

Supplementary Specification

**MRC Supplementary Specification
8505 Removable/Retractable Bollards**

Revision 3.0

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8505.1 Introduction

This supplementary specification applies to the supply and installation of removable / retractable bollards as detailed in the project Drawings. The bollard configuration shall take into account the proposed use.

Where the use of bollard is required to prevent vehicle encroachment into pedestrian area or to protect infrastructure from damage by vehicles these shall comply with AS2890.1 in respect of materials, location, and height.

Where the use of bollard is required to protect cyclists and pedestrians from obstacles along a pathway these shall comply with Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling.

The proposed product and installation procedure are to be submitted to the Superintendent for approval prior to any works being undertaken.

8505.1.1 Definitions of Terms

This section describes any term which are specific to this specification or requires clarification due to an ambiguous understanding.

The terms used in this Technical Specification shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*. Additional terms used in this Technical Specification are defined in the Table below.

Term	Definition
Bollard/s	For the purposes of this specification, the term refers to both removable and retractable types.
Retractable Bollard	For the purpose of this specification, the term refers to lockable key or tee-lock operated retractable bollard only (not including hydraulic, pneumatic, or electrical operating retraction systems) *

* These systems will be dealt with on a project basis where the design calls for these specialty retraction bollard systems.

8505.2 Referenced Documents

This supplementary specification shall be read in conjunction with the following;

- MRS01 *"Introduction to Specifications"*;
- MRTS01 *"Introduction to Technical Specifications"*;
- MRS14 and MRTS14 *"Road Furniture"*;
- MRS04 and MRTS04 *"Earthworks General"*;
- MRS50 and MRTS50 *"Specific Quality System Requirements"*;
- MRS70 and MRTS70 *"Concrete"*;
- AS/NZS 1170.1 Structural Design Actions Part 1: Permanent and Other;
- Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling;
- AS 1428.1 *Design for access and mobility General requirements for access - New building work*;

- AS 3845.1 *Road safety barrier systems and devices Road safety barrier systems;*
- AS 1906.1 *Retroreflective materials and devices for road traffic control purposes;*
- AS/NZS 2890.1 *Parking facilities Off-street parking;*
- Manufacturers Specification and Installation Requirements;
- MRC Std Drawing A3-00918, “Standard Bollard Removable”; and
- The Project Drawings.

8505.3 Description of Work

Work items incorporated by this supplementary specification are identified in Section 8505.6 and 8505.7 with individual activities/tasks for measurement and payment sourced from the Bill of Quantities and listed in MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards Section 1

8505.4 Quality Systems Requirements

8505.4.1 Std Test Methods (Testing Regime)

The following minimum testing regime applies to this specification:

Unless otherwise stated the manufacturer certification of the bollards forms the basis of the requirements.

Civil works activities associated with the floor of excavation and concrete pours shall be tested as per the relevant MRTS specification MRTS04, and MRTS70 unless otherwise approved by the Superintendent.

Where retractable bollards are installed the operational function of the retractability is to be tested as per the manufacturers specification or in the absence of detail as required by the design drawings.

8505.4.2 Hold Points, Witness Points and Milestones

Milestone

Milestone is a point within a project which marks the start or completion of an activity or compliance requirement. Generally associated with provision of records or data for verification with the projects contract and specification.

Hold Points

Hold points are noted on various Sections of this Specification.

“HOLD POINTS” are critical stages of the work, which require inspection by the Superintendent (or his nominated representative) and beyond which the Contractor will not be permitted to proceed without the written approval of the Superintendent.

A written “request for inspection” form shall be submitted to the Superintendent at least 48 hours prior to reaching the relevant “HOLD POINT”. One copy shall be submitted for each inspection. The signed copy will be handed back to the Contractor after the inspection to sanction work to proceed to the next stage or noting what work has to be done prior to re-inspection. This may involve inspection of the works by the Superintendent or approval of test results forwarded to the Superintendent by the Contractor.

Witness Points



Witness points are also important stages of work. However, these are not necessarily as critical work stages as defined by the hold points. Witness points are where the Superintendent (or his/her nominated representative) may review, witness, and inspect the work. The activities however may continue to proceed.

The following table represents the minimum inspection requirements for this specification;

Activity	Inspection Type	When	Reference
Construction Procedure and Traffic management plan (with TGS's) and other submissions as required by Clause 8505.5	Milestone	4 Weeks prior to works commencing	8505.5
Approval of bollard type and installation procedure.	Milestone	Prior to procuring bollards and sleeves	8505..1
Arrangements made for locks and keys	Hold Point	Prior to contractor requiring to lock bollards in place	8505.5.1
Inspection of materials and documentation	Hold Point	As delivered to site	8505.6.2
Layout survey through spot marking	Hold Point	During site layout survey prior to works commencing.	8505.6.4
Excavation of unsuitable materials (as required)	Hold Point	During excavation of footings	8505.6.5
Unstable vertical walls treatment	Hold Point	During excavation of footings	8505.6.7
Excavation Floor	Hold Point	Prior to installing bed and cage	8505.6.7
Installation of base and rebar cage	Witness Point	Prior to insertion of the sleeve	8505.6.8
Formwork and reinforcing prepour Inspection	Hold point	Prior to concrete pour proceeding	8505.6.8
Bollards on correct alignment and level, and vertically plumb on all sides	Hold Point	Post pour prior to concrete setting	8505.6.8
Approval to strip any formwork/bracing	Hold Point	72 hours after concrete pour.	8505.6.8
Bollard inspection and testing for conformance to working operations	Hold Point	After works are complete.	8505.6.9
Survey for compliance with manufacturers specification and design drawing requirements	Hold Point	At completion of works	8505.6.9
Works as Executed documentation	Hold Point	4 weeks prior to practical completion being requested.	8505.7.1



8505.4.3 Construction Tolerances

Unless noted on the design drawings or otherwise approved by the Superintendent the following construction tolerances shall apply to this Specification;

The construction activity outcome shall not depart from the widths, lengths, heights, and shapes specified by design drawings and the Manufacturers Specification as applies to this specification;

- Manufacturers dimensions and tolerances for installation of Removable/Retractable Bollards.

The Contractor should also note various Construction clauses of this Specification also contain construction tolerances which need to be complied with.

Further tolerances specific to the project are detailed on the design drawings and are included in Clause 2 of MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards

8505.5 Preliminary

The Contractor is to submit or ensure the following documentation is in place 4 weeks prior to delivery or a prestart is conducted:

- Sample of the proposed product and installation/construction procedure;
- Works procedure for all activities, and construction plan;
- Work, Health, and Safety Plan;
- Quality Plan outlining requirements of 8901.4 as a minimum, compliant with MRTS 50;
- Personnel Experience; and
- Approved Traffic Management Plan and TGS's.

Other requirements unique to the project will be listed in the MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards.

MILESTONE

8505.5.1 Materials

The Contractor shall submit to the Superintendent the type of product proposed to be utilised, and a copy of the manufacturer's specification for that type of bollard proposed to be installed, the Superintendent shall review the submission for the purposes of granting approval of an agreed product and installation method.

MILESTONE

Supply of all materials to site is the responsibility of the Contractor at their cost, where items are Principal supplied the nominated storage site shall be obtained from MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards Section 3 and shall be the point of supply.

Unless instructed otherwise by the Superintendent existing components to be salvaged and the nominated storage site will be detailed in MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards Section 4. This will also include any reuse of existing items.



Site storage of all materials shall be as required by the Manufacturer/s and be a secure location. The Contractor shall be responsible for all site storage of materials, the Superintendent shall be informed of the site storage as part of the submitted works procedure.

Padlock and key/s where required must be supplied as part of this specification. The Superintendent is to supply the contractor with the padlock and key/s as per the requirement of the asset owner at the time of the installation of the bollard/s. It is the responsibility of the Superintendent to ensure the asset owner is furnished with the key/s at the completion of the works.

HOLD POINT

Concrete supplied and placed for the support footings of the bollards shall comply with the specifications MRS70 & MRTS70.

All other materials shall be supplied in accordance with their relevant specification and/or manufacturers specification and requirements.

8505.5.2 Contractor's Personnel

Personnel, sub-contractors and suppliers utilised in the preparation of the base, installation of the bollards, and their performance shall be experience in the processes and activities required to carry out the works.

The Contractor shall provide documented evidence for the Superintendent's approval to demonstrate the experience, qualification, skills and training of proposed personnel, sub-contractors a minimum 4 weeks prior to works commencing.

MILESTONE

8505.5.3 Environmental Plan

The Contractors Environmental Plan shall be reflective of the requirements of MRTS51 and MRS51 and be submitted for approval by the Superintendent 4 weeks prior to site works commencing.

MILESTONE

8505.5.3.1 General

The Contractor shall remove all rubbish, debris, disused materials etc., from the Site. The Site shall be maintained in a clean state.

The Contractor shall be responsible for ensuring no debris is deposited on public or private rights of way because of the works outside of the immediate work area, including any deposits arising from the movement of plant and vehicles.

The Contractor shall keep pollution in the vicinity of the Works within reasonable minimum limits noting that this clause does not exempt the Contractor from complying with the limits controlled or required by legislation.

The Contractor shall collect, transport and dispose of waste at a registered waste facility.

8505.5.4 General Workplace Health and Safety Requirements

As a condition of this document, it is required that the Contractor and its workers (including all sub-contractors etc., and their workers) engaged to perform a service or work on site must at all times ensure (so far as reasonably practicable) the health and safety of all persons who are, or may be, affected by work under this Supplementary Specification or the services provided.



8505.5.4.1 Legislative Compliance

Without limiting the Contractor's other obligations, the Contractor must comply with all Acts, Regulations, Standards and Codes of Practice about work health and safety matters that are applicable to the scope of work undertaken or services being provided.

8505.5.5 Works Procedure

The Contractor shall prepare a works procedure for all activities required under this specification which also address WH&S specific requirements for the site, this shall include but not be limited to the following;

- i. Site setup, including traffic management and public consultation;
- ii. Identification of underground utilities which impact the works and the proposed treatment to address the impacts;
- iii. Staging of works;
- iv. Individual activity construction procedures, under-layers, drainage, bedding, paver laying, jointing, paver sealing, concrete works, testing and inspections as required;
- v. Timeline of works;
- vi. Collection of "As Constructed" data.

The works procedure shall be submitted to the Superintendent for approval four (4) weeks prior to site works commencing.

MILESTONE

8505.6 Construction

This section lays out the works operations with more detail based on specific requirements of this supplementary specification. Some activities may appear to include items which are stated within other specifications, the purpose is to reinforce that requirement specific to this supplementary specification.

Specific construction requirements associated with these works is detailed in MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards Section 5

The construction procedure for the installation of the bollards shall be in accordance with the manufacturer's specifications, and the approved Contractors construction procedure/s.

8505.6.1 Work Operations

Work operations incorporated in this item are those included in Clause 2.1.5 of MRS01 "Introduction to Standard Specifications" and the following work scope activities and associated sub activities;

8505.6.1.1 Work Scope

The scope of works (including all associated sub activities) covered under this specification is as follows:

- Procure, supply, and store all materials;
- Carry out excavation to design drawing alignments and depths;
- As required, compact and test foundation, including removal and replacement of unsuitable materials as approved;
- Utilise or dispose of excess materials, as required;
- Carry out preparation required for installation of bollard/s;
- Install and compact bedding material;
- Install and brace bollard sleeve/base as required by the design drawings and manufacturers specification;



- Carry out concrete footing works as required to encase the bollard sleeve/base, including surface finish to train water away from bollard;
- Install and lock in place bollard;
- Collect and submit “As Constructed” details.

8505.6.2 Supply of All Materials;

All materials, plant, and labour required to carry out the works under this Specification is to be supplied by the Contractor, where the bollard/s are Principal supplied the designated storage site will be the point of supply for the purposes of this Specification.

All items shall be inspected at delivery to site prior to use. Any items which are damaged are not to be used and are to be returned to the supplier.

HOLD POINT

8505.6.3 Existing Bollard Removal (as required)

The removal of existing bollards and footing shall be carried as required out prior to spot marking of the new bollard/s. The Contractors chosen method of removal will be such that any impact on surrounding environment is minimised. Unless the existing footing excavations are to be utilised by the new bollards, or as otherwise approved by the Superintendent existing holes are to be backfilled and compacted prior to site location approval of the new bollard/s.

Existing bollards to remain or salvaged are identified on the design drawings. For details of items to remain or be salvaged, and storage site location refer to MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards.

At the commencement of demolition the Superintendent may direct which bollards are to remain or be salvaged for reuse based on prevailing site conditions.

Disposal of any demolished materials and bollards not requiring storage or reuse shall be disposed of by the contractor at their cost to the nearest MRC waste disposal transfer station.

8505.6.4 Site Layout with Superintendent

The final location of the bollards is to be marked out on site and shall be inspected and approved by the Superintendent prior to excavation commencing.

HOLD POINT

8505.6.5 Carrying Out Excavations;

Excavation of material to level and grade as per MRC Standard Drawing A3-00918 and design drawings, vertical tolerances shall not exceed the manufacturers specification, in the absence of detail the tolerance shall not exceed +5mm/-10mm.

Horizontal tolerances shall not exceed the manufacturers specification and the design drawings. Where a straight line of bollards are installed the set out shall be such that when a string line is placed along the face of the bollards no bollard is out of alignment by more than 5mm's

The excavated hole is to be inspected for areas of unsuitable material. If unsuitable material is identified this is to be removed and replaced with approved material as per the instructions of the Superintendent.

HOLD POINT



8505.6.6 Utilising or Disposing of Excavated Material;

Excess excavated materials shall be disposed of by the contractor or utilised as per Superintendents instructions. Material stockpiled shall ensure that all Environmental ESC measures are in place and maintained.

8505.6.7 Bottom of Excavations

All loose material is to be removed from footing hole. The sides of the excavated hole are to be vertical and stable. If the vertical wall is unstable the Contractor shall submit to the Superintendent for approval the construction methodology intended to “shore” up the sides either temporarily or permanently i.e. casing.

HOLD POINT

The excavated floor preparation is to be carried out as per MRC Standard drawing A3-00918 and is to be presented for inspection by the Superintendent with inspections, geotechnical testing and survey requirements in accordance with MRTS 04 unless stated otherwise in MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards.

HOLD POINT

8505.6.8 Installation of Bollards, Compliant With Project Drawings, and Manufacturer’s Specification;

Prior to the installation of any bollard the base is required to be installed and compacted to allow drainage of the bollard and sleeve and a rebar cage installed to support the sleeve for the bollard.

WITNESS POINT

All concrete works associated with the footings shall be carried out in accordance with MRTS70, MRC standard drawings, the design drawings, and the manufacturers specification, where conflict exists the manufacturers requirements and specification will take precedence, with inspections, geotechnical testing and survey requirements applying unless stated otherwise in MRC Supplementary Specification Annexure 8505_1 Removable/Retractable Bollards.

HOLD POINT

Prior to the concrete setting the bollards installed shall be surveyed and checked for alignment, level, and vertically plumb to ensure no movement has occurred. Any movement will require rectification to ensure the finished bollards meets the requirements of the design drawings, manufacturers specification, and Australian Standards.

HOLD POINT

Removable Bollard – installed at the location and as per the dimensional requirements of the design drawings and to the manufacturer’s specification. The sleeve is to be concreted in place to ensure the bollard is vertically plumb on all sides and to the level as required by the design drawings and the hinged plate allows locking of the bollard and covers the bollard sleeve top flush with the surrounding surface without creating a trip hazard.

Retractable Bollard - installed at the location and as per the dimensional requirements of the design drawings and to the manufacturer’s specification. The sleeve is to be concreted in place to ensure the bollard is vertically plumb on all sides and to the level as required by the design drawings and be able to accommodate the bollard so when it is fully retracted is level with the surrounding surface without creating a trip hazard.



All bollards installed shall be generally of a smooth surface and free of protruding elements or elements which may introduce snag or spearing hazards to passing cyclists, pedestrians or people using personal mobility devices.

Concrete curing is to commence directly after the concrete pour has begun to set, where the work operations utilises formwork for the purpose of bracing and holding in place the sleeve (and bollard) this must not be removed for a minimum of 72 hours after pouring of the concrete unless otherwise approved by the Superintendent.

HOLD POINT

8505.6.9 Testing for Conformity With Construction Procedures and Specifications.

All bollards are to be tested to ensure they have set solidly and no movement occurs as required by the manufacture's specification. This includes the ease of removal and insertion, and the ease of retraction and extraction.)

HOLD POINT

A survey of the installations will be required to ensure location and alignment of bollards and height above the finished surface level are as required by the design drawings and manufacturers tolerances.

HOLD POINT

8505.6.10 Clean up of Site

Any disturbed areas are to be backfilled, turfed (as required), and made good. The site is to be cleaned of all debris, excavated material, and construction materials.

8505.7 Post Construction

Items which close out the project, and readies the project for the "On Maintenance" inspection. All items below **MUST** be complied with prior to the Contractor requesting an "On Maintenance" inspection and/or as required during the Defects/Liability (On Maintenance) period.

8505.7.1 Collection and Submission of All As Constructed Data.

Contractor is to supply and submit "As Constructed" documentation as required by *MRC D20 - Drawings and Documentation* for approval by the Superintendent 4 weeks prior to requesting a practical completion inspection.

HOLD POINT

Certification of works shall be submitted with the "As Constructed" Plans and documentation.

Format of submitted "As Constructed" documentation shall be compliant with MRC Supplementary Specification 8919.

8505.8 Measurement and Payment

Provision for these works shall be included in the scheduled unit rate for the items shown in Clause 8505.3 of this Supplementary Specification and Annexure. No separate payment will be made for the works specified in this Supplementary Specification. Any works associated with replacement of non-conforming material and/or construction procedures shall be at no cost to the Principal.



Version Control:

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1.0	Original issue		
2.0	Review of Specification	C. Sultana	25.01.2024
3.0	Full Review of Specification	C. Sultana	21/01/2026