

**APPENDIX E1
ANNOTATED OUTLINE FOR
CONTAINMENT/CAPPING
DESIGN AND IMPLEMENTATION PLAN**

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PREFACE

This appendix includes an annotated outline that identifies potential content for a Design and Implementation Plan for a containment/capping remedy. This outline is for guidance only, and is applicable on a case-by-case basis.

Engineering considerations will drive the precise content and organization of such plans. For instance, a simple asphalt cap over an impacted area may not require as extensive an analysis and design as a more elaborate system with components such as a foundation layer and surface water drainage control system. The following outline includes as many potential items as possible, and the site-specific plan may choose those applicable to the system being proposed.

**ANNOTATED OUTLINE FOR
CONTAINMENT/CAPPING DESIGN AND IMPLEMENTATION PLAN**

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1.0 INTRODUCTION

Instructions: Provide basic information on the site location and history, a brief summary of the project history, regulatory considerations, and a summary of site-wide contamination and remediation activities.

- 1.1 Overview
- 1.2 Facility/Site Description
- 1.3 Regulatory Considerations
- 1.4 Site-Wide Contamination and Remediation Activities
- 1.5 Report Organization

2.0 DESCRIPTION OF AREA TO BE CAPPED

Instructions: Provide a detailed description of the past and current conditions at the area to be capped. If the area was formerly an active unit or waste area, provide a description of the treatment or disposal activities. If it is a release area, describe the activities leading to the release. To provide a picture of the contaminant distribution, summarize the results of previous investigation documents, supported by appropriate references.

- 2.1 History of Area
- 2.2 Physical Characteristics of Area (Topography, Geology, etc.)
- 2.3 Description of Contamination and Distribution

3.0 CAP DESIGN ANALYSIS

Instructions: Present the engineering analysis performed to arrive at the detailed specifications of the cap. A list of the potential subject areas of the analyses are provided below. A large portion of the section will include geotechnical analysis of the conditions at the site, in preparation for the cap placement.

- 3.1 Field Investigation and Laboratory Testing
- 3.2 Seismic Analysis
- 3.3 Settlement Analysis
- 3.4 Stability Analysis
- 3.5 Infiltration Analysis
- 3.6 Surface Water Design

4.0 COVER DESIGN

Instructions: Provide both a large-scale overview and detailed descriptions of cap system elements. This section may include a quality assurance and quality control section, and may outline the content and format of the post-construction as-built and completion reports. As the section central to the cap design, this section should reference a large number of attached figures, tables, and appendices. In a subsection, outline how the as-built and completion report will be organized (see also Appendix E4, Capping Completion Report Annotated Outline).

- 4.1 Overview and Principal Design Components
 - 4.2 Site Preparation and Grading
 - 4.2.1 Description of Work
 - 4.2.2 Design Criteria
 - 4.3 Cover System Design
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 - 4.8 As-Built Report
 - 4.9 Certification of Completion

5.0 ENVIRONMENTAL MONITORING AND CONTROL MEASURES DURING CONSTRUCTION

Instructions: Describe any construction issues with air emissions and surface water/storm water runoff. Reference any permits and monitoring programs prescribed by state and local agencies.

- 5.1 Air Emissions
- 5.2 Surface Water Runoff

6.0 CONSTRUCTION SCHEDULE

Instructions: Provide a schedule and chronology for construction, preferably with a supplemental timeline or Gantt chart, showing milestones and timeframes for all activities.

7.0 POST-CONSTRUCTION ACTIVITIES

Instructions: Describe activities following construction which require mention in the design document. This can include demobilization issues, landscaping, security features, etc.

8.0 POST-CONSTRUCTION CARE AND RESTRICTIONS

Instructions: Briefly describe long-term operations and maintenance (O&M) issues, and any land-use restrictions which may be applicable to the cap, based on engineering issues. Summarize and reference other plans or governing documents (such as an O&M Plan and deed restriction document) for the cap. Discuss limitations for any future intrusive activities.

- 8.1 Operations and Maintenance (O&M) Plan
- 8.2 Land Use Restrictions

9.0 POST-CONSTRUCTION SURVEYING AND ENGINEERS REPORT

Instructions: A separate section may be merited to summarize post-construction surveying and engineering evaluations and reviews, particularly if the final configuration is complex or critical. Alternately, this section may be included as an appendix.

10.0 COST ESTIMATES

Instructions: Evaluate and summarize the cost estimates for the cap design and construction.

11.0 HEALTH AND SAFETY PLAN

Instructions: Include a health and safety plan for all construction and post-construction activities as a separate section or appendix.

12.0 REFERENCES

Instructions: List all references cited in the plan.

FIGURES

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APPENDICES

Instructions: A list of potential appendix topics is presented below. Include those appendices which are applicable to the type of cap used. Other appendices may also be applicable.

ENGINEERING DRAWINGS

ENGINEERING CALCULATIONS

CONSTRUCTION PHOTOGRAPHS

LABORATORY TEST RESULTS

MATERIAL CERTIFICATIONS

GEOLOGIC CROSS SECTIONS

AERIAL PHOTOGRAPHS

SETTLEMENT AND SEISMIC ANALYSIS

CONFORMANCE TESTINGS RESULTS

FORMAT EXAMPLES OF INSPECTION AND REPORT DOCUMENTS

FIELD MOISTURE/DENSITY TEST RESULTS

NUCLEAR DENSITY TEST

MANUFACTURER'S DATA ON MATERIALS TO BE USED

FOUNDATION LAYER TESTING

QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM