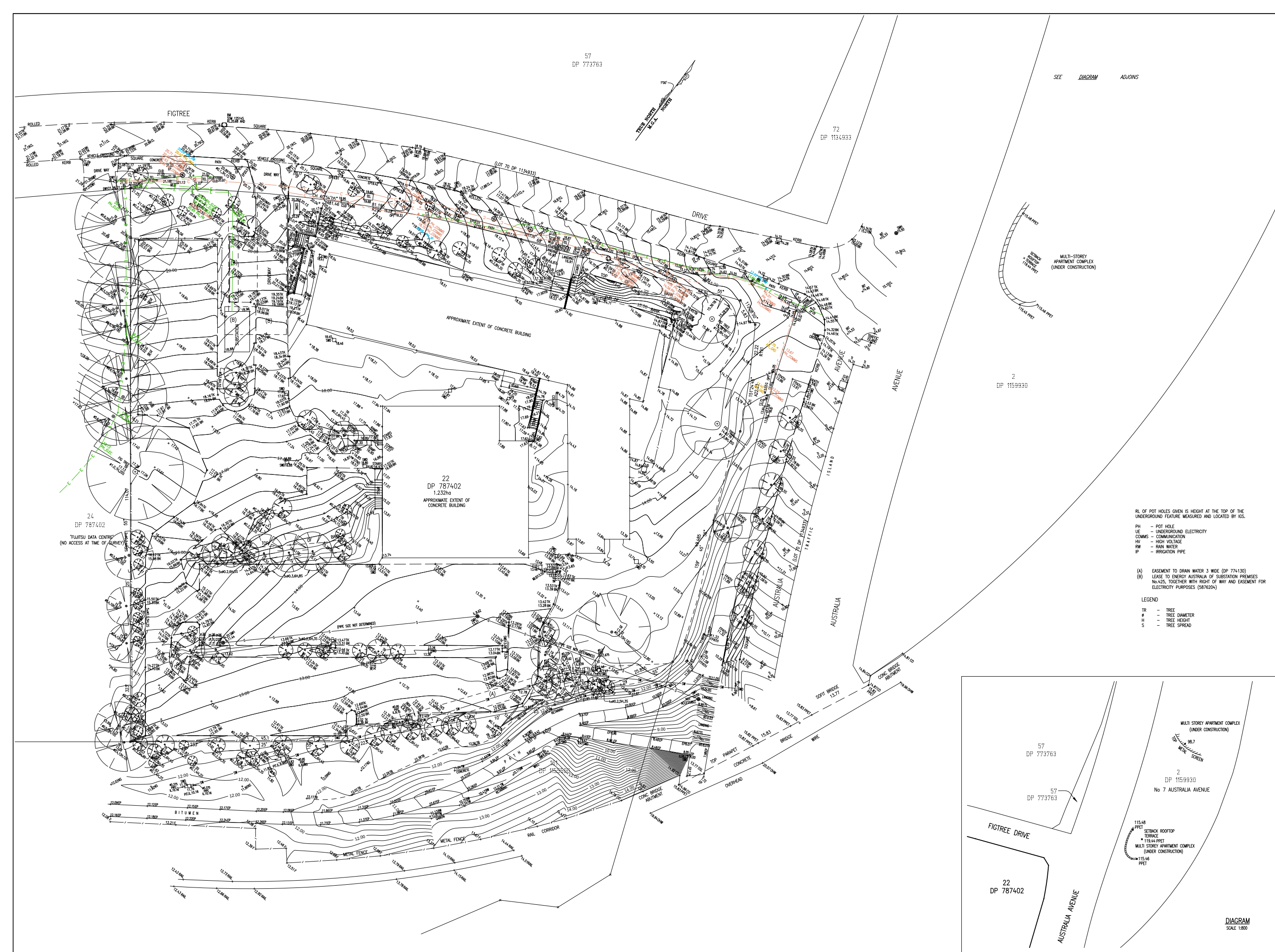




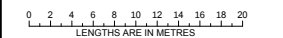
ISSUE	DATE	AMENDMENT	BY
1	10.04.15	TREES ADDED, RAILWAY PROPERTY ADJACENT LEVELS AND No.7 AUSTRALIA AVE. LEVELS ADDED.	AR/LG
2	21.05.15	STORM WATER SERVICES & STREET INFORMATION ADDED	GM/JP
3	30.06.15	TREES, INVERT LEVELS & PIPE INFORMATION ADDED	JN/JP
4	1.08.15	SERVICES LOCATION ADDED	GM/LG

[illegible][illegible]

LEGEND OF TYPICAL SERVICES

—C—	COMMUNICATION LINE	—DW—	RECYCLED WATER
—E—	UNDERGROUND ELECTRICITY CABLES	—HW—	RISING MAIN
—AC—AD—	OPTIC CABLES	—FPA—	ROADS & WATERSIDE PIT
—FS—	UNDERGROUND ELECTRICITY & FIBRE SERVICE	—S—	SINKHOLE
—G—	GAS LINE	—SH—	SHARED DITCH
—GZ—	GAS LINE & ELECTRICITY CABLES	—ST—	SHARED TRENCH
—H—	NATURAL GAS LINE	—SW—	STORM WATER
—OH—	OVERHEAD CABLES	—T—	TRENCH
—OPT—	OPTIC CABLE	—T-CO—	STRAWMATEX CHECK
—PR—	PRIVATE ELECTRICITY	—U—	UTILITY & GAS CABLES
—PS—	PRIVATE CABLE	—UN—	UNDERGROUND SERVICE
—PW—	PRIVATE WATER	—V—	VEGETATION CABLES
		—W—	WATER SUPPLY
		—WW—	WATER MAIN

1. ALL UNDERGROUND SERVICE INFORMATION INCLUSIVE OF GENERAL POSITION AND SURFACE COVER DEPICTS NOTED ON THE PLAN ARE APPROPRIATELY NOTED.
2. ALL UNDERGROUND SERVICE INFORMATION HAS BEEN COMPILED FROM SERVICE AUTHORITY PLANS PROVIDED BY THE AUTHORITIES.
3. THE LOCATION OF SERVICES BETWEEN SURVEYED POINTS (AS INDICATED) HAVE BEEN SHOWN DIAGONALLY ONLY USING THE SERVICE ENDWARD AS PROVIDED. THE EXACT LOCATION OF THESE SERVICES BETWEEN THE SURVEYED POINTS WILL BE VERIFIED PRIOR TO ANY EXCAVATION OR PILING NO WARRANTY IS GIVEN OTHER THAN THE EXISTENCE OF FURTHER INFORMATION FROM SERVICE AUTHORITY.
4. ALL CONTRACTORS, TENDERS, BIDDERS, PROJECT CONSULTANTS MUST CONSULT THE RELEVANT AUTHORITIES, IN ACCORDANCE WITH STANDARD "TIN BEFORE YOU DIG" PROCEDURES PRIOR TO UNDERTAKING ANY WORKS WITHIN THE VICINITY OF THE SERVICE LINES TO VERIFY THE POSITION OF THE SERVICE LINES.

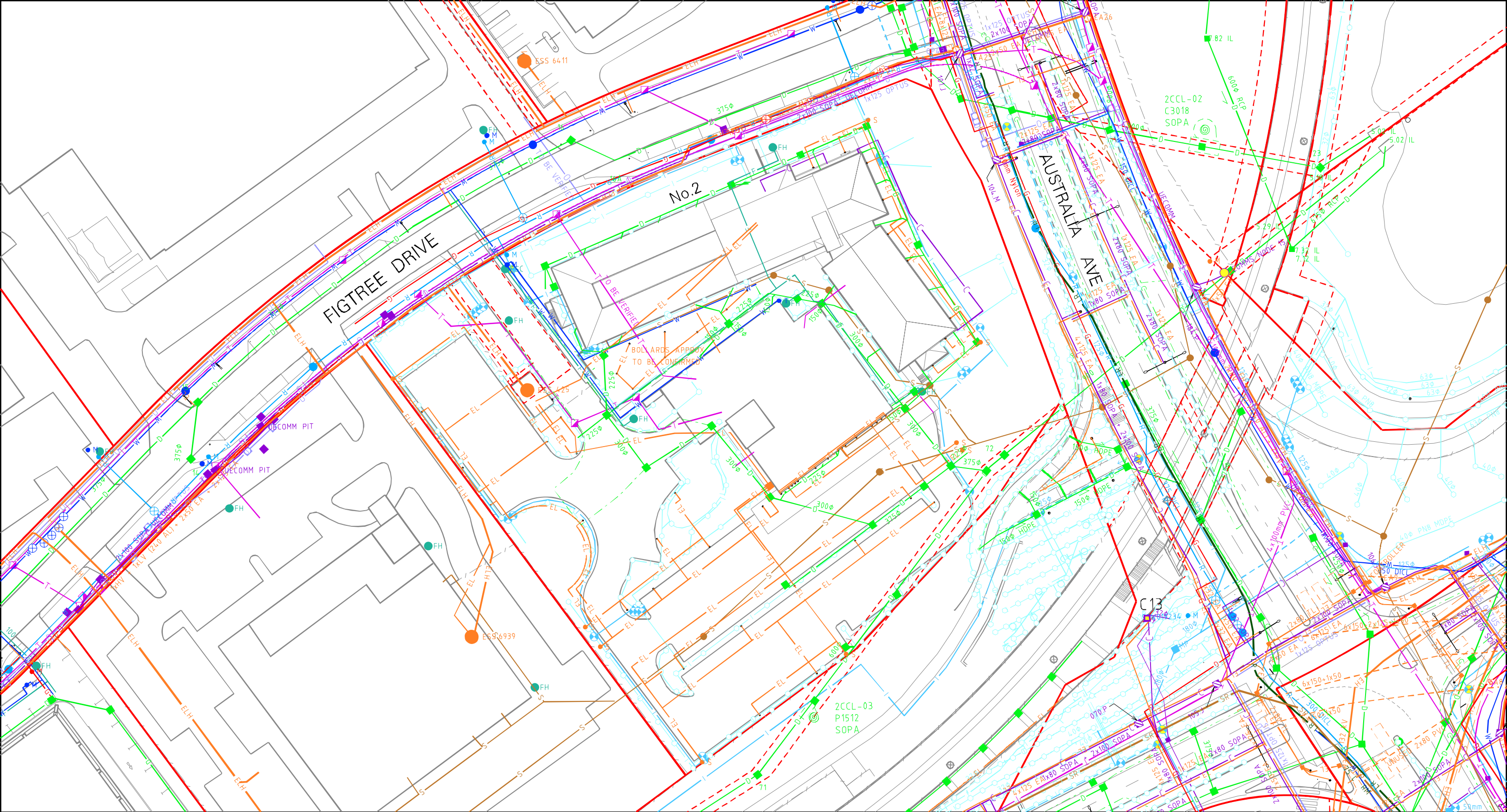


CLIENT: MIRVAC PROJECTS

TITLE No: 22/787402	REF:140632
DATUM: A.H.D.	ISSUE:4
DATE OF SURVEY: 09.07.14	ISSUE DATE:02.07.15
SURVEYOR: AK/AR/GM/JN	SHEET SIZE: A0
DRAFTER: LG/JP	SHEET 1 OF 2 SHEETS

PLAN SHOWING SELECTED DETAIL
AND LEVELS AT
No.2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK

Plan of Existing Services



ELECTRICITY		COMMUNICATIONS		DRAINAGE		LEACHATE		SEWER		WATER		FIRE		IRRIGATION		GAS		NOTES.	
 EL	LOW VOLTAGE	 T	TELSTRA CONDUIT CROSSING	 P	PIPE	 L	DRAIN	 S	MAIN	 POT	POTABLE	 F	MAIN	 I	MAIN	 G	MAIN		
 EH	HIGH VOLTAGE	 C	TELSTRA PIT	 SD	SURFACE DRAIN	 LR	RISING MAIN	 SR	RISING MAIN	 R	RECYCLED	 FH	HYDRANT	 IC	ISOLATION VALVE	 SV	STOP VALVE		
 ELH	LOW-HIGH VOLTAGE	 M	TELSTRA PIT	 CD	PIT	 LG	GRAVITY MAIN	 MH	PIT	 CC	CONDUIT CROSSING	 FHC	HYDRANT COVER	 AV	AIR VALVE	 M	METER		
 TR	TRENCH	 O	OPTUS CONDUIT CROSSING	 CD	MANHOLE	 CA	COMPRESSED AIR	 ST	MANHOLE	 T	TAP	 FHP	HYDRANT PILLAR	 QV	QC VALVE	 P	PIT		
 CC	CONDUIT CROSSING	 P	OPTUS PIT	 FA	CDS UNIT	 PP	PUMP PIT	 V	VENT	 H	HYDRANT	 FHR	HYDRANT HOSE REEL	 FLV	FLUSH VALVE	 R	REGULATOR		
 SCA	SCADA PIT	 SOPA	SOPA HEARING LOOP	 FD	FLOW ARROW	 MH	MANHOLE	 SPS	PUMPING STATION	 M	METER	 FMC	HYDRANT MAIN CONNECTION	 P	PUMP				
 PIT	PIT	 SOPA PIT	SOPA PIT	 SUBSD	SUBSOIL DRAIN	 PPM	PIEZOMETER	 UB	UTILITY BOX	 M	METER	 FMC	HYDRANT MAIN CONNECTION						
 PB	PILLAR BOX	 SOPA IC	SOPA IC (IRRIIG. CONTROLLER)			 SM	SETTLEMENT MONUMENT	 TWP	TRADE WASTE	 M	METER	 FMC	HYDRANT MAIN CONNECTION						
 SB	SWITCH BOX	 CP	PRIVATE			 LM	LEACHATE MEMBRANE	 GAR	GREASE ARRESTOR	 M	METER	 FMC	HYDRANT MAIN CONNECTION						
 SS	SUB-STATION	 PPIT	PRIVATE PIT					 TWP	TRADE WASTE PIT										
				NOTE: SUBSOIL INFORMATION MAY NOT BE AVAILABLE IN ALL AREAS												OIL			
																 P		PIPELINE	
																		THESE PLANS ARE FOR VERIFICATION PURPOSES AND SHOULD BE USED WITH CAUTION.	
																		IF INFORMATION SHOWN ON THIS PLAN IS FOUND TO BE INCORRECT, PLEASE INFORM THE SOPA SPATIAL INFORMATION SERVICES UNIT	

PRODUCT OF SOPA SPATIAL INFORMATION SERVICES UNIT

0 5 10 15 20 25 30 35 40m

NOTES

SYDNEY OLYMPIC PARK
2 FIGTREE DRIVE
SERVICES

SYDNEY OLYMPIC PARK AUTHORITY
8 AUSTRALIA AVENUE SYDNEY OLYMPIC PARK NSW 2127
PH.(02) 9714 7300 FAX.(02) 9714 7818

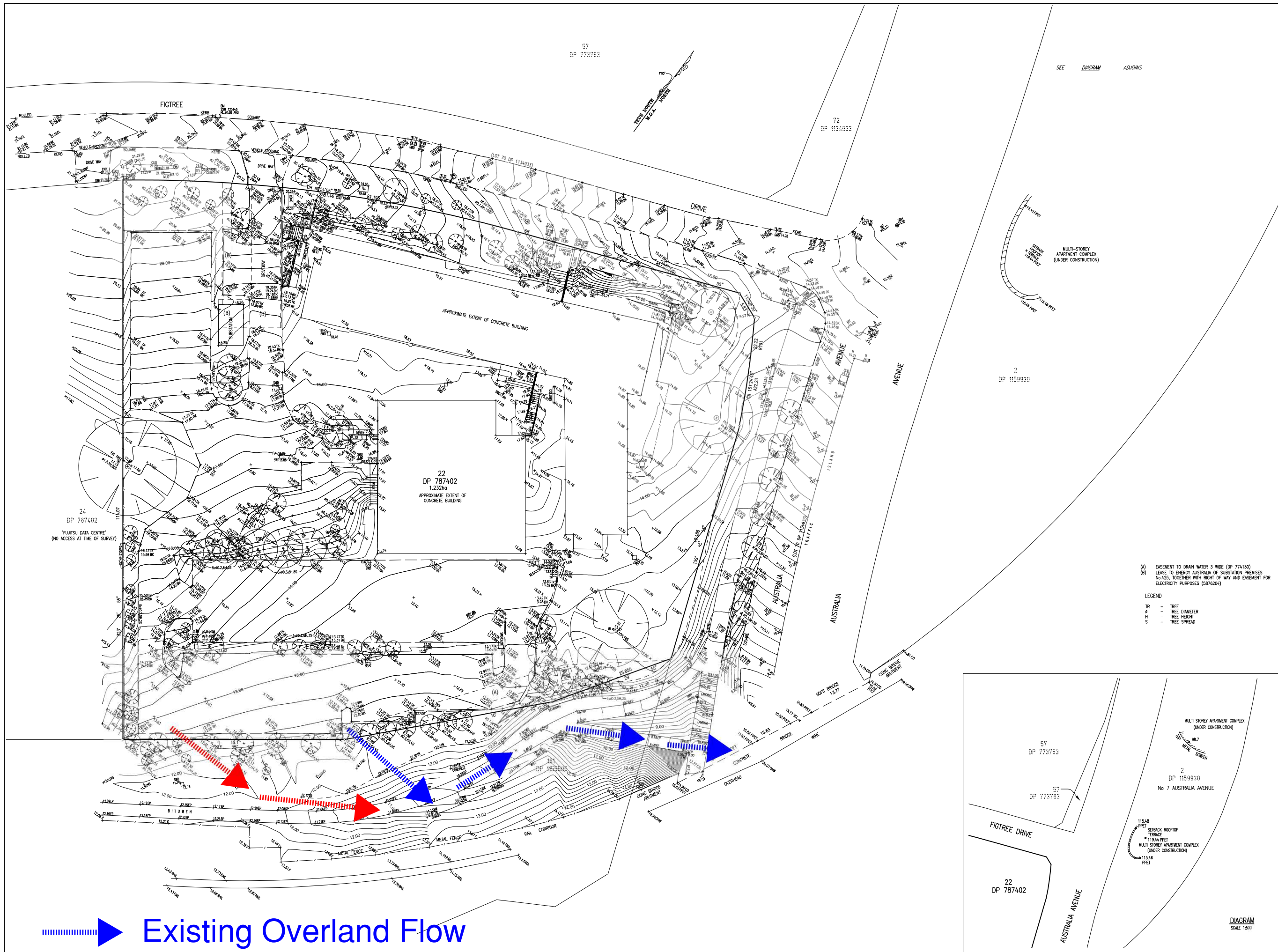
DISTRIBUTION CONTROL
THIS DRAWING REMAINS THE PROPERTY OF THE SYDNEY OLYMPIC PARK AUTHORITY EXCEPT AS PROVIDED IN THE CONDITIONS OF ISSUE. IT SHALL NOT BE COPIED IN WHOLE OR IN PART NOR RE-ISSUED IN ANY FORM TO ANY OTHER PARTY WITHOUT THE WRITTEN APPROVAL OF THE SYDNEY OLYMPIC PARK AUTHORITY.

NSW GOVERNMENT

SydneyOlympicPark

DRG. NO. : 033-P-P-0011 REV. A
SCALE: AS PER SCALE BAR
PLOT DATE: 12/12/2013

Existing and Proposed Overland Flow Paths

[illegible]

TYPICAL NOTES:

- 1. OPEN OF LEVELS SHOWN (25%+ ELEVATION (AS-BUILT))
- 2. BEARING SURVEY ON ALL CORNERS.
- 3. NO RECORDING SURVEY HAS BEEN INTERFERED.
- 4. BEARING SURVEYS HAVE BEEN COMPLETED FROM TITLE AND/OR DEED INFORMATION SUPPORTED BY SEPARATION OF LANDS RECORD.
- 5. RECONSTRUCTION OF IMPROVEMENTS TO DATE FOR BEARING IS DISAPPROPRIATE ONLY TO BE USED FOR RECORD PURPOSES ONLY.
- 6. SURVEYING SHOWN ARE BASED ON VISIBLE SURVEY INDICATORS EXCEPT IN THE CASE OF THE SHOWN AND THE RELEVANT SURVEYING OF THE VARIOUS ADJACENTS, AS SHOWN.
- 7. SURVEYING ON THE DEED AND THE RELEVANT SURVEYING INDICATORS, UNDER SURVEYING, IT IS NOT NECESSARY FOR THE ACCURACY OR COMPLETION OF THE SURVEYING SHOWN RECORD.
- 8. RECORD A SUTTER HEIGHTS (OR OTHERS) BY AN INDIRECT METHOD ARE TO BE ACCURATE FOR PLANNING PURPOSES ONLY.
- 9. ADJACENT BUILDINGS AND BUILDINGS HAVE BEEN PLANNED FOR DISAPPROPRIATE PURPOSES ONLY TO BE USED FOR RECORD PURPOSES ONLY.
- 10. THE DIMENSIONS (OR SPREAD) OF A DEED (OR OF EACH) TYPE, POSITIVE CORNERS AND SPECIFIC DETAILS, OR SPREAD, OR RECORD PURPOSES ONLY.
- 11. THE DIMENSIONS (OR SPREAD) OF A DEED (OR OF EACH) TYPE, POSITIVE CORNERS AND SPECIFIC DETAILS, OR SPREAD, OR RECORD PURPOSES ONLY.
- 12. THE DIMENSIONS (OR SPREAD) OF A DEED (OR OF EACH) TYPE, POSITIVE CORNERS AND SPECIFIC DETAILS, OR SPREAD, OR RECORD PURPOSES ONLY.

[illegible]

LEGEND OF SYMBOLIC SERVICES	
—C—	CERAMIC STORMWATER PIPE
—E—	UNDERGROUND ELECTRICITY
—C—	CABLES
—E—	UNDERGROUND ELECTRICITY & OPTUS CABLES
—FS—	FIRE SERVICE
—G—	GAZ LINE
—G—	GAZ LINE & ELECTRICITY CABLES
—NG—	NATURAL GAS LINE
—OH—	OVERHEAD CABLES
—OPT—	OPTUS CABLE
—PT—	PRIVATE ELECTRICITY
—PS—	PRIVATE SEWER
—PW—	PRIVATE WATER
—RW—	RECYCLED WATER
—RM—	RM
—R—	Roads & SHARING PIT
—S—	SEWER
—ST—	STORM OUTFALL
—ST—	SHARED TRENCH
—SW—	STORM WATER
—S—	STORMWATER DRAIN
—T—	TELESTRA CABLES
—T—	TELESTRA & OPTUS CABLES
—V—	VERICON CABLES
—W—	WATER SUPPLY
—WW—	WATER MAIN

1. ALL UNDERGROUND SERVICE INFORMATION INCLUDING OF GENERAL POSITION AND SURFACE COVER DEPICTS NOTED ON THE PLAN ARE APPLICABLY ONLY.
2. ALL UNDERGROUND SERVICE INFORMATION HAS BEEN COMPILED FROM SERVICE AUTHORITY PLANS PROVIDED BY THE AUTHORITIES.
3. THE LOCATION OF SERVICES BETWEEN SURVEYED POINTS (AS INDICATED) HAVE BEEN SHOWN PROBABLY ONLY USING THE SERVICE DRAWINGS AS PROVIDED. THE EXACT LOCATION OF THESE SERVICES BETWEEN THE SURVEYED POINTS MUST BE VERIFIED PRIOR TO ANY EXCAVATION OR PILING. NO WARRANTY IS GIVEN AGAINST THE POSSIBILITY OF THE EXISTENCE OF FURTHER UNSHOWN SERVICES.
4. ALL CONTRACTORS, TRADESMEN, BUILDING & PROJECT CONSULTANTS MUST CONTACT THE RELEVANT AUTHORITIES, IN ACCORDANCE WITH STANDARD TAP, BEFORE YOU START PROCEDURES PRIOR TO UNDERMINING ANY WORKS WITHIN THE VICINITY OF THE SERVICE LINES TO VERIFY THE POSITION LINE OF THE SERVICE LINES.



REDUCTION RATIO 1 : 250

0 2 4 6 8 10 12 14 16 18 20

LENGTHS ARE IN METRES

CLIENT: MIRVAC PROJECTS

TITLE No: 22/787402	REF:140632
DATUM: A.H.D.	ISSUE:2
DATE OF SURVEY: 09.07.14	ISSUE DATE:01.06.15
SURVEYOR: AK/AR/GM	SHEET SIZE: AO
DRAFTER: LG/JP	SHEET 1 OF 1 SHEETS

PLAN SHOWING SELECTED DETAIL
AND LEVELS AT
No.2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK

 Suite 301, Level 3, 55 Holt Street
Surry Hills NSW 2012
PO Box 1807
Strawberry Hills NSW 2012
t: (02) 9212 4655
f: (02) 9212 5254
email: linker@linkersurveying.com.au
web site: www.linkersurveying.com.au

CU14J0383140832OLYMPY3PAR6-F1GTRFEDRIVEDETAIL140832 DETAIL 20 DWG

Civil Road and Drainage Drawings

LOT 22 ON DP787402
SYDNEY OLYMPIC PARK AUTHORITY

LOT 22 ON DP787402

SYDNEY OLYMPIC PARK AUTHORITY



0000 GENERAL

C-0000	COVER SHEET AND DRAWING INDEX
C-0001	GENERAL NOTES

0200 ROADWORKS

NEW ROADWORKS	
C-0200	SITEWORKS PLAN
C-0205	ROADWORKS AND DRAINAGE PLAN
C-0210	LONGITUDINAL SECTIONS AND TYPICAL ROAD SECTION
C-0215	CROSS SECTIONS SHEET 1
C-0216	CROSS SECTIONS SHEET 2
C-0217	CROSS SECTIONS SHEET 3
C-0230	INTERSECTION DETAILS
C-0250	PAVEMENT PLAN

0300 DRAINAGE

C-0300	DRAINAGE CATCHMENT PLAN
C-0310	DRAINAGE LONGITUDINAL SECTIONS
C-0330	OSD PLAN
C-0331	OSD SECTION

0700 EROSION AND SEDIMENT CONTROL

C-0700	EROSION AND SEDIMENT CONTROL PLAN
C-0710	EROSION AND SEDIMENT CONTROL DETAILS



TITLE COVER SHEET AND DRAWING INDEX		
PROJECT No.	DRAWING No.	REV.
S16017	C-0000	E

1.0 GENERAL

- TECHNICAL SPECIFICATIONS OR SPECIFIC INSTRUCTIONS ON DRAWINGS TAKE PRECEDENCE OVER THESE NOTES.
- DO NOT DEPART FROM THE DESIGN UNLESS AUTHORISED IN WRITING BY THE DESIGN ENGINEER
- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH ANY OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. CONSTRUCTION FROM THESE DRAWINGS, AND THEIR ASSOCIATED CONSULTANTS' DRAWINGS IS NOT TO COMMENCE UNTIL APPROVED BY THE RELEVANT AUTHORITIES.
- REFER TO ALL NOTES ON THESE DRAWINGS AND PREVIOUSLY MENTIONED DOCUMENTATION BEFORE BEGINNING CIVIL WORKS.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT SPECIFIED STANDARDS AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT APPROVAL AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION AND/OR DRAWINGS.
- THE RELEVANT AUTHORITIES OCCUPATIONAL HEALTH AND SAFETY PRACTICES MUST BE COMPLIED WITH.
- ALL DIMENSIONS AND LEVELS SHOWN ON THE DRAWINGS SHALL BE VERIFIED BY THE CONTRACTOR ON SITE. CIVIL DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND SETOUT. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
- UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN METRES (m) AND ALL LEVELS ARE IN METRES (m) TO AUSTRALIAN HEIGHT DATUM (AHD).
- IF THERE IS DOUBT REGARDING THE CIVIL DESIGN, CONTACT THE ENGINEER FOR CLARIFICATION.
- ALL ABBREVIATIONS ARE AS FOLLOWS:

EGL	EXISTING GROUND LEVEL
FFL	FINISHED FLOOR LEVEL
RL	REDUCED LEVEL
E	EASTING COORDINATE
N	NORTHING COORDINATE
AHD	AUSTRALIAN HEIGHT DATUM
U.N.O.	UNLESS NOTED OTHERWISE
uPVC	UNPLASTICISED POLYVINYL CHLORIDE
RRJ2	REINFORCED CONCRETE PIPE WITH CLASS
VCP	VITRIFIED CLAY PIPE
FRC	FIBRE REINFORCED COMPOSITE
FSL	FINISHED SURFACE LEVEL
K&G	KERB AND GUTTER
KO	KERB ONLY
NFK	NOMINAL FACE OF KERB
FK	FLUSH KERB
TOK	TOP OF KERB
BOK	BACK OF KERB
DD	DISH DRAIN
MK	MOUNTABLE KERB
MIK	MOUNTABLE INTEGRAL KERB
IK	INTEGRAL KERB
IL	INVERT LEVEL
OL	OBVERT LEVEL
GD	GRATED DRAIN
TWL	TOP WATER LEVEL
GALV.	GALVANISED
TE	THICKENED EDGE
FP	FLUSHING POINT
DP	DOWN PIPE
RW#	RETAINING WALL
IJ	ISOLATION JOINT
DEJ	DOWELLED EXPANSION JOINT
SJ	SAWN JOINT
KJ	KEYED JOINT
WPJ	TROWELED WEAKENED PLANE JOINT
EJ	EXPANSION JOINT
TW	TOP OF WALL LEVEL
BW	BOTTOM OF WALL LEVEL
VC	VEHICLE CROSSING

2.0 SURVEY NOTES

- THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN DERIVED FROM SURVEY INFORMATION SUPPLIED FROM:

DENNY LINKER & CO
SURRY HILLS NSW 2010
9212 4655

THE FOLLOWING SURVEY INFORMATION HAS BEEN TAKEN DIRECTLY FROM ORIGINAL SURVEY DOCUMENTS.
DATE 08.07.14
DATUM AHD
REFERENCE 140632
- THE ABOVE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. BG&E PTY LTD DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.
- SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT BG&E PTY LIMITED.
- THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
- BENCH MARK, SURVEY PEGS, LEVEL PEGS OR SUPPLEMENTARY REFERENCE MARKS SHALL NOT BE ADJUSTED OR MOVED WITHOUT WRITTEN APPROVAL FROM THE SUPERINTENDENT. THE CONTRACTOR SHALL TRANSFER ANY PEGS AFFECTED BY THE PROPOSED WORKS TO SIDE POSITIONS CLEAR OF OPERATIONS AND SHALL NOTE THE EXTENT OF THE MOVEMENT IN DISTANCE AND LEVEL.

3.0 EXISTING SERVICES AND FEATURES

- THE CONTRACTOR MUST CONFIRM THE EXACT LOCATION AND EXTENT OF EXISTING SERVICES PRIOR TO CONSTRUCTION AND NOTIFY ANY CONFLICT WITH THE DRAWINGS IMMEDIATELY TO THE SUPERINTENDENT.
- EXISTING SERVICES UNLESS SHOWN ON SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE A 'DIAL BEFORE YOU DIG' SEARCH AND TO ESTABLISH 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. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.
- THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR SERVICES. DO NOT ASSUME DEPTHS OR ALIGNMENTS OF CABLES OR PLANT AS THESE MAY VARY SIGNIFICANTLY. THE CONTRACTOR MUST ACCEPT ALL RESPONSIBILITY TO DAMAGES TO EXISTING SERVICES AS SERVICE AUTHORITIES MAY SEEK COMPENSATION FOR DAMAGES CAUSED TO THEIR PROPERTY AND SUBSEQUENT LOSSES CAUSED.
- THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL OR RELOCATION (IF REQUIRED) TO RELEVANT AUTHORITIES GUIDELINES OF ALL EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA OR AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER/SUPERINTENDENT.
- INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO SURROUNDING ALLOTMENTS. CONTRACTOR TO GAIN APPROVAL FROM THE RELEVANT AUTHORITIES FOR TIME OF INTERRUPTION.
- THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY TO EXISTING BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF ANY RELEVANT AUTHORITIES. ONCE DIVERSION IS COMPLETE AND COMMISSIONED, THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE RELEVANT AUTHORITY/SUPERINTENDENT.
- EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS, BRICK PAVING AND CONSTRUCTION TRAFFIC MANOEUVRING AREAS SHALL BE PROTECTED TO RELEVANT AUTHORITIES GUIDELINES.
- ALL EXISTING SERVICE UTILITIES COVERS AND GRATES ARE TO BE ADJUSTED (TO RELEVANT AUTHORITY GUIDELINES) TO SUIT NEW FINISHED SURFACE LEVELS WHERE APPLICABLE.
- IF EXISTING SERVICE UTILITY COVERS AND GRATES OR SURROUNDING SURFACE LEVELS ARE TO BE LOWERED, THE CONTRACTOR IS TO MAKE CERTAIN THAT MINIMUM COVERS (TO RELEVANT SERVICE AUTHORITY GUIDELINES) TO SERVICES ARE MAINTAINED. IF MINIMUM COVERS AREN'T MAINTAINED THE CONTRACTOR IS TO LOWER OR PROTECT SERVICES TO THE SATISFACTION OF THE RELEVANT SERVICE AUTHORITY/SUPERINTENDENT.

4.0 STORMWATER DRAINAGE NOTES

- THE STORMWATER DESIGN SHOWN ON THESE DRAWINGS HAS BEEN CARRIED OUT IN ACCORDANCE WITH SOPA REQUIREMENTS, AUSTRALIAN RAINFALL AND RUNOFF (AR&R) GUIDELINES AND RELEVANT AUTHORITIES GUIDELINES.
- ALL STORMWATER WORK IS TO COMPLY WITH AS3500 PART 3.
- PROTECTION OF PIPES EXPOSED TO LOADS EXCEEDING THE W7 WHEEL LOAD OF 70kN SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- NO CONSTRUCTION LOADS SHALL BE APPLIED TO uPVC PIPES.
- EXISTING STORMWATER PIPE LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- GALVANIZED STEP IRONS SHALL BE PROVIDED AT 300 CTRS FOR PITS HAVING A DEPTH EXCEEDING 1200mm.
- PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE PIPES (RCP) CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS U.N.O.
- PIPES UP TO 300 DIA. SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
- EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED IF RELEVANT APPROVAL AUTHORITY AND SUPERINTENDENT PERMITS.
- BEDDING TYPE SHALL BE TYPE H2 FOR RCP, AND TYPE HS2 FOR uPVC. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS.
- PIPES SHALL BE LAID ON A 75mm THICK SAND BED. IN ALL CASES BACKFILL TRENCH WITH SAND TO 200mm ABOVE THE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL. COMPACTED IN 150mm LAYERS TO 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1 (OR A DENSITY INDEX OF NOT LESS THAN 75).
- WHERE TRENCHES ARE IN ROCK THE PIPE SHALL BE BEDDED ON A MINIMUM OF 50mm CONCRETE BED (OR 75mm BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE.
- ENLARGERS, CONNECTORS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
- CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES, GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
- GRATES AND COVERS SHALL CONFORM TO AS3996 AND AS1428.1 AT ALL TIMES DURING CONSTRUCTION OF THE STORMWATER PITS.
- ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT AND ENGINEER FOR FURTHER DIRECTIONS.

5.0 KERBING NOTES

INCLUDES ALL KERBS, GUTTERS, DISH DRAINS, CROSSINGS AND EDGES.

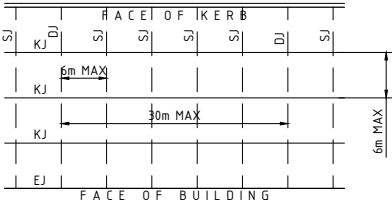
- ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON MINIMUM 75mm GRANULAR BASE COURSE MATERIAL COMPACTED TO A MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 6.2.1.
- EXPANSION JOINTS (EJ) TO BE FORMED FROM 10MM COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN SLABS.
- WEAKENED PLANE JOINTS (WPJ) ARE TO BE LOCATED AT A MAX 15 x WIDTH OF THE PAVEMENT. WEAKENED PLANE JOINTS (WPJ) ARE TO BE A MINIMUM 3mm WIDE WITH A JOINT DEPTH TO BE A MINIMUM OF 1/4 THE TOTAL DEPTH OF THE SECTION.
- ALL KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
- WHEN CONSTRUCTING NEW KERB TO EXISTING AND IN THE REPLACEMENT OF KERBS, EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm FROM LIP OF GUTTER. UPON COMPLETION OF NEW KERBS, NEW BASE COURSE AND SURFACE IS TO BE LAID 900mm WIDE TO MATCH EXISTING MATERIALS AND THICKNESS.
- EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB WITH A 125 x 75 GALVANISED RHS.
- EXISTING KERBS ARE TO BE COMPLETELY REMOVED WHERE NEW KERBS ARE SHOWN.
- ALL KERBING TO BE IN ACCORDANCE SOPA REQUIREMENTS.

6.0 PEDESTRIAN FOOTPATH JOINTING

- EXPANSION JOINTS (EJ) ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 70m CENTRES.
- WEAKENED PLANE JOINTS (WPJ) ARE TO BE LOCATED AT A MAX 15 x WIDTH OF THE PAVEMENT. WEAKENED PLANE JOINTS (WPJ) ARE TO BE A MINIMUM 3mm WIDE WITH A JOINT DEPTH TO BE A MINIMUM OF 1/4 THE TOTAL DEPTH OF THE SECTION.
- WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND / OR ADJACENT PAVEMENT JOINTS.
- ALL PEDESTRIAN FOOTPATH JOINTING IN ACCORDANCE WITH SOPA REQUIREMENTS.

7.0 VEHICULAR PAVEMENT JOINTING

- KEYED CONSTRUCTION JOINTS (KJ) SHOULD GENERALLY BE LOCATED AT A MAXIMUM OF 6M CENTRES.
- SAWN JOINTS (SJ) SHOULD GENERALLY BE LOCATED AT A MAXIMUM OF 6M CENTRES OR 15 x THE SPACING OF KEYED JOINTS (KJ), WHERE KEY JOINT SPACING IS LESS THAN 4m, PROVIDE DOWELED EXPANSION JOINTS (DEJ) AT MAXIMUM OF 30m CENTRES.
- PROVIDE 10mm WIDE EXPANSION JOINTS (EJ) BETWEEN STRUCTURES AND ALL CONCRETE OR UNIT PAVER INTERFACES.
- VEHICULAR PAVEMENT JOINTING AS FOLLOWS.



8.0 ASPHALT SURFACING NOTES

- ASPHALT (HOT MIXED) TO AS2150. BITUMEN EMULSION: TO AS1160.
- BEFORE SURFACING ENSURE THAT THE BASE COURSE SURFACE IS FIRM, FREE OF SURFACE WATER, OILS, GREASE, RETARDERS, LOOSE MATERIAL AND DUST. APPLY TACK COAT IMMEDIATELY BEFORE PLACING ASPHALT.
- TACK COAT: BITUMINOUS EMULSION SPRAY TO THE RECOMMENDATION OF AS2150.
- ASPHALT: MIXING LAYING AND COMPACTION TO THE RECOMMENDATION OF AS2150. MIXES:
 - AC10 - 10MM NOMINAL MAXIMUM AGGREGATE SIZE
 - AC7 - 7MM NOMINAL MAXIMUM AGGREGATE SIZE
 - AC5 - 5MM NOMINAL MAXIMUM AGGREGATE SIZE
- BITUMEN BINDER CLASS: 170.
- SURFACE FINISH: DENSE, SMOOTH, FREE OF ROLLER MARKS AND LOOSE MATERIAL.
- COMPACTION:
 - WHILST THE MIX TEMPERATURE IS ABOVE 140°C. SITE DENSITY (MINIMUM): 95% OF THE 50 BELOW MARSHALL DENSITY OF THE LABORATORY COMPACTED MIX.
- JOINTS:
 - THE NUMBER OF JOINTS, BOTH LONGITUDINAL AND TRANSVERSE, SHALL BE KEPT TO A MINIMUM.
 - THE DENSITY AND SURFACE FINISH AT JOINTS SHALL BE SIMILAR TO THOSE OF THE REMAINDER OF THE LAYER.
 - FORM JOINTS AND STAGGER 300MM MINIMUM IN SUCCESSIVE LAYERS.
- FINISHED PAVEMENT PROPERTIES:
 - FINISHED SURFACES SHALL BE SMOOTH, DENSE AND TRUE TO SHAPE AND SHALL NOT VARY MORE THAN 10MM FROM SPECIFIED PLAN LEVEL AT ANY POINT AND SHALL NOT DEVIATE FROM THE BOTTOM OF A 3M STRAIGHT EDGE LAID IN ANY DIRECTION BY MORE THAN 5MM.

9.0 SEDIMENT AND EROSION CONTROL

- ALL SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH RELEVANT AUTHORITY GUIDELINES AND ANY DETAILS SHOWN ON THESE DRAWINGS.
- ALL PERIMETER AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN EARTHWORKS AND/OR CLEARING.
- THE SEDIMENT AND EROSION CONTROL PLAN MAY REQUIRE FUTURE ADJUSTMENT TO REFLECT CONSTRUCTION STAGING. IT IS THE CONTRACTORS RESPONSIBILITY TO PREPARE THEIR OWN SEDIMENT AND EROSION CONTROL PLAN WHICH SUITS THE DESIGNED CONSTRUCTION STAGING.
- FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. DAMAGED SEDIMENT TRAPPING STRUCTURES ARE TO BE REPAIRED AND ANY TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE LOCATION.
- ALL TOPSOIL IS TO BE STOCKPILED ON SITE (AWAY FROM TREES AND DRAINAGE LINES) IN ACCORDANCE WITH DETAILS PROVIDED AND WITH RELEVANT AUTHORITY GUIDELINES. MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO SEAL THE EARTHWORKS. DUST SUPPRESSION SHALL BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUTHORITIES GUIDELINES.
- UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY RELEVANT AUTHORITY, SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.
- ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND STRAW MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION U.N.O. BY LANDSCAPE ARCHITECTS.
- EROSION AND SILT PROTECTION MEASURES ARE TO BE MAINTAINED AT ALL TIMES.
- ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ENTRY/EXIT AS PER DETAILS PROVIDED OR WITH RELEVANT AUTHORITY GUIDELINES.
- ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING SITE TO LIMIT SEDIMENT TRACKING TO ROADWAYS.

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EXISTING DRIVEWAY TO FUJITSU SITE

FIGTREE DRIVE
(SOPA UDEM LOCAL STREET 20)

LEGEND

- 52.00 SITE BOUNDARY
- SW EXISTING SURFACE CONTOURS
- W EXISTING STORMWATER
- W EXISTING WATER MAIN
- S EXISTING RECYCLED WATER MAIN
- HV EXISTING SEWER
- HV EXISTING HV ELECTRICITY
- E EXISTING LV ELECTRICITY
- T EXISTING TELSTRA
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- STRUCTURES TO BE DEMOLISHED
- PAVEMENT TO BE REMOVED

SITE 52 FUJITSU

AVENUE

AUSTRALIA

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

REVISIONS				REVISIONS			
REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
A	04.05.17	ISSUED FOR TENDER	TW				

ARCHITECT	CLIENT



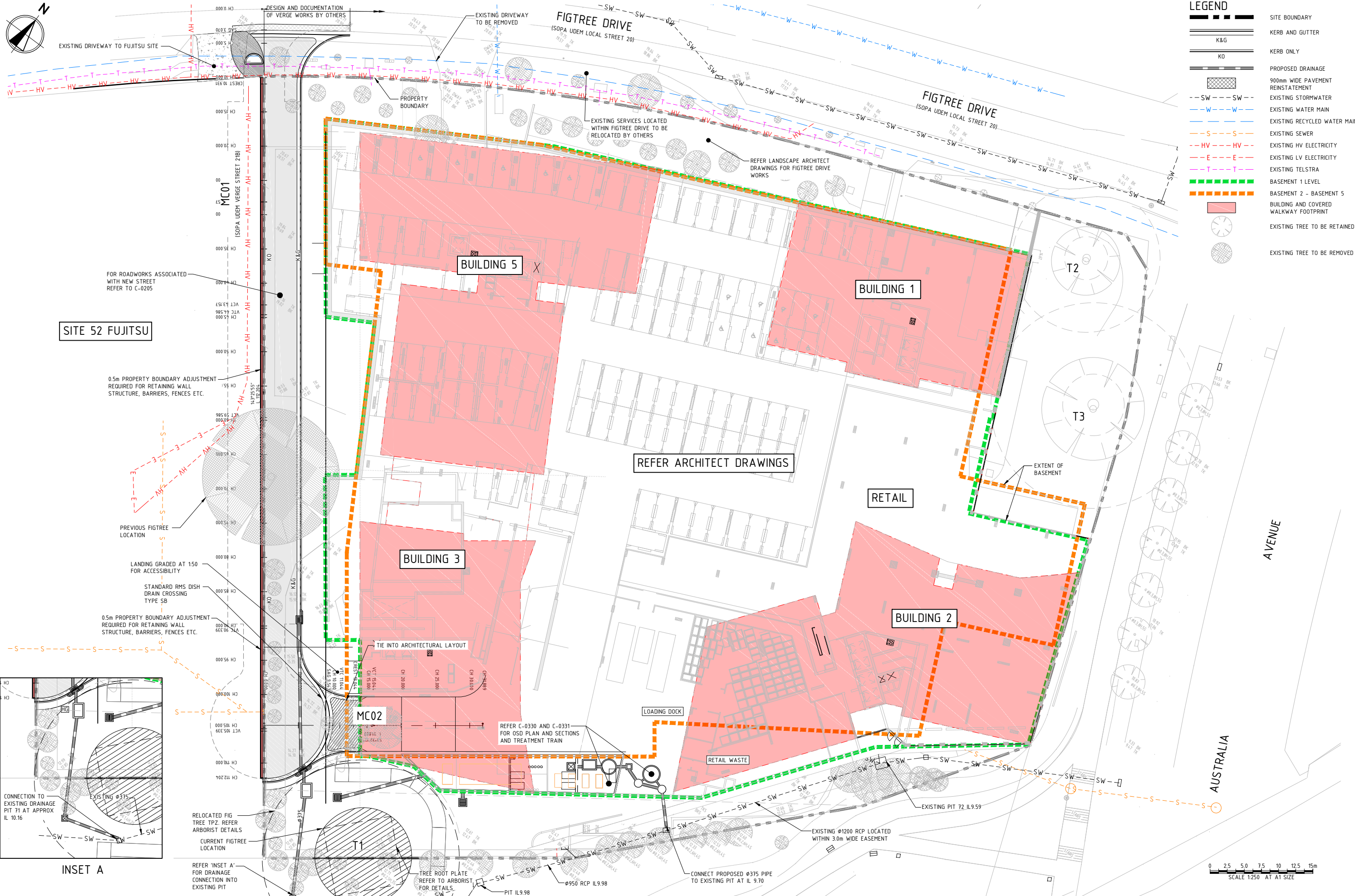
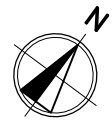
Sydney Office—
L2, 8 Windmill St, Sydney NSW 2000
P / +61 2 9770 3300
E / info@bgeeng.com
bgeeng.com—



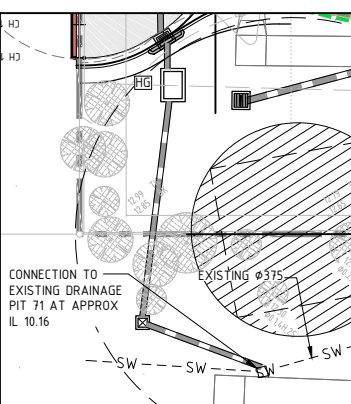
2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

ISSUED FOR TENDER NOT TO BE USED FOR CONSTRUCTION			
DRAWN	DESIGNED	CHECKED	APPROVED
LA	LM	TW	TW
DATUM	GRID	SCALE	
AHD	MGA	1:250	

EXISTING FEATURES AND DEMOLITION PLAN			
PROJECT No.	DRAWING No.	REV.	
S16017	C-0020	A	



LEGEND	
	SITE BOUNDARY
	K&G
	KO
	KO
	PROPOSED DRAINAGE
	900mm WIDE PAVEMENT REINSTATEMENT
	EXISTING STORMWATER
	EXISTING WATER MAIN
	EXISTING RECYCLED WATER MAIN
	EXISTING SEWER
	EXISTING HV ELECTRICITY
	EXISTING LV ELECTRICITY
	EXISTING TELSTRA
	BASEMENT 1 LEVEL
	BASEMENT 2 - BASEMENT 5
	BUILDING AND COVERED WALKWAY FOOTPRINT
	EXISTING TREE TO BE RETAINED
	EXISTING TREE TO BE REMOVED



INSET A

REVISIONS			
REV	DATE	DESCRIPTION	RVD
E	04.05.17	ISSUED FOR TENDER	TW
D	07.10.16	ISSUED FOR DA APPROVAL	TW
C	30.09.16	ISSUED FOR DA APPROVAL	TW
B	06.09.16	ISSUED FOR INFORMATION	TW
A	26.07.16	ISSUED FOR REVIEW	TW

REVISIONS			
REV	DATE	DESCRIPTION	RVD
E	04.05.17	ISSUED FOR TENDER	TW
D	07.10.16	ISSUED FOR DA APPROVAL	TW
C	30.09.16	ISSUED FOR DA APPROVAL	TW
B	06.09.16	ISSUED FOR INFORMATION	TW
A	26.07.16	ISSUED FOR REVIEW	TW



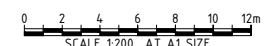
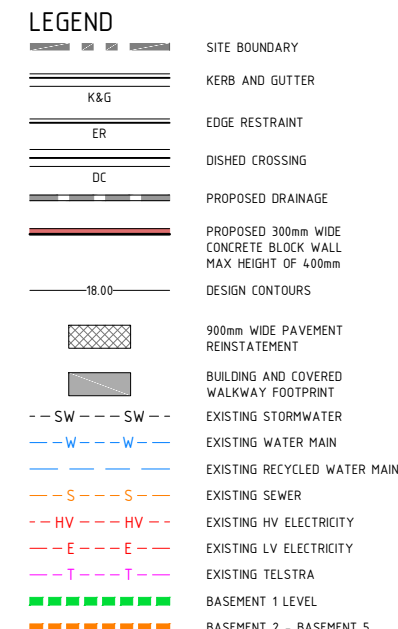
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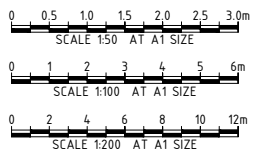
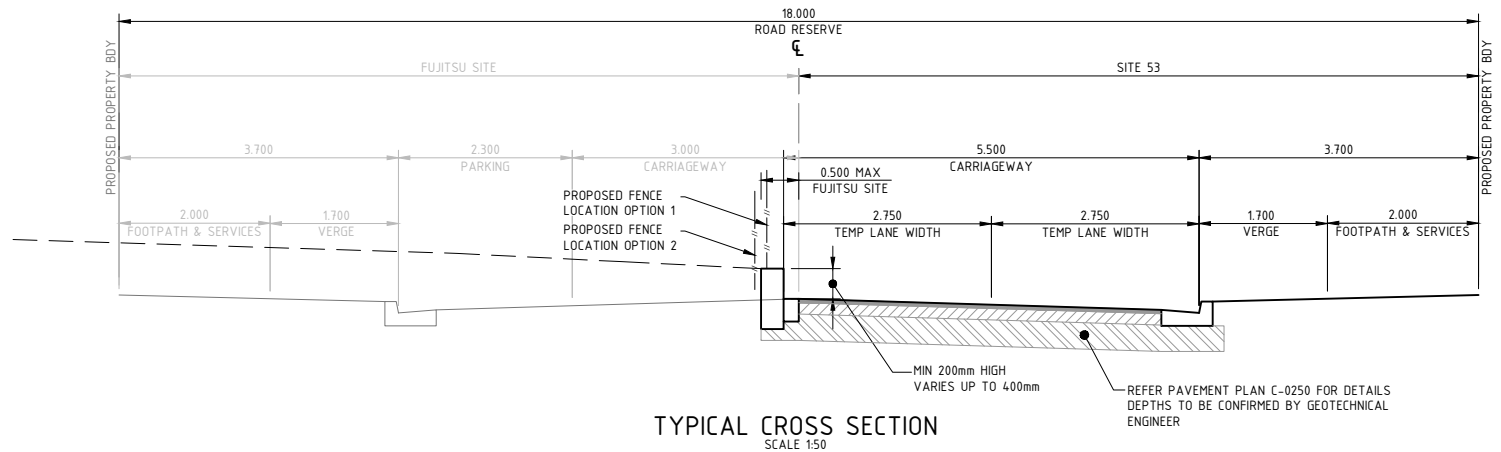
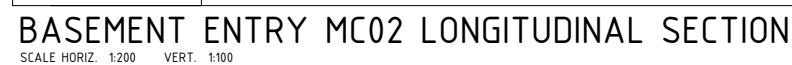
2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

ISSUED FOR TENDER			
LM	LM	TW	TW
LM	LM	TW	TW
LM	LM	TW	TW

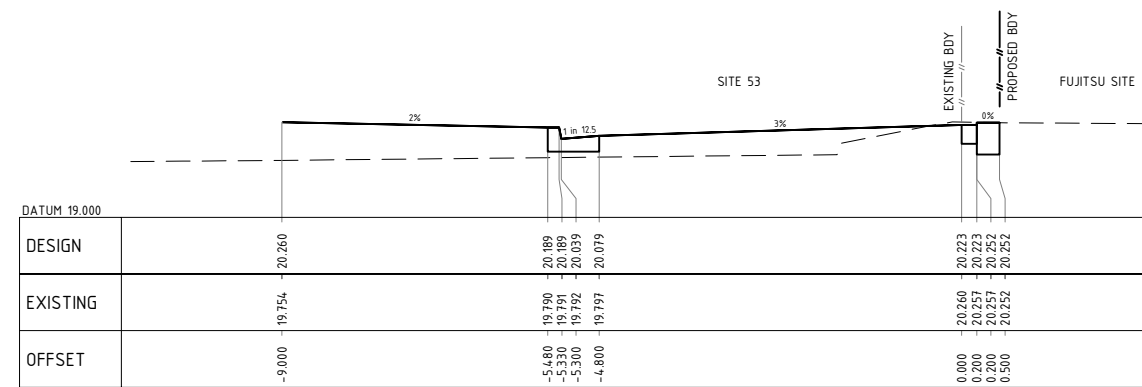
SITWORKS PLAN	
PROJECT No	S16017
DRAWING No	C-0200
REV	E

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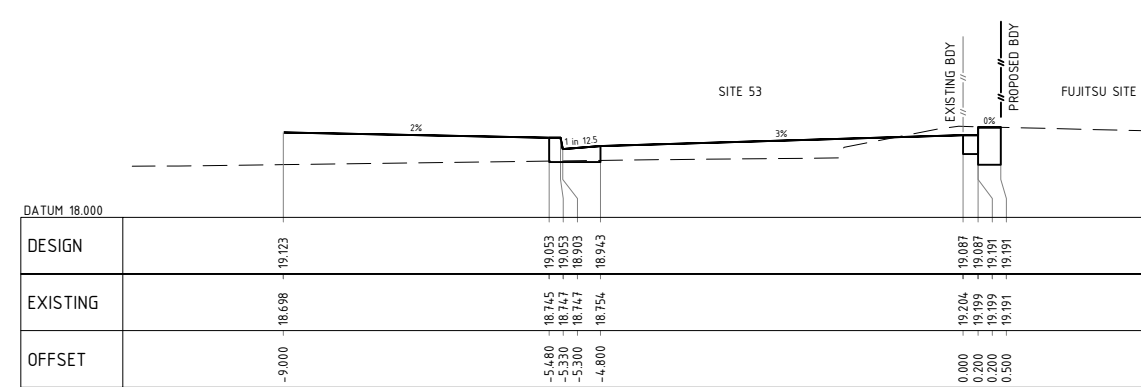
TITLE			
ROADWORKS AND DRAINAGE PLAN			
PROJECT No.	DRAWING No.	REV.	
S16017	C-0205	A	



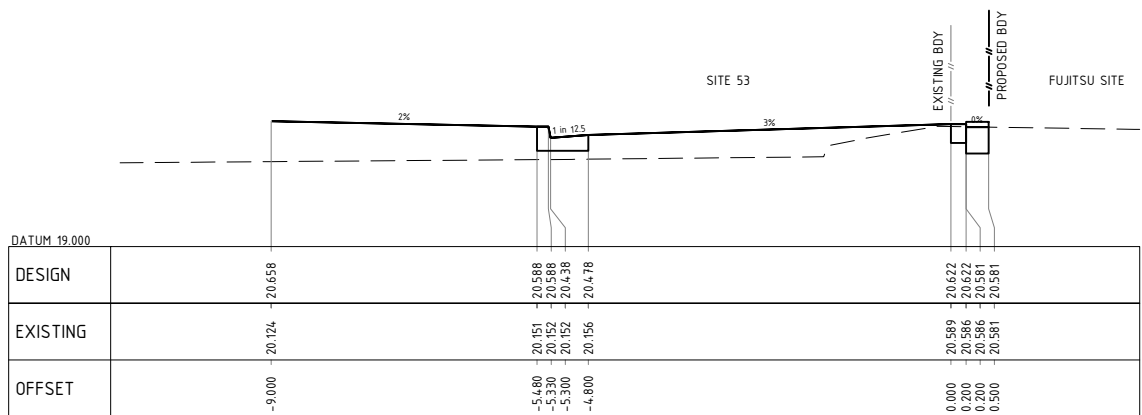
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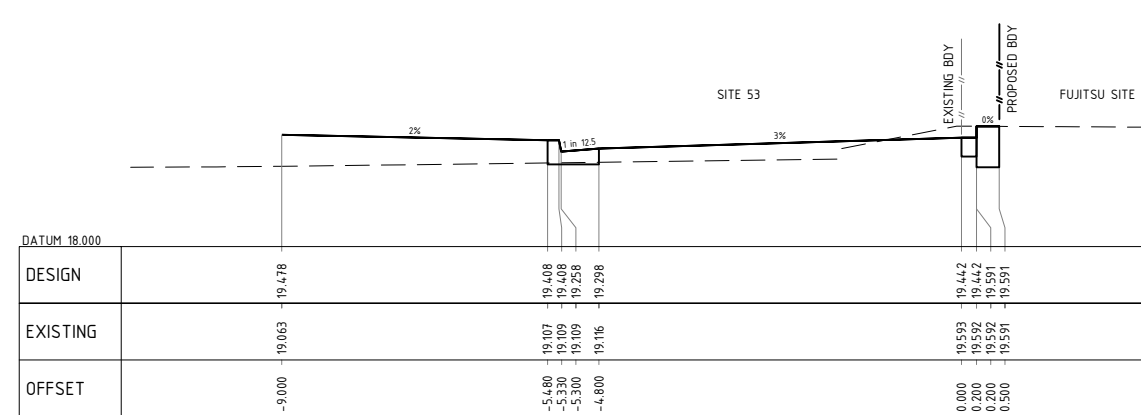
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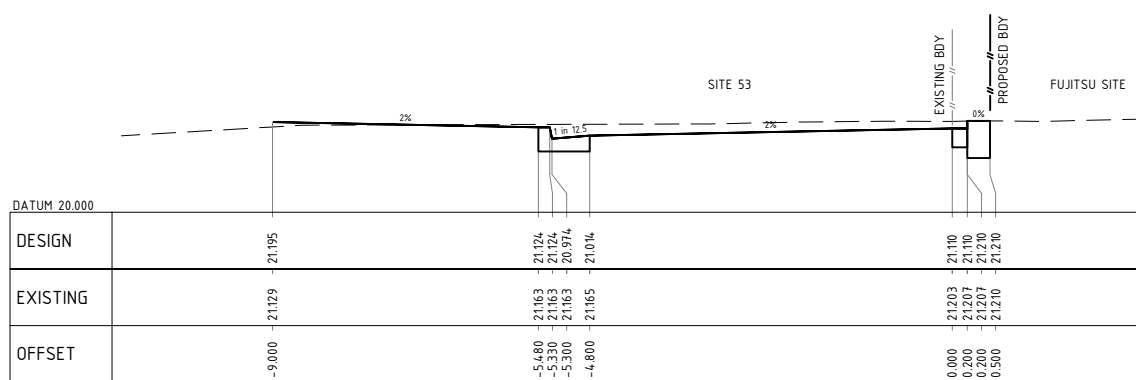
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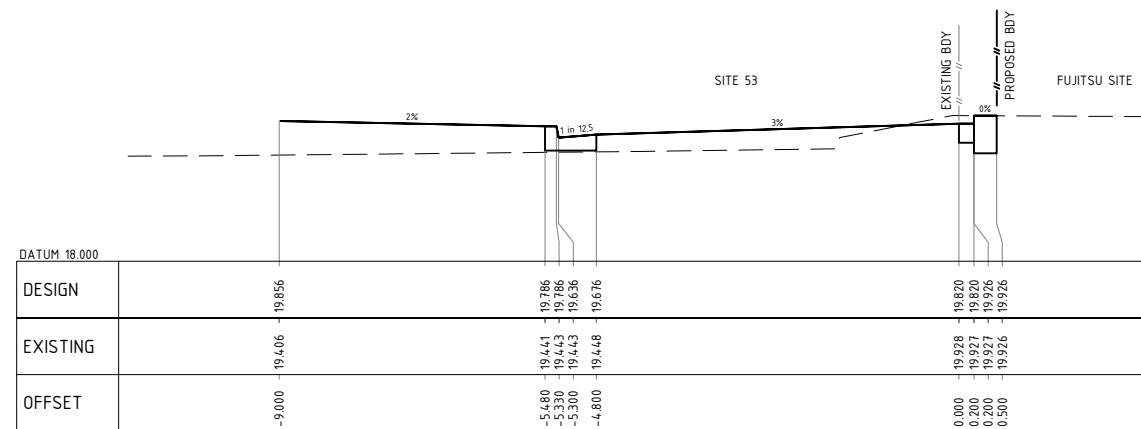
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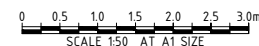
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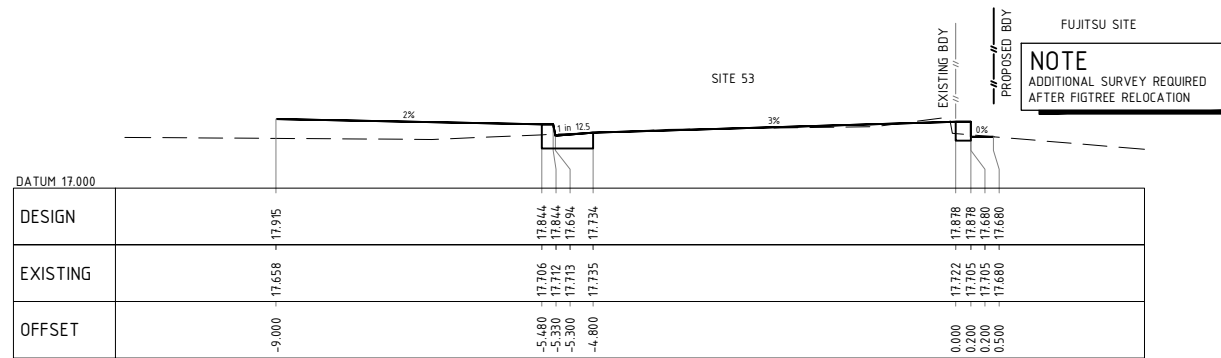


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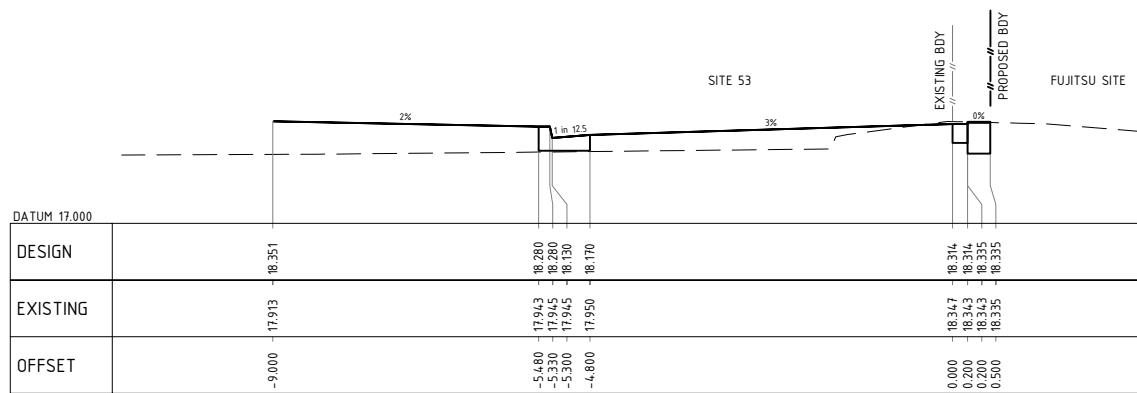


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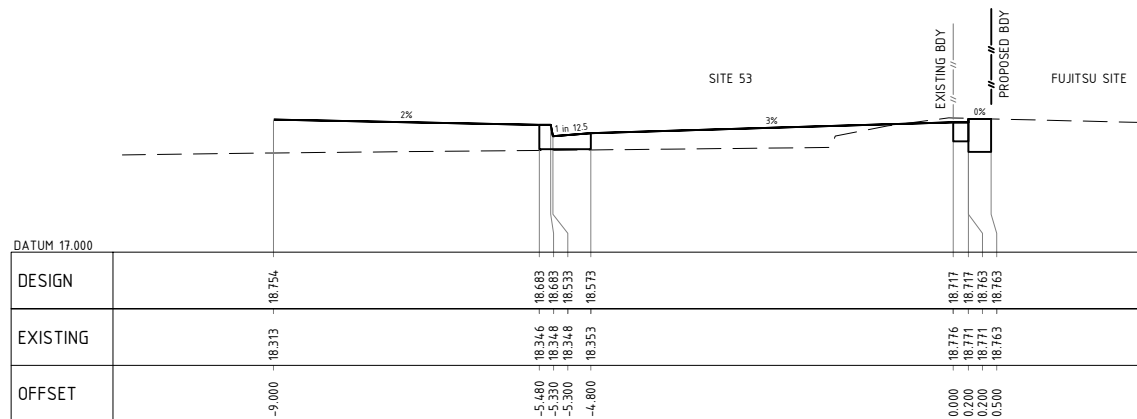




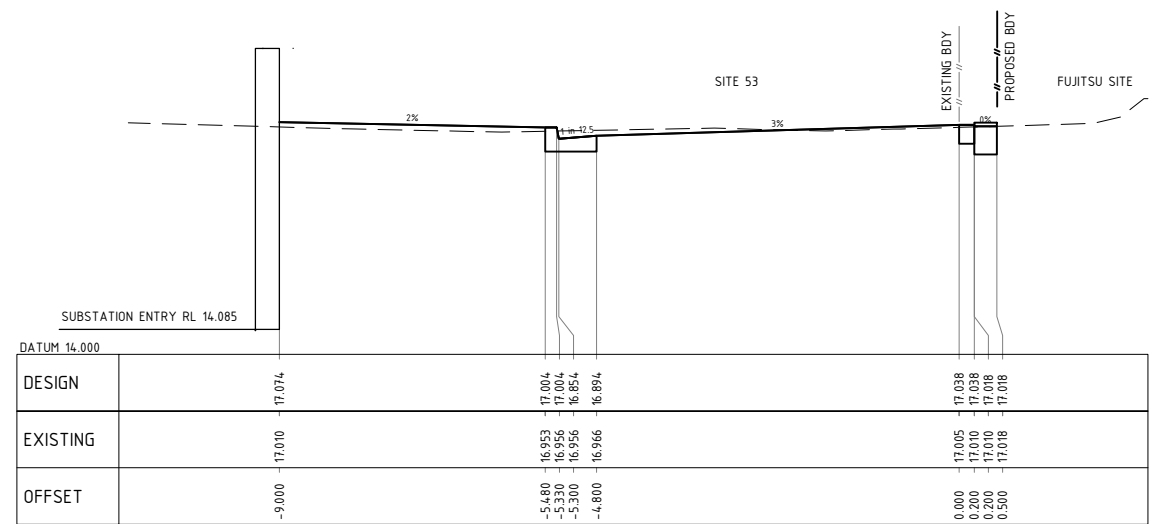
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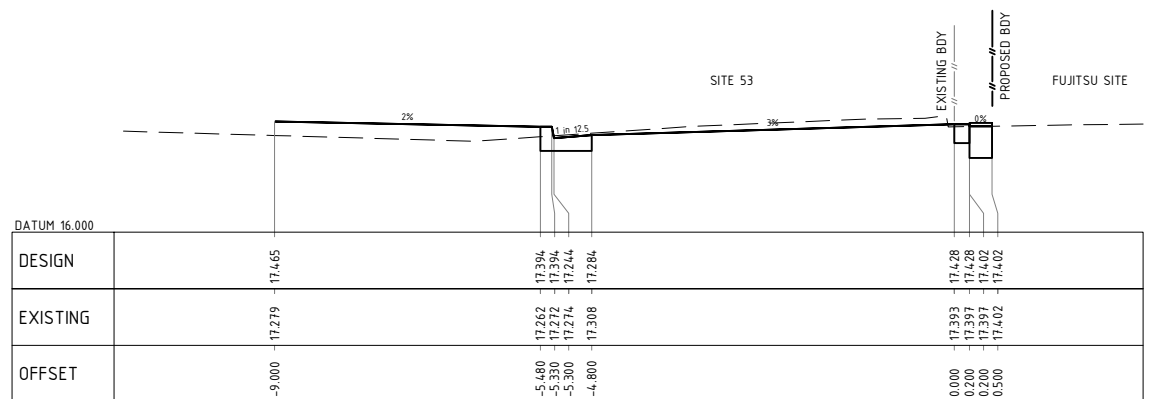
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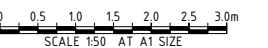
CHAINAGE 50



CHAINAGE 70



CHAINAGE 65



ARCHITECT				CLIENT			
REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
A	04.05.17	ISSUED FOR TENDER	TW				
REVISIONS				REVISIONS			

SYDNEY OLYMPIC PARK DRAWING LEVEL 100 (DAVIDSON'S) 100% - C-0216.DWG
4/25/2017 12:13 PM



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L2, 8 Windmill St, Sydney NSW 2000
P / +61 2 9770 3300
E / info@bgeeng.com
bgeeng.com—

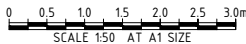
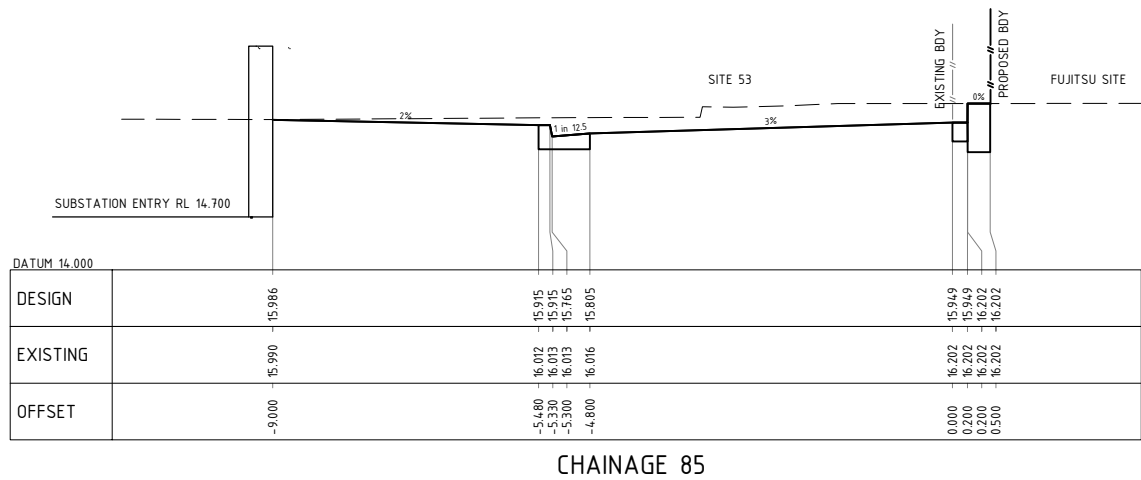
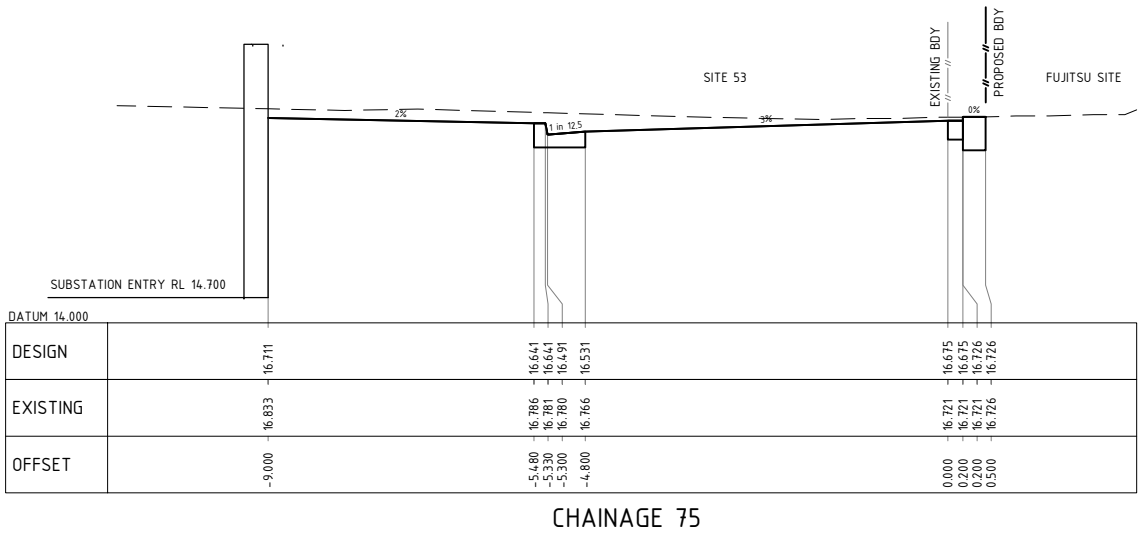
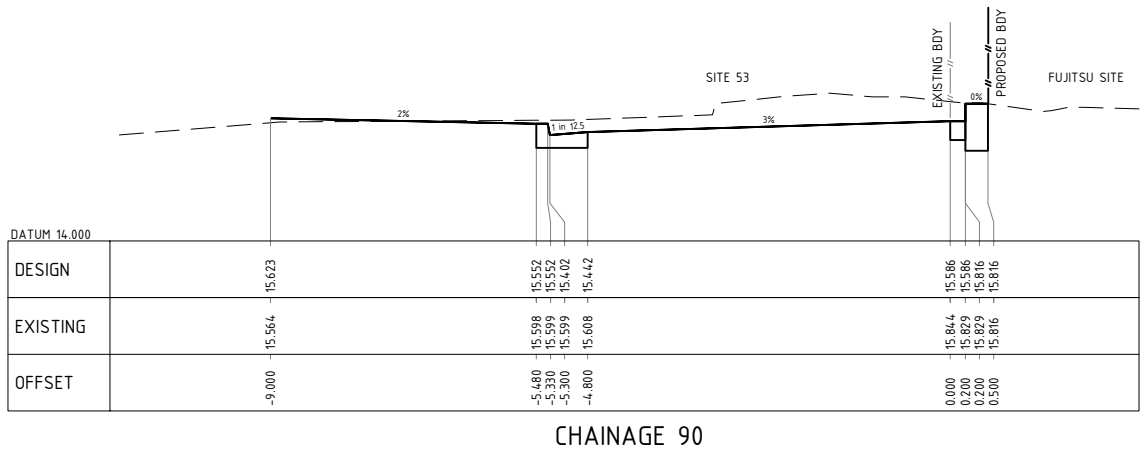
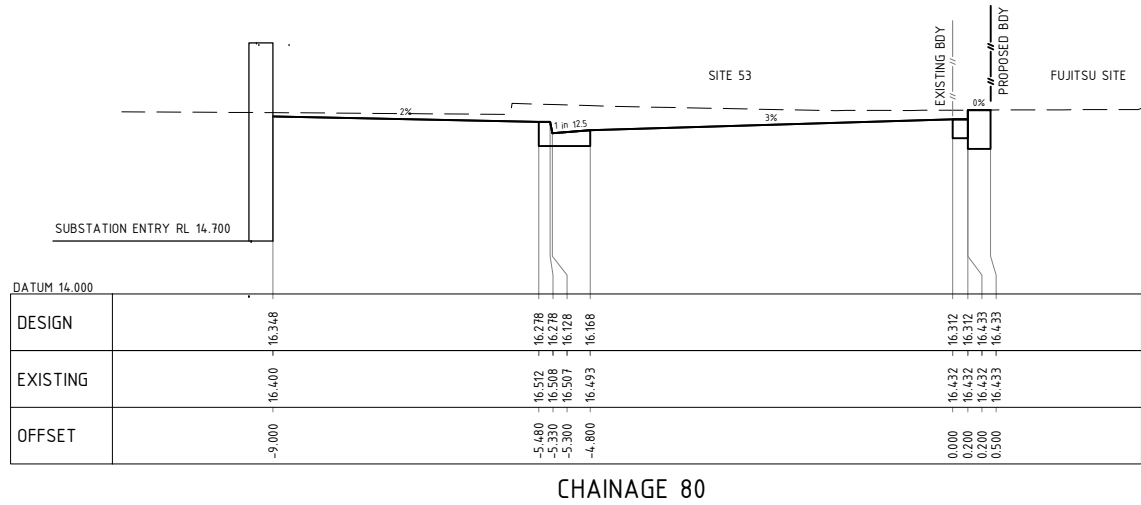


2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

ISSUED FOR TENDER			
NOT TO BE USED FOR CONSTRUCTION			
DRAWN	DESIGNED	CHECKED	APPROVED
LM	LM	TW	TW
DATUM	GRID	SCALE	AT
AHD	MGA	1:50	A1 SIZE

ROAD CROSS SECTIONS SHEET 2			
PROJECT No.	DRAWING No.	REV.	
S16017	C-0216	A	

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ARCHITECT				CLIENT			
REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
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REVISIONS				REVISIONS			

4/25/2017 12:12 PM

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REVISIONS				REVISIONS			

Sydney Office—
L2, 8 Windmill St, Sydney NSW 2000
P / +61 2 9770 3300
E / info@bgeeng.com
bgeeng.com—

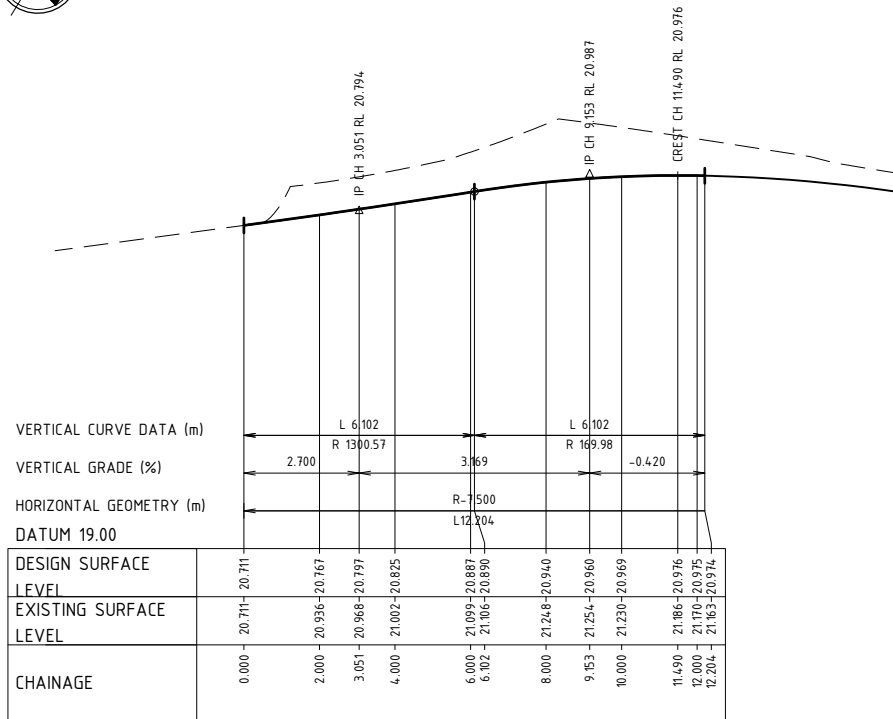


2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

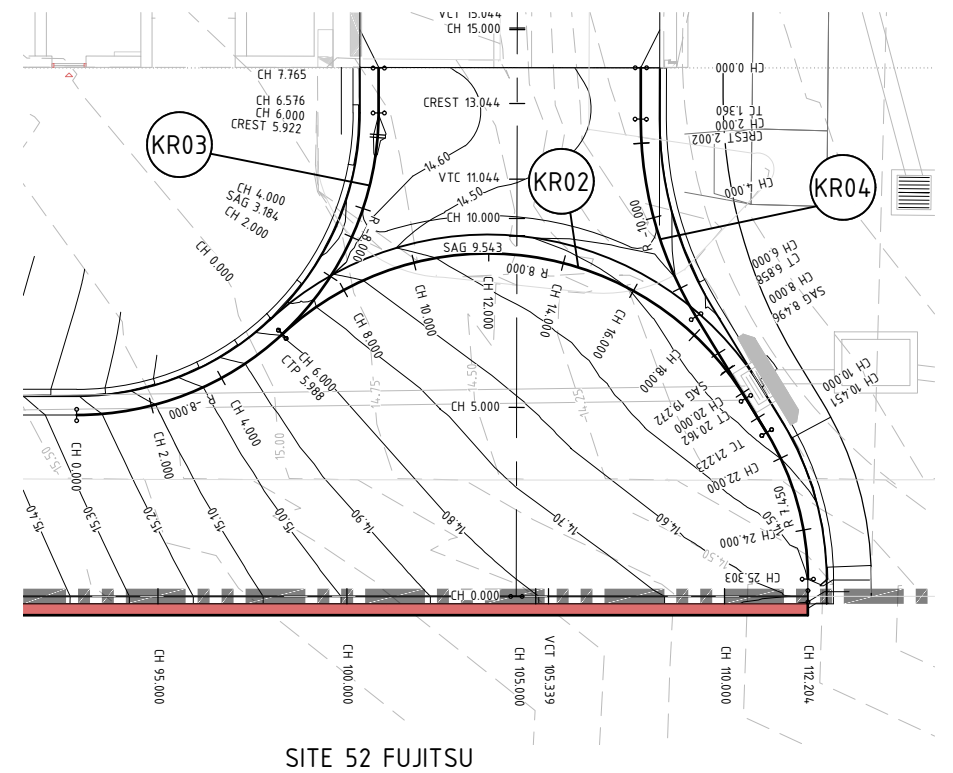
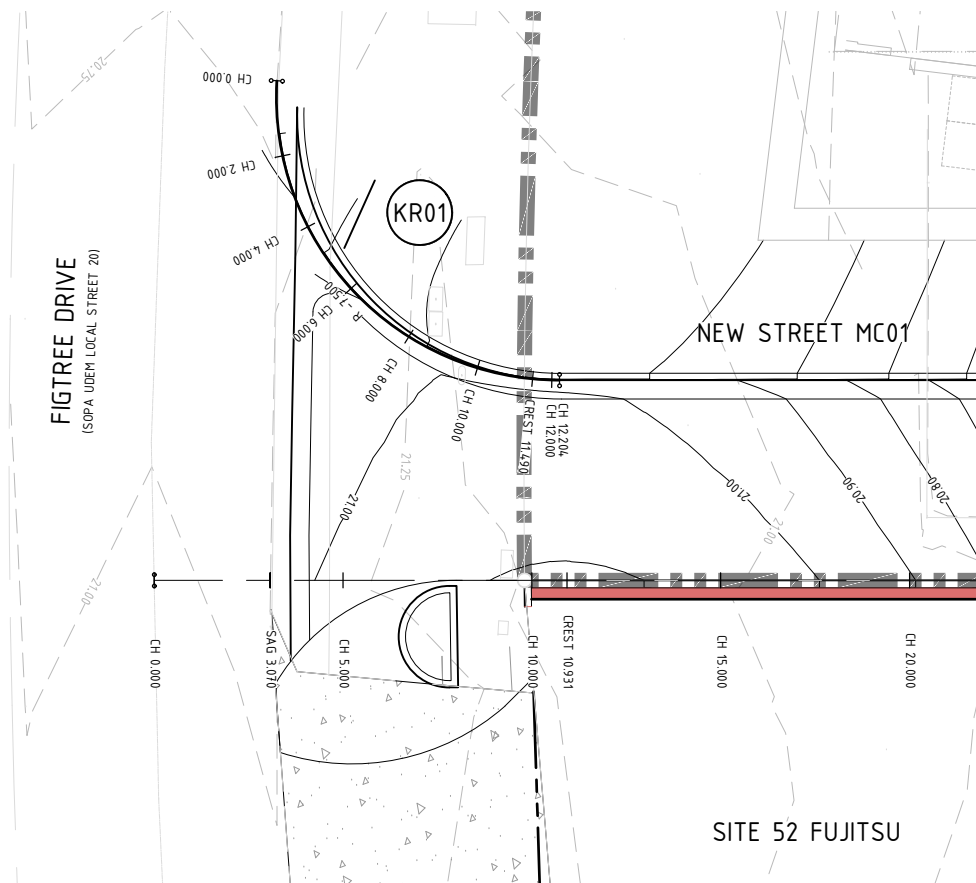
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ARCHITECT				CLIENT			
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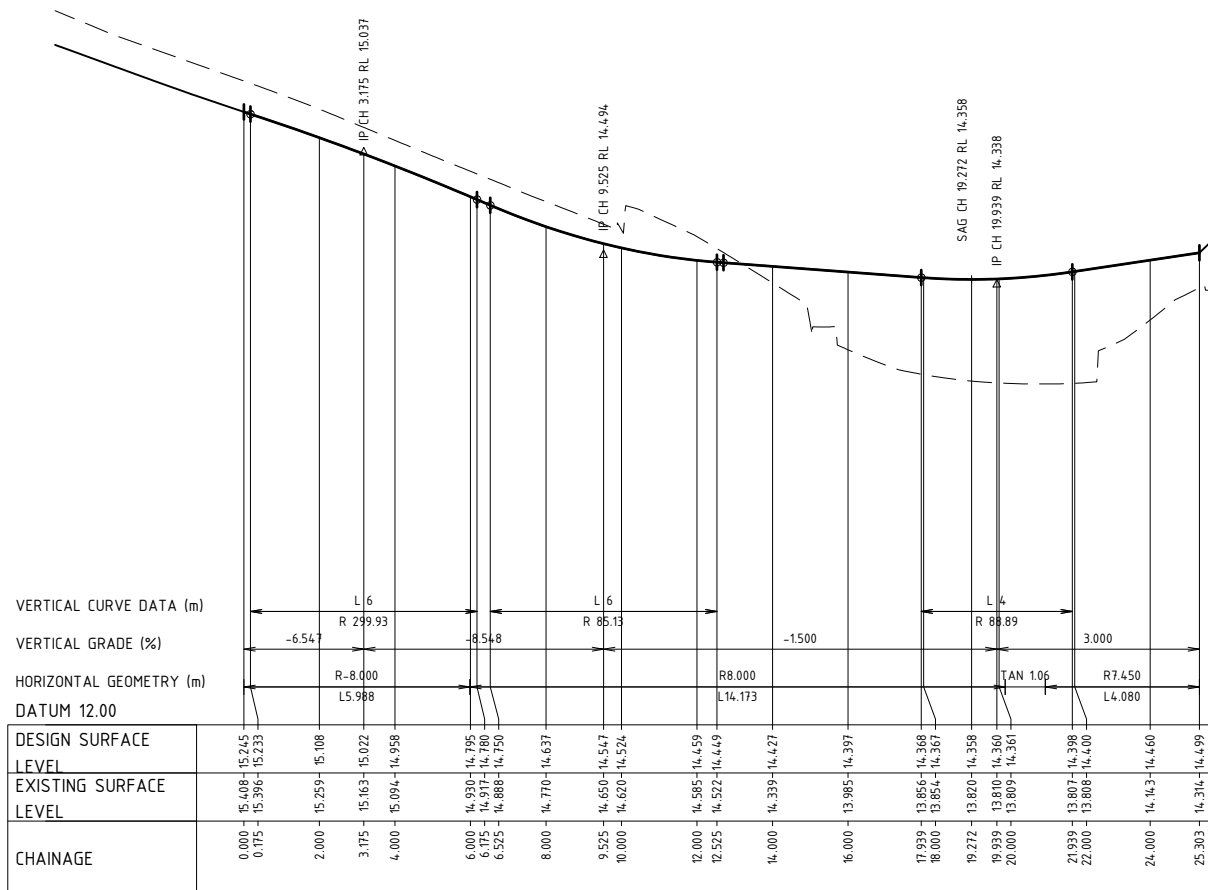
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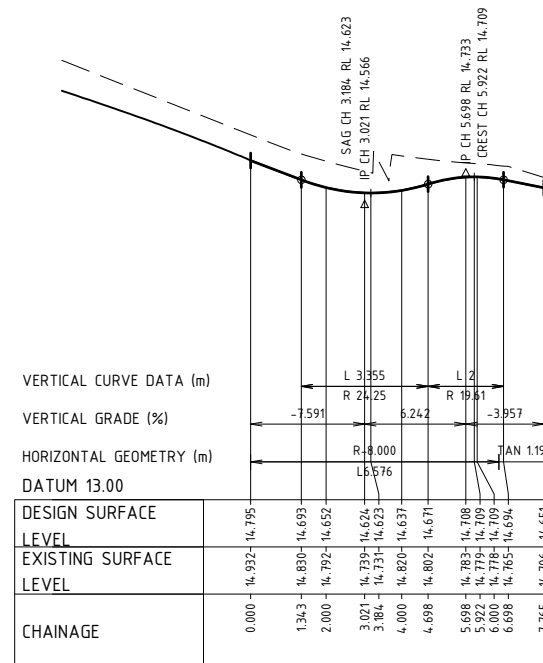
SCALE HORIZ. 1:100 VERT. 1:20



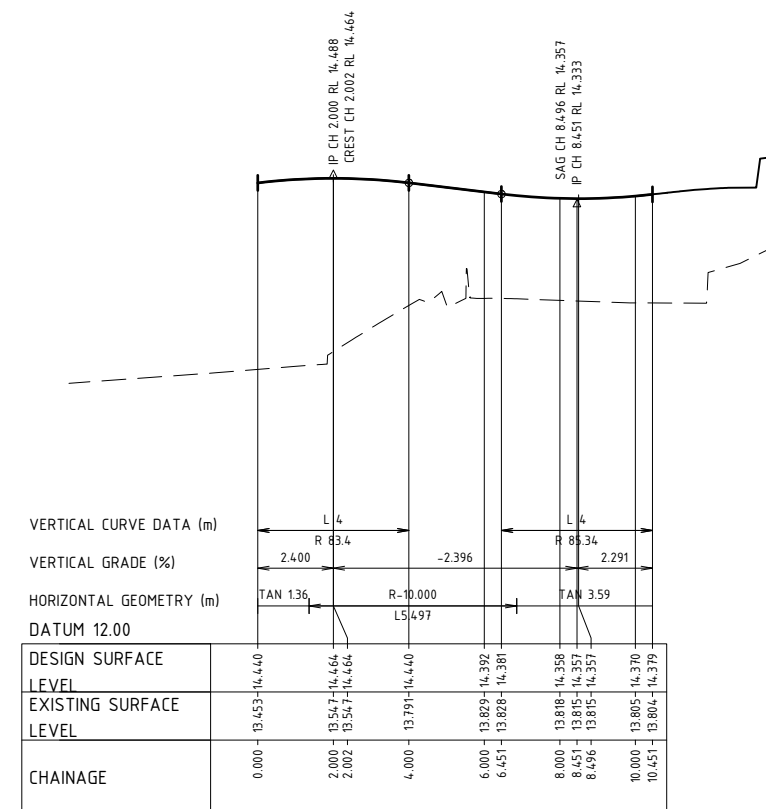
	SITE BOUNDARY
	KERB AND GUTTER
	EDGE RESTRAINT
	DISHED CROSSING
	DESIGN CONTOURS
	EXISTING CONTOURS



SCALE HORIZ. 1:100 VERT. 1:20



SCALE HORIZ. 1:100 VERT. 1:20

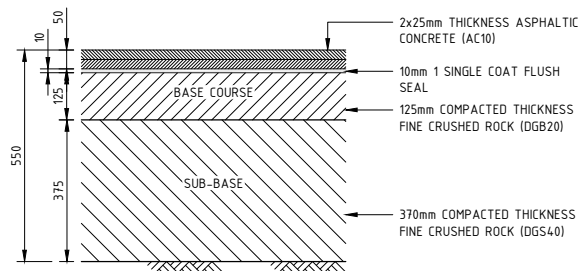


SCALE HORIZ. 1:100 VERT. 1:20

ARCHITECT

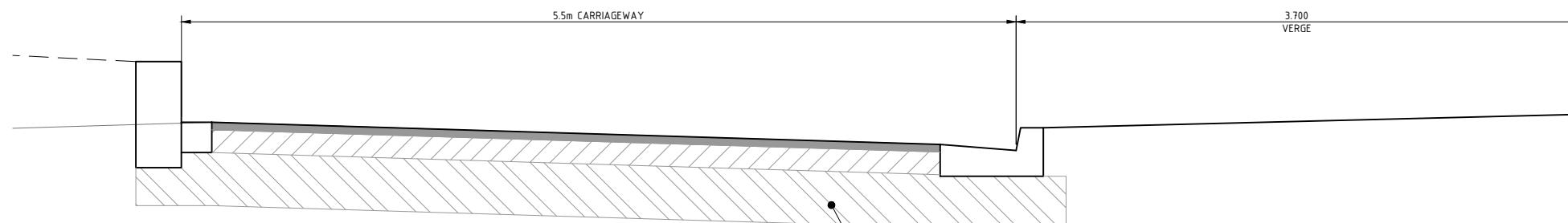


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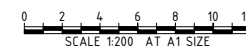


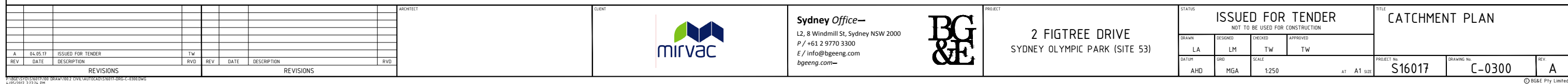
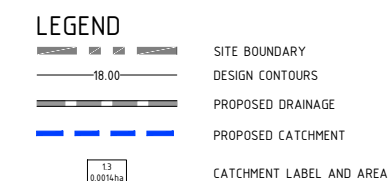
- TRAFFIC LOADING 4.5×10^4 ESA (LOCAL ACCESS STREET)
- ASSUMED CBR MIN 3%
- SUBGRADE COMPACTED TO 100% SMDD

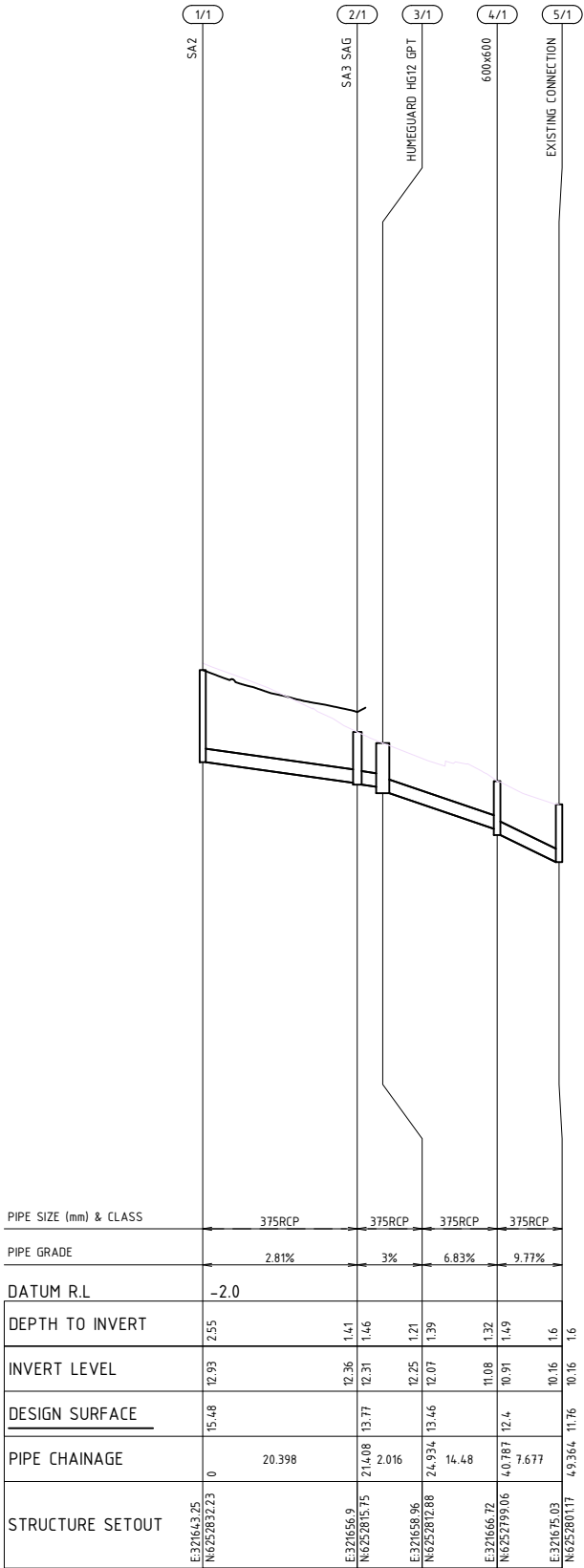
PAVEMENT DESIGN INDICATIVE ONLY
FINAL PENDING GEOTECHNICAL ADVICE



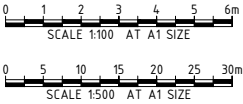
TYPICAL CROSS SECTION
SCALE 1:50

[illegible]





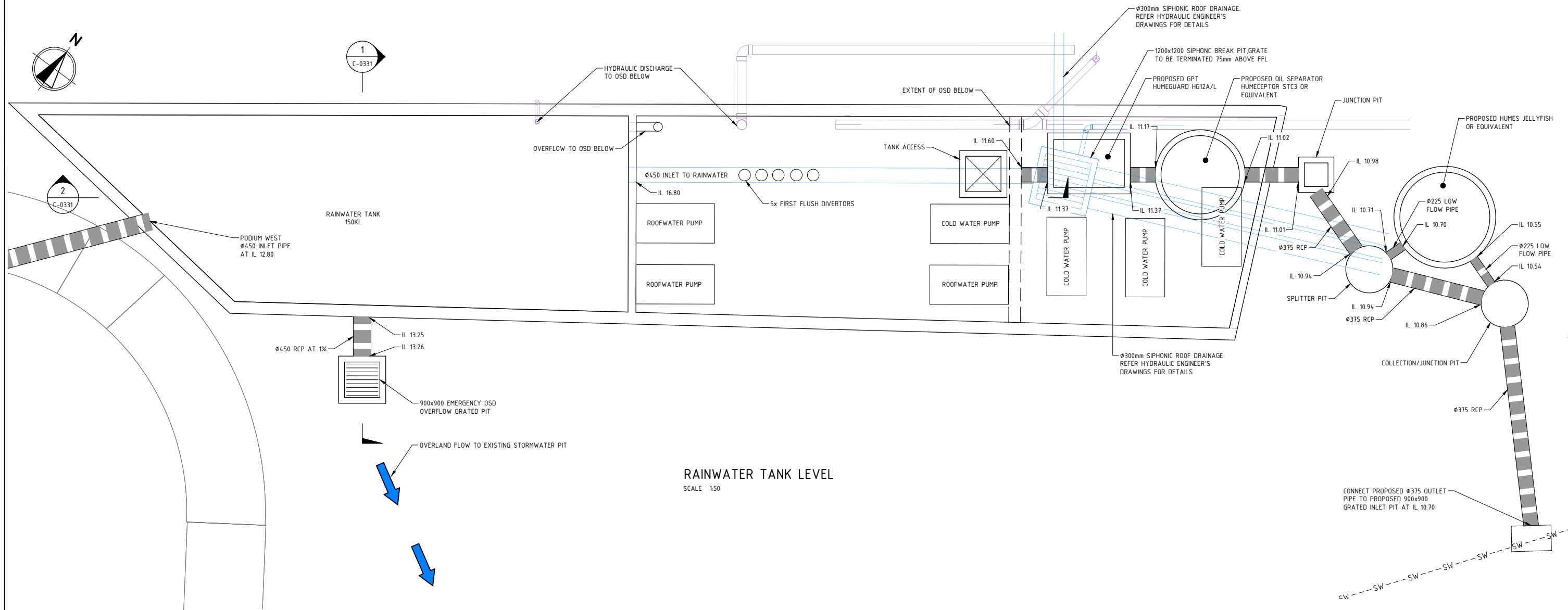
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STATUS

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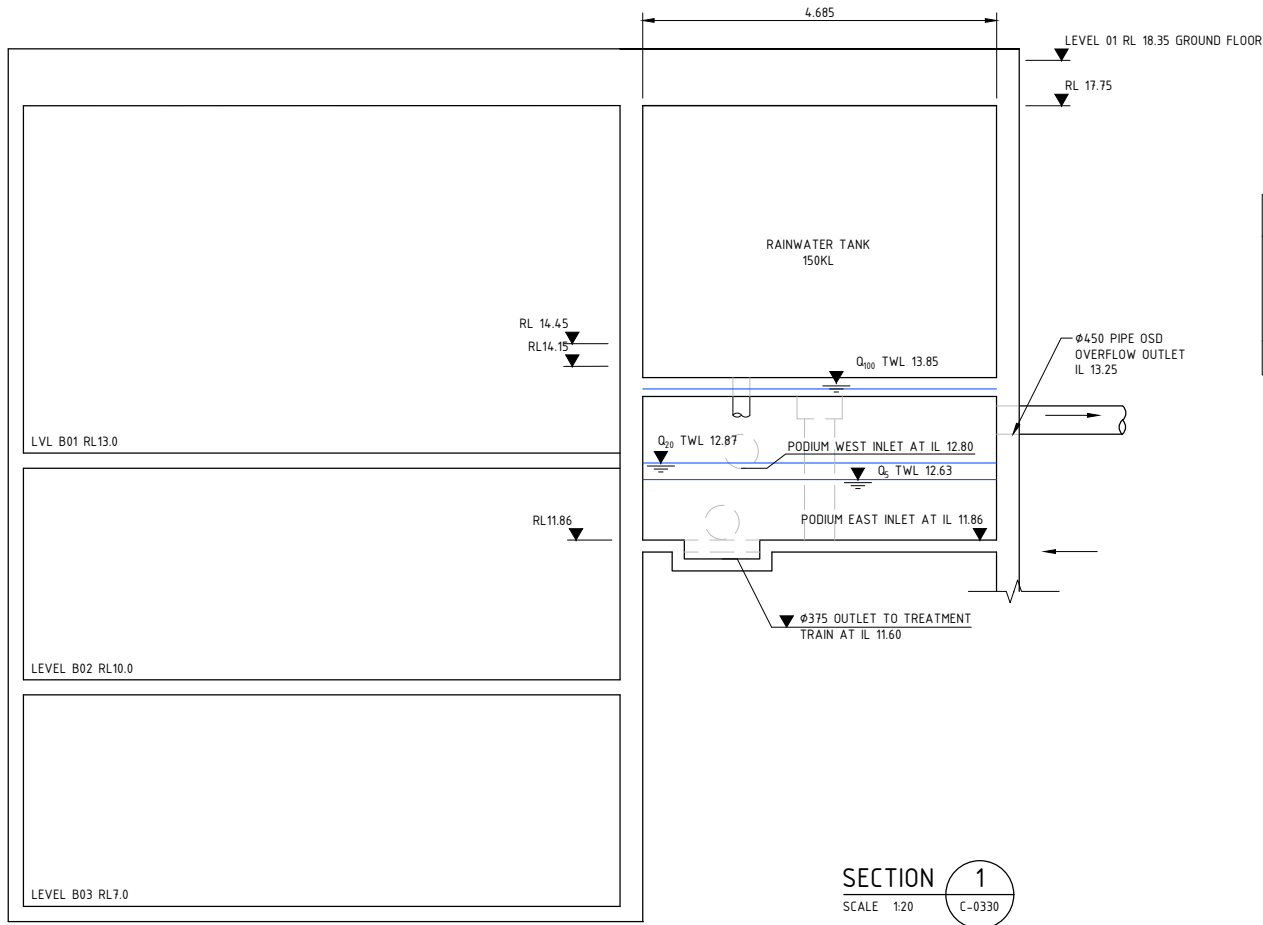
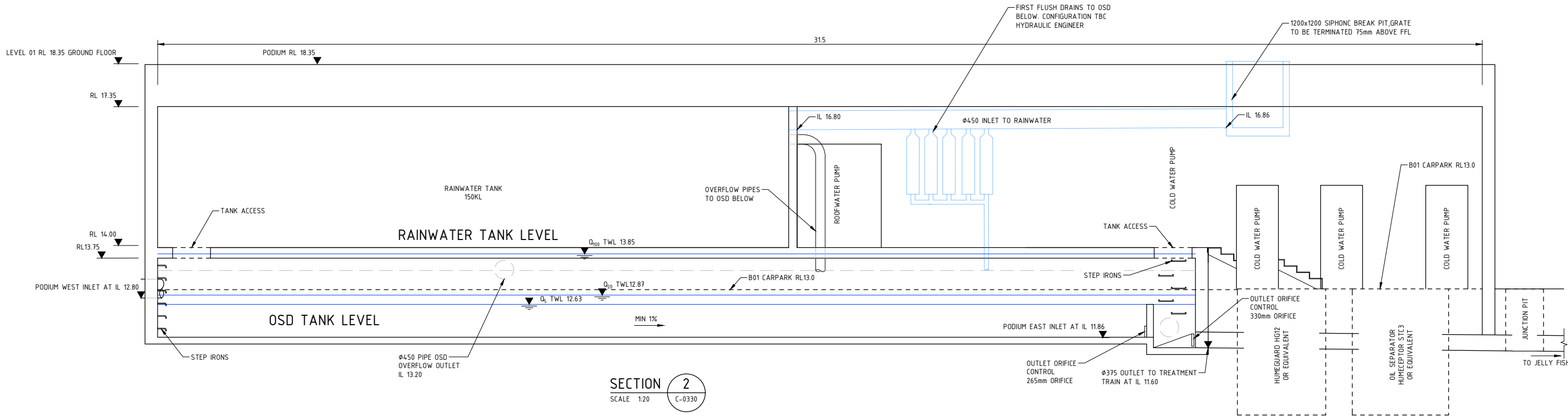
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DATUM	GRID	SCALE	
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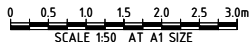
TITLE

OSD PLAN

PROJECT No.	DRAWING No.	REV.
S16017	C-0330	E



OSD CALCULATION TABLE								
ARI	PRE-DEV PEAK (L/s)	POST-DEV WITHOUT OSD FLOW (L/s)	POST-DEV PEAK FLOW (L/s) WITH OSD	POST-DEV FLOW < PRE-DEV FLOW	OSD TOP WATER LEVEL (RL AHDm)	MAX DEPTH (m)	MAX VOLUME (cu.m)	US PIT SURCHARGED
5 YEAR	138	279	138	YES	12.630	0.880	22	NO



REVISIONS				REVISIONS			
REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
E	04.05.17	ISSUED FOR TENDER	TW				
D	07.10.16	ISSUED FOR DA APPROVAL	TW				
C	30.09.16	ISSUED FOR DA APPROVAL	TW				
B	06.09.16	ISSUED FOR INFORMATION	TW				
A	26.07.16	ISSUED FOR REVIEW	TW				

ARCHITECT	CLIENT



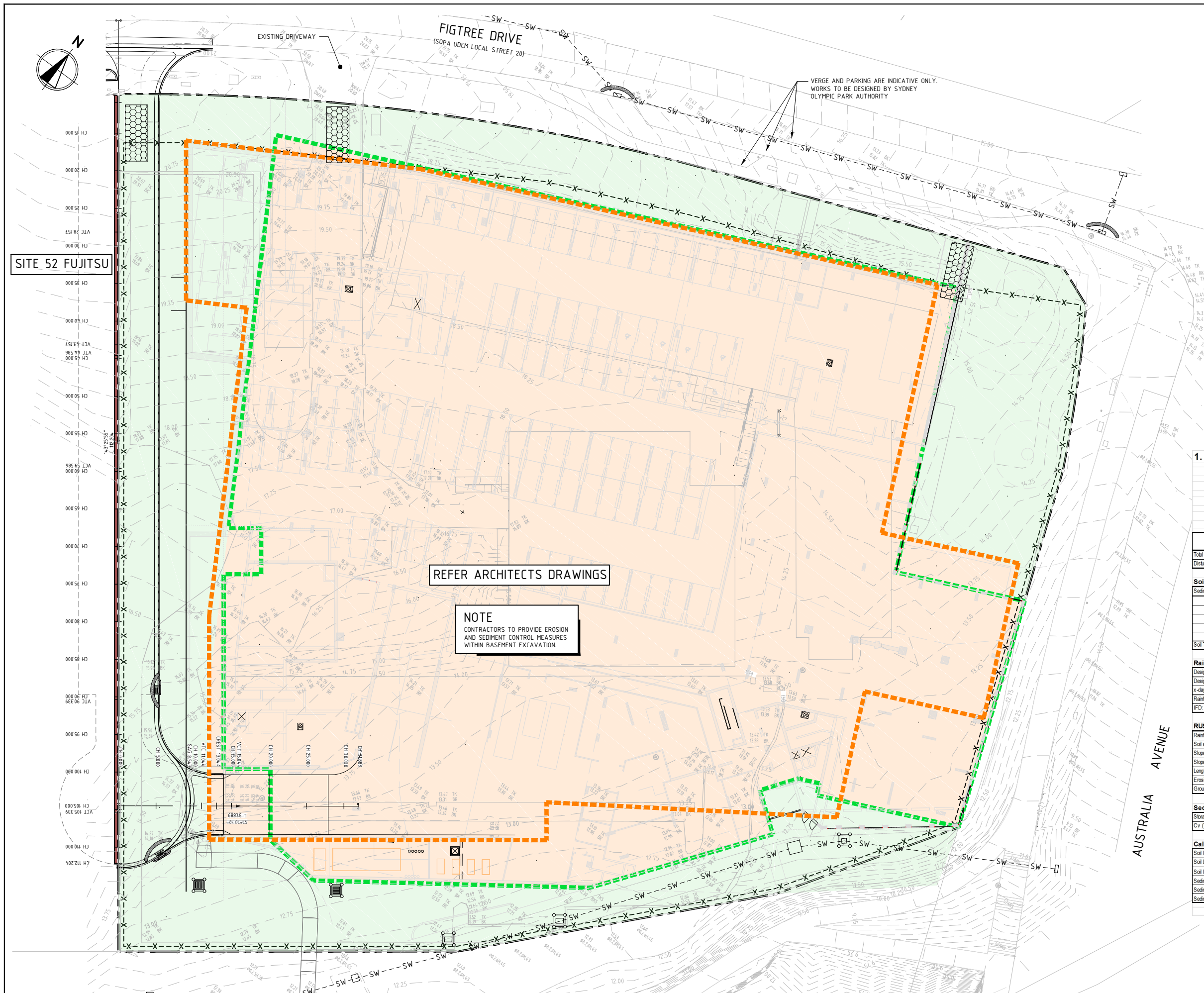
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E / info@bgeeng.com
bgeeng.com—



2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

ISSUED FOR TENDER			
NOT TO BE USED FOR CONSTRUCTION			
DRAWN	DESIGNED	CHECKED	APPROVED
LM	LM	TW	TW
DATUM	GRID	SCALE	
AHD	MGA	1:50	

OSD SECTION		
PROJECT No.	DRAWING No.	REV.
S16017	C-0331	E



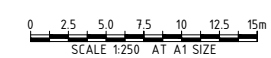
LEGEND

- 20.25 — SITE BOUNDARY
- 20.25 — EXISTING CONTOURS
- Construction Vehicle Exit
- X — X — SEDIMENT FENCE
- Geotextile Inlet Filter
- Inlet Filter
- Diversion Drain
- Assumed Extent of Basement Excavation
- Erosion and Sediment Catchment (3,630m²)

NOTE
A TEMPORARY SEDIMENT BASIN IS NOT DEEMED REQUIRED FOR THE SITE AS THE SOIL LOSS IS LESS THAN THE MINIMUM 150m³ IN ACCORDANCE WITH THE LANDCOM 'BLUE BOOK' PROCEDURE.

1. Erosion Hazard and Sediment Basins				
Site Name: SOPA SITE 53				
Site Location: 2 FIGTREE DRIVE				
Precinct/Stage: N/A				
Other Details:				
Site area	Sub-catchment or Name of Structure	Notes		
Total catchment area (ha)	0.363			
Disturbed catchment area (ha)	0.363			
Soil analysis (enter sediment type if known, or laboratory particle size data)				
Sediment Type (C, F or D) if known:	D			From Appendix C (if known)
% sand (fraction 0.02 to 2.00 mm)	22			Enter the percentage of each soil fraction. E.g. enter 10 for 10%
% silt (fraction 0.002 to 0.02 mm)	26			
% clay (fraction finer than 0.002 mm)	52			
Dispersion percentage	16.0			E.g. enter 10 for dispersion of 10%
% of whole soil dispersible	10.4			See Section 6.3.3(e). Auto-calculated
Soil Texture Group	D			Automatic calculation from above
Rainfall data				
Design rainfall depth (no of days)	5			See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25
Design rainfall depth (percentile)	75			
x-day, y-percentile rainfall event (mm)	14.7			
Rainfall R-factor (if known)				Only need to enter one or the other here
IFD, 2-year, 6-hour storm (if known)	11.1			
RUSLE Factors				
Rainfall erosivity (R-factor)	2670			Auto-filled from above
Soil erodibility (K-factor)	0.038			
Slope length (m)	50			
Slope gradient (%)	7.5			RUSLE LS factor calculated for a high rainfall ratio.
Length/gradient (LS-factor)	1.41			
Erosion control practice (P-factor)	1.3	1.3	1.3	1.3
Ground cover (C-factor)	1	1	1	1
Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)				
Storage (soil) zone design (no of months)	2			Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.39			See Table F2, page F-4 in Appendix E
Calculations and Type D/F Sediment Basin Volumes				
Soil loss (t/ha/yr)	186			
Soil Loss Class	2			See Table 4.2, page 4-13
Soil loss (m³/ha/yr)	143			Conversion to cubic metres
Sediment basin storage (soil) volume (m³)	9			See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m³)	21			See Sections 6.3.4(i) for calculations
Sediment basin total volume (m³)	30			

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).



REVISIONS				
REV	DATE	DESCRIPTION	RVD	
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REVISIONS				
REV	DATE	DESCRIPTION	RVD	
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2 FIGTREE DRIVE
SYDNEY OLYMPIC PARK (SITE 53)

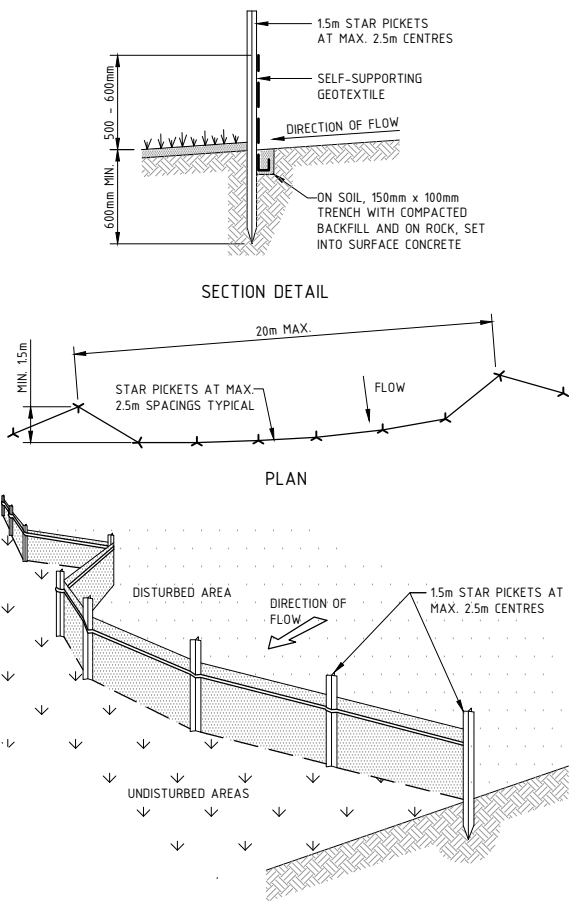
ISSUED FOR TENDER
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
LM	LM	TW	TW

DATUM: AHD
SCALE: 1:250
AT: A1 SIZE

EROSION AND SEDIMENT CONTROL PLAN

PROJECT No: S16017
DRAWING No: C-0700
REV: E

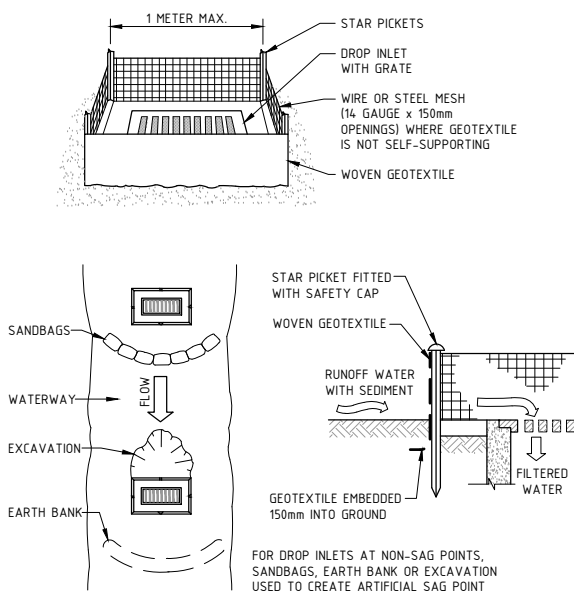


SEDIMENT FENCE CONSTRUCTION NOTES:

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 15m LONG STAR PICKETS INTO GROUND AT 2.5m 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

SCALE N.T.S

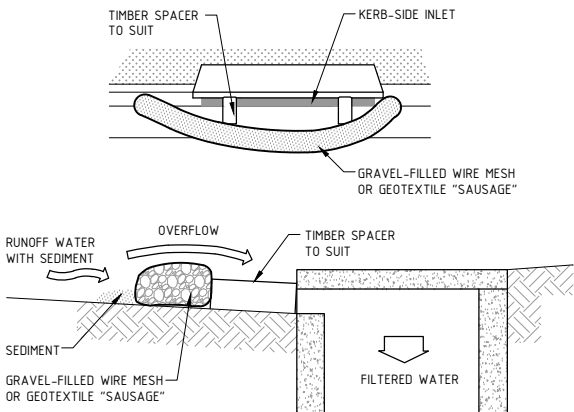


GEOTEXTILE INLET FILTER CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. PICKET SPACING TO BE A MAXIMUM 1.0m 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 GEOTEXTILES UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER

SCALE N.T.S

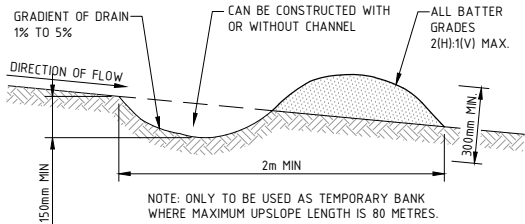


MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

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 CAN FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET FILTER

SCALE N.T.S

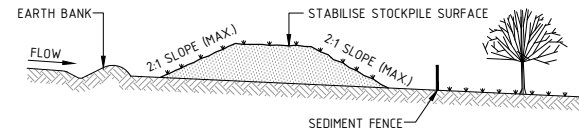


DIVERSION DRAIN CONSTRUCTION NOTES:

1. BUILD WITH GRADIENTS BETWEEN 1% AND 5%.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS-SECTIONS, NOT "V" SHAPED.
5. ENSURE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

DIVERSION DRAIN

SCALE N.T.S

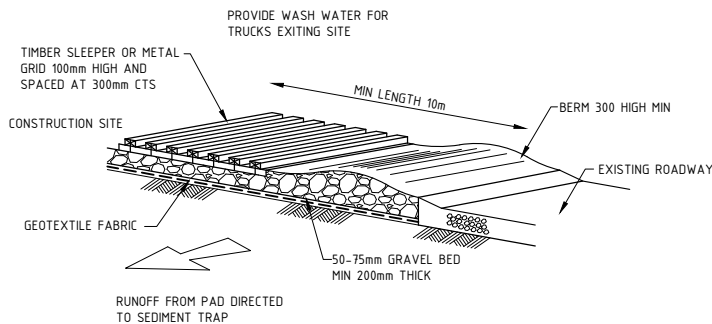


STOCKPILE CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILES

SCALE N.T.S



TEMPORARY CONSTRUCTION VEHICLE EXIT

NTS

1.0 SEDIMENT AND EROSION CONTROL

- 1.1. ALL SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH RELEVANT AUTHORITY GUIDELINES AND ANY DETAILS SHOWN ON THESE DRAWINGS.
- 1.2. ALL PERIMETER AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN EARTHWORKS AND/OR CLEARING.
- 1.3. THE SEDIMENT AND EROSION CONTROL PLAN MAY REQUIRE FUTURE ADJUSTMENT TO REFLECT CONSTRUCTION STAGING. IT IS THE CONTRACTORS RESPONSIBILITY TO PREPARE THEIR OWN SEDIMENT AND EROSION CONTROL PLAN WHICH SUITS THE DESIGNED CONSTRUCTION STAGING.
- 1.4. FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- 1.5. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. DAMAGED SEDIMENT TRAPPING STRUCTURES ARE TO BE REPAIRED AND ANY TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE LOCATION.
- 1.6. ALL TOPSOIL IS TO BE STOCKPILED ON SITE (AWAY FROM TREES AND DRAINAGE LINES) IN ACCORDANCE WITH DETAILS PROVIDED AND WITH RELEVANT AUTHORITY GUIDELINES. MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- 1.7. ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO SEAL THE EARTHWORKS. DUST SUPPRESSION SHALL BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUTHORITIES GUIDELINES.
- 1.8. UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY RELEVANT AUTHORITY, SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.
- 1.9. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND STRAW MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION U.N.O. BY LANDSCAPE ARCHITECTS.
- 1.10. EROSION AND SILT PROTECTION MEASURES ARE TO BE MAINTAINED AT ALL TIMES.
- 1.11. ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ENTRY/EXIT AS PER DETAILS PROVIDED OR WITH RELEVANT AUTHORITY GUIDELINES.
- 1.12. ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING SITE TO LIMIT SEDIMENT TRACKING TO ROADWAYS.

REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
E	04.05.17	ISSUED FOR TENDER	TW				
D	07.10.16	ISSUED FOR DA APPROVAL	TW				
C	30.09.16	ISSUED FOR DA APPROVAL	TW				
B	06.09.16	ISSUED FOR INFORMATION	TW				
A	26.07.16	ISSUED FOR REVIEW	TW				
REVISIONS				REVISIONS			

4/20/2017 12:12 PM

ARCHITECT	CLIENT



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PROJECT	TITLE
2 FIGTREE DRIVE SYDNEY OLYMPIC PARK (SITE 53)	EROSION AND SEDIMENT CONTROL DETAILS

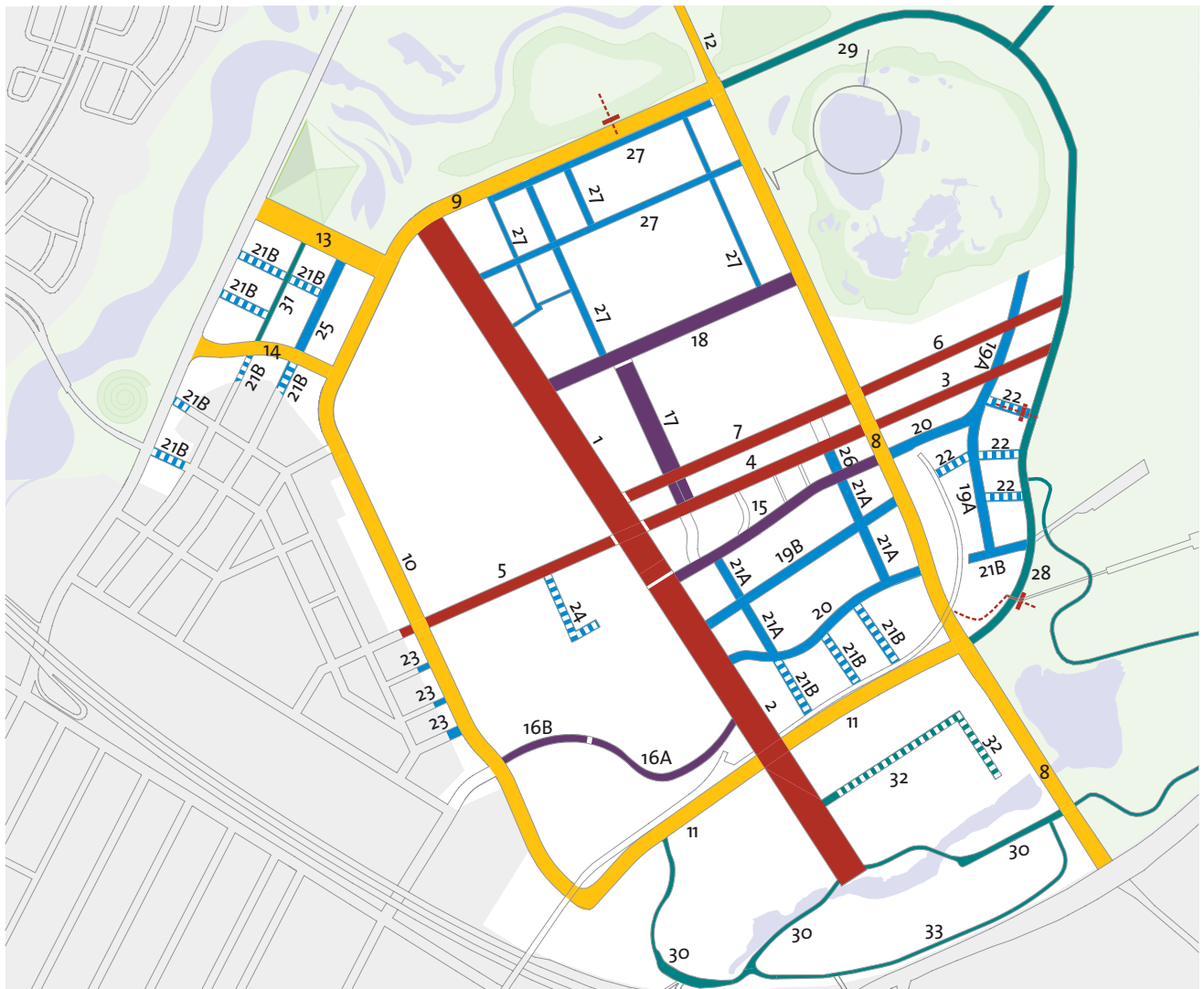
ISSUED FOR TENDER				NOT TO BE USED FOR CONSTRUCTION		
DRAWN	DESIGNED	CHECKED	APPROVED			
LM	LM	TW	TW			
DATUM	GRID	SCALE				
AHD	MGA	AS SHOWN				
AT A1 SIZE				PROJECT No.	DRAWING No.	REV.
				S16017	C-0710	E

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UEDM Road 21A Profile

Streets Master Plan

Draft Sydney Olympic Masterplan 2030
Section 4: refer to Sydney Olympic
Masterplan 2030 for final street layout.



Civic Streets	Perimeter Avenues	Town Streets	Local Streets	Park Edge Streets
1 Olympic Boulevard North	8 Australia Avenue	15 Herb Elliott Avenue	19A Median Street	28 Bennelong Parkway
2 Olympic Boulevard South	9 Kevin Coombs Avenue	16A Shane Gould Avenue East	19B East West Street	29 Majorie Jackson Parkway
3 Dawn Fraser Avenue East	10 Edwin Flack Avenue	16B Shane Gould Avenue West	20 Figtree Avenue & Parkview Drive	30 Shirley Strickland Avenue
4 Dawn Fraser Avenue Central	11 Sarah Durack Avenue	17 Showground Road	21A North South Street	31 Park Edge Street Haslams
5 Dawn Fraser Avenue West	12 Holker Street	18 Grand Parade	21B Verge Street	32 Park Edge Street Boundary Creek
6 Murray Rose Avenue East	13 Pondage Link Road		22 Pedestrian Street	33 Rod Laver Drive
7 Murray Rose Avenue Central	14 Old Hill Road		23 Shared Way	
			24 Car Parking Street	
			25 Coach Parking Street	
			26 Park Street	
			27 Showground Street	

Authority Funded Streets
Development Funded Streets

Note: Highlighted in *italics*, are new additional streets to be implemented under Master Plan 2030.

Principle

2008

DESIGN INTENT ONLY

Section 2.1
Placement and Co-ordination

MP

S21B Verge Street

For arrangement and urban elements refer to the following details:

- 2.1 Placement and Co-ordination
PCb for urban element placement
- 3.1 Pavements and Level Changes
P12 for footpath paving
P15 for kerb ramp
- 3.2 Street Furniture
no seats
no bins
- 3.3 Lighting
LA3 for street lighting
- 3.4 Engineering Elements
E3 for kerb and gutter
- 3.5 Street Tree Planting
T1 for planting species
T3 for tree in verge

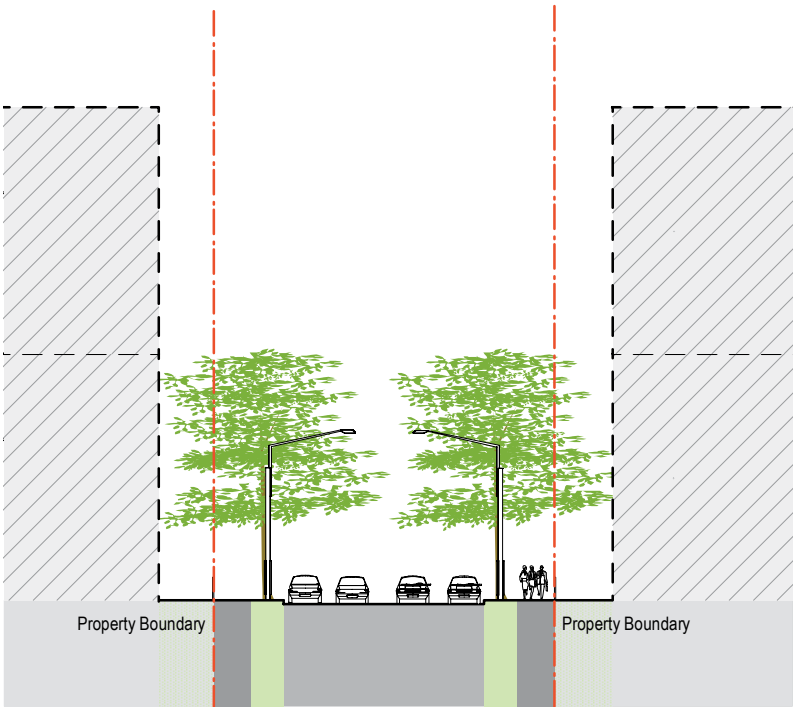
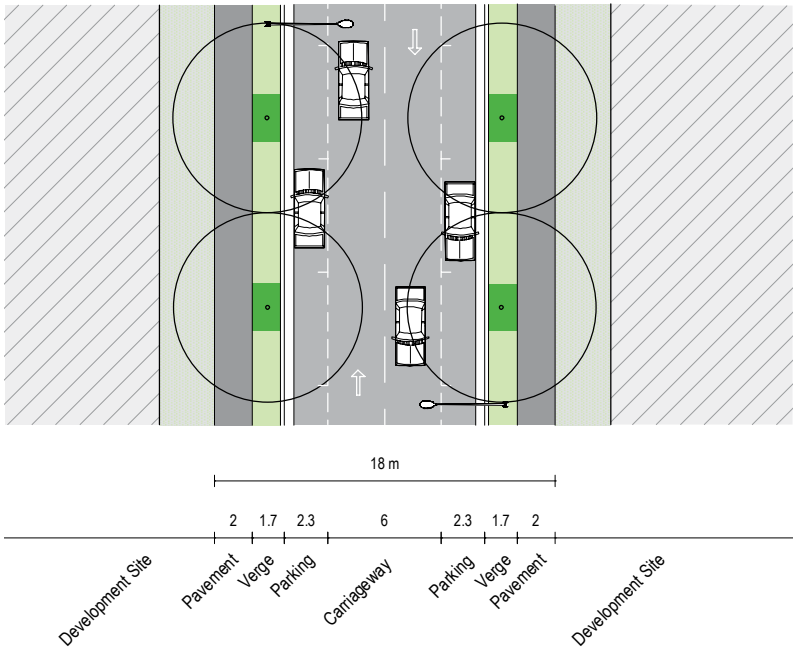


Figure C24b Verge Street – Indicative Plan



Humes Correspondence and WSUD Element Sizing

Trevor Woodward

From: Firas Naji <firas.naji@lafargeholcim.com>
Sent: Wednesday, 9 March 2016 2:28 PM
To: Trevor Woodward
Subject: Re: 2 Figtree drive
Attachments: 2 Figtree Homebush Bay Humes MUSIC results3.jpg; 2 Figtree dr Sydney olympic Park PCSWMM report .pdf; 2 Figtree Dr Sydney Olympic Park_Humes_9Mar2016.sqz; HC-JF1800-STC3 - V1.pdf; HG12AL.pdf; Humes Humeceptor STC3.pdf; BR_JF18_Configurations.pdf

Hi Trevor,

I revised the MUSIC model based on the updated information and configuration (attached) and you would need the following treatment train:

- Hume gard HG12A (375mm inlet/outlet pipe). Standard design drawing is attached. The inlet of this HG12A will be 225mm below the invert of the OSD tank outlet. Price for this is \$13,200
- Humeceptor STC3 (standard design drawing is attached). The inlet of this STC3 will be 200mm below the invert of the HG12A outlet. This will have two outlets, the main line 375mm outlet and the secondary 225mm outlet, which will be directed to the Jellyfish filter. Invert level arrangement will be as shown in the attached GA drawing for the STC3- JF1800 treatment train. Price for this is \$12,970
- JF1800-5-1 (standard design drawing is attached) and invert level arrangement will be as shown in the attached GA drawing for the STC3- JF1800 treatment train. Price for this is \$45,100.

Please note all quoted prices are GST exclusive and include transport to site n trucks (to be unloaded by others).

in relation to maintenance costs, based on 2006 prices for maintenance provider (indexed to 2016 @ 2.5% per year), you will need about \$2,900 per year to maintain all three devices. You will need additional \$9,000 cartridge replacement cost every 5 years on average. The maintenance is provided by any accredited waste management contractor.

Regards

Firas Naji | B.Eng (Civil), MES (Env), MIEAust, CPEng
Central Region Engineered Solutions Manager
Holcim (Australia) Pty Limited
Humes concrete products
Lot 1 Woodstock Ave, Rooty Hill NSW 2766
P +61 2 98325551 I F +61 2 9625 5200 I M +61 419 476 725
firas.naji@humes.com.au
www.humes.com.au

A member of LafargeHolcim

PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL.

On 9 March 2016 at 12:52, Trevor Woodward <trevor.woodward@bgeeng.com> wrote:

| Firas,

Additional information – outlet pipe is 375mm (from OSD)

Orifice is 275mm dia

Orifice cl RL = 11.74

Base of tank rl 11.85

5 year –

top water lvl = 12.64

vol – 85cu.m

20 year-

top water lvl = 13.29

vol – 155cu.m

100 year-

top water lvl = 13.95

vol – 225cu.m

Do you think you can have something back to me today?

I'll be finalising my report tonight.

Regards,

Trevor.

Please note:

All mobile reception within the Sydney Office is DOWN until further notice due to the decommission of the adjacent Harbour Control Tower at Barangaroo. Please use the office number 02 9770 3300 to contact staff in the office.

Trevor Woodward—
Senior Civil Engineer



Level 2, 8 Windmill Street, Sydney NSW 2000
P / +61 2 9770 3300 *M* / +61 402 454 338 *E* / trevor.woodward@bgeeng.com *W* / bgeeng.com

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Humeceptor® Design Summary

PCSWMM for Humeceptor®

Project Information

Date	21/01/2016
Project Name	2 Figtree Dr
Project Number	N/A
Location	Sydney Olympic Park

Designer Information

Company	BG&E
Contact	trevor

Notes

N/A

Drainage Area

Total Area (ha)	0.9943
Imperviousness (%)	54

The Humeceptor® System model STC 3 achieves the water quality objective removing 84% TSS for a Roads & Hardstand particle size distribution and 84% runoff volume.

Rainfall

Name	PARRAMATTA N (MASONS DR)
State	NSW
ID	6612
Years of Records	1984 to 2006
Latitude	33°47'30"S
Longitude	151°1'5"E

Water Quality Objective

TSS Removal (%)	80
Runoff Volume (%)	0

Upstream Storage

Storage (cu-m)	Discharge (L/s)
0	0

Humeceptor® Sizing Summary

Humeceptor® Model	TSS Removal %	Runoff Volume %
STC 2	76	69
STC 3	84	84
STC 5	85	84
STC 7	85	84
STC 9	89	90
STC 14	90	90
STC 18	92	95
STC 23	92	95
STC 27	94	97
STC 40	96	99
STC 50	96	99
STC 60	97	99

Particle Size Distribution

Removing finer sediment particles (<100 microns) from runoff ensures that more of the pollutants, such as hydrocarbons and heavy metals, are captured and are not discharged into our natural waterways. The table below lists the particle size distribution used to define the annual TSS removal.

Roads & Hardstand								
Particle Size	Distribution	Specific Gravity	Settling Velocity		Particle Size	Distribution	Specific Gravity	Settling Velocity
µm	%		m/s		µm	%		m/s
0.2	0.1	2.65	0.0004					
22.55	9.9	2.65	0.0005					
99.94	40	2.65	0.0070					
340.67	40	2.65	0.0524					
1000	9.9	2.65	0.1691					
2000	0.1	2.65	0.2870					

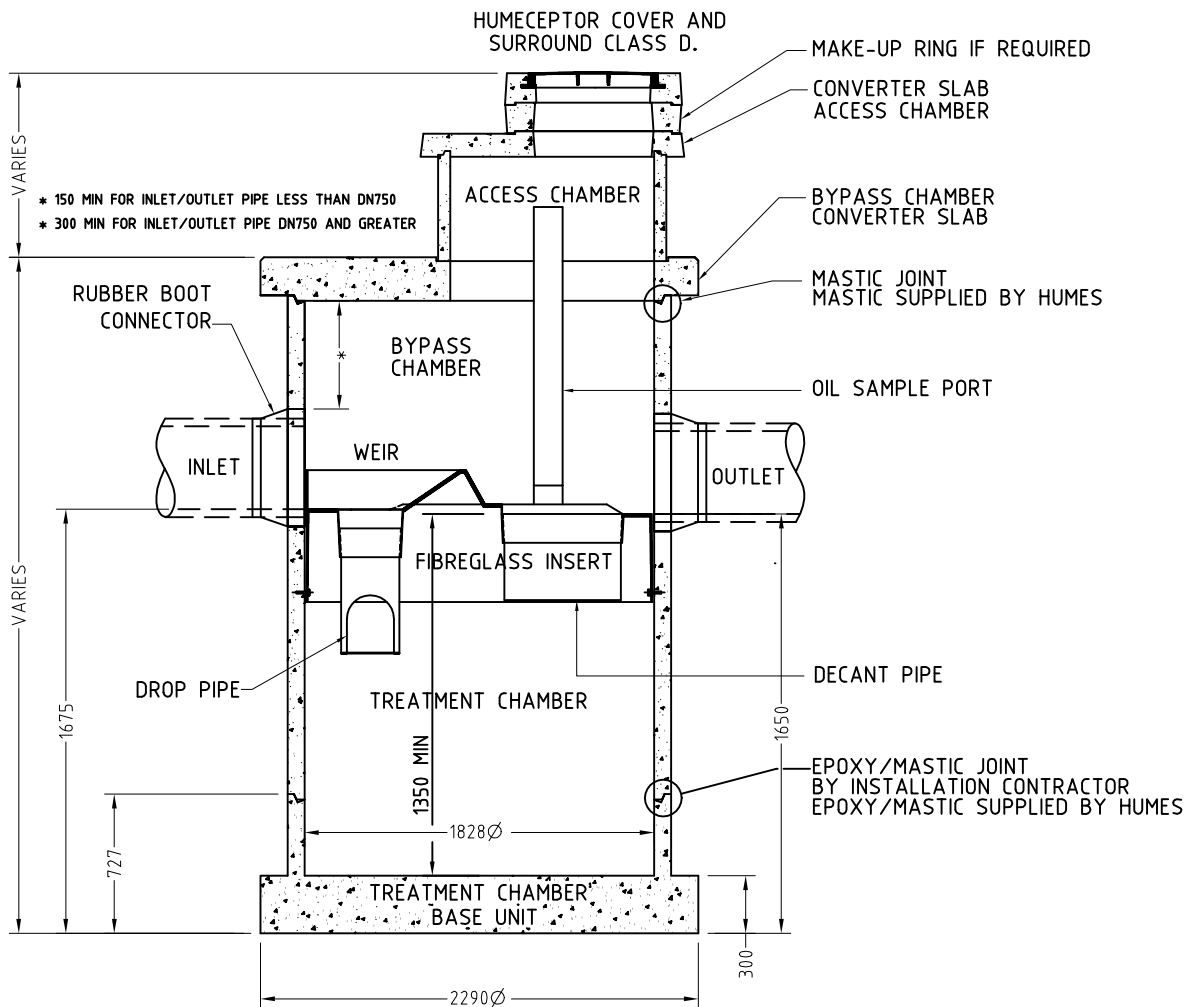
Humeceptor® Design Notes

- **Humeceptor®** performance estimates are based on simulations using PCSWMM for **Humeceptor®** and historical rainfall data.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC2 and **Multiceptor™** units are adaptable to function with a grated inlet and/or inline pipes.
- Only the **Multiceptor™** models STC 3 to STC 27 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 2	STC 3 to STC 27	STC40 to STC60
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

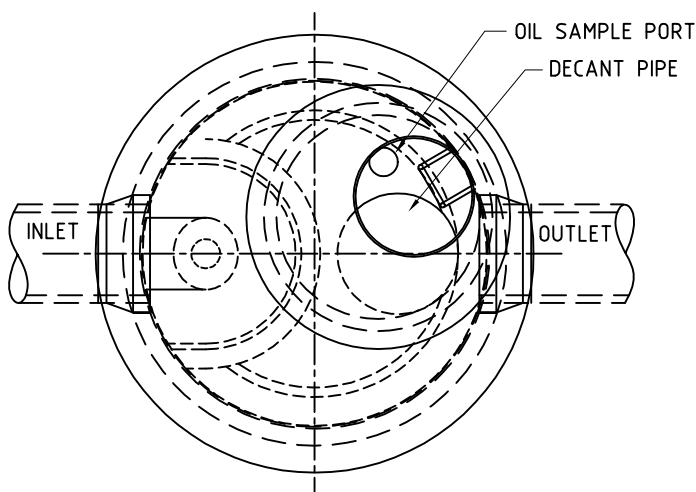
- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the drainage network is not submerged during zero flows. For submerged applications, please contact your local **Humes™** Water Solutions representative for an **Aquaceptor™**.
- Design estimates may be modified for specific spills controls (**Humeceptor®** EOS). Please contact your local **Humes™** Water Solutions representative for further assistance.
- For pricing inquiries or assistance, please contact **Humes™** Water Solutions, Ph. 1300 361 601, www.humeswatersolutions.com.au



SECTION THROUGH CHAMBER

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
TOTAL = 3540 LITRES
OIL STORAGE VOLUME = 1020 LITRES
SEDIMENT STORAGE VOLUME = 2.20 m³
4. COMPONENT MASSES
TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 3.9 TONNE
BYPASS CHAMBER = VARIES
BYPASS CHAMBER CONVERTER SLAB = 1.9 TONNE
5. REFER TO INSTALLATION GUIDE FOR RECOMMENDED INSTALLATION PROCEDURE
6. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS THE FOLLOWING SWIFTLIFT KNUCKLES WILL BE REQUIRED:
4 x 1.3 TONNES
4 x 2.5 TONNES
4 x 5.0 TONNES
7. OIL SAMPLE PORT, STEP IRONS AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.



PLAN

Humes™

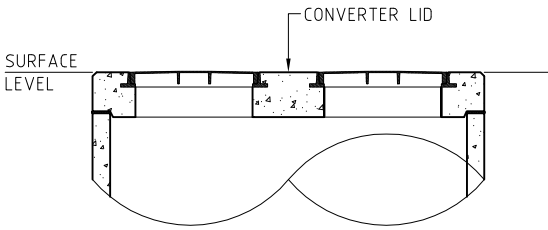
JULY 2003

Humeceptor™

MODEL STC3
3540 LITRES HOLDING CAPACITY

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	ISSUED FOR INFORMATION	GJH	20-01-14	CK

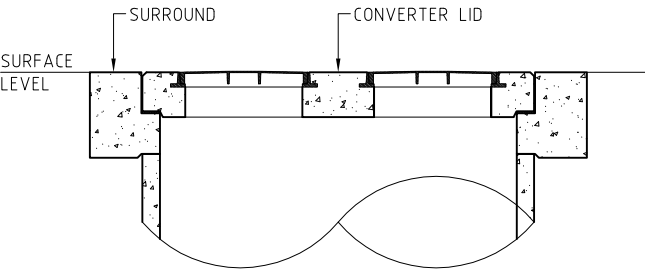
LID OPTIONS



CONVERTER LID

SCALE 1:20

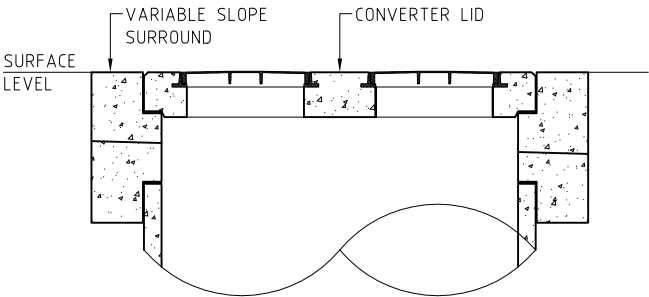
MINIMUM DEPTH FROM SURFACE
TO INLET PIPE I.L. = 1.6m
* SHALLOWER DEPTHS MAY BE
ACHIEVED; HOWEVER THIS WILL BE
ASSESSED ON A CASE BY CASE BASIS



CONVERTER LID c/w FLAT SURROUND

SCALE 1:20

MINIMUM DEPTH FROM SURFACE
TO INLET PIPE I.L. = 0.865m



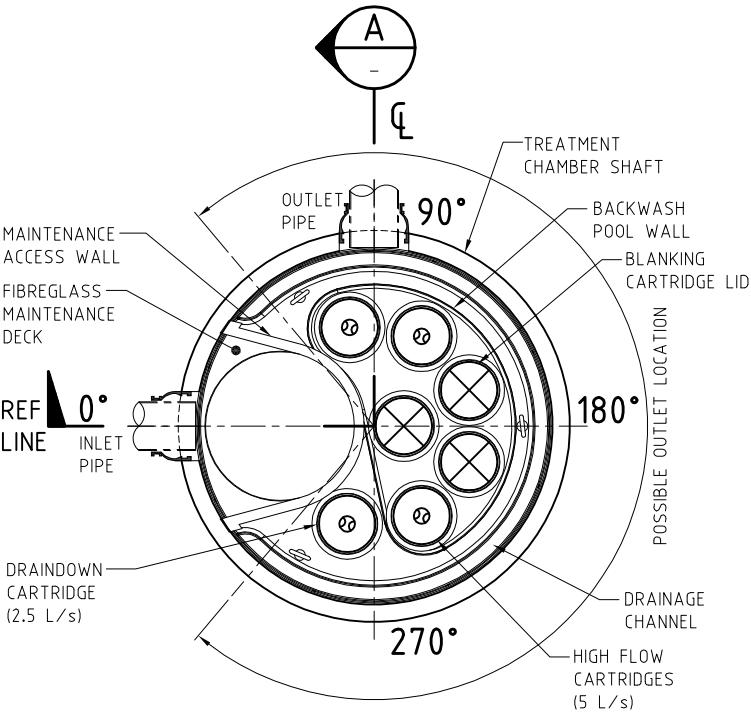
CONVERTER LID c/w VARIABLE SLOPED SURROUND

SCALE 1:20

MINIMUM DEPTH FROM SURFACE
TO INLET PIPE I.L. = 1.168m

NOTES:

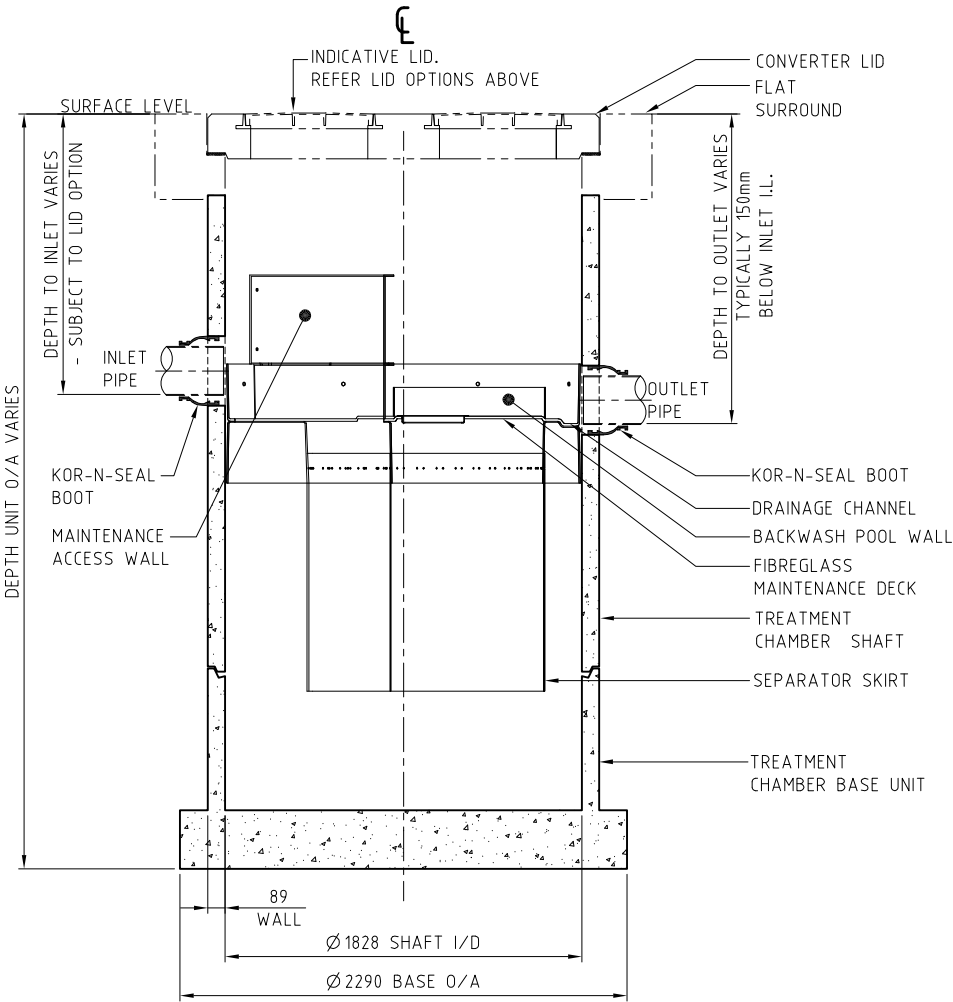
- 1. LID DESIGNED FOR CLASS 'D' VEHICLE LOADING
AS PER AS3996
- 2. FOUNDING MATERIAL TO BE A MINIMUM 200kPa (WORKING LOAD)
AND 150mm THICK COMPACTED GRAVEL TO 95% MDD
- 3. ABBREVIATIONS:
O/A = OVERALL
I/D = INTERNAL DIAMETER
O/D = OUTSIDE DIAMETER



SECTIONAL PLAN

SCALE 1:20

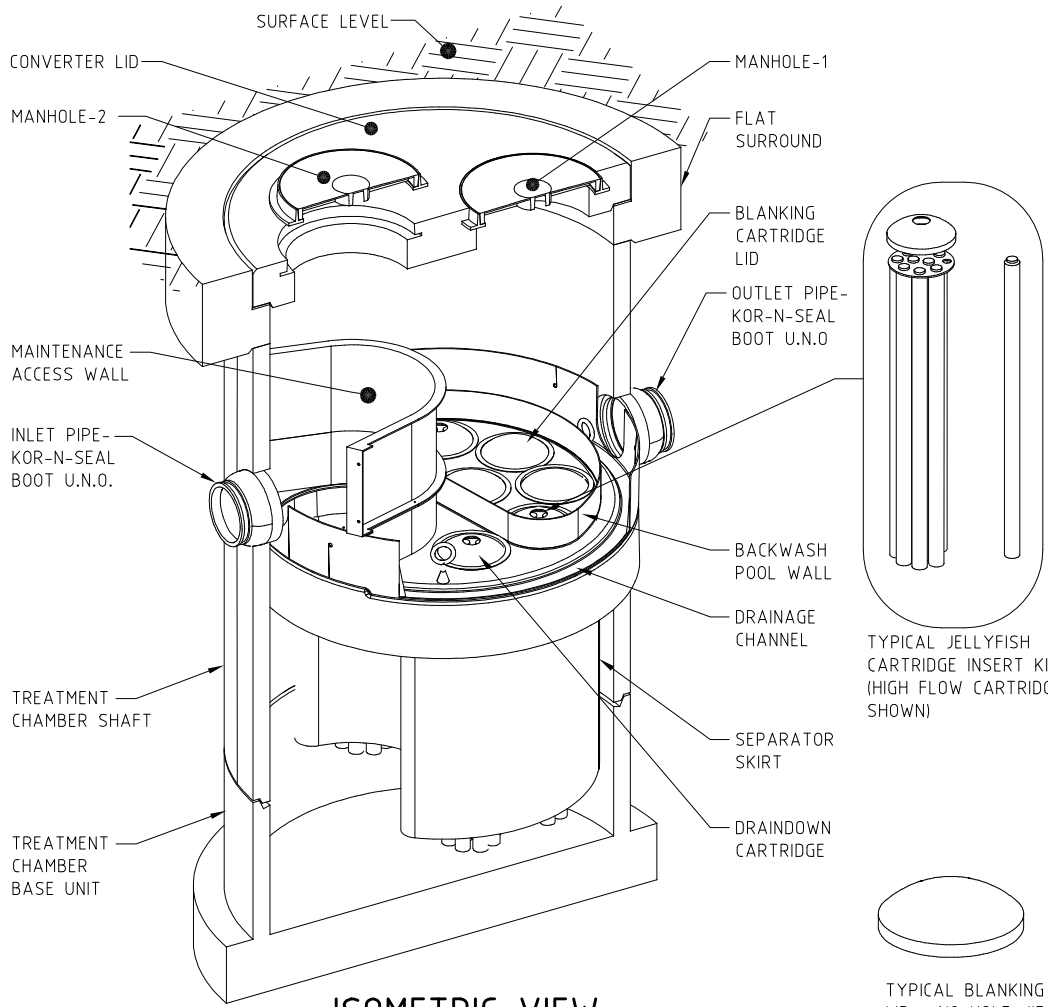
- 1. DENOTES BLANKING CARTRIDGE LID (IF REQUIRED)
- 2. MODEL SHOWN JF-1800-4-1



SECTION A-A

SCALE 1:20

- 1. PIPE INLET SLOPE - 5% MAX
- 2. JELLYFISH CARTRIDGES, TENTACLES NOT SHOWN
FOR CLARITY



ISOMETRIC VIEW

SCALE N.T.S.

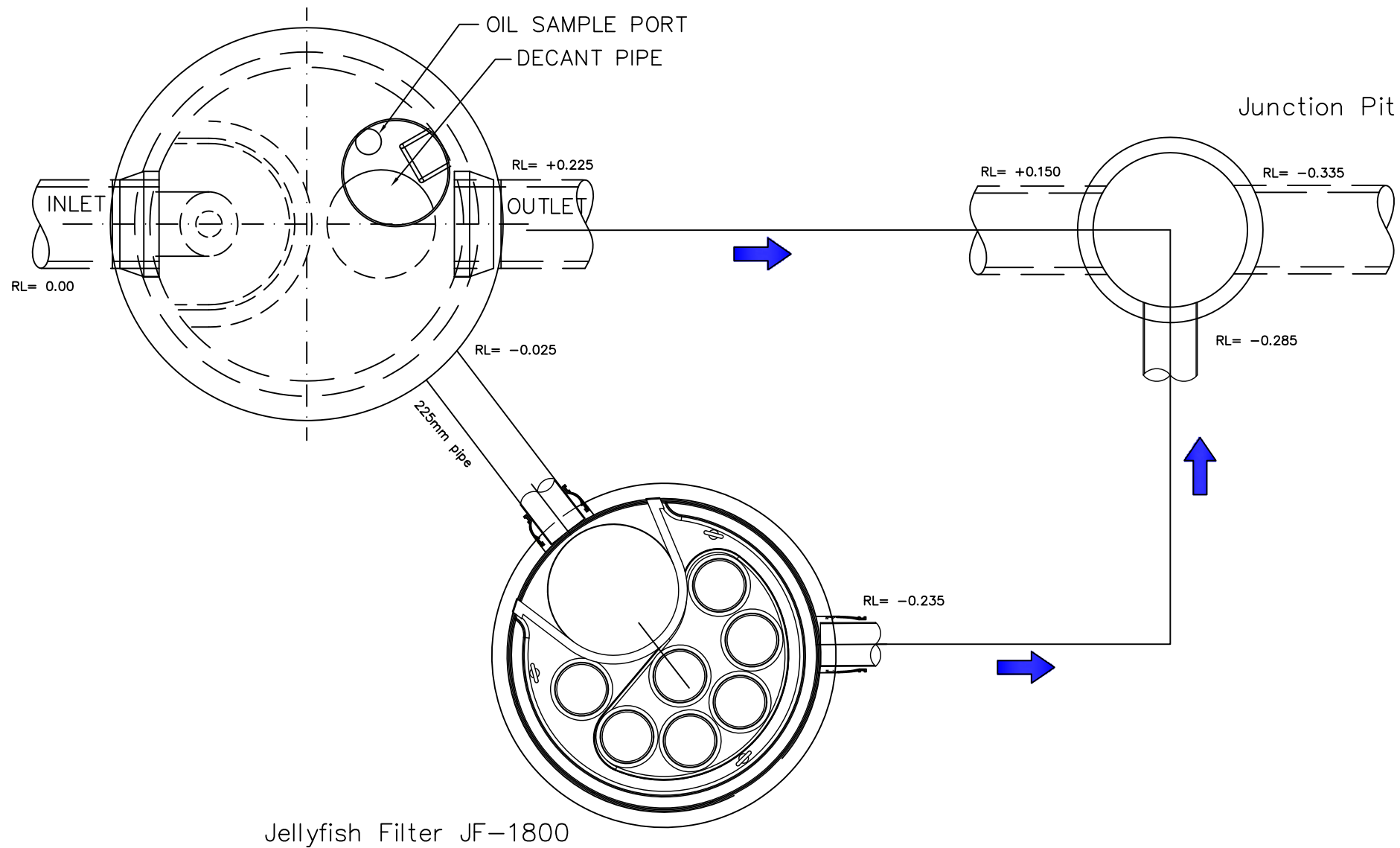
ISOMETRIC VIEW IS A GUIDE ONLY.
OUTLET PIPE LOCATION MAY VARY FROM IMAGE

INLET PIPE - DN225 uPVC
OUTLET PIPE - DN225 uPVC

CONTACT HUMES FOR MODELS THAT
REQUIRE GREATER DEPTHS.

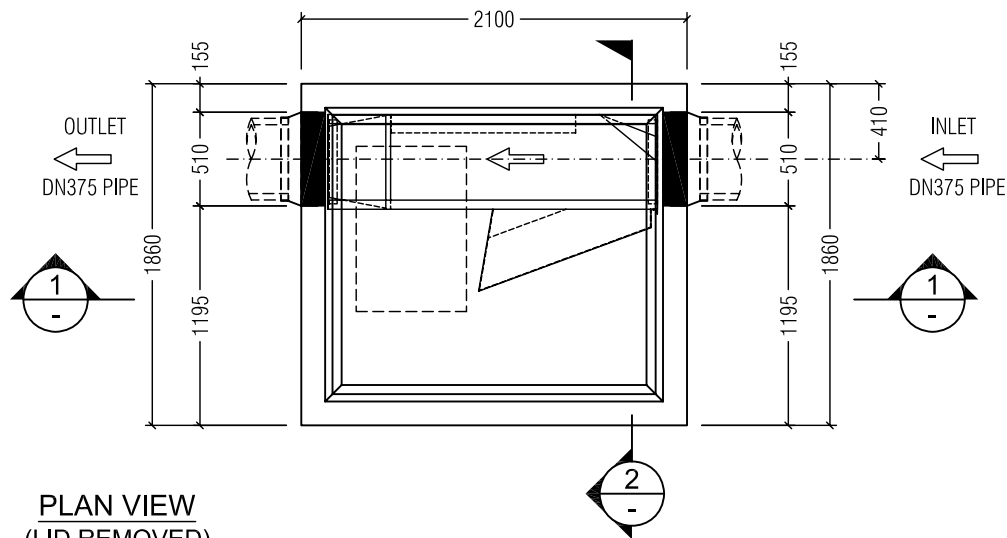
		HUMES		TECHNICAL SERVICES BRISBANE, QUEENSLAND	
Holcim (Australia) Pty Ltd PRIVATE DESIGN: This drawing remains, at all times, the property of Holcim (Australia) Pty Ltd and is subject to recall immediately upon request. It must not be loaned, copied or communicated in any form or by any means without permission of Holcim (Australia) Pty Ltd.		JELLYFISH FILTER JF-1800		GENERAL ASSEMBLY	
2014		1:1		A1 JF-1800-GA 0	

Humeceptor STC3



PLAN

Humeceptor STC3 – JELLYFISH JF1800 General Arrangement



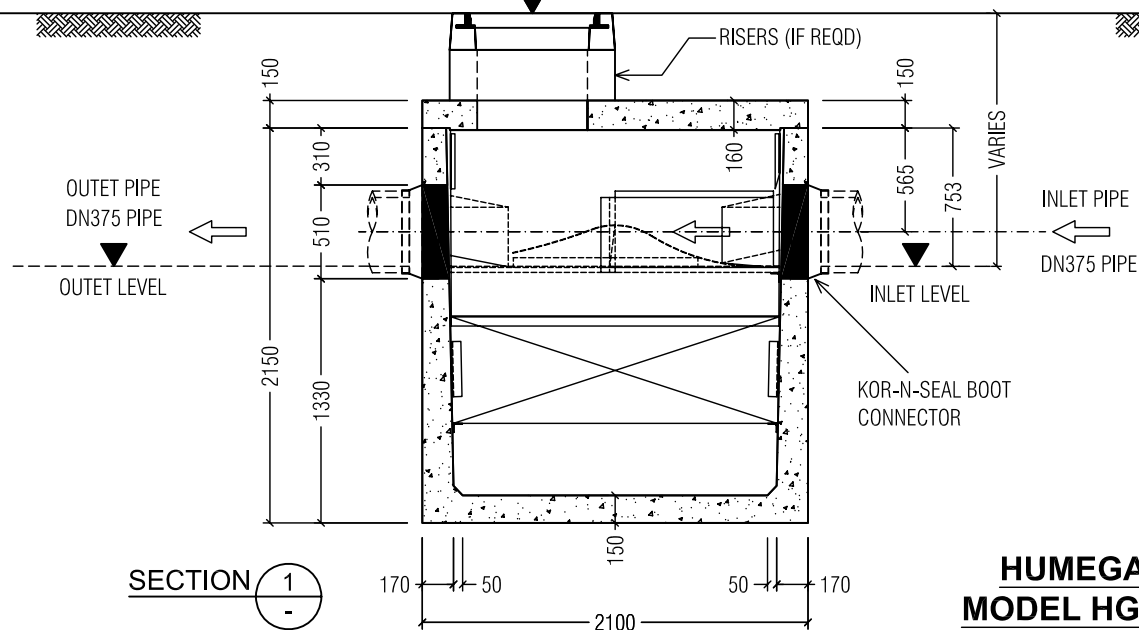
NOTES:

1. STEEL INSERTS MANUFACTURED FROM 3mm GALVANISED SHEET.
2. ALL CONCRETE COMPONENTS TO BE HANDLED VIA CAST-IN SWIFTLIFT ANCHORS AT ALL TIMES.
3. UNIT MASS: MASS OF BASE = 7000 Kg
MASS OF LID = 1350 Kg
4. DESIGN BASIS: DESIGNED TO AS3600 FOR 0 TO 2m FILL OVER TOP OF LID AND VEHICLE LIVE LOADS W7, T44 TO AUSTRROADS BRIDGE DESIGN CODE.
5. DESIGN SUITABLE UP TO B2 EXPOSURE CLASSIFICATION TO AS3600.

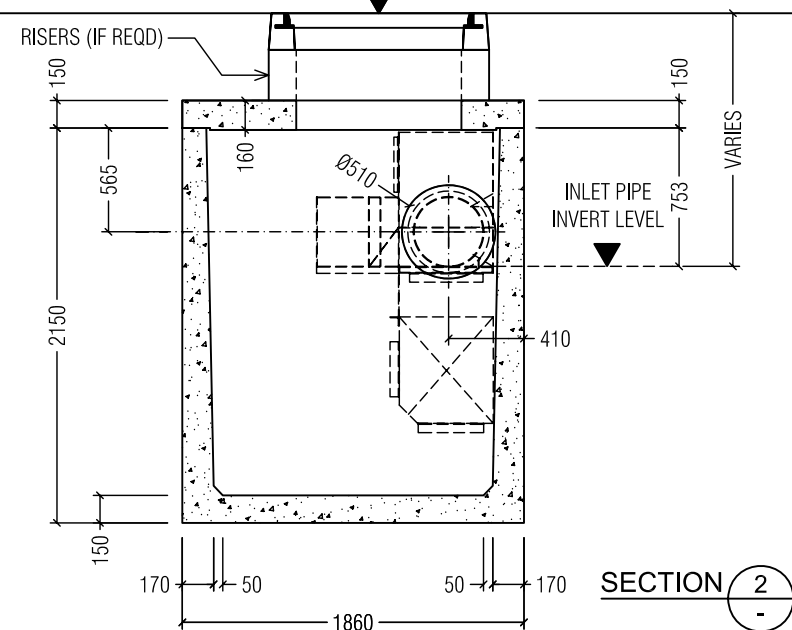
900 x 600 CLASS B CAST
IRON COVER & SURROUND
(SUPPLIED LOOSE)

FINISHED SURFACE LEVEL

900 x 600 CLASS B CAST
IRON COVER & SURROUND
(SUPPLIED LOOSE)



**HUMEGARD
MODEL HG12A-L**



ISSUE	DETAILS OF ALTERATIONS	DWN	DATE					HUMES N.S.W. HUMEGARD MODEL HG12A - L (RIGHT HAND UNIT) GENERAL ARRANGEMENT			
A	FIRST ISSUE	R.P.	-								
								SCALE	SIZE	DRG. NO.	ISSUE
				Supersedes				N.T.S	A4	HG12A-L	A

Indicative Bio- retention WSUD Lifecycle Costing Information

4 | Life Cycle Costing



Bioswale | Victoria Park

Indirect tangible benefits associated with well designed and constructed WSUD elements are the environmental outcomes such as reductions in potable water demands, downstream pollution and waterway rehabilitation works.

An important part of implementing WSUD strategies is the cost the systems pose to Councils. There are many approaches to computing and accounting the cost of infrastructure. In the case of land development, the capital cost is often borne by the developer with the asset subsequently assumed by local government with associated maintenance and renewal responsibilities.

The life cycle cost of an asset is made up of its capital cost, operational and maintenance cost, renewal cost and decommissioning cost. Often not included in a life cycle cost/benefit analysis are the benefits both directly accrued to the development, and indirectly attributed to the works within the development. The benefits directly

accrued to the development are reflected in the increased demand for properties in the development as reflected in the sale price. Indirect tangible benefits associated with well designed and constructed WSUD elements are the environmental outcomes such as reductions in potable water demands, downstream pollution and waterway rehabilitation works. Organisations are now considering the total community costs in evaluating water management strategies.



4.1 What are the Life Cycle Costs of WSUD Elements

The impact of maintenance and renewal costs is dependent on the expected life span of the asset.

Life cycle costing is a process to determine the sum of all expenses associated with a product or project, including acquisition, installation, operation, maintenance, refurbishment, discarding and disposal costs (Standards Australia, 1999). The life cycle costs (LCC) for WSUD elements include the total acquisition cost (TAC), the total annual maintenance (TAM), renewal, and decommissioning costs. The impact of maintenance and renewal costs is dependent on the expected life span of the asset. The decommissioning cost in some WSUD systems, such as constructed wetlands, may be irrelevant as they are designed to operate in perpetuity. All life cycle costs are discounted back to a base date (date of installation).

How is the Life Cycle Costs Calculated?

The supporting user manual for the Model for Urban Stormwater Improvement Conceptualisation (MUSIC, version 3) developed by the Cooperative Research Centre for Catchment Hydrology (CRCCH) provides a summary of the life cycle costs associated with bioretention systems, wetlands, ponds and sedimentation basins. A summary of the parameters affecting the LCC of these elements is given in **Table 2**.

In many cases, MUSIC uses an algorithm to define a particular life cycle cost element in terms of the treatment area. These algorithms have been developed based on real data collected between 2002 and 2004.

Table 2 | Life cycle cost parameters for specified WSUD elements.

LIFE CYCLE COST ELEMENT	BIORETENTION	WETLANDS	PONDS & SEDIMENTATION BASINS
Life cycle	25 to 50 years	15 to 80 years (with 50 years used as the default in MUSIC) Wetlands are designed to have an infinite life span. However, to determine a life cycle cost, a finite number needs to be set	5 year (sedimentation basins) 50 years (ponds)
Total acquisition cost (TAC) (per m ²)	$387.4 \times (A)^{0.7673}$ \$1000/m ² for first 20 m ² (\$200/m ² for remaining area)	$1911 \times (A)^{0.6435}$ The treatment area used in defining the total acquisition cost is the combined inlet and macrophyte zone area	$685.1 \times (A)^{0.7893}$
Total annual maintenance (TAM) (%TAC)	$48.87 \times (TAC)^{0.4410}$	$6.831 \times (A)^{0.8634}$	$185.4 \times (A)^{0.4780}$ The annual maintenance cost considers the volume of material likely to be removed from the basin per year (referred in MUSIC as the size attribute, V). The size attribute is the sum of gross pollutants, coarse sediment and total suspended solids (TSS) that are trapped in the basin / pond per year
Renewal period (years)	25	20 Renewal considerations include replanting and recontouring of the macrophyte zone	1 year (default in MUSIC due to lack of evidence). 10 years based on available data
Renewal costs (%TAC p.a.)	2.0%	0.52%	1.4% Costs associated with access ramps and contouring Limited data available
Decommissioning costs (% TAC)			38% - only applicable to sedimentation basins

What is the Annualised Life Cycle Cost with respect to pollutant removal?

The annualised life cycle cost is simply the Net Present Value (NPV) of the life cycle cost divided by the life cycle (years) of the asset.

In developing an example of annualised life cycle cost, a series of analyses were undertaken for an asset life cycle period of 50 years. Three different WSUD elements were assessed: bioretention basins, constructed wetlands, and sedimentation basins.

Bioretention basins and constructed wetlands were sized to meet best management practice pollutant load reductions for total nitrogen (TN) removal (that is, 45 percent). The sedimentation basin was sized to remove 80 percent of coarse sediment (greater than 125 microns), while also ensuring the associated clean out frequency of the basin was a minimum of 5 years. The life cycle costs are shown in Figure 1 to Figure 3.

The results are useful in showing the relative cost of maintenance to upfront capital cost and in particular the relatively low cost of maintaining these systems. For example, the annual maintenance cost of a bioretention basin sized for a 1 hectare impervious catchment is approximately 3 percent of the capital cost.

In the life cycle cost figures for each WSUD element (Figure 1 to Figure 3), the annualised cost in terms of pollutant load reductions are also reported. Such data is useful in:

- assessing the efficiency of one WSUD element against another in removing a specific pollutant
- comparing the cost of WSUD elements against other pollutant abatement technology

The annualised cost in terms of pollutant removal for a 1 hectare completely impervious catchment are:

Bioretention Basin:	– \$70 per kg TN removed (45% reduction) – \$320 per kg TP removed (67% reduction) – \$1 per kg TSS removed (81% reduction)
Constructed Wetland:	– \$440 per kg TN removed (45% reduction) – \$2,300 per kg TP removed (70% reduction) – \$3 per kg TSS removed (86% reduction)
Sedimentation Basin:	– \$500 per kg TN removed (4% reduction) – \$800 per kg TP removed (17% reduction) – \$1 per kg TSS removed (30% reduction)

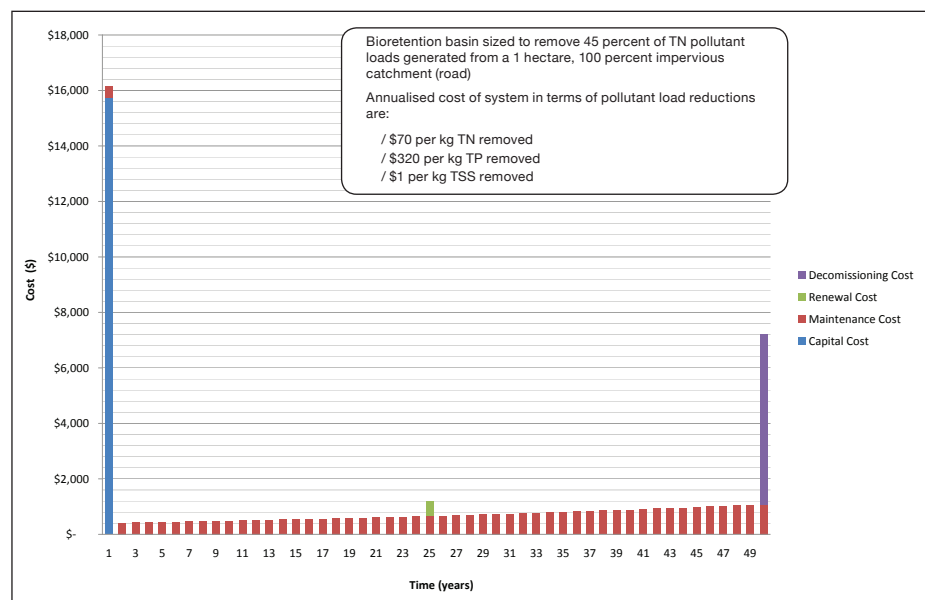


Figure 1: LCC for bioretention basins

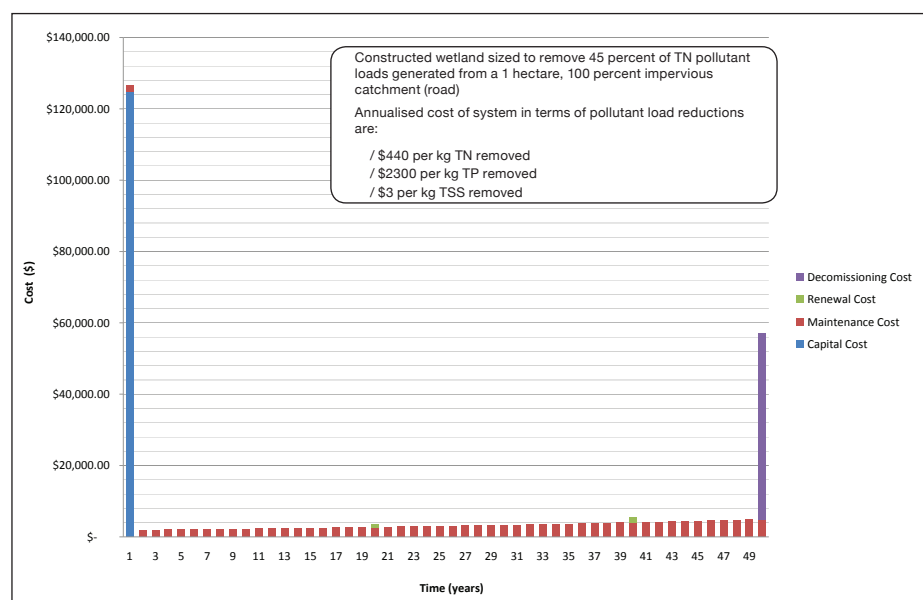


Figure 2: LCC for constructed wetlands

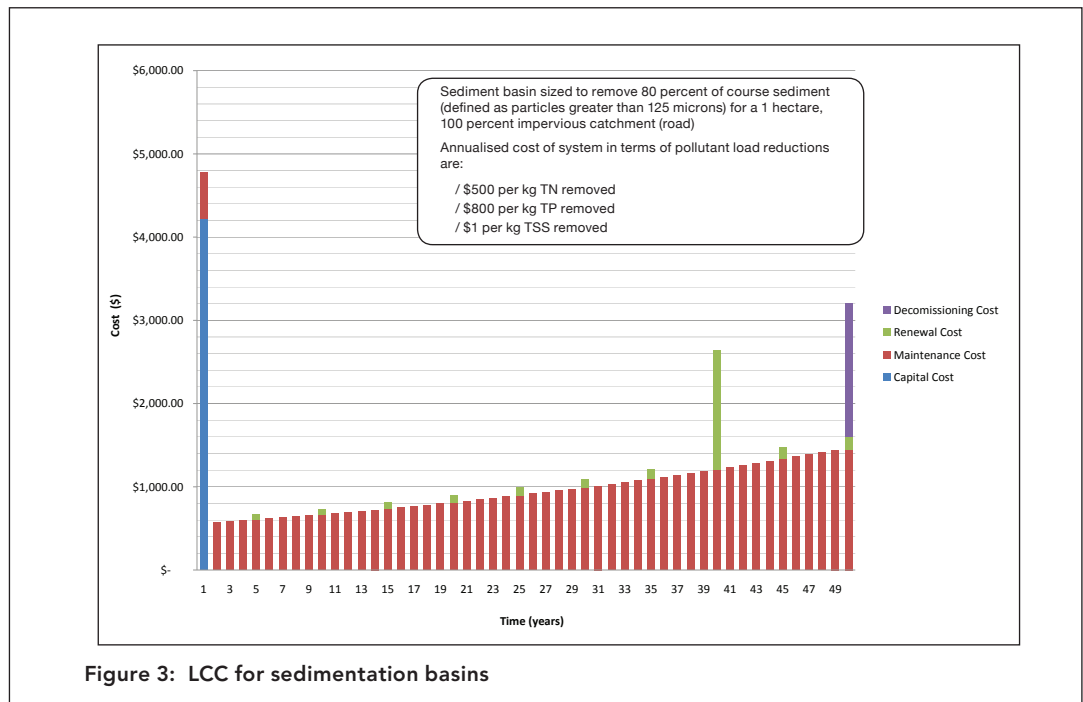


Figure 3: LCC for sedimentation basins

4.2 How does the LCC of WSUD development compare with that of conventional drainage infrastructure

The life cycle costs of water sensitive urban design measures were assessed by Lloyd et al. (2002) for one of the original WSUD strategies implemented in Victoria (that is, Lynbrook Estate). The assessment considered three stormwater management scenarios:

Conventional Approach:	Stormwater is piped to the downstream waterway. No treatment of stormwater is considered.
Downstream Stormwater Treatment:	An end-of-pipe treatment system is employed to ensure the quality of discharged stormwater meets best management practice (BMP) objectives for pollutant load reductions.
Distributed Stormwater Treatment:	A series of WSUD elements are employed to remove pollutants at source, such that a greater volume of stormwater can be treated to BMP objectives.

The assessment found the capital cost of a distributed system to be 22 percent greater than the conventional approach, while a downstream stormwater treatment cost an additional 47 percent. It should be noted that the cost of drainage infrastructure represents approximately 10% of the total cost of development.

The range of annualised maintenance cost from the study was reported as:

Approach	Annualised Maintenance Cost	Annualised Maintenance Cost per hectare
Conventional Approach:	\$737 to \$1,672	\$27 to \$62
Downstream Stormwater Treatment:	\$2,336 to \$6,371	\$87 to \$236
Distributed Stormwater Treatment:	\$1,723 to \$6,512	\$64 to \$241