HEIGHTS COLLEGE
276 CARLTON ST, ROCKHAMPTON QLD
PROPOSED BOUNDARY FENCE REPLACEMENT

LOCALITY PLAN
N.T.S.

DRAWING SCHEDULE	
DRAWING No.	DESCRIPTION
CE16031-200	COVER SHEET LOCALITY PLAN & DRG. SCHEDULE
CE16031-201	GENERAL NOTES SHEET 1 OF 2
CE16031-202	GENERAL NOTES SHEET 1 OF 2
CE16031-203	GENERAL ARRANGEMENT
CE16031-204	LONGITUDINAL SECTIONS
CE16031-205	STRUCTURAL DETAILS SHEET 1 OF 2
CE16031-206	STRUCTURAL DETAILS SHEET 1 OF 2

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/104-2020

Dated: 11 December 2020

DETAIL SURVEY BY:
RCC - DATE SURVEYED 1/03/19
SURVEY: CAPRICORN SURVEY GROUP
COORD: MGA SMARTNE AUS
STANDARD DRAWINGS:
CMDG STANDARD DESIGN DRAWINGS, INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA), AUSTROADS & NAT-SPEC

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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AMENDMENTS		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		PJ	JO	23/04/20	
	A	PJ	JO	23/04/20	ISSUED FOR APPROVAL
	B	PJ	JO	25/05/20	100% DETAILED DESIGN
	C	PJ	JO	25/08/20	100% DETAILED DESIGN - REVISED FLOOD ASSESMENT

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE16031

APPROVAL ISSUE

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
HEIGHTS COLLEGE

PROJECT
PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
NORTH ROCKHAMPTON Q

MOLONEY & SONS ENGINEERING
EXCELLENCE - INTEGRITY - INNOVATION
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
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DRAWING TITLE
LOCALITY PLAN & DRG. SCHEDULE

DRAWING NUMBER
CE16031-200

ISSUE
C

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PROPOSED BOUNDARY FENCE REPLACEMENT - 2019

DESIGN FILE No: CE16031
DESIGN STANDARD: CMDG STD DRGS, IPWEAQ, AUSTROADS & NAT-SPEC GUIDELINES

FLOOD DATA

REFER CE16031-205 FOR DETAILS.

GENERAL - CONSTRUCTION

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE LEGISLATION, STATUTORY REGULATIONS, BY-LAWS OR RULES. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH WORK HEALTH AND SAFETY ACT 2010, LEGISLATIVE REQUIREMENTS, ASSOCIATED REGULATIONS AND CODES OF PRACTICE, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
3. REFER DISCREPANCIES TO SUPERINTENDENT BEFORE PROCEEDING WITH WORK.
4. SUBMIT DETAILS OF CHANGES TO SCOPE, WORK METHODS OR MATERIALS etc FOR APPROVAL BEFORE PROCEEDING. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT.
5. NOMINATION OF PROPRIETARY ITEMS DOES NOT INDICATE EXCLUSIVE PREFERENCE, BUT INDICATES REQUIRED PROPERTIES OF ITEM. SIMILAR ALTERNATIVES HAVING REQUIRED PROPERTIES MAY BE OFFERED FOR APPROVAL. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT. INSTALL PROPRIETARY ITEMS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.
6. OBTAIN NECESSARY PERMITS AND APPROVALS FROM RELEVANT AUTHORITIES BEFORE COMMENCING WORK ON SITE. NOTIFY RELEVANT SERVICE AUTHORITIES BEFORE COMMENCING WORK ON SITE.
7. GIVE TWO WORKING DAYS' (48 HOURS) NOTICE SO THAT INSPECTION MAY BE MADE OF CRITICAL STAGES OF WORK.
8. INSPECTIONS UNDERTAKEN BY SUPERINTENDENT OR OTHERS DO NOT RELIEVE CONTRACTOR OF RESPONSIBILITY FOR COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.
9. DO NOT OBTAIN DIMENSIONS BY SCALING FROM DRAWINGS.
10. DIMENSIONS ARE IN MILLIMETRES, LEVELS ARE IN METRES UNO, CHAINAGES ARE IN METRES UNO.
11. DATUM FOR LEVELS IS AHD (AUSTRALIAN HEIGHT DATUM). CO-ORDINATES ARE TO RCC.
12. HAVE SURVEY AND SETTING OUT UNDERTAKEN BY A REGISTERED SURVEYOR.
13. VERIFY ON SITE SETTING OUT DIMENSIONS AND EXISTING MEMBER SIZES SHOWN ON DRAWINGS BEFORE SHOP DRAWINGS, CONSTRUCTION AND FABRICATION IS COMMENCED. EXISTING STRUCTURES SHOWN ON DRAWINGS ARE IN APPROXIMATE LOCATIONS ONLY.
14. USE STANDARD BOLT PATTERNS etc. THROUGHOUT THE WORKS TO AVOID CONFUSION OR AMBIGUITY.
15. TAKE CARE OF HAZARDS ASSOCIATED WITH BURIED, CONCEALED OR OVERHEAD SERVICES. TAKE PRECAUTIONS UNDERTAKE EXPLORATION TO ESTABLISH LOCATION OF AND PROTECT EXISTING SERVICES AT SITE. SERVICES SHOWN ON DRAWINGS ARE IN APPROXIMATE LOCATIONS ONLY. SERVICES OTHER THAN THOSE SHOWN MAY EXIST ON SITE. MARK LOCATIONS OF SERVICES CLEARLY ON SITE, AND ON AS-BUILT DRAWINGS. HAND EXCAVATE WITHIN ONE METRE OF IN-GROUND SERVICES.
16. DISPOSE OF SURPLUS MATERIAL OFF SITE IN ACCORDANCE WITH LOCAL AUTHORITY WASTE REGULATIONS..
17. IMPLEMENT SOIL AND WATER MANAGEMENT PROCEDURES TO AVOID EROSION, CONTAMINATION AND SEDIMENTATION OF SITE, SURROUNDING AREAS AND DRAINAGE SYSTEMS.
18. WORKMANSHIP AND MATERIALS TO COMPLY WITH REQUIREMENTS OF AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA (BCA) AND BY-LAWS AND ORDINANCES OF RELEVANT BUILDING AUTHORITIES. ALL STANDARDS REFERRED TO ARE THOSE CURRENT (AS AMENDED) AT COMMENCEMENT OF CONTRACT.
19. OBTAIN REQUIREMENTS FOR ADJOINING ELEMENTS TO BE FIXED TO OR SUPPORTED ON WORK AND PROVIDE FOR REQUIRED FIXINGS. PROVIDE FOR TEMPORARY SUPPORT OF ADJOINING ELEMENTS DURING CONSTRUCTION. DRAWINGS DO NOT SHOW DETAILS OF ALL FIXTURES, INSERTS, SLEEVES, RECESSES OR OPENINGS etc REQUIRED.
20. MAKE GOOD ANY DAMAGE TO EXISTING ELEMENTS AT COMPLETION OF WORKS.
21. WHERE NEW WORK ABUTS EXISTING, PROVIDE SMOOTH TRANSITION FREE OF ABRUPT CHANGES.
22. HAVE TESTING PERFORMED BY AN INDEPENDENT NATA (NATIONAL ASSOCIATION OF TESTING AUTHORITIES) ACCREDITED AUTHORITY, AND PROVIDE TEST REPORTS TO SUPERINTENDENT.
23. SEPARATE METALS FROM INCOMPATIBLE MATERIALS (eg STAINLESS STEEL, GALVANIZED STEEL, UNGALVANIZED STEEL AND TREATED TIMBER etc) BY CONCEALED LAYERS OF SUITABLE INERT MATERIALS OF SUITABLE THICKNESSES. USE PLASTIC SLEEVES AND WASHERS FOR BOLTS, etc.
24. SUPPLY RELEVANT NOTES, DRAWINGS AND SPECIFICATIONS etc TO SUB-CONTRACTORS.
25. UNO=UNLESS NOTED OTHERWISE, SLS=SERVICEABILITY LIMIT STATE, ULS=ULTIMATE LIMIT STATE, NSL=NATURAL SURFACE LEVEL, FSL=FINISHED SURFACE LEVEL.
26. SUPERINTENDENT=SUPERINTENDENT NOMINATED IN CONTRACT.
27. BUILD, FABRICATE AND PROCURE ONLY FROM DRAWINGS 'ISSUED FOR CONSTRUCTION'.
28. KEEP ON SITE A COMPLETE SET OF CONTRACT DOCUMENTS (INCLUDING DRAWINGS AND SPECIFICATIONS) AND SITE INSTRUCTIONS.

TEMPORARY WORKS

1. THESE DRAWINGS DO NOT DETAIL TEMPORARY WORKS. CONSTRUCTION METHODS AND TEMPORARY WORKS ARE RESPONSIBILITY OF THE CONTRACTOR.
2. PROVIDE SCAFFOLDING, BARRIERS, FALL RESTRAINT, HAND-MID RAILS AND TOE BOARDS FOR WORK AT HEIGHT. ERECT ACCESS STAIRS AT EARLIEST OPPORTUNITY TO REDUCE FALL HAZARDS AND FACILITATE ACCESS. MAINTAIN SAFETY MESH AND BARRIERS TO ALL OPENINGS AND ELEVATED EDGES.
3. MAINTAIN STRUCTURE IN A STABLE CONDITION DURING CONSTRUCTION AND PROVIDE TEMPORARY BRACING AND/OR SUPPORT AS REQUIRED. SHOW TEMPORARY MEMBERS ON SHOP DRAWINGS. PROVIDE SPREADERS AT LOADS AND/OR LIFTING POINTS WHERE REQUIRED. ENSURE NO PART IS OVERSTRESSED. DO NOT PLACE OR STORE BUILDING MATERIALS ON, SUPPORT FORMWORK OR PROP FROM STRUCTURAL MEMBERS WITHOUT SUPERINTENDENT'S APPROVAL. PROVIDE CALCULATIONS BY SUITABLY QUALIFIED STRUCTURAL ENGINEER TO
   PROVE ADEQUACY OF STRUCTURE FOR PROPOSED CONSTRUCTION SEQUENCE, METHODS AND LOADS INCLUDING PROPPING, etc.
4. PROVIDE TEMPORARY BRACING WHERE REQUIRED FOR STRUCTURAL ELEMENTS OR FRAMES STABILIZED BY MASONRY, PRECAST CONCRETE OR OTHER ELEMENTS CONSTRUCTED AFTER ERECTION OF THE STRUCTURAL ELEMENT OR FRAME, AND SHOW ON SHOP DRAWINGS.DESIGN ASSUMPTIONS.

DELIVERABLES

1. PREPARE WORKSHOP DRAWINGS, CALCULATIONS etc FOR PREFABRICATED COMPONENTS, INCLUDING STRUCTURAL STEELWORK, LIGHTWEIGHT STEELWORK, PRECAST CONCRETE, PRESTRESSING, FABRICATED TIMBER FRAMES etc AND SUBMIT ELECTRONIC PDF'S OR THREE PAPER COPIES OF EACH FOR SUPERINTENDENT'S REVIEW OF GENERAL COMPLIANCE WITH DESIGN CONCEPT. DO NOT COMMENCE FABRICATION UNTIL SHOP DRAWINGS AND CALCULATIONS HAVE BEEN REVIEWED. ALLOW 14 DAYS FOR SUPERINTENDENT'S REVIEW. SUPERINTENDENT'S REVIEW OF SHOP DRAWINGS AND CALCULATIONS IS OF GENERAL CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCEDURES AND CONSTRUCTION TECHNIQUES, AND PERFORMING WORK IN A SAFE MANNER. CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS AND CALCULATIONS DO NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR COMPLIANCE WITH REQUIREMENTS OF CONTRACT DRAWINGS AND SPECIFICATION.

GENERAL - STRUCTURAL

1. THE STRUCTURAL DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ALL OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY MUST BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK. DETAIL NOTES ON THESE DRAWINGS AND THE SPECIFICATION CLAUSES TAKE PRECEDENCE OVER THE GENERAL NOTES.
2. ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH THE RELEVANT CURRENT STANDARDS AUSTRALIA CODES, THE BUILDING CODE OF AUSTRALIA AND THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES, EXCEPT WHEN VARIED BY THE CONTRACT DOCUMENTS.
3. ALL DIMENSIONS SHOWN ON THE STRUCTURAL DRAWINGS MUST BE VERIFIED BY THE CONTRACTOR ON SITE, PRIOR TO COMMENCEMENT OF ANY FABRICATION OR CONSTRUCTION WORKS. THE STRUCTURAL DRAWINGS MUST NOT BE SCALED FOR DIMENSIONS.
4. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, U.N.O.
5. THE STRUCTURAL COMPONENTS DETAILED ON THESE STRUCTURAL DRAWINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RELEVANT STANDARDS AUSTRALIA CODE AND BUILDING CODE OF AUSTRALIA FOR THE FOLLOWING LOADINGS.

STRUCTURE/COMPONENT	IMPOSED ACTIONS (FLOOD LOAD POINT LOAD kN)	SUPERIMPOSED DEAD LOAD (kPa)
FENCE - GENERAL	Q50 DEBRIS LOAD / N/A	-
FENCE - BREAKAWAY PIN FENCE SECTION	Q10 DEBRIS LOAD / 12kN	-

6. THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR. IF ANY STRUCTURAL ELEMENT PRESENTS DIFFICULTY IN RESPECT OF CONSTRUCTABILITY OR SAFETY, THE MATTER MUST BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK.
7. DURING CONSTRUCTION THE STRUCTURE MUST BE MAINTAINED IN A STABLE CONDITION AND MUST ENSURE THAT NO PART IS OVERLOADED DURING CONSTRUCTION. TEMPORARY PROPPING OR BRACING MUST BE DESIGNED AND PROVIDED BY THE CONTRACTOR AND ISSUED TO THE DESIGN ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT, IN ORDER TO KEEP THE BUILDING WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
8. THESE NOTES MUST ALSO APPLY TO ALL MATERIALS AND PROPRIETARY PRODUCTS USED IN CONSTRUCTION OF THE WORK.
9. THE CONTRACTOR MUST BE RESPONSIBLE TO ENSURE ALL MATERIALS AND PROPRIETARY PRODUCTS SOURCED COMPLY WITH THE APPROPRIATE QUALITY AND RELEVANT STANDARDS NOTED WITHIN THESE GENERAL NOTES.

ABBREVIATIONS

B	BOLT
BP	BORED PIER
BS	BOTH SIDES
CFW	CONTINUOUS FILLET WELD
CJ	CONSTRUCTION JOINT
DJ	DOWELLED JOINT
EF	EACH FACE
ET	EDGE THICKENING
EW	EACH WAY
FFL	FINISHED FLOOR LEVEL
FPBW	FULL PENETRATION BUTT WELD
FS	FAR SIDE
FW	FILLET WELD
IJ	ISOLATION JOINT
KJ	KEYED JOINT
LG	LONG
NF	NEAR FACE
NS	NEAR SIDE
PA	PERSONNEL ACCESS (DOOR)
RD	ROLLER DOOR
SF	STRIP FOOTING
SJ	SAWN JOINT
SSL	STRUCTURAL SLAB LEVEL
TB	TENSIONED BEARING CONNECTION JOINT
TF	TENSIONED FRICTION CONNECTION JOINT

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/104-2020

Dated: 11 December 2020

FOOTINGS

1. ALL WORKMANSHIP AND MATERIALS MUST BE IN ACCORDANCE WITH AS2870 AND AS3600.
2. THE DESIGN IS BASED ON "GEOTECHNICAL INVESTIGATION & REPORT, JOB REFERENCE 2128E.P.121" PREPARED BY CARDNO, DATED 30 NOVEMBER 2015.
3. FOOTINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH AS2870-2011 FOR A SITE REACTIVITY CLASS "P" AND A MINIMUM ALLOWABLE BEARING CAPACITY OF 150kPa FOR BORED PIERS. THE FOUNDATION MATERIAL MUST BE APPROVED BY THE GEOTECHNICAL ENGINEER FOR THIS ALLOWABLE BEARING CAPACITY BEFORE PLACING MEMBRANE, REINFORCEMENT OR CONCRETE.
4. SHOULD ACTUAL CONDITIONS BE FOUND TO DIFFER FROM THOSE NOTED, THE MATTER SHOULD BE REFERRED TO THE SUPERINTENDENT FOR POSSIBLE FOOTING REDESIGN BY THE ENGINEER.
5. THE BASE OF ALL FOOTING EXCAVATIONS MUST BE COMPACTED TO A RELATIVE DRY DENSITY AS DETERMINED IN ACCORDANCE WITH AS 1289, AND MUST BE FINISHED CLEAN AND HORIZONTAL PRIOR TO POURING CONCRETE.
6. THE CONTRACTOR MUST CHECK ALL EXCAVATIONS FOR EXISTENCE OF ORGANIC MATERIAL AND RUBBISH. ANY SUCH MATERIAL MUST BE REMOVED AND THE EXCAVATION BACKFILLED WITH CLEAN GRANULAR MATERIAL AND COMPACTED.
7. FOOTINGS MUST BE CONSTRUCTED AND BACKFILLED AS SOON AS POSSIBLE FOLLOWING EXCAVATION TO AVOID EITHER SOFTENING OF THE FOUNDING MATERIAL OR DRYING OUT BY EXPOSURE.
8. EXCAVATE FOR FOOTINGS TO THE NOMINATED SIZE AND DEPTH. FOOTING FOUNDING LEVELS ARE PROVISIONAL SUBJECT TO ACTUAL SITE CONDITIONS AND APPROVAL BY A SUITABLY QUALIFIED PERSON OR GEOTECHNICAL ENGINEER.
9. CONCRETE MUST BE COMPACTED BY AN IMMERSION VIBRATOR.

CONCRETE

1. ALL WORKMANSHIP AND MATERIALS MUST BE IN ACCORDANCE WITH THE CURRENT EDITION OF AS3600 INCLUDING AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. READYMIX CONCRETE SUPPLY MUST COMPLY WITH AS1379.
3. CONCRETE QUALITY:
   GENERAL REQUIREMENTS ARE GIVEN IN THE FOLLOWING TABLE. REFER TO THE SPECIFICATION FOR ADDITIONAL REQUIREMENTS FOR SPECIAL CLASS CONCRETE.

M	CONC. CLASS	STRENGTH GRADE (MPa)	CEMENT TYPE	MAX. AGG SIZE (mm)	SLUMP (mm)	MAX SHRINKAGE STRAIN @ 56 DAYS (u - 10^-6)
BORED PIERS	NORMAL	32	-	20	80	TO AS1379

SL – SHRINKAGE LIMITED

4. PROJECT CONTROL TESTING MUST BE CARRIED OUT ON ALL SPECIAL CLASS CONCRETE IN ACCORDANCE WITH AS1379, CLAUSE 6.5.
5. ADMIXTURES CONTAINING CHLORIDES MUST NOT BE USED.
6. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY AND FIRE RESISTANCE MUST BE AS FOLLOWS U.N.O.

ELEMENT, INT OR EXT SURFACE	EXPOSURE CLASS TO AS3600	CONCRETE GRADE	MIN. COVER (mm)	ADJUST COVER FOR FIRE RATING (mm)
BORED PIERS	B1	32	50	-

AT EXTERNALLY EXPOSED SURFACES METALLIC ITEMS INCLUDING FORM BOLTS, FORM SPACERS, METALLIC BAR CHAIRS AND TIEWIRE MUST NOT BE PLACED IN THE COVER ZONE.

7. CONCRETE SIZES SHOWN DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
8. FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC., REFER TO ARCHITECTS DETAILS. MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS
9. REINFORCEMENT MUST BE SUPPORTED ON PURPOSE MADE CONCRETE, STEEL OR PLASTIC SUPPORTS DEPENDING ON THE EXPOSURE CONDITION TO PROVIDE THE SPECIFIED CLEAR COVER. AT EXTERNAL SURFACES EITHER ALL PLASTIC OR CONCRETE SUPPORTS MUST BE USED.
10. SUPPORTS MUST BE LOCATED AT NOT MORE THAN 60 BAR DIAMETERS EACH WAY FOR BARS AND NOT MORE THAN 750mm EACH WAY FOR MESH.
11. REINFORCEMENT SYMBOLS – BARS:
    R ROUND
    D DEFORMED
    I INDENTED
    250, 300, 500 STRENGTH GRADE IN MPa
    L LOW DUCTILITY
    N NORMAL DUCTILITY
    E EARTHQUAKE DUCTILITY

    EG. D500N16: DEFORMED BAR/GRADE 500 MPa/NORMAL DUCTILITY/16mmDIAMETER

    REINFORCEMENT SYMBOLS – WELDED MESH:
    R, D, I AS FOR BARS
    500 STRENGTH GRADE
    S SQUARE MESH
    R RECTANGULAR MESH
    L, N, E DUCTILITY AS FOR BARS

18. BARS DENOTED N MUST BE TYPE D500N.
    BARS DENOTED R MUST BE TYPE R250N.
    MESH DENOTED SL…… OR RL……..MUST BE TYPE D500SL OR TYPE D500RL RESPECTIVELY
    TRENCH MESH MUST BE TYPE D500L
19. REINFORCEMENT NOTATION
    N12 – 300 (└SPACING (mm), └BAR DIAMETER (mm), └TYPE OF BAR)
    3/N 28 (└BAR DIAMETER (mm), └TYPE OF BAR, └NUMBER OF BARS)
20. PULL OUT BARS OR OTHER BARS WHICH ARE SHOWN ON THE DRAWINGS TO BE RE-BENT ON SITE, MUST BE MADE FROM QUENCHED AND SELF TEMPERED STEEL. THE BARS MUST BE POSITIONED WITH THE INITIAL BEND CLEAR OF THE CONCRETE FACE.
21. SITE BENDING OF REINFORCEMENT BARS MUST BE DONE USING A RE-BENDING TOOL WITHOUT HEATING. THE BARS MUST BE RE-BENT AGAINST A FLAT SURFACE OR A PIN WITH A DIAMETER NOT LESS THAN THE MINIMUM PIN SIZE PRESCRIBED IN AS3600.
22. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
23. REINFORCEMENT SHALL NOT BE CUT, BENT OR HEATED ON SITE WITHOUT THE ENGINEERS' PRIOR APPROVAL.
24. WELDING OF REINFORCEMENT IS NOT PERMITTED U.N.O. ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE SUPERINTENDENT.
25. AT JOGGLES IN BARS, THE MAXIMUM OFFSET MUST BE 1 BAR DIAMETER OVER A LENGTH OF 12 BAR DIAMETERS.
26. REINFORCEMENT COUPLERS, U.N.O. ON THE DRAWINGS, MUST NOT BE USED WITHOUT APPROVAL BY THE SUPERINTENDENT.
27. GIVE A MINIMUM OF 24 HOURS NOTICE FOR INSPECTION OF REINFORCEMENT BY THE SUPERINTENDENT OR AS REQUIRED BY THE SPECIFICATION.
28. THE FINISHED CONCRETE MUST BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE MUST BE COMPACTED WITH MECHANICAL VIBRATORS.
29. CURING OF ALL CONCRETE MUST BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF 7 DAYS, U.N.O. APPROVED SPRAY-ON CURING COMPOUNDS THAT COMPLY WITH AS3799 MAY BE USED WHERE FLOOR FINISHES WILL NOT BE AFFECTED. POLYTHENE SHEETING OR WET HESSIAN MAY BE USED TO RETAIN CONCRETE MOISTURE WHERE PROTECTED FROM WIND AND TRAFFIC. CURING MUST COMMENCE IMMEDIATELY AFTER CONCRETE PLACEMENT.
30. CONSTRUCTION SUPPORT PROPPING MUST BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING. BACKPROPPING IS SUBJECT TO APPROVAL BY THE SUPERINTENDENT. NO BRICKWORK OR PARTITION WALLS MUST BE CONSTRUCTED ON SUSPENDED LEVELS UNTIL SLAB HAS CURED AND ALL PROPPING IS REMOVED AND THE SLAB HAS DEFLECTED UNDER ITS SELF WEIGHT.

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	PJ	JO	23/04/20	ISSUED FOR APPROVAL
B	PJ	JO	25/05/20	100% DETAILED DESIGN
C	PJ	JO	25/08/20	100% DETAILED DESIGN - REVISED FLOOD ASSESMENT

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

JAS-ANZ ISO 9001

DATUM

PROJECT No.
CE16031

APPROVAL ISSUE

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
HEIGHTS COLLEGE

PROJECT
PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
NORTH ROCKHAMPTON Q

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DRAWING TITLE
GENERAL NOTES
SHEET 1 OF 2

DRAWING NUMBER
CE16031-201

ISSUE
C

STRUCTURAL STEEL

1. ALL WORKMANSHIP AND MATERIAL MUST BE IN ACCORDANCE WITH AS4100 AND AS1554 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. U.N.O., ALL STEEL MUST BE OF THE FOLLOWING GRADE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD.

TYPE OF STEEL	GRADE
UNIVERSAL BEAMS & COLUMNS, PARALLEL FLANGE CHANNELS, LARGE ANGLES TO AS/NZ3679.1	300 PLUS
FLATS, SMALL ANGLES, TAPER FLANGE BEAMS & COLUMNS TO AS/NZ3679.1	300
WELDED SECTIONS TO AS/NZ3679.2	300
HOT ROLLED PLATES, FLOOR PLATES & SLABS TO AS/NZ3678	300
HOLLOW SECTIONS TO AS1163	C350
COLD FORMED PURLINS & GIRTS TO AS1397	G450, Z350

3. WORKSHOP FABRICATION DRAWINGS MUST BE SUBMITTED TO THE SUPERINTENDENT IN ACCORDANCE WITH THE SPECIFICATION FOR REVIEW AT LEAST 7 DAYS PRIOR TO COMMENCEMENT OF FABRICATION. FABRICATION MUST NOT COMMENCE WITHOUT THE SUPERINTENDENT'S APPROVAL OF THE WORKSHOP DRAWINGS.
4. THE CONTRACTOR MUST ENSURE THAT FIXINGS BETWEEN STEELWORK AND OTHER BUILDING ELEMENTS ARE COORDINATED AND INSTALLED. WHERE POSSIBLE THE FIXINGS MUST BE SHOWN ON THE WORKSHOP FABRICATION DRAWINGS.
5. THE FABRICATION AND ERECTION OF THE STRUCTURAL STEELWORK MUST BE SUPERVISED BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION, IN ORDER TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET.
6. ALL MEMBERS MUST BE SUPPLIED IN SINGLE LENGTHS. SPLICES MUST ONLY BE PERMITTED IN LOCATIONS SHOWN ON THE STRUCTURAL DRAWINGS.
7. ALL STEELWORK MUST BE SECURELY TEMPORARILY BRACED BY THE CONTRACTOR AS NECESSARY TO STABILISE THE STRUCTURE DURING ERECTION. CONSULT STRUCTURAL ENGINEER FOR ADDITIONAL DESIGN OF TEMPORARY PROPPING OR BRACING IF REQUIRED.
8. ALL CUT ENDS, PLATES, GUSSETS, ETC. MUST HAVE SHARP EDGES AND CORNERS GROUND SMOOTH TO A MINIMUM OF 2mm RADIUS.
9. BOLTING:
   BOLTING CATEGORIES ARE IDENTIFIED ON THE STRUCTURAL DRAWINGS IN THE FOLLOWING MANNER.

BOLT CATEGORY	COMMENTS
4.6/S	COMMERCIAL BOLTS OF GRADE 4.6 TO AS1111 SNUG TIGHTENED
8.8/S	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 SNUG TIGHTENED
8.8/TB	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A BEARING TYPE JOINT
8.8/TF	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A FRICTION TYPE JOINT WITH FACING SURFACES LEFT UNCOATED U.N.O.

10. U.N.O. ALL BOLTS MUST BE M16 CATEGORY 8.8/S. ALL CONNECTIONS MUST HAVE AT LEAST 2 BOLTS. ALL BOLTS AND WASHERS MUST BE GALVANISED. ALL HOLES MUST BE 2mm LARGER THAN THE BOLT DIAMETER U.N.O.
11. /TB AND /TF BOLT CATEGORIES MUST BE INSTALLED IN ACCORDANCE WITH SECTION 15 OF AS4100, USING EITHER THE PART-TURN METHOD OR THE DIRECT-TENSION INDICATOR METHOD.
12. WELDING:
    ALL WELDING MUST BE CARRIED OUT IN ACCORDANCE WITH AS1554.1. ELECTRODES MUST BE EITHER AS1553, AS1858, AS2203 OR AS2717, AS APPROPRIATE ALL FILLET WELDS MUST BE 8mm CONTINUOUS, ALL AROUND, CATEGORY SP USING E48XX ELECTRODES OR EQUIVALENT. ALL BUTT WELDS MUST BE COMPLETE PENETRATION BUTT WELDS CATEGORY SP TO AS1554.1 U.N.O.
    THE EXTENT OF NON-DESTRUCTIVE WELD EXAMINATION MUST BE AS SHOWN IN TABLE BELOW U.N.O. RADIOGRAPHIC OR ULTRASONIC EXAMINATION MUST BE TO AS1554.1, AS2177.1 AND AS2207 AS APPROPRIATE.

TYPE OF WELD & CATEGORY	EXAMINATION METHOD	EXTENT (% OF TOTAL LENGTH OF WELD TYPE)
FILLET WELDS, GP + SP	VISUAL INSPECTION	100
BUTT WELDS, GP	VISUAL INSPECTION	100
BUTT WELDS, SP	VISUAL INSPECTION	100
BUTT WELDS, SP	ULTRASONIC TESTING	10

13. GROUT ALL STEEL BASES TO CONCRETE SLAB OR FOOTINGS BY DRY PACKING USING GROUT WHICH IS NON-SHRINK AND HAS A MINIMUM COMPRESSIVE STRENGTH AT 7 DAYS OF 40 MPa.
14. PROTECTIVE COATING:
    SURFACE PREPARATION AND CORROSION PROTECTION OF STRUCTURAL STEEL ARE TO COMPLY WITH THE FOLLOWING:

STEEL WORK	SURFACE PREPARATION TO AS1627	PRIMER COAT	INTERMEDIATE & TOP COAT
ALL EXTERNAL STEEL WORK	N/A	HOT DIPPED GALVANISED IN ACCORDANCE WITH AS/NZS4680 MINIMUM 600 g/m²	TO OWNERS/ARCHITECTS REQUIREMENTS
ALL FITMENTS NUTS, BOLTS AND WASHERS	N/A	HOT DIPPED GALVANISED IN ACCORDANCE WITH AS/NZS4680 MINIMUM 50 g/m²	TO OWNERS/ARCHITECTS REQUIREMENTS

15. ALL GALVANISING OF STRUCTURAL STEELWORK MUST BE IN ACCORDANCE WITH AS4680. THE CONTINUOUS AVERAGE ZINC COATING MASS MUST BE 600g/m² (550g/m² MINIMUM).
16. PROVIDE SEAL PLATES TO THE ENDS OF ALL HOLLOW SECTIONS, WITH 'BREATHER' HOLES IF MEMBERS ARE TO BE HOT DIP GALVANISED. BREATHER HOLES MUST BE SEALED AFTER GALVANISING TO PREVENT INTERNAL CORROSION OF HOLLOW SECTIONS. SEAL BREATHER HOLES WITH EITHER A RUBBER GROMMET, SILICON SEALANT OR PLUG WELDING HOLE OR PLATE OVER AND REPAIR GALVANISED COATING WITH COLD GALVANISING PAINT.
17. STEELWORK INTENDED TO BE CONCRETE ENCASED MUST BE UNPAINTED. ENCASING CONCRETE MUST BE GRADE N25 U.N.O. PROVIDING A COVER ADEQUATE TO SUIT FIRE RATING OR EXPOSURE CONDITIONS. CONCRETE ENCASEMENT MUST BE CENTRALLY REINFORCED WITH 5mm WIRE TO AS4617 OR 6mm STRUCTURAL GRADE BARS TO AS4617 AT 150mm PITCH.

PROPRIETARY PRODUCTS

1. ALL PROPRIETARY PRODUCTS SUCH AS EPOXY ANCHORING PRODUCTS, CAST IN FERRULES, LIFTING DEVICES, ETC. MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
2. ANY DISCREPANCIES BETWEEN THE MANUFACTURERS SPECIFICATIONS AND DETAIL NOTES IN THESE DRAWINGS MUST BE REFERRED TO THE SUPERINTENDENT FOR CLARIFICATION PRIOR TO PROCEEDING OR INSTALLATION.

ALUMINIUM

1. ALL ALUMINIUM PINS TO BE GRADE 6060 T5.

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DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.

CE16031

APPROVAL ISSUE

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT

HEIGHTS COLLEGE

PROJECT

PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
NORTH ROCKHAMPTON Q

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DRAWING TITLE

GENERAL NOTES
SHEET 2 OF 2

DRAWING NUMBER

CE16031-202

ISSUE

C

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LEGEND

- Flow Direction
- Proposed Hercules Fencing
- Proposed Flood Relief 'Break-Away' Fencing
- Existing Lot Boundary
- Existing Edge of Bitumen
- Existing Fence Line
- Existing Overhead Communications
- Existing Overhead Electrical
- Existing Water Main (DBYD Location Only)
- Existing Sewer Main (DBYD Location Only)
- Existing Culvert Drain
- Existing Kerb Line
- Existing Bitumen Surface
- Existing Surface Contours

SPLITTERS CREEK

NEW OVAL

PROPOSED EASTERN FENCE A

PROPOSED WESTERN FENCE

PROPOSED EASTERN FENCE B

CH 0 CH 10 CH 20 CH 30 CH 40 CH 50 CH 60 CH 70 CH 80 CH 90 CH 100 CH 110 P1 17.917 CH 120 CH 130 CH 140 CH 150 CH 160 CH 165

CH 0 CH 10 CH 20 CH 30 CH 39

CH 0 CH 10 CH 20 CH 30 CH 40 CH 43

0 2.5 10.0m
0 5.0 20.0m

1:500 (A1)
1:1000 (A3)

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DESIGN CHECK

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DATUM

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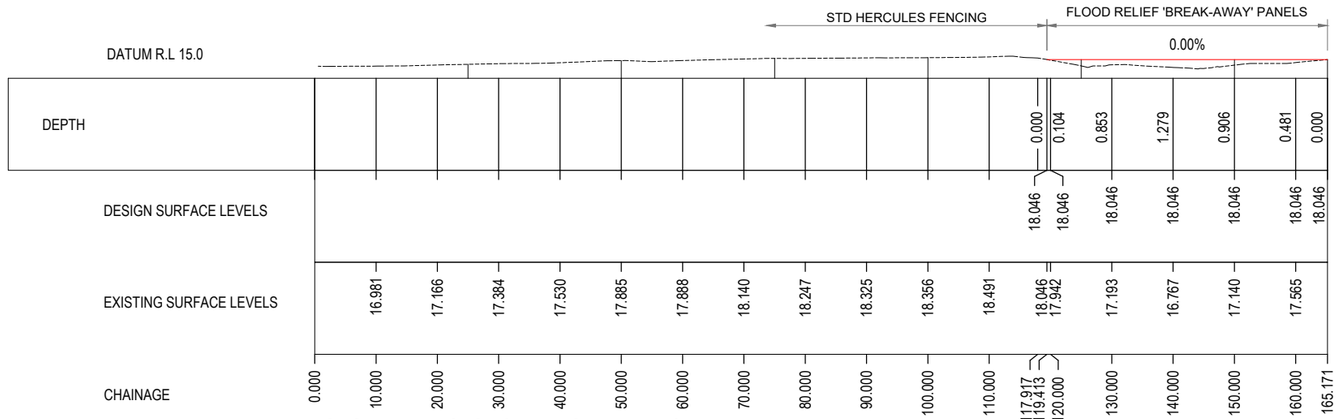
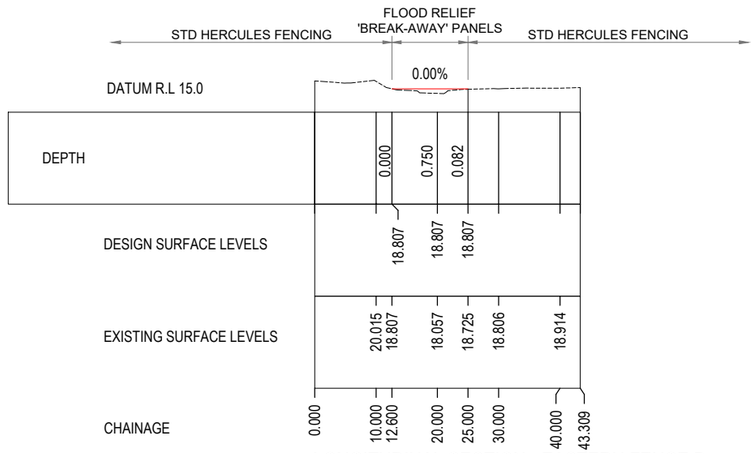
DRAWING TITLE
GENERAL ARRANGEMENT

DRAWING NUMBER
CE16031-203

ISSUE
C



LONGITUDINAL SECTION - WESTERN FENCE
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000



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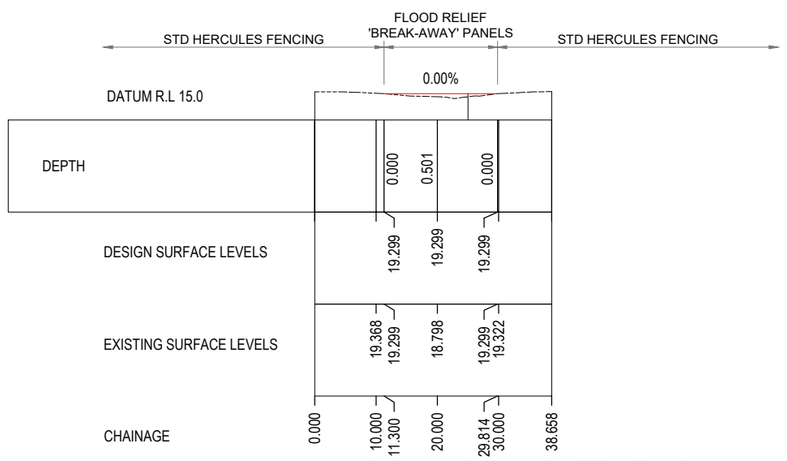
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000



LONGITUDINAL SECTION - EASTERN FENCE A
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000

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DESIGN CHECK

DRAWN CHECK

JAS-ANZ QUALAS ISO 9001

DATUM

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

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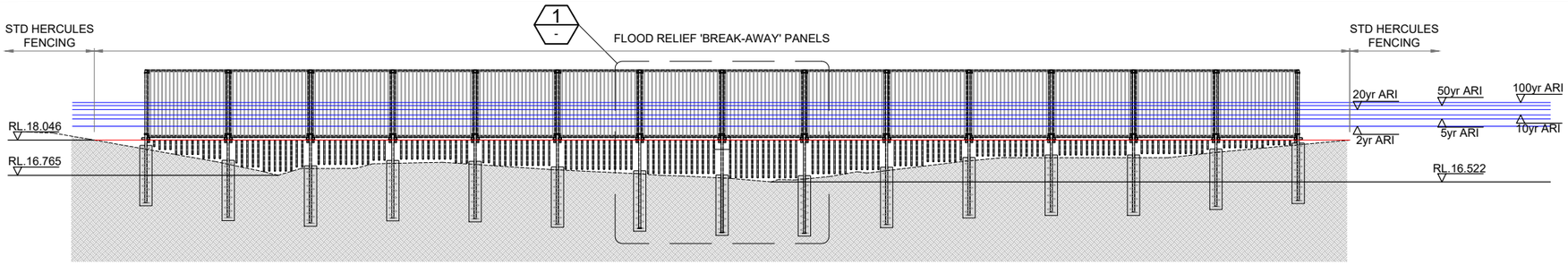
DRAWING TITLE: LONGITUDINAL SECTIONS

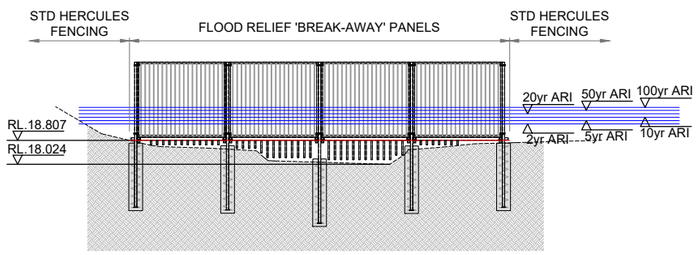
DRAWING NUMBER: CE16031-204

ISSUE: C



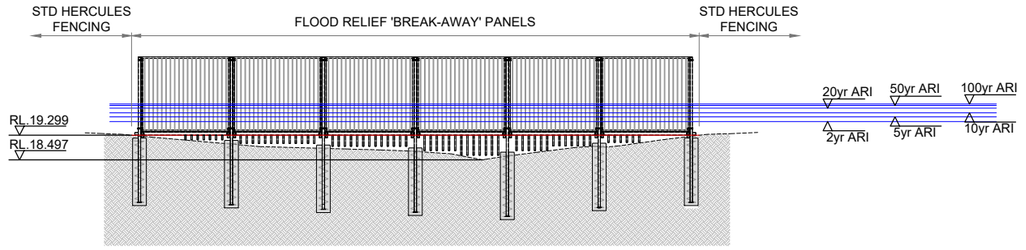
ELEVATION VIEW - PROPOSED WESTERN FENCE

SCALE 1:200



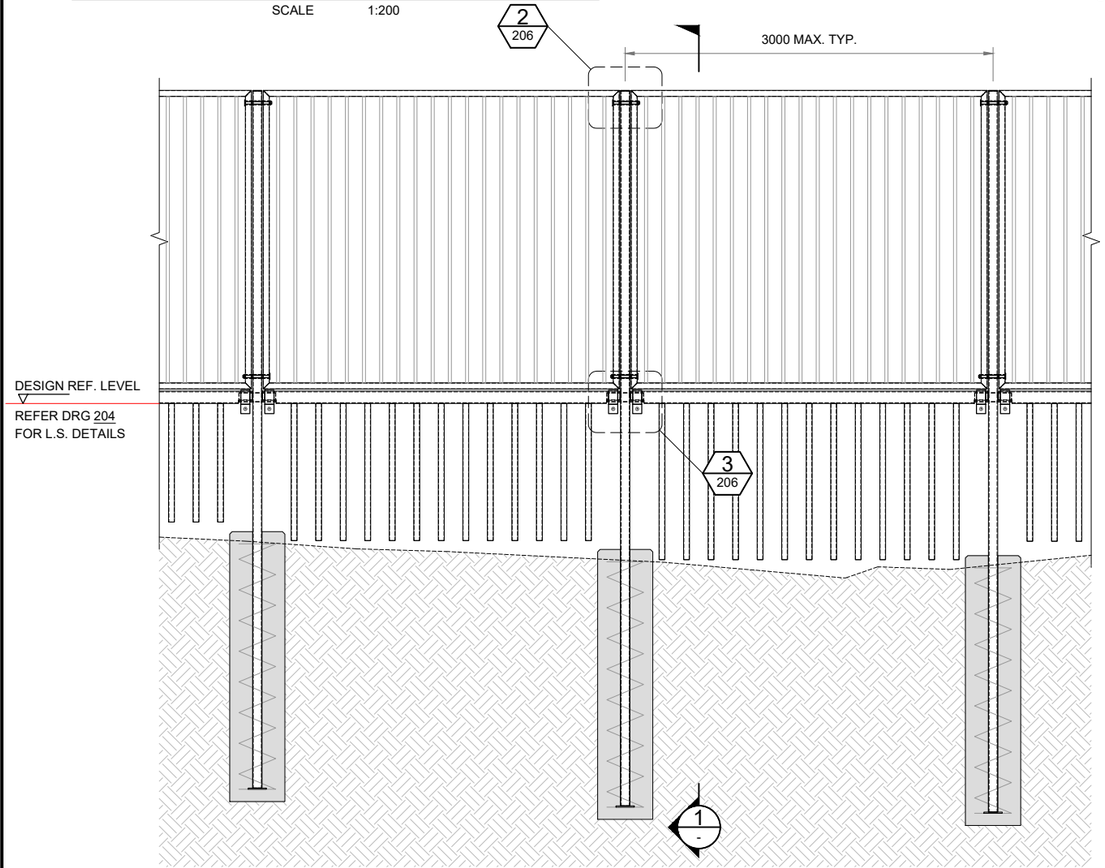
ELEVATION VIEW - PROPOSED EASTERN FENCE B

SCALE 1:200

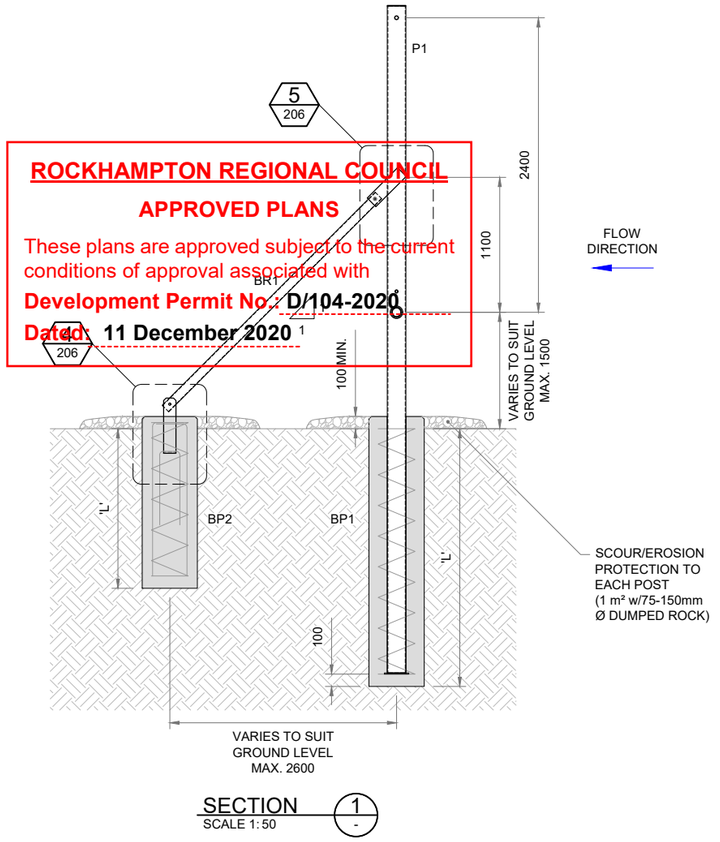


ELEVATION VIEW - PROPOSED EASTERN FENCE A

SCALE 1:200



DETAIL 1 - SCALE 1:50



SECTION 1 - SCALE 1:50

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Dated: 11 December 2020 1

STRUCTURAL FOOTING SCHEDULE

ID	DESCRIPTION	REINFORCEMENT
BP1	450 BORED PIER, L=2000	6/N16 LONGITUDINAL BARS, COG AT TOP. R10 HELIX, 300 DIAMETER, 250 PITCH. 50mm COVER TYP. 100mm BTM COVER.
BP2	450 BORED PIER, L=1200	6/N16 LONGITUDINAL BARS, COG AT TOP. R10 HELIX, 300 DIAMETER, 250 PITCH. 50mm COVER TYP. 100mm BTM COVER.

STRUCTURAL FRAMING SCHEDULE

ID	DESCRIPTION	CONNECTION DETAILS
P1	152x76x5 RHS	1900 EMBED INTO BP1. 200x150x10 BTM PL. 5mm TOP CAP PL.
BR1	76.1x3.6 CHS	1/M16 8.8/S BOLT TO 100x10 PL EACH SIDE.
R1	101.6x6.4 CHS	SLOTTED TO SUIT 76.1x3.6 CHS INNER PIN/PIPE. 5PL CLAMP AROUND W/ 1/N16

FLOODING DATA WESTERN FENCE

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.95	18.546	1.06	1.96	18.552	1.10
5	2.21	18.807	1.14	2.22	18.816	1.19
10	2.36	18.959	1.19	2.36	18.959	1.21
20	2.56	19.157	1.23	2.56	19.157	1.26
50	2.71	19.302	1.27	2.71	19.302	1.33
100	2.82	19.414	1.37	2.82	19.414	1.42

FLOODING DATA EASTERN FENCE A

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.22	19.744	2.04	1.22	19.745	2.18
5	1.37	19.897	2.18	1.37	19.899	2.29
10	1.49	20.020	2.20	1.50	20.027	2.21
20	1.64	20.173	2.24	1.65	20.180	2.25
50	1.73	20.262	2.41	1.74	20.271	2.43
100	1.78	20.306	2.58	1.79	20.317	2.61

FLOODING DATA EASTERN FENCE B

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.32	19.406	2.46	1.26	19.344	2.66
5	1.44	19.522	2.69	1.37	19.449	2.90
10	1.50	19.584	2.78	1.48	19.560	2.85
20	1.61	19.693	2.84	1.59	19.672	2.91
50	1.72	19.800	2.87	1.70	19.782	2.94
100	1.81	19.898	2.88	1.80	19.882	2.96

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DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No. CE16031

APPROVAL ISSUE

APPROVED

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: HEIGHTS COLLEGE

PROJECT: PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
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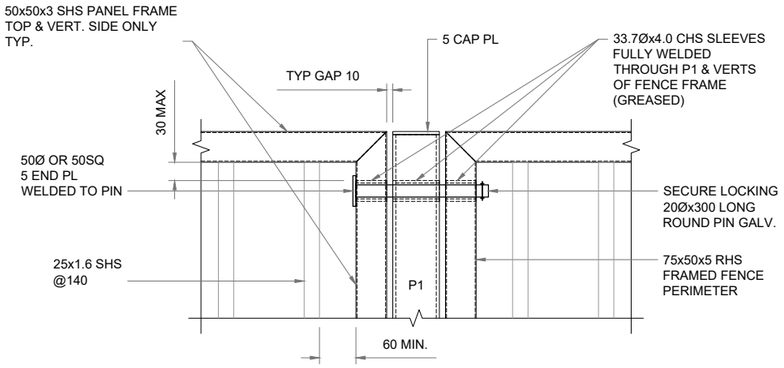
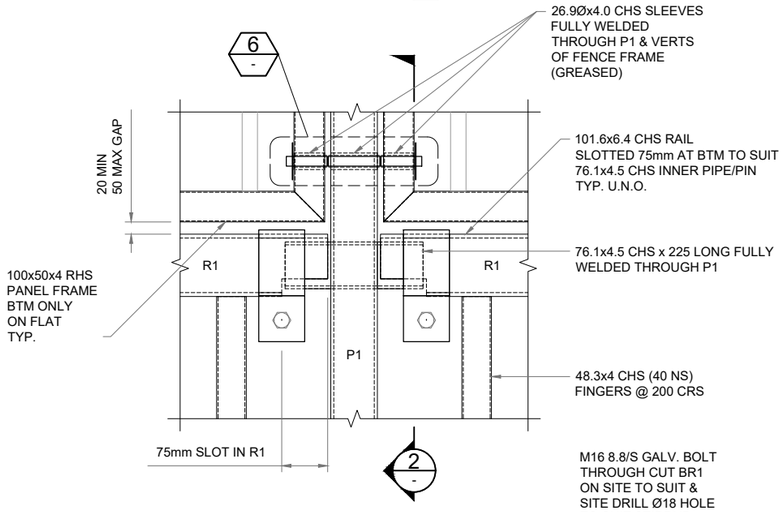
DRAWING TITLE: STRUCTURAL DETAILS SHEET 1 OF 2

DRAWING NUMBER: CE16031-205

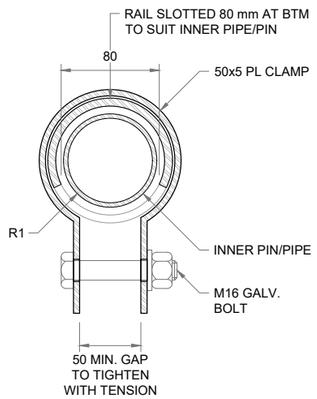
ISSUE: C



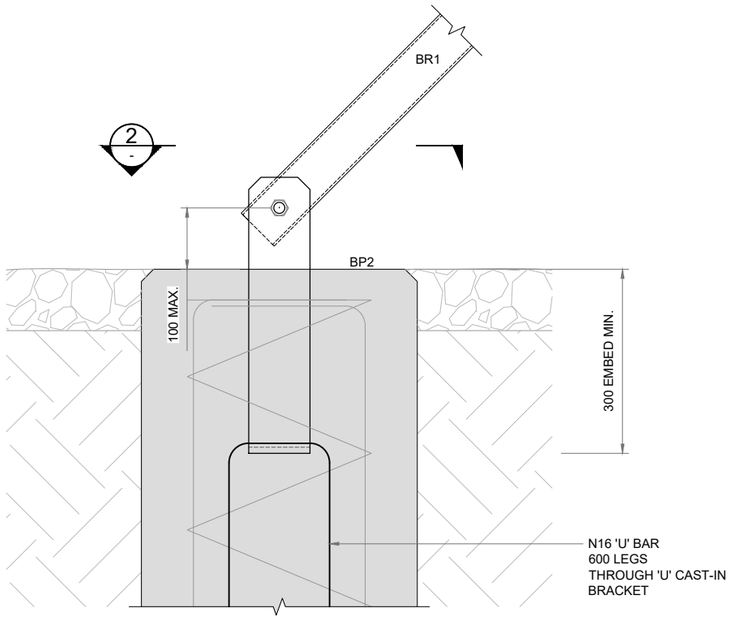
DETAIL 2 / 205
SCALE 1:10



DETAIL 3 / 205
SCALE 1:10



SECTION 2 / -
SCALE 1:5



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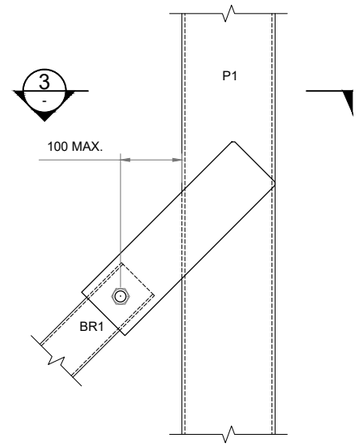
SCALE 1:10



DETAIL 5 / 205
SCALE 1:10

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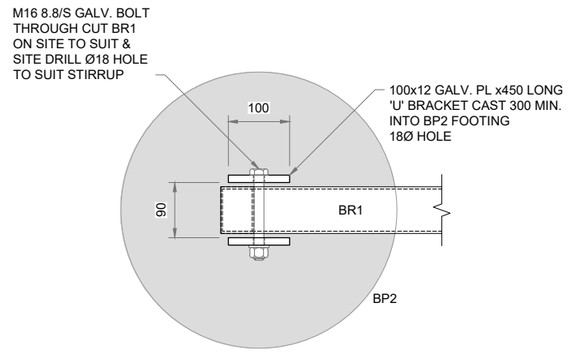
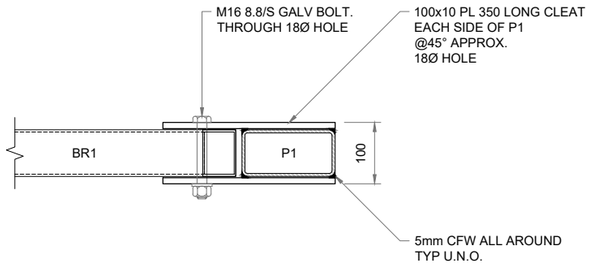


PLAN VIEW ON BR1
TO CAST-IN STIRRUP

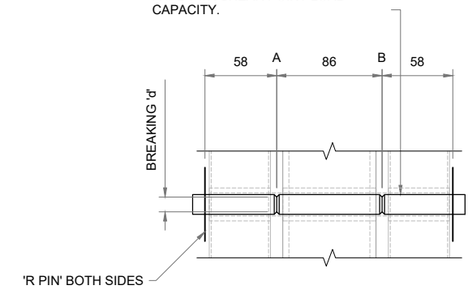
SECTION 2 / -
SCALE 1:10



PLAN VIEW ON P1 AT BR1
BRACE CONNECTION

SECTION 3 / -
SCALE 1:10

R16mm DIAM. 6060 T5 AL.
PIN THROUGH W/ NECK NOTCHED
AS SPECIFIED BELOW @ LOCATIONS
A & B FOR SHEAR POINT LOAD
CAPACITY.



DETAIL 6 / -
SCALE 1:5

LOCATION	WEASTERN FENCE	EASTERN FENCE A	EASTERN FENCE B
BREAKING 'd' [mm]	2.5	3.5	4.0

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AMENDMENTS

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DRAWN CHECK

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DRAWING TITLE
STRUCTURAL DETAILS
SHEET 2 OF 2

DRAWING NUMBER
CE16031-206

ISSUE
C

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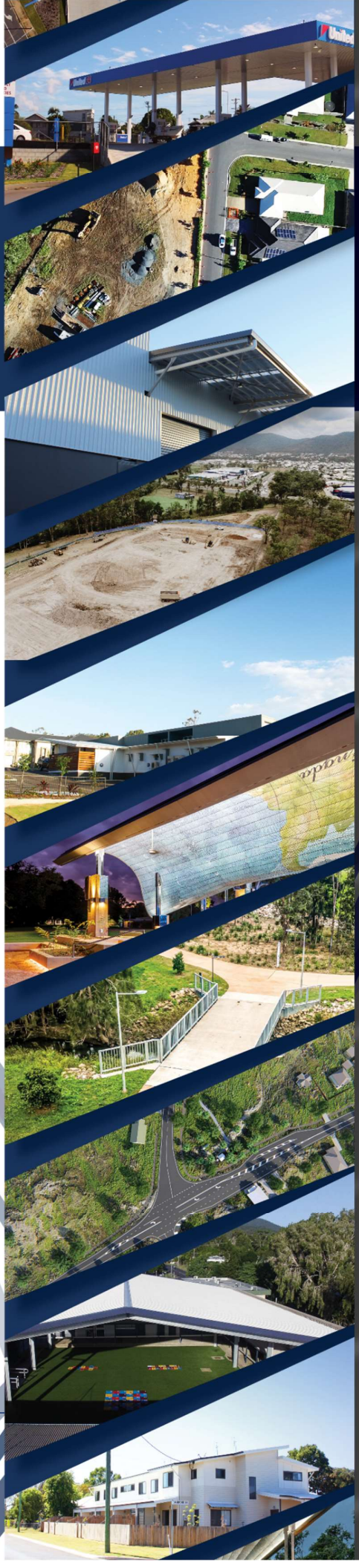

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Height's College

Detailed Design Report

Height's College Boundary Fence Creek Crossing's

12 June 2020

FP/001.CE16031-Rev B

Contract No. CE16031

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MOLONEY & SONS
ABN: 39 133 970 689

COMMERCIAL IN CONFIDENCE

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Po Box 3203
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2020

DOCUMENT CONTROL:

Issue	*Date*	*Issue Description*	*Author*	*Checked*	*Approved*
A	*3/6/2020*	*Detailed Design Issue*	*LM*	*DA*	*DA*
B	*22/9/2020*	*Amended Detailed Design Issue*	*LM*	*DA*	*DA*
C	*14/10/2020*	*Amended Detailed Design Issue*	*LM*	*DA*	 *RPEQ 7637*

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND

Moloney & Sons Engineering (MSE) have been engaged by Heights College by way of Reel Planning to prepare the detailed design for site specific boundary fence crossings of Splitters Creek at Heights College. The project site is at three locations situated on the Heights College boundaries to the western side of Yamba Road, North Rockhampton, as shown in *Figure 1*.

Figure 1 Site Locality (Source: Google 2019)

Figure 2 Staging Plan

LEGEND:

Stage 1

Stage 2

1.1. Background

To maintain school security and the safety of students Heights College has proposed a boundary fencing solution; the property is unfortunately divided by Splitters Creek. Reel Planning made application to Rockhampton Regional Council (RRC) in November 2019, RRC reference D/101-2019 for which an information request was issued dated 20 November 2019. To expedite the security improvements, it was decided to proceed only with the sections of boundary fence that were not situated in Splitters Creek. Approval for these sections of fence was granted 17 March 2020.

This report is to support the planning application for the fences that are within the Splitters Creek crossing points.

2. APPROVAL COMPLIANCE TARGETS

The RRC *Regional Planning Scheme (2015)* outlines the requirements for development in flood prone areas by way of the *Section 8.2.8 - Flood Hazard Overlay Code*. The purpose as defined in Section 8.2.8.2 of this code is to:

"(1) The purpose of the flood hazard overlay code is to manage development outcomes in flood prone areas so that risk to life, property, community and the environment as a result of flood is avoided or minimised. Development does not increase likelihood or consequences of flood damage, either onsite or to any other property or infrastructure."

It is noted that the planning scheme is more focused towards development works rather than fencing works hence some cross interpretation is necessary. The previously issued information request also nominated compliance with *Section 8.2.8 - Flood Hazard Overlay Code* for the fences crossing the creek to gain approval, prompting compliance with this requirement.

The Creek Catchment Flood Overlay Map OM-8C-23 dated Nov 2018 contained in the planning scheme identifies the fence locations to be generally within 'Planning Area 1' which indicates Performance and Acceptable Outcomes are to be assessed through Table 8.2.8.3.1. The defined performance outcomes contained in this table are summarised below:

Performance Outcome	Outcome Applicable?
PO4 Development does not involve the further intensification of land uses and does not increase the risk to people and property.	Yes
PO5 Development avoids the release of hazardous materials into floodwaters.	No

Table 8.2.8.3.1. further defines Acceptable Outcomes where compliance is considered for one of outcomes either AO4.1.1, AO41.2 or AO41.3 and compliance with outcome AO4.14. For the purposes of this report the fence is considered to be a 'structure'. The Acceptable Outcomes for compliance are summarised below noting the outcomes relevant to PO4 have only been considered:

Acceptable Outcome	Outcome Applicable?
AO4.1.1 Development does not involve new buildings or structures.	No
AO4.1.2 Where involving the replacement or alteration to an existing non-residential building or structure: (a) there is no increase in the existing or previous buildings' gross floor area; and (b) the finished floor level of any replacement or alteration to an existing building is constructed a minimum of 500 millimetres above the defined flood level.	Yes (a) - No (b) - No
AO4.1.3 Where involving the replacement or alteration to an existing caretaker's accommodation, dwelling house or dwelling unit: (a) there is no increase in the number of dwellings; (a) there is no increase in the existing or previous buildings' gross floor area; and (a) the finished floor level of all habitable rooms shall be constructed a minimum of 500 millimetres above the defined flood level.	No
AO4.1.4 Where located in the rural zone, the total floor area of class 10a buildings and structures on the site do not exceed a total of fifty (50) square metres, and are set back a minimum of twenty (20) metres from all site boundaries.	No

From review of the Acceptable Outcomes it is clear that whilst outcome AO4.1.2 has applicability the sub outcomes do not, it is therefore interpreted that there is no measurable 'Acceptable Outcome' for this application.

However, the required compliance intent of Performance Outcome PO4 is interpreted as requiring the proposed fence to not "*increase the likelihood or consequences of flood damage, either onsite or to any other property or infrastructure*"; increased risk would be defined as an unacceptable increased depth of flood water within any impacted property. This interpretation would assume that the proposed fence does not cause any measurable increase in flooding impacts to properties other than the applicant's own property which is considered an acceptable risk that can be managed by the applicant.

3. PROPOSED FENCE DESIGN

3.1. Detailed Drawings

The detailed drawings showing the proposed location, type and operation of the fence are provided in Appendix A.

3.2. Fence Operation

Sections of the proposed fence, situated within the creek, are designed to operate as top hinged opening panels. The opening panels are designed to open under the flood water loading, for the lowest modelled velocity[1], during 10% AEP storm flows with no debris loads remaining trapped on the fence; they will provide a clear floodway in all storm flows from 10% AEP and above. The opening mechanism is a bottom shear pin which will fail under the required load event but still provides a secure fence. Beneath the uniform height Hercules fencing panels there are low flow channel 'fingers' that will not impede storm water flows but will rotate under debris loading.

Following the storm event, the property owner/applicant (Heights College) will be required to clear any debris from fingers and fence area, rotate the fence panels to vertical and replace failed shear pins. The property owner/applicant (Heights College) will prepare a Maintenance Strategy to ensure that both the fence will be cleared and 'shear-pins' reinstated following a flooding event and that it will be periodically inspected with 'shear-pins' removed to ensure smooth opening operation.

4. REVIEW OF FLOOD IMPACTS

The Flood Impact Assessment Report dated 19/03/18 from Stormwater Consulting in association with newly constructed Sports Oval approval and its accepted developed case TUFLOW flood modelling inputs & results were adopted to further assess the flooding impacts of the proposed fence construction.

4.1. Existing Model

The TUFLOW model was based on the developed scenario as detailed in the abovementioned previous Report by Stormwater Consulting, with a 1m grid size and elevation data assigned from the ALS survey data sourced from the Department of Natural Resources and Mines.

The existing model was updated to include the existing fence along the eastern property boundary and re-run to create a more accurate existing model. This revised model has been used to develop the Existing Flood Depths and Flood Level Contour Maps presented in Appendix C.

4.2. Developed Model

The revised existing model was modified to incorporate the newly proposed fence construction in areas identified on the drawings included in Appendix A.

The model was developed assuming the following parameters:

[1] *For 10% AEP flow velocities at 3m intervals across the fence refer to* ***Appendix B***

- The design fence, rail & fingers are modelled and constitute as a 23% creek blockage for the 39% and 18% AEP storm events.
- The fingers below the fence do not open and are modelled as a 10% creek blockage for the 10% AEP and more severe storm events. This is to model the smaller cross section presented by the fingers as the water levels become deeper when the fence opens.
- Sensitivity testing is included to assess the worst case scenario that would equate to a 40% debris blockage in the 18% AEP storm event and the fence is not open (23% blockage), giving an equivalent of a 63% creek blockage, refer section 4.4.
- Sensitivity testing is included to simulate the failure of isolated fence panels to open, refer section 4.4.
- Additional blockage factors have not been considered as debris load on the fence in the lower intensity storms will cause the shear pins to break and the fence to open.
- The property owner/applicant (Heights College) has developed and implemented a Maintenance Strategy that includes management of vegetation within the vicinity of the creek to remove potential creek blockage debris build-up.

Maximum Depth and Water Level Contour Maps for the revised existing model 1% AEP to 39% AEP events & Water Level Impact Maps for the developed model 1% AEP to 39% AEP events based on the above criteria are presented in Appendix C.

4.3. Analysis Results

Modelling was completed with general outputs presented to show:

- The existing pre-developed maximum water depths and water level contours through the project site and beyond; and
- The post-developed water level impacts assuming the fence is in location and fully operational.

The existing flood depths and depth impacts output data for each storm event analysed is included in Appendix C.

The depth impact outputs presented indicate a small increase, in the 39% and 18% AEP storm events, generally in the range of 10mm to 50mm in isolated areas within the applicant's property (Heights College) and mainly contained within the Splitters Creek flow path. Impacts in the Transport and Main Roads Corridor are all contained to the west of the existing watermain and do not affect the state-controlled road. There are no impacts to downstream properties.

With normal fence operation in the 10% AEP and more intense storm events there are no increased impacts to either the owners or upstream/downstream properties. There are extremely minor depth changes around the fence on the eastern boundary which result from the slightly higher upstream velocities. The changes do not affect the state-controlled road.

4.4. Sensitivity Analysis

In addition to modelling the revised existing case and fully operating design case we also investigated the following scenarios:

1. Significant Blockage of one full 3m panel preventing its operation.
2. Significant Blockage of two full 3m panels (6m width) preventing their operation; and
3. Worst Case scenario the 18% AEP with a 63% blockage that stops the fence opening.

4.4.1. One Panel Blocked

The developed model was analysed to test the scenario of a 3m width obstruction within the creek, this was simulated as a single 3m panel not opening (an isolated 23% blockage), during a 1% AEP, in accordance with design. A panel in mid-stream was selected with the Water Level Impacts and Velocity Changes shown in Appendix D. The results show insignificant impacts within the creek and no impacts to downstream properties.

4.4.2. Two Panels Blocked

The developed model was analysed to test the scenario of a 6m width obstruction within the creek, this was simulated as two 3m panels not opening (an isolated 23% blockage), during a 1% AEP, in accordance with design. Two panels in mid-stream were selected with the Water Level Impacts and Velocity Changes shown in Appendix D. The results show insignificant impacts within the creek and no impacts to downstream properties.

4.4.3. Channel Roughness

The model has been developed with channel roughness that is depth varying (higher roughness at low depths and representing medium dense vegetation of n=0.06 at depths greater than 0.4m). If the channel roughness were higher, depths would increase, and velocities would decrease slightly. The extent of upstream impacts would likely not be much different because the water levels drop significantly upstream and downstream of the highway, so increases in water level would not propagate onto the highway much more than already shown.

In the event of higher roughness, the water depths would increase causing the fence panels to open at a lesser storm event. Maps have not been provided, however, all data is available in the TUFLOW files.

4.4.4. Worst Case Scenario

The developed model was analysed to test the worst-case scenario where the creek is blocked up to 63% blockage during an 18% AEP storm event. In a more severe storm event, the fence would be open either fully across the full width or with restrictions as demonstrated in 4.4.1 and 4.4.2.

The Water Level Impacts and Velocity Changes for this scenario are shown in Appendix D. The results show considerable impacts across the owner's property and the lowest private property adjacent to the western fence. The impact to the adjacent property would range from roughly 50mm depth increase next to the dwelling to a potential maximum 200mm depth increase in the furthest corner of the yard, the water would be standing water with an extremely insignificant flow velocity.

The worst-case scenario modelled is considered extremely unlikely since the debris load on the fence panels will exceed the shear pin failure pressure and the fence will then open; the worst case scenario therefore presents a negligible level of risk. It is however recommended that the property owner/applicant (Heights College) should include a creek vegetation management plan within their Maintenance Strategy. Removing the potential debris load periodically will further reduce the likelihood of a worst-case scenario occurring.

4.5. Flood Impact Summary

- All storm events from 39% AEP to 1% AEP have been modelled and analysed.
- Blockage factor of 23% has been used to model the 39% AEP and 18% AEP storm events.

- Blockage factor of 10% has been used to model the 10% AEP and more severe storm events.
- A worst-case scenario of 63% blockage in the 18% AEP has been analysed.
- Sensitivity testing for isolated blockages of 3m and 6m width has been completed.
- The fence is designed to open under the lowest modelled water pressure in the 10% AEP storm event.

All of the resulting flood level increases, apart from the worst-case scenario, do not result in a downstream nuisance. Numerous scenarios were modelled to determine a suitable fence profile & location that would cause the least amount of impacts to neighbouring properties. The proposed fence profile/operation & location resulted in the least amount of impacts external to the subject site.

TUFLOW model files can be made available for review of the velocity impacts if required.

5. SUMMARY

The proposed design constitutes a fence that will open to allow unimpeded ≥ 10% AEP storm water flows to pass through; the proposed fence design does not increase flood levels on adjacent downstream properties and has only a minor impact on the eastern boundary.

The fence operates through a 'shear-pin' failure mechanism allowing the panels to 'float' above the water flow without collecting debris. The mechanism is easily maintained and replaced following major events.

6. CONCLUSION AND RECOMMENDATIONS

The proposed fence design does not develop an increased risk to people and property and therefore demonstrates compliance with Performance Outcome PO4.

The small increase in flow depths within the creek area and Heights College property are unlikely to result in an actionable nuisance given the turbulent nature of the flow in this area.

Construction of the proposed fence, and implementation of a Maintenance Strategy, to improve the safety and security of the Heights College school grounds and student community is recommended.

APPENDIX A – Detailed Design Drawings

HEIGHTS COLLEGE
276 CARLTON ST, ROCKHAMPTON QLD
PROPOSED BOUNDARY FENCE REPLACEMENT

LOCALITY PLAN
N.T.S.

DRAWING SCHEDULE	
DRAWING No.	DESCRIPTION
CE16031-200	COVER SHEET LOCALITY PLAN & DRG. SCHEDULE
CE16031-201	GENERAL NOTES SHEET 1 OF 2
CE16031-202	GENERAL NOTES SHEET 1 OF 2
CE16031-203	GENERAL ARRANGEMENT
CE16031-204	LONGITUDINAL SECTIONS
CE16031-205	STRUCTURAL DETAILS SHEET 1 OF 2
CE16031-206	STRUCTURAL DETAILS SHEET 1 OF 2

DETAIL SURVEY BY:
RCC - DATE SURVEYED 1/03/19
SURVEY: CAPRICORN SURVEY GROUP
COORD: MGA SMARTNE AUS
STANDARD DRAWINGS:
CMDG STANDARD DESIGN DRAWINGS, INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA), AUSTROADS & NAT-SPEC

www.dialbeforeyoudig.com.au
ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED
DIAL 1100 BEFORE YOU DIG

AMENDMENTS		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		PJ	JO	23/04/20	
	A	PJ	JO	23/04/20	ISSUED FOR APPROVAL
	B	PJ	JO	25/05/20	100% DETAILED DESIGN
	C	PJ	JO	25/08/20	100% DETAILED DESIGN - REVISED FLOOD ASSESMENT

DESIGN CHECK
DRAWN CHECK

JAS-ANZ CERTIFIED ISO 9001

DATUM

PROJECT No.
CE16031

APPROVAL ISSUE
APPROVED
RPEQ 7637
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
HEIGHTS COLLEGE

PROJECT
PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
NORTH ROCKHAMPTON Q

MOLONEY & SONS ENGINEERING
EXCELLENCE - INTEGRITY - INNOVATION
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
www.moloneyandsons.com.au
ROCKHAMPTON • GLADSTONE • ROMA • MILES • CHINCHILLA • BRISBANE
GOLD COAST • COFFS HARBOUR • SYDNEY

DRAWING TITLE
LOCALITY PLAN & DRG. SCHEDULE

DRAWING NUMBER
CE16031-200

ISSUE
C

PROPOSED BOUNDARY FENCE REPLACEMENT - 2019

DESIGN FILE No: CE16031
DESIGN STANDARD: CMDG STD DRGS, IPWEAQ, AUSTROADS & NAT-SPEC GUIDELINES

FLOOD DATA

REFER CE16031-205 FOR DETAILS.

GENERAL - CONSTRUCTION

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE LEGISLATION, STATUTORY REGULATIONS, BY-LAWS OR RULES. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH WORK HEALTH AND SAFETY ACT 2010, LEGISLATIVE REQUIREMENTS, ASSOCIATED REGULATIONS AND CODES OF PRACTICE, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.
3. REFER DISCREPANCIES TO SUPERINTENDENT BEFORE PROCEEDING WITH WORK.
4. SUBMIT DETAILS OF CHANGES TO SCOPE, WORK METHODS OR MATERIALS etc FOR APPROVAL BEFORE PROCEEDING. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT.
5. NOMINATION OF PROPRIETARY ITEMS DOES NOT INDICATE EXCLUSIVE PREFERENCE, BUT INDICATES REQUIRED PROPERTIES OF ITEM. SIMILAR ALTERNATIVES HAVING REQUIRED PROPERTIES MAY BE OFFERED FOR APPROVAL. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT. INSTALL PROPRIETARY ITEMS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.
6. OBTAIN NECESSARY PERMITS AND APPROVALS FROM RELEVANT AUTHORITIES BEFORE COMMENCING WORK ON SITE. NOTIFY RELEVANT SERVICE AUTHORITIES BEFORE COMMENCING WORK ON SITE.
7. GIVE TWO WORKING DAYS' (48 HOURS) NOTICE SO THAT INSPECTION MAY BE MADE OF CRITICAL STAGES OF WORK.
8. INSPECTIONS UNDERTAKEN BY SUPERINTENDENT OR OTHERS DO NOT RELIEVE CONTRACTOR OF RESPONSIBILITY FOR COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.
9. DO NOT OBTAIN DIMENSIONS BY SCALING FROM DRAWINGS.
10. DIMENSIONS ARE IN MILLIMETRES, LEVELS ARE IN METRES UNO, CHAINAGES ARE IN METRES UNO.
11. DATUM FOR LEVELS IS AHD (AUSTRALIAN HEIGHT DATUM). CO-ORDINATES ARE TO RCC.
12. HAVE SURVEY AND SETTING OUT UNDERTAKEN BY A REGISTERED SURVEYOR.
13. VERIFY ON SITE SETTING OUT DIMENSIONS AND EXISTING MEMBER SIZES SHOWN ON DRAWINGS BEFORE SHOP DRAWINGS, CONSTRUCTION AND FABRICATION IS COMMENCED. EXISTING STRUCTURES SHOWN ON DRAWINGS ARE IN APPROXIMATE LOCATIONS ONLY.
14. USE STANDARD BOLT PATTERNS etc. THROUGHOUT THE WORKS TO AVOID CONFUSION OR AMBIGUITY.
15. TAKE CARE OF HAZARDS ASSOCIATED WITH BURIED, CONCEALED OR OVERHEAD SERVICES. TAKE PRECAUTIONS UNDERTAKE EXPLORATION TO ESTABLISH LOCATION OF AND PROTECT EXISTING SERVICES AT SITE. SERVICES SHOWN ON DRAWINGS ARE IN APPROXIMATE LOCATIONS ONLY. SERVICES OTHER THAN THOSE SHOWN MAY EXIST ON SITE. MARK LOCATIONS OF SERVICES CLEARLY ON SITE, AND ON AS-BUILT DRAWINGS. HAND EXCAVATE WITHIN ONE METRE OF IN-GROUND SERVICES.
16. DISPOSE OF SURPLUS MATERIAL OFF SITE IN ACCORDANCE WITH LOCAL AUTHORITY WASTE REGULATIONS..
17. IMPLEMENT SOIL AND WATER MANAGEMENT PROCEDURES TO AVOID EROSION, CONTAMINATION AND SEDIMENTATION OF SITE, SURROUNDING AREAS AND DRAINAGE SYSTEMS.
18. WORKMANSHIP AND MATERIALS TO COMPLY WITH REQUIREMENTS OF AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA (BCA) AND BY-LAWS AND ORDINANCES OF RELEVANT BUILDING AUTHORITIES. ALL STANDARDS REFERRED TO ARE THOSE CURRENT (AS AMENDED) AT COMMENCEMENT OF CONTRACT.
19. OBTAIN REQUIREMENTS FOR ADJOINING ELEMENTS TO BE FIXED TO OR SUPPORTED ON WORK AND PROVIDE FOR REQUIRED FIXINGS. PROVIDE FOR TEMPORARY SUPPORT OF ADJOINING ELEMENTS DURING CONSTRUCTION. DRAWINGS DO NOT SHOW DETAILS OF ALL FIXTURES, INSERTS, SLEEVES, RECESSES OR OPENINGS etc REQUIRED.
20. MAKE GOOD ANY DAMAGE TO EXISTING ELEMENTS AT COMPLETION OF WORKS.
21. WHERE NEW WORK ABUTS EXISTING, PROVIDE SMOOTH TRANSITION FREE OF ABRUPT CHANGES.
22. HAVE TESTING PERFORMED BY AN INDEPENDENT NATA (NATIONAL ASSOCIATION OF TESTING AUTHORITIES) ACCREDITED AUTHORITY, AND PROVIDE TEST REPORTS TO SUPERINTENDENT.
23. SEPARATE METALS FROM INCOMPATIBLE MATERIALS (eg STAINLESS STEEL, GALVANIZED STEEL, UNGALVANIZED STEEL AND TREATED TIMBER etc) BY CONCEALED LAYERS OF SUITABLE INERT MATERIALS OF SUITABLE THICKNESSES. USE PLASTIC SLEEVES AND WASHERS FOR BOLTS, etc.
24. SUPPLY RELEVANT NOTES, DRAWINGS AND SPECIFICATIONS etc TO SUB-CONTRACTORS.
25. UNO=UNLESS NOTED OTHERWISE, SLS=SERVICEABILITY LIMIT STATE, ULS=ULTIMATE LIMIT STATE, NSL=NATURAL SURFACE LEVEL, FSL=FINISHED SURFACE LEVEL.
26. SUPERINTENDENT=SUPERINTENDENT NOMINATED IN CONTRACT.
27. BUILD, FABRICATE AND PROCURE ONLY FROM DRAWINGS 'ISSUED FOR CONSTRUCTION'.
28. KEEP ON SITE A COMPLETE SET OF CONTRACT DOCUMENTS (INCLUDING DRAWINGS AND SPECIFICATIONS) AND SITE INSTRUCTIONS.

TEMPORARY WORKS

1. THESE DRAWINGS DO NOT DETAIL TEMPORARY WORKS. CONSTRUCTION METHODS AND TEMPORARY WORKS ARE RESPONSIBILITY OF THE CONTRACTOR.
2. PROVIDE SCAFFOLDING, BARRIERS, FALL RESTRAINT, HAND-MID RAILS AND TOE BOARDS FOR WORK AT HEIGHT. ERECT ACCESS STAIRS AT EARLIEST OPPORTUNITY TO REDUCE FALL HAZARDS AND FACILITATE ACCESS. MAINTAIN SAFETY MESH AND BARRIERS TO ALL OPENINGS AND ELEVATED EDGES.
3. MAINTAIN STRUCTURE IN A STABLE CONDITION DURING CONSTRUCTION AND PROVIDE TEMPORARY BRACING AND/OR SUPPORT AS REQUIRED. SHOW TEMPORARY MEMBERS ON SHOP DRAWINGS. PROVIDE SPREADERS AT LOADS AND/OR LIFTING POINTS WHERE REQUIRED. ENSURE NO PART IS OVERSTRESSED. DO NOT PLACE OR STORE BUILDING MATERIALS ON, SUPPORT FORMWORK OR PROP FROM STRUCTURAL MEMBERS WITHOUT SUPERINTENDENT'S APPROVAL. PROVIDE CALCULATIONS BY SUITABLY QUALIFIED STRUCTURAL ENGINEER TO
   PROVE ADEQUACY OF STRUCTURE FOR PROPOSED CONSTRUCTION SEQUENCE, METHODS AND LOADS INCLUDING PROPPING, etc.
4. PROVIDE TEMPORARY BRACING WHERE REQUIRED FOR STRUCTURAL ELEMENTS OR FRAMES STABILIZED BY MASONRY, PRECAST CONCRETE OR OTHER ELEMENTS CONSTRUCTED AFTER ERECTION OF THE STRUCTURAL ELEMENT OR FRAME, AND SHOW ON SHOP DRAWINGS.DESIGN ASSUMPTIONS.

DELIVERABLES

1. PREPARE WORKSHOP DRAWINGS, CALCULATIONS etc FOR PREFABRICATED COMPONENTS, INCLUDING STRUCTURAL STEELWORK, LIGHTWEIGHT STEELWORK, PRECAST CONCRETE, PRESTRESSING, FABRICATED TIMBER FRAMES etc AND SUBMIT ELECTRONIC PDF'S OR THREE PAPER COPIES OF EACH FOR SUPERINTENDENT'S REVIEW OF GENERAL COMPLIANCE WITH DESIGN CONCEPT. DO NOT COMMENCE FABRICATION UNTIL SHOP DRAWINGS AND CALCULATIONS HAVE BEEN REVIEWED. ALLOW 14 DAYS FOR SUPERINTENDENT'S REVIEW. SUPERINTENDENT'S REVIEW OF SHOP DRAWINGS AND CALCULATIONS IS OF GENERAL CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCEDURES AND CONSTRUCTION TECHNIQUES, AND PERFORMING WORK IN A SAFE MANNER. CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS AND CALCULATIONS DO NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR COMPLIANCE WITH REQUIREMENTS OF CONTRACT DRAWINGS AND SPECIFICATION.

GENERAL - STRUCTURAL

1. THE STRUCTURAL DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ALL OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY MUST BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK. DETAIL NOTES ON THESE DRAWINGS AND THE SPECIFICATION CLAUSES TAKE PRECEDENCE OVER THE GENERAL NOTES.
2. ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH THE RELEVANT CURRENT STANDARDS AUSTRALIA CODES, THE BUILDING CODE OF AUSTRALIA AND THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES, EXCEPT WHEN VARIED BY THE CONTRACT DOCUMENTS.
3. ALL DIMENSIONS SHOWN ON THE STRUCTURAL DRAWINGS MUST BE VERIFIED BY THE CONTRACTOR ON SITE, PRIOR TO COMMENCEMENT OF ANY FABRICATION OR CONSTRUCTION WORKS. THE STRUCTURAL DRAWINGS MUST NOT BE SCALED FOR DIMENSIONS.
4. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, U.N.O.
5. THE STRUCTURAL COMPONENTS DETAILED ON THESE STRUCTURAL DRAWINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RELEVANT STANDARDS AUSTRALIA CODE AND BUILDING CODE OF AUSTRALIA FOR THE FOLLOWING LOADINGS.

STRUCTURE/COMPONENT	IMPOSED ACTIONS (FLOOD LOAD POINT LOAD kN)	SUPERIMPOSED DEAD LOAD (kPa)
FENCE - GENERAL	Q50 DEBRIS LOAD / N/A	-
FENCE - BREAKAWAY PIN FENCE SECTION	Q10 DEBRIS LOAD / 12kN	-

6. THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR. IF ANY STRUCTURAL ELEMENT PRESENTS DIFFICULTY IN RESPECT OF CONSTRUCTABILITY OR SAFETY, THE MATTER MUST BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK.
7. DURING CONSTRUCTION THE STRUCTURE MUST BE MAINTAINED IN A STABLE CONDITION AND MUST ENSURE THAT NO PART IS OVERLOADED DURING CONSTRUCTION. TEMPORARY PROPPING OR BRACING MUST BE DESIGNED AND PROVIDED BY THE CONTRACTOR AND ISSUED TO THE DESIGN ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT, IN ORDER TO KEEP THE BUILDING WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
8. THESE NOTES MUST ALSO APPLY TO ALL MATERIALS AND PROPRIETARY PRODUCTS USED IN CONSTRUCTION OF THE WORK.
9. THE CONTRACTOR MUST BE RESPONSIBLE TO ENSURE ALL MATERIALS AND PROPRIETARY PRODUCTS SOURCED COMPLY WITH THE APPROPRIATE QUALITY AND RELEVANT STANDARDS NOTED WITHIN THESE GENERAL NOTES.

ABBREVIATIONS

B	BOLT
BP	BORED PIER
BS	BOTH SIDES
CFW	CONTINUOUS FILLET WELD
CJ	CONSTRUCTION JOINT
DJ	DOWELLED JOINT
EF	EACH FACE
ET	EDGE THICKENING
EW	EACH WAY
FFL	FINISHED FLOOR LEVEL
FPBW	FULL PENETRATION BUTT WELD
FS	FAR SIDE
FW	FILLET WELD
IJ	ISOLATION JOINT
KJ	KEYED JOINT
LG	LONG
NF	NEAR FACE
NS	NEAR SIDE
PA	PERSONNEL ACCESS (DOOR)
RD	ROLLER DOOR
SF	STRIP FOOTING
SJ	SAWN JOINT
SSL	STRUCTURAL SLAB LEVEL
TB	TENSIONED BEARING CONNECTION JOINT
TF	TENSIONED FRICTION CONNECTION JOINT

FOOTINGS

1. ALL WORKMANSHIP AND MATERIALS MUST BE IN ACCORDANCE WITH AS2870 AND AS3600.
2. THE DESIGN IS BASED ON "GEOTECHNICAL INVESTIGATION & REPORT, JOB REFERENCE 2128E.P.121" PREPARED BY CARDNO, DATED 30 NOVEMBER 2015.
3. FOOTINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH AS2870-2011 FOR A SITE REACTIVITY CLASS "P" AND A MINIMUM ALLOWABLE BEARING CAPACITY OF 150kPa FOR BORED PIERS. THE FOUNDATION MATERIAL MUST BE APPROVED BY THE GEOTECHNICAL ENGINEER FOR THIS ALLOWABLE BEARING CAPACITY BEFORE PLACING MEMBRANE, REINFORCEMENT OR CONCRETE.
4. SHOULD ACTUAL CONDITIONS BE FOUND TO DIFFER FROM THOSE NOTED, THE MATTER SHOULD BE REFERRED TO THE SUPERINTENDENT FOR POSSIBLE FOOTING REDESIGN BY THE ENGINEER.
5. THE BASE OF ALL FOOTING EXCAVATIONS MUST BE COMPACTED TO A RELATIVE DRY DENSITY AS DETERMINED IN ACCORDANCE WITH AS 1289, AND MUST BE FINISHED CLEAN AND HORIZONTAL PRIOR TO POURING CONCRETE.
6. THE CONTRACTOR MUST CHECK ALL EXCAVATIONS FOR EXISTENCE OF ORGANIC MATERIAL AND RUBBISH. ANY SUCH MATERIAL MUST BE REMOVED AND THE EXCAVATION BACKFILLED WITH CLEAN GRANULAR MATERIAL AND COMPACTED.
7. FOOTINGS MUST BE CONSTRUCTED AND BACKFILLED AS SOON AS POSSIBLE FOLLOWING EXCAVATION TO AVOID EITHER SOFTENING OF THE FOUNDING MATERIAL OR DRYING OUT BY EXPOSURE.
8. EXCAVATE FOR FOOTINGS TO THE NOMINATED SIZE AND DEPTH. FOOTING FOUNDING LEVELS ARE PROVISIONAL SUBJECT TO ACTUAL SITE CONDITIONS AND APPROVAL BY A SUITABLY QUALIFIED PERSON OR GEOTECHNICAL ENGINEER.
9. CONCRETE MUST BE COMPACTED BY AN IMMERSION VIBRATOR.

CONCRETE

1. ALL WORKMANSHIP AND MATERIALS MUST BE IN ACCORDANCE WITH THE CURRENT EDITION OF AS3600 INCLUDING AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. READYMIX CONCRETE SUPPLY MUST COMPLY WITH AS1379.
3. CONCRETE QUALITY:
   GENERAL REQUIREMENTS ARE GIVEN IN THE FOLLOWING TABLE. REFER TO THE SPECIFICATION FOR ADDITIONAL REQUIREMENTS FOR SPECIAL CLASS CONCRETE.

M	CONC. CLASS	STRENGTH GRADE (MPa)	CEMENT TYPE	MAX. AGG SIZE (mm)	SLUMP (mm)	MAX SHRINKAGE STRAIN @ 56 DAYS (u - 10^-6)
BORED PIERS	NORMAL	32	-	20	80	TO AS1379

SL – SHRINKAGE LIMITED

4. PROJECT CONTROL TESTING MUST BE CARRIED OUT ON ALL SPECIAL CLASS CONCRETE IN ACCORDANCE WITH AS1379, CLAUSE 6.5.
5. ADMIXTURES CONTAINING CHLORIDES MUST NOT BE USED.
6. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY AND FIRE RESISTANCE MUST BE AS FOLLOWS U.N.O.

ELEMENT, INT OR EXT SURFACE	EXPOSURE CLASS TO AS3600	CONCRETE GRADE	MIN. COVER (mm)	ADJUST COVER FOR FIRE RATING (mm)
BORED PIERS	B1	32	50	-

AT EXTERNALLY EXPOSED SURFACES METALLIC ITEMS INCLUDING FORM BOLTS, FORM SPACERS, METALLIC BAR CHAIRS AND TIEWIRE MUST NOT BE PLACED IN THE COVER ZONE.

7. CONCRETE SIZES SHOWN DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
8. FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC., REFER TO ARCHITECTS DETAILS. MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS
9. REINFORCEMENT MUST BE SUPPORTED ON PURPOSE MADE CONCRETE, STEEL OR PLASTIC SUPPORTS DEPENDING ON THE EXPOSURE CONDITION TO PROVIDE THE SPECIFIED CLEAR COVER. AT EXTERNAL SURFACES EITHER ALL PLASTIC OR CONCRETE SUPPORTS MUST BE USED.
10. SUPPORTS MUST BE LOCATED AT NOT MORE THAN 60 BAR DIAMETERS EACH WAY FOR BARS AND NOT MORE THAN 750mm EACH WAY FOR MESH.
11. REINFORCEMENT SYMBOLS – BARS:
    R ROUND
    D DEFORMED
    I INDENTED
    250, 300, 500 STRENGTH GRADE IN MPa
    L LOW DUCTILITY
    N NORMAL DUCTILITY
    E EARTHQUAKE DUCTILITY

    EG. D500N16: DEFORMED BAR/GRADE 500 MPa/NORMAL DUCTILITY/16mmDIAMETER

    REINFORCEMENT SYMBOLS – WELDED MESH:
    R, D, I AS FOR BARS
    500 STRENGTH GRADE
    S SQUARE MESH
    R RECTANGULAR MESH
    L, N, E DUCTILITY AS FOR BARS

18. BARS DENOTED N MUST BE TYPE D500N.
    BARS DENOTED R MUST BE TYPE R250N.
    MESH DENOTED SL…… OR RL……..MUST BE TYPE D500SL OR TYPE D500RL RESPECTIVELY
    TRENCH MESH MUST BE TYPE D500L
19. REINFORCEMENT NOTATION
    N12 – 300 (N = TYPE OF BAR; 12 = BAR DIAMETER (mm); 300 = SPACING (mm))
    3/N 28 (3 = NUMBER OF BARS; N = TYPE OF BAR; 28 = BAR DIAMETER (mm))
20. PULL OUT BARS OR OTHER BARS WHICH ARE SHOWN ON THE DRAWINGS TO BE RE-BENT ON SITE, MUST BE MADE FROM QUENCHED AND SELF TEMPERED STEEL. THE BARS MUST BE POSITIONED WITH THE INITIAL BEND CLEAR OF THE CONCRETE FACE.
21. SITE BENDING OF REINFORCEMENT BARS MUST BE DONE USING A RE-BENDING TOOL WITHOUT HEATING. THE BARS MUST BE RE-BENT AGAINST A FLAT SURFACE OR A PIN WITH A DIAMETER NOT LESS THAN THE MINIMUM PIN SIZE PRESCRIBED IN AS3600.
22. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
23. REINFORCEMENT SHALL NOT BE CUT, BENT OR HEATED ON SITE WITHOUT THE ENGINEERS' PRIOR APPROVAL.
24. WELDING OF REINFORCEMENT IS NOT PERMITTED U.N.O. ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE SUPERINTENDENT.
25. AT JOGGLES IN BARS, THE MAXIMUM OFFSET MUST BE 1 BAR DIAMETER OVER A LENGTH OF 12 BAR DIAMETERS.
26. REINFORCEMENT COUPLERS, U.N.O. ON THE DRAWINGS, MUST NOT BE USED WITHOUT APPROVAL BY THE SUPERINTENDENT.
27. GIVE A MINIMUM OF 24 HOURS NOTICE FOR INSPECTION OF REINFORCEMENT BY THE SUPERINTENDENT OR AS REQUIRED BY THE SPECIFICATION.
28. THE FINISHED CONCRETE MUST BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE MUST BE COMPACTED WITH MECHANICAL VIBRATORS.
29. CURING OF ALL CONCRETE MUST BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF 7 DAYS, U.N.O. APPROVED SPRAY-ON CURING COMPOUNDS THAT COMPLY WITH AS3799 MAY BE USED WHERE FLOOR FINISHES WILL NOT BE AFFECTED. POLYTHENE SHEETING OR WET HESSIAN MAY BE USED TO RETAIN CONCRETE MOISTURE WHERE PROTECTED FROM WIND AND TRAFFIC. CURING MUST COMMENCE IMMEDIATELY AFTER CONCRETE PLACEMENT.
30. CONSTRUCTION SUPPORT PROPPING MUST BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING. BACKPROPPING IS SUBJECT TO APPROVAL BY THE SUPERINTENDENT. NO BRICKWORK OR PARTITION WALLS MUST BE CONSTRUCTED ON SUSPENDED LEVELS UNTIL SLAB HAS CURED AND ALL PROPPING IS REMOVED AND THE SLAB HAS DEFLECTED UNDER ITS SELF WEIGHT.

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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

JAS-ANZ ISO 9001

DATUM

PROJECT No.
CE16031

APPROVAL ISSUE

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RPEQ 7637
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
HEIGHTS COLLEGE

PROJECT
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DRAWING TITLE
GENERAL NOTES
SHEET 1 OF 2

DRAWING NUMBER
CE16031-201

ISSUE
C

STRUCTURAL STEEL

1. ALL WORKMANSHIP AND MATERIAL MUST BE IN ACCORDANCE WITH AS4100 AND AS1554 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. U.N.O., ALL STEEL MUST BE OF THE FOLLOWING GRADE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD.

TYPE OF STEEL	GRADE
UNIVERSAL BEAMS & COLUMNS, PARALLEL FLANGE CHANNELS, LARGE ANGLES TO AS/NZ3679.1	300 PLUS
FLATS, SMALL ANGLES, TAPER FLANGE BEAMS & COLUMNS TO AS/NZ3679.1	300
WELDED SECTIONS TO AS/NZ3679.2	300
HOT ROLLED PLATES, FLOOR PLATES & SLABS TO AS/NZ3678	300
HOLLOW SECTIONS TO AS1163	C350
COLD FORMED PURLINS & GIRTS TO AS1397	G450, Z350

3. WORKSHOP FABRICATION DRAWINGS MUST BE SUBMITTED TO THE SUPERINTENDENT IN ACCORDANCE WITH THE SPECIFICATION FOR REVIEW AT LEAST 7 DAYS PRIOR TO COMMENCEMENT OF FABRICATION. FABRICATION MUST NOT COMMENCE WITHOUT THE SUPERINTENDENT'S APPROVAL OF THE WORKSHOP DRAWINGS.
4. THE CONTRACTOR MUST ENSURE THAT FIXINGS BETWEEN STEELWORK AND OTHER BUILDING ELEMENTS ARE COORDINATED AND INSTALLED. WHERE POSSIBLE THE FIXINGS MUST BE SHOWN ON THE WORKSHOP FABRICATION DRAWINGS.
5. THE FABRICATION AND ERECTION OF THE STRUCTURAL STEELWORK MUST BE SUPERVISED BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION, IN ORDER TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET.
6. ALL MEMBERS MUST BE SUPPLIED IN SINGLE LENGTHS. SPLICES MUST ONLY BE PERMITTED IN LOCATIONS SHOWN ON THE STRUCTURAL DRAWINGS.
7. ALL STEELWORK MUST BE SECURELY TEMPORARILY BRACED BY THE CONTRACTOR AS NECESSARY TO STABILISE THE STRUCTURE DURING ERECTION. CONSULT STRUCTURAL ENGINEER FOR ADDITIONAL DESIGN OF TEMPORARY PROPPING OR BRACING IF REQUIRED.
8. ALL CUT ENDS, PLATES, GUSSETS, ETC. MUST HAVE SHARP EDGES AND CORNERS GROUND SMOOTH TO A MINIMUM OF 2mm RADIUS.
9. BOLTING:
   BOLTING CATEGORIES ARE IDENTIFIED ON THE STRUCTURAL DRAWINGS IN THE FOLLOWING MANNER.

BOLT CATEGORY	COMMENTS
4.6/S	COMMERCIAL BOLTS OF GRADE 4.6 TO AS1111 SNUG TIGHTENED
8.8/S	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 SNUG TIGHTENED
8.8/TB	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A BEARING TYPE JOINT
8.8/TF	HIGH STRENGTH STRUCT BOLTS OF GRD 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A FRICTION TYPE JOINT WITH FACING SURFACES LEFT UNCOATED U.N.O.

10. U.N.O. ALL BOLTS MUST BE M16 CATEGORY 8.8/S. ALL CONNECTIONS MUST HAVE AT LEAST 2 BOLTS. ALL BOLTS AND WASHERS MUST BE GALVANISED. ALL HOLES MUST BE 2mm LARGER THAN THE BOLT DIAMETER U.N.O.
11. /TB AND /TF BOLT CATEGORIES MUST BE INSTALLED IN ACCORDANCE WITH SECTION 15 OF AS4100, USING EITHER THE PART-TURN METHOD OR THE DIRECT-TENSION INDICATOR METHOD.
12. WELDING:
    ALL WELDING MUST BE CARRIED OUT IN ACCORDANCE WITH AS1554.1. ELECTRODES MUST BE EITHER AS1553, AS1858, AS2203 OR AS2717, AS APPROPRIATE ALL FILLET WELDS MUST BE 8mm CONTINUOUS, ALL AROUND, CATEGORY SP USING E48XX ELECTRODES OR EQUIVALENT. ALL BUTT WELDS MUST BE COMPLETE PENETRATION BUTT WELDS CATEGORY SP TO AS1554.1 U.N.O.
    THE EXTENT OF NON-DESTRUCTIVE WELD EXAMINATION MUST BE AS SHOWN IN TABLE BELOW U.N.O. RADIOGRAPHIC OR ULTRASONIC EXAMINATION MUST BE TO AS1554.1, AS2177.1 AND AS2207 AS APPROPRIATE.

TYPE OF WELD & CATEGORY	EXAMINATION METHOD	EXTENT (% OF TOTAL LENGTH OF WELD TYPE)
FILLET WELDS, GP + SP	VISUAL INSPECTION	100
BUTT WELDS, GP	VISUAL INSPECTION	100
BUTT WELDS, SP	VISUAL INSPECTION	100
BUTT WELDS, SP	ULTRASONIC TESTING	10

13. GROUT ALL STEEL BASES TO CONCRETE SLAB OR FOOTINGS BY DRY PACKING USING GROUT WHICH IS NON-SHRINK AND HAS A MINIMUM COMPRESSIVE STRENGTH AT 7 DAYS OF 40 MPa.
14. PROTECTIVE COATING:
    SURFACE PREPARATION AND CORROSION PROTECTION OF STRUCTURAL STEEL ARE TO COMPLY WITH THE FOLLOWING:

STEEL WORK	SURFACE PREPARATION TO AS1627	PRIMER COAT	INTERMEDIATE & TOP COAT
ALL EXTERNAL STEEL WORK	N/A	HOT DIPPED GALVANISED IN ACCORDANCE WITH AS/NZS4680 MINIMUM 600 g/m²	TO OWNERS/ARCHITECTS REQUIREMENTS
ALL FITMENTS NUTS, BOLTS AND WASHERS	N/A	HOT DIPPED GALVANISED IN ACCORDANCE WITH AS/NZS4680 MINIMUM 50 g/m²	TO OWNERS/ARCHITECTS REQUIREMENTS

15. ALL GALVANISING OF STRUCTURAL STEELWORK MUST BE IN ACCORDANCE WITH AS4680. THE CONTINUOUS AVERAGE ZINC COATING MASS MUST BE 600g/m² (550g/m² MINIMUM).
16. PROVIDE SEAL PLATES TO THE ENDS OF ALL HOLLOW SECTIONS, WITH 'BREATHER' HOLES IF MEMBERS ARE TO BE HOT DIP GALVANISED. BREATHER HOLES MUST BE SEALED AFTER GALVANISING TO PREVENT INTERNAL CORROSION OF HOLLOW SECTIONS. SEAL BREATHER HOLES WITH EITHER A RUBBER GROMMET, SILICON SEALANT OR PLUG WELDING HOLE OR PLATE OVER AND REPAIR GALVANISED COATING WITH COLD GALVANISING PAINT.
17. STEELWORK INTENDED TO BE CONCRETE ENCASED MUST BE UNPAINTED. ENCASING CONCRETE MUST BE GRADE N25 U.N.O. PROVIDING A COVER ADEQUATE TO SUIT FIRE RATING OR EXPOSURE CONDITIONS. CONCRETE ENCASEMENT MUST BE CENTRALLY REINFORCED WITH 5mm WIRE TO AS4617 OR 6mm STRUCTURAL GRADE BARS TO AS4617 AT 150mm PITCH.

PROPRIETARY PRODUCTS

1. ALL PROPRIETARY PRODUCTS SUCH AS EPOXY ANCHORING PRODUCTS, CAST IN FERRULES, LIFTING DEVICES, ETC. MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
2. ANY DISCREPANCIES BETWEEN THE MANUFACTURERS SPECIFICATIONS AND DETAIL NOTES IN THESE DRAWINGS MUST BE REFERRED TO THE SUPERINTENDENT FOR CLARIFICATION PRIOR TO PROCEEDING OR INSTALLATION.

ALUMINIUM

1. ALL ALUMINIUM PINS TO BE GRADE 6060 T5.

		FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
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DESIGN CHECK

DRAWN CHECK

DATUM

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DRAWING TITLE
GENERAL NOTES
SHEET 2 OF 2

DRAWING NUMBER
CE16031-202

ISSUE
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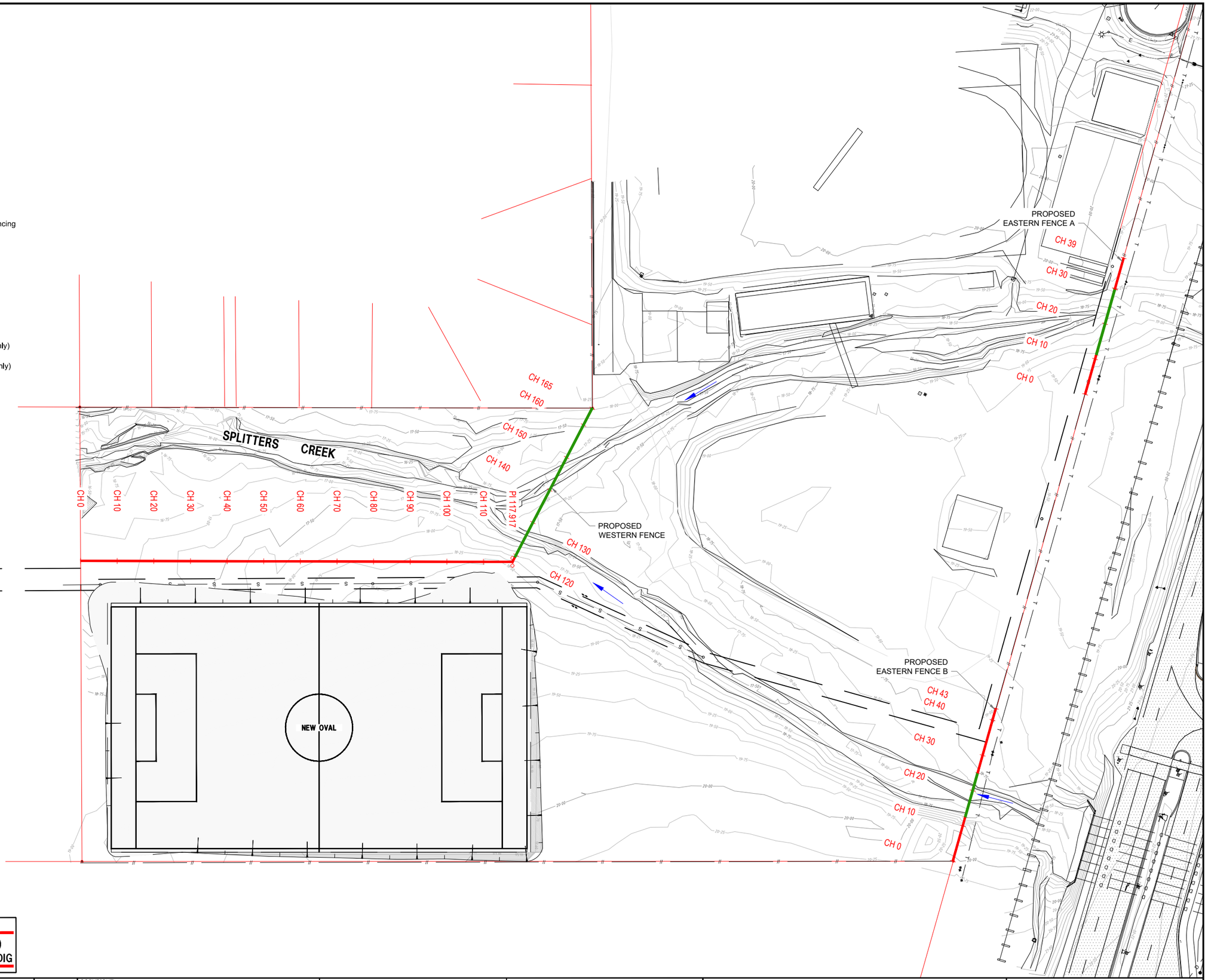
LEGEND

- Flow Direction
- Proposed Hercules Fencing
- Proposed Flood Relief 'Break-Away' Fencing
- Existing Lot Boundary
- Existing Edge of Bitumen
- Existing Fence Line
- Existing Overhead Communications
- Existing Overhead Electrical
- Existing Water Main (DBYD Location Only)
- Existing Sewer Main (DBYD Location Only)
- Existing Culvert Drain
- Existing Kerb Line
- Existing Bitumen Surface
- Existing Surface Contours



0 2.5 10.0m
0 5.0 20.0m

1:500 (A1)
1:1000 (A3)

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DRAWING TITLE
GENERAL ARRANGEMENT

DRAWING NUMBER
CE16031-203

ISSUE
C

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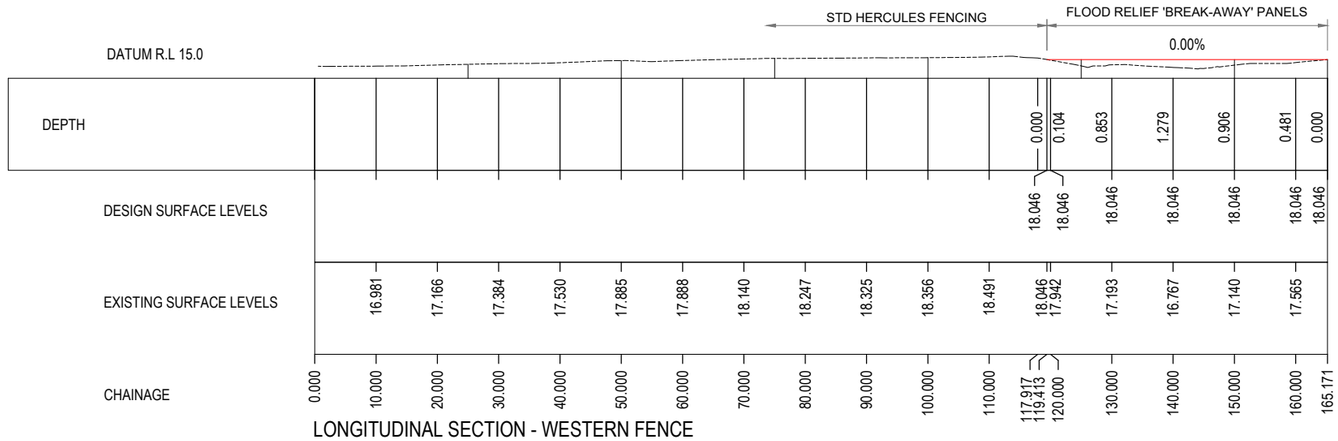
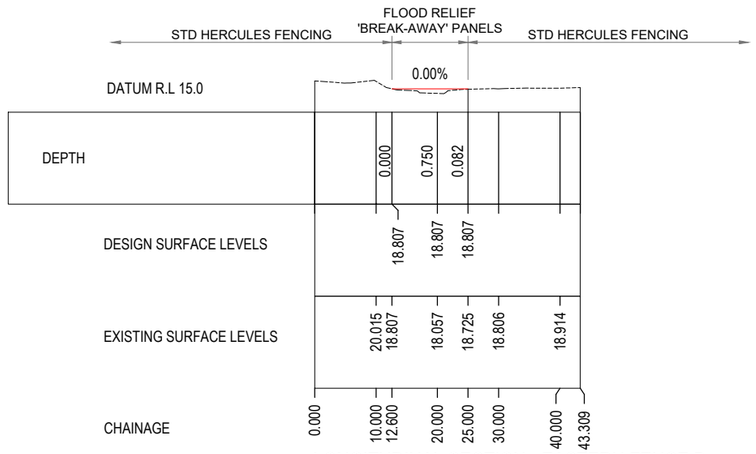
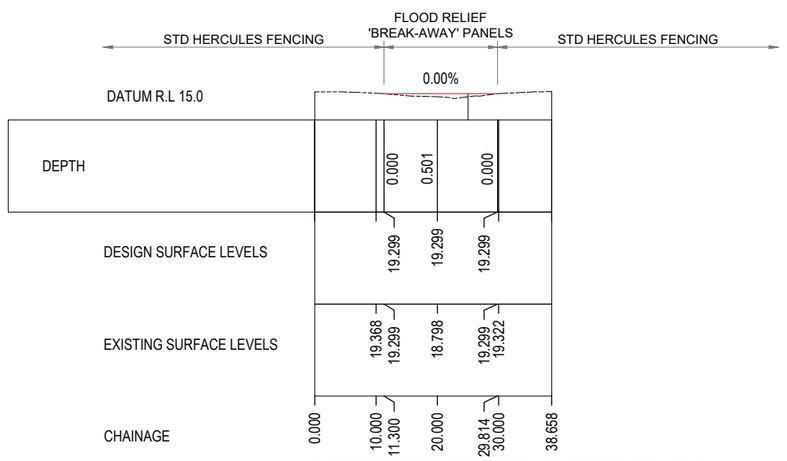


LONGITUDINAL SECTION - WESTERN FENCE
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000



LONGITUDINAL SECTION - EASTERN FENCE B
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000



LONGITUDINAL SECTION - EASTERN FENCE A
SCALE - HORIZ 1:1000.000, VERT. 1:1000.000

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LONGITUDINAL SECTIONS

DRAWING NUMBER
CE16031-204

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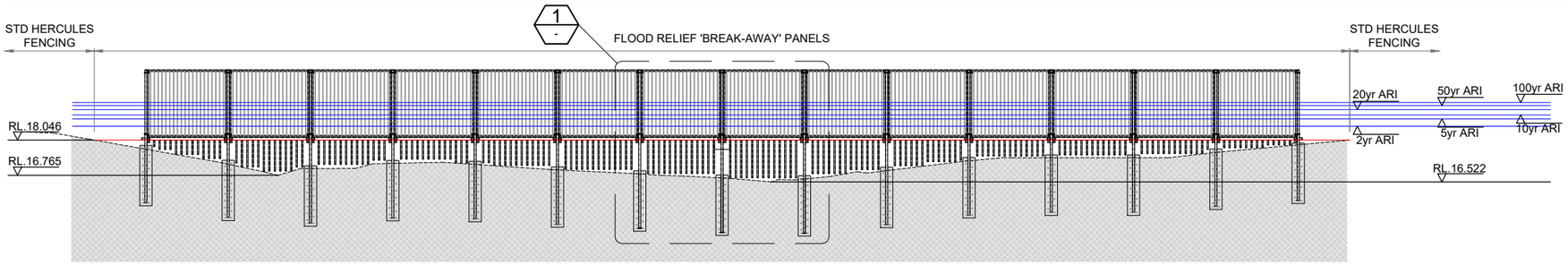
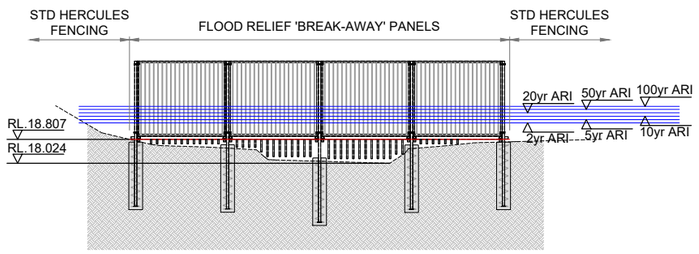


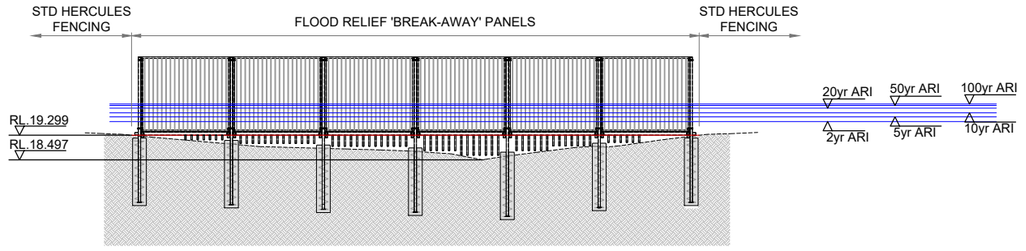
ELEVATION VIEW - PROPOSED WESTERN FENCE

SCALE 1:200



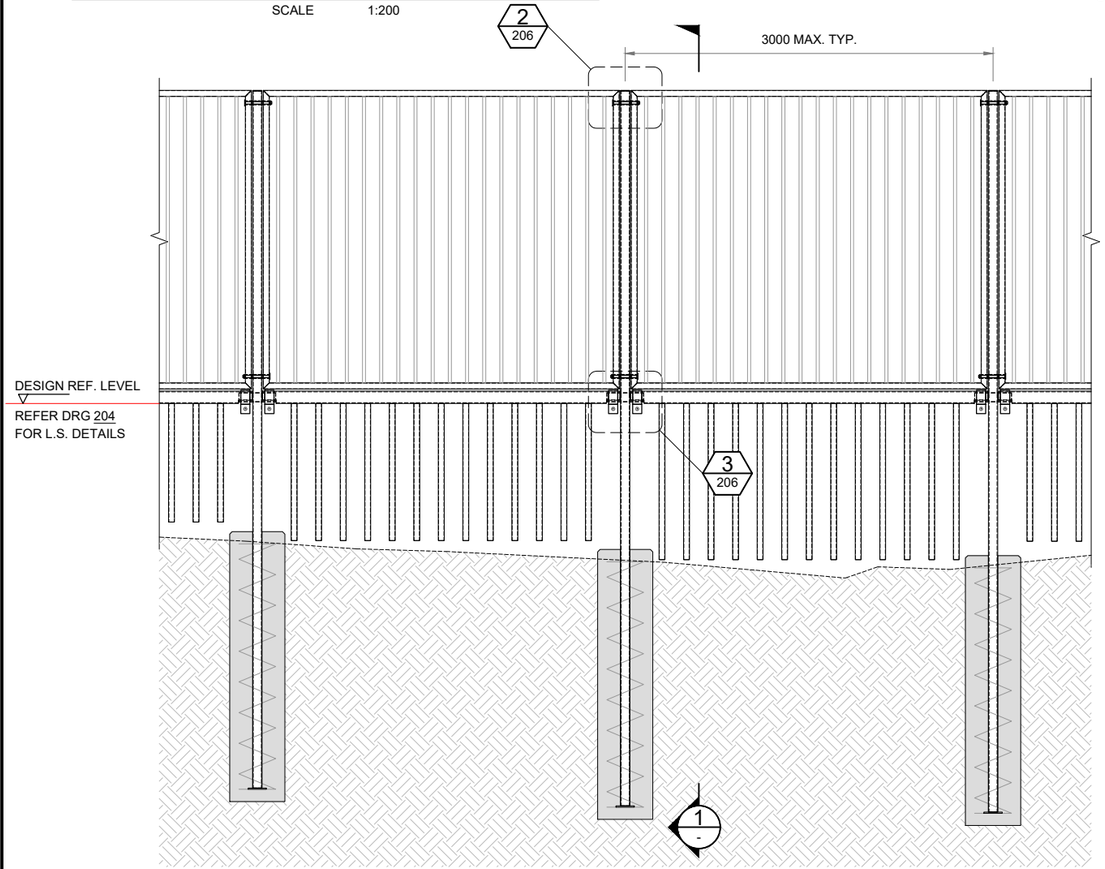
ELEVATION VIEW - PROPOSED EASTERN FENCE B

SCALE 1:200



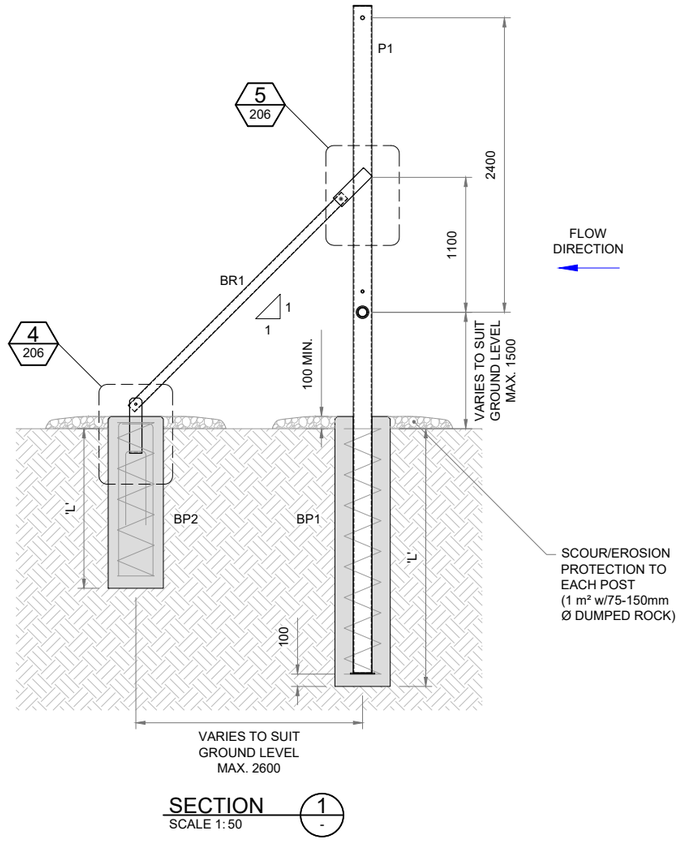
ELEVATION VIEW - PROPOSED EASTERN FENCE A

SCALE 1:200



DETAIL 1 -

SCALE 1:50



SECTION 1 -

SCALE 1:50

STRUCTURAL FOOTING SCHEDULE

ID	DESCRIPTION	REINFORCEMENT
BP1	450 BORED PIER, L=2000	6/N16 LONGITUDINAL BARS, COG AT TOP. R10 HELIX, 300 DIAMETER, 250 PITCH. 50mm COVER TYP. 100mm BTM COVER.
BP2	450 BORED PIER, L=1200	6/N16 LONGITUDINAL BARS, COG AT TOP. R10 HELIX, 300 DIAMETER, 250 PITCH. 50mm COVER TYP. 100mm BTM COVER.

STRUCTURAL FRAMING SCHEDULE

ID	DESCRIPTION	CONNECTION DETAILS
P1	152x76x5 RHS	1900 EMBED INTO BP1. 200x150x10 BTM PL. 5mm TOP CAP PL.
BR1	76.1x3.6 CHS	1/M16 8.8/S BOLT TO 100x10 PL EACH SIDE.
R1	101.6x6.4 CHS	SLOTTED TO SUIT 76.1x3.6 CHS INNER PIN/PIPE. 5PL CLAMP AROUND W/ 1/N16

FLOODING DATA WESTERN FENCE

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.95	18.546	1.06	1.96	18.552	1.10
5	2.21	18.807	1.14	2.22	18.816	1.19
10	2.36	18.959	1.19	2.36	18.959	1.21
20	2.56	19.157	1.23	2.56	19.157	1.26
50	2.71	19.302	1.27	2.71	19.302	1.33
100	2.82	19.414	1.37	2.82	19.414	1.42

FLOODING DATA EASTERN FENCE A

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.22	19.744	2.04	1.22	19.745	2.18
5	1.37	19.897	2.18	1.37	19.899	2.29
10	1.49	20.020	2.20	1.50	20.027	2.21
20	1.64	20.173	2.24	1.65	20.180	2.25
50	1.73	20.262	2.41	1.74	20.271	2.43
100	1.78	20.306	2.58	1.79	20.317	2.61

FLOODING DATA EASTERN FENCE B

ARI	EXISTING			DEVELOPED		
	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]	DEPTH [m]	WATER SURFACE LEVEL [m]	WATER VELOCITY [m/s]
2	1.32	19.406	2.46	1.26	19.344	2.66
5	1.44	19.522	2.69	1.37	19.449	2.90
10	1.50	19.584	2.78	1.48	19.560	2.85
20	1.61	19.693	2.84	1.59	19.672	2.91
50	1.72	19.800	2.87	1.70	19.782	2.94
100	1.81	19.898	2.88	1.80	19.882	2.96

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DRAWING TITLE

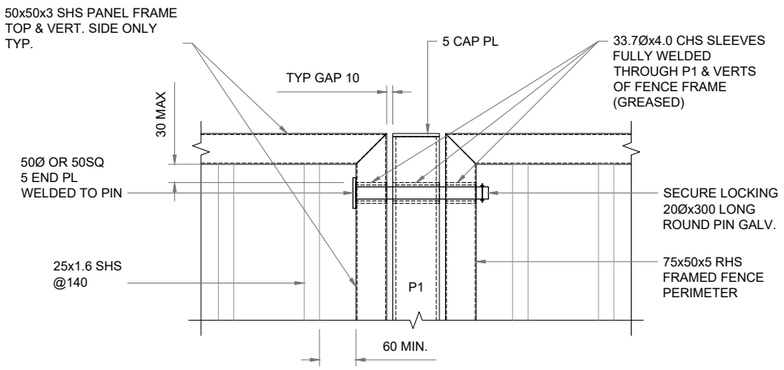
STRUCTURAL DETAILS
SHEET 1 OF 2

DRAWING NUMBER

CE16031-205

ISSUE

C



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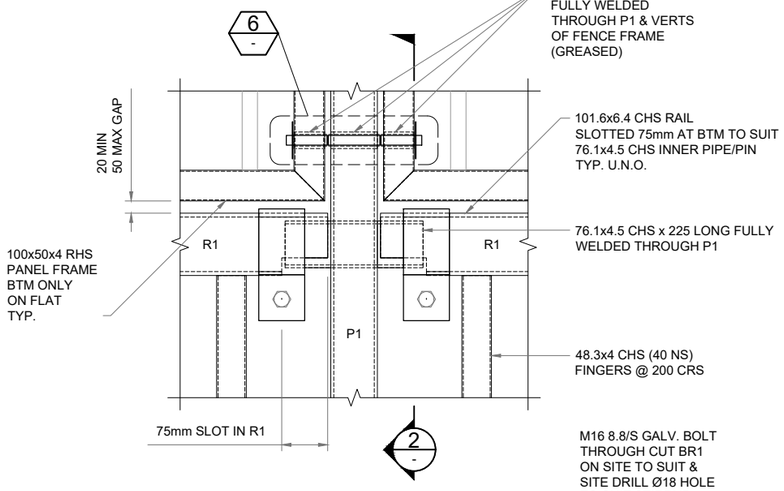

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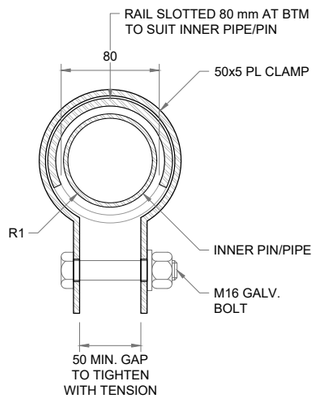

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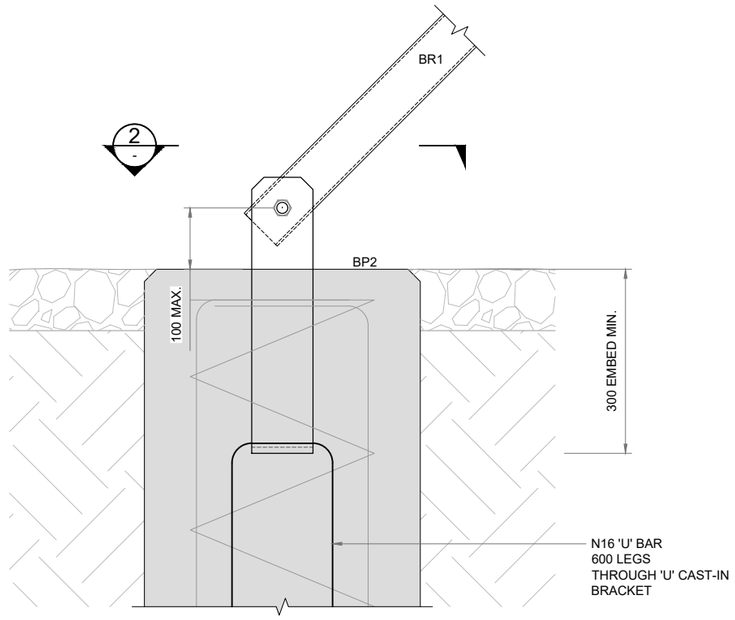

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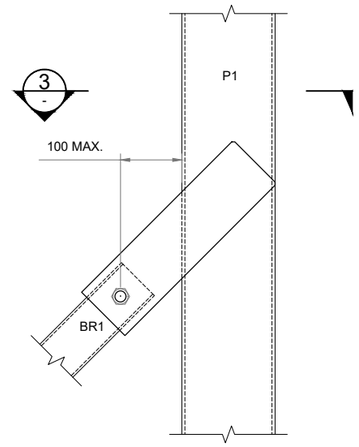
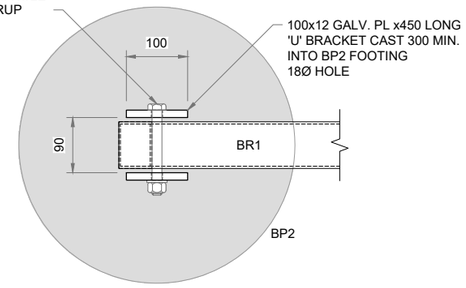


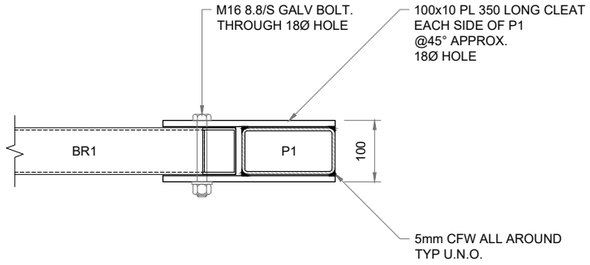
DETAIL 5 (205)
SCALE 1:10

M16 8.8/S GALV. BOLT
THROUGH CUT BR1
ON SITE TO SUIT &
SITE DRILL Ø18 HOLE
TO SUIT STIRRUP



PLAN VIEW ON BR1
TO CAST-IN STIRRUP

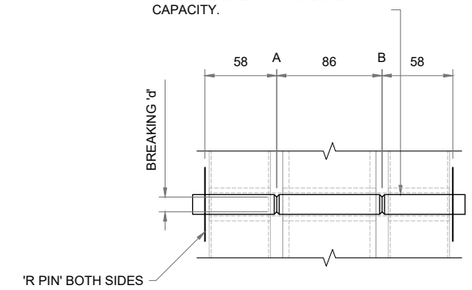
SECTION 2 (-)
SCALE 1:10



PLAN VIEW ON P1 AT BR1
BRACE CONNECTION

SECTION 3 (-)
SCALE 1:10

R16mm DIAM. 6060 T5 AL.
PIN THROUGH W/ NECK NOTCHED
AS SPECIFIED BELOW @ LOCATIONS
A & B FOR SHEAR POINT LOAD
CAPACITY.



DETAIL 6 (-)
SCALE 1:5

LOCATION	WEASTERN FENCE	EASTERN FENCE A	EASTERN FENCE B
BREAKING 'd' [mm]	2.5	3.5	4.0

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	PJ	JO	23/04/20	ISSUED FOR APPROVAL
B	PJ	JO	25/05/20	100% DETAILED DESIGN
C	PJ	JO	25/08/20	100% DETAILED DESIGN - REVISED FLOOD ASSESMENT

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

DATUM

PROJECT No.
CE16031

APPROVAL ISSUE

APPROVED
RPEQ 7637
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
HEIGHTS COLLEGE

PROJECT
PROPOSED FENCE REPLACEMENT
276 CARLTON STREET
NORTH ROCKHAMPTON Q

MOLONEY & SONS
ENGINEERING
EXCELLENCE - INTEGRITY - INNOVATION
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
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DRAWING TITLE
STRUCTURAL DETAILS
SHEET 2 OF 2

DRAWING NUMBER
CE16031-206

ISSUE
C

APPENDIX B – Existing/Developed Water depths, levels and velocities & 10% AEP Velocities

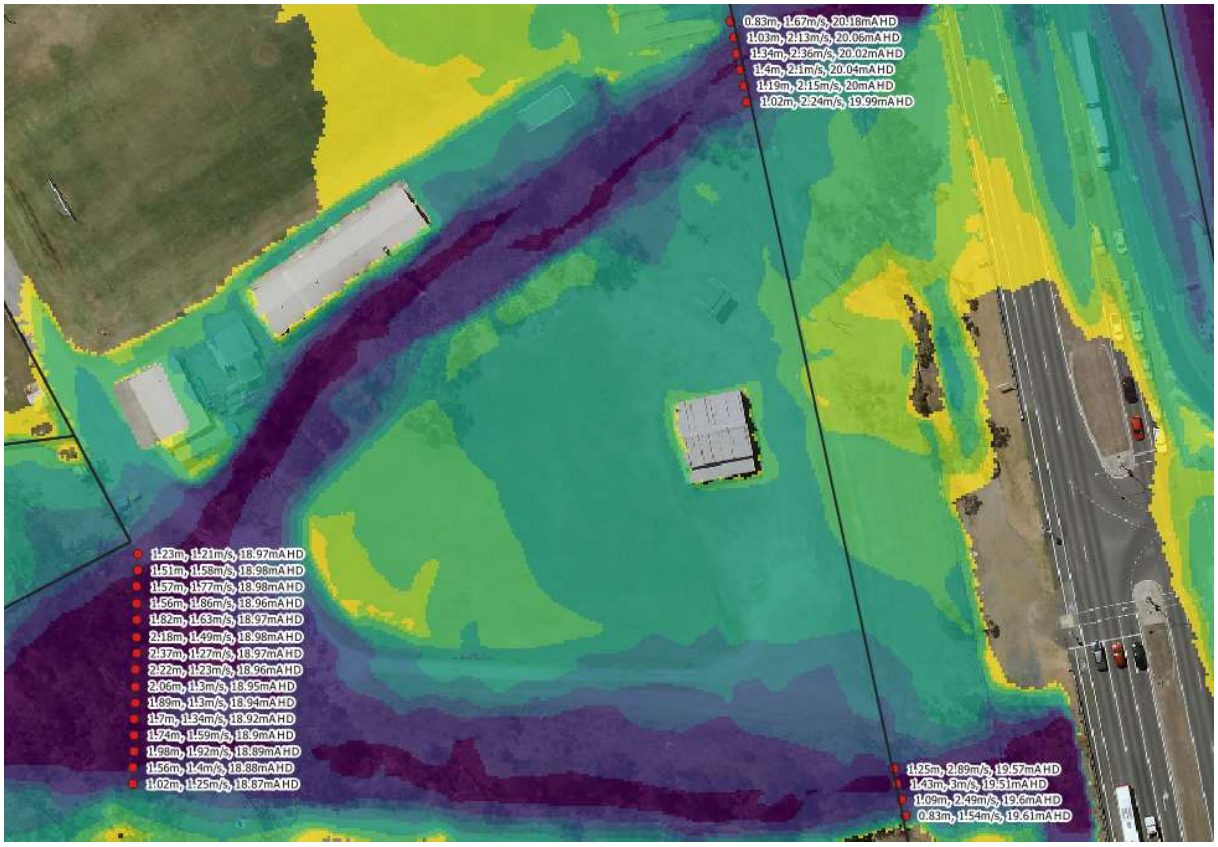
Existing and Developed Water depths, levels and velocities

Western Fence	Existing			Developed		
ARI	Depth (m)	Water Level (mAHD)	Velocity (m/s)	Depth (m)	Water Level (mAHD)	Velocity (m/s)
2	1.95	18.55	1.06	1.96	18.55	1.10
5	2.21	18.81	1.14	2.22	18.82	1.19
10	2.36	18.96	1.19	2.36	18.96	1.21
20	2.56	19.16	1.23	2.56	19.16	1.26
50	2.71	19.30	1.27	2.71	19.30	1.33
100	2.82	19.41	1.37	2.82	19.41	1.42

Eastern Fence A						
ARI	Depth (m)	Water Level (mAHD)	Velocity (m/s)	Depth (m)	Water Level (mAHD)	Velocity (m/s)
2	1.22	19.74	2.04	1.22	19.75	2.18
5	1.37	19.90	2.18	1.37	19.90	2.29
10	1.49	20.02	2.20	1.50	20.03	2.21
20	1.64	20.17	2.24	1.65	20.18	2.25
50	1.73	20.26	2.41	1.74	20.27	2.43
100	1.78	20.31	2.58	1.79	20.32	2.61

Eastern Fence B						
ARI	Depth (m)	Water Level (mAHD)	Velocity (m/s)	Depth (m)	Water Level (mAHD)	Velocity (m/s)
2	1.32	19.41	2.46	1.26	19.34	2.66
5	1.44	19.52	2.69	1.37	19.45	2.90
10	1.50	19.58	2.78	1.48	19.56	2.85
20	1.61	19.69	2.84	1.59	19.67	2.91
50	1.72	19.80	2.87	1.70	19.78	2.94
100	1.81	19.90	2.88	1.80	19.88	2.96

Flood Velocities at 3m intervals 10% AEP



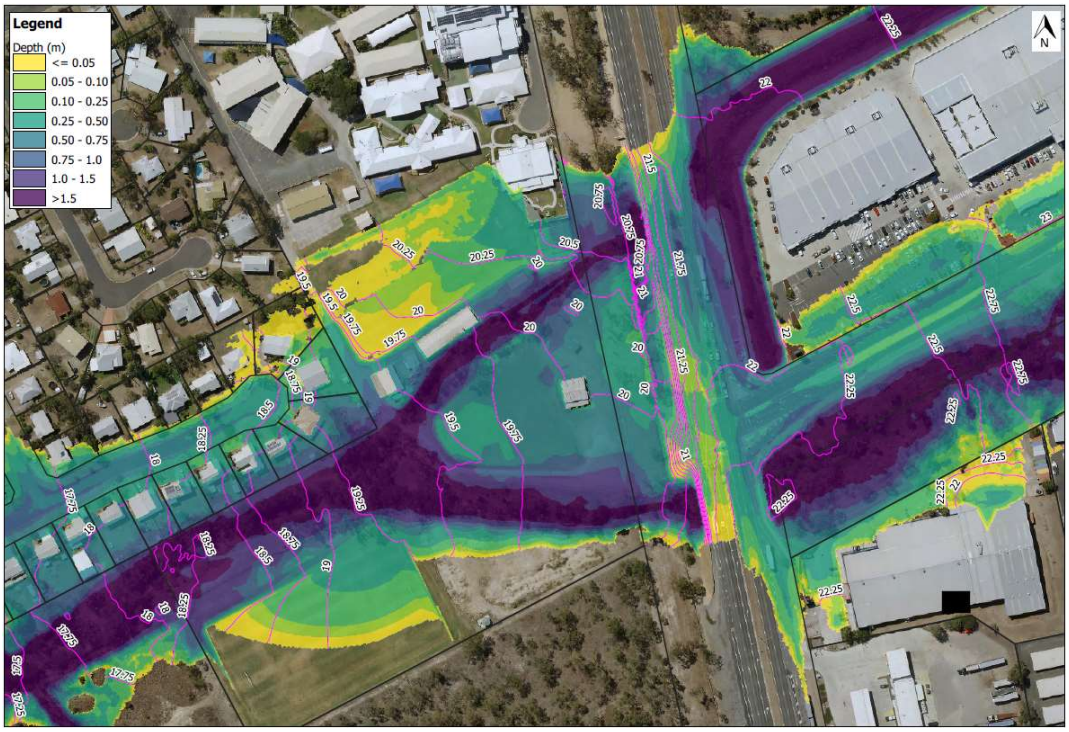
APPENDIX C – Flood Impacts

Existing flood map showing the flood level contours and flood depths by colour range.

And

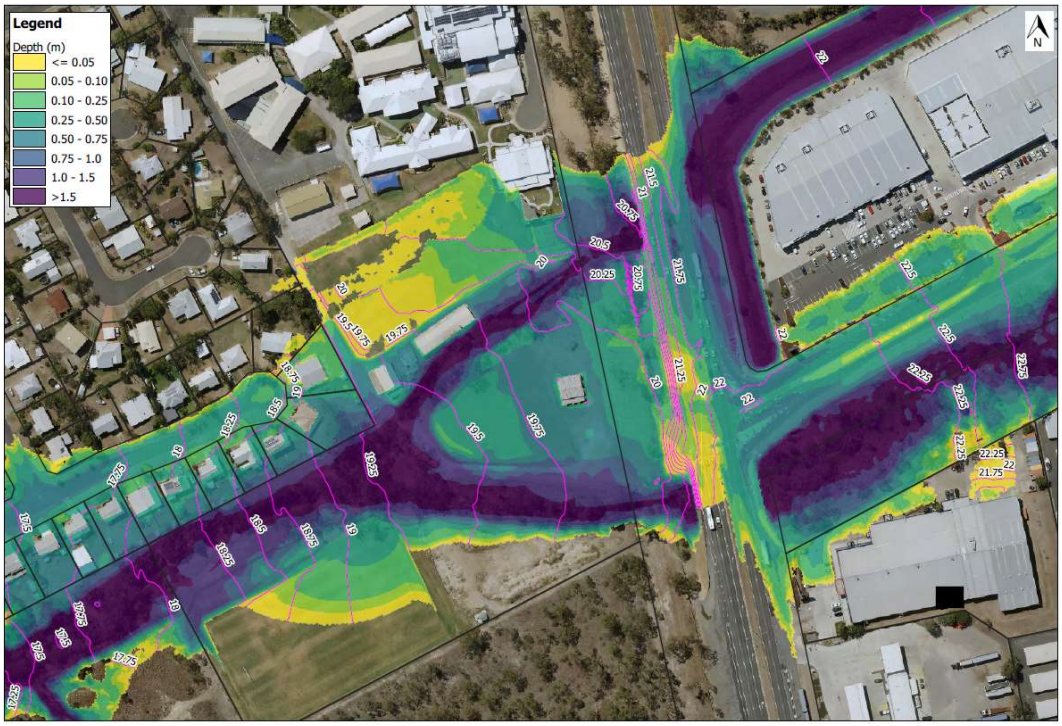
Changes to flood depth maps with the fence installed and operating in accordance with design

1% AEP – Existing Flood Depths/Contours



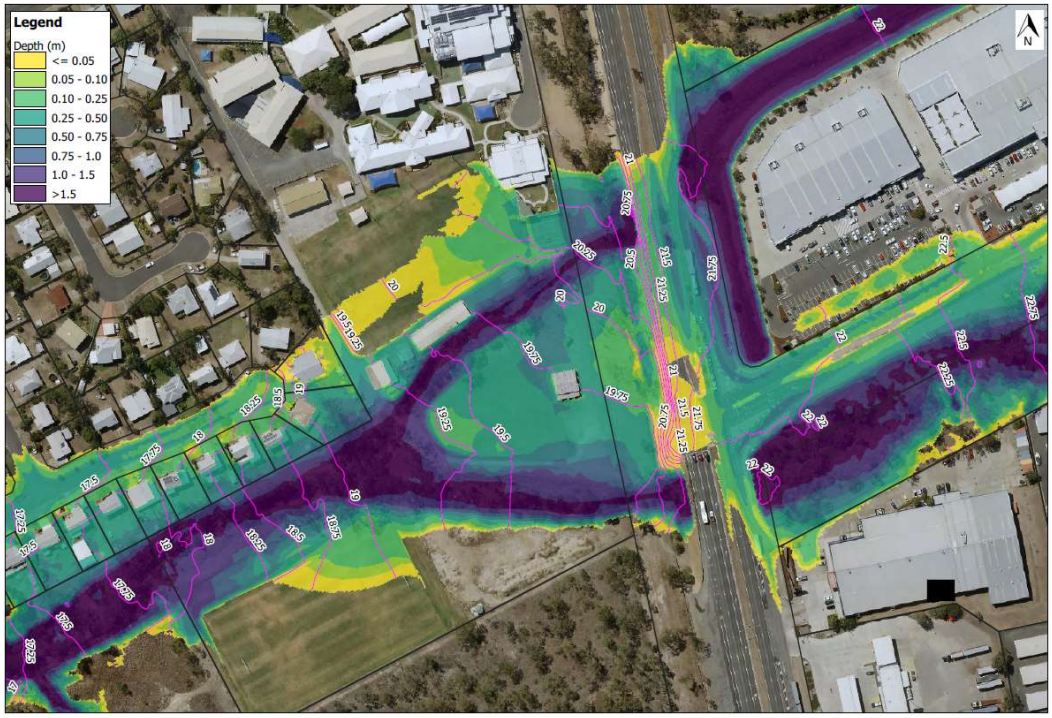
1% AEP – Flood Depth Changes with Fence Operating

2% AEP – Existing Flood Depths/Contours



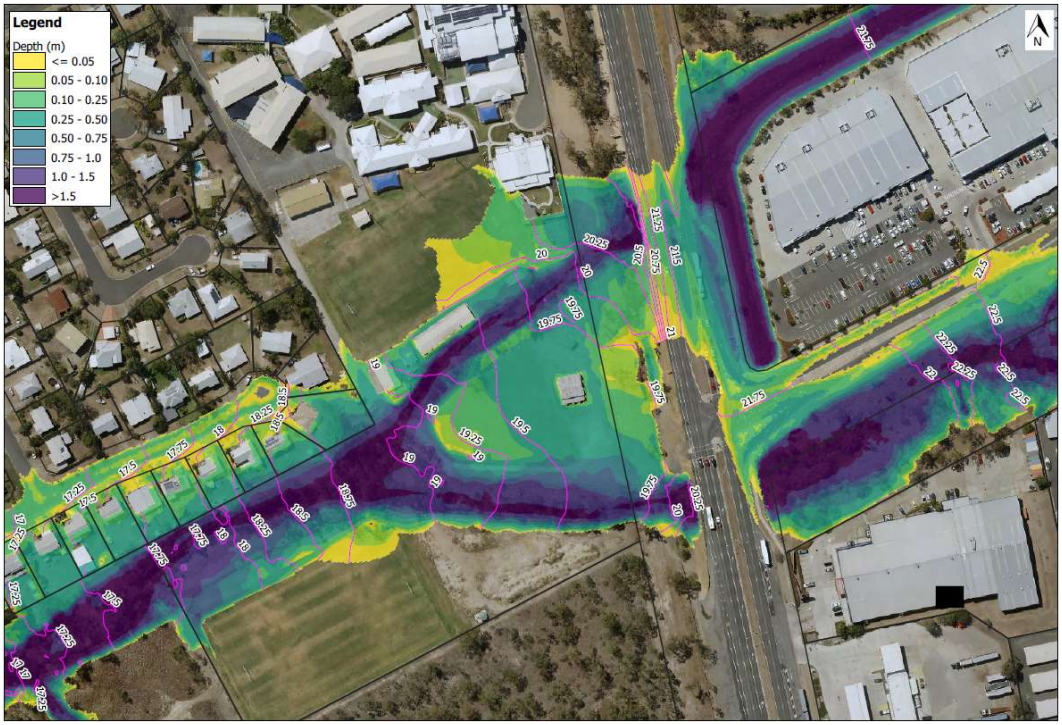
2% AEP – Flood Depth Changes with Fence Operating

5% AEP – Existing Flood Depths/Contours



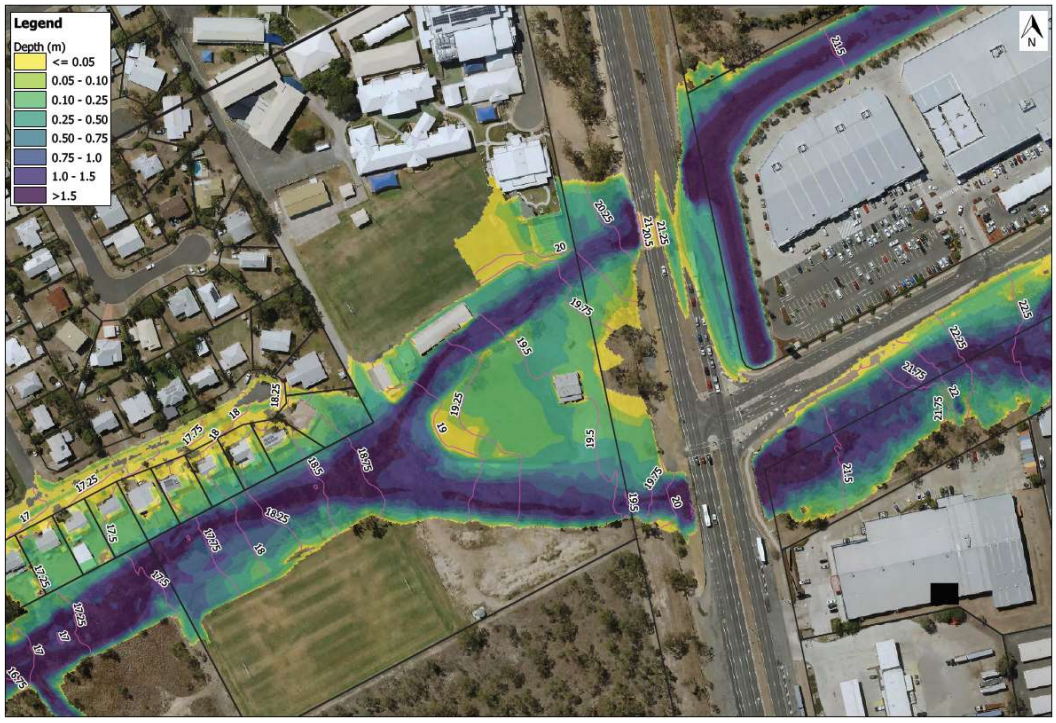
5% AEP – Flood Depth Changes with Fence Operating

10% AEP – Existing Flood Depths/Contours



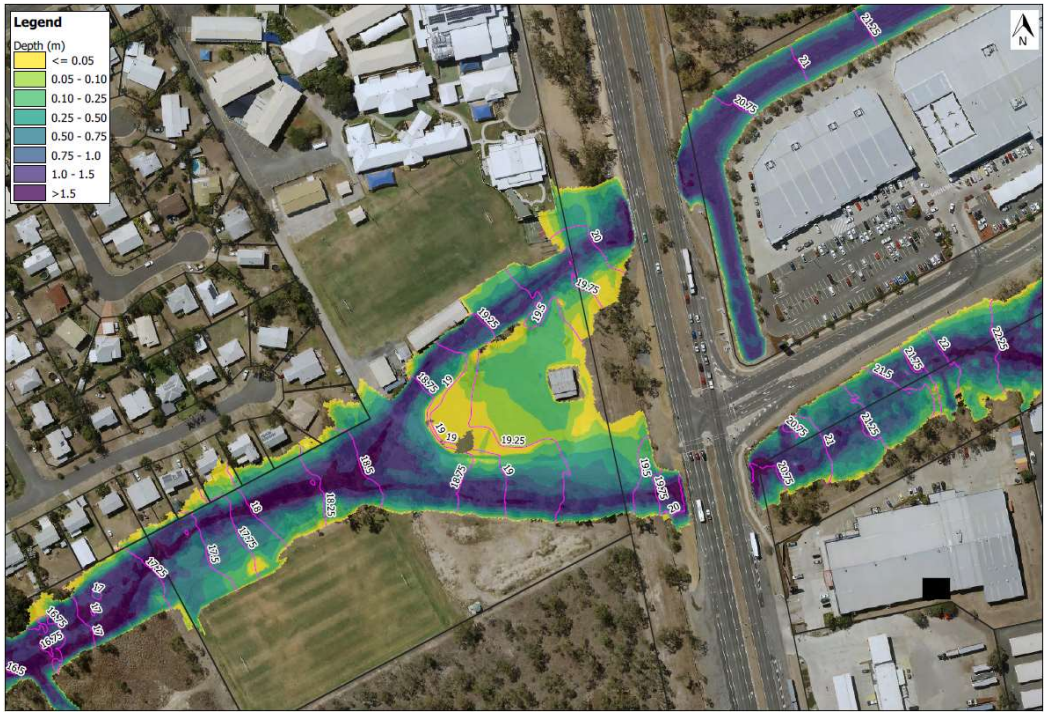
10% AEP – Flood Depth Changes with Fence Operating

18% AEP – Existing Flood Depths/Contours



18% AEP – Flood Depth Changes with Fence Operating

39% AEP – Existing Flood Depths/Contours



39% AEP – Flood Depth Changes with Fence Operating

APPENDIX D – Sensitivity Analysis

1% AEP – Water Level Impact – One Panel Not Opening

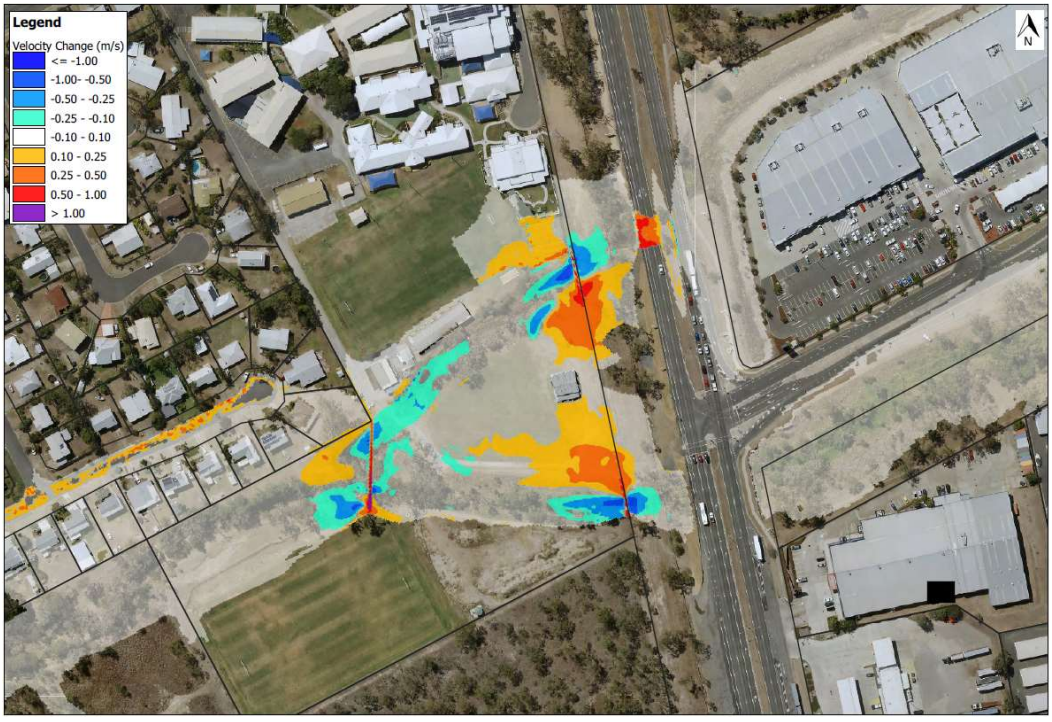
1% AEP –Velocity Change – One Panel Not Opening

1% AEP – Water Level Impact – Two Panels Not Opening

1% AEP –Velocity Change – Two Panels Not Opening

Worst Case Scenario 18% AEP 63% Blockage – Water Level Impacts

Worst Case Scenario 18% AEP 63% Blockage – Velocity Change



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/104-2020

Dated: 11 December 2020

Heights College

Splitters Creek Maintenance Plan

Heights College Boundary Fence Creek Crossings

Revisions/Modifications			
Version	**Date**	**Summary of changes**	**Reviewed by**
1	07/		

TABLE OF CONTENTS

1. BACKGROUND

Heights College is committed to providing safe and secure working and learning environment for all member of the college community. To support this commitment, we have completed boundary fencing of the school property that includes three locations where the fencing crosses Splitters Creek. This creek is subject to stormwater flows and flooding events which requires the fence to operate such that stormwater flows are impeded as little as possible.

Flood modelling has been completed that demonstrates the fence does not impede flows provided it is allowed to operate in accordance with design principles. To ensure that fence operation is maintained and a fish passage remains unimpeded, we have prepared this Splitters Creek Maintenance Plan.

The three fence locations are shown in ***Figure 1*.**

Figure 1 Fence Locations (Source: Google 2019)

2. PURPOSE

The purpose of this plan is to ensure that Heights College has procedures in place to complete periodic maintenance and inspection of the Splitters Creek area and the fence to ensure that potential debris build up is minimised and that the fence operation will be unhindered.

3. SCOPE

The scope of this maintenance plan is to outline the required tasks & associated performance targets, to outline the frequencies of task completion, to assign responsibility for their completion and to provide documents suitable for record keeping. The scope of the plan implementation will extend to employed grounds staff and contractors engaged by the College from time to time.

3.1. Required Tasks

The required tasks can be broadly described as follows:

1. Fence inspection.
2. Fence maintenance.
3. Creek/grounds inspection.
4. Creek/grounds maintenance.

The individual task is broken down to actions required for each task frequency. The tasks and performance targets for completed tasks are provided in **Appendix A**.

3.2. Frequency

Task completion frequencies should follow strict routines, this should include periodic tasks and tasks that will require completion before and after flood events. The task completion frequencies are provided in **Appendix A**.

3.3. Responsibility

Responsibility for task completion will be assigned by the Heights College Business Manager, he will be responsible for ensuring that tasks are completed in accordance with the required frequency and achieve the required performance targets.

The Business Manager is responsible for maintaining records of task completion.

4. ACTION PLAN

The action plan implemented as part of this Maintenance Plan is provided in a format suitable for distribution to Grounds Staff and Contractors in **Appendix A**.

The fence operates through a ‘shear-pin’ failure mechanism allowing the panels to ‘float’ above the water flow without collecting debris. The mechanism is easily maintained and replaced following major events.

5. FORMS AND RECORDS

Maintenance Plan completion shall be recorded on the form included in **Appendix B**. Completed inspection forms shall be forwarded/provided to the Business Manager for record keeping.

APPENDIX A – Action Plan

SPLITTERS CREEK MAINTENANCE ACTION PLAN

BASIC TASK	TASK DETAIL	FREQUENCY	**RESPONSIBILITY**	**PERFORMANCE TARGET**
Fence Inspection	• Inspect all three fence locations for build-up of vegetation and other debris • Remove debris build up and dispose to either recycling, refuse or green waste as applicable	• Daily • Before Forecast Storm Event • Following Storm Event	Grounds Staff	• Fence and fingers kept clear of debris build up that could cause the fence to operate incorrectly
Bi-Monthly Fence Maintenance	• Inspect all clamps for the fence fingers and replace any that are damaged • Inspect all shear pins, checking for free movement and replace any that are damaged	• Bi-Monthly	Fencing Contractor	• All clamps for the fence fingers are in good operational condition • All fence pins are in good operational condition
Annual Fence Maintenance	• As for Monthly Maintenance plus • Remove 50% of shear pins to inspect and check for hinge operation of the fence. Replace any shear pins showing signs of damage.	• Annual	Fencing Contractor	• 50% of the fence per year is demonstrated to operate as designed.
Creek and Floodplain Maintenance	• Inspect creek area for vegetation and other debris build up. • Inspect three fence locations for growth of tall grasses • Remove loose debris build up and dispose to either recycling, refuse or green waste as applicable • Mowing and weeding of the flood plain/school grounds either side of the creek • Trim grasses to ground level 1m downstream of fence to 2m upstream of fence (herbicide not to be used within creek)	• Weekly • Before Forecast Storm Event	Grounds Staff	• Creek area maintained clear of debris build up that could cause the fence to operate incorrectly • Fence kept clear of grasses that could press against panels and impede fish passage • Grounds maintained to the satisfaction of the Business Manager

APPENDIX B – Maintenance Plan Records

SPLITTERS CREEK FENCE INSPECTION RECORD

INSPECTION FREQUENCY **(Delete as Required)**	TASK	DATE	**INITIALS**	**COMMENTS**
Daily / Before Storm / After Storm	• Western Fence Inspection Completed			
Daily / Before Storm / After Storm	• Eastern Fence (North) inspection Completed			
Daily / Before Storm / After Storm	• Eastern Fence (South) Inspection Completed			

INSPECTION VERIFICATION

NAME	ROLE	SIGNATURE	DATE

SPLITTERS CREEK FENCE MAINTENANCE RECORD

INSPECTION FREQUENCY	TASK	DATE	INITIALS	COMMENTS
Bi- Monthly / Annual	• Western Fence Maintenance Completed			
Bi- Monthly / Annual	• Eastern Fence (North) Maintenance Completed			
Bi- Monthly / Annual	• Eastern Fence (South) Maintenance Completed			

MAINTENANCE VERIFICATION

NAME	ROLE	SIGNATURE	DATE

SPLITTERS CREEK AND FLOODPLAIN MAINTENANCE RECORD

INSPECTION FREQUENCY	TASK	DATE	INITIALS	COMMENTS
Weekly / Before Storm	• North Branch			
Weekly / Before Storm	• South Branch			
Weekly / Before Storm	• General Floodplain			

MAINTENANCE VERIFICATION

NAME	ROLE	SIGNATURE	DATE