



NOT TO SCALE
CONTOUR INTERVAL 1 METRE
ORIGIN OF LEVELS:
SSM 37046 RL 91.016 A.H.D.

APPROXIMATE EXTENT
OF WATER AS AT 23.08.2006
RL 90.85

LOT	DP	AREA ²
1	DP589977	315.8m
2	DP589977	4.218ha
1	DP.179075	46.4m

OAK

ROAD

PRINCES

FLORA

STREET

D.P.179075

D.P. 589977

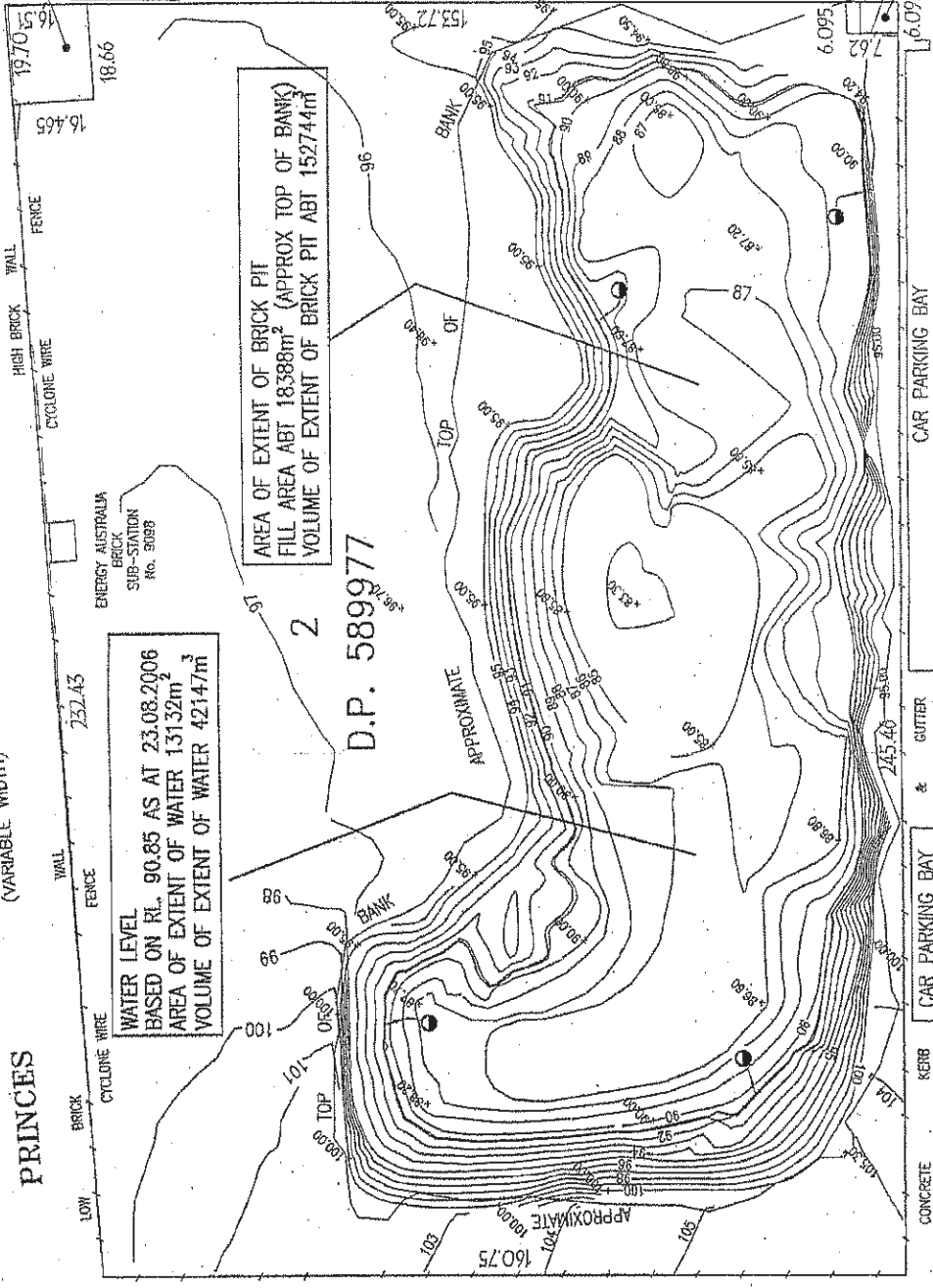
D.P.589977

3

D.P.539741

BRICK FACTORY
No.538-562

BRICK FACTORY
No. 3-5



WATER LEVEL
BASED ON RL 90.85 AS AT 23.08.2006
AREA OF EXTENT OF WATER 13132m²
VOLUME OF EXTENT OF WATER 42147m³

AREA OF EXTENT OF BRICK PIT
FILL AREA ABT 18388m² (APPROX TOP OF BANK)
VOLUME OF EXTENT OF BRICK PIT ABT 152744m³

NOTES:
1) THIS DRAWING HAS BEEN PREPARED BY AMT SURVEY FOR SWC
IN ACCORDANCE WITH A SPECIFIC BRIEF FOR THE PURPOSES OF
OBTAINING VOLUME OF WATER AND SHOULD NOT BE RELIED UPON
FOR ANY OTHER PURPOSE

LETTER	DETAILS OF AMENDMENT	APP'D	DATE
B	HISTORICAL CONTOURS ADDED (SEE NOTE 3)	J.S.	22.09.2006

SURVEYED	D.BURKE	PROJECT No.	060811
DRAWN	J.SZPYTMA	REGISTERED SURVEYOR	D.BURKE
VERIFIED	D.BURKE	P.CARR	DATE: 25.09.06
		SURVEY MANAGER	

AMT SURVEY
368 Brunner Rd Yagoona NSW 2199
PO Box 3078 Regents Park NSW 2143
Ph 8713 2400 Fax 8713 2401
email: admin@amtsurvey.com.au
DX2552W

DRAWING No.

PLAN SHOWING BOUNDARIES, AREAS AND
VOLUMES OF KIRRAWEE BRICK PIT (STAGE 3)
AT FLORA ST, KIRRAWEE

060811

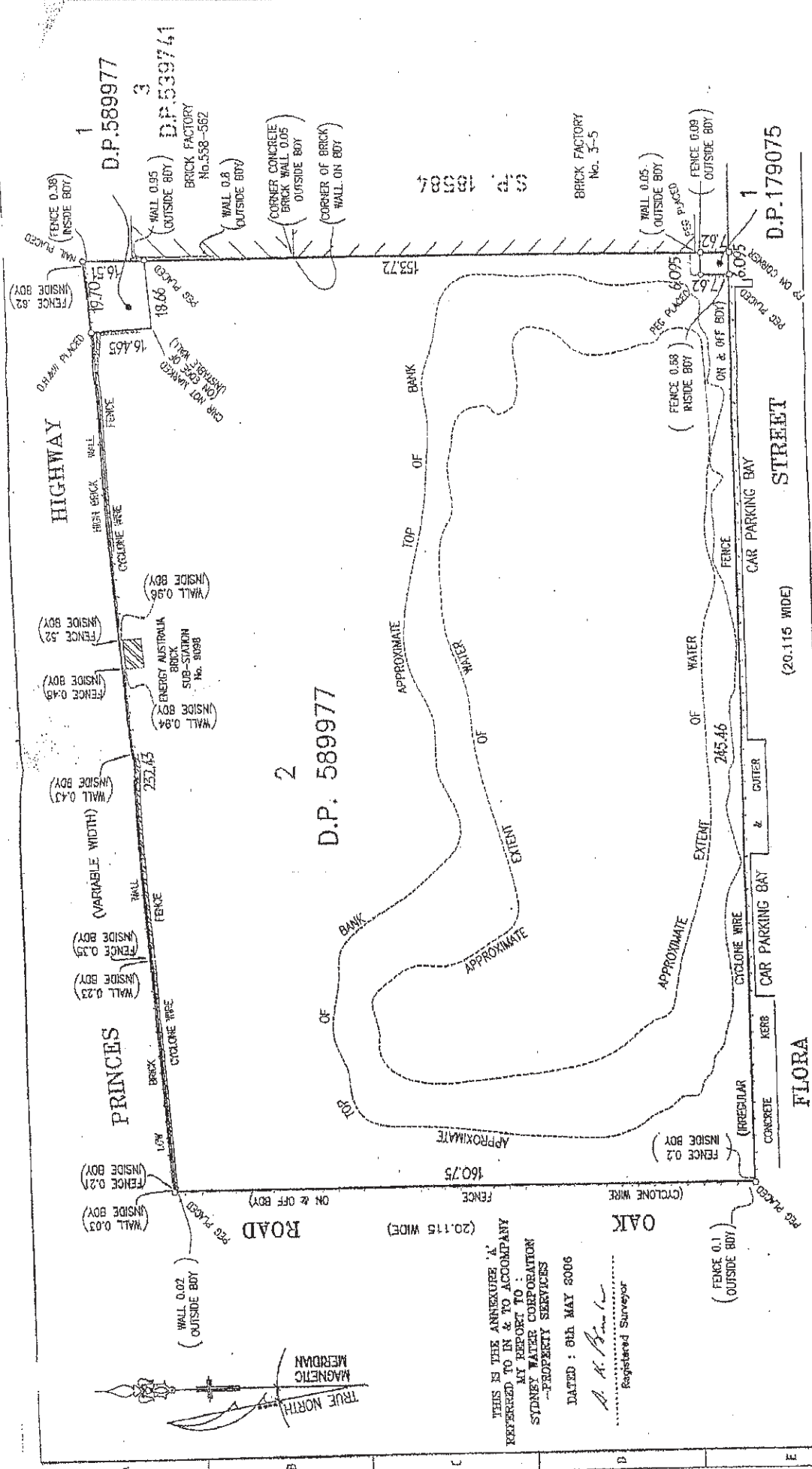
SHEET 1 OF 1

DRAWING STATUS
FINAL

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WHATSOEVER WITHOUT THE EXPRESS CONSENT OF AMT SURVEY PTY LTD

3) HISTORICAL CONTOURS FOR BOTTOM OF BRICK PIT HAVE BEEN OBTAINED FROM
PLAN W.P.6524 DATED 27.04.1972
(LEVELS BASED ON BENCH MARK - BOLT IN KERB WITH RL 105.48)
AND PLAN URS AUSTRALIA PLAN 43167325-001 (REV A) DATED: 30-03-2006

2) EXTENT OF WATER AND TOP OF BANK OBTAINED FROM
URS AUSTRALIA PLAN 43167325-001 (REV A) DATED: 30-03-2006



NOTES:

1) THIS DRAWING HAS BEEN PREPARED BY AMT SURVEY FOR SWC IN ACCORDANCE WITH A SPECIFIC BRIEF FOR THE PURPOSES OF BOUNDARY IDENTIFICATION AND SHOULD NOT BE RELIED UPON FOR ANY OTHER PURPOSE

2) EXTENT OF WATER AND TOP OF BANK OBTAINED FROM URS AUSTRALIA PLAN 43167325-001 (REV A) DATED: 30-03-2006

SURVEYED	O. BURKE	PROJECT No.	060504
DRAWN	J. SPYTHMA	REGISTERED SURVEYOR	<i>A. H. Burke</i>
VERIFIED	<i>A. H. Burke</i>	SURVEY MANAGER	<i>A. H. Burke</i>



AMT SURVEY PTY LTD
308 BRAYLEY RD YARRAGOON NSW 2199
PO BOX 8713 YARRAGOON NSW 2143
PH 8713 2400 Fax 8713 2401
email amt@amtsurvey.com.au
DX225278

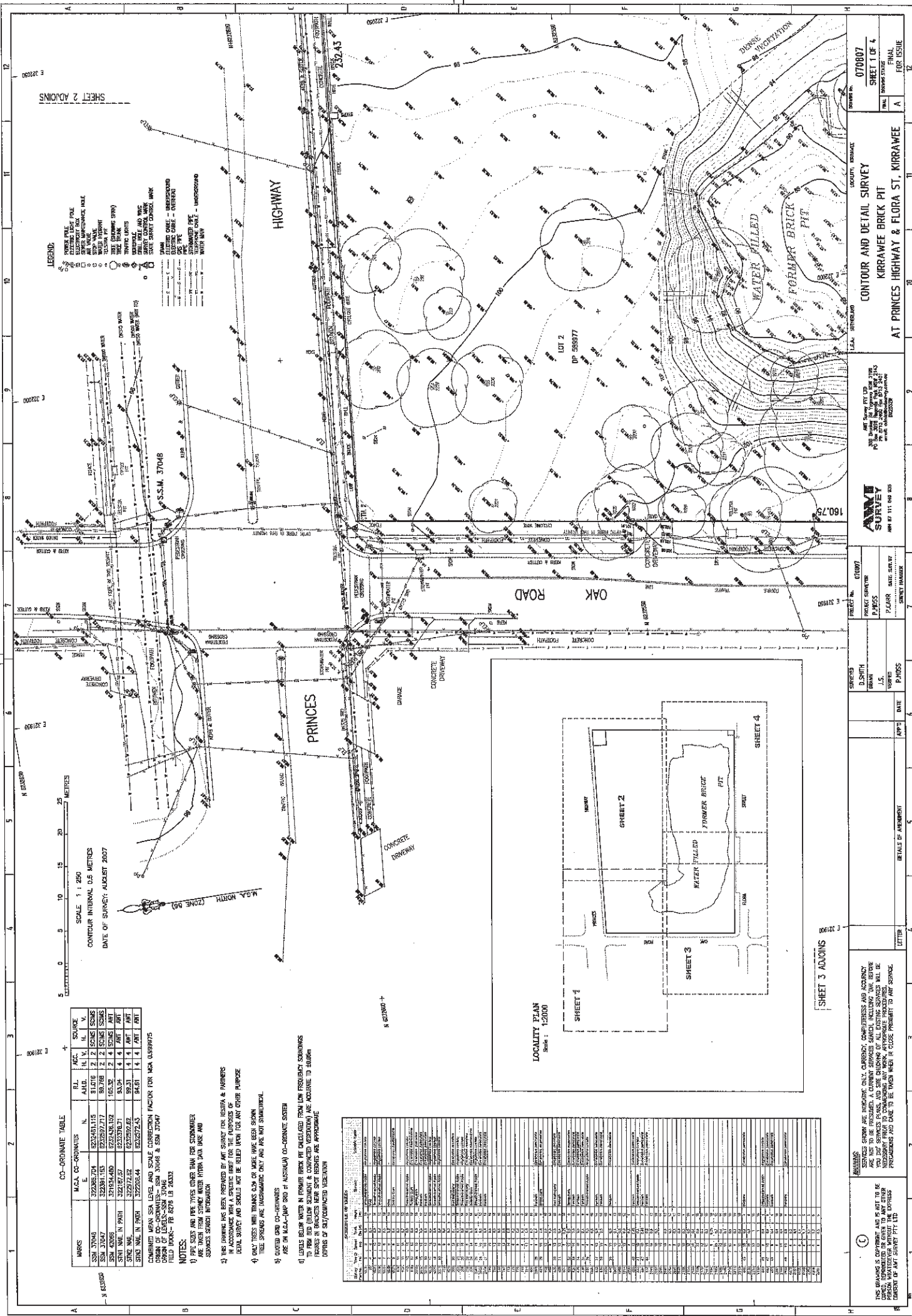
AMT 87 111 049 935

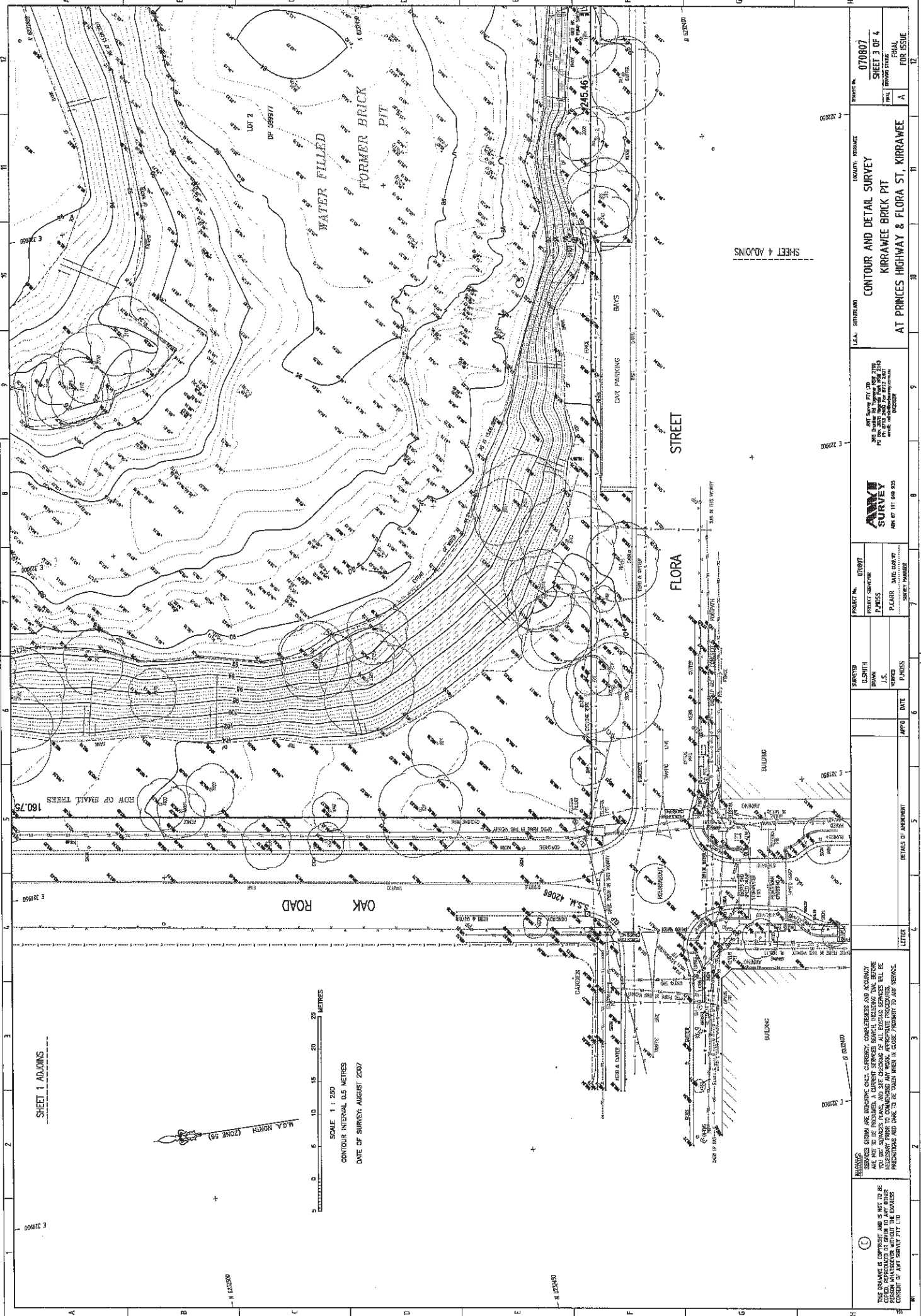
LOCALITY: KIRRAWEE		DRAWING No.	060504
PLAN SHOWING IMPROVEMENTS & BOUNDARIES FOR IDENTIFICATION PURPOSES ONLY, LOT 1 & 2 IN DP589977 & LOT 1 IN DP179075 FLORA ST, KIRRAWEE		SHEET 1 OF 1	
FINAL	DRAWING STATUS	FINAL	
A		FOR ISSUE	

THIS IS THE ANNEXURE 'A' REFERRED TO IN & TO ACCOMPANY MY REPORT TO:
SYDNEY WATER CORPORATION
-PROPERTY SERVICES

DATED: 8th MAY 2006

A. H. Burke
Registered Surveyor





SHEET 1 ADJOINS

180.75

ROW OF SMALL TREES

LOT 2
DP 589977

WATER FILLED
FORMER BRICK
PIT

SHEET 4 ADJOINS

245.46

SCALE 1 : 250
CONTOUR INTERVAL 0.5 METRES
DATE OF SURVEY: AUGUST 2007

M.A. NORTH (ZONE 56)

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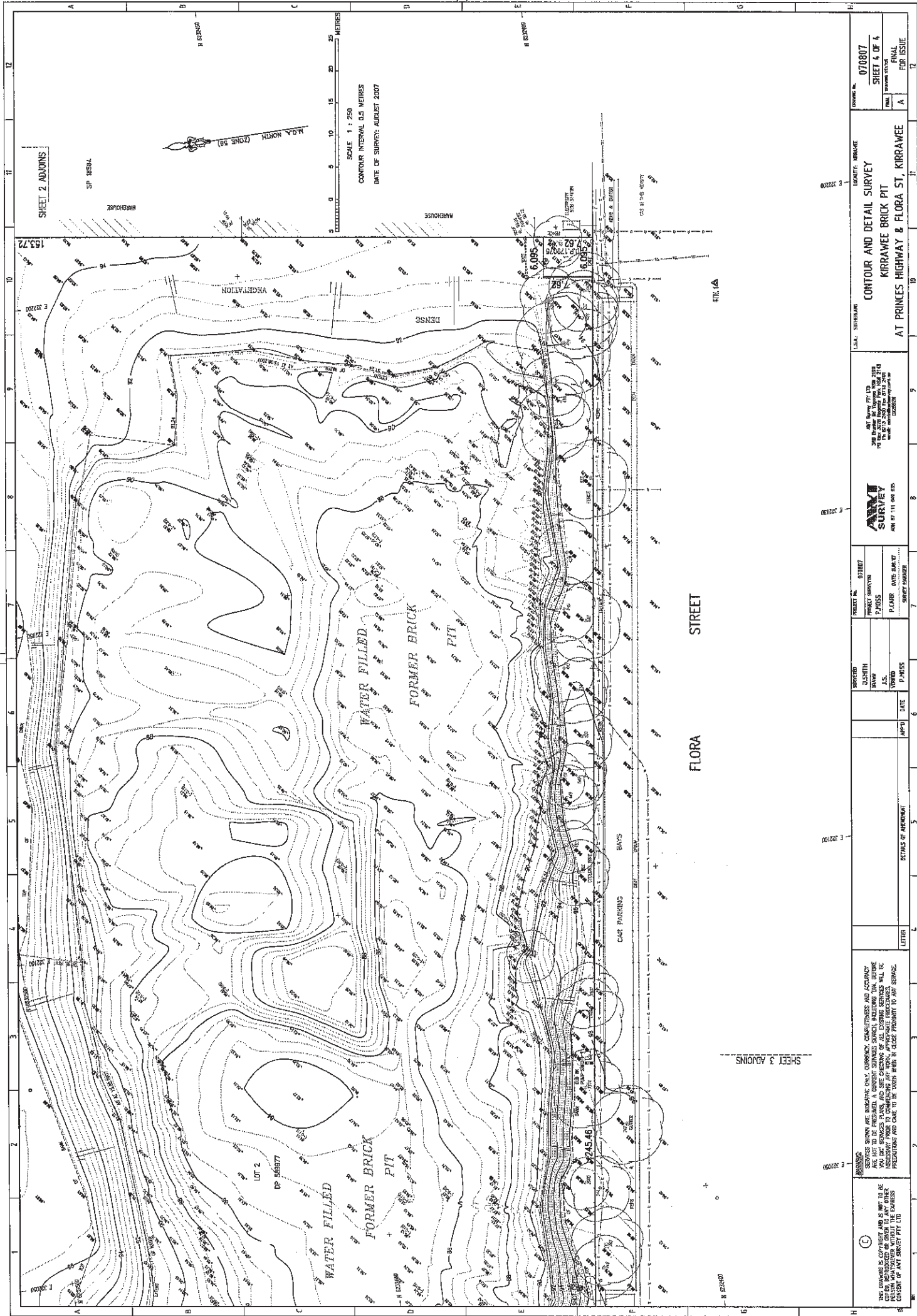
DETAILS OF ADJUNCTION

PROJECT NO. 070807
PROJECT SURVEYOR
P. WESS
P.L. 111 008 205

PROJECT NO. 070807
PROJECT SURVEYOR
P. WESS
P.L. 111 008 205

CONTOUR AND DETAIL SURVEY
KIRRAWEE BRICK PIT
AT PRINCES HIGHWAY & FLORA ST, KIRRAWEE

070807
SHEET 3 OF 4
FINAL
FOR ISSUE



SHEET 2 ADDONS

SCALE 1 : 250
CONTOUR INTERVAL 0.5 METRES
DATE OF SURVEY: AUGUST 2007

070807
SHEET 4 OF 4
FINAL
FOR ISSUE

CONTOUR AND DETAIL SURVEY
KIRRAWEE BRICK PIT
AT PRINKES HIGHWAY & FLORA ST, KIRRAWEE

ART SURVEY LTD
200 PRINKES HWY, KIRRAWEE NSW 2570
PH 02 9220 1111
WWW.ARTSURVEY.COM.AU
ART 87 111 ARE KIDS
SURVEY NUMBER

PROJECT NO. 070807
PROJECT SURVEYOR
7/2005
P-LEADER DATE LAM 17
SURVEY NUMBER

SURVEYOR
JLS
DATE
P-MSSE

DETAILS OF AMENDMENT
LOTTER

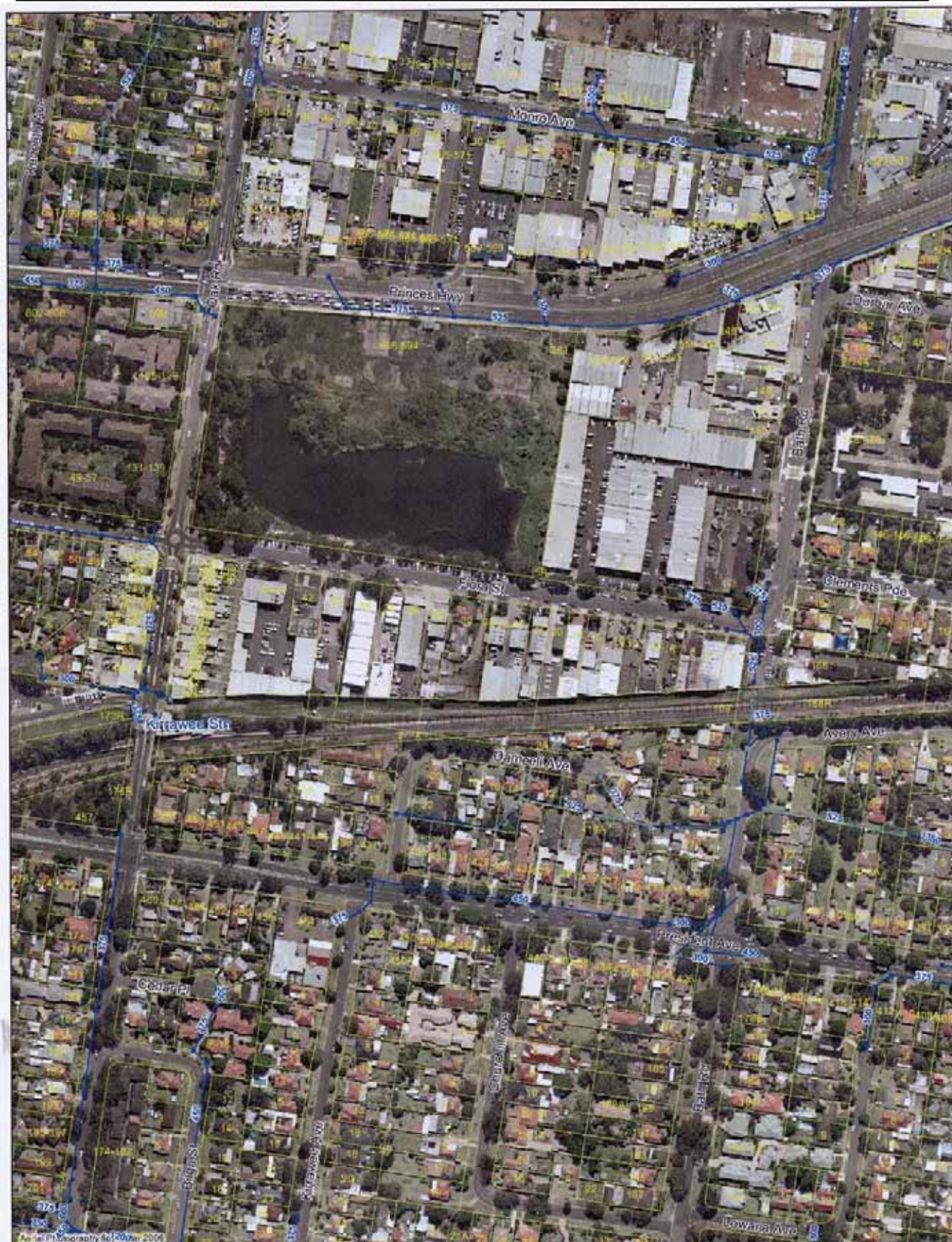
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APPENDIX L

Site Service and Infrastructure Drawings and Specifications



**SUTHERLAND SHIRE COUNCIL
Drainage - Brick Pit Surrounds**

Scale = 1:2,500
Metres 50 100

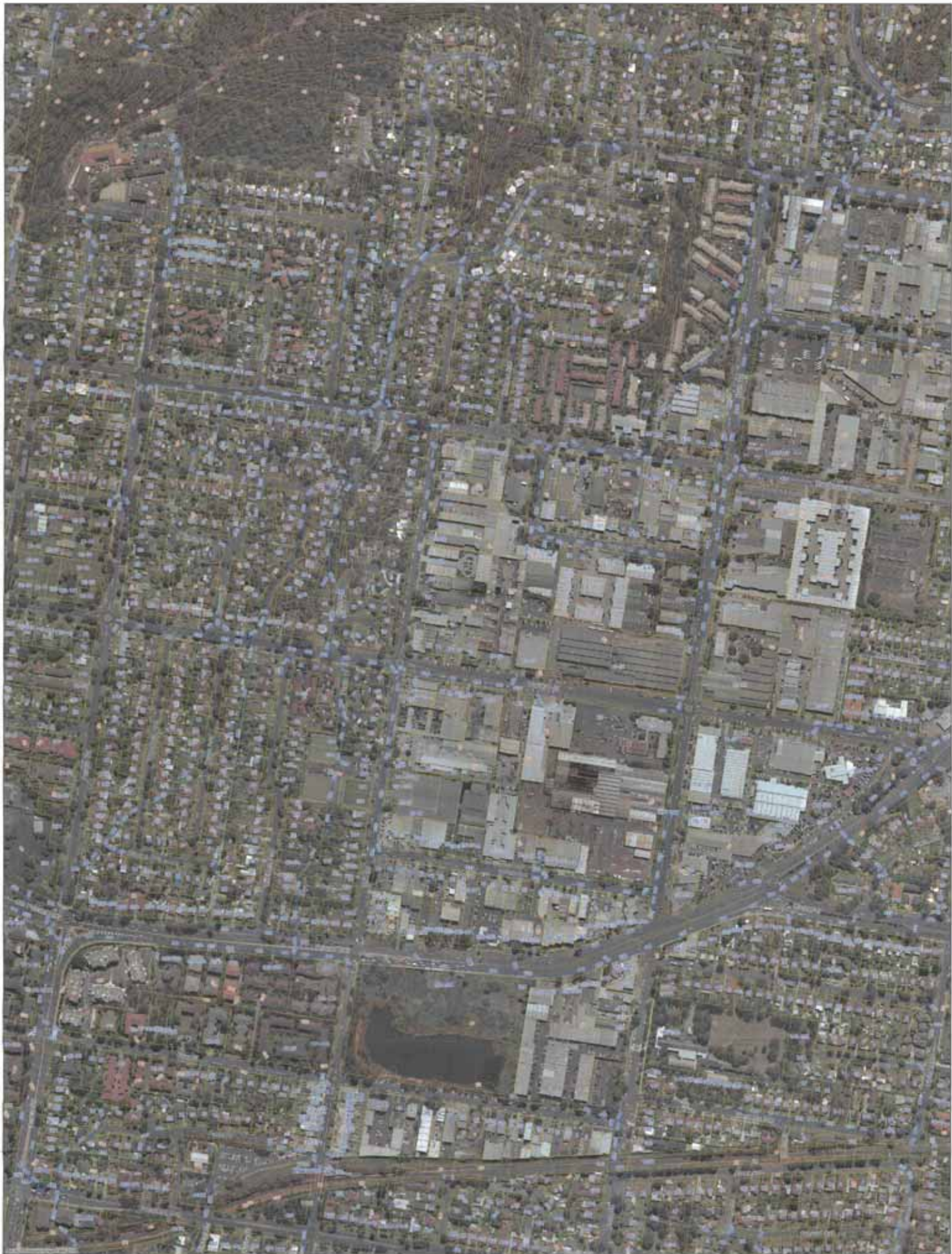
at A3

Printed: 1/02/2006

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Date of Aerial Photography shown on Map.

User: hesays



Sutherland Shire
COUNCIL



Kirrawee Brick Pit – Northern Catchment

Scale = 1:2,000
200 Metres

Printed: 15/01/2009

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Date of Aerial Photography shown on Map

User: Sanyan



Sutherland Shire
COUNCIL



Scale = 1:8,912
300 Metres

Printed: 9/01/2009

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Layer: smimg



Sutherland Shire
COUNCIL



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Date of Aerial Photography shown on Map:

User: among



Scale = 1:3,478
250 Metres

Printed: 9/01/2009

Hydra Legend

Sewer

Sewer Main (with flow arrow & size type annotation)	
Disused Main	
Pressure Main (Rising Main)	
Maintenance Hole with upstream depth to invert	
Terminal Maintenance Shaft	
Maintenance Shaft	
Maintenance Hole with Overflow Weir	
Rodding Point	
Ventshaft INDUCT	
Ventshaft EDUCT	
Vertical	
Lamphole	
Property Connection Point (with chainage to downstream MH)	
Concrete Encased Section	
Sewer Rehabilitation	
Pumping Station	
Sewer Mining	

Sewer - Low Pressure Sewer

Low Pressure Sewer Main	
Pump Unit (Alarm, Electrical Cable, Pump Unit)	
Property Valve Boundary Assembly	
Stop Valve	
Reducer / Taper	
Flushing Point	

Sewer - Vacuum

Vacuum Sewer Main	
Divisional Valve	
Vacuum Chamber	
Clean Out Point	

Stormwater

Stormwater Pipe	
Stormwater Channel	
Stormwater Gully	
Stormwater Maintenance Hole	

Property Details

Boundary Line	
Lot Number	
House Number	
Development Application Reference	
Location of SWC Heritage item - Please call 13 20 92 during office hours and ask for the Heritage Unit.	

Water

Water Main - Potable (with size type annotation)	
Disconnected Main - Potable	
Proposed Main - Potable	
Water Main - Recycled	
Special Supply Conditions - Potable	
Special Supply Conditions - Recycled	
Restrained Joints - Potable	
Restrained Joints - Recycled	
Hydrant	
Maintenance Hole	
Stop Valve	
Stop Valve with By-pass	
Stop Valve with Tapers	
Closed Stop Valve	
Air Valve	
Valve	
Scour	
Reducer / Taper	
Vertical Bends	
Reservoir	
Symbols for Recycled Water as per Potable above. Main and Symbol colour as indicated.	

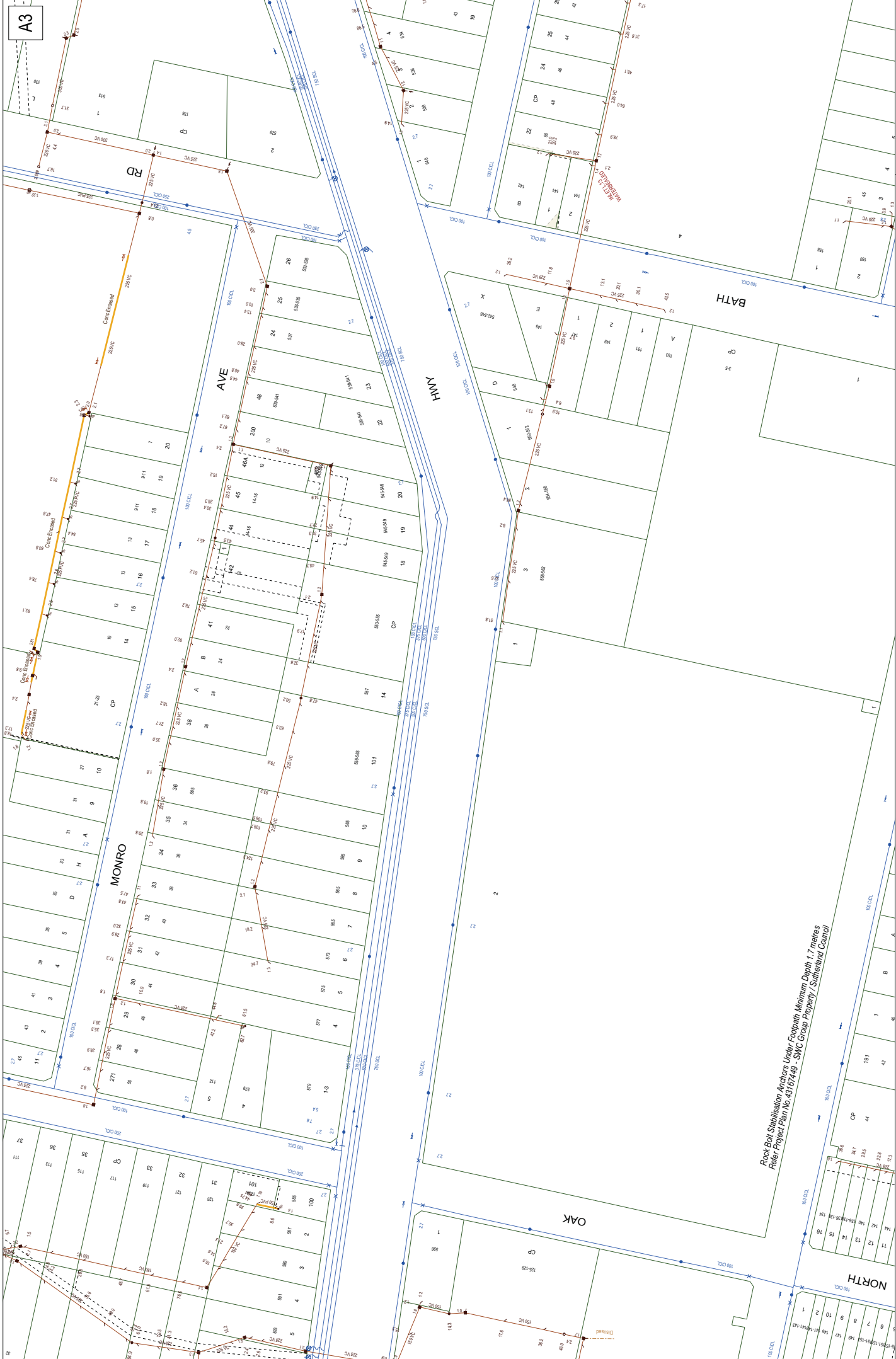
Private Mains

Potable Water Main	
Recycled Water Main	
Sewer Main	
Symbols for Private Mains shown grey. Main colour as indicated.	

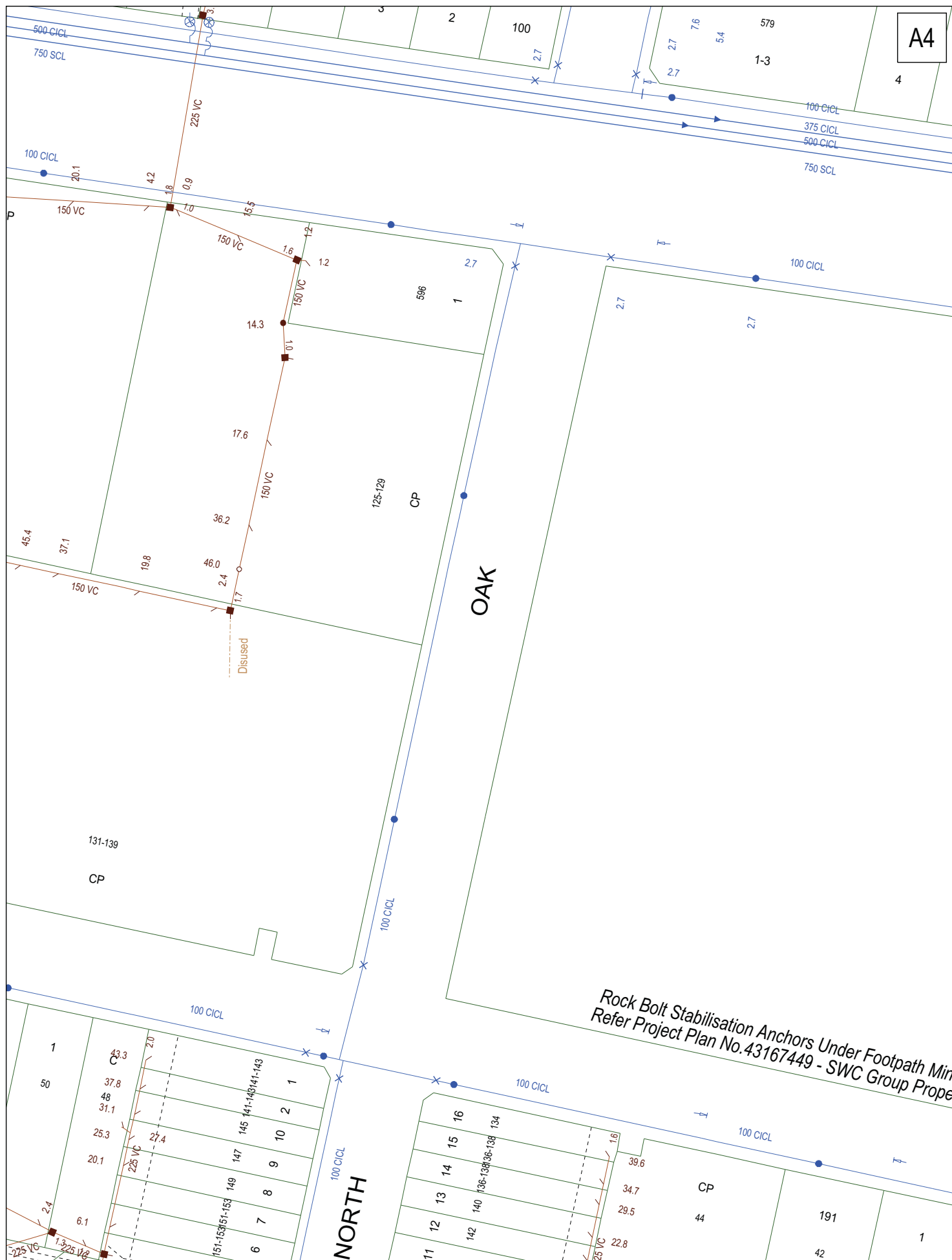
PIPELINE MATERIAL ABBREVIATIONS

ABBREVIATION	INTERPRETATION
ABS	acrylonitrile butadiene styrene
AC	asbestos cement
BRICK	brick
CI	cast iron
CICL	cast iron cement lined
CONC	concrete
COPPER	copper
DI	ductile iron
DICL	ductile iron cement (mortar) lined
EPDM	ethylene propylene diene monomer
EW	earthenware
FIBG	fibreglass
FL BAR	forged locking bar
GI	galvanised iron
GRP	glass reinforced polyester
HDPE	high density polyethylene
MS	mild steel
MSCL	mild steel cement lined
PE	polyethylene
PP	polypropylene
PVC	polyvinylchloride
PVC-M	polyvinylchloride modified
PVC-O	polyvinylchloride oriented
PVC PW	polyvinylchloride profile wall
PVC SW	polyvinylchloride smooth wall
PVC-U	polyvinylchloride unplasticised
RC	reinforced concrete
S	steel
SCL	steel cement (mortar) lined
SGW	salt glazed ware
SS	stainless steel
STONE	stone
VC	vitrified clay
WI	wrought iron
WS	woodstave





A3



DBYD Address:
Oak Rd
Kirrawee NSW 2232

DBYD Job No: 110445
DBYD Sequence No: 15068594

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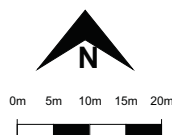
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SYDNEY WATER CORPORATION

Scale: 1:1000

Date of Production: 19/12/2008

Plan 1 of 1





APPENDIX M

Surface Waterway Assessment Results

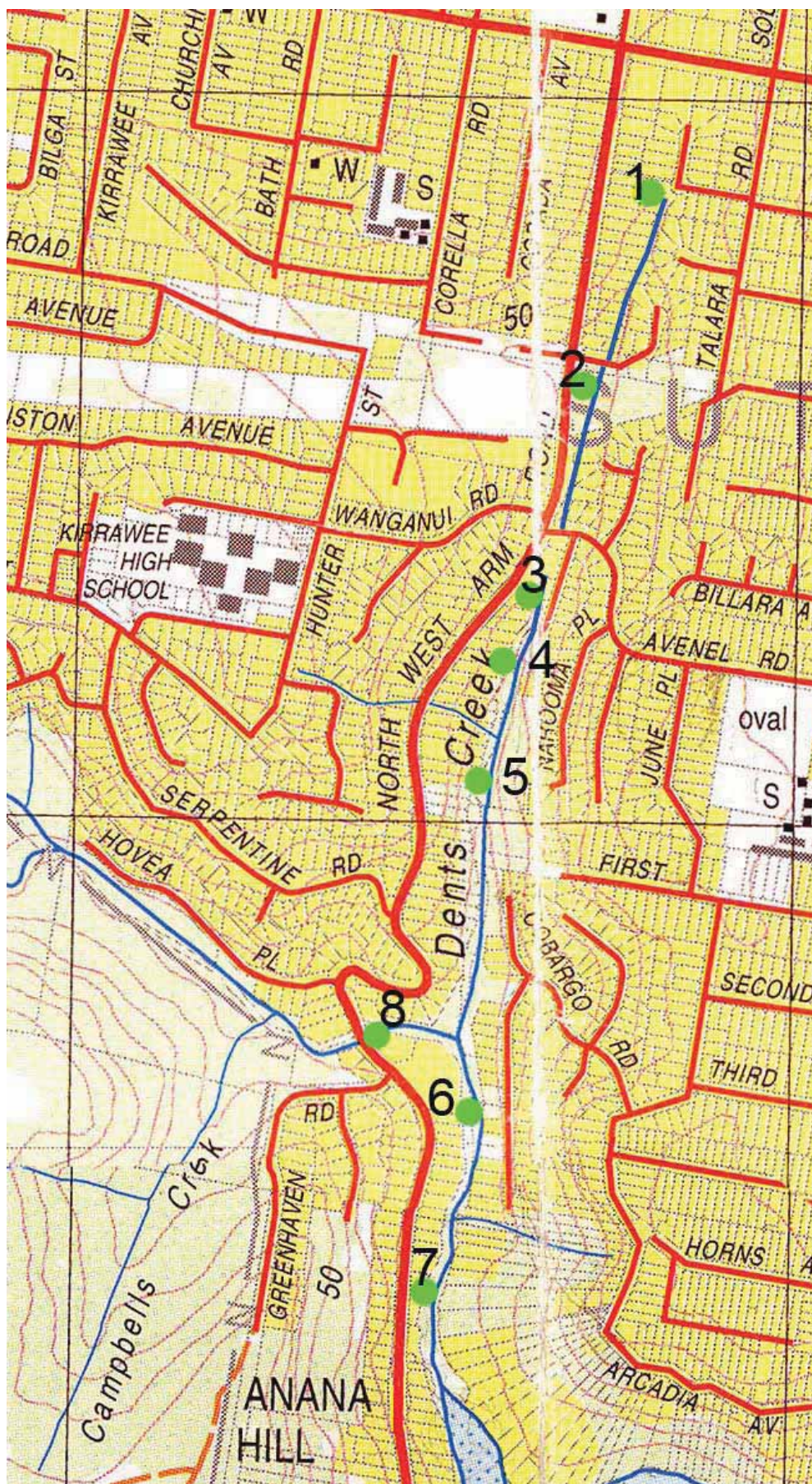


APPENDIX M1

Dents Creek

APPENDIX M

Dents Creek Site Locations



APPENDIX M1

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	1
Description	Outlet of underground stormwater system into the upper reaches of Dents Creek; outlet evident from the recreational reserve at the southwestern corner of Kenna Place.
Cultural Setting	Developed, predominantly residential
GPS Coordinates	322307 mE 6230521 mN
Elevation	59 metres AHD (from GPS)
Topographic Setting	Upper reaches of the catchment, gentle gradients in the order of 0.03 to 0.05, heavily incised channel (which is possibly aided by some engineering to the channel floor)
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Sandstone floor and lower embankments with some pools and small steps and benches stretching about 100 metres downstream of the stormwater outlet
Flow	About 0.1 to 0.2 L/s
Field Measurements	Water pH: 7.32 Electrical conductivity: 541 μS/cm Dissolved oxygen content: 5.90 ppm Temperature: 22.4 °C
Vegetation Condition	No native vegetation observed either in or surrounding the waterway; heavy weed infestation – mostly wandering weeds – engulf the stormwater outlet whilst a number of grass species are evident both within the recreational reserve as well as a number of surrounding residential yards.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper, Styrofoam, glass and wood; some grass clippings and a lot of vegetation debris also evident on both channel embankments. Water dark-grey to brown in colour with a strong odour

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	2
Description	Rulwalla Place road crossing – upper reach of Dents Creek
Cultural Setting	Developed (urban), residential area with an open recreational area on both sides of Dents Creek
GPS Coordinates	326610 mE 6231450 mN
Elevation	49 metres AHD (from GPS)
Topographic Setting	Upper reaches of the catchment, gentle gradients in the order of 0.03 to 0.05, incised channel with embankments up to 2 metres high on both sides of the channel
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Sandstone floor and lower embankments with some pools and small steps and benches stretching about 100 metres downstream of the road crossing; section of channel beneath underpass is concrete lined
Flow	About 0.5 L/s
Field Measurements	Water pH: 6.44 Electrical conductivity: 420 μS/cm Dissolved oxygen content: 6.25 ppm Temperature: 19.0 °C
Vegetation Condition	Only minor native vegetation observed either in the surrounding recreational reserve; minor weed infestation – mostly wandering weeds – along the alignment of the channel and embankments whilst a number of grass species are evident both within the recreational reserve as well as a number of surrounding residential yards. Area appears to have been the subject of bush regeneration activities.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper, Styrofoam, glass and wood. Water light-grey to brown in colour with a slight odour

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	3
Description	Immediately downstream of the small commercial complex situated between North West Arm Road and Tathra Place – upper reaches of Dents Creek
Cultural Setting	Developed (urban); mixed light-commercial and residential area with development evident on both sides of Dents Creek
GPS Coordinates	322545 mE 6231100 mN
Elevation	42 metres AHD (from GPS)
Topographic Setting	Upper reaches of the catchment, upper slopes have gentle gradients in the order of 0.03 to 0.05, incised channel with eastern embankment up to 12 metres high; several sandstone benches up to 3 and 4 metres in height evident downstream of the commercial complex
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Concrete lined culvert beneath commercial complex which opens into sandstone lined reaches; sandstone floor and lower embankments downstream of commercial complex with some pools, small steps, and benches stretching about 100 metres downstream the GPS point, very little bedload observed with most of the sandstone clean
Flow	About 1.0 L/s
Field Measurements	Water pH: 6.87 Electrical conductivity: 487 $\mu\text{S}/\text{cm}$ Dissolved oxygen content: 10.02 ppm Temperature: 22.3 $^{\circ}\text{C}$
Vegetation Condition	Only minor native vegetation observed along either the eastern embankment or the residential dwellings on the western embankment; minor weed infestation – mostly wandering weeds – along the alignment of the channel and embankments whilst a number of grass species are evident both within the recreational reserve as well as a number of surrounding residential yards.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper, Styrofoam, glass and wood. Water relatively clear with no apparent odour

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	4
Description	At the end of Tathra Place, about 20 metres west of Scout Hall
Cultural Setting	Disturbed bushland with residential dwellings and gardens evident along the upper embankments of Dents Creek
GPS Coordinates	322530 mE 6231010 mN
Elevation	42 metres AHD (from GOS)
Topographic Setting	Mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.03 to 0.05, incised channel with eastern embankment up to 15 metres high; embankments typically in the order of 40 degrees; several sandstone benches up to 3 and 4 metres in height evident downstream of the commercial complex
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Numerous rocks, boulders, gravels and cobbles line the channel floor creating a number of small pools and small cascades; only minor stretches where sandstone was observed in the channel floor; embankments typically sandy with little sign of sandstone benches or outcrop along channel sides
Flow	About 1.5 L/s
Field Measurements	Water pH: 7.00 Electrical conductivity: 512 μS/cm Dissolved oxygen content: 5.58 ppm Temperature: 22.7 °C
Vegetation Condition	Only minor native vegetation observed along either the eastern embankment or the residential dwellings on either embankment; heavy weed infestation – both woody and wandering weeds – along the alignment of the channel and embankments whilst a number of grass species are evident within the surrounding residential yards.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper, Styrofoam, glass and wood. Water relatively clear with no apparent odour.

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	5
Description	At the end of bush walking track linking Tathra Place and Cobargo Road
Cultural Setting	Disturbed bushland with residential dwellings and gardens evident along the upper embankments of Dents Creek; sewer located on the eastern embankment in close proximity to the channel.
GPS Coordinates	322520 mE 6230860 mN
Elevation	38 metres AHD (from GPS)
Topographic Setting	Mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10; incised channel with eastern embankment up to 30 metres high whilst shallow floodplain and lower slopes on western embankment; embankments on the eastern side of channel typically in the order of 20 to 40 degrees with several sandstone benches evident along the upper to mid slopes; several small sandstone benches and steps between 0.2 and 1.0 metres evident both upstream and downstream of site location
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Numerous rocks, boulders, gravels and cobbles line the channel floor creating a number of small pools; embankments typically sandy with little sign of sandstone benches or outcrop along channel sides
Flow	About 2.0 L/s
Field Measurements	Water pH: 6.85 Electrical conductivity: 587 μS/cm Dissolved oxygen content: 7.22 ppm Temperature: 22.4 °C
Vegetation Condition	Native vegetation observed along the upper and mid-slopes of the eastern embankment; heavy weed infestation – both woody and wandering weeds – along the alignment of the channel and western embankment including a number of grass species, bamboo and privet within the surrounding residential yards.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper, Styrofoam, glass and wood. Water relatively clear with yet exhibits a strong septic odour.

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	6
Description	Southern end of Huskisson Street (creek accessed from vacant residential block on western side of street)
Cultural Setting	Residential with disturbed bushland and gardens evident along the western and (upper) embankments of Dents Creek; sewer located on the eastern embankment in close proximity to the channel.
GPS Coordinates	322460 mE 6230370 mN
Elevation	15 metres AHD (from GPS)
Topographic Setting	Lower reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10; incised channel with eastern embankment up to 40 metres high whilst shallow floodplain and lower slopes on western embankment; embankments on the eastern side of channel typically in the order of 20 to 40 degrees with several sandstone benches evident along the mid and lower slopes; several small sandstone bench about 0.2 metres high – which is thought to be the freshwater / saltwater interface – evident upstream of this location
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek
Channel Features	Shallow gradient; channel floor unsighted; embankments typically sandy with sandstone benches and outcrop on eastern embankment
Flow	Unknown (water appeared to be relatively stagnant with little to no flow at the time of characterization works)
Field Measurements	Water pH: 7.07 Electrical conductivity: 39.5 mS/cm Dissolved oxygen content: 2.82 ppm Temperature: 23.9 °C
Vegetation Condition	Native vegetation observed along the eastern embankment; some weed infestation – both woody and wandering weeds – along the western embankment within the bounding residential yards.
Other Comments	Some pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic waste, plastic bags, bottles, paper and Styrofoam. Water grey to dark-brown in colour; slight septic odour.

APPENDIX M

Site Characterisation Information Sheet

Creek System	Dents Creek – eastern tributary of the North West Arm
Site No.	7
Description	Rear of the residential property fronting 188 North West Arm Road; tidally influenced zone
Cultural Setting	Developed; eastern embankment relatively open and cleared (yet abandoned) gardens; western embankment residential
GPS Coordinates	322395 mE 6230155 mN
Elevation	2 metres AHD (from GPS)
Topographic Setting	Lower reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10; incised channel with eastern embankment up to 15 metres high whilst shallow floodplain and lower slopes on both embankments; several sandstone benches evident along the upper and mid slopes, particularly on the western side of North West Arm bay.
Geological Setting	Hawkesbury Sandstone
Drainage	North to south along Dents Creek and North West Arm (of Port Hacking)
Channel Features	Width about 12 metres; typical of a flooded estuary; bedload not observed; channel embankments predominantly sandy with mangroves and some shell fish indicative of saltwater (marine) conditions.
Flow	Unknown
Field Measurements	Water pH: 7.45 Electrical conductivity: 44.5 mS/cm Dissolved oxygen content: 5.57 ppm Temperature: 24.5 °C
Vegetation Condition	Scarce native vegetation observed along both embankments; some weed infestation – both woody and wandering weeds – along the western embankment within the bounding residential yards; predominantly grasses on the eastern embankment.
Other Comments	Some pieces of urban waste evident in the channel including plastic bags, bottles and Styrofoam; overall however relatively free of urban waste. Water grey to dark-brown in colour, typical of inter-tidal zones.

APPENDIX M

Site Characterisation Information Sheet

Creek System	Savilles Creek – named tributary of Dents Creek
Site No.	8
Description	North West Arm Road crossing of Savilles Creek, about 120 metres west of Dents Creek
Cultural Setting	Residential with disturbed bushland and gardens evident along the northern and southern embankments of Savilles Creek.
GPS Coordinates	322310mE 6230520 mN
Elevation	13 metres AHD (from GPS)
Topographic Setting	Lower reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10; slightly incised channel with eastern embankment up to 1.5 metres high; shallow floodplain on southern embankment; several sandstone benches evident along the upper and mid slopes, particularly on the western side of Dents Creek; gradient of channel floor thought to be about 2 or 3 degrees.
Geological Setting	Hawkesbury Sandstone
Drainage	West to east along Savilles Creek; joins Dents Creek about 120 metres further to the east
Channel Features	Sandstone floor with sandy embankments and bedload; numerous gravels, boulders and cobbles also evident along channel floor with a number of pools and small cascades evident further upstream
Flow	About 2.5 L/s
Field Measurements	Water pH: 7.56 Electrical conductivity: 499 μS/cm Dissolved oxygen content: 8.92 ppm Temperature: 23.7 °C
Vegetation Condition	Only minor native vegetation observed along either embankment with heavy weed infestation – both woody and wandering weeds – along the alignment of the channel and both embankments; a number of grass species also evident within the surrounding residential yards as well as encroaching into the channel itself.
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic bags, bottles, Styrofoam and wood. Water very clear with no apparent odour.

APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	2		
Description	Outlet of underground stormwater system into the upper reaches of Dents Creek; exits on the northern side of Stirling Avenue and Tea Tree Place		
Cultural Setting	Urban; residential with open parkland and recreational space		
GPS Coordinates	321975 mE 6233430 mN		
Elevation	48 metres AHD (from GPS)		
Topographic Setting	Upper reaches of the catchment, upper slopes have gentle gradients in the order of 0.03 to 0.05; incised channel with embankments up to 5 or 6 metres high; several sandstone benches and steps up to 3 and 4 metres in height evident downstream of pipe outflow		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Sandstone channel floor and lower embankments with little to no channel bedload evident; walls of creek lined with concrete walls and blocks in sections, yet is mostly bounded by sandstone.		
Flow	About 0.1 L/s		
Field Measurements	Water pH:	8.05	
	Electrical conductivity:	636 μ S/cm	
	Dissolved oxygen content:	9.94 ppm	
	Temperature:	27.0 °C	
Vegetation Condition	Only minor native vegetation observed either in or surrounding the waterway; moderate degree of weed infestation – mostly wandering weeds – engulf the embankments whilst a number of grass species are evident both within the recreational reserve as well as a number of surrounding residential yards.		
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic bags, bottles, Styrofoam and glass; some grass clippings and a lot of vegetation debris also evident on both channel embankments. Water relatively clear with a faint odour typical of enclosed urban drainage waterways. Two pipes entering Oyster Gully Creek; one about 1350 millimetres in diameter, and the second about 1200 millimetres in diameter.		

APPENDIX M

Dents Creek Site 1



Left: stormwater outlet (start of Dents Creek)
Above: weeds around outlet



Downstream of stormwater outlet



Sandstone walls of stormwater drainage canal

Dents Creek Site 2



Left: view upstream from Rulwalla Street

Above: culvert under Rulwalla Street



Left: Site 2 creek measurement point

Above: Iron stained sandstone within the creek

Dents Creek Site 3



Above: view upstream of Site 3 into stormwater canal

Right: sandstone walls and base of channel

Below: view downstream of Site 3 location



Dents Creek Site 4



Left: Site 4 pool
Below: downstream of Site 4



Dents Creek Site 5



Top Left: Dents Creek Site 5

Top Right: upstream from Site 5 location

Below: downstream of Site 5



Dents Creek Site 6



Sandstone bench,
believed to be the
saltwater /
freshwater interface,
approximately
80 metres upstream
from Site 6

Above: upstream from Site 6
Below: downstream from Site 6



Dents Creek Site 7



Left: view from resident's private wharf upstream of Site 6

Below: view downstream of Site 6, the bay opens out in the background of this photo.



Savilles Creek Site 8



Top Left: view upstream of Site 8 (Savilles Creek)

Above: view downstream of Site 8

Left: Site 8 measurement point showing flow in creek

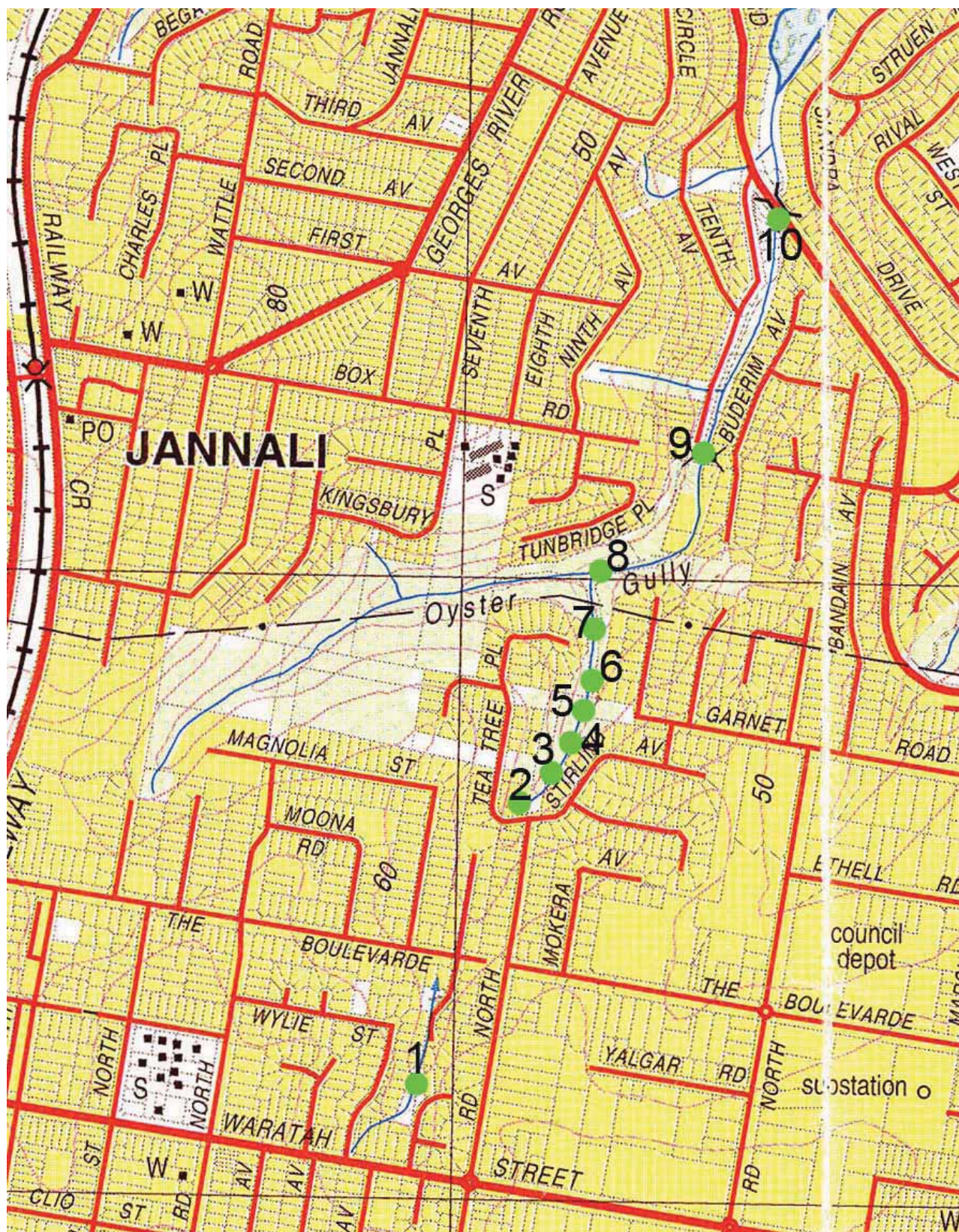


APPENDIX M2

Oyster Gully Creek

APPENDIX M

Oyster Gully Creek Site Locations



APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	3		
Description	Within the upper reaches of Oyster Gully Creek; behind residential dwellings fronting both Tea Tree Place and Stirling Avenue about 100 metres downstream of Site 2		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along the upper embankments.		
GPS Coordinates	322025 mE 6233465 mN		
Elevation	43 metres AHD (from GPS)		
Topographic Setting	Upper reaches of the catchment, upper slopes have gentle gradients in the order of 0.03 to 0.05, incised channel with eastern embankment up to 15 metres high; several sandstone benches up to 1 and 2 metres in height evident in the area; embankments typically 30 to 40 degrees with some sandstone benches and outcrop noted, particularly in the mid to upper slopes		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Numerous rocks, boulders, gravels and cobbles line the channel floor creating a number of small pools and small cascades; only minor stretches where sandstone was observed in the channel floor; embankments typically sandy although sandstone benches and outcrop evident along some stretches of the channel margins as well as the mid to lower slopes		
Flow	About 0.5 L/s		
Field Measurements	Water pH:	6.96	
	Electrical conductivity:	626 μ S/cm	
	Dissolved oxygen content:	2.90 ppm	
	Temperature:	23.3 °C	
Vegetation Condition	Native vegetation observed along the upper and mid-slopes of the eastern embankment; heavy weed infestation – both woody and wandering weeds – along the alignment of the channel as well as the embankment.		
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic bags, bottles, Styrofoam and glass; some grass clippings and a lot of vegetation debris also evident on the upper slopes of both embankments. Water relatively clear with a faint sewer odour		

APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	4		
Description	Within the upper reaches of Oyster Gully Creek; behind residential dwellings fronting both Tea Tree Place and Stirling Avenue about 180 metres downstream of Site 2		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along the upper embankments.		
GPS Coordinates	322055 mE 6233530 mN		
Elevation	18 metres AHD (from GPS)		
Topographic Setting	Upper reaches of the catchment, upper slopes have gentle gradients in the order of 0.03 to 0.05, incised channel with eastern embankment up to 15 metres high; several sandstone benches up to 1 and 2 metres in height evident in the area; embankments typically 30 to 40 degrees with some sandstone benches and outcrop noted, particularly in the mid to upper slopes		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Numerous rocks, boulders, gravels, cobbles line the channel floor creating a number of small pools and small cascades; some coarse sand and small gravel also evident; embankments typically sandy although some sandstone benches and outcrop evident along some stretches of the channel margins as well as the mid to lower slopes		
Flow	About 0.5 L/s		
Field Measurements	Water pH:	7.37	
	Electrical conductivity:	470 μ S/cm	
	Dissolved oxygen content:	4.70 ppm	
	Temperature:	22.7 °C	
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with heavy weed infestation – both woody and wandering weeds the dominant vegetation type; weeds include privet, lantana and ivy which are most dominant in close proximity to the sewer.		
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic bags, bottles, Styrofoam and blue metal. Sewer aquaduct evident along eastern margin of creek. Water relatively clear with although a moderate sewer odour evident.		

APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	5		
Description	Within the upper to mid-reaches of Oyster Gully Creek; behind residential dwellings fronting both Tea Tree Place and Stirling Avenue about 270 metres downstream of Site 2		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along the upper embankments.		
GPS Coordinates	322090 mE 6233600 mN		
Elevation	14 metres AHD (from GPS)		
Topographic Setting	Upper to mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, incised channel with eastern embankment up to 10 metres high; several sandstone benches up to 1 and 2 metres in height evident in the area; channel embankments typically 30 to 40 degrees with some sandstone benches and outcrop noted, particularly in the mid to upper slopes		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Large series of sandstone benches with drops up to 1.5 metres; numerous rocks, boulders, gravels, cobbles line the channel floor creating a number of small pools and small cascades both upstream and downstream of the benches; some coarse sand and small gravel also evident, particularly in some of the deeper and more stagnant pools; embankments typically sandy although some sandstone outcrop evident at varying elevations on both sides of the channel		
Flow	About 0.5 L/s		
Field Measurements	Water pH:	7.20	
	Electrical conductivity:	448 μ S/cm	
	Dissolved oxygen content:	4.02 ppm	
	Temperature:	22.2 °C	
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with heavy weed infestation – both woody and wandering weeds – the dominant vegetation type, particularly along and in close proximity to the channel; weeds include privet, lantana and ivy which are most dominant in close proximity to the sewer as well as across most of the eastern embankment.		
Other Comments	Numerous pieces of urban waste evident in the channel as well as in the surrounding vegetation, including plastic bags, bottles, Styrofoam and blue metal. Sewer aquaduct evident along eastern margin of creek. Water relatively clear with although a minor septic odour evident.		

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Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	6		
Description	Within the upper to mid-reaches of Oyster Gully Creek; behind residential dwellings fronting both Tea Tree Place and Stirling Avenue		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along the upper embankments.		
GPS Coordinates	322110 mE 6233625 mN		
Elevation	13 metres AHD (from GPS)		
Topographic Setting	Upper to mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, incised channel with eastern embankment between 5 and 10 metres high; several sandstone benches up to 1 and 2 metres in height evident in the area; channel embankments typically 30 to 40 degrees with some sandstone benches and outcrop noted, particularly in the mid to upper slopes		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Numerous rocks, boulders, gravels, cobbles line the channel floor creating a number of small pools and cascades both upstream and downstream; some coarse sand and small gravel also evident, particularly in some of the deeper and more stagnant pools; embankments typically sandy although some sandstone outcrop evident at varying elevations on both sides of the channel		
Flow	About 0.5 L/s		
Field Measurements	Water pH:	6.72	
	Electrical conductivity:	940 μ S/cm	
	Dissolved oxygen content:	1.10 ppm	
	Temperature:	21.3 °C	
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with heavy weed infestation – both woody and wandering weeds – the dominant vegetation type, particularly along and in close proximity to the channel; weeds include privet, lantana and ivy which are most dominant in close proximity to the sewer as well as across most of the eastern embankment.		
Other Comments	Minor rubbish – including plastic bags, bottles and Styrofoam – evident in the channel as well as in the surrounding vegetation. Sewer aquaduct evident along eastern margin of creek. Water relatively clear with although a strong septic odour evident.		

APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	7		
Description	Mid-reaches of Oyster Gully Creek; behind residential dwellings fronting both Tea Tree Place and Anemone Place		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along both upper embankments.		
GPS Coordinates	322110 mE 6233745 mN		
Elevation	10 metres AHD (from GPS)		
Topographic Setting	Mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, incised channel with eastern embankment between about 4 and 7 metres high; channel embankments typically 10 to 20 degrees with some sandstone benches and outcrop noted, particularly along the channel floor		
Geological Setting	Hawkesbury Sandstone		
Drainage	South to north along Oyster Gully Creek		
Channel Features	Numerous rocks, boulders, gravels, cobbles line the channel floor creating a number of small pools and cascades both upstream and downstream; several sandstone benches up to 1.0 noted downstream of sampling location, some coarse sand and small gravel also evident, particularly in some of the deeper and more stagnant pools; embankments typically sandy although some sandstone outcrop evident along the floor of the channel		
Flow	About 0.5 L/s		
Field Measurements	Water pH:	7.02	
	Electrical conductivity:	560 μ S/cm	
	Dissolved oxygen content:	2.55 ppm	
	Temperature:	22.2 °C	
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with heavy weed infestation – both woody and wandering weeds – the dominant vegetation type, particularly along and in close proximity to the channel; weeds include privet, lantana, ivy and several species of grass which are most dominant in close proximity to the channel as across most of the eastern embankment.		
Other Comments	Minor rubbish – including plastic bags, bottles and Styrofoam – evident in the channel as well as in the surrounding vegetation. Water relatively clear with no offensive odours evident.		

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Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay		
Site No.	8		
Description	Mid-reaches of Oyster Gully Creek; junction of Oyster Gully Creek and un-named tributary, behind residential dwellings fronting both Anemone Place and Tunbridge Place		
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek and residential dwellings and gardens evident along both upper embankments.		
GPS Coordinates	322110 mE 6233825 mN		
Elevation	12 metres AHD (from GPS)		
Topographic Setting	Mid-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, incised channel with eastern embankment between about 4 and 5 metres high; channel embankments typically 5 to 20 degrees with some sandstone benches and outcrop noted, particularly along the channel floor		
Geological Setting	Hawkesbury Sandstone		
Drainage	West to east along Oyster Gully Creek		
Channel Features	Numerous rocks, boulders, gravels, cobbles line the channel floor creating a number of small pools and cascades both upstream and downstream; several sandstone benches up to 1.0 noted upstream of sampling location, some coarse sand and small gravel also evident in the channel floor bedload, particularly in some of the deeper and more stagnant pools; embankments typically sandy		
Flow	About 0.5 L/s in Oyster Gully Creek; flow about 0.1 L/s in un-named tributary		
Field Measurements	Oyster Gully Creek	Un-named Tributary of Oyster Gully Creek	
	Water pH: 6.94	Water pH:	7.00
	Electrical conductivity: 521 µS/cm	Electrical conductivity:	511 µS/cm
	Dissolved oxygen content: 4.95 ppm	Dissolved oxygen content:	7.41 ppm
	Temperature: 23.8 °C	Temperature:	23.2 °C
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with heavy weed infestation – both woody and wandering weeds – the dominant vegetation type, particularly along and in close proximity to the channel.		
Other Comments	Minor rubbish – including plastic bags, bottles and Styrofoam – evident in the channel as well as in the surrounding vegetation. Water relatively clear with no offensive odour evident.		

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Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay	
Site No.	9	
Description	Lower-reaches of Oyster Gully Creek; pedestrian foot bridge crossing Oyster Gully Creek from Surrey Buderim Avenue to Carvers Road	
Cultural Setting	Mixed area with disturbed bushland along the alignment of Oyster Gully Creek with residential dwellings and gardens evident along both embankments; along much of this section the residential dwellings and/or landscaped gardens come right to the upper edge of the channel embankments.	
GPS Coordinates	322280 mE 6234030 mN	
Elevation	3 metres AHD (from GPS)	
Topographic Setting	Lower-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, slightly incised channel with embankments between about 2 and 3 metres high; channel embankments typically 20 to 40 degrees with some sandstone benches and outcrop noted in the upper slopes.	
Geological Setting	Hawkesbury Sandstone	
Drainage	South to north along Oyster Gully Creek	
Channel Features	Constructed channel with engineered slope and walls; some sand and small gravels evident in the area whilst small sandstone bench (about 0.4 metre high) creates a natural weir separating fresh water from saline water	
Flow	About 0.6 L/s	
Field Measurements	Upstream of Bench Water pH: 7.27 Electrical conductivity: 705 µS/cm Dissolved oxygen content: 8.81 ppm Temperature: 22.6 °C	Downstream of Bench Water pH: 6.27 Electrical conductivity: 33.9 mS/cm Dissolved oxygen content: 5.50 ppm Temperature: 26.9 °C
Vegetation Condition	Only minor native vegetation observed along either embankment or channel with manicured gardens evident along both embankments and margins of the channel; area downstream of footbridge has been the subject of recent bushland regeneration activities	
Other Comments	Only minor rubbish – including plastic bags, bottles and Styrofoam – evident in the channel as well as in the surrounding vegetation. Water relatively clear with no offensive odours evident.	

APPENDIX M

Site Characterisation Information Sheet

Creek System	Tributary of Oyster Gully Creek – feeder stream of Oyster Bay
Site No.	10
Description	Lower-reaches of Oyster Gully Creek; vehicular bridge of Bates Drive crossing Oyster Gully Creek
Cultural Setting	Mixed area with parkland and residential dwellings throughout the greater area; slightly disturbed mangrove ecosystem exists immediately downstream of the Bates Drive overpass
GPS Coordinates	322400 mE 6234405 mN
Elevation	2 metres AHD (from GPS)
Topographic Setting	Lower-reaches of the catchment, upper slopes have gentle gradients in the order of 0.05 to 0.10, slightly incised channel with embankments between about 2 and 3 metres high; channel embankments typically 20 to 40 degrees with some sandstone benches and outcrop noted in the upper slopes.
Geological Setting	Hawkesbury Sandstone
Drainage	South to north along Oyster Gully Creek
Channel Features	
Flow	Unknown
Field Measurements	Upstream of Bench Water pH: 7.18 Electrical conductivity: 34.0 mS/cm Dissolved oxygen content: 7.15 ppm Temperature: 30.7 °C
Vegetation Condition	Very little native bushland evident in the area with open parkland evident on both sides of the channel
Other Comments	Only minor rubbish – including plastic bags, bottles and Styrofoam – evident in the channel as well as in the surrounding vegetation. Water relatively clear with no offensive odours evident.

Oyster Gully Creek Site 1



Left: outlet from stormwater collection in upper section of park

Above: inlet to stormwater pipe at down gradient section of park



Above: view north from site 1

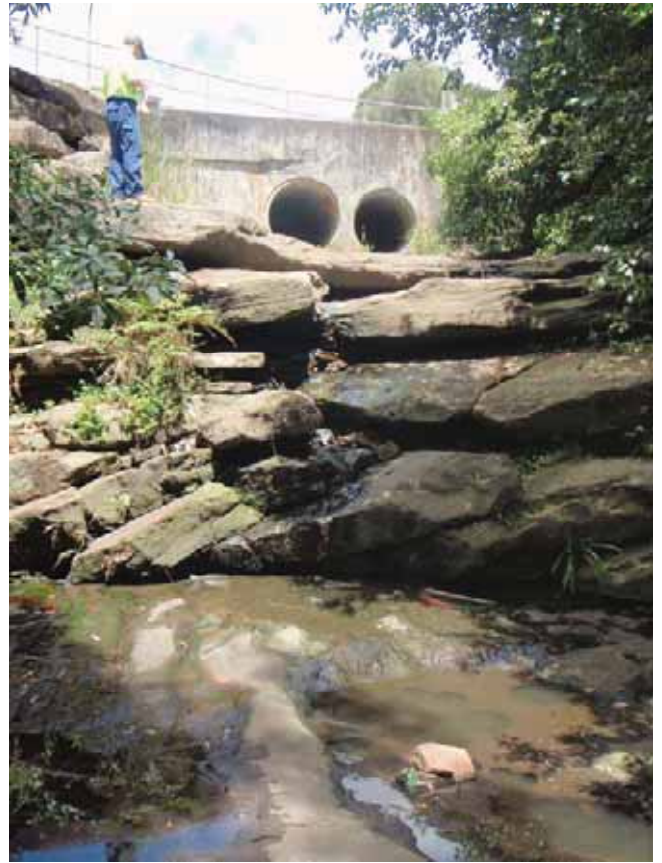
Right: park stormwater collection point



Oyster Gully Site 2



View of stormwater outlet pipes beneath
Stirling Avenue



Oyster Gully Creek Site 3



Above: Site 3 measurement point
Below: view upstream and downstream of Site 3



Oyster Gully Creek Site 4



Note: the sewer pipe manhole in foreground. The connecting pipe ran parallel to the creek in the background of this photograph

Oyster Gully Creek Site 5



View upstream of Site 5



View downstream of Site 5

Oyster Gully Creek Site 6



View upstream of Site 6



View downstream of Site 6

Oyster Gully Creek Site 7



View upstream of Site 7



View downstream of Site 7, note the large amount of rubbish

Oyster Gully Creek Site 8



*Left: view upstream of Site 8
Above: junction between tributaries along
Oyster Creek Gully.*

*Below: rubbish perched in trees as a result
of floodwater*



Oyster Gully Creek Site 9



Left: view upstream of Site 9. This concrete weir is the interface between the fresh and saltwater bodies

Below: view downstream of Site 9



Oyster Gully Creek Site 10



Above: view upstream of Site 10,
Bates Drive bridge in left of picture

Left: view to the north-east of Bates
Drive Bridge. Mangrove tidal
environment.