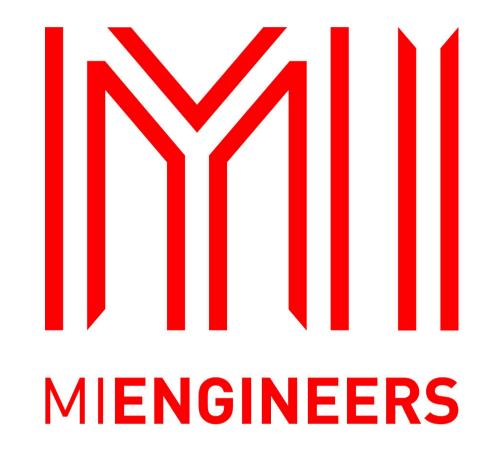
RAY BROOKS RESERVE, SANCTUARY POINT NSW

PROPOSED PUBLIC BOARDWALK

CIVIL / STRUCTURAL DESIGN

PREPARED BY



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REVISION	AMENDMENTS	DATE	CHECKED	APP'D	SURVEY
2	ISSUE FOR CONSTRUCTION - AMENDMENTS FOLLOWING PRE-TENDER MEETING		09/03/21	G.S	DATE OF
1	ISSUE FOR CONSTRUCTION		18/07/19	G.S	
В	80% DETAILED DESIGN ISSUE		14/06/19	G.S	ORIGIN:
А	50% CONCEPT DESIGN ISSUE FOR OPTIONS DETERMINATION		24/05/19	G.S	1
					HEIGHT (
					1
					HORIZON





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GENERAL NOTES

- 1. ALL WORKS CONDUCTED SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE RELEVANT AUSTRALIAN STANDARDS (INCLUDING ALL AMENDMENTS) AND THE CURRENT EDITION OF THE BUILDING CODE OF AUSTRALIA.
- 2. MAXIMUM DEPTH OF FILL (OTHER THAN BELOW) SHALL BE 400mm DEEP AND WELL COMPACTED IN 150mm LAYERS (AFTER COMPACTION) BY A MECHANICAL ROLLER. THIS FILL SHALL BE MOIST DURING COMPACTION. OR APPROVED SOUND GRANULAR FILL (FREE OF MATERIAL THAT WOULD PRECLUDE COMPACTION) SHALL BE PLACED TO A MAXIMUM DEPTH OF 800mm. FILL IS TO BE PLACED IN 200mm LAYERS (AFTER COMPACTION) BY A VIBRATING PLATE OR VIBRATING ROLLER. WHERE DEPTH OF FILL EXCEEDS 800mm CONTROLLED FILL SHALL BE PLACED IN ACCORDANCE WITH AS3798 AND CERTIFIED BY A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER. IF SOFT SPOTS ARE ENCOUNTERED THEN ALL SOFT MATERIAL IS TO BE REMOVED AND THEN BACKFILLED WITH A SUITABLE MATERIAL COMPACTED AS SPECIFIED ABOVE.
- 3. THE ENGINEER SHALL VIEW AND APPROVE ALL CONCRETE WORK PRIOR TO THE POURING OF ANY CONCRETE.
- 4. THE INFORMATION CONTAINED ON THESE DRAWINGS IS FOR STRUCTURAL PURPOSES ONLY. IN ALL OTHER MATTERS, THE APPROVED ARCHITECTURAL DRAWING SHALL TAKE PRECEDENCE. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
- 5. DURING CONSTRUCTION, THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. THE DESIGN INSTALLATION AND MAINTENANCE OF ALL TEMPORARY PROPPING, BRACING AND SHORING SHALL BE PROVIDED BY THE CONTRACTOR TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES. THE COST OF ALL SUCH WORK SHALL BE DEEMED TO BE INCLUDED IN THE CONTRACTORS TENDER.
- 6. THE BUILDER SHALL ENSURE THAT THE GROUND SURROUNDING THE STRUCTURE SLOPES AWAY FROM THE BUILDING WITH IMPERVIOUS MATERIALS.
- 7. 0.2mm HIGH IMPACT RESISTANT CONTINUOUSLY BRANDED DAMP PROOFING MEMBRANE AND ITS INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENT OF AS2870 AND THE BUILDING CODE OF AUSTRALIA.
- B. PROVIDE FINISHES AND FIXTURES THAT ALLOW FOR RELATIVE MOVEMENT BETWEEN OLD AND NEW STRUCTURES,
- 9. WHERE ROCK IS ENCOUNTERED THE REMAINDER OF THE FOOTING SYSTEM SHALL BE FOUNDED ON ROCK AS APPROVED BY THE ENGINEER.
- 10. IN BUILDINGS WITH MASONRY AND/OR CONCRETE SURFACES EXPOSED TO SALINE SOILS OR ACID SULPHATE SOILS, THE CONCRETE RAFT, SLAB, STRIP OR PAD FOOTING SHALL BE PROTECTED FROM THE AGGRESSIVE SOIL OR **GROUNDWATER BY:**
- ISOLATION OF THE CONCRETE OR MASONRY FROM THE AGGRESSIVE SOIL BY INSTALLING 0.5mm THICK DAMP-PROOFING MATERIAL IN ACCORDANCE WITH AS2870 AND
- 11. THE CONTRACTOR IS TO ENSURE THAT ALL WORK IS DONE IN A SAFE MANNER AND IN ACCORDANCE WITH ALL APPLICABLE SAFE WORK NSW REGULATIONS AND ANY OTHER APPLICABLE STATUTORY AUTHORITY REGULATIONS.
- 12. THE OWNERS ATTENTION IS DRAWN TO THE ACCEPTABLE LEVELS OF FOUNDATION PERFORMANCE AS OUTLINED BY AS 2870. ACCORDINGLY CATEGORY 1 OR 2 DAMAGE MAY BE EXPECTED UNDER SOME CONDITIONS. SHOULD A HIGHER LEVEL OF CRACK CONTROL BE REQUIRED THEN THE ENGINEER SHOULD BE NOTIFIED SO THAT THIS CAN BE INCORPORATED INTO THE DESIGN.
- 13. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO START OF CONSTRUCTION AND TO ALLOW TO ADJUST THESE AS REQUIRED TO PROVIDE FOR THE INTENT OF THE DESIGN.
- 14. WHERE MIENGINEERS RELIES ON THE INFORMATION SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS, WE ACCEPT NO LIABILITY FOR ERRORS, TO THE EXTENT THAT THE DESIGN HAS MADE RELIANCE ON THIS INFORMATION.
- 15. ALL WORK IS SUBJECT TO STATUTORY REQUIREMENTS, INCLUDING BUT NOT LIMITED TO OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS, & APPROPRIATE TRAFFIC CONTROL REQUIREMENTS.
- 16. THE CONTRACTOR IS TO PROVIDE ALL NECESSARY LABOUR, PLANT, MATERIALS AND ANYTHING ELSE REQUIRED TO COMPLETE THE INTENT OF THE DESIGN.
- 17. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SET OUT IN BOTH LINE AND LEVEL FOR THE WORKS IN ACCORDANCE WITH THE DESIGN.
- 18. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK THE LOCATION OF EXISTING AND PROPOSED SERVICES AND TO ALLOW IN THE TENDERED PRICE TO ADJUST THESE AS REQUIRED TO PROVIDE FOR THE INTENT OF THE DESIGN.
- 19. THE CONTRACTOR IS TO ADJUST EXISTING AND NEW SERVICE PITS TO DESIGN LEVELS AS REQUIRED.
- 20. THE CONTRACTOR IS TO ALLOW FOR THE COST OF TESTING. ALL TESTING IS TO BE DONE BY A NATA REGISTERED LABORATORY, TEST RESULTS ARE TO BE SUBMITTED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO WORK PROCEEDING.
- 21. NO SOUND HEALTHY TREES SHALL BE CLEARED FROM ANY PROPOSED LOT WITHOUT OBTAINING THE WRITTEN APPROVAL OF THE COUNCIL

- 22. THE CONTRACTOR SHALL AVOID UNWARRANTED DAMAGE TO ALL NATURAL FLORA ON SITE AND ON THE ADJACENT LAND.
- 23. THE CONTRACTOR SHALL ENSURE THAT THE ADJOINING PROPERTY OWNERS ARE NOT DEPRIVED OF ALL WEATHER ACCESS NOR ARE SUBJECTED TO ADDITIONAL STORMWATER
- 24. THE CONTRACTOR SHALL ENSURE THAT ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES ARE IN PLACE PRIOR TO COMMENCING.
- 25. THE CONTRACTOR SHALL NOT ENTER UPON ADJOINING PROPERTY WITH THE PERMISSION OF THE OWNER/OCCUPIER.
- 26. THE SITE IS TO BE LEFT CLEAN AND TIDY, AND TO THE

COMPOSITE FIBRE NOTES

SATISFACTION OF THE CLIENT.

- 1. ALL MATERIAL AND WORKMANSHIP SHALL COMPLY WITH THE MANUFACTURER'S WORK INSTRUCTIONS AND QUALITY ASSURANCE STANDARDS.
- 2. UNLESS OTHERWISE NOTES OR APPROVED, COMPOSITE MATERIALS FOR USE IN THIS PROJECT SHALL BE MANUFACTURED FROM ECR GLASS AND VINYL ESTER RESIN CONFORMING WITH ISO 9001 STANDARD.
- 3. ALL MEMBERS SHALL BE IN SOUND CONDITION FREE FROM PITTING, DE-LAMINATIONS AND OTHER DEFECTS WHICH ARE LIKELY TO IMPAIR THE STRUCTURAL CAPACITY OF THE
- 4. ALL COMPOSITE MEMBER PARTS OF THE HANDRAIL SYSTEM SHALL BE PAINTED USING URETHANE COATING TO PROVIDE EXTRA UV-RESISTENCE. COATING PROCEDURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S GUIDE APPLICATION OF PROTECTIVE COATINGS. THE NOMINATED COLOUR SHALL BE AS SPECIFIED AND CONSISTENT AND TRUE THROUGHOUT.
- 5. AT ALL FACTORY AND AT SITE DRILLED HOLES. AN APPROVED ANTICRUSH INSERT SHALL BE PUSHED TO THE CORRECT PLACEMENT. THIS PREVENTS CRUSHING OF THE SECTION AND PROVIDES A LARGE BEARING AREA FOR STRUCTURAL BOLTS.
- 6. AN ALTERNATIVE METHOD FOR ANTI-CRUSHING IS TO BOLT THROUGH ONE SIDE WALL OF THE PROFILE ONLY. TO PROVIDE ACCESS TO THIS BOLT, A LARGE OVERSIZED HOLE IN THE WALL THAT IS NOT BEING BOLTED IS REQUIRED.
- 7. USE OF A WATERPROOFING COMPOUND TO SEAL ANY END CUT FIBRES, AS A RESULT OF DRILLING OR CUTTING THE COMPOSITE FIBRE PROFILES IS REQUIRED.

- 1. ALL RETAINING WALLS SHALL BE PROVIDED WITH FREE DRAINING BACKFILL MATERIAL AND AN AGRICULTURAL DRAINAGE PIPE WITH SOCK FOR THE FULL LENGTH OF WALL.
- DO NOT BACKFILL THE WALL UNTIL ALL CONCRETE AND GROUT HAS ACHIEVED ITS FULL DESIGN STRENGTH. TEMPORARY PROPPING (BY BUILDER) MAY BE REQUIRED IF THE WALL HAS NOT ACHIEVED ITS FULL DESIGN STRENGTH. IT IS THE BUILDER'S RESPONSIBILITY TO DETERMINE WHETHER THE CONCRETE AND GROUT HAS ACHIEVED ITS FULL DESIGN STRENGTH.

- SLAB ON GROUND IS TO BE 100mm THICK, REFER TO CONCRETE NOTES FOR STRENGTH REQUIREMENTS.
- 2. SLAB TO BE REINFORCED WITH SL72 MESH TOP THROUGHOUT (U.N.O) REFER TO PLAN AND SECTIONS FOR EXTRA REINFORCEMENT
- 3. SLAB TO BE LAID ON 0.2mm HIGH IMPACT RESISTANT CONTINUOUSLY BRANDED DAMP PROOFING MEMBRANE AND ITS INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENT OF AS2870 AND THE BUILDING CODE OF AUSTRALIA
- 4. ALL EDGE BEAMS AND BEAMS SUPPORTING BRICK OR LOAD BEARING WALLS SHALL BE FOUNDED ON FIRM NATURAL MATERIAL WITH AT LEAST 100kPa BEARING CAPACITY TO THE ENGINEERS APPROVAL, OR ARE TO BE SUPPORTED ON PIERS AS DETAILED.
- 5. ALL SLAB FINISHES ARE TO BE CONSTRUCTED WITH JOINTS CORRESPONDING TO ANY TYPE OF SLAB JOINT OR SAW CUT JOINT IN THE SLAB.

SOFT SPOT NOTES

GENERAL NOTES.

 ALL SOFT SPOTS SHALL HAVE ALL LOOSE MATERIAL REMOVED AND SHALL BE BACK FILLED WITH SUITABLE MATERIAL AND COMPACTED AS INDICATED IN NOTE 2 OF

PIER NOTES

DIRECTION.

- 450 DIA. CONCRETE PIERS BEARING 200mm INTO 100kPa NATURAL MATERIAL AT 2400mm MAX. SPACING THROUGH COMPACTED FILL INTO FIRM NATURAL MATERIAL. PIER DEPTH TO BE 600mm MIN. EXCEPT
- A) WHERE GREATER DEPTH IS REQUIRED TO EXTEND BELOW THE ZONE OF INFLUENCE LINES, B) WHERE GREATER DEPTH IS REQUIRED TO ACHIEVE AN EVEN BEARING NATURAL MATERIAL, OR
- C) WHERE PIERING THROUGH FILL MATERIAL IS REQUIRED. D) WHERE NOTED OTHERWISE. THE ENGINEER SHALL VIEW AND APPROVE ALL PIERS BEFORE
- POURING CONCRETE. 2. ADDITIONAL PIERS MAY BE REQUIRED ADJACENT TO ANY

SERVICE TRENCH, AS DIRECTED BY AN ENGINEER.

- 3. WHERE SOFT SPOTS (BEARING CAPACITY LESS THAN 100kPa) ARE ENCOUNTERED IN NATURAL FOUNDATION MATERIAL OR WHERE FILL EXCEEDS 400mm THEN ADDITIONAL PIERS TO SUITABLE FOUNDING MATERIAL MAY BE REQUIRED AND SHALL BE POSITIONED ACCORDING TO THE ENGINEERS
- 4. WHERE ROCK IS ENCOUNTERED THE REMAINDER OF THE FOOTING SYSTEM SHALL BE FOUNDED ON ROCK AS APPROVED BY THE ENGINEER.
- 5. THE CONTRACTOR SHALL CLEAN THE BASE OF THE PIERS SO AS TO ENABLE INSPECTION BY THE ENGINEER.

6. THE APPROVAL OF THE ENGINEER IS REQUIRED PRIOR TO

7. THE CONTRACTOR SHALL SCABBLE THE TOP OF THE POURED PIER TO ENSURE A LEVEL SURFACE OF GOOD QUALITY CLEAN CONCRETE.

STAINLESS STEEL NOTES

PLACEMENT OF CONCRETE.

- 1. STAINLESS STEEL MATERIAL SHALL NOT BE STORED WITH CARBON STEEL.
- TOOLS USED FOR CARBON STEEL SHALL NOT BE USED TO FABRICATE OR ASSEMBLE STAINLESS STEEL COMPONENTS. WORK AREA FOR STAINLESS STEEL SHALL BE ISOLATED FROM THOSE WHERE CARBON STEEL IS PROCESSED TO AVOID CONTAMINATION BY DUST OR DEBRIS.
- STAINLESS STEEL SHALL BE MARKED USING XYLENE FREE PENS ONLY.
- 4. STAINLESS STEEL SHALL NOT BE STORED IN CONTACT WITH TANTALISED WOODS.
 - 5. THE STAINLESS STEEL SHALL BE WRAPPED OR OTHERWISE PROTECTED DURING TRANSPORT TO AVOID CONTAMINATION BY FERROUS PRODUCTS. IF A PLASTIC COATING IS USED ALL TRACES OF ADHESIVE SHALL BE REMOVED ON REMOVAL OF THE PLASTIC.
 - WELDING SHALL BE IN ACCORDANCE WITH AS1554.6.
 - 7. ALL WELDS SHALL BE 6mm CONTINUOUS FILLET WELDS OR FULL PENETRATION BUTT WELDS. ALL FABRICATED SECTIONS SHALL BE FULLY WELDED AND ARE NOT TO EXHIBIT CREVICES.
 - 8. LIMIT THE INPUT OF HEAT INTO THE WELD. THE WELD SHALL NOT BE PREHEATED, POST-HEATED OR STRESS
 - 9. GRADE 316L ELECTRODES SHALL BE USED FOR 316 AND AS/AWS2209 FOR DUPLEX.
 - 10. WELDS SHALL BE CATEGORY 2B IN ACCORDANCE WITH WITH AS1554.1 TABLE 6.2.2 (U.N.O.)
 - 11. ALL STAINLESS STEEL COMPONENTS SHALL HAVE A SURFACE ROUGHNESS OF LESS THAN 0.5 MICROMETERS Ra AND BE PASSIVATED USING A 20% TO 25% NITRIC ACID SOLUTION FOR AT 30 MINUTES AT 40°C TO 60°C IN ACCORDANCE WITH ASTM A380.
 - 12. ALL EXPOSED EDGES ARE TO BE CONSIDERED SAFE EDGES, WE RECOMMEND THAT EDGES ARE TO BE GIVEN A RADIUS BETWEEN 1 & 3mm.
 - 13. ALL STEEL MEMBERS TO BE FREE OF ANY FABRICATION DEFECTS AND PICKLING.
 - 14. SHOULD THE STEEL SUPPLIER HAVE SHOP DRAWINGS PRODUCED THESE WILL BE SUBJECT TO A REVIEW BY MIENGINEERS, BEFORE FABRICATION HAS COMMENCED. FABRICATION MAY NOT COMMENCE UNTIL THE REVIEW HAS BEEN COMPLETED. THE REVIEW DOES NOT REMOVE OR REDUCE THE CONTRACTOR RESPONSIBILTY TO CORRECTLY FABRICATE THE PARTS.
 - 15. WHERE MEMBERS SHOWN ON THE STRUCTURAL DRAWINGS ARE TO BE BENT, CURVED OR ROLLED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE METHODS REQUIRED TO ACHIEVE THE REQUIRED SHAPES WITHOUT LOCALIZED DISTORTION OF THE MEMBERS.
 - 16. ALL BOLTS ARE TO BE SUPPLIED WITH TWO WASHERS AND ONE NYLOC NUT. ALL THREADED RODS TO BE SUPPLIED WITH TWO WASHERS, ON ONE END ONE NYLOC NUT AND ON THE OTHER END TWO STANDARD NUTS. WHERE BOLTED CONNECTIONS ARE USED IN THE TRAFFICABLE AREA DOME NUTS ARE TO BE USED.
 - 17. ALL STAINLESS STEEL HANDRAILS AND CONNECTING BRACKETS SHALL BE POLISHED TO 1000 GRIT AND GIVEN A MIRROR FINISH. SURFACE FINISHES OR WELDS FOR HANDRAILS AND HANDRAIL BRACKETSSHALL BE GRADE 1. POLISH USING 1000 GRIT OR FINER SILICON CARBIDE ABRASIVE WITH LUBRICATION WITH MIRROR FINISH. AFTER POLISHING. WELDS SHALL BE PASSIVATED USING A 20% TO 25% NITRIC ACID SOLUTION TO THE GROUND / POLISHED AREA IN ACCORDANCE WITH ASTM A380 FOR AT LEAST 30 MINUTES BETWEEN 40°C TO 60°C

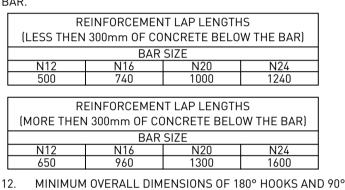
CONCRETE NOTES

- ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH THE CURRENT EDITION OF AS3600 AND AS2870 FOR RESIDENTIAL CONSTRUCTION.
- 2. CONCRETE STRENGTH SHALL BE AS FOLLOWS U.N.O.: STRENGTH SLUMP SIZE SLAB ON GROUND 40 MPa 100mm 20mm FOOTINGS 32 MPa 100mm 20mm
- CLEAR CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS U.N.O.:

ELEMENT	TOP	воттом	SIDE
SLAB ON GROUND (EXTERNAL)	45	30	45
FOOTINGS	50	50	50

- THE SIZES OF THE CONCRETE ELEMENTS DO NOT INCLUDE THICKNESSES OF ANY APPLIED FINISHES.
- 5. ALL CONCRETE SHALL BE COMPACTED ADEQUATELY IN ACCORDANCE WITH AS3600 BY THE USE OF A MECHANICAL
- ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH
- BRICKWORK SHALL BE ARTICULATED CORRESPONDING TO THE LOCATIONS OF ANY KEYED JOINTS. REFER TO TECHNICAL NOTE 61 IN THE SPECIFICATION FOR DETAILS.
- REINFORCEMENT SYMBOLS: N - DENOTES GRADE 500 DEFORMED BARS TO AS4671 R - DENOTES GRADE 250 N PLAIN BARS TO AS4671 SL - DENOTES WELDED GRADE 500 REINFORCING FABRIC TO AS4671
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
- 10. POLISHED CONCRETE SLAB MESH IS TO BE A MINIMUM SIZE OF SL81. SLAB THICKNESS IS TO BE INCREASE BY THE AMOUNT OF CONCRETE TO BE GROUND OFF (HONED). BURNISHED CONCRETE TO BE A MINIMUM OF 32MPa. HONED CONCRETE TO BE A MINIMUM OF 40MPa.

11. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER. LAPS SHALL BE IN ACCORDANCE WITH AS3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH



DGS MAY BE NO SMALLER THEN THE FOLLOWING TABLE:					
180° HOOKS OVERALL DIMENSION (X)					
PIN DIA.		BAR NOMIN	IAL SIZE (D)		
FIN DIA.	12	16	20	24	
3D	60	-	-	-	
4D	70	100	120	140	
90° COGS OVERALL DIMENSION (Y)					
PIN DIA.		BAR NOMIN			
	12	16	20	24	
3D	160	-	-	-	
4D	170	200	240	280	

DESIGN LOAD NOTES

THE LOADS BELOW TO BE USED, UNLESS NOTED

OTHERWISE ON LOADING PLANS OR FLOOR PLANS.

LIVE LOADS:

5.0 kPa GENERAL WIND LOADS:

> = 45 m/sREGION = A2TERRAIN CATEGORY

CLEARING AND GRUBBING:

- 1. THE CONTRACTOR SHALL GIVE COUNCIL AT LEAST THREE FULL WORKING DAYS NOTICE OF INTENTION TO COMMENCE CLEARING OPERATIONS.
- 2. ONLY TREES IDENTIFIED TO BE REMOVED IN THE DEVELOPMENT CONSENT ARE TO BE FELLED OR DAMAGED IN ANY WAY. SURPLUS SOIL IS TO BE KEPT WELL CLEAR OF EXISTING TREE TRUNKS. CARE MUST BE TAKEN TO PROTECT THE ROOTS OF TREES TO BE RETAINED.
- 3. ALL MATERIAL CLEARED OR GRUBBED SHALL BE DISPOSED OF BY THE CONTRACTOR TO AN APPROVED SITE. THE CONTRACTOR SHALL PAY ALL FEES. BURNING IS NOT PERMISSIBLE.
- 4. ANY HOLES OR DEPRESSION CAUSED BY THE CLEARING OR GRUBBING WORK SHALL BE INSPECTED BY THE SUPERINTENDENT. HOLES ARE TO BE BACKFILLED WITH APPROVED MATERIAL, AND COMPACTED TO AT LEAST 98% OF STANDARD MAXIMUM DRY DENSITY.

SOIL/WATER MANAGEMENT:

- ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AND STRUCTURES SHALL BE LOCATED AS SHOWN AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE GUIDELINES AND PRINCIPLES AS OUTLINED IN LANDCOM'S "SOILS AND CONSTRUCTION" VOLUME 1 (MANAGING URBAN STORMWATER 4TH EDITION, MARCH 2004),(MUS).
- 2. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT ALL EARTHWORKS, ROAD AND DRAINAGE CONSTRUCTION GENERALLY IN ACCORDANCE WITH MUS AND TO THE SATISFACTION OF COUNCIL, THE SOIL CONSERVATION SERVICE AND THE SUPERINTENDENT.
- 3. CONSTRUCTION SEQUENCE SHALL BE PLANNED SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MANAGEABLE SIZE. STABILISATION MEASURES SHALL BE APPLIED TO THE FIRST DISTURBED SECTION PRIOR TO COMMENCING ON THE NEXT SECTION.
- 4. BEFORE STRIPPING TOPSOIL ALL AREAS TO BE EXPOSED SHALL BE CLEARED AND GRUBBED OF ALL EXCESSIVE VEGETATION.
- 5. TOPSOIL REQUIRED TO BE RESPREAD ON SITE SHALL BE STOCKPILED CLEAR OF HAZARDS SUCH AS DRAINAGE AREAS, REMAINING TOPSOIL SHALL BE REMOVED AND STOCKPILED WHERE AGREED. STOCKPILED TOPSOIL IS TO BE RE-SPREAD LATER ON AREAS TO BE REVEGETATED AND STABILISED ONLY (ie. ALL FOOTPATHS, BATTERS, DRAINAGE RESERVE AND CHANNELS). TOPSOIL SHALL NOT BE SPREAD ON ANY OTHER AREAS UNLESS SPECIFICALLY INSTRUCTED BY THE SUPERINTENDENT. STOCKPILES REMAINING LONGER THAN THREE MONTHS SHALL BE PROTECTED FROM EROSION BY COVERING WITH A MULCH AND HYDROSEEDING AND, IF NECESSARY, BY LOCATING BANKS OR DRAINS UPSLOPE TO DIVERT RUNOFF.
- 6. THE CONTRACTOR SHALL REGULARLY MAINTAIN ALL SEDIMENT AND EROSION CONTROL DEVICES AND REMOVE ACCUMULATED SILT ETC BEFORE NO MORE THAN 60% OF THEIR CAPACITY IS LOST. ALL SILT REMOVED SHALL BE DISPOSED OF AS DIRECTED BY THE SUPERINTENDENT. CONTROL DEVICES SHALL BE MAINTAINED UNTIL ALL DISTURBED AREAS ARE REVEGETATED OR FURTHER AS MAY BE DIRECTED BY THE SUPERINTENDENT IN ACCORDANCE WITH THE CONTRACT.
- 7. CUT AND FILL BATTERS SHALL BE: a. FORMED AT MAXIMUMS OF 2:1 IN CUT AND 4:1 IN FILL b. TOPSOILED AS SOON AS PRACTICABLE AFTER FORMATION
- i. MINIMUM DEPTH OF 150mm AND MAXIMUM OF 250mm. ii SCARIFIED REFORE TOPSOILING iii. SEEDED WITHIN 7 DAYS OF TOPSOILING WITH AN
- APPROVED MIX c. WHERE LENGTH OF CUT BATTER SLOPES EXCEED 3m THE BATTER SHALL BE PROTECTED BY EITHER A CUT-OFF DRAIN 150mm DEEP OR A SOIL CUT-OFF BANK 150mm HIGH LEADING TO A SEDIMENT TRAP SO AS TO CONTROL RUNOFF OVER BATTERS PRIOR TO THEIR REVEGETATION.
- 8. OUTLETS: a. ALL WATER SHALL BE RELEASED IN A NON-SEDIMENT MANNER. GENERALLY IN ACCORDANCE WITH MUS. b. ENERGY DISSIPATERS SHALL BE PROVIDED AS DIRECTED BY THE SUPERINTENDENT WHEN DISCHARGE FLOW VELOCITIES ARE NOT IN ACCORDANCE WITH MUS. c. SHALL HAVE CAPACITY TO DISCHARGE THE 5 YEAR CRITICAL STORM EVENT WITHOUT CAUSING FAILURE OF THE
- 9. EARTH OR HAY BALE BANKS: a. SHALL BE PROVIDED WHERE REQUIRED. i. TO DIVERT SEDIMENT LADEN RUNOFF TO A SEDIMENT TRAP OR BASIN, OR ii. INCORPORATED AS PART OF A BARRIER OR DAM USED TO

INTERCEPT AND RETARD SEDIMENT LADEN RUNOFF.

b. FREEBOARD: BANKS SHALL HAVE FIXED 300mm

FREEBOARD WHEN USED AS A DIVERSION BANK.

d. AGGREGATE FOR OUTLETS SHALL BE CRUSHED BASALT.

STRUCTURE.

- 1. TOPSOIL INCLUDING ALL GRASS COVER SHALL BE STRIPPED FROM THE WHOLE OF THE AFFECTED AREA TO THE DEPTH SPECIFIED IN THE DRAWINGS OR, WHERE NO DEPTH IS SPECIFIED, TO A MINIMUM DEPTH OF 150mm.
- 2. STRIPPED SURFACES WILL NEED TO BE INSPECTED BY THE SUPERINTENDENT OR AN APPROVED GEOTECHNICAL ENGINEER PRIOR TO THE COMMENCEMENT OF EARTHWORKS TO ENSURE THE AREAS HAVE BEEN ADEQUATELY STRIPPED.
- 3. THE STRIPPED TOPSOIL IS THE STOCKPILED IN THE LOCATIONS SHOWN ON THE SOIL AND WATER MANAGEMENT PLAN AND THE SURFACE OF STOCKPILES TREATED ACCORDINGLY.
- 4. THE STOCKPILED TOPSOIL IS TO BE RE-SPREAD OVER THE FINISHED SURFACE IMMEDIATELY FOLLOWING COMPLETION OF EARTHWORKS. DEPTHS OF TOPSOIL SHALL BE A MINIMUM OF 150mm BUT SHALL NOT EXCEED 300mm IN RESIDENTIAL LOTS.
- 5. SURPLUS TOPSOIL SHALL NOT BE SPREAD OVER THE SITE WITHOUT THE WRITTEN PERMISSION OF THE SUPERINTENDENT.
- 6. NEWLY TOPSOILED AREAS ARE TO BE IMMEDIATELY REVEGETATED IN ACCORDANCE WITH THE APPROVED SOIL

- 1. ROUTES FOR HAULAGE ROADS SHOULD BE CHOSEN TO MINIMISE THE IMPACT OF CONSTRUCTION WORKS ON EXISTING RESIDENTIAL AREAS.
- 2. THE CONTRACTOR SHALL ENSURE THAT NO SITE MATERIAL IS TRACKED ONTO ANY ADJOINING PUBLIC ROADS. ALL PUBLIC ROADS ARE TO BE KEPT CLEAN AT ALL TIMES.

PROVISION FOR TRAFFIC:

AND WATER MANAGEMENT PLAN.

- 1. THE CONTRACTOR SHALL ENSURE THE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS AROUND THE WORK SITE
- AT ALL TIMES TO STATUTORY REQUIREMENTS. THE CONTROLS FOR VEHICULAR TRAFFIC MUST
- MANUAL" 3. SIGNS OR BARRIERS USED FOR TRAFFIC CONTROL SHALL COMPLY WITH AS1742 "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" AND WITH RTA's "GUIDELINES TO SIGNS

CONFORM TO THE RTA's "TRAFFIC CONTROL AT WORK SITES

4. THE CONTRACTOR IS TO PROVIDE PROPER PROVISION FOR TRAFFIC ADJACENT ROADS, AND MAINTAIN EXISTING VEHICULAR ACCESS TO PROPERTIES IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD AND STATUTORY REQUIREMENTS.

AND MARKINGS MANUAL"

- SUBSOIL DRAINAGE IS TO BE INSTALLED ALONG THE EDGE OF ANY SUBGRADE IN CUT OR ON THE HIGH SIDE OF A PAVEMENT, OR AS DIRECTED BY THE SUPERINTENDENT.
- 2. SUBSOIL DRAINAGE PIERS SHALL BE CORRUGATED SLOTTED uPVC MINIMUM 100MM DIAMETER SOCKED. AND LAID IN ACCORDANCE WITH RTA MR FORM 538 "SPECIFICATION FOR CONSTRUCTION OF SUBSOIL DRAINS"
- 3. TRENCHES SHALL BE MINIMUM 300mm IN WIDTH AND EXCAVATED TO AT LEAST 500mm BELOW SUBGRADE LEVEL. 4. BACKFILL FILTER MATERIAL SHALL MEET THE

GRADING REQUIREMENTS AS SET OUT IN MR538. HOWEVER

- COARSER MATERIAL WILL BE PERMISSIBLE IF THE ENTIRE BACKFILL IS WRAPPED IN A GEOTEXTILE FABRIC (BIDIM A14 OR TERRAM 1000, OR EQUIVALENT). 5. "NYLEX STRIP DRAIN" OR EQUIVALENT MAY BE CONSIDERED AN ALTERNATIVE TO CONVENTIONAL SUBSOIL
- THE SUPERINTENDENT IN EACH CASE. 6. ALL SUBSOIL DRAINAGE IS TO DISCHARGE DIRECTLY TO

DRAINS BUT WILL REQUIRE THE SPECIFIC PERMISSION OF

7. ALL DRAINAGE LINES SHALL HAVE A SOCKED 3m LENGTH OF CORRUGATED PVC SUBSOIL PIPE LAID WITHIN THE HAUNCHING MATERIAL OF THE PIPES IMMEDIATELY UPSTREAM OF ALL PITS. THIS WILL ENABLE PIPE BEDDING MATERIAL TO DRAIN FREELY TO THE DOWNSTREAM PIPE SYSTEM. THE SYSTEM MUST BE PROTECTED FROM

STANDARDS AND TEST METHODS:

SUBTERRANEAN EROSION.

A DESIGNATED STORMWATER SYSTEM.

- UNLESS OTHERWISE SPECIFIED IN THE CONTRACT, AND WHERE APPLICABLE, MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT STANDARD OF THE STANDARDS ASSOCIATION OF AUSTRALIA.
- 2. A STANDARD APPLICABLE TO THE WORKS SHALL BE THE EDITION LAST PUBLISHED 14 DAYS PRIOR TO THE CLOSING DATE FOR TENDERS UNLESS OTHERWISE SPECIFIED.
- 3. OVERSEAS STANDARDS AND OTHER STANDARD DOCUMENTS NAMED IN THE SPECIFICATION SHALL BE APPLICABLE IN THE SAME MANNER AS AUSTRALIAN STANDARDS TO RELEVANT MATERIALS AND WORKMANSHIP.

4. COPIES OF ANY STANDARDS QUOTED OR REFERRED TO

IN THE SPECIFICATION SHALL BE KEPT ON THE SITE IF SO

SPECIFIED. 5. WHERE NO SUITABLE TEST METHODS ARE AVAILABLE. THOSE OF THE RTA OR PWD (AS APPROPRIATE) SHALL BE

TESTING AND SURVEY:

1. ALL TESTING AND SURVEY AS REQUIRED SHALL BE ARRANGED AND CARRIED OUT BY THE CONTRACTOR AND ALL TEST RESULTS AND SURVEY RECORDS MADE AVAILABLE TO THE SUPERINTENDENT. THE COST OF ALL SUCH TESTING AND SURVEY SHALL BE INCLUDED IN THE TENDER.

PROTECTION OF THE ENVIRONMENT:

- 1. ALL WORK SHALL BE CARRIED OUT IN SUCH A MANNER AS TO AVOID NUISANCE AND/OR DAMAGE TO THE ENVIRONMENT. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE CONDITIONS OF APPROVAL IMPOSED BY THE MINISTER FOR LAND AND WATER CONSERVATION. THE RELEVANT LOCAL COUNCIL, THE ENVIRONMENTAL PROTECTION AUTHORITY, THE CLEAN WATERS ACT, THE CLEAN AIR ACT AND THE NOISE CONTROL ACT. THE CONTRACTOR IS TO ALLOW FOR THIS IN THEIR TENDER.
- 2. THE CONTRACTOR SHALL PLAN AND CARRY OUT THE WORKS TO AVOID EROSION, CONTAMINATION AND SEDIMENTATION OF THE SITE AND ITS SURROUNDINGS.
- 3. HERBICIDES AND OTHER TOXIC CHEMICALS SHALL NOT BE USED ON THE SITE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE SUPERINTENDENT.
- 4. NO NOISE, SMOKE, OR OTHER NUISANCE WHICH IN THE OPINION OF THE SUPERINTENDENT IS UNNECESSARY OR EXCESSIVE SHALL BE PERMITTED BY THE CONTRACTOR IN THE PERFORMANCE OF THE WORKS UNDER THIS CONTRACT. SHOULD WORK OUTSIDE CUSTOMARY WORKING HOURS BE APPROVED, THE CONTRACTOR SHALL NOT USE, DURING SUCH PERIOD, ANY PLANT, MACHINERY OR EQUIPMENT WHICH IN THE OPINION OF THE SUPERINTENDENT IS CAUSING OR LIKELY TO CAUSE A NUISANCE TO THE PUBLIC. NO NOISY WORKS AND/OR WORKS LIKELY TO DISTURB NEARBY RESIDENTS SHALL BE UNDERTAKEN DURING THE HOURS PRECLUDING SUCH ACTIVITY AS SPECIFIED BY COUNCIL IN ACCORDANCE WITH THE REQUIREMENTS FOR DEVELOPMENT CONSENT AND BUILDING APPROVAL MADE UNDER THE LOCAL GOVERNMENT ACT AND THE NOISE CONTROL ACT.
- 5. THE CONTRACTOR SHALL ENSURE THAT FUGITIVE DUST FROM DISTURBED AREAS IS MINIMISED BY A METHOD APPROVED BY THE SUPERINTENDENT.

- 1. THE PRINCIPLE WILL NOT BE RESPONSIBLE FOR THE SAFE KEEPING OF ANY OF THE CONTRACTOR'S PLANT, EQUIPMENT, TOOLS, MATERIALS OR OTHER PROPERTY. THE CONTRACTOR MAY PROVIDE, AT THEIR OWN COST, ANY SECURITY FENCING CONSIDERED NECESSARY AROUND THE SITE OFFICE, WORKSHOPS OR STORAGE AREAS, SUBJECT TO THE SUPERINTENDENT'S PRIOR APPROVAL.
- 2. IF EXISTING FENCING IS CUT OR ALTERED BY THE CONTRACTOR, IT SHALL PROVIDE AND MAINTAIN TEMPORARY FENCING TO THE SATISFACTION OF THE SUPERINTENDENT DURING THE CONTRACT TO PREVENT UNAUTHORISED ENTRY INTO THE PROPERTY, AND SHALL REINSTATE THE FENCING AND REMOVE TEMPORARY FENCING ON COMPLETION OF THE

1. CONSTRUCTION WORK CARRIED OUT UNDER THIS CONTRACT ADJACENT TO ADJOINING WORKS, SHALL MAKE SMOOTH JUNCTIONS WITH EXISTING WORK, AS APPROPRIATE.

WORK-AS-EXECUTED DRAWINGS

- THE CONTRACTOR SHALL SUPPLY THE SUPERINTENDENT WITH FULL MARKED-UP AND CERTIFIED WORK-AS-EXECUTED DRAWINGS FOR THE WHOLE OF THE CONTRACT PRIOR TO THE FINAL CERTIFICATE. PRINTS OR REPRODUCIBLES OF THE CONTRACT DRAWINGS WILL BE SUPPLIED BY THE PRINCIPAL FREE OF CHARGE FOR THIS PURPOSE.
- 2. WORK-AS-EXECUTED DRAWINGS FOR ROADWORKS OR CARPARKS SHALL SHOW IN RED INK, ALL CHANGES TO THE CONTRACT DRAWINGS AND ACTUAL VALUES OF ALL LEVELS SHOWN ON THE DRAWINGS. THE DRAWINGS SHALL BE SIGNED BY A REGISTERED SURVEYOR AND CERTIFIED BY THE CONTRACTOR.
- 3. WORK-AS-EXECUTED DRAWINGS FOR DRAINAGE AND SEWER WORKS WHERE APPLICABLE SHALL SHOW IN RED INK ALL CHANGES TO THE CONTRACT DRAWINGS. INCLUDING VARIATIONS TO LEVELS, DIMENSIONS, CONCRETE, REINFORCEMENT AND OTHER MATERIALS. THE DRAWINGS

SHALL BE CERTIFIED BY THE CONTRACTOR. EXISTING SERVICES:

DISCONNECT, AND MAKE SAFE.

- 1. THE CONTRACTOR IS TO INFORM THEMSELVES OF ALL EXISTING SERVICES. ATTEND TO EXISTING SERVICES AS
- (a) IF THE SERVICE(S) IS/ARE TO BE CONTINUED, REPAIR, DIRECT OR RELOCATE AS REQUIRED. IF SUCH A SERVICE(S) CROSSES THE LINE OF A TRENCH, OR WILL LOSE SUPPORT WHEN THE TRENCH IS EXCAVATED, PROVIDE PERMANENT SUPPORT FOR THE EXISTING SERVICES. (b) IF THE SERVICE IS TO BE ABANDONED, CUT AND SEAL OR
- 2. THE CONTRACTOR'S PRICE IS TO ALLOW FOR HAND EXCAVATION AND BACKFILL NEAR ALL EXISTING SERVICES OR IN AREAS WHERE THERE MAY BE EXISTING SERVICES.
- 3. THE COST OF ALL EXISTING SERVICES, AND THE TIME ASSOCIATED WITH THE WORK, IS TO BE INCLUDED IN THE
- 4. THE PRINCIPAL AND THE DESIGN CONSULTANT WILL NOT BE RESPONSIBLE FOR DAMAGES TO EXISTING SERVICES. THE CONTRACTOR IS TO TAKE ALL ACTION NECESSARY TO AVOID DAMAGE TO EXISTING SERVICES.

TENDER

MATERIALS AND WORKMANSHIP SHALL BE THE BEST OF THEIR KIND AND UNLESS OTHERWISE SPECIFIED, SHALL CONFORM TO RELEVANT AUSTRALIAN STANDARDS.

STATUS:

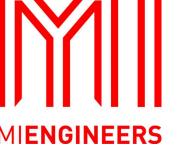
G.S

09/03/21

REVISION:

DN190088/01

APP'D REVISION AMENDMENTS DATE | CHECKED SHOALHAVEN CITY COUNCIL ISSUE FOR CONSTRUCTION - AMENDMENTS FOLLOWING PRE-TENDER MEETING 09/03/21 G.S DATE OF SURVEY: ISSUE FOR CONSTRUCTION G.S 18/07/19 В 80% DETAILED DESIGN ISSUE 14/06/19 G.S ORIGIN: 50% CONCEPT DESIGN ISSUE FOR OPTIONS DETERMINATION 24/05/19 G.S HEIGHT OF DATUM: HORIZONTAL DATUM:



SYDNEY OFFICE 83 - 89 Renwick Street, Redfern 2016 Tel (02) 8396 6565 SOUTH COAST OFFICE 49 Berry Street, Nowra NSW 2541 Tel (02) 44 230 566

WOLLONGONG OFFICE 134 Crown Street, Wollongong NSW 2500 Tel (02) 44 230 566 : admin@miengineers.com

W: www.miengineers.com

TO BE CONSTRUCTED BASED ON THIS DRAWING, OF PART OF THIS DRAWING, WITHOUT THE WRITTEN PERMISSION OF MI ENGINEERS. DRAWINGS TO BE READ IN CONJUNCTION WITH OTHER RELATED DESIGN DOCUMENTATION, FURTHERMORE, WHERE MIENGINEERS RELIES ON THE INFORMATION SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS, WE ACCEPT NO LIABILITY FOR ERRORS. TO THE EXTENT THAT THE DESIGN HAS MADE RELIANCE ON

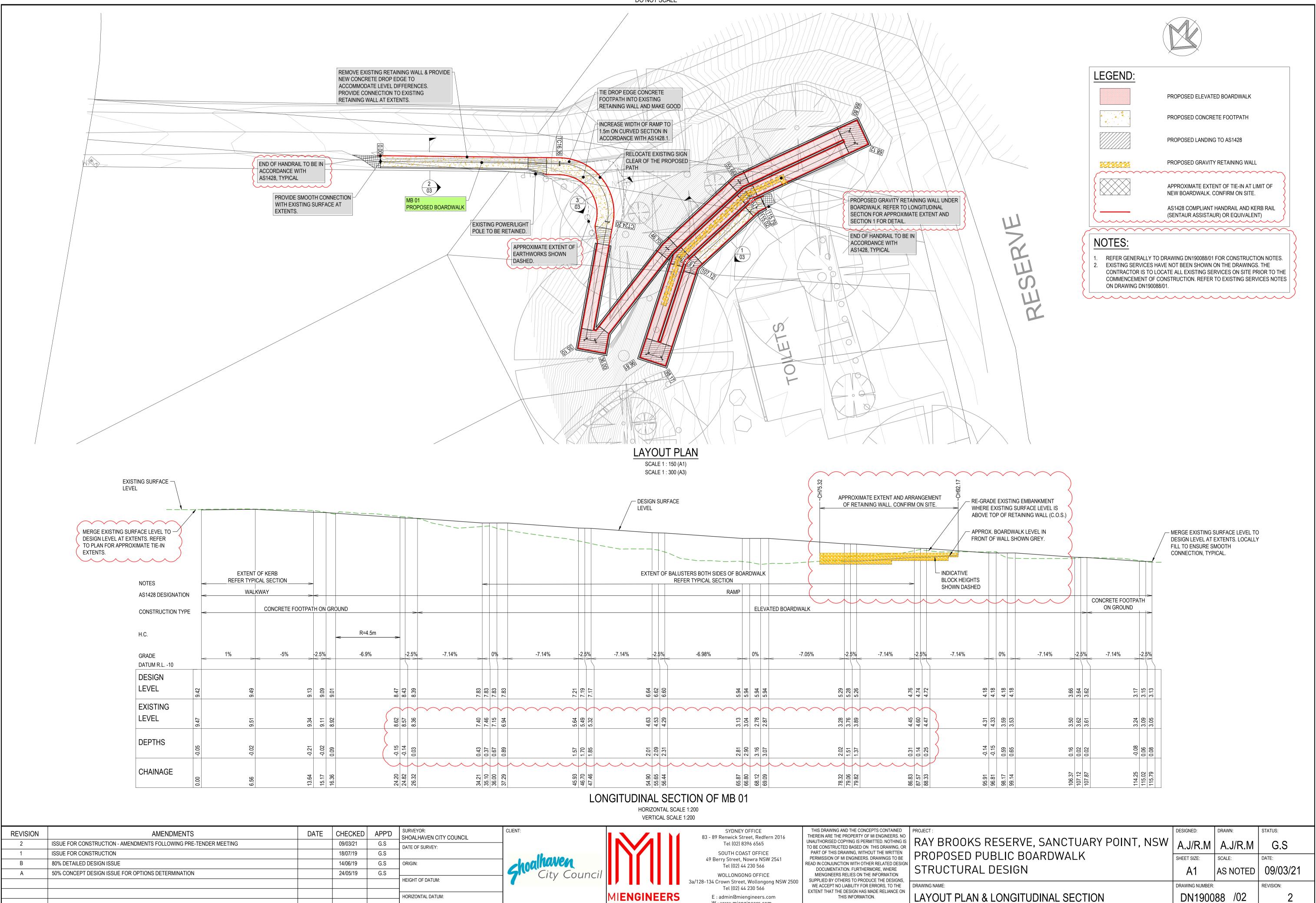
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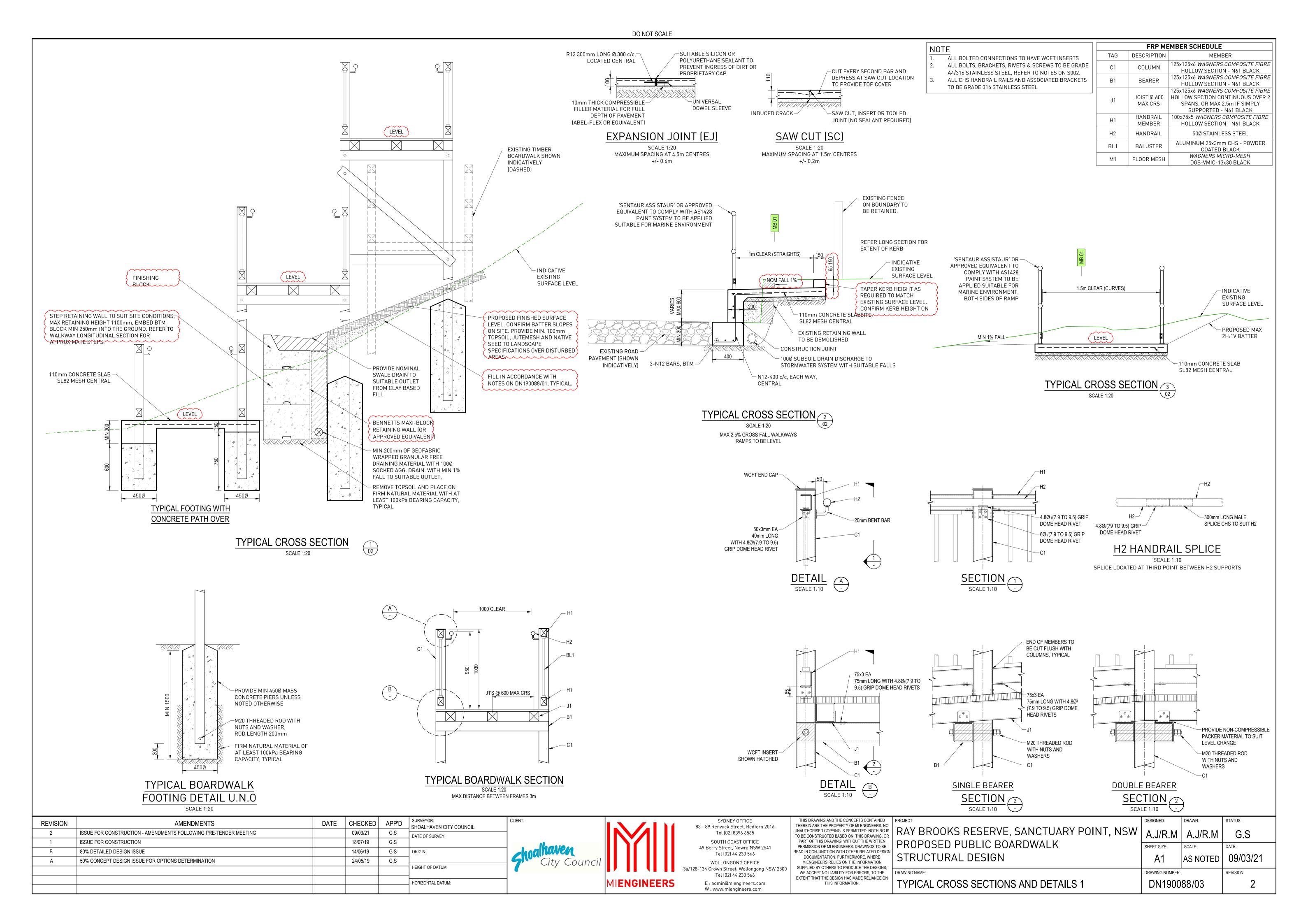
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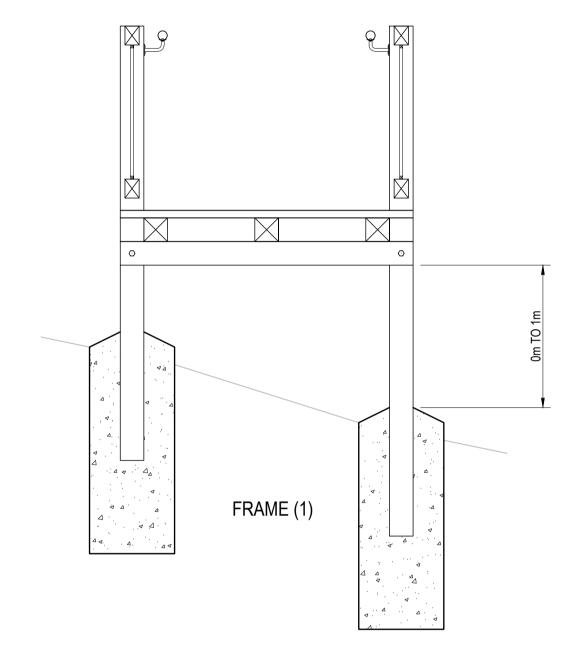
RAY BROOKS RESERVE, SANCTUARY POINT, NSW UNAUTHORISED COPYING IS PERMITTED, NOTHING IS A.J/R.M PROPOSED PUBLIC BOARDWALK SHEET SIZE: SCALE: STRUCTURAL DESIGN AS NOTED DRAWING NAME: DRAWING NUMBER:



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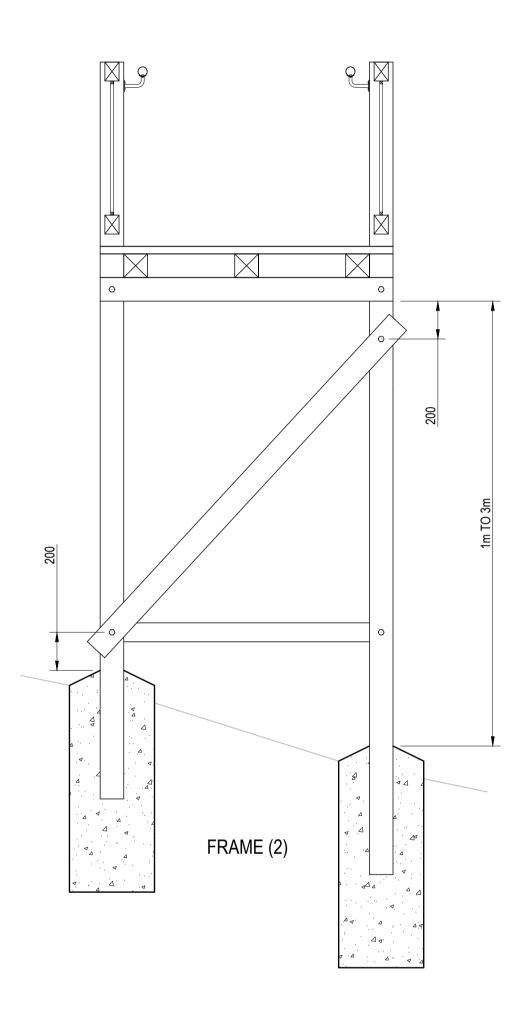
- ALL BOLTED CONNECTIONS TO HAVE WCFT INSERTS ALL BOLTS, BRACKETS, RIVETS & SCREWS TO BE GRADE
- A4/316 STAINLESS STEEL, REFER TO NOTES ON S002. ALL CHS HANDRAIL RAILS AND ASSOCIATED BRACKETS TO BE GRADE 316 STAINLESS STEEL



NOTES: FRAME (1): 0m TO 1m, NO BRACING REQUIRED

FRAME (2): 1m TO 3m, SINGLE DIAGONAL BRACE REQUIRED FRAME (3): 3m TO 4m, TWO DIAGONAL BRACES AND SINGLE HORIZONTAL BRACE REQUIRED

ALL BRACING MEMBERS TO BE WCFT 125x125x6 COMPOSITE FIBRE





	= = = 3m TO 4m
FRAME (3)	960 MAX

REVISION	AMENDMENTS	DATE	CHECKED	APP'D	SURVEY
2	ISSUE FOR CONSTRUCTION - AMENDMENTS FOLLOWING PRE-TENDER MEETING		09/03/21	G.S	DATE OF
1	ISSUE FOR CONSTRUCTION		18/07/19	G.S	
В	80% DETAILED DESIGN ISSUE		14/06/19	G.S	ORIGIN:
A	50% CONCEPT DESIGN ISSUE FOR OPTIONS DETERMINATION		24/05/19	G.S	
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	MI ENGINEERS

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Tel (02) 44 230 566	READ I
WOLLONGONG OFFICE	SUPF
3a/128-134 Crown Street, Wollongong NSW 2500	WE
Tel (02) 44 230 566	EXTE
E : admin@miengineers.com W : www.miengineers.com	

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	TO BE CONSTRUCTED BASED ON THIS DRAWING, OR	'
	PART OF THIS DRAWING, WITHOUT THE WRITTEN	Г
	PERMISSION OF MI ENGINEERS. DRAWINGS TO BE	
	READ IN CONJUNCTION WITH OTHER RELATED DESIGN	_
	DOCUMENTATION. FURTHERMORE, WHERE	
	MIENGINEERS RELIES ON THE INFORMATION	•
)	SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS,	
,	WE ACCEPT NO LIABILITY FOR ERRORS, TO THE	DR
	EXTENT THAT THE DESIGN HAS MADE RELIANCE ON	١_
	THIS INFORMATION.	l T

1	PROJECT:	DESIGNED:	DRAWN:
	RAY BROOKS RESERVE, SANCTUARY POINT, NSW	A.J/R.M	A.J/R.M
	PROPOSED PUBLIC BOARDWALK	SHEET SIZE:	SCALE:
	STRUCTURAL DESIGN	A1	1:20
	DRAWING NAME:	DRAWING NUMBER:	
TYPICAL BOARDWALK BRACING ARRANGEMENTS		DN190088/04	

STATUS:

REVISION:

G.S



DESIGN REPORT

RAY BROOKS RESERVE, SANCTUARY POINT, NSW

Public Boardwalk

Prepared for: Shoalhaven City Council

Report Number: DN190088.R01

18/07/2019 Date:







Company Details

Leckring Pty Ltd T/as MIEngineers (ABN 64 003 012 324)

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Document Control

Issue No.	Date	Prepared by	Checked by	Final Approval
1	18/07/2019	A Jones	A Stokes	

Reference Documents

RFQ Title	Boardwalk Design – Ray Brooks Reserve – Greville	
	Avenue, Sanctuary Point – Design & Documentation	
RFQ Number	DES92-01	

Limitations Statement

The sole purpose of this report and the associated services performed by MIEngineers is in accordance with the scope of services set out in the contract between MIEngineers and the Client. That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

MIEngineers derived the data in this report primarily from site visits, discussions with the Client, information provided by the client and/or Government Authority and current methodologies. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site, subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, MIEngineers has relied upon and presumed accurate information (or absence thereof) provided by the Client and others identified herein. Except as otherwise stated in the report, MIEngineers has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed by MIEngineers in this report are not, and should not be considered, an opinion concerning anything other than as outlined in the scope of works. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon site conditions and information in existence at the time of the investigation.

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Appendices

Appendix A | Drawings

Objectives of the Brief

Council has identified that the existing pedestrian access to Ray Brooks Reserve from Greville Avenue (between properties 256 & 258 Greville Ave) is to be upgraded. The existing access comprises of a short section of asphalt and gravel path on existing ground then follows a timber boardwalk structure that does not meet current standards for accessible grades.

The scope of the design is to detail the alignment, construction materials and detailed fixings of the proposed boardwalk system constructed from non-timber products along with connecting paths and infrastructure impacted by the works.

Whilst the alignment is envisaged to follow the approximate alignment, an alternative alignment that could reduce the number of switch-backs and maximise single-run lengths may be considered.

The new boardwalk structure should not impede vehicle access to the sewage pump-out that currently services the existing amenities building.

Existing Site Considerations

Site Description

Sanctuary Point is located approximately 30km South of Nowra. The site of work is located at the eastern end of Greville Avenue.

The proposed site of work is highlighted in Figure 1 – Site Locality.

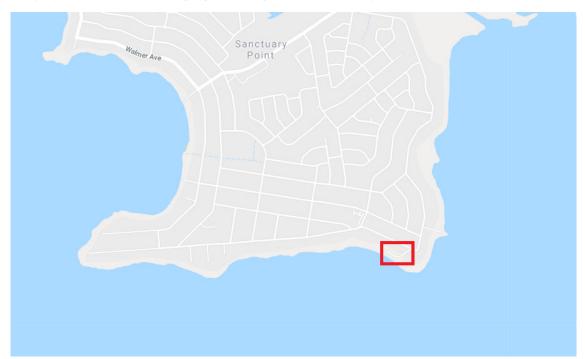


Figure 1 - Site Locality

Infrastructure

Infrastructure impacted as a result of the works includes:

- Existing timber boardwalk;
- Existing asphalt path;
- Existing rock retaining wall adjacent to access road;
- Existing timber retaining wall at bottom of boardwalk;
- TBC following potholing of 25mm UPVC rising main

Services

A Dial Before You Dig has been carried out and has highlighted that a 25mm UPVC rising main is in the area. Potholing of this sewer line will need to occur to ensure that the proposed boardwalk does not affect this service.

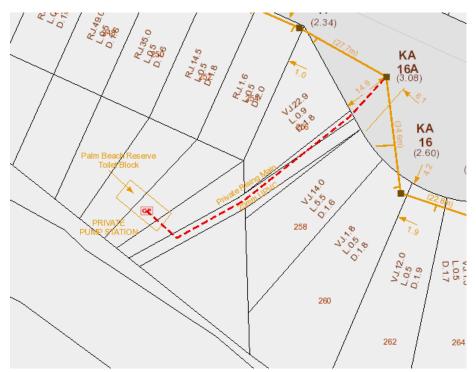


Figure 2 - Services

Environmental Considerations

Not in MIEngineers scope of works.

Geotechnical Characteristics

A visual walkover of the site was undertaken by a Senior Engineer of MIEngineers. The following observations were witnessed:

- The lower side of the embankment was observed to be a gravel sand material.
- Rock outcropping was observed within the embankment

Based on similar localities in Sanctuary Point, the material above the embankment is assumed to be clay overlaying weathered rock.

Description of the Works

The scope of works generally consists of:

- Creating a base survey model and establish a natural surface DTM that is fit for purpose from the Detailed Survey provided.
- Geometric design of the proposed works including the layout design showing extents of
 work and highlighting impacts to existing infrastructure provided from the detailed
 survey, including vegetation, vertical design of the proposed paths and boardwalk
 alignments are to be designed vertically to ascertain compliance with standards for
 access and mobility (AS1428) and typical sections of proposed boardwalk construction
 are to be provided for a minimum of two different material selections/alternatives and
 indicative lineal meterage construction costs for each.
- Bill of materials and quantities
- Design report highlighting design assumptions and standards as a result of the proposed works (This report)

Design Considerations

Access/Boardwalk Design

Access paths/boardwalk design was undertaken for both horizontal and vertical geometry as follows:

Horizontal Geometry

- The horizontal alignment provided by Shoalhaven City Council was utilised in the development of the geometry.
- Best fit geometry was designed for the access pathways to tie into the existing surrounding ground levels.

Vertical Geometry

- The proposed paths and boardwalk vertical alignment was designed to ascertain compliance with the Australian Standard for access and mobility (AS1428).
- Due to the construction materials, no fall has been provided at switch-backs locations.

Structures

- Concrete slab on ground was designed where natural ground levels were appropriate
- Retaining walls were utilised where natural ground lines were altered and/or were required to be retained.
- All structures were designed in accordance with the relevant Australian Standards.
- Existing signage to be relocated as required.

Design Assumptions

Design assumptions were as follows:

- 1m wide boardwalk adopted
- The design has not allowed for wheelchair passing bays. Wheelchairs can pass at the three switch-back locations.
- As per clause 10.8.1(b) of AS1428.1, as the change of direction is less than 30°, the internal corner has not been truncated for a minimum of 500mm in both directions (Refer to Figure 4 of AS1428.1).
- No large trees to be removed. Clearing to be of small trees, ground vegetation, shrubs and stumps.

Consultation

Documentation reviews have occurred throughout the design period with reviews occurring at 50% concept design and 80% concept design. At the 50% concept design review stage, the boardwalk structure material was confirmed to be the FRP Composite Material (as approved by M.Apolo 04/06/2019). At the 80% concept design review stage, feedback of the drawings was provided (email dated 02/07/2019) with a brief summary of comments below:

- Revise proposed sandstone gravity retaining wall to precast concrete blocks;
- Nominate FRP boardwalk material colours
- Amend landings to be square to the path of travel
- Miscellaneous comments and questions

Outcomes from the documentation reviews were incorporated into the final design drawings.

Bill of Quantities

A Bill of Quantities has been prepared based on the design drawings:

Table 1 – Bill of Quantities

Number	Description	Quantity	Unit
1	Earthworks		
1.1	Clearing & Grubbing	1	Lump Sum
1.2	Cut to Fill	150	m³
1.3	Strip Topsoil/leaf litter	63	m³
2	Demolition	1	
2.1	Remove existing retaining wall	1	Lump Sum
3	Elevated Boardwalk – Wagner Composite		
3.1	C1 - Columns	260	m
3.2	B1 - Bearers	80	m
3.3	J1 - Joists	266	m
3.4	H1 – Handrail Member	364	m
3.5	H2 – Handrail Member + Splice Member	192	m
3.6	BL1 - Balusters	108	m
3.7	Bracing Members	74	m
3.8	M1 – Floor Mesh	118	m²
3.9	SS fixing bolts and brackets	1	Lump Sum
3.10	0.6m Deep Bored Pier (450 Dia.)	5	No.
3.11	0.75m Deep Bored Pier (450 Dia.)	5	No.
3.12	1.5m Deep Bored Pier (450 Dia.)	55	No.
4	Concrete Works		
4.1	Concrete Footpath (110mm thick, SL82 Mesh, 40MPa)	54.6	m²
4.2	Concrete Kerb (150mm high x 150mm wide)	13.5	m
4.3	Concrete drop edge beam including subsurface drain	20	m
4.4	Saw Cut/tooled joint (min 20mm depth)	22	m
4.5	Expansion Joint (R12 Galv dowel at 300 c/c)	8	m
5	Retaining Wall		
5.1	Retaining Wall (Quickstone Concrete Blocks)	18	m
5.2	Subsurface drain and granular free draining backfill	18	m
6	Handrail 'Sentaur Assistaur'		
6.1	Sentaur Assistaur handrail on concrete footpath	35.4	m
7	Relocate Existing Sign	1	Lump Sum

Appendix A | Drawings

Table 2 - Drawings

Drawing No.	Description
DN180180/C00	COVER SHEET
DN180180/C01	NOTES
DN180180/C02	LAYOUT PLAN & LONGITUDINAL SECTION
DN180180/C03	TYPICAL CROSS SECTIONS AND DETAILS 1
DN180180/C04	TYPICAL BOARDWALK BRACING ARRANGEMENTS