Borehole Location

The Soil and Rock Logging, Classification, and Presentation Manual requires that each borehole be located by Northing and Easting coordinates, and that the benchmark used to determine the borehole elevation be identified on the plan sheet. The purpose of locating the borehole is to present its location relative to the planned work. This module provides instructions relating to these requirements.

Benchmark

Prior to drilling, locate and verify a nearby benchmark, which may be an actual USGS or Caltrans benchmark, or a fixed object of known elevation such as a centerline begin bridge or end bridge. Usable benchmarks may be shown on the project plans, topographic maps, or can be obtained from District Surveys or the US Geological Survey.

Verify whether the benchmark is located close enough to the planned boreholes to allow convenient determination of the borehole elevation. If not, consider setting a temporary benchmark close to the planned work to allow quick and easy determination of the borehole elevation before, during, or after drilling operations. A temporary benchmark could be a paint mark, nail, or wooden hub placed during an initial site visit or while marking the site for USA.

Location Methods

Borings can be located using traditional tools, GPS devices, project plans, and District Surveys.

Traditional Tools

The accuracy associated with traditional tools (measuring tapes and wheels, laser range finder, level, etc.) are acceptable for determining horizontal location and elevation.

To determine the borehole location, use convenient features shown on the plans. Foundation plans and layout plans typically present the alignment line, centerlines, and fixed objects such as drainage inlets, curbs, trees, structures, and other features which may be used as a reference to locate a borehole. The station and offset of the feature can be scaled directly from the plan sheet. Horizontal locations of reference points, and corresponding Northing and Easting, can be determined by using the measuring tools within the MicroStation program.

GPS

Use tools that can achieve accuracy that meet the reporting requirements. Do not use mobile phone or consumer-grade GPS devices to determine the borehole location.

Project Plans and Site Maps

In situations where it is not possible to use an existing feature as a reference (e.g., new alignment) contact the District Project Engineer to inquire about control points.

Project plans and site maps may be used to determine borehole elevation if the map accuracy meets the reporting requirement.

District Surveys

Using District Surveys to determine borehole locations or elevations is recommended for those occasions when it is not possible, safe, or cost effective for the geoprofessional to do so in the field. Typical examples are:

- New alignment where prior staking is not available
- Site is an area of high relief where the location cannot be determined by physical means (tape measure, measuring wheel) or where the benchmark and borehole elevations are significantly different.
- Site is otherwise not conducive to direct measurement (e.g., in a wooded area)
- Site is heavily vegetated, and the elevations cannot be determined without establishing multiple temporary benchmarks and turning points.

Reporting

Report Northing and Easting to the nearest tenth of a foot.

For structures report elevation to the nearest 0.1 foot. For earthwork report elevation to the nearest foot unless special needs (e.g., slope inclinometer for landslide monitoring) or geology concerns (e.g., potential for encountering hard rock) require reporting the elevation to the nearest 0.1 foot.

The datum used for borehole location should be the same datum used by the Project Engineer.