
California Underground Facilities Safe Excavation Board

April 14-15, 2025

Agenda Item No. 28 (Information Item) – Staff Report

Geographic Information Systems (GIS) Implementation: Regulatory Considerations

PRESENTER

Brittney Branaman, Acting Executive Director

AUTHOR

Mignon Marks, Policy Specialist

SUMMARY

During its December 2024 meeting, the Underground Safety Board (Board) agreed to proceed with developing regulations on map accuracy and data content for GIS implementation, while conducting additional stakeholder engagement to refine these proposals. Staff has identified several key concepts for discussion, focusing on the accuracy of geospatial data, data-content requirements, and metadata storage for GIS records. These concepts are intended for future regulation, and stakeholder feedback will be critical to shaping them.

STRATEGIC PLAN

2020 Strategic Plan Objective: Improve Accessibility of Buried Infrastructure Location Knowledge and Understanding

2024 Strategic Activity: Determine What New Facilities Need to be Incorporated into Utility Operator Geographic Information Systems

BACKGROUND

Government Code subsection 4216.3(a)(5) requires that all new subsurface installations be mapped using GIS starting January 1, 2023, with these records maintained as permanent operator records. The statute, however, does not specify the level of accuracy required for the geospatial data or how it should be collected. Without regulatory guidance, operators may use low-accuracy methods, such as cellphones, to gather location data. Stakeholders, including the California Regional Common Ground Alliance (CARCGA), have called for minimum accuracy standards.

In response, staff developed several concepts for regulatory language, focusing on three areas for potential regulation:

1. Horizontal positional accuracy of geospatial data.
2. The inclusion of specific components and attributes in GIS records.
3. The storage of metadata for geospatial records.

DISCUSSION

Geospatial Data Accuracy

It's important to note that GIS location records are not stored as traditional maps but as digital geospatial data files. These files typically include longitude (X), latitude (Y), and sometimes depth (Z) coordinates in decimal degrees within an assigned coordinate system. Therefore, discussions around "map accuracy" are essentially discussions about the accuracy of the underlying geospatial data.

The Board may want to consider setting a minimum horizontal positional accuracy requirement for new subsurface installations. One approach discussed at previous meetings involves requiring that the geospatial data be accurate within 100 mm (approximately four inches). This concept would apply to individual components within an installation, such as pipeline segments, rather than to the entire installation project.

Considerations for Geospatial Data Accuracy Requirements

The idea for consideration is that operators would be required to collect geospatial data for new subsurface installations while the installation is visible or while using trenchless methods. The accuracy of these field-collected coordinates would need to be within 100 mm. The GIS Committee has suggested that each coordinate be recorded in decimal degrees with six decimal places, thus providing the necessary precision for this level of accuracy. Operators could store this accuracy either as an attribute of the installation component or as metadata associated with it.

Data Content

Staff has identified several concepts related to the content of GIS records, including components to be included and attributes to be associated with some components. One proposal is to require operators to maintain geospatial records for specific components, such as tracer wires, marker balls, and Radio Frequency Identification (RFID) devices, if they are present in a new installation. Including these components in GIS records could enhance the efficiency of the locate-and-mark process and reduce the risk of excavation damage.

Another concept being considered is requiring pipeline operators to record certain attributes for their pipeline segments, such as the presence of pipe wraps, warning tapes, or insulation.

For high-priority subsurface installations, such as those carrying high-pressure gas or hazardous materials, operators might be required to indicate that the installation meets the "high priority" criteria under the Dig Safe Act.

Considerations for Data Content Requirements

It is proposed that operators would be required to maintain geospatial records of the following components if present in new subsurface installations:

1. Tracer wire or tracer tape, including the location of above-ground access points.
2. Marker balls.
3. RFID devices, along with the frequencies they emit.
4. Protruding stubs and fittings.

For pipeline operators, it is proposed that they must include attribute records for new pipeline installations that include pipe wraps, warning tapes, coatings, or insulation. Additionally, operators of high-pressure gas pipelines, petroleum pipelines, pressurized sewage pipelines, high-voltage electric lines, and hazardous materials pipelines would be required to indicate in their attribute records if the installation qualifies as a "high priority subsurface installation."

Metadata Storage

In response to stakeholder feedback, staff is exploring the inclusion of metadata for geospatial records. Metadata refers to data about this data, such as its source, accuracy, method of collection, and other relevant details. Storing metadata would help users assess the fitness of the data for its intended use and provide a clearer understanding of how the data was collected and processed.

Stakeholders have suggested that metadata should include information such as the reference frame, coordinate system, epoch, the equipment used to capture the data, the date the data was collected, and the name of the person attesting to the data's accuracy.

Considerations for Metadata Storage Requirements

The following concepts are under consideration for metadata storage requirements:

- The operator must maintain metadata for geospatial data records, including:
 - Reference frame, coordinate system, and epoch.
 - Equipment used to capture the data.
 - Date of data collection.
 - Name of the person attesting to the accuracy of the data.

These concepts would help ensure that GIS records are both accurate and transparent, providing users with the necessary context to assess their reliability.

References

The following sources define terms and provide standards relevant to the proposed concepts:

- Geospatial data definitions, including those from federal statute 43 USC 2801, Title 43.
- Geospatial positioning accuracy standards from the Federal Geographic Data Committee.
- International and national standards on geospatial data accuracy, including those from the Singapore Land Authority, British Standards Institute, and American Society of Civil Engineers.

Recommended Next Steps

Staff and the GIS Committee will continue engaging stakeholders to gather feedback on the proposed concepts for regulatory language. This feedback will be used to refine the concepts and inform future economic and fiscal impact assessments. Stakeholder engagement will likely include online surveys, public comment opportunities, and workshops.