

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
GEOLOGICAL AND SOIL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Topography</u> SI Major changes to surface elevation due to excavation and filling for construction of MPMG, MRF, KD ranges, and realignment of Route 15 would have a significant, direct, long-term impact to topography. Earthwork for LFTRC Alternative 1 would include 2,488,676 yd ³ (1,902,730 m ³) of cut and 2,451,937 yd ³ (1,874,640 m ³) of fill. Alternative 1 would involve a lower excavation volume than Alternatives 3 and 4, and a larger volume than Alternatives 5 and 2 (Alternative 3 would involve the greatest; Alternative 2 would involve the least). Potential Mitigation Measures Potential mitigation is not considered feasible for this impact because smaller cut/fill volumes would not provide the necessary level surfaces for the referenced ranges and roadway.	<u>Topography</u> LSI Because the elevation changes at Alternative 2 are smaller than those of the other alternatives, less excavation, filling, and contouring would occur at Alternative 2 so there would be less alteration of the surrounding landscape than at the other four alternatives. Therefore, Alternative 2 is expected to have a less than significant direct, long-term impact on topography. Earthwork would include 1,246,720 yd ³ (953,186 m ³) of cut and 1,254,698 yd ³ (959,286 m ³) of fill. Alternative 2 would involve the least volume of excavation of any of the alternatives.	<u>Topography</u> SI Major changes to surface elevation due to excavation and filling for construction of MPMG, MRF, KD ranges would have a significant, direct, long-term impact to topography. Earthwork would include 4,932,976 yd ³ (3,771,530 m ³) of cut and 3,130,058 yd ³ (2,393,100 m ³) of fill. Alternative 3 would involve the largest volume of excavation of any of the alternatives. Potential Mitigation Measures Similar to Alternative 1, i.e., potential mitigation is not considered feasible and is not proposed.	<u>Topography</u> SI Major changes to surface elevation due to excavation and filling for construction of MPMG and KD ranges would have a significant, direct, long-term impact to topography. Earthwork would include 2,716,125 yd ³ (2,076,627 m ³) of cut and 2,767,463 yd ³ (2,115,878 m ³) of fill. Alternative 4 would involve the second largest volume of excavation any of the alternatives (Alternative 3 would involve the greatest; Alternative 2 would involve the least). Potential Mitigation Measures Similar to Alternative 1, i.e., potential mitigation is not considered feasible and is not proposed.	<u>Topography</u> SI Major changes to surface elevation due to excavation and filling for construction of MPMG Range would have a significant, direct, long-term impact to topography. Earthwork would include 2,047,295 yd ³ (1,565,270 m ³) of cut and 1,932,392 yd ³ (1,477,420 m ³) of fill. Alternative 5 would involve the second lowest amount of excavation of all the alternatives (Alternative 3 would involve the greatest; Alternative 2 would involve the least). Potential Mitigation Measures Similar to Alternative 1, i.e., potential mitigation is not considered feasible and is not proposed.
LSI Minor changes in surface elevations due to excavation and filling for the HG Range would have direct, long-term,	LSI Minor changes in surface elevations due to excavation and filling for the HG Range would have direct, long-term, less than	LSI Minor changes in surface elevations due to excavation and filling for the HG Range would have direct, long-term, less than	LSI Minor changes in surface elevations due to excavation and filling for the HG Range would have direct, long-term, less than	LSI Minor changes in surface elevations due to excavation and filling for the HG Range would have direct, long-term, less than

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
less than significant impacts.	significant impacts.	significant impacts.	significant impacts.	significant impacts.
<p><u>Soils</u> LSI Potential increase in construction-related erosion Alternative 1 and the HG Range minimized through compliance with 22 GAR, Chapter 10 Guam Soil Erosion and Sediment Control Regulations and construction stormwater BMPs as per the Construction General Permit, DoD Program SWPPP, and project SWPPPs.</p> <p>There would be no stream re-routing involved with construction of Alternative 1.</p> <p>Less than significant direct, short-term impacts to soils at Alternative 1 and the HG Range from erosion.</p> <p>No indirect short-term impacts expected at Alternative 1 and the HG Range.</p> <p>Minimally-used, non-prime farmland soils would be disturbed at Alternative 1 and the HG Range.</p> <p>Construction of Alternative 1 and the HG Range would be a less than significant, direct, long-term impact to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts from construction-related erosion at Alternative 2 and the HG Range would be similar to Alternative 1.</p> <p>No indirect short-term impacts expected at the HG Range and Alternative 2.</p> <p>Construction of Alternative 2 would involve stream re-routing.</p> <p>Disturbance to unused prime farmland soils at Alternative 2 would be an adverse, but less than significant direct long-term impact.</p> <p>Disturbance to minimally-used, non-prime farmland soils at the HG Range would be a less than significant, direct, long-term impact to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts from construction-related erosion at Alternative 3 and the HG Range would be similar to Alternative 1. No indirect short-term impacts expected.</p> <p>Construction of Alternative 3 would involve stream re-routing.</p> <p>Construction of the HG Range would be a less than significant, direct, long-term impact to agricultural soils.</p> <p>NI No prime farmland is identified in the Alternative 3 development footprint. No direct or indirect impacts to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts from construction-related erosion at Alternative 4 and the HG Range would be similar to Alternative 1. No indirect short-term impacts expected.</p> <p>Construction of Alternative 4 would involve stream re-routing.</p> <p>Disturbance to unused prime farmland soils at Alternative 4 would be an adverse, but less than significant direct long-term impact to agricultural soils.</p> <p>Construction of the HG Range would be a less than significant, direct, long-term impact to agricultural soils.</p>	<p><u>Soils</u> LSI Direct, short-term impacts from construction-related erosion at Alternative 5 and the HG Range would be similar to Alternative 1. No indirect short-term impacts expected.</p> <p>There would be no stream re-routing involved with construction of Alternative 5.</p> <p>Construction of the HG Range would be a less than significant, direct, long-term impact to agricultural soils.</p> <p>NI No prime farmland is identified in the Alternative 5 development footprint. No direct or indirect impacts to agricultural soils.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Sinkholes</u> LSI Three features have been preliminarily identified as sinkholes/depressions that may contain sinkholes.</p> <p>No adverse impact at Alternative 1 and the HG Range with compliance with 22 GAR Chapter 10 Section 10106 F.</p> <p>Less than significant direct, short-term impacts to sinkholes.</p>	<p><u>Sinkholes</u> LSI HG Range: Impacts would be similar to Alternative 1, since the location would remain the same.</p> <p>NI There are no sinkholes in the volcanic bedrock underlying Alternative 2. There would be no direct or indirect short or long term impacts.</p>	<p><u>Sinkholes</u> LSI Four features have been preliminarily identified as sinkholes/depressions that may contain sinkholes.</p> <p>Impacts for Alternative 3 and the HG Range would be similar to Alternative 1.</p>	<p><u>Sinkholes</u> LSI Three features have been preliminarily identified as sinkholes/depressions that may contain sinkholes.</p> <p>Impacts for Alternative 4 and the HG Range would be similar to Alternative 1.</p>	<p><u>Sinkholes</u> LSI Seven features have been preliminarily identified as sinkholes/depressions that may contain sinkholes.</p> <p>Impacts for Alternative 5 and the HG Range would be similar to Alternative 1.</p>
<p><u>Geologic Hazards</u> LSI One major and one minor bedrock fault cross the Alternative 1 footprint. No bedrock faults cross the HG Range footprint.</p> <p>Potential for earthquake-generated fault rupture/ground shaking to cause structure damage and injury would be minimized with application of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p> <p>Compliance with 22 GAR Chapter 10 Section 10106 F would minimize potential geologic hazards associated with sinkholes. Therefore, construction of Alternative 1 and the HG Range would result in less than significant direct</p>	<p><u>Geologic Hazards</u> LSI One major bedrock fault crosses the Alternative 2 footprint.</p> <p>Impacts for Alternative 2 and the HG Range would be similar to Alternative 1.</p>	<p><u>Geologic Hazards</u> LSI One minor bedrock fault crosses the Alternative 3 footprint.</p> <p>Impacts for the Alternative 3 and the HG Range would be similar to Alternative 1.</p>	<p><u>Geologic Hazards</u> LSI One minor bedrock fault crosses the Alternative 4 footprint.</p> <p>Impacts for Alternative 4 and the HG Range would be similar to Alternative 1.</p>	<p><u>Geologic Hazards</u> LSI Impacts for the LFTRC and HG Range areas would be similar to Alternative 1.</p> <p>Potential hazard to workers if USFWS facilities are demolished would be minimized with tsunami hazard communication and evacuation procedures.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
and indirect short-term impacts associated with geologic hazards.				
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Topography</u> NI No large scale grading and changes to elevation at Alternative 1 and the HG Range. No direct or indirect impacts.	<u>Topography</u> NI Impacts for Alternative 2 and the HG Range would be similar to Alternative 1, because operations at the proposed LFTRC site would not alter topography post construction.	<u>Topography</u> NI Impacts for the Alternative 3 and the HG Range would be similar to Alternative 1.	<u>Topography</u> NI Impacts for Alternative 4 and the HG Range would be similar to Alternative 1.	<u>Topography</u> NI Impacts for the Alternative 5 and the HG Range would be similar to Alternative 1.
<u>Soils</u> LSI There would be about 30 acres for Alternative 1 and about 1 acre for the HG Range of associated impervious surfaces. Potential for erosion associated with firing range operations at Alternative 1 and HG Range would be minimized by application of Marine Corps range management policies and procedures and preparing a Range Fire Management Plan. Potential for erosion from minimal surface disturbance for maintenance activities would be reduced by implementation of construction stormwater BMPs. With implementation of Marine Corps range management policies and procedures and stormwater BMPs (for ranges and utility maintenance), less than significant direct and indirect long-term impacts to soils from erosion would occur	<u>Soils</u> LSI There would be about 29 acres for Alternative 2 and about 1 acre for the HG Range of associated impervious surfaces. Impacts from erosion associated with firing range operations at Alternative 2 and the HG Range would be similar to Alternative 1. Operation of the HG Range and Alternative 2 would have a less than significant direct, long-term impact to agricultural soils.	<u>Soils</u> LSI There would be about 20 acres for Alternative 3 and about 1 acre for the HG Range of associated impervious surfaces. Impacts from erosion associated with firing range operations at Alternative 3 and the HG Range would be similar to Alternative 1. Operation of the HG Range would be a less than significant, direct, long-term impact to agricultural soils. NI No prime farmland is identified in the Alternative 3 development footprint. No direct or long-term indirect impacts to agricultural soils.	<u>Soils</u> LSI There would be about 32 acres for Alternative 4 and about 1 acre for the HG Range of associated impervious surfaces. Impacts from erosion associated with firing range operations at Alternative 4 and the HG Range would be similar to Alternative 1. Operation of the HG Range and Alternative 4 would have a less than significant direct long-term impact to agricultural soils.	<u>Soils</u> LSI There would be about 29 acres for Alternative 5 and about 1 acre for the HG Range of associated impervious surfaces. Impacts from erosion associated with firing range operations at Alternative 5 and the HG Range would be similar to Alternative 1. Operation of the HG Range would have a less than significant, direct, long-term impact to agricultural soils. NI No prime farmland is identified in the Alternative 5 development footprint. No direct or long-term indirect impacts to agricultural soils.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>due to Alternative 1 and HG Range operations.</p> <p>Minimally-used, non-prime farmland soils would be disturbed at Alternative 1 and the HG Range.</p> <p>Operation of Alternative 1 and HG Range would have a less than significant, direct, long-term impact to agricultural soils.</p>				
<p><u>Sinkholes</u> LSI No adverse impact at Alternative 1 and the HG Range sites with compliance with 22 GAR Chapter 10 Section 10106 F.</p> <p>Operation of Alternative 1 and the HG Range would have less than significant direct, long-term impacts to sinkholes.</p>	<p><u>Sinkholes</u> LSI Impacts for the HG Range would be similar to Alternative 1.</p> <p>NI There are no sinkholes in the volcanic bedrock underlying Alternative 2, so operation would have no direct or indirect long-term impacts to sinkholes.</p>	<p><u>Sinkholes</u> LSI The impacts for the HG Range and Alternative 3 would be similar to Alternative 1.</p>	<p><u>Sinkholes</u> LSI The impacts for the HG Range and Alternative 4 would be similar to Alternative 1.</p>	<p><u>Sinkholes</u> LSI The impacts for the HG Range and Alternative 5 would be similar to Alternative 1.</p>
<p><u>Geologic Hazards</u> LSI Minimal hazards associated with slope instability and liquefaction.</p> <p>Minimal potential for earthquake-generated fault rupture and ground shaking to cause structure damage and injury due to use of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p>	<p><u>Geologic Hazards</u> LSI Minimal hazards associated with slope instability and liquefaction.</p> <p>Minimal potential for earthquake-generated fault rupture and ground shaking to cause structure damage and injury due to use of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p> <p>Less than significant direct, long-term hazards associated with</p>	<p><u>Geologic Hazards</u> LSI Minimal hazards associated with slope instability and liquefaction.</p> <p>Minimal potential for earthquake-generated fault rupture and ground shaking to cause structure damage and injury due to use of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p> <p>Less than significant direct, long-term hazards associated with</p>	<p><u>Geologic Hazards</u> LSI Minimal hazards associated with slope instability and liquefaction.</p> <p>Minimal potential for earthquake-generated fault rupture and ground shaking to cause structure damage and injury due to use of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p> <p>Less than significant direct, long-term hazards associated with</p>	<p><u>Geologic Hazards</u> LSI Minimal hazards associated with slope instability and liquefaction.</p> <p>Minimal potential for earthquake-generated fault rupture and ground shaking to cause structure damage and injury due to use of Unified Facilities Criteria 3-310-04 Seismic Design of Buildings dated June 1, 2013 during design and construction.</p> <p>Less than significant direct, long-term hazards associated with</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
Less than significant direct, long-term hazards associated with sinkholes due to implementation of sinkhole BMPs. Less than significant direct and indirect long-term impacts associated with geologic hazards.	sinkholes due to implementation of sinkhole BMPs at the HG Range. Less than significant direct and indirect long-term impacts associated with geologic hazards.	sinkholes due to implementation of sinkhole BMPs. Less than significant direct and indirect long-term impacts associated with geologic hazards.	sinkholes due to implementation of sinkhole BMPs. Less than significant direct and indirect long-term impacts associated with geologic hazards.	sinkholes due to implementation of sinkhole BMPs. Less than significant direct and indirect long-term impacts associated with geologic hazards.
WATER RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Surface Water</u> NI No surface waters are located within or near the construction area. There would be no significant direct or indirect short-term impacts to groundwater.	<u>Surface Water</u> LSI Potential short-term increase in stormwater runoff and associated pollutants during construction could have indirect effects on surface water features. Short-term direct impacts would occur to up to 5 streams due to construction activities within and adjacent to surfaces waters. However, through compliance with the Construction General Permit and implementation of SWPPPs and associated erosion control, runoff reduction, and sediment removal BMPs, these effects would be minimized.	<u>Surface Water</u> LSI Potential short-term increase in stormwater runoff and associated pollutants during construction could have indirect effects on surface water features. Short-term direct impacts to up to 2 streams. Impacts as well as compliance and minimization measures would be similar as Alternative 2.	<u>Surface Water</u> LSI Potential short-term increase in stormwater runoff and associated pollutants during construction could have indirect effects on surface water features. Short-term direct impacts to up to 7 streams. Impacts as well as compliance and minimization measures would be similar as Alternative 2.	<u>Surface Water</u> NI Same as Alternative 1.
<u>Groundwater</u> LSI Potential for stormwater to reach Northern Guam Lens Aquifer. Stormwater runoff and sinkhole protection measures would serve to protect groundwater quality, resulting in less than significant direct or indirect short-term impacts.	<u>Groundwater</u> LSI Minor potential for stormwater to reach local aquifers (not the Northern Guam Lens Aquifer). Stormwater runoff protection measures would serve to protect groundwater quality, resulting in less than significant short-term impacts.	<u>Groundwater</u> LSI Groundwater is primarily in the low-permeability volcanic rocks in the area. Impacts and avoidance measures would be similar to Alternative 2.	<u>Groundwater</u> LSI Similar to Alternatives 2 and 3, since the Alternative 4 project area (not including the HG Range) overlaps the Alternatives 2 and 3 project areas.	<u>Groundwater</u> LSI Similar to Alternative 1, there would be a potential for stormwater to reach Northern Guam Lens Aquifer. Stormwater runoff and sinkhole protection measures would serve to protect groundwater quality, resulting in less than significant direct or indirect short-term impacts.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Nearshore Waters</u> NI Stormwater runoff from the project area would not enter nearshore waters.</p>	<p><u>Nearshore Waters</u> NI Stormwater runoff from the project area would occur more than one mile inland from the coastline and would not cause indirect impacts to nearshore waters in Talofofo Bay.</p>	<p><u>Nearshore Waters</u> NI Same as Alternative 2.</p>	<p><u>Nearshore Waters</u> NI Same as Alternative 2.</p>	<p><u>Nearshore Waters</u> NI The project area would be approximately 0.04 mile (0.06 km) from nearshore waters, and would cause no impact due to compliance with the Construction General Permit and implementation of SWPPPs.</p>
<p><u>Wetlands</u> NI No wetlands are located within or near the construction areas.</p>	<p><u>Wetlands</u> SI-M Direct long-term impact to up to 17.7 acres of potentially jurisdictional wetland areas due to proposed cut and fill of wetlands associated with the Sarasa River and Malaja River. As required under the Section 404 permitting process, a mitigation plan would be prepared.</p> <p>Alternative 2, although significant, would have less of an impact to wetlands than Alternatives 3 or 4.</p> <p>Potential Mitigation Measures If LEDPA, a Section 404 permit would be obtained for unavoidable impacts to jurisdictional wetlands. Direct impacts would be mitigated by creating new wetlands, restoring or enhancing existing wetlands, or preserving existing wetlands areas on Guam to, at a minimum, replace the area filled.</p>	<p><u>Wetlands</u> SI-M Direct impact to up to 36.9 acres of potentially jurisdictional wetland areas would result in long-term, direct impacts at the MPMG and KD Riffle Ranges and range roads. As required under the Section 404 permitting process, a mitigation plan would be prepared.</p> <p>Alternative 3 would have the greatest impact to wetlands, compared to all LFTRC alternatives.</p> <p>Potential Mitigation Measures Same as Alternative 2.</p>	<p><u>Wetlands</u> SI-M Direct impact to up to 25.2 acres of potentially jurisdictional wetland areas would result in long-term, direct impacts at the MPMG and KD Riffle Ranges and range roads. As required under the Section 404 permitting process, a mitigation plan would be prepared.</p> <p>Alternative 4, although significant, would have less of an impact to wetlands than Alternative 3.</p> <p>Potential Mitigation Measures Same as Alternative 2.</p>	<p><u>Wetlands</u> NI No wetlands are located within or near the construction areas.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
	<p>LSI Potential increase in stormwater runoff and associated pollutants could have indirect effects on wetlands. These short-term, indirect impacts would be minimized through the CONSTRUCTION GENERAL PERMIT and implementing BMPs to reduce/prevent site- and activity-specific stormwater runoff protection requirements.</p>	<p>LSI Similar to Alternative 2, resulting in short-term, indirect impacts.</p>	<p>LSI Similar to Alternative 2 resulting in short-term, indirect impacts.</p>	
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p><u>Surface Water</u> NI No surface waters are located within or near the project area and the implementation of LID and range management BMPs would ensure that there would be no increase in off-site transport of excess runoff, sediment, or pollutants for up to the 25-year storm event.</p>	<p><u>Surface Water</u> LSI Increase in stormwater intensity and volume and increase in training-related residual contaminants. The potential for increase in wildland fires leading to increased erosion is highest in Alternative 2, compared to the other two NAVMAG alternatives. Impacts to the water quality of Fena Valley Reservoir from projectiles would be negligible. Stormwater runoff would be minimized through LID measures and BMPs for managing stormwater runoff at firing ranges. Appropriate fire suppression and mitigation measures would be incorporated into the design and range operating procedures.</p>	<p><u>Surface Water</u> LSI Potential impacts (including to Fena Valley Reservoir) and impact minimization measures would be similar to Alternative 2, except that the potential for wildland fires would be smaller.</p>	<p><u>Surface Water</u> LSI Potential impacts (including to Fena Valley Reservoir) and impact minimization measures would be similar to Alternative 2, except that the potential for wildland fires would be smaller in the portion of the project area on NAVMAG land.</p>	<p><u>Surface Water</u> NI Same as Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<u>Groundwater</u> LSI Minor increase in localized recharge rates and in pollutant loading potential to the NGLA.	<u>Groundwater</u> LSI Minor potential for stormwater to reach local aquifers (not the NGLA).	<u>Groundwater</u> LSI Similar to Alternative 2 resulting in less than significant long-term, direct impacts.	<u>Groundwater</u> LSI Similar to Alternative 2 resulting in less than significant long-term, direct impacts.	<u>Groundwater</u> LSI Similar to Alternative 1, resulting in less than significant long-term, direct or indirect impacts.
<u>Nearshore Waters</u> NI Stormwater runoff from the project area would not enter nearshore waters. Potential impacts to nearshore water quality from projectiles used within the surface danger zone would be negligible.	<u>Nearshore Waters</u> NI Stormwater runoff from the project area would not cause indirect impacts to nearshore waters in Talofofu Bay.	<u>Nearshore Waters</u> NI Similar to Alternative 2.	<u>Nearshore Waters</u> NI Similar to Alternative 2.	<u>Nearshore Waters</u> NI Similar to Alternative 2.
<u>Wetlands</u> NI No wetlands are located within or near the project area.	<u>Wetlands</u> LSI Potential minor increase in stormwater runoff and associated pollutants could have long-term, direct or indirect effects on wetlands. Stormwater runoff protection methods (i.e., LID, BMPs, and pollution prevention plans) would reduce potential impacts.	<u>Wetlands</u> LSI Similar to Alternative 2, resulting in less than significant long-term, direct or indirect impacts.	<u>Wetlands</u> LSI Similar to Alternative 2 resulting in less than significant long-term, direct or indirect impacts.	<u>Wetlands</u> NI No wetlands are located within or near the project area.
AIR QUALITY				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
LSI Construction phase increase in emissions would be below the impact significance threshold of 250 tpy. The annual on-site and off-site PM emission levels would be much less than the worst-case alternative (Alternative A), for which a hot-spot impact modeling was conducted. PM impacts from Alternative 1 would be much less than Alternative A	LSI Similar to Alternative 1, with the exception of the proposed site location. The predicted construction activity annual emissions would be the same as Alternative 1, and the hot-spot impacts during construction would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI Similar to Alternative 1, with the exception of the proposed site location. The predicted construction activity annual emissions would be the same as Alternative 1, and the hot-spot impacts during construction would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI Similar to Alternative 1, with the exception of the proposed site location. The predicted construction activity annual emissions would be the same as Alternative 1, and the hot-spot impacts during construction would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI Similar to Alternative 1, with the exception of the proposed site location. The predicted construction activity annual emissions would be the same as Alternative 1, and the hot-spot impacts during construction would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
and would be result in less than significant, direct, short-term PM impacts during construction.				
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
LSI The on-road vehicle emissions under Alternative 1 would be substantially less than either of the modeled worst-case alternatives (Alternatives A and D). On-road hot-spot impacts during operation of Alternative 1 would result in less than significant, direct, long-term hot-spot air quality impacts.	LSI The hot-spot impacts during operation would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI The hot-spot impacts during operation would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI The hot-spot impacts during operation would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.	LSI The hot-spot impacts during operation would be similar to Alternative 1, resulting in less than significant short- and long-term hot spot air quality impacts.
NOISE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
LSI Graders and scrapers would be approximately 67 decibels (dB) at the nearest receptor. Construction would be short-term and noise would not exceed construction noise level standards. The direct, short-term noise impacts would be less than significant.	NI Construction activities would be in an unpopulated area of Guam, and construction areas would be at least one mile (1.6 kilometers) away from the nearest receptors.	NI Construction activities would be in an unpopulated area of Guam, and construction areas would be approximately 0.25 mile (0.4 kilometers) away from the nearest receptors.	NI Construction activities would be in an unpopulated area of Guam, and construction areas would be approximately 0.25 mile (0.4 kilometers) away from the nearest receptors.	NI Construction activities would be within the NWF at AAFB, and away from any sensitive receptors.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
SI-M Noise levels would exceed land use guidance and create a direct, long-term, significant impact from the sound exposure to nearby residences. An estimated 88 people (22 homes) would be affected in Noise Zone 2 (65-74 dB) and no people would be affected in Zone 3 (greater than 75 dB).	NI Noise levels would not create a significant sound exposure because no residential areas are within Noise Zones 1, 2, or 3. No homes, residents, or other sensitive receptors would be affected. There would be no impacts from the HG Range, for the same reason as Alternative 1.	NI Noise levels would not create a significant sound exposure because no residential areas are within Noise Zones 2 or 3. Approximately 70-80 homes along Route 12 would experience noise levels between 55-60 dB, and 100 homes in Agat near the Pagachao Guam House and Urban Renewal Authority Housing Area would experience noise levels	NI Similar to Alternatives 2 and 3 combined. No houses lie within the Zone 2 or 3 noise contours, and the same number of homes fall within the 55-68 dB noise range as in Alternative 3. There would be no impacts from the HG Range, for the same reason as Alternative 1.	NI Similar to Alternative 2, no homes, residents, or sensitive receptors would be within Noise Zones 2 or 3, and there are only uninhabited homes near Jinapsan Beach, under Noise Zone 1. There would be no impacts from the HG Range, for the same reason as Alternative 1.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>Alternative 1 is the only alternative that would result in potentially significant impacts.</p> <p>Potential Mitigation Measures Using sound berms and foliage can reduce the levels to below significance. If this alternative is chosen for implementation, a detailed noise reduction plan would be developed to reduce impacts to below significance levels.</p> <p><i>NI</i> No residents would be affected by the noise from the HG Range, because all of the HG Range noise contours remain within Andersen South.</p>		<p>between 55-68 dB; however, noise exposure at this level is considered compatible for residential use, and the actual noise may be reduced due to existing topography and vegetation.</p> <p>There would be no impacts from the HG Range, for the same reason as Alternative 1.</p>		
AIRSPACE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><i>NI</i> No changes to airspace would occur as a result of construction activities, and construction activities would not be expected to conflict or interfere with the use or management of existing airspace; therefore, there would be no impacts to airspace.</p>	<p><i>NI</i> Same as Alternative 1.</p>	<p><i>NI</i> Same as Alternative 1.</p>	<p><i>NI</i> Same as Alternative 1.</p>	<p><i>NI</i> Same as Alternative 1.</p>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p><u>Civilian Air Traffic</u> SI-M Operational activities have the potential for significant impacts to civilian aviation; however, if this alternative is selected potential impacts and</p>	<p><u>Civilian Air Traffic</u> SI-M Operational activities have the potential for significant impacts to civilian aviation. Studies identified potential issues to aviation within the following:</p>	<p><u>Civilian Air Traffic</u> SI-M Operational activities have the potential for significant impacts to civilian aviation. Studies identified potential issues to aviation within the following:</p>	<p><u>Civilian Air Traffic</u> SI-M Operational activities have the potential for significant impacts to civilian aviation. Studies identified potential issues to aviation within the following:</p>	<p><u>Civilian Air Traffic</u> LSI Alternative 5 is more removed from Guam International airspace than Alternatives 1-4 and based on FAA's review and the OPNAV assessment, this</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>mitigation would be further studied through the DON/FAA/Air Force consultation process. Studies identified potential issues to aviation within the following: Guam International airspace and instrument approach procedures, Standard Instrument Departures and Standard Terminal Arrivals, IFR/VFR traffic flows and terminal operations, known but uncharted high volume routes, existing SUA/Terminal Radar Service Area, and VFR Reporting Points.</p> <p><u>Military Air Traffic</u> No impact.</p> <p><u>Summary</u> Operational impacts under Alternative 1 would be the same as Alternatives 2, 3, and 4; and greater than Alternative 5.</p> <p>Potential Mitigation Measures The general types of mitigation measures that could be employed may include adjusting airspace through FAA coordination. However, no specific mitigation measures are proposed at this time.</p>	<p>Guam International airspace and instrument approach procedures, Standard Instrument Departures and Standard Terminal Arrivals, IFR/VFR traffic flows and terminal operations. However, if this alternative is selected, potential impacts and mitigation would be further studied through the DON/FAA/Air Force consultation process.</p> <p><u>Military Air Traffic</u> No impact.</p> <p><u>Summary</u> Operational impacts under Alternative 2 would be the same as Alternatives 1, 3, and 4; and greater than Alternative 5.</p> <p>Potential Mitigation Measures Same as Alternative 1.</p>	<p>Guam International airspace and instrument approach procedures, Standard Instrument Departures and Standard Terminal Arrivals, IFR/VFR traffic flows and terminal operations. However, if this alternative is selected, potential impacts and mitigation would be further studied through the DON/FAA/Air Force consultation process.</p> <p><u>Military Air Traffic</u> No impact.</p> <p><u>Summary</u> Operational impacts under Alternative 3 would be the same as Alternatives 1, 2, and 4; and greater than Alternative 5.</p> <p>Potential Mitigation Measures Same as Alternative 1.</p>	<p>Guam International airspace and instrument approach procedures, Standard Instrument Departures and Standard Terminal Arrivals, IFR/VFR traffic flows and terminal operations. However, if this alternative is selected, potential impacts and mitigation would be further studied through the DON/FAA/Air Force consultation process.</p> <p><u>Military Air Traffic</u> No impact.</p> <p><u>Summary</u> Operational impacts under Alternative 4 would be the same as Alternatives 1, 2, and 3; and greater than Alternative 5.</p> <p>Potential Mitigation Measures Same as Alternative 1.</p>	<p>alternative would have less than significant impacts to civilian aviation and the national airspace system.</p> <p><u>Military Air Traffic</u> Alternative 5 would have potentially significant impacts to military air operations in and around Andersen AFB that require deconfliction.</p> <p><u>Summary</u> Operational impacts under Alternative 5 would be the least of all alternatives but some mitigation would still be required.</p> <p>Potential Mitigation Measures Same as Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

<i>Route 15 (Alternative 1)</i>	<i>NAVMAG East/West (Alternative 2)</i>	<i>NAVMAG North/South (Alternative 3)</i>	<i>NAVMAG L-Shaped (Alternative 4)</i>	<i>NWF (Alternative 5)</i>
LAND AND SUBMERGED LAND USE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>NI</i> All changes in land use are considered long-term operational impacts.	<i>NI</i> Same as Alternative 1.	<i>NI</i> Same as Alternative 1.	<i>NI</i> Same as Alternative 1.	<i>NI</i> Same as Alternative 1.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Loss of Valued Use</u> <i>SI</i> Long-term direct impact from loss of a unique community-valued land use, the Guam International Raceway. An existing quarry within the proposed LFTRC would be precluded from continuing operations resulting in a long-term impact to an existing land use. Alternative 1 would have the same level of impacts due to loss of valued lands as Alternatives 2, 4, and 5. Potential Mitigation Measures The CLTC license that allows the raceway to operate at the present location expires in 2018. It is unknown if the raceway or quarry operations license would be renewed irrespective of the proposed action, no potential mitigation measure has been identified.	<u>Loss of Valued Use</u> <i>SI</i> Direct and long-term impact from restricted access to a portion of the Bolanos Conservation Area. Alternative 2 would have the same level of impacts due to loss of valued lands as Alternatives 1 and 4. Potential Mitigation Measures DoD may work with GovGuam to develop a plan to balance the loss of conservation land use and access with the operational needs and public safety concerns.	<u>Loss of Valued Use</u> <i>NI</i> No loss of a land use valued by the community. <i>LSI</i> Indirect, long-term, less than significant impact to agricultural lands, because there are no prime farmlands within the acquisition area, and less than 1% of the total important farmlands on Guam are within the acquisition area. Additionally, farmlands identified within the area are not currently in agricultural use.	<u>Loss of Valued Use</u> <i>SI</i> Similar to Alternative 2, there would be a direct and long-term impact from restricted access to a portion of the Bolanos Conservation Area. Alternative 4 would have the same level of impacts due to loss of valued lands as Alternatives 1 and 2. Potential Mitigation Measures Same as Alternative 2.	<u>Loss of Valued Use</u> <i>NI</i> The land use within the Ritidian Unit of the NWR encumbered by SDZs would remain Conservation.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<i>LSI</i> Direct, long-term, less than significant impact due to loss of subsistence farming acreage in an area that is not designated for agriculture.	<i>LSI</i> Indirect, long-term, less than significant impact due to loss of prime and important farmlands identified within the area, but not currently in agricultural use.		<i>LSI</i> Indirect, long-term, less than significant impact due to loss of prime and important farmlands identified within the area, but not currently in agricultural use.	<i>NI</i> No impact to agricultural lands.
<u>Public Access</u> <i>SI</i> Long-term impact from new public access restrictions on GovGuam submerged lands. DoD would provide access to submerged lands to the extent possible. Potential Mitigation Measures No mitigation measures have been identified that would reduce the significance of this impact to a less than significant level.	<u>Public Access</u> <i>SI-M</i> Long-term loss of access to the portion of the Bolanos Conservation Area within the acquisition area. Potential Mitigation Measures DoD may work with GovGuam to develop a plan to balance the loss of conservation land use and access with the operational needs and public safety concerns.	<u>Public Access</u> <i>NI</i> No long-term impact related to access to Mount Lamlam or Mount Jumullong.	<u>Public Access</u> <i>SI-M</i> Similar to Alternative 2, there would be a long-term loss of access to the portion of the Bolanos Conservation Area within the acquisition area. Potential Mitigation Measures Same as Alternative 2.	<u>Public Access</u> <i>SI</i> Although the land and submerged land use within the Ritidian Unit of the NWR would remain as Conservation land use, there would be access restrictions to the land and submerged lands within the SDZs. Such restrictions would be limited to the minimum SDZ area and period of use required for the LFTRC. Access to non-NWR submerged lands under the custody and control of the DON would be similarly restricted. The DON would coordinate with the USFWS to ensure that the portion of the SDZ overlaying the Ritidian Unit is compatible with the purposes of the NWR.
<i>NI</i> No impact on access to the Pâgat Trail and related cultural sites.	<i>NI</i> No additional public access restrictions on public access to Mount Lamlam or Mount Jumullong.		<i>NI</i> No additional public access restrictions on public access to Mount Lamlam or Mount Jumullong.	
<u>Compatibility with Current and Future Use</u> <i>SI</i> There would be short- and long-term direct and indirect impacts from the LFTRC land use being incompatible with existing and future residential land uses within the noise Zone 2 and 3 contours. There would be a direct, short- and long-term significant impact	<u>Compatibility with Current and Future Use</u> <i>LSI</i> Long-term compatibility issues within NAVMAG regarding existing and planned land uses would be resolved through the implementation of installation master planning guidelines. <i>LSI/BI</i> The proposed access road increases public access to remote areas, so	<u>Compatibility with Current and Future Use</u> <i>LSI</i> Indirect, long-term impact from loss of designated important farmland. Land is not currently in agricultural use. <i>LSI</i> Long-term compatibility issues within NAVMAG regarding	<u>Compatibility with Current and Future Use</u> <i>LSI to NI</i> Similar to Alternative 3, with regard to agricultural lands, long-term compatibility issues, and the HG Range noise contours. <i>LSI/BI</i> The proposed access road increases public access to remote	<u>Compatibility with Current and Future Use</u> <i>NI</i> The LFTRC noise Zone 2 would extend slightly into private property but there would be no impact to land use. The HG Range noise Zone 2 and 3 contours would not extend off-base. No new utility or access road

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>associated with new restrictions on public access to the coastal and submerged lands encumbered by the SDZs generated by LFTRC operations.</p> <p>The significance of land use impacts resulting from implementation of Alternative 1 would be similar to that of Alternatives 2, 4 and 5; Alternative 3 is the only LFTRC alternative with no significant impact land use impact.</p> <p>Potential Mitigation Measures Non-DoD action, including GovGuam updates to future community land use plans to address proposed DoD land uses.</p> <p>DoD coordination with GovGuam on military noise and hazard area information derived from Joint Land Use Studies or Range/AICUZ plans or other studies to inform future GovGuam zoning or land use decisions and minimize the potential for incompatible public or private development near military installations.</p> <p>A detailed noise reduction plan would be prepared that would address impacts to exiting land uses.</p>	<p>could be perceived as beneficial or adverse direct and long-term impact on adjacent land uses.</p> <p>NI The HG Range noise Zone 2 and 3 contours would not extend off-base, so would not impact existing or proposed residential land uses.</p> <p>LFTRC noise levels would be compatible with surrounding designated Agriculture land use.</p>	<p>existing and planned land uses would be resolved in SEIS master planning processes.</p> <p>NI The HG Range noise Zone 2 and 3 contours would not extend off-base. LFTRC Zone 3 contours would not extend off-base. Zone 2 noise contours would extend off-base and would be compatible with surrounding designated Agriculture land use.</p> <p>No new utility or access road easements would be acquired.</p>	<p>areas could be perceived as beneficial or adverse direct and long-term impact on adjacent land uses.</p>	<p>easements would be acquired.</p> <p>No impact from relocation of NWR and USFWS administrative facilities, visitor center and associated access roads.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>LSI Any compatibility issues from the HG Range, regarding existing and planned land uses, would be resolved through application of installation master planning guidelines and land use impacts to Andersen South would be indirect, short-term, and less than significant.</p> <p>Impacts to farming would be direct and long-term but less than significant, because the planned acquisition area does not include agricultural land uses.</p> <p>NI The HG Range noise Zone 2 and 3 contours would not extend off-base, so would not impact existing or proposed residential areas.</p> <p>No new utility or access road easements would be acquired.</p> <p>There would be no land use impact on the Pacific International quarry land use.</p>				
RECREATIONAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p>SI Direct long-term impact from permanent closure of the Guam International Raceway.</p> <p>Alternative 1 would have the most substantial impacts to</p>	<p>LSI Short-term, direct impacts from slowed access to recreational resources due to use of public roads by construction vehicles.</p>	<p>LSI Similar to Alternative 2.</p>	<p>LSI Similar to Alternative 2.</p>	<p>LSI Construction-related vehicles travelling along Route 3A would potentially cause a less than significant adverse impact due to traffic congestion and delays to persons attempting to gain access</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>recreational resources, compared to the other LFTRC alternatives.</p> <p>Potential Mitigation Measures The CLTC license that allows the raceway to operate at the present location expires in 2018. Since it is unknown if the license would be renewed irrespective of the proposed action, no mitigation measure has been identified.</p> <p>LSI Short-term direct impact from slowed access to recreational resources with use of public roads by construction vehicles.</p>				<p>to the Ritidian Unit.</p> <p>NI The Guam NWR Nature Center would be replaced at a location outside the SDZs prior to the construction of the LFTRC. The existing center would be utilized until the new center becomes operational. This would ensure uninterrupted visitor use of the center during the construction period, and yield no direct or indirect adverse impacts to recreational resources.</p>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p>SI Direct and long-term impact from the loss of a unique community-valued recreational resource, the Guam International Raceway.</p> <p>Potential Mitigation Measures No mitigation measures have been identified.</p> <p>SI Direct and long-term impact from SDZs extending over the Pāgat Point cultural site, impeding the public's access to this archaeological area during Marine Corps training.</p>	<p>LSI There are no identified recreational resources in those areas that would be directly or indirectly affected by land acquisition.</p>	<p>LSI There are no identified recreational resources in those areas that would be directly or indirectly affected by land acquisition.</p>	<p>LSI Recreational resources directly affected by the SDZs include Mount Alifan Unit, Japanese Lookout, Almagosa Springs, and Dobo Springs within the NAVMAG property. However, there are fewer recreational resources within the area to be acquired, leading to a direct and long-term but less than significant impact.</p> <p>LSI Potential indirect, long-term, less than significant impacts from firing range noise on recreational resources in the area.</p>	<p>LSI Long-term direct impacts from restricted access to popular dive spots and fishing zones for the public when ranges are being used. There would be limitations on access to hiking and cave exploring as well. Access to these areas would be restricted during operation of the LFTRC. However, the DON would coordinate with USFWS to ensure that access restrictions to the Ritidian Unit of the Guam NWR are consistent with the purposes for which the Unit was established. Access to the Ritidian Unit during those periods when the ranges are not in use is</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><i>Potential Mitigation Measures</i> <i>No mitigation measures have been identified.</i></p> <p><i>NI</i> Pâgat Village, Cave, and Trail would not be impacted.</p>				<p>a matter under the management authority of the USFWS. Recreational boat users would have to halt boat use during training periods, or travel around the composite SDZ.</p>
TERRESTRIAL BIOLOGICAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><u>Vegetation</u> SI-M Conversion of 255 acres (103 ha) of limestone forest to developed area, which is the greatest of all alternatives.</p> <p><i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 255 acres (103 ha) of limestone forest.</p>	<p><u>Vegetation</u> LSI Conversion of 19 acres (8 ha) of limestone forest and 39 acres (16 ha) of ravine forest to developed area.</p>	<p><u>Vegetation</u> SI-M Conversion of 169 acres (68 ha) of limestone forest and 13 acres (5 ha) of ravine forest to developed area.</p> <p><i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 169 acres (68 ha) of limestone forest.</p>	<p><u>Vegetation</u> SI-M Conversion of 131 acres (53 ha) of limestone forest and 62 acres (25 ha) of ravine forest to developed area.</p> <p><i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 193 acres (78 ha) of limestone forest.</p>	<p><u>Vegetation</u> SI-M Conversion of 201 acres (82 ha) of limestone forest to developed area.</p> <p><i>Potential Mitigation Measures</i> Forest enhancement on a minimum of 201 acres (82 ha) of limestone forest.</p>
<p><u>Terrestrial Conservation Areas</u> NI None present</p>	<p><u>Terrestrial Conservation Areas</u> NI Overlay Refuge, Bolanos Conservation Area – no ground-disturbing activities; only SDZs overlap Overlay Refuge lands and Bolanos Conservation Area. Implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Terrestrial Conservation Areas</u> SI-M Conversion of 275 acres (111 ha) of Overlay Refuge lands to developed area.</p> <p><i>Potential Mitigation Measures</i></p> <ul style="list-style-type: none"> • Submit a proposal to designate an ERA on NAVMAG. • Expansion of Orote Peninsula ERA. 	<p><u>Terrestrial Conservation Areas</u> SI-M Conversion of 219 acres (88 ha) of Overlay Refuge lands to developed area.</p> <p><i>Potential Mitigation Measures</i></p> <ul style="list-style-type: none"> • Submit a proposal to designate an ERA on NAVMAG. • Expansion of Orote Peninsula ERA. 	<p><u>Terrestrial Conservation Areas</u> SI-M Conversion of 255 acres (103 ha) of Overlay Refuge lands to developed area.</p> <p><i>Potential Mitigation Measures</i></p> <ul style="list-style-type: none"> • Submit a proposal to designate an ERA on NAVMAG. • Expansion of Orote Peninsula ERA.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
				<i>LSI</i> Relocation of ESA-required mitigation measure from previous AAFB action (ungulate fence).
<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 302 acres (122 ha) of potential wildlife habitat. Wildlife currently present is widespread on Guam. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 335 acres (136 ha) of potential wildlife habitat. Wildlife currently present is widespread on Guam. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 286 acres (116 ha) of potential wildlife habitat. Wildlife currently present is widespread on Guam. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 391 acres (158 ha) of potential wildlife habitat. Wildlife currently present is widespread on Guam. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during construction activities is considered unlikely.	<u>Native Wildlife</u> <i>LSI</i> Direct impacts to 245 acres (99 ha) of potential wildlife habitat. Wildlife currently present is widespread on Guam. With implementation of BMPs, potential introduction of new or spread of existing non-native species on Guam during construction activities is considered unlikely.
<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Guam rail – impacts to 283 acres (115 ha) of rail recovery habitat. Potential Mitigation Measures <ul style="list-style-type: none"> • Forest enhancement on a minimum of 255 acres (103 ha) of limestone forest. • Brown treesnake research and suppression. 	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>LSI</i> Mariana fruit bat – impacts to 43 acres (17 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana crow – impacts to 43 acres (17 ha) of crow recovery habitat; implementation of BMPs would avoid and minimize impacts. Guam rail – impacts to 49 acres (20 ha) of rail recovery habitat; implementation of BMPs would avoid and minimize impacts. Guam Micronesian kingfisher – impacts to 43 acres (17 ha) of kingfisher recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana swiftlet – noise levels	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 223 acres (90 ha) of fruit bat recovery habitat. Mariana crow – impacts to 230 acres (93 ha) of crow recovery habitat. Guam Micronesian kingfisher – impacts to 223 acres (90 ha) of kingfisher recovery habitat. Potential Mitigation Measures <ul style="list-style-type: none"> • Forest enhancement on a minimum of 169 acres (68 ha) of limestone forest. • Brown treesnake research and suppression. Mariana common moorhen – loss of two wetlands used by moorhens.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> <i>SI-M</i> Mariana fruit bat – impacts to 161 acres (65 ha) of fruit bat recovery habitat. Mariana crow – impacts to 166 acres (67 ha) of crow recovery habitat. Guam Micronesian kingfisher – impacts to 161 acres (65 ha) of kingfisher recovery habitat. Potential Mitigation Measures <ul style="list-style-type: none"> • Forest enhancement on a minimum of 193 acres (78 ha) of limestone forest. • Brown treesnake research and suppression. 	<u>Special-Status Species – Federal ESA-Listed and Candidate Species and Critical Habitat</u> <i>SI-M</i> Mariana fruit bat – impacts to 196 acres (79 ha) of fruit bat recovery habitat. Mariana crow – impacts to 196 acres (79 ha) of crow recovery habitat. Guam Micronesian kingfisher – impacts to 196 acres (79 ha) of kingfisher recovery habitat. Potential Mitigation Measures <ul style="list-style-type: none"> • Forest enhancement on a minimum of 201 acres (82 ha) of limestone forest. • Brown treesnake research and suppression.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
	<p>within the immediate vicinity of proposed construction activities would be localized and temporary; construction activities would not impact swiftlet nesting/roosting caves approximately 2 miles north. <i>Serianthes</i> tree – impacts to 18 acres (7 ha) of <i>Serianthes</i> recovery habitat; implementation of BMPs would avoid and minimize impacts.</p> <p>NI Mariana common moorhen – species is not present as no suitable open water habitat.</p>	<p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • Moorhen Habitat Wetland Restoration. The DON may implement wetland restoration in accordance with the recommendations provided in the 2014 Wetland Restoration Feasibility Study. 		
<p>LSI Mariana fruit bat – impacts to 81 acres (33 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana crow – impacts to 81 acres (33 ha) of crow recovery habitat; implementation of BMPs would avoid and minimize impacts. Guam Micronesian kingfisher – impacts to 81 acres (33 ha) of kingfisher recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana eight-spot butterfly – implementation of BMPs would avoid and minimize impacts. <i>Serianthes</i> tree – impacts to to 67 acres (27 ha) of <i>Serianthes</i> recovery habitat; implementation of BMPs would avoid and minimize impacts.</p>		<p>LSI Guam rail – impacts to 24 acres (10 ha) of rail recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana swiftlet – noise levels within the immediate vicinity of proposed construction activities would be localized and temporary; construction activities would not impact swiftlet nesting/roosting caves approximately 1 mile east. Mariana eight-spot butterfly – implementation of BMPs would avoid and minimize impacts to butterflies and host plants. <i>Serianthes</i> tree – impacts to to 40 acres (16 ha) of <i>Serianthes</i> recovery habitat; implementation of BMPs would avoid and minimize impacts.</p>	<p>LSI Guam rail – impacts to 50 acres (20 ha) of rail recovery habitat. Mariana swiftlet – noise levels within the immediate vicinity of proposed construction activities would be localized and temporary; construction activities would not impact swiftlet nesting/roosting caves approximately 1 mile east and 2 miles north. Mariana common moorhen – loss of one temporary wetland used by moorhens. Mariana eight-spot butterfly – implementation of BMPs would avoid and minimize impacts to butterflies and host plants. <i>Serianthes</i> tree – impacts to to 19 acres (8 ha) of <i>Serianthes</i> recovery habitat; implementation of BMPs would avoid and minimize impacts.</p>	<p>LSI Mariana fruit bat, Mariana crow, Guam Micronesian kingfisher critical habitat – impacts to 12 acres (5 ha) of critical habitat. The remaining 364 acres (147 ha) of critical habitat would remain functional to serve the intended conservation role for the bat, crow and kingfisher. Guam rail– impacts to 40 acres (16 ha) of rail recovery habitat. Mariana eight-spot butterfly – implementation of BMPs would avoid and minimize impacts. <i>Serianthes</i> tree– impacts to to 154 acres (62 ha) of <i>Serianthes</i> recovery habitat; implementation of BMPs, including 100-foot (30-m) buffer around one remaining mature tree at NWF, would avoid and minimize impacts.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>LSI</i> <i>Heritiera longipetiolata</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p>Guam-listed species are also federal ESA-listed – see previous.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>SI-M</i> Pacific slender-toed gecko – impacts to 169 acres (68 ha) suitable habitat.</p> <p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • Forest enhancement on a minimum of 169 acres (68 ha) of limestone forest. • Cat control on a minimum of 169 acres (68 ha) of limestone forest. • Brown treesnake research and suppression. <p><i>LSI</i> <i>Tabernaemontana rotensis</i>, <i>Merrilliodendron megacarpum</i>, <i>Cycas micronesica</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>SI-M</i> Pacific slender-toed gecko – impacts to 131 acres (53 ha) suitable habitat.</p> <p>Potential Mitigation Measures</p> <ul style="list-style-type: none"> • Forest enhancement on a minimum of 131 acres (53 ha) of limestone forest. • Cat control on a minimum of 131 acres (53 ha) of limestone forest. • Brown treesnake research and suppression. <p><i>LSI</i> <i>Tabernaemontana rotensis</i>, <i>Merrilliodendron megacarpum</i>, <i>Cycas micronesica</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u></p> <p><i>LSI</i> <i>Tabernaemontana rotensis</i>, <i>Cycas micronesica</i> – implementation of BMPs would avoid and minimize impacts.</p>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p><u>Vegetation</u></p> <p><i>LSI</i> With implementation of BMPs, range fires and potential introduction of new or spread of existing non-native species on Guam during LFTRC operations is considered unlikely.</p>	<p><u>Vegetation</u></p> <p><i>LSI</i> Same as Alternative 1.</p>	<p><u>Vegetation</u></p> <p><i>LSI</i> Same as Alternative 1.</p>	<p><u>Vegetation</u></p> <p><i>LSI</i> Same as Alternative 1.</p>	<p><u>Vegetation</u></p> <p><i>LSI</i> Same as Alternative 1.</p>
<p><u>Terrestrial Conservation Areas</u></p> <p><i>NI</i> None present</p>	<p><u>Terrestrial Conservation Areas</u></p> <p><i>LSI</i> Overlay Refuge, Bolanos Conservation Area –noise levels within the conservations areas from LFTRC operations would be at or below ambient noise levels;</p>	<p><u>Terrestrial Conservation Areas</u></p> <p><i>LSI</i> Overlay Refuge – no physical disturbance of Overlay Refuge lands; temporary live-fire noise impacts to 2,993 acres (1,211 ha) of Overlay Refuge lands;</p>	<p><u>Terrestrial Conservation Areas</u></p> <p><i>LSI</i> Overlay Refuge – no physical disturbance of Overlay Refuge lands; temporary live-fire noise impacts to 1,525 acres (617 ha) of Overlay Refuge lands;</p>	<p><u>Terrestrial Conservation Areas</u></p> <p><i>LSI</i> Overlay Refuge – no physical disturbance of Overlay Refuge lands; temporary live-fire noise impacts to 1,691 acres (684 ha) of Overlay Refuge lands;</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
	LSI to management or conservation value of conservation areas.	implementation of BMPs would avoid and minimize impacts.	implementation of BMPs would avoid and minimize impacts.	implementation of BMPs would avoid and minimize impacts.
<u>Native Wildlife</u> LSI With implementation of BMPs, potential impacts to wildlife from LFTRC operations would be reduced to less than significant.	<u>Native Wildlife</u> LSI Same as Alternative 1.	<u>Native Wildlife</u> LSI Same as Alternative 1.	<u>Native Wildlife</u> LSI Same as Alternative 1.	<u>Native Wildlife</u> LSI Same as Alternative 1.
<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Mariana fruit bat, Mariana eight-spot butterfly – implementation of BMPs would avoid and minimize impacts.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Mariana fruit bat – no physical disturbance of recovery habitat; temporary live-fire noise impacts to 824 acres (333 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana swiftlet – LFTRC noise levels would not impact foraging swiftlets or swiftlet nesting/roosting caves approximately 2 miles north. Mariana common moorhen – LFTRC noise levels at the closest moorhen nesting area (Fena Reservoir) would be at or below ambient noise levels.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Mariana fruit bat – no physical disturbance of recovery habitat; temporary live-fire noise impacts to 1,534 acres (621 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana swiftlet – LFTRC noise levels would not impact foraging swiftlets or swiftlet nesting/roosting caves approximately 1 mile north. Mariana common moorhen – LFTRC noise levels at the closest moorhen nesting area (Fena Reservoir) would be at or below ambient noise levels. Mariana eight-spot butterfly - implementation of BMPs would avoid and minimize impacts.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Mariana fruit bat – no physical disturbance of recovery habitat; temporary live-fire noise impacts to 1,506 acres (610 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana swiftlet – LFTRC noise levels would not impact foraging swiftlets or swiftlet nesting/roosting caves approximately 1 mile north and 2 miles east. Mariana common moorhen – LFTRC noise levels at the closest moorhen nesting area (Fena Reservoir) would be at or below ambient noise levels. Mariana eight-spot butterfly - implementation of BMPs would avoid and minimize impacts.	<u>Special-Status Species – Federal ESA-Listed and Candidate Species and Critical Habitat</u> LSI Mariana fruit bat – no physical disturbance of recovery habitat; temporary live-fire noise impacts to 1,101 acres (446 ha) of fruit bat recovery habitat; implementation of BMPs would avoid and minimize impacts. Mariana eight-spot butterfly - implementation of BMPs would avoid and minimize impacts.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>NI Mariana crow, Guam rail, Guam Micronesian kingfisher – species no longer occur on Guam, therefore there would be no impacts due to operations of LFTRC.</p> <p><i>Serianthes</i> tree – implementation of BMPs would avoid and minimize impacts.</p>	<p>NI Mariana crow, Guam rail, Guam Micronesian kingfisher – species no longer occur on Guam, therefore there would be no impacts due to operations of LFTRC.</p> <p><i>Serianthes</i> tree – implementation of BMPs would avoid and minimize impacts.</p>	<p>NI Mariana crow, Guam rail, Guam Micronesian kingfisher – species no longer occur on Guam, therefore there would be no impacts due to operations of LFTRC.</p> <p><i>Serianthes</i> tree – implementation of BMPs would avoid and minimize impacts.</p>	<p>NI Mariana crow, Guam rail, Guam Micronesian kingfisher – species no longer occur on Guam, therefore there would be no impacts due to operations of LFTRC.</p> <p><i>Serianthes</i> tree – implementation of BMPs would avoid and minimize impacts.</p>	<p>NI Mariana crow, Guam rail, Guam Micronesian kingfisher – species no longer occur on Guam, therefore there would be no impacts due to operations of LFTRC.</p> <p>Mariana fruit bat, Mariana crow, Guam Micronesian kingfisher critical habitat – No impacts.</p> <p>Mariana eight-spot butterfly– implementation of BMPs would avoid and minimize impacts.</p> <p><i>Serianthes</i> tree – implementation of BMPs would avoid and minimize impacts.</p>
<p><u>Special-Status Species –Guam-Listed and SOGCN</u> LSI <i>Heritiera longipetiolata</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u> Guam-listed species are also federal ESA-listed – see previous.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u> LSI Pacific slender-toed gecko, <i>Tabernaemontana rotensis</i>, <i>Merrilliodendron megacarpum</i>, <i>Cycas micronesica</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u> LSI Pacific slender-toed gecko, <i>Tabernaemontana rotensis</i>, <i>Merrilliodendron megacarpum</i>, <i>Cycas micronesica</i> – implementation of BMPs would avoid and minimize impacts.</p>	<p><u>Special-Status Species –Guam-Listed and SOGCN</u> LSI Mariana eight-spot butterfly, <i>Tabernaemontana rotensis</i>, <i>Cycas micronesica</i>– implementation of BMPs would avoid and minimize impacts.</p>
MARINE BIOLOGICAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><u>Marine Flora, Invertebrates, Fish, and EFH</u> LSI Potential indirect short-term impacts to marine flora, invertebrates, fish and EFH from increased recreational use (damage to reefs typically caused by anchors, reef-walkers, or scuba diving, snorkeling, and fishing)</p>	<p><u>Marine Flora, Invertebrates, Fish, and EFH</u> NI The project site would be located entirely inland. There would be no in-water or coastal components therefore there would be no direct impacts. Stormwater runoff from the project area would not enter nearshore waters, therefore, there would be no</p>	<p><u>Marine Flora, Invertebrates, Fish, and EFH</u> NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters, therefore, there would be no impacts to marine flora,</p>	<p><u>Marine Flora, Invertebrates, Fish, and EFH</u> NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters, therefore, there would be no impacts to marine</p>	<p><u>Marine Flora, Invertebrates, Fish, and EFH</u> LSI The impacts would be similar to Alternative 1.</p> <p>NI The impacts would be similar to Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>activities) would be avoided or minimized to less than significant impacts with the implementation of BMPs.</p> <p>NI There would be no in-water construction or dredging, therefore there would be no direct short-term impacts. Stormwater runoff from the project area would not enter nearshore waters, therefore there would be no short-term impacts to marine flora, invertebrates, fish, and EFH associated with construction runoff.</p>	<p>impacts to marine flora, invertebrates, fish, and EFH associated with construction.</p>	<p>invertebrates, fish, and EFH associated with construction.</p>	<p>flora, invertebrates, fish, and EFH associated with construction.</p>	
<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Green sea turtle, hawksbill sea turtle.</p> <p>Short-term indirect impacts to green sea turtle and hawksbill sea turtle from disturbance resulting from increased activity in the area. Potential indirect impact on special-status species from increased recreational use as mentioned above would be avoided or minimized to less than significant impacts with the implementation of BMPs.</p> <p>NI There would be no in-water construction or dredging;</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> NI The project site would be located entirely inland. There would be no in-water or coastal components therefore there would be no direct impacts. Stormwater runoff from the project area would not enter nearshore waters, therefore there would be no indirect impacts to Special-Status Species – Federal ESA-Listed and Candidate Species.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> NI Same as Alternative 2. Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters. Therefore, impacts would be similar to Alternative 2.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters. Therefore, impacts would be similar to Alternative 2.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u> LSI Short-term indirect impacts would be similar to Alternative 1.</p> <p>NI Impacts would be similar to Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
therefore, there would be no direct impacts to green sea turtles or hawksbill sea turtles associated with construction.				
<u>Marine Conservation Areas</u> NI There are no marine conservation areas at or adjacent to the proposed Route 15 LFTRC alternative. Therefore, there would be no impacts to such areas.	<u>Marine Conservation Areas</u> NI The project site would be located entirely inland. There would be no in water or coastal components; therefore, there would be no direct impacts. Stormwater runoff from the project area would not enter nearshore waters; therefore, there would be no indirect impacts to marine conservation areas.	<u>Marine Conservation Areas</u> NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters.	<u>Marine Conservation Areas</u> NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater runoff from the project area would not enter nearshore waters.	<u>Marine Conservation Areas</u> LSI Construction activities for the NWF alternative are expected to result in less than significant direct and indirect short-term impacts to conservation efforts and management activities at the Guam National Wildlife Refuge – Ritidian Unit with the implementation of BMPs.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Marine Flora and Invertebrates</u> LSI There would be no in-water training. The small number of rounds that could ricochet outside the range and enter the marine environment would have no direct long-term impacts to marine flora and invertebrates. NI Stormwater runoff from the range area would not enter nearshore waters; therefore, there would be no long-term impacts to marine flora and invertebrates associated with range runoff.	<u>Marine Flora and Invertebrates</u> NI The range would be located entirely inland. There would be no in water or coastal operations components; therefore, there would be no direct impacts. Stormwater runoff from the range area would not enter nearshore waters, therefore there would be no indirect impacts to marine flora and invertebrates associated with operations.	<u>Marine Flora and Invertebrates</u> NI The range would be located entirely inland. There would be no in water or coastal operations components; therefore, there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to marine flora and invertebrates.	<u>Marine Flora and Invertebrates</u> NI The range would be located entirely inland. There would be no in water or coastal operations components; therefore, there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to marine flora and invertebrates.	<u>Marine Flora and Invertebrates</u> LSI The impacts would be similar to Alternative 1. NI The impacts would be similar to Alternative 1.
<u>Fish and EFH</u> LSI There would be no in-water training. The minimal number of rounds that could ricochet	<u>Fish and EFH</u> NI The range would be located entirely inland. There would be no in water or coastal operations	<u>Fish and EFH</u> NI The range would be located entirely inland. There would be no in water or coastal operations	<u>Fish and EFH</u> NI The range would be located entirely inland. There would be no in water or coastal operations	<u>Fish and EFH</u> LSI The impacts would be similar to Alternative 1.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>outside the range and enter the marine environment would have a less than significant direct, long-term impacts to fish and EFH.</p> <p>NI Stormwater runoff from the range area would not enter nearshore waters; therefore, there would be no long-term impacts to fish and EFH associated with range runoff.</p>	<p>components therefore there would be no direct impacts. Stormwater runoff from the range area would not enter nearshore waters, therefore there would be no impacts to fish and EFH associated with operations.</p>	<p>components therefore there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to fish and EFH.</p>	<p>components therefore there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to fish and EFH.</p>	<p>NI The impacts would be similar to Alternative 1.</p>
<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>LSI With use of range safety procedures, range lighting design to minimize impacts to special-status species, and implantation of BMPs, direct impacts to green sea turtles and hawksbill sea turtles would be less than significant.</p> <p>NI Stormwater runoff from the range area would not enter nearshore waters; therefore, there would be no long-term impacts to green sea turtles and hawksbill sea turtles from range runoff.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>NI The range would be located entirely inland. There would be no in-water or coastal operations components therefore there would be no direct impacts. Stormwater runoff from the range area would not enter nearshore waters; therefore, there would be no impacts to green sea turtles and hawksbill sea turtles associated with operations.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>NI The range would be located entirely inland. There would be no in-water or coastal operations components therefore there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to green sea turtles and hawksbill sea turtles.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>NI The range would be located entirely inland. There would be no in-water or coastal operations components therefore there would be no direct impacts. Similar to Alternative 2, stormwater runoff from the range area would not enter nearshore waters, thus there would be no indirect impacts to green sea turtles and hawksbill sea turtles.</p>	<p><u>Special-Status Species – Federal ESA-Listed and Candidate Species</u></p> <p>LSI The impacts would be similar to Alternative 1.</p> <p>NI The impacts would be similar to Alternative 1.</p>
<p><u>Marine Conservation Areas</u></p> <p>NI There are no marine conservation areas at or adjacent to the proposed Route 15 LFTRC alternative.</p>	<p><u>Marine Conservation Areas</u></p> <p>NI The project site would be located entirely inland. There would be no in-water or coastal components therefore there would be no direct</p>	<p><u>Marine Conservation Areas</u></p> <p>NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components. Stormwater</p>	<p><u>Marine Conservation Areas</u></p> <p>NI Similar to Alternative 2, the project site would be located entirely inland with no in-water or coastal components.</p>	<p><u>Marine Conservation Areas</u></p> <p>LSI NWF Alternative 5 operational activities would result in less than significant direct and indirect impacts to conservation efforts</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
Therefore, there would be no impacts to such areas.	impacts. Stormwater runoff from the project area would not enter nearshore waters; therefore, there would be no indirect impacts to marine conservation areas.	runoff from the project area would not enter nearshore waters. Therefore there would be no direct or indirect impacts.	Stormwater runoff from the project area would not enter nearshore waters. Therefore there would be no direct or indirect impacts.	and management activities at the Guam NWR – Ritidian Unit with the implementation of BMPs and coordination between USFWS and the DON for current or planned research and conservation programs.
CULTURAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p><i>SI-M</i> Potential direct adverse effects to three historic properties from excavation and soil removal. Potential impacts to culturally important natural resources from vegetation removal.</p> <p>Potential Mitigation Measures Proposed mitigation through 2011 PA process, including development of a Range Mitigation Plan, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.</p>	<p><i>SI-M</i> Potential direct adverse effects to nine historic properties. Potential impacts to culturally important natural resources from vegetation removal.</p> <p>Potential Mitigation Measures Proposed mitigation through 2011 PA process, including development of a Range Mitigation Plan and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.</p>	<p><i>SI-M</i> Potential direct adverse effects to 11 historic properties excavation and soil removal. Undetermined effects to two unevaluated sites and one potential TCP from excavation and soil removal. Potential impacts to culturally important natural resources from vegetation removal.</p> <p>Potential Mitigation Measures Proposed mitigation through 2011 PA process, including development of a Range Mitigation Plan, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.</p>	<p><i>SI-M</i> Potential direct adverse effects to 11 historic properties from excavation and soil removal. Potential impacts to culturally important natural resources from vegetation removal.</p> <p>Potential Mitigation Measures Proposed mitigation through 2011 PA process, including development of a Range Mitigation Plan and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners</p>	<p><i>SI-M</i> Potential direct adverse effects to 20 historic properties. Undetermined effects to one unevaluated site from excavation and soil removal. Potential impacts to culturally important natural resources from vegetation removal.</p> <p>Potential Mitigation Measures Proposed mitigation through 2011 PA process, including development of a Range Mitigation Plan, and coordination with SHPO, concurring parties, and knowledgeable traditional practitioners.</p>
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p><i>SI-M</i> Potential indirect adverse effects to one NRHP-eligible site/potential TCP from changes in use that degrade site integrity. Potential indirect adverse effects to one NRHP-eligible archaeological site/potential TCP from recreational use.</p>	<p><i>SI-M</i> Potential indirect adverse effects to one NRHP-eligible site from changes in use that degrade site integrity. Undetermined effects to three unevaluated sites from changes in use that degrade site integrity. Potential indirect effects to one potential TCP from restricted access.</p>	<p><i>SI-M</i> Potential indirect adverse effects to 25 NRHP-eligible sites and indirect effects to two potential TCPs from changes in use that degrade site integrity. Potential indirect effects to five potential TCPs from restricted access.</p>	<p><i>SI-M</i> Potential indirect adverse effects to 24 historic properties from changes in use that degrade site integrity. Potential indirect effects to four potential TCPs from restricted access. Undetermined effects to five unevaluated sites and two potential TCPs from changes in</p>	<p><i>SI</i> Potential adverse impacts to two NRHP-eligible archaeological sites from restricted access.</p> <p><i>SI-M</i> Potential indirect adverse effects to three NRHP-eligible sites from changes in use that degrade site integrity.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA with implementation of a Range Mitigation Plan, coordination with SHPO and concurring parties, and Cultural Resources Awareness briefs.	<i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA with implementation of a Range Mitigation Plan to include consideration for access and coordination with SHPO and concurring parties.	<i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA with implementation of a Range Mitigation Plan to include consideration for access and coordination with SHPO and concurring parties.	use that degrade site integrity. <i>Potential Mitigation Measures</i> Proposed mitigation through 2011 PA with implementation of a Range Mitigation Plan to include consideration for access and coordination with SHPO and concurring parties.	<i>Potential Mitigation Measures</i> Proposed partial mitigation through 2011 PA with implementation of a Range Mitigation Plan to include consideration for access and coordination with SHPO and concurring parties.
VISUAL RESOURCES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Visual impacts would be direct, short-term, and less than significant.	<i>LSI</i> Same as Alternative 1.	<i>LSI</i> Same as Alternative 1.	<i>LSI</i> Same as Alternative 1.	<i>LSI</i> Same as Alternative 1.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>SI-M</i> While the visual landscape would be substantially altered during the construction phase, Alternative 1 would not result in significant negative visual impacts. Over time, the graded and replanted areas would blend with the surrounding topography and eventually, the surrounding vegetative cover. The realigned Route 15 would traverse the same type of fast-growing scrub forest areas as those bordering the existing road and would produce the same type of visual experience as those from the current route. <i>Potential Mitigation Measures</i> To maintain the existing visual appearance, land clearing and grading should be minimized to the extent	<i>LSI</i> Less than significant direct, long-term impact due to limited scale of proposed development, and a lack of visibility from Mt. Lamlam and Mt. Jumullong Manglo Overlook.	<i>SI</i> Direct, long-term impact from Alternative 3 facilities being visible from Jumullong Manglo Overlook as well as from the trails leading up to the Overlook and near the top of Mount Lamlam. The elevation of both Mount Lamlam (the highest point on Guam) and Jumullong Manglo Overlook could result in the ability to see portions of the 3 miles (5 km) of new roadways, areas of removed vegetation and cut/fill features, earthen berms as well as some of the proposed structures, including some of the 72 relocated ordnance magazines. <i>Potential Mitigation Measures</i> Same as Alternative 1.	<i>SI</i> Direct, long-term impact from Alternative 4 facilities being visible from Jumullong Manglo Overlook as well as from the trails leading up to the Overlook and near the top of Mount Lamlam. The elevation of both Mount Lamlam (the highest point on Guam) and Jumullong Manglo Overlook could result in the ability to see portions of the 1 mile (2 kilometers) of new roadways, areas of removed vegetation and cut/fill features, earthen berms as well as some of the proposed structures including some of the 66 relocated ordnance magazines. <i>Potential Mitigation Measures</i> Same as Alternative 1.	<i>LSI</i> There would be a less than significant long-term direct impact from this alternative due to flat topography, dense vegetation and limited public access for viewing the proposed LFTRC facilities.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

<i>Route 15 (Alternative 1)</i>	<i>NAVMAG East/West (Alternative 2)</i>	<i>NAVMAG North/South (Alternative 3)</i>	<i>NAVMAG L-Shaped (Alternative 4)</i>	<i>NWF (Alternative 5)</i>
possible on lands proposed for range uses. Minimize impact by using native flora to create a natural-appearing “screen” around the cleared range areas, outside of the firebreaks/perimeter roads.				
GROUND TRANSPORTATION				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Short-term, direct impacts from construction workers and construction-related vehicle trips resulting in congestion on on-base roadways. Implementation of appropriate work zone traffic management strategies and BMPs would minimize impacts. Potential direct and indirect impacts to ground transportation resources from construction would be minimized with implementation of appropriate work zone traffic management strategies and BMPs. Therefore, there would be less than significant short-term impacts to on-base (internal) roadways.	<i>LSI</i> Similar to Alternative 1.			
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Internal (range) Roadways</u> <i>NI</i> No impacts to internal roadway segments would occur, because all internal (range) roadway segments would be designed with the capacity required to accommodate the expected travel demand on the facilities.	<u>Internal (range) Roadways</u> <i>NI</i> Similar to Alternative 1.			

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

<i>Route 15 (Alternative 1)</i>	<i>NAVMAG East/West (Alternative 2)</i>	<i>NAVMAG North/South (Alternative 3)</i>	<i>NAVMAG L-Shaped (Alternative 4)</i>	<i>NWF (Alternative 5)</i>
MARINE TRANSPORTATION				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>NI</i> Construction for the project takes place on shore with no in-water or coastal components; therefore, there would be no impacts to marine transportation during construction.	<i>NI</i> LFTRC and associated SDZ do not extend over water used by vessels.	<i>NI</i> Same as Alternative 2.	<i>NI</i> Same as Alternative 2.	<i>NI</i> Similar to Alternative 1, but would likely affect more marine vessels.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Direct impact from full- or part-time closure of the SDZ will exclude vessels from entering. Through the use of live-fire observation, mariner notification, and chart updates to include the SDZ, impacts to marine transportation would be less than significant during operation.	<i>NI</i> LFTRC and associated SDZ do not extend over water used by vessels.	<i>NI</i> Same as Alternative 2.	<i>NI</i> Same as Alternative 2.	<i>LSI</i> Similar to Alternative 1.
UTILITIES				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<i>LSI</i> Users may experience short-term construction outages with electrical power, potable water, wastewater systems, and IT/COMM systems during construction. Advance notice and other measures would minimize impacts. There would be short-term, direct impact to the solid waste handling due to increases of waste during construction.	<i>LSI</i> Short-term, direct impacts to utilities would be similar to that described for Alternative 1.	<i>LSI</i> Short-term, direct impacts to utilities would be similar to that described for Alternative 1.	<i>LSI</i> Short-term, direct impacts to utilities would be similar to that described for Alternative 1.	<i>LSI</i> Short-term, direct impacts to utilities would be similar to that described for Alternative 1.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<i>LSI</i> Increased demand for electrical, potable water, wastewater, solid waste, and IT/COMM utility would be low. Proposed improvements to all utilities have been developed to meet the requirements for the proposed action. Therefore, short- and long-term direct impacts would be less than significant.	<i>LSI</i> Short- and long-term, direct impacts would similar to that described for Alternative 1.	<i>LSI</i> Short- and long-term, direct impacts would similar to that described for Alternative 1.	<i>LSI</i> Short- and long-term, direct impacts would similar to that described for Alternative 1.	<i>LSI</i> Short- and long-term, direct impacts would similar to that described for Alternative 1.
SOCIOECONOMICS AND GENERAL SERVICES				
Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts
<u>Sociocultural Impacts of Land Acquisition</u> <i>LSI</i> None of the lots to be potentially acquired are privately owned. There would be adverse short- and long-term, indirect impacts from a sociocultural perspective due to the potential for the loss of the raceway park. Since groups of people currently use the raceway park for social gatherings, if these gatherings ceased then the related social networks may lose cohesiveness. Feelings of injustice may arise from deterioration of social networks.	<u>Sociocultural Impacts of Land Acquisition</u> <i>LSI</i> Of the 19 lots to potentially be acquired, 17 are known to be privately owned and one lot has unknown ownership, so up to 18 different private parties could be affected. Should condemnation be necessary as a last resort, while the landowner would be made economically whole by payment of fair market value, such an occurrence could represent an adverse long-term sociocultural impact for that individual landowner. Such instances are expected to be extremely rare or nonexistent during implementation of this alternative, and collectively would not represent a significant impact.	<u>Sociocultural Impacts of Land Acquisition</u> <i>LSI</i> Of the 23 lots to potentially be acquired, 4 are known to be privately owned and 17 lots have unknown ownership, so up to 21 different private parties could be affected. It is anticipated that, in all cases, a negotiated sale or lease between the federal government and a willing seller would be arranged, and there would be no adverse sociocultural impact. In the unlikely event that the land was acquired through condemnation, it is possible that the individual landowner would potentially consider the forced sale or lease of property to be an adverse impact (despite being paid fair market value). Such instances are expected to be extremely rare or nonexistent	<u>Sociocultural Impacts of Land Acquisition</u> <i>LSI</i> Of the 30 lots to potentially be acquired, 9 are privately owned and 18 have unknown ownership, so up to 27 different private parties could be affected. It is anticipated that, in all cases, a negotiated sale or lease between the federal government and a willing seller would be arranged, and there would be no adverse sociocultural impact. In the unlikely event that the land was acquired through condemnation, it is possible that the individual landowner would potentially consider the forced sale or lease of property to be an adverse impact (despite being paid fair market value). Such instances are expected to be extremely rare or nonexistent during	<u>Sociocultural Impacts of Land Acquisition</u> <i>LSI</i> Alternative 5 would not require federal land acquisition. There would be long-term indirect sociocultural impacts from restricted access due to the potential that access restrictions will deteriorate social networks; i.e. if groups of people currently (or traditionally) use areas that would be restricted to hold social gatherings, then the access restrictions could impact those groups by deteriorating the social networks inherent in those groups. Also, as social networks may deteriorate due to the access restrictions, feelings of injustice may arise. While there is potential for social networks to deteriorate, it is not a certainty. Given the presence of

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
		during implementation of this alternative, and collectively would not represent a significant impact.	implementation of this alternative, and collectively would not represent a significant impact.	other public recreation areas nearby, potential impacts are determined to be less than significant.
<u>Economic Impacts of Land Acquisition</u> LSI There would be a direct reduction in revenue to GovGuam of \$472,000 over the 2015-2018 period resulting in lost license/lease revenue from the Guam International Raceway and the coral quarry. However, because the land acquisition process would compensate for highest and best use, there would be no impact to GovGuam associated with this loss of revenue.	<u>Economic Impacts of Land Acquisition</u> LSI There would be a reduction of 33 acres (13 ha) of prime farmlands, leading to a potential reduction of up to \$263,500/year in property tax revenue and resulting in an adverse but less than significant impact. However, the 360 acres (146 ha) of GovGuam land subject to acquisition are not currently generating income, so a sale or lease of those lands would generate a small beneficial direct economic effect.	<u>Economic Impacts of Land Acquisition</u> LSI There could be a potential reduction of up to \$27,436/year in property tax revenue from acquisition of privately owned parcels. However, the 360 acres (146 ha) of GovGuam land subject to acquisition are not currently generating income, so a sale or lease of those lands would generate a small beneficial direct economic effect.	<u>Economic Impacts of Land Acquisition</u> LSI There could be a potential reduction of up to \$122,000/year in property tax revenue from acquisition of privately owned parcels. However, the 205 acres (83 ha) of GovGuam land subject to acquisition are not currently generating income, so a sale or lease of those lands would generate a small beneficial direct economic effect.	<u>Economic Impacts of Land Acquisition</u> NI Alternative 5 would not involve acquisition of non-federal land and would therefore have no economic impact relative to land acquisition.
HAZARDOUS MATERIALS AND WASTE				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<u>Hazardous Materials and Hazardous Waste Management</u> LSI Less than significant, direct, short-term increase in the use, transport, storage and handling of hazardous materials and hazardous waste during construction. Use of BMPs and SOPs to minimize potential for accidental releases and implement timely cleanup would reduce impacts to a less than significant level.	<u>Hazardous Materials and Hazardous Waste Management</u> LSI Range construction activities for Alternative 2 would be similar to those for Alternative 1. Construction of Alternative 2 Ranges would use similar types and volumes of hazardous materials and would generate similar volumes of hazardous wastes. Use of BMPs and SOPs to minimize potential for accidental releases and implement timely cleanup would reduce impacts to a less than significant level.	<u>Hazardous Materials and Hazardous Waste Management</u> LSI Range construction activities for Alternative 3 would be similar to those for Alternative 1. Construction of Alternative 3 Ranges would use similar types and volumes of hazardous materials and would generate similar volumes of hazardous wastes. Use of BMPs and SOPs to minimize potential for accidental releases and implement timely cleanup would reduce impacts to a less than significant level.	<u>Hazardous Materials and Hazardous Waste Management</u> LSI Range construction activities for Alternative 4 would be similar to those for Alternative 1. Construction of Alternative 4 Ranges and would use similar types volumes of hazardous materials and would generate similar volumes of hazardous wastes. Use of BMPs and SOPs to minimize potential for accidental releases and implement timely cleanup would reduce impacts to a less than significant level.	<u>Hazardous Materials and Hazardous Waste Management</u> LSI Range construction activities for Alternative 5 would be similar to those for Alternative 1. Construction of Alternative 5 Ranges would use similar types and volumes of hazardous materials and would generate similar volumes of hazardous wastes. Use of BMPs and SOPs to minimize potential for accidental releases and implement timely cleanup would reduce impacts to a less than significant level.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> NI There are no contaminated sites in the proposed Alternative 2 site area; therefore, there would be no impacts.</p>	<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> LSI There are two IRP and five potentially contaminated sites within the proposed development footprint. Contaminated sites would be avoided to the maximum extent practicable. If avoidance is not possible, active sites would be appropriately remediated in accordance with CERCLA prior to construction activities. No Further Action sites would be developed in accordance with land use controls, if any.</p>
<p><u>Toxic Substances</u> LSI Suspected LBP, ACM, and PCBs in existing structures on the Alternative 1 site would be properly surveyed, managed, and materials disposed of in accordance with existing laws and regulations. No LBP, ACM, and PCBs would be used in new construction. Because the Alternative 1 site is located in a USEPA Radon Zone 1, it is possible that new buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and mitigation systems would be incorporated into the building/facility designs. In addition, DoD would periodically test facilities constructed in known radon</p>	<p><u>Toxic Substances</u> NI There are no structures in the Alternative 2 site, so no LBP, ACM, or PCBs would be present to be encountered during demolition. No such materials would be used in the new construction. Therefore, there would be no direct or indirect impacts. The site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no radon toxic substances impacts with construction of Alternative 2.</p>	<p><u>Toxic Substances</u> LSI There are existing structures on the Alternative 3 site, so suspected LBP, ACM, and PCBs would be properly surveyed, managed, and materials disposed of in accordance with existing laws and regulations. No LBP, ACM, and PCBs would be used in new construction. Therefore, impacts would be less than significant. NI The Alternative 3 site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no radon toxic substances impacts with construction of Alternative 3</p>	<p><u>Toxic Substances</u> LSI There are existing structures on the Alternative 4 site, so suspected LBP, ACM, and PCBs would be properly surveyed, managed, and materials disposed of in accordance with existing laws and regulations. No LBP, ACM, and PCBs would be used in new construction. Therefore, impacts would be less than significant. NI The Alternative 4 site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no radon toxic substances impacts with construction of Alternative 3</p>	<p><u>Toxic Substances</u> LSI There are existing structures on the Alternative 5 site, so potential LBP, ACM, and PCBs would be properly surveyed, managed, and materials disposed of in accordance with existing laws and regulations. No LBP, ACM, and PCBs would be used in new construction. Therefore, impacts would be less than significant. Because the Alternative 5 site is located in a USEPA Radon Zone 1, it is possible that new buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and mitigation systems would be incorporated into the building/facility designs. In</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
zones to verify that no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate.				addition, DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate.
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<u>Hazardous Materials Management</u> LSI A direct, long-term increase in hazardous materials use volume of 640 pounds (290 kilograms) per year is anticipated. Range clearance, erosion control measures, and BMPs would minimize runoff from munitions and explosives of concern and reduce impacts to a less than significant level.	<u>Hazardous Materials Management</u> LSI The range operations for Alternative 2 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous materials used would be similar to Alternative 1. The same range clearance and erosion control measures and BMPs would be used to reduce impacts to a less than significant level.	<u>Hazardous Materials Management</u> LSI The range operations for Alternative 3 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous materials used would be similar to Alternative 1. The same range clearance and erosion control measures and BMPs would be used to reduce impacts to a less than significant level.	<u>Hazardous Materials Management</u> LSI The range operations for Alternative 4 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous materials used would be similar to Alternative 1. The same range clearance and erosion control measures and BMPs would be used to reduce impacts to a less than significant level.	<u>Hazardous Materials Management</u> LSI The range operations for Alternative 5 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous materials used would be similar to Alternative 1. The same range clearance and erosion control measures and BMPs would be used to reduce impacts to a less than significant level.
<u>Hazardous Waste Management</u> LSI A direct long-term increase in hazardous waste volume of 12,880 pounds (5,842 kilograms) per year is anticipated. Satellite hazardous waste accumulation sites would be created on DoD property, and managed in accordance with applicable regulations, therefore, impacts would be less than significant.	<u>Hazardous Waste Management</u> LSI The range operations for Alternative 2 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous waste generated would be similar to Alternative 1. As with Alternative 1, satellite hazardous waste accumulation sites would be created on DoD property, and managed in accordance with applicable regulations, therefore, impacts would be less than significant.	<u>Hazardous Waste Management</u> LSI The range operations for Alternative 3 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous waste generated would be similar to Alternative 1. As with Alternative 1, satellite hazardous waste accumulation sites would be created on DoD property, and managed in accordance with applicable regulations, therefore, impacts would be less than significant.	<u>Hazardous Waste Management</u> LSI The range operations for Alternative 4 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous waste generated would be similar to Alternative 1. As with Alternative 1, satellite hazardous waste accumulation sites would be created on DoD property, and managed in accordance with applicable regulations, therefore, impacts would be less than significant.	<u>Hazardous Waste Management</u> LSI The range operations for Alternative 5 would be similar to Alternative 1; therefore, the long-term increase in volume of hazardous waste generated would be similar to Alternative 1. As with Alternative 1, satellite hazardous waste accumulation sites would be created on DoD property, and managed in accordance with applicable regulations, therefore, impacts would be less than significant.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> NI There are no contaminated sites in the proposed Alternative 2 site area; therefore, there would be no impacts.</p>	<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> NI Contaminated sites were determined to either be outside of the proposed construction area and would have no direct or indirect impact on site conditions, or have been investigated and determined to pose no risk to human health or environmental receptors.</p>	<p><u>Contaminated Sites</u> LSI Contaminated sites (IRP and MMRP) identified under this alternative have been investigated and determined to pose no risk to human health or environmental receptors or would be investigated and remediated prior to facility construction to ensure that no health hazards would be present during site operations. Therefore, the impacts to IRP/MMRP sites under this alternative would be less than significant.</p>
<p><u>Toxic Substances</u> LSI Suspected LBP, ACM and PCBs would be properly surveyed, managed and materials disposed of in accordance with existing laws and regulations. No LBP, ACM and PCBs would be used in new construction. Therefore, there would be less than significant direct or indirect impacts to human health and the environment. Because the Alternative 1 site is located in a USEPA Radon Zone 1, it is possible that new buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and mitigation systems would be incorporated into the building/facility designs. In</p>	<p><u>Toxic Substances</u> NI No LBP, ACM and PCBs would be used in new construction. No such materials would be present; therefore, there would be no impact. The site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no toxic substances impacts with operation of Alternative 2.</p>	<p><u>Toxic Substances</u> LSI Suspected LBP, ACM, and PCBs would be properly surveyed, managed and materials disposed of in accordance with existing laws and regulations. No LBP, ACM and PCBs would be used in new construction. Therefore, impacts would be less than significant. NI The Alternative 3 site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no radon toxic substances impacts with construction of Alternative 3.</p>	<p><u>Toxic Substances</u> LSI Suspected LBP, ACM, and PCBs would be properly surveyed, managed and materials disposed of in accordance with existing laws and regulations. No LBP, ACM and PCBs would be used in new construction. Therefore, impacts would be less than significant. NI The Alternative 4 site is in a USEPA Radon Zone 3, where radon intrusion into structures would be unlikely. Therefore, there would be no radon toxic substances impacts with construction of Alternative 3.</p>	<p><u>Toxic Substances</u> LSI Suspected LBP, ACM and PCBs would be properly surveyed, managed and materials disposed of in accordance with existing laws and regulations. No LBP, ACM and PCBs would be used in new construction. Therefore, impacts would be less than significant. Because the Alternative 5 site is located in a USEPA Radon Zone 1, it is possible that new buildings, facilities, and structures could encounter radon intrusion. To minimize this impact, radon resistant construction techniques and mitigation systems would be incorporated into the building/facility designs. In addition, DoD would periodically test facilities constructed in known radon zones to verify that</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
addition, DoD would periodically test facilities constructed in known radon zones to verify that no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate. Therefore, direct and indirect impacts would be less than significant.				no unacceptable radon gas buildup occurs and install radon mitigation systems as appropriate.
PUBLIC HEALTH AND SAFETY				
Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts	Construction Impacts
<p>LSI Less than significant, short-term direct impacts from temporary construction noise.</p> <p>NI No impacts to public, military personnel, or worker safety from potential construction hazards because a health and safety program would be implemented for construction contractors and the public would be excluded from construction areas.</p> <p>No impacts from hazardous substances use because hazardous substance management and investigative/cleanup activities would be conducted in accordance with applicable regulations and established BMPs and SOPs.</p>	<p>LSI Similar to Alternative 1, there would be less than significant impacts from short-term construction noise.</p> <p>NI Similar to Alternative 1, there would be no impacts from potential construction hazards and no impacts from hazardous substance use.</p>	<p>LSI Same as Alternative 1.</p> <p>NI Similar to Alternative 1, there would be no impacts from potential construction hazards and no impacts from hazardous substance use.</p>	<p>LSI Same as Alternative 1.</p> <p>NI Same as Alternative 1.</p>	<p>LSI Same as Alternative 1.</p> <p>NI Same as Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts	Operation Impacts
<p>LSI Less than significant short- and long-term direct and indirect impacts to health care services from increases in notifiable diseases and mental illness.</p> <p>Less than significant, direct or indirect impacts from potential contact with UXO because unauthorized personnel would not be allowed on the installation or range at any time, training areas would be cleared after live-fire events, and applicable BMPs and safety measures would be implemented to identify and remove UXO before construction activities.</p> <p>Impacts from munitions operations/storage and the emergency demolition range on NAVMAG would have less than significant, long-term, direct or indirect impacts because ordnance and munitions would be managed by trained and qualified personnel in accordance with Marine Corps explosive safety directives.</p> <p>Less than significant direct or indirect impacts to water quality as a result of increased demand and potential water related illness. Implementation</p>	<p>LSI Impacts to health care services, water quality and availability, and air quality (as a result of airborne toxic dust), as well as from UXO, munitions operations/storage, the emergency demolition range, and traffic accidents would be similar to Alternative 1, and would all be less than significant.</p>	<p>LSI Impacts to health care services, water quality and availability, and air quality (as a result of airborne toxic dust), as well as from UXO, munitions operations/storage, the emergency demolition range, and traffic accidents would be similar to Alternative 2, and would all be less than significant.</p> <p>Less than significant direct or indirect safety impacts would result if existing incompatible munitions magazines are relocated.</p>	<p>LSI Impacts to health care services, water quality and availability, and air quality (as a result of airborne toxic dust), as well as from UXO, munitions operations/storage, the emergency demolition range, and traffic accidents would be similar to Alternative 2, and would all be less than significant.</p> <p>Less than significant direct or indirect safety impacts would result if existing incompatible munitions magazines are relocated.</p>	<p>LSI Impacts to health care services, water quality and availability, and air quality (as a result of airborne toxic dust), as well as from UXO, munitions operations/storage, the emergency demolition range, and traffic accidents would be similar to Alternative 1 and would all be less than significant.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p>of sustainability practices would reduce the amount of groundwater needed, and water well locations would be protected from future development and operational activities.</p> <p>Less than significant, direct or indirect impacts from firing range activities (i.e., exposure to airborne toxic dust) because range maintenance procedures ensure that participating personnel are not exposed to airborne contaminants above permissible limits and analysis of firing range emissions are below significance criteria.</p> <p>Less than significant direct or indirect impacts from potential increase in traffic incidents, because the long-term increase in the number of traffic accidents as a result of the increase in the island population would be minimal.</p> <p>NI No impact on public safety would occur from operational safety concerns (i.e., explosive safety and electromagnetic safety).</p>	<p>NI Same as Alternative 1.</p>	<p>NI Same as Alternative 1.</p>	<p>NI Same as Alternative 1.</p>	<p>NI Same as Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

<i>Route 15 (Alternative 1)</i>	<i>NAVMAG East/West (Alternative 2)</i>	<i>NAVMAG North/South (Alternative 3)</i>	<i>NAVMAG L-Shaped (Alternative 4)</i>	<i>NWF (Alternative 5)</i>
ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN				
Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts	Construction and Operation Impacts
<u>Noise</u> LSI Special-status populations would not be disproportionately affected by construction- or operation-related noise impacts from the Route 15 LFTRC alternative because the entire region has minority, low-income, and child populations. All residents within the area of noise impacts for this alternative would be affected in the same manner, resulting in less than significant short-term direct impacts.	<u>Noise</u> NI There would be no impact due to construction or operational noise under this alternative because the LFTRC activities would be in an unpopulated area of Guam. The nearest noise receptors would be at least one mile away from the proposed LFTRC location.	<u>Noise</u> NI Similar to Alternative 2, due to the lack of populated areas and sensitive receptors in the area.	<u>Noise</u> NI Similar to Alternative 2, due to the lack of populated areas and sensitive receptors in the area.	<u>Noise</u> NI Similar to Alternative 2, due to the lack of populated areas and sensitive receptors in the area.
<u>Recreation</u> LSI The loss of the Raceway would have long-term adverse effect on recreational and sociocultural resources. However, all people of Guam would be affected by impacts to recreational resources; therefore, Alternative 1 would not result in disproportionately high and adverse effects on minority or low-income populations nor would there be disproportionate risks to the health and safety of children.	<u>Recreation</u> LSI Similar to Alternative 1, since the impact to recreational resources would affect all people of Guam.	<u>Recreation</u> LSI Similar to Alternative 1, since the impact to recreational resources would affect all people of Guam.	<u>Recreation</u> LSI Similar to Alternative 1, since the impact to recreational resources would affect all people of Guam.	<u>Recreation</u> LSI Similar to Alternative 1, since the impact to recreational resources would affect all people of Guam.

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

Route 15 (Alternative 1)	NAVMAG East/West (Alternative 2)	NAVMAG North/South (Alternative 3)	NAVMAG L-Shaped (Alternative 4)	NWF (Alternative 5)
<p><u>Land Acquisition</u> LSI Low-income populations would not experience disproportionately high and adverse effects due to land acquisition because federal regulations regarding land acquisition would ensure that significant economic impacts to landowners and occupants do not occur. Land acquisition would also not result in health and safety risks that would disproportionately impact children. Therefore, Alternative 1 would not result in disproportionate land use or socioeconomic impacts to minority and low-income populations or children as a result of land acquisition, and impacts would be indirect and less than significant.</p>	<p><u>Land Acquisition</u> LSI Similar to Alternative 1, since the proposed land acquisition would not disproportionately affect minority, low-income, and child populations.</p>	<p><u>Land Acquisition</u> LSI Similar to Alternative 1, since the proposed land acquisition would not disproportionately affect minority, low-income, and children populations.</p>	<p><u>Land Acquisition</u> LSI Similar to Alternative 1, since the proposed land acquisition would not disproportionately affect minority, low-income, and children populations.</p>	<p><u>Land Acquisition</u> NI No environmental justice impacts from land acquisition, since there would be no acquisition under Alternative 5.</p>
<p><u>Public Health and Safety</u> LSI No impacts to public health and safety are anticipated from management of hazardous substances, and an additional demand to public health services (e.g., hospitals, and outpatient clinics) is not anticipated, resulting in less than significant long-term direct and indirect impacts. Less than significant impacts to public safety are anticipated from operational safety concerns (i.e., explosive safety,</p>	<p><u>Public Health and Safety</u> LSI Similar to Alternative 1, because regardless of where the LFTRC is located on Guam, high (relative to the U.S.) percentages of minorities, low-income residents, and children would be affected, so impacts cannot be considered disproportionate.</p>	<p><u>Public Health and Safety</u> LSI Similar to Alternative 1.</p>	<p><u>Public Health and Safety</u> LSI Similar to Alternative 1.</p>	<p><u>Public Health and Safety</u> LSI Similar to Alternative 1.</p>

Table 5.7-1. Summary of Impacts and Potential Mitigation Measures for the LFTRC Alternatives

<i>Route 15 (Alternative 1)</i>	<i>NAVMAG East/West (Alternative 2)</i>	<i>NAVMAG North/South (Alternative 3)</i>	<i>NAVMAG L-Shaped (Alternative 4)</i>	<i>NWF (Alternative 5)</i>
electromagnetic safety, and construction safety). Less than significant indirect long-term impacts to public safety from firing range air emissions are anticipated. Less than significant impacts are anticipated from noise, water quality, and UXO. Impacts would not be disproportionate because regardless of where the LFTRC is located on Guam, high (relative to the U.S.) percentages of minorities, low-income residents, and children would not be affected.				

This page intentionally left blank.