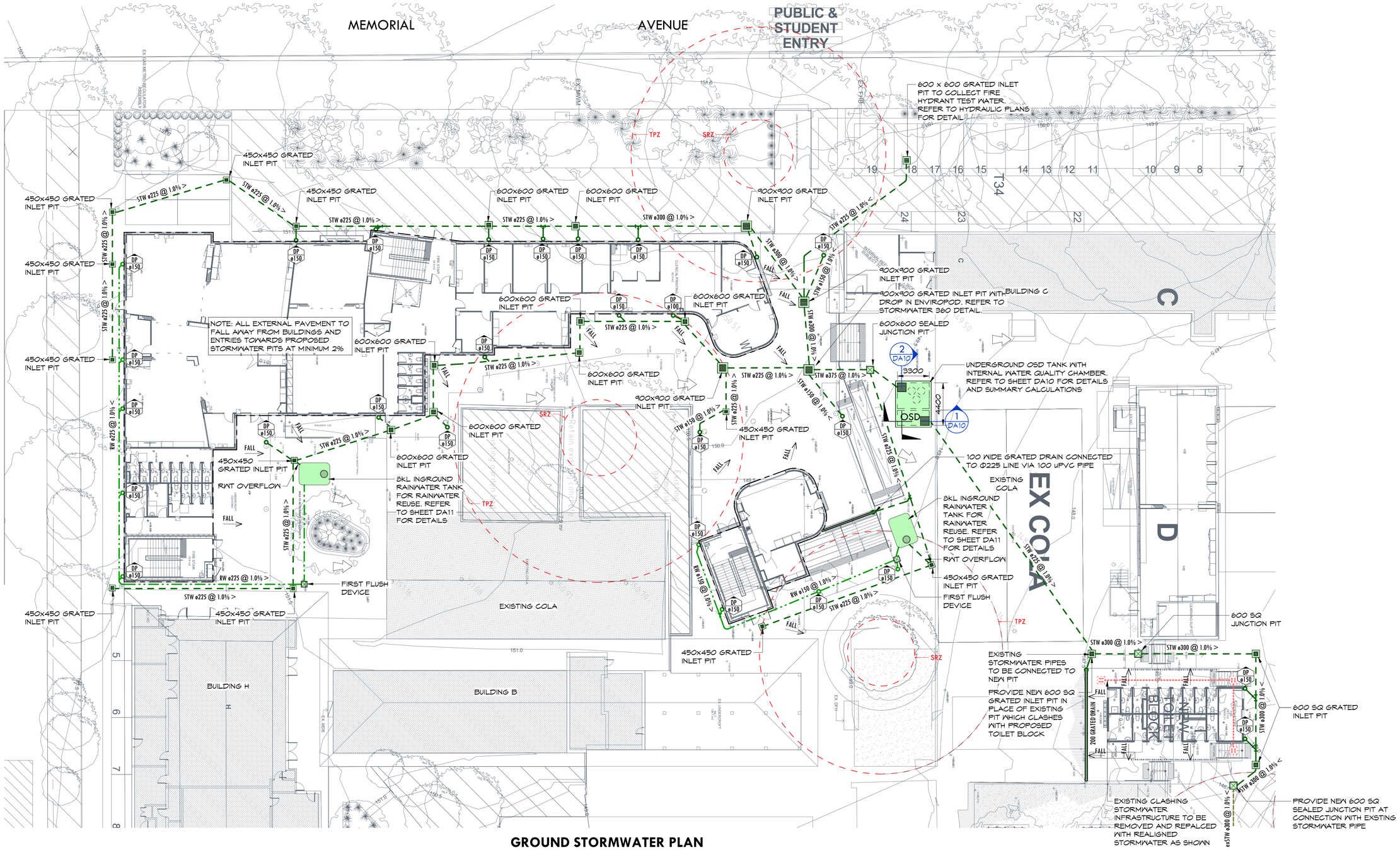


GROUND STORMWATER PLAN

SCALE 1 : 200

NOTES:

- ALL STORMWATER AND ROOF DRAINAGE TO BE IN ACCORDANCE WITH EFSG SPECIFICATION AND AS 3500
- ALL DOWNPIPES TO HAVE OPENING PRIOR TO CONNECTION WITH STORMWATER DRAINAGE SYSTEM. REFER TO TYPICAL DETAIL ON SHEET DA10

AMDT	DATE	BY	DESCRIPTION
C	01.05.19	ELR	RE-ISSUED FOR DA
B	29.04.19	ELR	RE-ISSUED FOR DA
A	26.10.18	ELR	100% ISSUED FOR TENDER
4	18.10.18	ELR	95% ISSUE FOR COORDINATION

bsi. ISO 9001 Quality Management | ISO 14001 Environmental Management | AS/NZS 4801 Occupational Health & Safety Management

CIVIL - STRUCTURAL - BUILDING SERVICES

JONES NICHOLSON CONSULTING ENGINEERS

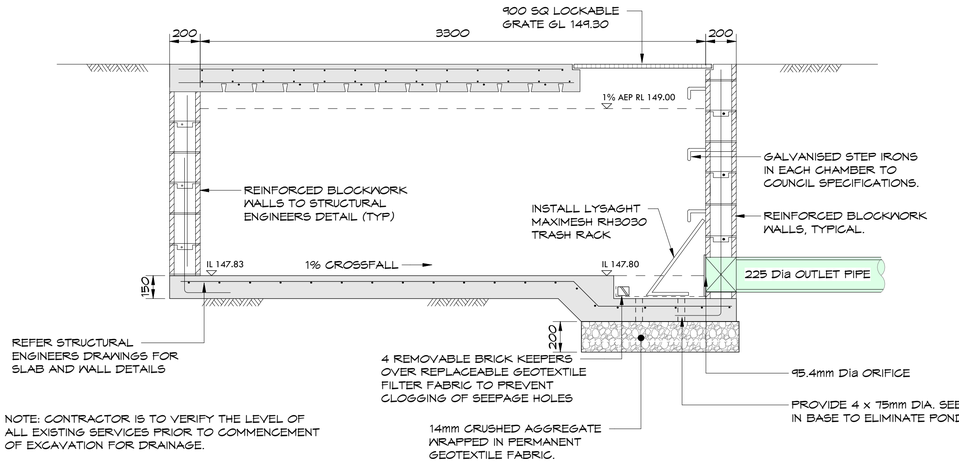
WWW.JONESNICHOLSON.COM.AU ABN: 51 003 316 032

DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 200
PROJECT MGR : DL

CIVIL DESIGN
GROUND STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA02C



NOTE: CONTRACTOR IS TO VERIFY THE LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF EXCAVATION FOR DRAINAGE.

SECTION 1 DA03
SCALE 1 : 20

OSD CALCULATIONS

CATCHMENT NAME:	KU-RING-GAI CREEK (KC2)
CATCHMENT DISCHARGE RATE:	166 l/s/ha
CATCHMENT STORAGE RATE:	241 m^3/ha
SITE AREA:	2106 m^2
60% OF SITE AREA:	1263.8 m^2
% NOT DRAINING TO OSD:	0%
IMPERVIOUS %:	100%
PSD:	20.98 l/s
SSR:	30.46 m^3
ORIFICE HEAD:	1.2m
ORIFICE DIAMETER:	95.4mm

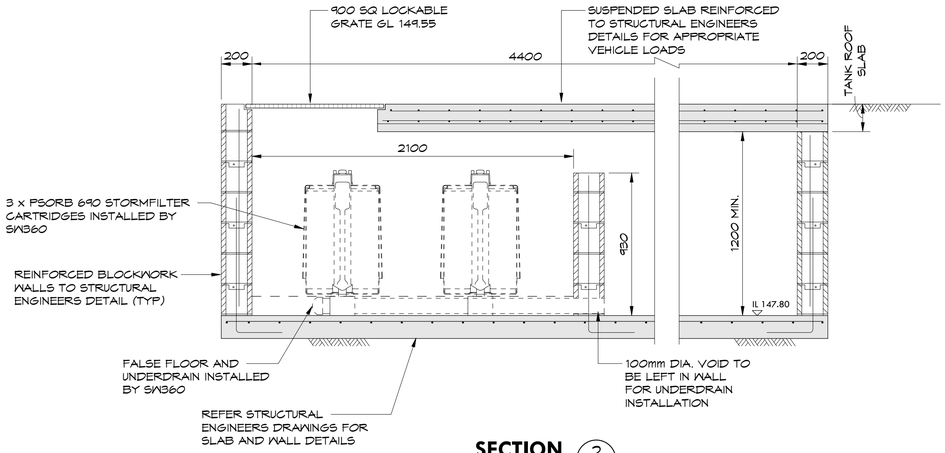
OSD DIMENSIONS

AV. HEIGHT = 1.2m
WIDTH = 3.3m
LENGTH = 8.6m

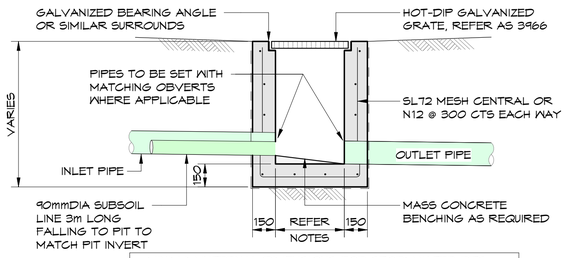
VOLUME PROVIDED = 16.6m^3

VOLUME REDUCTION DUE TO WQ ELEMENTS = 1.9m^3

VOLUME REDUCTION DUE TO RAINWATER RETENTION = 16m^3



SECTION 2 DA03
SCALE 1 : 20

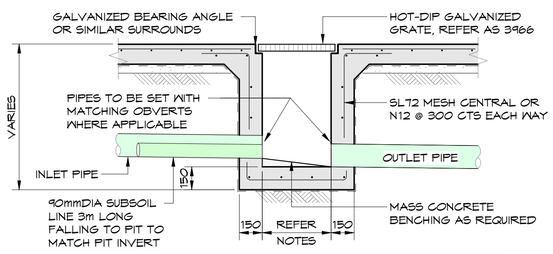


MINIMUM INTERNAL DIMENSIONS FOR STORMWATER PITS		
DEPTH OF INVERT OF OUTLET	DEPTH OF INVERT OF OUTLET	
	WIDTH	LENGTH
< 600	450	450
> 600	600	600
> 900	600	900
> 1200	900	900

*STEP IRONS SHALL BE PROVIDED FOR PITS WITH DEPTHS EXCEEDING 1200mm

NOTE:
1. CLIMB IRONS SHALL BE PROVIDED UNDER LID AT 300 CTS TO COUNCIL STANDARDS WHERE PIT DEPTH IS DEEPER THAN 1000.
2. REINFORCEMENT NOTED IS ONLY REQUIRED FOR PITS EXCEEDING 900 DEEP, SUBJECT TO COUNCIL REQUIREMENTS. PITS GREATER THAN 3000 DEEP WILL REQUIRE STRUCTURAL ENGINEERS DESIGN.
3. PROVIDE 90Dia x 3000 LONG SUBSOIL DRAINAGE STUB PIPE SURROUNDED WITH 100mm THICKNESS OF NOMINAL 20mm COARSE FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC.
(BIDUM A24 OR APPROVED SIMILAR). TO BE PARALLEL TO UPSTREAM SIDE OF EACH INLET PIPE.
4. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
5. CONCRETE STRENGTH F'c = 32 MPa

TYPICAL CONCRETE INLET PIT - NATURAL SURFACE



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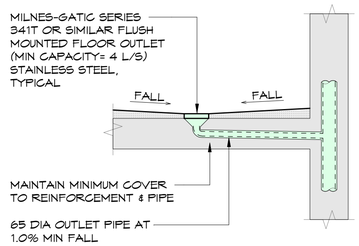
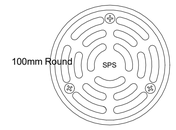
4. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
5. CONCRETE STRENGTH F'c = 32 MPa

TYPICAL CONCRETE INLET PIT - CONCRETE SURFACE

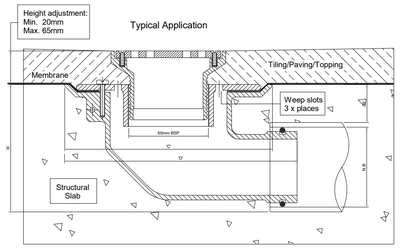


TYPICAL BALCONY FLOOR OUTLET DETAIL

Specification code:
R100B/C90 (brass grate, ABS lower body)
R100N/C90 (nickel bronze grate, ABS lower body)
R100S4/C90 (polished 304 stainless steel, ABS lower body)
R100S/C90 (satin 316 stainless steel grate, ABS lower body)



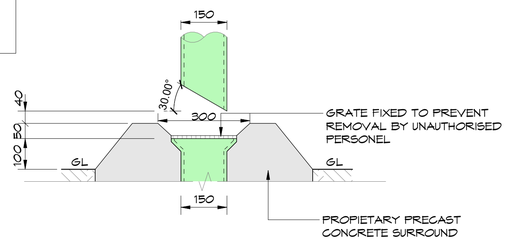
- Round grate available in nickel bronze, 304 & 316 stainless Steel. Bronze non-stock option.
- ABS 90° Body and Reversible Membrane Clamp Collar with female 65mm BSP thread.



Spigot pushes into 65mm PVC or copper with o-ring connection, or connects to 50mm PVC/HDPE with no-hub coupling.

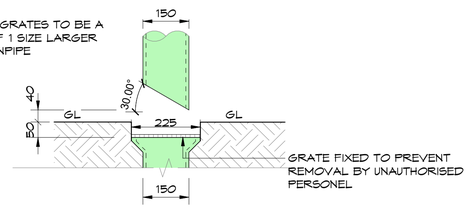
N.B.	A	B	C	D
50	100	40	180	200
65	105	37	180	200

SPS 100mm ROUND VARI LEVEL SIDE OUTLET DRAIN 65/50mm OUTLET

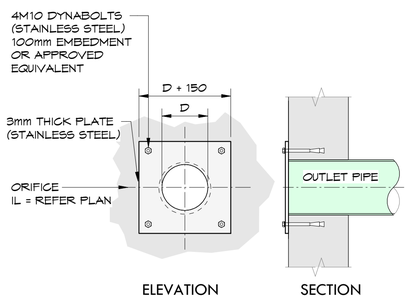


WHERE DOWNPIPE IS LOCATED OVER A LANDSCAPED AREA

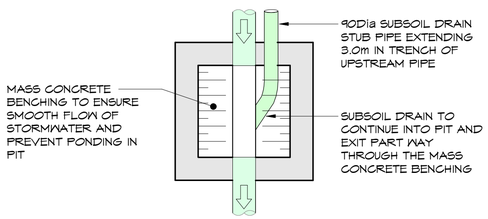
NOTE: ALL GRATES TO BE A MINIMUM OF 1 SIZE LARGER THAN DOWNPIPE



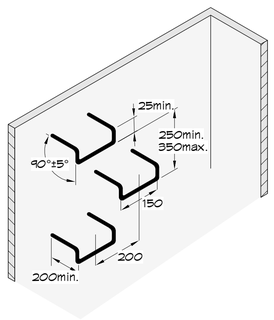
WHERE DOWNPIPE IS LOCATED OVER A HARDSTAND AREA



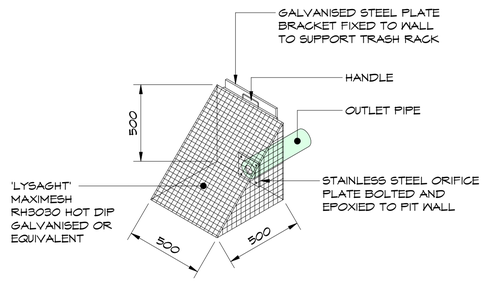
TYPICAL ORIFICE PLATE DETAIL



TYPICAL SUBSOIL PIPE/PIT BENCHING



STEP IRON DETAIL



TYPICAL TRASH RACK SCREEN DETAIL

AMDT	DATE	BY	DESCRIPTION
B	29.04.19	ELR	RE-ISSUED FOR DA
A	26.10.18	ELR	100% ISSUED FOR TENDER
4	18.10.18	ELR	95% ISSUE FOR COORDINATION
3	28.09.18	ELR	ISSUED FOR DA

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CIVIL - STRUCTURAL - BUILDING SERVICES

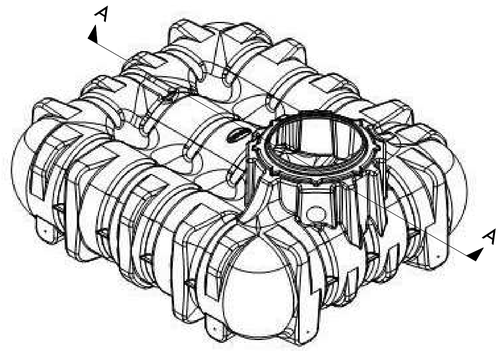
JONES NICHOLSON CONSULTING ENGINEERS
WWW.JONESNICHOLSON.COM.AU ABN: 51 003 316 032

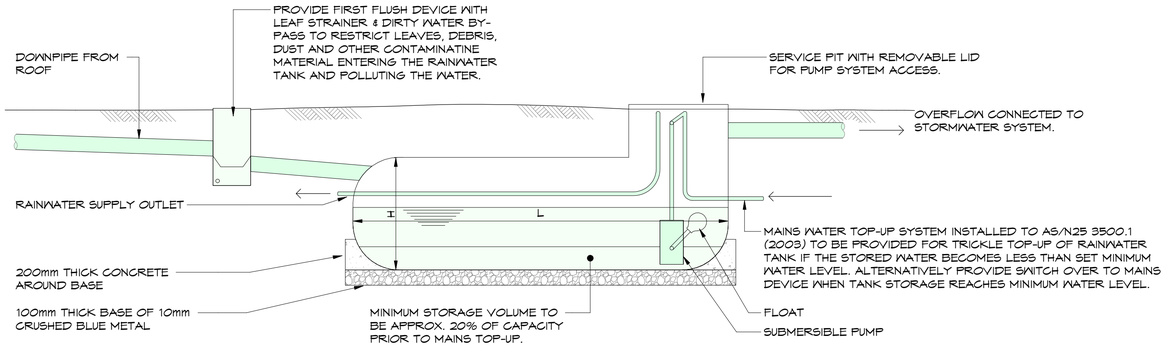
DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : As indicated
PROJECT MGR : DL

CIVIL DESIGN DETAILS SHEET 1

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA10 B





UNDERGROUND RAINWATER TANK DETAIL

RAINWATER TANK - GRAF UNDER GROUND

AMDT	DATE	BY	DESCRIPTION
A	29.04.19	ELR	RE-ISSUED FOR DA

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CIVIL - STRUCTURAL - BUILDING SERVICES

JONES NICHOLSON CONSULTING ENGINEERS

WWW.JONESNICHOLSON.COM.AU ABN: 51 003 316 032

DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 20
PROJECT MGR : DL

CIVIL DESIGN DETAILS SHEET 2

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA11A

ST IVES NORTH PUBLIC SCHOOL

MEMORIAL AVENUE ST IVES NSW 2075

Job No. **17011064**

PIPEWORK

PROPOSED STORMWATER DRAINAGE LINE (IN THE GROUND) Ø100 @ 1.0% MIN GRADE UNO.

PROPOSED RAINWATER DRAINAGE LINE Ø100 @ 1.0% MIN GRADE UNO. USE PRESSURE GRADE PIPES FOR CHARGED SYSTEM

90Ø SUBSOIL LINE CONNECT TO STORMWATER OUTLET OR VERTICAL SLOT DRAIN

EXISTING STORMWATER DRAINAGE LINE

DOWNPIPE, RISER OR VERTICAL DROP

STORMWATER FIXERS & EQUIPMENT

PROPOSED SEALED JUNCTION PIT

PROPOSED GRATED SUFACE INLET PIT. PIT DIMENSIONS ARE GOVERNED BY DEPTH REFER TO DETAIL.

PROPOSED KERB INLET PIT

PROPOSED GRATED DRAIN

PROPOSED RAINWATER TANK

TAGS & MISCELLANEOUS

DP 150 — DOWNPIPE / VERTICAL DROP ETC PIPE SIZE

225 DIA uPVC @ 1.0% MIN — PIPE SIZE, TYPE AND GRADE

OVERLAND FLOW PATH

ROOF FALL DIRECTION

FALL — FALL DIRECTION

P 35.05 — PROPOSED PAVEMENT SURFACE LEVEL

GL 35.05 — PROPOSED PIT SURFACE LEVEL

IL 34.75 — PROPOSED PIT INVERT LEVEL

FFL 23.56 — PROPOSED FINISHED FLOOR LEVEL

+35.11 — EXISTING SURFACE LEVEL

36.00 — EXISTING SURVEY CONTOUR

* DEPTH AND LOCATION OF ALL EXISTING SERVICES TO BE CONFIRMED BY BUILDER ON SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION

* ALL EXISTING LEVELS TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORKS

GENERAL

1. ALL EXISTING LEVELS TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORKS
2. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE NOMINATED OR APPLICABLE COUNCIL SPECIFICATION AND THE EFSG SPECIFICATION. WHERE A SPECIFICATION HAS NOT BEEN NOMINATED THEN THE CURRENT NSW DEPARTMENT OF HOUSING CONSTRUCTION SPECIFICATION IS TO BE USED. THE NOMINATED SPECIFICATION SHALL TAKE PRECEDENCE TO THESE NOTES..
3. ALL DRAWINGS SHOULD BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL DRAWINGS & DRAWINGS FROM OTHER CONSULTANTS.
4. THE CONTRACTOR SHOULD REPORT ANY DISCREPANCIES ON THE DRAWINGS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN.
5. THE CONTRACTOR SHOULD LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND PROTECT AND MAKE ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE AND/OR ADJUST IF NECESSARY. INFORMATION GIVEN ON THE DRAWINGS IN RESPECT TO SERVICES IS FOR GUIDANCE ONLY AND IS NOT GUARANTEED COMPLETE NOR CORRECT.
6. CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT THE PERMISSION OF THE OWNER.
7. SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED OR REMOVED FROM SITE.
8. ALL NEW WORKS SHALL MAKE A SMOOTH JUNCTION WITH EXISTING.
9. ALL DRAINAGE LINES THROUGH ADJACENT LOTS SHALL BE CONTAINED WITHIN EASEMENTS CONFORMING TO COUNCIL'S STANDARDS.
10. THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES AND DEBRIS ETC. TO THE EXTENT SPECIFIED.
11. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL PROVIDE A TRAFFIC MANAGEMENT PLAN PREPARED BY AN ACCREDITED PERSON IN ACCORDANCE WITH RMS REQUIREMENTS, FOR ANY WORK ON OR ADJACENT TO PUBLIC ROADS, PLAN TO BE SUBMITTED TO COUNCIL & RMS.

SURVEY

1. JONES NICHOLSON IS NOT RESPONSIBLE FOR THE ACCURACY OF ANY 3rd PARTY INFORMATION PROVIDED ON THIS DRAWING.
2. ALL LEVELS ARE TO A.H.D.
3. ALL CHAINAGES AND LEVELS ARE IN METRES, AND DIMENSIONS IN MILLIMETRES.
4. CONTRACTORS SHALL ARRANGE FOR THE WORKS TO BE SET OUT BY A REGISTERED SURVEYOR.

STORMWATER DRAINAGE INSTALLATION

1. SUPPLY & INSTALLATION OF DRAINAGE WORKS TO BE IN ACCORDANCE WITH THESE DRAWINGS, THE COUNCIL SPECIFICATION AND THE CURRENT APPLICABLE AUSTRALIAN STANDARDS.
2. BACKFILL SHALL BE PLACED & COMPACTED IN ACCORDANCE WITH THE SPECIFICATION. A GRANULAR GRAVEL AGGREGATE MATERIAL (<10mm BACKFILL IS RECOMMENDED FOR THE BEDDING, HAUNCH SUPPORT AND SIDE ZONE DUE TO IT'S SELF COMPACTING ABILITY.
3. A MINIMUM OF 150mm CLEARANCE IS TO BE PROVIDED BETWEEN THE OUTSIDE OF THE PIPE BARREL AND THE TRENCH WALL FOR PIPES < 600 DIA. 200mm CLEARANCE FOR PIPES 600 TO 1200 DIA AND D/6 CLEARANCE FOR PIPES >200 DIA.
4. BEDDING OF THE PIPELINES IS TO BE TYPE 'HS2' IN ACCORDANCE WITH THE STANDARDS AND AS FOLLOWS:
5. BEDDING DEPTH UNDER THE PIPE TO BE 100mm.
6. BEDDING MATERIAL TO BE EXTENDED FROM THE TOP OF THE BEDDING ZONE UP TO 0.3 TIMES PIPE OUTSIDE DIAMETER. THIS REPRESENTS THE 'HAUNCH ZONE.'
7. THE BEDDING & HAUNCH ZONE MATERIAL IS TO BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 98% WITHIN ROAD RESERVES AND TRAFFICABLE AREAS AND 95% ELSEWHERE FOR COHESIVE MATERIAL OR A MINIMUM DENSITY INDEX OF 70% IN ACCORDANCE WITH THE STANDARDS FOR COHESIONLESS MATERIAL.
8. COMPACTION TESTING SHALL BE CARRIED OUT BY AN APPROVED ORGANISATION WITH A NATA CERTIFIED LABORATORY FOR ALL DRAINAGE LINES LAID WHOLLY OR IN PART UNDER THE KERB & GUTTER OR PAVEMENT.
9. COMPACTED GRANULAR MATERIAL IS TO COMPLY WITH THE FOLLOWING GRADINGS AND THE MATERIAL PASSING THE 0.075 SIEVE HAVING LOW PLASTICITYAS DESCRIBED IN APPENDIX D OF AS1726.

SIEVE SIZE (mm)	19	2.36	0.60	0.30	0.15	0.075
% MASS PASSING	100	50-100	20-90	10-60	0-25	0-10

SAFETY IN DESIGN

THERE ARE INHERENT RISKS WITH CONSTRUCTING, MAINTAINING, OPERATING, DEMOLISHING, DISMANTLING AND DISPOSING THIS DESIGN THAT ARE TYPICAL OF SIMILAR DESIGNS. AS FAR AS IS REASONABLY PRACTICABLE RISKS HAVE BEEN ELIMINATED OR MINIMISED THROUGH THE DESIGN PROCESS. HAZARD CONTROLS MUST STILL BE IMPLEMENTED BY THE CONTRACTOR, OWNER OR OPERATOR TO ENSURE THE SAFETY OF WORKERS.

- JONES NICHOLSON'S ASSESSMENT DID NOT IDENTIFY ANY UNIQUE RISKS ASSOCIATED WITH THE DESIGN

STORMWATER DRAINAGE

1. STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS AND COUNCIL'S SPECIFICATION.
2. PIPES OF 225mm DIA. AND UNDER SHALL BE UPVC.
3. PIPES OF 300mm DIA. AND LARGER SHALL BE FRC OR CONCRETE CLASS 2 RUBBER RING JOINTED UNO.
4. ALL FRC OR RCP STORMWATER PIPES WITHIN ROAD RESERVE AREAS TO BE CLASS 3 U.N.O.
5. MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK & ROADWAY AREAS UNO.
6. PIPES SHALL GENERALLY BE LAID AT THE GRADES INDICATED ON THE DRAWINGS.
7. PIPES UP TO 150mm DIA SHALL BE LAID AT 1.0% MIN. GRADE U.N.O.
8. PIPES 225mm DIA AND OVER SHALL BE LAID AT 0.5% MIN. GRADE U.N.O.
9. BACKFILL TRENCHES WITH APPROVED FILL COMPACTED IN 200mm LAYERS TO 98% OF STANDARD DENSITY.
10. ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS.
11. PITS SHALL BE AS DETAILED WITH METAL GRATES AT LEVELS INDICATED. ALL PITS DEEPER THAN 1200mm TO HAVE CLIMB IRONS. ALL PITS WITHIN BUILDING AND PEDESTRIAN AREAS TO HAVE HEEL SMART ANTI-SLIP GRATES.
12. BUILD INTO UPSTREAM FACE OF ALL PITS A 3.0m SUBSOIL LINE FALLING TO PITS TO MATCH PIT INVERTS.
13. ALL COURTYARD & LANDSCAPED PITS TO BE 450 SQUARE UNLESS NOTED OTHERWISE.
14. ALL DRIVEWAY & OSD PITS TO BE 600 SQUARE UNLESS NOTED OTHERWISE.
15. INSTALL TEMPORARY SEDIMENT BARRIERS TO INLET PITS, TO COUNCIL'S STANDARDS UNTIL SURROUNDING AREAS ARE PAVED OR GRASSED.
16. PITS & DOWNPIPE LOCATIONS AND LEVELS MAY BE VARIED TO SUIT SITE CONDITIONS AFTER CONSULTING THE ENGINEER.
17. DOWNPIPES SHOWN ARE INDICATIVE ONLY, ALL ROOF GUTTERING AND DOWNPIPES TO THE CURRENT AUSTRALIAN STANDARDS.
18. ALL PLANTER BOXES AND BALCONIES TO BE CONNECTED TO THE PROPOSED STORMWATER DRAINAGE LINE.
19. HAND-EXCAVATE STORMWATER PIPES IN VICINITY OF TREE ROOTS.
20. FOOTPATH CROSSING LEVELS SHOWN ARE TO BE ADJUSTED TO FINAL COUNCIL'S ISSUED LEVELS.
21. GEOTEXTILE FABRIC TO BE PLACED UNDER RIP RAP SCOUR PROTECTION.
22. ALL BASES OF PITS TO BE BENCHED TO HALF PIPE DEPTH AND PROVIDE GALVANISED ANGLE SURROUNDINGS TO GRATE.
23. SUBSOIL LINE PIPES AND FITTINGS SHALL BE PERFORATED PLASTIC TO CURRENT AUSTRALIAN STANDARDS. LAY PIPES ON FLOOR OF TRENCH GRADED AT 1% MIN. AND OVERLAY WITH FILTER MATERIAL EXTENDING TO WITHIN 200mm OF SURFACE. PROVIDE FILTER FABRIC OF PERMEABLE POLYPROPYLENE BETWEEN FILTER MATERIAL AND TOPSOIL.

EARTHWORKS

1. PROVIDE PROTECTION BARRIERS TO PROTECTED/SENSITIVE AREAS PRIOR TO ANY BULK EXCAVATION.
2. OVER FULL AREA OF EARTHWORKS, CLEAR VEGETATION, RUBBISH, SLABS ETC. AND STRIP TOP SOIL. AVERAGE 200mm THICK. REMOVE FROM SITE, EXCEPT TOP SOIL FOR RE-USE.
3. CUT AND FILL OVER THE SITE TO LEVELS REQUIRED.
4. PRIOR TO ANY FILLING IN AREAS OF CUT OR IN EXISTING GROUND, PROOF ROLL THE EXPOSED SURFACE. REFER TO PROJECT INFORMATION TABLES FOR MINIMUM ROLLER WEIGHT AND THE MINIMUM NUMBER OF PASSES.
5. EXCAVATE AND REMOVE ANY SOFT SPOTS ENCOUNTERED DURING PROOF ROLLING AND REPLACE WITH APPROVED FILL COMPACTED IN LAYERS. THE WHOLE OF THE EXPOSED SUBGRADE AND FILL SHALL BE COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT ± 2%.
6. FOR ON SITE FILLING AREAS, THE CONTRACTOR SHALL TAKE LEVELS OF EXISTING SURFACE AFTER STRIPPING TOPSOIL AND PRIOR TO COMMENCING FILL OPERATIONS.
7. WHERE HARD ROCK IS EXPOSED IN THE EXCAVATED SUB-GRADE, THIS WILL BE INSPECTED AND A DECISION MADE ON THE LEVEL TO WHICH EXCAVATION IS TAKEN.
8. FILL IN 200mm MAXIMUM (LOOSE THICKNESS) LAYERS TO UNDERSIDE OF BASECOURSE USING THE EXCAVATED MATERIAL AND COMPACTED TO 98% STANDARD (AS 1289 5.1.1). MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT ± 2% SHOULD THERE BE INSUFFICIENT MATERIAL FROM SITE EXCAVATIONS, IMPORT AS NECESSARY CLEAN GRANULAR FILL TO the DESIGN ENGINEERS APPROVAL.
9. COMPACTION TESTING TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT INFORMATION TABLE. THE COSTS OF TESTING AND RE-TESTING ARE TO BE ALLOWED FOR BY THE BUILDER.
10. BATTERS TO BE AS SHOWN, OR MAXIMUM 1 VERT : 4 HORIZ. ALL CONDUITS AND MAINS SHALL BE LAID PRIOR TO LAYING FINAL PAVEMENT.
11. ALL BATTERS AND FOOTPATHS ADJACENT TO ROADS SHALL BE TOP SOILED WITH 150mm APPROVED LOAM AND SEEDED UNLESS OTHERWISE SPECIFIED.

DA DRAWING LIST

No.	SHEET NAME
DA01	NOTES & LEGEND
DA02	GROUND STORMWATER PLAN
DA03	LEVEL 1 SOUTH STORMWATER PLAN
DA04	LEVEL 1 NORTH STORMWATER PLAN
DA05	LEVEL 2 SOUTH STORMWATER PLAN
DA06	LEVEL 2 NORTH STORMWATER PLAN
DA07	ROOF PLAN SOUTH STORMWATER PLAN
DA08	ROOF PLAN NORTH STORMWATER PLAN
DA09	ROOF STORMWATER PLAN - ZONE B
DA10	DETAILS SHEET

PRELIMINARY NOT TO BE USED FOR CONSTRUCTION

AMDT	DATE	BY	DESCRIPTION
3	28.09.18	ELR	ISSUED FOR DA
2	14.09.18	ELR	80% ISSUE FOR COORDINATION
1	24.08.18	MJR	50% ISSUE FOR COORDINATION

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2018

CIVIL - STRUCTURAL - BUILDING SERVICES

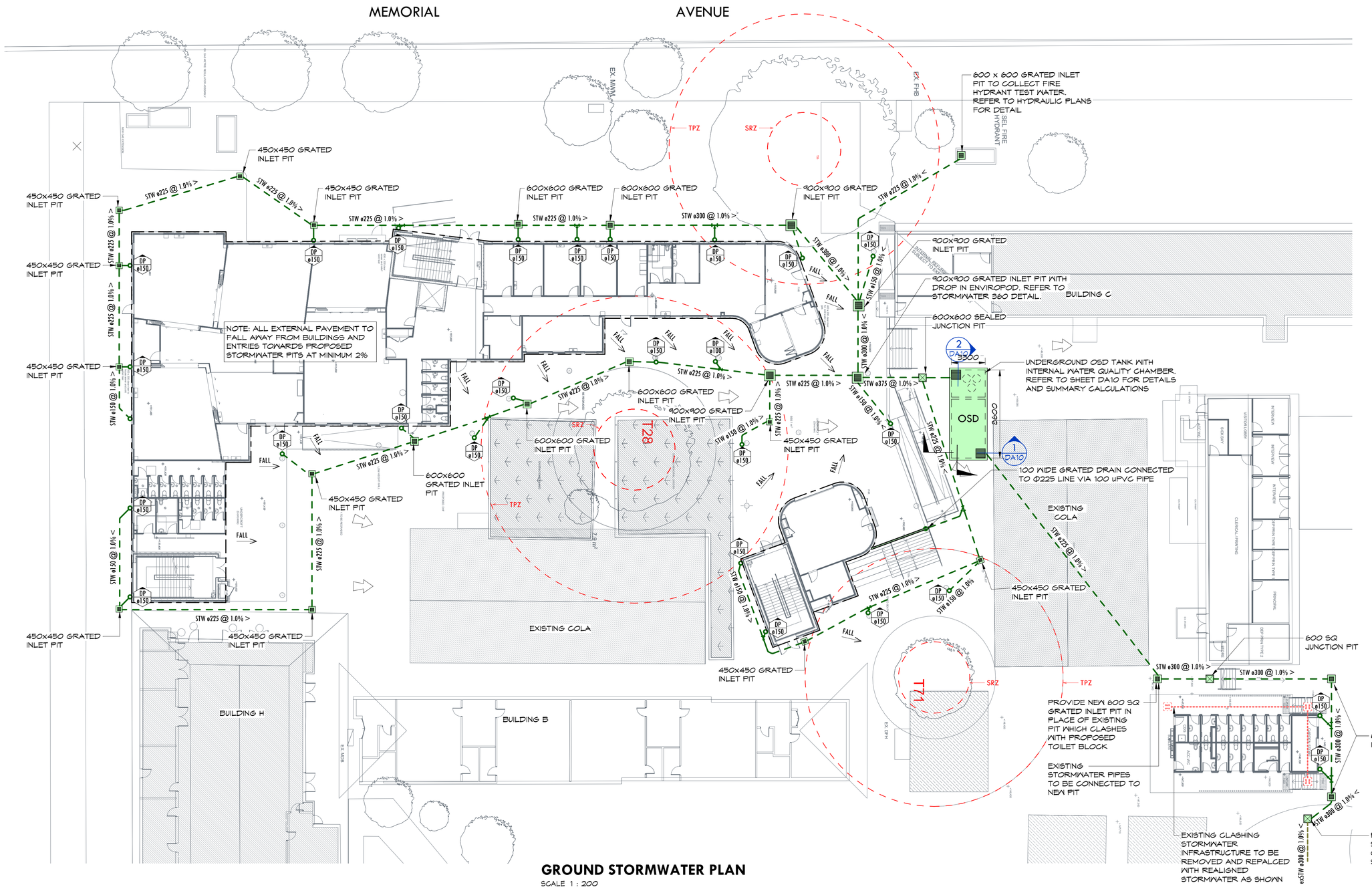
JONES NICHOLSON CONSULTING ENGINEERS
WWW.JONESNICHOLSON.COM.AU ABN: 51 003 316 032

DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 1
PROJECT MGR : DL

CIVIL DESIGN NOTES & LEGEND

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA01 3



GROUND STORMWATER PLAN

SCALE 1 : 200

NOTES:

- ALL STORMWATER AND ROOF DRAINAGE TO BE IN ACCORDANCE WITH EFSG SPECIFICATION AND AS 3500
- ALL DOWNPIPES TO HAVE OPENING PRIOR TO CONNECTION WITH STORMWATER DRAINAGE SYSTEM. REFER TO TYPICAL DETAIL ON SHEET DA10

PRELIMINARY NOT TO BE USED FOR CONSTRUCTION

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CIVIL - STRUCTURAL - BUILDING SERVICES

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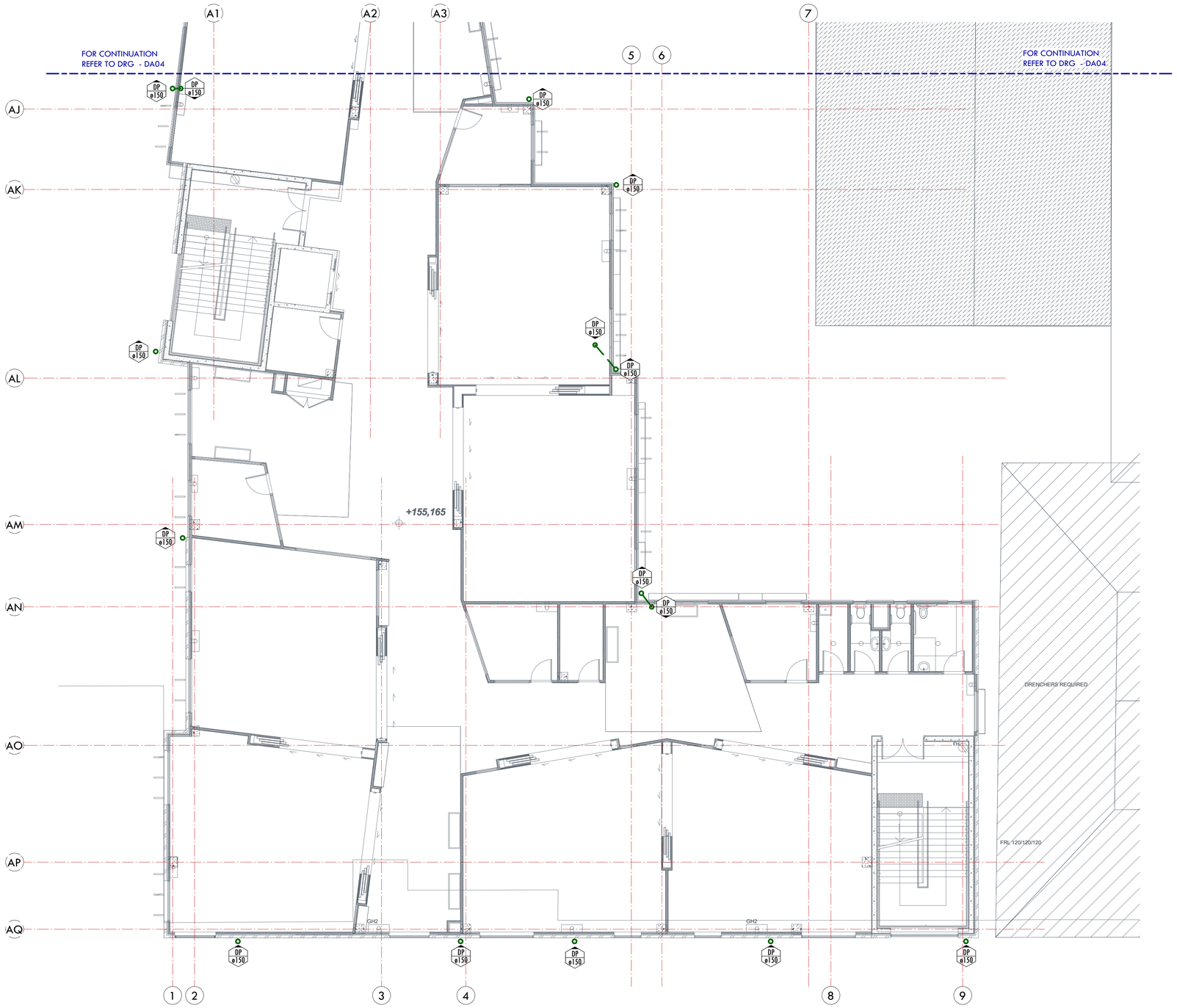
DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 200
PROJECT MGR : DL

CIVIL DESIGN
GROUND
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA023



LEVEL 1 STORMWATER PLAN - SOUTH

NOTE:

- ALL LEVELS TO ARCHITECTS DETAILS.
- ALL Ø65mm PIPES TO BE CAST WITHIN SLAB.
- ALL PIPE FALL NOMINATED AS MINIMUM REQUIRED.
- MINIMUM Ø50mm PIPE THROUGH PARAPET FOR OVERFLOW. SET PIPE INVERT BELOW ADJACENT PROPOSED FLOOR LEVEL.

PRELIMINARY
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CIVIL - STRUCTURAL - BUILDING SERVICES

JONES NICHOLSON CONSULTING ENGINEERS

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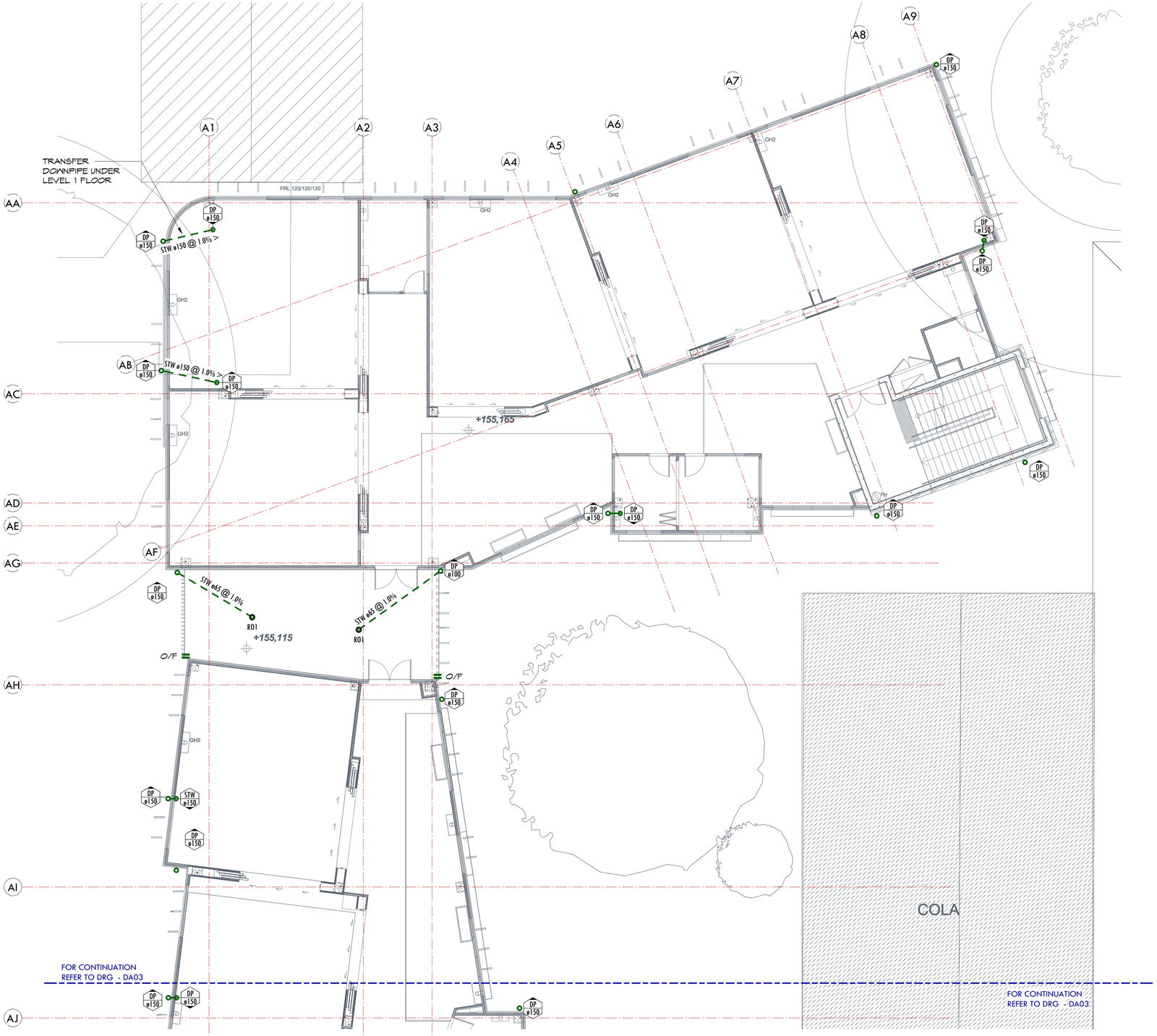
DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 100
PROJECT MGR : DL

CIVIL DESIGN
LEVEL 1 SOUTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA03 3



LEVEL 1 STORMWATER PLAN - NORTH

NOTE:

- ALL LEVELS TO ARCHITECTS DETAILS.
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CIVIL - STRUCTURAL - BUILDING SERVICES

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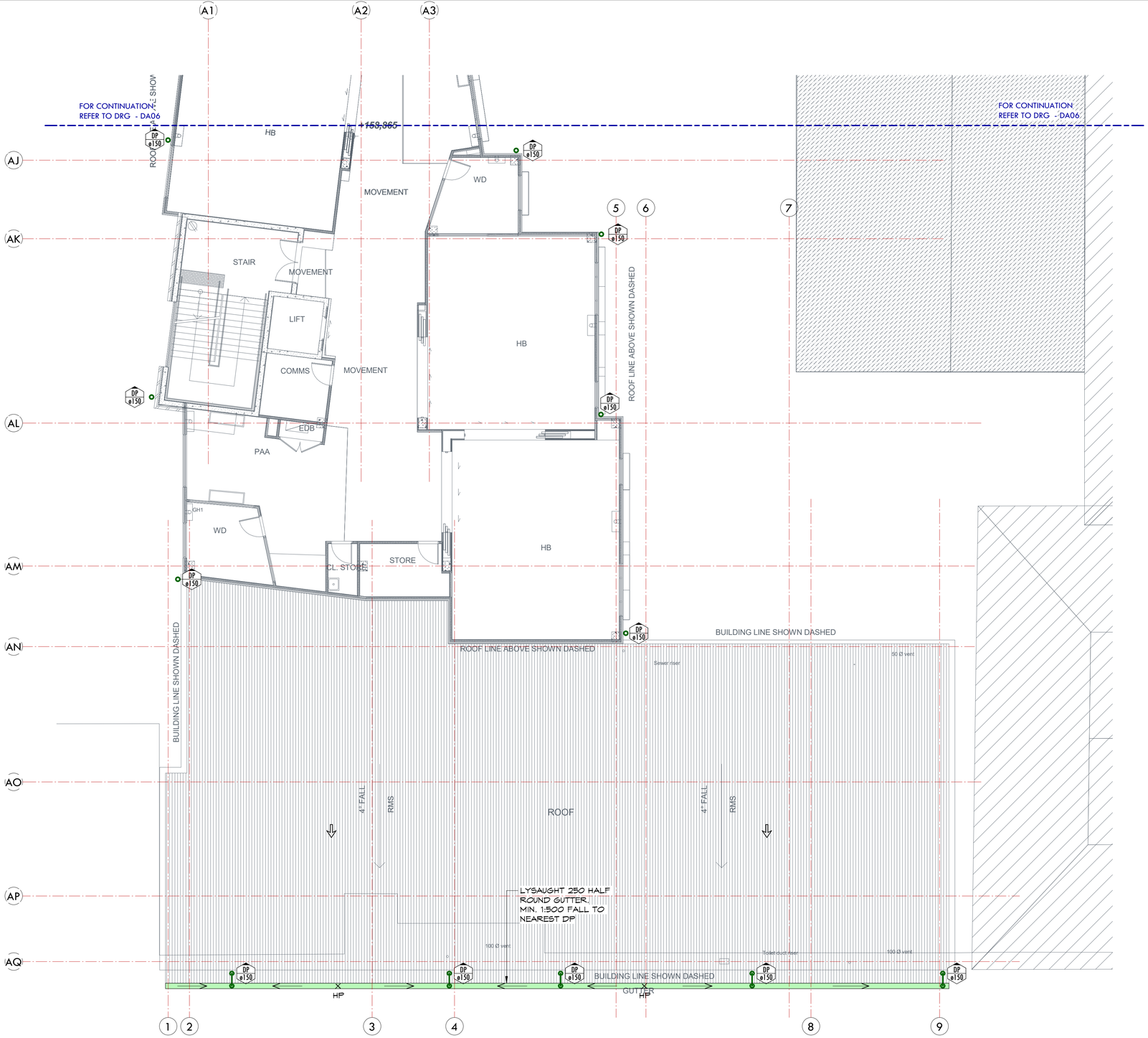
DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : 1 : 100
PROJECT MGR : DL

CIVIL DESIGN
LEVEL 1 NORTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA043

PRELIMINARY NOT TO BE USED FOR CONSTRUCTION



LEVEL 2 STORMWATER PLAN - SOUTH

NOTE:

- ALL LEVELS TO ARCHITECTS DETAILS.
- ALL Ø65mm PIPES TO BE CAST WITHIN SLAB.
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- MINIMUM Ø50mm PIPE THROUGH PARAPET FOR OVERFLOW. SET PIPE INVERT BELOW ADJACENT PROPOSED FLOOR LEVEL.

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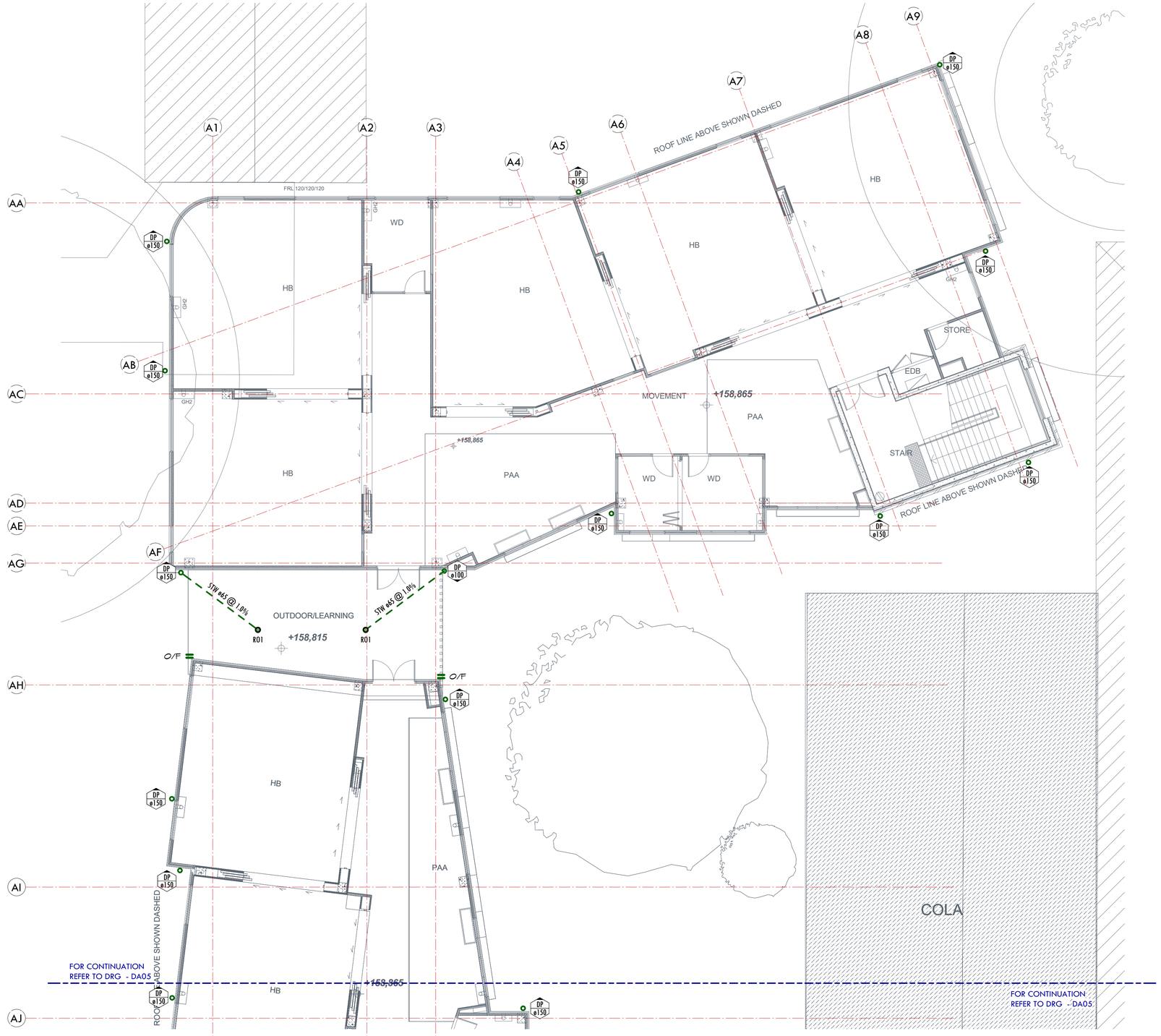
CIVIL DESIGN
LEVEL 2 SOUTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA05 3



LEVEL 2 STORMWATER PLAN - NORTH

NOTE:
- ALL LEVELS TO ARCHITECTS DETAILS.
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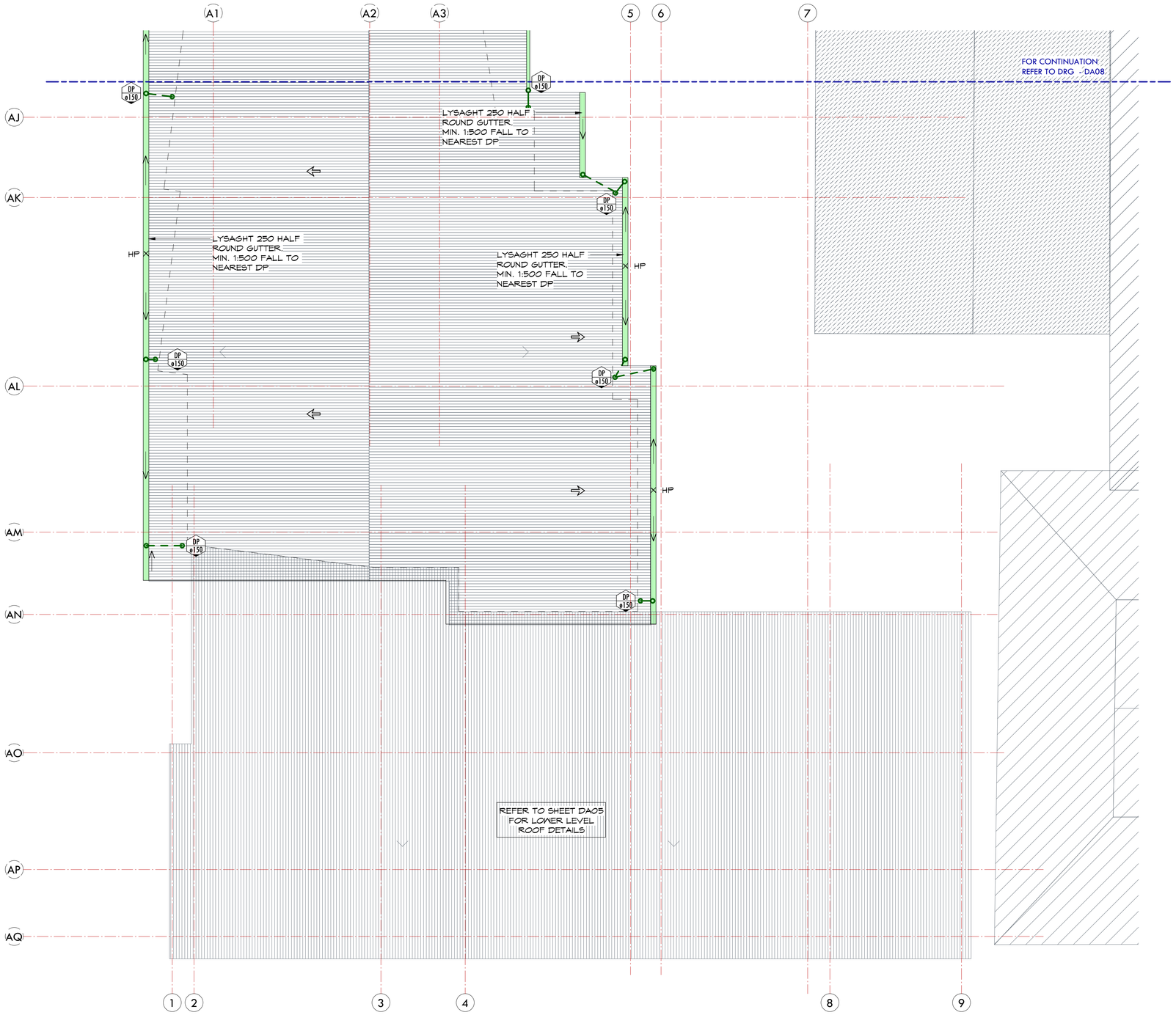
DRG SIZE : A1
SCALE : 1 : 100
PROJECT MGR : DL

CIVIL DESIGN
LEVEL 2 NORTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA06 3



ROOF PLAN STORMWATER PLAN - SOUTH

NOTE:
- ALL LEVELS TO ARCHITECTS DETAILS.
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- ALL PIPE FALL NOMINATED AS MINIMUM REQUIRED.
- MINIMUM Ø50mm PIPE THROUGH PARAPET FOR OVERFLOW. SET PIPE INVERT BELOW ADJACENT PROPOSED FLOOR LEVEL.
- ALL STORMWATER AND ROOF DRAINAGE TO BE IN ACCORDANCE WITH EFSG SPECIFICATION AND AS 3500.
- ALL DOWNPIPES TO HAVE AN OPENING PRIOR TO CONNECTION WITH STORMWATER SYSTEM. REFER TO TYPICAL DETAIL ON SHEET DA10

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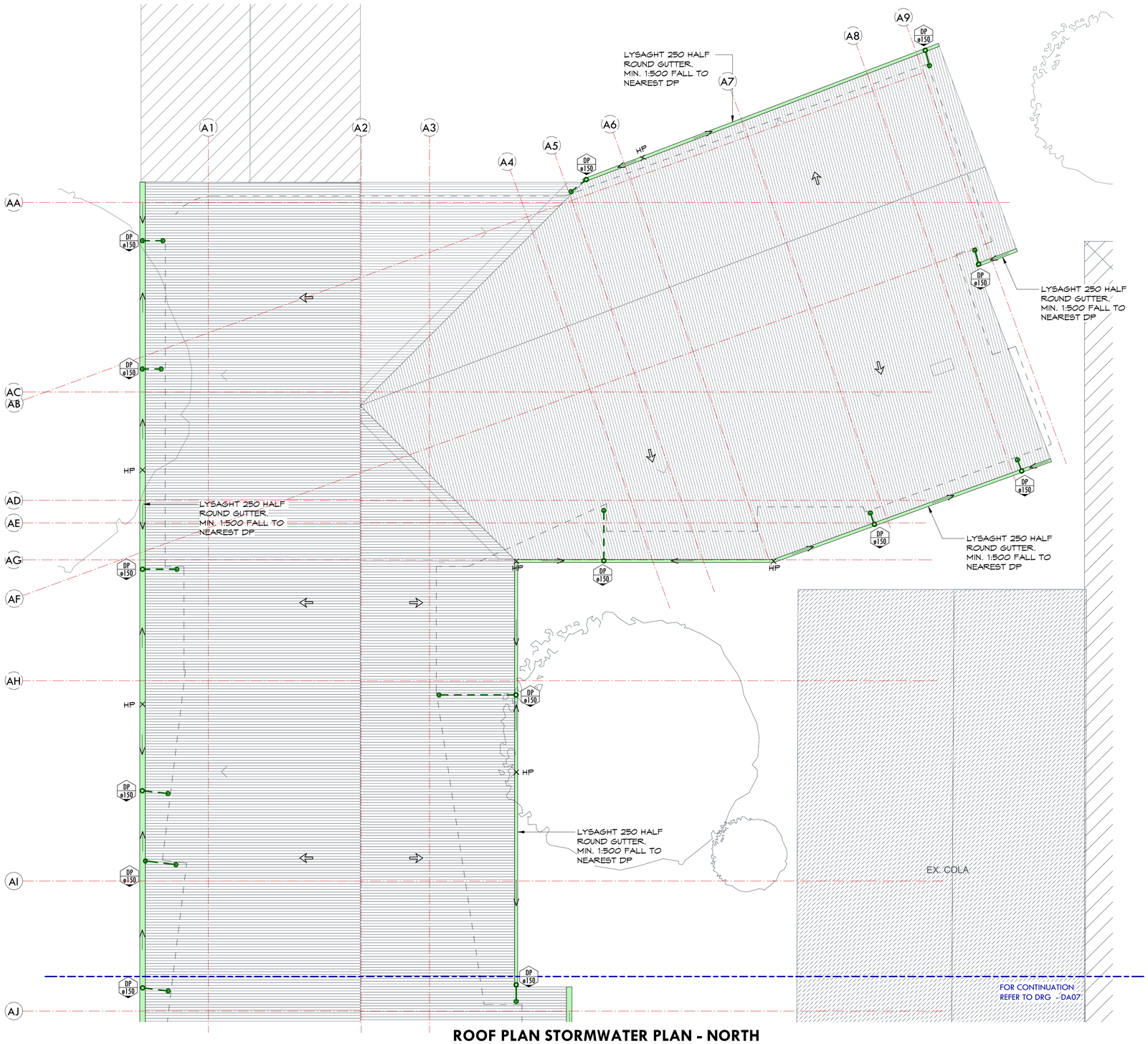
PROJECT MGR : DL

CIVIL DESIGN
ROOF PLAN SOUTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA07 3



ROOF PLAN STORMWATER PLAN - NORTH

NOTE:

- ALL LEVELS TO ARCHITECTS DETAILS.
- ALL Ø65mm PIPES TO BE CAST WITHIN SLAB.
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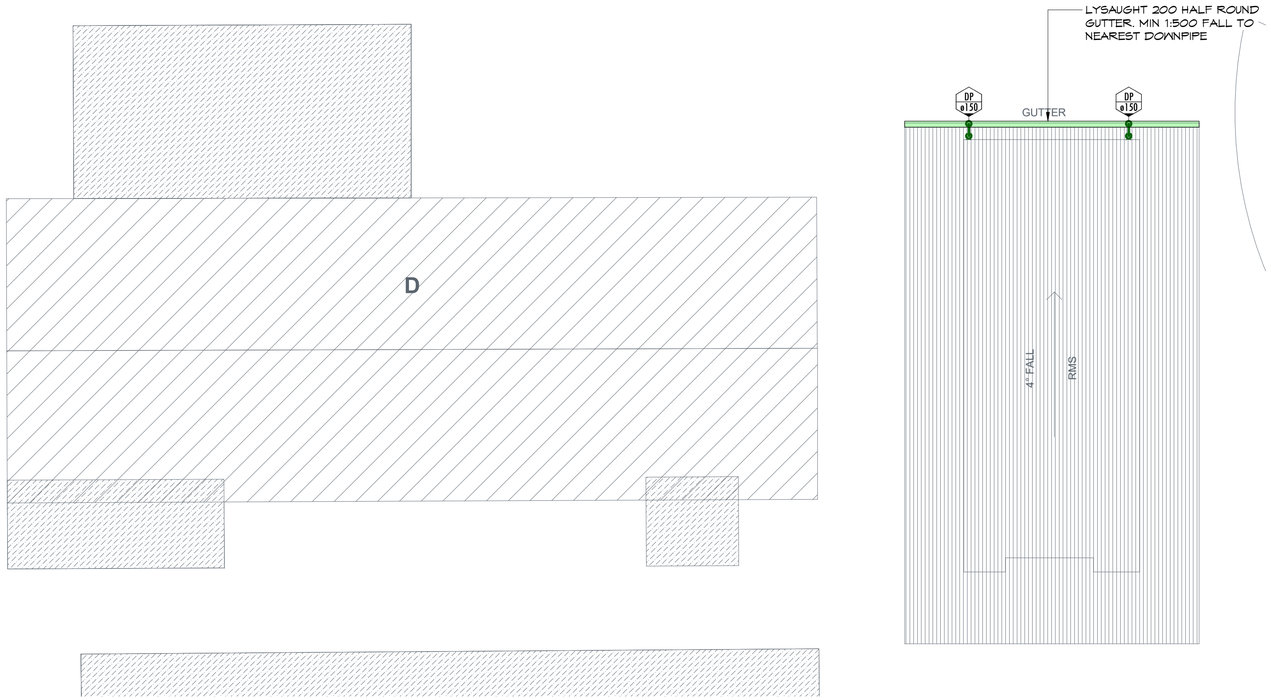
CIVIL DESIGN
ROOF PLAN NORTH
STORMWATER PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA08 3



ROOF PLAN STORMWATER PLAN - ZONE B

SCALE 1 : 100

AMDT	DATE	BY	DESCRIPTION
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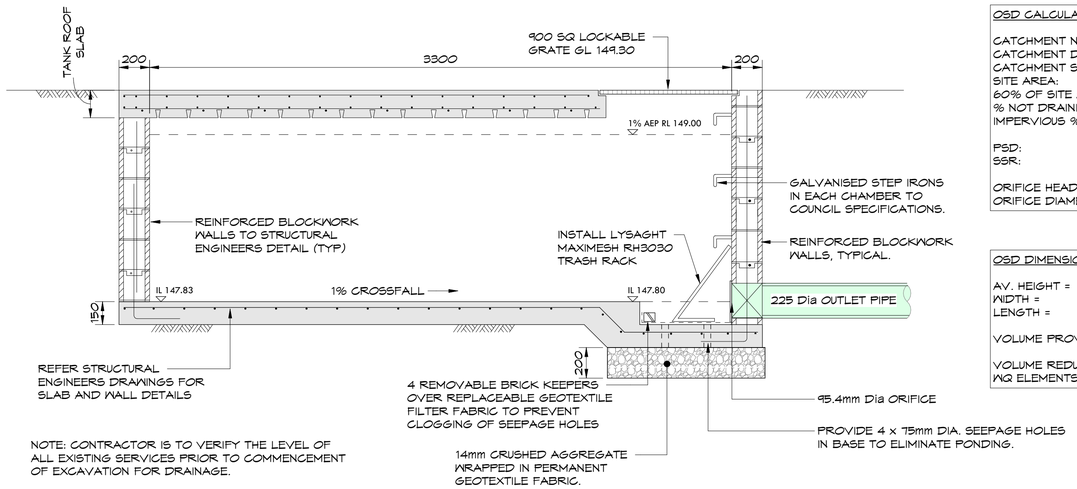
PROJECT MGR : DL

CIVIL DESIGN
ROOF STORMWATER PLAN - ZONE B

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA09 1



NOTE: CONTRACTOR IS TO VERIFY THE LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF EXCAVATION FOR DRAINAGE.

OSD TANK SECTION 1

OSD CALCULATIONS

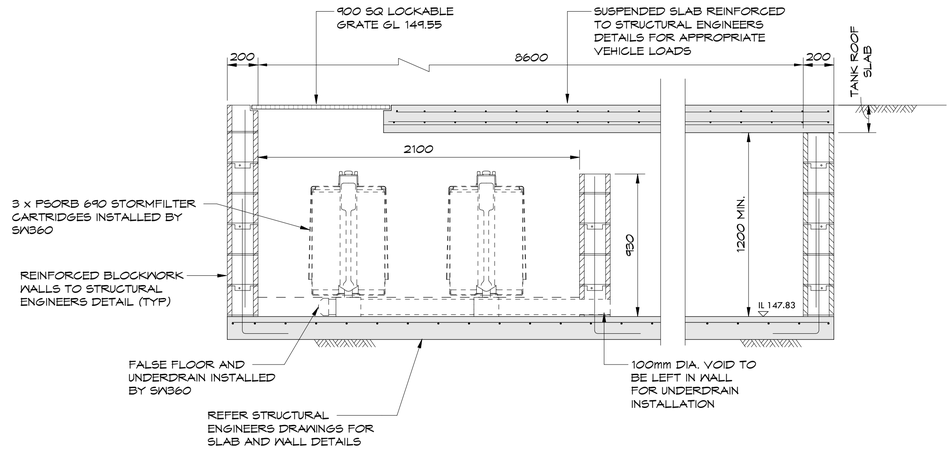
CATCHMENT NAME:	KU-RING-GAI CREEK (KC2)
CATCHMENT DISCHARGE RATE:	166 l/s/ha
CATCHMENT STORAGE RATE:	241 m^3/ha
SITE AREA:	2106 m^2
60% OF SITE AREA:	1263.8 m^2
% NOT DRAINING TO OSD:	0%
IMPERVIOUS %:	100%
PSD:	20.98 l/s
SSR:	30.46 m^3
ORIFICE HEAD:	1.2m
ORIFICE DIAMETER:	95.4mm

OSD DIMENSIONS

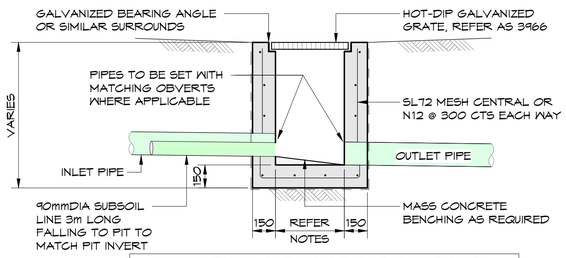
AV. HEIGHT = 1.2m
WIDTH = 3.3m
LENGTH = 8.6m

VOLUME PROVIDED = 32.2m^3

VOLUME REDUCTION DUE TO WQ ELEMENTS = 1.9m^3



OSD TANK SECTION 2

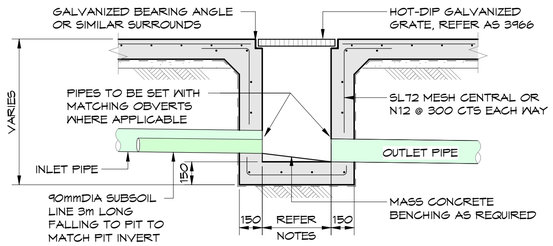


MINIMUM INTERNAL DIMENSIONS FOR STORMWATER PITS			
DEPTH OF INVERT OF OUTLET		DEPTH OF INVERT OF OUTLET	
		WIDTH	LENGTH
	< 600	450	450
> 600		600	600
> 900		600	900
> 1200		900	900

*STEP IRONS SHALL BE PROVIDED FOR PITS WITH DEPTHS EXCEEDING 1200mm

NOTE:
1. CLIMB IRONS SHALL BE PROVIDED UNDER LID AT 300 CTS TO COUNCIL STANDARDS WHERE PIT DEPTH IS DEEPER THAN 1000.
2. REINFORCEMENT NOTED IS ONLY REQUIRED FOR PITS EXCEEDING 900 DEEP, SUBJECT TO COUNCIL REQUIREMENTS. PITS GREATER THAN 3000 DEEP WILL REQUIRE STRUCTURAL ENGINEERS DESIGN.
3. PROVIDE 90Dia x 3000 LONG SUBSOIL DRAINAGE STUB PIPE SURROUNDED WITH 100mm THICKNESS OF NOMINAL 20mm COARSE FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC. (BIDUM A24 OR APPROVED SIMILAR). TO BE PARALLEL TO UPSTREAM SIDE OF EACH INLET PIPE.
4. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
5. CONCRETE STRENGTH F'c = 32 MPa

TYPICAL CONCRETE INLET PIT - NATURAL SURFACE



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DEPTH OF INVERT OF OUTLET		DEPTH OF INVERT OF OUTLET	
		WIDTH	LENGTH
	< 600	450	450
> 600		600	600
> 900		600	900
> 1200		900	900

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NOTE:
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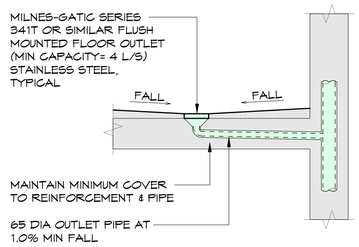
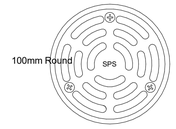
4. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
5. CONCRETE STRENGTH F'c = 32 MPa

TYPICAL CONCRETE INLET PIT - CONCRETE SURFACE

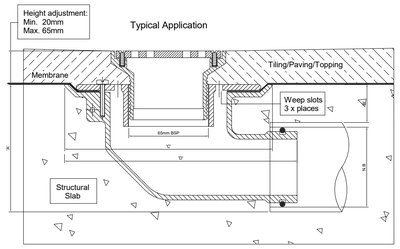


TYPICAL BALCONY FLOOR OUTLET DETAIL

Specification code:
R100B/C90 (brass grate, ABS lower body)
R100N/C90 (nickel bronze grate, ABS lower body)
R100S4/C90 (polished 304 stainless steel, ABS lower body)
R100S/C90 (satin 316 stainless steel grate, ABS lower body)

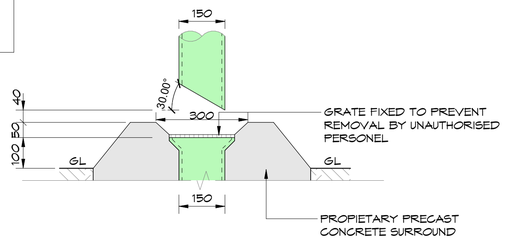


- Round grate available in nickel bronze, 304 & 316 stainless Steel. Bronze non-stock option.
- ABS 90° Body and Reversible Membrane Clamp Collar with female 65mm BSP thread.



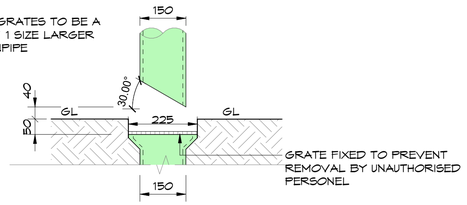
N.B.	A	B	C	D
50	100	40	180	200
65	105	37	180	200

SPS 100mm ROUND VARI LEVEL SIDE OUTLET DRAIN 65/50mm OUTLET



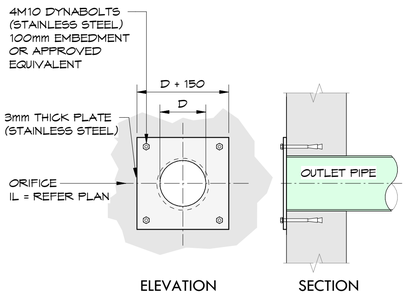
WHERE DOWNPIPE IS LOCATED OVER A LANDSCAPED AREA

NOTE: ALL GRATES TO BE A MINIMUM OF 1 SIZE LARGER THAN DOWNPIPE

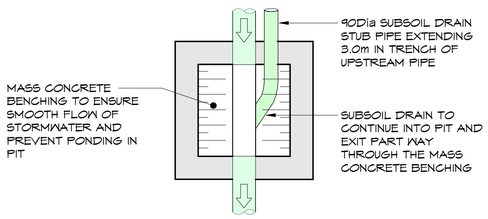


WHERE DOWNPIPE IS LOCATED OVER A HARDSTAND AREA

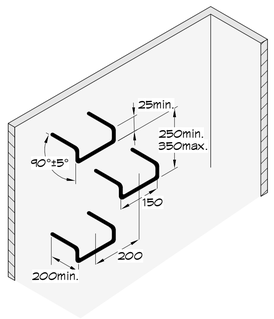
TYPICAL DOWNPIPE DISCHARGE DETAIL



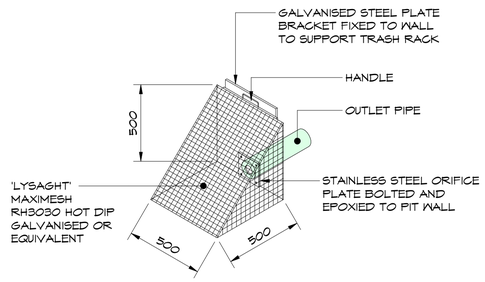
TYPICAL ORIFICE PLATE DETAIL



TYPICAL SUBSOIL PIPE/PIT BENCHING



STEP IRON DETAIL



TYPICAL TRASH RACK SCREEN DETAIL

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CIVIL - STRUCTURAL - BUILDING SERVICES

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DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : As indicated
PROJECT MGR : DL

CIVIL DESIGN DETAILS SHEET

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
DA103

ENVIRONMENTAL SITE MANAGEMENT LEGEND

- PROPOSED BUILDING LINE
- PROPRIETARY SILT FENCE
- PROVIDE TEMPORARY CHAIN WIRE FENCING (HOARDING) ALONG THE SITE BOUNDARY.
- TEMPORARY STABALISED CONSTRUCTION ENTRY/EXIT. (SHAKER PAD)
- TEMPORARY FILTER TUBE WITH SAFETY BARRICADE TO KERB INLET PITS.
- NOMINATED DISPOSAL ROUTE FOR TRUCK MATERIAL TRANSPORTATION.
- TEMPORARY MASS CONCRETE FOOTPATH CROSSING.
- UNDISTURBED NON-TRAFFICABLE AREA
- DIVERSION BANK
- SURFACE INLET DRAINAGE PIT WITH SURROUNDING FILTER FABRIC INLET SEDIMENT TRAP OR FILTER TUBES (SANDBAGS)
- TEMPORARY GEOTEXTILE WRAPPED HAY BALES/SAND BAGS
- STOCK MATERIALS
- SITE EQUIPMENT LOCATIONS

ESM DRAWING LIST

No.	SHEET NAME
ESM1	NOTES, LEGEND & DETAILS
ESM2	ESM PLAN

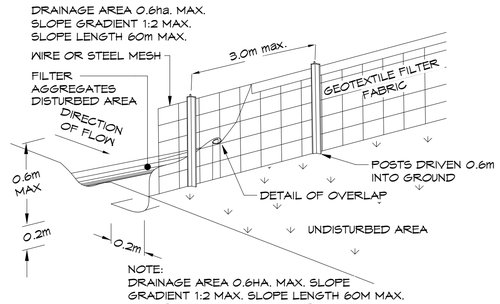
ENVIRONMENTAL SITE MANAGEMENT

1. EROSION & SEDIMENT CONTROLS TO BE INSTALLED IN ACCORDANCE WITH COUNCIL'S SPECIFICATION & THE NSW DEPARTMENT OF HOUSING "BLUE BOOK" – SOILS AND CONSTRUCTION – MANAGING URBAN STORMWATER, 2004. REFER TO THE BLUE BOOK FOR STANDARD DRAWINGS "SD"
2. SEDIMENT & EROSION CONTROLS MUST BE IN PLACE PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS OR DEMOLITION ACTIVITY. THE LOCATION OF SUCH DEVICES IS INDICATIVE ONLY AND FINAL POSITION SHOULD BE DETERMINED ON SITE.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MEASURES ARE TAKEN DURING THE COURSE OF CONSTRUCTION TO PREVENT SEDIMENT EROSION AND POLLUTION OF THE DOWNSTREAM SYSTEM. SUPERVISING ENGINEER SHOULD BE CONTACTED IF IN DOUBT. ALL SEDIMENT CONTROL STRUCTURES TO BE INSPECTED AFTER EACH RAINFALL EVENT FOR STRUCTURAL DAMAGE AND ALL TRAPPED SEDIMENT TO BE REMOVED TO A NOMINATED SOIL STOCKPILE SITE.
4. RETAIN ALL EXISTING GRASS COVER WHEREVER POSSIBLE. TOPSOIL FROM ALL AREAS THAT WILL BE DISTURBED TO BE STRIPPED AND STOCKPILED AT THE NOMINATED SITE. A SEDIMENT FENCE TO BE PLACED DOWNHILL OF STOCKPILE.
5. AREAS OF SITE REGRADING ARE TO BE COMPLETED PROGRESSIVELY DURING THE WORKS AND STABILISED AS EARLY AS POSSIBLE. THE SUPERVISING ENGINEER MAY DIRECT THE CONTRACTOR TO HAVE AREAS OF DISTURBANCE COMPLETED AND STABILISED DURING THE COURSE OF THE WORKS.
6. ALL DISTURBED AREAS ARE TO BE SEEDED & FERTILISED WITHIN 14 DAYS OF EXPOSURE.
7. ALL EXISTING TREES TO BE RETAINED UNLESS SHOWN OTHERWISE ON APPROVED DRAWINGS. TREES RETAINED ARE TO BE PROTECTED WITH A HIGH VISIBILITY FENCE, PLUS FLAGGING TO INDIVIDUAL TREES AS NECESSARY.
8. INSTALL TEMPORARY SEDIMENT BARRIERS TO ALL INLET PITS LIKELY TO COLLECT SILT LADEN WATER, UNTIL SURROUNDING AREAS ARE PAVED OR REGRASSED. GRAVEL OR GEOTEXTILE INLET FILTERS TO SD6-11 & SD6-12.
9. ALL SILT FENCES & BARRIERS ARE TO BE MAINTAINED IN GOOD ORDER & REGULARLY DESILTED DURING THE CONSTRUCTION PERIOD. SILT FENCES TO SD6-8 OR SD6-9.
10. STOCKPILES OF LOOSE MATERIALS SUCH AS SAND, SOIL, GRAVEL MUST BE COVERED WITH GEOTEXTILE SILT FENCE MATERIAL. PLASTIC SHEETING OR MEMBRANE MUST NOT BE USED. SAFETY BARRICADING SHOULD BE USED TO ISOLATE STOCKPILES OF SOLID MATERIALS SUCH AS STEEL REINFORCING, FORMWORK AND SCAFFOLDING.
11. WASTE MATERIALS ARE TO BE STOCKPILED OR LOADED INTO SKIP-BINS LOCATED ON SITE AS SHOWN ON PLAN.
12. NO MORE THAN 150m OF TRENCHING TO BE OPEN AT ANY ONE TIME. IMMEDIATELY AFTER TRENCH BACKFILLING, PROVIDE SANDBAGS OR SAUSAGE FILTERS ACROSS EACH TRENCH AT MAXIMUM 20m SPACINGS. FILTERS TO REMAIN IN PLACE UNTIL REVEGETATION HAS OCCURRED.
13. ALL VEHICLES LEAVING THE SITE MUST PASS OVER THE STABILISED SITE ACCESS BALLAST AREA (SIMILAR TO SD6-14) TO SHAKE OFF SITE CLAY AND SOIL. IF NECESSARY WHEELS AND AXLES ARE TO BE HOSED DOWN. BALLAST IS TO BE MAINTAINED & REPLACED AS NECESSARY DURING THE CONSTRUCTION PERIOD.
14. THE HEAD CONTRACTOR IS TO INFORM ALL SITE STAFF AND SUB-CONTRACTORS OF THEIR OBLIGATIONS UNDER THE EROSION AND SEDIMENT CONTROL PLAN.
15. ANY SEDIMENT DEPOSITED ON THE PUBLIC WAY, INCLUDING FOOTPATH RESERVE AND ROAD SURFACE, IS TO BE REMOVED IMMEDIATELY.
16. PROVIDE BARRIERS AROUND ALL CONSTRUCTION WORKS WITHIN THE FOOTPATH AREA TO PROVIDE SAFE ACCESS FOR PEDESTRIANS.
17. CONCRETE PUMPS AND CRANES ARE TO OPERATE FROM WITHIN THE BALLAST ENTRY DRIVEWAY AREA AND ARE NOT TO OPERATE FROM THE PUBLIC ROADWAY UNLESS SPECIFIC COUNCIL PERMISSION IS OBTAINED.
18. TRUCKS REMOVING EXCAVATED / DEMOLISHED MATERIAL SHOULD TRAVEL ON STABILISED CONSTRUCTION PATHS. MATERIAL TO BE TAKEN TO THE TRUCK TO REDUCE TRUCK MOVEMENT ON SITE. TRUCKS TO BE LIMITED TO SINGLE UNIT HEAVY RIGID VEHICLES. (NO SEMITRAILERS)
19. ANY EXCAVATION WORK ADJACENT TO ADJOINING PROPERTIES OR THE PUBLIC ROADWAY IS NOT TO BE COMMENCED UNTIL THE STRUCTURAL ENGINEER IS CONSULTED AND SPECIFIC INSTRUCTIONS RECEIVED FROM THE ENGINEER.
20. TOILET FACILITIES MUST BE EITHER A FLUSHING TYPE OR APPROVED PORTABLE CHEMICAL CLOSET. CHEMICAL CLOSETS ARE TO BE MAINTAINED & SERVICED ON A REGULAR BASIS SO THAT OFFENSIVE ODOUR IS NOT EMITTED.
21. DURING TRENCH EXCAVATION ALL SPOIL SHALL BE MOUNDED ON THE UPHILL SIDE OF TRENCHES AND PLACEMENT IS TO COMPLY WITH THE SUPERINTENDENTS REQUIREMENT.
22. DIVERSION BANKS SHOULD BE CONSTRUCTED BY MOUNDING STRIPPED TOPSOIL (MIN HEIGHT 600mm) WHERE DIRECTED. MATERIAL TO BE RESPREAD ON FOOTWAYS AFTER FINAL TRIMMING.
23. UNDISTURBED BUFFER ZONE AREAS ARE CLOSED TO ALL TRAFFIC MOVEMENTS UNLESS OTHERWISE NOTED BY THE SUPERINTENDENT AND ACCESS TO THE SEWER OR C.D.L. TRENCHING WILL BE AS SHOWN, OR HEAVY PENALTIES MAY BE IMPOSED.
24. TRAFFIC MANAGEMENT MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION. IN ACCORDANCE WITH 'R.T.A. TRAFFIC CONTROL AT WORK SITES – CURRENT EDITION' AND AS 1742 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.'
25. PEDESTRIAN CONTROL MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION. IN ACCORDANCE WITH AS 1742 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

SAFETY IN DESIGN

THERE ARE INHERENT RISKS WITH CONSTRUCTING, MAINTAINING, OPERATING, DEMOLISHING, DISMANTLING AND DISPOSING THIS DESIGN THAT ARE TYPICAL OF SIMILAR DESIGNS. AS FAR AS IS REASONABLY PRACTICABLE RISKS HAVE BEEN ELIMINATED OR MINIMISED THROUGH THE DESIGN PROCESS. HAZARD CONTROLS MUST STILL BE IMPLEMENTED BY THE CONTRACTOR, OWNER OR OPERATOR TO ENSURE THE SAFETY OF WORKERS.

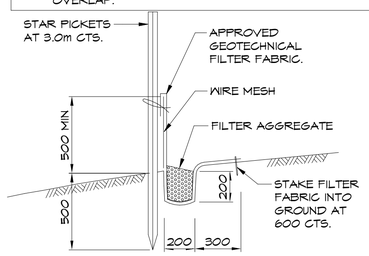
- JONES NICHOLSON'S ASSESSMENT DID NOT IDENTIFY ANY UNIQUE RISKS ASSOCIATED WITH THE DESIGN



SEDIMENT FENCE

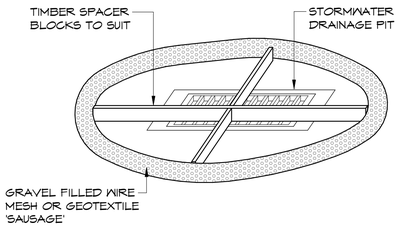
GENERAL CONSTRUCTION NOTES

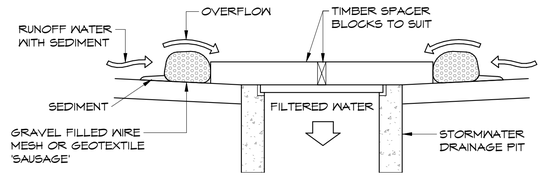
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5m LONG STAR PICKETS IN GROUND 3m APART.
3. DIG A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT WITH A 150m OVERLAP.



SILT FENCE DETAIL

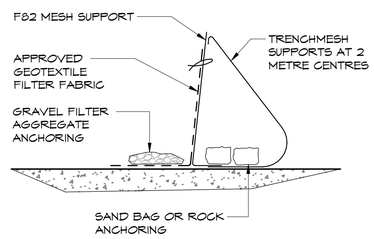
SEDIMENT SILT FENCE DETAIL1





1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH ON THE INLET PIT.
2. FILL THE SLEEVE WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. MAINTAIN A CLEAR DISTANCE AWAY FROM THE PIT WITH SPACER BLOCKS.

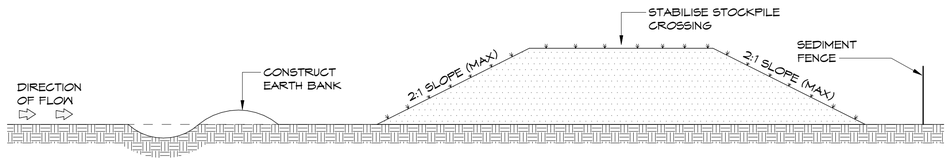
SAUSAGE BARRIER DETAIL



GENERAL CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
3. JOIN SECTIONS OF FABRIC AT A SUPPORT WITH A 150mm OVERLAP.
4. REFER TO DETAIL SD 6-9 "BLUE BOOK"

SEDIMENT FENCE - ALTERNATIVE



STOCKPILES

N.T.S

GENERAL CONSTRUCTION NOTES:

1. LOCATE STOCKPILE AT LEAST 5m FROM VEGETATION, CONCENTRATED WATER FLOWS, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS A LOW FLAT ELONGATED MOUND.
3. WHERE THERE IS A SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT. (TO ALLOW AIR VENTILATION FOR FUTURE REUSE)
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.
5. CONSTRUCT EARTH BANK ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE 1m TO 2m DOWNSLOPE OF STOCKPILE.

STOCKPILES

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION

AMDT	DATE	BY	DESCRIPTION
1	28.09.18	ELR	ISSUED FOR DA
A	27.09.18	KJM	EARLY WORKS REVISED TENDER ISSUE

bsi. ISO 9001 Quality Management | ISO 14001 Environmental Management | AS/NZS 4801 Occupational Health & Safety Management

CIVIL - STRUCTURAL - BUILDING SERVICES

JONES NICHOLSON CONSULTING ENGINEERS

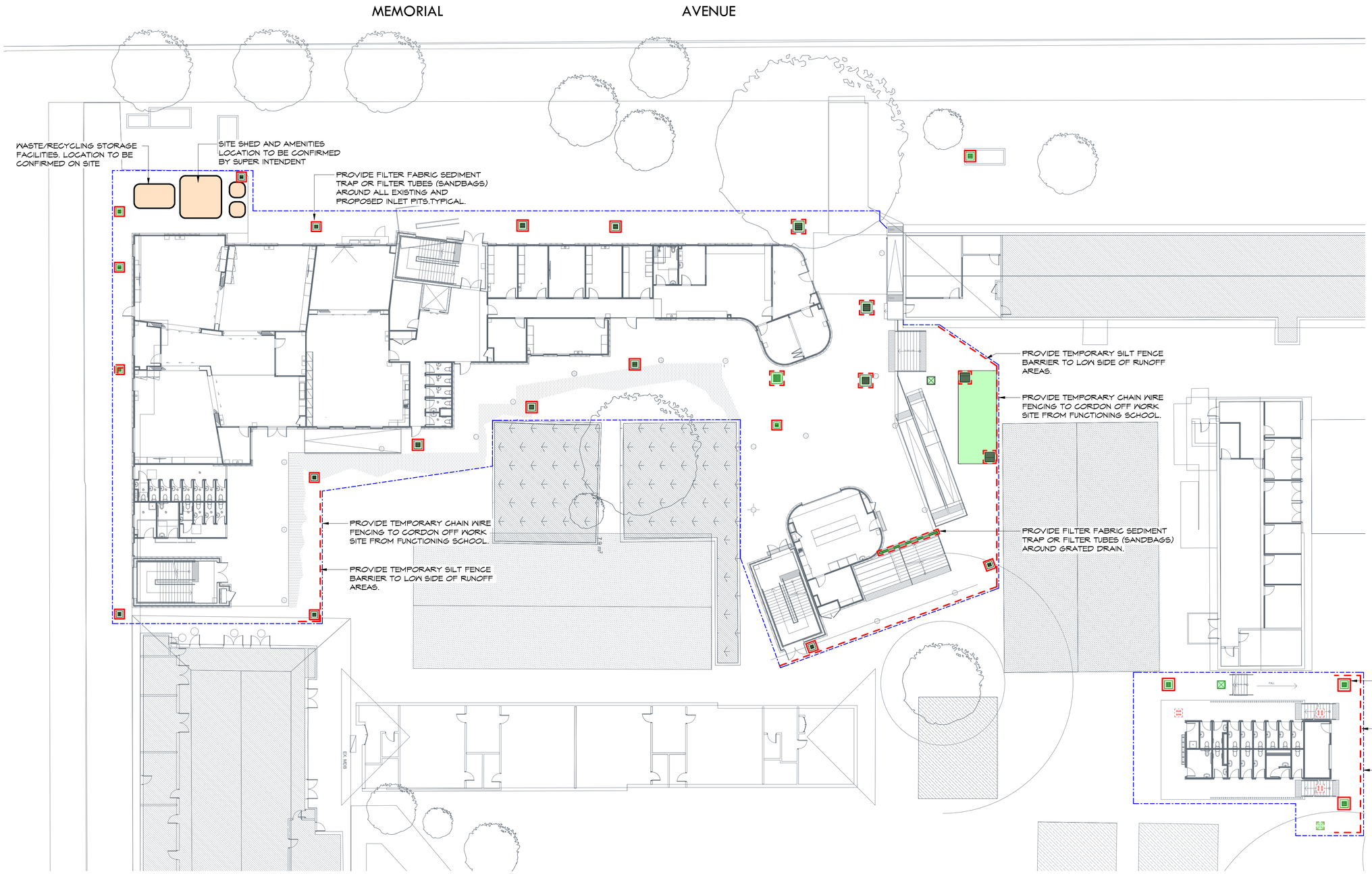
WWW.JONESNICHOLSON.COM.AU ABN: 51 003 316 032

DESIGN : TH
DRAWN : MJR
DATE : APR 2018
DRG SIZE : A1
SCALE : As indicated
PROJECT MGR : DL

CIVIL DESIGN NOTES, LEGEND & DETAILS

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
ESM11



ESM SITE PLAN

SCALE 1 : 200

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION

AMDT	DATE	BY	DESCRIPTION
1	28.09.18	ELR	ISSUED FOR DA

bsi ISO 9001 Quality Management | ISO 14001 Environmental Management | AS/NZS 4801 Occupational Health & Safety Management

CIVIL - STRUCTURAL - BUILDING SERVICES

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DESIGN : TH
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DATE : APR 2018
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SCALE : 1 : 200
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CIVIL DESIGN
ESM PLAN

ST IVES NORTH PUBLIC SCHOOL
MEMORIAL AVENUE ST IVES NSW 2075
JDH ARCHITECTS

17011064
ESM21