



## MINING DESIGN & CONSTRUCTION MANAGEMENT

**Providing civil and geotechnical engineering, environmental services, and project/construction management, as well as permitting support for the mining industry.**

Our Mining and Design Services team offers a competitive and efficient alternative for all permitting, engineering design, and construction management needs. Services include:

- Airshed Modeling
- Baseline Scientific Studies
- Construction and Project Management
- Data Visualization: 3D Animations, Interactive Graphics, Public Forums
- EIS/EA/ESIA Preparation
- Engineering Design: Tailing Storage Facilities, Waste Rock Disposal, Leach Pads, Closure/Capping, Civil Infrastructure
- Environmental Compliance and Monitoring
- Environmental Design Criteria Development
- Environmental Engineering and Geochemistry
- Environmental Solute Transport Modeling
- Litigation Support and Expert Testimony
- GIS and Database Management
- Environmental Permitting
- Geotechnical Engineering
- Hydrogeology and Groundwater Modeling
- Hydrology and Surface Water Modeling
- Laboratory and Field QA/QC Testing and Inspection
- Mine Reclamation and Closure Planning
- Mine Discharge and ARD Treatment Analysis and Design: Passive and Semi-passive
- Water Resource Studies & Water Analyses
- Water Rights
- Water Supply Development
- Wildlife Habitat Assessment and Enhancement
- Aerial & Bathymetric Modeling and Aerial Imagery

# How We Can Help

NewFields provides customized solutions to meet the unique challenges that our clients are faced with. We know that most projects don't fit neatly in a box. Below is a brief description of some of the services we provide.

## ■ Project Conceptualization

Early contact with regulatory agencies to introduce the conceptual project, solicit concerns and issues, identify jurisdiction of each agency, and permit requirements.

## ■ Environmental/Social Baseline

Design baseline studies and solicit input from regulatory agencies to ensure adequate breadth and depth of each study; implement studies with open communication to agencies to provide assurance that data will satisfy project needs – including mine planning, engineering, internal and external impact analysis.

## ■ Mine Planning

Use baseline information to select the best location for infrastructure (environmentally and economically), engineering design, operational methods, and closure design. Conduct internal impact analysis; retain a record of all options considered (location, design, operation, closure) and the rationale for dismissing.

## ■ Permit Strategy/Navigation

Compile all permit applications to meet both completeness and compliance of regulations and enactments that apply to the project.

## ■ Public Involvement/Community Relations

Conduct informational meetings with stakeholders to inform the public about the project and control the message outside of the regulatory process.

## ■ Geotechnical Engineering

Complete geotechnical investigations to determine locations for various facilities and characterize foundation conditions and borrow areas for construction materials (gravels, sands, silts and clays). Perform settlement analysis, seepage modeling and stability analysis.

## ■ Hydrology and Surface Water Modeling

Determine the watershed limits and expected precipitation to calculate flow rates into areas such as reservoirs, tailings facilities and pits or passing through areas such as culverts under roads or diversion channels.

## ■ Water Resource Studies & Balance Analysis

Analyze the process inflows into an area to ensure that there is a balance between the available storage capacity and outflow.

## ■ Engineering Design

Complete civil engineering design of infrastructure including: tailings storage facilities, heap leach pads, reservoirs, geomembrane lined ponds, channels, waste rock dumps, landfills, ore stockpiles, laydown areas, roads, building foundations, and more.

## ■ Laboratory and Field QA/QC

Complete field and laboratory testing of construction materials (soils, aggregates, concrete, asphalt, geomembrane) to ensure they are installed in accordance with design requirements.

## ■ Construction Management

Planning and management of construction projects that vary from small civil works to large multi-billion dollar complex facilities. Service components include HSE, contract formulation and administration, constructability reviews, project controls (cost and schedule), change management, document control, procurement and logistics, operational and optimization reviews, QA/QC and commissioning of process and mining facilities.

## ■ Project Aerial Imagery and Modeling

Using existing or data obtained from unmanned vehicles, 3D visual animations and extremely accurate terrain modeling can be generated for the project site, no matter how remote.



# Case Studies

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**CHALLENGE 1:** Mine Permitting - Develop adequate Plans of Study for baseline information gathering.

## THE APPROACH

Baseline studies must address several project needs including mine planning, engineering design, facility siting, and impact assessment. Initial contact with regulatory agencies is key to defining the objectives of the study, the study area, field and laboratory methods, quality assurance/quality control, and reporting. Based on the various interests that are to be satisfied with baseline characterization, individual Plans of Study are prepared for agency review. Input from agencies is used to revise the plans and the studies are implemented. Throughout the data collection period for each study, communication with the client and the agencies ensures that data will meet project needs. If desired, 3D visual animations can be produced from unmanned vehicle topographic and/or photographic imagery to aid in showing the proposed facilities.

**CHALLENGE 2:** Mine Design - Client needs to develop and/or expand mine designs.

## THE APPROACH

Our staff work with mine owners to develop designs for both new and expanding mines. Based on site-specific criteria agreed upon with the client and satisfying regulatory requirements, preliminary plans are generated to evaluate options to locate facilities. After a preferred alternative is identified, a geotechnical investigation and laboratory testing are performed to characterize the subsurface soils at the site. Hydrology of the site is analyzed and hydraulic features are designed to manage the surface water runoff and groundwater flows. The final design is completed to provide storage of ore, waste rock, tailings and process solutions while maintaining containment and geotechnical stability. A design report is compiled along with construction drawings, technical specifications, supporting information and calculations. The design report is of sufficient detail for submittal to regulatory agencies and is stamped by a registered engineer when required. Prior to construction, NewFields can assist with pre-construction services including developing and evaluating bid packages. During construction, NewFields performs field and laboratory Quality Assurance / Quality Control (QA/QC) testing and supervision to ensure that construction is completed in accordance with the design. In addition, NewFields provides Construction Management and Commissioning services autonomously or as part of the Owner's "salt and pepper" team. Upon completion of construction, a Record of Construction report is issued that details construction methods and modifications implemented, construction photos, as-built drawings, laboratory and field testing results, and installation reports and logs.

# The NewFields Difference

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We practice a "front-loading" permitting strategy that invests the time and effort to satisfy permit requirements before initiation of formal public involvement. The primary reason for this approach is to ensure that the project description that is ultimately represented to the public during formal scoping will have been vetted through the regulations and industry standards and declared to meet the requirements for a permit.

NewFields' staff has a vast amount of experience including over 120 tailings storage facilities and 85 heap leach facilities. Our experts offer innovative, constructible, and cost effective designs. We have established relationships with primary vendors and contractors in the industry. We have approximately 50 full-time office-based staff, as well as 30 field based staff dedicated to these services.

NewFields is a one-stop option for permitting, design, testing, construction QA/QC, and construction management of new and expanding mine design and construction.

***Let us help you with your next project and experience the NewFields difference!***

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**Since 1995** we have been providing businesses with practical and tactical expertise. We collect, research, refine and provide the actionable intelligence needed to resolve your complex business needs.

## About NewFields

NewFields is an environmental, engineering, and construction management consulting firm. We provide access to a global network of recognized experts and professionals who work together to resolve our clients' complex business needs.

Our talented staff is a diverse group of accomplished individuals, most of whom are senior level engineers, scientists, and specialists, who offer our client base both practical and strategic solutions.

We look forward to helping you achieve success and sustainability in a rapidly changing, interconnected world.



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