



25 August 2011

To: Regional Managers/Regional Engineers
Fr: Ken Jong, Engineering Manager
Re: Notice to Designers No. 6 – Stand Alone Radio Sites

Please see the attached internal memo for guidance regarding the identification of sites for stand alone radio sites in support of the train control system and other communications during operations.

The primary design issue for the 15% Design is to identify any restrictions in locating these radio sites which consist of a small site and a 100-foot tall monopole. Most notably would be height restrictions in the vicinities of airports, but we need to understand if there are any other restrictions that might impact the ability to site these locations as outlined in the guidance memo.

At this time, we are only requiring feasibility statements from each Regional Manager that no restrictions have been identified along their section or identification of locations where there may be potential restrictons. It is important that we identify any restrictions to determine what if any mitigation or other design actions are needed to implement the communications system.

Please be sure to confirm feasibility for both the stand alone sites as well as the planned radio sites at each of the substations.

Please contact Brad Banks if there are any questions in implementing the technical aspects of this notice.

cc: Hans Van Winkle, John Popoff, Mike Gillam, John Chirco, Rick Schmedes, Brad Banks, Mosies Gutierrez, Ann Koby



August 25, 2011

To: Regional Managers/Regional Engineers

Fr: Rick Schmedes, EMT - Systems Manager

Re: Requirement for Identification of Standalone Radio Sites at 2.5 mile Intervals

Purpose:

This memorandum establishes the requirement for the Regional Teams to identify sites for radio communications facilities between traction power facilities at approximately 2.5 mile spacing. The rules for locating the sites are described below, and the two attached drawings show the size of the required sites and the relative positioning of them with respect to other wayside facilities.

Background:

The radio communications system for the CHSTP is a critical element to the safe, reliable and efficient operation of the California High Speed Rail System. The radio system will support voice, Automatic Train Control (ATC), data and video to the high-speed trains, as well as voice and data to operations, maintenance, and security personnel. Therefore the radio system must be configured as a secure, multi-functional network which connects wayside elements with the mobile units throughout the right-of-way.

General Requirements:

The EMT has previously given direction to the Regional Teams to provide space accommodations for a communications house and radio tower at a spacing of approximately 5-miles. This is accomplished through the co-location of radio sites within or adjacent to traction power (TP) facilities (Substations, Paralleling Stations, and Switching Stations), signaling equipment houses, and tunnel portal sites. This 5-mile radio tower spacing was chosen to accommodate adequate tower spacing to implement a GSM-R based system within standard GSM-R (876 MHz — 880 MHz and 921 MHz — 925 MHz) frequencies, or other radio system at or below these frequencies.

However, due to the lack of available frequency spectrum in the target range, propagation simulations have been performed by the EMT at frequencies above 900 MHz. These simulations have determined that a redundant radio system with coverage of the entire route will require 100ft. towers with a spacing of 2.5 miles. This spacing will provide for greater flexibility in design, more easily allow redundant coverage for a single site dropout, and reduce environmental permitting and site acquisition scheduling risks.

Specific Requirement:

Therefore, the EMT team directs the Regional Teams to provide additional Standalone Radio Sites with a 100 ft tall tower and communications shelter and to include the facility in the 15% or 30% design, as well as the environmental permitting and property acquisition processes (including the 100 ft tall tower and access road) and undertrack conduits (allowing far-side cable trough cabling to reach the Standalone



Radio Site). These Standalone Radio Sites shall be placed only relative to the Traction Power Facilities, Signaling Equipment Houses, and Tunnel Portal Facilities such that the linear distance between any two radio towers is nominally 2.5 miles and no greater than 3 miles. The attached drawings present the sizing and typical spacing guidance for the Regional Consultants to be used in the selection of suitable locations for these Standalone Radio Sites.

The regional teams shall evaluate spacing between the Traction Power Facilities, Signaling Equipment Houses and Tunnel Portal Sites and use the following criteria to place Standalone Radio Sites:

Spacing between adjacent Traction Power Facilities, Signaling Equipment Houses and Tunnel Portal Sites	Rule for Placement
Greater than 0 miles and less than or equal to 3 miles	No Standalone Radio Site required - Do Nothing
Greater than 3 miles and less than or equal to 6 miles	Place a single Standalone Radio Site equidistant between adjacent sites
Greater than 6 miles	Multiple Standalone Radio Sites shall be placed between the existing sites to achieve a uniform spacing no greater than 3 miles between all sites.

Standalone Radio Sites shall only be placed at above-ground locations. As Regional Consultants evaluate and show alternative site locations for Traction Power Facilities, Signaling Equipment Houses and Tunnel Portal Facilities, accompanying Standalone Radio Sites (as per above placement rules) shall be allocated as well.

Reference Set of Drawings:

Reference drawings have been prepared to provide guidance to the regional consultants about the level of design effort to be done and details to be presented in their drawings. These drawings are also intended to maintain uniformity in the design submissions among different regional consultants.

This set includes:

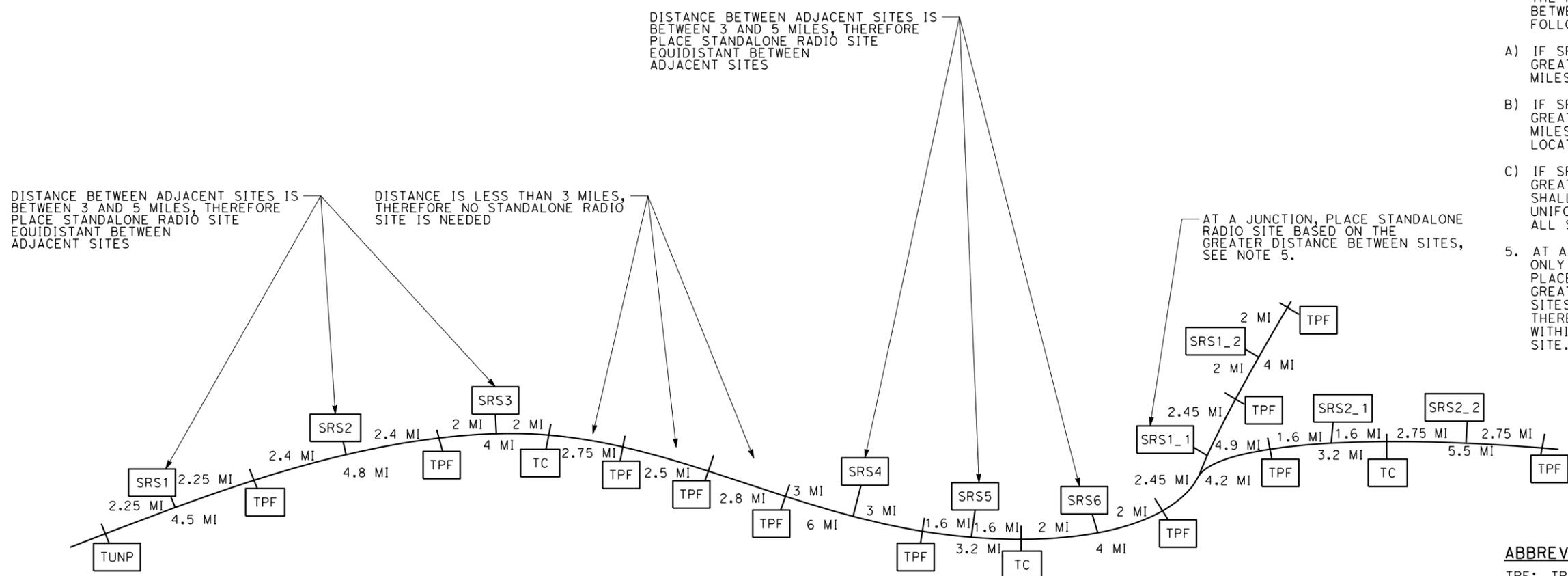
- A typical site plan for an individual Standalone Radio Site
- A typical key plan showing the rule for placing Standalone Radio Sites,

The submission of a similar key plan showing Standalone Radio Sites, their numbering and distance from adjacent sites in the regional consultants' drawing package will facilitate understanding of the design and expeditious review of the same.

Questions are to be addressed to the EMT Team. Contact Bradley Banks at banksb@pbworld.com.

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PRELIMINARY
 NOT FOR CONSTRUCTION



NOTES:

1. THIS DRAWING SHOWS A TYPICAL SITE PLAN FOR STANDALONE RADIO SITES (SRS). DISTANCES SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY AND ARE NOT TO SCALE. STANDALONE RADIO SITES MAY BE LOCATED ON EITHER SIDE OF TRACK. THE REGIONAL CONSULTANT IS TO USE THE NOMENCLATURE SHOWN TO LABEL THE STANDALONE RADIO SITES, AND DEFER TO BROAD NOMENCLATURE DIRECTIONS THAT MAY LATER SUPERCEDE THESE NOTES.
2. STANDALONE RADIO SITES ARE SITES DEDICATED TO RADIO USE ONLY AND HOUSE A RADIO TOWER AND COMMUNICATIONS SHELTER. SEE DRAWING TM 3.4.2-F FOR SITE PLAN. STANDALONE RADIO SITES ARE PLACED TO INSURE THE LINEAR DISTANCE BETWEEN ANY TWO RADIO TOWERS IS APPROXIMATELY 2.5 MILES AND IN NO CASE SHALL BE GREATER THAN 3 MILES.
3. STANDALONE RADIO SITES SHALL BE PLACED RELATIVE TO THE FOLLOWING SITES WHICH HOUSE A RADIO TOWER: TRACTION POWER FACILITIES (SUBSTATIONS, SWITCHING STATIONS, PARALLELING STATIONS) (TPF) TRAIN CONTROL FACILITY (TC) TUNNEL PORTAL FACILITIES (TUNP)

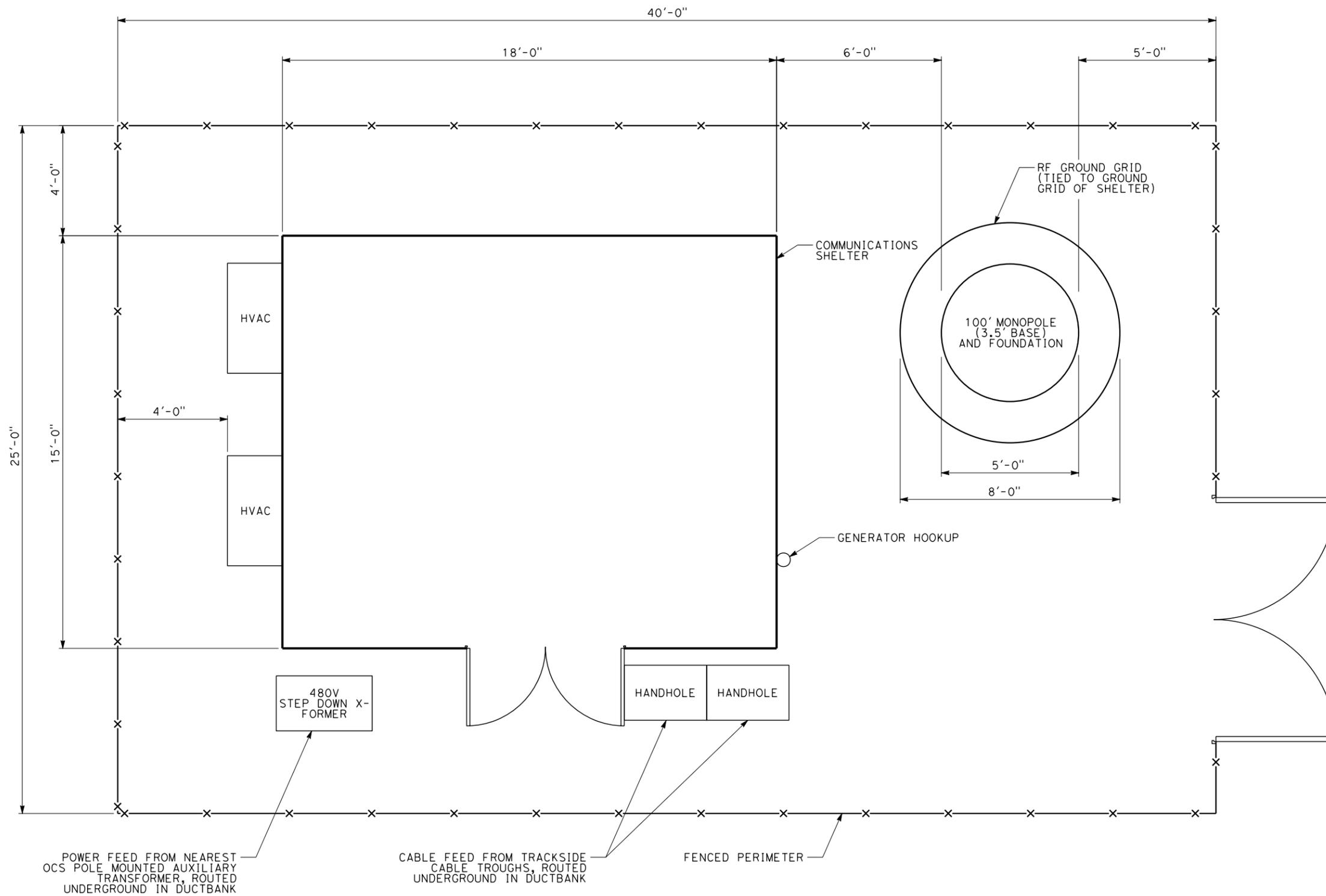
THE REGIONAL CONSULTANT IS TO EVALUATE SPACING BETWEEN THE TPF, TC AND TUNP SITES AND USE THE FOLLOWING CRITERIA:
 - A) IF SPACING BETWEEN TPF, TC AND TUNP SITES IS GREATER THAN 0 MILES AND LESS THAN OR EQUAL TO 3 MILES, NO STANDALONE RADIO SITE IS TO BE PLACED.
 - B) IF SPACING BETWEEN TPF, TC AND TUNP SITES IS GREATER THAN 3 MILES AND LESS THAN OR EQUAL TO 6 MILES: A SINGLE STANDALONE RADIO SITE SHALL BE LOCATED EQUIDISTANT BETWEEN THE SITES.
 - C) IF SPACING BETWEEN TPF, TC AND TUNP SITES IS GREATER THAN 6 MILES: STANDALONE RADIO SITES SHALL BE LOCATED BETWEEN THESE SITES TO ACHIEVE A UNIFORM SPACING NO GREATER THAN 3 MILES BETWEEN ALL SITES.
5. AT A MAIN LINE JUNCTION OR MAIN LINE TRACK SPLIT, ONLY A SINGLE STANDALONE RADIO SITE SHALL BE PLACED. THE REGIONAL CONSULTANT IS TO USE THE GREATER OF THE DISTANCES BETWEEN TPF, TC AND TUNP SITES IN EVALUATING PLACEMENT CRITERIA IN NOTE 4. THERE SHALL NEVER BE A STANDALONE RADIO SITE WITHIN A 3 MILE RADIUS OF ANOTHER STANDALONE RADIO SITE.

ABBREVIATIONS:

- TPF: TRACTION POWER FACILITIES (SUBSTATIONS, SWITCHING STATIONS, PARALLELING STATIONS)
- TUNP: TUNNEL PORTAL FACILITIES
- SRS: STANDALONE RADIO SITE
- TC: TRAIN CONTROL FACILITY

DATE: 08/10/11

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NOTES:

1. TYPICAL STANDALONE RADIO SITE CONFIGURATION SHOWN BASED ON EXPECTED EQUIPMENT COMPLEMENT AT SITE TO BE USED FOR SPACE PLANNING PURPOSES.
2. ACCESS ROAD NOT SHOWN. O&M PARKING SPACES ARE LOCATED EXTERNAL TO THE SITE FENCE LINE.
3. TOTAL CLEARED AREA AROUND FENCED PERIMETER SHALL BE MINIMUM 40'X60' TO ACCOMMODATE INSTALLATION OF TOWER AND SHELTER.
4. BASED ON ROHN 100' MONOPOLE T100HA:
 - A) TOWER EMBEDMENT DEPTH ASSUMED TO APPROXIMATELY 25 FT. TOWER BASE AND FOUNDATION ASSUMED TO BE 5 FT. DIAMETER.
 - B) THESE ASSUMPTIONS SHALL BE VALIDATED BY DESIGN FOR SOIL AND ENVIRONMENTAL CONDITIONS.

DATE: 08/10/11