Alabama Department of Transportation

GIS-Based Environmental Long-Term Monitoring Web Portal Phase III

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16. Abstract

A GIS-based online portal was developed to store, analyze, and display data from multiple sources pertinent to the ALDOT Coliseum Boulevard groundwater contaminant plume site in Montgomery Alabama. These sources comprise various consultants involved with the site including geotechnical companies, water testing labs, law firms, and management personnel from ALDOT/ADEM. The goal of this portal was to centralize information into a single location for easy access by all of these groups while also consolidating a number of activities in relation to data collection, verification, and preparation. The culmination of these goals resulted in a data-driven Plume Web map. The web map is able to display and query the numerous monitoring points and regions related to the site. On selection of these locations, the web map presents associated data and documents for download. In a similar manner, the property owner's parcels affected by the plume can be selected or queried and legal documents relating to that property displayed. For more robust data retrieval, there are several tools capable of querying data based on multiple locations, location types, and constituents. The Search Documents tool can perform similar functions for ascertaining files based on their type and associated location. Any data and documents can be uploaded to the portal through one of two easy to use tools. The Upload Documents tool allows user to upload a file and input related information into several fields for future acquisition. The Import Data tool accepts comma separated value sheets for well specific data (e.g., contaminant lab testing and groundwater elevation data). The lab data uploaded to the site is put through a verification process before final import to the database. Part of this verification process involves the data location names being potentially assigned through an alias list. This alias list is flexible with the Add Alias tool, which will allow for more versatile data import in case of future well name changes. Several layers can be toggled on the map as well such as groundwater velocity and elevation contour maps. These map layers (typically created for display in the Annual Report) can now be generated directly in the online portal with the Generate Annual Report Figures tool. Many of the data-based tables in the annual report are now available for generation in the Reports tool. These features contribute to a streamlined and unified environmental site management process. The portal is available for use with login credentials within an ALDOT site.

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Contents

Table of Figures

Executive Summary

A GIS-based online portal was developed to store, analyze, and display data from multiple sources pertinent to the ALDOT Coliseum Boulevard groundwater contaminant plume site in Montgomery Alabama. These sources comprise various consultants involved with the site including geotechnical companies, water testing labs, law firms, and management personnel from ALDOT/ADEM. The goal of this portal was to centralize information into a single location for easy access by all of these groups while also consolidating a number of activities in relation to data collection, verification, and preparation. The culmination of these goals resulted in a data-driven Plume Web map. The web map can display and query the numerous monitoring points and regions related to the site. On selection of these locations, the web map presents associated data and documents for download. In a similar manner, the property owner's parcels affected by the plume can be selected or queried and legal documents relating to that property displayed. For more robust data retrieval, there are several tools capable of querying data based on multiple locations, location types, and constituents. The Search Documents tool can perform similar functions for ascertaining files based on their type and associated location. Any data and documents can be uploaded to the portal through one of two easy to use tools. The Upload Documents tool allows user to upload a file and input related information into several fields for future acquisition. The Import Data tool accepts comma separated value sheets for well specific data like contaminant lab testing and groundwater elevation data. The lab data uploaded to the site is put through a verification process before final import to the database. Part of this verification process involves the data location names being potentially assigned through an alias list. This alias list is appendable with the Add Alias tool, which will allow for more versatile data import in case of future well name changes. Several layers can be toggled on the map as well such as groundwater velocity and elevation contour maps. These map layers (typically created for display in the Annual Report) can now be generated directly in the online portal with the Generate Annual Report Figures tool. The data-based tables in the annual report are now available for generation in the Reports tool. The portal is available for use with login credentials at ALDOT servers at https://aldotgisonline.dot.state.al.us/plume.

1.0 Introduction

The Coliseum Boulevard Plume refers to an area of contaminated groundwater in Montgomery, AL. The main plume constituent of concern is Trichloroethylene (TCE), but daughter-products and other chlorinated hydrocarbons are also present. ALDOT used TCE in asphalt testing and, as was standard at the time, disposed of the spent TCE into storm sewers. Failures in the sewer lines allowed the contaminants to escape into the immediate groundwater resulting in the extensive seepage observed today. ALDOT has investigated and managed the plume under the oversight of the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA), and the Alabama Department of Public Health (ADPH).

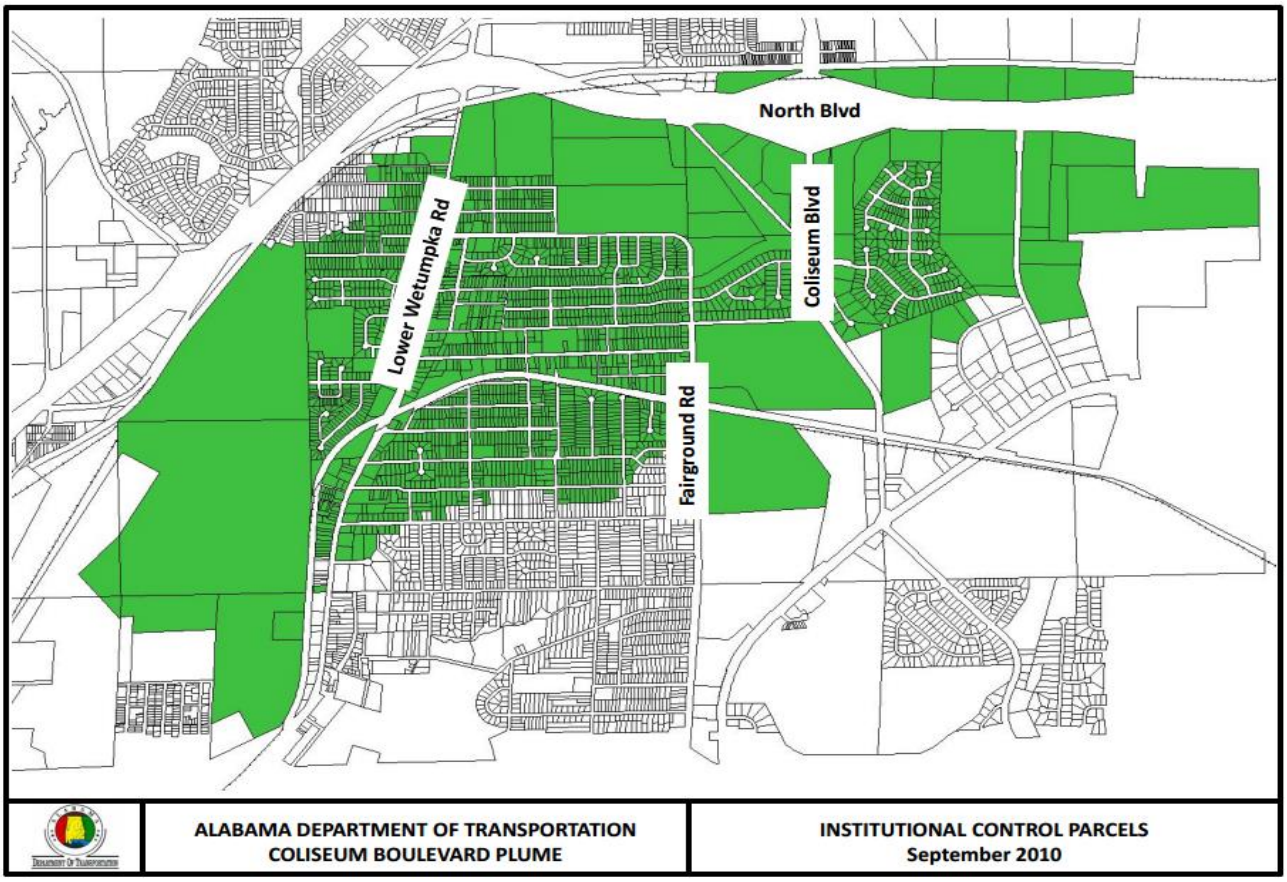

Figure 1. Coliseum Boulevard Plume Extent

The initial investigation's results sparked an expansion of activities involving further investigation as well as several remedial projects. Two of these projects remain a major part of monitoring practices today, namely the Southwest Treatment Area (SWTA) and Low-Lying Area. In these areas, wetlands were constructed to aid in the retention and mitigation of TCE-contaminants in surface water. These outfall areas and the remainder of the city within the Institutional Control Boundary (ICB) contain the majority of activities on the site (though some minor investigative work has been performed outside of this boundary). Present day activities are

described in ALDOT's "Long-Term Monitoring Plan" and mainly consist of normal monitoring procedures. These procedures include: ICB groundwater and surface water sampling, data verification and storage, outfall area inspections, and creation of an annual report detailing activities and results.

To perform these procedures, ALDOT has been working with several outside consultants to monitor the groundwater within the CBP area. These consultants have held responsibilities involving collecting, storing, and managing data and documents as well as producing reports. Dividing these responsibilities was the mandated project management solution at the time of the project's inception and through the years following. In recent time, ALDOT has become responsible for these monitoring-oriented tasks.

In 2017, the GIS-Based Plume Data Web Portal development began with a number of meetings, correspondences, and sharing of materials held by the various groups collaborating on the CBP. By the end of Phase I and II, a prototype Plume Web Portal had been developed, capable of data import, query, and export. Further information on these activities can be found in the Phase I and II Final Report.

2.0 Project Tasks

Task 1: Re-Establish Users

The Plume Portal is a secure site. This task will ensure the approved portal users have verified access and login information in accordance with ALDOT approval.

Deliverables:

- Ensure correct users have access.

Task 2: User Training

Authorized users will receive training on portal interface, functions and capabilities and they will have access to various instructional documents, e.g., portal user guide. Quarterly meetings will be held with ALDOT and their affiliates. These meetings will function as opportunities to update ALDOT personnel on progress and receive feedback on the portal from the various users. The portal user guide and other instructional documentation will be updated according to user revisions of the site interface and functionality.

Deliverables:

- Quarterly meetings and training sessions as needed with project team personnel.

Task 3: Portal Functionality and Interface Improvements

The goal of this task will be to incorporate user feedback from Phase II to improve portal functionality, interface, final reports, and overall aesthetics. To handle the dynamics of long-term monitoring, well location, consistent location symbology, and well category functionality will be added to the portal (i.e., the ability to search for a specific well category such as 'Long-Term Monitoring Wells' in the Locate Well tool). To increase portal interface and functionality, the export feature ability will be improved to include location coordinates and shapefiles. To improve the parcel search feature to include more robust query capabilities, the addition of an address search in relation to the parcels will be incorporated.

Deliverables:

- Implementation of user feedback into portal functionality and interface from Phase II will include the following: addition of well location, addition of well category functionality, consistent location symbology, improved export feature ability, and address search capability.

Task 4: Transfer of Portal from UA to ALDOT

The portal will be transferred from UA CAPS to ALDOT for complete transfer and management of the system. A successful transfer will require the following from ALDOT: space to host the website (currently 25 GB), ESRI ArcGIS mapping software, and authentication

services. Direct communication with UA team and ALDOT GIS/IT personnel will be required for a smooth transfer.

Deliverables:

- Successful transfer of Plume Portal from UA to ALDOT.

Proposed timeline:

2022	May	June	July	Aug	Sept	Oct	Nov	Dec
Task 1								
Task 2								
Task 3								
Task 4								

3.0 Project Results

Task 1: Re-Establish User

Approved portal users verified access and login information into the site including Mr. Lawson Brown, the ARCADIS team (Britt McMillan, Jason Hughes, and Edida Nefso), AC ESS (Ashley Cousins), Southern Earth Science (Eric Guarino), and the UA team.

Task 2: User Training

Authorized users received training on portal interface, functions and capabilities and had access to various instructional documents, e.g., portal user guide. Formal training sessions were help on April 7, 2021 and April 14, 2021. Informal trainings were held in 2022 based on user request.

Task 3: Portal Functionality and Interface Improvements

Portal functionality and interface improvements include the following updates: 1) the reporting interface was improved via access and review; 2) the annual report generation file structure was enhanced, and the generation process was refined; 3) figure generation of maps was added to the portal.

Task 4: Transfer of Portal from UA to ALDOT

The transfer of the portal from UA CAPS center to ALDOT was successfully completed in conjunction with UA and ALDOT GIS/IT teams. The teams met several times in Fall 2022 to complete the transfer. User authentication is operating on CAPS servers, but redirects the user to the ALDOT plume site once approved. Once ALDOT servers have the capability to authentic users, the authentication process will be transferred to ALDOT. The site can now be found on ALDOT servers at the URL https://aldotgisonline.dot.state.al.us/plume.

4.0 Conclusions

This phase of the Plume Web Portal saw further development and investigation of existing features, new functionality, and potential future capabilities. These developments will bolster the original goal of the portal: to facilitate efficient management of the CBP's vast array of activities and datasets. Of primary importance to the future of the portal, is the adoption of the site by CBP personnel (Arcadis, Southern Earth Sciences, Ashley Cousins Environmental Strategies and Solutions (AC ESS), and ALDOT). The site's core functions were complete in Phase I and II, and Phase III revision and additions has enhanced the site for greater utilization by the CBP managing parties. With this utilization and further review by said managing parties, the plume portal can be better tailored to suit the needs of its users. Continued outreach to site users, will aid in creating an optimal experience with the Plume Web Portal. The Plume Web Portal was successfully transferred to ALDOT servers and is completely owned by ALDOT at https://aldotgisonline.dot.state.al.us/plume. Authentication occurs on CAPS servers and redirects the user to ALDOT plume site.

5.0 ACKNOWLEDGEMENTS

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