

Guam and CNMI Military Relocation EIS

Volume 2: Marine Corps Relocation – Guam

Table of Contents

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION	1-1
1.1 INTRODUCTION	1-1
1.2 PURPOSE AND NEED.....	1-2
CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES.....	2-1
2.1 OVERVIEW.....	2-1
2.1.1 Summary of Proposed Action: Establish a Marine Corps Base on Guam.....	2-1
2.1.2 Alternatives Analysis Methodology	2-11
2.1.2.1 Step 1 - Requirements Analysis.....	2-14
2.1.2.2 Step 2 - Site Alternatives	2-14
2.1.2.3 Step 3 - Site-Specific Planning Alternatives.....	2-18
2.1.2.4 Step 4 - Selection of Alternatives Carried Forward for Analysis	2-18
2.1.3 No-Action Alternative	2-18
2.1.4 Brown Tree Snake Dispersal and Interdiction	2-19
2.1.4.1 Dispersal Threats to Hawaii and Islands within CNMI without Suspected Populations of BTS.....	2-19
2.1.4.2 Current and Proposed Additional Interdiction Efforts.....	2-20
2.1.4.3 Biosecurity Plans and Procedures.....	2-21
2.2 PROPOSED ACTION: MAIN CANTONMENT AREA FUNCTIONS	2-22
2.2.1 Requirements.....	2-22
2.2.2 Alternatives Analysis: Main Cantonment Area.....	2-26
2.2.2.1 Site Alternatives for Main Cantonment Area Functions	2-26
2.2.2.2 Site-Specific Planning Alternatives for Main Cantonment Area Functions	2-31
2.2.3 Alternatives Carried Forward for Analysis: Main Cantonment Area	2-31
2.2.3.1 Main Cantonment Alternative 1	2-34
2.2.3.2 Main Cantonment Alternative 2	2-36
2.2.3.3 Main Cantonment Alternative 3	2-36
2.2.3.4 Main Cantonment Alternative 8	2-39
2.3 PROPOSED ACTION: TRAINING FUNCTIONS.....	2-41
2.3.1 Requirements.....	2-41
2.3.1.1 Ammunition Storage.....	2-43
2.3.1.2 Command, Control, and Simulation	2-44
2.3.1.3 Non-Firing General Military Skills Training Facilities	2-44
2.3.1.4 Firing General Military Skills Training.....	2-55
2.3.1.5 Aviation Training.....	2-59
2.3.1.6 Airspace	2-62
2.3.2 Alternatives Analysis: Training Functions	2-64
2.3.2.1 Feasibility and Suitability Criteria.....	2-64

2.3.2.2	Ammunition Storage Alternatives	2-66
2.3.2.3	Command, Control, and Simulation Alternatives.....	2-66
2.3.2.4	Non-Firing General Military Skills Training Alternatives	2-69
2.3.2.5	Firing General Military Skills Training Alternatives	2-71
2.3.2.6	Airspace	2-84
2.3.3	Alternatives Carried Forward for Analysis: Training Functions.....	2-85
2.3.3.1	Ammunition Storage Facilities	2-85
2.3.3.2	Command, Control, and Simulation Facilities.....	2-85
2.3.3.3	Non-Firing General Military Skills Training	2-85
2.3.3.4	Firing General Military Skills Training Facilities	2-86
2.3.3.5	Aviation Training.....	2-87
2.3.3.6	Airspace	2-87
2.4	PROPOSED ACTION: AIRFIELD FUNCTIONS	2-88
2.4.1	Requirements	2-88
2.4.1.1	ACE Beddown.....	2-88
2.4.1.2	Air Embarkation	2-91
2.4.1.3	North Gate and Access Road.....	2-93
2.4.2	Alternatives Analysis: Airfield Functions	2-96
2.4.3	Alternatives Carried Forward for Analysis: Airfield Functions.....	2-97
2.5	PROPOSED ACTION: WATERFRONT FUNCTIONS	2-98
2.5.1	Requirements.....	2-98
2.5.1.1	General Overview	2-98
2.5.1.2	Proposed Waterfront Embarkation Projects	2-102
2.5.2	Alternatives Analysis: Waterfront Functions	2-128
2.5.2.1	Waterfront Project: Amphibious Task Force Ship Berthing and Embarkation.....	2-128
2.5.2.2	Amphibious Craft Laydown Area	2-129
2.5.2.3	USCG Berthing and Crew Support Buildings	2-129
2.5.2.4	Military Working Dog Kennel.....	2-132
2.5.2.5	Apra Medical/Dental Clinic.....	2-134
2.5.3	Alternatives Carried Forward for Analysis: Waterfront Functions	2-137
2.6	SUMMARY OF ALTERNATIVES.....	2-138
2.6.1	Proposed Action Alternatives.....	2-138
2.6.1.1	Least Environmentally Damaging Practicable Alternative (LEDPA) ...	2-138
2.6.1.2	Preferred Alternative	2-138
2.6.1.3	Alternatives Carried Forward for Cantonment Area/Housing Functions	2-139
2.6.1.4	Alternatives Carried Forward for Training Functions	2-140
2.6.1.5	Alternatives Carried Forward for Airfield Functions	2-142
2.6.1.6	Alternatives Carried Forward for Waterfront Functions	2-142
2.6.2	No-Action Alternative	2-143
2.6.2.1	Main Cantonment/Family Housing	2-143
2.6.2.2	Training Functions.....	2-143
2.6.2.3	Airfield Functions.....	2-144
2.6.2.4	Waterfront Functions.....	2-144
2.6.2.5	Summary.....	2-144

CHAPTER 3. GEOLOGICAL AND SOIL RESOURCES	3-1
3.1 AFFECTED ENVIRONMENT	3-1
3.1.1 Definition of Resource.....	3-1
3.1.1.1 Geologic Overview.....	3-1
3.1.1.2 Topography.....	3-3
3.1.1.3 Geologic Units.....	3-3
3.1.1.4 Geologic Hazards and Seismicity	3-10
3.1.2 North.....	3-14
3.1.2.1 Andersen AFB	3-14
3.1.2.2 Finegayan.....	3-15
3.1.2.3 South Finegayan	3-16
3.1.2.4 Non-Department of Defense (DoD) Land	3-17
3.1.2.5 Off Base Roadways	3-18
3.1.3 Central.....	3-19
3.1.3.1 Andersen South.....	3-19
3.1.3.2 Barrigada	3-21
3.1.3.3 Non-DoD Land	3-21
3.1.3.4 Off Base Roadways	3-22
3.1.4 Apra Harbor	3-23
3.1.4.1 Apra Harbor.....	3-23
3.1.4.2 Naval Base Guam	3-25
3.1.4.3 Off Base Roadways	3-25
3.1.5 South.....	3-26
3.1.5.1 Naval Munitions Site	3-26
3.1.5.2 Off Base Roadways	3-29
3.2 ENVIRONMENTAL CONSEQUENCES	3-31
3.2.1 Approach to Analysis	3-31
3.2.1.1 Methodology.....	3-31
3.2.1.2 Determination of Significance.....	3-33
3.2.1.3 Issues Identified During Public Scoping Process	3-34
3.2.2 Alternative 1.....	3-34
3.2.2.1 North.....	3-34
3.2.2.2 Central	3-40
3.2.2.3 Apra Harbor	3-42
3.2.2.4 South.....	3-45
3.2.2.5 Summary of Impacts.....	3-47
3.2.2.6 Proposed Mitigation Measures	3-48
3.2.3 Alternative 2 (Preferred Alternative)	3-49
3.2.3.1 North.....	3-49
3.2.3.2 Central	3-49
3.2.3.3 Apra Harbor.....	3-49
3.2.3.4 South.....	3-49
3.2.3.5 Summary of Impacts.....	3-50
3.2.3.6 Proposed Mitigation Measures	3-51
3.2.4 Alternative 3.....	3-52
3.2.4.1 North.....	3-52

3.2.4.2	Central	3-52
3.2.4.3	Apra Harbor	3-53
3.2.4.4	South	3-53
3.2.4.5	Summary of Impacts	3-53
3.2.4.6	Proposed Mitigation Measures	3-55
3.2.5	Alternative 8.....	3-55
3.2.5.1	North	3-55
3.2.5.2	Central	3-55
3.2.5.3	Apra Harbor	3-56
3.2.5.4	South	3-56
3.2.5.5	Summary of Impacts	3-56
3.2.5.6	Proposed Mitigation Measures	3-58
3.2.6	No-Action Alternative	3-58
3.2.7	Summary of Impacts	3-58
3.2.8	Summary of Proposed Mitigation Measures	3-63
CHAPTER 4. WATER RESOURCES		
4-1		
4.1	AFFECTED ENVIRONMENT	4-1
4.1.1	Definition of Resource.....	4-1
4.1.1.1	Water Resources Overview	4-1
4.1.1.2	Surface Water	4-1
4.1.1.3	Groundwater	4-10
4.1.1.4	Nearshore Waters.....	4-17
4.1.1.5	Wetlands	4-21
4.1.2	North.....	4-25
4.1.2.1	Andersen Air Force Base (AFB)	4-25
4.1.2.2	Finegayan.....	4-26
4.1.2.3	Non- DoD Land	4-27
4.1.2.4	Off Base Roadways	4-29
4.1.3	Central.....	4-34
4.1.3.1	Andersen South.....	4-34
4.1.3.2	Non-DoD Land	4-35
4.1.3.3	Barrigada	4-35
4.1.3.4	Off Base Roadways	4-38
4.1.4	Apra Harbor	4-49
4.1.4.1	Harbor	4-49
4.1.4.2	Naval Base Guam	4-63
4.1.4.3	Off Base Roadways	4-64
4.1.5	South.....	4-68
4.1.5.1	Naval Munitions Site	4-68
4.1.5.2	Non-DoD Land	4-71
4.1.5.3	Off Base Roadways	4-73
4.2	ENVIRONMENTAL CONSEQUENCES	4-73
4.2.1	Approach to Analysis	4-73
4.2.1.1	Methodology.....	4-73
4.2.1.2	Determination of Significance.....	4-81

4.2.1.3	Issues Identified during Public Scoping Process	4-83
4.2.2	Alternative 1.....	4-84
4.2.2.1	North.....	4-84
4.2.2.2	Central	4-93
4.2.2.3	Apra Harbor.....	4-100
4.2.2.4	South.....	4-112
4.2.2.5	Summary of Impacts.....	4-117
4.2.2.6	Proposed Mitigation Measures	4-118
4.2.3	Alternative 2 (Preferred Alternative)	4-118
4.2.3.1	North.....	4-119
4.2.3.2	Central	4-120
4.2.3.3	Apra Harbor.....	4-121
4.2.3.4	South.....	4-122
4.2.3.5	Summary of Impacts.....	4-123
4.2.3.6	Proposed Mitigation Measures	4-123
4.2.4	Alternative 3.....	4-123
4.2.4.1	North.....	4-124
4.2.4.2	Central	4-124
4.2.4.3	Apra Harbor.....	4-130
4.2.4.4	South.....	4-131
4.2.4.5	Summary of Impacts.....	4-132
4.2.4.6	Proposed Mitigation Measures	4-132
4.2.5	Alternative 8.....	4-132
4.2.5.1	North.....	4-133
4.2.5.2	Central	4-134
4.2.5.3	Apra Harbor.....	4-135
4.2.5.4	South.....	4-136
4.2.5.5	Summary of Impacts.....	4-137
4.2.5.6	Proposed Mitigation Measures	4-137
4.2.6	No-Action Alternative	4-137
4.2.6.1	Surface Water	4-137
4.2.6.2	Groundwater	4-138
4.2.6.3	Nearshore Waters.....	4-138
4.2.6.4	Wetlands	4-138
4.2.7	Summary of Impacts.....	4-139
4.2.8	Summary of Proposed Mitigation Measures	4-142
4.2.9	Least Environmentally Damaging Practicable Alternative (LEDPA) for Waterfront Functions.....	4-144
4.2.9.1	Ship Berthing for Amphibious Task Force Ships and Associated Amphibious Vehicles and Boats.....	4-145
4.2.9.2	Amphibious Craft (LCAC/AAV) Laydown Area	4-146
4.2.9.3	USCG Berthing.....	4-147
4.2.9.4	Wetlands-Onshore Impacts.....	4-147
4.2.9.5	LEDPA Summary for Potential Impacts to Jurisdictional Wetlands and Waters Under All Alternatives in Volume 2.....	4-148

CHAPTER 5. AIR QUALITY	5-1
5.1 AFFECTED ENVIRONMENT	5-1
5.1.1 Definition of Resource.....	5-1
5.1.1.1 Regulatory Overview.....	5-1
5.1.1.2 Stationary Sources	5-5
5.1.1.3 Mobile Sources	5-5
5.1.1.4 Ambient Air Quality Monitoring.....	5-7
5.1.1.5 Climate.....	5-7
5.1.1.6 Greenhouse Gas Emissions.....	5-8
5.1.2 North.....	5-9
5.1.2.1 Andersen Air Force Base (AFB)	5-9
5.1.2.2 Finegayan.....	5-10
5.1.2.3 Non-Department of Defense (DoD) Land	5-10
5.1.2.4 Off Base Roadways	5-10
5.1.3 Central.....	5-11
5.1.3.1 Andersen South.....	5-11
5.1.3.2 Barrigada	5-11
5.1.3.3 Non-DoD Land and Naval Hospital Guam.....	5-11
5.1.3.4 Off Base Roadways	5-12
5.1.4 Apra Harbor	5-12
5.1.4.1 Harbor.....	5-12
5.1.4.2 Naval Base Guam	5-13
5.1.4.3 Off Base Roadways	5-13
5.1.5 South.....	5-13
5.1.5.1 Naval Munitions Site	5-14
5.1.5.2 Off Base Roadways	5-14
5.2 ENVIRONMENTAL CONSEQUENCES	5-14
5.2.1 Approach to Analysis	5-14
5.2.1.1 Methodology.....	5-14
5.2.1.2 Determination of Significance.....	5-17
5.2.1.3 Issues Identified during Public Scoping Process	5-18
5.2.2 Alternative 1.....	5-18
5.2.2.1 North.....	5-19
5.2.2.2 Central	5-24
5.2.2.3 Apra Harbor.....	5-25
5.2.2.4 South.....	5-26
5.2.2.5 Summary of Impacts.....	5-26
5.2.2.6 Proposed Mitigation Measures	5-27
5.2.3 Alternative 2 (Preferred Alternative)	5-27
5.2.3.1 North.....	5-27
5.2.3.2 Central	5-28
5.2.3.3 Apra Harbor.....	5-28
5.2.3.4 South.....	5-29
5.2.3.5 Summary of Impacts.....	5-29
5.2.3.6 Proposed Mitigation Measures	5-29
5.2.4 Alternative 3.....	5-30

5.2.4.1	North.....	5-30
5.2.4.2	Central	5-31
5.2.4.3	Apra Harbor	5-31
5.2.4.4	South.....	5-32
5.2.4.5	Summary of Impacts.....	5-32
5.2.4.6	Proposed Mitigation Measures	5-32
5.2.5	Alternative 8.....	5-32
5.2.5.1	North.....	5-33
5.2.5.2	Central	5-33
5.2.5.3	Apra Harbor.....	5-34
5.2.5.4	South.....	5-35
5.2.5.5	Summary of Impacts.....	5-35
5.2.5.6	Proposed Mitigation Measures	5-35
5.2.6	No-Action Alternative	5-35
5.2.7	Summary of Impacts.....	5-35
CHAPTER 6. NOISE.....		6-1
6.1	AFFECTED ENVIRONMENT	6-1
6.1.1	Definition of Resource.....	6-1
6.1.2	North.....	6-7
6.1.2.1	Andersen AFB	6-7
6.1.2.2	Finegayan.....	6-11
6.1.2.3	Non-DoD Land	6-11
6.1.2.4	Off Base Roadways	6-11
6.1.3	Central.....	6-13
6.1.3.1	Andersen South.....	6-13
6.1.3.2	Barrigada	6-16
6.1.3.3	Non-DoD Land	6-16
6.1.3.4	Off Base Roadways	6-17
6.1.4	Apra Harbor	6-18
6.1.4.1	Harbor.....	6-18
6.1.4.2	Naval Base Guam	6-19
6.1.4.3	Off Base Roadways	6-19
6.1.5	South.....	6-20
6.1.5.1	Naval Munitions Site	6-20
6.1.5.2	Off Base Roadways	6-20
6.2	ENVIRONMENTAL CONSEQUENCES	6-21
6.2.1	Approach to Analysis	6-21
6.2.1.1	Methodology.....	6-21
6.2.1.2	Determination of Significance.....	6-22
6.2.1.3	Issues Identified during Public Scoping Process	6-23
6.2.2	Alternative 1.....	6-23
6.2.2.1	North.....	6-23
6.2.2.2	Central	6-31
6.2.2.3	Apra Harbor.....	6-36
6.2.2.4	South.....	6-40

6.2.2.5	Summary of Impacts.....	6-42
6.2.2.6	Proposed Mitigation Measures	6-42
6.2.3	Alternative 2 (Preferred Alternative)	6-42
6.2.3.1	North.....	6-42
6.2.3.2	Central	6-43
6.2.3.3	Apra Harbor	6-44
6.2.3.4	South.....	6-44
6.2.3.5	Summary of Impacts.....	6-44
6.2.3.6	Proposed Mitigation Measures	6-44
6.2.4	Alternative 3.....	6-45
6.2.4.1	North.....	6-45
6.2.4.2	Central	6-45
6.2.4.3	Apra Harbor	6-46
6.2.4.4	South.....	6-46
6.2.4.5	Summary of Impacts.....	6-47
6.2.4.6	Proposed Mitigation Measures	6-47
6.2.5	Alternative 8.....	6-47
6.2.5.1	Central	6-48
6.2.5.2	Apra Harbor	6-48
6.2.5.3	South.....	6-49
6.2.5.4	Summary of Impacts.....	6-49
6.2.5.5	Proposed Mitigation Measures	6-49
6.2.6	Summary of Impacts	6-49
6.2.7	Summary of Proposed Mitigation Measures	6-52
CHAPTER 7.	AIRSPACE	7-1
7.1	AFFECTED ENVIRONMENT	7-1
7.1.1	Definition of Resource.....	7-1
7.1.1.1	Airspace	7-1
7.1.1.2	Air Traffic.....	7-7
7.1.2	Military Air Traffic.....	7-8
7.1.3	Civilian Air Traffic.....	7-10
7.2	ENVIRONMENTAL CONSEQUENCES	7-12
7.2.1	Approach to Analysis	7-12
7.2.1.1	Methodology.....	7-12
7.2.1.2	Determination of Significance.....	7-12
7.2.2	Alternative 1.....	7-13
7.2.2.1	Aviation Training and Airfield Functions	7-13
7.2.2.2	Firing Training.....	7-14
7.2.2.3	Summary of Impacts.....	7-14
7.2.3	Alternative 2 (Preferred Alternative)	7-15
7.2.3.1	Aviation Training and Airfield Functions	7-15
7.2.3.2	Firing Training.....	7-15
7.2.3.3	Summary of Impacts.....	7-15
7.2.3.4	Proposed Mitigation Measures	7-15
7.2.4	Alternative 3.....	7-15

7.2.4.1	Aviation Training and Airfield Functions	7-15
7.2.4.2	Firing Training.....	7-16
7.2.4.3	Summary of Impacts.....	7-16
7.2.4.4	Proposed Mitigation Measures	7-16
7.2.5	Alternative 8.....	7-16
7.2.5.1	Aviation Training and Airfield Functions	7-16
7.2.5.2	Firing Training.....	7-16
7.2.5.3	Summary of Impacts.....	7-16
7.2.6	No-Action Alternative	7-16
7.2.7	Summary of Impacts.....	7-17
7.2.8	Summary of Proposed Mitigation Measures	7-18
CHAPTER 8. LAND AND SUBMERGED LAND USE.....		8-1
8.1	AFFECTED ENVIRONMENT	8-1
8.1.1	Definition of Resource.....	8-1
8.1.1.1	Land Ownership and Management - Islandwide	8-1
8.1.1.2	Non-Federal Land Management	8-3
8.1.1.3	Federal Land Ownership and Management	8-4
8.1.1.4	Submerged Lands Ownership and Use.....	8-5
8.1.1.5	Land Use.....	8-8
8.1.2	North.....	8-18
8.1.2.1	Andersen AFB	8-19
8.1.2.2	Finegayan.....	8-25
8.1.2.3	Non-DoD	8-27
8.1.2.4	Off Base Roadways	8-29
8.1.3	Central.....	8-32
8.1.3.1	Andersen South.....	8-32
8.1.3.2	Barrigada	8-34
8.1.3.3	Non-DoD Land and Submerged Land.....	8-36
8.1.3.4	Off Base Roadways	8-37
8.1.4	Apra Harbor	8-40
8.1.4.1	Harbor.....	8-40
8.1.4.2	Naval Base Guam	8-47
8.1.4.3	Off Base Roadways	8-49
8.1.5	South.....	8-51
8.1.5.1	Naval Munitions Site	8-51
8.1.5.2	Non-DoD Lands	8-53
8.1.5.3	Off Base Roadways	8-54
8.2	ENVIRONMENTAL CONSEQUENCES	8-56
8.2.1	Approach to Analysis	8-56
8.2.1.1	Determination of Significance - Land Ownership/Management	8-56
8.2.1.2	Determination of Significance – Land Use.....	8-57
8.2.2	Issues Identified During Public Scoping Process.....	8-58
8.2.3	Alternative 1.....	8-59
8.2.3.1	North.....	8-59
8.2.3.2	Central	8-64

8.2.3.3	Harbor/Waterfront	8-68
8.2.3.4	South.....	8-73
8.2.3.5	Summary of Impacts.....	8-74
8.2.3.6	Proposed Mitigation Measures	8-74
8.2.4	Alternative 2 (Preferred Alternative)	8-75
8.2.4.1	North.....	8-75
8.2.4.2	Central	8-75
8.2.4.3	Apra Harbor.....	8-76
8.2.4.4	South.....	8-76
8.2.4.5	Summary of Impacts.....	8-76
8.2.4.6	Proposed Mitigation Measures	8-76
8.2.5	Alternative 3.....	8-76
8.2.5.1	North.....	8-76
8.2.5.2	Central	8-76
8.2.5.3	Apra Harbor	8-77
8.2.5.4	South.....	8-77
8.2.5.5	Summary of Impacts.....	8-77
8.2.5.6	Proposed Mitigation Measures	8-77
8.2.6	Alternative 8.....	8-78
8.2.6.1	North.....	8-78
8.2.6.2	Central	8-78
8.2.6.3	Apra Harbor	8-78
8.2.6.4	South.....	8-79
8.2.6.5	Summary of Impacts.....	8-79
8.2.6.6	Proposed Mitigation Measures	8-79
8.2.7	No-Action Alternative	8-79
8.2.7.1	North.....	8-79
8.2.7.2	Central	8-79
8.2.7.3	Apra Harbor.....	8-80
8.2.7.4	South.....	8-80
8.2.7.5	Summary of No-Action Alternative Impacts.....	8-80
8.2.8	Summary of Impacts	8-80
8.2.9	Summary of Proposed Mitigation Measures	8-84
CHAPTER 9. RECREATIONAL RESOURCES		9-1
9.1	AFFECTED ENVIRONMENT	9-1
9.1.1	Definition of Resource.....	9-1
9.1.2	North.....	9-1
9.1.2.1	Andersen Air Force Base (AFB)	9-1
9.1.2.2	NCTS Finegayan and South Finegayan Housing Area.....	9-3
9.1.2.3	Federal Aviation Administration (FAA).....	9-4
9.1.2.4	Non-Department of Defense (DoD) Land	9-4
9.1.2.5	Off Base Roadways	9-5
9.1.3	Central.....	9-6
9.1.3.1	Andersen South.....	9-6
9.1.3.2	Barrigada	9-6

9.1.3.3	Non-DoD Land	9-9
9.1.3.4	Off Base Roadways	9-11
9.1.4	Apra Harbor	9-11
9.1.4.1	Apra Harbor	9-13
9.1.4.2	Naval Base Guam	9-13
9.1.4.3	Off Base Roadways	9-13
9.1.5	South.....	9-14
9.1.5.1	Naval Munitions Site	9-14
9.1.5.2	Non-DoD Land	9-14
9.1.5.3	Off Base Roadways	9-16
9.2	ENVIRONMENTAL CONSEQUENCES	9-18
9.2.1	Approach to Analysis	9-18
9.2.1.1	Methodology	9-18
9.2.1.2	Determination of Significance	9-18
9.2.1.3	Issues Identified during Public Scoping Process	9-19
9.2.2	Alternative 1.....	9-19
9.2.2.1	North.....	9-19
9.2.2.2	Central	9-22
9.2.2.3	Apra Harbor	9-24
9.2.2.4	South.....	9-25
9.2.2.5	Summary of Impacts.....	9-26
9.2.3	Alternative 2 (Preferred Alternative)	9-27
9.2.3.1	North.....	9-27
9.2.3.2	Central	9-27
9.2.3.3	Apra Harbor	9-28
9.2.3.4	South.....	9-28
9.2.3.5	Summary of Impacts.....	9-29
9.2.3.6	Mitigation Measures	9-29
9.2.4	Alternative 3.....	9-29
9.2.4.1	North.....	9-29
9.2.4.3	Apra Harbor	9-30
9.2.4.4	South.....	9-31
9.2.4.5	Summary of Impacts.....	9-31
9.2.4.6	Proposed Mitigation Measures	9-31
9.2.5	Alternative 8.....	9-31
9.2.5.2	Central	9-32
9.2.5.3	Apra Harbor	9-32
9.2.5.4	South.....	9-33
9.2.5.5	Summary of Impacts.....	9-33
9.2.5.6	Proposed Mitigation Measures	9-33
9.2.6	No-Action Alternative	9-33
9.2.7	Summary of Impacts	9-33
9.2.8	Summary of Proposed Mitigation Measures	9-36
CHAPTER 10	TERRESTRIAL BIOLOGICAL RESOURCES	10-1
10.1	AFFECTED ENVIRONMENT	10-1

10.1.1	Definition of Resource.....	10-1
10.1.1.1	Vegetation Communities	10-1
10.1.1.2	Wildlife	10-6
10.1.1.3	Special-Status Species	10-7
10.1.2	Study Areas and Survey Methods.....	10-15
10.1.3	North.....	10-16
10.1.3.1	Andersen AFB	10-16
10.1.3.2	Finegayan.....	10-34
10.1.3.3	Off Base Roadways	10-45
10.1.4	Central.....	10-52
10.1.4.1	Andersen South.....	10-52
10.1.4.2	Non-DoD Land	10-54
10.1.4.3	Navy Barrigada and Air Force Barrigada	10-59
10.1.4.4	Off Base Roadways	10-62
10.1.5	Apra Harbor	10-6:
10.1.5.1	Naval Base Guam	10-6:
10.1.5.2	Off Base Roadways	10-75
10.1.5.3	Naval Munitions Site	10-76
10.1.5.4	Off Base Roadways	10-86
10.2	ENVIRONMENTAL CONSEQUENCES	10-85
10.2.1	Approach to Analysis	10-85
10.2.1.1	Methodology.....	10-88
10.2.1.2	Determination of Significance.....	10-89
10.2.1.3	Issues Identified during Public Scoping Process	10-; 2
10.2.2	Alternative 1.....	10-; 2
10.2.2.1	North.....	10-; 2
10.2.2.2	Central	10-124
10.2.2.3	Apra Harbor	10-13:
10.2.2.4	South.....	10-146
10.2.2.5	Summary of Impacts.....	10-156
10.2.2.6	Mitigation Measures	10-157
10.2.3	Alternative 2.....	10-16;
10.2.3.1	North.....	10-16;
10.2.3.2	Central	10-17:
10.2.3.3	Apra Harbor.....	10-17:
10.2.3.4	South.....	10-17:
10.2.3.5	Summary of Impacts.....	10-17:
10.2.3.6	Mitigation Measures	10-17:
10.2.4	Alternative 3.....	10-17;
10.2.4.1	North.....	10-17;
10.2.4.2	Central	10-17;
10.2.4.3	Apra Harbor.....	10-184
10.2.4.4	South.....	10-184
10.2.4.5	Summary of Impacts.....	10-184
10.2.4.6	Mitigation Measures	10-184
10.2.5	Alternative 8.....	10-185

10.2.5.1	North.....	10-185
10.2.5.2	Central	10-189
10.2.5.3	Apra Harbor	10-189
10.2.5.4	South.....	10-189
10.2.5.5	Summary of Impacts.....	10-189
10.2.6	Mitigation Measures.....	10-190
10.2.7	No-Action Alternative	10-190
10.2.8	Summary of Impacts	10-190
CHAPTER 11. MARINE BIOLOGICAL RESOURCES		11-1
11.1	AFFECTED ENVIRONMENT	11-1
11.1.1	Definition of Resource.....	11-1
11.1.1.1	Marine Flora, Invertebrates and Associated EFH.....	11-1
11.1.1.2	Essential Fish Habitat	11-1
11.1.1.3	Special-Status Species	11-6
	Sea Turtles	11-7
	Species of Concern	11-7
	Guam-Listed Species.....	11-7
	Marine Mammals.....	11-7
11.1.1.4	Non-native Species	11-9
11.1.2	Region of Influence.....	11-9
11.1.3	Study Areas and Survey Methods.....	11-9
11.1.4	Guam Regional Environment.....	11-11
11.1.4.1	Marine Flora, Invertebrates and Associated EFH.....	11-16
11.1.4.2	Essential Fish Habitat	11-18
11.1.4.3	Special-Status Species	11-38
11.1.4.4	Non-Native Species	11-40
11.1.5	North.....	11-42
11.1.5.1	Andersen AFB	11-42
	Marine Flora, Invertebrates and Associated EFH.....	11-43
	Essential Fish Habitat	11-44
	Special-Status Species	11-45
	Non-native Species	11-45
11.1.5.2	Finegayan.....	11-46
	Marine Flora, Invertebrates and Associated EFH.....	11-46
	Essential Fish Habitat	11-46
	Special-Status Species	11-49
	Non-native Species	11-50
11.1.5.3	Non-DoD Land.....	11-50
11.1.5.4	Off-Base Roadways	11-50
11.1.6	Central.....	11-51
11.1.6.1	Andersen South.....	11-51
11.1.6.2	Barrigada	11-51
11.1.6.3	Non-DoD Land.....	11-51
	Marine Flora, Invertebrates and Associated EFH.....	11-51
	Essential Fish Habitat	11-51
	Special-Status Species	11-52
	Non-native Species	11-52

	Piti/Nimitz Hill	11-52
	Marine Flora, Invertebrates and Associated EFH.....	11-52
	Essential Fish Habitat	11-52
	Special-Status Species	11-54
	Non-native Species	11-54
	Off-Base Roadways.....	11-54
11.1.7	Apra Harbor	11-56
	11.1.7.1 Harbor.....	11-56
	Outer Apra Harbor and Sasa Bay	11-57
	Inner Apra Harbor	11-62
	11.1.7.2 Naval Base Guam	11-67
	11.1.7.3 Off-Base Roadways.....	11-67
11.1.8	South.....	11-68
	11.1.8.1 Naval Munitions Site	11-68
	11.1.8.2 Non-DoD Land	11-68
	11.1.8.3 Off-Base Roadways.....	11-68
11.2	ENVIRONMENTAL CONSEQUENCES	11-68
11.2.1	Approach to Analysis	11-68
	11.2.1.1 Methodology.....	11-68
	11.2.1.2 Determination of Significance.....	11-71
	11.2.1.3 Issues Identified during Public Scoping Process	11-73
11.2.2	Alternative 1.....	11-73
	11.2.2.1 North.....	11-73
	Construction.....	11-73
	Operation	11-74
	Marine Flora, Invertebrates and Associated EFH	11-74
	Essential Fish Habitat.....	11-74
	Special-Status Species.....	11-77
	Non-Native Species.....	11-78
	Construction.....	11-78
	Marine Flora, Invertebrates and Associated EFH	11-78
	Essential Fish Habitat.....	11-79
	Special-Status Species.....	11-79
	Non-Native Species.....	11-80
	Operation	11-80
	Marine Flora, Invertebrates and Associated EFH	11-80
	Essential Fish Habitat.....	11-82
	Special-Status Species.....	11-83
	Non-Native Species.....	11-83
	11.2.2.2 Central	11-84
	Construction.....	11-84
	Marine Flora, Invertebrates and Associated EFH	11-84
	Essential Fish Habitat.....	11-84
	Special-Status Species.....	11-84
	Non-Native Species.....	11-85
	Operation	11-85
	Marine Flora, Invertebrates and Associated EFH	11-85
	Essential Fish Habitat.....	11-87
	Special-Status Species.....	11-87

	Non-Native Species.....	11-92
	Construction.....	11-92
	Marine Flora, Invertebrates and Associated EFH	11-93
	Essential Fish Habitat.....	11-93
	Special-Status Species.....	11-96
	Non-Native Species.....	11-97
	Operation	11-97
	Marine Flora, Invertebrates and Associated EFH	11-99
	Essential Fish Habitat.....	11-100
	Special-Status Species.....	11-100
	Non-Native Species.....	11-102
	Construction.....	11-102
	Marine Flora, Invertebrates and Associated EFH	11-102
	Essential Fish Habitat.....	11-104
	Special-Status Species.....	11-105
	Non-native Species.....	11-107
	Operation	11-107
	Marine Flora, Invertebrates and Associated EFH	11-107
	Essential Fish Habitat.....	11-108
	Special-Status Species.....	11-108
	Non-Native Species.....	11-108
11.2.2.3	South.....	11-109
11.2.2.4	Summary of Alternative 1 Impacts.....	11-109
11.2.2.5	Summary of Alternative 1 EFH Assessment	11-109
11.2.2.6	Alternative 1 Proposed Mitigation Measures	11-110
11.2.3	Alternative 2.....	11-113
11.2.3.1	North.....	11-113
11.2.3.2	Central	11-113
11.2.3.3	Apra Harbor.....	11-114
11.2.3.4	South.....	11-114
11.2.3.5	Summary of Alternative 2 Impacts.....	11-114
11.2.3.6	Summary of Alternative 2 EFH Assessment	11-114
11.2.3.7	Proposed Mitigation Measures	11-114
11.2.4	Alternative 3.....	11-114
11.2.4.1	North.....	11-114
11.2.4.2	Central	11-114
11.2.4.3	Apra Harbor.....	11-115
11.2.4.4	South.....	11-115
11.2.4.5	Summary of Alternative 3 Impacts.....	11-115
11.2.4.6	Summary of Alternative 3 EFH Assessment	11-115
11.2.4.7	Proposed Mitigation Measures	11-115
11.2.5	Alternative 8.....	11-115
11.2.5.1	North.....	11-115
11.2.5.2	Central	11-116
11.2.5.3	Apra Harbor.....	11-116
11.2.5.4	South.....	11-116
11.2.5.5	Summary of Alternative 8 Impacts.....	11-116
11.2.5.6	Summary of Alternative 8 EFH Assessment	11-116

11.2.5.7	Proposed Mitigation Measures	11-116
11.2.6	No-Action Alternative	11-117
11.2.7	Summary of Impacts	11-117
11.2.8	Summary of Essential Fish Habitat Assessment.....	11-121
11.2.9	Summary of Proposed Mitigation Measures	11-126
CHAPTER 12.	CULTURAL RESOURCES.....	12-1
12.1	AFFECTED ENVIRONMENT	12-1
12.1.1	Definition of Resource.....	12-1
12.1.1.1	Regulatory Review	12-1
12.1.1.2	Research Methodology	12-3
12.1.1.3	Historical Overview.....	12-4
12.1.2	North.....	12-9
12.1.2.1	Andersen AFB	12-9
12.1.2.2	Finegayan.....	12-16
12.1.2.3	Non-DoD Land	12-20
12.1.2.4	Off Base Roadways	12-20
12.1.3	Central.....	12-21
12.1.3.1	Andersen South.....	12-21
12.1.3.2	Barrigada	12-22
12.1.3.3	Non-DoD Land	12-23
12.1.3.4	Off Base Roadways	12-24
12.1.4	Apra Harbor	12-27
12.1.4.1	Harbor.....	12-27
12.1.4.2	Naval Base Guam	12-29
12.1.4.3	Off Base Roadways	12-33
12.1.5	South.....	12-33
12.1.5.1	Naval Munitions Site	12-33
12.1.5.2	Non-DoD Lands	12-37
12.1.5.3	Off Base Roadways	12-37
12.2	ENVIRONMENTAL CONSEQUENCES	12-39
12.2.1	Approach to Analysis	12-39
12.2.1.1	Methodology.....	12-39
12.2.1.2	Issues Identified during Public Scoping Process	12-40
12.2.2	Alternative 1.....	12-41
12.2.2.1	North.....	12-41
12.2.2.2	Central	12-45
12.2.2.3	Apra Harbor	12-50
12.2.2.4	South.....	12-53
12.2.2.5	Summary of Impacts.....	12-55
12.2.2.6	Proposed Mitigation Measures	12-55
12.2.3	Alternative 2 (Preferred Alternative)	12-57
12.2.3.1	North.....	12-57
12.2.3.2	Central	12-59
12.2.3.3	Apra Harbor	12-60
12.2.3.4	South.....	12-60

12.2.3.5	Summary of Impacts.....	12-61
12.2.3.6	Proposed Mitigation Measures	12-61
12.2.3.7	Alternative 3	12-62
12.2.3.8	North.....	12-62
12.2.3.9	Central	12-65
12.2.3.10	Apra Harbor	12-65
12.2.3.12	Summary of Impacts.....	12-66
12.2.3.13	Proposed Mitigation Measures	12-66
12.2.4	Alternative 8.....	12-67
12.2.4.1	North.....	12-67
12.2.4.2	Apra Harbor.....	12-70
12.2.4.3	South.....	12-71
12.2.4.4	Summary of Impacts.....	12-71
12.2.4.5	Proposed Mitigation Measures	12-71
12.2.6	Summary of Proposed Mitigation Measures	12-75
CHAPTER 13. VISUAL RESOURCES		13-1
13.1	AFFECTED ENVIRONMENT	13-1
13.1.1	North.....	13-1
13.1.1.1	Andersen Air Force Base (AFB)	13-1
13.1.1.3	Non-DoD Land	13-15
13.1.1.4	Off Base Roadways	13-18
13.1.2	Central.....	13-24
13.1.2.1	Andersen South.....	13-24
13.1.2.2	Non-DoD Land	13-28
13.1.2.3	Barrigada	13-32
13.1.2.4	Piti/Nimitz Hill	13-35
13.1.2.5	Off Base Roadways	13-35
13.1.3	Apra Harbor	13-43
13.1.3.1	Harbor.....	13-43
13.1.3.2	Naval Base Guam	13-45
13.1.3.3	Non-DoD Land	13-47
13.1.3.4	Off Base Roadways	13-48
13.1.4	South.....	13-54
13.1.4.1	Naval Munitions Site	13-54
13.1.4.2	Non-DoD Land	13-55
13.1.4.3	Off Base Roadways	13-58
13.2	ENVIRONMENTAL CONSEQUENCES	13-62
13.2.1	Approach to Analysis	13-62
13.2.2	Alternative 1.....	13-62
13.2.2.1	North.....	13-62
13.2.2.2	Central	13-68
13.2.2.3	Apra Harbor.....	13-68
13.2.2.4	South.....	13-69
13.2.2.5	Summary of Impacts.....	13-69
13.2.2.6	Proposed Mitigation Measures	13-69

13.2.3	Alternative 2 (Preferred Alternative)	13-69
13.2.3.1	North.....	13-69
13.2.3.2	Central	13-70
13.2.3.3	Apra Harbor.....	13-70
13.2.3.4	South.....	13-72
13.2.3.5	Summary of Impacts.....	13-72
13.2.3.6	Proposed Mitigation Measures	13-72
13.2.4	Alternative 3	13-73
13.2.4.1	North.....	13-73
13.2.4.2	Central	13-75
13.2.4.3	Apra Harbor.....	13-76
13.2.4.4	South.....	13-76
13.2.4.5	Summary of Impacts.....	13-76
13.2.4.6	Proposed Mitigation Measures	13-76
13.2.5	Alternative 8	13-76
13.2.5.1	North.....	13-76
13.2.5.2	Central	13-79
13.2.5.3	Apra Harbor.....	13-79
13.2.5.4	South.....	13-79
13.2.5.5	Summary of Impacts.....	13-79
13.2.5.6	Proposed Mitigation Measures	13-79
13.2.6	No-Action Alternative	13-79
13.2.7	Summary of Impacts	13-80
CHAPTER 14. MARINE TRANSPORTATION		14-1
14.1	AFFECTED ENVIRONMENT	14-1
14.1.1	Definition of Resource	14-1
14.1.2	North	14-1
14.1.3	Central	14-1
14.1.3.1	Andersen South.....	14-1
14.1.3.2	Barrigada	14-1
14.1.3.3	Non-Department of Defense (DoD) Land	14-1
14.1.4	Apra Harbor	14-1
14.1.4.1	Harbor.....	14-2
14.1.4.2	Naval Base Guam	14-6
14.1.5	South	14-9
14.1.5.1	Naval Munitions Site	14-9
14.1.5.2	Non-DoD Land	14-9
14.2	ENVIRONMENTAL CONSEQUENCES	14-9
14.2.1	Approach to Analysis	14-9
14.2.1.1	Methodology.....	14-9
14.2.1.2	Determination of Significance.....	14-9
14.2.1.3	Issues Identified during Public Scoping Process	14-9
14.2.2	Alternative 1	14-10
14.2.2.1	North.....	14-10
14.2.2.2	Central	14-10

14.2.2.3	Apra Harbor	14-11
14.2.2.4	Harbor	14-11
14.2.2.5	South	14-15
14.2.2.6	Summary of Impacts.....	14-15
14.2.2.7	Proposed Mitigation Measures	14-16
14.2.3	Alternative 2 (Preferred Alternative)	14-16
14.2.3.1	North.....	14-16
14.2.3.2	Central	14-16
14.2.3.3	Apra Harbor	14-17
14.2.3.4	South.....	14-17
14.2.3.5	Summary of Impacts.....	14-17
14.2.3.6	Proposed Mitigation Measures	14-17
14.2.4	Alternative 3.....	14-18
14.2.4.1	North.....	14-18
14.2.4.2	Central	14-18
14.2.4.3	Apra Harbor	14-19
14.2.4.4	South.....	14-19
14.2.4.5	Summary of Impacts.....	14-19
14.2.4.6	Proposed Mitigation Measures	14-19
14.2.5	Alternative 8.....	14-20
14.2.5.1	North.....	14-20
14.2.5.2	Central	14-20
14.2.5.3	Apra Harbor.....	14-21
14.2.5.4	South.....	14-21
14.2.5.5	Summary of Impacts.....	14-21
14.2.5.6	Proposed Mitigation Measures	14-21
14.2.6	No-Action Alternative	14-21
14.2.7	Summary of Impacts.....	14-22
14.2.8	Summary of Proposed Mitigation Measures	14-23
CHAPTER 15. UTILITIES.....		15-1
CHAPTER 16. SOCIOECONOMICS AND GENERAL SERVICES		16-1
16.1	AFFECTED ENVIRONMENT	16-1
16.1.1	Definition of Resource.....	16-1
16.1.2	Historical and Economic Overview	16-1
16.1.3	Population Characteristics	16-3
16.1.3.1	Overall Trends	16-3
16.1.3.2	Demographics	16-3
16.1.3.3	Household Characteristics	16-5
16.1.3.4	Military Demographics.....	16-7
16.1.4	Economic Characteristics	16-8
16.1.4.1	Employment and Income	16-8
16.1.4.2	Housing Supply and Characteristics.....	16-12
16.1.4.3	GovGuam Finances	16-15
16.1.4.4	Gross Island Product (GIP).....	16-20
16.1.5	Public Services	16-20

16.1.5.1	Education Services.....	16-20
16.1.5.2	Health and Human Services.....	16-22
16.1.5.3	Public Safety.....	16-26
16.1.5.4	Agencies Affected by Population Growth.....	16-29
16.1.5.5	Agencies Affected by Development on Guam.....	16-30
16.1.6	Sociocultural Issues.....	16-32
16.1.6.1	Political Self-Determination.....	16-32
16.1.6.2	Minoritization.....	16-33
16.1.6.3	Cultural Artifacts.....	16-33
16.1.6.4	World War II Reparations.....	16-33
16.1.6.5	Military-Civilian Social Issues on Okinawa that Affect Public Perceptions on Guam.....	16-34
16.1.6.6	Crime, Vice, and Social Order.....	16-35
16.1.6.7	Sociocultural Changes.....	16-36
16.1.6.8	Quality of Life.....	16-37
16.1.6.9	Recreational Fishing.....	16-37
16.1.7	Land Acquisition Issues.....	16-39
16.1.7.1	Historical Land Tenure and Administration on Guam.....	16-39
16.1.7.2	Current Land Tenure and Administration on Guam.....	16-43
16.1.7.3	Economic Value of Land on Guam.....	16-47
16.1.7.4	Sociocultural Value of Land on Guam.....	16-53
16.1.7.5	Recreational and Cultural Sites and Activities.....	16-55
16.1.7.6	Federal Land Acquisition Process.....	16-57
16.1.8	Off-Base Roadways.....	16-59
16.1.8.1	Regional Overview of Community Facilities and General Services within Off-Base Roadways Study Area.....	16-59
16.1.8.2	North.....	16-66
16.1.8.3	Central.....	16-66
16.1.8.4	Apra Harbor.....	16-67
16.1.8.5	South.....	16-67
16.2	ENVIRONMENTAL CONSEQUENCES.....	16-67
16.2.1	Approach to Analysis.....	16-67
16.2.1.1	Methodology.....	16-68
16.2.1.2	Determination of Significance.....	16-69
16.2.1.3	Issues Identified During Public Scoping Process.....	16-73
16.2.2	Proposed Action.....	16-73
16.2.2.1	Population Impacts.....	16-73
16.2.2.2	Economic Impacts.....	16-80
16.2.2.3	Public Service Impacts.....	16-101
16.2.2.4	Sociocultural Impacts.....	16-119
16.2.3	Land Acquisition Impacts.....	16-128
16.2.3.1	Former FAA Parcel.....	16-129
16.2.3.2	Harmon Annex.....	16-132
16.2.3.3	Route 15 Lands.....	16-135
16.2.3.4	Alternative 1.....	16-141
16.2.3.5	Alternative 2 (Preferred Alternative).....	16-143

16.2.3.6	Alternative 3	16-145
16.2.3.7	Alternative 8	16-147
16.2.4	Summary of Impacts	16-147
16.2.4.1	Population Impacts	16-147
16.2.4.2	Economic Impacts	16-147
16.2.4.3	Public Service Impacts	16-148
16.2.4.4	Sociocultural Impacts	16-149
16.2.4.5	Land Acquisition Impacts.....	16-149
16.2.5	No-Action Alternative	16-151
16.2.5.1	Population Impacts	16-152
16.2.5.2	Economic Impacts	16-152
16.2.5.3	Public Service Impacts	16-152
16.2.5.4	Sociocultural Impacts	16-152
16.2.5.5	Land Acquisition Impacts.....	16-153
16.2.6	Summary of Proposed Mitigation Measures	16-153
CHAPTER 17. HAZARDOUS MATERIALS AND WASTE.....		17-1
17.1	AFFECTED ENVIRONMENT	17-1
17.1.1	Definition of Resource.....	17-1
17.1.2	Regulatory Framework.....	17-1
17.1.2.1	Federal Environmental Laws and Regulations	17-2
17.1.2.2	Guam Environmental Protection Agency Laws and Regulations.....	17-6
17.1.3	Hazardous Materials and Waste on Guam.....	17-7
17.1.3.1	Hazardous Materials Storage, Use, and Handling	17-7
17.1.3.2	Hazardous Waste Generation and Disposal.....	17-13
17.1.3.3	Off Base Roadways	17-30
17.2	ENVIRONMENTAL CONSEQUENCES	17-37
17.2.1	Approach to Analysis	17-37
17.2.1.1	Methodology.....	17-37
17.2.1.2	Determination of Significance.....	17-37
17.2.1.3	Issues Identified during Public Scoping Process	17-38
17.2.2	Alternative 1.....	17-38
17.2.2.1	Transportation to and on Guam	17-38
17.2.2.2	Construction Activities	17-43
17.2.2.3	Operations.....	17-46
17.2.3	Alternative 2 (Preferred Alternative)	17-55
17.2.4	Alternative 3.....	17-55
17.2.5	Alternative 8.....	17-55
17.2.6	No-Action Alternative	17-56
17.2.7	Summary of Potential Impacts.....	17-56
17.2.8	Summary of BMPs and SOPs.....	17-58
CHAPTER 18. PUBLIC HEALTH AND SAFETY		18-1
18.1	AFFECTED ENVIRONMENT	18-1
18.1.1	Definition of Resource.....	18-1
18.1.2	Operational Safety.....	18-1

18.1.2.1	Aircraft Mishaps	18-1
18.1.2.2	Bird Aircraft Strike Hazards (BASH).....	18-2
18.1.2.3	Explosives Safety.....	18-3
18.1.2.4	Electromagnetic Emissions.....	18-3
18.1.3	Environmental Health Effects.....	18-4
18.1.3.1	Noise.....	18-4
18.1.3.2	Water Quality	18-4
18.1.3.3	Air Quality	18-4
18.1.3.4	Health Care Services.....	18-5
18.1.4	Notifiable Diseases.....	18-5
18.1.4.1	Acquired Immune Deficiency Syndrome (AIDS)	18-5
18.1.4.2	Cholera.....	18-5
18.1.4.3	Dengue.....	18-6
18.1.4.4	Hepatitis C	18-6
18.1.4.5	Malaria.....	18-6
18.1.4.6	Measles	18-6
18.1.4.7	Rubella.....	18-7
18.1.4.8	Typhoid Fever.....	18-7
18.1.4.9	Sexually Transmitted Diseases (STDs) other than AIDS	18-7
18.1.4.10	Tuberculosis.....	18-8
18.1.5	Mental Illness.....	18-8
18.1.6	Hazardous Substances	18-8
18.1.7	UXO	18-9
18.1.8	Off Base Roadways.....	18-9
18.1.8.1	North.....	18-9
18.1.8.2	Central	18-11
18.1.8.3	Apra Harbor.....	18-11
18.1.8.4	South.....	18-11
18.1.9	Public Services	18-11
18.2	ENVIRONMENTAL CONSEQUENCES	18-12
18.2.1	Approach to Analysis	18-12
18.2.1.1	Methodology.....	18-12
18.2.1.2	Determination of Significance.....	18-12
18.2.1.3	Issues Identified during Public Scoping Process	18-12
18.2.2	Alternative 1.....	18-13
18.2.2.1	Operational Safety	18-13
18.2.2.2	Environmental Health Effects.....	18-15
18.2.2.3	Notifiable Diseases	18-18
18.2.2.4	Mental Illness	18-19
18.2.2.5	Hazardous Substances	18-20
18.2.2.6	UXO.....	18-20
18.2.2.7	Traffic Incidents.....	18-21
18.2.2.8	Public Services	18-21
18.2.3	Alternative 2 (Preferred Alternative)	18-23
18.2.4	Alternative 3.....	18-23
18.2.5	Alternative 8.....	18-23

18.2.6	No-Action Alternative	18-23
18.2.6.1	Noise	18-23
18.2.6.2	Water Quality	18-23
18.2.6.3	Air Quality	18-24
18.2.6.4	Health Care Services.....	18-24
18.2.6.5	Notifiable Diseases	18-24
18.2.6.6	Mental Illness	18-24
18.2.6.7	Hazardous Substances	18-25
18.2.6.8	UXO.....	18-25
18.2.6.9	Traffic Incidents.....	18-25
18.2.6.10	Public Services	18-25
18.2.7	Summary of Impacts	18-25
18.2.8	Summary of Proposed Mitigation Measures	18-29
CHAPTER 19. ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN 19-1		
19.1	AFFECTED ENVIRONMENT	19-1
19.1.1	Definition of Resource.....	19-1
19.1.2	Guam Demographics Relevant to Environmental Justice.....	19-4
19.1.2.1	North.....	19-4
19.1.2.2	Central	19-6
19.1.2.3	South.....	19-7
19.2	ENVIRONMENTAL CONSEQUENCES	19-8
19.2.1	Approach to Analysis.....	19-8
19.2.1.1	Methodology.....	19-8
19.2.1.2	Determination of Significance	19-9
19.2.1.3	Issues Identified During Public Scoping Process	19-10
19.2.1.4	Public Involvement.....	19-10
19.2.2	Alternative 1.....	19-11
19.2.2.1	North.....	19-11
19.2.2.2	Central	19-15
19.2.2.3	Apra Harbor.....	19-17
19.2.2.4	South.....	19-17
19.2.2.5	Proposed Mitigation Measures	19-18
19.2.3	Alternative 2 (Preferred Alternative)	19-18
19.2.3.1	North.....	19-18
19.2.3.2	Central	19-18
19.2.3.3	Apra Harbor.....	19-18
19.2.3.4	South.....	19-18
19.2.3.5	Proposed Mitigation Measures	19-19
19.2.4	Alternative 3.....	19-19
19.2.4.1	North.....	19-19
19.2.4.2	Central	19-19
19.2.4.3	Apra Harbor.....	19-19
19.2.4.4	South.....	19-19
19.2.4.5	Proposed Mitigation Measures	19-19

19.2.5 Alternative 8.....	19-19
19.2.5.1 North.....	19-19
19.2.5.2 Central	19-19
19.2.5.3 Apra Harbor.....	19-19
19.2.5.4 South.....	19-19
19.2.5.5 Proposed Mitigation Measures	19-19
19.2.6 No-Action Alternative	19-20
19.2.7 Summary of Impacts.....	19-20
19.2.8 Summary of Proposed Mitigation Measures	19-22
CHAPTER 20. REFERENCES	20-1
20.1 PURPOSE OF AND NEED FOR ACTION.....	20-1
20.2 PROPOSED ACTION AND ALTERNATIVES	20-1
20.3 GEOLOGICAL AND SOIL RESOURCES.....	20-2
20.4 WATER RESOURCES.....	20-3
20.5 AIR QUALITY.....	20-7
20.6 NOISE	20-9
20.7 AIRSPACE.....	20-10
20.8 LAND AND SUBMERGED LAND USE.....	20-10
20.9 RECREATIONAL RESOURCES	20-12
20.10 TERRESTRIAL BIOLOGICAL RESOURCES	20-13
20.11 MARINE BIOLOGICAL RESOURCES.....	20-22
20.12 CULTURAL RESOURCES.....	20-30
20.13 VISUAL RESOURCES.....	20-36
20.14 MARINE TRANSPORTATION.....	20-37
20.15 UTILITIES.....	20-38
20.16 SOCIOECONOMICS AND GENERAL SERVICES.....	20-38
20.17 HAZARDOUS MATERIALS AND WASTE	20-49
20.18 PUBLIC HEALTH AND SAFETY.....	20-50
20.19 ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN.....	20-51

List of Figures

<u>Figure</u>	<u>Page</u>
2.1-1 Overview of Proposed Facility Construction and Operations on Guam.....	2-4
2.1-2. Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation, Guam	2-6
2.1-3. Functions without Alternative Locations	2-12
2.1-4. Comparison of Main Cantonment Area Alternatives	2-13
2.1-5. Location Map of Guam	2-17
2.2-1. Main Cantonment Alternatives Considered.....	2-27
2.2-2. Family Housing/Community Support Alternatives Considered	2-29
2.2-3. Main Cantonment Area Alternatives Analysis	2-33
2.2-4. Cantonment/Housing Area Alternative 1	2-35
2.2-5. Cantonment/Housing Area Alternative 2	2-37
2.2-6. Cantonment/Housing Area Alternative 3	2-38
2.2-7. Cantonment/Housing Area Alternative 8	2-40
2.3-1. Typical Marine Corps Obstacle Course.....	2-46
2.3-2. Example of Marine Corps Rappelling Tower.....	2-46
2.3-3. Proposed Large-Scale Maneuver Training Areas.....	2-48
2.3-4. Naval Munitions Site Maneuver Area Access.....	2-50
2.3-5. Standard Maneuver Area LZ Dimensions	2-51
2.3-6. Site Plan for MOUT and Supporting Facilities at Andersen South with Range Complex Alternative A	2-52
2.3-7. Site Plan for MOUT and Supporting Facilities at Andersen South with Range Complex Alternative B	2-53
2.3-8. Sample AMVOC Course.....	2-54
2.3-9. Landing Zones.....	2-63
2.3-10. New Special Use Airspace Requirements for the Proposed Action	2-65
2.3-11. Naval Munitions Site Ammunition Storage Improvements	2-67
2.3-12. Andersen AFB MSA Improvements	2-68
2.3-13. Firing and Non-Firing Range Alternatives Considered.....	2-70
2.3-14. Live-Fire Range Site Alternatives on Federally-Owned Property.....	2-74
2.3-15. Live-Fire Range Complex Alternatives Requiring Land Acquisition	2-78
2.3-16. Training Range Alternatives.....	2-83
2.4-1. North Ramp Airfield Operations	2-90
2.4-2. Location of Proposed AMC/Marine Corps Campus at South Ramp	2-92
2.4-3. Proposed Joint AMC/Marine Corps Campus	2-93
2.4-4. North Gate and Access Road: Location Map	2-95
2.4-5. North Gate and Access Road: Site Plan	2-95
2.5-1. Ships.....	2-100
2.5-2. Amphibious Ships	2-101
2.5-3. Apra Harbor Projects.....	2-104
2.5-4. Embarkation Site Plan	2-106
2.5-5. LCAC/AAV Laydown	2-116
2.5-6. USCG Site Plan	2-119
2.5-7. Military Working Dog Kennel Site Plan	2-123
2.5-8. Medical/Dental Clinic Site Plan	2-126
2.5-9. Alternatives Considered for USCG Relocation	2-131

2.5-10. Alternatives Considered for MWDK Relocation	2-133
2.5-11. Alternatives Considered for Medical/Dental Clinic Relocation	2-135
3.1-1. Guam Geologic Map	3-2
3.1-2. Guam Topography Map	3-4
3.1-3. Guam Major Sinkholes, Caves, and National Natural Landmarks (NNL)	3-6
3.1-4. Guam Soils Map.....	3-8
3.1-5. Guam Fault Lines	3-12
3.1-6. Soils and Geologic Hazards for GRN Projects in the North Region	3-20
3.1-7. Soils and Geologic Hazards for GRN Projects in the Central Region.....	3-24
3.1-8. Soils and Geologic Hazards for GRN Projects in the Apra Harbor Region	3-27
3.1-9. Soils and Geologic Hazards for GRN Projects in the South Region	3-30
4.1-1. Guam Annual Rainfall.....	4-3
4.1-2. Surface Waters of Guam	4-4
4.1-3. Water Quality Criteria Designations and Stormwater Recharge Zones	4-9
4.1-4. Guam Flood Zones	4-11
4.1-5. Guam Groundwater Resources.....	4-13
4.1-6. NWI Wetlands and NRCS Hydric Soils on Guam	4-23
4.1-7. NWI Wetlands and NRCS Hydric Soils on NCTS Finegayan, South Finegayan, Former FAA Parcel, and Harmon Annex	4-28
4.1-8. Significant Surface Waters and Watersheds within Roadway Project Limits	4-30
4.1-9. Typical Roadway Surface along Route 9	4-31
4.1-10. Grass Swale along Route 1 in North Area.....	4-31
4.1-11. FEMA Map – North Area – West Side	4-32
4.1-12. FEMA Map – North Area – East Side.....	4-33
4.1-13. Delineated Wetland Areas in Navy and Air Force Barrigada Project Areas	4-37
4.1-14. FEMA Map – Harmon Sink	4-39
4.1-15. Harmon Sink at Route 1	4-40
4.1-16. FEMA Map – Tamuning Drainageway	4-40
4.1-17. Tamuning Drainageway Outlet	4-41
4.1-18. Tamuning Drainageway Downstream Channel.....	4-41
4.1-19. Route 16 – Curb Outlet at Low Point to Sink.....	4-42
4.1-20. Sink Adjacent to Route 16.....	4-42
4.1-21. Route 27 Asphalt Damage.....	4-43
4.1-22. FEMA Map of Agana Floodplain.....	4-44
4.1-23. FEMA Map of Fonte Floodway	4-44
4.1-24. FEMA Map of Asan Floodway	4-45
4.1-25. FEMA Map of Masso Floodway.....	4-45
4.1-26. Coastal Erosion Protection along Route 1	4-47
4.1-27. Coastal Erosion Protection along Route 1	4-48
4.1-28. Agana River Bridge at Route 1	4-48
4.1-29. Apra Harbor Water Resources.....	4-50
4.1-30. Sample Locations and Compositing Scheme for Sediment Characterization for Construction Dredging Feasibility Study at Charlie, Sierra, and SRF Wharves, Apra Harbor, 2006.....	4-53
4.1-31. Sediment Sample Locations at Polaris Point and SRF Wharves, Apra Harbor, 2010	4-56

4.1-32. Dredged Material Sampling and Tier III Analysis Evaluation for Apra Harbor Projects (P-436m P-518), 2007.....	4-57
4.1-33. Route 1 at Laguas River Bridge	4-65
4.1-34. Route 1 at Atantano Bridge	4-65
4.1-35. FEMA Map of Apra Harbor Floodplain.....	4-66
4.1-36. Route 11 Bridge over Piti Canal.....	4-66
4.1-37. Piti Canal Downstream of Route 11	4-67
4.1-38. Coastal Erosion Protection along Route 11	4-67
4.1-39. Fena Reservoir and Lost River Watersheds.....	4-69
4.1-40. Wetlands Located in the Vicinity of Magazine Storage Options, NMS.....	4-72
4.2-1. Range Options and Nearby Wells	4-99
4.2-2. Potential Dredge Upland Placement Sites and Water Resources, Apra Harbor	4-102
4.2-3. Proposed Dredging Activities and Wetland Areas, Inner Apra Harbor.....	4-108
4.2-4. Wetland Avoidance Design under Magazine Storage Options, NMS	4-114
4.2-5. Project Footprint and Wetland Areas under Alternatives 3 and 8, Air Force Barrigada	4-129
5.1-1. Guam SO ₂ Nonattainment Areas	5-4
6.1-1. Typical A-Weighted Sound Levels of Common Sounds.....	6-2
6.1-2. Existing Noise Contours at Andersen AFB	6-9
6.1-3. Existing Demolition Operational Noise Contours at Northwest Field	6-12
6.2-1. Proposed Noise Contours at Andersen AFB	6-25
6.2-2. Projected Demolition Operational Noise Contours	6-30
6.2-3. Aviation Training Noise Contours at Andersen South	6-32
6.2-4. Noise Contours and Complaint Risk Contours for the Breacher House and Hand Grenade Range	6-34
6.2-5. Noise Contours for Route 15 Small Arms Ranges	6-37
6.2-6. Aviation Training Noise Contours at Orote Field	6-39
6.2-7. Aviation Training Noise Contours at NMS	6-41
6.2-8. Projected Small Caliber Operational Noise Contours with Foilage Attenuation.....	6-54
6.2-9. Projected Small Caliber Operational Noise Contours and ADNL Noise Contours with Barrier Attenuation – Alternative A.....	6-55
6.2-10. Projected Small Caliber Operational ADNL Noise Contours	6-57
7.1-1. Airspace Classifications	7-3
7.1-2. Airspace in the Mariana Islands Range Complex.....	7-9
7.1-3. Guam Enroute Chart Airspace.....	7-11
8.1-1. Guam Villages and Land Ownership.....	8-2
8.1-2. Regional Land and Water Use.....	8-6
8.1-3. 1966 Land Use Zoning and Prime Farmlands	8-10
8.1-4. Land Use Map for North and Central Guam	8-12
8.1-5. DoD Land and Non-DoD Lands of Interest	8-17
8.1-6. Andersen AFB Land Use (General)	8-20
8.1-7. Andersen AFB Main Base Land Use Plan	8-21
8.1-8. Northwest Field Land Use Plan.....	8-23
8.1-9. Finegayan and Potts Junction Land Use.....	8-26
8.1-10. North – Roadway Project Locations.....	8-30
8.1-11. Andersen South Land Use	8-33
8.1-12. Navy and Air Force Barrigada Land Use	8-35

8.1-13. Central – Roadway Project Locations	8-38
8.1-14. Naval Base Guam Land Use.....	8-41
8.1-15. Naval Base Guam Land Use Plan	8-48
8.1-16. Apra Harbor – Roadway Project Locations.....	8-50
8.1-17. Naval Munitions Site Land Use	8-52
8.1-18. South – Roadway Project Locations.....	8-55
8.2-1. Baseline and Projected Noise Contours, Andersen AFB.....	8-60
9.1-1. Recreational Resources of Guam- North.....	9-2
9.1-2. Monthly Visitor Arrivals, Air and Sea, Guam: 2000 to 2005.....	9-5
9.1-3. Recreational Resources of Guam – Central.....	9-7
9.1-4. Recreational Resources on and in the Vicinity of Andersen South, Navy Barrigada, and Air Force Barrigada.....	9-8
9.1-5. War in the Pacific National Historical Park Annual Public Use Report, 2004-2009	9-10
9.1-6. Recreational Resources on Naval Base Guam and in the Vicinity of Apra Harbor	9-12
9.1-7. Recreational Resources in the Vicinity of the Naval Munitions Site	9-15
9.1-8. Recreational Resources of Guam – South	9-17
10.1-1. Biological Resources Study Areas – Guam.....	10-2
10.1-2. Overlay Refuge Lands and Designated Critical Habitat – Northern Guam.....	10-10
10.1-3. Overlay Refuge Lands – Southern Guam.....	10-11
10.1-4a. Recovery habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat.....	10-13
10.1-4b. Recovery Habitat for Guam Rail and <i>Serianthes</i> Tree.....	10-14
10.1-5. Vegetation Communities – Andersen AFB East	10-18
10.1-6. Vegetation Communities – Andersen AFB West.....	10-19
10.1-7. Occurrence of Special-Status Species – Andersen AFB East.....	10-20
10.1-8. Occurrence of Special-Status Species – Andersen AFB West	10-21
10.1-9a. Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> on or in the Vicinity of Andersen AFB.....	10-26
10.1-9b. Recovery Habitat, for Guam Rail and <i>Serianthes</i> Tree on or in the Vicinity of Andersen AFB.....	10-27
10.1-10. Vegetation Communities – NCTS Finegayan	10-32
10.1-11a. Occurrences of Special-Status Species and Recovery habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat on or in the Vicinity of NCTS Finegayan	10-33
10.1-11b. Occurrences of Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> – NCTS Finegayan.....	10-37
10.1-12. Vegetation Communities – Former FAA Parcel, South Finegayan, GLUP 77, and Harmon Annex	10-40
10.1-13a. Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat on or in the Vicinity of the Former FAA Parcel, South Finegayan, GLUP 77, and Harmon Annex.....	10-43
10.1-13b. Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> – Former FAA Parcel, South Finegayan, GLUP 77, and Harmon Annex	10-44
10.1-14. North Region Proposed Road Improvements	10-46
10.1-15. North Region Proposed Road Improvements: GRNs 8, 57, and 124	10-47
10.1-16. North Region Proposed Road Improvements: GRNs 9, 10, 22, and 22a.....	10-48
10.1-17. North Region Proposed Road Improvements: GRN 23.....	10-49
10.1-18. Vegetation Communities – Andersen South and Route 15 Lands.....	10-53
10.1-19a. Occurrences of Special-status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat – Andersen South and Route 15 Lands	10-56
10.1-19b. Occurrences of Special-status Species and Recovery Habitat for Guam Rail and <i>Serianthes</i> Tree on or in the Vicinity of Andersen South and Route 15 Lands	10-57

10.1-20a. Vegetation Communities and Special-Status Species at Navy Barrigada and Air Force Barrigada.....	10-60
10.1-20b. Recovery Habitat for Guam Rail - Navy Barrigada and Air Force Barrigada.....	10-61
10.1-21. Central Region Proposed Road Improvements.....	10-63
10.1-22. Central Region Proposed Road Improvements: GRNs 36 and 46.....	10-64
10.1-23. Vegetation Communities – Naval Base Guam	10-68
10.1-24. Occurrence of Special-Status Species and Recovery Habitat for Guam Rail– Naval Base Guam	10-71
10.1-25. Apra Harbor Region Proposed Road Improvements: GRNs 4, 5, 24, 26, 35, 50, and 51	10-73
10.1-26. Vegetation Communities – Naval Munitions Site	10-80
10.1-27a. Occurrences of Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat – Naval Munitions Site	10-81
10.1-27b. Occurrences of Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> – Naval Munitions Site.....	10-82
10.1-28. South Region Proposed Road Improvements: GRNs 25 and 27	10-84
10.2-1. Potential Vegetation Impacts – Andersen AFB East.....	10-90
10.2-2. Potential Vegetation Impacts – Andersen AFB West.....	10-91
10.2-3. Potential Special-Status Species Impacts – Andersen AFB East.....	10-93
10.2-4. Potential Special-Status Species Impacts – Andersen AFB West	10-94
10.2-5a. Potential Impacts to Recovery Habitat and Critical Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat on or in the Vicinity of Andersen AFB	10-96
10.2-5b. Potential Impacts to Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> on or in the Vicinity of Andersen AFB.....	10-99
10.2-6. Recovery Habitat and Critical Habitat for Guam Micronesian Kingfisher and Mariana Fruit Bat and Noise Contours of Baseline and Proposed Andersen AFB Aircraft Operations	10-102
10.2-7. Recovery Habitat for the Mariana Crow and Noise Contours of Baseline and Proposed Andersen AFB Aircraft Operations.....	10-106
10.2-8. Potential Vegetation Impacts – Alternative 1 (NCTS Finegayan, Former FAA Parcel, South Finegayan, and Harmon Annex).....	10-109
10.2-9a. Potential Special-Status Species Impacts and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat – Alternative 1 (NCTS Finegayan, South Finegayan, Former FAA Parcel, and Harmon Annex)	10-113
10.2-9b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> – Alternative 1 (NCTS Finegayan, South Finegayan, Former FAA Parcel, and Harmon Annex).....	10-115
10.2-10. Potential Vegetation Impacts – Andersen South and Route 15 Lands (Range Complex Alternative A).....	10-122
10.2-11a. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat on or in Vicinity of Andersen South and Route 15 Lands (Range Complex Alternative A)	10-125
10.2-11b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> at Andersen South and Route 15 Lands (Range Complex Alternative A).....	10-127
10.2-12. Potential Vegetation Impacts – Andersen South and Route 15 Lands (Range Complex Alternative B).....	10-132
10.2-13a. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat at Andersen South and Route 15 Lands (Range Complex Alternative B).....	10-134
10.2-13b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes</i> Tree on or in Vicinity of Andersen South and Route 15 Lands (Range Complex Alternative B).....	10-135
10.2-14. Potential Vegetation Impacts – Naval Base Guam.....	10-139
10.2-15. Potential Impacts to ESA-Listed Species and Recovery Habitat for Guam Rail – Naval Base Guam...10-141	
10.2-16. Potential Vegetation Impacts – Naval Munitions Site.....	10-145

10.2-17a. Potential Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat – Naval Munitions Site.....	10-147
10.2-17b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> – Naval Munitions Site	10-149
Diagram 10.2-1. Major Pathways for Invasion to and from Guam and CNMI	10-160
Diagram 10.2-2. Invasion Process, Management Options and MBP Responses	10-162
Diagram 10.2-3. Development and Implementation of the MBP	10-163
10.2-18. Potential Vegetation Impacts - Alternative 2 (NCTS Finegayan, Former FAA Parcel, and South Finegayan).....	10-169
10.2-19a. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat - Alternative 2 (NCTS Finegayan, Former FAA Parcel, and South Finegayan)	10-172
10.2-19b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> - Alternative 2 (NCTS Finegayan, Former FAA Parcel, and South Finegayan).....	10-174
10.2-20. Potential Vegetation Impacts – Alternative 3 (NCTS Finegayan, South Finegayan, Navy Barrigada, and Air Force Barrigada).....	10-179
10.2-21a. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat - Alternative 3 (NCTS Finegayan, South Finegayan, Navy Barrigada, and Air Force Barrigada)	10-180
10.2-21b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> - Alternative 3 (NCTS Finegayan, South Finegayan, Navy Barrigada, and Air Force Barrigada).....	10-181
10.2-22. Potential Vegetation Impacts - Alternative 8 (NCTS Finegayan, Former FAA Parcel, South Finegayan, and Air Force Barrigada).....	10-185
10.2-23a. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Micronesian Kingfisher, Mariana Crow, and Mariana Fruit Bat - Alternative 8 (NCTS Finegayan, Former FAA Parcel, South Finegayan, and Air Force Barrigada).....	10-186
10.2-23b. Potential Impacts to Special-Status Species and Recovery Habitat for Guam Rail and <i>Serianthes nelsonii</i> - Alternative 8 (NCTS Finegayan, Former FAA Parcel, South Finegayan, and Air Force Barrigada).....	10-187
11.1-1. Overview of Sensitive Marine Biological Resources and Nearshore Habitat Associated with Andersen AFB East.....	11-2
11.1-2. Overview of Sensitive Marine Biological Resources and Nearshore Habitat Associated with Andersen AFB West.....	11-3
11.1-3. Overview of Sensitive Marine Biological Resources and Nearshore Habitats Associated with the Study Areas – NCTS Finegayan and Route 15 Lands.....	11-4
11.1-4. Overview of Sensitive Marine Biological Resources and Nearshore Habitats Associated with the Study Areas – Apra Harbor and Naval Base Guam.....	11-5
11.1-5. EFH, HAPC, and Specific HAPC Sites Designated within Guam Waters	11-20
11.1-6. EFH and HAPC Designated within Guam Waters for Various Life Stages of CHCRT and PHCRT	11-27
11.1-7. EFH Designated within Guam Waters for Egg, Larval, Juvenile, and Adult Life Stages of Bottomfish ..	11-30
11.1-8. EFH Designated within Guam Waters for Egg, Larval, Juvenile, and Adult Life Stages of Crustaceans..	11-32
11.1-9. EFH and HAPC Designated within Guam Waters for all Life Stages of Pelagic Fish.....	11-34
11.1-10. Sensitive Marine Habitats Associated with NCTS Finegayan	11-47
11.1-11. Sensitive Marine Biological Resources and Habitats Associated with Route 15 Range Lands	11-53
11.1-12. Sensitive Marine Biological Resources and Habitats Associated with the Proposed Road Projects in the Apra Harbor Region and Central Region Study Areas.....	11-55
11.1-13. Sensitive Marine Biological Resources and Habitats Associated with Apra Harbor	11-58
11.1-14. Inner Apra Harbor Transect Surveys and Percent Biotic Coverages.....	11-65

11.1-15. Photographs of Marine Environmental Features along Route 11 (Commercial Port)	11-67
11.2-1. Sensitive Marine Biological Resources and Nearshore Habitat Associated with Andersen AFB East	11-75
11.2-2. Sensitive Marine Biological Resources and Nearshore Habitat Associated with Andersen AFB West.....	11-76
11.2-3. Sensitive Marine Biological Resources and Habitat Impacts Associated with NCTS Finegayan	11-81
11.2-4. Sensitive Marine Biological Resources and Habitat Impacts Associated with Route 15 Range Lands, Guam.....	11-86
11.2-5. Sensitive Marine Biological Resources and Habitats Impacts Associated with Apra Harbor.....	11-95
12.1-1. Latte Site at NMS	12-6
12.1-2. Northwest Field 1945	12-8
12.1-3. Historic Properties in the Area of Potential Effect (APE)	12-26
12.1-4. Apra Harbor Training Constra.....	12-28
12.1-5. Naval Munitions Site Training Constraints	12-38
12.2-1. Impacts on or in the Vicinity of Andersen AFB.....	12-42
12.2-2. Construction at Main Cantonment Alternative 1	12-44
12.2-3. Alternative A Impacts on or in the Vicinity of Andersen South and Route 15 Parcels	12-46
12.2-4. Alternative B Impacts on or in Vicinity of Andersen South and Route 15 Parcels	12-48
12.2-5. Firing Range Alternative A, Profile of Elevation from Firing Range to Pagat Site	12-49
12.2-6. Impacts on or in the Vicinity of Naval Base Guam.....	12-52
12.2-7. Cultural Resources Impacts on or in the Vicinity of Naval Munitions Site	12-54
12.2-8. Construction at Main Cantonment Alternative 2.....	12-58
12.2-9. Construction at Main Cantonment Alternative 3.....	12-64
12.2-10. Construction at Main Cantonment Alternative 8.....	12-69
12.2-10. Construction at Main Cantonment Alternative 8.....	12-69
13.1-1. Visual Resources of Guam	13-2
13.1-2. Aerial View of the North Ramp Area looking from the Northeast to the Southwest with Heavily Vegetated Cliff line in the Foreground.....	13-3
13.1-3. Aerial View of the South Ramp Port of Debarkation (APOD) at.....	13-4
13.1-4. Aerial View of South Ramp and the Andersen AFB Housing Area.....	13-4
13.1-5. A View at the Palm Tree Golf Course Looking North Toward the Pacific Ocean and Pati Point	13-5
13.1-6. Aerial View of Andersen MSA in the Foreground Looking East	13-6
13.1-7. View of Tarague Beach and Ritidian Point from the	13-6
13.1-8. The Road to Tarague Beach Provides a Panoramic Ocean View	13-7
13.1-9. A View of Ritidian Point from Tarague Beach	13-7
13.1-10. Aerial View of NWF Looking North	13-8
13.1-11. A Typical View from Within the NWF Area	13-8
13.1-12. A South-Looking Aerial View of NCTS Finegayan with the Philippine Sea in the Distance and Route 3 in the Left of the Picture.....	13-9
13.1-13. NCTS Finegayan Communications Facilities	13-10
13.1-14. NCTS Finegayan Interior Roadways and Facilities	13-10
13.1-15. The North Part of NCTS Finegayan Features Dense Vegetation	13-11
13.1-16. View from Route 3 Looking Northward into the North Part of NCTS	13-11
13.1-17. Panoramic View from Route 3 Looking Northwestward	13-12
13.1-18. View from Route 3 Looking Northward with South Finegayan Water Tower in Foreground and NCTS Finegayan Water Tower in Background as Seen from Route 3 Looking North (Former FAA Parcel Lies in Between the Two)	13-12

13.1-19. Ocean from NCTS Finegayan toward Double Reef	13-13
13.1-20. View of Haputo Beach	13-14
13.1-21. A Typical View from Within the South Finegayan Housing Area.....	13-15
13.1-22. View of Ritidian Point.....	13-16
13.1-23. Ritidian Point Beach Area	13-16
13.1-24. A View of the Beach at Guma Fahou.....	13-17
13.1-25. A View of Andersen AFB and Pati Point from Mount Santa Rosa Scenic Vista.....	13-18
13.1-26. Typical Views for Pavement Strengthening Projects – North Region.....	13-21
13.1-27. Typical Views for Roadway and Intersection Widening Projects – North Region	13-23
13.1-28. Typical Views for Road Realignment and New Road Projects – North Region.....	13-25
13.1-29. View of Andersen South Gate from Route 15.....	13-26
13.1-30. View of Andersen South from Route 15	13-26
13.1-31. View of Abandoned Housing and Overgrowth at Andersen South.....	13-27
13.1-33. An Aerial View of Two Lovers Point Looking South with Tumon Bay.....	13-28
13.1-34. View of Tumon Bay Looking South from Two Lovers Point	13-29
13.1-35. Street View of Tumon Bay Tourist District	13-29
13.1-36. Panoramic View of a Part of the Tumon Bay Tourist District	13-30
13.1-37. A View of Pagat Point.....	13-30
13.1-38. A View of the Sasayan Valley and Beyond Pagat Point	13-31
13.1-39. A Panoramic View of the Guam International Golf Course.....	13-31
13.1-40. Typical Streetscape of Marine Corps Drive (Tamuning)	13-32
13.1-41. A View of the Admiral Nimitz Golf Course Looking East	13-33
13.1-42. An Aerial View of Mangilao Golf Course and its Surrounding Vegetation.....	13-33
13.1-43. An Oceanic View at Taguan Point	13-34
13.1-44. A View of Pago Bay.....	13-35
13.1-45. Typical Views for Pavement Strengthening Projects – Central Region.....	13-37
13.1-46. Typical Views for Roadway and Intersection widening Projects – Central Region.....	13-39
13.1-47. Typical Views for Road Realignment and New Road Projects – Central Region.....	13-41
13.1-48. Typical Views for Bridge Replacement Projects – Central Region	13-44
13.1-49. Aerial View of Orote Peninsula and Outer Apra Harbor.....	13-45
13.1-50. View from Orote Point, the Top of the Spanish Steps.....	13-46
13.1-51. Below the Orote Point Overlook	13-46
13.1-52. Dadi Beach	13-47
13.1-53. View from Mount Chachao Scenic Vista	13-48
13.1-54. Typical Views for Pavement Strengthening Projects – Apra Harbor Region	13-49
13.1-55. Typical Views for Bridge Replacement Projects – Apra Harbor Region.....	13-51
13.1-56. Typical Views for Roadway and Intersection Widening Projects – Apra Harbor Region	13-53
13.1-57. Fena Valley Reservoir.....	13-54
13.1-58. A View of Southern Mountains from Mount Lamlam	13-55
13.1-59. A View of Facpi Point.....	13-55
13.1-60. A View of Sella Bay Looking Towards the Philippine Sea	13-56
13.1-61. A View of Cetti Bay.....	13-56
13.1-62. A View of Fouha Bay.....	13-57
13.1-63. Talifak Spanish Bridge.....	13-58

13.1-64. Typical Views for Pavement Strengthening Projects – South Region	13-59
13.1-65. Typical Views for Roadway and Intersection Widening Projects – South Region	13-61
13.2-1. Aerial View of the North Ramp Area with Depiction of Where Most New Development would be Located.....	13-63
13.2-2. Aerial View Looking East South with Depiction of Where the Proposed New AMC Campus Would be Located Adjacent to South Ramp.....	13-64
13.2-3. Aerial View Looking Northwest Northeast With Depiction of Where the Proposed New AMC Campus Would be Located Adjacent to South Ramp	13-64
13.2-4. Alternative 1: View from Route 3 Looking Northward with New Family Housing in the Foreground and Middle Ground and the Main Cantonment and Water Tower/Tank in the Background (RESULTING VIEW)	13-66
13.2-5. Alternative 1: Panoramic View from Route 3 Looking Northwestward into the Central Part of NCTS with New Warehouse in the Foreground and Water Tower/Tank in the Middle Ground (RESULTING VIEW)	13-66
13.2-6. Alternative 1: View from Route 3 Looking Northward into the North Part of NCTS (RESULTING VIEW).....	13-67
13.2-8. Alternative 2: View from Route 3 Looking Northward with New Family Housing in the Foreground and Middle Ground and the Main Cantonment in the Background (RESULTING VIEW)	13-71
13.2-9. Alternative 2: Panoramic View from Route 3 Looking Northwestward into the Central Part of NCTS with New Warehouse in the Foreground and Water Tower/Tank in the Background (RESULTING VIEW).....	13-71
13.2-10. Alternative 2: View from Route 3 Looking Northward into the North Part of NCTS with New Facilities in the Foreground and Water Tower/Tank in the Background (RESULTING VIEW)	13-72
13.2-11. Alternative 2: View from Route 3 Looking Westward into the South Part of NCTS and Water Tower/Tank in the Background (RESULTING VIEW).....	13-72
13.2-12. Alternative 3: View from Route 3 Looking Northward with New Family Housing in the Foreground, Undeveloped Former FAA Parcel in the Middle Ground and Main Cantonment in the Background (RESULTING VIEW)	13-73
13.2-13. Alternative 3: Panoramic View from Route 3 Looking Northwestward into the Central Part of NCTS with New Warehouse in the Foreground and Water Tower/Tank in the Background (RESULTING VIEW).....	13-74
13.2-14. Alternative 3: View from Route 3 Looking Northward into the North Part of NCTS with New Facilities in the Foreground and Water Tower/Tank in the Background (RESULTING VIEW)	13-74
13.2-15. Alternative 3: View from Route 3 Looking Westward into the South Part of NCTS with Water Tower/Tank in the Background (RESULTING VIEW).....	13-75
13.2-16. Alternative 8: View from Route 3 Looking Northward with New Family Housing in the Foreground and Middle Ground, and Main Cantonment and Water Tower/Tank in the Background (RESULTING VIEW)	13-77
13.2-17. Alternative 8: Panoramic View from Route 3 Looking Northwestward into the Central Part of NCTS with New Warehouse in the Foreground and Water Tower/Tank in the Middle Ground (RESULTING VIEW)	13-77
13.2-18. Alternative 8: View from Route 3 Looking Northward into the North Part of NCTS with New Facilities in the Foreground (RESULTING VIEW).....	13-78
13.2-19. Alternative 8: View from Route 3 Looking Westward into the South Part of NCTS (RESULTING VIEW).....	13-78
14.1-1. Guam Shipping Lanes	14-7
14.1-2. Commercial Shipping Routes to Guam and CNMI.....	14-8
16.1-1. Historical Guam General Fund Revenues, Expenditures, and Deficits	16-19
16.1-2. Guam Villages and Land Ownership.....	16-44

16.1-3. GovGuam Revenues from Recreation Fees.....16-53

16.1-4. Community Facilities within Roadway Project Study Area16-63

16.1-5. Educational Facilities and Libraries within Roadway Project Study Area16-64

16.1-6. Houses of Worship within Roadway Project Study Area.....16-65

16.2-1. Population with and without Proposed Action16-76

16.2-2. Labor Force Demand with and without Proposed Action16-82

16.2-3. Labor Force Income with and without Proposed Action16-86

16.2-4. Potential Temporary Workforce Housing Locations.....16-90

16.2-5. Housing Demand with and without Proposed Action16-93

16.2-6. GovGuam Tax Revenues with and without Proposed Action16-95

16.2-7. Guam GIP with and without Proposed Action16-98

17.1-1. Guam Radon Zones17-12

17.1-2. IRP Sites- Northwest Field.....17-16

17.1-3. IRP Sites – Andersen AFB Main Base.....17-17

17.1-4. IRP Sites - Andersen South17-18

17.1-5. IRP Sites – Apra Harbor Naval Complex.....17-20

17.1-6. IRP Sites – Tear Gas Burial Site17-21

17.1-7. IRP Sites – Navy Barrigada.....17-22

17.1-8. PWC Site 2810: CB Landfill, Finegayan Landfill #1, Finegayan Landfill #2, and Trap and Skeet Range17-23

17.1-9. PWC Site 37: Marbo Power Plant17-24

17.1-10. IRP – Other Navy Sites17-25

17.1-11. Navy MRAs.....17-26

17.1-12. Air Force Waste Accumulation Points17-28

17.1-13. Navy Waste Accumulation Points.....17-29

17.1-14. Hazardous Material Locations in the North Region-Roadway Projects17-31

17.1-15. Hazardous Material Locations in the Central Region-Roadway Projects.....17-34

17.1-16. Hazardous Material Locations in the Apra Harbor Region-Roadway Projects17-36

19.1-1. Villages of Guam.....19-5

List of Tables

<u>Table</u>	<u>Page</u>
2.1-1. Projects Associated with the Relocation of Marines to Guam	2-7
2.1-2. DoD Parcels Considered	2-16
2.1-3. Non-DoD Land Parcels Considered	2-16
2.1-4. Current and Proposed BTS Interdiction Efforts	2-21
2.2-1. Details of Main Cantonment Facility Requirements	2-24
2.2-2. Considered and Dismissed Main Cantonment Sites	2-28
2.2-3. Considered and Dismissed Family Housing/Community Support Sites	2-30
2.2-4. Summary of Parcels for Each Main Cantonment Alternative	2-34
2.3-1. Proposed Training Projects on Guam	2-42
2.3-2. Daily and Annual Use of Proposed Small Arms Outdoor Qualification Ranges	2-57
2.3-3. Daily and Annual Use of Proposed Demolition and Explosive Ranges	2-58
2.3-4. Aviation Training Types	2-60
2.3-5. Aircraft Loading for Aviation Training Under the Proposed Action	2-60
2.3-6. Estimated Annual Training Sortie Activities at Improved Airfields	2-61
2.3-7. Estimated Annual Training Sortie Activity in Military Flight Corridors, Routes, or Tactical Navigation Area in Guam Based on Minimum Training Requirements	2-62
2.3-8. Maneuver and Non-Live-Firing General Skills Training Sites	2-69
2.3-9. Live-Fire Range Mission Requirements	2-72
2.3-10. Suitability-Land Availability	2-73
2.3-11. Live-Fire Range Alternatives: Key Reason for Dismissal	2-75
2.3-12. Considered and Dismissed Live-Fire Range Complex Alternatives	2-79
2.3-13. Considered and Dismissed Aviation Training Sites	2-84
2.3-14. Alternatives Carried Forward for Analysis: Ammunition Storage Facilities	2-85
2.3-15. Alternatives Carried Forward for Analysis: Non-Fire General Skills Training	2-86
2.3-16. Area Requirements for Training Range Alternatives	2-87
2.3-17. Alternatives Carried Forward for Analysis: Aviation Training	2-87
2.4-1. Proposed ACE Beddown Facilities and Dimensions	2-89
2.4-2. Proposed Aircraft Loading	2-91
2.4-3. Proposed Flight Operation Increases at Andersen AFB	2-91
2.4-5. Considered and Dismissed Alternatives: Airfield Operations	2-96
2.5-1. Amphibious Task Force Ships and Based Amphibious Vehicles and Boats	2-99
2.5-2. Embarkation Waterfront Facilities	2-107
2.5-3. Approximate MEU Administrative/Non-Tactical Event Schedule	2-113
2.5-4. LCAC/AAV Laydown Area Buildings	2-115
2.5-5. USCG Ships	2-118
2.5-6. Key Disadvantages of the Alternatives	2-132
2.5-7. Military Working Dog Kennel Alternative Site Evaluation	2-132
2.5-8. Medical/Dental Clinic Alternatives Assessment Summary	2-136
2.5-9. Waterfront Action Carried Forward	2-137
2.6-1. Alternatives Carried Forward for Analysis: Ammunition Storage Facilities	2-140
2.6-2. Alternatives Carried Forward for Analysis: Non-Fire General Skills Training	2-141
2.6-3. Waterfront Action Alternatives Carried Forward	2-143

3.1-1. Soils Across Guam	3-9
3.1-2. Risk Potential for Landslides to Occur	3-11
3.1-3. Historic Tsunamis on Guam	3-14
3.2-1. Soil Types at Proposed Sites	3-35
3.2-2. Alternative 1 Main Cantonment Footprint Area	3-37
3.2-3. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8	3-59
3.2-4. Summary of Training Impacts – Firing Range Alternatives	3-61
3.2-5. Summary of Training Impacts – Ammunition Storage Alternatives	3-61
3.2-6. Summary of Training Impacts – NMS Access Roads Alternatives	3-62
3.2-7. Summary of Other Training, Airfield, and Waterfront Component Impacts	3-62
4.1-1. DoD Activities Subject to NPDES Stormwater Permitting – Federal and Local Guam Regulations	4-6
4.1-2. Sustainable Yield Estimates and Recent Annual Average Pumping, NGLA	4-14
4.1-3. Summary of Delineated and NWI-Indicated Wetland Areas in and adjacent to Air Force Barrigada	4-38
4.1-4. Sediment Sampling Summary Table	4-54
4.1-5. Results of 2007 Apra Harbor Bulk Sediment Chemistry Analysis Sampling Summary	4-59
4.1-6. Summary of Wetland Areas in and Adjacent to Apra Harbor	4-63
4.1-7. Summary of Wetland Areas on Naval Base Guam	4-64
4.1-8. Summary of Wetland Areas in the Vicinity of Magazine Storage Options, NMS	4-71
4.2-1. BMPs for the Proposed Action	4-76
4.2-2. BMP and IMP Treatment Success Percentage	4-80
4.2-3. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8	4-139
4.2-4. Summary of Training Impacts – Firing Range Alternatives	4-140
4.2-5. Summary of Training Impacts – Ammunition Storage Alternatives	4-140
4.2-6. Summary of Training Impacts – NMS Access Roads Alternatives	4-141
4.2-7. Potential Impacts of other Training, Airfield, and Waterfront Components	4-141
4.2-8. Summary of Proposed Mitigation Measures	4-143
4.2-9. Summary of Potential Impacts to Wetlands and Waters of the U.S. under All Alternatives to Support LEDPA Discussion	4-149
5.1-1. U.S. National and Guam Ambient Air Quality Standards	5-2
5.1-2. Andersen AFB – 2007 Actual Stationary Source Emissions	5-9
5.1-3. Andersen AFB – 2005 Mobile Source Emissions	5-9
5.1-4. NCTS Finegayan—Permitted Emissions	5-10
5.1-5. GPA Power Stations—Existing Permitted Major Source Emissions	5-10
5.1-6. Non-DoD Power Stations—Existing Permitted Major Source Emissions	5-12
5.1-7. Naval Hospital Guam—Title V Permitted Emissions	5-12
5.1-8. Non-DoD Power Stations—Existing Permitted Major Source Emissions	5-13
5.1-9. Orote Point Power Plant Title V—Permitted Emissions	5-13
5.2-1. Training Field and Facility Annual Construction Emissions (2011-2014)	5-19
5.2-2. Main Cantonment Annual Construction Emissions (2011-2016)	5-20
5.2-3. Annual Increase in Aircraft Sortie Emissions at Andersen AFB	5-21
5.2-4. Aircraft Training Flight Annual Emissions	5-21
5.2-5. Vehicle Annual Emissions	5-22
5.2-6. Training Vessel Annual Emissions	5-25
5.2-7. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8	5-36
5.2-8. Summary of Training Impacts – Firing Range Alternatives	5-36

5.2-9 Summary of Training Impacts – Ammunition Storage Alternatives	5-36
5.2-10. Summary of Training Impacts – NMS Access Roads Alternatives.....	5-37
5.2-11 Summary of Other Training, Airfield, and Waterfront Component Impacts.....	5-37
5.2-12. Summary of Proposed Mitigation Measures	5-38
6.1-1. Noise Zones and Compatibility Levels	6-5
6.1-2. Land Use Compatibility in the Airport Environs by Noise Contours.....	6-5
6.1-3. Large Caliber and Explosives Risk of Complaints Levels	6-5
6.1-4. Samples of Construction Noise Equipment	6-6
6.1-5. Guam Loudest Hourly Noise Standards for Transportation Noise and Land Use Activity	6-7
6.1-6. Baseline Flight Operations at Andersen AFB	6-8
6.1-7. Projected Baseline (Calendar Year 2014) Noise Contour Acreage for Andersen AFB	6-8
6.1-8. Short-Term Noise Measurement Results.....	6-14
6.1-9. Long-Term Noise Measurement Results	6-15
6.2-1. Baseline and Proposed Flight Operations at Andersen AFB.....	6-26
6.2-2. Baseline and Projected Noise Contour Acreage for Andersen AFB and Vicinity (Onshore).....	6-26
6.2-3. Aviation Training Types, Total Required Sorties, and Locations	6-27
6.2-4. Sound Levels (SEL and L_{max} [dBA]) for Proposed Aircraft Associated with Marine Corps Relocation for Cruising Speeds.....	6-28
6.2-5. Single Event Maximum Noise Levels (L_{max} , dBA) for Low-speed Flights.....	6-28
6.2-6. Annual Sortie-Operations Specifications for NWF and Andersen AFB	6-29
6.2-8. Annual Sortie-Operations Specifications for Orote Field.....	6-38
6.2-9. Annual Sortie-Operations Specifications for NMS	6-40
6.2-10. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....	50
6.2-11. Summary of Training Impacts – Firing Range Alternatives.....	6-51
6.2-12. Summary of Training Impacts – Ammunition Storage Alternatives	6-51
6.2-13. Summary of Training Impacts – NMS Access Roads Alternatives.....	6-51
6.2-14. Summary of Other Training, Airfield, and Waterfront Component Impacts.....	6-51
6.2-15. Peak Noise Levels with Foliage Attenuation	6-53
6.2-16. Peak Noise Levels with Barrier Attenuation	6-56
6.2-17. ADNL Noise Levels with Barrier Attenuation	6-56
6.2-18. ADNL Noise Levels – Alternatives A and B	6-58
6.2-19. Summary of Proposed Mitigation Measures	6-59
7.1-1. Airspace Features for Classes of Airspace	7-3
7.2-1. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....	7-17
7.2-2. Summary of Training Impacts – Firing Range Alternatives.....	7-17
7.2-3. Summary of Training Impacts – Ammunition Storage Alternatives	7-17
7.2-4. Summary of Training Impacts – NMS Access Roads Alternatives.....	7-18
7.2-5. Summary of Other Training, Airfield, and Waterfront Component Impacts.....	7-18
8.1-1. Non-DoD Parcels of Interest	8-16
8.1-2. Summary of DoD Parcels.....	8-18
8.1-3. Proposed Guam Roadway Network (GRN) Projects in North Region.....	8-29
8.1-4. Proposed GRN Projects in Central Region.....	8-37
8.1-5. Proposed GRN Projects in Apra Harbor Region	8-49
8.1-6. Proposed GRN Projects in South Region	8-54
8.2-1. Comparison of Training Range Alternatives A and B.....	8-67

8.2-2. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....8-80

8.2-3. Summary of Training Impacts – Firing Range Alternatives.....8-81

8.2-4. Summary of Training Impacts – Ammunition Storage Alternatives8-82

8.2-5. Summary of Training Impacts – NMS Access Roads Alternatives.....8-82

8.2-6. Summary of Other Training, Airfield, and Waterfront Component Impacts.....8-82

8.2-7. Summary of Proposed Mitigation Measures8-84

9.1-1. Recreational Resources and Public Access on Andersen AFB9-3

9.1-2. Recreational Resources and Public Access on NCTS Finegayan and South Finegayan Housing Area9-3

9.1-3. Recreational Resources on non-DoD Land in North Guam9-4

9.1-4. Recreational Resources on Non-DoD Land in Central Guam.....9-9

9.1-5. Recreational Resources on Non-DoD Land in Piti/Nimitz Hill9-11

9.1-6. Recreational Resources and Public Access on Apra Harbor9-13

9.1-7. Recreational Resources on Naval Munitions Site and Public Access9-14

9.1-8. Recreational Resources on non-DoD Land in South Guam9-16

9.2-1. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....9-34

9.2-2. Summary of Training Impacts – Firing Range Alternatives.....9-34

9.2-3. Summary of Training Impacts – Ammunition Storage Alternatives9-35

9.2-4. Summary of Training Impacts – NMS Access Roads Alternatives.....9-35

9.2-5. Summary of Other Training, Airfield, and Waterfront Component Impacts.....9-35

9.2-6. Summary of Proposed Mitigation Measures9-36

10.1-1. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species on Guam10-8

10.1-2. Project-specific Terrestrial Biological Resources Field Studies within Proposed Project Locations.....10-16

10.1-3. Vegetation Communities at Andersen AFB10-17

10.1-4. Known or Potential Occurrence of ESA-listed, Guam-Listed, and Candidate Species at Andersen AFB 10-25

10.1-5. Vegetation Communities at NCTS Finegayan10-34

10.1-6. Known or Potential Occurrence of ESA-listed, Guam-listed, and Candidate Species at NCTS Finegayan 10-36

10.1-7. Vegetation Communities at South Finegayan10-39

10.1-8. Vegetation Communities at Former FAA Parcel and Harmon Annex Parcels.....10-41

10.1-9. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species at the Former FAA Parcel and Harmon Annex Parcels.....10-42

10.1-10. Vegetation Communities within North Region BRSA for the Proposed GRN Projects (ac [ha]).....10-45

10.1-11. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species within North Region for Proposed GRN Projects.....10-51

10.1-12. Vegetation Communities at Andersen South.....10-52

10.1-13. Vegetation Communities at the Route 15 Lands (ac [ha]).....10-54

10.1-14. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species at the Route 15 Lands10-55

10.1-17. Vegetation Communities within the Central Region for the Proposed GRN Projects (ac [ha])10-65

10.1-18. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species within the Central Region for the Proposed GRN Projects.....10-66

10.1-19. Vegetation Communities at Naval Base Guam10-67

10.1-20. Known or Potential Occurrence of ESA- and Guam-Listed and Candidate Species at Naval Base Guam.....10-70

10.1-21. Vegetation Communities within the Proposed GRN Projects Boundaries in the Apra Harbor Region (ac [ha]).....10-74

10.1-22. Known or Potential Occurrence of ESA-listed, Candidate, and Guam-listed Species within the Apra Harbor Region BRSA for the Proposed GRN Projects10-74

10.1-23. Vegetation Communities at NMS.....10-75

10.1-24. Native and Non-native Aquatic Species Distribution in NMS Streams Based on Visual Surveys10-76

10.1-25. Known or Potential Occurrence of ESA-listed, Guam-listed, and Candidate Species at NMS.....10-78

10.1-26. Vegetation Communities within the Proposed South Region GRN Projects (ac [ha]).....10-83

10.1-27. Known or Potential Occurrence of ESA-listed, Guam-listed, and Candidate Species within the Proposed South Region GRN Projects.....10-85

10.2-1. Potential Impacts to Vegetation Communities at Andersen AFB with Implementation of Alternative 1 (ac [ha]).....10-89

10.2-2. Potential Impacts to Special-Status Species Habitat at Andersen AFB with Implementation of Alternative 1 (ac [ha])10-97

10.2-3. Baseline and Projected Noise Contour Acreages over Recovery Habitat for Mariana Fruit Bat and Guam Micronesian Kingfisher from Andersen AFB Aircraft Operations (ac [ha]).....10-101

10.2-4. Baseline and Projected Noise Contour Acreages over Mariana Crow Recovery Habitat from Andersen AFB Aircraft Operations (ac [ha])10-105

10.2-5. Potential Impacts to Vegetation Communities at Finegayan, Former FAA Parcel, and Harmon Annex with Implementation of Alternative 1 (ac [ha]).....10-108

10.2-6. Potential Impacts to Special-Status Species Habitat at NCTS Finegayan, Former FAA Parcel, South Finegayan, and Harmon Annex with Implementation of Alternative 1 (ac [ha])10-112

10.2-7. Potential Impacts to Vegetation Communities at Andersen South and Route 15 Lands with Implementation of Alternative 1 (ac [ha]).....10-121

10.2-8. Potential Impacts to Recovery Habitat at Andersen South and Route 15 Range Complex with Implementation of Alternative 1 (ac [ha]).....10-124

10.2-9. Potential Impacts to Vegetation Communities at Apra Harbor with Implementation of Alternative 1 (ac [ha]).....10-138

10.2-10. Potential Impacts to Vegetation Communities at NMS with Implementation of Alternative 1 (ac [ha])10-144

10.2-11. Potential Impacts to Special-Status Species Habitat at NMS with Implementation of Alternative 1 (ac [ha]).....10-148

10.2-12. Potential Impacts to Vegetation Communities at NCTS Finegayan, South Finegayan, and Former FAA Parcel with Implementation of Alternative 2 (ac [ha]).....10-168

10.2-13. Potential Impacts to Special-Status Species Habitat at NCTS Finegayan, South Finegayan, and Former FAA Parcel with Implementation of Alternative 2 (ac [ha]).....10-170

10.2-14. Potential Impacts to Special-Status Species Habitat at NCTS Finegayan, South Finegayan, and Former FAA Parcel with Implementation of Alternative 3 (ac [ha]).....10-178

10.2-15. Potential Impacts to Vegetation Communities at Navy and Air Force Barrigada with Implementation of Alternative 3 (ac [ha])10-182

10.2-16. Potential Impacts to Special-Status Species Habitat at NCTS Finegayan, South Finegayan, and Former FAA Parcel with Implementation of Alternative 8 (ac [ha]).....10-184

10.2-17. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....10-189

10.2-18. Summary of Training Impacts – Firing Range Alternatives.....10-190

10.2-19. Summary of Training Impacts – Ammunition Storage Alternatives10-190

10.2-20. Summary of Training Impacts – NMS Access Roads Alternatives.....10-191

10.2-21. Summary of Other Training, Airfield, and Waterfront Component Impacts.....10-191

10.2-22. Summary of Mitigation Measures10-192

11.1-1. Special-Status Marine Species Present in the ROI Around Guam11-6

11.1-2. Summary of Previous and Current Marine Biological Surveys within the Study Areas11-10

11.1-3. Guam EFH and HAPC11-19

11.1-4. Mariana Archipelago Coral Reef Ecosystem CHCRT MUS.....	11-21
11.1-5. Mariana Archipelago Coral Reef Ecosystem PHCRT MUS	11-24
11.1-6. Sensitive MUS present in the EFH of Guam.....	11-28
11.1-7. Mariana Archipelago Bottomfish MUS	11-31
11.1-8. Mariana Archipelago Crustacean MUS.....	11-33
11.1-9. Pacific Pelagic Fisheries MUS	11-35
11.1-10. Special-Status Species for Guam.....	11-39
11.1-11. Hearing Thresholds and Bandwidth for Sea Turtles.....	11-66
11.2-1. EFH Areas Associated with Andersen AFB and Potential Effects.....	11-78
11.2-2. EFH Areas Associated with Finegayan and Potential Effects	11-83
11.2-3. EFH Areas Associated with Route 15 Range Lands and Potential Effects	11-87
11.2-4. Size of Proposed Firing Ranges and Associated Notional SDZs	11-88
11.2-5. Daily and Annual Use of Proposed Small Arms Outdoor Qualification Ranges	11-89
11.2-6. Daily and Annual Use of Proposed Demolition and Explosive Ranges	11-90
11.2-7. Sensitive Months for Certain Species within Apra Harbor	11-94
11.2-8. EFH Areas Associated with Outer Apra Harbor and Potential Effects	11-96
11.2-9. EFH Areas Associated with Inner Apra Harbor and Potential Effects	11-105
11.2-10. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....	11-118
11.2-11. Summary of Training Impacts – Firing Range Alternatives.....	11-119
11.2-12. Summary of Training Impacts – Ammunition Storage Alternatives	11-119
11.2-13. Summary of Training Impacts – NMS Access Roads Alternatives.....	11-119
11.2-14. Summary of Other Training, Airfield, and Waterfront Component Impacts.....	11-120
11.2-15. EFHA Summary	11-122
11.2-16. Summary of Proposed Mitigation Measures	11-126
12.1-1. Archaeological Surveys in the North Ramp Area	12-10
12.1-2. Historic Properties in the North Ramp Area	12-11
12.1-3. Archaeological Surveys in the MSA	12-11
12.1-4. Historic Properties in the MSA	12-12
12.1-5. Archaeological Surveys in the NWF Area	12-13
12.1-6. Historic Properties in the NWF Area	12-13
12.1-7. Historic Properties in the South Andersen AFB.....	12-16
12.1-8. Summary of the Surveys that Have Taken Place at NCTS Finegayan	12-17
12.1-9. Historic Properties in the NCTS Finegayan Area.....	12-18
12.1-10. Historic Properties in the South Finegayan Area	12-19
12.1-11. Historic Properties in the Harmon Annex	12-20
12.1-12. Historic Properties in the Former FAA Parcel	12-20
12.1-13. Archaeological Surveys at Andersen South Parcel	12-21
12.1-14. Historic Properties at Andersen South Parcel.....	12-21
12.1-15. Archaeological Surveys at Navy Barrigada.....	12-22
12.1-16. Historic Properties in the Vicinity of Navy Barrigada	12-22
12.1-17. Historic Properties at Route 15 Parcel.....	12-23
12.1-18. Historic Properties within the APE of Central Region Projects	12-24
12.1-19. Archaeological Surveys at Naval Base Guam	12-29
12.1-20. Historic Properties in the Naval Base Guam Area	12-30

12.1-21. Historic Properties in the Vicinity of the MWDK..... 12-32

12.1-22. Historic Properties within the APE of Apra Harbor Region Projects..... 12-33

12.1-23. Archaeological Surveys at the NMS 12-34

12.1-24. Historic Properties in the NMS 12-36

12.2-1. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8..... 12-73

12.2-2. Summary of Training Impacts – Firing Range Alternatives..... 12-73

12.2-3. Summary of Training Impacts – Ammunition Storage Alternatives 12-74

12.2-4. Summary of Training Impacts – NMS Access Roads Alternatives..... 12-74

12.2-5. Summary of Other Training, Airfield, and Waterfront Component Impacts..... 12-74

12.2-6. Summary of Proposed Mitigation Measures 12-75

13.1-1. Existing Visual Quality for MAP Projects – North Region 13-19

13.1-2. Existing Visual Quality for Pavement Strengthening Projects – North Region 13-20

13.1-3. Existing Visual Quality for Roadway and Intersection Widening Projects – North Region 13-22

13.1-4. Existing Visual Quality for Road Realignment and New Road Projects – North Region..... 13-24

13.1-5. Existing Visual Quality for MAP Projects – Central Region..... 13-36

13.1-6. Existing Visual Quality for Pavement Strengthening Projects – Central Region..... 13-38

13.1-7. Existing Visual Quality for Bridge Replacement Projects – Central Region 13-40

13.1-8. Existing Visual Quality for Roadway and Intersection Widening Projects – Central Region 13-42

13.1-9. Existing Visual Quality for Road Realignment and New Road Projects – Central Region 13-43

13.1-10. Existing Visual Quality for MAP Projects – Apra Harbor Region 13-48

13.1-11. Existing Visual Quality for Pavement Strengthening Projects – Apra Harbor Region 13-50

13.1-12. Existing Visual Quality for Bridge Replacement Projects – Apra Harbor Region..... 13-50

13.1-13. Existing Visual Quality for Roadway and Intersection Widening Projects – Apra Harbor Region 13-52

13.1-14. Existing Visual Quality for MAP Projects – South Region 13-58

13.1-15. Existing Visual Quality for Pavement Strengthening Projects – South Region 13-60

13.1-16. Existing Visual Quality for Roadway and Intersection Widening Projects – South Region..... 13-60

13.2-1. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8..... 13-80

13.2-2. Summary of Training Impacts – Firing Range Alternatives..... 13-81

13.2-3. Summary of Training Impacts – Ammunition Storage Alternatives 13-81

13.2-4. Summary of Training Impacts – NMS Access Roads Alternatives..... 13-82

13.2-5. Summary of Other Training, Airfield, and Waterfront Component Impacts..... 13-82

13.2-6. Summary of Proposed Mitigation Measures 13-83

14.1-1. Port of Guam Vessel Visits 1995 through 2008 14-5

14.2-1. Port of Guam Total Containers to be Handled 2008 through 2018 14-12

14.2-2. Port of Guam Inbound Break-bulk Tonnage to be Handled 2008 through 2018..... 14-12

14.2-3. Port of Guam Estimated Number of Vessel Calls 14-13

14.2-5. Air Emissions Estimated from Vessels at Port of Guam 14-15

14.2-6. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8..... 14-22

14.2-7. Summary of Training Impacts – Firing Range Alternatives..... 14-22

14.2-8. Summary of Training Impacts – Ammunition Storage Alternatives 14-22

14.2-9. Summary of Training Impacts – NMS Access Roads Alternatives..... 14-23

14.2-10. Airfield and Waterfront Component Impacts 14-23

16.1-1. Combined Military and their Dependents Population on Guam, Selected Years 16-2

16.1-2. Annual Rate of Increase on Guam's Population 16-3

16.1-3. Guam-Wide Total Population and Ethnicity, 1920-2000	16-4
16.1-4. Demographic Characteristics 2000, Guam Total and Individual Villages	16-4
16.1-5. Household Characteristics 2000, Guam Total and Individual Villages	16-6
16.1-6. Active Duty Military Population on Guam, 1998-2007	16-7
16.1-7. Active Duty Military and Military Dependent Demographic Characteristics, 2000	16-8
16.1-8. Government's Share of Employment (June 2009)	16-8
16.1-9. Guam Civilian Employment by Industry, 2000 and 2009	16-9
16.1-10. Guam Employment by Occupation, 2000 and 2008	16-9
16.1-11. Guam Median Annual Salary by Occupation, 2000 and 2008	16-10
16.1-12. Guam and U.S. Consumer Price Index (CPI) Comparison, (All Items, Index, Year 2000 = 100)	16-11
16.1-13. Guam, Price Adjusted Median Annual Salary by Occupation, 2000 and 2008	16-11
16.1-14. Guam Employment Trends 2000-2007	16-12
16.1-15. Home Purchase Component of Guam CPI, 2000-2006	16-13
16.1-16. Housing Characteristics for Guam, 2000	16-13
16.1-17. Revenue Sources for the GovGuam	16-15
16.1-18. GovGuam FY 2008 Revenues	16-16
16.1-19. GovGuam FY 2008 Expenditures	16-17
16.1-20. Guam GIP 1991-2007 (Millions of Current \$)	16-20
16.1-21. Guam Educational Attainment as of 2000	16-21
16.1-22. Comparison of Violent and Property Crime Rates, Guam Versus U.S., 2002-2006	16-27
16.1-23. SOFA-Status Total and Heinous Crime Arrests on Okinawa, 2003-2008	16-35
16.1-24. Summary of Guam Acreage by Ownership	16-43
16.1-25. Price Range for Guam Land by Village, 1973	16-48
16.1-26. Estimated Price Range and Median Price for Guam Land, by Village, 2009	16-48
16.1-27. Estimated Median Prices for Land on Guam by Selected Zoning Types	16-49
16.1-28. Estimated Total Value of Guam Land, 2009	16-50
16.1-29. Community Facilities by Region, Off-Base Roadways	16-59
16.1-30. Educational Facilities and Libraries by Region, Off-Base Roadways	16-61
16.1-31. Houses of Worship by Region, Off-Base Roadways	16-62
16.2-1. Summary of Marine Corps-Related Population Increase – Peak and Steady-State Levels	16-74
16.2-2. Construction Component Assumptions for Marine Corps-Related Population Impacts	16-74
16.2-3. Operational Component Assumptions for Marine Corps-Related Population Impacts	16-75
16.2-4. Estimated Population Increase Associated with Proposed Marine Corps Action	16-75
16.2-5 Employment Component Assumptions for Demographic Characteristic Impacts	16-76
16.2-6 Military Component Assumptions for Demographic Characteristic Impacts	16-77
16.2-7. Employment Component Assumptions for Household Characteristics Impacts	16-79
16.2-8. Military Component Assumptions for Household Characteristic Impacts	16-79
16.2-9. Summary of Economic Impacts – Peak and Steady-State	16-80
16.2-10. Construction Component Assumptions for Civilian Labor Force Demand	16-81
16.2-11. Operational Component Assumptions for Labor Force Demand	16-81
16.2-12. Intermediate Operations-Related Calculations for Civilian Labor Force Demand	16-81
16.2-13. Impact on Civilian Labor Force Demand (FTE Jobs)	16-82
16.2-14. Assumptions for Origins of Direct On-Site Labor Force Construction Supply	16-83
16.2-15. Assumptions for Origins (On vs. Off-Island) of Labor Force Supply for Employment Other Than Direct On-Site Construction	16-83

16.2-16. Estimated Origin of Workers Constructing Military Facilities.....	16-84
16.2-17. Estimated Numbers of On-Island Workers for Various Job Categories Excluding Direct On-Site Construction.....	16-84
16.2-18. Estimated Numbers of Off-Island Numbers of Workers for Various Job Categories Excluding Direct On-Site Construction.....	16-84
16.2-19. Construction Component Assumptions for Civilian Labor Force Income	16-85
16.2-20. Operational Component Assumptions for Civilian Labor Force Income	16-85
16.2-21. Impact on Civilian Labor Force Income (Millions of 2008 \$)	16-85
16.2-22. Temporary Workforce Housing Locations and Attributes (Map Key for Figure 16.2-4).....	16-89
16.2-23. Construction Component Assumptions for Civilian Housing Demand.....	16-91
16.2-24. Operational Component Assumptions for Housing Demand	16-92
16.2-25. Construction and Operational Assumptions for Civilian Housing Supply	16-92
16.2-26. Demand for New Civilian Housing Units	16-92
16.2-27. Demand and Supply for New Civilian Housing Units	16-93
16.2-28. Assumptions for Local Government Revenue.....	16-94
16.2-29. Impact on GovGuam Tax Revenue Summary (Thousands of 2008 \$s)	16-95
16.2-30. Construction Component Assumptions for GIP	16-96
16.2-31. Operational Component Assumptions for GIP.....	16-97
16.2-32. Impact on GIP (Millions of 2008 \$s).....	16-98
16.2-33. Construction Component Assumptions for Public Education Agency Impacts	16-102
16.2-34. Operational Component Assumptions for Public Education Agency Impacts	16-103
16.2-35. GPSS Student Population Impacts Summary	16-103
16.2-36. Primary and Secondary Education Teacher Requirements Impacts Summary.....	16-104
16.2-37. Higher Education Student Population Impacts Summary	16-104
16.2-38. Higher Education Faculty Requirement Impacts Summary	16-104
16.2-39. Construction Component Assumptions for Public Health Agency Impacts.....	16-106
16.2-40. Operational Component Assumptions for Public Health Agency Impacts.....	16-107
16.2-41. Impact on Public Health and Human Services, Service Population Summary.....	16-107
16.2-42. Public Health and Human Services Impact Summary.....	16-108
16.2-43. Construction Component Assumptions for Public Safety Agency Impacts	16-111
16.2-44. Operational Component Assumptions for Public Safety Agency Impacts	16-112
16.2-45. Impact on Public Safety Service Population Summary	16-112
16.2-46. Public Safety Services Staffing Impacts Summary	16-112
16.2-47. Assumptions for Other Selected Agency Impacts.....	16-115
16.2-48. Impact on Other Selected General Service Agency Service Population	16-115
16.2-49. Other Selected General Service Agency Impacts Summary.....	16-115
16.2-50. Assumptions for Growth Permitting Agency Impacts.....	16-117
16.2-51. Additional Growth Permitting Staff Required.....	16-119
16.2-52. Summary of Private Land Parcels included in each Alternative	16-128
16.2-53. Summary of Impacts of Land Acquisition by Alternative.....	16-129
16.2-54. Guam Raceway Park Rental Fee Schedule from 1998 through 2018.....	16-139
16.2-55. Potential Increase in Revenue: Route 15 Alternative's A and B.....	16-139
16.2-56. Alternative 1 Land Parcel Characteristics	16-142
16.2-57. Alternative 1 Potential Land Ownership Changes.....	16-142
16.2-58. Alternative 2 Land Parcel Characteristics	16-144

16.2-59. Alternative 2 Potential Land Ownership Changes.....	16-144
16.2-60. Alternative 3 Land Parcel Characteristics	16-146
16.2-61. Alternative 3 Potential Land Ownership Changes.....	16-146
16.2-62. Summary of Impacts Associated with the Proposed Action.....	16-150
16.2-63. Summary of Proposed Mitigation Measures	16-153
18.1-1. Class A Flight Mishaps	18-2
18.1-2. AIDS Reports, Guam 1997-2006	18-5
18.1-3. Cholera Reports, Guam 1997-2006.....	18-5
18.1-4. Dengue Reports, Guam 1997-2006.....	18-6
18.1-5. Hepatitis C Reports, Guam 1997-2006.....	18-6
18.1-6. Malaria Reports, Guam 1997-2006.....	18-6
18.1-7. Measles Reports, Guam 1997-2006	18-7
18.1-8. Rubella Reports, Guam 1997-2006.....	18-7
18.1-9. Typhoid Fever Reports, Guam 1997-2006.....	18-7
18.1-10. STD Reports, Guam 1997-2006.....	18-8
18.1-11. Tuberculosis Reports, Guam 1997-2006.....	18-8
18.1-12. Mental Illness Reports, Guam 2000-2005.....	18-8
18.2-1. Potential Disease Occurrence Increase, Guam	18-19
18.2-2. Potential Traffic Accident Increase, Guam	18-21
18.2-3. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....	18-26
18.2-4. Summary of Training Impacts – Training Range Complex Alternatives	18-26
18.2-6. Summary of Training Impacts – NMS Access Roads Alternatives.....	18-27
18.2-7. Summary of Other Training, Airfield, and Waterfront Component Impacts.....	18-28
19.1-1. Villages Affected by the Proposed Action Alternatives on Guam: Percentage Ethnic Minorities, in Poverty, and Under 18 Years of Age	19-6
19.2-1. Environmental Justice Public Involvement	19-11
19.2-2. Summary of Main Cantonment Impacts – Alternatives 1, 2, 3 and 8.....	19-20
19.2-3. Summary of Training Impacts – Firing Range Alternatives.....	19-21
19.2-4. Summary of Training Impacts – Ammunition Storage Alternatives	19-21
19.2-5. Summary of Training Impacts – NMS Access Roads Alternatives.....	19-21
19.2-6. Summary of Other Training, Airfield, and Waterfront Component Impacts.....	19-21