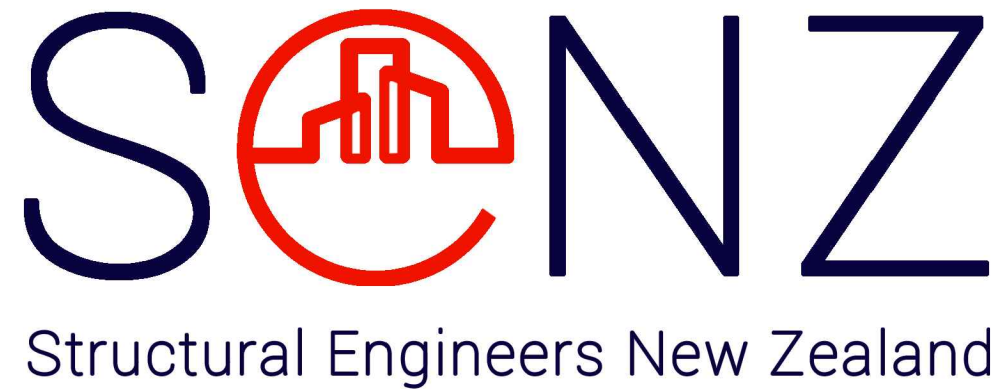


**STRUCTURAL DRAWINGS
TYPICAL BALUSTRADE
RESIDENTIAL LOADING CLASS
JOB NUMBER - 055 - 002**



DWG NO	TITLE	REV	REV DATE
055-002-02G-000	DRAWING SCHEDULE	0	26/11/2020
055-002-02S-000	GENERAL NOTES	0	26/11/2020
055-002-02S-001	GENERAL ARRANGEMENT	0	26/11/2020
055-002-02S-100	CONNECTION DETAILS - 1	0	26/11/2020
055-002-02S-101	CONNECTION DETAILS - 2	0	26/11/2020
055-002-02S-102	CONNECTION DETAILS - 3	0	26/11/2020

						Business Address: Level 1 52 Highbrook Drive, East Tamaki, Auckland	 Chartered Civil & Structural Engineers	Client: 	Project: RESIDENTIAL LOADING CLASS TYPICAL BALUSTRADES	FOR CONSTRUCTION PRELIMINARY		
					Office Number: (+64) 09 275 6029	Title:			DRAWING SCHEDULE	Drawing No.	Rev.	
A	PRELIMINARY	MW	SK	SK	26/11/20	E-mail Address: info@structural-engs.co.nz					055 - 002 - 02G - 000	A
REV	Issue	By	Chk	Appd	Date	Website: www.structural-engs.co.nz						

GENERAL NOTES

- THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE STRUCTURAL ENGINEERS NZ DESIGN FEATURES REPORT, ARCHITECTURAL DRAWINGS, CIVIL ENGINEERING DRAWINGS, AND THE GEOTECHNICAL REPORT FOR THE PROPERTY. COPIES OF ALL THE LISTED DOCUMENTS ARE TO BE KEPT ON SITE AT ALL TIMES.
- ALL WORKS ARE TO COMPLY WITH THE MOST RECENT VERSIONS OF THE NEW ZEALAND BUILDING ACT AND THE BUILDING CODE.
- DIMENSIONS ARE TO BE READ FROM DRAWINGS, NOT SCALED FROM THEM. ALL DIMENSIONS ARE TO BE CHECKED ON-SITE PRIOR TO SETTING OUT.
- ALL DIMENSIONS ARE IN MILLIMETRES (mm), ALL LEVELS ARE IN METRES (m), UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL TAKE PRECAUTIONS TO ESTABLISH LOCATION OF EXISTING SERVICES AT SITE. SERVICES SHOWN ON DRAWINGS ARE IN APPROXIMATE LOCATIONS ONLY. SERVICES OTHER THAN THOSE SHOWN MAY EXIST ON SITE. ONLY HAND EXCAVATION ALLOWED WITHIN ONE METRE OF SERVICES.
- THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF ALL NECESSARY TEMPORARY WORKS INCLUDING TEMPORARY STRUCTURAL SUPPORTS TO ENSURE STRENGTH AND STABILITY OF THE STRUCTURE AND ADEQUATE SUPPORT TO THE STRUCTURES WITHOUT ANY ADVERSE EFFECT TO THE STRUCTURES OR ADJACENT STRUCTURES..
- THE CONTRACTOR SHALL ENSURE THAT ALL REGULATORY CONSENT DOCUMENTATION AS REQUIRED BY THE COUNCIL OR OTHERS HAS BEEN ISSUED BEFORE COMMENCING CONSTRUCTION WORKS.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE DESIGN FEATURES REPORT AND/OR DRAWINGS.
- THE LOCATION, SIZE AND DETAILS OF ALL PENETRATIONS, RECESSES, SLEEVES, HOLES ETC IN STRUCTURAL MEMBERS MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION UNLESS SHOWN ON THE STRUCTURAL DRAWINGS. THESE ITEMS SHALL BE CAST-IN, FORMED, OR SHOP FABRICATED AND SHALL NOT BE CUT OR COVERED ON SITE, UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.
- SUBSTITUTION FOR OR AMENDMENT OF SPECIFIED DETAILS OR MATERIALS SHALL NOT BE CARRIED OUT WITHOUT APPROVAL OF THE ENGINEER.
- WHERE PROPRIETARY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL BY THE ENGINEER.
- VERIFY ALL DIMENSIONS WITH ARCHITECTURAL, SERVICES, AND ALL OTHER PROJECT DRAWINGS PRIOR TO CONSTRUCTION COMMENCING. ANY DISCREPANCIES WITH THE ARCHITECTURAL DRAWINGS RELATING TO THE CONSTRUCTION WORKS SHOWN ON THESE DRAWINGS MUST BE REFERRED TO THE ENGINEER FOR CLARIFICATION..
- ALL WORKS SPECIFIED IN THE FOLLOWING DRAWINGS ARE CLASSIFIED AS RESTRICTED BUILDING WORK.
- THE ENGINEER AND THE LOCAL COUNCIL ARE TO BE NOTIFIED IMMEDIATELY UPON THE DISCOVERY OF ARCHAEOLOGICAL REMAINS ON SITE. ALL WORKS ON SITE MUST BE STOPPED UNTIL APPROVAL HAS BEEN GIVEN BY CCC AND THE ENGINEER.

SITE CLEARANCE AND DEMOLITION

- ALL WORK SHOULD BE IN ACCORDANCE WITH THE HEALTH AND SAFETY IN EMPLOYMENT ACT 1992.

INSTALLATION OF COMPACTED HARDFILL

- THE EXCAVATION SHOULD BE AS INDICATED ON DRAWINGS OR TO A LEVEL WHERE THE SOIL ACHIEVES A GEOTECHNICAL ULTIMATE BEARING CAPACITY OF 300kPa.
- COMPACTED HARDFILL WHERE REQUIRED SHALL BE IN ACCORDANCE WITH NZS 4402:1998 WITH REGARDS TO MOISTURE CONTENT.
- COMPACTION WHERE REQUIRED SHALL BE CARRIED OUT IN CONTROLLED LAYERS OF NOT MORE THAN 150MM COMPACTED DEPTH, USING A 4-7 TONNE VIBRO-ROLLER UNTIL THE SITE IS BROUGHT TO A LEVEL SUITABLE FOR CONSTRUCTION OF A CONCRETE SLAB ON GRADE. TARGET COMPACTION CIV OF 18 IS REQUIRED. A19 GEOTEXTILE SHALL BE PLACED ON THE SUBGRADE LEVEL PRIOR TO PLACEMENT OF HARDFILL.

CONCRETE WORK

- ALL CONCRETE WORK SHOULD BE IN ACCORDANCE WITH THE STANDARDS AND CODE OF PRACTICES SPECIFIED IN THE DESIGN FEATURES REPORT.
- CONCRETE STRENGTHS ARE SPECIFIED 28 DAY COMPRESSIVE STRENGTHS AS DEFINED IN NZS 3109:1987. WHERE NOT SPECIFIED, THE CONCRETE STRENGTH SHALL BE 20MPa, 100 MM SLUMP MIX WITH EITHER 13 MM OR 19 MM NOMINAL AGGREGATE SIZE U.N.O.
- SURFACE FINISHES ARE F4 AND U2
- MINIMUM CONCRETE COVERS ARE NOT LESS THAN 60MM.

- NO SAW CUTS OR CONSTRUCTION JOINTS ARE TO BE FORMED IN THE SLAB UNLESS NOTED OR SHOWN ON THE DRAWINGS.

- POLYSTYRENE UNDER SLAB FOUNDATIONS SHALL BE EXPANDED POLYSTYRENE DOW STYROFOAM RTM-X OR APPROVED EQUIVALENT

REINFORCEMENT

- STAGGER LAPS WHERE POSSIBLE. WHERE LAPS ARE NOT STAGGERED INCREASE LAP LENGTH BY 30%. WHERE GAPS BETWEEN LAP BARS EXIST, THE LAP LENGTH SHALL BE EXTENDED BY 1.5xGAP.

- MINIMUM LAP FOR FABRIC SHALL BE ONE MESH BAR SPACING PLUS 50mm.

- PLACING AND SPACING OF REINFORCEMENT – GENERAL

- SPlicing OF REINFORCEMENT, WHETHER BY LAPPING, WELDING OR MECHANICAL SPlice SHALL ONLY BE CARRIED OUT AS SHOWN ON THE DRAWINGS OR AS SPECIFICALLY APPROVED BY THE ENGINEER. – WELDED WIRE MESH SHALL BE SPliced AS REQUIRED, BUT NOT THROUGH SLAB JOINTS.

- ALL HOOKS ON STIRRUP AND TIES MUST FIT CLOSELY AROUND MAIN BARS U.N.O. FIRST STIRRUP TO BE PLACED NOT FURTHER THAN THE LESSER OF 1/2 STIRRUP SPACING OR 50mm FROM SUPPORT FACE.

- LAP SPLICES IN REINFORCEMENT

- LAP LENGTHS FOR DEFORMED BARS SHALL BE AS SHOWN IN THE FOLLOWING TABLES U.N.O.
- NOTE RE USE OF THE FOLLOWING TABLES:

- TOP BAR FACTOR IS 1.0 FOR ALL VERTICAL BARS (COLUMNS, WALLS) AND FOR HORIZONTAL BARS WITH LESS THAN 300mm OF FRESH CONCRETE CAST BENEATH BAR (TYPICALLY BEAM BOTTOM BARS AND SLAB BARS).
- TOP BAR FACTOR IS 1.3 FOR ALL HORIZONTAL BARS WITH MORE THAN 300mm OF FRESH CONCRETE CAST BENEATH THE BAR (TYPICALLY BEAM TOP BARS AND HORIZONTAL WALL BARS).

	25 MPa CONCRETE	GRADE 300 DEFORMED	GRADE 500 DEFORMED
12mm BAR	1.0 FACTOR	400	600
12mm BAR	1.3 FACTOR	500	800
16mm BAR	1.0 FACTOR	500	800
16mm BAR	1.3 FACTOR	650	1050
20mm BAR	1.0 FACTOR	650	1000
20mm BAR	1.3 FACTOR	800	1300

- BARS ARE TO BE TO AS/NZS 4671 – GRADE 500E DEFORMED, OTHER THAN FOR TIES, STIRRUPS AND SPIRALS, THAT COULD BE MICRO ALLOY GRADE 300E UNLESS NOTED OR SHOWN OTHERWISE ON THE DRAWINGS.

- ALL MASONRY REINFORCEMENT LAP LENGTH = 70 BAR DIAMETERS U.N.O.

- ALL CELLS OF MASONRY WALLS SHALL BE FILLED WITH 17.5 mPa GROUT

- WELDING OF HIGH STRENGTH REINFORCEMENT IN NOT PERMITTED.

STRUCTURAL STEEL

- STEEL MEMBERS SHALL BE THE FOLLOWING GRADES U.N.O.

	MOVE	GRADE
CHS, SHS, RHS		350
UB's, UC's, PFC's, TFC's & ANGLES (125 x 125 OR LARGER)		300
ANGLES (100 x 100 OR SMALLER)		250

- FABRICATION SHALL COMPLY WITH NZS 3404:2009.

- STRAIGHTNESS OF MEMBERS AFTER FABRICATION AND BEFORE ERECTION U.N.O. SHALL NOT DEVIATE MORE THAN:
STRUTS, COLUMNS = L/1000
OTHER MEMBERS = L/600

- LENGTH SHALL NOT DEVIATE FROM THE TRUE LENGTH BY:
STRUTS WITH END BEARING = ±1mm
OTHER MEMBERS UP TO L=9.0m = +0mm, -3mm
OTHER MEMBERS OVER L=9.0m = +0mm, -5mm

- BOLTING

- ALL HOLES SHALL BE DRILLED AND SHALL BE 2mm LARGER THAN THE BOLT DIAMETER U.N.O. HOLES IN BASEPLATES MAY BE 4mm LARGER THAN THE BOLT DIAMETER FOR CAST IN BOLTS ONLY.
- ALL BOLTS SHALL HAVE AT LEAST ONE THREAD PROJECTING THROUGH BOTH SIDES OF NUT.
- ALL BOLTS SHALL BE GRADE 4.6/s U.N.O.
- TIGHTENING PROCEDURE SHALL COMPLY WITH AS 1511. BOLTING ABBREVIATIONS ARE TO AS 1511 AND AISC PROCEDURES.

- WELDING

- ALL WELDS SHALL BE 6mm CONTINUOUS FILLET U.N.O.
- ALL WELDS TO BE CLASS SP TO AS 1554 U.N.O.
- WELDING ELECTRODES SHALL BE E48XX TO AS 1583 U.N.O.
- ALL WELDS SHALL BE CARRIED OUT, OR SUPERVISED BY QUALIFIED WELDERS TO NZS4711 FOR THE POSITION USED.

- STEEL WORK TO BE SUPPLIED FULLY HOT DIP GALVANIZED.

- PLUMBNESS OF STRUTS/COLUMNS SHALL BE WITHIN L/1000 OF TRUE VERTICAL.

- ALL GUSSET PLATES, CLEATS AND STIFFENERS SHALL BE GRADE 250 STEEL TO AS 3678 OR EQUIVALENT U.N.O.

TIMBER WORK

- ALL TIMBER MATERIAL SHALL BE GRADE SGB U.N.O.

- ALL TIMBER TREATMENT AND CONNECTIONS SHALL BE TO NZS 3604 U.N.O.

- ALL TIMBER FIXINGS SHALL BE TO NZS 3604:2011 U.N.O.

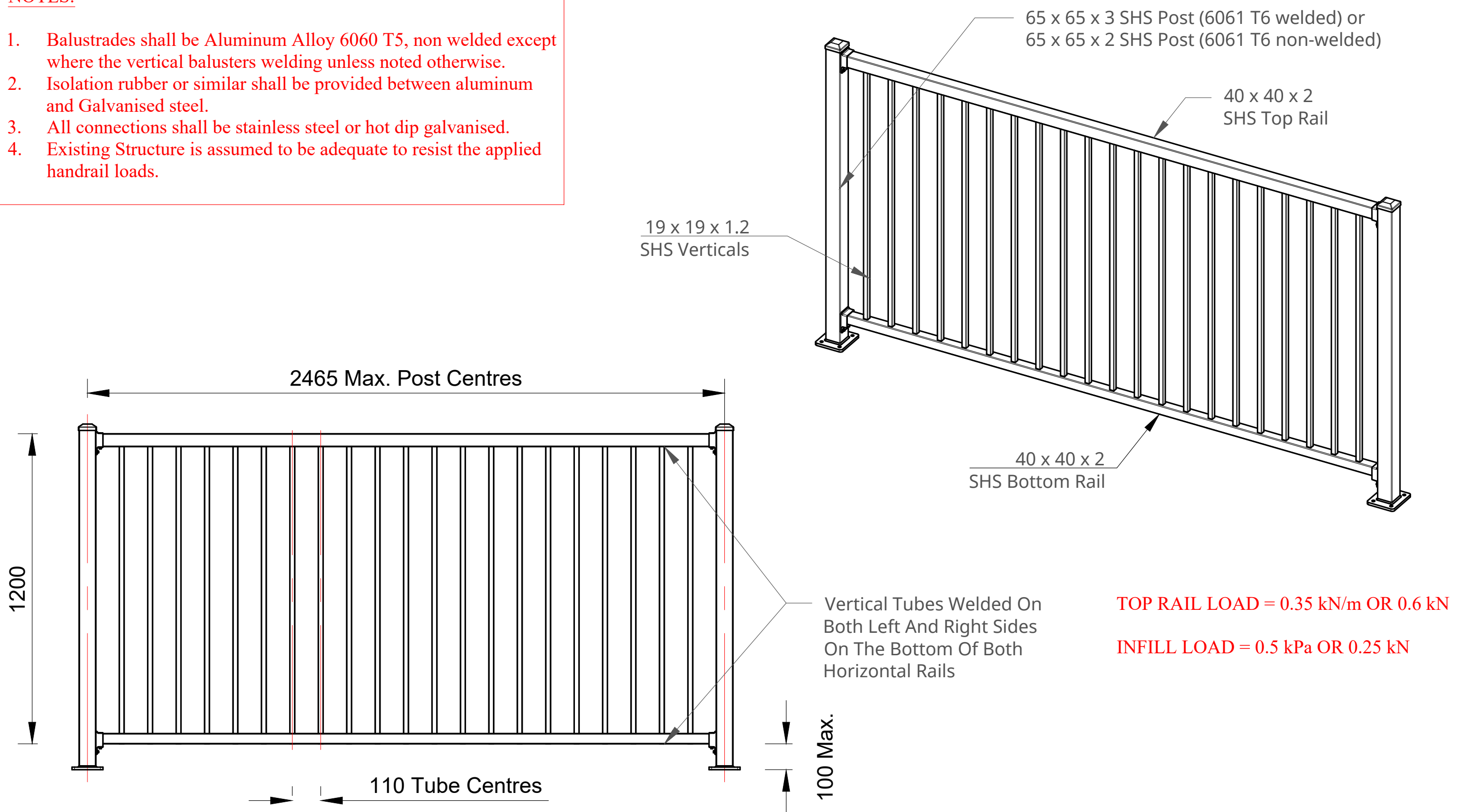
ABBREVIATIONS

BGL = BELOW GROUND LEVEL
C/C = CENTRE TO CENTRE
E.W = EACH WAY
F.F = FAR FACE
F.F.L = FINISHED FLOOR LEVEL
F.G.L = FINISHED GROUND LEVEL
F.W = FILLET WELD
F.W.A.R = FILLET WELD ALL ROUND
G.W.L = GROUND WATER LEVEL
HORIZ. = HORIZONTAL
L.A.R = LAP AT RANDOM
N.F = NEAR FACE
STRP = STIRRUP
T & B = TOP AND BOTTOM
T.O.C = TOP OF CONCRETE
T.O.S = TOP OF STEEL
VERT. = VERTICAL
CHS = CIRCULAR HOLLOW SECTION
EA = EQUAL ANGLE
PFC = PARALLEL FLANGE CHANNEL
RHS = RECTANGULAR HOLLOW SECTION
SHS = SQUARE HOLLOW SECTION
TFB = TAPER FLANGE BEAM
UA = UNEQUAL ANGLE
UB = UNIVERSAL BEAM
UC = UNIVERSAL COLUMN
C.O.S = CONFIRM ON SITE
UBC = ULTIMATE BEARING CAPACITY
U/S = UNDERSIDE

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						Office Number: (+64) 09 275 6029			Title: GENERAL NOTES	Drawing No. 055 - 002 - 02S - 000	Rev. A
						Mobile Number: (+64) 021 967 977					
A	PRELIMINARY	MW	SK	SK	26/11/20	E-mail Address: info@structural-engs.co.nz					
REV	Issue	By	Chk	Appd	Date	Website: www.structural-engs.co.nz					

NOTES:

1. Balustrades shall be Aluminum Alloy 6060 T5, non welded except where the vertical balusters welding unless noted otherwise.
2. Isolation rubber or similar shall be provided between aluminum and Galvanised steel.
3. All connections shall be stainless steel or hot dip galvanised.
4. Existing Structure is assumed to be adequate to resist the applied handrail loads.



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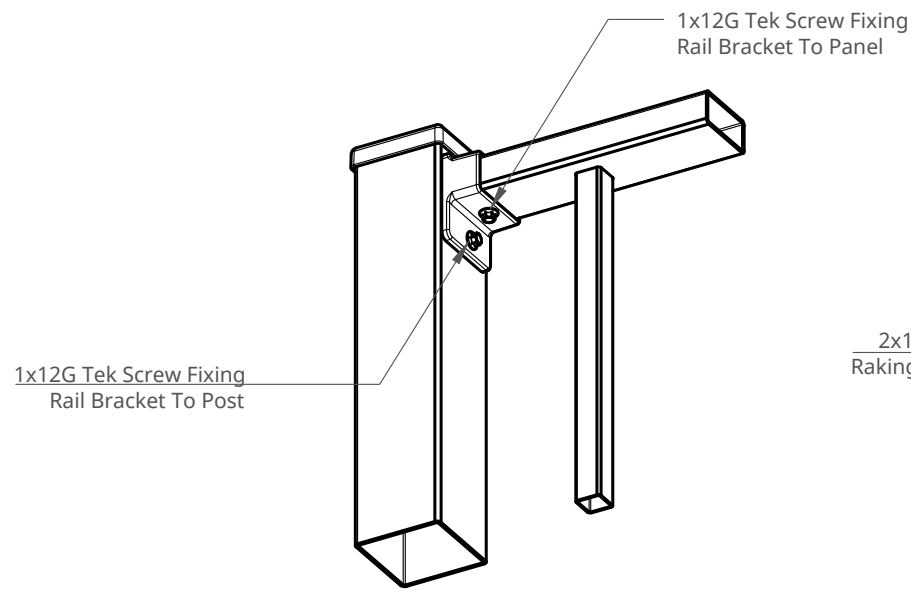
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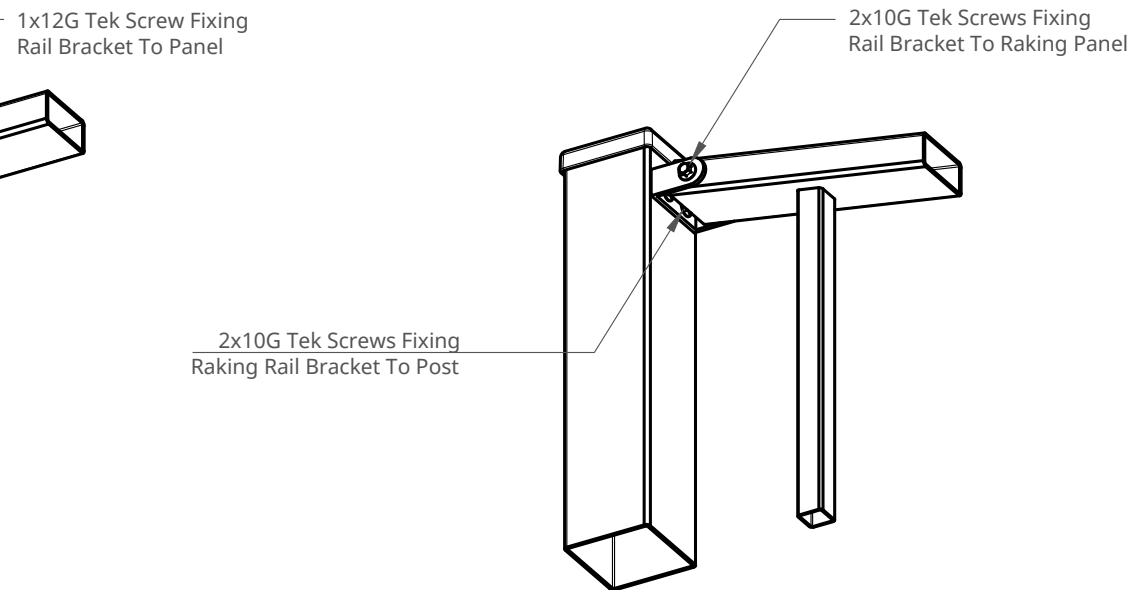
Client: **UrbanGroup™**

Project: RESIDENTIAL LOADING CLASS
TYPICAL BALUSTRADES
Title: GENERAL ARRANGEMENT

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Drawing No. 055 - 002 - 02S - 001
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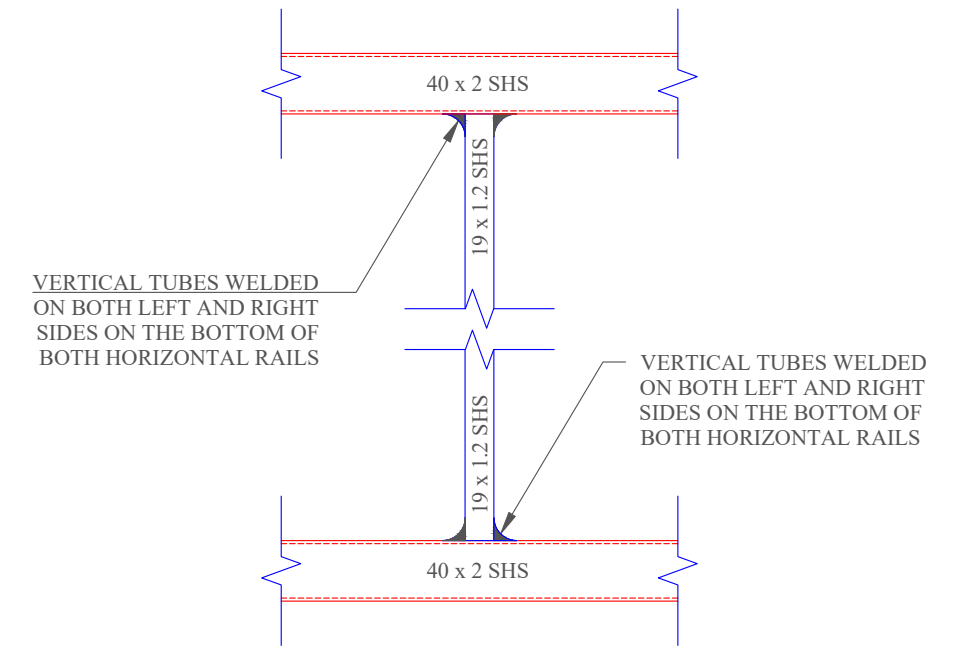


1x12G Tek Screw Fixing
Rail Bracket To Post



2x10G Tek Screws Fixing
Raking Rail Bracket To Post

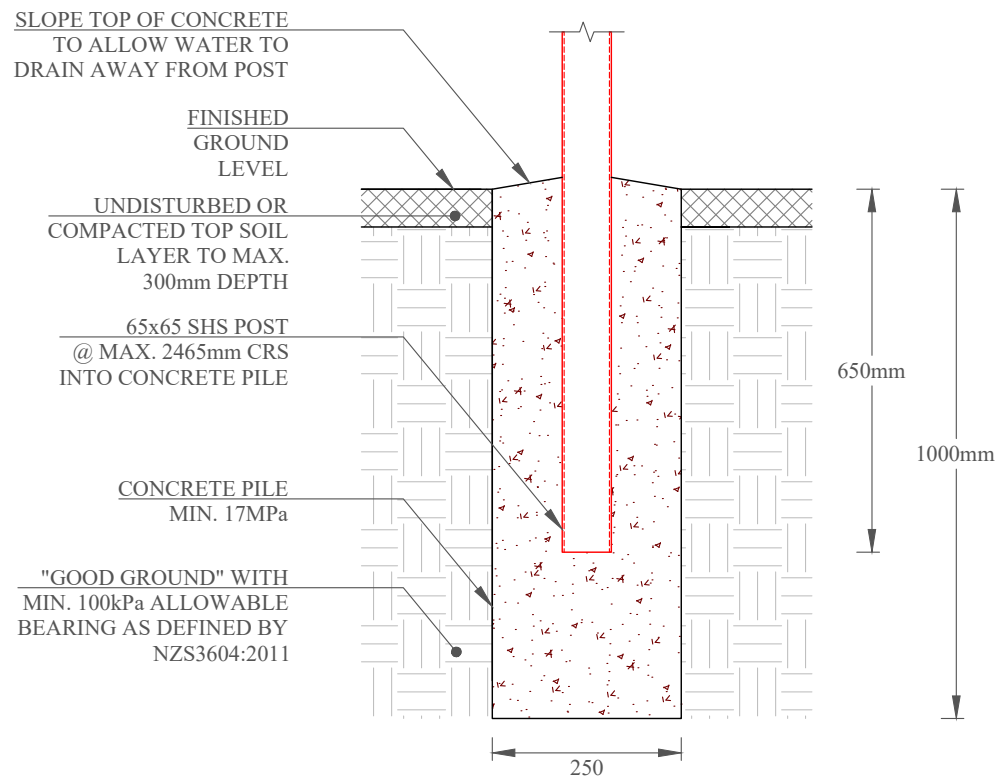
01 RAIL TO POST TYPICAL DETAIL



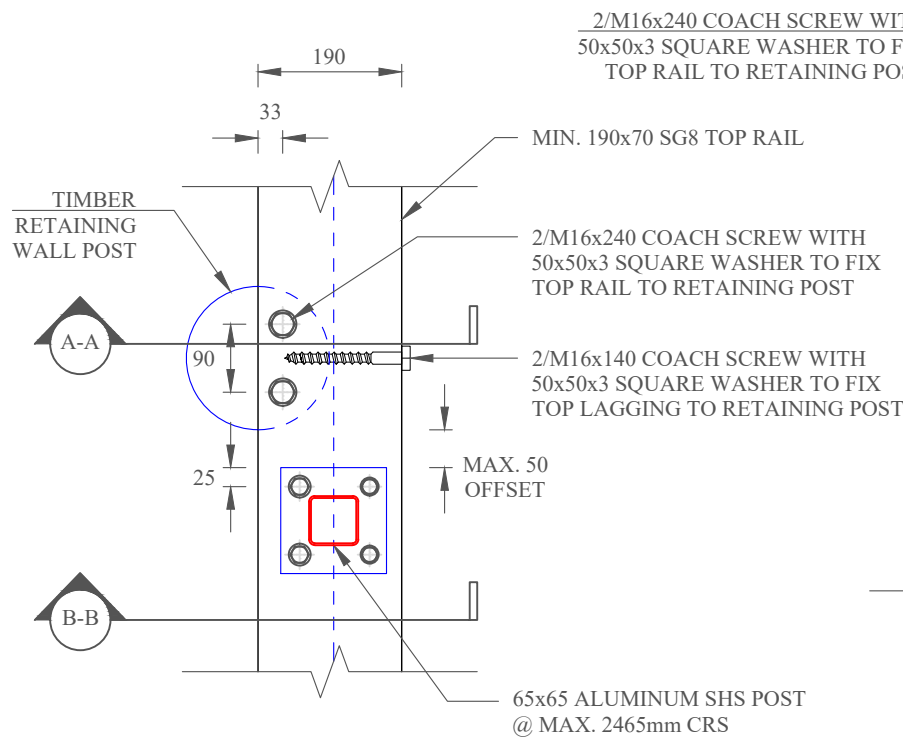
VERTICAL TUBES WELDED
ON BOTH LEFT AND RIGHT
SIDES ON THE BOTTOM OF
BOTH HORIZONTAL RAILS

VERTICAL TUBES WELDED
ON BOTH LEFT AND RIGHT
SIDES ON THE BOTTOM OF
BOTH HORIZONTAL RAILS

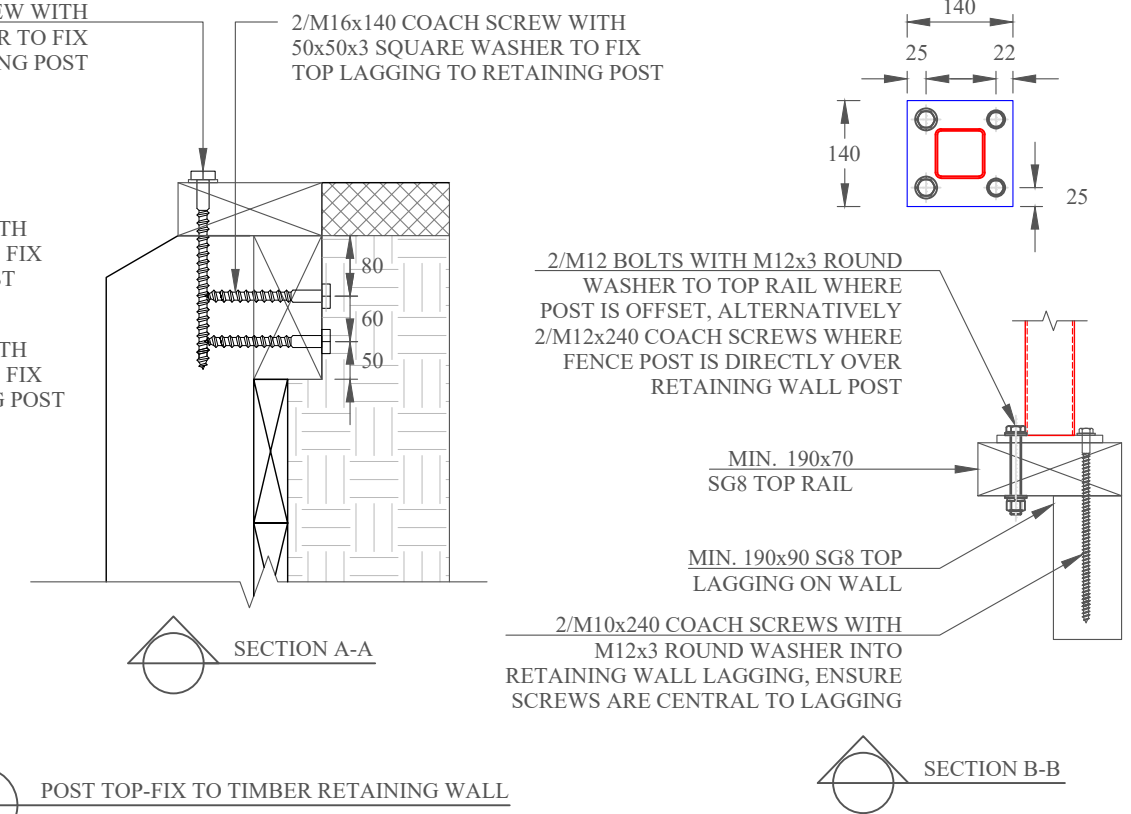
02 VERTICAL TUBES CONNECTION DETAIL
Scale - 1:5 @ A3



03 POST INTO CONCRETE PILE DETAIL
Scale - 1:10 @ A3



04 POST TOP-FIX TO TIMBER RETAINING WALL
Scale - 1:10 @ A3



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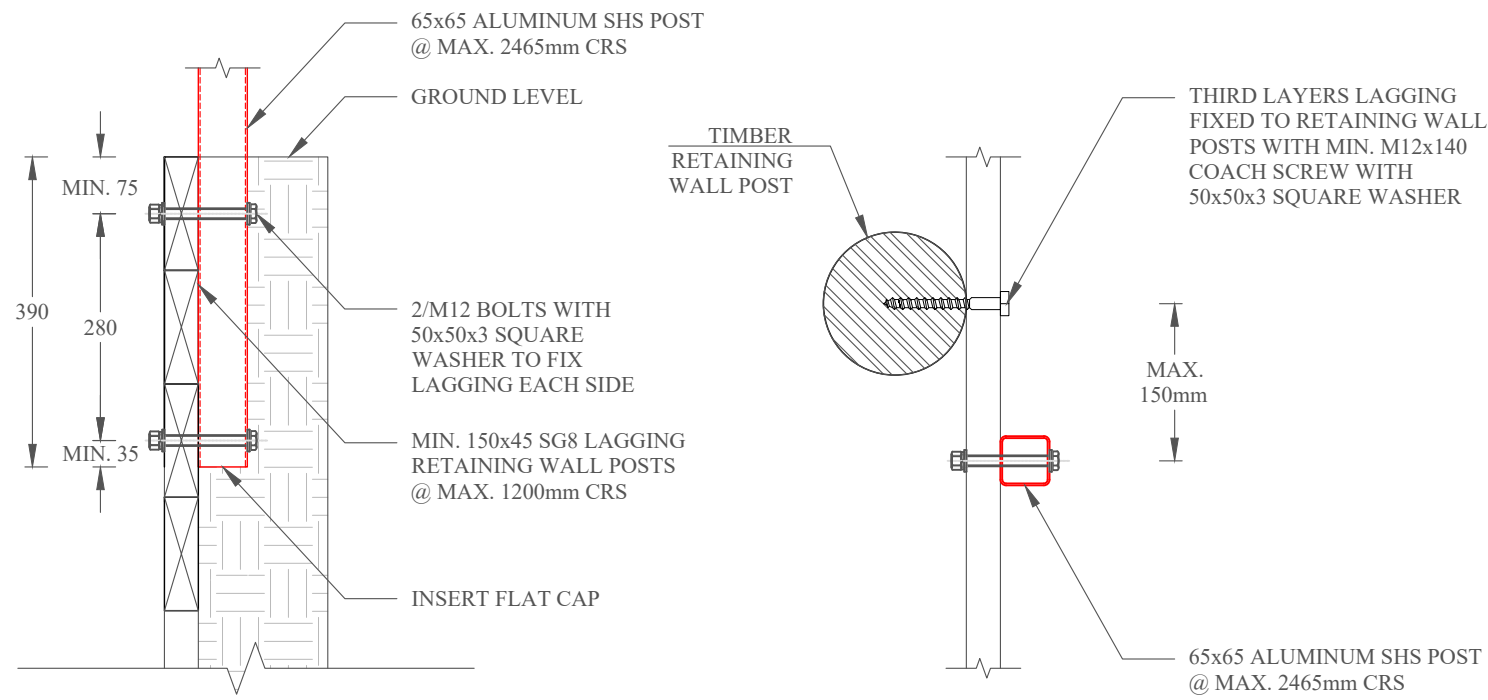
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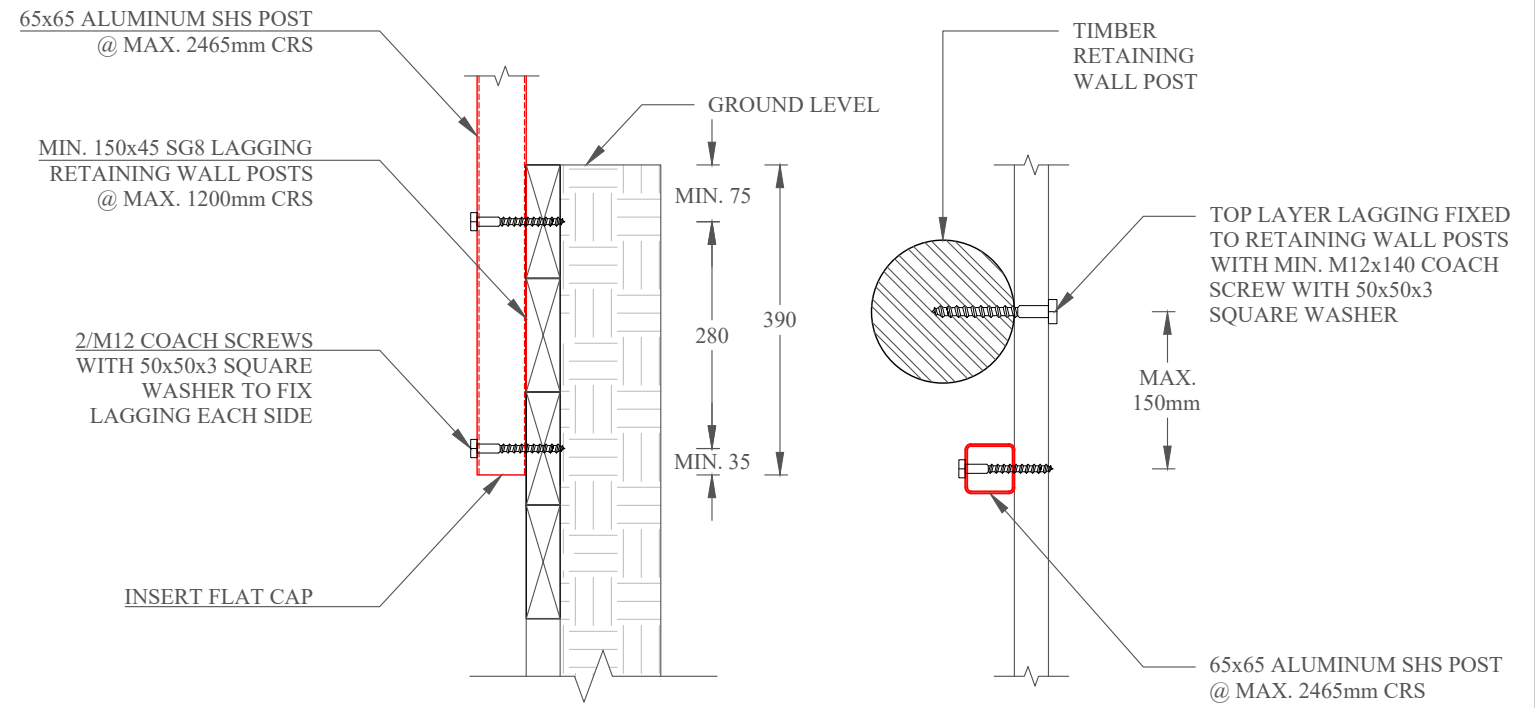
Client: **UrbanGroup™**

Project: RESIDENTIAL LOADING CLASS
TYPICAL BALUSTRADES
Title: CONNECTION DETAILS - 1

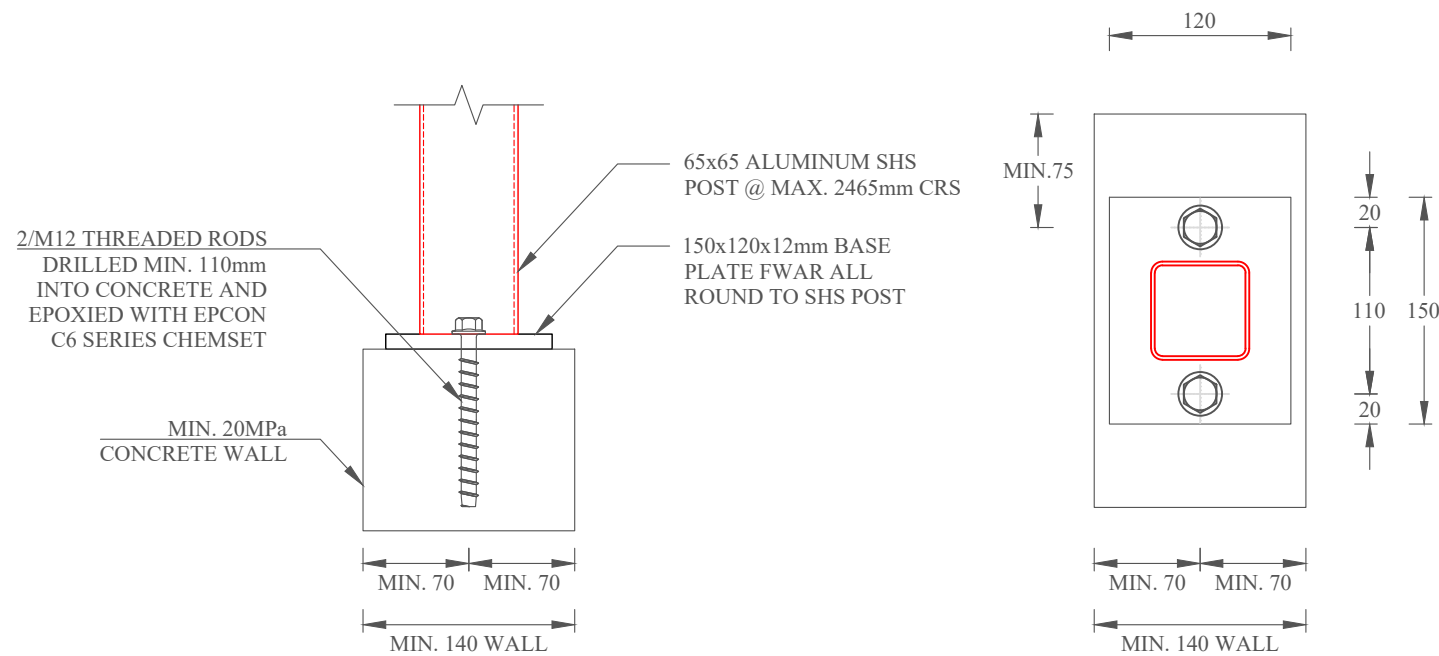
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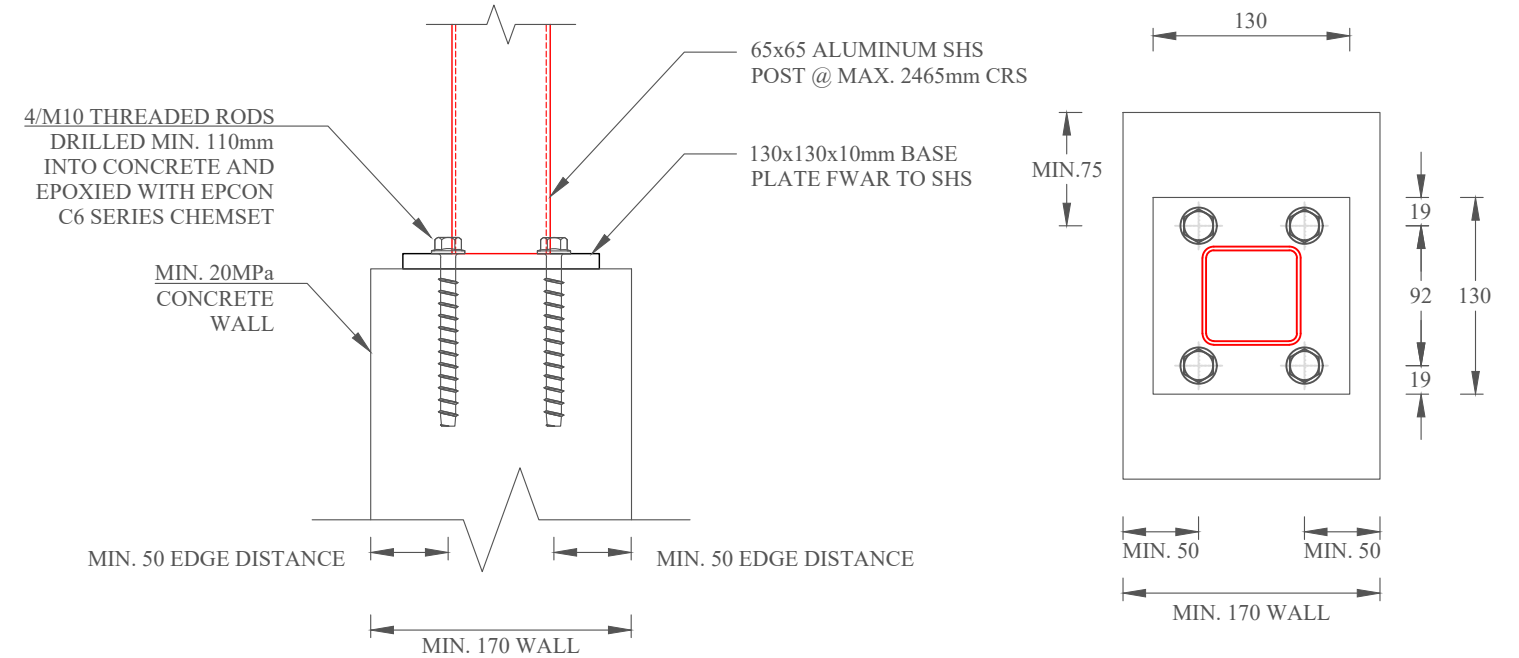
01 POST SIDE-FIX TO TIMBER RETAINING WALL - 1
Scale - 1:10 @ A3



02 POST SIDE-FIX TO TIMBER RETAINING WALL - 2
Scale - 1:10 @ A3



03 POST TOP-FIX TO CONCRETE WALL - 1
Scale - 1:5 @ A3



04 POST TOP-FIX TO CONCRETE WALL - 2
Scale - 1:5 @ A3

A	PRELIMINARY	MW	SK	SK	26/11/20
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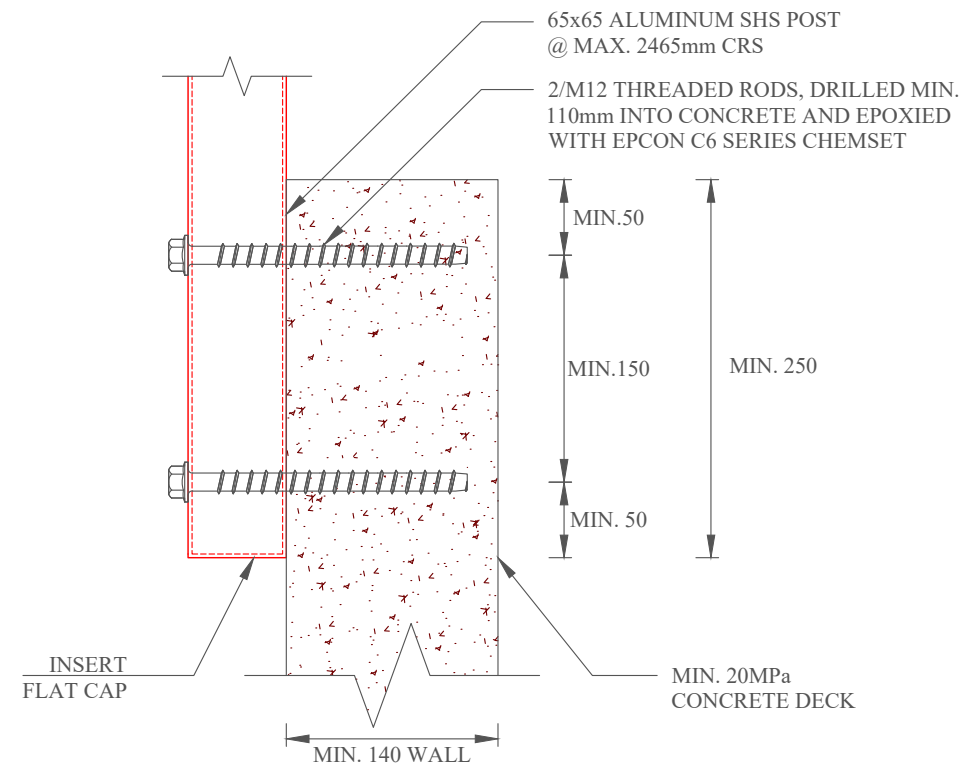
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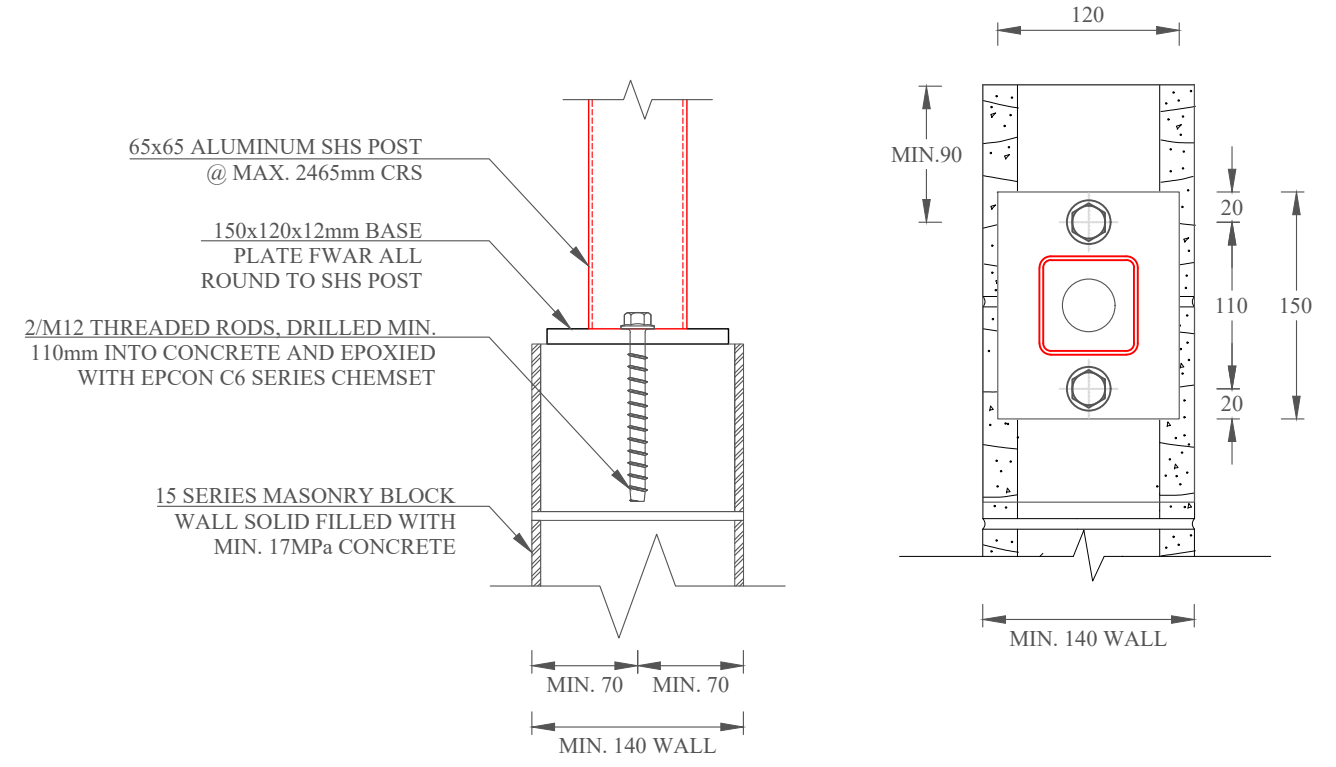
Client: **UrbanGroup™**

Project: RESIDENTIAL LOADING CLASS
TYPICAL BALUSTRADES
Title: CONNECTION DETAILS - 2

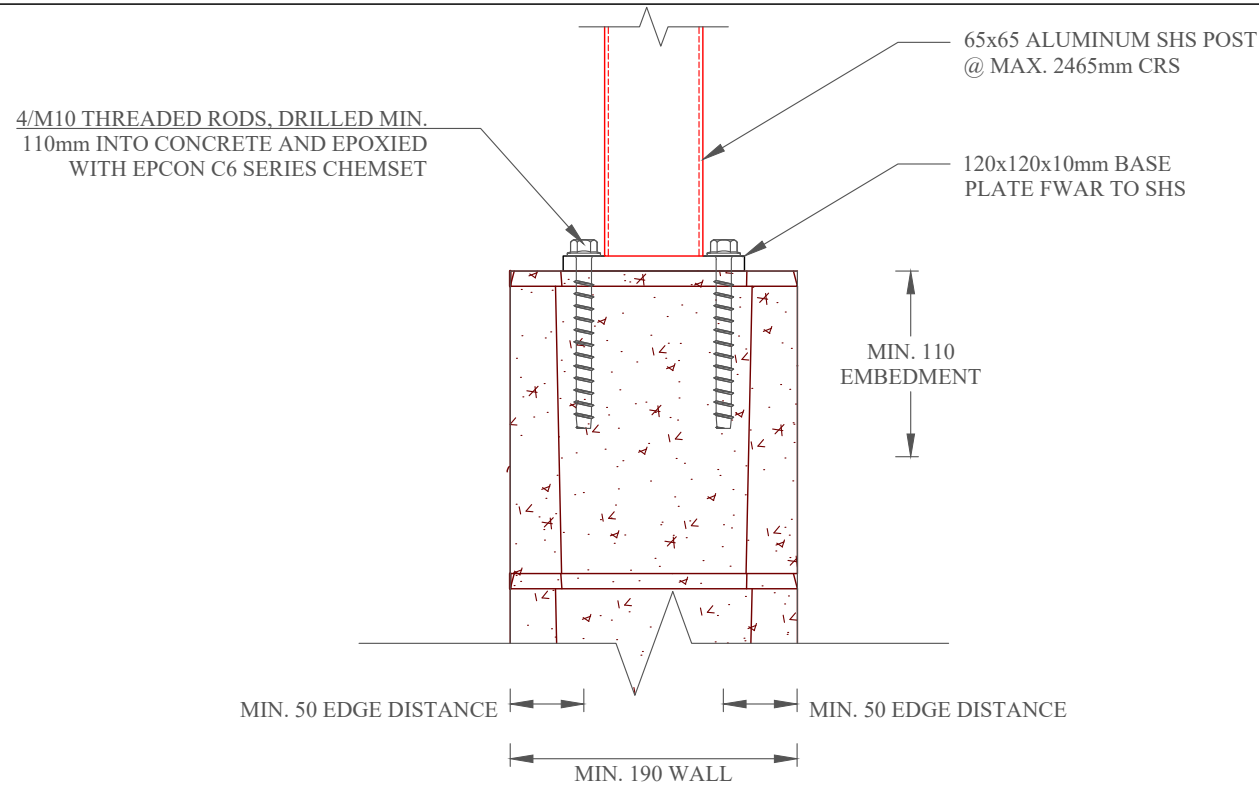
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Rev. A



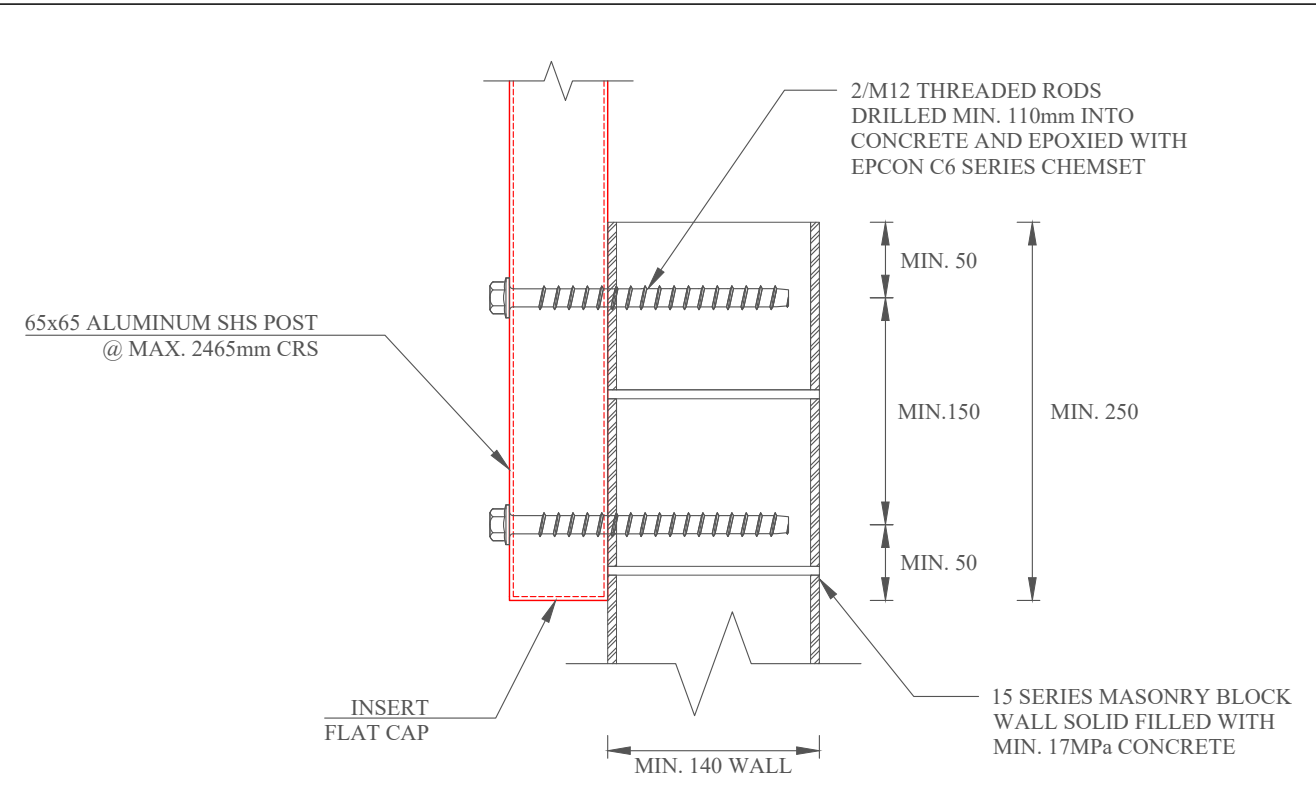
01 POST SIDE-FIX TO CONCRETE WALL
Scale - 1:5 @ A3



02 POST TIP-FIX TO MASONRY WALL - 1
Scale - 1:5 @ A3



03 POST TIP-FIX TO MASONRY WALL - 2
Scale - 1:5 @ A3



04 POST SIDE-FIX TO MASONRY WALL
Scale - 1:5 @ A3

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TYPICAL BALUSTRADES

Title: CONNECTION DETAILS - 3

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Drawing No. 055 - 002 - 02S - 102

Rev. A