

## 1.0 INTRODUCTION

### 1.1 Background

The Stirling Mine was a former underground lead, zinc, copper, silver and gold producer located near the community of Stirling, Richmond County, Cape Breton, Nova Scotia, which has been abandoned since 1956. Prior to final abandonment, the mine had two operating periods: 1935 through 1938 and 1952 through 1956. Surface construction, shaft sinking and underground development was initially undertaken on the property between 1925 and 1930; although, there was no mineral production during this period. Between 1930 and 1935, the property was also placed on standby as a result of low metal prices, however, production did commence in 1935, and continue until 1938.

The mine ceased production in 1938 and remained dormant until 1952, when production resumed. During the 1952 through 1956 operating period, additional underground development and shaft sinking was carried out. Following final abandonment of the mine in 1956, all buildings and equipment were removed from the site; however, concrete foundations from the site structures and two abandoned, open mine shafts (No. 1 and No. 2 Shaft) and two service/ventilation raises (No. 1 and No.2 Raise) remained.

These abandoned mine openings represented a potential hazard to public safety. To eliminate this hazard and permit the assessment of various methods to secure and seal abandoned mine openings, the Nova Scotia Department of Natural Resources (NSDNR), contracted to have the four mine openings capped. The project would both increase public safety for people using the mine site, and serve as a demonstration project to evaluate the design, construction techniques and suitability of various closure methods for the four mine openings on the Stirling Mine site and other similar abandoned mine openings located throughout the province.

### 1.2 Purpose and Scope of Work

On behalf of the Nova Scotia Department of Natural Resources, Jacques Whitford and Associates Limited (JWA) was contracted to complete the design and construction of four different closure methods for the four abandoned mine openings at the former Stirling Mine site, Nova Scotia. JWA was contracted to complete the work following acceptance of our proposal No. 95138, submitted to the NSDNR in response to RPF # 1994-001218 Shaft Capping Design and Construction at the Stirling Mine Site, Richmond County. Details on the design and construction of the four closure methods were outlined in the subsequent contract between The Minister of Natural Resources and JWA. Funds for the projects were provided from the Canada-Nova Scotia Cooperation Agreement on Mineral Development (MDA).



### **1.3 Report Format**

This as-built report describes the salient features of the design, material procurement, site preparation and construction of the four closure methods. The report is presented in six sections. Section 1 provides general site and project background information, identifies the main project personnel and acknowledges particular individuals for their assistance. Section 2 details pre-capping conditions and the closure designs for the four mine openings. Section 3 reviews the field activities associated with the construction, including mobilization and demobilization, the construction period and associated construction support services. Details on the construction of the caps for the four mine openings are described in Section 4, including problems, safety, environmental and survey components associated with the field construction activities. Section 5 presents a project summary, with site specific recommendations based on the design and construction components of the project. Section 6 provides details on the report author and the site specific limitations of the report.

Appendices provided at the end of the report provide a site plan (Appendix A), a complete set of design and as-built drawings (Appendix B and C), and a photographic record of site activities (Appendix D to H). Concrete test results, survey field notes and a stream crossing permit are contained in Appendix I, J and K, respectively.

### **1.4 Project Personnel**

The main organizations and individuals associated with the project were.

Jacques Whitford and Associates Limited - Mr. Brian Herteis, P.Eng.

W. S. Langley and Associates Limited - Mr. Wilbert S. Langley

Terra Marine and Environmental Limited - Mr. Peter Bangay, President

### **1.5 Acknowledgements**

JWA gratefully acknowledges Mr. Daniel Khan, P.Eng., Mining Engineering, with the Nova Scotia Department of Natural Resources, for his assistance and advice.

