



Pebble Project Environmental Baseline Studies  
2004-2008  
Technical Summary

**APPENDIX E.**  
**Consolidated Study Plans**



## TABLE OF CONTENTS

|                                |                       |
|--------------------------------|-----------------------|
| TABLE OF CONTENTS .....        | E-i                   |
| E.1 Purpose.....               | E-1                   |
| E.2 Goals and Objectives ..... | E-1                   |
| E.3 Project Study Area .....   | E-1                   |
| E.4 Approach.....              | E-1                   |
| TABLES .....                   | following Section E.4 |



## APPENDIX E. CONSOLIDATED STUDY PROGRAM

### E.1 Purpose

The purpose of the consolidated study program is to summarize the study plans for the baseline studies for The Pebble Partnership's Pebble Project. It is separated into 19 parts, one for the introduction and one for each of 18 disciplines of study. The study program encompasses proposed and completed work for these disciplines for 2004 through 2008. Each section of the consolidated study program is a compilation of the annual study plans that were developed for each year of study for a given discipline during the years 2004 through 2008. Certain chapters in the environmental baseline document present data from 2009 and 2010; therefore, the consolidated study programs for those disciplines also include 2009 and 2010.

### E.2 Goals and Objectives

The primary goal of the study plans is to describe The Pebble Partnership's baseline study program for characterizing the natural environment. The specific objectives of the consolidated study program are as follows:

- Summarize the annual study plans for characterizing baseline environmental conditions.
- Define the objectives of each environmental component of the baseline studies.
- Define the methods and approach for data gathering and analysis.

### E.3 Study Areas

The environmental baseline studies center on four study areas: the mine study area immediately around the general deposit location, the transportation-corridor study area between the mine study area and the Bristol Bay/Cook Inlet drainages boundary, the Iliamna Lake study area in the northeastern extent of the lake, and the Cook Inlet study area surrounding Iliamna and Iniskin Bays on Cook Inlet (Figure 1-4 in Chapter 1 of the technical summary for the Pebble Project environmental baseline document). For many of the study disciplines, the study areas evolved over time as data were collected. For example, in 2004/2005, the mine study area was centered on the Pebble Deposit as it was then delineated. By 2006/2007, the mine study area for some disciplines had been expanded considerably to encompass the area surrounding the newly delineated eastern deposit.

### E.4 Approach

Several environmental aspects (including physical, chemical, biological, and human) in the study areas require consideration by experts from a variety of disciplines. The disciplines (and the associated consultants) required to characterize the environmental baseline conditions for the Pebble Project are listed in Table E-1. The overall approach of the environmental baseline

studies is to collect information on all these aspects and integrate the studies across scientific disciplines to characterize baseline conditions. Depending on the methods used in a given study, not all disciplines require study plans. For example, certain studies that are based on desktop research of existing literature and other available information sources may not have study plans. The study disciplines included in the consolidated study program are listed in Table E-2.

The individual study approach varies widely depending on the study discipline. Researchers studying the chemical environment, for example, collect samples of water, sediment, biological tissue, etc. for laboratory analysis and then evaluate the resulting data. Studies for other disciplines, such as hydrology and meteorology, install instruments on site to measure and record data for subsequent evaluation. Research for biological disciplines such as wildlife may include field counts to acquire data used to determine species distribution and abundance. Studies of the human-related disciplines, for example subsistence, may involve interviewing knowledgeable local residents. The approaches used for individual studies are described in detail in the study program for the respective discipline.

Appendix E is a product of The Pebble Partnership and is a consolidation of the annual study plans provided by the consultants who conducted the studies.

Appendix E—Consolidated Study Program

**TABLE E-1**  
**Baseline Study Disciplines and Associated Consultants**

| <b>Discipline</b>   | <b>Consultant(s)</b>   |
|---|--|
| Climate and Meteorology                                   | Hoefler Consulting Group, CH2M Hill  |
| Geology and Mineralization                                | Knight Piésold, Thomas Hamilton, SLR International Corp.   |
| Physiography  | Knight Piésold   |
| Soils   | Three Parameters Plus, Inc.  |
| Geotechnical Studies, Seismicity and Volcanism            | Knight Piésold, Water Management Consultants Inc., Schlumberger Water Services, Frontier Geosciences Inc.  |
| Surface Water Hydrology                                   | <i>Mine Study Area</i> — Knight Piésold; HDR Alaska, Inc.; ABR, Inc.; APC Services, LLC, CH2M Hill<br><i>Transportation Corridor/Cook Inlet Study Areas</i> — Bristol Environmental and Engineering Services Corp.   |
| Groundwater Hydrology                                     | <i>Mine Study Area</i> — Water Management Consultants; Schlumberger Water Services; SLR International Corp., Bristol Environmental and Engineering Services Corp., HDR Alaska, Inc., CH2M Hill   |
| Water Quality (Surface Water, Groundwater, and Marine)    | <i>Mine Study Area</i> — Water Management Consultants; Schlumberger Water Services; HDR Alaska, Inc.; APC Services, LLC; SLR International Corp.; CH2M Hill<br><i>Transportation Corridor/Cook Inlet Study Areas</i> — Bristol Environmental and Engineering Services Corp., Pentec Environmental/Hart Crowser, Inc. |
| Trace Elements and Other Naturally Occurring Constituents | <i>Mine Study Area</i> — SLR International Corp.; HDR Alaska, Inc.; CH2M Hill<br><i>Transportation Corridor/Cook Inlet Study Areas</i> — Bristol Environmental and Engineering Services Corp., SLR International Corp., Pentec Environmental/Hart Crowser, Inc.  |
| Geochemical Characterization                              | <i>Mine Study Area</i> — SRK Consulting, Inc.  |
| Noise   | Michael Minor & Associates   |
| Vegetation  | Three Parameters Plus, Inc.; HDR Alaska, Inc.  |
| Wetlands  | Three Parameters Plus, Inc.; HDR Alaska, Inc.  |
| Fish and Aquatic Invertebrates (Freshwater and Marine)    | R2 Resource Consultants, Inc.; HDR Alaska, Inc.; Buell & Associates; Bailey Environmental; Northern Ecological Services; EcoFish; Inter-fluve; Pacific Hydrologic, Inc.; Pentec Environmental/Hart Crowser, Inc.   |
| Wildlife and Habitat (Terrestrial and Marine)             | ABR, Inc.; Bristol Environmental and Engineering Services Corp.; Pentec Environmental/Hart Crowser, Inc.; RWJ Consulting   |
| Threatened and Endangered Species                         | ABR., Inc.   |
| Land and Water Use  | Kevin Waring Associates  |
| Transportation  | Kevin Waring Associates  |
| Power   | Kevin Waring Associates  |
| Socioeconomics  | Kevin Waring Associates, McDowell Group  |

## Appendix E, Consolidated Study Plan

| Discipline                                   | Consultant(s)   |
|--|---|
| Cultural Resources                           | Stephen R. Braund & Associates  |
| Subsistence and Traditional Knowledge        | Stephen R. Braund & Associates  |
| Visual Resources                             | Land Design North   |
| Recreation                                   | Kevin Waring Associates   |
| Analytical Quality Assurance/Quality Control | Shaw Alaska, Inc.; Argon, Inc.  |
| Iliamna Lake Studies                         | HDR Alaska, Inc.  |
| Data Management                              | Resource Data Inc.; DES.IT; Shaw Alaska, Inc.; Argon, Inc.  |
| Analytical Laboratories                      | SGS North America; Columbia Analytical Services;; SGS CEMI; SGS Lakefield; TestAmerica Laboratories, Inc.; University of Waterloo; ACZ Laboratories, Inc.; Texas A&M University; Frontier GeoSciences |
| Aerial Photography                           | Aerometric, Eagle Mapping, Kodiak Mapping, Dudley Thompson Mapping  |



## Appendix E—Consolidated Study Program

**TABLE E-2**  
**Consolidated Study Program Elements**

| <b>No.</b> | <b>Study Discipline</b>  |
|------------|--|
| 1          | Introduction   |
| 2          | Meteorology  |
| 3          | Noise  |
| 4          | Surface Hydrology  |
| 5          | Groundwater Hydrology  |
| 6          | Water Quality  |
| 7          | Trace Elements   |
| 8          | Geochemical Characterization and Metal Leaching/Acid Rock Drainage |
| 9          | Terrestrial Wildlife and Habitat                                   |
| 10         | Wetlands   |
| 11         | Fish and Aquatic Habitat   |
| 12         | Marine   |
| 13         | Subsistence  |
| 14         | Cultural Resources   |
| 15         | Recreation   |
| 16         | Land Use   |
| 17         | Visual Aesthetics  |
| 18         | Socioeconomics   |
| 19         | Data Management and Geographic Information System                  |