

CONTENTS

	Page
1. INTRODUCTION	1-1
1.1 Background	1-1
1.2 Requirements under the Environmental Impact Assessment Ordinance	1-1
1.3 Purpose and Objective of the Environmental Impact Assessment (EIA) Study	1-2
1.4 Approach of the EIA Study	1-4
1.5 Structure of the EIA Report	1-4
2. PROJECT DESCRIPTION	2-1
2.1 Background	2-1
2.2 Location and Description of the Project	2-1
2.3 Need for the Project	2-4
2.4 Consideration of Alternative Options of Water Supply, Water Main Alignments, Landfall Locations and Construction Methods	2-6
2.5 Implementation Programme	2-24
2.6 Project Interfaces / Concurrent Projects	2-25
2.7 Scope of Works during Operational Phase	2-25
2.8 Continuous Public Involvement	2-25
2.9 Illustrative Materials for Landscaping Measures	2-27

3.	WATER QUALITY IMPACT ASSESSMENT	3-1
3.1	Introduction	3-1
3.2	Environmental Legislation, Policies, Standards and Criteria	3-1
3.3	Study Area	3-4
3.4	Baseline Water Quality Conditions of the Study Area	3-4
3.5	Water Sensitive Receivers	3-8
3.6	Potential Impacts during Construction Phase	3-8
3.7	Mitigation Measures for Construction Phase Impacts	3-14
3.8	Residual and Cumulative Impacts	3-23
3.9	Monitoring and Audit Requirement	3-23
3.10	Summary	3-24
3.11	References	3-24
4.	ECOLOGICAL IMPACT ASSESSMENT	4-1
4.1	Introduction	4-1
4.2	Environmental Legislation, Criteria and Guidelines	4-1
4.3	Study Area	4-2
4.4	Ecological Key Issues	4-2
4.5	Literature Review	4-3
4.6	Field Survey Scope and Methodology	4-3
4.7	Key Ecological Issues for the EIA Study	4-7
4.8	Results of Literature Review	4-8
4.9	Results of Field Surveys	4-16
4.10	Evaluation of Habitats and Species	4-23
4.11	Impact Identification and Evaluation	4-32
4.12	Impact Avoidance and Mitigation Measures	4-35
4.13	Residual and Cumulative Ecological Impacts	4-36
4.14	Ecological Monitoring and Audit	4-36
4.15	Summary	4-37
4.16	References	4-37
5.	FISHERIES IMPACT ASSESSMENT	5-1
5.1	Introduction	5-1
5.2	Legislation	5-2
5.3	Study Area	5-2
5.4	Methodologies for Baseline Establishment and Assessment	5-2
5.5	Baseline Conditions	5-3
5.6	Sensitive Receivers	5-5
5.7	Impact Identification and Evaluation	5-6
5.8	Mitigation of Impacts	5-9
5.9	Residual Impacts	5-9
5.10	Environmental Monitoring and Audit	5-9
5.11	Summary	5-9
5.12	References	5-10

6.	CULTURAL HERITAGE IMPACT ASSESSMENT	6-1
6.1	Introduction	6-1
6.2	Environmental Legislation, Standards, Guidelines and Criteria	6-2
6.3	Terrestrial Archaeological Investigation (TAI)	6-4
6.4	Marine Archaeological Investigation (MAI)	6-10
6.5	Residual Impacts	6-13
6.6	Environmental Monitoring and Audit	6-13
6.7	Summary	6-13
6.8	References	6-14
7.	CONSTRUCTION WASTE MANAGEMENT	7-1
7.1	Introduction	7-1
7.2	Relevant Legislation, Policies, Standards and Criteria	7-1
7.3	Assessment Methodology	7-3
7.4	Sources and Types of Waste arising from the Project	7-3
7.5	Impact Assessment and Evaluation	7-4
7.6	Mitigation Measures	7-10
7.7	Evaluation of Residual Impacts	7-19
7.8	Environmental Audit	7-20
7.9	Summary	7-20
8.	CONSTRUCTION NOISE IMPACT ASSESSMENT	8-1
8.1	Introduction	8-1
8.2	Noise Criteria	8-1
8.3	Study Area	8-3
8.4	Representative Noise Sensitive Receivers	8-4
8.5	Construction Noise Impact Assessment	8-5
8.6	Mitigation Measures	8-8
8.7	Residual Impact	8-13
8.8	Cumulative Impact	8-13
8.9	Monitoring and Audit Requirements	8-14
8.10	Summary	8-14
9.	ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS	9-1
9.1	Introduction	9-1
9.2	Background	9-1
9.3	Environmental Management	9-2
9.4	Project Organisation	9-3
9.5	Construction Programme	9-3
9.6	Water Quality	9-3
9.7	Ecology	9-5
9.8	Fisheries	9-5
9.9	Cultural Heritage	9-5
9.10	Waste Management	9-6
9.11	Construction Noise	9-7
9.12	Other Information	9-8

10.	ENVIRONMENTAL OUTCOMES	10-1
10.1	Justification and Benefits of the Project	10-1
10.2	Population and Environmental Sensitive Areas Protected	10-1
10.3	Environmental Friendly Designs Recommended	10-2
10.4	Key Environmental Problems Avoided	10-3
10.5	Compensation Areas Included	10-4
10.6	Environmental Benefits of Environmental Protection Measures Recommended	10-4
11.	CONCLUSION	11-1
11.1	Background	11-1
11.2	Location and Description of the Project	11-2
11.3	Water Main Design	11-2
11.4	Justification and Benefits of the Project	11-3
11.5	Key Environmental Issues	11-3
11.6	Water Quality Impact	11-4
11.7	Ecological Impact	11-4
11.8	Fisheries Impact	11-5
11.9	Cultural Heritage Impact	11-5
11.10	Construction Waste Management	11-6
11.11	Construction Noise Impact	11-6
11.12	Environmental Monitoring and Audit (EM&A)	11-7
11.13	Overall Conclusion	11-8

END OF TEXT

PLATES

Plate 1	Rocky shore of Chi Ma Wan, Lantau
Plate 2	Low headland at Tai Kwai Wan, Cheung Chau
Plate 3	Cheung Kwai Road and WSD temporary storage area
Plate 4	WSD temporary area, south of Tai Kwai Wan
Plate 5	Village vehicle in Cheung Chau
Plate 6	Adamasta Channel
Plate 7	Existing exposed land main at Lantau
Plate 8	Existing exposed land main at Cheung Chau
Plate 9	Typical Horizontal Directional Drilling Rig
Plate 10	Typical Horizontal Directional Drilling Rig and General Site Arrangement
Plate 11	Typical Drilling Fluid Recycling Unit
Plate 12	Typical Bentonite Pump and General Site Arrangement

APPENDICES

Appendix 1	EIA Study Brief
Appendix 2	Evaluation of Options for Improving the Adequacy and Reliability of the Water Supply to Cheung Chau
Appendix 4	Details of Ecological Impact Assessment
Appendix 4.1	Works Programme
Appendix 4.2	Plant Species recorded within the Study Area
Appendix 4.3	Bird species recorded within the Study Area
Appendix 4.4	Herpetofauna and Mammal recorded within the Study Area
Appendix 4.5	Butterfly Species recorded within the Study Area
Appendix 4.6	Dragonfly recorded within the Study Area
Appendix 4.7	Marine Ecological Survey Results
Appendix 6	Marine Archaeological Investigation
Appendix 8.1	Details of Construction Noise Impact Assessment
Appendix 10	Project Implementation Schedule

LIST OF TABLES

Table 2.1	Summary of the Evaluation of Alternative Options for the Improvement of Fresh Water Supply to Cheung Chau
Table 2.2	Summary of Public Consultation
Table 3.1	Water Quality Objectives for Southern WCZ
Table 3.2	Summary of EPD Marine Water Quality Data for Southern WCZ (SM12) in 2008
Table 4.1	Habitats recorded within the Assessment Area
Table 4.2	Evaluation of Plantation Habitat within the Assessment Area
Table 4.3	Evaluation of Shrubland-Grassland Habitat within the Assessment Area
Table 4.4	Evaluation of Developed Area within the Assessment Area
Table 4.5	Evaluation of Sandy Shore within the Assessment Area
Table 4.6	Evaluation of Rocky Shore within the Assessment Area
Table 4.7	Evaluation of Artificial Seawall within the Assessment Area
Table 4.8	Evaluation of Marine Waters within the Assessment Area
Table 4.9	Evaluation of Flora Species of Conservation Concern within the Study Area
Table 4.10	Evaluation of Fauna Species of Conservation Concern within the Study Area
Table 4.11	Habitat Loss caused by the Project
Table 5.1	Evaluation of Fisheries Impact
Table 6.1	Assessment of Terrestrial Archaeological Potential of the Project
Table 7.1	Types of C&D Materials and Wastes Generated by the Project
Table 7.2	The Estimated Quantities of C&D Materials and C&D Waste Arising from the Project
Table 7.3	Summary of the Quantities and Disposal Routes of C&D Materials and Waste Arising from the Project
Table 7.4	Preliminary Disposal Programme of the C&D Materials
Table 8.1	EIAO-TM Daytime Construction Noise Standards
Table 8.2	Representative Noise Sensitive Receivers (NSRs)

Table 8.3	Predicted Noise Level during Construction at Cheung Chau - Unmitigated
Table 8.4	Quiet Powered Mechanical Equipment Recommended for Use during Construction Phase
Table 8.5	Predicted Noise Level during Construction at Cheung Chau - Mitigated (Level 1 Mitigation: Use of Quiet Plant)
Table 8.6	Predicted Noise Level during Construction at Cheung Chau - Mitigated (Level 2 Mitigation: Use of Quiet Plant + Temporary Noise Barrier)
Table 9.1	Water Quality Monitoring Stations during Construction Stage
Table 9.2	Representative NSRs chosen for Noise Monitoring during Construction Stage

LIST OF FIGURES

Figure 1.1	General Location Plan
Figure 1.2	General Location Plan of the Project (Aerial View)
Figure 2.1	Proposed Main Alignment – Key Plan
Figure 2.2	Proposed Main Alignment (Cheung Chau Landfall)
Figure 2.3	Proposed Main Alignment (Lantau Landfall)
Figure 2.4	Schematic Layout of Proposed Launching Site at Cheung Chau
Figure 2.5	Schematic Layout of Proposed Reception Site at Lantau
Figure 2.6	Options considered for Improvement of Fresh Water Supply to Cheung Chau
Figure 2.7	Proposed HDD Pipe Alignment
Figure 2.8	Typical HDD Procedures for this Project
Figure 2.9	Landscaping Measures for the Proposed Land-Based Main at Cheung Chau
Figure 2.10	Landscaping Measures for the Proposed Land-Based Main at Lantau
Figure 3.1	Location of EPD Marine Water Quality Monitoring Station near the Project
Figure 3.2	Water Sensitive Receivers within the Study Area
Figure 3.3	Proposed Water Quality Mitigation Measures for the Launching Site at Cheung Chau
Figure 3.4	Proposed Water Quality Mitigation Measures for the Reception Site at Lantau
Figure 4.1	Study Area, Sites of Conservation Importance and Sampling Locations
Figure 4.2	Seasonal Distribution of Chinese White Dolphin in Hong Kong Waters (April 2008 – February 2009)
Figure 4.3	Seasonal Distribution of Finless Porpoise in Hong Kong Waters (2004 – 2009)
Figure 4.4a	Habitat Map and Locations of Species of Conservation Concern
Figure 4.4b	Habitat Map and Locations of Species of Conservation Concern (close-up at Chi Ma Wan Landfall Point)
Figure 4.4c	Habitat Map and Locations of Species of Conservation Concern (close-up at Tai Kwai Wan Landfall Point)

Figure 4.5	Photos of Habitats, Species of Conservation Concern and Works Area
Figure 4.6	Coral Species recorded within the Study Area
Figure 5.1	Locations of Fisheries Resources within the Study Area
Figure 5.2	Distribution of Overall fisheries Production (Adult Fish) in terms of Production (kg/ha)
Figure 5.3	Distribution of Overall fisheries Production (Adult Fish & Fish Fry) in terms of Production (HK\$/ha)
Figure 6.3.1	Geological Map of Chi Ma Wan
Figure 6.3.2	Geological Map of Cheung Chau
Figure 6.3.3	Location of Tai Kwai Wan Archaeological Site
Figure 6.3.4	2007 Aerial Photograph of Chi Ma Wan
Figure 6.3.5	1945 Aerial Photograph of Tai Kwai Wan
Figure 6.3.6	1980 Topographic Map overlaid on Current Topographic Map showing Landform Changes at Tai Kwai Wan
Figure 6.3.7	1963 Aerial Photograph of Tai Kwai Wan
Figure 6.3.8	1985 Aerial Photograph of Tai Kwai Wan
Figure 6.4.1	Seabed Features of the Survey Area (Sheet 1 of 2)
Figure 6.4.2	Seabed Features of the Survey Area (Sheet 2 of 2)
Figure 8.1	Locations of Noise Sensitive Receivers
Figure 8.2	Location of Proposed Temporary Noise Barrier
Figure 9.1	Locations of Proposed Water Quality Monitoring Stations
Figure 9.2	Locations of Proposed Noise Monitoring Station and Noise Sensitive Receivers