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Sophisticated Mapping for Increasing Railway Capacity

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When the Burlington Northern Santa Fe Railway Company (BNSF) wanted to increase the capacity of its rail network in California, they required an accurate survey of the existing rail infrastructure along the 453-mile route from Barstow to Oakland. BNSF hoped to expand the existing rail line with additional main-line tracks within its right-of-way (ROW), so Merrick & Company was contracted to provide all of the necessary geospatial data products to support this analysis.

BNSF's analysis required advanced topographical evaluation of the ROW boundary, which called for the acquisition of LiDAR elevation data suitable for generating one (1) foot contours. In addition, digital orthophotography was simultaneously collected with the LiDAR at a 0.25 foot ground resolution to support 1'=100' planimetric mapping.

Due to numerous curves, elevation and terrain changes along this rail corridor, various innovative geospatial techniques were developed and utilized. Survey ground control was established every 5th mile along the rail line. As ground control was being established, survey crews dealt with the issue of crossing three (3) state plane zones. Working closely with BNSF, the decision was made to divide the 453-mile corridor into segments determined by combined factors that would yield less than 0.1' error along its length. In addition, Merrick developed projection files to allow all railway segments to accurately line up across the entire length of the rail line. Upon completion of the air and ground mapping, a comprehensive desktop GIS viewing application was developed by Merrick to view all of the project data including orthophotos, contours and railway planimetric features.

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While mapping the BNSF right-of-way presented many challenges unique to railways, the combined geospatial techniques developed in this project can be directly translated to similar corridor projects, including interstate highways, pipelines and high-voltage electric transmission lines.