

# Environmental Services

for the Mining Industry



**Brown and Caldwell (BC) understands that the mining industry has a wide range of natural-resource and environmental challenges. With 52 offices and more than 1,700 employees across North America and the Pacific, we are a recognized leader in adapting state-of-the-art technologies to achieve cost-effective solutions.**

We will leverage our practical, economical, highly effective, and customized solutions to complex issues—including those related to mine planning, permitting, compliance during operations, closure, and reclamation—to produce the best results for your project.

BC's nationally recognized team of hydrogeologists, geochemists, soil scientists, water treatment professionals, engineers, and constructors can provide the expertise needed to help you work through site-specific challenges using a collaborative, multidisciplinary approach.



BC has helped dozens of clients enhance millions of dollars in mining investments with our integrated life-cycle approach. With mining experts based in BC offices across the United States, our team provides services that enable our clients to navigate key regulatory programs and deliver proven, holistic approaches to managing risk, accelerating permitting approvals, and reducing costs.

### National Environmental Policy Act Permitting



Wetlands identification, assessments, impact determination, and mitigation; waterways and water quality

analyses; biological species and habitat surveys and assessments; air quality assessments; land use analyses; socioeconomic and community impacts; and hazardous waste and materials site compliance and assessments

### National Pollutant Discharge Elimination Program



NPDES permit applications and negotiations, NPDES permit modifications, wasteload allocation

modeling, whole effluent toxicity issues, mixing zone and outfall studies, site-specific water quality standards, total maximum daily loads (TMDLs), and compliance monitoring

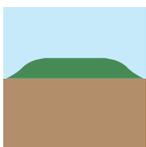
### Erosion Control, Stormwater Best Management Practices



NPDES permit program development and compliance, water quality assessment and permitting, watershed

modeling and planning, source water protection, infrastructure asset management, infrastructure and BMP design, green infrastructure, ecosystem restoration, climate resiliency, program management, construction, and integrated project delivery

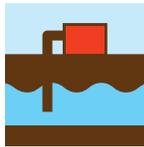
### Cap-and-Cover Design



Reclamation covers; closure cap design and construction including pre-screening, design, performance, and

durability evaluations; cost and constructibility assessments; alternatives comparisons; performance modeling; and construction

### Hydrogeologic Assessment



Soil borings and well installation; down-hole and surface geophysics; groundwater, surface water, and sediment sampling; Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), brownfields, and

state cleanup programs; aquifer testing and water supply evaluations; groundwater conveyance, treatment, and storage; stream/aquifer interaction investigations; groundwater recharge facility design and optimization; well rehabilitation, abandonment, and closure; groundwater flow and contaminant plume modeling and visualization; leachate characterization and modeling; soil and groundwater remediation; testimony, litigation support, and community relations; water withdrawal and underground injection permits; aquifer storage and recovery; and risk assessment and alternate concentration limit development

### Groundwater and Vadose Zone Modeling



Mine permit support, hydrogeologic conceptual model development, surface water/groundwater evaluations, and hydrogeochemical analyses in the form of 3D groundwater flow/fate and transport modeling

### Surface Water Hydrology



Watershed management engineering; stormwater and surface water engineering; delineation, mitigation, and wetlands designs; NPDES permits; TMDL analyses; water discharge permits; water quality monitoring

### Biological Resource Surveys



Threatened- and endangered-species surveys, wetland delineations, wildlife and botanical studies, habitat assessments, GIS/GPS surveying, special-status species inventories, and mitigation monitoring plans

### Water Treatment



Treatability studies and pilot testing; wastewater and process water handling and treatment; arsenic, selenium, and solids treatment; wetlands and passive treatment; acid mine drainage bioreactors; operations and maintenance; and construction management

### Revegetation



Natural stream channel design, bioengineering, ecosystem habitat restoration, wetland restoration and enhancement, green infrastructure and landscape design, compliance and performance monitoring, construction document preparation, cost estimation, wetland and stream mitigation banking, species conservation banking, and watershed and riparian restoration

### State Permitting



Permit applications; compliance reporting; water management plans; reclamation and closure; environmental assessments and studies; water pollution control permits; cyanidation permits; air quality permitting, modeling, and monitoring; regulatory agency coordination; noncompliance risk identification and management; sampling plans; and program development/optimization

**BC is geographically well positioned to respond with solutions tailored to meet your needs within the communities in which you operate.**





**Being able to provide in-house training at BC gives staff an opportunity to take ownership in the H&S program by discussing project-specific hazards and best practices and leads to more engagement from employees than a general MSHA refresher class.**

—Kelly Donahue  
BC MSHA specialist

## Health and Safety

**Excellence in health and safety (H&S) performance, project delivery, and project execution lead to outstanding safety results.**

H&S incidents are costly and can have a significant negative impact. BC fosters a culture-based H&S program focused on providing our employees with the skills, knowledge, and equipment necessary to deliver safe projects. BC empowers our employees to take ownership for safety and environmental issues by taking whatever actions are consistent with project goals to eliminate injuries. This dedication to H&S is what makes BC the company of choice for our clients and our employees.

BC's ThinkSharp program focuses on safe behavior; empowering employees to recognize, report, and correct unsafe acts and conditions; and recognizing employees who contribute ideas or innovations that improve BC's safety culture. ThinkSharp incorporates risk management, culture-based safety, and traditional safety concepts into a continually improving integrated safety and risk management program that allows BC to safely deliver leading-edge engineering and business solutions to efficiently meet the needs of our clients. The program integrates the resources of the safety, operations, and field teams and weaves H&S into project planning, approval, and execution.

Our annual in-house MSHA certification refresher courses engage our employees in project-specific hazard recognition training. Project managers and employees provide input and feedback for this training to inform employees of lessons learned from recent experiences on project sites. As a result of our efforts, **BC has had no reportable accidents on an MSHA site or been issued an MSHA citation on any of our project sites.**

# Safety Performance

Health and safety is Brown and Caldwell's (BC's) number one core value, and zero health and safety (H&S) incidents is our goal. Beyond preventing injuries and property damage, reducing H&S occurrences benefits our clients in reduced costs, increased productivity, and a positive public image. Adherence to BC's H&S principles results in incident costs and loss history that are consistently better than those of our industry at large. BC is the recipient of multiple industry and client awards recognizing H&S performance.

### Safety metrics

