



MINING SERVICES



FIRM PROFILE

Mines provide an abundant source of natural, raw materials for modern society. The extraction of aggregate materials is critical to the creation of infrastructure developments, such as roads, bridges, and essential facilities, as well as to private development, including industrial, commercial, and residential improvements. In addition to aggregate products, other minerals and metals—such as silica, calcium carbonate, dolomite and precious metals—are being consumed at a rapid rate for a growing world.

GeoDesign offers premier, comprehensive surface mining services. Our mining group of scientists and engineers embodies the company’s commitment to provide integrated services throughout the lifecycle of a mine.

Founded in 1997, employee-owned GeoDesign provides integrated mining, environmental and geotechnical engineering, engineering geology, and pavement design from offices in Portland and Salem, Oregon; Vancouver, Longview, Tacoma, and Seattle, Washington; and Anaheim, California. Our experience covers mining, transportation, infrastructure, and building projects throughout the Pacific Northwest, California, Nevada, Idaho, and Alaska.

CLIENT SATISFACTION

What makes GeoDesign different? Our reputation for responsiveness sets us apart from other consulting firms. Our philosophy is simple—to inspire confidence in the reliability and quality of our work.

MINING SERVICES

GeoDesign provides experience in all phases of surface mining, including evaluation/feasibility, permitting, regulatory compliance, and reclamation. Through open communication, integrity, and sound consulting practices, GeoDesign has gained the respect of mine owners and mining industry regulatory personnel, and enjoys excellent working relationships with both owners and agencies. Our services include:

MINING SERVICES	
• Mine Feasibility	• Resource Evaluation
• Mine Planning	• Mine Revisions and Expansions
• Mine Permitting	• Mine Reclamation and Bond Calculation
• Mine Regulatory Compliance	• Expert Testimony

Additionally, we offer the following support services for mining activities:

ENVIRONMENTAL SERVICES	
• Stormwater Design	• Industrial Regulatory Compliance
• Stormwater Management Plans	• Contaminant Clean-up
• Stormwater Regulatory Compliance	• Sand and Gravel General Permits
• Air Quality	• Vibration/Acoustic Monitoring

GEOTECHNICAL SERVICES	
• Geotechnical Investigations	• Landslide Characterization and Remediation
• Slope Stability Analysis	• Seismic Hazard Evaluation

PROJECT EXPERIENCE

Our project experience covers an array of mine types, including sand and gravel, hard rock, silica, dolomite, calcium carbonate, coal, and precious metals. We are involved in any number of stages of the mining process, including environmental assessments, environmental impact statements, permitting, resource evaluation, operation planning, revisions, expansions, regulatory compliance monitoring, reclamation practices, bond evaluations, and creative subsequent use. The following projects show a sampling of our expertise and our involvement at integral stages of the mining process.

Maytown Sand and Gravel Pit, Thurston County, Washington

GeoDesign provided mining services for the Maytown Aggregates Pit, a 497-acre surface mine in Thurston County. An aggregate resource investigation was performed for the Port of Tacoma (the original owner of the property), which included a geomorphic analysis of the glacial geology of the mine property, a sonic drilling investigation of the aggregate material, and laboratory testing. These data were used to develop cross-sections depicting the subsurface extent of the aggregate unit within the mine property, as well as a materials source report.

Our role included coordinating with multiple managers and departments within the Port, and the owners of Maytown Aggregates, who purchased the property. We served as a liaison to the Port, Thurston County, and Washington State Departments of Natural Resources (DNR) and Ecology (DOE) regulators for a multitude of complex permitting issues and the development of surface mine operation plans. Our team was successful in meeting the conditions of the approved Thurston County Special Use Permit and State Environmental Policy Act (SEPA) Determination prior to start-up of mining under the approved DNR Reclamation Plan. Recent work includes assisting the Port with evaluating the mine's current operational compliance with the Thurston County Special Use Permit (SUP), as well as DNR and DOE permits.

Stoker and Nonpareil Coal Mines, Lewis County, Washington

GeoDesign performed an investigation and assessment of the hazards posed by two abandoned underground coal mines within a proposed large-lot residential development. Digital scans of historic maps showing the underground workings of these mines were geo-referenced to a recent site survey that included topographic contours. Identifiable mine features and areas of ground subsidence were mapped in the field using a handheld GPS, and these locations were evaluated in relation to the coal mine workings. Funding was obtained from the Office of Surface Mining (OSM) to investigate a series of vertical shafts and determine the hazard from collapse of the existing shaft backfill. GeoDesign completed an evaluation of coal mine hazards on the site and provided OSM with a geotechnical report that included a summary of our evaluation of the mine hazards, along with mitigation recommendations.

English Pit Reclamation, Vancouver, Washington

GeoDesign provided services for the reclamation of this 35-acre surface mine to facilitate development of a new business park and mixed-use center. We prepared a revised reclamation plan, including DNR forms, SEPA checklist, and reclamation slope prescriptions. We also provided geotechnical engineering services. The reclamation plan involved extensive backfilling of the former mine with clean, inert fill; re-grading the side slopes surrounding the area; and implementing a surcharge program in areas of former tailings ponds. We were the primary liaison between the client, City of Vancouver, and DNR, which required extensive communication to keep the project on track with the reclamation goals and objectives of the client.



English Pit Reclamation, Vancouver, Washington

Progress Ridge, Beaverton, Oregon

Sited on a former 110-acre rock quarry, this development features more than 700 residences, a shopping center, commercial facilities, a 20-acre park, and a 12-acre lake created from the original deep quarry depression. GeoDesign completed a baseline characterization for the project by conducting geologic reconnaissance and subsurface explorations. We employed a risk-based approach for each major site component, then created a risk-versus-cost matrix designed to select the most appropriate construction techniques based on the complexity of subsurface conditions. The project was recognized by the Department of Geology and Mineral Industry with its 2005 *Outstanding Reclamation of the Year Award*. Recent project phases concluded in 2014.

Ramshorn Mine Remediation, Bayhorse, Idaho

GeoDesign provided geotechnical services in support of remediating the Ramshorn Mine's main tailings pile associated with mining activity at this historic mine. The mine is no longer in operation and is the focal point of an EPA action to stabilize the mine tailings, prevent erosion, and manage drainage from the tailings area to limit human and ecological exposure. High concentrations of primarily arsenic and lead had been detected in soil samples collected from the tailings pile. (When in operation, gold, silver, lead, copper, and zinc were mined.) The site straddles USDA Forest Service and State-owned land. The Forest Service and EPA worked together to characterize the site and select an appropriate removal action. GeoDesign's re-grading alternative (rather than moving the tailings to a new repository location) helped reduce remediation costs and minimize environmental impacts.



Ramshorn Mine Remediation, Bayhorse, Idaho

PEOPLE

GeoDesign's experience in surface mining is supplemented with our environmental, geotechnical, and geological services to provide clients with reliable, turn-key services. With every project, our goal is to assign the appropriate staff and find solutions that meet and exceed our clients' needs and expectations. In addition to providing technical excellence, we have a passion for what we do, and work closely with our clients to develop relationships that benefit every aspect of the project. We have the ability to effectively work with owners, regulatory agencies, and community stakeholders. We have a thorough understanding of the interaction and necessary regulatory integration required for mine operation standards.

ROY GARRISON – Principal, Mining Services

Roy has devoted his entire career to mining with over 38 years of experience in surface mine permitting, planning, reclamation, and regulatory compliance. Roy has consulted on over 300 mines in 34 counties in Washington alone, and multiple mine sites throughout the western states. He served 20 years in the coal industry, developing sound mine reclamation plans, including permitting requirements for a 20,000-acre mine property regulated by OSM. He has gained the respect of regulatory personnel and enjoys excellent working relationships with them.



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In 2005, Roy served on a Surface-Mining Act Revision Committee appointed by the Washington Department of Natural Resources to review and revise the State Surface-Mining Act, RCW 78.44. Additionally, his knowledge base includes the National Environmental Policy Act (NEPA), SEPA, California Environmental Quality Act (CEQA), Surface Mining and Reclamation Act (SMARA), Oregon Mined Land Reclamation Act (OMLRA), and the Office of Surface Mining Reclamation and Enforcement (OSMRE). He has also provided extensive deposition and expert witness testimony in mining-related public hearings and trials.



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ERICK STALEY, LEG, CEG – Senior Mining and Engineering Geologist

Erick has 15 years of professional experience in mine resource evaluation, reserve estimation, permitting, reclamation, and hydrogeological monitoring for industrial sand, aggregate, and metallic mine sites. Erick also has extensive experience as an engineering geologist, with expertise in evaluating slope failure potential, rock wall stability, and other geologic hazards; installing geotechnical instrumentation to monitor soil and rock displacements, blast vibrations, and groundwater levels; and conducting subsurface explorations using a wide variety of drilling techniques.

A born geologist, Erick's projects have taken him across the United States, as well as South America and Australia. In addition to project work, Erick served as the Vice Chair and Chair of the Illinois Association of Aggregate Producers (IAAP) Public Information and Education Committee from 2009 to 2013. He currently serves as Chair of the Oregon Independent Aggregate Association (OIAA).

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