

Task Agreement Number: J1596090174      Cost: \$12,000.00

Park: Zion National Park and Cedar Breaks National Monument

Investigator: David Maxwell      Project: FMSS Building Data & Infrastructure Collection

Start date: July 20, 2009      End Date: February 28, 2011      Project Number: SUU-17

### **Final Report: Brief Report Abstract - September 13, 2010**

The following is a brief summary report of the project completion.

This project was designed to complete the field data collection of all building in Zion NP and Cedar Breaks NM, as well as start the initial research for compiling utilities infrastructure. The project started field collections early fall 2009 and continued through late spring 2010. Most data manipulation, editing, and database integration took place over the winter months and late spring and early summer 2010. Initial training and safety orientation was completed with cooperation of the NPS and Matt Betenson. NPS personnel provided safety equipment, park vehicles, and radios as needed in order to accommodate a professional and safe environment. No restricted access was required to complete this project and NPS personnel were not required to escort anyone for GPS field collection. Many thanks to the NPS personnel who helped make this project a success.

Building data was collected both in Cedar Breaks and Zion. Only a few buildings in the higher elevations in Zion required a return trip late summer 2010 by an IIC NPS employed student, to complete a few buildings. All GPS data collection was completed using a Trimble Geo-XH and differentially corrected with Trimble H-Star technology, all base points exceed the 120 static positions and the 1 meter horizontal accuracy standard of this project. Areas in Zion where poor GPS singles could affect the building foot print, a True Pulse 360 laser ranger was used in conjunction with a tripod for acquiring building corner offset. These data were compared to aerial photography (1foot, and 1 meter) where available. In addition FM CAD drawings were consulted for comparison and building placement if needed. The True Pulse laser Range finder was provided by the NPS and was returned on completion of field collection.

GIS data integration into the NPS database was required for this project and all the FMSS identification numbers (GUID) that existed were used to properly link to polygon geometry to NPS database files. There were several new buildings were new GUID's were required to be generated. In this case the actual NPS database records were updated to match the new derived building GUID's to allow for a 100% link to existing NPS FMSS database tables. In addition to building data collection the project time allowed for a feasibility study of ZION NP utilities infrastructure. A small portion of the FM hard copy maps were scanned at SUU for proof of concept. These scans were used in a testing the ability to georeference them to existing utilities. CAD drawings were also looked at as potential sources of information. We found that the two sources of information were lacking accurate dates and did not always correlate to ground truth. They were useful in compiling an initial assumed base infrastructure of utilities. It would be our recommendation that GPS field collection be used to collect visible infrastructure, such as hydrants, meters, transformers, power poles, etc. After which this field data will be used to georeference FM maps with the intent to extract underground utilities.

There are no materials and/or equipment that have not been returned to the NPS. All GPS data, GIS files and maps have been delivered to the NPS. All verbal verification has been received for project completion and all that remains is the receipt of this final report.