From: Kelly, Gordon
To: Smart, John
Subject: Friday - 14 Sept 18 Observation - Block 8
Date: Tuesday, 18 September 2018 2:38:00 PM
Attachments: image003.png
image004.png

Hi John,

Can you have a look at the 'summary' statement and confirm its accuracy.

Once you or your team has confirmed its accuracy – we will initiate the next sequence of events to resolve the potential non-compliance.

Intentional break in email-

It has been reported – (unofficially at this stage) that there were electrical conduits being installed on Friday 14 September 18.
Location Block 8.
Installation potentially undertaken by unlicensed persons / or persons not under the direct supervision of an electrically licensed persons.

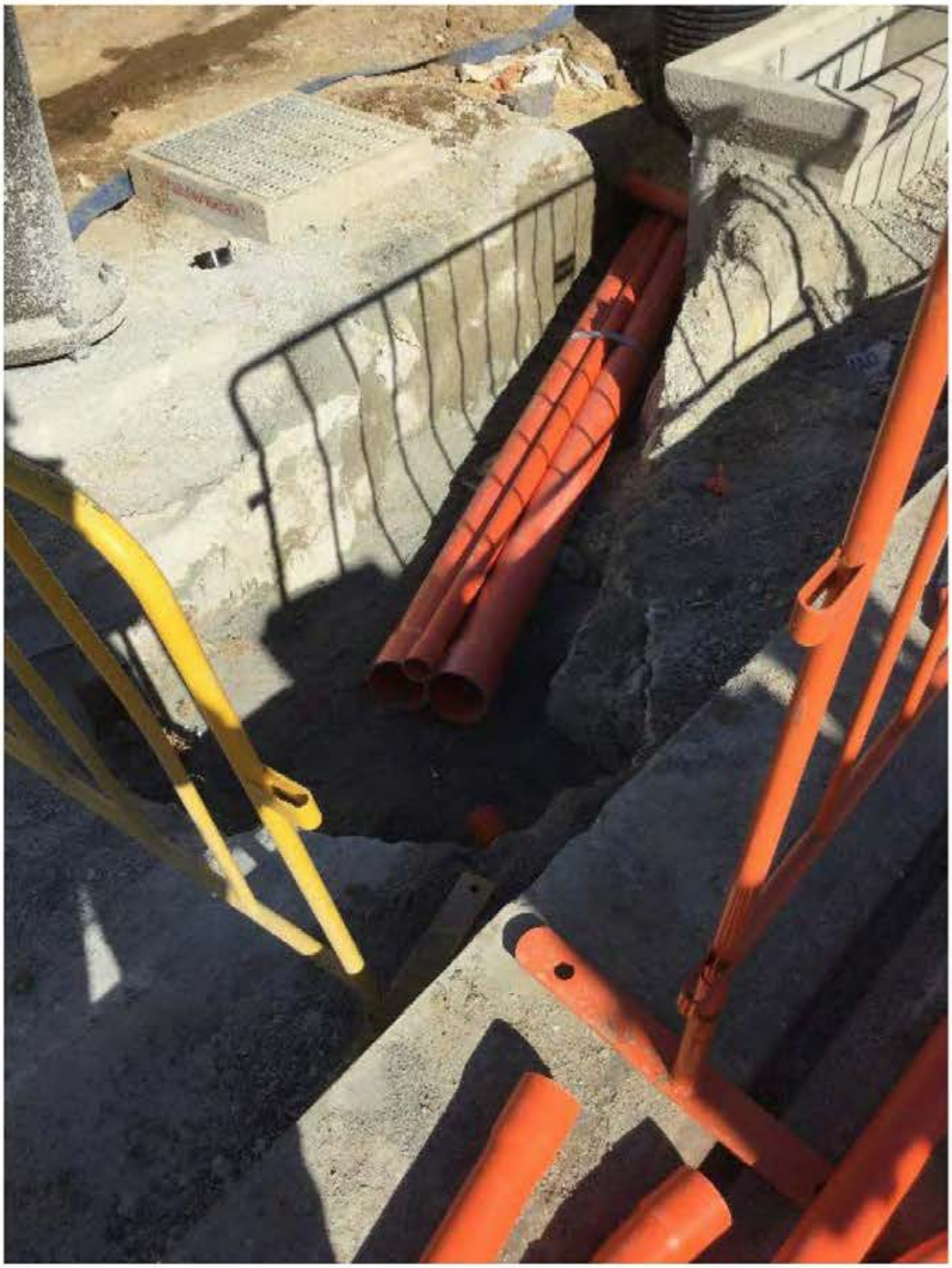
Can we work with Sch 2 2(a)(ii) – License nominee and confirm the location and associated activity.

Can we also – put this item on the 'agenda' for tomorrow's informal discussion?

If and when it's been confirmed that the activity has taken place, I have no other option, but to advise the Deputy Register – Construction Occupations Licensing.
This will potentially trigger a formal investigation into the events supporting this activity.

After the informal discussion, I will need to advise the senior executive of CMC of the impending action that will be taken.

Added the file fil_7f602d88-71dd-4418-9db8-1edbfb00e77a_iOSUpload with the notes, Power conduits being installed in trench next to OHW structure carrying wires by earthworks/drainage crew wth no electrical or structural qualifications to the clipboard element, Photos.



My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

Supporting
a safe and vibrant city
Access Canberra.
For more info on
how we do this,
Click here

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From: Sch 2 2.2(a)(ii)
Sent: 08/10/2018 5:43 PM
To: "Sch 2 2.2(a)(ii)
Cc: "Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject: FW: Report for Federal Highway intersection and the block 14.
Attachments: CANBERRA METRO PROJECT, FEDERAL HIGHWAY.pdf

FYI

From: Sch 2.2(a)(ii)
Sent: Monday, 8 October 2018 5:05 PM
Sch 2.2(a)(ii)
Cc: Sch 2.2(a)(ii)
Sch 2 2.2(a)(ii)
2.2(a)(ii)
Subject: Report for Federal Highway intersection and the block 14.

Please find the PDF report for the federal highway intersection and block 14.

Kind Regards

Sch 2.2(a)(ii)
Rail Systems Superintendent
METRO
Sch 2.2(a)(ii)

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IC Pipes Pty Ltd
7 Arriott Pl
Weiherill Parl
Tel:
Fax:
Email:

∑∅ / Main sections

Project name	Job NO. :	Operator :	Date :
CANBERRA METRO PROJECT, FED		Sch 2.2(a)(ii)	**4/10/2018**

No.	Start MH	End MH	Asset	Street	Material	Comments	m	(m)
5	P1A152.04HV1	P1A152.04HV1		FEDERAL HIGHWAY	Polyvinyl chloride		33.10	33.10
6	P1A152.04HV2	P1A152.05HV2		FEDERAL HIGHWAY	Polyvinyl chloride		33.60	33.60
7	P1B152.04LV1	P1B152.05LV1		FEDERAL HIGHWAY	Polyvinyl chloride		32.20	32.20
8	P1B152.04LV2	P1B152.05LV2		FEDERAL HIGHWAY	Polyvinyl chloride		33.10	33.10
9	P2152.30LV1	P2152.11LV1		FEDERAL HIGHWAY	Polyvinyl chloride		33.70	33.70
10	P2152.30LV1	P2152.11LV1		FEDERAL HIGHWAY	Polyvinyl chloride		30.50	30.50
11	PW1151.14HV1	PW1151.15HV1		FEDERAL HIGHWAY	Polyvinyl chloride		63.48	**62.88**
12	PW1151.05HV1	PW1151.04HV1		FEDERAL HIGHWAY	Polyvinyl chloride		53.20	**52.60**
13	P1A151.02LV1	P1A151.01LV1		FEDERAL HIGHWAY	Polyvinyl chloride		79.79	**79.19**
14	P1A151.02LV2	P1A151.01LV2		FEDERAL HIGHWAY	Polyvinyl chloride		68.06	**67.46**
15	P1A152.02LV2	P1A152.03LV2		FEDERAL HIGHWAY	Polyvinyl chloride		30.18	**29.73**

Pipe size: CIRCULAR 100 = 490.91 m (488.06 m)

No.	Start MH	End MH	Asset	Street	Material	Comments	m	(m)
1	LV152.10-HV1	HV152.05-HV1	LV152.10-HV1	FEDERAL HIGHWAY	Polyvinyl chloride		55.26	**54.66**
2	LV152.10-LV1	HV152.05-LV1	LV152.10-LV1	FEDERAL HIGHWAY	Polyvinyl chloride		55.06	**54.46**
3	HV152.05-HV1	LV152.10-HV1	LV152.10-HV1	FEDERAL HIGHWAY	Polyvinyl chloride		3.11	**2.51**
4	HV152.05-LV1	LV152.10-LV1	LV152.10-LV1	FEDERAL HIGHWAY	Polyvinyl chloride		3.40	**2.80**

Pipe size: CIRCULAR 150 = 116.83 m (114.43 m)

All sections = 607.74 m (602.49 m)

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

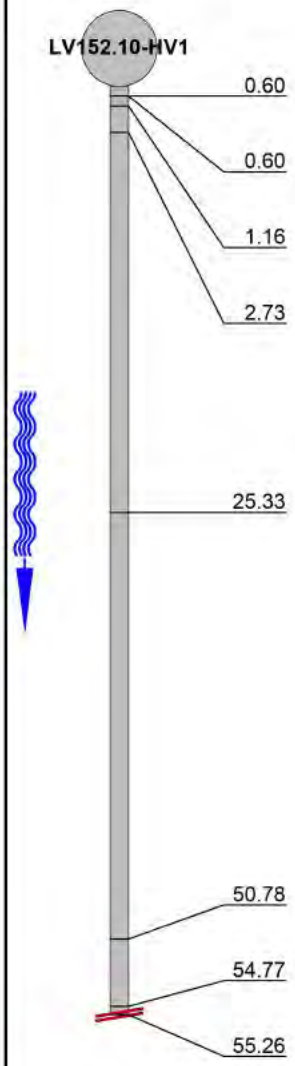
Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers	08:12:09	4/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular	Survey downstream	150 mm	

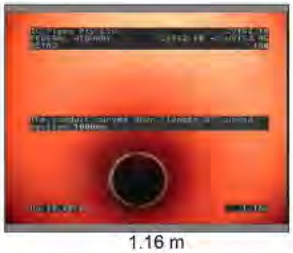
Lenght :	55.26 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :	LV152.10-HV1	**Work Order:**		**Suburb:**	WATSON
Start MH :	LV152.10-HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	HV152.05-HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

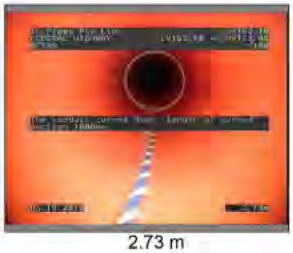
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

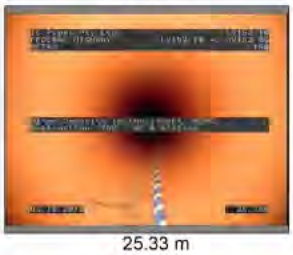
Comments: .

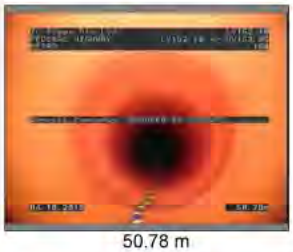


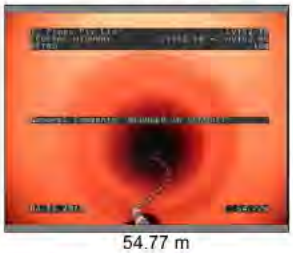
1:450 Position	Observation	Rate
0.60	Start node, terminal maintenance shaft, Nodename: LV152.10	
0.60	Water level, clear flow (the invert is visible), depth 0%	
1.16	The conduit curves down, length of curved section 1000mm	
2.73	The conduit curves down, length of curved section 1000mm	
25.33	Other Deposits in the invert, ROPE , Obstruction: <5% , at 6 o'clock	
50.78	General Comments REDUCER IN CONDUIT	
54.77	General Comments `REDUCER IN CONDUIT	
55.26	Inspection (survey) abandoned, obstruction , General Comments LIP IN CONDUIT	


1.16 m


2.73 m


25.33 m


50.78 m


54.77 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	1	5	0.09	5	2

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**1**	

Photo: S_Sectionname_4102018_1_3_A.JPG
1.16m, The conduit curves down, length of curved section 1000mm

Photo: S_Sectionname_4102018_1_4_A.JPG
2.73m, The conduit curves down, length of curved section 1000mm

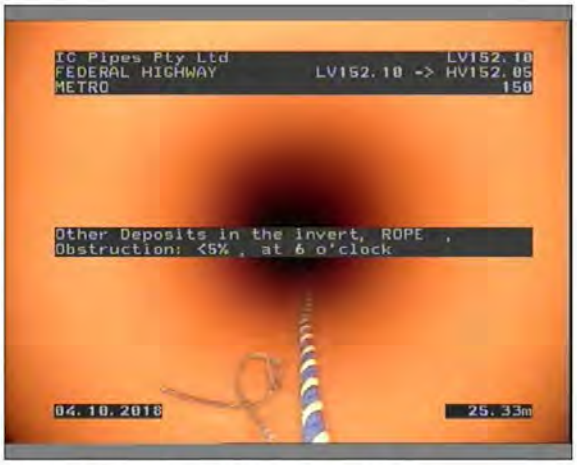


Photo: S_Sectionname_4102018_1_5_A.JPG
25.33m, Other Deposits in the invert, ROPE , Obstruction: <5% , at 6 o'clock

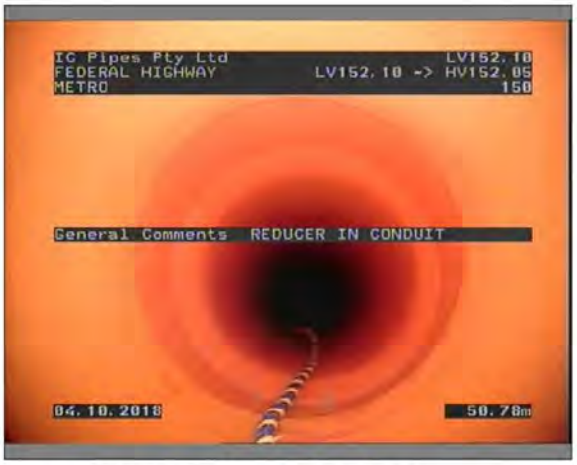


Photo: S_Sectionname_4102018_1_6_A.JPG
50.78m, General Comments REDUCER IN CONDUIT

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**1**	

Photo: S_Sectionname_4102018_1_7_A.JPG
54.77m, General Comments `REDUCER IN CONDUIT

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

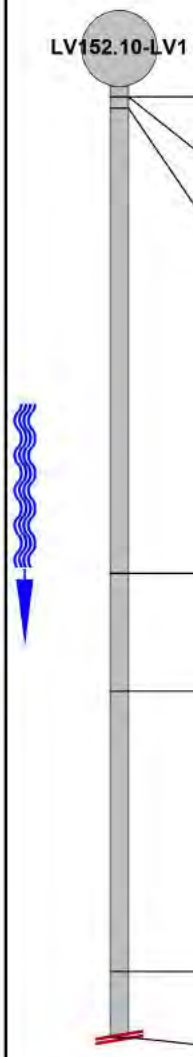
Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers	09:10:57	4/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular	Survey downstream	150 mm	

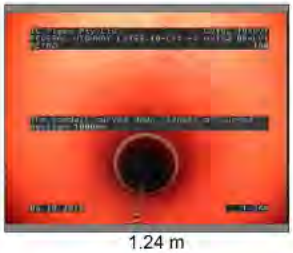
Lenght :	55.06 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :	LV152.10-LV1	**Work Order:**		**Suburb:**	WATSON
Start MH :	LV152.10-LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	HV152.05-LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

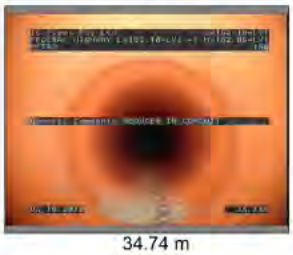
Comments: .

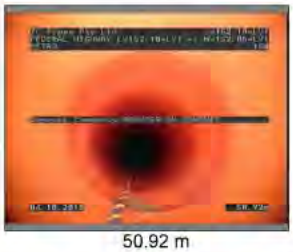


1:435 Position	Observation	Rate
0.60	Start node, terminal maintenance shaft, Nodename: LV152.10-LV1	
0.60	Water level, clear flow (the invert is visible), depth 0%	
1.24	The conduit curves down, length of curved section 1000mm	
27.99	General Comments INCORRECT SEATING IN CONDUIT	
34.74	General Comments REDUCER IN CONDUIT	
50.92	General Comments REDUCER IN CONDUIT	
54.72	Inspection (survey) abandoned, obstruction , General Comments LIP IN CONDUIT	


1.24 m

27.99 m


34.74 m


50.92 m

55.06 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**2**	

Photo: S_Sectionname_4102018_2_3_A.JPG
1.24m, The conduit curves down, length of curved section 1000mm

Photo: S_Sectionname_4102018_2_4_A.JPG
27.99m, General Comments INCORRECT SEATING IN CONDUIT

Photo: S_Sectionname_4102018_2_5_A.JPG
34.74m, General Comments REDUCER IN CONDUIT

Photo: S_Sectionname_4102018_2_6_A.JPG
50.92m, General Comments REDUCER IN CONDUIT

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**2**	

Photo: S_Sectionname_4102018_2_7_A.JPG
55.06m, General Comments REDUCER IN CONDUIT

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers	10:02:58	4/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular	Survey upstream	150 mm	

Lenght :	3.11 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :	LV152.10-HV1	**Work Order:**		**Suburb:**	WATSON
Start MH :	HV152.05-HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	LV152.10-HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

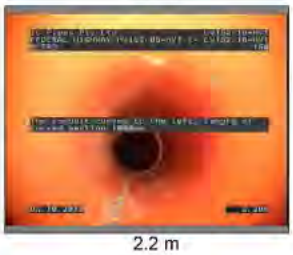
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:50 Position	Observation	Rate
HV152.05-HV1		
0.60	Start node, terminal maintenance shaft, Nodename: HV152.05-HV1	
0.60	Water level, clear flow (the invert is visible), depth 0%	
0.78	The conduit curves to the right, length of curved section 1000mm	
0.98	General Comments REDUCER IN CUNDUIT	
2.20	The conduit curves to the left, length of curved section 1000mm	
2.95	General Comments REDUCER INTO BOREHOLE	
3.11	Inspection (survey) abandoned, obstruction , General Comments CONDUIT TOO SMALL	

0.78 m

0.98 m


2.2 m

2.95 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**3**	

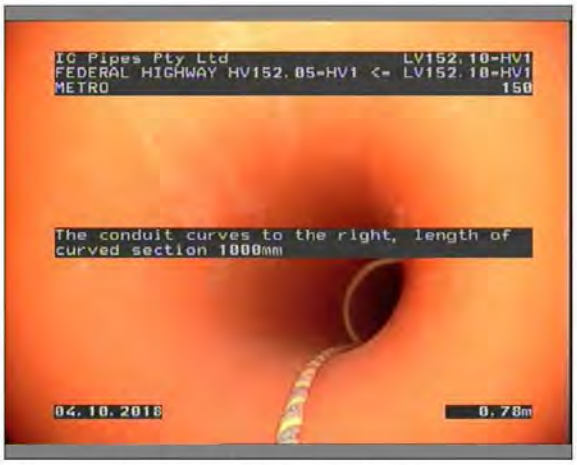


Photo: S_Sectionname_4102018_3_3_A.JPG
0.78m, The conduit curves to the right, length of curved section 1000mm

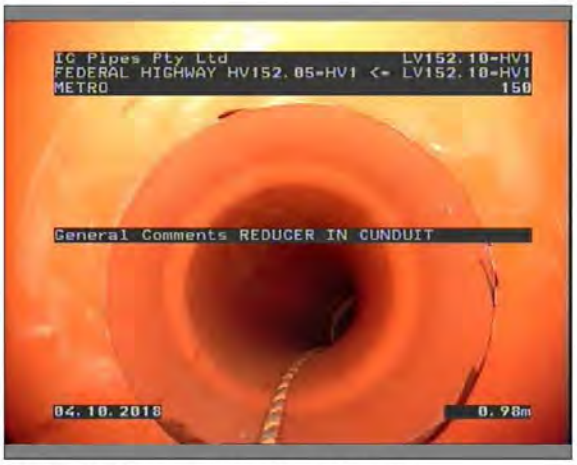


Photo: S_Sectionname_4102018_3_4_A.JPG
0.98m, General Comments REDUCER IN CUNDUIT

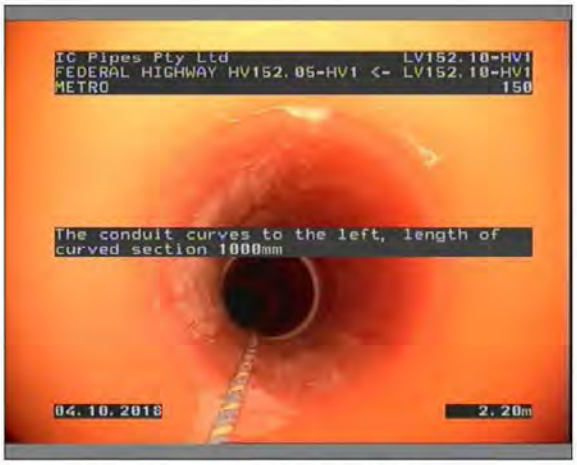


Photo: S_Sectionname_4102018_3_5_A.JPG
2.2m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_4102018_3_6_A.JPG
2.95m, General Comments REDUCER INTO BOREHOLE

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

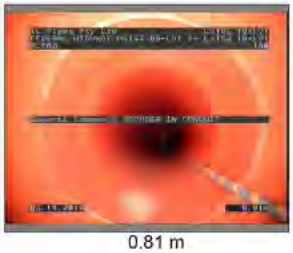
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers	10:15:19	4/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular	Survey upstream	150 mm	

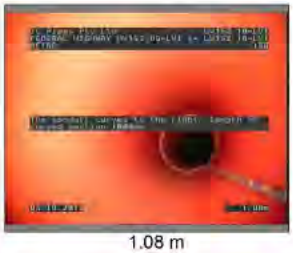
Lenght :	3.40 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :	LV152.10-LV1	**Work Order:**		**Suburb:**	WATSON
Start MH :	HV152.05-LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	LV152.10-LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

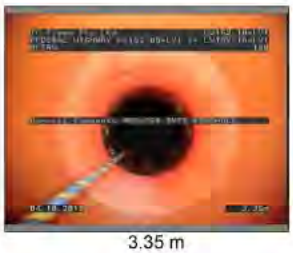
Comments: .

1:50 Position	Observation	Rate
HV152.05-LV1		
0.60	Start node, terminal maintenance shaft, Nodename: HV152.05-LV1	
0.60	Water level, clear flow (the invert is visible), depth 0%	
0.81	General Comments REDUCER IN CONDUIT	
1.08	The conduit curves to the right, length of curved section 1000mm	
2.54	The conduit curves to the left, length of curved section 1000mm	
3.35	General Comments REDUCER INTO BOREHOLE	
3.40	Inspection (survey) abandoned, obstruction , General Comments CONDUIT TOO SMALL	


0.81 m


1.08 m

2.54 m


3.35 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**4/10/2018**	**4**	

Photo: S_Sectionname_4102018_4_3_A.JPG
0.81m, General Comments REDUCER IN CONDUIT

Photo: S_Sectionname_4102018_4_4_A.JPG
1.08m, The conduit curves to the right, length of curved section 1000mm

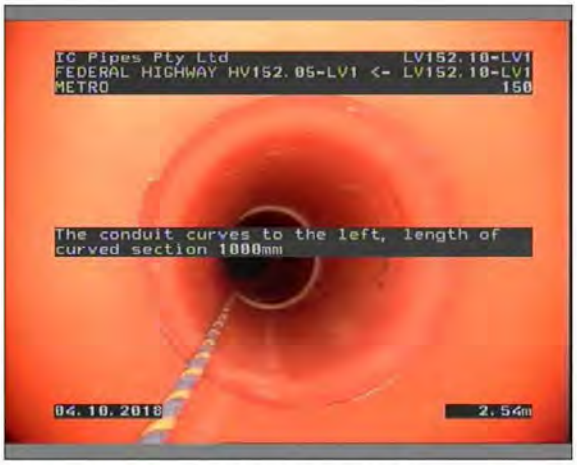


Photo: S_Sectionname_4102018_4_5_A.JPG
2.54m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_4102018_4_6_A.JPG
3.35m, General Comments REDUCER INTO BOREHOLE

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

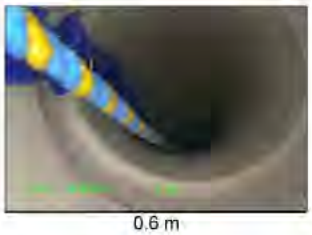
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	33.10 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1A152.04HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1A152.04HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

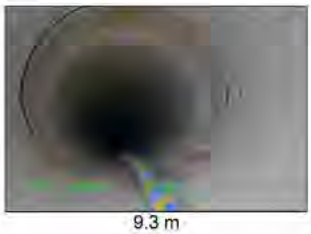
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments:

1:270	Position	Observation	Rate
P1A152.04HV1	0.00	Start node, terminal maintenance shaft, Nodename: , General Comments P1A152.04HV1	
	0.60	The conduit curves to the right, length of curved section 1000mm	
	9.30	The conduit curves down, length of curved section 1000mm	
	33.10	Inspection (survey) abandoned, OUT OF CABLE	



0.6 m



9.3 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**5/10/2018**	**5**	

Photo: S_Sectionname_5102018_5_2_A.jpg
0.6m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_5102018_5_3_A.jpg
9.3m, The conduit curves down, length of curved section 1000mm

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12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
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Inspection Report

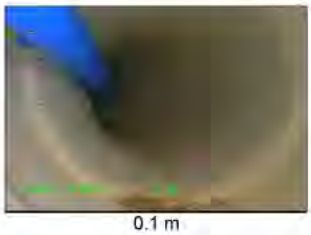
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

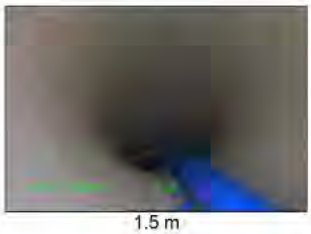
Lenght :	33.60 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1A152.04HV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1A152.05HV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

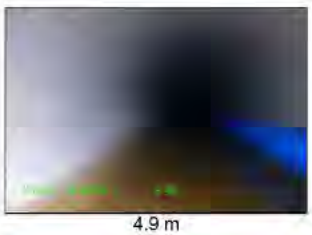
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

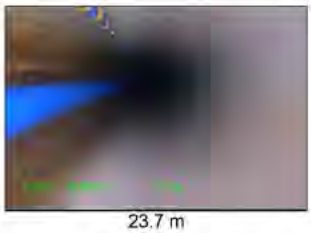
Comments:

1:270 Position	Observation	Rate
P1A152.04HV2		
0.00	Start node, terminal maintenance shaft, Nodename: , General Comments P1A152.04HV2	
0.10	The conduit curves to the left, length of curved section 1000mm	
1.50	The conduit curves down, length of curved section 1000mm	
4.90	General Comments WATER HOLDING	
23.70	General Comments WATER HOLDING	
33.60	Inspection (survey) abandoned, OUT OF CABLE	


0.1 m


1.5 m


4.9 m


23.7 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**5/10/2018**	**6**	

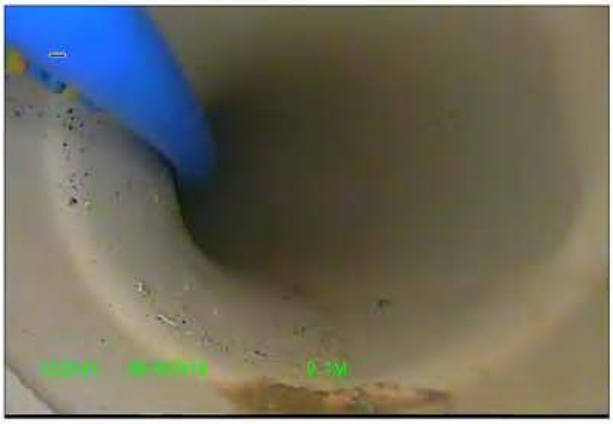

Photo: S_Sectionname_5102018_6_2_A.jpg
0.1m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_5102018_6_3_A.jpg
1.5m, The conduit curves down, length of curved section 1000mm

Photo: S_Sectionname_5102018_6_4_A.jpg
4.9m, General Comments WATER HOLDING

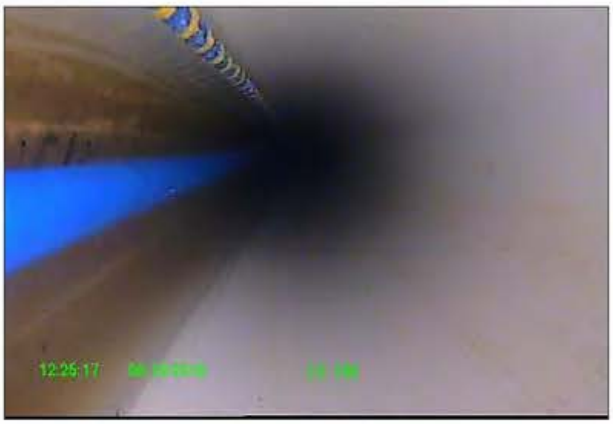

Photo: S_Sectionname_5102018_6_5_A.jpg
23.7m, General Comments WATER HOLDING

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Suburb : Wetherill Parl
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Inspection Report

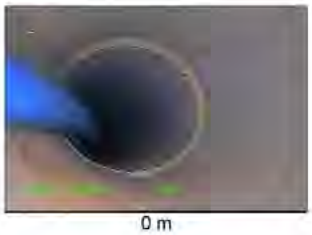
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	32.20 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1B152.04LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1B152.05LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

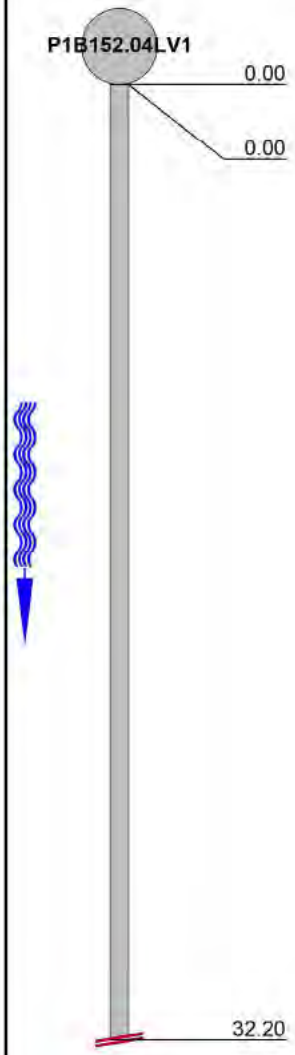
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments:

1:255	Position	Observation	Rate



0 m



Position	Observation
0.00	Start node, terminal maintenance shaft, Nodename: P1B152.04LV1
0.00	The conduit curves to the left, length of curved section 1000mm
32.20	Inspection (survey) abandoned, OUT OF CABLE

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**5/10/2018**	**7**	

Photo: S_Sectionname_5102018_7_2_A.jpg
0m, The conduit curves to the left, length of curved section 1000mm

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12/14 Holbeche Rd 7 Arnott Pl
Suburb Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	33.10 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1B152.04LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1B152.05LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:270	Position	Observation	Rate
P1B152.04LV2	0.00	Start node, terminal maintenance shaft. Nodename: P1B152.04LV2	
	0.60	The conduit curves down, length of curved section 1000mm	
	33.10	Inspection (survey) abandoned, OUT OF CABLE	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Suburb : Wetherill Parl
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Email:

Inspection Report

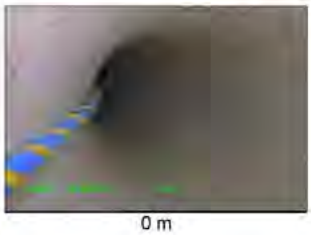
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

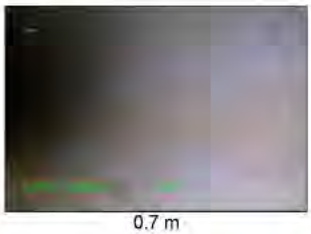
Lenght :	33.70 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P2152.30LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P2152.11LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

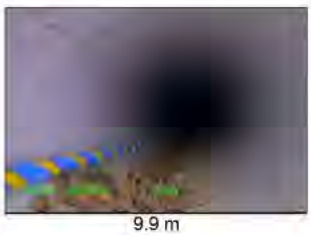
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

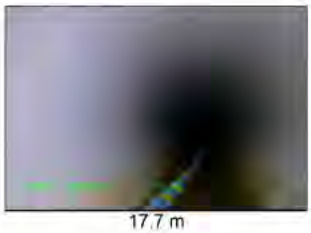
Comments:

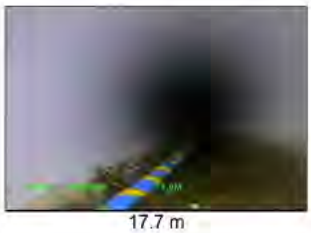
1:270	Position	Observation	Rate
P2152.30LV1	0.00	Start node, terminal maintenance shaft, Nodename:	
	0.00	The conduit curves to the right, length of curved section 1000mm	
	0.00	Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , at 6 o'clock	
	0.70	The conduit curves to the left, length of curved section 1000mm	
	6.30	Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , at 6 o'clock	
	9.90	Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , from 5 to 7 o'clock	
	17.70	General Comments WATER HOLDING	
	28.90	Deposit is fine sediments- Sand or Silt in the invert, at joint , Obstruction: <5% , at 6 o'clock	
	33.70	Inspection (survey) abandoned, OUT OF CABLE	


0 m


0.7 m


9.9 m


17.7 m


17.7 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	3	5	0.45	15	2

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	5/10/2018	9	

Photo: S_Sectionname_5102018_9_2_A.jpg
0m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_5102018_9_3_A.jpg
0.7m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_5102018_9_6_A.jpg
9.9m, Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , from 5 to 7 o'clock

Photo: S_Sectionname_5102018_9_7_A.jpg
17.7m, General Comments WATER HOLDING

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**5/10/2018**	**9**	

Photo: S_Sectionname_5102018_9_7_B.jpg
17.7m, General Comments WATER HOLDING

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
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Inspection Report

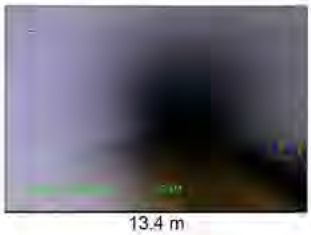
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Showers		5/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

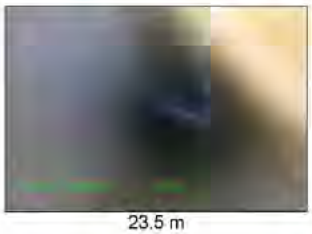
Lenght :	30.50 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P2152.30LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P2152.11LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments:

1:255	Position	Observation	Rate
P2152.30LV1	0.00	Start node, terminal maintenance shaft, Nodename: P2152.30LV1	
	0.00	The conduit curves to the right, length of curved section 1000mm	
	13.40	General Comments WATER HOLDING	
	23.50	General Comments WATER HOLDING	
	30.50	Finish node, terminal maintenance shaft, Nodename: P2152.11LV1	
P2152.11LV1			


13.4 m


23.5 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**5/10/2018**	**10**	

Photo: S_Sectionname_5102018_10_3_A.jpg
13.4m, General Comments WATER HOLDING

Photo: S_Sectionname_5102018_10_4_A.jpg
23.5m, General Comments WATER HOLDING

IC Pipes Pty Ltd
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Suburb : Wetherill Parl
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Inspection Report

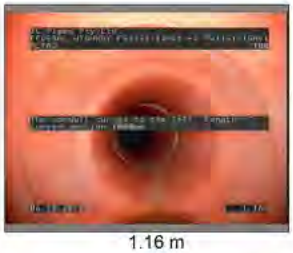
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		6/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	63.48 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	PW1151.14HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	PW1151.15HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

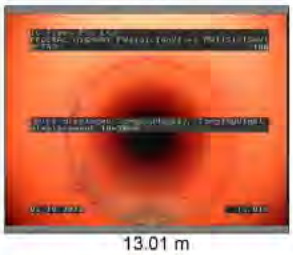
DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

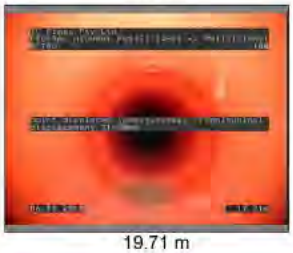
1:504 Position	Observation	Rate
0.60	Start node, terminal maintenance shaft, Nodename: PW1151.14HV1	
PW1151.14HV1		
1.16	The conduit curves to the left, length of curved section 1000mm	
10.06	General Comments REDUCER IN CONDUIT	
13.01	Joint displaced longitudinaly, longitudinal displacement 10-20mm	
16.96	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
19.71	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
27.44	General Comments WATER HOLDING	
27.88	Joint displaced longitudinaly, longitudinal displacement 10-20mm	
29.06	Breaking, some pieces are missing, at joint, length of break 100, General Comments NOT A CLEAN CUT IN CONDUIT, from 4 to 7 o'clock	
30.23	General Comments WATER HOLDING	
30.63	Joint displaced longitudinaly, longitudinal displacement >30mm	
50.74	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
54.80	Joint displaced longitudinaly, longitudinal displacement 10-20mm	
58.84	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
62.87	Joint displaced longitudinaly, longitudinal displacement 21-30mm	


1.16 m

10.06 m


13.01 m

16.96 m


19.71 m

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Street: Wetherill Parl
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Inspection Report

Contract NO. :	Job No :	Work Order No :	Asset No:	Date :	Time :
				6/10/2018	
Operator :	Weather :	Suburb :	Map No :		
Liam de Vries	**Dry**	**WATSON**			

1:504	Position	Observation	Rate
	63.48	Inspection (survey) abandoned, WHEELS SPINNING	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
11	**2**	**0.11**	**7**	**1**	**0**	**0**	**0**	**0**	**1**

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**11**	

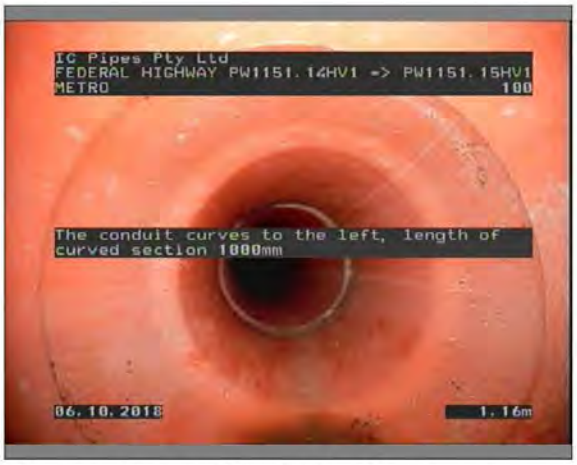

Photo: S_Sectionname_6102018_11_2_A.JPG
1.16m, The conduit curves to the left, length of curved section 1000mm

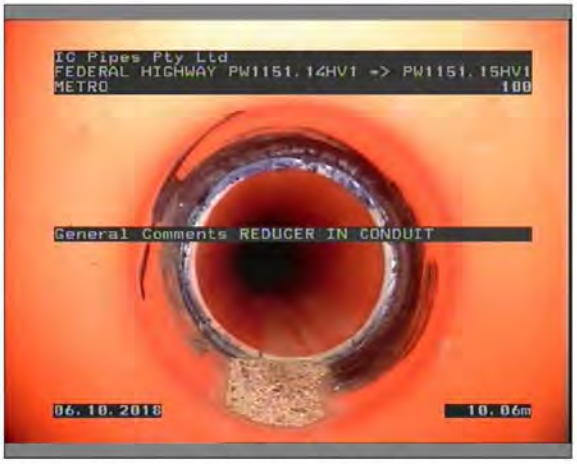

Photo: S_Sectionname_6102018_11_3_A.JPG
10.06m, General Comments REDUCER IN CONDUIT

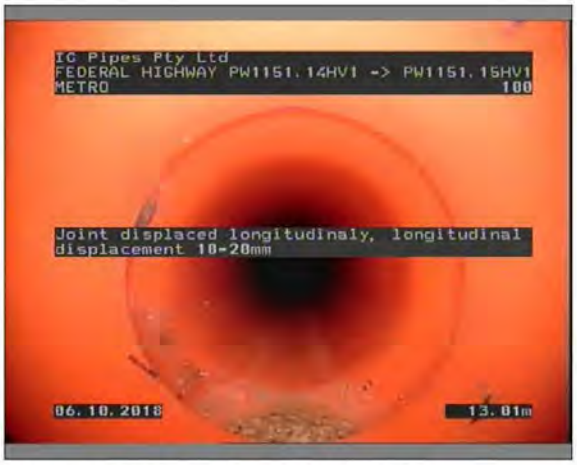

Photo: S_Sectionname_6102018_11_4_A.JPG
13.01m, Joint displaced longitudinaly, longitudinal displacement 10-20mm

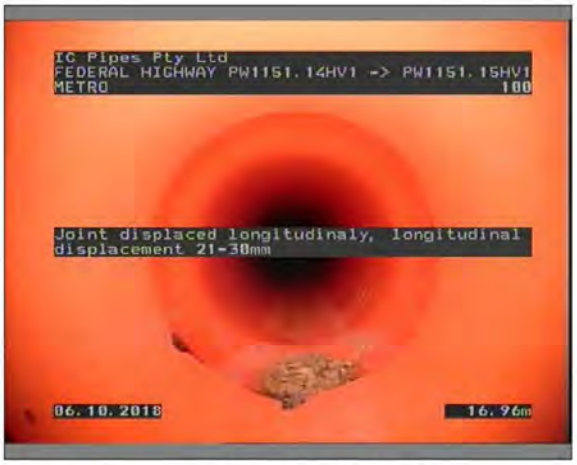

Photo: S_Sectionname_6102018_11_5_A.JPG
16.96m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**11**	

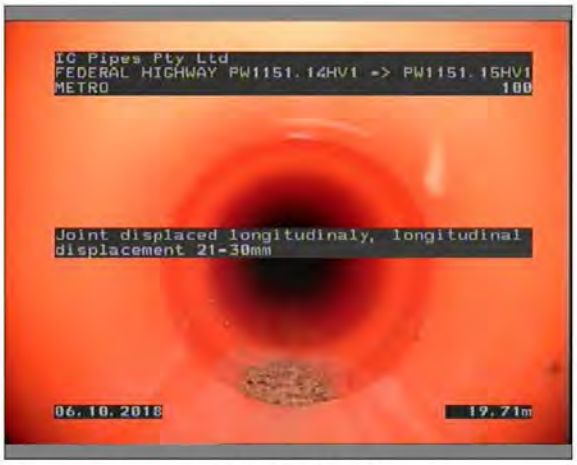

Photo: S_Sectionname_6102018_11_6_A.JPG
19.71m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

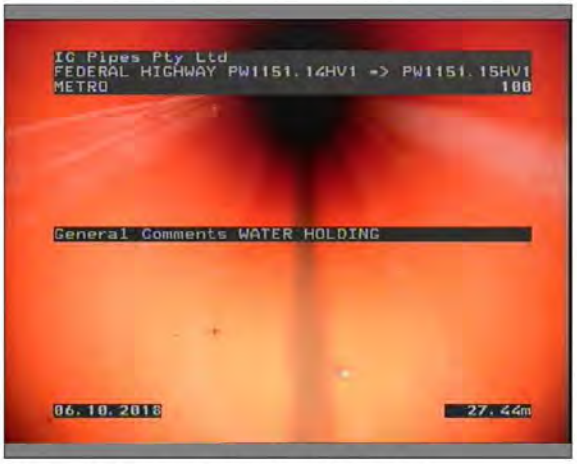

Photo: S_Sectionname_6102018_11_7_A.JPG
27.44m, General Comments WATER HOLDING

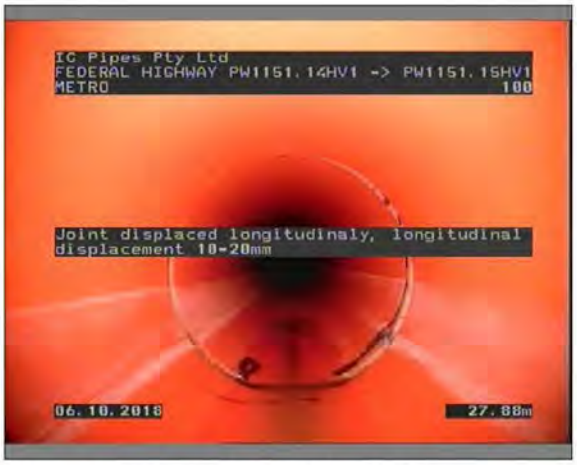

Photo: S_Sectionname_6102018_11_8_A.JPG
27.88m, Joint displaced longitudinaly, longitudinal displacement 10-20mm

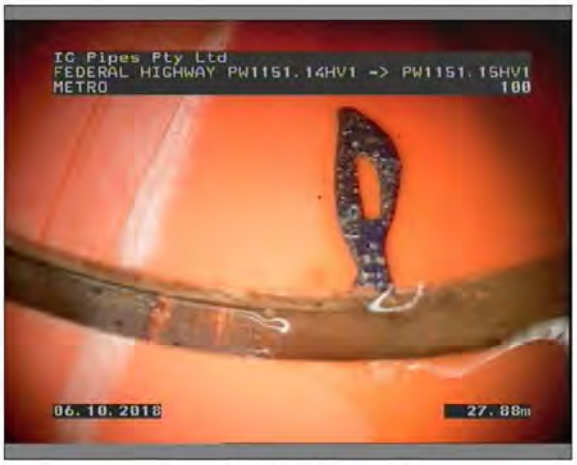

Photo: S_Sectionname_6102018_11_8_B.JPG
27.88m, Joint displaced longitudinaly, longitudinal displacement 10-20mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**11**	

Photo: S_Sectionname_6102018_11_9_A.JPG
29.06m, Breaking, some pieces are missing, at joint, length of break 100, General Comments NOT A CLEAN CUT IN CONDUIT, from 4 to 7 o'clock

Photo: S_Sectionname_6102018_11_9_B.JPG
29.06m, Breaking, some pieces are missing, at joint, length of break 100, General Comments NOT A CLEAN CUT IN CONDUIT, from 4 to 7 o'clock

Photo: S_Sectionname_6102018_11_10_A.JPG
30.23m, General Comments WATER HOLDING

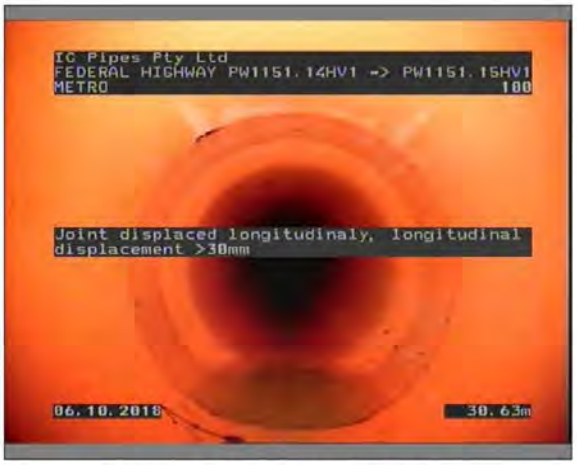

Photo: S_Sectionname_6102018_11_11_A.JPG
30.63m, Joint displaced longitudinaly, longitudinal displacement >30mm

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City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**11**	

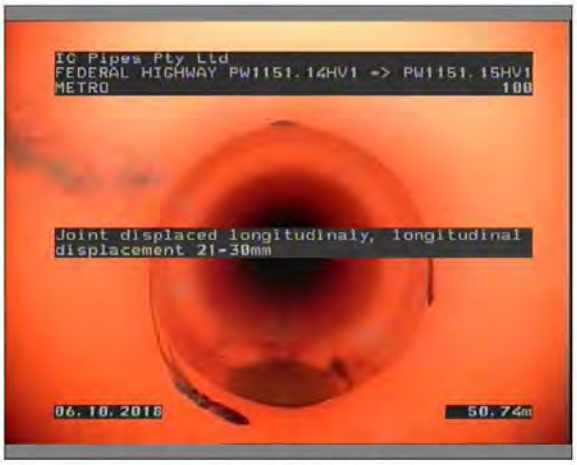

Photo: S_Sectionname_6102018_11_12_A.JPG
50.74m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_11_13_A.JPG
54.8m, Joint displaced longitudinaly, longitudinal displacement 10-20mm

Photo: S_Sectionname_6102018_11_14_A.JPG
58.84m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

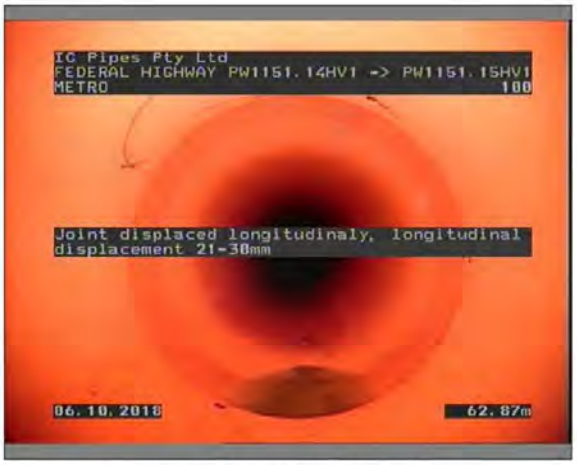

Photo: S_Sectionname_6102018_11_15_A.JPG
62.87m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

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Inspection Report

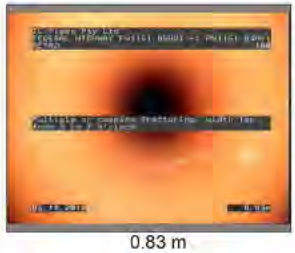
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		6/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	53.20 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	PW1151.05HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	PW1151.04HV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

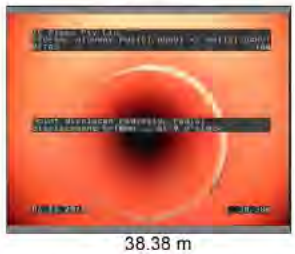
1:420	Position	Observation	Rate
PW1151.05HV1			
	0.60	Start node, terminal maintenance shaft, Nodename: PW1151.05HV1	
	0.83	Multiple or complex fracturing, width 1mm , from 3 to 7 o'clock	
	2.63	The conduit curves to the left, length of curved section 1000mm	
	6.14	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
	38.38	Joint displaced radially, radial displacement 5-10mm , at 9 o'clock	
	39.79	The conduit curves to the right, length of curved section 1000mm	
	43.39	The conduit curves to the left, length of curved section 1000mm	
	45.69	Joint displaced longitudinaly, longitudinal displacement >30mm	
	48.55	Joint displaced longitudinaly, longitudinal displacement >30mm	
	52.61	Other Deposits in the invert, OFF CUT OF CONDUIT , Obstruction: 5-20% , at 6 o'clock	
	52.61	Joint displaced longitudinaly, longitudinal displacement >30mm	
	52.88	The conduit curves up, length of curved section 1000mm	
	53.20	Inspection (survey) abandoned, UNABLE TO PASS LIP DUE TO INCLINE OF CONDUIT	


0.83 m

0.83 m

2.63 m

6.14 m


38.38 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
12	80	3.36	178.5	5	0	30	0	0	3

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**12**	

Photo: S_Sectionname_6102018_12_2_A.JPG
0.83m, Multiple or complex fracturing, width 1mm , from 3 to 7 o'clock

Photo: S_Sectionname_6102018_12_2_B.JPG
0.83m, Multiple or complex fracturing, width 1mm , from 3 to 7 o'clock

Photo: S_Sectionname_6102018_12_3_A.JPG
2.63m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_6102018_12_4_A.JPG
6.14m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	6/10/2018	12	

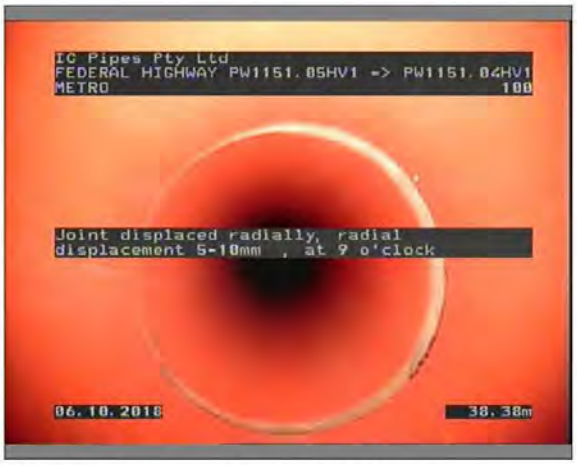

Photo: S_Sectionname_6102018_12_5_A.JPG
38.38m, Joint displaced radially, radial displacement 5-10mm , at 9 o'clock

Photo: S_Sectionname_6102018_12_5_B.JPG
38.38m, Joint displaced radially, radial displacement 5-10mm , at 9 o'clock

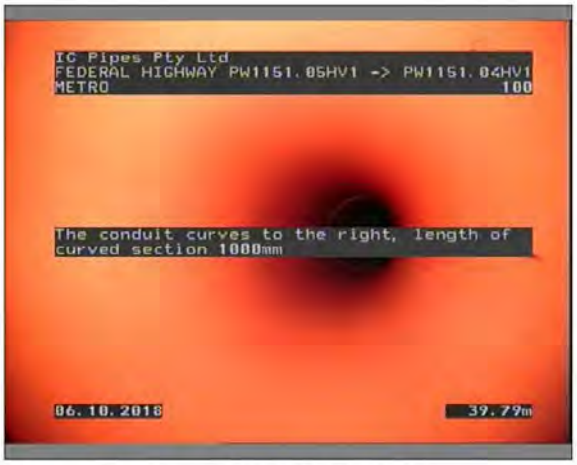

Photo: S_Sectionname_6102018_12_6_A.JPG
39.79m, The conduit curves to the right, length of curved section 1000mm

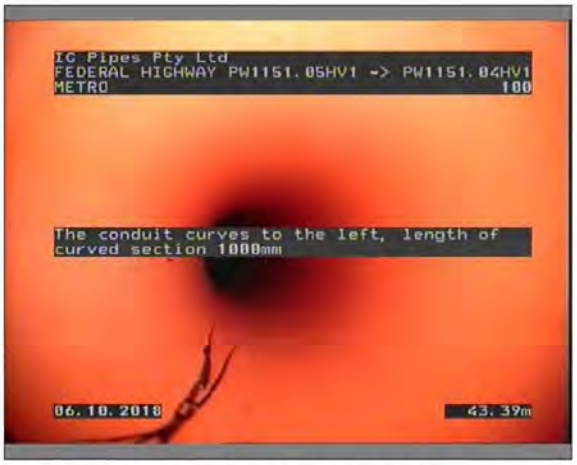

Photo: S_Sectionname_6102018_12_7_A.JPG
43.39m, The conduit curves to the left, length of curved section 1000mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**12**	

Photo: S_Sectionname_6102018_12_8_A.JPG
45.69m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_12_9_A.JPG
48.55m, Joint displaced longitudinaly, longitudinal displacement >30mm

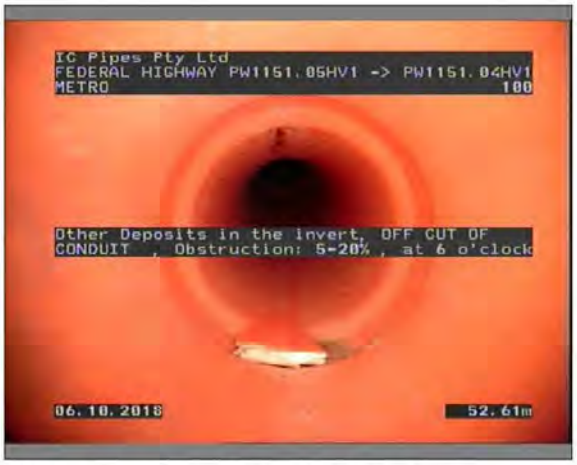

Photo: S_Sectionname_6102018_12_10_A.JPG
52.61m, Other Deposits in the invert, OFF CUT OF CONDUIT , Obstruction: 5-20% , at 6 o'clock

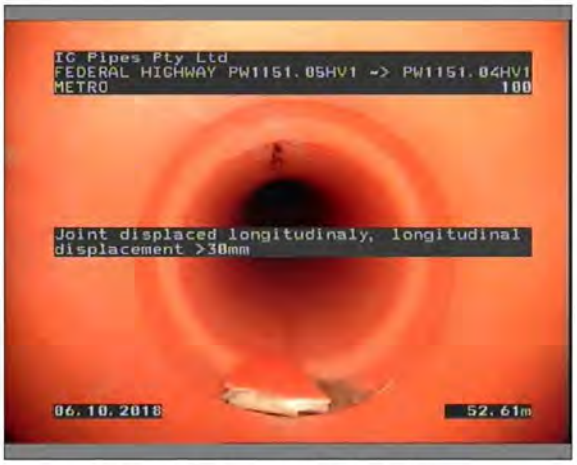

Photo: S_Sectionname_6102018_12_11_A.JPG
52.61m, Joint displaced longitudinaly, longitudinal displacement >30mm

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City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**12**	

Photo: S_Sectionname_6102018_12_12_A.JPG
52.88m, The conduit curves up, length of curved section 1000mm

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Inspection Report

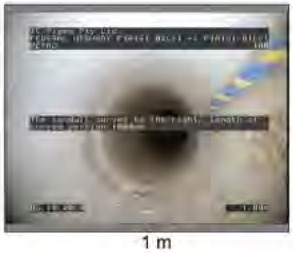
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		6/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	79.79 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1A151.02LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1A151.01LV1	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:450 Position	Observation	Rate
0.60	Start node, terminal maintenance shaft, Nodename: P1A151.02LV1	
1.00	The conduit curves to the right, length of curved section 1000mm	
1.00	Joint displaced radially, radial displacement >20mm , at 3 o'clock	
1.29	General Comments CCONDUIT HAS NOT BEEN CLEAN CUT	
1.34	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock	
3.80	Joint displaced longitudinaly, longitudinal displacement >30mm	
9.89	Joint displaced longitudinaly, longitudinal displacement >30mm	
14.12	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
20.20	Joint displaced longitudinaly, longitudinal displacement >30mm	
26.33	General Comments JOINT OF CONDUIT HAS PEELED BACK	
32.29	General Comments JOINT OF CONDUIT HAS PEELED BACK	
32.31	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
38.44	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
50.57	General Comments JOINT OF CONDUIT HAS PEELED BACK	
56.56	General Comments JOINT OF CONDUIT HAS PEELED BACK	


1 m

1.29 m

1.34 m

3.8 m

9.89 m

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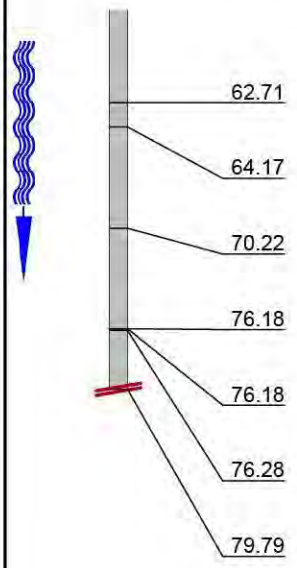
Inspection Report

Contract NO. :	Job No :	Work Order No :	Asset No:	Date :	Time :
				6/10/2018	
Operator :	Weather :	Suburb :	Map No :		
Liam de Vries	Dry	WATSON			



1:450 Position	Observation	Rate
62.71	General Comments JOINT OF CONDUIT HAS PEELED BACK	
64.17	Joint displaced radially, radial displacement 5-10mm , at 8 o'clock	
70.22	Joint displaced longitudinaly, longitudinal displacement >30mm	
76.18	General Comments BULGE IN CONDUIT	
76.18	The conduit curves down, length of curved section 1000mm	
76.28	Joint displaced longitudinaly, longitudinal displacement >30mm	
79.79	Inspection (survey) abandoned, UNABLE TO PASS LIP	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
20	45	0.88	70	4	0	30	0	0	3

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	6/10/2018	13	

Photo: S_Sectionname_6102018_13_2_A.JPG
1m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_6102018_13_4_A.JPG
1.29m, General Comments CCONDUIT HAS NOT BEEN CLEAN CUT

Photo: S_Sectionname_6102018_13_5_A.JPG
1.34m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_6102018_13_6_A.JPG
3.8m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**13**	

Photo: S_Sectionname_6102018_13_7_A.JPG
9.89m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_13_8_A.JPG
14.12m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_13_9_A.JPG
20.2m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_13_10_A.JPG
26.33m, General Comments JOINT OF CONDUIT HAS PEELED BACK

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**13**	

Photo: S_Sectionname_6102018_13_11_A.JPG
32.29m, General Comments JOINT OF CONDUIT HAS PEELED BACK

Photo: S_Sectionname_6102018_13_12_A.JPG
32.31m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_13_13_A.JPG
38.44m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_13_14_A.JPG
50.57m, General Comments JOINT OF CONDUIT HAS PEELED BACK

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**13**	

Photo: S_Sectionname_6102018_13_15_A.JPG
56.56m, General Comments JOINT OF CONDUIT HAS PEELED BACK

Photo: S_Sectionname_6102018_13_16_A.JPG
62.71m, General Comments JOINT OF CONDUIT HAS PEELED BACK

Photo: S_Sectionname_6102018_13_17_A.JPG
64.17m, Joint displaced radially, radial displacement 5-10mm , at 8 o'clock

Photo: S_Sectionname_6102018_13_18_A.JPG
70.22m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**13**	

Photo: S_Sectionname_6102018_13_19_A.JPG
76.18m, General Comments BULGE IN CONDUIT

Photo: S_Sectionname_6102018_13_20_A.JPG
76.18m, The conduit curves down, length of curved section 1000mm

Photo: S_Sectionname_6102018_13_21_A.JPG
76.28m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_13_22_A.JPG
79.79m, Inspection (survey) abandoned, UNABLE TO PASS LIP

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Suburb : Wetherill Parl
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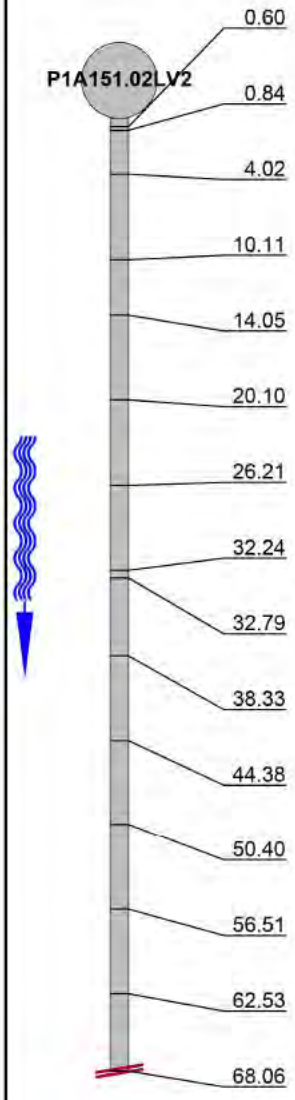
Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		6/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	68.06 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1A151.02LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1A151.01LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .



1:540 Position	Observation	Rate
0.60	Start node, terminal maintenance shaft, Nodename: P1A151.02LV2	
0.84	The conduit curves to the right, length of curved section 1000mm	
4.02	Joint displaced longitudinaly, longitudinal displacement >30mm	
10.11	Joint displaced longitudinaly, longitudinal displacement >30mm	
14.05	Joint displaced longitudinaly, longitudinal displacement >30mm	
20.10	Joint displaced longitudinaly, longitudinal displacement >30mm	
26.21	Joint displaced longitudinaly, longitudinal displacement >30mm	
32.24	Joint displaced longitudinaly, longitudinal displacement >30mm	
32.79	Hole in wall , at 2 o'clock	
38.33	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
44.38	General Comments JOINT OF CONDUIT PEELED BACK	
50.40	General Comments JOINT OF CONDUIT PEELED BACK	
56.51	General Comments JOINT PEELED BACK AND SPLIT	
62.53	General Comments JOINT PEELED BACK	
68.06	Inspection (survey) abandoned, WHEELS SPINNING	

0.84 m

4.02 m

10.11 m

14.05 m

20.1 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
12	2	0.22	15	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**14**	

Photo: S_Sectionname_6102018_14_2_A.JPG
0.84m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_6102018_14_3_A.JPG
4.02m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_14_4_A.JPG
10.11m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_14_5_A.JPG
14.05m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**14**	

Photo: S_Sectionname_6102018_14_6_A.JPG
20.1m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_14_7_A.JPG
26.21m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_14_8_A.JPG
32.24m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_14_9_A.JPG
32.79m, Hole in wall , at 2 o'clock

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**14**	

Photo: S_Sectionname_6102018_14_9_B.JPG
32.79m, Hole in wall , at 2 o'clock

Photo: S_Sectionname_6102018_14_10_A.JPG
38.33m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_14_11_A.JPG
44.38m, General Comments JOINT OF CONDUIT PEELED BACK

Photo: S_Sectionname_6102018_14_11_B.JPG
44.38m, General Comments JOINT OF CONDUIT PEELED BACK

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**14**	

Photo: S_Sectionname_6102018_14_12_A.JPG
50.4m, General Comments JOINT OF CONDUIT PEELED BACK

Photo: S_Sectionname_6102018_14_13_A.JPG
56.51m, General Comments JOINT PEELED BACK AND SPLIT

Photo: S_Sectionname_6102018_14_14_A.JPG
62.53m, General Comments JOINT PEELED BACK

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		6/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	30.18 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	WATSON
Start MH :	P1A152.02LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	
Finish MH :	P1A152.03LV2	**Address:**	FEDERAL HIGHWAY	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	100mm	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:240 Position	Observation	Rate
P1A152.02LV2		
0.45	Start node, terminal maintenance shaft, Nodename: P1A152.02LV2	
0.62	The conduit curves to the left, length of curved section 1000mm	
1.97	Joint displaced longitudinaly, longitudinal displacement >30mm	
8.03	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
8.03	General Comments CONDUIT NOT CLEAN CUT	
8.48	General Comments BULGE IN CONDUIT	
10.93	General Comments BULGE IN CONDUIT	
13.37	General Comments BULGE IN INVERT OF CONDUIT	
19.29	General Comments CONDUIT NOT CLEAN CUT	
28.20	Joint displaced longitudinaly, longitudinal displacement >30mm	
29.73	Other Deposits in the invert, ROCK , Obstruction: 5-20% , at 6 o'clock	
30.18	Inspection (survey) abandoned, ROCKS IN CONDUIT	

0.62 m

1.97 m

8.03 m

8.03 m

8.48 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
10	4	0.36	11	1	0	30	0	0	3

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**15**	

Photo: S_Sectionname_6102018_15_2_A.JPG
0.62m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_6102018_15_3_A.JPG
1.97m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_15_4_A.JPG
8.03m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

Photo: S_Sectionname_6102018_15_5_A.JPG
8.03m, General Comments CONDUIT NOT CLEAN CUT

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Tel:
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Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**15**	

Photo: S_Sectionname_6102018_15_6_A.JPG
8.48m, General Comments BULGE IN CONDUIT

Photo: S_Sectionname_6102018_15_7_A.JPG
10.93m, General Comments BULGE IN CONDUIT

Photo: S_Sectionname_6102018_15_8_A.JPG
13.37m, General Comments BULGE IN INVERT OF CONDUIT

Photo: S_Sectionname_6102018_15_9_A.JPG
19.29m, General Comments CONDUIT NOT CLEAN CUT

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FEDERAL HIGHWAY	**6/10/2018**	**15**	

Photo: S_Sectionname_6102018_15_10_A.JPG
28.2m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_6102018_15_11_A.JPG
29.73m, Other Deposits in the invert, ROCK , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_6102018_15_12_A.JPG
30.18m, Inspection (survey) abandoned, ROCKS IN CONDUIT

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From: Sch 2 2.2(a)(ii)
Sent: 11/10/2018 4:13 PM
To: "Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Cc: "Sch 2 2.2(a)(ii)
Subject: FW: Bridge Conduits

fyi

Regards,

Sch 2 2.2(a)(ii)
Director
Sch 2 2.2(a)(ii)
www.specialistelectrical.com.au

From: Sch 2 2.2(a)(ii)
Sent: Wednesday, 22 August 2018 5:39 PM
Subject: Bridge Conduits

Guys,

I have reviewed the conduits on one of the bridges today. The main issue is where the conduits leave the underground installation and rise to shallow depths entering the bridge structure.

There are clauses which need to be meet to make this as risk free to future damage as practical, see below.

I would expect as a minimum the following controls from future damage from 2.5m either side of the bridge.

1. Hard caver 100mm over the rising conduits.
2. Concrete encased conduits entering the bridge.
3. Hard cover under the final concrete layer (or pavers) extending over the full bridge length, plus 2.5m past, and 50mm past the edge of the outer conduits
4. Clear warning signs in SS indicating conduit location direction and depth. Placed either side, and 2.5m past, the bridge ends.

I hope this helps.

Regards
Sch 2 2.2(a)(ii)

3.3.2.6 Impact
Wiring systems shall be selected and installed so as to minimize the risk of mechanical damage.
Protection against mechanical damage shall be provided by one or any combination of the following:

(a) Mechanical characteristics of the wiring system.
(b) Location selected.
(c) Provision of additional local or general mechanical protection.

3.11 UNDERGROUND WIRING SYSTEMS

3.11.1 Suitability and protection

Cables installed underground shall be—

(a) suitable for the environment in which they are placed; and

(b) provided with protection against inadvertent damage likely to be caused by manual or mechanical excavation work; and

(c) provided with suitable warnings, marking or other means to minimize the risk of inadvertent damage likely to be caused by manual or mechanical excavation works.

3.11.2 Classification of wiring systems

Underground cables shall be—

(a) of a type specified in Column 1 of Table 3.5; and

(b) installed in accordance with a category of installation permitted in Columns 2 to 9 of Table 3.5.

NOTE: Underground wiring systems do not include those that are—

(i) embedded in a concrete floor, slab or pad; or

(ii) laid on the surface of the ground either within the building or in outdoor locations; or

(iii) enclosed in a ventilated cable tunnel; or

(iv) enclosed in a trough with removable covers where air circulation is not restricted.

3.11.3 Arrangements

3.11.3.1 Category A underground wiring systems

Category A underground wiring systems recognized by this Standard comprise one of the following arrangements:

(a) A system where cables are enclosed in heavy-duty insulating conduit without further mechanical protection.

(b) A system where cables are enclosed in insulating wiring enclosures encased in concrete.

(c) A system where sheathed cables are enclosed in galvanized steel pipe without further mechanical protection.

NOTE: Metal conduits are not suitable for this purpose.

(d) A system where armoured sheathed cables or neutral-screened cables are buried direct in the ground without mechanical protection.

Regards,

Sch 2 2.2(a)(ii)

Director

Sch 2 2.2(a)(ii)

www.specialistelectrical.com.au

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From:"Benivento, Lloyd" <Lloyd.Benivento@act.gov.au>
Sent:30/11/2018 5:38 PM
To:"Alford, Robert" <Robert.Alford@act.gov.au>;"Gray, Jennifer" <Jennifer.Gray@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject: Fwd: Canberra Metro - CSR1 TPS (HV and LV Traction)

Sent from my iPhone

Begin forwarded message:

From: Sch 2 2.2(a)(ii)
Date: 30 November 2018 at 5:31:46 pm AEDT
To: Sch 2.2(a)(ii)
Cc: <lloyd.benivento@act.gov.au >, " adam.bownds@act.gov.au " <adam.bownds@act.gov.au >, Sch 2.2(a)(ii)
Subject: RE: Canberra Metro - CSR1 TPS (HV and LV Traction)

Hi Sch 2.2(a)(ii)

Apologise I am at the airport at this stage.

Good to go for the Hv and DC supply to be energized TPS 1 and 2.

Please make sure all safety precautions are in place.

Please make sure the risk assessment is comply to as we will be checking this issue with cmc out midweek.

Sch 2 2.2(a)(ii)
Seeg
Ph Sch 2 2.2(a)(ii)

On Nov 30, 2018 4:59 PM, Sch 2.2(a)(ii) wrote:

Sch 2 2.2(a)(ii)

As discussed, the guys have gone out and inspected plus sucked out water in all HV and DC pits in Area 1 & TPS 2.

The guys got limited photo's unfortunately working under pressure, but I went out witnessed approx. 50% of them being done.

I am satisfied we are safe to proceed and are aligned with the actions in the risk assessment

TPS 1 with full traction, TPS 2 in by-pass with no HV.

Daily inspection regime with noted pits are programmed to commence tomorrow for:

1. Pole N29 – HV Pit
2. Pole N48 – HV Pit
3. Pole N61 – Pull Pit
4. TPS 2 – HV pit

We keep an eye on outcomes daily, with a view to reconceive the risk assessment next Friday.

If anything coming from inspections compromises safety or goes against the controls in the risk assessment – it will be shut down immediately.

Sch 2.2(a)(ii)

From: Sch 2.2(a)(ii)
Sent: Friday, 30 November 2018 3:09 PM
To: lloyd.benivento@act.gov.au ; adam.bownds@act.gov.au ; Sch 2 2.2(a)(ii)
Sch 2 2.2(a)(ii)
Cc: Sch 2.2(a)(ii)
Subject: Canberra Metro - CSR1 TPS (HV and LV Traction)

Gents,

Please see risk assessment and associated mitigations conducted this morning in relation to the HV/LV water ingress issues.

Please contact me as necessary to discuss.

Kind Regards,

Sch 2.2(a)(ii)

Senior Rail Systems Manager

Sch 2.2(a)(ii)

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From:"Grice, Simon" <Simon.Grice@act.gov.au>
Sent:30/11/2018 2:25 PM
To:"Ponton, Ben" <Ben.Ponton@act.gov.au>
Cc:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Green, Ben" <Ben.Green@act.gov.au>;"Gray, Jennifer" <Jennifer.Gray@act.gov.au>;"Caruso, Lisa" <Lisa.Caruso@act.gov.au>
Subject: Weekly UTR update#6 [SEC=UNCLASSIFIED]
Attachments: Weekly UTR update#5 [SEC=UNCLASSIFIED], FOI2018-0332 safety audit and inspection of electrical works - 11kV and ....obr, Canberra Metro Asset Management Plan - Comments [SEC=UNCLASSIFIED]

Hi Ben

Here is the weekly update regarding the light rail project.

Kind regards,

Simon

Recommendations for next steps

- Noting that Sch 2.2(a)(ii) submitted confirmation that the light rail depot bridge has not been constructed in accordance with the requirements of the approved design and Technical Code, it is recommended that a show cause notice is issued to CMO regarding the light rail depot bridge.
- UTR officers will request from CMO that the forthcoming stray current working group on 18 December considers any increased stray current risks from the light rail system as currently delivered.

Access Canberra

- CMTEDD has received an FOI (2018-0332) regarding safety, audit and inspection of light rail electrical works. Reference to UTR documents which have been partially uploaded attached.
- UTR has requested documentation from CMO regarding Traction Power Station (TPS) 1, 2 and 3.
- UTR officers provided comments to the Head of Access Canberra on 21 November regarding the draft management plan submitted by Sch 2.2(a)(ii) on 20 November; and advice on 28 November regarding the Asset Management Plan issued to UTR on 26 November.
- On 30 November UTR provided advice to the Head of Access Canberra regarding documents submitted by Sch 2.2(a)(ii) (email attached). This includes a fresh review of documents undertaken by a Senior Engineer within UTR that supports existing conclusions regarding the asset management plan and risk work undertaken by CMC to date.

Canberra Metro Construction

- On 29 November 2018, Sch 2.2(a)(ii) advised the Head of Access Canberra that CMC required an update on the review of the Asset Management Plan submitted on 23 November.
- On 29 November 2018, Sch 2.2(a)(ii) advised the Head of Access Canberra that CMC intend to complete works under AS2067:2016, and request consent from the Technical Regulator for adoption of this standard. He has advised that will assist in communicating to those at a more technical level that solutions can be developed and considered in accordance with the AS 2067:2016.
- Canberra Metro Construction (CMC) has organised a stray current working group meeting for 18 December. The Senior Manager of UTR has recommended attendance at this working group to senior officers within Icon Water, Evoenergy distribution, and Evoenergy gas/Jemena. Responses have been received from Icon Water and Evoenergy distribution confirming attendance.
- On 29 November CMC advised Access Canberra (WorkSafe and UTR) that water ingress into electrical pits would lead to a shutdown of the affected area.

Canberra Metro Operations

- Following a meeting on 26 November, UTR is engaging with CMO on the requirements for the forthcoming application for a provision of service operating certificate required to commence railway operations.

- CMO officers have advised UTR verbally that they believe that CMO should issue all future documentation regarding the regulatory issues relating to the light rail project.
- A CMO officer advised the Senior Manager of UTR that a risk assessment process held on 30 November had led to the shutdown of electrical systems impacted by the water filled pits identified yesterday. UTR is advised that the pits will be drained, with an NCR raised with CMC to rectify the issue.
- CMO officers have been advised that considerable cost recovery fees payable to Access Canberra remain unpaid. This includes an invoice issued to CMC for fees of approximately $185K for 2017. Advice to CMO is that the unpaid CMC invoice will be cancelled and reissued to CMO with other fees for 2018 regulatory activity.

TCCS

- The Director-General of TCCS made enquiries into the conduct of UTR officers regarding third party knowledge of defects with the light rail system on 29 November 2018. It should be noted that many participants in the rail industry are familiar with some of the technical issues with the Canberra light rail system, and many would have participated in visits to Canberra Metro facilities as part of the AusRail conference held in Canberra 27-28 November.

Independent Electrical Certifier

- It is understood that no formal communication has been received by UTR from SEEG this week. (Gordon is on leave today, so I can't categorically confirm this!)

Simon Grice | Senior Manager | Utilities Technical Regulation
Phone 02 6205 3078 | Email simon.grice@act.gov.au
Construction, Environment and Workplace Protection | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

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From:"Grice, Simon"
Sent:23/11/2018 1:00 AM
To:"Ponton, Ben" <Ben.Ponton@act.gov.au>
Cc:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Green, Ben" <Ben.Green@act.gov.au>
Subject: Weekly UTR update#5 [SEC=UNCLASSIFIED]
Attachments:FW: Weekly UTR Update#4 - light rail [SEC=UNCLASSIFIED], RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]

Hi Ben

Here is the weekly update regarding the light rail project.

Simon

Recommendations for next steps

- Seek advice from GSO regarding possible breaches of legislation referenced in Canberra Metro's "Proposed Approach to Key Issues" provided by Sch 2.2(a)(ii) (CEO Canberra Metro) and reviewed by UTR 23 November.
- Issue request regarding stray current working group (forthcoming brief and letters, work to commence next week).

ONRSR

- No communication.

Other Utilities

- No communication regarding light rail project.
- TCCS advised of damage to stormwater assets.

Independent Electrical Certifier (SEEG)

- No formal communication.

Construction Occupations Registrar

- Access Canberra (UTR, electrical inspectorate) and SEEG undertook inspection of light rail depot and administration building 22 November. Electrical installation is incomplete. CMC Sch 2.2(a)(ii) Sch 2.2(a)(ii) stopped inspection part way through because installation was incomplete.

Canberra Metro Construction

- No UTR officer level communication apart from during depot inspection on 22 November.

Canberra Metro Operations

- Regulatory discussion regarding provision of service operating certificate. Meeting scheduled for 26 November.

UTR

- Sch 2.2(a)(ii) undertook light rail site familiarisation 19 November with UTR officers. He provided advice regarding AS 2067 and is reviewing stray current documentation. This will support forthcoming brief and correspondence.

TCCS

- TCCS officers have provided formal advice of 3 separate locations where non complaint works appear to have taken place. TCCS officers have advised UTR that independent certifier has been notified.

Simon Grice | Senior Manager| Utilities Technical Regulation
Phone 02 6205 3078| Email simon.grice@act.gov.au
Construction, Environment and Workplace Protection | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

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From:"Grice, Simon"
Sent:16/11/2018 3:48 AM
To:"Ponton, Ben" <Ben.Ponton@act.gov.au>
Cc:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Green, Ben" <Ben.Green@act.gov.au>
Subject:FW: Weekly UTR Update#4 - light rail [SEC=UNCLASSIFIED]
Attachments: Canberra Metro Meeting _15 Nov 2018.docx, Weekly UTR update#2 - light rail [SEC=UNCLASSIFIED], FW: Site inspection - Light rail depot administration building at Mitchell [SEC=UNCLASSIFIED]

Hi Ben

In discussion with Peter Stanford, amending TCCS working group to exclude Jonathan Dragus but reference relevant technical officers!

Apologies for the amended advice,

Simon

From: Grice, Simon
Sent: Friday, 16 November 2018 1:35 PM
To: Ponton, Ben <Ben.Ponton@act.gov.au>
Cc: Marcantonio, Laura <Laura.Marcantonio@act.gov.au>; Peffer, Dave <Dave.Peffer@act.gov.au>; Jones, Greg <Greg.Jones@act.gov.au>; Kelly, Gordon <Gordon.Kelly@act.gov.au>; Green, Ben (ACTPLA) <Ben.Green@act.gov.au>
Subject: Weekly UTR Update#4 - light rail [SEC=UNCLASSIFIED]

Hi Ben

Here is the weekly update regarding the light rail project. (I have numbered this as update 4, noting that no update was provided last week).

Simon

Recommendations for next steps

- Consider advice from Sch 2.2(a)(ii) regarding stray current risk posed by light rail design and construction as precursor to issuing formal communication to CMC and CMO.
- Await advice from GSO regarding issuing of show cause notice and AS2067, noting advice from CMC that this issue only relates to 5% of the project, and that this appears to use standard out of context noting that HV cabling is in public domain.
- Recommend to DG TCCS establishment of a government working group (under governance arrangements established by EPSDD/Access Canberra) to consider compliance with Technical Code. Working group to include Gordon Kelly (UTR); Peter Stanford, Jonathan Dragus and John Smart (Transport Canberra) and Shelly Fraser (City Services).

ONRSR

- No communication.

Licensed Utilities

- Advised Evoenergy gas / Jemena on 12 November and Evoenergy electricity on 13 November that the stray current working group may need to be reconvened to consider whether the risk profile from the light rail project has changed.

Independent Electrical Certifier, SEEG

- Request to SEEG on 16 November to confirm whether existing electrical systems energised for the purposes of commissioning can remain energised.

Construction Occupations Registrar

- Access Canberra held a comprehensive inspection of the light rail depot 15 November (email attached). Inspection noted illegal occupation of incomplete building.

-

Canberra Metro Construction

- Meeting held 13 November (notes attached). Sch 2.2(a)(ii) (CEO Canberra Metro) and Sch 2.2(a)(ii) (John Holland Operations Manager NSW/ACT) present. Discussion of changing standard (AS2067) and relevance to project led to advice that standard related to around 5% of total project. Consideration of UTR evidence of range of defects and non-compliance of significant parts of project.
- Advised that stray current working group may need to be convened due to issues identified with design and construction.
- Sch 2.2(a)(ii) provided with copy invoice for unpaid fees to Access Canberra for regulatory activity in 2017.

-

TCCS

- Duncan Edghill (Deputy Director-General, TCCS) and Meghan Oldfield (Project Director, TCCS) attending meeting of 13 November with CMC and UTR. Duncan Edghill stressed TCCS wanted a functioning, safe, light rail system. Duncan Edghill sought clarification regarding the number and extent of defects, and was advised that this was the responsibility of CMC rather than UTR to determine.

-
-
-

From: McKeown, Brianna
Sent: Thursday, 15 November 2018 4:53 PM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>; Grice, Simon <Simon.Grice@act.gov.au>
Subject: Canberra Metro Meeting _15 Nov 2018

Hi friends,

Please see attached notes from the Canberra Metro meeting on Wednesday – please note I haven't been exposed to light rail issues, so acronyms etc might (probably) be wrong.

Cheers
B

Brianna McKeown
Project Officer | Utilities Technical Regulation
Access Canberra | CMEDD | ACT Government
Phone: 02 6205 9872
GPO Box 158, Canberra City ACT 2601| www.act.gov.au/accessCBR

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Canberra Metro - 13/11/ 2018

Sch 2.2(a)(ii) , CEO Capital Metro Project Delivery introduced the meeting and gave a brief run-down of the issues to be addressed.

Note* The Independent Electrical Certifier will be a late attendance, Canberra Metro to organise separate catch-up with the electrical certifier and UTR to discuss issues identified.

Standards

Canberra Metro advised there have been inconsistencies in what standard contractors are working towards. Canberra Metro noted the difference between AS2067-2008 and AS2067-2016 can be attributed some of the identified problems.

Participants noted Canberra Metro were required to design the light rail to AS2067-2008 as the project documents were issued in February 2016, and the AS2067-2016 standard was issued in September 2016.

It was noted Standard AS2067-2016 allows the option to undertake a risk assessment.

UTR advised AS2067-2008 is the standard Capital Metro need to comply to. The non-compliance with standard has been identified to be a broad issue, and not isolated to limited areas.

- Canberra Metro advised they are working through non-compliance for the transition across bridges etc, where they cannot legally gain the correct depth.
- UTR have advised Jemena that they may need to meet Canberra Metro to discuss stray current issues.

The light rail corridor has been designed to the AS3000 Standard, which refers to the AS2067 where necessary. Canberra Metro need to check whether the built form is compliant with AS300 and AS2067-2008.

- The difference of the two standards comes to around 5% of the total area.

UTR Presentation

UTR Electrical Inspector Sch 2 2.2(a)(ii) presented a power point presentation detailing a number of issues identified.

The presentation included, but was not limited to:

- Flemington Road, UTR have not been provided any documentation of design and construct as requested.
- UTR request for supporting documents for the shark fin installation.
- UTR request for supporting docs to see electrical conduits on rail bonds.

UTR are preparing a brief to the Technical Regulator to present a holistic representation of the issues identified by UTR.

Comments

Canberra Metro noted they are not sure all the issues identified have been communicated to stakeholders. All the issues need to be clearly identified to work towards a solution.

Canberra Metro have complied data to help work towards resolution of the issues. CCTV footage has been collected for 65% of the corridor, with 100% verification via CCTV to be completed. Canberra Metro are attempting to rectify the issues as they're identified.

Canberra Metro is undertaking a process to check depth compliance across the corridor.

TCCS requested a timeframe for UTR to provide a comprehensive list of all issues.
UTR noted it is difficult for UTR to provide a comprehensive list as UTR don't know the scope of the issues. UTR need to work with stakeholders and the contractor in a series of workshops and ongoing work.

Canberra Metro can produce a document with the issues identified to date, but the document will be a live document and will continue to develop.

- Canberra Metro noted if they were to verify every issue identified the work wouldn't be completed until around March 2019.
- Canberra Metro will provide the initial list of issues. UTR and the Independent Electrical Certifier (members of SEEG) to verify.
- Show Clause outcomes are due on 25 Nov 2018, the initial list will be provided in line with the show clause due date. The verification process will not be completed by 25 November 2018, but the proposed asset management will presented and will provide detail of the extent of the identified issues.

UTR noted the critical objective is that SEEG is satisfied with the work and certifies that the electrical work is in accordance with the code, and that CMO are prepared to accept the asset from CMC.

Canberra Metro noted that they believe from a baseline and design point of view, Canberra Metro are meeting a high level of compliance.

It was queried why UTR are involved, UTR noted they are involved because the independent certifier has told UTR that he is struggling to get any traction. UTR is only involved because the issue has been escalated to the Technical Regulator.

CM have been replacing any 'show stoppers' as identified.

The Independent Electrical Certifier has tabled issues where the HV has limited or no clearance with other assets (i.e. water and gas). The Independent Electrical Certifier is not sure whether asset owners have been notified and signed off on the impact on their asset.

Canberra Metro noted 106 issues were identified by the CCTV on block 7. Issues are predominantly identified in CSR1 and are predominantly minor issues, not workman failure.

Canberra Metro noted remediation work to rectify issues identified at the depot will begin on Friday 16/11/2018.
It was noted it will take two weeks to get the cables out, two weeks reification work and 2 weeks to put the cables back in. A total of 6 weeks minimum work is required to remediate.
Alternative solutions to be workshopped 14 Nov 2018, final decision by COB 15/11/2018.

The Independent Electrical Certifier noted there needs to be a collective agreement on the rectification work forward to ensure the final outcome is broadly agreed and accepted.

UTR cost recovery – unpaid invoices presented to the CEO.

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From:"Grice, Simon"
Sent:26/10/2018 4:11 AM
To:"Ponton, Ben" <Ben.Ponton@act.gov.au>
Cc:"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>
Subject: Weekly UTR update#2 - light rail [SEC=UNCLASSIFIED]
Attachments: Weekly UTR update - light rail [SEC=UNCLASSIFIED]

Hi Ben

Here is the weekly update regarding the light rail project.

Kind regards,

Simon

Recommendation for next steps

- UTR to prepare Technical Regulator correspondence to CMO & CMC reiterating need for SEEG certification as a precursor of energisation, and requiring risk workshop as precursor to further stages of testing and commissioning. The asset register requested in the previous DG correspondence will be a key input into this workshop.
- Confirm availability of key EPSDD and Access Canberra staff December – February
- Note that ONRSR want to develop a new MOU with the Technical Regulator and Access Canberra/Work Safety Commissioner.
- Advise DG TCCS that CMC has verbally confirmed that there is non-compliance with Australian Standards for HV works in some areas of the project. (The nature of this risk would be a key point of discussion in the proposed risk workshop).

ONRSR

- Telephone conversation with ONRSR officers 22 October. ONRSR noted regular meetings with CMO had not taken place for a few months. ONRSR advice that they would prefer to create new MOU between Technical Regulator, Work Safety Commissioner and ONRSR.
- CMO organised meeting with ONRSR, CMC, TCCS and UTR regarding ONRSR accreditation process on 23 October. Sch 2.2(a)(ii) noted likelihood project would be delayed and that staff availability in TCCS, UTR and ONRSR in January needed to be known.
- ONRSR confirmed that Technical Regulator matters would form part of their assessment process, together with documentation from CMO and the independent safety assessor (ISA). ONRSR noted process for issuing conditional approval for partially complete systems. This could include pre-issued conditional approval where certain tests need to be met to manage key risks.
- UTR met ONRSR 25 October. ONRSR are keen to receive the asset data that will be provided by CMC. ONRSR do not anticipate another trip to the ACT until after passenger operations commence.
- ONRSR noted that they would anticipate some residual "red" risks regarding traffic collisions. For ONRSR, most critical risks are after commencement of passenger operations.

Independent Electrical Certifier, SEEG

- On 25 October, SEEG informed Senior Manager UTR that they were concerned that that 11kV HV cables near the depot have been concreted over prior to completion of certification, and that these cables were not in accordance with the relevant Australian Standards. Request for advice and recommendation of a risk workshop prior to further testing and commissioning sent to CMC Project Director 26 October.
- SEEG noted that work commenced contrary to their advice, and that of key CMC staff including the Superintendent and Commissioning Manager.

CMO/CMC

- On 23 October CMO provided a list of possible documents to support their regulatory plan and application for a provision of service operating certificate. UTR will provide feedback on this list next week.
- On 25 October, the CMC Deputy Project Director and a SEEG certifier met to discuss the 11kV HV issue at the depot. CMC confirmed that elements of the design were not to Australian Standards regarding HV cable depths. Agreement that risk workshop with SEEG, CMO and TCCS was a practical way forward with testing and commissioning.

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From:"Grice, Simon"
Sent:19/10/2018 4:59 AM
To:"Ponton, Ben" <Ben.Ponton@act.gov.au>
Cc:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>
Subject: Weekly UTR update - light rail [SEC=UNCLASSIFIED]

Hi Ben

Here is the weekly update regarding the light rail project.
I have summarised the update based on the key stakeholders, with a recommendation regarding next steps.
(I have verbally confirmed TCCS and SEEG content at officer level).

Kind regards,

Simon

Recommendation for next steps

- Confirm critical Territory contractual hold points remaining before commencement of passenger services with DG TCCS.
- Advise DG TCCS that SEEG has identified serious electrical non-compliance across inspected part of the light rail project and that this non-compliance includes high voltage cabling and installations in the public realm.
- Anticipate an update regarding asset identification and risk management process for light rail electrical assets.

TCCS

- Inter-directorate operational readiness meeting organised by TCCS 15 October. Some interest from attendees regarding who would inspect light rail assets and vehicles following any incidents, with some discussion regarding WorkSafe inspecting assets.
- 7 November identified as critical date in light rail verification process for Territory, with requirement for 48 days of continuous testing prior to operation.
- Informal meeting with TCCS officers 16 October, identified control systems as key outstanding issue for Safety Assurance Reporting (SAR) Design Process Stage 3. This is required for the independent safety assessor (ISA) to issue an end of design safety report to ONRSR and to complete the progressive verification of the staged testing and commissioning process.
- This SAR process requires electrical systems to be certified by the independent electrical certifier, SEEG.
- Canberra Metro Construction (CMC) should be at testing and commissioning baseline 4, but are currently at baseline 2 of a total of 8 stages.

Independent Electrical Certifier, SEEG

- Informal meeting held 19 October 2018. Certifier noted that inspections were moving forward. Inspection of approximately 50% of conduits by camera had found none of the conduit was compliant, with the exception of 1 of the approximately 30 blocks, which was compliant after being completely reworked following the initial certifier inspection (Combined Services route 2).
- Certifier noted that they would expect patches of non-compliance on a similar job. Observed that most of Canberra Metro site inspected to date was non-compliant. Non-compliance includes not to design, contract, Australian Standards including high voltage standards, Technical Code or Canberra Metro Construction (CMC) work instructions. No document trail for non-compliant work, and absence of evidence of supervision or process control, particularly for earlier phases of work.
- Serious non-compliance includes high voltage cables in the public domain and high voltage connections in approximately 60 pit connections. Connections were not water proof, and pits subject to flooding which could result in explosion in public domain. Certifier working with CMC regarding resolving risk.
- High voltage non-compliance the highest risk. Certifier noted that all problems were resolvable, and that it would be possible to consider some mechanisms for fixing some issues in situ.

Canberra Metro

- Regulatory meeting held 19 October 2018. Sch 2.2(a)(ii) Deputy Project Director CMC, confirmed that a hold was placed on all underground electrical work until verification was complete. He noted that the inspection process using CCTV was underway. Agreed with observation that all conduits were non-compliant.
- In response to most recent Technical Regulator correspondence, CMC has engaged a dedicated resource to develop asset register for all electrical assets and outline risk mitigation for each asset. CMC were holding ongoing detailed discussions regarding the findings of the verification process with SEEG.
- CMC outlined that they had design and construction issues with HV to structures with non-compliant HV in the public realm.
- Canberra Metro Operations (CMO) outlined that CMO, the ISA, independent certifier (IC), and TCCS needed to verify acceptance of all key elements of the construction process. CMO committed to work with UTR regarding submission of the regulatory plan for the provision of service operating certificate.
- CMC and CMO did not appear to consider 7 November critical to delivering the light rail project in accordance with the contract. They confirmed that the light rail system would need to run for 7 days at maximum load without fault before it could be considered safe for passenger operations.

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From:"Mosslar, Michael" <Michael.Mosslar@act.gov.au>
Sent:15/11/2018 2:47 PM
To:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Grice, Simon" <Simon.Grice@act.gov.au>
Subject:FW: Site inspection - Light rail depot administration building at Mitchell [SEC=UNCLASSIFIED]
Attachments: Light Rail - B3 S16 Mitchell.obr
Importance: High

FYI

From: Zarak, Marko
Sent: Thursday, 15 November 2018 2:38 PM
To: Green, Ben (ACTPLA) <Ben.Green@act.gov.au>
Cc: Curtin, Daniel <Daniel.Curtin@act.gov.au>; Buddhadasa, Ajith <Ajith.Buddhadasa@act.gov.au>; Sekara, Bojan <Bojan.Sekara@act.gov.au>; Anderson, Gordon <Gordon.Anderson@act.gov.au>; Mosslar, Michael <Michael.Mosslar@act.gov.au>; Frazer, Mark <Mark.Frazer@act.gov.au>; Nassar, Vincent <Vincent.Nassar@act.gov.au>; Viney, Barry <Barry.Viney@act.gov.au>; Alford, Robert <Robert.Alford@act.gov.au>
Subject: Site inspection - Light rail depot administration building at Mitchell [SEC=UNCLASSIFIED]
Importance: High

Hi Ben

Please find below brief notes from the site inspection of Mitchell Light rail depot (**administration building**) today 15/11/2018.

Present:

Marko Zarak – Deputy Construction Occupation Registrar – Access Canberra
Ajith Buddhadasa – Building Inspector – Access Canberra
Bojan Sekara – Building Inspector – Access Canberra
Sch 2.2(a)(ii) [redacted]

Access Canberra inspectors raised following issues with the builder and advised the builder on need to address the same prior to consideration of an application for Partial Occupancy and Use (COU).

1. Certifier to provide plans showing latest amendments to the administration building within two weeks from 15/11/2018. Failure to provide latest approved plans by two weeks from 15/11/2018 may result in issuing a stop work notice. The builder advised that the alterations are only internal to the originally approved layout. Any plans or information currently in draft state must be finalised.
2. Emergency Evacuation Map must reflect the latest amendments to the layout. Emergency exit paths must be reassessed for compliance.
3. Latest amendments to the layout must be reassessed by the fire-engineer and must be submitted to the fire-brigade for compliance.
4. Builder to liaise with Access Canberra Electrical Inspection Senior Manager about the electrical requirements acceptable to issue of Partial COU. Builder advised Access Canberra that the permanent electrical supply expected to be commissioned by 4 December 2018. Currently the building is supplied through temporary electrical supply and DB.
5. Partial COU must demonstrate in intended, how the admin building can be functioned independent of other areas under construction especially in terms of fire safety and other facilities required for the function of the building.
6. Provision of accessible car parking to be addressed.
7. Engineers certificate for the structural stability of upper floor glass balustrade to be provided (especially in regards to the span of glass panels) performance solution verification of assessment.

8. Need to clarify the operation or functional requirement of sprinklers installed in side rooms between the glazed windows and ceiling bulkhead.
9. Need to check all fire doors for their smooth operation and if need necessary adjustments to be done.
10. Penetration of services through fire walls must be checked for compliance. Altered penetration to be recertified and reinspected
11. Fire compartment separation must be complete and reinspected and certified.
12. Damaged fire protection insulation must be rectified.
13. **Inspection noted illegal occupancy of the incomplete building**. Builder was advised about the risks and legal implications around illegal occupation of the building. They understood and assured that they will advised the occupants to vacate until a COU is issued.
14. Certifier has been advised to submit to Registrar Section 50 notices (Building Act 2004) upon notice of any non-compliance issues.
15. Certifier to provide to Registrar all the Building Approval Nos. related to the light rail and all station to confirm/ensure they have all been captured with a building approval.

Builder to provide intended scope of work; list of work Partial COU applying for; and stages of rest of the work and timing
Then we can move forward to discuss how they will meet compliance within their intended time frames .... If possible....

Please Note:
Attached is a link to a folder of pictures relating to the site inspection, don't rush to open it Bojan is still up loading (over 100 pics) then should be good to access by 1530

Happy to discuss

Thanks

Marko Zarak | Deputy Construction Occupations Registrar | **Manager Construction Audit Team**
Phone: 02 62055340 | Email: marko.zarak@act.gov.au
Access Canberra | Chief Minister and Economic Development Directorate | ACT Government
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From:"Grice, Simon"
Sent:22/11/2018 10:06 PM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Ponton, Ben" <Ben.Ponton@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject:RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]
Attachments: Proposed Approach to key issues_.pptx, Letter to CMO [SEC=UNCLASSIFIED]

Hi Dave

Thanks for sending over Canberra Metro's slides re key issue 1 (CSR1 – HV cable) an key issue 2 (depot cable bridge).

There are some similar comments regarding both issues that we can advise Sch 2.2(a)(ii) TCCS and Sch 2.2(a)(ii) Sch 2.2(a)(ii)

Note that the information provided below contains references to likely breaches of legislation and a recommendation to seek further advice from GSO.

Please let me know if you would like to discuss further! (I am travelling interstate and will be leaving about 2, and back Tuesday morning. Gordon will be here as usual!)

Kind regards,

Simon

Key Issue 1-Resumption of installation of HV cable in CSR 1

- Requires IC (APP) certification of design and installation and IEC (SEEG) certification of installation. SEEG certification must outline compliance with design specification and Technical Code, including all referenced standards within Technical Code.
- Works to date do not appear to demonstrate compliance with design specification and Technical Code. We await advice regarding the process for verifying compliance.
- Noting that we are aware of a wider range of issues than those referenced in the slide for CSR 1, the proposed approach does not appear to comprehensively address the range of issues identified. However, their forthcoming asset management plan may provide further information.

Key Issue 2-Depot Cable Bridge

- Requires IC (APP) certification of design and installation and IEC (SEEG) certification of installation. SEEG certification must outline compliance with design specification and Technical Code, including all referenced standards within Technical Code.
- Works to date do not appear to demonstrate compliance with design specification and Technical Code. We await advice regarding the process for verifying compliance.
- Noting that we are aware of a wider range of issues that those referenced in the slide for the depot cable bridge, the proposed approach does not appear to comprehensively address the range of issues identified because there is no reference to CSR 2. However, their forthcoming asset management plan may provide further information.
- Note forthcoming advice from the Technical Regulator to CMO regarding AS2067 and the design review process which may assist CMC/CMO/John Holland.
- Further advice from Canberra Metro regarding comments re cables being a controlled area, noting that they are in the public domain and accessible by the public at all times.

Advice by Canberra Metro of Possible breaches of Light Rail Technical Code

- The slides reference that cables are not to correct depth and construction, and is not in accordance with design. CMO/CMC/John Holland need to follow the process outlined in forthcoming advice from the Technical Regulator regarding the design review process. Furthermore, this advice (if accurate and correct, which should be considered highly likely because the slide has come from

Sch 2.2(a)(ii) Canberra Metro and Sch 2.2(a)(ii) John Holland rail lead for NSW/ACT) would show that multiple Australian Standards have not been met (therefore multiple breaches of section 16, failure to comply with a Technical Code) and the requirements for issuing operating certificate (e.g. section 49 – unlicensed regulated utility is providing a regulated utility service in contravention of this Act.)

- Recommend that we seek further advice from GSO regarding the information provided in these slides, and the probable breaches of legislation.

From: Peffer, Dave
Sent: Thursday, 22 November 2018 5:41 PM
To: Grice, Simon <Simon.Grice@act.gov.au>; Kelly, Gordon <Gordon.Kelly@act.gov.au>
Cc: Ponton, Ben <Ben.Ponton@act.gov.au>; Jones, Greg <Greg.Jones@act.gov.au>
Subject: Fwd: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]

Simon / Gordon

These are the two complex issues that I flagged at our briefing the other day. As I indicated, CMC are keen to move forward on resolution of these matters.

Can Ben and I please have your advice in response to what CMC have documented in the attached slides. We'll need to be specific with reference to standards or the code where we have questions.

Note also that I expect before any work occurs, the proposals would need to be signed off by their verifier, and certifier.

Thanks

Dave

Begin forwarded message:

From:
To: "Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc: Sch 2.2(a)(ii) "Edghill, Duncan" <Duncan.Edghill@act.gov.au>, "Oldfield, Meghan" <Meghan.Oldfield@act.gov.au>
Subject: RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]

Dave,

As discussed on Tues afternoon, please find attached a couple of slides that speak to the two key issues we would like to start resolving. The two issues being the recommencement of HV cable installation in the south and the resolution of the HV over the Depot Access Bridge.

The intention is to workshop through the right approach on both of these items this afternoon. Darren is the point of contact as I am in board meetings for most of the day.

I understand our respective technical teams are meeting at the Depot this morning to review status of the electrical certification of the Admin building following install of the permanent Main Switchboard. Importantly, this to allow occupation of the Admin building while other works in the main yard and maintenance hall are ongoing.

Regards,

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

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Key Issue 2 – Proposed Approach

CANBERRA METRO

Description:

- **CSR-1 – HV Cable**
- **Plan Reference:** Area 3 & 4 South
- **NCR Reference:** NCR-0184552
- **Description:** resumption of the installation of the HV cable within CSR-1
- **Timing:** subject to Risk Assessment workshop scheduled for 22nd of November 2018 against all applicable standard and implementation of any mitigations and approval of IV to Energisation

Status:

Works to date:

- CCTV surveying of the conduits has been undertaken and will continue over length of CSR.
- Wire brushing has been undertaken to a significant % of the conduits to date.
- Depth of CSR has been confirmed via Desktop study comparison of design v As-builts
- Conduits which have collapsed or puncture have / will be repaired prior to cable installation
- Pits to be dewatered will be drained and drainage solution applied
- Additional general Quality issues have been identified and being managed through NCR process.

Next Steps

- A full risk assessment workshop will be undertaken by CMC, CMO , Designers, IC and IV to ensure all standards, risks and mitigations are understood and agreed before re-commencement of works.
- Established inspection & test plan will be undertaken prior and post installation and energization of the cable.

Key Issue 2 – Proposed Approach

Description:

- **Depot Cable Bridge**
- **Plan Reference:** Depot;
- **NCR Reference:** NCR-0184559
- **Description:** Undertake Risk Assessment workshop in relation to all applicable standards and implement any changes, repairs, risk mitigations or controls as required in order to resolve the status of the cables bridge.
- **Timing:** Risk Assessment workshop is scheduled for the 22nd of November, 2018, all recommendations to be implemented prior to approval for Energisation by IV

Status:

Works to date

- During the Construction and installation of CSR-1 at the Depot Cable bridge it was identified that the Cables were not to the correct depth and that the construction being undertaken was not to design.
- It has been confirmed the Cables are not to the correct depth as per standard AS2067: 2008
- The cables are currently encased in Stabilised Sand and not concrete as per design
- The cables are in a controlled area and any future works will be undertaken using the CMO permit system.
- An initial temporary solution was proposed however this has not been implemented.

Next Steps

- Risk Assessment workshop will undertake an assessment of the design, the current construction and operational and maintenance impact of the installed works.
- Temporary solutions to be considered by the Risk Committee while permanent solution is confirmed and implemented.
- All relevant standards and risk mitigations will be considered and once agreement is reached that the risk is ALARP, any modifications, repairs or mitigations required shall be implemented.
- On completion of recommendations, authority to proceed shall be obtained from the IV.

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From:"Grice, Simon"
Sent:22/11/2018 5:46 AM
To:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>
Cc:"Jones, Greg" <Greg.Jones@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Astbury, Geoff" <Geoff.Astbury@act.gov.au>;"Kumar, Vijender" <Vijender.Kumar@act.gov.au>;"Collins, Alexandra" <Alexandra.Collins@act.gov.au>
Subject: Letter to CMO [SEC=UNCLASSIFIED]
Attachments:20181122 Tech Reg Ltr re standards.doc, Letter re Australian Standards [SEC=UNCLASSIFIED, DLM=Sensitive: Legal]

Hi Laura

Here is the letter ready for Ben's signature. Two very small changes to original letter include adding AS to a standards reference and referencing IC as APP.

Please let me know if you need anything else.

Kind regards,

Simon

Simon Grice | Senior Manager| Utilities Technical Regulation
Phone 02 6205 3078| Email simon.grice@act.gov.au
Construction, Environment and Workplace Protection | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

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ACT Government
Environment, Planning and Sustainable Development

Sch 2.2(a)(ii)
General Manager
Canberra Metro Operations Pty Ltd ACN 612 397 485
490 Northbourne Avenue
DICKSON ACT 2602

Dear Sch 2.2(a)(ii)

Application of Australian Standards under the *Utilities (Technical Regulation) (Light Rail Regulated Utility (Electrical) Network Code) Approval 2016*

I understand there have recently been discussions between Canberra Metro Operations (**CMO**), Canberra Metro Construction (**CMC**) and the Utilities Technical Regulator Team (**UTR**) within Access Canberra in relation to the application of the 2008 and 2016 versions of AS 2067 - Substations and High Voltage Installations exceeding 1 kV a.c (**AS 2067**).

As you are aware, on 14 September 2016, Standards Australia published the 2016 version of AS 2067 (**AS 2067:2016**) which superseded the 2008 version of the standard (**AS 2067:2008**). The Canberra Metro Combined Services Route Design Specifications were approved by AECOM under the ISO 9001 – 2000 on 26 August 2016. AS 2067: 2008 was the current standard at the time of approval. The Design Specifications were then approved by the Independent Certifier on 11 January 2017. I have not received an amended version of the Design Specifications. Based on the information before me, I can only assume that, notwithstanding the introduction of AS 2067:2016, the IC approval was given on the basis that the specifications complied with AS 2067:2008. Therefore, I presume that works will be completed in accordance with the Design Specifications dated 11 January 2017 which complied with the requirements of AS 2067:2008.

If you consider my assumption that the Design Specifications were approved in accordance with AS 2067:2008 is incorrect, I invite you to provide me all relevant information to demonstrate the contrary, including that you provide to me written confirmation from the IC the version of the AS2067 upon which the specifications were approved.

If it is your intention to complete works in accordance with AS 2067:2016, I take this opportunity to draw your attention to the process for varying the design and construction of a regulated utility service.

Part 10.2 of the *Utilities (Technical Regulation) (Light Rail Regulated Utility (Electrical) Network Code) Approval 2016* (**Technical Code**) sets out the process for variations of design and contraction after the first operating certificate has been issued. On 30 June 2017, I issued a Design and Construction Operating Certificate to CMO (**2017 OC**) with a number of conditions, including "*That all works are completed in accordance with the* Utilities (Technical Regulation) (Light Rail Regulated Utility (Electrical) Network Code) Approval 2016 *and the* Utilities (Technical Regulation) (Light Rail Regulated Utility (Electrical) Network Boundary Code) Approval 2016". For the purposes of Part 10.2 of the Technical Code, I consider the 2017 OC to be the "first operating certificate".

I have not yet received a "*technical analysis*" of proposed variations under Part 10.2(2) of the Technical Code. However, I look forward to considering any technical analysis submitted to take into account the changes introduced by AS 2067:2016. In accordance with the Regulatory Management Plan submitted with your application for 2017 OC, it is my expectation that any technical analysis submitted to the Regulator for consideration has already been approved by APP and/or SEEG.

Any variation made to the Design Specifications must comply with the Technical Code in order for me to be satisfied that, at the time you submit an application for a final operating certificate, the regulated utility service is being provided in accordance with the Act and the other criteria set out in section 46(1)(a) of the *Utilities (Technical Regulation) Act 2014*.

If you have any questions or comments regarding this letter please contact Simon Grice on 6205 3078.

Yours sincerely

Ben Ponton
Technical Regulator
*** November 2018

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Sch 1.2

Sch 1.2

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From:"Grice, Simon"
Sent:30/11/2018 2:24 AM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Jones, Greg" <Greg.Jones@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Caruso, Lisa" <Lisa.Caruso@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>
Subject: Canberra Metro Asset Management Plan - Comments [SEC=UNCLASSIFIED]
Attachments: Further comments regarding risk assessment [SEC=UNCLASSIFIED], RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED], Recommended response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED], RE: Canberra Metro Asset Management Plan [SEC=UNCLASSIFIED], Copy of ACT Asset Register.xlsx

Hi Dave

Thanks for the update. It will need to be CMO that submit the request regarding use of 2067:2016, rather than CMC, because CMO hold the operating certificate.
Following a conversation with CMO yesterday, CMO are keen to ensure that they provide future correspondence regarding light rail asset matters. Also, as previously advised 2067:2016 does not assist CMO and CMC with cable separation and proximity to other assets.

I recommend that we don't attend a meeting with CMO without taking technical officers to the meeting because CMC/John Holland will seek to engage us in a technical argument if we don't agree with or criticise their proposed approach.

Furthermore, the documents provided to date do not appear to represent an asset management plan in any meaningful way. I have included the advice we provided regarding the asset management plan submitted on 28 November, and the advice provided on 21 November regarding the draft asset management plan.

To date, Sch 2.2(a)(ii) correspondence has advised us that the light rail has not been constructed in accordance with the requirements of the operating certificate and the Technical Code at the depot light rail bridge, and confirmed that significant sections of the light rail have not been verified, which appears to demonstrate that SEEG (and likely the independent certifier) have been unable to carry out their respective roles.

Recommend that we issue a show cause notice to CMO requiring them to rectify the light rail depot bridge in accordance with the approved design and Technical Code, and to get this work certified by the IC and IEC. This will then establish a precedent to move forward with any other work that is confirmed to be non-compliant.

I asked Lisa to undertake a fresh review of the documents and advice previously submitted regarding CMC's proposed asset management plan. Her advice, and a copy of Essential Energy's asset register for the ACT is provided for your information. This is a regulatory document provided as part of their application for an operating certificate, so should be treated as confidential!

Happy to discuss further!

Simon

Lisa's notes:

I agree with the previous comments provided by UTR that the Asset Management Plan submitted has not identified and addressed the wider range of risks and issues that have been identified.

There is also no evidence that the impact of these non-compliances on CMO assets or other utility assets has been considered, and there is no evidence of consultation with other utilities that are potentially impacted by these non-compliances.

The scope of the risk assessment is also very narrow. I'm concerned that it focuses on non-compliance with Australian Standards and excludes other key areas of concern, and in particular non-compliance with the approved design.

I would also expect an Asset Management Plan to be more comprehensive than the power point slides provided. At a minimum, the plan should identify the location and condition of all assets. I've attached an example of an asset register that would inform an Asset Management Plan.

I would also suggest that Sch 2.2(a)(ii) from the Electrical Technical Review Group (ETRG) attend any meetings with CMC / John Holland to discuss the approach. The role of the ETRG is to provide advice to the Technical Regulator on issues such as these.

Additional comments:
The role of the Independent Verifier (SEEG) is not aligned with the conditions of the D&C Operating Certificate (A1–5) – SEEG (as the IEC) must confirm the installation is in accordance with the design and applicable Australian Standards and is safe to operate. The scope in the Asset Management Plan only refers to company and Australian Standards and no consideration is given to design.

The Asset Management Plan suggests that the risks identified in relation to Key Issue 1 – collapsed and damaged conduits, water ingress to cable pits, sharp concrete edges - were to be considered at a risk workshop scheduled on 22 November. These is no evidence in the documentation provided from this workshop that these issues have been considered.

From: Peffer, Dave
Sent: Thursday, 29 November 2018 6:37 PM
To: Sch 2.2(a)(ii)
Cc: Ponton, Ben <Ben.Ponton@act.gov.au>; Edghill, Duncan <Duncan.Edghill@act.gov.au>; Darren McBride Sch 2.2(a)(ii) Sch 2.2(a)(ii) Oldfield, Meghan <Meghan.Oldfield@act.gov.au>; McGinness, Julie <Julie.McGinness@act.gov.au>; Jones, Greg <Greg.Jones@act.gov.au>; Grice, Simon <Simon.Grice@act.gov.au>
Subject: RE: Canberra Metro Asset Management Plan [SEC=UNCLASSIFIED]

Hi Sch 2.2(a)(ii)

Thanks for the quick phone conversation. As discussed, Julie from my team will coordinate a meeting next week for us to discuss what's covered in the latest version of the management plan, with a view to resolving any outstanding elements that we'd like to see included.

We'll be able to turn a response around on the standard confirming the position once we receive your correspondence.

Thanks

Dave

DAVE PEFFER

0433 962 829 | dave.peffer@act.gov.au
GPO Box 158 Canberra ACT 2601 | www.act.gov.au/accesscbr

From: Sch 2.2(a)(ii)
Sent: Thursday, 29 November 2018 6:19 PM
To: Peffer, Dave <Dave.Peffer@act.gov.au>
Cc: Ponton, Ben <Ben.Ponton@act.gov.au>; Edghill, Duncan <Duncan.Edghill@act.gov.au>; Sch 2.2(a)(ii) Oldfield, Meghan <Meghan.Oldfield@act.gov.au>
Subject: RE: Canberra Metro Asset Management Plan

Hi Dave,

Can you please provide an update on the review of the Asset Management Plan submitted on 23 Nov 18.

As previously indicated, CMC will continue to develop and update the Plan with the next iteration to be issued on 30 Nov 18.

Also, the response to the UTR letter of 23 Nov 18 on the Application of Australian Standards is expected to be back to the Technical Regulator tomorrow. In short, it will confirm that CMC intend to complete the works under the AS 2067:2016. As part of the response the Technical Regulator's consent for our adoption of this standard will be requested, noting the requirement to comply with the process for varying the design and construction of the regulated utility service (part 10.2 of the Technical Code). This will assist in communicating to those at a more technical level that solutions can be developed and considered in accordance with the AS 2067:2016.

I am available to discuss as required.

Regards,

Sch 2.2(a)(ii)

Move | Live | Grow

Sch 2.2(a)(ii)

From: Peffer, Dave <Dave.Peffer@act.gov.au>
Sent: Saturday, 24 November 2018 9:15 AM
To: Sch 2.2(a)(ii)
Cc: Ponton, Ben <Ben.Ponton@act.gov.au>
Subject: Re: Canberra Metro Asset Management Plan

Thanks Glenn

Confirmed received. I'll meet with the team early next week to discuss and come back to you.

I'll also come back to you soon with advice on the initial two matters you sent through the other day.

Dave

On 23 Nov 2018, at 5:36 pm, Sch 2.2(a)(ii) wrote:

> Dave,
>
> Please find attached the Asset Management Plan as at 23 Nov 18.
>
> The plan continues to be developed and refined as we move through the validation and resolution process.
>
> The team welcomes continued engagement and advice as we move through to completion.
>
> For your consideration.
>
> Regards ,
>
> Sch 2.2(a)(ii)
>
> Begin forwarded message:
>
> Sch 2.2(a)(ii)
>
> **Subject: Canberra Metro Asset Management Plan**
>
> Sch 2.2(a)(ii)
>
> Please find attached the first revision of the Electrical Asset Management Plan plus separate attachments which are referenced in the plan for Risk assessments, NCR's and Defects.
>
> I would also like to highlight the following;
>
> - This is the first issue of the Electrical Asset Management Plan
> - The document is a live document and will be updated on a regular basis
>   - Updates of the NCR and Defects Register will issued on a weekly basis
>   - Risk Assessments will be issued when completed
> - Signature of the documents by the key stakeholders will occur over the next week once
>   All comments / feedback are received.
> - The NCR Register will be updated over the coming weeks to include design reference and Standard reference
>
> I am just about to board the plane, if any changes are required then please drop me an email and I will update and send tonight.
>
> Regards

Sch 2.2(a)(ii)

Level 2, 65 Pirmarra Road,
Pyrmont, NSW 2000
M. Sch 2.2(a)(ii)
W. johnholland.com.au

<7002.xlsx>

<JIRA Defects 16112018.xlsx>

<CMC_SFAIRP_Risk_Assesment CSR-Depot Bridge v1.1.pdf>

<report - canberra metro - asset management plan - 191118 v2.pptx>

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From:"Grice, Simon"
Sent:29/11/2018 4:40 AM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Caruso, Lisa" <Lisa.Caruso@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>
Subject: Further comments regarding risk assessment [SEC=UNCLASSIFIED]
Attachments:CMC_SFAIRP_Risk_Assesment CSR-Depot Bridge v1.1.pdf

Hi Dave

Here are Lisa's comments regarding the risk assessment provided by CMC that we received on 26 November 2018.

Kind regards,

Simon

From: Caruso, Lisa
Sent: Thursday, 29 November 2018 3:13 PM
To: Grice, Simon <Simon.Grice@act.gov.au>; Kelly, Gordon <Gordon.Kelly@act.gov.au>
Cc: Kumar, Vijender <Vijender.Kumar@act.gov.au>
Subject: RE: Further comments regarding risk assessment [SEC=UNCLASSIFIED]

My comments on the risk register:

- Not all risks associated with the depot bridge have been identified and assessed. For example, risks associated with design non-compliances have not been considered.
- Outcomes / consequences are not fully considered / documented. For example, for the risks listed in the matrix, there is no evidence that the impact on assets and other factors have been assessed.
- There was no client representative at the workshop.

Kind Regards,
Lisa.

From: Grice, Simon
Sent: Wednesday, 28 November 2018 12:28 PM
To: Peffer, Dave <Dave.Peffer@act.gov.au>
Cc: Marcantonio, Laura <Laura.Marcantonio@act.gov.au>; Kelly, Gordon <Gordon.Kelly@act.gov.au>; Caruso, Lisa <Lisa.Caruso@act.gov.au>
Subject: Further comments regarding risk assessment [SEC=UNCLASSIFIED]

Hi Dave

Lisa is reviewing the risk assessment provided by CMC.

We will provide some additional comments regarding the risk assessment by COB tomorrow, but have some concerns with the risk methodology employed by CMC and that there are a number of gaps in their risk assessment matrix which we want to review further.

Kind regards,

Simon

Simon Grice | Senior Manager| Utilities Technical Regulation
Phone 02 6205 3078| Email simon.grice@act.gov.au
Construction, Environment and Workplace Protection | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

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CMC Risk Assessment - Context Setting

CONTEXT SETTING
1. Background
CMC are constructing the Canberra Metro Project on behalf of the Territory. SMEC and AECOM are the principal designers for the project.
2. Scope (inclusions and exclusions)
To assess the safety/operational risks associated with the CSR, HV and LV Networks which are not complaint with the relevant Standards.
3. Risk Assessment Objectives
Identify and Assess any risks introduced to CMO and the Territory due to the non-compliances.
4. Critical Success Factors of the activity/proposal being assessed
Objectives are that the maintenance of the assets can be carried out safely SFAIRP and that the infrastructure is safe SFAIRP.
5. Scope (inclusions and exclusions)
The scope is to review: 1. Depot bridge CSR
6. Stakeholders
CMC, CMO, TCCS, Electrical Regulator
7. Stakeholder consultation
Numerous meetings and discussions have been had in regard the CSR construction, compliance and the relevant standards and NCR's raised in relation to non-compliances
8. Assumptions
9. Constraints
Existing infrastructure, physical arrangements and corridor width
10. Boundaries/interfaces
The works are constructed within the Operational Phase Area.
11. Qualifications/conditions
Nil
12. Reference documentation and standards
AS2067:2016 AS3000
13. Other clarifying commentary

Canberra Metro - CSR Risk Assessment - Depot Bridge

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION						5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 **Existing Control**	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
1	Safety	11kV and LV duct shallower than required in AS2067:2016	Construction issues, design adherance and site constraints	**Most Likely (Credible) Outcome**	**Worst Case (Credible) Outcome**	Ducts transition from structure to required depth over a distance of 5m (should be <3m)	Engineering/ Design	CMC	**Moderate**	**Unlikely**	LOW - 8E	Yes	A further capping slab has been added above the existing slab to provide a cold joint. Correct tape will be laid on the existing slab and the new slab laid over the top. Plaques will be laid into the topping slab identifying shallow HV/LV and Comms services. If this was then ever broken out the top slab would come away and the hard cover/tape would be exposed.
						Ducts are encased in 12:1 sand/cement stabilised sand	Engineering/ Design	CMC					
						Warning tape have been laid over the ducts on top of the stabilised sand layer and below the reinforced concrete slab	Engineering/ Design	CMC					
						A 150mm min. reinforced concrete slab is laid on top of the stabilised sand forming a path/walkway	Engineering/ Design	CMC					
						The area is a controlled area that is restricted to the general public due to being in the Operational Phase Area	Isolation	CMO					
						Excavation or work in this area will require a permit from the operator including an excavation permit. This permit will detail the services and depths of the services from the As-built drawings.	Administrative	CMO					
						3. PROPOSED ADDITIONAL RISK TREATMENT			**4. RESCORE TO REFLECT SFAIRP**			5.1 Do the decisions make sense?	
				No space on site exists to add more ducts so it is unlikely that the CSR will be augmented in the future. Works will disrupt service so an alternative cable route would be sought if it was required.	Excavation works strike duct/cable	**3.0 Proposed Additional Control**	3.01 Control type	**SFAIRP TEST** 3.1 **BENEFIT** / 3.2 **COST** / 3.3 Decision / 3.4 Responsible Party / 3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
						Plaques detailing HV/LV services below to be installed on walkway	Engineering/ Design	Moderate / Minimal / Adopt / CMC	**Minor**	**Rare**	LOW - 1E		
						Risk Assessment by competent professionals to asses the risk	Administrative	Moderate / Minimal / Adopt / All stakeholders					
						Remove the cables, concrete, ducts and stabilised sand and rebuild as per design	Engineering/ Design	High / High / Reject / CMC					
						Add reinforced concrete slab on top of current slab, placing correct hard cover and tape configuration between the two slabs.	Engineering/ Design	Moderate / Moderate / Adopt / CMC					

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION						5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 **Existing Control**	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
2	Regulatory	Non-compliant depth to AS2067:2016 and AS3000	Construction issues	**Most Likely (Credible) Outcome**	**Worst Case (Credible) Outcome**	As-built survey of ducts and finished level	Engineering/ Design	CMC	**Moderate**	**Unlikely**	LOW - 3E		Regulatory compliance in this instance cannot be achieved, hence the item does not have all the same controls as Item 1 above. The risk assesment is considering the impact of regulatory compliance with the controls put in place by other items.
						Site assessment and design reviews	Administrative	CMC/AECOM					
						3. PROPOSED ADDITIONAL RISK TREATMENT			**4. RESCORE TO REFLECT SFAIRP**			5.1 Do the decisions make sense?	
				Asset left as is	Non-compliant asset requiring major remedial works	**3.0 Proposed Additional Control**	3.01 Control type	**SFAIRP TEST** 3.1 **BENEFIT** / 3.2 **COST** / 3.3 Decision / 3.4 Responsible Party / 3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level		
						Risk Assessment by competent professionals	Administrative	Moderate / Minimal / Adopt / All Stakeholders	**Minor**	**Rare**	LOW - 2E		

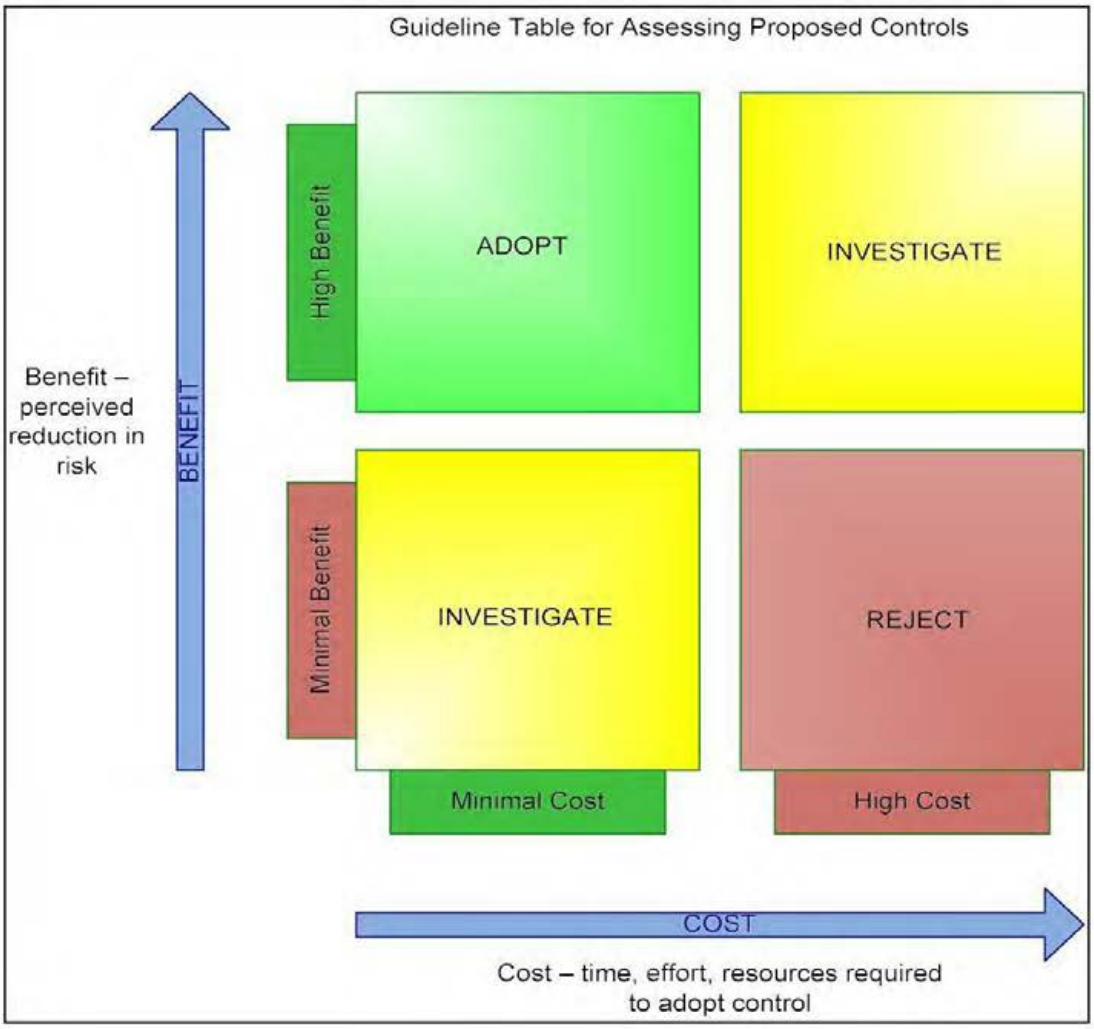
1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION												5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments					2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome	Ducts provide a Class A System	Engineering/ Design	CMC					Moderate	Unlikely	LOW - 3D	Yes	Controls as per item 1
						Controlled area restricts access	Administrative	CMO									
3	Regulatory	No Hard Cover, Tape Only for HV is non-compliant	Construction Issues	No physical barrier (Hard Cover) between surface level and ducts, only lightweight electrical delineation tape	Excavation can occur and no resistance or notification during excavation work before encountering services	3. PROPOSED ADDITIONAL RISK TREATMENT							4. RESCORE TO REFLECT SFAIRP			5.1 Do the decisions make sense?	
						3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST					4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
								3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when					
						Measures detailed in Item 1 including laying of hard cover and tape for the respective services on current slab and then forming and pouring a new slab over the top with delineation by plaques	Engineering/ Design	Moderate	Moderate	Adopt	CMC		Minor	Rare	LOW - 3E		

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION												5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments					2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome	Ducts provide a Class A System	Engineering/ Design	CMC					Moderate	Unlikely	LOW - 3D	Yes	Controls as per item 1
						Controlled area restricts access	Administrative	CMO									
4	Regulatory	Tape does NOT cover all services or overlap as required	Construction issues	Excavation could occur, breaking concrete and not encountering tape before hitting services	Excavation could occur, breaking concrete and not encountering tape before hitting services	3. PROPOSED ADDITIONAL RISK TREATMENT							4. RESCORE TO REFLECT SFAIRP			5.1 Do the decisions make sense?	
						3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST					4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
								3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when					
						Measures detailed in Item 1 including laying of hard cover and tape for the respective services on current slab and then forming and pouring a new slab over the top with delineation by plaques	Engineering/ Design	Moderate	Moderate	Adopt	CMC		Minor	Rare	LOW - 3E		

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION												5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments					2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome	Controlled area so unlikely vandalism would occuir	Administrative	CMO					Moderate	Unlikely	LOW - 3D	Yes	
						3. PROPOSED ADDITIONAL RISK TREATMENT							4. RESCORE TO REFLECT SFAIRP			5.1 Do the decisions make sense?	
5	Safety	Cable route plaques in concrete could get stolen	Vandalism or lack of maintenance	Plaques will not get removed	Plaques are removed removing a level of protection/warning	3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST					4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
								3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when					
						Plaques to be made from stainless steel instead of brass making them less valuable	Engineering/ Design	Moderate	Minimal	Adopt	CMC		Minor	Rare	LOW - 3E		

	Risk Category	Consequence				
Safety category is focussed on Impact to People	**S: Safety**	No Medical Treatment Required	Lost Time Injury Results (LTI) OR Medical Treatment Required	Serious Injury Occurs	Single Fatality Occurs	Multiple but Localised Fatalities Occur
Asset category is focussed on Operations Impact, Track, Systems (Hardware & Software) and Human Assets	**A: Assets**	<6hrs Track Closure	>6hrs but <24hrs Track Closure	>24hrs but <48hrs Track Closure	>48hrs but <5 Days Track Closure	>5 Days Track Closure
Focussed on Financial Impact Cash flow, liquidity, Capital, Asset Value, Procurement & Contracts related exposure	**F: Financial**	<$250K	>$250K but <$2M	> $2M but <$10M	>$10M but <$50M	>$50M
Focussed on Environment Impact Heritage, Flora & Fauna, Archaeology & Indigenous, Pollution and Amenity (Public)	**E: Environment**	Contained Environmental Damage - fully recoverable (no cost or ARTC action required)	Isolated Environmental Damage - minimal ARTC remediation required	Localised/Clustered Environmental Damage - requiring remediation	Considerable Environmental damage - requiring remediation	Widespread long term or permanent damage to the environment - remediation required
Focussed on Regulatory/Legislation Exposure Non-compliance & Our Licence to Operate	**R: Regulatory**	Minimal or no Regulatory involvement	Notice to Produce Information	Improvement Notice or Threatened Action	Prohibition Notice or Fine/s	Prosecution of the company and/or its office holders
Focussed on Reputational Exposure Customer Dissatisfaction, Shareholder Support, Service Quality & Reliability, Public Image and Stakeholder Attitudes	**R: Reputation**	Isolated event able to be resolved [<7Days]	Management intervention required [>7days but <3mths]	Tactical (Business Unit / Divisional) intervention required [>3 months but <18mths]	Strategic intervention required [>18mths but <3years]	Corporate Loss of Shareholder and/or Customer support (tangible business impact) >3years
		D →	*Not Significant*	*Minor*	*Moderate*	*Major*	*Extreme*

Likelihood		*Descriptor* ↓	Level	1	2	3	4	5
Description	**Frequency of Occurrence**							
Is expected to occur in most circumstances	Once per month	*Almost Certain*	A	MED - 1A	MED - 2A	HIGH - 3A	V HIGH - 4A	V HIGH - 5A
Will probably occur in most circumstances	Between once a month and once a year	*Likely*	B	LOW - 1B	MED - 2B	HIGH - 3B	V HIGH - 4B	V HIGH - 5B
Might occur at some time	Between once a year and once in five years	*Possible*	C	LOW - 1C	LOW - 2C	MED - 3C	HIGH - 4C	HIGH - 5C
Could occur at some time	Between once in 5 years and once in 20 years	*Unlikely*	D	LOW - 1D	LOW - 2D	LOW - 3D	MED - 4D	MED - 5D
May occur in exceptional circumstances	Once in more than 20 years	*Rare*	E	LOW - 1E	LOW - 2E	LOW - 3E	LOW - 4E	MED - 5E



Notes:

1. This matrix is designed as a guide **only** and should not be implemented without sufficient analysis and debate about proposed controls.

2. The decision to reject any control must be justified and the decision documented.

3. The recommendation to "investigate" a control indicates that further analysis into the costs and benefits is required. This analysis may be conducted by the workshop participants, or may require further investigation outside of the workshop environment.

Stakeholder Consultation and Risk Assessment Attendees

Risk Assessment Subject Title	CMC - CSR Compliance Risk Assessment - Depot Bridge

1. Assessment Process

Date: 22nd November 2018

Location: CMC Training Room 1

Facilitator: Sch 2.2(a)(ii)

SIGNED ATTENDANCE SHEET ATTACHED SEPERATELY AS PDF

2. Name & Signature	Organisation	Position	Email	Telephone	Signature
Sch 2.2(a)(ii)	CMC	Operations Manager NSW/ACT	Sch 2.2(a)(ii)		
	CMC	Technical & Commercial Director			
	CMC	Health and Safety and Assurance Manager			
	IC	IC Representative			
	CMC	Design Review Manager			
	CMC	Rail Systems Superintendent			
	CMC	Senior Rail Systems Manager			
	SMEC	Manager - Roads and Highways ACT and Southern NSW			
	SMEC				
	IC	IC Technical Reviewer			
	CMC	CPS Manager			
	AECOM	Project Manager			
	AECOM	Technical Director Rail			

3.Stakeholder Review of Risk Assessment

The draft Risk Assessment ver 1.1 was circulated to Attendees and Stakeholders on 23/11/2018
The following feedback was received from these respondents.

4.Stakeholder Feedback on draft Risk Assessment

Name	Organistion	Position	Feedback	Comment Accepted / Rejected / Modified

4. Approval	Name	Signature	Organistion	Position	Report Version	Date
Risk Assessment Workshop prepared by:						
Risk Assessment reviewed by:						
Risk Assessment endorsed by:						

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From:"Grice, Simon"
Sent:22/11/2018 10:06 PM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Ponton, Ben" <Ben.Ponton@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject:RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]
Attachments: Proposed Approach to key issues_.pptx, Letter to CMO [SEC=UNCLASSIFIED]

Hi Dave

Thanks for sending over Canberra Metro's slides re key issue 1 (CSR1 – HV cable) an key issue 2 (depot cable bridge).

There are some similar comments regarding both issues that we can advise Sch 2.2(a)(ii) TCCS and [redacted]

Note that the information provided below contains references to likely breaches of legislation and a recommendation to seek further advice from GSO.

Please let me know if you would like to discuss further! (I am travelling interstate and will be leaving about 2, and back Tuesday morning. Gordon will be here as usual!)

Kind regards,

Simon

Key Issue 1-Resumption of installation of HV cable in CSR 1

- Requires IC (APP) certification of design and installation and IEC (SEEG) certification of installation. SEEG certification must outline compliance with design specification and Technical Code, including all referenced standards within Technical Code.
- Works to date do not appear to demonstrate compliance with design specification and Technical Code. We await advice regarding the process for verifying compliance.
- Noting that we are aware of a wider range of issues than those referenced in the slide for CSR 1, the proposed approach does not appear to comprehensively address the range of issues identified. However, their forthcoming asset management plan may provide further information.

Key Issue 2-Depot Cable Bridge

- Requires IC (APP) certification of design and installation and IEC (SEEG) certification of installation. SEEG certification must outline compliance with design specification and Technical Code, including all referenced standards within Technical Code.
- Works to date do not appear to demonstrate compliance with design specification and Technical Code. We await advice regarding the process for verifying compliance.
- Noting that we are aware of a wider range of issues that those referenced in the slide for the depot cable bridge, the proposed approach does not appear to comprehensively address the range of issues identified because there is no reference to CSR 2. However, their forthcoming asset management plan may provide further information.
- Note forthcoming advice from the Technical Regulator to CMO regarding AS2067 and the design review process which may assist CMC/CMO/John Holland.
- Further advice from Canberra Metro regarding comments re cables being a controlled area, noting that they are in the public domain and accessible by the public at all times.

Advice by Canberra Metro of Possible breaches of Light Rail Technical Code

- The slides reference that cables are not to correct depth and construction, and is not in accordance with design. CMO/CMC/John Holland need to follow the process outlined in forthcoming advice from the Technical Regulator regarding the design review process. Furthermore, this advice (if accurate and correct, which should be considered highly likely because the slide has come from

Sch 2.2(a)(ii) Canberra Metro and Sch 2.2(a)(ii) John Holland rail lead for NSW/ACT) would show that multiple Australian Standards have not been met (therefore multiple breaches of section 16, failure to comply with a Technical Code) and the requirements for issuing operating certificate (e.g. section 49 – unlicensed regulated utility is providing a regulated utility service in contravention of this Act.)

- Recommend that we seek further advice from GSO regarding the information provided in these slides, and the probable breaches of legislation.

From: Peffer, Dave
Sent: Thursday, 22 November 2018 5:41 PM
To: Grice, Simon <Simon.Grice@act.gov.au>; Kelly, Gordon <Gordon.Kelly@act.gov.au>
Cc: Ponton, Ben <Ben.Ponton@act.gov.au>; Jones, Greg <Greg.Jones@act.gov.au>
Subject: Fwd: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]

Simon / Gordon

These are the two complex issues that I flagged at our briefing the other day. As I indicated, CMC are keen to move forward on resolution of these matters.

Can Ben and I please have your advice in response to what CMC have documented in the attached slides. We'll need to be specific with reference to standards or the code where we have questions.

Note also that I expect before any work occurs, the proposals would need to be signed off by their verifier, and certifier.

Thanks

Dave

Begin forwarded message:

From: Sch 2.2(a)(ii)
To: "Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc: Sch 2.2(a)(ii) "Edghill, Duncan" <Duncan.Edghill@act.gov.au>, "Oldfield, Meghan" <Meghan.Oldfield@act.gov.au>
Subject: RE: Response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]

Dave,

As discussed on Tues afternoon, please find attached a couple of slides that speak to the two key issues we would like to start resolving. The two issues being the recommencement of HV cable installation in the south and the resolution of the HV over the Depot Access Bridge.

The intention is to workshop through the right approach on both of these items this afternoon. Darren is the point of contact as I am in board meetings for most of the day.

I understand our respective technical teams are meeting at the Depot this morning to review status of the electrical certification of the Admin building following install of the permanent Main Switchboard. Importantly, this to allow occupation of the Admin building while other works in the main yard and maintenance hall are ongoing.

Regards,

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

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From:"Grice, Simon"
Sent:21/11/2018 5:07 AM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Jones, Greg" <Greg.Jones@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject: Recommended response to Canberra Metro's draft asset management plan [SEC=UNCLASSIFIED]
Attachments: Canberra Metro - Asset Managment Plan.pdf, Canberra Metro - Asset Managment Plan.docx

Hi Dave

Gordon and I have prepared the following advice regarding Canberra Metro's draft Asset Management Plan as provided on 20 November 2018.

Recommend that this summary advice and Gordon's detailed notes are sent to Canberra Metro.

Happy to discuss further!

Kind regards,

Simon

Section 1 (Purpose & Use)

- Signatory to include TCCS as client.
- Draft document references Project Independent Certifier (APP) and Independent Electrical Certifier (SEEG). UTR seeks further advice on the role of the independent verifier referenced in draft plan.

Section 2 (Issues Identification)

- Asset management plan must include all non-conformance reports (NCRS) and all defects identified by Independent Electrical Certifier by asset by light rail block (understood to be 75 blocks of approximately 150 metres length).
- Asset management plan must include references to design reports, approvals and specifications for each asset by light rail block.
- Asset management plan must include references to Independent Certifier approved drawings for each asset for each light rail block.
- Asset management plan must include detailed methodology for verifying how each asset in each light rail block will be demonstrated to comply with Technical Code and each referenced standard.
- For each asset comment on known level of compliance with Technical Code and each referenced standard for each asset for each light rail block.
- For each asset provide references to verification by Independent Certifier and Independent Electrical Certifier for each light rail block.

Section 3 (Resolution of Issues)

- Further detailed advice from each stakeholder identified in section one is required once Asset Management Plan is developed and includes information as referenced in comments under sections one and two.
- See detailed notes provided by Gordon Kelly in attachment.

Section 4 (Appendix A)

- Include Independent Electrical Certifier's defect list.

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Summary of Technical information supporting proposed Asset Management Plan from Canberra Metro Constructions

Reference: Canberra Light Rail

Asset Management Plan – 21 November 2018

Item 1) Non-Conformance Report Register (4 x A3 pages double side printed)

- Document is untitled – No reference to Project or discipline
- No Independent Certifier reference
- No design reference

Comments: Data set is incomplete / does not provide necessary detailed narrative or reference

Recommendation: Following data set to be resubmitted

Item 2) Canberra Light Rail – Electrical Asset Management Plan – Draft 21 November 2018

Introduction.

Asset Management Plan has been broken up into 4 distinct sections

Section 1	Signature	Inclusion of the Client - TCCS
	Purpose and Use	Plan is to be provided to all stakeholders on a weekly basis
	Structure	Inclusion of complete NCR list
	Background	Inclusion of Design Report, Design Approval and Design Specification
	Roles and Glossary	Inclusion of 'Project' Independent Certifier Confusion around SEEG being the Independent Verifier, Inclusion of client
Section 1 Cont	Overview	
	CSR1	Description of Design Specification requirements
	CSR 2	Description of Design Specification requirements
	Electrical Conduit	Description of Design Specification requirements
	Separation of Services	Description of Services as per Design Specification requirements
		Intentionally Blank
		Intentionally Blank

Section 2	Identification of issues	Inclusion – Of Primary Technical Reference Material – Design Reports, Design and Design Specification
	Parties Identified	Inclusion of Independent Electrical Certifier
	Electrical Independent Verifier	Inclusion of all defects / non-conformances as per design standard / specification
	Process for Identifying Issues	Inclusion of Project Independent Certifier (APP)
		Inclusion of CMC – Project documentation requirements – ITP's, RFI's, supporting images, IC approved drawings
	Remaining Identification Works	Inclusion of Scope of works
	Verifiable v unverifiable assets	Inclusion – All assets are to be verified
		Inclusion of each asset type – per block per section
	Categorisation of issues	Inclusion of reference narrative – Design , Design Specification
		Inclusion of applicable Australian Standard
		Inclusion of specific requirements of design specification
	Overview of issues	Per block per section
	Summary 1	Inclusion of detailed description and remediation plan
	Summary 2	Inclusion of detailed description and remediation plan
	Summary 3	Inclusion of detailed description and remediation plan
	Summary of all categories	Inclusion of detailed description and remediation plan
	Non-Conformance Register and Defects Process	Inclusion of NCR'S that have or potentially impact on CSR1, CSR2 and wiring systems associated with project
	Defect Register	Inclusion of existing Defect Register (JIRRA) into Asset Management Plan

Section 3	Resolution of Issues	
	Overarching Principles	Inclusion (Suggested reword) To Install and commission a railway / network into services which complies with the agreed contract between TCCS, the Design and Construction Operating Certificate and, but not limited to Light Rail Regulated Utility (Electrical) network code. (Feb 2016)
	Potential Resolution	Further detailed narrative required – Approval, verification and certification of all systems and services prior to Provision of Service Operating Certificate
	Overview – Potential Resolution	Engagement with all stakeholders required for all sub sections of the proposed Asset Management Plan
	Risk Assessment and Monitor 1	Engagement with all stakeholders required for all sub sections of the proposed Asset Management Plan
	Relevant Standards	Inclusion – Technical requirements for a light rail regulated utility to design, construct, operate and maintain in accordance with the Light Rail Regulated Utility (Electrical) Network Code

	Risk Assessment and Monitor 2	In-sufficient detail provided
	Key Issue 1 - Resolution	In-sufficient detail – Related stakeholders to comment / provide input into this section
	Key Issue 2 - Resolution	In-sufficient detail – Related stakeholders to comment / provide input into this section
	Key Issue 3 etc - Resolution	In-sufficient detail – Related stakeholders to comment / provide input into this section
	List of all issues & resolution (1)	Inclusion of supporting narrative to be included, but not limited to – Life cycle of assets, impact on other assets or structures, NCR closed out without any 'conditional requirements'

Section 4	Appendix A	
	Outstanding Issues	Inclusion of IEC defect list into asset management plan
		Inclusion – Impact on – compliance with Technical Code Inclusion – Impact on Provision of Service operating certificate
	List of Resolved Issues	Inclusion – Resolution in accordance with Design Specification, IC approved Design Documentation, stakeholder sign off / acceptance of solution
		Intentionally Blank
		Intentionally Blank
		End

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02 Oct 2018

Background:

It is elledged that the Installation of electrical wiring systems by unlicensed persons. - Scale of no compliance is yet to be formally determined.

Specialist Electrical Engineering Group (SEEG) wishes to advise the Territory, of its position on several issues previously raised.

These issues are outlined below.

1. CMC has been reckless about whether workers installing electrical conduit have electrical licenses. This is considered an offense. Relevant legislative references are provided below:
    a. Electrical conduit is considered part of an electrical installation (Refer ESA 1971 Electrical Installation definition)
    b. Electrical Wiring Work includes any installation work on an electrical installation (Refer ESA 1971 Electrical wiring work definition)
    c. An electrician is an entity that does or supervises electrical wiring work (Refer Construction Occupations (Licensing) Act 2004, Part 2 Section 11)
    d. An electrician is deemed to be a construction occupation (Refer Construction Occupations (Licensing) Act 2004, Part 2 Section 7)
    e. Doing or supervising work as an electrician is a construction service (Refer Construction Occupations (Licensing) Act 2004, Part 2 Section 6 (2))
    f. A person commits an offence if they engage an unlicensed person to carry out a construction service and they are reckless about whether the worker is licensed to provide the service.

Onsite observation:

1. Separation of services does not comply with CMC approved design drawing 00-ACM-DRW-RAS-CT-0004 Table 1.2
2. It has been observed on site that installed electrical wiring systems in CSR1 & CSR2 do not meet:
    a. Minimum depth requirements according to AS3000-2007 Table 3.6
    b. Installation of signal strip in accordance with AS3000-2007 3.11.4.5
    c. Cover requirements in CMC approved design drawing 00-ACM-DRW-RAS-CT-0004 Table 1.1
    d. For HV cables, minimum depth of 0.75m according to AS2067-2016 4.2.9.1 (a)

3. CMC has committed an offence by installing a HV joint, which is not suitable for water immersion, in a pit with water.
    a. HV installations are considered electrical installations (Refer ESA 1971 Electrical Installation definition)
    b. Manufacturers documentation indicates joint is not suitable for water immersion
    c. AS3000 requires equipment to be installed in accordance with manufacturer's instructions. (Refer AS3000 2007 1.7.1C)

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Electrical Certification / Compliance Summary

Background:

The Light Rail Project (CMC) have advised 'service' will commence on the 21 December 2018.

Acknowledging the amount of works that need to be completed, tested and verified the following methodology is proposed.

High Level Summary:

1. Civil works – uncontrolled - yet to be verified by JH and SEEG. (Estimated 30 weeks work ahead to verify 20% of CSR 1 &2)
2. Civil works – uncontrolled – verified by JH SEEG certification / sign off that electrical works are fit for purpose
3. Civil works – uncontrolled – defects identified by JH, SEEG and TCCS
4. Civil works controlled by onsite management processes – verified by JH SEEG certification / sign-off
5. Licensed electrician – verified by JH SEEG certification / sign off
6. Civil works - uncontrolled – can't be verified by JH SEEG cannot certify / sign off

Way forward:

Letter from Technical Regulator to CMC & CMO advising both parties of known concerns / onsite observation.

CMC and CMO to provide monthly update of status of item # 1 & 3

CMO to control and monitor restoration works (electrical defects) on an ongoing basis – SEEG required to monitor and certify on onsite electrical work corrective actions

CMO to provide monthly status update of onsite corrective actions (electrical)

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From:"Caruso, Lisa" <Lisa.Caruso@act.gov.au>
Sent:30/11/2018 12:41 PM
To:"Grice, Simon" <Simon.Grice@act.gov.au>
Cc:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>;"Kumar, Vijender" <Vijender.Kumar@act.gov.au>
Subject:RE: Canberra Metro Asset Management Plan [SEC=UNCLASSIFIED]
Attachments: Copy of ACT Asset Register.xlsx

Hi Simon,

I agree with the previous comments provided by UTR that the Asset Management Plan submitted has not identified and addressed the wider range of risks and issues that have been identified.

There is also no evidence that the impact of these non-compliances on CMO assets or other utility assets has been considered, and there is no evidence of consultation with other utilities that are potentially impacted by these non-compliances.

The scope of the risk assessment is also very narrow. I'm concerned that it focuses on non-compliance with Australian Standards and excludes other key areas of concern, and in particular non-compliance with the approved design.

I would also expect an Asset Management Plan to be more comprehensive than the power point slides provided. At a minimum, the plan should identify the location and condition of all assets. I've attached an example of an asset register that would inform an Asset Management Plan.

I would also suggest that Sch 2.2(a)(ii) from the Electrical Technical Review Group (ETRG) attend any meetings with CMC / John Holland to discuss the approach. The role of the ETRG is to provide advice to the Technical Regulator on issues such as these.

-
Additional comments:
The role of the Independent Verifier (SEEG) is not aligned with the conditions of the D&C Operating Certificate (A1–5) – SEEG (as the IEC) must confirm the installation is in accordance with the design and applicable Australian Standards and is safe to operate. The scope in the Asset Management Plan only refers to company and Australian Standards and no consideration is given to design.

The Asset Management Plan suggests that the risks identified in relation to Key Issue 1 – collapsed and damaged conduits, water ingress to cable pits, sharp concrete edges - were to be considered at a risk workshop scheduled on 22 November. These is no evidence in the documentation provided from this workshop that these issues have been considered.

Kind Regards,
Lisa.

Lisa Caruso | Senior Engineer | Utilities Technical Regulation
Phone: 02 6207 0683 | Email: lisa.caruso@act.gov.au
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From:"Kelly, Gordon"
Sent:29/10/2018 5:20 AM
To:"Stanford, Peter" <Peter.Stanford@act.gov.au>
Cc:"'kim'" <kim@specialistelectrical.com.au>;"'Tony Berryman'" <tonyberryman@specialistelectrical.com.au>;"Grice, Simon" <Simon.Grice@act.gov.au>
Subject:RE: coverage

Hi Peter,

Please see my previous email regarding separations / clearances.

From the information provided, most if not all installation fail, as they don't comply with the minimum installation requirements of the standards.

My suggestion is all conduits, csr1 and 2 and the depot to be camera inspected.
From there a list of non-conformances can be established and a rectification process can be established and commenced.

Again, SEEG, are to be actively consulted in this suggested process.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

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From: Stanford, Peter
Sent: Monday, 29 October 2018 3:19 PM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>
Subject: coverage

Gordon

Below is the table and values Sch 2.2(a)(ii) had on a powerpoint slide. No other details apart from the below. First question ill get asked is what should the min cover be?

Appreciate your comments / thoughts

P

Depths and Covers found: ***CSR1 should be min xxxxx, CSR2 should be min XXXXXX***

North Blocks 1 – 7	CSR1 – 19 locations potholed – no id tape found – cover ranges 600-900mm
	CSR2 – 6 locations potholed – no id tape found – cover ranges 600-800mm
North Blocks 10-16	CSR1 – 4 locations potholed – no id tape found – cover ranges 700 – 900mm
	CSR2 – 2 locations potholed – no id tape found – cover ranges 800-900mm
South Blocks 1-13	CSR1 – 2 locations potholed – tape located – cover ranges 800-1200mm
	CSR2 – no checks yet.

Peter Stanford | Senior Manager - Technical
Mobile: 0412 214 674 | Phone: 02 6205 9033 | Email: peter.stanford@act.gov.au
Transport Canberra Light Rail | Transport Canberra and City Services Directorate | **ACT Government**
496 Northbourne Avenue Dickson ACT | GPO Box 158 Canberra ACT 2601 | www.transport.act.gov.au

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Please consider the environment before printing this e-mail.

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:10/09/2018 4:05 PM
To:"Curtin, Daniel" <Daniel.Curtin@act.gov.au>;"Mosslar, Michael" <Michael.Mosslar@act.gov.au>;"Smart, John" <John.Smart@act.gov.au>
Cc:"Green, Ben (ACTPLA)" <Ben.Green@act.gov.au>;"Grice, Simon" <Simon.Grice@act.gov.au>;Sch 2.2(a)(ii) Sch 2.2(a)(ii)
Subject:FW: Electrical Compliance and ITP's
Attachments: Electrical Compliance – Existing CSR Assets.pdf, ITPCMC00053 Rev 03pdf.pdf, ITPCMC00115 Rev 01.pdf

Dear All,

Please find the attached email from CMC regarding electrical compliance framework, now as the CMC project moves forward and also looking backwards to works already completed.

The suggested framework is a significant step in the right direction.
The IEC has primary steerage of the certification of all electrical installation associated with the Light Rail Project.

At this point in time, I am personally confident, that if the (recently established) onsite work practices continue, CMC should be able to discharge their respective obligations, regarding licensed electrical works.

UTR will continue to assist the Independent Electrical Certifier, should it be observed that the onsite work practices slip or aren't been undertaken as CMC have committed to.

Should the situation change, I will keep you advised.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

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From: Sch 2.2(a)(ii)
Sent: Monday, 10 September 2018 9:00 AM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>
Subject: FW: Electrical Compliance and ITP's

Gordon

Attached as discussed.

1. Flow chart developed in conjunction with SEEG detailing how we propose to validate and sign off the current installed electrical assets. This process is already underway with photos and QA documentation provided to SEEG for both the North and South of the alignment.

2. ITPCMC00115 rev 01 – ITP for Installation of Cables, Item 7 revised to include licensed electrical supervisor Hold Point sign off.
3. ITPCMC00053 rev 03 – ITP for Combined Services Trench, Item 15 added to include licensed electrical supervisor Hold Point sign off. CSR Checklist item 15 Hold Point added for electrical supervisor hold point.

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

From: Sch 2.2(a)(ii)
Sent: Monday, 10 September 2018 8:35 AM
To: Sch 2.2(a)(ii)
Subject: Electrical Compliance and ITP's

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

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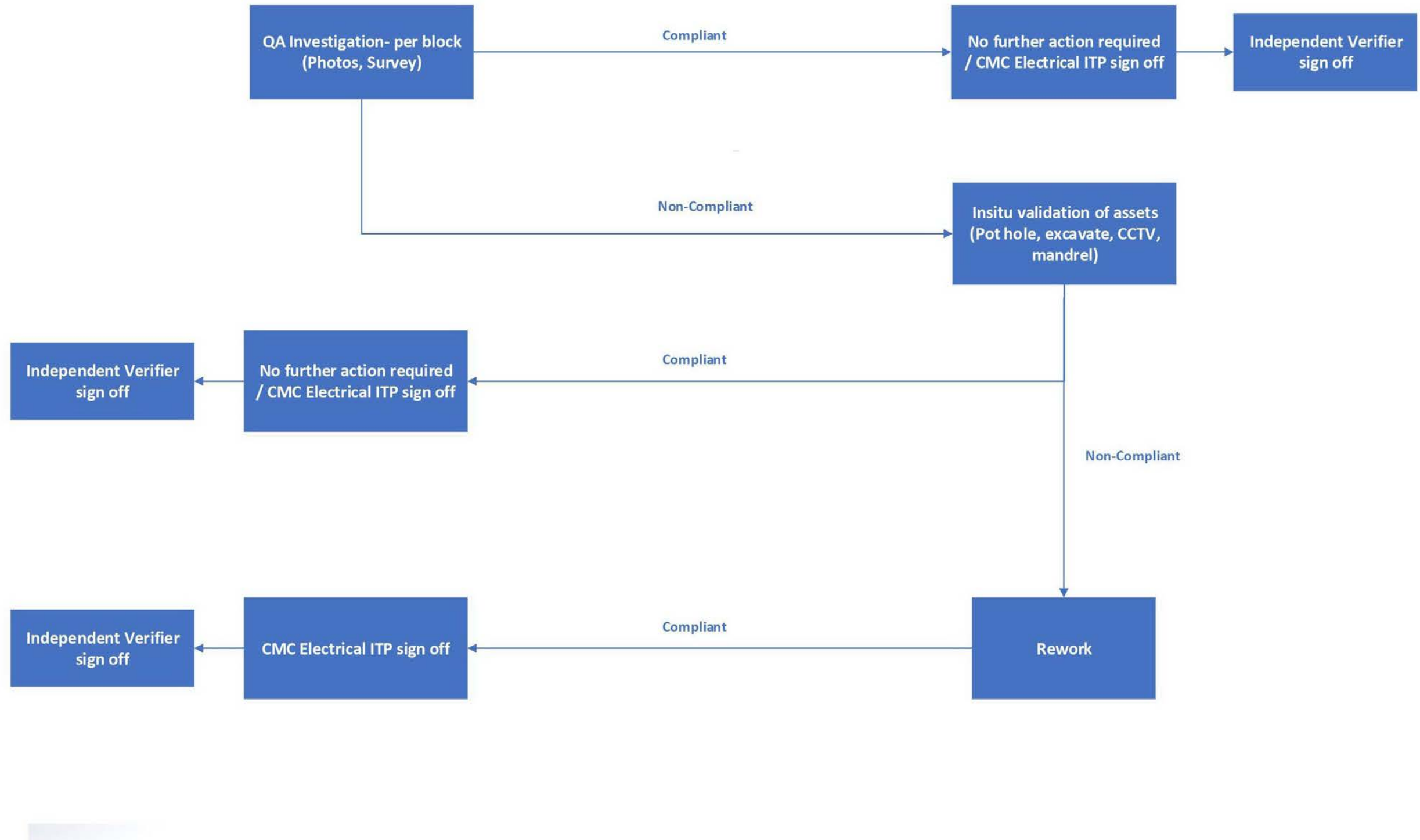
Electrical Compliance – Existing CSR Assets



Inspection & Test Plan (ITP)
Combined Services Trench (CSR)

METRO Construction

Process: Combined Services Trench

ITP No.: ITP/CMC/00053 **Revision No:** 03

Date: 04/09/2018

This Inspection & test plan comprises the following documents and approved for use:

Part 1 Inspection and Test Plan

Part 2 Lot Verification Checklist

Reference Documentation: *Design packages 15.1, 15.2, 34, 49 – Combined Services Route*

R53-00-CMC-SPC-CIV-GE-0109 - Concrete for General Use - Mortar and Grout

00-CMC-SPC-CIV-GE-0197 - CLR TRITS 03 – Underground Services

G36-00-CMC-SPC-CIV-GE-0193 - Environmental Protection

G38-00-CMC-SPC-CIV-GE-0194 - Soil and Water Management

Prepared by Sch 2.2(a)(ii) **(signature)** 05/09/18 **(date)**

Reviewed by: **(signature)** **(date)**

Approved by: Sch 2.2(a)(ii) **(signature)** 05/09/2018 **(date)**

Project may add additional Reviewer and Approver rows as necessary

Client acceptance (if required): **(signature)** **(date)**

Rev No.	Description	Date	Reason for Revision
00	CMC Approval	05/05/2017	Area specific for the South
01	Updated	14/06/2017	Hold Point added in line item 10
02	Updated	21/09/2017	Updated to combine ITP/CMC/00029, 00-CMC-TMP-QUA-NA-0001-05, HWP Register M
03	Revised ITP	04/09/2018	Addition of point 15 to include licensed electrical HP sign off

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 04/09/2018 AMS No: AMS/CMC/00019, 53,61,62	**INSPECTION AND TEST PLAN** **Combined Services Trench (CSR)**	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
1.	TRAs and ESCP	SMP and CEMP	Ensure TRAs are approved and ESCP are in place, understood and signed off by all personnel involved in completing the task.	Prior to Start	SS	S		ITC
2.	Permit to Disturb	CEMP	Ensure a valid and current copy of the Permit to Disturb is on site. Permit to disturb to contain current DBYDs. Locate all services in work area through soft excavation methods. Ensure relevant crews have signed onto the excavation permit.	Each work activity	PE	S		ITC
3.	Vehicle Management Control of Site	VMP	Provide for the safe movement of traffic and the protection of persons and property through and/or around the work site. Vehicle management plan to be drafted and notified to plant operators of the proposed routes for the day.	Each Day	SS	S		ITC
4.	Working in or near environmentally sensitive areas	G36 cl 4.13	At least five working days prior, provide to the DCNR a copy of the EWMS for working in or near environmentally sensitive areas and written notice that environmentally sensitive areas are clearly delineated with locations and boundaries signposted.	Prior to Start	PER	HP		ITC
5.	Commencement of work requiring the installation of erosion control and sediment capture measures not previously addressed by ESCP and authorised by earlier Hold Point release	G38 cl3.1	Drawings prepared progressively for sections of the Site where work is to commence. (The drawing(s) must be submitted at least ten working days before disturbance of the surface of the section of the Site)	Prior to Start	PER	HP		ITC

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 04/09/2018 AMS No: AMS/CMC/00019, 53,61,62	INSPECTION AND TEST PLAN Combined Services Trench (CSR)	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
6.	Unexpected Finds	CEMP Contamination & Heritage Management Plans	Excavation will cease in the vicinity of the discovery of any contamination, heritage or anthropogenic material. The Supervisor will be informed immediately of the event. Excavation will stop and an environmental advisor will undertake an assessment of any unexpected and determine any further actions required. If unexpected material is discovered, the following procedure will be implemented: • Excavation will cease in the vicinity of the discovery; • The Supervisor will be informed immediately of the event; • Excavation will not recommence until the extent and importance of the find has been assessed and work has been approved to start by the environmental manager or their delegate.	Prior to Start	PER	HP		ITC
7.	Commencement of excavation for conduits	TRITS 03 cl9.2 HP3.5	Prior to the excavation of conduits the contractor shall submit to the superintendent details of the proposed pipes, pipe jointing, pipe colour, bedding materials to be used demonstrating conformance of products to the criteria in section 3.07.01 of the spec	Prior to commencement at least 5 working days notification	PE	HP		ITC Conformance certificates
8.	Materials – Stabilised sand	CLR R53	Approved mix design for stabilised sand 12:1	Once	SPE	R		ITC Conformance certificates
9.	Commencement of excavation for any service trenches	TRITS 03 cl9.3.2.1 HP3.6	Prior to proposed commencement of each trench the contractor shall provide notification to the principal that the trench alignment has been set out on site and verification that the levels of the existing crossover points and connection points will allow construction as specified.	Each trench	SV	HP	WP	ITC Survey report
10	Commencement of excavation of trenches in roads, road reserves or footways	TRITS 03 cl9.3.5 HP3.7	Prior to proposed excavation of any services trench in roads, road reserves or footways the contractor shall provide a copy of the road opening permit and the approved temporary traffic management plans.	Each trench	PE	HP		ITC Survey report TTMP number

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 04/09/2018 AMS No: AMS/CMC/00019, 53,61,62	**INSPECTION AND TEST PLAN** **Combined Services Trench (CSR)**	METRO Construction
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Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
11.	Commencement of trench excavation	TRITS 03 cl9.3.5 HP3.8	Prior to proposed excavation of trenches the contractor shall provide documentation demonstrating the method of shoring for all pipes and structures deeper than 1.5m	Each trench at least 3 workings days notification	PE	HP		ITC Shoring plan (if applicable)
12.	Placement of bedding material in trench	TRITS 03 cl9.3.6 HP3.9	Prior to proposed placement of bedding in a trench the contractor shall provide notification that the foundation of the trench will be ready for inspection	Each trench	PE	HP	WP	ITC
13.	Bedding materials	AS2566.1, AppC, table C1 00-ACM-DRW-RAS-CT-0004-table 1.3	• Manufactured sand to be used to bed all conduits • Thickness to be 100mm BEDDING MATERIAL AS SIEVE SIZE (mm) / AS SIEVE SIZE (mm) 19 / 100 2.36 / 30 - 100 0.425 / 15 - 70 0.075 / 3 - 30 OTHER PROPERTIES LINEAR SHRINKAGE / 6 MAXIMUM	Each trench	SE	S		ITC Compaction test reports Test requests Material Conformance
14.	Install conduits	Per design detail 00-ACM-DRW-RAS-CT-0004-table 1.2	• Placement of conduits in trench • Jointing materials per manufacturers recommendations • Installation of separation template and required spacing materials. MINIMUM SEPARATION REQUIREMENTS EXISTING SERVICE / MINIMUM CLEARANCE TRANSVERSE CROSSINGS (mm) / COMMS ROUTE (CSR02) / HV ROUTE / LV ROUTE SEWERS <DN300 / 300 / 300 / 300 TELECOMMUNICATION CABLES / 600 / 300 / 300 ELECTRICAL CABLES HV/LV / 300/100 / 300 / 100 DRAINAGE PIPE / 300 / 300 / 300 WATER PIPE / 100 / 500 / 500 GAS MAINS / 300 / 300 / 300	Each trench Each conduit	SS	S		ITC Photos Trench arrangement drawing
15.	Conduit Inspection prior to Backfilling	AS3000	• Validate electrical installation in accordance with AS 3000 & 2067	Each trench	ES	HP		ITC

ITP No.: ITP/CMC/00053 **ITP Rev:** 03 **ITP Date:** 04/09/2018 **AMS No:** AMS/CMC/00019, 53,61,62	**INSPECTION AND TEST PLAN** **Combined Services Trench (CSR)**	METRO Construction

Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
16.	Survey Cover	 00-ACM-DRW-RAS-CT-0004-table 1.1	Survey to be undertaken to top layer of conduits. All levels and locations to be checked and within tolerance prior to concealing any service. MINIMUM COVER REQUIREMENTS UTILITY TYPE / UNDER TOP OF TRACK SLAB (mm) / UNDER SEALED ROADS (mm) [1] / VERGE (mm) / UNDER A FOOT INFILL SLAB [2] COMMUNICATION: 600 / 600 / 600 / 300 LV ELECTRICAL: 950 / 950 / 600 / 300 HV ELECTRICAL: 1050 / 1050 / 950 / 300 NOTES: • [1] AT STRUCTURES, BRIDGES AND CULVERTS ETC, SERVICES ARE CONCRETE ENCASED AND THEREFORE THE MINIMUM COVER REQUIREMENTS ARE REDUCED. • [2] COVER TAKEN FROM UNDERSIDE OF SLAB	Each trench	SV	S		ITC Survey report
17.	Backfill - Including around pits	TRITS 3, cl9.3.8 AS2566.1, AppC, table C1 00-ACM-DRW-RAS-CT-0004/14	• Thickness – max 150mm layers • Compaction testing conducted – min 1 test per 100lm, required 95% • Material to be 12:1 stabilised sand per approved mix design Ensure all conduits are suitably encased and prevent movement and subsidence.	Each trench	SE	S		ITC Material Delivery dockets
18.	Compaction testing	TRITS 3, table 9.2	Item / Compaction Requirement Overlay Zone – not under Roads, Paths and Driveways: 90% MMDD Overlay Zone - under Roads, Paths and Driveways: 90% MMDD subbase material; DI 70% for bedding material Backfill – not under Roads, Paths and Driveways: Same as existing ground Backfill - under Roads, Paths and Driveways: 90% MMDD deeper than 600mm below sub-base; 95% MMDD - top 600mm below sub-base Backfill pipes adjacent to kerbs: 90% MMDD	min 1 test per 100lm per layer	SE	S		ITC Compaction test reports

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 04/09/2018 AMS No: AMS/CMC/00019, 53,61,62	INSPECTION AND TEST PLAN Combined Services Trench (CSR)	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
19.	Hard cover/marking tape	00-ACM-DRW-RAS-CT-0004	**Type 1 trench** • placed min100mm above top conduit • Material to be "hard cover" • Continue to backfill with stab sand to top of trench **Type 2 trench** • Placement per RFI, to top of trench • Material to be location tape, installed after blinding layer placement per CMC-RFI-000153	Each trench	SS	S		ITC Material Certificate Photos
20.	Remaining backfill (type 1 trench only)	AS2566.1, AppC, table C1	• Fill to top of trench in 150mm layers • Material – stabilised sand	Each trench	SE	S		ITC Delivery dockets
21.	Installation of pits	00-ACM-DRW-RAS-CT-0180	Pits to be installed per schedule. Note detailed locations for placement. Note 48- Installation of multiple conduits into plastic pits requires a 100mm concrete encasing, 200mm deep from pit wall.	Each pit	SE	S		ITC Certificate of conformance – supplier
22.	Installation of draw-wire/rope	00-ACM-DRW-RAS-CT-0004	**Galvanised wire 2.5mm** • HV/LV conduits require 2 wires • Where conduit run is greater than 30m and 100mm diameter, install 1 wire **Telecoms Rope 6mm** Conduit runs less than 30m, 100mm diameter. Note 16a- Secure wire to prevent being accidentally pulled out	Each conduit	SS	S		ITC Photos
23.	Protection of conduits	00-ACM-DRW-RAS-CT-0004	Note 18- All conduits to be capped at both ends	Each conduit	SS	S		ITC Photos

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 04/09/2018 AMS No: AMS/CMC/00019, 53,61,62	INSPECTION AND TEST PLAN Combined Services Trench (CSR)	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
24.	Inspection for blockages or obstructions	00-ACM-DRW-RAS-CT-0004	Note 20 - Following installation of conduit, a mandrel 95% diameter to pass from one end of the conduit to the other in both directions to test for obstructions. Attach a replacement draw wire/rope to the mandrel prior to drawing. Trailing wire/rope to remain in conduit.	Each Conduit	SS	S		ITC 00-CMC-FRM-QUA-NA-00005-00 CMC Mandrel Log Sheet
25.	Install pit surrounds/lids	00-ACM-DRW-RAS-CT-0004	Note 31- Covers to be class D in accordance with AS3996. For pits larger than 900x900mm multi part covers are to be installed Note 32- Lids to be brushed concrete colored as per adjacent track slab unless otherwise agreed with urban designer. Note 45- must be lockable and inaccessible to the public	Each pit	SS	S		ITC Conformance Certificate
26.	Pit signage	00-ACM-DRW-RAS-CT-0004	Note 35- install confined space signage	Each pit	SS	S		ITC
27.	Pit fit out	00-ACM-DRW-RAS-CT-0004	Note 36 – access steps or rungs to be installed to AS1657	Each pit as required	SS	S		ITC
28.	Final survey	00-ACM-DRW-RAS-CT-0004 00-ACM-DRW-RAS-CT-0004	All pits to be located, documented and conforming. Note 41- pit levels are from centre of the pit. Max slope to regrade is 1 in 10. Note 49- CSR02 pits may be adjusted (longitudinally) +/- 1m providing geometry allows offset of 1500mm from slab edge- consult design team and ensure no clashes with other elements of works	Each trench	SV	S		ITC Works as executed
29.	Rectification of Nonconformities	CLR Q6 cl 8.3	Details of the corrective action to be documented in JHET along with the proposed rectification method for nonconforming product, and additional supporting documentation where required.	As applicable. At least 2 working days' notice	PE SPE PQR	HP	HP	NCR Number to be referenced only. CMC- 00-CMC-FRM-QUA-NA-0016 CLR Q6 Specification Form

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

Precinct:			
Location:			
Lot Number		**Date Lot Opened:**	
Completed By:			

Item No	Activity/Criteria	Resp.	Inspected				Remarks
			Criteria As Measured	Compliant?	Signed	Date	NCR/RFI No
1.	TRAs and ESCP	SS	Ensure TRAs are approved and ESCP are in place, understood and signed off by all personnel involved in completing the task. TRA No..... ESCP No	□ Yes □ No □ NA			
2.	Permit to Disturb	PE	Ensure a valid and in-date copy of the Permit to Disturb is on site. Permit to disturb to contain current DBYDs. Locate all services in work area through soft excavation methods. Ensure relevant crews have signed onto the excavation permit. Permit No.....	□ Yes □ No □ NA			
3.	Vehicle Management Control of Site.	SS	Provide for the safe movement of traffic and the protection of persons and property through and/or around the work site. Vehicle management plan to be drafted and notified to plant operators of the proposed routes for the day. VMP No	□ Yes □ No □ NA			

4. <u>HOLD POINT:</u> Working in or near environmentally sensitive areas,

At least five working days prior, provide to the DCNR a copy of the EWMS for working in or near environmentally sensitive areas and written notice that environmentally sensitive areas are clearly delineated with locations and boundaries signposted.

Submitted: (SE) (Date) Approved: (PER) (Date)

5. <u>HOLD POINT:</u> Commencement of work requiring the installation of erosion control and sediment capture measures not previously addressed by ESCP and authorised by earlier Hold Point release.

Drawings prepared progressively for sections of the Site where work is to commence. (The drawing(s) must be submitted at least ten working days before disturbance of the surface of the section of the Site).

ITP- Checklist signed off and approved.

Submitted: (SE) (Date) Approved: (PER) (Date)

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

Item No	Activity/Criteria	Resp.	Inspected Criteria As Measured	Compliant?	Signed	Date	Remarks NCR/RFI No

6. HOLD POINT: Unexpected Finds

Excavation will cease in the vicinity of the discovery of any contamination, heritage or anthropogenic material.
The Supervisor will be informed immediately of the event. Excavation will stop and an environmental advisor will undertake an assessment of any unexpected and determine any further actions required.

If unexpected material is discovered, the following procedure will be implemented:

Excavation will cease in the vicinity of the discovery;
The Supervisor will be informed immediately of the event;
Excavation will not recommence until the extent and importance of the find has been assessed and work has been approved to start by the environmental manager or their delegate.

Remedial action plan has been approved and executed.
ITP- checklist signed off

Submitted: (SE) (Date) Approved: (PER) (Date)

7. HOLD POINT - Commencement of excavation for conduits

Prior to the excavation of conduits the contractor shall submit to the superintendent details of the proposed pipes, pipe jointing, pipe colour, bedding materials to be used demonstrating conformance of products to the criteria in section 3.07.01 of the spec

Submitted: (SE) (Date) Approved: (PE) (Date)

8.	Materials – Stabilised sand	SPE	Approved mix design for stabilised sand. Mix design code	□ Yes □ No □ NA			

9. HOLD POINT - Commencement of excavation for any service trenches

Prior to proposed commencement of each trench the contractor shall provide notification to the principal that the trench alignment has been set out on site and verification that the levels of the existing crossover points and connection points will allow construction as specified.

Submitted: (SE) (Date) Approved: (PE) (Date)

10. HOLD POINT - Commencement of excavation of trenches in roads, road reserves or footways

Prior to proposed excavation of any services trench in roads, road reserves or footways the contractor shall provide a copy of the road opening permit and the approved temporary traffic management plans.

Temporary Traffic Management Plan number: .....

Submitted: (SE) (Date) Approved: (PE) (Date)

11. HOLD POINT - Commencement of trench excavation

Prior to proposed excavation of trenches the contractor shall provide documentation demonstrating the method of shoring for all pipes and structures deeper than 1.5m

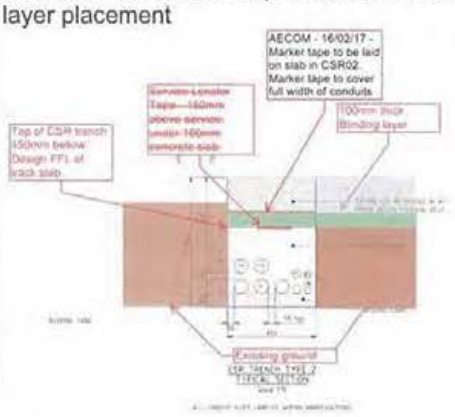
Submitted: (SE) (Date) Approved: (PE) (Date)

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

METRO Construction

Item No	Activity/Criteria	Resp.	Inspected Criteria As Measured	Compliant?	Signed	Date	Remarks NCR/RFI No
12. HOLD POINT - Placement of bedding material in trench Prior to proposed placement of bedding in a trench the contractor shall provide notification that the foundation of the trench will be ready for inspection Submitted: (SE) (Date) Approved: (PE) (Date)							
13.	Bedding materials	SE	Manufactured sand to be used to bed all conduits Thickness to be 100mm BEDDING MATERIAL AS SIEVE SIZE (mm) / AS SIEVE SIZE (mm) 19 / 100 2.36 / 30 - 100 0.425 / 15 - 70 0.075 / 3 - 30 OTHER PROPERTIES LINEAR SHRINKAGE / 6 MAXIMUM	□ Yes □ No □ NA			
14.	Install conduits	SS	a) Placement of conduits in trench b) Jointing materials per manufacturers recommendations c) Installation of separation template and required spacing materials. MINIMUM SEPARATION REQUIREMENTS EXISTING SERVICE / MINIMUM CLEARANCE TRANSVERSE CROSSINGS (mm): COMMS ROUTE (CSR02) / HV ROUTE / LV ROUTE SEWERS <DN300: 300 / 300 / 300 TELECOMMUNICATION CABLES: 600 / 300 / 300 ELECTRICAL CABLES HV/LV: 300/100 / 300 / 100 DRAINAGE PIPE: 300 / 300 / 300 WATER PIPE: 100 / 500 / 500 GAS MAINS: 300 / 300 / 300	□ Yes □ No □ NA			
15. HOLD POINT: - Conduit Inspection prior to Backfilling Validate electrical installation in accordance with AS 3000 & 2067 Submitted: (SE) (Date) Approved: (ES) (Date)							
16.	Survey Cover	SV	Survey to be undertaken to top layer of conduits. All levels and locations to be checked and within tolerance prior to concealing any service. MINIMUM COVER REQUIREMENTS UTILITY TYPE / UNDER TOP OF TRACK SLAB (mm) / UNDER SEALED ROADS (mm) [1] / VERGE (mm) / UNDER 6 FOOT INFILL SLAB [2] COMMUNICATION: 600 / 600 / 600 / 300 LV ELECTRICAL: 950 / 950 / 600 / 300 HV ELECTRICAL: 1050 / 1050 / 950 / 300 NOTES • [1] AT STRUCTURES, BRIDGES AND CULVERTS ETC. SERVICES ARE CONCRETE ENCASED AND THEREFORE THE MINIMUM COVER REQUIREMENTS ARE REDUCED. • [2] COVER TAKEN FROM UNDERSIDE OF SLAB	□ Yes □ No □ NA			
17.	Backfill - Including around pits	SE	Thickness – max 150mm layers Compaction testing conducted – min 1 test per 100lm, required 95% Material to be 12:1 stabilised sand per approved mix design Ensure all conduits are suitably encased and prevent movement and subsidence.	□ Yes □ No □ NA			

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

Item No	Activity/Criteria	Resp.	Inspected					Remarks NCR/RFI No
			Criteria As Measured		Compliant?	Signed	Date	
18.	Compaction testing	SE	Overlay Zone – not under roads	90% MMDD				
			Overlay Zone – under roads	90% MMDD subbase DI 70% for bedding				
			Backfill – not under roads	Same as existing ground				
			Backfill – under roads	90% MMDD deeper than 600mm below subbase 95% MMDD top 600mm below subbase				
			Backfill to pipes adjacent kerbs	90% MMDD				
19.	Hard cover/marking tape **Type 1 trench**	SS	Placed min100mm above top conduit Material to be "hard cover" Continue to backfill with stab sand to top of trench		□ Yes □ No □ NA			
	Hard cover/marking tape **Type 2 trench**	SE	Placement per CMC-RFI-000153 Material to be location tape, installed after blinding layer placement 		□ Yes □ No □ NA			
20.	Remaining backfill ***(type 1 trench only)***	SE	Fill to top of trench in 150mm layers Material – stabilised sand		□ Yes □ No □ NA			
21.	Installation of pits	SS	Pits to be installed per schedule. Note detailed locations for placement. Note 48- Installation of multiple conduits into plastic pits requires a 100mm concrete encasing, 200mm deep from pit wall.		□ Yes □ No □ NA			
22.	Installation of draw-wire/rope	SS	**Galvanised wire 2.5mm** HV/LV conduits require 2 wires Where conduit run is greater than 30m and 100mm diameter, install 1 wire **Telecoms Rope 6mm** Conduit runs less than 30m, 100mm diameter. Note 16a- Secure wire to prevent being accidentally pulled out		□ Yes □ No □ NA			
23.	Protection of conduits	SE	Note 18- All conduits to be capped at both ends		□ Yes □ No □ NA			

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

METRO Construction

Item No	Activity/Criteria	Resp.	Inspected				Remarks NCR/RFI No
			Criteria As Measured	Compliant?	Signed	Date	
24.	Inspection for blockages or obstructions	SS	Note 20 - Following installation of conduit, a mandrel 95% diameter to pass from one end of the conduit to the other in both directions to test for obstructions. Attach a replacement draw wire/rope to the mandrel prior to drawing. Trailing wire/rope to remain in conduit.	□ Yes □ No □ NA			
25.	Install pit surrounds/lids	SS	Note 31- Covers to be class D in accordance with AS3996. For pits larger than 900x900mm multi part covers are to be installed Note 32- Lids to be brushed concrete colored as per adjacent track slab unless otherwise agreed with urban designer. Note 45- must be lockable and inaccessible to the public	□ Yes □ No □ NA			
26.	Pit signage	SS	Note 35- install confined space signage	□ Yes □ No □ NA			
27.	Pit fit out	SS	Note 36 – access steps or rungs to be installed to AS1657	□ Yes □ No □ NA			
28.	Final survey	SV	All pits to be located, documented and conforming. Note 41- pit levels are from centre of the pit. Max slope to regrade is 1 in 10. Note 49- CSR02 pits may be adjusted (longitudinally) +/-1m providing geometry allows offset of 1500mm from slab edge- consult design team and ensure no clashes with other elements of works	□ Yes □ No □ NA			

29. HOLD POINT: Rectification of Nonconformities

Details of the corrective action to be documented in JHET along with the proposed rectification method for nonconforming product, and additional supporting documentation where required.

At least 2 working days' notice.

NCR Number.....

CMC- 00-CMC-FRM-QUA-NA-0016 CLR Q6 Specification Form attached

Submitted: (SPE) (Date) Approved: (PQR) (Date)

ITP No.: ITP/CMC/00053 ITP Rev: 03 ITP Date: 05/09/2018 AMS No: AMS/CMC/00019, 53,61,62	CHECKLIST **Combined Services Trench (CSR)**

All personnel signing or initialing this Checklist must complete this box for future identification purposes

Name	Position
	Supervisor (SS)
	Site Engineer (SE)
	Project Engineer (PE)
	Senior Project Engineer (SPE)
	Project Environmental Representative (PER)
	Geotechnical Representative (GR)
	Survey (SV)
	Licensed Electrical Supervisor (ES)
	Project Quality Representative (PQR)

Comments:

Conformance / Verification Statement:

This closed lot conforms in all respects with the standards and requirements specified in the Contract Documents. The lot verification records are complete, and any non-conformances have been dispositioned in accordance with the contract requirements.

Closed by: ***Quality Co-ordinator:*** **Date:**

Inspection & Test Plan (ITP)
Installation of Cables

METRO Construction

Process:	Installation of Cables (11kV AC and 750V DC)	
ITP No.:	ITP/CMC/00115	**Revision No:** 01
Date:	05/09/2018	

This Inspection & test plan comprises the following documents and is approved for use:

Part 1	Inspection and Test Plan
Part 2	Lot Verification Checklist

Reference Documentation: *Add reference to all relevant documents necessary for this ITP, e.g. contract clauses, designer specifications, contract drawings etc*

Prepared by:	Sch 2.2(a)(ii) [redacted]	**(signature)** 05/09/18	**(date)**
Reviewed by:		**(signature)**	**(date)**
Reviewed by:	Sch 2.2(a)(ii) [redacted]	**(signature)** 05/09/2018	**(date)**
Approved by:	[redacted]	**(signature)**	**(date)**

Project may add additional Reviewer and Approver rows as necessary

Client acceptance (if required):	**(signature)**	**(date)**

Rev No.	Description	Date	Reason for Revision
00	CMC Review & Approval	10/01/2018	New ITP
01	ITP Revision	04/09/2018	Item No 7 revised to include licensed electrical supervisor HP sign off

ITP No.: ITP/CMC/00115 ITP Rev: 01 ITP Date: 04/09/2018 AMS No: AMS/CMC/00093	**INSPECTION AND TEST PLAN** **Installation of Cables**	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
1	TRAs and ESCP	SMP and CEMP	Ensure TRAs are approved and ESCP are in place, understood and signed off by all personnel involved in completing the task.	Prior to Start	SS	S		ITC
2	Vehicle Management Control of Site.	VMP	Provide for the safe movement of traffic and the protection of persons and property through and/or around the work site. Vehicle management plan to be drafted and notified to plant operators of the proposed routes for the day.	Each Day	SS	S		ITC
3	Working in or near environmentally sensitive areas	G36 cl 4.13	At least five working days prior, provide to the ***DCNR*** a copy of the EWMS for working in or near environmentally sensitive areas and written notice that environmentally sensitive areas are clearly delineated with locations and boundaries signposted.	Prior to Start	PER	HP		ITC
4	Underlying lot(s)		Underlying lots have been checked for conformance. Civil infrastructure has been built/installed as per design and handed over to Rail Systems team.	Prior to start	SE	S		ITC
5	Materials acceptance	AS3000 Cable data sheets Design drawings	• Cable drums and cable to be in good condition upon delivery (visual inspection) • Drums with visible damage to protective tin/wood, and at least one drum from each delivery batch, to be tested for cable continuity and insulation • Supplier QA documentation to be provided	After delivery	SS	S		Supplier QA documents ITC
6	Pre-pull checks	AS3000 Cable pulling schedule	• No damage has occurred to cable or drum during transit to site • On-site cable drum contains correct cable type, size and length, as per cable pull schedule and design	Each run	SS	S		Cable Pulling Sheet ITC
7	Pit & Conduit Inspection	AS3000	• Pits and conduits in run to be clear of debris and/or water Note: conduit mandrel to be run as part of Civil work lot (i.e. mandrel testing not within scope of this ITP)	Each pit	ES	HP		ITC

ITP No.: ITP/CMC/00115 ITP Rev: 01 ITP Date: 04/09/2018 AMS No: AMS/CMC/00093	INSPECTION AND TEST PLAN Installation of Cables	METRO Construction
Verification Key:	WP– Witness Point, HP – Hold Point, S – Surveillance, N – Notification, R – Review	
Responsibility (Resp.) Key:	**CM** – Construction Manager, **AM** – Area Manager, **SS** – Site Supervisor, **SPE** – Senior Project Engineer, **PE** – Project Engineer, **SE** – Site Engineer, **GR** – Geotechnical Representative, **SC** – Subcontractor, **SV** – Surveyor, **PQR** – Project Quality Rep, **PER** – Project Environmental Rep, **SR** – Safety Rep, **DR** – Design Rep, **TR** – Territory Representative, IC – Independent Certifier – **ES** – Licensed Electrical Supervisor	

Item No.	Activity *(Including Necessary Inspections)*	Applicable Standards *(Std and clause)*	Acceptance Criteria *(describe measure)*	Inspection / Test Frequency	Inspectorate			Records to be attached to Lot to demonstrate Compliance
					Resp	Verification		
						CLR	TR / IC	
8	Set up cable rollers / winch	Manufacturers' instructions Cable data sheets	• Cable stand, bars, sock and swivel to be certified • Cable drum to be loaded on cable stand as per manufacturer's instructions • Rollers to be installed appropriately, so no damage occurs during pulling operations	Each run	SS	S		ITC
9	Haul/pull cables	AS3000 Cable data sheets Cable pulling schedule Design drawings	• Cable winch to be set at comfortable speed to avoid over-stressing • High rated tension rope to be used • Cable to be sufficiently lubricated with cable lubricant • Cable maximum pulling tension (as per cable data sheets) not to be exceeded at any stage – works to cease immediately • Correct cable pulled to/from correct origin and destination pits, as per cable schedule and design	Each run	SS	S		Cable Pulling Sheet ITC
10	Install cable supports	AS3000	• Cable support system to be securely installed • Cables to be appropriately clamped to support systems	Each run	SS	S		Cable Support Install Sheet ITC
11	Post-haul test	AS3000	• Installed cable to pass continuity and insulation tests • Calibrated electrical testing equipment to be used	Each run	SS	S		Calibration certificates ITC
12	Rectification of Nonconformities	CLR Q6 cl 8.3	Details of the corrective action to be documented in JHET along with the proposed rectification method for nonconforming product, and additional supporting documentation where required.	As applicable. At least 2 working days' notice	PE SPE PQR	HP	HP	NCR Number to be referenced only. CMC- 00-CMC-FRM-QUA-NA-0016 CLR Q6 Specification Form

ITP No.: ITP/CMC/00115 ITP Rev: 01 ITP Date: 04/09/2018 AMS No: AMS/CMC/00093	CHECKLIST **Installation of Cables**

Precinct:			
Location:			
Lot Number		**Date Lot Opened:**	
Completed By:			

Item No	Activity/Criteria	Responsibility	Inspected				Remarks NCR/RFI No
			Criteria As Measured	Compliant?	Signed	Date	
1.	TRAs and ESCP	SS	Ensure TRAs are approved and ESCP are in place, understood and signed off by all personnel involved in completing the task. TRA No..... ESCP No	□ Yes □ No □ NA			
2.	Vehicle Management Control of Site.	SS	Provide for the safe movement of traffic and the protection of persons and property through and/or around the work site. Vehicle management plan to be drafted and notified to plant operators of the proposed routes for the day. VMP No	□ Yes □ No □ NA			
3.	**HOLD POINT:** Working in or near environmentally sensitive areas. At least five working days prior, provide to the ***DCNR*** a copy of the EWMS for working in or near environmentally sensitive areas and written notice that environmentally sensitive areas are clearly delineated with locations and boundaries signposted. Submitted: (SE) (Date) Approved: (PER) (Date)						
4.	Underlying lot(s)	SE	Underlying lots have been checked for conformance. Civil infrastructure has been built/installed as per design and handed over to Rail Systems team.	□ Yes □ No □ NA			
5.	Materials acceptance	SS/SE	• Cable drums and cable to be in good condition upon delivery (visual inspection) • Drums with visible damage to protective tin/wood, and at least one drum from each delivery batch, to be tested for cable continuity and insulation • Supplier QA documentation to be provided Attach *Supplier QA Document(s), HV/LV Cable Drum Test Report(s)*	□ Yes □ No □ NA			

ITP No.: ITP/CMC/00115 ITP Rev: 01 ITP Date: 04/09/2018 AMS No: AMS/CMC/00093	CHECKLIST **Installation of Cables**

Item No	Activity/Criteria	Responsibility	Inspected				Remarks NCR/RFI No
			Criteria As Measured	Compliant?	Signed	Date	
6.	Pre-pull checks	SS	• No damage has occurred to cable or drum during transit to site • On-site cable drum contains correct cable type, size and length, as per cable pull schedule and design Attach *Cable Pulling Sheet*.	□ Yes □ No □ NA			
7. **HOLD POINT:** Pit & Conduit Inspection. Pits and conduits in run to be clear of debris and/or water. Note: conduit mandrel to be run as part of Civil work lot (i.e. mandrel testing not within scope of ITP) Submitted: (SE) (Date) Approved: (ES) (Date)							
7.	Pit & Conduit Inspection	ES	• Pits and conduits in run to be clear of debris and/or water Note: conduit mandrel to be run as part of Civil work lot (i.e. mandrel testing not within scope of this ITP)	□ Yes □ No □ NA			
8.	Set up cable rollers / winch	SS	• Cable stand, bars, sock and swivel to be certified • Cable drum to be loaded on cable stand as per manufacturer's instructions • Rollers to be installed appropriately, so no damage occurs during pulling operations	□ Yes □ No □ NA			
9.	Haul/pull cables	SS	• Cable winch to be set at comfortable speed to avoid over-stressing • High rated tension rope to be used • Cable to be sufficiently lubricated with cable lubricant • Cable maximum pulling tension (as per cable data sheets) not to be exceeded at any stage – works to cease immediately • Correct cable pulled to/from correct origin and destination pits, as per cable schedule and design Attach *Cable Pulling Sheet*.	□ Yes □ No □ NA			
10.	Install cable supports	SS	• Cable support system to be securely installed • Cables to be appropriately clamped to support systems Attach *Cable Support Install Sheet*.	□ Yes □ No □ NA			
11.	Post-haul test		• Installed cable to pass continuity and insulation tests • Calibrated electrical testing equipment to be used Attach *Cable Support Sheets*.	□ Yes □ No □ NA			

ITP No.: ITP/CMC/00115 ITP Rev: 01 ITP Date: 04/09/2018 AMS No: AMS/CMC/00093	CHECKLIST Installation of Cables

Item No	Activity/Criteria	Responsibility	Inspected				Remarks NCR/RFI No
			Criteria As Measured	Compliant?	Signed	Date	

12. **HOLD POINT:** Rectification of nonconformities.

Details of the corrective action to be documented in JHET along with the proposed rectification method for nonconforming product, and additional supporting documentation where required.

At least 2 working days' notice.

Submitted: (SPE) (Date) Approved: (PQR) (Date)

All personnel signing or initialing this Checklist must complete this box for future identification purposes

Name	Position
	Site Supervisor (SS)
	Site Engineer (SE)
	Project Engineer (PE)
	Senior Project Engineer (SPE)
	Project Environmental Representative (PER)
	Geotechnical Representative (GR)
	Survey (SURV)
	Licensed Electrical Supervisor (ES)
	Project Quality Representative (PQR)

Comments:

Conformance / Verification Statement:

This closed lot conforms in all respects with the standards and requirements specified in the Contract Documents. The lot verification records are complete, and any non-conformances have been dispositioned in accordance with the contract requirements.

Closed by: ***Quality Co-ordinator:*** **Date:**

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From:kim@specialistelectrical.com.au
Sent:29/10/2018 1:44 PM
To:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject:FW: NCR-0184559
Attachments:NCR-0184559.pdf, Route marker drawing.tif, 04-SMC-DRW-STR-SB-3162_03A.pdf, RFI-003383.pdf

FYI

From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Sent: Sunday, 28 October 2018 11:27 AM
To: 'Kelly, Gordon' <Gordon.Kelly@act.gov.au>
Cc: 'Kim (SEEG)' <kim@specialistelectrical.com.au>
Subject: FW: NCR-0184559

fyi

Regards,

Tony Berryman
Director
M 0407 994 831
www.specialistelectrical.com.au

From: Sch 2.2(a)(ii)
Sent: Friday, 26 October 2018 10:11 AM
To: tony@specialistelectrical.com.au
Cc: Sch 2.2(a)(ii)
Subject: NCR-0184559

Hi Tony,

On behalf of Sch 2.2(a)(ii) please find attached a copy of NCR-0184559 along with the supporting documentation, CMC has raised against the designer for the Depot Access Bridge.

It would be appreciated if SEEG could please obtain acceptance from the Technical Regulator for these works.

Regards,
Sch 2.2(a)(ii)

Construction
Sch 2.2(a)(ii)

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Event Notification (* required fields)

Event Number (generated on save)
EVT-1100445

Legacy ID

Overall Actual Outcome (generated on save)
3A

Overall Potential Outcome (generated on save)
3P

Event Date *
25/10/2018

Event Time (HH:MM 24 hour) *
15:23

Notified Date *
25/10/2018

Notified Time (HH:MM 24 hour) *
15:23

Project Name *
7002, Canberra Metro Construction

Workplace/Project Manager *
Sch 2.2(a)(ii) Project Director

Event Type *
- [ ] Environment
- [ ] Near Miss
- [ ] People Injury
- [x] Product NCR
- [ ] Property Damage
- [ ] Rail Safety
- [ ] Regulator Notice
- [ ] Unsafe Act
- [ ] Unsafe Condition

Did this Event occur as a result of non-compliance with one or more GMR(s)? *
( ) Yes (•) No

If Yes, select relevant GMR(s)

Discipline Event relates to *
Civil

Activity/Task Category *
Electrical / Data Services

Site/Office Location *
Depot, Mitchell

Exact Location of Event *
Depot Access bridge

Risk Profile Category *
Design Requirements

Consequence Category *
Quality

Process/Task Description (Maximum of 2000 characters) *

Installation of HV conduits to Depot access bridge vicinity

Event Description (Maximum of 2000 characters) *

North - Conduits have been not been installed in accordance with AS2067 Cl4.2.9, which requires a minimum 750mm cover to all HV conduits

External Notification Required?

☐

Alcohol/Drug Test Required?

☐

Regulator Investigation Required?

☐

Event Entered By *

Sch 2.2(a)(ii) Quality Coordinator

Product NCR

Product NCR Number (generated on save)

NCR-0184559

Legacy Product NCR Number

Issued Against *

○ Project ○ Subcontractor ◉ Designer ○ Clie

Raised After Practical Completion?

○ Yes ◉ No

Subcontractor/Designer

SMEC

Actual Outcome (generated on save according to Total Cost of NCR)

3A

Potential Outcome *

3P

Related Lotus Notes AMS Numbers

AMS Number	Project Pack AMS Number	Description	Delete
AMS-0075323	AMS/CMC/00019	CSR Installation	

Non Lotus Notes AMS Numbers

Related Lotus Notes Work Lots

Work Lot Number	Project Pack Work Lot Number	Description	Delete
No Records	*No Records*	*No Records*	

Name of Originator

Sch 2.2(a)(ii)

Date of Non-conformance Raised *
25/10/2018

Date Response Required By
30/11/2018

Disposition *
(•) Use as-is/Concession ( ) Rework ( ) Scrap

Correction Actions

Action

Action Number	Action by When	Action Required	Responsible Person	Status

Action

Action Number (generated on save)
ACT-0138987

Project *
7002, Canberra Metro Const

Action Type *
NCR

Action Discipline *
( ) Safety (•) Quality ( ) Environment ( ) Rail Safety ( ) Sustainability

Employer Type *
( ) Direct (•) Indirect

Company Name
SMEC

Person Raising Action *
Sch 2.2(a)(ii) Quality Coc

Date Raised *
25/10/2018

Work Location (generated on save for Product NCR)
Depot Access bridge

Reason For Action *
Construction carried out in accordance with non-compliant design.

Action Required *
TBA

Action Priority *
( ) Extreme Risk
( ) High Risk
(•) Medium Risk
( ) Low Risk

Risk Level must be considered - Click here for Action Priority Definitions

Responsible Person *

Action by when *
30/11/2018

Action Controller
Sch 2.2(a)(ii) Quality Coc

Action Progress

Date of Action Progress	Action Progress Updated By	Percentage Complete	Delete
No Records	*No Records*	*No Records*	

Action Completion

Action Status
○ Completed ○ Cancelled ◉ Open

Completed/Cancelled By
Kindred, Scott, Area Manage

Completion/Cancellation Date

Completion/Cancellation Comments (Must be completed if the Action is Cancelled)

Has this Action been completed?
○ Yes ◉ No

Action Close Validation Message

Action Verification

Action Verification (Restricted to Action Controller)

Action Verified? ☐

Verified By

Verified Date

Verification Comments

Follow Up

Follow Up Date	Follow Up Person	Follow Up Completion Date	Delete
No Records	*No Records*	*No Records*	

File Attachments

	File Description	Attached File	Delete
▶	Route marker drawing	Route marker drawing	☐
▶	RFI and response	RFI-003383	☐
▶	Design Drawing	04-SMC-DRW-STR-SB-3162_03A	☐

OK

Client/3rd Party/Independent Review

Approval/Acceptance

○ Yes ○ No ○ N/A

Comment

Name **Date**

Construction/Engineering Manager Review

Please Note that when the field ?Is Design Affected? is set to Yes or is set to No, the Construction/Engineering Manager must enter his/her name and the date of the review.

Is Design Affected?

○ Yes ○ No ○ N/A

Construction/Engineering Manager Name **Date**

Design References

RFI **Design Site Instruction**

Design Change Notice/Request

Comment

Rectification Costs

Click Here for the Product NCR Cost Calculator

JH/JV/Alliance (AUD)
1000.00

Subcontractor (AUD)

Client Rectification (AUD)

Design Rectification (AUD)

Total Cost of NCR (AUD)
1000.00

Comment

Causal Factor

Causal Factor *
Design

Non-conformance Status (To be completed by an NCR Status Approver for 1P and 2P Events)

Status *
(•) Open ( ) Closed

The text below (generated on save) will display any outstanding actions required to close this NCR

Date

Comment

Name

File Attachments

File Attachment

File Description	Attached File	Delete
No Records	*No Records*	

Actions

Action

Action Number	Action by When	Action Required	Responsible Person	Status	
No Records	*No Records*	*No Records*	*No Records*	*No Records*	

Event Email Notification and Approval

Overall Potential Outcome
3P

Send Event Notification Email?

Date Notified (generated on save)

Potential Outcome 1P Email Notification Approval

Approval?

Approved By

Approval Date

Investigation

Investigation Number (generated on save)

Investigation Start Date

Lead Investigator

Expected Completion date

Actual Completion date

Investigation Team

Identified Facts (Maximum of 2000 characters)

Timeline of Events (Maximum of 2000 characters)

Witnesses - including contact details (Maximum of 2000 characters)

ICAM Analysis

Category	Contributing Factor	Type	Delete
No Records	*No Records*	*No Records*	

CRN Requirements Only

Area

Terms of Reference Provided

Investigation Type

Status

Reported Requested from 3rd Party

Report Published

Health, Safety & Environment (HSE) Behaviours

HSE Behaviour Information

If one or more behaviour was identified in the ICAM analysis as leading to, or contributing towards the event, identify on the HSE Behaviour Framework below which of the 12 categories are most relevant

	EVERYONE	SUPERVISORS	MANAGERS
STANDARDS	Follow rules ☐	Ensure compliance ☐	Set high standards ☐

COMMUNICATION	**Speak up** ☐	**Encourage the team** ☐	**Communicate openly** ☐
RISK MANAGEMENT	**Be mindful** ☐	**Promote risk awareness** ☐	**Confront risk** ☐
INVOLVEMENT	**Get involved** ☐	**Involve the team** ☐	**Involve the workforce** ☐

Following the identification of a behaviour leading to, or contributing towards the event, indicate if the Accountable Culture Tool has been used?

○ Yes ○ No ○ N/A

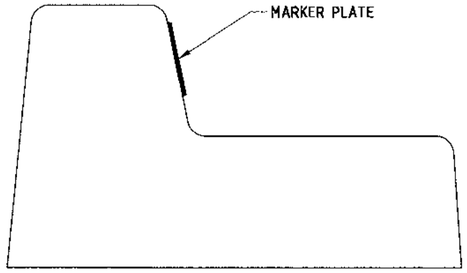
Click her to access the Accountable Culture Tool

Lessons Learnt (Maximum of 2000 characters)

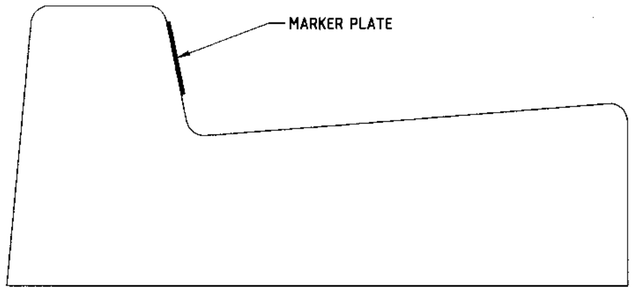
Ready to Close

Is this Event ready to be Closed? ☐

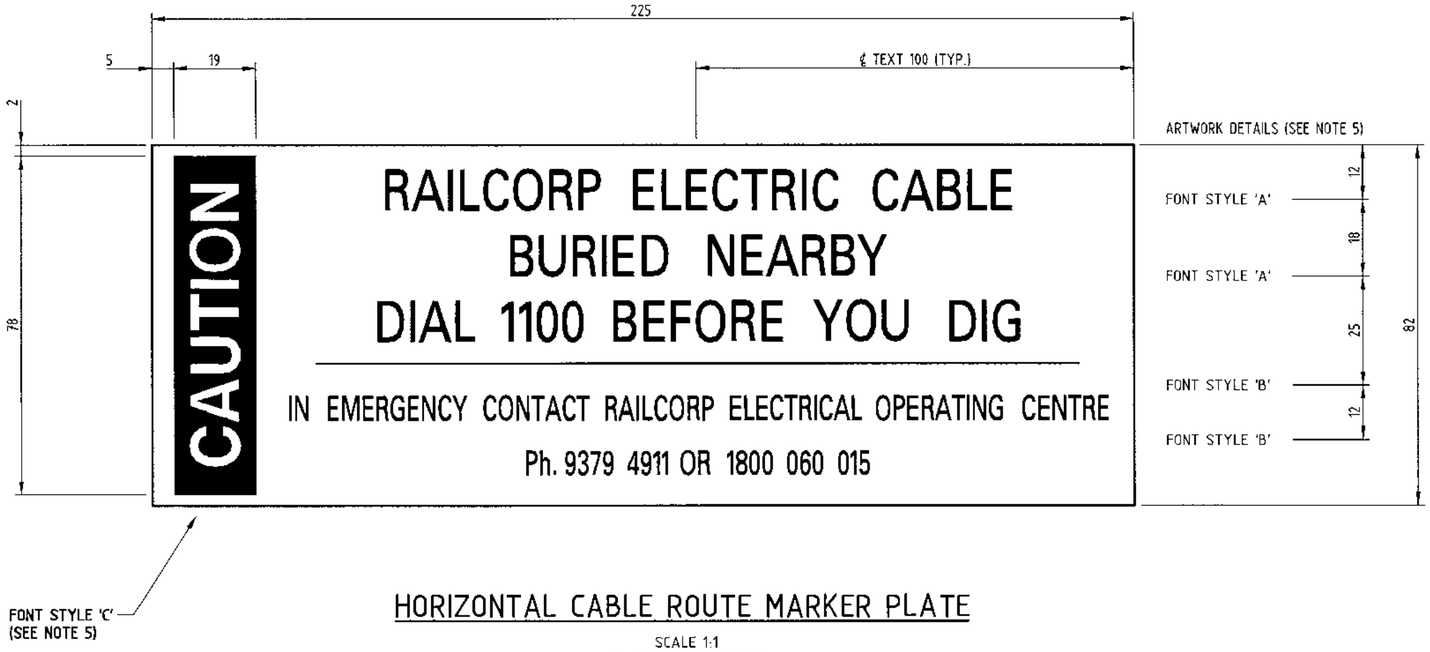
The text below (generated on save) will display any outstanding actions required to close



BARRIER KERB AT TRAFFIC ISLANDS

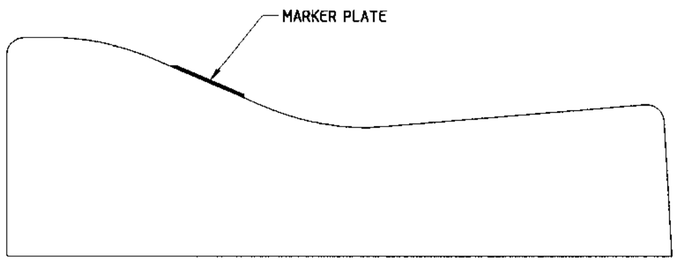


BARRIER KERB AND GUTTER



HORIZONTAL CABLE ROUTE MARKER PLATE

SCALE 1:1
MATERIAL: SEE NOTE 2



URBAN VERGE PARKING

CABLE ROUTE MARKER APPLICATION EXAMPLES

N.T.S.

FONT SCHEDULE		
FONT STYLE	FONT	HEIGHT WIDTH (mm) x (mm)
'A'	SWISS_722_B_L [13]	10 x 8
'B'	SWISS_722_B_L [13]	6 x 4
'C'	SWISS 721 BOLD OUTLINE BT [1075]	9 x 8.5

0 10 20 30 40 50 100
MILLIMETRES 1 TO 1

NOTES

1. CABLE ROUTE MARKER PLATE TO COMPLY WITH AS 1319 EXCEPT THE WORD 'CAUTION' INSTEAD OF 'WARNING'.
2. PLATE MATERIAL TO BE 1.2mm THICK SOFT ALUMINIUM OR MATERIAL APPROVED BY THE CHIEF ENGINEER ELECTRICAL SYSTEMS (RAILCORP).
3. YELLOW COLOUR TO BE CLASS 2 RETROREFLECTIVE MATERIAL TO AS 1906, PART 1.
4. MARKER PLATE TO BE FIXED TO CONCRETE KERB BY ADHESIVE "SELLEYS LIQUID NAILS LANDSCAPE" OR EQUIVALENT. ADHESIVE TO BE OF SUFFICIENT SPECIFICATION TO ENSURE LONG TERM ADHESION OF THE MARKER PLATE TO THE CONCRETE KERB IN ALL WEATHER AND TRAFFIC CONDITIONS.
5. ALL ARTWORK (LINES AND TEXT) TO BE BLACK ON YELLOW BACKGROUND WITH THE EXCEPTION OF 'CAUTION' WHICH IS YELLOW LETTERING WITHIN BLACK BACKGROUND.
6. ALL DIMENSIONS ARE IN MILLIMETRES.

WARNING SCANNED IMAGE

A ORIGINAL ISSUE

SCALES: 1:1

CAD DRAWING

REFERENCE DRAWINGS

EL0282878	VERTICAL MARKER PLATE MANUFACTURING DETAILS
EL0282879	VERTICAL MARKER PLATE ASSEMBLY AND MANUFACTURING DETAILS

RailCorp
ASSET MANAGEMENT GROUP
Engineering Standards & Services Division
ELECTRICAL SERVICES SECTION

DRAWN
DESIGNED A.Maguire
DRG CHECK G.C.
DESIGN CHECK N. Lewis
APPROVED N Rocke 12/3/09

RailCorp Design accepted for use by RailCorp

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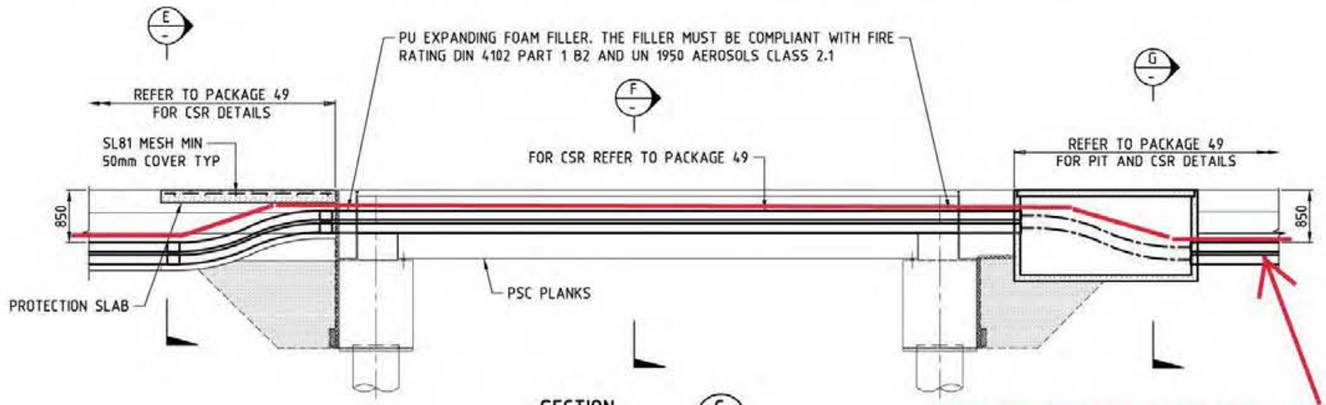
GENERAL

HIGH VOLTAGE AERIAL LINES AND CABLES
ELECTRICAL CABLE ROUTE MARKERS
HORIZONTAL MARKER PLATE MANUFACT. AND APPLICATION DETAILS ©

FILE No. 0282880_A_CU | SHEET 1 OF 1 | A2
STATUS: CURRENT
EL0282880 | A

DF 564x400

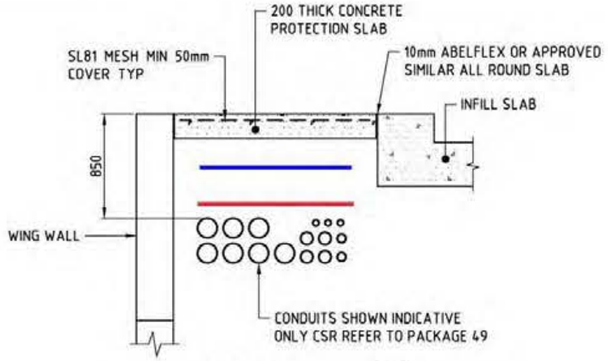
File Plotted #:\Groups\ELEC_DES\Jobs_2008\GENERAL_HV CABLE ROUTE MARKERS_E0ASTD02\Drawings\0282880_A_CU.dgn
Plot Date & Time 12-MAR-2009 15:28
Plotted by dparry



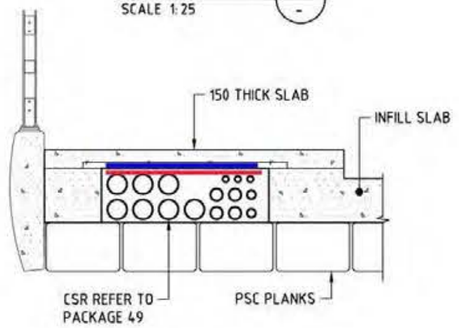
SECTION C (3160) — SCALE 1:50

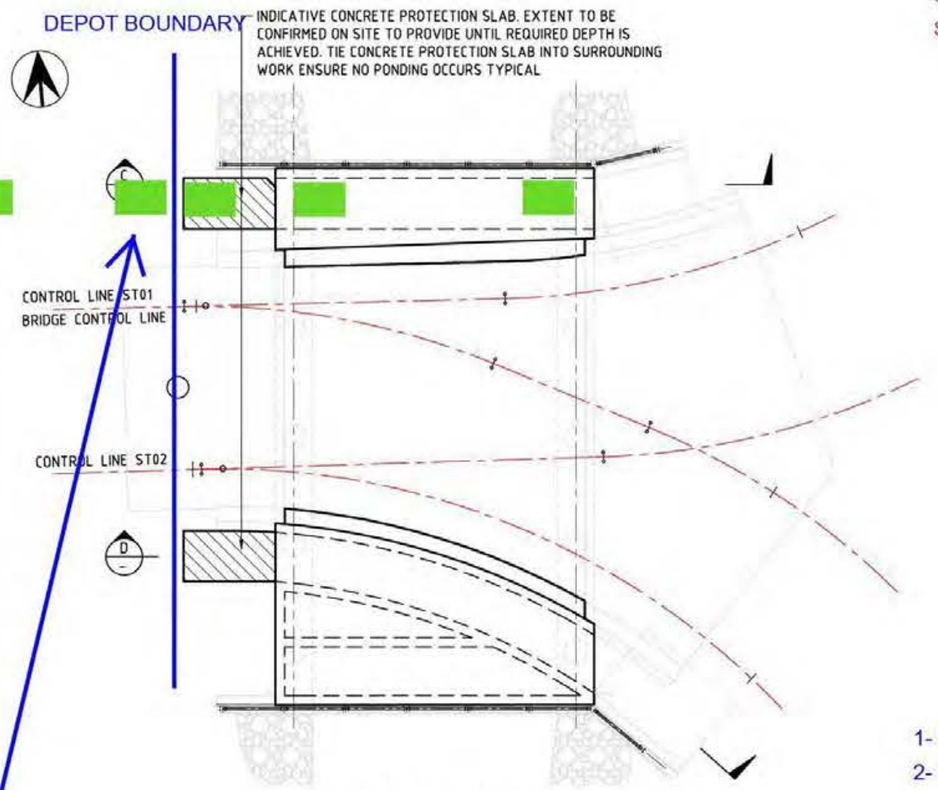
SECTION D (3160) — SCALE 1:50 — SIMILAR

1- THE PROTECTION SLAB SHALL BE PLACED NOT MORE THAN 75mm ABOVE CONDUITS.
2- THE PROTECTION SLAB SHALL COVER ALL CONDUITS WITH AT LEAST 40mm OVERLAP ON EACH SIDE; ITS WIDTH SHALL NOT BE LESS THAN 150mm AT ANY LOCATION.
3- THE PROTECTION SLAB SHALL CONSIST OF A CAST IN-SITU CONCRETE SLAB WITH A THICKNESS NOT LESS THAN 100mm.

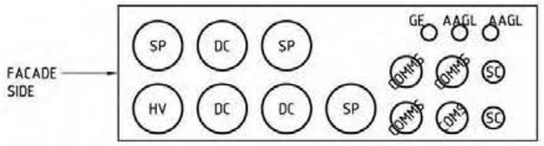


SECTION E — SCALE 1:25

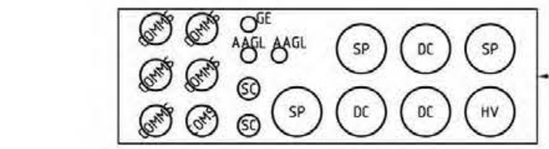




LAYOUT PLAN - PROTECTION SLAB
SCALE 1:100

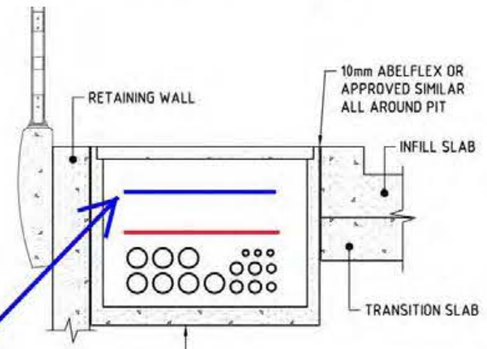


PROPOSED NORTHERN CONDUIT ARRANGEMENT
NTS



PROPOSED SOUTHERN CONDUIT ARRANGEMENT
NTS

SECTION F — SCALE 1:25



SECTION G — SCALE 1:25

1- UNDERGROUND CONDUITS SHALLE BE IDENTIFIED BY AN ORANGE MARKER TAPE COMPLYING WITH AS/NZS 2648.1.
2- MARKER TAPE SHALL BE PLACED AT 50% OF THE DEPTH OF COVER ABOVE THE PROTECTION SLAB.

GENERAL NOTES

1. FOR GENERAL NOTES REFER TO DRAWING NUMBER 04-SMC-DRW-STR-SB-3160

CABLE ROUTE MARKER AFFIXED TO CONCRETE PROTECTION SLAB OR BRIDGE DECK MARKED "HV CABLE BURIED BELOW"

SCALE 1:25 (0.25 0 0.50 1.00)
SCALE 1:50 (0.5 0 1 2)
SCALE 1:100 (1 0 1 2 3 4 5)
SCALES AT A1 SIZE DRAWING

IC CERTIFICATE NUMBER: 01-IDC-CRT-STR-SC-0001

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

03A	CMC-RFI-003383	GA 24/10	AJB 24/10	
03	ISSUED FOR CONSTRUCTION	VV 09/06/17	AB 09/06/17	MB 09/06/17
02	CONDITIONAL IFC RE-ISSUE	VV 31/05/17	AB 31/05/17	MB 31/05/17
01	CONDITIONAL IFC ISSUE	VV 06/03/17	WF 06/03/17	MB 06/03/17
AMD	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE

CO-ORDINATE SYSTEM: STROMLO | HEIGHT DATUM: AHD | SCALE: AS SHOWN

Transport Canberra — Light Rail — CANBERRA METRO Move | Live | Grow

This drawing is confidential and shall only be used for the purpose of this project. The signing of this title block confirms the design and drafting of this project have been prepared and checked in accordance with the SMEC quality assurance system to ISO 9001:2000.

SMEC Australia Pty. Ltd. CIV

DRAWN	K. ELLIS	21/10/2016
DESIGNED	P. HARBER	21/10/2016
DRG CHECK	K. KOCK	09/06/2017
DESIGN CHECK	V. VIGNESWARAN	09/06/2017
APPROVED	M. BARRETT	09/06/2017

CANBERRA LIGHT RAIL

NORTH CORRIDOR - PACKAGE 72
DEPOT ACCESS BRIDGE - 1408
DECK SLAB DETAILS
SHEET 2

FILE No. WVR138 | SHEET: 32 OF 51 | A1
STATUS: ISSUED FOR CONSTRUCTION | ©
DRG No. 04-SMC-DRW-STR-SB-3162 | EDMS No. - | 03A
DF 8011554

File Plotted V:_Vault Projects\300251\CAD\DWG\72\31_SB_Steel Bridge\04-SMC-DRW-STR-SB-3162.dwg
Plot Date & Time 6/9/2017 1:19 PM
Plotted by KG1125

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METRO

METRO Construction

MAIL TYPE	MAIL NUMBER	REFERENCE NUMBER
Response to RFI	CMC-RTRFI-016378	CMC-RFI-003383

Fwd: Completion of Infill Slab at Depot Bridge

From	Sch 2.2(a)(ii) Canberra Metro Construction
To	Tony Berryman - Specialist Electrical Engineering Group (tonyberryman@specialistelectrical.com.au)
Cc (3)	Sch 2.2(a)(ii) Canberra Metro Construction Canberra Metro Construction - Canberra Metro Construction
Sent	Wednesday, 24 October 2018

DETAILS

Design Impact Assessment	No Change to Design
Design Package	44 Roadworks, pavements, fencing & gates
Area	04 Stabling & Maintenance Yards Depot
Discipline	CIV Civil
RFI Type	Design
Design Phase	Post-IFC
Design Impact	Type 2 - Other
Time Impact	Yes
Safety Issue	Yes
IFC Design Change Required?	No
DCIA Form Attached?	No
NCR Number	NA
Reference Document Numbers and Revision	Attached

MESSAGE

Tony

As discussed, attached is Depot Bridge Red line drawing, showing non compliant HV conduits and cover and proposed mechanical protection.

SMEC have also confirmed compliance to AS2067 Ver 2016 and that conduits are contained within Railway easement.

Length of protection slab is 15m following potholing of conduits to determine point at which cover compliance of 750mm was achieved.

Regards

[redacted]

From: [redacted]
Sent: 24/10/2018 2:43:32 PM AEDT (GMT +11:00)
To:
Cc: Sch 2.2(a)(ii)
Mail Number: SMEC-RTRFI-003907
Subject: Re: Completion of Infill Slab at Depot Bridge

Design Impact Assessment:	No Change to Design
Design Package:	44 Roadworks, pavements, fencing & gates
Area:	04 Stabling & Maintenance Yards Depot
Discipline:	CIV Civil
RFI Type:	Design
Design Phase:	Post-IFC
Design Impact:	Type 2 - Other
Time Impact:	Yes
Safety Issue:	Yes
IFC Design Change Required?:	No
DCIA Form Attached?:	No
NCR Number:	NA
Reference Document Numbers and Revision:	Attached

[redacted]

We confirm that the conduits are entirely within the Railway easement.

We also confirm that the design has been completed in accordance with AS2067 Ver 2016.
See below detailed explanation.

Clause 4.2.9 of AS2067 (substations and high voltage installations exceeding 1kV a.c.) requires **750mm** cover above the top of the cable in areas accessible to the public. However, it allows other methods (see excerpt below) where access is restricted to authorized people.

This is a critical point because Depot and the Railway easement is an area with restricted access, meaning that it is not open to the public and also it is unlikely that excavation or concrete cutting

will occur by an external party without full coordination with the Operator/Maintainer of the site. This reduces the risk of potential damage to the conduits and cables therein.

4.2.9 Insulated cables other than for overhead lines

4.2.9.1 *General requirements*

Insulated cable shall be selected to suit the electrical duty required plus the method of installation and related physical protection. Notwithstanding requirements of special service conditions in substations and industrial installations such as mine sites the following general principles apply for high voltage cables:

(a) Cables installed underground in areas accessible to the public (within a high voltage installation) shall be buried at a depth which ensures the top of the cable is at least 0.75 m below the finished ground level. Mechanical protection and cable marking in accordance with AS/NZS 3000 shall be used. In areas where access is restricted to authorized personnel or substation area, other types of installation methods may be used, for example, cables trays, cable trenches, troughing, etc. For these installations appropriate mechanical protection shall be provided based on a risk assessment.

NOTE: Local regulations may require increased depth of burial or additional mechanical protection.

For mechanical protection, AS2067 refers to AS3000. In this case, Category B wiring system under AS3000 can be applied which requires additional mechanical protection. Below are the requirements that have to be adhered to for the mechanical protection.

3.11.4.3 *Category B wiring system mechanical protection*

For a Category B wiring system, additional mechanical protection shall be provided as follows:

(a) The protection shall be placed not more than 75 mm above the wiring system.

(b) The protection shall be not less than 150 mm wide.

(c) The protection shall overlap the wiring system by at least 40 mm on each side.

(d) The protection shall consist of one or a combination of the following:

(i) Precast concrete slabs having a thickness of not less than 40 mm and a classification of not less than grade 20 in accordance with AS 3600 or NZS 3104.

(ii) Concrete slabs cast on-site having a thickness of not less than 100 mm.

(iii) A continuous concrete pour having a thickness of not less than 75 mm.

(iv) Fibrous cement slabs having a thickness of not less than 12 mm.

(v) Bricks manufactured specifically for the protection of electric cables.

(vi) Polymeric cable cover strips complying with AS 4702.

(vii) Other materials that offer the same degree of protection afforded by the materials in Items (i) to (vi).

I will send a separate ACONEX for markup up drawing as soon as it is available.

Cheers
Sch 2.2(a)(ii)

From: Sch 2.2(a)(ii)
Sent: 19/10/2018 11:51:17 AM AEDT (GMT +11:00)
To: Sch 2.2(a)(ii)
Cc:
Mail Number: CMC-RFI-003383
Subject: Completion of Infill Slab at Depot Bridge

Design Package:	44 Roadworks, pavements, fencing & gates
Area:	04 Stabling & Maintenance Yards Depot
Discipline:	CIV Civil
RFI Type:	Design
Design Phase:	Post-IFC
Design Impact:	Type 2 - Other
Time Impact:	Yes
Safety Issue:	Yes
IFC Design Change Required?:	No
DCIA Form Attached?:	No
NCR Number:	NA
Reference Document Numbers and Revision:	Attached

Hi [redacted]

Please find attached a plan for the completion of the infill slabs at the Depot Bridge. A general photo of the area is also attached.

Our intention is complete Pavement Type DEP02 infills in accordance with the permanent design. The CSR conduits coming out of the bridge will be protected immediately underneath the slab - depths are marked on the attached but in summary:

1. 0m from the bridge (ie immediately abutting the bridge) the depth from the underside of the permanent slab to the top of the conduits will be 0mm.
2. 5m from the bridge, the depth from the underside of the permanent slab to the top of the conduits will be approximately 400mm.
3. 10m from the bridge, the depth from the underside of the permanent slab to the top of the conduits will be approximately 500mm.
4. 15m from the bridge, the depth from the underside of the permanent slab to the top of the conduits will be approximately 800mm.

Can you please confirm proceeding with the permanent IFC pavement design is acceptable? An **urgent response today** is required please.
Regards, [redacted]

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:18/11/2018 8:02 AM
To: Sch 2.2(a)(ii)
Cc:"Grice, Simon" <Simon.Grice@act.gov.au>;"Kumar, Vijender" <Vijender.Kumar@act.gov.au>
Subject:FW: Depot Bridge HV Conduits [SEC=UNCLASSIFIED]
Attachments:0282880_A0c.tif, 04-SMC-DRW-STR-SB-3162_03A.pdf, 24102018152929-0001.pdf, IMG_2068.JPG

Hi Sch 2.2(a)(ii)

Please find enclosed correspondence from the 'designer' regarding compliance with the applicable standard.

One item worth consideration, is there are 4 locations (bridge culverts) in total that have a similar design principle applied. Unfortunately three of them are in a public space. The forth is located at the access of the depot, however they are making a number of assumptions.
The existing network – under a range of possible fault conditions won't / can't effect the adjacent steel rail track.
The entire area is / or will be potentially mean is a zone substation and therefore, technically all personal will need to be trained and authorised to enter the depot.
The installation has not been installed in accordance with the design or design specification.

For your background information.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

From: Kim Power [mailto:kim@specialistelectrical.com.au]
Sent: Wednesday, 24 October 2018 4:39 PM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>
Subject: Fwd: Depot Bridge HV Conduits

---------- Forwarded message ----------
From: Sch 2.2(a)(ii)
Date: Oct 24, 2018 4:29 PM
Subject: Depot Bridge HV Conduits
To: tony@specialistelectrical.com.au
Cc: 'Kim Power' <kim@specialistelectrical.com.au> Sch 2.2(a)(ii)

Tony

Attached is PDF of email sent in ACONEX, it contains copy of my email and email received from SMEC the designer.

Regards

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

METRO Construction

330 Northbourne Ave, Dickson ACT 2602

Sch 2.2(a)(ii)

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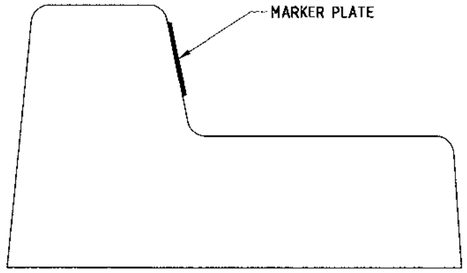
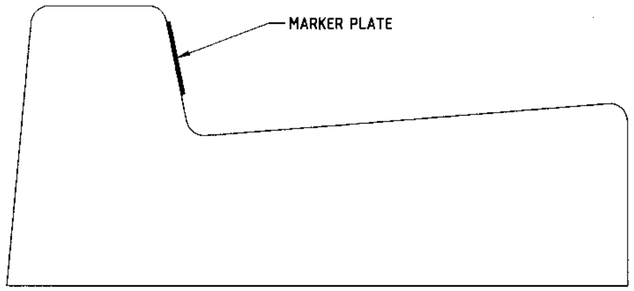
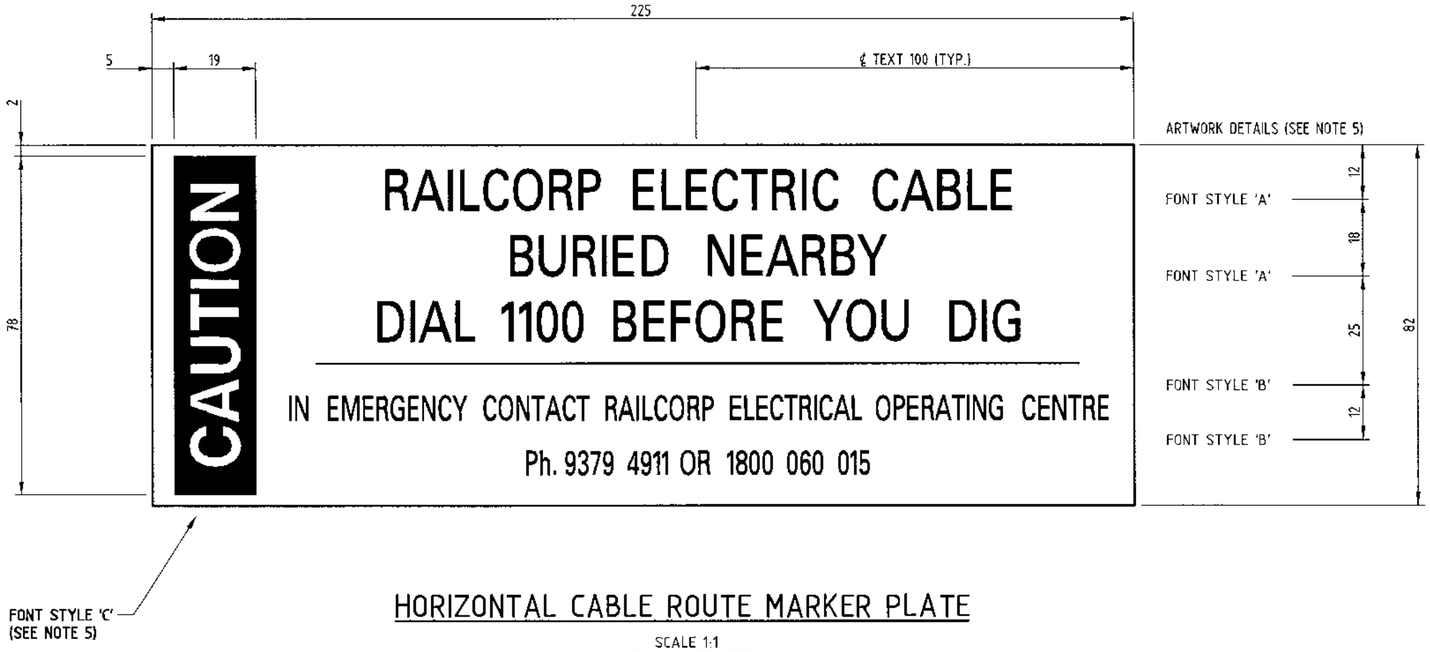


BARRIER KERB AT TRAFFIC ISLANDS

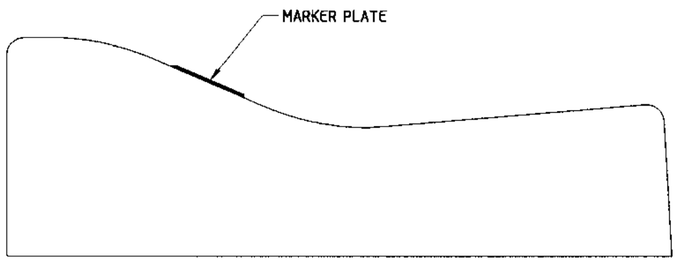


BARRIER KERB AND GUTTER



HORIZONTAL CABLE ROUTE MARKER PLATE

SCALE 1:1
MATERIAL: SEE NOTE 2



URBAN VERGE PARKING

CABLE ROUTE MARKER APPLICATION EXAMPLES

N.T.S.

FONT SCHEDULE		
FONT STYLE	FONT	HEIGHT WIDTH (mm) x (mm)
'A'	SWISS_722_B_L [13]	10 x 8
'B'	SWISS_722_B_L [13]	6 x 4
'C'	SWISS 721 BOLD OUTLINE BT [1075]	9 x 8.5

0 10 20 30 40 50 100
MILLIMETRES 1 TO 1

NOTES

1. CABLE ROUTE MARKER PLATE TO COMPLY WITH AS 1319 EXCEPT THE WORD 'CAUTION' INSTEAD OF 'WARNING'.
2. PLATE MATERIAL TO BE 1.2mm THICK SOFT ALUMINIUM OR MATERIAL APPROVED BY THE CHIEF ENGINEER ELECTRICAL SYSTEMS (RAILCORP).
3. YELLOW COLOUR TO BE CLASS 2 RETROREFLECTIVE MATERIAL TO AS 1906, PART 1.
4. MARKER PLATE TO BE FIXED TO CONCRETE KERB BY ADHESIVE "SELLEYS LIQUID NAILS LANDSCAPE" OR EQUIVALENT. ADHESIVE TO BE OF SUFFICIENT SPECIFICATION TO ENSURE LONG TERM ADHESION OF THE MARKER PLATE TO THE CONCRETE KERB IN ALL WEATHER AND TRAFFIC CONDITIONS.
5. ALL ARTWORK (LINES AND TEXT) TO BE BLACK ON YELLOW BACKGROUND WITH THE EXCEPTION OF 'CAUTION' WHICH IS YELLOW LETTERING WITHIN BLACK BACKGROUND.
6. ALL DIMENSIONS ARE IN MILLIMETRES.

WARNING SCANNED IMAGE

A ORIGINAL ISSUE

SCALES: 1:1

CAD DRAWING

REFERENCE DRAWINGS

EL0282878	VERTICAL MARKER PLATE MANUFACTURING DETAILS
EL0282879	VERTICAL MARKER PLATE ASSEMBLY AND MANUFACTURING DETAILS

RailCorp
ASSET MANAGEMENT GROUP
Engineering Standards & Services Division
ELECTRICAL SERVICES SECTION

DRAWN
DESIGNED A.Maguire
DRG CHECK G.C.
DESIGN CHECK N. Lewis
APPROVED N Rocke 12/3/09

RailCorp Design accepted for use by RailCorp

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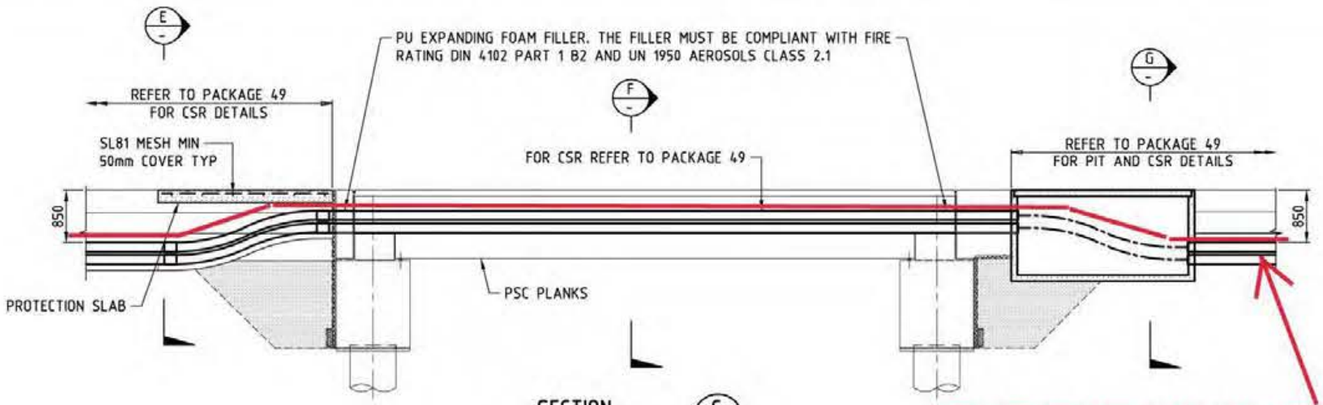
GENERAL

HIGH VOLTAGE AERIAL LINES AND CABLES
ELECTRICAL CABLE ROUTE MARKERS
HORIZONTAL MARKER PLATE MANUFACT. AND APPLICATION DETAILS ©

FILE No. 0282880_A_CU | SHEET 1 OF 1 | A2
STATUS: CURRENT
EL0282880 | A

DF 564x400

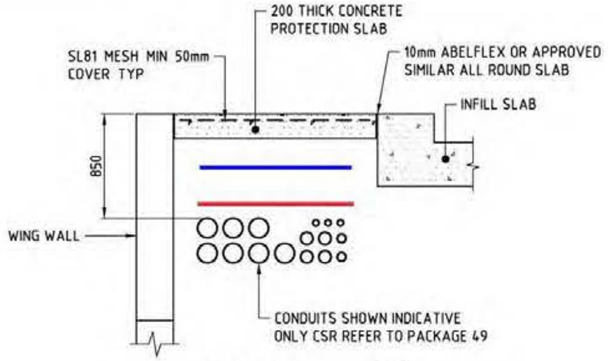
File Plotted #:\Groups\ELEC_DES\Jobs_2008\GENERAL_HV CABLE ROUTE MARKERS_E0ASTD02\Drawings\0282880_A_CU.dgn
Plot Date & Time 12-MAR-2009 15:28
Plotted by dparry



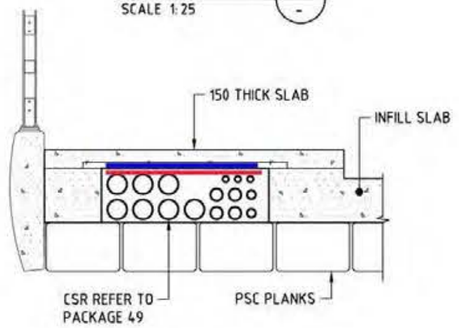
SECTION C — SCALE 1:50 — 3160

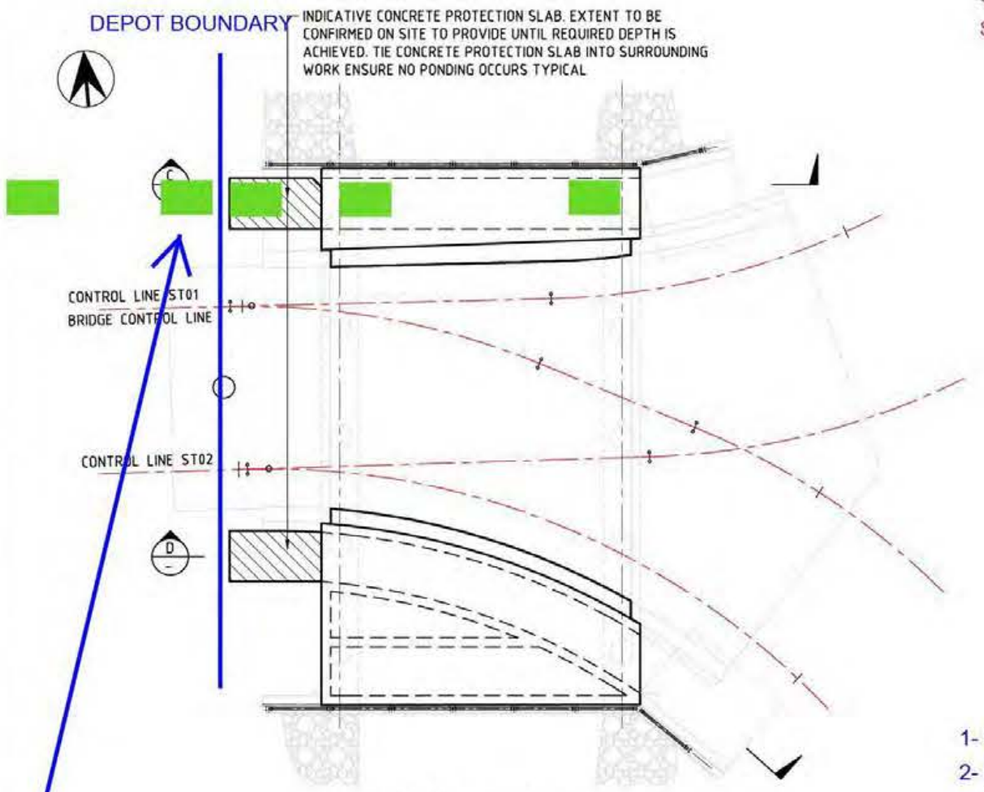
SECTION D — SCALE 1:50 — 3160 SIMILAR

1- THE PROTECTION SLAB SHALL BE PLACED NOT MORE THAN 75mm ABOVE CONDUITS.
2- THE PROTECTION SLAB SHALL COVER ALL CONDUITS WITH AT LEAST 40mm OVERLAP ON EACH SIDE; ITS WIDTH SHALL NOT BE LESS THAN 150mm AT ANY LOCATION.
3- THE PROTECTION SLAB SHALL CONSIST OF A CAST IN-SITU CONCRETE SLAB WITH A THICKNESS NOT LESS THAN 100mm.

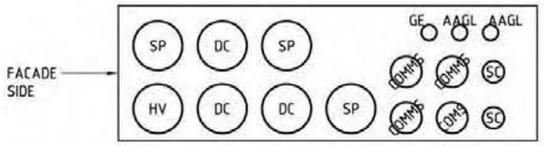


SECTION E — SCALE 1:25 —

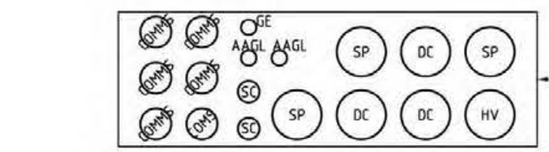




LAYOUT PLAN - PROTECTION SLAB
SCALE 1:100

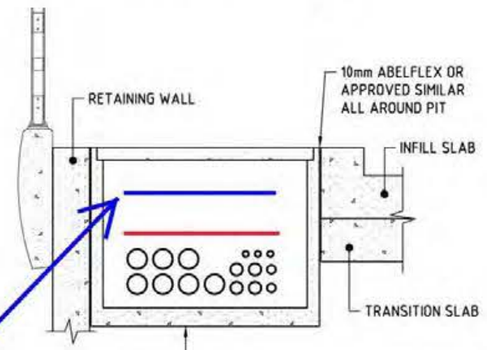


PROPOSED NORTHERN CONDUIT ARRANGEMENT
NTS



PROPOSED SOUTHERN CONDUIT ARRANGEMENT
NTS

SECTION F — SCALE 1:25 —



SECTION G — SCALE 1:25 —

1- UNDERGROUND CONDUITS SHALLE BE IDENTIFIED BY AN ORANGE MARKER TAPE COMPLYING WITH AS/NZS 2648.1.
2- MARKER TAPE SHALL BE PLACED AT 50% OF THE DEPTH OF COVER ABOVE THE PROTECTION SLAB.

GENERAL NOTES

1. FOR GENERAL NOTES REFER TO DRAWING NUMBER 04-SMC-DRW-STR-SB-3160

CABLE ROUTE MARKER AFFIXED TO CONCRETE PROTECTION SLAB OR BRIDGE DECK MARKED "HV CABLE BURIED BELOW"

~~IC CERTIFICATE NUMBER: 01-IDC-CRT-STR-SC-0001~~

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

SCALE 1:25 0.25 0 0.50 1.00
SCALE 1:50 0.5 0 1 2
SCALE 1:100 1 0 1 2 3 4 5
SCALES AT A1 SIZE DRAWING

03A	CMC-RFI-003383	GA 24/10	AJB 24/10	
03	ISSUED FOR CONSTRUCTION	VV 09/06/17	AB 09/06/17	MB 09/06/17
02	CONDITIONAL IFC RE-ISSUE	VV 31/05/17	AB 31/05/17	MB 31/05/17
01	CONDITIONAL IFC ISSUE	VV 06/03/17	WF 06/03/17	MB 06/03/17
AMD	DESCRIPTION	DESIGNER INITIAL/DATE	VERIFIED INITIAL/DATE	APPROVED INITIAL/DATE

CO-ORDINATE SYSTEM: STROMLO | HEIGHT DATUM: AHD | SCALE: AS SHOWN

Transport Canberra Light Rail

A JOINT VENTURE METRO Move | Live | Grow

This drawing is confidential and shall only be used for the purpose of this project.
The signing of this title block confirms the design and drafting of this project have been prepared and checked in accordance with the SMEC quality assurance system to ISO 9001:2000.

SMEC Australia Pty. Ltd. CIV

DRAWN	K. ELLIS	21/10/2016
DESIGNED	P. HARBER	21/10/2016
DRG CHECK	K. KOCK	09/06/2017
DESIGN CHECK	V. VIGNESWARAN	09/06/2017
APPROVED	M. BARRETT	09/06/2017

CANBERRA LIGHT RAIL
NORTH CORRIDOR - PACKAGE 72
DEPOT ACCESS BRIDGE - 1408
DECK SLAB DETAILS
SHEET 2

FILE No. WVR138 | SHEET: 32 OF 51 | A1
STATUS: ISSUED FOR CONSTRUCTION | ©
DRG No. 04-SMC-DRW-STR-SB-3162 | EDMS No. - | 03A

DF 601554

File Plotted V:_Vault Projects\300251\CAD\DWG\72\31_SB_Stand_Bridges\04-SMC-DRW-STR-SB-3162.dwg
Plot Date & Time 6/9/2017 1:19 PM
Plotted by KG1125

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:21/11/2018 9:18 AM
To: Sch 2.2(a)(ii)
Cc:"Grice, Simon" <Simon.Grice@act.gov.au>
Subject:FW: Today's catch up and what F**ked looks like. [SEC=UNCLASSIFIED]
Attachments: Not Acceptable .docx

Hi Robert,

Please find enclosed the supporting documentation from Canberra Metro Constructions regarding the status of installed conduits.

Some helpful background for you to understand the complexities of the onsite issues. Never mind arguing about the individual interpretation of the applicable standard.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

---

From: Tony Berryman [mailto:tonyberryman@specialistelectrical.com.au]
Sent: Wednesday, 17 October 2018 8:03 PM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>
Subject: FW: Today's catch up and what F**ked looks like.

fyi

Regards,

Tony Berryman
Director
M 0407 994 831
www.specialistelectrical.com.au

From: Sch 2.2(a)(ii)
Sent: Wednesday, 17 October 2018 5:57 PM
To: Sch 2.2(a)(ii) 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>; Kim Power <kim@specialistelectrical.com.au>; Sch 2.2(a)(ii)

Cc: Sch 2.2(a)(ii)
Subject: Today's catch up and what F**ked looks like.

Guys

As per our catch up and what bad / unacceptable looks like.

Kind Regards

Sch 2.2(a)(ii)

METRO

Sch 2.2(a)(ii)

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Not Acceptable

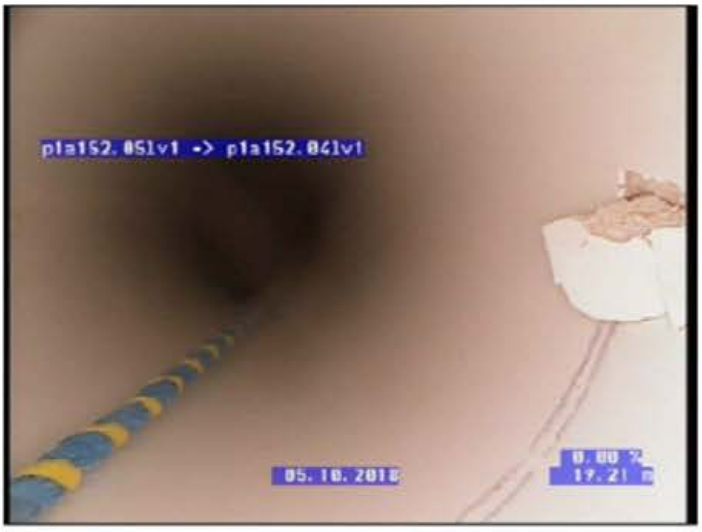

Photo: S_Sectionname_8102018_1_8_A.jpg
19.02m, Hole in wall , at 3 o'clock

Photo: S_Sectionname_8102018_1_11_A.jpg
30.68m, Other Deposits in the invert, screw , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_8102018_2_4_A.jpg
43.7m, Hole in wall , at 9 o'clock

Photo: S_Sectionname_8102018_2_4_B.jpg
43.7m, Hole in wall , at 9 o'clock

Photo: S_Sectionname_8102018_2_6_A.jpg
44.44m, Breaking, some pieces are missing , length of break 500, General Comments HAS EXTERIOR PATCH, from 10 to 2 o'clock

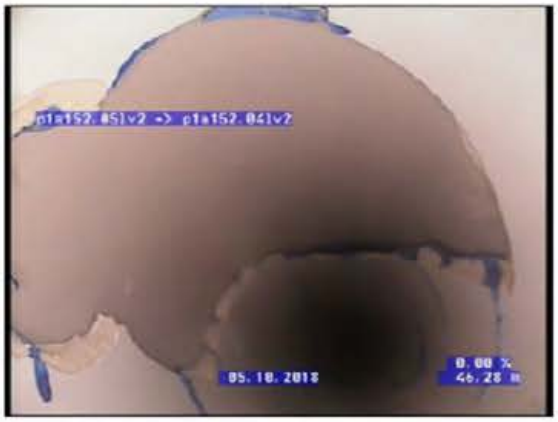

Photo: S_Sectionname_8102018_2_9_A.jpg
46.08m, Breaking, some pieces are missing , length of break 1000, General Comments HAS EXTERIOR PATCH, from 9 to 3 o'clock

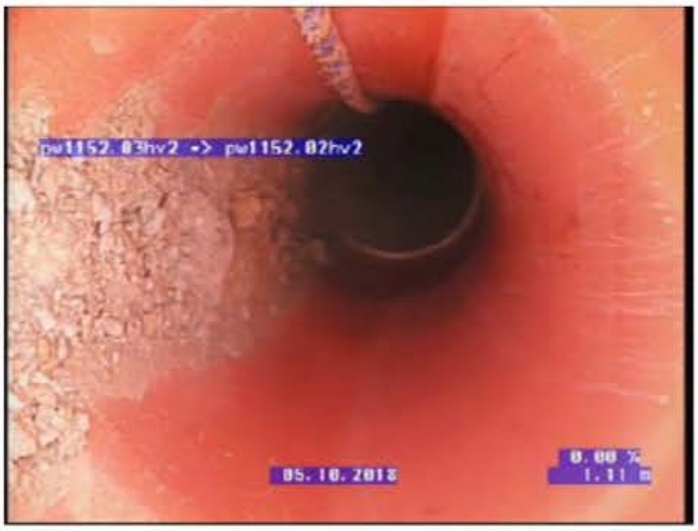

Photo: S_Sectionname_8102018_7_3_A.jpg
0.89m, Deposit is fine sediments- Sand or Silt in the invert , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_8102018_27_4_A.jpg
32.11m, Hole in wall , at 5 o'clock

Photo: S_Sectionname_8102018_29_2_A.jpg
21.71m, Inspection (survey) abandoned, ROPE BUNCHED UP

Photo: S_Sectionname_9102018_2_2_A.jpg
0.28m, Vertical deformation , change in diameter 5-10%, length of deformation 100mm , at 12 o'clock

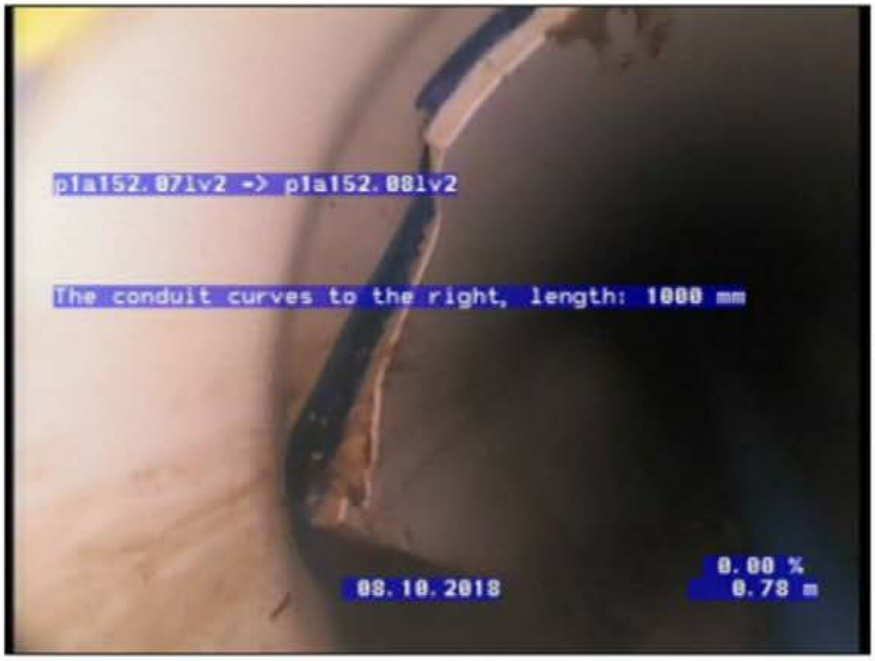

Photo: S_Sectionname_9102018_5_4_A.jpg
0.79m, Joint displaced longitudinaly, longitudinal displacement 10-20mm, General Comments NOT CLEAN CUT

Photo: S_Sectionname_9102018_10_4_A.jpg
36.12m, Longitudinal fracture , width 2mm , at 2 o'clock

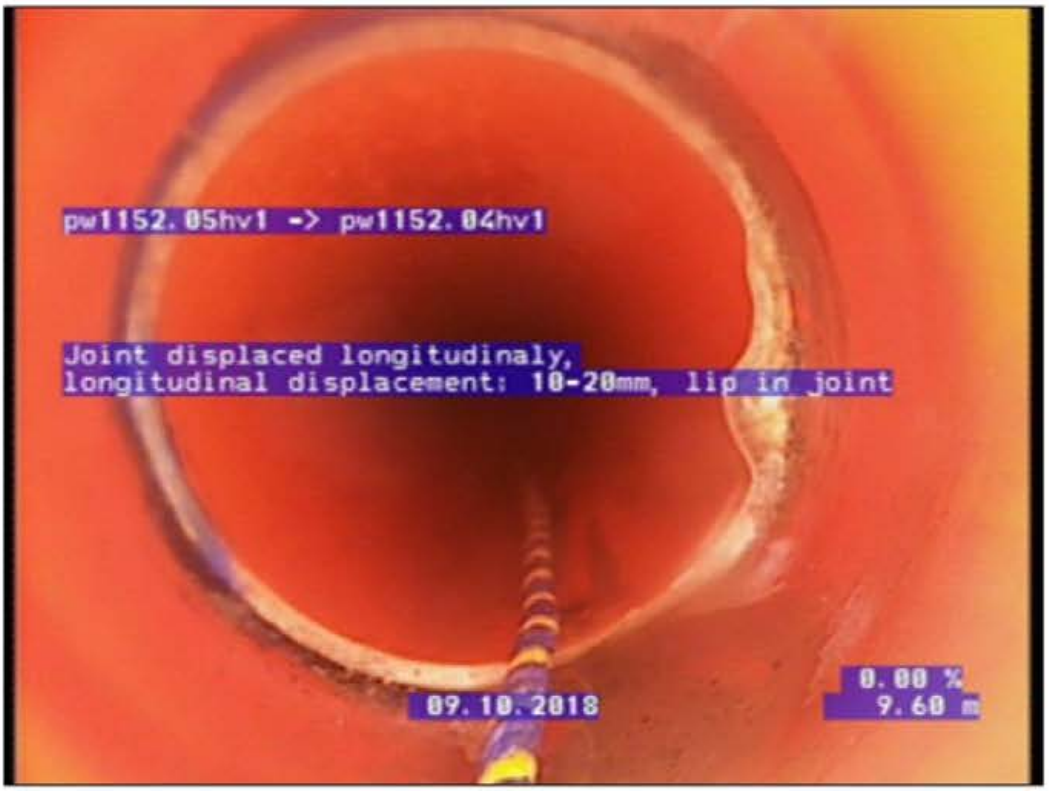
pw1152.05hv1 -> pw1152.04hv1
Joint displaced longitudinaly,
longitudinal displacement: 10-20mm, lip in joint
09.10.2018
0.00 %
9.60 m

Photo: S_Sectionname_9102018_14_5_A.jpg
6.05m, Longitudinal fracture, at joint, width 2mm , at 6 o'clock

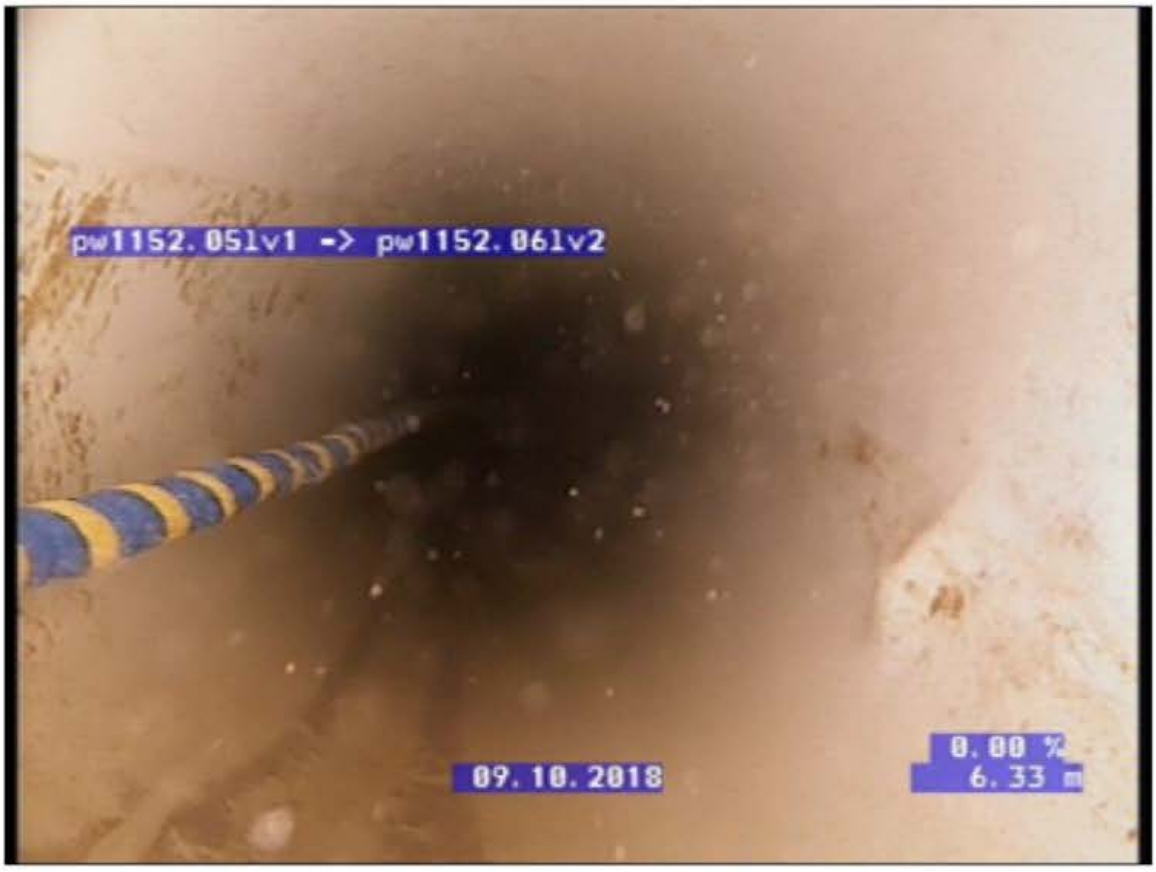

Photo: S_Sectionname_9102018_16_5_A.jpg
6.33m, General Comments BULGE

Photo: S_Sectionname_9102018_14_8_A.jpg
34.4m, Multiple or complex surface crack(s) , width 1mm

Photo: S_Sectionname_9102018_16_9_A.jpg
45.13m, Joint displaced longitudinaly, longitudinal displacement 10-20mm, General Comments JOINT PEELED BACK

Photo: S_Sectionname_9102018_17_8_A.jpg
17.42m, Breaking, some pieces are missing , length of break 100, General Comments CONDUIT IS DEFORMED, at 3 o'clock

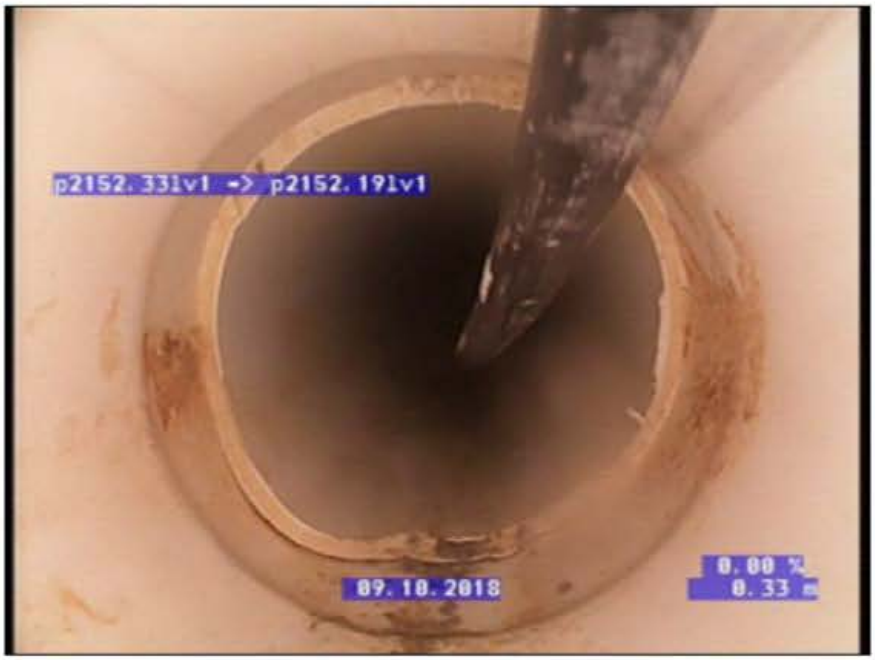

Photo: S_Sectionname_10102018_1_2_A.jpg
0.33m, Deformation, mixed orientation , change in diameter <5%, length of deformation 100mm , from 12 to 12 o'clock

Photo: S_Sectionname_10102018_1_7_A.jpg
17.21m, General Comments CONDUIT PEELING

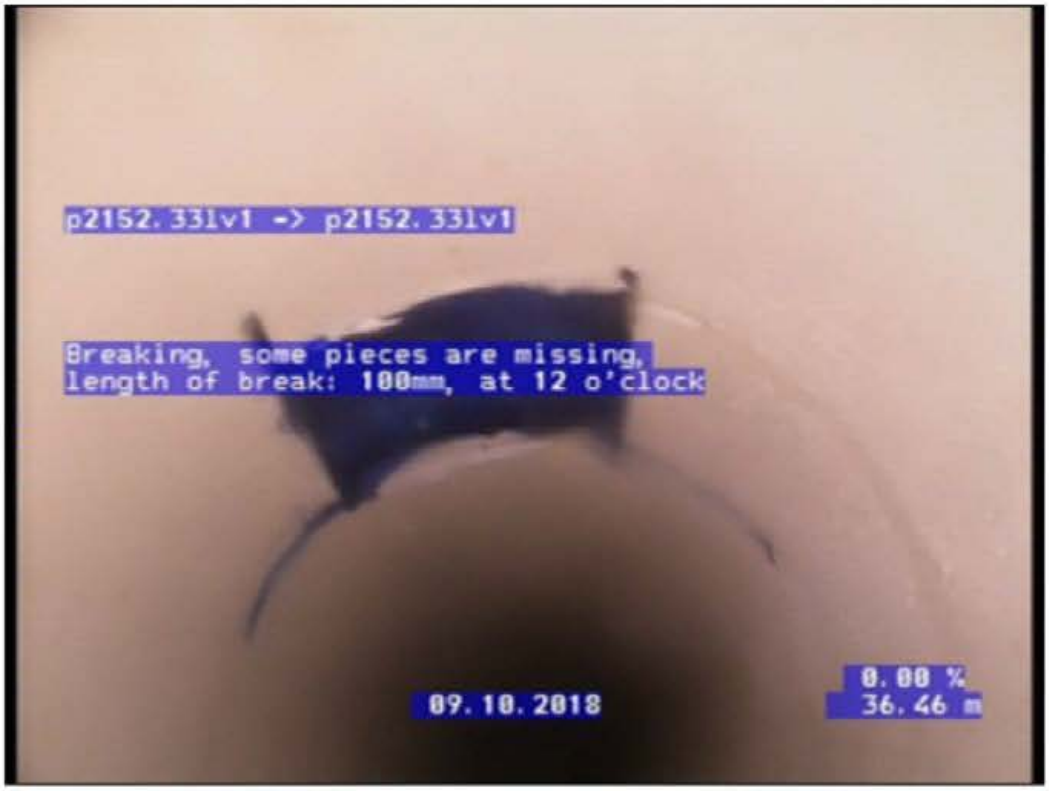

Photo: S_Sectionname_10102018_2_10_A.jpg
36.46m, Breaking, some pieces are missing , length of break 100, General Comments SECTION HAS BEEN CUT OUT AND EXTERNALLY REPAIRED, from 11 to 1 o'clock

Photo: S_Sectionname_10102018_9_7_A.jpg
46.4m, Hole in wall , at 11 o'clock

Photo: S_Sectionname_10102018_9_6_A.jpg
46.31m, Deposit is fine sediments- Sand or Silt in the invert ,
Obstruction: 5-20% , from 3 to 7 o'clock

Photo: S_Sectionname_10102018_17_6_A.jpg
3.98m, General Comments CABLE HAS BEEN STRIPPED

Photo: S_Sectionname_15102018_1_2_A.jpg
28.68m, General Comments POSSIBLE GRINDER CUT

Photo: S_Sectionname_15102018_1_3_A.jpg
28.68m, Hole in wall , at 1 o'clock

Photo: S_Sectionname_15102018_1_3_B.jpg
28.68m, Hole in wall , at 1 o'clock

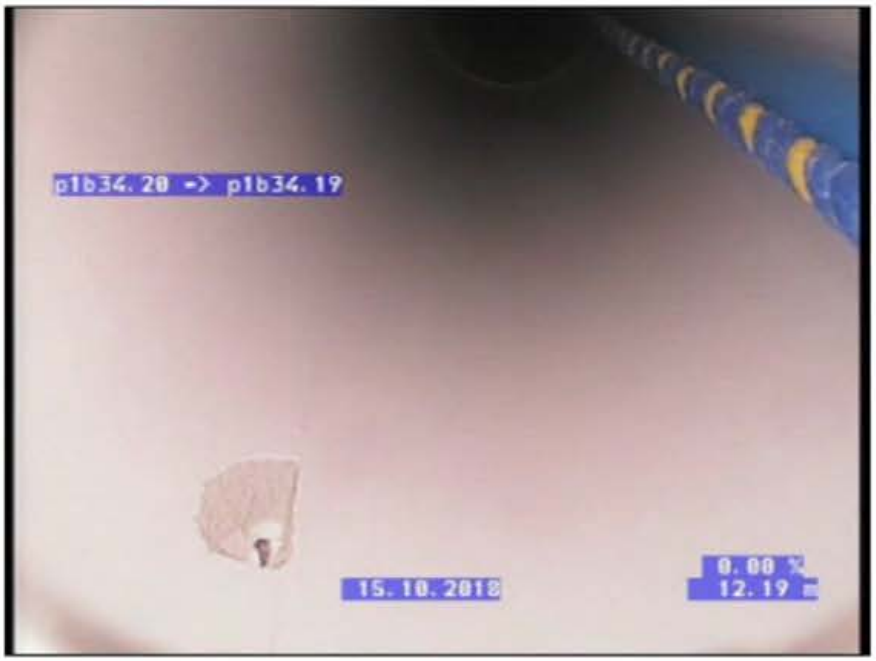

Photo: S_Sectionname_15102018_3_2_A.jpg
12.19m, Hole in wall , at 12 o'clock

Photo: S_Sectionname_15102018_5_2_A.jpg
4.44m, Longitudinal fracture , width 2mm , at 12 o'clock

Photo: S_Sectionname_15102018_5_2_B.jpg
4.44m, Longitudinal fracture , width 2mm , at 12 o'clock

Photo: S_Sectionname_15102018_7_3_A.jpg
13.08m, General Comments CONDUIT CHANGES COLOUR

Photo: S_Sectionname_15102018_7_4_A.jpg
13.08m, General Comments CONDUIT CHANGES COLOUR

Photo: S_Sectionname_16102018_1_3_A.jpg
12.41m, Breaking, all pieces are present but some of them are visibly displaced from position , length of break 100 , at 11 o'clock

Photo: S_Sectionname_16102018_10_13_A.JPG
95.02m, Hole in wall , at 2 o'clock

Photo: S_Sectionname_16102018_13_3_A.jpg
25.04m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , from 5 to 7 o'clock

Photo: S_Sectionname_13102018_2_12_A.JPG
54.37m, Breaking, some pieces are missing , length of break >1000, General Comments VOID VISIBLE, from 9 to 12 o'clock

Photo: S_Sectionname_13102018_2_12_B.JPG
54.37m, Breaking, some pieces are missing , length of break >1000, General Comments VOID VISIBLE, from 9 to 12 o'clock

Photo: S_Sectionname_13102018_4_2_A.JPG
3.31m, Joint displaced longitudinaly, longitudinal displacement >30mm, General Comments CONDUIT CHANGES COLOUR

Photo: S_Sectionname_13102018_4_3_A.JPG
3.58m, General Comments CONDUIT CHANGES COLOUR

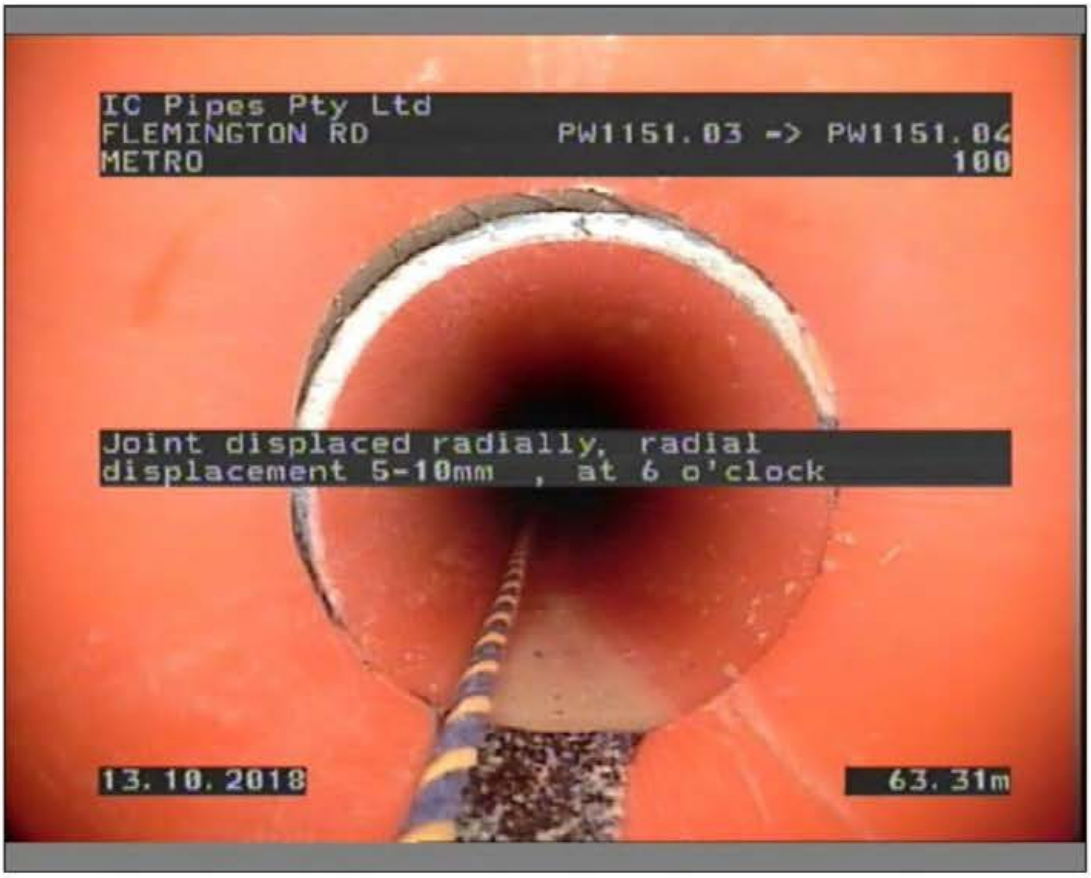

Photo: S_Sectionname_13102018_4_17_A.JPG
63.31m, Joint displaced radially, radial displacement 5-10mm , at 6 o'clock

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From:"Kim Power" <kim@specialistelectrical.com.au>
Sent:26/10/2018 11:29 AM
To:"Grice, Simon" <Simon.Grice@act.gov.au>
Subject: Fwd: FW: Depot Bridge HV Conduits
Importance: Normal

---------- Forwarded message ----------
From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Date: Oct 26, 2018 11:33 AM
Subject: FW: Depot Bridge HV Conduits
To: Sch 2.2(a)(ii)
Cc: "'Kim (SEEG)'" <kim@specialistelectrical.com.au>," 'Kelly, Gordon'" <Gordon.Kelly@act.gov.au>, Sch 2.2(a)(ii)

Hi Sch 2.2(a)(ii)

Please be aware until the below design is approved by the ACT Regulator the 11KV cables between TPS2 and TPS3 plus TPS3 to TPS4 can not be energised as the HV conduits do not meet the required depth of AS2067 either side of the depot bridge. This has been a verbal direction to me from the regulator until this design has gone through the correct processes on the project.

Kind Regards,

Tony Berryman

Director

M 0407 994 831

www.specialistelectrical.com.au

From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Sent: Wednesday, 24 October 2018 3:59 PM
To: Sch 2.2(a)(ii)
Cc: 'Kim Power' <kim@specialistelectrical.com.au>; Sch 2.2(a)(ii)

[redacted]

Subject: RE: Depot Bridge HV Conduits

Hi [redacted]

I assume the red line on the cross section is the protective slab?

Can we get the marker tape as the HD type (Hard Cover) and make sure it overlaps the full width of the conduit bank by 100mm.

You will need to mark up both sides of the bridge as there are conduits on both.

Im ok otherwise but as discussed the ACT Gov will also need to approve as they are the owner.

Thanks,

Regards,

Tony Berryman

Director

M 0407 994 831

www.specialistelectrical.com.au

From: [redacted]
Sent: Wednesday, 24 October 2018 3:30 PM
To: tony@specialistelectrical.com.au
Cc: 'Kim Power' <kim@specialistelectrical.com.au>; [redacted]
Subject: Depot Bridge HV Conduits

Tony

Attached is PDF of email sent in ACONEX, it contains copy of my email and email received from SMEC the designer.

Regards

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

330 Northbourne Ave, Dickson ACT 2602

Sch 2.2(a)(ii)

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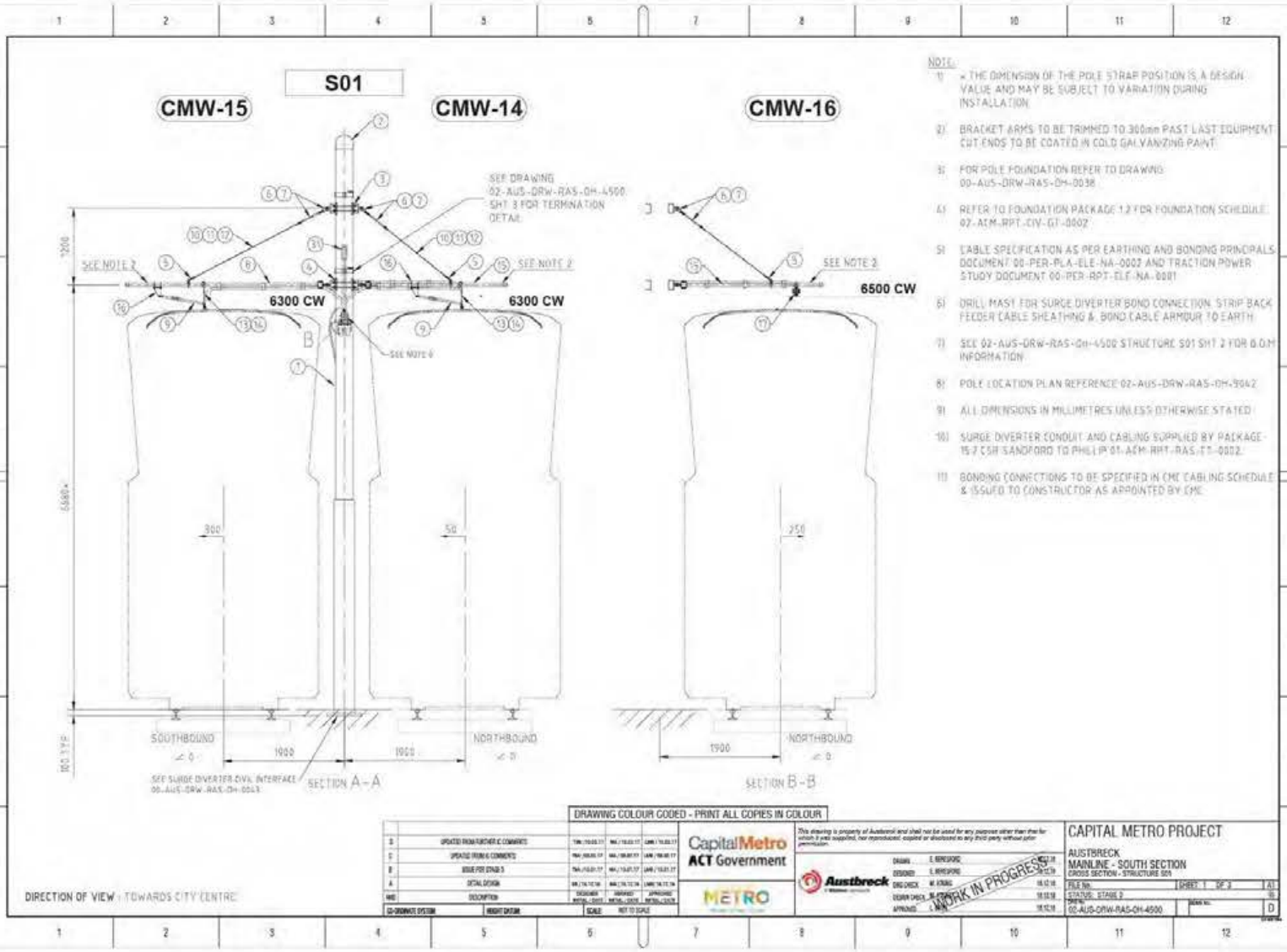

NOTE:

1) x THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION
2) BRACKET ARMS TO BE TRIMMED TO 300mm PAST LAST EQUIPMENT CUT ENDS TO BE COATED IN COLD GALVANIZING PAINT
3) FOR POLE FOUNDATION REFER TO DRAWING 00-AUS-DRW-RAS-OH-0038
4) REFER TO FOUNDATION PACKAGE 1.2 FOR FOUNDATION SCHEDULE 02-AEM-RPT-CIV-GT-0002
5) CABLE SPECIFICATION AS PER EARTHING AND BONDING PRINCIPALS DOCUMENT 00-PER-PLA-ELE-NA-0002 AND TRACTION POWER STUDY DOCUMENT 00-PER-RPT-ELE-NA-0001
6) DRILL MAST FOR SURGE DIVERTER BOND CONNECTION. STRIP BACK FEEDER CABLE SHEATHING & BOND CABLE ARMOUR TO EARTH
7) SEE 02-AUS-DRW-RAS-OH-4500 STRUCTURE S01 SHT 2 FOR G.O.M INFORMATION
8) POLE LOCATION PLAN REFERENCE 02-AUS-DRW-RAS-OH-9042
9) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
10) SURGE DIVERTER CONDUIT AND CABLING SUPPLIED BY PACKAGE 15.7 CSR SANDFORD TO PHILLIP 01-AEM-RPT-RAS-ET-0002
11) BONDING CONNECTIONS TO BE SPECIFIED IN CME CABLING SCHEDULE & ISSUED TO CONSTRUCTOR AS APPOINTED BY CME

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

D	UPDATED FROM FURTHER IC COMMENTS	TMK / 19.03.17	MAL / 19.03.17	LMM / 19.03.17
C	UPDATE FROM IC COMMENTS	TMK / 03.03.17	MAL / 09.03.17	LMM / 09.03.17
B	ISSUE FOR STAGE 3	TMK / 15.01.17	MAL / 15.01.17	LMM / 15.01.17
A	DETAIL DESIGN	MK / 16.12.16	MAL / 16.12.16	LMM / 16.12.16
NO	DESCRIPTION	DESIGNER INITIAL / DATE	VERIFIED INITIAL / DATE	APPROVED INITIAL / DATE

CO-ORDINATE SYSTEM: | HEIGHT DATUM: | SCALE: NOT TO SCALE

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Capital Metro ACT Government

METRO

Austbreck

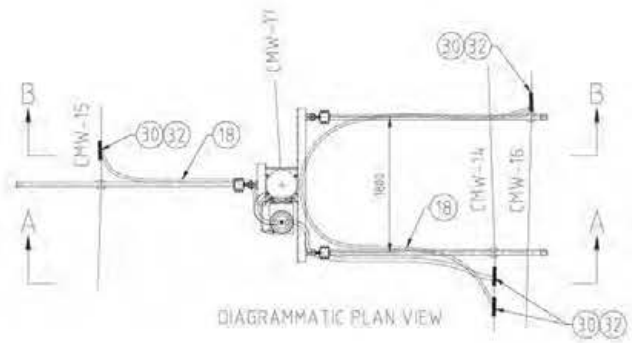
DRAWN	E.RIVISORO	16.12.16
DESIGNED	E.RIVISORO	16.12.16
DSG CHECK	M. KONG	16.12.16
DRWN CHECK	M. KONG	16.12.16
APPROVED	L. MAL	16.12.16

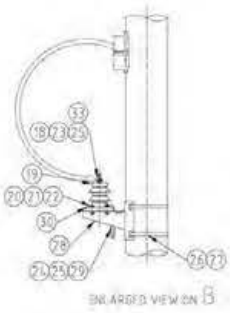
WORK IN PROGRESS

CAPITAL METRO PROJECT

AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S01

FILE No.	SHEET 1 OF 2	A1
STATUS: STAGE 2		1:5
DRG No. 02-AUS-DRW-RAS-OH-4500	REV No.	D





ITEM	DESCRIPTION	PART NO	QTY
1	POLE 273-235-8.5	MA4687-01-D	1
2	FINAL ASSEMBLY DIA 273	MA4333-16-A	1
3	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA4365-13-A	1
4	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA4366-03-A	1
5	QUICK LINK 8mm	MA4211-01-D	3
6	LINK PLATE ASSY	MA5315-03-A	3
7	ALINE INSULATOR 27	MA4619-51-D	3
8	BRACKET ARM ASSEMBLY DIA 60mm 3075mm	MA7210-05-A	1
9	REGISTRATION ARM ASSEMBLY	MA5324-03-A	2
10	WIRE ROPE 6mm (metres)	WRR-ROPE-6	5
11	THIMBLE FOR 6mm ROPE	THS66	6
12	FERRULE FOR 6mm ROPE	TCU6-S	6
13	INSULATED STITCH ASSY 3m WITH NUGGET	MA5271-05-A	2
14	STITCH SUPPORT ASSY DIA 42mm	MA5342-01-A	2
15	BRACKET ARM ASSEMBLY DIA 60mm 2148mm	MA7210-01-A	2
16	OVERLAP DROPPER ASSEMBLY	MA5385-01-A	2
17	CONTACT WIRE SUPPORT ASSEMBLY	MA2230-09-A	1
18	XPLE CABLE 120mm² (metres)	120	40
19	BIMOL DIVERTER	IB500MC16	1
20	HEX HD SETSCREW M12x60 A4-80	HSSA80.12060H	4
21	HD ST/ST A4-80 HEX NYLOC NUT	HNE48M.12SN	4
22	12mm HD ST/ST A4 PLAIN WASHER FORM 'A'	HWS48M.12PA	4
23	TERMINAL PLATE ASSEMBLY	MA7099-05-A	1
24	TERMINAL TO SUIT 95mm² CABLE	T95	4
25	HEAT SHRINK (metres)	R22-13-00-26410	3.5
26	STAINLESS STEEL BAND (metres)	MA1200-01-D	3
27	BUCKLE (BAT 164)	RS164 BUCKLES	2
28	MOUNTING BRACKET TAB	MA1424-02-FD	1
29	95mm² XLPE CABLE (metres)	95	15
30	TERMINAL TO SUIT 120mm² CABLE	T120	8
31	FEEDER POLE KIT	MA7260-02-A	1
32	CONTACT WIRE CONNECTION KIT	MA7191-05-A	4
33	TERMINAL BAR	MA7099-02-C	1

NOTES:
1) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

DIRECTION OF VIEW : N/A

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

REV	DESCRIPTION	DRAWN	APPROVED
D	UPDATED FROM FURTHER IS COMMENTS	TMA 19.03.17	AM 19.03.17
C	UPDATED FROM IS COMMENTS	TMA 28.02.17	AM 28.02.17
B	ISSUE FOR STAGE 2	TMA 23.01.17	AM 23.01.17
A	DETAIL DESIGN	AM 16.12.16	AM 16.12.16

CO-ORDINATE SYSTEM: | HEIGHT DATUM: | SCALE: NOT TO SCALE

CapitalMetro ACT Government

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Austbreck

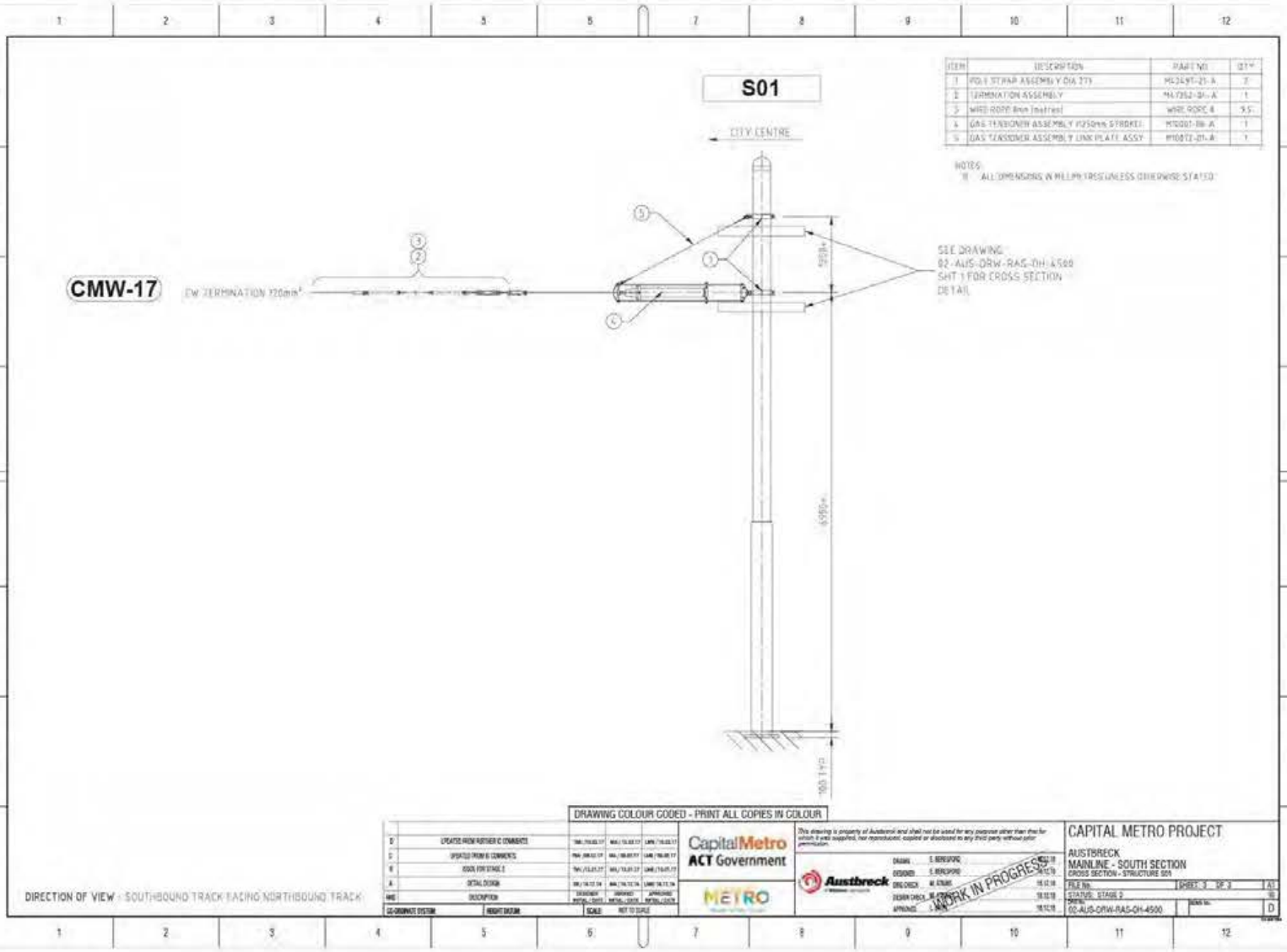
DRAWN	T. BIRKSHORE	16.12.16
DESIGNED	T. BIRKSHORE	16.12.16
DSG CHECK	M. KONG	16.12.16
DESIGN CHECK	M. KONG	16.12.16
APPROVED	T. MA	16.12.16

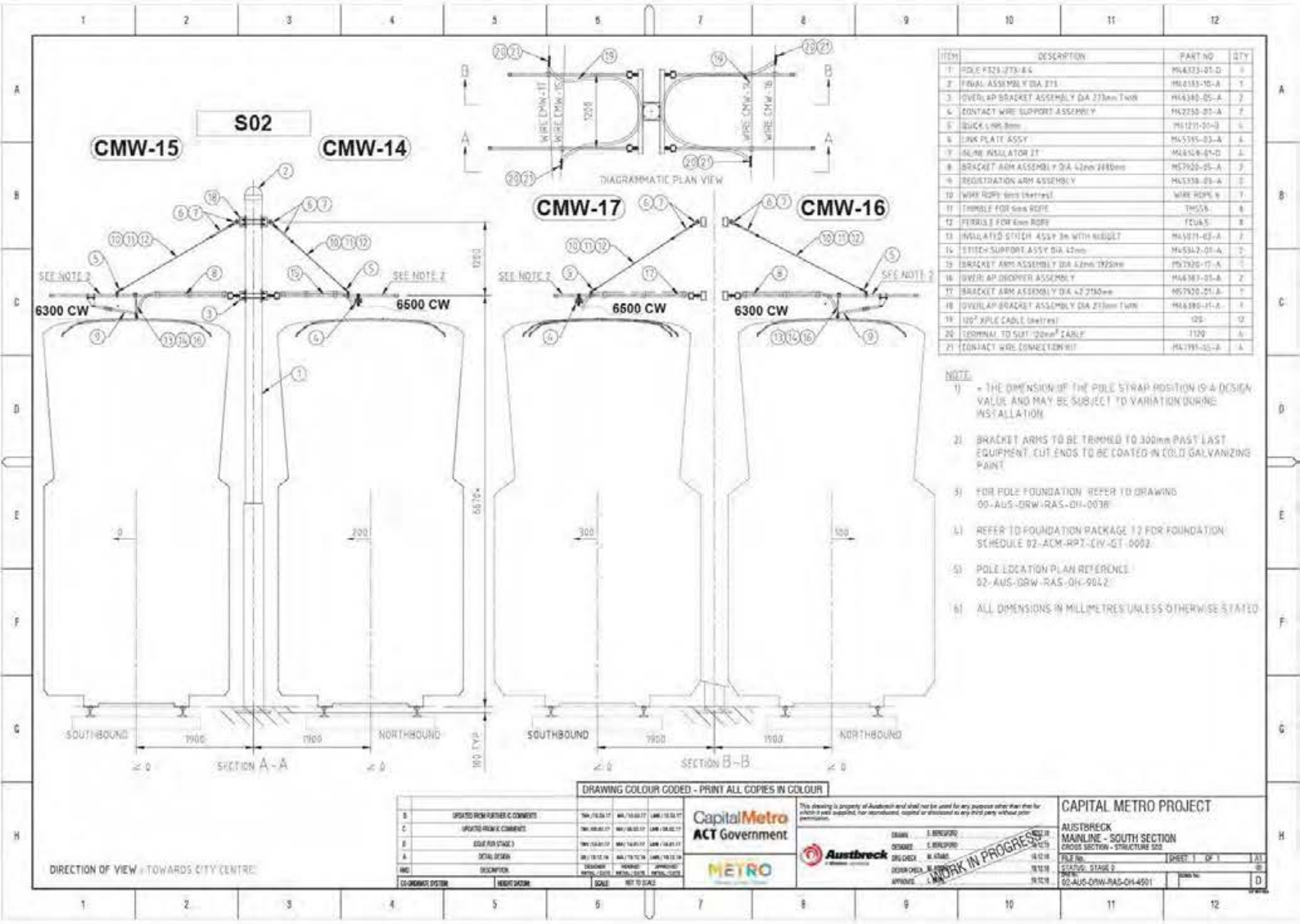
WORK IN PROGRESS

CAPITAL METRO PROJECT

AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE 005

FILE No.	SHEET 2 OF 2	A1
STATUS: STAGE 2		1:5
DRG No. 00-AUS-DRW-RAS-GH-4500	ISSUE No.	D


S01
CITY CENTRE
CMW-17
DW TERMINATION 720mm²
SEE DRAWING
02-AUS-DRW-RAS-OH-4500
SHT 1 FOR CROSS SECTION
DETAIL
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR
DIRECTION OF VIEW - SOUTHBOUND TRACK FACING NORTHBOUND TRACK
CapitalMetro
ACT Government
METRO
Austbreck
WORK IN PROGRESS
CAPITAL METRO PROJECT
AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S01
02-AUS-DRW-RAS-OH-4500



ITEM	DESCRIPTION	PART NO	QTY
1	POLE PS23-273-8.6	MA4373-01-D	1
2	FINIAL ASSEMBLY DIA 273	MA6183-10-A	1
3	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA6390-05-A	2
4	CONTACT WIRE SUPPORT ASSEMBLY	MA2250-01-A	2
5	QUICK LINK 8mm	MS1211-50-G	4
6	LINK PLATE ASSY	MA5395-03-A	4
7	INLINE INSULATOR 27	MA6619-01-D	4
8	BRACKET ARM ASSEMBLY DIA 42mm 2480mm	MS7920-05-A	2
9	REGISTRATION ARM ASSEMBLY	MA5358-05-A	2
10	WIRE ROPE 6mm (metres)	WIRE ROPE 6	7
11	THIMBLE FOR 6mm ROPE	TM516	8
12	FERRULE FOR 6mm ROPE	TF1665	8
13	INSULATED STITCH ASSY 3m WITH NUGGET	MA5071-03-A	2
14	STITCH SUPPORT ASSY DIA 42mm	MA5342-01-A	2
15	BRACKET ARM ASSEMBLY DIA 42mm 1920mm	MS7920-17-A	2
16	OVERLAP DROPPER ASSEMBLY	MA6387-01-A	2
17	BRACKET ARM ASSEMBLY DIA 42 2150mm	MS7920-01-A	2
18	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA6390-11-A	1
19	120² XPLE CABLE (metres)	120	12
20	TERMINAL TO SUIT 120mm² CABLE	T120	4
21	CONTACT WIRE CONNECTION KIT	MA7191-05-A	4

NOTE:

1) * THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION.
2) BRACKET ARMS TO BE TRIMMED TO 300mm PAST LAST EQUIPMENT. CUT ENDS TO BE COATED IN COLD GALVANIZING PAINT.
3) FOR POLE FOUNDATION REFER TO DRAWING 00-AUS-DRW-RAS-OH-0038.
4) REFER TO FOUNDATION PACKAGE T2 FOR FOUNDATION SCHEDULE 02-ACM-RPT-CIV-GT-0002.
5) POLE LOCATION PLAN REFERENCE 02-AUS-DRW-RAS-OH-9042.
6) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NO	DESCRIPTION	DESIGNED INITIAL / DATE	VERIFIED INITIAL / DATE	APPROVED INITIAL / DATE
B	UPDATED FROM FURTHER COMMENTS	TMH / 15.06.17	MAL / 15.06.17	LMB / 15.06.17
C	UPDATED FROM IC COMMENTS	TMH / 06.07.17	MAL / 06.07.17	LMB / 06.07.17
D	ISSUE FOR STAGE 2	TMH / 14.07.17	MAL / 14.07.17	LMB / 14.07.17
A	DETAIL DESIGN	JBL / 19.12.16	MAL / 19.12.16	LMB / 19.12.16

CO-ORDINATE SYSTEM: | HEIGHT DATUM: | SCALE: NOT TO SCALE

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Austbreck

DRAWN: T. BERGFORD 18.12.18
DESIGNED: T. BERGFORD 19.12.18
DRG CHECK: M. ATHAS 19.12.18
DESIGN CHECK: M. ATHAS 19.12.18
APPROVED: J. WALL 19.12.18

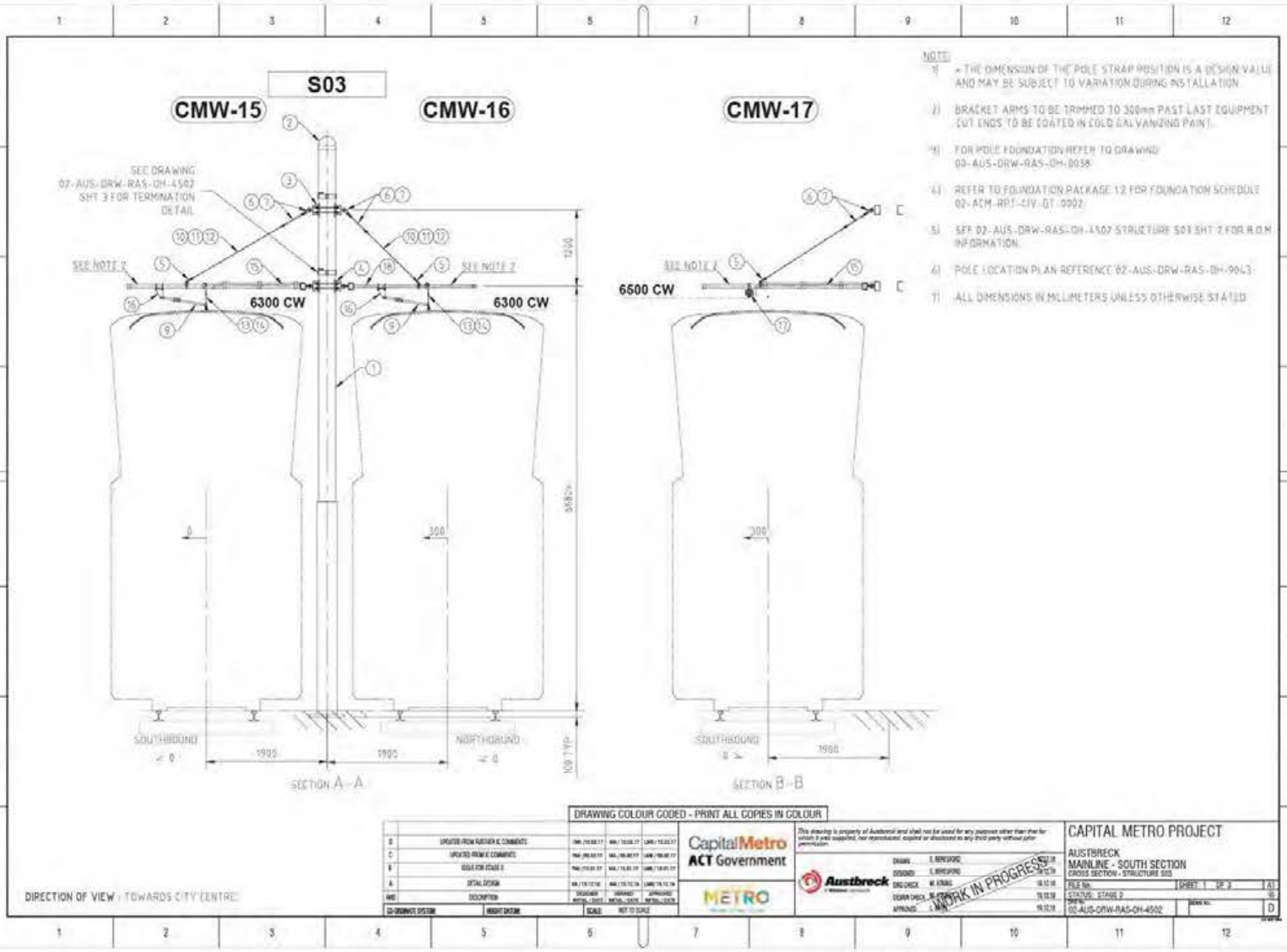
WORK IN PROGRESS

CapitalMetro
ACT Government
METRO

CAPITAL METRO PROJECT

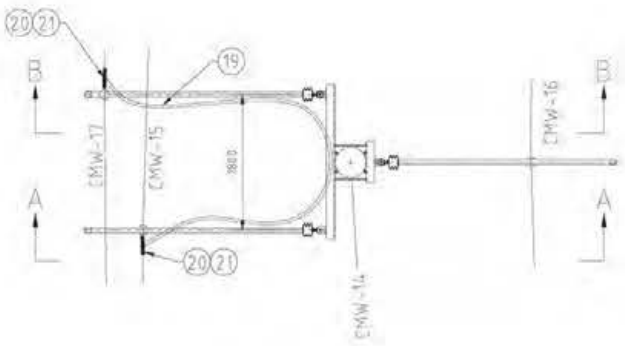
AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S02

FILE No.: SHEET 1 OF 1 A1
STATUS: STAGE 2
DRG No.: 02-AUS-DRW-RAS-OH-4501 REVISION No.: D


S03
CMW-15
CMW-16
CMW-17
SEE DRAWING 02-AUS-DRW-RAS-OH-4502 SHT 3 FOR TERMINATION DETAIL
SEE NOTE 2
SEE NOTE 2
6300 CW
6300 CW
6500 CW
SEE NOTE 2
1200
5685
100 TYP
0
300
300
SOUTHBOUND
NORTHBOUND
SOUTHBOUND
1900
1900
1900
SECTION A-A
SECTION B-B
NOTE:
1) * THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION
2) BRACKET ARMS TO BE TRIMMED TO 300mm PAST LAST EQUIPMENT CUT ENDS TO BE COATED IN COLD GALVANIZING PAINT.
3) FOR POLE FOUNDATION REFER TO DRAWING 00-AUS-DRW-RAS-OH-0038
4) REFER TO FOUNDATION PACKAGE 12 FOR FOUNDATION SCHEDULE 02-ACM-RPT-CIV-GT-0002
5) SEE 02-AUS-DRW-RAS-OH-4502 STRUCTURE S03 SHT 2 FOR B.O.M. INFORMATION
6) POLE LOCATION PLAN REFERENCE 02-AUS-DRW-RAS-OH-9043
7) ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR
D UPDATED FROM FURTHER IC COMMENTS
C UPDATED FROM IC COMMENTS
B ISSUE FOR STAGE 3
A DETAIL DESIGN
REV DESCRIPTION
CapitalMetro
ACT Government
METRO
Austbreck
DRAWN
DESIGNED
DRG CHECK
DESIGN CHECK
APPROVED
WORK IN PROGRESS
CAPITAL METRO PROJECT
AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S03
FILE No.
SHEET 1 OF 2
STATUS: STAGE 2
SCALE: NOT TO SCALE
02-AUS-DRW-RAS-OH-4502
D
DIRECTION OF VIEW : TOWARDS CITY CENTRE

ITM	DESCRIPTION	PART NO	QTY
1	POLE 1333, 273-9	MA8664-05-G	1
2	FINIAL ASSEMBLY DIA 273	MA6333-10-A	1
3	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA6383-13-A	1
4	OVERLAP BRACKET ASSEMBLY DIA 273mm TWIN	MA6380-09-A	1
5	QUICKLINK 60kN	MA1211-01-D	3
6	LINK PLATE ASSY	MA5395-03-A	3
7	MONO INSULATOR 21	MA4464-01-D	3
8	BRACKET ARM ASSEMBLY DIA 60mm 2720mm	MA1210-03-A	1
9	REGISTRATION ARM ASSEMBLY	MA5334-03-A	2
10	WIRE ROPE 6mm (Ref 11)	WIRE ROPE 6	5
11	THIMBLE FOR 6mm ROPE	TH556	6
12	FERRULE FOR 6mm ROPE	TE066	5
13	INSULATED STITCH ASSY 3m WITH NUGGET	MA3411-03-A	2
14	STITCH SUPPORT ASSY DIA 60mm	MA5342-02-A	2
15	BRACKET ARM ASSEMBLY DIA 60mm 2510mm	MA7292-04-A	1
16	OVERLAP DROPPER ASSEMBLY	MA4347-03-A	2
17	CONTACT WIRE SUPPORT ASSEMBLY	MA2230-09-A	1
18	BRACKET ARM ASSEMBLY DIA 42mm 1925mm	MA1920-11-A	1
19	120mm² XPLE CABLE (TO BE SUPPLIED BY OTHERS)	120	-
20	TERMINAL TO SUIT 120mm² CABLE	T120	2
21	CONTACT WIRE CONNECTION KIT	MA7791-05-A	3

NOTES:
1) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED



DIAGRAMMATIC PLAN VIEW

DIRECTION OF VIEW : N/A

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

REV	DESCRIPTION	DESIGNED INITIAL / DATE	DRAWN INITIAL / DATE	APPROVED INITIAL / DATE
D	UPDATED FROM AUTHORITY COMMENTS	TMK / 19.03.17	MA / 19.03.17	LMB / 19.03.17
C	UPDATED FROM IFC COMMENTS	TMK / 06.03.17	MA / 06.03.17	LMB / 06.03.17
B	ISSUE FOR STAGE 3	TMK / 13.01.17	MA / 13.01.17	LMB / 13.01.17
A	DETAIL DESIGN	MA / 15.12.16	MA / 15.12.16	LMB / 15.12.16

CO-ORDINATE SYSTEM: | HEIGHT DATUM: | SCALE: NOT TO SCALE

CapitalMetro ACT Government

METRO

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Austbreck

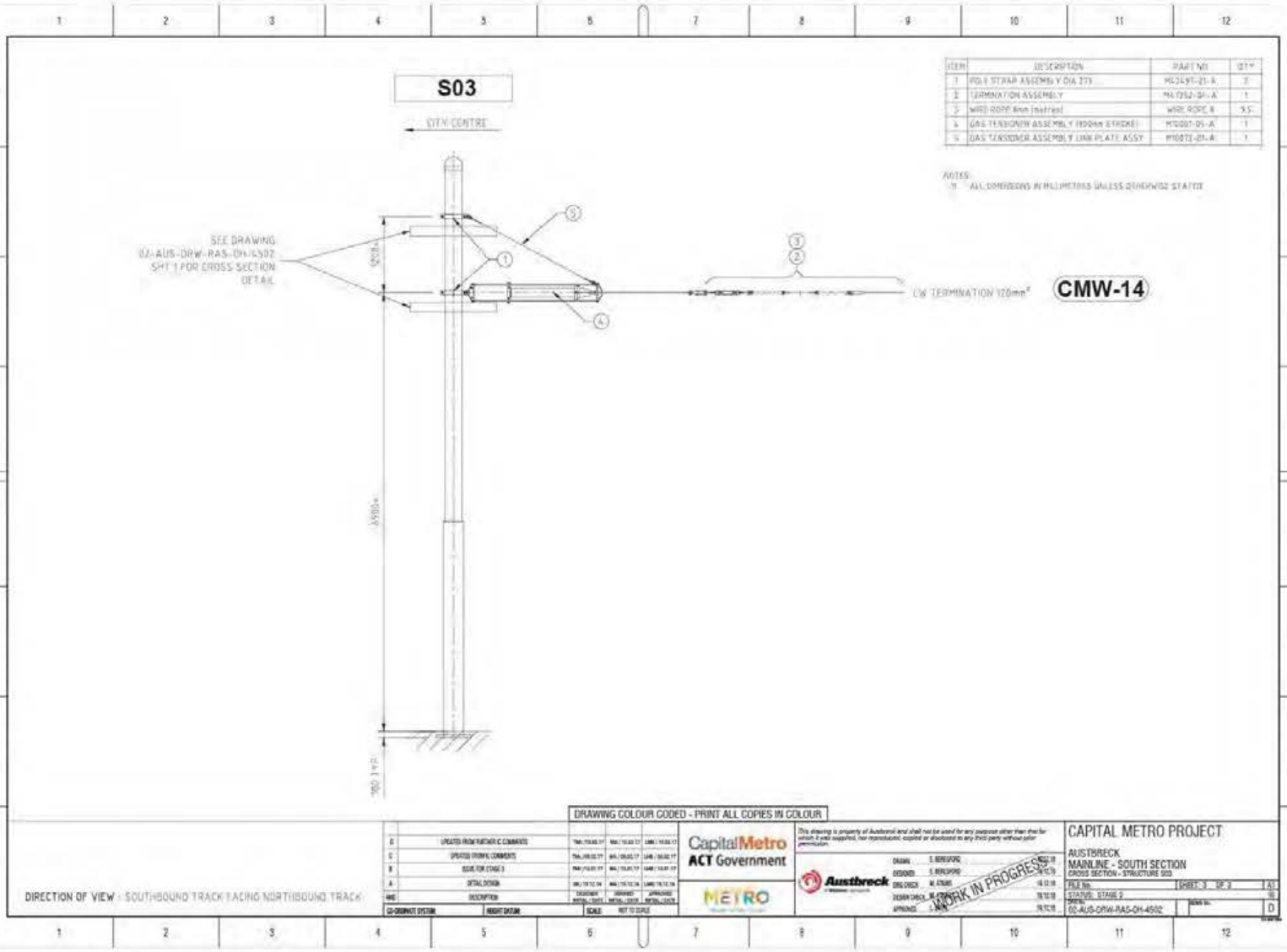
DRAWN	T. BIRKSHORE	12.12.16
DESIGNED	T. BIRKSHORE	15.12.16
DSG CHECK	M. KOENIG	16.12.16
DESIGN CHECK	M. KOENIG	19.12.16
APPROVED	T. MAY	19.12.16

WORK IN PROGRESS

CAPITAL METRO PROJECT

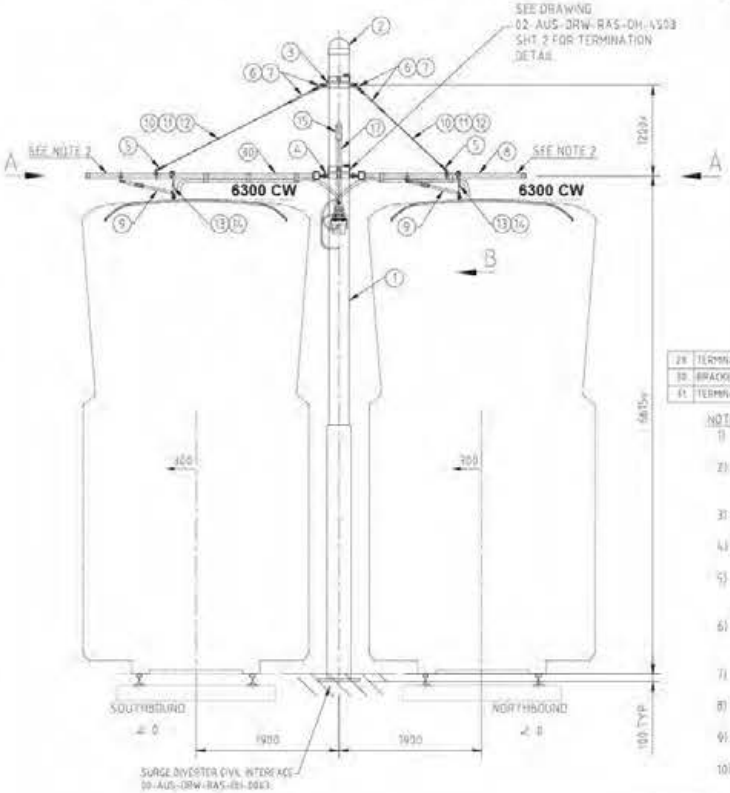
AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE SC5

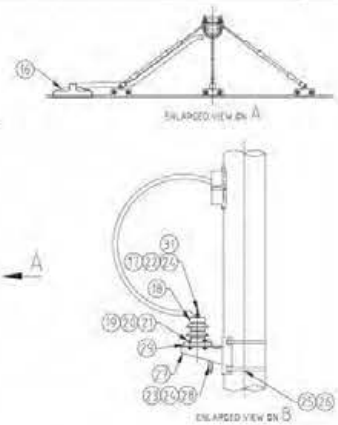
FILE No.	SHEET 2 OF 2	A1
STATUS: STAGE 2		1:5
DRG No. 02-AUS-DRW-RAS-CH-4502	REVISION No.	D


S03
CITY CENTRE
SEE DRAWING
02-AUS-DRW-RAS-DH-4502
SHT 1 FOR CROSS SECTION
DETAIL
CW TERMINATION 120mm²
CMW-14
ITEM | DESCRIPTION | PART NO | QTY
1 | POLE STRAP ASSEMBLY DIA 273 | ML249T-01-A | 2
2 | TERMINATION ASSEMBLY | MA7352-01-A | 1
3 | WIRE ROPE 8mm (metres) | WIRE ROPE 8 | 55
4 | GAS TENSIONER ASSEMBLY (600mm STROKE) | MT600T-01-A | 1
5 | GAS TENSIONER ASSEMBLY LINK PLATE ASSY | MT600T-01-A | 1
NOTES:
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR
DIRECTION OF VIEW : SOUTHBOUND TRACK FACING NORTHBOUND TRACK
CapitalMetro
ACT Government
METRO
Austbreck
WORK IN PROGRESS
CAPITAL METRO PROJECT
AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S03
FILE No.
SHEET: 3 OF: 3
STATUS: STAGE 2
02-AUS-DRW-RAS-DH-4502
D

S04

CMW-17 **CMW-16**





ITEM	DESCRIPTION	PART NO	QTY
1	POLE P323-275-8.4-P	M46526-01-D	1
2	EARTH ASSEMBLY DIA 273	M46737-10-A	1
3	POLE STRAP ASSEMBLY DIA 273	M45320-21-A	1
4	POLE STRAP ASSEMBLY DIA 273	M45329-21-A	1
5	QUICK LINK 4mm	M45321-01-D	2
6	LINK PLATE ASSY	M45395-05-A	2
7	INLINE INSULATOR 27	M46549-01-D	2
8	BRACKET ARM ASSEMBLY 60 DIA 3015mm	M47210-05-A	1
9	REGISTRATION ARM ASSEMBLY	M45398-12-A	1
10	WIRE ROPE 6mm (metres)	WIRE ROPE 6	25
11	THIMBLE FOR 6mm ROPE	THS56	4
12	FERRULE FOR 6mm ROPE	TF066	2
13	INSULATED STITCH ASSY 3m WITH NUGGET	M45071-03-A	2
14	STITCH SUPPORT ASSY DIA 60	M45342-02-A	2
15	FEEDER POLE KIT	M47190-02-A	1
16	CONTACT WIRE CONNECTION KIT	M47191-05-A	2
17	120mm² XPLE CABLE (metres)	120	34
18	SURGE DIVERTER	HEA0MC12	1
19	HEX HD SETSCREW M12x40 A4-80	●S568M 120401	4
20	M12 ST/ST A4-80 HEX NYLOC NUT	AN568M 12SN	4
21	12mm I/D ST/ST A4 PLAIN WASHER FORM 'A'	●W568M 12FA	4
22	TERMINAL TO SUIT 120mm² CABLE	T120	4
23	TERMINAL TO SUIT 95mm² CABLE	T95	4
24	HEAT SHRINK (metres)	R22-15-03-34470	1
25	STAINLESS STEEL BAND (metres)	M47200-01-D	2
26	BUCKLE (SRC 1941	INSTRA BUCKLES	2
27	MOUNTING BRACKET FAR	M47621-02-EB	1
28	95mm² XLPE CABLE (metres)	95	15

29	TERMINAL PLATE ASSEMBLY	M47090-01-A	1
30	BRACKET ARM ASSEMBLY 60 DIA 2150mm	M47290-01-A	1
31	TERMINAL BAR	M47090-02-D	1

NOTES:

1) ● THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION
2) BRACKET ARMS TO BE TRIMMED TO 930mm PAST LAST EQUIPMENT. CUT ENDS TO BE COATED IN COLD GALVANIZING PAINT
3) FOR POLE FOUNDATION REFER TO DRAWING 00-AUS-DRW-RAS-OH-0038
4) REFER TO FOUNDATION PACKAGE 12 FOR FOUNDATION SCHEDULE 02-ACM-RPT-DV-CT-0002
5) CABLE SPECIFICATION AS PER EARTHING AND BONDING PRINCIPALS DOCUMENT 00-PER-PLA-ELE-NA-0002 AND TRACTION POWER STUDY DOCUMENT 00-PER-RPT-ELE-NA-0001
6) STRIP BACK FEEDER CABLE SHEATHING. BOND CABLE ARMOUR TO EARTH DRILL MAST FOR SURGE DIVERTER BOND CONNECTION
7) POLE LOCATION PLAN REFERENCE 02-AUS-DRW-RAS-OH-9043
8) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
9) SURGE DIVERTER CONDUIT AND CABLING SUPPLIED BY PACKAGE 15.2 CSR - SANDFORD TO PHILLIP 01-ACM-RPT-RAS-CT-0002.
10) BONDING CONNECTIONS TO BE SPECIFIED IN CML CABLING SCHEDULE & ISSUED TO CONSTRUCTION AS APPOINTED BY CML.

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NO	DESCRIPTION	DESIGNED INITIAL / DATE	REVIEWED INITIAL / DATE	APPROVED INITIAL / DATE
D	UPDATED FROM FURTHER IC COMMENTS	TNK / 16.08.17	MAL / 16.08.17	LMK / 16.08.17
C	UPDATED DRAWING COMMENTS	TNK / 09.08.17	MAL / 09.08.17	LMK / 09.08.17
B	ISSUE FOR STAGE 2	TNK / 04.01.17	MAL / 04.01.17	LMK / 04.01.17
A	INITIAL DESIGN	MK / 19.12.16	MAL / 19.12.16	LMK / 19.12.16

CO-ORDINATE SYSTEM: — HEIGHT DATUM: — SCALE: NOT TO SCALE

CapitalMetro ACT Government

METRO

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Austbreck

DRAWN	E.BERGSPONG	16.12.16
DESIGNED	E.BERGSPONG	16.12.16
DRG CHECK	M. ATHAS	16.12.16
DESIGN CHECK	M. ATHAS	19.12.16
APPROVED	J. MAL	19.12.16

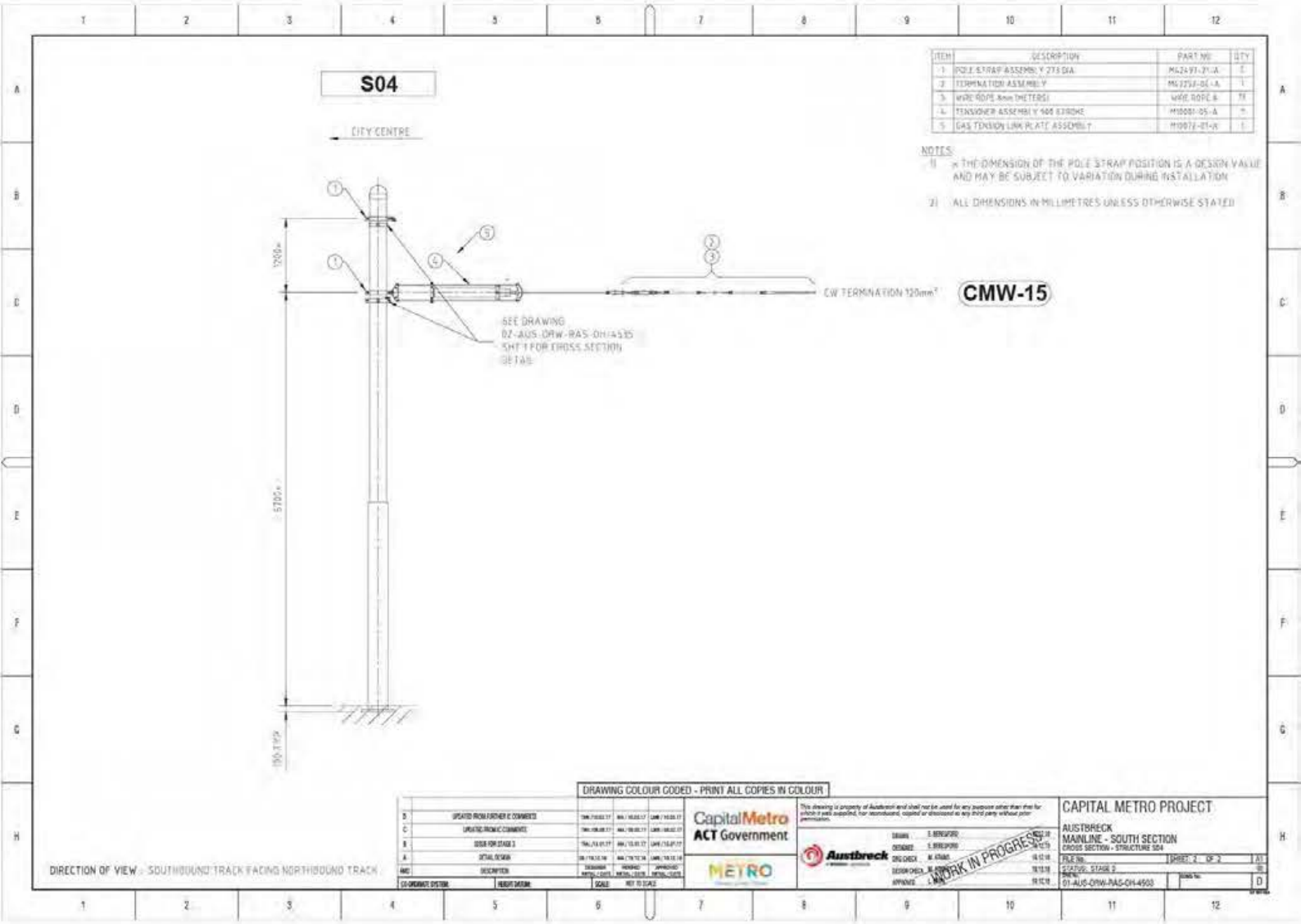
WORK IN PROGRESS

CAPITAL METRO PROJECT

AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE S04

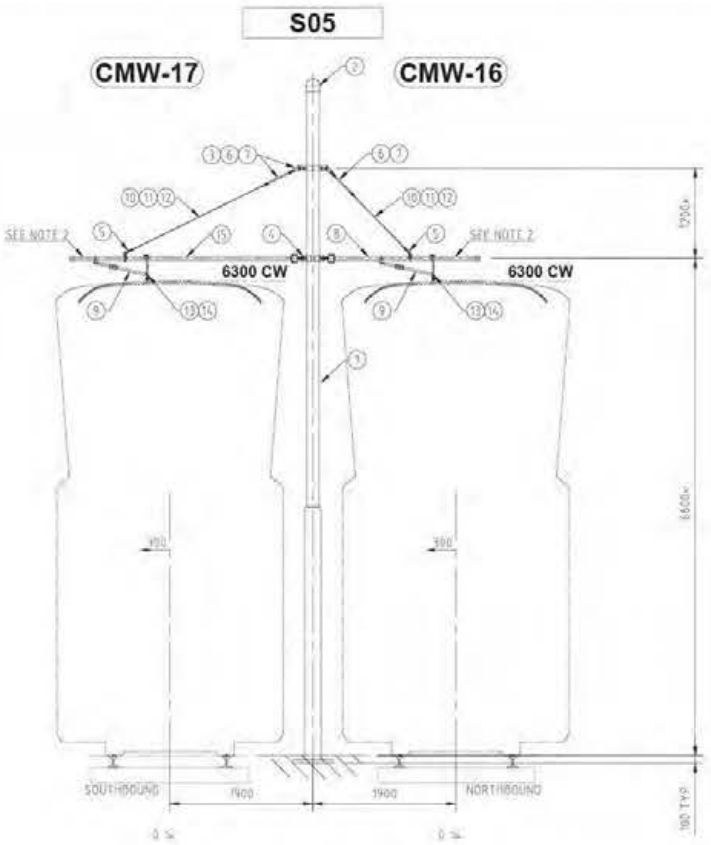
FILE No.	SHEET: 1 OF: 2	A1
STATUS: STAGE 2		1:10
DRG No. 01-AUS-DRW-RAS-OH-4503	REVISION No.	D

DIRECTION OF VIEW = TOWARDS CITY CENTRE



ITEM	DESCRIPTION	PART NO	QTY
1	POLE STRAP ASSEMBLY 273 DIA	M4249-21-A	2
2	TERMINATION ASSEMBLY	M4325J-01-A	1
3	WIRE ROPE 8mm (METERS)	WIRE ROPE 8	78
4	TENSIONER ASSEMBLY 900 STROKE	M10081-05-A	1
5	GAS TENSION LINK PLATE ASSEMBLY	M10072-01-A	1

NOTES:
1) x THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION
2) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED



ITEM	DESCRIPTION	PART NO	QTY
1	POLE P219.168-9	EN4666-01-D	1
2	FINAL ASSEMBLY DIA 168	MA6191-01-A	1
3	POLE STRAP ASSEMBLY DIA 168	MA5311-21-A	1
4	POLE STRAP ASSEMBLY DIA 168	MA5311-21-A	1
5	QUICK LINK 8mm	MG121-01-D	4
6	LINK PLATE ASSY	MA5295-03-A	2
7	INLINE INSULATOR 21	MG459-51-D	2
8	BRACKET ARM ASSEMBLY DIA 42 3935mm	MS7920-17-A	1
9	REGISTRATION ARM ASSEMBLY	MA5338-01-A	2
10	WIRE ROPE 6mm (metres)	WIRE ROPE 6	3.5
11	THIMBLE FOR 6mm ROPE	THS56	4
12	FERRULE FOR 6mm ROPE	TEU63	4
13	INSULATED STITCH ASSY 3m WITH NUGGET	MA5071-03-A	2
14	STITCH SUPPORT ASSY DIA 42	MA5342-01-A	2
15	BRACKET ARM ASSEMBLY DIA 42 2935mm	MS7920-02-A	1

NOTE:

1) * THE DIMENSION OF THE POLE STRAP POSITION IS A DESIGN VALUE AND MAY BE SUBJECT TO VARIATION DURING INSTALLATION
2) BRACKET ARMS TO BE TRIMMED TO 300mm PAST LAST EQUIPMENT. CUT ENDS TO BE COATED IN COLD GALVANIZING PAINT
3) FOR POLE FOUNDATION REFER TO DRAWING 00-AUS-DRW-RAS-DH-0038
4) REFER TO FOUNDATION PACKAGE 12 FOR FOUNDATION SCHEDULE 02-ACM-RPT-CIV-GT-0002
5) POLE LOCATION PLAN REFERENCE 02-AUS-DRW-RAS-DH-9043
6) ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

DIRECTION OF VIEW : TOWARDS CITY CENTRE

REV	DESCRIPTION	DESIGNED INITIAL / DATE	VERIFIED INITIAL / DATE	APPROVED INITIAL / DATE
D	UPDATED FROM FORTHNIC COMMENTS			
C	UPDATED FOR IFC COMMENTS			
B	ISSUE FOR STAGE 2			
A	DETAIL DESIGN			

CO-ORDINATE SYSTEM: | HEIGHT DATUM: | SCALE: NOT TO SCALE

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Austbreck

DRAWN: E.RIMSPORG
DESIGNED: E.RIMSPORG
ENG CHECK: M.KOWAL 07.12.18
DESIGN CHECK: M.KOWAL 07.12.18
APPROVED: L.WOOD 07.12.18

WORK IN PROGRESS

CapitalMetro
ACT Government
METRO

CAPITAL METRO PROJECT

AUSTBRECK
MAINLINE - SOUTH SECTION
CROSS SECTION - STRUCTURE 05

FILE No.: SHEET 1 OF 1 A1
STATUS: STAGE 2 1:10
DRG No.: 02-AUS-DRW-RAS-DH-4504 REV No.: D

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From:"Kim Power" <kim@specialistelectrical.com.au>
Sent:08/10/2018 5:44 PM
To:"'Tony Berryman'" <tonyberryman@specialistelectrical.com.au>
Cc:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject:FW: Block 15 Camera works.
Attachments:CANBERRA METRO, AGELIOS.pdf

FYI

From: Sch 2.2(a)(ii)
Sent: Monday, 8 October 2018 5:35 PM
Sch 2.2(a)(ii)

'Kim (SEEG)' <kim@specialistelectrical.com.au>;

Subject: Block 15 Camera works.

Please find current report for block 15 around the stop.

Kind Regards

Sch 2.2(a)(ii)

METRO

Sch 2.2(a)(ii)

From: Sch 2.2(a)(ii)
Sent: Monday, 8 October 2018 5:05 PM
Sch 2.2(a)(ii)

'Kim (SEEG)' <kim@specialistelectrical.com.au>;

Subject: Report for Federal Highway intersection and the block 14.

Please find the PDF report for the federal highway intersection and block 14.

Kind Regards

Sch 2.2(a)(ii)

METRO

Sch 2.2(a)(ii)

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IC PIPES PTY LTD

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

∑∅ / Main sections

Project name	Job NO. :	Operator :	Date :
CANBERRA METRO, AGELIOS			**8/10/2018**

No.	Start MH	End MH	Asset	Street	Material	Comments	m	(m)
1	P1A152.05LV1	P1A152.04LV1		FLEMINGTON RD	Polyvinyl chloride	.	30.68	30.68
2	P1A152.05LV2	P1A152.04LV2		FLEMINGTON RD	Polyvinyl chloride	.	46.44	46.44
3	P2152.12LV1	P2152.13LV1		FLEMINGTON RD	Polyvinyl chloride	.	51.26	51.26
4	PW1152.13LV1	PW11152.14LV1		FLEMINGTON RD	Polyvinyl chloride	BLOCK 1	42.39	42.39
5	P2152.14HV1	P2152.15HV1		FLEMINGTON RD	Polyvinyl chloride	.	5.77	5.77
6	PW1152.03HV1	PW1152.04HV1		FLEMINGTON RD	Polyvinyl chloride	.	57.02	57.02
7	PW1152.03HV2	PW1152.02HV2		FLEMINGTON RD	Polyvinyl chloride	.	51.04	51.04
8	PW1152.03LV1	PW1152.04LV1		FLEMINGTON RD	Polyvinyl chloride	.	36.57	36.57
9	PW1152.03LV2	PW1152.02LV2		FLEMINGTON RD	Polyvinyl chloride	.	37.31	37.31
10	PW1152.03LV2	PW1152.04LV2		FLEMINGTON RD	Polyvinyl chloride	.	46.61	46.61
11	P1A151.02LV1	P1A151.03LV1		HIBBERSON ST	Polyvinyl chloride	.	52.37	52.37
12	P1A151.02LV1	P1A151.01LV1		HIBBERSON ST	Polyvinyl chloride	.	56.62	56.62
13	P1B151.02LV1	P1B151.03LV1		HIBBERSON ST	Polyvinyl chloride	.	44.43	44.43
14	PW1151.14LV1	PW1151.13LV1		HIBBERSON ST	Polyvinyl chloride	.	55.71	55.71
15	P1A152.05HV3	P1A152.06HV3		FLEMINGTON ST	Polyvinyl chloride	.	8.33	8.33
16	P1A152.05LV2	P1A152.06LV2		FLEMINGTON ST	Polyvinyl chloride	.	56.89	56.89
17	P1A152.05LV3	P1A152.06LV3		FLEMINGTON ST	Polyvinyl chloride	.	8.40	8.40
18	P1B152.05HV1	P1B152.06HV1		FLEMINGTON ST	Polyvinyl chloride	.	5.11	5.11
19	P1B152.05HV2	P1B152,06HV2		FLEMINGTON ST	Polyvinyl chloride	.	5.00	5.00
20	P1B152.05LV1	P1B152.04LV1		FLEMINGTON ST	Polyvinyl chloride	.	44.55	44.55
21	P1B152.05LV1	P1B152.06LV1		FLEMINGTON ST	Polyvinyl chloride	.	4.85	4.85
22	P1B152.05LV2	P1B152.06LV2		FLEMINGTON ST	Polyvinyl chloride	.	5.74	5.74
23	P2152.15HV1	P2152.16HV1		FLEMINGTON ST	Polyvinyl chloride	.	27.70	27.70
24	P2152.15HV2	P2152.16HV2		FLEMINGTON ST	Polyvinyl chloride	.	2.47	2.47
25	P2152.15LV1	P2152.14LV1		FLEMINGTON ST	Polyvinyl chloride	.	5.39	5.39
26	PW1152.04HV1	PW1152.05HV1		FLEMINGTON ST	Polyvinyl chloride	.	54.70	54.70
27	PW1152.04HV2	PW1152.05HV2		FLEMINGTON ST	Polyvinyl chloride	.	45.13	45.13
28	PW1152.04LV1	PW1152.03LV1		FLEMINGTON ST	Polyvinyl chloride	.	54.97	54.97
29	PW1152.04LV1	PW1152.05LV1		FLEMINGTON ST	Polyvinyl chloride	.	21.71	21.71
30	PW1152.04LV2	PW1152.05LV2		FLEMINGTON ST	Polyvinyl chloride	.	22.91	22.91

Pipe size: CIRCULAR 100 = 988.07 m (988.07 m)

All sections = 988.07 m (988.07 m)

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	30.68 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A152.05LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	P1A152.04LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

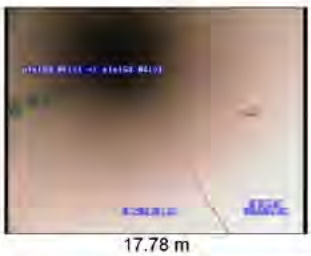
Comments: .

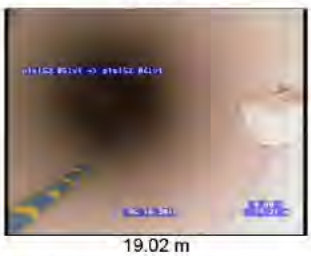
1:255 Position	Observation	Rate
P1A152.05LV1		
0.00	Start node, terminal maintenance shaft, Nodename: P1A152.05LV1	
0.68	The conduit curves to the right, length of curved section 1000mm	
4.34	The conduit curves to the right, length of curved section 1000mm	
7.83	The conduit curves to the right, length of curved section 1000mm	
8.20	The conduit curves to the left, length of curved section 1000mm	
14.18	Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , from 5 to 7 o'clock	
17.78	Multiple or complex fracturing, width 1mm , from 3 to 5 o'clock	
19.02	Hole in wall , at 3 o'clock	
19.69	The conduit curves to the right, length of curved section 1000mm	
29.97	The conduit curves to the right, length of curved section 1000mm	
30.68	Other Deposits in the invert, screw , Obstruction 5-20% , at 6 o'clock	
30.68	Inspection (survey) abandoned, screw in line	

0.68 m

4.34 m

14.18 m


17.78 m


19.02 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	80	2.61	80	5	2	30	1.14	35	3

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**1**	

Photo: S_Sectionname_8102018_1_2_A.jpg
0.68m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_8102018_1_3_A.jpg
4.34m, The conduit curves to the right, length of curved section 1000mm

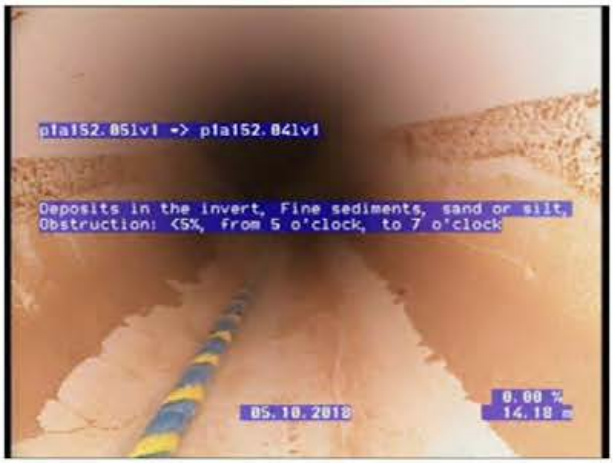


Photo: S_Sectionname_8102018_1_6_A.jpg
14.18m, Deposit is fine sediments- Sand or Silt in the invert , Obstruction: <5% , from 5 to 7 o'clock

Photo: S_Sectionname_8102018_1_7_A.jpg
17.78m, Multiple or complex fracturing, width 1mm , from 3 to 5 o'clock

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**1**	

Photo: S_Sectionname_8102018_1_8_A.jpg
19.02m, Hole in wall , at 3 o'clock

Photo: S_Sectionname_8102018_1_9_A.jpg
19.69m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_8102018_1_11_A.jpg
30.68m, Other Deposits in the invert, screw , Obstruction: 5-20% , at 6 o'clock

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

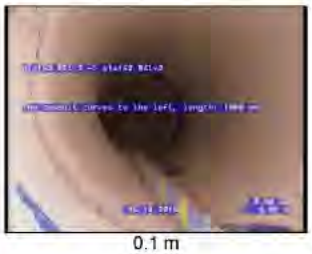
Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	46.44 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A152.05LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	P1A152.04LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:375 Position	Observation	Rate
P1A152.05LV2		
0.00	Start node, terminal maintenance shaft, Nodename: P1A152.05LV2	
0.10	The conduit curves to the left, length of curved section 1000mm	 0.1 m
		40.44 m
40.44	Joint displaced longitudinaly, longitudinal displacement >30mm	
43.70	Hole in wall , at 9 o'clock	43.7 m
44.31	Other type of Surface Damage, POSSIBLE GRINDER CUT , Obstruction: <5% , from 11 to 1 o'clock	
44.44	Breaking, some pieces are missing , length of break 500, General Comments HAS EXTERIOR PATCH, from 10 to 2 o'clock	
44.70	Hole in wall , at 2 o'clock	43.7 m
45.10	Hole in wall , at 9 o'clock	
46.08	Breaking, some pieces are missing , length of break 1000, General Comments HAS EXTERIOR PATCH, from 9 to 3 o'clock	44.44 m
46.44	Inspection (survey) abandoned, BROKEN CONDUIT	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
3	160	3.49	162	5	0	0	0	0	1

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	8/10/2018	2	

Photo: S_Sectionname_8102018_2_2_A.jpg
0.1m, The conduit curves to the left, length of curved section 1000mm

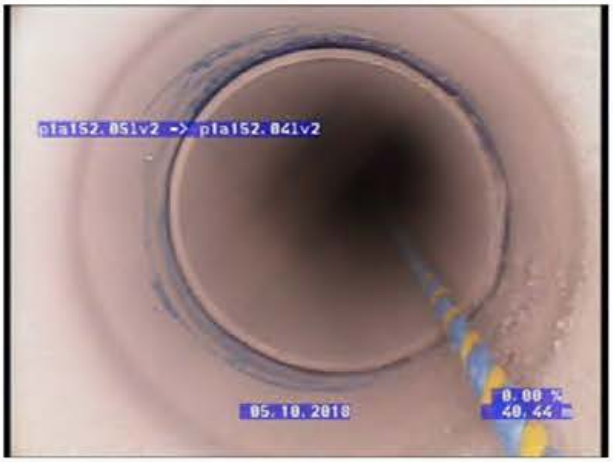


Photo: S_Sectionname_8102018_2_3_A.jpg
40.44m, Joint displaced longitudinaly, longitudinal displacement >30mm

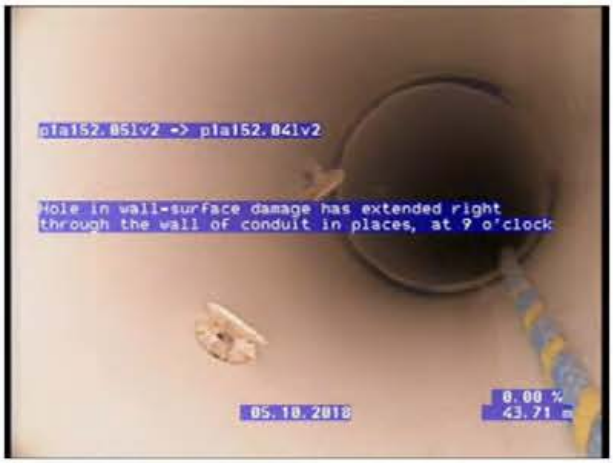


Photo: S_Sectionname_8102018_2_4_A.jpg
43.7m, Hole in wall , at 9 o'clock

Photo: S_Sectionname_8102018_2_4_B.jpg
43.7m, Hole in wall , at 9 o'clock

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
Tel:
Fax:
Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**2**	

Photo: S_Sectionname_8102018_2_6_A.jpg
44.44m, Breaking, some pieces are missing , length of break 500, General Comments HAS EXTERIOR PATCH, from 10 to 2 o'clock

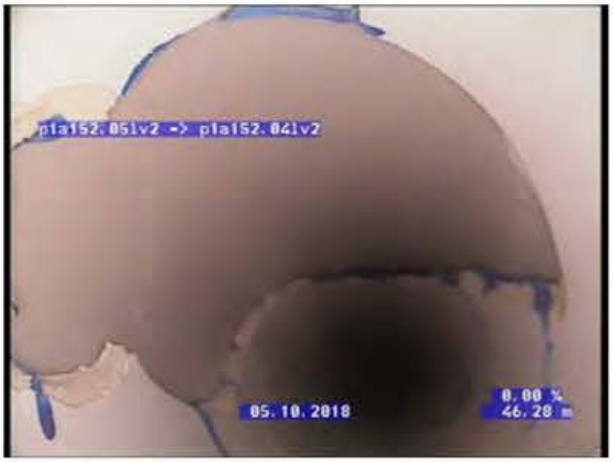


Photo: S_Sectionname_8102018_2_9_A.jpg
46.08m, Breaking, some pieces are missing , length of break 1000, General Comments HAS EXTERIOR PATCH, from 9 to 3 o'clock

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

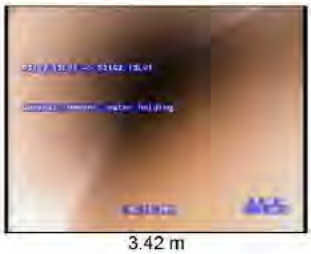
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

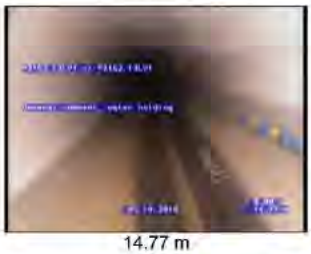
Lenght :	51.26 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P2152.12LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	P2152.13LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:405	Position	Observation	Rate
P2152.12LV1	0.00	Start node, terminal maintenance shaft, Nodename: P2152.12LV1	
	3.42	General Comments WATER HOLDING	
	14.77	General Comments WATER HOLDING	
	21.25	General Comments WATER HOLDING	
	46.34	Joint displaced longitudinaly, longitudinal displacement >30mm	
	51.26	Inspection (survey) abandoned, OUT OF CABLE	


3.42 m


14.77 m

21.25 m

46.34 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
6	80	6.32	324	5	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	8/10/2018	3	

Photo: S_Sectionname_8102018_3_2_A.jpg
3.42m, General Comments WATER HOLDING

Photo: S_Sectionname_8102018_3_3_A.jpg
14.77m, General Comments WATER HOLDING

Photo: S_Sectionname_8102018_3_4_A.jpg
21.25m, General Comments WATER HOLDING

Photo: S_Sectionname_8102018_3_5_A.jpg
46.34m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

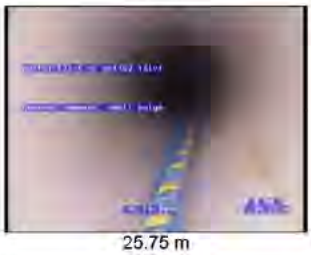
Lenght :	42.39 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.13LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW11152.14LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

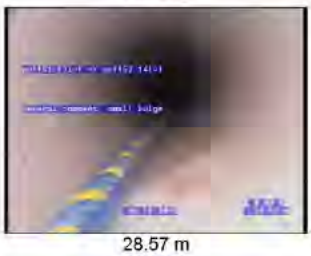
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: BLOCK 1

1:345 Position	Observation	Rate
PW1152.13LV1		
0.00	Start node, terminal maintenance shaft, Nodename: P2152.13LV1	
2.55	Longitudinal wall crack, at joint, width 1mm , at 7 o'clock	
25.75	General Comments BULGE IN CONDUIT	
28.57	General Comments BULGE	
42.39	Finish node, terminal maintenance shaft, Nodename: P2152.14LV1 , General Comments PIT RUNS TO P1B151.14LV1	
PW11152.14LV1		

2.55 m


25.75 m


28.57 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
5	80	5.66	240	5	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	8/10/2018	4	

Photo: S_Sectionname_8102018_4_2_A.jpg
2.55m, Longitudinal wall crack, at joint, width 1mm , at 7 o'clock

Photo: S_Sectionname_8102018_4_3_A.jpg
25.75m, General Comments BULGE IN CONDUIT

Photo: S_Sectionname_8102018_4_4_A.jpg
28.57m, General Comments BULGE

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Inspection Report

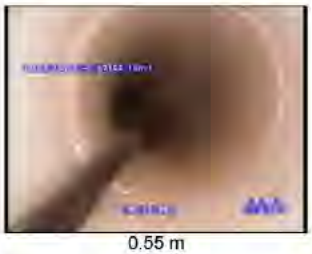
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	5.77 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P2152.14HV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	P2152.15HV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

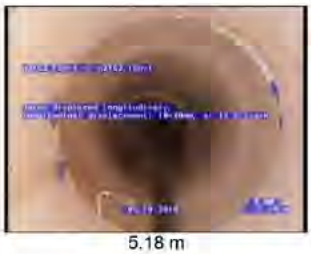
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:60	Position	Observation	Rate
P2152.14HV1	0.00	Start node, terminal maintenance shaft, Nodename: P2152.14HV1	
	0.55	The conduit curves to the left, length of curved section 1000mm	
	5.18	Joint displaced longitudinaly, longitudinal displacement >30mm	
	5.77	Finish node, terminal maintenance shaft, Nodename: P2152.15HV1	
P2152.15HV1			



0.55 m



5.18 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	4	0.69	4	2	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**5**	

Photo: S_Sectionname_8102018_5_2_A.jpg
0.55m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_5_3_A.jpg
5.18m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Suburb : Wetherill Parl
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Inspection Report

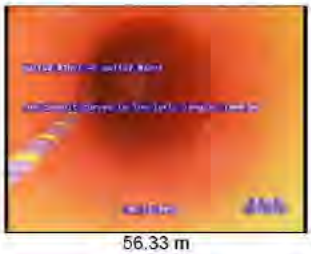
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	57.02 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.03HV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW1152.04HV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:450	Position	Observation	Rate
PW1152.03HV1	0.00	Start node, terminal maintenance shaft, Nodename: PW1152.03HV1	
	3.55	The conduit curves to the right, length of curved section 1000mm	
	56.33	The conduit curves to the left, length of curved section 1000mm	
	57.02	Inspection (survey) abandoned, OUT OF CABLE	



56.33 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**6**	

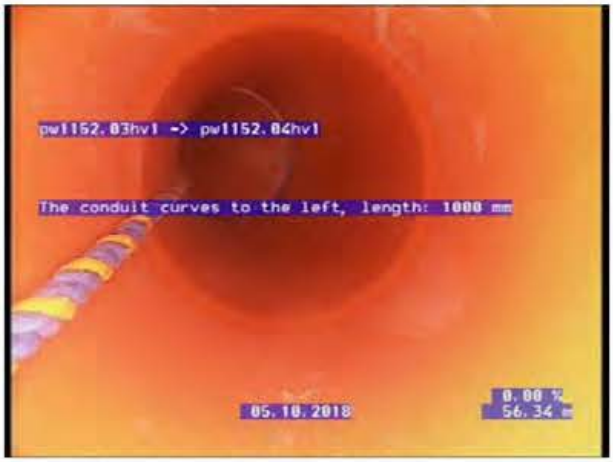

Photo: S_Sectionname_8102018_6_3_A.jpg
56.33m, The conduit curves to the left, length of curved section 1000mm

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Inspection Report

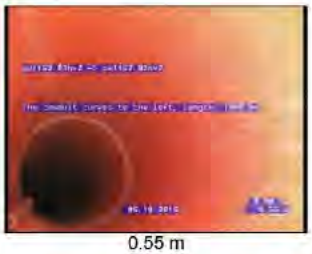
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	51.04 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.03HV2	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW1152.02HV2	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:405 Position	Observation	Rate
PW1152.03HV2		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.03HV2	
0.55	The conduit curves to the left, length of curved section 1000mm	
0.89	Deposit is fine sediments- Sand or Silt in the invert , Obstruction: 5-20% , at 6 o'clock	
1.11	The conduit curves to the left, length of curved section 1000mm	
1.66	New material, PVC , General Comments CONDUIT CHANGES COLOUR	
51.04	Inspection (survey) abandoned, OUT OF CABLE	


0.55 m

0.89 m

1.66 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	1	30	0.59	30	3

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**7**	

Photo: S_Sectionname_8102018_7_2_A.jpg
0.55m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_7_3_A.jpg
0.89m, Deposit is fine sediments- Sand or Silt in the invert , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_8102018_7_5_A.jpg
1.66m, New material, PVC , General Comments CONDUIT CHANGES COLOUR

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

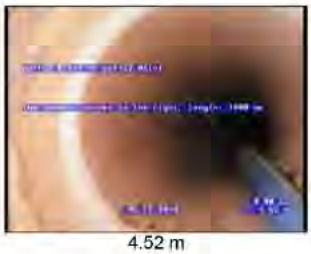
Lenght :	36.57 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.03LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW1152.04LV1	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:300 Position	Observation	Rate
PW1152.03LV1		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.03LV1	
0.72	The conduit curves to the right, length of curved section 1000mm	
4.52	The conduit curves to the right, length of curved section 1000mm	
36.57	Inspection (survey) abandoned, CANT PUSH FURTHER	

0.72 m


4.52 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**8**	

Photo: S_Sectionname_8102018_8_2_A.jpg
0.72m, The conduit curves to the right, length of curved section 1000mm

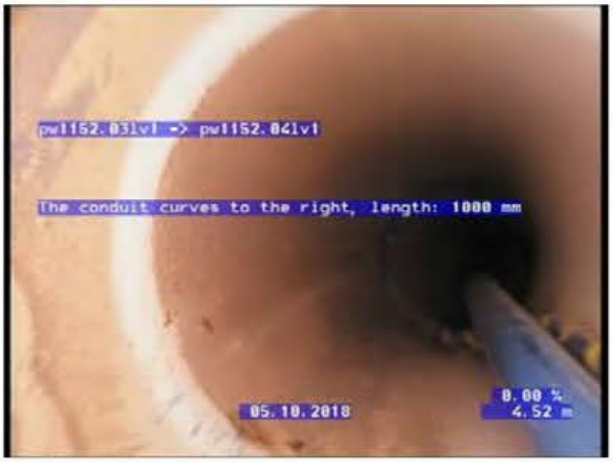

Photo: S_Sectionname_8102018_8_3_A.jpg
4.52m, The conduit curves to the right, length of curved section 1000mm

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	37.31 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.03LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW1152.02LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:300	Position	Observation	Rate
PW1152.03LV2	0.00	Start node, terminal maintenance shaft, Nodename:	
	0.62	The conduit curves to the left, length of curved section 1000mm	
	9.37	General Comments WATER HOLDING	
	37.31	Inspection (survey) abandoned, UNABLE TO PUSH FURTHER	

0.62 m

9.37 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**9**	

Photo: S_Sectionname_8102018_9_2_A.jpg
0.62m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_9_3_A.jpg
9.37m, General Comments WATER HOLDING

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	46.61 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.03LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	
Finish MH :	PW1152.04LV2	**Address:**	FLEMINGTON RD	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:375	Position	Observation	Rate
PW1152.03LV2	0.00	Start node, terminal maintenance shaft, Nodename: PW1152.03LV2	
	5.11	Other Deposits in the invert, GRASS , Obstruction: <5% , at 6 o'clock	
	46.61	Inspection (survey) abandoned, UNABLE TO PUSH FURTHER	

5.11 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	1	5	0.11	5	2

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON RD	**8/10/2018**	**10**	

Photo: S_Sectionname_8102018_10_2_A.jpg
5.11m, Other Deposits in the invert, GRASS , Obstruction: <5% , at 6 o'clock

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Inspection Report

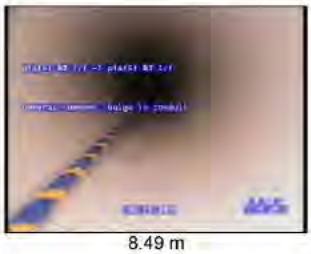
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	52.37 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A151.02LV1	**Address:**	HIBBERSON ST	**MH Depth:**	
Finish MH :	P1A151.03LV1	**Address:**	HIBBERSON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

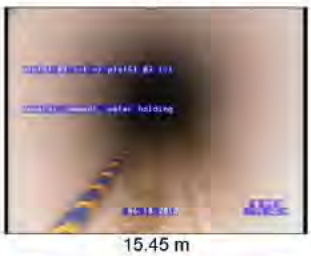
Comments: .

1:420 Position	Observation	Rate
P1A151.02LV1		
0.00	Start node, terminal maintenance shaft, Nodename:	
0.10	The conduit curves to the left, length of curved section 1000mm	
8.49	General Comments BULGE	
11.12	General Comments BULGE	
13.41	General Comments BULGE	
15.45	General Comments WATER HOLDING	
22.10	General Comments BULGE	
22.73	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock	
31.93	Joint displaced longitudinaly, longitudinal displacement >30mm	
33.42	General Comments BULGE	
42.62	Joint displaced longitudinaly, longitudinal displacement >30mm	
50.95	General Comments WATER HOLDING	
52.37	Inspection (survey) abandoned, OUT OF CABLE	


8.49 m

11.12 m

13.41 m


15.45 m

22.73 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
5	2	0.19	10	1	1	5	0.1	5	2

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	8/10/2018	11	

Photo: S_Sectionname_8102018_11_3_A.jpg
8.49m, General Comments BULGE

Photo: S_Sectionname_8102018_11_4_A.jpg
11.12m, General Comments BULGE

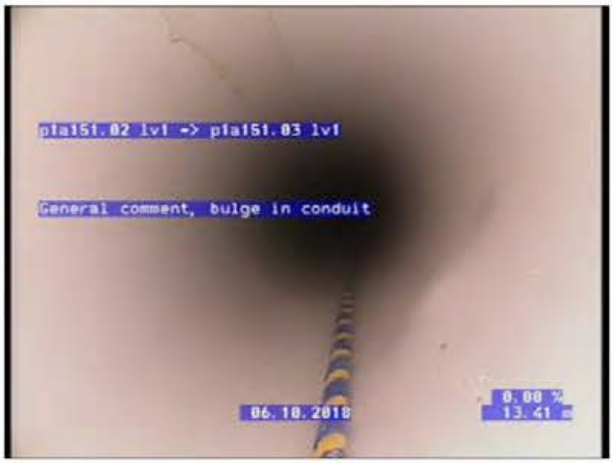

Photo: S_Sectionname_8102018_11_5_A.jpg
13.41m, General Comments BULGE

Photo: S_Sectionname_8102018_11_6_A.jpg
15.45m, General Comments WATER HOLDING

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	8/10/2018	11	

Photo: S_Sectionname_8102018_11_8_A.jpg
22.73m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock

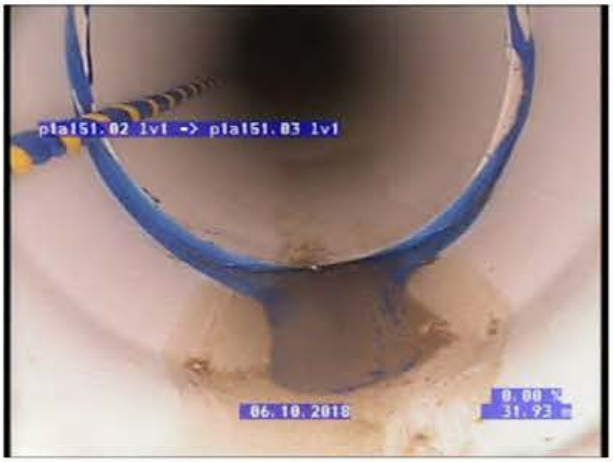

Photo: S_Sectionname_8102018_11_9_A.jpg
31.93m, Joint displaced longitudinaly, longitudinal displacement >30mm

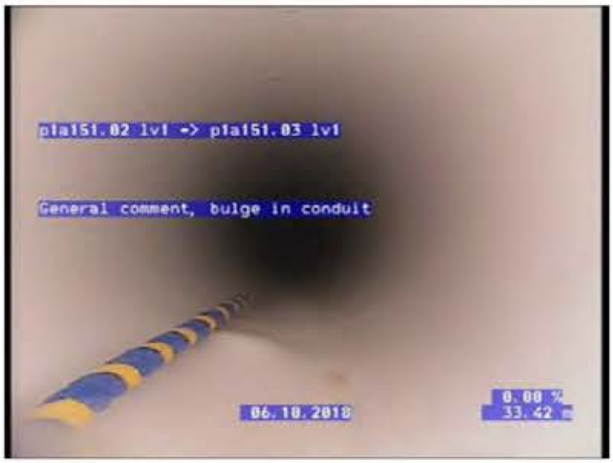

Photo: S_Sectionname_8102018_11_10_A.jpg
33.42m, General Comments BULGE

Photo: S_Sectionname_8102018_11_11_A.jpg
42.62m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	**8/10/2018**	**11**	

Photo: S_Sectionname_8102018_11_12_A.jpg
50.95m, General Comments WATER HOLDING

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Suburb : Wetherill Park
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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	58.62 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A151.02LV1	**Address:**	HIBBERSON ST	**MH Depth:**	
Finish MH :	P1A151.01LV1	**Address:**	HIBBERSON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:450	Position	Observation	Rate
P1A151.02LV1	0.00	Start node, terminal maintenance shaft. Nodename: P1A151.02LV1	
	56.62	Inspection (survey) abandoned, OUT OF CABLE	

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

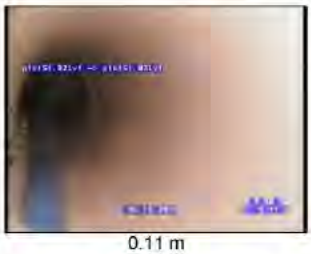
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

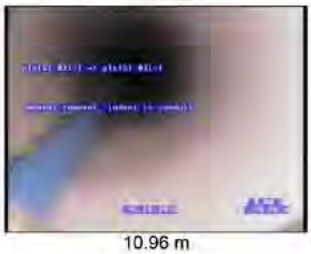
Lenght :	44.43 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B151.02LV1	**Address:**	HIBBERSON ST	**MH Depth:**	
Finish MH :	P1B151.03LV1	**Address:**	HIBBERSON ST	**MH Depth:**	

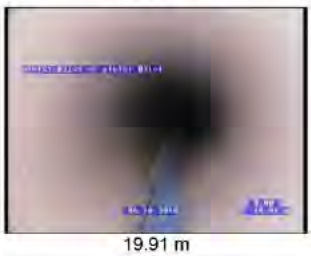
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

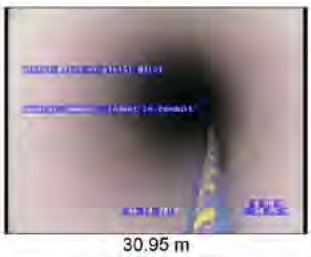
Comments: .

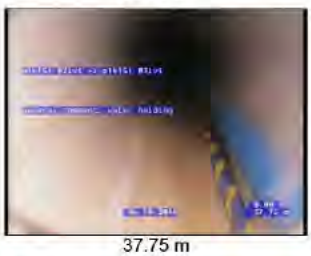
1:360 Position	Observation	Rate
P1B151.02LV1		
0.00	Start node, terminal maintenance shaft, Nodename: P1B151.02LV1	
0.11	The conduit curves to the left, length of curved section 1000mm	
10.96	General Comments BULGE	
19.91	General Comments BULGE	
30.95	General Comments BULGE	
37.75	General Comments WATER HOLDING	
44.43	Inspection (survey) abandoned, LOSS OF VISION	


0.11 m


10.96 m


19.91 m


30.95 m


37.75 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	**8/10/2018**	**13**	

Photo: S_Sectionname_8102018_13_2_A.jpg
0.11m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_13_3_A.jpg
10.96m, General Comments BULGE

Photo: S_Sectionname_8102018_13_4_A.jpg
19.91m, General Comments BULGE

Photo: S_Sectionname_8102018_13_5_A.jpg
30.95m, General Comments BULGE

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	**8/10/2018**	**13**	

Photo: S_Sectionname_8102018_13_6_A.jpg
37.75m, General Comments WATER HOLDING

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Suburb : Wetherill Parl
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Inspection Report

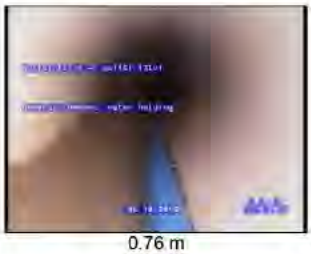
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	55.71 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1151.14LV1	**Address:**	HIBBERSON ST	**MH Depth:**	
Finish MH :	PW1151.13LV1	**Address:**	HIBBERSON ST	**MH Depth:**	

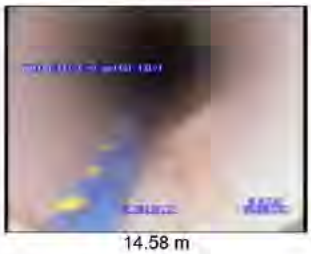
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:450	Position	Observation	Rate
PW1151.14LV1	0.00	Start node, terminal maintenance shaft, Nodename: PW1152.14LV1	
	0.76	General Comments WATER HOLDING	
	14.58	General Comments BULGE	
	55.71	Inspection (survey) abandoned, OUT OF CABLE	



0.76 m



14.58 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	HIBBERSON ST	**8/10/2018**	**14**	

Photo: S_Sectionname_8102018_14_2_A.jpg
0.76m, General Comments WATER HOLDING

Photo: S_Sectionname_8102018_14_3_A.jpg
14.58m, General Comments BULGE

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

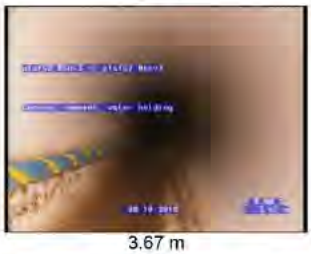
Lenght :	8.33 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A152.05HV3	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1A152.06HV3	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

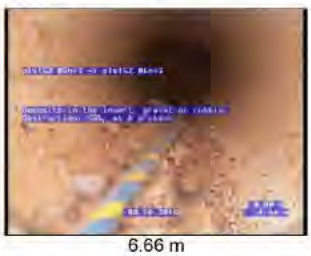
1:75 Position	Observation	Rate
P1A152.05HV3		
0.00	Start node, terminal maintenance shaft, Nodename: P1A152.05HV3	
0.38	The conduit curves to the left, length of curved section 1000mm	
3.67	General Comments WATER HOLDING	
5.25	The conduit curves to the left, length of curved section 1000mm	
6.00	General Comments WATER HOLDING	
6.66	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock	
7.34	The conduit curves up, length of curved section 1000mm	
8.33	Finish node, terminal maintenance shaft, Nodename: P1A152.06HV3 , General Comments RUNS TO SUB STATION	
P1A152.06HV3		

0.38 m


3.67 m

5.25 m

6 m


6.66 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	1	5	0.6	5	2

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**15**	

Photo: S_Sectionname_8102018_15_2_A.jpg
0.38m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_15_3_A.jpg
3.67m, General Comments WATER HOLDING

Photo: S_Sectionname_8102018_15_4_A.jpg
5.25m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_15_5_A.jpg
6m, General Comments WATER HOLDING

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**15**	

Photo: S_Sectionname_8102018_15_6_A.jpg
6.66m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock

Photo: S_Sectionname_8102018_15_7_A.jpg
7.34m, The conduit curves up, length of curved section 1000mm

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Email:

Inspection Report

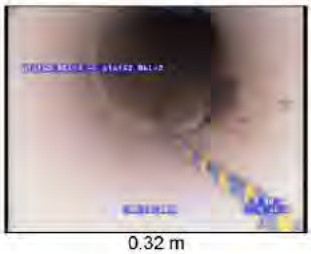
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	56.89 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A152.05LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1A152.06LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

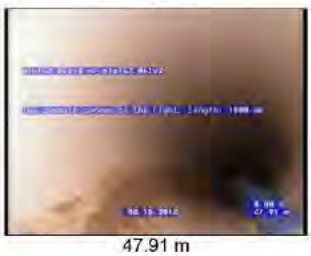
1:450 Position	Observation	Rate
P1A152.05LV2		
0.00	Start node, terminal maintenance shaft, Nodename: P1A152.05LV2	
0.32	The conduit curves to the right, length of curved section 1000mm	
13.52	Joint displaced longitudinaly, longitudinal displacement 10-20mm, General Comments NOT CLEAN CUT	
41.05	The conduit curves to the left, length of curved section 1000mm	
41.65	General Comments DISCOLOURED WATER HOLDING	
47.91	The conduit curves to the right, length of curved section 1000mm	
56.89	Joint displaced longitudinaly, longitudinal displacement 21-30mm	
56.89	Inspection (survey) abandoned, OUT OF CABLE	


0.32 m

13.52 m

41.05 m

41.65 m


47.91 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
6	1	0.05	3	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**16**	

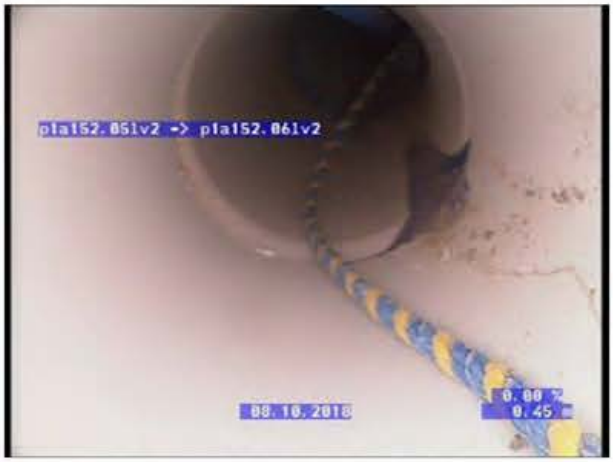

Photo: S_Sectionname_8102018_16_2_A.jpg
0.32m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_8102018_16_3_A.jpg
13.52m, Joint displaced longitudinaly, longitudinal displacement 10-20mm, General Comments NOT CLEAN CUT

Photo: S_Sectionname_8102018_16_4_A.jpg
41.05m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_16_5_A.jpg
41.65m, General Comments DISCOLOURED WATER HOLDING

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**16**	

Photo: S_Sectionname_8102018_16_6_A.jpg
47.91m, The conduit curves to the right, length of curved section 1000mm

Photo: S_Sectionname_8102018_16_7_A.jpg
56.89m, Joint displaced longitudinaly, longitudinal displacement 21-30mm

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Suburb : Wetherill Parl
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Inspection Report

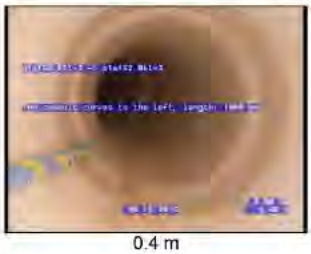
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

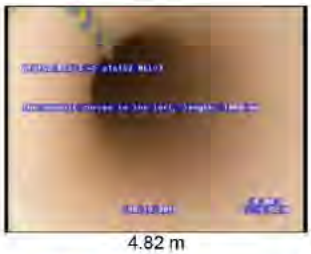
Lenght :	8.40 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1A152.05LV3	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1A152.06LV3	**Address:**	FLEMINGTON ST	**MH Depth:**	

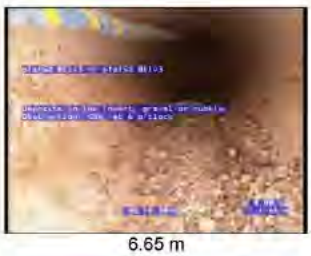
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:75	Position	Observation	Rate
P1A152.05LV3	0.00	Start node, terminal maintenance shaft, Nodename: P1A152.05LV3	
	0.40	The conduit curves to the left, length of curved section 1000mm	
	4.82	The conduit curves to the left, length of curved section 1000mm	
	6.65	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock	
	6.96	Other Deposits in the invert, PLASTIC , Obstruction: 5-20% , at 6 o'clock	
	7.65	The conduit curves up, length of curved section 1000mm	
P1A152.06LV3	8.40	Finish node, terminal maintenance shaft, Nodename: P1A152.06LV3 , General Comments RUNS TO SUB STATION	


0.4 m


4.82 m


6.65 m

6.96 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	2	60	7.14	60	5

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**17**	

Photo: S_Sectionname_8102018_17_2_A.jpg
0.4m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_17_3_A.jpg
4.82m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_17_4_A.jpg
6.65m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_8102018_17_5_A.jpg
6.96m, Other Deposits in the invert, PLASTIC , Obstruction: 5-20% , at 6 o'clock

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	5.11 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B152.05HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1B152.06HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:50	Position	Observation	Rate
P1B152.05HV1	0.00	Start node, terminal maintenance shaft, Nodename: P1B152.05HV1	
	3.58	The conduit curves to the left, length of curved section 1000mm	
P1B152.06HV1	5.11	Finish node, terminal maintenance shaft, Nodename: P1B152.06HV1 , General Comments CONDUIT RUNS TO PIT PW1152.0	

3.58 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**18**	

Photo: S_Sectionname_8102018_18_2_A.jpg
3.58m, The conduit curves to the left, length of curved section 1000mm

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

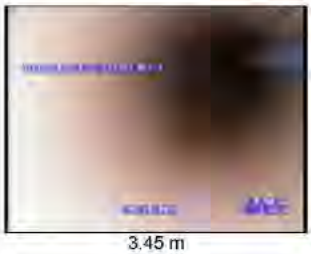
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	5.00 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B152.05HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1B152.06HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:50 Position	Observation	Rate
P1B152.05HV2		
0.00	Start node, terminal maintenance shaft, Nodename: P1B152.05HV2	
3.45	The conduit curves to the right, length of curved section 1000mm	
5.00	Finish node, terminal maintenance shaft, Nodename: P1B152.06HV2 , General Comments CONDUIT RUNS TO PIT PW1153.0	
P1B152.06HV2		



3.45 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**19**	

Photo: S_Sectionname_8102018_19_2_A.jpg
3.45m, The conduit curves to the right, length of curved section 1000mm

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Inspection Report

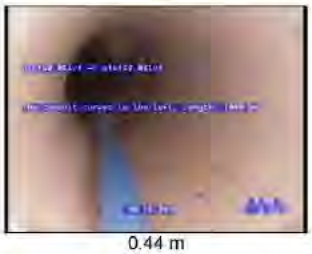
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	44.55 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B152.05LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1B152.04LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

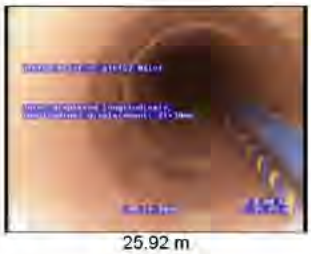
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:360 Position	Observation	Rate
P1B152.05LV1		
0.00	Start node, terminal maintenance shaft, Nodename: P1B152.05LV1	
0.44	The conduit curves to the left, length of curved section 1000mm	
25.92	Joint displaced longitudinaly, longitudinal displacement >30mm	
44.55	Inspection (survey) abandoned, ROP BUNCHED UP	



0.44 m



25.92 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	2	0.09	4	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**20**	

Photo: S_Sectionname_8102018_20_2_A.jpg
0.44m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_20_3_A.jpg
25.92m, Joint displaced longitudinaly, longitudinal displacement >30mm

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Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

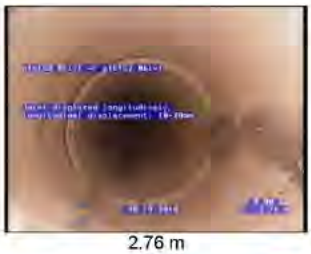
Lenght :	4.85 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B152.05LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1B152.06LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

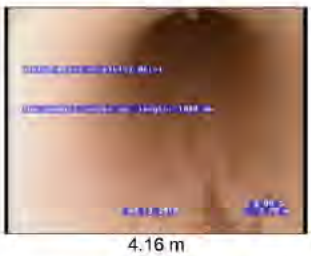
Comments: .

1:50	Position	Observation	Rate
P1B152.05LV1	0.00	Start node, terminal maintenance shaft, Nodename: P1B152.05LV1	
	1.97	The conduit curves to the left, length of curved section 1000mm	
	2.76	Joint displaced longitudinaly, longitudinal displacement >30mm	
	3.78	The conduit curves up, length of curved section 1000mm	
	4.16	Other Deposits in the invert, PLASTIC , Obstruction: <5% , at 6 o'clock	
P1B152.06LV1	4.85	Finish node, terminal maintenance shaft, Nodename: P1B152.06LV1 , General Comments SUB STATION	

1.97 m


2.76 m

3.78 m


4.16 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	4	1.65	8	3	0	5	0	0	2

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**21**	

Photo: S_Sectionname_8102018_21_2_A.jpg
1.97m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_21_3_A.jpg
2.76m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_8102018_21_4_A.jpg
3.78m, The conduit curves up, length of curved section 1000mm

Photo: S_Sectionname_8102018_21_4_A.jpg
4.16m, Other Deposits in the invert, PLASTIC , Obstruction: <5% , at 6 o'clock

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Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	5.74 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P1B152.05LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P1B152.06LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

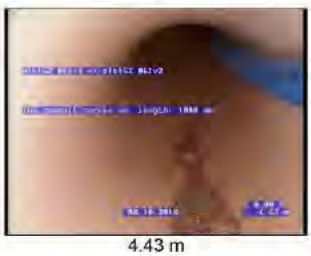
1:60	Position	Observation	Rate
P1B152.05LV2	0.00	Start node, terminal maintenance shaft, Nodename: P1B152.05LV2	
	1.15	Other Deposits in the invert, PLASTIC , Obstruction: 5-20% , at 6 o'clock	
	2.25	The conduit curves to the left, length of curved section 1000mm	
	3.27	The conduit curves to the left, length of curved section 1000mm	
	4.29	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock	
	4.43	The conduit curves up, length of curved section 1000mm	
P1B152.06LV2	5.74	Finish node, terminal maintenance shaft, Nodename: P1B152.06LV2 , General Comments SUB STATION	

1.15 m

2.25 m

3.27 m

4.29 m


4.43 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	2	30	6.1	35	4

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**22**	

Photo: S_Sectionname_8102018_22_2_A.jpg
1.15m, Other Deposits in the invert, PLASTIC , Obstruction: 5-20% , at 6 o'clock

Photo: S_Sectionname_8102018_22_3_A.jpg
2.25m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_22_4_A.jpg
3.27m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_22_5_A.jpg
4.29m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: <5% , at 6 o'clock

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City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**22**	

Photo: S_Sectionname_8102018_22_6_A.jpg
4.43m, The conduit curves up, length of curved section 1000mm

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

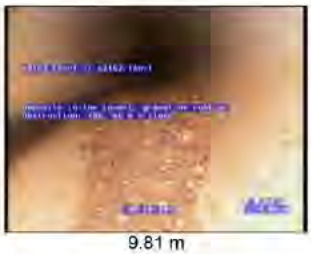
Lenght :	27.70 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P2152.15HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P2152.16HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:225 Position	Observation	Rate
P2152.15HV1		
0.00	Start node, terminal maintenance shaft, Nodename: P2152.15HV1	
3.04	Joint displaced longitudinaly, longitudinal displacement >30mm	
9.81	Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock	
27.70	Finish node, terminal maintenance shaft, Nodename: P2152.16HV1	
P2152.16HV1		

3.04 m



9.81 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
3	2	0.22	6	1	0	30	0	0	3

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**23**	

Photo: S_Sectionname_8102018_23_2_A.jpg
3.04m, Joint displaced longitudinaly, longitudinal displacement >30mm

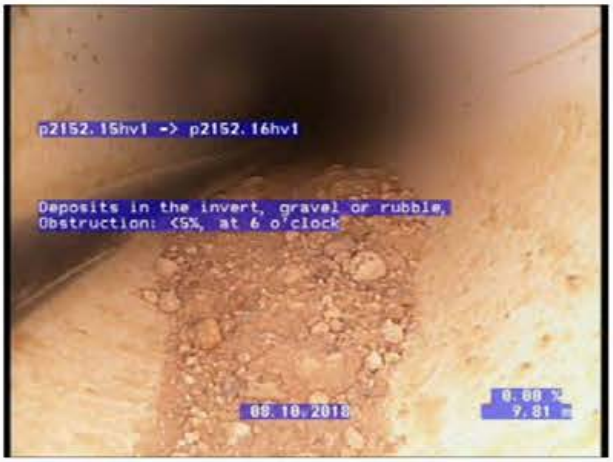

Photo: S_Sectionname_8102018_23_3_A.jpg
9.81m, Deposit is coarse sediments- Gravel or Rubble in the invert , Obstruction: 5-20% , at 6 o'clock

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Inspection Report

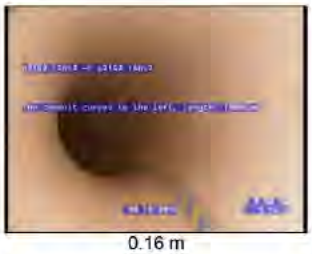
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	2.47 m	**Surveyed By:**	Sch 2 2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P2152.15HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P2152.16HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:50 Position	Observation	Rate
P2152.15HV2		
0.00	Start node, terminal maintenance shaft, Nodename: P2152.15HV2	
0.16	The conduit curves to the left, length of curved section 1000mm	
1.42	Joint displaced longitudinaly, longitudinal displacement >30mm	
2.47	Deposit is Hard or compacted material in the invert , Obstruction: 51-75% , from 3 to 9 o'clock	
2.47	Inspection (survey) abandoned, obstruction	


0.16 m

1.42 m

2.47 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
3	4	2.43	6	4	0	50	0	0	4

600

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**24**	

Photo: S_Sectionname_8102018_24_2_A.jpg
0.16m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_24_3_A.jpg
1.42m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_8102018_24_4_A.jpg
2.47m, Deposit is Hard or compacted material in the invert , Obstruction: 51-75% , from 3 to 9 o'clock

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Inspection Report

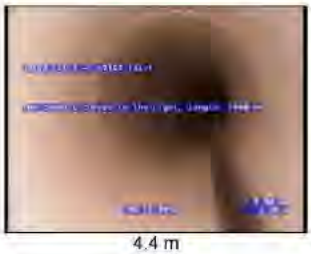
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	5.39 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	P2152.15LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	P2152.14LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:50	Position	Observation	Rate
P2152.15LV1	0.00	Start node, terminal maintenance shaft, Nodename: P2152.15LV1	
	4.40	The conduit curves to the right, length of curved section 1000mm	
P2152.14LV1	5.39	Finish node, terminal maintenance shaft, Nodename: P2152.14LV1	



4.4 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**25**	

Photo: S_Sectionname_8102018_25_2_A.jpg
4.4m, The conduit curves to the right, length of curved section 1000mm

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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

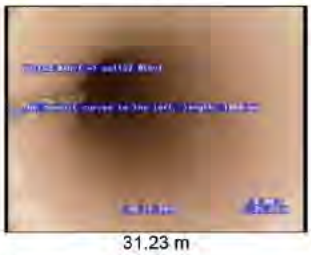
Lenght :	54.70 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.04HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	PW1152.05HV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:435 Position	Observation	Rate
PW1152.04HV1		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.04HV1	
31.14	Joint displaced longitudinaly, longitudinal displacement >30mm	
31.23	The conduit curves to the left, length of curved section 1000mm	
37.49	The conduit curves to the right, length of curved section 1000mm	
54.70	Inspection (survey) abandoned, OUT OF CABLE	

31.14 m


31.23 m

37.49 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	4	0.15	8	1	0	0	0	0	1

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City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**26**	

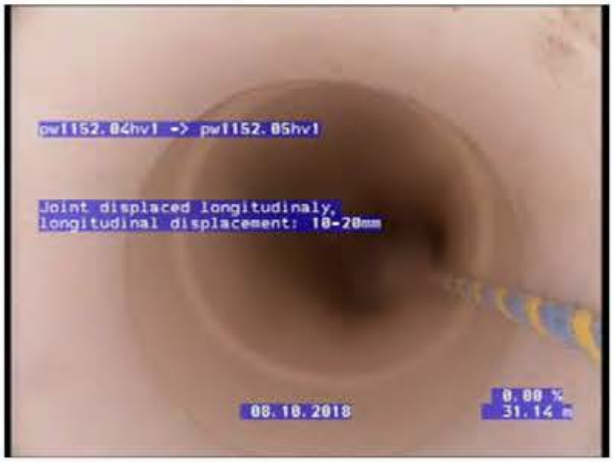

Photo: S_Sectionname_8102018_26_2_A.jpg
31.14m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_8102018_26_3_A.jpg
31.23m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_26_4_A.jpg
37.49m, The conduit curves to the right, length of curved section 1000mm

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Inspection Report

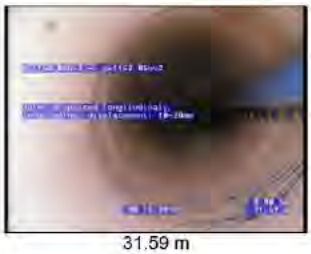
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	45.13 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.04HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	PW1152.05HV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:360 Position	Observation	Rate
PW1152.04HV2		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.04HV2	
31.59	Joint displaced longitudinaly, longitudinal displacement >30mm	
31.84	The conduit curves to the left, length of curved section 1000mm	
32.11	Hole in wall , at 5 o'clock	
37.92	The conduit curves to the right, length of curved section 1000mm	
45.13	Inspection (survey) abandoned, UNABLE TO PUSH FURTHER	


31.59 m

31.84 m

32.11 m

37.92 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	4	0.09	4	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**27**	

Photo: S_Sectionname_8102018_27_2_A.jpg
31.59m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_8102018_27_3_A.jpg
31.84m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_27_4_A.jpg
32.11m, Hole in wall , at 5 o'clock

Photo: S_Sectionname_8102018_27_5_A.jpg
37.92m, The conduit curves to the right, length of curved section 1000mm

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Suburb : Wetherill Parl
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Inspection Report

Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

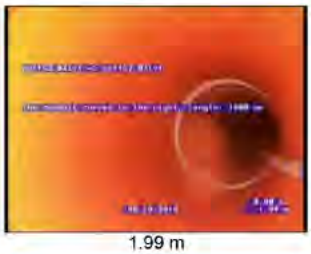
Lenght :	54.97 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.04LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	PW1152.03LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

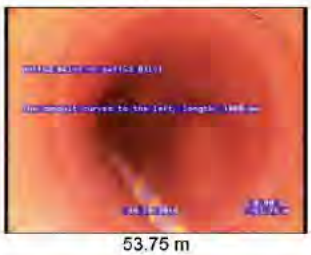
DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:435 Position	Observation	Rate
PW1152.04LV1		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.04LV1	
0.24	The conduit curves to the left, length of curved section 1000mm	
1.99	The conduit curves to the right, length of curved section 1000mm	
53.75	The conduit curves to the left, length of curved section 1000mm	
54.97	Inspection (survey) abandoned, UNABLE TO PUSH FURTHER	

0.24 m


1.99 m


53.75 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

IC Pipes Pty Ltd
7 Arnott Pl
Wetherill Parl
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Email:

Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**28**	

Photo: S_Sectionname_8102018_28_2_A.jpg
0.24m, The conduit curves to the left, length of curved section 1000mm

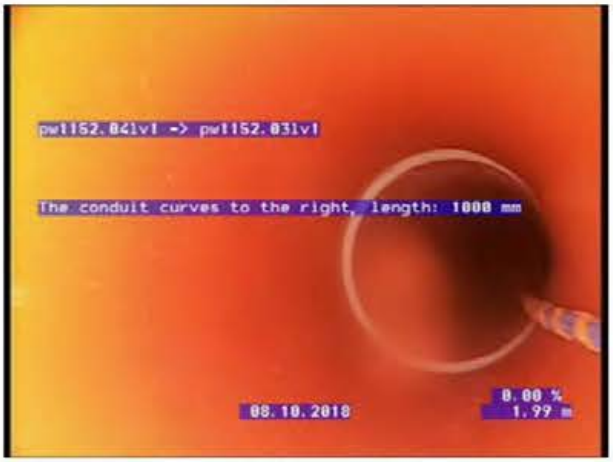

Photo: S_Sectionname_8102018_28_3_A.jpg
1.99m, The conduit curves to the right, length of curved section 1000mm

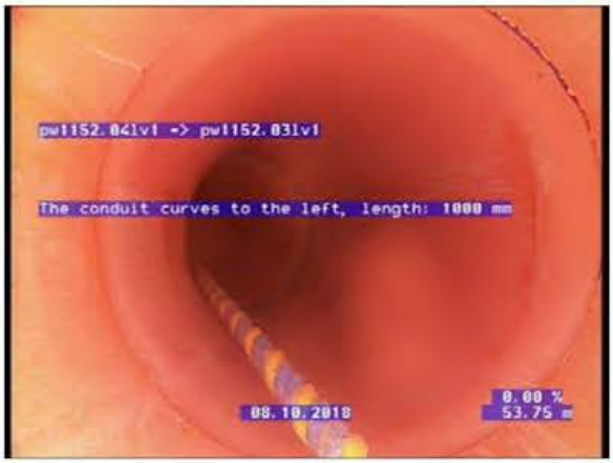

Photo: S_Sectionname_8102018_28_4_A.jpg
53.75m, The conduit curves to the left, length of curved section 1000mm

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12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
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Email:

Inspection Report

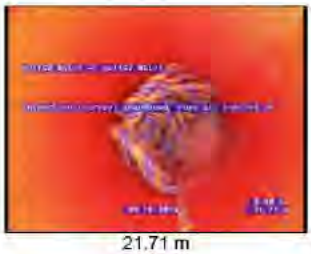
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

Lenght :	21.71 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.04LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	PW1152.05LV1	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

Comments: .

1:180	Position	Observation	Rate
PW1152.04LV1	0.00	Start node, terminal maintenance shaft, Nodename: PW1152.04LV1	
	21.71	Inspection (survey) abandoned, ROPE BUNCHED UP	



21.71 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	0	0	0	0	1

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**29**	

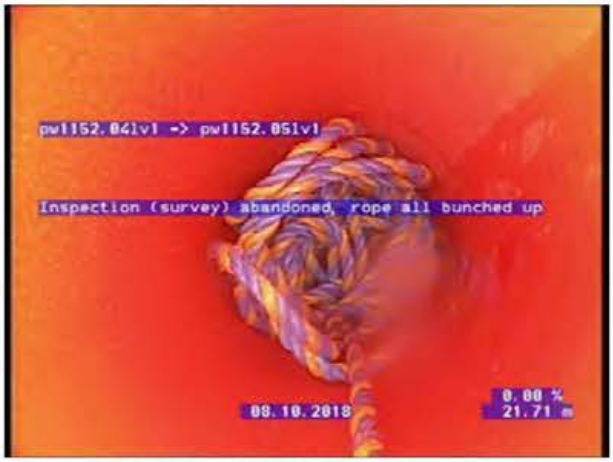


Photo: S_Sectionname_8102018_29_2_A.jpg
21.71m, Inspection (survey) abandoned, ROPE BUNCHED UP

IC Pipes Pty Ltd
12/14 Holbeche Rd 7 Arnott Pl
Suburb : Wetherill Parl
Tel:
Fax:
Email:

Inspection Report

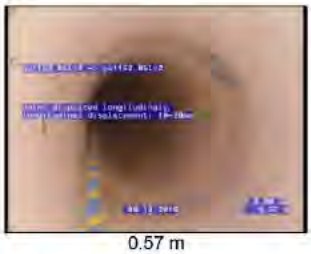
Client:	Contract No:	Job No:	Weather:	Time:	Date:
METRO			Dry		8/10/2018
Pipe Use:	**Material:**	**Shape:**	**Direction:**	**Height:**	**Width:**
Electrical	Polyvinyl chloride	Circular		100 mm	

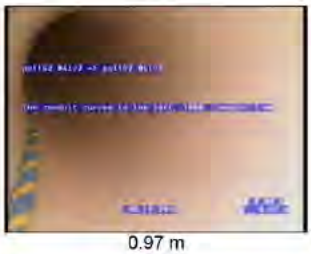
Lenght :	22.91 m	**Surveyed By:**	Sch 2.2(a)(ii)	**Vehicle:**	IC04
Asset No :		**Work Order:**		**Suburb:**	CANBERRA
Start MH :	PW1152.04LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	
Finish MH :	PW1152.05LV2	**Address:**	FLEMINGTON ST	**MH Depth:**	

DVD No:		**O2 :**	20.8
Camera:	Pushrod	**CO :**	0
JJ Access:	No	**H2S :**	0
Cleaned:	CCTV Only	**LEL:**	0

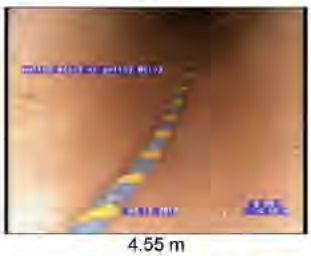
Comments: .

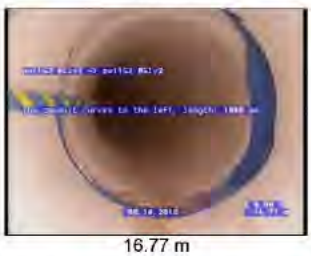
1:195 Position	Observation	Rate
PW1152.04LV2		
0.00	Start node, terminal maintenance shaft, Nodename: PW1152.04LV2	
0.57	Joint displaced longitudinaly, longitudinal displacement >30mm	
0.97	The conduit curves to the left, length of curved section 1000mm	
4.23	The conduit curves down, length of curved section 1000mm	
4.55	The conduit curves up, length of curved section 1000mm	
16.77	The conduit curves to the left, length of curved section 1000mm	
21.60	The conduit curves to the left, length of curved section 1000mm	
22.90	Other Deposits in the invert, STAR PICKET CAP , Obstruction: 21-50% , from 3 to 9 o'clock	
22.91	Inspection (survey) abandoned, CAP BLOCKING CONDUIT	


0.57 m


0.97 m

4.23 m


4.55 m


16.77 m

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
8	4	0.7	16	2	0	40	0	0	4

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**30**	

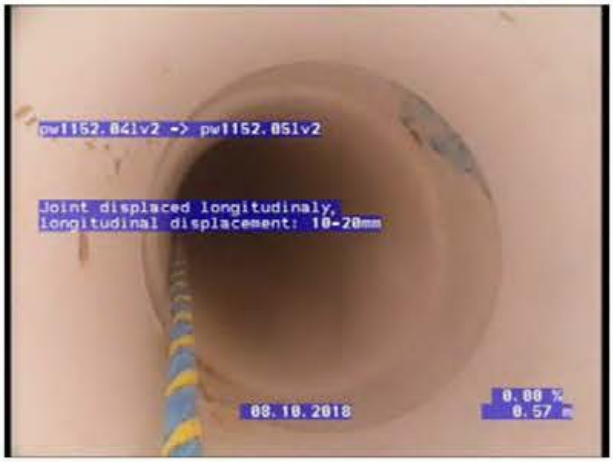

Photo: S_Sectionname_8102018_30_2_A.jpg
0.57m, Joint displaced longitudinaly, longitudinal displacement >30mm

Photo: S_Sectionname_8102018_30_3_A.jpg
0.97m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_30_4_A.jpg
4.23m, The conduit curves down, length of curved section 1000mm

Photo: S_Sectionname_8102018_30_5_A.jpg
4.55m, The conduit curves up, length of curved section 1000mm

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Inspection Pictures

City :	Street :	Date :	Section # :	Section name :
	FLEMINGTON ST	**8/10/2018**	**30**	

Photo: S_Sectionname_8102018_30_6_A.jpg
16.77m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_30_7_A.jpg
21.6m, The conduit curves to the left, length of curved section 1000mm

Photo: S_Sectionname_8102018_30_8_A.jpg
22.9m, Other Deposits in the invert, STAR PICKET CAP ,
Obstruction: 21-50% , from 3 to 9 o'clock

DANGER ELECTRIC CABLES BELOW
DANGER ELECTRIC CABLES BELOW
DANGER ELECTRIC CABLES BELOW

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:01/11/2018 8:33 AM
To:"Davis, MattE" <MattE.Davis@act.gov.au>;"Alford, Robert" <Robert.Alford@act.gov.au>
Cc:"Gray, Jennifer" <Jennifer.Gray@act.gov.au>;"Grice, Simon" <Simon.Grice@act.gov.au>
Subject:FW: HV Elec Asset Access

Hi Matt and Bob,

Please find enclosed to following internal (CMC) advice regarding access to HV Electrical Assets associated with the project.
I am keen to understand if this process actually makes it to the Civil Construction team of the project. From Monday afternoon activities – TPS1 there appears to be two different process out at the worksite.
I am not prepared to accept any verbal advice / determination – as it's just not working out there on site.
It is respectfully suggested, that any / all advice / instruction is to be documented in CMC systems and process.

For your background advice.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

From: kim@specialistelectrical.com.au [mailto:kim@specialistelectrical.com.au]
Sent: Wednesday, 31 October 2018 4:02 PM
To: Kelly, Gordon <Gordon.Kelly@act.gov.au>; 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>
Subject: FW: HV Elec Asset Access

FYI

Kind Regards,
Kim Power
Project Manager
SEEG Holdings Pty Ltd
M 0434 363 597
PO Box 2036, Kingscliff NSW 2487

Specialist Electrical Engineering Group

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From: Sch 2.2(a)(ii)
Sent: Wednesday, 31 October 2018 2:23 PM
To: Sch 2.2(a)(ii)
Cc: kim@specialistelectrical.com.au; Matt Gaunt
Subject: HV Elec Asset Access

Darren

As per our conversation this morning please find the following dot points around accessing and working around LIVE HV assets

EVO HV Assets

- Assets to be clearly identified on / in PTD process and permit.
- Potholing of HV services should only be hydro vacc'd if the service has been previously potholed or has been tested and authorised for hydo-vac by EVO
- EVO Blue Book Trained / Accredited spotter in place during operations where the potential to encroach in safe approach distance is a risk.
- NO movement or physical interaction / touching / stepping on, with cable or cable joints
- NO HV Service to be left uncovered at completion of Shift.
- Excavation to maintain normal project parameters of fencing and exclusion zones. (inclusive of construction and relevant voltage danger signage)

CMC HV Assets

- CMC Access permit required to expose and work around known live HV assets
- Determination of isolation will be undertaken upon risk assessment of the works to be undertaken. And scheduled accordingly
- Potholing of HV services for PTD process should only be hydro vacc'd if the service has been previously potholed or has been tested and authorised for hydo-vac by CMC
- EVO Blue Book Trained / Accredited spotter in place during operations where the potential to encroach in safe approach distance is a risk. (SAD's same as PTD)
- NO movement or physical interaction / touching / stepping on, with cable or cable joints
- NO HV Service to be left uncovered at completion of Shift.
- Excavation to maintain normal project parameters of fencing and exclusion zones. (inclusive of construction and relevant voltage danger signage) Covering of excavation or double fencing with signage required

Kind Regards

Sch 2.2(a)(ii)

METRO

Sch 2.2(a)(ii)

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:19/12/2018 4:56 PM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>
Cc:"Jones, Greg" <Greg.Jones@act.gov.au>;"Grice, Simon" <Simon.Grice@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>
Subject:FW: Depot Bridge & Federal Flemington Risk Assessments
Attachments:CMC-RS-CSR-TP-001 - 1.4 - Depot Bridge HV LV Depth of Cover Issues.pdf, CMC_SFAIRP_Risk_Assessment CSR - Fed Flem v2.0.pdf, CMC_SFAIRP_Risk_Assesment CSR-Depot Bridge v2.0.pdf, CMC-RS-CSR-TP-002 - 1.2 - Fed Flem HV LV Depth of Cover Issues.pdf

Hi Dave,

Please find enclosed the enclosed correspondence from SEEG to Sch 2 2.2(a)(ii) (06 Dec 18)

This advice maybe in conflict with the narrative that yourself and Simon were provided today.

For your background information.

This advice is sensitive, however provided in good faith from SEEG.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

From: kim@specialistelectrical.com.au [mailto:kim@specialistelectrical.com.au]
Sent: Friday, 7 December 2018 2:45 PM
To: 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>
Subject: RE: Depot Bridge & Federal Flemington Risk Assessments

Hi Darren,

Thank you for your email and supporting documentation.

After reviewing the attached files, I seek your assistance to confirm, in the first instance the follow details.

1) Confirming in writing from the Utilities Tech Regulator that AS 2067:2016 can be adopted.

   (Adoption of the Standard may trigger a redesign / design assessment for the entire project.)

2) Further supporting information is required, as a minimum.

- IC Appoved design drawings prior to actual construction activities
- NCR's and all RFI and supporting commentary from IC-APP, Territory, CMO and CMC Electrical Superintendent
- Provision of all hold points documentation and appropriate sign off's to continue with construction
- Supporting images during the construction of electrical services at these locations
- CMC – Electrical Superintendent Acceptance / sign off of the installation
- Supporting documentation that licensed electrical persons installed the cables / wiring system
- Supporting documentation from IC-APP, Territory, CM Electrical Superintendent that the installation has been constructed in accordance with the approved design

3) Confirmation of IC -AAP comments have been addressed and resolved as of 04 Dec 2018 – acconex reference.

4) Risk assessment are incomplete and do not address the legislative compliance risks and supporting methodology to resolve

5) Risk assessment are incomplete and do not address SPR requirements

If you require any further advice or assistance please give me a call in the first instance.

Kind Regards,
Kim Power
Project Manager
SEEG Holdings Pty Ltd
M 0434 363 597
PO Box 2036, Kingscliff NSW 2487

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From: Sch 2.2(a)(ii)
Sent: Thursday, 6 December 2018 8:01 PM
To: kim@specialistelectrical.com.au
Cc: Sch 2.2(a)(ii)
Subject: Depot Bridge & Federal Flemington Risk Assessments

Dear Kim,

As you aware, we have been advised by the Technical Regulator that we are able to apply AS2067:2016 to a number of individual issues on the project in order to find a safe and practical way forward.

The Risk Assessments and Technical Papers attached have been produced following a meeting of a Risk Assessment Committee which was assembled to consider the issues of the Depot Bridge and Federal Flemington. The Risk Assessment committee consisted of Project Co, CMO, CMC Designers, CMC Delivery and the IC. A number of mitigations were then proposed and considered by The group and these have been set out in the Technical Papers.

As the Independent Verifier we rely on your review and approval of these Risk assessments in order to proceed in a safe and practical way to ensure the project can apply the proposed mitigations and that the safe energisation of the railway can commence.

I cannot emphasise enough the importance of agreeing a safe and practical way forward. We are happy to discuss at any point tomorrow and consider any further mitigations which allow these works to proceed.

Kind Regards

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

JOHN HOLLAND

Level 2, 65 Pirmarra Road,
Pyrmont, NSW 2000
M. Sch 2.2(a)(ii)
W. johnholland.com.au

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Technical Paper

Subject:	Depot Bridge – HV/LV Depth of Cover Issue

Author:	Sch 2.2(a)(ii)	**Position:**	Senior Rail Systems Manager		
Document ID:	CMC-RS-CSR-TP-001	**Version:**	1.4	**Date:**	6th December 2018

The depot bridge HV/LV duct route interface and its depth of coverage moving away from the bridge on the depot side has been raised as an issue.

This document is a collation of information to provide a singular response to the current and future construction works with a view to mitigating the risk and provide for an equivalent level of protection that a compliant solution would provide.

Detail/Description of As-Built nature of the ducts

The ducts are shallow as they exit from the bridge (~200-300mm – one LV conduit on the outside is potentially 75-100mm from the top of the slab) due to the nature of the bridge structure and the allowable space (Plate 1). As the conduits exit the bridge they are bedded in stabilised sand backfill (Plate 1).

Some excavation work occurred to further expose the conduits from the stabilised sand and to provide for concrete to encase the sides of the ducts for 3m from the bridge. The depth of the top most LV duct 3m from the bridge is >400mm below the finished surface level of the Stage 1 slab with the HV duct at >600mm below the finished surface level of the Stage 1 slab (Long Section).

Further from the bridge (>3m), the ducts are encased in stabilised sand to the underside of the slab and warning tape applied to the surface of the stabilised sand (Plate 2 and 3). The warning tape is not appropriate level of warning required given the services present and as such is being disregarded and the proposal provides for the correct medium to be included I the works. Reinforcing mesh was laid on chairs seated on the top of the stabilised sand (Plate 3).

The Stage 1 slab extends for >20m from the bridge. At 20m, the depth of cover to the topmost LV duct is circa 910mm from the finished surface level of the Stage 1 slab which would infer that the HV conduit is 1110mm from the finished surface level of the Stage 1 slab (Long section).

The track form has a stray current detection system installed in it and the rail is installed in Edilon. The stray current is not applicable to the depot bridge and the ducts that contain LV and HV.

Earthing and Bonding is not affecting the structure or otherwise due to the HDPVC ducts being installed in stabilised sand and capped with a concrete slab.

The 11kV cable is a Trefoil type arrangement such that it places the phases the same distance apart, so the magnetic field and circulating currents are equivalent for each cable phase.

The services have been adequately separated through the bridge and as they exist the bridge and there are no external utility providers infrastructure installed in that area.

Depth of cover information

A pre-pour As-Built survey of the ducts was taken before the concrete pour of the Stage 1 slab providing the RL of the topmost pipes. A post-pour As-Built survey of the Stage 1 slab was conducted enabling comparison of the finished surface level of the concrete slab and distance to the ducts. The thickness of the slab is >200mm with the thickness increasing as the ground level falls

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

away. The remaining distance between the top of duct and base of slab is comprised of the stabilised sand backfill.

The information below is an extrapolation of the As-Built surveyed heights of the upper most LV duct in the bank. A HV duct is located under the LV duct and is 200mm below the topmost level of the LV duct (150mm duct + min. 50mm clearance).

Chainage	Distance from edge bridge	Depth (from top of Stage 1 slab)	
		LV Conduit (top duct)	HV Conduit (second duct)
300.998 (Edge Bridge)	0m	340mm	440mm
300.000	1m	200mm	400mm
299.075	1.25m	290mm	490mm
298.000	3m	390mm	590mm
296.000	5m	570mm	770mm
294.000	7m	670mm	870mm
292.000	9m	700mm	900mm

Correction proposal

Due to the insufficient cover and an inadequate spatial and structural sequence for the location of the marker tape laid in the Stage 1 slab it is proposed to augment the current installation further to provide for a more adequate form of protection and demarcation.

The proposal detailed below attempts to mitigate the risk by providing an equivalent level of protection.

The proposal is to:

1. If required, dowel in and pour curb trackside to provide a neater finish to the path trackside;
2. Install hard cover, LV warning tape or comms warning tape on the surface of the Stage 1 slab as appropriate to the applicable standard (Plate 9); and
3. Form, reinforce and pour a Stage 2 slab, flush with the height of the bridge This slab is designed to act as a footpath (Plate 10. The footpath is laid over the existing Stage 1 slab for 5m or more and veers right continuing to the staff access gate in the fence (at the 5m mark the depth to the top of the LV conduit is 570mm from the top of the Stage 1 slab).

Some pits will need to be raised, this requirement will be clarified based on the final position of the curb/edge of the Stage 2 slab.

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

Plate 1 - Depot side of Bridge – conduits exiting bridge structure

Plate 2 - Depot side of Bridge – conduits buried in stabilised sand heading toward depot out from bridge. Right hand edge of large pit is circa 10m from bridge with LV top of conduit at 720mm below the finished level of the Stage 1 slab (unpoured in this plate)

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

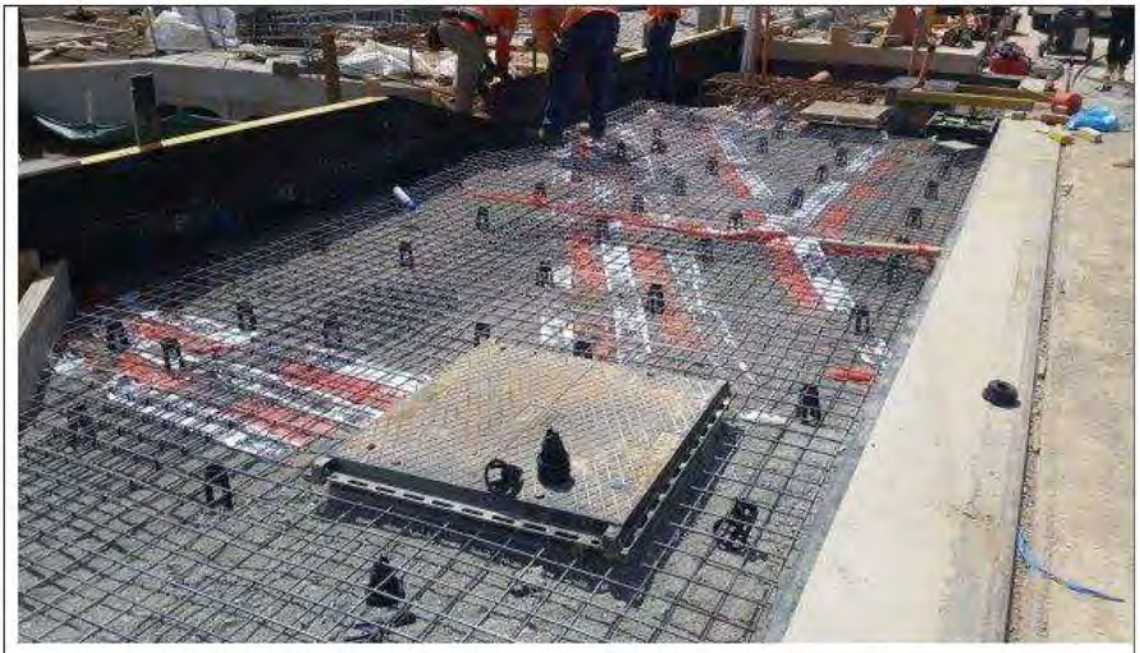

Plate 3 - Depot side of Bridge – conduits buried in stabilised sand heading toward depot out from bridge – warning tape at stabilised sand level, with reinforcing mesh for Stage 1 slab set over

Plate 4 - Depot side of Bridge – 50-75mm concrete cover over ducts with concrete encasement down side and remaining voids. Commencement of pouring Stage 1 slab.

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

Plate 5 - Depot side of Bridge – conduits exiting bridge structure toward depot, start of pour of stage 1 slab.

Plate 6 - Depot side of Bridge – conduits exiting bridge structure toward depot, start of Stage 1 slab pour.

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

Plate 7 - Depot side of Bridge – completed Stage 1 slab

Plate 8 - Depot side of Bridge – completed Stage 1 slab.

Technical Paper

Subject: Depot Bridge – HV/LV Depth of Cover Issue

Plate 9 - Depot side of Bridge – completed Stage 1 slab with proposed hard cover

Plate 10 - Depot side of Bridge – completed Stage 1 slab with proposed Stage 2 slab over

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ARTC Risk Assessment - Context Setting

CONTEXT SETTING
1. Background
CMC are constructing the Canberra Metro Project on behalf of the Territory. SMEC and AECOM are the principal designers for the project.
2. Scope (inclusions and exclusions)
To assess the safety/operational risks associated with the CSR, HV and LV Networks which are not complaint with the Australian Standards.
3. Risk Assessment Objectives
Identify and Assess any risks introduced to CMO and the Territory due to the non-compliances.
4. Critical Success Factors of the activity/proposal being assessed
Objectives are that the maintenance of the assets can be carried out safely SFAIRP and that the infrastructure is safe SFAIRP.
5. Scope (inclusions and exclusions)
The scope is to review the Federal Flemington CSR1 underbore and its transition to pit and buried routes.
6. Stakeholders
CMC, CMO, TCCS, Electrical Regulator
7. Stakeholder consultation
Numerous meetings and discussions have been had in regard the CSR construction, compliance and the relevant standards
8. Assumptions
9. Constraints
Existing infrastructure, physical arrangements and corridor width
10. Boundaries/interfaces
The works are constructed within the Operational Phase Area.
11. Qualifications/conditions
Nil
12. Reference documentation and standards
AS2067:2016 AS3000 TRITS03
13. Other clarifying commentary

Canberra Metro - CSR1 Federal Flemington - Risk Assessment

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION						5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 **Existing Control**	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
1	Safety	11kV and LV duct ULX depth Non-compliant under Northbound track at Fleminton road end and the Southbound track at the Federal Hwy end	Ducts can be made compliant in 6-foot and garden bed but ducts are non-compliant as they go under the Northbound track slab	**Most Likely (Credible) Outcome**	**Worst Case (Credible) Outcome**	Ducts are under min 450mm structural self-supporting track slab	Engineering/ Design	CMC	**Major**	Rare	LOW - 4E	Yes	The ducts are under the track form that is a continous self-supporting track slab. If the ducts need to be dug up the entire Light Rail operation would be shut down for a minimum of 3 weeks but more likely significantly longer. No work can occur there without a permit and service suspension. The permit would include the As-built information and as such the depth of the ducts would be known
						Ducts will be encased in concrete or Liquifill	Engineering/ Design	CMC					
						Hard cover will be placed below the track slab as the concrete is poured so hard cover is in the cold joint between the mass fill and the underside of the track slab	Engineering/ Design	CMC					
						The area is a controlled area that is restricted to the general public due to being in the Operational Phase Area and it **is under the Northbound track - as** such **rail services would be suspended for a minimum of 3 weeks**	Isolation	CMO					
						Excavation or work in this area will require service suspension and a permit from the operator including an excavation permit. This permit will detail the services and depths of the services from the As-built drawings.	Administrative	CMO					
						The top two ducts are allocated as spare ducts and as such until a cable is installed in them some time in the distant future if that occurs then they will remain empty	Engineering/ Design	CMC					
						3. PROPOSED ADDITIONAL RISK TREATMENT			**4. RESCORE TO REFLECT SFAIRP**			5.1 Do the decisions make sense?	
				No change should be required to the CSR in the future	Excavation works strike duct/cable	3.0 **Proposed Additional Control**	3.01 Control type	**SFAIRP TEST** 3.1 **BENEFIT** / 3.2 **COST** / 3.3 Decision / 3.4 Responsible Party / 3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
						Plaques detailing HV/LV services below to be installed on concrete slab	Engineering/ Design	Moderate / Minimal / Adopt / CMC	**Moderate**	Rare	LOW - 3E		
						Risk Assessment by competent professionals to asses the risk	Administrative	Moderate / Minimal / Adopt / All Stakeholders					
						Ensure Operational Phase Area Plans are updated to include any areas that fall outside that currently depicted on the drawings.	Administrative	Moderate / Minimal / Adopt / CMC					

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION						5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 **Existing Control**	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
2	Regulatory	Non-compliant depth to TRITS03 standard adopted for ULX and URX depth of 1050mm	Ducts transitioning in an upward curve meant the duct extensions were on an upward angle toward the pit	**Most Likely (Credible) Outcome**	**Worst Case (Credible) Outcome**	Ducts are under min 450mm structural self-supporting track slab	Engineering/ Design	CMC	**Major**	Rare	LOW - 4E	Yes	The ducts are under the track form that is a continous self-supporting track slab. If the ducts need to be dug up the entire Light Rail operation would be shut down for a minimum of 3 weeks but more likely significantly longer. No work can occur there without a permit and service suspension. The permit would include the As-built information and as such the depth of the ducts would be known
						Ducts will be encased in concrete or Liquifill	Engineering/ Design	CMC					
						Hard cover will be placed below the track slab as the concrete is poured so hard cover is in the cold joint between the mass fill and the underside of the track slab	Engineering/ Design	CMC					
						The area is a controlled area that is restricted to the general public due to being in the Operational Phase Area and it **is under the Northbound track - as** such **rail services would be suspended for a minimum of 3 weeks**	Isolation	CMO					
						Excavation or work in this area will require service suspension and a permit from the operator including an excavation permit. This permit will detail the services and depths of the services from the As-built drawings.	Administrative	CMO					
						The top two ducts are allocated as spare ducts and as such until a cable is installed in them some time in the ditant future if that occurs then they will remain empty	Engineering/ Design	CMC					
						3. PROPOSED ADDITIONAL RISK TREATMENT			**4. RESCORE TO REFLECT SFAIRP**			5.1	

						3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST 3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Do the decisions make sense?	
																Yes	
				No change to the CSR will occur in the future	Excavation works strike duct/cable	Risk Assessment by competent professionals to asses the risk	Administrative	Moderate	Minimal	Adopt	All Stakeholders		Minor	Unlikely	LOW - 3D		
						Plaques detailing HV/LV services below to be installed on concrete slab	Engineering/ Design	Moderate	Minimal	Adopt	CMC						

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION					5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome								
						Operational Phase area is set out on existing design drawings	Administrative	CMC					
									Moderate	Unlikely	LOW - 3D		
						3. PROPOSED ADDITIONAL RISK TREATMENT			4. RESCORE TO REFLECT SFAIRP				
3	Regulatory	Asset is installed outside the original project boundary (Operational Phase Area)	Changes to construction methodoology due to timing allowed to shut down the Federal Highway to build the CSR01 in the 6-foot between the tracks	No change to the CSR will occur in the future	Excavation works strike duct/cable	3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST 3.1 BENEFIT / 3.2 COST / 3.3 Decision / 3.4 Responsible Party / 3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	5.1 Do the decisions make sense?	
						Operational Phase Area Drawing set is required to be updated at the end of the project to ensure any changes have been captured and from these the required easements are established	Administrative	Moderate / Minimal / Adopt / CMC	Minor	Unlikely	LOW - 3D		

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION					5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome								
						Earthing and bonding design	Engineering/ Design	CMC				Yes	
						Installed by competent people (licenced electricians)	Engineering/ Design	CMC					
						Testing by competent individuals	Engineering/ Design	CMC	Minor	Unlikely	LOW - 3D		
						ITP's and quality paperwork	Administrative	CMC					
						3. PROPOSED ADDITIONAL RISK TREATMENT			4. RESCORE TO REFLECT SFAIRP				
4	Regulatory	Earthing and Bonding	- lack of design - insufficient design - design not constructed correctly	Design will be followed and any relative control measures are puit in place	Energisation of a structure occurs, the circuit doesn't trip and could result in serious injury or death	3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST 3.1 BENEFIT / 3.2 COST / 3.3 Decision / 3.4 Responsible Party / 3.5 By when	4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	5.1 Do the decisions make sense?	
												Yes	

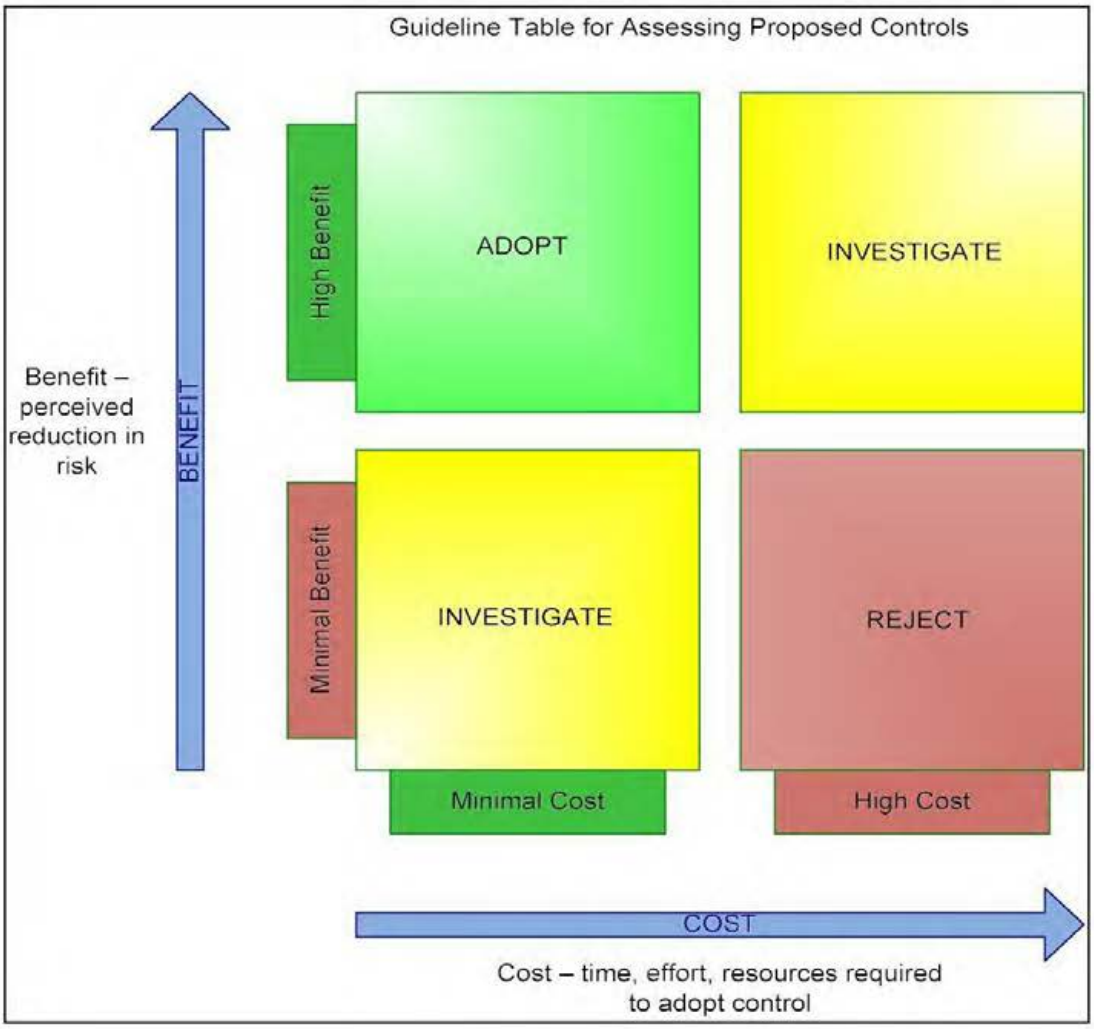
1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION					5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
				Most Likely (Credible) Outcome	Worst Case (Credible) Outcome								
						Stray current design	Engineering/ Design	CMC				Yes	A stray current collection system has been installed in the track form. A stray current monitoring system is being installed to monitor stray current present if any. Track form (Edilon Sedra) is a part of the stray
						Installed by competent people (licenced electricians)	Engineering/ Design	CMC					
						Testing by competent individuals	Engineering/ Design	CMC	Moderate	Unlikely	LOW - 3D		
						ITP's and quality paperwork	Administrative	CMC					

5	Regulatory	Stray Current	- lack of design - insufficient design - design not constructed correctly	Design will be followed and any relative control measures are puit in place	Stray current exists using nearby utilities as a pathway for traction return, some utilities clould degrade	Stray current working group meets to discuss any issues, controls and other items	Administrative	CMC							current management system.
						Stray current monitoring system to be installed	Engineering/ Design	CMC							
						3. PROPOSED ADDITIONAL RISK TREATMENT							4. RESCORE TO REFLECT SFAIRP			5.1 Do the decisions make sense?	
						3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST					4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
								3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when					

1. RISK IDENTIFICATION						2. ANALYSIS AND EVALUATION						5. VALIDATION AND CLARIFICATION	
1.0 Risk No.	1.01 Risk Category: 1. Safety 2. Assets 3. Financial 4. Environment 5. Regulatory 6. Reputation	1.1 Hazard or scenario or circumstance	1.2 Caused by	1.3 Leading to an Outcome		2.0 Existing Control	2.01 Control type	2.1 Responsible Party / Comments	2.2 Current consequence	2.3 Current likelihood	2.4 Current risk level	5.0 Has this workshop adequately addressed this risk?	5.2 Comments / clarification
6	Regulatory	Service seperation	- lack of design co-ordination - unknown services - construction not aware of requirements	Most Likely (Credible) Outcome	Worst Case (Credible) Outcome	DBYD and desktop services searches	Administrative	CMC	Moderate	Unlikely	LOW 30	Yes	There are no other utilities or services in this area.
						Cable location services and sucker trucks	Engineering/ Design	CMC					
						Design details speration to be complied with	Engineering/ Design	CMC					
						ITP's check note services	Administrative	CMC					
						3. PROPOSED ADDITIONAL RISK TREATMENT						4. RESCORE TO REFLECT SFAIRP				5.1 Do the decisions make sense?	
						3.0 Proposed Additional Control	3.01 Control type	SFAIRP TEST					4.0 Revised consequence	4.1 Revised likelihood	4.2 Revised risk level	Yes	
								3.1 BENEFIT	3.2 COST	3.3 Decision	3.4 Responsible Party	3.5 By when					
				Design co-ordianted, services known about and construcgtion staff maintain the design and regulatory clearances to services and utilities	Construction occurs too close to utilities and services, in the future a utility owner could dig down and to repair or replace their assett and strike the CMO assett.	Desktop photgraphic exercise reviewing as constructed CSR	Administrative	Moderate	Minimal	Adopt	CMC		Minor	Unlikely	LOW 30		

	Risk Category	Consequence				
Safety category is focussed on Impact to People	**S: Safety**	No Medical Treatment Required	Lost Time Injury Results (LTI) OR Medical Treatment Required	Serious Injury Occurs	Single Fatality Occurs	Multiple but Localised Fatalities Occur
Asset category is focussed on Operations Impact, Track, Systems (Hardware & Software) and Human Assets	**A: Assets**	<6hrs Track Closure	>6hrs but <24hrs Track Closure	>24hrs but <48hrs Track Closure	>48hrs but <5 Days Track Closure	>5 Days Track Closure
Focussed on Financial Impact Cash flow, liquidity, Capital, Asset Value, Procurement & Contracts related exposure	**F: Financial**	<$250K	>$250K but <$2M	> $2M but <$10M	>$10M but <$50M	>$50M
Focussed on Environment Impact Heritage, Flora & Fauna, Archaeology & Indigenous, Pollution and Amenity (Public)	**E: Environment**	Contained Environmental Damage - fully recoverable (no cost or ARTC action required)	Isolated Environmental Damage - minimal ARTC remediation required	Localised/Clustered Environmental Damage - requiring remediation	Considerable Environmental damage - requiring remediation	Widespread long term or permanent damage to the environment - remediation required
Focussed on Regulatory/Legislation Exposure Non-compliance & Our Licence to Operate	**R: Regulatory**	Minimal or no Regulatory involvement	Notice to Produce Information	Improvement Notice or Threatened Action	Prohibition Notice or Fine/s	Prosecution of the company and/or its office holders
Focussed on Reputational Exposure Customer Dissatisfaction, Shareholder Support, Service Quality & Reliability, Public Image and Stakeholder Attitudes	**R: Reputation**	Isolated event able to be resolved [<7Days]	Management intervention required [>7days but <3mths]	Tactical (Business Unit / Divisional) intervention required [>3 months but <18mths]	Strategic intervention required [>18mths but <3years]	Corporate Loss of Shareholder and/or Customer support (tangible business impact) >3years
	D →	*Not Significant*	*Minor*	*Moderate*	*Major*	*Extreme*

Likelihood		*Descriptor* ↓	Level					
Description	**Frequency of Occurrence**			1	2	3	4	5
Is expected to occur in most circumstances	Once per month	*Almost Certain*	A	MED - 1A	MED - 2A	HIGH - 3A	V HIGH - 4A	V HIGH - 5A
Will probably occur in most circumstances	Between once a month and once a year	*Likely*	B	LOW - 1B	MED - 2B	HIGH - 3B	V HIGH - 4B	V HIGH - 5B
Might occur at some time	Between once a year and once in five years	*Possible*	C	LOW - 1C	LOW - 2C	MED - 3C	HIGH - 4C	HIGH - 5C
Could occur at some time	Between once in 5 years and once in 20 years	*Unlikely*	D	LOW - 1D	LOW - 2D	LOW - 3D	MED - 4D	MED - 5D
May occur in exceptional circumstances	Once in more than 20 years	*Rare*	E	LOW - 1E	LOW - 2E	LOW - 3E	LOW - 4E	MED - 5E



Notes:

1. This matrix is designed as a guide **only** and should not be implemented without sufficient analysis and debate about proposed controls.

2. The decision to reject any control must be justified and the decision documented.

3. The recommendation to "investigate" a control indicates that further analysis into the costs and benefits is required. This analysis may be conducted by the workshop participants, or may require further investigation outside of the workshop environment.

Stakeholder Consultation and Risk Assessment Attendees

Risk Assessment Subject Title	Canberra Metro - CSR1 Federal Flemington - Risk Assessment

1. Assessment Process

Date: 22nd November 2018

Location: CMC Training Room 1

Facilitator: Matt Gaunt

SIGNED ATTENDANCE SHEET ATTACHED SEPERATELY AS PDF

2. Name & Signature	Organistion	Position	Email	Telephone	Signature
Sch 2.2(a)(ii)	CMC	Operations Manager NSW/ACT	Sch 2.2(a)(ii)		
	CMO	Technical & Commercial Director			
	CMO	Health and Safety and Assurance Manager			
	IC	IC Representative			
	CMO	Design Review Manager			
	CMC	Rail Systems Superintendent			
	CMC	Senior Rail Systems Manager			
	SMEC	Manager - Roads and Highways ACT and Southern NSW			
	SMEC				
	IC	IC Technical Reviewer			
	CMC	CPS Manager			
	AECOM	Project Manager			
	AECOM	Technical Director Rail			

3.Stakeholder Review of Risk Assessment

The draft Risk Assessment ver 1.1 was circulated to Attendees and Stakeholders on 23/11/2018
Comments received and incorporated 5/12/18.
The updated RA (v2.0) was sent for Review and Comment 6/12/18
The following feedback was received from these respondents.

4.Stakeholder Feedback on draft Risk Assessment

Name	Organistion	Position	Feedback	Comment Accepted / Rejected / Modified
Sch 2.2(a)(ii)	CMC	Senior Rail Systems Manager	No commets received as at 27/11/2018 1030hrs	Note
	APP	IC	The IC notes that it is the IC's opinion that the risk assessment envisaged by AS2067-2016 would only apply to those portions of the work covered by AS2067 not to other aspects of the work. The Technical Paper advises that portions of the LV works are non-compliant to the requirements of AS/NZS3000. CMC appear to have sought to apply the AS 2067-2016 risk assessment to these non-compliances. CMC would need to provide further advice on how the identified LV non-compliances to AS/NZS 3000 are proposed to be addressed in accordance with the requirements of AS/NZS 3000.	Noted
	AECOM	Project Manager	Only comment additional to our response to CMC-RFI-003569 is the quote spaning distance of 2m – this should be 1.5m	Accepted - Comment couldn't be identified in the risk assesment but will be dealt with in the Technical Paper as is required
	SMEC	Manager- Roads and Highways ACT/NSW	No comments from SMEC	

4. Approval	Name	Signature	Organistion	Position	Report Version	Date
Risk Assessment Workshop prepared by:	Sch 2.2(a)(ii)		CMC	Senior Rail Systems Manager	2.0	06/12/2018
Risk Assessment reviewed by:			CMC	Operations Manager NSW/ACT	2.0	06/12/2018
Risk Assessment endorsed by:			CMC	Senior Rail Systems Manager	2.0	06/12/2018

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Technical Paper

Subject:	Federal Flemington – HV/LV Depth of Cover Issue				
Author:	Sch 2.2(a)(ii)	**Position:**	Senior Rail Systems Manager		
Document ID:	CMC-RS-CSR-TP-002	**Version:**	1.2	**Date:**	6th December 2018

The HV/LV contained in CSR1 at the intersection of Federal Flemington has some non-compliant aspects to the work that require review.

This document is a collation of information to provide a singular response to the current and future construction works with a view to mitigating the risk and provide for an equivalent level of protection that a compliant solution would provide.

Detail/Description of As-Built nature of the ducts

The CSR will be detailed from Flemington Road to Federal Highway. The CSR1 was designed to continue running, as in other areas, in the 6-foot (the area between the two tracks) as the alignment transitioned the curve from Flemington Road and onto the Federal Highway. A number of issues prevented the original design being adhered to, the main one being the time available for the work to occur. A considerable possession of the Federal Highway/Flemington Road intersection was required to excavate the required trench and install the ducts for CSR1 and CSR2 in the design alignment. The time requested was not granted/available and an alternative option to underbore was made for CSR1 and CSR2.

Accordingly, an underbore of CSR1 was planned and constructed from the future location of the Northbound track slab near the HV/LV Pit in the 6-foot (HV152.05) to the traffic island in between the North and South bound lanes of the Federal Highway (Plate 1).

Due to the existing nature of Flemington Road rising to meet Federal Highway, the upward attitude of the approaching cable route and land availability, the HDPVC pipes joining the CSR1 pit and the bore pipes are at the required depth however there are minor technical aspects that make them non-compliant. Plate 2 shows the internal view of the pit with the designed conduit allocation.

The track form has a stray current detection system installed in it and the rail is installed in Edilon. The stray current has no structure to effect and there are no services that would be affected in the area.

Earthing and Bonding is not considered an issue due to the HDPVC ducts being installed in stabilised sand and capped with a concrete slab.

The 11kV cable is a Trefoil type arrangement such that it places the phases the same distance apart, so the magnetic field and circulating currents are equivalent for each cable phase.

The services are adequately separated and there are no external utility providers infrastructure close to the CSR installed in that area.

Ducts interfacing with Pit 152.05

At the Federal Highway face of pit 152.05 the depths of the 150mm HDPVC ducts will be compliant when the final construction works are constructed as detailed. The top most LVS (LV Spare) ducts enter the pit at a depth of 560mm from FSL (Plate 3). When the trench is filled to -200mm below FSL and capped with a 200mm reinforced concrete slab, this will make the first row and second rows of

ducts compliant at AS3000. The second row however contains a HVS (HV Spare) duct with a requirement for HV to be 750mm to 'Top of Cable', even when installed in a Class A system. The spacing between the first and second row of ducts is nominally 30mm. Given the initial 560mm from FSL, the dimension of the first row of HDPVC (160.5mm OD) and nominal spacing of 30mm the top of the second row of ducts is at 750mm. This makes the second row of ducts entering the pit compliant to AS2067 (2008 and 2016). If the spacing between the ducts was 0mm (it is variable although it is not 0mm) then the top of the second row of ducts would be 720mm. At 720mm the second row of ducts are compliant to AS2067 as the depth from FSL to the 'Top of the Cable' is greater than the required 750mm. The maximum diameter of cable that could be installed and remain compliant is 125mm (12,271mm^2 CSA). The third row of ducts by default being below the second row of compliant ducts are compliant for both HV and LV at a minimum of 880mm assuming the worst case of no spacing between ducts which is not the case.

Ducts transitioning from Pit 152.05 to the bore pipes

From the pit the ducts are HDPVC, falling at a shallow angle as the ground rises up at a shallow angle. The ducts start in the 6-foot and gradually transition to being under the Northbound Track Slab. The HDPVC ducts transition to PVC bore pipes under the Down Leg of the Down track (outside leg of the Northbound track) below the self-supporting structural track slab.

The depth below the track slab is non-compliant to the TRITS03 standard adopted for the project requiring a 1050mm clearance from top of rail.

Underbore (ULX and URX) and traffic island

Once the ducts transition to the 150mm OD bore pipe the directional bore angled down steeply under the federal highway and at the midpoint (>2.5m below FSL) rose but up again on an equally steep angle. The bore pipes turn southward and sub-parallel CSR2. At the point where they daylight, the top most duct is 750mm below FSL (Plate 6). One duct is slightly higher than the others, as such the other 5 ducts are compliant. This makes all 6 HV and LV ducts compliant with AS3000 and AS2067.

The ducts have not been laid in the garden bed at this point. The ducts will be laid in a compliant fashion to tie onto the ducts that are protruding from under the track slab from the south. The item in point has the LV conduits at their highest at 700mm below FSL. A such they can be installed in a compliant fashion.

Southbound ULX under Southbound track

The ULX in block 16 that carries the ducts from the traffic island to the 6-foot is non-compliant. The top most duct is 700mm below FSL (Plate 7) with its sister duct on approximately the same level at 750mm below FSL. It is non-compliant to the depth adopted from the TRITS 3 standard of 1050mm below top of rail. The top most pair of ducts that are LVS (LV Spare) are also non-compliant to AS3000 as they are not succinctly 300mm below the protecting slab. The minimum under AS3000 is 300mm clearance to the protecting slab over which can be at a minimum 75mm of continuous poured concrete. There is approximately 200mm clearance to the blinding layer which is about 150mm and then the 400mm track slab.

Proposal

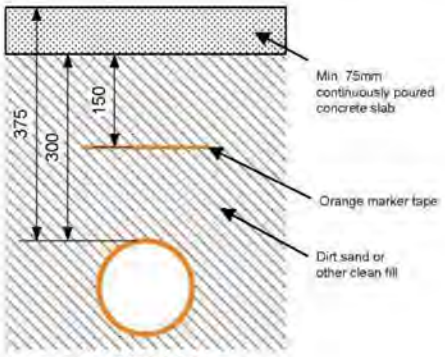
Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

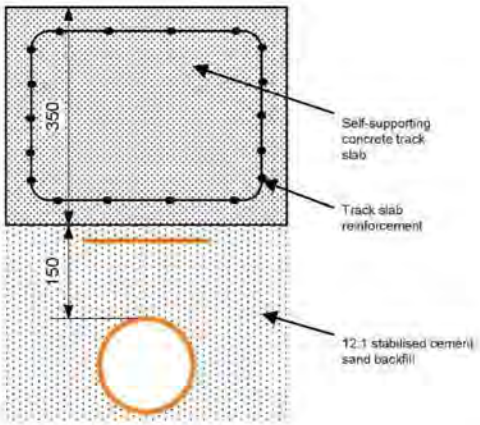
Depth of cover to LV ducts from Pit 152.05 to the underbore transition.

It is proposed to fill the current void with concrete ensuring no air gaps under the structural track slab to a depth of 200-250mm below FSL, this provides coverage of 300mm to the top slab in compliance with AS3000. Hard cover will be installed on the concrete fill to provide the required warning/demarcation. A 200-250mm reinforced top slab will be poured above the Hard Cover/Cold Joint as a topping slab that forms that protection slab allowing for the required 300mm between the ducts and the protection slab as per AS3000 requirements.

The first non-compliance that remains is clearance of the LV to the track slab as the ducts start to cross under the track slab (Plate 4). The non-compliance is that the LV is meant to have 300mm from the top of the duct to the underside of a protection slab. The thickness of the slab in AS3000 is deemed irrelevant. The standards allows for 300mm to the underside of a 75mm thick continuously poured slab. This means that the top of the duct would be 375mm below FSL (left hand image below). In the Federal Flemington instance, the top of the duct will be 500mm below FSL but only 150mm below the 350mm structurally reinforced track slab (right image below). As such the depth is greater than the minimum depth requirement and the protecting slab is thicker and stronger than that which is deemed as the minimum requirement under AS3000.



Min. AS3000 req.



Track Slab config

The second non-compliance is the ULX depth. The section of duct from the pit to the underbore transition does not comply with the Project's 1050mm ULX depth which has been derived from the TRITS 3 standard.

The proposal is to adopt the above measures and accept the non-compliance to AS3000 for clearance to slab and accept the non-compliance to the ULX depth of 1050mm. The structural slab is self-supporting for spans up to 1.5m and such should not provide any significant bearing pressure to the ducts.

Underbore (ULX and URX) and traffic island

The underbore is compliant under the Federal Highway and where it daylights in the traffic island.

The ducts through the traffic island can be installed in a compliant manner.

Proposal is to accept as is.

Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

Southbound ULX under Southbound track

The Southbound ULX is non-compliant to the TRITS 3 standard adopted of 1050mm from top of rail to top of ducts (Plate 7).

The Southbound ULX is non-compliant to AS3000 being the depth under the protecting slab is not 300mm (Plate 7).

The proposal is to accept as is. The ducts/ULX are under the self-supporting track slab that can span 1.5m if required and as such should not provide significant ground bearing pressure on the ducts that are in/under it. The AS3000 non-compliance although technically not compliant provides for significantly more protection than would be afforded under the minimum requirement of AS3000 being 375mm including the 300mm clearance to the top slab of 75mm continuously poured concrete.

Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

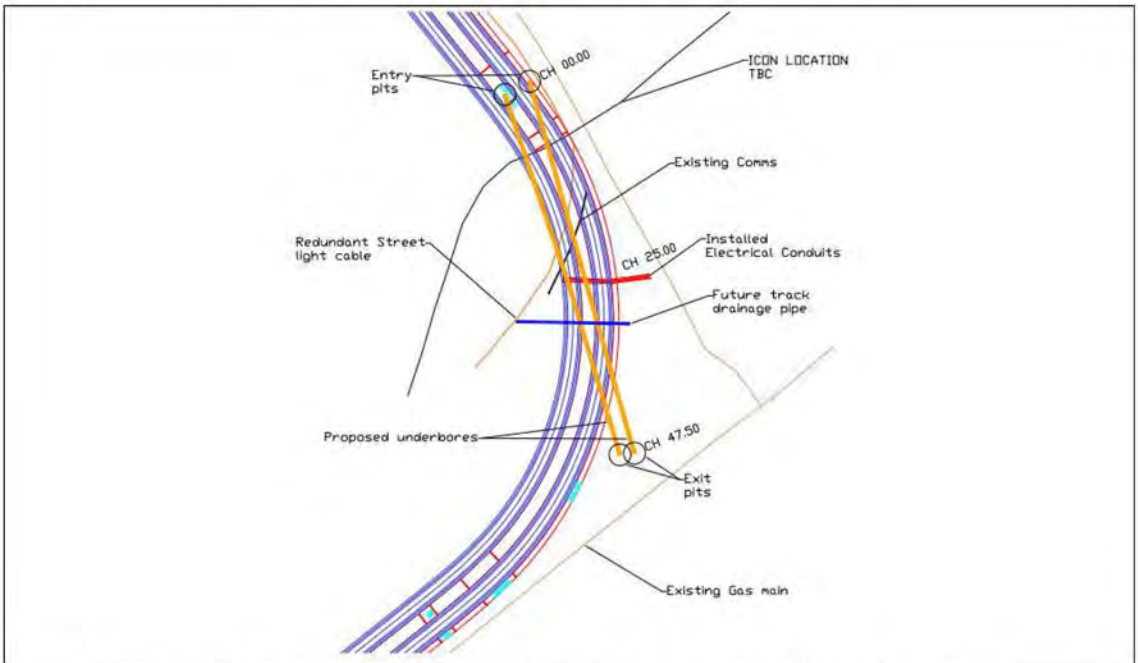


Plate 1 – Initial plan of underbores at Federal Flemington, alignment changes occurred.

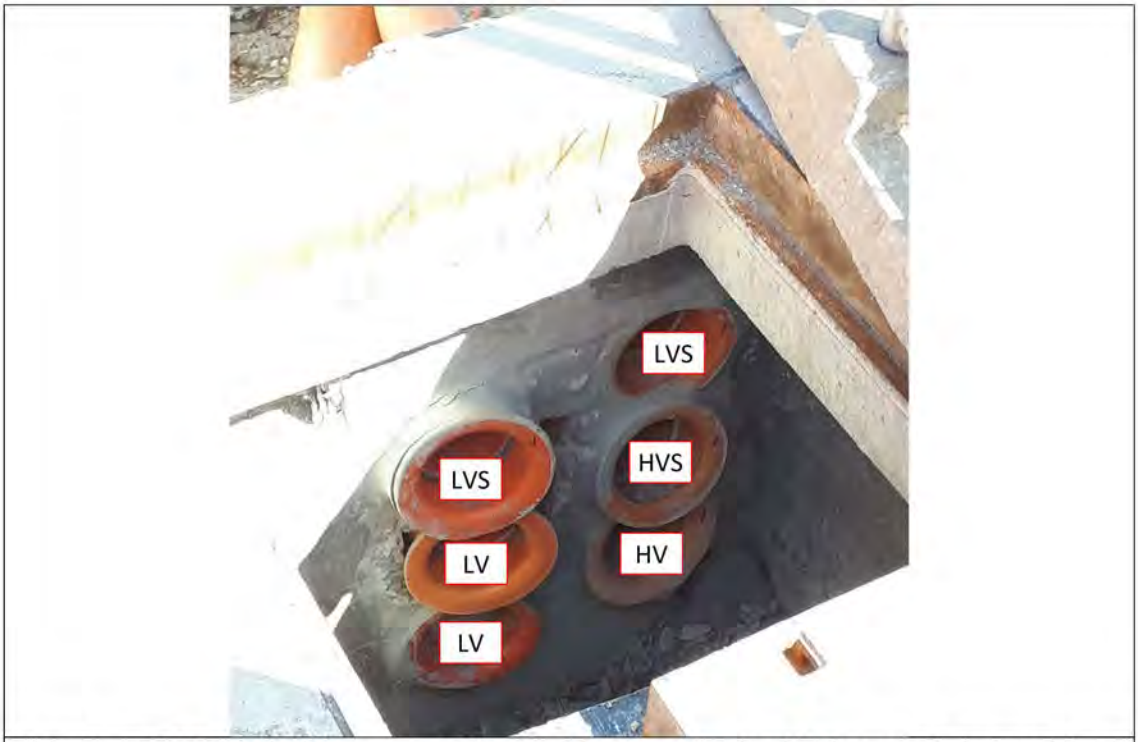


Plate 2 – HV/LV Pit (152.05) Flemington Road looking toward Federal Highway with designed duct allocation.

Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

Plate 3 - HV/LV Pit (152.05) view from Federal Highway toward Flemington Road – Depth to top of duct(s) is 560mm.

Plate 4 – Flemington Road – HDPVC ducts passing under Northbound track slab to join onto PVC bore pipes.

Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

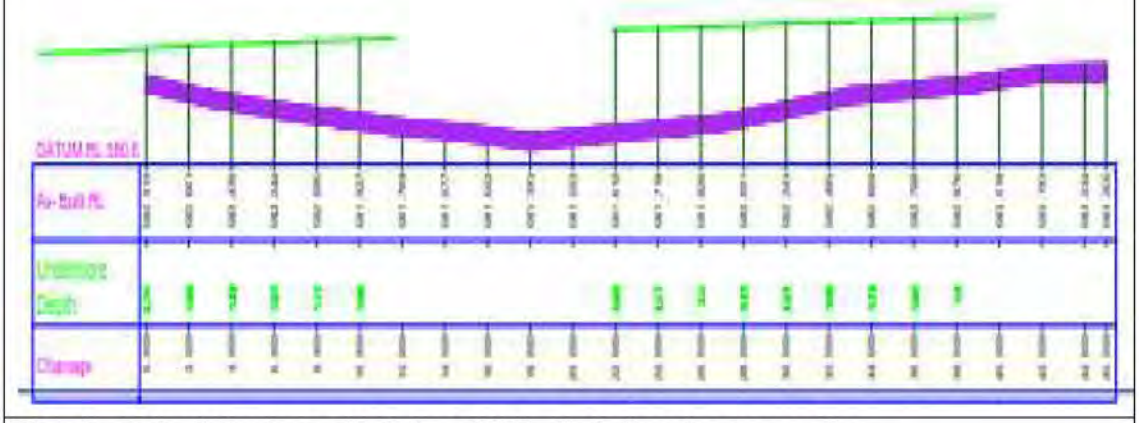


Plate 5 – Federal Flemington Underbore CSR1 – Underbore log cross section

Plate 6 – Bores daylight in Traffic Island – Depth is compliant

Technical Paper

Subject: Federal Flemington – HV/LV Depth of Cover Issue

Plate 7 – South ULX to Block 13 – Top two ducts are LVS (LV Spare), next tow are LV and HVS (HV Spare)

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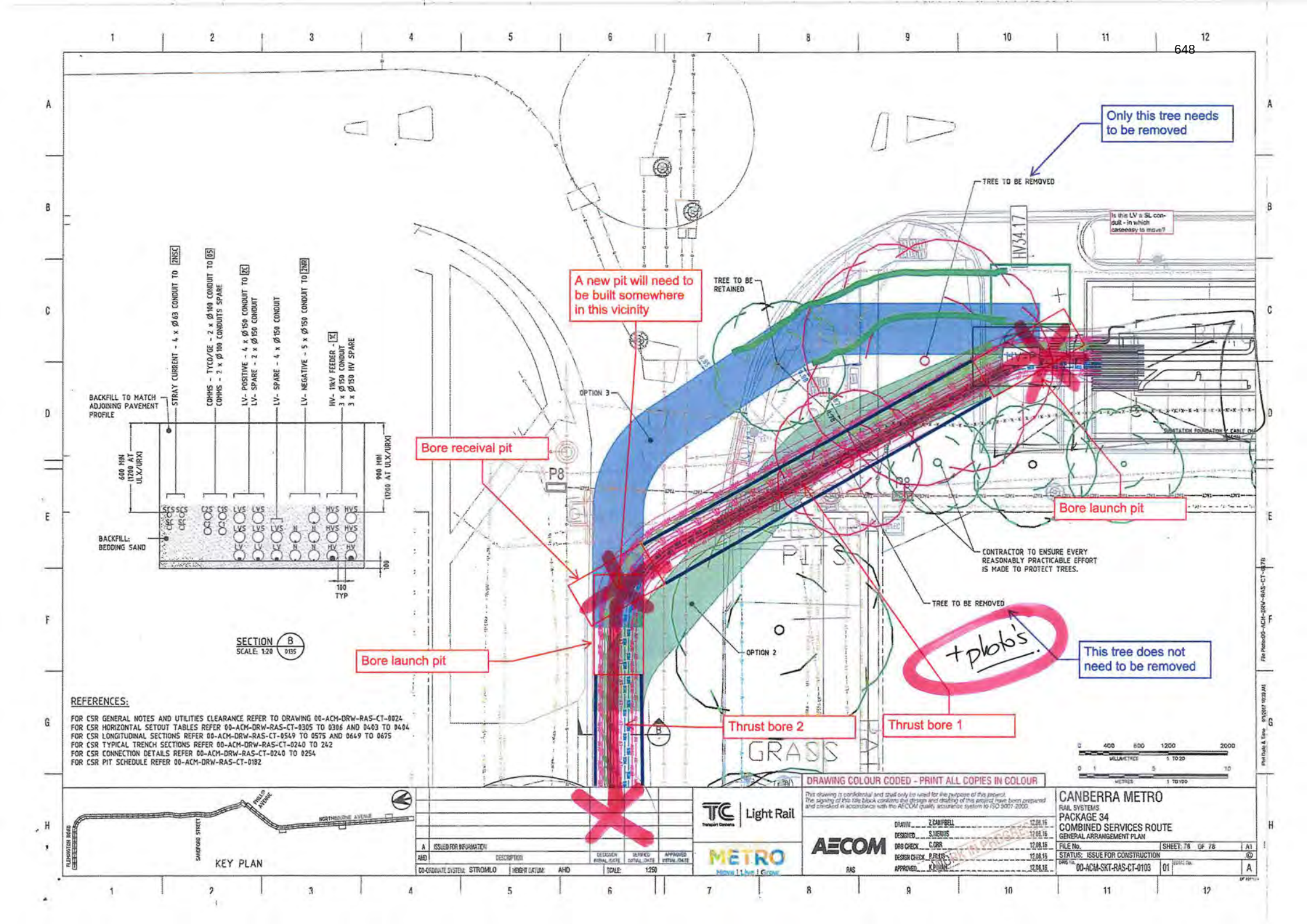
Only this tree needs to be removed
TREE TO BE REMOVED
Is this LV a SL conduit - in which caseeasy to move?
HV34.17
A new pit will need to be built somewhere in this vicinity
TREE TO BE RETAINED
OPTION 3
Bore receival pit
Bore launch pit
CONTRACTOR TO ENSURE EVERY REASONABLY PRACTICABLE EFFORT IS MADE TO PROTECT TREES.
TREE TO BE REMOVED
+ plobs
This tree does not need to be removed
OPTION 2
Bore launch pit
Thrust bore 2
Thrust bore 1
GRASS
BACKFILL TO MATCH ADJOINING PAVEMENT PROFILE
STRAY CURRENT - 4 x Ø63 CONDUIT TO 2NSC
COMMS - TYCO/GE - 2 x Ø100 CONDUIT TO 6S
COMMS - 2 x Ø 90 CONDUITS SPARE
LV- POSITIVE - 4 x Ø150 CONDUIT TO 2K
LV- SPARE - 2 x Ø150 CONDUIT
LV- SPARE - 4 x Ø150 CONDUIT
LV- NEGATIVE - 5 x Ø150 CONDUIT TO 2NR
HV- 11kV FEEDER - 1K
3 x Ø150 CONDUIT
3 x Ø150 HV SPARE
600 MIN (1200 AT ULX/URX)
900 MIN (1200 AT ULX/URX)
BACKFILL: BEDDING SAND
100 TYP
SECTION B
SCALE: 1:20
REFERENCES:
FOR CSR GENERAL NOTES AND UTILITIES CLEARANCE REFER TO DRAWING 00-ACM-DRW-RAS-CT-0024
FOR CSR HORIZONTAL SETOUT TABLES REFER 00-ACM-DRW-RAS-CT-0305 TO 0306 AND 0403 TO 0404
FOR CSR LONGITUDINAL SECTIONS REFER 00-ACM-DRW-RAS-CT-0549 TO 0575 AND 0649 TO 0675
FOR CSR TYPICAL TRENCH SECTIONS REFER 00-ACM-DRW-RAS-CT-0240 TO 242
FOR CSR CONNECTION DETAILS REFER 00-ACM-DRW-RAS-CT-0240 TO 0254
FOR CSR PIT SCHEDULE REFER 00-ACM-DRW-RAS-CT-0182
KEY PLAN
FLEMINGTON ROAD
SANDFORD STREET
PHILLIP AVENUE
NORTHBOURNE AVENUE
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR
CANBERRA METRO
RAIL SYSTEMS
PACKAGE 34
COMBINED SERVICES ROUTE
GENERAL ARRANGEMENT PLAN
FILE No.
SHEET: 78 OF 78
STATUS: ISSUE FOR CONSTRUCTION
00-ACM-SKT-RAS-CT-0103
01
A
Light Rail
METRO
AECOM
ISSUED FOR INFORMATION
CO-ORDINATE SYSTEM: STROMLO
HEIGHT DATUM: AHD
SCALE: 1:250

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From:"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Sent:11/12/2018 9:03 PM
To:"Peffer, Dave" <Dave.Peffer@act.gov.au>;"Jones, Greg" <Greg.Jones@act.gov.au>;"Grice, Simon" <Simon.Grice@act.gov.au>
Cc:"Caruso, Lisa" <Lisa.Caruso@act.gov.au>;"Connelly, Macleay" <Macleay.Connelly@act.gov.au>;"Marcantonio, Laura" <Laura.Marcantonio@act.gov.au>;"Gray, Jennifer" <Jennifer.Gray@act.gov.au>;"Kumar, Vijender" <Vijender.Kumar@act.gov.au>;"Astbury, Geoff" <Geoff.Astbury@act.gov.au>
Subject:FW: Depot Bridge & Federal Flemington Risk Assessments [SEC=UNCLASSIFIED]
Attachments:CMC-RS-CSR-TP-001 - 1.4 - Depot Bridge HV LV Depth of Cover Issues.pdf, CMC_SFAIRP_Risk_Assessment CSR - Fed Flem v2.0.pdf, CMC_SFAIRP_Risk_Assesment CSR-Depot Bridge v2.0.pdf, CMC-RS-CSR-TP-002 - 1.2 - Fed Flem HV LV Depth of Cover Issues.pdf

Good evening Dave,

Following on from our conversation this afternoon (11 Dec 18) – regarding the supporting narrative between CMC (John Holland) and the Independent Electrical Certifier and the acceptance / certification of the suggested risk assessments associated with the Depot Bridge and Flemington Rd / Federal Hi Way.

Should you have any concerns, regarding the technical content or accuracy of the risk assessment please let me know.

I will endeavour to answer your inquiries to the best on my site knowledge and capabilities.

My Regards,

Gordon K

Gordon Kelly | Utilities Technical Regulation - Electrical

Phone 02 62059654 Email: Gordon.Kelly@act.gov.au
Construction, Environment and Workplace Protection Division | Access Canberra | ACT Government
GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

---

Subject: RE: Depot Bridge & Federal Flemington Risk Assessments

Hi Sch 2 2(a)(ii)

Thank you for your email and supporting documentation.

After reviewing the attached files, I seek your assistance to confirm, in the first instance the follow details.

1) Confirming in writing from the Utilities Tech Regulator that AS 2067:2016 can be adopted.

(Adoption of the Standard may trigger a redesign / design assessment for the entire project.)

2) Further supporting information is required, as a minimum.

- IC Appoved design drawings prior to actual construction activities
- NCR's and all RFI and supporting commentary from IC-APP, Territory, CMO and CMC Electrical Superintendent
- Provision of all hold points documentation and appropriate sign off's to continue with construction
- Supporting images during the construction of electrical services at these locations
- CMC – Electrical Superintendent Acceptance / sign off of the installation
- Supporting documentation that licensed electrical persons installed the cables / wiring system
- Supporting documentation from IC-APP, Territory, CM Electrical Superintendent that the installation has been constructed in accordance with the approved design

3) Confirmation of IC -AAP comments have been addressed and resolved as of 04 Dec 2018 – acconex reference.

4) Risk assessment are incomplete and do not address the legislative compliance risks and supporting methodology to resolve

5) Risk assessment are incomplete and do not address SPR requirements

If you require any further advice or assistance please give me a call in the first instance.

Kind Regards,
Kim Power
Project Manager
SEEG Holdings Pty Ltd
M 0434 363 597
PO Box 2036, Kingscliff NSW 2487

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From: Sch 2.2(a)(ii)
Sent: Thursday, 6 December 2018 8:01 PM
To: kim@specialistelectrical.com.au
Cc: Sch 2.2(a)(ii)
Subject: Depot Bridge & Federal Flemington Risk Assessments

Dear Kim,

As you aware, we have been advised by the Technical Regulator that we are able to apply AS2067:2016 to a number of individual issues on the project in order to find a safe and practical way forward.

The Risk Assessments and Technical Papers attached have been produced following a meeting of a Risk Assessment Committee which was assembled to consider the issues of the Depot

Bridge and Federal Flemington. The Risk Assessment committee consisted of Project Co, CMO, CMC Designers, CMC Delivery and the IC. A number of mitigations were then proposed and considered by
The group and these have been set out in the Technical Papers.

As the Independent Verifier we rely on your review and approval of these Risk assessments in order to proceed in a safe and practical way to ensure the project can apply the proposed
mitigations and that the safe energisation of the railway can commence.

I cannot emphasise enough the importance of agreeing a safe and practical way forward. We are happy to discuss at any point tomorrow and consider any further mitigations which allow these works to proceed.

Kind Regards

Sch 2.2(a)(ii)

Sch 2.2(a)(ii)

JOHN HOLLAND

Level 2, 65 Pirmarra Road,
Pyrmont, NSW 2000
M. Sch 2.2(a)(ii)
W. johnholland.com.au

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From: Sch 2.2(a)(ii)
Sent:05/09/2018 10:19 PM
To:"Tony Berryman" <tonyberryman@specialistelectrical.com.au>Sch 2.2(a)(ii)
Cc:"'Kim (SEEG)'" <kim@specialistelectrical.com.au>;"Kelly, Gordon" <Gordon.Kelly@act.gov.au>
Subject:RE: Enclosure
Importance: High

Tony,

Is there an updated position on required earthing configuration with isolation transformers at intersections. As I understand this is still open – please confirm.

Wayne

From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Sent: Thursday, 7 June 2018 4:12 PM
To: Sch 2 2.2(a)(ii)
Sch 2 2.2(a)(ii)
Cc: 'Kim (SEEG)' <kim@specialistelectrical.com.au>; 'Kelly, Gordon' <Gordon.Kelly@act.gov.au>
Subject: RE: Enclosure

Sch 2 2.2(a)(ii)

There are currently 5 isolation transformers energised. We have allowed this as the risk is minimal to a fault caused by external influences and the current design has the enclosures internal equipment all double insulated. Moving forward could we please install a 6mm^2 bond cable between the isolation enclosure frame and the isolated earth bar in the traffic signal enclosure as per the diagram below from EN50122.1.

In parallel I will review the drawings and make comments in the next couple of days and also confirm the protection grading and sizing.

Regards,

Tony Berryman
Director
M 0407 994 831
1/16 Metroplex Avenue, Murarrie Q4172
www.specialistelectrical.com.au

From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Sent: Thursday, 7 June 2018 2:52 PM
To: Sch 2 2.2(a)(ii)
Sch 2 2.2(a)(ii)
Cc: 'Kim (SEEG)' <kim@specialistelectrical.com.au>
Subject: FW: Enclosure

Hi Sch 2 2.2(a)(ii)

Questions on the Wayside and isolation design.

1. Does there need to be a bond back to the new isolated earth stake per the EN standard below. Currently the steel cubical is not connected to either the MEN or the separate earth stake. Is the design put forward done as AS3000 section 1.9.4, page 55?
2. The drawings do not show the isolation txf in the traffic signal cubicle.
3. The Evoenergy fuses/CB are shown as 80A and the cable is 6mm^2. Can this be looked at?

Can we get the designer to look at.

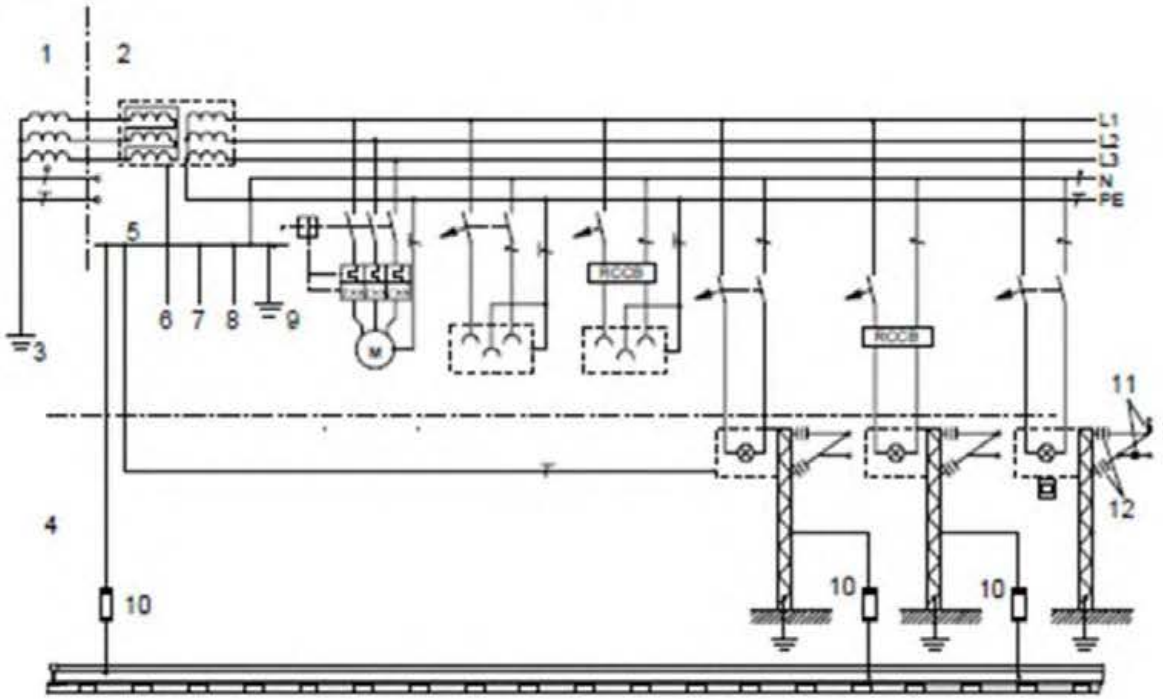
thanks

Regards,

Tony Berryman
Director
M 0407 994 831
1/16 Metroplex Avenue, Murarrie Q4172
www.specialistelectrical.com.au

From: ben@specialistelectrical.com.au <ben@specialistelectrical.com.au>
Sent: Thursday, 10 May 2018 3:18 PM
To: 'Kim Power' <kim@specialistelectrical.com.au>; 'Jamie McCullough' <jamie@specialistelectrical.com.au>; 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>
Subject: FW: Enclosure

This is relevant:



Key

1	electricity supply network	7	heating
2	railway network	8	lightning protection
3	public earth	9	railway structure earth
4	overhead contact line and current collector zone	10	VLD
5	MEB	11	1st insulation
6	water and gas pipes	12	2nd insulation (only for LV traction systems)

Figure 23 — TN system for d.c. railways

NOTE 2 The earthing symbol at masts does not indicate that each mast needs an additional earthing electrode.

NOTE 3 It is also possible to use a RCBO (IEC 60050-442-05-04) instead of circuit breaker in combination with RCCB.

Regards,

Ben Power
Electrical Engineer
M 0435 613 209
1/16 Metroplex Avenue, Murarrie Q4172
www.specialistelectrical.com.au

SEEG
Specialist Electrical Engineering Group

From: ben@specialistelectrical.com.au <ben@specialistelectrical.com.au>
Sent: Thursday, 10 May 2018 3:07 PM
To: 'Jamie McCullough' <jamie@specialistelectrical.com.au>; 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>
Cc: 'Kim Power' <kim@specialistelectrical.com.au>
Subject: RE: Enclosure

Tony, Jamie,

The requirements in AS3000 for electrical separation are for when separation is to be used as a method of fault protection. However, the use of an isolation transformer on the Canberra Metro project is for stray current mitigation and to limit dangerous voltages being transported far away.

With this in mind the isolation TX supplied circuits are not separated circuits and therefore the requirements in AS3000 for separated circuits do not necessarily apply.

Regards,

Ben Power
Electrical Engineer
M 0435 613 209
1/16 Metroplex Avenue, Murarrie Q4172
www.specialistelectrical.com.au

SEEG
Specialist Electrical Engineering Group

From: Jamie McCullough <jamie@specialistelectrical.com.au>
Sent: Tuesday, 8 May 2018 7:10 PM
To: 'Tony Berryman' <tonyberryman@specialistelectrical.com.au>
Cc: 'Kim Power' <kim@specialistelectrical.com.au>; ben@specialistelectrical.com.au
Subject: RE: Enclosure

Hi Tony,

The attached John Holland document (section 2.2) appears to comply with AS/NZS 3000 Clause 7.4. Whereas the drawings previously sent through from Metro appears to have an earth stake on the secondary which would not pass the tests detailed in AS/NZS 3000 Clause 7.4.7.3.

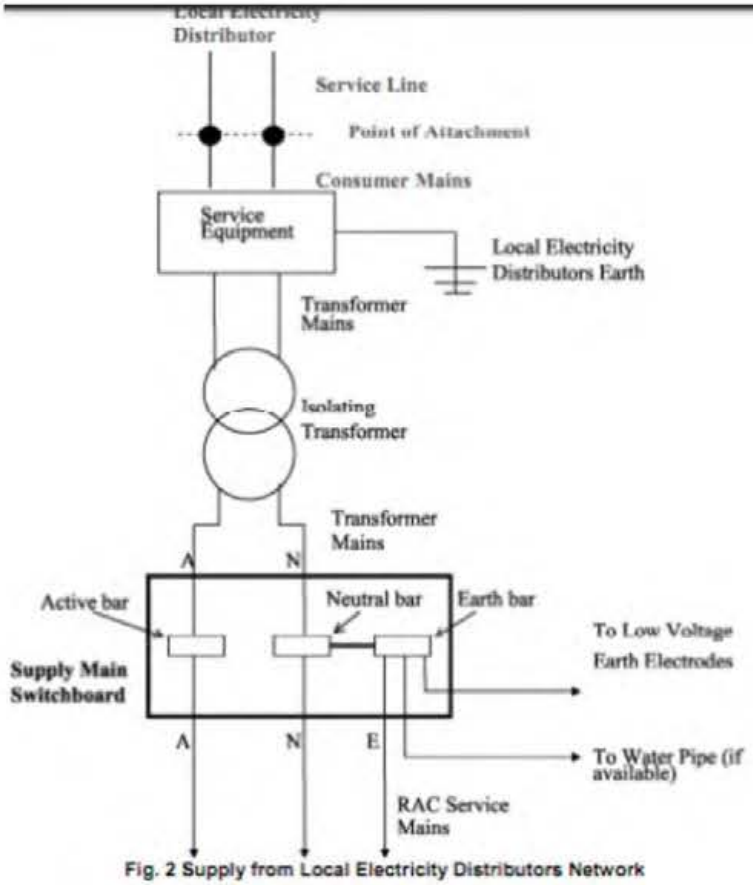


Fig. 2 Supply from Local Electricity Distributors Network

In the situation described above no connection shall be made to the isolating transformer screen.

The case of the transformer is not to be earthed.

7.4.7.3 *Multiple items of electrical equipment*

Where more than one item of electrical equipment is supplied from a single separated circuit, separation shall be verified in accordance with Clause 7.4.7.1 and, in addition, by a measurement of the insulation resistance between—

(a) the separated circuit and the equipotential bonding conductor; and

(b) the equipotential bonding conductor and earth; and

(c) the equipotential bonding conductor and any equipotential bonding conductor associated with another separated circuit.

Thanks,

Jamie McCullough
Lead Electrical Engineer
High Voltage / Hazardous Area Auditor
M 0438 717 994
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www.specialistelectrical.com.au

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-----Original Message-----
From: Tony Berryman <tonyberryman@specialistelectrical.com.au>
Sent: Tuesday, 8 May 2018 3:02 PM
To: jamie@specialistelectrical.com.au; Kim Power <kim@specialistelectrical.com.au>; ben@specialistelectrical.com.au
Subject: Enclosure

60
ROAD
WORK