

19/07/2019

Ref: SY182476-CL01-3

Mr Byron Williams
Bloompark Consulting Pty Ltd
Suite 2.04/41 McLaren Street
North Sydney NSW 2060

Dear Byron,

**Re: Loreto Kirribilli Innovation Centre
Brief Stormwater Management Report to Support Section 4.55 Application**

This Stormwater Management Report prepared by Northrop Consulting Engineers (Northrop) provides a comparative review of the revised architectural scheme to support the Section 4.55 application for the development of the Loreto Kirribilli Innovation Centre at 85 Carabella Street, Kirribilli.

This report should be read in conjunction with the previously approved *Stormwater Management Plan – 85 Carabella Street, Kirribilli (Rev 2)* by Henry & Hymas Civil and Structural Engineers dated August 2017 (H&H SWMP) and Civil Engineering Documentation (Rev 3) by Northrop Consulting Engineers dated 19/07/2019 included in Appendix A.

We note that council policy emphasises the impact of site imperviousness with respect to stormwater runoff: “The amount of stormwater runoff in an area relates directly to intensity of development in that area. The more impervious to stormwater an urban area is, the larger the runoff quantities are and thereafter the impact on the environment.” (*North Sydney Council DCP 2013 - Commercial and Mixed-Use Development, Part B Section 2.6*)

In the context of the proposed development, the revised architectural scheme has decreased overall site impervious area – consistent with the stormwater approach of the approved stormwater management strategy detailed in the H&H SWMP.

Table 1 below compares the proportion of pervious and impervious areas of the Western catchment for the previously approved plans with the proposed S4.55 site. A minor adjustment was made to the Western Catchment area, when compared with the previous catchment layout (as identified in H&H SWMP) to reflect the topography of the subject site captured in the revised detailed survey.

Table 1: Post Developed Western Catchments as per approved H&H SWMP (August 2017) and Section 4.55 Application Documentation (July 2019)

Catchment (Western)	Impervious Area (%)	Pervious Area (%)
H&H SWMP (Approved)	80.30	19.70
S4.55 (Proposed)	80.25	19.75

The revised catchment and impervious areas are included on Civil Engineering Drawings C06.01 and C07.01.

Stormwater models for the proposed stormwater system have been produced in 12d 1D Dynamic Drainage Software (ILSAX) to determine the hydraulic performance of the post development network under a range of flood events (1% and 10% AEP). Rainfall intensity duration and frequency data was adopted from the 2016 version of Australian Rainfall and Runoff. The model adopts the following parameters:

- Paved (impervious) area depression storage = 1mm
- Supplementary area depression storage = 0mm
- Grassed (pervious) area depression storage = 5 mm
- Soil type = 3
- AMC = 3

The proposed system conveys all runoff from the 10% AEP event via an above ground pit and pipe network consistent with North Sydney Council policy. The stormwater results for the minor (10% AEP) and major (1% AEP) storm events are provided on results tables within Civil Engineering drawings C05.91 and C05.92. The design (minor – 10% AEP) event HGL is shown on Civil Engineering stormwater longitudinal sections C05.11, C05.12, C05.13. We note storm events in excess of the 10% AEP event result in safe overland flow through the site (refer Civil Engineering drawing C05.01 and overflow data on C05.92).

The modelling demonstrates compliance with the council guidelines and is consistent with the previously approved SWMP. Similar to the previously approved H&H SWMP, we infer on-site stormwater detention (OSD) is not required for the development

The proposed management of stormwater quality remains consistent with the H&H SWMP.

Noting this, the revised architectural scheme will involve no changes that negatively impact catchment runoff (with respect to stormwater quantity and quality) and the proposed stormwater system remains consistent with the approved H&H SWMP and council stormwater guidelines.

We trust this report satisfies your requirements at this time. Should you have any questions or queries with any item discussed in this letter, feel free to contact the undersigned on (02) 9241 4188.

Yours faithfully,



Ben Lawrence

Civil Engineer
BE Civil & Environmental, Hons1 MIEAust

NORTHROP CONSULTING ENGINEERS PTY LTD

Appendix A

S4.55 Application Civil Engineering Documentation (Rev 3) by Northrop Engineers dated 19.07.2019.

LORETO KIRRIBILLI

85 CARABELLA STREET CIVIL ENGINEERING WORKS PACKAGE - MASTERPLAN



DRAWING SCHEDULE	
DRG No.	DRAWING TITLE
C01.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
C01.11	SITE IMPERVIOUSNESS - EXSITING
C02.01	SITE IMPERVIOUSNESS - PROPOSED

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	19.07.19



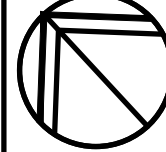
LORETO KIRRIBILLI
CIVIL ENGINEERING PACKAGE

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.



NORTHROP

Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

MASTERPLAN
COVER SHEET, DRAWING
SCHEDULE AND LOCALITY PLAN

JOB NUMBER

182476

DRAWING NUMBER

C10.01

REVISION

01

DRAWING SHEET SIZE

A1

NOT FOR CONSTRUCTION

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:



EASTERN CATCHMENT AREA
11,900 sq.m.

	ROOF AREA - IMPERVIOUS (5,150 sq.m. - 44%)
	PAVEMENT AREA - IMPERVIOUS (4,670 sq.m. - 39%)
	LANDSCAPED AREA - PERVIOUS (2,080 sq.m. - 17%)

WESTERN CATCHMENT AREA
6,270 sq.m.

	ROOF AREA - IMPERVIOUS (3,320 sq.m. - 53%)
	PAVEMENT AREA - IMPERVIOUS (1,720 sq.m. - 27%)
	LANDSCAPED AREA - PERVIOUS (1,230 sq.m. - 20%)

TOTAL CATCHMENT AREA
18,170 sq.m.

	ROOF AREA - IMPERVIOUS (8,470 sq.m. - 47%)
	PAVEMENT AREA - IMPERVIOUS (6,390 sq.m. - 35%)
	LANDSCAPED AREA - PERVIOUS (3,310 sq.m. - 18%)

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	19.07.19

CLIENT

THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT

THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:400@A1

NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

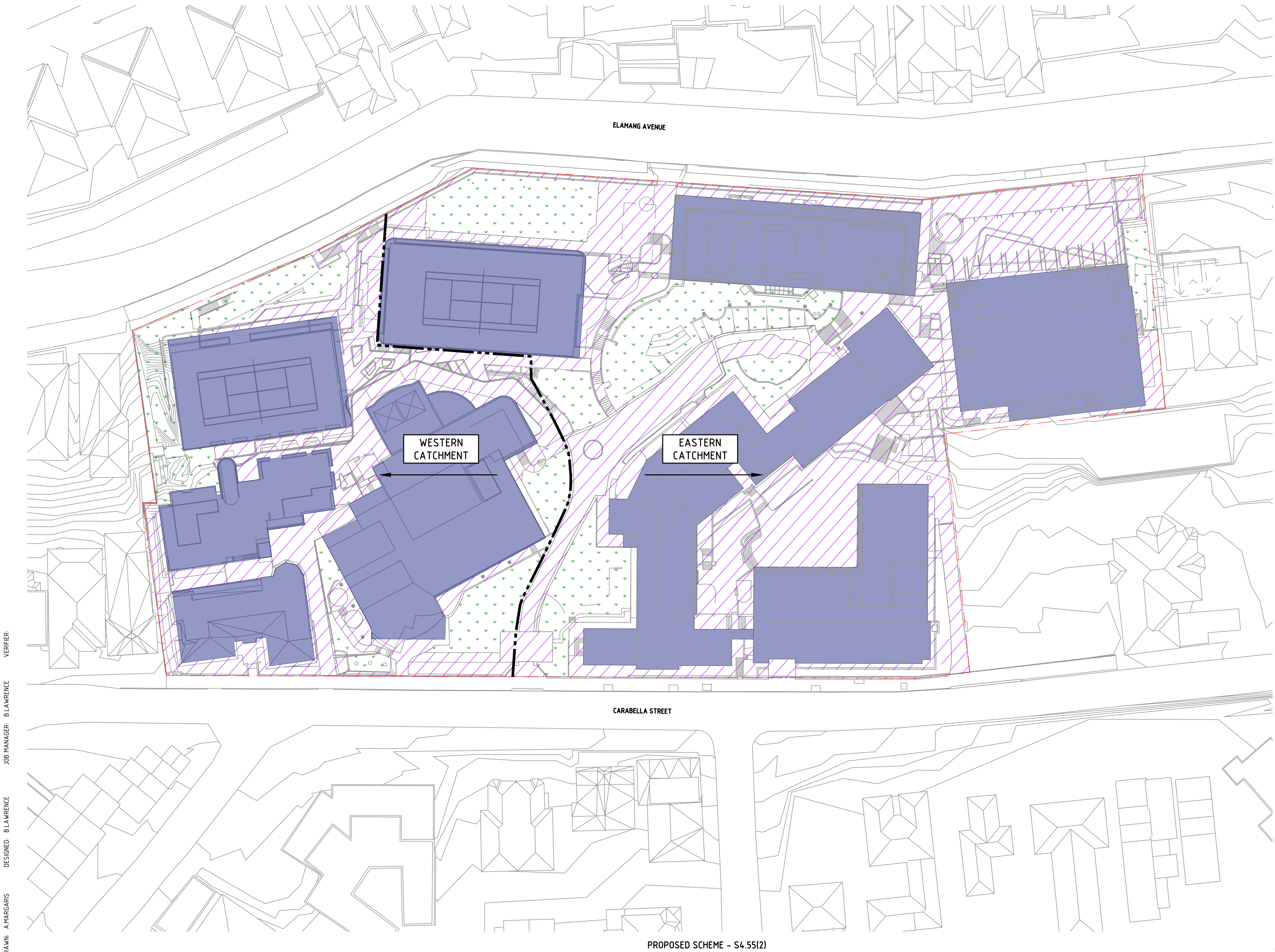
CIVIL ENGINEERING PACKAGE

**MASTERPLAN
SITE IMPERVIOUSNESS
EXISTING**

JOB NUMBER 182476	
DRAWING NUMBER C11.01	REVISION 01
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION

DRAWN: A MARGARIS DESIGNED: BLAWRENCE JOB MANAGER: BLAWRENCE VERIFIER:



EASTERN CATCHMENT AREA
11,900 sq.m.

	ROOF AREA - IMPERVIOUS (5,400 sq.m. - 45%)
	PAVEMENT AREA - IMPERVIOUS (5,000 sq.m. - 42%)
	LANDSCAPED AREA - PERVIOUS (1,500 sq.m. - 13%)

WESTERN CATCHMENT AREA
6,270 sq.m.

	ROOF AREA - IMPERVIOUS (3,320 sq.m. - 53%)
	PAVEMENT AREA - IMPERVIOUS (1,710 sq.m. - 27%)
	LANDSCAPED AREA - PERVIOUS (1,240 sq.m. - 20%)

TOTAL CATCHMENT AREA
18,170 sq.m.

	ROOF AREA - IMPERVIOUS (8,700 sq.m. - 48%)
	PAVEMENT AREA - IMPERVIOUS (6,970 sq.m. - 38%)
	LANDSCAPED AREA - PERVIOUS (2,500 sq.m. - 14%)

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	19.07.19

CLIENT

THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT

THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:400@A1

NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

**MASTERPLAN
SITE IMPERVIOUSNESS
PROPOSED**

JOB NUMBER 182476	
DRAWING NUMBER C12.01	REVISION 01
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION

LORETO KIRRIBILLI

85 CARABELLA STREET

CIVIL ENGINEERING WORKS PACKAGE



DRAWING SCHEDULE	
DRG No.	DRAWING TITLE
C01.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
C01.11	SPECIFICATION NOTES
C02.01	CONCEPT SEDIMENT AND EROSION CONTROL PLAN
C02.11	SEDIMENT AND SOIL EROSION CONTROL DETAILS
C05.01	STORMWATER DRAINAGE PLAN
C05.11	STORMWATER LONGITUDINAL SECTIONS - SHEET 01
C05.12	STORMWATER LONGITUDINAL SECTIONS - SHEET 02
C05.13	STORMWATER LONGITUDINAL SECTIONS - SHEET 03
C05.91	STORMWATER CALCULATIONS SHEET - MINOR
C05.92	STORMWATER CALCULATIONS SHEET - MAJOR
C06.01	CATCHMENT PLAN
C07.01	SITE IMPERVIOUSNESS
C09.01	DETAILS

DRAWN: A.MARGARIS

DESIGNED: B.LAWRENCE

JOB MANAGER: B.LAWRENCE

VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	02.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
4	ISSUED FOR SECTION 4.55	AM		BL	19.07.19



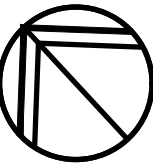
LORETO KIRRIBILLI
CIVIL ENGINEERING PACKAGE

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.



Sydney

Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

COVER SHEET, DRAWING
SCHEDULE AND LOCALITY PLAN

JOB NUMBER

182476

DRAWING NUMBER

REVISION

C01.01

4

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION

Printed By :ANGUS FALLINS

Date :15.02.2018 11:24 AM

Found : L:\2018\jobs\182476 - Loreto Kirribilli-drawings\4-northrop\C-CIVIL&CAD\FILES\386182476_C01.dwg

Drawn By : AMARGARIS DESIGNED: BLAWRENCE JOB MANAGER: BLAWRENCE VERIFIER:

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH NORTH SYDNEY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW.
IF CONFLICT ARISE, NORTH SYDNEY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE NORTH SYDNEY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE

ACCESS AND SAFETY
1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
2. <u>THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.</u>
3. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
4. WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE SITE.
5. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS.

TREE PROTECTION
1. REFER TO LANDSCAPE / ARCHITECTS PLAN FOR TREES TO BE RETAINED AND PROTECTED.
2. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY: 2.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE. 2.2. ENSURING THAT NOTHING IS NAILED TO ANY PART OF THE TREE. 2.3. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY. COUNCILS AND/OR INDEPENDENT ARBORISTS TO BE CONSULTED WHERE TREE ROOTS ARE TO BE REMOVED AND/OR CUT.

SEDIMENT AND SOIL EROSION
1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN, OTHER REGULATORY AUTHORITY REQUIREMENTS <u>AND MAKE GOOD PAYMENT OF ALL FEES.</u>
2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND <u>MAINTAINED ON A DAILY BASIS.</u>
3. THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND <u>ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.</u>
4. THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE; 5.1 <u>CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.</u> 5.2 <u>INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.</u> 5.3 <u>INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.</u>
6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL <u>ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.</u>
8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM. ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

EXISTING SERVICES
1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. <u>NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.</u>
2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
3. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT <u>AT THE CONTRACTORS EXPENSE.</u>
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT .
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED AND MAINTAINED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

STORMWATER DRAINAGE
1. ALL PIPES SHALL BE CLASS 2 RUBBER-RING JOINTED RCP U.N.O. WHERE uPVC PIPES HAVE BEEN SPECIFIED, THE FOLLOWING CLASS PIPEWORK IS TO BE ADOPTED U.N.O. ø100mm OR LESS TO BE CLASS 'SN10' AND ABOVE ø100mm TO BE CLASS 'SN8'.
2. uPVC STORMWATER LINES PASSING UNDER FLOOR SLABS TO BE CONCRETE ENCASED.
3. FRC PIPES EQUAL TO THAT OF THE STEEL REINFORCED CONCRETE PIPE CLASS SPECIFIED ON THE DRAWINGS MAY BE USED SUBJECT TO APPROVAL FROM THE SUPERINTENDENT.
4. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
5. <u>COVERS</u> 5.1 USE HOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS. 5.2 ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT. 5.3 ALL COVERS AND GRATES TO BE FITTED WITH POSITIVE COVER LIFTING KEYS 5.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES. CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS. 5.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B' ELSEWHERE.
6. ALL GRATED TRENCH DRAINS SHOULD BE 'CLASS D' CAST IRON WITHIN VEHICULAR PAVEMENTS AND CLASS 'B' HEEL SAFE WITHIN PEDESTRIAN PAVEMENTS.
6. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING PURPOSE MADE FITTINGS OR STORMWATER PITS.
7. ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
8. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDER AND MADE NEAT.
9. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
10. U.N.O. MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
11. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN 50mm CONCRETE BED (OR 75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK.
12. BEDDING SHALL BE U.N.O TYPE HS2 UNDER ROADS AND H2 UNDER GENERAL AREAS IN ACCORDANCE WITH CURRENT RELEVANT INDUSTRY STANDARDS AND GUIDELINES.
13. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
14. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.
<u>SUBSOIL DRAINAGE</u> 15. ø100mm SUBSOIL DRAINAGE LINES WITH NON-WOVEN GEOTEXTILE FILTER SOCK SURROUND SHALL BE CONNECTED TO A STORMWATER DRAINAGE PIT (AT MIN 1% LONGITUDINAL GRADE) AND PROVIDED IN THE FOLLOWING LOCATIONS; 15.1. THE HIGH SIDE OF PROPOSED TRAFFICKED PAVEMENT AREAS. 15.2. ALL PLANTER AND TREE BEDS PROPOSED ADJACENT TO PAVEMENT AREAS. 15.3. BEHIND RETAINING WALLS (IN ACCORDANCE WITH RETAINING WALL DETAILS). 15.4. ALL OTHER AREAS SHOWN ON DRAWINGS. 15.5. <u>CONTRACTOR IS TO MAKE ALLOWANCE IN BOTH TENDER AND CONSTRUCTION COSTING TO ALLOW FOR SUBSURFACE DRAINAGE BEHIND ALL RETAINING WALLS / ABOVE LOCATIONS AND TO MAKE CONNECTION TO STORMWATER SYSTEM.</u>
16. WHERE SUBSOIL DRAINAGE PASSES BENEATH BUILDINGS / PAVED AREAS AND/OR PAVEMENTS, CONTRACTOR TO ENSURE ø100mm CLASS 'SN10' uPVC DRAINAGE LINE IS USED AND THAT PROPRIETARY FITTINGS ARE USED TO RECONNECT SUBSOIL DRAINAGE LINE.
17. THE CONTRACTOR SHALL INSTALL INSPECTION OPENINGS / CLEAROUTS TO ALL SUBSOIL DRAINAGE LINES AND DOWNPIPE LINES AS SPECIFIED ON DRAWINGS AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AT MAXIMUM 30m CENTRE AND AT ALL UPSTREAM ENDPOINTS.
18. PROVIDE 3.0m LENGTH OF ø100 SUBSOIL DRAINAGE LINE WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC TO THE UPSTREAM SIDE OF STORMWATER PITS, LAID IN STORMWATER PIPE TRENCHES AND CONNECTED TO DRAINAGE PIT.
19. IN AREAS WHERE DUMPED / HAND PLACED ROCK IS USED AS A MEANS OF SCOUR PROTECTION, CONTRACTOR IS TO EXCAVATE A MINIMUM OF 100mm FROM PROPOSED SURFACE, LEVEL AND COMPACT SUBGRADE AS SPECIFIED. ROCK TO THEN BE PLACED ON GEOTEXTILE FILTER FABRIC.

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT		PROJECT	DRAWING TITLE	JOB NUMBER		
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19			 Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100	LORETO KIRIRIBILLI	CIVIL ENGINEERING PACKAGE	182476		
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19								
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19								
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD		SPECIFICATION NOTES			DRAWING NUMBER C01.11	REVISION 3
												DRAWING SHEET SIZE = A1	

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19	LORETO KIRIBILLI CATHOLIC SCHOOL
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19	
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19	



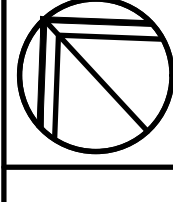
LORETO KIRIBILLI
CATHOLIC SCHOOL

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:200@A1



0 2 4 6 8 10m



NORTHROP

Sydney

Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

**CONCEPT SEDIMENT AND
EROSION CONTROL PLAN**

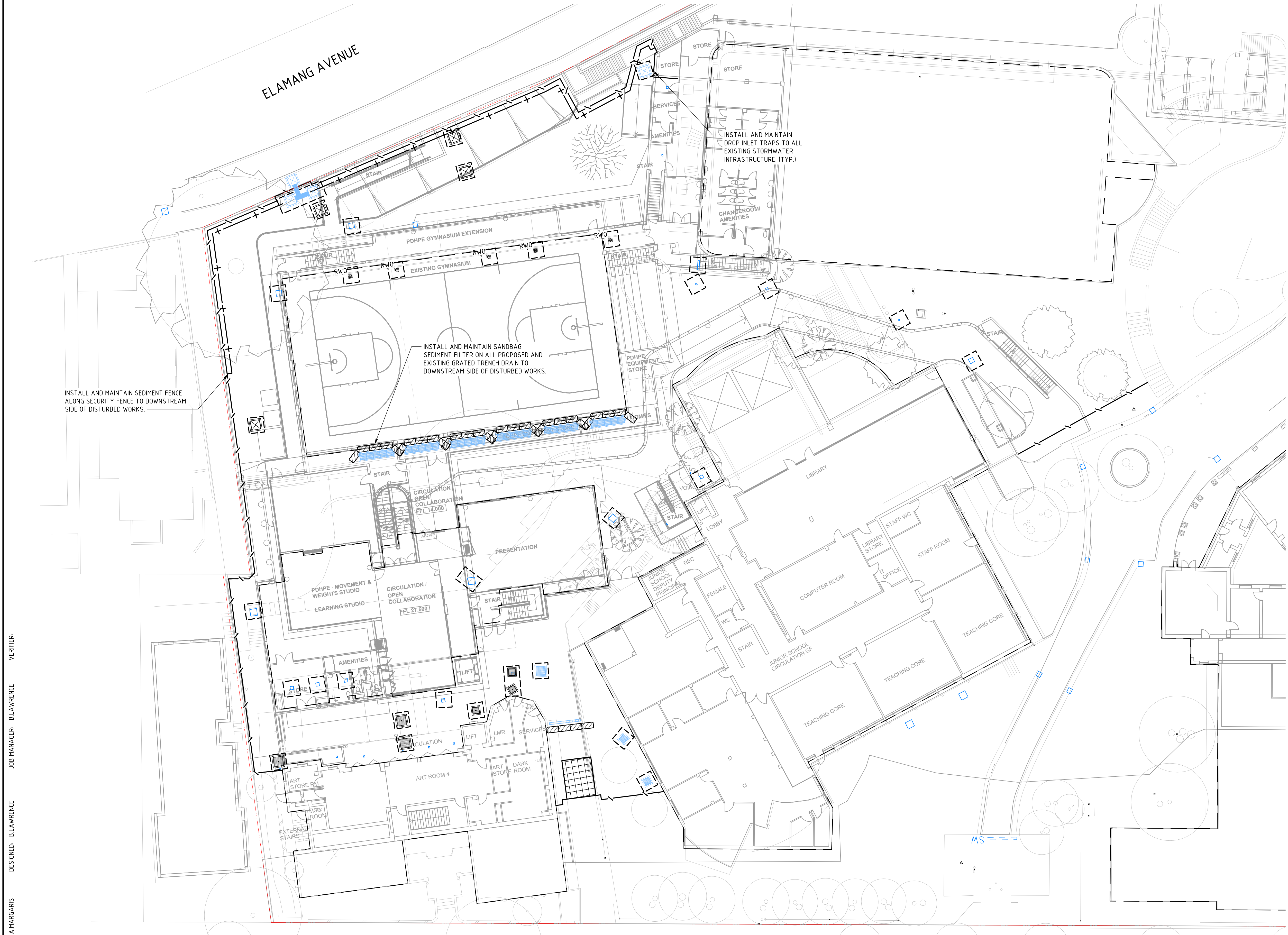
JOB NUMBER

182476

DRAWING NUMBER	REVISION
C02.01	3

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND



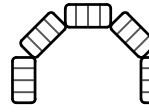
PROPOSED BOUNDARY LINE



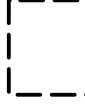
SEDIMENT FENCE



SECURITY FENCE



SANDBAG SEDIMENT FILTER



DROP INLET SEDIMENT TRAP



GRADED INLET PIT (NEW / EXTG)



JUNCTION PIT (NEW / EXTG)



OUTDOOR LEARNING AREA

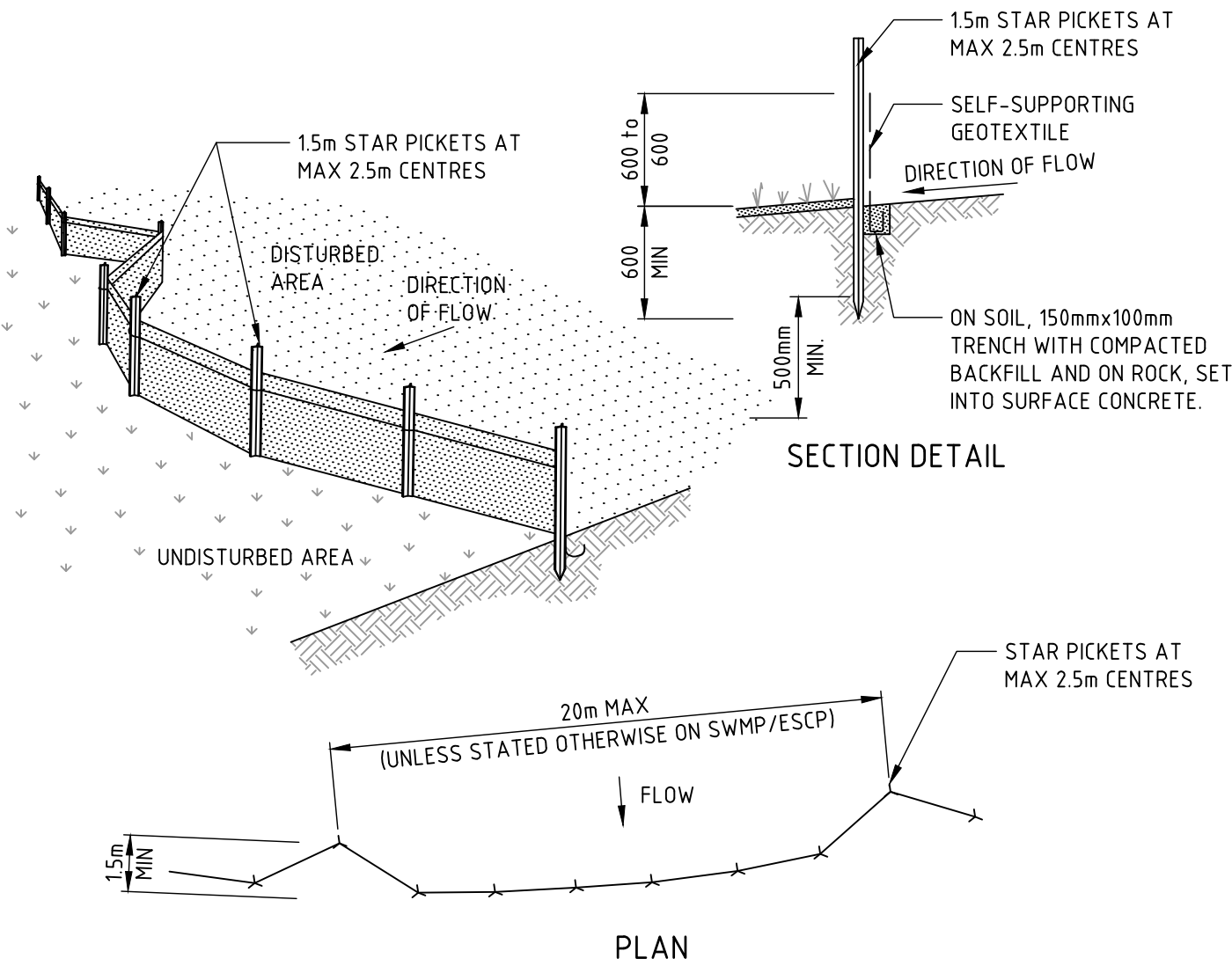


STABILISED SITE ACCESS



BALCONY ABOVE

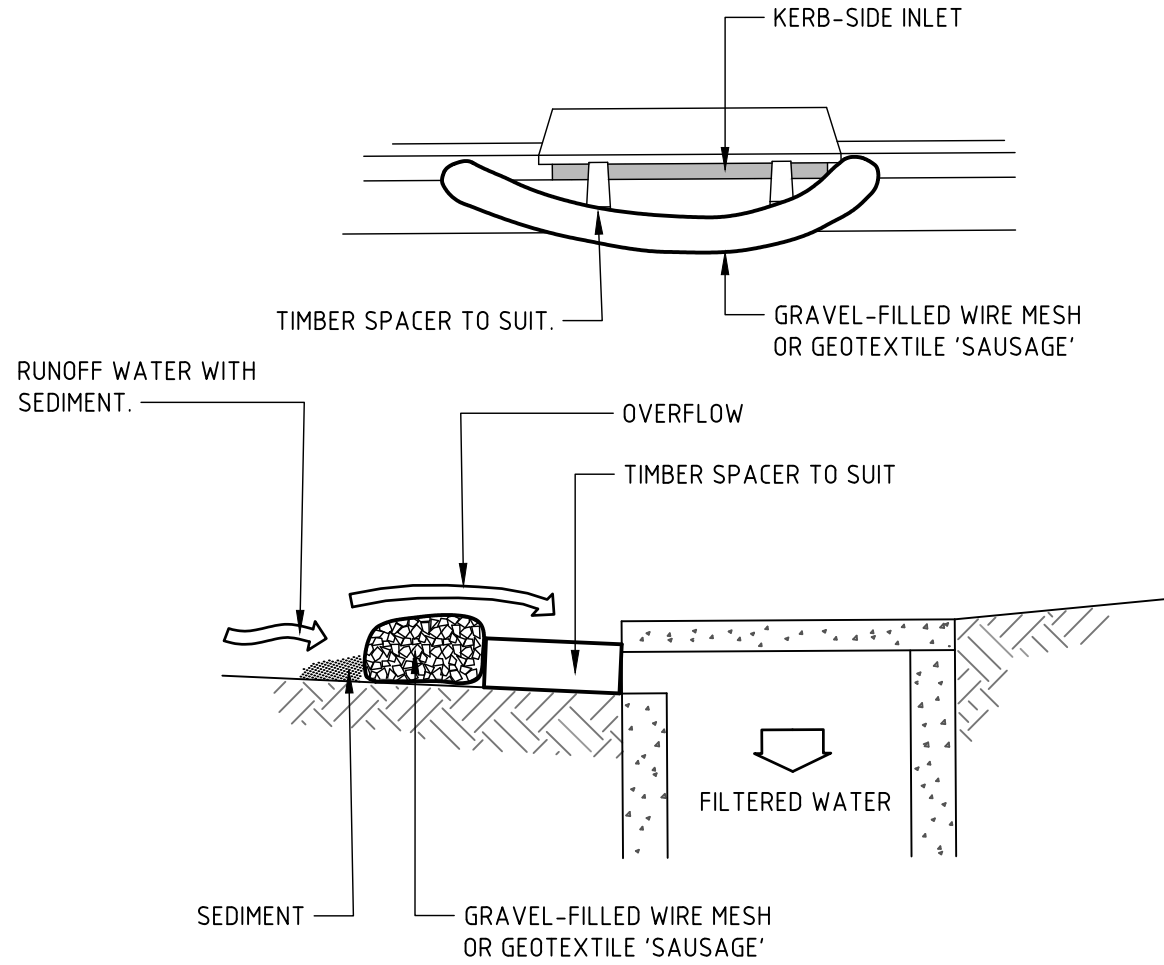
Found: L:\2019\Jobs\182476 - Loreto Kirribilli Drawings\4-northrop\CIVIL & CAD\FILESS\386182476_C02.01.dwg
Plotted By: ANGUS FALLINS Date: 15.02.2018 11:24 AM



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE (SD 6-8)

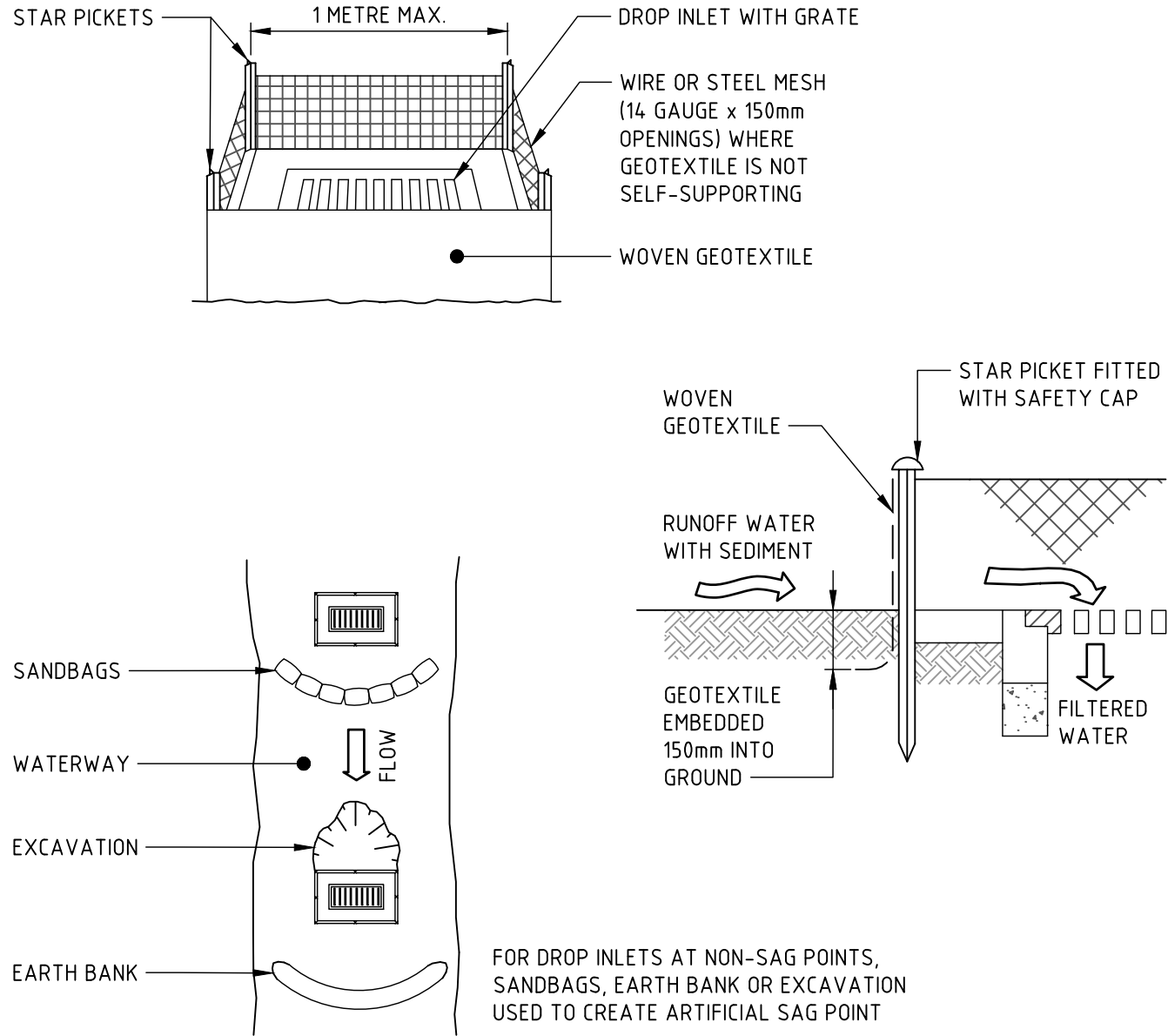


NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

SANDBAG SEDIMENT FILTER (SD 6-11)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOTEXTILE. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

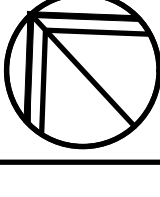
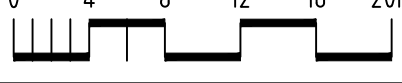
GEOTEXTILE INLET FILTER (SD 6-12)

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19


DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT 
THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD


ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.
SCALE 1:400@ A1 


Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT LORETO KIRRIBILLI

DRAWING TITLE CIVIL ENGINEERING PACKAGE SEDIMENT AND SOIL EROSION CONTROL DETAILS
--

JOB NUMBER 182476
DRAWING NUMBER C02.11
REVISION 3
DRAWING SHEET SIZE = A1

DRAWN: A.MARGARIS
DESIGNED: B.LAWRENCE
JOB MANAGER: B.LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19	
2	ISSUED FOR SECTION 4.55	AM		BL	19.07.19	



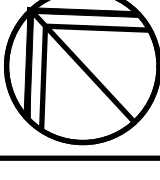
LORETO KIRRIBILLI
SCHOOL

THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:200@A1





NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

STORMWATER DRAINAGE PLAN

JOB NUMBER

182476

DRAWING NUMBER

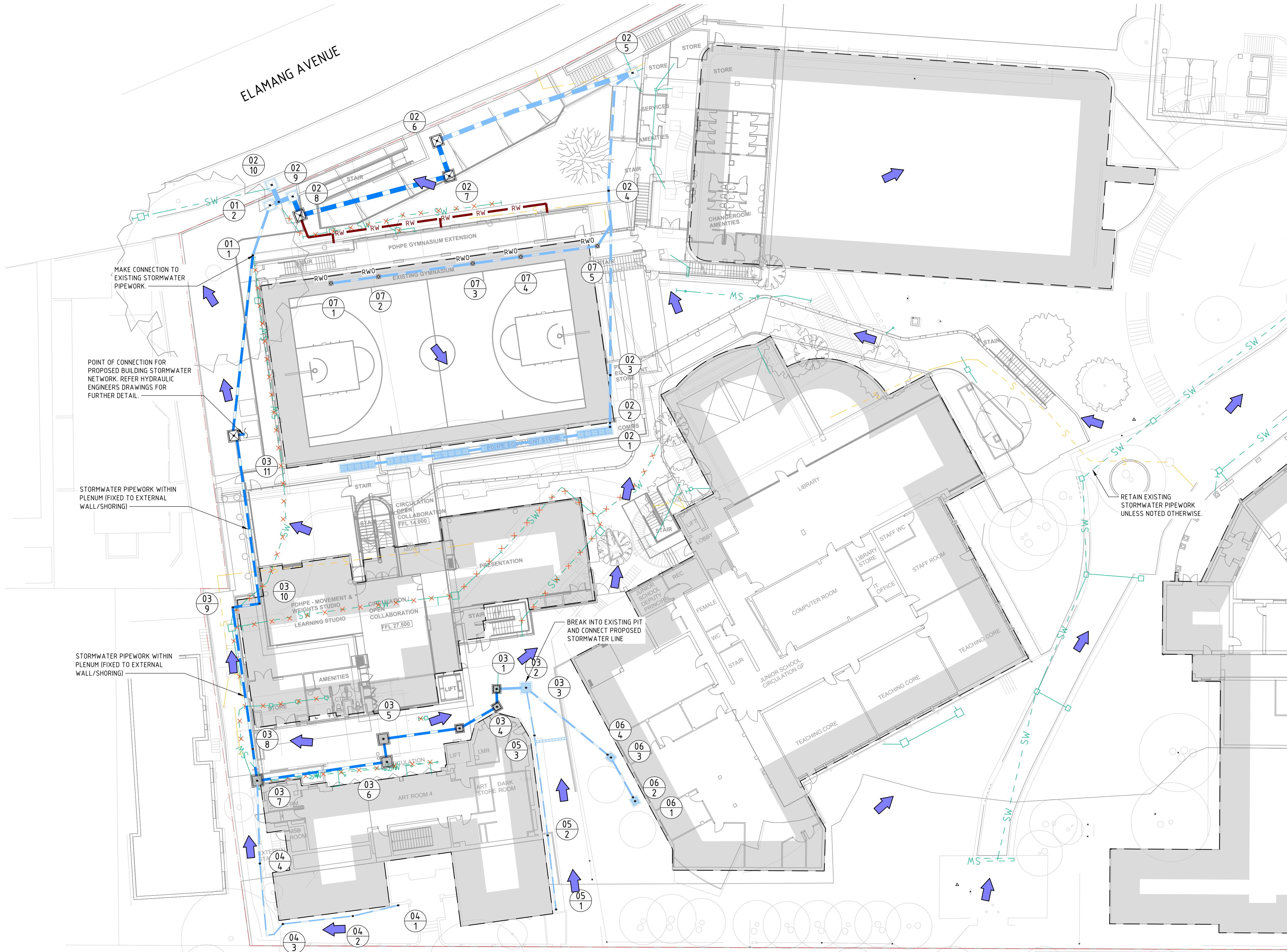
C05.01

REVISION

2

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND

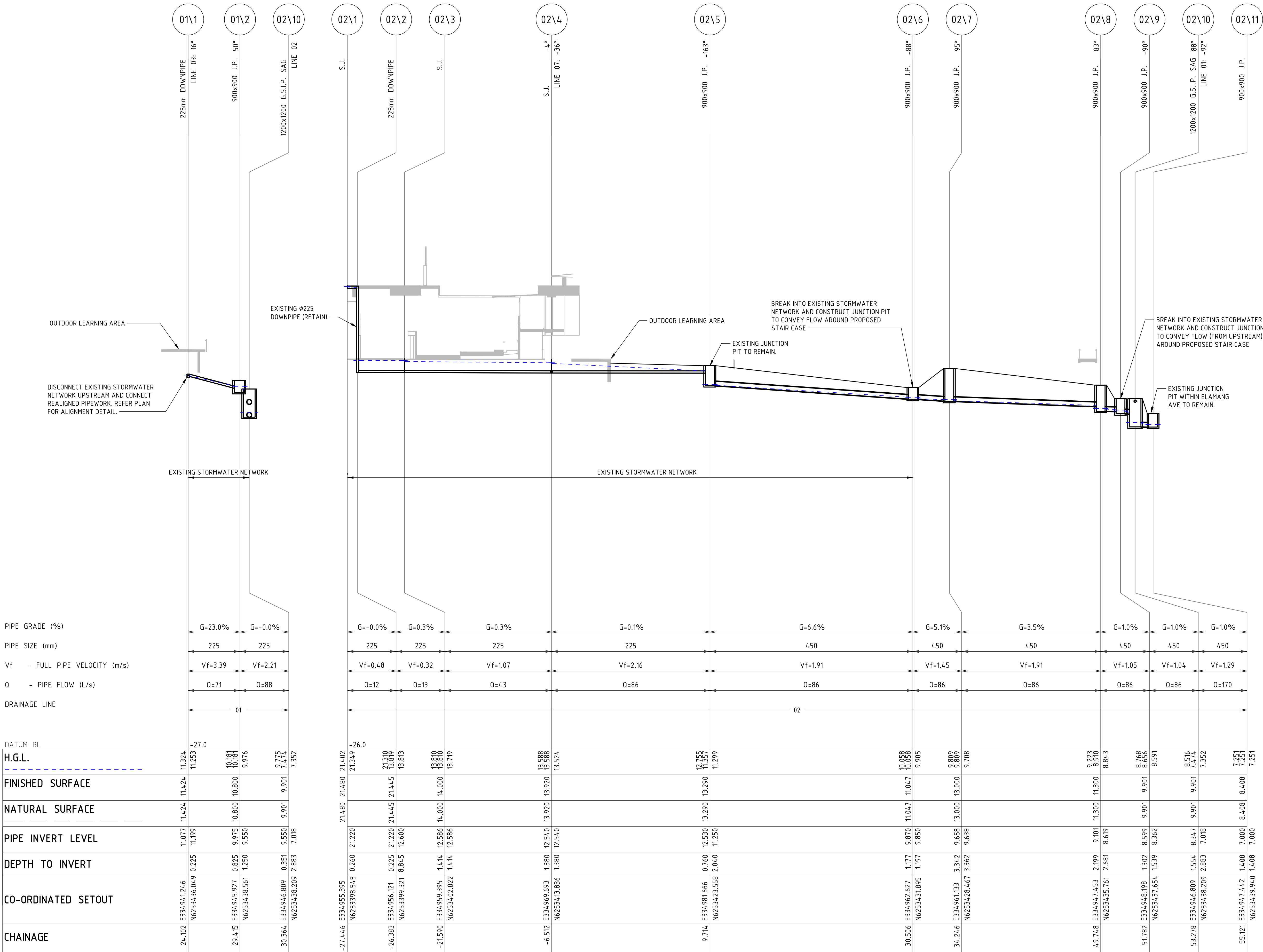
- PROPOSED BOUNDARY LINE
- STORMWATER PIPE
- EXISTING STORMWATER NETWORK
- EXISTING STORMWATER NETWORK TO BE DEMOLISHED
- GRATED INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
- EXISTING GRATED TRENCH DRAIN
- RAINWATER PIPE
- DOWNPIPE
- STORMWATER PIT TAG STRUCTURE No / LINE ID
- OVERLAND FLOW
- RAINWATER OUTLET

NOTE

1. INSTALL EVIROPD BASKET INSERT (200 MICRON) ON ALL GRATED SURFACE INLET PITS

Found: L:\2018\182476 - Loreto Kirribilli\Drawings\182476-Civil\182476-CAD FILES\182476_C05.dwg
Plotted By: ANGUS FALLINS
Date: 15.02.2018 11:24 AM

DRAWN: A.MARGARIS DESIGNED: BLA WRENCE JOB MANAGER: BLA WRENCE VERIFIER:



PIPE GRADE (%)	G=23.0%		G=-0.0%	
PIPE SIZE (mm)	225		225	
Vf - FULL PIPE VELOCITY (m/s)	Vf=3.39		Vf=2.21	
Q - PIPE FLOW (L/s)	Q=71		Q=88	
DRAINAGE LINE	01			
DATUM RL	-27.0			
H.G.L.		11.324	10.181	9.775
		11.253	10.181	9.775
FINISHED SURFACE		11.424	10.800	9.901
NATURAL SURFACE		11.424	10.800	9.901
PIPE INVERT LEVEL		11.077	9.975	9.550
DEPTH TO INVERT		11.199	9.975	9.550
CO-ORDINATED SETOUT		11.077	9.975	9.550
CHAINAGE		11.199	9.975	9.550

G=-0.0%	G=0.3%	G=0.3%	G=0.1%	G=6.6%	G=5.1%	G=3.5%	G=1.0%	G=1.0%	G=1.0%
225	225	225	225	450	450	450	450	450	450
Vf=0.48	Vf=0.32	Vf=1.07	Vf=2.16	Vf=1.91	Vf=1.45	Vf=1.91	Vf=1.05	Vf=1.04	Vf=1.29
Q=12	Q=13	Q=43	Q=86	Q=86	Q=86	Q=86	Q=86	Q=86	Q=170
02									
-27.446	E334955.395	21.480	21.480	21.402					
	N6253398.545	0.260	21.349	21.349					
-26.383	E334956.121	0.225	21.220	21.445	21.445				
	N6253399.321	8.845	12.600	13.813					
-21.590	E334959.395	1.414	12.586	14.000	14.000				
	N6253402.822	1.414	12.586	13.719					
-6.512	E334969.693	1.380	12.540	13.970	13.970				
	N6253413.636	1.380	12.540	13.524					
9.714	E334981.666	0.760	12.530	13.290	13.290				
	N6253423.558	2.040	11.250	11.259					
30.506	E334962.627	1.177	9.870	11.047	11.047				
	N6253431.895	1.197	9.850	10.058	10.058				
34.246	E334961.133	3.342	9.658	9.809	9.809				
	N6253428.467	3.362	9.638	9.708					
49.748	E334947.453	2.199	9.101	11.300	11.300				
	N6253435.761	2.681	8.619	8.843					
51.782	E334948.198	1.302	8.599	9.901	9.901				
	N6253437.654	1.539	8.362	8.591					
53.278	E334946.809	1.554	8.347	9.901	9.901				
	N6253438.209	2.883	7.018	7.352					
55.121	E334947.442	1.408	7.000	8.408	8.408				
	N6253439.940	1.408	7.000	7.251					

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19	LORETO KIRIBILLI CIVIL ENGINEERING PACKAGE
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19	
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19	



LORETO KIRIBILLI
CIVIL ENGINEERING PACKAGE

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.



Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

STORMWATER LONGITUDINAL
SECTIONS - SHEET 01

JOB NUMBER

182476

DRAWING NUMBER

C05.11

REVISION

3

DRAWING SHEET SIZE = A1

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:

PIPE GRADE (%)
PIPE SIZE (mm)
Vf - FULL PIPE VELOCITY (m/s)
Q - PIPE FLOW (L/s)
DRAINAGE LINE

DATUM RL

H.G.L.

FINISHED SURFACE

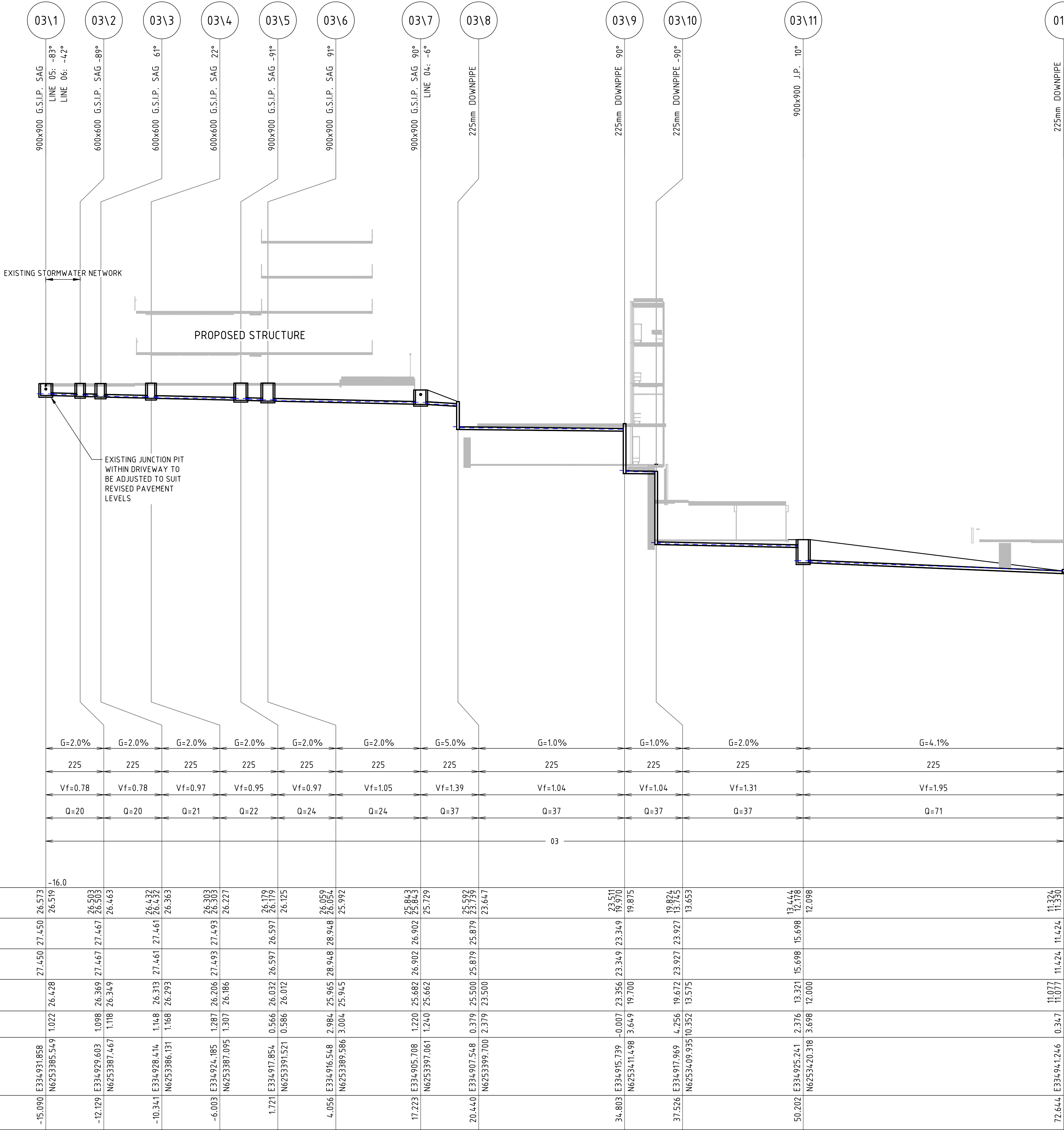
NATURAL SURFACE

PIPE INVERT LEVEL

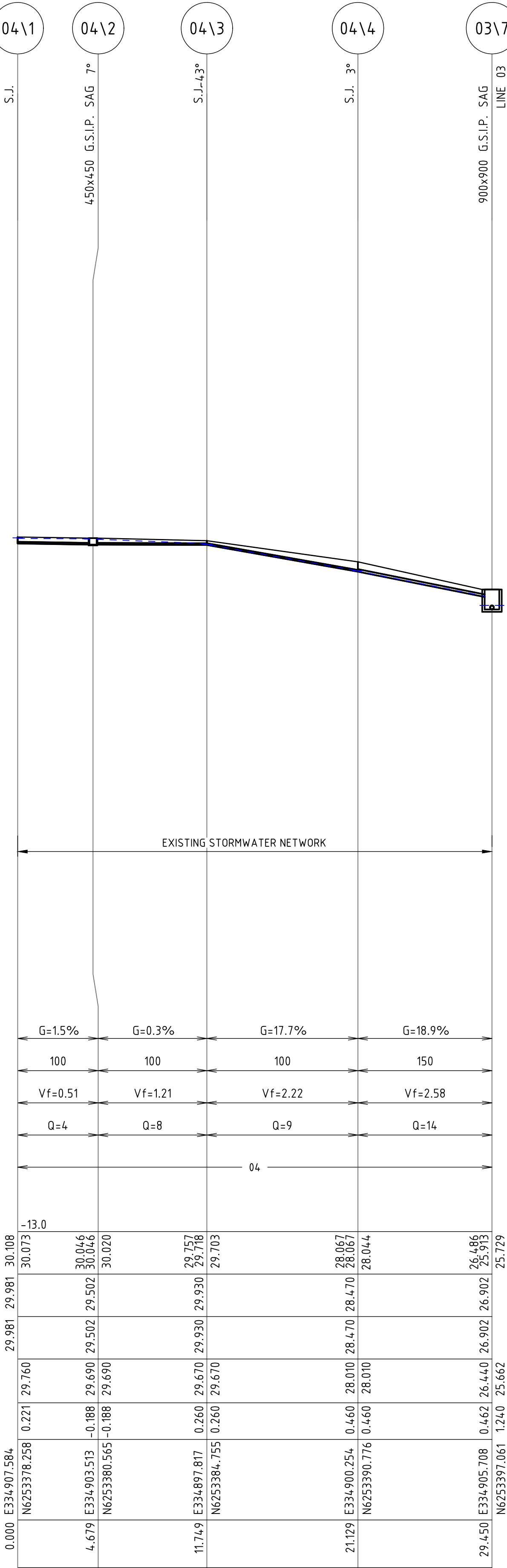
DEPTH TO INVERT

CO-ORDINATED SETOUT

CHAINAGE



LINE 03



LINE 04

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19



LORETO KIRRIBILLI
SCHOOL

THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE



NORTHROP

Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

**STORMWATER LONGITUDINAL
SECTIONS - SHEET 02**

JOB NUMBER

182476

DRAWING NUMBER

C05.12

REVISION

3

DRAWING SHEET SIZE = A1

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:

PIPE GRADE (%)
PIPE SIZE (mm)
Vf - FULL PIPE VELOCITY (m/s)
Q - PIPE FLOW (L/s)
DRAINAGE LINE

DATUM RL

H.G.L.

FINISHED SURFACE

NATURAL SURFACE

PIPE INVERT LEVEL

DEPTH TO INVERT

CO-ORDINATED SETOUT

CHAINAGE

LINE 05

LINE 06

LINE 07

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19


DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT

THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.


Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
LORETO KIRRIBILLI

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
STORMWATER LONGITUDINAL SECTIONS - SHEET 03

JOB NUMBER
182476
DRAWING NUMBER
C05.13
REVISION
3
DRAWING SHEET SIZE = A1

[illegible]

JOB MANAGER: B.LAWRENCE

DESIGNED: B.LAWRENCE

DRAWN: A.MARGARIS

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19

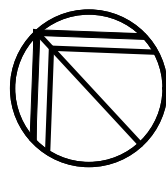


ARCHITECT



DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE



Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

STORMWATER CALCULATIONS SHEET - MINOR

JOB NUMBER

182476

DRAWING NUMBER

REVISION

DRAWING SHEET SIZE = A1

Plotted By : ANGUS FALLINS
Found : t:\2018 jobs\182476 - loreto kirribilli\drawings\id-northrop\C-CIVIL\2-CAD FILES\3-S96\182476 C05.91.dwg

NOT FOR CONSTRUCTION

Pit						Pipe										Catchment					Pit						Pipe					Overflow									
Pit Name	Pit Type	Surface RL (m)	Pit Max Ku	Major Event Inlet Capacity %	Minor Event Inlet Capacity %	Pipe Name	From	To (m)	Pipe Length (m)	U/S IL (m)	D/S IL (%)	Slope	Pipe Type	Pipe Diameter (mm)	Pipe Roughness	Roughness Type	Catchment Name	Area (Ha)	Impervious Percentage (%)	Pervious Percentage (%)	Impervious Tc (min)	Pervious Tc (min)	Pit Name	Approach Flow (m3/s)	Captured Flow (m3/s)	Bypass Flow (m3/s)	Max HGL (m)	Ponding Depth (m)	Pit Freeboard (m)	Pipe Name	Max Flow (m3/s)	Max Velocity (m/s)	Max U/S HGL (m)	MAX D/S HGL	From	To	Flow Width (m)	Flow Depth (m)	Flow Velocity (m/s)	VxD Ratio	
01\1	EX. POINT OF CONNECTION	11.424	1.31	80	100	01\1 to 01\2	01\1	01\2	5.312	11.199	9.975	23.04	UPVC	225	0.013	Manning	01\1		0	0			01\1	0	0		11.318	0	0.118	01\1 to 01\2	0.08	3.37	11.251	10.353	01\1			0			
01\2	900x900 J.P.	10.8	1.62	80	100	01\2 to 02\10	01\2	02\10	0.949	9.55	9.55	0	UPVC	225	0.013	Manning	01\2	0.042	100	0	5	10	01\2	0.027	0.027	0	10.353	0	0.806	01\2 to 02\10	0.105	2.65	10.148	9.775	01\2	02\10	0	0	0	0	0
02\10	1200x1200 G.S.I.P.	9.901															02\10						02\10																		
02\1	EX. POINT OF CONNECTION	21.48	8.41	80	100	02\1 to 02\2	02\1	02\2	1.063	21.22	21.22	0	UPVC	225	0.013	Manning	02\1	0.028	100	0	5	10	02\1	0.018	0.018		21.461	0	0.093	02\1 to 02\2	0.018	0.57	21.375	21.331	02\1			0			
02\2	225mm DOWNPIPE	21.445	1.78	80	100	02\2 to 02\3	02\2	02\3	4.793	12.6	12.586	0.3	UPVC	225	0.013	Manning	02\2		0	0			02\2	0	0		14.181	0	8.178	02\2 to 02\3	0.018	0.46	14.167	14.16	02\2			0			
02\3	N/A	14	2.92	80	100	02\3 to 02\4	02\3	02\4	15.079	12.586	12.54	0.303	UPVC	225	0.013	Manning	02\3	0.081	100	0	5	10	02\3	0.053	0.053		14.16	0	8.186	02\3 to 02\4	0.065	1.64	14.071	13.635	02\3			0			
02\4	N/A	13.92	1.27	80	100	02\4 to 02\5	02\4	02\5	16.226	12.54	12.53	0.062	UPVC	225	0.013	Manning	02\4	0.043	100	0	5	10	02\4	0.028	0.028		13.635	0	8.421	02\4 to 02\5	0.09	2.27	13.578	12.755	02\4			0			
02\5	900x900 J.P.	13.29	2.09	80	100	02\5 to 02\6	02\5	02\6	20.792	11.25	9.87	6.638	RRJ2	450	0.013	Manning	02\5		0	0			02\5	0	0	0	11.36	0	1.956	02\5 to 02\6	0.09	1.93	11.299	10.065	02\5	02\6	0	0	0	0	0
02\6	900x900 J.P.	11.047	2.11	80	100	02\6 to 02\7	02\6	02\7	3.74	9.85	9.658	5.135	RRJ2	450	0.013	Manning	02\6		0	0			02\6	0	0	0	10.065	0	1.04	02\6 to 02\7	0.09	1.45	9.91	9.815	02\6	LOST	0	0	0	0	0
02\7	900x900 J.P.	13	2.17	80	100	02\7 to 02\8	02\7	02\8	15.503	9.638	9.101	3.465	RRJ2	450	0.013	Manning	02\7		0	0			02\7	0	0	0	9.709	0	3.235	02\7 to 02\8	0.09	1.92	9.709	9.226	02\7	LOST	0	0	0	0	0
02\8	900x900 J.P.	11.3	2.09	80	100	02\8 to 02\9	02\8	02\9	2.034	8.619	8.599	1	RRJ2	450	0.013	Manning	02\8		0	0			02\8	0	0	0	8.919	0	2.457	02\8 to 02\9	0.09	1.06	8.85	8.773	02\8	02\9	0	0	0	0	0
02\9	900x900 J.P.	9.901	2.1	80	100	02\9 to 02\10	02\9	02\10	1.496	8.362	8.347	1	RRJ2	450	0.013	Manning	02\9		0	0			02\9	0	0	0	8.665	0	1.312	02\9 to 02\10	0.09	1.06	8.598	8.521	02\9	02\10	0	0	0	0	0
02\10	1200x1200 G.S.I.P.	9.901	2.09	80	100	02\10 to 02\11	02\10	02\11	1.843	7.018	7	1	RRJ2	450	0.013	Manning	02\10		0	0			02\10	0	0	0	7.532	0	2.532	02\10 to 02\11	0.194	1.41	7.375	7.272	02\10	LOST	0	0	0	0	0
02\11	900x900 J.P.	8.408															02\11						02\11	0	0		7.272	0	-0.2												
03\1	900x900 G.S.I.P.	27.45	2.09	80	100	03\1 to 03\2	03\1	03\2	2.961	26.428	26.369	2	UPVC	225	0.013	Manning	03\1	0.012	100	0	5	10	03\1	0.086	0	0.086	26.491	0.098	0.976	03\1 to 03\2	0.006	0.72	26.451	26.419	03\1	LOST	1.968	0.098	0.89	0.09	
03\2	600x600 G.S.I.P.	27.467	2.11	80	100	03\2 to 03\3	03\2	03\3	1.788	26.349	26.313	2	UPVC	225	0.013	Manning	03\2		0	0			03\2	0.002	0	0.002	26.419	0.093	1.068	03\2 to 03\3	0.006	0.69	26.389	26.358	03\2	03\3	1.852	0.093	0.13	0.01	
03\3	600x600 G.S.I.P.	27.461	2.38	80	100	03\3 to 03\4	03\3	03\4	4.337	26.293	26.206	2	UPVC	225	0.013	Manning	03\3	0.005	100	0	5	10	03\3	0.005	0	0.005	26.354	0.097	1.124	03\3 to 03\4	0.006	0.78	26.317	26.251	03\3	03\4	1.942	0.097	0.29	0.02	
03\4	600x600 G.S.I.P.	27.493	1.72	80	100	03\4 to 03\5	03\4	03\5	7.725	26.186	26.032	2	UPVC	225	0.013	Manning	03\4	0.005	100	0	5	10	03\4	0.007	0	0.006	26.238	0.064	1.268	03\4 to 03\5	0.006	0.86	26.219	26.079	03\4	03\5	1.289	0.064	0.43	0.03	
03\5	900x900 G.S.I.P.	27.5	2.11	80	100	03\5 to 03\6	03\5	03\6	2.335	26.012	25.965	2	UPVC	225	0.013	Manning	03\5	0.009	100	0	5	10	03\5	0.006	0	0.006	26.079	0.05	1.44	03\5 to 03\6	0.006	0.72	26.045	26.01	03\5	03\6	0.988	0.05	0.25	0.01	
03\6	900x900 G.S.I.P.	27.5	2.1	80	100	03\6 to 03\7	03\6	03\7	13.167	25.945	25.682	2	UPVC	225	0.013	Manning	03\6		0	0			03\6	0.012	0	0.012	25.99	0.035	1.521	03\6 to 03\7	0.006	0.59	25.962	25.808	03\6	03\7	0.704	0.035	0.96	0.03	
03\7	900x900 G.S.I.P.	26.902	2.09	80	100	03\7 to 03\8	03\7	03\8	3.217	25.662	25.5	5.024	UPVC	225	0.013	Manning	03\7	0.009	100	0	5	10	03\7	0.018	0	0.017	25.808	0.054	1.14	03\7 to 03\8	0.027	1.34	25.706	25.579	03\7	LOST	1.08	0.054	0.6	0.03	
03\8	225mm DOWNPIPE	25.9	2.09	80	100	03\8 to 03\9	03\8	03\9	14.363	23.5	23.356	1	UPVC	225	0.013	Manning	03\8		0	0			03\8	0	0		23.666	0	2.287	03\8 to 03\9	0.027	0.98	23.589	23.481	03\8			0			
03\9	225mm DOWNPIPE	24	2.09	80	100	03\9 to 03\10	03\9	03\10	2.723	19.7	19.672	1.035	UPVC	225	0.013	Manning	03\9		0	0			03\9	0	0		19.901	0	4.158	03\9 to 03\10	0.027	0.87	19.848	19.795	03\9			0			
03\10	225mm DOWNPIPE	19.897	2.09	80	100	03\10 to 03\11	03\10	03\11	12.676	13.575	13.321	2	UPVC	225	0.013	Manning	03\10		0	0			03\10	0	0		13.71	0	6.827	03\10 to 03\11	0.027	1.26	13.641	13.423	03\10			0			
03\11	900x900 J.P.	14	3.34	80	100	03\11 to 01\1	03\11	01\1	22.442	12	11.077	4.113	UPVC	225	0.013	Manning	03\11	0.085	100	0	5	10	03\11	0.055	0.055	0	12.392	0	1.86	03\11 to 01\1	0.08	2	12.309	11.318	03\11	LOST	0	0	0	0	0
01\1	225mm DOWNPIPE	11.424															01\1						01\1																		
04\1	EX. DOWNPIPE CONENCTION POINT	30.16	7.89	80	100	04\1 to 04\2	04\1	04\2	4.679	29.76	29.69	1.496	UPVC	100	0.013	Manning	04\1	0.011	100	0	5	10	04\1	0.007	0.007		30.162	0	0.169	04\1 to 04\2	0.006	0.72	30.11	30.063	04\1			0			
04\2	450x450 G.S.I.P.	30.09	1.96	50	100	04\2 to 04\3	04\2	04\3	7.07	29.69																															

DRAWN: A.MARGARIS
DESIGNED: B.LAWRENCE
JOB MANAGER: B.LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19	
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19	
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19	
4	ISSUED FOR SECTION 4.55	AM		BL	19.07.19	



LORETO KIRRIBILLI
CATHOLIC PRIMARY SCHOOL

ARCHITECT



THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:200@A1





NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

CATCHMENT PLAN

JOB NUMBER

182476

DRAWING NUMBER	REVISION
C06.01	4

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION

DATE: 15.02.2018 11:24 AM



LEGEND

- PROPOSED BOUNDARY LINE
- GRATED INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
- EXISTING GRATED TRENCH DRAIN
- DOWNPIPE
- STORMWATER PIT TAG
STRUCTURE No / LINE ID
- PROPOSED CATCHMENT BOUNDARY
- RECONFIGURED CATCHMENT
(MODIFIED TO SUIT REVISED FACADE
- REFER HYDRAULIC ENGINEERS
DOCUMENTATION)
- EXISTING CATCHMENT BOUNDARY
- PIT NUMBER / CATCHMENT AREA

Found: L:\2018\Jobs\182476 - Loreto Kirribilli\Drawings\Northrop\Civil\2-CAD\CAD FILES\3-Site\182476_C06.01.dwg
Plotted By: J.ANGUS FALLINS

DRAWN: A.MARGARIS DESIGNED: B.LAWRENCE JOB MANAGER: B.LAWRENCE VERIFIER:



LEGEND	
	ROOF AREA (IMPERVIOUS)
	PAVEMENT AREA (IMPERVIOUS)
	LANDSCAPED AREA (PERVIOUS)

SITE IMPERVIOUSNESS		
SURFACE TYPE	APPROVED	S4.55 (PROPOSED)
IMPERVIOUS	80.30%	80.25%
PERVIOUS	19.70%	19.75%

NOTE:
¹REFER TO HENRY & HYMAS STORMWATER MANAGEMENT PLAN (REV 2 AUG. 2017)

PROPOSED SCHEME - S4.55(2)

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	02.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
4	ISSUED FOR SECTION 4.55	AM		BL	19.07.19



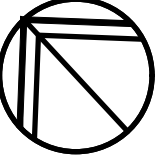
LORETO KIRRIBILLI
SCHOOL

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT

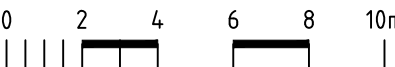


THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE
COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE
USABILITY, COMPLETENESS OR SCALE OF DRAWINGS
TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR,
AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:200@A1





NORTHROP

Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

SITE IMPERVIOUSNESS

JOB NUMBER

182476

DRAWING NUMBER

C07.01

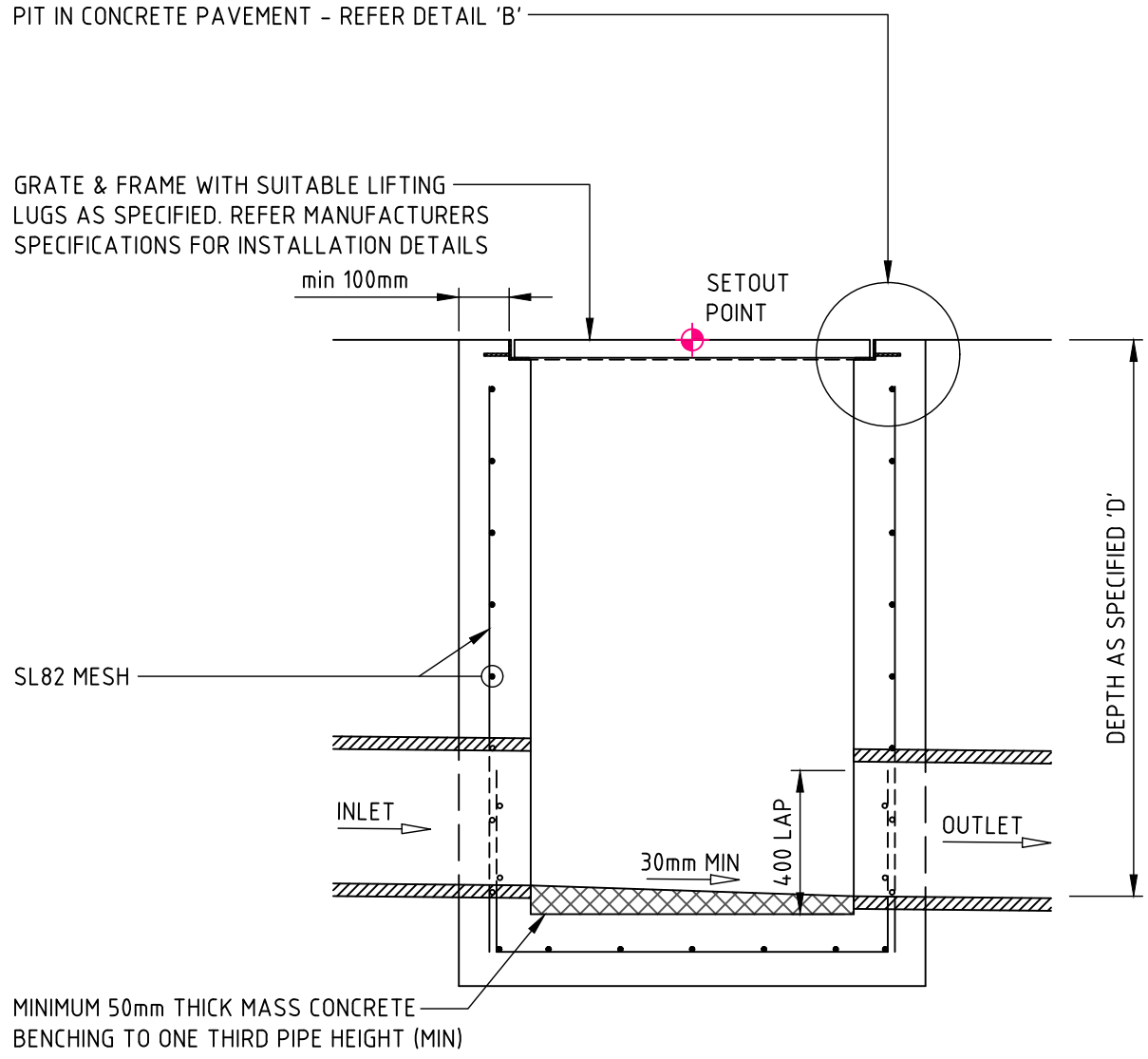
REVISION

4

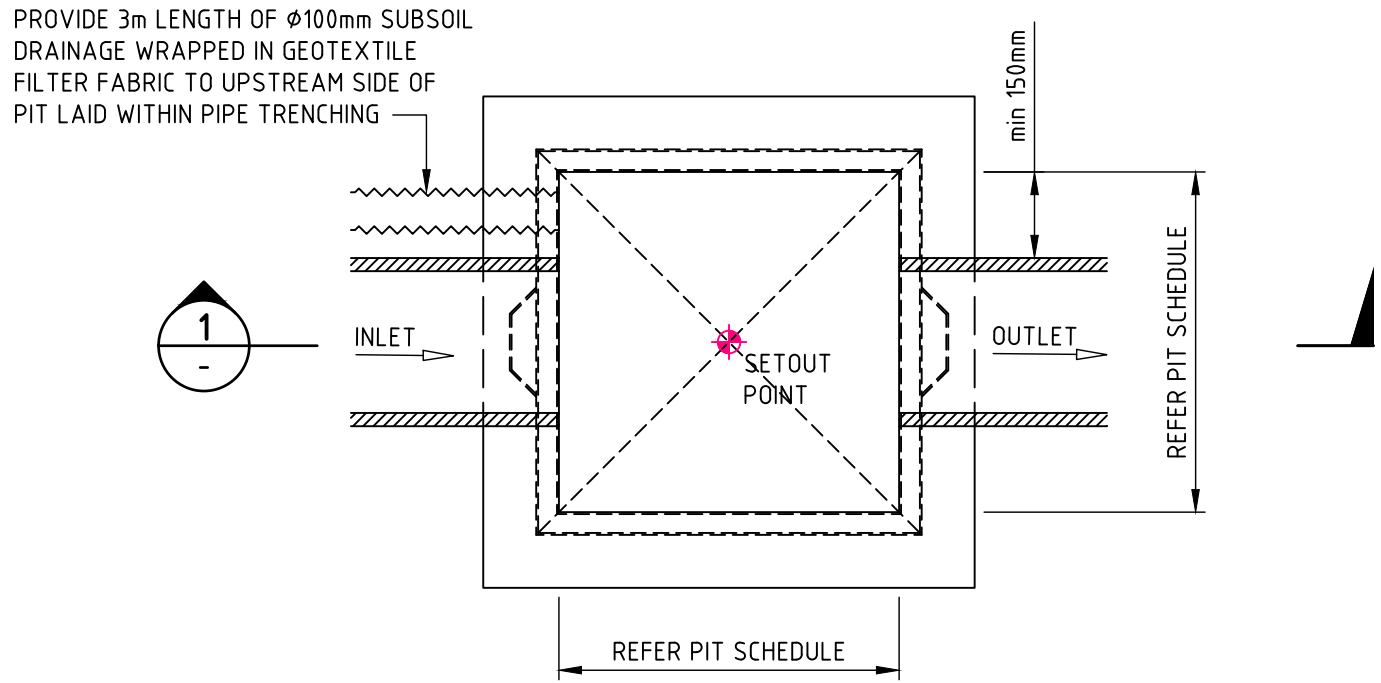
DRAWING SHEET SIZE = A1

Found: L:\2018 jobs\182476 - Loreto Kirribilli-drawings\2-northrop\CIVIL&CAD FILES\S4.55\182476_C07.01.dwg Plotted By: J.ANGUS FALLINS Date: 15.02.2018 11:24 AM

Drawn: A.MARGARIS
Designed: BLAWRENCE
Job Manager: BLAWRENCE
Verifier:

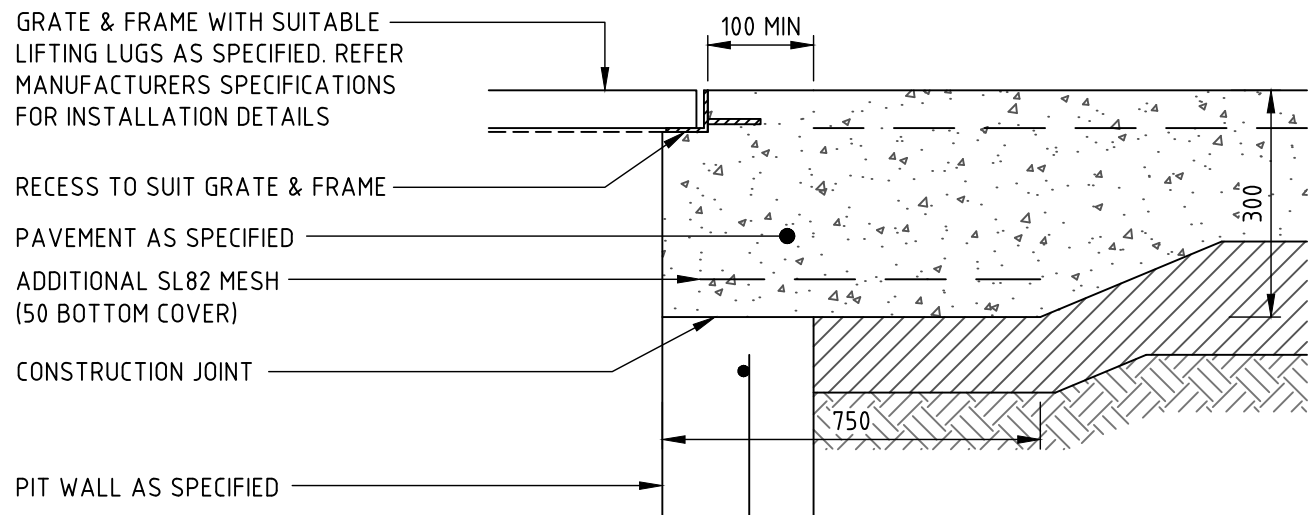


SECTION 1

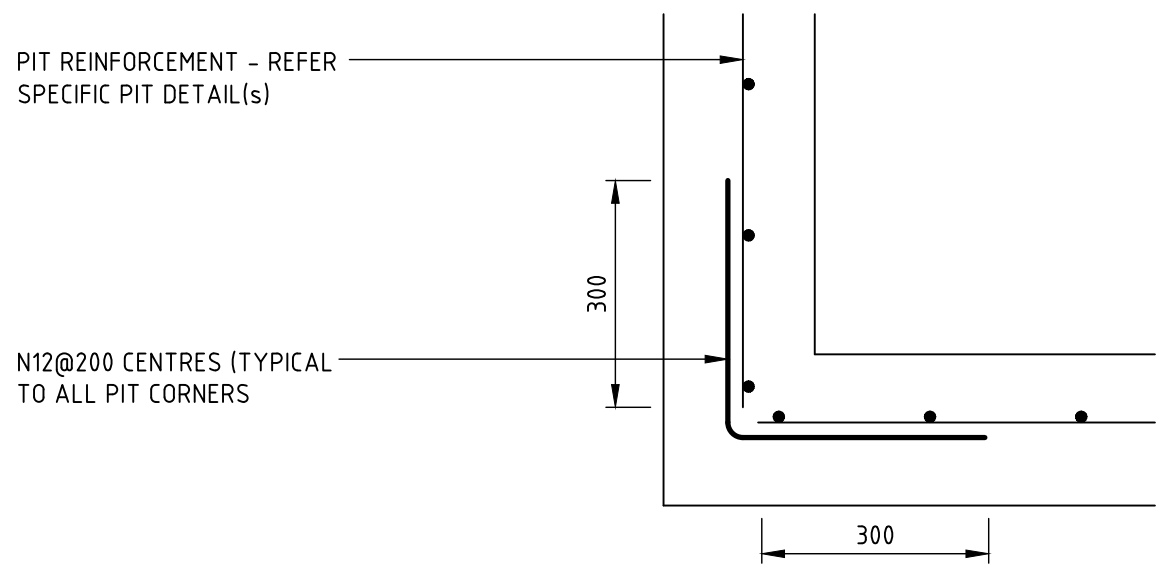


PLAN
SURFACE INLET 'SIP' / JUNCTION PIT 'JP'

PIT STRUCTURE TO BE 200mm THICK UNLESS SHOWN OTHERWISE. DRILL AND EPOXY PLASTIC PROPRIETARY STEP IRONS IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND MANUFACTURERS SPECIFICATIONS (PITS + 1000mm DEPTH).
REFER PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT



PIT INTERFACE - DETAIL 'B'



PIT INTERFACE (PLAN VIEW)- DETAIL 'F'

APPLICABLE TO ALL STORMWATER DRAINAGE STRUCTURES

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR SECTION 4.55	AM		BL	06.06.19
2	ISSUED FOR SECTION 4.55	AM		BL	12.07.19
3	ISSUED FOR SECTION 4.55	AM		BL	19.07.19



LORETO KIRRIBILLI
SOUTH COAST NEW SOUTH WALES

THE COPYRIGHT OF THIS DRAWING REMAINS WITH
NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT



ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.
NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.



Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

LORETO KIRRIBILLI

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

DETAILS

JOB NUMBER

182476

DRAWING NUMBER	REVISION
C09.01	3

DRAWING SHEET SIZE = A1

DATE

15.02.2018 11:24 AM

Found: L:\2018\Jobs\182476 - Loreto Kirribilli-drawings\4-northrop\C-CIVIL\3-CAD\FILES\3-S&B\182476_C09.01.dwg

DATE

15.02.2018 11:24 AM

Found: L:\2018\Jobs\182476 - Loreto Kirribilli-drawings\4-northrop\C-CIVIL\3-CAD\FILES\3-S&B\182476_C09.01.dwg