
DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

JOINT BASE LEWIS-McCHORD REAL PROPERTY MASTER PLAN



November 2016

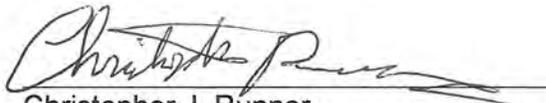
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DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE REAL PROPERTY MASTER PLAN

JOINT BASE LEWIS-McCHORD, WASHINGTON



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EXECUTIVE SUMMARY

INTRODUCTION

The United States (U.S.) Department of the Army (Army) has prepared this environmental assessment (EA) to examine the potential environmental effects of adopting the Real Property Master Plan (RPMP), including the Installation Development Plan (IDP), Installation Planning Standards (IPS), Capital Investment Strategy, 2015 Air Installation Compatible Use Zone (AICUZ) Study Update, and Installation Operational Noise Management Plan (IONMP), all of which consist of long-term strategies to guide the physical development of the Cantonment areas of Joint Base Lewis-McChord (JBLM), which includes the Cantonment area of the Yakima Training Center (YTC), over the next 50 years. This EA analyzes the overall programmatic environmental impacts of long-term components; environmental impacts of site-specific new construction through an assessment of existing best management practices, standard operating procedures, and mitigation measures through the environmental review process; and cumulative effects of past, present, and foreseeable future actions.

This EA was developed in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code §4321 et seq.); implementing regulations issued by the President's Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) §§1500–1508; Army Regulation 200-2, and 32 CFR §651, *Environmental Analysis of Army Actions*. The purpose of an EA is to inform decision-makers and the public of the likely environmental consequences of the Proposed Action and alternatives.

The purpose of the Proposed Action is to adopt the RPMP to provide a framework for future development that incorporates today's needs and mission requirements and allows installation planners to sustainably accommodate future change. The need for the Proposed Action is to address the complexities of the installation, the current mission of JBLM, including the YTC, and future development requirements over the next 50 years.

BACKGROUND AND SETTING

JBLM is located in Pierce and Thurston counties in the west portion of Washington, approximately 25 miles south of Seattle and 7 miles north of Olympia, near the cities of Lakewood and Tacoma, Washington. The JBLM portion of the installation occupies about 90,000 acres of land and also includes the YTC, which occupies approximately 324,000 acres of land, located approximately 10 miles northeast of Yakima, Washington. JBLM was established when Fort Lewis and McChord Air Force Base were merged on 10 March 2010. JBLM is 1 of 12 joint installations in the United States military. JBLM is a training and

mobilization center for all services, and its strategic location enables Army and U.S. Air Force units to conduct combat and humanitarian missions in any location in the world. JBLM is home to more than 58,000 Soldiers, Airmen, and employees; the installation also supports more than 120,000 retirees and approximately 52,000 Family members and dependents. The installation is home to the:

- Army's I Corps;
- Western Region Medical Command;
- Madigan Army Medical Center;
- 1st and 2nd Brigades of the 2nd Infantry Division;
- 593rd Expeditionary Sustainment Command;
- 555th Engineer Brigade;
- 42nd Military Police Brigade;
- 16th Combat Aviation Brigade;
- 17th Fires Brigade;
- 62nd Medical Brigade;
- 201st Battlefield Surveillance Brigade;
- I Corps Noncommissioned Officer Academy;
- 7th Infantry Division;
- 1st Special Forces Group (Airborne);
- 2nd Battalion (Ranger);
- 75th Infantry; and
- 189th Infantry Brigade

U.S. Air Force units located on McChord Field include the 62nd Airlift Wing and its Reserve Partner the 446th Airlift Wing, the Western Air Defense Sector, and the 22nd Special Tactics Squadron.

PROPOSED ACTION

JBLM is considering adopting the RPMP that comprises the IDP, IPS, Capital Investment Strategy, 2015 AICUZ Study Update, and IONMP. The purpose of the JBLM IDP is to present a vision for future development that incorporates today's needs and mission requirements, while allowing installation planners to sustainably accommodate future change. JBLM's IDP consists of a series of framework and network plans that respond to site constraints, opportunities, functional relationships and planning efforts at the installation scale. The IPS is a working document that establishes directions on standardizing and improving facility planning and design to guide the installation as a visually coherent, functionally effective, and Soldier and Family friendly community in support of the installation's mission readiness and quality of life. The Capital Investment Strategy is based on Area Development Plans (ADPs) located in the IDP. These ADPs include short-, mid-, and long-range phasing plans that provide a map for development. The Capital Investment Strategy uses these plans to provide a list of projects for the installation to adopt to realize the vision of the ADPs. The 2015 AICUZ Study Update consists of plans and guidance to promote compatible land development in areas subject to aircraft noise and accident potential. The IONMP provides a strategy for noise management at JBLM.

ALTERNATIVES

This EA proposes a No Action Alternative and one Action Alternative. Both the No Action and the Action Alternative include the Proposed Action; however, under the Action Alternative, the RPMP would be formally adopted, whereas under the No Action Alternative the RPMP would be followed but would lack the formalized framework established by the adoption of the plan. If needed, any number and combination of the actions could be incorporated into a final decision.

Alternative 1 – No Action

Under the No Action Alternative, management of JBLM would continue based on existing planning principles and development goals. Implementation of projects to address facility deficits and excesses would occur on an as-needed basis without a formalized framework that enables suitable locations of projects that address the large-scale functional relationships at JBLM. Implementation of the No Action Alternative would conflict with the National Defense Authorization Act of 2013 requiring military installations to develop a master plan. The No Action Alternative would be inconsistent with Department of Defense (DoD) and Army regulations and instructions, as well as 10 U.S. Code §2864 (*Master Plans for Major Military Installations*) that require the formal adoption of a master plan. Inclusion of the No Action Alternative is prescribed

by the CEQ regulations implementing NEPA to serve as a benchmark against which the Proposed Action and alternatives can be evaluated. The No Action Alternative is defined as the environmental baseline conditions that would result if the RPMP were not formally adopted; therefore, the No Action Alternative is evaluated in this EA.

Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP and the features described under the Proposed Action, including the IDP, IPSs, and Capital Investment Strategy. In addition, the 2015 AICUZ Study Update and IONMP would be considered finalized as part of Alternative 2. Through this programmatic EA, the overall environmental impacts of site-specific new construction identified in the RPMP are assessed, allowing future development to take place under a NEPA process as noted in CFR 651, Subparts B, C, and D.

Alternative Considered but Eliminated From Further Consideration

NEPA's implementing regulations provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable require detailed analysis.

The purpose of the JBLM RPMP is to meet statutory requirements under the National Defense Authorization Act for Fiscal Year 2013 (Public Law 112-239, Sec 2802) and the National Defense Authorization Act for Fiscal Year 2014 (Public Law 113-66, Sec 2811) as well as to meet the requirements of DoD and Army instructions and regulations. Under Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*, which provides guidance for RPMP development at installations JBLM is required to prepare and implement an RPMP that addresses sustainable planning; natural, historic and cultural resource management; healthy community planning; defensible planning; capacity planning; area development planning; network planning; form-based planning; facility standardization; and plan-based programming.

CEQ regulations require inclusion of the No Action alternative in an EA. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated. As a result, two alternatives were evaluated in detail: the preferred alternative (adopts and implements an RPMP) and the No Action Alternative (continue implementation based on existing planning principles and development goals), and both are evaluated in this EA.

ENVIRONMENTAL CONSEQUENCES

Table 3-22 summarizes impacts by resource area for the No Action Alternative and the Proposed Action. The implementation of Alternative 2 would result in temporary noise, air emissions, and waste generation due to construction and demolition activities; earth disturbance and tree clearing; removal of vegetation; additional burdens placed on government and emergency and utility services from new development, with each of these impacts are anticipated to be less than significant. Environmental benefits of Alternative 2 - Adoption of the RPMP would reduce emissions and vehicle trips; reduce potential airspace encroachment and incompatible land uses; provide greater security and improve water and energy efficiency; improve explosives safety and occupational health and safety; provide economic growth from the procurement of goods and services; and the restoration of soils, vegetation and floodplains.

The No Action Alternative would result in similar environmental impacts and benefits as described above for Alternative 2, with the exception of potential impacts to the visual character of JBLM from the lack of a development guide. Under the No Action Alternative, management of JBLM would continue based on existing planning principles and development goals. The implementation of projects to address facility deficits and excesses would occur on an as-needed basis without a formalized framework that enables suitable locations of projects to address the large-scale functional relationships at JBLM. Implementation of the No Action Alternative would conflict with the National Defense Authorization Act of 2013 requiring military installations to develop a master plan. The No Action Alternative would be inconsistent with DoD and Army regulations and instructions, as well as 10 U.S. Code §2864 (*Master Plans for Major Military Installations*) that require the formal adoption of a master plan. CEQ guidelines stipulate analysis of the No Action Alternative as a baseline to assess any environmental consequences that may occur if the Proposed Action is not implemented.

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1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The United States (U.S.) Department of the Army (Army) has prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code §4321–4370h), the regulations of the President’s Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] Parts 1500–1508), Army Regulation 200-2, and 32 CFR §651, *Environmental Analysis of Army Actions*. This EA focuses on the analysis of the Joint Base Lewis-McChord (JBLM or installation) Real Property Master Plan (RPMP), including the Installation Development Plan (IDP), Installation Planning Standards (IPSS), Capital Investment Strategy, 2015 Air Installation Compatible Use Zone (AICUZ) Study Update, and Installation Operational Noise Management Plan (IONMP), which consist of long-term strategies to guide the physical development of the Cantonment areas of JBLM, including the Yakima Training Center (YTC), over the next 50 years.

The EA is a public document used to determine and evaluate the potential environmental consequences of adopting the RPMP, establish procedures for detailed project review, and identify mitigation measures to lessen or eliminate adverse effects. The intended audience of the EA is Army decision-makers; interested government agencies and non-government organizations; tribes, including the Nisqually Indian Tribe, Puyallup Tribe, the Squaxin Island Tribe, and the Colville, Wanapum Band, Umatilla, Nez Perce, and Yakama tribes; as well as members of the public. The effects analyses in this report are based on a variety of sources and the best available information at the time of preparation. The information contained in this EA will be reviewed and considered by the Army prior to the final decision on how to proceed with the implementation of the Proposed Action, if at all, and to determine whether a Finding of No Significant Impact (FNSI) is appropriate or whether a Notice of Intent to prepare an environmental impact statement should be issued.

1.2 Joint Base Lewis-McChord Location, Setting, and History

Located in Pierce and Thurston counties in the western portion of Washington, JBLM encompasses more than 90,000 acres bordering Tacoma, Washington, to the southeast, approximately 35 miles south of Seattle and 7 miles northeast of Olympia, Washington (Figure 1-1). JBLM also includes the YTC, which encompasses approximately 324,000 acres located approximately 10 miles northeast of Yakima, Washington (Figures 1-2 and 1-3).

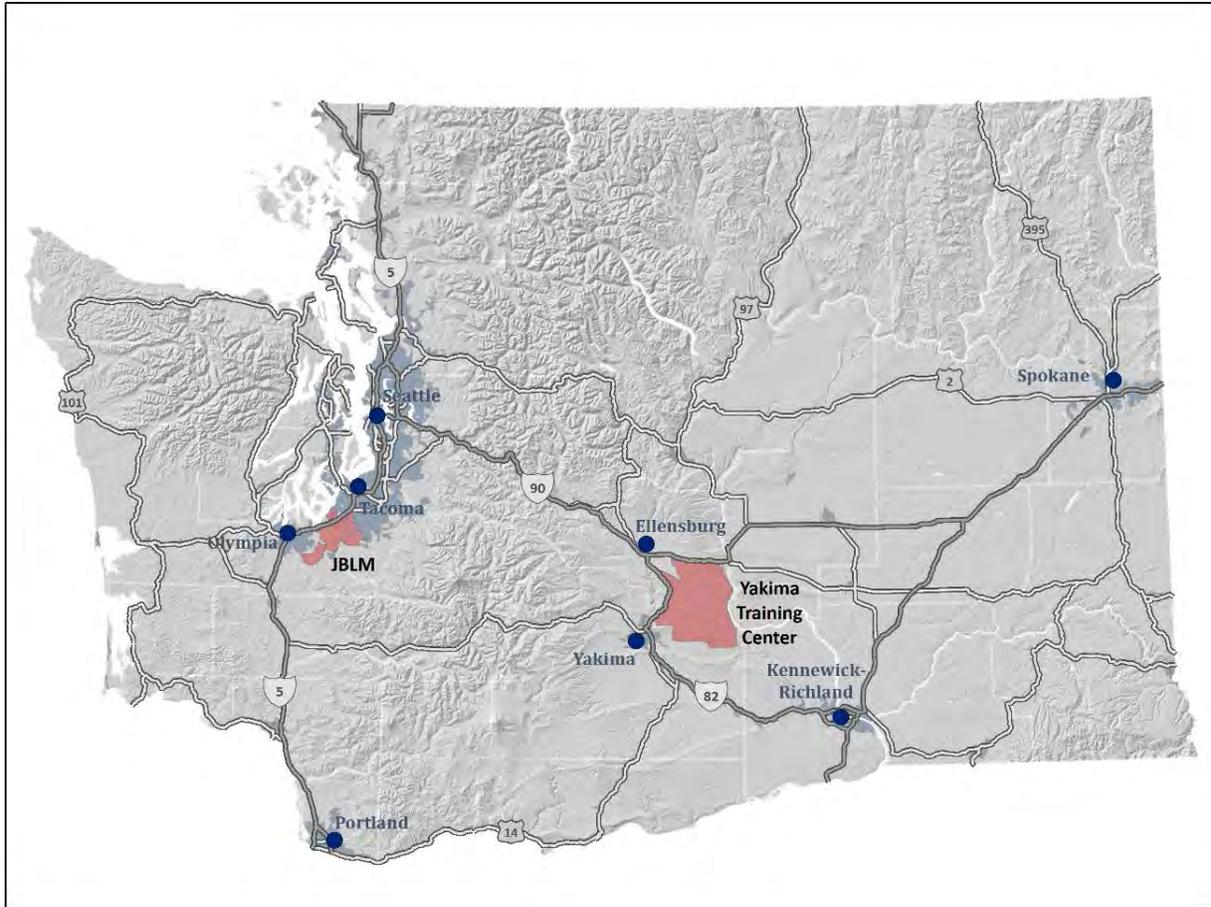


Figure 1-1. Joint Base Lewis-McChord Regional Setting

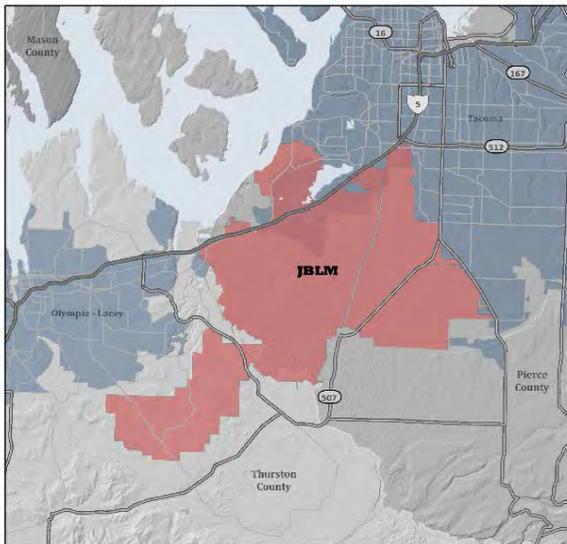


Figure 1-2. Joint Base Lewis-McChord Vicinity



Figure 1-3. Yakima Training Center Vicinity

Interstate 5 (I-5), the main transportation corridor in the Puget Sound region, bisects the installation. It is bordered by suburban and commercial development on the north; rural areas, forested land, and several small communities on the east and south; and the Puget Sound, Nisqually Indian Reservation, and rural areas that surround Olympia on the west. The Nisqually Wildlife Refuge is located on the northwest border of the installation.

JBLM is 1 of only 12 joint installations in the United States military. Fort Lewis and McChord Air Force Base were merged to form JBLM on 10 March 2010. JBLM is a training and mobilization center for all services and is the only Army power-projection platform west of the Rocky Mountains. A power-projection platform refers to an army installation that strategically deploys one or more high-priority active component brigades or larger and/or mobilizes and deploys high-priority Army reserve component units. Its key geographic location provides rapid access to the deep-water ports of Tacoma, Olympia, and Seattle for deploying equipment, while similarly having units that can be deployed from McChord Field. The strategic location of the installation enables Army and U.S. Air Force units to conduct combat and humanitarian missions in any location in the world.

Home to more than 58,000 Soldiers, Airmen, and employees, the installation also supports approximately 52,000 Family members and dependents. Installation priorities include “providing continued support to the war efforts, continuing to transform the force, establishing and maintaining first-class training facilities, and providing top-notch care to Soldiers, Airmen, and their Families” (U.S. Army 2014a).

The installation is home to the:

- Army’s I Corps;
- Western Region Medical Command;
- Madigan Army Medical Center;
- 1st and 2nd Brigades of the 2nd Infantry Division;
- 593rd Expeditionary Sustainment Command;
- 555th Engineer Brigade;
- 42nd Military Police Brigade;
- 16th Combat Aviation Brigade;
- 17th Fires Brigade;

- 62nd Medical Brigade;
- 201st Battlefield Surveillance Brigade;
- I Corps Noncommissioned Officer Academy;
- 7th Infantry Division;
- 1st Special Forces Group (Airborne);
- 2nd Battalion (Ranger);
- 75th Infantry; and
- 189th Infantry Brigade

U.S. Air Force units located on McChord Field include the 62nd Airlift Wing and its Reserve Partner the 446th Airlift Wing, the Western Air Defense Sector, and the 22nd Special Tactics Squadron. JBLM is known for its abundance of high-quality, close-in training areas, including 115 live-fire ranges and substantial space for maneuver training.

The JBLM YTC provides additional training and support facilities in a much lower populated area. The YTC is a maneuver training area located in central Washington, northeast of the town of Yakima and west of the Columbia River. Although designed for Army use, the YTC supports a broad range of users—from the U.S. Air Force to local law enforcement. Its value for training Service members and testing equipment in austere conditions is unequalled in the United States.

Fort Lewis began as a gift of land from the Pierce County electorate in 1917 for use as a military training camp for Soldiers entering World War I. On 26 May 1917, Captain David L. Stone and his staff arrived to begin initial construction of “Camp Lewis,” named after Captain Meriwether Lewis of the famed Lewis and Clark expedition.

McChord Field, originally named Tacoma Field, was established as an airfield supporting Fort Lewis in 1930. In 1940, after the airfield was officially transferred to the U.S. Government, it was renamed McChord Field in honor of Colonel William Caldwell McChord, the Chief of the Training and Operations Division in Headquarters (HQ) Army Air Corps, who died in 1937.

The installation greatly expanded during World War II and continued to expand through the Vietnam and Cold Wars. At the conclusion of the Cold War, when many military installations were downsizing, Fort Lewis was chosen to continue to grow because of its strategic location in the Pacific Northwest region.

Today, as part of JBLM, the Army and Air Force missions continue to evolve, particularly with several Army units slated for deactivation. Even with the current downsizing of the Army force, JBLM remains a key national defense asset because of its location and excellent training capabilities.

1.3 Purpose of and Need for Proposed Action

The purpose of the Proposed Action is to adopt the RPMP at JBLM to provide a framework and guiding principles for future development within the Cantonment areas of the installation that includes both the JBLM installation near Tacoma, Washington as well as the JBLM YTC. As such when the JBLM RPMP is noted in this document, with the exception of Chapter 3: “Affected Environment and Environmental Consequences”, it is referring to both localities. The RPMP incorporates current needs and mission requirements and allows installation planners to sustainably accommodate future change. The RPMP is a reference for design and programming of future project proposals and supports the installation mission and long-term strategic goals over the next 50 years.

The RPMP is needed because of the complexities of the installation, JBLM’s current mission, and future development requirements. The RPMP will provide decision makers with the information to know where and how much development within the Cantonment areas can occur in the future, whether it is to accommodate existing mission expansion or new and future mission capability. For JBLM, the RPMP will also enable the installation to capture the efficiencies and possibilities in land, facilities, and functions that JBLM can provide.

The RPMP was produced in accordance with Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*, which provides guidance for RPMP development at installations. This guidance supports the Department of Defense (DoD)-wide overarching installation planning philosophy to develop a sustainable platform to support the effective execution of assigned military missions as efficiently as possible.

As a result of the UFC 2-100-01, *Installation Master Planning*, objective “to develop a sustainable platform to support the effective execution of assigned military missions as efficiently as possible,” the RPMP establishes five planning goals/principles to help guide future development:

- Mission Capable Environments—Recognize the primacy of the installation’s mission by providing environments that promote mission sustainability
- Sustainable Communities—Create a JBLM community that meets the needs of today’s mission and support without depleting the resources to provide for future generations
- Walkable Neighborhoods—Provide safe, comfortable, and convenient walks within neighborhoods and neighborhood centers
- Identifiable Neighborhood Centers—Include distinct areas within the community that meet the needs for many public activities, such as retail, dining services and gathering
- Complete Streets—Design streets that provide safe, efficient passage for all forms of transportation, including through and local traffic, bicyclists, and pedestrians

Each goal is supported by several planning principles. Each principle is characterized by specific design elements, and, together, the list of principles functions as a checklist to ensure that the plan supports the design goals and, ultimately, the planning vision. It is important to note that these principles work best in concert and that each principle can support multiple goals. Figure 1-4 illustrates the ultimate goals for JBLM, as well as historical and current assessments.

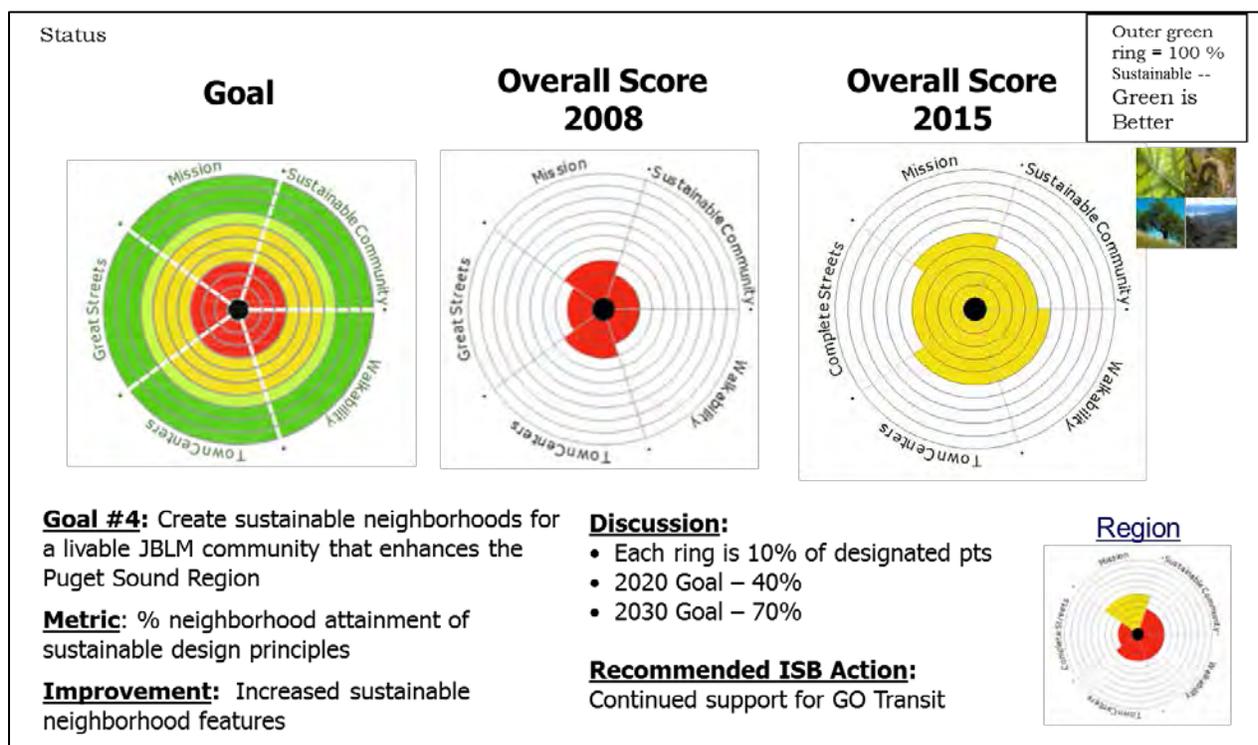


Figure 1-4. Joint Base Lewis-McChord 2015 Overall Sustainable Design Assessments

In addition to these goals, numerous federal statutes, executive orders, and mandates have formalized sustainability requirements through changes in the nation's energy consumption and production and reduction in greenhouse gas (GHG) emissions (Table 1-1). The Army and JBLM must strive to attain the energy targets outlined in the Energy Policy Act of 2005 (EPA 2005) (USEPA 2005). EPA 2005 required that in fiscal years (FY) 2010–2012, 5.0 percent of the total electricity consumed by the federal government will come from renewable energy sources. The required percentage of electricity consumed from renewable sources rose to at least 7.5 percent by FY 2013. Under Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, at least 50 percent of the renewable energy used must come from “new renewable sources” placed in service after 1 January 1999. In addition, EO 13423 requires federal agencies to reduce GHG emissions through reduction of energy intensity by 3 percent annually through FY 2015 or by 30 percent by 2015. Along with these requirements, the National Defense Authorization Act of 2007 requires that 25 percent of DoD's total electric energy consumption come from renewable sources by 2025. Specific JBLM requirements include a Net Zero Policy mandate, in which JBLM was selected to achieve net zero water and waste by 2020.

Table 1-1. Summary of Legislation and Executive Orders Affecting Master Planning and Energy, Water Consumption, and Waste Generation

Federal Mandate	Resource Area	Requirement and/or Performance Target
Energy Policy Act of 2005	Electricity use for federal government from renewable sources	At least 7.5% of total electricity consumption (FY 2013+)
EO 13423	Energy use in federal buildings	Reduce 3% per year for 30% total by FY 2015 (FY 2003 baseline)
	Total consumption from renewable sources	At least 50% of required annual renewable energy consumed from “new” renewable sources
	Fleet vehicle alternative fuel use	Increase by 10% annually to reach 100% (FY 2005 baseline)
Energy Independence and Security Act of 2007	Total consumption from renewable sources	25% by FY 2025—“Sense of Congress”
	Hot water in new/renovated federal buildings from solar power (Section 438)	30% by FY 2015 if life-cycle is cost-effective
	Fossil fuel use in new/renovated federal buildings	Reduce 100% by FY 2030
EO 13514	GHG emission reduction	DoD goal: Reduce Scope 1 and 2 GHGs by 34% by FY 2020 DoD Goal: Reduce Scope 3 GHG emissions by 13.5% by FY 2020

Federal Mandate	Resource Area	Requirement and/or Performance Target
	Net Zero buildings	All new buildings that enter design in FY 2020 and after achieve Net Zero energy by FY 2030
	Water consumption	Reduce consumption by 2% annually for 26% total by FY 2020 (FY 2007 baseline)
	Waste minimization	Divert at least 50% of solid waste and 50% of construction and demolition waste by FY 2015
National Defense Authorization Act of 2007	Renewable fuels use	Directs the Secretary of Defense to consider renewable fuels in aviation, maritime, and ground transportation fleets.
National Defense Authorization Act of 2010	Facility renewable energy use	Produce or procure 25% of the total quantity of facility energy needs, including thermal energy, from renewable sources starting in FY 2025
National Defense Authorization Act of 2013	Master Planning	<p>The commander of each military installation under the jurisdiction of the Secretary of Defense shall ensure that an installation Master Plan is developed to address environmental planning, sustainable design and development, sustainable range planning, real property master planning, and transportation planning.</p> <p>The transportation component of the Master Plan for a major military installation shall be developed and updated in consultation with the metropolitan planning organization designated for the metropolitan planning area in which the military installation is located.</p>
National Defense Authorization Act of 2014	Master Planning	Installation master plans shall include the consideration of planning for compact and infill development; horizontal and vertical mixed-use development; the full lifecycle costs of real property planning decisions; and capacity planning through the establishment of growth boundaries around Cantonment areas to focus development towards the core and preserve range and training space.
Army Net Zero	Net zero waste and water	JBLM was selected as a pilot installation to become net zero in water and waste by 2020 in which JBLM would consume only as much water as they produce and will reduce, reuse, and recover waste streams, converting them to usable resources, thereby reducing or eliminating the need for landfills.

Federal Mandate	Resource Area	Requirement and/or Performance Target
National Historic Preservation Act (NHPA)	Master Planning	<p>Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the NRHP. Such resources are also termed “historic properties.” Historic properties are defined as “a district, site, building, structure or object significant in American history, architecture, engineering, archeology or culture at the national, state, or local level.”</p> <p>Moreover, the federal agency must afford the Advisory Council on Historic Preservation the opportunity to comment in the event that an undertaking will have an adverse effect on a cultural resource that is eligible for or listed in the NRHP and must consult with the State Historic Preservation Office and other interested parties in an effort to avoid, minimize, or mitigate adverse effects.</p>

Notes: DoD – Department of Defense, FY – fiscal year, GHG – greenhouse gas

JBLM has taken a proactive approach to sustainability, initiating an interdisciplinary process in 2002. JBLM’s sustainability program began with a workshop to define the challenges facing the then Fort Lewis and the actions needed to face the challenges. Guiding the process was the need to maintain current and future access to training land. The program includes long-term goals and a system to evaluate the sustainability program. Led at the strategic level by the Installation Sustainability Board, which is chaired by the Commanding General, the program also has five teams dedicated to helping achieve the goals: Air Quality, Energy, Sustainable Community, Products and Materials, Sustainable Training Lands, and Water Resources.

1.4 Project Background

1.4.1 Master Planning Process

Master planning is an iterative process that involves meetings and planning sessions (charrettes) and data collection to develop feasible alternatives. The process consists of primary phases—identification, evaluation, implementation, and monitoring and amending though they are not carried out in an entirely linear progression. This RPMP continues the work that began at Fort Lewis prior to the merging of the two installations into JBLM.

1.4.1.1 Identification Phase

The identification phase prepares the foundation for detailed planning through identification of a vision, specific goals that support that vision, and measurable objectives that support one or more goals. The product that results from this phase is often referred to as the Vision Plan.

The master planning process began at Fort Lewis in 2007 with a Vision Plan workshop. During this time the process to join Fort Lewis and McChord Field into a joint base occurred leading to further visioning interviews and workshops as well as other master planning efforts being delayed until late 2011. The initial visioning kickoff involved the interviewing of stakeholders with the goal of determining major issues, needs, and desires related to master planning. From there, the initial Vision Plan workshop was held on 17–18 January 2012. The workshop introduced the project to JBLM stakeholders and tenants, and the subsequent workshops validated master planning goals and objectives and led to the creation of an overall framework.

1.4.1.2 Evaluation Phase

In the evaluation phase, planners prepare and evaluate development alternatives for all scales of planning, from individual districts to the overall installation. Planning workshops or charrettes, which evaluate specific areas with the necessary support of installation stakeholders, were part of the evaluation. This phase included workshops focused on specific development plans, and included:

- Workshop held on 30 January–3 March 2012 about JBLM McChord Center and Carter Lake Area Development Plans (ADPs) to analyze districts and their facilities, roads and parking, landscape, and blights and rights and to develop plan alternatives for leadership review
- Workshop held on 16–20 April 2012 about JBLM Flightline and Lewis-McChord Link ADPs to analyze districts and their facilities, roads and parking, and landscape and to develop plan alternatives for leadership review
- Workshop held on 29–31 May 2012 for general ADP updates and integration
- JBLM Master Plan joint opportunities workshop on 17–19 July 2012

1.4.1.3 Implementation Phase

The implementation phase is marked by the selection of a preferred alternative that would implement the vision. Detailed documents are typically prepared to guide installation development and implementation of the plan. The RPMP consists of the following products described in more detail in Section 2.1:

- Installation Development Plan—ADPs, including detailed constraints and opportunities maps, regulating plans, illustrative plans, implementation plans, capacity analysis, and supporting sketches and renderings, as well as appropriate network plans. The Main

Cantonment at JBLM consists of 17 ADPs, and the YTC Main Cantonment consists of an additional ADP.

- Installation Planning Standards—installation standards for development for the installation as a whole, including YTC.
- Capital Investment Strategy—overall installation strategy for using and investing in real property, including a list of current known projects needed to support installation missions.

1.4.1.4 Monitoring and Amending Phase

As the RPMP is adopted and executed, monitoring and amending is necessary because of resource constraints, mission changes, or alterations in environmental, social or political conditions. The RPMP will be revised to reflect such change to maintain its relevance as a useful planning and management tool. At a minimum, the RPMP should be reviewed every 5 years. Potential future revisions to the RPMP and subsequent required environmental documentation would adhere to and be determined by following 32 CFR 651.12, *Determining Appropriate Level of NEPA Analysis*.

1.4.2 Area Development Planning Districts

Installations are divided into identifiable and connected districts based on geographical features, land use patterns, building types, and/or transportation networks. As districts are identified, an ADP is then prepared for each district. This leads to developing the RPMP in logical planning increments. By focusing master planning on districts, planners can identify areas that need planning attention due to mission, requirement, or command priority changes. The Cantonment areas at JBLM are divided into 18 districts, which includes 17 within the primary JBLM installation and one located at the Cantonment of the YTC (Figure 1-5 and Figure 1-6).

1.5 Scope of Environmental Analysis

This EA identifies, documents, and evaluates the potential environmental effects of adopting the RPMP in accordance with NEPA implementing regulations issued by CEQ (40 CFR §§1500–1508) and the Army (32 CFR §651). The purpose of the EA is to inform the Army and the public of the potential environmental consequences of the Proposed Action and alternatives along with associated mitigation. To understand the environmental consequences of the decision to be made, the EA qualitatively and, when appropriate, quantitatively evaluates the environmental impacts of the alternatives. Under NEPA, the analysis of environmental conditions only

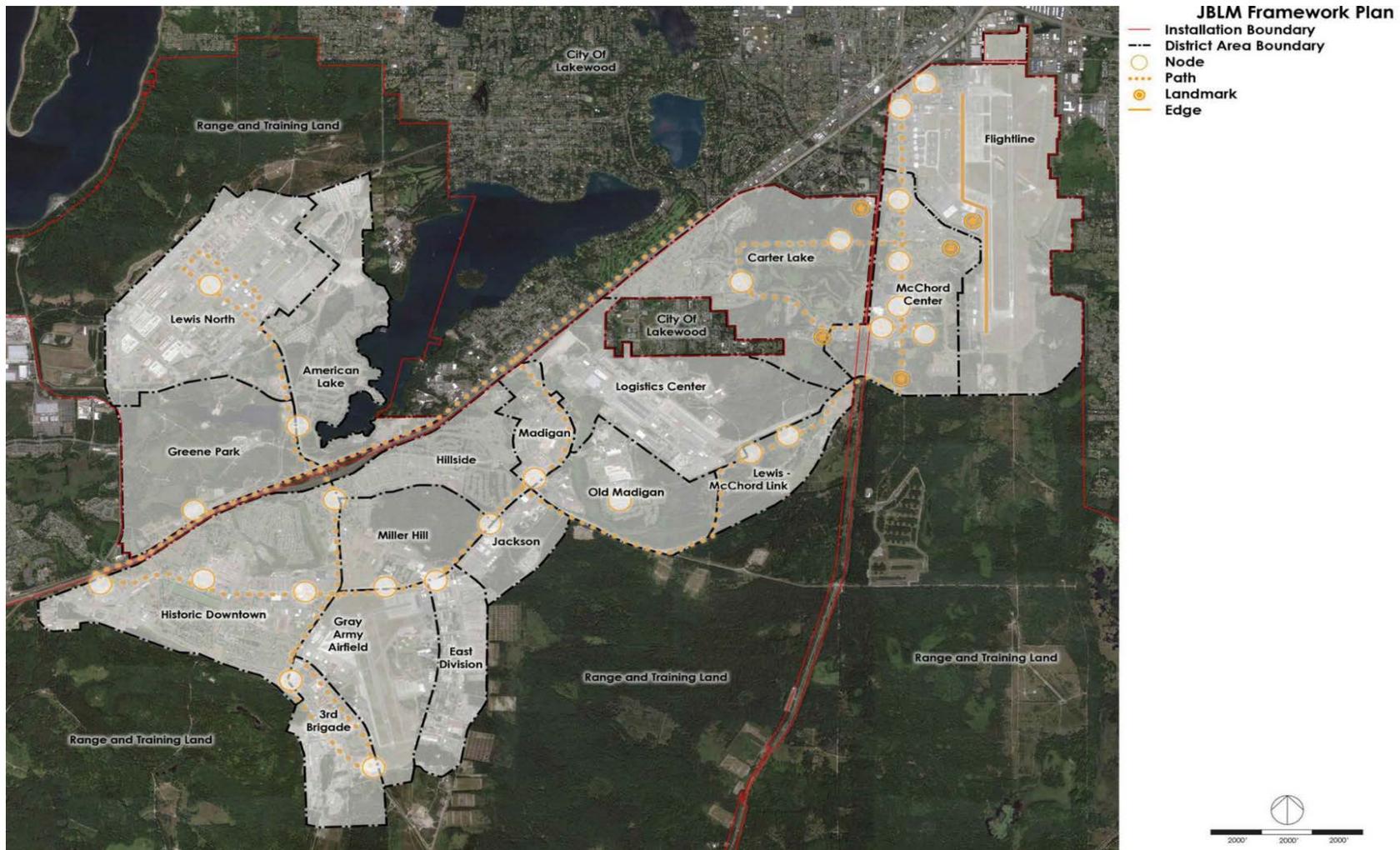


Figure 1-5. Joint Base Lewis-McChord Area Development Planning Districts

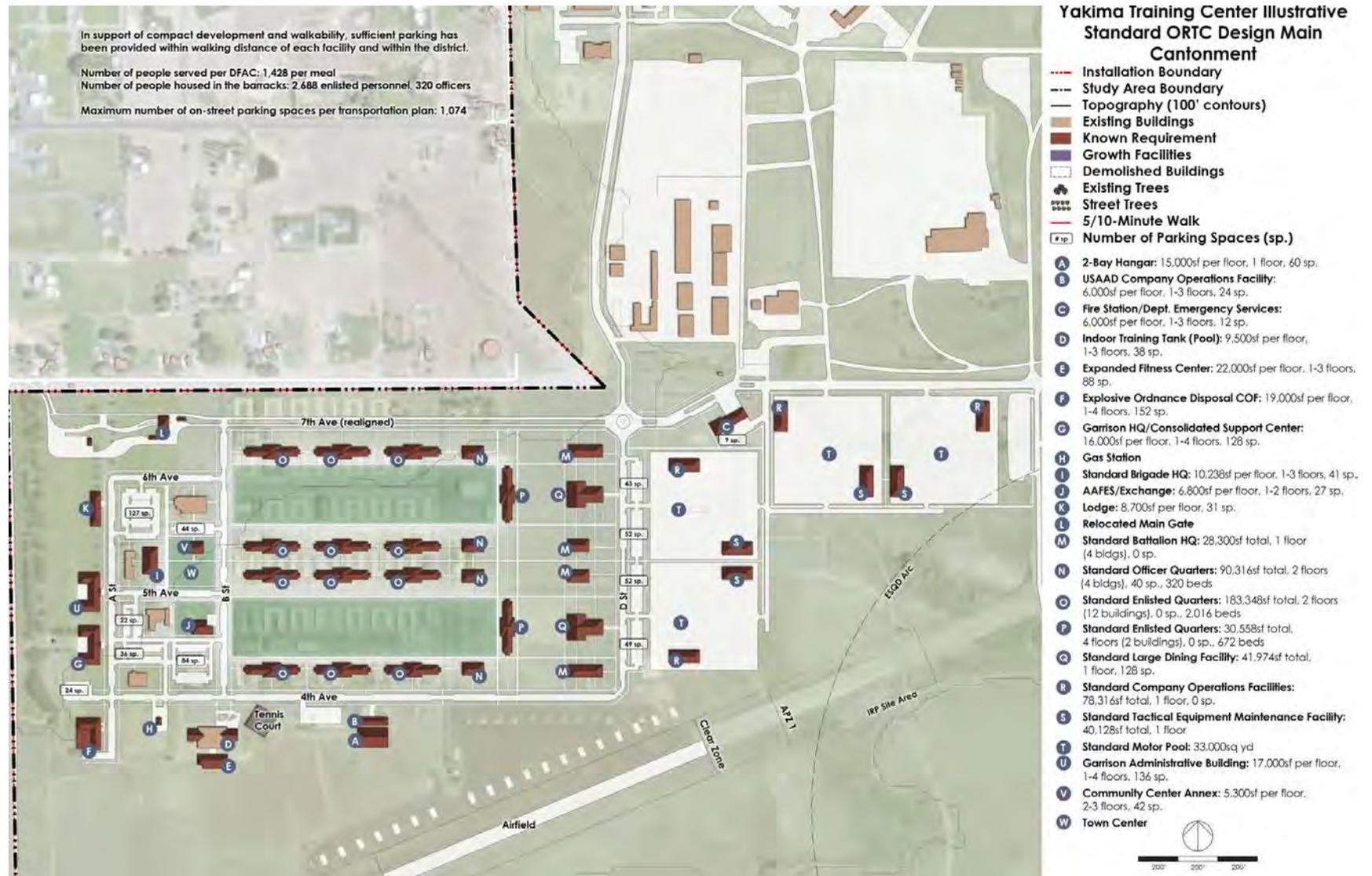


Figure 1-6. Yakima Training Center Area Development Planning District

addresses those areas, or Regions of Influence (ROIs), and environmental resources with the potential to be affected by the Proposed Action or alternatives. Locations and resources with no potential to be affected are not analyzed. The ROI, which includes all areas and lands that might be affected, may vary by resource. The Army's NEPA Regulation 200-2, calls for the environmental analysis to be proportionate to the nature and scope of the action, the complexity and level of anticipated effects on important resources, and the capacity of Army decisions to influence those effects in a productive, meaningful way from the standpoint of environmental quality.

1.6 Public Involvement

Public involvement is a critical and essential component of the NEPA process. The CEQ and Army NEPA regulations provide opportunity for the public to participate in this process. For this EA, a public review period for the draft EA and draft FNSI began with the publication of a Notice of Availability (NOA) in local newspapers. The Army will wait a minimum of 30 days from the date of the NOA publication before completing a final EA and reaching a decision on the Proposed Action.

1.6.1 Public Review and Comment Process

The NOA for the draft EA and draft FNSI will be published in the *Tacoma News Tribune*, *The Olympian*, the *Northwest Guardian*, and the *Yakima Herald*. The publication of the NOA initiated a 30-day comment period, during which the Army invited the general public, local governments, tribes, state agencies, and other federal agencies to submit comments or suggestions concerning the analyses and alternatives addressed in the draft EA. Copies of the draft EA were mailed out to identified tribes, prior to the release of the document for public review. Copies of the draft EA are available for public review at libraries in the region and on the JBLM website at: <http://www.lewis-mcchord.army.mil/publicworks/sites/envir/eia.aspx>. Written comments should be forwarded to: Department of the Army, Directorate of Public Works, Environmental Division, 2012 Liggett Avenue, Box 339500 MS 17, Joint Base Lewis-McChord, WA 98433-9500 and electronic copies should be submitted to: usarmy.jblm.imcom.list.dpw-eis@mail.mil.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Proposed Action is to adopt the RPMP for JBLM. The RPMP establishes long-term strategies to guide the physical development of the Cantonment areas of JBLM and the YTC over the next 50 years. It creates an integrated Joint Base Master Plan in accordance with DoD Joint Basing Policy that includes the former Fort Lewis and McChord AFB, as well as the YTC. The RPMP also makes updates to the YTC, Lewis Main, and Lewis North ADPs and creates three ADPs for the former McChord AFB. In addition, the RPMP creates utility and urban forestry plans and incorporates IPS, as well as the 2015 AICUZ Study Update and the IONMP. The RPMP includes the IDP, IPSs, the Capital Investment Strategy, the 2015 AICUZ Study Update, and the IONMP. The following sections describe the features of the Proposed Action for each of the RPMP components.

2.1.1 Installation Development Plan

The purpose of JBLM's IDP is to present a vision for future development that incorporates today's needs and mission requirements, while allowing installation planners to sustainably accommodate future change. The JBLM IDP consists of a series of framework and network plans that respond to site constraints, opportunities, functional relationships, and planning efforts at an installation scale. These plans help delineate focused growth areas within the Main Cantonment, create walkable districts, establish key transportation and land use concepts, and define significant features that influence development patterns at JBLM. The framework and network plans that comprise the IDP are discussed further below and noted in Figures 2-1 through 2-6, including: the Overall Concept Plan, Illustrative Plan, Regulating Plan, Transportation Plan, Pedestrian and Bicycle Plan, Parks and Open Space Plan, and ADPs. The IDP also includes street standards, building standards, and the Secretary of the Interior Standards and Guidelines for the Treatment of Historic Properties.

2.1.1.1 Overall Concept Plan

The Overall Concept Plan analyzes the relationship between the 17 separate ADPs within the JBLM Main Cantonment and the singular ADP that encompasses the Main Cantonment of the YTC, which together form the overall IDP. The plan as discussed includes YTC, even though it is geographically separate from the Main Cantonment of the primary JBLM installation by the

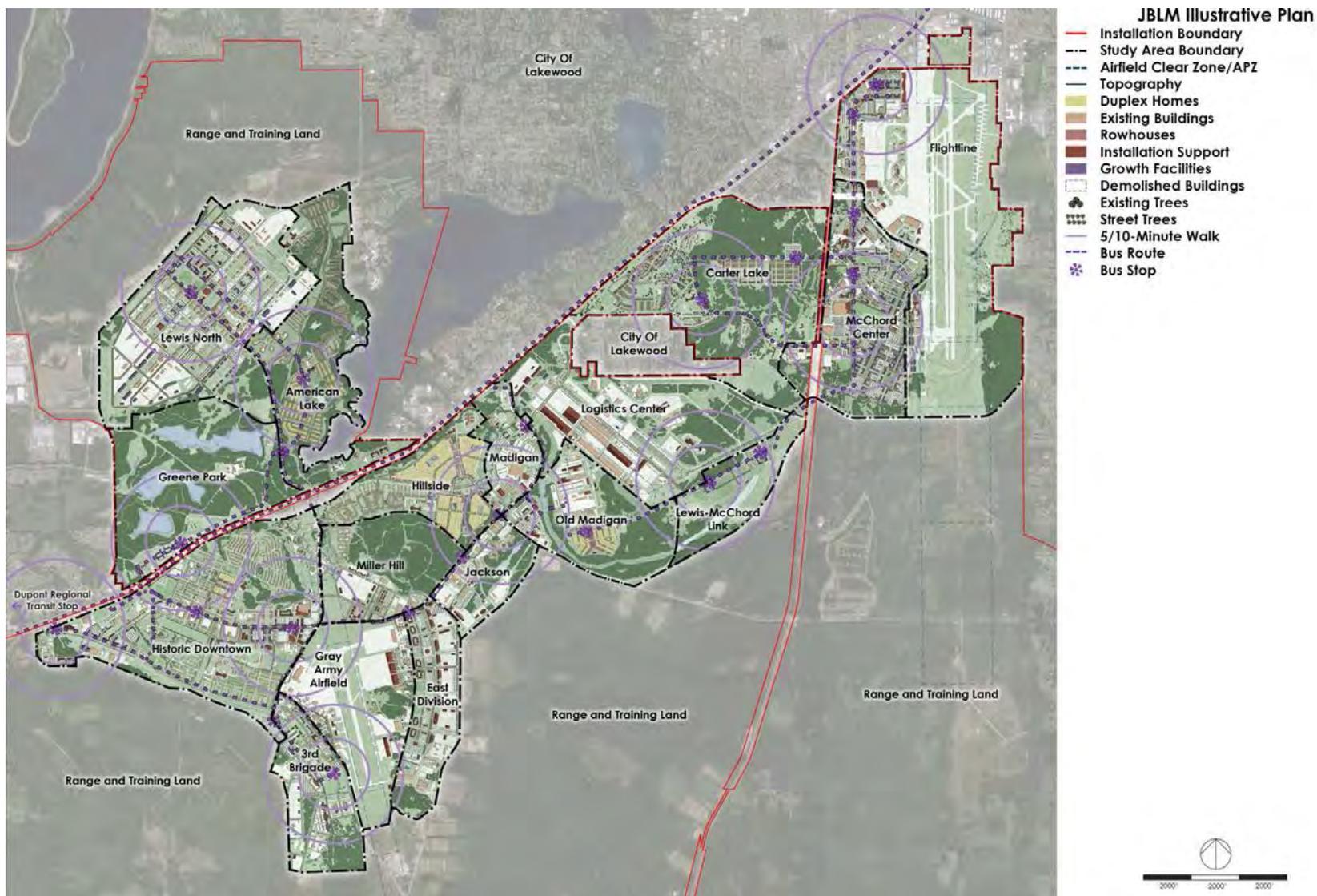


Figure 2-1. Joint Base Lewis-McChord Illustrative Plan

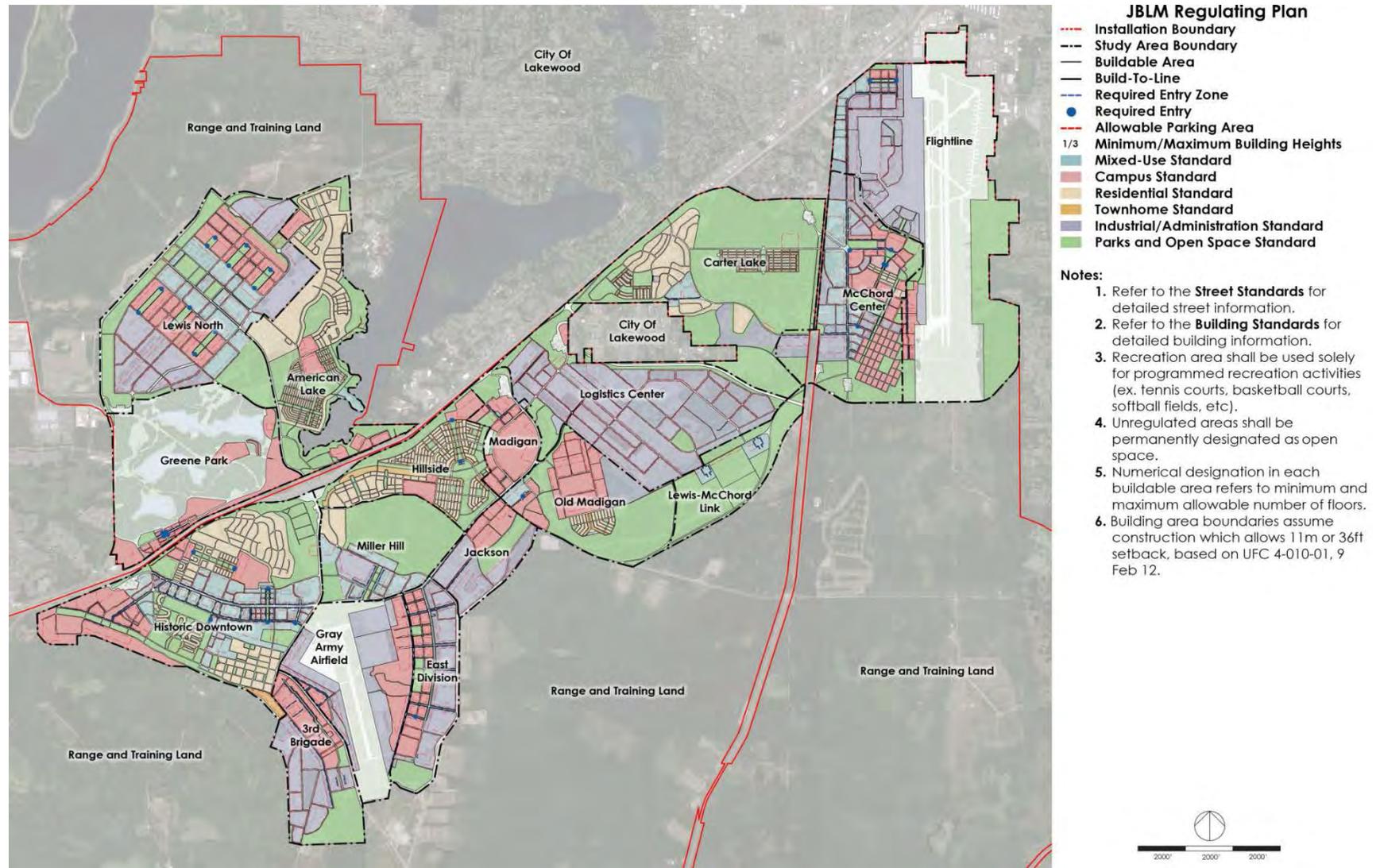


Figure 2-2. Joint Base Lewis-McChord Regulating Plan

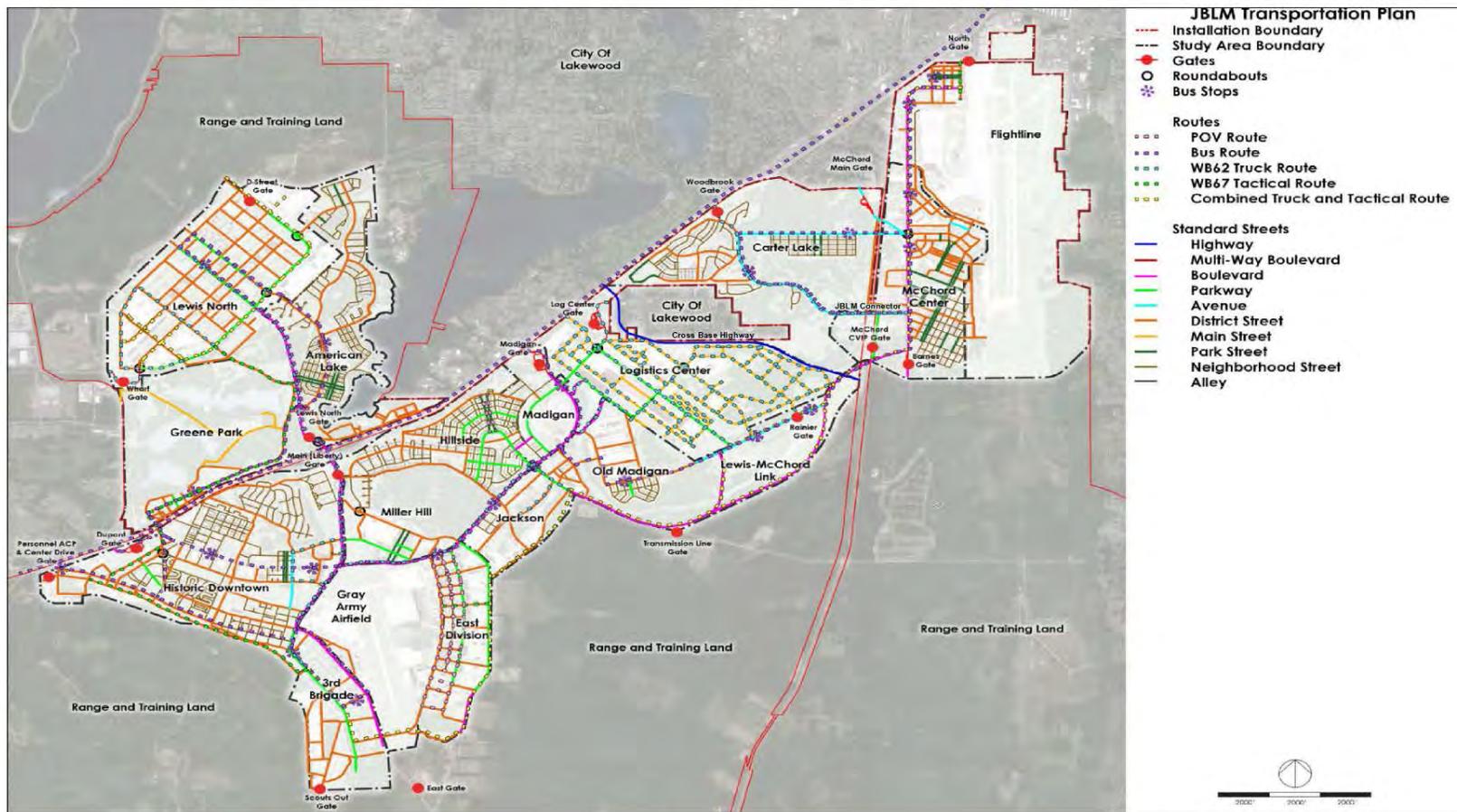


Figure 2-3. Joint Base Lewis-McChord Transportation Plan

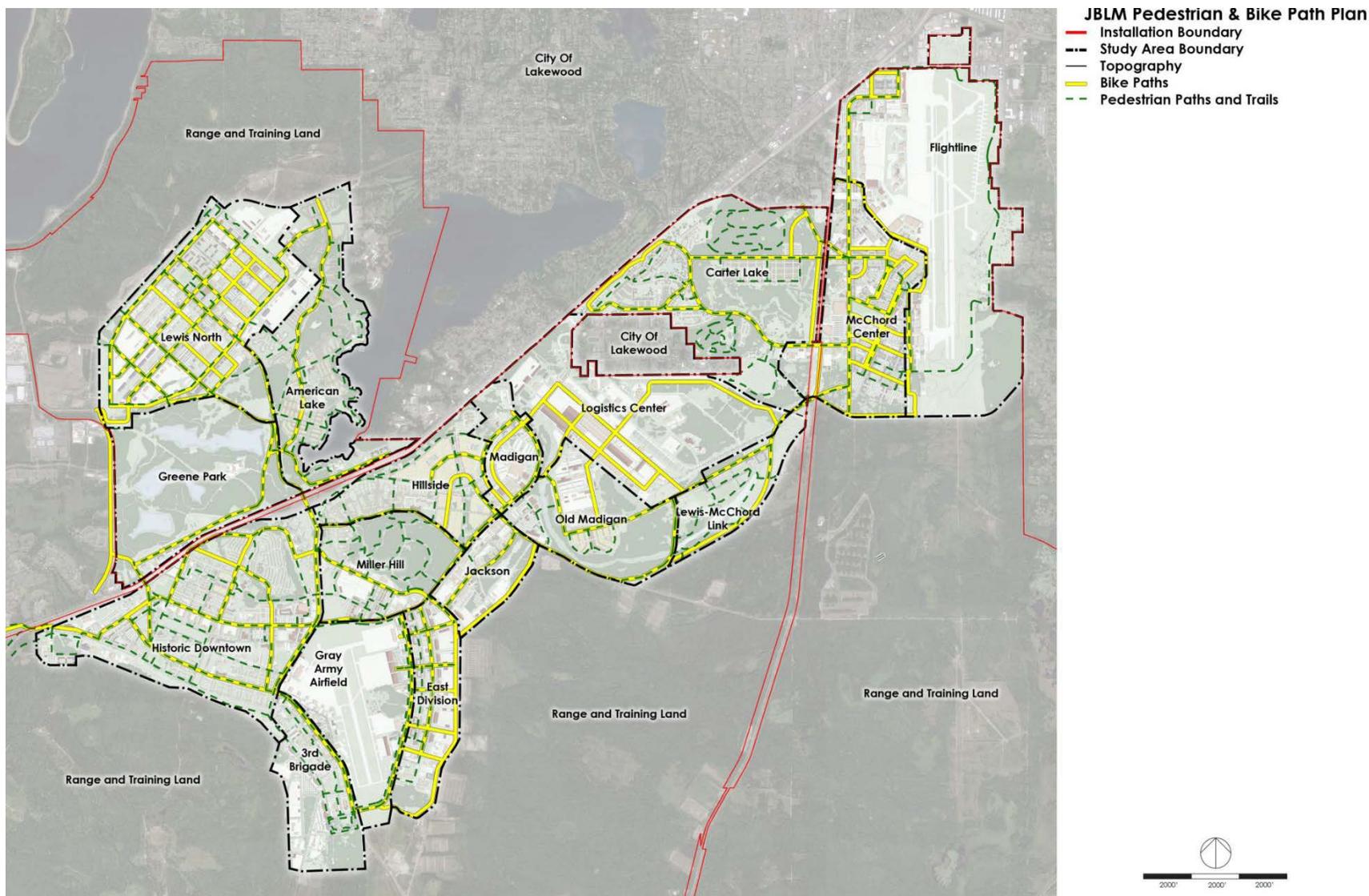


Figure 2-4. Joint Base Lewis-McChord Pedestrian and Bicycle Plan

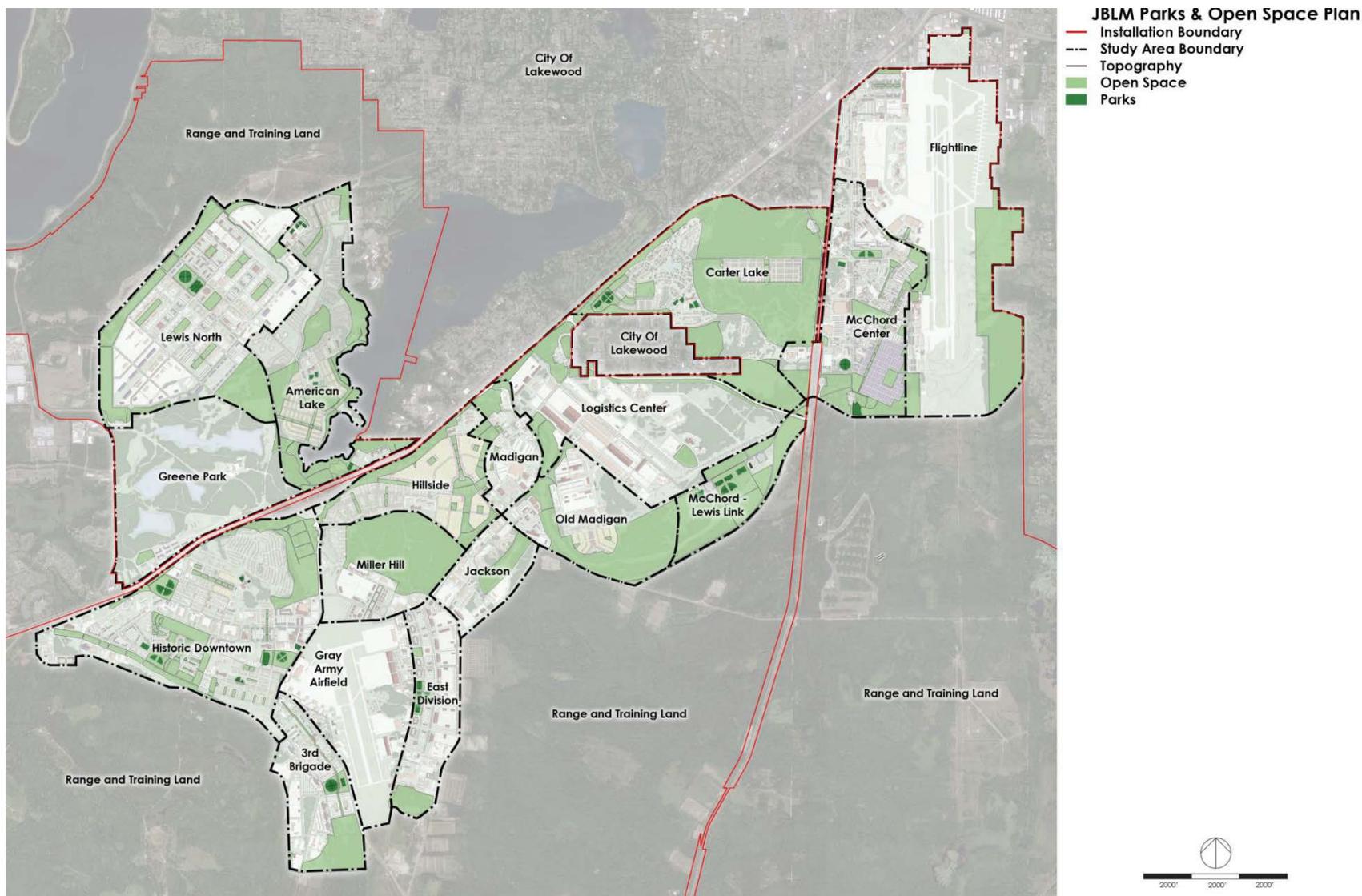


Figure 2-5. Joint Base Lewis-McChord Park and Open Space Plan

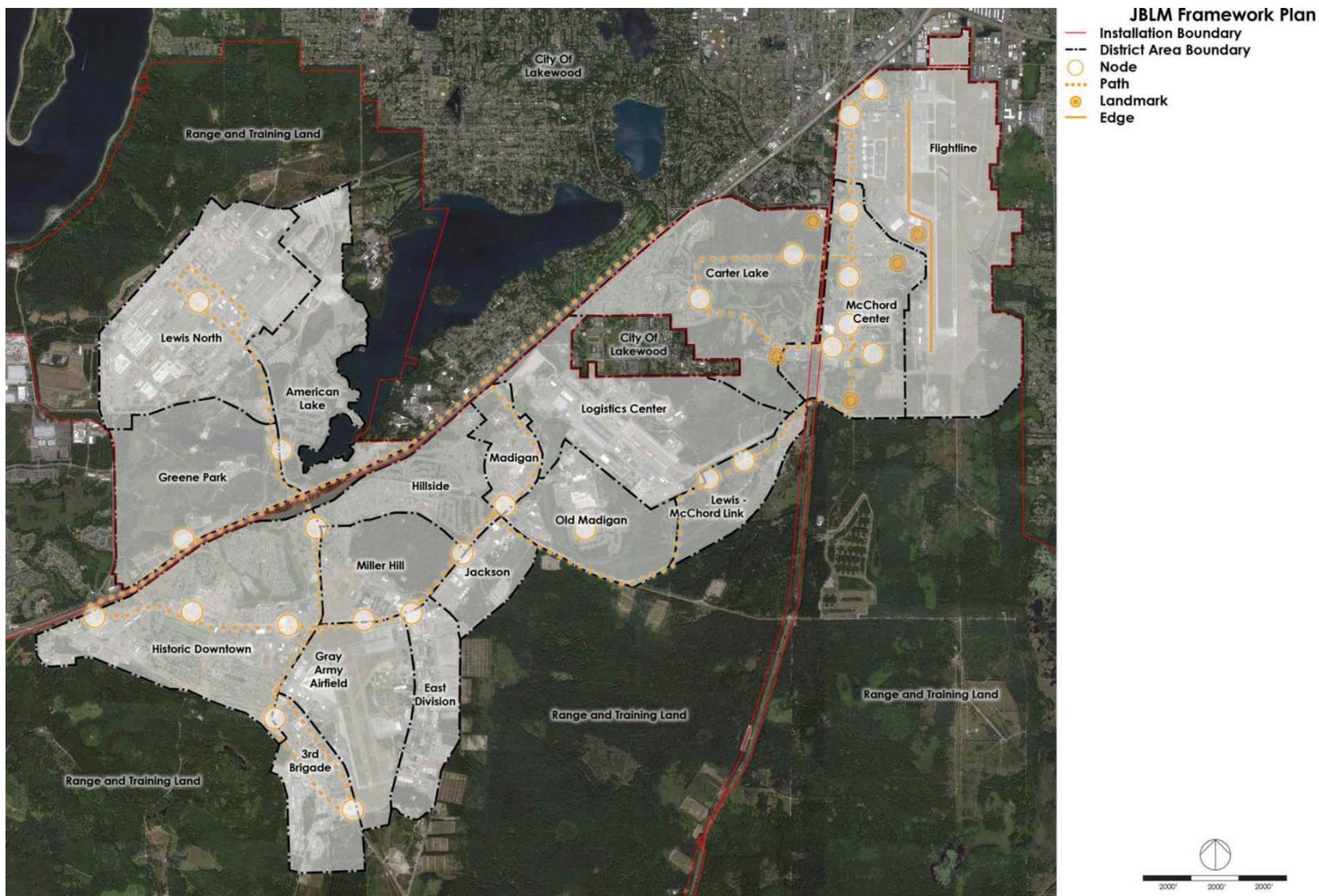


Figure 2-6. Joint Base Lewis-McChord Area Development Plan Districts

Cascade Mountain Range. The districts within the Main Cantonment are divided by topography, function, and major roadways with each district being a neighborhood or series of neighborhoods with clear and distinct edges. The overall Installation Transit Plan with transit stops is identified in this plan. The combined components organize the installation, allow it to support its mission and vision, and work to guide its future development.

2.1.1.2 Illustrative Plan

The Illustrative Plan shows one possible outcome for development at the Main Cantonment at JBLM, as seen in Figure 2-1. The individual Illustrative Plans for each ADP were developed by installation leadership, the Public Works Planning Division, and stakeholders and are presented below in Section 2.1.1.7 (see Figures 2-7 through 2-24). This plan integrates the ADPs for each district into one overall plan for the installation. The combined ADPs in this image form the Illustrative Plan. The individual plans were analyzed as a whole to ensure that the known requirements for the installation are sited and that capacity planning for each district balances the others. The final layout of the installation will likely vary from this plan in some details such as specific building footprints and park layouts, but the Illustrative Plan provides the framework for future programming and siting. Land uses described and proposed as part of this plan include residential areas that would include duplex homes, existing housing, and rowhomes as well as installation support, growth facilities, and buildings proposed for demolition. Illustrative plans for the individual ADPs similarly provide the framework for future land use and development programming and siting at a more detailed level that is specific to the needs and future goals of the individual ADPs and as such are included below.

2.1.1.3 Regulating Plan

The Regulating Plan is the controlling document and principal tool for adopting the installation's form-based code. By regulating the key elements of the Illustrative Plan, such as parking, facility function, greenspace, axis and building entries, this plan serves as the guiding element to ensure future development meets then design intent of the Illustrative Plan. The use of form-based code allows JBLM to exercise more control in the development process. It is a tool to ensure that building development supports JBLM's vision, goals, and principles as noted in Section 1.3. Form-based codes promote mixed-use, compact, and walkable development patterns, not traditional auto-oriented, segregated land uses. Form-based codes emphasize spatial principles that support sustainable development that allows for a range of acceptable uses and regulates these uses through building form and massing while allowing for any compatible use to be constructed. The use of form-based code is apparent in both the

Regulating Plans, building and street standards, and through the Illustrative Plans that graphically illustrate potential development. The Regulating Plan delineates land uses by mixed-use, campus, residential, townhome, industrial/administration and parks and open space. Regulating plans for the individual ADPs provided a more detailed diagram of these land uses. The overall JBLM Regulating Plan can be viewed as Figure 2-2.

2.1.1.4 Transportation Plan

As is the case with many large installations, traffic is a major problem at JBLM. Within each district, workshop participants addressed transportation issues. The Transportation Plan illustrates solutions to those issues and also looks at transportation at JBLM holistically so that traffic can be alleviated on the entire installation (see Figure 2-3). This Transportation Plan classifies the different types of streets on the installation from Multiway Boulevards to Parkways to Alleys and are planned to support more efficient transportation at JBLM and to create complete streets designed for all users including vehicles, bicyclists, and pedestrians.

The centerpiece of this plan was the previous conversion of Pendleton Avenue into a multiway boulevard in the Historic Downtown. Boulevards with median-protected left turns connect the Historic Downtown with Lewis North and also connect the Eastside, Westside, and McChord Field ADPs. Residential neighborhoods are planned to have a more fine-grained system of connected streets that follow the traditional grid model. The Plan supports the possible closure of the Main Gate, which if closed, traffic will have unimpeded access underneath I-5. Because most installation traffic arrives on I-5, both north of the Madigan Gate or south of the DuPont Gate, this new system will be more efficient and improve safety along the I-5 corridor. Another approach to solve the connectivity issue between Lewis North and the Lewis Main Districts would be to construct an overpass connector between Lewis Main and Lewis North. The DoD wants to create a more efficient transportation network within the McChord Field portion of the installation, including providing easier access to I-5, reducing traffic conflicts and congestion, and creating a link between Lewis Main and McChord Field. In addition, the Transportation Plan includes the Army's goal to transform the existing random building and street infrastructure in McChord Field into an ordered neighborhood with complete streets and linear parks.

Given the greater mix of uses planned in each district, the plan moves away from single-use zoning model, which mandates the use of automobiles to get from one zone to another and, instead, embraces a transit-oriented approach that can support a future bus or streetcar network along the main boulevards and parkways. However, to be effective, transit must be paired with appropriate residential densities, one reason why the plan places higher density rowhouses,

barracks, and bungalows close to transit stops. Families and single Service members living within walking distance of these stops will benefit from lowered rates of driving. These neighborhoods will have ample parks and open spaces to make the density comfortable. The plan also accommodates future plans for regional transit and allows for future regional commuter rail line stop that connects directly to the transit system on the installation.

The Transportation Plan also includes provisions for the safe operation of large vehicles, both operational and service related. The roads with the large vehicle overlays must be designed to safely allow the passage of large vehicles. In addition, the plan designates areas that are off limits to large vehicles.

2.1.1.5 Pedestrian and Bicycle Plan

One major way to alleviate the traffic problems at JBLM is to provide opportunities for alternate types of transportation. The Pedestrian and Bicycle Plan illustrates the overall pathways to show that this has been coordinated throughout (see Figure 2-4). While much of the biking and walking will be contained within smaller areas, this plan shows that the networks that connect the entire installation.

This plan identifies a bike network that connects all the districts from Lewis North to Lewis Main to McChord Field using parkway bike lanes and boulevard access lanes. Residential streets become “shared streets” that can safely accommodate both bikes and cars in slow-moving through lanes. In addition, the plan lays out an interconnected fitness trail linking all of the installation. The placement of pathways through the Fort Lewis Garrison Historic District, will be required to adhere to development constraints and conditions, associated with the JBLM Historic Landscape Management Plan.

2.1.1.6 Parks and Open Space Plan

The Parks and Open Space Plan depicts areas that are designated to remain undeveloped (see Figure 2-5). Open space refers to areas that currently are green space outside developed areas, often because of topography or dense vegetation. Parks are structured green areas within developed areas, designated to remain open to achieve the intent of the RPMP. Parks can be completely undeveloped spaces or designed as gathering spaces or recreation areas that can serve as habitat for wildlife. This plan shows the connection of parks and open spaces throughout the installation. Restrictions that include historic districts and eligible archaeological resources may apply to the placement of proposed parks and green spaces. It is important to

note that the placement of green spaces could be considered a protective measure of archaeological resources and sites should the use of these sites be limited.

While the typical uses are still accommodated, this plan broadens the military concept of parks. In the Lewis-McChord Link area, a new Recreation Complex is planned along with parks that have large lawns suitable for a variety of uses, tree-shaded groves for smaller gatherings, and largely undeveloped settings for less structured activities such as hiking or camping. In the Historic Downtown, a park block system connects new residential neighborhoods with downtown retail areas, and a new Town Square, framed by mixed-use retail and office buildings, are oriented to capture a dramatic view of Mount Rainier. In addition, a new Memorial Park honors the sacrifices of Service members who have called JBLM home.

Lewis North's new Town Square is at the heart of the development, and a new campus quad connects the Exchange retail node with the rest of the district. In East Division, new barracks and administrative buildings define a campus quad that centers on a large park. Near the intersection of four Eastside Districts (Madigan, Old Madigan, Jackson, and Hillside) is a new neighborhood center. In all the housing neighborhoods, smaller parks are located within a 3-minute walk of every home. In McChord Center, a neighborhood center focuses on the majestic view of Mount Rainier, and small parks and recreation fields are located throughout Carter Lake. Finally, around the installation perimeter, greenways take advantage of required security buffers and support wide bike paths, linear parks, and neighborhood playgrounds.

2.1.1.7 Area Development Planning Districts

The bulk of the installation planning efforts should occur at the scale of an ADP district. This section summarizes the most recent results of master planning efforts for each ADP district, and this information will shape the programmatic impact analysis relative to potential development within each ADP district assessed in this EA. Table 2-1 details the individual ADPs' acreage, potential development capacity build-out, and parking required both with and without transit reduction as well as overall parking provided. Figure 2-6 shows all ADP districts and their location at JBLM, with Figures 2-7 through 2-24 detailing the specifics of the individual ADPs. Projects identified in the legends of the individual ADP figures (Figures 2-7 through 2-24) are specific projects as part of the Capital Investment Strategy, including new construction, renovations, and demolition and are noted in Appendix A. The developable land is used to provide context for the description of potential impacts in Chapter 3. In the future if JBLM's mission and mission requirements were to change, the ADP districts would be the first component of the RPMP to be altered to reflect overall installation changes and requirements.

As such, information presented on the ADP districts is relatively general to allow the installation greater flexibility to accommodate installation and mission requirements. A qualitative analysis of these districts has been completed and is presented in Chapter 3. The ADPs at JBLM as noted in Figure 2-6 include:

- American Lake
- Carter Lake
- East Division
- Flightline
- Gray Army Airfield
- Greene Park
- Hillside
- Historic Downtown
- Jackson
- Lewis-McChord Link
- Lewis North
- Logistics Center
- Madigan
- McChord Center
- Miller Hill
- Old Madigan
- First Brigade (previously noted as Third Brigade)
- Yakima Training Center

Since the finalization of the RPMP, the Third Brigade ADP, has since been renamed to the First Brigade ADP, while all other components of the ADP remain the same. While, it is referred to correctly as the First Brigade ADP throughout this document, Figures 2-1 through 2-6 continue to note the ADP as the Third Brigade as to remain consistent with the RPMP.

Table 2-1. Acreage and Proposed Capacity Development and Parking within the Area Development Planning Districts

Area Development Planning District	Acreage (acres)	Development Capacity (square feet)	Parking Required with Transit Reduction (spaces)	Parking Required without Transit Reduction (spaces)	Parking Provided (spaces)
American Lake	910	195,000	627	896	2,585
Carter Lake	1,260	3,255,400	235	336	2,577
East Division	424	3,096,800	2,705	3,865	4,747
Flightline	1,908	3,130,800	6,001	11,968	6,857
Gray Army Airfield	751	1,209,600	2,166	3,095	2,498
Greene Park	1,012	508,000	785	1,122	1,503
Hillside	722	249,600	380	543	487
Historic Downtown	1,322	4,183,300	8,300	11,855	9,763
Jackson	277	641,500	729	1,042	3,139
Lewis-McChord Link	722	375,000	815	1,164	1,302
Lewis North	1,322	6,473,600	8,845	12,635	11,096
Logistics Center	1,105	3,916,000	1,432	2,046	2,123
Madigan	239	693,600	3,995	5,708	4,020
McChord Center	864	8,123,000	10,573	15,034	12,343
Miller Hill	722	1,538,800	1,419	2,028	1,805
Old Madigan	596	1,090,400	3,165	4,522	4,006
First Brigade	367	2,133,200	3,324	4,748	3,569
Yakima Training Center	N/A	3,648,500	647	924	1,616

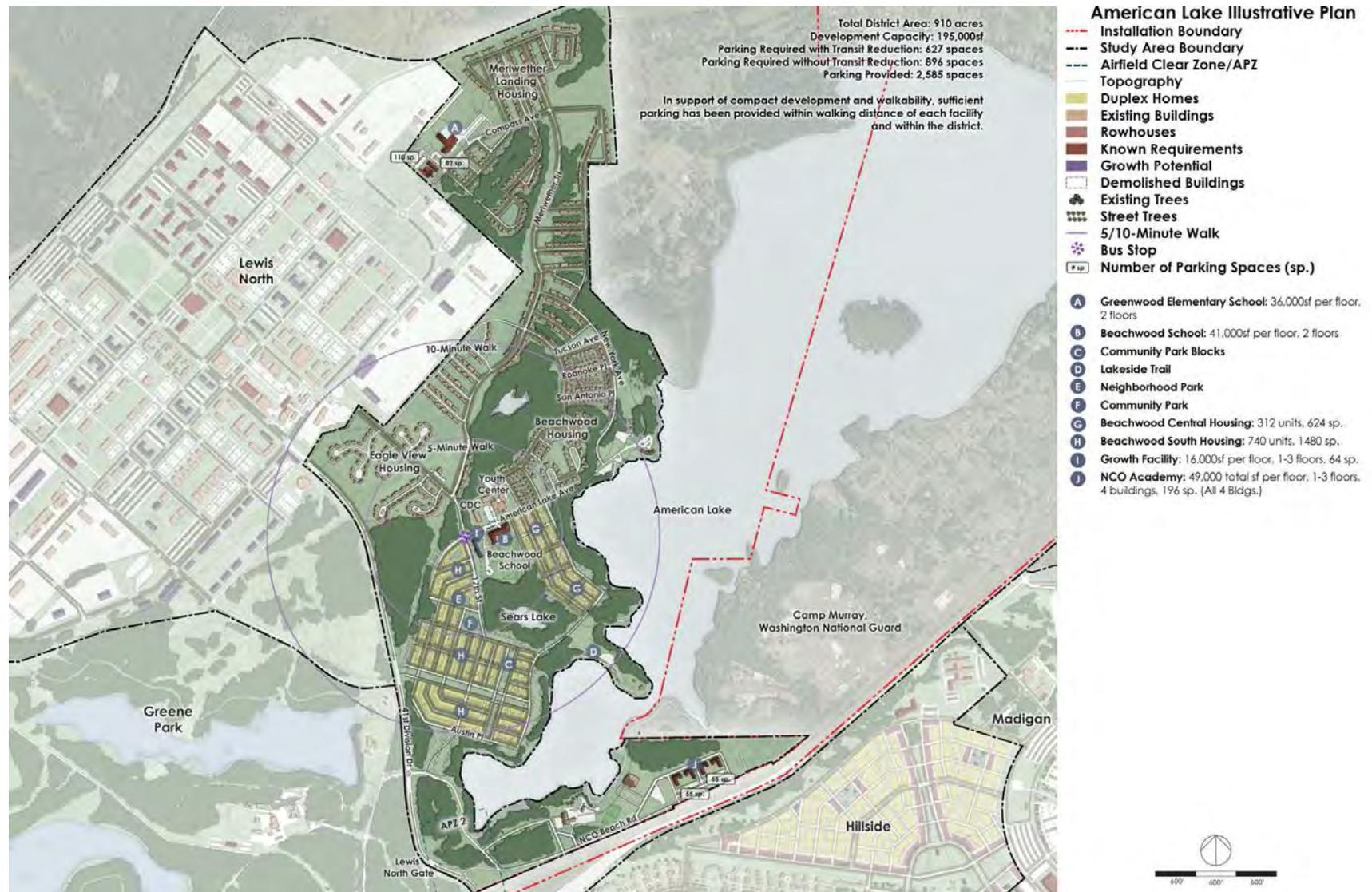


Figure 2-7. American Lake Area Development Plan Illustrative Plan

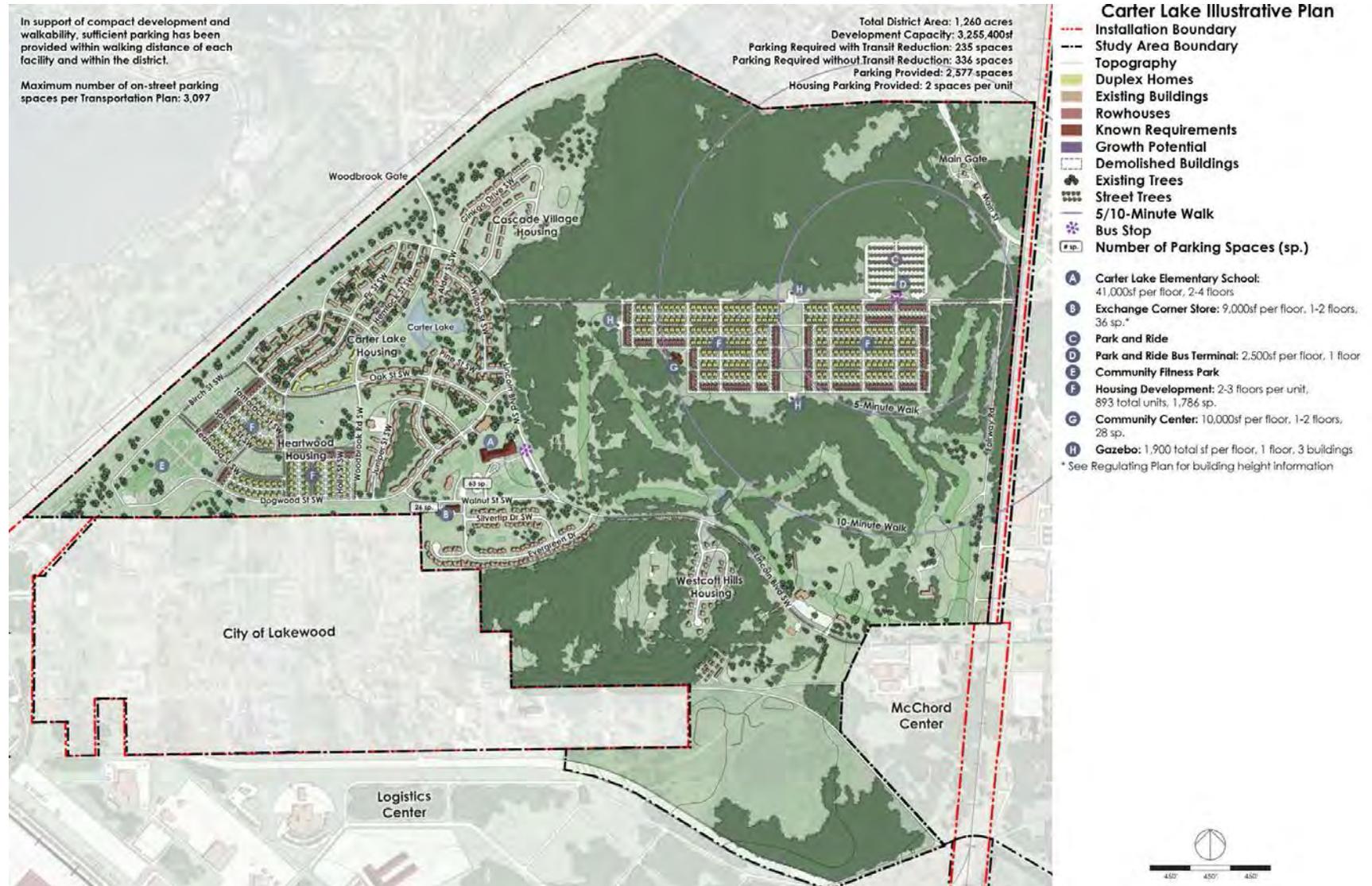


Figure 2-8. Carter Lake Area Development Plan Illustrative Plan

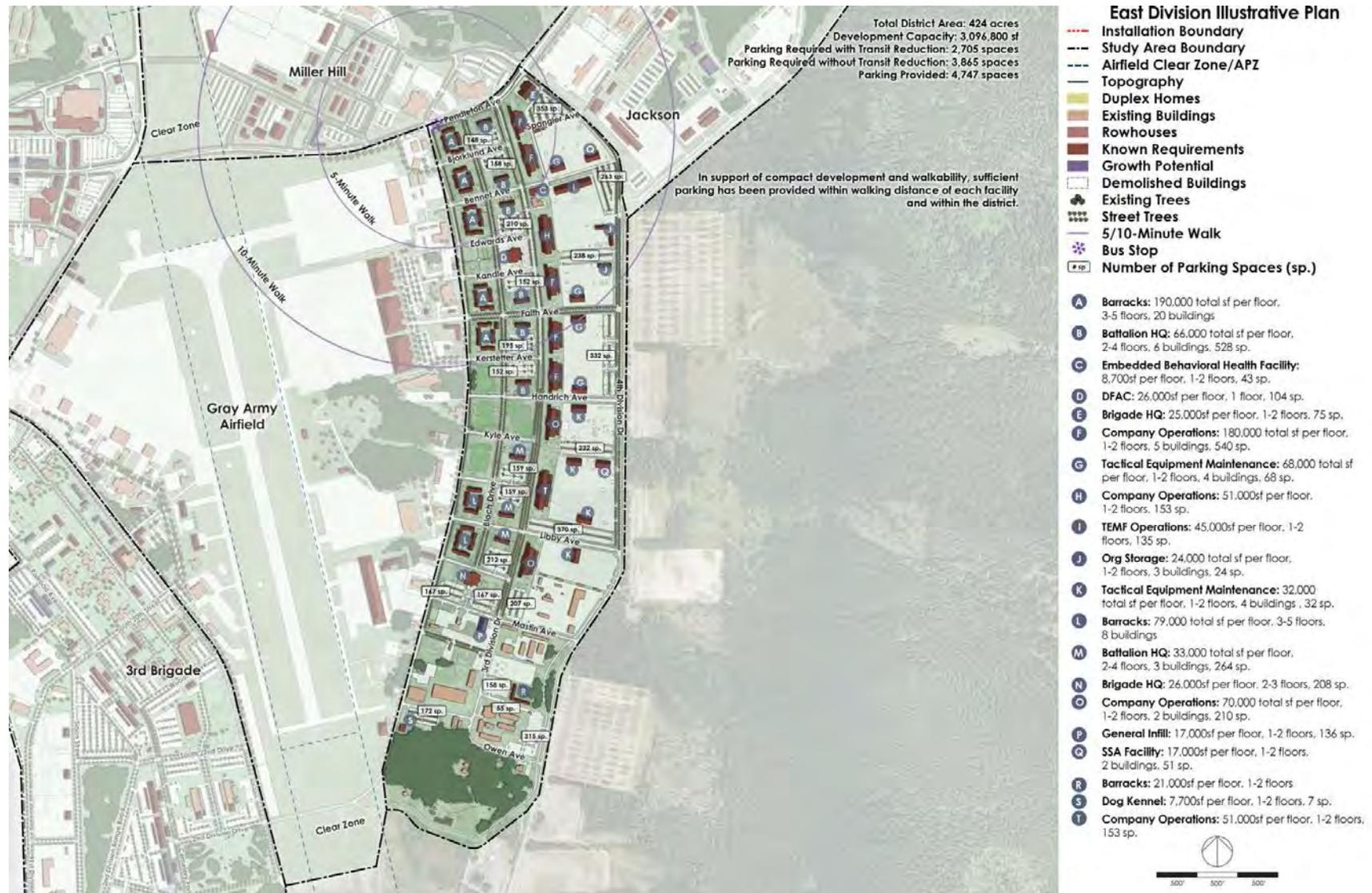


Figure 2-9. East Division Area Development Plan Illustrative Plan

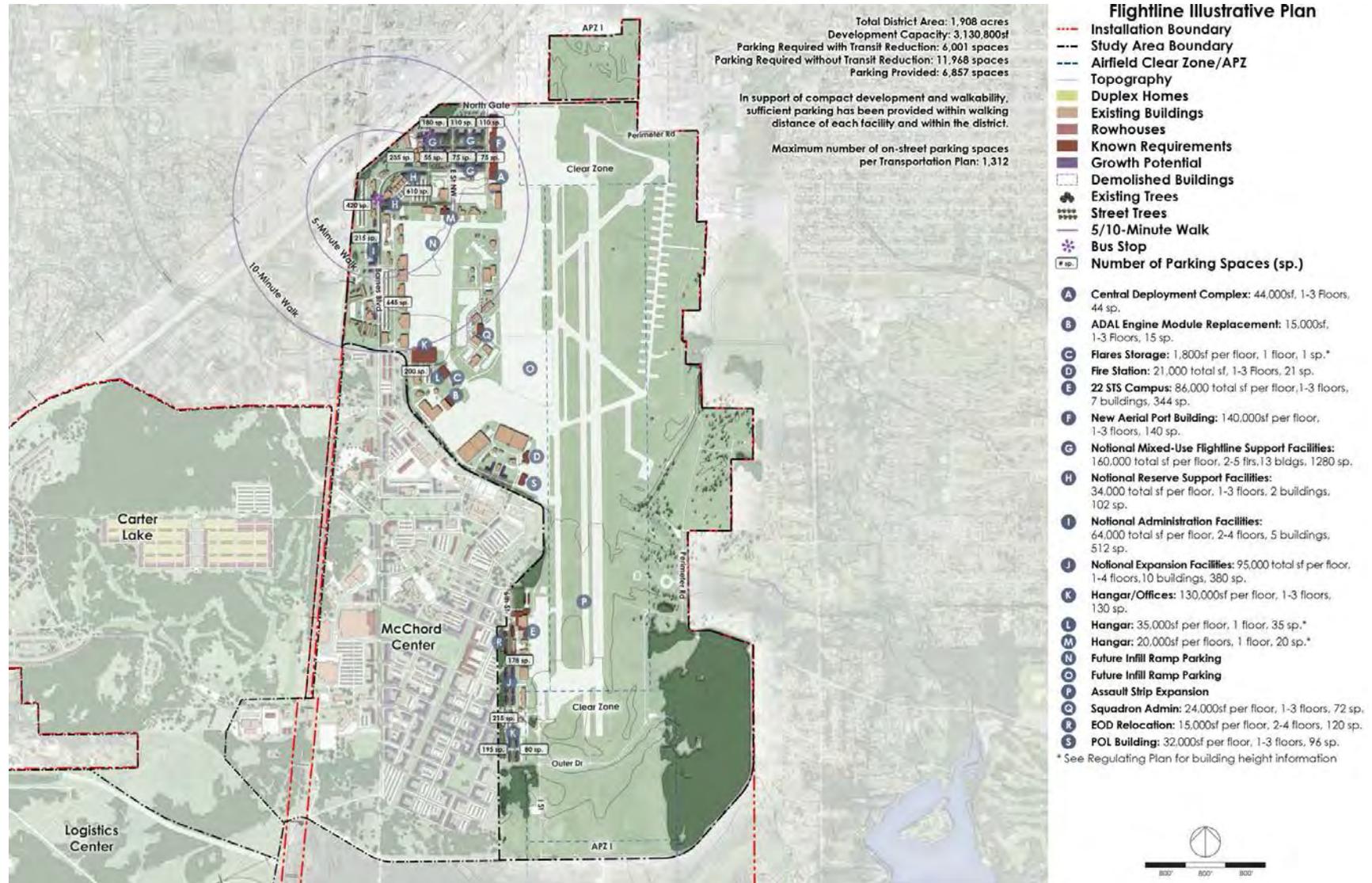


Figure 2-10. Flightline Area Development Plan Illustrative Plan

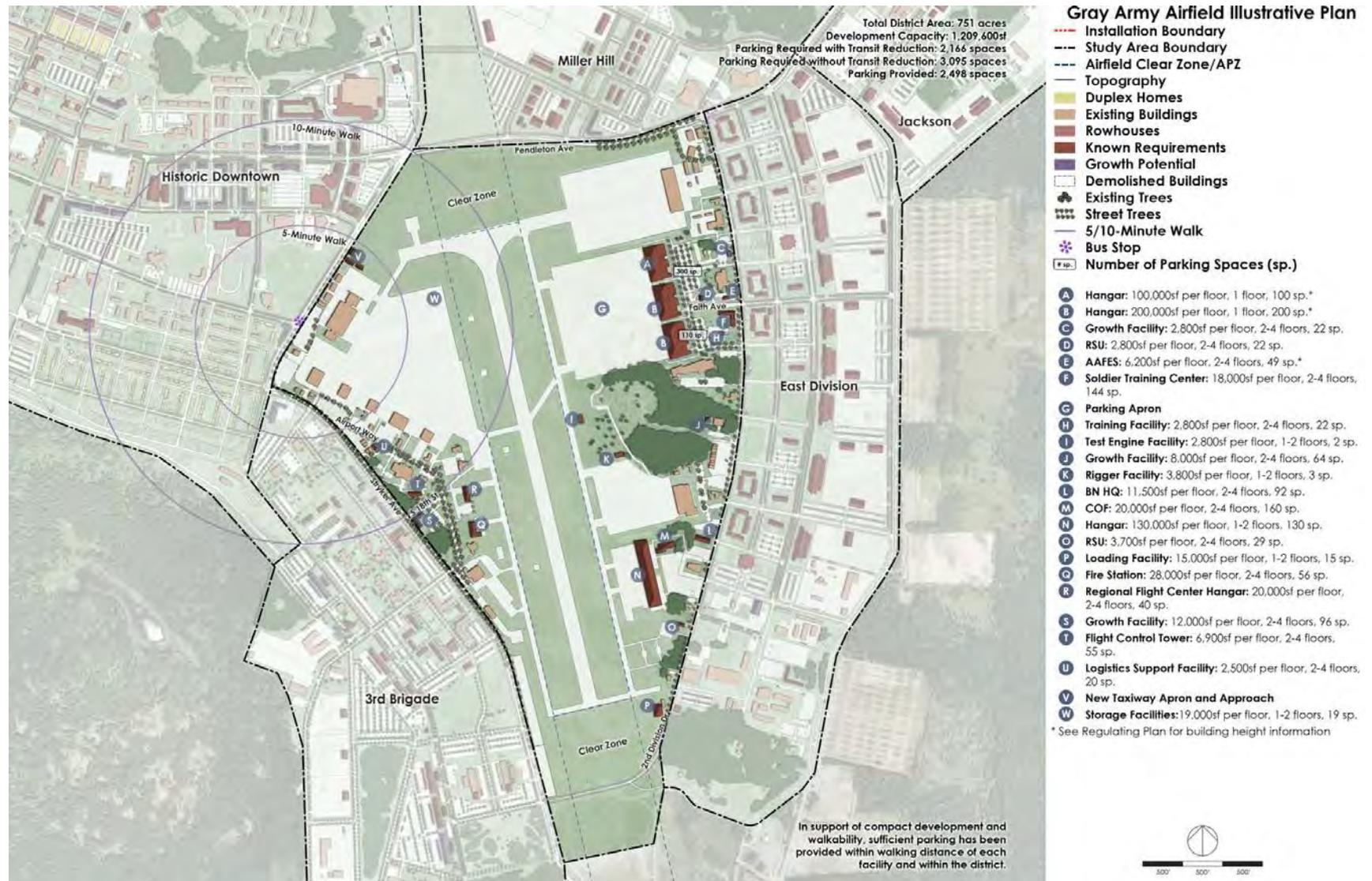


Figure 2-11. Gray Army Airfield Area Development Plan Illustrative Plan

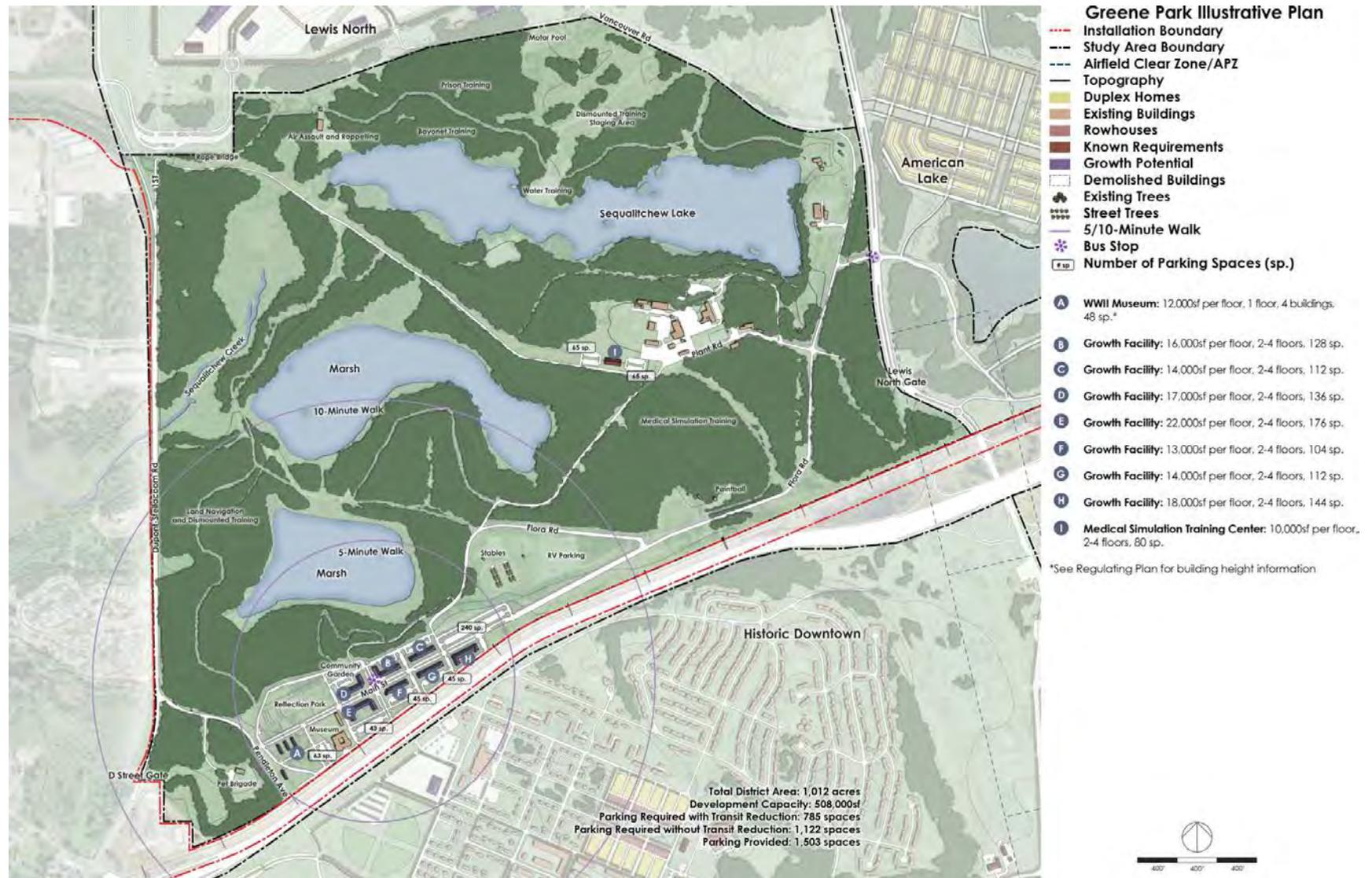


Figure 2-12. Greene Park Area Development Plan Illustrative Plan

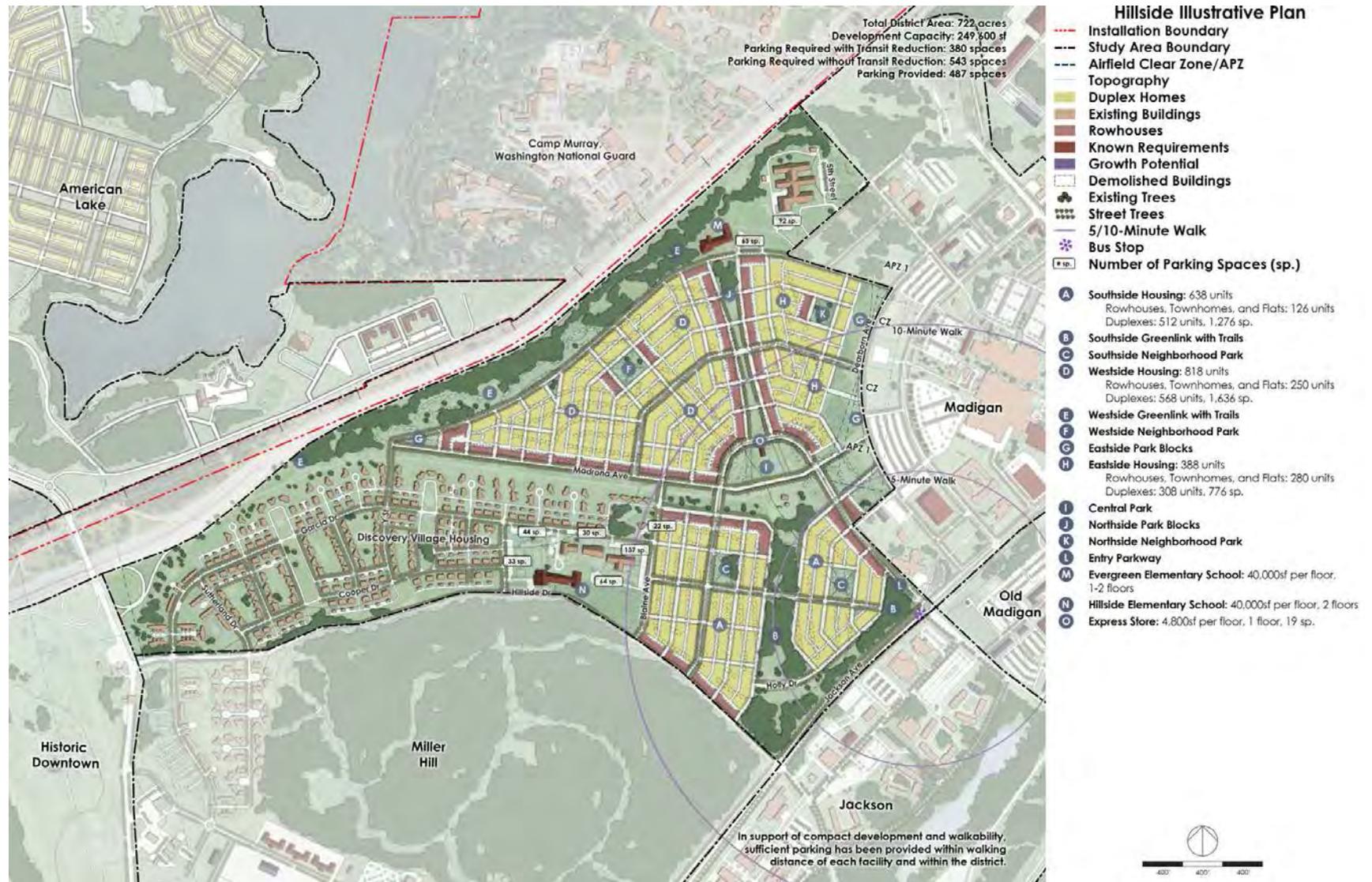


Figure 2-13. Hillside Area Development Plan Illustrative Plan

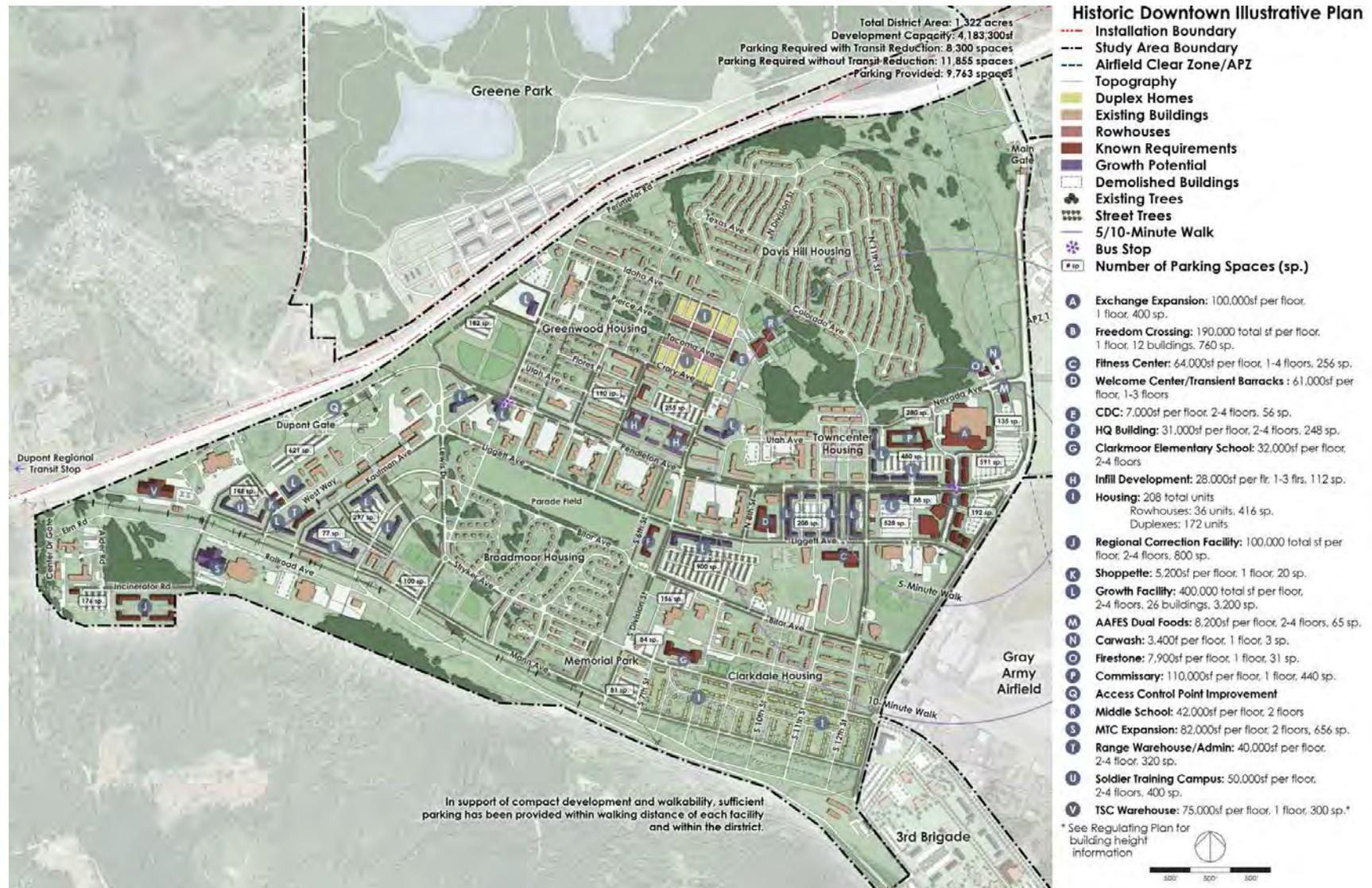


Figure 2-14. Historic District Area Development Plan Illustrative Plan

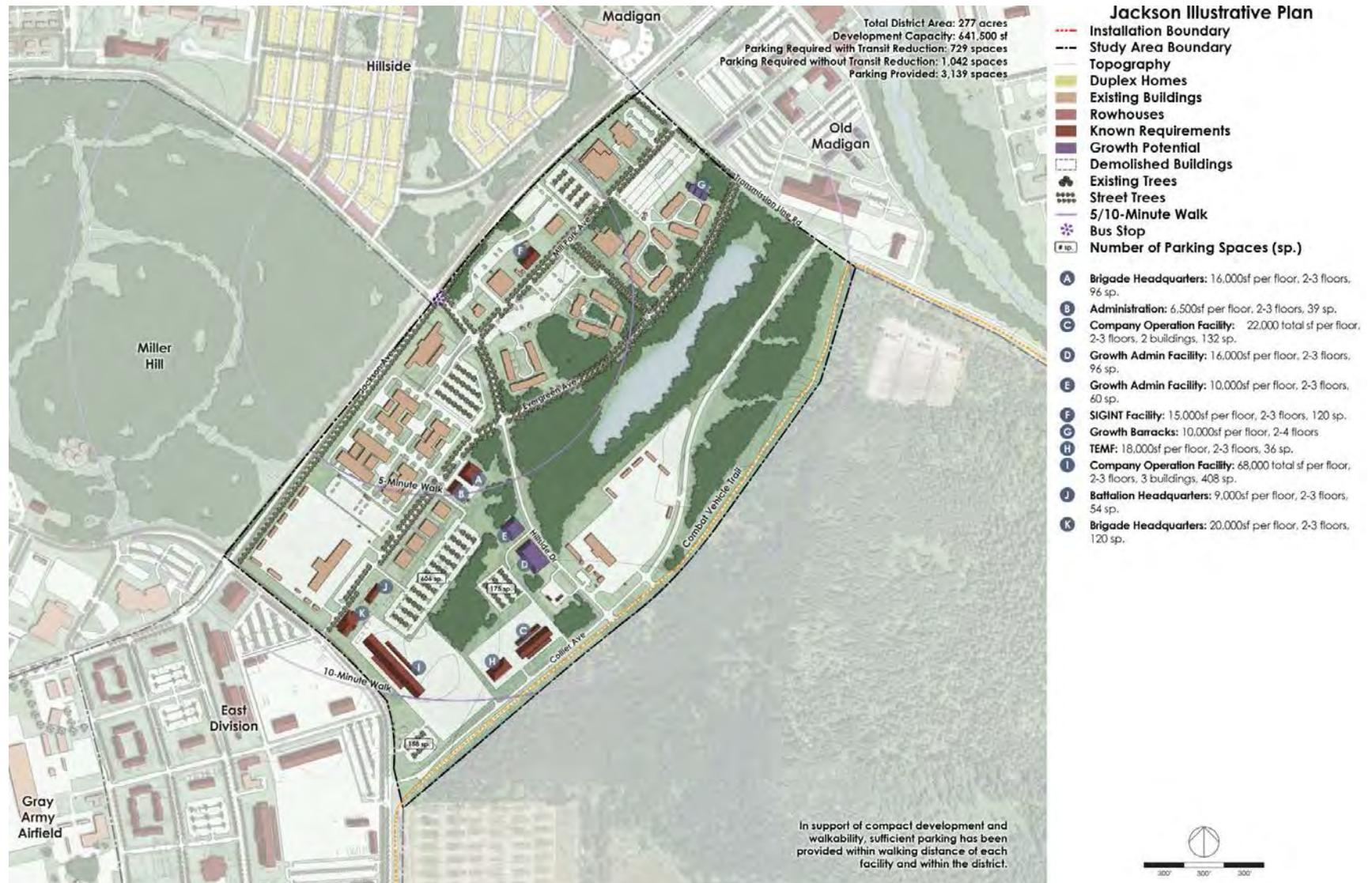


Figure 2-15. Jackson Area Development Plan Illustrative Plan

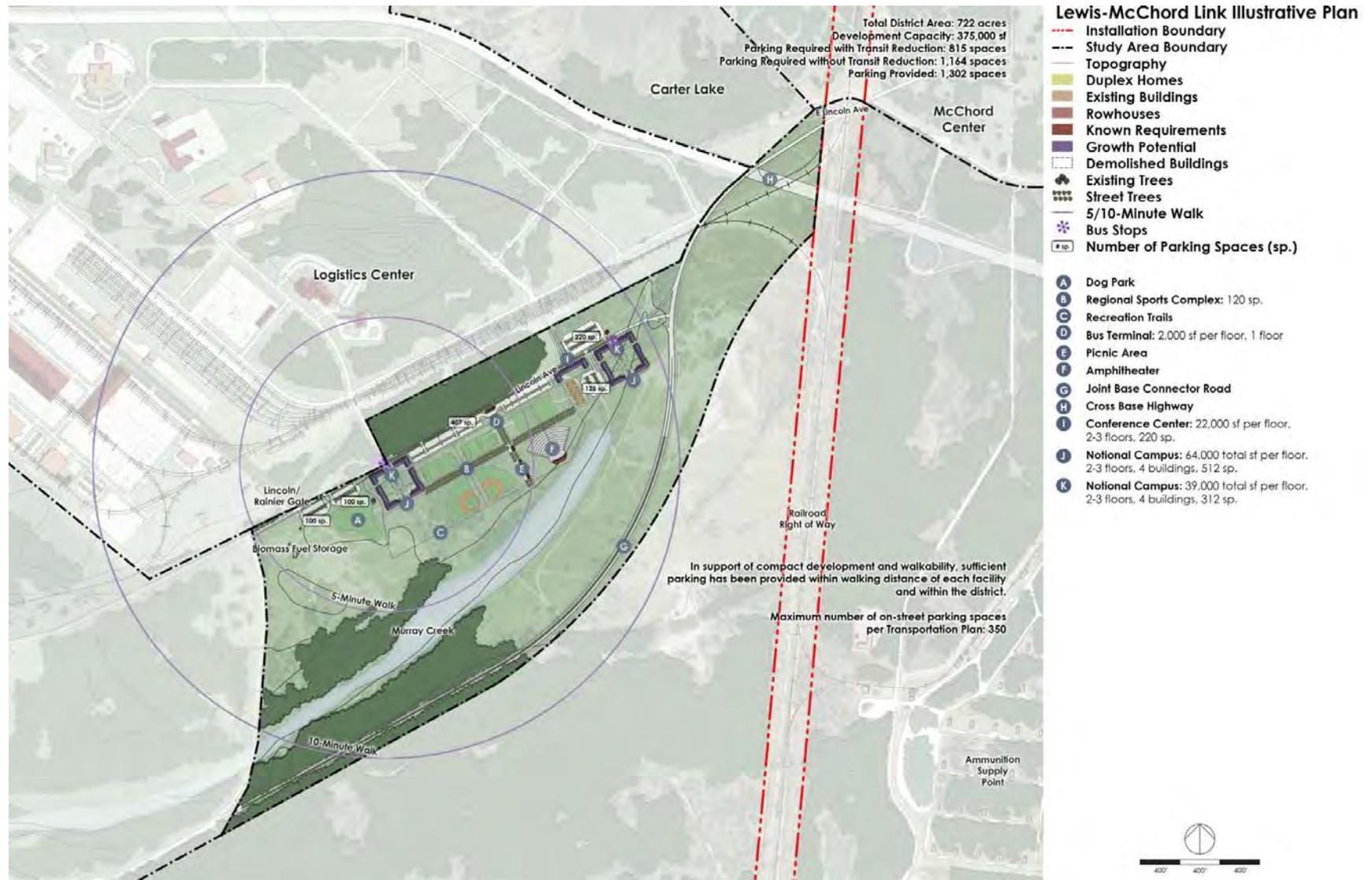


Figure 2-16. Lewis-McChord Link Area Development Plan Illustrative Plan

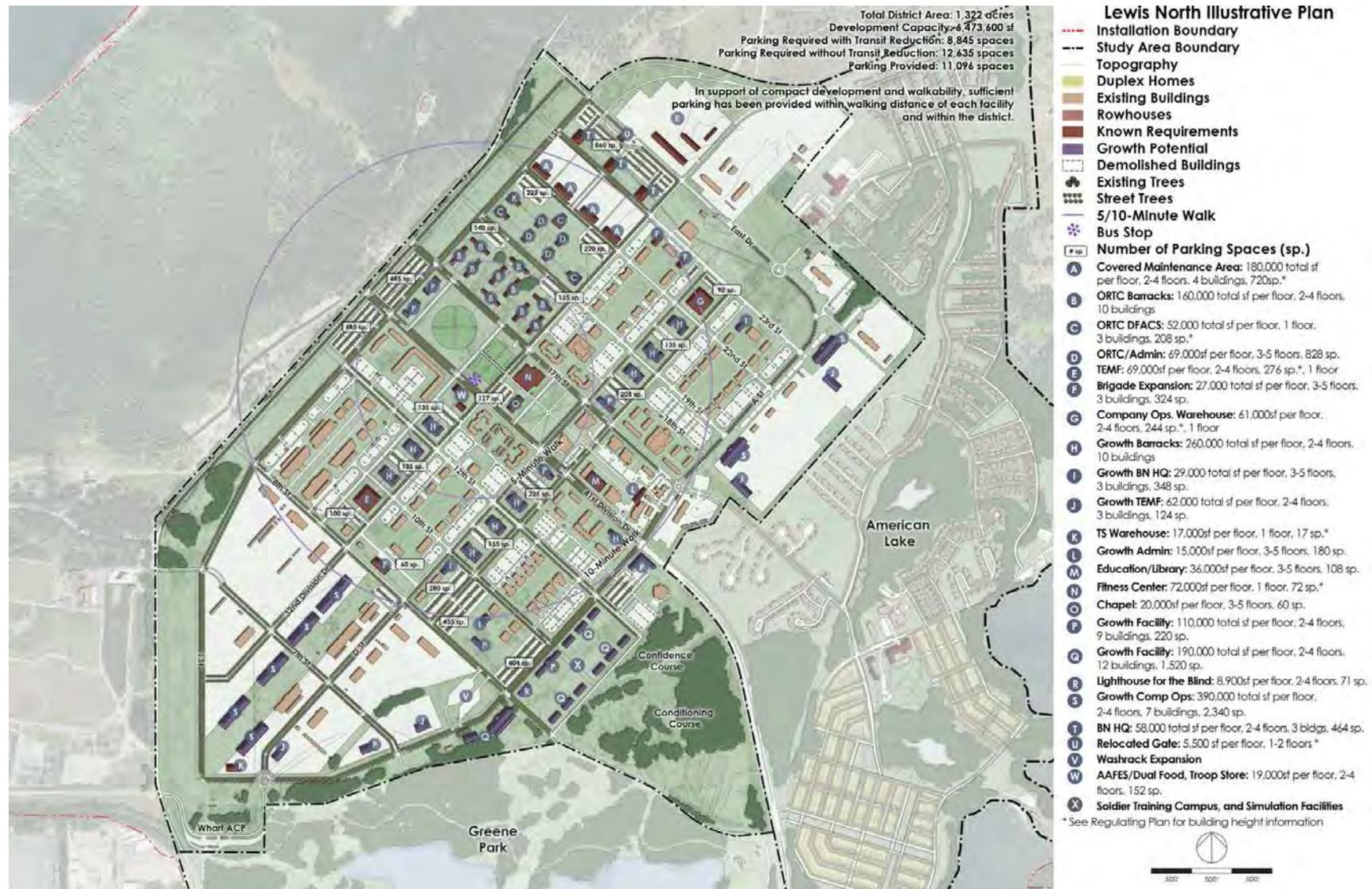


Figure 2-17. Lewis North Area Development Plan Illustrative Plan

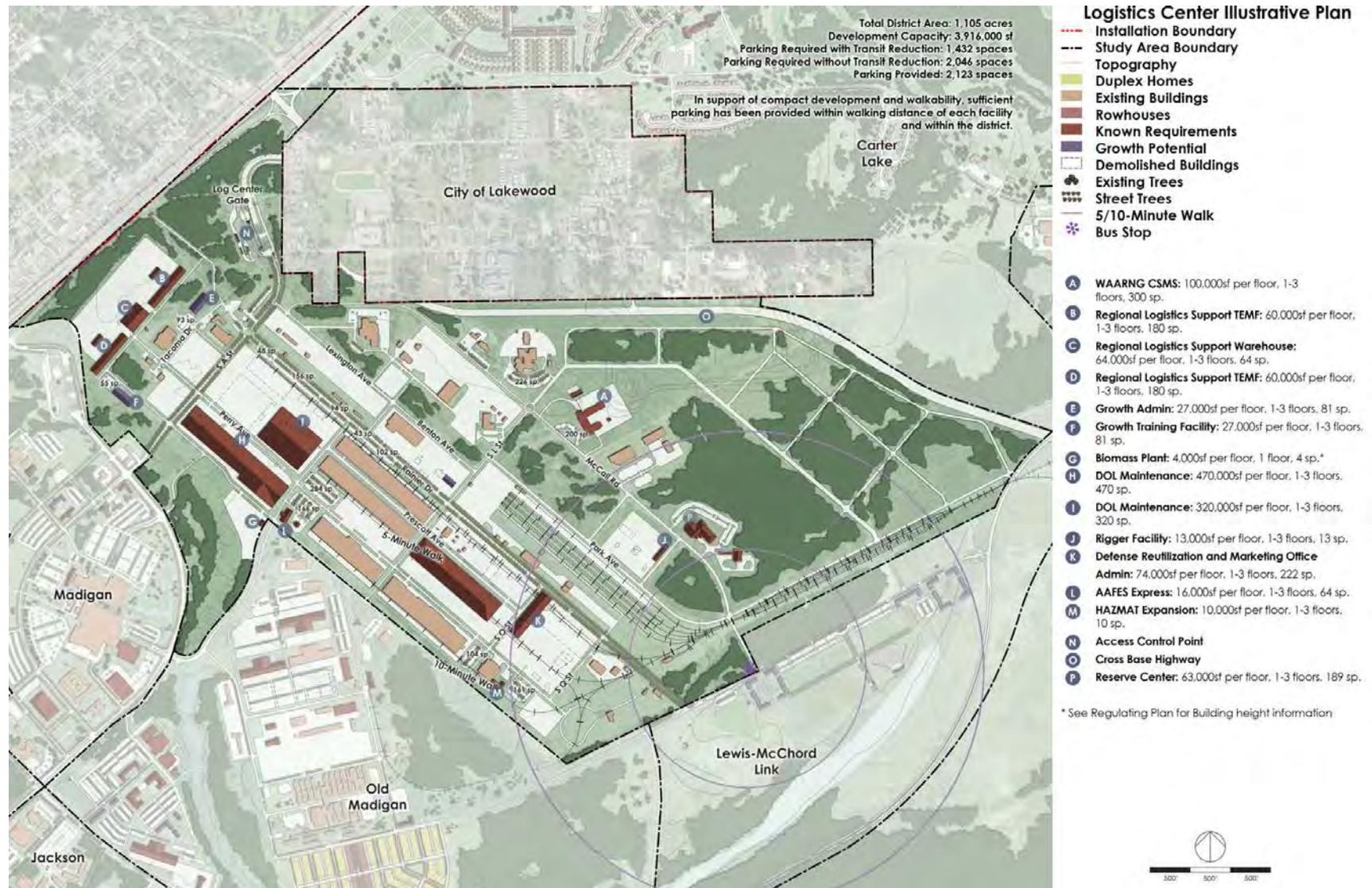


Figure 2-18. Logistics Center Area Development Plan Illustrative Plan

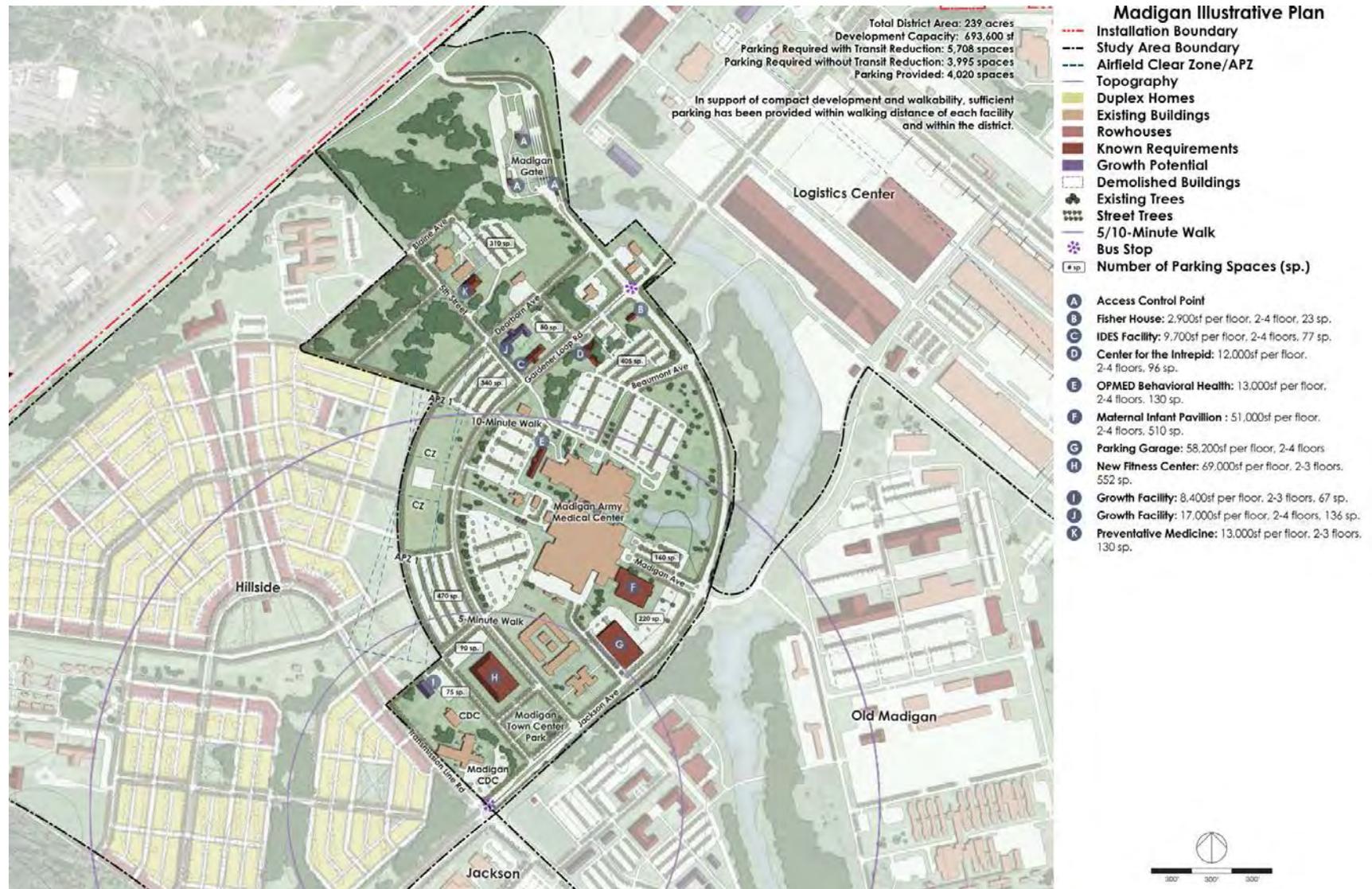


Figure 2-19. Madigan Area Development Plan Illustrative Plan

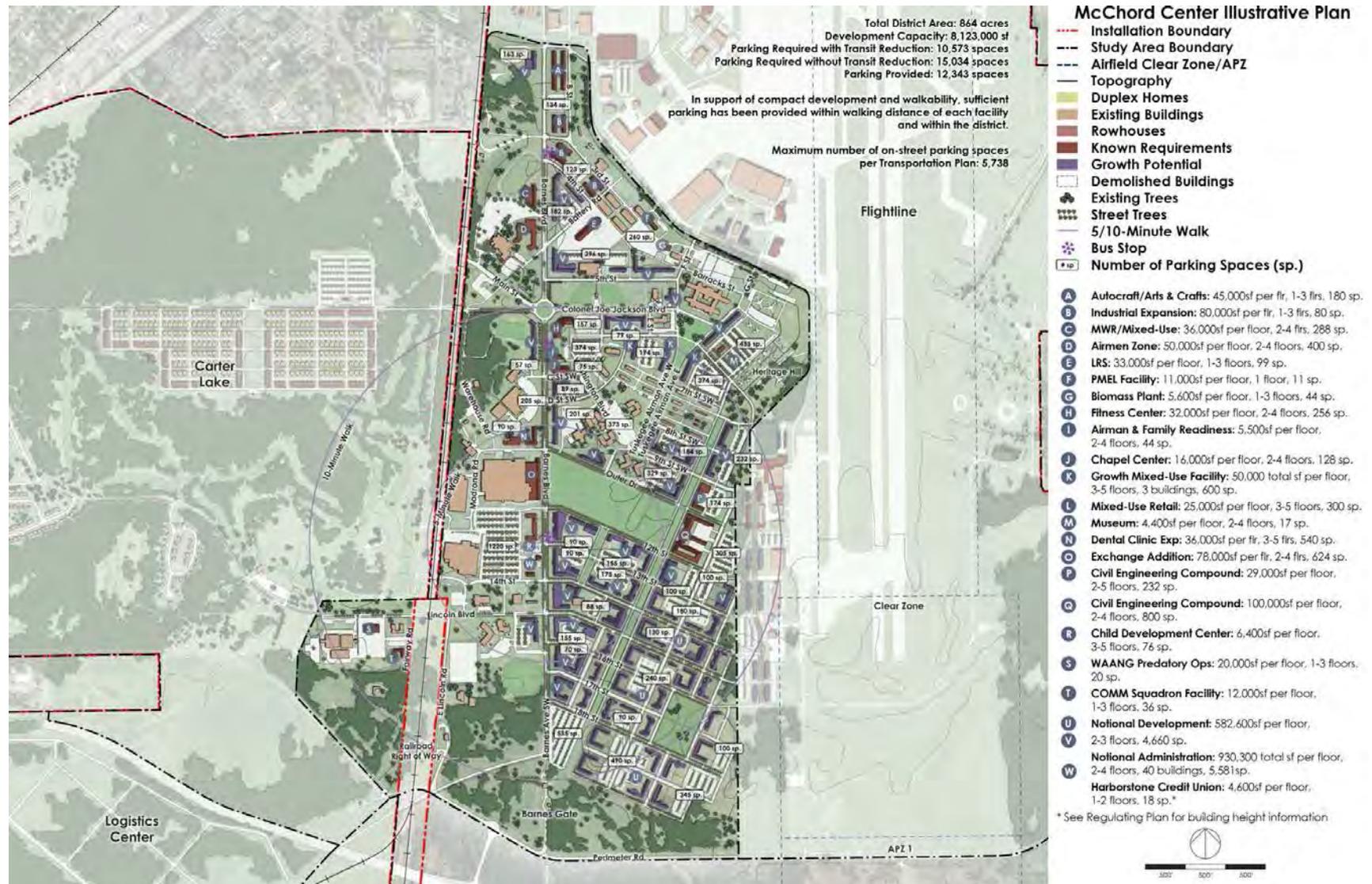


Figure 2-20. McChord Center Area Development Plan Illustrative Plan

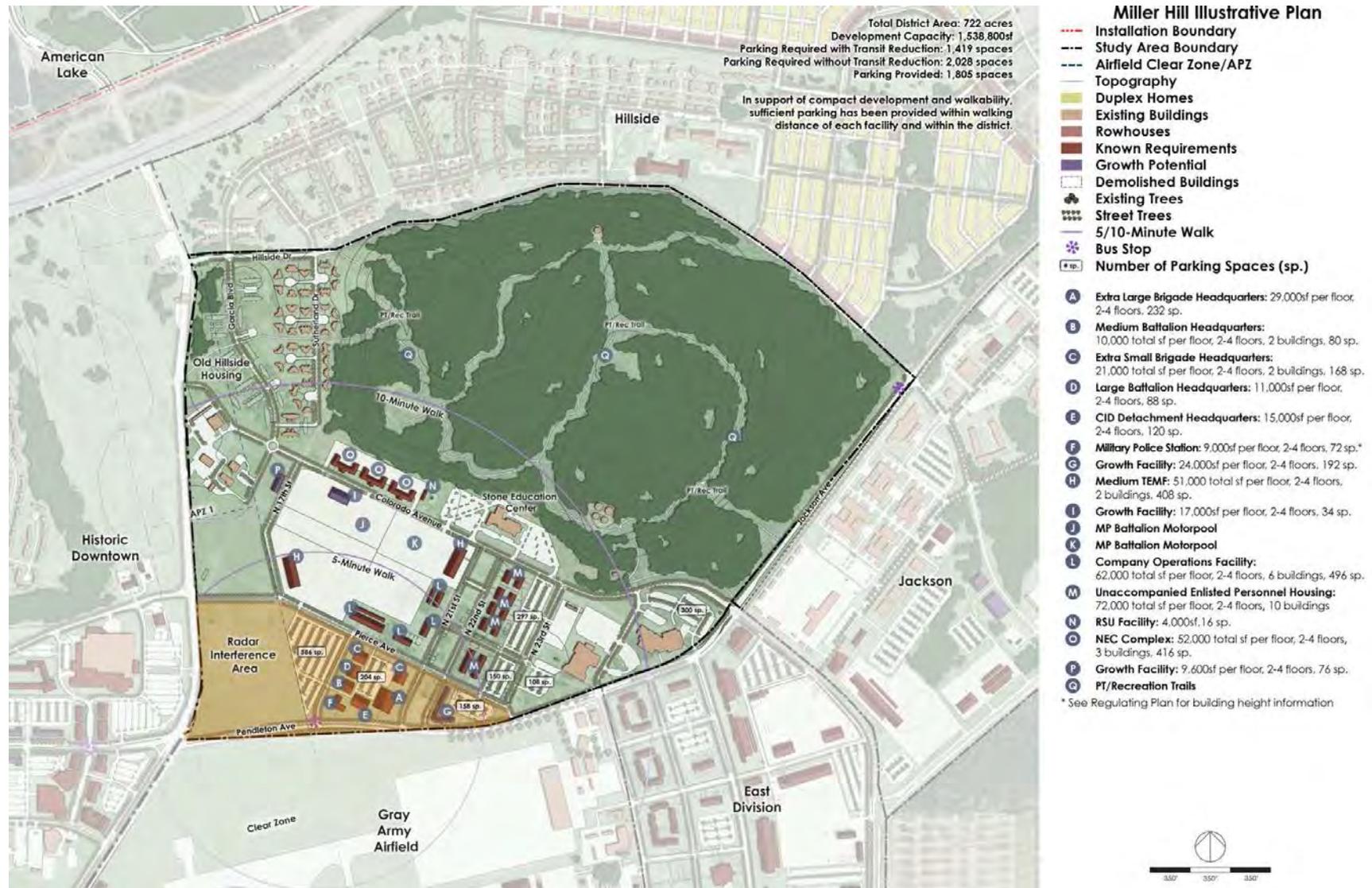


Figure 2-21. Miller Hill Area Development Plan Illustrative Plan



Figure 2-23. First Brigade Area Development Plan Illustrative Plan

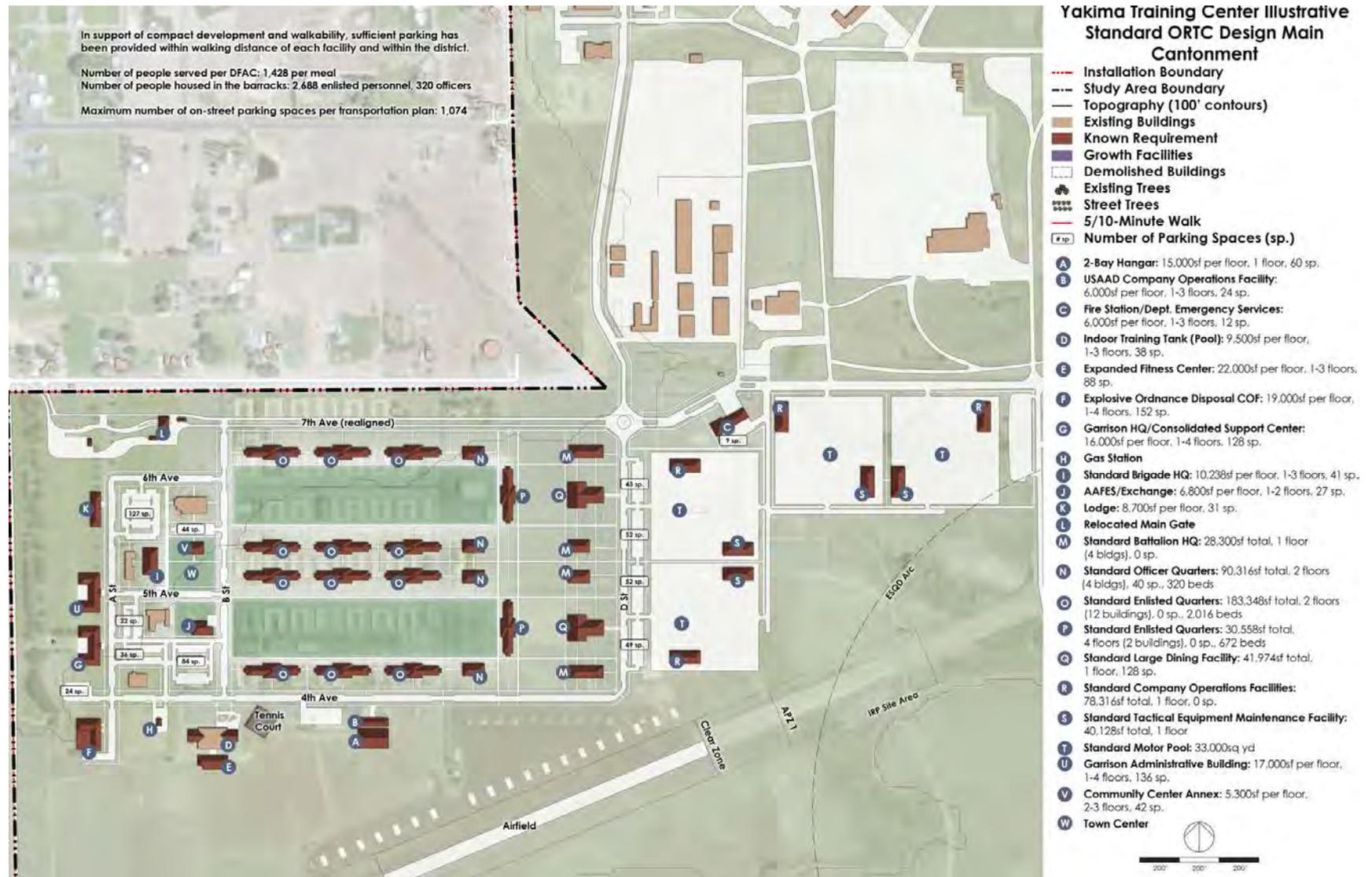


Figure 2-24. Yakima Training Center Area Development Plan Illustrative Plan

American Lake

The American Lake ADP (see Figure 2-7) creates a unified housing and community area out of the partially developed and partially natural area between the main installation and Lewis North to the east of 41st Division Drive. The land in this district surrounds the southern tip of American Lake, a beautiful area that has been left largely undeveloped to the south and has been partially developed with the existing Beachwood housing area to the west. Also included in this ADP is an additional development of housing and support facilities north and west of American Lake. The plan features schools and Child Development Centers (CDCs) within walking distance of the homes and includes community support facilities within walking distance of the south side neighborhood or a short drive from the Beachwood units. All of the areas are connected by a greenway path that runs along the edge of the lake, providing recreation opportunities for all of JBLM. The plan creates a housing area that is no longer isolated and undesirable.

Carter Lake

The major intent of the Carter Lake ADP (see Figure 2-8) is to provide Family housing that has appropriate amenities and convenient access to McChord Center. Housing is the primary function in the Carter Lake district. Five housing neighborhoods are located in this district, two of which have been constructed within the last decade. Because of existing noise stemming from the adjacent I-5, the Carter Lake ADP proposes to demolish and to not replace existing housing on the north side of Birch Street SW. A new school is being built to replace the school currently in use. Currently, the only access to McChord Center from Carter Lake is Lincoln Boulevard, a two-lane road with a mixture of sidewalks or bike lanes. The drive time from some of the Carter Lake housing to the Exchange, Commissary, Medical Center, and work places takes up to 15 minutes. Between the housing and McChord Center lies the primary ammunition storage area for McChord Field. It was constructed in the early 1940s along with the airfield and original administrative buildings. At that time, the location was chosen because it created a good distance between the ammunition and populated facilities, and a direct route is available for the transportation of the ammunition. Today, however, the location is cumbersome—it forces the separation between housing and McChord Center because traffic cannot pass through the area, and no construction can occur within the quantity-distance arcs of the munitions storage. Furthermore, the route from storage to the flightline requires the transport of ammunition through the populated areas of McChord Field. The ADP proposes to co-locate the U.S. Air Force munitions storage with the Army Ammunition Supply Point, located east of Lewis-McChord Link. The proposal would reduce the amount of JBLM land restricted by quantity-distance arcs. It would also allow for the proposed complete street through the site, reducing

driving distance to McChord Center, the Main Gate, a housing development of dense single-family homes and townhomes on the edges of McChord's golf course and a park-and-ride lot with a transit stop. The ADP provides neighborhood parks within a 3-minute walk of all Family housing, and a community recreation area on the edge of the housing district.

East Division

The East Division ADP (see Figure 2-9) includes redeveloping a Korean War-era troop housing area into a modern barracks, administrative, and operations area. The plan details how the existing facilities and functions housed in this area can be relocated and moved to allow demolition and reconstruction of the area to provide space for two large brigades with 10 battalions, companies and their associated maintenance facilities, and greater than 75 acres of motor pool hardstand. General organization and numbers associated with unit types are presented in Figure 2-25. In addition, it provides associated barracks space and support facilities for 3,330 Service members. The plan incorporates garden-style dormitories organized around dining facilities and green spaces with a connected running trail through the center. The central green area is connected to the brigade and barracks areas by a system of large quads that lead to the central multi-purpose field and the close-in-training areas. The parking requirement is addressed with sustainable and attractive car parks and on-street parking. The result is an extremely functional compact arrangement of company operations, HQ administrative facilities, barracks, maintenance, and close-in-training facilities.

Flightline

The Flightline ADP (see Figure 2-10) includes the redevelopment strategy for the Flightline district. The majority of the Flightline district consists of the runway, assault strip, taxiways, and the primary surface, restricting buildings in the area. The facilities in the central Flightline are centered on the Historic District of McChord Field. Hangars 1 through 4 were among the first structures on the installation; they were constructed in 1939 along with several support facilities. The plan looks at three different nodes of development. The 22nd Special Tactics Squadron (22nd STS) node incorporates the current plans for expansion of the 22nd STS and shows development of the area into a campus. It provides for future development to the east of existing buildings, which will act as a buffer between the airfield and future housing in McChord Center. The Flightline node shows how the parking apron can be increased to accommodate an additional 11 aircraft and provides for sensitive development of the area of historic hangars. The Central Deployment Complex node develops a plan that incorporates a new Central

Deployment Complex, a new aerial port, and transforms the existing random building and street infrastructure into an ordered neighborhood with complete streets and linear parks.

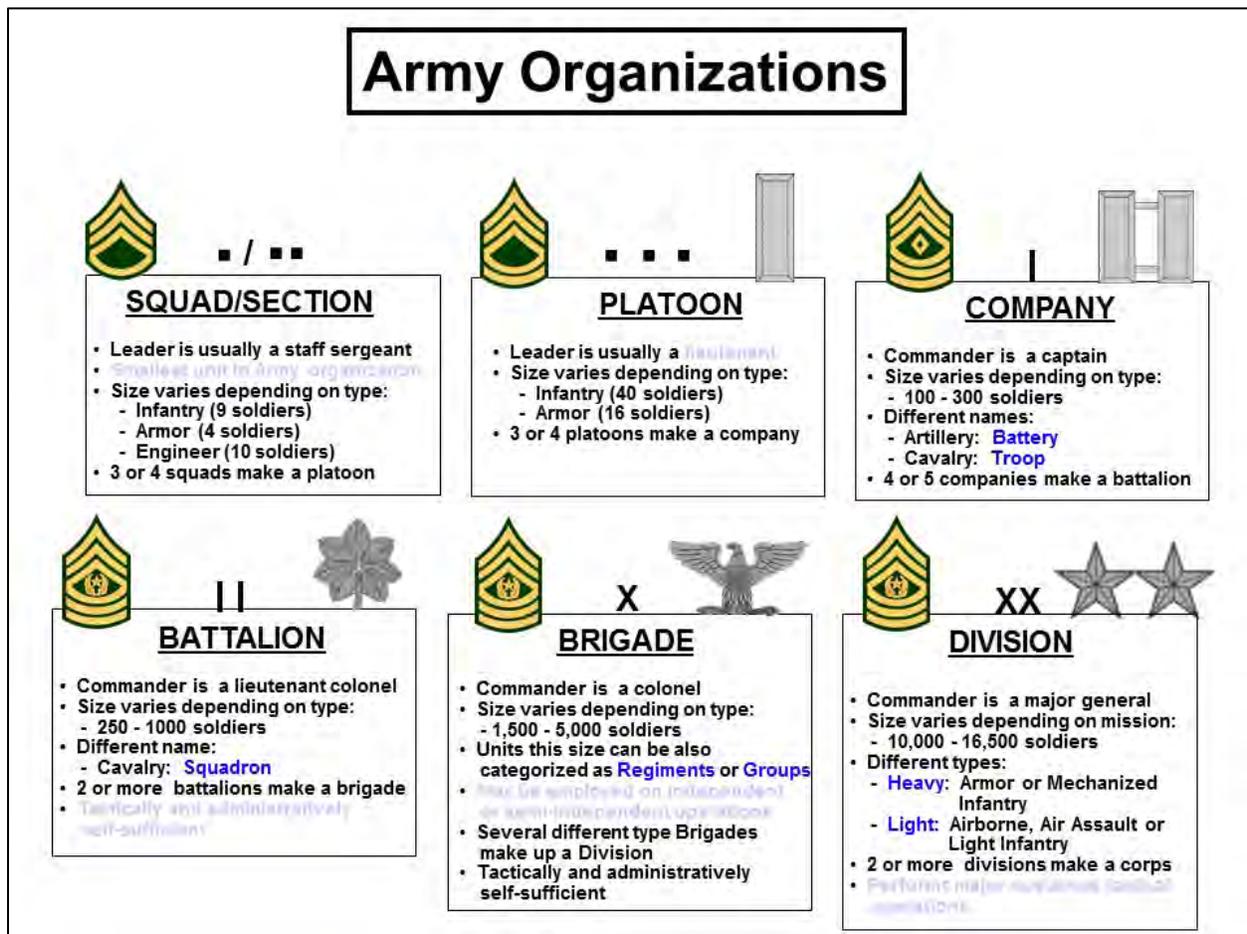


Figure 2-25. Army Organizations

Gray Army Airfield

This ADP (see Figure 2-11) focuses on the future changes likely to occur at Gray Army Airfield (GAAF) and its surrounding flightline facilities. With the exception of some recent relocations and limited new project requirements, the overall structure and circulation pattern of the airfield will remain unchanged. Future development plans include the need to update aging and obsolete facilities, expand the Army National Guard's mission, and accommodate U.S. Air Force cargo aircraft used to support the Army's deployment mission, preferably out of GAAF. In the plan, the 16th CAB is relocated to the east side of the airfield as permanent facilities are built, freeing up space on the west side for the future Aviation Intermediate Maintenance Hangar. The new control tower is sited just south of that hangar, providing excellent visibility of the entire

airfield. One of the 16th CAB Battalion's hangar and Company Operations Facility is sited on the east side in the vicinity of the current hot refueling point, which will be relocated to the south.

Greene Park

The Greene Park ADP (see Figure 2-12) focuses on future development recommendations for the largely natural area between the Lewis Main and Lewis North, located to the west of 41st Division Drive. The majority of this area is currently used for range and training exercises, including medical, air assault, prisoner of war, water operations, and rappelling. Small portions of the area are developed with the key facility area being the Lewis Army Museum. Because key design principles for development of JBLM include rangeland and historic preservation, the stakeholder group determined that this area should remain unaffected by further development, except some clustered growth facilities along Main Street. The plan preserves the historic area surrounding the museum for future expansion of the museum. Because the remainder of the area is predominantly used for open training land—the mission of JBLM—care is taken to preserve this area for current and future training needs. The result of the plan's effort minimizes development and preserves the Greene Park District as a range and training land.

Hillside

The Hillside ADP (see Figure 2-13) shows how the housing areas located to the west of Madigan, known as New Hillside and Evergreen, can be redeveloped into a more sustainable neighborhood model. People enter the neighborhood off a new Jackson Avenue roundabout that leads to a landscaped parkway lined with row houses and street trees, directing visitors to a large central park.

The central park is bordered by row houses that will create a safe, lively, central green for the neighborhood. The parkway continues east from the park and links to the Evergreen School.

This link also provides access to the Madigan neighborhood center, where community support services will be available. It continues to the west to link the neighborhood to the Hillside School and CDCs. Traffic is organized by a grid system of streets with connected sidewalks. Curb cuts are minimized by alley access to garages, keeping cars to the rear of homes. Each single-family home or rowhome is located within a 3-minute walk of a neighborhood park. Also, the entire neighborhood is surrounded by a 150-meter (m) perimeter linear park that provides a buffer from I-5 traffic and overhead transmission lines. The plan provides additional housing units, thus improving land use efficiency.

Historic Downtown

The Historic Downtown ADP (see Figure 2-14) documents the plan for the redevelopment of the Lewis central core. The plan covers all of the Cantonment area to the east of 41st Division Drive and south of I-5. The plan focuses on the previous redevelopment of Pendleton Avenue into a multiway boulevard and the development of the land surrounding Pendleton into a lively Historic Downtown, complete with community support facilities like retail, housing, training, and office functions. The plan details how the existing facilities and functions housed in this area can be relocated. It also shows how new facilities can be strategically placed in a historically sensitive way to allow reconstruction to support the installation's vision of the area. The plan includes all program and parking requirements known at the time of planning. It leverages the partnership that the installation has created with the privatized housing partner to create mixed-use Family housing above small retail functions. These units line the streets, and a neighborhood of townhomes extends to the north and south. The plan improves the existing development plans for the Exchange and Commissary additions to convert them from typical big-box retail to more inviting and sustainable mixed-use storefront retail functions.

A pedestrian core of large park blocks links housing and retail locations, providing space for people to exercise, children to play, and errands to be run on foot. These areas combine to form a mixed-use neighborhood center using a mix of green space, medium-density housing, shopfront retail, and community support facilities. The neighborhood center is reinforced by the expansion of Pendleton Avenue into a multiway boulevard, linking it to the remainder of the installation. In addition, elements of the existing historic district, including the street system, planned open spaces, and multi-story, narrow buildings are preserved and its patterns applied in future development. Overall, the plan is historically sensitive, maximizes views, provides focal point terminations, and provides Lewis Main with a true downtown.

Jackson

The Jackson ADP (see Figure 2-15) details the future development of the area south of Jackson Avenue and southwest of Madigan. This area has recently been developed as a single Service member housing, administrative, and operations area. Development of the area is mostly complete with new company operations facilities, barracks, and medical facilities recently constructed. The recommended plan builds on the new development by maintaining a northern community support area with barracks, chapel, and medical facilities, and a southern working area with company operations and administrative facilities. These projects strengthen the support and administrative areas and protect undeveloped land. The plan creates a

neighborhood in which people can live, eat, worship, exercise, and attend to medical needs in the north and work in the south. The northern living section is also within proximity to the future east side neighborhood center, placing community support functions within walking distance for those living and working in this area.

Lewis-McChord Link

The Lewis-McChord Link ADP (see Figure 2-16) focuses on the use of the land that connects Lewis Main with McChord Field. Prior to March 2010 and the inception of JBLM, Fort Lewis and McChord AFB were completely separate military installations, although they shared a border. Even as separate entities, however, the DoD wanted to make them more accessible to one another with no access control point required. The greatest barrier to this joint base connection has always been the public access to the land between the two installations. To connect the two parts of JBLM, a Joint Base Connector Road has been programmed by the installation. The Joint Base Connector Road extends from Barnes Boulevard north of Barnes Gate and then crosses over the rail line and connects to Lincoln Avenue just beyond the public road. This plan requires extending the perimeter of Lewis Main and enclosing the majority of the northern section of the Lewis-McChord Link within the Main Cantonment. Phase I of the Joint Base Connector Road has been completed. The ADP develops this land as a regional recreational complex that all military, Family, and civilian members of JBLM can use. It can easily be a stop for public transit between Lewis Main and McChord Field. In the long term, the Joint Base Connector Road would be expanded to a four-lane parkway that extends south of the Lewis-McChord Link district and connects to Transmission Line Road. Also a factor in the planning for Lewis-McChord Link is the Cross-Base Highway, which would directly connect I-5 to the municipalities east of JBLM. This Cross-Base Highway is an out-year project for Washington State Department of Transportation that addresses this need. JBLM would retain ownership of the road and is responsible for ensuring that all environmental and other compliance requirements, including those under NEPA are met.

Lewis North

An aggressive program of greater than \$728 million continues to transform the Lewis North area (see Figure 2-17). Beginning in 1995, the installation created a campus environment for Service members on Lewis North, and this plan builds upon and strengthens that development pattern. The plan includes a mixed-use neighborhood center, using a combination of green space, barracks, shopfront retail, and community support facilities. The neighborhood center provides people with walkable access to basic shopping, dining, fitness, medical, and recreational

facilities. This neighborhood center is reinforced by the compact development of COFs, HQ facilities, and maintenance facilities located within walking distance of one another and the neighborhood center. In addition, the plan provides barracks housing for Service members, all within a 10-minute walk of the neighborhood center, and their places of work, improving Service member health and reducing the necessity of driving. Finally, the plan provides a phased solution to replacing the old, wooden Operational Readiness Training Center (ORTC) buildings with modern facilities to maintain the operation of the training center during construction.

Logistics Center

The ADP (see Figure 2-18) details the future development of the Logistics Center, which encompasses the majority of maintenance, transportation, deployment, and storage functions at JBLM. The area includes more than 620 acres and contains mainly World War II-era warehouses and administrative buildings. During the development of the preferred alternative plan, the following specific goals emerged:

- Maintain the same overall orientation of the site toward Mount Rainier
- Keep personally owned vehicle (POV) and pedestrian circulation areas to the outside the development
- Establish a new truck entrance to ease flow and minimize congestion
- Consolidate storage functions

The result is a linear plan based around the existing street grid that provides an optimal layout for key facilities and improves traffic flow. The new Army Materiel Command facilities are sited to support functional adjacencies and the Logistics Readiness Center layout supports the efficient flow of supplies. The Logistics Readiness Center is located along the main truck route and provides separated receiving and shipping docks along with an off-loading area. Supplies can be delivered to the receiving area and then proceed to the repackaging area for issue or be moved into storage areas for future use.

In addition, the plan improves traffic flow by separating POV and commercial truck traffic. The objective is to provide commercial truck traffic with uninterrupted flow to all of the facilities while focusing the pedestrians and POVs through the center of the area. In addition to the separate gates, in an effort to direct POV traffic, a new avenue that connects to Jackson Avenue (the prominent east-west connector on Lewis Main) enters the area in a central location. Placing the combined administrative center also focuses POV traffic along Rainier Drive in the center of the

area. Finally, the ADP places the Joint Base Connector Road to the south of the Logistics Center, providing a connection to McChord Field.

Madigan

The Madigan ADP (see Figure 2-19) shows how the installation can continue to grow around the Madigan Army Medical Center main facility. Because Madigan is a large facility and the parking areas are already at full capacity, the Army belief had been that very little growth could occur in the area; however, there is a program requirement for an \$89 million medical center addition that comes with a parking garage and an administrative addition to replace the old and dislocated facilities of Old Madigan. In addition, new requirements for Warrior Transition Unit (WTU) facilities and additional CDCs have been incorporated into completed WTU facilities. To accommodate these requirements, this plan provided an east side neighborhood center with WTU facilities and barracks, dining, a Family assistance facility, fitness center, and retail locations framing an open green space. The plan also uses the additions to the hospital to contribute to the neighborhood center. To provide the additional 900 parking spaces required, plus the 360 spaces absorbed by new construction, the plan uses the existing semi-circular traffic pattern, placing 2,645 spaces in a car park located in the outer ring and concentrating development inside the ring. This plan, coupled with the improved traffic pattern created by the additional semi-circular road and the improved Madigan Gate, provides a useful multi-purpose center for WTU personnel, Special Forces, and housing residents located in the adjacent areas. Clear pedestrian and vehicular connections among these areas are provided to strengthen the east side neighborhood center. Additional future construction includes a new Fisher House, Integrated Disability Evaluation System Facility, and an Intrepid Fallen Heroes Satellite Center north of the existing Madigan Hospital and parking.

McChord Center

The McChord Center ADP (see Figure 2-20) focuses on building on the historic fabric of the area while expanding into to the south and west. The center of the district is the historical area. The original Wing HQ building was constructed in 1940, shortly after the Flightline facilities. The original street structure from the early construction is still maintained in this historic area, providing a grid system with a hierarchy to the Wing HQ building. Many other facilities from the earliest days of McChord Field remain in McChord Center, including a cluster of homes south of the Wing HQ building. McChord Center contains a broad mix of administrative, community support, retail, housing and industrial facilities. The plan creates a neighborhood center by shifting the façade of the Exchange to face Barnes Boulevard, making it a focal point of a town

square that lines up with Mount Rainier, mimicking the historic parade ground in Historic Downtown JBLM. This enforces the historic street grid, and new mixed-use facilities are used to emphasize the streets. Barnes Boulevard is defined by street trees and mixed-use facilities lining it, and a traffic circle is created at a major intersection that now has a road leading from the Carter Lake District. A large mixed-use district is included in the plan, aligned to provide a great view of Mount Rainer and providing users with a large park.

Miller Hill

This ADP (see Figure 2-21) focuses on the area around and including the prominent topographical feature on JBLM, known as Miller Hill. Miller Hill is prominent as one enters the installation and forms a primary visual landmark throughout much of the Main Cantonment. This valuable natural resource provides a number of recreational opportunities, while the lower elevation portions surrounding the hill offer future development opportunities. The plan realigns the street network to a symmetrical grid aligned with Pendleton Avenue to the south side of the ADP boundary to allow a direct connection to the street and Historic Downtown. A green linear park continues this connection to the Stone Education Complex. Development is focused near the Stone Education Complex, including the Military Police HQ and barracks, maintenance facilities, and dining facility. This plan provides the density to create a mixed-use neighborhood center for the area and connects to Pendleton Avenue. The plan preserves Miller Hill for recreation uses.

Old Madigan

The Old Madigan ADP (see Figure 2-22) documents the plan for the future development of the area southeast of Madigan Hospital. The plan has two main components. The first is a \$300 million Special Operations Forces (SOF) campus area located to the east of the existing SOF compound. The second is a replacement housing area located south of the Old Madigan facilities. The housing area plan replaces the 99 old, inefficient, single-family and duplex units with 271 new units. The housing area is organized around a community center located in a central green and is easily accessed by a clear and logical street grid system.

First Brigade

The First Brigade ADP (see Figure 2-23) redevelops one of the installation's key brigade operations areas. The plan covers the area west of Gray Army Air Field, which is the home of a Stryker Brigade Combat Team. The plan focuses on redevelopment of the area into a pleasant campus for the Stryker Brigade Combat Team with revitalized, properly sized facilities in which to live, work, and train. In addition, the plan provides relief from the traffic problems within the

area. The plan includes all program and parking requirements known at the time of planning, and develops a small campus core, using a mix of green space and community support facilities. The campus core is surrounded by administrative and barracks facilities, all located within a 10-minute walk of the support areas. Running through the middle of the administrative, living, and support area is a 0.9-mile physical training (PT) trail that connects PT nodes and recreation fields. This reduces the need to shut down the road network at key traffic hours to perform PT, which causes severe congestion and impedes the vehicular traffic flow during peak commuting hours. This trail will serve as a key pedestrian connector, allowing Service members to access all of the facilities in the area via a safe, direct, and pleasant walk. Located to the southwest of the administrative and support area is an expanded motor pool area, which serves to relieve some of the overcrowding of the existing motor pools. In addition to providing car parks, all roads within the area are recommended for improvement to include provisions for on-street parking.

Yakima Training Center

The planning vision of YTC is evident in its ADP (see Figure 2-24), in which the existing facilities and functions are combined with future facilities to create a new culturally and environmentally sensitive plan that meets all mission requirements and allows for expansion that supports the installation's vision of the area. Projects include the fire station, U.S. Army Air Ambulance Detachment Hangar, a CDC, and the relocation of the Main Gate. In addition, the plan provides site locations for ORTC HQ, barracks, and maintenance facilities required to replace the existing Korean War-era facilities with efficient new facilities. There are two designs for the ORTC, one of which is based on the original discussions with the installation using a campus and courtyard-based layout for the ORTC. The second uses the *Headquarters, Department of Army ORTC Standard Designs* as a template for the facilities and layout.

Key benefits of this plan include relocating the Main Gate to provide a secure, strong perimeter for the installation, relocating the HQ to a more prominent location, constructing a new, more functional parade field, and completing a phased replacement of the old ORTC facilities.

Overall, both plans are regionally sensitive by not expanding into virgin land, maximizing views of the surrounding landscape by planning lower story buildings and using park blocks and large open spaces, promoting walking with more compact planning and connected walks, and organizing the YTC into a small town, surrounded by a phenomenal landscape.

Parking numbers provided above in Table 2-1 are theoretical based on the proposed full development of the installation and the ADPs as noted in the RPMP. Spaces estimated above

are those that would be required to the appropriately meet the full proposed development. Should all of the proposed development take place it is likely that additional measures would similarly be implemented that could reduce the amount of parking needed, including mixed-use developments and mass transit, meaning that the numbers presented above would likely be reduced. In addition, currently there is an excess of parking throughout the installation, potentially further reducing the amount of parking being required in the future.

2.1.2 Installation Planning Standards

The Proposed Action would include adoption of the JBLM IPSs. The IPSs capture the installation's guidelines for development of sustainable and efficient facilities and provide a clear set of guidelines to ensure that JBLM's vision and planning goals/principles for development are achieved. The IPSs contain a number of working documents that establish directions on standardizing and improving facility planning and design at JBLM and include:

- Current Fort Lewis Installation Design Guide (IDG)
- Urban Forestry Guide
- Landscaping Guide
- Low-Impact Development Guide

The IPSs provide guidance for developing the installation as a visually coherent, functionally effective, and Family and Soldier friendly community in support of the installation's mission readiness and quality of life. The IPSs, the *Secretary of the Interior Standards for Historic Structures* and the IDG would be used by all individuals involved in decision-making, design, renovation, construction, and maintenance of facilities. In addition, the use of the previously mentioned guides to develop further plans, specifically Urban Forestry Plans would require the review by the JBLM Cultural Resources Office to identify any potential impacts to historic districts, historic buildings, viewsheds, and historic landscapes. The overall goal is to improve the quality of the total environment of the installation for those who live, visit or work there.

The different components of the IPSs include the following design standards:

- Proposed configurations and design requirements for all components of the circulation hierarchy including street grids, arterial, collector, and local roads as well as off- and on-street and hidden parking, sidewalks, and crosswalks and curb ramps

- Proposed standards placing an emphasis on community, unifying and mixed land uses and building types to include town squares, and street cafes and general store/shop front standards as well as a general focus on the “main street”
- Architectural standards for future design and renovations with the encouragement of architecturally compatible buildings in regards to similar, materials, style, shape, and color
- Promotion of mixed use, multi-story, narrow buildings with a compact and affordable overall development emphasis
- Architecture standards pertaining to various aspects of building design, including:
 - Building placement and orientation
 - Building setbacks and build-to line
 - Building form and massing
 - Building heights
 - Building facades and fenestrations
 - Materials and color
- Proposed design standards for natural landscape elements including trees, shrubs, ground cover and grasses, and human-made site elements, including site furnishings, lighting, signage, and landscape-related force protection elements
- Proposed canopy standards for street, landscape, and natural areas and parks. Standards include height, canopy spread, form, type, growth rate and lifespan, living requirements, and susceptibility to disease or pests
- Proposed low-impact design standards including site assessment, planning and layout considerations as well as general materials and stormwater and soil conservation measures.
- Proposed changes to street design, landscaping, curbs and facilities will conform to the visual integrity of historic districts and will adhere to the JBLM Historic Landscape Management Plan.

2.1.3 Capital Investment Strategy

The ADPs provide a model for the development, and the Capital Investment Strategy is based on these plans. Included within the ADPs are short-, mid- and long-range phasing plans, which

provide a map for development. The Capital Investment Strategy uses these plans to provide a list of projects for the base to adopt to realize the vision of the ADPs. Knowing that any plan must be flexible, it is important to remember that the phasing plans and the Capital Investment Strategy are recommendations and that based on funding and mission changes, the plans can also change. Appendix A presents specific projects identified by ADPs as part of the Capital Investment Strategy, including new construction, renovations, and demolition.

2.1.4 2015 Air Installation Compatible Use Zone Study Update

The 2015 AICUZ Study Update was developed to provide projections of potential future conditions that work in providing non-DoD jurisdictions information to promote compatible land development in areas subject to aircraft noise and accident potential. The 2015 AICUZ Study Update is an update of the 1998 McChord Field (formerly McChord Air Force Base) AICUZ Study. The study should be used as neighboring Pierce and Thurston counties prepare and modify their land use development plans and to guide internal JBLM development to prevent incompatible land use that could compromise the ability of JBLM to fulfill its mission.

The primary focus of the document is to ensure that accident potential and aircraft noise are major considerations in the overall planning process. Consequently, the 2015 AICUZ Study Update provides land use recommendations for the clear zones, Accident Potential Zones (APZ) I and II, and four noise zones (NZs) exposed to noise levels at or above the 65 decibel (dB) day-night average A-weighted sound level (LDN). Two of the zones are to the south of the McChord Field runway and are fully enclosed on military property. The other two are to the north of the McChord Field runway and involve some private properties outside of the JBLM perimeter fence. See the recommended zoning tables in the 2015 AICUZ Study Update for properties expected to experience 65 dB noise or greater for two affected areas.

In general, development in the clear zones should be limited to agriculture or highways and streets. Development in APZ I and APZ II is limited to a lesser extent; however, residential land use would remain incompatible, except the detached, single-family housing with a maximum density of one to two dwelling units per acre would be compatible with restrictions of APZ II.

Figure 2-26 depicts the CZs and APZs at McChord Field. Each end of the runway has a 3,000-foot by 3,000-foot CZ and two APZs. APZ I is 3,000 feet by 5,000 feet, and APZ II is 3,000 feet by 7,000 feet.

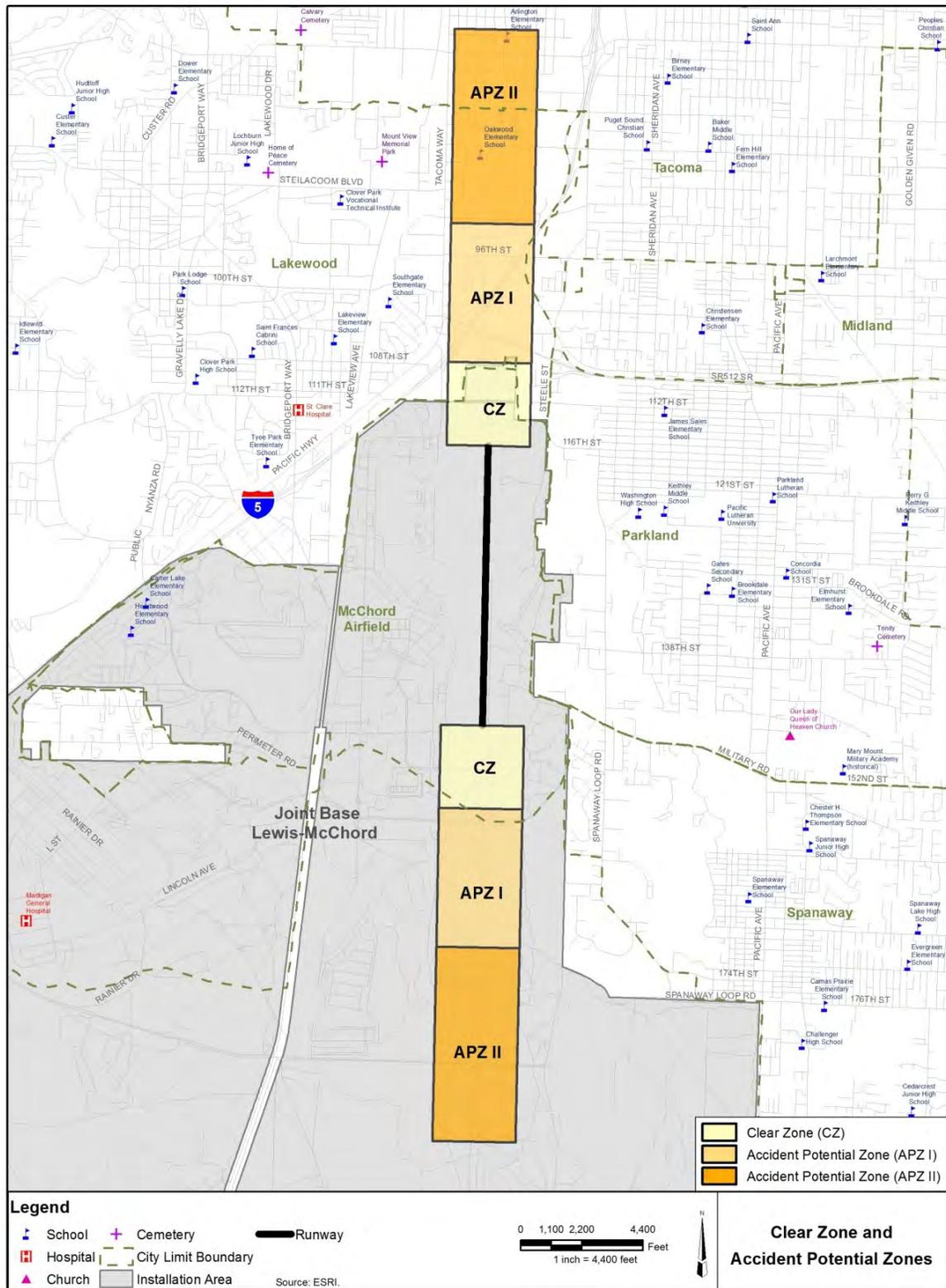


Figure 2-26. Clear Zone and Accident Potential Zones at McChord Field

The Proposed Action would formally adopt the 2015 AICUZ Study Update. The 2015 AICUZ Study Update forecasts potential noise exposure if airfield noise generally related to in-flight operations and pre-flight and maintenance run-up operations are carried out as anticipated.

Figure 2-27 depicts Weighted Day-Night Level (DNL) noise levels anticipated at Gray Army Airfield and McChord Field, Figure 2-28 shows the 2015 AICUZ Study Update Noise Contours at McChord Field, Figure 2-29 shows the 1998 AICUZ Study Noise Contours at McChord Field, and Figure 2-30 shows the combined 2015 AICUZ Study Update Noise contours and the 1998 AICUZ Study noise contours at McChord Field. Table 2-2 summarizes the total acres within the 2015 and 1998 AICUZ study noise zones (Off-Base). Note that data depicted for noise contours for the 2015 AICUZ Study Update were calculated in 2014.

Table 2-2. Total Acres within the 2015 and 1998 AICUZ Study Noise Zones (Off-Base)

Weighted Day-Night Level (DNL)	2015 AICUZ Study Update Acres	1998 AICUZ Study Acres
65-70	479	585
70-75	89	146
75-80	11	8
>80	0	0
Total	579	739

The off-base land area exposed to 65 dB DNL or greater for the 2015 AICUZ Study Update is about 22 percent less than the 1998 AICUZ Study. The 2015 AICUZ update is built upon the current operational condition and incorporates forecasted changes in flight operations and flight patterns listed below:

- Increasing annual C-17 assault landing pattern flight operations by 1,800 (900 daytime and 900 nighttime) to meet growing demand as a result of past and/or current missions worldwide. These operations may be moved from Grant County Airport.
- Reversing the usage percentage of Runways 16 and 34 for arrival flight operations to 1) implement overall energy saving initiatives at the installation by reducing flight operations against southern prevailing winds at McChord Field and 2) further reduce noise impacts in the cities of Tacoma and Lakewood.
- Allows for increasing current tempo by 20 percent to meet future JBLM mission requirement.

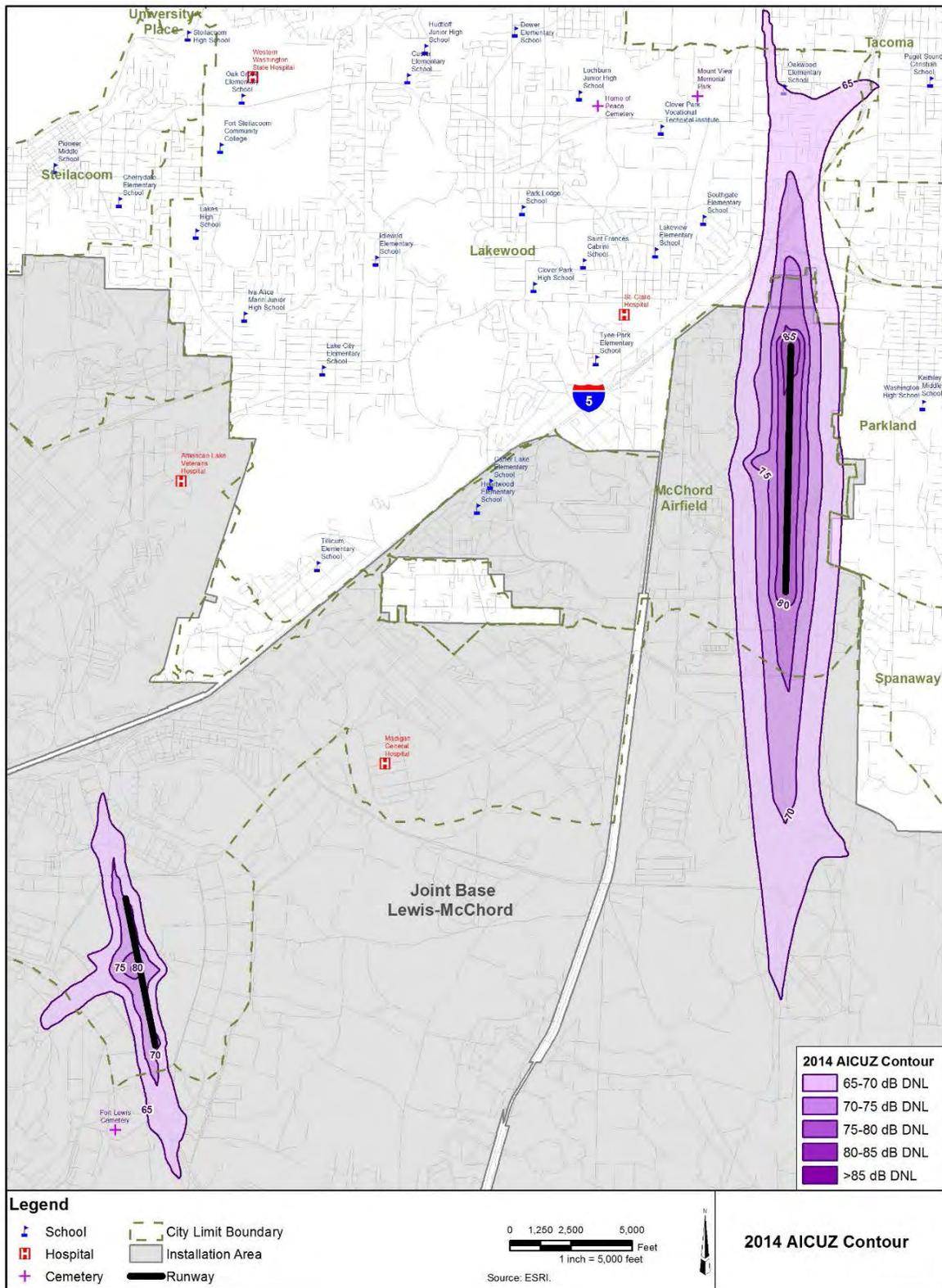


Figure 2-27. Weighted Day-Night Level (DNL) Anticipated at Gray Army Airfield and McChord Field

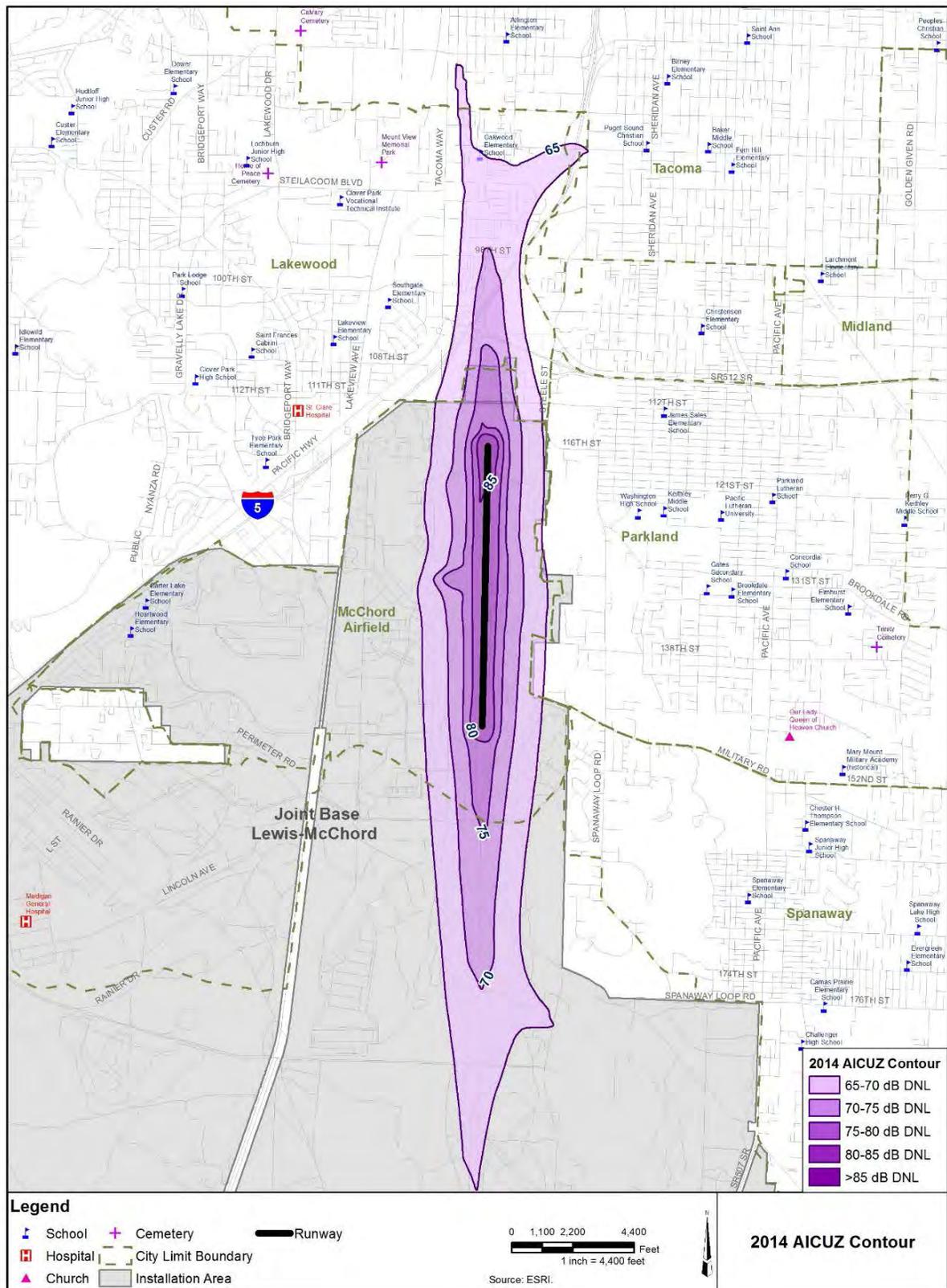


Figure 2-28. 2015 AICUZ Study Update Noise Contours at McChord Field

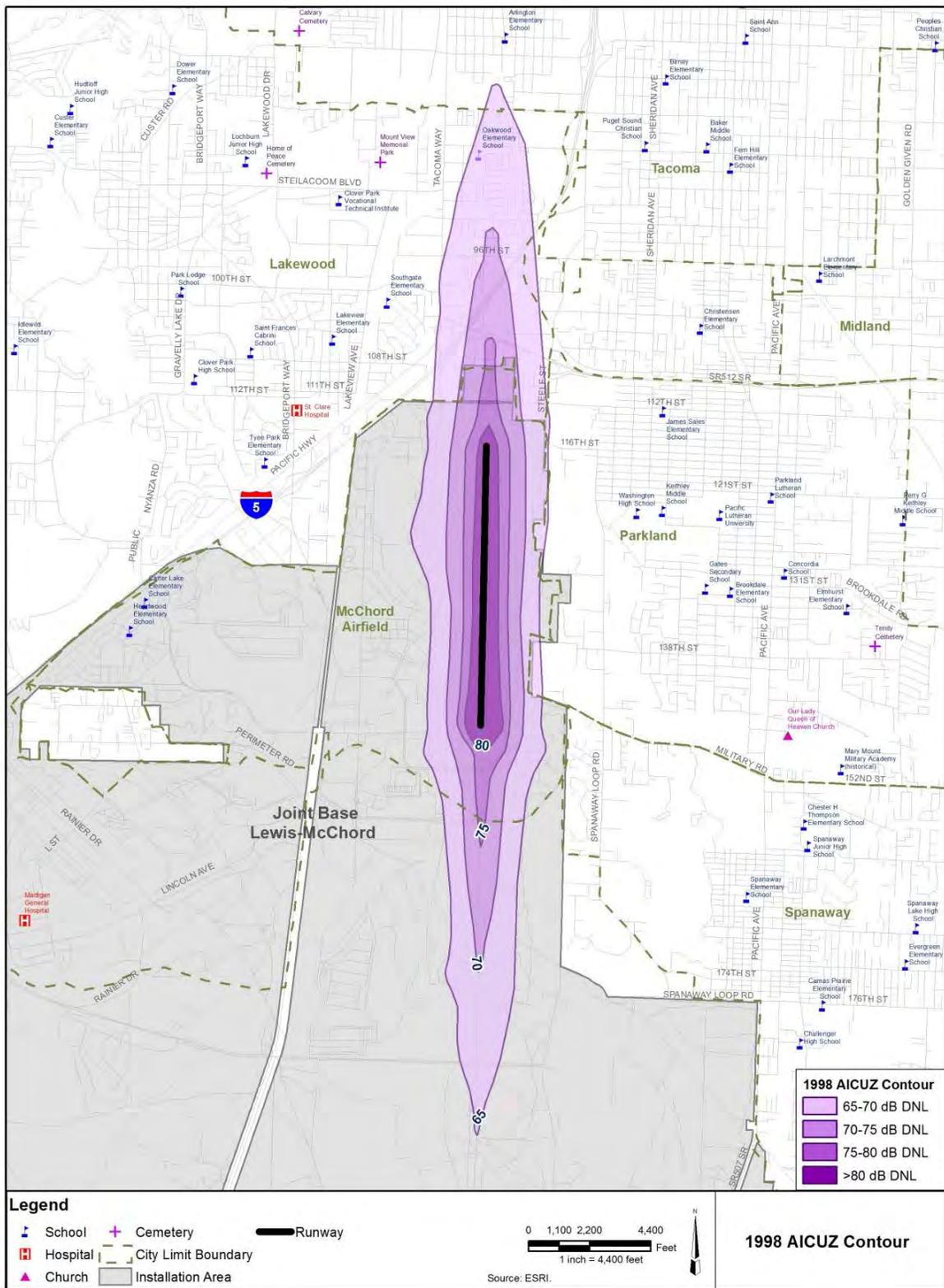


Figure 2-29. 1998 AICUZ Study Noise Contours at McChord Field

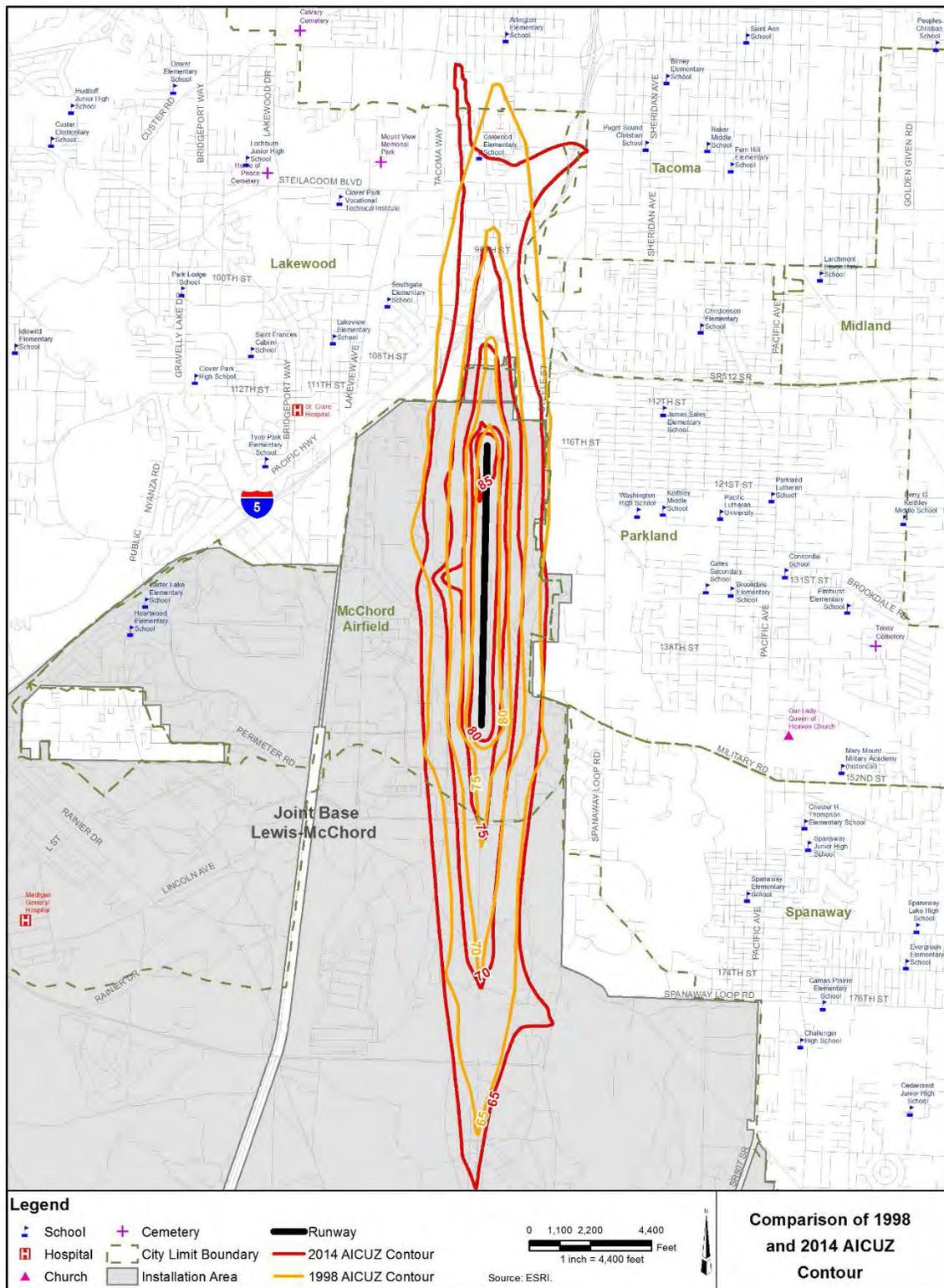


Figure 2-30. 2015 AICUZ Study Update and 1998 AICUZ Noise Study Combined Noise Contours at McChord Field

Once specific changes to in-flight operations and pre-flight and maintenance run-up operations are spelled out, further NEPA compliance and documentation would be conducted to ensure analysis of all relevant environmental factors at all impacted locations.

2.1.5 Installation Operational Noise Management Plan

The IONMP provides a strategy for noise management at JBLM. Elements of the IONMP include education, complaint management, noise mitigation, and abatement procedures.

The IONMP program provides a methodology for analyzing exposure to noise and safety hazards associated with military operations and provides land use guidelines for achieving compatibility between JBLM and the surrounding communities. The DoD has an obligation to the public to recommend uses of land around its installations that will protect: (1) people from noise and other hazards and (2) the public's investment in the installation.

The program classifies the noise impact on the community into three NZs: NZ I is compatible for most noise-sensitive land uses, NZ II is usually incompatible for noise-sensitive land uses, and NZ III is always incompatible for noise-sensitive land uses. Additionally, a land use planning zone has been established to supplement land use compatibility zones for JBLM, where applicable, to manage potential risk of noise complaints from the surrounding communities.

The aircraft accident hazard is also defined by three zones: clear zones and APZs I and II.

Similar to the AICUZ, the inclusion of the IONMP as part of this EA is to allow for the formal adoption of the IONMP noise management strategy. This EA does not evaluate or propose changes in operations, and, as the IONMP is further implemented and specific proposals to change operations are spelled out further, NEPA compliance and documentation would be conducted.

2.2 Alternatives

This section describes the alternatives carried forward for analysis in this EA. These alternatives include the No Action Alternative and the Action Alternative. The Action Alternative includes the adoption of the following components of the Proposed Action:

- IDP to include:
 - Vision Report
 - Overall Concept Plan
 - Illustrative Plan

- Regulating Plan
- Transportation Plan
- Pedestrian and Bicycle Plan
- Parks and Open Space Plan
- Development within ADP districts
- Installation Planning Standards
- Capital Investment Strategy
- 2015 AICUZ Study Update
- IONMP

2.2.1 No Action Alternative

Under the No Action Alternative, management of JBLM would continue based on existing planning principles and development goals. Implementation of projects to address facility deficits and excesses would occur on an as-needed basis without a formalized framework that enables suitable locations of projects to address the large-scale functional relationships at JBLM. Implementation of the No Action Alternative would conflict with the National Defense Authorization Act of 2013 requiring military installations to develop a master plan. The No Action Alternative would be inconsistent with DoD and Army regulations and instructions, as well as 10 U.S. Code §2864 (*Master Plans for Major Military Installations*) that require the formal adoption of a master plan. Inclusion of the No Action Alternative is prescribed by the CEQ regulations implementing NEPA to serve as a benchmark against which the Proposed Action and alternatives can be evaluated. The No Action Alternative is defined as the environmental baseline conditions that would result if the RPMP were not formally adopted.

2.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2 (the Proposed Action), JBLM would adopt the RPMP and the features described in Section 2.1, including the IDP, IPSs, and Capital Investment Strategy. In addition, the 2015 AICUZ Study Update and IONMP would be considered finalized as part of Alternative 2. Through this programmatic EA (PEA), the overall environmental impacts of the RPMP are assessed, allowing future development to take place under a NEPA process as noted in CFR 651, Subparts B, C, and D.

2.3 Alternatives Considered but Eliminated from Further Consideration

NEPA's implementing regulations provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable require detailed analysis.

The purpose of the JBLM RPMP is to meet statutory requirements under the National Defense Authorization Act for Fiscal Year 2013 (Public Law 112-239, Sec 2802) and the National Defense Authorization Act for Fiscal Year 2014 (Public Law 113-66, Sec 2811) as well as to meet the requirements of DoD and Army instructions and regulations. Under UFC 2-100-01, *Installation Master Planning*, which provides guidance for RPMP development at installations, JBLM is required to prepare and implement an RPMP that addresses sustainable planning; natural, historic, and cultural resource management; healthy community planning; defensible planning; capacity planning; area development planning; network planning; form-based planning; facility standardization; and plan-based programming.

CEQ regulations require inclusion of the No Action Alternative in an EA. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated. As a result, two alternatives were evaluated in detail: the preferred alternative (adopts and implements an RPMP) and the No Action Alternative (continue implementation based on existing planning principles and development goals), and both are evaluated in this EA.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the affected environment of JBLM and the environmental consequences of the Proposed Action and alternatives. For this particular chapter of the document, except when describing facets of Alternative 2 and in other specific circumstances as noted, when JBLM is referenced it is referring specifically to the portion of the installation near Tacoma, Washington, and does not include the YTC, which is discussed separately. This is done to allow for geographic-specific resources and impacts to be identified. The affected environment consists of baseline conditions that are used for analysis of the environmental effects from the alternatives described in Chapter 2. A region of influence (ROI) is described for each resource area. The ROI varies among resources and defines the geographic extent of potential effects from the alternatives on the important elements of that resource. Each section in this chapter delineates its ROI and identifies the topics and resources addressed by that section. Immediately following the affected environment discussion for each resource is the presentation of environmental consequences or effects of each alternative.

Environmental consequences presented as part of this EA between Alternative 1, the No Action Alternative, and Alternative 2, Adoption of the RPMP, are very similar and only differ for recreation resources and visual resources. As such, impacts in the following resource areas are presented primarily under Alternative 1 and then referred back as needed to in Alternative 2 discussions. Although the anticipated environmental consequences are similar for implementation of either alternative, the No Action Alternative is not possible because of the National Defense Authorization Act of 2013, which requires military installations to develop a master plan. Alternative 1 also would be inconsistent with additional DoD and Army regulations and instructions as well as 10 U.S. Code §2864 (*Master Plans for Major Military Installations*).

The CEQ defines direct effects as those caused by an action and that occur at the same time and place, whereas indirect effects are caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR §1508.8). For example, effects from construction of facilities at JBLM would be a direct effect associated with the alternatives, while spending on supplies for the project by a construction services vendor would be an indirect effect. Impacts are characterized in this EA as:

- Beneficial—A positive net impact.

- No impact—No measurable impacts expected to occur.
- Less than significant (minor to moderate)—Impact that is not significant but is perceptible and readily apparent. Additional care in following standard procedures or applying precautionary measures to minimize adverse impacts may be required.
- Significant but mitigable—Significant impacts are anticipated, but the Army can set management actions or other mitigation measures in place to reduce impacts to less than significant.
- Significant—An adverse environmental impact, which given the context and intensity, violates or exceeds regulatory or policy standards or otherwise exceeds the identified threshold. The significant impact, however, cannot be mitigated with practical means to a level below significance.

Significance thresholds for each resource are included in Table 3-1. The CEQ guidelines indicate that the significance of an impact is determined by the intensity and the context of the impact. Intensity refers to the severity or extent of an impact, and context relates to the environmental circumstances at the location of the impact. Significance criteria were developed in consideration of the CEQ's guidance for determining significance (40 CFR §1508.27).

Table 3-1. Significance Thresholds for Each Resource Topic

Resource Topics	Significance Threshold
Air Quality	Impacts would be considered significant if emissions would: <ul style="list-style-type: none"> • Increase ambient air pollution concentrations to exceed the NAAQS. • Impair visibility within federally mandated Prevention of Significant Deterioration Class I areas. • Result in the potential for any stationary source to be considered a major source of emissions as defined in 40 CFR §52.21 (total emissions of any pollutant subject to regulation under the Clean Air Act that is greater than 250 tons per year for attainment areas), or • For mobile source emissions, result in an increase in emissions to exceed 250 tons per year for any pollutant. • Result in the violation of any existing Title V Permits.

Resource Topics	Significance Threshold
Airspace	<p>Impacts would be considered significant if they:</p> <ul style="list-style-type: none"> • Restrict movement of other air traffic in the area. • Create conflicts with air traffic control in the region. • Change operations within airspace already designated for other purposes. • Result in a need to designate controlled airspace where none previously existed. • Result in a reclassification of restricted airspace from a less restrictive to a more restrictive classification.
Biological Resources	<p>Impacts would be considered significant if they were to result in:</p> <ul style="list-style-type: none"> • Substantial permanent conversion or net loss of habitat at landscape scale. • Long-term loss or impairment of a substantial portion of local habitat (species dependent) or substantial loss to a species population, including special status species resultant from implementation of the Proposed Action.
Cultural Resources	<p>Impacts would be considered significant if they meet one or more of the following criteria:</p> <ul style="list-style-type: none"> • The activity would cause an adverse effect on an archaeological, historical, or other cultural site that is listed in or eligible for inclusion in the National Register of Historic Places, and measures minimizing or mitigating the adverse effect of the resource are not implemented. • The activity involves construction, repair, or maintenance affecting contributing elements to a historic building or district and historic landscapes. • The activity would permanently introduce visual, audible, or atmospheric elements that are out of character with the historic property or alter its setting when setting contributes to the property's qualifications for the National Register of Historic Places, and measures minimizing or mitigating the adverse effect of the resource are not implemented. • The activity would restrict access to a cultural resource of significance to the federally recognized tribes, and no attempt has been made to mitigate or to address issues through government-to-government consultation.
Energy	<p>Impacts would be considered significant if:</p> <ul style="list-style-type: none"> • The immediate and/or long-term energy demand of JBLM would have the potential to exceed the actual or projected capacity of JBLM or its energy suppliers to provide service and would not produce enough energy to meet the energy demands to support the JBLM mission, or • The Proposed Action would interfere with JBLM's ability to absorb intermittent impacts and variance in peak energy generation.
Geology and Soils	<p>Impacts would be considered significant if they:</p> <ul style="list-style-type: none"> • Substantially degrade soils, soil fertility, soil productivity, or geologic resources.

Resource Topics	Significance Threshold
Land Use	Impacts would be considered significant if: <ul style="list-style-type: none"> • An action would not be compatible with the surrounding land use. • Or an action would not conform to zoning and community land use plans and policies.
Noise	Impacts would be considered significant if: <ul style="list-style-type: none"> • Noise levels on the installation would exceed compatibility standards for noise zones at JBLM. • Occupational noise levels exceed 85 dB for an 8-hour day.
Recreation Resources	Impacts would be considered significant if: <ul style="list-style-type: none"> • The Proposed Action would substantially affect the quantity or quality of recreational resources, opportunities or activities.
Public Health and Safety	Impacts would be considered significant if the Proposed Action would result in: <ul style="list-style-type: none"> • A substantial safety risk to the general public and installation personnel. • Notable public safety and emergency service level reductions. • Increases for the potential in manmade disasters and decrease the ability of services to respond.
Socioeconomics and Environmental Justice	Impacts would be considered significant if the estimated impacts on socioeconomic issues, such as employment, business volume, population, and income, would affect a large number of individuals, groups, businesses, or government entities and/or be readily detectable and observed and/or occur over a wide geographic area and have a substantial influence on social and/or economic conditions. <p>An environmental justice impact is considered to be significant if the impact from an Action Alternative disproportionately and adversely affects a minority or low income community.</p> <p>An impact on a population of children is considered to be significant if the impact from an Action Alternative disproportionately and adversely affects this population of children.</p>
Solid and Hazardous Waste and Pollution	Impacts would be considered significant if they would result in: <ul style="list-style-type: none"> • An unacceptable risk of exposure or impact on human health and safety regarding the amount of materials or waste to be handled, stored, used, or disposed of, or probable regulatory violation. • Site contamination conditions that would preclude development of the site for the proposed use.
Transportation and Traffic	Impacts would be considered significant if: <ul style="list-style-type: none"> • Level of service is reduced to unacceptable levels. • Intersections and gates would reach capacity and extensive delays would develop.
Utilities and Services	Impacts would be considered significant if the Proposed Action would require more utility service than could be reliably provided and sustained by the combination of available utility providers, system and sources.

Resource Topics	Significance Threshold
Visual Resources	Impacts would be considered significant if the Proposed Action would: <ul style="list-style-type: none"> • Result in changes to the physical features that would diminish the aesthetic character and value of the landscape. • Eliminate public viewing opportunities.
Water Resources	Impacts would be considered significant if they would: <ul style="list-style-type: none"> • Alter the existing pattern of surface or groundwater flow or drainage in a manner that would adversely affect the uses of the water within or outside the region. • Degrade surface or groundwater quality in a manner that would reduce the existing or potential beneficial uses of the water. • Would be out of compliance with existing or proposed water quality standards or other regulatory requirements related to protecting or managing water resources, including all requirements of JBLM's Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4), Permit number WAS-026638. • Would not comply with the CWA. • Would not comply with the Safe Drinking Water Act.

Notes: CFR – Code of Federal Regulations, CWA – Clean Water Act, dB – decibel, JBLM – Joint Base Lewis-McChord, NAAQS – National Ambient Air Quality Standards

Impacts also are characterized as short term or long term. Short-term effects typically are those that would be temporary and associated with the construction phase but would no longer be perceptible once construction is completed or shortly thereafter. Long-term effects are those that would be permanent or would persist for the operational life of the project.

3.1.1 Resource Areas Carried Forward for Analysis

Army NEPA Regulations (32 CFR §651.14) state the NEPA analysis should reduce or eliminate discussion of minor issues to help focus analyses. This approach minimizes unnecessary analysis in the document and discussion during the NEPA process. The CEQ regulations for implementing NEPA (40 CFR §1500.4(g)) emphasizes implementing the scoping process not only to identify significant environmental issues deserving of study but also to deemphasize insignificant issues, narrowing the scope of the EA/environmental impact statement process. After consideration of the anticipated impacts associated with the Proposed Action and alternatives, the following resource topics were carried forward for detailed analysis in this EA:

- Air Quality
- Airspace
- Biological Resources (including wildlife, vegetation, and sensitive species)
- Cultural Resources
- Energy
- Geology and Soils
- Land Use
- Noise
- Recreation Resources
- Public Health and Safety
- Socioeconomics and Environmental Justice
- Solid and Hazardous Waste and Pollution
- Transportation and Traffic
- Utilities
- Visual Resources
- Water Resources
- Transportation and Traffic

3.1.2 Resource Areas Dismissed from Further Analysis

After consideration of the anticipated impacts associated with the Proposed Action and alternatives, no resources were dismissed from further analysis.

3.2 Air Quality

3.2.1 Affected Environment

Air quality is protected by federal regulations administered by the U.S. Environmental Protection Agency (USEPA); state regulations administered by the Washington State Department of Ecology (WDOE); and the local clean air agency, Puget Sound and Yakima Regional Clear Air Agencies.

3.2.1.1 Air Quality Standards and General Conformity Rule

Air quality is defined as the ambient air concentrations of specific pollutants determined by the USEPA and WDOE and to be of concern to the health and welfare of the general public. The specific pollutants include the criteria pollutants, hazardous air pollutants, and GHGs.

The criteria pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter less than 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), and lead. National Ambient Air Quality Standards (NAAQS) have been established by the USEPA for these criteria pollutants (USEPA 2016a). Washington State has adopted the NAAQS for all criteria pollutants except for SO₂, for which the state has adopted slightly more stringent requirements (Washington Administrative Code 173-474). Table 3-2 lists the NAAQS as well as applicable state air quality standards.

Depending on the type of pollutant, these maximum concentrations may not be exceeded at any time, or may not be exceeded more than once per year.

Table 3-2. National and Washington State Ambient Air Quality Standards

Pollutant	Averaging Time	Washington Standards	National Standards	
			Primary	Secondary
Carbon monoxide	8-hour	9 ppm	9 ppm	None
	1-hour	35 ppm	35 ppm	None
Lead	Rolling 3-month average	0.15 µg/m ³	0.15 µg/m ³	0.15 µg/m ³
Nitrogen dioxide	Annual average	0.053 ppm	0.053 ppm	0.053 ppm
	1-hour	None	0.100 ppm	None
Particulate matter ₁₀	24-hour	150 µg/m ³	150 µg/m ³	150 µg/m ³
Particulate matter _{2.5}	Annual arithmetic average	12.0 µg/m ³	12.0 µg/m ³	15.0 µg/m ³
	24-hour	35 µg/m ³	35 µg/m ³	35 µg/m ³
Ozone	8-hour (2015 standard)	0.075 ppm	0.07 ppm	0.07 ppm
Sulfur dioxide	3-hour	None	None	0.50 ppm
	1-hour	0.40 ppm ^a	0.075 ppm ^b	None

Sources: USEPA (2016a), WDOE (undated [a])

Notes: µg/m³ – micrograms per cubic meter, ppm – parts per million

^a Volume average for 1-hour period more than once per 1-year period; 0.25 ppm not to be exceeded more than two times in any 7 consecutive days.

^b Final rule issued 22 June 2010. To achieve this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitoring station in an area must not exceed 75 parts per billion. The USEPA also revoked the annual and 24-hour primary standards when enacting the 1-hour standard.

The NAAQS provide definitions of the maximum concentrations of the criteria pollutants that are considered safe with an additional, adequate margin of safety to protect human health and welfare. Short-term standards (1-, 8-, and 24-hour periods) are established for pollutants contributing to acute health effects. Long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects. Air Quality Control Regions exist to assist in planning and monitoring to prevent air quality deterioration and achieve attainment status with all NAAQS.

As described in 40 CFR Part 51, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* (the General Conformity Rule), all federal actions occurring in air basins designated in nonattainment or in a maintenance area must conform to an applicable State Implementation Plan. JBLM, including YTC is located in Pierce, Thurston, Yakima, and Kittitas counties. No counties in Washington State are currently in nonattainment; however, Pierce, Thurston, and Yakima counties were previously in nonattainment for PM₁₀ but were redesignated as maintenance in 2001, 2000, and 2005, respectively. Pierce County was also redesignated as maintenance for CO in 1996 and PM_{2.5} in 2015 (USEPA 2016a). Given the programmatic nature of the RPMP, a General Conformity Rule review will not be performed but may be required as specific construction projects are proposed to implement the RPMP.

3.2.1.2 Existing Ambient Air Quality Concentrations

Stations that meet the USEPA's design criteria for State and Local Air Monitoring Stations and National Air Monitoring Stations monitor ambient air quality across Washington State. The highest and second highest values recorded at all stations located within the four counties that comprise JBLM during the period 2011 through 2015 are shown in Table 3-3.

Table 3-3. Two Highest PM_{2.5} and CO Values, 2011 to 2015

Monitoring Station	Year				
	2011	2012	2013	2014	2015
#530770009 – 402 South 4th Ave (Yakima County)					
Particulate matter ₁₀ – monitor 1	59/43	58/54	59/55	53/41	73/37
Particulate matter ₁₀ – monitor 2	--	--	--	--	41/40
#530770017 – 3851 N Harrah Rd (Yakima County)					
Particulate matter ₁₀	--	12/12	127/84	--	--
#530530029 – 7802 South L Street (Pierce County)					
Particulate matter _{2.5} – monitor 1	55.9/47.3	43.5/40.9	41.5/38.1	37/35.7	50.3/44.5
Particulate matter _{2.5} – monitor 2	57.5/48.6	19.7/12.4	38.9/34	33.7/30	45.2/20

Monitoring Station	Year				
	2011	2012	2013	2014	2015
Particulate matter _{2.5} – monitor 3	55.9/46.6	43.2/42	40.3/37.6	40.8/35.1	77.3/539.

Source: USEPA (2015a)

Notes: All values are in $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter)

3.2.1.3 Regional Air Quality Index Summary

The USEPA calculates the Air Quality Index (AQI) for five major air pollutants regulated by the Clean Air Act—ground-level ozone, particulate matter, CO, SO₂, and NO₂. The USEPA collects data daily to determine air quality for the region and releases it in the form of the AQI. The AQI ranges from zero to 500—zero being no air pollution and 500 representing severely unhealthy air pollution levels. An AQI value between 101 and 150 indicates that air quality is unhealthy for sensitive groups who may be subject to negative health effects. Sensitive groups may include those with lung or heart disease who will be more negatively affected by lower levels of ground level ozone and particulate matter than the rest of the general public. An AQI value between 151 and 200 is considered to be unhealthy and may result in negative health effects for the general public, and more severe effects are possible for those in sensitive groups. AQI values greater than 200 are considered very unhealthy. An AQI greater than 300 represents hazardous air quality (USEPA 2016b). Table 3-4 provides the AQI for the four JBLM counties in 2015.

Table 3-4. Air Quality Index Data for JBLM in 2015

2015	County			
	Pierce	Thurston	Kittitas	Yakima
101 to 150 Unhealthy for Sensitive Groups (no. of days)	3	0	1	9
151 to 200 Unhealthy (no. of days)	1	0	2	4
201+ Very Unhealthy (no. of days)	0	0	0	0

Source: USEPA (2015b)

3.2.1.4 Air Emissions

The primary emission sources at JBLM, including YTC are motor vehicles and industrial sources. Industrial sources include aerospace maintenance and rework operations, fuel burning, fuel storage and dispensing, degreasing, woodworking, and painting operations. Currently, JBLM maintains a “Synthetic Minor” operating permit that means that any increase in stationary source emissions could require the transition back to major source status. Additional thresholds

are pollutant-specific for nonattainment and maintenance areas. An inventory of emissions from the major air pollution sources on the installation is provided in Table 3-5.

Table 3-5. Air Emission Inventory for Joint Base Lewis-McChord

Pollutant	Tons/Year (2010)
Carbon monoxide	60
Nitrogen oxides	55
Sulfur dioxide	3.0
Volatile organic compounds	35
Particulate matter	5.0
Total hazardous air pollutants	5.0
Total toxic air contaminants	---

Source: JBLM (2014a)

3.2.1.5 Greenhouse Gas Emissions (Climate Change)

There is broad scientific consensus that humans are changing the chemical composition of the earth's atmosphere. Activities, such as fossil fuel combustion, deforestation, and other changes in land use, are resulting in the accumulation of trace GHGs, such as carbon dioxide (CO₂), in the atmosphere. An increase in GHG emissions is said to result in an increase in the earth's average surface temperature, which is commonly referred to as global warming. Global warming is expected, in turn, to affect weather patterns, the average sea level, ocean acidification, chemical reaction rates, and precipitation rates, commonly referred to as climate change. The best estimates of the Intergovernmental Panel on Climate Change are that the average global temperature rise between 2000 and 2100 could range from 0.6 degree Celsius (1.08 degrees Fahrenheit) (with no increase in GHG emissions greater than year 2000 levels) to 4.0 degrees Celsius (6.66 degrees Fahrenheit) (with substantial increase in GHG emissions) (Intergovernmental Panel on Climate Change 2007). Even small increases in global temperatures could have considerable detrimental impacts on natural and human environments.

GHGs include water vapor, CO₂, methane, nitrogen oxide (NO_x), ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. A gas's global warming potential provides a relative basis for calculating its CO₂ equivalent, which is a metric measure used to compare the emissions from various GHGs based on their global warming potential. CO₂ has a global warming potential of 1 and is therefore the standard to which all other GHGs are measured.

Water vapor is a naturally occurring GHG and accounts for the largest percentage of the GHG effect. Next to water vapor, CO₂ is the second-most abundant GHG. Uncontrolled CO₂ emissions from power plants, heating sources, and mobile sources are a function of the power rating of each source, the feedstock (fuel) consumed, and the source's net efficiency at converting the energy in the feedstock into other useful forms of energy (e.g., electricity, heat, and kinetic). Because CO₂ and the other GHGs are relatively stable in the atmosphere and essentially uniformly mixed throughout the troposphere and stratosphere, the climatic impact of these emissions does not depend on the source location on the earth (i.e., regional climatic impacts/changes will be a function of global emissions).

GHG emissions from federal installations are the subject of numerous policy and planning documents, including EO 13693, *Planning for Federal Sustainability in the Next Decade*, which calls for a 40 percent reduction in federal GHG emissions by 2040 compared to 2008 levels. In 2014, the DoD released its *Strategic Sustainability Performance Plan* (DoD 2014).

Baseline Greenhouse Gas Emissions at JBLM

GHG emission sources at JBLM, including YTC, include boiler plants and other boilers that use natural gas, propane, and fuel oil for space heating and hot water. No specific monitoring of these emission sources has occurred.

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1 – No Action

Under the No Action Alternative, management of JBLM, including the YTC, would continue based on existing planning principles and development goals. Any construction, renovation, or demolition projects that would occur based on existing planning principles and development goals could result in short-term impacts on air quality during the construction phase. Construction-related air quality impacts would result from direct emissions from construction equipment used for activities, such as land clearing, site preparation (i.e., demolition, excavation/fill, trenching, and grading), gravel and concrete work, paving, and building. Typical construction equipment could include bulldozers, backhoes, scraper/hauler/excavators, graders, compactors, concrete mixers, cranes, rollers, paving machines, pile drivers, fork lifts, diesel generators, and dump trucks, concrete trucks, and delivery trucks. The type and number of pieces of construction equipment would vary depending on the requirements for each construction project. Emissions would also result from construction workers commuting to and from the construction site in personal vehicles. Emissions associated with construction

equipment would include volatile organic compounds (VOCs), CO, NO_x, SO₂, PM₁₀, and PM_{2.5}. Construction equipment and construction worker commutes would also release GHG emissions. The movement of equipment and demolition and excavation activities would result in fugitive dust emission (primarily PM₁₀) in dry weather.

The total emissions in any particular area would vary depending on the currently unknown details of each project. Emissions would generally be proportional to the size of the project. Similarly, fugitive dust emissions would generally be proportional to the area of soil exposed and quantity of excavation; however, because the projects are anticipated to be constructed over a multiple year time frame and the relatively small scale of potential projects, the emissions in any particular year is expected to be less than significant. Construction-related air quality impacts could be further reduced through implementation of standard best management practices (BMPs), such as implementing dust control measures (e.g., covering trucks, watering exposed soil in dry weather, and promptly seeding/covering exposed areas), limiting idling of equipment, encouraging contractors to use newer model construction equipment, and ensuring proper equipment maintenance. As construction project details are known, individual projects would require a formal General Conformity Rule analysis to ensure impacts would not be significant.

Development in accordance with existing planning principles and development goals could result in the demolition of existing building space and the construction of new building space that may offset the space demolished. While a net increase in building space would increase overall energy consumption and GHG emissions on the installation, this potential impact would be at least partially offset by the increased energy efficiency of new buildings compared to those being replaced and the potential incorporation of renewable energy features into new buildings. Building-related heating and hot water emissions would continue to be generated onsite by boilers (primarily natural gas with oil backup). Changes in onsite heating and electrical generation systems would comply with air quality permitting requirements (e.g., modification of the installation's existing synthetic minor permit, as appropriate). The long-term impact of additional building facilities is expected to be less than significant.

The incorporation of additional parks or open space could have long-term, beneficial effects regarding GHG implications in terms of carbon sequestration by adding vegetated areas and naturally functioning riparian areas. Additional long-term benefits from a reduction in pollutants and GHG emissions could occur as a result of an improved transportation network, including less congestion and reduced use of personal vehicles.

Because the RPMP would not be formally adopted under the No Action Alternative, JBLM, including YTC may or may not implement identified projects and plans. Consequently, beneficial impacts identified above are not as certain as they would be with Alternative 2 and formal adoption of the RPMP.

Overall, impacts under the No Action Alternative would include short-term, non-significant impacts during construction, long-term, non-significant impacts from increased energy use, and long-term, beneficial impacts from reduced congestion and increased open space.

Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on air quality would be the same as those described for the No Action Alternative. Overall, impacts under Alternative 2 including short-term, non-significant impacts during construction, long-term, non-significant impacts from increased energy use, and long-term, beneficial impacts from reduced congestion and increased open space. Because the RPMP would be formally adopted under Alternative 2, impacts identified are more certain than those presented for the No Action Alternative.

3.3 Airspace

3.3.1 Affected Environment

The ROI for the airspace analysis is the airspace over and surrounding the Main Cantonment of JBLM and the Main Cantonment of YTC.

The DoD manages airspace delegated to it by the Federal Aviation Administration (FAA) in accordance with the processes and procedures outlined in DoD Directive 5030.19, *DoD Responsibilities on Federal Aviation and National Airspace System Matters* (DoD 1997), and implemented by Army Regulation 95-2, *Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control, and Navigation Aids* (U.S. Army 2008a). The DoD and the Army collaborate with the FAA to ascertain the minimum requirement for airspace, evaluating any environmental consequences of proposed airspace designations in compliance with both the FAA and the DoD NEPA implementing regulations.

The two categories of airspace or airspace areas are regulatory and non-regulatory. Within these two categories, four types of airspace include controlled airspace, special use airspace (SUA), other, and uncontrolled airspace. Controlled airspace is airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules, or IFR, flights and to Visual Flight Rules, or VFR, flights in accordance with the airspace classification (FAA 2008).

Controlled airspace is categorized into five separate classes: Classes A through E. These classes identify airspace that is controlled, airspace that supports airport operations, and designated airways affording en route transit from place to place. The classes also dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace. Uncontrolled airspace is designated Class G airspace.

The FAA has designated the majority of airspace within JBLM as restricted SUA. This airspace regulation covers 55 square miles, up to 14,000 feet mean sea level (MSL). JBLM has access to this airspace through area R6703, sub-areas A, B, and D from 7:00 a.m. to 11:00 p.m. daily from Monday through Friday. Sub-area C is scheduled by Notice to Airmen. The primary purpose for R6703 is live-fire training with artillery, mortars, small arms, and demolitions. The airspace also supports helicopter and U.S. Air Force aircraft training. Restricted areas within the SUA may be activated, in which case nonmilitary and unauthorized military aircraft are prohibited from entering the airspace.

The airspace surrounding GAAF is classified as Class D, which refers to airspace restricted from the surface to a ceiling of 2,800 feet MSL.

The airspace on the eastern portion of YTC is SUA, R671A, which supports helicopter training up to 7,000 feet MSL and the Vagabond Army Heliport. Airspace surrounding YTC to the south is classified as Class D airspace from the surface to 3,600 feet MSL surrounding McAllister Field in Yakima, Washington.

Several commercial and private airports, including Seattle-Tacoma International Airport and McAllister Field, respectively, and numerous smaller airfields are located near JBLM and the YTC. Designated SUAs reduce the likelihood of interaction between military aircraft and public, private, or commercial aircraft. Training is currently conducted within designated SUAs and restricted operating zones to allow unencumbered training flights to meet mission essential training goals.

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1 – No Action

Under the No Action Alternative, management of JBLM, including the YTC would continue based on existing planning principles and development goals. Under the No Action Alternative, impacts on airspace would occur as a result of existing planning standards that call out rangeland/airspace preservation as a planning principle. As part of this principle, existing

planning standards seek to reduce and, in certain cases, eliminate airspace encroachment, resulting in a long-term, beneficial impact on airspace. However, under the No Action Alternative, airspace preservation and protection is not as certain as it would be with the formal adoption of the RPMP under Alternative 2, resulting in a potential reduction in the beneficial impacts that would result from adopting the IDP.

In addition, existing planning principles and development goals for GAAF call for updating aging and obsolete facilities to accommodate U.S. Air Force cargo aircraft and rearranging the site to allow for the future aviation intermediate maintenance hangar and control tower, increasing visibility for air traffic staff, resulting in long-term, beneficial impacts on airspace from increased efficiencies and safety measures.

Although not finalized, under the No Action Alternative, JBLM, including YTC would adhere to its principles in the 2015 AICUZ Study Update, which would prevent incompatible land use that could compromise the ability of JBLM to fulfill its mission and result in compatible land development in areas subject to aircraft noise and accident potential. The reduction in accident potential from finalizing the 2015 AICUZ Study Update would have long-term, beneficial impacts on airspace.

3.3.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on airspace would be similar to those presented for the No Action Alternative. Impacts under Alternative 2 would occur as a result of adopting the IDP, which calls out rangeland/airspace preservation as a planning principle. As part of this principle, the Master Plan seeks to reduce and, in certain cases, eliminate airspace encroachment, resulting in a long-term, beneficial impact on airspace. Based on the adoption of the RPMP, beneficial impacts under Alternative 2 are more certain than those presented for the No Action Alternative.

In addition, components of the GAAF ADP that call for updating aging and obsolete facilities and rearranging the site would result in long-term, beneficial impacts on airspace as a result of increased efficiencies and safety measures. Furthermore, as previously described, adherence to the 2015 AICUZ Study Update would also reduce the potential for accidents and have a long-term, beneficial impact on airspace. The beneficial impacts resulting from formally adopting the RPMP under Alternative 2 would be more certain than those presented for the No Action Alternative.

Implementation of other plans as part of the larger IPS, IONMP, and Capital Investment Strategy is not anticipated to affect airspace, the use of existing air assets, or airspace classifications, resulting in no impacts on airspace.

3.4 Biological Resources

Biological resources are the plants, animals, and the habitat within which they occur. Habitats are ecological or environmental areas that are inhabited by a particular species of animal, plant, or other type of organism. For the purposes of this analysis, the resources within the project area are divided into four major categories: vegetation, wetlands, fish and wildlife, and sensitive species.

3.4.1 Affected Environment

The ROI specific to biological resources for this analysis is limited to the boundaries of the Main Cantonments of JBLM and the YTC installations because potentially affected resources would be confined to these localized areas. The RPMP does not include components outside the Cantonment and is therefore not likely to affect biological resources in those areas. Biological resources occurring within the larger installation boundary are discussed, where appropriate, to provide an overall context of the existing conditions.

3.4.1.1 Vegetation

Vegetation community types are plants that are considered collectively, especially those found in a particular area or habitat and are distinguishable from neighboring patches of different vegetation types. The components of each vegetation community are influenced by climate, soil, animal, and time factors (Daubenmire 1966).

Four main vegetation community types occur within the Main Cantonment of JBLM—coniferous/mixed forests, oak/oak-mixed woodlands, prairies, and wetlands/riparian areas (JBLM 2014a, 2013a). Wetlands are discussed in more detail in Section 3.4.1.2.

The three main forest communities at JBLM are dry Douglas-fir forest, moist Douglas-fir/red cedar/western hemlock forest, and wetland/floodplain forest (JBLM 2014a). The dry Douglas-fir forest is characterized by plants that thrive under relatively dry forest conditions. This category is further divided into 1) dry forests on prairie soils, and 2) dry forests on forest soils. Dry forests on prairie soils are “colonization” Douglas-fir stands that occupy former prairies that are underlain by prairie soils formed on glacial outwash. These stands have little coarse woody debris. Dry forests on forest soils consist of Douglas-fir stands growing in areas that historically

were forest and are underlain by forest soils on glacial till and moraine. These stands typically have more coarse woody debris than dry forests on prairie soils. The moist forest type tends to contain more red cedar and hemlock and deciduous trees, such as bigleaf maple, than dry forest stands. These stands are found on till, moraine, and depressions in glacial outwash. The wetland/floodplain forest of the Main Cantonment at JBLM is dominated by hardwood trees, mostly along the Nisqually River and other streams throughout the installation.

Since the late 1800s, fire has ceased to be a major agent of ecological change, and during the 1930s and 1940s, most of the installation's forests were clearcut; therefore, most of the forest stands on JBLM are of similar age and do not contain trees that have developed the structural characteristics of mature and old-growth forests.

Oregon white oak woodlands offer a structural complexity not found in the surrounding grasslands and conifer forests, which provide a variety of wildlife habitat elements for feeding, breeding, resting, and shelter (Larsen and Morgan 1998). General wildlife management in oak woodlands focuses on increasing the size and openness of oak habitats, increasing connectivity, and reducing catastrophic fire risks. The risk of catastrophic fire is reduced through use of prescribed burning. Prescribed burning reduces the fuel loadings within oak communities and provides essential ecosystem functions that cannot be achieved through other management techniques, such as mowing and herbicide application. Oak trees are allowed to grow larger to the benefit of wildlife species, such as the western gray squirrel, that use oaks to help meet life requisites.

Prairie habitat, including a small acreage of riparian meadows, occurs on JBLM. These prairies vary in quality with quality typically defined in terms of the amount of native vegetation relative to the amount of non-native vegetation on a given site. According to descriptions provided by the Washington Natural Heritage Program (WNHP 2016), relatively undisturbed South Puget Sound prairies can be defined by the Roemer's fescue, the white-top aster association community type. Disturbed prairies, which typically support substantial populations of invasive species, are defined by several different disturbance community types that vary on the basis of their species assemblages. Historically, prairies formed a dynamic vegetation complex with Oregon white oak, Ponderosa pine, and Douglas-fir savannas.

JBLM controls noxious or invasive vegetation using an integrated approach to minimize damage to property, protect native habitats, and comply with laws (JBLM 2014a). Without proper control and restoration efforts, invasive species threaten native plant and animal species, some of which may already be listed as threatened or endangered. Invasive species also can adversely

affect military readiness and create fire and safety hazards. Data from noxious weed surveys and sightings are to be used to prioritize areas for treatment. The implemented treatment methods depend on the target species and the extent of infestation.

Some of the documented noxious weeds located on JBLM include Scotch broom (*Cytisus scoparius*), non-native pasture grasses, knapweed (*Centaurea sp.*), Sulphur cinquefoil (*Potentilla recta*), and leafy spurge (*Euphorbia esula*), Eurasian watermilfoil (*Myriophyllum spicatum*), yellow-flag iris (*Iris pseudocorus*), pondweeds, reed canarygrass (*Phalaris arundinacea*), and purple loosestrife (*Lythrum salicaria*) (JBLM 2014a). These invasive species, if untreated, can dominate habitats, reducing their suitability for training and for native plant and animal species. Reed canarygrass is one of the most problematic invasive plant species because it provides little habitat value to wildlife and it blocks stream channels, reduces flows, and binds spawning gravels.

The Main Cantonment of the YTC includes shrub-steppe habitat, which is characterized by a bunch grass and shrub dominated plant community (U.S. Army 2014c). This type of habitat is described as vegetation communities that consist of one or more layers of perennial grass with a discontinuous overstory layer of shrubs (WDFW 2016a). One of the largest contiguous remaining areas of shrub-steppe habitat in Washington State is located adjacent to the Main Cantonment of the YTC (U.S. Army 2014c). According to the Washington Department of Fish and Wildlife (WDFW) (2016a), shrub-steppe communities have been lost or degraded by conversion to cropland, extensive energy extraction, alteration of the vegetation through overgrazing, invasion by exotic and invasive plants, and changes in fire frequency.

3.4.1.2 Wetlands

Wetlands are defined as areas that are inundated or saturated by surface or ground water a frequency and duration sufficient to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR 232.2). Wetlands typically include marshes, swamps, bogs, fens, wetlands created from non-wetland areas to mitigate for conversion of wetlands, and similar areas.

The U.S. Fish and Wildlife Service's (USFWS') National Wetlands Inventory Wetlands Mapper data identified the several wetlands within the Main Cantonment of JBLM (USFWS 2016a), which are described below.

- Freshwater emergent wetland are non-tidal wetlands, such as herbaceous marshes, that are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. The vegetation is present for most of the growing season in most years and is usually dominated by perennial plants. According to USFWS (2016a), one freshwater emergent wetland is located within the Main Cantonment of JBLM.
- Freshwater forested/shrub wetlands are non-tidal wetlands, such as forest swamps, that are generally characterized by woody vegetation that is 6-m tall or taller. According to USFWS (2016a), 21 freshwater forested/shrub wetlands are located within the Main Cantonment of JBLM.
- Freshwater ponds are non-tidal wetlands that do not have an active wave-forming or bedrock shoreline feature and have a water depth of less than 2 m in the deepest part of the basin. According to USFWS (2016a), 9 freshwater ponds are located in the vicinity of the Main Cantonment of the JBLM.

Table 3-6 provides more information on the types of wetlands, approximate acreage, and the general location of each wetland within the Main Cantonment of the JBLM (USFWS 2016a).

Table 3-6. Wetland Type, Approximate Size, and General Location of Wetlands within the Main Cantonment of JBLM

Wetland Type (Cowardin Classification)	Approximate Size (acres)	General Location (District)
Freshwater emergent	1.34	Madigan
Freshwater forest shrub/scrub	13.10	Carter Lake
Freshwater forest shrub/scrub	9.71	Carter Lake
Freshwater forest shrub/scrub	7.60	Carter Lake
Freshwater forest shrub/scrub	5.58	Carter Lake
Freshwater forest shrub/scrub	5.35	Carter Lake
Freshwater forest shrub/scrub	5.14 (partially outside project area)	Carter Lake/City of Lakewood
Freshwater forest shrub/scrub	4.03	Carter Lake
Freshwater forest shrub/scrub	2.33	Carter Lake
Freshwater forest shrub/scrub	11.77	Jackson
Freshwater forest shrub/scrub	0.42	JBLM Flightline
Freshwater forest shrub/scrub	6.42	Lewis-McChord Link
Freshwater forest shrub/scrub	4.60	Lewis-McChord Link
Freshwater forest shrub/scrub	1.68	Lewis-McChord Link
Freshwater forest shrub/scrub	11.57	Logistics Center

Wetland Type (Cowardin Classification)	Approximate Size (acres)	General Location (District)
Freshwater forest shrub/scrub	4.86	Logistics Center
Freshwater forest shrub/scrub	5.18	Madigan
Freshwater forest shrub/scrub	1.61	McChord Center
Freshwater forest shrub/scrub	0.79	McChord Center
Freshwater forest shrub/scrub	1.39	Miller Hill
Freshwater forest shrub/scrub	68.97	Old Madigan/Lewis-McChord Link
Freshwater forest shrub/scrub	0.65	Old Madigan
Freshwater pond	3.29	Carter Lake
Freshwater pond	0.39	Carter Lake
Freshwater pond	2.91	JBLM Flightline
Freshwater pond	1.78	JBLM Flightline
Freshwater pond	0.79	JBLM Flightline
Freshwater pond	0.13	JBLM Flightline
Freshwater pond	0.56	Logistics Center
Freshwater pond	0.17	Logistics Center
Freshwater pond	2.63	Old Madigan

Source: USFWS (2016a)

The USFWS' National Wetlands Inventory Wetlands Mapper data identified the several wetlands within the vicinity of the Main Cantonment of the YTC:

- Freshwater emergent wetlands are non-tidal wetlands, such as herbaceous marshes, characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. The vegetation is present for most of the growing season in most years and is usually dominated by perennial plants. According to USFWS (2016a), one freshwater emergent wetland is located within the Main Cantonment of the YTC.
- Freshwater Ponds are non-tidal wetlands that do not have an active wave-forming or bedrock shoreline feature and have a water depth of less than 2 meters in the deepest part of the basin. According to USFWS (2016a), five freshwater ponds are located in the vicinity of the Main Cantonment of the YTC.

Table 3-7 provides more information on the types of wetlands, approximate acreage, and the general location of each wetland within the Main Cantonment of the YTC (USFWS 2016a).

Table 3-7. Wetland Type, Approximate Size, and General Location of Wetlands within the Main Cantonment of the YTC

Wetland Type (Cowardin classification)	Approximate Size (acres)	General Location
Freshwater emergent	0.73	West of E Street
Freshwater pond	0.63	East of E Street and South of Firing Center Road
Freshwater pond	0.42	East of E Street and South of Firing Center Road
Freshwater pond	0.33	East of F Street and North of Firing Center Road
Freshwater pond	0.26	East of F Street and North of Firing Center Road
Freshwater pond	0.15	Intersects Firing Center Road between D Street and E Street

3.4.1.3 Fish and Wildlife

Fish and wildlife encompass any member of the animal kingdom, without limitation, including any mammal, bird (including migratory, non-migratory, or endangered bird for which protection is afforded by treaty or other international agreement), fish, amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate (USFWS 2013).

The Main Cantonment of the JBLM provides habitat for numerous wildlife species (JBLM 2013a). According to the WDFW's Priority Habitats and Species (PHS) online database, the Main Cantonment of JBLM provides habitat for western gray squirrel (*Sciurus griseus*), streaked horned lark (*Eremophila alpestris strigata*), Townsend's big-eared bat (*Corynorhinus townsendii*), and purple martin (*Progne subis*) (WDFW 2016b). The WDFW PHS online database also shows that the township of the JBLM is mapped to have the presence of big brown bat (*Eptesicus fuscus*), little brown myotis (*Myotis lucifugus*), and Yuma myotis (*Myotis yumanensis*), and the section is mapped to have Taylor's checkerspot (*Euphydryas editha taylori*) (WDFW 2016b). Biodiversity areas and corridors, which are naturally vegetated land areas that should be considered for conservation and natural area protection, are designated within the Main Cantonment of JBLM (WDFW 2016b).

Some of the big game species inhabiting JBLM forests include black bear (*Ursus americanus*), Columbian black-tailed deer (*Odocoileus columbianus*), and Roosevelt elk (*Cervus canadensis roosevelti*). Columbian black-tailed deer are common on JBLM and are the primary big game species. Black bear appear to be increasing in population and occur throughout JBLM, inhabiting forests, prairie edges, oak woodlands, riparian areas, and the Main Cantonment. Roosevelt elk, which have been observed only infrequently on JBLM, have been sighted mainly

in the forested areas of the Rainier Training Area and are thought to be following a migration corridor. The primary small upland game species occurring within JBLM forests include the Ruffed Grouse (*Bonasa umbellus*) and Sooty Grouse (*Dendragapus fuliginosus*) with ruffed grouse being more prevalent.

The USFWS Information for Conservation and Planning online database shows that the Main Cantonment of JBLM may also provide habitat for several migratory bird species (USFWS 2016b). These species potential include bald eagle (*Haliaeetus leucocephalus*), black swift (*Cypseloides niger*), Caspian tern (*Hydroprogne caspia*), fox sparrow (*Passerella iliaca*), Olive-sided flycatcher (*Contopus cooperi*), peregrine falcon (*Falco peregrinus*), purple finch (*Carpodacus purpureus*), Rufous hummingbird (*Selasphorus rufus*), short-eared owl (*Asio flammeus*), vesper sparrow (*Pooecetes gramineus ssp. affinis*), Western grebe (*Aechmophorus occidentalis*), and willow flycatcher (*Empidonax traillii*) (USFWS 2016b). Waterfowl concentrations, which are regular, small to large concentrations of waterfowl, are designated by the WDFW PHS online database to occur within the Main Cantonment of the JBLM (WDFW 2016b).

According to the WDFW's StreamScape online database, the only species of anadromous fish found within riverine systems in the Main Cantonment of JBLM is coho salmon (*Oncorhynchus kisutch*) (WDFW 2016c). This species has historically used the Muck Creek, Cabin Creek, and the Clear Creek systems as spawning and rearing habitat. In the past, coho salmon has also spawned within Muck Creek as far upstream as 13th Division prairie (JBLM 2013a). The WDFW PHS online database also shows this area has resident cutthroat trout (*Oncorhynchus clarki*) (WDFW 2016b).

The Main Cantonment of the YTC contains shrub-steppe habitat, a type of habitat that tends to support a range of wildlife species (WDFW 2016a). Some of the species that inhabit shrub-steppe habitat include greater sage-grouse (*Centrocercus urophasianus*), sage sparrow (*Artemisiospiza nevadensis*), sage thrashers (*Oreoscoptes montanus*), pygmy rabbit (*Brachylagus idahoensis*), Washington ground squirrel (*Urocitellus washingtoni*), Brewer's sparrow (*Spizella breweri*), and burrowing owl (*Athene cunicularia*) (WDFW 2016a). The WDFW PHS online database also shows the presence of the little brown myotis, western small-footed myotis (*Myotis ciliolabrum*), California myotis (*Myotis californicus*), and black-tailed jackrabbit (*Lepus californicus*) within the Main Cantonment of the YTC, while the presence of big brown bat is designated within the township of the YTC (WDFW 2016b).

The USFWS IPaC online database shows that the this area may also provide habitat for several additional migratory bird species such as bald eagle, Calliope hummingbird (*Stellula calliope*), Cassin's finch (*Carpodacus cassinii*), eared grebe (*Podiceps nigricollis*), Ferruginous hawk (*Buteo regalis*), flammulated owl (*Otus flammeolus*), fox sparrow, loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), peregrine falcon (*Falco peregrinus*), Rufous hummingbird, short-eared owl, Swainson's hawk (*Buteo swainsoni*), western grebe, and willow flycatcher (USFWS 2016b). The WDFW PHS online database also indicates the presence of golden eagle (*Aquila chrysaetos*) within the township of the YTC (WDFW 2016b). Additionally, areas adjacent to and primarily outside the YTC's Main Cantonment support one of two populations of sage grouse that remain in the state of Washington (U.S. Army 2014c).

3.4.1.4 Sensitive Species (Federal Only)

This section provides an overview of sensitive species within the project area, including federal Endangered Species Act-listed threatened, endangered, candidate, and proposed species. This section also provides information about the presence of any federally designated critical habitats, which are specific geographic areas that contain features essential for the conservation of a threatened or endangered species and that may require special management and protection (USFWS 2015).

The Main Cantonment of JBLM provides habitat for numerous wildlife species, including federal Endangered Species Act-listed species. Table 3-8 lists plant and animal species that may have the potential to occur within this area and are given a special status at the federal level based on their risk of extirpation and decline (NOAA Fisheries 2016a, USFWS 2016b, WDFW 2016c). The bald eagle (*Haliaeetus leucocephalus*), which is not federally listed under the Endangered Species Act but is protected under the Bald and Golden Eagle Protection Act, has the potential to occur within the Main Cantonment area of JBLM. No federally proposed or candidate species, critical habitat, or proposed critical habitat are located within the Main Cantonment of JBLM (NOAA Fisheries 2016b, USFWS 2016b).

Table 3-8. Federally Listed, Proposed or Candidate Species with the Potential to Occur within the Main Cantonment of JBLM

Common Name	Scientific Name	Federal Status
Plants		
Golden paintbrush	<i>Castilleja levisecta</i>	Threatened
Marsh sandwort	<i>Arenaria paludicola</i>	Endangered
Water howellia	<i>Howellia aquatilis</i>	Threatened
Reptiles and Amphibians		
Oregon spotted frog	<i>Rana pretiosa</i>	Threatened
Birds		
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Threatened
Northern spotted owl	<i>Strix occidentalis caurina</i>	Threatened
Streaked horned lark	<i>Eremophila alpestris strigata</i>	Threatened
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened
Mammals		
Canada lynx	<i>Lynx Canadensis</i>	Threatened
Mazama pocket gopher	<i>Thomomys mazama</i>	Threatened
Fish		
Bull trout	<i>Salvelinus confluentus</i>	Threatened
Invertebrates		
Taylor's Checkerspot	<i>Euphydryas editha</i>	Endangered

Sources: NOAA Fisheries (2016b), USFWS (2016b), WDFW (2016c), Federal Register (2014, 2013)

The Main Cantonment of the YTC provides habitat for numerous wildlife species, including federally listed species. Table 3-9 shows the listed species that may have the potential to occur within the Main Cantonment of the YTC and are given a special status at the federal level based on their risk of extirpation and decline (NOAA Fisheries 2016a, USFWS 2016b, WDFW 2016c). In addition to those species, USFWS (2016b) indicated that marbled murrelet has the potential to occur within Yakima County; however, the potential for this species to occur within the Main Cantonment of YTC is low because it is located more than 60 miles from saltwater. No federally proposed or candidate species, critical habitat, or proposed critical habitat are located with this area (NOAA Fisheries 2016b, USFWS 2016b).

Table 3-9. Federally Listed, Proposed, or Candidate Species with the Potential to Occur within the Main Cantonment at the YTC

Common Name	Scientific Name	Federal Status
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened
Gray wolf	<i>Canis lupus</i>	Endangered

Sources: NOAA Fisheries (2016b), USFWS (2016b), WDFW (2016c)

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and management of the physical development at the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development goals. Adoption of the No Action Alternative would not be consistent with DoD and Army regulations. Under the No Action Alternative, potential projects within the Main Cantonments of JBLM and the YTC would occur as the installation responds to changing mission objectives and needs. Under the No Action Alternative, each project put forward for construction will require a separate NEPA review and appropriate site-specific review to identify project-specific impacts on biological resources. Any and all appropriate local, state, and federal permits and processes would be obtained/completed prior to the implementation of projects. Additionally, any JBLM, including YTC, project would likely need to implement avoidance, minimization, and/or mitigation measures to address impacts on biological resources identified during the project-specific review.

3.4.2.2 Alternative 2 – Adoption of the RPMP

The RPMP includes potential projects within the Main Cantonment areas of JBLM and the YTC. Under Alternative 2, JBLM would implement and adopt the RPMP and all projects would comply with the codes and regulations of the RPMP. Because new projects would be located within the Main Cantonments of JBLM and the YTC, they are unlikely to adversely affect biological resources, including vegetation communities, wetlands, fish and wildlife, and sensitive species. All planned projects under the RPMP will undergo appropriate site-specific review to identify project-specific impacts on biological resources. Any impacts that are identified during the project-specific review will require avoidance, minimization, and/or mitigation for any impacts on biological resources as implemented by JBLM. Also, any and all appropriate local, state, and federal permits and processes will be obtained/completed prior to implementation of projects.

Overall, the adoption of the RPMP is unlikely to adversely affect biological resources because it does not promote expansion of installation development into previously undisturbed lands and is

consistent with JBLM policies for natural resource management, including the *JBLM Draft Integrated Natural Resources Management Plan* (JBLM 2014a), *JBLM Draft Fish and Wildlife Management Plan* (JBLM 2013a), and the *Yakima Training Center Final Cultural and Natural Resources Management Plan* (YTC 2002). Therefore, the impacts on biological resource associated with the RPMP will likely be less than significant because a substantial permanent conversion or net loss of habitat or a loss habitat would not occur and species populations would not be lost or impaired. Additionally, if adopted, the RPMP would substantially reduce operational costs and improve efficiency at JBLM because streamlining the NEPA process would be permissible.

3.5 Cultural Resources

Cultural resources for federal agency planning and environmental review purposes are primarily those resources that qualify for the National Register of Historic Places (NRHP) as well as those addressed by certain other laws protecting archeological sites and Native American properties. The National Historic Preservation Act of 1966 (NHPA), as amended, is the principal legislative authority for managing cultural resources. Generally, Section 106 of the NHPA, as amended, and as implemented in 36 CFR §800, requires all federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the NRHP. Such resources are also termed “historic properties.” Historic properties are defined as “a district, site, building, structure or object significant in American history, architecture, engineering, archeology or culture at the national, state, or local level.”

Moreover, the federal agency must afford the Advisory Council on Historic Preservation the opportunity to comment in the event that an undertaking will have an adverse effect on a cultural resource that is eligible for or listed in the NRHP and must consult with the State Historic Preservation Office and other interested parties in an effort to avoid, minimize, or mitigate adverse effects.

Eligibility for the NRHP is established according to the official criteria of evaluation (36 CFR §60.4) issued by the U.S. Department of the Interior. The criteria relate to the following:

The quality of significance in American history, architecture, archeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That has yielded, or may be likely to yield, information important in prehistory or history.

Other important laws and regulations designed to protect cultural resources follow:

- Native American Graves Protection and Repatriation Act of 1960
- American Indian Religious Freedom Act of 1978
- National Environmental Policy Act of 1969
- Archaeological Resources Protection Act of 1979

3.5.1 Affected Environment

The ROI for cultural resources is the area within which an option to implement the Proposed Action could potentially affect existing cultural resources. For the Proposed Action, the ROI for cultural resources is defined as the Main Cantonment of JBLM and the Main Cantonment of the YTC.

3.5.1.1 Area of Potential Effect

According to the Section 106 NHPA regulations (36 CFR §800), an Area of Potential Effect (APE) is defined as the geographic area or areas in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. In NEPA terms, the APE is the equivalent of the study area for cultural resources.

The APE for this project encompasses the entirety of the JBLM Main Cantonment, and the entirety of the Main Cantonment of the YTC. Direct effects on cultural resources would be restricted to areas of ground disturbance, such as new road and building construction, and locations immediately adjacent to the principle and minor arterials and principle collectors. Direct changes, renovations, and modifications to historic buildings, landscaping, and viewsheds can

also be direct effects because these actions have the potential to adversely change the integrity of setting, viewsheds, and structures. Indirect effects, such as visual and auditory, could occur throughout the APE.

3.5.1.2 Cultural Resources Present at JBLM

There are 38 archaeological resources within the JBLM Cantonment: 28 of these sites are within the Lewis Cantonment (24 historic, 2 prehistoric, and 2 multicomponent) and 10 are within McChord Field (9 historic and 1 multicomponent). Of these sites, five have been determined eligible for the NRHP, but two have been mitigated due to recent construction activities. Therefore, there are only three eligible sites remaining on the JBLM Cantonment: the Miller Hill Rifle Butt, Green Park Amusement Zone, and the Morey Pond Area. Morey Pond is an eligible, multi-component site that was recorded within McChord Field in 2015. The significance of the site spans pre-historic/Indian uses up to and through the late 1870s. Preservation and protection of the site, located above the actual ponded area is not anticipated to adversely impact the airfield or adjacent land uses. Any development at the location of the site would require data recovery operations prior to any construction occurring. Several other sites located in the Cantonment have not been evaluated but are scheduled for assessment in the near future for eligibility for listing in the NRHP.

Three NRHP-eligible historic districts occur on JBLM—the Garrison Historic District (Lewis Main), the Old Madigan General Hospital Historic District, and the McChord Field Historic District (Figure 3-1). The Veterans Historic District lies outside of the APE for this project. A historic district is defined as a significant concentration of buildings, structures, or both dating to the same time period and associated with the same historical theme. A historic district has a specific geographical boundary within which contributing and non-contributing resources are present. The DoD does not complete the formal listing of historic properties as a cost-saving mechanism because, once historic resources have been determined eligible, they are managed and treated as being listed on the NRHP. Therefore, while all three are eligible, only the McChord Air Force Base Historic District is listed on the NRHP.

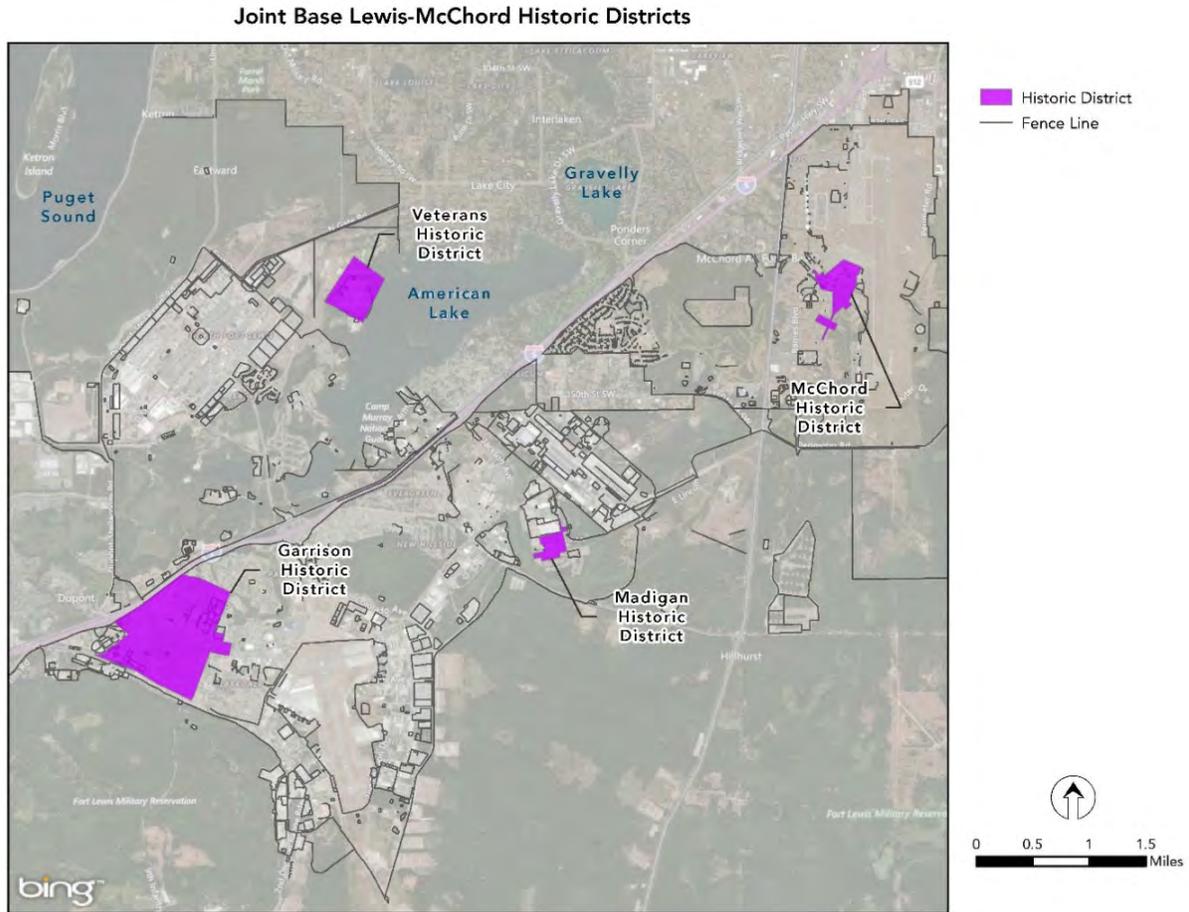


Figure 3-1. Joint Base Lewis-McChord Historic Districts



Photo 3-1. Family Resource Center, former Red Cross Hostess House, Constructed 1919, View from 2005. Credit: U.S. Army

The Fort Lewis Garrison Historic District is listed in the Washington Heritage Register, and in 2004, it was determined eligible for, but not formally nominated for, listing in the NRHP. The historic landscape in and around the Fort Lewis Garrison Historic District is recognized as contributing to its significance. The historic landscape has features that include, but are not limited to, views, open space, vegetation, site furnishings, circulation systems, and water features. This district contains 299 contributing buildings,

structures, and objects, including the Family Resource Center (Photo 3-1) and the Main Post Chapel (Photo 3-2).



Photo 3-2. Main Chapel 1942. Credit: U.S. Army

The Old Madigan General Hospital Historic District was determined eligible for, but not formally nominated for, listing in the NRHP in 2001. The district originally contained 99 buildings, 42 of which were recorded to the specifications of the Historic American Building Survey and

demolished in 1994. The remaining resources in the district include 27 contributing buildings, 29 non-contributing buildings and structures, and one road structure distributed over 32 acres.

The historic district of McChord Field, much of which is in McChord Center, includes the original headquarters (Building 100), hangars, housing, and greenway that were constructed in the early 1940s. These areas cannot be demolished or altered in any significant way. Development within these areas requires close consultation with the Washington State Historic Preservation Office and the JBLM Cultural Resources Office.

Individual Historic Properties

Two individual historic buildings and several monuments and commemorative objects lie within the JBLM Cantonment area. Table 3-10 presents the individual NRHP-eligible historic properties.

Table 3-10. Individual NRHP Eligible and Listed Historic Properties at JBLM

Location	Building Number	Year Built	Current Name	Historic Name	NRHP Determination	NRHP Listing Status
McChord	82062	1940	Heating Facility Building	Heating Facility Building	NRHP Eligible	Individual
McChord	KHK3	1940	"F" Street Bridge	"F" Street Bridge	NRHP Eligible	Individual
McChord	KHK4	1940	McCarthy Blvd. Bridge	McCarthy Blvd. Bridge	NRHP Eligible	Individual
No District	2163	1950	Carey Memorial Theater	Carey Theater	NRHP Listed	Individual
No District	4185	1918	Hudson's Bay Company Trail Monument	Hudson's Bay Company Trail Monument	Not Evaluated	Individual
No District	4320	1917	Fort Lewis Museum	Red Shield Inn	NRHP Listed	Individual
Logistics Center	9099	1942	Logistics Center Gate	Rainer Ordnance Depot	NRHP Eligible	Individual
No District	4043	Unknown	Automotive Crafts Shop	Automotive Crafts Shop	NRHP Eligible	Individual
No District	4079	1948	Warehouse	Warehouse	NRHP Eligible	Individual
Logistics Center	9503	Unknown	Logistics Center	Logistics Center	NRHP Eligible	Individual



Photo 3-3. Liberty Gate, 1940s, Original Location. Credit: U.S. Army

Native American Traditional Cultural Resources

Present-day JBLM is located within the traditional territories of the Squaxin Island, Nisqually and Puyallup tribes as they were documented in the early 19th century. Places and resources that are important to the ongoing traditional or ceremonial practices of the Squaxin Island, Nisqually, and Puyallup tribes (and other area tribes) are present on JBLM. Such places include particular plant and animal habitats, natural features of the landscape, and sites where important rituals, were carried out in the past, and that continue to be used for such purposes. Resources of traditional cultural or ceremonial value may not have specific geographic boundaries that can be drawn on a map and may be known only to tribal members who wish to keep their location and nature confidential (Fort Lewis DPW 2010). The knowledge of tribal traditional cultural resources on JBLM is based on ethnographic documentation cited in previous cultural resources studies completed for the former Fort Lewis.

Major village sites have been identified at the Nisqually River delta; the mouths of Muck Creek, Clear Creek, and Meshal Creek; and the cities of Roy, Rainier, and Tenino (Fort Lewis DPW 2010).

The northern portion of JBLM was also within the aboriginal territory of the Puyallup Indians. JBLM cultural resource managers are aware that places and resources on the installation have traditional cultural or ceremonial importance to the Nisqually, Puyallup, and Squaxin Island

tribes. Several important traditional places have been identified on JBLM by Nisqually Indian Tribe elders, who have expressed their wish to keep their locations confidential. An ongoing program of consultation with the tribes is in place to ensure accessibility and confidentiality within the parameters of the JBLM mission.

3.5.1.3 Cultural Resources Present at YTC

Approximately 280,000 acres of the 325,500 acres available for training and operation on the impact areas of the YTC have been surveyed for archaeological resources, including the approximately 1,700 acres in the Main Cantonment. Compared to Fort Lewis and McChord Field, the YTC has a far greater number of archaeological sites (a total of 1,353), all of which are located outside the Main Cantonment. To date, 140 of the archaeological sites inventoried on the YTC have been determined eligible for listing in the NRHP.

Two archaeological districts are present on YTC—the *Wa Pai Xie* Archaeological District, which contains 11 sites, and the Tributary Headwaters Archaeological District, which contains nearly 100 sites, 10 of which are protected by a conservation easement. Both archaeological districts are eligible for listing in the NRHP.

Historic Districts, Buildings, and Structures

Compared with the Main Cantonment at JBLM, relatively few historic buildings and structures and no historic districts are located on the YTC. The Main Cantonment contains Cold War-era buildings and structures that date to the 1950s, including single-story barracks, administrative and maintenance facilities, recreational facilities, ammunition storage structures, a water tank, and an airstrip. All of these historic resources, intended as temporary buildings/structures, are managed under a Section 106 programmatic agreement between the Army, the Advisory Council on Historic Preservation, and the Washington State Historic Preservation Office concerning the identification and treatment of 1) Cold War Era (1946–1974) Unaccompanied Personnel Housing and 2) World War II and Cold War Era (1939–1974) Ammunition Storage Facilities. This agreement acknowledges that these types of historic military structures are not eligible for listing in the NRHP and provides a programmatic approach to their management.

Native American Traditional Cultural Resources

Native American traditional cultural resources on the YTC are places and resources that are important in the ongoing traditional or spiritual practices of the Colville, Wanapum Band, Umatilla, Nez Perce, and Yakama tribes. Such resources include specific plant and animal habitats, natural features of the landscape, and places where important rituals were carried out

in the past that continue to be used for such purposes in the present. They may not have specific geographic boundaries that can be drawn on a map and may be known only to tribal members who wish to keep their locations and natures confidential.

The Medicine Creek Treaty of 1855 identifies the area within the YTC as part of the ceded lands of the Yakama Indian Nation, who retain treaty rights on their present-day reservation located 17 miles south of the YTC. The Wanapum Indian People reside in a community located near Priest Rapids adjacent to the installation's eastern boundary. Members of both tribes continue to depend on and use areas on the YTC for traditional cultural practices, such as gathering bitterroot and lomatium, which are common throughout the installation.

3.5.2 Environmental Consequences

The section presents a general discussion of the potential effects on cultural resources associated with the unadopted RPMP. JBLM would follow the guidelines and protocols outlined in the *Joint Base Lewis-McChord Integrated Cultural Resource Management Plan* (JBLM 2012) and the *Yakima Training Center Integrated Cultural Resources Management Plan* (YTC 2008) to comply with Section 106 of the NHPA for all future actions. At that time, JBLM would implement measures to avoid, minimize, or mitigate site-specific impacts on cultural resources.

3.5.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be formally adopted, and management of the physical development of the Main Cantonments at JBLM and the YTC would continue based on existing planning principles and development goals. Primary impacts on cultural resources would occur as a result of construction, ground-disturbing activities, and the renovation/modification/ or rehabilitation of historic buildings and landscapes and change to historic districts.

Ground-disturbing activities during construction would result in short-term visual changes that could affect the cultural landscapes. Additionally, historic structures and the cultural landscape may be affected by implementation of transit-related projects if future routes bring traffic closer to these areas, increasing indirect effects from vibrations, noise, and visual intrusions; however, these effects are expected to be less than significant. The potential construction of duplex homes, existing buildings, rowhouses, and installation support and growth facilities and the demolition of buildings may adversely affect historic structures and the cultural landscape. Impacts on these resources are most likely in areas where ground disturbance is required and where demolition of NRHP-eligible or listed buildings may occur. These impacts are anticipated

to be less than significant because procedures are in place to ensure cultural resources would be reviewed prior to implementation of any action.

Existing development goals note the previous conversion of Pendleton Avenue into a multiway boulevard in the Historic Downtown, which will connect it with Lewis North and with the Eastside, Westside, and McChord Field ADPs. Adopting this design may have short-term, adverse effects during construction, including the loss of access to buildings or a temporary increase in vibration, but it will provide a beneficial, long-term effect in terms of enhancing and recognizing cultural resources. These proposed changes will beneficially affect cultural resources, such as Historic Downtown, not the least of which is the formal acknowledgement of the area as an appropriate center of social and retail activity, taking place within a setting underlined in its importance by historic buildings. In addition, the potential closure of Liberty Gate (Main Gate), would result in beneficial impacts to cultural resources from reduced potential for damage to the gate from traffic and use. The implementation of pedestrian and bicycle amenities and pathways could lead to adverse impacts on historic archaeological resources, historic districts and structures, and the cultural landscape; however, overall, these impacts are anticipated to be less than significant because procedures are in place including close coordination and consultation with the JBLM Cultural Resources Program Manager and the Washington SHPO to ensure that cultural resources would be reviewed prior to implementation of any action. Impacts on these resources are most likely in areas where ground disturbance is required to construct a trail or sidewalk or where it is necessary to widen an existing route to allow for multiple types of traffic.

Pedestrian or bicycle use of existing roads and trails would not affect cultural resources because the infrastructure is already in place, and no new ground disturbance that could affect these resources would be conducted. Additionally, this type of use is consistent with the character of the historic districts and the components of the cultural landscape.

The further development of parks and open space could affect historic archaeological resources, districts, and landscapes because of land disturbance and historic architectural resources because of changing recreational needs. Impacts are far less likely in undeveloped parks because of the lack of land disturbance. Although adverse impacts could occur from infrastructure development associated with land disturbance and construction under the potential Parks and Open Space Plan, the impacts are anticipated to be less than significant because procedures are in place to ensure cultural resources would be reviewed prior to implementation of any actions.

In summary, impacts on cultural resources are anticipated to be less than significant because procedures are in place to ensure cultural resources would be reviewed prior to implementation of any actions, and all development would follow identified RPMP planning principles that include historic preservation. JBLM, including YTC would follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties* when making any changes to historic properties to ensure that historic properties are not adversely affected.

Existing planning principles and development goals were developed to focus planning efforts and guide land and facility developments that are similar in nature to specific districts. As such, carrying out the enactment of these districts is anticipated to negatively affect all cultural resources, particularly historic districts and structures and the cultural landscape. Ground disturbance has the potential to affect archaeological resources; therefore, potential impacts could occur with any demolition or new construction.

Planning principles and development goals recognize the Historic District for McChord Field Hangars 1–4, constructed in 1939. The Historic Downtown will see major enhancements with the redevelopment of Pendleton Avenue. McChord Center's 1940 architectural resources will become the development locus for the area as JBLM seeks to create a neighborhood center, underlining the importance of historic buildings in the public mind and the importance of their retention in creating significant neighborhood centers.

Potential, new development, such as a new medical center in Madigan and a new campus environment at Lewis North, including a mixed use neighborhood center, will be created and the old ORTC buildings will be demolished and replaced with modern facilities.

Demolition of any buildings in historic districts could lead to districts no longer retaining their eligibility for listing in the NRHP. In addition, the construction of new buildings within historic districts has the potential to change their character and visual setting, resulting in negative impacts on their integrity. In the event that a historic district would lose its eligibility for the NRHP, significant impacts on cultural resources could occur; however, based on policies and procedures in place, including Section 106 under NEPA, it is anticipated that these impacts would be mitigated to less than significant. On the other hand, the removal of non-contributing or more recent structures that do not fit with the historic character of these districts could have beneficial impacts on these areas.

In summary, potential future development would result in less than significant impacts on cultural resources because procedures are in place to ensure cultural resources would be reviewed

prior to implementation of any actions. Effects on cultural resources would be identified through the Section 106 review process prior to the implementation of any development projects, and adverse effects would be avoided, minimized or mitigated. Additionally, adherence to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* would ensure that work involving historic properties would result in little or no impacts.

The use of form-based code under existing planning principles and development goals allows JBLM, including YTC to exercise more control in the development process. It is a tool to ensure that building development supports JBLM's vision, goals, and principles. Form-based codes promote mixed-use, compact, and walkable development patterns, not traditional auto-oriented, segregated land uses. Form-based codes emphasize spatial principles that support sustainable development, making building form and character the most important factor, and building use secondary. These are consistent with the goals of historic preservation, which often seeks to preserve elements or entire communities where these values were integrated into the initial design or construction. In addition, form-based code provides a ready blueprint for new construction that is sympathetic to nearby historic resources. The impacts on cultural resources from the use of form-based code are anticipated to be beneficial. Similarly, existing planning standards note historic preservation as a planning principle and as such would work to protect and maintain cultural resources, resulting in beneficial impacts.

Overall, impacts on cultural resources are anticipated to range from beneficial to less than significant. Potential beneficial impacts would occur as a result of reduced vehicle traffic. Less than significant adverse impacts could occur as a result of construction-related ground disturbance, road operation, and facility demolition and construction. Impacts on cultural resources are anticipated to be less than significant due to the procedures in place for ensuring cultural resource review prior to implementation.

Because the RPMP would not be formally adopted under the No Action Alternative, JBLM may or may not implement identified projects and plans. As a result, the beneficial impacts identified above are not as definite as they would be in the event the RPMP is formally adopted as described for Alternative 2.

3.5.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on cultural resources would be similar to those presented for the No Action Alternative, with the exception that development would be based on the RPMP and its components, and primary impacts would occur as a result

of construction and ground-disturbing activities from the IDP and ADP. Based on the adoption of the RPMP, adverse effects under Alternative 2 would be no more likely than under the No Action Alternative; however, other benefits in planning may be realized. In general, impacts would continue to be less than significant for cultural resources.

Overall, impacts on cultural resources are anticipated to range from beneficial to less than significant. Potential beneficial impacts would occur as a result of reduced vehicle traffic. Less than significant adverse impacts could occur as a result of construction-related ground disturbance, road operation, and facility demolition and construction. Impacts on cultural resources are anticipated to be less than significant because of the procedures in place to ensure cultural resources are reviewed prior to implementation of any actions.

3.6 Energy

Energy security is increasingly viewed as essential to ensuring and protecting the long-term viability of installation operations. Safe and reliable access to energy is critical to virtually all activities on DoD installations. The DoD recognizes the threats to its installations and operations posed by increasing costs of centrally distributed, over-burdened, utility-provided energy grids, as well as the vulnerabilities posed by potential disruption of military installation energy supplies. Therefore, the DoD has included energy as part of its Net Zero strategy.

The DoD Net Zero approach comprises five interrelated steps: reduction, re-purpose, recycling and composting, energy recovery, and disposal. Reduction includes maximizing energy efficiency in existing facilities. Re-purpose involves diverting energy to a secondary purpose with limited processes. For energy, recycling involves cogeneration where two forms of energy—heat and electricity—are created from one source. Energy recovery can occur from converting unusable waste to energy, renewable energy, or geothermal water sources. The EA examines the alternatives proposed that are related to each of these steps.

3.6.1 Affected Environment

The ROI for the energy analysis is limited to the proposed area of development within the boundaries of the Main Cantonment of JBLM and the Main Cantonment of the YTC as well as all applicable utility providers.

3.6.1.1 Electricity

The Lewis portion of JBLM accounts for about 79 percent of the total energy consumption on the installation as a result of energy-intensive activities and higher levels of development. As a

result, while electrical energy use intensity decreased 5 percent on the McChord portion of JBLM during the period from 2003 through 2009, the overall JBLM electrical energy use intensity increased by about 14 percent during the same period. Expanding use of electricity, primarily on the Lewis portion of JBLM, is negatively affecting JBLM's ability to meet EO 13423's FY 2015 mandate to decrease overall energy use intensity by 30 percent over the baseline intensity in FY 2003. In addition to the external power, over 120 emergency generators are maintained across JBLM. Emergency generator capacities range from five to 500 kilovolt-amperes and existing equipment is sufficient to power all mission critical operations throughout JBLM. Prior to replacement or substantial generator maintenance, a life cycle cost analysis is recommended to determine the cost effectiveness of switching to propane fueled generators.

The current electrical system is sufficient to meet existing JBLM electrical needs. In recent years, the maximum peak electrical demand was 54 megawatts (MW), and the current cumulative substation capacity is 105 MW. The 54 MW peak load represents 51 percent of the total existing substation capacity.

The current electrical system is capable of meeting the electrical demands of the YTC; however, the system is limited to 3 MW and lacks redundancy; past studies have noted deficiencies and options to expand capacity as needed.

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted; and management of the physical development at the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development goals.

As the physical development of JBLM, including YTC occurs based on existing planning principles and development goals, impacts to energy would similarly occur. Direct and indirect impacts from transportation-related projects could have far-reaching effects on overall energy consumption and cost. The emphasis on transit-oriented development and the potential future development of a bus or streetcar network along main boulevards and parkways could lower energy consumption, subsequently cutting energy costs because shared ridership can exponentially reduce overall personal fuel consumption. A benefit-cost analysis is required to prove the extent of energy cost reduction, and a future tiered NEPA process would be implemented at the site-specific level; however, it is anticipated that long-term, beneficial impacts would occur. Similarly, efforts made to create complete streets to support more efficient

transportation, reduce traffic congestion, and support the use of other modes of transportation including walking and bicycling could further reduce usage as traffic would run more efficiently and more people opt out of fuel-based transit options for walking or biking to their desired destinations.

Similarly, construction of pedestrian and bicycle amenities and trails lays out a strategy to encourage pedestrian and bicycle activity. By providing increased options for transit and increased connectivity for the installation, the implementation of this plan and its components could substantially reduce energy consumption, thereby potentially resulting in multi-faceted, long-term, beneficial effects for the installation by creating a multi-modal transportation environment and affording individuals viable travel alternatives.

The development of parks and open space would also encourage pedestrian and bicycle activity. It would simultaneously lessen the load on infrastructure, while providing opportunities and connections by which pedestrians and bicyclists travel, and could have various indirect, beneficial impacts on energy consumption.

Utility improvements and upgrades to energy utility systems are aimed at satisfying the installation's net energy goals. A renewable energy bio-mass energy production facility has been proposed, but that facility has been determined to be financially unfeasible at this time. If technologies and demand evolve to appropriate levels, this technology may be integrated in the future. Impacts would be evaluated in a future tiered NEPA evaluation process; however, it is anticipated that implementation of the Utility Infrastructure Plan and any of the associated fuel and energy production components would have long-term, beneficial impacts on energy and would increase overall energy security at JBLM, including YTC.

Development standards used to guide future land use developments propose that low-impact design standards be used for new construction. The use of these standards will create more energy efficient facilities and result in long-term, beneficial impacts on energy.

Overall, impacts on energy under the No Action Alternative are anticipated to be beneficial and would occur as a result of increased energy security, renewable energy generation, energy security, reduced vehicle use, and energy efficient facilities. However, because the RPMP would not be adopted under the No Action Alternative, impacts as described above could vary based on the actual implementation of potential future developments and project specifics, which would be determined as project details are developed.

3.6.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on energy would be similar to those presented for the No Action Alternative. Implementation of the Transportation Plan would result in beneficial impacts stemming from reduced energy consumption and reduced traffic congestion. Other beneficial impacts would occur from adopting the Pedestrian and Bicycle Plan, which sets forth a strategy to encourage pedestrian and bicycle activity. The Parks and Open Space Plan would also encourage pedestrian and bicycle activity. It would simultaneously lessen the load on infrastructure, while providing opportunities and connections by which pedestrians and bicyclists travel, thereby potentially resulting in various indirect, beneficial impacts on energy consumption.

The Utility Infrastructure Plan, as part of the development of ADPs, has the potential to affect energy consumption and costs in the most direct way of all the components of the Master Plan. This plan identifies a number of ongoing or planned upgrades to energy utility systems and discusses a potential facility aimed at satisfying the installation's net energy goals. Impacts would be evaluated in a future tiered NEPA evaluation process; however, it is anticipated that implementation of the Utilities Framework Plan and any of the associated fuel and energy production components would have long-term, beneficial impacts on energy and would increase overall energy security at JBLM, including YTC.

The use of IPS standards guiding future land use developments would work to create more energy efficient facilities and result in long-term, beneficial impacts on energy.

Overall, impacts on energy from Alternative 2 are anticipated to be beneficial. Beneficial impacts would occur as a result of increased energy security stemming from upgrades to energy utility systems, renewable energy generation aiming at satisfying the installation's net zero goals and meeting DoD requirements, reduced vehicle use and subsequent reductions in the use of energy and fossil fuels, and energy efficient facilities resulting in energy and cost reductions.

3.7 Geology and Soils

3.7.1 Affected Environment

The ROI for the analysis of geology and soils consists of the potential areas of development at the Main Cantonment of JBLM and the Main Cantonment of the YTC.

The topography at JBLM is typically flat to gently rolling with localized areas of moderately sloping land. Continental glacial deposits, originating during the Vashon stage of the Fraser Glaciation approximately 13,500 years ago, dominate the geology of JBLM. Overall, the

geologic material at JBLM comprises outwash gravels and till and localized areas of peat and alluvium surrounding the Nisqually River and Muck Creek. The majority of JBLM north of the Nisqually River comprises a series of glacial outwash terraces, channels, and glacial ponds. The low hills in the western portion of this area are glacial deposits of undifferentiated till, often mixed with outwash gravels. The hills of the Rainier Training Area, Training Areas 19–23, are predominantly Vashon moraine and some till with a small area of older (pre-Fraser) glacial drift near the southwestern boundary. Because of the coarse nature of the glacial deposits, soils are highly resistant to compaction and are typically permeable and well drained, despite high regional precipitation levels. These properties, combined with generally gentle topography, result in limited erosion which is constrained to localized areas of steep slopes and escarpments along the Nisqually River and Puget Sound (Fort Lewis DPW 2010, JBLM 2014a).

The elevation throughout most of the installation ranges between 250 and 400 feet above sea level, but it varies from sea level at Puget Sound to 567 feet in the extreme southwestern portion of JBLM, at the Rainier Training Area (RTA) (JBLM 2014a). The Spanaway-Nisqually association dominates soil types, which are formed on gravelly glacial outwash and are typically gravelly sandy loam. Nisqually soils are formed on sandy glacial outwash and are loamy fine sands. Other well- to poorly drained soils exist throughout JBLM. Soils on JBLM have the potential to be moderately productive under good management practices (Fort Lewis DPW 2010).

Soils at the YTC are highly varied with respect to particle size, depth, slope, thickness, permeability, and other factors. Because a large portion of the soils are shallow, light, silt loams characteristic of arid to semiarid climates, many soils at the installation are fragile and easily eroded. The YTC lies within the Columbia Plateau physiographic province. Topography is dominated by east-west trending anticlinal and synclinal ridges and north-south trending drainages that dissect the ridges. Numerous drainages parallel the ridges and contribute water and sediment to the Columbia River on the east and the Yakima River on the west. Elevations range from approximately 500 feet above MSL at Priest Rapids Dam on the Columbia River to 4,216 feet at the top of Cairn Hope Peak (Fort Lewis DPW 2010).

The majority of folding and uplifting that produced the ridges at the YTC occurred approximately 9 million to 1.8 million years ago. This disturbance occurred after the deposition of extensive flood basalts during the Miocene period. Although uplift has slowed, tilted fan piedmonts indicate continued faulting (Fort Lewis DPW 2010).

Shallow lithosol soils are common at the YTC (approximately 40 percent of the installation's acreage) and are generally found on south-facing slopes and windswept ridges. These soils commonly contain high percentages of cobbles and boulders. Because of their shallow nature and rock content, they have limited water-holding capacity and may be extremely saturated for about 6 to 8 weeks every year (Fort Lewis DPW 2010).

Deep soils at the YTC are dominated by mollisols followed by less extensive aridisols, entisols, and alfisols. Deep soils are often loamy or cobbly, generally are more productive, and have higher water-holding capacities than lithosols. Although deep soils typically become saturated because of snowmelt, they also dry quickly as water percolates through the soil profile. Silt loams and very cobbly loams make up about 70 percent of the installation's soils (Fort Lewis DPW 2010).

Most soils at the YTC are characteristic of arid climates and mesic temperature regimes. Soil surveys at the installation have identified more than 200 soil units, each of which has been rated in terms of suitability for various military operations and vehicular operations. Not all soils are equally suitable for the various operations that the Army conducts (Fort Lewis DPW 2010).

Most soils at the YTC are highly susceptible to erosion because of physical properties, steep slopes, and limited vegetation cover. Most erosion and runoff at the installation result from short-duration, high-intensity rain-on-snow events, commonly in areas of frozen or partially frozen soil. Frozen soils may be extremely resistant to erosion, but the erodibility of thawing soils is often greater. Summer thunderstorms are also a significant source of runoff. Yearly sediment yields across the installation range from nearly 0 to 1.64 tons per acre. Often, unimproved roads and firebreaks contribute disproportionate amounts of sediment load within a given watershed than the surrounding rangeland. Other disturbances to installation-influencing soil erosion include excavations, intense off-road vehicle travel, weapons fire, bivouacs, and wildland fire (Fort Lewis DPW 2010).

The YTC has implemented numerous monitoring and mitigation strategies that aim to maintain soils in a means that supports other natural resources, such as vegetation, water quality, wildlife, and cultural resources. Key methods include stabilizing banks along the Columbia River; minimizing soils disturbance; revegetating; upgrading heavily used unimproved roads and bivouac areas; performing road maintenance following large maneuver events; installing weirs and check dams to promote sediment deposition; rotating training areas; monitoring water quality; closing steep roads, roads adjacent to streams, and those that are not maintained to

reduce soil loss; and monitoring wet soils and limiting maneuver training when soils are saturated (Fort Lewis DPW 2010).

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and management of the physical development of the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development components. Ground-disturbing construction activities, including those associated with transportation and bicycle- and pedestrian-related development as well as facility development, could affect soils at JBLM through ground-disturbing activities. Adverse impacts would occur from grading, compaction, and site preparation activities, as well as from the removal of soils at the installation from cut-and-fill activities related to construction. Based on previous disturbances and the relatively small amount of affected area compared to JBLM as a whole; however, construction activities would not result in substantial degradation of soils, soil fertility, or soil productivity. Therefore, it is anticipated that all adverse impacts would be less than significant and would be short term in duration. Impacts on geology are not anticipated.

Existing planning and development standards would be effective in lessening impacts on soils because these standards would provide direction for standardizing and improving facility planning and design. One such example is the proposal for low-impact design standards that include site assessment, planning and layout considerations, and general materials and stormwater and soil conservation measures as well as sustainable site planning, which would develop grayfields and brownfields prior to undeveloped sites.

Although not finalized, under the No Action Alternative, JBLM, including YTC would adhere to its principles in the 2015 AICUZ Study Update and the IONMP. The adherence to the 2015 AICUZ Study Update and IONMP are not anticipated to affect geology or soils.

3.7.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on geology and soils would be similar to those presented for the No Action Alternative. Primary impacts would result from construction activities proposed under the IDP and the Capital Investment Strategy, and these impacts could be lessened by components of the IPS, including low-impact design and sustainable site planning and the development of grayfields and brownfields before undeveloped sites. Based on the adoption of the RPMP, less than significant, adverse impacts

of short duration to soils are anticipated under Alternative 2, and these impacts would be more certain than those for the No Action Alternative.

3.8 Land Use

3.8.1 Affected Environment

JBLM is approximately 90,000 acres and is divided into two primary functional areas—the Main Cantonment and non-cantonment areas. The Main Cantonment is located in the northernmost portion of the installation. Four separated historic districts are located in the cantonments, three in the Main Cantonment and one in Lewis North. Areas outside the Main Cantonment consist primarily of range and training lands. Military training is the primary land use on YTC. As a training facility, YTC provides the land, facilities, and logistical support needed to conduct realistic training exercises by active and reserve forces. YTC is divided into five Land Use Zones based on the suitability of the lands to accommodate various mission activities. The general use zone is the largest zone, accounting for approximately 75 percent of land and includes the Main Cantonment (YTC 2008).

The existing land use is based on five primary planning goals intended to improve sustainability and the military mission: (1) walkable neighborhoods, (2) centralized neighborhood centers, (3) enhanced mission environments, (4) sustainable communities, and (5) complete streets. Each goal is supported by six to nine planning principles that refine how each goal will be achieved.

The planning goals and principles support the RPMP by reducing environmental impacts through sustainable policy and efficient land use planning and urban design. Compacting and promoting future mixed-use developments, preserving rangeland and airspace, encouraging housing and employment proximity, and using transportation efficiently are some of the planning principles that would enhance the military environment. Based on these principles, locating residential, recreation, military, and employment in proximity to one-another reduces costs for developing public services (i.e., sewer, water, and maintenance), increases lands available for military training and mission growth, and reduces emissions at JBLM, including YTC by lowering vehicle miles and inefficient growth patterns. JBLM, including YTC would be developed with walkable neighborhoods by placing workplaces, schools, homes, and shopping in mixed-use neighborhoods. Family-oriented neighborhood parks essential for community growth and development would be located in proximity to residences. Neighborhood centers would maintain

existing historic character and be developed with, main streets, and large park blocks. Table 3-11 shows the RPMP land use principles as related to planning goals at JBLM, including YTC.

Table 3-11. RPMP Goals and Related Principles

Goal Number	Goal	Land Use Principles
1	Mission Capable Environments	<ul style="list-style-type: none"> • Compact Development • Rangeland/Airspace Preservation • Job and Housing Proximity • Mixed-use • Efficient Transportation • Affordable Development • Visible Entries/Optimum Unit Layout • Close-in Training • Public Transit
2	Sustainable Communities	<ul style="list-style-type: none"> • LEED Facilities • Low-impact Development • Linear Parks • Hidden Parking • Multi-story Buildings • Bikeable/Bike Paths • Car Parks • Narrow Buildings
3	Walkable Neighborhoods	<ul style="list-style-type: none"> • Planting Strips • Connected Sidewalks • Sidewalk Buildings • Five-Minute Walk • Neighborhood Parks • Shop Fronts • Great Views • Aligned Entries
4	Identifiable Town Centers	<ul style="list-style-type: none"> • Regional Character/Design Excellence • Large Park Blocks • Clear Edges • Town Square • Main Streets • Historic Preservation • Focal Points

Goal Number	Goal	Land Use Principles
5	Complete Streets	<ul style="list-style-type: none"> • Parkways • On-street Parking • Street Cafes • Bulb Outs • Street Trees • Street Grid • Multiway Boulevards

A form-based code was developed to provide a framework for future growth and mission changes, and support planned growth as outlined in the RPMP. The form-based code provides a framework to examine the siting and massing of each proposed or renovated building as they occur. This ensures that change supports the overall vision of the RPMP. The form-based code consists of the Regulating Plan, building envelope standards, streetscape standards, and landscape standards and are packaged in the IDP. Allowable building types and required build-to lines govern planned growth providing flexibility in conforming to the form-based code of the RPMP.

The IDP supports sustainable development at JBLM by adopting the planning goals and principles identified in the RPMP. The IDP is implemented through form-based code and the approved Regulating Plan. Land use for the 17 ADPs and the YTC Main Cantonment ADP are guided through the Regulating Plan, Transportation Plan, Pedestrian and Bicycle Plan, and Parks and Open Space Plan. Variances from the plan and form-based code are approved on a per project basis where justification, cited alternatives, cost and scheduling, and documented concurrence of the variance request are required for approval. Table 3-12 presents land uses designated on the Regulating Plan resulting from the RPMP's planned growth.

Table 3-12. Regulating Plan Land Uses by ADP

ADPs and YTC	Existing Land Use
American Lake	<ul style="list-style-type: none"> • Residential • Mixed Use • Campus • Parks and Open Space
Carter Lake	<ul style="list-style-type: none"> • Residential • Mixed Use • Townhome • Industrial/Administration • Parks and Open Space

ADPs and YTC	Existing Land Use
East Division	<ul style="list-style-type: none"> • Campus • Industrial/Administration • Parks and Open Space
Flightline	<ul style="list-style-type: none"> • Industrial/Administration • Mixed Use • Campus • Airfield • Parks and Open Space
Gray Army Airfield	<ul style="list-style-type: none"> • Campus • Industrial/Administration • Airfield
Greene Park	<ul style="list-style-type: none"> • Campus • Parks and Open Space
Hillside	<ul style="list-style-type: none"> • Townhome • Residential • Campus • Parks and Open Space
Historic Downtown	<ul style="list-style-type: none"> • Mixed Use • Residential • Townhome • Campus • Parks and Open Space
Jackson	<ul style="list-style-type: none"> • Industrial/Administration • Campus • Parks and Open Space
Lewis-McChord Link	<ul style="list-style-type: none"> • Mixed Use • Parks and Open Space
Lewis North	<ul style="list-style-type: none"> • Industrial/Administration • Mixed Use • Campus • Parks and Open Space
Logistics Center	<ul style="list-style-type: none"> • Industrial/Administration • Parks and Open Space
Madigan	<ul style="list-style-type: none"> • Campus • Residential • Parks and Open Space
McChord Center	<ul style="list-style-type: none"> • Industrial/Administration • Campus • Mixed Use • Residential • Parks and Open Space

ADPs and YTC	Existing Land Use
Miller Hill	<ul style="list-style-type: none"> • Industrial/Administration • Residential • Mixed Use • Parks and Open Space
Old Madigan	<ul style="list-style-type: none"> • Campus • Townhome • Residential • Mixed Use • Industrial • Parks and Open Space
First Brigade	<ul style="list-style-type: none"> • Campus • Industrial/Administration • Parks and Open Space
Yakima Training Center	<ul style="list-style-type: none"> • Mixed Use • Campus • Explosive Storage • Airfield

3.8.2 Environmental Consequences

3.8.2.1 Alternative 1 – No Action

Under the No Action Alternative, development of the ADPs and the YTC Main Cantonment ADP would continue based on existing planning principles and development goals. Development projects would require individual project NEPA review. Anticipated development would include additions and alterations to existing uses and new development on vacant lands. Table 3-13 presents the development capacity at JBLM available under the ADPs.

Table 3.13. ADP Total Acreages and Development Capacity

Area Development Planning District	Acreage (acres)	Development Capacity (square feet)
American Lake	910	195,000
Carter Lake	1,260	3,255,400
East Division	424	3,096,800
Flightline	1,908	3,130,800
Gray Army Field	751	1,209,600
Greene Park	1,012	508,000
Hillside	722	375,000
Historic Downtown	1,322	4,183,300
Jackson	277	641,500

Area Development Planning District	Acreage (acres)	Development Capacity (square feet)
Lewis-McChord Link	722	375,000
Lewis North	1,322	6,473,600
Logistics Center	1,105	3,916,000
Madigan	239	693,600
McChord Center	864	8,123,000
Miller Hill	722	1,538,800
Old Madigan	596	1,090,400
First Brigade	367	2,133,200
Yakima Training Center	N/A	3,648,500

Development under the No Action Alternative would result in beneficial growth through planned development consistent with existing planning principles and development goals. Some beneficial land use impacts consistent with existing planning principles and development goals include compact development, job and housing proximity, efficient transportation, rangeland/airspace preservation, mixed-use, linear parks, multi-story buildings, car parks, neighborhood parks, identifiable neighborhood centers, large park blocks, historic preservation, and on-street parking.

Infrastructure plans in support of future land uses and planned growth at JBLM, including the YTC would be consistent with the Utility Infrastructure Plan, Transportation Plan, Pedestrian and Bicycle Plan, and Parks and Open Space Plan. The Transportation Plan calls for developing complete streets designed for all users—vehicles, bicyclists, and pedestrians. The Pedestrian and Bicycle Plan will construct a bike network that connects all lands from Lewis North to Lewis Main to McChord Field using parkway bike lanes and boulevard access lanes. Roadways would be shaded by street trees providing a cooler temperature for pedestrian travel throughout JBLM. Interspersed parks at JBLM will provide recreational opportunities to nearby residential areas and other land uses. Range and Training Plan supports the military mission at JBLM. Development consistent with existing planning principles and development goals will concentrate growth in the Main Cantonments to preserve valuable range and training lands that surround the main installation.

The No Action Alternative would not adversely affect land use because development (planned growth and operational goals) at JBLM, including the YTC would be consistent with the existing planning principles and development goals; however, development projects would continue to

require NEPA review. Lengthy NEPA review and approval and related increased operational costs and decreased time efficiency would adversely affect the project development process if the No Action Alternative is selected. Adoption of the No Action Alternative would not be consistent with DoD and Army regulations.

3.8.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP, which includes the IDP and ADPs. Through this PEA, the overall environmental impacts of site-specific new construction identified in the RPMP are assessed, allowing future development to take place under a NEPA process as noted in CFR 651, Subparts B, C, and D.

As under Alternative 1, the anticipated development under Alternative 2 would include additions and alterations to existing uses and new development on vacant lands. Development capacity at JBLM available under the RPMP is shown Table 3-13. Lands developed under the RPMP would result in the same beneficial land use impacts as under Alternative 1 discussed above. Infrastructure plans in support of future land uses and planned growth at JBLM, including the YTC would be consistent with the Utility Infrastructure Plan, Transportation Plan, Pedestrian and Bicycle Plan, and Parks and Open Space Plan.

Under Alternative 2, the development of infrastructure, parks and open space, residential, industrial, and campus areas would take place under the form-based code and regulations of the RPMP and planned growth would be consistent with existing and future land uses; therefore, Alternative 2 would also not adversely affect land use. However, unlike under Alternative 1, Alternative 2 would include a NEPA review process as noted in CFR 651, Subparts B, C, and D for projects included in the RPMP with defined environmental thresholds as identified in this EA. Specific projects that exceed defined thresholds would be subject to the appropriate level of NEPA reviews (documented categorical exclusions, EAs, and environmental impact statements). Under Alternative 2, no adverse impacts would result from the lengthy NEPA review and approval processes, resulting in more efficient project development at JBLM with reduced operational costs.

3.9 Noise

Noise is generally defined as unwanted or objectionable sound that alters or disturbs quality of life, communication, or may affect physical health. Noise levels are usually measured and expressed in dB that are weighted to frequencies perceivable by the human ear, known as A-weighted sound levels and expressed as dBA. Noise levels are typically measured over a set

period (1 hour, 8 hours, or 24 hours) and commonly expressed as dBA Leq, representing the equivalent or average noise level for a given period. Noise experienced by an individual is a function of the noise source and the physical conditions between the source and receptors (e.g., topography/structures, weather, background noise, and time of day).

The ROI for the analysis of noise includes the potential areas of development at the Main Cantonments of the JBLM and the YTC and the immediate vicinity of those areas.

3.9.1 Affected Environment

Noise within and around JBLM and the YTC generally results from transportation, aviation, military training, and construction activities. Persistent and continuous sources of noise (such as traffic on major roads during daytime hours) contribute only minimally to background noise levels compared to louder but more infrequent or intermittent generators of noise (such as construction noise and military training activities). The primary military-related noise generators include artillery training, ordnance explosions, detonation of ammunition, firing on small arms ranges and grenade ranges, and aircraft noise (JBLM 2015a). NZs are classified into three levels with regard to their compatibility with land uses. These zones are described below:

- **Noise Zone I (acceptable)**—the area where the day-night sound level (DNL) is less than 65 dB, dBA. This area, considered to have moderate to minimal noise exposure from aircraft operations, weapons firing, and other noise sources, is acceptable for noise-sensitive land uses including residences, schools, and medical facilities.
- **Noise Zone II (normally unacceptable)**—the area where the sound level is between 65 and 75 dBA DNL. This area is considered to have a significant noise exposure and is, therefore, normally unacceptable for noise-sensitive land uses. Zone II boundaries are generated by aircraft operations, small arms training, and large weapons training on JBLM, and firing points, demolition ranges, impact areas, and aircraft operations at YTC.
- **Noise Zone III (unacceptable)**—the area where the DNL is greater than 75 dBA. This zone is considered an area of severe noise exposure and is unacceptable for noise-sensitive activities. Zone III boundaries are generated by aircraft operations, small arms training, and large weapons training on JBLM, and firing points, demolition ranges, impact areas, and aircraft operations at the YTC.

The dominant source of noise within JBLM is generally a result of military training with small arms and large weapons, and aviation activities at GAAF and McChord Airfield. Other types of noise are associated with traffic on I-5 and other general installation transportation.

Approximately 10 miles of I-5 corridor are aligned along the JBLM boundary or cut through the installation particularly in the Main Cantonment of JBLM where some housing areas and school are located. The NZ II that exists on either side of the roadway intersects the edge of the residential areas of Greenwood, Davis Hill, Parkway, Hillside, and Evergreen and the playground area of Evergreen Elementary School. However, relatively few homes exist in NZ II compared to total existing homes (JBLM 2015a).

The three small arms ranges at JBLM are located on the north-central portion of the installation. The land uses within NZ III (104 dB PK 15) are all suitable for this activity (JBLM 2015a).

Noise originating from NZ II (62–70 CDNL) and NZ III (>70 CDNL) from the firing of large caliber weapons extends beyond the installation boundary to the city of Roy in Pierce County. Most of the areas within NZ II and NZ III are zoned as rural residential areas; however, the NZ II also encompasses other land uses including commercial, industrial, mixed use, agricultural, and public institutional uses (JBLM 2015a).

Noise associated with Grey Army Airfield and McChord Airfield is generally related to in-flight operations and pre-flight and maintenance run-up operations. For GAAF, NZ II (65 ADNL) and NZ III (75 ADNL) are mostly contained within the installation boundary, and no overlap of the NZ II or NZ III with any residential/ housing areas on the installation occurs. At McChord Airfield, NZ II and NZ III from aircraft operations do extend beyond the JBLM installation. Currently over 20,000 annual aircraft operations including approximately 8,000 pattern flights occur at McChord Airfield, with the majority of operations, approximately 80 percent, for the C-17 and 81 percent of overall operations occurring between 7:00 a.m. to 10:00 p.m. These levels represent a 40 percent reduction from those predicted as part of a 1998 AICUZ Study as well as a reduction in land areas exposed to 65 dBA DNL. The 2015 AICUZ Study Update proposes increases in operations particularly those associated with increased C-17 operations (approximately 1,800 annually) to meet mission requirements. These increases are only projections, and a formalized proposal to implement these projects has not yet been developed. Most of the off-installation NZs II and III acreage is contained in the air corridor/clear zone with some residential and commercial uses outside this area primarily to the north of the installation and a small NZ II contour to the east. These areas include residential, commercial, industrial, mixed use, and open space/recreation zoning (JBLM 2015a, JBLM 2015b).

Existing sources of noise at the YTC include military training activities and vehicular traffic (Fort Lewis DPW 2010). Existing noise levels at the YTC vary with location, time of measurement, and the types of activities and training underway.

Noise levels within the Main Cantonment of the YTC, range offices, and temporary barracks are at or below 65 dBA DNL. Noise from vehicular traffic is primarily located in the Main Cantonment.

Seven small arms ranges are used at the YTC. NZ III (PK15 [met] 104 dB) noise contour from the small arms ranges does not extend into the Main Cantonment of the YTC or beyond the installation boundary. NZ II (PK15 [met] 87 dB) does not extend into the Main Cantonment and extends less than 3,900 feet beyond the installation boundary (Fort Lewis DPW 2010).

The moderate (115 dB PK15 [met]) and high (130 dB PK15 [met]) noise contours for large caliber weapons do not extend into the Main Cantonment of the YTC. The noise contours from large caliber weapons extend beyond the western and southwestern installation boundary: NZ II extends less than 4,300 feet beyond the western boundary, and NZ III extends approximately 300 feet beyond the western boundary; NZ II extends approximately 1,600 feet beyond the southwestern boundary, and NZ III extends approximately 160 feet beyond the southern boundary. These areas are primarily mountainous and either sparsely populated or unpopulated (Fort Lewis DPW 2010).

Noise contours associated with Vagabond Army Heliport include only NZ II noise contours. The low number of operations does not produce a NZ III noise contour. NZ II (65 ADNL) noise contours do not extend beyond the installation boundary or occur near existing structures (Fort Lewis DPW 2010).

3.9.2 Environmental Consequences

3.9.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and the management of the physical development at the Main Cantonments of JBLM and the YTC would occur based on existing planning principles and development goals.

Potential future development at JBLM and the YTC associated with transportation and bicycle and pedestrian infrastructure improvements would require construction activities to create a system of connected streets, an overpass, and interconnected fitness trails to enhance vehicle and pedestrian transportation. Additionally, the development of parks and open space would involve construction activities to build a new Recreation Complex in the Lewis-McChord Link area. Because JBLM and YTC would adhere to all applicable federal and state noise regulations during construction, noise impacts would be short-term and less than significant.

Facility development associated with the Main Cantonments would result in construction, demolition, and renovation activities and related noise at both JBLM and the YTC. Impacts from future development would be short term and would follow applicable federal and state noise regulations.

Adherence to the 2015 AICUZ Study Update includes projections for increased flight activity, particularly activity surrounding C-17 operations. Because the AICUZ does not formally propose changes in operations and instead includes only projections, implementation of specific proposals to change operations would be spelled out in the future, and further NEPA compliance and documentation would be conducted.

The future development associated with existing planning principles and development goals, when combined, would contribute adverse impacts on noise levels from construction activities within the Main Cantonments at JBLM and the YTC; however, implementation of the No Action Alternative would not result in noise levels that would in the long-term exceed the compatibility standards for noise zones at JBLM or the YTC, or produce occupational noise levels that exceed 85 dB for an 8-hour day. Thus, adverse impacts from noise would be short term and would not be significant.

3.9.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM and the YTC would adopt the RPMP. Impacts on noise would be similar to those presented for the No Action Alternative with primary impacts on noise levels occurring as a result of construction activities from the IDP and ADP. Based on the adoption of the RPMP, adverse noise impacts under Alternative 2 would be more certain than those presented for the No Action Alternative. Impacts from noise would be short term and would not be significant.

The implementation of the IPS as part of the larger IDP, which provides a clear set of guidelines for planning and development objectives, is not anticipated to affect noise levels.

Similarly as described above for the No Action Alternative, future increased flight activity and operations as projected by the AICUZ would be spelled out in future proposals and subsequent NEPA compliance and documentation.

3.10 Public Health and Safety

3.10.1 Affected Environment

The ROI for the analysis of public health and safety includes the communities in and immediately surrounding the Main Cantonment of JBLM and the Main Cantonment of the YTC.

3.10.1.1 Public Health

Health Services at Joint Base Lewis-McChord

Madigan Army Medical Center

Madigan Army Medical Center is located on JBLM in Tacoma, Washington, and is part of the larger Madigan Healthcare System, which comprises a network of Army medical facilities located in Washington and California that serves more than 100,000 active duty service members, their families, and retirees. This tertiary care medical center provides an array of medical services, such as general medical and surgical care, patient-centered adult and pediatric primary care, a 24-hour emergency room, specialty clinics, behavioral health services, and wellness services. Madigan Army Medical Center, which provides safe quality care, an unparalleled educational facility, and a state-of-the-art research platform, is a leader in readiness and deployment medicine and is an engaged community partner (MAMC 2016).

Madigan Army Medical Center is the Army's second largest medical treatment facility and a state-of-the-art and technologically advanced medical center. It is a designated Level II trauma center. It participates in a unique partnership with St. Joseph Medical Center and Tacoma General Hospital to provide care to non-beneficiary trauma victims outside of JBLM (MAMC 2016).

Madigan Army Medical Center maintains approximately 220 beds for inpatient care and can expand to accommodate more than 300 inpatients during periods of urgent need including emergencies. Outpatients are seen at the hospital's medical mall complex, handling nearly 1 million visits annually. Madigan Army Medical Center performs more than 45 surgeries, fills nearly 4,000 prescriptions, and delivers eight babies daily (MAMC 2016).

Madigan Army Medical Center includes the following facilities in the vicinity of JBLM:

- Madigan Army Medical Center
- McChord Family Medicine Clinic
- Okubo Family Medical Clinic
- Winder Family Medicine Clinic

- Puyallup Community Medical Home
- South Sound Community Medical Home

McChord Family Medicine Clinic

McChord Family Medicine Clinic is located at JBLM and serves patients enrolled specifically at the McChord Clinic, including active duty service members, families, and selected retirees. General services provided include case management, clinic pharmacy, diabetes education, laboratory services, outpatient records, patient advocacy, radiology, behavioral health, immunizations, physical therapy, and women's health services (MAMC 2016).

Okubo Family Medicine Clinic.

Okubo Family Medicine Clinic is also located at JBLM and serves active duty service members, local families, and retirees. General services provided include behavioral health, case management, dietician services, immunizations, lab services, medical records, clinic pharmacy, physical therapy for active duty members, and radiology (MAMC 2016).

Winder Family Medicine Clinic

Winder Family Medicine Clinic is located at JBLM and serves JBLM active duty service members, TRICARE Prime-enrolled Family members, and eligible retirees. General services provided include audiology testing, aviation medicine, behavioral health, immunizations, laboratory services, optometry for active duty members, clinic pharmacy, and physical therapy for active duty members (MAMC 2016).

Puyallup Community Medical Clinic

Puyallup Community Medical Clinic is located in Puyallup, Washington, and serves military Family members and a limited number of retirees and their families with active duty dependent and military retiree beneficiary status living in and around Puyallup. General services provided include auricular acupuncture, case management, colposcopies, contraception management, joint injections, laboratory services, clinic pharmacy, and tobacco cessation (MAMC 2016).

South Side Community Medical Clinic

The South Side Community Medical Clinic is located in Olympia, Washington, and serves military Family members and a limited number of retirees and their families with active duty dependent and military retiree beneficiary status living in and around the Olympia and Lacey, Washington, areas. General services provided include behavioral health, case management,

coloscopies, contraception management, immunizations, joint injections, lab services, clinic pharmacy, radiology referrals, and tobacco cessation (MAMC 2016).

Health Services at the Yakima Training Center

The YTC has an onsite occupational health nurse available on weekdays, but it does not offer any other onsite care. Medical and emergency services in the vicinity of the installation area are available at Yakima Valley Memorial Hospital and Yakima Regional Medical and Cardiac Center (YTC 2016a).

Yakima Valley Memorial Hospital

The Yakima Valley Memorial Hospital is based in Yakima, Washington, and has associated primary care and special services locations located throughout Yakima County. The hospital has 226 licensed hospital beds and 327 physicians representing 35 specialties. Hospital inpatient services include emergency care, cancer care, heart and vascular care, critical care, orthopedics, surgery, chaplain services, children's services, pediatric care, laboratory services, neonatal intensive care, nuclear medicine, pharmacy services, radiology, respiratory therapy, women's services psychiatric care, and rehabilitation services. Several outpatient treatments and services are also available including home health services and hospice care (Yakima Valley Memorial Hospital 2015).

Yakima Regional Medical and Cardiac Center

The Yakima Regional Medical and Cardiac Center is a nationally recognized for the treatment of heart attacks and heart disease and shares Level III trauma center coverage and provides a full complement of medical services. Yakima Regional has 214 licensed hospital beds and a full complement of medical services including the valley's only open-heart surgery, advanced imaging, comprehensive robotics, state-of-the-art neurosurgery, and a wide array of inpatient and outpatient services. General medical services offered include cancer care, cardiovascular care, critical care, geriatric medicine, home and assisted care, imaging and radiology, neurosciences and stroke care, occupational medicine, orthopedics, pharmacy, rehabilitation services, respiratory care, robotic surgery, laboratory services, and a wide array of surgical services (Yakima Regional Medical Center 2016).

3.10.1.2 Public Safety

Safety Services at Joint Base Lewis-McChord

Emergency Services

The Directorate of Emergency Services at JBLM consists of the Provost Marshal, the Fire Division, and the Protection Division (JBLM 2016a).

The office of the Provost Marshal, which oversees law enforcement at JBLM, is a professionally trained Army Law Enforcement and Access Control organization that is responsive to the needs of commander and the civilian community. This office is charged with maintaining good order and discipline, safety, and security for those living and/or working at JBLM. The primary task of the Police Services Division is to provide information including receipt, duplication, distribution, filling and storing of information, as well as protection of privacy, and auditing and validation of information. This division also provides customer service concerning police reports, tickets, civil charges, summons, and release of information, blotters, and other administrative actions (JBLM 2016).

Physical security inspectors are available at both JBLM and the YTC. The Military Police Investigations section is responsible for investigating all military criminal complaints. The Traffic Investigations section is responsible for investigating accidents that result in serious injuries or extensive property damage (JBLM 2016).

The Training Area Patrol Section is responsible for patrolling areas considered to be outside the Main Cantonment of JBLM, including approximately 88,000 square acres of forested lands and major roads leading into and through JBLM. This section investigates and enforces an array of crimes including crimes against conservation laws, hunting and fishing regulations, traffic offences, and access regulations. This section is also responsible for leading Search and Rescue missions and operation of the JBLM Patrol Boat which monitors and enforces boating regulation on American Lake and assists Lakewood Police Department with regulation and law enforcement as needed (JBLM 2016).

The Fire Division is responsible for protecting and enhancing the quality of life at JBLM and to safeguard health, safety, and welfare of the community through code enforcement, loss prevention, and effective fire prevention and public education programs. Highly skilled and professional emergency response teams capable of providing emergency medical, hazardous material, fire rescue, fire suppression and consequence management to mitigate the effects of both natural and manmade disasters (JBLM 2016).

The Protection Division executes Force Protection, Antiterrorism, Force Protection and Antiterrorism training, and develops, coordinates, monitors, and evaluates the status of the JBLM Protection and Antiterrorism programs (JBLM 2016).

JBLM is a controlled access installation requiring an authorized identification card or authorized visitor pass for entry. JBLM uses automated installation entry systems that enhance security at

installation entrances and expedite access for personnel and vehicles. The primary purpose of the automated installation entry system is to reduce potential human errors. At JBLM entry gates, guards monitor while identification cards are swiped and credentials are validated prior to access being granted (JBLM 2016).

All vehicles entering JBLM are subject to inspection at any time as an installation force protection measure. Weapon registration is mandatory for all persons residing on JBLM and all privately owned weapons brought onto JBLM property must be registered (JBLM 2016).

Safety Services at the Yakima Training Center

Emergency Services

Emergency services at the YTC include services provided by a police department and a fire department located on the installation. These emergency services are provided to protect life and property by maintaining a safe and secure environment across the installation. These services provide support in meeting the installation's mission to enhance the well-being of all personnel who work and train on the installation through application of uninterrupted, customer-focused emergency and force protection services (YTC 2016b).

Additional emergency services in the vicinity of the YTC are provided by the surrounding communities including the Yakima County Sheriff's Office and neighboring municipalities (Greater Yakima Chamber of Commerce 2016).

To provide for installation security and individual safety, access to the YTC adheres to all DoD, Army, and installation management command regulations and guidance when granting access to the installation. All guests and visitors are required to check into the installation's visitor center with the Army's security guards prior to entering the boundaries of the YTC. Contractors can apply for and be issued passes for the duration of their contract after initial check in procedures are completed. Escorts may be provided as needed (YTC 2015a).

Army Policies to Protect the Public from Construction and Operation Activities

Construction and operation activities undertaken at JBLM and at the YTC must adhere to applicable UFC and any applicable Army policies to ensure the safety of civilians and military personnel. UFC documents provide planning, design, construction, sustainment, restoration, and modernization criteria, and apply to the military departments, the defense agencies, and the DoD field activities in accordance with the DoD Directive 4270.5, *Military Construction*, and USD (AT&L) Memorandum (WBDG 2016). Strategies set forth in *Unified Facilities Criteria*:

Installation Master Planning (UFC 2-100-01) include measures to improve public safety (DoD 2012).

3.10.2 Environmental Consequences

3.10.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and management of the physical development at the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development goals. Implementation of transportation and bicycle-and pedestrian-related projects could contribute to public safety through designing safe streets and intersections and improvements to the walking and biking environment, and the development of parks and open space could contribute to public health through enhanced wellness and increased walkability. The physical development of the Main Cantonments may contribute to the expansion of public and health safety services at JBLM and the YTC. The adherence to the 2015 AICUZ Study Update, in conjunction with the adherence to the IONMP, would fulfill DoD obligations to protect the public from noise and other hazards associated with military operations at JBLM. Hazards to the public associated with noise are discussed in Section 3.9. Both direct and indirect beneficial impacts on public health and safety would occur from potential developments based on existing development goals. Impacts on public health and safety would be beneficial and long term.

Adherence to existing planning principles would also result in beneficial impacts on public health and safety through providing guidance for development in a way that promotes a Soldier and Family community by improving the quality of the total environment for those who live, visit, or work at the installation.

3.10.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on public health and safety would be similar to those presented for the No Action Alternative. Primary impacts would result from development activities proposed under the IDP and the Capital Investment Strategy, and the IPS goals to promote a Family and Soldier friendly community. Adherence to the 2015 AICUZ Study Update and IONMP would also mitigate potential noise impacts related to public health hazards at JBLM and YTC. Based on the adoption of the RPMP, impacts on public health and safety would be significant, beneficial, and long term under Alternative 2.

3.11 Recreation Resources

3.11.1 Affected Environment

The JBLM Family Morale, Welfare, and Recreation (MWR) is responsible for overseeing the Outdoor Recreation Plan, but because of the lack of resources, JBLM has not updated the last plan since it was originally written in 1993. The goal of the Outdoor Recreation Program, both on JBLM and the YTC, is to give service members and their Families, civilian employees, and their guests a variety of recreational opportunities. Numerous recreation opportunities exist on JBLM and the YTC, including both indoor activities at sports, fitness, and recreation centers and outdoor activities (Table 3-14). This assessment focuses on recreation opportunities within the Main Cantonments of JBLM and the YTC. Common outdoor activities include golf and disc golf, camping, biking, hiking/jogging, swimming/scuba diving, and boating.

Table 3-14. Existing MWR Facilities and Managed Areas on the Installation

Recreation Amenity	Recreational Activities
Developed parks	Developed parks include maintained park, picnic areas, playgrounds and skate parks. Facilities provide informal recreation and leisure for service members and families, retirees, civilian employees and mission related resources.
Bicycle and pedestrian trails	Refer to Pedestrian and Bicycle Plan
AFC Arena	AFC Arena provides an indoor skating rink and rooms for group meetings and parties
Lewis Main and Sounders Lanes	State-of-the-art bowling facilities, pro shops, game rooms and bars and group meeting/party rooms.
Community Centers and Warrior Zone	Provides unit events, socials, games/gaming, internet, billiards, snack bars, movies, classes and other recreational amenities. Facilities include the Firing Point Community Club on the YTC.
Sports and fitness centers and pools	Facilities for active exercise, fitness, sports, swimming, child and youth services and classes. Facilities include the Army and Air Force Exchange Service shopette and gymnasium on the YTC.
Cowan and Memorial Stadiums	Athletic facilities located in five different areas and all-weather track
Splash Park	Americans with Disabilities Act-compliant water play feature for children and families adjacent to Freedom Park Playground.
Outdoor recreation program	The Northwest Adventure Center is an outdoor services facility that offers a variety of outdoor services including equipment rental programs. The Northwest Adventure Center controls on-base hunting opportunities.
Camping	The travel camp at Lewis North and Holiday Park Campground has lakeside camping cabins. Primitive camping is allowed at Lewis Lake and Chambers Lake
Boat marina and lakeside recreation	Russel Landing Marina and Shoreline Park offer boat access, rentals, fishing and swimming areas

Recreation Amenity	Recreational Activities
Skeet, rifle and pistol ranges and paintball facilities	JBLM offers recreational skeet, rifle and pistol ranges in addition to training ranges. Paintball facilities offer unit training and recreational paintball activities.
Libraries	JBLM libraries provide service members, retirees, students, civilian employees, and Family members with recreational, educational, and mission related resources.
Arts & Crafts Center and Auto Skills Development Center	Services and educational classes include gift and personalization needs, engine repair, body shop, and detail.
Community services and child, youth and school services	MWR provides information, assistance, and guidance to service member and community members in dealing with personal and Family problems, child care, and youth services.

Source: Marcoa Publishing (2013)

In addition to the designated recreational areas, certain portions of the JBLM are available to military personnel and the public for informal outdoor recreation, provided it does not interfere with military training. Recreation activities can occur throughout most of the installation with the appropriate permits and permission from the Outdoor Recreation Program's Northwest Adventure Center (hunting and fishing permits) and/or the Training Division/Range Control, which issues Area Access Permits for non-training access to the range complex. Most training areas are open to the public, if restrictive military training is not taking place. The more commonly used recreation areas are those that support relatively low levels of military training, such as the Rainier Training Area. Informal recreational opportunities available in non-developed areas within the Main Cantonment of JBLM include use of hiking and biking trails, dog training, horseback riding, and nature and wildlife viewing (Table 3-15).

Table 3-15. Existing Informal Recreation MWR Areas on the Installation

Recreation Amenity	Informal Recreational Activities
Camping	In addition to developed camping sites, primitive camping is allowed at Lewis Lake and Chambers Lake. Primitive camping requires pre-registration with the Northwest Adventure Center and are subject to the access restrictions and regulations.
Open space and informal recreation	Open Space and passive recreation areas include non-training open spaces and non-developed areas. Activities include trail walking/running, hiking, biking, dog walking, bird watching, nature photography, disc golf, and many other unplanned and unscheduled activities.

Recreation Amenity	Informal Recreational Activities
Fishing	With the exception of Nisqually Lake and Muck Creek, where it flows through the impact areas, people may fish on all the lakes and streams on Lewis Main and Lewis North, except in the event of closures. Sears Lake is only open to juveniles under age 15. No boating is permitted on McChord Field and fishing is limited to Clover Creek, Morey Creek, Morey Pond, and Carter Lake. The Carter Lake fishery is managed as a "put and take" fishery for rainbow trout. Morey Pond contains peamouth chub, yellow perch, rock bass, pumpkinseed, largescale sucker, western brook lamprey, and brown bullhead. People who fish on JBLM waters must have valid Washington State fishing licenses and follow all applicable federal, state, and Army regulations, including Washington State's Game and Fisheries Code.

3.11.2 Environmental Consequences

Formal adoption of the RPMP will provide a framework and guiding principles for future recreational facilities. Each ADP outlines recreation components that are intended to be consistent with the overall goals of the RPMP, specifically sustainable communities' goals. The RPMP incorporates current needs and mission requirements and allows installation planners to sustainably accommodate future change. The RPMP is a reference for design and programming of future project proposals and supports the installation mission and long-term strategic goals over the next 50 years. Specific recreational facilities or amenities described within each ADP are not proposed for construction at this time. No significant, adverse impacts are expected as a result of adopting the RPMP.

3.11.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and management of the physical development at the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development goals. Recreational features to improve the quality of and access to recreational facilities on the installation including linear trails, parks, and activity centers for each specific ADP would be proposed and constructed on an ad-hoc basis. Projects would be evaluated on a case-by-case basis for potential impacts on recreation.

3.11.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on recreation resources would be similar to the No Action Alternative. With the approval of the RPMP, information regarding all of the ADPs would be combined into a single guiding document and would help to create a more unified recreation resource that would be more functional, walkable, and better connected; be

more usable for all users; help to establish identifiable visual character; be more environmentally sustainable; and have few identifiable negative impacts.

3.12 Socioeconomics and Environmental Justice

3.12.1 Affected Environment

JBLM is located approximately 9 miles south-southwest of Tacoma, Washington. The ROI for JBLM in this analysis includes those areas that are generally considered the geographic extent to which the majority of the installation's Soldiers, Army civilians, contractor personnel, and their Families reside. This ROI includes Pierce and Thurston counties. Additionally, the YTC is located in both Kittatis and Yakima counties northeast of the city of Yakima; therefore, the ROI for the YTC is both Kittatis County and Yakima County, Washington. Because JBLM and the YTC are 160 miles apart, this analysis presents Pierce and Thurston counties as one ROI (JBLM ROI) and Kittatis and Yakima counties as a separate ROI (Yakima ROI). All dollar values are presented in 2014 dollars unless noted otherwise.

3.12.1.1 Population

Regional Population

Population statistics in this section are presented in 5-year annual averages from the U.S. Census' American Community Survey 5-year annual average datasets.¹ The population in the JBLM ROI increased from 1,026,244 in 2010 to 1,072,019 in 2014, representing an approximate 4 percent increase, while the population in the Yakima ROI increased from 276,441 to 288,107 between 2010 and 2014, representing an approximate 4 percent increase, compared to a 5 percent statewide increase.

The cities of Olympia and Tacoma, Washington, the closest major cities to JBLM, had populations of 47,847 and 201,794, respectively, in 2014. The larger Olympia-Lacey-Tumwater area has a population of 110,006. The city of Yakima had a population of 92,806 in 2014 (U.S. Department of Commerce 2010a, 2014a).

Joint Base Lewis-McChord and Yakima Training Center Population

Populations include permanent party military officers, noncommissioned and enlisted officers, Army civilians, non-appropriated civilians, and contractors, as well as other military service personnel attending training at the installation. Using 2011 as a baseline, JBLM has a total

¹ Statistics presented for the year 2010 are an annual average of these statistics between the years 2006 and 2010, while statistics presented for the year 2014 are an annual average of these statistics between the years 2010 and 2014.

working population of 50,438 consisting of active duty Soldiers and Army civilians, and other military services, civilians, and contractors. Of the total working population, 36,222 were Soldiers and Army civilians. The population that lives on JBLM consists of 9,953 Soldiers and Army civilians and an estimated 15,109 Family members, for a total on installation population of 25,062 (USAEC 2014). Finally, the number of the Soldiers, Army civilians, and Family members living off the installation in 2011 was estimated to be 66,145, and a projected 52,946 persons work on the installation as of FY 2016. This total will be reduced to 51,042 persons by FY 2022 (USAEC 2014).

Approximately 284 civilian workers are employed at the YTC, and an additional 195 active duty personnel are located at the YTC (Cantral 2016).

3.12.1.2 Income

In 2014, the annual median household incomes in Pierce and Thurston counties was, on average, \$59,711 and \$62,286, respectively. During the same year, the annual median household incomes in Kittitas and Yakima counties was \$45,406 and \$43,956, respectively. The annual median household income for both Pierce and Thurston counties was similar to the state's median household income of \$60,294, while Kittatis County and Yakima County's median household income was 25 and 27 percent lower than the state's median household income, respectively (U.S. Department of Commerce 2014b).

3.12.1.3 Labor Force, Unemployment, and Employment by Industry

Labor Force

The total labor force in the JBLM and Yakima ROIs was 507,335 and 139,424 persons, respectively, in 2014. The average annual unemployment rate in the JBLM ROI in 2014 was 7 percent, 1 percent higher than the state-wide average for Washington, while the unemployment rate in the Yakima ROI was 9 percent in 2014. The current labor force in the JBLM ROI increased by 3 percent between 2005 and 2014, while the total labor force in the Yakima ROI increased by 2 percent during this period. These increases are both substantially less than the statewide labor force increase of 7 percent during the same period (U.S. Department of Commerce 2014c).

Employment

The total number of employed persons residing within the JBLM ROI was approximately 471,111 in 2014, an increase of 2 percent from the 2005, while the total number of employed persons in the Yakima ROI was 127,233, a less than 1 percent increase in total employment

from 2005. The majority of employed residents in the JBLM ROI resided in Pierce County, while the majority of employed residents in the Yakima ROI resided in Yakima County. During this period, the total number of employed persons across the state increased by 6 percent (U.S. Department of Commerce 2014c).

In 2014, the latest year for which jobs by industry data are available, the total number of jobs in the health care and social assistance industry made up 13 percent of all jobs in both the JBLM and Yakima ROIs, while the total number of jobs in the retail trade industry made up 11 percent of all jobs in the JBLM ROI and 10 percent of all jobs in the Yakima ROI. Statewide, these industries represented 11 and 10 percent of all jobs in the health care and social assistance and retail trade industries, respectively. Total jobs in local government made up the next largest industry in both ROIs at 9 percent of all jobs in the JBLM ROI and 10 percent in the Yakima ROI. The total jobs in the military and federal government made up 6 and 2 percent, respectively, of all jobs in the JBLM ROI and accounted for 1 percent each of all jobs in the Yakima ROI. Relative to total jobs in these two industries at the state level, at 2 percent each for federal jobs and military jobs, the JBLM ROI has a relatively high level of jobs in the military. The construction industry made up 6 percent of all jobs in the JBLM ROI and less than 1 percent of all jobs in the Yakima ROI in 2014. This industry experienced a 13 and 21 percent decline in total jobs between 2005 and 2014 in the JBLM and Yakima ROIs, respectively. This decline is indicative of how the construction was affected by the national recession that started in 2008, and the total number of jobs in this industry has increased since this recession ended (U.S. Department of Commerce 2014d).

3.12.1.4 Housing

Regional Housing and Household Characteristics

In 2014, 438,997 housing units were located within the JBLM ROI, while 108,194 housing units were located in the Yakima ROI. Approximately 38 percent of all occupied housing units in the JBLM ROI and the Yakima ROI is renter occupied—slightly higher than the rental occupancy rate at the state level (U.S. Department of Commerce 2014e). JBLM has approximately 5,000 Family housing units in 22 neighborhoods on the installation. Since 2002, Lewis-McChord Communities LLC has renovated more than 3,000 homes and constructed more than 1,000 new homes on the installation (USAEC 2014). JBLM has approximately 12,000 barracks and dormitory spaces for unaccompanied personnel.

YTC has no on-installation housing units for either unaccompanied or accompanied personnel stationed there. All military personnel reside in surrounding communities. Approximately 2,500 barracks spaces are available to house Soldiers during training exercises (Morey 2008).

3.12.1.5 Government Services

Education

Military-connected students attend schools throughout the ROI. The Clover Park School District operates the five elementary schools on the installation and an additional 20 schools (elementary, middle, and high) in the city of Lakewood, which is adjacent to JBLM. JBLM and the DoD's Office of Economic Adjustment are in the process of replacing the five elementary schools on the installation because current facilities are outdated and require modernization to accommodate standards and school capacity.

During the 2014-2015 academic year, approximately 43.0 percent of the district's total enrollment was attributable to military-connected students (Clover Park School District 2015). In addition, military-connected students represent a notable share of total enrollment in the Steilacoom Historical and Yelm school districts, 17.0 percent and 7.0 percent, respectively during the 2008-2009 academic year. Enrollment in regional schools has increased in recent years to such an extent that numerous school districts within the ROI are operating at or over capacity.

The YTC has no schools; however, 21 school districts are located within the Yakima ROI. Personnel assigned to the YTC may reside throughout the ROI; because of the small number of military and Army civilian workers at the YTC, their children do not constitute a noticeable portion of the student membership in any school district (Fort Lewis DPW 2010).

Environmental Justice and the Protection of Children

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* [59 Federal Regulation No. 32, February 1994] provides that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The general purpose of this executive order are to:

- Focus the attention of federal agencies on human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice

- Foster nondiscrimination in federal programs that substantially affect human health or the environment
- Improve data collection efforts on the impacts of decisions that affect minority communities and low-income communities and encourage more public participation in federal decision-making by ensuring documents are easily accessible (e.g., available in multiple languages and made readily available)

EO 13045, *Protection of Children from Environmental Health and Safety Risk*, requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. This executive order, dated 21 April 1997, further requires federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks.

The development and construction of projects consistent with the RPMP would be located entirely within the boundaries of the JBLM and the YTC. These projects would not be adjacent to or in the immediate vicinity of minority populations or children located outside the boundaries of JBLM and YTC in the larger ROIs.

3.12.2 Environmental Consequences

Socioeconomic impacts in the ROIs on demographics, employment, income, and housing and impacts that could occur on community and public services (such as law enforcement, fire and rescue, schools, and medical services) are examined in more detail in the following text.

Estimated impacts on these resources are assessed qualitatively. The significance of impact on these resources depends on the services, but generally, impacts on these services are defined as beneficial, no impact, less than significant, significant but mitigable, or significant, according to the definitions of these terms at the beginning of this chapter.

3.12.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be formally adopted and management of the physical development at the Main Cantonments of JBLM and the YTC would continue based on existing planning principles and development goals. The implementation of projects to address facility deficits and excesses would occur on an as-needed basis without a formalized framework that enables suitable locations of projects that address the large-scale functional relationships at JBLM. Because the specific projects to be developed under this alternative are not clear, it is assumed that all of the projects described in Appendix A would be implemented. The construction of any of these projects, which could include the construction of new housing,

CDCs, mixed-use developments, and other operations-related facilities, would have short-term, beneficial impacts on employment, income, and sales in the JBLM and Yakima ROIs during the construction period. If any of these projects were to require construction workers to temporarily relocate to either ROI during the construction period, the population within that ROI would increase in the short term. If any of these projects were to require adding additional military or civilian positions for their operation, long-term impacts on the population in either ROI would occur if these positions are filled by persons relocating to the ROI for these jobs. Spending by temporary construction workers or permanent employees who relocate to the ROI to fill these positions would have a beneficial impact on employment, income, and sales in the ROI as these persons spend their incomes within the ROI. Similar socioeconomic impacts would occur from the demolition of current facilities as well as from the construction and operation of any new projects, if they were to occur.

Government and emergency services would be affected to the extent that they would be required to render assistance during the construction period if construction workers need medical care or construction projects on either JBLM or the YTC were to require additional fire or police support. During the operation of these short-term projects, government and emergency services would be affected only to the extent that persons who relocate to the ROI to work on these projects would use these services or through any cooperative agreement support (if cooperative agreements are in place during the operation of these projects) that may be rendered by fire or police services to the project sites. Additionally, construction of a new fire station is possible under existing development goals, potentially benefiting emergency fire services on the installation.

Operation of new businesses, to the extent that new businesses are created under development goals would also have long-term, beneficial impacts on the JBLM or Yakima ROI through the creation of new employment, sales, and income. If any of these new businesses attract permanent workers to the JBLM or Yakima ROI to work in these businesses, local population and housing would also be affected. Government and emergency services would be affected by construction of these businesses and any change in population that they bring. During the short term, impacts on government and emergency services would be limited to impacts related to the construction of these businesses. During the long term, impacts would be related to changes in business volume and the total population change outside the installation.

Schools in either ROI could be affected by any project under existing development goals to the extent that any population change in that ROI causes a change in enrollment in local schools.

Specific impacts on schools would be determined in a future tiered NEPA evaluation process based on specific project impacts on the local population in the ROI.

Specific socioeconomic impacts related to these short-term projects would be explored under a future tiered NEPA evaluation process once more project details and information are available. Overall, impacts on socioeconomics under Alternative 1 would be beneficial as a result of economic growth associated with the procurement of goods and services.

Environmental Justice and the Protection of Children

An environmental justice impact is considered to be significant if the impact disproportionately and adversely affects a minority or low income community. In addition, an impact on a population of children is considered to be significant if it disproportionately and adversely affects this population of children.

The primary impacts of the No Action Alternative are beneficial and result from projects associated with existing development goals continuing to move ahead, which would benefit all JBLM and YTC residents. Because all projects would be located within the boundaries of JBLM and YTC, populations outside the boundaries of the installation would not be affected, including disproportionate and adverse impacts on minority or low income populations and children. As future projects are identified, sited, and implemented, JBLM will consider whether minority or low income populations or children adjacent to the installation could be disproportionately affected.

3.12.2.2 Alternative 2 – Adoption of the RPMP

Impacts under Alternative 2 would be the same as those described for the No Action Alternative because the same projects were assumed to be implemented under the No Action Alternative as under Alternative 2. Overall, impacts on socioeconomics under Alternative 2 would be beneficial as a result of economic growth associated with the procurement of goods and services.

Environmental justice and protection of children impacts would be the same as those described above for the No Action Alternative.

3.13 Solid and Hazardous Waste and Pollution

3.13.1 Affected Environment

The ROI for solid and hazardous waste and pollution consists of the boundaries of the Main Cantonments of JBLM and the YTC because potentially affected resources under the JBLM RPMP would be confined to these localized areas.

JBLM, including YTC maintains standard operating procedures to minimize and prevent damage to human health and the environment from the use and disposal of hazardous materials, remediate previous environmental contamination, and management solid waste disposal and recycling. Table 3-16 outlines these plans, the regulatory authority under which they fall. In general, hazardous materials and waste and toxic substances issues are governed by such statutes including, but not limited to, the Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Emergency Planning and Community Right to Know Act (EPCRA), Clean Air Act, Clean Water Act, Safe Drinking Water Act, National Pollutant Discharge Elimination System (NPDES), Federal Facilities Compliance Act, Military Munitions Rule, and the federal Hazardous Materials Transportation Law. Army regulations, including the Defense Environmental Restoration Program, and executive orders have also been established pursuant to these and subsequent federal and state regulations.

Table 3-16. Environmental Contamination Protection Programs

Plan/Standard Operating Procedure	Description	Regulatory Authority	Effective Length	Expiration Date
Wellhead Protection Plan	Wellhead Management plan for areas around drinking water sources to protect the water supply from contamination.	SDWA, WAC §246–290	Ongoing	Ongoing
Cross Connection Control Plan	The Cross Connection Control Program is to protect the potable water system from cross connections and meet all applicable laws and regulations.	SDWA, WAC §246–290	Ongoing	Ongoing
Stage 2 Disinfectants and Disinfection Byproduct Monitoring Plan	DDP monitoring plan to protect public health by reducing adverse health effects associated with DDP.	SDWA, WAC §246–290	5 years	2014
Water System Emergency Response Plan	The Emergency Response Plan outlines procedures for emergency responses for natural or man-made threats.	SDWA, WAC §246–290	Ongoing	Ongoing

Plan/Standard Operating Procedure	Description	Regulatory Authority	Effective Length	Expiration Date
Fort Lewis Stormwater Pollution Prevention Plan	This plan requires industrial activities to conduct pollution prevention and control measures to support the NPDES Multi-Sector General Permit.	CWA, NPDES	5 years	Ongoing
Construction Stormwater Pollution Prevention Plan	This plan requires construction activities to conduct pollution prevention and control measures to support the NPDES Construction General Permit.	CWA, NPDES	5 years	Ongoing
Municipal Separate Storm Sewer System Management Plan (MS4MP)	The MS4MP requires Municipal Separate Storm Sewer System (MS4s) that drain to any surface waterbody to conduct pollution prevention and control measures to support the NPDES Phase II requirements and the upcoming NPDES MS4 permit.	CWA, NPDES	5 years	Ongoing
Installation Restoration Program (USAEC undated)	Established in 1975 by the US Army Environmental Command, the IRP addresses contamination from past activities, and identifies, investigates, and remediates environmental contamination and pollution that pose health and safety risks. Each installation has an Action Plan outlining the integrated multi-year approach to environmental contamination, and catalogues individual site descriptions, status, cleanup schedules, and land use controls.	RCRA, CERCLA	5 years	Ongoing
Military Munitions Response Program (MMRP)	Established in 1975, the MMRP to address risks to human health and the environment from unexploded ordnance and discarded munitions at locations not within existing range and training lands.	Military Munitions Rule	Ongoing	Ongoing
Installation Action Plan (JBLM 2013c)	In accordance with the IRP and MMRP, JBLM's IAP is a comprehensive outline of the installation's cleanup program, including the identification of cleanup requirements cost, and schedule for each site and area of concern.	RCRA, CERCLA	5 years	Ongoing

Plan/Standard Operating Procedure	Description	Regulatory Authority	Effective Length	Expiration Date
Pollution Prevention (JBLM 2015f)	The Pollution Prevention program at JBLM is a comprehensive Program to reduce and prevent pollution at the source, with a focus on conservation of resources, substitution of hazardous materials with environmentally-friendly substitutions, waste reduction, diversion of waste through reuse, recycling, composting and energy recovery, and other preventive means to cost effectively avoid, prevent, or reduce the generation of pollutants.	RCRA, EPCRA, TSCA	Ongoing	Ongoing
Environmental Operating Permit	A one-source Environmental Management Document designed for each organization on the installation. It describes the processes, environmental considerations, legal and other requirements, authorized hazardous waste streams, training and documentation requirements, and BMPs for environmental management.	RCRA, CWA, NPDEIS, TSCA	Ongoing	Ongoing
Department of Public Works Environmental Guidebook	This document outlines the procedures for handling, disposing, and/or recycling of a variety of hazardous materials and solid waste, and environmental contamination and human health risks.	RCRA, CERCLA, CWA, TSCA	Ongoing	Ongoing

3.13.1.1 Solid and Hazardous Waste

The RCRA and the Hazardous and Solid Waste Amendments of 1984 define hazardous waste as a solid waste or combination of wastes that due to quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed. A solid waste is a hazardous waste if it is not excluded from regulation as a hazardous waste under 40 CFR §261.4(b) and if it exhibits identified characteristics of hazardous waste or meets other specified criteria. Hazardous wastes commonly generated at military installations include hazardous materials (such as solvents, antifreeze, petroleum, oils, and lubricants) with an expired shelf life, paint and paint-contaminated media, and fluid from change out processes, such as oil. As a Large Quantity Generator, JBLM, including YTC is subject to the corresponding hazardous waste management

requirements as outlined in 40 CFR 262 (USEPA 2014), the Dangerous Waste Rule as outlined in Washington Administrative Code §173–303 and Army regulations. Certain types of solid waste and recycling materials are accumulated in designated receptacles throughout the installation; the DPW manages the location and operation of these receptacles. Hazardous waste and certain classes of solid waste have specific disposal and handling protocols in accordance with DPW’s Environmental Guidebook, Environmental Operating Permit, and pollution prevention policies. In 2011, JBLM was nominated by the Assistant Secretary of the Army as one of six pilot installations in the Army’s Net Zero Installation Program for Water and Waste. Since then, it has achieved more than 80 percent of its goal of net zero waste.

3.13.1.2 Environmental Contamination

Under the Defense Environmental Restoration Program, both known and potential hazardous waste contamination areas are investigated through the Installation Restoration Program (IRP) and the Military Munitions Response Program programs. These programs were instituted to satisfy 23 requirements of the CERCLA and RCRA for former and current hazardous waste sites. In September 2012, the U.S. Army Corps of Engineers, Sacramento District, conducted its first five-year review of 18 sites within JBLM to evaluate the effectiveness of ongoing remediation under CERCLA (U.S. Army Corps of Engineers 2012). Contamination at these sites is attributed to a variety of activities, ranging from leaking underground storage tanks to petroleum and hazardous substance spills from normal work operations. Of these sites, eight required no further action. In FY 2013, JBLM updated its IAP to document ongoing remediation efforts. The IAP identified primary contaminants of concern including metals, petroleum, oil and lubricants, polychlorinated biphenyls, and VOCs, affecting both groundwater and soil resources. Although here are also munitions related environmental concerns for soil resources within JBLM, the remedies outlined in JBLM’s IAP are expected to be protective in the long term (JBLM 2013b). The following contaminated sites and areas of concern within the JBLM ROI are currently undergoing remediation as described in the IAP and the 2012 five-year review:

- The Logistics Center—This site is the largest and most affected site at JBLM, is on the USEPA’s National Priorities List of contaminated sites. A large groundwater plume extends from the source area, and several individual sites are on the National Priorities List. Remediation actions include the use of three groundwater pump-and-treat systems, removal of source pollution, long-term groundwater monitoring, and use of land use controls. Vapor intrusion exposure is a concern for facilities above the groundwater plume, and JBLM is current gathering data to evaluate the vapor intrusion risk.

- American Lake Garden Tract—Disposal activities associated with a historical landfill has resulted in groundwater contamination. The selected remedy includes connection of the residential units to a public water system, groundwater extraction and treatment, groundwater monitoring, and the implementation of institutional controls.
- Solvent Refined Coal Processing Plant—This site operated from 1974 to 1981 as a production and research facility designed to develop a solvent extraction technology for deriving petroleum hydrocarbon-like products from coal. In 1979, 2,000-gallons of solvent-refined coal liquid spilled. Subsequent soil and groundwater assessments identified that additional sources of contamination might exist. Remediation includes soil excavation and onsite treatment, groundwater monitoring, and implementation of land use controls.
- Landfill 4—Landfill 4 was reportedly used for solid waste disposal between 1951 and 1967, and remediation is required to protect human health and the environment from contaminated groundwater resources within the upper aquifer. Remediation actions include treatment of suspected sources of groundwater contamination, treatment of contaminated groundwater, groundwater monitoring, and implementation of institutional controls to restrict access to and development at the site as long as risks to human health occur.
- Pesticide Rinse Area—This area consists of a concrete pad historically used as a rinsing area for pesticide applicator equipment and empty chemical containers. While soil and groundwater sampling has shown the site does not pose an unacceptable risk, land use controls are in place because of the elevated levels of pollutants.

The YTC likewise has historical environmental contamination. The WDOE ranks the YTC as a “2” on its Hazardous Sites List, indicating a high level of environmental risk. In 1995, 115 known or potentially contaminated sites within the YTC were identified, and an additional 12 sites have been investigated since that time (WDOE undated [b]). It is unknown how many of these sites occur within the Main Cantonment of the YTC; however, as of 2013, all sites have been investigated and cleanup was nearing completion. Long-term groundwater monitoring and land use controls have been established for nine sites that do not meet soil and/or groundwater standards.

3.13.2 Environmental Consequences

3.13.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted; and management of the physical development at the Main Cantonments of JBLM and the YTC would occur based on existing planning principles and development goals. Future development would generate solid waste during both construction and operation, but JBLM would continue to work toward its goal of net-zero waste, resulting in less than significant impacts from solid waste.

Future development in the administrative and industrial zones associated with existing development goals may generate hazardous waste depending on mission and unit requirements; however, these wastes would be disposed of in accordance with existing federal, state, and Army regulations as well as the installation's Standard Operating Procedures and policies to prevent future environmental contamination, resulting in less than significant impacts. Furthermore, future development would respect institutional and land use controls implemented as part of the IRP and IAP. Over time, existing pollution and environmental contamination would be remediated in accordance with JBLM's IRP and IAP.

3.13.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts from solid and hazardous waste and pollution would be the same as those presented for the No Action Alternative, i.e., no measurable impacts.

3.14 Transportation and Traffic

3.14.1 Affected Environment

The study area, or ROI, for the analysis of traffic and transportation includes the area within the Main Cantonment of JBLM and the roadways immediately surrounding JBLM, as well as the area within the Main Cantonment of the YTC and the immediately surrounding roadways.

3.14.1.1 Off-Installation Transportation

Off-installation Road Network

Interstate 5 (I-5) is the main road corridor that serves JBLM. I-5 links key population centers such as Vancouver, Olympia, Seattle, Tacoma, Everett, and Bellingham and is a principle route for the movement of people, goods, services, and the military on a state-wide basis. Adjacent to the installation, I-5 is a divided interstate that has three through lanes in each direction south of Thorne Lane on the northern end of the installation, and four through lanes in each direction

north of Thorne Lane. All lanes are unmanaged general purpose lanes, and northbound and southbound auxiliary lanes are added between the Center Drive (Exit 118) and Steilacoom-DuPont Road (Exit 119) interchanges (WDOT 2014a). Congestion along the corridor through the JBLM area is a daily occurrence because of the high vehicle volumes and the large number of vehicles entering and exiting the freeway within the vicinity of the installation. Heavy off-ramp traffic backs up along some of the ramps, spilling back onto the I-5 mainline. Because of these back-ups, drivers change lanes to avoid other drivers and generally cause traffic to slow, create extended traffic delays, and reduce traffic safety along I-5 (WDOT 2014b). To understand the installation's impact on the I-5 corridor, approximately 80 percent of the traffic to/from JBLM uses the I-5 corridor (WDOT 2014a). I-5 lane types also do not provide any incentives for using transit within the corridor adjacent to the installation, likely contributing to the high concentration of single-occupancy vehicles in the area, including the installation.

I-5 is also a major freight corridor within Washington State. Adjacent to JBLM, trucks currently make up 12 percent of the total daily traffic north of Steilacoom-DuPont Road and 10 percent of total traffic north of Bridgeport Way, near McChord North.

Other main roadways within the vicinity of the installation include State Route (SR) 7 / SR 507, which runs generally north-south on the eastern side of the installation, and SR 510, which runs northwest-southeast on the southwest side of the installation. SR 512 provides east-west movement north of the installation from I-5 east to Puyallup, and SR 702 provides east-west access south of the installation. In the area of Lewis North, DuPont Steilacoom Road, on the west side of Lewis North, provides connections from Lewis North to the cities of DuPont and Steilacoom, and East Drive connects Lewis North to North Gate Road, providing access to the city of Lakewood (Fort Lewis DPW 2010). Clark Road also provides access to the JBLM for vehicles coming from the south and the city of DuPont and East Gate Road and SR 507 provide access to JBLM from the east.

To address congestion along I-5 near the installation, the Washington State Department of Transportation (WDOT) has recently made temporary improvements to relieve congestion until more long-term improvements can be implemented, including installing ramp meters, widening ramp lanes, adding a ramp lane and auxiliary lane, installing data collection stations, and making installation Intelligent Transportation System improvements (WDOT undated).

The YTC is accessed via I-82, the main north-south interstate in the area (Fort Lewis DPW 2010). I-82 is a divided freeway with two lanes in each direction near the training center.

Regional Air Transportation

The nearest airport to the JBLM-area is the Seattle-Tacoma International Airport, located about 27 miles from the installation. The other nearby airport is the King County International Airport located about 32 miles from the installation; this airport services domestic flights (JBLM Housing 2016).

The nearest airport to the YTC is the Yakima Air Terminal-McAllister Field. Located in Yakima, the airport is approximately 25 minutes or 12 miles from the Main Gate at the YTC. The airport primarily services Seattle-Tacoma International Airport.

Off-installation Rail Network

A rail corridor owned by Sound Transit in the area of the installation parallels I-5 on its western side (WDOT 2014a). Three rail operators use the Sound Transit Rail line adjacent to the installation: Burlington Northern Santa Fe, Tacoma Rail, and Sound Transit. Tacoma Rail operates two to three trains per week on this line. In 2012, Sound Transit increased commuter rail service near the north end of the installation when it extended service to the Lakewood Station on the west side of I-5; however, because this station is on the opposite side of I-5, travelers have no direct or easy access to the installation.

Off-installation Bus Network

Three public transit providers operate in the vicinity of JBLM—Intercity Transit, Pierce Transit, and Sound Transit (WDOT 2014a). Intercity Transit, based in Thurston County, operates five routes in the area of JBLM and sub-contracts service for a sixth route. All routes provide access close to a JBLM gate, but no routes serve on the installation itself because security regulations prohibit general public riders from entering the installation. Three routes offer weekday bi-directional service between Olympia and Tacoma, one weekday route offers bi-directional service between Turnwater (state agency campus) and Lakewood, and one route offers weekend bi-directional service between Olympia and the Tacoma Mall; most of these routes offer stops at Lacey and Lakewood. The one contracted Intercity Transit line operates with weekday service between Olympia and Seattle.

Pierce Transit provides local bus service in Pierce County and operates four routes that provide access to or close to JBLM (WDOT 2014a). Two of the Pierce Transit service routes provide service onto the installation—Route 206 operates between the Lakewood Transit Center and the Madigan Hospital, and Route 300 operates between the Tacoma Mall Transit Center and the McChord Commissary with a stop at the SR 512 park-and-ride lot. Of the other two Pierce Transit routes, one connects Lakewood Station (near the McChord North Gate) with the

Lakewood Transit Center and destinations in central and north Tacoma, and one operates via South 112th Street and serves the SR 512 park-and-ride lot; this later route is also available to McChord North Gate.

Sound Transit, the Central Puget Sound Transit provider, operates three express bus routes along the I-5 corridor (WDOT 2014a). All service is provided during peak hours in the morning and evening. Sound Transit does not provide local bus service to JBLM; the closest stop is located at the Lakewood Sounder Station and park-and-ride lot. These three Sound Transit routes provide service to the north to the Seattle-Tacoma International Airport and downtown Seattle.

Furthermore, seven park-and-ride lots serve the area around the installation, providing more than 2,000 parking spaces (WDOT 2014a). Both Intercity Transit and Pierce Transit offer carpool and vanpool services in the area, and a large number of these service JBLM.

The nearest transit to the YTC, Yakima Transit, does not appear to service YTC (Yakima Transit 2016).

3.14.1.2 On-Installation Transportation

Access Control Points

JBLM is a controlled access installation, so vehicles driven by an adult with an authorized identification card may enter through any open gate (JBLM 2016b). Visitors to the installation or vehicles that are driven by an adult without an authorized identification card must visit the Visitor Center to receive a pass to the installation at either the Liberty Gate or the McChord Main Gate. Commercial vehicles entering the following installation areas are directed to enter at the following gates: Logistics Center Gate at Lewis Main, Integrity Gate at Lewis North, and CVIP Gate at McChord Field. When the Logistics Center Gate and CVIP Gate are closed, commercial vehicles enter and are processed at Madigan Gate.

Approximately 15 gates currently serve the installation, three gates serve Lewis North, five gates serve McChord, and seven gates serving Lewis Main (JBLM 2016b). Six of these 15 gates are only open Monday through Friday, and three gates close at mid-day (two of which are open Monday through Friday only). Five gates are open 24 hours a day, 7 days a week—Liberty Gate (Lewis Main), 41st Division Gate (Lewis North), Madigan or MAMC Gate (Lewis Main), East Gate (Lewis Main), and McChord Field Main Gate (McChord Field).

Based on counts from the first three months of 2016, the gates with the highest estimated average weekday volume are included in Table 3-17. Additionally, as of 2010, JBLM generated

between 126,000 to 152,000 offsite vehicle trips per day (the latter value including Camp Murray); most of these trips are by single or personal occupancy vehicle (South Sound Military & Communities Partnership 2010).

Table 3-17. Average Weekday Gate Counts, January – March 2016

Access Control Point or Gate	Average Weekday Total
Liberty Gate	11,673
MAMC (Madigan) Gate	8,870
McChord North Gate	8,198
McChord Main Gate	6,564
Dupont Gate	4,617
Barnes Gate	3,441
East Gate	3,165
Integrity Gate	1,406

Source: JBLM Department of Public Works (2016)

The physical constraints of I-5 freeway interchanges and local streets in the vicinity of JBLM gates sometimes contribute to traffic queues that extend back onto the surrounding roadway system (WDOT 2014b). Long queuing has occurred primarily on the I-5 ramps. While recent changes to gate operations have improved traffic queuing at ramps, day-to-day variability in gate traffic levels can still result in queuing that negatively affects ramp and/or freeway traffic.

The YTC is also a controlled access installation where all visitors without current DoD identification must check into the Visitor Center at the Main Gate. The access control point at the Main Gate and primary access point to the YTC is via Firing Center Road, Exit 26 off I-82. The access control point at the Main Gate has one lane operating in each direction (one entering and one exiting). The secondary access to the YTC is via Military Road, Exit 11 off I-82, and is primarily only used for military convoys. When the Military Road entrance is not in use for convoys, the location is typically gated and locked. A third access point to the YTC via E. Pomona Road is only used when freight is brought in by rail; at all other time the entrance is gated and locked.

Circulation Network

According to the JBLM Growth Coordination Plan's Transportation Appendix (South Sound Military & Communities Partnership 2010), primary roads within the installation at Lewis North include Main Street, 41st Division Drive, 32nd Division Drive, D Street, A Street, East Drive, and 17th Street. Primary roads within Lewis Main generally from west to east include Mann Avenue,

Clark Road, West Way, Kaufman Avenue, Pendleton Avenue, 41st Division Drive, Railroad Avenue, Stryker Avenue, 2nd Division Drive, 3rd Division Drive, East Gate Road, Jackson Avenue, S. I Street, Rainer Drive, and Murray Road SW. Within McChord Field, primary roads are limited to Barnes Boulevard according to the same study. Several of the larger primary roads have posted speeds of 35 miles per hour (Fort Lewis DPW 2010). Secondary roadways within the installation typically have two travel lanes, one in each direction, and posted speeds of 25 miles per hour. Secondary roads function as collectors, distributing traffic between the primary and tertiary roadways.

On Lewis Main, 41st Division Drive leads from the Main Gate to Pendleton Avenue, a major east-west road through the installation, and provides access to the neighborhood center (Fort Lewis DPW 2010); 41st Division Drive on Lewis Main has five lanes and a posted speed limit of 35 miles per hour. At Lewis North, 41st Division Drive south of A Street has route lanes and a raised, planted median, a concrete sidewalk on the east side of the road separated by a planter strip, and a signed and marked 4-foot-wide, on-street bike lane in both directions. Pendleton Avenue, the primary east-west arterial on Lewis Main through the neighborhood center, is a three-lane roadway with a center two-way, left-turn lane and a posted speed of 25 miles per hour. Pendleton Avenue is the only street within the neighborhood center with a continuous pedestrian walkway; the other streets do not have continuous pedestrian facilities. Pendleton Avenue connects to Lewis North under I-5. Within Lewis North, several streets were improved around 2010 to include a 5-foot-wide, striped bike lane on both sides as well as curbs, gutters, and sidewalks.

In addition to peak traffic flows inbound from the gates and on-installation housing to work locations in the morning and outbound to regional roadways and on-installation housing in the evening, gate volume counts also showed that the mid-day (lunch time) period also generates a large percentage of vehicle trips (Fort Lewis DPW 2010). The neighborhood center area also experiences an increase in traffic volumes during the mid-day period, mostly because of the numerous shopping, eating, exercise, and recreational establishments located in this area of the installation.

A complete transportation report was not available for the installation to provide more details on the operating conditions on roadways within the installation. However, according to a presentation to the Transportation Research Board (TRB) by the Director of Public Works of JBLM, 20 of the installation's 38 intersections operate at a Level of Service (LOS) of E during the peak period around 2010 (TRB 2011). LOS is a qualitative measure describing the

operational conditions within a traffic flow and the perceptions of these conditions by drivers or passengers. LOS is measured with letter designations from A to F with A representing the best operating conditions (free flow and little delay) and LOS F the worst (congestion and long delays). Generally, LOS E and F are considered in need of improvement.

One contributing factor to the vehicle traffic on the installation is the high percentage of trips that are made by single-occupancy vehicles. A TRB report notes that there are several challenges to reducing traffic on the installation, particularly with finding alternatives to single-occupancy vehicle commuting which adds more trips to the roadway network than vehicles with more than one person (TRB 2011). Military personnel have unique schedules that make it difficult for transit to gain modal share and for carpools to be coordinated. All Soldiers have a requirement to do PT prior to work. While many Soldiers stay on the installation to shower and eat breakfast before proceeding to their work site, some Soldiers commute home in-between PT and work, essentially creating two morning travel peaks. Security concerns have also prohibited priority access for public transportation because fixed bus routes are often not able to access the installation because of the public traveling on the bus. No funding is available for transit improvements, as well. Carpools are difficult to arrange because of the unpredictability of Soldiers' schedules and needs to travel around the installation for work or personal trips. Also, extensive parking is available, which is a disincentive to using public transportation.

JBLM's lack of safe, connected, non-automobile modes of transportation between the residential areas and the community support or work areas in many places on the installation is one reason for the limited pedestrian and bike activity. Because of suburban, auto-oriented pattern of development at JBLM, it is anticipated that most trips between the residential areas and community support or work areas would continue to be car trips.

Rail Network

A rail spur off of the local Burlington Northern Santa Fe owned railroad network (Prairie Line) services the installation south of the City of Lakewood, between what was the eastern edge of Lewis Main and the western edge of McChord Field. Most of the spur lines are located within the Logistics Center and enter the installation near the intersection of E Lincoln Road/Lincoln Boulevard, 150th Street SW, and Perimeter Road. The rail spurs head east from where they enter the installation and turn northwest to parallel Rainier Drive. The rail system is used for receipt of materials and equipment and the shipping of vehicles and equipment to points of debarkation during deployments or training exercises. Although it appears to be unused, another rail spur also exists on the very western edge of the installation between the Lewis Main

Center Drive and Dupont Gates. The spur parallels the north side of Railroad Avenue and is owned by the US Army (South Sound Military & Communities Partnership 2010).

Transit Service

Although several transit services are available in the vicinity of the installation, Pierce Transit is the only public transit that operates on the installation. Routes 300 with service between the Tacoma Mall and McChord Commissary and Route 206 with service between the Lakewood Mall Town Center and Madigan Army Hospital) serve the installation (JBLM 2015c). Riders must have a DoD-issued identification card to disembark on the installation. Route 300 provides service on weekdays only between 7:20 a.m. and 8:50 a.m. and between 3:30 p.m. and 6:00 p.m.; service is provided every 30 minutes at the Commissary stop on the installation (Pierce Transit undated). Saturday and Sunday service for Route 300 does not serve the Commissary. During weekdays, Route 206 provides service approximately every half hour during the AM peak period—every 45 minutes during the mid-day—and every 40 minutes during the PM peak period with service from 5:30 a.m. to 7:10 p.m. Saturday service on Route 206 is provided to the Madigan Hospital approximately every 30 minutes between 8:30 a.m. and 6:30 p.m., and there is no Sunday service to the hospital or the installation. Adult fare on Pierce Transit is \$2.00 per trip.

JBLM offer's two shuttle routes, called GO Transit, to all service members, civilians, Family members, and visitors (JBLM 2015c). The service operates on weekdays between 7:00 a.m. and 7:00 p.m. and on weekdays between 10:00 a.m. and 6:00 p.m. The service is free and shuttle service is provided every twenty minutes, with overall service offered between 7 a.m. and 7 p.m. Route 1 serves Lewis Main and Lewis North. Major stops on Route 1 include Madigan, Jackson Avenue and Hillside Housing, Commissary & Exchange, I Corps, CDC/Raindrops & Rainbows, Lewis North Shoppette, and Warrior Zone, although there are other stops in-between (GO Lewis-McChord 2016). Route 2 serves Logistics, Madigan Annex, and McChord Field. Major stops on Route 2 include Madigan, Madigan Annex and E Johnson, McChord Clinic, and PAX Terminal with additional stops available in-between. A modified route, Route 1 E, is available on the weekends.

A hospital shuttle also serves the installation with four round trips daily between the Madigan Army Medical Center and Naval Hospital Bremerton for the convenience of patients referred to the other hospital for specialty care. The shuttles depart Madigan at 5:30 a.m., 8:30 a.m., 11:30 a.m., and 2:30 p.m. (JBLM 2014b). Vanpools organized through Intercity Transit and

Pierce Transit also provide service to the installation; 37 Intercity Transit vanpools and over 30 Pierce Transit vanpools service JBLM (WDOT 2014b).

3.14.2 Environmental Consequences

3.14.2.1 Alternative 1 – No Action

This section first describes future reasonably foreseeable transportation projects that would occur within the transportation study area during the time frame of analysis. The section concludes with a description of the transportation and traffic environmental consequences for Alternative 1, including those impacts associated with the future background projects.

Off-installation Planned Improvements

Several off-installation roadway projects are planned, and many funded will directly affect individuals traveling to JBLM. While the impacts may not extend far within the installation, the following project would likely directly or indirectly affect JBLM traffic:

- Cross-Base Highway (SR 704) would provide regional travelers with a new 6-mile-long, multi-lane dividing highway beginning at the west end of the I-5 Thorne Lane interchange and connecting to the east end of 176th Street at SR 7, east of the installation (South Sound Military & Communities Partnership 2010). Providing a public route through JBLM, the alternate east-west route would ease congestion on roads near the installation. The existing SW 150th Street corridor and Perimeter Road would no longer be used as the main east-west connection. The segment between Spanaway Loop Road and SR 7 was completed in August 2009. No funding has been identified for the remaining segments, but the highway remains in WDOT's and Puget Sound Regional Council's long-range plans.
- I-5 Madigan access improvements would add an additional lane at the end of the southbound I-5 exit to Berkeley Street to allow for two left-turn lanes, widen the Berkeley Street overpass to continue that added lane over I-5, and widen Union Avenue (WDOT 2016a). WDOT is completing this project for the city of Lakewood after the city received DoD financing to improve traffic circulation at the Madigan Army Medical Center. The project would help reduce congestion on southbound I-5 at the Berkeley Street exit in Lakewood, near the Madigan Gate, by preventing existing traffic from backing onto the mainline of southbound I-5.
- Extensive improvements are planned and funded along I-5 adjacent to the installation to reduce traffic congestion and safety issues and plan for future growth. While the projects

are not currently finalized, they tentatively include adding one lane in each direction along the southern two-thirds of I-5 adjacent to the installation, rebuilding interchanges using roundabouts at Thorne Lane and Berkeley Street near the Madigan Gate and Logistics Center Gate, building a new local connector road between Gravelly Lake Drive and Thorne Lane near the McChord Field Woodbrook Gate, building a bicycle/pedestrian path along the I-5 corridor, and making improvements between the Mounts Road and Steilacoom-DuPont Road interchanges near the DuPont Gate (WDOT 2016b). The proposed changes would reduce chronic traffic congestion through the JBLM corridor and the new interchanges with roundabouts would improve traffic flow and reduce the potential for collisions. The project is funded through a 10-year period from 2015–2025.

- Sound Transit’s Long-Range Plan includes the potential for commuter rail service to operate to DuPont (and possibly beyond) and to JBLM (WDOT 2014a). Such service would likely require adding a second track within the right-of-way, grade-separating certain crossings, and locating new station(s) by the gate(s) to and from JBLM.

In addition to these roadway projects, in 2017 the Point Defiance Bypass project will move Amtrak service that is currently on the nearby Burlington Northern Santa Fe mainline tracks along the Puget Sound to this line. Amtrak currently runs 10 trains per day on the nearby Burlington Northern Santa Fe segment, so rail crossings occurring near the I-5 interchanges near the installation will increase. Based on the Point Defiance Bypass project EA, “the additional train service will cause added delay at some at-grade crossings, but reduced delay at others with improved signal timings” (WDOT 2014a).

On-installation Planned Improvements

Existing development goals include many recommendations for transportation upgrades. Given the extent and condition of the current roadways and infrastructure compared to what is proposed, significant construction would be required. While the discussion of impacts would consider all of the proposed transportation and pedestrian and bicycle related improvements the focus would be on the main objectives associated with development goals. These improvements, grouped by ADP, are prioritized development improvements, but most of them are not programmed or funded; the projects that are programmed are noted below.

- American Lake—Pedestrian trails
- East Division—Complete central PT trails

- Flightline—Upgrade Barnes Boulevard to complete streets
- Gray Army Airfield—Road connection to Stryker Boulevard, complete street grid by extending Hardrick Avenue to the west and constructing future road north of Nelson Recreation Center
- Greene Park—Interconnect the network of pedestrian trails
- Hillside—Link housing areas with trail system
- Historic Downtown—Upgrade 41st Division Drive to a parkway and New Dupont Gate with park-and-ride capability
- Lewis-McChord Link—Construct Joint Base Connector Road (programmed), upgrade Lincoln Avenue (bridge and extension are programmed), construct recreational trails, and although not included as a priority project, implement the Cross Base Highway, which is also programmed
- Lewis North—Complete PT trails
- Logistics Center—Complete the road connector to Jackson Avenue and Madigan
- Madigan—Upgrade new Madigan Gate with park-and-ride capability, and although not included as a priority project, complete the proposed parking garage, which is programmed
- McChord Center—Upgrade Barnes Avenue to a complete street, improve traffic flow with roundabout at the intersection of Barnes Boulevard and Colonel Joe Jackson Boulevard
- Miller Hill—Complete the park trails
- 3rd Brigade—Complete the Stryker Avenue upgrade to Boulevard, add a roundabout at Stryker Avenue and 41st Division Drive, complete the pedestrian commons
- Yakima Training Center—Construct a new gate alignment and road

The Joint Base Connector Road (or Joint Base Access Road) is funded (\$13.5 million) by the DoD to better connect Lewis Main with McChord Field (South Sound Military & Communities Partnership 2010). This connector road would be a new north-south arterial between the two parts of the installation and would cross the existing Perimeter Road. Until the Cross-Base Highway is constructed, security check points would still be necessary because the connection

would leave the controlled boundary of the installation as it crosses Perimeter Road. In the future, when the Cross-Base Highway is constructed, the Joint-Base Connector will be fully within the perimeter of the installation with a grade separated crossing of the Cross-Base Highway and a new interchange.

Alternative 1 – No Action

Construction activities associated with the future growth at JBLM would likely increase traffic congestion both on JBLM roadways and on the surrounding roads as a result of construction worker trips and materials delivery and may also result in road closures on JBLM. If construction trips occurred at the same time as peak commuting times for installation employees, traffic congestion impacts could be more acute in the areas near construction. It is anticipated, however, that overall increases in traffic and potential road closures would be relatively small in nature when compared to existing traffic and existing infrastructure, so adverse impacts would be short and less than significant.

Future growth at JBLM from projected increases in military personnel accommodated in proposed facilities and proposed housing units would increase long-term traffic on both the installation and nearby roads in the vicinity of JBLM. Off-installation, this traffic growth would likely have no impacts or less than significant impacts once planned external roadway improvements are implemented. However, until off-installation improvements are implemented, growth in traffic on area roads from any growth at JBLM would increase already congested I-5 during peak hours and increase volumes on other area roads, causing adverse conditions. Additional delays may occur from increased installation-related transportation trips, but any increases in delays, while adverse, would likely be less than significant and temporary until offsite improvements are made, unless acute increases in development and growth occur.

Within the installation, transportation-related development goals seek to create a connected network of streets that provides alternative routes for transportation, accommodate all transportation users through the implementation of complete streets, better connect Lewis Main and Lewis North by closing the Main Gate and redistributing traffic or building an overpass connector, accommodate future plans for regional transit service, and provide for the safe operations of large vehicles through designation of large-vehicle routes. Pedestrian- and bicycle-related development goals seek to make walking and biking more accessible with the addition of a convenient and interconnected system including sidewalks wide enough for two people to pass, sidewalks shaded by trees, sidewalks buffered from the street with planting or landscaped strips, bike lanes on busy streets, and a bicycle network extending throughout the

installation. These improvements would lead to long-term, beneficial effects on transportation by themselves with improved transportation options, improved safety, and improved network connectivity which increases access and can decrease congestion.

Proposed transportation improvements, while providing overall benefits, may or may not address additional vehicular trips added to the network by the proposed new development. If environmental review of proposed development projects and transportation project improvements is conducted prior to implementation and projects are designed with necessary mitigation to address existing and future conditions, proposed transportation projects would address future installation growth in areas where the projects are implemented and installation growth would result in no adverse, long-term impacts. If environmental review of individual projects is not performed and if growth within the installation is not coordinated with transportation improvements, implementation of projects associated with development goals would adversely affect traffic in certain areas until co-located transportation improvements are realized; these on-installation impacts would likely be less than significant but would have to be evaluated in more detail with transportation studies.

Additionally, it should be noted that some of the transportation improvements recommended as part of existing development goals would require further traffic evaluation to ensure the improvements would provide the intended beneficial consequences. For example, because a large portion of the installation trips are serviced by the Main Gate, closure of the Main Gate or development of an overpass would require additional analysis to understand impacts. Similarly, provision of the reduced parking due to transit credits should be evaluated with parking occupancy studies to ensure sufficient parking is available for mission-related activities.

Under the No Action Alternative, proposed transportation improvements would not be as certain as they would be in the event that the RPMP is formally adopted, resulting in a potential reduction in any beneficial impacts from projects associated with existing development goals. Additionally, current needs and mission requirements would drive ad hoc development of transportation facilities with the chance for less coordination and cohesion between improvements, also resulting in a potential reduction in any beneficial impacts from projects associated with existing development goals.

3.14.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, JBLM would adopt the RPMP. Impacts on transportation would be very similar to those under the No Action Alternative and would similarly include the background

impacts from the list of projects described for the Alternative 1. Therefore, overall implementation of the Alternative 2 would result in less than significant, short-term impacts from construction, no impacts or less than significant impacts on transportation outside the installation provided proposed improvements are implemented, beneficial impacts on all modes of transportation within the installation, and possible less than significant impacts on traffic if proposed projects do not concurrently address increases in installation growth. Beneficial impacts under Alternative 2 would be more certain than under the No Action Alternative because proposed projects would be completed in conjunction with each other at a system-wide level (e.g., transit, pedestrian) with adoption of the RPMP, and projects would occur in an orderly deliberate manner to ensure that benefits are realized.

3.15 Utilities

3.15.1 Affected Environment

The following discussion summarizes the existing utility systems (water, wastewater, non-potable water, electrical, steam, and communications) serving JBLM and the YTC, which constitutes the affected environment. Analog telephone, externally operated cable, natural gas, propane, heating oil, and storm sewer were specifically excluded as part of the utility analysis performed to develop the Utility Infrastructure Plan, so these issues are not in this analysis.

3.15.1.1 Joint Base Lewis-McChord

JBLM is served by potable water, wastewater, electrical, steam, and communications systems described in more detail below.

Potable Water System

The Lewis and McChord portions of the installation are each served by separate water systems. A project has been programmed to interconnect the two water systems in the future. The following discussion provides more detail on the potable water systems in each portion of JBLM.

Lewis

Four separate water systems serve Lewis—Main Cantonment of Lewis, the golf course, the Ammunition Supply Point and Range 17. Each of these four systems are separate and served by separate supply sources. Because the golf course, Ammunition Supply Point, and Range 17 are not within the study area boundary of the RPMP, the following discussion of potable water systems focuses on the system for the Main Cantonment of Lewis.

The Main Cantonment of Lewis is served by seven wells and the Sequalitchew Springs with Wells 12A, 12B, and the springs operating as the primary source of supply with a combined capacity of 12,300 gallons per minute (gpm), equating to a capacity of approximately 17.7 million gallons per day (MGD). Treatment is provided by a plant located immediately adjacent to Sequalitchew Springs. High lift pumps deliver treated water to the distribution system. The capacity of the treatment plant and high lift pumps is approximately 21.6 MGD, which exceeds the capacity of the primary supply sources. The rated capacity of the treatment plant is 12.9 MGD, its capacity when operating on emergency power.

The distribution system for the Main Cantonment of Lewis is made up of approximately 900,000 lineal feet of water main that is 6 inches in diameter or larger. Roughly 30 percent of the pipes are asbestos cement 50 years old or older, which is the usable lifespan of this material. Pipeline replacements are anticipated to occur on an as-needed basis as projects are developed, or if annual maintenance inspections reveal problems with specific pipe sections. Fire flow is generally adequate across the Main Cantonment of Lewis, but it could be improved through additional looping of water mains.

The Main Cantonment of Lewis is divided into three pressure zones—410, 420, and 515—served by the WTP Clearwell Booster Station, Wells 12A and 12B Booster Station, and the Davis Hill Booster Station, respectively. Each booster station has one or more pumps. Capacity for these pumps is shown in Table 3-18.

Table 3-18. Pump Capacity

Pressure Zone	Booster Station	Pump Capacity
420	WTP Clearwell Booster Station	Pumps 1–4: 3,000 gpm (each) Pump 5: 2,000 gpm Pump 6: 1,000 gpm
420	Wells 12A and 12B Booster Station	Pumps 1 and 2: 2,000 gpm (each)
515	Davis Hill Booster Station	Pump 1: 500 gpm at 150 feet Pump 2: 200 gpm at 130 feet Pump 3: 300 gpm at 130 feet

Water storage within the Main Cantonment of Lewis is provided by a series of eight tanks ranging in size from 200,000 to 846,000 gallons and has a combined volume of 5.0 million gallons.

McChord

The McChord water system is composed of three systems—Military Family Housing (MFH), Semi-Automatic Ground Equipment, and Main Cantonment. These systems operate as separate subsystems under normal conditions and are isolated from one another by valves. Each system has its own wells and elevated storage allowing isolated operation, but all the elevated storage overflows are set at the same altitude, allowing operation of the combined subsystems in a single pressure zone if isolation valves are opened.

The source of supply for the McChord subsystem is 10 groundwater wells with a total capacity of 5,520 gpm or 7.95 MGD. Capacity by subsystem is 2,890 gpm or 4.16 MGD for Main Cantonment, 580 gpm or 0.84 MGD for Semi-Automatic Ground Equipment, and 2,500 gpm or 2.95 MGD for MFH.

The distribution system contains a total of approximately 212,000 lineal feet of water main that is 6 inches in diameter or larger. According to the Utility Infrastructure Plan, there is a significant percentage of asbestos cement pipe of which up to one-half is in need of replacement. To date, the water system has not been modeled.

Storage for the McChord system is provided by five elevated tanks with a total capacity of 1.03 million gallons. Two elevated tanks each serve both the MFH and the Main Cantonment distribution systems and a single elevated tank serves the Semi-Automatic Ground Equipment water system. When all storage across the three McChord subsystems is considered, there is a deficiency of approximately 200,000 gallons of firefighting water storage on the installation as a whole. Storage and subsystem storage for all other purposes is adequate.

Wastewater System

The wastewater system on Lewis and McChord is a single, interconnected system with a single wastewater treatment plant (WWTP) located at Solo Point on Puget Sound. The existing WWTP is permitted for an average monthly hydraulic load of 7.6 MGD and is operating within NPDES required effluent limits for biological oxygen demand and total suspended solids. In 2013, JBLM approved plans to replace the existing WWTP with a new plant designed with newer technology to improve water quality discharges. The new plant also includes a reclaimed water distribution system that will help the Army achieve sustainability goals on the installation. The new plant is operational as of July 2016.

The Lewis wastewater collection system consists of vitrified clay, concrete, and polyvinyl chloride pipes, although some segments are composed of ductile iron, cast iron, and asbestos cement. Pipes range in diameter from 36-inch trunk lines to 6-inch side sewer connections.

The JBLM collection system has 57 sewer lift stations, the majority (50 of 57) of which are located on sewer laterals. Details on the wastewater collection system were not available in the CH2M Hill Wastewater Feasibility Study or the Sewer Model. According to the Utility Infrastructure Plan, the McChord collection system likely contains similar pipe materials based on the age of the two systems. Overall, collection system capacity has been judged to be capable of handling existing wastewater loading and anticipated future loading.

Non-Potable Water System

JBLM has a non-potable water system consisting of 82,597 lineal feet of pipe within the Lewis Main and Lewis North portions of the installation. Approximately 42 percent of the pipe is located outside the RPMP study area boundary. Non-potable wells supply water to the system, but future sources would include highly treated wastewater and rain water. The system will help JBLM achieve a net-zero water status as required by the federal mandate.

Electrical System

Electrical power for JBLM distribution system is supplied by Tacoma Power Utilities. The primary distribution system includes four substations located on Lewis and two substations located on McChord. Tacoma Power Utilities supplies 115 kV power to each substation on JBLM where it is transformed to 13.8 kV for further distribution throughout the installation. JBLM owns and the DPW maintains the 13.8 kV distribution systems beyond each substation, including four of seven transformers. The distribution system consists of approximately 227 miles of overhead and underground and primary and secondary lines. Stepdown transformers located near buildings are employed to bring voltages to usable levels in individual buildings.

Lewis

The Lewis portion of JBLM receives power from Tacoma Power Utilities through four substations (Table 3-19).

Table 3-19. Lewis Substations

Substation Name	Number of Transformers	Transformer Rated Capacity	Physical Location
Madigan	1	20 MVA	Southeast of I-5 and Just west of building 09010
Central	2	20 MVA (each)	The north boundary of the substation abuts the south side of Robin Court
South	1	20 MVA	Southwest of the intersection of South 6th Street and Mann Avenue at the edge of the woods
Sequalitchew	1	25 MVA	Northeast of Sequalitchew Springs and West of Vancouver Road

Note: MVA – megavolt amp

The Central substation is the main Lewis substation and based on information provided by system operations personnel, the Central substation can power the entire Main Cantonment, if necessary. Additionally, each substation serves multiple circuits and each circuit can be fed from more than one substation providing significant system redundancy throughout Lewis.

McChord

McChord receives power from Tacoma Power Utilities through two substations (Table 3-20).

Table 3-20. McChord Substations

Substation Name	No. of Transformers	Transformer Rated Capacity	Physical Location
Main	1	22.4 MVA	East of the intersection of 47th Avenue and 124th Street
Ginko (Housing)	1	20 MVA	0.2 mile NE of Ginko Drive, South of I-5 (between Ginko Drive and New York Avenue SW)

Note: MVA – megavolt amp

The Main substation feeds four circuits that supply electrical power to McChord MFH and the Main Cantonment. The Ginko substation feeds six circuits that primarily supply power to McChord MFH. According to the Utility Infrastructure Plan, the power to serve all circuits can be fed from either substation. Currently, none of the existing circuits in either of the McChord substations is at or near capacity.

Steam System

Centralized steam and hot water systems are present on both Lewis and McChord; however, service is limited to select facilities and none of the central systems are interconnected.

Lewis

Lewis has five steam/hot water systems that serve specific locales. One major central steam/hot water plant is Plant 3LC (9576), which provides steam to Log Center and Madigan Hospital. The Emergency Madigan (9040) Plant also provides support to the Madigan Hospital. Plant Madigan (9785) supports the Old Madigan area. The largest system serves the East Division ADP through three separate boiler plants. Plant 9 (3152) provides hot water to the 3100 block of buildings, Plant 10 (3292) provides hot water to the 3200 block of buildings, and Plant 11 (3292) provides steam to the 3400 block of buildings. All of the plants are primarily gas fired boilers; however, each has the capability to use fuel oil should gas be unavailable.

McChord

A single central steam plant serves the Main Cantonment of McChord. The boiler uses natural gas with fuel oil as a backup supply. While not every building in the Main Cantonment is connected to the McChord steam plant, many of the larger buildings are connected. According to the Utility Infrastructure Plan, keeping the existing centralized steam system and continuing to use the central system to provide steam to new buildings where it made sense to do so. As a result, the steam plant has been well maintained and has received modifications to improve efficiency (the installation of stack economizers and a new digital control system is currently underway).

Communications System

The Lewis and McChord communications systems are fully connected but use different communication protocols. A virtual area network was created to overcome differences in the networks and to allow fairly seamless communication between Lewis and McChord networks.

3.15.1.2 Yakima Training Center

The YTC is served by potable water, wastewater, electrical, and communications systems (digital) described in more detail below. The YTC no longer uses its central steam system, so this system was not reviewed in this EA. In addition, mapping for the Army Reserve/National Guard training center area in the northern portion of the Main Cantonment is incomplete; therefore, system estimates and mapping of future ADP build-out infrastructure may include utilities components that likely already exist.

Potable Water System

Water supply for the YTC's potable system comes from three wells—the Pomona, Bowers, and Jordon—with a total capacity of 1,676 gpm or approximately 2.4 MGD. Water is distributed in

two pressures zones (lower and upper) in 10 miles of water main ranging from 4 to 16 inches in diameter. Pipe materials are cast iron, cement-lined ductile iron, and polyvinyl chloride. Storage is provided in two aboveground reservoirs—one 500,000-gallon concrete reservoir and one 600,000-gallon steel reservoir—that serve the upper and lower zones, respectively.

Wastewater System

The YTC wastewater system is composed of 4.5 miles of gravity sewer lines, serving 104 service connections. Another 2,520-foot-long gravity sewer line, located off the installation, connects the western edge of the Main Cantonment to the headworks for the WWTP and an additional 1.5 miles of gravity line convey treated effluent from the WWTP to the Yakima River.

The WWTP has capacity to treat 0.72 MGD of influent and is operating at 12 percent capacity. The plant is meeting existing WWTP NPDES requirements, but a study is necessary to assess whether the plant can meet new, more stringent phosphorous and nitrogen discharge limits for the Yakima River. Depending on the outcome of the study, WWTP upgrades may be required to meet new NPDES permit limits.

Electrical System

PacifiCorp provides all power to the Main Cantonment of the YTC. Power is distributed throughout the installation by a combination of overhead and underground and primary and secondary conductors. The majority of the conductors in the Main Cantonment are overhead. PacifiCorp supplies the YTC via two feeds that are not interconnected or looped. The Main Cantonment is fed via a single 12.47 kV, three-phase distribution circuit that is rated at 10 megavolt amps (MVA). The circuit also provides power to other customers, limiting the capacity to the YTC at 3 MVA. The YTC electrical distribution system is rated at 10 MVA with a 4 MVA branch serving the down range area.

Communications System

According to the Utility Infrastructure Plan, the communication system infrastructure on the YTC has problems in common with those on JBLM. No further information is available on the YTC communications system and the Utility Infrastructure Plan recommends undertaking a survey of the existing system and the development of a communications system master plan to guide future additions and modifications.

3.15.2 Environmental Consequences

This section evaluates potential effects on utilities under Alternative 1 (no action) and Alternative 2 (the adoption of the RPMP).

3.15.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted; however, utility management at JBLM and the YTC would continue based on the existing planning and development goals. In general, utilities are sufficient to meet existing and future demand under the No Action Alternative. However, select utility systems are deteriorating with age or are not equipped with upgraded technologies for better efficiency and are not adequate to meet future demand as described above. If the No Action Alternative is selected, future utility projects would be subject to project-level NEPA review and would likely require detailed EAs or EISs rather than no NEPA review or limited scope EAs and Categorical Exclusions. As a result of the No Action Alternative requirement for full NEPA review of future utility projects, projects would be impacted by delays and increased costs due to the loss of NEPA streamlining. Under Alternative 1, detailed NEPA reviews would be necessary because a PEA would not be in place.

The following discussion identifies utility system upgrades common to either alternative. With implementation of these utility system upgrades, both alternatives would be consistent with necessary system upgrades identified in existing planning principles and development goals. These beneficial impacts on system upgrades would result from either alternative, but services would cost more and may be less efficient under the No Action Alternative.

Joint Base Lewis-McChord

Potable Water System

Lewis. The existing potable water system has excess source water capacity to service the Main Cantonment of Lewis and to meet population growth and potable water demand. The following additional projects may be necessary to accommodate future demand:

- Replacement of asbestos piping that is at the end of its 50-year useful life
- An examination of fire flow to ensure that it is adequate to supply current and future needs

The MS4 permit for JBLM conditionally allows for potable water source discharges, including, but not limited to, water line flushing, hyperchlorinated water line flushing, fire hydrant flushing, and pipeline hydrostatic test water. Planned discharges must be dechlorinated to a total residual chlorine concentration of 0.1 parts per million (ppm) or less; pH-adjusted, if necessary; and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4.

McChord. The existing system capacity is adequate to meet projected growth on the installation. The following projects would be necessary to accommodate existing populations or future demand:

- Replacement of up to one-half of the water main that is composed of asbestos cement
- Examination of fire flow capabilities, which would first require corrections to McChord Geographic Information System data, water system operational parameters, and system geometries
- An increase in water storage capacity to meet existing firefighting water demand that is currently deficient

The MS4 permit requirements for potable water are described in the previous section.

Wastewater System

The current collection system capacity has been judged to be capable of handling existing wastewater loading and anticipated future loading. The new WWTP is operational as of July 2016. The new plant includes technology that improves the quality of the effluent discharge, meets water quality standards, and includes the ability to install a reclaimed water distribution system that will help the Army achieve sustainability goals on the installation. The MS4 Permit for JBLM allows for limited discharge of catch basin decant liquid and water removed from stormwater treatment facilities into the sanitary sewer with the approval of the sewer authority and by meeting the permit's pretreatment, contamination prevention, and capacity requirements. The reasonable availability of sanitary sewer discharge will be determined by the Permittee, by evaluating such factors as distance, time of travel, load restrictions, and capacity of the stormwater treatment facility.

Non-Potable Water System

According to the Utility Infrastructure Plan, the existing reclaimed system would need to expand to approximately 25 miles of piping and add pumping and storage facilities to connect and serve all industrial and minor water users on the installation.

Electrical System

Lewis. None of the existing electrical circuits is near capacity, and all are capable of handling some additional new electrical loads. While current capacity is adequate, electrical system operators and management continue to press for improvements to the overall system to expand future substation capacity, ensure reliability, and redundancy. The following projects are

ongoing or under development to upgrade portions of the Lewis electrical distribution system. These system upgrades are not necessitated by projected future growth.

- Upsizing the South substation capacity from 20 to 25 MVA
- Replacing two of the main feeder lines serving the base
- Upsizing the Main Cantonment distribution system
- Moving distribution lines underground where it makes sense to do so

McChord. Currently, none of the existing circuits in either of the McChord substations is at or near capacity. According to the Utility Infrastructure Plan, the McChord electrical system should be able to handle anticipated future increases in electrical loads.

Steam System

Lewis. None of the major steam/hot water systems on Main Cantonment of Lewis are at or near capacity; however, a task force has determined that central steam heating plants located on military installations are not energy efficient or cost effective. As a result, any future expansion of existing centralized steam/hot water service would only be considered at Log Center and Madigan Hospital. Over time, it is expected that the central steam/hot water plants serving the East Division ADP and Old Madigan area will be decommissioned as old buildings are demolished or renovated. Centrally fed steam/hot water systems will replace standalone heating systems.

McChord. The McChord steam plant is well maintained and has received modifications to improve efficiency. As a result, the central steam plant load is below its maximum capacity; however, condensation loss rates are considered unacceptable, even without a federal mandate to reduce energy. As a result, it is highly unlikely that any new or remodeled buildings would be connected to any existing steam plant. Currently, a seven-phase plan is being implemented to completely overhaul and replace steam piping throughout the McChord system. This plan is expected to continue because no decision has been made to decentralize heating functions on McChord.

Communication System

Many of the Lewis Area Distribution Network hubs and Remote Switching Units are at maximum capacity. Additionally, the main hub connecting JBLM with external communications systems is at capacity and also is a single point of failure for the communication system. The following

projects are ongoing or under development to upgrade portions of the JBLM communication systems to meet future anticipated growth:

- A full survey of the existing communications system equipment, operations, and maintenance
- Development of a communication system master plan

Yakima Training Center

Potable Water System

The current capacity of the existing wells is sufficient without modification to meet the potential increased water demands within the Cantonment. Additionally, the existing water storage capacity is sufficient to meet anticipated requirements from future development; however, existing fire flow capacities throughout the installation are not currently known. A hydraulic analysis of the YTC water distribution system should be conducted to determine the ability of the existing water storage and distribution systems to deliver required fire flows to all current and potential future facilities throughout the Main Cantonment. Based on that analysis, distribution system piping upsizing and looping and additional fire flow pumping capacity may be required to meet required fire flows.

Wastewater System

Based on projected hydraulic loading only, the existing WWTP should be capable of handling the hydraulic loading projected from future development. Additional study would likely be necessary to determine whether the existing WWTP can meet more stringent limits on discharges of phosphorous and nitrogen to the Yakima River, while managing both the increased hydraulic loading and organic loading associated with the increased installation population expected at ADP build-out. Depending upon the outcome of that study, WWTP upgrades may be required, in particular, to meet more stringent discharge limits.

Electrical System

While the existing system is capable of meeting the electrical demands on the YTC, it lacks redundancy and past studies have suggested improvements to address that deficiency, as well as providing options to expand capacity in the future as needed. Given the increase in electrical load if ADP build-out occurs, the distribution system would likely need to double, at a minimum, in overall capacity.

Communication System

While the YTC communication systems have been able to meet the growing communication needs of the Main Cantonment, serious future issues are likely if the communication system continues to expand without a solid long-term plan. A complete survey of the existing communications system equipment, operations, and maintenance should be undertaken, followed by development of a communication system master plan, to guide future development of this critical system.

3.15.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2, the RPMP would be adopted, and new utility projects would be implemented in accordance with the goals and objectives of the RPMP. Therefore, no significant, adverse impacts are anticipated. Future utility system upgrades in compliance with the RPMP would undergo expedited NEPA reviews due to the issuance of this PEA. Use of the PEA would result in a significant benefit of time and cost savings. Utility systems are generally sufficient to meet existing and future demand with notable exceptions as described above. These utility system upgrades, while not considered to have significant adverse impacts because they have already been accounted for in the RPMP, may lead to beneficial results for the utility systems.

3.16 Visual Resources

3.16.1 Affected Environment

This section discusses the potential aesthetics and visual resource impacts associated with the proposed JBLM RPMP. Visual resources are defined by the visual character of a particular area and include the color, form, line and texture of the resources that are present. Resources include points on installation, public roadways, parks, public spaces, and natural features. The significance of a visual resource is very subjective and depends on the scenic quality of the area, the degree of alteration, and the sensitivity of the viewer. For the purposes of this assessment, aesthetic and visual resources refer to the overall visual character of the installation and the surrounding areas. Specific viewsheds have not been defined for the analysis of the RPMP, and individual elements of the RPMP have not been evaluated for visual impacts.

3.16.1.1 Visual Character

JBLM is located in western Washington encompassing approximately 90,000 acres. The visual character of JBLM is influenced by natural resources and large scale topographic features.

Extensive stands of conifer and deciduous trees tend to visually isolate views onto and off the flat to gently rolling terrain. Miller Hill rises above the surroundings and serves as a prominent topographic feature. Periodic open grasslands offer views of the surrounding area including majestic views of Mt. Rainier. When visible Mt. Rainier, dominates views and defines the character of the installation and south Puget Sound area.

Visual character is also defined by existing man-made features within the Main Cantonment, which includes military facilities and infrastructure (e.g., units, headquarters, command, maintenance and storage, and airfield), personnel and Family housing, commercial, schools, recreational facilities and others. Structures vary in age and condition and in character; however, some historically significant structures dating from World War I and World War II lend important visual character and aesthetic value to the installation.

The installation is bordered on the north by suburban and commercial development; on the east and south by several small communities, rural areas, and forested land including the Nisqually Wildlife Refuge; and on the west by Puget Sound, the Nisqually Indian Reservation, the city of Lakewood and rural areas in Thurston County. The I-5 corridor bisects the Main Cantonment of JBLM and offers views onto this area for passing motorists.

The YTC, is located approximately 10 miles northeast of Yakima, Washington. The approximately 327,231-acre site lies between the Cascade Mountain's eastern slopes and the Columbia River on the east. Visual characteristics of the YTC are typical of sagebrush-steppe ecosystems of eastern Washington. The YTC is covered with sagebrush, volcanic formations, dry gulches, and large rock outcroppings. The YTC has vast flat valleys, separated by east-west parallel ridges that range in elevation from 400 to 4200 feet that offers views of Mt. Rainier and Mt. Adams. The vast majority of the YTC is dedicated to training, but it does contain a small Main Cantonment. The Main Cantonment at the YTC is developed area with a parade field, headquarters, and other support and housing on the west side of the installation. Within the Main Cantonment, visual character is largely influenced by the built structures, which vary in age and condition and most are indistinct (US Army 2014).

3.16.2 Environmental Consequences

3.16.2.1 Alternative 1 – No Action

Under the No Action Alternative, the RPMP would not be adopted, and management of the physical development at the Main Cantonments at JBLM and the YTC would occur based on existing planning principles and development goals. Specific facility and amenity development

footprints and details are currently unknown, and, as such, no adverse visual or aesthetic impacts are expected under the No Action Alternative. As future needs and mission requirements necessitate individual projects, they would be reviewed for consistency with the existing goals and planning principles for the installation in each of the ADPs independently. Individual projects would require separate visual analysis during reviews and may not lead to the coordinated visual and aesthetic goal for the installation in the long-term. Impacts to visual resources would be evaluated on a project-level basis and would consider appropriate settings, character, and viewsheds.

3.16.2.2 Alternative 2 – Adoption of the RPMP

Under Alternative 2 the RPMP would be adopted. Impacts to visual resources would be the same as those described for the No Action Alternative. The RPMP is designed to provide a framework for decision makers to know where and how development can occur in the future. The RPMP comprises a series of plans that work together to show future development at JBLM as a whole. It incorporates current needs and mission requirements and allows installation planners to sustainably accommodate future change over the next 50 years. The RPMP establishes five planning goals to help guide sustainable future community development. Each goal includes design principles that have been developed to support the long-term goals for visual and aesthetics resources of the installation (Table 3-21). Actual visual and aesthetic impacts will vary as specific projects are developed and may require site-specific visual analysis prior to construction. Overall, the RPMP is intended to improve the visual and aesthetic quality of JBLM and YTC by providing an integrated approach to future development.

Table 3-21. Summary of Visual and Aesthetic Impacts under the Unadopted RPMP

Planning Goals	Design Principles	Visual Impacts
Joint Base Lewis-McChord		
Mission Capable	<ul style="list-style-type: none"> • Compact development • Job and housing proximity • Efficient transportation • Affordable development • Visible entries/optimum unit layout • Close-in training • Rangeland and airspace preservation • Mixed use 	Natural views and regional character of undeveloped land is maintained with compact and efficient development. Visual character of developed areas would have higher impacts but is offset by fewer on-road vehicles and smaller parking lots and a smaller overall footprint. Visual clutter and user frustration is reduced with clear lines of sight and identifiable destinations.
Sustainable Communities	<ul style="list-style-type: none"> • LEED facilities • Low-impact development 	Natural materials and methods establishes a network of interconnected natural systems that help maintain

Planning Goals	Design Principles	Visual Impacts
	<ul style="list-style-type: none"> • Linear parks • Hidden parking • Multi-story buildings • Public transit • Bikeable/bike paths • Car parks • Narrow buildings 	<p>regional character and are less visually dominant. Parks, open spaces, green infrastructure and low-impact development emphasizes natural visual elements and facilities. Trees and vegetation can also limit views of man-made elements and incompatible land uses.</p>
Walkable Neighborhoods	<ul style="list-style-type: none"> • Planting strips • Sidewalk buildings • Connected sidewalks • Five-minute walk • Neighborhood parks • Aligned entries • Shop fronts • Great views 	<p>Introduce natural vegetation and visual elements to streetscapes. Vegetation can buffer incompatible land uses. Visual clutter and user frustration is reduced with clear lines of sight and identifiable destinations. Views of Mt. Rainier define visual elements of JBLM where available. Roadway, building and other facility developments should protect and preserve views.</p>
Identifiable Neighborhood Centers	<ul style="list-style-type: none"> • Main streets • Clear edges • Town square • Regional character • Large park blocks • Historic preservation • Focal points 	<p>Clear Edges such as hills, creeks or rivers, natural vegetation or others should be used to visually identify and separate ADPs. ADPs should identify and preserve the regional character of natural and built areas to establish identifiable main streets and town squares. Historic buildings and amenities help define the base and individual ADPs and provide a sense of visual history. Preservation should be balanced with other design principles in restoration, adaption or removal of specific elements. Using regional elements such as Mt. Rainier, HQ buildings, churches or other visually dominant elements can help to define visual character and establish ADP identity and wayfinding.</p>
Complete Streets	<ul style="list-style-type: none"> • Multi-way boulevards • On-street parking • Street cafes • Build-outs • Street trees • Parkways • Street grid 	<p>Visual impacts will be reduced as efficient transportation reduces on-road traffic and parking size. Landscape and pedestrian scale elements are introduced to street corners and overall visual width of streets are reduced. Landscape elements are introduced to the built environment and vegetation can buffer incompatible land uses. Visual impacts would be further reduced as transportation congestion is reduced.</p>
Yakima Training Center		
Long-Range Vision	<ul style="list-style-type: none"> • Training land protection • Secure entry • Future expandability • Flexibility • Rural character • On-street parking • Walkability 	<p>Training and range protection is the primary mission at the YTC. Efficient land use for the small rural community that balances density and preservation of rangeland will help to preserve of regional visual character and long open views. Development and architecture should follow stated design principles to help maintain a rural character and create a sense of place and reduce visual impacts.</p>

Planning Goals	Design Principles	Visual Impacts
	<ul style="list-style-type: none"> • Five to 10-minute walk • Boulevards • Livable sensitivity • Defined open space • Terrain sensitivity • Articulated facades • Arcades • Alleys • Focal points • Street grid courtyard Housing • Bungalows • Connections • Street trees • Town square • Mixed-use • Multi-story construction • Main Street 	

Existing visual and aesthetic resources on the Main Cantonments of JBLM or the YTC would not be affected because all components of the RPMP are consistent with the visual objectives. The adoption of the RPMP combines planning goals and design principles for all of the ADPs into a single guiding document that would allow installation planners to sustainably accommodate future change. As future needs and mission requirements necessitate individual projects, they would be reviewed for consistency with the goals and planning principles discussed above, and this review process would help create a more unified visual resource to help to establish an identifiable visual character that is more environmentally sustainable and have fewer negative visual impacts.

3.17 Water Resources

3.17.1 Affected Environment

Water resources are sources of water available for use by humans, flora, or fauna, including surface water, groundwater, and floodplains. Surface water resources, including but not limited to stormwater, lakes, streams, rivers, and wetlands, are important for economic, ecological, recreational, and human health reasons. Groundwater is classified as any source of water

beneath the ground surface and may be used for potable water, agricultural irrigation, and industrial applications.

The ROI for water resources consists of the boundaries of the Main Cantonment of JBLM and the Main Cantonment of the YTC because potentially affected resources under the RPMP would be confined to these localized areas. Water resources outside the ROI are discussed as appropriate to provide an overall context of the existing conditions.

3.17.1.1 Joint Base Lewis-McChord

The hydrology of JBLM consists of both stormwater and natural surface waters. The average precipitation for JBLM is 39 inches per year, almost two-thirds of which occurs during the wet season between October and March as a result of storms originating in the Pacific Ocean (U.S. Army 2014b). Precipitation that does not infiltrate the soil is collected in a variety of major surface water features within the ROI as shown in Table 3-22. American Lake is located adjacent to the American Lake ADP, and Sequelitchew Lake is located within the Greene Park ADP. The Green Park ADP also contains Hanner Marsh and Mackay Marsh. Murray Creek, a perennial stream, flows northeast through the Logistics Center ADP under I-5 and into American Lake. Clover Creek likewise flows northeasterly through the Flightline ADP into Steilacoom Lake, outside the ROI (U.S. Geological Survey 2013). As of 2012, American Lake and a portion of Clover Creek are impaired waterbodies under the Clean Water Act §303(d), whereby the WDOE has data showing water quality standards have been violated for one or more pollutants and there is no Total Maximum Daily Load or pollution control plan. American Lake is impaired for total phosphorous, dieldrin, polychlorinated biphenyls, and 2,3,7,8-tetrachlorodibenzodioxin, and a small portion of Clover Creek within the ROI is impaired for fecal coliform bacteria (WDOE 2012).

Table 3-22. Surface Water Features on JBLM

Surface Water Name	Type	Size (approximate)
American Lake	Lake	1,092 acres
Sequelitchew Lake	Lake	82 acres
Hanner Marsh	Marsh	71 acres
Mackay Marsh	Marsh	40 acres
Murray Creek	Perennial stream	9 miles
Clover Creek	Perennial stream	4.5 miles

In addition to these major surface water features, approximately 140 acres of marshland and 16 acres of lakes are located within the ROI. Roughly 5 percent of the Main Cantonment is wetland and open water habitat (Herrera Environmental Consultants 2007). Most wetlands are found along creek and river drainage areas as noted in Section 3.4.1.2. Lacustrine and riverine 100-year floodplains (Zone A) occur immediately adjacent to the surface water features described in this section. Additionally, larger areas of Zone A and B (floodplains between the limits of the 100-year flood and 500-year flood) are associated with Clover Creek to both the east and west of McChord Airfield within the Flightline ADP. An area of Zone B floodplain associated with Lake Mondress northeast of McCall Hill is located within the Logistics Center ADP (FEMA undated (a), FEMA undated (b)).

Groundwater resources in the ROI are within the Vashon and Salmon Spring Aquifers. JBLM acquires its drinking water from groundwater reserves and springs within the installation. Groundwater is an excellent source of drinking water because of the natural filtration properties of the aquifers. In 2014, the McChord Field drinking water system, within the Flightline ADP, supplied more than 270 million gallons of drinking water to more than 5,000 consumers. Additionally, JBLM acquires drinking water from Sequelitchew Springs, and eight secondary drinking water source wells are located at various locations around the installation. Together, these groundwater resources produced more than 1.5 billion gallons of drinking water in 2014 (JBLM 2015d, 2015e).

3.17.1.2 Yakima Training Center

The YTC is a more arid environment than JBLM, and average precipitation for the YTC is 6 to 16 inches per year, mostly in the form of snow. The majority of precipitation occurs in late fall and early winter, similar to JBLM. Surface water features consist of drainage ditches, unnamed streams, and six lakes, totaling approximately 2 acres. No identified floodplains are located within the YTC, and the WDOE has not identified any impaired waterbodies (WDOE 2012). However, JBLM has identified storm water quality from erosion and sedimentation as an issue at YTC (U.S. Army 2014c). Specifically, six stormwater outfalls are identified in the Stormwater Pollution Prevention Plan (SWPP) that discharge to a small unregulated MS4 which establishes a significant nexus to impaired Yakima River waters. One additional outfall and the 15th Engineer BSA Quarry Pit have the potential to discharge to an irrigation canal that returns flow to the Yakima River. The main pollutants of concern at down-range industrial sites are total suspended solids and petroleum compounds resulting from land transportation vehicles (YTC 2015b).

3.17.2 Environmental Consequences

3.17.2.1 Alternative 1 – No Action

Under the No Action Alternative, the management of the Main Cantonments of JBLM and the YTC would be based on existing planning principles and development goals. Under the No Action Alternative, each project put forward for construction under existing development goals would require a separate NEPA review and appropriate site-specific review to identify project-specific impacts on water resources. Any and all appropriate local, state, and federal permits and processes will be obtained/completed prior to the implementation of projects. Additionally, any impacts that are identified during the project-specific review will likely require avoidance, minimization, and/or mitigation measures to address impacts on water resources. However, if the RPMP is not adopted, these measures to prevent significant impacts are not guaranteed. Furthermore, if the RPMP is not adopted, operational costs and efficiency would be substantially affected with regard to managing water resources within the ADP areas and streamlining the NEPA processes for future development.

3.17.2.2 Alternative 2 – Adoption of the RPMP

The RPMP includes potential projects within the ADP areas of JBLM and the YTC. Under Alternative 2, JBLM would implement and adopt the RPMP, and all projects would be implemented under the codes and regulating plan of the RPMP. Because these projects would be located within existing development footprints, they are unlikely to adversely affect water resources, including surface water, groundwater, and floodplains. All projects put forward for construction under the RPMP would undergo appropriate site-specific review to identify project-specific impacts on water resources. Any impacts that are identified during the project-specific review would require implementing avoidance, minimization, and/or mitigation measures to address impacts on water resources. Additionally, any and all appropriate local, state, and federal permits and processes would be obtained/completed prior to the implementation of projects.

The sustainability goals and planning principals of the RPMP would result in long-term, beneficial impacts on water resources. In 2011, JBLM was nominated by the Assistant Secretary of the Army as one of six pilot installations in the Army's Net Zero Installation Program for Water and Waste, and the RPMP sets a goal to achieve a secured net-zero water installation by 2020; JBLM has established similar goals for the YTC that consider the unique environment of the training center. The RPMP supports JBLM's net-zero water strategy by calling for nonpotable water reuse and water-efficient landscaping, including the selection of

native and drought-resistant plant species from the approved plant list in the Landscaping Guide. All landscaping at the YTC should be carefully planned to survive in the semi-arid landscape with no irrigation (U.S. Army 2014c).

Additionally, the RPMP outlines low impact development strategies to minimize stormwater runoff, including the incorporation of pervious surfaces in development plans and the containment of stormwater within car parks, landscaped medians, street trees, and greenspaces. A network of green space forming an interconnected park system serves as stormwater catchment and recharge areas for entire districts and generally includes existing surface water and floodplain areas. The RPMP Regulating Plan would further ensure floodplain management (U.S. Army 2014b).

The MS4 Permit for JBLM outlines the requirements for the discharge of stormwater to waters of the United States and to groundwater of the State of Washington from the installation. These requirements are designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, and to protect water quality in receiving waters. To comply with the MS4 permit, JBLM must implement a Stormwater Management Program to control the quality and quantity of stormwater discharges; detect, remove, and prohibit illicit connections and discharges into the MS4; conduct education and outreach programs to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts; and comply with public involvement activity requirements. For construction activities resulting in disturbance of greater than or equal to 5,000 square feet, JBLM is required to implement and enforce a program to reduce erosion and sedimentation which includes oversight and regulation, enforcement actions, BMPs, pre-construction site plan reviews, a construction site inspection plan, and staff training (JBLM 2014c).

Within the YTC ADP area, development under the RPMP would minimize disturbance of steep slopes. All development would include stormwater management systems to reduce the quantity and improve the quality of stormwater runoff (U.S. Army 2014b).

The Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) issued for EPA Region 10 on 21 July 2015, Permit Number WAR0500F governs stormwater discharge associated with major industrial activities at the YTC under Sectors J, P, and S of the Standard Industrial Classification. Co-located facilities that discharge stormwater associated with industrial activities as defined by 40 CFR 122.26 (b)(14)(i)-(ix) and (xi) are required to comply with the SWPP and all applicable monitoring requirements. The objectives of YTC's SWPP are to identify sources of pollution potentially affecting the quality of stormwater

discharges associated with industrial activity from the YTC; describe and ensure implementation of practices to minimize and control pollutants in stormwater discharges associated with industrial activity from the YTC; and to ensure compliance with the terms and conditions of the permit. The intention of the SWPPP is to document the design, selection, and installation of stormwater control measures for industrial facilities at the YTC. Several control measures and mitigation projects have been implemented on the YTC for pollution prevention and erosion control, including preventative maintenance and stewardship; spill prevention and emergency cleanup procedures; employee training; inspections and record keeping; and advanced BMPs such as stormwater retention/detention basins, wet ponds, vegetation swale, and oil/water separator inspections (YTC 2015b).

3.18 Summary of Environmental Impacts

Table 3-23 provides a summary of impacts by resource area for the No Action Alternative and the Proposed Action. Impacts identified by green text are those that are anticipated to be beneficial to the resource topic, and impacts identified by black text are those that are anticipated to be less than significant and adverse.

Table 3-23. Summary of Environmental Consequences for Alternatives

Resource	Alternative 1: No Action	Alternative 2: Adoption of the RPMP
Air Quality	<i>Beneficial impacts from reduced emissions as a result of a potential reduction in vehicle trips and additional vegetated and riparian areas.</i> Less than significant impacts from temporary construction emissions and additional building facilities.	Same as those for Alternative 1.
Airspace	<i>Beneficial impacts from the reduction and potential elimination of airspace encroachment, incompatible land uses, and increased efficiencies and safety measures.</i>	Same as those for Alternative 1.
Biological Resources	Less than significant impacts on vegetation, wildlife, and sensitive species as a result of construction-related ground disturbance and noise and construction of future facility footprints.	Same as those for Alternative 1.

Resource	Alternative 1: No Action	Alternative 2: Adoption of the RPMP
Cultural Resources	<i>Potential beneficial impacts from the use of form-based code and emphasis on historic districts, historic landscapes, historic buildings, and cultural resources for future development as well as beneficial impacts from historic preservation as a planning principle.</i> Less than significant impacts on cultural resources as a result of construction-related ground disturbance and road operation. Less than significant impacts as a result of facility demolition and construction. Section 106 process would be completed prior to construction.	Same as those for Alternative 1.
Energy	<i>Beneficial impacts on energy generation as a result of proposed renewable energy projects resulting in increased renewable energy generation and to energy security from greater energy generation on the installation. Beneficial impacts as a result of vehicle reductions and energy efficient facilities.</i>	Same as those for Alternative 1.
Geology and Soils	<i>Beneficial impacts on soils and soil productivity as a result of the naturalization of the floodplain and the planting of native vegetation.</i> Less than significant impacts on soils from ground disturbance. No impacts on geologic features.	Same as those for Alternative 1.
Land Use	<i>Beneficial impacts on land use as a result of increased connectivity, form-based code, land use compatibility, and increased land use efficiency resulting from compact in-fill development thereby preserving non-Cantonment training lands for core JBLM defense functions.</i>	Same as those for Alternative 1.
Noise	Less than significant impacts from noise during construction and potential, less than significant impacts from light rail and facility operations.	Same as those for Alternative 1.
Public Health and Safety	<i>Beneficial impacts from the promotion of a Family- and Solider-friendly community and from hazard protection.</i>	Same as those for Alternative 1.
Recreation Resources	No impacts.	<i>Beneficial impacts from unified recreational resources as a result of a single unified guiding document.</i>

Resource	Alternative 1: No Action	Alternative 2: Adoption of the RPMP
Socioeconomics and Environmental Justice	<i>Beneficial impacts on economic growth associated with the procurement of goods and services during construction and potentially operation.</i> Less than significant impacts on government and emergency services as a result of new development and businesses.	Same as those for Alternative 1.
Solid and Hazardous Waste and Pollution	<i>Beneficial impacts on human health and safety as a result of the identification, removal, and remediation of hazardous substances.</i> Less than significant impacts from the potential for petroleum leaks from construction equipment.	Same as those for Alternative 1.
Transportation and Traffic	<i>Beneficial impacts as a result of increased connectivity (roads and trails), transit options, and walkability, and therefore some local reduced congestion if improvements are implemented at the system level.</i> Less than significant impacts from construction-related road closures and delays. Less than significant impacts with mitigation owing to increased congestion based on potential future development and growth.	Same as those for Alternative 1.
Utilities	<i>Beneficial impacts as a result of the construction and operation of high-efficiency facilities.</i> Less than significant impacts on electrical utilities from additional requirements on existing systems and construction requirements.	Same as those for Alternative 1.
Visual Resources	Potential less than significant impacts as a result of ad hoc development.	<i>Beneficial impacts resulting from an integrated approach to future development that would be consistent with an overall visual style and character for each ADP and the installation as a whole.</i>
Water Resources	Less than significant impacts on surface, groundwater, and riparian areas as a result of construction and facility operation.	Same as those for Alternative 1.

4.0 CUMULATIVE IMPACTS METHODOLOGY

In addition to identifying the direct and indirect environmental impacts of their actions, the CEQ's NEPA regulations require federal agencies to address cumulative impacts related to their proposals. A cumulative impact is defined in the CEQ regulations (40 CFR §1508.7) as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." This section describes the process used to identify potential cumulative impacts related to the Proposed Action at JBLM and discusses those impacts for each of the resources addressed in Chapter 3.

4.1 Process for Identification of Cumulative Impacts

The CEQ has published guidance for assessing cumulative impacts in *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997). The process outlined by the CEQ includes identifying significant cumulative effects issues, establishing the relevant geographic and temporal (time frame) extent of the cumulative effects analysis, identifying other actions affecting the resources of concern, establishing the cause-and-effect relationship between the Proposed Action and the cumulative impacts, determining the magnitude and significance of the cumulative effects, and identifying ways in which the Proposed Action might be modified to avoid, minimize, or mitigate significant cumulative impacts.

Issues to be addressed in this cumulative impacts analysis were determined based on the identification of resources that would be affected by the alternatives under evaluation. These resources were identified based on the analysis of direct and indirect effects that have the potential to combine with other past, present, or reasonably foreseeable future actions to produce a larger impact. If the analysis demonstrated a resource would not be directly or indirectly affected, it was not included in the cumulative impacts analysis because the Proposed Action would not add to cumulative impacts.

The geographic extent of the cumulative impacts analysis generally coincides with the ROI of each resource. The CEQ regulations specify that cumulative impacts analyses encompass past, present, and reasonably foreseeable future actions. As a practical matter, the impacts of past actions are already reflected in the conditions that currently exist, as described in the affected environment in Chapter 3. Where appropriate and feasible, those sections note past activities

that may have cumulatively contributed to the current condition of the environment. Past, present, and reasonably foreseeable future actions considered in the analysis are identified here. In general, this EA considered present and reasonably foreseeable future actions as those that are under construction, are the subject of a plan or proposal, or have identified funding. Actions beyond that become increasingly speculative and difficult to assess.

4.2 Identified Past, Present, and Reasonably Foreseeable Future Actions

The following past, present, and reasonably foreseeable future actions were considered as part of this cumulative impacts analysis.

4.2.1 Past Actions

No past actions have been identified to cumulatively affect the Proposed Action.

4.2.2 Present and Reasonably Foreseeable Future Actions

The following action are ongoing or are considered reasonably foreseeable future actions.

Supplemental Programmatic Environmental Assessment for Army 2020 Force Structure Realignment

A Supplemental PEA was completed in 2014 that considered the environmental effects on installations that could result from the realignment of Army forces from FY 2013 through FY 2020 (USAEC 2014). The 2014 Supplemental PEA was prepared as a supplemental NEPA evaluation to the Army's 2013 PEA because of changes to the Purpose and Need described in the 2013 PEA. The Proposed Action was to conduct force reductions and force realignments to a size and configuration that was capable of meeting national security and defense objectives. Force reductions and realignments were analyzed at 30 installations, including JBLM. Potential population loss analyzed as a result of reductions and realignments at JBLM in the Supplemental PEA was 16,000, including approximately 14,459 permanent party Soldiers and 1,541 Army civilians. The majority of impacts at JBLM were considered negligible or minor; however, significant impacts were identified for socioeconomics, and beneficial impacts were identified for air quality, noise, biological resources, water resources, energy demand and generation, land use conflict and compatibility, and traffic and transportation.

I-5 and Mounts Road to Thorne Lane Corridor Improvements

This segment of I-5 experiences congestion and mobility problems due to high traffic volumes. This project will construct an additional lane on I-5 between the Thorne Lane and Steilacoom-DuPont Interchange; reconstruct the Thorne Lane, Berkeley Street, and Steilacoom-DuPont interchanges; construct a connector road between the Gravelly Lake Drive and Thorne Lane

interchanges to divert local traffic off of I-5; and construct a separated bike/pedestrian trail. When complete, this corridor will benefit from reduced congestion, enhanced freight mobility, and improved safety and support economic growth.

4.3 Cumulative Impacts to Resource Areas

4.3.1 Air Quality

Air quality would benefit from potential force reductions from the Army's 2020 Force Structure Realignment Supplemental Preliminary Environmental Assessment completed in 2014 (2014 Supplemental PEA). The I-5 and Mounts Road to Thorne Lane Corridor Improvements would have short-term, adverse impacts on air quality as a result of emissions from construction activities; however, reduced congestion would result in long-term, beneficial impacts on air quality. Therefore, cumulative impacts from the combination of past and present activities and the Proposed Action would be less than significant.

4.3.2 Airspace

Impacts on airspace from the potential force reductions from the 2014 Supplemental PEA would be negligible and less than significant. When combined with the beneficial impacts on airspace from the Proposed Action, overall cumulative impacts would be long term and less than significant.

4.3.3 Biological Resources

Cumulative impacts on biological resources under both Alternative 1 and Alternative 2, combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mount Road to Thorne Lane corridor improvements, would be less than significant. Construction activities at JBLM associated with the RPMP and the construction of new transportation infrastructure would have short-term impacts on biological resources but would not cause substantial degradation of biological resources such as vegetation communities, wetlands, fish and wildlife, and/or federally listed endangered or threatened species. Overall, the cumulative impacts on biological resources associated with the RPMP are likely to be less than significant because habitat would not be permanently converted or experience a net loss and a species' population would not be lost or impaired.

4.3.4 Cultural Resources

The Proposed Action is anticipated to have less than significant impacts on cultural resources. The 2014 Supplemental PEA did not call for the demolition of any historic structures and would

ensure that adequate staff will be maintained to manage cultural resources at JBLM. Other past, present, and reasonably foreseeable projects considered for this analysis would have less than significant impacts. Therefore, cumulative effects on cultural resources from the Proposed Action and the 2014 Supplemental PEA would be less than significant.

4.3.5 Energy

Impacts on energy as a result of the Proposed Action would be beneficial because of increased energy security, renewable energy generation, reduced vehicle use, and energy efficient facilities. When combined with the beneficial impacts of reduced energy consumption identified under the force reductions and realignments analyzed in the 2014 Supplemental PEA and of the I-5 and Mounts Road to Thorne Lane corridor improvements from reduced congestion, overall cumulative impacts on energy are anticipated to be beneficial.

4.3.6 Geology and Soils

Cumulative impacts on soils and geology under both Alternative 1 and Alternative 2 combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane corridor improvements would be less than significant.

Construction activities at JBLM associated with the RPMP and the construction of new transportation infrastructure would result in short-term impacts on soils but would not result in substantial degradation of soils, soil fertility, soil productivity, or geologic resources.

4.3.7 Land Use

Cumulative impacts on land use occurring under both Alternative 1 and Alternative 2, combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane Corridor improvements, would be long term and beneficial. The plan will concentrate growth in the Main Cantonments to preserve valuable range and training lands that surround JBLM. Lands developed under the RPMP would result in beneficial growth through planned development consistent with the goals and policies of the RPMP. Some beneficial cumulative land use impacts are likely to include compact development, job and housing proximity, efficient transportation, rangeland/airspace preservation, mixed-use, linear parks, multi-story buildings, car parks, neighborhood parks, identifiable neighborhood centers, large park blocks, historic preservation, and on-street parking.

4.3.8 Noise

The Proposed Action combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane corridor improvements would have less than significant, cumulative impacts from noise at the installation. While noise is expected to increase as a result of cumulative construction projects, it is not expected that these combined actions would result in noise levels that exceed the compatibility standards for noise zones at JBLM or would produce occupational noise levels that exceed 75 dB for an 8-hour day.

4.3.9 Recreation Resources

Cumulative impacts on recreation resources occurring under Alternative 1 and Alternative 2 combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane corridor improvements would be long term and beneficial. Implementation of the RPMP would provide more integrated recreation opportunities and tie together existing opportunities in a consistent approach throughout the installation. Combined with force reductions and realignment and I-5 corridor improvements, recreational resources are not expected to be cumulatively impacted.

4.3.10 Public Health and Safety

Cumulative impacts on public health and safety under Alternative 1 and Alternative 2 combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane corridor improvements would be long-term and beneficial. Actions associated with the RPMP, as described in the environmental consequences section, decreased JBLM population requiring public health and safety services, and the construction of new transportation infrastructure, including construction of a new bike and pedestrian trail, would result in long-term, beneficial impacts on public safety at the installation.

4.3.11 Socioeconomics and Environmental Justice

Impacts on socioeconomics under Alternative 1 and Alternative 2 when combined with the I-5 and Mounts Road to Thorne Lane corridor improvements would be cumulative and beneficial to the JBLM ROI as a result of increased construction spending during the construction periods of projects under Alternatives 1 and 2 the construction period of the I-5 corridor improvements. No other cumulative socioeconomic impacts associated with this project and Alternatives 1 and 2 would occur.

The force reductions and realignments analyzed in the 2014 Supplemental PEA are expected to have significant, adverse impacts on some schools on both the installation and the ROI. Impacts

to population are expected to be significant, while less than significant impacts are expected for housing, employment, income, sales and public services under this project. Because no impact from Alternatives 1 or 2 is anticipated to result in significant impacts to any socioeconomic resources, cumulative impacts from the combination of the Army 2020 Force Structure Realignment activities along with the impacts from the Alternatives 1 and 2 would likely result in beneficial impacts to sales, income, housing, public services and employment and significant impacts to schools and population. Therefore, cumulative impacts from the combination of present and future activities along with the impacts from Alternatives 1 and 2 would likely result in significant impacts to schools and population and less than significant impacts to other socioeconomic resources.

4.3.12 Solid and Hazardous Waste and Pollution

Cumulative impacts to Solid and Hazardous Waste and Pollution occurring under both Alternative 1 and Alternative 2, combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mount Road to Thorne Lane corridor improvements, would be less than significant. Construction activities at JBLM associated with the RPMP and the construction of new transportation infrastructure associated with the I-5 corridor improvements would result in less than significant impacts for solid waste, largely as a result of debris generated by the construction of new facilities and transportation infrastructure. Remediation of existing environmental contamination would continue, consistent with federal and state regulations and JBLM's IRP, and hazardous waste generated during the construction or operation of the new infrastructure would be subject to existing regulations that minimize the risk of harm to human health and the environment.

4.3.13 Transportation and Traffic

Impacts under Alternative 1 and Alternative 2 already include impacts associated with the I-5 and Mounts Road to Thorne Lane corridor improvements, as background transportation projects are typically included in traffic analyses. Cumulative impacts on transportation and traffic occurring under both Alternative 1 and Alternative 2 with force reductions and realignments realized in the 2014 Supplemental PEA would be long term and beneficial. The reduced forces and staffing at JBLM would mean a reduction in traffic on the installation and the surrounding area, and the reduced traffic volumes would mean overall operational improvements and less delays.

4.3.14 Utilities

Cumulative impacts on utilities occurring under both Alternative 1 and Alternative 2, combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane Corridor improvements, would be long term and beneficial. Utility systems are generally sufficient to meet existing and future demand, but select utility systems are deteriorating with age or are not equipped with upgraded technologies for better efficiency and are not adequate to meet future demand. The reduced forces and staffing at JBLM are likely to result in a beneficial, cumulative impacts by creating a reduction in the use of communications, electrical, wastewater, and non-potable water, steam utilities. Additionally, any updated utility technologies would likely have a beneficial, cumulative impact on utilities by increasing efficiency and helping to meet the future utility demands at JBLM.

4.3.15 Visual Resources

Cumulative impacts on visual resources occurring under Alternative 1 and Alternative 2 combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mounts Road to Thorne Lane corridor improvements would be long term and beneficial. Implementation of the RPMP would provide more integrated visual resources and aesthetics and tie together existing opportunities, in a consistent approach throughout the installation. Combined with force reductions and realignment and I-5 corridor improvements, visual resources are not expected to be cumulatively affected.

4.3.16 Water Resources

Cumulative impacts on water resources occurring under both Alternative 1 and Alternative 2, combined with force reductions and realignments analyzed in the 2014 Supplemental PEA and the I-5 and Mount Road to Thorne Lane corridor improvements, would be less than significant. Construction activities at JBLM associated with the RPMP and the construction of new transportation infrastructure associated with the I-5 corridor improvements would result in short-term impacts on surface water resources from sedimentation but would not result in degradation of surface or groundwater quality or the loss of floodplains. Over the long term, the cumulative impacts on biological resources associated with the RPMP would be less than significant because surface and groundwater resources are protected by existing federal, state, and Army regulations, and development would avoid floodplains and other hydrologically sensitive areas to the extent practicable.

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5.0 OTHER CONSIDERATIONS REQUIRED BY NEPA

5.1 Irreversible or Irrecoverable Commitment of Natural or Depletable Resources

NEPA requires an analysis of significant, irreversible effects resulting from implementation of a Proposed Action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources) are also irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for one project and thus become unavailable for other purposes. An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

Implementation of the Proposed Action would result in an irreversible commitment of fuel for construction vehicles and equipment and decommissioning and dismantling, human labor, and other resources. These commitments of resources are neither unusual nor unexpected, given the nature of the actions. The Proposed Action would not result in the destruction of environmental resources such that the range of potential uses of the environment would be limited, and it would not affect the biodiversity of the region.

5.2 Relationship between Local Short-Term Use of the Human Environment and Maintenance and Enhancement of Long-Term Natural Resource Productivity

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one option could reduce future flexibility to pursue other options, or that choosing a certain use could eliminate the possibility of other uses at the site.

Implementation of the Proposed Action would not result in any such environmental impacts because it would not pose long-term risks to health, safety, or the general welfare of the communities surrounding the project area that would significantly narrow the range of future beneficial uses. In addition, biological productivity would not be affected because

implementation of the Proposed Action would not result in cumulative impacts on any biological resources.

5.3 Means to Mitigate and/or Monitor adverse Environmental Impacts

This section presents a summary of potential mitigation measures, including implementing appropriate BMPs, that could reduce adverse environmental impacts from the alternatives analyzed in this EA. Standard requirements and BMPs that could be used include:

- All infrastructure development within the historic districts or involving historic structures would follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- New construction within the historic districts would be designed to be sympathetic with the historic character of the district.
- Standard BMPs that would be implemented during construction to reduce air quality effects include controlling dust (e.g., covering trucks, watering exposed soil in dry weather, and promptly seeding/covering exposed areas), limiting idling of equipment, encouraging contractors to use newer model construction equipment, and ensuring proper equipment maintenance.
- Potential BMPs for conservation of energy and water and for reduction of solid waste to reduce the utility requirements could include the following:
 - training in water conservation measures for domestic and construction use for staff and contractors
 - training on eligible materials for recycling municipal solid waste
 - providing adequate containers for recycling materials
 - mandatory incorporation of recycling requirements for construction demolition debris into all contracts for outside construction, renovation, and demolition contractors. These elements could be carried forward as development continues according to the RPMP.
- If identified, asbestos and lead-based paint would require implementation of abatement tasks to proceed with redevelopment activities.
- JBLM would adhere to applicable policies for the storage of petroleum products on the installation, including those resulting from project construction.

- Solid waste materials from demolition and construction generated by potential projects would require appropriate disposal and would be re-used as clean fill material where possible.
- Pesticide use would continue in landscaped areas at JBLM as needed and would be regulated and stored according to applicable policies and regulations.
- Developments would incorporate to the extent feasible low-impact design features to minimize the impacts to the environment.
- All developments that exceed 5,000 square feet would implement green infrastructure/low-impact development per the Energy Independence and Security Act of 2007 and Executive Order 13693.

5.4 Any Probably Adverse Environmental Effects That Cannot Be Avoided and Are Not Amenable to Mitigation

This EA has determined that the Proposed Action would not result in any significant immitigable impacts; therefore, there are no probable adverse environmental effects that cannot be avoided or are not amenable to mitigation.

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6.0 CONCLUSION

Based on the analysis performed in this EA, implementation of the Proposed Action, in general, would have less than significant direct, indirect, and cumulative effects on the quality of the natural or human environment. A detailed impact analysis would be conducted as part of future tiered NEPA reviews as further details are developed.

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8.0 ACRONYMS AND ABBREVIATIONS

22nd STS	22nd Special Tactics Squadron
ADP	Area Development Plan or Area Development Planning
AICUZ	Air Installation Compatible Use Zone
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQI	Air Quality Index
Army	U.S. Department of the Army
BMP	best management practice
CAB	Combat Aviation Brigade
CDC	Child Development Center
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
dB	decibel
DNL	day-night sound level
DoD	Department of Defense
EA	Environmental Assessment
EO	Executive Order
EPAct 2005	Energy Policy Act of 2005
EPCRA	Emergency Planning and Community Right to Know Act
FAA	Federal Aviation Administration
FNSI	Finding of No Significant Impact
FY	fiscal year

GAAF	Gray Army Airfield
GHG	greenhouse gas
gpm	gallons per minute
HQ	Headquarters
I	Interstate
IAP	Installation Action Plan
IDG	Installation Design Guide
IDP	Installation Development Plan
installation	Joint Base Lewis-McChord
IONMP	Installation Operational Noise Management Plan
IPS	Installation Planning Standards
IRP	Installation Restoration Program
JBLM	Joint Base Lewis-McChord
kV	kilovolt
LOS	Level of Service
µg/m ³	micrograms per cubic meter
MFH	Military Family Housing
MGD	million gallons per day
MSL	mean sea level
MVA	megavolt amps
MW	megawatts
MWR	Family Morale, Welfare, and Recreation
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NOA	Notice of Availability
NO ₂	nitrogen dioxide
NO _x	nitrogen oxide

NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NZ	Noise Zone
ORTC	Operational Readiness Training Center
PEA	Programmatic Environmental Assessment
PHS	Priority Habitats and Species
PM	particulate matter
POV	personally owned vehicles
ppm	parts per million
PT	physical training
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RPMP	Real Property Master Plan
SOF	Special Operations Forces
SO ₂	sulfur dioxide
SR	State Route
SUA	special use airspace
TRB	Transportation Research Board
TSCA	Toxic Substances Control Act
UFC	Unified Facilities Criteria
U.S.	United States
U.S. Army	U.S. Department of the Army
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington State Department of Ecology

WDOT	Washington State Department of Transportation
WTU	Warrior Transition Unit
WWTP	wastewater treatment plant
YTC	Yakima Training Center

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Appendix A: Projects Associated with the Capital Investment Strategy at Joint Base Lewis-McChord

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Table A-1. Projects Associated with the Capital Investment Strategy

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
American Lake	Greenwood Elementary School	36,000 SF (per floor) – 2 floors
American Lake	Beachwood School	41,000 SF (per floor) – 2 floors
American Lake	Community Park Blocks	N/A
American Lake	Lakeside Trail	N/A
American Lake	Neighborhood Park	N/A
American Lake	Community Park	N/A
American Lake	Beachwood Central Housing	312 Units
American Lake	Beachwood South Housing	740 Units
American Lake	Growth Facility	16,000 SF (per floor) – 1-3 floors
American Lake	Noncommissioned Officers Academy	49,000 SF (per floor) – 1-3 floors
Carter Lake	Carter Lake Elementary School	41,000 SF (per floor) – 2-4 floors
Carter Lake	Exchange Corner Store	9,000 SF (per floor) – 1-2 floors
Carter Lake	Park and Ride	N/A
Carter Lake	Park and Ride Bus Terminal	2,500 SF
Carter Lake	Community Fitness Park	N/A
Carter Lake	Housing Development	893 Units
Carter Lake	Community Center	10,000 SF (per floor) – 1-2 floors
Carter Lake	Gazebo	1,900 SF
East Division	Barracks	190,000 SF (per floor) – 3-5 floors, 20 buildings
East Division	Battalion HQ	66,000 SF (per floor) – 2-4 floors, 4 buildings
East Division	Embedded Behavioral Health Facility	8,000 SF (per floor) – 1-2 floors
East Division	Dining Facility	26,000 SF
East Division	Brigade HQ	25,000 SF (per floor) – 1-2 floors
East Division	Company Operations	180,000 SF (per floor) – 1-2 floors, 5 buildings
East Division	Tactical Equipment Maintenance Facility	68,000 SF (per floor) – 1-2 floors, 4 buildings
East Division	Company Operations	51,000 SF (per floor) – 1-2 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
East Division	Tactical Equipment Maintenance Facility Operations	45,000 SF (per floor) – 1-2 floors
East Division	Organizational Storage	24,000 SF (per floor) – 1-2 floors, 3 buildings
East Division	Tactical Equipment Maintenance Facility	32,000 SF (per floor) – 1-2 floors, 4 buildings
East Division	Barracks	79,000 SF (per floor) – 3-5 floors, 8 buildings
East Division	Battalion HQ	33,000 SF (per floor) – 2-4 floors, 4 buildings
East Division	Brigade HQ	26,000 SF (per floor) – 2-3 floors
East Division	Company Operations	70,000 SF (per floor) – 1-2 floors, 2 buildings
East Division	General Infill	17,000 SF (per floor) – 1-2 floors
East Division	SSA Facility	17,000 SF (per floor) – 1-2 floors, 2 buildings
East Division	Barracks	21,000 SF (per floor) – 1-2 floors
East Division	Dog Kennel	7,700 SF (per floor) – 1-2 floors
East Division	Company Operations	51,000 SF (per floor) – 1-2 floors
Flightline	Central Deployment Complex	44,000 SF (per floor) – 1-3 floors
Flightline	ADAL Engine Module Replacement	15,000 SF (per floor) – 1-3 floors
Flightline	Flares Storage	1,800 SF
Flightline	Fire Station	21,000 SF (per floor) – 1-3 floors
Flightline	22 Special Tactics Squadron Campus	86,000 SF (per floor) – 1-3 floors, 7 buildings
Flightline	New Aerial Port Building	140,000 SF (per floor) – 1-3 floors
Flightline	Notional Mixed-Use Flightline Support Facilities	160,000 SF (per floor) – 2-5 floors, 13 buildings
Flightline	Notional Reserve Support Facilities	34,000 SF (per floor) – 1-3 floors, 2 buildings
Flightline	Notional Administrative Facilities	64,000 SF (per floor) – 2-4 floors, 5 buildings

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Flightline	Notional Expansion Facilities	95,000 SF (per floor) – 1-4 floors, 10 buildings
Flightline	Hangar/Office	130,000 SF (per floor) – 1-3 floors
Flightline	Hangar	35,000 SF
Flightline	Hangar	20,000 SF
Flightline	Future Infill Ramp Parking	N/A
Flightline	Future Infill Ramp Parking	N/A
Flightline	Assault Strip Expansion	N/A
Flightline	Squadron Admin	24,000 SF (per floor) – 1-3 floors
Flightline	Explosive Ordinance Disposal Relocation	15,000 SF (per floor) – 2-4 floors
Flightline	Petroleum, Oils, and Lubricants Building	32,000 SF (per floor) – 1-3 floors
Gray Army Airfield	Hangar	100,000 SF
Gray Army Airfield	Hangar	200,000 SF
Gray Army Airfield	Growth Facility	2,800 SF (per floor) – 2-4 floors
Gray Army Airfield	Rapid Support Unit	2,800 SF (per floor) – 2-4 floors
Gray Army Airfield	Army & Air Force Exchange Service	6,200 SF (per floor) – 2-4 floors
Gray Army Airfield	Soldier Training Center	18,000 SF (per floor) – 2-4 floors
Gray Army Airfield	Parking Apron	N/A
Gray Army Airfield	Training Facility	2,800 SF (per floor) – 2-4 floors
Gray Army Airfield	Test Engine Facility	2,800 SF (per floor) – 1-2 floors
Gray Army Airfield	Growth Facility	8,000 SF (per floor) – 2-4 floors
Gray Army Airfield	Rigger Facility	3,800 SF (per floor) – 1-2 floors
Gray Army Airfield	Battalion HQ	11,500 SF (per floor) – 2-4 floors
Gray Army Airfield	Consolidated Operations Facility	20,000 SF (per floor) – 2-4 floors
Gray Army Airfield	Hangar	130,000 SF (per floor) – 1-2 floors
Gray Army Airfield	Rapid Support Unit	3,700 SF (per floor) – 2-4 floors
Gray Army Airfield	Loading Facility	15,000 SF (per floor) – 1-2 floors
Gray Army Airfield	Fire Station	28,000 SF (per floor) – 2-4 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Gray Army Airfield	Regional Flight Center Hangar	20,000 SF (per floor) – 2-4 floors
Gray Army Airfield	Growth Facility	12,000 SF (per floor) – 2-4 floors
Gray Army Airfield	Flight Control Tower	6,900 SF (per floor) – 2-4 floors
Gray Army Airfield	Logistics Support Facility	2,500 SF (per floor) – 2-4 floors
Gray Army Airfield	New Taxiway Apron and Approach	N/A
Gray Army Airfield	Storage Facilities	19,000 SF, 4 buildings
Greene Park	WWII Museum	12,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	16,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	14,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	17,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	22,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	13,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	14,000 SF (per floor) – 2-4 floors
Greene Park	Growth Facility	18,000 SF (per floor) – 2-4 floors
Greene Park	Medical Simulation Training Center	10,000 SF (per floor) – 2-4 floors
Hillside	Southside Housing	638 Units
Hillside	Southside Greenlink with Trails	N/A
Hillside	Southside Neighborhood Park	N/A
Hillside	Westside Housing	818 Units
Hillside	Westside Greenlink with Trails	N/A
Hillside	Westside Neighborhood Park	N/A
Hillside	Eastside Park Blocks	N/A
Hillside	Eastside Housing	388 Units
Hillside	Central Park	N/A
Hillside	Northside Park Blocks	N/A
Hillside	Northside Neighborhood Blocks	N/A
Hillside	Entry Parkway	N/A

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Hillside	Evergreen Elementary School	40,000 SF (per floor) – 1-2 floors
Hillside	Hillside Elementary School	40,000 SF (per floor) – 2 floors
Hillside	Express Store	4,800 SF
Historic Downtown	Exchange Expansion	100,000 SF
Historic Downtown	Freedom Crossing	190,000 SF, 12 buildings
Historic Downtown	Fitness Center	64,000 SF (per floor) – 1-4 floors
Historic Downtown	Welcome Center/Transient Barracks	61,000 SF (per floor) – 1-3 floors
Historic Downtown	Child Development Center	7,000 SF (per floor) – 2-4 floors
Historic Downtown	HQ Building	31,000 SF (per floor) – 2-4 floors
Historic Downtown	Clarkmoor Elementary School	32,000 SF (per floor) – 2-4 floors
Historic Downtown	Infill Development	28,000 SF (per floor) – 1-3 floors
Historic Downtown	Housing	281 Units
Historic Downtown	Regional Correction Facility	100,000 SF (per floor) – 2-4 floors
Historic Downtown	Shoppette	5,200 SF
Historic Downtown	Growth Facility	400,000 SF (per floor) – 2-4 floors, 26 buildings
Historic Downtown	Army & Air Force Exchange Service Duals Foods	8,000 SF (per floor) – 2-4 floors
Historic Downtown	Carwash	3,400 SF
Historic Downtown	Firestone	7,900 SF
Historic Downtown	Commissary	110,000 SF
Historic Downtown	Access Control Point Improvements	N/A
Historic Downtown	Middle School	42,000 SF (per floor) – 2 floors
Historic Downtown	Mission Training Centers Expansion	82,000 SF (per floor) – 2 floors
Historic Downtown	Range Warehouse/Admin	40,000 SF (per floor) – 2-4 floors
Historic Downtown	Soldier Training Campus	50,000 SF (per floor) – 2-4 floors
Historic Downtown	Tactical Support Center Warehouse	75,000 SF
Jackson	Brigade Headquarters	16,000 SF (per floor) – 2-3 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Jackson	Administration	6,500 SF (per floor) – 2-3 floors
Jackson	Company Operation Facility	22,000 SF (per floor) – 2-3 floors, 2 buildings
Jackson	Growth Administrative Facility	16,000 SF (per floor) – 2-3 floors
Jackson	Growth Administrative Facility	10,000 SF (per floor) – 2-3 floors
Jackson	SIGINT facility	15,000 SF (per floor) – 2-3 floors
Jackson	Growth Barracks	10,000 SF (per floor) – 2-4 floors
Jackson	Tactical Equipment Maintenance Facility	18,000 SF (per floor) – 2-3 floors
Jackson	Company Operation Facility	68,000 SF (per floor) – 2-3 floors, 3 buildings
Jackson	Battalion Headquarters	9,000 SF (per floor) – 2-3 floors
Jackson	Brigade Headquarters	20,000 SF (per floor) – 2-3 floors
Lewis North	Covered Maintenance Area	180,000 SF (per floor) – 2-4 floors, 4 buildings
Lewis North	Organizational Readiness Training Center Barracks	160,000 SF (per floor) – 2-4 floors, 10 buildings
Lewis North	Organizational Readiness Training Center Dining Facilities	52,000 SF, 3 buildings
Lewis North	Organizational Readiness Training Center /Admin	69,000 SF (per floor) – 3-5floors
Lewis North	Tactical Equipment Maintenance Facility	69,000 SF (per floor) – 2-4 floors
Lewis North	Brigade Expansion	27,000 SF (per floor) – 3-5 floors, 3 buildings
Lewis North	Company Operations Warehouse	61,000 SF (per floor) – 2-4 floors
Lewis North	Growth Barracks	260,000 SF (per floor) – 2-4 floors, 10 buildings
Lewis North	Growth Battalion HQ	29,000 SF (per floor) – 3-5 floors, 3 buildings
Lewis North	Growth Tactical Equipment Maintenance Facility	62,000 SF (per floor) – 2-4 floors, 3 buildings
Lewis North	TS Warehouse	17,000 SF
Lewis North	Growth Admin	15,000 SF (per floor) – 3-5 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Lewis North	Education/Library	36,000 SF (per floor) – 3-5 floors
Lewis North	Fitness Center	72,000 SF
Lewis North	Chapel	20,000 SF (per floor) – 3-5 floors
Lewis North	Growth Facility	110,000 SF (per floor) – 2-4 floors, 9 buildings
Lewis North	Growth Facility	190,000 SF (per floor) – 2-4 floors, 12 buildings
Lewis North	Lighthouse for the Blind	8,900 SF (per floor) – 2-4 floors
Lewis North	Growth Comp Operations	390,000 SF (per floor) – 2-4 floors, 7 buildings
Lewis North	Battalion HQ	58,000 SF (per floor) – 2-4 floors, 3 buildings
Lewis North	Relocated Gate	5,500 SF (per floor) – 1-2 floors
Lewis North	Washrack Expansion	N/A
Lewis North	Army & Air Force Exchange Service /Dual Food Troop Store	19,000 SF (per floor) – 2-4 floors
Lewis North	Soldier Training Campus, and Simulation Facilities	N/A
Lewis-McChord Link	Dog Park	N/A
Lewis-McChord Link	Regional Sports Complex	N/A
Lewis-McChord Link	Recreation Trails	N/A
Lewis-McChord Link	Bus Terminal	2,000 SF
Lewis-McChord Link	Picnic Area	N/A
Lewis-McChord Link	Amphitheater	N/A
Lewis-McChord Link	Joint Base Connector Road	N/A
Lewis-McChord Link	Cross Base Highway	N/A
Lewis-McChord Link	Conference Center	N/A
Lewis-McChord Link	National Campus	64,000 SF (per floor) – 2-3 floors, 4 buildings
Lewis-McChord Link	National Campus	39,000 SF (per floor) – 2-3 floors, 4 buildings
Logistics Center	Washington Army National Guard – Combined Support Maintenance Shop	100,000 SF (per floor) – 1-3 floors
Logistics Center	Regional Logistics Support Tactical Equipment Maintenance Facility	60,000 SF (per floor) – 1-3 floors
Logistics Center	Regional Logistics Support Warehouse	64,000 SF (per floor) – 1-3 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Logistics Center	Regional Logistics Support Tactical Equipment Maintenance Facility	60,000 SF (per floor) – 1-3 floors
Logistics Center	Growth Admin	27,000 SF (per floor) – 1-3 floors
Logistics Center	Growth Training Facility	27,000 SF (per floor) – 1-3 floors
Logistics Center	Biomass Plant	4,000 SF
Logistics Center	Directorate of Logistics Maintenance	470,000 SF (per floor) – 1-3 floors
Logistics Center	Directorate of Logistics Maintenance	320,000 SF (per floor) – 1-3 floors
Logistics Center	Rigger Facility	13,000 SF (per floor) – 1-3 floors
Logistics Center	Defense Reutilization and Marketing Office Admin	74,000 SF (per floor) – 1-3 floors
Logistics Center	Army & Air Force Exchange Service Express	16,000 SF (per floor) – 1-3 floors
Logistics Center	Hazmat Express	10,000 SF (per floor) – 1-3 floors
Logistics Center	Access Control Point	N/A
Logistics Center	Cross Base Highway	N/A
Logistics Center	Reserve Center	63,000 SF (per floor) – 1-3 floors
Madigan	Access Control Point	N/A
Madigan	Fisher House	2,900 SF (per floor) – 2-4 floors
Madigan	IDES Facility	9,700 SF (per floor) – 2-4 floors
Madigan	Center for the Intrepid	12,000 SF (per floor) – 2-4 floors
Madigan	OPMED Behavioral Health	13,000 SF (per floor) – 2-4 floors
Madigan	Maternal Infant Pavilion	51,000 SF (per floor) – 2-4 floors
Madigan	Parking Garage	58,200 SF (per floor) – 2-4 floors
Madigan	New Fitness Center	69,000 SF (per floor) – 2-3 floors
Madigan	Growth Facility	8,400 SF (per floor) – 2-3 floors
Madigan	Growth Facility	17,000 SF (per floor) – 2-4 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Madigan	Preventive Maintenance	13,000 SF (per floor) – 2-3 floors
McChord Center	Autocraft/Arts & Crafts	45,000 SF (per floor) – 1-3 floors
McChord Center	Industrial Expansion	80,000 SF (per floor) – 1-3 floors
McChord Center	Family and Moral, Welfare and Recreation/Mixed-Use	36,000 SF (per floor) – 2-4 floors
McChord Center	Airmen Zone	50,000 SF (per floor) – 2-4 floors
McChord Center	Logistics Readiness Squadron	33,000 SF (per floor) – 1-3 floors
McChord Center	Precision Measurement Equipment Laboratory Facility	11,000 SF
McChord Center	Biomass Plant	5,600 SF (per floor) – 1-3 floors
McChord Center	Fitness Center	32,000 SF (per floor) – 2-4 floors
McChord Center	Airman and Family Readiness	5,500 SF (per floor) – 2-4 floors
McChord Center	Chapel Center	16,000 SF (per floor) – 2-4 floors
McChord Center	Growth Mixed-Use Facility	50,000 SF (per floor) – 3-5 floors, 3 buildings
McChord Center	Mixed-Use Retail	25,000 SF (per floor) – 3-5 floors
McChord Center	Museum	4,400 SF (per floor) – 2-4 floors
McChord Center	Dental Clinic Expansion	36,000 SF (per floor) – 3-5 floors
McChord Center	Exchange Addition	78,000 SF (per floor) – 2-4 floors
McChord Center	Civil Engineering Compound	100,00 SF (per floor) – 2-4 floors
McChord Center	Civil Engineering Compound	29,000 SF (per floor) – 2-5 floors
McChord Center	Child Development Center	6,400 SF (per floor) – 3-5 floors
McChord Center	Washington Army National Guard Predatory Operations	20,000 SF (per floor) – 1-3 floors
McChord Center	COMM Squadron Facility	12,000 SF (per floor) – 1-3 floors
McChord Center	Notional Development	582,600 SF (per floor) – 2-3 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
McChord Center	Notional Administration	930,300 SF (per floor) – 2-4 floors, 40 buildings
McChord Center	Harborstone Credit Union	4,600 SF (per floor) – 1-2 floors
Miller Hill	Extra Large Brigade HQ	29,000 SF (per floor) – 2-4 floors
Miller Hill	Medium Battalion HQ	10,000 SF (per floor) – 2-4 floors, 2 buildings
Miller Hill	Extra Small Brigade HQ	21,000 SF (per floor) – 2-4 floors, 2 buildings
Miller Hill	Large Battalion HQ	11,000 SF (per floor) – 2-4 floors
Miller Hill	6th Military Police Group Detachment HQ	15,000 SF (per floor) – 2-4 floors
Miller Hill	Military Police Station	9,000 SF (per floor) – 2-4 floors
Miller Hill	Growth Facility	24,000 SF (per floor) – 2-4 floors
Miller Hill	Medium Tactical Equipment Maintenance Facility	51,000 SF (per floor) – 2-4 floors, 2 buildings
Miller Hill	Growth Facility	17,000 SF (per floor) – 2-4 floors
Miller Hill	Military Personnel Battalion Motorpool	N/A
Miller Hill	Military Personnel Battalion Motorpool	N/A
Miller Hill	Company Operations facility	62,000 SF (per floor) – 2-4 floors, 6 buildings
Miller Hill	Unaccompanied Enlisted Personnel Housing	72,000 SF (per floor) – 2-4 floors, 10 buildings
Miller Hill	Rapid Support Unit Facility	4,000 SF
Miller Hill	Navy Exchange Complex	52,000 SF (per floor) – 2-4 floors, 3 buildings
Miller Hill	Growth Facility	9,600 SF (per floor) – 2-4 floors
Miller Hill	Physical Training/Recreation Trails	N/A
Old Madigan	Data Center	1,600 SF (per floor) – 2-3 floors
Old Madigan	Headquarters	23,000 SF (per floor) – 3-4 floors
Old Madigan	CRFT/ Tactical Human Optimization, Rapid Rehabilitation and Reconditioning	29,000 SF (per floor) – 1-3 floors
Old Madigan	Dining Facility	18,000 SF (per floor) – 1-3 floors
Old Madigan	Community Center	8,500 SF (per floor) – 1-3 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Old Madigan	Barracks	35,000 SF (per floor) – 3-4 floors, 2 buildings
Old Madigan	Growth Facilities	43,000 SF (per floor) – 3-4 floors, 5 buildings
Old Madigan	Battalion Operations Facility	120,000 SF (per floor) – 1-2 floors, 3 buildings
Old Madigan	Battalion TEMPF	13,000 SF, 3 buildings
Old Madigan	Organizational Parking	N/A
Old Madigan	Tactical Unmanned Aerial Vehicle	9,000 SF (per floor) – 1-3 floors
Old Madigan	Consolidated Operations Facility	24,000 SF (per floor) – 2-3 floors
Old Madigan	Consolidated Operations Facility	26,000 SF (per floor) – 1-3 floors
Old Madigan	Military Working Dog Kennel	9,300 SF
Old Madigan	Veterinary Center	12,000 SF (per floor) – 2-3 floors
Old Madigan	Neighborhood Park	N/A
Old Madigan	Community Center	7,100 SF (per floor) – 2-4 floors
Old Madigan	Old Madigan Housing	868 Units
Old Madigan	Firestation	3,800 SF (per floor) – 2-3 floors
First Brigade	Company Operations Facility Expansion	7,500 SF (per floor) – 1-2 floors
First Brigade	Fitness Center Expansion	30,000 SF (per floor) – 1-2 floors
First Brigade	Brigade HQ	27,000 SF (per floor) – 2-4 floors
First Brigade	Battalion HQ	9,600 SF (per floor) – 2-4 floors
First Brigade	Company Operations Facility	38,000 SF (per floor) – 2-4 floors
First Brigade	Barracks	24,000 SF (per floor) – 2-4 floors
First Brigade	Barracks	19,000 SF (per floor) – 2-4 floors
First Brigade	Barracks	7,500 SF (per floor) – 2-4 floors
First Brigade	Dining Facility	15,000 SF (per floor) – 2-4 floors
First Brigade	Army & Air Force Exchange Service Facility	7,300 SF (per floor) – 1-2 floors

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
First Brigade	Tactical Equipment Maintenance Facility (Small)	9,200 SF (per floor) – 2-4 floors
First Brigade	Tactical Equipment Maintenance Facility	17,000 SF (per floor) – 1-3 floors
First Brigade	Consolidated Brigade/Battalion	37,000 SF (per floor) – 2-4 floors
First Brigade	Unaccompanied Personnel Housing – Personnel Housing	9,600 SF (per floor) – 2-4 floors
First Brigade	Growth Facility	18,000 SF (per floor) – 2-4 floors
First Brigade	Growth Facility	24,000 SF (per floor) – 2-4 floors
First Brigade	Weather Squadron Facility	7,900 SF (per floor) – 1-4 floors
First Brigade	Growth Company Operations Facility	49,000 SF (per floor) – 1-3 floors
First Brigade	Physical Training Trail	N/A
First Brigade	Growth Admin Facility	9,600 SF (per floor) – 2-4 floors
Yakima Training Center	2-Bay Hangar	15,000 SF
Yakima Training Center	United States Army Artillery Detachment Company Operations Facility	6,000 SF (per floor) – 1-3 floors
Yakima Training Center	Fire Station/Department of Emergency Services	6,000 SF (per floor) – 1-3 floors
Yakima Training Center	Indoor Training Tank (Pool)	9,500 SF (per floor) – 1-3 floors
Yakima Training Center	Expanded Fitness Center	22,000 SF (per floor) – 1-3 floors
Yakima Training Center	Explosive Ordinance Disposal Consolidated Operations Facility	19,000 SF (per floor) – 1-4 floors
Yakima Training Center	Garrison HQ/Consolidated Support Center	16,000 SF (per floor) – 1-4 floors
Yakima Training Center	Gas Station	N/A
Yakima Training Center	Standard Brigade HQ	10,238 SF (per floor) – 1-3 floors
Yakima Training Center	Army & Air Force Exchange Service /Exchange	6,800 SF (per floor) – 1-2 floors
Yakima Training Center	Lodge	8,700 SF
Yakima Training Center	Relocated Main Gain	N/A
Yakima Training Center	Standard Battalion HQ	28,300 SF, 4 buildings
Yakima Training Center	Standard Officer Quarters	90,316 SF (per floor) – 4 floors, 2 buildings

Area Development Planning District	Proposed Project	Project Size (square footage (SF) or units as noted)
Yakima Training Center	Standard Enlisted Quarters	30,558 SF (per floor) – 4 floors, 2 buildings
Yakima Training Center	Standard Large Dining Facility	41,974 SF
Yakima Training Center	Standard Company Operations Facilities	78,316 SF
Yakima Training Center	Standard Tactical Equipment Maintenance Facility	40,128 SF
Yakima Training Center	Standard Motor Pool	N/A
Yakima Training Center	Garrison Administrative Building	17,000 SF (per floor) – 1-4 floors
Yakima Training Center	Community Center Annex	5,300 SF (per floor) – 2-3 floors
Yakima Training Center	Town Center	N/A

Note: Projects listed above are known requirements at JBLM, however, additional projects could occur as mission requirements and needs evolve.

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