RELOCATION OF RAPID TRANSIT SYSTEM (RTS) COOLING TOWERS AND MAKE-UP WATER TANK

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PREFACE

This quick guide clarifies LTA's design requirements on E&M technical proposal submission requirements for developments integrating with Rapid Transit Systems (RTS) stations. Such integrations may be initiated by the Owner/Developer of an existing building or imposed by the relevant agencies on Government Land Sales (GLS) developments. In either case, the proposal will be subjected to the review and approval by LTA.

The case studies presented in this series aim to provide a guide on the pertinent E&M design requirements to be incorporated in the developer's E&M technical proposal for proposed relocation of RTS cooling towers and make-up water tank.

CONTENT

A technical proposal for the relocation of RTS cooling towers and make-up water tank shall be submitted for LTA's review and approval. The relevant design and submission requirements are stated in this document:

1. Locations of cooling towers and make-up water tank
2. Operation and Maintenance requirements
3. E&M requirements
4. Submission requirements
5. Testing and Commissioning

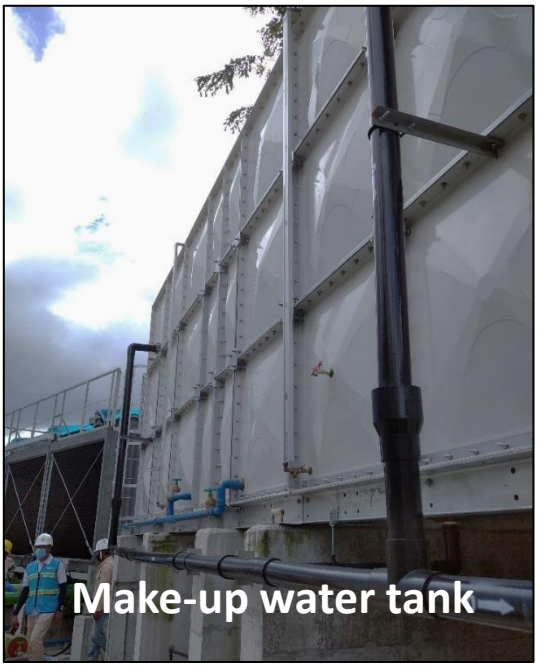
1. Locations of New Cooling Towers and Make-up Water Tank

a. The cooling towers, make-up water tank and other related equipment may be located on the station entrance roof or at ground level near the station. The Developer may need to relocate these equipment to make way for their works. The proposed new locations, either temporary or permanent, shall be submitted to LTA for review.

b. The location of new cooling towers and the make-up water tank located within the proposed development, shall take the following factors into consideration:

- They shall be close to the station, with dedicated pipe and cable shafts/enclosures
- The routing of the cables and pipes from station box to the cooling towers shall be as direct as possible.
- The Developer shall ensure no short-circuiting of air between
  - the exhaust and cooling tower intake;
  - cooling tower exhaust and station intake ventilation shafts
  - cooling tower exhaust and development's ventilation system

c. If the permanent location is not ready, a temporary location need to be identified if the existing cooling tower area is needed for Developer' works.



Example of RTS Cooling Tower and Make-up Water Tank

2. Operation and Maintenance Requirements

a. The **pipe and cable shafts/riser** that are incorporated in the future development shall be **accessible** for maintenance and future replacement.

Example of dedicated shafts for pipes/cables

b. An **enclosure** shall be provided for the cooling towers, make-up water tanks and other equipment to prevent unauthorized entry and tampering of the system and for security reasons. Access to the enclosure for maintenance purpose, etc. shall be through **doors or gates provided with approved locksets** (which have key cylinder compatible to the system used on the MRT system).

Example of the Cooling Tower Enclosure

2. Operation and Maintenance Requirements

c. The Developer shall ensure that the operations of the existing cooling towers, make-up water tanks and other equipment serving the station are **not affected** at all times. The **changeover** from the existing cooling towers to the new cooling towers can only be carried out during the **station's non-revenue hours**.

d. The Developer shall **maintain and protect** the cooling towers and the associated services which are located within the development site until the completion of all works before handing over to the rail operator.

e. The Developer/Architect shall design the cooling tower area for operation and maintenance, in addition to complying to statutory requirements and Code of Practices. .

Provisions of ramps and staircases to enhance safety

3. E&M Requirements

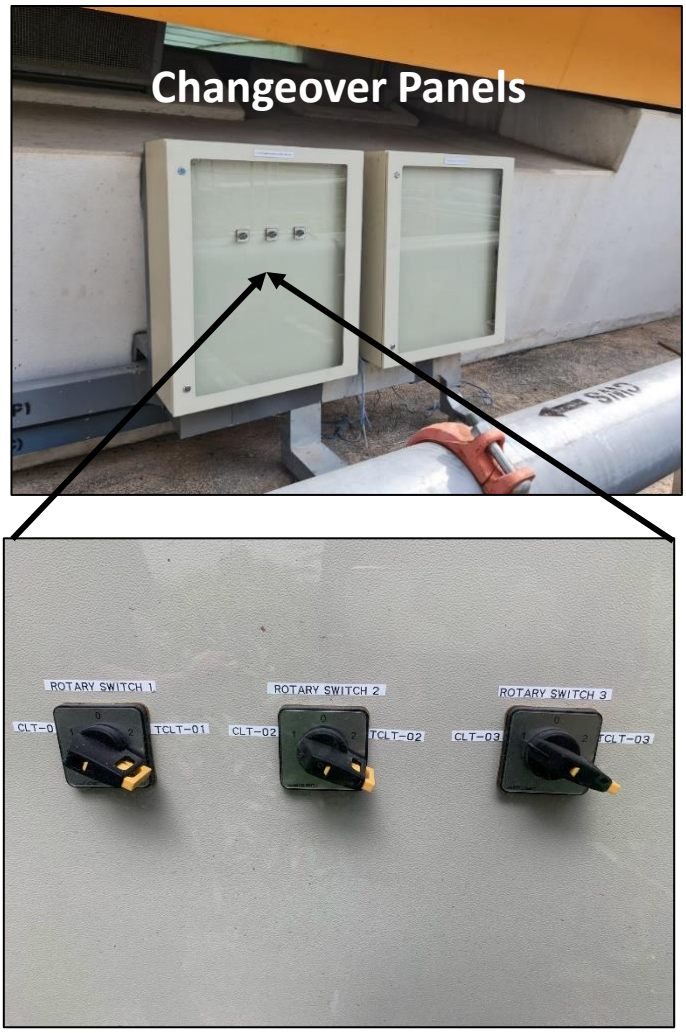
a. It is important for the Developer to arrange with the rail operator to carry out **site surveys** for the existing equipment and to ascertain the work scope for the affected system & services.

b. The Developer shall assess and provide **calculations** as to whether the **pumps** and other equipment such as **Motor Control Centre (MCC)** are affected due to the new locations of the cooling tower and make-up water tank. The calculations shall be submitted for LTA's review and acceptance.

c. For Electrical Services, general **lighting** and **switch socket outlets** shall be provided at the cooling tower area. The internal perimeter lighting requirement shall be **average 100 lux**. **Lightning protection system** shall be provided to the cooling tower enclosure, the cooling towers and water tanks, if the enclosure is **outdoor**.

d. The Developer shall provide **radio coverage** and **CCTV** at the new location. The Developer shall undertake all necessary works for **Integrated Supervisory Control System (ISCS)** to be updated and configured to reflect the changes.

e. The Developer shall propose the **migration strategy** for the cooling tower relocation. Below left picture is an example of the use of changeover panels for power and control for switching between the existing cooling towers and new cooling towers. Below right picture shows the pipe tee joint added to enable the migration of cooling towers.



Example of Changeover Panels

Example of pipe tee joint for chilled water pipes

4. Submission Requirements

Documents that are required to be furnished for technical review and modification application include but not limited to the following:

a. Location, layout and sectional plans of the proposed modification work

b. Method statement showing sequence of works/installation details

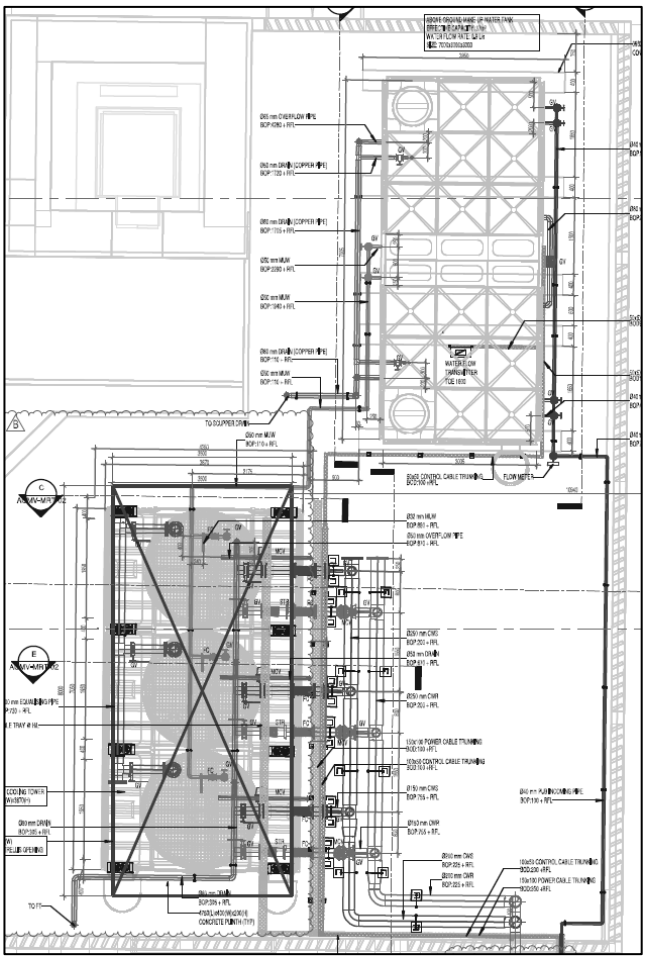
c. Cable/Pipe routing

d. Single line diagram, schematics and calculations

e. Technical brochures/ specifications, test reports and certificates for equipment and materials

f. Test plans and test procedures

g. Updated as-built drawings



Sample drawing of cooling tower and make-up water tank

5. Testing and Commissioning

a. The Developer is responsible for the testing and commissioning (T&C) of the cooling tower systems including the electrical and control works, before handing over to the rail operator.

b. The new cooling towers are to **be tested and running** for a period of time during the **station's non-revenue hours** before the full switch over.

c. There shall be a minimum **Defect Liability Period (DLP) of 12 months** for electrical and mechanical related assets **commencing from the date of Certificate of Transfer of Care Custody and Control** endorsed by all parties or otherwise advised by LTA.

Example of tested and commissioned cooling tower

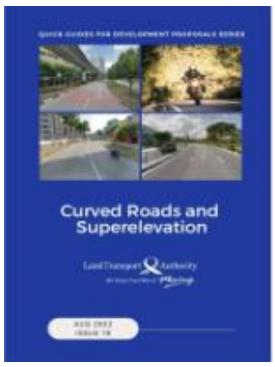
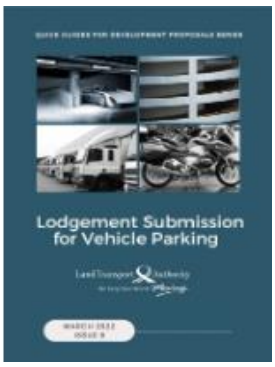
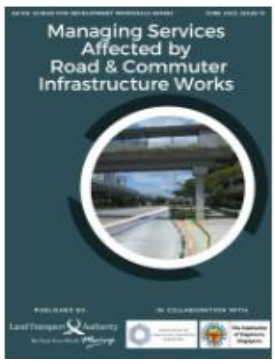
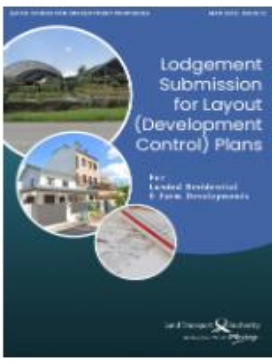
For more information on the relocation of RTS cooling towers and make-up water tank, please refer to the "*Guidebook for Carrying Out Modification Work to Rapid Transit System (RTS) Stations or Railway by Private Developer*", which is available on LTA's corporate website.

Alternatively, you can scan the QR code on the right to access the guidebook.

https://go.gov.sg/lta-guidebook-modification

CONCLUSION

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.

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