

# Main Roads Specification

## **MRS63A**

### **Piles for Ancillary Structures**

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# Table of Contents

	Page
1 INTRODUCTION.....	1
2 MEASUREMENT OF WORK.....	1
2.1 Standard Work Items .....	1
2.2 Work Operations .....	1
2.3 Calculation of Quantities.....	3
2.3.1 Natural Ground Surface Level .....	3
2.3.2 Supply of Liners .....	3
2.3.3 Sinking or Driving of Liners.....	3
2.4 Excavation.....	3
2.4.1 General .....	3
2.4.2 Excavation of Liners .....	3
2.4.3 Excavation Below Toe of Liner .....	3
2.5 Drilling of Test Holes .....	4
2.6 Concrete.....	4
2.7 Steel Reinforcing Bars .....	4



# Piles for High Moment Low Axial Load Applications

## 1 INTRODUCTION

This specification applies to the construction of cast-in-place, reinforced concrete piles contained in open-ended liners left permanently in place extending to competent rock. For high moment and low axial loads (for example, sign gantries).

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

This Specification forms part of the Main Roads Standard Specifications and Technical Standards Manual.

## 2 MEASUREMENT OF WORK

### 2.1 Standard Work Items

In accordance with the provisions of Clause 2 of MRS01 *Introduction to Standard Specifications and Technical Standards*, the standard work items covered by this specification are listed in Table 2.1.

**Table 2.1 – Standard Work Items**

Standard Item No.	Description	Unit of Measurement
<b>Cast-In-Place Piles for Non-Bridge Applications</b>		
7405	Supply and fixing of stiffening bands	each
7406	Handling and pitching of steel liners	each
7407P	Driving steel liners (Provisional Quantity)	m
7408P	Extension of steel liners (Provisional Quantity)	each
7411	Excavation of liners	m <sup>3</sup>
7412	Excavation below toes of liners	m <sup>3</sup>
7415P	Excavation for Bored Piles (Provisional Quantity)	m <sup>3</sup>
7421PS	Concrete Class [ <i>compressive strength</i> ] MPa/20 in lined pile (Provisional Quantity)	m <sup>3</sup>
7423PS	Concrete Class [ <i>compressive strength</i> ] MPa/20 in bored pile (Provisional Quantity)	m <sup>3</sup>
7425P	Steel reinforcing bar in lined and bored piles (Provisional Quantity)	tonne

### 2.2 Work Operations

#### Item 7405 Supply and fixing of stiffening bands

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Supply of stiffening bands; and
- c) Fixing stiffening bands to liner.

#### Item 7406 Handling and pitching of steel liners

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Transferring liner from on Site storage to its aligned position in the driving rig;
- c) Provision and use of driving rig; and

- d) Retention of liner on line for driving.

**Item 7407P Driving steel liners (Provisional Quantity)**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Driving the liner;
- c) Field splices made during driving;
- d) Trimming the liner to level on completion;
- e) Setting up to re-drive liners, where liners are driven in increments with progressive excavation; and
- f) Re-driving of liners to achieve a seal.

**Item 7408P Extension of steel liners (Provisional Quantity)**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Preparation for welding; and
- c) Full penetration butt welding of liners.

**Item 7411 Excavation of liners**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Excavation of material;
- c) Disposal of excavated material;
- d) De-watering;
- e) Sealing the base of liners against entry of water or material;
- f) Interruptions where liners are driven in increments with progressive excavation; and
- g) Backfill to liners placed in pre-bored holes, if required.

**Item 7412 Excavation below toes of liners**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Excavation of material;
- c) Disposal of excavated material;
- d) De-watering;
- e) Provision of safety shield, if required; and
- f) Inspection by contractor's geotechnical engineer.

**Item 7415P Excavation for Bored Piles (Provisional Quantity)**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Excavation of material;
- c) Disposal of excavated material; and
- d) Provision of temporary liners.

**Item 7421PS Concrete Class [*compressive strength*] MPa/20 in lined pile (Provisional Quantity)**

**Item 7423PS Concrete Class [*compressive strength*] MPa/20 in abutment bored pile (Provisional Quantity)**

Work Operations incorporated in the above items include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Supply of concrete;
- c) Transport of concrete;
- d) Placing and compacting concrete; and
- e) Finishing and curing concrete.

**Item 7425P Steel reinforcing bar in lined and bored piles (Provisional Quantity)**

Work Operations incorporated in the above item include –

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*;
- b) Supply of all materials; and
- c) Fixing reinforcing steel in place.

## **2.3 Calculation of Quantities**

### **2.3.1 Natural Ground Surface Level**

The natural ground surface level shall be taken as the level determined from the contours shown on the Drawings unless agreed otherwise, in writing, between the Contractor and the Administrator, prior to commencing excavation.

### **2.3.2 Supply of Liners**

Supply of liners of the nominated thickness shall be the length of liner shown on the Drawings which includes an allowance for possible variations in foundation levels.

### **2.3.3 Sinking or Driving of Liners**

Sinking or driving of liners shall be the length of liner, in place, measured along the pile axis from the bottom of the liner to the approved top cut-off level, or to the natural ground surface level, whichever is the lower.

## **2.4 Excavation**

### **2.4.1 General**

In the schedule of rates, where any item for excavation is inclusive of work from a number of discrete areas, the aggregate quantity shown for that item encompasses a range of constituent materials having similar physical properties and similar overall relative proportions of the different components as could be expected from information provided in accordance with Clause 5. The actual disposition and volumes of the various constituent materials within any individual pile may vary somewhat from those indicated by adjacent boreholes, but no additional compensation shall be paid where the aggregate quantities of the various components for all locations scheduled under the item are compatible with those indicated in accordance with Clause 5.

Over excavation shall not be measured under any Work Item.

### **2.4.2 Excavation of Liners**

Excavation of liners shall be measured as the volume calculated from the approved terminal level of the liner to the natural ground surface level, or to the underside of the pile cap or headstock if that is lower, using the nominal internal diameter of liner shown on the Drawings.

### **2.4.3 Excavation Below Toe of Liner**

Excavation below the toe (i.e. terminal level) of the liner shall be measured as the volume of the cylinder of material whose diameter is equal to the inside diameter of the liner and whose length is measured from the base of the excavation up to the terminal level of the liner.

## **2.5 Drilling of Test Holes**

Drilling of test holes shall be measured as the length of hole drilled below the bottom of the excavation as ordered in accordance with Clause 10.4.

## **2.6 Concrete**

For lined piles, the quantity of concrete shall be calculated as the sum of –

- a) the volume calculated from the approved terminal level of the liner to the underside of the pile cap or headstock using the nominal internal diameter of liner shown on the Drawings; and
- b) the quantities determined in accordance with Clause 2.4.3.

For bored piles, the quantity of concrete shall be calculated as the volume calculated from the approved base level of the pile to the approved top level of the pile using the diameter of pile shown on the Drawings.

Deductions shall not be made for the volume occupied by reinforcing steel.

No measurement shall be made for concrete required to fill over break in excavation.

## **2.7 Steel Reinforcing Bars**

The quantity of steel reinforcing bars shall be calculated in accordance with Clause 2.3 of MRTS71 *Reinforcing Steel*. The quantity shall be increased where appropriate to include additional steel reinforcing bars required by extensions to the length of piles from those shown on the Drawings.