

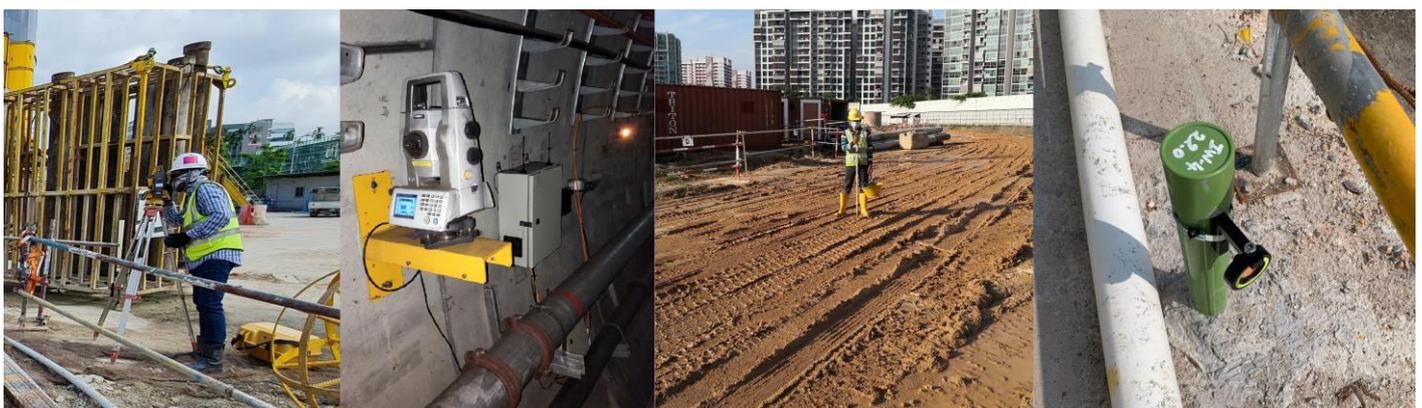
Certified Survey Plan Submission Requirements within the Railway Protection Zone

PREFACE

This quick guide clarifies LTA's certified survey plan (CSP) submission requirements for critical developments within the railway protection zone of underground rapid transit system (RTS) structures. The CSP shall be attached in the application for permit to carry out engineering work. This is to ensure that any form of drilling works are carried out safely and will not endanger or affect the structural integrity of the RTS structures and the safety of its operation.

Below are some examples of the required information that should be submitted with the application for LTA's review and approval:

1. Geometric tunnel survey of the RTS structures (for approval of reserve lines)
2. Drilling works near underground RTS structures (for clearance of proposed piles/boreholes location)
3. Installation of instrumentation in RTS tunnel (for clearance of instruments from structure gauge)



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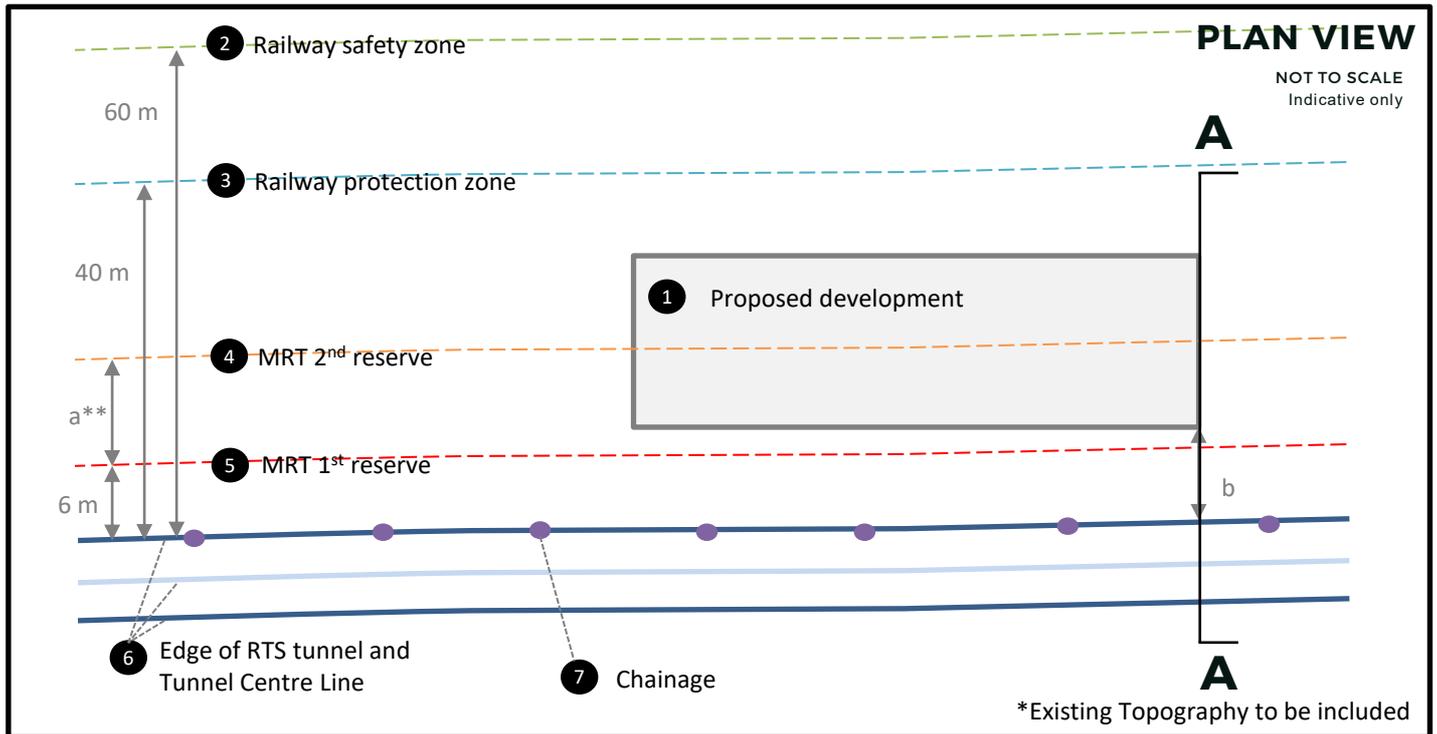
CSP SUBMISSION REQUIREMENTS

1) Geometric survey of the RTS structures

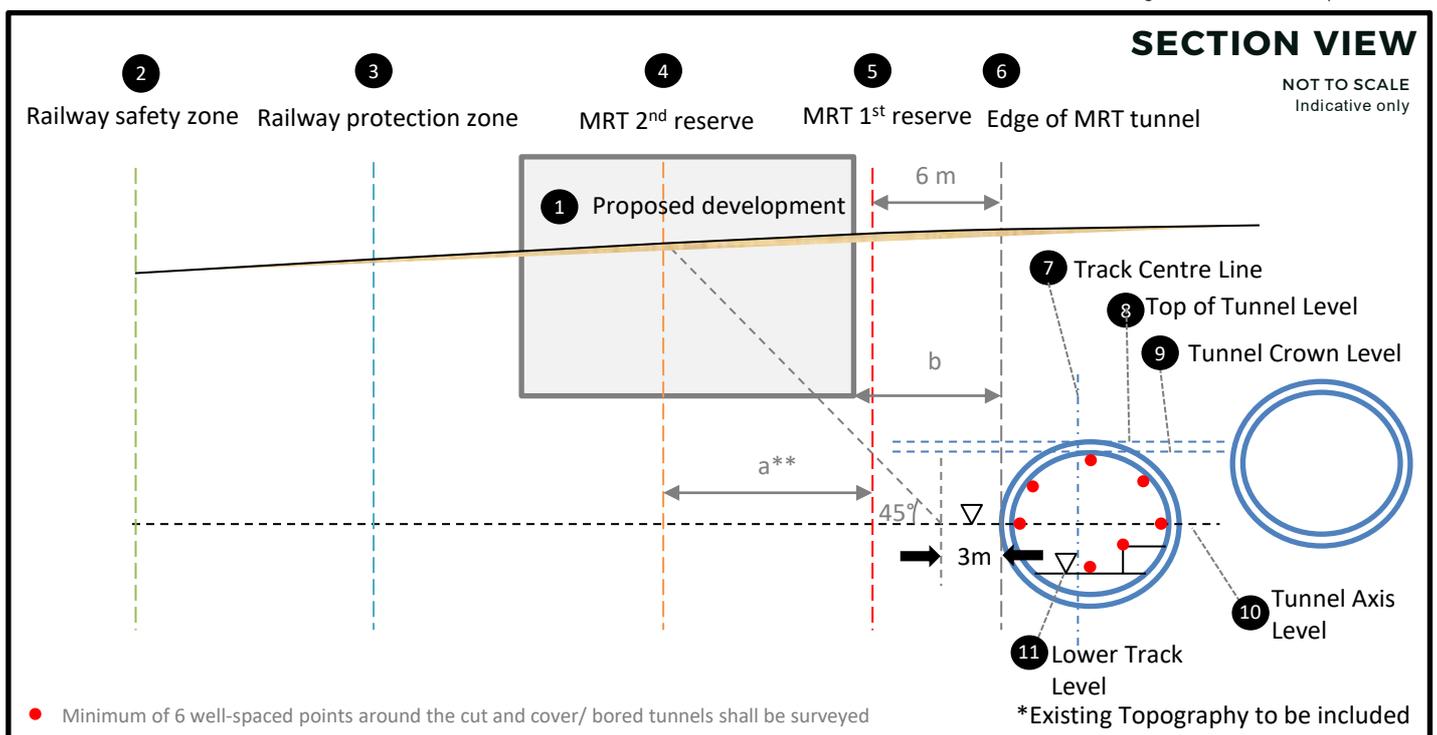
The RTS reserve lines (illustrated below from ② to ⑤) and RTS tunnel survey details (illustrated below from ⑥ to ⑪) should be shown clearly on the CSP.

Proposed development such as tunnelling, piled foundation, earth retaining system, basement construction, etc. (illustrated below as ①) and the clearances from the RTS reserve lines and RTS structures should be indicated clearly on both the plan and section view.

Note: There should be a minimum of 6 well-spaced surveyed points around the cut and cover/ bored tunnels to determine the tunnel details on CSP.



** 2nd reserve shall be determined in accordance with the Code of Practice for Railway Protection (min. 10m)

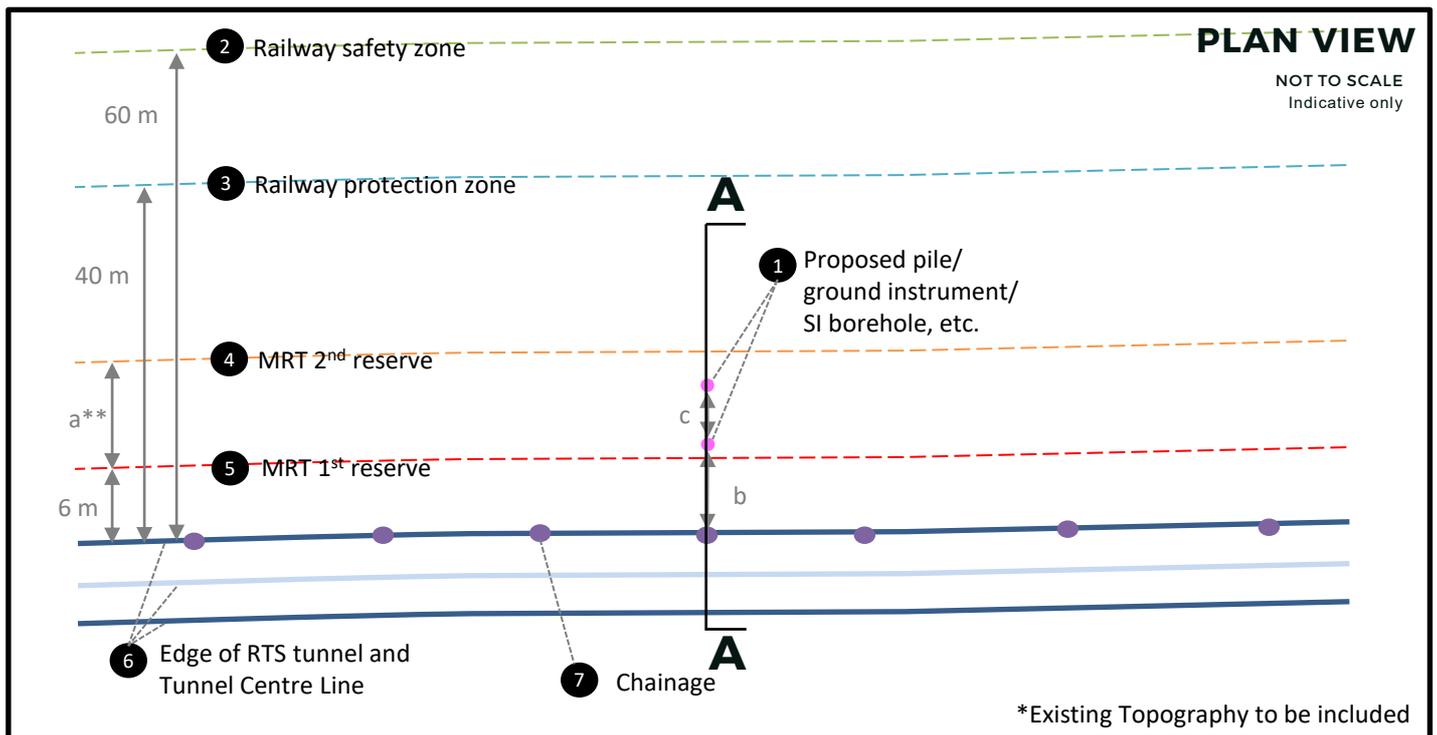


CSP SUBMISSION REQUIREMENTS

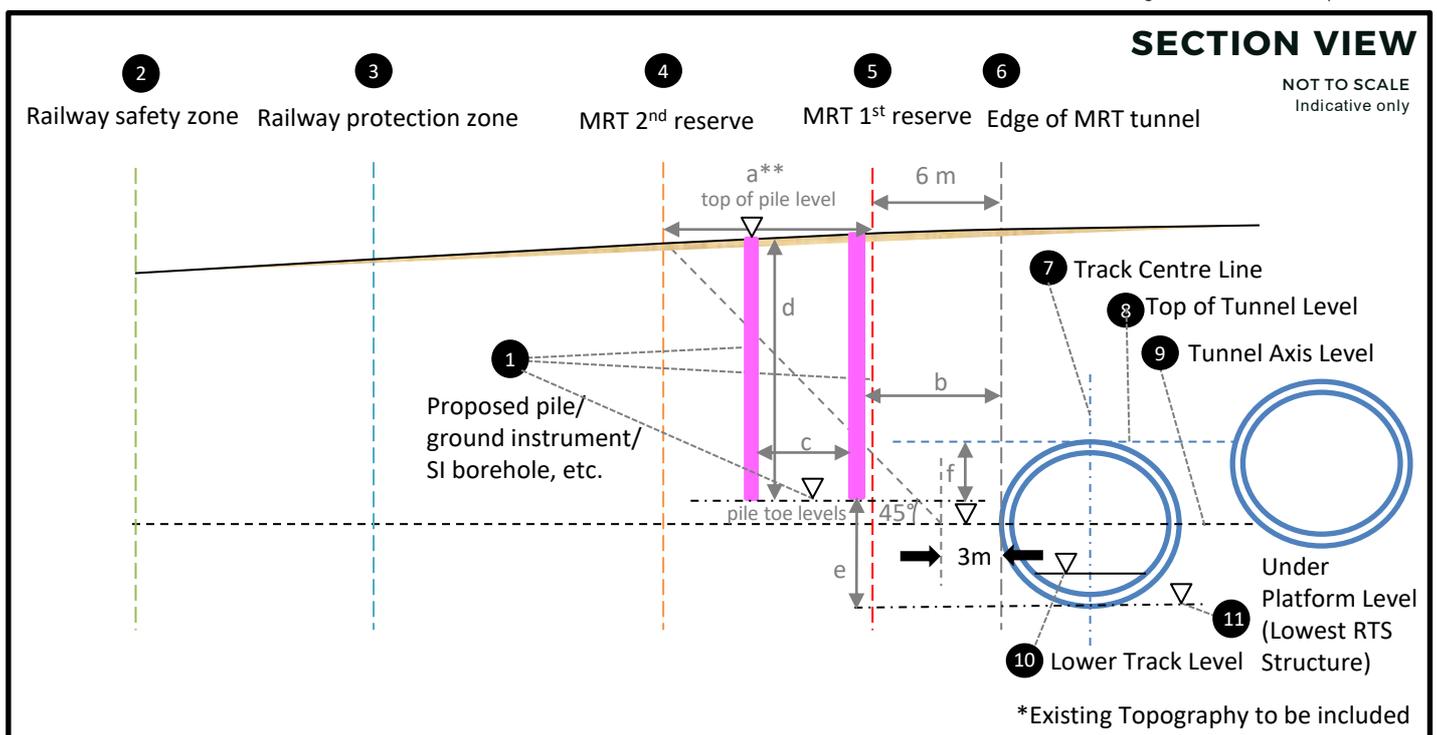
2a) Drilling works near RTS tunnel

The RTS reserve lines (illustrated below from ② to ⑤) and RTS tunnel survey details (illustrated below from ⑥ to ⑪) should be shown clearly on the CSP.

Proposed drilling works such as piled foundations, soil investigation boreholes and ground monitoring instruments (illustrated below as ①) and the clearances from the RTS reserve lines and RTS structures should be indicated clearly on both the plan and section view.



** 2nd reserve shall be determined in accordance with the Code of Practice for Railway Protection (min. 10m)

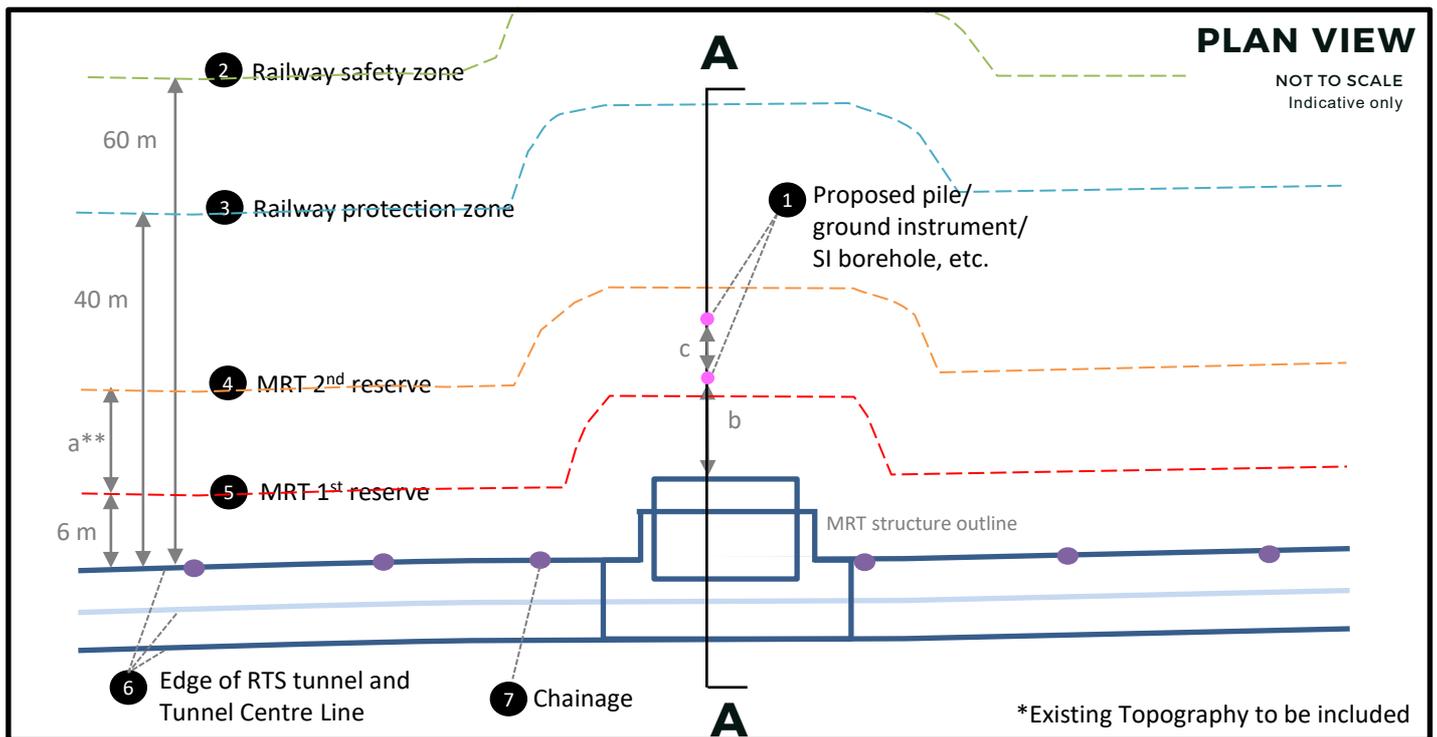


CSP SUBMISSION REQUIREMENTS

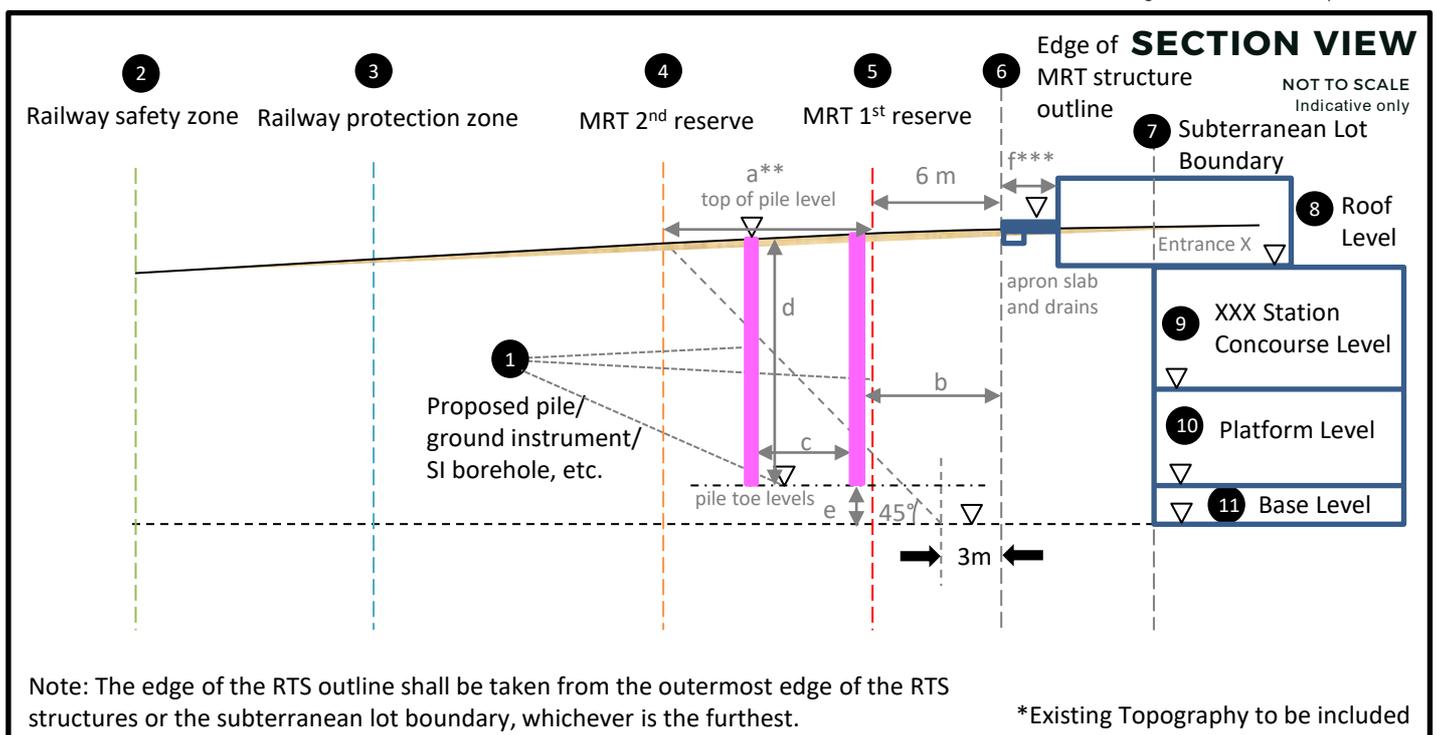
2b) Drilling works near underground RTS station

The RTS reserve lines (illustrated below from ② to ⑤) and RTS station survey details (illustrated below from ⑥ to ⑪) should be shown clearly on the CSP.

Proposed drilling works such as piled foundations, soil investigation boreholes and ground monitoring instruments (illustrated below as ①) and the clearances from the RTS reserve lines and RTS structures should be determined and indicated clearly on both the plan and section view.



** 2nd reserve shall be determined in accordance with the Code of Practice for Railway Protection (min. 10m)



Note: The edge of the RTS outline shall be taken from the outermost edge of the RTS structures or the subterranean lot boundary, whichever is the furthest.

*Existing Topography to be included

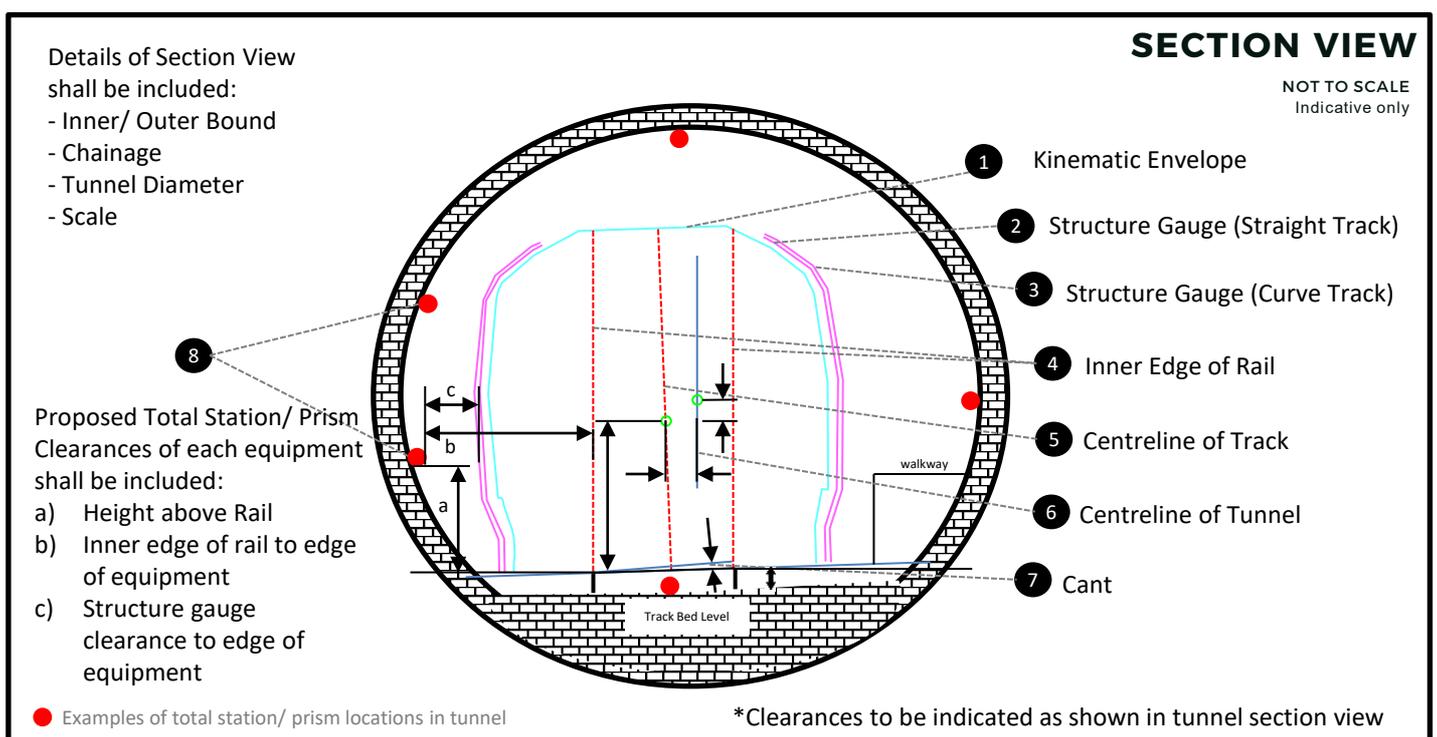
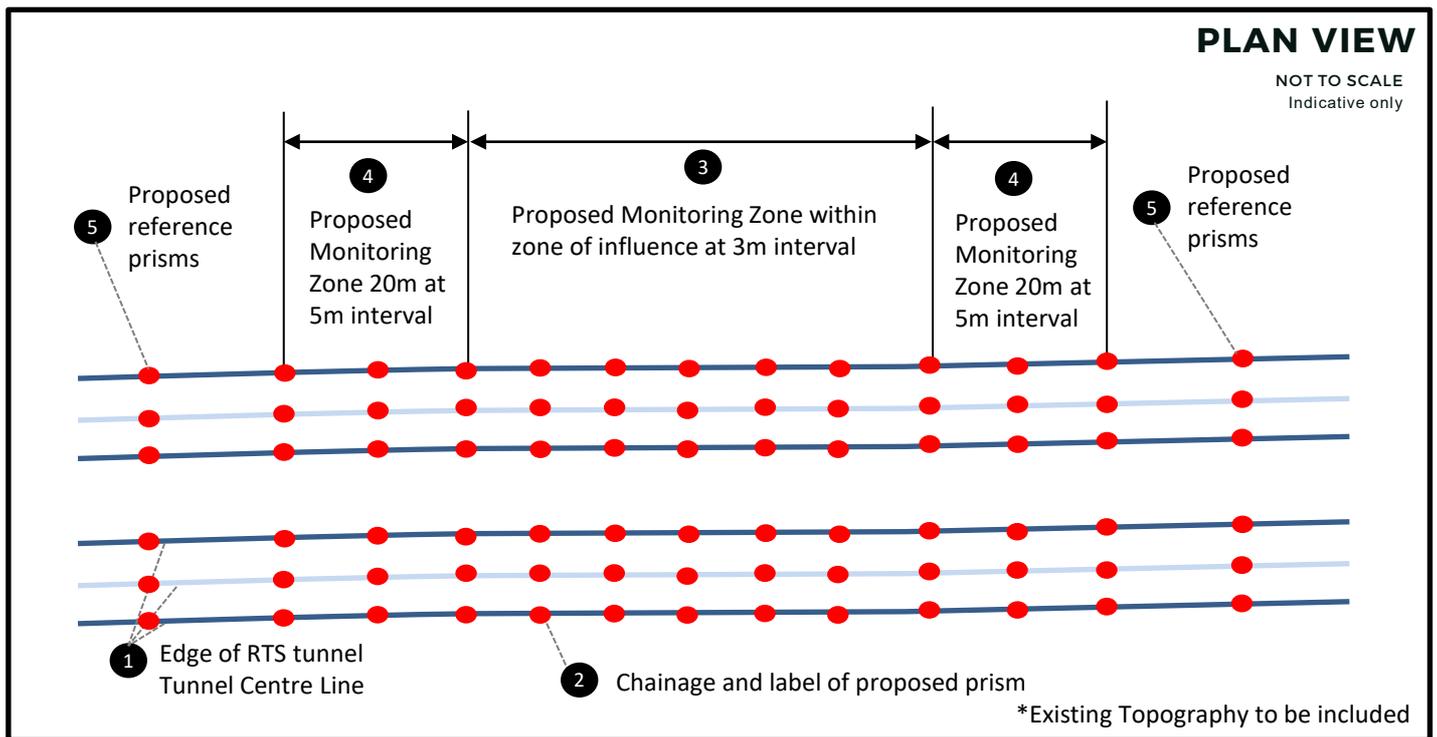
*** MRT structure outline shall include apron slab and drains, etc. at the aboveground MRT station entrance

CSP SUBMISSION REQUIREMENTS

3) Installation of Instrumentation in RTS tunnel

In the plan view, the proposed monitoring zones (illustrated below from ③ to ⑤) and RTS tunnel survey details (illustrated below from ① to ②) should be shown clearly in the CSP.

In the section view, tunnel survey details (illustrated below from ① to ⑦) and proposed total station/ prism to be installed in the trainway and their clearances from the structure gauge (illustrated below as ⑧) should be shown clearly on the CSP.



DATA TABULATION

Survey coordinates and levels in SVY21, SHD datum (e.g. chainage, Track Centre, Lower Track Level, Crown Level, outer edge of underground RTS structures such as stations and tunnels, MRT reserve lines, subject lot boundary, etc.) should be tabulated in the CSP in excel format to facilitate the review. Examples are shown below.

Survey details of RTS structures and Subject Lot:

Track Alignment Tabulation

Chainage	Track Centre			Left Track Level (m)	Right Track Level (m)	Crown Level (m)
	Easting (m)	Northing (m)	Lower Track Level (m)			

Reserve Lines and Tunnel Wall Tabulation

Coordinates of MRT 1st Reserve Line (NORTH BOUND)			Coordinates of MRT 1st Reserve Line (SOUTH BOUND)		
No.	Northing	Easting	No.	Northing	Easting
Coordinates of MRT 2nd Reserve Line (NORTH BOUND)			Coordinates of MRT 2nd Reserve Line (SOUTH BOUND)		
No.	Northing	Easting	No.	Northing	Easting
Coordinates of MRT 3rd Reserve Line (NORTH BOUND)			Coordinates of MRT 3rd Reserve Line (SOUTH BOUND)		
No.	Northing	Easting	No.	Northing	Easting
Coordinates of MRT Safety Zone (NORTH BOUND)			Coordinates of MRT Safety Zone (SOUTH BOUND)		
No.	Northing	Easting	No.	Northing	Easting
Coordinates of Tunnel Edge					
No.	Northing	Easting			

Subject/ Subterranean Lot Tabulation

Coordinates of Lot Boundary (MKXX-YYYYYY)		
No.	Northing	Easting

Proposed drilling points information with horizontal and vertical clearance to RTS structure shall also be tabulated in the CSP and excel format to facilitate the review. Examples are shown below.

Proposed Pile/ Boreholes Tabulation

S/No	ID	Northing	Easting	Ground Level	Depth	Toe Level	Instrument (Pile/ Borehole) Diameter	Tunnel Top Level	Horizontal Clearance to MRT Tunnel Wall	Horizontal Clearance to MRT 1 st Reserve Line	Vertical Clearance Above MRT Tunnel	Remarks

SURVEY DATUM

Survey Datum shall be in SVY21 coordinates and SHD.

VALIDITY PERIODS OF SURVEYS CARRIED OUT

- a) Tunnel Geometric Survey: 12 months from the date of survey (for submission of proposed reserve lines for new project/development).
- b) Topographical Survey: 6 months from the date of survey

Once the period of validity of the topographical survey carried out had expired, the Registered Surveyor should resurvey, revise, and update the survey plans.

The Qualified Person should submit the updated certified survey plans showing the survey information.

DOCUMENTS TO BE SUBMITTED

The relevant checklists and forms should be attached in your CSP submissions to LTA.

You can access the checklists and forms by scanning the following QR Codes:



<https://go.gov.sg/form-lta-dbc-rail-s3>

FORM LTA DBC
RAIL_S3



<https://go.gov.sg/form-lta-dbc-rail-s4a>

FORM LTA DBC
RAIL_S4A



<https://go.gov.sg/form-lta-dbc-rail-s4b>

FORM LTA DBC
RAIL_S4B



<https://go.gov.sg/form-lta-dbc-rail-instr>

FORM LTA DBC
RAIL-INSTR

Points to note:

- 1) Upon completion of the instruments installation/ dismantling works in RTS tunnel or trainway, a copy of duly completed form "FORM LTA DBC RAIL-INSTR" endorsed by Qualified Person and Registered Surveyor shall be submitted to LTA.
- 2) Prior to commencement of any piling and drilling works, etc., a copy of duly completed form "FORM LTA DBC RAIL_S3" endorsed by Qualified Person and Registered Surveyor shall be submitted to LTA upon completion of the setting out of works within the railway protection zone.

CONCLUSION

This Quick Guide has illustrated the submission requirements for critical developments within the railway protection zone of underground rapid transit system (RTS) structures.

Please note that this quick guide does not supersede the Rapid Transit Systems (Development and Building Works in Railway Protection Zone) Regulations and the Rapid Transit Systems (Railway Protection, Restricted Activities) Regulations. If there is any conflict, the prevailing regulations will take precedence.

We welcome any suggestion or feedback on the quick guide for improvement of future editions.

All publications are available on LTA's corporate website, under [Who We Are > Statistics & Publications > Journals & Newsletters](#).