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PROVISION OF CONSULTING ENGINEERING SERVICES

**81 GOW STREET,
PADSTOW NSW 2211
STORMWATER PIPE CONDITION & ADEQUACY**

Prepared for: Gow Street Recycling Centre
81 Gow St,
Padstow NSW 2211

Prepared by: Triaxial Consulting Pty Ltd
Suite 12, Level 14
327 Pitt Street,
SYDNEY NSW 2000

26 APRIL 2021



Document Control

Client	Gow Street Recycling Centre		
Prepared By:	Triaxial Consulting Pty Ltd		
Report Author	Daniel Bradford		
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01	DB	JK	26/04/2021



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Suite 12, Level 14, 327 Pitt St
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26 April 2021

Gow Street Recycling Centre
81 Gow St
Padstow NSW 2211

Re: Provision of Consulting Engineering Services
Gow Street Recycling Centre – 81 Gow St, Padstow
Triaxial Reference: TX15535.00-01.DB.docx

As requested, an inspection of the subject address was undertaken by Jeff Knox and Daniel Bradford of Triaxial Consulting on Wednesday 14 April 2021. 'Sydney Wide Environmental Services' were also present during the inspection.

The purpose of the inspection was to locate the two existing stormwater pipes running east-west across the site, measure the internal pipe sizes, depth and fall, and inspect their condition visually (with the aid of remote-control cameras).

It has been noted that Gow Street Recycling Centre plan on increasing the frequency of trucks entering/exiting the site. To our understanding, Council have requested confirmation of the structural adequacy of the existing stormwater pipes crossing the site for the additional loading, as these are Council assets.

Structural computations have been undertaken following our site inspection in order to assess the load capacity of the existing stormwater pipes and will be discussed herein.

All photographs taken at the time of inspection are filed with Triaxial Consulting.

(A) SITE INFORMATION

Gow Street Recycling Centre is located on the South side of Gow Street. Entry to and exit from the site is via a concrete driveway from Gow Street along the western boundary. Two weighbridges are located directly in front of the entry/exit on the north-western corner of the site.

A number of lightweight steel structures, including a single-storey office building are located on the site. At the time of inspection, some construction works had commenced which is believed to include new lightweight steel structures on a new concrete slab. The surface pavement is predominantly concrete or gravel. Refer Appendix A for the aerial view of the site.

Refer Appendix A

An easement containing two Council-asset stormwater pipes runs approximately east-west across the site, dividing the site in two halves. Refer Appendix B for the site survey.

Refer Appendix B

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(B) OBSERVATIONS & COMMENTS

At the time of our investigation works, the following observations were made:

An above-ground survey was undertaken by Triaxial Consulting to determine the heights of the pits at the western and eastern boundaries. A visual inspection inside the stormwater pit at the western boundary was also undertaken, and included measurements of the main stormwater pipe diameters and the stormwater pit dimensions as well as the approximate falls. Access to the stormwater pipes at the eastern pit could not be achieved during our site inspection.

Refer Appendix C

It was found that the two council-asset stormwater pipes were reinforced concrete with an internal diameter of 1520mm. At the western side of the property, the two pipes had approximately 660mm of cover. Near the eastern boundary, the pipes had approximately 1080mm of cover. The pipe wall thickness was measured to be approximately 80-85mm.

At the time of inspection, a wheel loader and excavator were observed to operate towards the back of the site, and used for stockpiling material and loading of trucks. Small trucks were regularly observed to access the site. Generally, the trucks will enter from Gow St and circulate towards the back of the site to be loaded before exiting via a concrete driveway along the western boundary. In this motion, the trucks cross the easement (and stormwater pipes) perpendicularly twice per visit.

An assessment of the load capacity of the existing 1500mm diameter stormwater pipes has been carried out using the 'PipeClass' program by the Concrete Pipe Association of Australasia (CPAA). As the pipes are existing and no geotechnical report has been provided, some assumptions have been made regarding the founding material and loadings. Zoe Muscat of Gow Street Recycling Centre provided Triaxial with the Wheel loader specs. All other assumptions/design parameters (including loads) are summarised in the report in Appendix D.

Refer Appendix D

Video recording inside the stormwater pipes was undertaken by 'Sydney Wide Environmental Services Pty Ltd' during our inspection. The video recordings included both stormwater pipes and extended the length of the subject site. Due to technical difficulties locating the camera from above-ground, the exact location of the camera relative to above ground could not be determined. An inspection report was provided to Triaxial after the inspection.

Refer Appendix E

A number of smaller pipe connections can be observed in the CCTV report, of which 'Sydney Wide Environmental Services' state as good workmanship with the connection appearing open.

For pipe section 1 at chainage 54.1 and pipe section 2 at chainage 38.35, the report identifies breaking out of the inside of the concrete pipe, with some pieces missing.

For pipe section 1 at chainage 51.45, Sydney Wide Environmental Services identify a 'circumferential fracture of approximately 5mm at the crown of the pipe.

For pipe section 1 at chainage 19.18, Sydney Wide Environmental Services identify infiltration and sweating at a joint.



(C) EVALUATIONS & RECOMMENDATIONS

Based on the observations made at the time of site inspection and the structural calculations that have been carried out, we make the following evaluations and recommendations:

Using the PipeClass program, it was found that for the loads provided/assumed and depth of fill over, a Class 2 reinforced concrete pipe is required, which is the minimum pipe class supplied for that size of pipe. Therefore, it is deemed the existing 1520mm internal diameter pipes are structurally adequate for the anticipated loads that will be imposed on them.

Refer Appendix D

In the areas where Sydney Wide Environmental Services identified breaking out of concrete inside the stormwater pipe, we recommend further investigation to determine the extent of damage, particularly if there is any corrosion to the reinforcement. It is expected that the areas will require a patch fixing in order to improve the pipe's durability. Triaxial can provide remedial details if required.

Where a circumferential fracture was identified, we again recommend the area is further investigated to determine if there is a clear crack through the pipe wall, or if the deterioration is only to the inside of the pipe wall. Pending this, Triaxial can provide details for strengthening of the pipe section or patch repair. It should be noted that most of the ground settlement leading to circumferential cracking would be from initial loading. Since there is no planned increase in the magnitude of loading, we do not expect there to be significant additional ground settlements that could worsen the circumferential cracking.

Subject to the above investigations, we recommend these areas are regularly monitored after repair to ensure the problem does not redevelop,

(D) SUMMARY & CONCLUSION

We offer our services to prepare a detailed scope of works for tendering purposes, engage three builders to tender the proposed works, review tenders, prepare contract documents and project the proposed works.

We trust this report meets your current requirements and should you wish to discuss the matter further please do not hesitate to contact the undersigned.

Yours faithfully

TRIAXIAL CONSULTING PTY LTD

Daniel Bradford

Senior Structural Engineer

BEng (Civil, structures)

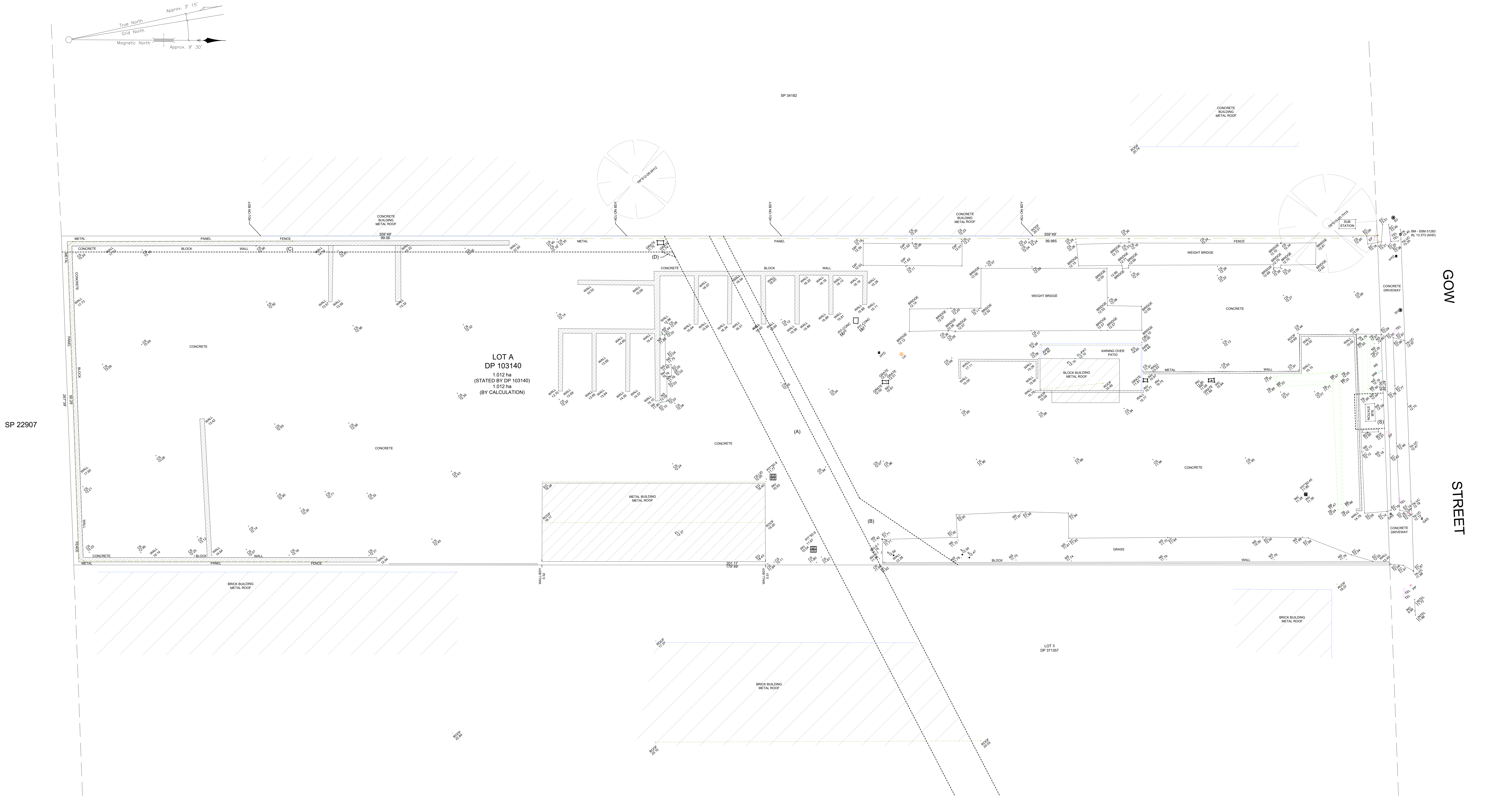


APPENDIX A





APPENDIX B



LEGEND:

AHD	AUSTRALIAN HEIGHT DATUM
AWN	AWNING
BM	BENCH MARK
CONC	CONCRETE
CS	CONCRETE SURFACE
D/H/S	DIAMETER/HEIGHT/SPREAD
D	DOOR
EC	EDGE OF CONCRETE
EG	EAVE & GUTTER
FL	FLOOR LEVEL
GDN	GARDEN
HYD	HYDRANT
IL	INVERT LEVEL
LH	LAMP HOLE
NS	NATURAL SURFACE
PAV	PAVERS
PP	POWER POLE
RL	REDUCED LEVEL
S	STEPS
SL	SURFACE LEVEL
SIL	WINDOW SILL
SV	STOP VALE
TEL	TELSTRA PIT
TK	TOP OF KERB
TW	TOP OF WALL
VC	VEHICLE CROSSING
W	WINDOW
WM	WATER METER
WTOP	TOP OF WINDOW

(A) DRAINAGE EASEMENT 6.095 WIDE (VIDE D692964)
(B) EASEMENT FOR DRAIN WATER 1.905 WIDE & VARIABLE (VIDE DP640567)
(C) DRAINAGE EASEMENT 2.44 WIDE (VIDE P017628)
(D) EASEMENT FOR DRAINAGE VARIABLE WIDTH (VIDE Q930497)
(S) EASEMENT FOR ELECTRICAL PURPOSES 4.42 WIDE (VIDE 9024383T)

TRENT JAMES VELLA
(REGISTERED SURVEYOR)
SURVEYOR ID No. 8959

NOTES:

A) SERVICES SHOWN HAVE BEEN DERIVED FROM VISUAL EVIDENCE APPARENT AT THE TIME OF SURVEY. SERVICES MAY EXIST WHICH ARE NOT SHOWN. THE RELEVANT SERVICE AUTHORITY SHOULD BE CONTACTED TO VERIFY THE EXISTENCE AND POSITION OF SERVICES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION.

B) DIAMETER, HEIGHT & SPREAD OF TREES ARE APPROXIMATE ONLY.

C) LEVELS SHOWN ARE OF AUSTRALIAN HEIGHT DATUM.

ORIGIN OF LEVELS: SSM 51283, RL 13.373 (AHD), CLASS B

D) USE STATED DIMENSIONS. DO NOT SCALE.

E) THESE NOTES FORM PART OF THIS PLAN AND CANNOT BE REMOVED.

F) NO COVENANTS AND/OR RESTRICTIONS HAVE BEEN INVESTIGATED BY C & A SURVEYORS PTY LTD.

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DETAIL & IDENTIFICATION SURVEY OF
LOT A IN DP 103140, LOCATED AT
No 81-87 GOW STREET, PADSTOW

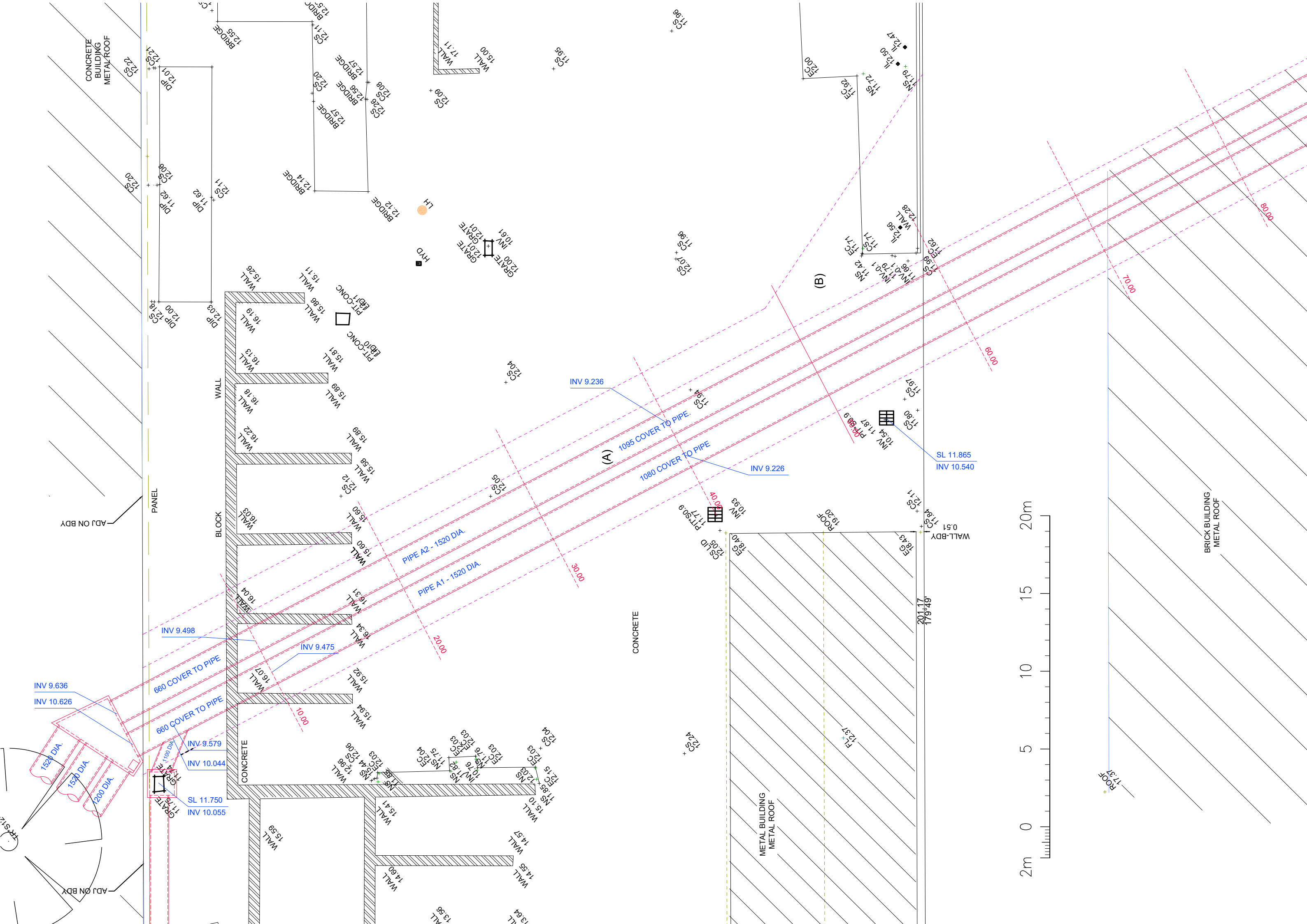
INSTRUCTING PARTY: EMMA HANSMA

Revision No	Description	Date
01	DRAWN FOR ISSUE	11/02/20

DATUM:	AHD	SURVEYED BY:	A.S
SURVEY DATE:	29/01/20	DRAWN BY:	J.D
DATE DRAWN:	11/02/20	SCALE:	1:200@A0
REFERENCE:	13415-20 DET/ID	SHEET:	1 OF 1



APPENDIX C





APPENDIX D

DESIGN OF 1500 DIA. RRJ DRAINAGE PIPE

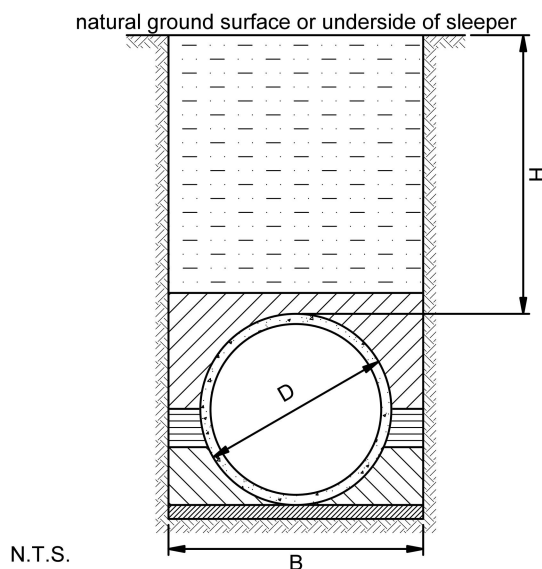
Client And Project Details

Date: 16-Apr-2021

Job number: TX	Design: Design01
Client:	Designer: Daniel Bradford
Project: 81 Gow St, Padstow	Company: Triaxial Consulting
Description:	File: 81 Gow St, Padstow - 1500 dia pipe check.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	1500
Pipe External Diameter, D (mm):	1714
Pipeline Orientation:	skew
Soil Type:	wet clay
Soil Density (kN/m ³):	20
Soil Parameter K _μ :	0.1100
Trench Width, B (m):	2.285
Height Of Fill, H (m):	1.100
Support Type:	HS2
Bedding Factor:	2.5



In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/2.5	Wq/1.5	Ww/2.5	Tc	Pipe Class
earth + weight of internal water	1.100	16.2		5.6	21.8	2
uniform surcharge load	1.100	26.5		5.6	32.1	2
point load	1.100	17.4		5.6	23.0	2
W80(AS/NZS3725)	1.100	16.2	15.9	5.6	37.7	2
A160(AS/NZS3725)	1.100	16.2	21.1	5.6	42.9	2
CAT325B (Other)	1.100	16.2	11.3	5.6	33.1	2
T44(AUSTROADS) (Other)	1.100	16.2	16.0	5.6	37.8	2
VOLVO L150H WHEEL LOADER (Other)	1.100	16.2	16.5	5.6	38.3	2

All loads in kN/m. *Includes earth load at fill height shown.

Controlling Loads: earth + A160(AS/NZS3725) standard vehicle + weight of internal water

Minimum Test Load: $T_c = 16.2 + 21.1 + 5.6 = 42.9$ kN/m

Adopt 1500 dia. Class 2 RRJ pipe (1500/2 RRJ) in accordance with AS/NZS 4058:2007.

Design Notes:

- A nominal pipe wall thickness of 83 mm has been assumed.

INSTALLATION OF 1500 DIA. CLASS 2 RRJ DRAINAGE PIPE

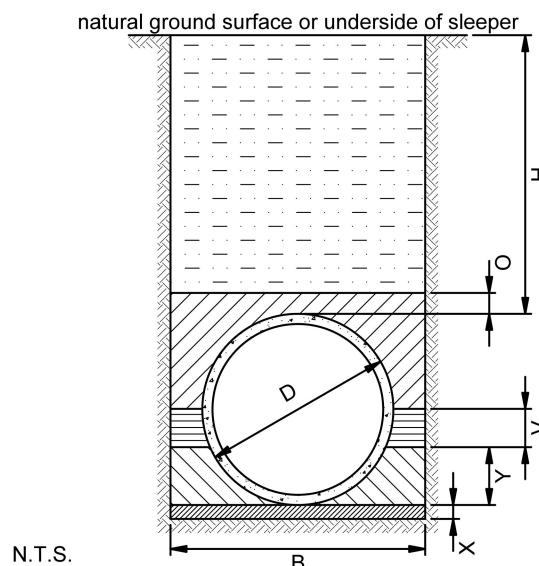
Client And Project Details

Date: 16-Apr-2021

Job number: TX	Design: Design01
Client:	Designer: Daniel Bradford
Project: 81 Gow St, Padstow	Company: Triaxial Consulting
Description:	File: 81 Gow St, Padstow - 1500 dia pipe check.ppr

Design Parameters

Installation Condition:	trench
Pipe Nominal Diameter (mm):	1500
Pipe External Diameter, D (mm):	1714
Pipeline Orientation:	skew
Trench Width, B (m):	2.285
Height Of Fill, H (m):	1.100
Support Type:	HS2
Excavation Volume (solid) (m³/m):	6.8



Installation Quantities

Support Zone	Depth (mm)	Quantities(m³/m)		Minimum Zone Compaction (%)	
		Solid	Loose	Density Index (for cohesionless soils)	Relative Density (standard compaction)
Bed zone	X = 150	0.343	0.412	60	-
Haunch zone	Y = 515	0.594	0.713	60	-
Side zone	V = 345	0.213	0.256	60	90
Overlay zone	O = 150	1.146	0.000	as per project specification	as per project specification
Backfill	950	2.171	0.000	as per project specification	as per project specification

Material Grading Requirements

Sieve Size (mm)	75.0	19.0	9.5	2.36	0.60	0.30	0.15	0.075
Bed & Haunch Zones (% mass passing)	-	100	-	100-50	90-20	60-10	25-0	10-0
Side Zone (% mass passing)	100	-	100-50	100-30	50-15	-	-	20-0

Construction Equipment Requirements

No construction vehicles considered.

Design Notes:

1. All bed, haunch and side zone material passing the 0.075 mm sieve to have low plasticity (AS 1726).
2. Ordinary fill material to have no stones > 150 mm dia., and no more than 20% to be 75-150 mm.
3. For additional information refer to the project specification.
4. A nominal pipe wall thickness of 83 mm has been assumed.

DESIGN OF 1500 DIA. CLASS 2 RRJ DRAINAGE PIPE

Client And Project Details

Date: 16-Apr-2021

Job number: TX	Design: Design01
Client:	Designer: Daniel Bradford
Project: 81 Gow St, Padstow	Company: Triaxial Consulting
Description:	File: 81 Gow St, Padstow - 1500 dia pipe check.ppr

In Service Load Cases/Combinations Considered (controlling load case/combination highlighted)

Load Description*	Fill Height (m)	Wg/2.5	Wq/1.5	Ww/2.5	Tc	Pipe Class
earth + weight of internal water	1.100	16.2		5.6	21.8	2
uniform surcharge load	1.100	26.5		5.6	32.1	2
point load	1.100	17.4		5.6	23.0	2
W80(AS/NZS3725)	1.100	16.2	15.9	5.6	37.7	2
A160(AS/NZS3725)	1.100	16.2	21.1	5.6	42.9	2
CAT325B (Other)	1.100	16.2	11.3	5.6	33.1	2
T44(AUSTROADS) (Other)	1.100	16.2	16.0	5.6	37.8	2
VOLVO L150H WHEEL LOADER (Other)	1.100	16.2	16.5	5.6	38.3	2

All loads in kN/m. *Includes earth load at fill height shown

weight of internal water

Working load due to water load, $Ww = 14.1$ kN/m

earth

Height of fill, $H = 1.100$ m

Pipeline orientation is skew

Trench Condition, vertical walls

Spangler coefficient, $Ct = 0.457$

Working load due to earth fill, $Wg = 47.7$ kN/m

Positive Projection Check

Settlement ratio, $rs = 1.000$

Projection ratio, $p = 0.700$

Plane of equal settlement height, $He = 1.100$

Modified Spangler coefficient, $C'e = 1.074$

Working load due to earth fill, $Wg = 40.5$ kN/m

Positive projection controls, adopt $Wg = 40.5$ kN/m

W80(AS/NZS3725)

Footprint width at top of pipe, $L1 = 2.096$ m

Footprint length at top of pipe, $L2 = 1.796$ m

Footprint area, $A = 3.764$ m²

Load on footprint = 80.0 kN

Impact factor = 1.24

Live load pressure at top of pipe, $q = 26.246$ kPa

Minimum of $L2$ and D , $S = 1.714$ m

Effective supporting length of pipe, $Le = 3.960$ m

Working load due to live load, $Wq = 23.8$ kN/m

DESIGN OF 1500 DIA. CLASS 2 RRJ DRAINAGE PIPE**A160(AS/NZS3725)**

Footprint width at top of pipe, $L1 = 4.096$ m
Footprint length at top of pipe, $L2 = 1.796$ m
Footprint area, $A = 7.356$ m²
Load on footprint = 160.0 kN

Impact factor = 1.24
Live load pressure at top of pipe, $q = 26.861$ kPa

Minimum of $L2$ and D , $S = 1.714$ m
Effective supporting length of pipe, $Le = 5.960$ m

Working load due to live load, $Wq = 31.6$ kN/m

point load

Footprint width at top of pipe, $L1 = 1.606$ m
Footprint length at top of pipe, $L2 = 1.606$ m
Footprint area, $A = 2.579$ m²
Load on footprint = 10.0 kN

Impact factor = 1.00
Point load pressure at top of pipe, $q = 3.877$ kPa

Minimum of $L2$ and D , $S = 1.606$ m
Effective supporting length of pipe, $Le = 3.470$ m

Working load due to point load, $Wg = 2.9$ kN/m

uniform surcharge load

Working load due to uniform surcharge load, $Wg = 25.7$ kN/m

CAT325B (Other)

CAT325B: Excavator CAT325B - Total Weight 25.9 t

Footprint width at top of pipe, $L1 = 5.388$ m
Footprint length at top of pipe, $L2 = 2.195$ m
Footprint area, $A = 11.827$ m²
Load on footprint = 127.0 kN

Impact factor = 1.24
Live load pressure at top of pipe, $q = 13.262$ kPa

Minimum of $L2$ and D , $S = 1.714$ m
Effective supporting length of pipe, $Le = 7.252$ m

Working load due to live load, $Wq = 16.9$ kN/m

DESIGN OF 1500 DIA. CLASS 2 RRJ DRAINAGE PIPE**T44(AUSTROADS) (Other)**

T44(AUSTROADS): Standard Vehicle, Austroads - T44 Truck Load

Footprint width at top of pipe, $L1 = 3.796$ mFootprint length at top of pipe, $L2 = 2.995$ mFootprint area, $A = 11.369$ m²

Load on footprint = 192.0 kN

Impact factor = 1.24

Live load pressure at top of pipe, $q = 20.857$ kPaMinimum of $L2$ and D , $S = 1.714$ mEffective supporting length of pipe, $Le = 5.660$ m*Working load due to live load, $Wq = 24.0$ kN/m***VOLVO L150H WHEEL LOADER (Other)**

VOLVO L150H WHEEL LOADER: New vehicle

Footprint width at top of pipe, $L1 = 4.096$ mFootprint length at top of pipe, $L2 = 1.795$ mFootprint area, $A = 7.352$ m²

Load on footprint = 125.0 kN

Impact factor = 1.24

Live load pressure at top of pipe, $q = 20.997$ kPaMinimum of $L2$ and D , $S = 1.714$ mEffective supporting length of pipe, $Le = 5.960$ m*Working load due to live load, $Wq = 24.7$ kN/m*

Installation Specification for Type HS2 Support

This specification is prepared to ensure the pipe installation conforms with the requirements of AS/NZS 3725:2007 Design for installation of buried concrete pipes.

Type HS2 supports represents an installation with controlled compaction in the bed zone and haunch zone.

Excavation and Bedding

Prior to completion of excavation, the soil type in which the trench is to be excavated shall be assessed for density and stiffness, to the satisfaction and approval of the superintendent.

If it is established that the natural ground will provide effective side support, the trench width for both trench condition an embankment condition shall be as shown on the drawings.

For an embankment installation, the positive projection of the pipe shall be 0.5 times the pipe outside diameter or less. Where the projection of the pipe above natural ground surface is greater than 0.5 times the pipe outside diameter, it will be necessary to construct the embankment to a height above top of bed level at least equal to 0.5 time pipe outside diameter, prior to laying the pipe, and to a width equal to at least 1.5 times pipe nominal diameter on each side of the proposed trench width.

The embankment shall be constructed in accordance with the specification for refilling, bed zone. A trench is then to be cut through the constructed embankment.

For a trench installation, if in the opinion of the superintendent, the natural ground is not considered effective in providing the necessary side support, the trench shall be excavated to a width of 4.0 times pipe nominal diameter to the top of bed level.

The wide trench excavation shall then be refilled in accordance with the specification for refilling, side zone.

Refilling in embankment or wide trench shall be placed in layers not exceeding 150mm when compacted and, if cohesive material is used, the moisture content shall be controlled to within the range 85 percent to 115 percent of the optimum moisture content. Compaction by tamping, rolling and/or vibration shall be carried out to achieve a minimum Relative Density (RD) of 90% of standard maximum dry density, or a minimum Density Index (DI) of 60 for cohesionless material.

Density achieved shall be monitored by field testing as directed by the superintendent.

The required trench for the installation, to the width and depth shown on the drawings shall be excavated centrally through the above compacted select fill material.

Excavation shall be to line and level shown on the drawings.

Should the excavation to the required foundation at the bottom of the bed level reveal material, which in the opinion of the superintendent is unsuitable, the trench shall be over-excavated to a depth required to remove the unsuitable material and refilled with compacted material conforming to the requirements for the bed zone.

Bedding

Bed zone material shall be select fill. Select fill as defined in AS/NZS 3725:2007 is material obtained from excavation of the pipe trench or elsewhere with a particle size not greater than 19 mm, and which conforms with the following soil classes as defined in Appendix D of AS 1726.

Select fill grading requirements are defined as below.

Sieve Size (mm)	19.0	2.36	0.60	0.30	0.15	0.075
% Mass Passing	100	100-50	90-20	60-10	25-0	10-0

The material passing the 0.075mm sieve must have low plasticity as described in Appendix D of AS 1726.

Alternatively select fill as defined in AS/NZS 3725:2007 which does not conform with the above grading limits may be used provided that it is cement stabilized. Where controlled low strength materials are used they should comply with Appendix A of AS/NZS 3725:2007 to achieve 28 day compressive strength in the range of 0.6 to 3.0 MPa.

The bed zone shall be placed to the final required thickness as follows:

Pipe Nominal Diameter	Minimum bed zone thickness
≤ 1500mm	100mm
> 1500mm	150mm

The bed material shall extend over the full width of the trench and shall be compacted by tamping, rolling and/or vibration to a minimum Density Index (DI) of 60.

Compaction achieved shall be monitored by field testing in accordance with AS 1289.

The bed level shall be graded to provide for a uniform fall to the discharging end of the pipeline, with line and level as shown on the drawings.

For pipes with sockets protruding beyond the barrel outside surface, chases shall be dug into the bed and foundation if necessary, in the appropriate positions, so that each pipe is supported along the full length of the barrel and the socket is not subjected to point loading.

Refilling

The refilling shall be carried out in four stages and these are to be identified as:

- Haunch zone
- Side zone
- Overlay zone
- Backfill or embankment fill

The **haunch zone** shall extend from the top of the bed zone to 0.3 times the pipe outside diameter and shall be fill material complying with the requirements shown above for the bed zone.

The material shall be placed over the full width of the trench either in layers not exceeding 150mm compacted thickness and compacted by conventional methods or compacted in one operation by saturation and vibration to achieve a minimum Density Index (DI) of 60.

Compaction achieved shall be monitored by field testing in accordance with AS 1289.

The **side zone** shall extend from the top of the haunch zone to 0.5 times pipe outside diameter and shall consist of select fill material complying with the following grading:

Sieve Size (mm)	75	9.5	2.36	0.60	0.075
% Mass Passing	100	100-50	100-30	50-15	25-0

The material shall be placed over the full width of the trench in layers not exceeding 150mm compacted thickness and compacted by tamping, rolling or vibration to a minimum Relative Density (RD) of 90% or a minimum Density Index (DI) of 60.

Compaction achieved shall be monitored by field testing in accordance with AS 1289.

The **overlay zone** shall extend from the top of the side zone to 150mm above the top of the pipe and around the pipe measured radially from any point. The fill material in the overlay zone shall be ordinary fill consisting of material from the excavation or elsewhere. It shall not contain any stones larger than 150mm, nor more than 20% with a size between 75mm and 150mm. No defined degree of compaction is specified yet material should be compacted as necessary to prevent excessive settlement in the ground surface level over the installed pipeline.

The fill in the overlay zone should be placed and compacted in relatively thin layers. For select fill the layer thickness should not exceed 200mm.

Backfill or Embankment fill is to be the remainder of the refilling and should consist of any available material up to finished levels as shown on the drawings.

The material should be compacted as necessary to prevent excessive settlement in the ground surface level over the installed pipeline.

Refilling of sheeted trenches shall be carried out to the following requirements:

- No struts, walling or other supports shall be removed until the top of the compacted refilling has reached the level of these supports.
- No wall sheeting is to totally removed from the trench until the level of the compacted refill is within 1500 mm of the surface.
- No wall sheeting is to be removed, in dewatered trenches, until the level in water table between natural ground and refill material is less than 500mm.
- The wall sheeting is to be withdrawn or removed in such a manner that the pipe and compacted bed and haunch support are not disturbed during such withdrawal or removal.

Important Notes:

- Ensure the bed zone is even and well graded to provide uniform support for the pipe.
- Do not compact directly over the pipe.
- Ensure the pipe is appropriately embedded and covered before allowing any construction equipment or plant over the top.
- Compact as you go and ensure that the appropriate levels of compaction are reached.



APPENDIX E

City :



Sydneywide Environmental Services

40 edward st

Riverstone

Tel: 0417924993

Website:

Email: sydwide@bigpond.com

/ Main sections / Inspection: 1

Project name TRIAXIAL CONSULTING 80 GOW ST	Project Number:	Responsible:	Date: 14/04/2021
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No.	Start MH	End MH	Date	Location/Street	Tape No.	Material	m	(m)
1	A	A1	14/04/2021	GOW ST		Reinforced concrete	95.97	95.37
2	A	A2	14/04/2021	GOW ST		Reinforced concrete	98.79	98.19

Pipe size: CIRCULAR 1125 = 194.76 m (193.56 m)

All sections = 194.76 m (193.56 m)



Inspection summary / Inspection: 1

Project Name: TRIAXIAL CONSULTING 80 GOW ST PADSTOW CCTV	Project number:	Date: 14/04/2021	Contact:	
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Please find per enclosure the inspection report

Total Length of sewer network	194.76 m
Inspected Length of sewer network	193.56 m
Not inspected Length of sewer network	1.20 m
Total Length of house connections (satellite)	0.00 m
Inspected Length of house connections (satellite)	0.00 m
Not inspected Length of house connections (satellite)	0.00 m
Number of Sections	2
Number of house connections	0
Number of Photos	12



Inspection Summary / Inspection: 1

Date:
14/04/2021




Responsible:

Sewer Reference:

Section Numer: 1
Start node: A
End node: A1

Section length: 95.97 m

Pipe length:
Material Reinforced concrete
Shape: Circular

		<u>0.60</u>	STGP	Start node, grated inlet pit, Nodename: A	
		<u>0.60</u>	WLC	Water level, clear flow (the invert is visible)	
		<u>7.79</u>	CNGO	Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock	
		<u>19.18</u>	IS	Infiltration, sweating, at joint , from 4 to 8 o'clock, Start	
		<u>31.66</u>	CNGO	Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock	
		<u>50.34</u>	CNGO	Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock	
		<u>51.45</u>	FC	Circumferential fracture , width 5mm , from 12 to 12 o'clock	8;
		<u>54.10</u>	BM	Breaking, some pieces are missing , length of break 200 , at 3 o'clock	60;
		<u>63.47</u>	BM	Breaking, some pieces are missing , length of break 800 , from 1 to 4 o'clock	60;
		<u>63.47</u>	WLC	Water level, clear flow (the invert is visible), depth 5%	
		<u>95.97</u>	LL	The conduit curves to the left, length of curved section 10mm	
		<u>95.97</u>	GC	END OF WORKS	



Inspection Summary / Inspection: 1

Date:
14/04/2021

Responsible:

Sewer Reference:

Section Numer: 2
Start node: A
End node: A2

Section length:

98.79 m

Pipe length:

Material Reinforced concrete

Shape:

Circular

	A	0.60	STGP	Start node, grated inlet pit, Nodename: A	
		0.60	WLC	Water level, clear flow (the invert is visible)	
		1.43	CNGO	Connection, good workmanship, connection appears to be open, diameter 300mm , at 10 o'clock	
		13.23	CNGO	Connection, good workmanship, connection appears to be open, diameter 150mm , at 10 o'clock	
		38.35	BM	Breaking, some pieces are missing , length of break 400 , from 9 to 11 o'clock	60;
		52.12	CNGO	Connection, good workmanship, connection appears to be open, diameter 225mm , at 10 o'clock	
		60.46	BM	Breaking, some pieces are missing , length of break 100 , at 10 o'clock	60;
		98.79	LL	The conduit curves to the left, length of curved section 45mm	
	A2	98.79	GC	END OF WORKS	

WSA assessment / Inspection: 1

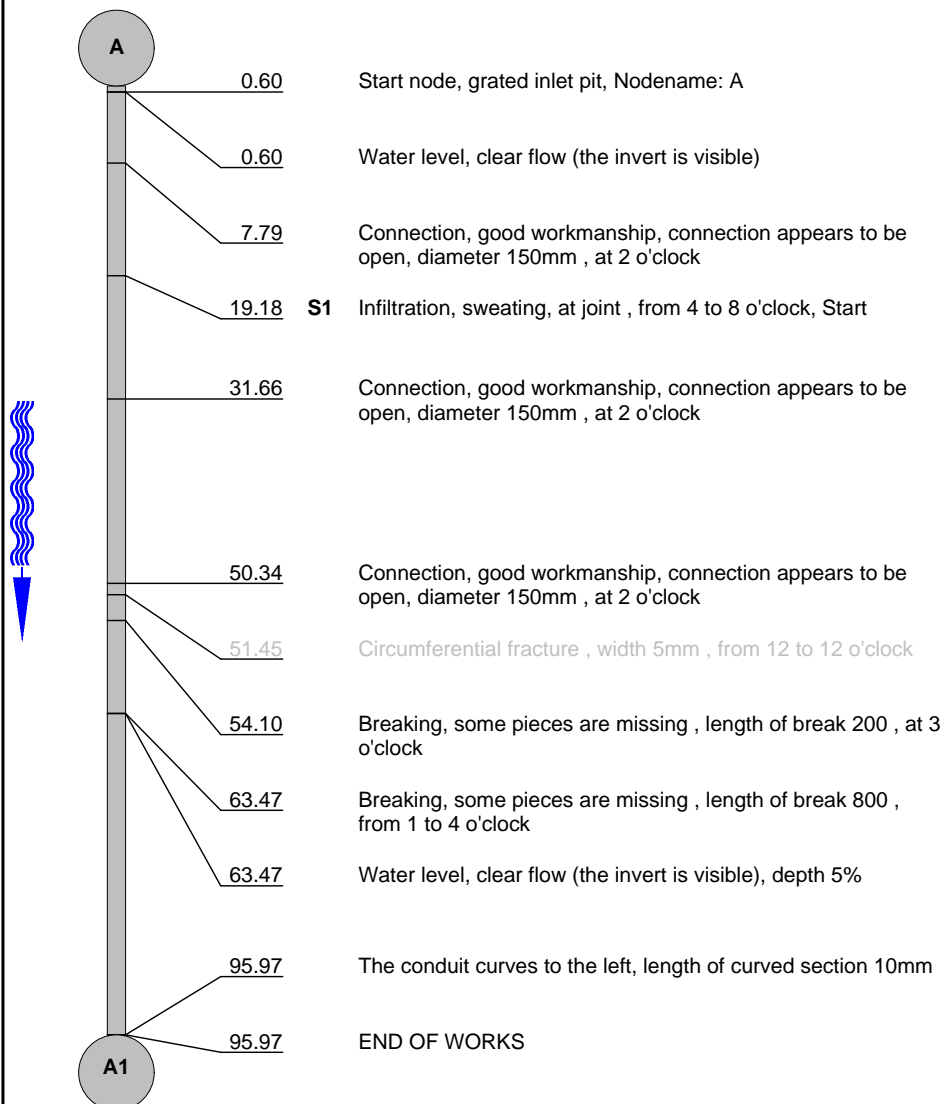
Date: 14/04/2021	Asset owner's job ref.:	Asset Owner: TRIAXIAL CONSULTING	Operator : CRAIG PICKUP	Section number: 1	Pipe Asset Id:
Time of inspection: 07:44:30	Cleaning: not cleaned	Standard:	LRP Other	Conduit Unit Length	Method of Inspection Television Camera

Town: Suburb: Street: Asset Location	PADSTOW GOW ST Private property, industrial site	Catchment: Asset Owner: Weather.: Flow control	TRIAXIAL CONSULTING Dry	US MH: Survey Dir: DS MH: Inspect Length :	A downstream A1 95.97 m
Purpose of inspection :	Structural Condition Inspection	Shape :	Circular	Dia/Height:	1125 mm
Use of Conduit:	Drain	Width:		Pipe Material:	Reinforced concrete
Type of Conduit:	Stormwater drain				

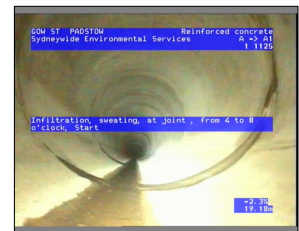
Remarks :

1:765 Position

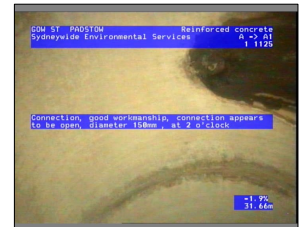
Observation



7.79 m



19.18 m



31.66 m



50.34 m



51.45 m

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

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 1	Sewer Ref.:
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Photo: 082244_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:03:02
7.79m, Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock

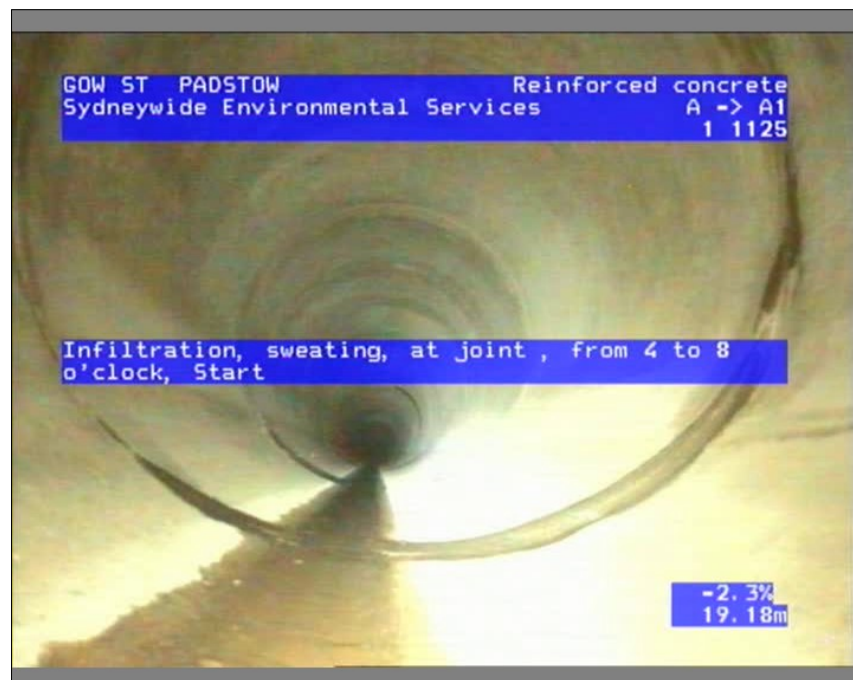


Photo: 082334_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:03:45
19.18m, Infiltration, sweating, at joint , from 4 to 8 o'clock, Start

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 1	Sewer Ref.:
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Photo: 082440_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:04:41
31.66m, Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock



Photo: 083125_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:09:36
50.34m, Connection, good workmanship, connection appears to be open, diameter 150mm , at 2 o'clock

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 1	Sewer Ref.:
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Photo: 083354_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:10:04
51.45m, Circumferential fracture , width 5mm , from 12 to 12 o'clock



Photo: 083418_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:10:22
54.1m, Breaking, some pieces are missing , length of break 200 , at 3 o'clock

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 1	Sewer Ref.:
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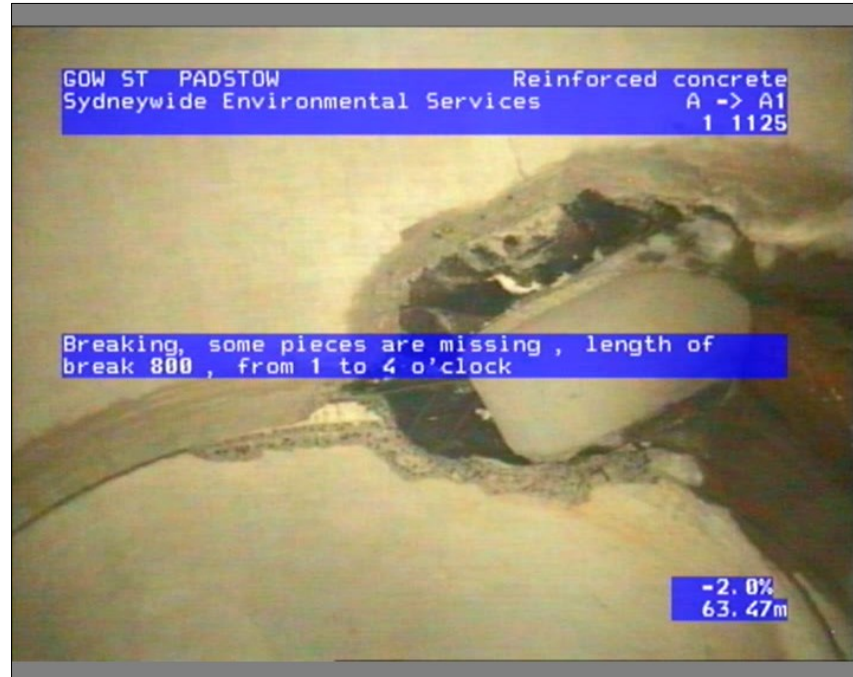


Photo: 083516_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:11:07
 63.47m, Breaking, some pieces are missing , length of break 800 , from 1 to 4 o'clock

WSA assessment / Inspection: 1

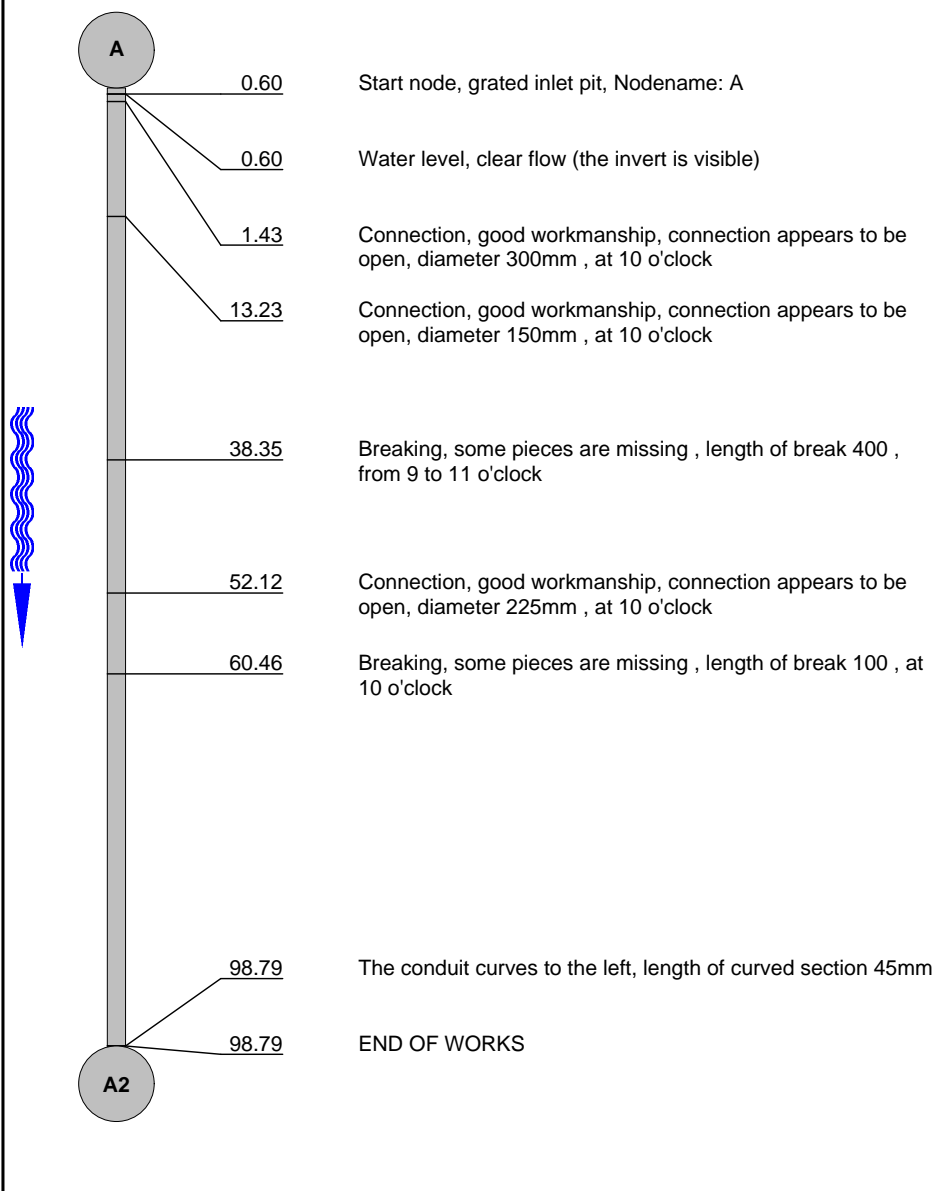
Date: 14/04/2021	Asset owner's job ref.:	Asset Owner: TRIAXIAL CONSULTING	Operator : CRAIG PICKUP	Section number: 2	Pipe Asset Id:
Time of inspection: 08:03:06	Cleaning: not cleaned	Standard:	LRP Other	Conduit Unit Length	Method of Inspection Television Camera

Town: Suburb: Street: Asset Location	PADSTOW GOW ST Private property, industrial site	Catchment: Asset Owner: Weather.: Flow control	TRIAXIAL CONSULTING Dry	US MH: Survey Dir: DS MH: Inspect Length :	A downstream A2 98.79 m
Purpose of inspection :	Structural Condition Inspection			Shape :	Circular
Use of Conduit:	Drain			Dia/Height:	1125 mm
Type of Conduit:	Stormwater drain			Width:	
				Pipe Material:	Reinforced concrete

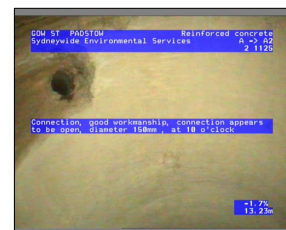
Remarks :

1:780 Position

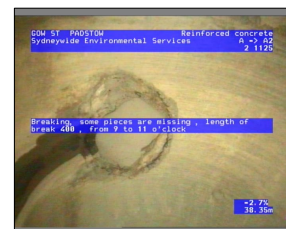
Observation



1.43 m



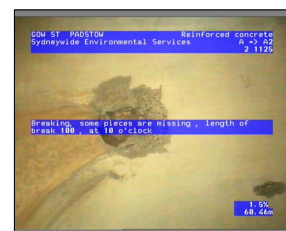
13.23 m



38.35 m



52.12 m



60.46 m

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

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 2	Sewer Ref.:
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Photo: 084917_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:00:30
1.43m, Connection, good workmanship, connection appears to be open, diameter 300mm , at 10 o'clock



Photo: 084957_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:01:03
13.23m, Connection, good workmanship, connection appears to be open, diameter 150mm , at 10 o'clock

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 2	Sewer Ref.:
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Photo: 085116_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:02:07
38.35m, Breaking, some pieces are missing, length of break 400, from 9 to 11 o'clock



Photo: 085207_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:02:44
52.12m, Connection, good workmanship, connection appears to be open, diameter 225mm, at 10 o'clock

Inspection Pictures / Inspection: 1

Location/Street GOW ST	Town or suburb:	Date : 14/04/2021	Section number: 2	Sewer Ref.:
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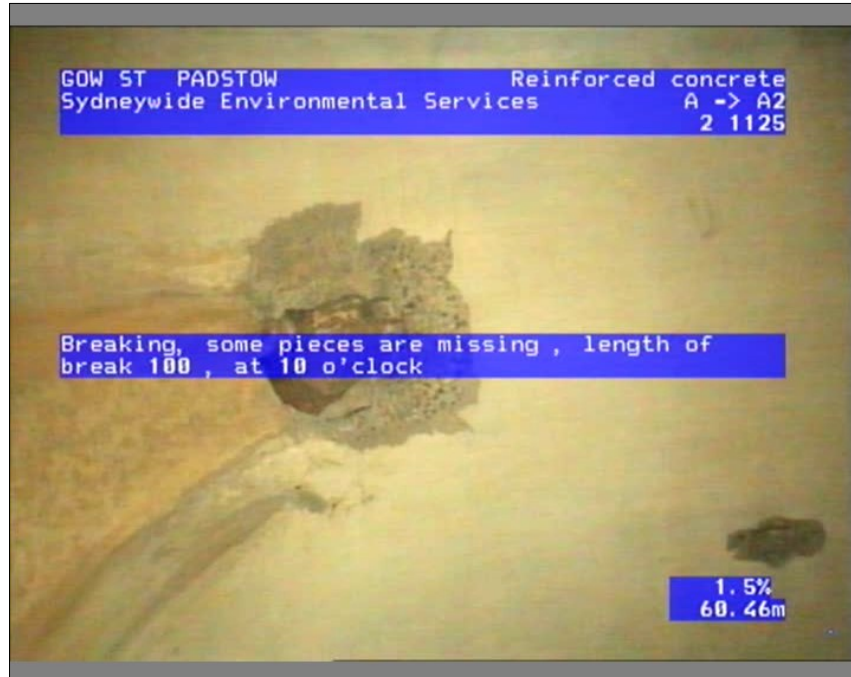


Photo: 085253_14042021_A.JPG, Media No.: TRIAXIAL CON_0, 00:03:24
 60.46m, Breaking, some pieces are missing , length of break 100 , at 10 o'clock