



Securing raw materials is a business imperative. Primary availability of limestone and aggregate resources is determined by the geological setting and therefore site selection and feasibility studies are critical. Equally important is the continued access to those resources which have already been secured through correct extraction, permitting, compliance and stewardship management. Long-term local access to these raw materials is required, but resources are finite and their utilization often be constrained.

Golder works through the entire life cycle, from securing raw material reserves, to maximizing output out of the ground, to closure, all while considering operational needs and constraints. Our holistic approach allows us to help optimize operations, ultimately saving money and reducing your costs per tonne.

Specific services helping to provide Access to Resources include:

### SITE SELECTION & DUE DILIGENCE

- Market and feasibility studies for sources and supply of limestone and aggregate resources
- GIS and related constraint mapping to find and assess 'greenfield' resource asset purchase potential
- Merger and acquisition assessment of single to multiple asset portfolios to determine environmental liability, safety performance and resource quality prior to purchase and integration assessment post purchase

### RESOURCE EVALUATIONS & MINE PLANNING

- Geological mapping, drilling, sampling and quality testing for the purpose of providing accurate volume and tonnage estimates reportable under relevant guidelines
- Innovative methods of determining complex geological deposits such as geophysics and 3-D resource modeling
- Operation support, economic analysis, feasibility studies, extraction and process design for both above and underground operations

### LICENSING & PERMITTING

- Environmental and social impact assessments (ESIAs) for new site development or expansions including ancillary services such as overall project management, ground and surface water assessments, social impacts, ecology, atmospheric, cultural heritage, blasting and vibration
- Public and agency interaction and consultation and general stakeholder analysis

### OPERATIONAL DEVELOPMENT & COMPLIANCE

- Capital and operating cost estimates, development concepts, strategies and designs
- Geotechnical foundation design, tunneling, stripping, construction supervision, and Health & Safety
- Waste management, environmental audits, environmental management services (i.e., EMS design)
- Full life cycle mine engineering, optimization and design

- Construction design and management, including silt ponds, crushing mitigation systems, discharge treatment and rehabilitation
- Incorporation of recycled products, performance assessments and design

### CLOSURE PLANS & REHABILITATION

- Landfilling closure plans, such as cement and lime kiln dust disposal sites
- Decommissioning planning and construction supervision
- Landscape architecture, closure visualization, biodiversity planning and performance studies
- Rehabilitation design and construction management

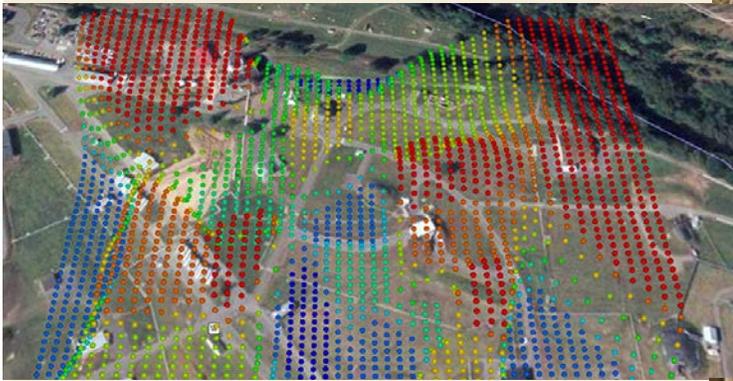
## CONSTRUCTION MATERIALS

GOLDER'S PROFESSIONALS HAVE EXPERIENCE IN ACCESSING RESOURCES FOR OUR CLIENTS IN MANY SECTORS, INCLUDING CONSTRUCTION MATERIALS. A FEW REPRESENTATIVE PROJECT EXAMPLES ARE HIGHLIGHTED BELOW:

Golder was retained by a client in Africa to complete a full international standard Environment and Social Impact Assessment (ESIA) for a proposed cement works with quarry, processing plant and an 8 kilometre long rail link. The study was completed to in-country law and international standards and involved community engagement and design of mitigation to deal with high water levels, near site resettlement and biodiversity challenges.



A confidential client asked Golder to carry out a site selection study on their behalf in North America to identify potential new sources of limestone and also aggregate sources. The study involved a number of states in the US and provinces in Canada using GIS constraint mapping techniques and a unique ranking system developed by Golder to help the client prioritize unconstrained target areas identified during the study for possible future purchase.



A global Construction Materials client retained Golder to help develop and implement an Environmental Management System (EMS) for their operations around the world. The purpose of the EMS was to help ensure compliance at their operations and support their corporate commitment to achieve ISO 14001 compliance. This global implementation will help the company in communicating with regulatory authorities, the public and other stakeholders the company's commitment to being environmentally responsible with the resources they own and provides credibility in messaging for future resource development.



Golder carried out a detailed geological evaluation and mine planning project for a global cement producer at a site where the complex geology made it difficult to meet cement quality production demands. Golder's use of geophysical techniques to identify unique characteristics in the limestone bedding and subsequent 3D structural modeling allowed for the development of a resource evaluation mine plan. The site was influenced by the development of sinkhole shafts infilled with glacial sand that interconnected to a major karst aquifer resulting in major groundwater inflows which had to be assessed in conjunction with the development of the plan.



ENGINEERING EARTH'S DEVELOPMENT, PRESERVING EARTH'S INTEGRITY.

solutions@golder.com  
www.golder.com

Africa + 27 11 254 4800  
Asia + 86 21 6258 5522  
Australasia + 61 3 8862 3500

Europe + 44 1628 851851  
North America + 1 800 275 3281  
South America + 56 2 2616 2000