

GENERAL	
1	Structural drawings to be in accordance with the structural specification and all documents produced by or for the consultants.
2	The contractor shall obtain a copy of the structural Safety in Design report and adhere to the recommendations of that report.
3	When considering discrepancies between drawings, notes and specifications, the drawings shall take precedence over the notes and the notes shall take a precedence over the specifications.
4	Refer to the architectural documents for all setting out dimensions. Any discrepancies shall be reported to the architect.
5	The documents described as the as constructed structure, the contractor shall be responsible for the stability of the structure during erection and until the structure is fully completed during construction. The contractor shall provide a proposed construction sequence prior to the commencement of works. Any deviation from a proposed sequence shall be approved in writing by the engineer. The contractor shall not absolve the contractor accepting full responsibility for the submitted construction. If approved by the engineer, the contractor shall submit calculations justifying the adequacy of the structure to carry the construction loads. The contractor shall be responsible for providing the construction sequence.
6	The engineer shall be given the opportunity to inspect all structural works prior to their concealment. All structural work in preparation for inspection must be provided. The contractor remains responsible for the works notwithstanding any inspection by the engineer.
7	All workmanship and material shall be in accordance with the current Australian Standards and Codes of Practice.
8	Any variation to the structure, as described in the documents, shall be via a written request, detailing the variation, and the impact, and the variation shall not proceed prior to the receipt of written approval.
9	Any changes to the structural drawings required by the contractor including but not limited to changes to the building services, architectural design or detailing will be charged at the applicable hourly rate.
10	Should the contractor require the engineer to provide advice on temporary works, buildability, construction sequencing, temporary bracing on alternate materials, applicable hourly rate charges will apply.
11	The engineer will provide periodic site attendance to confirm the design intent shown on the drawings is being carried out and to (including the following):
12	It is the contractor's responsibility to carry out a pre-pour inspection of reinforcement and confirm in writing that the reinforcement is installed in accordance with the drawings prior to the engineers inspection. If the contractor is not satisfied with the work, the engineer when the contractors works are effective will be charged at the applicable hourly rate.
13	All services design, including but not limited to, the contractor shall be responsible for the penetrations of holes is required prior to pouring concrete. Any request for approval to core holes will be charged at the applicable hourly rate.
14	All Precast elements are to be installed and fixed by the precast supplier.
15	All elements are expressed in drawings. All items are expressed in metres.
16	No contract work is to be completed on a small scale or minor scale.
17	Autoclaves.
18	Drawings notes on the drawings must be FOR CONSTRUCTION before being used for permanent works.
19	The structural drawings do not show all relevant flange, clads, openings, etc, necessary for the completion of the works, including any other drawings.
20	The price tender must allow for all details necessary for the completion of the works, whether on the drawings or not.
21	Inspection applying to the structure during construction requiring assessment by the engineer shall be shown on drawings and shall be carried out by the engineer at the contractor's cost hourly rates. Submission of items for approval must be made a minimum of 7 working days before incorporation in the works.
22	Design of all formwork and falsework shall remain the responsibility of the contractor and shall comply with the relevant Australian Standards.
23	Plans to formwork and falsework shall be approved by the architect and in accordance with AS 3610.
24	The use of proprietary products shall be in strict accordance with manufacturers' recommendations and instructions and is subject to engineer's approval where relevant.
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The contractor shall obtain a copy of the Douglas Partners geotechnical report number 72811-0, dated June 2015 and adhere to the recommendations of that report.

**▲** Foundation shall be constructed in accordance with the recommendations of the geotechnical engineer. The contractor shall allow for these costs in the tender.

**▲** Retain the geotechnical engineer to provide bearing pressures and founding levels. The contractor shall report founding levels to the engineer prior to pouring footings.

No excavation shall fall within the zone of influence of any adjacent foundation without prior approval.

**Subgrade**

Natural subgrades shall be profiled with a roller of 80 kN minimum static weight (minimum of 10 passes) unless otherwise stated in the site geotechnical report, to select soft to loose soils. Such soils shall be removed in accordance with the geotechnical engineer's recommendation.

**b.** All profiling should be completed in the presence of an experienced geotechnical engineer or geotechnician. Where soft or bearing zones are identified they should be excavated down to a sound base and replaced with engineered fill as described below.

**c.** Where fill is placed against slopes, such as the backfilling of temporary batters associated with the wall/retention of the stormwater system, batters should be formed in the batter slopes. This will allow the fill to be connected as described below in Engineer's Ref.

**d.** Unless otherwise specified, the following table shows classes of soils that shall be suitable density material compacted to 100% as determined by test AS 1288.5.2.1 or 70% minimum density for cohesionless soils.

Sub-base	Unless otherwise specified
1	Zone shall be approved graded fill aggregate or crushed rock (maximum size of 40mm) spread and compacted to 95% m/s as determined by test AS 1285.5.2.1 or 80% minimum density limits for cohesionless soils.
2	Sub
3	Sub
4	Sub
5	Sub
6	Sub
7	Sub
8	Sub
9	Sub
10	Sub
11	Sub
12	Sub
13	Sub
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15	Sub
16	Sub
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18	Sub
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91	Sub
92	Sub
93	Sub
94	Sub
95	Sub
96	Sub
97	Sub
98	Sub
99	Sub
100	Sub

**Hand Blending Item**

**Industrial slab and pavements**

**a.** Cohesive (Loamey and Clayey) Soils to:

- Underlie of footings to be a minimum of 600mm below natural ground level.
- Excavate to firm ground and maintain the excavation in a dry condition until any part/grout can be drilled by the geotechnical engineer.
- Where over-excavation in soft ground is required, filling to the correct level with concrete fill.
- Blinding of 20mm concrete (15 to 15 MPa) to be placed in footings excavations as soon as the foundations have been inspected by the geotechnical engineer.

**Non-Cohesive (Sandy) Soils:**

- Compaction under footings and slabs to be measured using a penetrometer in accordance with AS 1289.5.2.1 or AS 1288.3.3. Compaction under footings and slabs to be 110 or per 300mm maximum from 150mm to 750mm deep. Results to be submitted to the geotechnical engineer.
- Penetration testing to be carried out at 1m below under footings. One per ten square metres or one per six (6) m by six (6) m area. One per five metre length Under slabs. One per twenty square metres.

	FORMWORK	
SECTION 2.	<p>1. The contractor shall be fully responsible for the design of all Formwork unless a product is specified on the drawings as being the responsibility of the engineer e.g., a profiled steel decking acting compositely with the concrete such as Bardeck, CorusDeck or Kingdeck.</p> <p>2. All formwork shall be designed in accordance with BS 3000 and BS 3610.</p> <p>3. The contractor shall remain in place undisturbed for the following minimum periods:</p> <ul style="list-style-type: none"> <li>a. Slab edges - 2 days</li> <li>b. Beams and columns - 7 days</li> <li>c. Backstops to beams and abutts - 28 days</li> </ul> <p>In multi-level construction, the contractor shall take into account the ages of the floors previously erected and supported by the formwork. It will be assumed that any new slabs are to be placed on the freshly cast concrete below; the above schedules supporting structure to contribute to carry loads.</p> <p>5. The contractor shall submit for review by the engineer, full details of the propping system proposed to be used. This should include the weight of the formwork system to be used and any heavy loading such as reinforcement bundles to be placed on the slab. Review by the engineer does not diminish the contractors full responsibility for the design of the formwork system. Details submitted shall indicate the means by which formwork is to be raised to the required position and transported across the site. If cast in situ, indicate the weight of equipment proposed to be used for that purpose. The contractor shall be liable for the engineers costs associated with assessing the impact of any additional loading on the existing structure.</p> <p>From the review, these areas will be charged at current hourly rates.</p> <p>Approved for removal edges shall be removed after 28 days. Internal chambers added to formed or cast edges, unless noted on the architectural drawings,</p> <ul style="list-style-type: none"> <li>a. All openings require approval as noted on the architectural drawings shall be constructed with reinforced concrete. A minimum depth of 100mm concrete is maintained across the drop. Reveal to concrete notes for cover requirements.</li> </ul>	
	<b>CONCRETE</b>	
	<ul style="list-style-type: none"> <li>A1 works to be in accordance with BS 3000, AS 3610 and the specification.</li> <li>B1 Beam dimensions on the documents indicate the depth first, with second, Normal downward beam depth indicates slab thickness. Unusually, if the second dimension is greater than the first, it is the beam depth.</li> <li>C1 Dimensions for all concrete elements do not include thickness of applied finishes.</li> <li>D1 Refer to drawings for notes on concrete.</li> <li>E1 Construction joints, where not indicated on the drawings, shall be approved by the engineer. Remove all formwork to engineer's approval, prior to the construction of masonry above.</li> <li>F1 Concrete shall conform to the following minimum test values:</li> </ul> <ul style="list-style-type: none"> <li>a. Cement: Type S, to AS 3572</li> <li>b. Readiness-to-pump: Class 1B179</li> <li>c. Concrete aggregates: AS 2758.1</li> <li>d. Sp gr: 29m</li> <li>e. Maximum aggregate size: 20mm</li> <li>f. Maximum drying shrinkage strain: BS 1012 Part 13 less than 650 micrometres at 65 days.</li> <li>g. Strength Grade: S30, S32 or S50 as shown on the drawings.</li> </ul> <p>8. All concrete is to be properly cured using an approved method within 2 hours of finishing. Curing shall be continuous for 7 days by one of the following methods:</p> <ul style="list-style-type: none"> <li>a. Ponding with water or curing compound with water</li> <li>b. Use of continuous absorptive cover, such as hessian, kept continually wet</li> <li>c. Coating with wetting agent followed by curing compound</li> <li>d. Use of an approved impervious covering to the whole or all parts of the concrete, such as polythene, which has been laid over the surface immediately after between the concrete and the covering, the covering is to remain undisturbed in place for the duration of the curing period.</li> </ul> <p>If plastic sheeting the concrete is observed due to rapid drying shrinkage or other conditions, apply a single layer of 150 micron thick polythene immediately after the initial rough screed, while the concrete is still wet. Minimum 11°C to 15°C from Master Builders (or approved equivalent).</p> <p>Any cast in elements, such as walls and piers, not indicated on the structural drawings, are to be approved by the engineer. Where pipes and conduits are cast in slabs and walls, these are to be placed in the mid third depth of the member in the layers of reinforcement. Where conduits are to be cast in gullies on ground and there is only one layer of reinforcement, the minimum gap between the conduit and reinforcement is to be 50mm.</p> <p>11. Formwork for all external corners of exposed concrete shall incorporate a 20 to 25 fillet, unless noted otherwise.</p> <p>Unless noted otherwise, the characteristic strength and clear cover to the reinforcement, including filament shall be as follows:</p>	
	<b>ELEMENT</b>	<b>EXTERNAL INTERNAL</b>
	Grade (MPa)	Grade (MPa)

Plans and piling to be in accordance with AS 2159 and are to be designed by the specialist soil contractor, engaged by the contractor.

The contractor shall investigate the presence of any existing services in the ground likely to be affected by the piling. Confirmation of the investigation by AS 3700 and the final design report shall be forwarded to the engineer, in CAD form, prior to commencement of any piling on site. **Rate of penetration** for the contractor shall be as follows:

The contractor is responsible for the cost of the piling. Maximum acceptable design vertical settlement at corner position of piles is 75mm. Maximum acceptable design lateral settlement is 1 k.

Plans are to be designed for the loads indicated on the engineer's drawings and shall be designed to a maximum ultimate load of 1700mm in addition to the final design load of 2.5% of the maximum vertical pile load in the pile, applied at the toe of the pile.

All piles are to be designed, constructed and installed in accordance with the specification and requirements set out on the drawings. Details of each pile type and capacity are to be submitted to the superintendent as required before any piling is commenced.

All piles are to be inspected by a qualified professional engineer to verify design bearing pressures.

All piling rigs are to be inspected to ensure they are cleaned and free of loose material and water prior to pouring concrete, which should be with minimal delay and on the same day as boring.

The inspection should ensure adequate rigging is achieved in the pile shaft to guarantee full adhesion, the use of a pumping cone is recommended.

Some groundwater seepage into piles can be expected. Water should be pumped from the piles immediately prior to pouring concrete. Tremie methods should be used if depth of water exceeds 1.5m.

Obstructions may be expected when piling through existing fill.

Concrete cure to be placed to the 7 days.

Concrete to be to the 10 MPa.

The contractor should make all necessary site investigations to confirm the accuracy or otherwise of the geotechnical report. Tenders to include unit rates for variation to be placed from estimated values.

On completion of piling, a drawing prepared by a registered surveyor shall be prepared showing the location of the piles relative to their nominated position and the level of the top of the pile. The drawing shall be forwarded to the engineer for approval before any further work associated with the piling commences.

The contractor shall be responsible for the design and installation of any work associated with the piling, including the following tolerances:

This shall include the following:

- a. Design checking by the engineer
- b. Assessment by the engineer of any rectification proposals
- c. Design of any rectification works
- d. Approval by the engineer of any rectification works
- e. Costs for any rectification works these activities shall be payable by the contractor to the engineer at current hourly rates.

The piling contractor to design the pile reinforcement such that the ultimate tensile reinforcement on the relevant pile shall be achieved as fully developed at the head of the pile cap in which it is protruding.

ELEMENT	MATERIAL	Strength (N/c)	Motor class/c	Motor M/c	Maximum joint spacing
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**REINFORCEMENT**

- $s_y$ : R: Structural grade plain bars to AS/NZS 4671, ductility class N (250MPa)
  - $s_y$ : N: Deformed bar to AS/NZS 4671, ductility class N (500 MPa)
  - $s_y$ : TM: Heat treated steel mesh mesh to AS/NZS 4671, ductility class L (500 MPa)
  - $s_y$ : SL: Steel mesh AS/NZS 4671, ductility class L (500 MPa)
  - $s_y$ : RL: Rectangular mesh AS/NZS 4671, ductility class L (500 MPa)
- All reinforcement bars to be Type N unless noted otherwise.
- Distribution bars to main reinforcement bars in slabs shall be N12 at 300mm centres unless noted otherwise. Refer to reinforcement lap schedule for lap lengths.
- Minimum lap for fabric shall be one mesh plus 25mm.
- Width of reinforcement is not allowed without prior approval.
- Top and bottom reinforcement shall be supported in both directions at maximum centre 1000mm.
- The minimum clear spacing between conduits as per AS3600 but not less than three diameters. Conduits in slabs to be placed above the bottom reinforcement and below the top reinforcement.
- All re-entrant corners and service beds are to have trimmer bars placed diagonally at corners using two bars (1000mm long) one tied to the underside of top reinforcement and the other bent to the top of the bottom reinforcement. Trimmer bars to be N12 for slabs not thicker than 120mm and N16 for slabs not thicker than 180mm.
- Where not shown bars to be N20 unless noted otherwise.
- Abbreviations and notations used are as follows:
  - BB = Bottom Bottom
  - B = Bottom
  - TT = Top Top
  - T = Top
  - EF = Each Face
  - EV = Each Way
  - N = Near Face
  - FF = Far Face
- At least 95% of all reinforcing bar and mesh meets or exceeds 560 Mideberg grade, and at least 90% of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually)
- At least 95% of all reinforcing steel meets or exceeds 500 MPa strength grade, and at least 15% of mass of all reinforcing steel is assembled using off site optimal fabrication techniques detailed in Table 2 (Main Street, Green Building Council of Australia).

**EDGE BEAMS**

**SLABS AT EDGES**

**INTERNAL BEAMS**

**INTERNAL BEAMS**

**EDGE BEAMS**

**SLABS AT EDGES**

**INTERNAL BEAMS**

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## STRUCTURAL STEELWORK

All workmanship and material standards with AS 4190 and AS 4800.

Steel shall have the following minimum properties unless noted otherwise.

COMPONENT	STANDARD	GRADE
Plates	AS 3778	350
Hot rolled sections	AS 3670	300
CHS	AS 1163	C359
RHS and SHS	AS 1183	C459
Welded beams and columns	AS 3670	300
Flat bars and Rods	AS 3670	300
Purlins and girts	AS 1197	450

All bolts shall be M20 Grade 8.8 in 22mm diameter holes with a minimum of two bolts per connection unless otherwise specified. A smaller bolt shall be placed under the nut if an allowance and where the head of the bolt is to be tightened against a surface it is to be placed under the bolt head.

Where shoring or over bracing is required, the shoring shall be fabricated from minimum dimensions shall be placed under the nut and the bolt head to completely cover the shank. Unless noted otherwise, the washer shall be firm continuous flat welded to the element containing the shank.

Order tightening bolts shall proceed beyond the nut to a minimum of a full thread.

All weldings to be in accordance with AS 1554, special purposes (SP) using E8000 electrodes in accordance with AS 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 215

**LOADING**

1. All loadings have been assessed in accordance with AS1170.0 and the national construction code (NCC).

2. The structural components in these drawings have been designed for the following loadings:

FUNCTION	SDL (kPa)	LL (kPa)
General	1.8	3.0
Offices	1.5	3.0
Lobby	1.8	4.0
Car parking	0.25	2.5
Roof Concrete	2.5	4.0
Roof Steel	0.5	0.25
Toilets/Bathrooms/Kitchens	3.0	2.0
V-ards	1.8	3.0
V-ard Corridors	1.8	4.0
Stairs	0	4.0
Substation	7.5	10.0
Compacting	1.0	7.5
Plantroom	2.5	7.5

3.	<p>The design wind criteria to AS1170.2 are as follows:</p> <ul style="list-style-type: none"> <li>Design Life: 50 years</li> <li>Region: A2</li> <li>Importance Level: 4</li> <li>Terrain Category: 3</li> <li>Regional Wind Speed: <math>U_{ref}</math></li> <li>Ultimate V<sub>r</sub>: 30m/s</li> <li>Service V<sub>r</sub>: 30m/s</li> </ul>
4.	<p>The design earthquake criteria to AS1170.4 are as follows:</p> <ul style="list-style-type: none"> <li>Importance Level: 4</li> <li>Probability Factor: 0.15</li> <li>Hazard Factor: 2.048</li> <li>Site Subclass: Cb</li> <li>Earthquake Design Category (EDC): III</li> </ul>
5.	<p>Do not place or store building materials or construction materials without the contract administrator's approval.</p>

LEGEND / ABBREVIATIONS	
Abbreviation	Description
HORIZ	HORIZONTAL
VERT	VERTICAL
CENTRAL	CENTRALLY PLACED
CRS	CENTRES
B or BTM	TOP or TOP FACE
	BOTTOM or BOTTOM FACE
T&B	TOP & BOTTOM
NF	NEAR FACE
FT	FAIR FACE
INTF	INTERNAL FACE
EXTF	EXTERNAL FACE
E/F	EACH FACE
EW	EACH WAY
EQ	EQUAL
NSOP	NOT SHOWN ON PLAN
NSOE	NOT SHOWN ON ELEVATION
UNO	UNLESS NOTED OTHERWISE
TYP	TYPICAL
CL	CENTRE LINE
PL	PLATE
SV	SIZE VARIES
STG	STAGGERED
N/S	NEAR SIDE
BS	FACE SIDE
B/S	BOTH SIDES
US	UNDER SIDE
L	LENGTH/ LONG
W	WIDTH/ WIDE
H	HEIGHT/ HIGH
D	DEPTH/ DEEP
NOM	NORMAL
RECD	REQUIRED
REIN	REINFORCEMENT
OPP	OPPOSITE
SM	SIMILAR
GA	GENERAL ARRANGEMENT
PT	POST TENSION
DRG	DRAWINGS
NTS	NOT TO SCALE
LV	LENGTH VARIES
ABR	ALTERNATE BAR REVERSED
MAX	MAXIMUM
MIN	MINIMUM
CONT	CONTINUOUS
FFL	FINISHED FLOOR LEVEL
CSL	STRUCTURAL SLAB LEVEL
GA/ V	GA/ VARIED
CS/ S	CONSTRUCTION SITE
(U)	UNDER
(O)	OVER
BEYOND	BEYOND

ELEMENT	EXTERNAL	INTERNAL
	Grade (MPa)	Grade (MPa)
Blinding and mass concrete	N25	N25
Footings	\$50	\$50
Pile Caps	\$50	\$50
Slabs and beams	\$40	\$40
Columns	\$60	\$50
Stairs	\$40	\$40
Retaining walls	\$40	\$40
Non-loadbearing precast walls	\$40	\$40
R.C. in situ walls	\$40	\$40

ELEMENT	EXPOSURE CONDITION			
	CAST AGAINST FORMS (mm)		CAST AGAINST FORMS WATERPROOF MEMBRANE (mm)	CAST AGAINST GROUPING (mm)
	INTERNAL	EXTERNAL		
Footings	40	40	40	75
Slab on ground				
Top	25	40		75
Bottom			30	
Columns	30	40		75
Beams	30	40		
Beams	30	40		75
Suspended slabs				
Top	30	35		
Bottom	30	35	40	

[illegible]

ELEMENT	MATERIAL	Strength (f <sub>cu</sub> )	Mortar classification	Mortar ratio C : S : L	Maximum joint spacing
Reinforced Blockwork	Concrete Block	15 MPa	M4	1 : 0.5 : 4.5	10
Unreinforced Blockwork External face finished, rendered and painted	Concrete Block	15 MPa	M3	1 : 1 : 6	7
Unreinforced Blockwork External wall openings more than 900mm in height	Concrete Block	15 MPa	M3	1 : 1 : 6	5
Unreinforced Blockwork Internal face finished or sheathed	Concrete Block	15 MPa	M3	1 : 1 : 6	6
Unreinforced Blockwork External rendering and/or painted	Concrete Block	15 MPa	M3	1 : 1 : 6	5
Load-bearing Brickwork	Brick	20 MPa	M3	1 : 1 : 6	

[illegible][illegible]

**TAIMER**

1. Timber design, material and construction shall be to AS1700 and AS1702.3.
2. Softwood to be minimum stress grade F7 timbers. Hardwood to be minimum grade F14 timbers. Submittal suppliers certificate as to stress grade of F7 timbers. All timber shall be treated.
3. External timber shall be either hardwood durability class 1 or 2 or AS1702.3 incorporated class grade F7, pressure treated to AS1504 and re-dried prior to use. Supplemental treatment shall be applied to all out surfaces. Supply supporting evidence of treatment.
4. All bolts in timber construction shall be minimum M16 unless noted and shall be galvanneal. Bolts shall be tightened at the end of the maintenance period. Bolt holes shall be no less than 1mm oversize Washers under all heads and nuts shall be at least 2mm hole diameter.  
Timber dimensions shall be not less than:

SEASONED SOFTWOOD.....	3, -5, -9mm
UNSEASONED SOFTWOOD.....	+7, 2, -3mm
SEAASONED HARDWOOD.....	+7, 2, -4mm
SEAASONED HARDWOOD.....	2, -2, -9mm
UNSEASONED HARDWOOD.....	+3, -3, -9mm
(SEE ALSO CLAUSE 1.6.2 IN AS 2092)	

5.	<p>■ Joints, joints and notches are to be 100mm minimum away from loose knots, severe sapling, severe decay or other minor defects.</p> <p>■ Trusses and rafters shall be fixed to be truss plate with metal plate connectors.</p>
6.	<p>■ All framing to be designed by the manufacturer to AS1720 and AS1594, Manufacturer shall provide all necessary design drawings to the client prior to erection. All windloads to be designed and detailed by the manufacturer in accordance with AS1684.</p>
8.	<p>■ All connections and details to be designed and manufactured in accordance with AS1594, AS1594 as appropriate. Costs bearing required for timber structure to be proposed by contractor and approved by Engineer.</p>
9.	<p>■ Timber roof</p> <p>1. Timber roof trusses, anchorages, bracing and lateral stability to truss manufacturer's design and detail in accordance with AS1720 &amp; AS1684</p> <p>2. Truss Design Loads</p> <p>Dead: 0.2 kPa roof shingling</p> <p>Live: ~0.25 kPa</p> <p>SU: ~ 700 to solar panels (refer to arch drawings for locations)</p> <p>~ 625 kg flat/photonic panels (refer to arch drawings for locations)</p> <p>~ 0.5 kPa ice loading</p> <p>Refer to general notes for the details on wind design.</p> <p>3. The truss manufacturer must submit drawings and calculations for approval. Drawings must nominate placement of all trusses and bracing, all connections and fixing details, timber grades and expected long term deflection.</p> <p>4. Trusses shall be preassembled an order prior to erect to exact load maximum. Maximum total allowable deflection shall be 1/200 of span or 10mm whichever is less.</p> <p>5. The truss manufacturer is to design roof bracing to transfer loads in the plane of the roof to the bracing on the structural steel frame.</p> <p>6. The truss manufacturer is to design and detail all roof beam tie downs.</p>

**EXISTING STRUCTURE**

1. The contractor is to obtain all existing structural drawings prior to works commencing.
2. All assessments of existing structural capacity have been based on the above mentioned drawings. No site confirmation has been undertaken.
3. The contractor shall undertake non-destructive site investigation of key structural elements where noted on structural structural drawings to confirm that as built geometry and reinforcement is as per existing structural drawings.
4. All existing reinforcement exposed by demolition or the formation of new penetrations to be epoxy injected.

EXISTING SERVICES	
1.	The location of existing services shall be checked before any excavation takes place by checking with  relevant authorities and survey data.
2.	The exact location of any services shown to exist on the site shall be verified by the contractor by hand excavation before proceeding with earthworks by machines.

1. All light steel framing to contractors design and detail in accordance with AS4600, Light weight construction where used shall be a tested system in accordance with the requirements of the BCA and relevant Australian Standards.

1. Prior to the commencement of any excavation or demolition works, the contractor shall submit a detailed excavation and demolition construction methodology which will be reviewed and agreed by the structural and geotechnical engineer. This document will outline appropriate methods and equipment to be used.

2. The contractor shall provide temporary over head protection during demolition as required by Workcover.
3. All necessary approvals from authorities and adjacent property owners must be obtained before commencement of work.
4. Identify and verify the location of existing adjacent services and confirm details with the engineer prior to the excavation.
5. The geotechnical engineer is to monitor the excavation as it proceeds and shall be consulted at all times regarding stability of rock faces and confirmation of, or changes to the requirements for the Rock Bolts, Dowels, Rock Anchors, Concrete Panels, Soldiers, Wallers, and Drain Holes.

[illegible]

CLIENT

 **NSW** Health  
Infrastructure

PROJECT MANAGER

 TSA  
MANAGEMENT

PROJECT

**BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT**

97-103 BOWRAL ST,  
BOWRAL NSW 2576

DRAWING NUMBER  
130443-ENS-ST-DWG-EW001-01

DRAWING NAME  
EW GENERAL NOTES

REV

N

0m 2m 4m 6m 8m 10m

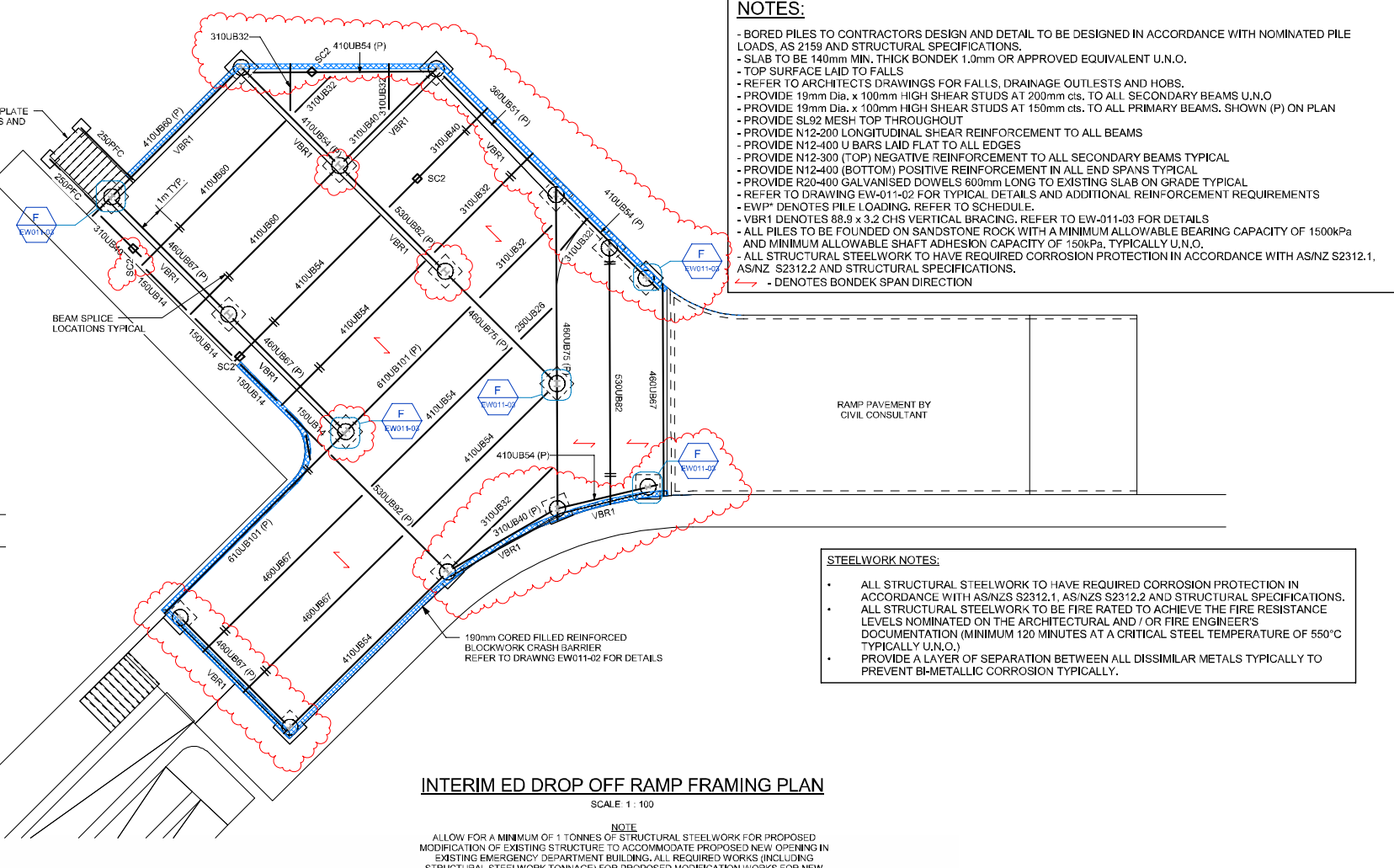
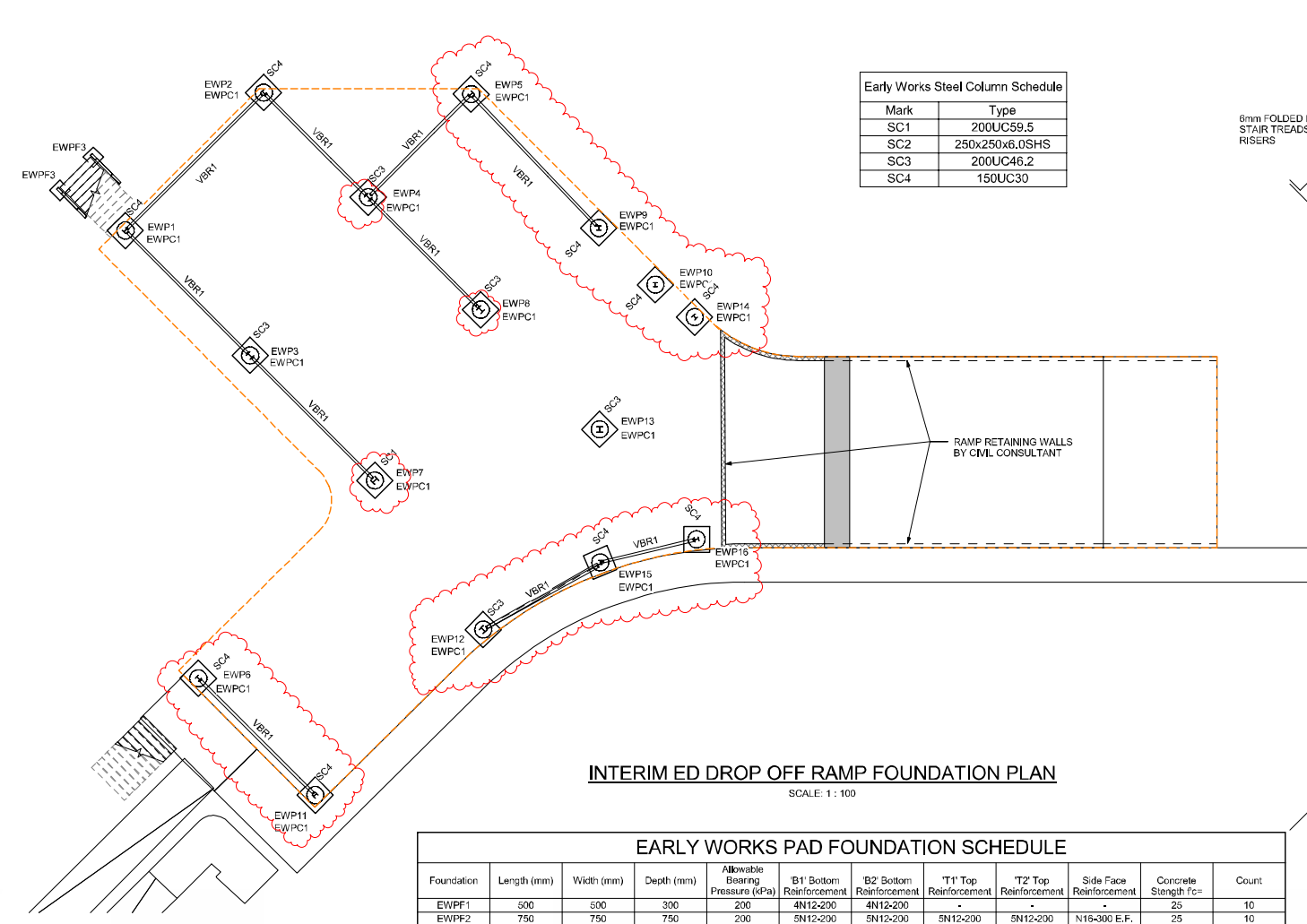
A

SCALE 1:100 @ B1

ISSUE DATE

22.01.17





PILE	PILE LOADS			EARTHQUAKE		
	SELF WEIGHT	SDL	Q	COMPRESSION	TENSION	SHEAR
	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
EW1	60	160	170	70	70	210
EW2	70	130	170	70	70	210
EW3	110	220	290	10	10	170
EW4	130	110	340	100	100	220
EW5	70	160	180	110	110	220
EW6	60	120	150	-	-	-
EW7	190	230	480	70	70	170
EW8	120	100	320	80	80	180
EW9	70	100	170	60	60	190
EW10	30	70	80	-	-	-
EW11	60	130	150	-	-	-
EW12	120	160	320	110	110	220
EW13	120	100	320	-	-	-
EW14	30	60	80	-	-	-
EW15	60	100	150	30	30	230
EW16	40	60	100	120	120	210

THE SELF WEIGHT, SUPERIMPOSED DEAD LOAD (SDL) AND LIVE LOAD (Q) NOMINATED IN THE TABLE ARE WORKING LOADS.

ALL NOMINATED LOADS ARE APPLIED AT THE HEAD OF THE PILE CAP

ALL LOAD CASE COMBINATIONS AS NOMINATED IN AS1170.0 SECTION 4 SHALL BE CONSIDERED, IN ADDITION TO THOSE NOMINATED BELOW.

ALL PILES TO BE DESIGNED FOR THE ECCENTRICITY NOMINATED IN AS2159

ALL PILES TO BE DESIGNED FOR THE MOMENT DUE TO THE MAXIMUM 75mm OUT OF POSITION ECCENTRICITY IN COMBINATION WITH 2.5% OF THE ULS COMPRESSION LOAD APPLIED AT THE HEAD OF THE PILE

ALL FOLLOWING LOAD CASES ARE TO CONSIDER THE MOMENT AND SHEAR DUE TO THE 75mm OUT OF POSITION ECCENTRICITY OF THE VERTICAL LOAD IN THAT CASE:

i) WHERE A PILE IS SUBJECT TO AN EARTHQUAKE FORCE, THE DESIGNER MUST ACCOUNT FOR THE FOLLOWING COMBINATIONS:

+0.9 SELF WEIGHT + EARTHQUAKE TENSION

+G (SELF WEIGHT + SDL) + 0.3Q + EARTHQUAKE COMPRESSION

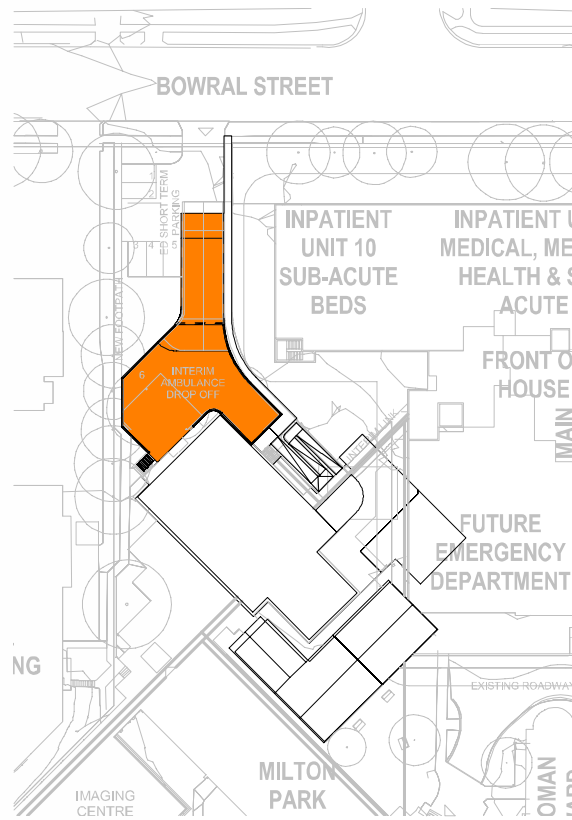
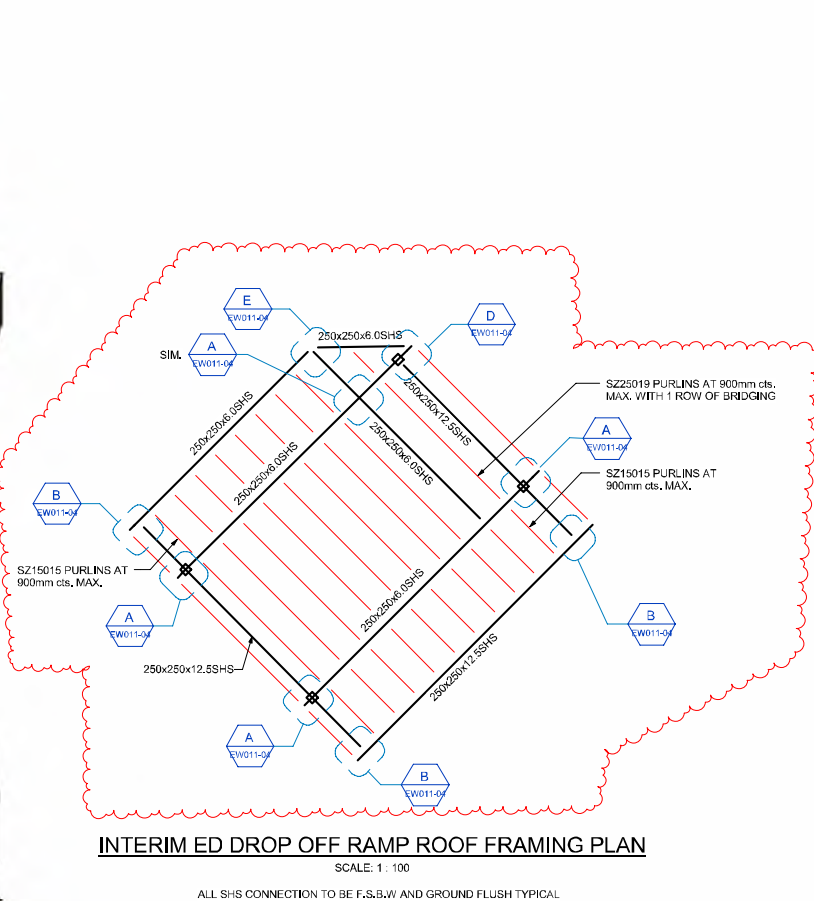
ii) WHERE A PILE IS SUBJECT TO AN EARTHQUAKE SHEAR, FOR THE CAPACITY OF THE PILE IN BENDING AND SHEAR, THE DESIGNER MUST ACCOUNT FOR THE FOLLOWING, UTILISING ONLY THE AVAILABLE PRECOMPRESSION IN THAT CASE:

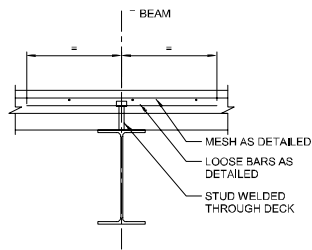
+0.9 SELF WEIGHT + EARTHQUAKE SHEAR

+0.9 SELF WEIGHT + EARTHQUAKE TENSION + EARTHQUAKE SHEAR

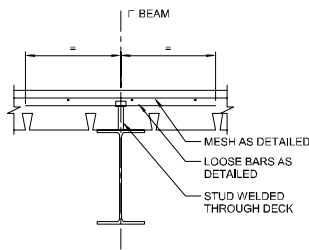
+G (SELF WEIGHT + SDL) + 0.3Q + EARTHQUAKE SHEAR

+G (SELF WEIGHT + SDL) + 0.3Q + EARTHQUAKE COMPRESSION + EARTHQUAKE SHEAR

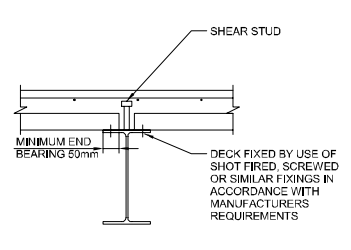




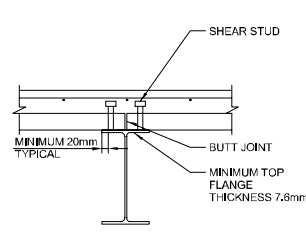
SPAN PERPENDICULAR TO  
BEAM  
SCALE 1:10



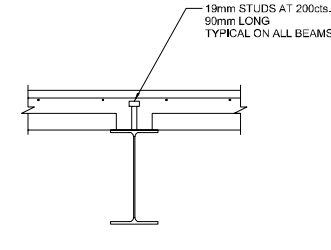
SPAN PARALLEL TO  
BEAM  
SCALE 1:10



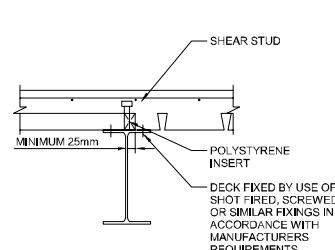
TYPICAL BUTT JOINT  
SCALE 1:10



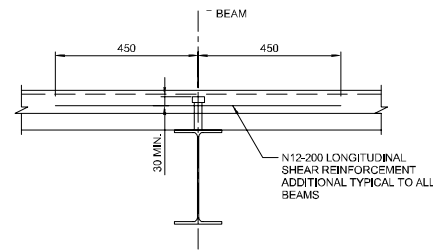
DOUBLE STUD BUTT  
JOINT  
SCALE 1:10



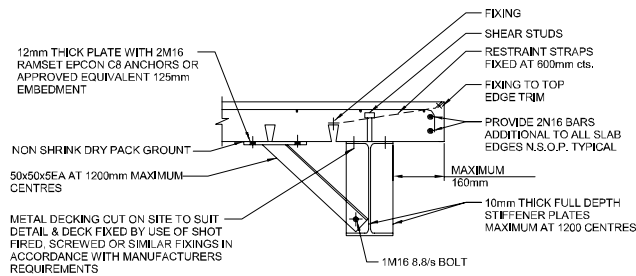
TYPICAL STUD DETAIL  
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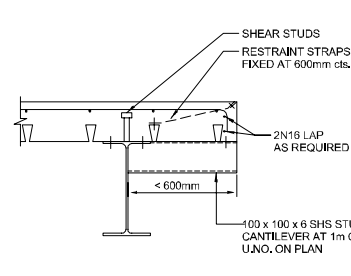
TYPICAL DECK CHANGE  
IN DIRECTION  
SCALE 1:10



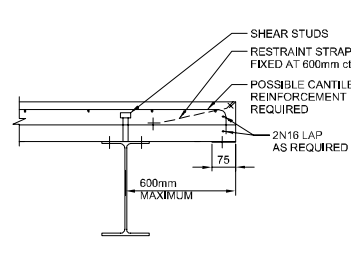
LONGITUDINAL SHEAR  
REINFORCEMENT DETAIL  
SCALE 1:10



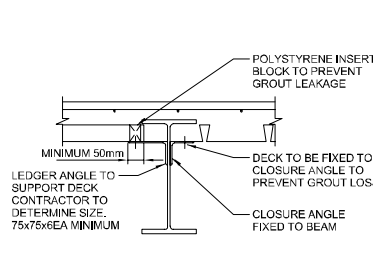
TYPICAL EDGE DETAIL  
SCALE 1:10



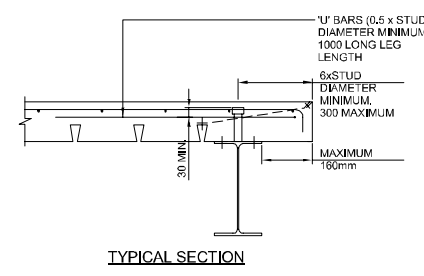
SIDE CANTILEVER WITH  
STUB BRACKET  
SCALE 1:10



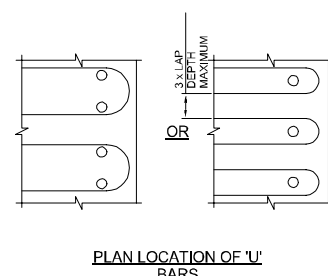
TYPICAL END  
CANTILEVER  
SCALE 1:10



TYPICAL LEDGER ANGLE  
DETAIL  
SCALE 1:10

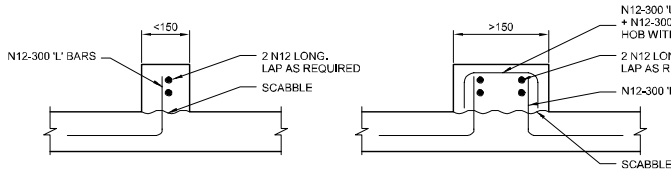


TYPICAL SECTION



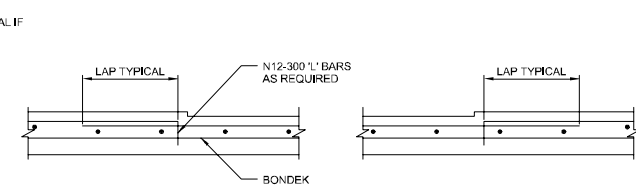
PLAN LOCATION OF 'U'  
BARS

TYPICAL ADDITIONAL 'U'  
BARS AT EDGE DETAIL  
SCALE 1:10

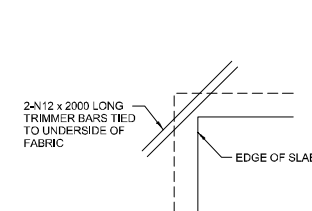


TYPICAL HOB/KERB DETAILS  
SCALE 1:10

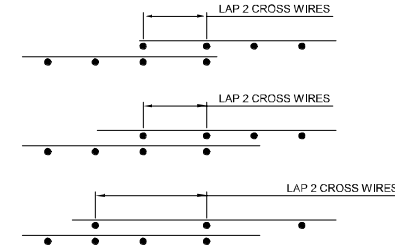
- NOTE:
1. REFER ARCHITECTS DRAWINGS FOR KERB LOCATIONS.
  2. JOINTS IN KERBS TO CORRESPOND WITH SLAB JOINT LOCATIONS.



TYPICAL WET AREA SETDOWN DETAIL  
SCALE 1:10

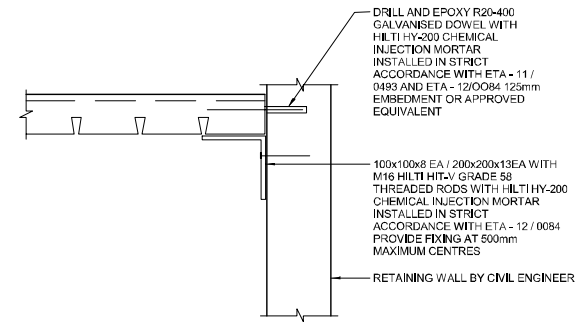


TYPICAL RE-ENTRANT  
CORNER DETAIL  
SCALE 1:10

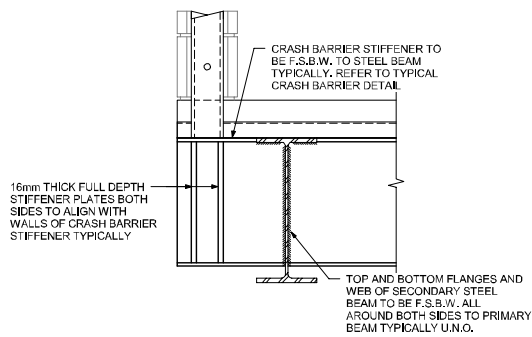


FABRIC REINFORCEMENT  
LAP DETAILS  
SCALE 1:10

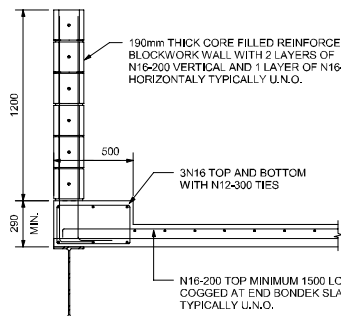
REINFORCEMENT LAP SCHEDULE FOR ALL BAR SIZES	
BAR	LAP LENGTH (mm)
N12	500
N16	850
MESH	REFER TO TYPICAL DETAIL



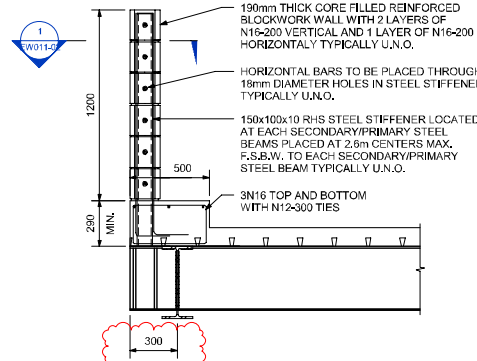
TYPICAL EDGE SUPPORT DETAIL  
FOR BONDEK SLAB AT RETAINING  
WALL  
SCALE 1:10



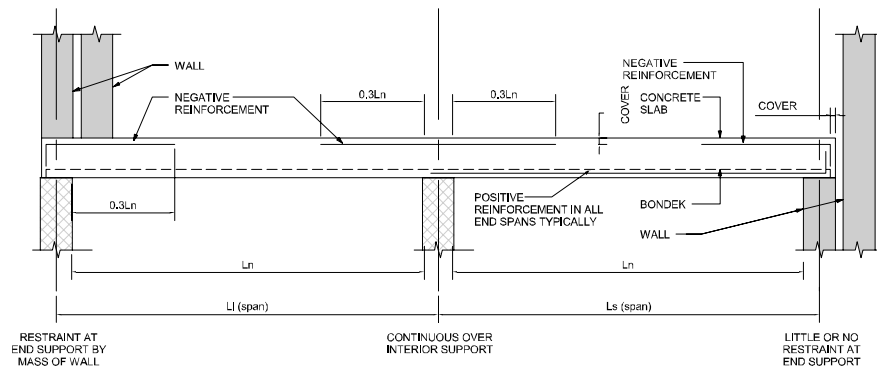
TYPICAL BLOCKWORK STIFFENER TO  
PRIMARY/SECONDARY BEAM  
SCALE: 1 : 20



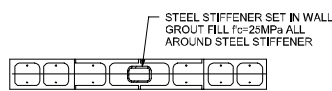
TYPICAL INTERIM ED DROP OFF CRASH  
BARRIER DETAIL (BLOCKWORK WALL BARRIER  
PERPENDICULAR TO BONDEK RIBS)  
SCALE: 1 : 20



TYPICAL INTERIM ED DROP OFF CRASH  
BARRIER DETAIL (BLOCKWORK WALL BARRIER  
PARALLEL TO BONDEK RIBS)  
SCALE: 1 : 20



TYPICAL REINFORCEMENT DETAIL  
SCALE = 1:20



SECTION 1  
1 : 20

AMENDMENTS			
ISSUE	DATE	SUBJECT	AU#
1	22-1-17	TENDER ISSUE	
2	23-1-17	TENDER ISSUE	
A	22-2-16	CONSTRUCTION ISSUE	IAU
B	24-2-16	CONSTRUCTION ISSUE	W.S.

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**NSW Health**  
Infrastructure

PROJECT MANAGER  
**TSA**  
MANAGEMENT

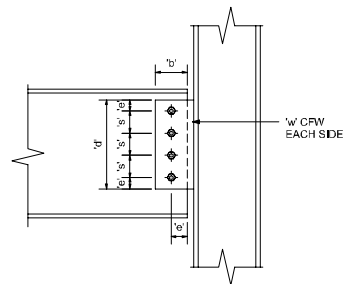
PROJECT  
**BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT**  
97-103 BOWRAL ST,  
BOWRAL NSW 2576

DRAWING NUMBER  
130443-ENS-ST-DWG-EW011-02  
DRAWING NAME  
EW INTERIM ED DROP OFF Sheet 2

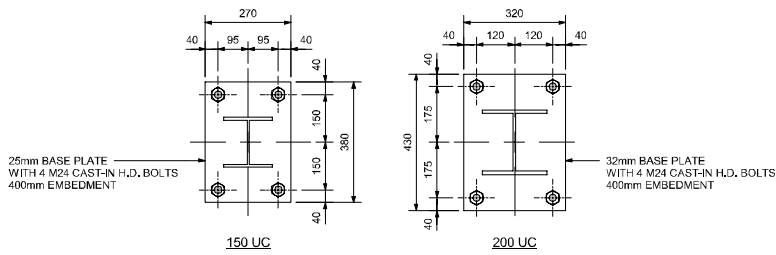
REV  
B  
N  
0m 2m 4m 6m 8m 10m  
SCALE 1:100 @ B1

ISSUE DATE  
24.04.18



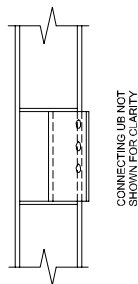


ELEVATION UC / UB COLUMNS

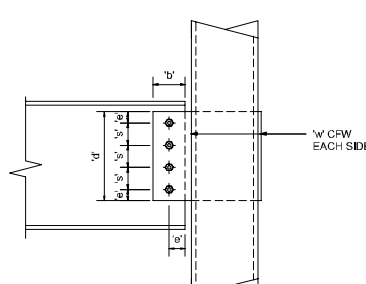


TYPICAL COLUMN BASEPLATE DETAILS

SCALE 1:10

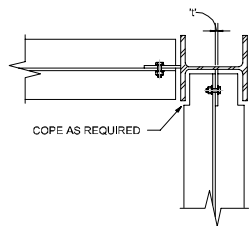


ELEVATION UC / UB COLUMNS

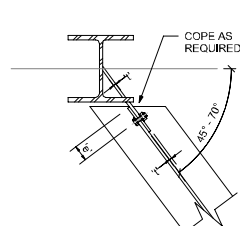


ELEVATION SHS / RHS

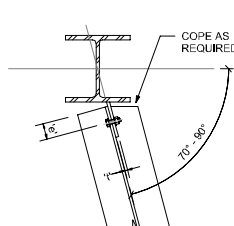
FIN PLATE							
BEAM SIZE	d (min.)	b (min.)	t	e	s	w	Grade 8.8/n,d
150 UB	110	100	10	30	50	6	2 M20
180 UB	130	100	10	35	60	6	2 M20
200 UB/PFC	140	100	10	35	70	6	2 M20
250 UB	140	100	10	35	70	6	2 M20
310 UB	210	100	10	35	70	6	3 M20
360 UB	280	100	10	35	70	6	4 M20
410 UB	280	100	12	35	70	6	4 M20
460 UB	350	100	12	35	70	6	5 M20
530 UB	430	100	12	40	70	6	6 M24
610 UB	500	100	12	40	70	8	7 M24



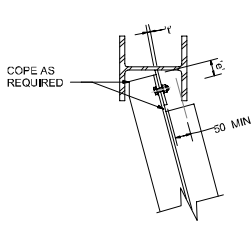
PLAN UC / UB COLUMNS



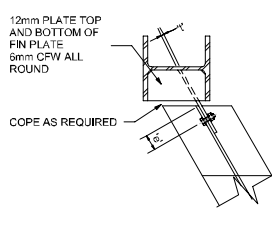
PLAN UC / UB COLUMNS



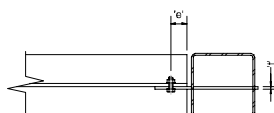
PLAN UC / UB COLUMNS



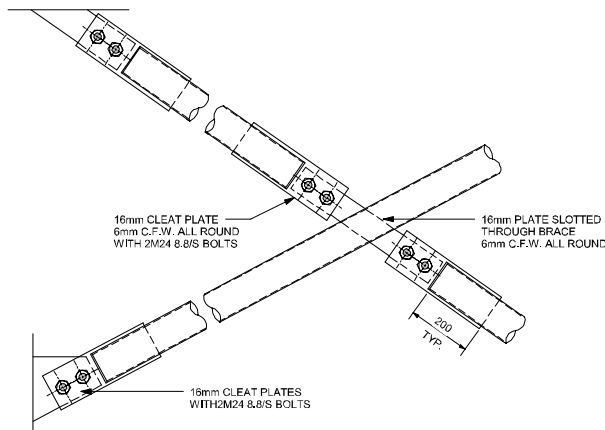
PLAN UC / UB COLUMNS



PLAN UC / UB COLUMNS

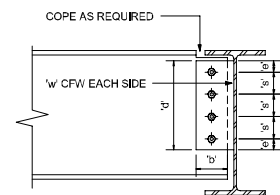


PLAN SHS / RHS

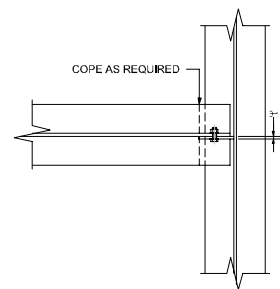


TYPICAL CHS BRACING CONNECTION DETAILS

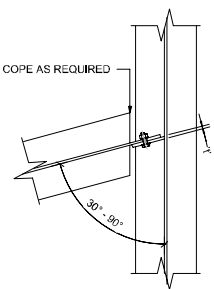
SCALE 1:10



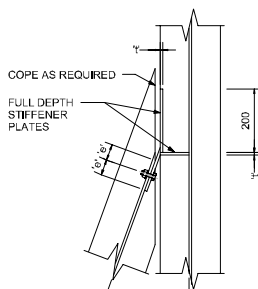
ELEVATION



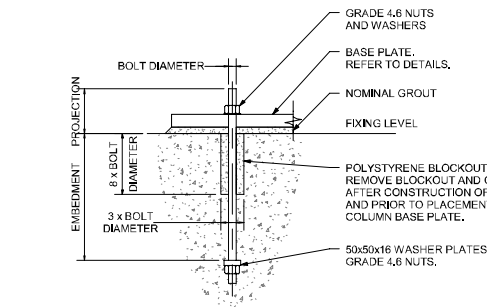
PLAN



PLAN



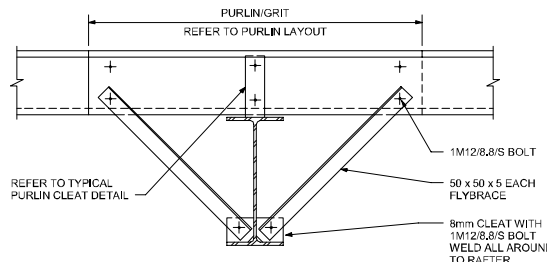
PLAN



TYPICAL GRADE 4.6. CAST-IN H.D. BOLT DETAIL

NOTE: CONTRACTOR TO SURVEY EACH BOLT PRIOR TO AND IMMEDIATELY FOLLOWING PLACEMENT OF CONCRETE TO ENSURE BOLT SETOUT ACCURACY.

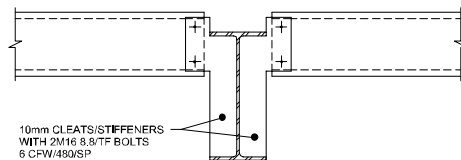
BOLT DIAMETER	EMBEDMENT	PROJECTION
16	250	120
20	300	130
24	400	140
30	500	160



TYPICAL FLY BRACE (FB) DETAIL

SCALE = 1:10

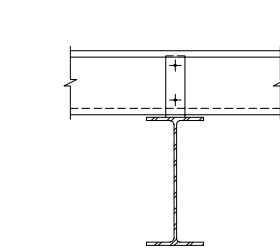
NOTE: PURLIN LAP TO BE MINIMUM 15% OF THE GREATER ADJACENT PURLIN SPANS



PURLIN CONNECTION DETAIL BETWEEN BEAMS (TYPICAL)

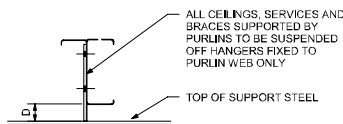
SCALE = 1:10

WHEN PURLINS ARE WITHIN DEPTH OF BEAMS



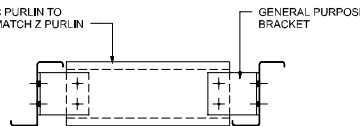
PURLIN CONNECTION DETAIL (TYPICAL)

SCALE = 1:10



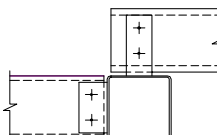
PURLINS SUPPORT SCHEDULE		
DISTANCE (D)	SUPPORT	BOLTS
LESS THAN 60	75 x 8 CLEAT PL 8 CFW	2M12 4.6/S
60 TO 100	75 x 10 CLEAT PL 8 CFW	2M12 4.6/S
100 TO 150	75 x 12 CLEAT PL 10 CFW	2M12 4.6/S
150 TO 300	75 x 75 x 8 EA. 8 CFW	2M12 4.6/S

TYPICAL PURLIN AND GIRT CLEAT DETAIL



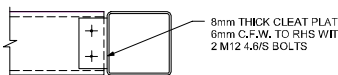
Z PURLIN PENETRATION TRIMMING DETAIL

SCALE = 1:10



TYPICAL GIRT TO COLUMN FIXING DETAIL

SCALE = 1:10

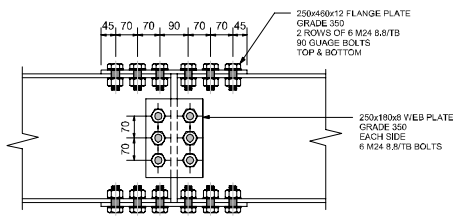


PURLIN TO RHS CONNECTION DETAIL

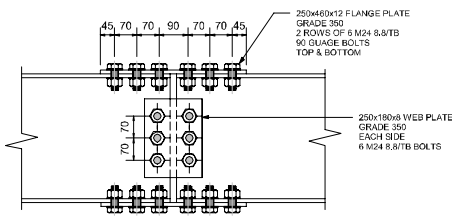
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TYPICAL BEAM TO BEAM FIN PLATE CONNECTION DETAIL

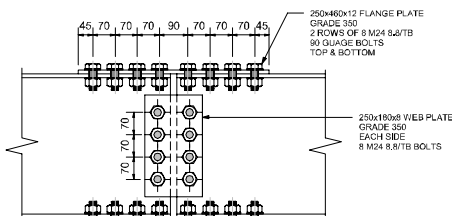
SCALE 1:10



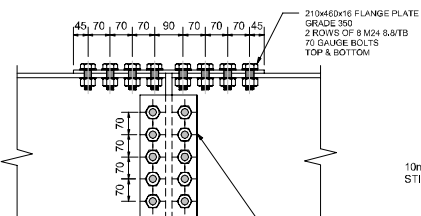
SMALLER SPLICE  
NOTE: REFER TO PLAN FOR LOCATIONS



410UB SPLICE  
NOTE: REFER TO PLAN FOR LOCATIONS



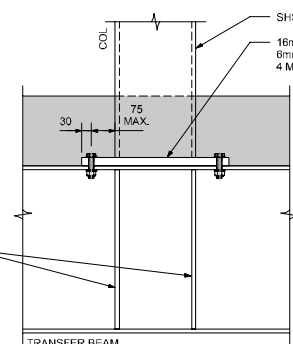
460UB SPLICE  
NOTE: REFER TO PLAN FOR LOCATIONS



530 UB SPLICE

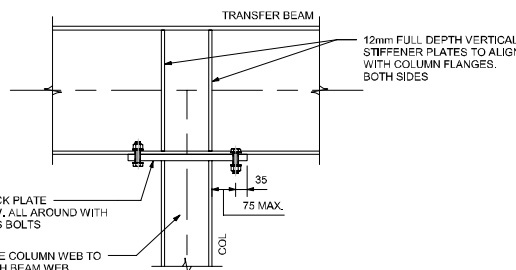
TYPICAL BEAM SPLICE CONNECTION DETAIL

SCALE 1:10



TYPICAL TRANSFER COLUMN ON BEAM STIFFENER PLATES DETAIL

SCALE 1:10



TYPICAL CONTINUOUS BEAM AT COLUMN DETAIL

SCALE 1:10

DETAIL F EW011-07

AMENDMENTS			
NO.	DATE	SUBJECT	BY
1	20.10.17	PROPOSED	EN
2	21.11.17	PROPOSED	EN
3	22.11.17	PROPOSED	EN

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http://www.enstruct.com.au

CLIENT



PROJECT MANAGER



PROJECT

**BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT**

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BOWRAL NSW 2576

DRAWING NUMBER

130443-ENS-ST-DWG-EW011-03

DRAWING NAME

EW INTERIM ED DROP OFF Sheet 3

REV

A



0m 2m 4m 6m 8m 10m  
SCALE 1:100 @ B1

ISSUE DATE

22.01.17

