FORT LEWIS
INSTALLATION DESIGN GUIDE

October 2007

FOREWORD
IDG AND MILCON TRANSFORMATION INSTALLATION SPECIFIC REQUIREMENTS

F.1 INTRODUCTION

The Installation Design Guide brings together design standards and installation-specific requirements for project development. This foreword includes design principles developed by the installation community as part of the 2007-2008 revised master plan and specific system requirements to guide the development of construction projects (contract betterments by building type and chapter 6 – Project Specific Requirements template for Fort Lewis as part of the standard MILCON Transformation RFP.) Where information in the design guide and this foreword conflict, the foreword shall govern.

F.2 FORT LEWIS PLANNING VISION / GOALS

In August 2007, the Urban Collaborative, LLC through a contract with the Seattle District, US Army Corps of Engineers, facilitated the creation of a planning vision and goals for Fort Lewis that will guide all future development.

The Fort Lewis Planning Vision is:

In support of the mission, our soldiers and families, we will create a sustainable community of walkable neighborhoods with identifiable town centers connected by great streets.

The following goals support the planning vision:

1. Enhance Mission Capabilities

2. Sustainable Community

3. Walkable Neighborhoods

4. Identifiable Town Centers

5. Great Streets

F.3 DESIGN PRINCIPLES

These design principles are guidelines that define design elements to ensure that Fort Lewis planning goals and vision are achieved. Weigh all design elements against these principles to ensure that they are followed and that none are violated. If a design decision is required, utilize these principles to create a decision matrix that facilitates the design direction decision.

F.3.1 MULTI-WAY BOULEVARD: The multi-way boulevard provides unimpeded public transit, lanes for thru traffic, and side access lanes for local traffic, bicyclists, and on-street parking. Landscaped medians separate the lanes and provide places for closely-spaced street trees, storm water recharge, and dedicated turning lanes.

This principle supports the Design Goals Sustainable Communities, Walkable Neighborhoods, and Great Streets

Figure 1
Multi-Way Blvd

F.3.2 MAIN STREET: Main streets create a pleasant community connector with multi-story buildings, storefront windows, wide sidewalks, and street trees.

This principle supports the Design Goals Walkable Neighborhoods, Identifiable Town Centers, and Great Street

Figure 2
Main Street

F3.3 PUBLIC TRANSIT: Public transit enables sustainable communities by reducing traffic, decreasing emissions, and providing opportunities for soldiers and families to easily and efficiently commute within the installation. Public transit can also connect Ft. Lewis to the surrounding community.

This principle supports the Design Goals Sustainable Communities.

Figure 3
Public Transit

F3.4 STREET CAFES: Encourage local street cafes in each neighborhood. Make them intimate places with several rooms, open to a busy path where people can sit with a drink and watch the world go by. Build the front of the café so that a set of tables stretch out of the café into the street.

This principle supports the Design Goals Great Streets.

Figure 4
Street Cafes

F3.5 REGIONAL CHARACTER: Regional Character means architecturally compatible buildings that help create a unique and unified environment. Compatible buildings share similar materials, style, shape and color while varying, using contrast and accents to ensure there is no monotony. Regional and local resources should be studied in evaluating existing themes. Use natural materials that are native to the region. Colors and textures shall be warm in hue and also be reflective of the region. Architectural details shall clearly convey the military hierarchy, with higher headquarters buildings being more finely detailed with richer materials to clearly convey their prominence. Details and type of construction should be characteristics of the area.

This principle supports the Design Goals Identifiable Town Centers.

Figure 6
Regional Character

F3.6 ON-STREET PARKING: On-street parking plays a crucial role in benefiting activity centers. On-street parking is more convenient, uses less space, slows traffic down so it's safer for pedestrians, and helps to create an atmosphere that encourages more walking, biking and use of public transportation, making for a healthier, busier downtown.

This principle supports the Design Goals Great Streets.

Figure 5
On-Street Parking

F3.7 ALIGNED ENTRIES: Whenever possible, align entries to buildings to create a clear geometry. This will help with wayfinding, reduce pedestrian travel time and aid with the goal of defining entries.

This principle supports the Design Goals Great Streets and Walkable Neighborhoods.

Figure 7
Aligned Entries

F3.8 BULB-OUTS: Bulb outs are a traffic calming measure, intended to slow the speed of traffic and increase driver awareness. They also allow pedestrians and vehicle drivers to see each other when vehicles parked in a parking lane would otherwise block visibility. Recommend siting at pedestrian crossings where the effect of the narrowed roadway shortens the exposed distance pedestrians must walk.

This principle supports the Design Goals Great Streets and Walkable Neighborhoods.

Figure 8
Bulb Outs

F3.9 PARKWAYS: Incorporating two sidewalks and the roadway, separated from each other by rows of trees, parkways have many variations of design. More than a wide street that moves cars from place to place, parkways can become a destination of their own, as a landscaped place for the eye to rest, a retail, business or residential address, or a comfortable place to walk.

This principle supports the Design Goals Great Streets and Sustainable Communities.

Figure 9
Parkways

F3.10 PLANTING STRIPS: Planting strips create a buffer between the pedestrian and vehicles, creating a safer, less noisy and healthier walk. In addition, they reduce storm water run-off and can be used to emphasize key signs and signals to traffic. When planning new streets, standard planting strips should ideally be 8 feet wide, and a minimum of 6 feet wide. Planting strip widths of 4-5 feet are acceptable in very constrained conditions. Maintain local clear vision areas - usually an area between 36" and 96" - near driveways and intersections.

This principle supports the Design Goals Sustainable Communities and Walkable Neighborhoods.

Figure 10
Planting Strips

F3.11 SHOP FRONTS: 80% of the front exterior finish on a retail / community building should be glazed windows, in an effort to attract pedestrians and create an interesting entry. Glazing also increases the pleasure of shopping and dining by bringing more natural light into the sales area and affording views out as well. Locate functions not needing windows (bathrooms, storerooms, video arcades, etc) away from the exterior and locate smaller sales areas (beauty shop, jewelry shop, optometry, coffee) at the exterior so they can have storefront windows.

This principle supports the Design Goals Great Streets and Walkable Neighborhoods.

Figure 11
Shop Fronts

F3.12 GREAT VIEWS: Great Views speak for themselves. Incorporate them whenever possible to terminate a road, provide a refreshing look out of an important building or a clear view from a public green space.

This principle supports the Design Goals Great Streets and Walkable Neighborhoods.

Figure 12
Great Views

F3.13 CLEAR EDGES: Buildings with clear edges provide definition for exterior spaces. The transition should not be harsh, however. Soften the hard edges of these facades with inviting storefronts, landscaping, verandas, covered walkways and other human-scale elements and penetrations for activities to occur.

This principle supports the Design Goals Identifiable Town Centers, Great Streets and Walkable Neighborhoods

Figure 13
Clear Edges

F3.14 BIKE-ABLE / BIKE PATHS: Creating bikeable, walkable communities with bike paths enhances connections, and serves to tie communities together. Effective pedestrian and bicycle networks also serve to substantially reduce congestion by reducing trip generation. Bike lanes on benefit not only the cyclist, but both the pedestrian and motorist as well. By providing for needed separation between the roadway and the pedestrian, and providing a clear demarcation of lanes for the motorist.

This principle supports the Design Goals Great Streets and Sustainable Communities.

Figure 14
Bike-able/Bike Paths

F3.15 LINEAR PARKS: Frederick Olmstead once said, "We want a ground to which people may easily go after the day's work is done." A linear parks system contributes to the overall well being of the community by providing a wide variety of year round recreational opportunities. Linear parks provide convenient access to natural spaces and an amenity that enhances neighbourhoods. They are part of an overall non-motorized transportation system that provides connectivity throughout the community. Park corridors are generally a minimum of 10 metres wide, with a 5 meter buffer, on slopes that can be accessed by the average pedestrian.

Figure 15
Linear Parks

This principle supports the Design Goals Sustainable Communities and Walkable Neighborhoods

F3.16 FOCAL POINTS: Focal points should be used to draw interest and terminate paths. They become goals to walk to. Paths without focus tend to be dull and feel too exposed. Scale these focal points to the space they terminate or highlight. Small space foal points may include fountains, sculptures, gardens or trees. Large ones may be aircraft displays, flags, towers, or buildings.

Figure 16
Focal Points

This principle supports the Design Goals Identifiable Town Centers and Great Streets.

F3.17 STREET GRID: Confusing traffic patterns are unsafe and inconvenient. The simple solution is often the best. Two-way streets, street grid patterns and 90 degree T intersections are effective strategies. Also, consider origin and destination points when laying out the street network. Terminate main streets with key buildings and separate the pedestrian traffic from the streets.

Figure 17
Street Grid

This principle supports the Design Goals Sustainable Communities and Walkable Neighborhoods.

F3.18 VISIBLE ENTRIES: Have you ever wasted time wondering where a building's entry was? Recessed entries, hidden entries, and poorly scaled entries make finding the front door difficult. Entries should be visible from all directions and lines of sight. Visible Entries can be achieved by making the entry protrude from the main body of the building.

Figure 18
Visible Entries

This principle supports the Design Goals Great Streets and Walkable Neighborhoods.

F3.19 CAR PARKS: Seas of asphalt are major eyesores on Ft Lewis. They are unpleasant to view, uncomfortable to walk through and create significant storm water run-off. Make these places more like a garden, a car park. Between every parking aisle, create a planted aisle full of trees, grass and shrubs. Plant the trees so that they will eventually form a canopy over the parking aisles. Allow drainage from the paved area to pass through the curbs and into the landscaped areas.

This principle supports the Design Goals, Great Streets and Sustainable Communities.

Figure 19
Car Parks

F3.20 CONNECTED SIDEWALKS: Disconnected sidewalks discourage walkability and pose a safety risk. Connect sidewalks throughout the installation to provide pleasant, safe walkways with clear destination points.

This principle supports the Design Goals Sustainable Communities, Great Streets and Walkable Neighborhoods.

Figure 20
Connected Sidewalks

F3.21 HIDDEN PARKING: Save the fronts of buildings for people! Hidden parking by parking behind, rather than in front of commercial facilities allows buildings to be at or near the sidewalk's edge—more welcoming and pedestrian friendly than a building in an asphalt ocean. Consolidate parking into well-landscaped lots behind or to the side of buildings in order to create pleasing streetscapes, share ATFP standoff distances and encourage walking in the clustered building areas. On-street parking can be used to reduce demand and size of lots.

This principle supports the Design Goals Sustainable Communities and Walkable Neighborhoods.

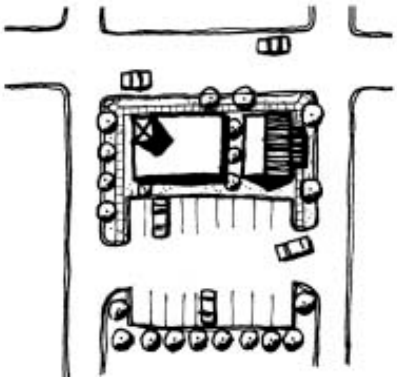

Figure 21
Hidden Parking

F3.22 SIDEWALK BUILDINGS: Sidewalk buildings define streets, provide attractive pedestrian ways, and slow vehicle traffic. In addition, bringing buildings as close as possible to the street saves valuable land resources and minimizes sprawl.

This principle supports the Design Goals Sustainable Communities, Identifiable Town Centers, Great Streets and Walkable Neighborhoods.

Figure 22
Sidewalk Buildings

F3.23 NARROW BUILDINGS: Wide buildings create unpleasant work environments, are difficult to navigate and expensive to maintain. Longer and taller buildings allow natural light on both sides of the building, promoting environmental sustainability. Narrow buildings also help define exterior spaces and allow "eyes on the street" for AT/FP measures. Make each wing as narrow as possible, less than 60'.

This principle supports the Design Goals Sustainable Communities and, Great Streets.

Figure 23
Narrow Buildings

F3.24 STREET TREES: Street trees provide shelter from the elements, clean the air, reduce noise, provide street definition, buffer pedestrians, reduce vehicle speeds and create an attractive environment. In addition, they create cost savings by reducing storm drainage infrastructure and improving pavement life through temperature regulation. Whenever possible, plant street trees 8 to 10 meters on center in a planting strip 1 to 2 meters wide between the curb and sidewalk. When careful thought is given to location of trees near signals and signage, trees actually improve visibility.

Sustainable Communities, Great Streets and Walkable Neighborhoods.

Figure 24
Street Trees

F3.25 TOWN SQUARE: Fort Lewis needs a unifying element, a place where people can gather to create a sense of community. A town center is a feature like an open space, an important avenue, a built square, or a natural feature that sets the tone for the built environment. Ft Lewis Town Center will center around a large open space enclosed by mixed-use buildings that may include places to shop, dine, worship, work, and play.

Identifiable Town Centers and Walkable Neighborhoods.

Figure 25
Town Square

F3.26 MIXED-USE: Single use facilities contribute to inefficient land use (sprawl) because they force construction of small, single story facilities with their own ATFP standoff. Compatible functions should be collocated in mixed-use facilities. Mixed use facilities are economically and environmentally sustainable, use land more efficiently, and support vertical construction and compact development.

Sustainable Communities, Great Streets and Walkable Neighborhoods.

Figure 26
Mixed-Use Facilities

F3.27 MULTI-STORY BUILDINGS: Single-story buildings are also a primary contributor to sprawl. With large footprint and parking combined, they do nothing to increase density and community and do not define the street or provide a feeling of protection to pedestrians. When in the core of the installation, use multi story buildings and place the more public functions on the ground level and private functions above.

This principle supports the Design Goals Sustainable Communities, Identifiable Town Centers, Great Streets and Walkable Neighborhoods.

Figure 27
Multi-Story Buildings

F3.28 COMPACT DEVELOPMENT: Planning using compact development as a guideline ensures that critical resources like land, money and time are not used unnecessarily for facilities and infrastructure. They can then be applied to mission enhancing pursuits.

This principle supports the Design Goal Enhance Mission Capability.

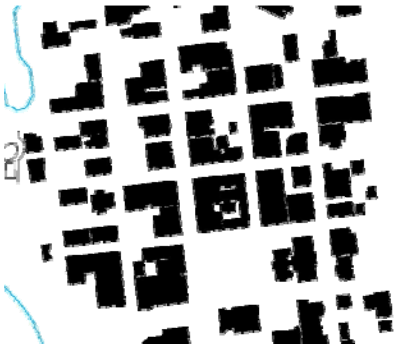

Figure 28
Compact Development

F3.29 RANGELAND PRESERVATION: Training is the cornerstone of readiness. Integral to this is the lands on which this training is performed. Greenfield development methods of the past have encroached on the rangelands at Ft Lewis. A focus of any planning effort on the installation must focus on rangeland preservation for this most mission critical activity. No encroachment is acceptable and providing room for future expansion is the goal.

This principle supports the Design Goal Enhance Mission Capability.

Figure 29
Rangeland Preservation

F3.30 EFFICIENT TRANSPORTATIONN: A logical, direct and efficient transportation network not only makes the morning commute less frustrating, it enables soldiers to spend less time in their cars and more time impacting the mission. In addition, it improves safety, force protection and facilitates rapid deployment of people and equipment.

This principle supports the Design Goal Enhance Mission Capability.

F3.31 CLOSE-IN TRAINING: Ft Lewis suffers from a lack of appropriate training areas located within the cantonment area, known as close-in training. Emphasis must be placed on locating open areas for PT and other daily outdoor training close to company operations facilities to accommodate this mission requirement.

This principle supports the Design Goal Enhance Mission Capability.

F3.32 AFFORDABLE DEVELOPMENT: Focus must be placed on planning affordable development. Applying sustainable design principles minimizes initial infrastructure costs and future maintenance costs of roads, utilities and stormwater management. A careful analysis is required when choosing building materials to ensure the proper balance is found between cost and long-lasting construction. This is critical to ensuring Ft Lewis maximizes the dollars it receives to provide the best environment for its soldiers.

This principle supports the Design Goal Enhance Mission Capability.

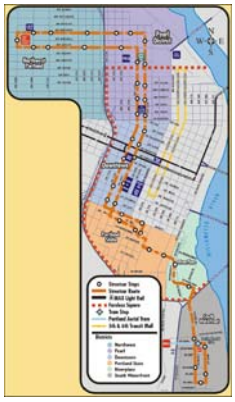

Figure 30
Efficient Transportation

Figure 31
Close-In Training

Figure 32
Affordable Development

Evaluation Criteria – Installation Preferences/Betterments (by building type)

Note: The evaluation criteria are not part of Chapter 6 of the MT Standard RFP. It is contained to ensure all installation input to the MILCON Transformation RFP is contained in one location.

Site

1. Provide street trees at 30 feet o.c. or match existing adjacent street tree spacing in a 7'-0" wide minimum landscaped buffer strip between road edge/curb and sidewalk.

2. Use low-impact development strategies for stormwater. Use multiple vegetated planting strips in between all rows of head to head parking at parking lots to meet stormwater treatment and retention requirements rather than large consolidated stormwater facilities. Avoid large stormwater ponds and ensure stormwater facilities do not disrupt pedestrian and bicycle circulation throughout the site.

3. Preserve the maximum number of trees possible. Additional consideration will be given for larger areas of trees left undisturbed.

4. Provide sport courts adjacent to the Barracks, while incorporating adequate separation / design features to keep noisy activities from impacting sleeping rooms. Basketball, volleyball, etc… (barracks sites only).

5. Provide a well-connected network of pedestrian and bicycle circulation that encourages pleasant walking/biking between the various facilities of the complex. Provide dedicated bike lanes each side of all new roads that tie in with existing bike paths. Demonstrate via maps with routes and distances (Barracks, Dining Facility, Administrative Facilities, Company Operations Facilities, TEMFs, and neighborhood community services).

6. Provide on-street parallel parking with bulb-outs at pedestrian crossings on all streets.

Barracks

1. Preserve land for future barracks expansion by building four- to five-story barracks buildings. If three-story or less barracks are unavoidable, provide garden-style design barracks buildings as defined elsewhere in the RFP <note to specifier, ensure definition of garden style barracks is included in the RFP>.

2. Provide a fully landscaped courtyard with a combination of landscaping and decorative hardscaping, vandal resistant, secured, covered and uncovered picnic tables, outdoor barbecues, and other outdoor living amenities in barracks courtyard areas.

3. Provide a varied height brick / CMU base on the buildings to well above head height with <metal siding at Jackson Ave projects> <stucco at all other areas> above and <standing seam metal roofing at all other areas><concrete roofing tile at North Fort projects>.

4. Provide an enhanced acoustical control design, beyond the minimum RFP standards, for the barracks, minimizing noise transmission between modules and between sleeping rooms within the module, addressing all paths of sound intrusion, including openings, walls, floors, and ceilings. Demonstrate performance via STC ratings of assemblies and noise criteria curves indicating built performance of modules and sleeping rooms.

Dining Facility

1. Provide more than 10 percent additional energy savings beyond the minimum RFP requirements.

2. Provide a varied-height brick base on the buildings to well above head height with metal siding above and standing seam metal roofing.

3. Provide controlled natural daylighting meeting LEED criteria (ensure direct sun penetration is excluded during summer months via exterior shading devices) to the facility, so that artificial lighting is minimized during daylight hours for public areas. Provide daylight harvesting sensors that automatically reduce artificial lighting levels when adequate daylight is present. Additional consideration will be given for natural daylighting meeting the criteria above in other areas of the facility.

Tactical Equipment Maintenance Facility

1. Provide more than 10 percent additional energy savings beyond the minimum RFP requirements.

2. Provide controlled natural daylighting meeting LEED criteria (ensure direct sun penetration is excluded during summer months) to the facility, so that artificial lighting is minimized during daylight hours for maintenance bays and all areas required to have natural lighting in other sections of the RFP. Provide daylight harvesting sensors that automatically reduce artificial lighting levels when adequate daylight is present. Additional consideration will be given for natural daylighting meeting the criteria above in other areas of the facility.

Company Operations Facility

1. Provide more than 10 percent additional energy savings beyond the minimum RFP requirements.

2. Provide a varied-height brick/masonry base on the buildings to well above head height with metal siding above and standing seam metal roofing.

3. Provide controlled natural daylighting meeting LEED criteria (ensure direct sun penetration is excluded during summer months via exterior shading devices) to the facility, so that artificial lighting is minimized during daylight hours for readiness modules. Provide daylight harvesting sensors that automatically reduce artificial lighting levels when adequate daylight is present. Additional consideration will be given for natural daylighting meeting the criteria above in other areas of the facility.

Battalion Headquarters

1. Provide more than 10 percent additional energy savings beyond the minimum RFP requirements.

2. Provide a varied-height brick base on the buildings to well above head height with rain screen flush metal panels above and <standing seam metal roofing at Jackson Avenue projects> <concrete tile roofing at North Fort projects>.

3. Provide controlled natural daylighting meeting LEED criteria (ensure direct sun penetration is excluded during summer months via exterior shading devices) to the facility, so that artificial lighting is minimized during daylight hours. Provide daylight harvesting sensors that automatically reduce artificial lighting levels when adequate daylight is present. Additional consideration will be given for higher percentages of occupied spaces provided with controlled daylight as outlined above.

Brigade Headquarters

1. Provide more than 10 percent additional energy savings beyond the minimum RFP requirements.

2. Provide a varied-height brick base on the buildings to well above head height with rain screen flush metal panels above and <standing seam metal roofing at Jackson Avenue projects> <concrete tile roofing at North Fort projects>.

3. Provide controlled natural daylighting meeting LEED criteria (ensure direct sun penetration is excluded during summer months via exterior shading devices) to the facility, so that artificial lighting is minimized during daylight hours. Provide daylight harvesting sensors that automatically reduce artificial lighting levels when adequate daylight is present. Additional consideration will be given for higher percentages of occupied spaces provided with controlled daylight as outlined above.

4. Provide mechanical equipment enclosures of the same material as the building base with complementary architectural metalwork (no chain link) in conformance with AT/FP criteria.

5. Add additional architectural details to the Brigade Headquarters that clearly convey its importance in the hierarchical organization of the troop complex.

MILCON TRANSFORMATION RFP TEMPLATE – CHAPTER 6

6.0 PROJECT-SPECIFIC REQUIREMENTS

6.1 GENERAL: The requirements in this chapter augment the requirements indicated in paragraphs 3 through 5.

6.2 APPROVED DEVIATIONS: The following are approved deviations from the requirements indicated in paragraphs 3 through 5. <Some of these deviations require a waiver or deviation approved by higher headquarters. Others do not require a waiver>. If the are any conflicts between Para 5 and Para 6 then Para 6 will take precedence since it is intended to be specific to the local post specifics.

6.2.1 WAIVER PENDING the following

<u>Paragraph 3 Deviations for TEMF only:</u>

- Remove 3.1.3.(2)(b) Maintenance Pit. Fort Lewis does not use Maintenance Pits in Tactical Equipment Maintenance Facilities. (Coordinate deletion of Maintenance Pit from standard design drawings.)

- Remove 3.1.10(4) Sump Pump in maintenance pits.

- Remove 3.1.11(4)((e)iii Maintenance Pit Lighting.

- 3.1.11 Table 6 Remove "Maintenance Pit" from Equipment/Furniture Item column for Maintenance Areas.

6.2.2 PARAGRAPH 5 DEVIATIONS from that will not require a waiver.

- 5.7.4 TELECOMMUNICATIONS SERVICE - Exception to I3A guidance:

  A. Fort Lewis standard DOIM outlet configuration includes three 8-position connectors; two for data, one for voice, and a blank position.

  B. Dedicated underground ducts are required to each building for Comcast cable television and Qwest Communications telephone services. Contractor shall use inner ducts to maximize the duct use from the pedestal where possible.

  C. <Fiber optic cable is required to Barracks buildings to provide for DDC connection to the post EMCS.>

6.3 SITE PLANNING AND DESIGN

6.3.1 SITE PLANNING, DESIGN, AND CONSTRUCTION OBJECTIVES: <SDC> <Contractor> shall be responsible for the site planning, design, and construction of all functional and technical requirements listed in this project, including erosion control measures, underground conduit, piping, utility service lines and connections (electrical, communications, cable, water, sewer, stormwater, gas, mechanical), etc., <outside the building limits of construction. The building's limits of construction are shown on the drawings.>

6.3.2 TREE PRESERVATION PLAN: The < SDC> <Contractor> will be required to provide a Tree Preservation and Protection Plan to COE for approval before any clearing and grading can take place. The Tree Preservation and Protection Plan must follow Fort Lewis' Urban Forest Management

requirements included in Appendix <insert letter designation>.

Oak trees that cannot be preserved shall be replaced at the ratio of six new to every one removed, Contact the Contracting Officer for guidance on locations for planting new oak trees on Fort Lewis.

6.3.3 SITE LANDSCAPING: The <SDC> <Contractor> is responsible for the landscaping <within the project construction limits> <outside the building construction limit>. <For Barracks only the Building contractor is required to provide landscaping within the building pad construction limit and the SDC is responsible for the landscaping outside the building pad construction limit.>

6.3.3.1 **Existing Plant Materials:** Retention of existing plant materials, particularly mature trees, is preferred. Protect the root zone and foliage of materials being retained. Where trees and other vegetation must be cleared from a site, mark trees and confirm planned clearing with Contracting Officer prior to cutting.

6.3.3.2 **New Plant Materials:** Only use of drought tolerant, insect and disease resistant species native to western Washington is authorized. Provide trees, shrubs, groundcovers and grasses consistent with existent plantings. Minimize the use of ornamental turf areas. Review Appendix <insert letter designation> for lists of acceptable and prohibited plant materials. New plant materials shall meet the following criteria.

a. Able to withstand weather extremes likely to occur in any 10-year period without supplemental irrigation or seasonal protection.

b. Acclimated to western Washington State for a period of one growing season.

c. Low-maintenance varieties without significant pruning and thinning requirements.

d. Supplemental irrigation is acceptable for turf varieties used at lawns and training areas.

6.3.3.3 **New Sod:** All sod will be locally grown and State-certified as classified by applicable state laws and industry standard. Provide amendments to ensure successful turf establishment. Contractor is responsible for establishing and maintaining a healthy stand of turf.

a. Provide sod free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 2 inches in diameter, woody plant roots, and other material detrimental to a healthy stand of turf.

b. Dry moldy, yellow, irregularly shaped, torn or uneven end sod pieces are not acceptable.

c. Machine cut to a uniform thickness of 1 inch within a tolerance of 0.25 inch, excluding top growth and thatch.

d. Measurement for thickness does not include top growth and thatch.

e. Use sod anchors for sloped areas as recommended by the sod supplier.

6.3.3.4 **Seed Mixes:** Performed by the seed supplier prior to delivery to the site. Bulk quantities of seed shall be labeled.

a. Provide seed that does not contain mold or is otherwise damaged.

b. Provide seed that does not contain amounts of weed seed greater than 1 percent by weight of the total mixture, and will be free of restricted or prohibited noxious weed seed.

c. Provide seed free of crop seed. Inert matter shall not exceed 3 percent by weight of the total mixture.

6.3.3.5 **Landscape Design**: Provide landscaping schemes that are consistent with the function of the

facility, contextually compatible with existing landscape design in the vicinity, and in accord with the sustainable design goals of the project. Provide continuity with existing landscapes, including continuation of adjacent lawns, shrub beds, street tree plantings, and similar features. Provide landscaping over all site areas not covered with buildings, pavement, or other non-vegetative surfacing. Landscape design should provide a professional and natural appearance to all sites while minimizing water consumption and the amount of recurring labor necessary for maintenance. Design shall incorporate the following.

a. Conformance with antiterrorism design standards.
b. Screening of parking, service areas, and utility equipment from adjacent streets.
c. Landforms and practices consistent with minimization of erosion.
d. Concrete mow strips to separate lawn areas from shrub beds and gravel beds.
e. Mulch at all shrub beds.

6.3.3.6 **Irrigation Systems:** Where plant materials selected require permanent irrigation, provide irrigation that is consistent with project sustainability goals and installation water conservation initiatives, exposure, and service. Where xeriscape planting is developed, provide temporary irrigation necessary to maintain plant materials until established. Provide supplemental irrigation during plant establishment periods.

a. Areas to receive permanent irrigation include the following.

    1. Stormwater management areas, such as bioswales.
    2. Street trees and shrub beds where bubblers shall be provided for spot irrigation.
    3. All turf areas.
    4. Any other area where non-drought tolerant plants are used.

b. Irrigation control shall be automatic, easily programmable for weekly adjustment, and capable of providing separate frequency, time and duration settings for each zone. Locate all controllers in facility electrical rooms in a common wall area. Irrigation equipment shall not be located within turf areas to receive foot traffic. Prevent contamination of potable water by irrigation water.

c. Irrigation systems shall be designed to minimize the risk of damage from freezing. Provide connections at the head end of systems to accommodate seasonal evacuation of water using air pressure. Provide manual drain valves to gravel basins as required for drainage.

d. Underground irrigation piping shall be PVC plastic pipe (Schedule 40) or polyethylene plastic pipe. Use overhead spray (gear or rotor) heads at lawn areas and drip or bubbler hoses or heads at tree, shrub, and groundcover beads.

e. Irrigation Capacity: Sufficient to maintain landscape plantings with maximum contribution by precipitation equal to the Precipitation Allowance.

    1. Precipitation Allowance: 25 percent of normal rainfall, maximum, in any month.

    2. Application Rate: Enough water to soak soil to depth of 6 inches at each application; intermittent applications, if necessary, to avoid saturation to runoff; adjustable for less water on damp soil.

    3. Irrigation Efficiency: 55 percent, minimum, of applied water actually reaching plants, under normal wind conditions.

    4. Locations of Irrigation Equipment: To provide complete coverage of landscaped area requiring irrigation, without overspray or runoff onto pavements, buildings, or unirrigated planted areas.

    5. Variation in Application Rate at Individual Locations: Not more than 25 percent.

    6. Sloped Areas: Prevent drainage out of lower outlets. Program to avoid run-off.

    7. Operating Pressure: As low as possible as is compatible with results.

6.3.3.7 **Water Conservation:** All landscape design shall incorporate water conservation consistent with Fort Lewis goals for reduction of water consumption. Provide design consistent with the following requirements.

a. Coordinate irrigation design with plant selection requirements. Minimize water usage through appropriate plant selection.

b. Do provide irrigation for street trees on separate drip irrigation valved sections from lawn areas.

c. Hydrozones: Locate plants of different water needs in groups for ease of water application.

d. Rain Sensors: To prevent operation in the rain.

e. Potential Water Usage: Estimated Evapotranspiration times Irrigation Efficiency, in inches per year; areas of planting exempt from water conservation requirements calculated separately.

f. Estimated Evapotranspiration: Equal to Potential Evapotranspiration times Average Plant Factor, in inches per year.

g. Potential Evapotranspiration: Inches per month for each month of year, for reference crop of 4-inch high well-watered grass, as determined by government or educational agricultural or irrigation information agency for actual project location.

h. Average Plant Factor: Average of plant factor of each different hydrozone based on relative areas of each, using plant factors as follows (or otherwise documented by research as relative to evapotranspiration of reference crop of 4-inch high well-watered grass).

   1. Native Plants: Defined as plants that grow in the wild in natural local climate, or other plants and turf of equivalent climatic endurance requiring no supplementary irrigation; plant factor of 0 (zero).
   2. Low Water-Using Plants: Plants proven to be able to survive significant periods without water in the local climate without degradation of appearance; 0.3.
   3. Warm-Season Grasses: 0.6.
   4. Cool-Season Grasses: 0.8.
   5. Moderate Water-Using Plants: Plants proven to be able to survive periods without water in the local climate but with significant degradation of appearance; 0.8.
   6. Flowering Plants, when in Flower: 1.20.
   7. Area within Drip Line of Trees: 1.0; regardless of other type of planting.
   8. All Other Plants: 1.0.

i. Irrigation Efficiency: As calculated or designed for actual system provided.

6.3.3.8 **Topsoil:** Provide topsoil, whether native from the site or imported, for landscaped areas meeting the following criteria.

a. Conform to the USDA textural class with a pH of 6.5 to 7.0 for lawn/turf areas.
b. Conform to the USDA textural class with a pH of 7.5 to 8.5 for planting areas.
c. Maximum particle size is 3/4 inch.
d. Matter content between 5 to 20 percent by volume or 2 to 7 percent by weight.

Perform soil tests of native and imported topsoil to establish chemical, mechanical, and nutrient character. Amend the backfill topsoil mix for landscaped areas for improved plant growth and water holding capacity as indicated by the soil test. Ensure sufficient topsoil material for landscape plant establishment, ease of maintenance requirements and longevity of successful landscape design. Provide

minimum topsoil depth of 8 inches at all lawn and field grass areas. Provide minimum topsoil depth of 18 inches at all shrub beds.

6.3.3.9 **Mulch:** Mulching practices for all planting material, such as trees, shrubs, and planting beds, will be in accordance with industry standard for commercial landscape areas. Mulch will be free of weeds to promote germination and seedling establishment. Hydromulch will be applied using the recommended rate of an organic tackifier. Erosion control blankets will be used whenever reclaiming slopes greater than 3:1 or along drainage areas where erosion is probable. Use nonwoven polypropylene or polyester fabric under bark.

6.3.3.10 **Site Furniture and Equipment:** Required site furniture and equipment includes the following.

a. Exterior seating and table areas, including waste receptacles, at Enlisted Personnel Dining Facility (EPDF). <Exterior seating at Battalion and Brigade Headquarters is preferred.> Seating and tables shall not be fabricated of wood.

b. Bicycle racks at all regularly occupied facilities with rack capacities consistent with LEED credit requirements. Provide racks fabricated of corrosion resistant materials. Racks shall be mounted on concrete pads and anchored into the pad.

c. Fencing as indicated for security or safety barriers. <Primary requirement for fencing occurs at TEMF to be installed by <TEMF Building contractor> <Contractor>.> Fencing shall be galvanized, vinyl coated, or aluminum-coated chain-link.

d. Physical barriers, including concrete filled steel pipe bollards and vehicle gates, as required by antiterrorism or traffic control design.

e. Waste receptacles shall be fabricated of durable, corrosion-resistant materials.

f. Flagpoles are required at Battalion and Brigade Headquarters facilities. Provide free-standing poles, 25 feet in height above surrounding ground plane. Flagpoles shall resist a 3-second duration wind gust of 85 mph. Provide brushed natural aluminum, tapered from top to bottom, with 6-inch-diameter aluminum top ball.

6.3.4 FORCE PROTECTION REQUIREMENTS FOR LANDSCAPING**:** Individual deciduous or coniferous trees, existing or new, will be allowed within the 33-foot unobstructed space around buildings, but shall be located far enough apart from adjacent trees providing good visibility around trunks, and shall be sparsely limbed so that trunks are visible to a minimum height of 6 feet and do not allow concealment of objects 6 inches or greater in diameter, observable by building occupant.

6.4 SITE ENGINEERING

6.4.1 EXISTING CONDITIONS: <Reference as-built records of this site are attached in this RFP.>. Also reference the site plan drawing provided in Appendix <insert letter designation> of this RFP. Information shown is approximate. Provide any surveying required for design and construction.

The <SDC and Building Contractor><Contractor> will be required to follow these general conditions.

6.4.2 SITE GRADING: The <SDC> <Contractor> will be responsible to provide site grading to facilitate drainage and provide functional building, parking, and laydown areas. Site grading will include clearing and grubbing for access drives, parking lots, and any site development.

The <Building Contractor> <Contractor> will be responsible for all foundation, subbase, and building floor slabs, including final grading material and compaction.

6.4.3 CUT AND FILL: Cut and fill should equal out where possible. Obtain borrow material from licensed and permitted sources off government property. The <SDC> <Contractor> shall be required to

obtain all fill off post and at their expense. See 6.17.2 for disposal of material. <Note to specifier: confirm section no..>

6.4.4 UTILITY PADS: The <Building Contractor> <Contractor> will be responsible for installation of all concrete utility pads located outside the building exterior for any mechanical or utility device needed for the building operation and function. This will include all necessary piping, wiring, or utility extensions for the device to function as designed. Mechanical equipment should be located next to existing or proposed sidewalks, pathways, or parking areas to eliminate the need to construct additional hard surface access. All utility pads with equipment will meet antiterrorism/force protection standards.

6.4.5. SIDEWALKS: <The SDC will be required to provide 6-foot-wide minimum paved walkway to within in line with the building entrances and up to the construction limits noted in the demarcation matrix. The SDC will provide 6-foot-wide paved walkway to within 5 feet of the mechanical room. The SDC will provide all necessary sidewalks for site development up to the construction limits noted in the demarcation matrix. The Building Contractor will provide sidewalks for all areas within the building complex, including courtyards and up to the construction limits noted in the demarcation matrix >

<The Contractor will be required to provide 6-foot-wide minimum paved walkways to the entrance(s) of the building, around the building perimeter or all areas within the building complex, including courtyards. >

6.4.6 ROADWAYS AND PARKING LOTS: The <SDC> <Contractor> will be responsible for all roadway improvements and parking lots for the facilities. Design procedures and materials shall conform to one or more of the applicable criteria.

For vehicles where neither AASHTO nor WSDOT cover, such as military-tracked vehicles, then Department of Defense (DOD) Pavement Transportation Computer Assisted Structural Engineering (PCASE) programs (UFC 3-250-01FA) and Unified Facilities Criteria (UFC), UFC 3-250-01FA Pavement Design for Roads, Streets, and Open Storage Areas criteria shall be used for design.

Regardless of the pavement design, a minimum flexible pavement section shall consist of 2 inches of asphalt and 4 inches of base course. Pavements shall have at least a minimum thickness of base course regardless of subgrade strength. A concrete joint layout plan shall be required for all rigid concrete pavements. Joint spacing, joint types, and joint grading shall be shown.

Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

6.4.7 POST UTILITY INFORMATION

6.4.7.1 **General Utilities:** Provide tracer wire directly above non-metallic lines and install marking tape. Care shall be exercised by the <SDC and Building Contractor><Contractor> when excavating trenches in the vicinity of trees. Where roots are 4 inches in diameter or greater, the trench shall be excavated by hand and tunneled. When large roots are exposed, they shall be wrapped with moist heavy burlap for protection and to prevent drying. Trenches dug by machines adjacent to trees having roots less than 4-inch diameter shall have the sides hand trimmed making a clean cut of the roots. Trenches having exposed tree roots shall be backfilled within 24 hours unless adequately protected by moist burlap or canvas. Care shall be exercised by <each> <the> contractor to avoid compacting and polluting the soil in the root zone of trees to remain. <Each> <The> contractor shall also exercise care to minimize damage to tree trunks and branches by installing a temporary fence around each tree at its drip line.

All meters will be provided with equipment to connect to DDC/BAS/UMCS capabilities for monitoring utility use and leak detention by Fort Lewis. The meter connections to the DDC/BAS/USMC are to be hardwired to the DDC system and not of the wireless type.

6.4.7.2 **Electrical Service Maps:** The electrical distribution system is owned and operated by Fort

Lewis Public Works, Exterior Electric Shop. Point of Contact: Jose L Solis, Electrical System Manager Engineer, 253-966-0143; and Ron Cottrill, 253-967-5840.

6.4.7.3 **Telecommunications:** The Directorate of Information Management, DOIM, operates the Army communications system at Fort Lewis. Point of Contact: Gary Schroeder; 253-967-3870.

6.4.7.4 **Security:** Physical Security requirements shall be coordinated through Fort Lewis Physical Security. Point of Contact: Mr. Criss Christian, 253-966-7153.

6.4.7.5 **Cable TV Service:** Cable TV service at Fort Lewis is provided by Comcast. Point of Contact: Scott Morrison, Engineering Construction Coordinator, Comcast Cable, 410 Valley Avenue NW, Building C, Puyallup, WA 98371, 253-864-4350.

6.4.7.6 **Local Telephone Service:** Local telephone service at Fort Lewis is provided by Qwest. Point of Contact: Ivan Esmeral, Senior Design Engineer, Qwest Communications, 2410 South 84th Street, Suite 18, Lakewood, WA 98499, 253-597-5090.

6.4.7.7 **Exterior Utility Installation:** Where new utilities cross roads, driveways, and parking lots to be paved under this contract, install utilities prior to paving. If paving has occurred prior to installing the utilities, jacking or boring is required. It is preferred to jack and bore utilities under all existing paved roads, but open cut excavation is allowed if the pavement cut width is a minimum of 15 feet wide across the entire width of the road. Install new utilities that connect to existing utilities located under existing paved areas by open cut excavation. A minimum 15-foot pavement cut width is required for all open cut excavations.

[Road cuts for utility connections will not be permitted.]

6.4.8 SANITARY SEWER SERVICE

6.4.8.1 **General:** All contractors will provide mains or laterals of ductile-iron, or polyvinyl chloride (PVC) plastic pipe. Surface clean outs shall be surrounded by 2-square-foot cement concrete pad in landscape areas. No utilities shall be installed under the footprint of the building.

Polypropylene manhole steps shall be made of a copolymer polypropylene superior in its resistance to corrosiveness, meeting the requirements of ASTM 2146 Type II, Grade 16906, and shall completely encapsulate a deformed 1/2-inch steel reinforcing rod conforming to ASTM A615, Grade 60. Polypropylene steps shall be factory installed in complete accordance with the manufacturer's instructions.

A fiberglass manhole marker post shall be located adjacent to all manholes located outside the roadway corridor, or as directed by Fort Lewis Public Works. The marker post shall be green in color, 3.75 inch and 60 inches long and furnished with a 3- by 3-inch high-intensity white reflector (250 candle power) and a flexible anchor barb. The marker posts shall be set so as to leave 36 inches of the post exposed above grade.

To demonstrate the integrity of the installed material and construction procedures, the <SDC> <Contractor> shall conduct final air testing after the finished grading, landscaping, and paving is accomplished; all other underground utilities have been installed; and the lines have been flushed, cleaned, deflection tested, and television inspected. For ductile iron pipe, the testing shall be in accordance with the applicable requirements of ASTM C 924. Allowable pressure drop shall be as given in ASTM C 924. Make calculations in accordance with the appendix to ASTM C 924. For PVC pipe, the testing shall be in accordance with UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the appendix to UBPPA UNI-B-6. The <SDC> <Contractor> will be responsible for protecting existing systems during building construction. The <SDC> <Contractor> may be required to retest the system if warranted by the contracting agency.

Prior to final inspection, all pipelines shall be tested, flushed, and cleaned, and all debris removed by the <SDC> <Contractor>**.** A pipeline "cleaning ball" of the proper diameter for each size of pipe shall be flushed through all pipelines prior to final inspection.

Before sewer lines are accepted, the <SDC> <Contractor> shall conduct a closed-circuit television inspection, using color video equipment with pan-and-tilt capabilities of the sewer pipe and appurtenances in the presence of the Contracting Officer, and provide two copies of the VHS videotapes to the Contracting Officer.

<The SDC will provide a sanitary sewer lateral to the construction limits noted in the demarcation matrix. The service lateral shall truncate at a logical point near the building footprint. The SDC and Building contractors shall coordinate the location of the sewer extensions to provide the best and most effective sewer service to the building. The Building Contractor will be required to supply the SDC with the sewer line sizes and logical extension points to service the building. The Building Contractor shall connect the building to the line placed by the SDC to the building.>

The <Building Contractor><Contractor> will be responsible for installing a boot/equipment wash system. The boot wash system will discharge to the sanitary sewer system and must be sited to minimize rain intrusion, and installed with adequate oil/water/grit separator system to prevent direct discharge of non-sanitary waste into the collection system.

6.4.9 STORMWATER

6.4.9.1 **General**: <Stormwater management shall be the responsibility of both the SDC and Building Contractors.> Stormwater management shall be in accordance with the most current edition of the Washington State Department of Ecology (DOE) Stormwater Management Manual for Western Washington (SMMWW). Infiltrate all stormwater on site. Use simplified methods for drainage where possible, such as filter strips. Facilities that detain water shall be fenced for safety precaution.

Proposed drainage shall not connect into the existing storm drain facilities. All stormwater shall remain on the site. The contractor(s) shall use stormwater best management practices for stormwater runoff that are the most appropriate for each site. Storm drain lines and branches within the site shall be polyvinyl chloride (PVC) plastic, ductile-iron, HDPE, or concrete pipe.

The <SDC> <Contractor> shall be responsible for design, development, and installation of all stormwater facilities at their respective sites. Stormwater facilities shall be designed and sized to accommodate stormwater runoff from all site development surfaces and all runoff from buildings. <Stormwater lines installed by the SDC shall truncate at a logical point near the building but no closer than 5 feet to the building footprint. The SDC and Building Contractors shall coordinate the location of the stormwater extensions. The Building Contractor will be required to supply the SDC with the storm line sizes and logical extension points. This will require the SDC to coordinate with the Building Contractor for service locations of downspouts, area drains, covered hardstands, and any surface within 5 feet of the building perimeter that requires stormwater discharges. The Building Contractor shall be responsible for design, development, and installation of all stormwater systems from the building and any drainage surface in and around the building to the perimeter, and make connection to stormwater lines as installed by the SDC.>

<Stormwater infiltration methods that are small and distributed throughout the project site and less visually obtrusive are preferred by Fort Lewis. Preferred methods may include use of such elements as car parks, rain gardens, porous pavement, and underground infiltration systems.>

The use of underground injection to manage stormwater runoff must be in accordance with Chapter 173-218 WAC. New injection facilities must meet the non-endangerment standard as defined in the WAC and be registered with the State through the Fort Lewis Stormwater Office prior to being placed into service.

If underground injection is going to be used to manage stormwater, comply with the DOE's *Guidance for UIC Wells that Manage Stormwater* (latest edition) .

Where low-impact development techniques are used, comply with the *Low Impact Development Technical Guidance Manual for Puget Sound*.

6.4.10 WATER SERVICE

6.4.10.1 **General:** Provide material for and installation of water system to provide for domestic use and required hydrant flow to meet NFPA 24 and NFPA13. NFPA 13 requires clearances around the main riser to prevent damage of piping subjected to earthquakes. Provide water service and fire lines of ductile-iron pipe or polyvinyl chloride (PVC) plastic water main pipe. Provide water service appurtenances as required. No utilities shall be installed under the footprint of a building. <The SDC will be responsible for supplying a fire line off the domestic water system with PIV with tamper switch per NFPA 24 standards to supply the building's interior fire suppression system The fire line will terminate within 5 feet of the building's perimeter and to within the construction limits of the medium and small

TEMF.and be capped and marked. The Building Contractor will connect to the both the domestic and fire line system and install water line system to and through the building.>

Anticipated water service connection points are identified in Appendix <insert letter designation>. The installation has recently experienced loss of water pressure and adequate supplies are suspect in many locations. Sufficient water supply may not be available for this project. See hydrant flow test information provided in Appendix <insert letter designation>, but may not be indicative of the actual flow. Repairs to all reservoirs are ongoing, and anticipated for next two years that require the post to empty the tanks. No more than two are authorized to be emptied at a time. Upgrades to the existing water distribution system outside the limits of this project except as stated in paragraph 6 or shown on drawings included in Appendix <insert letter designation> may be required for this project.

6.4.10.2 All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.

6.4.10.3 If backflow prevention devices are required for installation on the distribution system, the following references should be added to the specifications.

- American Water Works Association (AWWA)
- Cross Connection Control Manual (latest edition)
- Cross Connection Control Committee, Pacific Northwest Selection

Backflow Prevention Assemblies shall be approved by the Washington State Department of Health (DOH) for installation in Washington State. The most current list of approved assemblies is available from the DOH test reports, showing name of the manufacturer of the BPA, the manufacturer's serial number, test date, test results, tester's name, and tester's certificate number.

Reduced pressure principle assemblies, double-check valve assemblies, atmospheric (non-pressure) type vacuum breakers, and pressure-type vacuum breakers shall be tested, approved, and listed in accordance with FCCHR-01 and in accordance with DOH Standards. Backflow preventers with intermediate atmospheric vent shall conform to ASSE 1012. Reduced pressure principle backflow preventers shall conform to ASSE 1013. Hose connection vacuum breakers shall conform to ASSE 1011. Pipe applied atmospheric-type vacuum breaker shall conform to ASSE 1001. Air gaps in plumbing systems shall conform to ASME A112.1.2. Backflow devices must be approved by DOH for installation in Washington State.

All testable Backflow Prevention Assemblies (reduced pressure backflow assembly, double-check valve assembly, and pressure vacuum breaker) shall be tested and a test report form shall be completed, and submitted to the Contracting Officer (to be forwarded to the installation water systems manager). Test procedures and criteria shall be in conformance with recommendations published in AWWA Cross Connection Control Manual, Section 6, Requirements for Equipment Approval and Testing.

Fittings in areas shown on the plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1.

6.4.10.4 All fire hydrants will be center stem-dry barrel, and the barrels are to be painted nutmeg brown. PANTONE 18-1222 PTX. The hydrants will also be installed with 6-inch shut-off gate valve for easy maintenance and service.

Fire hydrants shall be fitted with 5-inch Stortz adapters. Provide a fire department connection within 50 feet of a fire hydrant and install a PIV valve. Hydrants shall not be further than 50 feet from the building, and no closer than 25 feet. Locate them not less than 6 feet and no more than 10 feet from a paved traffic rated surface. Do not locate closer than 10 feet to any obstruction or near an entranceway. The pumper nozzle will face the nearest roadway.

<Specifier Note: If water system is being installed as part of general right-of-way improvements, the editor needs to confirm if hydrants are required along the street, regardless of the presence of buildings to be protected, as part of the infrastructure development.>

6.4.10.5 The flow tests were conducted in the vicinity of the project sites and can be found in Appendix <insert letter designation>. Any additional flow testing will be the responsibility of either Contractor, if deemed necessary and for the portion of their respective development activity. Any additional water flow testing shall be conducted in accordance with NFPA 291, Recommended Practice for Fire-Flow Testing and Marking of Hydrants. Hydrant barrel shall be collared with two reflective metal backed collars and numbered to provide pumper operators with an indication of available flow. Hydrants shall be classified in accordance with their rated capacities (at 20 psi [1.4 bar] residual pressure or other designated value):

Class AA – Light blue - Rated capacity of 1,500 gpm or greater (5,680 L/min)
Class A – Green - Rated capacity of 1,000 to 1,499 gpm (3,785 to 5,675 L/min)
Class B – Orange – Rated capacity of 500 to 999 gpm (1,900 to 3,780 L/min)
Class C – Red – Rated capacity of less than 500 gpm (1,900 L/min)

If not already in place, a blue double-sided reflectiorized raised pavement marker shall be secured in the road near center line for each hydrant. In addition to collaring, each hydrant shall have a metal tag installed that indicates the hydrant number, with the Global Positioning System (GPS) location. GPS location shall be established for each fire hydrant. This tag will provide a secondary indicator to operator should the marking be removed from each.

Submit hydrant test and installation report to the Contracting Officer (to be forwarded to the installation water systems manager).

6.4.10.6 All water meters shall be read in U.S. gallons, have frost protection design if appropriate, shall have bronze casing when available, and have permanently sealed registers. Register type shall be an encoder-type remote register designed in accordance with AWWA C707. The <SDC> <Contractor> will be responsible for the supplying and installation of all domestic water meters needed for each project site. Water meter shall be provided with equipment to connect to DDC/BAS/UMCS system for monitoring by Fort Lewis. <The SDC shall coordinate with the Building Contractor for sizing and locating water meters. The Building Contractor will be responsible for connection to the meter and routing to and through the building for each project.>

6.4.10.7 Meter boxes shall be concrete with cast iron lid and cast iron meter reader lid. Plastic boxes and lids shall be used in unpaved areas or grass areas not subject to vehicular traffic.

<The SDC and Building Contractors shall coordinate the location of the extension to provide the best and most effective service to the site. The Building Contractor will be required to supply the SDC with the waterline sizes and logical extension points to service the buildings.>

6.4.11 GAS SERVICE: <If Natural Gas is used>

6.4.11.1 **General**: Puget Sound Energy (PSE), 888-321-7779, owns and operates the gas distribution system on Fort Lewis. Therefore, local utility standards as determined by PSE for installation of natural gas facilities shall take precedence over any references made in this document to natural gas facilities installation methods, means, and materials. All meters shall be provided with a pulse meter sensor compatible with the Fort Lewis DDC/BAS/UMCS system for monitoring. <The Building Contractor shall be responsible for performing the actual tie-in connection of the pulse meter sensor to the DDC.> Fort Lewis owns and operates the propane fuel distribution system.

The <SDC> <Contractor> shall be responsible for coordinating and contracting with PSE for the installation of the natural gas piping up to and including the meter to all facilities at their respective sites.

PSE's installation cost, including meter, is at the expense of the <SDC> <Contractor>. The meter shall be provided with equipment to connect to DDC/BAS/UMCS system for monitoring. <The Building Contractor will provide a shut-off valve and line pressure regulator downstream of the meter. The Building Contractor will coordinate and provide required pressures for meter settings to the SDC. The Building Contractor will provide gas piping from the meter into the each of their respective facilities.> See Appendix <insert letter designation> for exhibit representing the location of the existing natural gas main.

6.4.11.2 Gas Line Locations: Anticipated gas line locations are identified in Appendix <insert letter designation> of this RFP.

6.4.11.3 Propane Fuel Distribution System: Fort Lewis owns and operates the propane fuel distribution system. The <SDC> <Contractor> shall install the propane facilities on the opposite side of the road from PSE's natural gas facilities with a minimum separation of 36 inches from PSE's natural gas pipe. In addition, the <SDC> <Contractor> shall install yellow pipe with black striping in order to further distinguish the two facilities.

6.4.12 HAUL ROUTES AND LAYDOWN AREA: Adhere to the haul route and laydown areas as directed by the Contracting Officer and as shown on drawings in Appendix <insert letter designation>. The laydown areas shall be cleared and restored to its original condition after construction is complete.

6.5 ARCHITECTURE

6.5.1 GENERAL: The buildings shall be sympathetic to the architectural style of the adjacent buildings and shall use similar materials and colors <, except where existing buildings do not comply with the Fort Lewis Area Design Guide>..

6.5.2 ARCHITECTURAL DESIGN: Exterior elements of these facilities shall <comply with the Fort Lewis <insert name of area> Area Design Guide in Appendix <insert letter designation>><comply with the following requirements: <insert requirements determined through coordination with Fort Lewis DPW Master Planning>>.

<If "garden style apartment" scheme for UEPH facilities is used. Garden style apartments consist of multiple unit, clustered, low-rise (three stories or less) residential buildings having multiple entries in each cluster, with each entry typically serving a maximum of 12 units (no more than four per floor). Such schemes shall be consistent with life safety code provisions for apartment buildings with a single exit.>

6.5.2.1 <Historic Preservation: The project site is located within the Fort Lewis Historic District or its environs and will be required to follow the Secretary of the Interior's Standards for the Treatment of Historic Properties. Fort Lewis Historic District guidelines will govern exterior colors, materials, fenestration, entries, roof forms, building massing, site elements, etc. The building and site design will require review and approval by the Washington State Historic Preservation Office (SHPO).>

<Note to Specifier: Add design submittal requirement and 30-day review period for SHPO to Section 01 33 16 Design After Award. Submittals will be made to SHPO via the Fort Lewis DPW Cultural Resources Office.>

6.5.2.2 Roofs: Minimum roof slope on Fort Lewis for low slope roof systems is 1/4inch per foot and 3 inches per foot for steep slope roof systems. Designs that incorporate sloped roofs and that avoid valleys and complex flashing and venting conditions are preferred. Minimum thickness of roofing materials shall be in accordance with standards listed in Applicable Criteria.

6.5.2.3 Exterior Finishes: Exterior Insulation and Finish Systems (EIFS), if used, shall include high-impact reinforcement at grade level walls and rain screen or drainable design. Exposed exterior materials shall not require periodic repainting. Preferred materials are factory prefinished, integrally colored, or

have similarly intrinsic weathering finishes. Ferrous metals shall not be exposed to the weather unless prefinished with a protective coating that has a minimum 20-year warranty. Exterior masonry surfaces shall be provided with a penetrating, breathable masonry sealer.

6.5.2.4 Exterior Doors: It is preferred that entry doors into lobbies and corridors be glazed aluminum storefront entry systems.

6.5.2.5. Exterior Windows: Operable windows with insect screens are preferred for all occupied spaces. Power operators shall only be provided for windows that are not within the normal reach range of personnel. <Windows in sleeping rooms shall be provided with manufacturer's standard hardware to allow window to be opened for venting while preventing access through the opening from the outside.>

6.5.2.6 Bird Roosting: Design facilities with features that prevent congregating or nesting of birds on elements of the building.

6.5.2.7 Fall Protection: Provide permanent fall protection anchors on all roofs in accordance with OSHA requirements

6.5.2.8 Background Noise: Maintain ambient sound levels within the following Noise Criteria (NC) ranges, as defined in ASHRAE HVAC Applications Handbook, when adjacent spaces are occupied and are being used normally.

a. Executive Offices (Command Suites): 20 – 30
b. Classroom, Conference Room: 25 – 30
c. Semiprivate Office: 30 – 35
d. Large Open Office: 35 – 45
e. Dining Facility: 35 – 50
f. Sleeping Rooms : 25-30

6.5.2.9. Sound Isolation**:** Design and construct interior spaces to achieve the following minimum noise isolation class (NIC) values between adjacent spaces:

a. Spaces of like function and similar NC value: NIC 36

b. Quiet space (NC value of 20 – 30) and noisy space (NC value of 50 – 60): NIC 48

c. Executive offices and conference rooms, which require high-speech confidentiality, and adjacent spaces: NIC 50

d. Adjacent UEPH Apartment Suites and Apartment Suite/Corridor: NIC 40. Minimum STC rating for wall and floor/ceiling assemblies between sleeping rooms and between apartment suites and adjacent spaces shall be 50 (or FSTC 45). Minimum IIC rating of floor/ceiling assemblies between apartment suites shall be 50 (or FIIC 45).

6.5.3 LOCKS AND KEYING

All locking systems shall comply with keyless entry standards. Only communication rooms, mechanical rooms, and electrical rooms shall have a keying lock system with interchangeable cores.

6.5.3.1 Key Changing: All locks changeable without disassembly of lock cylinders; acceptable methods include interchangeable removable core cylinders.

6.5.3.2 Control of Lock Cores and Keying: Provide all hardware and construction (temporary) cores required to secure buildings, utility access, and related work throughout the construction period. Provide construction cores with a bright color on their exposed face for ease of identification. During construction, the Contractor shall meet with representatives of the Contracting Officer, Public Works Lock Shop, and

the user to develop a keying schedule. Submit Schedule to Contracting Officer for approval. Provide final keying and combinations as performed by a licensed, bonded locksmith approved by the Contracting Officer. Upon acceptance of the facility for occupancy, replace construction cores with final cores in the presence of the government inspector and a Public Works locksmith, test each lock for proper operation and deliver any permanent or control keys to the inspector. Prior to core change out, provide the government, by security shipment, with keys tagged with identifying labels in the quantities indicated.

6.5.3.3 Authorized Locksmiths: The following locksmiths are currently approved by the Fort Lewis Public Works Lock Shop to combinate cores for locksets used in this project. Verify that authorization remains current prior to beginning lock/core related work on this project.

1) Bassett Services: POC: Bob Bassett, 2111 Hernlock Ct SE, Lacey, WA 98503 (360) 239-4416

2) Beyond Security: POC: Julie Santie, 11420 Hwy 302 NW, Gig Harbor, WA 98329 (253) 720-7416

3) Harbor Enterprises: POC: Mike Quanrud, 3523 140th St. Ct. NW, Gig Harbor, WA 98332 (253) 851-8466

4) PD Services Unlimited: POC: Pam Johnson, 9508 356th Street South, McKenna, WA 98558 (360) 458-2632

5) Security Unlimited: POC: Mike Pennella, 8205 E. Martin Way No.188, Olympia, WA 98516 (360) 456-1677

6.5.3.4 Cylinders and Cores: Provide cylinders and cores with six-pin tumblers for locks. Cylinders shall be products of one manufacturer, and cores shall be products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall have interchangeable core that are compatible with A-2 SFIC (A-2 system specifications are available at http://www.lab-lockpins.com/pinsicore.htm) and are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core. Cylinders shall be fully compatible with products of the Best Lock Corporation, Arrow Lock Corporation, or Falcon Lock. Submit a core code sheet with the cores. Provide cores master keyed in one system for this project. Provide construction interchangeable cores.

6.5.3.5 Keys: Furnish four keys for each lock core KD (keyed different), and four keys for each set KA (keyed alike) to the Public Works Lock Shop for control and issuing. In addition to the keys listed above, furnish four additional key blanks per core KA. Stamp each key with appropriate key control symbol and "U.S. Property – Do No Duplicate". Key bows must be stamped with key code line ID (example: LA1223, MPA1223, etc.). All Fort Lewis codes are one to four letters and one to four numbers. Public Works Lock Shop will provide ID information and Master control number to be used in combinating core. Do not place room number on keys.

6.5.4 PROGRAMMABLE PUSHBUTTON LOCKSETS: Hardware shall be programmable pushbutton locksets similar to OSI Omnilock "OM300" for exterior doors and KABA "E-plex 5000" for all locking interior doors, except standard bored locksets shall be provided on mechanical, electrical, and telephone rooms. Programmable locks shall be provided with key override and interchangeable cores.

6.5.4.1 <Programmable Keyless Access Systems for UEPH Facilities: Provide programmable pushbutton keyless access systems in UEPH facilities, at the following door locations: main and side entrances, living module entry, individual bedrooms and central laundry rooms. Programmable locks shall be provided with key override and interchangeable cores.>

6.5.4.2 Mechanical, Electrical, and Communication Room Doors: Provide standard keyed locksets for these doors.

6.5.4.3 High Security Doors: Doors for vaults, secure document storage rooms, SIPRnet communications rooms, and similar spaces requiring a high level of physical security shall be provided with locks complying with the requirements contained in the security standards referenced for spaces

designated under Functional Area Requirements paragraphs. These may include combination locks and other special hardware.

6.5.5 SPECIAL SIGNAGE: The following special signage is required by Fort Lewis.

a. Fire Department Connection: Sign shall be mounted on the building above exterior fire department connection, and shall be a minimum of 20 by 15inches, mounted 6 feet above grade, with red text on white background.

b. Gas Shutoff: Sign shall be mounted on the building above the natural gas meter and valve, and shall be a minimum of 20 by 15 inches, mounted 6 feet above grade, with red text on white background.

c. Alarm System: Sign shall be mounted centered on all doors accessing rooms and spaces protected by alarm systems. Test at top of sign shall read “This Room is Protected by an ALARM SYSTEM.” Note on lower portion of sign shall read “Unauthorized entry is prohibited. Violators will be prosecuted under the provisions of the UCMJ or other applicable laws.” Bottom of sign shall have message in Braille. Provide black letters on yellow background.

6.5.6 ELEVATORS: Provide elevators as required in paragraph 3.

6.5.6.1 Standards: Comply with provision applicable standards and with provision of Washington Administrative Code (WAC) 296-96 Elevator Safety Regulations, including inspections and certifications.

6.5.6.2 Operating Features

a. Key switch in each elevator car for independent operating service.

b. Key-controlled out-of-service feature.

c. Firefighter's key operated switch at lobby landing. Provide Knox-Box at fire landing with elevator keys.

d. Provide a pushbutton activated firefighter's intercom system that permits speech between the elevator car and the first floor lobby landing area. No action by elevator passengers shall be required to permit two-way conversations using the intercom system. Intercom system shall meet State of Washington requirements for emergency communication. Locate pushbutton switch/speaker unit on wall adjacent to firefighter's key operated switch.

e. Provide a telephone system for passenger elevators. Install vandal-resistant speaker type intercom with pushbutton to activate in car station connected to a programmable auto-dialer located in elevator machine room. Provide Auto-dialer with a solid-state charger unit, which will automatically provide emergency power and an immediate transfer in the event of failure of normal power supply. The pushbutton located in car station or in separate cabinet shall be at the prescribed height for access by the disabled and shall be identified as "EMERGENCY PHONE PUSH TO ACTIVATE". The entire communication assembly shall be approved for an elevator installation. The pushbutton telephone shall comply with ADA-ABA accessibility guidelines. The telephone communication shall not be terminated until one of the communicating parties hangs up the receiver or manually disconnects the communication link. Auto-dialer shall connect to on post 24-hour emergency number (967-5859); verify number with Contracting Officer during construction. A Class "C" telephone will need to be requested by Fort Lewis Department of Public Works to have service installed to the building elevator.

6.5.6.3 Elevator Pit Features

a. Provide push/pull-type pit "STOP" switch for stopping elevator motor, independent of regular operating device. Locate on same side of hoistway as ladder.

b. Provide galvanized steel ladder conforming to 29 CFR 1910.27 with minimum 7-inch distance between rung and wall. Locate ladder on hoistway side wall closest to hoistway door opening. Top rung of ladder shall be readily accessible from first floor landing and have the same elevation as

finished floor. Coordinate ladder location with elevator car and operating equipment to eliminate any spatial conflicts.

c. Locate pit light not less than 6 feet above pit floor. Locate switch on same side of hoistway as ladder. Provide GFCI duplex receptacle in each pit. Pit shall be provided with impact resistant fluorescent light fixture capable of providing minimum average pit illumination of 20 footcandles. Provide sign with 1-inch-high letters indicating position of light switch.

d. Provide sump in pit floor with submersible pump and float switch. Activation of float switch shall signal an alarm through the building Energy Management Control System (EMCS). The pump shall be manually activated and shall discharge to a floor drain located in elevator machine room.

6.5.6.4 Construction Inspection: Provide Elevator Inspector (State of Washington certified) to inspect the installation of the elevator(s) to assure that the installation conforms to Washington State requirements. Elevator Inspector shall witness the acceptance inspections and tests, approve all results and, after completion of the acceptance inspections and tests, shall certify in writing that the installation is in accordance with Washington State requirements. Elevator Inspector shall witness the acceptance inspections and tests, approve all results and sign and certify the successful results. The Elevator Inspector, after completion of the acceptance inspections and tests, shall certify in writing that the installation is in accordance with the contract requirements. Contractor shall coordinate with Contracting Officer to ensure attendance by Elevator Inspector at necessary times during construction, inspection, and testing periods. Verify all critical construction activities that must be witnessed by the inspector and do not proceed with that portion of the work until the inspector is present.

6.5.7 ACCESSORY FIXTURES

Accessory finishes and materials shall be coordinated with the Structural Interior Design (SID) and Furniture, Fixtures and Equipment (FF&E) design indicated in Section 01 33 16, Design After Award.

6.5.7.1 Toilet and Locker Rooms: Toilet accessories shall be of durable materials and finishes designed for commercial use facilities. Toilet and locker rooms shall be provided with mirrors, waste receptacles, paper towel dispensers or electric hand dryers, toilet paper dispensers, towel and robe hooks, liquid hand soap dispensers, and sanitary product dispensers and disposals. Each locker room shall have one full-height mirror. All lavatories shall have a mirror and soap dispenser. [Public restrooms in EPDF facilities shall have a baby diaper changing station.] Soap dishes, shower rods, and curtains and towel hooks shall be provided at each shower stall. Provide coat hooks in toilet stalls. Other accessories, such as grab bars and folding shower seats shall be provided for buildings designated as accessible to the disabled. Benches and electric hair dryers shall be provided for locker rooms.

6.5.7.2 Janitor Closets: Janitor closets shall be provided with shelves and cam-type broom/mop holders for a minimum of six mops and brooms.

6.5.7.3 Classrooms/Training and Conference/Meeting Rooms: Provide markerboards, tackboards, and projection screens as indicated in Functional Area requirements paragraphs. If not indicated, provide not less than 32 square feet of markerboard on each of two walls, and one projection screen sized appropriately for the room for overhead projection systems, with a surface that provides a minimum gain of 1.0 within 30 degrees of viewing axis. Provide mounting bracket for GFGI projector. Provide mounting brackets for GFGI monitors and televisions where indicated.

6.5.7.4 Fire Extinguisher Cabinets: Provide fully or semi recessed cabinets and fire extinguishers. Surface-mounted cabinets shall be used only where cavity-type walls are not available, and shall comply with ADAAG requirements in accessible buildings. Mounting of extinguishers on exposed brackets may be provided in mechanical rooms or where mounting on exposed structural elements is necessary.

6.5.7.5 Shelving: Provide adjustable shelving in office supply and storage closets. A minimum of four 12-inch-wide shelves shall be provided along the length of one wall.

6.5.8 FURNISHINGS

6.5.8.1 Furniture materials and finishes shall be coordinated with SID and designed in accordance with FFE package requirements in Section 01 33 16 Design After Award.

6.5.8.2 Health and Safety Criteria: Furnishing design shall select components with drawers and doors that stay securely closed and resist accidental removal. Filing cabinets and similar storage cabinetry shall have design features that prevent accidental overturning. Any electrical systems incorporated shall meet requirements of UL 1286. Workstations, keyboard trays, seating, and similar repetitive-use components shall include features for ergonomic adjustment to suit a range of occupant sizes.

6.5.8.3 Building Coordination: Coordinate furnishings layout with the building layout and design components, including mechanical, plumbing, power, lighting, and telecommunications systems, to optimize functional efficiency of work spaces. Design furniture placement and components in accessible facilities to comply with the ADAAG. Position switches, thermostats, FGFI equipment, and appliances for best utility. Include furnishings to support normal office equipment, such as faxes, copiers, printers, computers, and shredders.

6.5.8.4 Maintainability: Surfaces shall be cleanable with ordinary household- type cleaning solutions <**,** except EPDF surfaces shall resist damage from commercial cleaners and disinfectants>. Upholstery fabrics shall have colors and patterns that hide soiling and stains. Colors of large surfaces shall be neutral.

6.6 STRUCTURAL DESIGN

Design of the subject facility shall be performed assuming a ground snow load of 15 psf, Terrain Category C. However, all roof structures shall be designed for a minimum uniform roof snow load of 25 psf. An additional 5 psf rain-on-snow surcharge load shall be applicable in accordance with the requirements of ASCE 7.

The structural system shall be compatible with building use. For example, columns shall not be located in rooms requiring visibility or open space, such as entries, common areas, etc.

6.7 THERMAL PERFORMANCE: No additional requirements.

6.8 PLUMBING

6.8.1 WATER DISTRIBUTION SYSTEM: The <Building Contractor><Contractor> shall design and install complete water distribution system from water service to buildings (see “Post Utility Information”) up to and including plumbing fixtures located as shown on architectural floor plan. Fixtures shall be as listed for each type of building. All piping shall be concealed where possible and access provided for all valves, equipment, or appurtenances requiring maintenance, service, or inspection.

6.8.2 POTABLE SYSTEM: Contractor shall provide all devices and appurtenances to ensure potable water system is reliable, quiet, and safe. This shall include, but is not limited to, backflow prevention devices, balancing valves, thermostatic mixing valves, and water hammer arresters.

6.8.3 PLUMBING FIXTURES: Plumbing fixtures shall include the following.

- Water Closets: low-flow flush valve type
- Urinals: waterless type with lifetime, maintenance-free cartridges

- Mop Sink: floor-mount type
- Hose Bibbs: provide freeze-proof hose bibs on all sides of building

ADA-compliant fixtures shall be provided only in buildings designated to be universally accessible. Design of waterless urinals shall include methods to provide flushing of lines, such as providing water-using fixtures at the end of the line, and angled connections for complete drainage of fluids. To avoid inadvertent damage to drain cartridge, provide signage above urinals with manufacturers O&M limitations.

6.8.4 WATER HEATERS: Provide natural gas-fired or electric-type domestic water heaters, as appropriate for the project. Water heaters intended to serve multiple rooms or an entire facility shall be storage type. Point-of-use electric water heaters are acceptable to serve small, remotely located lavatories. Electric water heaters with storage tanks are acceptable to serve mop sinks in remotely located janitor rooms. All domestic water shall be stored at 140°F.

6.8.5 DRAIN, WASTE, AND VENT: The <Building Contractor><Contractor> shall design and install complete DWV system as required by the building water distribution system. This system will be connected to the drainage system serving the building (see "Post Utility Information"). Vent system shall be designed to prevent trap siphonage and back pressure. Vent terminations shall be located away from air intakes to mechanical equipment and other openings into the building.

Where it is possible and economically feasible to use reclaimed water for such applications as irrigation, all piping, fittings, equipment, and devices associated with such a system shall be clearly labeled and marked with the color purple.

6.9 SITE ELECTRICAL AND COMMUNICATION SYSTEMS

6.9.1 SITE POWER

6.9.1.1 **General:** Electrical power distribution is a 13,800-volt, 3-phase, 3-wire single-point grounded wye system. Fort Lewis has adopted Tacoma Public Utilities (TPU) utility design criteria and construction standards for all power distribution work performed on the post, except for requirements associated with single-point grounding. The "single-point grounding" portion of the Fort Lewis distribution system applies to a single reference point to ground at the substations only. Fort Lewis is, for all intent and purpose, a Delta, so the neutral conductor shown on the details should be disregarded. Refer to TacomaPower.com for construction details and specifications and to Fort Lewis Exterior Electric Shop for any questions regarding system requirements. Comply with the National Electrical Safety Code (NESC ANSI C-2), NFPA 70, and TPU standards for the Work of this Contract. Fort Lewis standard details are available on usarmy.jblm.imcom.list.dpw-design-standards@mail.mil.

Design, furnish, and install a 15kV class distribution system that extends from the existing system, provides power for the facilities in this project, and provides expansion capability for future projects. The distribution system expansion shall be coordinated with the Fort Lewis Public Works Electrical System Manager Engineer and the Exterior Electric Shop.

Demolition: Any existing distribution equipment required to be removed under this contract shall be turned over to the Fort Lewis Public Works Exterior Electric Shop. Coordinate turnover with the Exterior Electric Shop Foreman.

Seismic Bracing: Brace or anchor distribution equipment to resist horizontal forces acting in any direction per the site class and seismic use group as defined in the International Building Code.

System Coordination Study: Provide a coordination study to demonstrate that the equipment selected and system constructed meets the contract requirements for equipment ratings, coordination, and protection. The study shall be performed by a registered professional engineer with demonstrated experience in power system coordination.

6.9.1.2 **Primary Duct Banks:** Medium-voltage ducts shall be minimum 4-inch Schedule 40 PVC encased in Controlled Density Fill (CDF) except under roads or paved areas subject to vehicular traffic. Duct banks under roads or paved areas subject to vehicular traffic shall be encased in reinforced concrete. A 36-inch minimum burial depth is required to the top of the concrete encasement. Provide a 6-inch metallic warning tape above primary duct banks at 12 inches below finished grade. Arrange ducts so that they enter manholes and vaults at the lowest point. Provide at least two spare ducts in all medium-voltage duct banks and a pull cord in all empty ducts. Provide a minimum #2 bare copper ground conductor in the duct bank encasement and ground the conductor in all vaults.

6.9.1.3 **Primary Conductors:** All primary conductors shall be 15kV, EPR, CU, 133% insulation, with insulation shielding and a drain wire. Main feeders shall be 500kcmil with 600-ampere terminations; loop feeders shall be #4/0 AWG with 200-ampere terminations; and lateral feeders to transformers shall be #2 AWG.

Splicing: Where splicing is required, provide junction assemblies in an appropriately sized vault with a hinged diamond-plate lid. Angle assemblies upward to facilitate above-ground operation. All 200-ampere medium-voltage separable insulated connectors shall be of the loadbreak type. In-line and T-tap primary splices are not permitted. Provide test points on elbows at padmount transformers and switches.

Fire Taping: Provide fire protective tape on all medium-voltage conductors in manholes and in vaults under transformers.

Labeling: Label all cables by means of fiber, laminated plastic, or non-ferrous metal tags indicating the cable type, conductor size, circuit number, circuit voltage, cable destination, and phase identification.

Testing: Provide hi-pot and phase testing on all new primary conductors prior to energizing the cables.

6.9.1.4 **Manholes and Vaults:** Size manholes to comply with minimum cable bending radius requirements according to the current edition of the National Electrical Safety Code (NESC). Install manholes at street intersections to facilitate street crossings, and space manholes to minimize pulling tension on the conductors. The transformer pad serves as the lid for the vault under transformers. All manholes shall be grounded, free of any obstruction, and correctly labeled per NESC and associated contract documents.

Conductor Installation: Conductors shall be secured to insulators on racks on all four walls of vaults, looped and racked a minimum of 360 degrees, and arranged in an approved manner that provides safely and rapid access to personnel during installation and maintenance.

Vault Penetrations: All transformer vault penetrations shall be properly sealed to prevent water and moisture into the vault..

Conduits: Conduits entering the manhole shall start at the lowest level of entry.

6.9.1.5 **Junction Pedestals:** Provide junctions above ground or in manholes. Where four-way junctions are installed in manholes, provide manhole with diamond plate, two-section steel covers to allow for hook-stick operation. Above-ground junction pedestals are required where the number of junctions exceeds four.

6.9.1.6 **Distribution Switches:** Primary distribution switches shall be fused, dead-front, oil-filled, above-ground type. Taps 200A shall be fused.

6.9.1.7 **Connections to Existing Overhead Distribution:** In areas where the overhead system has not been removed and must be retained to provide services for buildings that are to remain, provide connections from the new underground system to the existing aerial system. Remove and replace the existing porcelain distribution fused cut-outs with the load-break, silicone type that meets the following criteria: Open outdoor loadbreak fused cutout with Type K fuses conforming to NEMA C37.42 with rated amperes to match system requirements. Silicone rubber insulators, clamshell terminal connectors, NEMA B bracket, 12 kAIC symmetrical fault-interrupting current rating, with solid cap fuse holder.

Provide galvanized rigid steel risers and long radius sweeps from the underground duct bank system, bonded to the equipment ground and sealed at the top. Stirrups off of main distribution lines are required (no hot line clamps on overhead lines). Provide load-break **Silicone-Rubber** cut-outs for service to transformers.

6.9.1.8 **Overhead Transformers:** Where overhead transformers are authorized, provide transformer or transformer bank with separate case and neutral grounds, and provide separate grounding electrodes for each separated by a minimum distance of 20 feet per IAW NESC (2002) Rule 097.D.1. Provide fused **Silicone-Rubber** cut-outs with lightning arrestors. No overhead transformers larger that 100kVA.

6.9.1.9 **Padmount Distribution Transformers:** Furnish and install liquid filled pad-mounted transformers for the facility in the project. Locate transformers to comply with AT/FP requirements. Based on the electrical load of the facility or facilities to be served, determine the kVA capacity and low-voltage rating of the transformer. Install outdoor, medium-voltage transformers on vaults. For outdoor installation, use mineral oil design and high fire point fluids for indoor/vault use.

Transformer Specifications: Distribution transformers shall be new, loop-feed, mineral oil-insulated, complying with ANSI C57.12.26. Transformers shall be dead-front, equipped with current-limiting bayonet oil-immersed fuses, five primary taps (two-above and two-below nominal), and a load-break switch (or switches) to facilitate opening and closing of either side of the loop, and the ability to de-energize the transformer with the loop remaining energized. High-voltage warning signs shall be permanently attached to each side of the transformer. Provide copper-faced or stainless steel ground connection pads in both the high- and low-voltage compartments, a dial-type thermometer, pressure-relief valve, liquid-level gauge, and drain valve. Provide oil sampling tube on transformers 500kVA and above. Provide removable MOV surge arrestors on the unused side of loop transformers, where applicable, with removable grounds. Where the transformer is used as a feed-through, provide fault indicators. Provide insulated-bushing-type parking stands adjacent to each separable load-break elbow to provide for cable isolation. Provide pad-lock hasps and locks. Coordinate lock style and material with the Public Works Exterior Electrical Shop. Provide bollards for protection in locations vulnerable to vehicular traffic.

Primary Connections: Primary conductor connections shall be compression type, except provide mechanical connectors at arrestor grounds.

Distribution Cut-outs: Distribution fused cut-outs shall be of the load-break, silicone type that meets the following criteria: Open outdoor loadbreak fused cut-out with Ttype K fuses conforming to NEMA C37.42 with rated amperes to match system requirements. Silicone rubber insulators, clamshell terminal connectors, NEMA B bracket, 12 kAIC symmetrical fault-interrupting current rating, with solid cap fuse holder.

Secondary Connections: Secondary conductor connections shall be compression type. Provide antioxidant compound where required by code. No penetrations are allowed through the transformer casing.

Transformer Grounding: Provide a buried copper ground ring around each transformer and ground per National Electrical Safety Code (NESC) for a single-point grounded wye distribution system, with secondary neutral ground isolated from equipment ground and the ground strap removed. Below-grade

ground connections shall be of the exothermic type. Refer to Appendix <insert letter designation> for typical detail. *(Waiting for details from Fort Lewis)*

6.9.1.10 **600-volt Distribution:** Provide a 600V underground distribution system from the secondary side of all transformers installed for service to buildings within the scope of this project. Cables shall be copper with 90-degree C insulation and suitable for use in an underground duct system. All secondary duct banks shall be direct buried Schedule 40 PVC with a minimum of 3 inches of sand above and below ducts, except under roads or paved areas subject to vehicular traffic, and shall contain at least one spare duct. Duct banks under roads or paved areas subject to vehicular traffic shall be encased in reinforced concrete. Minimum burial depth shall be 30-inches below finished grade. Provide a 6-inch metallic warning tape above secondary ducts at 12-inches below finished grade. Determine the secondary conductor size, duct size and quantity based on the transformer rating and building service requirements, adjusted for voltage drop. Provide galvanized rigid steel (GRS) conduit long-radius elbows and transitions from below to above grade and into buildings, and wrap all GRS conduits below grade to prevent corrosion. Provide compression type-connectors at the transformer secondary and the building service entrance switchboard.

6.9.2. SITE TELECOMMUNICATIONS

6.9.2.1 **General:** Telecommunications systems consist of the Army-owned telephone system, which provides Army communications, and the Local Area Network (LAN), Qwest Communications,for residential and non-Army telephones, and COMCAST cable television. All communications requirements shall be coordinated with the Fort Lewis Directorate of Information Management (DOIM) through the Contracting Officer.

Coordination with Adjacent Construction Projects: Alert the Contracting Officer if coordination with adjacent construction projects is required by the Communications System Contractor.

Site telecommunications systems shall be coordinated, designed and installed by a qualified Telecommunications Contractor with a minimum of five years of experience.

6.9.2.2 **Telecommunications Duct Bank and Manholes:** Provide telecommunications duct banks and manholes at locations to meet the requirements of the facilities in this project. Place manholes to minimize pulling tension on cables and to provide a location for cable splices for entrance cables (both copper and fiber) to each facility. Provide maintenance loops in manholes per Installation Information Infrastructure Architecture (I3A). From the manholes, provide ducts to each facility in accordance with the "**Facility Communications System Requirements**" listed below

Telecommunications manholes shall be concrete, 6' x 12' x 8' deep, and may be shared between the services. Install manholes with 36 inches of cover over manhole shoulders. Provide 36-inch manhole risers with dishpan-type locking lids. All manholes, cables, and splice cases shall be grounded per I3A.

Telecommunications ducts shall be 4-inch Schedule 80 PVC in pea gravel, except encase duct banks in reinforced concrete under roads or paved areas subject to vehicular traffic. Provide a 36-inch minimum burial depth to the top of telecommunications duct banks. Arrange ducts so that they enter manholes at the lowest point. Provide a nylon pull cord in all ducts. Power and telecommunications ducts may be routed in a common trench provided that the ducts are spaced in accordance with the spacing requirements defined in the NESC.

6.9.2.3 **Outside Plant Cables:** Army cables consist of a multi-pair 24-gauge, outside plant copper telephone cables and multi-strand single-mode fiber optic cables. From the nearest Remote Switching Unit (RSU), route Army copper and fiber optic cables to the facilities within this project. Determine the number of copper pairs for the outside plant cable and the number of strands for the fiber optic cable by the facility cable requirements. Underground cables shall be the filled type. Cables that leave the RSU shall be fully mounted on the Main Distribution Frame (MDF), terminated, and tested. Install Army copper

cables in one of the 4-inch ducts and fiber optic cable in one of the fabric mesh cells. Route cables to and terminate in the Main DOIM Telecommunications Equipment Room of each facility. One 4-inch duct in the duct bank shall be dedicated to Qwest and a second 4-inch duct shall be dedicated to Comcast, who will each furnish and install their cables.

6.9.2.4 **Facility Communications System Requirements:** Provide the following communications system ducts and cables to each facility except EPDF and UEPH

Four 4-inch conduits

- Army #24 AWG Copper (telephone)
- Empty conduit with pull-strings for Comcast Cable
- Empty conduit with pull-strings for Qwest
- Empty spare conduit with pull-strings

Two 4-inch conduits with 9-cell innerducts

- Army single-mode fiber optic cable for data and spare innerducts
- Spare conduit with empty innerducts and pull-strings

At EPDF and UEPH, provide four 4-inch conduits

Three 4-inch conduits

- Army #24 AWG Copper (telephone)
- Empty conduit with pull-strings for Comcast Cable
- Empty conduit with pull-strings for Qwest

One 4-inch conduits with 9-cell innerduct

- Army single-mode fiber optic cable for data and spare innerducts

Provide Army communications cables to facility types as follows:

Brigade Headquarters Buildings:	150-pair copper and 24-strand fiber
Battalion Headquarters Buildings:	150-pair copper and 24-strand fiber
Company Operations Buildings:	50-pair copper per Company and 24-strand fiber
Tactical Equipment Maintenance Facilities:	100-pair copper and 12-strand fiber
Enlisted Personnel Dining Facilities:	50-pair copper and 12-strand fiber
Unaccompanied Enlisted Personnel Housing:	50-pair copper and 12-strand fiber
<Other Facilities>	<Note to specifier: coordinate and list DOIM requirements >

6.9.3 SITE LIGHTING

6.9.3.1 **General:** Provide exterior lighting appropriate for the building function. Provide street lighting with photoelectric control on metal poles for any new streets and on streets that are modified as part of this project. Street lighting shall match the type used on the existing streets within the project area.

Provide exterior parking lot and pedestrian pathway lighting conforming to Illuminating Engineering Society of North America (IESNA) recommended illumination levels and the Washington State Non-Residential Energy Code. Provide metal poles with pole-mounted, color-corrected, high-intensity discharge luminaries with cut-off feature to minimize light pollution. Site lighting circuits shall be direct-buried Schedule 40 PVC conduits encased in sand, except use galvanized rigid steel conduit in paved areas subject to vehicular traffic. Provide handholes at each lighting pole. Site lighting circuits and controls shall be provided from the adjacent primary facility service. Provide photoelectric control with manual bypass.

Security lighting for boundaries and controlled areas, when applicable, shall meet minimum illumination as indicated in the Security Engineering Technical Manual (SETM) 853, Volume 2.

6.9.4 SITE GROUNDING

6.9.4.1 **General:** Site grounding shall consist of a counterpoise grid system composed of copper clad steel ground rods interconnected by stranded bare #1/0 copper wire. Connections shall be made using exothermic welds below grade for connections to electrical panels, communications system grounds, building steel and static ground points. Exposed ground connections shall be removable pressure type. Grounding and bonding shall comply with Article 250, NFPA 70.

6.10 FACILITY ELECTRICAL AND TELECOMMUNICATION SYSTEMS

6.10.1 **General:** Provide analysis during the design process to document selection of equipment and wiring. Calculations shall include load analysis, voltage drop, fault current and device coordination, and exterior lighting. A short circuit and protective device coordination study shall be conducted and documented during the design phase.

6.10.2 POWER

6.10.2.1 **General:** Comply with the National Electrical Code and coordinate equipment locations for working clearances and accessibility for ease of maintenance. Provide at least one exterior door to the main electrical room with panic hardware and that opens outward.

6.10.2.2 **Design Calculations:** Provide analysis during the design process to document selection of equipment and wiring. Calculations shall include load analysis, voltage drop, fault current and device coordination, and exterior lighting. A short circuit and protective device coordination study shall be conducted and documented during the design phase.

6.10.2.3 **Service Equipment:** Provide a service entrance switchboard or main distribution panel in the main electrical room with copper bus, transient voltage surge suppression, fully rated and selectively coordinated with downstream circuit breakers. (Series-rated breakers are not acceptable.)

Provide a meter in the Service Switchboard that is compatible with the post DDC system. Meter shall measure kilowatt-hour demand averaged over a 15-minute interval, phase voltage, amps, frequency, true power, reactive power, apparent power, and power factor with an accuracy of 1.0 percent minimum. Meter shall include battery backup, on-board data storage for a minimum of 30 days, peak demand recording, time-of-use logging, and remote alarm annunciation for power outage, phase loss, and phase voltage over/under conditions. Provide communications conduit and wiring from the meter to the DDC system in the Mechanical Room with ANSI/CEA-709.1b protocol (LonWorks) output for communications using Standard Network Variable Types (SNVTs) for measured values.

Provide panelboards with copper bus and bolt-on circuit breakers, fully rated and coordinated between downstream and upstream circuit breakers. Provide a dedicated panelboard for the building's general lighting, which is separate from panelboards serving sensitive electronic equipment and panelboards serving mechanical equipment. Locate panelboards and dry-type transformers in electrical rooms only. Provide a 4-inch concrete housekeeping pad under floor-mounted equipment.

Provide a lighting inverter system that meets the requirements of NFPA 101 for power to exit signs and egress lighting. Inverter shall include self-test/self-diagnostic feature that automatically performs a minimum 30-second test and diagnostic routine at least once every 30 days and indicates failures and alarms. Status, test, and alarm information shall be stored in memory and retrievable from unit display, with provisions for remote alarm indication and condition monitoring. Battery systems shall incorporate maintenance-free lead-acid or lead-calcium batteries. Emergency power source shall be located in

dedicated electrical equipment room, readily accessible to maintenance personnel from the exterior of the facility, independent of building occupants.

6.10.2.4 **Grounding:** Install a #6 ground wire at the DOIM telecommunications room telephone terminal backboard and connect it to the building's metallic ground. Leave sufficient coil to reach any part of the telephone backboard/equipment-racks/cabinets. Provide a ground bus in all electrical rooms and all telecommunications rooms.

6.10.2.5 **Receptacles:** Limit receptacle circuits to no more than five duplex receptacles in office and administrative areas. Provide a duplex receptacle adjacent to each voice/data outlet. Provide a duplex receptacle adjacent to each cable television outlet. Coordinate the location of the outlets with the type of television to be provided.

6.10.3. INTERIOR LIGHTING

6.10.3.1 **General:** Interior facility lighting shall be primarily fluorescent with high-efficiency lamps and fixtures with electronic ballasts, and shall conform to Illuminating Engineering Society of North America (IESNA) recommended illumination levels and the Washington State Non-Residential Energy Code. Exit and emergency egress lighting shall be provided and circuited to a single lighting inverter.

6.10.4 TELECOMMUNICATIONS

6.10.4.1 **General:** The telecommunications system design will consist of voice, data, and telemetry cable based functional design that complies with all requirements of Installation Information Infrastructure Architecture (I3A) and ANSI/TIA/EIA-568-B and 569-A requirements as appropriate.

6.10.4.2 **Telecommunications Service:** Terminate Army Outside Plant copper communications cables in a protected building entrance terminal with gas protector modules and provide cross connect from gas protector module to 110-type punch-down blocks. Terminate the fiber optic cable on rack-mounted fiber distribution patch panels with pull-proof-type ST-type single-mode connectors and locking clips for additional protection. Where rack-mounted equipment is required in existing facilities, verify rack dimensions and provide equipment to match.

Telecommunications rooms shall be provided in accordance with I3A criteria. Provide all connectors, racks, patch panels, and cables necessary for a complete and functional telecommunications system. Provide cable trays around the perimeter of all telecommunications rooms.

Provide dedicated space on the telephone back board for Qwest and Comcast. Qwest and Comcast will provide and install their entrance cables and make connections to their equipment. Furnish and install interior cables from cable television outlets and from commercial telephone outlets that may be required for the facilities in this project back to the appropriate demarcation point. Comcast and Qwest will make the connections to their equipment.

<For UEPH, Qwest and Comcast shall install cabling from outlets to the demarcation point and make connections to their equipment.>

All voice/data outlets installed within offices and other administrative spaces shall have three 8-pin RJ-45 modular telephone jacks and one blank space. Cables from the data outlets shall be routed from the outlet to 110-type RJ-45 CAT-6 rack-mounted patch panels located in the appropriate Telecommunications Equipment Room. Voice cables shall be routed from the outlet to 110-type punch down blocks in the appropriate Telecommunications Equipment Room. Cables shall be continuous without splices from termination to termination. Cabling shall be neatly bundled, properly tagged and labeled per standards.

A standard DOIM information outlet shall be provided on the telephone backboard for connection to the Post EMCS. The outlet location shall be coordinated with the Department of Public Works.

Test CAT-6 and fiber optic cabling and terminations using a testing method to meet physical and electrical Class II accuracy requirements of EIA TSB 67 (Draft) Standard.

6.10.4.3 **Secure Communications:** Provide a protected distribution system for the secure network, including minimum separation requirements at secure (SIPR) and non-secure (NIPR) outlet locations in accordance with provisions of NSTISSI No. 7003, Protected Distribution System and NSTISAM TEMPEST 2-95 for Red and Black Installations. Coordinate design and construction of secure communications system through the Contracting Officer with DOIM, Ms. Sarah Keys; 253-966-2463.

6.10.4.4 **Field Radio Antenna:** Provide a 2-inch raceway from the Duty Office (or location designated by the User) to the exterior of the building with a grounding bushing at the interior and a weather head at the exterior and coax cable for a field radio antenna connection. Coordinate installation requirements with the User.

6.10.5 FIRE ALARM AND MASS NOTIFICATION

6.10.5.1 **General:** Provide an addressable, Signaling Line Circuit Style 7, Notification Appliance Circuit Style 4, zoned, battery-backed fire alarm system with input to the post monitoring system through a Monaco transceiver and a hardwire connection. All areas of the building shall be monitored and pull-stations will be provided at all exits. The Fire Alarm Control Panel (FACP) shall be located in the main electrical room adjacent to the Mass Notification System Autonomous Control Unit (ACU). Fire Alarm/Mass Notification System wiring shall be in conduit (EMT). Coordinate with the Post Fire Marshal for approval of annunciator panel location.

<For UEPH:

Sleeping Room Smoke Detector Functions:

Smoke detection in sleeping rooms shall automatically initiate the following functions:

A. No transmission of signals over the station radio fire reporting system.

B. Sound local alarm of the sleeping room smoke detectors sounding base. The sound shall be different than that of the general building evacuation alarm.

C. A supervisory notification identifying room in alarm with no transmission of signals over the station fire reporting system.

D. An alarm condition on the circuit shall automatically sound smoke detector sounder bases in the sleeping rooms. >

Provide a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter, notification and annunciating devices, mass notification devices, and interfaces to other systems, such as EMCS.

The notification device shall be a speaker/horn type producing a chime-like sound that is pleasant and distinctive from the other building alarms. Notification devices designated for exterior walls shall be a combination audio/visual notification type rated for outdoor use.

Mass notification shall be fully functional as part of the Monaco DB21 fire system and capable of standalone live microphone and activation of prerecorded messaging. Installation-approved messages

shall be provided by Fort Lewis Directorate of Emergency Services (DES), Physical Security Branch. The system shall also connect to the current head-end equipment (CCU) and made fully functional from the remote site located at the Fort Lewis Emergency Operation Command (FLEC) facility, Building 04101.

Performance verification and intelligible voice testing shall be conducted by the installation engineer and/or security specialist. Testing shall be measured through the use of a DSP 30 intelligible voice measuring instrument. A minimum of 0.7 on the Sound Transmission Index (STI) at an expected average ambient noise level for the environment being tested will be required. Test points shall be identified and conducted throughout the facility at a point furthest from any single speaker and/or at the mid-point between any two speakers servicing the target area. A current calibration certificate shall be provided at the time of testing. Upon completion of work and the contractor's 100 percent system test, the contractor shall schedule a 100 percent Performance Verification Test (PVT) with the Fire Marshall and Directorate of Emergency Services, SAC-D, Physical Security Branch. Upon acceptance, contractor shall receive results of the performance verification test.

6.10.6 INTRUSION DETECTION

6.10.6.1 **General:** Contractor shall design and install a complete, fully tested intrusion detection system, including installation of Government-Furnished Contractor-Installed (GFCI) equipment, all conduit and conductors, drawings, system integration, and all testing.

The Intrusion Detection System on Fort Lewis is an Integrated Commercial Intrusion Detection System II (SAFENET ICIDS II) manufactured by MDI, Inc., 9725 Datapoint Drive, San Antonio, Texas 78229. Intrusion Detection System equipment and devices (RTU's, PPU, BMS, PIR, etc) shall be GFCI devices. Government-furnished equipment shall be provided to the contractor in factory-delivered unopened shipping boxes. Upon receipt of equipment, the contractor shall be responsible for all warranty issues associated with that equipment. System requirements shall be coordinated with the Physical Security office.

The Intrusion Detection System shall use Version 6.2.1.6 SAFENET operating system, with PB2000 processor, firmware revision 1.48, encrypted, and carried over the installation LAN via VLAN23. System shall be fully compatible with the existing ICIDS II security system at Fort Lewis. Battery backup shall be provided for a minimum of six hours for all ICIDS components, to include subcomponents that support the operation and reporting of alarm events.

Work includes updating input points and graphics at the central monitoring station to provide a turnkey system. Contractor shall coordinate with the Government Construction Representative for access to the central monitoring station.

To reduce system compatibility problems, the Intrusion Detection System shall be installed by MDI-certified ICIDS II integrator with a minimum of five years of experience installing, integrating, and programming on systems comparable in size to Fort Lewis ICIDS, and with the following clearances and certifications:

- Company TOP SECRET
- SECRET for system administrators, programmers, and supervisors
- CONFIDENTIAL for all others performing work on ICIDS

Proof of clearances and certifications shall be provided to the Directorate of Emergency Services.

6.10.6.2 **Final Testing and Acceptance:** Upon completion of work and the contractor's 100 percent system test, the contractor shall schedule a 100 percent Performance Verification Test (PVT) with the Directorate of Emergency Services, SAC-D, Physical Security Office. The contractor shall provide all PVT documentation. Upon acceptance, the contractor shall receive results of the (PVT).

6.11 HEATING, VENTILATING, AND AIR-CONDITIONING

The HVAC systems for these facilities shall provide heating, ventilation, and (in some cases) cooling, with a design intended for personnel comfort and cooling of electronic equipment (computer servers, communication equipment, etc.).

The < Building Contractor> <Contractor> shall be responsible for the professional quality and technical accuracy of all HVAC design documents and shall insure construction meets all requirements of the approved design. Drawings, specifications, and other design documents upon which construction is based shall be coordinated with other disciplines to insure compatibility of all building systems.

It is desirable to locate all primary mechanical equipment such as air handlers, boilers, hot water heaters, pumps, storage tanks, etc., inside of a main mechanical room where possible. All equipment shall be of the high-efficiency type. Gas-fired boilers, hot water pumps, and any other cooling and heating plant accessories and/or appurtenances shall be designed and arranged to fit properly within associated mechanical rooms. All exterior piping, tanks, or other appurtenances, which could be damaged by freezing, shall be protected with heat tracing and proper coatings or finishes. All pumps serving the central mechanical equipment shall be located inside the main mechanical room.

Locate all ceiling-mounted equipment, such as variable volume terminals and fans, above corridors or other areas that can provide ready accessibility. Avoid installing such equipment above classroom ceilings or other occupied areas whenever possible.

6.11.1 DESIGN CRITERIA: The HVAC systems shall be designed to the latest industry standards, codes, government regulations, and to the specifications included in this solicitation.

All equipment and controls shall be integrated and communicate with the existing Fort Lewis Tridium Niagara system via LonMark/LonTalk and/or BACnet communication protocols.

When designing the mechanical rooms, the designer shall take into account the requirements of ASHRAE Standard 15.

The layout of the rooms and equipment shall consider proper maintenance clearances, around all equipment, separation of conditioned and unconditioned areas, security of the communication room, and observance of the "dedicated electrical space" around electrical equipment as required by the National Electrical Code (NEC 2005).

6.11.2 DESIGN REQUIREMENTS

6.11.2.1 Design conditions include the following.

<u>Outdoor Conditions</u>
(Reference: ASHRAE Puget Sound Chapter “Recommended Outdoor Design Temperatures, Washington State,” 2nd Edition)

Winter Dry-Bulb (0.6 percent):	24°F
Summer Dry-Bulb:	82°F
Summer Wet-Bulb:	64°F

<u>Indoor Conditions</u>

Winter Dry-Bulb:	68°F
Summer Dry-Bulb:	77°F (air-conditioned spaces only)

- Ventilation requirements shall follow the guidelines and recommendations of ASHRAE 62.1 – 2004.

- HVAC systems shall be in accordance with ASHRAE Handbooks and the International Mechanical Code.
- HVAC Commissioning shall be in accordance with ASHRAE Guideline 1.
- Elevator equipment rooms shall be ventilated per International Building Code and Washington Administrative Code (WAC) Chapter 296-96 for Washington State.
- Boilers shall be inspected by the State of Washington.

6.11.2.2 The buildings are to be heated and ventilated without the use of mechanical cooling. Design system for 100 percent outdoor air capability. Communication rooms, SIPR rooms, and Electrical rooms may require cooling. The **<**Building Contractor> <Contractor> shall perform heat load calculations to include all anticipated heat producing equipment located within these spaces. Provide a ventilation system based on manufacturer's recommended data as well as published criteria such as can be found in "ASHRAE Thermal Guidelines for Data Processing Environments". Mechanical cooling should only be installed if heat load calculations indicate that ventilation (outdoor air) alone cannot maintain recommended room temperature. If mechanical cooling is required, provide self-contained or split system air-conditioning units using R-410A refrigerant. Unit should be capable of operating in economizer mode to ventilate the space with outdoor air until the thermostat calls for mechanical cooling. Provide exhaust systems for all toilet rooms, shower rooms, janitor rooms, kitchens,clothes dryers, and electrical and mechanical rooms. Heat recovery should be considered where energy savings may be realized.

In the absence of published manufacturer's specifications, provide environmental conditions in accordance with one of the following.

- ANSI T1.304 -1997 Ambient Temperature and Humidity Requirements for Network Equipment in Controlled Environments
- ASHRAE Thermal Guidelines for Data Processing Environments
- Network Equipment Building System (NEBS)
- Telcordia GR-63-CORE
- Exhaust toilet rooms per ASHRAE 62.1 – 2004

6.11.2.3 If used, boilers can be either natural gas or electric, as determined based on life-cycle cost analysis. Cast iron boilers of any type are not allowed. If natural gas-fired boilers are installed, boiler shall produce no greater than 30 ppm NOx in the flue gases, at 3% excess oxygen, and combustion air temperature of 68 degrees F.

6.11.2.4 Any water heater or boiler used as a hot water heater can be either natural gas or electric, as determined based on life cycle cost analysis. If natural gas fired hot water heaters are installed, equipment shall produce no greater than 30 ppm NOx in the flue gases, at 3% excess oxygen and combustion air temperature of 68 degrees F.

6.11.3 VENTILATION AIR FOR BUILIDNG OCCUPANTS

Outside air quantity to each air-handling unit shall be automatically controlled as determined by CO_2 monitors while maintaining the requirements of ASHRAE Standard 62.1-2004, Appendix C. Design shall incorporate CO_2 ventilation control with ventilation reset per ASHRAE 62.1-2004 and Trane newsletter 34-5; show in design algorithms, formulas, and sequence of operation that meet these requirements. Design shall incorporate CO_2 sensors and shall also include time of day schedules and/or occupancy sensors to reduce ventilation requirements.

6.11.4 DIRECT DIGITAL CONTROL AND ENERGY MANAGEMENT CONTROL SYSTEM

The direct digital control (DDC) and utilities monitoring and control system (UMCS) requirements in Paragraph 6 take precedence over the DDC and UMCS requirements in paragraph 5 of this SOW.

Fort Lewis UMCS uses a Tridium Niagara platform that is designed to provide interoperability using LonMark/LonWorks and BACnet compliant controllers. Provide a building DDC system compatible with and remotely programmable and configurable through a Java Application Control Engine (JACE) Network Area Controller (NAC) and the Fort Lewis Public Works Standard Tridium system via the existing postwide IT wide area network (WAN) operated by DOIM. The JACE Network Area Controllers have been approved by Fort Lewis DOIM for connection to the WAN/LAN. Fort Lewis DOIM does not allow routers on their WAN/LAN system. Routers shall not be used. Provide a building control system which integrates with the Tridium system, controls the indoor environment, and manages energy consumption, and schedules preventative maintenance, controls interior lighting, controls exterior lighting, monitors fuel consumption, monitors water usage, monitors electrical consumption, (monitors packaged equipment controls, and monitors equipment alarms). All motors are to be monitored for actual status using current transmitters. Provide a LonWorks or BACnet interface for packaged equipment controllers, when necessary for network communication.

Provide a central location (usually the mechanical room) for each building's control system to monitor and control each zone setpoint. Also provide one DDC system workstation for each project in at least one of the project buildings. Provide a system with alarms that identifies when system is outside of normal operation from sequence or setpoints. Provide interlock and safety routines that will safeguard and prevent progressive damage to equipment due to monitored failures. Provide a system which is user programmable, has access from remote locations, has multiple layers of secured access to data and program information, and has a graphical user interface accessible through any standard web browser without manufacture's software. The graphical user interface shall allow for hierarchical graphical navigation between systems, provide graphical representations of systems, provide access to real-time data for systems, and provide the ability to override points in a system, and provide access to all supervisory monitoring and control functions. Each system display shall clearly distinguish between the following point data types and information: real-time data, user-entered data, overridden or operator-disabled points, devices in alarm (unacknowledged), and out-of-range, bad, or missing data. The software shall allow the user to create, modify, and delete displays and graphic symbols. Configure monitoring and control (M&C) software functionality. Fort Lewis Standard graphical pages shall be used for system graphic displays, including overrides, alarm handling, scheduling, tends for critical values needing long-term or permanent monitoring via trends, and demand limiting.

Where exposed to damage, install wiring external to control panels, including low-voltage wiring, in metallic raceways (plenum rated wiring where not exposed to damage). Install wiring without splices between control devices and DDC panels. Install instrumentation grounding as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system.

Tag cables and conductor wires at both ends, with the identifier shown on the shop drawings. Identify equipment manufacture's literature stating compatibility with Fort Lewis Tridium system and LonMark/LonWorks or BACnet. Demonstrate system communication by downloading programs and configuring programs to controllers over the network from the workstation. Disconnect the network server communication line from the JACEs. Ensure all the JACEs continue to perform their local functions.

If natural gas is used, gas meter to be provided with equipment to connect to BAS/DDC/UMCS system for monitoring of gas usage. Electric and water consumption shall be monitored through the DDC/BAS/UMCS system. Electric shall be trended every 15 minutes and archived to hourly, daily monthly and yearly charts. Gas and water will be trended every hour, and achieve daily, monthly, and yearly charts.

Provide one workstation desktop computer, monitor, etc. with performance meeting current technology standards and web supervisor workstation software, licensed to Fort Lewis/GSA in the Org Id section for the project. Provide security workstation cabinet with the following features.

1. Locking upper compartment with Plexiglass window providing viewable access to most 20-inch monitors.

2. Locking pull-out drawer: Facilitates ergonomic operation of keyboard, mouse, and convenient storage of small supplies; keyboard and supplies can be accessed even while top and bottom compartments are locked.

3. Full-size locking bottom doors in front and rear for complete access to equipment and cables; lower compartment features one fixed bottom and one adjustable shelf for desktop or tower style PCs, printer, paper or supplies; louvers in rear provide equipment ventilation.

4. Heavy-duty all welded steel top and bottom sections bolt together for easy assembly; Top Level Compartment (internal): 20-3/4" W x 21-1/4" D x 23-1/2" H; Overall Dimensions: 21" W x 22-1/2" D x 59-1/2" H.

Provide one notebook computer with performance meeting current technology standards and the latest version of Tridium JDE (Java Desktop Environment) software, licensed to Fort Lewis/GSA in the Org Id section.

All computers shall have the DOIM image installed though DPW IT Department before its DDC software is installed and licensed.

Thermostats to temperature sensors shall have integral override pushbutton and setpoint adjustment level. Both override time frame and lever adjustment range to be adjustable through DDC GUI. Thermostats shall not be line voltage.

Provide M&C software with Web Supervisor license and node licenses for additional JACEs.

Provide M&C software with a license for no less than quantity of points to support systems being controlled and monitored, plus 10 percent more for expansion.

The software shall be expandable in both number of points and number of clients supported in order to support system expansion.

The <Building Contractor> <Contractor> shall perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. The PVT shall demonstrate that the system performs as specified, including but not limited to demonstrating that the system correctly performs the Sequences of Operation.

Provide a one-year unconditional warranty for the installed BAS/DDC/UMCS and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

Provide a minimum of 16 hours of training that consists of 8 hours of classroom and 8 hours of field training at the project site on the installed BAS/DDC/UMCS. Upon completion of this training, each student, using appropriate documentation, should be able to start the system, operate the system, recover the system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

6.11.5 PERMITTING: The <Building Contractor> <Contractor> shall be responsible for all applicable environmental permitting and testing concerning the mechanical systems, including coordination of the permitting with the Contracting Officer's Representative. Shortly after notice to proceed, the Government and the <Building Contractor> <Contractor> shall attend a meeting to discuss the roles and responsibilities of the permit applications. The <Building Contractor> <Contractor> shall fill-in all

applicable parts of the permit(s) and submits them to the Contracting Officer's Representative for the Government to fill-in the remaining parts and sign the permit.

6.11.5.1 **Miscellaneous Information**: Refrigerant Ozone Depletion Factor: 0.050 or Lower. http://www.usace.army.mil/inet/usace-docs/armytm/tm5-809-10.

6.11.5.2 **Outside Air Criteria**: Designed to ASHRAE Standard 62.1 - 2004.

6.12 ENERGY CONSERVATION: Energy conservation will involve building design and orientation, landscaping, and envelope construction, glazing selection, power, lighting fixtures, occupancy sensors, daylighting, variable speed motors and pumps, and innovative mechanical systems.

<Note to Specifier: Add submittal requirement in proposal instructions, with associated evaluation factor if this preference is selected as betterment.>

6.13 FIRE PROTECTION

No heat tape, heat tracing, or insulation on any fire suppression system component. All wet system standpipes will be located on the interior of structures and/or in heated enclosures. Install only like material components in a suppression system, do not mix materials. All screwed pipe 2 inches or smaller shall be Schedule 40 or better. For wet pipe systems, eliminate alarm valves and install electric bell as secondary notification device. Use galvanized pipe only on dry systems. Wet suppression systems are preferred over dry systems as they have lower maintenance requirements and a longer life expectancy.

For dry sprinkler systems, use only beltless and oil less compressors.

6.14 SUSTAINABLE DESIGN

Fort Lewis Sustainability Philosophy is to apply systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life so the end result is a quality, high-performance building. Priorities in the order listed below provide guidance on the relative importance of sustainable strategies to Fort Lewis as an aid in design decision. However, additional proven sustainable strategies are encouraged. <Note to Specifier: Add these Fort Lewis preferences and appropriate notes to Appendix <insert letter designation> LEED Credit Preferences, Guidance and Resources as applicable.>

The following are Fort Lewis' eight sustainability goals

1) Reduce installation stationary source and non-tactical motor vehicle air emissions 85% by 2025

2) Reduce total energy consumption by 30% by 2015

3) Sustain all activities on post using renewable energy sources and generate all electricity on post by 2025

4) Create sustainable neighborhoods for a livable Fort Lewis community that enhances the Puget Sound region

5) Cycle all material use to achieve zero net waste by 2025

6) Maintain the ability of Fort Lewis to meet its current and future military missions without compromising the integrity of natural and cultural resources, both on the installation and regionally

7) Recover all listed and candidate federal species in the South Puget Sound region

8) Treat all wastewaters to Class A reclaim standards by 2025 to conserve water resources and improve Puget Sound water quality

The following priorities support Fort Lewis sustainability goals

1. Energy savings, including architectural strategies, such as building orientation, daylighting, and building envelope efficiencies
2. Water savings/reuse
3. Low-emitting, non-toxic materials
4. Reusable/recyclable building materials (do not use materials that must be disposed of in a landfill when removed from the building)
5. Tie in to neighborhood sustainability features (e.g., continuance of bike lanes, neighborhood gray water treatment and reuse system, use of neighborhood heat plants)
6. Minimize turf areas/water intensive landscapes; use xeriscaping; use low-impact development strategies for stormwater.
7. Provide operable windows and views for all building occupants

6.14.1 LEED Minimum Rating Exempt Facilities: The following facilities are exempt from the minimum Silver requirement: [None] [ ]

6.14.2 CREDIT VALIDATION: [The project is a standard design portion of a multiple contractor combined project.] Although USGBC certification is not required, the project is required to be registered with USGBC and use LEED Letter Templates for documentation. [See Appendix <insert letter designation> of this RFP for LEED Requirements for Multiple Contractor Combined Project.] Registration of the standard design and payment of fees will be by the contractor. Administration of the online project will be by the [Government- editor needs to confirm that Fort Lewis will be funding from non-MCA funds as USACE policy prohibits funding of registration from project funds)] [Contractor].

6.14.3 COMMISSIONING: See Appendix <insert letter designation> of this RFP for Owner's Project Requirements document(s). <Note to Specifier: Enhanced commissioning may be feasible if the Commissioning Agent is hired by the design A/E with reports submitted directly to the Government, per USGBC Credit EA-3 Interpretation Request response dated 10-9-2006. Add the appropriate notes on this credit to Appendix <insert letter designation> LEED Credit Preferences, Guidance and Resources as applicable.>

6.14.4 LEED CREDIT PREFERENCES, GUIDANCE, AND RECOURSES: See Appendix <insert letter designation> **LEED Credit Preferences, Guidance and Resources,** as applicable, of this RFP for LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.5 [MULTIPLE CONTRACTOR COMBINED PROJECT: When site work and building(s) are accomplished by separate Contractors, it is a combined project for purposes of LEED scoring and documentation.

The LEED-NC Application Guide for Multiple Buildings and On-Campus Projects applies to all combined projects that include multiple facilities. The minimum overall combined project requirement is to achieve Silver level of Leadership in Energy and Environmental Design (LEED) rating for all non-exempt buildings plus site.

See Appendix <insert letter designations> of this RFP for LEED requirements of Multiple Contractor Combined Projects and for LEED Strategy Table(s) for special requirements for this project.]

6.14.6 Energy efficiency incentives and rebates through PSE is available to the <Building Contractor> <Contractor>. Contact PSE energy management engineer to confirm the available rebates and incentive programs that is suited for the project.

6.15 ENVIRONMENTAL

6.15.1 EMERGENCY UNEXPLODED ORDNANCE (UXO) RESPONSE: Should UXO be encountered during construction activities that are deemed to be a threat to human health or the environment, Fort Lewis EOD professionals shall be immediately contacted to conduct an emergency response. Additionally, immediately contact the Contracting Officer if UXO is encountered. An evaluation of this scenario and procedures, with contact numbers, shall be included in the HASP for the fieldwork.

6.15.2 Monitoring wells may be encountered during construction activities. Any monitoring wells encountered during construction activities shall be protected against damage. If any monitoring well is damaged in any way, it shall be repaired at the <SDC> <Contractor>'s expense. Contact the Contracting Officer if a monitoring well is encountered.

6.15.3 Other environmental issues (i.e., random underground storage tanks, transite piping, random transformer, etc.) may be encountered during construction activities. Contact the Contracting Officer if an environmental issue is encountered.

6.16 PERMITS: The Government has obtained no permits/licenses to this project. It shall be the responsibility of **<**both the SDC and Building Contractors> < the Contractor> to obtain ALL permits/licenses required for this project. Submittal of the permits to the Contracting Officer and Public Works Environmental Division (ED) must be sufficient time to allow for review and revisions with ultimate submittal at least 10 days before commencing removal activities. Amendments to the permits shall also be provided to the Contracting Officer and ED. <Both Contractors> <The Contractor> shall be responsible for determining fee basis and paying all filing fees. Upon notice to proceed, immediately begin working required permits, and supporting information required by the Government to process permits. <Both Contractors> <The Contractor> is responsible for procuring a dig permit from Fort Lewis DPW. The <SDC> <Contractor> shall also procure approval for demolition and disposal plans from Fort Lewis DPW. Complete all applications for the Clean Air permit and submit to Fort Lewis DPW for review. Once reviewed, incorporate changes and forward application and fee to the appropriate agency. Coordinate with Fort Lewis DPW for commissioning and approval of water and sewer systems. Obtain any other operating permits or licenses as required for construction. A Stormwater Pollution Prevention Plan (SWPP) is required for construction activities that will have a land disturbance of one or more acres (or is part of a common plan of development that will disturb an acre or greater), and has the potential for stormwater discharge to a water of the U.S. The SWPPP must receive Government approval prior to land disturbing activities. One SWPPP may be submitted jointly for the project or each operator may submit a separate plan.

All permit applications must indicate the following address as the building and site owner:

Fort Lewis Public Works
ATTN: IMNW-PWE
Box 339500 (Building 2012)
Fort Lewis, WA 98433-9500

6.17 DEMOLITION

6.17.1 CLEARING AND GRUBBING: Clear and grub all trees and vegetation necessary for

construction, but save as many healthy trees as possible. Consider alternatives of the site orientation to preserve existing trees. Unless otherwise noted, a qualified tree specialist (International Society of Arboriculture (ISA) Certified Arborist, urban forester, or horticulturist) shall determine the health and safety of trees. Trees to be preserved within the project site limits shall be protected by a fence around a tree directly under its outermost branch tips. Existing trees to be preserved shall be crown-pruned to remove all dead, broken, or crossing branches within the crown of the tree. Pruning shall be accomplished by trained and experienced personnel in accordance with ANSI A300. Trees to remain shall also have all flagging, paint, hardware, or other man-made products removed prior to completion of landscaping. Any existing vegetation designated to remain that is damaged during the work under this contract shall be replaced in kind with a minimum 5 feet high, in accordance with **UFGS 01 57 20.00 10** ENVIRONMENTAL PROTECTION.

All timber removed from the project shall remain the property of the Government, unless otherwise indicated or specified. Merchantable trees removed during construction shall be piled for subsequent disposal by the Government. Coniferous tree stems will be piled separately from deciduous tree stems. A merchantable tree is defined as a tree with a small end diameter of at least 4 inches and 16 feet in length. Trees shall be cut from the stump and limbed (flush to the trunk) out to a 4-inch diameter. Trees shall be topped at 4-inch diameter and from this point to the top of the tree shall be considered unmerchantable (slash). Whenever possible, trees will not be cut into log lengths. If trees are too large to be handled tree length, cut 41-foot logs from the butt end until a manageable length is achieved. Tree length logs shall be piled separately from all shorter material (cut and broken logs). Piles shall be located as directed by PW, Engineering and Contract Management Division. Piles shall be located so as not to interfere with construction work and so they will be accessible at a later date for disposal action. Piles shall not exceed 8 feet in height.

To maintain the highest potential cost recovery to the Government, trees shall be felled and bucked into preferred lengths prior to being removed from the site for storage. Preferred lengths are as follows: 41’-10”, 38’-10”, 36’-10”, or 32’-10”. Acceptable lengths include 2 foot multiples less than 32’-10” down to 16’-10”. All logs should be manufactured down to a 4-inch top. Log lengths should be merchandized to exclude volume defects.

Material and soils to be stripped or grubbed shall be removed to a depth recommended by the contractor’s geotechnical engineer. Tree stumps shall be removed by grinding to a minimum depth of 18 inches below original ground surface. If the stump is within the drip-line of a preserved tree, grind the tree stump to grade level only. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform to the original adjacent surface**.**

6.17.2 DISPOSAL OF MATERIALS: Disposal areas for cut material generated from the project may be disposed of on post in designated disposal areas. All other materials not designated for on post disposal shall be disposed of off post at the contractor’s expense. On post disposal areas for the specified materials are as follows.

a. Sequalitchew Creek Eco Park and Earthworks. Materials accepted for recycling purposes are concrete, asphalt, brick, concrete block (if not painted with lead-based paint), rock, land clearing/clearing debris, and excess uncontaminated soil.

b. <Note to the specifier: confirm availability of site, otherwise delete this paragraph> Uncontaminated excavated soils are accepted at the following pits subject to availability and direction of Fort Lewis Public Works (FLPW), Sequalitchew, Gray Army Airfield Pit, East Gate Pit, and Lincoln Pit**.** <Additional sites are available subject to direction by FLPW>

c. <Note to the specifier : confirm Ft Lewis will accept these, otherwise delete this paragraph> Non-hazardous lead-contaminated soil (top 6 inches from designated areas) is accepted at former Landfill 2 subject to availability and direction from FLPW.

d. The Contractor is required to submit a "Borrow Source Use and Entry Notification Form" to dispose of uncontaminated soils within Fort Lewis at the designated sites and under the direction of FLPW.

e. Coordination for all recycling activities, disposal of materials on Fort Lewis, and obtaining permit forms are through Fort Lewis Public Works, Solid Waste and Recycling Program Manager Fort Lewis PW/ENRD, General Dynamics; Phone: (253) 966-6452; Cell: (253) 377-1420; Fax: (253) 967-9937; E-mail: **usarmy.jblm.imcom.list.dpw-jblm-recycles@mail.mil**.

6.17.3 ABANDONED UTILITIES: The <SDC><Contractor> will be responsible for locating and removing any abandoned utilities found onsite that may interfere with the site development or building.

6.18 ADDITIONAL FACILITIES: No additional facilities.

Date of Change	Change Number	Synopsis of Change	Revision Date	Detailed Description
NOTE: *Click* “Details” *below to view the detailed description of the change*				

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Users of the IDG are presented with a hyperlinked table of contents. Each name is hyperlinked directly to the beginning of the document that it indicates. The table of contents is expandable and hyperlinked to each section and subsection.

Click on the hyperlinks inside the bottom right corner box to enter the IDG Table of Contents and Executive Summary.

For a complete list of military terms and acronyms, go to http://www.dtic.mil/doctrine/jel/doddict/acronym_index.html

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EXECUTIVE SUMMARY

ES.1 PURPOSE

The purpose of the Army Installation Design Guide (IDG) is to provide directives for the mandatory common facility and infrastructure standards for all Army installations. These standards set a common basis to facilitate the continuous improvement of the functional and visual aspects of all Army installations (Fig. ES.1). It is also the purpose of these standards to promote sustainable design and development and to promote an integrated design process for all projects.

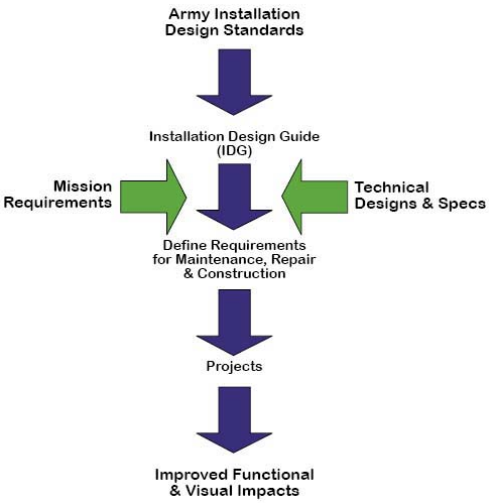

Fig. ES.1 - The Army Installation Design Standards Facilitate Continuous Functional and Visual Improvements.

ES.2 AUTHORITY

Authority for this document is derived from the Message from Vice Chief of Staff Army (VCSA), dated 241209Z Apr 03, Subject: Army Installation Design Standards, which directs implementation of the Army Installation Design Standards effective 28 April 2003.

ES.3 APPLICABILITY

ES.3.1 The Army Installation Design Guide document is applicable to all installations and activities under jurisdiction and supervision of the Department of the Army in the United States, its territories and possessions, the Commonwealth of Puerto Rico, and in foreign countries. This document also applies to the National Guard and Army Reserves, and includes planning and development of base camps in theaters of operation. This document is specific to Fort Lewis, Washington.

ES.3.2 Organizational Responsibilities; Army Facilities Standardization Committee (AFSC) process for development of facilities standards, waiver, and change procedures are defined in Section 1.

ES.4 BACKGROUND

ES.4.1 The Installation Design Guide (IDG) provides the Army Standards for all facilities. The Installation Design Guide Model follows the concept established in the Joint Service Unified Facilities Criteria Installation Design manual (UFC 2-600-01).

ES.4.2 Research was conducted to incorporate into Army standards the best practices from other organizations such as the Air Force, Navy, Army and Air Force Exchange Services (AAFES), General Services Administration (GSA), National Park Service, Federal Highway Administration, and various city and county governments, and associations.

ES.5 SCOPE

ES.5.1 The IDG provides standards based on basic design principles, and guidelines to installation decision makers, contracted and in-house planning and design professionals, installation maintenance personnel, and others. The IDG sets interior and exterior standards and planning criteria to be integrated into all proposals, design and construction contracts, renovation, maintenance, or repair projects performed on the installation or its properties.

ES.5.2 The IDG promotes a sense of arrival, functional compatibility, visual harmony and order, relates the natural and man-made environment, and achieves consistent architectural themes throughout an installation. The general steps involved in the development of an IDG and which are presented in the model are:

- Establishment of an installation profile.
- Conduct surveys to determine the assets and liabilities of the installation relative to the standards given in the IDG.
- Development of visual zones and themes throughout an installation.
- Development of projects needed to bring the installation into compliance with the IDG, cost estimate, the priority set by the garrison Real Property Planning Board and approved by the Installation Management Agency (IMA).

ES.5.3 The IDG consists of twelve sections:

- Section 1 - Introduction
- Section 2 – The Installation Design Guide Process and Implementation
- Section 3 – Design Guide Analysis Criteria
- Section 4 – Installation Profile
- Section 5 – Visual Themes and Zones
- Section 6 – Improvement Projects
- Section 7 – Site Planning Design Standards
- Section 8 – Building Design Standards
- Section 9 – Circulation Design Standards
- Section 10 – Landscape Design Standards
- Section 11 – Site Elements Design Standards
- Section 12 – Force Protection Design Standards

ES.5.3.1 The IDG also consists of eighteen appendices:

- Appendix A – Design Team IDG Checklist
- Appendix B – Project Requirements IDG Checklist
- Appendix C – Interior Design Review Checklist
- Appendix D – Sustainable Design
- Appendix E – LEED Checklist
- Appendix F – Landscape Maintenance Schedule
- Appendix G – Prioritized Improvements Project List
- Appendix H – Self-Help Project Checklist
- Appendix I – Interior Finishes Standards
- Appendix J – Interior Furnishings Guide
- Appendix K – Exterior Materials Charts
- Appendix L – Exterior Color Charts
- Appendix M – Historic Preservation Guidelines
- Appendix N – Housekeeping Rules (Example)
- Appendix O – Plant Palette
- Appendix P – Army Facilities Standardization Program, Centers of Standardization
- Appendix Q – Standards and References
- Appendix R – Waiver/Exception to Standards

ES.6 SUMMARY

The aforementioned standards supercede all previous directives and are to be implemented in all current and future Army construction projects. Doing so will effect a steady transformation of all Army installations with continuous functional and visual improvements in a uniform and cohesive manner and with sustainability and an integrated design process for all projects as key design considerations.

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SECTION 1
INTRODUCTION

1.1 PURPOSE

1.1.1 A military installation conveys a visual image established by its architectural and historical character, arrangement of facilities, circulation patterns, and features in the landscape. This image can be clear, orderly, logical and attractive; or cluttered, confused, and unattractive.

1.1.2 The purpose of the Army Installation Design Guide (IDG) is to provide design guidance for standardizing and improving the quality of the total environment of the installation. This includes not only the visual impact of features on the installation and but also the impact of projects on the total built and natural environment. The improvement of the quality of visual design and development and use of sustainable design and development practices have a direct and future impact on the quality of life for those who live, work or visit the installation.(Fig. 1.1)

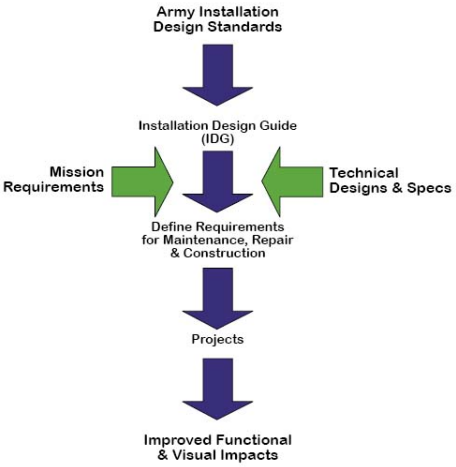


Fig. 1.1 - The Army Installation Design Guide is a Tool to Implement Army Standards.

1.1.3 The IDG includes standards and general guidelines for the design issues of site planning; architectural character, colors and materials; vehicular and pedestrian circulation; and landscape elements, including plant material, seating, signage, lighting, and utilities. The design guidelines incorporate sustainable design, quality of design, anti-terrorism, low maintenance, historical and cultural considerations, durability, safety, and compatibility.

1.2 GOAL

The goal of the IDG is to provide a clear, comprehensive approach to establish and maintain a positive visual imagery throughout the

installation and implement appropriate standards. This is accomplished by providing a systematic development process that is defined through description, analysis, synthesis, and implementation.

1.3 OBJECTIVES

The objectives of the IDG are:

1.3.1 To provide a set of general design standards and guidelines that define color, materials, style, signage, and other aspects of design for all visual elements surveyed.

1.3.2 To provide standards and guidelines for the selection of materials for new construction, renovation, maintenance and repair projects.

1.3.3 To provide guidance for accomplishing sustainable development. See Appendix D.

1.3.4 To provide a structured methodology for establishing projects to improve the visual imagery of the installation.

1.3.5 To provide guidance to integrate ATFP standards.

1.4 AUDIENCE

1.4.1 The IDG is to be used by all individuals involved in decision-making, design, construction, and maintenance of facilities (Fig.1.2). The primary users include the following:

1.4.1.1 Senior Mission Commander

1.4.1.2 Garrison Commanders and Staff

1.4.1.3 Installation facility planning and design personnel

1.4.1.4 Installation facility maintenance personnel

1.4.1.5 Installation Management Agency and Region

1.4.1.6 U.S. Army Corps of Engineers project managers, design, and construction staff

1.4.1.7 Consulting Planners, Architects, Engineers, Interior Designers, and Landscape Architects

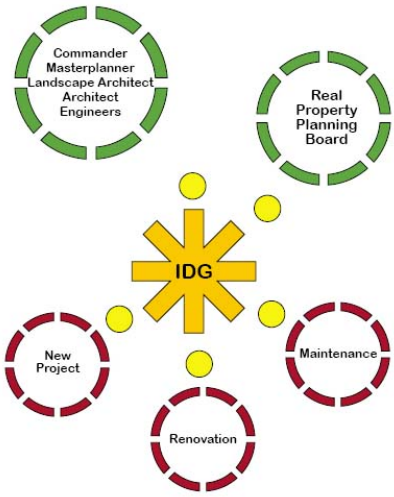


Fig. 1.2 - Design Guide Audience

1.4.1.8 Supporting agencies such as AAFES, DeCA, DoDDS, MEDCOM, tenants, etc.

1.4.1.9 National Guard

1.4.1.10 US Army Reserve

1.4.2 The ultimate success of the IDG is dependent upon the commitment of the above individuals and organizations working as a team to apply the Army standards.

1.5 ORGANIZATION

1.5.1 This Army Installation Design Guide is organized to facilitate the preparation and execution of projects to improve the visual image on the installation and ensure design conforms to Army standards to include sustainability.

1.5.2 Sections 2 and 3 discuss the process, use, and implementation of the IDG.

1.5.3 Section 4 establishes the installation profile. The installation setting, existing land use, and future land use are detailed.

1.5.4 Section 5 addresses the development of installation visual themes and zones. It lists visual themes and zones, specifies assets and liabilities of each zone, and offers recommendations.

1.5.5 Section 6 provides a list of prioritized improvement projects. All projects are addressed in terms of existing conditions, design concept, cost estimate, funding and maintenance impact, and site plan where applicable.

1.5.6 Sections 7 through 12 discuss the six design components that provide the categories used for review and analysis during the visual inventory of the installation. The visual impressions of each zone are categorized according to these six design components.

1.6 WHEN TO USE THE ARMY INSTALLATION DESIGN GUIDE

1.6.1 This IDG provides installation-specific design data for Fort Lewis. The general design concepts, recommendations, and standards addressed herein are applicable to all Army installations. This document will be used as a reference to acquire recommendations and Army standards on the design of all facilities, new roads, road widening, parking, sidewalks and other

pedestrian paths, bicycle paths, Access Control Points (ACP), site furnishing selection and placement, signage selection and placement, lighting selection and placement, utility corridor selection, and utilities. Clearing of plant materials and planting of new plant materials will be based upon the guidance herein.

1.7 MAINTAINING THE ARMY INSTALLATION DESIGN GUIDE

1.7.1 Since the Fort Lewis IDG is a "living document", keeping it up-to-date and accurate will ensure its continued usefulness. Therefore, it will become necessary to revise it as mission, budget, standards, and other conditions generate new planning and design requirements and in response to facility user feedback.

1.7.2 In accordance with AR 210-20, Master Planning for Army Installations, the installation Real Property Planning Board (RPPB) is the adjudicating body for the Army Installation Design Guide at the installation level. Violations and variances from standards will be reviewed and adjudicated by the RPPB. The Garrison Commander will chair an Installation Planning Board (IPB) to review and approve the RPPB's actions.

1.8 RESPONSIBILITIES

1.8.1 As directed by the Secretary of the Army and the Chief of Staff, Army and approved by the Army Installation Management Board of Directors the following responsibilities are established:

1.8.1.1 Assistant Chief of Staff for Installation Management (ACSIM)

- Establish Army facility standards and approve deviations from the standards.
- Approve Army Installation Design Standards Implementation Plan.
- Approve Army Installation Design Standards Investment Strategy.

1.8.1.2 Director Installation Management Agency (Dir IMA)

- Develop and implement the Army Installation Design Standards Implementation Plan.

- Develop and implement the Army Installation Design Standards Investment Strategy.

- Ensure compliance with the Army Installation Design Standards.

- Maintain electronic newsletter for communicating changes in standards.

1.8.1.3 Fort Lewis Garrison Commander

- Develop Fort Lewis' IDG.

- Chair Real Property Planning Board (RPPB) to review and approve projects established on the Prioritized Improvement Projects List (Appendix G) to meet Army standards.

- Submit Prioritized Improvements Projects List for approval and funding IAW Director, IMA instructions after review and endorsement by Senior Mission Commander.

- Enforce Fort Lewis IDG standards.

1.8.1.4 Senior Mission Commander

- Review and endorse IDG.

- Review and endorse RPPB prioritized improvement projects list recommendations to meet Army standards prior to submission to IMA Region Director.

1.8.1.5 Major Army Command/Tenant

- Participate in installation Real Property Planning Board.

- Participate in design and planning charrettes, where applicable.

- Determine project functional requirements.

- Participate in design reviews.

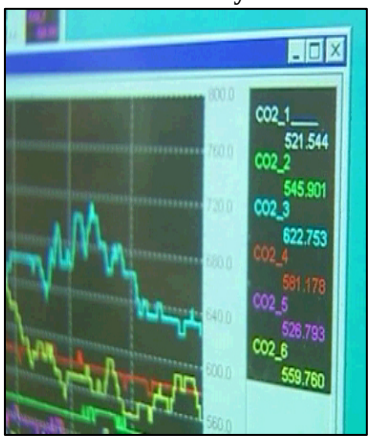
- Participate in development of Prioritization Projects List.

1.9 SUSTAINABLE DESIGN AND DEVELOPMENT

1.9.1 Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. Protecting our natural resources and reducing our impact on the natural environment is achievable when we create high-performance facilities (Fig. 1.3), healthy environments (Fig. 1.4), energy efficient lighting (Fig. 1.5), and safe buildings.

1.3 - Efficient Water Usage Contributes to a High Performance Facility

1.9.2 The Integrated Design Process. Critical to the success of sustainable design and development is the organization and commitment of the team to engage in the Integrated Design Process. To effect change in building design and operation, the project delivery process itself must become a collaborative effort to integrate design strategies among all disciplines and all players in the project delivery process. Integrated design demands a more inclusive team, working closer together than is traditionally the case. Future building users and facility managers must be invited to join architects, engineers, and planners in developing the vision and goals for new facilities.



1.4 - CO2 Measurements Measure Indoor Air Quality Assisting in Creating a Healthy Environment

1.9.3 Appendix D, Sustainable Design, discusses the sustainable design concept and its application to Army projects. Paragraph D.3 discusses the Sustainable Project Rating Tool (LEED) developed by the U.S. Green Building Council (USGBC). The LEED rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability for all projects in FY08 and beyond.

1.5 - Energy Efficient Lighting Contributes to Sustainability

1.9.3.1 The LEED document (Appendix E) was derived from the U.S. Green Building Council LEED 2.2 (Leadership in Energy and Environmental Design) Green Building Rating System.

1.9.3.2 Army Rating Standard.

1.9.3.2.1 For all FY06 and future-year MILCON projects, the minimum LEED rating requirement is "Gold".

1.9.4 Further information on sustainable design can be obtained at the following websites:

Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website This site provides information on the following topics: documentation and references; sustainable process, tools, products and materials; Sustainable Design and

Development Training; and links to various sustainable design and development informational website.

U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website.

Whole Building Design Guide (WBDG) This site provides comprehensive and current information on sustainable design strategies and technologies.

1.10 ARMY STANDARDS

1.10.1 Army Standards and References are included in the last two paragraphs of the following sections and appendices: Section 7, Site Planning Design Component; Section 8, Buildings Design Component; Section 9, Circulation Design Component; Section 10, Landscape Design Component; Section 11, Site Element Design Component; Section 12, Force Protection Design Component; Appendix D, Sustainable Design; and Appendix M, Historic Preservation Guidelines.

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SECTION 2
THE INSTALLATION DESIGN GUIDE PROCESS AND IMPLEMENTATION

2.1 INTRODUCTION

Military installations are hometowns for many of our military families, resources for many veterans and retirees, and an integral part of the surrounding communities. The Army Installation Design Guide (IDG) provides direction for achieving a sense of community, order, tradition, and pride on our installations. This section provides a brief overview of the IDG developmental process and methodology.

2.2 THE DESIGN GUIDE PROCESS

2.2.1 The IDG includes a process for analysis, planning, design, and implementation. This process includes the following steps:

2.2.1.1 Setting Goals and Objectives. The installation develops a set of goals and objectives that address the visual requirements of the installation. The goals and objectives provide a pre-determined image that helps create a visually pleasing and optimally functional environment. (Fig. 2.1)

Fig. 2.1 –Positive Visual Elements Include Features which Enhance the Surroundings Either Visually or Functionally

2.2.1.2 Conduct Visual and Spatial Surveys. Two visual surveys are preformed in the preparation of the IDG. The first survey establishes the visual zones and themes of the installation. The second survey documents the assets and liabilities within each visual zone.

2.2.1.2.1 Establish Visual Zones and Themes (Fig. 2.2)

2.2.1.2.1.1 The Information gathered during the first survey is used to establish the visual zones of the installation. The visual zones are delineated by the visual characteristics of an area defined as the "look and feel" of an area together with the dominant features that help define its image. A functional analysis of each zone organizes the visual impressions and assesses their functional relationships to determine the visual character and unifying motif. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, functional use, natural features, and spatial relationships.

2.2.1.2.1.2 Visual zones with similar characteristics are then grouped together to form a broader category called themes. Example themes include, community life theme, operations support theme, buffer/open space theme, and industrial theme.

2.2.1.2.2 Determine Assets and Liabilities. The second survey a visual zone inventory is conducted. During the survey each visual zone is analyzed for specific visual impacts. The objective of the inventory is to define the visual assets and liabilities within the visual zone.

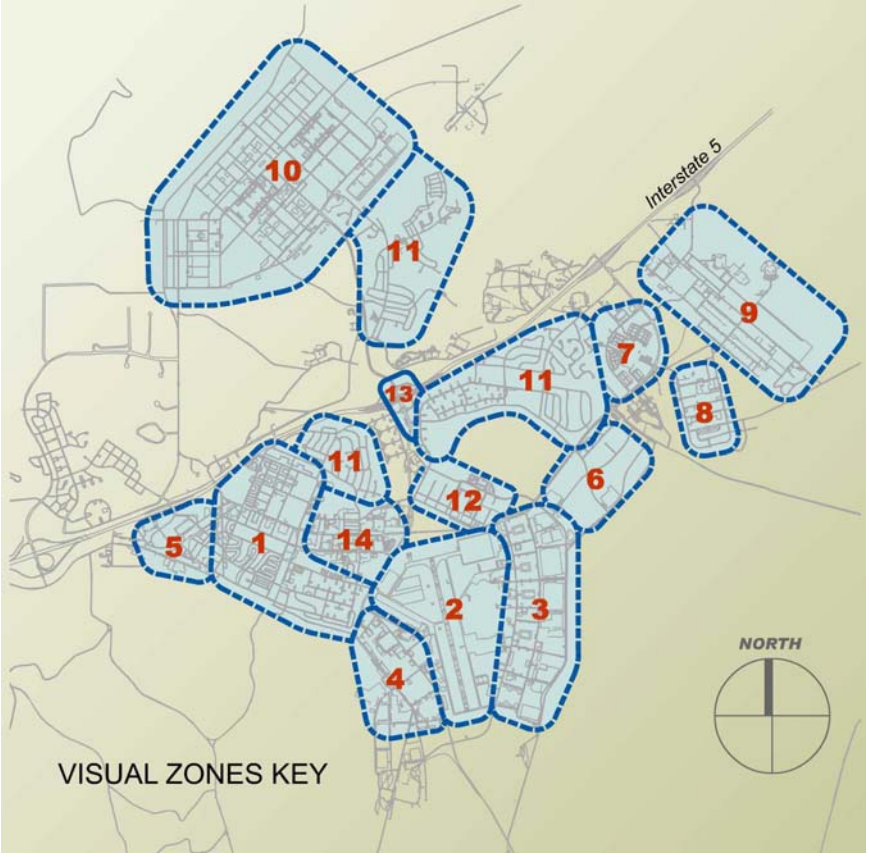

Fig. 2.2 –Visual Zones Key

2.2.1.2.2.1 Assets. Assets are positive visual elements, design elements, or features that enhance the surroundings, either visually or functionally.

2.2.1.2.2.2 Liabilities. Liabilities are negative visual elements, design elements, or features that detract from the visual image or functionality of the surroundings. Liabilities should be corrected through appropriate design measures and are the basis for recommendations for improvement.

2.2.1.3 Recommendations and Implementation Plan

The assessment of each visual zone includes recommendations to correct liabilities and where desired to enhance assets. The

recommendations are in the form of specific projects and are described in detail Section 6, Improvement Projects of the IDG.

2.2.2 Design Components

The following six design components, described in sections 7 through 12, provide guidelines and standards from which to conduct the visual zone review and analysis.

Section 7, Site Planning

Section 8, Buildings

Section 9, Circulation

Section 10, Landscape

Section 11, Site Elements

Section 12, Force Protection

2.2.3 Design Principles. The visual inventory and analysis requires an understanding of basic design principles. These design principles are discussed in Section 3, paragraph 3.3.

2.2.4 Visual Elements. The basic design principles are used to define the visual elements described in Section 3, paragraph 3.4. The assessment and classification of visual elements follows basic design principles describing "good" (positive visual elements) and "not so good" (negative visual elements) design.

2.3 USING THE DESIGN GUIDE

2.3.1 Use this IDG in determining the general design and construction considerations inherent in the preparation of project plans. The IDG provides design guidelines and Army-wide design standards intended to be used in all maintenance, repair, renovation, and new construction projects. The IDG applies to all projects, regardless of the funding source.

2.3.2 The following steps illustrate how the design guide is used for the preparation of plans for new construction, renovation, maintenance and repair projects on the installation (Fig. 2.3):

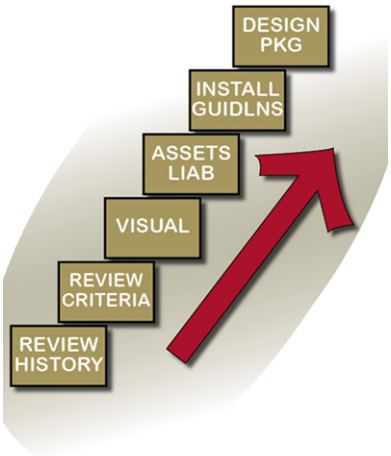

Fig. 2.3 – Step to Using the Design Guide

2.3.2.1 Step 1: Review the Installation Profile information included in this IDG (Section 4).

2.3.2.2 Step 2: Review the IDG analysis criteria information (Section 3) including design goals and objectives, visual elements, and design principles.

2.3.2.3 Step 3: Review the applicable references, guidelines, and standards of the design components. These include site planning, buildings, circulation, landscaping, site elements, and force protection and are discussed in Sections 7 through 12 respectively.

2.3.2.4 Step 4: Review the information and description of the installation themes in Section 5, paragraph 5.2.

2.3.2.5 Step 5: Select the zone where the project will be located from Section 5, Visual Themes and Zones. Review the assets, liabilities, and recommendations for that zone.

2.3.2.6 Step 6: Select the appropriate guidelines or standards from the design components addressed in Sections 7 through 12.

2.3.2.7 Step 7: Assemble all materials gathered in steps 1 through 6 above.

2.4 IMPLEMENTATION

2.4.1 IDG Review and Approval

The Fort Lewis IDG will be reviewed by the installation garrison staff and approved by the Garrison Commander. The Garrison Commander-approved document will be submitted to Installation Management Command (IMCOM) West for approval.

2.4.2 Compliance

All construction at Fort Lewis will be in compliance with this IDG.

2.4.2.1 For the IDG to work optimally as a management tool, it is essential that the Master Planner or designated representative establish an understanding of the IDG among the parties concerned with its use. This can best be established at the RPPB level where all installation principles are represented. The Directorate of Public Works (DPW) staff Master Planner or designated representative shall insure that the guidelines and requirements of the IDG are readily available to, and understood by, all parties involved in the design of new facilities, design of additions or alterations to existing facilities, or maintenance.

2.4.2.2 The Master Planner or designee, acting in support of the RPPB, is the first level reviewer of projects (SRM, MCA, and NAF to include Design Build) and other requests for actions that involve compliance with IDG guidelines and standards.

2.4.2.3 The Garrison Commander, supported and advised by the RPPB, is the final authority in enforcement of the IDG guidelines and standards.

2.4.2.4 The Installation Planning Board (IPB) chaired by the Garrison Commander, will monitor development of the installation planning process and provide guidance to other installation boards and the Garrison Command for areas such as:

- Strategic Planning
- Real Property Planning
- Range Planning
- Communications Planning

2.4.3 Project Approval

2.4.3.1 Project requests to include a DA Form 4283 (IJO or Work Order) shall be submitted to the DPW or equivalent and will include the required Design Team IDG Checklist discussed below.

2.4.3.2 Design Team IDG Checklist.

2.4.3.2.1 The Design Team IDG Checklist is to be completed by the design team to assure the guidelines and standards have been considered in the design process. The Design Team IDG Checklist is provided in Appendix A.

2.4.3.2.2 The accepted checklist shall become a part of the project record files.

2.4.4 Self-Help Projects, Occupant Purchased, Installed Site Furnishings and Features Projects, shall become a part of the project record files. Ft. Lewis does not have a designated Self-Help Program. Requests for self-help will require a work order/IJO (DA4283) submission and process for review and approval.

2.4.5 Request for Waiver

2.4.5.1 A request of waiver form the Design Guide Checklist (Appendix A) will be submitted to the Master Planning office for approval by the IPB.

2.4.5.2 A request for waiver from the Army standards shall be submitted to the Assistant Chief of Staff for Installation Management for approval.

2.4.6 Checklists (optional)

2.4.6.1 Projects Requirements Checklist

It is recommended that this checklist be used as a pre-design planning tool for initiating projects and to present a functional description of the project at MILCON Planning Charrettes and Design Charrettes. The checklist can assist participants of the charrettes in project formulation and documentation. By the nature of the planning process all the data on the forms will not be completed. However, the form should be completed to the greatest extent possible prior to the charrettes. The checklist can also be used to document the results of the planning or design charrettes. The Projects Requirement Checklist is provided at Appendix B.

2.4.6.2 Interior Design Review Checklist

It is recommended that the Interior Design Review Checklist be used during review of a Request for Proposal (RFP) submission, an A/E or in-house design prior to solicitations. The Interior Design Review Checklist is provided at Appendix C.

2.4.7 The requirement to use the IDG as a design tool in all facility planning, design, and construction should be included in the Request for Proposals on new projects, Scopes of Work for new projects, and maintenance agreements.

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SECTION 3
DESIGN GUIDE ANALYSIS CRITERIA

3.1 INTRODUCTION

3.1.1 The Army Installation Design Guide process depends upon the development of visual goals and objectives and the identification of visual elements. Goals and objectives provide the desired visual context of the installation.

3.1.2 Basic design principles are used to assess, define, and classify visual elements. This assessment becomes the design criteria used to determine the visual character of the installation. These design criteria are used for design decisions in the review of existing visual context and determination of project recommendation.

3.2 IDENTIFICATION AND CLASSIFICATION OF VISUAL ELEMENTS

3.2.1 Basic design principles define visual elements and assess their character (Fig. 3.1).

3.2.2 The assessment and classification of visual elements follows basic design principles describing "good" and "not so good" design. Their assessment becomes the design criteria used to determine the visual character of the installation.

Fig. 3.1 –Basic Design Principles are Used to Assess, Define & Classify Visual Elements.

3.3 DESIGN PRINCIPLES

The visual inventory and analysis requires an understanding of basic design principles. The primary principles are:

- **Scale -** The proportional relationship of humans to their spatial environment. The scale should result in a comfortable relationship for the user and will vary as space, size and activities vary (Fig. 3.2).

- **Form -** The size and shape of mass. Individual forms should be designed to complement one another and the environment.

- **Function –** The use of a space or an area. Function is gauged by the degree to which the space works for its intended purpose (Fig. 3.3).

- **Color –** All elements of the visual environment have color. The use and arrangement of colors greatly determine the visual impact of all elements.

- **Texture –** All elements of the visual environment have texture. The use and blending of textures greatly impact the visual environment.

- **Unity –** All elements of the visual environment should blend to complement one another. Repetition of scale, form, color, and texture results in a unified visual impression (Fig. 3.4).

- **Framing –** All views include a ground plane, side planes, and overhead plane. The relationship of planes changes as the individual moves through the environment.

- **Axis –** An axis is a linear progression of space connecting two or more dominant features.

- **Terminus –** A terminus is the end of an axis and is typically defined by a dominant feature such as a building.

- **Balance –** Visual elements are composed to be symmetrical or asymmetrical. In either case, visual elements should be sized and located to provide visual balance.

- **Sustainability -** Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice (See Appendix D).

Fig 3.2 – Monumental & Human Scale

Figure 3.3 – Function – Open Space Provides Positive Visual for Parade Field

Fig. 3.4 – Unity- Repetition of Size, Color and Scale Creates a Unified Element

3.4 VISUAL ELEMENTS

The visual elements described below include manmade and natural features and their inter-relationship. This Army Installation Design Guide provides guidance on how to recognize the visual impacts of the installation and how to improve upon them if warranted.

- **Natural Characteristics -** Regional and site characteristics that have been preserved and enhanced as a part of the installation (Fig. 3.5).

- **Edges and Boundaries -** Linear elements such as walls, fences, or trees create separation of use and activities.

- **Buildings and Structures -** Typically the most dominant features of an installation. Their location and design characteristics determine the primary visual image.

- **Activity Nodes -** Centers of activity that attract people on a daily basis.

- **Landmarks -** Visually or historically prominent features such as towers, statues, static displays, or buildings that provide identity and orientation of place (Fig. 3.6).

- **Entrances and Gates -** Provide the first and last impression of the installation.

- **Circulation System -** Includes streets, railroad tracks, trails, sidewalks, parking lots, driveways, delivery areas, and bicycle paths. The circulation system utilizes a large amount of space and creates significant visual impact.

- **Trees and Other Vegetation -** Trees and other vegetation frame views, provide visual screens, shade, color, and interest in the installation.

- **Street Trees -** Street trees soften, complement, and define the road hierarchy, and improve the overall visual quality of the installation (Fig. 3.7).

Fig. 3.5 –Natural Characteristics – Preserving Indigenous Plant Life Around Structures Create a Balanced Element

Fig. 3.6 - Landmarks Provide Orientation of Place

Fig. 3.7 - Street Trees Improve the Overall Visual Quality of the Installation

- **Views and Vistas -** Scenic and attractive views and vistas should be enhanced. Unattractive views should be screened (Fig. 3.8).

- **Open Spaces -** Open space areas create visual impact and can be designed to either separate or integrate adjacent uses.

- **Signage -** A coordinated installation signage plan, addressing both exterior and interior signage, should be developed to facilitate circulation and provide useful information.

- **Utility Corridors -** Utilities should be in corridors and unsightly above ground utilities minimized Fig. 3.9).

- **Other Elements -** Visual elements other than those above may occur within an installation and should be noted.

Fig. 3.8 – Beautiful Mount Rainier Seen from the Parade Field

Fig. 3.9 –Utility should be in Corridors and Unsightly Above Ground Utilities Minimized

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SECTION 4
INSTALLATION PROFILE

4.1 SETTING

4.1.1 Regional Setting

Fig. 4.1 – Washington Area Map

Fort Lewis, located in Pierce and Thurston counties, covers 86,176 acres in western Washington, is approximately 35 miles south of Seattle and 7 miles north east of Olympia. The installation is divided by Interstate 5, which is the main transportation corridor in the Puget Sound region. It is bordered on the north by McChord AFB, and suburban and commercial development; on the east and south by rural areas, forested land, and several small communities; and on the west by Puget Sound, the Nisqually Indian Reservation and the rural areas that surround Olympia and on the southwest by Nisqually Wildlife Refuge. (Fig. 4.1)

The main gate and primary access point to Fort Lewis is off of Interstate 5 (Exit 120). The installation is served by two branches of the Burlington Northern Railroad. The port of Tacoma, 15 miles north of Fort Lewis, is the Army's preferred location for sea-born deployment activities during exercises and combat missions.

4.1.2 History of the Installation

Pre-History (Fig. 4.2)

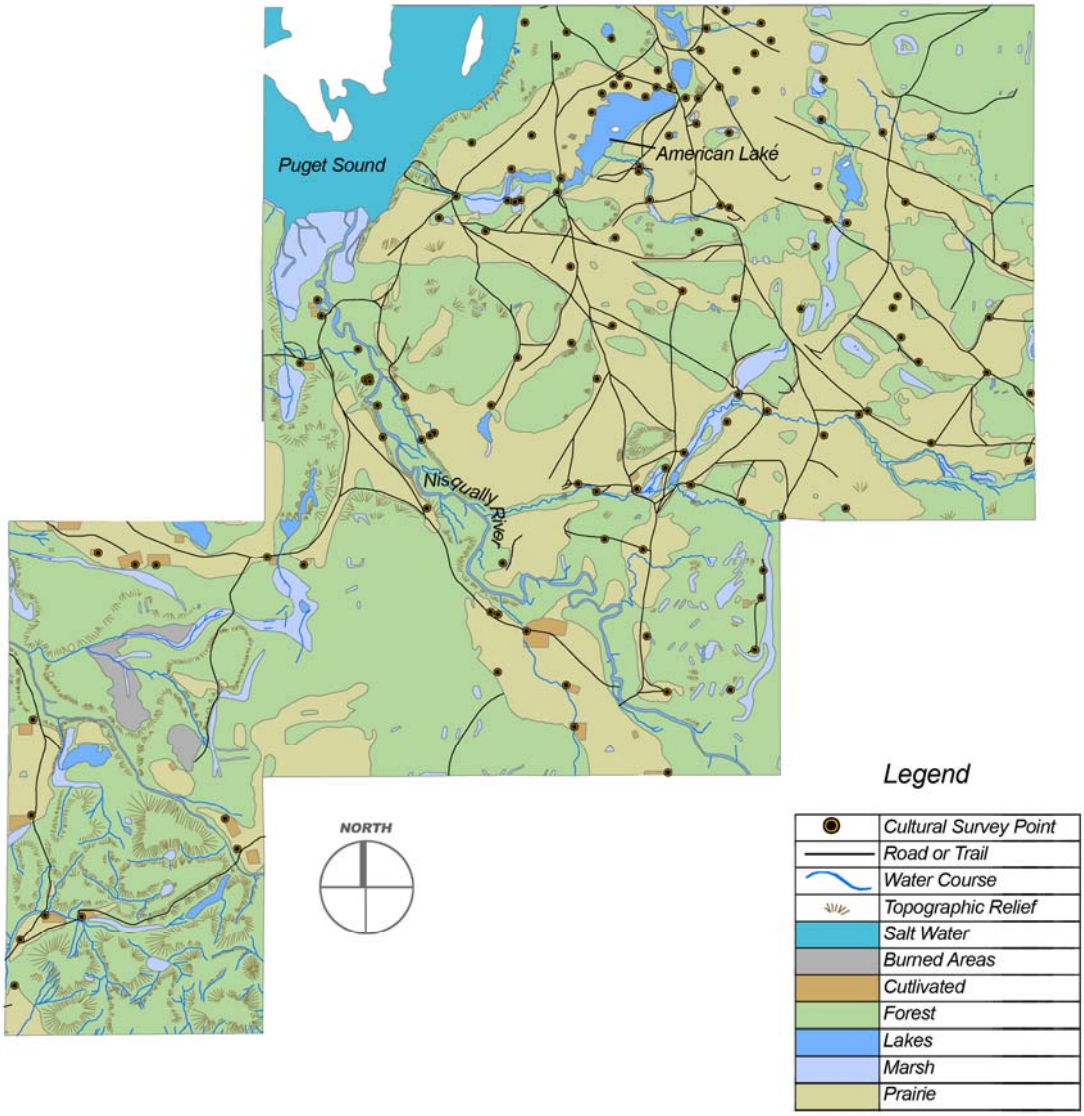

Fig. 4.2 Fort Lewis – Pre-Developed Conditions

Before European contact in the late 1700s and American contact during the 1840s, numerous Salish-speaking Native American groups lived in villages along the creeks and rivers of what is now Fort Lewis. The villages consisted of cedar plank longhouses that could accommodate up to eight families. The Native Americans utilized various environmental zones (forest, prairies, marshes, rivers, the sound, etc.) for hunting, gathering and fishing. The Native Americans utilized dip nets, spears and fish traps to catch salmon and steelhead in the rivers and creeks, netted ducks and geese in the ponds and marshlands, and hunted deer and elk in the woodlands. The open prairies contained large numbers of camas

and balsam root that were collected and processed by the Native Americans as an important food source. Periodic burning of the prairies prevented the encroachment of Douglas firs into the plains and enhanced conditions for the propagation of root food sources. These prescribed burns have shaped the current landscape of Fort Lewis by maintaining the prairies, including Jackson's Prairie, the location of the Camp Lewis cantonment.

Descendents of these early Native American peoples remain near Fort Lewis and include the present-day Nisqually, Puyallup, Squaxin Island and Steilacoom tribes.

Euro-American settlement of the Fort Lewis area began in 1832 when the Hudson's Bay Company (HBC), an English fur-trading enterprise, established Fort Nisqually near the town of DuPont (Fig. 4.3). The British company traded with the Nisqually, the Puyallup and other local tribes in order to procure the valuable furs. With fur-bearing animals in a state of decline, the HBC formed a subsidiary, the Puget Sound Agricultural Company (PSAC), in 1839 for the development of commercial farming operations for profit. The PSAC constructed roads, farms, herding stations, corrals, sheep pens, cattle barns, stables and granary at various locations throughout Fort Lewis. Some of these agricultural farming stations were Tlithlow, Treehatchee, Old Muck, New Muck, Kul-Kullee, Molock House, and S'Gukugwas. Operations continued at the PSAC farms until the 1860s after which the lands and improvements became U.S. property.

Fig. 4.3 – Fort Nisqually circa 1854

Individual farmsteads and homesteads began to appear in the Fort Lewis area in the late 1840s after the establishment of the Oregon Territory (which included the current state of Washington) as U.S. lands exclusively and the Donation Claim Act of 1850. The Act provided free land to American citizens and those intending to obtain U.S. citizenship. To protect these new settlers Fort Steilacoom was established in 1849. The U.S. Army established Fort Steilacoom north of American Lake.

By the early 20th century with greatly improved roadways, highways and railroads, a number of agricultural and railroad communities developed in the Fort Lewis area including the towns of Roy, Spanaway, Hillhurst, Fir Tree, DuPont and Greendale.

In 1890 the newly-formed state militia began military training at American Lake, probably at the present location of Camp Murray. Subsequent encampments occurred at this location in 1892, 1894 and 1902. In 1903, the State of Washington purchased the property and established Camp Murray which is still the Headquarters of

the Washington State National Guard. Beginning in 1904, the American Lake area was selected for joint Army-National Guard maneuvers. Other joint maneuvers were held in the vicinity in 1906, 1908, 1910 and 1912. During these maneuvers rifle target practice was conducted on the south side of Miller Hill.

Camp Lewis - 1917 to 1919

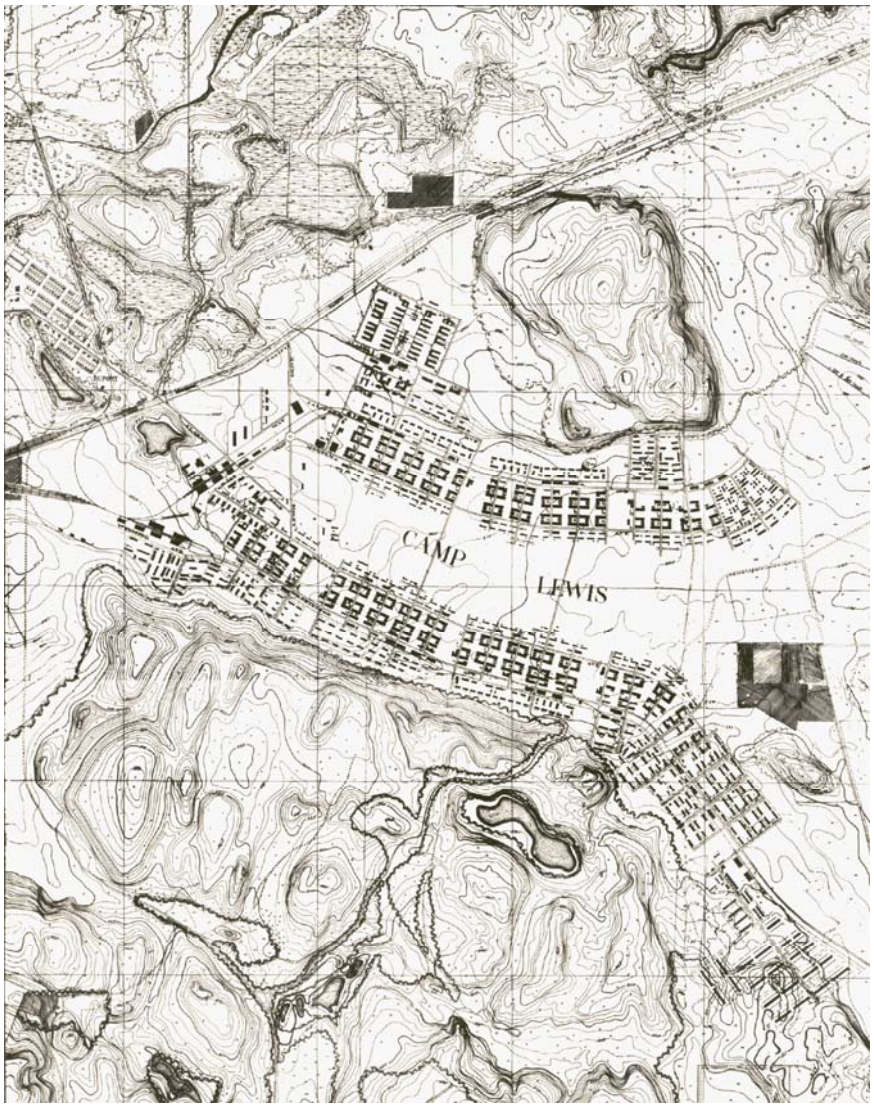

Fig. 4.4 Camp Lewis Cantonment Area - 1917

The nation's largest army post at that time was constructed in 1917 by Quartermaster Corps on 62,432 acres which were donated to the Federal Government by the citizens of Pierce County, WA (Fig. 4.4). Originally the post was designed to house a maximum force of 50,000 men using a standard layout prepared by the U.S. Army Corps' Engineering Division, but the plan was modified by civilian advisors to adjust to the individual site. Upon completion it was

named Camp Lewis for Captain Meriwether Lewis (Fig. 4.5). It was constructed in 8 weeks by using 10 on-site saw-mills under the supervision of Major David L. Stone to train Soldiers for World War I. Subsequently, it provided accommodations for 19 regiments of infantry, artillery and engineers, and contained a division headquarters, hospital group, bakery, warehouses, supply buildings and an ordnance depot. C. F. Pilat, Planning and Consulting Engineer, utilized the concept of a military park in his plans for Camp Lewis.

Fig. 4.5 – Overview of Camp Lewis Cantonment Area

From the initial layout, an open space focusing on the view of Mt Rainier was used. The post Headquarters was located at one end of this space, and it was flanked by brigade units. This Army concept of barracks design was taken from frontier posts where the barracks faced a parade ground and were organized in straight lines (Fig 4.6).

Fig. 4.6 – Barracks with View of Mount Rainier Vintage & Today

Army planning and design concepts of posts made careful use of architectural distinctions to show rank. Each of the regimental units formed a self-contained group consisting of barracks for enlisted men and officers, administration and school buildings. Separate corrals which contained stables, wagon sheds, workshops and a guardhouse for each of the infantry regiments were built adjacent to the barracks. The buildings were one and two-story wood frame construction with gable roofs laid out in rectangular blocks. Each Brigade Headquarters was located just inside the central open space boundaries. Engineering and community facilities were located to the north end of the complex. As the regimental units were built to the east, they were placed further apart, following the bases of the hills.

A 1,000-bed hospital group was located on a 60-acre site between the complex and Pacific Highway to the north. An auxiliary remount station complete with barracks, stables, hay sheds, isolation corrals and a blacksmith school operated at the east end of the site.

During this initial phase of development the Old Liberty Main Gate was constructed on Lewis Drive in 1918 from funds donated by the construction workers who had built Camp Lewis. It was designed by Kirtland Kelsey Cutter, a prominent Pacific Northwest architect, to be reminiscent of the earlier military block-houses used in the northwest. Twin river-rock towers with notched log upper portions and hipped roofs supported a heavy log walkway between them (Fig 4.7).

Fig. 4.7 – Young Boy at Old Liberty Main Gate Soon After Construction

Greene Park Amusement Center, also constructed during this period, was located on the north side of the Seattle-Olympia highway (Pacific Highway) and provided entertainment for the troops. It contained stores, restaurants, a library, a theatre, and facilities run by organizations such as the Y.M.C.A. and the Knights of Columbus (Fig 4.8).

Fig. 4.8 –Greene Park Amusement Center

The Salvation Army's 150-room facility, known as the Red Shield Inn, was built in 1919 as a hotel facility for visitors and was transferred to the Army in 1921. Constructed by Pratt and Watson Construction Company of Spokane as a two and one-half story wood frame building designed in the Swiss Chalet style. Wide overhanging eaves with large, prominent brackets, exposed rafters, decorative balustrades and pyramidal-roofed cupolas were included in its design (Fig 4.9).

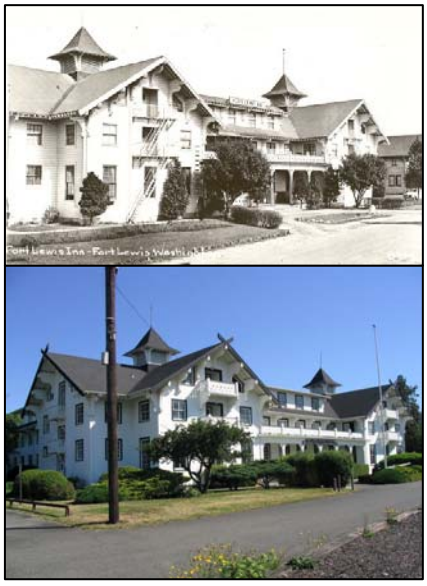

Fig. 4.9 – Red Shield Inn in the 1920's and the Same Structure Today as the Military Museum

The Red Cross Hostess House was erected near the main hospital in 1919 as a recreational facility for convalescing Soldiers. Planned in the shape of a cross, this wood frame building presented a classical appearance due to its pedimented classical revival portico.

Period immediately after World War I

Drastic reductions in military appropriations and the size of the country's active Army reduced the manpower at Camp Lewis to approximately 1,000 Soldiers. The hastily constructed, temporary buildings (with a projected life span of five years) erected in the cantonment area deteriorated rapidly due to lack of maintenance and repair, and the buildings became unsafe, unhealthy and fire hazards.

Some of the buildings were sold for removal or burned down, and most others were demolished. Roads and water and sewer lines also fell into a state of disrepair. The Pierce County citizens, disenchanted with the deterioration of the installation and fearing that the Army intended to abandon the camp, demanded implementation of a reversion clause included in the original deed. It stated that the property would revert to Pierce County if the government abandoned it as an active military post.

In response to this local pressure, Congress authorized the Secretary of War in 1924 to submit plans to convert certain temporary posts into permanent installations. With the Housing Program of 1926 Congress appropriated $800,000 for construction of permanent barracks and later renamed the post Fort Lewis.

Frederick Law Olmsted, Jr. and George B. Ford, both landscape architects, and A. L. Harmon, an architect with the firm of McKim, Meade and White, were instrumental in affecting the design of military posts at this time. They stressed designs which incorporated the natural features of each site and which were compatible with the climate, materials and traditional character of the region. They chose a park-like setting to improve the military image to the public and to convey a sense of honor and discipline in the military service.

Ford stated that the architectural effects of buildings were greatly enhanced when they were viewed across an open space as one unit of a larger composition. One of Ford's military assistants claimed that this design concept derived from certain laws of nature.

He described these laws as follows:

- Law of Unity - one single design theme.
- Law of Consonance - recurring geometric figures related to style and scale.
- Law of Natural Beauty - allowing for diversity.
- Law of Balance - symmetrical arrangement of elements around an axis.
- Law of Radiation - parts of a design are related back to a common center.

First Permanent Construction Period from 1927 to 1940

The Housing Program of 1926 utilized civilian planning principles. These emphasized the grouping of related buildings and utilized the concept of regionalizing the architecture through the use of the Georgian Colonial Revival Style (Fig. 4.10), a military architectural style prominent in the Pacific Northwest. It further recommended civilian residential subdivision design principles in order to achieve a sense of design unity.

The $800,000 appropriated by Congress was insufficient to complete the initially accepted plan for permanent brick buildings, so it was recognized that an ongoing building program would be required. Congressional appropriations continued for 11 years. In 1928 the name of the installation was changed, by General Order, to Fort Lewis. Also in 1928 the commandant, Major General Joseph D. Leitch, proposed consolidating all of the 3rd Division's troops at Fort Lewis, and while never fully implemented, his plan did cause an increase in the number of quarters to be built. It

Fig. 4.10 – Elements of Georgian Revival Style

caused the commissioned officers' quarters to be separated from the enlisted barracks by a parade ground, and it provided for the construction of single family houses instead of apartments for noncommissioned officers. (Figs. 4.11 & 4.12)

Three quadrangles approximately 500 feet square were aligned along the north side of the open parade ground, staff officers' houses were arranged in a crescent shape at the west end, and quarters for commissioned officers were placed along looping roads on the south side of the parade ground. Each quadrangle contained three barracks buildings arranged around a drill-type courtyard with a screen of fir trees located on the fourth side to form a green background for the quadrangle. This met Ford's basic objective to provide a design unity to the groupings of all building types so they would pattern well from the air (Fig. 4.13). He also reviewed the choice of exterior materials so that a blend of one building to another was provided.

Fig. 4.11 –Single Family Home Then and Now

The three-story barracks were constructed in the Georgian Colonial Revival Style with concrete frames, brick-faced walls, clay barrel tile gable roofs and raised, dressed stone entrances. Stucco was used on the upper portions of two of the buildings. The barracks had a regular, symmetrical placement of doors and windows. The staff officers' houses enjoyed a view of Mt Rainier from the end of the parade ground. At the center of the group, the post commander's imposing brick house was two and one-half stories high. It had an enclosed two-story wood porch with paneled pilasters which extended nearly full width across the front. The other staff officers' houses were also brick with entrance porticos which had denticulated pediments. The field officers' quarters, located along the looping roads which provided privacy and park areas, were symmetrically arranged brick houses with white painted wood trim and expressed entrance porches. Careful attention to details was evident throughout the entire Broadmoor Housing Area. A military hierarchy was established through the variety and importance if these architectural details.

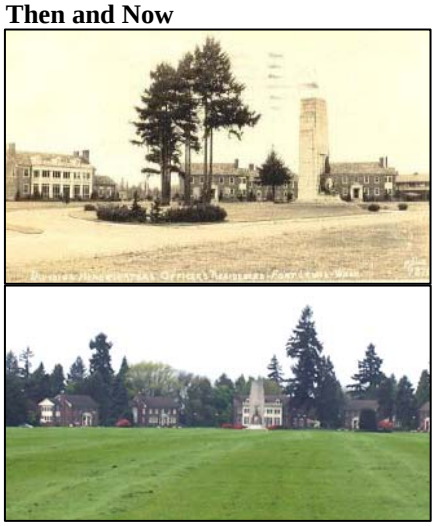

Fig. 4.12 –Generals' Housing Then and Now

Stables and corrals were placed to the north of the barracks quadrangles, store rooms and gun sheds were placed across the railroad tracks. Several parks were planned in conjunction with housing, and an athletic field and non-commissioned officers' apartments were located north and east of the hospital. It was recognized that there was ample space to expand construction as the need arose. In 1939, a fourth barracks quadrangle, considerably larger than the others, was built along the north side of the open space (Fig. 4.14). It should be noted here that top planning and design authority was conferred on the professional officer corps.

Fig. 4.13 –Aerial of Fort Lewis circa 1938

In 1928 a sandstone and bronze monument designed by Avard Fairbanks to commemorate the 91st Division was erected. During this period of time the following buildings were built to serve the entire community: the Main Post Chapel - 1934, the Drill Hall (now Jenson Memorial Gym) - 1934, the Bank - 1935, the Post Headquarters - 1935 and the Gas Station (Stone Station) - 1937. (Fig. 4.15) In 1934 to 1936 the permanent Gun Sheds and Stables were built to the north of the barracks quadrangles. Five warehouses were built in 1934 and 1935 on the original warehouse site.

Fig. 4.14 – Fort Lewis in 1939

The Main Post Chapel, constructed west of the barracks, deviated from the traditional Georgian Colonial Style used for the rest of the Garrison Area. Designed by H. H. Ginnold in the Lombardy Romanesque Revival Style, it was built of red brick with a clay barrel-tile roof, dressed stone trim and leaded, stained-glass windows (Fig 4.16). The Drill Hall, built to the east of the third barracks quadrangle, was a tall one-story brick building with a copper-clad gable roof, decorative brickwork and pilasters. Also built of brick with a clay barrel-tile roof, the Bank's main facade contained arched openings. The Post Headquarters, considered to be the best example of the Georgian Colonial Revival Style at Fort Lewis, was a two and one-half story brick building with a flat-tile, hipped roof and round-headed dormers. Brick quoins marked the building corners. It had a central pedimented pavilion, an oval window and a carved stone garlanded swag. The Gas Station and the old Madigan Gate were constructed of fieldstone similar to the Old Liberty Main Gate. The Gun Sheds and Stables were one-story with brick walls and clay barrel-tile, gable roofs and large doorways along one long side.

Fig. 4.15 –The Stone Station Then and Now

Greenwood Housing, built between 1929 and 1939, included 75 single family quarters (arranged around open, landscaped areas) and 12 five-plexes further north for noncommissioned officers. The single family quarters were one-story, red brick bungalows with hipped, barrel-tile roofs and roofed porches. The later ones had roofs of flat tile and entrances flanked with pilasters. Two multi-unit residential brick buildings and one building for unmarried officers were built in the Broadmoor Area in 1934, and 6 five-plexes were added there in 1939.

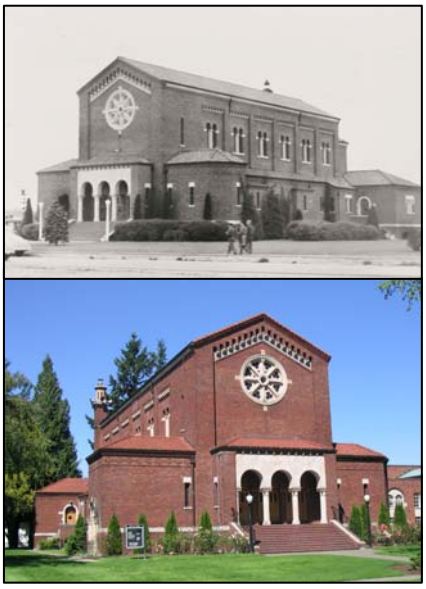

Fig. 4.16 –Post Chapel Then and Now

World War II Period (1941 to 1946) - War Planning and Support

Fort Lewis was greatly expanded during World War II by predominantly temporary wood frame one and two-story structures. Two Supply and Administration areas were developed in 1940; one was located at the base of Miller Hill, and the other was located near DuPont Gate. The following year North Fort, the Logistics Center, Gray Army Airfield and an area near the current Museum were developed. At this time the emphasis was on utilitarian planning with a grid-iron circulation system and repetitive wood-sided buildings placed in parallel rows. North Fort construction was arranged around a very large open space. Efficiency of operation, low cost of construction and limiting the effect of bombing raids were the priorities at this time.

In 1944 a new hospital complex of permanent masonry and brick buildings was built at the east side of the property. Madigan Hospital, as it was known, was one of the largest medical centers of its kind in the country and cost three million dollars. Madigan Hospital was named after Colonel Patrick Madigan, known as the "Father of Neuropsychiatry" and was also the Assistant to the Surgeon General of the US Army from 1940-1943. The original Madigan Hospital buildings were one and two-story brick buildings with pitched roofs and white wood trim, similar in quality and detailing to the old Garrison Area buildings (Fig. 4.17 & 4.18).

Figure 4.17 –Old Madigan Hospital

Fig. 4.18 –Vintage Photo of Barracks in the Garrison Area

Period from 1947 to 1972 - Dispersed Industrial Phase

Construction was started during this period to meet the needs of the troops which were being trained for the Korean War. The major developments during this era included six troop barracks areas on the east side and one barracks area on the west side of Gray Army Airfield, as well as support facilities such as chapels and dispensaries.

After World War II the Department of Defense replaced the War Department and adopted an industrial site planning approach to Army planning. Civilian planners were employed, standard designs for new barracks were developed to utilize inexpensive materials and construction techniques, mission statements were issued to each installation and the Officer Corps' ideals of an expressed military hierarchy and park planning theme were no longer considered vital.

No attempt was made to integrate the design of these barracks complexes with the Georgian Colonial Style or to give them a regional character (Fig. 4.19). Each complex was sited apart from others so that it could be administered separately. The impact of technology reduced the importance of the parade ground in Army planning.

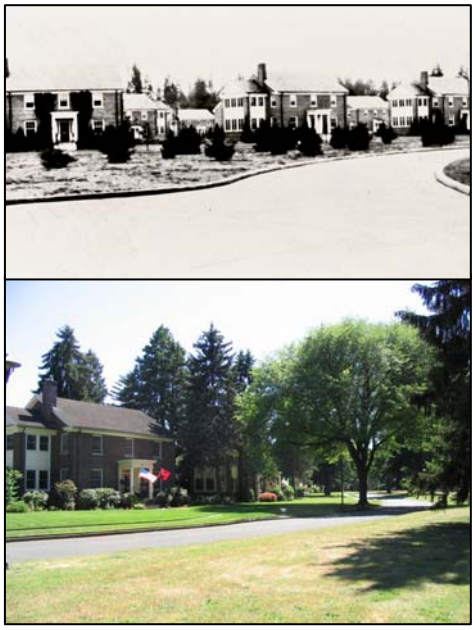

Fig. 4.19 –Example of Georgian Style Housing Then and Now

Family housing at Clarksdale, Parkway, Hillside and Beachwood was built during the 1950's and more family housing was constructed at Davis Hill and Miller Woods in the early 1960's. The demands of training, new weapons and new methods of war enhanced the role of non-commissioned officers in Army thinking. Their importance was reflected by their separate housing areas. Capehart Housing duplexes were built, expressing no strong distinctions of rank. Under Federal Housing Authority (FHA) policies which called for intense utilization of the land, they were clearly civilian in character. Numerous other multi-family buildings erected during this period also contrasted with the family quarters built in the 1930's.

In 1971 construction was begun on the Community Center, which was designed in the Dispersed Industrial Style. Through the years it was greatly expanded in size and planned along civilian lines similar to what is termed "strip development". Emphasis was not placed on the use of quality materials, inter-relationship of buildings or an enhanced atmosphere, but instead on enclosing the most amount of space for the least cost. The south side of the Community Center site was expanded to include many recreational facilities, increasing its importance as an activity center on Post.

Period from 1972 to Present

Fort Lewis was redesignated Headquarters, 9th Infantry Division, on 21 April 1972. On 26 May 1972, Army Chief of Staff General William C. Westmoreland unfurled the 9th Infantry Division colors during a day-long activation ceremony held at Gray Army Airfield and presented them to Major General William B. Fulton, signifying the reactivation of the "Old Reliables."

The activation was phased over a 12-month period. During this period, the 9th recruited over 8,000 men, including many from the Pacific Northwest. It became the first "all volunteer" division in the U.S. Army. Once reactivated at Fort Lewis, the 9th was deeply involved in training for future conflicts.

The Fort Lewis Military Museum was established in 1971. It was originally housed in a two-story barracks, but in July 1973, it

relocated in the old Fort Lewis Inn. The Inn, built in 1918 by the Salvation Army, had served the post as a hotel and guest house. Originally called the Red Shield Inn, after the symbol of the Salvation Army, it was renamed the Camp Lewis Inn in 1921 when it was deeded to the Army. When Fort Lewis became a permanent post in 1927, the name was changed to the Fort Lewis Inn; and it was operated until August 1972, when it was closed and renovated for service as a museum. The building was entered on the National Register for Historic Places in February 1979 (Fig. 4.20).

Fig. 4.20 –The Fort Lewis Military Museum today

The mission of the Museum is to collect, preserve, and exhibit objects, and provide information on the history of the military in the Pacific Northwest. There are approximately 10,000 square feet of interior displays and 2 1/2 acres of outside exhibits.

On 21 March 1973, the 593rd Area Support Group was activated at Fort Lewis as the only area support group in the Active Army, vice the 15th Support Command. The 593rd, with attached supply, maintenance, transportation, ordnance, engineer and signal units, operates as a composite logistical support group with a peacetime mission of providing support to Fort Lewis and its units. Added missions have been: support to the Vietnamese refugee project, the 1980 Mount Saint Helens relief operation, duty in Operation Desert Storm in 1990-91, Operation Restore Hope in Somalia in 1993 and participation in Afghanistan and Iraq.

On 3 July 1973, the Headquarters for IV ROTC Region was established here in what at one time had been the Installation Headquarters, Building 1010 (Fig. 4.21). Handling administrative, procurement, and training for ROTC detachments scattered at college campuses throughout 17 western states and Guam, the Headquarters' most visible mission is coordinating and commanding the ROTC Senior Cadet Encampments. These train 2,200 to 2,800 cadets each summer.

Fig. 4.21 ROTC Headquarters – an Excellent Example of Georgian Revival Architectural Style

Almost simultaneously, on 1 July 1973, Readiness Group Fort Lewis was established on North Fort Lewis. This agency, a part of Sixth U.S. Army in San Francisco and controlled through Army Readiness and Mobilization Region IX, is responsible for integrating Army Reserve and Army National Guard units of Washington and Oregon into a comprehensive training and assistance program aimed at achieving and maintaining combat readiness. It was instrumental in the mobilization and demobilization of Reserve Component units for Operation Desert Storm.

The 2nd Battalion (Ranger), 75th Infantry was activated at Fort Lewis on 1 October 1974. This battalion, which traces its lineage back to the famous "Merrill's Marauders" of Burma in World War II, is in constant training for an aggressive response anywhere in the world. It played key roles in Grenada in 1983 and in Panama in 1989.

In 1979, some decisions were made at the Secretary of Defense and Chief of Staff of the Army level that would have a profound effect on Fort Lewis and its primary tenant, the 9th Infantry Division.

At the time, there was a major movement in the Department of Defense and in Congress to structure Army forces as mechanized or armored forces. All eyes seemed focused on war in Europe or the Middle East. In order to avoid this heavy-division fixation, the Chief of Staff put forward a proposal. He proposed, through the use of high technology, to structure a light division that had a rapid deployment capability, but with the firepower and survivability of a heavy division. The 9th Division and Fort Lewis were selected for this task.

The basic implement of this innovative idea would be an organization on the ground at Fort Lewis known as the High Technology Test Bed (HTTB). The Test Bed was to explore all types of equipment, military and civilian, foreign and domestic, which would be suitable for the new unit. They were to acquire this equipment in the most expeditious way possible, and thus, short cut the normal 10-15 year procurement cycle. In the meantime, the Test Bed, along with the 9th Division and under the guidance of the Chief of Staff of the Army, would develop the tactics and employment doctrine to be used by this High Technology Light Division (HTLD) (Fig. 4.22).

Fig. 4.22 –Field Training circa 1980

Formation of the HTTB began in 1980. In the late summer the Army Science Board met at Fort Lewis for a week. When it left, there was an idea of what the Test Bed should be doing, and from that, what structure it should take. By early 1982, the Test Bed was beginning to deal with equipment, and had begun to formalize the structure of HTLD. On 14 April 1983, the HTTB became the Army Development and Employment Agency (ADEA). As time went on, the activity's function changed; and in March 1990, it was redesignated the Army Tactical Command and Control Experimentation Site.

Throughout the 1980-1987 time period, the 9th Infantry Division also evolved. At first it was called a High Technology Motorized

Division and was equipped with modified and armed dune buggies and many other items of innovative equipment. Later, the dune buggies were replaced with the High Mobility Multi-purpose Wheeled Vehicles which carried tank-killing missiles. At about this time, the 9th Division's designation changed from light to motorized.

In 1980, Fort Lewis was notified of another major change of structure. A corps headquarters was to be activated in March 1982. I Corps was formally activated on 1 October 1981, much earlier than expected. It became a primary contingency planner for U.S. interests in the Pacific region, with a rapidly expanding role in Army affairs. On 1 August 1983, the Corps expanded its operational control of active Army units outside Fort Lewis, to include the 7th Infantry Division (Light) at Fort Ord, California, and the 172nd Infantry Brigade (Light) in Alaska, which then became the 6th Infantry Division (Light).

Fort Lewis itself continued to grow and modernize. The 1st Special Forces Group was activated on 4 September 1984 and the 35th Air Defense Artillery Brigade on 1 June 1985, both at North Fort Lewis. On 18 January 1985, ground was broken for a new Madigan Army Medical Center, which began to receive its first patients in March 1992.

Three child care centers, new facilities for the 1st Special Forces Group, a new commissary, and more hangar space on Gray Army Airfield were constructed. Occupation of the new facilities began in 1988.

In 1987, two new units were activated, the 66th Aviation Brigade and the 201st Military Intelligence Brigade.

The 9th Infantry Division (Motorized) was reduced by one brigade "slice" in the summer of 1988 and the civilian workforce was reduced by some 500 positions, both as economy measures. By 11 December 1991, inactivation of the 9th Division was complete.

During 1989-90, it became obvious the "cold war" had been won. That, combined with national budgetary problems, dictated a careful restructuring of national priorities and of the defense establishment. As these actions evolved, it became evident that Fort Lewis was ideally located to act as a base for mobilization and power projections into the Pacific region. Thus, while most of the Army was downsizing, Fort Lewis began to grow. Most of the changes described in the following paragraphs were driven by these considerations.

A residual of the 9th Division inactivation was that its 3rd Brigade became the 199th Motorized Infantry Brigade. This one-of-a-kind unit was an I Corps Unit until its redesignation as the 2d Armored Cavalry Regiment (Light) and its departure for Fort Polk, Louisiana, which occurred in 1993.

On 13 September 1990, the 1st Personnel Group was activated at Fort Lewis. The Group Commander was dual-hatted as I Corps Adjutant General and 1st Personnel Group Commander.

In 1990 Fort Lewis received word it would likely become the home of the 7th Infantry Division (Light) if Congress approved the closure of Fort Ord, California. This approval occurred in 1991. The 7th Division began its move in 1992. After the move began, in March 1993, the decision was made to allow the 1st Brigade of the 7th (the 9th Infantry Regiment) to complete its move to Fort Lewis, but to inactivate the rest of the division. Later in 1993, the post was alerted to expect to receive at least one armored brigade from Europe.

Also in 1990, the U.S. intervention in Southwest Asia began with Operation Desert Shield. During that intervention, Fort Lewis shipped 34 active and 25 reserve component units to Saudi Arabia. I Corps expanded its contingency missions and became a quick-response corps. For several months, I Corps was the nation's worldwide contingency corps, while the XVIII Airborne Corps was in Southwest Asia. This caused a good deal of activity on Fort Lewis, as the post postured itself to support the Corps' expanded mission and to insure the Corps had a smooth, rapid departure in case they were needed anywhere in the world.

After the return of forces from Southwest Asia, activity on Fort Lewis did not return to pre-war levels. While I Corps did not retain the worldwide contingency mission, it did retain contingency responsibilities for that half of the world whose shores were washed by the Pacific Ocean. The Corps began to convert to a permanently-structured, no-mobilization contingency corps. This entailed the addition of a number of active component corps units.

In preparation for these new I Corps requirements, Fort Lewis began to receive new corps support units which were coming out of Europe. One of these was the 7th Engineer Brigade, which was inactivated on 16 January 1992 and immediately reactivated as the 555th Engineer Group. On 16 February, the 210th Field Artillery Brigade, also from Europe, was activated. In 1997 the 35th Air Defense Brigade moved to Fort Bliss, Texas, to join other air defense brigades. Other units would flow into and out of Fort

Lewis as the operational needs of the Army changed during the late 1990's.

While the ROTC units from Fort Bragg, NC and Fort Riley, KS (ROTC summer camp sites) were being deployed to southwest Asia, Fort Lewis became host to the only ROTC camp during the summer of 1991. From June through August, 5,300 cadets trained at Fort Lewis.

In 1994, Fort Lewis completed an Environmental Impact statement which allowed up to two heavy brigades to be stationed there, in addition to the 9th Regiment. In May 1994, elements of the 3rd Brigade, 1st Armor Division began to flow in and by October, some 3,600 soldiers, with their families, pets, vehicles and household goods, had arrived. On 29 September, the brigade was redesignated as the 3rd Brigade, 2nd Infantry Division (Mechanized). The 2nd Division Headquarters and the other two brigades remained in Korea.

On 12 October 1999, General Eric K. Shinseki, Chief of Staff, Army (CSA), announced the acceleration of Army transformation and the creation of two medium-weight, Initial Brigade Combat Teams (IBCT) at Fort Lewis, Washington. The 3d Brigade, 2d Infantry Division (Heavy) (3-2d ID) was named to transform first, with the 1st Brigade, 25th Infantry Division (Light) (1-25th ID) following shortly after. This concept entailed t the brigades to use lighter weight armored vehicles, dismounted infantry/combined arms, recent technological developments (particularly in communications and computers), and parallel and collaborative leadership techniques to create a new combat power.

The brigades would be deployable anywhere in the world within 96 hours of initial notification. The IBCT combat power would be optimized for Small-Scale Contingencies (SSC) in urban and complex terrain, but it would be capable of participating in the full spectrum of operations. This new concept required reorganizing, re-equipping and retraining the two existing Fort Lewis brigades. In the long term, this transformation process would serve as a model for change in the U.S. Army. Thus, the tarpaper barracks and remount corral of World War I gave way to lasers and fiber optics on the gravel shelf known as the Nisqually Plain.

Historic Properties Eligible for Listing in the National Register of Historic Places

All buildings, structures, and objects built before 1948 in the Main Post and North Fort cantonment areas have been formally evaluated for National Register eligibility in consultation with the Washington State Historic Preservation Officer. A summary of these evaluations is included below. In short, Fort Lewis contains three National Register-eligible Historic Districts (Fort Lewis Garrison Historic District, Old Madigan General Hospital Historic District, and the American Lake Veteran's Administration Hospital Historic District); one individually listed National Register property (the Red Shield Inn); three individual National Register eligible buildings and structures (the Carey Memorial Theater, the Liberty Gate, and the Mount Rainier Ordnance Depot Gate); and one individual commemorative property listed on the Washington Heritage Register (the Captain Wilkes July 4, 1841 Celebration Site.)

Summary of Fort Lewis Historic Buildings, Structures, and Objects by National Register District

Fort Lewis Garrison Historic District - The Fort Lewis Garrison Historic District has been determined eligible but was not formally listed on National Register. With an area of 470 acres is has 298 contributing buildings and structures and one object (the 91st Division Monument). The area has been listed on the Washington Heritage Register since 2004.

Old Madigan General Hospital Historic District - The Old Madigan General Hospital Historic District has been determined eligible for the National Register but has not been formally listed. Its area covers 32.4 acres and has 99 buildings that were evaluated in 1999 (see National Register Nomination). 42 of these were recorded to HABS standards (HABS-WA-202) and demolished in 1994. In 2003, 27 contributing buildings were recorded to HABS standards (WA-202 Addendum). Currently, there are 24 non-contributing buildings, 5 non-contributing structures and 1 contributing road structure.

American Lake/Veteran's Administration Hospital Historic District - This area was determined eligible but not formally listed on National Register. It is comprised of 106.0 acres with 85 contributing buildings, determined eligible, which are all owned by the Veteran's Administration on lands leased from Fort Lewis. The US Army has no NHPA management responsibility for these

buildings. It was listed on the Washington Heritage Register in 1980.

4.1.3 Environmental Setting

Located at the southern end of Puget Sound and west of the Cascade mountains, Fort Lewis is characterized by flat to gently rolling terrain with isolated mounds rising sharply above their surroundings. It's climate is composed of short, pleasant summers followed by a cool and humid weather pattern during fall, winter and spring.

4.1.3.1 Topography (Fig. 4.23)

Located between the glacial outwash plain bordering Puget Sound, Fort Lewis is characterized by flat to gently rolling terrain with isolated mounds rising sharply above their surroundings. Some 30 glacial kettle lakes from one to 1,123 acres in size, extensive stands of Douglas fir and large but less extensive prairie grass communities grace this terrain. With the exception of the Nisqually River, where steep escarpments border the river, surface drainage channels on Fort Lewis are poorly defined or non-existent due to the highly permeable surface material.

Fig. 4.23 –Topography Map

The portion of Fort Lewis where field maneuvers occur is nearly a level plain, with isolated hills rising about 100’ above the surrounding terrain. The elevation throughout most of the installation ranges between 250' and 400' above sea level, but varies to 567’ in the extreme southwest portion of Fort Lewis at the Rainier Training Center.

Muck Creek is located in the south-central portion of Fort Lewis and drains west to the Nisqually River. Surface drainage features are poorly defined because of the permeable nature of the soils.

Landforms

The three landform types found in or adjacent to the cantonment area are low plains, high plains, and escarpments. Escarpments line Puget Sound, just northwest of the "North Fort" area, and the Nisqually River flood plain, southwest of the cantonment area. These steep, rocky cliffs with slopes almost always greater than 30% are not visible for any intensively used portions of Fort Lewis, with the possible exception of Solo Point on Puget Sound, but help isolate the post from its surroundings. High plains, which comprise approximately 30% of the post, are found around Miller Hill, at the top of the Puget Sound escarpment, just north of the 91st Division Prairie, and at other areas remote from the cantonment area. This terrain is usually thickly forested with Douglas fir and its glacial mounds provide some of the best natural views and vistas on the post.

Slopes Analysis

Slopes, aside from the much steeper glacial mounds, usually fall between 0 and 15%. The majority of Fort Lewis (65%) is classified as low plains characterized by dense, evergreen forests, open, grassy meadows and marshes on flat or very gently rolling terrain. Most of the ponds and lakes on the post are found in this landform type which has slopes almost never exceeding 3%. As stated before, most of Fort Lewis is located on flat terrain which provides abundant land for military activities. Because of the vegetation generally found on them, the visual qualities that they possess and the relatively high site and building development costs, the hills and bluffs that do exist should be kept free from all uses except passive recreation facilities such as hiking and nature trails.

4.1.3.2 Geology

The geologic units underlying Fort Lewis are primarily the result of glacial and alluvial processes. The glacial units mapped at the site were deposited during the Vashon Stage of the Fraser glaciations approximately 13,500 years ago.

As the glaciers advanced, extensive erosion occurred with meltwater streams forming a braided network of outwash deposits at the front of the glacier. As the glacier receded, stratified outwash was deposited at the front of the receding glacier. In the depressions in the glacial till, lake deposits were formed.

At Fort Lewis, these deposits consist of the Steilacoom Gravels, Vashon Recessional Outwash, and till, with localized areas of peat and alluvium surrounding the Nisqually River and Muck Creek.

Seismicity

Fort Lewis is located in a seismically active area. Three types of earthquakes have the potential for producing ground motion; large-magnitude offshore earthquakes in the Cascadia subduction zone, deep sub-crustal events in the Juan de Fuca plate, and large shallow-focus events in the Puget Sound area.

The magnitude of the first type is postulated as being greater than 8, with a recurrence interval of 300 to 1,000 years.

The second potential earthquake type is the one that historically has occurred most frequently in the Puget Sound area, with magnitudes of up to 7.5 at depths of 40 to 70 kilometers (km). Three such earthquakes recorded in this area are the magnitude 7.1 earthquake that occurred in Olympia in 1949, the magnitude 6.5 earthquake that occurred between Seattle and Tacoma in 1965, and the magnitude 6.8, 2001 earthquake off of Anderson Island.

The third type, low-focus events, haw no associated surface features and opinion as to the magnitude and location of future shallow earthquakes of this type is still uncertain (Algermissen, 1988).

The International Building Code, except as amended by UFC 1-200-01, shall provide the seismic criteria for building design at Fort Lewis. The criteria are based on specific location (longitude and latitude).

Geologic Hazards

Potential geologic hazards at Fort Lewis include earthquake shaking, slope failure, and volcanic hazards. Areas within Fort Lewis that have the greatest potential for slope failure are locations where the slopes are steep and prone to erosion.

In addition to ground shaking during seismic events, slope failure can occur as a result of earthquake activity.

Mount Rainier is the nearest volcano to Fort Lewis, located approximately 35 miles to the southeast (Fig. 4.24). Hazards from an eruption of Mount Rainier erupting include ashfall (projected to be minimal) and flooding. The hazard from flooding is limited to the valley of the Nisqually River. Renewed volcanic activity could

Fig. 4.24 – Mount Rainier

cause rapid melting of the glaciers, resulting in flooding downstream in the Nisqually River (U.S. Army, 1979; Crandall, 1973).

Mineral Resources

The mineral resources at Fort Lewis consist primarily of supplies of sand and gravel present in the outwash materials. Gravel pits have been developed on the installation. However, they are not currently operational. The materials in these pits are highly suitable for construction aggregate for onsite road and building construction (Terrain Analysis Center, December 1988). Currently, there are eight sand and gravel pits (not operational) on the installation, three of which are in the Rainier Training Area.

4.1.3.3 Soils

Fort Lewis is located in an area covered by the Fraser Glaciation some 14,000 years ago. The glaciers deposited thick layers (up to 200' in the Fort Lewis area) of advance glacier outwash and glacial till, a compact mixture of clay, silt, and sand. Upon melting, the glacier left layers of unconsolidated course gravels known as recessional outwash. These moderately to excessively drained sandy and gravelly soils form the vast majority of the present day land surface on the Post, and are primarily of the Spanaway and Everett Series. (Fig. 4.25)

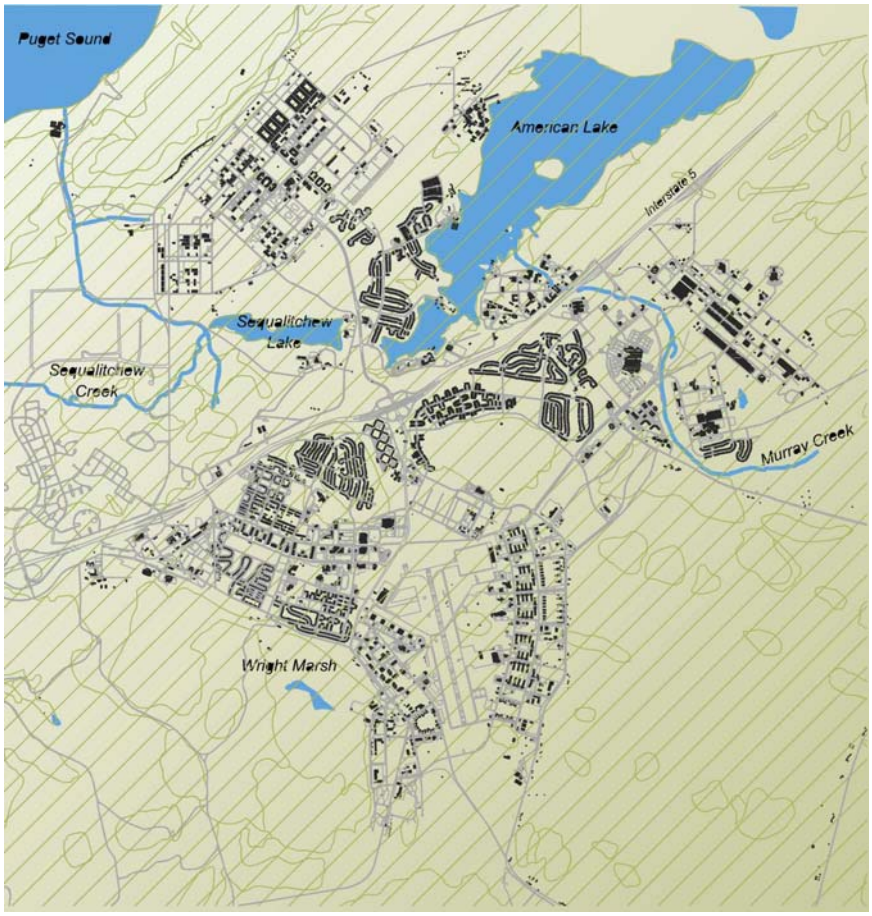

Fig. 4.25 - Soils Map with hatched areas indicating the prevalence of recessional glacial outwash at Ft. Lewis (Everett & Spanaway series)

Other non-organic soils found scattered throughout the cantonment and nearby areas are Alderwood and Sinclair series compacted silts and gravels, well drained alluvial plain sandy soils along the Nisqually River, small pockets of poorly drained silty clay of the Pilchuck and Puyallup series soils in upland depressions and terraces, and stony, gravelly, excessively drained soils on steep, exposed slopes. Peat and other highly organic soils of the Mukilteo, Semi-ah-moo and Rifle series occur in depressions and along creeks.

Because of permeable, coarse-textured soils and relatively level topography, very little natural erosion occurs at Fort Lewis. Erosion potential is confined to the steeper slopes where maneuver training is limited.

Even though the Fort Lewis region is subject to seismic activity, significant damage is extremely rare due to the minor strength of local earthquakes and the dampening capabilities of gravelly outwash soils. These same soils provide generally excellent support for building foundations and roads.

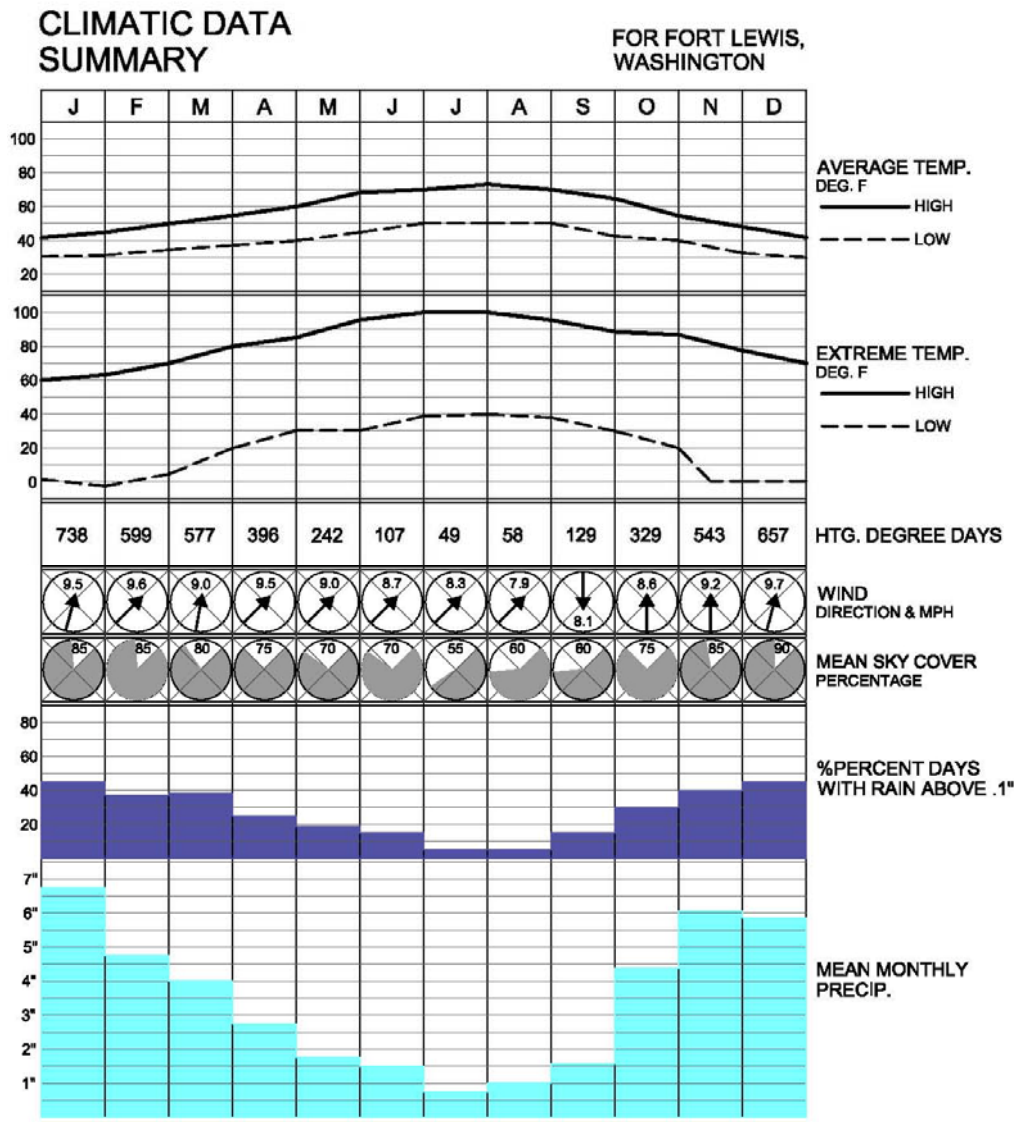

Fig. 4.26 Climatic Data Survey for Fort Lewis

4.1.3.4 Climate

Typically, the climate of this region is composed of short summers characterized by sunny, relatively dry, warm weather followed by a cool and humid weather pattern during fall, winter and spring. Fort Lewis receives an average total precipitation of 41 inches annually, and heavy cloud cover is a normal occurrence (for much of the year). The prevailing gusty wind during the storm season is from the southwest. (Fig. 4.26)

The temperate climate of Fort Lewis is characterized by warm, generally dry summers and mild, wet winters (Fig. 4.27). The weather and climate are strongly affected by the proximity of the Pacific Ocean and Puget Sound, the imposing barrier of the Cascade Mountains approximately 40 miles to the east and, to a lesser extent, by the Olympic Mountains located about 50 miles to the northwest.

Fig. 4.27 –A Winter Day at Fort Lewis During 1920's

Seasons

October signals the beginning of autumn with a marked increase in precipitation as the Aleutian Low Pressure system replaces the Pacific High as the dominant climatic feature.

The winter months at Fort Lewis are characterized by an almost continual cloudiness and a majority of winter days measure at least a trace of precipitation. Winter daily low temperatures hover very close to freezing. Occasionally Fort Lewis will experience a period of extremely cold weather with a southward flow of Canadian air. These periods typically last from 7 to 10 days and are also characterized by clear days and nights and northerly winds.

The spring months of April and May see warming temperatures and less precipitation as the track of the Pacific storms moves gradually northward.

Agreeable temperatures, mostly in the 70's and 80's, along with relatively light precipitation, are typical of the summer season. The summer season, which is centered around July and early August, is much appreciated and enjoyed by Fort Lewis residents. The warmest month at Fort Lewis is July, closely followed by August, with a fairly moderate mean daily maximum temperature of 75° F. Daily high temperatures are between 70° and 80° F in the summer and on those occasions when they do rise to 90° or above, the humidity level is usually correspondingly lowered so that uncomfortable heat is rare at Fort Lewis. The absolute maximum

temperature recorded at nearby McChord Air Force Base was 100° F whereas the lowest was 6° F.

Temperature

January is the coldest month of the year with a mean daily minimum temperature of 32° F. December is traditionally almost as cold as January.

Sun

The distribution of clear and cloudy days shows a marked seasonal pattern at Fort Lewis, ranging from a relatively sunny 53% sky cover in July to a dominantly cloudy 87% in December. The only significant daily cycle, with regard to sky cover evidences itself in the late spring and summer months. This pattern is of clearing skies in the evening followed by fog or low stratus clouds in the early morning which normally dissipate by noon.

Due to predominantly mild temperatures, shading devices are not critical, nor is the overheating potential a large problem. Solar heat gain is of modest importance due to the fact the yearly amount of possible sunshine is only 40%. Summer and winter sun angles are shown in Figs. 4.28 and 4.29.

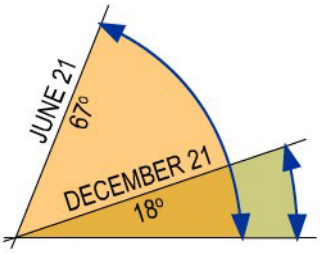

Fig. 4.28 -Solar Altitude in June and December

Fig. 4.29 Solar Azimuth

Wind

Wind velocities are generally stable throughout the year, with 9.7 miles per hour winter and 8.3 miles per hour summer average wind speeds. The prevailing direction during the year is from the southwest. This predominance is more from the south during the primary winter months and more from the west during the summer.

Occasionally fierce winter storms generate strong northwest winds. The Coast Range tends to protect Fort Lewis from the hurricane-force winds accompanying some of the fall and winter Pacific storms along the coast, moderating the local gusts to a maximum of 50 miles per hour. (Fig. 4.30)

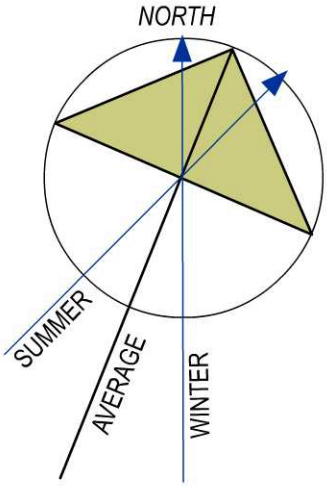

Fig. 4.30- Prevailing Winds

Precipitation

Total annual precipitation at Fort Lewis averages about 41 inches. The rainy season extends from October to March with December and January normally being the wettest months. Approximately 75% of the total annual precipitation falls within this winter wet season. The majority of the rainfall at Fort Lewis is a result of storms common to the middle latitudes, with these disturbances being much more severe in nature during the winter months. It is very common at Fort Lewis to have a summer dry period lasting from two to four weeks with no precipitation, low relative humidity and potential forest fire danger. Local summer afternoon showers and relatively rare thundershowers occur but do not measurably contribute to the annual precipitation. Individual amounts of snowfall fluctuate widely and usually melt prior to significant accumulation. There are some winters with no snow, but at the other extreme, a maximum of 8 inches has been recorded at nearby McChord AFB.

Relative Humidity

The average annual relative humidity at Fort Lewis is 79%. Relative humidity is highest during the winter months with the peak in December at 89% and averaging over 80% for the 6-month wet season from October to March. The humidity gradually declines during the summer with the low average of 69% occurring in July.

4.1.3.5 Hydrology

Because of the high soil porosity, a large portion of Fort Lewis' considerable rainfall seeps directly into the ground. Ground water is found at depths ranging from about 200' to the surface as in the case of permanent lakes or marshes. Because of this high porosity

and seasonal variation in rainfall, considerable fluctuations in the ground water level can occur. One obvious development ramification of this seasonal fluctuation and diverse location is that the ground water depth must be measured during the rainy season when it should be at its highest at a given project development site.

The soil porosity, combined with generally level terrain, limits the potential for erosion. In the cantonment area, only steep slopes, such as those found on Miller and Davis Hills and 30th Infantry and 6th Engineer Bluffs are likely to erode if the vegetative cover is removed. Other nearby areas with a potential for surface erosion or mass failure are the steep bluffs associated with Puget Sound, the Nisqually River, and Muck Creek.

Because of relatively level terrain and highly permeable soil, Murray and Sequalitchew Creeks are the only defined natural drainage-ways in the cantonment area. Nearby, however, the Nisqually River and Muck Creek both have well defined channels. (Fig. 4.31)

Fig. 4.31 –Hydrology Map

Because of the pervious nature of the surface soils and the presence of groundwater near the surface of the land, several water bodies exist as surface expressions of the shallow groundwater table. Examples are American Lake; Sequalitchew Lake; several wetlands; at times, Sequalitchew Creek and Murray Creek in the cantonment area; and numerous other lakes, wetlands and some tributaries to Muck Creek. Some of these areas are both groundwater discharge and recharge areas, depending on seasonal changes in groundwater elevation and on the direction of groundwater flow.

Several marshes, some of which almost dry up during the summer dry season, are located in, or near, the cantonment area and, as

stated before, development in these areas must be avoided to limit construction costs and environmental damage.

Constructed stormwater drainage facilities convey surface runoff from portions of the cantonment area. Stormwater discharges to Puget Sound through an extensive drainage system and to other surface waters on Fort Lewis. Major surface waters that receive stormwater discharges include American Lake (directly and via Murray Creek), Murray Creek, Sequalitchew Lake via its inlet stream, and wetlands in the vicinity of Sequalitchew Creek and Murray Creek.

The Nisqually River and Muck Creek are the only drainages subject to major flooding. Local flooding occurs as a result of backups in the storm drainage system along Pendleton Avenue between its intersections with Kaufman Avenue and Division Street in the cantonment area. The flooding along Pendleton Avenue is believed to be caused by inadequate storm drain size in the lower part of the drainage basin. Additional local flooding has been reported for the stormwater system in North Fort Lewis. That flooding is believed to be caused by blocked storm drain inlets because the system is adequately sized to carry expected stormwater flows.

4.1.3.6 Vegetation

Plant communities found at Fort Lewis include coniferous, deciduous, and mixed coniferous-deciduous forests; grasslands; and a variety of wetland types. Coniferous forests, dominated by Douglas fir and lesser amounts of ponderosa pine, western hemlock, and western red cedar, are the most common habitat types at Fort Lewis. Mixed forests and deciduous forests, dominated by black cottonwood and red alder, typically occur along watercourses. Deciduous forests, primarily Oregon white oak, are also interspersed along the periphery of prairie areas. Refer to Fig. 4.32 for general land cover and vegetation at Fort Lewis.

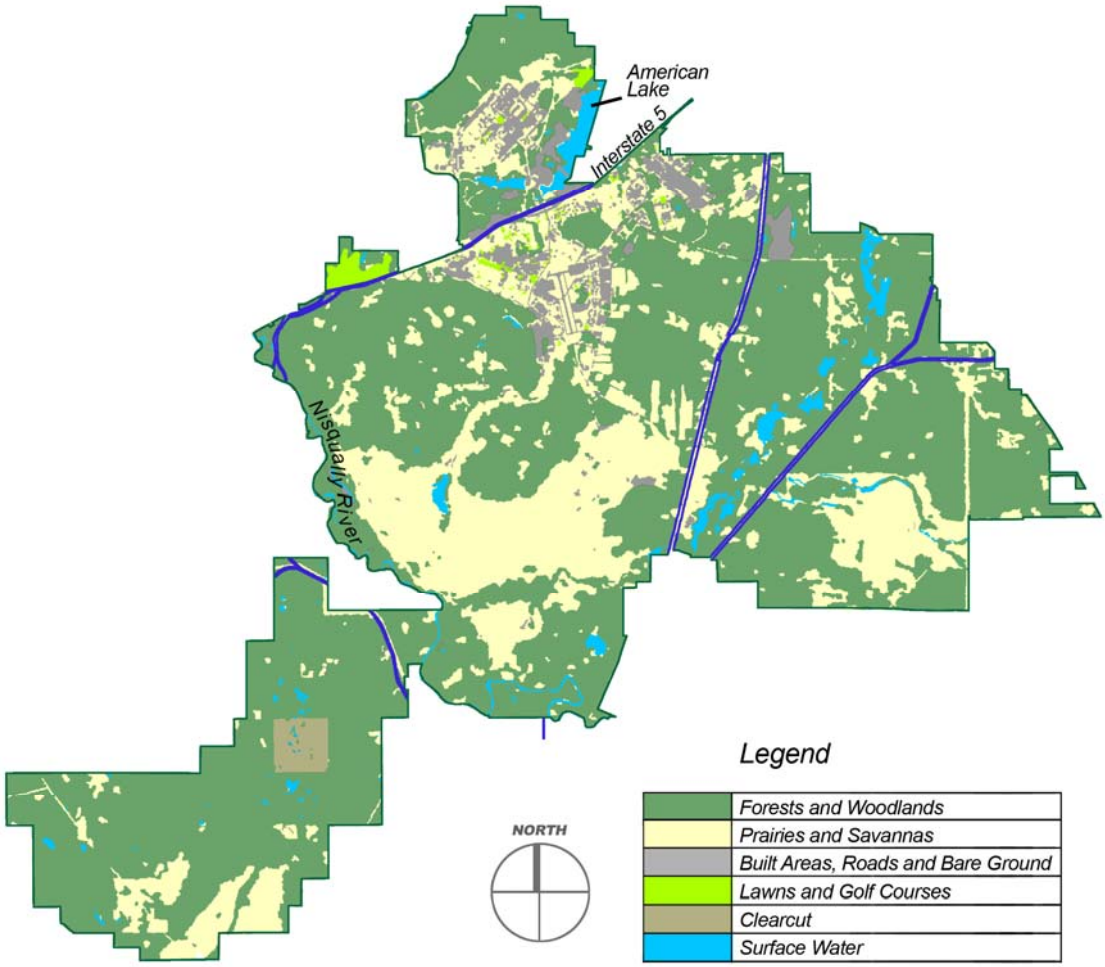

Figure 4.32 – General Land Cover and Vegetation

Plant communities at Fort Lewis can be grouped into three habitat types as described below:

- Coniferous Forests. Approximately 49,000 acres of Fort Lewis are coniferous forest. Douglas fir dominates these forests, with western red cedar and hemlock found in moister areas. The dominant understory species in these forested areas is salal. Along the edge of the forests, Douglas fir seedlings and saplings, vine maple, hawthorn, blackberry, and Scot's broom are found. Ponderosa pine and lodgepole pine are also scattered within the Douglas-fir-dominated forests as well as in pure stands with grasses as the understory layer (Fig. 4.33).

Fig. 4.33 –Typical Example of Coniferous Forest

  Coniferous forests are actively managed for wildlife at Fort Lewis. The restricted timber harvesting is

primarily limited to second-growth Douglas fir trees. Less common species such as oak, ponderosa and lodgepole pines are commonly left in place, as are designated wildlife trees. Understory species important for wildlife at Fort Lewis include red elder, blue elder, trailing blackberry, snowberry, Oregon grape, osoberry, red stem ceonothus, salmonberry, thimbleberry, woods rose, Nootka rose, red-osier dogwood, serviceberry, red-flowering currant and small flowered trillium (Trillium Grandiflorium) is a state-sensitive species found in the coniferous zones.

- Oak/Oak-Mixed Woodlands. There are approximately 3,700 acres of oak woodland, ranging from pure Oregon white oak to a mix of oak, conifer, and deciduous trees. Oak woodlands are predominantly found on the prairie edges and are considered part of a transition zone between prairie and forest dominance. Understories in these woodlands are predominantly prairie grasses. Oak woodlands are a subset of the deciduous or broadleafed forest at Fort Lewis. Other deciduous or mixed coniferous/deciduous forests consist of Douglas fir, big leaf maple, black cottonwood, western red cedar, western hemlock, Oregon ash, and red alder. The understory of these other deciduous or mixed forests is similar to the conifer forest understory discussed above. Douglas firs can out-compete oak and pine saplings in some areas, so the Environmental and Natural Resources Division at Fort Lewis actively manages some oak woodlands and pine forests to encourage plant and wildlife diversity in these habitats (Fig. 4.34).

Fig. 4.34 –Typical Example of Oak/Oak-Mixed Woodland

- Prairies. A unique aspect of the Fort Lewis plant community is the extensive prairies. Well-drained, coarse-textured soils and comparatively low rainfall have combined to produce prairie ecosystems not unlike those found on the east side of the Cascade Mountains. Grasslands are found on approximately 20,400 acres distributed primarily on the three large prairies (13th Division Prairie, 91st Division Prairie, and the Weir/Johnson Prairie) and several smaller prairie remnants. Native prairie vegetation is dominated by bunchgrasses, notably Idaho fescue (Festuca idahoensis), with intervening spaces covered by a low-growing moss-lichen complex known as cryptogamic crust. Species penetrating the crust layer include

shooting star, camas, Nuttall's violet, death camas, and balsamroot. Mixed shrub-grassland communities consisting of grasses, forbs, shrubs, and scattered trees are also found in these areas (Fig. 4.35).

Fig. 4.35 –Typical Example of a Prairie

Disturbance and fire suppression have significantly changed the species composition of many of the Fort Lewis prairies. Dairy farming, grazing and agriculture, since the area was first settled in the 1850's, plus subsequent military training maneuvers, have combined to disturb large portions of the prairies. Much of the native prairie on the installation has been disturbed and invaded by exotic species such as Scot's broom (Cytisus scoparius), bentgrass (Agrostis sp.), and other species.

Natural controls that favor grassland communities have been disrupted. High-frequency, low-intensity fires, which help maintain prairie ecosystems, have been suppressed, therefore woody species such as Douglas Fir have been allowed to persist within these prairies. Some of the Fort Lewis prairies have already been lost as a result of fire protection and subsequent encroachment by woody species and conversion to transition zone or forested communities.

All prairies studied at Fort Lewis were found to contain sensitive species (Thomas and Carey, 1993). One species of plant, the rigid white-top aster (Aster curtus), is currently listed as a federal candidate and state sensitive species. Although the best patches of this species tended to be found in high-quality native prairie, this species can also be found associated with invasive species such as bentgrass and Scot's broom. Other state sensitive species known to occur at Fort Lewis are bristly sedge (Carex comosa) and green-fruited sedge (Carex interrupta). An additional sensitive species, golden paintbrush (Castilleja levisecta), is a regional endemic of the Puget Sound area and Willamette Valley but has not been found on the post during several recent surveys (Bottorff and Swanson, 1993).

4.1.3.7 Wetlands

Of the 86,176 acres on the installation, only 5% (4,500 acres) is wetland and open water habitat. This relative lack of wetland habitat is largely the result of the underlying coarse outwash gravels deposited by the Vashon glaciation and the resultant soils formed within it. Somewhat excessive internal drainage of soils such as Spanaway gravelly sandy loams precludes the development of the anoxic site conditions representative of wetland environments. Nevertheless, of the 4,500 acres of

wetlands that do exists, a variety of wetland types occur, including emergent marshes, scrub-shrub swamps, and forested wetlands. Some of these areas are of high functional value.

Wetlands at Fort Lewis include lakes, river- and creek-associated riparian corridors, emergent marshes, intermittent brush-covered bogs, and forested wetlands. In general, most wetlands are found in creek and river drainage areas. In particular the Nisqually River, Muck Creek, and their tributaries support a wide array of wetland types, including freshwater marshes, open water and forested wetland fringes. (Fig. 4.36)

In addition to freshwater wetlands, 2.5 miles of marine shoreline with gravel and sand beaches border the northwest boundary of Fort Lewis. An artificial reef, built by Fort Lewis with discarded tires in 1979, covers 2.5 acres. This reef is populated by a wide variety of marine plants and animals.

Fig. 4.36 –Wetlands Map

4.1.3.8 Wildlife

Fort Lewis has a mosaic of productive wildlife habitats and plant community distributions. This variety of habitat types results from the influence of the Puget Sound lowland maritime climate, the area's glacial plains, and the primary hydrological features, including the flood plains of the Nisqually River watershed at Fort Lewis. (Fig. 4.37)

HABITAT	MAMMALS	BIRDS	REPTILES/ AMPHIBIANS
CONIFEROUS / DECIDUOUS MIXED FOREST	Raccoon Coyote Various Bats Townsend Chipmunk Northern Flying Squirrel Black Bear (uncommon)	Raptors Upland Game Birds Swifts Swallow Bluebird Thrushes Warbler Great Blue Heron Bald Eagle Osprey Owl Woodpecker	Western Toad Northwestern Salamander
OAK/OAK MIXED WOODLAND	Blacktail Deer Western Grey Squirrel Douglas Squirrel Northern Flying Squirrel	Band-Tail Pigeon Great Horned Owl Woodpecker Northern Flicker	Northern Garter Snake Western Fence Lizard
PRAIRIE GRASSLAND	Deer Mice Vagrant Shrew Pacific Jumping Mice Eastern Cottontail Roy Prairie Pocket Gopher	Lazuli Buntin American Robin White-Crowned Sparrow Raptor Northern Harrier Western Bluebird Horned Lark Western Meadowlark Besper Sparrow Savannah Sparrow	

Fig. 4.37 – Main wildlife habitats and their species.

Some cantonment area buildings host bats. Mammals expected to inhabit urban portions of the installation include raccoon, opossum, house mouse, and the Norway rat.

In addition to these four wildlife habitat types, the Fort Lewis cantonment area, which includes 8,500 acres, supports ruderal and horticultural vegetation and is used by a variety of wildlife tolerant of human activity. Other areas include the marine habitat found along Puget Sound at the northwest boundary of Fort Lewis and the estuarine habitat of the Nisqually Delta.

Most mammal species are permanent residents whose off-installation habitats have undergone urbanization. Approximately half of the bird species are also permanent residents, with about 35% spending summers on the installation. Most year-round and summer residents are noted to use Fort Lewis habitats for breeding. Waterfowl generally use the wetlands as overwinter forage and migratory resting habitats.

4.1.3.9 Environmentally Sensitive Habitat

Various endangered or candidate species are supported by habitats found at Fort Lewis.

The bald eagle, (Haliaeetus leucocephalus), a federal and state threatened species (although the bald eagle may be de-listed from the threatened and endangered species list in the latter half of 2007), is protected through management plans at Fort Lewis. During the last decade, both nesting and wintering numbers have increased. There are now five known active nesting territories on the installation. Productivity fluctuates within these nesting territories; all were successful in 1991, but two of five failed in 1992. This fluctuation is not unusual; over time, the Fort Lewis nesting population has usually equaled, if not exceeded, the state average and the reproductive rate necessary for maintenance of the population (USFWS, 1986; Stalmaster, 1992).

Fig. 4.38 – Bald Eagle

In the 1991-1992 season, a total of 168 wintering bald eagles returned to Fort Lewis. Food supplies have been determined to be the single most important factor in maintaining the wintering population at Fort Lewis (Stalmaster, 1992). Also of key concern was the maintenance of habitat near and within extensively used roost sites and foraging areas, particularly along Muck Creek and Carter Woods along the Nisqually River, and disturbance factors that could preclude eagles from using suitable habitat (Fig. 4.38).

The northern spotted owl (Strix oddicentalis caurina) is listed as threatened by the federal government and endangered by the state. A northern spotted owl survey(www.rainforest-alliance.org/programs/forestry/smartwood/documents/fortlewisfmpubsum04.pdf) was conducted for Fort Lewis by the USFWS in 1991, 1994/95, 1998/99 and 2002/03. Although no northern spotted owls were found, and none were known to occur on the installation on January 15, 1992, 58,000 acres of Fort Lewis were designated as critical habitat by the USFWS. With proper management, the USFWS considers these areas to have important future habitat capability for the northern spotted owl. Fort Lewis has developed a management plan for areas on the installation which are designated critical habitat and proposed conservation areas for the northern spotted owl (Fig. 4.39).

Fig. 4.39 – Spotted Owl

More intensive studies of the status and distribution of red-legged and spotted frogs at Fort Lewis are currently underway.

Roy Prairie pocket gopher (Thomomys mazama glacialis), a federal and state candidate species, mounds were found in the greatest numbers in maneuver area L5. Part of the pocket gopher area currently experiences intensive training in the form of small-arms fire. The firing range is maintained by occasional burning and mowing. Intensive small-arms fire creates microsite vegetation and

soil disturbance where projectiles hit and along the route of ricocheting rounds.

The western big-eared bat (Plecotus townsendii), a federal and state candidate species, is critically limited by the lack of undisturbed breeding and hibernating sites within the proper temperature ranges. Chambers Lake is within a series of wetlands along the Muck Creek drainage. This wetland complex is excellent foraging habitat for the insectivorous bats within the Fort Lewis portion of the Puget Trough.

Potential habitat at Fort Lewis for mountain quail (Oreortyx pictus), a federal candidate species, exists around the edges of the impact zones, on the edges and interspersed through most of the prairie/forest ecotone, and within occasional old clear-cuts and openings within the forest. Much of the habitat has developed from disturbances. All potential habitat was surveyed at least once during 1992; almost all suitable units of habitat contained quail.

Another local species is the Western Grey Squirrel (Sciurus griseus). They are active year round and feed on nuts and pine cones found in the local coniferous woodland areas (Fig. 4.40).

Fig. 4.40 – Western Grey Squirrel

The western bluebird (Sialia mexicana), a state candidate species, nests in cavities within or on the edge of woodlands. The bluebird population at Fort Lewis has steadily increased over the last decade, almost entirely as a result of an aggressive bluebird nest box placement program. The number of young fledged per year has steadily risen from less than 100 in 1983 to more than 700 per year since 1990. Most of the prairie areas having bluebirds are used for training, including the artillery impact area, small-arms impact areas, and tracked-vehicle training areas. All of those locations contain bluebird boxes and active bluebird nesting during the summer nesting period.

Although the pileated woodpecker (Dryocopus pileatus) is found throughout the United States and southern Canada, this species is a state candidate species because recent forest practices have destroyed the snag habitats this bird requires for nesting, roosting, and foraging. Fort Lewis contains about 46,000 acres of habitat potentially suitable for pileated woodpeckers (i.e., trees over 35 years of age). Some training activities appear to have created suitable foraging and roosting snags. Foraging activity by pileated woodpeckers has been observed within areas subjected to intensive military training.

The purple martin (Progre subis), a state candidate species, breeds primarily near water around Puget Sound. Nesting colonies were established at Fort Lewis through the erection of nest boxes on at least nine major wetland areas.

The common loon (Gavia immer), a state candidate species, nests on relatively large lakes in areas with little or no human disturbance. Common loons might occasionally use the inland lakes during migration and are found on adjacent marine waters during the winter.

Marbled murrelets (Brachyramphus marmoratus) range along the Pacific coast from Alaska to central California. Due to the substantial loss and modification of nesting habitat (older forest) and mortality from net fisheries and oil spills, the Washington, Oregon and California vertebrate population segment was federally listed as threatened in September 1992. Critical habitat was designated for the species in May 1996. It is listed as endangered by California and as threatened in Washington and Oregon. Marbled murrelets use forests which primarily include typical old-growth forests (characterized by large trees, a multistoried stand and moderate to high canopy closure), but also use mature forests with an old-growth component.

4.1.4 Man-Made Environment

4.1.4.1 Contaminated Areas

Two sites at Fort Lewis (the Logistics Center and Landfill No. 5) are on the EPA National Priority List (NPL) of contaminated sites. These two and nine other sites are listed in the Fort Lewis Federal Facility Agreement (FFA) between the Army, EPA, and Washington State Department of Ecology.

In 1990, the Army, EPA and Washington State Department of Ecology signed a Record of Decision to clean up the Logistics Center site. The clean-up of contaminated groundwater was slated to take approximately 30 years.

Other sites around Fort Lewis are contaminated to a lesser extent with hazardous substances. Contamination at these sites is attributed to a variety of activities, ranging from leaking underground storage tanks to petroleum and hazardous substance spills resulting from normal work operations.

Fort Lewis manages all underground and aboveground storage tanks in conformance with applicable federal, state, and Army regulations. The management plan for Fort Lewis uses a

predetermined program for removing leaking, older, and abandoned tanks.

Expanded petroleum storage capabilities were made available with the construction of five consolidated fuel facilities at Fort Lewis between 1994 and 1998. This reduced the total of underground storage tanks from 353 to 70.

4.1.4.2 Solid Waste Management

Both Fort Lewis and McChord AFB have a non-active landfill located 2 miles north of Interstate 5. All solid wastes are currently hauled off-post.

Madigan Army Medical Center uses a separate incinerator for disposal of most hospital waste; infectious wastes are disposed of at the Fort Lewis incinerator. The operation of all facilities is regulated and complies with all federal, state and local permits and regulations.

Solid wastes are also generated by military and civilian personnel who work on the post, but live with their families in the surrounding areas of Pierce and Thurston Counties. In 1992, approximately 34,000 individuals associated with Fort Lewis lived off-post in the two-county area. These individuals generated an estimated 33,100 tons of solid waste, which represented 4.4 percent of the total quantity of solid wastes generated in the two counties.

4.1.4.3 Noise

Major noise sources at Fort Lewis include artillery and mortar firing, tracked and wheeled vehicles, train traffic, helicopters, and fixed-wing aircraft. Other noise sources in the immediate area include McChord AFB, traffic noise on I-5, and miscellaneous commercial and industrial activities.

Existing noise levels at Fort Lewis vary depending on location and time of day. Existing noise levels at noise-sensitive receptors are below 65 decibels (DBA) day-night level (DNL) (Pierce County, et. al., 1992). Noise levels at industrial and commercial areas on post, such as motor pools and retail areas, are at or below 75 dBA DNL. Areas above 72 dBA DNL include firing ranges, impact areas, and Gray Army Airfield.

Weapons noise, such as artillery and mortar firing and explosive ordnance detonation activities, is the loudest noise source at Fort

Lewis. Range limitations are imposed on night firing to reduce noise impacts on nearby residential communities.

The primary traffic noise sources for communities surrounding Fort Lewis are I-5, SR 7, SR 507, SR 510 and SR 512. Noise levels on these roadways are expected to vary, depending on the time of day and measurement location. Traffic noise from I-5 is fairly constant because of heavy truck traffic. The calculated existing DNL at 500' from I-5 near Fort Lewis is 69 dBA, up to 74 dBA during peak traffic hours (Fig. 4.41).

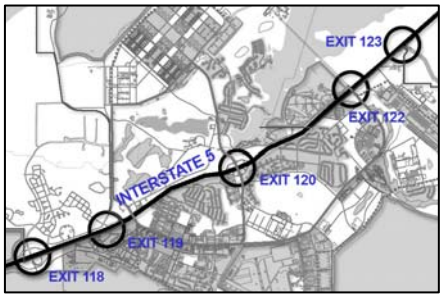

Fig. 4.41 – Relationship of Interstate 5 to Fort Lewis

Traffic noise related to training activities varies greatly, depending on the level of training, number of concurrent activities, and the distance and topography between the noise source and receiver locations.

Weapons noise originating from Fort Lewis is often audible in nearby rural and residential areas. Fort Lewis has established policies of publishing notice of training and explosive ordnance detonation activities. Most large-scale weapons-firing is limited to ranges located as far as possible from populated areas. Further, the number of weapons used at fire ranges is limited between 10 p.m. and 7 a.m.

There are two airfields contributing to the existing noise environment at Fort Lewis. Gray Army Airfield provides service for airplanes and helicopters and is a major contributor to the existing noise environment. McChord AFB, located adjacent to and north of Fort Lewis, primarily services US Air Force large jet aircraft and fighter jets.

The primary aircraft noise for the areas surrounding Fort Lewis involves take-off, landing, touch-and-go, and low-flying training activities at McChord AFB. Because of the limited number of off-post flights, fixed-wing aircraft and helicopter traffic from Gray Army Airfield does not contribute significantly to the noise outside Fort Lewis.

4.1.4.4 Air Quality

Fort Lewis is located in the Puget Sound Region of Washington State. The air quality of the region is greatly affected by the urbanization, industrialization, topographical and meteorological characteristics of the area. The Puget Sound Region has experienced a large surge in population and economic growth for the last 10-plus years. This increase in population and the surrounding mountainous regions contribute to spikes in seasonal

pollutants trapped by stagnant air conditions caused by temperature inversions between the upper and lower atmospheres. These inversions are typically of a shorter duration, less than 2 weeks, but have the effect of trapping all the pollutants that are generated during that time in the lower atmosphere where people typically live and work. Winter pollutants are generally fine particulate matter generated from residential and commercial combustion sources. Summertime pollutants are generally ground level ozone from industrial combustion processes and motor vehicle operation.

Fort Lewis operates a wide variety of industrial and residential sources of air pollutants. Residential hot water heating and household maintenance are generally controlled by private citizens and are not generally controlled by the installation. Commercial operations such as gasoline filling stations, Industrial scale boilers, painting operations, woodworking and vehicle maintenance are typically federally owned and operated and are regulated.

All new industrial or commercial activities that may emit any air pollutants are required to be reviewed by the Fort Lewis Environmental and Natural Resources Division (ENRD) for regulatory review and identification of permitting requirements prior to construction or installation. Fort Lewis recently agreed to a regulatory order that limits the facility emissions to below Major Source thresholds. It is critical that air pollution sources are managed in a manner that most effectively serves the installation's mission. This allowed the Installation to exit the Title V Air Operating Permit Program in 1995. The impact of this is that the installation must keep a watchful eye on its emission of Criteria Pollutants such as Carbon Monoxide (CO), Oxides of Sulfur (Sox), Oxides of Nitrogen (Nox), Volatile Organic Carbons (VOC's) and Particulate Matter (PM) to insure the agreed upon limits are not exceeded. The primary sources for reportable emission are combustion of fossil fuels for Heat (CO, Nox, Sox), the dispensing of gasoline (VOC's) and coating and solvent cleaning (VOC's). When new projects or operations are permitted for Fort Lewis, they are required to implement the best available control technology (BACT) when they are designed or planned. Even when regulatory permits are not required Fort Lewis actively pursues emission reduction efforts for its industrial sources. Minimization of fugitive dust / smoke and mobile source emission on Fort Lewis is also actively pursued. Activities which generate fugitive dust and smoke emissions are performed deep enough within the boundaries of Fort Lewis so as to prevent opacity violations which would cross the Installation boundaries and impact neighboring communities. Mobile source emissions are

impacted by an active rideshare program at the Installation which promotes car and vanpooling in order to minimize the number of vehicles on the road and the emissions those vehicles would generate.

4.2 EXISTING LAND USE

4.2.1 Introduction

The land use plan allocates sufficient space to accommodate activities in compatible use zones, and serves as a screening mechanism to ensure new activities are provided space in appropriate areas.

The land use plan distributes activity types to different locations on post. As a whole, analysis ratifies historic land use patterns of the 1920's and 1950's. Adjustments accommodate changes in the size, types and densities of military equipment, the impacts of automobiles, the growing space per capita needed to house single Soldiers, unit command and control facilities, and the long term needs for power projection. The most significant conflicts exist in the Garrison area, where troop unit activities clash with adjacent residential and administrative activities.

In Fig. 4.42, troop unit areas include barracks, unit headquarters, motor pools and limited service and retail activities. Community areas provide space for administrative functions, primary services, retail activities, and other community support and operations. Open space includes areas set aside for training, recreational uses and preservation of the aesthetics of the post.

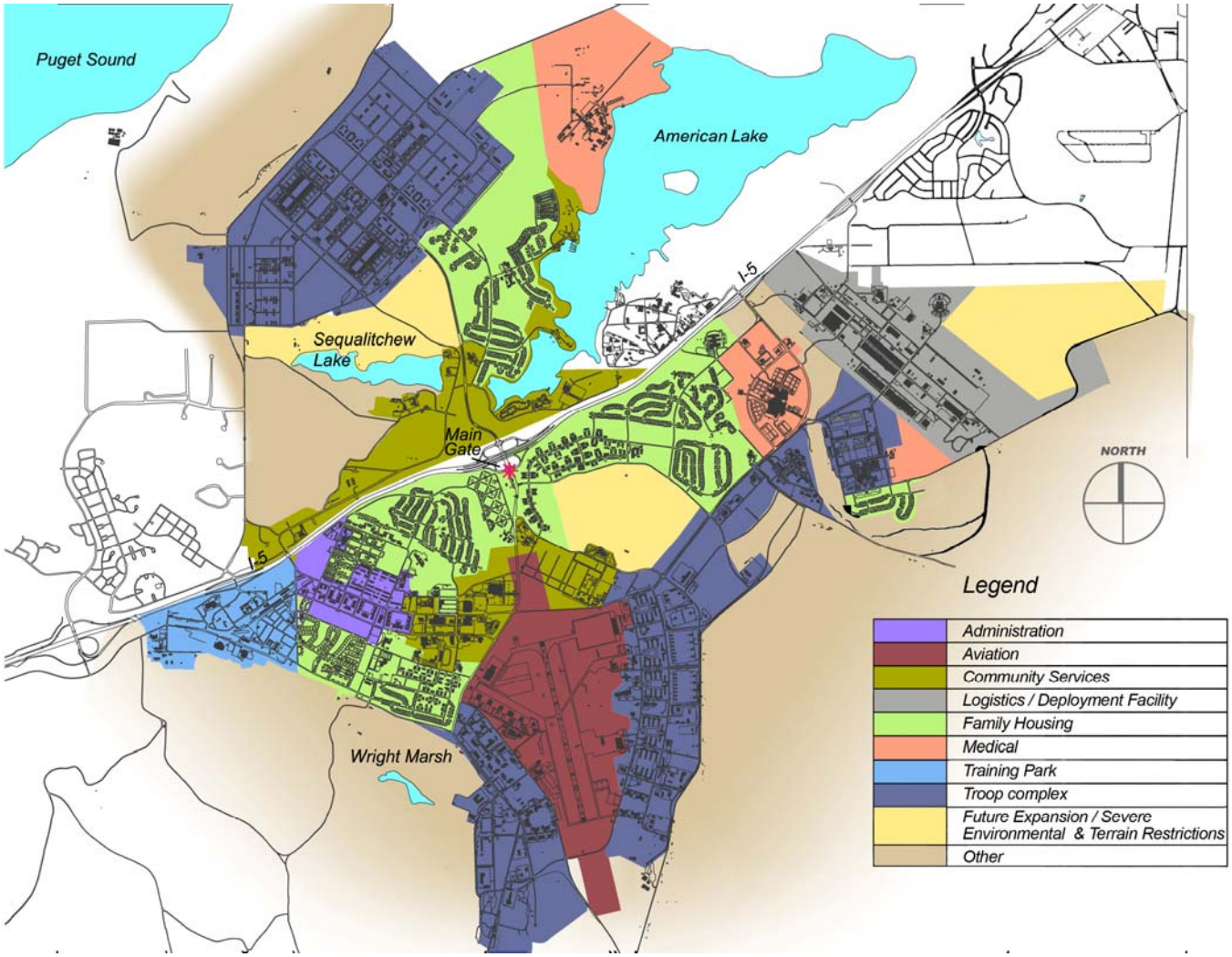

Figure 4.42 – Fort Lewis Land Use

4.2.2 North Fort

North Fort originally consisted exclusively of World War II vintage temporary buildings. It is currently being developed as a primary troop unit area.

North Fort's land use plan is based on a series of parallel bands of compatible and complementary zones as shown in (Fig. 4.43). The center orange band is zoned for commercial, recreational and service activities focused on the needs of the resident single Soldier population and, to a lesser degree, the Soldiers assigned to units in this area but who live in family housing or off post. The yellow ochre bands represent single Soldier residential facilities (barracks) clustered in brigade sized complexes.

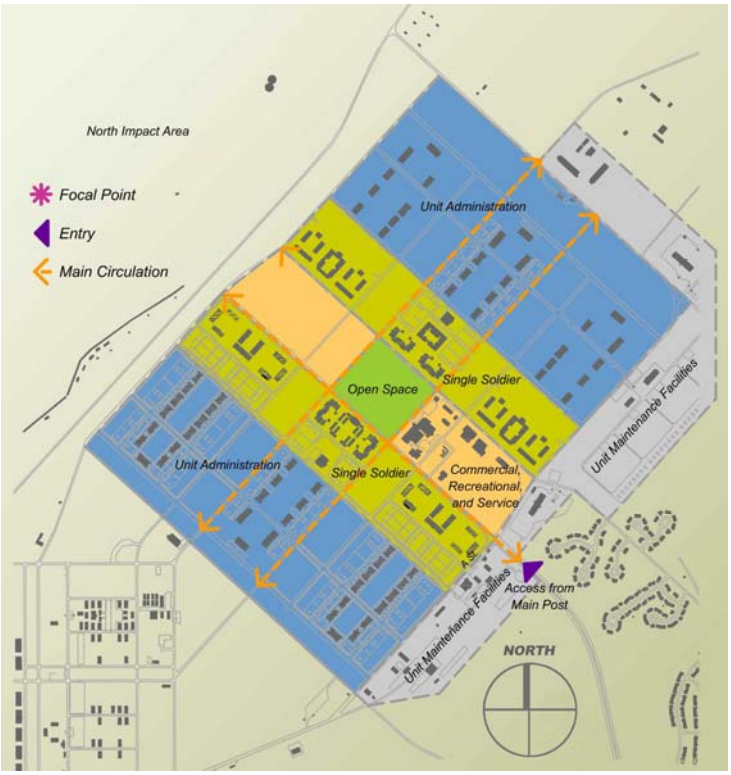

Fig. 4.43 – North Fort

Each barracks complex plans for three barracks buildings containing 200 to 300 barracks spaces with a Soldier community building to house common areas like game rooms, TV rooms, laundry rooms and mail boxes. Each barracks complex also includes, a dining facility sized to feed 400 - 800 Soldiers. The dark blue bands are unit administration and include large open areas for physical training and limited training and other support functions. The central area labeled "Open Space" has been set aside to enhance the aesthetics of the area. The gray outer band is zoned for unit maintenance facilities.

4.2.3 Garrison Area and Community Center

This part of Fort Lewis is divided into three sub-areas, the Garrison Area, the Community Center and the Training Support Campus, as shown on Fig. 4.44. The Garrison Area construction was begun in the 1920's. This area is on the historical register but despite its age, the facilities and their layout remain viable and useful.

Fig. 4.44 – Garrison Area and Community Center

To resolve the conflict between troop unit activities and residential and administrative activities in the Garrison Area, barracks and unit level activities will be relocated to new facilities at North Fort. This move will allow conversion of the majority of the space along Watkins Field to general administration, allowing consolidation of garrison staff and selected tenant activities into permanent facilities in a central business district.

Fig. 4.45 –The PX in the Fort Lewis Community Center

The Community Center, on the east of the Garrison Area, contains the Post Exchange (Fig. 4-45), Commissary, a services mall, fast food outlets, the welcome center at Waller Hall (Fig. 4-46), the library and other Morale, Welfare, and recreation activities. It provides a convenient concentration of destination facilities which allows family members, retirees, and other users from off post to minimize movements on the installation when conducting personal business.

Fig. 4.46 –Waller Hall at Community Center

A Training Support Campus is being established in the triangle of land on the west side of the garrison area which is currently light industrial and confinement center activities. This site will support growing use of simulation based training which has generated a requirement for an area dedicated to specialized simulation facilities. This site is accessible to installation units and Interstate-5 allowing users and visiting units ready access without bringing their movements through the community center. In addition, this area provides an appropriate site for other training support activities including range control and the training aids support center. The western corner of this area lies at a point where planned tactical vehicle routes from the division area, North Fort and the main maneuver areas come together allowing ready access without bringing tactical vehicles through the main cantonment area.

4.2.4 Division Area

The Division Area is the major permanent troop unit area on Fort Lewis. It was developed in two main phases. The first phase, spanning the 1950s, created a troop complex along the east side of Gray Army Airfield. The second phase, completed in 1976, provided a complex to support a brigade of the 9th Infantry Division which was stationed here at that time.

A FORSCOM Barracks Revitalization Alternatives Study, completed in February 1993, demonstrated that it is more cost effective to replace the type of barracks in the division area rather than to renovate them to the new Army standard,

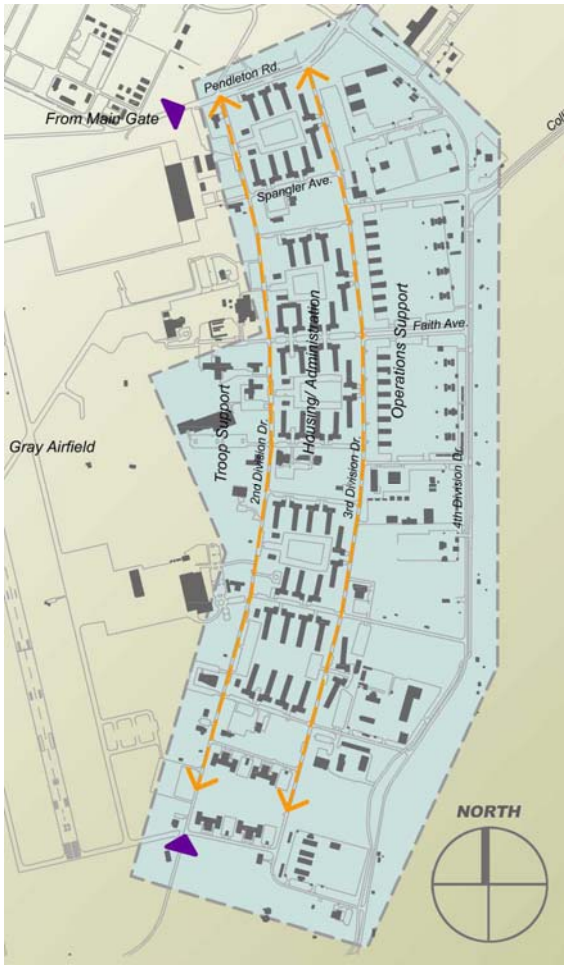

Fig. 4.47 –Division Area

with the exception of barracks built in 1976. The whole barracks renewal program at Fort Lewis envisions replacing existing inadequate facilities in the division area in phases. A detailed discussion of the master plan for the division area is contained in the Fort Lewis Division Area Master Plan Study, June 1994 (Fig. 4.47).

4.2.5 3rd Brigade Area

3/2 is the 3rd Brigade of the 2nd Infantry Division (Fig. 4.48). The 5/2 will be built at Fort Lewis, and will be re-flagged as the 2/2. The Division Headquarters and 1/2 are currently stationed in Korea. The Stryker Brigade (SBCT) is designed to bridge the gap between the Army's light and heavy forces. The unit provides combatant commanders increased operational and tactical flexibility. The Stryker, an eight-wheeled medium weight armored vehicle, is the SBCT's primary combat and combat support platform. Significantly lighter and more transportable than existing tanks and armored vehicles, the Stryker fulfills an immediate requirement to equip a strategically and tactically deployable brigade, capable of rapid movement worldwide. The 3rd Brigade Area includes the Barracks, Administration (Brigade HQ, Battalion HQs, Company Operations Facilities (COFs), and maintenance/motor pools for the Brigade.

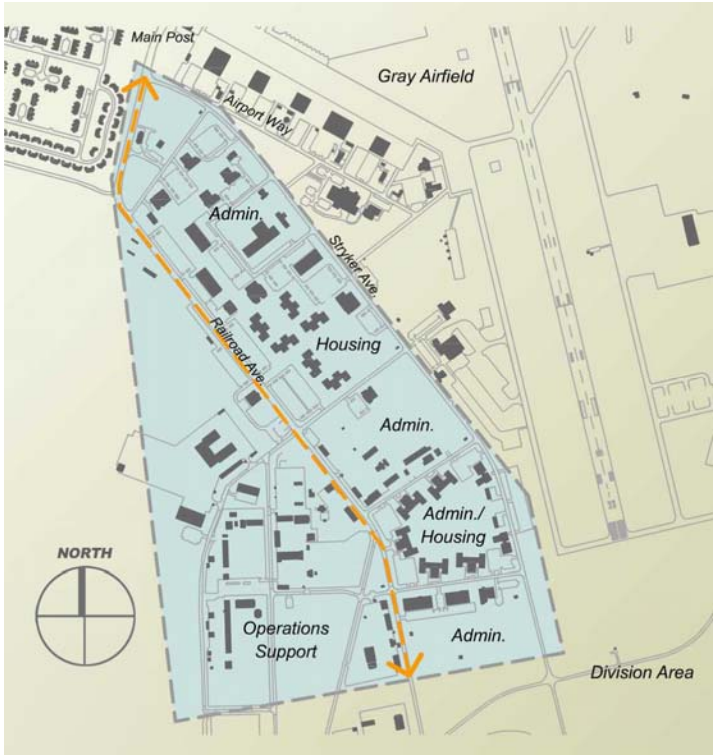

Fig. 4.48 – 3rd Brigade Area

4.2.6 Gray Army Airfield

Gray Army Airfield consists of a north/south 6,250 foot runway, associated fixed and rotary wing hangars, airfield operations facilities, and a simulator facility. It is located to the east of the garrison area. It is lined on both sides by troop units (division area including the Third Brigade area). Training areas underlie the majority of the controlled airspace south of the runway, and family housing and transportation facilities underlie the controlled airspace to the north (Fig. 4.49).

Fig. 4.49 –Gray Army Airfield

4.2.7 Miller Hill

Miller Hill comprises about 300 acres of undeveloped green space in the middle of the cantonment area. There are minor intrusions of family housing along the west end of the hill, the David L. Stone

Education Center sits along the southern boundary of the hill and there are recreational trials throughout the area. However, except for water storage and communications facilities, there has been no development of the interior portions of Miller Hill. Because it serves as a bridge between habitat areas in the training areas and wetlands to the North, development needs to be sensitive to protecting that use (Fig. 4.50).

Fig. 4.50 –Miller Hill in background

4.2.8 New Madigan Area

The New Madigan Army Medical Center (MAMC), comprising 1.2 million square feet of hospital and clinic space, was completed in 1992. A 30,000 square foot addition was built in 1993 to house missions transferred to Fort Lewis under base realignment and closure (BRAC). The area surrounding new MAMC provides land for future expansion of medical center and related missions (Fig. 4.51).

Fig. 4.51 –Madigan Hospital Today

Medical and dental facilities which provide direct support to Soldiers may be sited in troop unit areas in accordance with the land use plan.

4.2.9 Old Madigan Area

The original Madigan Army Medical Center was built in this area in 1942. Demolition of unused portions started in 1993. Demolition will continue as facilities are vacated. The area occupied by old Madigan and adjacent areas comprise about 125 acres and abuts four different major land uses. Of the facilities remaining on the site, only the Fisher House, a visitors' lodge which supports Madigan Army Medical Center, is of enduring value. The existing barracks, family housing, gym, theater, and other support facilities are in need of major renovation to greatly extend their useable life. Given this fact, and the adjacency to multiple land uses, no new construction is planned in this area until a major requirement is identified which requires a significant portion of the available space and is compatible with adjacent land uses (Fig. 4-52).

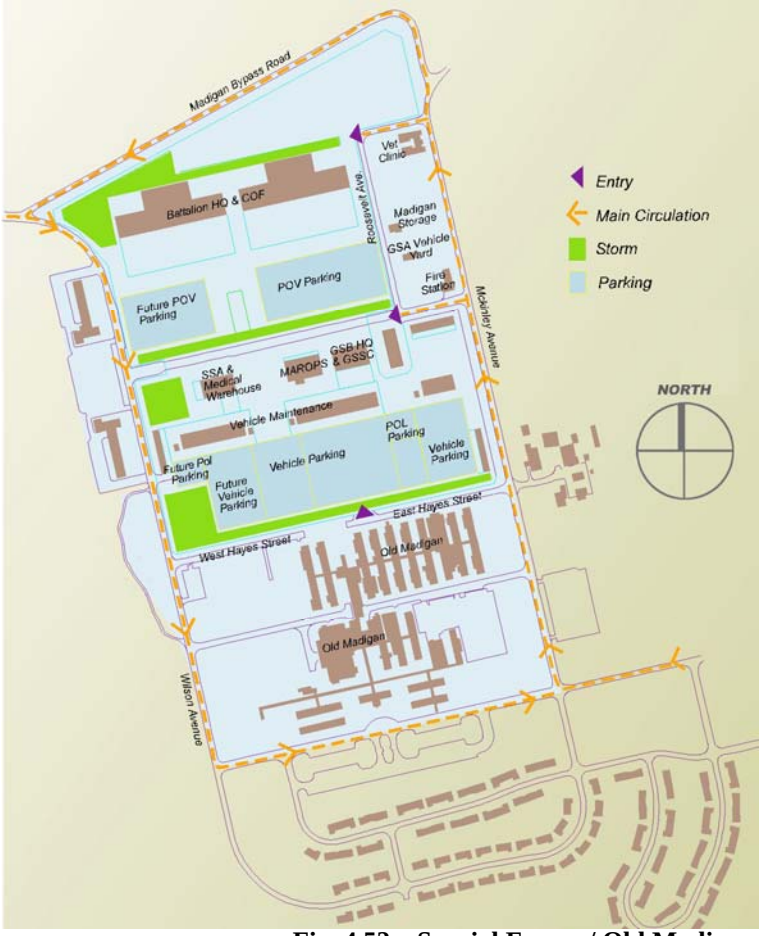

Fig. 4.52 – Special Forces / Old Madigan

4.2.10 Logistics and Deployment Center

The logistics center, originally established as Rainier Ordnance Depot, encompasses maintenance, transportation, deployment and storage facilities for the installation and major tenant activities.

No significant land use changes are projected for this area; however, significant improvements and expansions are envisioned over time as the army shifts its focus from a strategic concept of forward based forces to one of power projection.

The Logistics Center & Deployment Area Site Plan Study completed in early 1995 examined the logistics center and the deployment process in detail, and then developed a conceptual master plan (Fig. 4.53).

The plan provides separation between installation logistics and deployment functions, identifies traffic circulation and process improvements for deployment related functions, and allows for simultaneous support to deployment, mobilization, sustainment and installation operations. The plan ensures redevelopment can occur without displacing any activities until a new facility is in place (Fig. 4.54).

Fig. 4.53 – Logistics and Deployment Area and Center

4.2.11 Rainier Park

A new concept in the installation master plan is the designation and development of a reserve area for Department of Defense tenant industrial and administrative activities. The objective is to provide an orderly basis for allocating increasingly scarce buildable land to organizations having a legitimate need to locate facilities on Fort Lewis and simultaneously be able to quantify expected utilities construction costs to potential tenants. The area divided to accommodate reserve and national guard armories as well as light industrial land uses such as those normally associated with agencies such as the Defense Logistics Agency (DLA), the Army and Air Force Exchange System (AAFES), and the Defense Commissary Agency (DeCA).

Fig. 4.54 Army Reserve Center Located in Logistics Area

The plan also allocates space for convenience commercial services, isolation facilities for deployment, and billeting for Reserve, National Guard and other transients who are currently provided space in World War II vintage wood facilities.

The Rainier Park Study and Plan is part of the Fort Lewis Real Property Master Plan (Volume One, page 12), undated. The plan is available at Fort Lewis Public Works. The study established and defined the area while providing a road map that allows tenant activities and reserve units to know up front what utilities and infrastructure they need to include in design of major construction projects in order to ensure continuity and coherence as development progresses.

4.3 PROPOSED LAND USE

Fort Lewis' current patterns of land use are based on the installation’s 1996 plan, which was created to address continuing growth and development throughout the installation. The existing land use area designations will remain and development will occur incrementally, within or adjacent to their boundaries, as building and infrastructure projects come to fruition.

4.4 HISTORIC DISTRICT MAPS

Fig. 4.55 American Lake/Veterans Administration Hospital Historic District

Fig. 4.56 Old Madigan General Hospital Historic District (yellow area)

Fig. 4.57– Fort Lewis Garrison Historic District (indicated in blue cross-hatch)

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SECTION 5
VISUAL THEMES AND ZONES

5.1 INTRODUCTION

5.1.1 Visual themes and zones are determined after performing the two surveys mentioned in Section 2, paragraph 2.2. These surveys were conducted using existing installation maps, visual inspection, interviews, questionnaires, and photographs to record impressions of visual and spatial impacts. The data captured was used to define the visual themes and zones of the installation. Figure 5.1 presents a graphical portrayal of the of the installation's visual zones and themes.

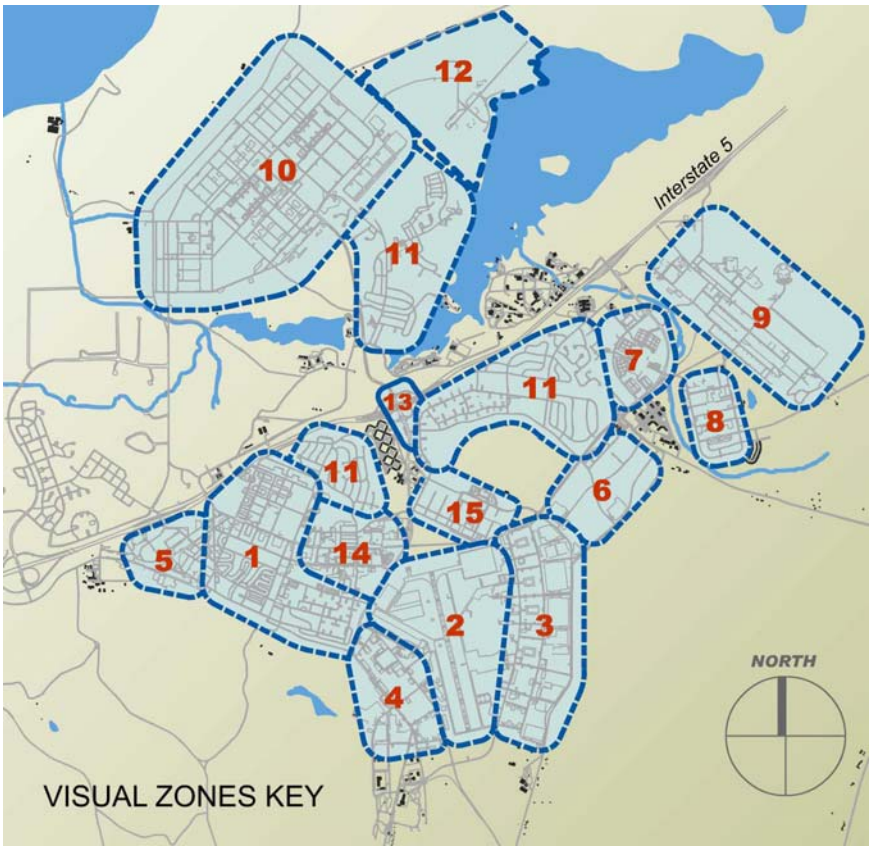

Fig. 5.1 – Visual Zones Key

5.2 VISUAL THEMES

5.2.1 Visual themes create a perception of unification within the installation. These themes create design consistency that provides orientation and a "sense of place".

5.2.2 Visual themes are generalized groupings of visual zones that provide the same general use and visual characteristics. Visual

themes include broad scale activities that occur on the installation. These activities typically include similar design and layout characteristics.

5.3 VISUAL ZONES

5.3.1 Visual Zones are areas within the installation that include similar visual characteristics. Visual characteristics define a "look and feel" of an area together with the dominant features that define its image. The distinction is more general than identifying building character, era or use. There are often sub-zones with the boundaries where groups of buildings share an architectural vocabulary, historic character or functionality. Some of these sub-zones straddle the boundaries of multiple zones, such as the Garrison Historic District. The relationship across these boundaries must therefore be considered when construction projects occur in these areas. Typical visual characteristics with Visual Zones include unique buildings, vehicular and pedestrian corridors, natural features, and spatial relationships.

5.3.2 The following paragraphs present a functional analysis of each of the visual zones. This analysis includes a description of the visual character, a visual analysis map, assets, liabilities, and recommendations for each zone.

5.3.3 The visual analysis maps graphically illustrate the features and constraints that affect the visual character of the zone.

5.3.4 Assets and liabilities are determined according to the following criteria: installation visual goals and objectives (Section 3, Paragraph 3.2), design principles (Section 3, Paragraph 3.4) and visual elements (Section 3, Paragraph 3.3) in relationship to the six design components described in Sections 7 through 12 of this Army Installation Design Guide.

5.3.5 Recommendations are made to correct the liabilities or enhance the assets. These recommendations are used to generate projects that are listed in Section 6, Improvement Projects.

5.4 VISUAL ZONE 1 – GARRISON AREA

5.4.1 Visual Character

The Garrison Area includes command structures, officer/family housing and former barracks all built to a very consistent architectural style. Historic portion of Garrison Area is characterized by Georgian Revival structures and organized

around a central parade field. See Figure 4.52 for the Garrison Historic District which overlaps with Zone 1.

5.4.2 **Visual Analysis Map (Fig. 5.2)**

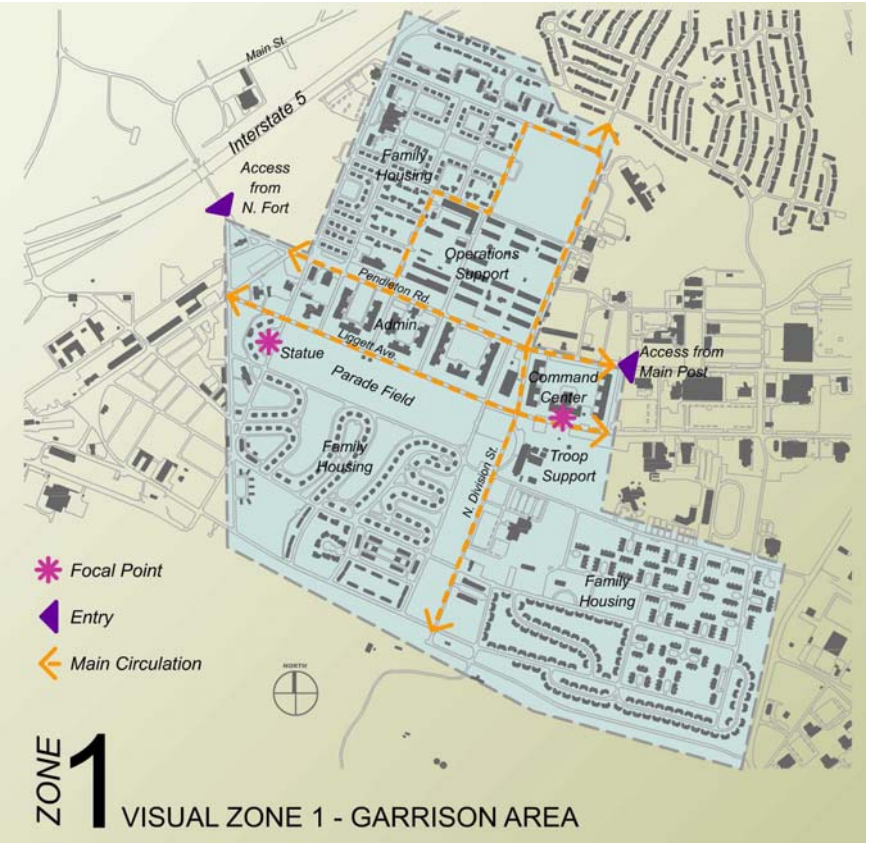

Fig. 5.2 – Visual Zone 1 – Garrison Area

5.4.3 **Assets**

5.4.3.1 Site Planning

- Different functions well separated within the larger area
- Parade Field provides a strong central focal point
- Military hierarchy well articulated

5.4.3.2 Buildings

- The Fort Lewis Garrison Historic District, which is eligible for listing in the National Register of Historic Places
- Georgian Revival structures provide unified appearance
- Georgian Revival architectural style establishes theme for other areas of Ft. Lewis
- Lombardy Romanesque Revival architectural style of Chapel.

5.4.3.3 Circulation

- Pendleton Ave. and Liggett Ave. provide strong longitudinal arterials
- “Boulevard” fronting and Parade Field acts as service “spine” running parallel to area
- Numerous cross streets provide ready access to all structures

5.4.3.4 Plant Material

- Maturity of trees help establish sense of permanence and unifies visual impression
- Tree placement and type emphasize formal nature of the admin areas
- More “casual” tree placement reinforces the less formal nature of the housing areas within the Garrison Area
- Parade Field provides large open space

5.4.3.5 Site Elements

- Statue at general officer’s quarters circle
- Cannons at Buildings HQ2025, 2027 and 1010
- Flagpole at Building HQ2025
- Watkins field provides large green open space throughout the year.

5.4.3.6 Force Protection

- Some setbacks/criteria have been implemented per current Force Protection requirements

5.4.4 **Liabilities**

5.4.4.1 Site Planning

- This area is already highly developed and site planning is difficult due to lack of space
- Limitations on existing buildings and facilities by RCI Family Housing

5.4.4.2 Buildings

- Wood sided and framed structures introduced during WWII, and subsequent years, do not support the overall theme

5.4.4.3 Circulation

- Limited bike paths on older streets

- Although this area includes the command center for the installation, the route to it from the entry gates is obscured

- Lacks handicap accessibility and has poor pedestrian visibility on Pendleton Ave.

5.4.4.4 Plant Material

- Planting styles around the older structures not carried through to newer ones or renovations of older structures

- Loss of stately colonnade of American Elms along Liggett Avenue has not been replaced

5.4.4.5 Force Protection

- Use of courtyards for parking areas too close to structures

- Few structures meet current Force Protection standards

5.5 Visual Zone 2 – GRAY ARMY AIRFIELD

5.5.1 Visual Character

The large triangular shaped area of Gray Army Airfield divides the Main Post into three major areas. The Airfield is characterized by large aircraft maintenance and storage hangars that line the taxiways parallel to the runway.

5.5.2 Visual Analysis Map (Fig. 5.3)

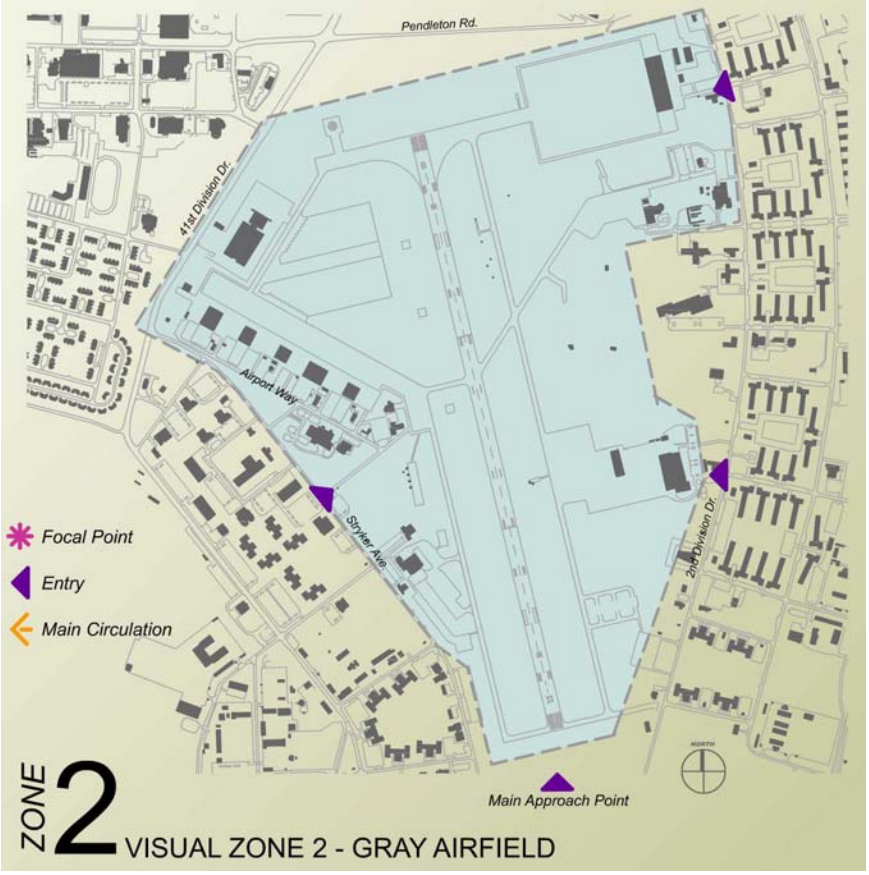

Fig. 5.3 – Visual Zone 2 – Gray Airfield

5.5.3 Assets

5.5.3.1 Site Planning

- Different functions well separated within the larger area

- Hierarchy of uses

5.5.3.2 Buildings

- Structures reflect the large scale of aircraft and maintenance operations house within

5.5.3.3 Circulation

- 2nd Division Drive, Stryker Ave. and 41st Division Drive run around airfield to provide good access to field and surrounding functions

5.5.3.4 Plant Material

- Material around airfield has been limited by necessity

5.5.3.5 Site Elements

- Scale and placement of hangars along Airport Way create a landmark which signifies the airfield and its activities

5.5.3.6 Force Protection

- Potential for controlled perimeter to airfield

5.5.4 **Liabilities**

5.5.4.1 Site Planning

- Airfield along with Miller Hill to the north split the base into eastern and western zones

- Clear Zones and Accident Potential Zones (APZ's) restrict development in the Gray Airfield visual zone

5.5.4.2 Buildings

- Buildings properly suited/sized for current functions

- Building use restricted to aviation activities

5.5.4.3 Circulation

- No clear routes to components scattered around the perimeter

- Multiple access points not clearly identified

5.5.4.4 Plant Material

- Little actual planting, but material (and therefore, foreign object damage) should be minimized

5.5.4.5 Site Elements

- Does not take advantage of location as terminus of entry drive (41st Division Drive)

5.5.4.6 Force Protection

- Parking areas too close to structures
- Few structures meet current Force Protection standards

5.6 Visual Zone 3 – DIVISION AREA

5.6.1 Visual Character

Referred to as the "Banana Belt", the Division Area, east of Gray Army Airfield, has a homogenous visual appearance. Barracks, administration and support structures all have a linear, 3-story mid-20th century architectural style. The strong order created by the parallel north-south streets creates a unified visual area.

5.6.2 Visual Analysis Map (Fig. 5.4)

Fig. 5.4 – Visual Zone 3 – Division Area

5.6.3 Assets

5.6.3.1 Site Planning

- Different functions well zoned within the larger area
- 3 parallel streets within the area zone the entire area – moving from east to west are Ranges, Motor Pools, Admin and Barracks, and Community Services

- Hierarchy of spaces
- Buildings grouped to form clearly defined unit areas within the larger district

5.6.3.2 Buildings

- Consistency of design provide unifying appearance
- Utilitarian architectural style helped establish theme for other areas of Ft. Lewis

5.6.3.3 Circulation

- Long arching streets provide strong longitudinal routes
- Numerous cross streets provide good access to compounds of buildings

5.6.3.4 Plant Material

- Mature trees help establish strong eastern and western edges

5.6.3.5 Site Elements

- In general, green spaces around strip of Housing/Administration buildings enhance appeal of these brick structures

5.6.3.6 Force Protection

- Almost all development in this area pre-dates force protection consideration, therefore no assets can be listed

5.6.4 **Liabilities**

5.6.4.1 Site Planning

- Random nature of development and use of courtyards create an unkempt appearance in many areas

5.6.4.2 Buildings

- Buildings are older and require maintenance typical for structures of these eras

5.6.4.3 Circulation

- Limited bike paths on older streets
- Traffic control needed on cross streets
- Gravel parking lots

5.6.4.4 Plant Material

- Smaller plantings have no consistency or theme

5.6.4.5 Site Elements

- No identifying markers

5.6.4.6 Force Protection

- Parking areas and streets too close to structures
- Few structures meet current Force Protection standards
- East-west streets do not have setbacks that meet force protection standards

5.7 Visual Zone 4 – 3rd BRIGADE AREA

5.7.1 Visual Character

Built over a longer period of time than the Division Area, the 3rd Brigade Area has a collection of visual styles. As the most remote portion of the main cantonment area, it has structures built with a variety of materials, from the mid to late 20th century.

5.7.2 **Visual Analysis Map (Fig. 5.5)**

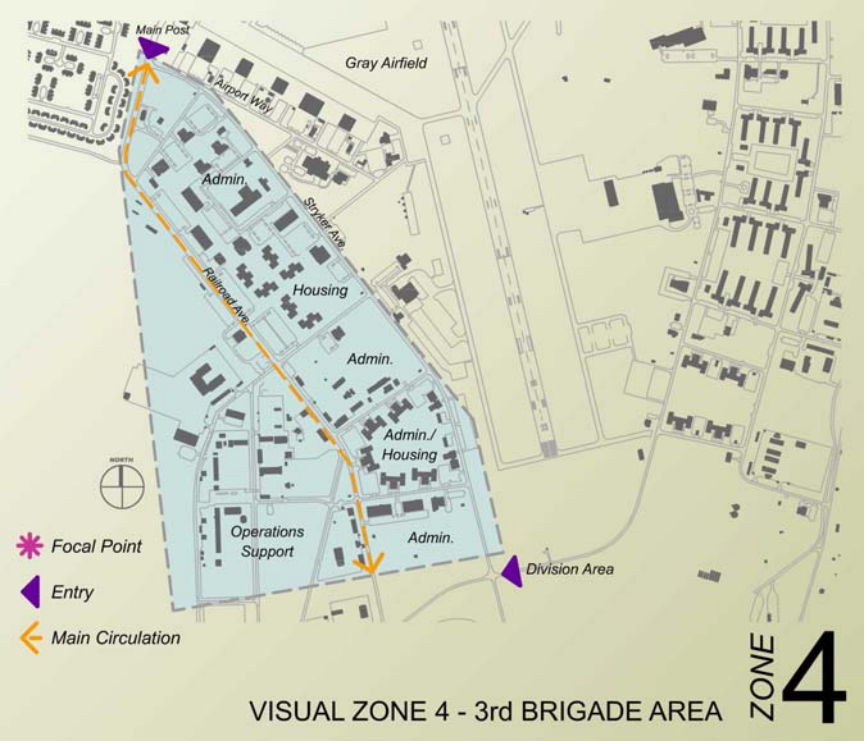

Fig. 5.5 – Visual Zone 4 – 3rd Brigade Area

5.7.3 **Assets**

5.7.3.1 Site Planning

- Buildings are grouped by function

5.7.3.2 Buildings

- Newer buildings require less maintenance
- Upgraded barracks

5.7.3.3 Circulation

- Ease of access from Garrison Area

5.7.3.4 Plant Material

- A few mature tree stands are still present

5.7.3.5 Site Elements

- Softball fields south of 22nd Street

5.7.3.6 Force Protection

- Some buildings have potential to meet current standards with some upgrades

5.7.4 **Liabilities**

5.7.4.1 Site Planning

- Isolated from majority of installation by airfield

5.7.4.2 Buildings

- Wide range of structure vintage and style create non-cohesive appearance

- Korean vintage structures and 80's structures have very different feels

5.7.4.3 Circulation

- Limited bike paths on older streets
- Parking "surrounds" many structures.
- Insufficient parking for admin/maintenance/work area

5.7.4.4 Plant Material

- Planting styles vary widely and planting is limited

5.7.4.5 Site Elements

- No identifying markers

5.7.4.6 Force Protection

- Parking areas too close to structures
- Few structures meet current Force Protection standards

5.8 Visual Zone 5 – TECHNOLOGY AND TRAINING PARK

5.8.1 **Visual Character**

An evolving area of Fort Lewis, the Technology and Training Park Area is characterized by a series of newer, larger stand-alone structures. See Figure 4.52 for the Garrison Historic District which overlaps with Zone 5.

5.8.2 **Visual Analysis Map (Fig. 5.6)**

Fig. 5.6 – Visual Zone 5 – Technology & Training Park

5.8.3 **Assets**

5.8.3.1 Site Planning

- Developing area
- "Fringe" location allows development on variations of styles.

5.8.3.2 Buildings

- Mission Support Training Facility (MSTF) and Battle Simulation Center (BSC) provides model for developing large, complex training and operations structures.

5.8.3.3 Circulation

- Combat Vehicle Trail (CVT) provides a good link to other areas of the installation

5.8.3.4 Plant Material

- Substantial buffer material on boundary slopes to the south

5.8.3.5 Site Elements

- General open space provides amenities for recreation

5.8.3.6 Force Protection

- Several structures developed after implementation of Force Protection standards

5.8.4 **Liabilities**

5.8.4.1 Site Planning

- Challenge to create cohesive building areas where large areas of open space occur

5.8.4.2 Buildings

- Buildings vintages cover a wide range

5.8.4.3 Circulation

- Limited bike and pedestrian paths on older streets
- Circuitous routes to access newer facilities

5.8.4.4 Plant Material

- Little mature material on most of the lower topography

5.8.4.5 Site Elements

- No identifying markers

5.8.4.6 Force Protection

- Remote location on the base requires special attention to perimeter force protection issues.

5.9 Visual Zone 6 – JACKSON AVENUE AREA

5.9.1 Visual Character

A second evolving area of Fort Lewis, located between the north end of Division Area and the south end of the Madigan complex, Jackson Avenue Area has several 10 year (plus or minus) old structures and large areas of undeveloped land. A consistent plan and visual image has yet to be developed.

5.9.2 Visual Analysis Map (Fig. 5.7)

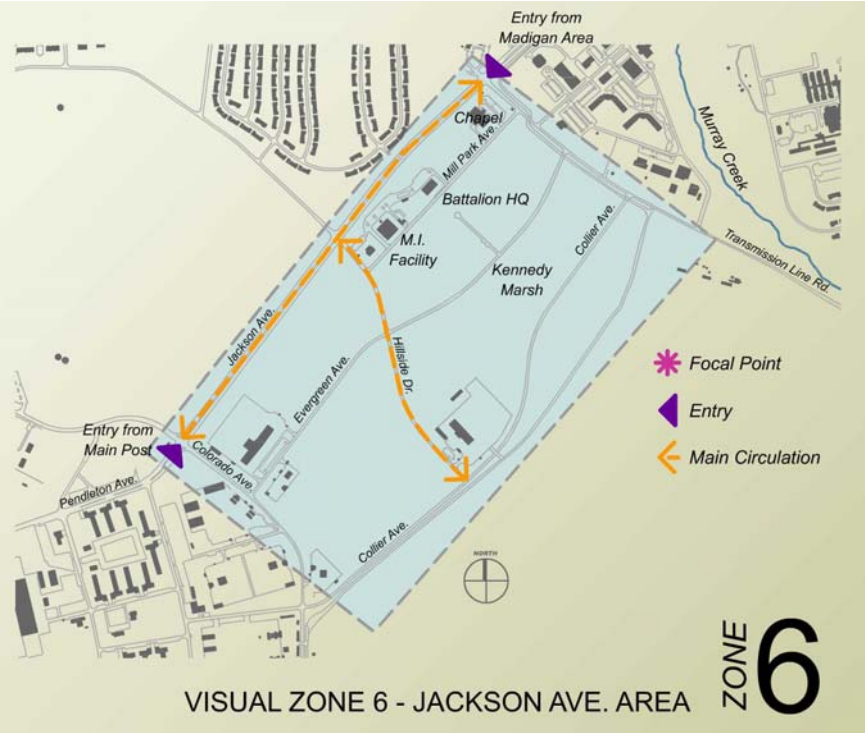

Fig. 5.7 – Visual Zone 6 – Jackson Avenue Area

5.9.3 Assets

5.9.3.1 Site Planning

- Different functions have potential to be well separated within the larger area

- Special Forces compound to north end of Division Area is well defined

5.9.3.2 Buildings

- Existing structures continue use of brick similar to other locations on Post
- Some wood construction is used in this area
- Four Chaplains Memorial Chapel easily identified from southbound Jackson Ave.

5.9.3.3 Circulation

- Pattern of streets established and constructed form strong backbone and allow zoning of functions within area

5.9.3.4 Plant Material

- Much of site is still in second growth forest some of which will be removed for construction.

5.9.3.5 Site Elements

- Open space provides recreation area

5.9.3.6 Force Protection

- Retrofitting of security measures has taken place for many facilities
- "Clean Sites" on much of area will allow development to meet current standards

5.9.4 **Liabilities**

5.9.4.1 Site Planning

- Site design developed during the 1980's has not been "tested' for current design and planning standards

5.9.4.2 Buildings

- High security of Building 09113 isolates use

5.9.4.3 Circulation

- Limited bike paths on streets

- Additional local streets may need to be constructed as development of this area takes place

5.9.4.4 Plant Material

- No plantings around Building 09113

5.9.4.5 Site Elements

- No identifying markers

5.9.4.6 Force Protection

- Street blockage in front Building 09113
- Pattern of streets developed in the 1980's may not provide sufficient stand-off distances to meet current Force Protection standards.

5.10 Visual Zone 7 – MADIGAN ARMY MEDICAL CENTER (MAMC)

5.10.1 Visual Character

Dominated by the main structure of Madigan Army Medical Center (MAMC), the tallest occupied structure on Fort Lewis, the hospital is a stand-alone destination facility that is separated from surrounding uses by a ring of open space and surface parking.

5.10.2 Visual Analysis Map (Fig. 5.8)

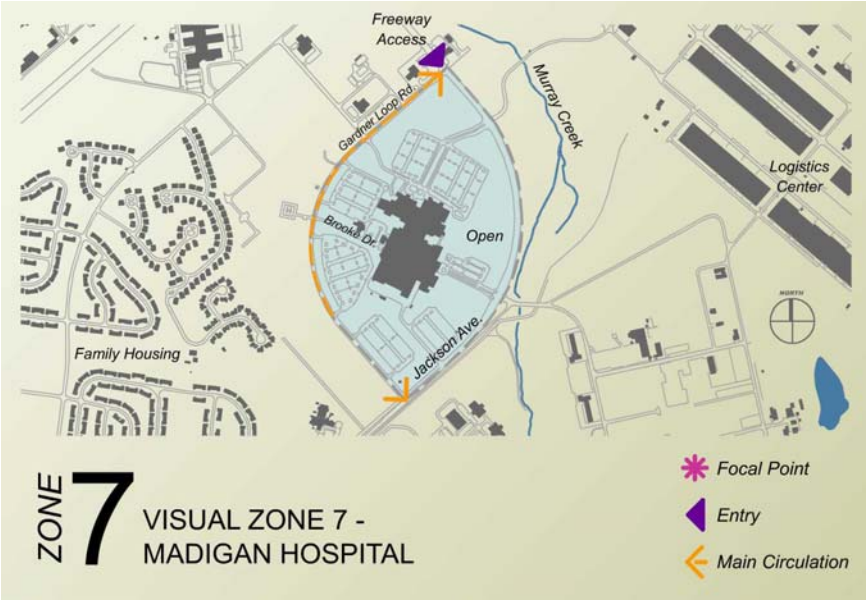

Fig. 5.8 – Visual Zone 7 – Madigan Hospital

5.10.3 Assets

5.10.3.1 Site Planning

- Strong site organization plan
- Takes advantage of its visual prominence

- Unique nature of medical functions results in a site plan with vehicles pushed to the perimeter of the site.

5.10.3.2 Buildings

- Size of main hospital makes the hospital tower a strong visual landmark

5.10.3.3 Circulation

- Perimeter road for the complex allows for separation of users to complex.
- Jackson Avenue is main circulation route from Main Post
- Separation of functions (hospital, staff, clinic) is good

5.10.3.4 Plant Material

- Grass lawns and planted areas
- Strong landscape cohesion and design

5.10.3.5 Site Elements

- Strong and easily readable signage systems on post
- Water fountain and pond

5.10.3.6 Force Protection

- Some Force Protection measures can be achieved with minimum effort and cost

5.10.4 **Liabilities**

5.10.4.1 Site Planning

- Challenge of high demand for parking

5.10.4.2 Buildings

- Orientation for visitors somewhat confusing

5.10.4.3 Circulation

- Limited bike paths on outer streets (i.e. Jackson) as well as bike parking

5.10.4.4 Plant Material

- Planting style different from other locations on post

5.10.4.5 Site Elements

- Main building entrances not identified with distinct landscape elements

5.10.4.6 Force Protection

- Temporary Force Protection modifications to building access are unsightly and confuse building approach

5.11 Visual Zone 8 – SPECIAL FORCES / OLD MADIGAN

5.11.1 **Visual Character**

Special Forces / Old Madigan consists of 2 separate zones bisected by Murray Creek. The Old Madigan area is primarily single story wood structures, with some concrete masonry and brick structures, from WWII vintage. The Special Forces complex is a series of single mix multi-story brick buildings all built with a single architectural style in the late 20th century. See Figure 4.53 for the Old Madigan General Hospital Historic District, which is within Zone 8. Special Forces will be developing a second complex on the old MAMC site.

5.11.2 **Visual Analysis Map (Fig. 5.9)**

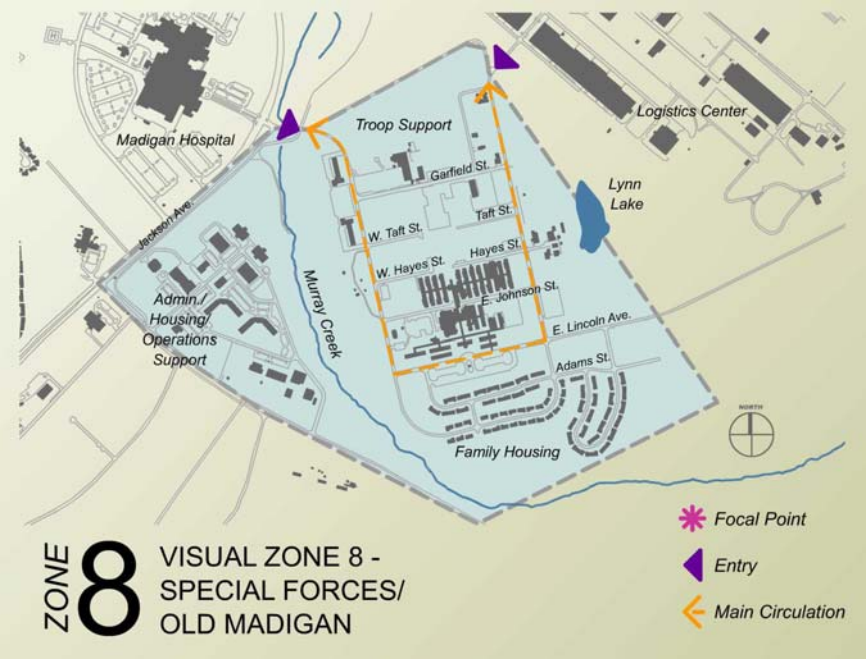

Fig. 5.9 – Visual Zone 8 – Special Forces/Old Madigan

5.11.3 **Assets**

5.11.3.1 Site Planning

- Different functions well separated within the larger area

5.11.3.2 Buildings

- Strong, consistent aesthetic theme – low, large buildings, broken into smaller sections by wings

- Will construct new ISFG(A) Administration and Maintenance

5.11.3.3 Circulation

- Simple and effective

5.11.3.4 Plant Material

- Zone nearly completely encircled by mature evergreen tree stands

5.11.3.5 Site Elements

- Outdoor recreation in Troop Support area

- Picnic Grove off Wilson Ave.

5.11.3.6 Force Protection

- Two functional areas – Special Forces and Old Madigan – allow separation with little overlap of various Force Protection categories

5.11.4 **Liabilities**

5.11.4.1 Site Planning

- Physically isolated from rest of installation

- "Temporary" deployment personal vehicle parking area in middle of site. These areas will be phased out so that new construction can support increased ISFG(A) compound

- Site split by Murray Creek

5.11.4.2 Buildings

- Structures require extensive modifications for long term uses other than original medical use

5.11.4.3 Circulation

- Limited bike paths on older streets

5.11.4.4 Plant Material

- Little landscaping within the zone

5.11.4.5 Site Elements

- No identifying markers

5.11.4.6 Force Protection

- Parking areas too close to structures
- No structures meet current Force Protection standards

5.12 Visual Zone 9 – LOGISTICS CENTER

5.12.1 **Visual Character**

Characterized by large vehicle access roads, rail loading yards, vehicle/equipment storage and staging areas, both enclosed and open air, the Logistics Center has a utilitarian warehouse appearance.

5.12.2 **Visual Analysis Map (Fig. 5.10)**

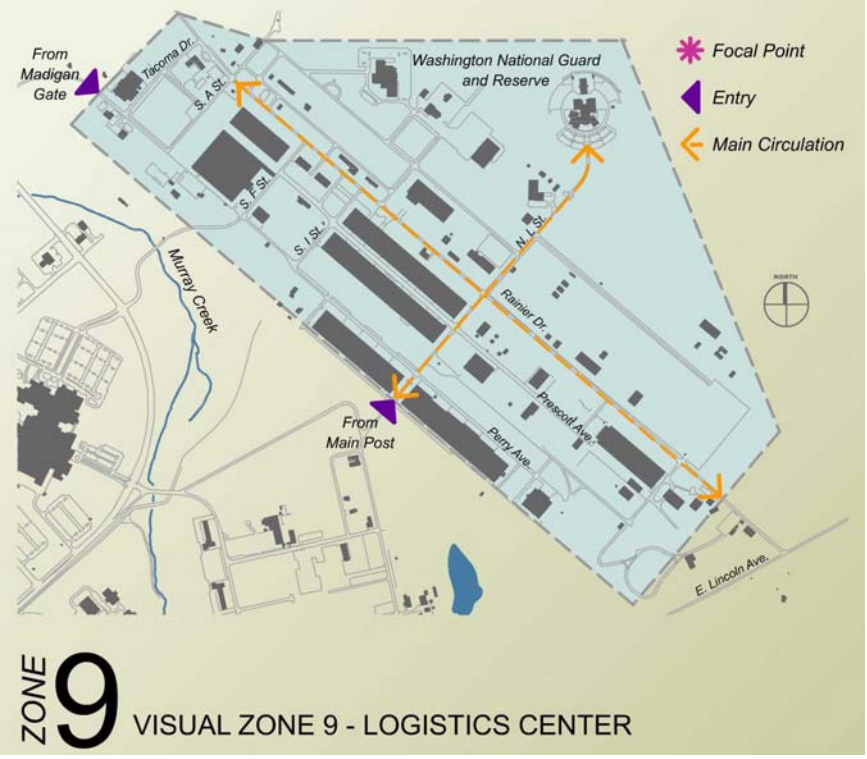

Fig. 5.10 – Visual Zone 9 – Logistics Center

5.12.3 **Assets**

5.12.3.1 Site Planning

- Linear layout parallel to rail spurs give a strong orientation to site

5.12.3.2 Buildings

- Mixture of vintage structures unified by the long shed-like/warehouse character

5.12.3.3 Circulation

- Strong street grid

5.12.3.4 Plant Material

- Mature tree stands separate Log Center from remainder of Post

5.12.3.5 Site Elements

- Conifer forest along Beaumont Ave. entrance

5.12.3.6 Force Protection

- Controlling vehicular access to area could be accomplished if desired

5.12.4 **Liabilities**

5.12.4.1 Site Planning

- Guard and Reserve facilities accessed from main road (Rainier Road) and Logistics Gate entrance

5.12.4.2 Buildings

- Character of some buildings is bleak
- Some older WWII-era wood structures

5.12.4.3 Circulation

- Limited bike paths on older streets

5.12.4.4 Plant Material

- Little or no landscaping within the complex

5.12.4.5 Site Elements

- Minimal directional signage
- No identifying markers

5.12.4.6 Force Protection

- Many buildings pre-date force protection consideration

5.13 Visual Zone 10 – NORTH FORT LEWIS

5.13.1 **Visual Character**

As an evolving area, North Fort Lewis is 10 years into a program to replace one and two story wood frame structures with one- to three-story Georgian Revival structures built in 21st century military park configuration with separate zones for bachelor housing, operations, administration and morale and welfare facilities.

5.13.2 **Visual Analysis Map (Fig. 5.11)**

5.13.3 **Assets**

5.13.3.1 Site Planning

- Different functions well zoned within the larger area
- Central spine of community functions provides a strong focal point
- Clear hierarchy

5.13.3.2 Buildings

- Georgian Revival style structures provide unifying appearance
- Diversity within a consistent theme

5.13.3.3 Circulation

- 41st Division Drive provides a clear link to main post
- Well spaced grid system allows ease of movement within the area
- Bicycle circulation and parking provided

5.13.3.4 Plant Material

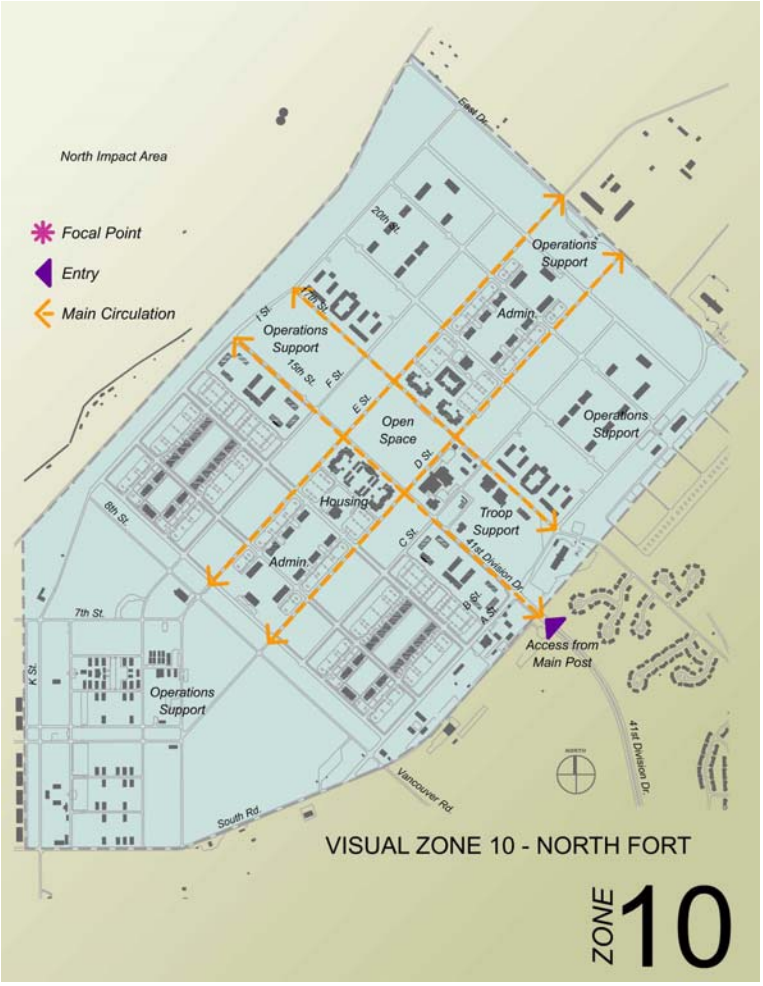

Fig. 5.11 – Visual Zone 10 – North Fort

- New plantings will help establish sense of permanence
- Tree placement and type emphasize formal nature of the admin areas
- More “casual” tree placement reinforces the less formal nature of the housing areas within the Garrison Area

5.13.3.5 Site Elements

- Appealing open spaces created by arrangement of barracks buildings and inclusion of recreation facilities
- Parade fields create strong and unifying open space

5.13.3.6 Force Protection

- Most structures built after 2002 meet current Force Protection standards.

5.13.4 **Liabilities**

5.13.4.1 Site Planning

- Master plan for this area is restrictive so that vision for North Fort will be achieved

5.13.4.2 Buildings

- Continual construction disruption as new buildings are built

5.13.4.3 Circulation

- No formal entry to North Fort area

5.13.4.4 Plant Material

- Grass in large open spaces dormant through dry summers
- Plant material will take another decade to mature

5.13.4.5 Site Elements

- No identifying markers

5.13.4.6 Force Protection

- New construction has complied with Force Protection standards since 2002. Older construction has not.

5.14 Visual Zone 11 – FAMILY HOUSING

5.14.1 **Visual Character**

The Family Housing Zone is characterized by a single function, housing for the families of both enlisted personnel and officers. Each sub zone of this area has its own distinct architectural style related to the period of its construction. Most of the areas share the dominant characteristics, mature vegetation and a civilian street configuration.

5.14.2 **Visual Analysis Map (Fig. 5.12)**

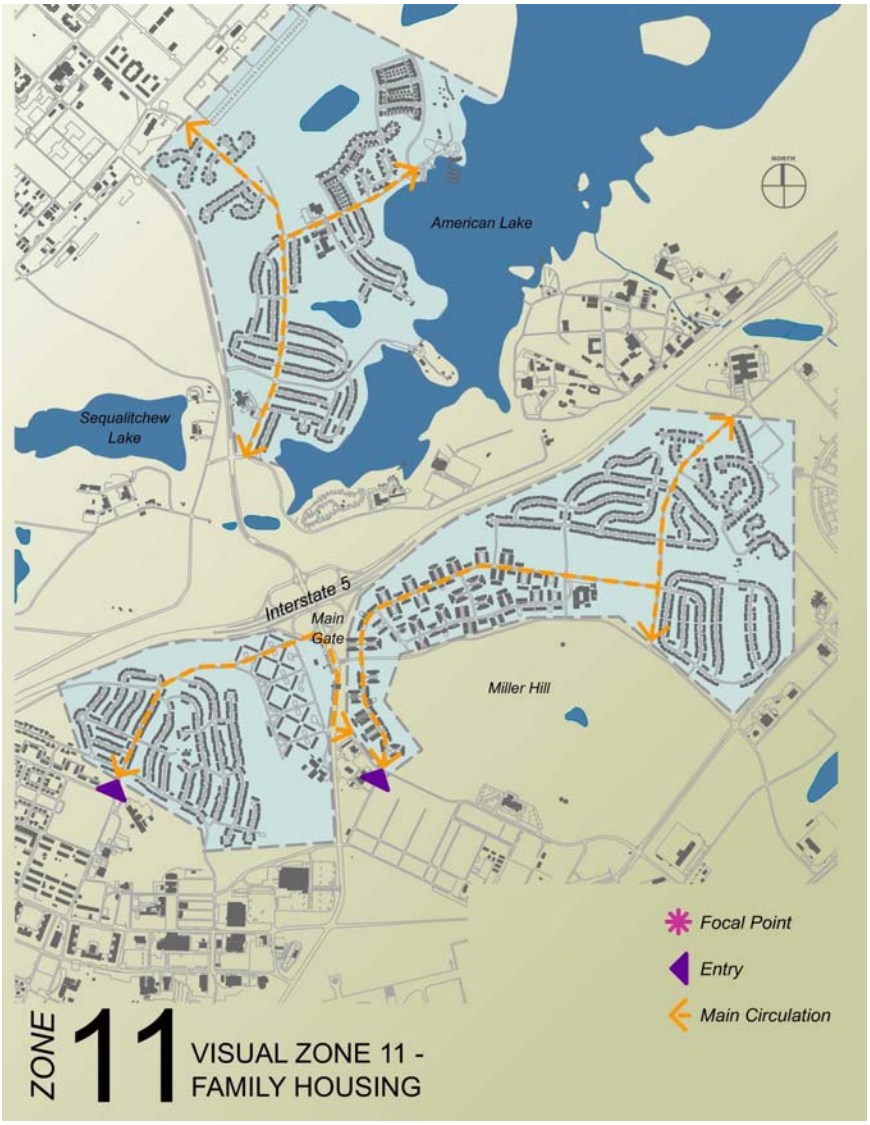

Fig. 5.12 – Visual Zone 11 – Family Housing

5.14.3 **Assets**

5.14.3.1 Site Planning

- Variety of communities within the larger housing community
- Diversity of neighborhood density and patterns (some with "alleys" for vehicle access – some with street access)
- Clearly defined neighborhoods – differentiated by vintage and style

5.14.3.2 Buildings

- Diversity of housing styles

5.14.3.3 Circulation

- Neighborhoods designed without through streets to eliminate non-neighborhood traffic

- Curvilinear layout of roads provides distinctive less formal style for residential areas

5.14.3.4 Plant Material

- Mature trees within most neighborhoods

5.14.3.5 Site Elements

- Some signage indicating different neighborhoods
- Parks, activity centers and schools within the neighborhoods

5.14.3.6 Force Protection

- Force Protection requirements are not applied to low occupancy density of spread-out housing facilities

5.14.4 **Liabilities**

5.14.4.1 Site Planning

- Some neighborhoods located too close to main post entry
- Some neighborhoods located too close Interstate 5 and main arterials

5.14.4.2 Buildings

- Some housing does not meet current Family Housing standards

5.14.4.3 Circulation

- Limited bike paths on older streets
- Wayfinding within neighborhoods not clear
- Better sidewalks needed
- Weak linkage to community facilities; no pedestrian access routes to everyday service needs

5.14.4.4 Plant Material

- Variability in landscape management between houses

5.14.4.5 Site Elements

- Interstate-5

5.14.4.6 Force Protection

- Future requirements may be difficult to implement.

5.14.5 **Recommendations**

5.14.5.1 Buildings

- Redevelopment should possibly consider maintaining distinct neighborhoods

5.14.5.2 Circulation

- Link neighborhoods to Fort Lewis community services by providing for a variety of transportation options between neighborhoods and community services.

5.15 Visual Zone 12 – AMERICAN LAKE / VETERANS HOSPITAL (VA Hospital)

5.15.1 Visual Character

Isolated from the rest of Fort Lewis, the complex of structuring at the American Lake/VA Hospital has a distinct style of concrete structures and tile roofs. The Veterans' Administration Hospital is listed in the National Register of Historic Places. See Figure 4.54 for the American Lake/Veterans Administration Hospital Historic District which is within Zone 12.

5.15.2 Visual Analysis Map (Fig. 5.13)

Fig. 5.13 – Visual Zone 12 – American Lake/Veterans Hospital

5.15.3 Assets

5.15.3.1 Site Planning

- Functional and visually appealing arrangement of buildings

- Campus-like setting
- Sites with views of American Lake

5.15.3.2 Buildings

- Appealing character of historic buildings

5.15.3.3 Circulation

- Efficient circulation loop

5.15.3.4 Plant Material

- Mature plant species near and within campus

5.15.3.5 Site Elements

- Shore of American Lake
- Golf Course

5.15.3.6 Force Protection

- Facilities built prior to enactment of Force Protection standards

5.15.4 **Liabilities**

5.15.4.1 Site Planning

- Historic character dictates future development

5.15.4.2 Buildings

- Historic designation may mean more costly maintenance and upgrades

5.15.4.3 Circulation

- Circuitous route to campus, isolated from rest of Post

5.15.4.4 Plant Material

- Maintenance needs

5.15.4.5 Site Elements

- Signage unclear to and within this area

5.15.4.6 Force Protection

- Most structures pre-date force protection consideration

5.16 Visual Zone 13 – POST ENTRY AND GATE AREA

5.16.1 **Visual Character**

The main entrances to both Main Post and North Fort share access to a single freeway access. Designed to meet current security considerations, neither has a particularly strong architectural character. The Main Post provides an interesting contrast between the historic stone and timber entrance (now largely ceremonial) and the Gate House of steel and concrete that reflects today's Army. The Captain Meriwether Memorial Park, located just outside the main gate, has statues of Captain Meriwether Lewis, his dog Seaman and 1st Sgt. John Ordway, all of the Lewis and Clark expedition.

5.16.2 **Visual Analysis Map (Fig. 5.14)**

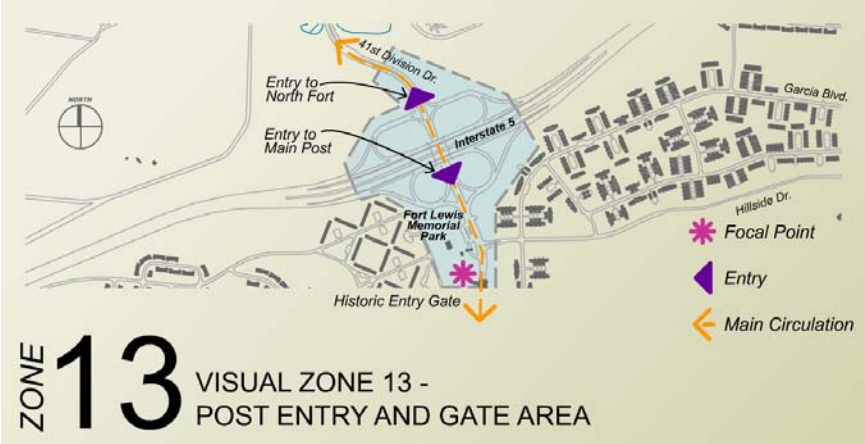

Fig. 5.14 – Visual Zone 13 – Post Entry & Gate Area

5.16.3 **Assets**

5.16.3.1 Site Planning

- Entries to the two major areas of installation are split by freeway

5.16.3.2 Buildings

- Clearly defined entry point to main post
- Historic Gate House
- North Fort Guard House
- Relatively new Visitor Information Building

5.16.3.3 Circulation

- Clear approaches to gates

5.16.3.4 Plant Material

- Open space with trees near Main Gate

5.16.3.5 Site Elements

- Captain Meriwether Memorial Park with statues of Captain Meriwether Lewis and 1st Sgt. John Ordway

5.16.3.6 Force Protection

- Gate itself (excluding vehicle queing and turnaround areas) is successful example of current Force Protection standards

5.16.4 **Liabilities**

5.16.4.1 Site Planning

- Not much space due to Interstate-5 and main installation roads that are already established

5.16.4.2 Buildings

- Understated entry to North Fort
- Visitor/Information Building somewhat hidden

5.16.4.3 Circulation

- Limited queuing area between freeway and gates
- Two conflicting uses –connection within the base and access to the base
- Turnarounds at guard stations insufficient

5.16.4.4 Plant Material

- Planting obscures entry from highway

5.16.4.5 Site Elements

- Insufficient directional signage to rest of post
- Directional signage is inside of entrance gate

5.16.4.6 Force Protection

- Gate does not meet needs of current force protection requirements for queuing, turnarounds, etc. Gates continually being upgraded to meet changing Force Protections standards.

5.16.5 **Recommendations**

5.16.5.1 Site Planning

- Long Term – Develop more prominent connection between North Fort and Main Post that does not require leaving controlled area.

5.16.5.2 Force Protection

- Gate should be improved to meet current force protection requirements.

5.17 Visual Zone 14 – COMMUNITY SERVICE AREA

5.17.1 Visual Character

A collection of structures built over the past 50 years, the Community Service Area is characterized by a series of stand alone buildings with ample supply of parking to provide ease-off access for Soldiers and dependants.

5.17.2 Visual Analysis Map (Fig. 5.15)

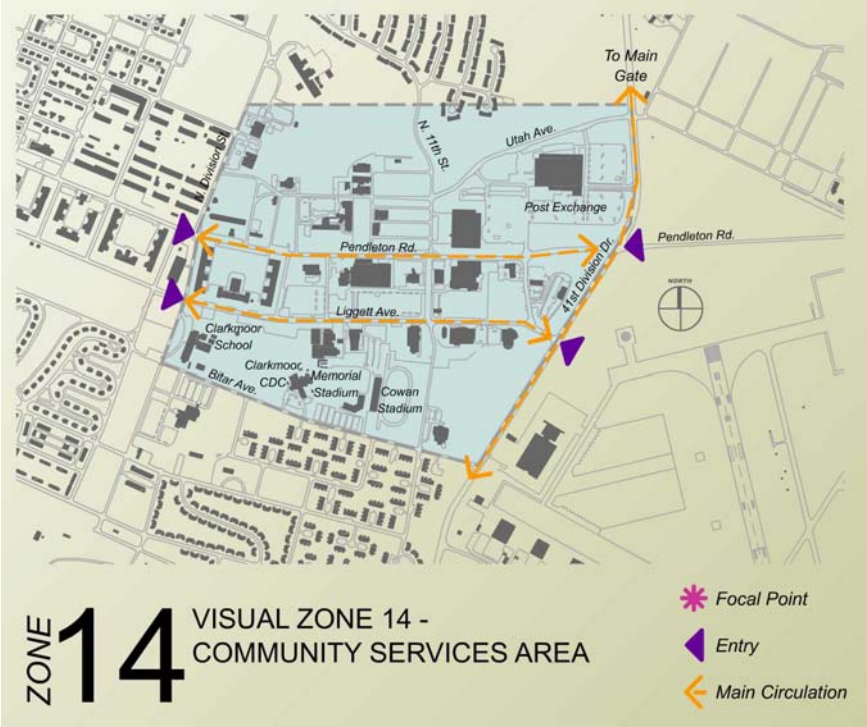

Fig. 5.15 – Visual Zone 14 – Community Services Area

5.17.3 Assets

5.17.3.1 Site Planning

- Busy retail buildings (PX and Commissary) located on main vehicular corridor

5.17.3.2 Buildings

- Appealing character of older brick buildings in western part of this Zone

5.17.3.3 Circulation

- Circulation around PX and Commissary is well-planned for vehicular traffic

5.17.3.4 Plant Material

- Trees and grass along major roads and around older buildings
- Mature trees throughout Zone

5.17.3.5 Site Elements

- Sports fields and courts

5.17.3.6 Force Protection

- Newer buildings such as the Temporary Lodging Facility meet current Force Protection standards

5.17.4 Liabilities

5.17.4.1 Site Planning

- Parking demands of retail and Soldier services buildings dominates site design

5.17.4.2 Buildings

- Entrances to some buildings are not obvious or appealing
- Many buildings lack visual character and appeal

5.17.4.3 Circulation

- Circulation between PX, Commissary and Waller Hall not pedestrian-friendly
- Lack of strong visual linkage from main gate to headquarters and garrison area
- Pendleton Ave. lacks character and definition

5.17.4.4 Plant Material

- Sparse vegetation in some areas

5.17.4.5 Site Elements

- Temporary trailers across from Clarkmoor housing area

5.17.4.6 Force Protection

- Older buildings along western part of Zone pose great challenges for implementing current standards

5.17.5 Recommendations

5.17.5.1 Circulation

- 41st Division Drive / Pendleton Ave. intersection should clearly delineate visual direction to various uses at Fort (it is a primary intersection on the post)

- Pendleton Ave. needs to improve linkage and "procession" quality as it approaches the garrison area

5.18 Visual Zone 15 – STONE EDUCATION COMPLEX

5.18.1 **Visual Character**

The Stone Education Complex has an old and a new face – the area south of Colorado Avenue is a series of smallish wood buildings while, north of Colorado Avenue, the Stone Education Center is a modern facility with ample parking and landscaped areas. Located between Miller Hill and main installation roads, 41st Division Drive South and Pendleton Avenue, these structures create a Zone whose future will inevitably see further development. The area south of Colorado Ave, with its grid of tertiary streets, is characterized by many buildings that are visibly deteriorated, some of which seem abandoned.

When fully developed this Zone will include the Stone Education Center, Distance Learning Center, NCO Academy (for Reserve and Active Duty Officers). The NCO Academy will have barracks, classrooms, arms room and administrative and maintenance areas.

5.18.2 **Visual Analysis Map (Fig. 5.16)**

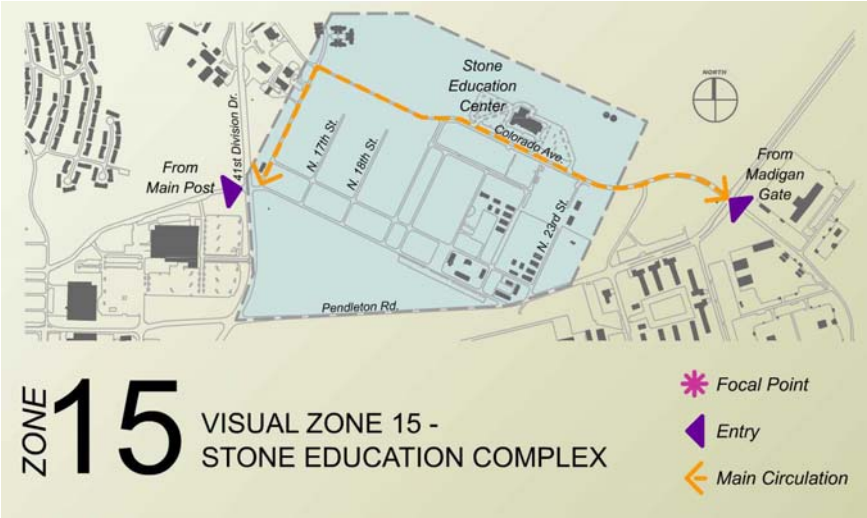

Fig. 5.16 – Visual Zone 15 – Stone Education Complex

5.18.3 **Assets**

5.18.3.1 Site Planning

- Ease of parking and building access

5.18.3.2 Buildings

- Stone Education Center is an icon for the area

5.18.3.3 Circulation

- Access from main arteries is good
- The zone forms part of the "front door" for Fort Lewis, as one approaches Pendleton Avenue along 41st Division Drive.

5.18.3.4 Plant Material

- Mature trees throughout Zone
- Attractive landscaping around Stone Education Center

5.18.3.5 Site Elements

- Miller Hill
- Physical training field in "elbow" between 41st Division Drive South and Pendleton Ave.

5.18.3.6 Force Protection

- Force Protection will be incorporated in future projects

5.18.4 **Liabilities**

5.18.4.1 Site Planning

- Isolation of Stone Education Center
- Lack of updated existing infrastructure for future development

- Clear Zones and Accident Potential Zones (APZ's) restrict development area

5.18.4.2 Buildings

- "Temporary" aesthetic of many structures south of Colorado Ave.
- A series of 1-story wood buildings are extremely rundown

5.18.4.3 Circulation

- Many dead-end streets and poor signage in area south of Colorado Ave.

5.18.4.4 Plant Material

- Expanses of unkempt grass in area south of Colorado Ave.

5.18.4.5 Site Elements

- Trash dumpsters and outdoor storage of machines/refuse degrades visual quality of area south of Colorado Ave.

5.18.4.6 Force Protection

- Few of buildings meet any Force Protection criteria

SECTION 6
IMPROVEMENT PROJECTS

6.1 Refer to Master Planning at Public Works for a list of on-going and future projects for specific areas at Fort Lewis.

Links

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SECTION 7
SITE PLANNING DESIGN STANDARDS

7.1 INTRODUCTION

7.1.1 Site Planning is the process of arranging an external physical environment in complete detail to include the structures, circulation patterns and other elements that form the built environment. The site planning and design process is used to develop a project which fulfills facility requirements and creates the optimal relationship with the natural site. See Unified Facilities Criteria (UFC) *3-210-06FA*, Site Planning and Design for detailed guidance on site planning to include program analysis, site analysis, site verification and concept development. This section also discusses site design guidelines, describes the steps in the site planning process and contains examples of various sketches/diagrams developed in support of these steps. Also see Unified Facilities Criteria (UFC) 3-210-06A, *Site Planning and Design*. Environmental documentation will be prepared prior to site selection to support the construction activity in accordance with AR 200-2, *Environmental Effects of Army Actions.*

7.1.2 The site planning component provides the spatial arrangement of the installation. (Fig. 7.1) The installation master plan provides information that forms the foundation for site planning. The master plan is a mechanism for ensuring that individual projects are sited to meet overall installation requirements. AR 210-20, *Master Planning for Army Installations* and the Master Planning Instructions (MPI) provide additional information concerning the master plan.

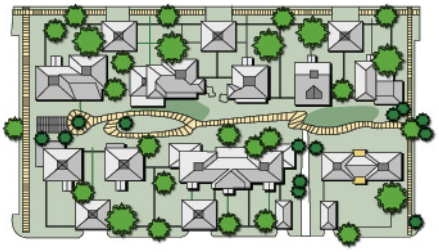

Fig. 7.1 – Site Plan Provides Spatial Arrangement within the Installation

7.1.3 The other five design components are dependent upon site planning for their location and spatial relationships. The other five components are identified below and discussed in Sections 8-12.

- Section 8 - Buildings Design Standards
- Section 9 - Circulation Design Standards
- Section 10 - Landscape Design Standards
- Section 11 - Site Elements Design Standards
- Section 12 - Force Protection Design Standards

7.2 SITE PLANNING OBJECTIVES

7.2.1 The goal of site planning for the installation is to produce an attractive, sustainable development. Sustainability requires the built environment to be designed and constructed to preserve and enhance the natural environment. Manmade facilities are designed as a part of the environment to minimize negative environmental impacts. General site planning techniques resulting in sustainable development are cost efficient because they conserve energy and reduce construction and maintenance cost. Typical site planning objectives include the following:

Fig. 7.2– Example of Preserving Natural Site and Existing Land Form

7.2.1.1 Preserve natural site features such as topography, hydrology, vegetation and tree cover (Fig. 7.2).

7.2.1.2 Locate facilities with consideration of climatic conditions such as wind, solar orientation and micro-climate.

7.2.1.3 Preserve the natural site by molding development to fill around existing land forms and features. This development approach minimizes extensive earthwork, preserves existing drainage patterns and preserves existing vegetation.

7.2.1.4 Plan for facilities to be clustered to preserve land and reduce construction cost. Clustering should occur on the flattest land areas. Room for expansion should be provided. When clustering facilities, Force Protection measures must be considered.

7.3 SITE PLANNING CONSIDERATIONS

7.3.1 The primary “fit” of the development to its environment is initially determined by the site analysis and subsequent site

planning. The determination of primary issues that provide basic location and organization of spatial relationships are determined during the site planning (Fig. 7.3).

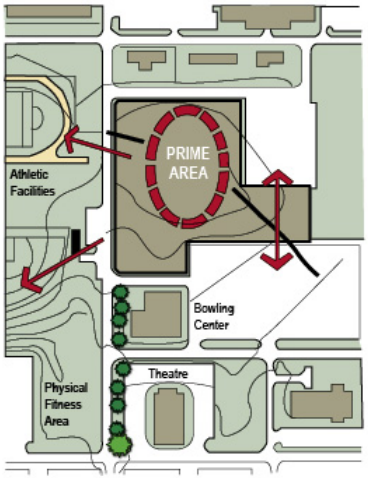

Fig. 7.3 – Site Opportunity and Constraint Plan

A site design is created using an analysis of all the existing physical and aesthetic features of the site's relationship to the entire installation. The design synthesis to be chosen should be the scheme which best articulates the many factors listed above in relation to the desired architectural theme and which results in a total organization of visually unified forms.

A complete site analysis will be composed of six types of studies:

- Land Use
- Environmental Issues (level and known problems)
- Circulation (Pedestrian, Bicycle, Auto)
- Visual Design Factors (compatibility with adjacent uses, i.e. Historic Garrison)
- Context (Zone or Neighborhood) and Existing Conditions
- Natural Factors

7.3.2 Accessibility. Any building or facility used only by able-bodied personnel need not be accessible to the disabled. Nevertheless, when feasible and appropriate, seek to incorporate accessibility measures into the design since the facility use may change over time (military exclusion is provided by UFAS 4.1.4 (2)). All other structures or facilities must meet the standards of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS), with the most stringent standards applied in the event of conflicting guidelines. (See AR 420-70, Chapter 2, Paragraph 2.8). This includes the avoidance of site barriers through the use of curb cuts, ramps, handrails and grade-level entrances to avoid site barriers. Provide designated handicapped parking spaces in all major parking lots and drop-off zones for persons with mobility impairments (Fig. 7.4). Modify existing structures for handicapped accessibility whenever possible, especially community facilities most likely to be used by families, veterans or visitors.

Fig. 7.4 – Handicap Accessible Parking Close to Building

7.3.3 Environmental. Environmental issues to consider in the preparation of a site plan include any action or proposal that has a detrimental effect on a site area's land, water or air quality. The location of facilities on land which results in minimal disturbance to the existing topography, vegetation and drainage patterns greatly reduces the negative impact on the environment. It is the

Garrison Commander's responsibility to ensure all National Environmental Policy Act (NEPA) documentation is started before the site selection process, as this process feeds the 1391 process.

7.3.3.1 Deconfliction Meetings. Prior to final approved site selection and NEPA action a "deconfliction meeting" is conducted at Ft. Lewis with individual specialist project managers in Land Use and Environmental (i.e. storm water, endangered species, etc.)

7.3.3.2 The integration of the National Environmental Policy Act (NEPA) into the ongoing planning activities of the Army can produce considerable savings to the Army. Meaningful integration of environmental considerations is accomplished by efficiently and effectively informing Army planners and decision makers. NEPA is the "umbrella" that facilitates coordination by integrating processes that might otherwise proceed independently. In accordance with 32 CFR Part 651 there are various levels of NEPA documentation/analysis that can accomplish compliance.

- Record of Environmental Consideration (REC): An REC is a signed statement submitted with project documentation that briefly documents that an Army action has received environmental review. These documents can be signed using an appropriate Categorical Exclusion (CX) or by actions covered by existing or previous NEPA documentation. An REC is typically a one-page document. and is completed for all projects on Fort Lewis.

- Environmental Assessment (EA): An EA is a concise public document that analyzes the environmental impacts of a proposed federal action and provides sufficient evidence to determine the level of significance of the impacts. The EA is intended to assist agency planning and decision-making, and requires the development of alternatives and mitigation measures. If the findings within the EA are not likely to have a significant impact on human health or the environment, a Finding of No Significant Impact (FNSI) will be signed and incorporated into the beginning of the EA. If the findings within the EA identify significant environmental impacts, an Environmental Impact Statement will be initiated.

- Environmental Impact Statement (EIS): NEPA requires a "detailed statement" which an agency prepares when its proposed action significantly affects the quality of the human environment. The EIS process requires extensive

research, public input and involvement, is extremely costly and typically takes a year to complete.

Information pertaining to Environmental Impact Statements and their submission can be found at the following EPA websites:

- Environmental Impact Statement (EIS)
- Submitting Environmental Impact Statements (EISs)

7.3.3.3 Prior to the undertaking of activities which affect the nation's waterways, federal law requires the acquisition of a permit. Waterways are described as "navigable waters of the United States" and "waters of the United States" to include wetlands. Information regarding statutory, administrative and judicial matters, including general regulatory policy, definitions of "waters of the United States" and "navigable waters", and processing of permits, can be obtained at the following Corps of Engineers website:

- Statutory, Administrative, and Judicial Materials

7.3.3.4 Include procedures for mitigating environmental concerns in the early stages of project development. To the maximum extent possible avoid siting development or individual buildings in environmentally sensitive areas. The installation master plan environmental overlay should be reviewed prior to the development for areas designated as threatened and endangered species habitat areas.

7.3.3.5 All sites, which do not currently appear to have been developed, may conceal elements such as unexploded ordnance, abandoned underground storage tanks, and/or hazardous waste. Follow the DoD "Clean Site" policy to insure that all such elements are safely eliminated. A "Clean Site" indicates that a site is free of known environment concerns. A "Clear Site" (one in which nothing exists on the site, such as utilities, and there are no environmental concerns) cannot be guaranteed.

7.4 SITE PLANNING DESIGN CRITERIA

7.4.1 The site planning component of installation design comes first in the design process and determines the general location of the other components. Consequently, site planning must consider the criteria for architectural design, circulation, landscape architecture, site elements and force protection. Site planning criteria is divided into two categories: natural conditions and

manmade conditions. Each is discussed separately in the following paragraphs. These criteria are to be utilized for the assessment of the visual and spatial impacts of site planning.

7.5 NATURAL CONDITIONS

7.5.1 Topography. The natural terrain is a major determinant of the layout and form of the installation. The following guidelines should be used to maintain the natural topography of the installation (Figs. 7.5 and 7.6).

7.5.1.1 Maintain natural ground slopes and elevations.

7.5.1.2 Align roadways and buildings along topographic lines.

7.5.1.3 Locate facilities, which have expansive ground coverage, on relatively flat terrain.

7.5.1.4 Use moderately sloping areas for buildings with less ground coverage area.

7.5.1.5 Avoid development on steep slopes.

7.5.1.6 Avoid development in natural drainage ways and flood plains.

7.5.1.7 Provide a reasonable balance of cut and fill.

7.5.2 Hydrology. The site planning team will consider the following hydrologic concerns for natural drainage corridors, floodplains and waterways during the site planning process.

7.5.2.1 Preserve and maintain natural drainage areas and floodplains.

7.5.2.2 Limit development in floodplains to open spaces and recreation uses.

7.5.2.3 Preserve rivers, lakes, streams or other waterways and incorporate them into the design layout.

7.5.3 Climate. The installation will be designed in response to local climatic conditions to provide a more comfortable environment and reduce the demands for heating and cooling.

In a temperate region such as Fort Lewis, design and site development to balance the effects of seasonal thermal variations

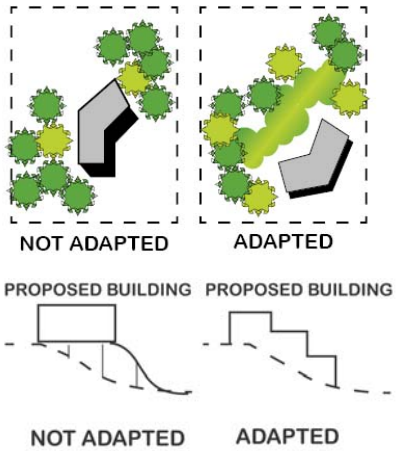

Fig. 7.5 – Accommodate Natural Conditions

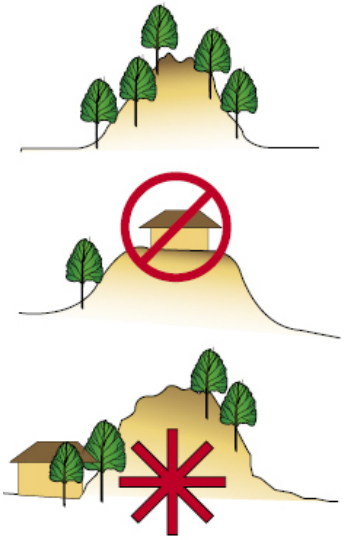

Fig. 7.6 Develop Around Natural Landforms

promoting both winter and summer cooling in terms of seasonal solar orientation and prevailing winds (Fig. 7.7).

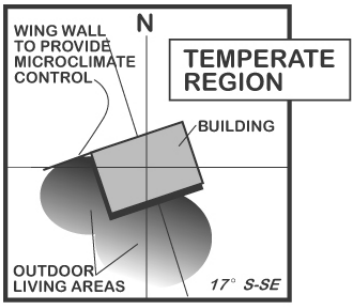

Fig. 7.7 - Building Oriented for Passive Solar Heating and Cooling

7.5.4 Views and Vistas. The installation will be designed to preserve and enhance scenic views and vistas. In addition, it will be designed to screen unattractive views and vistas. Visual extensions through open spaces provide a sense of orientation, relief and enjoyment.

7.5.5 Vegetation. The installation will be designed to protect and preserve existing native vegetation where at all possible. This preservation reduces maintenance and enhances sustainability. A preferred plant matrix (Appendix O, Plant Palette) is included in this Army Installation Design Guide. (Also, see Section 10 – Landscape Design Component).

Natural landscape elements of the existing topography include earth, rock and water. Extensive utilization of these natural features provides visual variety to the design and should be considered when site is planned.

7.5.6 Wildlife Habitats, three special habitats and any impacts on them deserve special attention at Ft. Lewis.

7.5.6.1 Riparian zones – areas adjacent to streams and rivers.

7.5.6.2 Oak woodlands and set aside areas – special designated areas of native oaks and habitat set aside for species such as the Spotted Owl.

7.5.6.3 Critical habitat for the Spotted Owl – 58,000 acres on Fort Lewis have been designated as critical habitat.

7.6 MANMADE SITE CONDITIONS

7.6.1 The site plan provides the locations of the manmade development which will occur on site. It establishes the spatial relationships as well as the relationships between manmade and existing natural features. Manmade site conditions include all development on the installation to include buildings, roadways, parking lots, walkways, walls, fences, utilities and other facilities. Buildings, roadways, parking lots and above ground utilities are the primary manmade visual determinants.

The siting of new buildings may be constrained by the existing road grid, which follows the traditions of the installation, but

determinants such as sun, wind and topography shall still be taken into account.

7.6.1.1 Military Hierarchy is desired in the Headquarters-Administration areas and anywhere else, a symmetrical arrangement of buildings or groups of buildings shall be chosen to create a formal, balanced approach to the design (Fig 7.8).

Fig. 7.8 – Military Hierarchy

7.6.1.2 The use of pedestrian-oriented spaces or courtyards in the transient troop housing areas should be considered. These areas can be landscaped and enhanced with site amenities for passive recreation and recreational courts (basketball, volleyball, etc.)

7.6.2 The following site planning guidelines will be used in the visual and spatial review of the installation:

7.6.2.1 Cluster buildings to reduce impact on the natural environment. Reduce the number of roadways and utility corridors needed to serve the development. At the same time, give full consider to anti-terrorism and force protection requirements.

7.6.2.2 Locate large buildings in relatively flat areas to reduce the cut and fill and preserve the natural vegetation and drainage and orient to topography (Fig. 7.9).

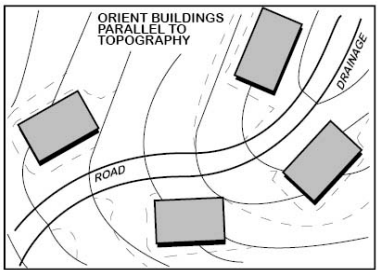

Fig. 7.9 - Orient Buildings and Roads to Topography

7.6.2.3 The location of modular or temporary facilities may vary from typical site planning guidelines on a case-by-case basis.

Locate major buildings as focal points and provide a framed view from the walks and drives approaching the building complex. Steps in combination with architecture have a strong directional movement and help establish an entrance sequence leading to buildings of major importance, while also allowing the building to work well with the natural sloping grades.

7.6.2.4 Minimize solar heat gain for cooling and maximize solar heat gain and retention for heating.

In accordance with climatic considerations, the recommended shape for a single building is a rectangle elongated along the east-west axis, thus facing the long facade of the building slightly east of south. Architectural treatment is required to control solar heat gain on the south facade. Glazing and/or sun shades can be designed to accept solar heat gain in the winter and repel solar heat gain in the summer. Although the standard military design of most buildings uses central, double-loaded corridors, living spaces, when possible, should be oriented toward the south. When a

grouping of buildings is required, the best choice will be for the arrangement to have a long (E-W axis) central building with short wings (N-S axis) and the entire open courtyard or plaza facing slightly east of due south (Fig 7.10). With proper landscaping, this arrangement would provide users of the buildings and courtyards with shelter from the winter winds and with sunlit outdoor spaces.

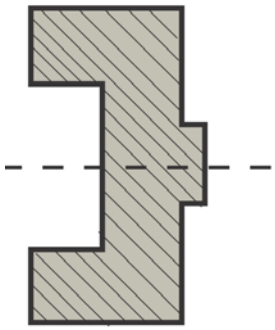

Fig. 7.10 – Example of Footprint Using Standard Military Design

7.6.2.5 Site buildings with consideration for the micro-climate conditions that result in variances in wind or light because of adjacent land forms, structures or trees.

Care must be taken to size and space buildings so solar access is not denied. To that end, projected building shadows should be plotted during the building design phase. At other times, a building plan with staggered elements may best solve the site problem yet still allow solar access into habitable spaces.

7.6.2.6 Orient outdoors pedestrian areas for most comfortable exposure.

Fig. 7.11 – Lighter colored Building Surface

7.6.2.7 Utilize lighter colored building surfaces exposed to the sun and darker colors on recessed surfaces to absorb radiation. (Fig. 7.11)

7.6.2.8 Orient windows according to impact of climatic conditions.

7.6.2.9 Locate development on leeward side of hills.

7.6.2.10 Design and locate roads to provide a hierarchy of traffic carrying capacities. (Refer to Section 9 - Circulation.)

Special areas of interest are site entrance points, road hierarchies, parking and separation of service entrances. Circulation systems are concerned with efficiently moving people, goods and services about a site. Each circulation system must be logical sequentially, yet not conflict with another form. Existing circulation systems at Fort Lewis are composed of grid systems, radial roads and curvilinear systems. Road alignments should emphasize views of buildings of importance and should follow the existing topography as closely as possible. The use of roundabouts shall be employed at Ft. Lewis where useful for traffic control.

7.6.2.11 Locate roads to blend with topography and vegetation.

7.6.2.12 Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles. (Refer to Fig. 7.12 and Section 9 - Circulation)

Arrival and turnaround areas should be designed for right-handed passenger drop-offs. Visitor parking should be separated from employee parking; service areas should be separated from parking areas. Minimize straight aisles perpendicular to the building.

Parking lot distance from the building is dictated by Force Protection setbacks. (Refer to Section 12 - Force Protection)

Parking should be arranged for safe efficient travel from vehicles to buildings. The lot design should emphasize building entries by the alignment of a landscaped median with each main entry.

Figure 7.13 shows a desirable relationship between landscaping and parking; i.e., trees in islands, landscaping between parking and important pedestrian paths, and low shrubs marking intersection of pedestrian walk and parking lot drive.

Locate loading docks out of view of building entries, customer or visitor parking, and major roads. If necessary, provide screens such as landscaping, walls or fences in conjunction with landscaping.

7.6.2.13 Design and locate pedestrian walkways and bicycle paths to fit the physical environment, and provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic. (Refer to Section 9 – Circulation)

Pedestrian circulation systems must provide a safe, convenient link between buildings, outdoor spaces and parking areas (Fig 7.14). Considerations must also be given to make the system accessible to wheelchairs. Hierarchy, alignment and topography are important walk considerations. Bikeways have special requirements and space must be provided for bicycle parking.

Vehicular, bicycle and pedestrian traffic, especially in areas of high intensity use, such as the Community Center and along arterial streets, should be separated to the greatest practical degree. All new or upgraded roads should include separate bicycle lanes or paths as well as separate walks or paths for pedestrians. (Fig 7.15)

This segregation can be accomplished with physical separations such as distance, elevation changes, berms and walls; or implied separations such as paint striping, plantings and so on; or a combination of these.

Fig. 7.12 – Example of Essential Elements in Parking Lot

Fig. 7.13 – A Desirable Relationship Between Landscaping and Parking

Fig. 7.14 – Typical Pedestrian Circulation System

Fig. 7.15 – Example of Separated Lanes for Vehicles, Bikeways and Pedestrians

7.6.2.14 Locate trees and shrubs to buffer harsh natural conditions. (Fig. 7.16)

7.6.2.15 Deciduous trees provide for sun in the winter and shade in the summer. Evergreen trees provide windbreaks for cold north winds. (Fig. 7.17)

7.6.2.16 Design and locate site elements to blend with and enhance the physical environmental.

7.6.2.17 Force Protection requirements should be designed and located to blend with the physical environment.

Fig. 7.16 – Trees and Shrubs Acting as Natural Buffer Against the Elements

Fig. 7.17 –Trees and Shrubs Protect Building from Elements

7.7 ARMY STANDARDS

7.7.1 The cited Army Standards shall be met.

- Unified Facilities Criteria (UFC) DoD Minimum Anti-Terrorism Standards for Buildings (latest edition)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)

7.8 REFERENCES

7.8.1 The following references are provided for guidance.

- Unified Facilities Criteria (UFC) *3-400-01*, Design: Energy Conservation
- Unified Facilities Criteria (UFC) *3-210-01A* Design: Area Planning, Site Planning, and Design,
- Unified Facilities Criteria (UFC) *3-230-15FA*, Design: Subsurface Drainage Facilities for Airfields and Heliports
- Unified Facilities Criteria (UFC) *3-230-16FA*, Design: Drainage and Erosion Control Structures for Airfields and Heliports
- Unified Facilities Criteria (UFC) *3-230-17FA* , Design: Drainage for Areas Other than Airfields
- Unified Facilities Criteria (UFC) *3-230-18FA*, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas

- Unified Facilities Criteria (UFC) *3-260-02*, Design: Pavement Design for Airfields
- Unified Facilities Criteria (UFC) *3-250-01FA*, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas
- Army Regulation (AR) 200-2, *Environmental Effects of Army Actions*
- Unified Facilities Criteria (UFC) *4-711-01*, *Family Housing*
- Whole Building Design
- Stormwater Management Manual for Western Washington (latest edition)
- LEED Literature

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SECTION 8
BUILDING DESIGN STANDARDS

8.1 INTRODUCTION

Fig. 8.1 – The Building's Character Affects the Overall Image of the Installation

8.1.1 The design character of an installation's buildings affects the installation's overall image. The visual analysis of buildings and related structures helps define visual zones and themes and is an important part of an installation's assets and liabilities assessment (Fig. 8.1).

8.1.2 The building design component encompasses the character of the buildings as well as the arrangement of buildings to one another and to their environment. In general, use architectural style, materials, and colors indigenous to the region. The preservation of historically and culturally significant structures adds to an installation's character and provides a sense of heritage.

8.1.3 The visual analysis of structure also includes concern for accessibility, use of materials, placement of entrances, incorporation of additions and renovations, the incorporation of plazas and courtyards, interior design and the appropriateness and quality of building maintenance.

8.1.4 This section provides the objectives and visual determinants that shall be utilized to identify and assess the building design quality of the installation. The section also provides standards and guidance pertaining to the development and maintenance of the various interiors and exteriors of buildings on the installation. There will be no standards for temporary structures. The design standards will be applied for community,

troop support and residential areas, but not necessarily for areas such as motor pools and maintenance shops.

8.2 BUILDING OBJECTIVES

8.2.1 Sustainability. The architectural style of existing and future buildings shall reflect and reinforce the sustainability of the installation. Sustainable design reduces construction and maintenance cost and conserves energy through proper construction and materials selection. See Appendix D for a more complete discussion on Sustainable Design.

8.2.2 Building Design Objectives:

8.2.2.1 Adapt building designs to natural site conditions (Fig 8.2).

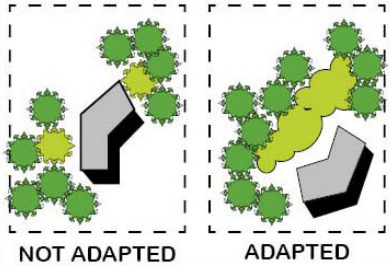


Fig. 8.2 – Adapt Building Design to Natural Site Conditions

8.2.2.2 Design buildings in clusters to preserve land and reduce construction and maintenance costs.

8.2.2.3 Develop a coherent architectural style that results in the blending of new and old structures (Fig. 8.3). However, when considering historical buildings one should be able to differentiate between the historic fabric and the new material.

Fig. 8.3 – Old and New Lodging

8.2.2.4 Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas.

8.2.2.5 Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.

8.2.2.6 Design multiple use facilities with the capability to quickly change interior layouts to accommodate changing requirements.

8.2.2.7 Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness (Fig. 8.4).

Fig. 8.4 - Use of Indigenous Construction Materials Reduces Transportation Cost

8.2.2.8 Locate windows to maximize natural light, ventilation and outward views. Shade windows via exterior architectural elements to avoid direct summer sun penetration into interior spaces.

8.2.2.9 Design for adaptive reuse of buildings once their initial use is no longer required.

8.3 STRUCTURAL CHARACTER

8.3.1 Buildings have an overall structural character defined by scale, mass, form, color and materials. The design process controls structural character, thus the building design effort shall coordinate structural character with existing buildings. The coordination of structural character with other buildings on post results in a consistent and coherent "sense of order" and "sense of place". This coordination makes a positive contribution to an installation's aesthetic. On the other hand, disregarding character degrades the installation's aesthetic. The structural character of installation architecture can vary according to the use of the structure and the time it was built. Use and age variations can result in character incompatibilities if designers do not address coordination of structural character.

8.3.2 Successful coordination of structural character is the result of a two step process. First, designers analyze the context architecture on post to understand the definition of structural character at Fort Lewis. Second, designers apply the results of the analysis to the new design so the new design conforms to the existing architectural context. The second step requires designers to discard elements of existing structural character which do not apply to the new design. For example, the overall structural character of a vehicle maintenance building does not apply to a barracks building. Analyzing structural character involves evaluating scale, mass, form, color and materials. These elements are further explained below:

8.3.2.1 Scale. Scale refers to the sizes of building elements in relation to people and surrounding buildings. Buildings of monumental scale feature predominantly vertical facades that dwarf a person and surrounding buildings. Buildings of human scale have more horizontal facades designed to relate to the size of a person (Fig. 8.5). Additionally, the sizes of roof forms, windows, ornament and landscaping all affect a building's scale. In general, larger windows and plants and taller roofs relate less to the human scale than do smaller such elements. The scales of most buildings on Fort Lewis should be human rather than monumental. All new construction should be compatible in scale with adjacent buildings as well. Monumental architectural design is reserved for more ceremonial buildings, such as worship centers and headquarters complexes. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building's use.

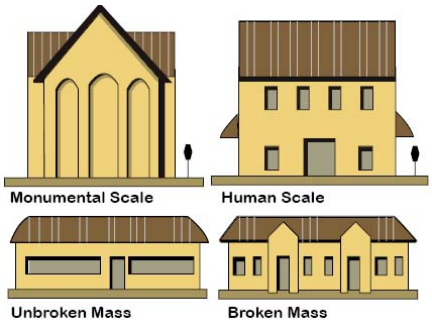


Fig. 8.5 –Scale and Mass

8.3.2.2 Mass. Mass refers to the overall volume or volumes that comprise the building shape. (Fig. 8.5). The design may increase or decrease a building's mass through the design of roof forms, the placement of windows and doors, and the arrangement of exterior walls. Smart design can decrease a building's mass to coordinate with the character of adjacent structures or increase a building's mass to coordinate with the character of a structure's specific use.

8.3.2.3 Form. The form of a building is determined by shape and proportions. The use of similar building forms provides continuity to the installation aesthetic. The result is coordination between structural characters. Examples at Fort Lewis include the forms found in the administrative buildings of the Old Fort District: tall gable roofs with vertically-oriented rectangular windows. In contrast, a warehouse building may have more horizontal forms with a flat roof and ribbon windows.

Fig. 8.6 - Color and Form Contribute to a Sense of Place

8.3.2.4 Color. The use of a color scheme that is consistent throughout the installation coordinates structural character (Fig. 8.6). However, color schemes throughout the installation often vary according to the visual zone and visual theme in which the structure is located. Color is an element of structural character which should be coordinated with neighboring buildings regardless of use.

8.3.2.5 Materials. Materials allow a building to coordinate with neighboring buildings and other buildings of a similar use. For example, metal siding may denote more utilitarian structures such as maintenance facilities. Buildings of more importance shall be of a richer palette of materials, such as brick and precast concrete. In addition, not only do type of materials help define character, but the number of materials used affects character as well. For example, a more important public building, such as a chapel, may feature a variety of materials comprising a richer palette appropriate to its importance related to other buildings on post.

8.4 BUILDING ENTRANCES

8.4.1 A building entrance is a primary feature of any building design. The entrance should be defined and recognizable as the point of entry regardless of the size or importance of the building (Fig. 8.7).

Fig. 8.7 – Entrance is Positive Visual Experience

8.4.2 The entrance to a building should be in a prominent location and should be oriented toward the primary adjacent public spaces such as a courtyard, lawn, parking lot, or street.

8.4.3 The details of an entrance should be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings.

8.5 SERVICE AREAS

8.5.1 Service areas, such as loading docks and trash dumpsters, should be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets, and parking lots.

8.5.2 Service areas should be screened as an enclosure by using walls and landscaping (Fig. 8.8). Screen walls should be between six and eight feet high and should be in harmony with the adjacent building.

8.5.3 Trash and garbage collection areas must be located to conform to the current anti-terrorism / force protection criteria of the Department of Defense.

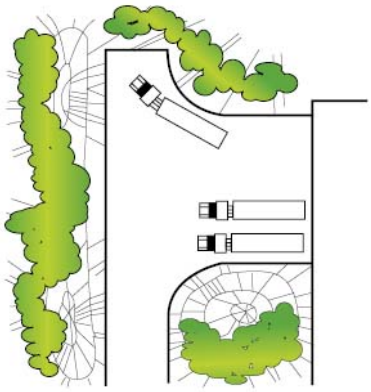


Fig. 8.8 - Plants and Berms in Service Area Presents a Positive Visual Image

8.6 BUILDING ACCESSIBILITY

8.6.1 All structures or facilities, other than the exceptions mentioned below, must meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS) accessibility standards. The more stringent standards apply in the event of conflicting guidelines (Fig. 8.9).

Fig. 8.9 – Building with Universal Accessibility

8.6.1.1 Any building or facility that is specifically restricted by occupancy classification to use only by able-bodied personnel during the expected useful life of the building or facility need not be accessible (military exclusion is provided by UFAS 4.1.4 [2]), but accessibility is recommended since the intended use of the facility may change with time.

8.6.1.2 In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed messes, vehicle, and aircraft maintenance facilities.

8.7 SEISMIC POLICY

8.7.1 To ensure compliance, seismic evaluations and mitigation of unacceptable seismic risks shall be performed. Higher levels of seismic protection for mission essential facilities will be considered in the evaluation.

8.7.2 Seismic evaluation. Buildings will have a seismic evaluation performed when:

- A change in the building's use causes a change in the occupancy category to a category of greater importance.

- A project is planned which causes the capacity of the structural system or components to be reduced to 90 percent or less of original stability and strength.

- A project will significantly extend the facility's useful life or will significantly increase the facility's value and the cost exceeds 50 percent of the current replacement value.

- A facility is damaged or is deemed to be an exceptionally high risk to occupants or to the public.

8.7.3 Exceptions to Seismic Evaluations. Existing facilities are exempt from seismic evaluation if:

- The original design was done according to the provisions of the 1982 or later edition of TM 5-809-10, or the 1988 or later edition of TM 5-809-1.

- Replacement is scheduled within 5 years.

- The facility is intended only for minimal human occupancy, and occupied by persons for a total of less than 2 hours a day.

- The gross area is less than 3,100 square feet (275 square meters). Mitigation of unacceptable seismic risks. If the seismic evaluation determines that the facility does not meet Substantial Life-Safety or higher performance standards, as appropriate, unacceptable seismic risks will be mitigated.

8.7.4 New Facilities or Additions or Extension of Existing Facilities.

8.7.4.1 New facilities and additions or extension of existing facilities will be designed to provide the level of seismic protection required by the International Building Code (IBC) except as amended by UFC 1-200-01.

8.8 INDIGENOUS STRUCTURES

Sustainability in the design and construction of buildings includes incorporating time-proven building designs that are indigenous to the region (Fig. 8.10). Indigenous design elements should be utilized in the design of new buildings.

Fig. 8.10 – Historical Structure Built Using Indigenous Materials

8.9 HISTORIC ARCHITECTURE

8.9.1 The visual integrity of historic buildings or districts on the installation will be preserved and protected. The Army's management of historic properties is pursuant to the duties and responsibilities established by Congress under the National Historic Preservation Act (NHPA). The NHPA also created the National Register of Historic Places as the official listing of the nation's historic properties considered worthy of preservation (Fig. 8.11). When working with historic properties the Army uses the following three categories:

8.9.1.1 Historic Buildings or Structures. These are significant buildings or structures, which are listed in or eligible for listing in the National Register of Historic Places.

8.9.1.2 Historic District. A distinct group of buildings, structures, or landscapes that possesses significance and are listed in or eligible for listing in the National Register.

8.9.1.3 National Historic Landmarks. Buildings, structures, or landscapes listed in the National Register, but also recognized as nationally significant. National Historic Landmarks can either be listed individually or as a district.

Fig. 8.11 Family Resource Center (originally a Red Cross building)

8.9.2 For further guidance use Army Regulation 200-4 and Department of the Army Pamphlet 200-4. Specific requirements and recommendations for the treatment of historic properties are available in the National Park Service's Secretary of the Interior's Standards for the Treatment of Historic Properties. A working awareness of historic preservation policies and procedures followed by the Army Corp of Engineers can be found in the Technical Instruction (TI) 800-01, Design criteria, Chp. 16, Preservation of Historic Structures.

8.9.3 See Appendix M, Historic Preservation Guidelines.

8.10 RENOVATIONS AND ADDITIONS

When existing buildings are renovated or additions are constructed, the architectural character of the renovation or addition shall be compatible with the architectural character of the existing building and the adjacent buildings (Fig. 8.12). This compatibility includes the use of materials, color, shape, size, scale, and massing in the addition or renovation that blends with the architectural character of the existing structure. However, when renovating or adding to historical buildings one should be able to differentiate between the historic fabric and the new material.

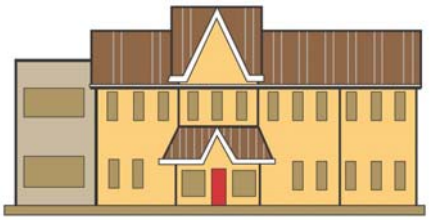


Fig. 8.12 - Example of Incompatible Additions

8.11 PLAZAS AND COURTYARDS

Plazas and courtyards can be located as part of the primary entrance to a building, or as an extension of non-primary entrance areas to the outside (Fig. 8.13). Wide, paved entrance plazas need vehicular barriers.

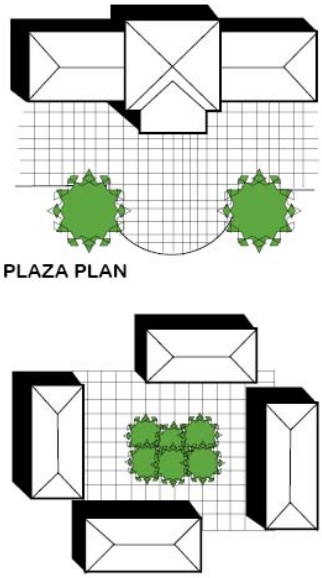


Fig. 8.13 – Plazas and Courtyards

8.12 BUILDING MAINTENANCE

Buildings designed and constructed to incorporate sustainable design criteria should minimize life cycle, energy and maintenance costs through proper selection of forms, materials, and construction details.

8.13 INTERIOR DESIGN

8.13.1 Inhabited spaces, that require the selection of furnishings or equipment, shall be designed by professional interior designers. Interior design impacts the functioning and productivity of people. People spend the majority of their time inside, working, eating, sleeping, and relaxing. The productivity, comfort, and safety of the personnel living, working, or relaxing in the facilities they inhabit is directly related to the quality of interior design provided within the facility. The use of material which can be deconstructed, re-used or recycled shall be highly encouraged. Use low-emitting materials which will not adversely impact indoor air quality.

8.13.2 Interior design is required on building construction and renovation projects regardless of the funding source. General interior design guidance and interior design guidance for medical facilities and family housing is provided at the following websites:

- General Guidance. Design Guide (DG) 1110-3-122, *Design Guide for Interiors*.

- Medical Facilities. Interior design guidance for medical facilities is furnished in Unified Facilities Criteria (UFC) 4-510-01, Design: Medical Military Facilities.

- Family Housing. Interior design for family housing will be in accordance with Technical Instruction (TI) 801-02, *Family Housing*.

8.13.3 Engineering Regulation (ER) 1110-345-122, *Engineering and Design, Interior Design*, defines projects that require interior design, design requirements and responsibilities of participants, and methods and funding for execution of interior design. For cost estimating see Air Force Interior Design Guides, Chap. 3, Cost Estimating Guide.

8.13.4 Space Planning.

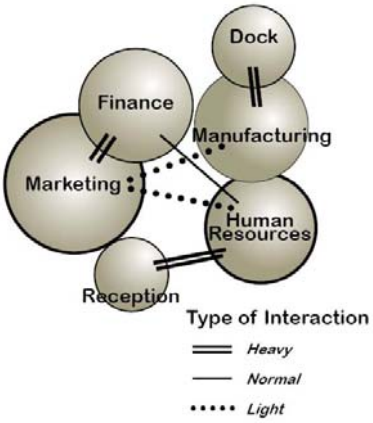
8.13.4.1 Space planning is the basic building block of the facilities program for administration and operational facilities. Army Regulation (AR) 405-70, *Utilization of Real Property* (Appendix D) provides numerical planning allowances and addresses the quantities for programming space for personnel and equipment.

8.13.4.2 Space planning takes into consideration the following; who will be using a space, how this space will be used, what activities will take place there, and the interaction of other people in the building. Professionally trained interior designers are best at gathering the required information to formulate a space utilization plan.

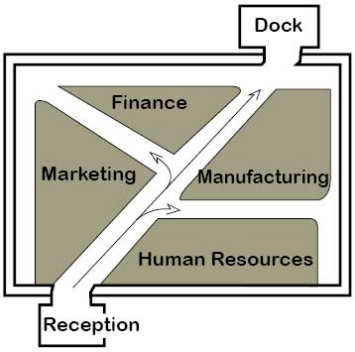
8.13.4.2.1 Bubble Diagrams. Bubble diagrams show the working relationship of one group to another (Fig 8.14). They do not represent a space plan or floor plan, but the relationship of organizations to one another. The adjacency requirements for individuals, user groups, and support functions to accomplish the product of service provided is analyzed. Bubble diagrams assist in organizing an existing facility as well as a new facility.

8.13.4.2.2 Blocking Diagram. An extension of the bubble diagram is the block diagram. The blocking diagram is designed to fit inside the proposed floor plan (Fig. 8.15).

8.13.4.2.3 The next step in the process is the development of the actual space plan. The layout of the space plan is detailed to the workstation level.



8.14 - A Typical Bubble Diagram Indicating Group Relationships



8.15 - A Typical Blocking Diagram Demonstrating the Fit into the Floor Plan

8.13.5 Electrical and Communications.

8.13.5.1 Electrical. Electrical power supply in the United States is available in a number of configurations, the most common of which are 120/240 volt single-phase three wire, 120/208 volt 3-phase 4-wire, and 277/480 volt 3-phase 4 wire.

8.13.5.1.1 Design standards for interior electrical systems are found in Unified Facilities Criteria (UFC) 3-520-01, *Interior Electrical Systems*. Compliance with this UFC is mandatory for the design of interior electrical systems. This UFC:

- Establishes criteria for the design of interior electrical systems
- Establishes system-level design criteria.
- Establishes facility-level criteria for interior electrical systems
- Provides a starting point for determining the applicable design criteria for a facility.

8.13.5.2 Communications. Communications systems handle the transport of telephone and data networks (e.g. video, multi-media, teleconferencing, data transfer, facsimile transmission, and voice conversation).

8.13.5.2.1 The design criteria for interior wiring of communications and information system is found in the Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide. This guide shall be used as the basis for designing both the premises distribution system (inside plant) and the outside plant cable distribution system for all new construction and renovation projects. The Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide is Appendix A of U.S. Army Corps of Engineers engineering technical letter (ETL) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide.

8.13.5.3 Distribution. Distribution of electrical and electronic systems through a building is generally accomplished through branched distribution. A central chase or trunk will run the length or height of the facility, then horizontal distribution systems run from a central connection closet to the end user. This distribution may be overhead or underfoot, in many instances it is a combination of the two.

8.13.6 Color.

8.13.6.1 Color plays an important role in the design of interior environments. Color has a large impact on how we feel and behave in a space. Its quality affects emotions directly and immediately. Successful interior designs harmonize form, space, light, and color.

8.13.6.2 Information on color and light, optical effects, basic color theory, color schemes, and applying color in facilities can be found in Corps of Engineers, Design Guide (DG) 1110-3-122, *Design Guide for Interiors*, Chapter 3, Light and Color and in the Air Force Interior Design Guides, Chapter 9, Color Principles, Part 1 and Part 2.

8.13.7 Acoustics.

8.13.7.1 Acoustics as an environmental variable significantly impacts the human impression of an interior environment. Productivity, speech intelligibility, privacy, safety, positive user attitude and response, and environmental comfort all depend on proper acoustic design. The interior designer is concerned with reducing unwanted noise and preserving desirable sound in a space. Sound can be controlled in the following three ways: eliminate the source, isolate the source, i.e. provide a barrier between the user and the source or mask the offending sound (Fig. 8.16).

8.13.7.2 A discussion of the dynamics and control of acoustics can be found in the Design Guide (DG) 1110-3-122, *Design Guide for Interiors*, Chap. 5.

8.13.8 Interior Lighting.

8.13.8.1 Lighting will be designed with the work activities being performed in mind. Always supplement overhead lighting with task lighting and use architectural lighting in entrances, corridors, waiting rooms, and other spaces to light artwork and provide interest.

8.13.8.2 For Army installation buildings to achieve a high quality lighting environment, lighting equipment/systems selected must satisfy both performance and aesthetics. Factors for consideration in this selection are based on the following: lumens per watt, color temperature, color rendering index, life and lumen maintenance, availability, switching, dimming capability, and cost.

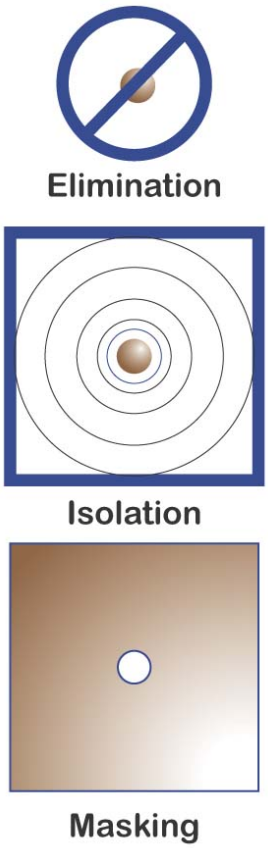


Fig. 8.16 – Noise Control Concepts

8.13.8.3 Lighting design approaches and lighting applications can be found in the following publications:

- Technical Instructions (TI) 811-16, *Lighting Design*; Design Guide for Interiors, DG 1110-3-122 Chapter 5
- Air Force Interior Design Guides, Chapter 10
- Unified Facilities Criteria (UFC) 3-520-01, Interior Electrical Systems, Appendix F.

8.13.8.4 Lighting Maintenance, Types, and Problem Solving. Information on lighting maintenance, types, and lamp trouble-shooting is found in TM 5-683, Electrical Interior Facilities, Chp. 9.

8.13.9 Finishes. Interior finish standardization is important for administrative and financial reasons. Standardization presents a unifying element throughout all buildings that is more cost effective, efficient, and easy to maintain.

8.13.10 Installation Finishes Standards. Standards are to be determined at a later date. Installation finishes standards and charts are found in Appendix I, Interior Finishes Standards of this guide.

8.13.11 Furnishings. Furnishings are elements added to a building for utility or ornamentation following construction. These include furniture such as chairs, desks, sofas, and tables and also cabinetry, window treatments, signage, accessories, art, and plants (Fig. 8.17). When selecting furnishings for an interior environment, care should be taken to include their design as an integral part of the overall concept and to ensure coherency between architecture, materials, furniture, art, and signage. The following paragraphs discuss the various furnishings components and give guidance on the programming, acquisition, functionality, and maintenance of the various components. The use of low-emitting and re-useable or recyclable (not just down-recyclable) furnishing shall be encouraged.

8.13.11.1 Furniture. Furniture systems are a wide range of furniture types comprised of components to create a custom designed work environment to meet specific functional needs. Furniture includes seating and case goods. Case goods are furniture elements constructed from box-like components. These include desks credenzas, file cabinets, etc. Case goods fall under two major categories: conventional and modular. Conventional case goods are delivered as pre-assembled, ready-to-use products.

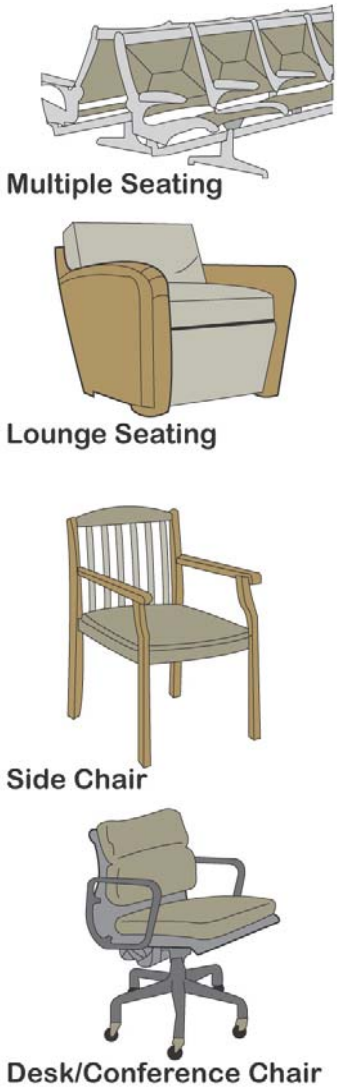


Fig. 8.17 – Typical Examples of Various Chair Classes

Modular case goods are manufactured as separate pieces that may be grouped into a number of different arrangements.

8.13.11.1.1 Systems Furniture. Systems furniture is ergonomically designed to meet a variety of conditions and requirements. Careful planning is critical during the initial stages of designing new systems furniture layouts. Power and communications requirements must be determined and planned so they are available at the locations were they are needed. Provisions for furniture systems electrical and data requirements must be made a part of the construction documents. See paragraphs 8.13.5.1.1 and 8.13.5.2.1 for interior design standards for electrical and communications wiring respectively. Surface mounted conduit and power poles are unsightly and should be avoided.

8.13.11.1.2 For a detailed discussion on the Army Interior Design Process (planning and programming, procurement, and design services) and Planning for Administrative Work Environments (data collection, analysis, space planning, layout, design coordination, documentation, and implementation) see Appendix A and Appendix B of Design Guide for Interiors, DG 110-3-122 respectively.

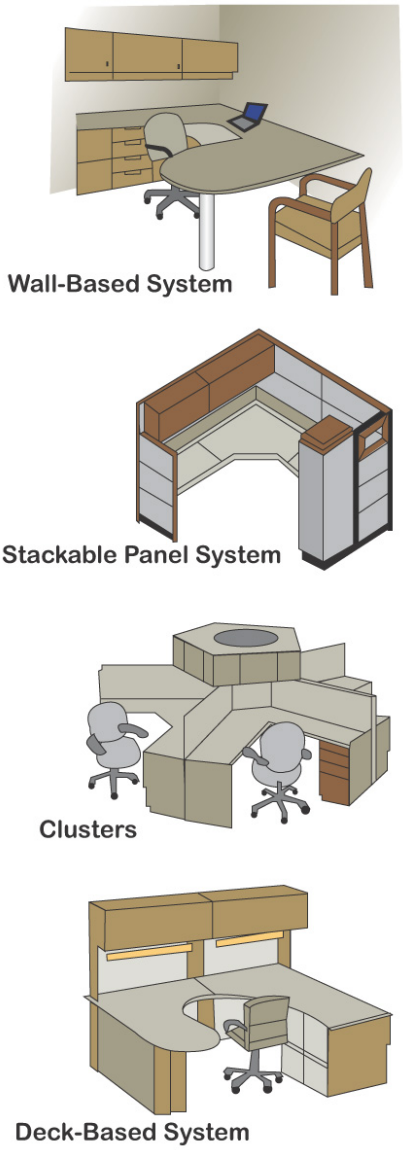
8.13.11.1.3 Budgeting for Furniture Systems. Furniture systems represent a significant percentage of a project. Furniture systems are Operations and Maintenance (O&M) funded and should be included in the project scope along with such items as built-in casework. Furniture systems are listed on the DoD Form 1391 as a non-add entry in Block 9 for "Equipment Provided for Other Appropriations". In Block 12b, the furniture systems should be as an O&M funded item, the fiscal year the funds are requested, and the line item cost. Accessories can amount for a significant portion of the furniture systems package and should be budgeted with the basic system components (Fig. 8.18).

8.13.11.1.4 Systems Furniture Design Guidelines.

8.13.11.1.4.1 General.

- During the initial planning of new systems furniture, consider the condition and appearance of existing paint, wall coverings, carpet and base of the area.

- When planning the location of office equipment and break areas, do not place heat generating devices, such as coffee makers or copiers, near a thermostat.



8.18 - Typical Examples of Systems Furniture

- Circulation paths should be clear and easy to navigate.
- Topics that should be considered when designing new systems furniture layouts include:
    - Function of the office
    - Adjacencies of personnel and activities
    - Meeting and conference room requirements
    - Individual storage needs
    - Areas for common use office equipment such as the copier and fax
    - Reception area with waiting and guest seating space
    - Special furniture or needs of a particular office, such as drafting tables or extra storage space
    - Communications equipment
    - Task lighting, daylight, and ambient lighting
    - Special security requirements
    - Budget constraints
    - Flexibility to allow future changes
    - Schedules of design, delivery, and installation
    - Air conditioning
    - Acoustic performance requirements

8.13.11.1.4.2 Panels.

Fig. 8.19 – Example of Cubicles in an Office Area

- Full height panels should be used only in areas with a specific need for increased privacy or separation, such as conference rooms, break areas and certain private offices (Fig. 8.19).

- Provide glass panels in corners and at windows to open up the space and allow natural light to filter into the center of the space.

- Provide access panels in the systems furniture to allow for communications connection.

- Panels should generally not exceed 66 inches in height in an open office area. Taller panels cut off air circulation, block views and natural light, and create a closed-in feeling.

- The location and use of taller panels must be carefully planned and coordinated because they can interfere with the proper functioning of air conditioning diffusers, fire sprinklers and smoke detectors, lighting fixtures, switches, thermostats, and sensors.

- Panels should not block service access to mechanical, electrical, or telephone equipment.

- Do not install panels in front of windows, as they will block natural light for the entire area. Panels installed perpendicular to windows should be installed at a window mullion.

8.13.11.1.4.3 Color and Texture.

- To maintain a professional atmosphere, the style and types of systems furniture should be consistent throughout the area.

- The materials and colors of the panels and chairs should be durable. They should be heavy-duty and stain resistant.

- The fabric on the systems furniture panels should harmonize with the overall building color scheme.

8.13.11.2 Window Treatments.

8.13.11.2.1 Window treatments serve many purposes in an interior environment. They provide privacy, light and sun control, reduced energy consumption, and decreased sound transmission. The following should be taken into consideration when selecting fabric type:

- Sheer or semi-sheer fabrics will provide minimum privacy, shade, and energy conservation.
- Heavy, opaque fabric and hard treatments should be used only where total light exclusion is required.
- Full, soft treatments will absorb more sound than hard treatments.

8.13.11.2.2 Window treatments should complement and support the interior design of a space (Fig. 8.20). Window treatments also conceal architectural defects, or change the apparent size, shape, and character of a room. Consider the following factors when making a window treatment selection:

- Light control requirements
- Architectural style
- Historical context

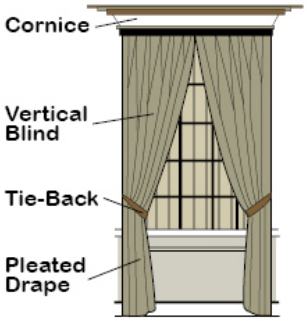


Fig. 8.20 - Window Treatments Should Complement the Interior Space

8.13.11.3 Signage.

8.13.11.3.1 Signage may be informational, directional, or regulatory. Informational signage provides the user with information and includes room or area labels, bulletin boards, menus, artwork descriptions, and emergency information. Directional signage directs circulation and provides orientation. It includes entry directories, directional arrows, and maps. The purpose of regulatory signage is control: providing prohibitions, warnings, emergency instructions, and use restrictions (Fig. 8.21).

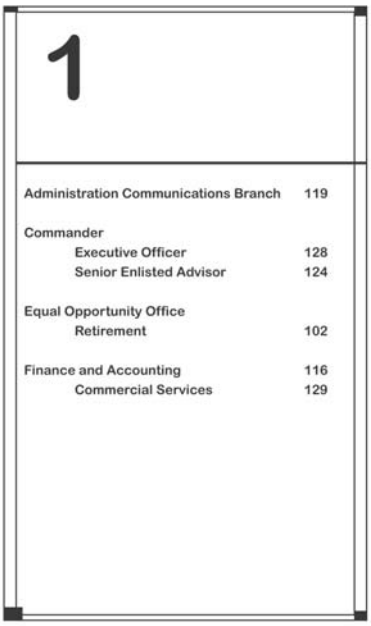


Fig. 8.21 - Directional Sign Facilitates Circulation

8.13.11.3.2 Interior signage is covered in detail in Technical Manual (TM) 5-807-10, *Signage*. The manual includes graphics for the following: directional, identification signs, information, and pictograms.

8.13.11.3.3 A rideshare bulletin board shall be installed in the common area of all barracks projects.

8.13.11.4 Accessories.

8.13.11.4.1 Accessories may be either functional or decorative. Whatever the purpose, accessories serve to make a room appear inviting and personal.

8.13.11.4.2 Functional Accessories. These accessories include letter trays, coat racks, lamps, product displays, magazine racks, brochure racks, and message boards. This group of accessories should be selected for utilitarian aspects as well as aesthetic qualities that may contribute to the total design concept. Repetitive elements can act as unifiers and help tie the accessories to the design theme (Fig. 4.22).

8.13.11.4.3 Decorative Accessories. Decorative accessories are objects such as artwork and plants.

Fig. 8.22 – Example of Good and Bad Design

8.13.11.5 Art. The preparation of artwork to be displayed and positioned in an interior space involves many important decisions. The designer must work closely with the user to determine placements that are satisfactory for both functional and visual composition. Some of the factors to be taken into consideration in the selection of are:

- Quality (posters, prints, original art)
- Subject matter
- Medium (photography, paper, oil, etc.)
- Size
- Placement
- Method of display (permanent collection or rotating program)
- Lighting
- Integration with design scheme

8.13.11.6 Plants.

8.13.11.6.1 Plants add color, texture, and variety of form and shape to the interior. They bring a natural element to an interior space. They are used for focal points, screen, and for psychological effect. Increasingly, plants are being incorporated into the interior

environment for the health and well-being of the user, as well as enrichment of the space.

8.13.11.6.2 When selecting plants, their light, water, and temperature needs, continuing care requirements, and ease of replacement must all be considered. Also, the types and amount of light the space has (direct or indirect) daylight, fluorescent, or incandescent must be considered. Plants should not be positioned such that their location presents a problem when watering.

8.13.11.6.3 Detailed information on interior planting to include design considerations (light requirements, temperature, atmosphere considerations, and planters), plant maintenance, and a listing of recommended plants can be found at the following web locations (Air Force Interior Design Guides, Chapter 8):

- Design Considerations
- Maintenance
- Recommended Plant List

8.13.12 Unified Facilities Guide Specifications. See the "Division 12 - Furnishings" section on the Construction Criteria Base website for Unified Facilities Guide Specifications for furnishings.

8.13.13 Installation Furnishings Standards. Installation furnishings standards are found in Appendix J, Interior Furnishings Standards of this guide.

8.13.14 Interior Operations Policies. To preserve the quality of facilities, operations policy is set between the user and the installation management. The user is responsible for preserving the visual appearance of the facility, and installation management is responsible for providing maintenance needed to preserve facility quality. Interior operations policies address the following issues (See Appendix N, Housekeeping Rules (Example) :

- Housekeeping responsibilities
- Policy to prevent and eliminate visual clutter
- Carpet cleaning, repair, and replacement policy
- Height restrictions for partitions and furniture

- Policy on buildings modifications including: partitions, painting, window treatment, HVAC, lighting, and the installation of communications and electric wiring

- Maintenance of directories and signage

- Smoking and eating locations

- Procurement information on matching or compatible furniture

- Policy on personalization and plants

8.13.15 Interior Appearance Policy. The following are Army standards to follow.

- Keep work areas cleared of clutter. Cleanup, throw away (Fig. 8.23).

- Avoid hanging things in the work area. Find another way to refer to organization charts, personnel listings, and calendars, other than having them hung on walls or partitions except framed artwork, diplomas, awards, etc.

- Notes and references hung on partition walls should be kept below the height of the partitions. Some things may be mounted on the partitions by hooking into the metal supports between the partitions, but not by hooking into the fabric.

- Anything not contributing to the overall décor of the work area should be put in a drawer or on a shelf behind a closed door.

- Do not overwhelm the work area décor with an excess of plants or personal artifacts.

- Thin out your files.

- Keep walkways into work areas open and free of clutter. Do not store things on the floor, or on top of shelves, or partitions.

- Office chiefs should consider the overall office appearance and visual contrasts between work areas.

Fig. 8.23 –Interior Shot of Clean Office/Workspace

- Be sure that anything you do in your work area contributes to color coordination, rather than detracts from it.

- Keep vacant workstations and common areas clean. Do not use them as a dumping area for things you do not know what to do with.

8.14 EXTERIOR BUILDING MATERIALS AND COLOR

8.14.1 Exterior Building Materials.

8.14.1.1 Building materials make a major contribution to the scale, color, texture, and character of a military installation. A limited palette of durable, low maintenance materials should be used that, while encouraging a variety of expression, provides a cohesive and consistent architectural character through the installation and within each visual zone. Material should reflect the function of a building, and its hierarchy within the installation.

8.14.1.2 Use the following guidelines when selecting exterior building materials:

8.14.1.2.1 Choose materials for their longevity and maintenance characteristics.

8.14.1.2.2 Use materials with integral colors - avoid painting exterior colors.

8.14.1.2.3 Use installation standard colors for exterior walls. Add accent colors sparingly. Accent colors can be used in recesses and to accent certain portions of a buildings façade.

8.14.1.2.4 Use pre-finished material where possible - gutters, window frames, doorframes, etc.

8.14.1.2.5 Use blended colors on pitched roofs.

8.14.2 Appendix K, Exterior Materials Charts list the building materials applicable to the visual zones listed in the following paragraphs:

8.14.2.1 Visual Zones

Visual Zone 1 – Garrison Area

Visual Zone 2 – Gray Airfield

Visual Zone 3 – Division Area

Visual Zone 4 – 3rd Brigade Area

Visual Zone 5 – Technology and Training Park

Visual Zone 6 – Jackson Avenue Area

Visual Zone 7 – Madigan Army Medical Center

Visual Zone 8 – Special Forces/Old Madigan

Visual Zone 9 – Logistics Center

Visual Zone 10 – North Fort Lewis

Visual Zone 11 – Family Housing

Visual Zone 12 – American Lake

8.14.3 Exterior Building Color

8.14.3.1 Color charts have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc. (Fig. 8.24) Color changes will be implemented during normally scheduled paint cycles (see Appendix L, Exterior Color Charts).

Fig. 8.24 - The Geographical Areas for Exterior Colors

8.14.3.2 Color is closely linked to the appropriate selection of exterior building materials and is a critical design element in relating adjacent buildings and creating a compatible visual environment within an installation.

8.14.3.3 Historic Buildings. Repaint the building or structure to match the existing colors or colors that can be documented to have been used on that building.

8.15 KEY FACILITY TYPES STANDARDIZATION

8.15.1 The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

8.15.2 Residential Communities Initiative.

8.15.2.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing that is built in attractive neighborhoods.

8.15.2.2 The Military Housing Privatization Initiative (MHPI) legislation allows developers to build housing to local standards. In those areas where local standards do not meet the quality of life requirements of Soldiers, the Community Development and

Management Plan (CDMP) process allows a negotiated determination of those standards. To ensure a uniform level of quality throughout RCI, Headquarters, Department of the Army has developed a "Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing" to be used as reference points during CDMP preparation.

8.15.2.3 All RCI projects planned or under design will meet the SPiRiT "Gold" Homes rating.

8.15.3 Department of the Army (DA), Facilities Standardization Program.

8.15.3.1 As per the Center of Standardization and MILCON Transformation Strategy, standard design packages are developed for facility types that are repetitively designed and constructed at Army installations. These design packages are developed to the definitive design level (80%) and once approved are mandatory for Army MILCON. These designs are adapted per the specific site.

8.15.3.2 Currently, there are thirty one (31) DA standard design packages. Headquarters, U.S. Army Corps of Engineers has established eight (8) Centers of Standardization to develop and maintain the definitive and design packages. See Appendix P, DA Facilities Standardization Program Centers of Standardization for a list of the various centers and the facility type assigned to each center. (Centers of Standardization homepage.)

8.15.3.2.1 Army Chapel Design Standards are complete and approved. See The Army Standard for Chapel Construction – January 2004 and Memorandum for Record, subject: The Army Standards for Chapels, dated 21 January 2004.

8.15.4 Unaccompanied Personnel Housing (Army Barracks Modernization Program).

8.15.4.1 The Army's Barracks Modernization Program is based upon a whole community approach providing modernized private living and sleeping areas for Soldiers as well as a more functional work environment. This is being realized with the construction and renovation of barracks, and associated Company Operations Facilities (COF), Battalion Headquarters (BN HQ) and Brigade Headquarters BDE HQ), and Dining Facilities (DEFAC). For a detailed discussion of the Army Barracks Modernization Program see the Army Barracks Master Plan. The Army Barracks Master Plan only includes requirements for activity duty permanent party Soldiers' barracks.

8.15.4.2 Army Barracks Standards. The Army Barracks Modernization Program design criteria gives commanders and contractors the direction to incorporate best business practices around a modular floor plan. The Army Barracks Master Plan, Appendix I, Army Barracks Standards, promotes barracks with an appropriate balance between private and common areas. The Vice Chief of Staff of the Army (VCSA) specified the "New Army Barracks Construction Criteria" in his Memorandum Subject: New Barracks Construction Criteria, dated 11 July 2002 in which he strongly endorsed the new standards. The criteria was further revised in Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003 which makes the following four changes to the Army Barracks Standards:

- Establishes the two-bedroom/one bath module as the standard module
- Requires installation of a stove or cook top
- Requires laundries in the barracks
- Eliminates the separate Soldier community building

See the above memorandum for detailed guidance.

8.15.4.3 Furnishings.

8.15.4.3.1 Acquisition of new furnishings is planned and accomplished in concert with the facility design and construction schedule so that delivery of the new furnishings coincides with the beneficial occupancy date (BOD).

8.15.4.3.2 The U.S. Army Interior Design Manual (IDM) for Single Soldiers provides guidance to help furniture managers prepare order packages. The manual uses standard Army furniture specifications; i.e. medium oak wood furnishings or acceptable wood/steel alternatives; construction and fabric specification, and specific information for authorized items of furniture. The manual also contains standard living/sleeping room arrangements, and SCB plans with color schemes. The manual includes information on waiver requirements, the procurement process, order forms, and final inspection checklist.

8.15.4.4 Construction design criteria for COFs, BN HQ buildings, BDE buildings, and DFAC facilities can be viewed on the web at ProjNet.

8.15.5 Army Lodging.

8.15.5.1 The Army Lodging Standards promote economies in serving the Army traveler, but not at the expense of quality or service. The standards define the facilities and the level of service the Army traveler should expect.

8.15.5.2 The following standards provide the level of service that a guest should expect when they travel to an Army installation. That expected level of service should be consistent from installation to installation. The following documents provide the service, operations, and facilities standards for Army Lodging.

- Army Lodging Standards for Service
- Army Lodging Standards for Operations
- Army Lodging Standards for Facilities

8.15.6 Morale, Welfare, and Recreation (MWR) Branded Theme Operations.

8.15.6.1 The U.S. Army Community and Family Support Center (CFSC) through its Theme Operations, offers comprehensive theme packages pertaining to restaurants and entertainment centers. The packages are customized to the installation.

8.15.6.2 CFSC will conduct an assessment for market viability, provide architectural designs, and other promotional items. Information on the CFSC Branded Theme Operations to include how to get a theme operation, management support, and food service support is located on the CFSC website at the Army Brand Theme Operations Home Page.

8.15.7 Range Standards.

8.15.7.1 The Army Sustainable Range Program (SRP), proponent is HQDA Office Deputy Chief of Staff Operations, ODCSOPS/G3 (DAMO-TRS), phone number (703) 692-6410. To contact SRP technical support call (256) 895-1535 or e-mail RTPL@HND01.usace.army.mil.

8.15.7.2 The SRP develops and manages standard designs for Army Ranges in accordance with AR 210-21 and Training Circular 25-8 Army Training Ranges. The Range Standards are available on the following web pages.

- Design Manual for Remoted Target Systems (RETS) Ranges, CEHCN 1110-1-23 Manual.

- Revised Range Design/Construction Interface Standards.

- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual.

8.16 PHYSICAL SECURITY REQUIREMENTS

To assure the required physical measures are met the installation Provost Marshall or Physical Security Officer will be coordinated with during the planning, design, and construction of all construction projects. (AR 190-13, *The Army Physical Security Program*, Para 1-26) See Section 12, Force Protection for a more detailed discussion regarding anti-terrorism measures.

8.17 SALE AND OUTLEASE OF ARMY ASSETS

8.17.1 In an effort to offset some of the impacts of constrained resources, the Army has implemented initiatives that improve cost effectiveness and efficiency of installation operations. To the extent permitted by law, funds that become available as a result of these initiatives are retained by, or returned to, garrison commanders.

8.17.2 The Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C)) has developed the "Sales and Outlease of Army Assets - Installation Guide" to assist garrison commanders in using the sales and outlease program. The guide provides an overview of major policies, procedures, and responsibilities pertaining to the following three major initiatives of the program:

- Sale of Real Property

- Outlease of Real Property

- Outlease of Personal Property

The guide provides hyperlinks to Sale and Outlease governing regulations and legal and informational references.

8.18 ARMY STANDARDS

8.18.1 The cited Army Standards shall be met.

- Unified Facilities Criteria (UFC) 3-520-01, *Interior Electrical Systems*
- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings, latest edition*
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- Secretary of the Interior's Standards for the Treatment of Historic Properties
- Standards of Seismic Safety for Existing Federally Owned and Leased Buildings
- Army Lodging Standards
- Design Manual for Remoted Target Systems (RETS) Ranges, CEHCN 1110-1-23 Manual
- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual

8.19 REFERENCES

8.19.1 The following references are provided for guidance.

- Army Regulation (AR) 190-13, *The Army Physical Security Program*
- Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*
- Army Regulation (AR) 200-4, *Cultural Resources Management*
- Army Regulation (AR) 405-45, *Real Property Inventory Management*

- Army Regulation (AR) 405-70, *Utilization of Real Property*

- Unified Facilities Criteria (UFC) 1-200-01, *General Building Requirements*

- Unified Facilities Criteria (UFC) 4-510-01, Design: Medical Military Facilities

- Unified Facilities Criteria (UFC) 3-400-01, Energy Conservation

- Engineering Regulation (ER) 1110-345-122, *Engineering and Design, Interior Design*

- Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*

- Unified Facilities Criteria (UFC) 3-330-03A, *Seismic Review Procedures for Existing Buildings*

- Unified Facilities Criteria (UFC) 3-510-01ANF, *Foreign Voltage and Frequencies Guide*

- Unified Facilities Criteria (UFC) 3-520-01, *Interior Electrical Systems*

- Unified Facilities Criteria (UFC) 3-530-01, *Design: Interior and Exterior Lighting and Control*

- Air Force Sustainable Facilities Guide

- Air Force Interior Design Guides

- Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C)) Sales and Outlease of Army Assets - Installation Guide

- Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website

- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website

- Whole Building Design Guide
- AR 210-50 Housing Management
- United States Army Furnishings Manual for Single Soldier Housing

Links

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SECTION 9
CIRCULATION DESIGN STANDARDS

9.1 INTRODUCTION

9.1.1 The image of the installation is greatly determined by the design and location of roadways, walkways, entrances, and parking lots. The primary roadway system and parking lots utilize considerable amounts of land and are a visually dominant element of any installation. The location of primary circulation elements is presented in Section 7, Site Planning. Section 9 discusses the details of circulation design and impacts.

9.1.2 The circulation system provides a primary vantage point from which all installations are viewed (Fig. 9.1). Safe and efficient vehicular movement results in better orientation and contributes to the development of a positive environment for installation personnel and visitors. The circulation component is used to assess the circulation elements of the installation and identify specific characteristics that provide visual zone and theme identity.

Fig. 9.1 – A Circulation System Provides a Primary Vantage Point

9.1.3 Roadways, pedestrian walkways, and bicycle trails will be designed to provide a hierarchy of circulation design and carrying capacity. Functionally, a hierarchical network can be created that separates incompatible types of traffic. This separation of traffic promotes sustainability because it results in more efficient energy consumption.

9.1.4 Visually, the circulation hierarchy can be reinforced through design, planting, signage, and lighting to promote a more attractive visual experience and promote a sense of orientation.

9.2 CIRCULATION OBJECTIVES

The goal for the circulation system on the installation is to establish a sustainable system that promotes aesthetic appeal, environmental preservation, and energy conservation while providing safe and efficient circulation. The objectives below should be followed to achieve a sustainable circulation system:

- Provide circulation that meets anti-terrorism and security requirements and promotes and enhances public health and safety.
- Provide a system of circulation that includes all forms of vehicular and pedestrian circulation.
- Provide a system that includes hierarchies of vehicular and pedestrian traffic flow.
- Adapt the circulation system to the natural conditions of the site (Fig. 9.2).
- Improve the existing circulation network for expansion, safety, way finding and appearance.
- Promote maintenance and repair of existing and proposed circulation systems.

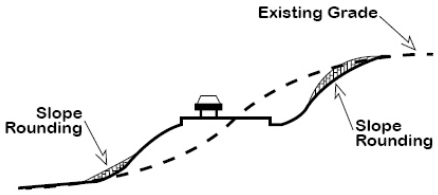

Fig. 9.2 – Adapt Circulation to Natural Conditions of the Site

9.3 ROADWAY HIERARCHY

9.3.1 The roadway network of the installation should functionally and visually reflect a logical hierarchy of traffic circulation. The network should separate types of traffic by function and volume, ranging from through traffic to local traffic. The visual character of each segment of the network should appropriately convey its role and function within the overall network. The basic network is classified as follows in terms of the type, character, and appearance of the road (Fig. 9.3):

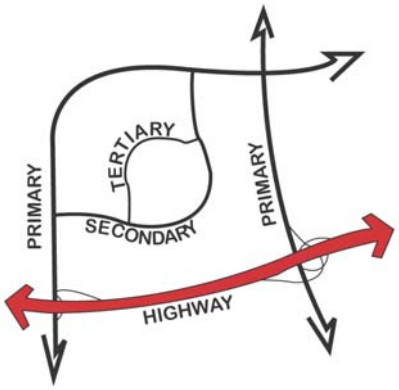

Fig. 9.3 – Roadway Hierarchy

9.3.1.1 **Highways**. Highways provide primary high-speed traffic access to, around, or through a military installation. The design includes:

9.3.1.1.1 Continuous, relatively straight or large radii curvilinear alignments that carry high-speed through-traffic movement between major activity centers within a region.

9.3.1.1.2 A minimum of two lanes on each direction typically divided by a median or median divider.

9.3.1.1.3 Alignments that border lane use areas rather than bisect them, and green space buffers between the road and adjacent uses.

9.3.1.1.4 Controlled access onto the road.

9.3.1.1.5 Either grade-separated or at grade channelized intersections with traffic signal controls.

9.3.1.1.6 Shoulders for emergency stopping but strict prohibition of on-street parking.

9.3.1.1.7 Street signing, lighting, and planting that reflects the high-speed nature of traffic movement.

9.3.1.2 **Primary Roadways**. These are arterial routes that connect major activity centers, provide the primary access through the installation, and provide the means by which most people view the installation. These roadways often traverse the entire installation and carry the heaviest volume of traffic that results in high speed and high visibility corridors. Direct access to this type of road should be restricted to crossing at major intersections. Primary roadways are designated as boulevards in urban areas and as avenues in rural and suburban areas (Fig. 9.4). Design characters include:

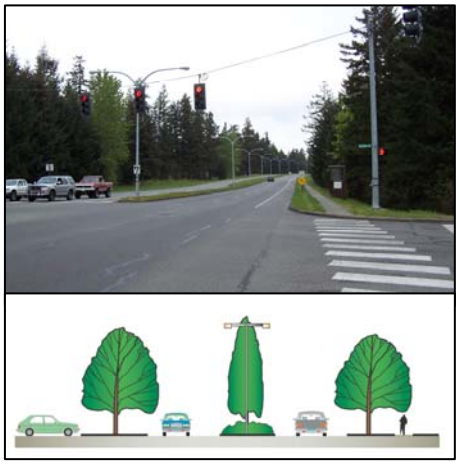

Fig. 9.4 – Primary Roadway

9.3.1.2.1 Continuous, through-traffic alignments that are relatively straight or large-radii curvilinear to handle moderate to heavy traffic.

9.3.1.2.2 Alignments that form the boundary between different land uses are preferable to alignments that transect a land use zone.

9.3.1.2.3 Two or more moving lanes in each direction typically divided by a median.

9.3.1.2.4 Controlled access and a minimum of curb cuts limited to entranceways to major facilities or building groups.

9.3.1.2.5 At-grade intersections with signal controls.

9.3.1.2.6 On-street parking prohibited.

9.3.1.2.7 Medians, street lighting, signing, and planting that enforces the moderate-to-high speed nature and importance of the road.

9.3.1.2.8 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acre.

9.3.1.3 **Secondary Roadways**. Secondary roadways serve as connectors between primary roads and tertiary roads and typically connect primary roads to adjacent land use zones (Fig. 9.5). Secondary roads accommodate moderate to slow traffic speeds with one moving lane in each direction. On-street parking should be prohibited and left-turn lanes provided at intersections with primary roads. Design characteristics include:

Fig. 9.5 – Secondary Roadway

9.3.1.3.1 Continuous through-traffic alignment between primary roads, either straight or curvilinear based upon the design speed topography and land pattern.

9.3.1.3.2 Direct access to abutting property.

9.3.1.3.3 A maximum of two moving traffic lanes in each direction, either undivided or a boulevard with planted median.

9.3.1.3.4 On-street parking is generally prohibited. However, on-street parking may be allowed in the community center areas and dense neighborhood centers. Streets should be designed to accommodate on-street parking.

9.3.1.3.5 Sidewalk separated from the road by a planting strip.

9.3.1.3.6 Street lighting, signing, and planting that reflects the moderate-to-slow speed nature of traffic and the character of the land use area they are in.

9.3.1.3.7 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acre.

9.3.1.4 **Tertiary Roadways.** Tertiary roadways provide access to individual facilities, parking and service areas. They are designed to handle low speed, low volumes of traffic, with one lane in each direction (Fig. 9.6). Tertiary roadways make use of "T" intersections and cul-de-sacs to reduce through traffic, promote safety, and limit noise impacts from truck traffic. Design characteristics include:

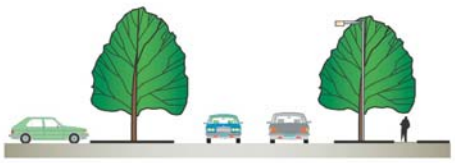

Fig.9.6 – Tertiary Roadway

9.3.1.4.1 Alignments designed to discourage through-traffic.

9.3.1.4.2 Alignments are relatively short straight or curvilinear keeping with topography, land use, and slow speed nature of traffic.

9.3.1.4.3 Generally a maximum of two moving traffic lanes, one in each direction.

9.3.1.4.4 On-street parking allowable on an infrequent overflow basis by the addition of a parallel parking lane or bay.

9.3.1.4.5 Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

9.3.1.4.6 Sidewalks shall be required on both sides of the street.

9.3.1.4.7 Street lighting, signing, and planting in character with slow speed nature of traffic and the land use area within which the road is located.

9.3.1.5 **Cul-de-Sacs**. Cul-de-sacs are short dead-end tertiary streets located primarily in residential areas. They connect at one end to a tertiary or secondary street and have a turnaround at the other end, providing direct access to an abutting property while preventing through traffic. Design characters include:

9.3.1.5.1 Short, straight, or curvilinear alignment to serve abutting property.

9.3.1.5.2 Generally a maximum of two traffic lanes, one in each direction.

9.3.1.5.3 Generally a maximum length of 600 feet, or less, except in areas where terrain and low density justify a longer length.

9.3.1.5.4 Turnarounds must include a diameter to accommodate fire and garbage trucks.

9.3.1.5.5 Turnarounds can be either symmetrical or offset.

9.3.1.5.6 Turnarounds should have center planting islands to reduce the expanse of paved area.

9.3.1.5.7 Overflow parking can be provided on street in parking bays or within center of turnarounds.

9.3.1.5.8 Sidewalks, if any, are generally limited to one side of the road.

9.3.1.5.9 Street lighting, signing, and planting is character with the slow speed nature of traffic and the land use area being served.

9.3.1.6 **Tactical Vehicle Trails**. These are routes which provide alternative access for tactical vehicles and other vehicles utilized in combat readiness training (Fig. 9.7). They are recommended for installations with high use of tactical vehicles to enhance the movement of the vehicles and reduce traffic congestion on the other installation roadways. These trails provide one lane access for vehicles between motor pools and maneuver areas. It is recommended these trails be hard surfaced within developed areas with concrete of a thickness to withstand the weight of armored vehicles. The hard service will reduce dust pollution. These trails should be designed to provide as direct access as possible while minimizing crossings with primary, secondary, or tertiary roads. All crossings with the other roadway systems should be paved with concrete to support the weight of the vehicles and clearly marked with signage.

Fig. 9.7 – Example of a Tactical Vehicle Trail

9.4 ROADWAY SETBACKS

Department of Defense anti-terrorism standards state that all inhabited buildings within a controlled perimeter will be setback a minimum of 10 meters (33 feet) from roadways, and that troop billeting and primary gathering spaces shall be setback a minimum of 25 meters (82 feet) from roadways. Inhabited buildings not within a controlled perimeter the minimum setback distance is 25 meters (82 feet) and for primary gathering places and troop facilities the minimum distance is 45 meters (148 feet). (See, Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, Table B-1).

Fig. 9.8 – Design of Circulation System Using Positive Visual Image

9.5 ROADWAY SYSTEM DESIGN

9.5.1 The location and design of new circulation system alignments as well as improvements to the existing system should be prepared to promote development sustainability. They should be designed to minimize impacts, relieve driver monotony, and provide a positive visual experience for the user, without compromising safety (Fig. 9.8). The following design techniques should be applied to circulation system design:

Fig. 9.9 – Build Circulation into Natural Landform

9.5.2 Blend Circulation With Natural Landform. The horizontal and vertical alignment of roads, walkways, and bikeways should minimize landform disturbance and blend with the natural setting (Fig. 9.9).

9.5.2.1 Minimize cut and fill by avoiding steep terrain and aligning roadway, walkway, or bicycle system to cross slopes diagonally or parallel to the contours rather than perpendicular to the contours.

9.5.2.2 Mold cut and fill slopes to blend into the natural landform (Fig. 9.10).

9.5.2.3 Blend road drainage ditches, swales, or channels into the natural landform.

9.5.2.4 Use cluster development wherever possible to limit the lengths and required intersections of roadway and other circulation system elements and to preserve land. Consideration should be given to meeting anti-terrorism requirements when developing cluster type facilities.

9.5.2.5 Minimize pedestrian, railroad, and bikeway crossings of highway, primary, and secondary roads.

9.5.2.6 Use natural topographic conditions to create grade separated pedestrian, railroad, and bikeway road crossings wherever possible especially on highways and primary roads.

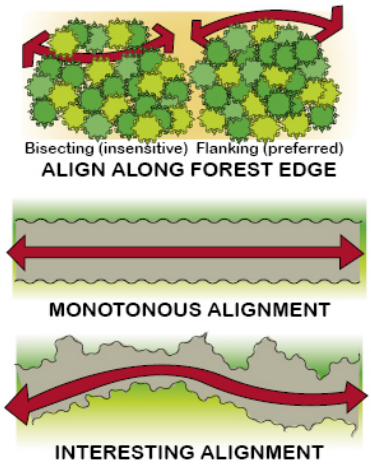

Fig. 9.10 – Roadway Alignment

9.5.3 Adapt Circulation to Preserve Vegetation. Design roads, walkways, and bike paths to minimize disturbance to existing vegetation, encourage re-vegetation in disturbed areas, and reduce the visual impact of landscape disturbance (Fig. 9.11).

Fig. 9.11 – Landscape and Berms Buffer Air and Noise Pollution

9.5.3.1 Align roads through open areas rather than forested areas.

9.5.3.2 Minimize cut and fill to reduce the limits of clearing.

9.5.3.3 Clear only for sight distances rather than uniform right-of-way clearing.

9.5.3.4 Utilize tree wells or retaining walls to preserve specimen trees or significant vegetation areas.

9.5.3.5 Provide optimum conditions for re-vegetation by following proper planting and maintenance techniques.

9.5.3.6 Restore vegetation to disturbed areas using naturalistic plantings of native plant material.

9.5.4 Minimize Adverse Impacts on Adjacent Land Uses.

9.5.4.1 Air Pollution. Locate roadway alignments to minimize the impact of traffic-emitted pollutants on adjacent development. This can be accomplished by the following:

9.5.4.1.1 Locate roads adjacent to land uses that are minimally affected by traffic-emitted air pollutants.

9.5.4.1.2 Reduce the impact of traffic-emitted pollutants on more sensitive land use areas by locating the roadways downwind and/or providing planted buffers. Tactical vehicle trails should be hard surfaced to reduce dust pollution.

9.5.4.2 Noise Pollution. Design and locate roadways to reduce the impact of traffic noise on adjacent development.

9.5.4.2.1 Roads should be physically separated from sensitive land uses including residential, medical, education, recreation, administration, religious, library, community or child care facilities.

9.5.4.2.2 Utilizing noise abatement techniques such as berms, sound barrier walls, and plant material to reduce noise levels.

9.5.4.2.3 Reroute truck and tank traffic to roadways adjacent to less noise sensitive land uses. Tracked vehicle traffic should, ideally, be routed to a system of tank trails that are totally separate from corridors used by wheeled traffic vehicles.

9.6 INTERSECTIONS

9.6.1 Intersections are the most dangerous areas of the installation circulation system. They should be planned or improved to provide safe and efficient traffic flow for both pedestrian and vehicular traffic. The following design techniques should be used to plan or improve intersections (Fig. 9.12):

9.6.1.1 All roadways should intersect at right angles (90 degrees), although 85-95 degrees is acceptable.

9.6.1.2 Avoid dangerous, complex intersections of more than two streets intersecting at one point or offset intersections.

9.6.1.3 Eliminate intersections that are in close proximity to one another. They should be no closer than a minimum distance of 30 meters (100 feet).

9.6.1.4 Use T-intersections for tertiary road intersections with secondary or primary roads to reduce conflict and promote safety.

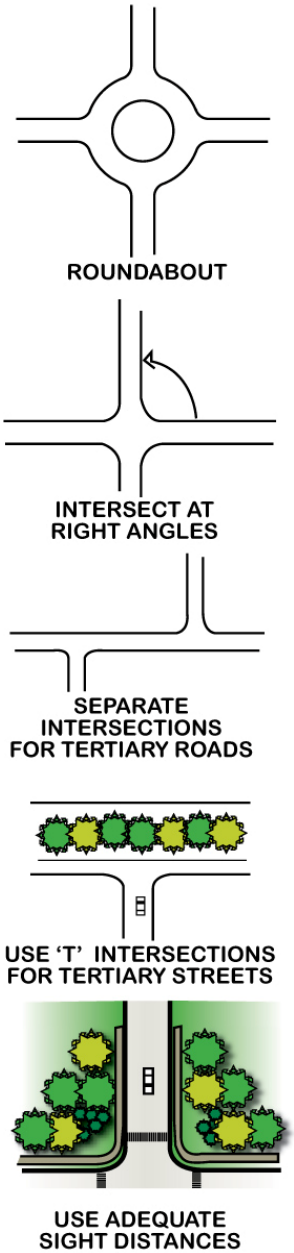

Fig. 9.12 – Intersection Design

9.6.1.5 Roundabouts may be used in certain areas if approved by the installation. The roundabout must have radii appropriate for emergency vehicles, track and trailer combinations and all military traffic. Roundabouts to be two lanes wide and be designed to ASHTO standards.

The installation has proposed to construct roundabouts at several intersections on main post Fort Lewis. Pros include smooth traffic flow while a negative impact is possible confusion for drivers.

9.6.1.6 Provide turning lanes at all intersections along primary roads to eliminate interference with through traffic flow.

9.6.1.7 Minimize intersections along primary roads to reduce points of conflict and increase safety. Existing intersections with secondary and tertiary streets can be eliminated by the use of cul-de-sacs with traffic routed along parallel streets to primary and secondary streets. Pedestrian connections, via sidewalks or paths, shall be provided from cul-de-sacs to sidewalk system of primary and secondary roads.

9.6.1.8 Include adequate sight distances to meet minimum standard requirements at all intersections. The location from where the driver is waiting to cross or enter a traffic lane to a point 23 meters (75 feet) down the centerline to the right and the left forms the sight triangle.

9.6.1.9 Minimize pedestrian and bicycle intersections with primary streets.

9.6.1.10 Provide crosswalks at all intersections where necessary. Mark with paint or vinyl strips or identify with a different paving surface (Fig. 9.13).

Fig. 9.13 – Crosswalks and Bike Paths Marked Clearly

9.6.1.11 Provide pedestrian access to persons with disabilities in accordance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). In the event of a conflict the most stringent standards will be applied.

9.6.1.12 Create local service drives or access roads to parallel highways and primary roads to provide access to properties fronting the primary road avoiding a direct curb cut from the primary road to each individual property.

9.6.1.13 Intersections between railroad track and high-speed roads must be signaled, well marked and have a smooth transition.

All other road crossings must be well marked and have clear line of sight down the tracks.

9.7 ENTRANCE GATES

9.7.1 The location and design of the installation entrance gates is a primary component of the installation circulation system. Entrance gates must be designed to be functional, while providing security protection not only for the installation itself, but also for personnel and others waiting to be admitted to the installation. Gates should also be designed as a visual amenity to provide an aesthetically pleasing entrance to and exit from the installation. See Section 12, Force Protection, paragraph 12.7 for information on the design standards for installation gates (Fig. 9.14).

Fig. 9.14 – The Main Entrance Gate to Fort Lewis

9.8 PARKING REQUIREMENTS

9.8.1 The total quantity of parking in any one location will vary with the needs of the facility. The following are general considerations considering parking requirements.

9.8.1.1 All parking lots will be accessible to persons with disabilities in accordance with the requirements of the UFAS.

9.8.1.2 For initial planning and programming, allocate 400 square feet of parking lot area per car. The total provides adequate minimum space for the parking spaces, access drives, and planting islands which make up a parking lot (Fig. 9.15). This allocation is not withstanding tactical military vehicles.

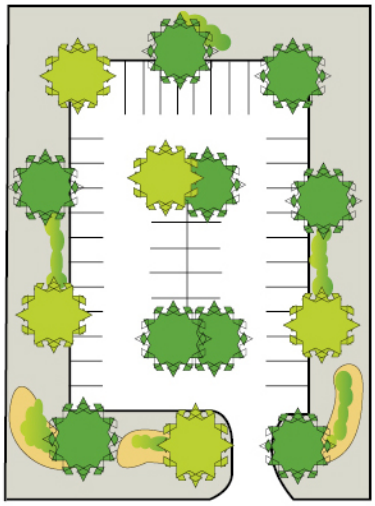

Fig. 9.15 - Provide Islands with Trees to Soften Visual Expanse

9.8.1.3 Minimize parking space requirements of a facility by selecting a site which will allow the sharing of parking with related activities.

9.8.1.4 Small parking lots are usually preferable to large lots because they enhance the visual environment by increasing the percent of landscaped area to paved area and allow more conformance to natural topography.

9.8.1.5 The monotony of large parking areas can be altered by the use of designs such as curvilinear parking or the introduction of large planting islands (Fig. 9.16).

Fig. 9.16 – Trees/Berms/Walls Screen Parking Lot

9.8.1.6 Promote means of access other than vehicular by providing alternative means of access such as walkways and bikeways.

9.9 PARKING LOT LOCATION AND DESIGN

9.9.1 Parking areas can be designed and enhanced to provide a more pleasing impact and a more comfortable physical experience for the user. The following design techniques should be used to create more aesthetically pleasing, physically comfortable parking lots. Refer to Fig.9.17.

Fig. 9.17– Parking Lot Showing Essential Elements such as Landscaping and Lighting

9.9.1.1 Locate parking lots between and behind buildings to reduce the visual impact from the circulation system.

9.9.1.2 Locate parking lots on relatively level areas to avoid excessive cut and fill.

9.9.1.3 Design parking lots to be efficient in the design and placement of access drives and parking spaces. All drives providing direct access to parking spaces should provide spaces on both sides of the drive.

9.9.1.4 Provide planting areas at the ends of all rows of parking spaces. Provide islands with trees within the main parking lot to soften the visual expanse of the parking lot, provide shade and/or wind breaks (Fig. 9.18). These islands, as a rule, should occur every 10 to 12 parking spaces. Install vegetated swales or rain gardens in parking lot strips to mitigate the impact of storm water as well as providing green space within parking lots.

Fig. 9.18 – Trees Planted on Islands Provide Shade and Shelter

9.9.1.5 Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays.

9.9.1.6 Design parking lots to preserve significant existing trees. Provide a planting area around the tree that is large enough to allow water to the root system. Do not encroach upon the tree dripline. Refer to Fig. 9.19.

Fig. 9.19 – Parking Lot Showing Preservation of Existing Trees

9.9.1.7 On street parking along primary and some secondary streets should be avoided because it reduces the vehicular carrying capacity of the street, is visually unattractive, and is unsafe.

9.9.1.8 Parking lots should be paved with concrete, asphalt, or other paving material. Impervious or pervious materials may be used.

9.9.1.9 Parking structures, both below grade and above grade, provide for greater parking capacity in densely developed areas where available land is scarce. Parking structures are expensive,

but they provide a number of benefits including efficient land use, reduced visual impact and protection of vehicles from inclement weather. If parking structures are built they shall be designed to meet anti-terrorism requirements.

9.9.2 Parking Area Design Guide. A comprehensive parking area design guide that includes siting, parking area types, geometry (parallel, perpendicular, angled), access, and maintenance consideration is located at the following website: U. S. Air Force Landscape Design Guide, Section 14, Parking Areas.

9.9.3 Antiterrorism Setback Requirements.

Parking lots within a controlled perimeter shall be located a minimum of 10 meters (33 feet) from inhabited structures, and 25 meters (82 feet) from troop billeting and primary gathering structures. Parking lots without a controlled perimeter shall be located a minimum of 25 meters (82 feet) from inhabited structures, and 45 meters (148 feet) from troop billeting and primary gathering areas (UFC 4-010-01, Table B-1). Designated parking for family housing located within secured perimeters with access control is excluded from the 25-meter (82 feet) setback requirement.

9.10 SERVICE AREAS

Facilities that require pickup and deliveries should have a service area that allows for easy access to a loading dock exclusively for service vehicles. These areas should be designed to provide direct, easy access for vehicles (Figs. 9.20 and 9.21). They should be screened from public view to reduce negative visual impacts. Service areas shall meet all anti-terrorism requirements.

9.11 DROP-OFF AREAS

Facilities that include a high percentage of persons arriving by vehicle should include a vehicle drop-off area for users. Included are buildings such as headquarters, child development centers, schools, dining facilities, and clubs. Anti-terrorism standards state that the access drive must be clearly defined and marked and that their intended use is clear to prevent parking of vehicles in those areas and that drop-off lanes will not be located under any inhabited portion of a building (UCF 4-010-01, para B-1.4) It is recommended that physical barriers be used to define the area. These barriers may include curbing, planters, or other barriers together with signage to identify and restrict access. The driveway shall be configured so that vehicles can be restricted during times

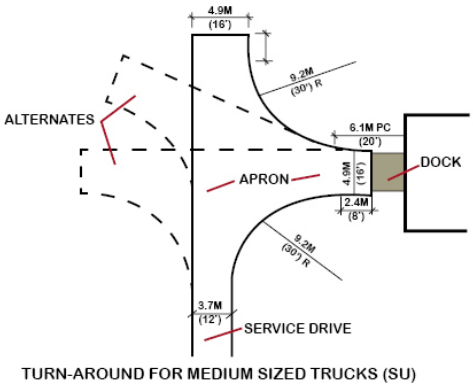

Fig. 9.20 - Typical Loading Area

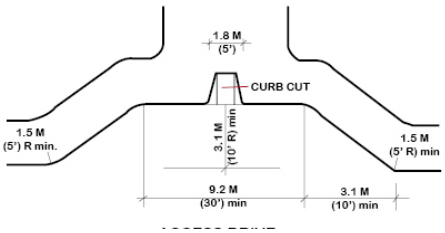

Fig. 9.21 - Typical Drop Off Area

of high alert. Access to the driveway shall be located outside the standoff area with the initial approach parallel to the building or a barrier must be directed to prevent direct vehicular movement toward the building.

9.12 WALKWAYS AND PEDESTRIAN CIRCULATION

Fig. 9.22 - Promote Means of Access other than Vehicular by Providing Walkways and Bikeways

9.12.1 Walkways provide connections for pedestrians between buildings and ancillary facilities such as parking lots and other areas. Well designed and located pedestrian walkways also provide a desirable alternative to total dependence on motor driven vehicles (Fig. 9.22).

9.12.2 The goal is to encourage the use of walkways as an alternative means of circulation. Pedestrian walkways should be designed and located to provide a comfortable, enjoyable experience for the user. The use of walkways within the installation promotes development sustainability by conserving energy, reducing air pollution, and decreasing the land requirement for parking. These walkways as well provide a means to increase physical fitness.

9.12.3 In order to achieve this goal the following objectives must be met:

- Provide walkways that are designed at a pedestrian scale to be comfortable and pleasant.
- Provide safe and secure pedestrian facilities that are separate from vehicular and railroad traffic.
- Provide amenities for pedestrians.
- Provide accessibility to all users, including physically impaired or challenged persons. All street and driveway crossings shall be ramped, marked and accessible to persons with disabilities in accordance with requirements of the UFAS. See the following UFAS paragraphs for the respective standards: Curb Ramps, paragraph 4.7; Ramps, paragraph 4.8; Stairs, paragraph 4.9 (Fig. 9.23).
- Provide links to major attractions and generators of pedestrian traffic.
- Provide design consistency throughout the walkway and be well drained.

Fig. 9.23 - Ramps must be Provided per UFAS Standards

9.12.4 Walkway Network Hierarchy. Sidewalks are classified to conform to the hierarchy roadway system; primary walkways, secondary walkways, and tertiary walkways. Non- roadway oriented sidewalks should be sized and placed where people will use them rather than creating worn "shortcut" paths. Railroad track crossing should be avoided, but where necessary, they should be well marked and have good line of sight. Walkways through railroad track ballast should be maintained with small, well-drained rock.

9.12.4.1 Primary Walkways.

9.12.4.1.1 Primary walkways (Fig. 9.24) should be placed along both sides of primary roadways, wherever possible, within the cantonment areas. These walkways are also used for high volume pedestrian routes to facilities and should be designed along axis lines relating to adjacent building entries, plazas, or streets. They should be paved with concrete, brick, or other pavers.

Fig. 9.24 – Primary Walkways

9.12.4.1.2 Primary walkways should be sized to accommodate anticipated pedestrian use. They should have a minimum width of 1.8 meters (6 feet), and a maximum width should be 3-3.5 meters (10-12 feet) in high use areas.

9.12.4.2 Secondary Walkways.

9.12.4.2.1 Secondary walkways (Fig. 9.25) should be provided along one or both sides of secondary and tertiary streets. They are designed to carry moderate volumes of pedestrians between activity centers and housing areas. They should provide access to building entrances, plaza areas, or streets. They should be paved with concrete, brick, or other pavers.

Fig. 9.25 – Secondary Walkway

9.12.4.2.2 These walkways should be sized to accommodate anticipated pedestrian use, but not less than 1.2 meters (4 feet), and a maximum of 3-3.5 meters (10 - 12 feet) in high use areas.

9.12.4.3 Tertiary Walkways.

9.12.4.3.1 Tertiary walkways (Fig. 9.26) provide pedestrian walkways in recreational and scenic areas for casual walking and hiking. They can be paved with concrete or bituminous asphalt or constructed with woodchips. The layout of the walkway should have a meandering and curvilinear alignment. Paved walkways should have a minimum width of 1.2 meters (4 feet). Wood chip trails should have a minimum width of 1 meter (3 feet) (Fig. 9.X). Where paths are designated for use by bicyclists and pedestrians,

Fig. 9.26 – Tertiary Walkway

these widths should be increased an additional three feet for each bike lane (Fig. 9-27).

9.12.5 Troop Running Trails.

Troop running trails should be provided for Soldiers both in and out of formation. The width should 4.5-5 meters (approximately 15 feet) to provide the width necessary for four Soldiers abreast with a cadence caller. Primary, secondary, and tertiary walkways can be designed to provide this function.

9.12.6 Troop Movement Paths.

In locations where troops need to move four (4) abreast; for example, troops marching in formation between classrooms, barracks/dinning hall facilities, a hard surface walkway of adequate width shall be provided.

9.12.7 Site Amenities at Walkways.

9.12.7.1 Utilize site furnishings to reinforce the walkway system hierarchy. Provide directional and informational signage where appropriate. Locate site furnishings, such as benches, tables, waste receptacles, drinking fountains, and signage in response to travel distance and traffic volume.

9.12.7.2 Site furnishings should be placed at regular intervals along walkways, parallel to the walk and facing the flow of pedestrian traffic (Fig. 9.28).

9.12.8 Landscaping at Walkways.

Use a combination of canopy and ornamental trees along sidewalks to provide shade, define the path, provide visual interest, and discourage the creation of "shortcuts". Utilize evergreen buffer plantings to screen harsh winds and undesirable views. Discourage the use of fruit bearing trees and shrubs along walkways because of threat of insects or other problems.

9.13 BIKEWAYS

9.13.1 The use of bicycles as alternatives to the automobile has become more acceptable to installation personnel. This trend is encouraged as a method of reducing the automobile vehicle trips within the installation and reduce the need for greater carrying capacity. Also, cycling is a popular recreation activity that is

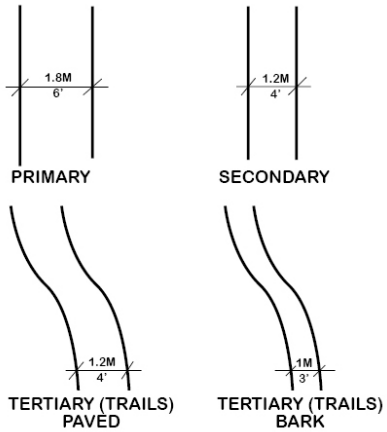

Fig. 9.27 – Minimum Walkway Widths

Fig. 9.28 – Utilize Site Furnishings to Reinforce the Walkway System Hierarchy

enhanced by the availability of a safe and well planned system of bike trails.

9.13.2 A bikeway system should provide direct routes between primary traffic and destination within the installation. This network should be continuous and minimize conflicts between bikes, pedestrians, and vehicles. Bikeways should be planned and designed according to the classifications that define the level of separation they maintain from roadways and walkways. The ideal solution for the development of bikeways is to physically separate them from both roadways and walkways.

9.13.3 Bikeways are designed according to the following classifications:

9.13.3.1 Class I Bikeway. A Class I Bikeway is intended for the exclusive use of bicycles. While it may parallel a roadway, it is physically separated by distance or a vertical barrier (Fig. 9.29). Class I Bikeway considerations include:

- A Class I Bikeway provides the safest and most efficient means of bicycle travel and is the preferred option for bikeway development.
- Crossing of a Class I Bikeway by pedestrians, train, or automobile should be minimized.
- If a Class I Bikeway does not closely parallel a roadway, it should be designed to provide appropriate bikeway gradient and curvature.
- Class I Bikeways require the greatest amount of space and advance planning to reserve land and assure appropriate routing.
- Railroad crossings should be well marked, with proper operating signals and clear sighting down the tracks. Road crossing transitions should be smooth and well drained.

9.13.3.2 Class II Bikeways. A Class II Bikeway shares the right-of-way with a roadway or walkway. It is indicated by a bikeway pictograph on the pavement and a continuous strip on the pavement or separated by a continuous or intermittent curb or other low barrier (Fig. 9.30). Class II Bikeway considerations include:

Fig. 9.29 - Class I Bikeway

Fig. 9.30 - Class II Bikeway

- Because some separation is provided for bicycle travel, a Class II Bikeway provides some level of safety for the bicyclist and pedestrian.

- While crossing by pedestrians or automobiles are discouraged, they are not as controllable as they are on a Class I Bikeway because the Class II Bikeway is adjacent to the walkway or roadway.

- Because Class II Bikeways are tied to the adjacent roadway or walkway, route selection is important to maintain appropriate bikeway gradient and curvature.

- Class II Bikeways generally require less space than Class I Bikeways because they follow the alignment of and share the right-of-way with a roadway or walkway.

9.13.3.3 Class III Bikeways. A Class III Bikeway shares the right-of-way with a roadway or walkway. It is not indicated by a continuous strip on the pavement or separated by any type of barrier, but it is identified as a bikeway with signs. Class III Bikeway considerations include:

- Because no separation is provided, there is a higher potential for safety conflicts between automobiles and bicycles and between bicycles and pedestrians.

- Class III Bikeways provide continuity within the bikeway network and designate preferred shared routes to minimize potential conflicts. To maintain safety for bicyclist and pedestrians, Class III Bikeways should be developed, if possible, only where automobile and pedestrian traffic is moderate to light.

- Because Class III Bikeways share the roadway or walkway, route selection is important to maintain appropriate bikeway gradients and curvature.

- Class III Bikeways require the least space because they share the pavement with a roadway or walkway.

9.13.4 General Guidelines.

9.13.4.1 Wherever possible, provide a designated right-of-way for bike traffic that is separate from vehicular and pedestrian routes.

9.13.4.2 Locate bikeway crossings away from vehicular intersections with crossings marked on the street pavement.

9.13.4.3 When separate bicycle right-of-ways are not feasible, designate bikeway lanes with paint on the right-hand side of roadways.

9.13.4.4 Bikeways should never share undesignated space with roadways except at crossings.

9.13.5 Bikeway Furnishings. Encourage use of the bicycle system by making trails visually attractive and providing pedestrian amenities in appropriate locations. Provide site furnishings such as benches, tables, waste receptacles, drinking fountains, and signage along paths. Location of these amenities should be in response to travel distance and traffic volume.

9.13.6 Bicycle Storage. Provide bicycle storage racks in areas that can be visually supervised and in close proximity to building entrances, high activity areas, major workplaces, and recreational facilities, while avoiding conflicts with pedestrian circulation. Bicycle storage areas shall be covered at barracks and easily accessible to building entrances (Fig. 9.31).

Fig. 9.31 – Covered Bicycle Storage

9.13.7 Landscaping. Use a combination of canopy and ornamental trees along bicycle paths for shade, route definition, and visual interest. Provide evergreen buffers to screen harsh winds and undesirable views.

9.13.8 Crosswalks. Provide crosswalks at all intersections of roads and walkways/bikeways. When laying out the crosswalk, consider the following:

- Extend walk's paving across the road in heavily used areas. Raised crosswalks eliminate the need for curb ramps in sidewalks.
- Provide a clear line of sight for motorist and pedestrians. Do not plant in sight lines. Walkways should meet the road at 90 degree angles (Fig 9.32).
- Adequate light should be provided.
- Provide barrier-free access at all intersections or used raised crosswalks.

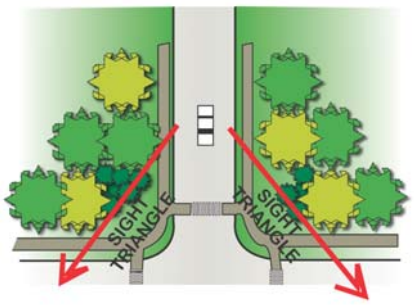

Fig.9.32 - Adequate Sight Lines Give Pedestrians an Unobstructed View of Crosswalks

9.13.9 Walkway and Bikeway Lighting Design. Roadway lights and building exterior lights can serve also as walkway and bikeway lights. Maximum use will be made of multi-purpose lighting systems. Paragraph 10.4 of Technical Manual (TM) 5-811-1, Electric Power Supply and Distribution directs the following walkway and bikeway lighting standards.

9.13.9.1 Intensities. Values are dependent upon whether walkways and bikeways are adjacent to roadways or are isolated from vehicular traffic.

9.13.9.1.1 Adjacent to Roadways. Walkways and bikeways will be illuminated to not less than one-half the maintained illumination required for adjacent roadways (Fig. 9.33). Areas having in grade, such as stairs and ramps, will require special treatment. Crosswalks in the middle of the block will be illuminated to 1.5 to 2 times the normal roadway lighting level.

Fig. 9.33 – Lighted Walkway Next to a Secondary Roadway

9.13.9.1.2 Remote from Roadways. Walkways and bikeways remote form roadways will have a minimum of 5 lux (0.5 foot-candle) average illumination measured in lo-foot levels. Pedestrian tunnels will have 40 lux (4.0 foot-candles), stairways will have 6 lux (0.6 foot-candles), and overpasses will have 3 lux (0.3 foot-candles) illumination (Fig. 9.34).

Fig. 9.34 – Example of a Lighted Walkway Remote from a Roadway

9.13.9.2 Walkway lighting. Vandal-resistant, lighted bollards are the preferred lighting method for walkways. Where pole mounted lights illuminate only walkways or bikeways, shorter poles are most suitable, but luminary height will not be less than 10 feet. Construction will be such as to minimize vandalism by use of break-resistant lenses, tamperproof screws, and sturdy poles.

9.13.10 Signs. The federal Manual of Uniform Traffic Control Devices (MUTCD) provides standards signs and markings for bicycle lanes and related bicycle facilities. See the MUTCD, Chapter 9 and any applicable amendments for traffic controls for bicycle facilities standards.

9.14 ARMY STANDARDS

9.14.1 The cited Army Standards shall be met.

- Army Regulation (AR) 420-72, *Transportation Infrastructure and Dams*
- Unified Facilities Criteria (UFC) *3-210-02, Privately Owned Vehicle (POV) Site Circulation and Parking*

- Unified Facilities Criteria (UFC) *3-230-18FA*, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas

- Unified Facilities Criteria (UFC) *3-260-02*, Design: Pavement Design for Airfields

- Unified Facilities Criteria (UFC) 4-860-01FA, *Railroad Design and Rehabilitation*

- Manual For Railway Engineering

- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings, latest edition*

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)

- Uniform Federal Accessibility Standards (UFAS)

- Manual of Uniform Traffic Control Devices (MUTCD)

9.15 REFERENCES

9.15.1 The following references are provided for guidance.

- U.S. Air Force, Landscape Design Guide, Parking Area

- U.S. Air Force, Landscape Design Guide, Walkways and Bikeways (Provides a comprehensive walkways and bikeways planning guide including sections on paving materials and gradients and curvature data).

- Chicago's Bike Lane Design Manual (Provides a comprehensive series of technical drawings and design specifications for bike lanes).

- Fort Lewis Design Standards http://designstandards.lewis.army.mil/

SECTION 10
LANDSCAPE DESIGN STANDARDS

10.1 INTRODUCTION

10.1.1 The Landscape Design Standards includes the selection, placement, and maintenance of plant material on the installation. Landscape plantings provide a simple and cost effective enhancement to the general appearance of the installation.

10.1.2 The visual image conveyed by a military installation is defined not just by architectural character and site organization, but also by an attractive, organized landscape design (Fig. 10.1). The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation and the general morale of Soldiers, their family members, civilian and contractor employees and visitors.

Fig. 10.1 – Landscape Design Creates an Attractive, Organized Element

10.1.3 Plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer winds, reinforce the hierarchy of the circulation system, or provide a visual transition between dissimilar land uses.

10.2 LANDSCAPE OBJECTIVES

10.2.1 The overall objective of the use of plant material within the installation is to improve the physical and psychological well being of the people who live and work on the installation. This is achieved through the following objectives:

10.2.1.1 Preserve existing natural ecosystem as much as possible.

10.2.1.2 Improve the overall visual quality of the installation through the use of native plant material where appropriate.

10.2.1.2.1 Blend the designed landscape with the natural environment and constructed structures.

10.2.1.2.2 Provide scale and comfort to pedestrian environments (Fig. 10.2).

Fig. 10.2 - Provide Comfort to Pedestrian Environment

10.2.1.2.3 Reinforce the hierarchy of the circulation system.

10.2.1.2.4 Screen unsightly views or elements.

10.2.1.2.5 Buffer incompatible land uses.

10.2.1.2.6 Minimize maintenance through the use of native and drought tolerant plants that require less maintenance and water to survive.

10.2.1.2.7 Adhere to anti-terrorism requirements and enhance those capabilities where appropriate.

10.2.1.2.8 Preserve and restore significant landscape features in the Fort Lewis Historic District. Integrate new construction within the Historic District in an historically appropriate manner. Promote sound historic preservation practices.

10.3 PRINCIPLES OF LANDSCAPE DEVELOPMENT

10.3.1 Landscape design is based on the following principles (Fig. 10.3).

Fig. 10.3 – Example of Landscaping Following the Principles of Development

10.3.1.1 Unity. The selection and placement of plant material can be used to blend, screen, and soften incompatible architectural or other unattractive visual impacts. Plant material as a unifying element can be placed in front of a building or view to frame and enhance the visual impact.

10.3.1.2 Balance. Plant material can be selected and placed to provide visual equilibrium or balance through the use of either a symmetrical or asymmetrical planting scheme. Symmetrical plantings are generally more formal while asymmetrical plantings are informal.

10.3.1.3 Contrast. Plant material can be selected and placed to provide differences in size and shape that add interest to the environment. Plants can be located to provide a backdrop for other plants such as a hedge behind a bed of annuals or perennials.

10.3.1.4 Rhythm. Repetition of a single plant or a mass of plants provides visual interest and formality to the landscape. Rhythm produces emphasis and unity and is especially effective in articulating main circulation routes.

10.3.1.5 Color and Texture. Plants can be selected and placed to provide visual interest according to their color and texture. Colors are classified as either warm (red, orange, yellow) or cool (violet, blue, green). Texture is classified as either coarse or fine.

10.3.1.6 Simplicity. Landscape plans should be broad and simple in form to limit excessive maintenance. Plant material should be grouped in beds with simple edges that are easy to mow. Small turf areas should be avoided because of the difficulty of mowing. The use of annuals should be minimal because of the high maintenance involved.

10.3.1.7 Ultimate Effect. The landscape plan should be prepared with consideration for the mature size of all plants. The spacing of all material should utilize nursery industrial standards for mature material to account for spread as well as height. The ultimate height of the material should also be considered in relation to windows and other visual concerns.

10.3.1.8 Spatial Articulation (Fig. 10.4). Plants can be selected and placed to create enclosed spaces or to separate spaces from one another. They can also be used to direct people by visually defining and reinforcing patterns of movement. The degree of enclosure, separation, or movement is dependent upon the density, form and type of plants used.

Fig.10. 4 – Spatial Articulation

10.4 SUSTAINABLE LANDSCAPE DEVELOPMENT

10.4.1 The use of plant material on the installation promotes the sustainability of the development and promotes the conservation of water resources. Trees, shrubs, groundcover, and vines provide aesthetic appeal as well as preservation of fauna and flora, energy conservation, climate modification, erosion control, air purification, and noise abatement (Fig.10.5).

Fig.10. 5 – Example of Sustainable Landscape Development

10.5 GENERAL LANDSCAPE DESIGN PRINCIPLES

10.5.1 Proposed plantings must be reviewed to ensure that site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements) are considered in the desired plant design and selection (i.e., form, texture, color, size). The uses and users of the site must also be

considered. Landscape planting plans should be approved by qualified personnel to provide quality assurance and promote design consistency within each visual zone.

10.5.2 The following paragraphs present landscaping guidelines for the various locations of plant material use:

10.5.2.1 Foundation Planting. Foundation planting provides a green background for additional plantings, adds scale and character to the building, helps to integrate the building with its surroundings, screens HVAC and other utilities, helps minimize soil loss by wind and surface runoff, and helps create a sense of arrival (Fig.10.6). When developing foundation planting plans consideration should be given to anti-terrorism measures (See paragraph 10.11).

Fig. 10.6 Foundation Planting Adds Scale and Character to a Building

10.5.2.1.1 Focal and seasonal plantings should be located at building entries for pedestrian interest.

10.5.2.1.2 Use the architecture of the building to evaluate the planting design and selection of plants.

10.5.2.1.3 Plant materials should not block windows and views from interior spaces, nor encroach into pedestrian space at sidewalks and at building entrances.

10.5.2.1.4 Trees shall be setback from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.

10.5.2.1.5 A symmetrical foundation planting design should be used for a symmetrical building.

10.5.2.1.6 Due to the possibility of insect problems (bee stings, etc.) do not plant flowering plants near entrances.

10.5.2.2 Screening.

10.5.2.2.1 Windscreens. Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds. Windbreak plantings should be irregular in form, rather than straight and evenly spaced, in order to provide more effective wind control and to visually blend with the natural character of the installation.

10.5.2.2.2 Screening of Dumpsters. Landscape planting should be used to supplement wood fence and masonry wall dumpster enclosures (Fig. 10.7).

Fig. 10 7 Example of Screening a Dumpster

10.5.2.3 Buffer Planting. Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones.

10.5.2.4 Open Space Planting. Enhance open space areas with planting. Use a mix of evergreen, deciduous, and ornamental trees. Plant the same kind of trees in massive groupings to impact the vast open areas (Fig. 10.8).

Fig. 10.8 - Enhance Open Spaces with Plantings

10.5.2.5 Street Trees. Street tree plantings should be used to reinforce vehicular hierarchy, orient and direct traffic, upgrade views, and to visually de-emphasize on-street parking. Separate plant species may be used to identify distinctive details or areas of the installation, for example, a particular land use relationship, historical district, community area, or other similar entity.

10.5.2.5.1 Use formal street trees in single rows to visually reinforce *primary and secondary* roads. Use regularly spaced and uniformly shaped deciduous trees to provide a regimented appearance.

10.5.2.5.2 Use informal groupings of street trees along *tertiary* routes. Utilize medium size deciduous trees to screen on-street parking along roadways. Set trees 1 to 2 meters (3 to 6 feet) from the back of curbs (Fig. 10.9). Spacing should be uniform, except where curb cuts interrupt regular spacing.

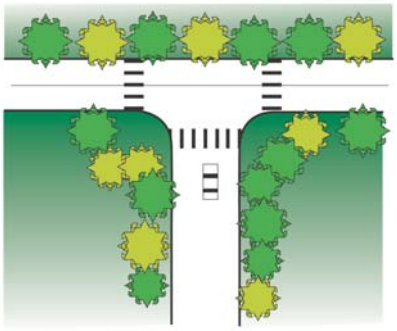

Fig. 10.9 – Informal Groupings Along a Tertiary Roadway

10.5.2.5.3 As a general rule, street trees should be deciduous species, resistant to root pressure, and should have an 10’ to 12’ (high) clearance between the street pavement and branch height at maturity to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches Planting strips, within which street trees are to be planted, should be wide enough (10’ to 12’ usually) to avoid tree roots from heaving up sidewalk sections or pushing out street curb sections.

10.5.2.5.4 The street tree layout should be coordinated with the layout of proposed street lighting.

10.5.2.5.5 Appropriate plant heights should be used within sight triangles to ensure safe views from intersections.

10.5.2.5.6 Weeping trees should not be used in locations where they may hang over the roadway or block views.

10.5.2.6 Parking Lot Planting. Parking lots are often the least attractive elements on a military installation. The use of landscape plant material and earth berms can greatly improve the appearance of these areas as well as help define circulation and reduce heat gain during summer months (Fig. 10.10).

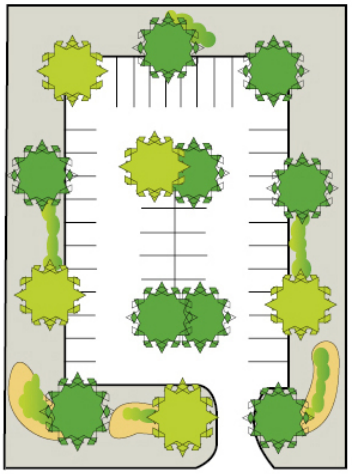

Fig. 10.10 - Provide Parking Lot Planting to Reduce Heat Gain

10.5.2.6.1 Use shade tree plantings at parking lots to reduce glare and moderate ambient air temperatures on the lot. Optimum spacing of parking lot shade trees is 10 to 12 meters (35 to 40 feet) on center.

10.5.2.6.2 Choose trees and shrubs that require minimum maintenance and will not litter the parking area with leaves, fruit, or nuts.

10.5.2.6.3 Consider sight distances near entrances and exits when selecting and placing plant material.

10.5.2.6.4 Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, and reduced water supply.

10.5.2.6.5 Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.

10.5.2.7 Environmental Control Planting. When properly placed, plants can provide environmental benefits, as well as address visual concerns.

10.5.2.7.1 Use deciduous trees and shrubs at courtyards, buildings and along streets to provide shade, moderate temperatures and reduce glare during the summer months while allowing solar exposure in the winter. (Fig. 10.11)

Fig. 10.11 - Use of Deciduous Trees and Shrubs Provide Shade and Moderate Temperatures

10.5.2.7.2 Locate deciduous plantings on the southeast and southwest corner of buildings or courtyards to mitigate solar radiation and glare due to heat build-up and lower sun angles in the mid-morning and late afternoon hours.

10.5.2.7.3 Use mixed massings of deciduous shrubs and evergreen trees and shrubs to provide sound control along primary and secondary roads.

10.5.2.8 Image Planting (Fig. 10.12). The image of the installation is formed by the visual impressions that exist within the installation. The primary locations of highly visible images are the main gate, along primary circulation systems, and at areas of high concentrations of people. Features such as signs, statues, static displays, and other primary visual images can be improved by the use of trees, shrubs, and ground cover.

Fig. 10.12 –Image Planting at the Main Gate Creates a Positive Visual Image

10.5.2.9 Entrances to the Installation. The entrances and streetscapes into the installation are areas to place landscaping that will develop a strong visual image and provide visual interest during all four seasons. The entrance to the installation creates the first visual impression for the visitor (Fig. 10.13).

Fig. 10.13 - Landscaping at Entrance Gates will Meet AT/FP Requirements

10.5.2.9.1 The landscape materials and planting areas should be proportional in scale to the hierarchy of the street on which they are located.

10.5.2.9.2 Landscaping must be integrated with the Force Protection requirements of Section 12. Low shrubs, groundcover, annual/perennial plants and canopy trees provide seasonal interest as well as maintain views required to ensure force protection measures. Large evergreen trees are discouraged in these locations because they may obstruct sightlines and impact the need for force protection. Adequate lines of sight must be maintained for guard personnel to observe vehicular and pedestrian traffic approaching the gate.

10.5.2.10 Xeriscaping and LEED Water Conservation Measures. Xeriscape is the conservation of water and energy through creative and adaptive landscape design. Xeriscape landscapes provide attractive solutions that save money, water, and maintenance. To conserve water and lower maintenance, use xeriscaping and LEED water conservation methods such as the use of drought tolerant plantings, minimizing turf areas, and designing water efficient irrigation systems. The following website provides guidance on specific design principles of the xeriscape design process and xeriscape design application:

- USAF Landscape Design Guide, Xeriscape.

10.6 PLANT MATERIAL SELECTION

10.6.1 Trees, shrubs, ground cover and turf are the major elements of a planting composition. Basic plant selection criteria should consider creating a unified composition utilizing native materials for low maintenance and sustainability, avoiding

incompatible colors, textures and forms, and matching the appropriate plant to the land use, situation, and environmental condition.

10.6.2 The ability of plant material to provide lasting benefit is dependent upon the plant's hardiness and its appropriateness to the site use. Major factors affecting plant hardiness are soil type and organic content, temperature, moisture and light. These climatic conditions can be modified to an extent by specific site conditions, such as wind protection, solar orientation, and planting design, to create microclimates.

10.6.3 Selecting appropriate plants for a given condition is only one aspect of planting design. Compositional arrangement to provide texture variety and to accent site and building features is another. The selection and composition of a planting design requires an understanding of each plant's characteristics, form, and environmental needs as well as how each plant can relate to and complement other plants in the design. Plants are used in four basic design categories (Fig 10.14):

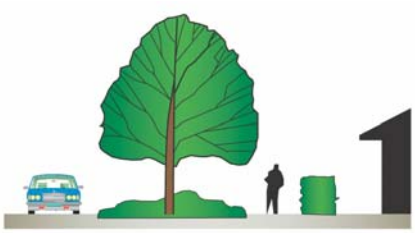

Fig. 10.14–Example Showing Canopy, Barrier, Screen & Groundcover

- Canopy
- Barrier
- Screen (or Baffle)
- Groundcover

10.7 PLANT PALETTE AND PLANT CATEGORIES

10.7.1 The plant palette and categories are designed to help the designer choose the best plant for each particular set of design requirements. The plants that appear on the palette and in the categories were selected for their hardiness and their ability to survive in this geographical area. To use them effectively, the design requirements must be well defined for the specific site.

10.7.2 The Plant Palette. Refer to Appendix O for the Plant Palette using selected plants from the geographical area designated for Fort Lewis.

10.7.2.1 A select group of plant materials has been divided into the following six categories:

- Deciduous trees – Have leaves that turn color in the autumn and shed them before the cold season. New leaves appear in the spring.

- Coniferous trees – Have needles rather than leaves and may bear cones for seeds. They usually stay green year round.

- Deciduous shrubs - Have leaves that turn color in the autumn and shed them before the cold season. New leaves appear in the spring.

- Coniferous shrubs - Have needles rather than leaves and may bear cones for seeds. They usually stay green year round. Make excellent borders.

- Broadleaf evergreen shrubs - With their year-round foliage, evergreen shrubs are the preferred bushes for borders. Needle bearing evergreen shrubs are useful in hedges. Also included the same category is the "broadleaf" evergreen shrub that produces flowering or berries.

- Groundcover and vines – A low growing dense growth plant that is used for ornamental reasons or to prevent soil erosion in areas where turf is difficult to grow.

10.7.2.2 On the palette, the plants appear in alphabetical order by their botanical name, followed by their common name, design characteristics, cultural information, recommended use, and miscellaneous notes. The plant palette is presented in a matrix format in Appendix O.

10.7.3 The Plant Categories.

10.7.3.1 Plants from the plant palette with similar characteristics have been cataloged in the Plant Categories. These characteristics could be cultural (e.g., upright, narrow form), environmental (e.g., shade tolerant), ornamental (e.g., red fall color), or functional (e.g., screening plant). Characteristics include: Cultural Conditions (mature height and spread, form and growth rate, disease and pest resistance), Environmental Conditions (sun/shade, pH range, soil moisture required, and wind/sun), and Ornamental Characteristics (flower color, autumn color, fruit color, and/or summer leaf color).

10.7.3.2 Each category describes a list of plants that share a similar quality. For example, materials that are shade tolerant

would be placed in the Shade Tolerant group under the "Environmental Conditions" heading. To further explain the Categories, under the "Environmental Conditions" heading, in the Shade Tolerant group, all shade tolerant deciduous trees would be listed under “Deciduous Trees"; all shade tolerant Coniferous trees would be listed under "Coniferous Trees"; and so on.

10.8 PLANT MATERIAL INSTALLATION

10.8.1 A key step in assuring successful planting is to select plants of the highest quality. Plant material should be of the size, genus, species and variety to comply with the recommendations and requirements of the "American Standard for Nursery Stock" ANSI Z60.1.

10.8.2 As part of the design process and prior to plant installation, review the installation's Master Plans, Basic Information Maps, or As-Built Drawings for utility locations and verify with the Directorate of Public Works or equivalent.

10.8.3 The planting and establishment of trees, shrubs, ground covers and vines is detailed in the Unified Facilities Criteria (UFC) 3-210-05FA, Landscape Design and Planting.

10.8.4 General Guidelines for Plant Installation

10.8.4.1 At planting time, thin out plants by removing one-third of the vegetative material.

10.8.4.2 Spray all evergreens with an anti-desiccant within 24 hours of planting.

10.8.4.3 Water all plants thoroughly during the first 24-hour period after planting.

10.8.4.4 All site plants and stakes to be plumb.

10.8.4.5 Space plants according to their mature size. Plants should not be planted too close nor too far apart.

10.8.4.6 Install plant materials in groups for greater impact (Fig. 10.15).

10.8.4.7 Installation of Lawn Areas.

10.8.4.8 Installation techniques for turf are detailed in Unified Facilities Criteria (UFC) *3-210-05FA*, Design: Landscape Design and Planting Criteria, Chapter 4. The details include site

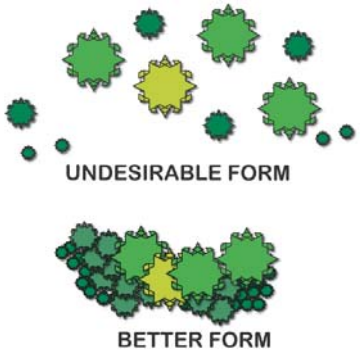

Fig. 10.15 – Grouped Plants Have Greater Impact

evaluation, site preparation, selection of turf and maintenance requirements.

10.8.4.9 Refer to the Landscape Section for the Fort Lewis Design Standards (Fort Lewis Public Works-Design Standards) for Post specific requirements.

10.9 LANDSCAPE MAINTENANCE SCHEDULE

Landscape Maintenance Schedule. The general objective of a landscape maintenance schedule is to ensure an orderly and efficient care of the grounds. The landscape maintenance schedule included in the Fort Lewis Installation Design Guide (See Appendix F) identifies times throughout the year when specified maintenance should be undertaken. Use of the landscape maintenance schedule will improve all aspects of landscape on the installation. Materials and supplies can be ordered in a timely fashion, manpower needs can be calculated and anticipated, and a correlation between the level of maintenance and appropriate cost can be derived. Refer to Fig. 10.16.

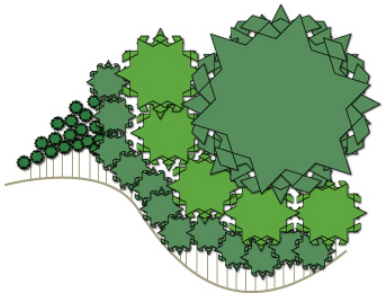

Fig. 10.16 – Group Plants in Mulched Beds to Reduce Maintenance

10.10 TREE PROTECTION AND PRESERVATION

10.10.1 Existing urban trees and forest shall be preserved if they are in good health. Plan construction to provide for the preservation of significant trees.

10.10.2 During the clearing and construction process, trees should be protected from damage. Construction barricades should be erected to protect the existing trees to be preserved. The barricades should be no closer to the trunk of the tree than the distance from the trunk to the drip line. Existing trees that cannot be preserved should be considered for transplanting to a different location on site or to a different site.

10.10.3 Changes in the grade of the soil around trees can cause extensive root damage and eventually death of the tree. To prevent damage to the tree, it is important to maintain the existing grade for at least the size of the trees canopy (the drip line) (Fig. 10.17).

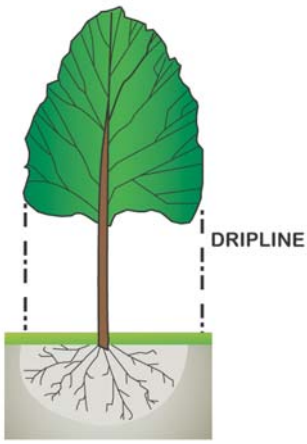

Fig 10.17 - Construct a Barrier at Drip Line During Construction to Maintain Grade

10.11 ANTI-TERRORISM/FORCE PROTECTION CONSIDERATIONS

10.11.1 The presence of vegetation on an installation can have both beneficial and detrimental impacts on security. The selection and placement of landscape plant material on Army installations is

an integral element in the provision of protective measures to reduce the threat of terrorism.

10.11.2 Proper selection and placement of trees and shrubs can be utilized to provide visual screening without creating concealment for covert activity. The landscape architect responsible for tree placement should work closely with installation force protection experts to design a landscape plan that provides visual screening without compromising anti-terrorism measures.

10.11.3 The plant material must allow building occupants to see out, but must not allow outside forces to monitor interior activity. The landscape architect should incorporate the following aspects into the design:

- Avoid conditions within 10 meters (33 feet) of inhabited structures that permit concealment of aggressors or obscure the view of objects or packages 150-millimeters (6 inches) in height from the view of security personnel. This results in the placement of shrubs and trees that are loose rather than dense in growth habit and possess multiple small stems rather than a single trunk that will obscure a 150 mm (6 inch) package.

- Vegetation groupings provide reduction of blast effect.

- Plant material selection and placement shall minimize potential hiding places for bombs and aggressors.

- Provide vegetation screens for play areas and outdoor recreation areas to obscure from off-installation view.

- Use trees to obscure sight lines of on-installation buildings from off-installation buildings (Fig. 10.18).

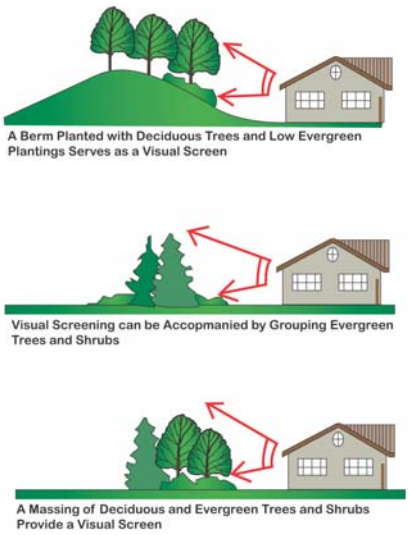

Fig. 10.18 – Use Trees to Obscure Sight Lines

10.12 LANDSCAPE DESIGN GUIDELINES

10.12.1 Landscape Setbacks.

10.12.1.1 Purpose. To provide a strong continuity and enhancement along the installation's rights-of-way, with an emphasis on trees.

10.12.1.2 Design Guideline. Provide minimum landscaped setbacks in all areas and land use zones in accordance with the following standards.

10.12.1.3 Minimum Depth of setbacks for Road Classifications.

- Adjacent to primary roads, expressways or freeways: 35'
- Adjacent to secondary roads or minor arterials: 30'
- Adjacent to any tertiary road or street: 20'
- Adjacent to a non-street boundary of a land use zone district: No minimum depth requirement; however, provision must be made for required "non-street boundary" trees discussed in this guideline. Also, additional buffer areas may be required by Landscape Guideline 2.

10.12.1.4 Minimum number of trees required in setbacks.

- Adjacent to a major arterial, primary roads, expressway, or freeways: a minimum of one (1) tree for every twenty feet (20') of frontage of the project or area within the zone.
- Adjacent to a secondary road or minor arterial: a minimum of one (1) tree for every twenty-five feet (25') of frontage of the project or area with the zone.
- Adjacent to any tertiary street: a minimum of one (1) tree for every thirty feet (30') of frontage of the project or area within the zone district.
- Adjacent to any non-street (interior) boundary: a minimum of one (1) tree for every thirty feet (30') of non-street (interior) boundary of the project or area. These trees do not need to be located in a landscaped setback of a minimum size but shall be in planters of sufficient size and design to accommodate the growth of the trees and to prevent damage to the trees by vehicles.

These required landscaped setback and boundary trees may be clustered along a particular frontage or boundary.

The required landscaped setback trees may be located in a landscaped setback with a depth greater than the minimum required depth; however, in any case the required trees shall be located within sixty feet (60') of the street curb line. The required

boundary trees shall be located within fifty feet (50') of the non-street (interior) boundary.

Walls and fences which are twenty-five percent (25%) or more opaque in design shall be no higher than three feet (3') above finish grade in a required landscaped setback. Opaque walls and fences higher than three feet (3') (such as noise barriers) must be located outside of the landscaped setback to maintain a landscaped appearance along the street.

10.12.1.5 Implementation Policies.

10.12.1.5.1 Flexibility. The need for flexibility is recognized in the development of some relatively small sites. On a site with a net size (excluding adjacent streets) of less than one (1) acre, the landscaped setback may be approved at less than required depth up to one-half (1/2) of the street frontage if the average depth of the landscaped setback complies with the required depth. This type of relief may allow for a desirable pedestrian-oriented space in lieu of a relatively short and narrow landscaped strip on a relatively small lot where site planning options are significantly limited.

10.12.1.5.2 Retaining Walls. Relief may be granted for retaining walls higher than three feet (3') in a required landscaped setback where special grading conditions exist. Such retaining walls shall be visually softened by plantings of trees and shrubs.

10.12.1.5.3 Sidewalks. Sidewalks may be permitted "meander" into a required landscaped setback area if landscaping is provided and maintained to adequately compensate for the loss of landscaping in the setback area.

10.12.1.5.4 Parking Areas and Driveways. Parking areas shall not be located in the setback areas except in single or double unit detached family housing areas. Driveways may cross the required setbacks to provide access for off-street parking areas.

10.12.1.5.5 Measurements. Landscape setback minimum depths shall be measured perpendicular to the street from the edge of existing pavement (or that proposed on current master plan if greater).

10.12.2 Landscape Buffers.

10.12.2.1 Purpose. To screen and buffer higher intensity and/or objectionable land uses from lower-intensity uses. Other purposes of this guideline are to increase the visual awareness of zone edges

and neighborhood areas and to emphasize the distinct functional zones of Ft. Lewis.

10.12.2.2 Design Guideline. Buffer between non-residential and residential projects or areas separated by a secondary or tertiary street.

10.12.2.2.1 Where required - Such a buffer is required along the street side frontage in any zone district where such a project or area is separated from a residential project or area by a secondary or tertiary street. For the purposes of this guideline, residential uses shall include family housing, officer housing and troop housing. Secondary and tertiary streets are those designated as such in the current master plan documents.

10.12.2.2.2 Design Standard - Such a buffer shall comply with all requirements previously established for landscape buffers with these exceptions:

- Such a buffer shall also include an opaque structure with a minimum height of six feet (6') along the common boundary line.

- This type of buffer does not require a minimum percentage of ground covering by living materials that shall consist of bark, wood chips, rock, stone or similar materials.

10.12.2.3 Implementation Policies. It is recognized that the actual uses of land may vary greatly along a required buffer. Service docks, fronts of commercial buildings, parking areas or landscaped areas may face housing entries, private patios, parking areas or landscaped areas of a residential project. A variance of the minimum standards of the buffer may be approved to reflect the varying interface of the adjacent uses. For example, the required opaque structure may not be required between two landscaped spaces if plant materials are correspondingly increased.

10.12.3 Parking Lot Screening

10.12.3.1 Purpose. To screen parked cars from view from rights-of-way and adjacent uses.

10.12.3.2 Design Guideline. When possible, existing tree groupings shall be retained in parking areas. Trees planted around the perimeter of the parking area are useful in screening the view of parked cars from upper building levels. Open parking spaces,

except in one-family and two-family residential projects, shall be screened from view from adjacent projects, complexes and streets to an eventual minimum height of three (3') feet by the use of berms and/or plantings (Fig 10.19). A minimum of two-thirds (2/3) of the affected street frontage on project or complex boundary not counting intersecting drive ways must have the required screen.

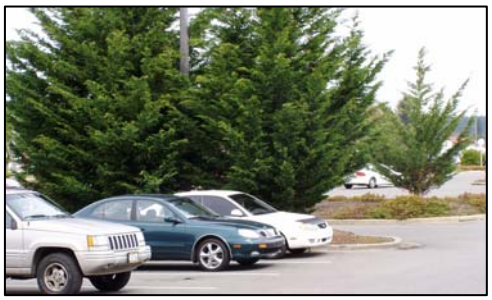

Fig. 10.19 – Trees Used to Screen Parking Lot

10.12.3.2.1 With prior approval from PW, decorative walls or fences may be used as an alternative method of screening if:

- The structures avoid a blank and monotonous appearance by such means as architectural articulation and/or the planting of vines, shrubs or trees
- The total use of berms and/or plantings is not physically feasible
- The structures attractively complement the use of berms and/or plantings

10.12.3.3 Implementation Policies.

10.12.3.3.1 Parking Lot. The shrubs used as parking lot screening shall substantially conform to the types, sizes and spacings provided in the Landscape Design Analysis.

10.12.3.3.2 Reference Elevation. In general, the reference elevation for the base of the required screen shall be the surface of the parking area that is to be screened.

10.12.3.3.3 Grades. The following maximum acceptable grades for screening parking lots shall be:

- Sodded berms: 3:1 (3 feet horizontal: 1 foot vertical).
- Planting beds: 2:1 (2 feet horizontal: 1 foot vertical).

These standards may be applied to other planting area, as well.

Fig. 10.20 – Natural Settings Eliminate the Visual Harshness

10.12.4 Parking Lot Trees

10.12.4.1 Purpose. To eliminate the visual harshness within parking areas, to provide a minimum quantity of plant materials within developed areas and to prevent parked automobiles from dominating the visual environment of adjacent activities. (Fig. 10.20)

10.12.4.2 Design Guideline. Provide a minimum of one (1) tree, of a type suitable for parking lots, for every fifteen (15) open air vehicular parking spaces in parking lots with fifteen (15) or more stalls. The required trees may be clustered but shall be located to divide and break up expanses of paving and long rows of parking stalls and to create a canopy effect in parking lots. Trees must be located in planters that are bounded on at least three sides by parking lot paving to be considered within the parking lot paving to be considered within the "parking lot".

This means that only trees within landscaped "islands" or "fingers" can be counted toward the parking lot tree requirement. Tree planters shall be of sufficient size and design to accommodate the eventual maximum growth of the trees and to prevent damage to the trees by maneuvering vehicles (Fig 10.21).

Fig. 10.21 – Landscaped Islands in Parking Lot

10.12.4.3 Implementation Policies.

10.12.4.3.1 Tree Types. It is recognized that trees in addition to those discussed may be approved for use in parking lots if special conditions exist. For example:

- A relatively small proportion of deciduous ornamental trees may be approved if a ratio of trees to parking spaces is greater than the minimum provided.

- Coniferous evergreen trees may be approved if such trees are planted in areas exceeding the minimum planter sizes and if vehicular visibility is not a problem.

10.12.4.3.2 Tree Location. The required parking lot trees shall be located within the "parking lot area" which is essentially where vehicles park and maneuver and excludes other landscaping areas.

10.12.4.3.3 Beneficial Impact. It is understood that parking lot trees have the greatest beneficial impact in relatively large parking lots, such as those in the Community Area. Relatively small parking lots (a maximum of thirty (30) parking stalls with one aisle) may not significantly benefit from trees within the parking lot area. Relief from this guideline may be obtained in special small lot cases; however, the required trees shall be placed adjacent to the parking lot area, in conjunction with other required plant materials and trees, to provide visual relief and shading.

10.12.5 "Internal" Landscaping

10.12.5.1 Purpose. To augment the "boundary" landscaping requirements (such as landscaped setbacks and buffers) and parking lot landscaping requirements, to visually soften the mass of buildings and to visually separate building areas from parking areas.

10.12.5.2 Design Guidelines. Flexibility in the design of landscaping is needed because of the diversity of building designs and the possible limitations on plant selections due to building foundation problems caused by the root growth of some trees.

10.12.5.2.1 Standards for the minimum internal landscaping area and minimum number of trees.

- Location of the minimum area to be credited toward the minimum internal landscaping area requirement, a landscaping area shall be located as follows:
    - Adjacent to those building elevations which form the major public views of the project from adjacent streets and properties and to the users of the project
    - Within a plaza or courtyard between buildings or portions of buildings
    - In a space provided to separate building areas from parking areas
    - In a similar location which substantially conforms to the stated purpose of the required internal landscaping area (see above), if approved.
- The minimum internal landscaping area and its minimum number of trees may not consist of spaces or trees which are proposed to meet the minimum requirements of other sections of this Chapter--such as landscaped setbacks, buffers or parking lot trees (Fig. 10.22).
- The minimum required internal landscaping area shall consist of a minimum of fifty percent (50%) in ground covering by living grass or other plant materials. This percentage provides flexibility where plants and their irrigation should be limited next to building foundations.

Fig. 10.22– Trees Creating an Internal Landscaping Element

- The intent of the internal landscaping area is to provide relief from structures and hard surfaces in a project through the use of plantings. Therefore, sidewalks which provide basic pedestrian circulation only shall not be credited toward the minimum internal landscaping area requirements. Paved plazas may be credited to a maximum of 50% of the required internal landscaping area if such plazas have trees which provide visual relief to those building elevations which form the major public views of the project.

To provide for flexibility of design in the minimum internal landscaping area, the designers may select the types of, and the planting spaces between, the required trees. The planting spacing should allow for the growth of the trees without adversely affecting the maintenance of structures, walks or drives.

10.12.6 Living Ground Cover

10.12.6.1 Purpose. To insure the presence of attractive, beneficial landscaping around all Ft. Lewis's facilities.

10.12.6.2 Design Guideline. Unless otherwise specified, any required landscape area-such as a "minimum landscaped setback"-shall consist of a minimum of seventy-five percent (75%) in ground covering by living grass or other plant materials. The foliage crown of trees shall not be used in the seventy-five percent (75%) or other required percentage calculation. The remaining twenty-five percent (25%) of the required landscape area may be covered with bark, wood chips, rock, stone, or other similar materials as approved.

10.12.6.3 Implementation Policies.

10.12.6.3.1 Living Materials. Planting of shrubs and ground covers to be considered "ground cover of living materials" shall substantially comply with the planting sizes and spacings shown in Appendix O, Plant Palette.

10.12.6.3.2 Spacing. The spacing between two plants with different spacing requirements shall be an approximate average of the two spacing requirements.

10.12.7 Irrigation

10.12.7.1 Purpose. Since the necessity, appropriateness and advantages of irrigation have been explained earlier in this report,

the purpose of this section is to explain the type of equipment and methods to be used to irrigate the required landscape areas.

10.12.7.2 Design Guideline. Proposed types of irrigation should be similar to the following:

10.12.7.2.1 Native grass. May germinate with normal precipitation if planted in early fall or early spring. Insure sufficient moisture; use drought tolerant species.

10.12.7.2.2 Ground covers, shrubs and trees native to the general Fort Lewis area or are drought tolerant may establish with normal precipitation but will most likely need temporary irrigation for one or two summers until established. Possible solutions:

- Small accessible areas may be hand watered.
- Drip irrigation system, plants gradually weaned off system.
- Overhead temporary system.
- Plantings should favor drought tolerant species.

10.12.7.2.3 Ground covers, shrubs and trees native to the Puget Sound region. Temporary or permanent irrigation system. Possible solutions:

- Drip irrigation system. Plants gradually weaned off system.
- Permanent irrigation system.
- Plantings should be drought tolerant.

10.12.7.2.4 Ground covers, shrubs and trees not native to the Puget Sound region. Spring through fall. Possible solutions:

- Drip irrigation system.
- Permanent irrigation system.
- Plantings should be drought tolerant

10.12.7.2.5 Sod. Spring through fall. Permanent irrigation system.

10.13 ARMY STANDARDS

10.13.1 The cited Army Standards shall be met.

- Unified Facilities Criteria (UFC) *3-210-05FA*, Landscape Design and Planting
- Technical Manual (TM) 5-630, *Natural Resources Land Management*
- American Standard for Nursery Stock, ANSI Z60.1
- Overseas (Host Nation Standards)

10.14 REFERENCES

10.14.1 The following references are provided for guidance.

- USAF Landscape Design Guide
- C. Brickell and D. Joyce. Pruning and Training, 1996.
- Landscape Development Plan (Volume II), Fort Lewis, Washington, March 30, 1996. U.S. Army Corps of Engineers, Seattle District (Primarily for Historic District)

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Go to Section 11
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SECTION 11
SITE ELEMENTS DESIGN STANDARDS

Site Furnishings

Signs

Lighting

Utilities

Fig. 11.1 – Site Elements

11.1 INTRODUCTION

11.1.1 Site elements include all visual elements of the installation that are considered utilitarian in use (Fig. 11.1). These elements include the following four categories of utilitarian amenities:

- Site Furnishings
- Signs
- Lighting
- Utilities

11.1.2 The four sub-components provide dominant visual impacts within the installation. The specific site element features and equipment should, to the extent possible, reflect the local or regional design standards. This allows for ease of maintenance and blending into the local community. The four sub-components and their visual impacts are discussed in detail in this chapter.

11.2 SITE ELEMENT OBJECTIVES

11.2.1 The site element plans for existing and future installation use should be prepared and the site elements selected to enhance the sustainability of the installation. To this end, site elements should meet the following objectives:

11.2.1.1 Provide site elements that are appropriate to their intended function.

11.2.1.2 Establish a coordinated system of site elements that provide consistency and continuity throughout the installation to convey a sense of organization.

11.2.1.3 The design and location of the various site elements should express an image, character, and scale appropriate to the installation.

11.2.1.4 Design and locate all site elements to meet AT/FP requirements.

11.2.1.5 Use recycled/salvaged materials wherever possible.

11.2.1.6 Minimize maintenance and repair through the use of efficient products that are vandal-proof.

11.2.1.7 Minimize negative visual impacts of all utility systems (Fig. 11.2).

11.2.1.8 Minimize environmental impacts of all utility systems.

Fig. 11.2 - Planted Screen Minimizes Negative Visual Impact

11.3 SITE FURNISHINGS

11.3.1 Site furnishings include all of the utilitarian outdoor amenities found on an installation. These outdoor furnishings should be located in coordinated clusters to provide areas of multi-furnishing amenities and avoid the haphazard proliferation of furniture elements around the installation (Fig. 11.3). All furnishings shall be accessible to, and usable by, persons with disabilities, in accordance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS) http://www.ccb.org/ufgs/ufgs.htm, with the most stringent standards to apply in the event of conflicts.

Fig. 11.3 – Outdoor Furnishing Should be Formed into Coordinated Clusters

11.3.2 Site furnishings include the following:

- Seating
- Tables
- Telephone Booths

- Shelters
- Kiosks
- Walls and Fences
- Trash Receptacles
- Dumpsters
- Flagpoles
- Movable Planters
- Bicycle Racks
- Tree Grates
- Bollards
- Play Equipment
- Mailboxes
- Monuments, Memorials, Military Equipment Static Displays
- Drinking Fountains

Fig. 11.4 - Planter Serves as Bench

Fig. 11.5 – Benches at Pedestrian Node in Courtyard

11.3.3 Seating. Seating includes benches and walls, as well as tables and movable chairs (Fig. 11.4).

11.3.3.1 Benches.

11.3.3.1.1 Bench Location. Benches should be located in areas of high pedestrian use, and arranged to encourage socialization within a pleasant outdoor setting. This includes pedestrian nodes along primary walkways, at major building entryways, courtyards and at bus stops (Fig. 11.5).

Fig. 11.6 – Concrete Seating Wall. Tables Well Oriented for Relaxing and Socializing

11.3.3.1.2 Bench Siting. Benches should be sited on concrete pads adjacent to walkways. Provide proper clearance around benches, a minimum 2’0” setback from adjacent sidewalks and a minimum of 5’0” between front of bench and any stationary obstacle. Provide appropriate planting treatment for visual definition and seasonal shade.

11.3.3.1.3 Bench Design.

11.3.3.1.3.1 Wood Benches. Wood benches with backs are appropriate for the informal gathering, resting, eating and waiting uses characteristic of the community facility areas. Benches should be a contoured style, constructed of 2 1/2” x 2 1/2" Redwood, Alaskan Yellow Cedar or dark brown recycled plastic members. Standard bench size should be 6'-0" long. Metal support base should have a dark brown factory finish to match standard trim color. Bench dimensions should meet specifications presented in the Technical Manual (TM) 5-803-5, *Installation Design Manual*, Fig. 2.5, page 8. Wall mounted benches should be similar in style and color to free standing benches.

11.3.3.2 Seating Walls.

11.3.3.2.1 Seating Walls Location. Wherever possible, seating should be incorporated into planter boxes or retaining walls, particularly at building entrance area. Seating walls should be integrated into the overall area design and the pedestrian circulation system.

11.3.3.2.2 Seating Wall Design. Seating walls should generally be between 18” and 22” high, and 12” to 18” wide and constructed of textured concrete or brick in a manner to complement or match the materials of the adjacent buildings (Fig. 11.6).

11.3.3.3 Tables. Locate tables together with seating that is oriented to the user needs of socializing, relaxing, or eating in less formal spaces with a pleasant setting and attractive view.

11.3.3.3.1 Table Location. Small groupings of tables in high visibility areas should be placed within proximity of recreation or food service facilities. These groupings should be located on hard pavement areas adjacent to walkways. Pavement should be constructed of exposed aggregate or broom finish concrete. Incorporate tree plantings and overhead trellis structures within these areas to provide shade and spatial definition (Fig. 11.7).

Fig. 11.7 - Trellis and Vines Provide Haven

11.3.4 Telephone Booths. Telephone booths should be incorporated into building architecture, utilizing building recesses and overhangs, or integrated into bus or other shelters. Provide a minimum 3’0” clearance between booths and the edge of walkways. All service line wiring should be underground or concealed. Booths should be equipped with lighting for nighttime use. In sheltered areas, use standard wall-mounted phone enclosures.

11.3.5 Shelters.

11.3.5.1 There are many different types of shelters on military installations. Shelters are provided for those waiting for buses, and in areas where people congregate to socialize or eat such as in courtyards or picnic areas.

11.3.5.1.1 Bus Shelters.

11.3.5.1.1.1 Bus Shelter Location. Bus shelters should be located at major facilities along the bus route such as Commissary/Post Exchange areas, barracks areas, Hospital, and Library. Siting for the shelters should be coordinated with the Public Works Planning Division. Bus stops should relate to major pedestrian walkways, and be placed on concrete pads. Provide a minimum 3’0” clearance between shelters and the edge of walks.

11.3.5.1.1.2 Bus Shelter Design. Bus shelters should provide protection from wind, rain, and sun with an overhead roof with enclosure on three sides. Side enclosures should be a transparent, unbreakable type material to allow for adequate visibility. Bus shelter design typically should be simple and consistent throughout the post, matching the existing units in terms of materials, scale, and detail. Shelter design should have similar character as that for kiosks and vending machine shelters. Bus shelters should have a minimum size of 5' by 8' with a minimum height of 6’-6" from floor to underside of roof. The shelters should include an integral bench, trash receptacle, and ashtray.

11.3.5.1.2 Picnic Shelters.

11.3.5.1.2.1 Picnic Shelter Location. Picnic shelters should be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the installation.

11.3.5.1.2.2 Picnic Shelter Design. Picnic shelters can be open on all sides. The minimum size should be 20 feet square with a minimum 8-foot vertical clearance (Fig. 11.8).

Fig. 11.8 – Picnic Shelter

11.3.6 Kiosks

11.3.6.1 Kiosks Location.

Kiosks can be used as information centers at pedestrian nodes within the town center. Provide kiosks only where they are needed on a concrete base adjacent to walkways. Allow a minimum of 3’ clearance on all sides.

11.3.6.2 Kiosks Design.

Kiosk design should blend compatibly with other site furnishings and with the architectural character of the zone in terms of form, scale, and materials. A similar design treatment should be established for kiosks and shelters.

11.3.7 Walls and Fences.

11.3.7.1 Location and Use.

Walls and fencing should be used to provide visual screening, define pedestrian plaza areas, wind screening, pedestrian and vehicular control, security, and to retain soil. The design of walls and fences should fulfill their function in harmony with the character and appearance of their setting. The design and location of fences and walls shall also conform to the latest requirements of the Department of Defense anti-terrorism / force protection criteria.

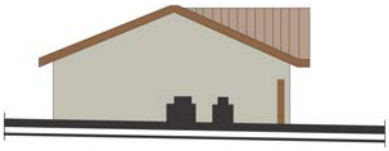

Fig. 11.9 - Screen Wall Hides Mechanical Equipment

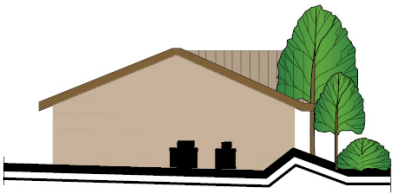

Fig. 11.10 - Berm and Shrubs Hide Mechanical Equipment

11.3.7.2 Walls.

Low walls should be used to define pedestrian court areas and provide informal seating. Screening walls can be used where appropriate to screen building service areas (Fig. 11.9). Walls adjacent to walkways should be free of any projections, such as signs or drain pipes that would pose a hazard to passing pedestrians. Construction of walls should incorporate either brick to match adjacent buildings, with stone or concrete cap or concrete with a textured finish and stone or concrete cap. Berms and plant material may be used instead of walls for screening purposes. (Fig. 11.10) Retaining walls may be constructed of brick, native stone, versa-lock modular stone with a light tan finish or concrete block with a light tan stucco finish, concrete block planters, or other appropriate material. Walls used to screen service areas or trash enclosures should incorporate landscape plantings to help reduce the negative visual impact of these areas (Fig. 11.11).

Fig. 11.11 - Retaining Wall Constructed of Concrete Block Planters

11.3.7.3 Fences.

Fences should be utilized for screening of service areas and site utilities, particularly dumpsters. Screen fencing should consist of square tubular metal posts and rails with vertical wood fence boards. All fence posts should be securely anchored with concrete footings. All metal posts and framework should be painted standard dark brown and wood fencing should be western cedar. Hardware shall be stainless steel to prevent rust. Chain link fences should be screened with trees and shrubs. The use of chain link fence should be held to a minimum in the cantonment area.

11.3.8 Trash Receptacles.

11.3.8.1 Trash Receptacle Location.

Trash containers should be highly visible and accessible for effective litter control. Containers should be located conveniently along walkways, near major pedestrian intersections, near building entrances and near seating and eating areas (Fig. 11.12).

Fig. 11.12 - Trash Receptacles Well Located at Building Entry

11.3.8.2 Trash Receptacle Design.

Container should be of a design that is compatible and in harmony with other site furnishings.

11.3.8.3 Dumpsters.

11.3.8.4 Dumpster Location.

The location of dumpsters can have a significant visual impact and shall be addressed as part of an overall building design and incorporated in site planning. Incorporate dumpster placement into areas screened with walls, fencing or plant material (Fig. 11.13). Avoid locating dumpsters along major circulation or use areas, or near storm drains. Dumpsters shall be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. The location of dumpsters must meet the latest requirements of the Department of Defense anti-terrorism / force protection criteria.

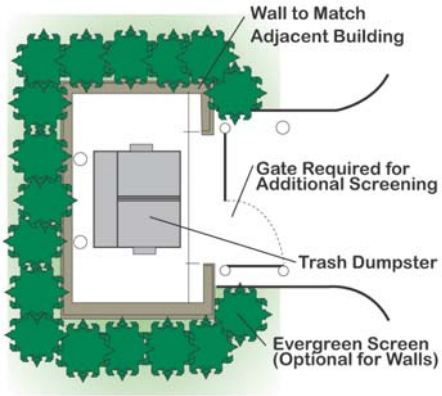

Fig. 11.13 – Enclose Dumpsters with Walls, Fences or Plantings and Place on Concrete Pad

11.3.8.4.1 Dumpster Site Design.

Incorporate plantings to buffer the visual impact of screen walls. Walls or fencing should be a maximum 6’ in height. Provide a minimum 3’ clearance on each side between screen walls and dumpsters to allow adequate pedestrian and truck access. All dumpsters should be placed on concrete pads with aprons large enough to encompass the bearing points of the service vehicle.

11.3.9 Flagpoles.

The standard flagpole for Fort Lewis will be tapered mill finish aluminum, fitted with a gold anodized finish “ball” finial (Fig. 11.14). The mounting detail should be simple with a concrete base flush at grade. A concrete pad should be used when poles are located in lawn areas. In plaza areas, flagpole locations and mounting detail should be integrated into the paving pattern.

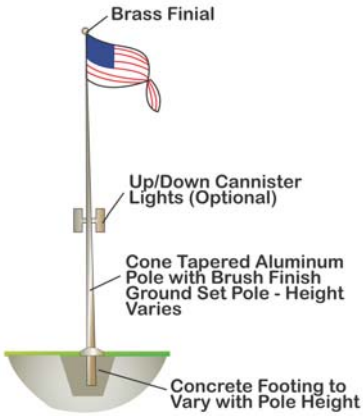

Fig. 11.14 – Standard Flagpole

Flagpoles should include lighting and may be accented with planting beds around the base of the flagpole.

11.3.10 Planters.

11.3.10.1 Movable pre-cast concrete planters may be used outside building entrances to provide seasonal color and interest and function as security threat barriers (Fig. 11.15). Planters should be located so they block uninterrupted vehicular access to a building, but not so they excessively impede pedestrian movement. Several planters of various sizes should be grouped together to produce an aesthetically pleasing display.

Fig. 11.15 – Movable Planters

11.3.11 Bicycle Racks.

11.3.11.1 Bicycle racks should be provided at key destination locations. They should be located on a concrete surface where they will not impede pedestrian movement or block building entrances.

11.3.11.2 A ribbon type tubular aluminum bike rack with an anodized dark bronze finish is the post standard. Bicycle storage areas near barracks shall be covered (Fig. 11.16).

Fig. 11.16 – Bike Racks

11.3.12 Tree Grates.

11.3.12.1 Tree grates should be used when installing trees in large paved areas such as pedestrian plazas, walks, and ceremonial entrance courts. Tree grates and planting pits should be a minimum of 4’x 4’.

11.3.13 Bollards.

11.3.13.1 Bollards are utilized to separate vehicular and pedestrian traffic, to direct access or as decorative elements in pedestrian areas (Fig. 11.17).

Fig. 11.17 – Typical Light Bollard

11.3.14 Playgrounds/Tot Lots.

11.3.14.1 The playgrounds and tot lots within the installation should use equipment that is consistent throughout the installation or that meets specific criteria of materials, color, and design (Fig. 11.18). The equipment will be purchased by RCI, Lodging, and MWR Child Development Centers.

Fig. 11.18 - Playgrounds and Tot Lots meet Specific Criteria of Materials, Color, and Design Throughout the Installation

11.3.14.2 Playground Planning and Design.

11.3.14.2.1 Guidance for planning and designing unsupervised outdoor play areas that meet child safety and child development

requirements is found in Unified Facilities Criteria (UFC) *3-210-04*, Design: Children's Outdoor Play Areas. The guidance given in this publication meets the needs of children with and without disabilities.

11.3.14.3 Playground Inspection and Maintenance.

11.3.14.3.1 A play area inspection and maintenance program for Child Development Centers can be found in Technical Manual (TM) 5-663, *Child Development Center, Play Area Inspection and Maintenance Program*.

11.3.14.4 Recalled and Banned Playground Equipment.

11.3.14.4.1 For updates on banned or recalled playground equipment consult the Consumer Product Safety Commission Press Releases and Recalls web site.

11.3.15 Mailboxes.

11.3.15.1 All mailboxes should be located in close proximity to the facility they serve. However, when locating mailboxes consider the potential for the site element being used as a container for the concealment of explosive, etc. Consider anti-terrorism / force protection requirements for locating similar container types i.e. trash receptacles which are located a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) form billeting and primary gathering areas (*Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings*, Table B-1).

Mailboxes that are to be sited within the Historic District (including family housing areas) will be coordinated with USPS, PW and the family housing contractor.

11.3.15.2 If group mailboxes are required, provide central locations for them adjacent to hard-surface walkways but not to impede pedestrian movement.

11.3.16 Monuments, Memorials, and Military Equipment Static Displays.

11.3.16.1 Monuments and static displays should be carefully designed and placed in prominent locations to serve as visual focal points within the installation (Fig. 11.19). Static displays of equipment should be consolidated in one location to create a central museum or exhibition facility within the installation.

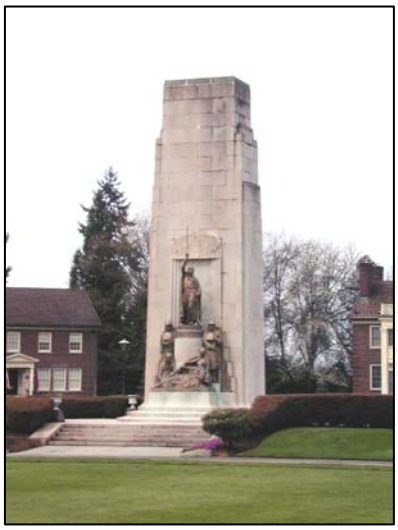

Fig. 11.19 - 91st Division Monument Placed in a Prominent Place Serves as a Visual Focal Point

11.3.16.2 Memorials will conform to the guidance set forth in Army Regulation (AR) 1-33, *Memorial Programs*. *Approval of all monuments and memorials will be made by the Installation Memorialization Board. Siting for all monuments, memorials, and static displays will be approved by the Installation Memorialization Board.*

11.3.17 Drinking Fountains.

Outdoor drinking fountains should not be provided, except to support larger playgrounds, outdoor recreation facility complexes, and outlying recreation areas if convenient to a potable water supply line. Steps should be provided for children and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and Uniform Federal Accessibility Standards (UFAS) http://www.ccb.org/ufgs/ufgs.htm standards meet.

11.4 SIGNS

11.4.1 Signs are used to visually communicate information. They are highly visible features which should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation and reinforce standards of excellence. Signage creates a unifying element throughout the installation which visually ties the installation themes together and builds a reference and continuity which translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type and sizing is found in Fort Lewis Regulation 420-10.

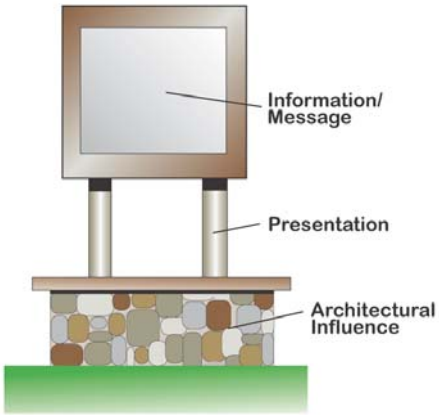

Fig. 11.20 - Signing Characteristics Help Establish a Signing System

11.4.2 Sign System Characteristics. There are several basic design characteristics which, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system (Fig. 11.20).

11.4.2.1 Simplicity. An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly (Fig. 11.21).

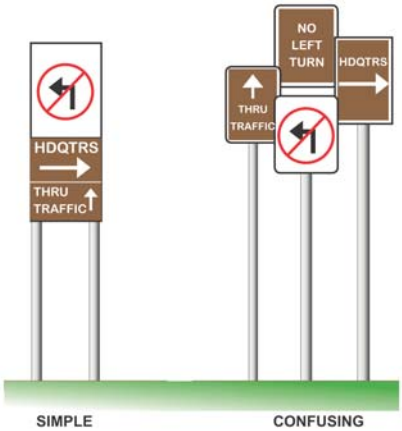

Fig. 11.21 – Sign should be Simple, Legible and Combined

11.4.2.2 Continuity. It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger

issues of sign type and size down to accurate color continuity and matching typestyles.

11.4.2.3 Visibility. Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

11.4.2.4 Legibility. Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorist, pedestrians, or bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

11.4.3 Vocabulary-Communications

11.4.3.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

11.4.3.2 The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family.

- Reference
- Information/Message
- Presentation
- Architectural Influence
- Graphic Architecture

11.4.4 Visual Hierarchy.

11.4.4.1 The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

11.4.4.2 A stated ranking method supports the visual standard of hierarchy within the signing system. Signs can be organized within

assigned classes with emphasis on the function and image of the installation.

11.4.4.3 Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

11.4.4.4 As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed (Fig. 11.22).

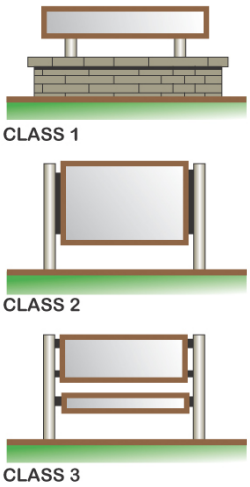

Fig. 11.22 - Signs can be Organized into Classes within the Visual Hierarchy

11.4.5 Types of Signs.

11.4.5.1 Information / Identification Signs.

These are signs which identify entrances to the installation, areas within the installation, major tenants, buildings and organizational or functional components (Fig. 11.23). They identify a location, and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings. These signs are designed to include the following:

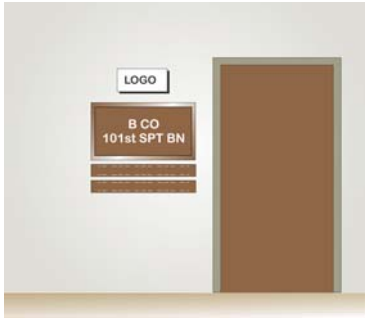

Fig. 11.23 – Building Mounted Information Sign

11.4.5.1.1 Typeface: Lettering is self-adhesive backing material.

- Building Title: Helvetica Medium, Upper and lower case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and lower case

11.4.5.1.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

11.4.5.1.3 Materials:

- Panel:

  Department of the Army standard:

  - Double-face 1/8” thick aluminum.

  Fort Lewis Standard:

  - For some signs Fort Lewis uses a recycled plastic material (Corplast) which requires less maintenance, is lighter and more sustainable.

- Post: 4”x 4” wood (pressure treated)

- Foundation: Concrete pier or direct burial

Cost, availability and consistency of materials are factors to consider so that consistency in signage can be maintained over time.

11.4.5.1.4 Building Identification.

11.4.5.1.4.1 Street Addresses. The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. DoD 4525.8-M, Chapter 3 prescribes the following:

All DoD addresses shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing.

The DoD installation is responsible for assigning city-style, street address on the installation.

Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee.

Only geographically locatable civilian-style street address (such as the 4102 Cindy Avenue example) shall be used.

Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation.

Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used.

11.4.5.1.4.2 Address Placement.

Place addresses by the front entrance of the building so they can be seen.

Place both the street name and address number on the building if both the building number and street address are visible from the street.

Building identification signs will use street addresses.

Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side (Fig. 11.24).

11.4.5.1.5 Housing Areas.

11.4.5.1.5.1 The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board.

11.4.5.1.5.2 Housing numbers should be placed on the house where lighting will effectively light the numbering.

11.4.5.1.6 Installation Identification Signs.

11.4.5.1.6.1 Installation identification signs name the installation and display the official US Army plaque. The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, Paragraph 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in "Installation Entrance Signs". The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed.

Fig. 11.24 - Street Address Location at Entrance Doors

11.4.5.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance.

- Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.

- Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

11.4.5.1.6.3 See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

11.4.5.1.7 Street Signs.

Street name identification signs should be designed with the same lettering, color and materials as other information signs.

11.4.5.1.8 Wheeled Electrical Signs.

Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should be used whenever possible. The siting of this type of sign will be approved by the RPPB. No sign of this type will be left in place for longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.

11.4.5.2 Directional Signs.

These signs guide the motorist or pedestrian in, around, and out of the installation (Fig. 11.25). The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. These signs should be placed in central locations and at major decision points along circulation routes. These signs are designed to include the following:

Fig. 11.25 – Direction Sign

11.4.5.2.1 Typeface: Lettering is self-adhesive backing material.

- Helvetica Medium upper and lower case

11.4.5.2.2 Arrow

- Place at end indicating direction

- Stoke width: Helvetica Medium cap (Fig. 11.26)

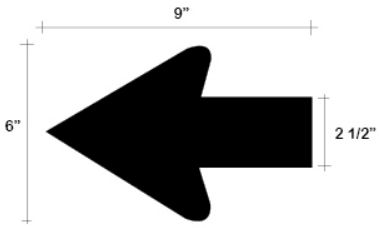

Fig. 11.26 - Typical Arrow for use on All Destination Signs

11.4.5.2.3 Color

- Panel: Dark Brown

- Lettering: White

- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

11.4.5.2.4 Materials:

- Panel

  Department of the Army standard:

  - Double-face 1/8” thick aluminum

  Fort Lewis Standard:

  - For some signs Fort Lewis uses a recycled plastic material (Corplast) which requires less maintenance, is lighter and more sustainable.

- Post: 4”x 4” wood (pressure treated)
- Foundation: Concrete pier or direct burial

11.4.5.3 Regulatory Signs.

These signs provide the rules for travel and parking on the installation. They include speed signs, turning and lane use signs, warning signs, parking control signs, etc. (Fig. 11.27). Related to these signs are pavement markings and traffic signals. These signs are designed to include the following:

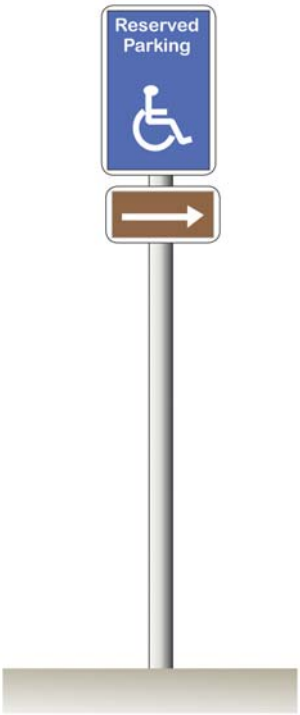

Fig. 11.27 – Regulatory Sign

11.4.5.3.1 Typeface: Lettering is self-adhesive backing material.

- Helvetica Medium upper and lower case

11.4.5.3.2 Color

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

11.4.5.3.3 Materials

- Panel

  Department of the Army standard:

  - Double-face 1/8” thick aluminum

  Fort Lewis Standard:

  - For some signs Fort Lewis uses a recycled plastic material (Corplast) which requires less maintenance, is lighter and more sustainable.

- Post: 4”x 4” wood (pressure treated)

- Foundation: Concrete pier or direct burial

11.4.5.3.4 Traffic Control Signs.

11.4.5.3.4.1 CONUS Installations. National highway standards will be used for signs to regulate vehicular traffic on CONUS installation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points.

11.4.5.3.4.2 Prohibitory (Warning) Signs. This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

11.4.6 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color require approval by Public Works.

11.4.7 Sign Placement

Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

Do not place more than one sign at any location. Traffic rules are the exception to this rule.

Place signs in areas free of visual clutter and landscape materials.

Place signs in locations that allow enough time for the user to read and react to the message.

Signs should not be placed to block sight lines at intersections (Fig. 11.28).

Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision. Provide proper placement to avoid a hazard to children.

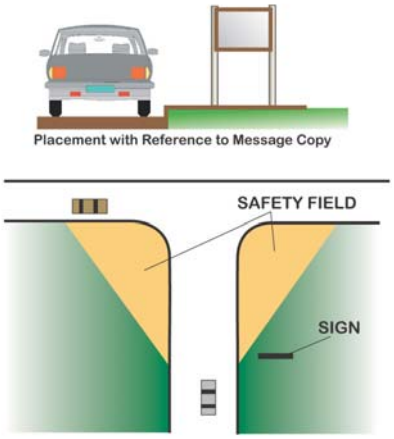

Fig. 11.28 - Placement Is Critical to Ensure Easy Readability

11.4.8 Sign System Typography.

11.4.8.1 Military Emblems. The Army has a rich tradition of military heraldry. Military emblems are an important part of the Soldiers' identity and the emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry (Fig. 11.29).

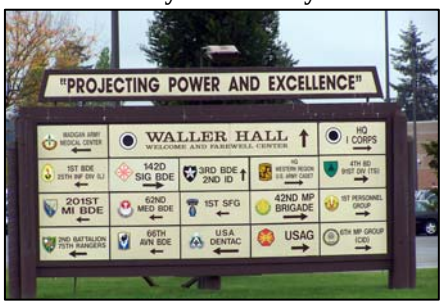

Fig. 11.29 – Military Emblems used in Location Sign

11.4.8.2 Department of the Army Plaque. The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

11.4.8.3 Insignias. The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

11.4.9 Reduce Visual Clutter.

11.4.9.1 Over-signing detracts form a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

11.4.9.2 Clutter creates confusion and ineffectiveness. Often motorist and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose.

11.4.10 Location Maps.

11.4.10.1 The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer (Fig. 11.30). The design and construction should be of compatible architectural materials found throughout the installation.

Fig. 11.30 - Location Maps Provide a Sense of Place and Orientation

11.4.10.2 The location map should contain the following characteristics within the design:

- Plexiglas covered map for protection
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Provide parking adjacent
- Provide current takeaway maps

11.5 LIGHTING

11.5.1 Lighting is a functional requirement of installations that also impacts the visual environment. The installation lighting system conveys a sense of order and organization. There are five primary types of lighting on military installations. They are:

- Roadway Lighting
- Pedestrian Lighting
- Parking Lot Lighting
- Outdoor Architectural Lighting

- Security Lighting

11.5.2 The primary visual problem that exists with exterior lighting on most military installations has been the lack of overall coordination of a lighting system.

11.5.3 A lighting system provides the proper type of lighting for different lighting requirements and locations. A system is composed of six primary components – fixtures, light height, type of pole, light spacing, type of lamp, and level of intensity of lamp.

11.5.4 The proper type of lighting for various locations is shown in the Lighting Design Matrix (Fig.11.31)

11.5.5 All lighting should be located or designed to prevent undesirable spillover of light into other areas. Spotlights in particular should be aimed or screened to prevent glare that could blind motorists or pedestrians or light sleeping areas. The latest requirements for LEED shall be followed for providing full cut-off lighting.

Fig. 11.31 Light Design Matrix

LIGHT DESIGN MATRIX		TYPICAL AREAS OF USE																		
		Entry Gates	Primary Roadways	Secondary Roadways	Tertiary Roadways	Primary Walkways/Bikeways	Secondary Walkways/Bikeways	Tertiary Walkways/Bikeways	Courtyards	Playgrounds	Ball fields	Basketball Courts	Tennis Courts	Buildings	Landscaping	Fence Parameters	Signs & Monuments	Large Parking Lots	Small Parking Lots	Training areas
LAMP	Incandescent													●						
	Halogen	●	●																	
	Florescent																			
	Metal Halide		●	●	●	●	●		●	●	●	●	●	●	●		●			
	High Pressure Sodium	●	●							●	●	●	●			●		●	●	●
LEVEL	Lux (lx)		20	15	10	10	2		50		200	200	50							
	Foot-candles (fc)		2	1.4	0.9	0.9	0.2		5		10	20	5.6			0.2		1	1	1
HEIGHT	40' Max	●							●					●	●	●		●		
	25' Max	●				●	●	●						●	●				●	
	15' Max			●	●															
	Varies		●							●	●	●	●				●			●
FIXTURE	Cutoff		●	●	●													●	●	
	Utility	●														●				●
	Bollard																			
	Spot													●			●			
	Wall Mount																			
POLE	Metal		●	●	●													●	●	
	Wood															●				
SPACED	120' Max		●	●	●											●		●		
	90' Max																		●	
	Varies													●			●			●

11.5.6 Light Fixtures.

11.5.6.1 A lighting fixture is the frame or housing for holding the lamp in position and for protecting it from damage. Light fixtures should be selected and located to maintain the minimum foot-candle requirements for safety and security purposes. Beyond that, aesthetic considerations should take precedence.

11.5.6.2 Lighting fixtures are grouped into five general categories as defined below. Figure 11.32 includes examples of four of the categories.

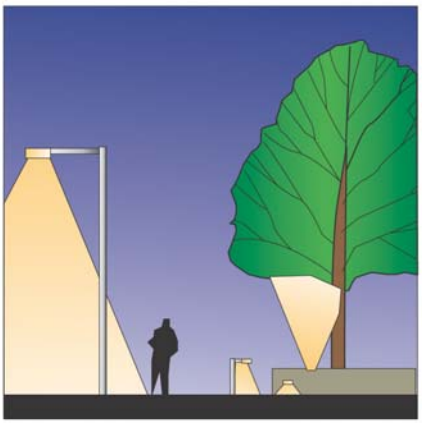

Fig. 11.32 – Example of Cutoff, Bollard, Wall and Spot Lighting

11.5.6.2.1 Cutoff Lighting.

Refers to the large shoebox-shaped fixtures placed on tall poles and used to illuminate streets and parking lots. They are designed to cut off light traveling to the top and sides of the fixtures, concentrating it down onto the parking lot. The fixtures reduce the spillover of light where it is not wanted.

11.5.6.2.2 Utility Lighting.

Refers to simple, inexpensive fixtures that are used in industrial areas of low visibility.

11.5.6.2.3 Bollard Lighting.

Refers to fixtures that are mounted on or in a short post to illuminate pedestrian areas. They can also be used as physical barriers between pedestrian and vehicular traffic.

11.5.6.2.4 Spotlighting.

Refers to high intensity fixtures that concentrate light into a narrow beam and are used to highlight signs and other important objects. Spotlights should be screened by landscaping or other methods so they are inconspicuous during the day.

11.5.6.2.5 Wall-Mounted Lighting.

Refers to fixtures attached to the wall of a building or a wall bordering a walkway or stairway.

11.5.7 Light Poles

11.5.7.1 The light fixture size should be proportional to the intended pole height.

11.5.8 Light Fixtures and Poles.

Light fixtures shall be determined by the Visual Zones and existing fixtures within those zones.

Light poles should be consistent and provide uniformity throughout the installation. The pole height shall be determined by their intended function as shown below (Fig. 11.33).

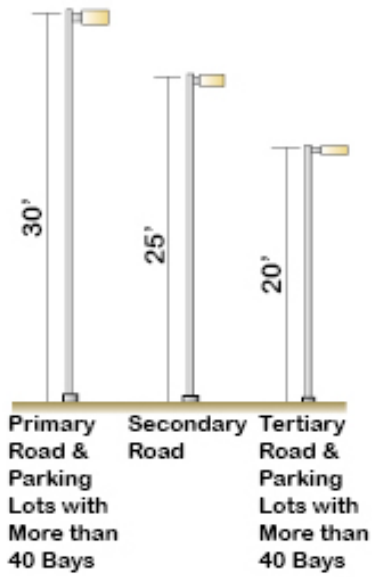

Fig. 11.33 – Pole Height Determined by Function

11.5.9 Lamp Characteristics.

Selection of a lamp involves evaluating its optical control, efficiency, lamp color rendition, lamp life, cost, and maintenance. The following is a summary of the characteristics of typical lamp types.

11.5.9.1 Incandescent

- Superior color rendition
- Inexpensive
- Short life span
- Lowest efficiency

11.5.9.2 High Pressure Sodium

- Poor color rendition
- Broad application
- Low maintenance
- Superior optical control
- Superior life span
- Excellent efficiency
- Expensive

11.5.9.3 Low Pressure Sodium

- Poor color rendition
- Good efficiency

- Superior life span
- Expensive

11.5.9.4 Fluorescent

- Good color rendition
- Poor optical control
- Good life span
- Good efficiency in mild climates
- Produces glare

11.5.9.5 Metal Halide

- Superior color rendition
- Superior optical control
- Efficiency better than mercury vapor but poorer than pressure sodium
- Expensive

11.5.9.6 Mercury Vapor

- Good color rendition
- Good foliage lighting
- Good life span
- Good efficiency
- Inexpensive

11.6 UTILITIES

11.6.1 Utility systems provide the basic infrastructure of power, communication, water, and sewer services necessary for the operation of the installation. Utilities play a key role in the visual quality on an installation. Their primary impact on the visual quality is the result of the clutter of overhead utility lines and poorly designed storm drainage systems. (Fig. 11.34)

Fig. 11.34 – Example of Utility Site with Negative Visual Impact

11.6.2 The visual and environmental impact of utilities should be minimized on the installation. Also, the systems should be designed to minimize maintenance and repair. The result is a more sustainable utility system which will promote the overall sustainability of the installation. The primary components of the utility system and recommendations for their location and design are included below.

11.6.3 Overhead Transmission Lines

11.6.3.1 Unsightly overhead utilities should be relocated underground wherever possible to reduce negative visual impacts and reduce maintenance and repair requirements. Underground utilities are also desirable for protection from terrorist or other enemy attack. When underground locations are not possible, the negative visual impacts should be minimized. (Fig. 11.35)

Fig. 11.35 - Soften Impact of Overhead Lines

11.6.3.2 Overhead Transmission Lines Location.

Overhead transmission lines should be aligned along edges of land use areas to avoid dividing an area and creating gaps or unusable areas. They should conform to natural landforms which can be utilized to screen them from public view. Hills should be crossed obliquely rather than at right angles. Alignments along hillcrests or steep grades should be avoided.

11.6.3.3 View Screening.

Minimize long views or silhouette views of overhead transmission lines from along roads and other public viewing areas. (Fig. 11.36) Avoid the "tunnel effect" of long, straight, uninterrupted views along the alignment by clearing vegetation only within the right-of-way that threatens the overhead lines. Jog the alignment at road crossings and periodically undulate and feature plant materials along the edges of the right-of-way.

Fig. 11.36 –Silhouette View of Utility Corridor with Overhead Transmission Lines (To be Avoided)

11.6.4 Distribution Lines.

Power distribution lines should also be located underground to minimize negative visual impact, reduce maintenance, and protect from terrorist or other enemy attack. If overhead, they should be located out of view from main public visibility areas or screened to be as unobtrusive as possible. Avoid alignments of overhead lines along major circulation corridors. Use minor streets, alleyways, rear lot lines, and vegetation or topography that provide screening and minimize visual impact. Minimize the number of poles and pole height, and use poles that blend into their surroundings to

reduce visual impact. Poles should also be multi-functional for power, telephone, cable television, street lighting, etc., to reduce visual clutter.

11.6.5 Substations and Transformers.

Substations and transformers should be designed and located to minimize their visual impact and be compatible with the character of their setting. Substations are best located in industrial use areas rather than in major public circulation areas. They should be screened from public view by using plant material, berms, and walls.

11.6.6 Sewer and Water.

11.6.6.1 All sewer and water lines should be underground.

11.6.6.2 Sewage treatment facilities should be located 1,250 ft. (0.38 Km) distance and in a downwind direction from all inhabited facilities.

11.6.6.3 Treatment facilities should be screened from view of major roads and other installation facilities by plant material, berms, walls, and fences.

11.6.6.4 A water storage tank that has visual strength in its form can be used as a focal point or identifying landmark that can provide a sense of orientation within the installation.

11.6.6.5 Fire hydrants should be highly visible and free of any screening. They shall be nutmeg brown in color with luminous paint. Caps shall indicate tested water pressure (Fig. 11.37).

Fig. 11.37 - Fire Hydrants Shall be Nutmeg Brown. Caps Shall Indicate Tested Water Pressure

11.6.7 Storm Drainage

11.6.7.1 Installation storm drainage systems shall be designed in accordance with the Washington State Department of Ecology Stormwater Management Manual for Western Washington. Storm drainage systems shall be appropriate to the character of development they serve. Storm drainage systems in densely developed areas require curbs, gutters and underground lines. Storm drainage systems in low-density areas can utilize drainage swales and ditches which are contoured to be compatible with the natural landform. Where retention ponds are required, they should be designed to appear as a natural amenity that is part of the natural contour of the land, rather than a square or rectangular hole in the ground. Do not located large swales or retention ponds near

roadways. Larger ponds shall be located in the back of buildings or in less visible locations if at all possible. Retention ponds that are designed to be dry most of the time can be utilized for recreational purposes or as open space. In either case, the areas should be designed to conform to the natural contours of the land (Fig. 11.38). The use of infiltration for storm water that has met quality standards shall be encouraged.

Fig. 11.38 –Unfilled Retention Pond at Entry of Parking Lot

11.6.7.2 Large hard surfaced parking lots shall pipe storm water to prevent water draining into adjacent streets. Parking lot drainage shall be designed in accordance with the Washington State Department of Ecology Stormwater Management Manual for Western Washington. The use of vegetated swales and rain gardens is encouraged as an efficient and aesthetically pleasing method of dealing with water quality.

11.7 ARMY STANDARDS

11.7.1 The cited Army Standards shall be met:

- Army Regulation (AR) 420-49, Utility Services
- Army Regulation (AR) 420-72, Transportation Infrastructure and Dams
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- Manual of Uniform Traffic Control Devices (MUTCD)
- MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings
- Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, latest edition

11.8 REFERENCES

11.8.1 The following references are provided for guidance:

- Unified Facilities Criteria (UFC) *3-210-04,* Design: Children's Outdoor Play Areas
- Army Regulation (AR) 1-33, Memorial Programs

- Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques

- Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program

- Fort Lewis Design Standards http://designstandards.lewis.army.mil/

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SECTION 12
FORCE PROTECTION DESIGN STANDARDS

12.1 INTRODUCTION

12.1.1 Accommodating the need for security and anti-terrorism is a significant concern for all military facilities design. The security and anti-terrorism requirements must be integrated into the total project. Design of protective elements should seek to visually enhance and complement the design of a facility. Site elements such as fences, courtyards, screen walls, swales, berms, planters, and retaining walls can be used effectively for facility protection (Fig. 12.1). These design elements should be designed to provide visual harmony with the main facility, producing architectural compatibility through consistent use and application of materials, forms, and colors.

Fig. 12.1 – Example of Protective Elements

12.1.2 Final design decisions to meet security and anti-terrorism requirements and resolve conflicts will require coordination among the design disciplines and appropriate functional areas to include land planners, landscape architects, architects, intelligence personnel, security personnel, Force Protection Officer, facility users, and engineers. The designers must work to balance force protection requirements with all other requirements that impact design and development. These include the Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Uniform Federal Accessibility Standards (UFAS), National Fire Protection Codes (NFPA), and all applicable local building codes and ordinances. The design team will also consult security personnel to determine whether portions of the design documents are subject to access limitations.

12.2 BUILDING SITING AND DESIGN STANDARDS

12.2.1 A primary concern for Army installations throughout the world is the threat of terrorist attack. To minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live DoD has developed the Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings (latest edition).

12.2.1.1 UFC 4-010-01 establishes the minimum building anti-terrorism standards for all DoD components.

- Mandatory DoD minimum anti-terrorism standards for new and existing inhabited buildings
- Mandatory DoD minimum anti-terrorism standards for expeditionary and temporary structures
- Additional recommended measures for new and existing, inhabited buildings

Implementation of the mandatory standards is obligatory for all new construction regardless of the funding source. These standards apply to FY 2004, and all subsequent fiscal years, for projects involving new construction and major renovations for inhabited structures. The standards will be reviewed before any site planning or design is initiated.

12.2.1.2 Minimum Standoff Distances and Separation for Buildings:

- The minimum standoff distances and separation for new and existing buildings are found in Table B-1 of UFC 4-010-01.
- The minimum standoff distances and separation for expeditionary and temporary structures are found in Table D-1 of UFC 4-010-01.

12.2.1.3 The DoD minimum standards, when applicable, may be supplemented by more stringent force protection building standards to meet specific threats inherent in the geographical area where the facility is to be constructed. Those additional requirements may be established by either standards for specific Combatant Commanders or based on Risk and/or Threat Analysis.

12.2.1.4 When the minimum standoff distances can not be achieved because land is unavailable, the standards allow for building hardening to mitigate blast effects. Costs and requirements will be found in UFC 4-010-01FA *Security Engineering: Project Development*, UFC 4-010-02FA *Security Engineering: Concept Design*, UFC 4-010-03FA *Security Engineering: Final Design*, UFC 4-010-04FA *Security Engineering: Electronic Security Systems* (This 4 volume manual is a "For Official Use Only (FOUO)" publication.)

12.2.2.1 Website Access for Military and Government Users. This is a password protected website. To enter the site you must be accessing the site from either a ".mil" or ".gov" address. Upon initial entry, you will be prompted with instructions on how to acquire your password.

12.2.2.2 Website Access for Non Military and Government Users. Currently, the Protective Design Center is developing a procedure for e-mailing the network administrator to receive procedures to enter the site. If upon initial entry into the site there are no instructions on this procedures, contact the Protective Design Center (CENWO-ED-S) at (402) 221-3151 for instructions.

12.2.3 Orientation of Buildings on a Site. The following will be given consideration when determining the orientation of a building:

12.2.3.1 Deny aggressors a clear "line of sight" to the facility from on or off the installation where possible. Protect the facility against surveillance by locating the protected facility outside of the range or out of the view of vantage points.

12.2.3.2 Protect against attack by selecting perimeter barriers to block sightlines such as obstruction screens, trees, or shrubs (Fig. 12.2). Non-critical structures or other natural or man-made features can be used to block sightlines.

Fig. 12.2– Example of Perimeter Barriers

12.2.3.3 Create "defensible space" by positioning facilities to permit building occupants and police to clearly monitor adjacent areas.

12.2.3.4 If roads are nearby, orient building so there are no sides parallel to vehicle approach routes.

12.2.3.5 Design vehicular flow to minimize vehicle bomb threats, avoid high-speed approach into any critical or vulnerable area.

12.2.3.6 Avoid siting the facility adjacent to high surrounding terrain, which provides easy viewing of the facility from nearby non-military facilities.

12.3 FENCING

12.3.1 Fences are used as protective measures against project-specific threats. They are most appropriately used to define boundaries and to deter penetration of a secure area (Fig. 12.3). A fence will assist in controlling and screening authorized access to a secured area. Fences also serve the purposes listed below:

Fig. 12.3 – Fences Offer Various Force Protection Measures

12.3.1.1 As a platform for the Intrusion Detection System.

12.3.1.2 As a screen against explosive projectiles.

12.3.1.3 To stop moving vehicles if they are reinforced to do so.

12.3.2 Plants with tall growth habits and/or large mature growth will be located well away from security fences.

12.4 LANDSCAPE CONSIDERATIONS

12.4.1 Landscaping guidelines for buildings should not be ignored because of standoff distances. The landscape design should enhance the overall attractiveness of the facility while still providing or enhancing the objective level of security level of security.

12.4.2 Establish clear zones along both sides of security fencing. Vegetation in the clear zone should not exceed six inches in height.

12.4.3 Strategically locate trees and planters to prevent penetration of an attack vehicle into the secure area perimeter (Fig. 12.4). Trunks should be no closer than 10’ from fence and no lower than 10’ in height.

Fig. 12.4 –Planters Used to Create a Barrier

12.4.4 Vegetative groupings and earth sheltering berms provide inherent blast effect reduction from external blast forces.

12.4.5 Plant material that can provide concealment will not be used adjacent to high security structures or fence lines.

12.4.6 Use dense, thorn-bearing plant material to create natural barriers to deter aggressors.

12.4.7 Screen play and outdoor recreation areas from public (off-installation) view.

12.4.8 Designers need to balance the need for signs that identify, locate, and direct residents and supported personnel to installation assets, versus the need to discourage and frustrate hostile intelligence gathering and access. One method of achieving this balance is to direct people to a community support or information center to obtain directions to high security activities.

12.4.9 Trash containers shall be located as per the latest Department of Defense anti-terrorism / force protection requirements.

12.4.10 Unobstructed Space. Ensure that vegetation and site features within 10 meters (33 feet) of inhabited buildings do not conceal from observation objects of 150mm (6 inches) in height. UFC 4-010-01, Appendix B, Para B-1.3). This does not preclude landscaping within the unobstructed space, but it will affect the design and may affect plant selection.

12.5 LIGHTING

Lighting systems for security operations provide illumination for visual and closed-circuit television (CCTV) surveillance of boundaries, sensitive inner areas, and entry points. When CCTV is used as part of security operations, the lighting system will be coordinated with the CCTV system. The specific installation environment and the intended use determines lighting system requirements. Often two or more types of lighting systems are used within a single area. Guidance on the use of security lighting may be obtained from Unified Facilities Criteria (UFC) 3-550-03FA *Electrical Power Supply and Distribution*. All areas around exterior of buildings must be lighted to prevent unobserved approaches.

12.6 BERMS

12.6.1 Use of berms for force protection can fulfill one of more of the following functions (Fig. 12.5).

- Define boundaries of property or boundary limits.
- Provide a barrier to moving vehicles.
- Hinder pedestrian movement.
- Intercept projectiles.
- Obstruct lines of sight.

Fig. 12.5 – Berms and Walls can serve many Force Protection Functions

12.6.2 Berms used to block lines of sight or projectiles must be high enough to achieve those objectives or may be combined with landscaping or other construction elements. Detailed design guidance is contained in UFC 4-020-03FA *Security Engineering: Final Design* (FOUO).

NOTE: This Army Technical Manual is a "For Official Use Only" document and is not accessible on the Army Corps of Engineers publications website. A copy of the manual can be acquired by ordering it through your standard publications account.

12.7 GATES AND ENTRANCES (ACCESS CONTROL POINTS [ACP])

12.7.1 Installation entry points are key components in the force protection security program. The most effective entrances accommodate the functions of observation, detection, inspection, access control and disablement of hostile personnel and vehicles, while containing the vehicles and pedestrians until access is granted. These areas are one of the most important installation features in the creation of a sense of arrival for both installation personnel and visitors. It is important that these areas present a positive public image (Fig. 12.6).

Fig. 12.6 – Example of Conceptual Entrance Gate to Meet AT/FP Requirements

12.7.2 Access Control Points criteria are outlined in UFC 4-022-01 Security Engineering: Entry Control Facilities / Access Control Points.

12.7.2.1 Canopies for ACPs. ACPs will have a canopy, which will cover the full width of incoming lanes at the Guard Booth (Fig. 12.7). The canopy shall have a minimum clearance of 14.5 feet and shall have a minimum length of 50 feet. Supporting structure of roof will consist of columns sized and located to create peripheral vision for the guards with minimal obstructions. Lighting will provide a minimum of 10 ft-candles with a Color Rendition Index of 65. Measures will be taken to protect the canopy from the threat of an over-height vehicle.

Fig. 12.7 –Canopy for Main Entrance

12.7.2.2 *The Interim Army Standard for Canopies at Army Installation Access Points, Feb. 2004*.

12.7.3 Physical Security Equipment.

12.7.3.1 The Product Manager, Physical Security Equipment (PM-PSE) under DoD Directive 3324.3 is assigned the mission of developing, fielding, and supporting Physical Security Equipment

(PSE) throughout its life cycle for the Army, Joint Services, and other Government agencies.

12.7.3.2 The DoD Directive assigns specific areas of responsibility which include: interior PSE, Command and Control Systems, security lighting, force protection systems, barrier and systems, and interior and exterior robotics. The PM-PSE homepage and the DA-approved equipment Blank Purchase Agreements (BPAs) are listed below.

- Product Manager - Physical Security Equipment Homepage

- DA-approved PSE Equipment Blanket Purchase Agreements (BPAs)

12.8 ARMY STANDARDS

12.9.1 The cited Army Standards shall be met.

- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings (latest edition)*

- Unified Facilities Criteria (UFC) 4-010-02, latest edition, *DoD Minimum Antiterrorism Standoff Distances for Buildings*. (This document is a "For Official Use Only (FOUO)" publication. Users may contact the Point of Contact posted at the noted website for inquires regarding this document).

- UFC 4-010-01FA *Security Engineering: Project Development*, UFC 4-010-02FA *Security Engineering: Concept Design*, UFC 4-010-03FA *Security Engineering: Final Design*, UFC 4-010-04FA *Security Engineering: Electronic Security Systems* (This 4 volume manual is a "For Official Use Only (FOUO)" publication.)

- Uniform Federal Accessibility Standards (UFAS)

- Americans with Disabilities Act Accessibility Guideline (ADAAG)

- DoD Instruction 2000.16, DoD Antiterrorism Standards

12.9 REFERENCES

12.9.1 The following references are provided for guidance.

- DoD Handbook 2000.12-H, *Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence*, February 1993 (This Handbook is a "For Official Use Only (FOUO)" publication.

- Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the Army Knowledge Online web portal).

Technical Manuals/Air Force Manual series TM 5-853/AFMAN) 32-1071, Security Engineering Concept Design, 3 volume series: (Volumes 2 and 3 are "For Official Use Only [FOUO]" and are not available on the Army Corps of Engineers publications website. A copy of the manuals can be acquired via your standard publications account. The three volumes cover, Project Development, Concept Design, and Final Design respectively).

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APPENDIX A
DESIGN TEAM IDG CHECKLIST

A.1 A completed Design Team Installation Design Guide (IDG) Checklist should be completed for all projects that impact the appearance of an Army Installation. The Master Planner shall provide the checklist to all teams designing new facilities, additions, or renovations to existing facilities, or maintenance on the installation. The Design Team IDG Design Checklist is to be completed by the design team to assure the guidelines and standards have been considered and complied with in the design process, and by the Master Planner in project review.

A.2 The Designer of Record or Design Agent will provide a copy of the completed checklist, together with a signed certification statement with each design submittal (10% [pre-concept], 35%, 60%, and 90% for each MILCON projects). The Designer of Record will complete the checklist and verify compliance in the space provided. In the case of Design Build, all agents i.e. the Corps of Engineers, NAF, AFFES, Host Nation, tenants, etc. shall have the perspective design build contractors submit a completed IDG Checklist as part of their proposal. The completed checklist will be provided to the Master Planner for review with concurrence or denial. Upon a determination of concurrence by the Master Planner, the plan and checklist with signatures will then be provided to the Real Property Planning Board for final acceptance or denial. The accepted checklist will become a part of the project record files.

A.3 If plans are denied for non-compliance at the installation or command level (where applicable) of review, an explanation of the denial will be provided to the Designer of Record. The plan and checklist can be resubmitted with revisions as indicated in the explanation of denial.

A.4 ARMY INSTALLATION DESIGN GUIDE (IDG) COMPLIANCE CHECKLIST

1. PROJECT TITLE AND DESCRIPTION.

Title:_____

Description:_____

_____

2. PROJECT JUSTIFICATION:_____

_____

_____

3. SUSTAINABLE DESIGN:

a. Has LEED Checklist been attached? (If not, obtain completed checklist)

b. Does LEED meet the current level as required by current US Army criteria? (Silver for FY08)

Yes _____ - Review project as submitted.

No _____ - Return submittal to design team for revisions to meet LEED.

4. SITE PLANNING

a. Was a site plan prepared for the proposed project utilizing the IDG Design Process included in Sections 2, 3 and 5 of the IDG?

Yes _____ No _____

b. Does the site plan include Site Planning Design Component guidelines of the IDG?

Yes _____ No _____

c. Does the site plan meet AT/FP requirements identified in Section 12 of the IDG?

Yes _____ No _____

d. Designer Comments on Site Planning:

_____

_____

e. Does Site Planning comply with the IDG? If not, provide justification.

_____

_____

f. Does Site Planning meet approved installation master plan siting compliance?

Yes _____ No _____ If not, provide justification.

_____

_____

g. Has NEPA been initiated for the construction effort in accordance with AR 200-2?

Yes _____ No _____

h. Has airspace criteria been consider relative to airfield accident potential zones?

Yes _____ No _____

5. BUILDINGS

a. Does the building exterior design meet the Building Design objectives defined in the IDG?

Yes _____ No _____

b. Is the exterior building designed to meet the Structural Characteristics defined in the IDG?

Yes _____ No _____

c. If the project is a renovation or addition, does the proposed renovation or addition meet IDG building design and structural characteristics?

Yes _____ No _____

d. If the project impacts an historic building, structure or landscape, does the project design comply with the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties? Has a State Historic Preservation Offices consultation taken place, in accordance with Section 106 of the National Historic Preservation Act, and been followed up with a letter of concurrence from the Washington Department of Archaeology and Historic Preservation?

Yes _____ No _____

e. Does the building exterior design meet AT/FP requirements (if applicable)?

Yes _____ No _____

f. Designer Comments on exterior Building Design:

_____

_____

g. Does Building design comply with the IDG? If not, provide justification.

_____

_____

6. CIRCULATION

a. If the project includes roadway construction, does the proposed plan meet Federal Highway and/or local guidelines defined in the IDG?

Yes _____ No _____

b. If the project includes roadway construction, does the proposed plan meet AT/FP roadway setback requirements defined in the IDG?

Yes _____ No _____

c. If the project includes roadway construction, does the proposed plan include applicable roadway alignment and intersection guidelines defined in the IDG?

Yes _____ No _____

d. If the project is an entrance gate, does the proposed plan include entrance gate guidelines and standards defined in the IDG?

Yes _____ No _____

e. If the project includes parking, does the proposed plan meet the Parking Lot Location/Design guidelines defined in the IDG?

Yes _____ No _____

f. If the project includes pedestrian circulation, does the proposed plan meet the Walkways and Pedestrian Circulation Guidelines in the IDG?

Yes _____ No _____

g. If the project includes bicycle circulation, does the proposed plan meet the Bikeway Guidelines in the IDG?

Yes _____ No _____

h. Designer Comments on Circulation Design:

_____

_____

i. Does Circulation Design comply with the IDG? If not, provide justification.

_____

_____

j. If the project impacts an historic property, does the Circulation Design comply with the Fort Lewis Landscape Development Plan and the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties? Has a State Historic Preservation Offices consultation taken place, in accordance with Section 106 of the National Historic Preservation Act, and followed up with a letter of concurrence from the Washington Department of Archaeology and Historic Preservation?

Yes _____ No _____

7. PLANT MATERIAL

a. Does the proposed planting plan include a project plan?

Yes _____ No _____

b. Does the proposed planting plan meet current AT/FP requirements?

Yes _____ No _____

c. Does the proposed planting plan include plant material recommended in the selected Plant Palette Matrix included in the IDG?

Yes _____ No _____

d. Designer Comments on Landscape Design:

_____

_____

_____

e. Does Landscape Design comply with the IDG? If not, provide justification.

_____

_____

f. If the project impacts an historic landscape, does the Landscape Design comply with the Fort Lewis Landscape Development Plan and the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties? Has a State Historic Preservation Offices consultation taken place, in accordance with Section 106 of the National Historic Preservation Act, and followed up with a letter of concurrence from the Washington Department of Archaeology and Historic Preservation?

Yes _____ No _____

8. SITE ELEMENTS

a. If the project includes Site Furnishings, does the proposed plan follow the guidelines in the IDG?

Yes _____ No _____

b. If the project includes Signs, does the proposed plan meet the signs standards as defined in the IDG?

Yes _____ No _____

c. If the project includes exterior Lighting, does the proposed plan meet the exterior Lighting guidelines defined in the IDG?

Yes _____ No _____

d. Will all power and other distribution lines to be located underground?

Yes _____ No _____

e. Will all substations and transformers be located or designed as to be screened from view as allowed by current anti-terrorism / force protection regulations?

Yes _____ No _____

f. Will all sewer and water lines to be located underground?

Yes _____ No _____

g. Are all storm drain systems designed to meet the guidelines defined in the IDG?

Yes _____ No _____

h. Designer Comments on Site Elements Design:

_____

_____

i. Does Site Elements Design comply with IDG? If not, provide justification.

_____

_____

j. If the project adds Site Elements to an historic landscape, does the Elements Design comply with the Fort Lewis Landscape Development Plan and the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties? Has a State Historic Preservation Offices consultation taken place, in accordance with Section 106 of the National Historic Preservation Act, and followed up with a letter of concurrence from the Washington Department of Archaeology and Historic Preservation?

Yes _____ No _____

9. ANTI-TERRORISM (SECURITY)

a. Have installation boundary setbacks been taken into account?

Yes _____ No _____

b. Have building setbacks from roads, parking, other buildings been included?

Yes _____ No _____

c. Do site plans and landscape plans include the criteria outlined for AT/FP?

Yes _____ No _____

d. Designer Comments on AT/FP Compliance:

_____

_____

e. Does AT/FP Design comply with the IDG? If not, provide justification.

_____

_____

g. Have all building AT/FP requirements been met, if applicable (progressive collapse, hardened windows, etc.)

_____

_____

10. SAFETY

Check the following for safety and health regulations:

_____ Building Code Requirements

_____ NFPA 101

_____ National Electrical Safety Code

_____ Local Health Requirements

_____ Electrical Code, Mechanical and Plumbing Codes and Elevator Codes

_____ ADA/FHHA Requirements

_____ Environmental Requirements

Notes

_____

_____

I hereby certify that the information provided is in compliance with the guidelines of the installation or applicable IDG, except as justified as non-compliance.

_____ _____

Designer of Record **Date**

Concur _____ **Deny _____, Explanation of denial is attached.**

_____ _____

IDG Coordinator **Date**

Accept _____ **Deny _____, Explanation of denial is attached.**

_____ _____

Command Review (Where Applicable) **Date**

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APPENDIX B
PROJECT REQUIREMENTS IDG CHECKLIST

B.1 The following checklist is optional and is designed for use on major projects.

PROJECT REQUIREMENTS CHECKLIST

For Completion by Installation Personnel for Use in Preparation of the Request for Proposals (RFP).

PROJECT _____ **LOCATION** _____

DPW/DIS POC _____ **PH#** _____

ADDRESS: _____

_____

E-MAIL _____

DATE CHECKLIST COMPLETED _____ **BY** _____

When completing this form it is important to remember that it is the responsibility of the installation to resolve any conflicts between the different "users" (i.e. DMWR, DPW, etc.) about wants, needs, etc. The A/E that prepares the RFP must have the specific guidance contained herein to get you what you want. If there is information you wish to provide that is not specifically requested or you are unable to make your desires clear within the confines of this checklist, then add those comments at the end. Overseas installations consider compliance with Host Nation codes.

1.0 GENERAL INFORMATION

A. Maps and plans available: (Provide copies with completed checklist)

1. Basic Information Maps (BIMs): (List Drawing Numbers)

   (Maps should be provided in Spatial Data Standards (SDS) compatible GIS format whenever possible.)

   Site topography
   Site Sanitary Sewer
   Site Storm Sewer
   Site Electrical
   Site Water
   Site Plan Extract - from RPMP (Future Development Site Plan)
   Other
   Project Location Plans
   Area Map
   a) Site Map

2. Aerial Photograph (Preferred to Topographic)

3. USGS Map

4. Project Siting Plan (Proposed)

5. Environmental

   a) Jurisdictional wetlands designation
   b) Other historical concerns:

B. Project Building Plans: (If renovation/addition or prior design, provide available information and plans)

1.	Foundation	7.	Electrical
2.	Basement	8.	Mechanical
3.	Floor	9.	Plumbing
4.	Structural	10.	Site Utilities
5.	Roof	11.	Specifications
6.	Elevations	12.	Other

C. Applicable Codes and Standards:

List all known applicable codes and regulations. Generally, NAF construction will not follow Federal or Military Specifications.

Department of Defense (DoD) Governing criteria is UFC 1-200-01, *Design: General Building Requirements*, 31 July 2002

Local Building Codes: Specific requirements shown in Fort Lewis Design Standards

State and County Codes: Pierce County where applicable

Environmental Regulations: Fort Lewis Regulation 200-1

Installation Regulations: Not available to general public

Cultural Regulations: See Fort Lewis Regulation 200-1

Other:

National Fire Protection Codes: (NFPA) found in UFC 3-600-01 http://www.ccb.org/docs/UFC/3_600_01.pdf

1.1 TEMPORARY FACILITIES AVAILABLE TO THE CONTRACTOR

A. Facilities available to contractor during construction:

1. General Site Plan has been annotated to show limits of construction site: _____Yes, _____No. If the contractor requires the use of additional area, he must obtain written approval from the Contracting Officer.

2. Construction Office available: _____Yes, _____No.

3. Covered materials storage available: _____Yes, _____No.

4. Uncovered materials storage available: _____Yes, _____No.

NOTE: Security of construction site and materials is the Contractor's responsibility.

5. Select fill borrow areas, spoil areas, sanitary fill and haul routes are shown on attached Installation map: _____Yes,_____No.

   List any restrictions or notes on the use of those areas:

NOTE: Disposition of scrap and salvageable materials resulting from construction is the responsibility of the contractor unless otherwise noted and agreed.

B. Utilities available to contractor during construction:

1. Potable Water: ____Yes, _____No; Metering required: _____Yes, _____No;

   Cost $_____per_____.

2. Non-Potable Water (Irrigation, Machine Washing, etc.): ____Yes, _____No;

   Metering required: _____Yes, _____No; Cost $_____ per _____.

3. Electricity: _____Yes, _____No; Metering required: _____Yes, _____No;

   Cost $_____ per _____.

4. Natural gas: _____Yes, _____No; Metering required: _____Yes, _____No;

   Cost $_____ per _____.

5. Sanitary sewer: _____Yes, _____No

NOTE: Utilities used at the construction may be metered and/or charged to the contractor. The rate schedule for utilities will be provided as part of this completed checklist and shall be the basis by which the installation will bill the

utility usage. Installation of temporary meters, where required, and temporary tie-ins to the utility systems shall be the responsibility and at the cost of the contractor.

1.2 DEMOLITION REQUIREMENTS

Facilities for demolition, relocation, or retention.

Provide description, size, type construction, and location of any existing facilities on the site that must be demolished, relocated or retained. Consider all structures, foundations, pavements, communications, and utilities (whether active or abandoned). Consider demolition hazards (i.e. lead, asbestos, etc.). Every effort shall be made by the installation to ensure compliance with the clean site policy. Provide the date when the clean site will be available. Recycle 75% minimum (by weight, excluding soils) of building demolition and debris material.

1.3 PAVING REQUIRMENTS

A. Parking area (s) required: ____Yes, _____No.

1. Location and brief description:
2. Number of parking spaces for passenger vehicles: _____

   (including _____ spaces for the handicapped).
3. Type of pavement: _____
4. Perimeter of parking area (s) to have concrete curb:_____Yes, _____No.
5. Striping of parking spaces required: _____Yes, _____No.
   a) Width of stripes: _____
   b) Type of paint to be used: _____
6. Special signage required: _
7. Concrete wheel stops required: _____Yes, _____No.
8. Handicapped ramps/depressed curbs required: _____Yes, _____No.

B. Service road (s) required: _____Yes, _____No.

1. Location: _____
2. Type pavement: _____
3. Concrete curbing required on both sides of road: _____Yes, __No.

4. Minimum roadway width: _____Feet _____.

   List any other special paving considerations or needs: _____

   _____

   _____

   _____

C. Sidewalks required: _____Yes, _____No.

1. Type of paving material: _____
2. Location: _____
3. Minimum width: _____
4. Minimum thickness shall be 4" with welded wire fabric.

D. Concrete dumpster pads required: _____Yes, _____No.

1. Number of pad (s): _____each. See note below.
2. Size of each pad: _____ feet by _____ feet.
3. Provide bumper stops at rear of pads: _____Yes, _____No.
4. Provide architectural screening of pads: _____Yes, _____No.

   Type: _____

NOTE: Building orientation or design may eliminate need for screening. Screening shall be in accordance with the Army Installation Design Guide (IDG).

1.4 UTILITIES SERVICE REQUIREMENTS

A. Electrical Service: Meter required: _____Yes, _____No,

Type: _____

1. Type system to be installed: _____underground, _____aerial.
2. Type transformer (s) to be installed: _____Pole mtd., _____Pad mtd.,

NOTE: Screen in accordance with Army Installation Design Guide (IDG).

3. Available Voltage: _____

4. Location of tie-in point: _____

B. Water Service: Meter required: _____Yes, _____No.

1. Size and location of tie-in point: _____

2. Additional fire hydrant (s) required: _____

C. Sanitary Sewer Service: Size and location of tie-in point: _____

_____

D. Storm Drainage:

1. Design for _____year occurrence.

2. Type System: _____Surface, _____Underground

3. Location of tie-in point for existing underground storm drainage system if incorporated in contractor design: See Site Plan.

E. Gas Service: _____Natural, _____Propane;

Meter required: _____Yes, _____No.

1. For Heating: _____Yes, _____No.

2. For domestic hot water: _____Yes,_____No.

3. For laundry dryers: _____Yes,_____No.

4. For kitchen equipment: _____Yes,_____No.

5. Size and location of tie-in point: _____

NOTE: Contractor (Offeror) shall be responsible to determine that all of the existing service utilities are of sufficient capacity to accommodate all of the design loads for this total facility. Should a Contractor (Offeror) determine that one or more of the existing service utilities are not adequate to accommodate the Contractor's (Offeror's) design loads for this total facility, then the Contractor (Offeror) shall submit with his initial and any subsequent proposal (Best & Final Offer), the requirements, design data and the price for increasing the capacity of each existing service utility system or for providing a new service utility system. Design loads for this facility shall be calculated in accordance with the criteria specified in this Request for Proposals (RFP), with the most stringent criteria governing. The responsibility for verification and field location of any and all information provided in the RFP and on any attached or enclosed drawings, or other documents shall be and is the responsibility of the Contractor (Offeror).

F. Coordination and Notification Required for Utilities Tie-in:

1. Point of contact for coordination: _____

   Tel. _____ Email _____

2. Road Closing:

   a) Can both lanes be closed to traffic: _____Yes, _____No.

   b) Maximum time road can be closed:

   c) Can road be closed over a holiday or weekend: _____Yes, _____No.

3. Minimum notification time required for utilities outages and road closing:

   a) Electric Power: _____working days.

   b) Water: _____working days.

   c) Gas: _____working days.

   d) Steam: _____working days.

   e) Central AC lines: _____working days.

   f) Roads: _____working days.

   NOTE: Enclose underground primary electrical service in concrete from the new utility tie-in points to the pad mounted transformer and/or mechanical room panel boxes. Provide one spare conduit for each service sealed at both ends. The conduit may be PVC provided it conforms to NFPA 70, current edition.

   NOTE: If existing sidewalk, curbs, gutters, or paving are disturbed or removed during construction, the paving or concrete must be replaced by the Contractor.

   NOTE: At overseas installations, utility work must meet Host Nation codes. Notably, in Europe utilities connections shall comply with the supplier's local codes. Contractors in Europe shall meet local utilities provider's conditions.

G. Coordination and Notification Required for Railroad Track Work:

1. Point of contact for coordination: _____

   Tel. _____ Email _____

2. Road Closing:

   a) Can both lanes of traffic be closed: _____ Yes, _____ No.

   b) Maximum time road can be closed:

   c) Can road be closed over a holiday or weekend: _____ Yes, ____ No.

3. Railroad Track Closing:

   a) Can track be closed to traffic: _____ Yes, _____ No.

   b) Maximum time track can be closed: _____

   c) Can track be closed over holiday of weekend: _____ Yes, ____ No.

4. Minimum notification time required for railroad track and road closing:

   a) Railroad track: working days.

   b) Road: working days.

5. Are used track components to be sorted and properly stored: __ Yes, ___ No.

6. Are samples, ultra-sonic inspections, temperature recordings, and certificates to be submitted for ties, rail track components, or ballast: ____ Yes, ____ No.

7. Are RAILER markings and reporting required: ____ Yes, ____ No.

8. Are there special radio or communication requirements: ____ Yes, ____ No.

NOTE: If existing sidewalk, curbs, gutters, drainage, ballast, or paving are disturbed or removed during construction, the paving, drainage, ballast, or concrete must be replaced by the Contractor.

1.5 ARCHITECTURAL AND STRUCTURAL BUILDING DESIGN REQUIRMENTS

A. Seismic Design Zone: _____. Structural design shall be in accordance with codes specified in the RFP.

B. Basic wind speed: _____ mph.

C. Ground Snow Load: _____ PSF (Plus code live load).

D. Maximum Frost Penetration: _____inches.

E. Heat Transmission: "U" Factors:

1. Walls: _____.

2. Floor (slab-on-grade) at perimeter foundation wall: _____.

3. Floor over ventilated crawl spaces: _____.

4. Ceiling and/or roofs: _____.

F. Roof:

1. Minimum pitch: _____

2. Type: _____

3. Scuppers and drains are required: _____ Yes, (If a parapet type roof is proposed); _____ No.

4. Gutters and downspouts: _____ Yes, _____ No, Type: _____

5. Drainage carry off: _____ Splash Blocks; or _____ Underground drainage system (internal roof drains not permitted.)

6. Access to roof: _____.

NOTES: Catwalks to and around rooftop HVAC units and other equipment are required (Cary tread or equal). Where possible, architectural screening of visible rooftop equipment is required.

G. Site Conditions:

1. Environmental Assessment required: _____ Yes, _____ No.

   Completion Date: _____.

   EIS Required: _____ Yes, _____ No.

   Completion Date: _____.

   (Provide copies of actions to date.)

2. Cultural Resources Compliance Completed: _____ Yes, _____ No.

3. Site Conditions:

   Topographical feature description: _____

   _____

   _____

   _____

Confirm or identify subterranean hazards:

Fill area
Old foundations
Unexploded ordnance
Existing/abandoned utility line
Tunnels/mines
Other

4. Soil investigation data available: ___ Yes, ___ No.

   At project location: _____ Yes, _____ No.

   Other:

5. Soil bearing capacity: _____ PFS. Actual test _____, Assumed _____.

NOTE: The successful Offeror shall be responsible for accomplishing additional necessary testing to verify soil characteristics at the site and design of the foundation system to meet these requirements.

H. Building Exterior: Brick: _____Yes, _____No.

Other: _____

NOTE: Where brick is required, the exterior walls shall be finished with face brick with through body integral color and shall match the brick currently in place in Building No's _____.

NOTE: The final floor plan as designed by Offerors shall include all functional areas outlined subsequently in this section. Gross building areas shall not exceed that specified in the RFP, including the mechanical room.

I. Barrier Free Requirements: (Where applicable) as minimum, _____ guest units shall be barrier free.

NOTE: Where required, "Barrier Free Requirements" shall be designed and constructed to provide for the Physically Handicapped (interior and exterior), in accordance with Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

J. Kickplates required on interior wood doors: _____Yes, _____No.

K. Approximate total maximum occupancy:

1. Female: Adults _____ Children _____

2. Male: Adults _____ Children _____

3. TOTAL: _____

Comments: _____

_____

_____

_____

L. Landscape Requirements:

List any special requirements:

NOTE: Offerors will provide a Landscaping Plan for the project area as required in the RFP. Surface area disturbance and tree removal will be minimized. Trees determined to be retained will be incorporated in the Landscaping Plan. Landscaping shall refer to the planting of trees, shrubs, plants, etc. and shall not be associated with establishment of turf as defined below. Trees, shrubs, plants, etc. shall be guaranteed for a period of one (1) year from time of planting.

M. Establishment of Turf:

N. Soil Poisoning: For termite protection is _____, is not _____ required.

NOTE: It will be the Contractor's responsibility to protect all existing turf and landscaping affected by the construction and to replace any turf or landscaping that has been damaged, for the term of the contract.

O. Paint Color:

List standard paint colors:

P. Finishes:

List standard finishes:

1.6 ELECTRICAL DESIGN REQUIREMENTS

A. Exterior lighting:

1. Parking area (s) lighting required: _____Yes, _____No.

   a) Type of lighting: _____ High Pressure Sodium

   _____ Low Pressure Sodium

   _____ Mercury

   _____ Halogen

   _____ Other

   b) Average Intensity: _____ foot candles per sq. yd. with a uniformity ratio of 4:1_____, Other _____. (Avg. to min.)

   c) Type pole: _____.

   d) Special mounting requirements:

   e) Switching:

   Type: _____ Manual

   _____ Clock _7 day _7 day

   _____ Astronomical

   _____ Photo Electric

   _____ Combination of above as indicated.

   _____ Other

2. Exterior building lighting required: ____Yes, __No.

   a) Type of lighting: _____ High Pressure Sodium

   _____ Low Pressure Sodium

   _____ Mercury

   _____ Halogen

   _____ Other

b) Average Intensity: _____foot candles per sq. yd.

c) To be mounted on the building structure: _____Yes, _____No.

d) Switching:

1) Type: _____ Manual

_____ Clock _7 day _7 day

_____ Astronomical

_____ Photo Electric

_____ Combination of above as indicated.

_____ Other

2) Location: _____.

3) Lighting for plumbing and electrical chases required:

_____Yes, _____No.

NOTE: All electrical wiring (exterior and interior) shall be copper.

B. Outside weather proof receptacles: shall be installed every _____ feet along the building exterior. Outside weather proof receptacles should be RCD (GFCI) protected.

NOTE: The building shall have emergency light fixtures and exit lights in accordance with NFPA requirements. Both shall have battery powered back-up, charge level meters and test buttons.

C. Electromagnetic Shielding:

List any electromagnetic shielding requirements.

D. Standby/Backup Power Requirements:

List and standby/backup power requirements.

1.7 MECHANICAL/PLUMBING DESIGN REQUIREMENTS

A. Heating design data:

1. Below is the outside dry bulb temperature that is equaled or exceeded 97 ½ percent of the time, on the average, during the coldest 3 consecutive months

(Dec., Jan., and Feb.). Heating design shall be based on the dry bulb temperature equaled or exceeded 97 ½ percent of the time.

a) Dry bulb temperature: _____.

b) Wind velocity: _____.

c) Degree days: _____.

2. Interior design temperatures: 68 degrees.

B. Air conditioning design data:

1. Outside dry bulb and wet bulb temperatures that are equaled or exceeded 2 ½ percent of the time, on the average, during the warmest 4 consecutive months (Jun. thru Sep.) are given below. Air conditioning design shall be based on the 2 ½ percent dry bulb, wet bulb temperature.

a) Dry bulb temperature: _____.

b) Wet bulb temperature: _____.

2. Interior design temperatures: _____.

a) Dry bulb temperature: _____.

b) Wet bulb temperature: _____.

C. Heating and air conditioning system: shall be designed to provide a relative humidity of 50% + 10% or -10%.

D. Mechanical Systems: Economy cycle. The air conditioning system except where room fan coil units are located, if located where the winter design dry bulb temperature is 35 degrees F (97 ½% basis) or less, shall be designed so that 100% outside air may be used in the system during those cool weather periods when the outside air temperature is sufficiently low to provide all the cooling needed, or reduce the load on the air conditioning refrigeration equipment. Use of the economy cycle in areas above 358 F shall be provided when it can be clearly shown that use of the economy cycle is cost effective.

E. Install humidity control override: _____Yes, _____No.

F. Automatic timer controls required for:

1. Heating System: _____Yes, _____No.

2. Air Conditioning System: _____Yes, _____No.

G. Heating and Air Conditioning Source:

1. Self contained plant: _____Heat, _____AC.
2. Supply lines from central plant: _____Heat, _____AC.
3. Purchased heat: _____

H. Low profile roof mounted HVAC units are permissible:_____Yes, _____No.

I. Automatic timer controls required for:

1. Heating System: _____Yes, _____No.
2. Air Conditioning System: _____Yes, _____No.

J. Heating fuel to be used:

Fuel: _____Natural gas, _____#2 Fuel oil, _____Propane.

K. Dual fuel heating plant required: _____Yes, _____No.

Primary Fuel _____, Secondary Fuel_____.

L. Outside air supply intake: to close when building is unoccupied:

_____Yes, _____No.

M. Outside air supply intake: to close when building is unoccupied:

_____Yes, _____No.

N. Type heating and air conditioning filters required:

( ) Permanent ( ) Throw away

O. Covers and locks: required on interior utilities controls: _____Yes, _____No.

P. Plumbing Design Data:

1. Exterior hose bibs: Minimum of _____ each with ¾" hose connection on building exterior.
   a) Frost protection required: _____Yes, _____No.
   b) Removable cutoff handles required: _____Yes, _____No.
2. Interior hose bibs: See Functional Requirements

3. Grease trap (s) required: _____Yes, _____No.

   Location (s):

4. Commodes shall be floor mounted flush valve type.

5. Lift station required: _____Yes, _____No.

6. Hot water heater (s) required: _____Yes, _____No.

   a) Energy source: _____ Natural gas, _____ #2 Fuel oil.

   b) Required minimum temperature: _____

   c) System: _____

NOTE: All domestic water piping below grade shall be type K copper. All domestic water piping above grade shall be either type L copper in accordance with appropriate codes. All joints shall be soldered with 95/5 Tin/Antimony solder. The entire potable water system shall be lead free. Vent piping shall be schedule 40 galvanized steel or DWV weight copper.

7. Provide a minimum of _____ floor drain (s) in the laundry and mechanical room.

8. Insulate all water pipes (hot & cold) above slab: _____Yes, _____No.

NOTE: The domestic hot and cold water piping below grade shall be kept to a minimum, and below the frost line if located outside the building perimeter.

9. All domestic water pipes (hot & cold) shall be stenciled HW or CW. If pipes have been insulated then the pipe insulation shall also be stenciled.

10. Provide grease interceptor: _____Yes, _____No.

    Location: _____

11. Provide a water filtration system: _____Yes, _____No.

    Location: _____
    Type: _____

12. Other plumbing considerations or requirements:

2.0 MINIMUM REQUIREMENTS FOR RESTROOMS

The following criteria are for minimal requirements only and may be superseded in quantities and/or finishes, providing that changes are an upgrading of the minimal requirements.

A. General: MALE and FEMALE

ITEM	QUANTITY	SPECIAL REQUIREMENTS
Lavatory	_____	
Commode	_____	
Faucets	_____	chrome finish.
Expose pipes/valves	_____	chrome finish.
Pipe penetrations	_____	chrome finish escutcheons.
Clean outs	_____	chrome covers.
Mirrors	_____	mech. wall fasteners.
		Lighting
Floor drain	_____	each restroom.
Hose bib	_____	under lavatory in each restroom.
Wall finish		ceramic tile to 5' height
Ceiling		moisture resistant DW.
Floors		ceramic tile w/ceramic tile base, or quarry tile w/quarry tile base. Tile shall be MUD-SET.
Toilet Partitions	_____	at all commodes and urinals. overhead braced w/door bumpers baked enamel w/skirts.
Skirts	_____	18" stainless steel. watertight top edge.
Duplex receptacle	_____	GFCI type over vanity.
Paper towel dispenser with trash receptacle	_____	recessed in wall.
Hand dryer	_____	over each lavatory.
Soap dispenser	_____	liquid pump.
Toilet paper dispenser	_____	each commode stall.
Ash receptacle	_____	recessed, each restroom.

B. Specific: WOMENS

Sanitary napkin disposal	_____	each commode stall.
Sanitary napkin disposal	_____	each restroom, coin operated.

C. Specific: MENS

Urinal	_____	porcelain wall mounted w/stainless steel part.

NOTE: Each restroom shall be designed and constructed with provisions for the handicapped and shall conform to the latest edition of the National Standard Plumbing Code and the Uniform Federal Accessibility Standards published in the Federal Register, August 7, 1984 (Current Edition).

3.0 FIRE PROTECTION REQUIREMENTS

A. Sprinkler system required: _____ Yes, _____ No.

1. Type system to be installed: _____ Wet, _____ Dry.

2. Complete coverage throughout the structure: _____Yes, _____No.
   If no, describe proposed system, layout, etc.:

3. Exterior siamese connections are required.

B. Detection System:

1. Smoke detectors required: _____Yes, _____No.

NOTE: Radium type shall not be used.

2. Heat detectors required: _____Yes, _____No.
   (Rate of Rise Heat Detectors shall not be permitted.)

NOTE: When smoke and heat detectors are specific, full coverage of the building is required. In addition, heat detectors are also to be installed in conjunction with potential fire producing equipment such as furnaces, electric motors, etc. All detection devices shall be spaced and installed in accordance with manufacturer's specifications and the latest edition of the NFPA in effect at the time of installation. Heat detectors shall be set to trigger at 1358 F. The heat and smoke detectors shall be the combination type. The smoke detection unit shall alarm locally and the heat detection unit shall alarm the facility and transmit the alarm to the fire department via a dedicated telephone line or appropriate transmission media, i.e. radio transmission equipment. Automatic cutoff of air handling equipment is required when smoke or heat detectors, sprinkler systems, or any other automatic/manual fire alarm suppression system are activated.

C. Manually Activated Fire Alarm System: installed in accordance with the latest edition of the NFPA in effect at the time of installation, is required. Also provide manual pull stations at the ends of the building. The pull stations shall be tied into a central panel box that will signal the fire department via a dedicated telephone line or appropriate transmission media, i.e. radio transmission equipment.

D. Special fire suppression system (s) required: ____ Yes, _____ No.

Describe type, location, and justification:

E. Fire extinguishers (manually operated) are required.

1. Government furnished: _____Yes, _____No.

2. Quantity and locations shall be based upon building design, NFPA, requirements, and coordinated with Installation's fire department.

3. Recessed cabinet mounted: _____Yes, _____No.

NOTE: The Contractor (Offeror) shall furnish and install the recessed fire extinguisher cabinets. The cabinets shall be at a minimum 24 1½"tall, 7" deep and 8 ½" wide w/glass doors.

F. All interior finish materials shall be per NFPA standards and Military Handbook 1008C.

G. Water supply lines: for the sprinkler system shall be black steel pipe.

H. The installation's standard fire alarm panels shall be specified for ease of maintenance and sustainability.

I. Emergency Lighting Requirements:

4.0 SECURITY REQUIREMENTS

A. Building physical security:

1. Intrusion detection system required: _____Yes, _____No.

   a) Type system to be installed.

   b) Desired location of detectors:

   c) Exterior door alarm requirements:

   d) Exterior window alarm requirements:

2. Duress alarm system (s) required: _____Yes, _____No.

   a) Type system to be installed.

   b) Location (s):

B. Safe (s) required: _____ Yes, _____ No.

1. Type and Number:
2. Size:
3. Location (s):
4. Secure to building: _____ Yes, _____ No, if yes, how:
5. Connect to main intrusion alarm system: _____ Yes, _____ No.

C. Remote transmission of the intrusion alarm system: to the installations master system required: _____ Yes, _____ No. If yes, provide and install the transmitter, all conduit, wiring, hookups from the intrusion alarm devices to the transmitter, as well as all exterior underground conduit, required wiring, panel boxes and all other ancillary equipment to bring the system to the existing communication transmission lines. The final connection at the communication line will be made by the government. All systems proposed shall be compatible with the existing system (s) installed at the installation. Point of coordination is Provost Marshall's Physical Security Officer. Specify the installation's standard intrusion alarm system if required.

D. Keying requirements:

1. Rooms requiring card readers:
2. Rooms requiring cipher locks:
3. Rooms requiring individual keys:
4. Rooms requiring master keys:
5. Exterior keying requirements:
6. At least six (6) keys shall be provided for each lock. An additional twelve (12) sub master and six (6) master keys shall be provided.
7. The Offeror shall provide fifty (50) key blanks in addition to the above keying requirements.

E. All exterior doors shall have irremovable hinge pins.

F. Panic hardware shall be in accordance with NFPA requirements.

G. Hardened secure area (s) required: _____ Yes, _____ No

Location (s):

H. Fencing Requirements:

1. Location:

2. Type and height:

3. Gate requirements:

I. Anti-Terrorism Requirements:

1. Blast resistant windows:

2. Setbacks:

3. Barriers:

4. Others:

J. Risk/Threat Analysis Requirements:

1.

2.

3.

5.0 COMMUNICATIONS REQUIREMENTS

A. Intercom system required: _____ Yes, _____ No.
Give a brief description of the requirements for the system:

B. Music/Paging system required: _____ Yes, _____ No.
Give a brief description of the requirements for the system:

C. Telephone system required: _____ Yes, _____ No.

Location:

Type:

Pay telephone required: _____ Yes, _____ No. If required, unit (s) will be wall hung. Contractor shall run wire and conduit from pay phone outlets to the main panel. Phones to be provided by Contractor.

NOTE: Contractor shall provide all conduit, wire, junction boxes and pull wires for the telephone system as required. Hookup of the telephone system will be performed by the Contractor. The Contractor shall coordinate all the telephone requirements with the installation's Directorate of Public Works (DPW) office and the local telephone company to determine requirements and provide space for communication equipment, panels, etc., in the mechanical room of where otherwise designed.

They system functions shall include the following:

1. Direct in dialing, with restrictions on receiving collect calls.

2. Direct out dialing to local exchange number only.

3. Restrictions on placing chargeable calls outside the local exchange, except for calls charged to credit card or calls made with the charges reversed.

D. Television system required: _____ Yes, _____ No.

1. The technical and installation requirements of the television system shall be coordinated with _____ the local cable television provider.

2. Locations/number of internal outlets:

3. Wiring and grounding shall be in accordance with the National Electric Code.

E. Mass Notification System (Required per UFC 4-010-01, Standard 23: for New Inhabited Buildings and for Existing Buildings (Primary Gathering and Billeting), also for Existing Buildings, Recommended for all Inhabited Buildings)

Type of Mass Notification System Required:

6.0 SIGNAGE REQUIREMENTS

(Excluding those required by NFPA and OSHA)

A. Interior signage:

B. Exterior Signage:

All exterior signage shall conform with the Army Installation Design Guide and Post Wide Paint/Exterior Finish Standards and color charts.

7.0 OTHER COMMENTS

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APPENDIX C
INTERIOR DESIGN REVIEW CHECKLIST

C.1 The following checklist is optional and is designed for use on major projects.

INTERIOR DESIGN REVIEW CHECKLIST

1. Installation	**Project**	**Date**
Job Description		
Building No.	**Building Cost$**	
Evaluator	**Furnishing Cost$**	
Using Agency Coordinator	**Phone#**	
Designer	**Phone#**	

ITEM	YES	NO	N/A
2. Is the interior design integral to the facility design?			
- Interior design is specified by the using agency.			
- Scope of work includes building related interior design.			
- Scope of work includes furniture related interior design.			
- Design incorporates Army Installation Design Guide and Standards criteria.			
- DPW representative was a member of Pre-selection and/or Selection Boards.			
Preselection member:			
Selection member:			
3. Was the designer provided interior design criteria?			
- Design Guide for Interiors DG 1110-3-122.			
- Design Guide for facility type designed.			
- Army Installation Design Guide.			
4. The design has been reviewed and the following are acceptable?			
<u>For building related interior design?</u>			
- Statement of Design Objective			
- Sketches			
- Color Board			
- Furniture Plan			

ITEM	YES	NO	N/A
- Exterior Materials and Finishes			
- Graphic Design			
Hand Drawn Sketches			
Digital image files (JPG, BMP, etc.)			
3D Model			
Animation (AVI, etc.)			
- Interior Design Finish Schedule			
- Government Furnished Material List			
Items for Installation of Furniture and Accessories			
-Predesign Evaluation:			
Maintenance Data			
Floor Systems			
Electrical Equipment and Task/Supplemental Lighting			
- Interior Element Specification			
Cost Estimates:			
Maintenance and Repair			
New Work			
Equipment-in-place and Furnishings			
For furniture related interior design:			
- Typical furniture layout			
- Furnishing, fabrics and finishes board			
- Furnishings plan			
- Sketch perspectives			
- Colored rendering			
- Photographs			
- Catalog Cuts			
- Furnishing illustration sheets			
- Furnishing placement lists			
- Furnishing order forms			
- Furnishing contract specifications			

ITEM	YES	NO	N/A
5. Does the interior design address the following functions?			
- Communications			
- Storage/filing			
- Display surfaces			
- Work surfaces			
- Conference Space(s)			
- Privacy			
- Lighting			
- Planting			
- Spatial considerations			
- Color/texture characteristics			
- Reflectance values			
- Acoustical considerations			
- Mechanical fixture placement			
- Electronic support			
- Furnishings/accessories			
- Work, training or paper flow			
- Hardware selection			
- Graphics/signage			
- Force Protection			
- Physical Security			
- Fire Safety			
6. Construction and installation phase			
- Positive first impression is created			
- Coordinated color scheme, interior reflecting exterior			
- Area & shape of spaces match function & support mission			
- Furnishings support function of space			
- Creative use of interior design spaces			

ITEM	YES	NO	N/A
- Retained designer to review and approve contractor submittals			
- Retained designer to oversee the installation of furnishings			
- Color boards were required and reviewed			
- Interior appearance policy is implemented			
Describe actions taken to ensure quality interior design to all negative responses on an attached sheet. Maintain a copy of this interior design review checklist and all negative responses in the DPW project file.			
I hereby certify that the information provided is in compliance with the guidelines of the installation or applicable IDG, except as justified as non-compliance.			
Designer of Record	**Date**		
Concur			
Deny (Explanation of denial is attached.)			
Master Planner	**Date**		
Accept			
Deny (Explanation of denial is attached.)			
Command Review (Where Applicable)	**Date**		

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APPENDIX D
SUSTAINABLE DESIGN

D.1 WHAT IS SUSTAINABLE DESIGN?

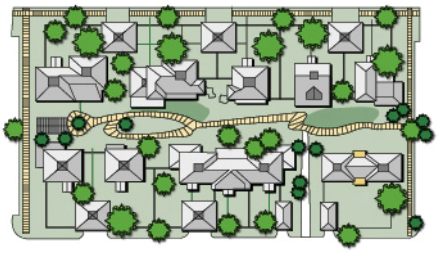

Fig. D.1 – Sustainable Site Design

D.1.1 Sustainable design and development is an integrated approach to planning, designing, building, operating, and maintaining facilities in a collaborative and holistic manner among all stakeholders (Fig. D.1). It is a systematic process and engineering practice with how-to-do-it guidance, checklist, tools, and scoring systems. Sustainable design integrates the decision-making across the installation, basing every decision on the greatest long-term benefits and recognizing the interrelationship of installation actions with the natural environment. In the content of Army Installations Sustainable Design is the design, construction, operation, and reuse/removal of the built environment in an environmentally and energy efficient manner (Fig. D.2). The basic objectives of sustainability are:

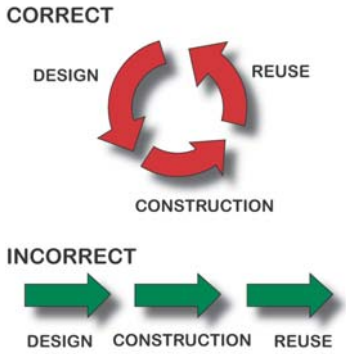

Fig. D.2 – Sustainable Design Process

D.1.1.1 Reduce the consumption of energy, land, materials, water, and other non-renewable resources.

D.1.1.2 Minimize the waste of energy, land, materials, water, and other limited resources.

D.1.1.3 Protect the natural environment that is the source of all resources.

D.1.1.4 Create livable, healthy, and fiscally productive manmade environments for existing and future generations.

D.1.2 Designing for sustainability ultimately increases quality of life through better resource protection and use. The design process

must incorporate a change in mind-set that embraces less consumptive lifestyles. This mind-set change must include global interdependence, stewardship of the environment, social responsibility, and economic viability. The new design mind-set must change from the traditional approach to recognize the impacts of every design choice on natural and cultural resources and on local, regional, and global environments.

D.1.3 Fort Lewis Sustainability Goals

D.1.3.1 Air Quality - Reduce installation stationary source and non-tactical motor vehicle air emissions 85% by 2025.

D.1.3.2 Energy - Reduce total energy consumption by 30% by 2015. Sustain all activities on post using renewable energy sources and generate all electricity on post by 2025.

D.1.3.3 Sustainable Community – Create sustainable neighborhoods for a livable Fort Lewis community which enhances the Puget Sound Region

D.1.3.4 Products and Materials – Cycle all material use to achieve zero net waste by 2025.

D.1.3.5 Sustainable Training Lands – Maintain the ability of Fort Lewis to meet its current and future military missions without compromising the integrity of natural and cultural resources, both on the installation and regionally. Recover all listed and candidate federal species in the South Puget Sound Region.

D.1.3.6 Water Resources – Treat all waste waters to Class A reclaim standards by 2025 to conserve water resources and improve Puget Sound water quality.

D.1.4 Fort Lewis Priority for Sustainable Design Strategies

D.1.4.1 Energy savings – include architectural strategies such as building orientation, daylighting and building envelope.

D.1.4.2 Water savings / re-use

D.1.4.3 Low-emitting, non-toxic materials

D.1.4.4 Re-usable / recyclable building materials (do not use materials which must be down-cycled when removed from the building.)

D.1.4.5 Tie into neighborhood sustainability features (e.g. continuance of bike lanes, neighborhood gray water treatment and re-use system, neighborhood heat plant, etc.)

D.1.4.6 Minimize turf areas / water intensive landscapes. Use xeriscaping.

D.1.4.7 Provide operable windows and views for all building occupants.

Priorities in the order listed provide guidance on the relative importance of sustainable strategies to Fort Lewis as an aid in design decisions. However, additional proven sustainable strategies are encouraged.

Fig. D.3 - Energy Efficient Lighting Contributes to Sustainability

D.2 SUSTAINABLE DESIGN AND DEVELOPMENT

D.2.1 Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. Protecting our natural resources and reducing our impact on the natural environment is achievable when we create energy efficient (Fig. D.3), healthy (Fig. D.4), high-performance (Fig. D.5) and safe buildings.

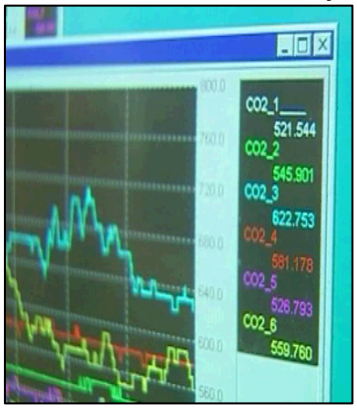

Fig. D.4 - CO2 Measurements of Indoor Air Quality Assisting in Creating a Healthy Environment

D.2.2 The Integrated Design Process. Critical to the success of sustainable design and development is the organization and commitment of the team to engage in the Integrated Design Process. To effect change in building design and operation, the project delivery process itself must become a collaborative effort to integrate design strategies among all disciplines and all players in the project delivery process. Integrated design demands a more inclusive team, working closer together than is traditionally the case. Future building users and facility managers must be invited to join architects, engineers, and planners in developing the vision and goals for new facilities.

Fig. D.5 - Efficient Water Usage Contributes to a High Performance Facility

D.2.3 Appendix D, Sustainable Design, discusses the sustainable design concept and its application to Army projects. Paragraph D.3 discusses the Green Building Rating System (LEED®). Refer to Appendix E, developed by the Green Building Council. The LEED rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability.

D.2.3.1 The LEED document (Appendix E) was derived from the U.S. Green Building Council LEED v.2.2 (Leadership in Energy and Environmental Design) Green Building Rating System. See

Website "LEED Wizard" which outlines using LEED, records and tracks rationale, generates LEED rating and permits reuse of previous strategies for subsequent projects.

D.2.3.2 Army Rating Standard

D.2.3.2.1 The LEED rating of "Silver" is the standard for all FY08 and beyond MILCON vertical construction projects. Refer to current US Army requirements for sustainability.

D.2.4 Further information on sustainable design can be obtained at the following websites:

D.2.4.1 Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website This site provides information on the following topics: documentation and references; sustainable process, tools, products and materials; Sustainable Design and Development Training; and links to various sustainable design and development informational website.

D.2.4.2 U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website.

D.2.4.3 Whole Building Design Guide (WBDG) This site provides comprehensive and current information on sustainable design strategies and technologies.

D.3 SUSTAINABILITY AND THE FEDERAL GOVERNMENT

D.3.1 The Federal Government has led the nation in the energy efficient, resource-conserving building design, construction, and operation. Executive Order (EO) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management", was issued 24 January 2007. The new E.O. consolidates and strengthens a number of prior EOs by establishing new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability.

In the area of sustainable design and high performance buildings, the new EO makes mandatory the five Guiding Principles of the "Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding" (MOU) for all new construction and major renovations and sets an aggressive goal for

applying these practices to our existing capital assets over the next decade. The five Guiding Principles address (Fig. D.6):

- Employing integrated design;
- Optimizing energy performance;
- Protecting and conserving water;
- Enhancing indoor environmental quality; and
- Reducing the environmental impact of materials.

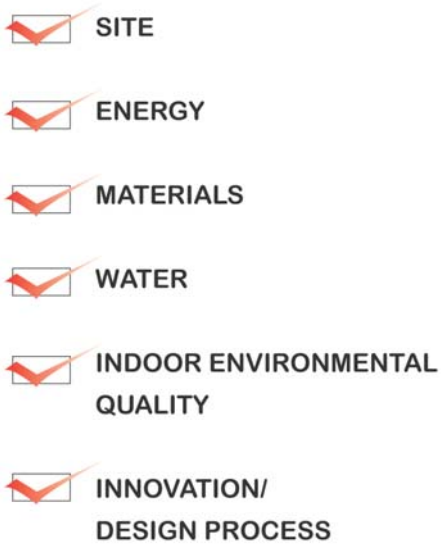

Fig. D.6 – Sustainable Design Principles

The first set of Instructions for Implementing E.O. 13423 were issued by the Council on Environmental Quality on March 29, 2007. The purpose of this document is to define agency requirements for implementing E.O. 13423 and to define broad strategies for achieving them. In order to ensure effective and efficient implementation, and to meet the goals and objectives of the E.O., it is mandatory that executive departments and agencies implement the activities described in these instructions in accordance with Sections 1, 2, 3, and 4(b) of the E.O.

D.4 LEED®

D.4.1 The U.S. Green Building Council has developed a rating system for sustainability to be used by design professionals in all new construction, additions or renovations of facilities. This checklist is the LEED v.2.2 (or higher) Green Building Rating System. (Fig. D.7)

Sustainable Sites	14pts.max
Water Efficiency	5pts.max
Energy/Atmosphere	17pts.max
Materials/Resources	13pts.max
Env.Indoor Quality	15pts.max
Innovation & Design Process	5pts.max
TOTAL	69pts.max

Fig. D.7 – LEED Checklist Points Summary

D.4.2 LEED is a rating tool that offers a checklist, strategies, and scores to provide sustainable facilities to the Army. LEED allows environmentally responsible practices to be integrated into the process of facility delivery form the very beginning of the project. By using a "whole building" perspective, the LEED rating tool (See Appendix E, LEED Checklist) helps in preserving the environment and improving facility life-cycle management. LEED is based on accepted energy and environmental principles.

D.4.3 The LEED document includes six (6) categories of design concerns. A facility points summary is included at the end of the document. Points are achieved based upon the sustainable design issues addressed in the building, site and infrastructure design. The design is certified by the designer and design review personnel based upon the following certification levels.

D.4.3.1 LEED Silver 33 to 38 Points

D.4.3.2 LEED Gold 39 to 51 Points

D.4.3.3 LEED Platinum 52 to 69 Points

D.5 ARMY STANDARDS

D.5.1 The cited Army Standards shall be met.

- The LEED rating of "Silver" is the standard for all FY08 and beyond MILCON vertical projects. Refer to current US Army requirements for sustainability.

D.6 REFERENCES

D.6.1 The following references are provided for guidance.

- Assistant Chief of Staff for Installation Management memorandum Subject: Sustainable Project Rating Tool, dated 21 December 2002
- Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website
- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website
- Air Force Sustainable Facilities Guide
- Whole Building Design Guide

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APPENDIX E
LEED CHECKLIST

The U.S. Green Building Council has developed a checklist for sustainability to be used by design professionals in all new construction, additions, or renovation of facilities. This checklist is the LEED® 2.2 (or higher) Green Building Rating System (October 2005 or higher).

LEED is a rating tool that offers a checklist, strategies, and scores to provide sustainable facilities to the Army. LEED allows environmentally responsible practices to be integrated into the process of facility delivery form the very beginning of the project. By using a "whole building" perspective, the LEED rating tool helps in preserving the environment and improving facility life-cycle management. LEED is based on accepted energy and environmental principles.

The LEED document includes six (6) categories of design concerns. A facility points summary is included at the end of the document. Points are achieved based upon the sustainable design issues addressed in the building, site and infrastructure design.

The Army promotes sustainability in the design and development process. Leadership in Energy and Environmental Design (LEED) was developed by the United States Green Building Council (USGBC) as a series of criteria to define and measure “green buildings” (For more information on LEED, See http://www.usgbc.org). LEED includes the following six categories:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Design Process

LEED has rating criteria for several categories: NC-New Construction, EB-Existing Buildings and CI-Commercial Interiors. All plans for new government facilities are evaluated according to the LEED-NC checklist. Points are achieved based upon the sustainability issues addressed in the design. The design is certified based upon the following certification levels:

- LEED-NC Certified 26 to 32 Points
- LEED-NC Silver 33 to 38 Points
- LEED-NC Gold 39 to 51 Points
- LEED-NC Platinum 52 to 69 Points

Fort Lewis has been at the forefront of the effort to include sustainability in design and development processes. The Fort Lewis Sustainability Conference" was held in 2002 to define sustainability at the installation. The sustainable rating goal for new construction is LEED-NC Silver under current Army policy, a LEED-NC Gold rating by 2015 and a Platinum rating for 2025.

Appendix D of this Installation Design Guide provides Fort Lewis' approach to promoting sustainability through the coordination of installation design with LEED.

For more information go to www.usgbc.org.

LEED for New Construction v2.2
Registered Project Checklist

Project Name:0
Project Address:

Yes	?	No			
0	0	0		**Sustainable Sites**	**14** Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
			Credit 1	**Site Selection**	1
			Credit 2	**Development Density & Community Connectivity**	1
			Credit 3	**Brownfield Redevelopment**	1
			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
			Credit 4.3	**Alternative Transportation**, Low-Emitting & Fuel-Efficient Vehicle	1
			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
			Credit 5.1	**Site Development,** Protect of Restore Habitat	1
			Credit 5.2	**Site Development,** Maximize Open Space	1
			Credit 6.1	**Stormwater Design,** Quantity Control	1
			Credit 6.2	**Stormwater Design,** Quality Control	1
			Credit 7.1	**Heat Island Effect,** Non-Roof	1
			Credit 7.2	**Heat Island Effect,** Roof	1
			Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
0	0	0		**Water Efficiency**	**5** Points
			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
			Credit 2	**Innovative Wastewater Technologies**	1
			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
			Credit 3.2	**Water Use Reduction**, 30% Reduction	1

0	0	0		**Energy & Atmosphere**	**17** Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
0	0	0	Credit 1	**Optimize Energy Performance**	1 to 10
				10.5% New Buildings or 3.5% Existing Building Renovations	1
				14% New Buildings or 7% Existing Building Renovations	2
				17.5% New Buildings or 10.5% Existing Building Renovatio	3
				21% New Buildings or 14% Existing Building Renovations	4

				24.5% New Buildings or 17.5% Existing Building Renovatio	5
				28% New Buildings or 21% Existing Building Renovations	6
				31.5% New Buildings or 24.5% Existing Building Renovatio	7
				35% New Buildings or 28% Existing Building Renovations	8
				38.5% New Buildings or 31.5% Existing Building Renovatio	9
				42% New Buildings or 35% Existing Building Renovations	10
0	0	0	Credit 2	**On-Site Renewable Energy**	1 to 3
				2.5% Renewable Energy	1
				7.5% Renewable Energy	2
				12.5% Renewable Energy	3
0			Credit 3	**Enhanced Commissioning**	1
			Credit 4	**Enhanced Refrigerant Management**	1
			Credit 5	**Measurement & Verification**	1
			Credit 6	**Green Power**	1

continued…

Yes	?	No			
0	0	0		**Materials & Resources**	**13** Points
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
			Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
			Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
			Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
			Credit 3.1	**Materials Reuse**, 5%	1
			Credit 3.2	**Materials Reuse**,10%	1
			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured R	1
			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured R	1
			Credit 6	**Rapidly Renewable Materials**	1
			Credit 7	**Certified Wood**	1

Yes	?	No			
0	0	0		**Indoor Environmental Quality**	**15** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
			Credit 1	**Outdoor Air Delivery Monitoring**	1
			Credit 2	**Increased Ventilation**	1
			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1

			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1	**Controllability of Systems**, Lighting	1
			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
			Credit 7.1	**Thermal Comfort**, Design	1
			Credit 7.2	**Thermal Comfort**, Verification	1
			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1
Yes	?	No			
0	0	0		**Innovation & Design Process**	**5** Points

			Credit 1.1	**Innovation in Design**: Provide Specific Title	1
			Credit 1.2	**Innovation in Design**: Provide Specific Title	1
			Credit 1.3	**Innovation in Design**: Provide Specific Title	1
			Credit 1.4	**Innovation in Design**: Provide Specific Title	1
			Credit 2	**LEED® Accredited Professional**	1
Yes	?	No			
0	0	0		**Project Totals** **(pre-certification estimates)**	**69** Points

Certified: 26-32 points, **Silver:** 33-38 points, **Gold:** 39-51 points, **Platinum:** 52-69 points

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APPENDIX F
LANDSCAPE MAINTENANCE SCHEDULE

		January	February	March	April	May	June	July	August	September	October	November	December
Irrigation System	1. Winterization										•		
	2. Service		•	•		***1**							
	3. Spring schedule					•	•						
	4. Summer schedule							•	•	•	•		
Turf Areas	1. Aeration of soil									•			
	2. Seeding		•										
	3. Thatch		•										
	4. Mowing			***2**	***2**	***3**	***3**	***3**	***3**	***3**	***3**	***3**	
	5. Fertilization		***4**							***5**			
	6. Weed & moss control		•										
	7. Lawn renovation		•	•	•						•		
	8. Disease & pest control			•	•								
	9. Trimming along walks			•	•	•	•	•	•	•	•		
Woody Plants: Ground Covers, Shrubs, Trees	1. Leaf & debris removal										•	•	•
	2. Fertilization		•	•									
	3. Mulching	•	•										
	4. Disease & weed control			•	•								
	5. Weeding	•	•	***6**				***6**			***6**		
	6. Plant repair		•	•									
	7. Pruning	•	•										

LANDSCAPE MAINTENANCE SCHEDULE
Fort Lewis, Washington

***1** - final check and service	***4** - apply 15-5-10
***2** - bi-weekly	***5** - apply 10-20-30
***3** - weekly	***6** - as required

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APPENDIX G
PRIORITIZED IMPROVEMENTS PROJECTS LIST

Contact Fort Lewis Master Planning for a current prioritized list of improvement projects.

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APPENDIX H
SELF-HELP PROJECT CHECKLIST

Fort Lewis currently does not have a self-help program. Self-help work can be accomplished by the following means:

1) Submitting a work order (DA Form 4283).

2) Approval of the Public Works Business Operations Section.

3) Having an adequate funding process.

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APPENDIX I
INTERIOR FINISHES STANDARDS

Acceptable materials will be developed as part of renewed Fort Lewis Area Development Plans and will be added to the Installation Design Guide as they become available.

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APPENDIX J
INTERIOR FURNISHINGS GUIDE

Acceptable materials will be developed as part of renewed Fort Lewis Area Development Plans and will be added to the Installation Design Guide as they become available

INTERIOR FURNISHINGS GUIDE

Area/Zone	Brief Description	Notes (Hyperlinked)
1 - Garrison Area	Historic portion of the Garrison Area is characterized by Georgian Revival structure and organized around a central parade field. The area includes command structures, officer/family housing and former barracks. Interiors should be warm and inviting. It should reflect the pride, history and accolades of the installation, and be direct and dramatic in these areas. A neutral color scheme should be employed throughout the building interior with traditional and historical colors used in the fabrics, window treatments and artwork.	
2 – Gray Army Airfield	This area is characterized by large aircraft maintenance and storage hangars. Cool, neutral interior colors and furnishings should be durable and easy to maintain and/or replace.	
3 – Division Area	Barracks, administration and support structures all have a linear, 3-story mid-twentieth century architectural style. A neutral scheme should dominate with bright and vivid accent colors used in the display of unit flags, artwork, seating and accents. Unit pride should be proudly displayed with flags, banners and wall decorations. All materials should be durable and easily maintained.	
4 – 3rd Brigade Area	Housing, administration and support structures create a collection of visual styles. A neutral scheme should dominate with bright and vivid accent colors used in the display of unit flags, artwork, seating and accents. Unit pride should be proudly displayed with flags, banners and wall decorations. All materials should be durable and easily maintained.	
5 – Technology & Training Park	This area is characterized by newer, large, stand-alone structures. Interiors should be more modern in style while still maintaining the neutral colors. Should have professional, organized surroundings.	
6 – Jackson Avenue Area	This area includes several 19 year or older structures and large areas of undeveloped land that is scheduled to be developed. Interiors will be determined at a later date depending on structure.	
7 – Madigan Hospital	As a stand-alone facility, the interior should be warm and hospitable. The lobby should have comfortable furnishings and warm colors. Rooms should be functional yet friendly using light colors.	

8 – Special Forces/Old Madigan	Primarily made up of WWII vintage structures of wood brick with concrete masonry. Interiors should represent the era with proper furnishings and use warm, neutral colors.	
9 – Logistics Center	Comprised of a utilitarian warehouse, interiors should be functional and easily maintained.	
10 – North Fort	Separate zones with this zone are being developed with separate bachelor housing, operations, administration and morale facilities. As these zones represent a more livable habitat, interiors should be welcoming and comfortable. Colors should be warm with comfortable furnishings.	
11 – Family Housing	Characterized by a single function of housing families for enlisted personnel and officers, interiors should be neutral in color with warm tones. Easily maintained and repaired.	
12 – American Lake/Veterans Hospital	Isolated from the rest of Fort Lewis, with a distinct exterior of concrete structures and tile roads, the interiors of this hospital should still be warm and soothing in color. Furnishings should be comfortable while easily maintained and replaceable.	
13 – Post Entry & Main Gate Area	Distinguished by the historical main gate, the interior of the post entry should be neutral in color, functional and organized. Fort Lewis insignia should be present as well as location maps.	

NOTES	

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APPENDIX K
EXTERIOR MATERIALS CHARTS

Acceptable materials will be developed as part of renewed Fort Lewis Area Development Plans and will be added to the Installation Design Guide as they become available

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 1 – Garrison Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material	Brick veneer	
	Secondary material	Stucco walls	
		Copper roof accents	
Roof	Sloped areas	Tile roofs	
	"Flat" areas		
Fenestration	Doors	Detailed trim	
	Storm Doors		
	Door & Window Frames	Dressed stone or brick surrounds and accents and entrance porch refinements.	
	Storm window or sash		
	Window	Double hung, circular fixed, and round arched	
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories	Patterned brick, brick arches, sun porches, chimneys, decorative cornices and quoined corners.	
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	Classical detailing such as pediments and pilasters
Note 2	As buildings are located further away from the historic district, more freedom of design interpretation is acceptable.
Note 3	Architectural style should be given a unified appearance throughout the Garrison area. The Georgian Colonial Revival is the appropriate style that will blend into the historic district and adhere to the principles of the Military Park Theme. The goal, however, should be to create an harmonious blend of architecture and not one of monotony. Buildings should be contemporary or of the time in which they are designed but be of the predominant style of the district.

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 2 – Gray Airfield

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 3 – Division Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone4 – 3rd Brigade Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 5 – Technology and Training Park

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 6 – Jackson Avenue Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 7 – Madigan Hospital

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 8 – Special Forces/Old Madigan

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 9 – Logistics Center

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 10 – North Fort

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 11 – Family Housing

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 12 – American Lake VA

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 13 – Post Entry and Gate Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 14 – Community Services Area

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
Note 1	
Note 2	
Note 3	

EXTERIOR MATERIALS CHART

VISUAL ZONE: Visual Zone 15 – Stone Education Complex

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material		
	Secondary material		
Roof	Sloped areas		
	"Flat" areas		
Fenestration	Doors		
	Storm Doors		
	Door & Window Frames		
	Storm window or sash		
	Window		
Trim Items	Fascia		
	Soffit		
	Gutters and D.S.		
	Awnings and canopies		
	Stair or balcony railings, balusters, and related trim/accessories		
	Handrails		

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes		
	Grilles and louvers		
	Coping		
	Roof ventilators		
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures		
	Porch crawl space enclosure		

NOTES:	
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Note 2	
Note 3	

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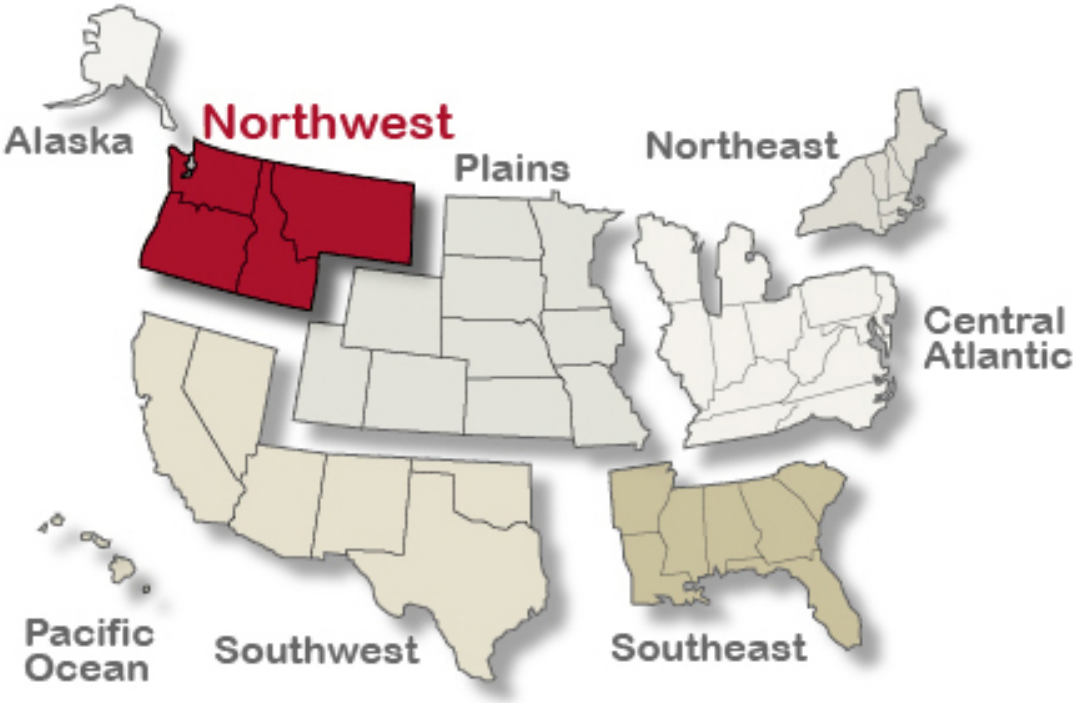
APPENDIX L
EXTERIOR COLOR CHARTS



L.1 EXTERIOR COLOR CHARTS for INSTALLATION BUILDINGS

Buildings Outside of Historic Districts

Colors schemes and building materials are critical design elements in relating adjacent buildings and creating a compatible visual environment within an installation. This section identifies the Army standard palette of colors that will unify installations. Exterior colors will be defined as part of renewed Fort Lewis Development Plans and will be added to the Installation Design Guide as they become available. A sufficient color palette range is provided to allow for variety. General direction on the use and application of materials and their colors follows:

- Avoid cluttered, cosmetic application of a number of different colors on a facade. Simplistically, an exterior color scheme should consist of a wall color, trim color, and an accent color, all of which should work together with the choice of roofing to provide a harmonious appearance compatible with adjacent structures and environs.

- Select colors from the following Exterior Color Chart based upon their appropriateness to the building type, desired appearance, material to be painted and prevailing architectural design and landscape character of the installation. Ease of maintenance, and sustainability should also be considered.

- Avoid garish colors. Strong or vibrant colors should be used with restraint and should be limited to accents or focal points such as entrance doors where appropriate.

Buildings Inside of Historic Districts

Consultation with the Cultural Resources Office is required for guidance in deciding colors schemes and building materials for buildings within historic districts.

L.2 PANTONE COLORS

The six digit color designations found in the Exterior Color Charts are Pantone numbers taken from the Color Guide for Architecture and Interiors which have been cross-referenced to the Pantone Process Guide. The colors in the Process Guide are intended for viewing on a color monitor and for printing on a four-color process printer (CMYK) using ISO 2846-1 inks. With proper calibration, colors viewed and printed should accurately represent the specified color.

Calibration for Dell FP E171 & 1800FP Monitor is per manufacturer's recommendation.

Calibration for Hewlett Packard Color 4500 is per manufacturer's recommendation.

For calibration of equipment other than the above, contact Pantone at (201) 935-5500.

Due to calibration and other technical problems, the color of paint to be used should be based on manufacturer's correspondence to the six-digit Pantone A & I number and shall not be predicated on matching a computer-generated sample.

The name provided for the colors is a generic name representing the color range and is not the actual Pantone name for that color. Always use the six-digit Pantone A & I number instead of the generic name when referencing the color.

Any color name given is generic and is for the purpose of general color identification only. When referencing the color, use the six-digit Pantone A & I number.

ROOFS

Roofs should be red and be of the following material:

- Fiberglass face room shingles manufactured by “Eternit” or equal,
- Concrete roof tile manufactured by “BRAAS” or equal, or
- Clay roof tile or equal.

DOORS, WINDOWS, and ACCENTS

Doors and accent elements such as windows, gutters, and pilasters shall be painted Altweiss, Color 0029.

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APPENDIX M
HISTORIC PRESERVATION GUIDELINES

M.1 INTRODUCTION

M.1.1 **Military Planning and Design**

M.1.1.1 Most of the history and literature about the military does not deal with the topic of Army facility planning and design processes. However, to plan for the future development of an Army installation, it is necessary to go back and attempt to understand what has taken place there in the past.

M.1.1.2 In the development of its policies, the Army had to deal with the question of how buildings relate to one another by both use and layout and by architectural characteristics. At least in its earliest phases, this development was not always a conscious formulation of policy; so much as it was the immediate response to a given situation. Over the years, there have been different forces affecting the process of military planning in this country. As illustrated by the various districts and zones on Fort Lewis.

M.2 HISTORIC PRESERVATION REGULATIONS

M.2.1 The Army's management of historic properties is pursuant to the duties and responsibilities established by Congress under the National Historic Preservation Act (NHPA) of 1966 and its subsequent amendments. This act committed Federal agencies to a program of identification and protection of historic properties on the land they own. The NHPA established the Advisory Council on Historic Preservation (ACHP) to "advise the President and the Congress on matters relating to historic preservation; (and to)

recommend measures to coordinate activities of Federal, State, and local agencies." (16 U.S.C. 470j)

M.2.2 The NHPA also created the National Register of Historic Places to designate publicly or privately owned resources and to encourage identification and planning which promotes the compatible use of these properties. The National Register is the official listing of the nation's historic and cultural resources considered worthy of preservation. It includes "districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture". (16 U.S.C. 470a)

M.2.3 The NHPA has established a number of procedural steps, which Federal agencies must meet in order to comply with the intent of the law. This is set forth in Section 106 of the NHPA which requires that: "the head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, buildings, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking." (16 U.S.C. 470f)

M.2.4 Pursuant to its authority in overseeing the nation's historic preservation programs, the Department of the Interior has developed regulations which amount to a set of acceptable standards for work on properties listed in or eligible for listing in the National Register (Fig. M.1). The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation act as a guide to the Advisory Council and State Historic Preservation Offices in their procedural review of Federal undertakings. These guidelines should also act as standards for all Federal agencies as they commence planning for any undertaking, which has the potential to trigger Section 106 review, thus assuring that all proposed projects would meet Advisory Council and NHPA requirements.

Fig. M.1 - Many Army Properties are Listed on the National Register of Historic Places (Salvation Army: Red Shield Inn now the Fort Lewis Military Museum)

M.2.5 Federal agencies must comply with the NHPA by following a series of steps detailed in 36 CFR 800. The Army further

explains its policies and procedures in Army Regulation (AR) 200-4, *Cultural Resources Management* and Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*. This Installation Design Guideline is intended to be used in conjunction with the above regulations as well as with the Fort Lewis Integrated Cultural Resources Management Plan (ICRMP).

M.2.6 The recently developed Army Alternate Procedures (AAP) provide a new method for managing historic properties. The AAP, a streamlined approach to Section 106 of the National Historic Preservation Act, now allows installations to manage historic properties programmatically rather than on a project-by-project review. These procedures also enable installations to leverage existing Army and DoD program requirements while internally managing historic properties in a more efficient and cost effective manner.

M.3 STANDARDS AND GUIDLELINES

M.3.1 **Rehabilitation of Historic Properties.** Design and renovation guidelines for historic districts, such as those within Fort Lewis are of necessity much broader than design guidelines for single structures. Such guidelines must not only address the, appropriate architectural image (style, material, etc.) for proposed new buildings, they must also address how a proposed action within the historic district will impact its integrity. By this it is meant, how any new work will affect the original design intent of the given historic area.

M.3.1.1 New work should not:

M.3.1.1.2 Conflict with the existing architectural character. For example, it should not:

- Be larger in mass or taller than the existing historic structures.
- Be of a color or material that conflicts visually with the predominant historic material used in the area.
- Destroy the historic fabric of any existing structures or landscape features, which are essential character defining elements within the district.
- Destroy the spatial relationship between or among historic buildings designed as a grouping; this includes the regular spacing of buildings within a group, as well

as views from one to the other or into the grouping as a whole.

M.3.1.2 New work should:

M.3.1.2.1 Seek to enhance and protect the historic quality and existing resources. For example:

- Conduct a survey examining the level of use existing facilities prior to determining the need for new construction.

- Follow the Standards and Guidelines for Historic Preservation as recommended by the Secretary of the Interior.

M.3.1.2.2 Provide necessary modern conveniences as unobtrusively as possible. For example, it should:

- Site new construction so that it does not destroy existing building relationships or configurations.

- Scale new buildings down so as to minimize their visual impact.

- Place parking to the rear of historic buildings.

- Landscape parking areas and modern mechanical equipment so as to screen them from view.

M.3.1.2.3 Phase out (gradually eliminate) existing intrusions. For example, it should:

- Demolish structures designated as intrusions on the National Register Inventory when they are no longer needed.

- Restore buildings which have been altered by inappropriate color schemes, replacement windows, porch enclosures, etc.

M.3.2 **Treatment of Historic Fabric**. The most effective way to preserve historic properties is to keep them in use and to consistently maintain them. When buildings and grounds are consistently used for their intended purposes and regular maintenance is conducted, there is rarely a need for extensive preservation work. Only when they are misused, underused or left

vacant for long periods of time does large-scale rehabilitation become necessary. It follows that if a regular maintenance program is put into effect once a property has been appropriately renovated, another major rehabilitation will rarely be required.

Fig. M.2 - Make Every Effort to Use Historical Structures as Originally Intended (Broadmoor Family Housing)

M.3.3 **Standards for Historic Preservation Projects**

M.3.3.1 **Compatible use of historic sites and structures.** Every reasonable effort should be made to use a historic structure or site for its originally intended purpose or to provide a compatible use. The use should be compatible in the sense that it involves minimal alteration to the property and/or has no adverse effect upon its historic integrity. Use of the site and structure should be regulated to prevent alterations that are potentially damaging to historic fabric and/or cultural context (Fig. M.2).

Fig. M.3 - Retain Distinguished Stylistic or Character Defining Features (Main Post Chapel)

M.3.3.2 **Retention of character defining features.** Distinguishing stylistic or character defining features and examples of skilled craftsmanship should not be destroyed, altered, or removed from a historic site or structure. All such fabric should be treated with sensitivity and preserved in its original context and form (Fig. M.3).

M.3.3.3 **Treatment of deteriorated historic fabric.** Deteriorated historic fabric should be repaired rather than replaced whenever possible. When replacement is unavoidable, new material, whether man-made or natural, should match the existing fabric in composition, design, color, texture, and other visual/structural qualities.

M.3.3.4 **Documentation of missing historic elements.** Replacement of missing historic elements should be based on the accurate duplication of features known to have existed and substantiated by historic pictorial and/or physical evidence and not on conjecture, nor simply on the example of similar treatment found on other structures or sites of the same period or region.

M.3.3.5 **Retention of historic alterations.** Changes to a historic structure or site, which have occurred over the course of time, may provide evidence of important social or cultural processes. As such they should be respected and their potential significance carefully evaluated.

M.3.3.6 **Unacceptable alterations.** Historic sites and structures should be recognized as products of their own time and as part of an important cultural process. Alterations which have no historical

basis or which destroy the authenticity of the place are discouraged.

M.3.3.7 **Acceptable alterations and additions.** When possible, alterations and new additions to historic structures or sites should be done in such a manner as to leave the essential form and integrity unimpaired.

M.3.3.8 **Contemporary design in a historic context.** Contemporary design for additions to existing historic sites or districts should not be discouraged if such design is compatible with the massing, proportions, scale, materials, color, views, and general contextual relationships of the place.

M.3.3.9 **Surface cleaning methods.** Surface cleaning of structures or buildings should be undertaken with the gentlest possible means, and only when cleaning is essential to the preservation of the buildings. Cleaning methods, such as sand blasting, which could damage historic material or speed their deterioration, are discouraged.

M.3.3.10 **Archaeological resources.** All treatment work, which potentially affects surface or sub-surface pre-historic or historic archaeological resources, should be coordinated with an archaeologist.

M.3.3.11 **Historic preservation and maintenance**. The guidelines contained within this IDG are general in nature. The IDG must be utilized in conjunction with the Installation ICRMP.

M.3.4 **Guidelines for Historic Preservation Projects.**

M.3.4.1 **Roof Guidelines**

- Preserve existing historic roofing. Repair and patch with matching materials (Fig. M.4).
- All roofs should receive an annual inspection. Repair and patch all materials as needed and clean out all gutters and drains.
- When full replacement of the roof becomes necessary, replace or restore with historic materials.
- Roof details. Retain and/or maintain all existing chimneys, ventilators, vents, louvers and decorative

Fig. M.4 - Replace or Restore Roofs with Historical Materials (Fort Lewis Fire Station)

elements such as brackets, dentils, and cornices. When possible, restore missing decorative elements.

M.3.4.2 Wall Guidelines

- Limestone and brick masonry.
  - Clean only when necessary using the gentlest possible means.
  - Repair or replace deteriorated or missing units as needed.
- Stucco.
  - Repair damaged or deteriorated stucco.
  - Repaint only when necessary with appropriate color based on analysis of historic paint.
- Wood.
  - Retain or repair wood siding; where replacement is necessary, match existing clapboards in width and species.
  - Repaint only as need to maintain moisture protection.
  - Use color scheme based on analysis of existing paint layers.

M.3.4.3 Porch Guidelines

- Retain or maintain existing original porches (Fig. M.5).
- Remove historically inappropriate porches.
- Where possible, restore original porches that have been removed or enclosed.

Fig. M.5 - Retain Existing Historical Porches (Red Cross Hostess House – now used as the Fort Lewis Resource Center)

M.3.4.4 Window Guidelines

- In most historic districts or buildings, windows constitute a highly visible design element as they make up a large percentage of façades.

- If building an addition or altering the building, maintain height configuration of windows.

- Retain window size and fenestration pattern when replacing windows or altering the building.

- If replacing windows, preserve frame material or use historically accurate reproductions. Avoid replacing original frames with aluminum frames.

- Restore historic windows where non-historic replacement windows have been used.

- The window manufacturing industry can replicate and/or reproduce most all types and sizes of windows to match existing historic windows. In many cases, matching replacement windows are available as stock items.

M.3.4.5 **Door Guidelines**

- Although not usually as visually overpowering as windows, main entrance doorways are also important façade details. As a design element, decorative doors have stylistic features that belong to the particular era for which they were designed.

- Retain or maintain existing historic doors.

- If replacing doors, preserve frame material or use historically accurate reproductions.

- If building an addition or altering the building, maintain the size of the door opening.

- Restore all main entranceways by reinstalling appropriate frames.

M.3.4.6 **Color Guidelines**

- If historic buildings must be repainted before an accurate color scheme is developed, a very conservative approach should be followed. Repaint to match the existing colors or colors that can be documented to have been used on that building.

- Utilize a qualified historic paint color specialist for an inventory and analysis of the paint layer sequences for all building groupings.

- Establish a rotating schedule for the painting and cleaning of each building.

M.3.4.7 **Painting Guidelines**

- Do not undertake a paint job until any problems with leaking water have been solved. All gutters and downspouts should be repaired and be in good operating condition.

- Only repaint when existing coat is no longer performing, as excessive coats of paint create a thick film, which obscures detail.

M.3.4.8 **Handicap and Safety Access Guidelines**

- As a general rule, buildings listed in or determined eligible for listing in the National Register may receive special consideration for meeting safety and accessibility requirements. Any modifications required to bring a historic structure in compliance with safety and accessibility codes should be carefully planned and undertaken so that they do not adversely affect the design of main entrances or principal facades.

- Where possible, avoid alterations to the main façade and principal doorways.

- Place or install new ramps, lifts, and any added fire escapes on secondary building facades such as, to the side or rear of the building.

- Locate new doorways at the rear or side of the building.

- Required protective railings on ramps, stairs, steps, and lifts should match existing porch railings.

M.3.4.9 **Mechanical Equipment Guidelines**

- In many cases within historic districts, mechanical equipment is located outside of the building. When historic structures are renovated and mechanical

systems are upgraded, equipment placement should be planned in order to make the least visual impact.

- Where possible, locate mechanical equipment within the building.

- Screen necessary surface equipment with vegetation.

- When large groups of buildings are upgraded as one project, consider the use of a remote system.

M.3.4.10 **Guidelines for Additions**

- In general, additions should follow all of the guidelines for new construction within historic districts; but, because their proximity makes the potential for damage to historic fabric even greater, there are additional principles that should be followed.

- Avoid changes that impact primary facades.

- Note that some highly visible freestanding buildings may not have a secondary facade, and thus additions are not advisable.

- Scale down additions so that it makes the least visual impact.

- Design should establish a clear and obvious difference between the existing historic structure and the new addition.

M3.4.11 **Force Protection.** These guidelines should be used in conjunction with the *UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings* and the Force Protection Design Standards of this Army Installation Design Guide and Standards.

M.4 ARMY STANDARDS

- Army Regulation (AR) 200-4, *Cultural Resources Management*

- Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*

- The Secretary of the Interior's Standards for the Treatment of Historic Properties

M.5 REFERENCES

- Advisory Council on Historic Preservation
- United States Army Environmental Center

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APPENDIX N
HOUSEKEEPING RULES (EXAMPLE)

INTRODUCTION

N.1 The following set of housekeeping rules consists of a list of general and public rules that are applicable to the administrative office work areas throughout the installation. Organizations should make every effort to assure that all personnel are familiar with the facilities housekeeping rules. An organized, well kept working area that is neat and clean contributes to the visual harmony of the work area and fosters work efficiencies.

GENERAL RULES:

1. Alterations: Building occupant shall not mark, paint, drill, damage, string wires within, or in any way deface any part of the building. Building occupant will not install or permit the installation of any awnings, shades, Mylar films or num filters on windows. Building occupant will not obstruct, alter, or in any way impair the efficient operation of the heating, ventilating, air conditioning, electrical, fire safety, or lighting systems, nor shall the building occupant tamper with or change the setting of any thermostat or temperature control valve in the building. Building occupant shall not cover or block air ducts or vents.

2. Cleanliness: Building occupant shall exercise their best efforts to keep workstations and common areas, i.e., hallways, corridors, team rooms, etc., clean and free form rubbish. No building occupant shall cause any unnecessary labor on the part of cleaning personnel due to carelessness or indifference in the preservation of good order and cleanliness. It is highly recommended that building occupant use covered cups when transporting liquids to and from the coffee bars. Building occupant shall not bring any substance into the building that might add an undue burden to the cleaning or maintenance of the premises, or the building.

3. Carpet: Carpet stains and/or damage should be reported to PW Work Management Center.

4. Energy Conservation: Turn off systems furniture lighting, conference room lights, private office lights and equipment, etc. when not in use, especially at the end of the day. During non-business hours, building occupant shall limit the use of lighting and equipment to areas occupied.

5. Lighting: Do not move and /or modify any overhead lighting fixtures above workstations. One task light may be placed in a workstation.

6. Vertical and Venetian Blinds: Blinds are to be left in fully extended position at all times. Blades shall be positioned so as to permit a good level of natural lighting and shall only be closed for the purposes of sun control and at night for privacy. Only the wands will be used for adjustments. Items shall not be placed or stored on windowsills other than small plants as described hereinafter.

7. Signage: No signs, advertisements or notes shall be painted or affixed on or to any window, door, restroom conference/team room or other part of the building unless approved by PW Work Management Center. Bulletin boards for posting of unofficial material are restricted to communal areas such as break rooms and coffee bars.

8. Bicycles: Building occupant shall not bring bicycles or motorcycles into the office environment, but shall be left secured in an upright position in areas designated for that purpose.

9. Aerosol Sprays: The use of aerosol products such as air fresheners, hair sprays, etc., in the work environment should be avoided.

10. Maintenance: All requests for maintenance on furnishings, or building systems or components should be reported to PW Work Management Center.

11. Smoking: The use of tobacco products inside any Army facility is strictly prohibited. Smoking of tobacco products may only occur in designated areas where proper ash receptacles, which are kept free of trash and debris, are located.

PUBLIC SPACES:

1. Eating in Work Areas: Eating in work areas can contribute to pest infestation and an unsightly appearance. If eating at your desk, please ensure trash is discarded daily. Perishable food items should not be stored in the building occupant's work area. Perishable foods are to be kept refrigerated.

2. Appliances (e.g., Heaters/Refrigerators/Microwaves/Coffee Pots): Refrigerators and microwaves are not permitted in work areas. One personal fan, not to exceed 8" in diameter may be placed in a workstation. Exceptions to accommodate health problems may be submitted to Occupational Health.

3. Centralization: Copiers, faxes, scanners, printers, etc., will be centralized and networked to the maximum extent possible. Personal office equipment will be provided on an exception basis only.

4. Office Accessories: All office equipment and other devices of any electrical or mechanical nature shall be placed on an area of the work surface that best accommodates the prevention/elimination of any vibration, noise or annoyance to others. Building occupant shall not construct, maintain, use or operate any equipment of machinery that produces music, sound, noise, pictures, or lighting which is audible or visible beyond their workstation.

5. Office Wall Mountings: Only framed items shall be hung on walls. No artwork or other displays may be placed or hung on fixed or temporary walls/partitions, other than in private offices. The use of tape, pushpins, or other devices to affix items to walls is prohibited.

6. Plants: Plants must be contained in appropriate leak-proof non-corroding containers such as ceramic jardinières or flower pots with saucers and shall be kept within workstations and not affixed in any way to the workstation, partitions, floors, or ceiling as outlined in the guidance detailed elsewhere in this document; this prohibition extends to trailing vines. Small plants that do not interfere with the normal operation of window blinds may be placed on windowsills. Watering of plants shall not subject any government equipment to risk of damage.

7. Speakerphones: The use of speakerphones is discouraged and should be restricted to those occasions when absolutely necessary. Concerted efforts must be made to utilize team rooms when speakerphone conversations are required.

8. Trash: The janitorial contractor will discard only items in wastebaskets or items clearly labeled “TRASH”. Do not place trash in the corridors, hallways, stairwells, or other common areas.

9. Workstation Reconfiguration: Workstations will not be reconfigured, modified, or altered in any way by the occupant.

10. Workstation Guidelines: Every building occupant shall make a concerted effort to keep workstations clean, uncluttered, and professional in appearance. Avoid placing papers and other “hard copy” materials on the wall of the workstation and the accumulation of excessive pictures/cartoons/mementos. The storage of papers, boxes, and files on floors is prohibited. Materials are not to be hung on the outside panels of workstations.

a. Above the Panels: Nothing will be placed above the panel height of the workstations or hung from the ceiling. Nothing will be stacked on the tops of flipper doors, map files, filing cabinets, towers, etc.

b. Cabling: No temporary cabling for electrical, information technology, or communications is allowed. Communications and information technology are the responsibility of the Director of Information Management. Administrative furniture is the responsibility of the Director of Logistics. This prohibition includes extension

cords; surge protectors are permitted. Wiring is to be contained in cable trays and off the floors.

11. Care of Furniture and Furniture Systems

a. Laminate Surfaces – To clean laminate tops, use a soft cloth or non abrasive sponge dampened in a solution of mild detergent and warm water. Remove residue of cleaning solution with a soft cloth wrung out in clean water. Dry with a soft cloth.

b. Steel and Painted Metal Surfaces – Panel trim, panel poles, painted flipper doors, and other parts of flipper doors should be cleaned with a soft damp cloth and thoroughly dried with a soft dry cloth. For soiled areas a mild detergent solution in warm water may be used.

c. Fabric – For information on how to remove spots from fabric panels on workstations, contact PW Work Management Center.

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APPENDIX O
PLANT PALETTE

Following is a Plant Selection List for Fort Lewis. For areas that are within the installation's historic districts, refer to the Fort Lewis Landscape Development Plan to identify appropriate plants for these areas.

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics											Culture								Use							
DECIDUOUS TREES																												
Acer Circinatum	Vine Maple	♦			♦							♦		♦		♦	♦		♦				♦					
Acer Ginnala	Amur Maple	♦			♦							♦				♦	♦		♦									♦
Acer Griseum	Paperbark Maple	♦			♦						♦			♦			♦		♦									♦
Acer Palmatum	Japanese Maple	♦			♦							♦		♦			♦		♦									♦
Acer Rubrum	"Scarlet Sentinel" Red Maple	♦				♦						♦		♦			♦		♦		♦							
Acer Rubrum	"Autumn Blaze" Red Maple	♦				♦						♦		♦			♦		♦		♦							
Acer Rebrum	"Red Sunset" Red Maple	♦				♦						♦		♦			♦		♦		♦							
Acer Saccharum	"Bonfire" Sugar Maple	♦			♦							♦			♦		♦					♦						
Acer Saccharum	"Green Mountain Sugar Maple	♦			♦				♦			♦			♦		♦					♦						
Amelanchier Laevis	Serviceberry	♦			♦					♦		♦		♦					♦					♦				
Betula Jacquemontii	Jacquemont Birch	♦				♦					♦				♦			♦						♦				
Carpinus Betulus "Fastigiata"	Columnar Hornbeam	♦		♦								♦		♦				♦			♦		♦	♦				
Cercidiphyllum Japonicum	Katsura Tree	♦		♦								♦		♦			♦	♦			♦							
Cercis Occidentalis	Western Rosebud	♦			♦				♦	♦	♦	♦		♦		♦	♦		♦		♦			♦				♦
Cornus Kousa	Kousa Dogwood	♦		♦				♦		♦	♦	♦		♦			♦	♦					♦	♦				♦
Continus Coggygria "Purpureus"	Smoke Tree	♦		♦				♦		♦		♦			♦	♦	♦		♦									
Fraxinus Oxycarpa	Raywood Ash	♦				♦		♦				♦			♦		♦		♦		♦	♦						
Fraxinus Pennsylvanica	Cimmaron Ash	♦				♦		♦				♦			♦		♦		♦		♦	♦						
Fraxinus Pennsylvanica "Marshall's Seedless"	Seedless Green Ash	♦				♦		♦				♦			♦		♦		♦		♦	♦						
Fraxinus Pennsylvanica	Patmore Ash	♦				♦		♦				♦			♦		♦		♦		♦	♦						
Ginkgo Bilboa "Autumn Gold"	Maidenhair Tree	♦		♦				♦				♦			♦		♦		♦		♦							♦
Gleditsia Triancanthos	"Shademaster" Honey Locust	♦			♦							♦			♦		♦		♦			♦						♦
Gleditsia Triacanthos	"Skyline" Honey Locust	♦			♦							♦			♦		♦		♦			♦						♦

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics														Culture					Use							
DECIDUOUS TREES - CONTINUED																												
Larix Occidentalis	Western Larch	♦				♦						♦			♦			♦					♦	♦				♦
Liquidambar Styracflua	American Sweetgum	♦			♦						♦	♦			♦				♦									
Liriodendrum Tulipfera	Tulip Tree	♦				♦		♦		♦	♦	♦			♦			♦				♦						
Magnolia Soulangeana	Saucer Magnolia	♦			♦				♦	♦				♦				♦				♦						♦
Magnolia Stellata	Star Magnolia	♦		♦					♦	♦				♦				♦										♦
Malus "Centurion"	Centurion Crabapple	♦			♦				♦	♦					♦				♦									♦
Malus "Prairiefire"	Prairiefire Crabapple	♦			♦				♦	♦					♦				♦									♦
Malus "Sugartyme"	Sugartyme Crabapple	♦			♦				♦	♦					♦				♦									♦
Parrotia Persica	Persian Parrotia	♦		♦					♦	♦	♦	♦		♦			♦		♦									♦
Pyrus Calleryana	"Chanticleer" Flowering Pear	♦			♦				♦	♦		♦			♦				♦									♦
Styrax Obassia	Fragrant Snowbell	♦		♦				♦		♦		♦		♦			♦	♦										♦
Tilia Tomentosua	Silver Linden	♦			♦			♦		♦		♦			♦	♦			♦			♦						
Tilia Cordata	Greenspire Linden	♦			♦			♦		♦		♦			♦	♦			♦			♦						
Zelkova Serrata	"Village Green" Sawleaf Zelkova	♦					♦					♦				♦	♦		♦		♦	♦						

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics											Culture								Use							
EVERGREEN TREES																												
Calocedrus Decurrens	Incense Cedar		♦		♦							♦		♦		♦	♦		♦				♦					
Cedrus Atlantica	Atlas Cedar		♦	♦								♦			♦	♦			♦				♦					
Cedrus Deodara	Deodar Cedar		♦	♦								♦			♦	♦			♦				♦					
Chamaecyparis Nootkatensis	Alaska Yellow Cedar		♦	♦								♦		♦				♦					♦					♦
Chamaecyparis Obtusa	Hinoki False Cypress		♦	♦								♦		♦				♦					♦	♦				♦
Cupressocyparis Leylandii	Leyland Cypress		♦			♦						♦			♦	♦			♦				♦	♦	♦	♦		
Cupressus Sempervinirens	"Indica" Italian Cypress		♦		♦							♦			♦	♦				♦			♦	♦		♦		
Juniperus Chinensis	"Robustsa Green" Juniper		♦		♦							♦			♦	♦				♦			♦	♦				
Juniperus Scopulorum "Blue Heaven"	Rocky Mountain Juniper		♦		♦							♦			♦	♦				♦			♦	♦				
Magnolia Grandiflora	"St. Mary" Southern Magnolia		♦	♦					♦	♦		♦		♦				♦			♦		♦					♦
Pinus Contorta	Shore Pine		♦			♦					♦	♦			♦	♦				♦			♦	♦				
Pinus Flexilis	"Vanderwolf's Pyramid" Limber Pine		♦	♦							♦	♦			♦	♦				♦			♦	♦				
Pinus Nigra	Austrian Pine		♦	♦		♦					♦	♦			♦	♦				♦			♦	♦				
Pinus Ponderosa	Ponderosa Pine		♦			♦					♦	♦			♦	♦				♦			♦	♦				
Pinus Sylvestris	Scotch Pine		♦			♦					♦	♦			♦	♦				♦			♦	♦				
Pseudotsuga Menziesii	Douglas Fir		♦			♦						♦		♦		♦			♦				♦	♦				
Thuja Occidentalis	"Emerald Green" Arborvitae		♦		♦							♦			♦	♦			♦				♦		♦	♦		
Thuja Plicata	Hogan Cedar		♦			♦						♦			♦	♦			♦				♦	♦	♦	♦		
Thuja Plicata	Western Red Cedar		♦			♦					♦	♦		♦				♦					♦	♦				
Tsuga Canadensis	Canada Hemlock		♦		♦							♦		♦				♦					♦	♦				
Tsuga Heterophylla	Western Hemlock		♦		♦							♦		♦					♦				♦	♦				
Tsuga Mertensiana	Mountain Hemlock		♦	♦								♦		♦														
Abie's Grandis	Grand Fir		♦		♦							♦		♦					♦				♦	♦	♦			

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics								Culture											Use							
EVERGREEN SHRUBS																												
Arbutus Unedo	Strawberry Tree		♦	♦			♦			♦	♦	♦		♦		♦	♦		♦				♦	♦				
Arbutus Unedo "Compatica"	Compact Strawberry Tree		♦	♦			♦			♦	♦	♦		♦		♦	♦		♦				♦	♦				
Buxus Sempervirens	English Boxwood		♦		♦							♦		♦				♦					♦	♦		♦		
Ceanothus Thyrsiflorus	"Victoria" Ceanothus		♦			♦			♦	♦		♦			♦	♦				♦			♦	♦			♦	
Chamaecyparis Obtusa "Nana"	Dwarf Hinoki False Cypress		♦	♦								♦		♦				♦					♦	♦				
Cistus X Hybridus	White Rockrose		♦			♦			♦	♦		♦			♦	♦				♦				♦			♦	
Cistus X Purpureus	Purple Rockrose		♦			♦			♦	♦		♦			♦	♦				♦				♦			♦	
Cotoneaster Parneyi	Parney Cotoneaster		♦			♦	♦					♦			♦	♦	♦			♦			♦	♦			♦	
Daphne Cneorum	"Rugbyglow" Garland Daphne		♦		♦				♦	♦		♦			♦				♦					♦				
Elaeagnus Pungens	Pungent Elaeagnus		♦			♦	♦					♦		♦		♦			♦				♦	♦			♦	
Ilex Crenata	"Green Island" Japanese Holly		♦		♦							♦		♦					♦					♦		♦		
Ilex Crenata	"Northern Beauty" Japanese Holly		♦		♦							♦		♦					♦					♦		♦		
Lavandula Stoechas	Spanish Lavendar		♦		♦			♦		♦		♦			♦	♦	♦			♦				♦			♦	
Lonicera Pileata	Privet Honeysuckle		♦			♦			♦	♦		♦		♦		♦			♦								♦	
Mahonia Aquifolium	Oregon Grape		♦			♦			♦	♦		♦		♦		♦	♦		♦				♦	♦		♦	♦	
Myrica Californica	Pacific Wax Myrtle		♦			♦						♦		♦		♦			♦					♦			♦	
Nandina Domestica	"Gulf Stream" Nandina		♦	♦				♦				♦		♦			♦		♦					♦			♦	
Osmanthus Delavayi	Delavay Osmanthus		♦		♦				♦	♦		♦			♦	♦			♦					♦				♦
Paxistima Myrsinites	Oregon Boxwood		♦		♦							♦			♦	♦			♦					♦				
Picea Abies "Nidiformis"	Bird's Nest Spruce		♦	♦								♦		♦					♦					♦				
Pieris Japonica	Montain Fire Andromeda		♦		♦				♦	♦		♦		♦				♦						♦				♦
Pinus Mugo "Pumilio"	Dwarf Mugo Pine		♦	♦								♦		♦		♦				♦				♦				
Pittosporum Tobira	Wheelers Dwarf Pittosporum		♦	♦				♦		♦		♦		♦					♦					♦				
Polystichum Munitum	Sword Fern		♦		♦							♦		♦					♦					♦				

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics											Culture								Use							
EVERGREEN SHRUBS - CONTINUED																												
Prunus Lauracerasus	"Otto Luyken" Laurel		♦			♦			♦	♦		♦		♦		♦			♦				♦	♦		♦		
Prunus Laurocerasus	"Zabel" Laurel		♦			♦			♦	♦		♦		♦		♦			♦				♦	♦			♦	
Rhododendron	Anah Kruschkle Rhododendron		♦	♦				♦		♦		♦			♦			♦					♦	♦				♦
Rhododendron	Gomer Waterer Rhododendron		♦	♦				♦		♦		♦			♦			♦										♦
Rhododendron	Loder's White Rhododendron		♦	♦				♦		♦		♦			♦			♦										♦
Rhododendron	"Lucy Lou" Dwarf Rhododendron		♦	♦					♦	♦		♦			♦			♦						♦				
Rhododendron	"Myrtifolium" Dwarf Rhododendron		♦	♦				♦		♦		♦			♦			♦						♦				
Rhododendron	"PJM" Rhododendron		♦	♦					♦	♦		♦			♦			♦						♦				
Rhododendron	"Purple Splendor" Rhododendron		♦	♦				♦		♦		♦	♦		♦			♦					♦	♦				♦
Rhododendron	Dwarf Rhododendron		♦	♦					♦	♦		♦	♦		♦			♦						♦				
Rhododendron	Rosamundi Rhododendron		♦	♦					♦	♦		♦		♦				♦						♦				♦
Rhododendron	Unique Rhododendron		♦	♦					♦	♦		♦		♦				♦					♦	♦				
Rhododendron	Yakusimanum		♦	♦				♦		♦		♦		♦				♦						♦				
Rosmarinus Officinalis	Rosemary		♦			♦			♦	♦		♦			♦	♦	♦			♦				♦			♦	
Sarcococca Ruscifolia	Fragrant Sarcococca		♦		♦				♦	♦		♦	♦						♦					♦				
Senecio Greyi	Senecio		♦			♦		♦		♦		♦			♦	♦			♦					♦				
Taxus Baccata "Repandens"	Spreading English Yew		♦	♦								♦		♦		♦				♦				♦			♦	
Vaccinium Ovatum	Evergreen Huckleberry		♦	♦								♦		♦		♦			♦					♦				
Viburnum Davidii	Davids Virburnum		♦		♦				♦	♦		♦		♦		♦			♦					♦			♦	
Viburnum Tinus	"Spring Bouquet" Laurustinus		♦		♦		♦		♦	♦		♦		♦		♦			♦				♦	♦		♦		

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics											Culture								Use							
DECIDUOUS SCHRUBS																												
Amelanchier Alnifolia	Western Serviceberry				♦				♦	♦		♦		♦		♦			♦					♦				
Azalea Exgeny	Exbury Azalea	♦			♦				♦	♦	♦	♦		♦					♦					♦				♦
Azalea Mollis	Azalea Mollis	♦			♦				♦	♦	♦	♦		♦					♦					♦				♦
Berberis Thunbergii	"Red Dwarf" Japanese Barberry	♦		♦								♦			♦	♦			♦					♦				
Berberis Thunbergii	"Crimson Pygmy" Japanese Barberry	♦		♦								♦			♦	♦			♦					♦				
Berberis Thunbergii	"Rose Glow" Japanese Barberry	♦										♦			♦	♦			♦					♦				
Caryopteris X Clandonensis	Bluebeard	♦			♦		♦	♦				♦			♦	♦			♦					♦				
Cornus Stolonifera	Redtwig Dogwood	♦				♦		♦			♦			♦		♦			♦				♦	♦				
Cornus Stolonifera	"Silver & Gold" Dogwood	♦				♦		♦			♦	♦		♦		♦			♦					♦				
Cotoneaster Horizontalis	Rock Cotoneaster	♦			♦				♦		♦	♦			♦	♦	♦		♦					♦				
Enkianthus Campanulatus	Enkianthus	♦		♦					♦	♦	♦	♦	♦					♦						♦				♦
Euonymus Alata "Compacta"	Compact Burning Bush	♦				♦					♦	♦			♦	♦			♦					♦			♦	
Hamamelis X Intermedia	"Diane" Witchhazel	♦			♦				♦	♦		♦		♦				♦						♦				♦
Holodiscus Discolor	Ocean Spray	♦			♦			♦		♦		♦		♦		♦				♦				♦				
Hydrangea Macrophylla	"Lacecap" Hydrangea	♦				♦		♦		♦		♦	♦					♦					♦	♦				
Oemleria Cerasiformis	Indian Plum	♦			♦				♦	♦		♦		♦				♦						♦				
Philadelphus Lewisii	Mock Orange	♦				♦		♦		♦		♦			♦				♦				♦	♦				
Potentilla Fruticosa	Shrubby Cinquefoil	♦			♦			♦		♦		♦			♦	♦				♦				♦			♦	
Rhus Glabra	Smooth Sumac	♦						♦			♦	♦			♦	♦				♦				♦			♦	
Rhus Typhina "Laciniata"	Cutleaf Sumac	♦						♦			♦	♦			♦	♦				♦				♦			♦	♦
Ribes Aureum	Golden Currant	♦				♦			♦	♦		♦		♦		♦				♦				♦			♦	
Ribes Sanguineum	"Red Flowering" Currant	♦				♦			♦	♦		♦		♦		♦				♦				♦			♦	
Ribes Sanguineum	"Elk River Red" Currant	♦				♦			♦	♦		♦		♦		♦				♦				♦			♦	
Rosa Rugosa	Ramanas Rose	♦				♦		♦	♦	♦		♦			♦	♦	♦			♦				♦		♦	♦	
Rosa Woodsii	Wood's Rose	♦				♦		♦		♦		♦			♦	♦			♦					♦				♦
Spirea Nipponica	"Snowmound" Spirea	♦			♦			♦		♦		♦		♦		♦			♦					♦				
Symphoricarpos Albus	Common Strawberry	♦			♦			♦		♦		♦		♦		♦				♦				♦			♦	
Syringa Meyeri "Palibin"	Dwarf Korean Lilac	♦			♦				♦	♦		♦			♦	♦			♦					♦				♦
Viburnum Tomentosum "Mariesii"	Doublefile Viburnum	♦				♦			♦			♦		♦		♦			♦				♦	♦				♦

PLANT SELECTION LIST

Plant Materials Suitability Section

Botanical Name	Common Name	Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Characteristics											Culture								Use							
GROUND COVERS/VINES																												
Ajuga Reptans	Carpet Bugle	♦				♦		♦		♦		♦		♦					♦									
Arctostaphylos Uva Ursi "Vancouver Jade"	Kinnikinnick		♦	♦					♦	♦		♦			♦	♦				♦							♦	
Calluna Vulgaris	"Aurea" Heather		♦					♦		♦		♦			♦				♦					♦			♦	
Calluna Vulgaris	"Corbet Red" Heather		♦		♦			♦		♦		♦			♦				♦					♦			♦	
Calluna Vulgaris	"Robert Chapman" Heather		♦		♦			♦		♦		♦			♦				♦					♦			♦	
Clematis Armandii	Evergreen Clematis					♦			♦	♦		♦			♦				♦									
Clematis Montana "Rubens"	Deciduous Clematis	♦				♦			♦	♦		♦			♦				♦									
Cotoneaster Dammeri	Bearberry Cotoneaster		♦			♦			♦			♦			♦	♦				♦							♦	
Erica Carnea	"Mediterranean Pink" Heath		♦	♦					♦	♦		♦			♦				♦								♦	
Erica Carnea	"Springwood White" Heath		♦	♦					♦	♦		♦			♦				♦								♦	
Erica Carnea	"Winter Beauty" Heath		♦	♦					♦	♦		♦			♦				♦								♦	
Euonymus Fortunei "Colorata"	"Purple Leaf" Wintercreeper		♦			♦						♦		♦					♦									
Euonymus Fortunei	"Kewensis" Wintercreeper		♦			♦						♦			♦	♦			♦									
Fragaria Chiloensis	Sand Strawberry		♦			♦			♦	♦		♦				♦			♦								♦	
Gaultheria Shallon	Salal		♦		♦				♦			♦		♦		♦											♦	
Hydrangea Petiolaris	Climbing Hydrangea	♦				♦		♦		♦		♦		♦				♦										
Hypericum Calycium	St. Johnswort		♦			♦		♦		♦		♦			♦	♦			♦								♦	
Juniperis Conferta "Blue Pacific"	Shore Juniper		♦		♦							♦			♦	♦				♦				♦			♦	
Juniperis Horizontalis	"Blue Chip" Juniper		♦		♦							♦			♦	♦				♦				♦			♦	
Juniperis Horizontalis	"Prince of Wales" Juniper		♦		♦							♦			♦	♦				♦				♦			♦	
Juniperis Horizontalis	"Wilton" Juniper		♦		♦							♦			♦	♦				♦				♦			♦	
Juniperis Procumbens	"Green Mound Garden" Juniper		♦		♦							♦			♦	♦				♦				♦			♦	
Juniperis Sabina	"Braodmoor" Juniper		♦		♦							♦			♦	♦				♦				♦			♦	

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
Botanical Name	**Common Name**	**Characteristics**												**Culture**							**Use**							
GROUND COVERS/VINES - CONTINUED																												
Mahonia Nervosa	Longleaf Mahonia		♦		♦				♦	♦		♦		♦		♦				♦							♦	
Mahonia Repans	Creeping Mahonia		♦		♦				♦	♦		♦		♦		♦				♦							♦	
Pachysandra Terminalis	Japanese Spurge		♦	♦					♦			♦	♦					♦										
Rosmarinus Officinalis "Prostratus"	Creeping Rosemary		♦			♦			♦	♦		♦			♦	♦	♦			♦							♦	
Rubus Calycinoides "Emerald Carpet"	Creeping Raspberry		♦			♦			♦	♦		♦		♦					♦								♦	
Sarcococca Hookeriana "Humilis"	Low Sweetbox		♦		♦				♦			♦	♦						♦									
Thymus Pesudolanuginosus	Wooly Thyme		♦		♦			♦				♦			♦	♦			♦									
Thymus Serphyllum	Wild Thyme		♦		♦			♦				♦			♦	♦			♦									
Vinca Minor	Dwarf Periwinkle		♦			♦			♦	♦		♦		♦					♦								♦	

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resi stant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
Botanical Name	**Common Name**	**Characteristics**											**Culture**								**Use**							
GRASSES & PERENNIALS																												
Acorus Gramineus "Ogon"	Sweetflag		♦		♦							♦			♦			♦						♦				
Carex Morrowii "Aureo Variegata"	Variegated Sedge			♦								♦		♦				♦										
Epimedium Grandiflorum "Rose Queen"	Bishop's Hat								♦	♦		♦		♦		♦			♦									
Epimedium X Rubrum	Bishop's Hat					♦			♦	♦		♦		♦		♦			♦									
Geranium SP.	Cranesbill					♦		♦		♦		♦		♦					♦									
Helictotrichon Sempervirens	Blue Oat Grass		♦			♦			♦	♦		♦			♦	♦												
Hemerocallis Sp.	Daylily					♦		♦		♦		♦			♦	♦												
Heuchera Micrantha	"Palace Purple" Coral Bells				♦			♦		♦		♦	♦						♦									
Hosta Sp.	Plantain Lily			♦				♦		♦		♦	♦					♦										
Liatris Spicata "Kobold"	Gayfeather					♦		♦		♦		♦			♦	♦			♦									
Liriope Muscari	Big Blue Lilyturf			♦								♦	♦						♦									
Lithodora Diffusa	"Grace Ward" Lithodora					♦		♦		♦		♦			♦	♦				♦							♦	
Miscanthis Sinensis	"Yaku Jima" Silver Grass					♦		♦		♦		♦		♦					♦								♦	
Miscanthis Sinensis "Zebrinus"	Zebra Grass					♦		♦		♦		♦		♦					♦								♦	
Ophiopogon Japonicus "Nana"	Dwarf Mondo Grass			♦				♦				♦	♦						♦									
Pennisetum Alopecuroides	Fountain Grass				♦			♦		♦		♦		♦					♦									
Sedum Spurium	"Dragon's Blood" Stonecrop					♦		♦		♦		♦		♦		♦				♦								
Veronics Peduncularis	"Georgia Blue" Speedwell				♦				♦	♦		♦			♦				♦									

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APPENDIX P
ARMY FACILITIES STANDARDIZATION PROGRAM

CENTERS OF STANDARDIZATION

P.1 General. The various facility types are listed with contact information according to the Center of Standardization (COS) responsible for development of standards for that facility type.

P.2 Specific Contact Information. For more specific contact information, such as POC with email address and telephone number, refer to the IDS Newsletter (https://secureapp2.hqda.pentagon.mil/acsimnews/) under the heading "Standardization Program POCs". An Army Knowledge Online (AKO) account will be required to access the information which includes the Category Code, Army Proponent, ACSIM Proponent, HQUSACE POC, and HQIMA POC.

Army Facilities Standardization Program Centers of Standardization	
Assigned Center	**Facility Type**
U.S. Army Engineering and Support Center, Huntsville **Attn: CEHNC-ED-CS-A and IS** **P.O. Box 1600** **Huntsville AL 35807** **Telephone: 256-895-1673/1672/1535**	Child Development Center-Infant/Toddlers
	Child Development Center Playground
	Child Development Center – 6 to 10 Year Olds
	Physical Fitness Facilities
	Fire Station
	Hazardous Material Storage Facility
	Outdoor Sports Facility
	Close Combat Tactical Trainer (CCTT)
	Urban Assault Course (UAC) *replaces: Military Operations Urban Terrain (MOUT)*
	Training Range
	Youth Activity Center
	Bowling Center (RFP)
	Army Community Service Centers
	Consolidated Fire/Police/Safety Facility
U.S. Army Engineer District, Louisville **ATTN: CELRL-ED-D-A** **600 Martin Luther King Jr. Place** **Louisville, KY 40202 Tel: 502-315-6250**	Army Reserve Center
U.S. Army Engineer District, Norfolk **ATTN: CENAO-TS-EA** **803 Front Street** **Norfolk, VA 23510** **Telephone: 757-441-7702**	Classroom XXI
	Criminal Investigation Facility (CIDC)
	Enlisted Personnel Dining Facility
	Family Housing (RFP)
	General Instruction Building
	Information Systems Facility
	Troop Issue Subsistence Activity Facility (TISA)
	Central Issue Facility
	General Purpose Warehouse
U.S. Army Engineer District, Omaha **ATTN: CENWO-ED-DG/PM-M** **215 North 17th Street** **Omaha, NE 68102** **Telephone: 402-221-4552/443**	Army Chapel
	Chapel Family Life Center
	Religious Education Facility
	Small Site Chapel
	Access Control Points
	Airfields, Railroads, Pavements, Bridges, & Dams

Army Facilities Standardization Program Centers of Standardization	
Assigned Center	**Facility Type**
U.S.Army Engineer District, Mobile **ATTN:CESAM-PM-SI** **P.O. Box 2288** **Mobile, AL 36652-2288** **Telephone: 251-394-3600**	National Guard Armory
U.S. Army Engineer District, Savannah **ATTN: CESAS-EN-E** **P.O. Box 889** **Savannah, GA 31402** **Telephone: 912-652-5212**	Company Operations Facility (COF)
	Military Entrance Processing Station (MEPS)
	Tactical Equipment Maintenance Facility (TEMF)
	Unaccompanied Enlisted Personnel Housing (UEPH), New & Modernization
	One Station Unit Training (OSUT) Barracks
	Unaccompanied Officer / Sr. Enlisted / Quarters
	Unaccompanied Officer Quarters, Transient
	Brigade / Battalion HQ
	Operational Readiness Training Complex (ORTC)
	Deployment Facility
	*Advanced Individual Training (AIT) Barracks
	*Basic Combat Trainee (BCT)
U.S. Army Engineer District, Tulsa **ATTN: CESWT-EC-D** **1645 S. 101ST East Avenue** **Tulsa, OK 74128** **Telephone: 918-669-7033**	*Advanced Individual Training (AIT) Barracks
	*Basic Combat Trainee (BCT)
	Reception Barracks
*AIT & BCT to be transferred to Savannah, upon completion by Tulsa.	
CFSC **Telephone: 703-681-1506**	Army Lodging
	Clubs/FBE Facilities
	Golf Courses
	Recreational Lodging

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APPENDIX Q
STANDARDS AND REFERENCES

Q.1 STANDARDS AND REFERENCES

Standards and References for the Army Installation Design Guide (IDG). *These references and standards are subject to change. References should be checked per the latest MILCON Transformation RFP for applicability.*

Q.1.1 Section 7, Site Planning

Q.1.1.1 Army Standards

- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Anti-Terrorism Standards for Buildings* (latest edition)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)

Q.1.1.2 References

- Unified Facilities Criteria (UFC) *2*-600-01, *Installation Design*, Chap 7
- Unified Facilities Criteria (UFC) *3-400-01*, Design: Energy Conservation
- Unified Facilities Criteria (UFC) *3-210-01A* Design: Area Planning, Site Planning, and Design,
- Unified Facilities Criteria (UFC) *3-230-15FA*, Design: Subsurface Drainage Facilities for Airfields and Heliports

- Unified Facilities Criteria (UFC) *3-230-16FA*, Design: Drainage and Erosion Control Structures for Airfields and Heliports
- Unified Facilities Criteria (UFC) *3-230-17FA* , Design: Drainage for Areas Other than Airfields
- Unified Facilities Criteria (UFC) *3-230-18FA*, Design: General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas
- Unified Facilities Criteria (UFC) *3-260-02*, Design: Pavement Design for Airfields
- Unified Facilities Criteria (UFC) *3-250-01FA*, Design: Pavement Design for Roads, Streets, Walks and Open Storage Areas
- Army Regulation (AR) 200-2, *Environmental Effects of Army Actions*
- Technical Instructions (TI) 800-01, *Design Criteria*
- Technical Instructions (TI) 801-02, *Family Housing*
- Whole Building Design
- Stormwater Management Manual for Western Washington (latest edition)
- LEED Literature

Q.1.2 Section 8, Building Design Standards

Q.1.2.1 Army Standards

- Army Regulation (AR) 200-4, *Cultural Resources Management*
- Unified Facilities Criteria (UFC) 3-520-01, *Interior Electrical Systems*
- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*
- Unified Facilities Criteria (UFC) 4-171-05, *Army Reserve Facilities*
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- Secretary of the Interior's Standards for the Treatment of Historic Properties
- Unified Facilities Criteria (UFC) 3-310-04, *Seismic Design for Buildings*

- Unified Facilities Criteria (UFC) 3-330-03A, *Seismic Review Procedures for Existing Buildings*

- Unified Facilities Criteria (UFC) 4-721-11.1, *Unaccompanied Enlisted Personnel Housing (UEPH) Complexes*

- Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003

- Quality Standards for New and Replacement Residential Communities Initiative (RCI) Family Housing

- Army Lodging Standards

- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHNC 1110-1-23 Manual

- Revised Range Design/Construction Interface Standards

- Army Chapel Standard Definitive Design

- Army Standard for Chapel Construction – January 2004 and Memorandum for Record, subject: The Army Standards for Chapels, dated 21 January 2004.

- Army Standards for Company Operation Facility (COF)

Q.1.2.2 References

- Army Regulation (AR) 190-13, *The Army Physical Security Program*

- Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*

- Army Regulation (AR) 200-4, *Cultural Resources Management*

- Army Regulation (AR) 210-20, *Real Property Master Planning for Army Installations*

- Army Regulation (AR) 405-45, *Real Property Inventory Management*

- Unified Facilities Criteria (UFC) 4-510-01, *Design: Medical Military Facilities*

- Unified Facilities Criteria (UFC) 1-200-01, *General Building Requirements*

- Engineering Regulation (ER) 1110-345-122, *Engineering and Design, Interior Design*

- Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*

- U.S. Army Corps of Engineers, Design Guide (DG) 1110-3-122, *Design Guide for Interiors*

- Unified Facilities Criteria (UFC) 3-530-01, *Design: Interior and Exterior Lighting and Controls*

- Unified Facilities Criteria (UFC) 3-520-01, *Interior Electrical Systems*

- Unified Facilities Criteria (UFC) 3-510-01ANF, *Foreign Voltage and Frequencies Guide*

- Unified Facilities Criteria (UFC) 3-130-07, *Building Arctic and Sub-arctic Construction*

- Unified Facilities Criteria (UFC) 4-721-11.1, *Unaccompanied Enlisted Personnel Housing (UEPH) Complexes*

- Unified Facilities Criteria (UFC) 3-120-01, *Interior Design*

- Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA [FM&C]) Sales and Outlease of Army Assets - Installation Guide

- Assistant Chief of Staff for Installation Management

- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development Website

- Whole Building Design Guide

Q.1.3 Section 9, Circulation Design Standards

Q.1.3.1 Army Standards

- Army Regulation (AR) 420-72, *Transportation Infrastructure and Dams*

- Unified Facilities Criteria (UFC) 3-210-02, *Privately Owned Vehicle (POV) Site Circulation and Parking*

- Unified Facilities Criteria (UFC) 3-550-03FA, *Electric Power Supply and Distribution*

- Unified Facilities Criteria (UFC) 3-250-18FA, *General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas*

- Unified Facilities Criteria (UFC) 4-860-01FA, *Railroad Design and Rehabilitation*

- Manual For Railway Engineering

- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, latest edition

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)

- Uniform Federal Accessibility Standards (UFAS)

- Manual of Uniform Traffic Control Devices (MUTCD)

- Chicago's Bike Lane Design Manual (Provides a comprehensive series of technical drawings and design specifications for bike lanes).

Q.1.3.2 References

- U.S. Air Force, Landscape Design Guide, Parking Area

- U.S. Air Force, Landscape Design Guide, Walkways and Bikeways (Provides a comprehensive walkways and bikeways planning guide including sections on paving materials and gradients and curvature data).

- Illumination Engineering Society of North America (IESNA)

- Federal Highway Administration reference document "Accessible Sidewalks and Street Crossings – an informational guide".

Q.1.4 Section 10, Landscape Design Standards

Q.1.4.1 Army Standards

- Technical Manual (TM) 5-630, *Natural Resources Land Management*

- Unified Facilities Criteria (UFC) 3-210-05FA, *Landscape Design and Planting*

- American Standard for Nursery Stock, ANSI Z60.1

- Overseas (Host Nation Standards)

Q.1.4.2 References

- USAF Landscape Design Guide

- C. Brickell and D. Joyce. Pruning and Training, 1996

Q.1.5 Section 11, Site Elements Design Standards

Q.1.5.1 Army Standards

- DoD 4525.8-M, DoD Official Mail Manual
- Army Regulation (AR) 420-72, *Transportation Infrastructure and Dams*
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Uniform Federal Accessibility Standards (UFAS)
- Manual of Uniform Traffic Control Devices (MUTCD)
- MTMC Pamphlet 55-14, *Traffic Engineering for Better Signs and Markings*
- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, latest edition

Q.1.5.2 References

- Army Regulation (AR) 1-33, *Memorial Programs*
- Army Regulation (AR) 840-1, *Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques*
- Unified Facilities Criteria (UFC) 3-530-01, *Design: Interiors and Exterior Lighting and Controls*
- Unified Facilities Criteria (UFC) 4-740-14, *Design: Child Development Centers*
- Unified Facilities Criteria (UFC) 3-210-04, *Children's Outdoor Play Areas*

Q.1.6 Section 12, Force Protection Design Standards

Q.1.6.1 Army Standards

- Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings, Latest Edition*
- Unified Facilities Criteria (UFC) 4-010-02, *DoD Minimum Antiterrorism Standoff Distances for Buildings*. (This document is a "For Official Use Only [FOUO]" publication. Users may contact the Point of Contact posted at the noted website for inquires regarding this document).
- Uniform Federal Accessibility Standards (UFAS)
- Americans with Disabilities Act Accessibility Guideline (ADAAG)

- DoD Instruction 2000.16, DoD Antiterrorism Standards

Q.1.6.2 References

- Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the Army Knowledge Online web portal).

- Unified Facilities Criteria (UFC) 4-020-01, 4-020-02, 4-020-03, Security Engineering, All 3 volume series ("For Official Use Only [FOUO]" and are not available on the Army Corps of Engineers publications website. A copy of the manuals can be acquired via a standard publications account. The three volumes cover, Project Development, Concept Design, Final Design respectively).

Q.1.7 Appendix D, Sustainable Design

Q.1.7.1 Army Standard

- The LEED rating of "Silver" is the standard for all FY08 MILCON vertical construction projects. Refer to current US Army requirements for sustainable development.

Q.1.7.2 References

- Facilities and Housing Directorate Website

- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), Sustainable Design and Development

- Air Force Sustainable Facilities Guide

- Whole Building Design Guide

- LEED's rating systems, US Green Building Council

Q.1.8 Appendix M, Historic Preservation Guidelines

Q.1.8.1 Army Standards

- Army Regulation (AR) 200-4, *Cultural Resources Management*

- Department of the Army Pamphlet (DA PAM) 200-4, *Cultural Resources Management*

- The Secretary of the Interior's Standards for the Treatment of Historic Properties

Q.1.8.2 References

- Advisory Council on Historic Preservation
- United States Army Environmental Center

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APPENDIX R
WAIVER/ EXCEPTION TO STANDARDS

R.1 WAIVER/EXCEPTION TO STANDARDS

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