

Joliet army ammunition plant survey

During and after WWII, the Joliet Army Ammunition Plant was used extensively by the US Army for the purpose of manufacturing, loading, assembling, packing, and shipping of bombs, projectiles, fuses, and supplementary charges. However, after lying dormant since 1976, April 1993 saw the property declared as excess by the Army and, in the wake of a huge rejuvenation effort, the land is being cleaned-up and transferred to various Federal, local and state jurisdictions. The site will ultimately be transferred in large part to the U.S. Forest Service to become a nature area.

However, before the land could be transferred, the Army had to provide an accurate map of all buried structures and an assurance that the sewer system did not pose an explosive hazard.



Existing maps of the system were incomplete and too inaccurate to effectively locate, map, and assess the explosive and TNT contamination status of the underground sewer system. As such, the re-mapping and digital representation of the area - as required to conduct the safety assessment - posed a large scale data-collection task. As part of this process, a survey of all manholes sewer mains, laterals, catch basins, surface inlets, and septic connections comprising the sewer system was required - Surveylab's ike was identified as the ideal data capture device for this task.

Prior to the field work taking place, ArcPad Application Builder was used to create forms for ike's LCD display to allow relevant data to be collected for all of the features known or anticipated to occur at the Joliet site. These forms allowed the field team to capture and record all key attributes of each feature and allowed for five separate photos to be associated with each point recorded.

Once the relevant manholes and other surface structures were located, ike was used to map and catalogue details of these points of interest; the GPS coordinates obtained were later used to develop a complete, digital map of the sanitary and storm sewer system lying beneath the decommissioned plant.

The fieldwork itself took place over four separate visits to the Joliet site. Over this time, the survey team used ike to record critical data over the vast geographic area, relating to all important site features. ike proved particularly efficient for this task as its integrated mix of technologies allows targets to be captured and documented from a distance, significantly reducing time spent physically visiting each target. The mapping of single-point features such as manholes and hydrants typically required just a single laser shot in the middle of the object, whilst roads, fences, and buildings required different approaches to depict the terrain.

The mapping of roads required points selected on the centerline where there was transition from a straight line to a curve, whilst mapping of the fences required close proximity so that the laser did not overshoot, or shoot through, the weave. Similarly, the mapping of buildings

required a single point at each vertex, which were then combined to give a geometric representation.

In total, 791 points were captured during the field data collection using ike, with an average of 22 points captured per hour. A total of 60 sewer manholes were recorded during the project. At many of these manholes, the ArcPad form was used to record attributes regarding the manhole inlets and outlet. Bearings and diameters were taken for each of the pipes connected to the manhole chamber; these bearings were later used in ArcMap to connect the manholes to either the sanitary network or storm network. The 305 building vertices that were recorded were later used to draw the polygonal building features.

In total, the water system was comprised of 13 manholes, 12 water hydrants, and 17 valve controls interlaced in a network that encircled the group. The storm system was comprised of 35 manholes, 23 related structures, and an outfall set within a network that basically bisected the group east-west and channeled storm discharge to both the east and the north. The sanitary system was comprised of 25 manholes, 3 sanitary structures, and 7 septic tanks set within a network covering a large geographic area.

Through using ike in conjunction with the ArcMap and ArcPad software, the field team was able to successfully overcome this large-scale data collection task, and produce a comprehensive series digital maps of the Joliet Army Ammunition Plant area. The use of this particular tool significantly reduced time spent in the field collecting raw data, whilst its ability to integrate with other required stages in the mapping process meant this daunting task was carried out with unparalleled efficiency.