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Valley Metro System Design Services Project Profile

- Project:** Valley Metro System Design Services
- Agency:** Valley Metro Rail
- Soteria's Role:** System Safety Certification Support
Reliability, Availability and Maintainability Analysis
- Completion:** 2020

Project Overview

Valley Metro has several Light Rail projects that require systems design work associated with the existing alignment and new extensions. The light rail extension projects include Capitol/I-10 West, Northwest Phase 2, South Central in Phoenix, and others as assigned.

The Project includes stations, Park and Rides (PNRs), embedded trackwork, traction power substations, signals for crossovers and at gated intersections, communications, and ticket vending machines. The system elements shall be consistent and seamlessly compatible with existing Valley Metro corridors and systems.





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Soteria's Contribution to This Project

Soteria provided a technical review of the completed and verified Design Criteria Conformance Checklists for the following systems:

- Signaling System
- Communications
- WiMax
- Traction Power Substations
- Overhead Catenary System

Comments were provided to the responsible designers for final update and certification of the checklists. Reliability and maintainability analyses were carried out for four existing corridors and three new corridors under design. Sample As-Built drawings were analyzed from the existing corridors to provide a component list. The components and quantities, according to the As-Built drawings, were entered into the analysis database, which had been populated with the failure rates for most components. Failure rates for components without manufacturer's data were assigned failure rates from similar equipment. The major components are from manufacturer-provided data.



A typical Siemens Traction Power Substation configuration was assumed for all substations, using data existing "As Built" drawings and data gathered from the analysis of similar transit systems. The Communications equipment counts were based on the Systems Major Subsystem Component List provided by VMR Systems staff, supplemented by information from the drawing sets. To determine part counts for the new corridors, IFC, 60%



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and preliminary drawings were used. Typical signaling configurations were used as actual equipment had not been ordered at the time of the report. Standard Siemens TPSS were again assumed in these corridors.

The component and configuration data were compiled in a RAM database to produce the following reports:

- Reliability Analysis for the existing four corridors, showing totals for all four corridors for each subsystem
- Reliability Analysis for the three new corridors, showing totals for all three corridors for each subsystem
- FMECAs for the Signaling System for the three new corridors

List of systems included in the reports:

- TPSS
- Signaling
- Train to Wayside
- Track Switch Control and Indication
- Track Switches
- Grade Crossing Equipment
- SB HVAC
- TPSS HVAC
- Communication Subsystems
- Fire Detection
- Intrusion Detection