

**TABLE OF CONTENTS**  
**SECTION 11 - OPERATIONS FACILITY**

11.1	GENERAL .....	2
11.2	MAINTENANCE GUIDELINES.....	2
11.3	MAINTENANCE FACILITY AREAS AND FUNCTIONS.....	2
11.4	YARD LAYOUT .....	4
11.5	DESIGN REQUIREMENTS.....	5

## **SECTION 11 - OPERATIONS FACILITY**

### **11.1 GENERAL**

This section outlines the functional requirements and criteria for the planning and design of facilities for the inspection, maintenance, repair and storage of the Regional Transportation District (RTD) commuter rail system. These criteria are to be used in the development of a more in-depth study to determine design parameters for a specific facility. The criteria for this section have been prepared to interface with three different types of equipment: Electric Multiple Units (EMUs), Diesel Multiple Units (DMUs) and Diesel Locomotive-Hauled. However, it is understood that the resultant RTD maintenance facility may serve a combination of all three types. The Centralized Commuter Rail Operations Facility will be sited and designed based on RTD's proposed commuter rail (CR) route structure, the exact type(s) of CR vehicle(s) and equipment to be used within the system, space availability, operational and future route expansion requirements. The maintenance facility may be required to satisfy the needs of a mixed-technology fleet.

The capacity requirements for maintenance and inspection will be determined by the size of the in-service fleet, the characteristics of the fleet and the amount of time allocated for maintenance and inspection by the train schedules.

This guideline does not establish a certain, specific approach to maintenance, but rather is a general overview of the basic requirements of the facility. Facility requirements by fleet type will be offered in a separate report that will detail specific characteristics and maintenance needs.

### **11.2 MAINTENANCE GUIDELINES**

Regardless of fleet type and make-up, all will require a certain level of maintenance structured along the following guidelines:

- Daily Service and Inspection (FRA compliant)
- Programmed Life Cycle Maintenance
- Running Repair and Corrective Maintenance
- Heavy Repair (component change outs, main engines, generators, some structural, etc.)
- Mid-Life Overhaul (overhaul of all major systems and replacement/upgrade of cosmetic features, may be outsourced)

### **11.3 MAINTENANCE FACILITY AREAS AND FUNCTIONS**

RTD's CR Operations Facility shall house (but not be limited to) the following areas and functions:

- Rail Transportation Administration
- Rail Maintenance Administration
- Rail Operations Planning
- Rail Maintenance Engineering
- Control Center

- Rail Training Administration
- CR Vehicle Body Shop
- CR Vehicle Paint Shop
- Hazardous Fluid Storage and Disposal
- Traction Electrification System (TES) Service and Inspection
- CR Vehicle Service and Inspection (including FRA Class 1 Brake Test)
- Diesel Locomotive or DMU Engine Refueling (fuel storage shall be located away from the main building)
- Passenger Car Service and Inspection (including FRA Class 1 Brake Test)
- Wheel Truing and Inspection
- Wheel & Axle Presses
- CR Vehicle Truck Maintenance & Repair
- Electronic Component Repair
- Signal Relay Inspection & Calibration
- Pneumatic/Hydraulic Component Repair
- Air Brake Repair
- Parts Cleaning Room
- Lubrication Area
- Covered storage of CR Maintenance-of-Way (MOW) Materials
- CR Vehicle Re-railing
- Facilities Maintenance
- CR Parts Storage
- CR Operator Report Area
- CR Vehicle Air Conditioning and Current Collector Unit Repair
- Rail-bound Equipment Storage
- CR Vehicle Interior and Exterior Cleaning (including a wash bay)
- Shop Work Areas
- Sewage Disposal
- Sanding
- Restrooms and Locker/Shower Rooms
- Conference Rooms and Lunch Room

Some maintenance functions may be done by outside contract offsite. The following list of these items is subject to change prior to design work commencing:

- Major heavy component repairs, rebuilds and overhauls
- Pressing of wheels, bearings and brake disc hubs on/off axles
- Diesel engine and alternator major repairs and rebuilds
- Radio and certain electronic repairs
- Major metal component fabrication

The shop layout shall follow certain design guidelines as closely as funds and site configuration permit. These guidelines relate to the relative location of work spaces to each other within the shop, areas of the spaces for the type of activity or function, utilities requirements, etc. The shop layout shall be designed to separate work functions so that cars may be inspected, serviced and returned to revenue operation as quickly as possible.

Additionally, coordination with local agencies and jurisdictions is required to determine and approve fire protection safety, security and environmental measures that will be implemented as part of the planning, design and construction of the facility.

Isolated traction power shall be provided for the shop and yard storage tracks.

#### **11.4 YARD LAYOUT**

The yard layout (footprint) shall be based upon storage and movement needs for forecasted design year ridership levels. Enough level, tangent track shall be included in the yard layout to accommodate the anticipated number of CR vehicles. Direct access to and from the RTD mainline to the storage tracks is required, preferably operating two lead tracks from the mainline to the storage yard to permit the simultaneous receiving and dispatching of trains. Convenient access from freight mainlines shall also be provided for the delivery of cars and other heavy components. The storage yard shall be adjacent to the shop. The many diverse yard functions, plus the critical time requirements directly proceeding, during and after peak hour operations, necessitate a yard configuration that provides maximum train movement flexibility.

Track construction within the yard shall comply with "Design Criteria Chapter 4 - Trackwork."

Access for truck delivery, including semi-trucks and trailers shall be provided. Service roads shall be provided around the shop, between selected CR vehicle tracks, and to outdoor storage areas within the yard.

The yard shall be adequately lighted for 24-hour operation. Operations facility security shall be achieved by fencing the periphery of the yard, by lighting and by observation from the administration and operations areas of the building.

The overall storage yard layout footprint shall have adequate drainage such that normal operations are not interrupted.

Landscaping shall be minimal. The amount and type shall be consistent with the local zoning ordinance for the site.

## 11.5 DESIGN REQUIREMENTS

Design requirements for the building and yard shall comply with all federal, state, and local laws, regulations, rules, requirements, and shall uphold the preservation of natural resources (environmental) as well as all laws, ordinances, rules, regulations and lawful orders of any public entity bearing on the performance of the work. Architectural treatments (interior and exterior) should be decided as part of the coordination efforts between RTD and the consultant. Listed below (but not limited to) are the principal applicable codes (latest version is to be used):

- International Building Code
- International Mechanical Code
- National Electric Code
- National Electric Safety Code
- International Plumbing Code
- National Fire Protection Association (NFPA)
- American National Standard Code for Elevators
- American Society of heating, Refrigeration and Air-Conditioning Engineers, Inc. (ASHRAE)
- Occupation Safety and Health Administration (OSHA)
- Illuminating Engineering Society of North America
- American National Standards Institute, Inc.
- American Railway Engineering and Maintenance-of-Way Association (AREMA)
- Americans with Disabilities Act, including U.S. Department of Transportation, Final Rule - Transportation for Individuals with Disabilities
- County and City Zoning and Building Regulations
- Federal Railroad Administration – Office of Safety Assurance and Compliance guidelines for inspection
- ASCE Chapter 7 “Minimum Design Loads for Buildings and Other Structures”, American Society of Civil Engineers (latest version)

The facility shall be designed to meet applicable federal, state and local codes for accommodating access for the mobility impaired in effect at the time of facility design.

In planning and designing the facility, RTD's maintenance procedures shall be reviewed and Operations personnel shall be consulted to ensure that the new facility provides an efficient work environment.

**END OF SECTION**

**THIS PAGE LEFT INTENTIONALLY BLANK**