

ENGINEERING-GEOLOGY MAPS AND CROSS SECTIONS OF ANCHORAGE, ALASKA

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Program Element II

INVESTIGATIONS

The purpose of this project is to produce a revised large-scale surficial-geologic map and associated deep (~50-100 m) geologic cross sections of central and east Anchorage, Alaska (fig. 1). These maps and cross sections will be useful to engineers and planners in Anchorage for mitigating earthquake and other geologic hazards. They will also provide the basis for future detailed earthquake-hazard mapping by the Alaska Division of Geological & Geophysical Surveys (ADGGS) and will be used by the University of Alaska Geophysical Institute to complete models of ground-motion microzonation currently being developed using strong-motion instrumentation and shear-wave velocity measurements. The maps and cross sections will expand areal coverage of similar products completed for southwest Anchorage (Updike and Ulery, 1986) and Government Hill (Updike, 1986). Because of

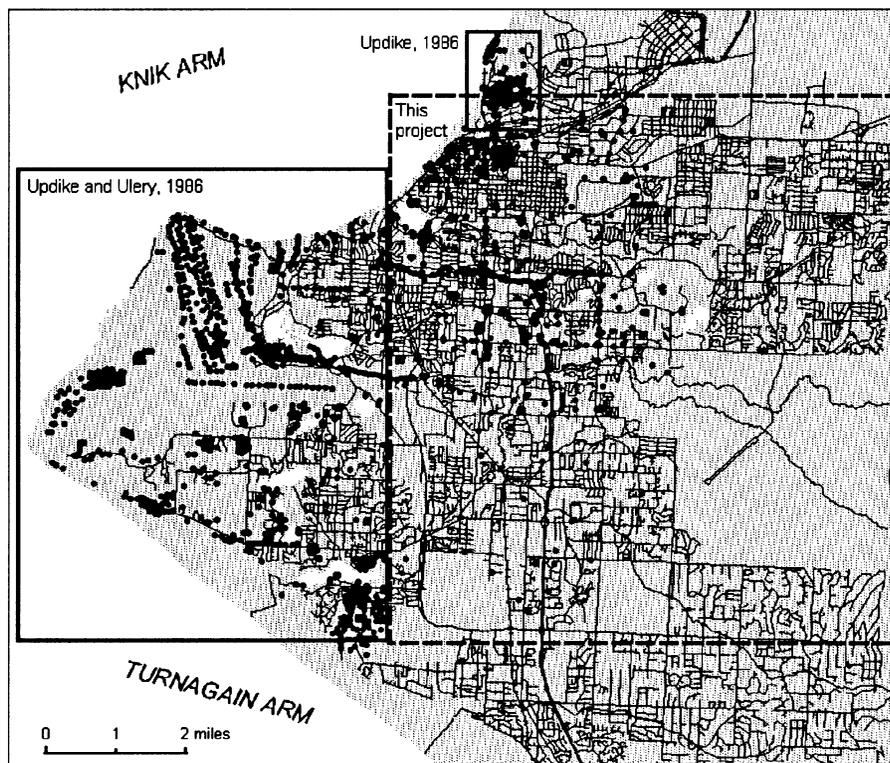


Figure 1. Index map of Anchorage, Alaska, showing the project area, locations of existing detailed geologic maps and cross sections, and boreholes indexed to date.

the complex nature of subsurface glacial, glaciomarine, and glaciofluvial deposits in the Anchorage area, a thorough understanding of their distribution is critical to the preparation of improved seismic-hazard maps. The data for this project come from geotechnical boreholes, water wells, natural geologic exposures, aerial photographs, and existing geologic maps.

RESULTS

We have compiled subsurface data from all of the geotechnical consultants who have drilled boreholes in the Anchorage area and from the Alaska Department of Transportation and Public Facilities. About 2,000 boreholes have been located and indexed using GIS and database software, including previously mapped areas (fig. 1). About 1,000 additional boreholes remain to be indexed for the project area. We have also acquired software for correlating subsurface geology and performing 3D Kriging modeling. This approach will allow rapid, automated production of block models and cross sections in any direction and interpolation of unit properties such as shear-wave velocity within stratigraphic units. Final products of the current project will include a revised surficial-geologic map at 1:15,840 scale (1" = 1/4 mile) and 8-10 associated cross sections.

REPORTS PUBLISHED

No reports have been published to date as a result of this work.

REFERENCES CITED

- Urdike, R.G., 1986, Engineering-geologic maps of the Government Hill area, Anchorage, Alaska: U.S. Geological Survey Miscellaneous Investigations Map I-1610, scale 1:4,800.
- Urdike, R.G., and Ulery, C.A., 1986, Engineering-geologic map of southwest Anchorage, Alaska: Alaska Division of Geological & Geophysical Surveys Professional Report 89, scale 1:15,840.

NONTECHNICAL SUMMARY

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As the great Alaska earthquake of 1964 demonstrated, seismic hazards in Anchorage are dominated by landsliding, differential settlement, ground cracking, and strong shaking. These effects are largely controlled by the nature and thickness of surface and subsurface geologic materials. A better understanding of the distribution of these materials and their properties will enable geologists and engineers to better predict ground response during future earthquakes. The results of this project will be the production of detailed surficial-geologic maps and cross sections of central and east Anchorage, similar to maps and cross sections of southwest Anchorage published by the Alaska Division of Geological & Geophysical Surveys in 1986.