

CASE STUDY / ELECTRIC UTILITY ARCGIS UPGRADE

# COMPREHENSIVE ARCGIS UPGRADE ENABLES NEW EFFICIENCIES FOR LARGE UTILITY

For many utilities, technology tools like ArcGIS can present new options for updating and managing drawings and documentation. This solution proved optimal for a utility on the West Coast in integrating thousands of inconsistent drawings and related materials into a new documentation suite backed by a geospatial database. The solution provided a range of new options for operations, maintenance and new construction.



# EFFICIENCIES REALIZED WITH CONVERSION TO ARCGIS AND AUTOCAD

Conversion of decentralized documentation has enabled numerous efficiencies for operations, maintenance and construction at a large West Coast utility.

### **PROJECT STATS**

**CLIENT** Confidential client on West Coast

**LOCATION** Western U.S.

75 SITES (PHASE 1) 250+ SITES (ALL PHASES)

#### CHALLENGE

For a large investor-owned electric utility on the West Coast, utilizing a number of legacy systems had resulted in disjointed and inefficient procedures for tracking and maintaining essential engineering drawings, asset inventories and other documentation.

The substation group, for example, used AutoCAD for drawings, while the telecom group used MicroStation. Further, each group maintained its own unique borders and drawings standards.

Due to the decentralized and fragmented nature of the legacy drawing system, engineers had trouble locating the appropriate base drawings to work from for new design, and operations and maintenance workers often had difficulty locating accurate and up-to-date drawings for as-builts or new installation work. Further, relevant design information was spread over many drawings. A relatively small update, like moving a piece of equipment in a rack, could lead to cascading drawing updates affecting dozens or even hundreds of drawings. As a result, significant investments of time were required to complete new designs, resolve drawing issues and keep documentation records up to date.

#### SOLUTION

Like many utilities nationwide, this utility has launched a comprehensive telecommunications system upgrade to accommodate a host of new demands. Burns & McDonnell was contracted to provide design support for the network upgrade, and for which new design work would occur at almost all telecom equipment locations, including all major substation, generation and office locations. It was a perfect time to modernize the telecom group's documentation system.

After trial and analysis, a customized ArcGIS Pro system was selected to form the primary system of record for telecom system site design and equipment interconnectivity. ArcGIS Pro offered the ability to track equipment assets and interconnectivity in a single view, enhancing geographic awareness of assets, along with industry and utility adoption. It delivers the power of a back-end database for bulk updates and data analysis. Esri's ArcGIS software is a geographic information system for working with maps and geographic information. Although ArcGIS is essentially a geospatial program, its database support and two-dimensional layout functionality allowed the development of telecommunications network one-line diagrams approximating legacy Visio and CAD diagrams, as well as support for other key assets of interest such as



building and facility site layouts. This gives engineering designers and O&M staff the ability to utilize a database in which they can access a single source of trusted information for equipment wiring and connectivity.

The ArcGIS Pro system has not been utilized exclusively, however, and its use has been complemented with certain CAD drawings. These CAD drawings were updated to utilize new standard naming conventions and a standard border with defined data fields to support integration and automation with the Vault drawing management system, providing consistency with standards being utilized by the substation and generation groups.

The file conversion process to migrate from MicroStation to AutoCAD for CAD files to match the substation group standards required creation of a script file based on LISP programming incorporated into AutoCAD. This automation programming enabled economical reformatting of the legacy drawings with the click of a button. The output was a drawing with a new title block and up-to-date layers preserving the aesthetics of the original drawing content, with minimal need for manual updates of the files. The process enabled a seamless and labor-efficient process to convert large batches of legacy drawings to the new file format.

### RESULTS

Because ArcGIS is a geospatial program, it has capabilities beneficial for asset management. Items like battery systems now include an accurate geographic representation of their location along with other key data such as make, model and system capacities, all easily retrievable as a database (or table) within the geospatial program.

This functionality allows sophisticated data analysis that would have been prohibitive due to time and cost of labor previously. For example, the telecom assets at a site can be quickly and easily identified, along with installation date and status (decommissioned, planned, existing, future). All locations of a certain equipment make and model could be easily identified, and analyzed by installation date, to isolate a manufacturer issue for example. Previously, most of this information was contained within CAD files grouped by site, such that an individual could not provide a comprehensive report on major telecom or other assets without review of hundreds or thousands of individual CAD drawings.

Conversion of vital system documentation and other information has enabled legacy documentation dating back many decades to be modernized and centralized, in part because AutoCAD and ArcGIS have developed interfaces to allow efficient, high-volume updates.

In the future, O&M staff will have the capability to access ArcGIS on mobile devices. This ease of access will pay dividends for workflow planning, efficient design updates, routine maintenance and asset analysis. With information aggregated within ArcGIS, it will no longer be necessary to search through drawing sets of 50 pages or more. This reduces design time and the potential for errors. The database also can accommodate new information on devices, components and other assets that have been installed as systems are upgraded.

This ongoing conversion is preserving the functional data needed by engineering and technical staff by maintaining drawing sets on the AutoCAD system while meeting complementary needs through utilization of the ArcGIS system. Specific drawings for rack elevations, building layouts or other site-specific elements are still accessible within the CAD format, all with precise dimensions or other detailed specifications. Meanwhile, high-level representations of the whole system needed by other utility personnel are now available in ArcGIS formats.

This innovative combination utilizes the best features of industry-leading CAD and GIS programs is giving the utility the flexibility to easily upgrade for new software, while also troubleshooting and adapting its network for future demands that are likely to be ever-evolving.



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