

MILITARY BASE CONVERSION AND THE BENEFITS OF GIS

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ABSTRACT

To most people, Military Base Conversion does not bring to mind GIS. However, the application of GIS to Military Base Conversion has proven to be an immense benefit to McClellan Business Park, formerly McClellan Air Force Base. The ability to distribute multiple layers of diverse geographic information to the McClellan Business Park development team has aided greatly in expediting access to pertinent facility and land transaction information. Geographic and technical information that was previously only available through engineering, environmental and architectural firms has been brought to the desktop. Information regarding hundreds of buildings, aircraft hangers, previous uses, toxic soil conditions, wetlands, land transfers and lease agreements are now easily accessible. This paper will offer insights to the effective use and benefits of digital mapping. It will also explore the implementation of an Arc Reader Document to aid in the retrieval of a diverse library of technical information.

INTRODUCTION

Large military bases are generally designed for heavy industrial uses and have significant infrastructure. When a military base closes, the presiding managers and operators do not linger and what remains is quite literally a ghost town. There is no operating manual.

The above scenario is what faced the County of Sacramento and the future property managers of McClellan Air Force base when they assumed control of the former military base. From the very early planning stages of the conversion and for the past several years, GIS technology has been a constant attendant. It has proven itself as a particularly useful tool in assisting the new stakeholders, consultants and property management staff to better understand the infrastructure, buildings, and multiple layers of diverse information of all things geographic, concerning the expansive 3,000 acre site.

FROM MILITARY TO CIVILIAN

The Base Realignment and Closure (BRAC) process was initiated in the 60's during the Kennedy Administration when it was established that the magnitude and number of military bases generated from World War II and the Korean Conflict could be reduced. When the Cold War of the 60's, 70's and 80's dissipated, it became evident that additional military bases could be closed or re-aligned to become more efficient.



McClellan Air Force Base located in Sacramento, California, was assigned to close on July 1, 2001. Initially established in 1935 as the Pacific Air Depot, it was expanded significantly and served as an overhaul and repair facility for aircraft during World War II. It grew to be one of the largest of four such Depots in the United States. During World War II, McClellan served as an overhaul facility for nearly all fighters, bombers and other aircraft that were assigned to the war in the Pacific Theater. This included Jimmy Doolittle's B-25's that were destined for a historic raid on Tokyo, Japan.

After World War II, McClellan continued to grow throughout the Cold War as an Air Logistics Base with highly technical staff and repair facilities for more modern day fighters and aircraft systems as well as satellite tracking and nuclear event surveillance.

All this activity produced a significant number of buildings, warehouses, hangers and offices. At the time that McClellan closed, it occupied over 3,000 acres and had an inventory of nearly 1,000 buildings, a two mile long runway, several miles of sewer, water and storm drain infrastructure and a tremendous amount of concrete flight line area.

When McClellan closed, the agreement between the Federal Government and the County of Sacramento was that the county would receive the lands of McClellan but there was a catch. The Environmental Protection Agency had declared McClellan as a Superfund Site. Due to previous maintenance operations and research and development activities, substantial amounts of industrial waste by-products were deposited at pits and landfills around the base using typical disposal practices of the time. This practice ultimately resulted in groundwater contamination and to a lesser degree, soil contamination, that remains today. Cleanup and remediation of these areas would need to be accommodated prior to land transfer to the County.



Aircraft Maintenance and Repair

The County of Sacramento was interested in portions of the base but was not eager to take on or manage the formidable process of closure and subsequent reuse of the entire military base. After all, McClellan basically represented the equivalent of a small city and the County did not have the experience of property management that would be required to meet the task. The County of Sacramento made the decision to select and designate a more experienced partner to handle the real-estate management of the military base. This partner would bring real-estate and land development experience to the team and also equity to assist in future development projects. The formula became

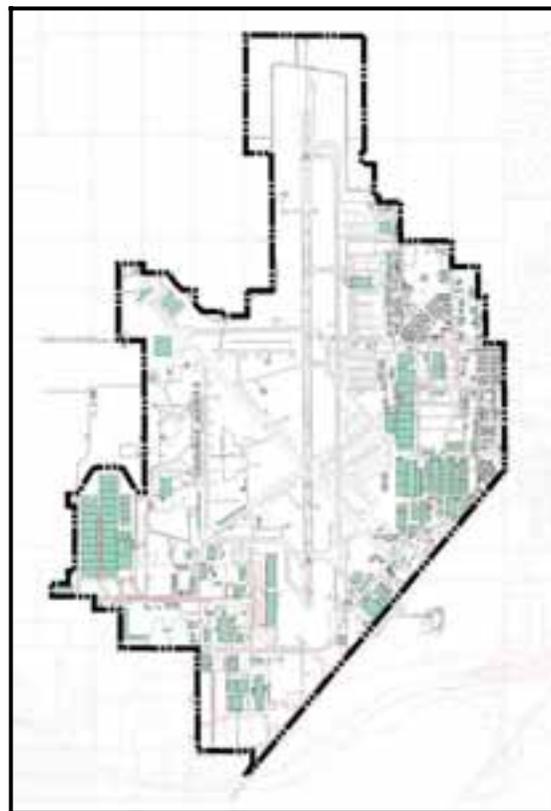
one of the most successful base conversion endeavors in the United States. That partner became known as McClellan Business Park (MBP) and is the third tier owner of the former McClellan Air Force Base real-estate.

The land ownership hierarchy is structured in the following way. The land and facilities are owned by the Department of Defense. Once environmentally hazardous areas are cleared and designated as usable, they can be transferred to the County of Sacramento. The County in turn retains areas that they desire and transfers the remainder to MBP.

This scenario sounds reasonable and easy to follow. However, due to certain regulatory procedures that must be met regarding groundwater contamination and the configuration of land use areas, this series of transactions can rapidly become difficult to follow.

THE MOTIVATION TO EMPLOY GEOGRAPHIC INFORMATION SYSTEMS

When McClellan Business Park took on the responsibility of real-estate management, it faced the task of managing over three thousand acres of land with hundreds of buildings and the infrastructure systems that were needed for support and operations. It also assumed the task of finding tenants for the millions of square feet of leasable building space. MBP consists of over 10 million square feet of usable floor space with another 6 million square feet of floor space available for development. That equates to nearly 370 acres of floor space. A very large problem had been established and it needed an efficient solution.



McClellan Business Park

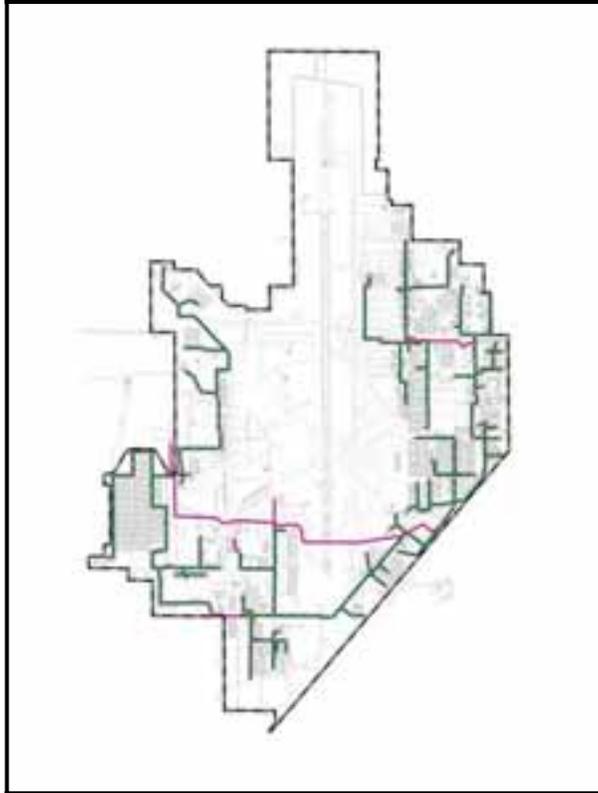
The perfect resolution was at hand; Geographic Information Systems (GIS) technology. Nolte Associates, Inc., a Sacramento based engineering firm, had been chosen to perform infrastructure master plan studies and determine infrastructure viability for the existing sanitary sewer and storm drain systems. Nolte also had GIS capability and offered to provide GIS services to explore the possibilities of organizing the vast amounts of geographic information in order to make it understandable to the County and to MBP.

Fortunately, two very key pieces of the puzzle were provided by the Air Force. The first was a Computer Aided Design (CAD) drawing of the base. The second was a database of existing buildings. The CAD drawing provided outlines of all the buildings, roadways, fences, runways and taxiways and additionally provided layers of underground infrastructure. Those layers included Sanitary Sewer, Water and Storm Drain Systems. The building database provided building numbers, historic uses, square footage and other pertinent building information.

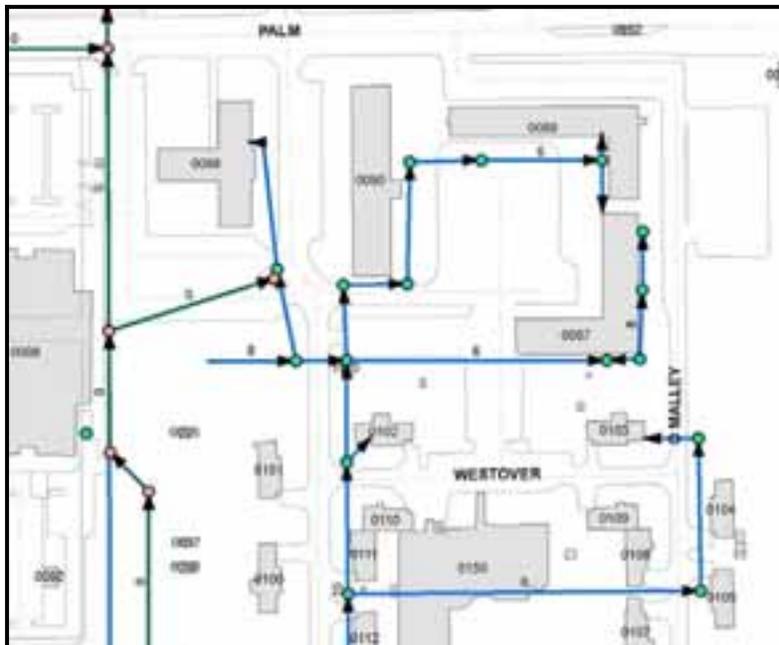
A plan was immediately implemented to use GIS to assist in extracting infrastructure information from the CAD drawing for Sanitary Sewer, Water and Storm Drain system master plan studies. Additionally, GIS was used to inventory other elements within the CAD drawing such as buildings, roadways, railways, runways and other facilities. The buildings were then joined to the buildings database to graphically depict various attributes of the buildings such as building number, square footage, structure condition, historic use, proposed use and other relevant information. This capability would become very helpful to the MBP real-estate management team in the future.

INFRASTRUCTURE MASTER PLAN STUDIES

An abrupt realization was made as soon as infrastructure master plan studies began. Federal agencies such as the Department of Defense do not necessarily adhere to local building or engineering standards when designing and building facilities within a military compound. Since development of the former military base proceeded on an as needed basis without the benefit of long range pre-planning, substantial portions of the underground infrastructure systems were undersized, poorly maintained and of questionable condition. As these systems were studied and evaluated, GIS technology allowed exhibits to be created that clearly indicated the system configurations, system condition and specific operative system components.



Sanitary Sewer System



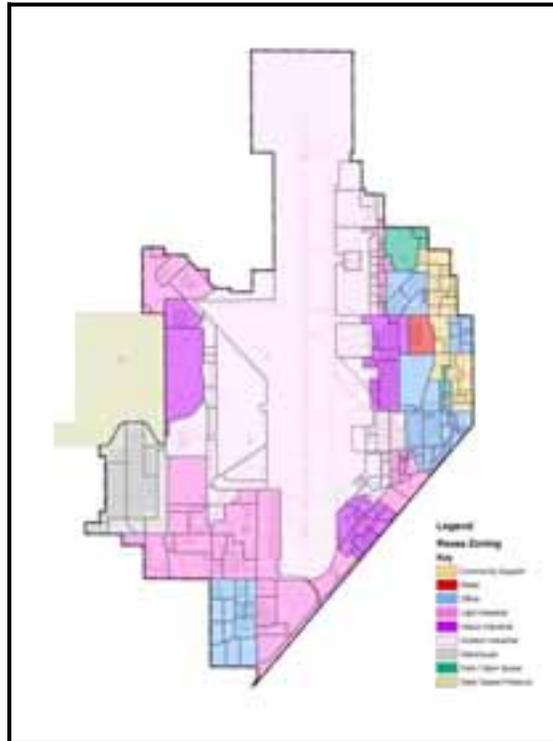
Sanitary Sewer System

These GIS exhibits provided pertinent infrastructure systems information that could be understood by the various groups and agencies involved in their analysis. As the master

plan studies progressed, additional information of discovery was added to the exhibits to keep all parties apprised of the information.

LAND AND PARCEL CONFIGURATION

As with infrastructure, the Department of Defense did not observe typical standards for parcel configurations or lot lines. When additional lands were needed for expansion, adjacent properties were acquired as needed. However, once the properties were assimilated into the overall configuration of the military base, the parcel lines and boundaries were no longer important.



Reuse Zoning Configuration

In order to convert the military base to civilian uses, a land use proposal needed to be implemented and ultimately, the underlying parcels would need to be re-configured to match the assigned land use zoning. A Master Land Plan study was undertaken to determine appropriate zoning and land use configurations that made sense of the previous military facilities and be appropriate to civilian zoning classifications.

Once this process was completed, a parcel map was assembled to reconfigure the outdated parcels that did not conform to the structures and facilities that had been constructed on top of them. The re-configured parcels could now relate to the buildings, roadways and facilities that were in place.

During this period, GIS was used as a vehicle to graphically illustrate various land use configurations and their relationship to the existing infrastructure of runways, buildings, roadways and open space. GIS technology could rapidly create updated land use exhibits

that indicated land use acreage, floor area ratio calculations and produce resultant densities and land use intensity for consideration by the County and MBP.



Original and Revised Parcel Configuration

WHO OWNS WHAT?

As the development of MBP has progressed over the past six years, several areas have been identified as being clean of any environmental issues and have been transferred to the County or to MBP. Also, specific land use areas such as the runway and taxiways with supporting facilities were taken over by the County of Sacramento Department of Airports with remainder areas specified as leasable real-estate for MBP.

With the multiple levels of ownership and the multiple number of land transfers occurring at irregular intervals, it became necessary to create and maintain a data library of ownership status. Additional layers were added to the growing collection of geographic information that could illustrate the ownership of parcels within MBP along with accompanying deed of transfer information.

To accomplish this, the GIS database was used to hyperlink Portable Document Format (PDF) copies of the recorded transfer deeds to the appropriate parcels. This enabled the option of pointing and clicking on a parcel to retrieve a PDF copy of the recorded document to determine the status of ownership, date of transfer and the legal description of the parcel. This capability is a powerful means to help both the County and MBP to stay apprised of the multiple transactions that have occurred and will allow easy additional hyperlinks to be added for the many land transactions that will transpire in the future.

IMPLEMENTATION OF Arc Reader

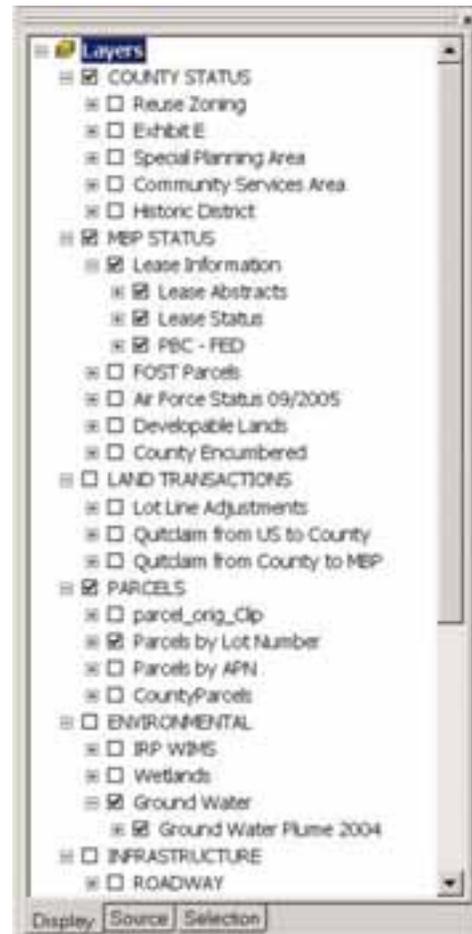
Throughout the base conversion process, a multitude of studies, reports, financing mechanisms, lease agreements and other operational issues have been generated. This collection of information had created a formidable library of documents. Unless one is innately familiar with the history of the base conversion and the various elements that have been considered and studied, it is difficult to research and retrieve the appropriate information when desired.

GIS has been used to catalog and illustrate graphically many of the geographic related issues as they relate to MBP. In order to maintain an understanding of their location, impact, or configuration relative to lease properties and future development, GIS has been used to depict graphically the geographic status of MBP at any moment.

For the first few years, this geographic information was provided by a tremendous number of paper based map exhibits. These exhibits were presented at meetings or hung on office walls and were discussed and studied over countless discussions. With the increasing geographic data that needed to be illustrated in order to understand the condition or status of any parcel within MBP, it became apparent that paper based mapping could no longer keep pace with the demand for up to date real-estate information.

Over the past year, the development of an ArcReader Document has been undertaken as a means to distribute the extensive geographic data library to the staff of MBP and the County of Sacramento. The ArcReader software was chosen due to the low cost of installation to MBP staff computers, the ease of updating information on the MBP network and the ability to train MPB staff on the intuitive process of using the ArcReader map interface. ArcReader may not be the ultimate solution and future desired capabilities will likely drive an ArcIMS implementation. However, for the moment, ArcReader is serving MBP very well.

The current ArcReader document is comprised of over fifty layers of information. The document is segregated into numerous layer groups that pertain to similar property management issues. Many of the layer groups also have sub-groups that can be expanded for additional information. As an example, under MBP STATUS, one can explore property lease information by viewing PDF's of Lease Abstract documents, or one could view a PBC-FED layer that delineates Public Benefit Conveyance parcels or federally reserved property.



One of the most important uses of the ArcReader document as it relates to MBP's property leasing and management operations is the ability to create custom views of particular parcels and properties on-the-fly. On a day to day basis, MBP managers speak with a multitude of interested parties looking for suitable properties to lease for various operations.

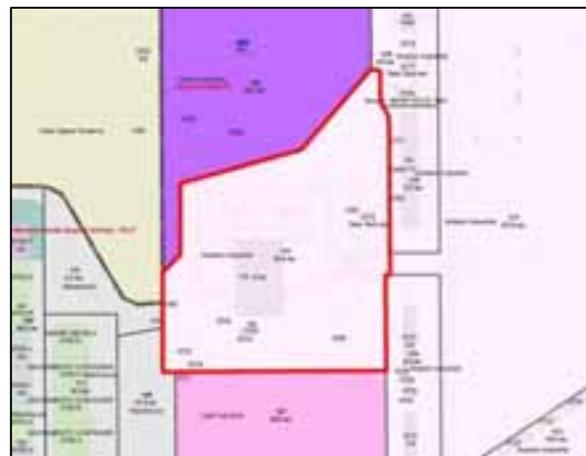
Prior to the ArcReader document, it was necessary to work from previously printed documents that may not have included specific layers that needed clarification. If additional information was needed, many times the appropriate consultant responsible for the data would need to be contacted to provide the information. Other possibilities included researching paper documents and maps located in file cabinets. All of these efforts added substantial time to the equation.

Another factor to consider is that due to the many environmental and physical features that may affect a particular parcel, it is likely that numerous exhibits would need to be collected and viewed in order to understand the overall condition of a property. ArcReader has allowed MBP staff the ability to drill down through multiple layers of information and view geographic elements in relation to one another in a custom manner. This ability is something that had not been available previously.

Using the ArcReader document that is now available on the desktop, MBP staff can display a parcel or specific area and then begin to research a wealth of information such as acreage, ownership status, groundwater contamination status, storm drain easements, building size or any number of other critical items relating to a property. The following images illustrate typical sets of layers that can be consulted to view and understand relative property information. Another bonus is that MBP staff can print to paper or create PDF images of their map display that can be forwarded to an interested party.



Acreage



Zoning



Existing Land Use



Previous Land & Soil Condition



Wetland Status



Groundwater Status



Storm Drainage & Sanitary Sewer



Lease Status



District Status



Community Service Area

SUMMARY

Throughout the development of McClellan Business Park in the transition from a Military Logistics base to a thriving business park, Geographic Information Systems technology has played a very beneficial role. Initially used as a tool to assist in analyzing the existing infrastructure, it soon expanded to include other physical features of the sprawling military base. As the base evolves as a business park, the GIS data sets have grown and evolved to keep pace with the ever growing complexity of issues related to the business park development.

GIS technology has proven to be vital to organize and present pertinent information needed to understand the status of such a large land complex. The evolution of the McClellan Business Park GIS to include an interactive ArcReader document has provided tremendous opportunity to retrieve and view geographic information at the desktop in a fast paced real estate environment. As McClellan Business Park grows into the future, the GIS library will surely advance and provide reliable and timely geographic information.

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