California High-Speed Train Project

TECHNICAL MEMORANDUM

Traction Power Supply Sites
General Standardization Requirements
TM 3.1.1.3

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Revision	Date	Description
0	01 Aug 08	Initial Release, R0
1	03 Jun 09	Paralleling Station sites revised to be at five-mile intervals; agency terminology updates

Note: Signatures apply for the latest technical memorandum revision as noted above.

Prepared by

for the California High-Speed Rail Authority

System Level Technical and Integration Reviews

The purpose of the review is to ensure:

- Technical consistency and appropriateness
- Check for integration issues and conflicts

System level reviews are required for all technical memorandums. Technical Leads for each subsystem are responsible for completing the reviews in a timely manner and identifying appropriate senior staff to perform the review. Exemption to the system level technical and integration review by any subsystem must be approved by the Engineering Manager or the System Integration Manager.

System Level Technical Reviews by Subsystem:

Systems: NOT REQUIRED_____ _____
Date

Infrastructure: NOT REQUIRED_____ _____
Date

Operations: NOT REQUIRED_____ _____
Date

Maintenance: NOT REQUIRED_____ _____
Date

Rolling Stock: NOT REQUIRED_____ _____
Date

Note: Signatures apply for the technical memorandum revision corresponding to revision number in header and as noted on cover.

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ABSTRACT

In order to provide a dependable and cost effective Traction Power Supply System for the California High-Speed Train System the placement, size, and power conditioning of the Traction Power Supply Station (TPSS) sites will be a priority during all phases of the design process. To enhance safe working conditions, simplify Operating and Maintenance procedures, and minimize the number and type of spare parts required, the layout and rating of the supply sites will be standardized as much as is feasible.

The purpose of this technical memorandum is to review best practices and provide design requirements that specify these standardization requirements and to list applicable industry standards, codes, and guidelines to:

- Define the physical footprint of each type of Traction Power Supply Station (Supply Station with High Voltage Utility circuits, Switching Station, and Paralleling Station).
- Define the land needed to be obtained to allow installation of each type of Supply Station.

  Note: All TPSS sites must be located within 100 feet of the CHST alignment to minimize the length of the duct banks between the supply stations and the track.

- Define the requirements for access to and maintenance of the supply sites.
- Allow for the consistent sizing and standardization of all TPSS equipment including transformers, switchgear, and bus systems.
- Allow for standardized duct banks and cable sizing, and routing

  Note: The last two items not are discussed in the text and will be defined and discussed when the traction power equipment is identified.

Development of the general design criteria for the Traction Power System will include review and assessment of, but not limited to, the following:

- Standardized layouts and equipment configurations for each type of supply station.
- Size of sites required for each type of supply station, including vehicle access.
- Existing FRA, CPUC General Orders, NESC, IEEE, NFPA, and AREMA guidelines where applicable to the Traction Power Supply Station equipment and sites.
- The gathering and analysis of existing international standards, codes, best practices, and guidelines used on existing high-speed train systems for applicability to CHST Supply Station sites.

6.0 DESIGN MANUAL CRITERIA

6.1 TRACTION POWER SUPPLY SITES GENERAL STANDARDIZATION REQUIREMENTS

6.1.1 Footprint

Approximate footprints for the traction power supply sites:

1. Traction Power Supply Stations with two high voltage Utility Supply Circuits – 200 ft X 150 ft
2. Traction Power Supply Switching Stations with 4 - 2 x 25kV Autotransformers – 120 ft X 80 ft
3. Traction Power Supply Paralleling Stations with 2 – 2 x 25kV Autotransformers – 100 ft X 80 ft

6.1.2 Equipment and Vehicle Access

The conceptual layout of Equipment and Vehicle Access are shown in Figures 1, 2 and 3.

6.1.3 Approximate Spacing

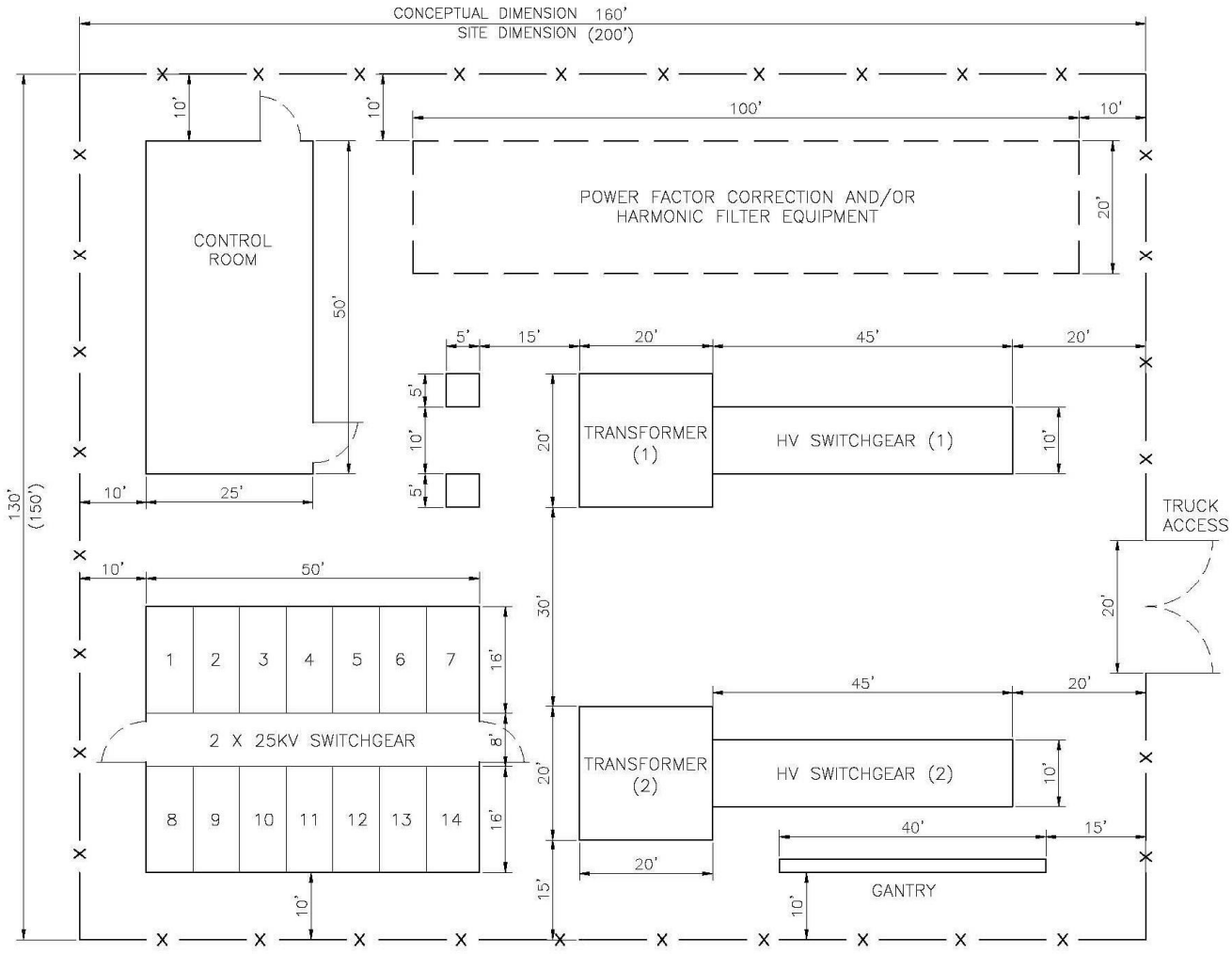
1. Supply Station Sites at 30 mile intervals along the HSR right-of-way
2. Switching Station Sites midway between Supply Station Sites
3. Paralleling Station Sites at approximately five-mile intervals between Switching and Supply Station Sites

6.1.4 Maximum Distance from Right of Way

The trackside fence for all types of Traction Power Supply Stations shall not be more than 100 feet from the center of the CHSR right of way

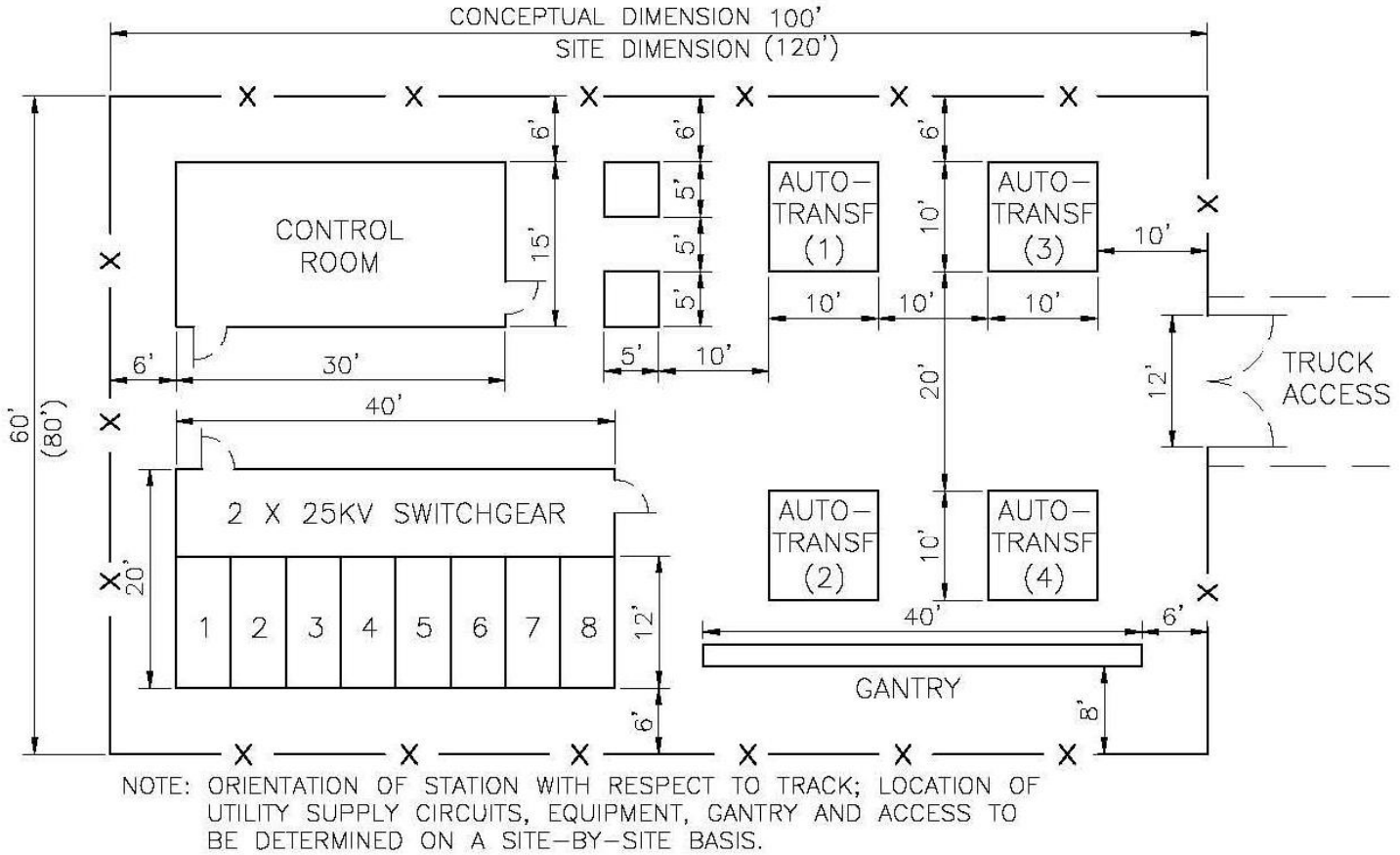
6.1.5 Location along the Right of Way

Once preliminary site locations have been selected Traction Power Simulations will be performed to confirm that the spacing and locations are acceptable for the required performance of the Traction Power Supply System.



CONCEPTUAL LAYOUT – SUPPLY STATION
WITH 2 UTILITY SUPPLY CIRCUITS

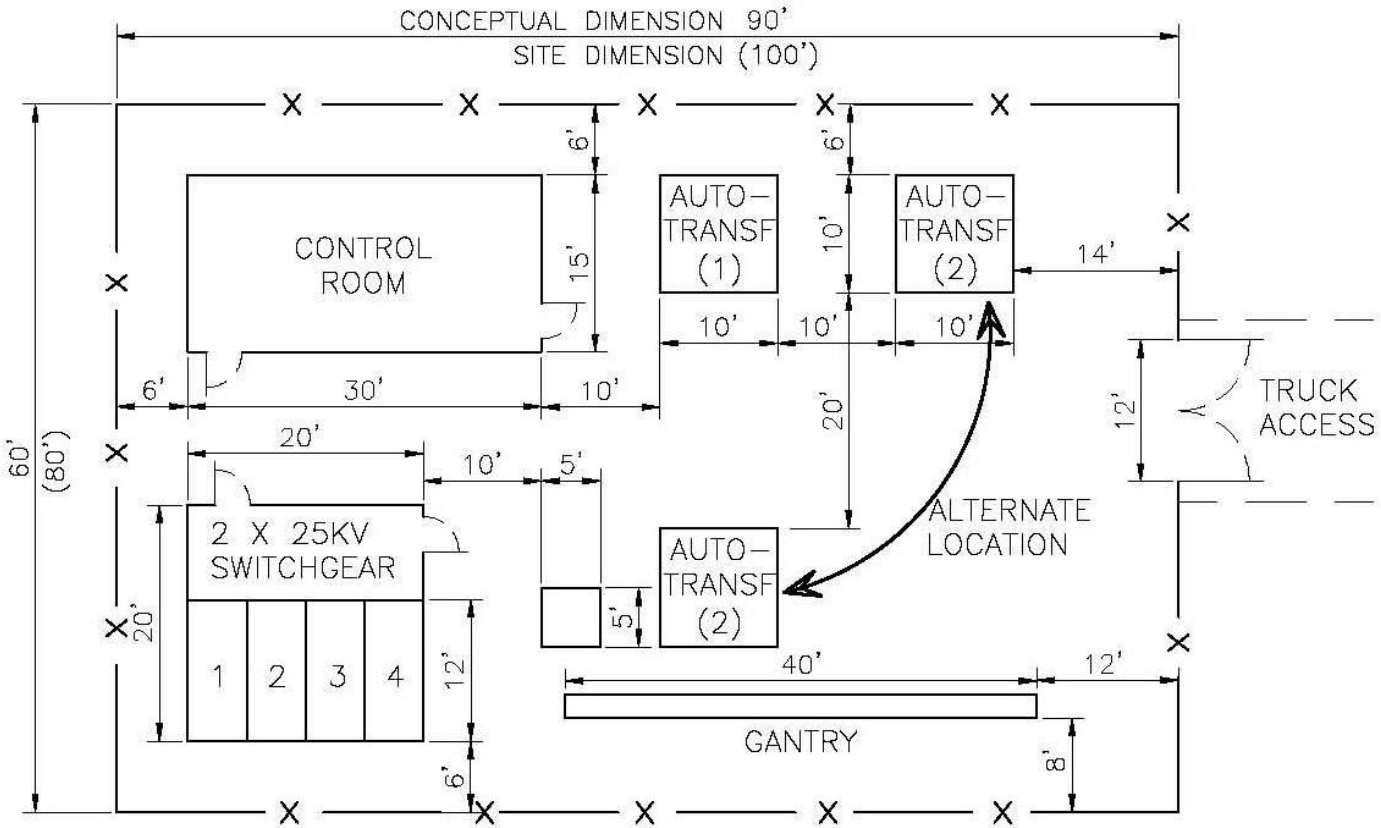
FIGURE 1



NOTE: ORIENTATION OF STATION WITH RESPECT TO TRACK; LOCATION OF UTILITY SUPPLY CIRCUITS, EQUIPMENT, GANTRY AND ACCESS TO BE DETERMINED ON A SITE-BY-SITE BASIS.

CONCEPTUAL LAYOUT – SWITCHING STATION 4 AUTO TRANSFORMER

FIGURE 2



NOTE: ORIENTATION OF STATION WITH RESPECT TO TRACK; LOCATION OF UTILITY SUPPLY CIRCUITS, EQUIPMENT, GANTRY AND ACCESS TO BE DETERMINED ON A SITE-BY-SITE BASIS.

CONCEPTUAL LAYOUT – PARALLING STATION 2 AUTO TRANSFORMER (WITH ALTERNATE LOCATIONS)

FIGURE 3