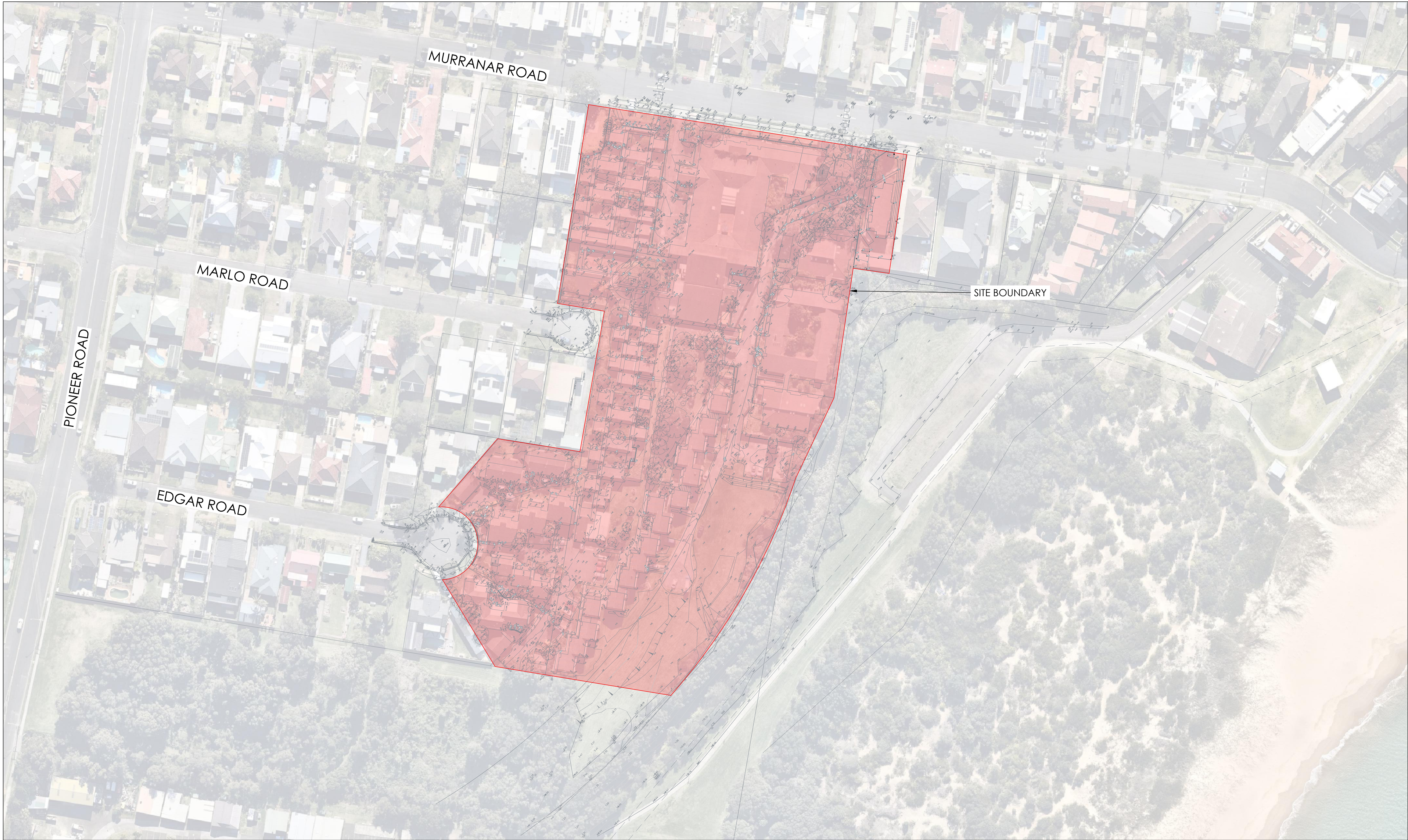
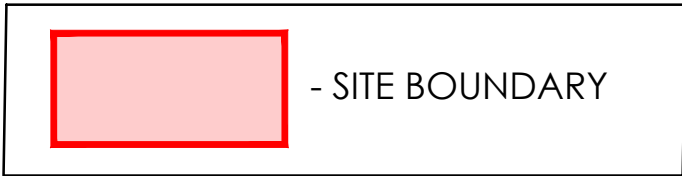


IRT TOWRADGI
17A MURRANAR ROAD, TOWRADGI

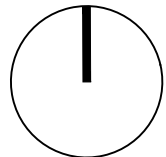


LOCALITY PLAN LEGEND



SCALE 1:750

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DISCIPLINE
CIVIL DESIGN
DRAWING TITLE
COVER SHEET
AND LOCALITY PLAN

PROJECT
IRT TOWRADGI
ADDRESS
17A MURRANAR ROAD
TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
DRG SIZE A1
SCALE 1:750
PROJECT AH
MGR
WWW.JN.COM.AU
19010057
C001 1

IRT TOWRADGI

17A MURRANAR ROAD, TOWRADGI

STANDARD SYMBOLS & NOTATIONS	
SYMBOL	DESCRIPTION
	BOUNDARY LINE
	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
	EXISTING STORMWATER DRAINAGE PIT AND PIPE
	PUMP RISING MAIN
	900 SUBSOIL LINE CONNECT TO STORMWATER OUTLET OR VERTICAL SLOT DRAIN
	SPOON / SWALE DRAIN
	GRATED SURFACE INLET PIT WITH (OVERLAND FLOW DIRECTION). PIT DIMENSIONS ARE GOVERNED BY DEPTH REFER DETAIL
	SEALED JUNCTION PIT
	GRATED DRAIN
	KERB INLET PIT WITH LINTEL
	RAINWATER DRAINAGE OUTLET
	CATCHMENT AREA TO STORMWATER PIT
	DRAINAGE CELL PLANTER OUTLET
	INDICATIVE DOWNPIPE - LOCATION AND MINIMUM SIZE
	GUTTER
	INSPECTION OPENING
	DOWNPIPES WITH SPREADER
	PROPOSED RAINWATER TANK
	EXISTING SURFACE LEVEL
	EXISTING SURVEY CONTOUR
	FINISHED SURFACE LEVEL
	FINISHED PAVEMENT LEVEL
	TOP OF NEW KERB LEVEL
	TOP OF NEW RETAINING WALL LEVEL
	PROPOSED PIT SURFACE LEVEL
	PROPOSED PIT INVERT LEVEL
	PROPOSED FINISHED FLOOR LEVEL
	PIPE SIZE, TYPE AND GRADE < > DENOTES DIRECTION OF FLOW
	RIGID PVC PIPE
	REINFORCED CONCRETE PIPE
	ROLL KERB & GUTTER
	KERB & GUTTER
	150 HIGH KERB ONLY
	OVERLAND FLOW PATH
	FALL DIRECTION
	RETAINING WALL WITH HEIGHT
	EXISTING SEWER LINE
	EXISTING TELSTRA LINE
	EXISTING GAS LINE
	EXISTING ELECTRICITY LINE
	EXISTING WATER MAIN

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

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

PROJECT INFORMATION TABLE

THE TABLES BELOW ARE TO BE READ IN CONJUNCTION WITH THE ADJACENT NOTES.

GEOTECHNICAL INFORMATION

COMPANY	REPORT No.	DATED
DOUGLAS PARTNERS PTY LTD	R.001	18.06.21

SURVEY INFORMATION

COMPANY	DATED
KF WILLIAMS & ASSOCIATES PTY LTD	30.04.21

GENERAL

- ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE NOMINATED OR APPLICABLE COUNCIL 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.
- ALL DRAWINGS SHOULD BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL DRAWINGS & DRAWINGS FROM OTHER CONSULTANTS.
- THE CONTRACTOR SHOULD REPORT ANY DISCREPANCIES ON THE DRAWINGS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN.
- 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.
- CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT THE PERMISSION OF THE OWNER.
- SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED OR REMOVED FROM SITE.
- ALL NEW WORKS SHALL MAKE A SMOOTH JUNCTION WITH EXISTING.
- ALL DRAINAGE LINES THROUGH ADJACENT LOTS SHALL BE CONTAINED WITHIN EASEMENTS CONFORMING TO COUNCIL'S STANDARDS.
- THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES AND DEBRIS ETC. TO THE EXTENT SPECIFIED.
- 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

- JN ARE NOT RESPONSIBLE FOR THE ACCURACY OF ANY 3RD PARTY INFORMATION PROVIDED ON THIS DRAWING.
- ALL LEVELS ARE TO A.H.D.
- ALL CHAINAGES AND LEVELS ARE IN METRES, AND DIMENSIONS IN MILLIMETRES.
- SET OUT COORDINATES ARE BASED ON SURVEY DRAWINGS PROVIDED FOR THE PURPOSE OF CARRYING OUT THE ENGINEERING DESIGN.
- CONTRACTOR SHALL VERIFY ALL SET OUT COORDINATES SHOWN ON THE PLANS WITH A REGISTERED SURVEYOR.
- CONTRACTOR SHALL ARRANGE FOR THE WORKS TO BE SET OUT BY A REGISTERED SURVEYOR.
- ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH THE ENGINEER PRIOR TO COMMENCEMENT OF THE WORK FOR CONFIRMATION OF THE SURVEY.

DRAINAGE INSTALLATION

RCP CONVENTIONAL INSTALLATIONS & ROAD CROSSINGS

- SUPPLY & INSTALLATION OF DRAINAGE WORKS TO BE IN ACCORDANCE WITH THESE DRAWINGS, THE COUNCIL SPECIFICATION AND THE CURRENT APPLICABLE AUSTRALIAN STANDARDS.
- BEDDING OF THE PIPELINES IS TO BE TYPE 'HS2' IN ACCORDANCE WITH THE STANDARDS AS FOLLOWS:
 - COMPACTED GRANULAR MATERIAL IS TO COMPLY WITH THE FOLLOWING GRADINGS:

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

- AND THE MATERIAL PASSING THE 0.075 SIEVE HAVING LOW PLASTICITY AS DESCRIBED IN APPENDIX D OF AS1726.
 - BEDDING DEPTH UNDER THE PIPE TO BE 100mm.
 - 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.
 - 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.
 - 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.
- 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 ITS SELF COMPACTING ABILITY.
 - 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 > 1200 DIA.

DRAWING STATUS

PRELIMINARY

PRELIMINARY DRAWINGS ARE NOT TO BE USED FOR TENDER OR CONSTRUCTION PURPOSES.

TENDER

TENDER DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES AND ARE INTENDED FOR AN EXTENT OF WORKS. ALL OTHER CONSULTANT DRAWINGS AND CONTRACT DOCUMENTS SHOULD BE READ IN CONJUNCTION WITH THESE DOCUMENTS TO DETERMINE THE FULL EXTENT OF WORKS.

CONSTRUCTION CERTIFICATE

CONSTRUCTION CERTIFICATE DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION UNLESS APPROVED & STAMPED BY THE PCA.

CONSTRUCTION

CONSTRUCTION DRAWINGS CAN BE USED FOR CONSTRUCTION PURPOSES AND/OR FOR THE CREATION OF FABRICATION DRAWINGS.

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.

STORMWATER DRAINAGE

- STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS AND COUNCIL'S SPECIFICATION.
- PIPES OF 225mm DIA. AND UNDER SHALL BE UPVC.
- PIPES OF 300mm DIA. AND LARGER SHALL BE FRC OR CONCRETE CLASS 2 RUBBER RING JOINTED UNO.
- ALL FRC OR RCP STORMWATER PIPES WITHIN ROAD RESERVE AREAS TO BE CLASS 3 U.N.O.
- PIPES SHALL GENERALLY BE LAID AT THE GRADES INDICATED ON THE DRAWINGS.
- MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK & ROADWAY AREAS UNO.
- PIPES UP TO 150mm DIA SHALL BE LAID AT 1.0% MIN. GRADE U.N.O.
- PIPES 225mm DIA AND OVER SHALL BE LAID AT 0.5% MIN. GRADE U.N.O.
- BACKFILL TRENCHES WITH APPROVED FILL COMPACTED IN 200mm LAYERS TO 98% OF STANDARD DENSITY.
- ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS.
- PITS SHALL BE AS DETAILED WITH METAL GRATES AT LEVELS INDICATED. ALL PITS DEEPER THAN 1000mm TO HAVE CLUMB IRONS.
- BUILD INTO UPSTREAM FACE OF ALL PITS A 3.0m SUBSOIL LINE FALLING TO PITS TO MATCH PIT INVERTS.
- ALL COURTYARD & LANDSCAPED PITS TO BE 450 SQUARE. LOAD CLASS A. UNLESS NOTED OTHERWISE.
- ALL DRIVEWAY & OSD PITS TO BE 600 SQUARE. LOAD CLASS D. UNLESS NOTED OTHERWISE.
- INSTALL TEMPORARY SEDIMENT BARRIERS TO INLET PITS, TO COUNCIL'S STANDARDS UNTIL SURROUNDING AREAS ARE PAVED OR GRASSED.
- PITS & DOWNPIPE LOCATIONS AND LEVELS MAY BE VARIED TO SUIT SITE CONDITIONS AFTER CONSULTING THE ENGINEER.
- DOWNPIPES SHOWN ARE INDICATIVE ONLY. ALL ROOF GUTTERING AND DOWNPIPES TO THE CURRENT AUSTRALIAN STANDARDS.
- ALL PLANTER BOXES AND BALCONIES TO BE CONNECTED TO THE PROPOSED STORMWATER DRAINAGE LINE.
- HAND-EXCAVATE STORMWATER PIPES IN VICINITY OF TREE ROOTS.
- FOOTPATH CROSSING LEVELS SHOWN ARE TO BE ADJUSTED TO FINAL COUNCIL'S ISSUED LEVELS.
- GEOTEXTILE FABRIC TO BE PLACED UNDER RIP RAP SCOUR PROTECTION.
- ALL BASES OF PITS TO BE BENCH TO HALF PIPE DEPTH AND PROVIDE GALVANISED ANGLE SURROUNDINGS TO GRATE.
- 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. PROVIDE FLUSHING EYES AT HIGH POINTS OR TO COUNCIL'S REQUIREMENTS.
- SHOULD THE CONTRACTOR ELECT TO INSTALL PRECAST STORMWATER PITS AND THEY ARE PERMITTED BY COUNCIL AND THE CLIENT, THE PRECAST PITS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH RMS STANDARDS INCLUDING:
 - SEAL THE SEGMENTS TOGETHER USING A SITE-APPROVED NON-SHRINK GROUT OR MASTIC-TYPE PRODUCT. APPLY THE SEALANT IN ACCORDANCE WITH THE PRODUCT MANUFACTURER'S REQUIREMENTS.
 - ENSURE THAT NO GAPS REMAIN AND THAT A SMOOTH FACE EXISTS BETWEEN MULTIPLE UNITS.
 - LEAVE THE SEGMENTS UNDISTURBED UNTIL THE PERIOD OF CURING IS COMPLETED IN ACCORDANCE WITH THE GROUT OR SEALANT PRODUCT MANUFACTURER'S REQUIREMENTS.

DRAWING LIST

No.	DRAWING TITLE
C001	COVER SHEET & LOCALITY PLAN
C002	GENERAL NOTES AND LEGEND
C100	STORMWATER SITE PLAN
C101	STORMWATER PLAN PART 1
C102	STORMWATER PLAN PART 2
C103	STORMWATER PLAN PART 3
C600	STORMWATER LONG SECTIONS SHEET 1
C601	STORMWATER LONG SECTIONS SHEET 2
C602	STORMWATER LONG SECTIONS SHEET 3

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STATUS

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CIVIL DESIGN

DRAWING TITLE

GENERAL NOTES
AND LEGEND

PROJECT

IRT TOWRADGI

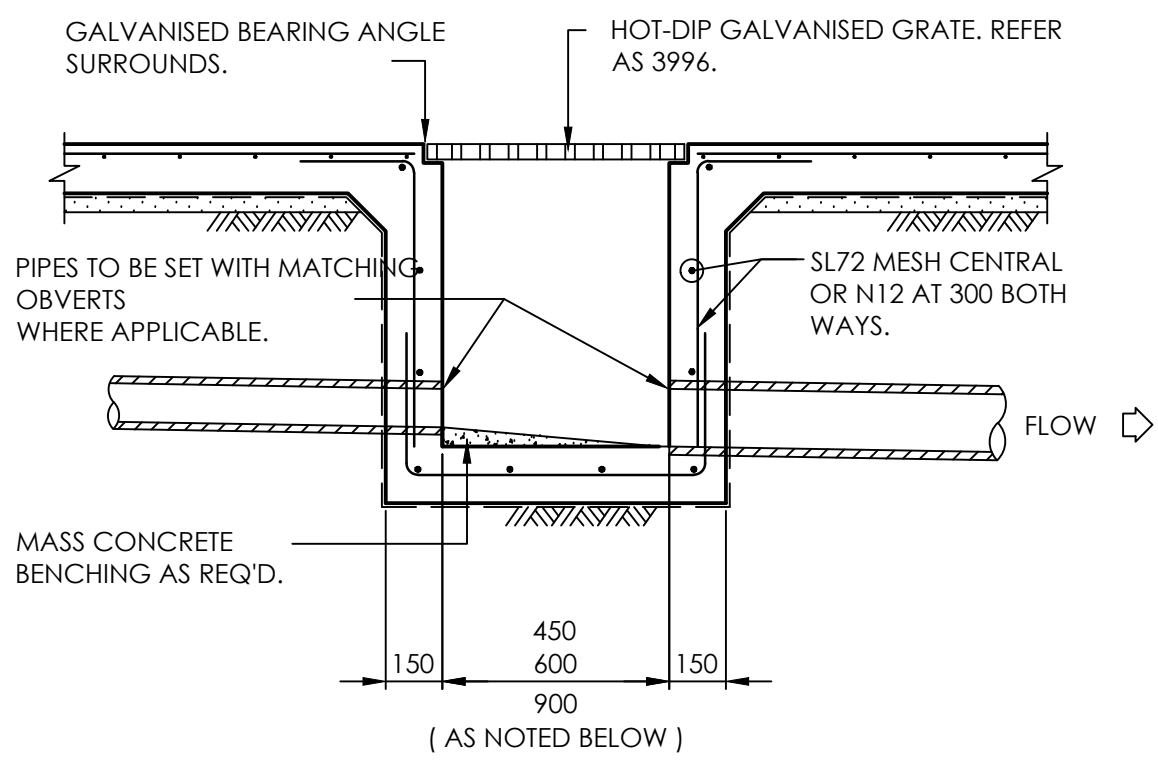
ADDRESS

17A MURRANAR ROAD
TOWRADGI, NSW

PROJECT DETAILS

DESIGN LAM
DRAWN LAP
STATUS SEP 2021
DRG SIZE A1
SCALE NTS
PROJECT AH
MGR
WWW.JN.COM.AU

19010057
C002 1

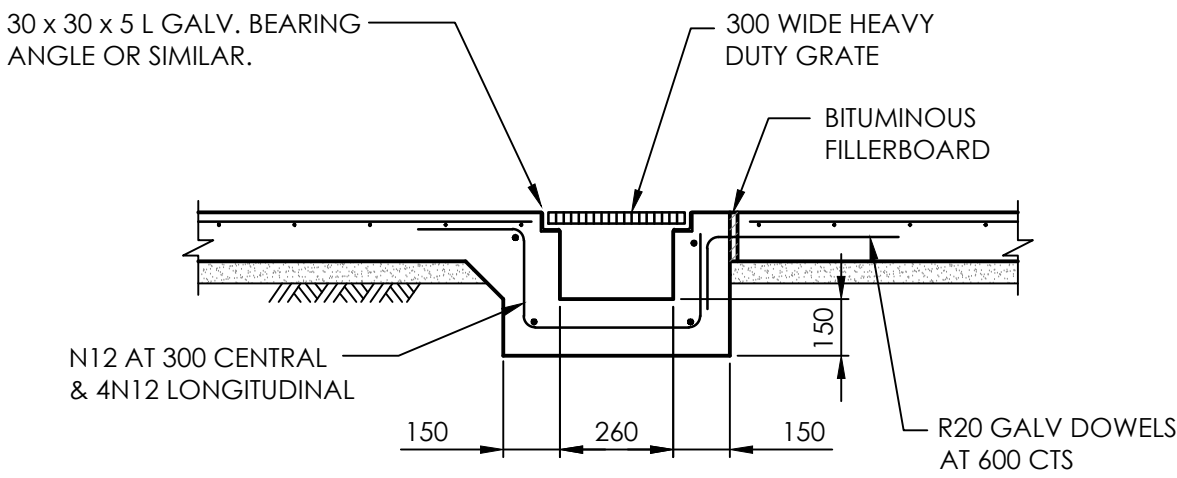


TYPICAL GRATED INLET PIT -
CONCRETE SURFACE

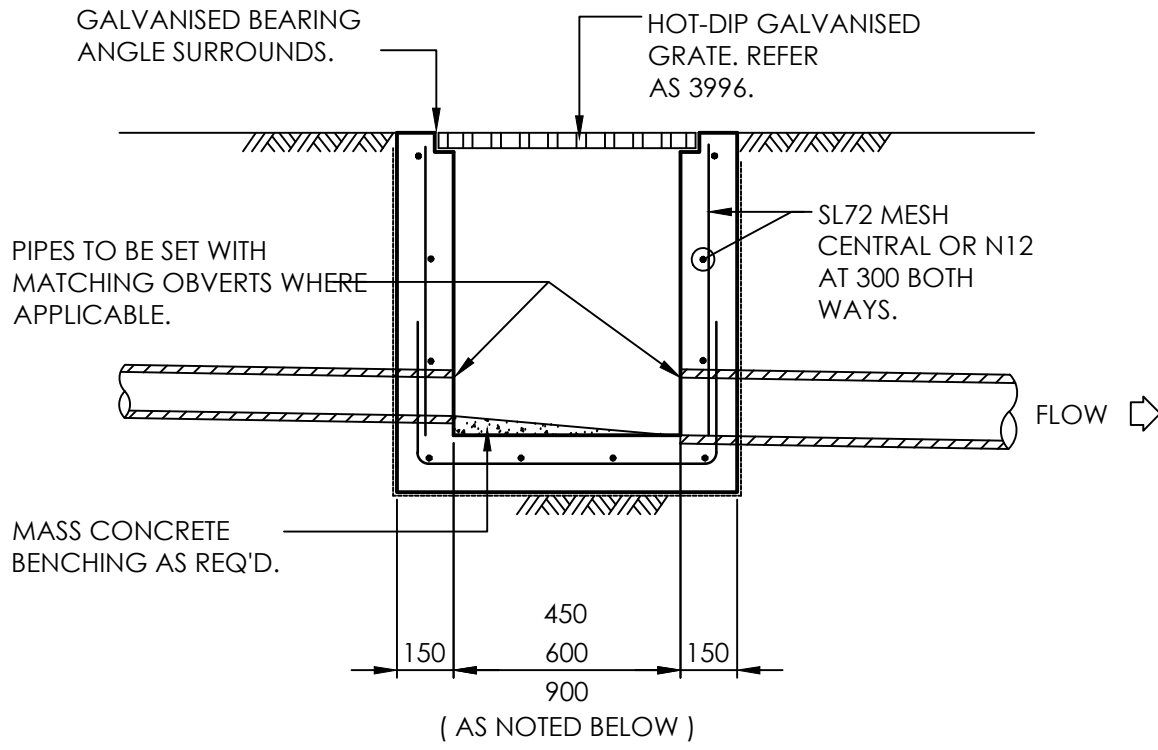
MINIMUM INTERNAL DIMENSIONS FOR STORMWATER PITS			
DEPTH TO INVERT OF OUTLET		PIT MINIMUM INTERNAL DIMENSIONS (mm)	
		WIDTH	LENGTH
	< 600	450	450
> 600		600	600
> 900		600	900
> 1200		900	900

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

- NOTES
1. REINFORCEMENT NOTED IS ONLY REQUIRED FOR PITS EXCEEDING 400 DEEP, SUBJECT TO COUNCIL REQUIREMENTS. PITS GREATER THAN 3000 DEEP WILL REQUIRE STRUCTURAL ENGINEERS DESIGN.
 2. PROVIDE 40φ 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.
 3. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
 4. CONCRETE STRENGTH F_c = 32 MPa



TYPICAL GRATED DRAIN DETAIL

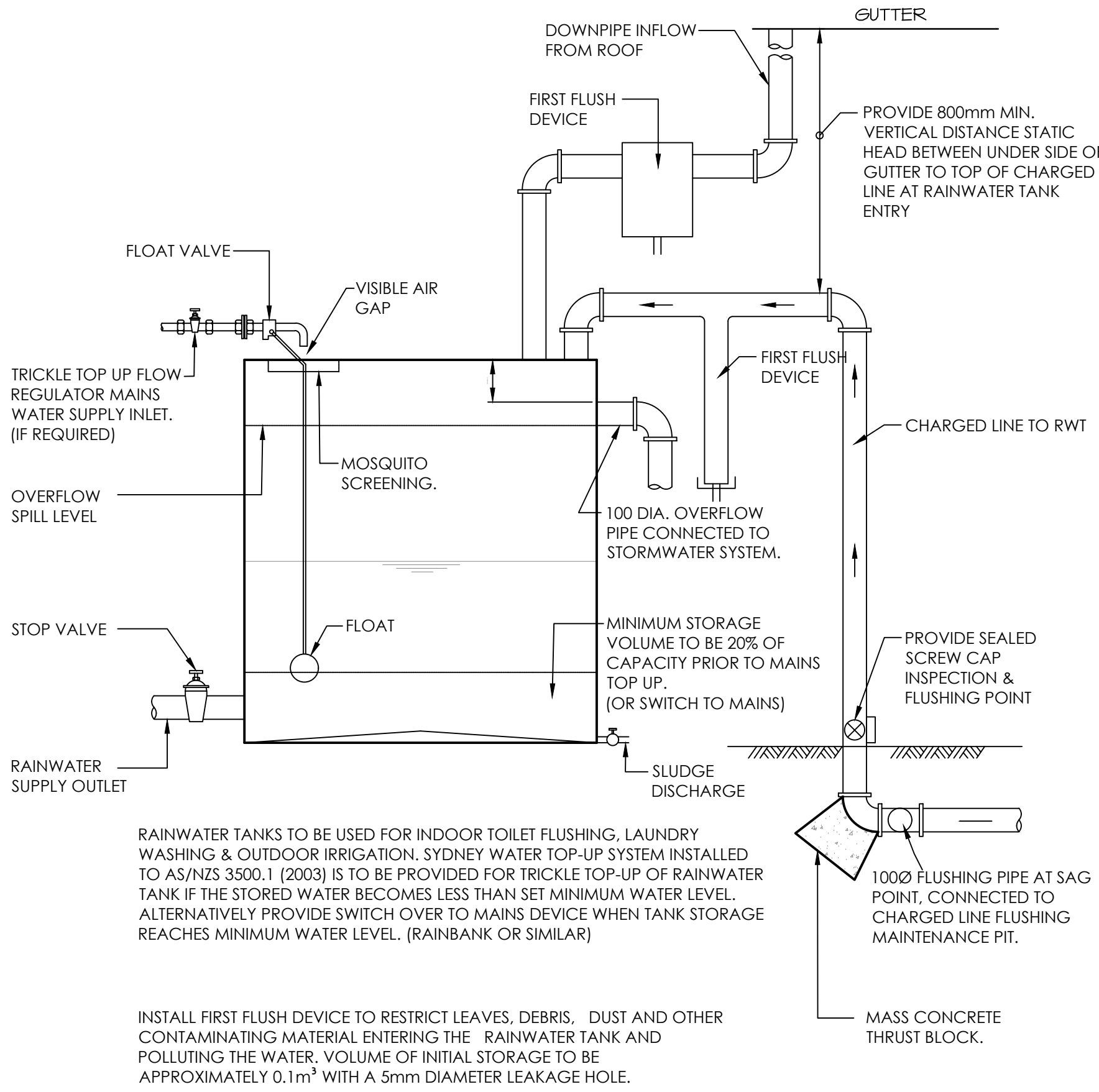


TYPICAL GRATED INLET PIT -
NATURAL SURFACE

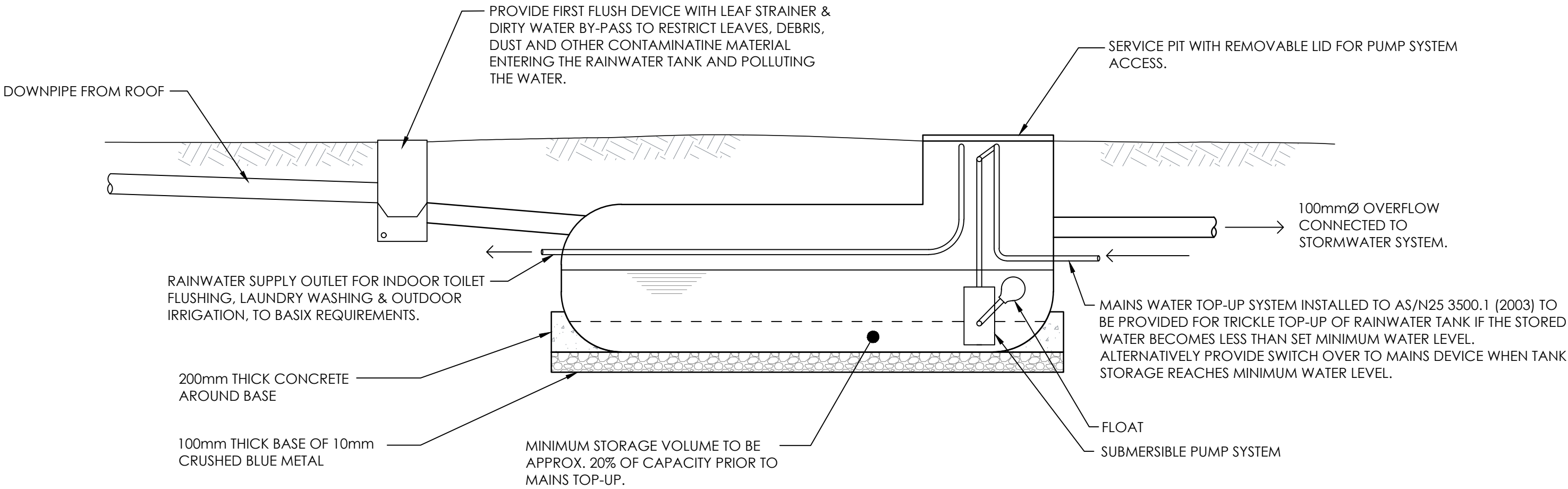
MINIMUM INTERNAL DIMENSIONS FOR STORMWATER PITS			
DEPTH TO INVERT OF OUTLET		PIT MINIMUM INTERNAL DIMENSIONS (mm)	
		WIDTH	LENGTH
	< 600	450	450
> 600		600	600
> 900		600	900
> 1200		900	900

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

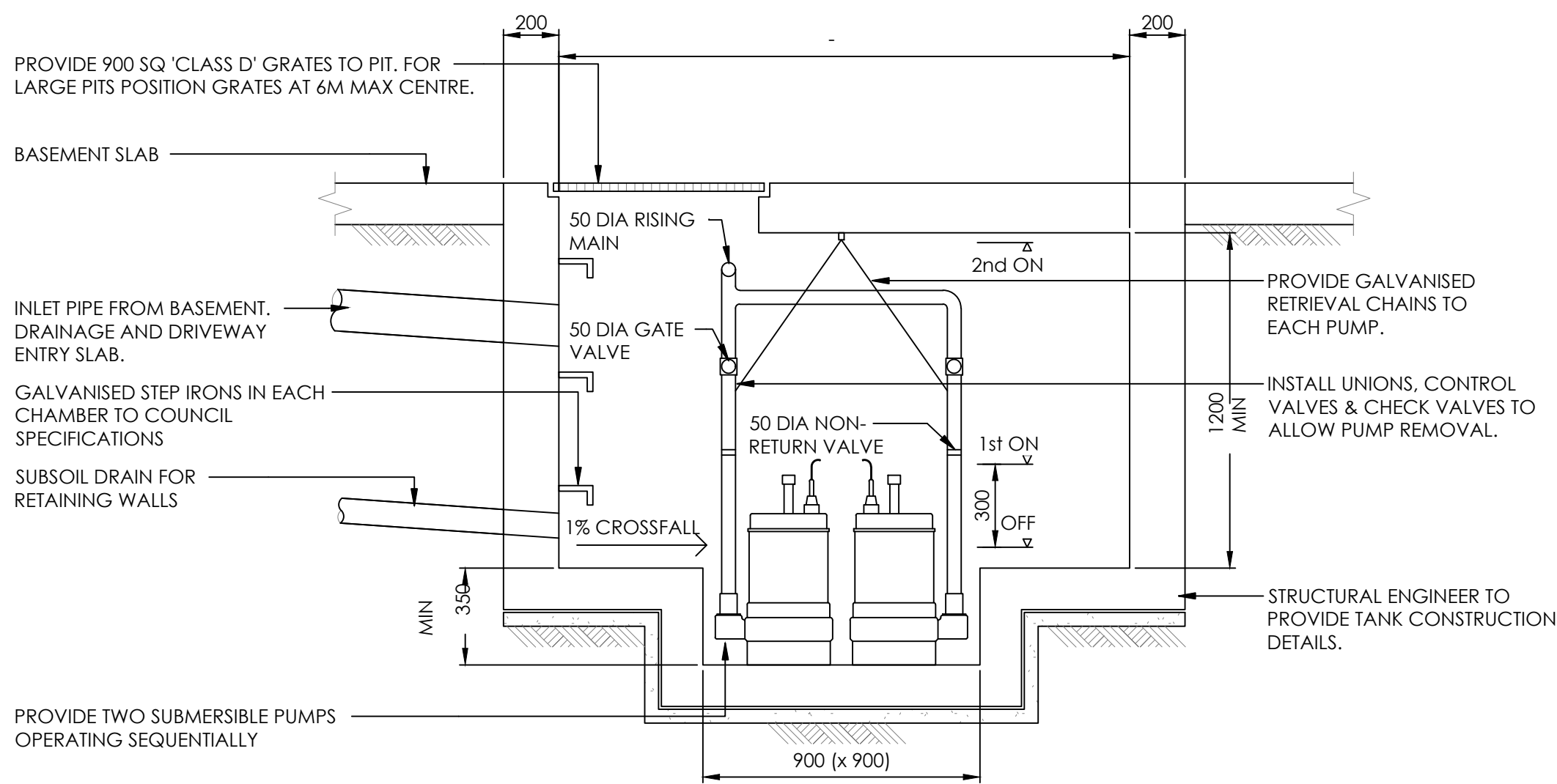
- NOTES
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 3. ALTERNATIVE PIT CONSTRUCTION MAY BE USED SUBJECT TO THE ENGINEERS APPROVAL.
 4. CONCRETE STRENGTH F_c = 32 MPa



TYPICAL RAINWATER TANK DETAIL



SECTION A-A
UNDERGROUND RAINWATER TANK DETAIL
4 x 3,000 LITRE CAPACITY UNDERGROUND RAINWATER TANKS.



- NOTE:**
THE PUMP OUT SYSTEM SHALL BE DESIGNED TO BE OPERATED IN THE FOLLOWING MANNER:
- THE PUMPS SHALL BE PROGRAMMED TO WORK ALTERNATELY SO AS TO ALLOW BOTH PUMPS TO HAVE AN EQUAL OPERATION LOAD AND PUMP LIFE.
 - A LOW LEVEL FLOAT SHALL BE PROVIDED TO ENSURE THAT THE MINIMUM REQUIRED WATER LEVEL IS MAINTAINED WITHIN THE SUMP AREA OF THE BELOW GROUND TANK. IN THIS REGARD THIS FLOAT WILL FUNCTION AS AN OFF SWITCH FOR THE PUMPS.
 - A SECOND FLOAT SHALL BE PROVIDED AT A HIGHER LEVEL, APPROXIMATELY 300mm ABOVE THE MINIMUM WATER LEVEL, WHEREBY ONE OF THE PUMPS WILL OPERATE AND DRAIN THE TANK TO THE LEVEL OF THE LOW LEVEL FLOAT.
 - A THIRD FLOAT SHALL BE PROVIDED AT A HIGH LEVEL, WHICH IS APPROXIMATELY THE ROOF LEVEL OF THE BELOW GROUND TANK. THIS FLOAT SHOULD START THE OTHER PUMP THAT IS NOT OPERATING AND ACTIVATE THE ALARM
 - AN ALARM SYSTEM SHALL BE PROVIDED WITH A FLASHING STROBE LIGHT AND A PUMP FAILURE WARNING SIGN WHICH ARE TO BE LOCATED AT THE DRIVEWAY ENTRANCE TO THE BASEMENT LEVEL. THE ALARM SYSTEM SHALL BE PROVIDED WITH A BATTERY BACK-UP IN CASE OF POWER FAILURE.
 - CONTRACTOR IS TO CONFIRM PUMP ELECTRICAL LOAD AND CONNECTION WITH ELECTRICAL CONTRACTOR AT THE BEGINNING OF THE PROJECT.

PUMPOUT PIT TYPICAL DETAIL

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DISCIPLINE
CIVIL DESIGN
DRAWING TITLE
STORMWATER TYPICAL
DETAILS SHEET 1

PROJECT
IRT TOWRADGI
ADDRESS
17A MURRANAR ROAD
TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
DRG SIZE A1
SCALE NTS
PROJECT AH
MGR
WWW.JN.COM.AU

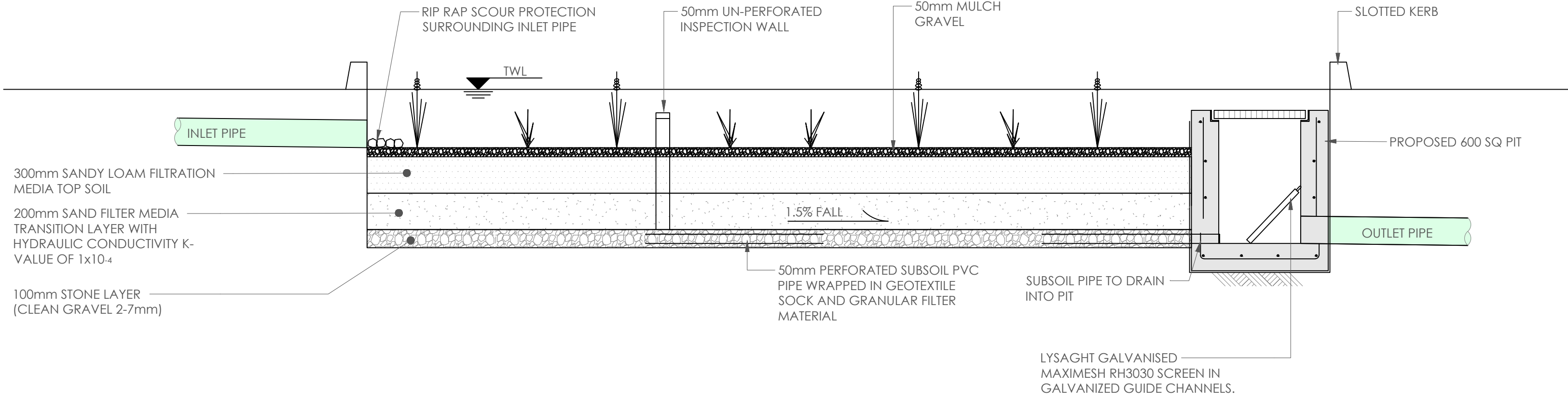
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C050 1

NOTE:
FILTRATION MEDIA:
300mm SANDY LOAM WELL GRADED WITH:
· HYDRAULIC CONDUCTIVITY (ASTM F1815-06) BETWEEN 100-300mm/hr.
· pH BETWEEN 5.5 AND 7.5
· ORGANIC CONTENT LESS THAN 5 PERCENT.
· ELECTRICAL CONDUCTIVITY LESS THAN 1.2 dS/m
· ORTHOPHOSPHATE CONTENT LESS THAN 55mg/kg
SUBJECT TO ADEQUATE HYDRAULIC CONDUCTIVITY THE FOLLOWING PARTICLE SIZE DISTRIBUTION IS A GUIDE:

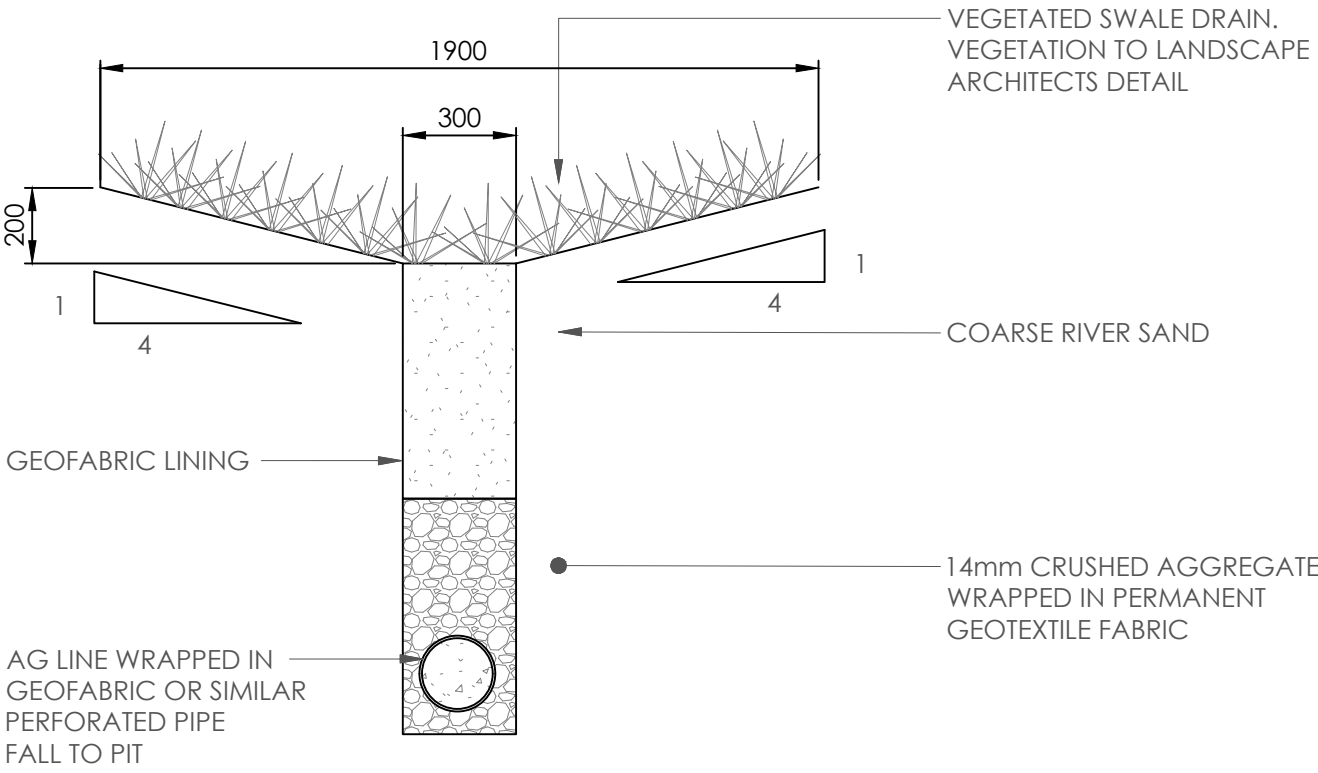
CLAY AND SILT	< 3%	(<0.05mm)
VERY FINE SAND	5 - 30%	(0.05 - 0.15mm)
FINE SAND	10 - 30%	(0.15 - 0.25mm)
MED-COARSE SAND	40 - 60%	(0.25 - 1.0mm)
COARSE SAND	7 - 10%	(1.0 - 2.0mm)
FINE GRAVEL	< 3%	(>2.0mm)

TRANSITION LAYER:
200mm CLEAN, WELL GRADED SAND CONTAINING LITTLE OR NO CLAY AND SILT (<3%) WITH HYDRAULIC CONDUCTIVITY OF 360mm/hr (Ka Value of 1x10⁻⁴)

DRAINAGE LAYER:
100mm OF 2-7mm WASHED SCREENINGS OF CLEAN GRAVEL WITH 5% ADDED CARBON (e.g: SMALL WOODCHIPS)



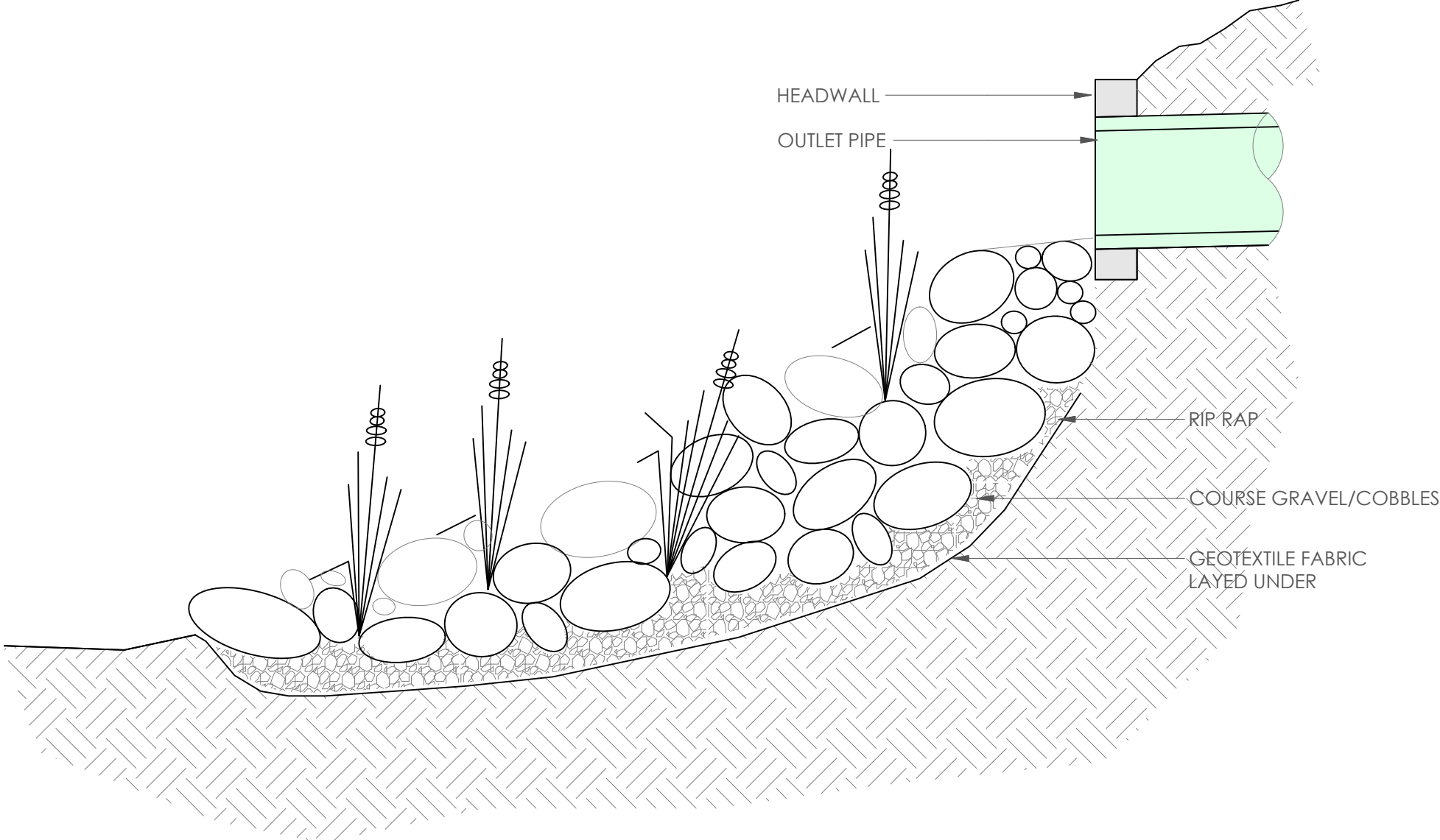
TYPICAL RAIN GARDEN DETAIL



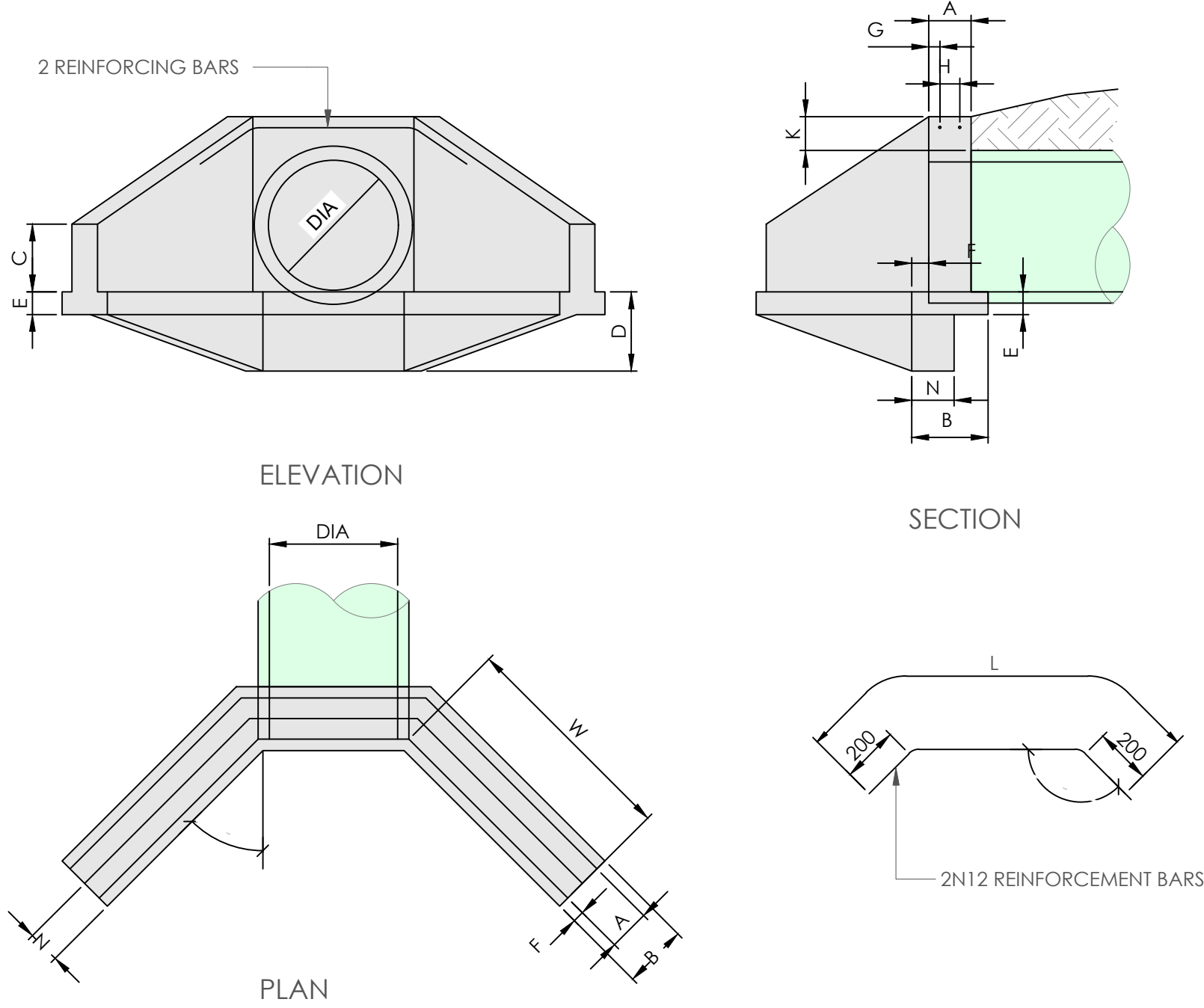
TYPICAL GRASSED SWALE DETAIL

Q_{MAX} T1900B300X200 @ 0.5% = 125 L/S

Q_{MAX} T2200B600X200 @ 0.5% = 164 L/S



STORMWATER DISPERSAL
STRUCTURE



TYPICAL HEADWALL DETAIL

PIPE DIA	300	375	450	525	600	675	750	825	900
A	150	150	150	150	175	175	200	200	225
B	300	300	300	300	450	450	450	450	450
C	300	300	300	300	350	350	350	350	350
D	375	375	375	375	530	530	530	530	530
E	150	150	150	150	175	175	200	200	225
F	75	75	75	75	100	100	100	100	100
G	40	40	40	40	50	50	50	50	50
H	70	70	70	70	75	75	100	100	125
K	200	200	200	200	300	300	300	300	300
N	150	150	150	150	150	150	150	150	150
W	700	700	850	1000	1100	1300	1450	1600	1750
L	800	850	950	1000	1100	1200	1250	1350	1400

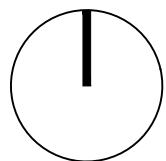
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AMDT	DATE	DESCRIPTION	BY
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STORMWATER SITE PLAN
SCALE 1:500



NOT TO BE USED FOR CONSTRUCTION			
AMDT	DATE	DESCRIPTION	BY
2	20.09.21	DA REISSUE	ER
1	10.09.21	DA ISSUE	LAP



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DISCIPLINE
CIVIL DESIGN
DRAWING TITLE
STORMWATER SITE PLAN

PROJECT
IRT TOWRADGI
ADDRESS
17A MURRUMBEI ROAD
TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
DRG SIZE A1
SCALE 1:500
PROJECT AH
MGR
WWW.JN.COM.AU
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C100 2

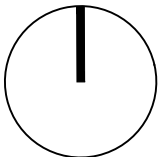


STORMWATER PLAN - PART 1
SCALE 1:200

NOTES:
- AS PART OF WSUD MEASURES AVERAGE 2.5KL RAINWATER TANK TO BE PROVIDED PER UNIT, EITHER AT INDIVIDUAL UNITS OR CUMULATIVE COMMON TANK FOR IRRIGATION AND FLUSHING



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DRAWING TITLE
STORMWATER PLAN
PART 1

PROJECT
IRT TOWRADGI

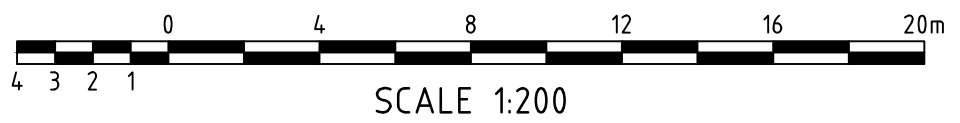
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TOWRADGI, NSW

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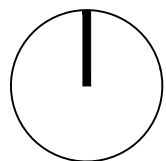


NOTES:
- AS PART OF WSUD MEASURES AVERAGE 2.5KL RAINWATER TANK TO BE PROVIDED PER UNIT, EITHER AT INDIVIDUAL UNITS OR CUMULATIVE COMMON TANK FOR IRRIGATION AND FLUSHING

STORMWATER PLAN - PART 2
SCALE 1:200



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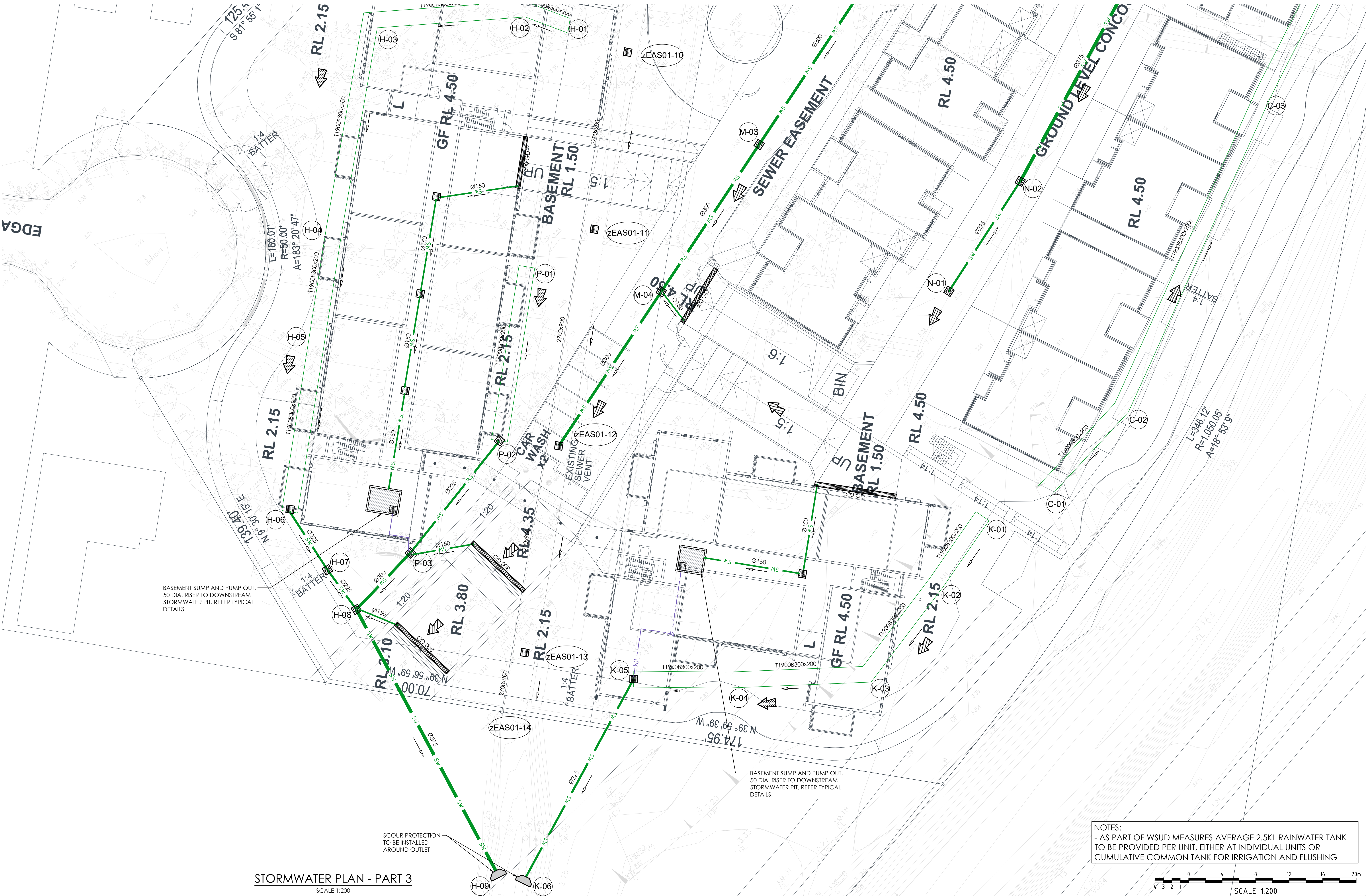
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CIVIL DESIGN

DRAWING TITLE
STORMWATER PLAN
PART 2

PROJECT
IRT TOWRADGI

ADDRESS
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TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
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DATE SEP 2021
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WWW.JN.COM.AU
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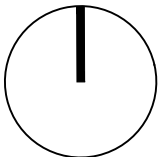


STORMWATER PLAN - PART 3
SCALE 1:200

NOTES:
- AS PART OF WSUD MEASURES AVERAGE 2.5KL RAINWATER TANK TO BE PROVIDED PER UNIT, EITHER AT INDIVIDUAL UNITS OR CUMULATIVE COMMON TANK FOR IRRIGATION AND FLUSHING



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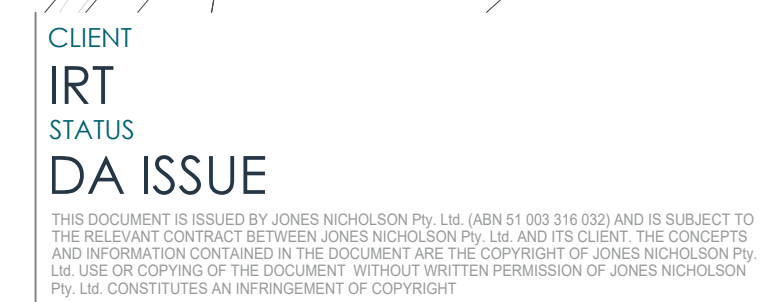
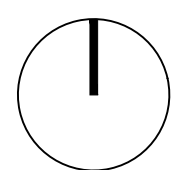
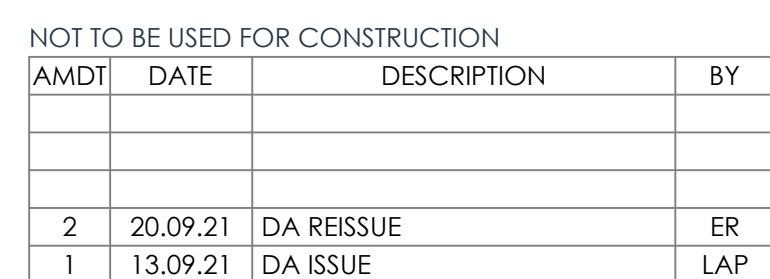


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DRAWING TITLE
STORMWATER PLAN
PART 3

PROJECT
IRT TOWRADGI
ADDRESS
17A MURRANAR ROAD
TOWRADGI, NSW

PROJECT DETAILS
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DATE SEP 2021
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19010057
C103 1



PROJECT
IRT TOWRADGI

ADDRESS
17A MURRANAR ROAD
TOWRADGI, NSW



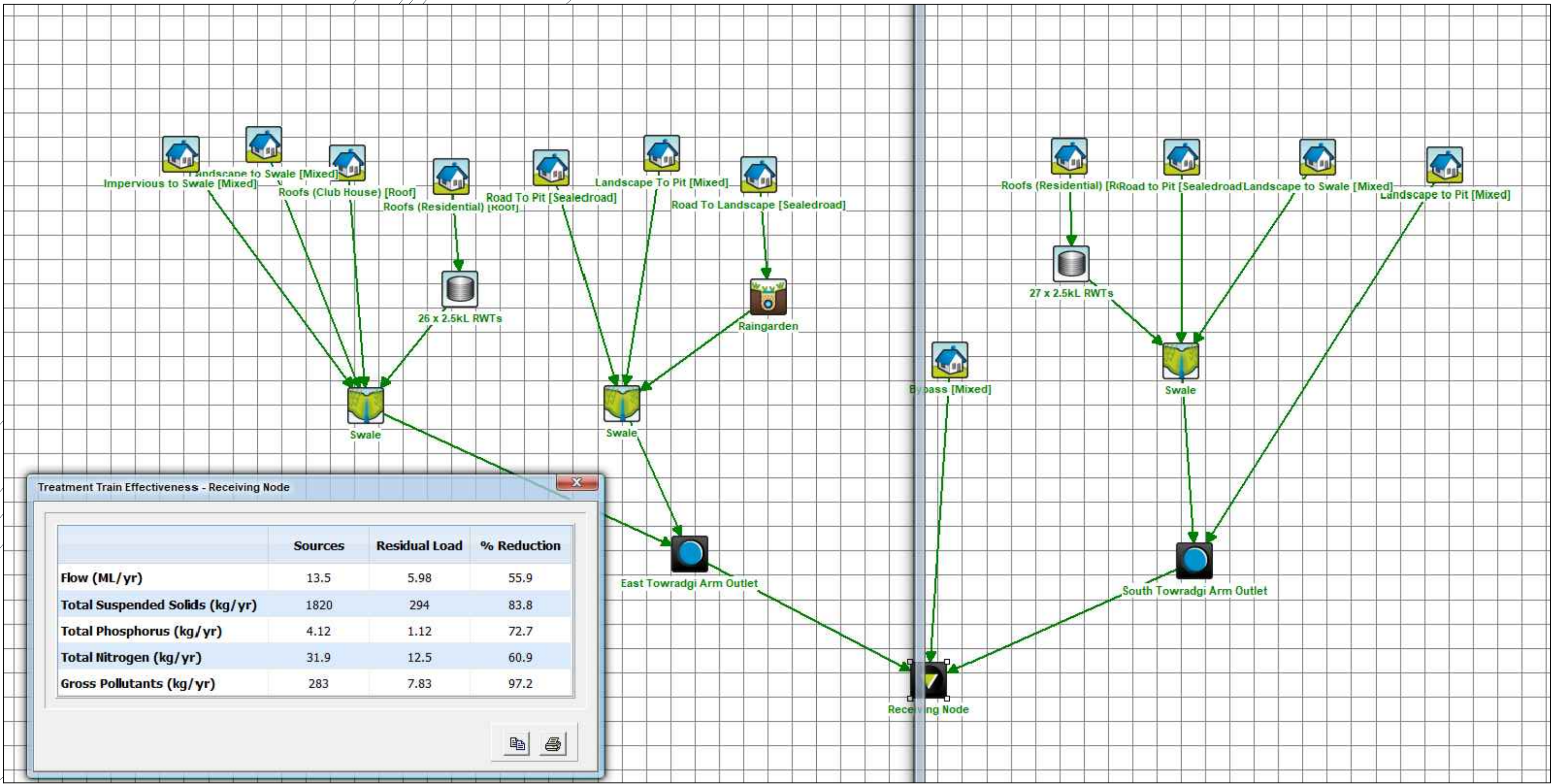
LEGEND		
REGION	HATCH	AREA
ROOF		9,695m ²
ROAD TO PIT		3,957m ²
ROAD TO LANDSCAPE		780m ²
LANDSCAPE TO PIT		5,119m ²
LANDSCAPE TO SWALE		6,698m ²
IMPERVIOUS TO SWALE		432m ²
BYPASS		672m ²
TOTAL SITE AREA = 27,353m ²		

NOTE:

- RAINWATER TANKS TO PROVIDE AVERAGE 2.5KL PER UNIT EITHER AS INDIVIDUALS TANKS OR CUMULATIVE COMMUNAL TANK TO SUIT WSUD REQUIREMENTS

Table 2: WSUD Stormwater Quality Performance Targets		
Performance target reduction loads	Development Type	
	Residential Subdivisions greater than 20 lots	Multi-dwelling housing development
	Industrial Subdivision	Residential Flat Buildings
	Business Parks	Mixed Use Developments
Gross Pollutants	90%	90%
Total Suspended Solids	85%	80%
Total Phosphorus	60%	55%
Total Nitrogen	45%	40%

* Reduction in loads are relative to the pollution generated from the development without treatment



Treatment Train Effectiveness - Receiving Node			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	13.5	5.98	55.9
Total Suspended Solids (kg/yr)	1820	294	83.8
Total Phosphorus (kg/yr)	4.12	1.12	72.7
Total Nitrogen (kg/yr)	31.9	12.5	60.9
Gross Pollutants (kg/yr)	283	7.83	97.2

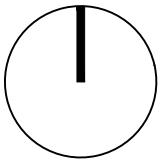
STORMWATER SITE WSUD PLAN

SCALE 1:500



SCALE 1:500

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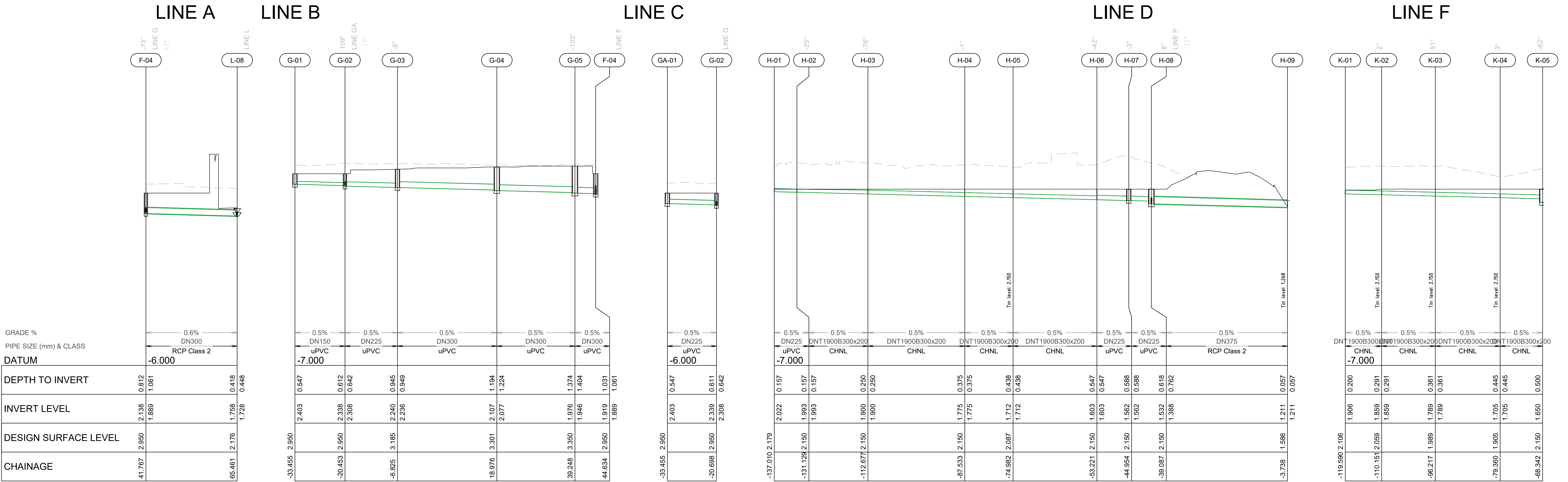
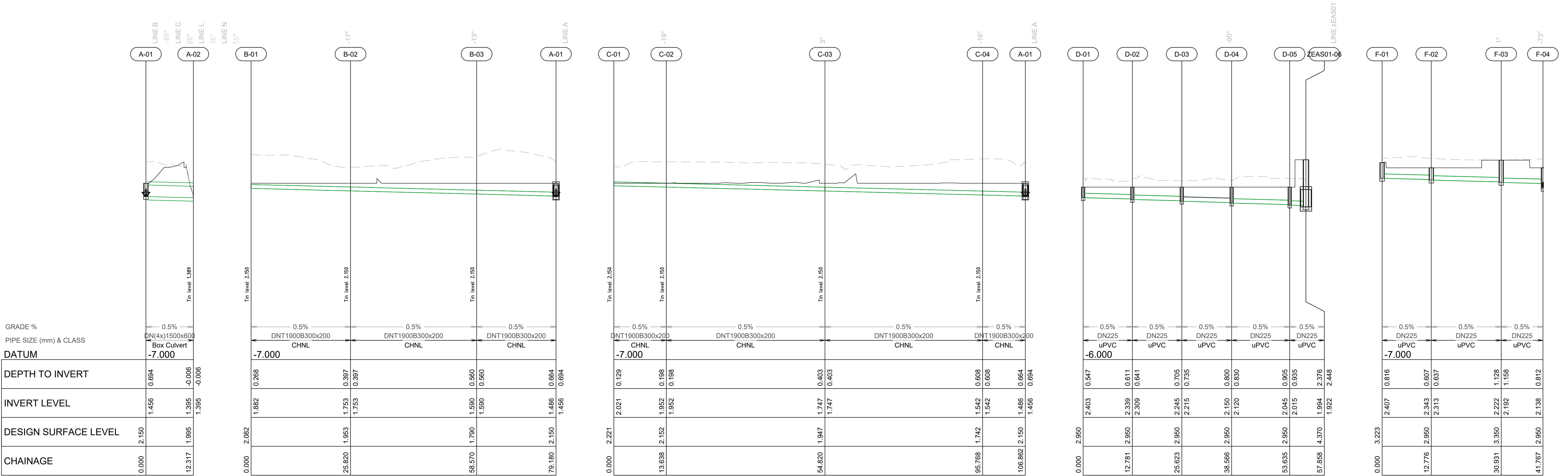
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WSUD PLAN

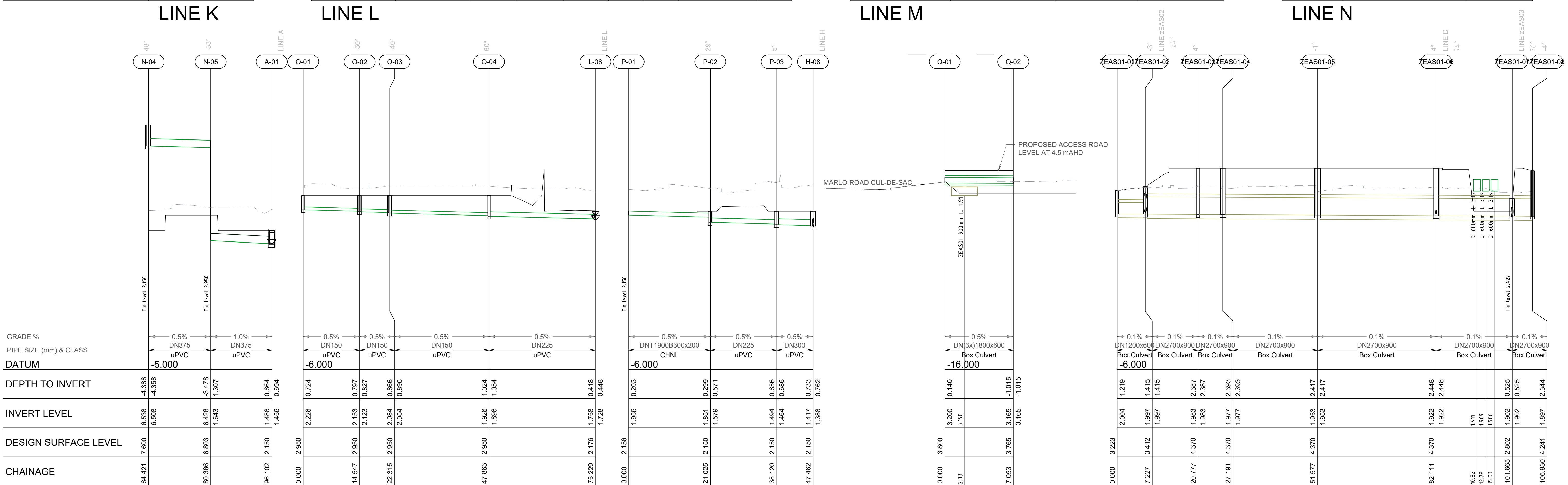
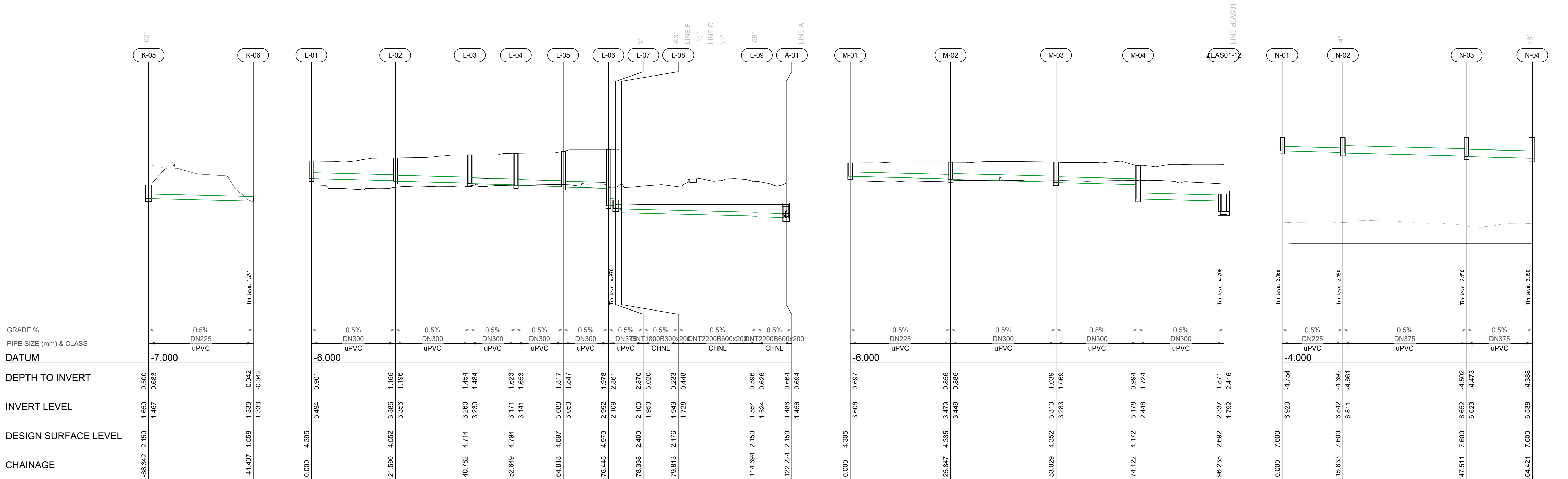
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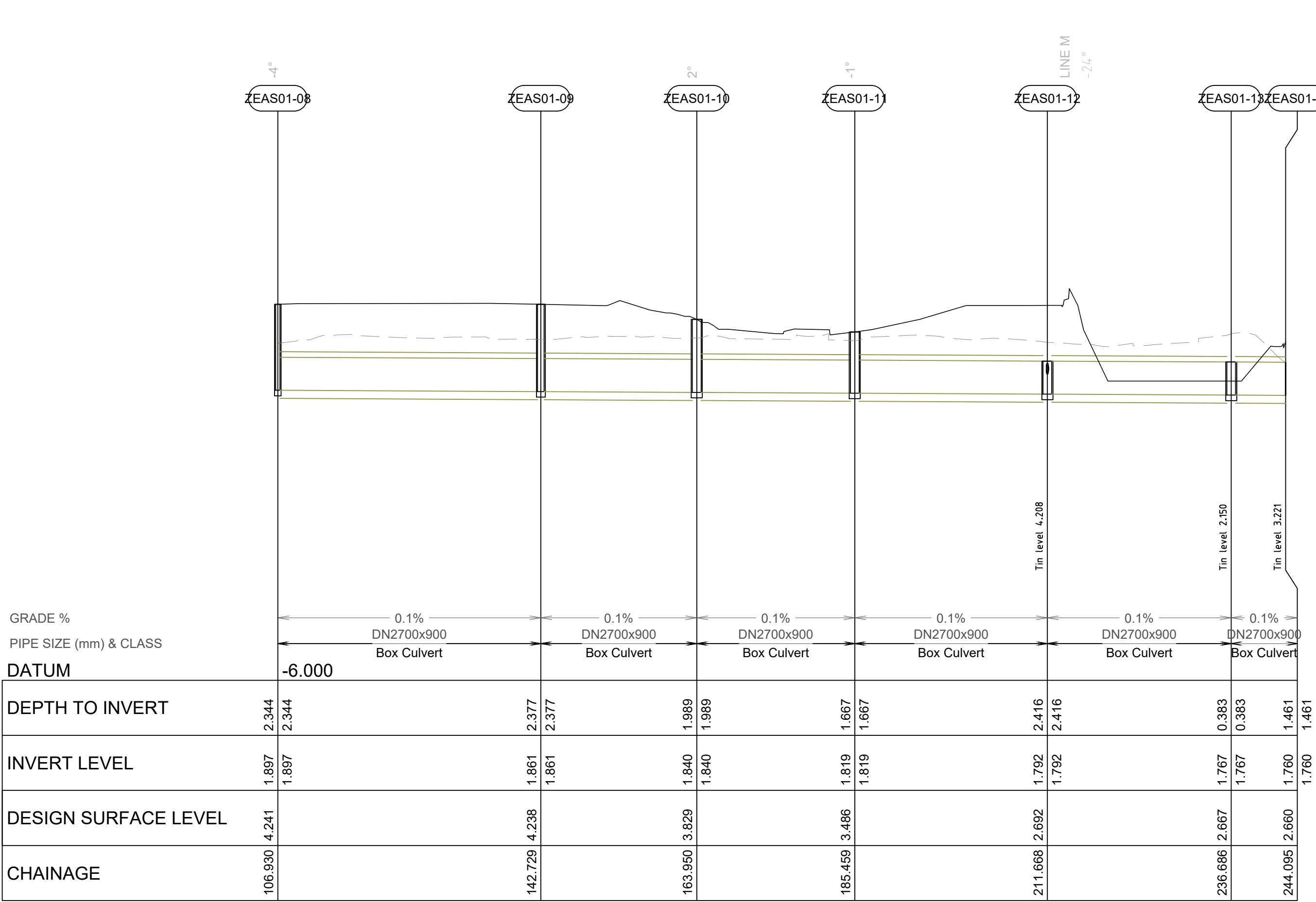
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17A MURRANAR ROAD
TOWRADGI, NSW

PROJECT DETAILS
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DRAWN SAB
DATE SEP 2021
DRG SIZE A1
SCALE 1:500
PROJECT AH
MGR
WWW.JN.COM.AU

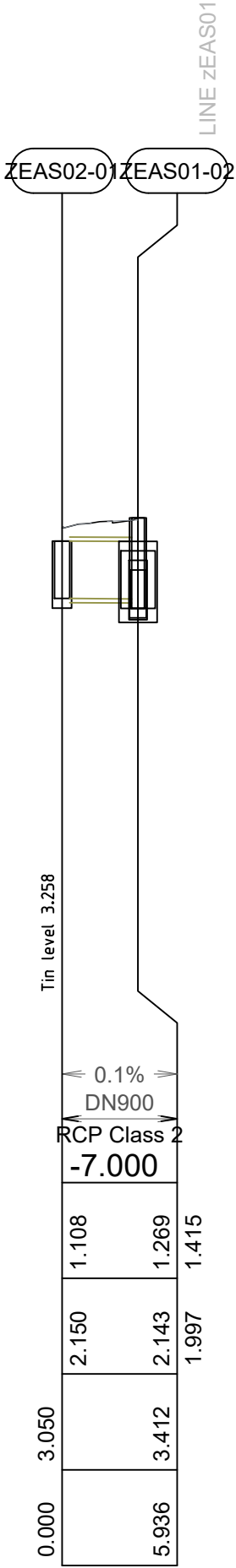
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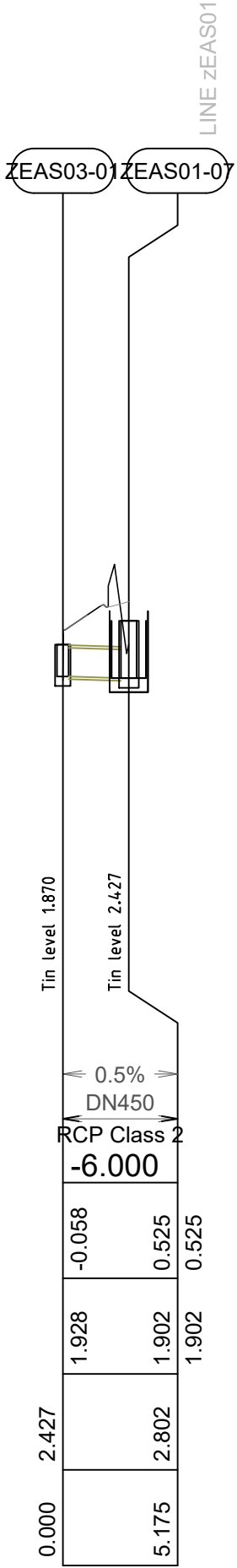




LINE zEAS01



LINE zEAS02



LINE zEAS03

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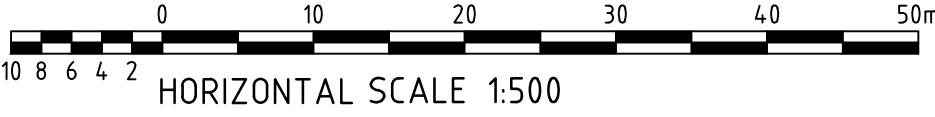
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STORMWATER LONG
SECTIONS SHEET 3

PROJECT
IRT TOWRADGI

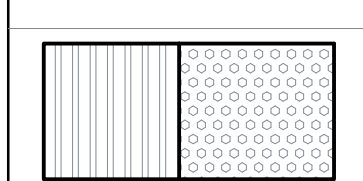
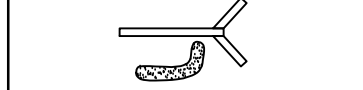
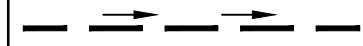
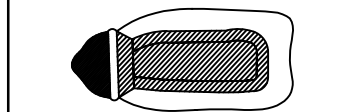
ADDRESS
17A MURRANAR ROAD
TOWRADGI, NSW



PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
DRG SIZE A1
SCALE AS SHOWN
PROJECT AH
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19010057
C602 1

IRT TOWRADGI

17A MURRANAR ROAD, TOWRADGI

ENVIRONMENTAL SITE MANAGEMENT LEGEND	
SYMBOL	DESCRIPTION
	PROPOSED BUILDING LINE
	PROPOSED BUILDING ROOF OUTLINE
	PROPRIETARY SILT FENCE
	PROVIDE TEMPORARY CHAIN WIRE FENCING (HOARDING) ALONG THE SITE BOUNDARY
	TEMPORARY STABILISED CONSTRUCTION ENTRY/EXIT. (SHAKER PAD)
	TEMPORARY FILTER TUBE WITH SAFETY BARRICADE TO KERB INLET PITS.
	TEMPORARY MASS CONCRETE FOOTPATH CROSSING.
	DIRECTION OF FLOW
	DIVERSION BANK
	SURFACE INLET DRAINAGE PIT WITH SURROUNDING FILTER FABRIC INLET SEDIMENT TRAP OR FILTER TUBES (SANDBAGS)
	TEMPORARY GEOTEXTILE WRAPPED HAY BALES/SAND BAGS
	SANDBAG SEDIMENT INLET TRAP
	SANDBAG KERB SEDIMENT TRAP
	SEDIMENTATION BASIN

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. DELIVERY VEHICLES MUST NOT STAND WITHIN THE PUBLIC ROADWAY FOR MORE THAN 20 MINUTES AT A TIME.
19. 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)
20. 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.
21. 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.
22. DURING TRENCH EXCAVATION ALL SPOIL SHALL BE MOUNDED ON THE UPHILL SIDE OF TRENCHES AND PLACEMENT IS TO COMPLY WITH THE SUPERINTENDENTS REQUIREMENT.
23. DIVERSION BANKS SHOULD BE CONSTRUCTED BY MOUNDING STRIPPED TOPSOIL (MIN HEIGHT 600mm) WHERE DIRECTED. MATERIAL TO BE RESPREAD ON FOOTWAYS AFTER FINAL TRIMMING.
24. 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.
25. 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.'
26. PEDESTRIAN CONTROL MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION. IN ACCORDANCE WITH AS 1742 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.'

No.	DRAWING TITLE
ESM1	EROSION AND SEDIMENT NOTES AND LEGEND
ESM2	EROSION AND SEDIMENT CONTROL DETAILS
ESM3	EROSION AND SEDIMENT CONTROL PLAN PART 1
ESM4	EROSION AND SEDIMENT CONTROL PLAN PART 2
ESM5	EROSION AND SEDIMENT CONTROL PLAN PART 3

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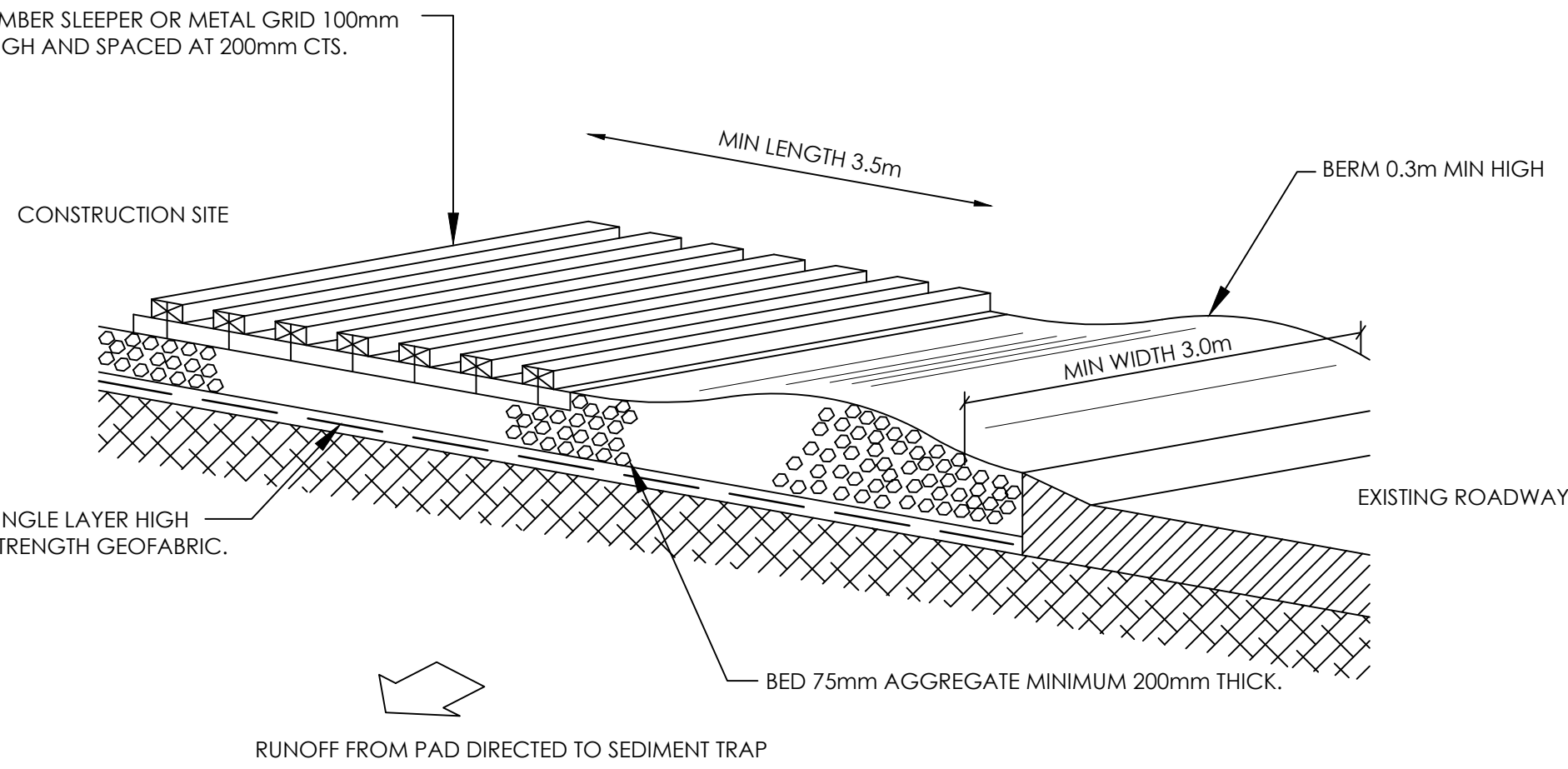
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EROSION AND SEDIMENT
NOTES AND LEGENDS

PROJECT
IRT TOWRADGI

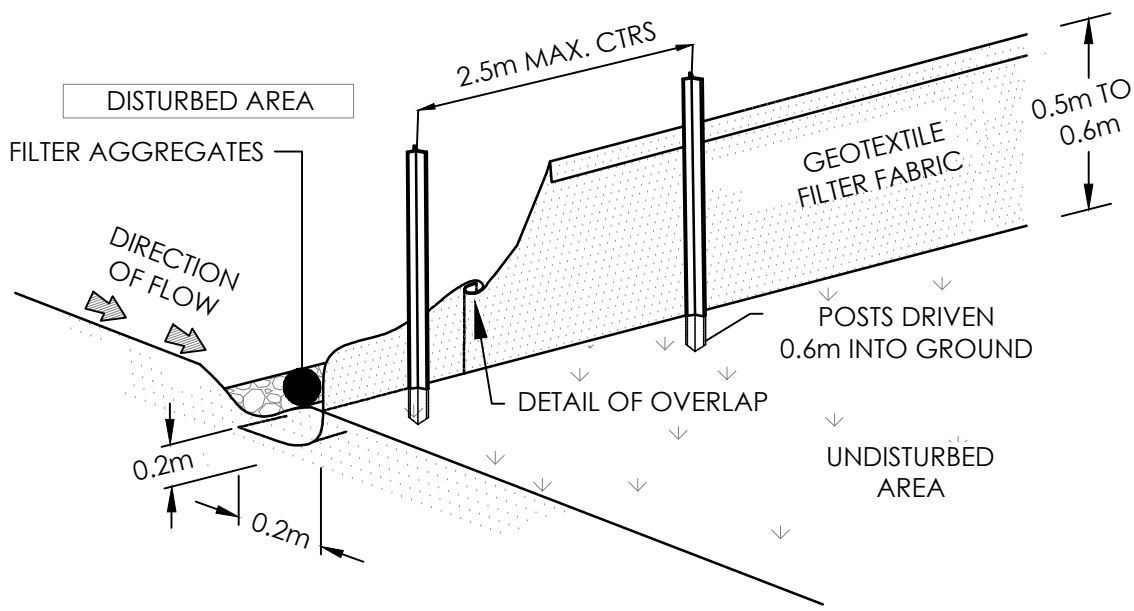
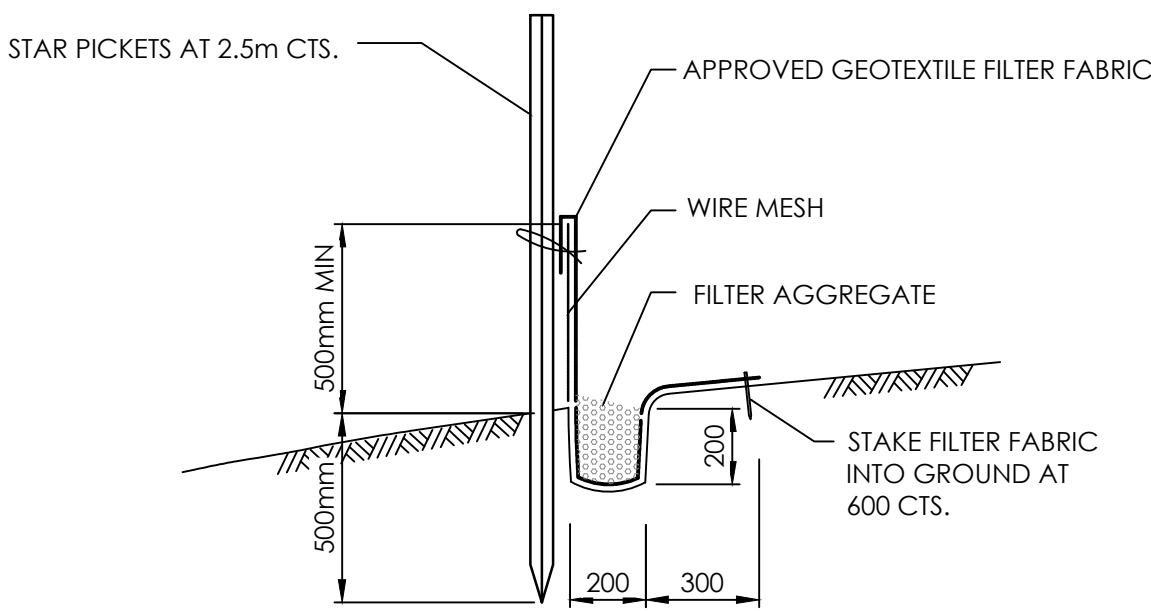
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17A MURRANAR ROAD
TOWRADGI, NSW

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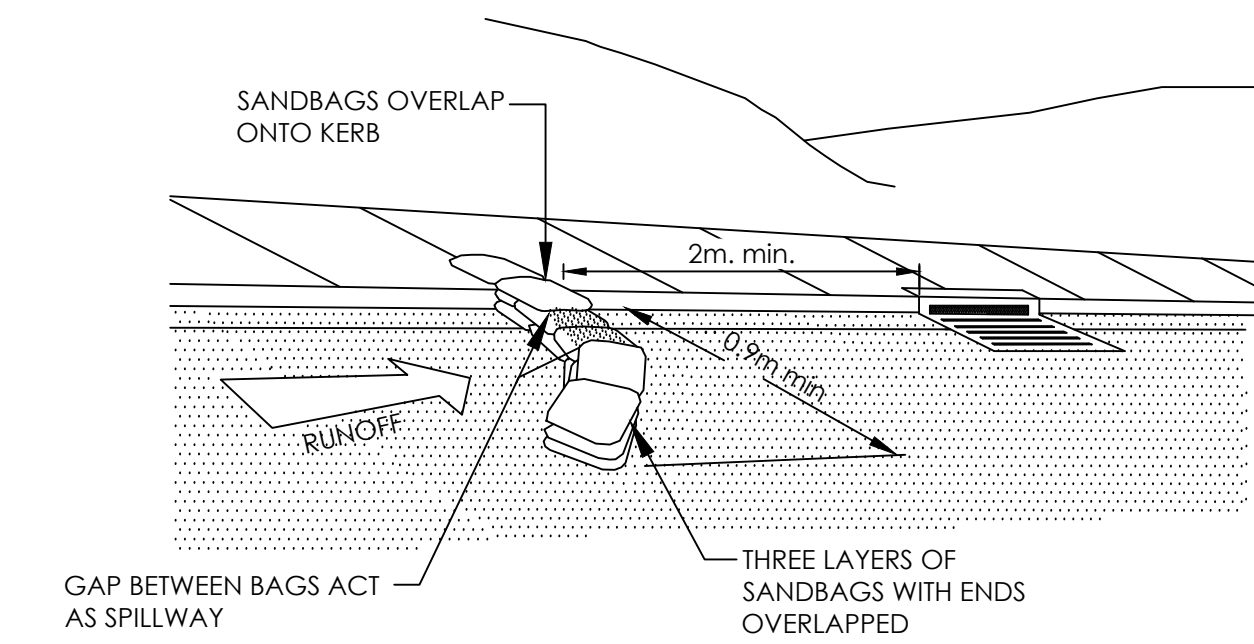
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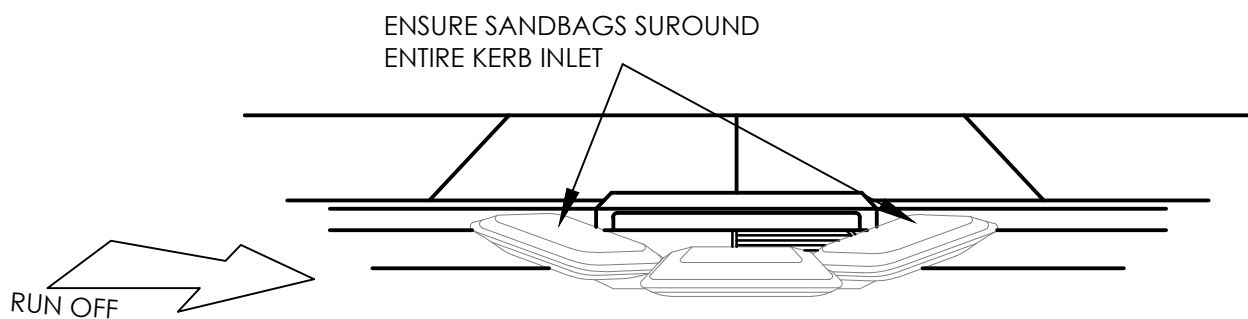
SEDIMENT FENCE
N.T.S.

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 150mm OVERLAP



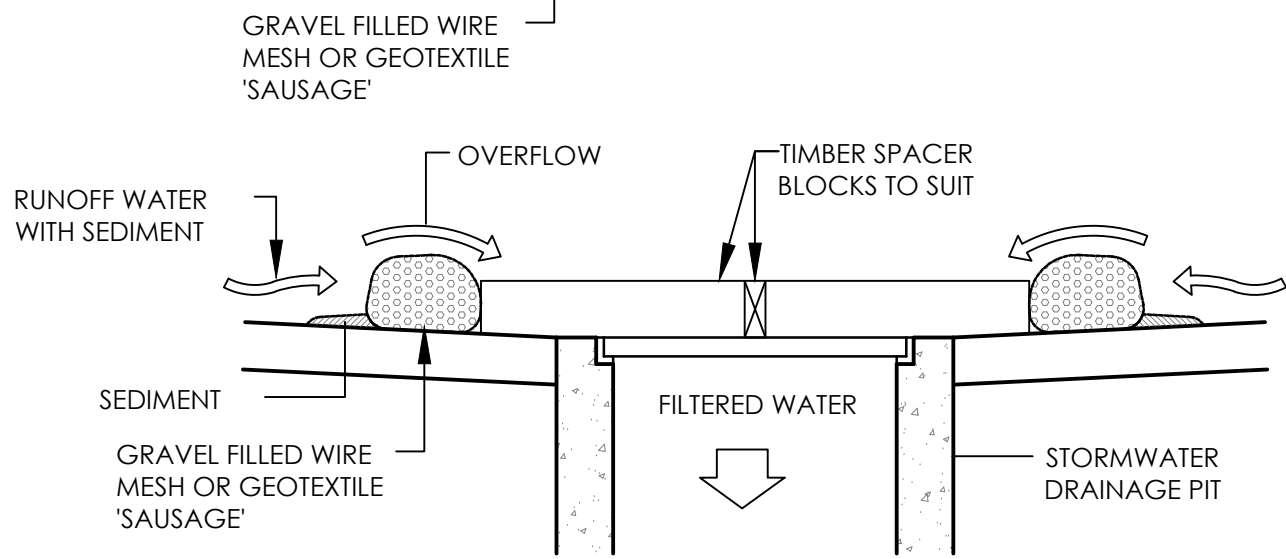
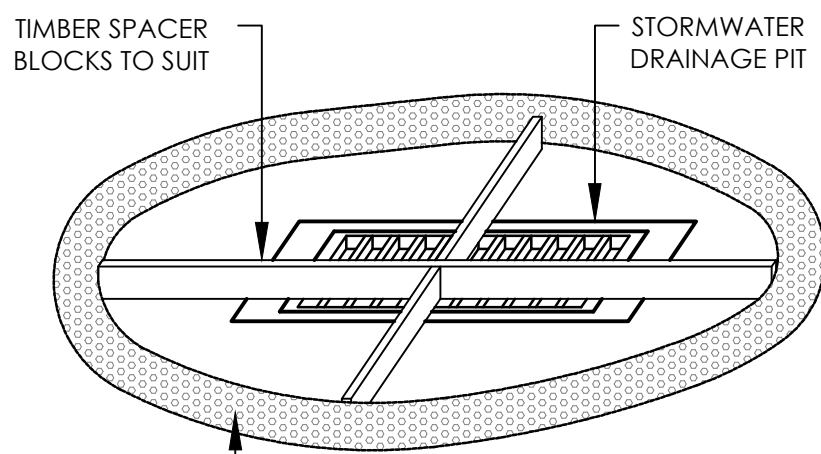
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N.T.S.



SANDBAG SEDIMENT INLET TRAP
N.T.S.

NOTES

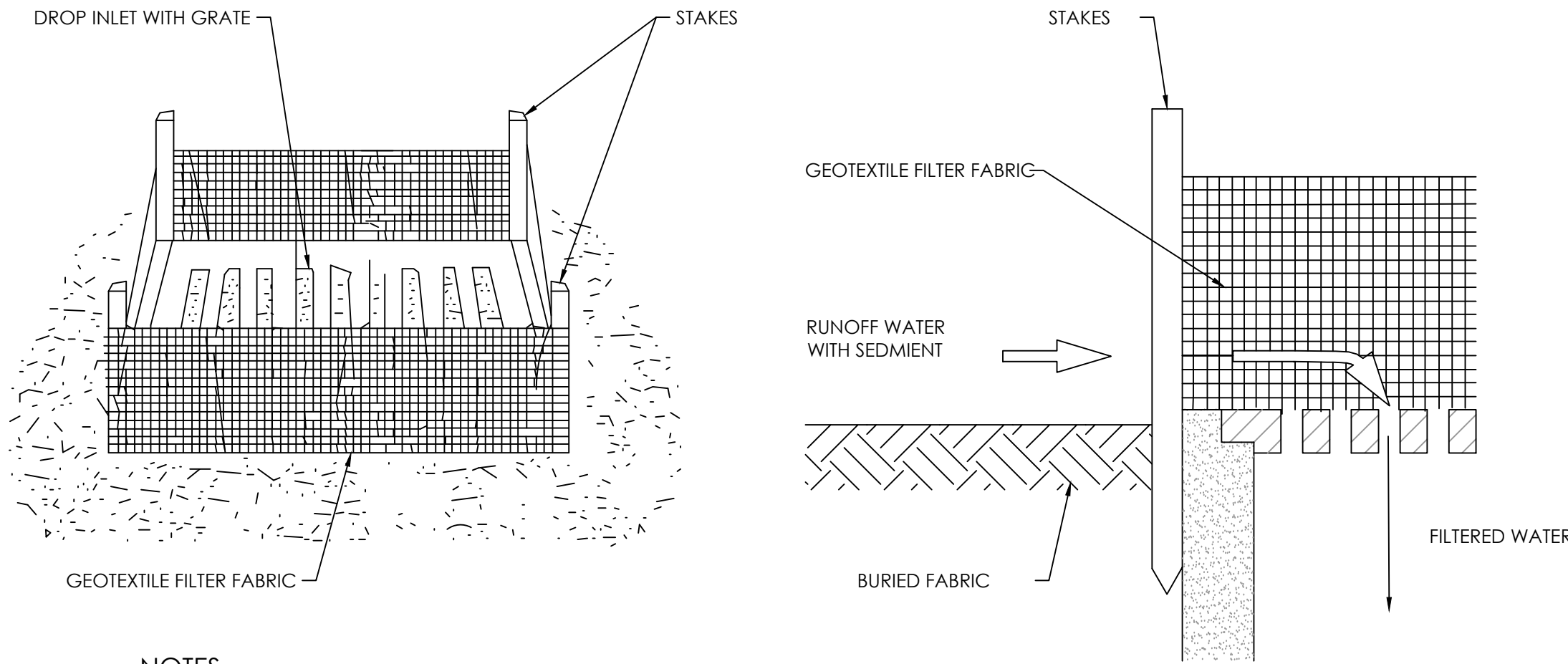
1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT.
2. FILL THE SLEEVE WITH 25mm TO 50MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS SECTION ABOUT 150mm HIGH X 400mm WIDE.
4. PLACE THE FILTER AT THE OPNEING OF THE KERB INLET LEAVING A 100MM GAP AT THE TOP TO ACT AS AN EMERGENCY SPILL WAY.
5. MAINTAIN A CLEAR DISTANCE AWAY FROM THE PIT WITH SPACER BLOCKS.
6. FORM A SEAL WITH THE KERBING AND PREVENT SEDIMENT BYPASSING THE FILTER.
7. FIT TO ALL KERB INLETS AS SHOWN.



SAUSAGE BARRIER
N.T.S.

NOTES

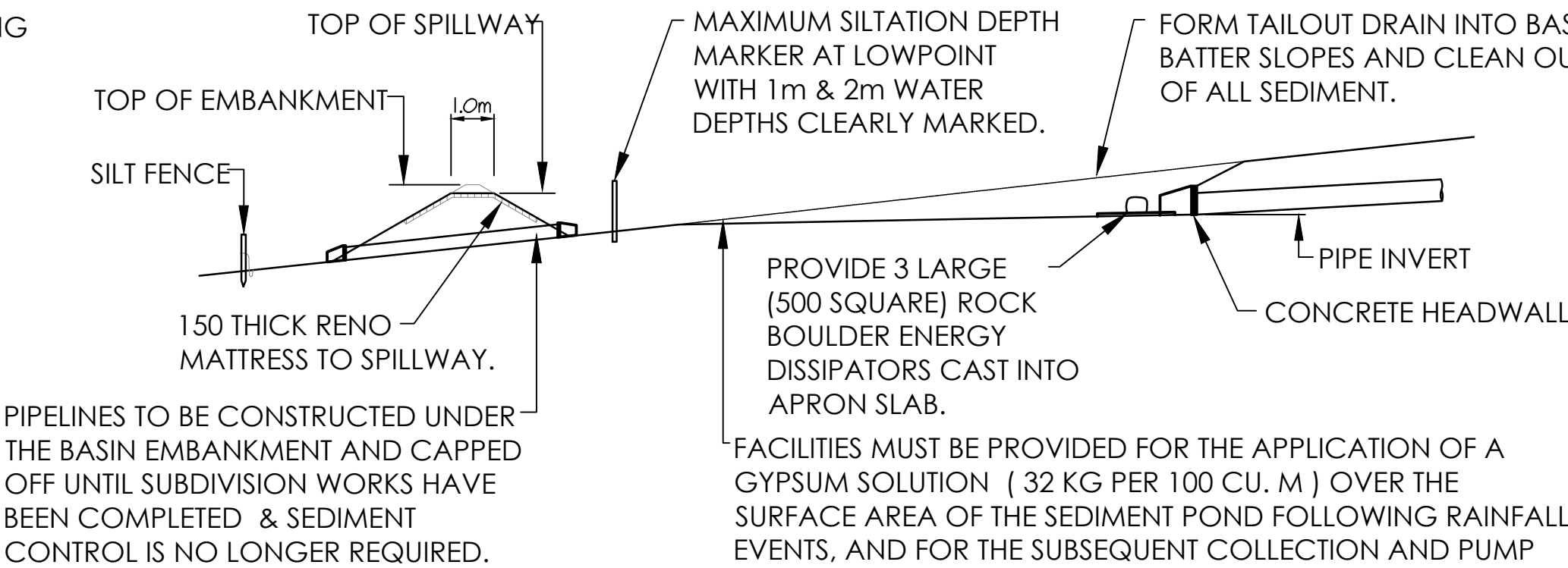
1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH ON THE INLET PIT.
2. FILL THE SLEEVE WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. MAINTAIN A CLEAR DISTANCE AWAY FROM THE PIT WITH SPACER BLOCKS.



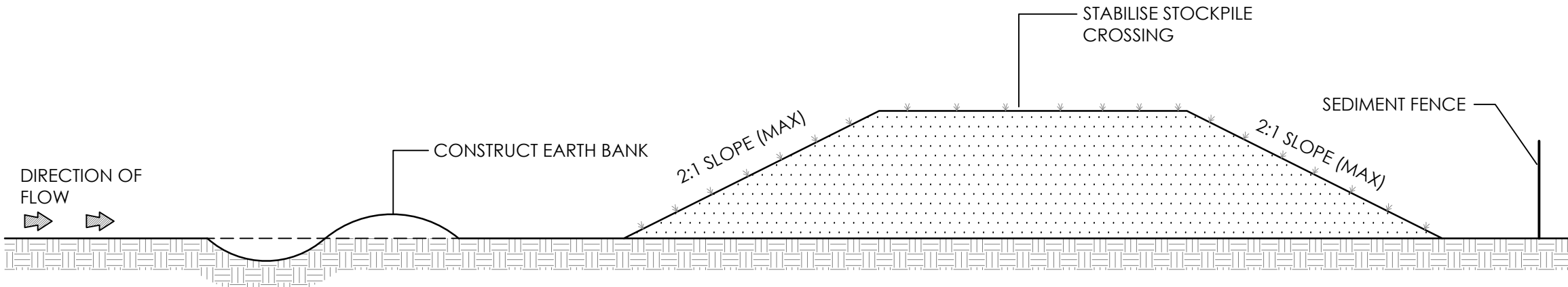
NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.0m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. 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 FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

GEOTEXTILE INLET FILTER
N.T.S.



SEDIMENTATION BASIN DETAIL



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.

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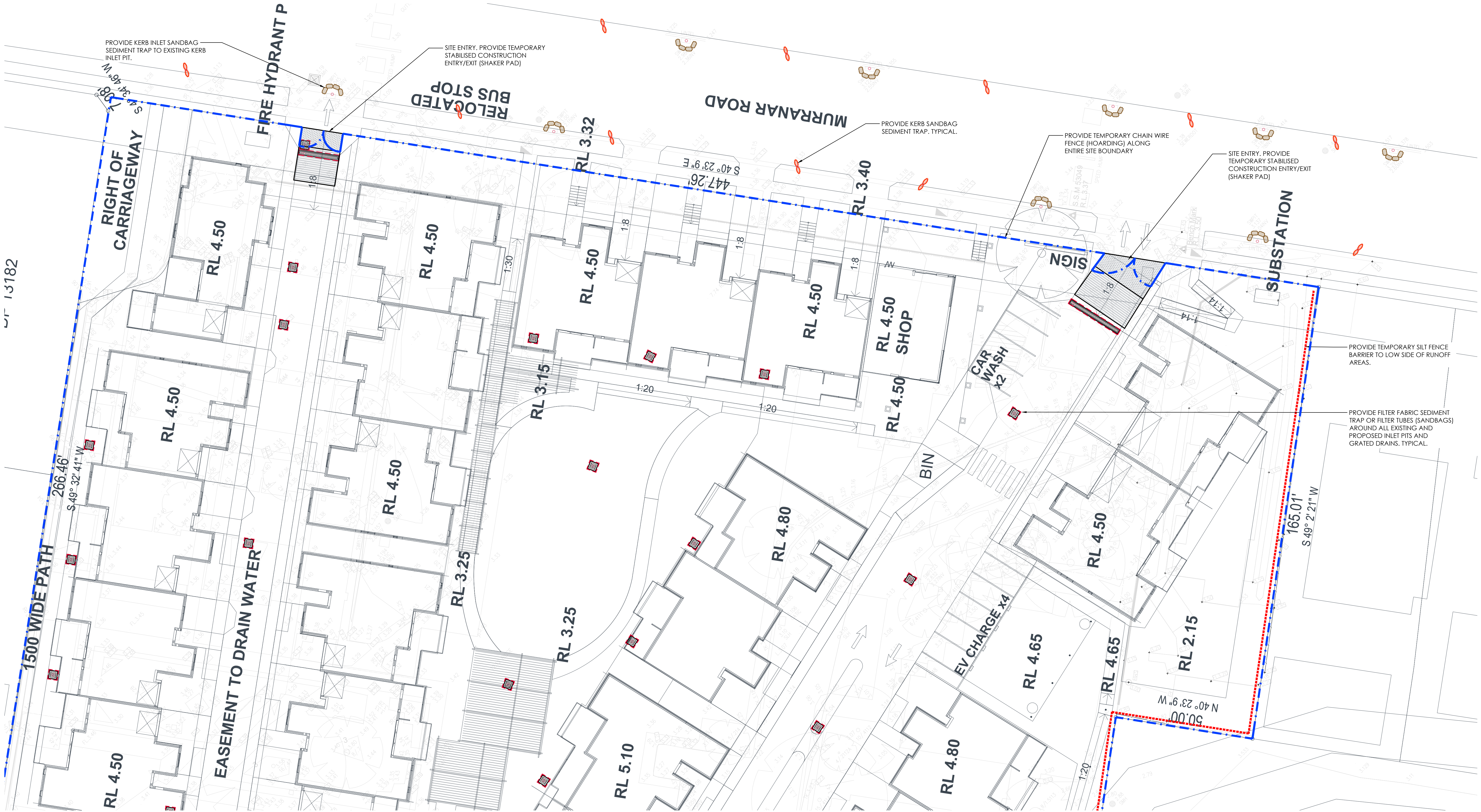
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EROSION AND SEDIMENT
CONTROL DETAILS

PROJECT
IRT TOWRADGI

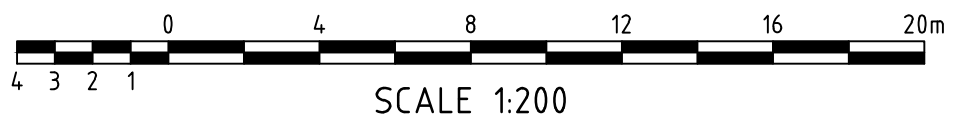
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TOWRADGI, NSW

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DATE SEP 2021
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SCALE AS SHOWN
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MGR
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ESM2 1

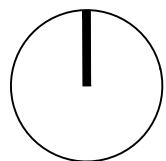


EROSION AND SEDIMENT CONTROL PLAN - PART 1
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EROSION AND SEDIMENT CONTROL PLAN PART 1

PROJECT
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TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
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SCALE 1:200
PROJECT AH
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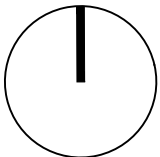


EROSION AND SEDIMENT CONTROL PLAN - PART 2
SCALE 1:200



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EROSION AND SEDIMENT
CONTROL PLAN PART 2

PROJECT
IRT TOWRADGI

ADDRESS
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TOWRADGI, NSW

PROJECT DETAILS
DESIGN LAM
DRAWN LAP
DATE SEP 2021
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SCALE 1:200
PROJECT AH
MGR
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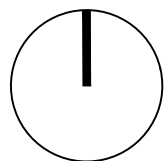
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EROSION AND SEDIMENT CONTROL PLAN - PART 3

SCALE 1:200

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