Statement of Qualifications

Information Management Solutions
Dikes, Dams and Levees
Background

Geosyntec’s excellence in environmental data management comes from our collective experience (including a practice leader with 20 years of experience developing and managing geotechnical databases), and our “vertical integration” in that many of our data management professionals are scientists or engineers with an ongoing practice in those disciplines. Our systems have been used on large scale construction projects (including the development of the Wolf Creek Information Management System, winner of a USACE Innovation Award) and a variety of smaller federal and municipal sites.

Approach

We build and deploy a data management workflow that covers the entire data “life cycle” including:

- Digital Sample Planning and Tracking
- Digital and automated Chain of Custody
- Electronic Field entry of sample and field data
- Automated electronic laboratory data import and validation
- Geospatial and tabular data visualization and reporting
- Intelligent data analytics
**Client:** Nicholson Construction Company

**Services Provided:**
- Automated Grouting Analysis
- Panel Verticality and Overlap Calculations
- As-Built Drawing Production
- Web-based Project Tracking
- Pay Item Report Generation

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**Project Objective**
The Richland Creek Reservoir provides safe drinking water to the citizens of Paulding County, GA. Nicholson Construction Company (Nicholson) was retained to construct a grout curtain and diaphragm wall at the Richland Creek Reservoir. Geosyntec developed a series of tools to collect, compile, analyze, visualize, and generate reports on the data collected during these activities.

**Geosyntec's Scope of Services**
Geosyntec developed and hosted tools that allow Nicholson personnel to securely upload data and immediately generate reports, analyses, and as-built drawings. During the cut-off wall installation, Nicholson used the Koden ultrasonic tool to measure the shape and size of excavations prior to backfilling with concrete. Geosyntec’s web tools allowed Nicholson to upload the Koden files and the tool instantly calculated the excavation shape in three dimensions, a process that previously required a CAD operator to spend several hours of labor. Following each file upload, the tool generated a printable PDF-format report that could be reviewed by the project engineer and submitted to the owner. On a routine basis, these same data were used to calculate the volume of concrete placed (in rock and overburden) and presented these in a formal pay-item report.
BOLIVAR DAM
Data Management Tools for Seepage Barrier Wall Construction
Bolivar, Ohio

Client: Treviicos South

Services Provided:
- Data Management Plan
- Secure FTP site
- Web and Desktop Mapping tools
- gINT database
- Verticality Analysis and Reporting
- Data Input and Validation Tools

Project Objective
Bolivar Dam, located on Sandy Creek of the Tuscarawas River in Bolivar, Ohio, is a dry dam consisting of two levees within the Bolivar Dam reservoir. The owner of the dam, United States Army Corps of Engineers (USACE), identified the need for a barrier wall to address seepage that is negatively affecting the structural stability of the dam, resulting in increased risks to the downstream public.

Geosyntec’s Scope of Services
Treviicos South (the contractor) was retained by USACE, Huntington District to install the 600,000 square foot barrier wall. Geosyntec was retained by the contractor to handle the data management aspect of the project. The owner and contractor both required data management tools that proved the data they produced met Barrier Wall specifications. The tools needed to quickly and efficiently submit the contractor data and interpret the data to facilitate correcting construction where necessary. Submittal of these data is on the critical path to backfilling of the seepage barrier panels. Geosyntec’s data management services included providing, a) a secure FTP site used for submittals and data transfer; b) a database accessible ‘live’ to USACE; c) a website with data input and reporting tools; d) online and offline mapping tools; e) gINT database; and, f) a data management plan. Geosyntec’s data management tools allowed USACE access to the data produced by the contractor quickly, transparently, and in a format that facilitated understanding and provided a visualization of the data, confirming a successful design.

Notable Accomplishments
Geosyntec provided a product that allowed efficient, transparent management of information generated during the construction in real time. The data management tools will provide USACE with a long-term living document of the project with a historical accounting of the original project construction and dam modification for use by both design engineers and operations staff for years to come.
**Project Objective**

Bluestone Dam, owned by the United States Army Corps of Engineers (USACE), began operation in 1949. The dam is a concrete gravity structure with an overall length of 2,060 feet and a maximum height of 165 feet above the streambed. In recent years, it was discovered that Bluestone Dam would be unable to pass the Probable Maximum Flood possible at the site, which could cause failure of the dam. In 2008, a Dam Safety Action Classification (DSAC) II was assigned, indicating attention to the safety of the dam construction was urgent. As a result of the DSAC, modifications to the original design have been implemented while others are undergoing construction and/or are in design phases. Part of the work includes installation of approximately 500 high capacity rock anchors in critical monoliths. USACE identified the need for sophisticated data modeling, management and access in advance of this effort.

**Geosyntec’s Scope of Services**

Geosyntec was retained by USACE, Huntington District to develop a 3-dimensional (3D) model to document the original dam construction, track the various modifications, record quality control of construction data, and demonstrate construction specifications for the dam were met. To meet this criteria, Geosyntec developed the BlueDMS. Its capabilities include a 3D MicroStation model, 3D GIS model, 2D GIS projects (web and desktop), a database constructed from project documents, and tools for data import and export.

To create the models, Geosyntec compiled a comprehensive database of anchor data, interpolated downhole survey data into 3D GIS features, mapped various elements (monoliths, grout lifts, water test zones, etc.) to 3D features, and added features to GIS and CAD models.

**Notable Accomplishments**

Geosyntec created a customized product that allows USACE to easily update the model as construction modifications continue. The model provides USACE with the ability to verify construction meets specification, and verify the design intent is met. The model will be a living document to aid in monitoring dam performance, maintenance, and future design efforts.
**Project Objective**

The Center Hill Dam is located on Center Hill Lake near Smithville, TN. Due to ongoing seepage problems in the foundation, Center Hill Dam has become a U.S. Army Corps of Engineers (USACE) priority. USACE and its primary contractor, Bauer Foundation Corporation of Florida (Bauer) initiated design and construction of a deep hydraulic barrier wall along the dam.

**Geosyntec’s Scope of Services**

In addition to Foundation Engineering, Submittal support and other geotechnical services, Bauer retained Geosyntec to meet USACE’s detailed data management specification. Geosyntec customized the WallTracker Information Management System, previously deployed in Bauer’s work at the Herbert Hoover Dike repair, to address these needs and more. WallTracker uses enterprise database, Geographical Information Systems (GIS), File Transfer Protocol (FTP) and other technologies to compile all data associated with construction into a single web-based system. These data include investigation borehole logs (including a connection to a gINT database), raw data generated from excavation rigs and post-excitation verticality measurements (made with Koden and other technologies), automated and manual instrumentation records, slurry records and analyses, and more. Data are accessible via live web-based reports, interactive GIS tools, and direct database connections to raw and processed data tables.

**Notable Accomplishments**

Geosyntec's WallTracker implementation allows the owner (USACE) and all permitted members of the contractor and subcontractor teams to access data in a single common operating platform. This way, all data can be visualized quickly and clearly, and used to meet challenges associated with disparate data. For example, users can view the verticality and continuity of barrier wall panels calculated from different verticality measurement devices. QA personnel can immediately view real-time piezometer data and query construction activities that might be responsible for an instrumentation spike or anomaly. Contractor team leads can predict the depth to rock of each cutter wheel by entering a stationing value into a report that queries historical boring log data and recent grouting records.
Geosyntec Consultants is a consulting firm with engineers, geologists, environmental scientists, and other technical and project staff based in offices throughout the United States and at select locations in Australia, Canada, Ireland, and the United Kingdom. We address new ventures and complex problems involving our environment, natural resources, and civil infrastructure.

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