SECTION 6

FOUNDATIONS
6 FOUNDATIONS

6.1 GENERAL

Various types of foundation elements are used in bridge construction and these include:

(a) Piles framed to headstock - several types
(b) Pile/Pile cap combination
(c) Spread Footings
(d) Rock Anchors - commonly used in conjunction with footings

Drawings shall contain a layout plan to enable the correct setting out of foundation elements and appropriate notes (conforming to AS5100 - Bridge Design and RTA Technical Specifications) shall also be included.

6.2 PILING

6.2.1 Precast Reinforced Concrete Driven Piles

For designs prepared by the Authority's Bridge Engineering Section or Consultants that prepare drawings for the Authority or for bridges that will become property of the Authority, RTA Standard Bridge Drawing Numbers RTAB002A and RTAB002B (Reinforced Concrete Pile Design Information, Sheets A and B) are provided for use when preparing drawings for either of the two standard precast reinforced concrete pile designs (Normal Driving Conditions and Hard Driving Conditions). RTA Standard Bridge Drawing Number RTAB003 shall be used for pile drawings where normal driving conditions are known to exist, whilst RTA Standard Bridge Drawing Number RTAB004 shall be used for pile drawings where hard driving conditions are known to exist. Missing information, such as schedule values, dimensions, bar sizes and values in notes shall be completed using tables and details as shown on RTA Standard Bridge Drawing Number RTAB002A, however, sketches provided by the engineer responsible for the design, may show some variations which will need to be included on the drawing.

A separate drawing shall be prepared, in each case, to provide details of the pile layout for the structure. This drawing shall clearly show the location of the test piles and representative piles. (See Clause 7 of RTA Specification B50).

Where piles exceed 20 metres in length, the details provided in RTA Standard Drawing No RTAB048 (Epoxy Splice for Precast Concrete Piles) should be included on the pile drawings.

Where piles are required to be spliced, the minimum depth below ground level to the splice shall be clearly shown on the drawings. The minimum depth shall be not less than 5 metres below the existing surface level or the design surface level, whichever is the lower.

See RTA Standard Drawing Nos RTAB003 AND RTAB004 for the typical level of detailing required for these types of piles.

6.2.2 Prestressed Reinforced Concrete Driven Piles

For designs prepared by the Authority's Bridge Engineering Section or Consultants that prepare drawings for the Authority or for bridges that will become property of the Authority, RTA Standard Bridge Drawing Numbers RTAB0025 and RTAB0026 (Prestressed Concrete Pile Design Information, Sheets A and B) are provided for use when preparing drawings for either of the two standard prestressed reinforced concrete pile designs.
(Normal Driving Conditions and Hard Driving Conditions). RTA Standard Bridge Drawing Number RTAB027 (Prestressed Concrete Pile – Normal Driving Conditions) shall be used for pile drawings where normal driving conditions are known to exist, whilst RTA Standard Bridge Drawing Number RTAB028 (Prestressed Concrete Pile – Hard Driving Conditions) shall be used for pile drawings where hard driving conditions are known to exist.

Missing information, such as schedule values, dimensions, bar sizes and values in notes shall be completed using tables and details as shown on RTA Standard Bridge Drawing Number RTAB0025, however, sketches provided by the engineer responsible for the design, may show some variations which will need to be included on the drawing.

A separate drawing shall be prepared, in each case, to provide details of the pile layout for the structure. This drawing shall clearly show the location of the test piles and representative piles.

Where piles exceed 20 metres in length, the details provided in RTA Standard Drawing No RTAB048 (Epoxy Splice for Precast Concrete Piles) should be included on the pile drawings.

Where piles are required to be spliced, the minimum depth below ground level to the splice shall be clearly shown on the drawings. The minimum depth shall be not less than 5 metres below the existing surface level or the design surface level, whichever is the lower.

See RTA Standard Bridge Drawing Nos RTAB027 and RTAB028) for the typical level of detailing required for these types of piles.

6.2.3 Cast-in-Place Reinforced Concrete Piles

No standard drawing is available for this type of pile however the drawing format for this type of pile is relatively standard.

Piles may have no casing requirements, or casing requirements (temporary or permanent), as dictated by geotechnical information and / or the design engineer’s requirements.

Provision of temporary steel casing is quite often a decision which is made by the contractor.

Drawings shall contain the following essential information:

• Pile layout plan in accordance with Clause 5.5 of this Manual.
• Elevation of pile showing Top RL and Contract Level, or Estimated Foundation Level, as appropriate, at toe.
• Indication of soffit level of pile cap or headstock. Piles are normally embedded 50mm into abutment beams or pile caps.
• Anchorage length of reinforcement into pile cap or headstock.
• Socket length of pile into rock, including the rock type and classification.
• Pile casing if required (shown in section with an appropriate note stating "Casing shown in section ").
• Elevation of raked pile (if required) showing all of the above information.
• Pile cross section showing spacing of main reinforcement.
Note: Where bars are closely spaced, care shall be taken to ensure that bars in the pile cap or headstock can pass between the exposed pile reinforcement. A sketch showing orientation of bars may be advantageous.

- Details of any required casing splice (in accordance with RTA Standard Bridge Drawing No RTAB039).
- Details of pile driving shoe (in accordance with Chief Bridge Engineer Circular No 91/6).
- Pile schedule (showing pile numbers, Top RL, Contract Level at toe, pile lengths and bar marks where numerous pile lengths are involved).
- Development and splice lengths for reinforcement given in Section 23 of this Manual are dependant on the specified minimum clear spacing between reinforcing bars. Development and splice lengths of closely spaced reinforcing bars may need to be determined from the formula 13.1.2.1(1) given in Clause 13.1.2.1 of AS 5100.5.
- For those Cast-in-Place reinforced concrete piles that rely on the support of the soil above the rock socket for lateral loads, minimum pile embedment below the existing or new surface level, whichever is the lower, must be specified in addition to the rock socket requirements.
- Reinforced concrete piles that support single column extensions must have a diameter greater that the diameter of the column above to account for construction tolerances when installing the piles. The outside faces of the column extensions must be located within the outside faces/perimeter of the supporting piles. The diameters of the supporting piles must be at least 200mm greater than the diameter of the column extensions. The construction joint between the tops of the supporting piles and the bottoms of the column extensions must be located at least 500mm below the constructed ground level at columns on land, below the NWL for non-tidal watercourses or below the MLWSL for tidal watercourses.

Figure 6.2.3 shows the typical level of detailing required for this type of pile.

6.2.4 Tubular Steel Driven Piles

No standard drawing has been developed for this type of pile drawing so each drawing for this type of pile shall be detailed in accordance with sketches provided by the engineer responsible for the design.

Generally these piles shall be detailed as for steel cased Cast-In-Place Reinforced Concrete piles with the differences being:

- no socket into rock shown although small embedment of the toe of the steel pile into soft rock may sometimes be specified by the designer
- generally, only the top section of the pile is of reinforced concrete whilst the bottom section is of earth plug or granular material.
- notes shall include driving details.

6.2.5 H Section Steel Driven Piles
'H' piles may be used with or without the top encased in reinforced concrete. Generally the encased section shall be that which is exposed to the air, water or aggressive soils. The cover to reinforcement shall be in accordance with AS 5100 - Bridge Design and RTA Technical Specifications.

Essential information:

- Pile layout plan in accordance with Clause 5.5 of this Manual
- Elevation of pile showing Top RL and Contract Level or Estimated Foundation Level, as appropriate, at toe
- Indication of soffit level of pile cap or headstock
- Concrete encasement (if applicable) together with reinforcement and protection of the concrete encasement against aggressive soil, if required, should also be shown
- Pile cross section in the encased section, if applicable
- Elevation of raked pile (if required) showing all of the above information
- Table of levels and lengths
- Splice detail (if applicable)
- Minimum pile embedment below the existing or new surface, whichever is the lower, must be specified
- The length of pile penetration into the pile cap must be specified

When using these piles care shall be taken when arranging reinforcing bars in pile caps and headstocks to ensure that the reinforcement does not clash with the designed pile location.

Figure 6.2.5 shows the typical level of detailing required for this type of pile.

### 6.3 PILE / PILE CAP COMBINATIONS

Where piles are used in conjunction with pile caps, the relevant section of Clause 6.2 and Clause 6.4 of this Manual shall be complied with

ie the detailing required for piles shall be as outlined in the relevant clause and Pile caps shall be detailed in accordance with the requirements for Spread Footings.

Figure 6.3 shows the typical level of detailing required for pile/pile cap combinations.

### 6.4 SPREAD FOOTINGS

Generally spread footings are detailed on pier or abutment drawings, however the location of any spread footing shall be shown on the foundation layout.

Essential information:

- Layout plan in accordance with Clause 5.6 and Figure 5.6 of this Manual showing dimensions
- Elevation of spread footing showing Contract Level or Estimated Foundation Level, as appropriate and top RL
• Mass concrete

• The position of the construction joint in the column above top of spread footing

• The location of starter bars for splicing with main column reinforcement. Clause 13.2.3 in Section 5 of AS5100 - Bridge Design, states that not more than 50% of the total area of tensile reinforcement shall be spliced at any one section. Where starter bars are provided to facilitate splicing of main vertical reinforcement, they shall be detailed with two vertical leg lengths, necessitating the use of two bar marks. Starter bars shall be placed alternately around the column base to facilitate splicing with main reinforcement ensuring that the main reinforcement fits within the shear reinforcement. Particular care shall be exercised to provide required clearances when using large diameter reinforcement at close spacing.

Development and splice lengths for reinforcement given in Section 23 of this Manual are dependant on the specified minimum clear spacing between reinforcing bars. Development and splice lengths of closely spaced reinforcing bars may need to be determined from the formula 13.1.2.1(1) given in Clause 13.1.2.1 of AS 5100.5.

Figures 6.4.1(a), 6.4.1(b) and 6.4.1(c) show the typical level of detailing required for spread footings.

6.5 ROCK ANCHORS

The location of rock anchors should generally be shown in the Foundation Layout. Where rock anchors are used to tie back walls and abutments, locations shall be shown on an elevation and any other views necessary to clearly show angles, etc.

Essential information:
• The location of test anchors

• An Elevation showing: Anchorage and anchorage recess

Bonded length (for primary grouting)
Free length (for secondary grouting)
Depth of drilled holes ie 500 below end of anchor
Bore hole diameter and length
Sheathing and extent of sheathing

• A cross section showing: Location and size of pipe through pile or footing

• Rock Anchor Notes as per Figure 6.5 modified to suit the actual case

• Proprietary names shall not be shown.
## GENERAL NOTES

**SCALE**

0.500 = 1.000 AS SHOWN.

Concrete Exposure Classification: B1

 Minimum 28 Day Compressive Strength of Concrete shall be 40MPa.

 Minimum Lap Length Required for DIA 28 Bars shall be 700mm.

 Minimum Lap Length for Ø10 Spiral Reinforcement shall be 320mm.

 Laps on adjacent bars not shown on the drawings shall be staggered (offset) by the length of the lap.

 Nominal Cover to Reinforcement shall be 75mm if no dimension shown.

 Pile Contract Levels (RL 'B') and Rock Socket Lengths ('Ls') are based on minimum properties of founding material ('BP' and 'SA') as given in Table 2. Contract Levels shall be lowered where the minimum Rock Socket Length and/or minimum founding material properties are not achieved. Contract Levels may be raised where the minimum Rock Socket Length and founding material properties are achieved at a higher level.

 'BP' denotes minimum allowable base bearing capacity (kPa).

 'SA' denotes minimum allowable shaft adhesion (kPa).

 'Ls' denotes socket length.

 Rock classification is based on SAA Site Investigation Code AS 1726.

FIGURE 6.2.3

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<th>DESIGN BENDING MOMENT PER PILE (kN.m)</th>
<th>MIN PROPERTIES OF ROCK SOCKET (kPa)</th>
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## PILES

ROADS AND TRAFFIC AUTHORITY OF NSW

BRIDGE OVER YASS RIVER

AT 4.6KM SOUTH OF YASS

PREPARED BY BRIDGE ENGINEERING

110 GEORGE STREET

PARRAMATTA NSW 2150

PHONE (02) 8837-0802

FACSIMILE (02) 8837-0055

CLIENT

XXX

XXX

XXX

PHONE (02)

FACSIMILE (02)

REGISTRATION No OF PLANS

0002 246 BC 1002

DRAWING No PH 0243

ISSUE STATUS:

RTA BRIDGE NUMBER 0002 246 BC 1002

NOTE:

This drawing is confidential and shall only be used for the purpose of the nominated project.

Issued

Highway No 2

Shire of Yass

Bridge Over Yass River

At 4.6km South of Yass

Prepared by

Bridge Engineering

110 George Street

Parramatta NSW 2150

Phone (02) 8837-0802

Facsimile (02) 8837-0055

Client

XXX

XXX

XXX

Phone (02)

Facsimile (02)

Registration No of Plans

0002 246 BC 1002

Drawing No PH 0243

Issue Status:

RTA Bridge Number 0002 246 BC 1002

Note:

This drawing is confidential and shall only be used for the purpose of the nominated project.
SURFACES IN CONTACT WITH ABUTMENT CONCRETE SHALL NOT BE EPOXY COATED.

PILES 1 TO 7 AND 20 TO 25.

PREBORING MAY BE REQUIRED FOR PILES TO REACH CONTRACT LEVEL. PREBORING PILES SHALL BE DRIVEN TO REFUSAL ON SOUND SANDSTONE OR SILTSTONE.

WELDING SYMBOLS ARE TO AS 1101 PART 3.

TO EXISTING SURFACE LEVEL THROUGH EMBANKMENT FILL IS REQUIRED FOR SURFACES OF STEEL PILES Nos 1 TO 7 AND 20 TO 26 SHALL BE ABRASIVE COATS OF COAL TAR EPOXY PAINT SHALL BE APPLIED TO SURFACES IN DIRECT CONTACT WITH EARTH PROVIDING A MINIMUM DRY FILM THICKNESS.

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40MPa.

CONCRETE EXPOSURE CLASSIFICATION: B2

TABLE I

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GENERAL NOTES

CONCRETE EXPOSURE CLASSIFICATION: B2

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40MPa.

CONCRETE EXPOSURE CLASSIFICATION: B2

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40MPa.

Elevations

FROM SYDNEY TO NEWCASTLE

PILE LAYOUT

PILE POSITIONS ARE GIVEN AT THE SOFFIT LEVEL OF PIER PILE CAPS AND AT UNDERSIDE OF ABUTMENT HEADSTOCKS.

VERTICAL PILE

PILE Nos 1 - 3 AND 20 - 25

FOR VALUES 'A','B' AND 'L' SEE TABLE I

RAKED PILE

PILE Nos 4 - 7 AND 20 - 23

FOR VALUES 'A','B' AND 'L' SEE TABLE I

VERTICAL PILE

PILE Nos 8, 11 AND 19 - 20

FOR VALUES 'A','B' AND 'L' SEE TABLE I

RAKED PILE

PILE Nos 8 - 11 AND 14 - 17

FOR VALUES 'A','B' AND 'L' SEE TABLE I

PILE Nos 4 - 7 AND 20 - 23

FOR VALUES 'A','B' AND 'L' SEE TABLE I

Figure 6.2.6

TABLE I

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</tbody>
</table>
GENERAL NOTES

NCF DENOTES NO CHAMFER OR FILLET UNLESS SPECIFIED OTHERWISE.

CONCRETE EXPOSURE CLASSIFICATION: B1

SCALE OR AS SHOWN.

EDGES SHALL BE CHAMFERED 20 x 20 AND RE-ENTRANT ANGLES FILLETED 20 x 20

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FIGURE 6.3.1
PIERS - CONCRETE

Lc OF PILE CAP COLUMN AND HEADSTOCK

COLUMN AND HEADSTOCK

SECTION

CONTROL LINE

TABLE I

FOR CHAINAGES AND VALUE OF "X" - SEE TABLE I

PIER A

Bearing 50' 29 40"
CONTRACT LEVEL OF FOOTINGS SHALL NOT BE RAISED ABOVE RL 19.000 ROCK CLASSIFICATION IS BASED ON SAA SITE INVESTIGATION CODE AS 1726. SEE SPECIFICATION.

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40.0 MPa. CONCRETE EXPOSURE CLASSIFICATION: B1

CONTRACT LEVEL MAY BE LOWERED 600mm MAX WITHOUT CHANGING THE CONCRETE.

THE CALCULATED MAXIMUM FOUNDATION PRESSURE IS 2000kPa.

SCALE OR AS SHOWN.

GENERAL NOTES

CONCRETE EXPOSURE CLASSIFICATION B1: MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40.0 MPa. EDGES SHALL BE CHAMFERED 20x20 AND RE-ENTRANT ANGLES FILLETED 20x20 UNLESS SPECIFIED OTHERWISE. NCF DENOTES NO CHAMFER OR FILLET. THE PLACING OF CONCRETE IN THE COLUMNS SHALL BE CARRIED OUT IN ONE CONTINUOUS OPERATION UNLESS SPECIFIED OTHERWISE. CONTRACT LEVEL MAY BE LOWERED 600MM MAX WITHOUT CHANGING THE CONCRETE SECTION. CONTRACT LEVEL OF FOOTINGS SHALL NOT BE RAISED ABOVE RL 19.000.

THE CALCULATED MAXIMUM FOUNDATION PRESSURE IS 2000kPa. THE ROCK CLASSIFICATION IS BASED ON SAA SITE INVESTIGATION CODE AS 1726. SEE SPECIFICATION.
EDGES SHALL BE CHAMFERED 20x20 AND RE-ENTRANT ANGLES FILLETED 20x20 UNLESS SPECIFIED OTHERWISE.

NCF DENOTES NO CHAMFER OR FILLET.

THE PLACING OF CONCRETE IN THE COLUMNS SHALL BE CARRIED OUT IN ONE CONTINUOUS OPERATION UNLESS SPECIFIED OTHERWISE.

SECTION.

CONTRACT LEVEL OF FOOTINGS SHALL NOT BE RAISED ABOVE RL 19.000.

ROCK CLASSIFICATION IS BASED ON SAA SITE INVESTIGATION CODE AS 1726. SEE SPECIFICATION.

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40.0 MPa.

CONCRETE EXPOSURE CLASSIFICATION: B1

CONTRACT LEVEL MAY BE LOWERED 600mm MAX WITHOUT CHANGING THE CONCRETE.

THE CALCULATED MAXIMUM FOUNDATION PRESSURE IS 2000kPa.

SCALE OR AS SHOWN.

GENERAL NOTES

CONCRETE EXPOSURE CLASSIFICATION B1

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 40.0 MPa.

EDGES SHALL BE CHAMFERED 20x20 AND RE-ENTRANT ANGLES FILLETED 20x20 UNLESS SPECIFIED OTHERWISE.

NCF DENOTES NO CHAMFER OR FILLET.

THE PLACING OF CONCRETE IN THE COLUMNS SHALL BE CARRIED OUT IN ONE CONTINUOUS OPERATION UNLESS SPECIFIED OTHERWISE.

CONTRACT LEVEL MAY BE LOWERED 600mm MAX WITHOUT CHANGING THE CONCRETE SECTION.

CONTRACT LEVEL OF FOOTINGS SHALL NOT BE RAISED ABOVE RL 19.000.

THE CALCULATED MAXIMUM FOUNDATION PRESSURE IS 2000kPa.

ROCK CLASSIFICATION IS BASED ON SAA SITE INVESTIGATION CODE AS 1726. SEE SPECIFICATION.

FIGURE 6.4.1(a)
HORIZONTAL TIES SHALL BE PROVIDED, UPON LOWERING OF THE FOOTINGS, AT A SPACING NOT EXCEEDING THAT SHOWN.

UNLESS OTHERWISE SPECIFIED, THE MINIMUM DEVELOPMENT LENGTHS AND LENGTHS OF LAPS SHALL BE AS FOLLOWS:

DENOTES VARIABLE LENGTH BAR.

BAR SIZE:

HORIZONTAL BARS WITH >300mm OF CONCRETE CAST BELOW THE BAR:

OTHER BARS:

a)...

b)...

NOMINAL COVER TO REINFORCEMENT SHALL BE 40 mm IF CONCRETE IS CAST AGAINST FORMWORK AND 70 mm IF CAST AGAINST THE GROUND.

UNLESS SHOWN OTHERWISE ON THE DRAWING, LAPS ON ADJACENT BARS ON ANY FACE SHALL BE STAGGERED (OFFSET) BY NO LESS THAN THE LAP LENGTH.

THE FOOTINGS MAY BE LOWERED 600mm MAX WITH THE LENGTHS OF THE VERTICAL REINFORCEMENT BEING ADJUSTED ACCORDINGLY. ADDITIONAL GROUPS OF REINFORCEMENT IN THE HEADSTOCK MAY BE DISPLACED SLIGHTLY TO AVOID COLUMN REINFORCEMENT WHERE NECESSARY.

GENERAL NOTES

SCALE

0

500

1000

1500mm

13 EQUAL SPACES AT 130 APPROX

120 COVER TYP

SECTION 1

13 EQUAL SPACES AT 130 APPROX

FIGURE 6.4.1(c)

ROADS AND TRAFFIC AUTHORITY OF NSW

CLIENT

ISSUE STATUS:

RTA BRIDGE NUMBER

PIER REINFORCEMENT - SHEET A

PREPARED

CHECKED

REGISTRATION NO OF PLANS

DESIGN

DRAWING

SHEET NO

ISSUE

DATE

REVISION

PREP

AUTH

MANAGER, BRIDGE DESIGN PROJECTS

ROADS AND TRAFFIC AUTHORITY OF NSW

THIS DRAWING IS CONFIDENTIAL AND SHALL ONLY BE USED FOR THE PURPOSE OF THE NOMINATED PROJECT

PIER REINFORCEMENT - SHEET A

PLAN OF FOOTING

COLUMN STARTER BARS L-1P AND L-1P NOT DETAILLED LL-1P AND LL-1P BARS SHALL BE PLACED NEAREST TO RESPECTIVE CONCRETE SURFACES

SHOWN ONLY - TO ILLUSTRATE THE CORRECT PLACEMENT OF STARTER BARS

DENOTES COVER DIMENSION PROVIDED FOR CONCRETE CAST AGAINST GROUND

36-L-1P

36-L-2P

15 EQUAL SPACES AT 100 = 1700

20-LL-3P

20-LL-4P

30-36-L-1P SPACED AS SHOWN IN SECTION

36-L-1P AND 20-LL-1P

1100

300 TYP

125

TYP

125

TYP

4 BUNDLES OF 1-20-S-1P-EF-250 AND 3-20-L-1P-250

14-28-LL-2P-FF-250 AND 14-20-LL-3P-NF-250

18-32-LL-1P-FF-250 AND 18-20-LL-4P-NF-250

20-A-1P

20-S-1P

20-A-1P

20-S-1P

20-LL-1P

20-LL-4P

28-LL-2P

30-36-L-2P SPACED AS SHOWN IN SECTION

36-L-1P

36-L-2P

36-L-1P

36-L-2P

36-L-1P

36-L-2P

36-L-1P

36-L-2P

36-L-1P TYP

36-L-2P

36-L-1P TYP

36-L-2P
GENERAL NOTES

MINIMUM COMPRESSION STRENGTH OF CONCRETE AT TRANSFER OF
PRESTRESS SHALL BE ...MPa.

EACH ROCK ANCHOR SHALL BE COMPRISED OF .../15.2mm DIApeter
SUPER GRADE STRESS RELIEVED, LOW RELAXATION STRANDS TO AS 1311
WITH A MINIMUM BREAKING LOAD OF ...kN.

THE DESIGN WORKING LOAD (TD) OF EACH ANCHOR SHALL BE ....kN.

AT LEAST ... ANCHORS SHALL BE ASSESSED DURING STRESSING BY PROVING TEST
AND ... ANCHORS SHALL BE ASSESSED DURING STRESSING BY SUITABILITY TEST.

THE REMAINING ANCHORS SHALL BE ASSESSED BY ACCEPTANCE TEST.

ANCHORS TO BE ASSESSED BY PROVING TEST SHALL PRECED THE STRESSING
OF ALL OTHER ANCHORS.

ROCK ANCHOR RECESSES SHALL BE FILLED WITH ...MPa CONCRETE AT THE
CONCLUSION OF STRESSING OPERATIONS.

FIGURE 6.5

TYPICAL SECTION

DUCT I.D. TO
SUIT ROCK ANCHOR
FOOTING, I.D. TO SUIT MINIMUM
HOLE DIMENSION FOR ROCK ANCHOR

RECESS DEPTH TO
SUITEANCHORAGE

LIVE END ANCHORAGE FOR
2/15.2mm STRAND ROCK ANCHOR

VOID FORMER THROUGH
ROCK ANCHOR TO SUIT MINIMUM
HOLE DIMENSION FOR ROCK ANCHOR

ROCK ANCHORS

300

80

150

L

c

2/15.2mm STRAND ROCK ANCHOR RECESS DEPTH TO
SUIT ANCHORAGE VOID FORMER THROUGH
ROCK ANCHOR TO SUIT MINIMUM
HOLE DIMENSION FOR ROCK ANCHOR

ROCK ANCHORS

300

80

150

L

c

2/15.2mm STRAND ROCK ANCHOR RECESS DEPTH TO
SUIT ANCHORAGE VOID FORMER THROUGH
ROCK ANCHOR TO SUIT MINIMUM
HOLE DIMENSION FOR ROCK ANCHOR

ROCK ANCHORS