



FORT CAMPBELL

INSTALLATION DESIGN GUIDE

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April 15, 2006

INSTALLATION DESIGN GUIDE

Fort Campbell, KY

US Army Corps of Engineers, Louisville District
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and

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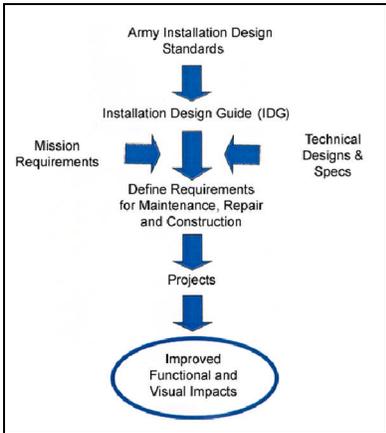


Figure ES - 1 The Army Installation Design Guide is a tool to implement army standards

Authority: The Commander's Guide Army Installation Standards published 1 October 2002 gave initial senior Army leadership direction. The Army Installation Design Standards establishes the Army standards for installation design as directed by the Secretary of the Army and the Chief of Staff, Army.

ES.1 PURPOSE

The purpose of the Army Installation Design Standards is to provide Army standards and serve as a tool for implementing those standards at Fort Campbell (Figure ES - 1).

- The design standards for site planning, buildings, vehicular and pedestrian circulation, landscaping, site elements (i.e. signage, utilities), force protection, and sustainable design are provided for incorporation into each Army installation.
- The framework for implementation is the Army Installation Design Guide (IDG). Each installation will imitate the IDG processes in the Army Installation Design Standards in the development of their installation specific IDG.

The "Fort Campbell, Kentucky, Technical Design Guide" is to be used in conjunction with the IDG. It has been developed to provide a single-source comprehensive resource for technical requirements regarding all MILCON and OMA program projects located on post. The technical guidance and criteria in this document is considered specific to Fort Campbell and it applies to all engineering and construction efforts completed by the Directorate of Public Works, The US Army Corps of Engineers (COE), and all Contract A-E designers.

ES.2 BACKGROUND

The Army Installation Design Standards follow the concept established in the Joint Service Unified Facilities Criteria Installation Design manual.

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

The existing Army Installation Design Guide was also reviewed for its application of procedures, examples, and benchmarks for IDG implementation Army-wide.

ES.3 IDG METHODOLOGY

The IDG provides standards and guidelines to Fort Campbell's 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.

The following paragraphs present an overview of the steps involved in developing Fort Campbell's IDG. The IDG promotes a sense of arrival, functional compatibility, and visual order, enhances site assets, relates the

natural and man-made environment, and achieves consistent architectural themes throughout the installation.

Step 1 – Installation Profile

Initially an installation profile was created in which the installation setting, existing land use, and proposed land use were detailed.

Step 2 - Visual Survey

The visual survey established the visual themes of the installation and documented the liabilities and assets within each visual theme.

Step 3 – Visual Themes

Information gathered was recorded and used to delineate visual themes (Figure ES - 2). Visual characteristics define a "look and feel" of an area, and together with the dominant features, define its image. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, functional use, natural features, and spatial relationships.

Step 4 – Assets and Liabilities

Each visual theme is then defined for its assets and liabilities. Subsequently, a visual analysis plan is prepared.

Step 5 – Recommendations

Recommendations are developed to address the liabilities identified and to enhance the assets noted in accordance with Army standards and the IDG goals and objectives. Recommendations follow assets and liabilities in section 5 (Visual Themes), and are in the form of specific projects that are utilized to prepare a prioritized projects list (Section 6 – Improvement Projects) for approval by the installation Real Property Planning Board.

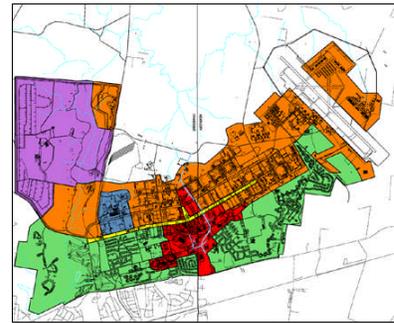


Figure ES - 2 Delineation of Visual Themes



ES.4 RESPONSIBILITIES

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.

Director Installation Management Agency (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.

Garrison Commander:

- Develop the installation's IDG.
- Chair installation Real Property Planning Board to review and approve projects established on the Prioritized Improvement Projects List to meet Army standards.
- Submit Prioritized Improvement Projects List for approval and funding IAW Director, IMA instructions after review and approval by Senior Mission Commander.
- Enforce IDG standards.



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

Major Army Command/Tenant:

- Participate in installation Real Property Planning Board.
- Participate in design and planning charrettes.
- Determine project functional requirements.
- Participate in design reviews.
- Participate in development of Prioritization Projects List.

ES.5 REFERENCES

[Fort Campbell Technical Design Guide](#)

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Section I Introduction

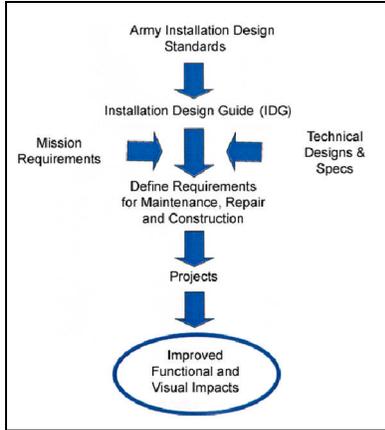


Figure I-1 The Army Installation Design Guide is a tool to implement army standard

I.1 PURPOSE

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.

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 (Figure I-1).

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.

I.2 GOAL

The goal of the IDG is to provide a clear, comprehensive approach to establish and maintain 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.

I.3 OBJECTIVES

The objectives of the IDG are:

- 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.
- To provide standards and guidelines for the selection of materials for new construction, renovation, maintenance and repair projects.
- To provide guidance for accomplishing sustainable development. See [Appendix C](#).
- To provide a structured methodology for establishing projects to improve the visual imagery of the installation.
- To provide guidance to integrate ATFP standards.

I.4 AUDIENCE

The IDG is to be used by all individuals involved in decision-making, planning, design, construction, and maintenance of facilities (Figure I-2). The primary users include the following:

- Senior Mission Commander
- Garrison Commanders and Staff
- Installation facility planning and design personnel
- Installation facility maintenance personnel
- Installation Management Agency and Region
- U.S. Army Corps of Engineers project managers, design, and construction staff
- Consulting Planners, Architects, Engineers, Interior Designers, and Landscape Architects
- Supporting agencies such as AAFES, DeCA, DoDDS, MEDCOM, tenants, etc.
- National Guard
- Force Protection Personnel

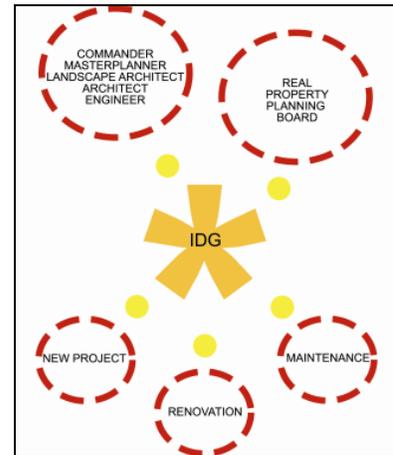


Figure I-2 Design Guide Audience

I.5 ORGANIZATION

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.

- [Section 1](#) describes the purpose of the IDG.
- [Sections 2](#) and [3](#) discuss the process, use, and implementation of the IDG.
- [Section 4](#) establishes the installation profile. The installation setting, existing land use, and future land use are detailed.
- [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.
- [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.
- [Sections 7, 8, 9, 10, 11](#) and [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.

I.6 WHEN TO USE THE ARMY INSTALLATION DESIGN GUIDE

This IDG provides installation-specific design data. 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. ATFP modifications and security considerations should also conform to the design standards.

I.7 MAINTAINING THE ARMY INSTALLATION DESIGN GUIDE

Since the 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.

I.8 RESPONSIBILITIES

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:

- 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.
- 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.
- Garrison Commander:
 - Develop the installation's IDG.
 - Chair Real Property Planning Board (RPPB) to review and approve projects established on the Prioritized Improvement Projects List (Appendix F) to meet Army standards.
 - Submit Prioritized Improvements Projects List for approval and funding IAW Director, IMA instructions after review and approval by Senior Mission Commander.
 - Enforce IDG standards.
 - Review and approve IDG.
 - Review and approve RPPB prioritized improvement projects list recommendations to meet Army standards prior to submission to IMA Region Director.
- Major Army Command/Tenant:
 - Participate in installation Real Property Planning Board.
 - Participate in design and planning charrettes.
 - Determine project functional requirements.
 - Participate in design reviews.
 - Participate in development of Prioritization Projects List.
 - In accordance with AR 210-20, Master Planning for Army Installations, the installation Real Property Planning Board (RPPB), or Siting Board, 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 DPW. The Garrison Commander will chair the RPPB, and review and approve Master Planning's actions.

1.8.1 The Siting Board

The Siting Board is responsible for reviewing each siting request to ensure that the recommended site meet the following considerations:

- Environmental
- Compatible with Land Use Plan
- Utility availability
- Installation Design Guide
- Transportation
- No conflict with future projects
- Archaeological & Historic
- Force Protection
- Aviation Safety
- Occupants' and Command Group preferences

1.8.2 Siting Board Members

- The Director of Public Works will assign members from the following divisions to the Siting Board:
 - Engineering Division (Master Plans Branch), Chairperson
 - Environmental Division
 - Utilities Division
- The Director of Emergency Services will assign the following to the board:
 - Fire Chief (or qualified alternate).
 - Chief, Force Protection (or qualified alternate).
- The Director of Logistics will assign the following to the board:
 - Air Traffic and Air Space Officer
 - CAAF Airfield Safety Officer
 - SAH Airfield Safety Officer
- The G-3, DPTM will assign the following to the board:
 - Range Officer
- The Director of Information Management will assign the following to the board:
 - Telecommunications Specialist (MCA Manager).

1.8.3 Siting Board Procedures and Responsibilities

The Siting Board will meet as called by the chairman. The chairman will provide all board members a read-ahead of each site to be considered. All board members shall provide responses in a timely manner or as specified by the installation master planner. The proponent for the site/sites to be considered shall be in each request. The installation master planner will retain record copies of all responses.

1.9 SUSTAINABLE DESIGN AND DEVELOPMENT

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, healthy (Figure 1-3), energy efficient (Figure 1-4) and safe buildings.

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

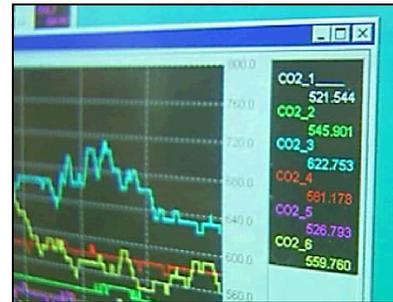


Figure 1-3 Monitors measure indoor air quality assisting in creating a healthy environment



Figure 1-4 Efficient Water Usage Contributes to a High Performance

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.

[Appendix C. Sustainable Design](#), discusses the sustainable design concept and its application to Army projects. Paragraph C.4 discusses the Sustainable Project Rating Tool (SPiRiT) developed by the U.S. Army Corps of Engineers (USACE). Per the [Assistant Secretary of the Army \(Installation & Environment\) Sustainable Design and Development Memorandum and the Assistant Chief of Staff for Installation Management \(ACSIM\) endorsement of Sustainable Design and Development](#) initiative, the SPiRiT rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability. (Be aware that the Army will transition from SPiRiT to the US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) rating system effective with the FY 08 Military Construction Program.)

The SPiRiT document ([Appendix D](#)) was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System.

Army Rating Standard

The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all MILCON projects, the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

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.

I.10 ARMY STANDARDS

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 C](#), Sustainable Design; and [Appendix J](#), Historic Preservation Guidelines.

I.11 REFERENCES

[Fort Campbell Technical Design Guide](#)



Section 2 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 detailed in [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design](#).

2.2 THE DESIGN GUIDE PROCESS

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

2.2.1 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.

2.2.2 Conduct Visual and Spatial Surveys

Two visual surveys are preformed in the preparation of the IDG. The first survey establishes the visual themes of the installation. The second survey documents the assets and liabilities within each visual theme. [Chapter 5 of UFC 2-600-01](#) details the method for conducting the installation visual survey.

2.2.3 Establish Visual Themes

The Information gathered during the first survey is used to establish the visual themes of the installation. The visual themes are delineated by the visual characteristics of an area and are defined as the "look and feel" of an area. Together with the area's dominant features, the visual themes help define its image. A functional analysis of each theme 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. Example themes include, community life theme, operations support theme, buffer/open space theme, and industrial theme.

2.2.4 Determine Assets and Liabilities

The second survey conducted is a visual theme inventory. During the survey each visual theme is analyzed for specific visual impacts. The objective of the inventory is to define the visual assets and liabilities within the theme area. Visual assets take into account not only those things that are visually pleasing but also identify ATRP features such as surveillance platforms and natural access and control features. It also determines liabilities such as concealment areas for illegal activities.

Assets

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

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.

2.2.5 Recommendations and Implementation Plan

The assessment of each visual theme 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.

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

- [Section 7](#), Site Planning
- [Section 8](#), Buildings
- [Section 9](#), Circulation
- [Section 10](#), Landscape
- [Section 11](#), Site Elements
- [Section 12](#), Force Protection

2.2.6 Design Principles

The visual inventory and analysis requires an understanding of basic design and force protection principles. These design principles are discussed in Section 3, paragraph 3.4. The force protection principles are discussed in Section 12, paragraph 12.1.

2.2.7 Visual Elements

The basic design principles are used to define the visual elements described in Section 3, paragraph 3.5. 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

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.

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 (Figure 2- 1):

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

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

Step 3: Review the applicable references, guidelines, and standards of the design components. These include site planning, buildings, circulation,

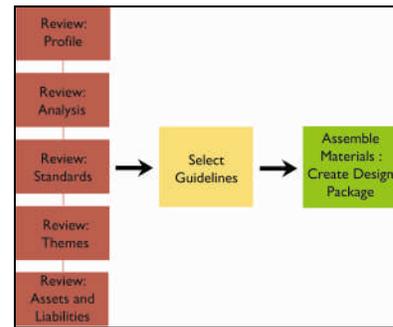


Figure 2-1 Using the Design Guide

landscaping, site elements, and force protection and are discussed in Sections [7](#) through [12](#) respectively.

Step 4: Review the information and description of the installation themes in [Section 5](#),

Step 5: Select the theme where the project will be located from [Section 5](#), Visual Themes and Zones. Review the assets, liabilities, and recommendations for that zone.

Step 6: Select the appropriate guidelines or standards from the design components addressed in Sections [7](#) through [12](#).

Step 7: Assemble all materials gathered in steps 1 through 5 above.

2.4 IMPLEMENTATION

2.4.1 Compliance

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.

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.

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

The Installation Planning Board chaired by the Senior Mission 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, and
- Communications Planning.

2.4.2 Project Approval

Project requests to include a DA Form 4283, Facilities Engineering Work request (IJO), shall be submitted to the DPW or equivalent and will include the required Design Team IDG Checklist discussed below. In order to ensure its use, this checklist will be incorporated into specifications and/or AE Scopes of Work.

2.4.3 Design Team IDG Checklist

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](#).

The Designer of Record or Design Agent shall provide a copy of the completed checklist to the Master Planner, together with a signed certification statement with each design submittal. The checklist along with

concept site plans and elevations for each design submittal shall be provided to the Master Planner for review. If the Master Planner or designated representative concurs, the plan and the signed checklist are forwarded to the installation master planner for review and final approval.

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

Self-help Projects and Occupant Purchased and Installed Site Furnishings and Features Projects.

2.4.4 Request for Waiver

A request of waiver from the Design Guide Checklist ([Appendix A](#)) will be submitted to the Master Planning office for approval by the Directorate of Public Works (DPW).

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

2.4.5 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](#).

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.

2.5 REFERENCES

[Fort Campbell Technical Design Guide](#).

Section 3 Design Guide Analysis Criteria

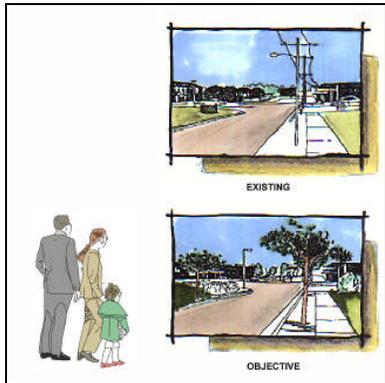


Figure 3-1 Include Positive Visual Elements

3.1 INTRODUCTION

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

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 GOALS, OBJECTIVES AND RECOMMENDATIONS

Fort Campbell currently supports a number of operational, training and support missions. In order of priority these are:

- To advance the combat readiness of the 101st Airborne Division (Air Assault)
- To further the readiness of non-divisional units.
- To advance the readiness of the Reserve and Guard units through mutual support.
- To train non-commissioned officers and specialists in leadership, and to provide medical and dental care for active and retired military personnel and their dependents.

In developing a unifying character for the post, a photographic survey helped establish existing similarities that could be used to support the Fort Campbell mission. A simplistic or spartan architecture was found that seemed to have no excess, no frills, tough, hard and minimal.

The character also seemed to be taking on a new permanence as compared to the older World War II buildings that were built as temporary units. The new architecture on the post aids the mission by providing a sense of stability and strength. The availability of land has allowed buildings to spread out, avoiding the cost associated with taller buildings, while providing a sense of permanence by appearing well founded through its spread out appearance.

The well-established central network of streets and layout of buildings establishes a very disciplined and orderly design character for the installation. The order of the central or main network is contrasted only by the single family housing streets that are less disciplined.

The primary goal is to preserve this precise, regimented, but maintained appearance of the post as future projects are added. Additionally, these future and self-help projects shall enhance existing facilities and instill a pride among those who live and work here (Figure 3-1).

[Chapter 4 of the UFC 2-600-01](#) discusses the goals, objectives, and recommendations process and gives examples.

3.3 IDENTIFICATION AND CLASSIFICATION OF VISUAL ELEMENTS

Basic design principles define visual elements and assess their character. When combined with ATFP principles, we ensure the visual elements also support the mission, safety and security of the site and those that use it.

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.

3.4 DESIGN PRINCIPLES

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

3.4.1 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 (Figure 3-2).

3.4.2 Form

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

3.4.3 Function

The use of a space or an area. Function is gauged by the degree to which the space works for its intended purpose.

3.4.4 Color

All elements of the visual environment have color. The use and arrangement of colors greatly determine the visual impact of all elements. Color also serves to generate territoriality and helps make those items that do not belong, stand out. Color is an important ATFP concept.

3.4.5 Texture

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

3.4.6 Unity

All elements of the visual environment should blend to complement one another (Figure 3-3). Repetition of scale, form, color, and texture results in a unified visual impression.

3.4.7 Framing

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

3.4.8 Axis

An axis is a linear progression of space connecting two or more dominant features (Figure 3-4).

3.4.9 Terminus

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

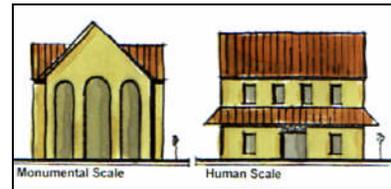


Figure 3-2 Monumental and Human Scales



Figure 3-3 Elements Complement Each Other



Figure 3-4 Parade Ground Axis with Building as Terminus

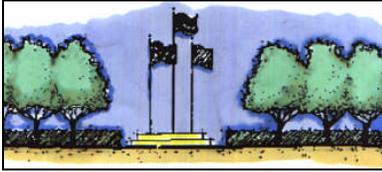


Figure 3-5 Symmetrical Elements



Figure 3-6 Boundary Defined by Trees and Fence



Figure 3-7 Buildings are Visually Dominant



Figure 3-8 Historic Landmark Provides Identity



Figure 3-9 Circulation Has a Significant Visual Impact

3.4.10 Balance

Visual elements are composed to be symmetrical or asymmetrical. In either case, visual elements should be sized and located to provide visual balance (Figure 3-5).

3.4.11 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 C](#)).

3.5 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.

3.5.1 Natural Characteristics

Regional and site characteristics that have been preserved and enhanced as a part of the installation.

3.5.2 Edges and Boundaries

Linear elements such as walls, fences, or trees create separation of use and activities (Figure 3-6) and expectations of behavior.

3.5.3 Buildings and Structures

Typically the most dominant features of an installation. Their location and design characteristics determine the primary visual image (Figure 3-7).

3.5.4 Activity Nodes

Centers of activity that attract people on a daily basis.

3.5.5 Landmarks

Visually or historically prominent features such as towers, statues, static displays, or buildings that provide identity and orientation of place (Figure 3-8).

3.5.6 Entrances and Gates

Provide the first and last impression of the installation, as well as an access control point (if utilized) and provides the opportunity to express accepted and expected behaviors while on site.

3.5.7 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 (Figure 3-9). Circulation systems also provide surveillance opportunities so that the desired users can watch over the adjacent areas of the system.

3.5.8 Trees and Other Vegetation

Trees and other vegetation: provide guidance, define space, can provide a physical barrier, frame views and provide visual screens, shade, color, and interest in the installation (Figure 3-10). Trees and vegetation should not hinder desired lines of sight or illumination or provide climbing aids or areas of concealment.

3.5.9 Street Trees

Street trees soften, complement, and define the road hierarchy, and improve the overall visual quality of the installation (Figure 3-11), while increasing site territoriality and access control (if utilized).

3.5.10 Views and Vistas

Scenic and attractive views and vistas should be enhanced. Unattractive views should be improved or screened and provided an alternate means of surveillance so that inappropriate activities cannot easily take place at these locations.

3.5.11 Open Spaces

Open space areas create visual impact and can be designed to either separate or integrate adjacent uses (Figure 3-12). Open spaces can also be utilized to create “time over distance”. Time over distance is the space used to respond appropriately to an approaching danger or concern.

3.5.12 Signage

A coordinated installation signage plan, addressing both exterior and interior signage, should be developed to facilitate circulation and provide useful information (Figure 3-13). Signage supports access control, surveillance and territoriality by providing direction, expected and acceptable behaviors and pride of organization.

3.5.13 Utility Corridors

Utilities should be in corridors and unsightly above ground utilities minimized. Provide alternative means of surveillance for utilities (if screened from view) so that they cannot be tampered with unseen.

3.6 REFERENCES

- [Fort Campbell Technical Design Guide.](#)



Figure 3-10 Trees Provide Impact



Figure 3-11 Street Trees Improve the Visual Quality of Streets



Figure 3-12 Open Space Creates Visual Impact



Figure 3-13 Signage Should Be Coordinated

4.1 SETTING

4.1.1 Regional Setting

Fort Campbell lies on the Kentucky-Tennessee border between the towns of Hopkinsville, KY and Clarksville, TN, and is about 60 miles northwest of Nashville, TN. Both Kentucky and Tennessee were among the earliest states to be settled west of the Appalachians, and the local area abounds with interesting historical sites dating from the early days of settlement in the late 1700's, through the Civil War era to the present.

Fort Campbell is a city within itself. There are more than 4000 homes on the installation, providing housing for officers, enlisted soldiers, and their families. It has seven schools (including a high school), a major hospital, childcare facilities, numerous chapels, a bank, restaurants, post exchanges, service stations, campgrounds, five swimming pools, and most other facilities a civilian city of that size would have.

Transportation

Transportation arteries in the Fort Campbell area include Interstate 24 (I-24), passing north of the post; U.S. Route 41A, which runs north-south along the eastern side of the post; and U.S. Route 79, which runs east-west along the southern boundary of the post. I-24 is a four-lane limited access freeway that links Nashville, Tennessee to St. Louis, Missouri. U.S. Route 41A is a four and five lane business route that connects Hopkinsville, Kentucky to the north with Clarksville, Tennessee to the south. U.S. Route 41A has been widened to seven lanes from the Kentucky/Tennessee border north to I-24.

U.S. Route 79 is a two and three lane road that provides principal access to the "Land Between the Lakes" (U.S. Forest Service) recreation area. I-24 interchanges with U.S. Route 41A approximately four miles north of the post and with U.S. Route 79 approximately 7 miles east of the post. Two additional interchanges are used for access to the post. The State Route 104 interchange is one mile south of the Tennessee-Kentucky border and provides east-west access to the post's Tennessee gates. A newly opened interchange on State Route 115 in Kentucky provides quick and convenient access to I-24 for residents of Oak Grove and post personnel exiting through the Kentucky gates.

Proposed road improvements include expanding Tiny Town Road to a four-lane highway from Fort Campbell Boulevard (U.S. 41A) to I-24 and a SR 374/101 St. Parkway Extension. Highway 79 will become a four-lane highway from Clarksville to Dover, TN. Running along the southern boundary of the installation.

The nearest airport with scheduled commercial airline service is Nashville International, 47 miles to the southeast just outside the city of Nashville, Tennessee.

Light-civil air transportation is available at Clarksville's Outlaw Field. The airport is located on a 473-acre site approximately three-quarters of a mile east of Fort Campbell.

Until 1981, the Illinois Central Gulf (ICG) Railroad Company had provided rail service to Fort Campbell. When ICG abandoned their lines, the Department of the Army purchased the track and right-of-way from Fort Campbell north to Hopkinsville, Kentucky to maintain rail service to the post. An additional acquisition of 3.1 miles of track in Hopkinsville was made in 1987 to allow for an interchange with the CSX Railroad /CSX Transportation system.

The Army Corps of Engineers-Nashville District does own a facility on the Cumberland River in Clarksville, Tennessee. The current system of waterborne transportation involves trucking equipment to the Corps of Engineers area at Old Lock "C". From there, equipment is loaded aboard commercial vessels. This area, however, was not originally designed to be a terminal transfer point.

Mission

Fort Campbell supports the 3rd largest military population in the Army and the 7th largest in the Department of Defense. There are 1,884 active duty officers, 20,511 active duty enlisted, 40,491 family members, 112,629 retirees, 3,921 civilian employees and 18,166 Army Reserve & National Guard. At 164 square miles (105,068 Acres), the installation is one of the largest in the world.

Fort Campbell's primary mission is to advance the combat readiness of the 101st Airborne Division (Air Assault) and the non-divisional units posted at the installation through training, mobilization and deployment.

Deployment capabilities include combat equipped soldiers, tactical vehicles, weapons and ammunition, and logistical equipment to sustain thousands of soldiers in a tactical environment for an extended period of time. The installation serves as a Premier Power Projection Platform for the Division and for major Special Operations Command units.

To fulfill its mission, Fort Campbell maintains 48 live fire ranges, impact areas, 51 training areas, five drop zones, 200 artillery firing points, a special operations training complex, and two airfields. Campbell Army Airfield is the Army's largest, spanning 2,500 acres.

Fort Campbell routinely conducts various levels of field training exercises. In FY99, five Brigade Task Force-sized field-training exercises were conducted, with each including over 6,000 soldiers and hundreds of vehicles and helicopters. Alert Areas usually are sites where extensive pilot training or other unusual activity occurs. There is one Alert Area — A-371 — that encompasses Fort Campbell. This airspace is in continuous use from the surface up to 2,000 feet.

Fort Campbell is the home of the 101st Airborne Division (Air Assault) Screaming Eagles. The major command is the 18TH AIRBORNE CORPS & FORSCOM. Fort Campbell is also home to 5th Special Forces Group (ABN), 160th Special Operations Aviation Regiment (SOAR), 31st Military Police Detachment, 58th Aviation Regiment, 1st Battalion, 95th Maintenance Company, and 902nd Military Intelligence Group. The Air Force has two units at Campbell Army Airfield: 19th Air Support Operation Squadron and 621st Air Mobility Operations Group.

Fort Campbell's Sabalauski Air Assault School conducts sixty classes annually for over 8,000 soldiers (Figure 4-1). The school teaches rappelling and sling load skills required for Air Assault Operations. The Air Assault School provides training on rappelling to more than 8,000 soldiers each year. The AIR ASSAULT COURSE taught at Fort Campbell's, SABALOUSKI AIR ASSAULT SCHOOL, has been called the ten toughest



Figure 4-1 Sabalauski Air Assault School



Figure 4-2 Sabalauski Air Assault School Course

days in the Army. The grueling course is designed to train soldiers in all facets of air assault operations unique to the world's only air assault division. The school is also responsible for the rappel master course, rope master course, and a sling master/heavy pick up zone course, basic airborne, refresher course and jump master refresher course (Figure 4-2). Additionally, the school has the mission of training the Division's prospective ranger students through the newly implemented pre-ranger program. Enrollment for each course is on a quota basis. Prior to arrival the soldiers must meet the height/weight standards of AR 600-9 and have successfully completed the Army Physical Fitness Test for their age group within 30 days of the class starting date and be recommended by the unit.

The mission of the 101st Airborne Division (Air Assault) is to deploy in 36 hours worldwide, to destroy enemy armed forces and to control land area, including populations and resources by employing the unique capabilities of the air assault division. The air assault capabilities and aviation assets greatly enhance the division's worldwide mission. Primary weapon systems are the Air Assault qualified infantry soldier, Apache helicopter, Hellfire Missile System, Mk 19 Grenade Launcher, and 105mm Howitzer Avenger.

4.1.2 History of the Installation

In the context of time, Fort Campbell's history is a very short one; however, in the context of Power Projection, Fort Campbell leads the way. It has played a key role in our nations' defense since it's beginning in 1942 by training, deploying, supporting and re-deploying soldiers in every major conflict. Today it stands as one of the Premier Power Projection Platforms for our nation.

In 1932 Winfield Durrett built a large 12-room farmhouse, which took almost two years to complete. But in the early 1940's, as part of the military build-up for the war, Durrett's farm and many others were purchased by the Army. (This home is occupied today by the Assistant Division Commander for Operations of Fort Campbell, and it is known as the "Log Cabin".

The advent of World War II demanded an increase in the armed forces and, as a result, required more places to put them. The site of Camp Campbell was selected on 16 July 1941, and construction began on 6 February 1942. It was planned as the cantonment for an armored division of 14,000 men, plus an additional 9,000 men for housekeeping and other duties. A total of \$35,000,000 was allotted initially for the project. The post was named in honor of William B. Campbell, a Tennessee statesman and Brigadier General of the United States Volunteers during the Civil War. The first army personnel -- one officer and a cadre of 19 enlisted men -- were assigned on 1 July 1942. These men comprised the 1580th Service Command Unit. Camp Campbell was renamed Fort Campbell on 15 April 1950, and today it totals approximately 105,000 acres in size.

A myriad of units, large and small, have made their home at the installation. The 20th Armored Div was activated here on 15 March 1942; all personnel had departed for overseas by 25 January 1945. The VI Armored Corps, later renamed XX Corps, moved here in April 1942 and saw action in Europe under Patton's Third Army. The 12th Armored Div was activated here on 15 September 1942, and moved to Camp Berkeley, TX, early in 1944. The 14th Armored Div moved here from Camp Chaffee AR, early in 1944; it departed for overseas in September of that year.

During WW II, a prisoner-of-war camp for captured German soldiers was located near the present site of Hammond Heights. Three stockades were

eventually built; Nazi and Anti-Nazi prisoners were segregated. The last POWs departed in April 1946.

The XVIII Airborne Corps came to Fort Campbell after its duties were ended in Europe in the autumn of 1945. It was inactivated here in the spring of 1946. The 5th Inf Div arrived after the inactivation and departure of the XVIII Airborne Corps in March 1946. It was inactivated a short time later.

Clarksville Base was constructed in 1947-1948 and was operated by the Navy for the Defense Atomic Support Agency; U. S. Marines guarded it. It was ultimately returned to the Army on 30 September 1969.

The 3d Infantry Division (Inf Div) arrived here in March 1948. It remained here until being replaced by the 11th Airborne Div in 1949. The 11th Airborne Div was relieved in Japan in May 1949 and moved to Fort Campbell. The 187th Airborne Regimental Combat Team was detached for combat operations in Korea, but the rest of the division remained here. The division later moved to Germany in March 1956 to replace the 5th Infantry Division there.

During these years, the proposed apartments, which had been designated for family housing in 1949 under the "Wherry Act") were actually constructed. (The "Wherry Act" provided for the building of privately financed family rental housing units on or near Department of Defense installations.) The first 20 units were occupied in February, 1951.

By July 1951 nearly all of the second groups of 400 apartment units were completed and the third group of 400 apartment units was expected to be ready for occupancy by mid-1952. A total of approximately 150 acres of land was leased to the private company who constructed these apartments.

When the third increment of apartments was finished there would be 228 one-bedroom, 744 two-bedroom, and 228 three-bedroom apartments. These 1200 two-story apartment units in Lee Village along with the 796 sets of converted quarters would make it possible for nearly 2000 dependent families to reside on Fort Campbell.

On June 25, 1951 the Commanding General of Fort Campbell turned the first spade of dirt marking the beginning of a long-range permanent construction program at Fort Campbell. Scheduled to be completed in May 1952, these three-story buildings were to be constructed of reinforced concrete, and each planned to accommodate 225 men and to include facilities for company administration, mess halls, and dayrooms. This \$2,875,000 project would furnish Fort Campbell with its first permanent troop accommodations.

By 1952 the Post Engineer maintained 2,136 temporary and 57 permanent buildings that served as classrooms, dayrooms, mess halls, billets, and offices for more than 28,000 enlisted men and officers. There were also additional quarters for 350 government employees.

The Army Training Center was activated in March 1966. It was active for more than five years and graduated more than 200,000 soldiers. The 6th Inf Div was reactivated here on 24 November 1967, while the 101st Airborne Div was away in Vietnam, and was inactivated on 7 May 1968.

Fort Campbell's current resident, the 101st Airborne Division, was reactivated early in 1946 and received the colors from President Truman on 26 September of that year. On 1 July 1965, the division was re-

designated “Air Cavalry.” In 1965, the 1st Brigade relocated to Vietnam, but the rest of the division did not arrive there until 13 December 1967. The 17,000 Screaming Eagles of the 101st Airborne Division were officially welcomed back from Vietnam to Fort Campbell on April 6, 1972. This return of the 101st prompted a renewed vigor in modernizing existing facilities and building new structures. Troop billets were modernized along with the construction of a new gymnasium and two new swimming pools. Major construction projects totaling over twelve million dollars were authorized in fiscal year 1972. In March 1974, the 101st Airborne Division lost its airborne capability. Finally, on 4 October 1974, it was re-designated “Air Assault”, a name the 101st Airborne Division still carries. The “Screaming Eagles” Division is undergoing a change even now: the 101st Aviation Brigade is being re-flagged as 1st Aviation Brigade, 101st Airborne Division (Air Assault), and other battalions of the current brigade will be formed under a new 2d Aviation Brigade.

During the summer of 1972, over \$19 million in construction contracts were awarded to civilian enterprises. Of these, a \$4,010,000 contract was awarded for the construction of a new commissary, which was located adjacent to the Main Post Exchange. Construction on the structure began in November 1974 and was completed late in 1975. More contracts were awarded to modernize sixteen permanent barracks that would include two and three man rooms with air conditioning and renovated administrative areas. Eight dining facilities were also modernized.

Finally, 1,000 family housing units were authorized for construction in areas near Lee Village, Drennan Park and Hammond Heights. One hundred of the units were planned for officers' families and the remaining 900 units were planned for families of enlisted men. On-post housing continued to be a critical problem. There was an average of 250 families on the waiting list for on-post quarters. There was an additional shortage of on-post bachelor officers' quarters. To help alleviate this shortage, a \$1,835,000 contract was awarded for the construction of eighty-six single space quarters for bachelor officers. The B.O.Q. complex was built adjacent the Cole Park housing area near Dolan Pool.

Since 1975, numerous construction projects have been completed, including a dental clinic, Club renovations, barracks construction and renovations, housing units, the Peter M. Guenette Arts and Crafts Center, the Criminal Investigation Division Headquarters, and a passive solar designed high school.

Perhaps one of the most significant installation improvements was the development of the Fort Campbell Natural Resource Program. In fact, the program was so successful in 1973, that Fort Campbell received the Department of Defense Conservation Award in August 1974, for demonstrated progress in ecological and environmental improvement on a military reservation. Additional environmental projects included the development and seeding of road shoulders to discourage soil erosion. Almost 15,000 acres of land were reseeded to restore soil fertility and prevent further erosion.

Today, as in the past, Fort Campbell stands ready to lead, train and project forces into any mission. It has modern, up-to-date facilities, ranges and the necessary infrastructure to fully support the forces of the new century.

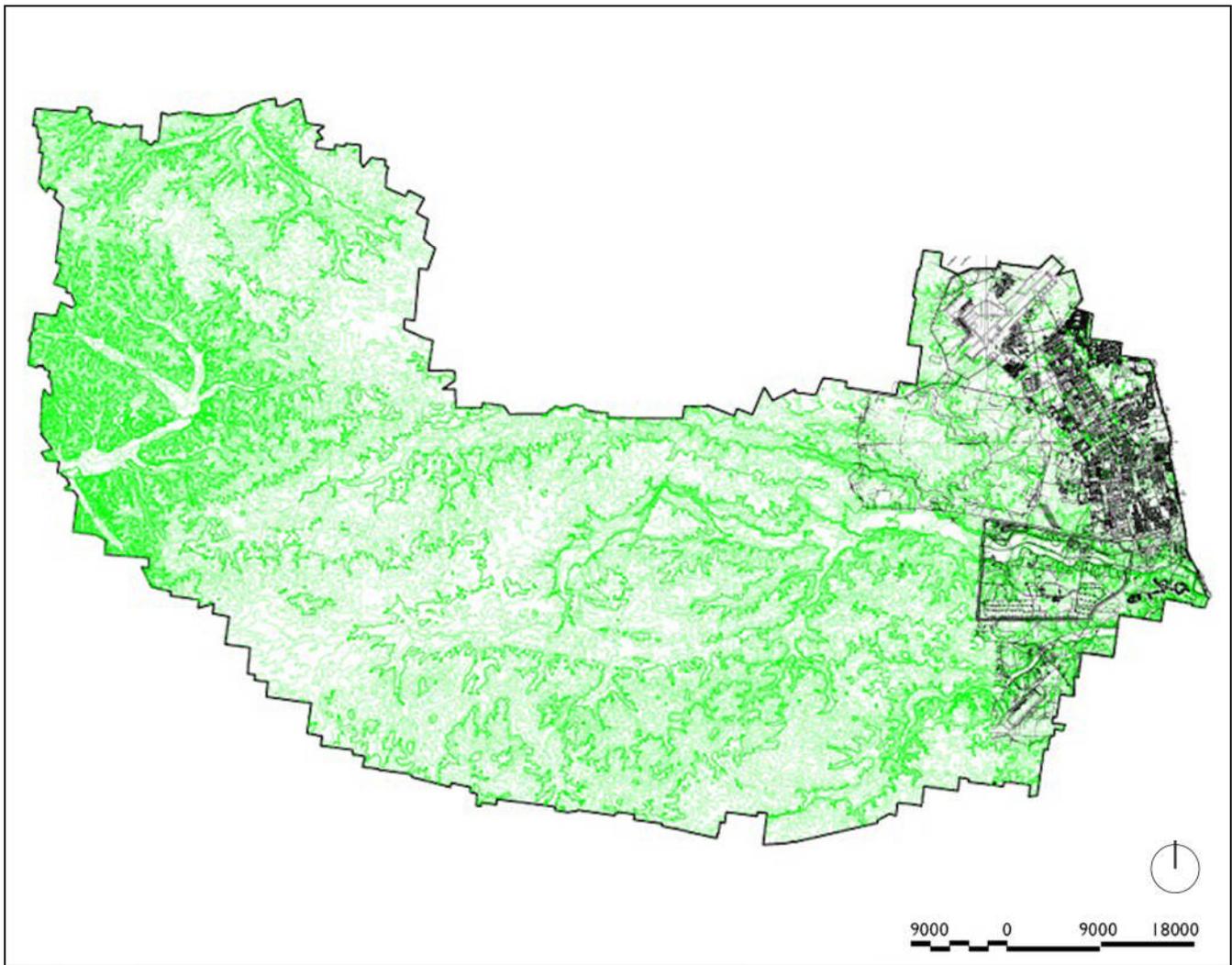


Figure 4-3 Topography of Fort Campbell

4.1.3 Environmental Setting

Topography

Fort Campbell is located within the Pennyrile physiographic section, which is one of the two plateaus comprising the Mississippian Plateau. The topography is gently rolling, with the exception of a comparatively flat area along the eastern boundary and approximately 5,000 acres of steep, highly dissected, hilly land along the western boundary.

Slopes vary between 3 to 10 percent over the majority of the installation, consisting of nearly level to gently rolling upland plain (Figure 4-3). Rolling to steep terrain primarily in areas adjacent to the large stream courses dissecting the installation interrupts this upland plain. Slopes in these areas range from 12 to 30 percent. Approximately 5,000 acres adjacent to the western boundary of the installation, in an area dissected by Saline Creek, contains steep terrain. Slopes in this area range from 15 to 70 percent. Elevations on the installation varies from 400 feet above sea level south of the cantonment area, where Little West Fork Creek leaves the installation, to 700 feet above sea level in the Saline Creek area in the western portion of the installation.

Geology

The area covered by Fort Campbell is a unique geologic region called karst terrain. Karst terrain is formed by water seeping through jointing patterns in the subsurface and dissolving rock, such as limestone, creating subterranean channels or cavities that can occasionally collapse. Features associated with the Karst terrain include sinkholes, caves, sinking streams, underground rivers, and springs to develop, which make it difficult to determine the flow of groundwater in the area. Consequently, caves and sinkholes are common across much of the installation, especially to the southeast and north.

The presence of Karst features and steep slopes on the installation presents a number of limitations for land use. Caution must be exercised in the construction of any structure in an area where Karst features or steep slopes are present. These areas are typically unsuitable for the construction of buildings, but may be used for training, ranges, outdoor recreation, and open spaces.

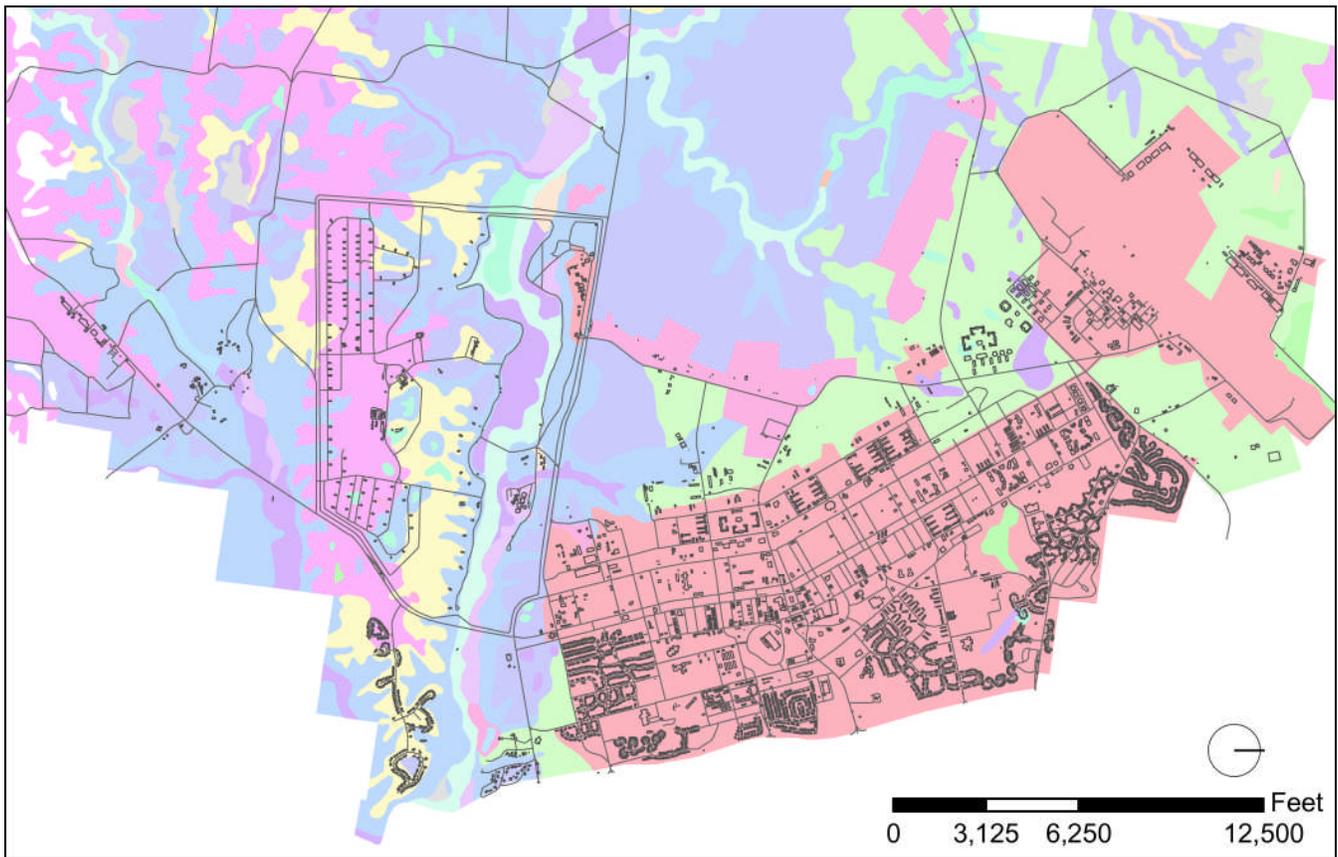


Figure 4-4 Soils Found at Fort Campbell

Soils

There are a wide variety of soils found on Fort Campbell, all of which have been formed in loess (wind deposited material) (Figure 4-4). These soils range from a light brown silt loam found on gentle slopes to a dark brown silty clay loam found in the eastern portion of the installation. Fragipan, or impervious soils, occur on the rolling slopes to the west.

Thirty soil-mapping units have been identified at Fort Campbell. Generally, soil permeability is poor (ranging from 0.1 to 2.0 in/hour), and available water capacity is medium to high. Soils are moderately well drained and slopes generally range from 3 to 10 percent, although slopes may reach 70 percent near the steep western boundary of the installation. Soil compressibility is low to medium, and soil strength is low.

Although the soils across the installation are generally suitable for all land uses, the west and southwest areas of the reservation have significant areas with soils that are classified as highly erodible. Highly erodible soils are those which have the potential for greater than acceptable levels of soil loss. Most problems associated with soil erosion on Fort Campbell result from the removal of vegetation on moderate to severe slopes or on long, gradual slopes. Where proposed activities will directly affect soils or the viability of a proposed use is dependent on soil conditions, on-site soil characterization should be conducted.

Other potential limitations associated with specific soils at certain locations on the installation include shrinking and swelling associated with changes in soil moisture; seasonally high water tables; low strength due to high clay content; and flooding due to topographic position.

- CRIDER (BEWLEYVILLE SILT LOAM)
- DICKSON SILT LOAM
- DICKSON SILTY CLAY LOAM
- GUTHRIE SILT LOAM
- HAMMACK (BEWLEYVILLE) SILT LOAM
- HAMMACK (MOUNTVIEW) SILT LOAM
- HUMPHREYS GRAVELLY SILT LOAM
- LINDSIDE SILT LOAM
- NEWARK SILT LOAM
- NOLIN SILT LOAM
- OCANA GRAVELLY SILT LOAM
- PEMBROKE SILT LOAM
- SENGTOWN GRAVELLY SILT LOAM
- TRACE SILT LOAM
- UDARENTS - URBAN LAND - PEMBROKE COMP
- UDORTHENTS - CLEYEY
- WATER

Hydric soils and soils with possible hydric inclusions are scattered across the reservation, especially in the southeast portion of Fort Campbell. The presence of hydric soils is one of the three necessary criteria for a jurisdictional wetland determination.

Climate

Fort Campbell is approximately 36.5° latitude and 87.5° longitude. This particular area is part of what is known as the “temperate zone”. Summers are generally hot and humid, with mean temperatures ranging from 68° F to 89°F. Winters are generally damp, but mild, with mean temperatures ranging from 28°F to 45°F, as snowstorms are infrequent. The annual precipitation is approximately 47 inches. Prevailing winds from the Gulf of Mexico bring warm, moist air; winds from the north and west bring cool, dry continental air.

Hydrology

In karst areas, water enters the ground at specific locations along fractures, or openings, in the earth’s surface, including sinkholes and cave entrances. This water then flows through conduits in the bedrock in much the same way that water travels through the plumbing in a building. These conduits control the direction of groundwater flow and do not conform to typical groundwater flow models. Additionally, they can carry groundwater several feet per hour, whereas non-karst settings generally carry water in feet per year. Understanding the unique flow patterns of these conduits is critical to understanding where specific contaminants are coming from and moving toward.

Fort Campbell’s water resources occur as surface and ground water. Surface water appears as numerous intermittent and permanent streams, all part of the Cumberland River drainage, meandering throughout the reservation. Surface streams often flow into sinkholes, underground channels, and sinking streams; seeps often appear along streambeds and limestone outcrops. Two small impoundments (Lake Kyle and Lake Taal), each containing more than one hectare in surface area, are present, as are numerous small ponds, marshy lowlands and beaver swamps.

Fort Campbell’s quality of life is directly related to the quality and wise use of the resource. The water reserve that provides Fort Campbell’s drinking water is ground water: water that flows beneath the earth’s surface through fractured limestone. The existing water supply system was developed in 1943 when the Post was first constructed during World War II as a temporary military training facility. The Post was converted to a permanent installation in the 1950’s, and the water system capacity was expanded from 5 million gallons per day (mgd) to 7.6 mgd. The current water supply system is comprised of a pumping station at Boiling Spring, an auxiliary intake on the Red River, and a conventional water treatment plant. Both the spring pumping station and water treatment plant have been expanded or renovated at least once over the past 60 years.

Vegetation

Farm and woodlands account for approximately 50% of surrounding lands. The reservation also contains several unique ecosystems. Its remnant tall grass prairies, known as barrens, are the largest continuous system known within the states of Kentucky and Tennessee.

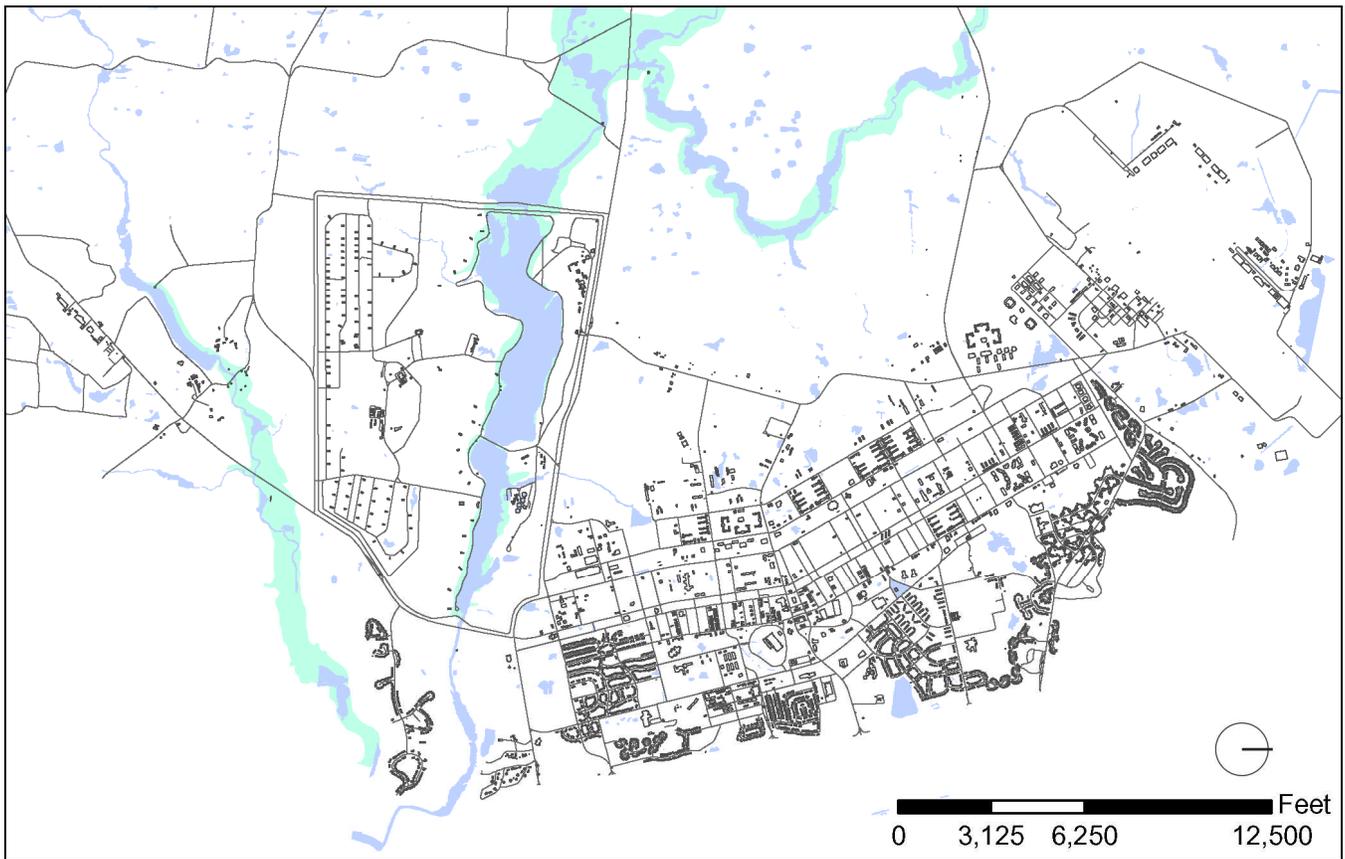


Figure 4-5 Fort Campbell Wetlands and Floodplains Map

Wetlands

Many poorly drained and low-lying areas hold water for most of the year (Figure 4-5). These sites are valuable natural resources that help improve water quality, reduce flood and storm damage, provide wildlife habitat, support hunting and fishing activities, and provide educational and aesthetic promise. The majority of federal and state listed threatened and endangered species inhabit these unique areas.

Wildlife

Fort Campbell possesses a diverse natural heritage. Its natural assets include a diverse flora and fauna, which contain over 500 species of plants, 171 birds, 63 fish, 28 amphibians, 26 reptiles, and 47 mammals. The Federal Endangered Species Act (ESA) was passed in 1973 with the purpose of conserving and recovering rare species as well as the ecosystems upon which they depend. Under this law, a species may be listed as either “endangered” or “threatened”. Endangered means a species is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

The states of Tennessee and Kentucky seek to protect certain species at the state level as well. In Tennessee, the Department of Environment and Conservation’s Division of Natural Heritage administers the Tennessee Natural Areas Preservation Act of 1971 and the Rare Plant Protection and Conservation Act of 1985. The Kentucky Department of Fish and Wildlife Resources and the Kentucky State Nature Preserves Commission seek to protect the threatened and endangered plants and animals of Kentucky.





Figure 4-6 Bald Eagles Have Been Spotted in the Lake Kyle Area

Numerous surveys to determine the presence of threatened and endangered plant and animal species on Fort Campbell have been conducted over the past several decades, including most recently:

- A fourteen-month survey for rare plants and animals from 1993 to 1994;
- A bat survey in 1998 which documented both the endangered gray bat and endangered Indiana bat;
- Continued annual monitoring of barrens communities, which harbor many rare plants; and
- Various other species surveys and natural resource studies.

These scientific studies, reports, and incidental sightings (e.g., the bald eagle at Lake Kyle) collectively contribute to the current information about threatened and endangered species at Fort Campbell. Currently 58 species are tracked by Fisheries and Wildlife personnel. The species which are listed as threatened or endangered at the Federal level, and have been positively identified at Fort Campbell, are shown below:

Bald eagle (Federal/Kentucky threatened)

Bald eagles (Figure 4-6) typically seek rivers or reservoirs with open water, little human activity, and large concentrations of waterfowl. Large diameter cottonwoods, sycamores, and other riparian trees are often used as daytime perches and night roosts. The bulk of the eagles' diet is fish, but bald eagles are opportunistic and will supplement their diet with a variety of living and dead vertebrate species. These birds are sensitive to disturbance, and radical changes in the eagle's environment can be detrimental. The bald eagle has been seen in the Lake Kyle area.

Gray bat (Federal/Kentucky/Tennessee endangered)

Two types of habitat are considered important to gray bats – caves and riparian (streamside) zones. Caves are used for hibernating, roosting during maternity, and for transient housing when migrating. Gray bats forage for aquatic-based flying insects within riparian zones. On Fort Campbell, gray bats, including several pregnant females, have been collected along Saline Creek, Piney Fork Creek, Jordan Creek, Fletcher's Fork Creek, and Noah Spring Branch. Although none have been found in the caves on the installation, gray bats have been identified roosting under a bridge.

Indiana bat (Federal/Kentucky/Tennessee endangered)

This bat species is known to roost under the loose bark of dead hardwood trees (e.g., cottonwood and various oaks) and under the bark of live trees such as shagbark hickories. The hardwood forest present on the installation may potentially serve as summer habitat for Indiana bats. Indiana bats consume insects over both aquatic and terrestrial habitats. Both foraging and roosting habitat is present at Fort Campbell. Two Indiana bats have been identified foraging in the riparian areas of the installation.

Habitat for these federally threatened and endangered species is known to occur across the installation. Measures to avoid impacts to the species and their habitat must be incorporated into any military training activity and construction plans. No "critical habitat" has been designated for these federally protected species at Fort Campbell.

Several additional species are not listed at the Federal level but have been designated as "endangered," "threatened," "special concern," or "rare" by the States of Kentucky and Tennessee. These species, believed to be

uncommon to Kentucky or Tennessee, also need to be given consideration during land-use planning and decision-making. They include:

- Bachman's sparrow (KY endangered, TN endangered)
- Blue-winged teal (KY endangered)
- Lark sparrow (KY threatened, TN threatened)
- Pied-billed grebe (KY endangered, TN rare)
- Aster (KY endangered)
- Bearded rattlesnake root (KY endangered, TN special concern)
- Broad wing sedge (KY threatened)
- Compass plant (KY endangered, TN threatened)
- Ear leaf foxglove (TN endangered)
- Hairy hawkweed (KY threatened, TN special concern)
- Nut-rush (KY endangered)
- Purple fringeless orchid (TN threatened)
- Prairie-dock (TN threatened)
- Rough rattlesnake root (KY endangered)
- Sweet coneflower (KY endangered, TN threatened)
- Thread-leaf sun drop (KY endangered)
- White walnut or butternut (KY special concern, TN threatened)

Fort Campbell Fisheries and Wildlife program is responsible for stewardship of the reservation's wildlife resources to include threatened and endangered species. The program seeks to provide current, accurate, and useful information to trainers, managers, federal and state agencies, and the public concerning wildlife status and threatened and endangered species.

Environmentally Sensitive Habitat

- Floodplains

Executive Order 11988 (Floodplain Management) requires executive agencies, including military organizations, to determine whether a proposed action will occur in a floodplain. The Federal Emergency Management Agency (FEMA) designates and maps floodplains. Official floodplain maps prepared by FEMA delineate intermediate regional flood zones including the 100-year flood elevation, which is the flood elevation that has a one-percent chance of being equaled or exceeded each year.

There are 422 miles of streams at Fort Campbell (Figure 4-7). Floodplain areas are primarily low-lying areas along these streams, which include Saline Creek, Dry Fork Creek, Weavers Creek, Piney Fork Creek, Fletchers Fork Creek and Little West Fork Creek. The Little West Fork Creek, formed by the confluence of the Piney Fork and Dry Creeks, is the most significant stream on Fort Campbell. This creek is located south of the cantonment area, and meanders eastward across the installation. Saline, Dry Fork, and Weavers Creeks traverse the northwestern perimeter of the installation, flowing in a generally southwestern direction. Fletchers Fork Creek is located in the southeastern area of the installation.

High water periods on the waterways within the Fort Campbell area generally occur from December through April. Stream flow is increased during rainfall events, and flooding is not considered to be a significant problem. Ponding may occur after particularly heavy rainfall in and near the cantonment where sinkholes serve as natural detention ponds.

Floodplains are typically not well suited for buildings and other structures. Activities that occur in floodplains should be compatible

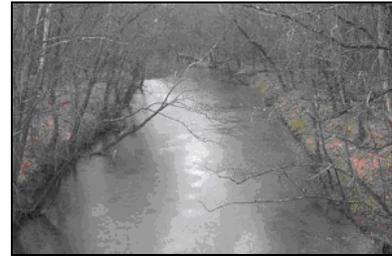


Figure 4-7 There Are 422 Miles of Streams at Fort Campbell



Figure 4-8 Wetlands at Fort Campbell

with occasional periods of high water, such as recreation or open space land use designations.

Floodplain management and planning aims to achieve a reduction in the loss of life, disruption, and damage caused by floods as well as the preservation and restoration of the natural resources and functions of flood plains.

- **Wetlands and Other Sensitive Habitats**

Wetlands are complex habitats that are transitional from dry land to open water (Figure 4-8). Section 404 of the Federal Clean Water Act defines wetlands as “areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Executive Order 11990, Protection of Wetlands, was signed by President Carter to avoid adverse impacts associated with the modification or destruction of wetlands.

The U.S. Army Corps of Engineers (USACE) maintains jurisdiction over waters of the United States, including wetlands. However, a January 9, 2001 Supreme Court ruling curtailed the USACE’s jurisdiction over certain types of wetlands – specifically, non-navigable, isolated, intrastate wetlands that affect interstate commerce by providing habitat for migrating waterfowl. The USACE will maintain jurisdiction over all other types of wetlands, including those that are adjacent to navigable waters and their tributaries. In addition, state authority over wetlands would continue under the Section 401 water quality certification programs.

The determination of a jurisdictional wetland is based on the presence of three criteria:

- hydric soils, which are formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part
- hydrophytic vegetation, which are plants that are adapted to grow in anaerobic soil conditions
- wetland hydrology, where an area must be periodically inundated or have soils saturated to the surface at some time during the growing season.

The U.S. Fish and Wildlife Service has completed National Wetlands Inventory (NWI) mapping for all of Fort Campbell. This mapping provides a basis upon which potential jurisdictional wetland areas can be determined. However, not all areas identified on the NWI map are jurisdictional wetlands; likewise, some jurisdictional wetlands have not been identified on the NWI map. An installation-wide jurisdictional wetland survey has been conducted and wetland sites containing hydric soils, hydrophytic vegetation, and the appropriate hydrological regimes are found at Fort Campbell. Approximately 300 acres of wetlands on Fort Campbell are considered jurisdictional. Depressions formed in the Karst areas at Fort Campbell are particularly likely to contain wetland sites. In addition to the potential regulatory limitations, the use of wetlands for physical development or military training activities may not be appropriate due to subsidence and poor drainage problems.

Other sensitive natural areas exist on the Fort Campbell reservation. Barrens communities, which are remnants of the tall grass prairies that once ranged across much of the middle-eastern U.S., are found on the reservation. Some areas are believed to contain some of the best examples of barrens in Tennessee and Kentucky. Current research

projects are being conducted that seek to characterize the size and composition of the barrens communities, monitor for invasions by exotic species, and investigate various techniques for long-term management, such as prescribed burning.

There are no designated wilderness or wildlife management areas on Fort Campbell. Similarly, there are no rivers designated as Wild and Scenic Rivers. Three man-made lakes exist on the installation – Lake Kyle, a 75-acre lake with an earthen dam and concrete spillway; Lake Taal, a 28-acre lake, also with an earthen dam and concrete spillway; and Joe Swing Pool, a 6-acre abandoned quarry lake. Both Lake Kyle and Lake Taal are having problems with siltation and nuisance aquatic plants. In addition, there are 422 miles of streams at Fort Campbell, including Little West Fork Creek, Saline Creek, Dry Fork Creek, Weavers Creek, Piney Fork Creek, and Fletchers Fork Creek.

4.1.4 Man-Made Environment

Range and Training Areas

Range, impact and demolition areas occupy about 28,000 acres of land at Fort Campbell. These areas generally lie west of Market Garden Road and are surrounded by the training and maneuver areas. Fort Campbell has 47 ranges, two impact areas (Small Arms Impact Area and North/South Impact Area), and two demolition areas. All of the ranges are located in or around the impact areas, with 75 percent located in the Small Arms Impact Area. Access to impact and demolition areas is restricted due to explosives contamination. CAM Reg. 385-5, Range Regulation (dated May 1999), provides the general characteristics of each range and delineates Standard Operating Procedures at these ranges.

Approximately 64,000 acres are utilized for training and maneuver areas at Fort Campbell. This acreage is divided into 51 numbered training and maneuver areas that range in size from 204 to 3,383 acres. Training, maneuver, and exercise areas generally lie west of Market Garden Road and southwest of the former Clarksville Base. Five drop-zones, totaling approximately 2,500 acres, are located around the training areas. Sizes of drop zones range from 168 to 775 acres. During a typical training year, these facilities are used to support a variety of training requirements.

Training functions include unit training for armored, infantry, air assault, and airborne divisions. Facilities include maneuver/exercise areas, firing ranges, artillery firing points, drop zones, landing/pick-up zones, a field landing strip, demolition areas, close-in training areas, and off-post maneuver areas. The primary training objective is to ensure that all individuals and units are totally prepared to perform their assigned missions in a combat situation.

Training areas on the installation are managed under guidelines established in the Integrated Training Area Management Plan (ITAM). The goal of the ITAM program is to achieve optimum sustainable use of training lands by implementing standardized methodology for inventorying and monitoring land condition, integrating training requirements with land capacity, educating land users to minimize adverse impacts, and providing for land rehabilitation and maintenance.

Spill Response and Management

Simply having knowledge can prevent most spills. Fort Campbell's Spill Management Program offers these guidelines:

- Preventative maintenance can go a long way. Use secondary containment whenever possible, use drip pans, inspect containers



Figure 4-9 Contaminated Area

before use, and inspect vehicles for leaks. Maintain good housekeeping. Make sure containers are not set in high traffic areas. Plan for emergencies.

- Understand your spill plan and have spill response materials in an accessible location. Be aware of the hazards involved with any chemical/hazardous material you may use or come into contact with.
- Participate in the annual spill awareness training. This guidance is provided by the Environmental Division.
- Avoid Spills

Notification Procedures

Oil spills that are over 10-gallons, in an area greater than three feet by three feet, or any amount that is spilled into a stream or body of water must be reported. Please call 911.

Report any amount of spilled or released mercury or any uncontrolled quantity of a hazardous substance. If a spill or release should occur in your work area, or at home, above all, keep yourself, your family, and co-workers safe, and then call 911.

Fort Campbell's Pollution Prevention Operations Center (PPOC) is equipped with spill response material kits. Kits are specially designed for POL spills. The PPOC can specialize kits to meet unit-specific needs as well. The kits were created to assist units to manage environmental impacts during deployment, training, and maintenance operations.

If the spill or release occurs in a training area, call range control at 798-3001/798-4122 or on radio frequency 49.95 FM.

Remember all spills must be cleaned up and properly disposed of. Contact Environmental Division at (270) 798-9641 or 798-9601 for assistance as needed.

Contaminated Areas

Because of activities conducted at the installation since its inception, Fort Campbell faces petroleum-related contamination in numerous areas throughout the installation (Figure 4-9). Most of the areas are former vehicle parking and maintenance areas where motor pool/maintenance facilities existed. By 1998, Fort Campbell had identified more than 300 SWMUs to investigate, including one at Campbell Army Airfield. Contamination from the airfield was migrating off post and the Commonwealth of Kentucky became concerned. Fort Campbell immediately began characterizing and remediating this site to address the public's concerns and prevent closure of the airfield. Continuing remedial actions without disrupting the military mission at the airfield has been an ongoing challenge.

The cleanup of environmental contaminants at Fort Campbell sometimes presents a challenge due to conflicts with ongoing training exercises and the need to maintain overall mission readiness. Fort Campbell's Installation Restoration Program seeks to maintain this balance by seeking effective management strategies, implementing efficient cleanup practices, and fostering partnerships with community and other stakeholders. Program personnel locate sites that have been contaminated, characterize the sites, report all findings to the U.S. Environmental Protection Agency, and remediate the sites, if necessary, pursuant to the Resource Conservation and Recovery Act (RCRA).

Fort Campbell has one of the most active Restoration Advisory Boards (RAB) in the Army. The RAB consists of 22 members, including

representatives from the installation, community, regulatory agencies from Tennessee and Kentucky, and the U.S. Environmental Protection Agency. Community members include adjacent landowners, educators, Chamber of Commerce members, farmers, and environmentalists. The RAB meets monthly to improve communication between the installation and community on cleanup activities and other environmental concerns.

As of March 2001, a total of 353 solid waste management units (SWMUs) exist at Fort Campbell. Most of these have already been remediated. Possible contaminant releases to soils, ground water, and surface water are possible at the remaining sites. Examples of SWMUs include range disposal areas, explosives detonation areas, and pesticide mixing areas. The primary types of hazardous wastes and hazardous materials handled at Fort Campbell are shown below:

Waste solids	Waste acids	Waste lithium batteries
Waste 1,1,1-trichloroethane	Waste oils	Waste calcium hypochlorite
Waste benzene	Waste naphtha	Waste mercury batteries
Mixed solvent wastes	Waste isopropanol	Sludge
Waste paint solvents	Waste kerosene	Waste liquids
Waste xylene	Waste fuel oil	Waste paint containing chrome
Waste lab packs	Polychlorinated biphenyls (PCBs)	Pesticides and herbicides

These materials are used at numerous locations throughout the installation, including the Campbell Army Airfield and the cantonment area. Battery shops, fire training areas, oil/water separators, and open burning and detonation areas are examples. Many of the hazardous wastes and hazardous materials handled at Fort Campbell result from site operations such as cleaning and maintenance of aircraft, vehicles and other equipment, buildings, and grounds at the installation. Active ranges are exempt. There are 20 abandoned sanitary and construction debris landfills that have been restored, but require continued monitoring. All of Fort Campbell's hazardous waste is processed through DRMOs 90-day permitted storage facility.

The Pollution Prevent Operations Center (PPOC) / Hazardous Materials Control Center (HMCC) Program enhances combat readiness, and establishes regulatory compliance and inventory management procedures for all batteries managed within divisional unit COMMO Shops. This is achieved by establishing single point control and accountability over the requisitioning, receipt, distribution, storage and disposal of hazardous materials and wastes.

The Karst topography of the installation does complicate environmental cleanup. Sinkholes, caves, sinking streams, and underground rivers can easily transmit contaminants from the surface to the subsurface. Contamination of the groundwater is a risk that must be considered.

USTs

Underground storage tanks (USTs) have the potential to contribute contaminants to the groundwater, surface water, soil, and air. Materials contained in USTs include gasoline, diesel, heating oil, lubrication oil, JP/4, JP/8, used oil and fuel. Regulated USTs are routinely tested for leaks and monitored to ensure minimal impact to the environment. Regulated USTs

found to be leaking must be removed (or otherwise mitigated), along with the contaminated soils.

Currently, there are 64 regulated USTs on post, with 15 having temporary closure status. Approximate locations are shown on the installation's UST map. All meet environmental laws and regulations. In addition, 203 regulated USTs have been removed (clean closure letters have been received from regulatory authorities for all locations). Fort Campbell requires that each UST be monitored daily for leaks and other malfunctions. All active USTs that are found to lack structural integrity will be removed, replaced, or upgraded. Any soil contamination that is found will be removed, or other regulatory guidelines will be followed until the site has been designated "clean". At this point, other land uses may be considered.

There are 32 USTs that are in the "Other UST" category. These include emergency spill tanks, hydrant fuel systems, etc. There are 130 heating oil USTs located in the cantonment area on post. Only 18 are active. There are 209 Army family housing heating oil USTs, however none are currently in use.

Regulated USTs are governed under Federal, Commonwealth of Kentucky and State of Tennessee environmental regulations:

- The Resource Conservation and Recovery Act (RCRA);
- 40 CFR 280 and 281, Underground Storage Tanks;
- Commonwealth of Kentucky Regulation KAR UST Title 401, Chapter 42 (administered by the Kentucky Department for Environmental Protection Division of Waste Management);
- State of Tennessee Rules of the Department of Environment and Conservation Division of Underground Storage Tanks, Chapter 1200-1-15; and
- Department of the Army and local regulations.

ASTs

Above ground storage tanks (ASTs), like USTs, have the potential to contribute contaminants to several media, including groundwater, surface water, soil, and air. There are 123 active ASTs on the installation. Approximate locations are shown on the installation's AST map. In addition, 43 ASTs have been removed.

Fort Campbell has a spill response team to assist the installation with a spill or release of hazardous substances. In 1998, sixty-one reported spills occurred on the installation. Eighty percent of the substances spilled were petroleum, oils, or lubricants. The Installation Spill Plan is the driver for AST compliance with Federal, state, Army and local laws and regulations.

Solid Waste Management

Because Fort Campbell exists in two states and has Solid Waste Management Units (SWMUs) in each, its cleanup program must comply with environmental regulations in both states. Though this is a difficult challenge, it is a primary reason for one of Fort Campbell's most successful program management strategies—an Installation Action Plan (IAP) that is developed at an annual workshop attended by all stakeholders, including Restoration Advisory Board (RAB) members, U.S. Forces Command (FORSCOM) representatives, Environmental Protection Agency (EPA) representatives, and Kentucky and Tennessee regulators.

Waste Water Management

Fort Campbell's Wastewater Treatment Plant (WWTP), built in the 1940's and expanded in 1975, is a trickling filter system with the capacity to treat four million gallons of wastewater per day. The wastewater collection system consists of 79 sewage lift stations and 100 miles of associated collection piping. Treatment of wastewater includes primary treatment, secondary treatment, and effluent disinfection using ultraviolet treatment. The plant operates under an NPDES Permit, which authorizes discharge of effluent from the WWTP to Little West Fork Creek, and requires pretreatment of any wastewater that contains grease or oils.

Stormwater Management

At Fort Campbell, care is taken to prevent storm water from becoming mixed with contaminants that are products of industrial and construction activities. An example of an industrial activity at Fort Campbell would be motor pool maintenance and construction activity, which generally includes all land disturbance work of one acre or greater. The Clean Water Act requires that operators of facilities, including federal installations, which discharge storm water associated with industrial and construction activities obtain permits under the National Pollutant Discharge Elimination System (NPDES) to control the quality of storm water discharges and to ensure that no contaminants or pollutants are conveyed along with storm water. Tennessee and Kentucky have issued NPDES permits for storm water discharges, and under those permits, Fort Campbell is required to develop and implement a Storm Water Pollution Prevention Plan for each industrial and construction site covered under the permit. On the installation, approximately 60 industrial sites and 30 construction sites are covered by NPDES permits at any given time. Each individual site is responsible for implementing its Storm Water Pollution Prevention Plan. The Clean Water act also requires Fort Campbell as an owner of a small Municipal Separate Storm Sewer System (MS4) to obtain NPDES permits from Tennessee and Kentucky for discharges from the system. Fort Campbell is required to implement and maintain a storm water management program for its MS4 which meets the provisions of the NPDES permit to reduce the discharge of pollutants to the "maximum extent practicable", protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act.

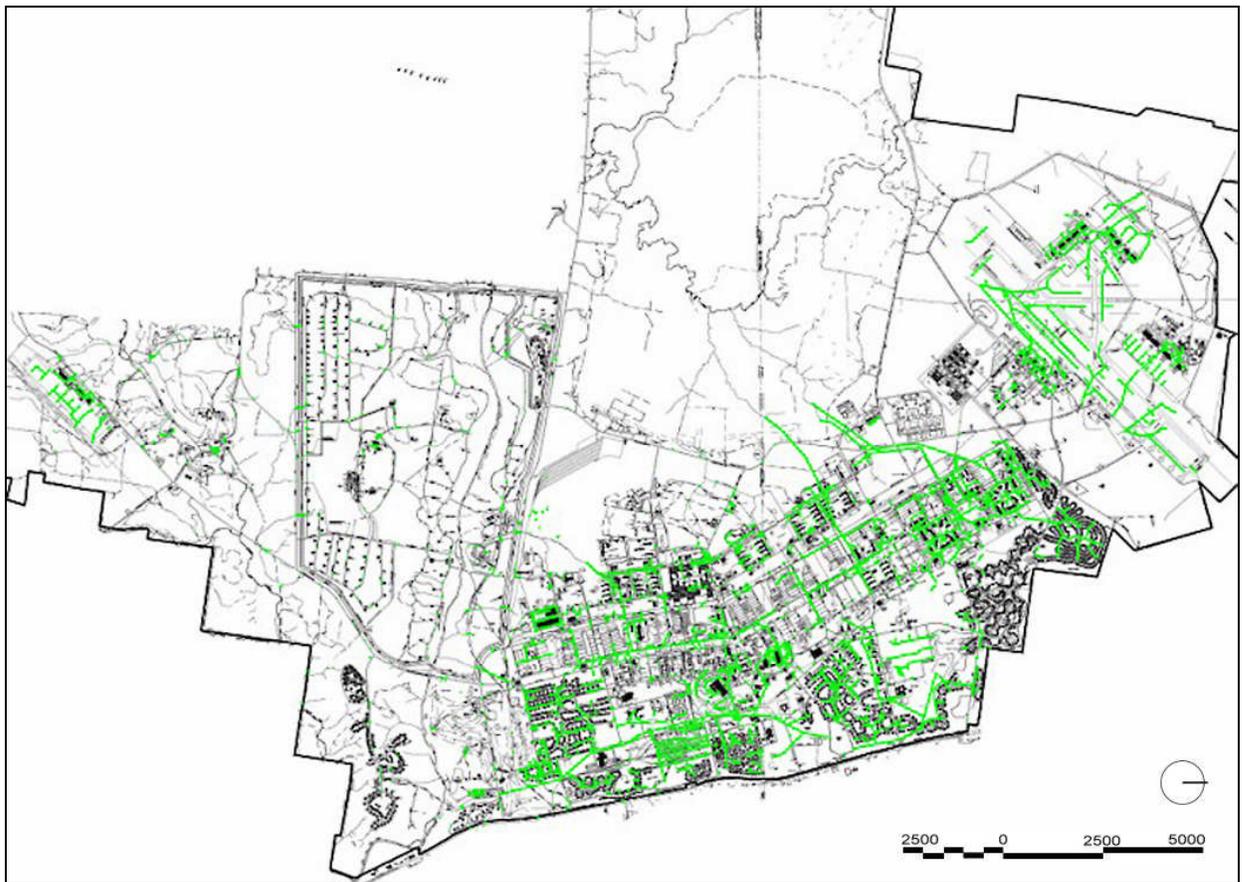


Figure 4-10 Fort Campbell Storm Drainage System

Storm Drainage System

The topography of the area consists of nearly level terrain covered with limestone sinkholes to gently rolling hills. The terrain provides adequate relief for surface runoff collected through a system of open ditches and subsurface storm drains to flow into Little West Fork Creek.

The Fort Campbell cantonment area can be divided into nine separate drainage areas, which are referred to as Basins A, B, C, D, E, F-1, F-2, F-3 and G. The basins are described briefly below.

- **Basin A**

Basin A consists of approximately 1,700 acres in the eastern portion of Fort Campbell. The storm sewer system flows generally northwest to southeast from the Lee Village Housing Area to the outfall at Little West Fork Creek near Cole Park. Storm water is conveyed through a system of open ditches, ponding areas and storm drains to a concrete chute at William C. Lee Road, which discharges into Little West Fork Creek. Basin A contains two major detention basins, which serve to significantly decrease the peak flow capacity required in the storm sewer system.

- **Basin B**

Basin B consists of approximately 1,050 acres in the southwest portion of the cantonment area of Fort Campbell. Storm water is collected by a storm drainage system that flows generally northwest to southeast and discharges into an open ditch, which is a tributary of Little West Fork Creek. Three other open ditches draining to Little West Fork Creek provide additional drainage for storm water in the southernmost end of the cantonment area.

- **Basin C**

Basin C incorporates approximately 280 acres of the west central portion of the Fort Campbell cantonment area. Approximately one fifth of this basin relies solely on sinkholes to drain accumulated storm water. Storm water from the remaining area is conveyed generally from east to west through storm drainage systems and open channels to Dry Fork Creek.
- **Basin D**

Basin D includes approximately 350 acres in the north central portion of the cantonment area. Storm water is collected by a storm drainage system and generally flows east westerly, passing through Basin C and discharging into a tributary of Dry Fork Creek.
- **Basin E**

Basin E contains approximately 650 acres in the north portion of the cantonment area, including the southernmost portion of Campbell Army Airfield. Storm water is collected by a storm drainage system that flows generally northeast to southwest and collects runoff from Pierce Village and the modular barracks and maintenance areas. This system discharges into a tributary of Dry Fork Creek.
- **Basin F-1**

Basin F-1, which includes approximately 480 acres, utilizes three large storm drains outfalls to drain the southern half of Campbell Army Airfield into a tributary of Dry Fork Creek. Storm water from Basin F-2, which contains approximately 530 acres, is drained through storm sewers to a retention basin with no outlet, south of the main taxiway. Storm water from Basin F-3, which includes approximately 210 acres, is conveyed through a storm drainage system to a tributary of Dry Fork Creek.
- **Basin G**

Basin G contains approximately 350 acres bisected by the southeast boundary of the Fort Campbell cantonment area. Storm water from Fort Campbell is discharged off post through a 30-inch culvert.

Limestone sinkholes and man-made ponding areas are used extensively in the system to regulate the flow of runoff carried in storm drains and open ditches. Both curb-and-gutter and open ditch roadside are utilized within the cantonment area. The storm water drainage system is independent of effective population, but impacted by any increase in impervious area that might result from future development.

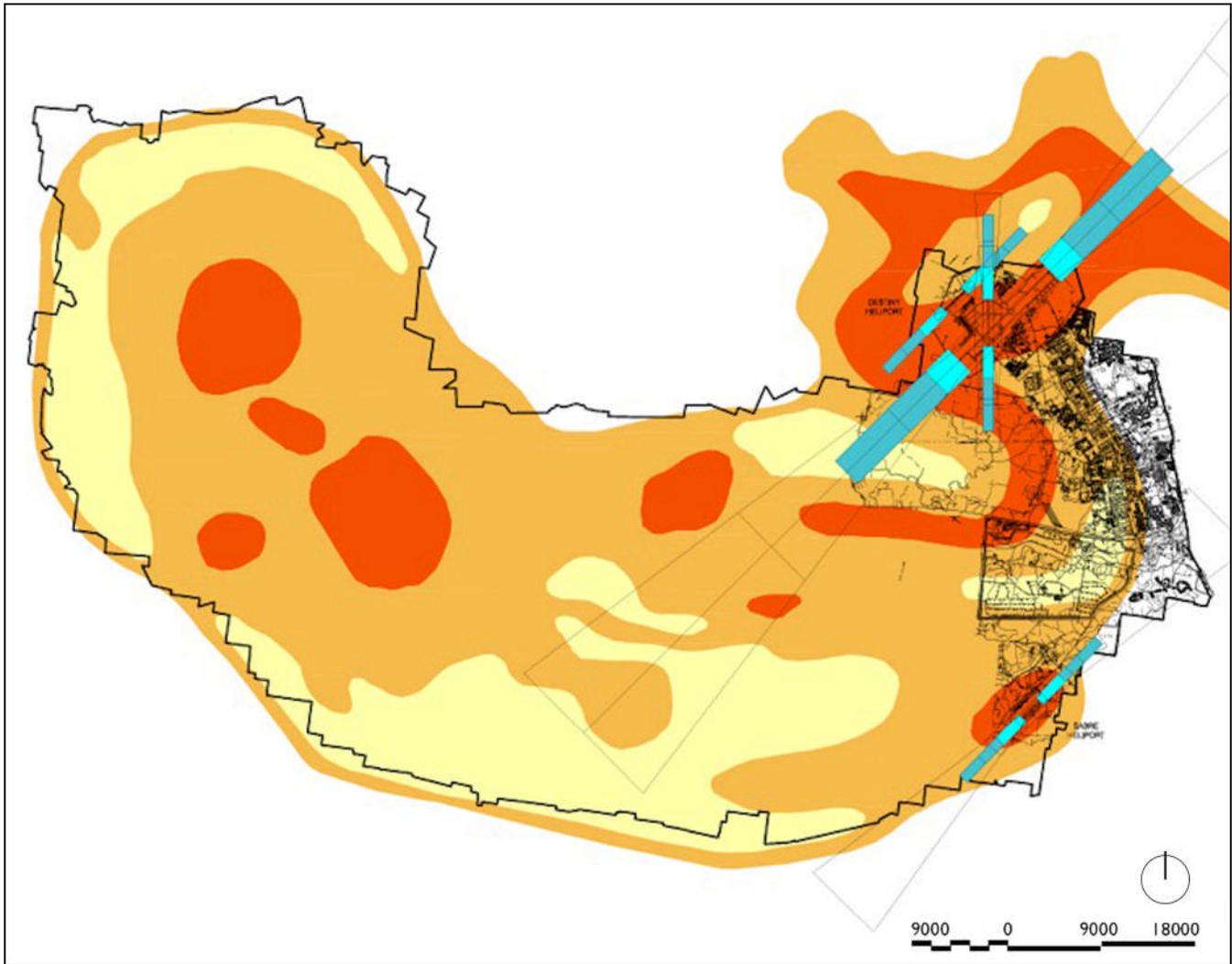


Figure 4-11 Fort Campbell Noise Map



Noise

On Fort Campbell high sound levels are routinely produced by firing small arms, artillery and armor; detonating explosives; and flying fixed and rotary wing aircraft (Figure 4-11). These sound levels are both part of the requirement of operating the weapons systems vital to Fort Campbell's national defense mission and a necessary part of training. Soldiers must learn to function in environments similar to the ones they may encounter in actual combat situations. Unfortunately, these sound levels are capable of extending beyond the installation and possibly disturbing those who are not participating directly in installation activities. The environmental noise program on the Fort Campbell installation addresses the noise generated by training and mission activities. Environmental noise program areas are:

- Installation Compatible Use Zone (ICUZ) Program
- Noise Monitoring and Noise Complaints
- Sound Absorption Structures

The Installation Compatible Use Zone (ICUZ) Program was designed as a method for Army installations and their surrounding communities to work together using land use planning techniques to resolve issues of potential concern for both parties. Army training operations and the inherent noise accompanying such activities is the primary focus of the ICUZ Program. Noise level zones are mapped so that the installation and the interested

public can work together employing compatibility guidelines and land use planning techniques to ensure that the land uses in these noise impacted areas are compatible. An ICUZ Study for Fort Campbell was completed in May 1994. The ICUZ study is updated every five years.

Noise monitoring is required, as specified in AR 2001, when noise Zone III extends off the installation, when there is significant noise controversy, or when the installation receives a significant number of noise complaints involving noise generated through training activities. It is essential to Fort Campbell that area residents' complaints are heard and routed to the proper office.

For each noise complaint, information is gathered, circumstances are investigated and follow-up action is taken. Noise complaint files are retained for several years to evaluate and possibly identify trends and problem areas. Semi-annual reports are made to the Environmental Quality Control Committee on problem areas identified. The results of noise monitoring are used for mitigating noise through building and site improvements, rescheduling or relocation of the training activity or the construction of sound barriers.

Several factors contribute to the general noise conditions at Fort Campbell. The primary sources of noise include fixed-wing aircraft, rotary-wing aircraft, training exercises (e.g., firing small and large caliber weapons, detonating explosives, etc.), motor vehicle use, railroad operations and military construction activities.

An Installation Compatible Use Zone (ICUZ) Study for Fort Campbell was completed in 1992. The ICUZ program is designed to facilitate Army installations and the surrounding communities working together to resolve issues of concern to both parties and to ensure that development at the installation does not negatively affect surrounding communities. The U.S. Army has developed land use guidelines for areas on and near its installations as an element of the ICUZ program. These guidelines have not been developed to prevent building in these areas, but rather to recommend land uses that are compatible with activities performed on the installation. The primary means of minimizing noise-sensitive development is through effective land-use planning.

The ICUZ study uses Noise Zones (contours) developed by a computerized methodology. Exposure to noise is classified into three levels for certain types of land use

- Zone I (acceptable) is the area where the day-night sound level (DNL) is less than 65 decibels, A-weighted scale (dBA) for aircraft, vehicle, and small arms range noise, and less than 62 decibels, C-weighted (dBC) for noise from weapon systems larger than 20-mm. This area, considered to have moderate to minimal noise exposure from aircraft operations, weapons firing and other noise sources, is acceptable for noise-sensitive land uses including housing, schools and medical facilities.
- Zone II (normally unacceptable) is the area where the DNL is between 65 and 75 dBA or between 62 and 70 dBC. This area is considered to have a significant noise exposure and is, therefore, normally unacceptable for noise-sensitive land uses.
- Zone III (unacceptable) is the area where the DNL is greater than 75 dBA or greater than 70 dBC. This zone is considered an area of severe noise exposure and is unacceptable for noise-sensitive activities.

A fourth contour, the Land Use Planning Zone (LUPZ) contour, is included on noise maps to account for days of higher than average operations and cover the range immediately below the Zone I levels.

Areas receiving the greatest impact from blast noise are contained within the boundaries of the installation, particularly the North/South Impact Area. Zone II and III noise contours for fixed and rotary-wing aircraft extend off-post into land located north and northeast of the installation. Noise contours associated with aircraft corridors indicate the presence of Zone II contours off-post around the entire peripheral boundary of the installation and in troop housing areas in the cantonment.

The majority of the noise generated by motor vehicle traffic is contained within the right-of-way of each major street. However, two residential areas are adversely impacted by nearby motor traffic. These are the Turner Loop Family housing area, and a portion of the Lee Village Family Housing area. The impact of railroad noise at Fort Campbell is minor.

Noise generated by construction activities is of a different nature than noise generated by other activities. Construction noise is produced by many different types of equipment and is temporary in nature. Construction activities are generally carried out during the day so there should be minimum disturbance to sensitive residential areas at the most critical times (2000 to 0700 hours).

The Army actively seeks ways to minimize the impact of operations at Fort Campbell on surrounding communities. The Joint Land Use Study (JLUS) Program is another tool designed to facilitate communication and joint decision-making by Army installations and their surrounding communities. The community's role is to insure that future growth and development is based on competent planning practices. Coordinated efforts insure that land use plans, policies, and ordinances are developed and enforced to provide future compatibility of uses both on and off the installation. A JLUS for Fort Campbell was completed in January 1996. It is updated every five years, or more frequently if necessary.

Fort Campbell does receive numerous noise complaints annually. Most complaints involve aircraft noise occurring outside the installation boundaries. Information is gathered for each noise complaint and all noise complaint files are retained for several years to possibly identify trends and problem areas. As specified in Army Regulation 200-1, noise monitoring is required:

- when Zone III extends off the installation
- when there is a significant noise controversy
- when the installation receives a significant number of noise complaints involving noise generated through training activities.

Additionally, the installation has recently completed a Noise Management Plan (November 2000) that outlines procedures and policies Fort Campbell will pursue to minimize the effects of post-generated noise on the surrounding community. Several techniques can be employed to mitigate noise, including implementing building and site improvements, rescheduling or relocating a training activity, or by constructing sound barriers or absorption structures.

Air Quality

In 2004 Fort Campbell was designated as a non-attainment area for ozone. State Implementation Plans are being revised/implemented to incorporate requirements for "basic" non-attainment areas. A General Conformity Rule analysis will be required for all new construction that begins June 15,

2005 or later. Data for this analysis will need to be submitted to the DPW Environmental Division, Air Quality Office, prior to commencement of construction.

There are various air pollution sources at Fort Campbell, which must be permitted for construction and operation. These sources include fossil fuel boilers and hot water heaters, woodworking shops, paints booths, incinerators, underground and aboveground storage tanks or any other source that might release pollutants into the atmosphere. Other major sources of air pollution are military equipment and vehicles.

The primary legal driver for air quality protection is the Federal Clean Air Act. Under the Act, the U.S. Environmental Protection Agency (EPA) sets national pollutant limits and individual states develop regulations for compliance. Fort Campbell is regulated by states agencies in Tennessee and Kentucky, as well as Army Regulation 200-1.

Fort Campbell currently holds approximately 30 air permits with Tennessee and Kentucky. The installation is considered a major operating source for both states under the Clean Air Act Title V program. Title V permit applications have been submitted. Once accepted, Fort Campbell will hold only 2 permits (one for each state).

Fort Campbell currently holds approximately 30 air permits with Tennessee and Kentucky. The installation is considered a major operating source for both states under the Clean Air Act Title V program. Title V permit applications have been submitted. Once accepted, Fort Campbell will hold only 2 permits (one for each state).

The primary sources of air emissions at Fort Campbell are heating plants and spray booths. Other point sources of air emissions at Fort Campbell include vehicles, woodworking shops, a laundry plant with perchlorethylene, a classified document incinerator, and an aggregate storage area. Military vehicles contribute directly to air quality degradation due to their emissions and indirectly by stirring dust from gravel roads. Vapors are also emitted during liquid fuel transfer to and from underground and above ground storage tanks. Several landfills contribute to air degradation but are not regulated. Other infrequent sources of air emissions at Fort Campbell include controlled burns and military training exercises using obscurants.

Pollutant levels from these and other minor emissions do not violate federal or state standards under normal operating conditions. Even in worst-case scenarios, Fort Campbell remains in compliance with state and federal air quality standards.

As directed under the Clean Air Act, the EPA has developed National Ambient Air Quality Standards (NAAQS) for six criteria pollutants:

- ozone
- carbon monoxide
- nitrogen dioxide
- sulfur dioxide
- particulate matter (total suspended particulates)
- lead particles

In order to monitor ambient levels of these pollutants, monitoring stations have been set up around the nation. In the Fort Campbell area, there are 11 monitoring stations (1 in Christian County, 6 in Montgomery County, and 2 each in Stewart and Trigg Counties). Based on an assessment of air monitoring data, EPA rated the air quality of the Fort Campbell area as

Pounds of Explosives	Safe Distance (meters)
1 – 27	300
50	369
100	465
150	534
200	585

Table 4-1 The Safe Distance Requirements at Which Personnel in the Open are Relatively Safe From Missile Hazards, Regardless of Type of Condition of the Soil

“moderate” to “good” every year between 1992 and 1998. Levels of the six criteria pollutants were below the standards for each of the four counties, meaning that Fort Campbell lies within an “attainment area” for all of the criteria pollutants.

The phase-out of Class I ozone-depleting substances (ODS) are one of the major air quality issues at Fort Campbell. ODS, such as chlorofluorocarbons (CFCs) and halons, are used as refrigerants, solvents, fire extinguishing agents, and other uses. The target phase-out date was October 1, 2003. Fort Campbell’s Environmental Division conducts regular inspections at the 20 shops on the installation that utilize ODS to ensure compliance with record keeping requirements.

Explosive Safety

There are 47 live fire ranges, two impact areas (North/South Impact Area and Small Arms Impact Area) and two demolition areas at Fort Campbell. The majority of the ranges are located within the Small Arms Impact Area and over 300 artillery-firing points are located within the training areas surrounding the North/South Impact Area. The ranges, impact areas, and demolition areas cover approximately 28,000 acres at Fort Campbell.

Explosive safety and quantity/fragment-distance arcs are based on the quantity of explosive material and the level of risk considered acceptable. Explosives used to propel missiles, for example, can result in hazards created by the bare charges placed in or on the ground (Table 4-1)(CAM Reg 385-5, Section 18-6).

Arc distances also vary for military personnel and the public. Access to the two impact areas and two demolition areas is restricted due to explosive contamination and potential safety issues.

Although ranges are designed so as not to allow live fire outside of prescribed safety limits, live fire outside of range fans or prescribed safety limits may occur. Live fire incidents are handled in accordance with CAM Reg 700-14. This regulation outlines procedures that must be followed when rounds land outside artillery and mortar impact areas.

Demolition Area 18 is used for quarry operations and demolition training. Ammunition is stored in magazines located on the southern edge of Old Clarksville Base, although the Explosive Ordnance Detachment (EOD) unit for destroying dud ammunition uses a portion of Training Area 11. Safety distances from explosions in these demolition and storage areas are specific to each particular area. Range Control enforces regulations governing use of the two demolition areas and two impact areas located on Fort Campbell. No over flights are allowed in these areas without prior coordination.

Cultural Resources

Significant cultural resources, including prehistoric archaeological remains and historic buildings, exist at Fort Campbell. They are protected under numerous federal and state laws, including the National Historic Preservation Act, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the Archaeological and Historic Preservation Act of 1974. Federal statutes, regulations, and executive orders with respect to cultural resources can be viewed or downloaded at U.S. Army Environmental Center’s Cultural Resources Management Program. In addition, Army Regulation 200-4 outlines the Army’s responsibilities regarding cultural resource management. These and other laws and regulations make it illegal to excavate, remove, damage, alter, or deface an archaeological resource, or attempt to do so. It is also

illegal to sell, purchase, exchange, transport, or receive an archaeological resource from federal land, or offer to do so.

Fort Campbell's 5-year old Cultural Resources Program, staffed by three archaeologists, is currently conducting a post-wide survey for archaeological sites. The Program coordinates closely with the G3 (Range Control) Integrated Training Area Management Plan (ITAM) program to ensure the protection of cultural resources during field training exercises. Other installation personnel must consult with the Program prior to any major construction or ground disturbing activity, which may have the potential to effect archaeological resources.

Prehistoric Archaeological Resources

Studies conducted by University of Kentucky scientists in the 1980s yielded evidence that Fort Campbell was used primarily as a hunting ground with a few intensively occupied sites. Artifacts discovered included hunting tools, cutting and grinding tools, ceramics, and animal remains. By the late prehistoric (early Mississippian) period, there appeared to be a more semi-permanent or permanent occupation of the area. The installation probably has other prehistoric artifacts that remain undiscovered.

Historic Resources

- Archaeological Resources

As of January 2006 Fort Campbell has recorded 1459 archaeological sites. Prehistoric site range in age from the very old Paleoindian (13,000 years old) to late Mississippian (AD 1400-1500) and all periods in between. There are also archaeological sites from the historic era. Of the 1459 recorded sites, 323 are considered eligible or potentially eligible for the National Register of Historic Places. Current inventory information with respect to any design project can be obtained by contacting the Cultural Resources Management Program within Conservation Branch of the Environmental Division of the Directorate of Public Works.

- Historic Buildings, Structures, or Objects

There are a number of places that have been designated as historic properties at Fort Campbell.

- Historic Properties with Compliance Responsibilities in Effect:

The houses specifically deemed eligible for the National Register of Historic Places are:

- The Parrish House, aka "the General's house" and/or "the farmhouse". Building 05001
- The Durrett House, aka "the log cabin". Building 1541 in Cole Park
- The Childers House, aka "the Mabry House". Building 6081

Fort Campbell Family Housing LLC is responsible for managing the Parrish and Durrett houses.

- Historic Objects

There are also two Historic Objects, neither of which have real property numbers:

- Statue sculpted by E.T. Wickham in front of Soldier's Chapel on Desert Storm Avenue
- State line marker placed in 1858-9 in Training Area 27.

- Clarksville Base

Clarksville Base Historic District is also considered eligible for the National Register. The district as a whole is the protected entity, so all of the component parts, whether original parts of the base or not, are treated as if they were historic, since effects to the parts might impair the integrity of the district as a whole. The effect of this is that undertakings within Clarksville Base all need to be coordinated through the Tennessee SHPO and assessed for potential adverse effect to the district as a whole.

- Historic Properties with No Compliance Responsibilities in Effect

The remaining World War II temporary buildings are “considered eligible” but under the terms of a nation-wide agreement between the Department of Defense and the Advisory Council on Historic Preservation, all of these at Fort Campbell may be legally demolished with no further compliance actions necessary under the National Historic Preservation Act. Fort Campbell’s programmatic agreement also allows alterations, rehabilitation, and re-use of these buildings without further compliance actions. There are approximately 200 of these as of January 2006.

Capehart/Wherry era family housing units were declared eligible by the Department of the Army. The Advisory Council on Historic Preservation subsequently approved an Army program with respect to these properties that allows alteration, demolition, etc. with no further actions applicable to the units at Fort Campbell. There are approximately 2200 of these, now under the ownership and management of Fort Campbell Family Housing LLC.

- Buildings specifically determined NOT Historic Properties

The Tennessee Historical Commission has specifically concurred with Fort Campbell evaluations that the following properties are NOT eligible for the National Register of Historic Places.

- The Pressler House (Building 1544)
- The three wings of the old hospital, buildings 00123, 00125, and 00127.
- The Wilson Theater number 00093
- The Mann Theater number 05740
- The Old NCO Club number 02577

Programmatic Agreements

There is a Programmatic Agreement in effect between Fort Campbell and the two State Historic Preservation Offices of Kentucky and Tennessee. This agreement regarding operations, maintenance and development at Fort Campbell establishes a streamlined alternative process for complying with the responsibilities of section 106 of the National Historic Preservation Act for many of the undertakings at Fort Campbell. This agreement will expire December 31, 2008.

The management responsibilities of Fort Campbell Family Housing for the Parrish House, the Durrett House and the Capehart/Wherry era housing has also been established by a programmatic agreement with the two state historic preservation offices. The terms of this agreement were incorporated in the ground lease for the family housing management. This agreement is valid throughout the term of the lease of property to Fort Campbell Family Housing.

Current compliance responsibilities can be reviewed by contacting the Cultural Resources Management Program.

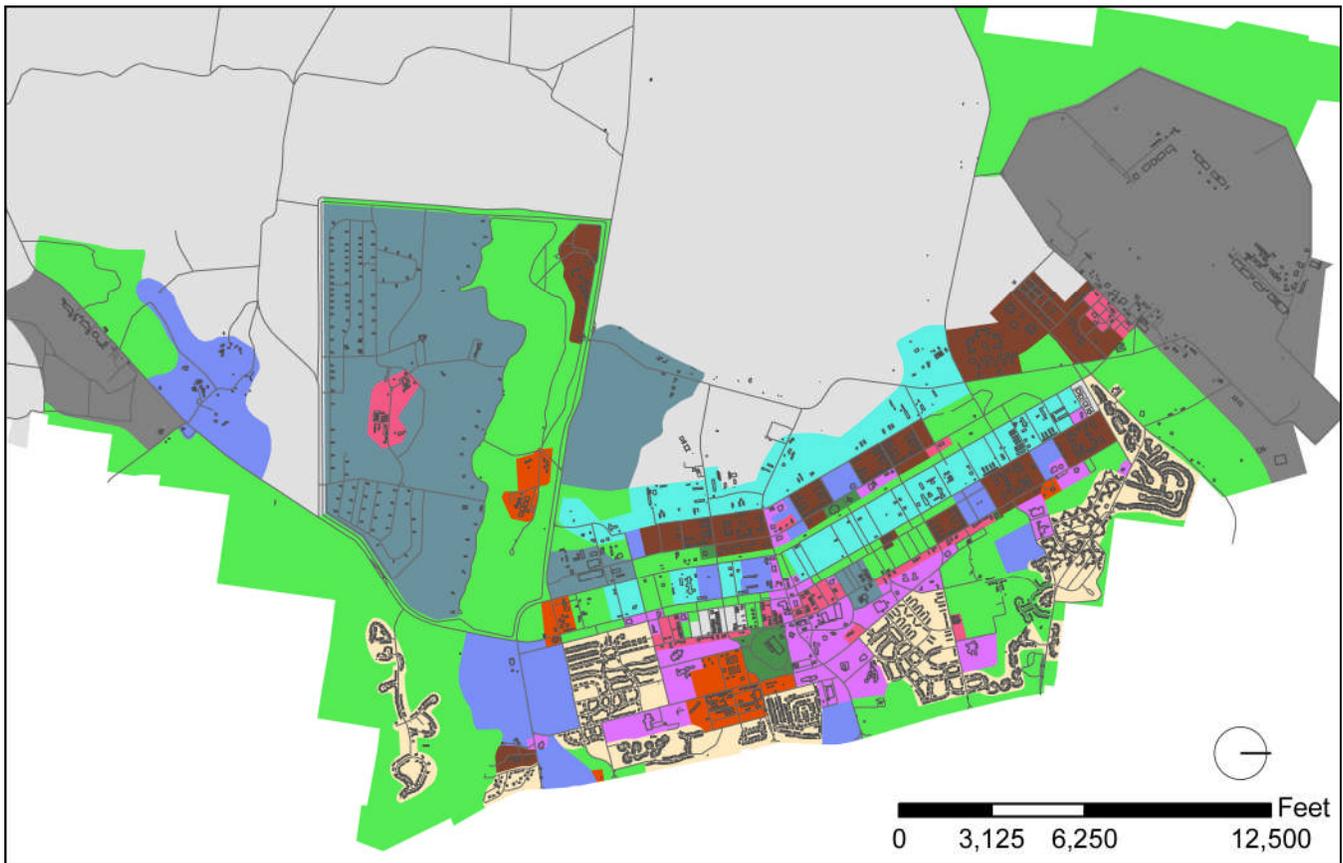


Figure 4-12 Existing Land Use

4.2 EXISTING LAND USE

A land use plan (Figure 4-12) for a military installation is comparable to the zoning ordinance of a civilian municipality, in that it controls what functions may be sited in which areas of the post.

Adopting and adhering to a land use plan will:

- Eliminate or minimize conflicts among incompatible functions;
- Improve the functional efficiency of operations on the installation;
- Improve the appearance of the installation by buffering or relocating unattractive industrial utility or maintenance functions; and
- Improve the installation environment by reducing motor vehicle use.

Fort Campbell includes approximately 105,000 acres of land, most of which is characterized by rolling prairies and wooded areas. Located in the eastern part of the reservation, the 12,000-acre cantonment area is similar to a small town, with a number of related land uses and supporting transportation and utility systems. Surrounding the cantonment to the west are the firing ranges, training and maneuver areas, impact areas, and several recreational areas.

The process of analyzing an installation's land use pattern requires the definition of existing land use zones, identification of compatible and non-compatible zones, and establishing a plan to reclassify or create zones to correct problems or meet future requirements.

Fort Campbell is divided into two general areas: training, range and impact areas, and the main cantonment area. The training, range and impact areas occupy approximately 92,000 acres of Fort Campbell. The cantonment



Land Use	Approximate Acres
Administration	225
Community Facilities	534
Family Housing	1214
Industrial	229
Maintenance	839
Medical	77
Open Space	4473
Outdoor Recreation	847
Supply Storage	2007
Unaccompanied Housing	1331
Total	11,775

Table 4-2 Fort Campbell Existing Land Use in Acreage

area with shops and organizational units account for approximately 12,000 acres of land (Table 4-2).

The cantonment area has several different land uses, including airfield, maintenance and industrial facilities, supply/storage areas, administrative and academic campuses, officer and enlisted unaccompanied personnel housing, family housing, commercial and service related community facilities, the Blanchfield Army Community Hospital area, outdoor recreation areas, and open space.

Fort Campbell has several opportunities for rearranging existing land uses to approach the optimal land use plan. The temporary buildings constructed in the 1940's are destined for demolition and will allow much leeway in the siting and rearranging of the activities on the installation to best make use of existing and desired functional relationships.

Limiting factors on the siting of facilities on Fort Campbell occur around three land uses: Housing, Airfield and Ranges. Safety zones and noise contours surrounding these land uses limit the siting of facilities, specifically Family and Troop housing areas and other noise sensitive land uses which are not compatible with these two land uses.

Ranges account for the largest portion of the installation because of the area required for maneuvering of units and for weapons training. The ranges are appropriately located autonomously from the built-up portion of the post.

Functional relationships exist between land uses when the activities that comprise each land use are in some way interdependent. Maintaining flows of material, information, people, energy, support services, administrative services and finished products between dependent land uses will increase the efficiency of the activities that comprise each land use. Siting dependent land uses adjacent to each other will result in:

- Increased efficiency and productivity;
- Shorter transit times;
- Decrease shipping costs;
- Opportunities for more face to face interactions;
- Enhanced interpersonal relationships; and

- Elimination or minimization of areas of incompatibility.

In addition to beneficial functional relationships between land uses, there are also land uses that are incompatible and have negative impacts on each other. Family and Troop Housing should not be located near Airfield or Industrial land uses due to the noise levels, visual impacts, and potential odors inherent to Industrial and Airfield functions. The noise associated with maintenance facilities negatively affects administrative functions; therefore, those land uses should not be sited together.

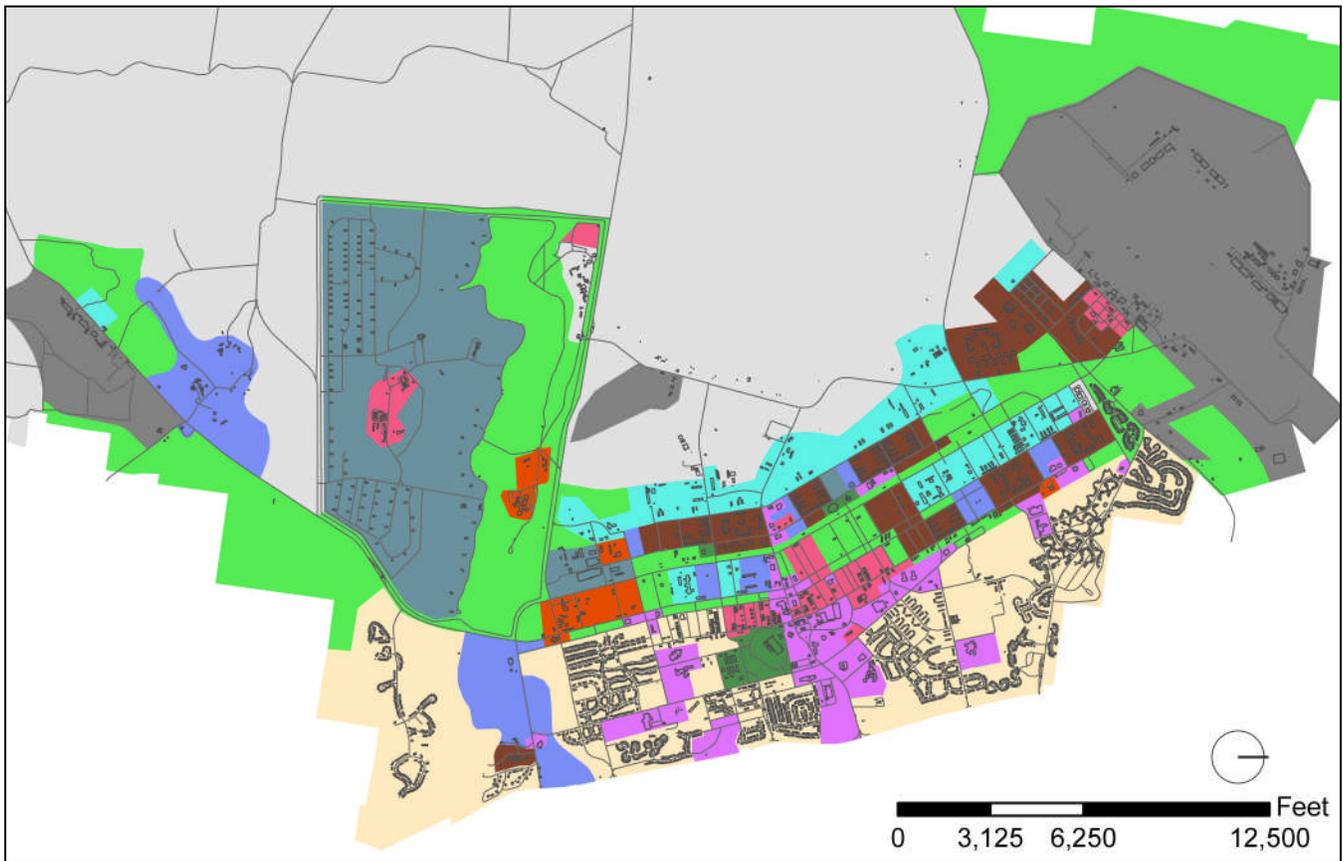


Figure 4-13 Proposed Land Use



4.3 PROPOSED LAND USE

The Summary Development Plan provides an overview of the current planning efforts, objectives, goals, and programs for future development at Fort Campbell (Figure 4-13). This document serves as a reference tool for commanders and other key officials to ensure that all future planning and development activities throughout the installation are part of a coordinated and systematic program. The need to use land wisely, current environmental considerations, and the importance of efficient use of federal funds make it essential that installation decision-makers plan for Fort Campbell's future role in national defense.

The ideal land use arrangement for an Army installation would have barracks, unit administration and supply, dining facilities and unit vehicle maintenance shops within walking distance of each other.

The Directorate of Public Works provided objectives used for the development of Fort Campbell's future land use plan. These include:

- Improve pedestrian and vehicular traffic patterns between barracks, family housing areas and work locations;
- Eliminate undesirable vehicular traffic through family housing;
- Segregate family and troop housing from industrial and maintenance areas;
- Consolidate maintenance facilities; and
- Develop additional open space, outdoor recreation and buffer areas.

4.4 REFERENCES

- [Fort Campbell Technical Design Guide](#)

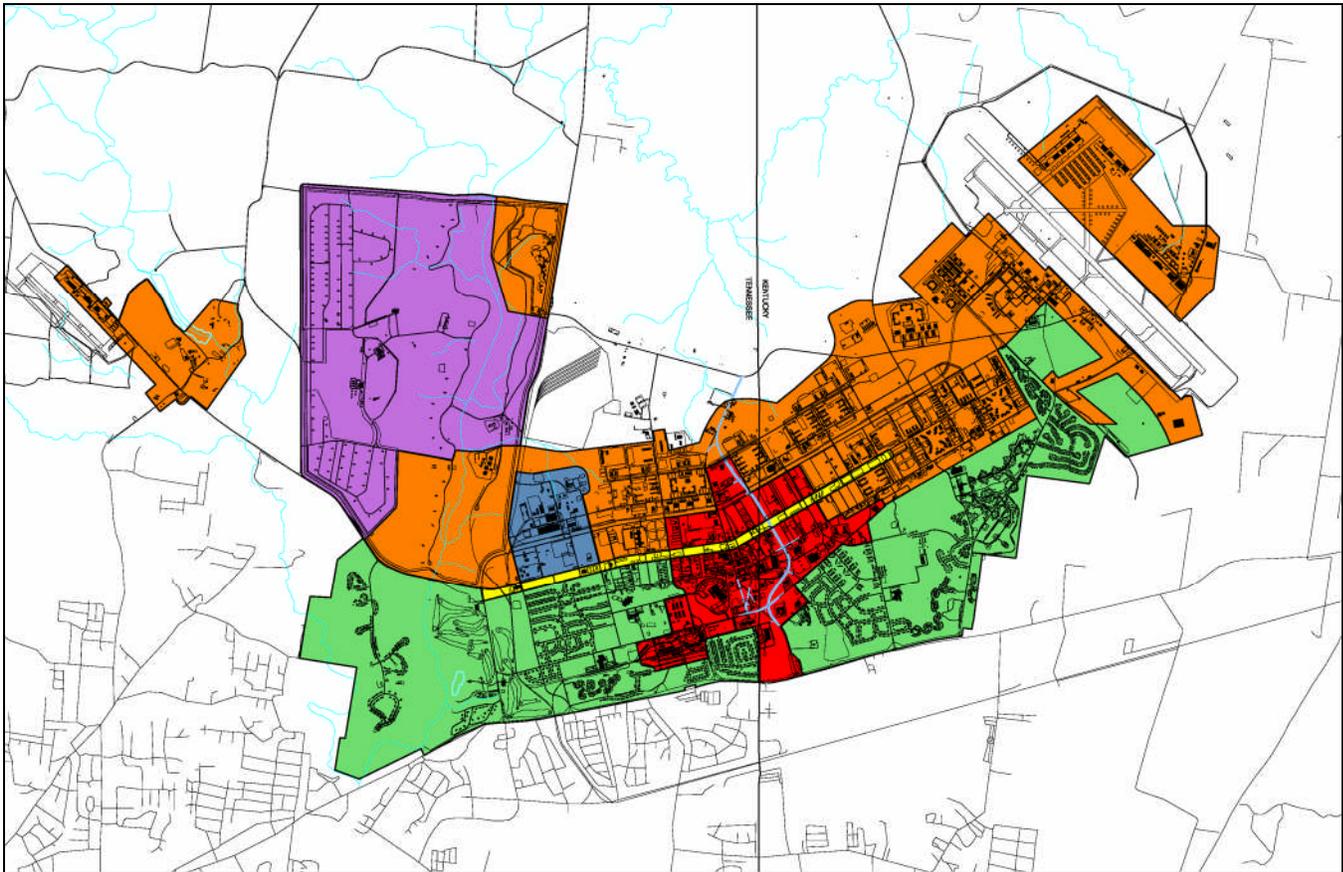
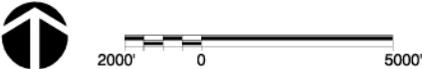


Figure 5-1 Fort Campbell Visual Themes Map

VISUAL THEMES

- TOWN CENTER
- MEMORIAL BOULEVARD
- COMMUNITY LIFE
 - FAMILY HOUSING
 - COMMUNITY FACILITIES
 - PARKS / GREEN SPACE
- BRIGADE COMBAT TRAINING (BCT)
 - MAINTENANCE / OPERATIONS
 - TROOP HOUSING
- CLARKSVILLE BASE
- PROPOSED REALIGNMENT OF SCREAMING EAGLE BOULEVARD



5.1 INTRODUCTION

Visual themes are determined after performing the two surveys mentioned in 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 of the installation. The map shown above (Figure 5-1) presents a graphical portrayal of the of the installation's visual themes.

5.2 VISUAL THEMES

Visual themes create a perception of unification within the installation. These themes create design consistency that provides orientation and a "sense of place".

Visual themes provide the same general use and visual characteristics. They include broad scale activities that occur on the installation. These activities typically include similar design and layout characteristics.

Assets and liabilities are determined according to the following criteria: installation visual goals and objectives ([Section 3, para 3.2](#)), design principles ([Section 3, para 3.3](#)) and visual elements ([Section 3, para 3.4](#)) in relationship to the six design components described in Sections 7 through 12 of this Army Installation Design Guide.

The visual analysis maps graphically illustrate the features and constraints that affect the visual character of the theme.

The following paragraphs present a functional analysis of each of the visual themes. This analysis includes a description of the visual character, a visual analysis map, assets, liabilities, and recommendations for each theme.

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.

It should be remembered that the current SPiRiT Standard of the base is currently gold, although the goal is for Platinum. All construction projects proposed as part of these recommendations should aim for the highest standard.

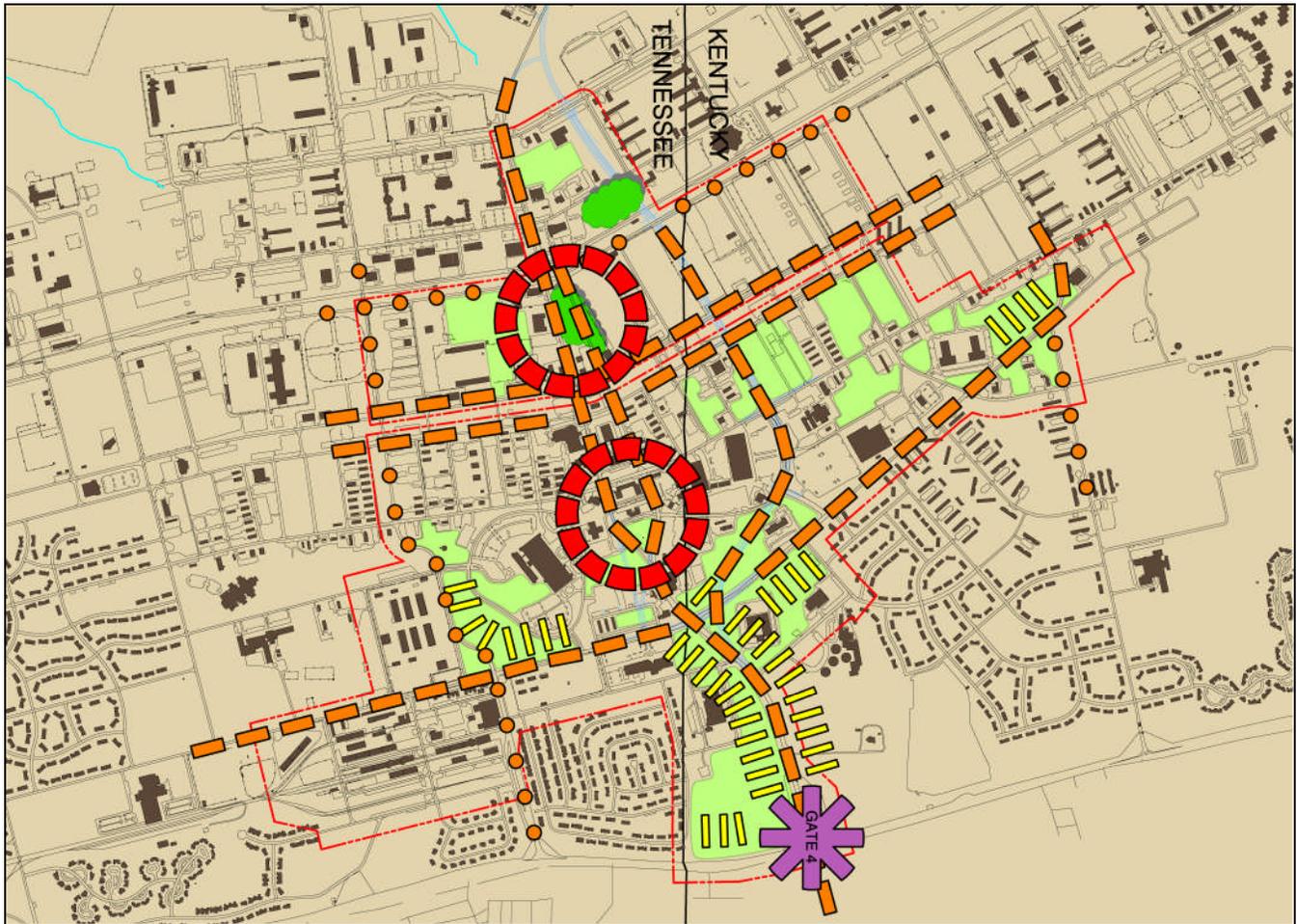
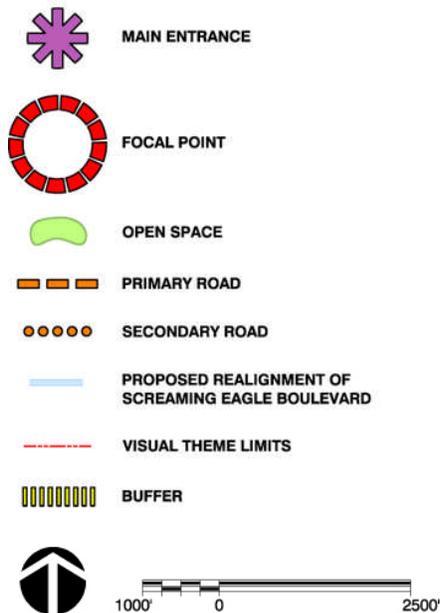


Figure 5-2 Town Center Visual Theme Map

5.3 TOWN CENTER VISUAL THEME

LEGEND



5.3.1 Visual Character

This Visual Theme is currently bisected on an East to West axis by Screaming Eagle Boulevard, which begins at the Main Gate (Gate 4) to Ft. Campbell (Figure 5-2). The Town Center Visual Theme falls in a geographically centralized location on the installation, and includes Blanchfield Army Hospital the main PX Shopping Mall, Guest House, the current Headquarters Building and many other administrative and service facilities.

5.3.2 Visual Analysis Map

There are two focal points in this Visual Theme. One is the current Headquarters Building, which provides a certain historic feeling to this theme area. The second, Gander Memorial, is an extremely meaningful and picturesque site that in many ways is the focal point of the entire base.

The new alignment of Screaming Eagle Boulevard may happen in the future, and has been included in this map, as a primary circulation route. The existing alignment of Screaming Eagle Boulevard is also given a primary circulation symbol.

5.3.3 Assets

The buffer along Screaming Eagle Boulevard represents a spatial buffer, or an offset of open space that separates adjacent buildings and uses from the primary circulation route.

Site Planning

The island created by the current Screaming Eagle Boulevard and Normandy Boulevard creates the sense of a “town square” (Figure 5-3).

There is a fair amount of open space, which is beneficial to the idea of a town center.

The theme area is central to the base.

The buildings are of a smaller scale, and are clustered together.

Building

Building 2577 is beautiful vintage 1950s architecture. Its curved façade is unique to the base, and the building should be maintained and preserved (Figure 5-4).

Building 2603 adds an historic flavor to the zone (Figure 5-5).

The Hospital is scaled correctly and gives a nice presence in the center of the post (Figure 5-6).



Figure 5-3 Screaming Eagle Boulevard



Figure 5-4 Building 2577



Figure 5-5 Building 2603 Adds Character



Figure 5-6 Hospital Is of a Pleasant Scale



Figure 5-7 Turner Guest House Courtyard



Figure 5-8 The Hospital Parking Lot



Figure 5-9 Building 89 Fence



Figure 5-10 Pool Wall Shelters Swimmers

The Turner Guest House (Buildings 82-83) is an example of contemporary architecture on the base. The exterior treatment is visually interesting and done using materials that fit its context. The integrated courtyard and playground are extremely positive attributes, and should be looked to as precedent for similar structures throughout the base (Figure 5-7).

The Education Center (Building 202) is another good example of new architecture.

The PX (Building 2840) is another good attempt at a unique façade treatment.

Circulation

A boulevard effect is created by separation Normandy Boulevard and Screaming Eagle.

A grid pattern over most of theme area provides ease of movement.

Plant Material

There is a strong planting scheme in the hospital parking lot that should be used as precedent for parking throughout Fort Campbell (Figure 5-8).

Site Elements

Building 89 has a simple, yet elegant fence (Figure 5-9).

The brick wall screening the swimming pool from Screaming Eagle Boulevard is an attractive way to shield the pool without creating a monolithic structure that would be inconsistent with this theme area (Figure 5-10).

Force Protection

Plantings in this zone consist largely of trees and lawn, and as such, comply with force protection standards.

5.3.4 Liabilities

Site Planning

Building orientations are toward parking areas off of Indiana and Kentucky Avenues. As a result, the buildings do not face the main streets of the zone, creating a sense of disconnection and isolation between facilities.

Sprawling parking is the dominant sight from the road.

Gander Memorial is awkwardly located, and is not given the prominence it deserves.

Buildings

Many of the older buildings along Bastogne Ave. are outdated and in need of repair.

Area along Kentucky Avenue between 27th St. & 36th St. contain maintenance facilities.

Fabric awnings and canopies over building entrances are outdated.

Building 89 has an addition that is inappropriate to the architecture of the building (Figure 5-11).

The sloped roof of the education center is a good feature for natural light, but the angle of the sloped glass roof is inappropriate and there isn't any ventilation or cooling so it becomes very warm.

Sheds at the Youth Center are inappropriate.

Circulation

There is no hierarchical treatment given to the streets in this zone.

The meeting of Normandy, Screaming Eagle and Wickham roads is tight and creates a dangerous intersection.

Screaming Eagle, as the main East-West thoroughfare, creates awkward movement patterns once it splits from Normandy Boulevard.

Plant Material

The trees at Gander Memorial are poorly planted, and are located too close together. As a result, they have had a history of needing to be replaced.

The majority of the buildings within the zone lack adequate landscaping (Figure 5-12).

Play areas/fields by the Youth Center have inadequate shade trees (Figure 5-13).

Trees have not been properly maintained at the Youth Center.

Site Elements

Edgings around planting beds and trees at the Turner Guest House are unnecessary (Figure 5-14).

Site furnishings such as benches, planters, trash receptacles, fencing, and screening lack design continuity throughout the zone.

Most buildings lack appropriate outdoor seating areas (Figure 5-15).



Figure 5-11 Poor Addition to Building



Figure 5-12 Building Lacks Landscaping



Figure 5-13 Inadequate Shade at Youth Center



Figure 5-14 Edgings at the Turner Guest House



Figure 5-15 Inappropriate Outdoor Seating



Figure 5-16 Inappropriate Screening

Dumpsters located throughout the theme are randomly placed, lack screening and are unsightly.

The electric substation at the Youth Center is inappropriately screened.

Numerous sheds are located throughout the theme area, and are inappropriate storage options.

Force Protection

Some screening techniques used to hide air conditioning units are inconsistent with force protection standards (Figure 5-16).

5.3.5 Recommendations

Site Planning

Relocate Gander Memorial to the Memorial Boulevard Theme area. Each tree should be given adequate room to flourish, and the group - as a whole - deserves a more prominent, central, and respectful treatment.

Future buildings in this theme should face the main roads.

Parking should be sited in the interior of the blocks.

Outdoor seating areas should be created in the interior areas of blocks - separate from parking.

Sidewalks should connect buildings along roadsides.

Buildings

Maintain exterior of all buildings.

New construction should be in context with adjacent buildings.

New additions or modifications should enhance and improve the original architecture.

Focus new construction around Screaming Eagle Blvd. after realignment.

Renovate or remove old structures in need of attention.

Use Education Center and Turner Guest House as precedents for new construction in this area.

Remove fabric awnings and canopies over entrances and replace with more permanent entrance cover that is designed to relate to existing original architecture.

Temporary buildings should be removed and permanent structures constructed in more appropriate locations.

Any modifications should be appropriate to the style and character of the original buildings.

Preserve the visual character and integrity of historic buildings. Additions to these buildings should be discouraged.

Remove all industrial-style metal buildings in the core area of this zone and replace with significant buildings appropriate to the zone.

Screen services areas, utility structures, and mechanical equipment according to force protection standards or relocate to less conspicuous locations.

Circulation

Roads should be given a hierarchy and should receive appropriate treatments.

The re-routing of Screaming Eagle Boulevard will allow for a more pedestrian friendly “downtown.” It will also resolve congestion between the current Screaming Eagle Boulevard and Normandy Boulevard.

Walks should be provided on all streets.

Plant Material

All trees should be evaluated by a certified arborist for health status.

Damaged trees (beyond remedy) should be removed.

Add islands with landscaping in the parking areas to decrease, capture and filter runoff and aesthetically enhance the visual character of the zone.

Plantings should be used to give hierarchy to streets. Landscaping for the administration buildings should be similar to college campuses planting with an emphasis on trees, groundcover and lawn.

Significant planting should be done around the Youth Center. Shade trees should be a large proportion of this planting.

Implement good pruning and maintenance practices. Stop radically pruning shrubs (throughout the installation), and allow shrubs to achieve their natural shape. If shrubs are inappropriately placed given their natural shapes and scales, they should be replaced with more appropriate choices.

Mass plant groups of the same tree, shrub and groundcover for visual impact.

Plant the largest size possible of trees and shrubs for an immediate show of landscaping.

Site Elements

Incorporate appropriate outdoor seating in site plans for all buildings in this theme.

Coordinate all planters, benches, trash receptacles, etc. throughout the theme.

Screen dumpsters according to force protection standards and/or relocate to more appropriate locations.

Remove all edgings from plants at Turner Guest House. They are unnecessary and unsightly.

Force Protection

Ensure that all plantings in the theme meet force protection standards.

Use topographical modifications to enhance force protection standards.

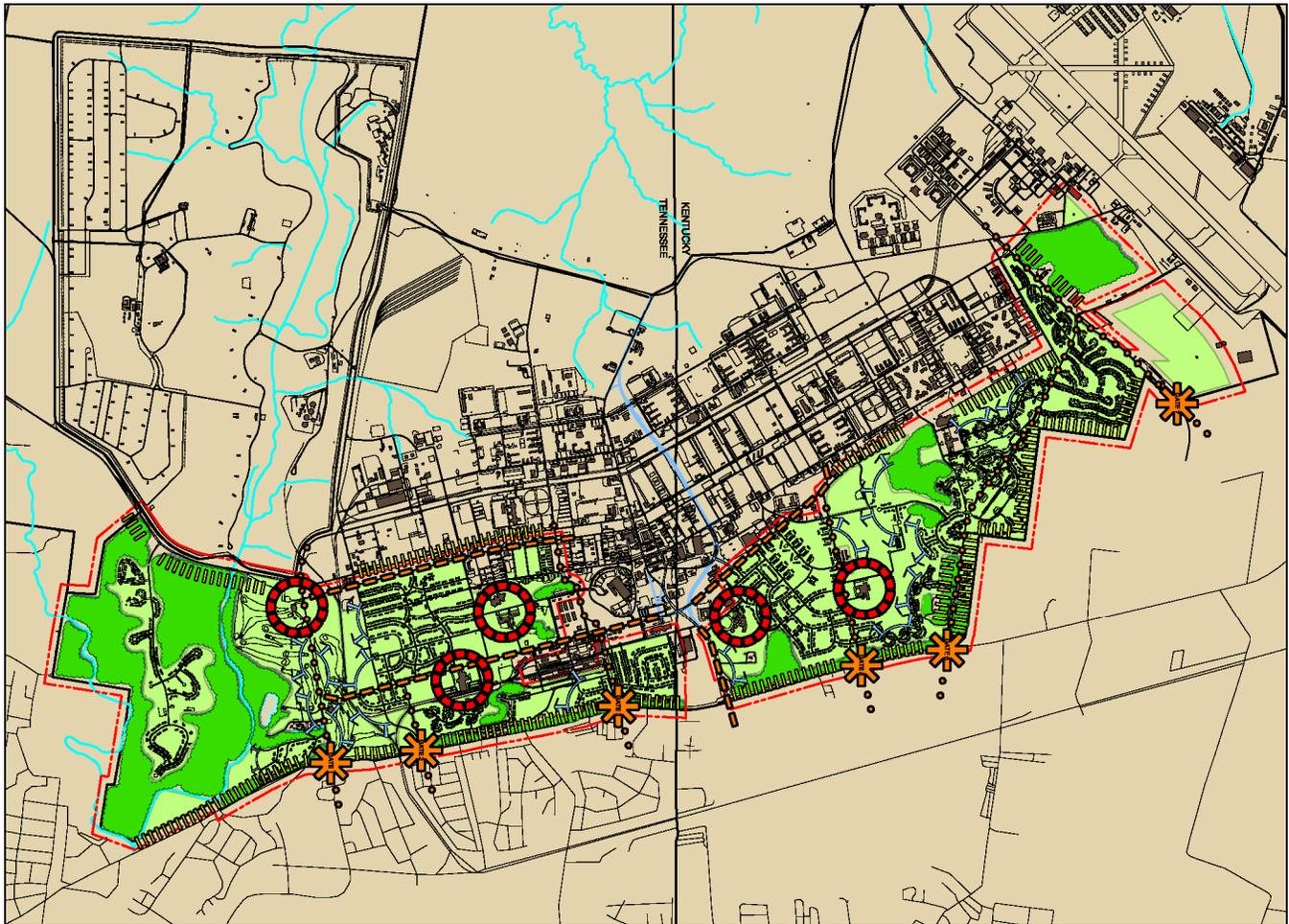


Figure 5-17 Community Life Visual Theme Map

LEGEND

-  ENTRANCE
-  FOCAL POINT
-  OPEN SPACE
-  SIGNIFICANT VEGETATION
-  PRIMARY ROAD
-  SECONDARY ROAD
-  PROPOSED REALIGNMENT OF SCREAMING EAGLE BOULEVARD
-  VISUAL THEME LIMITS
-  BUFFER
-  GOOD VIEWS



1600' 0 4000'

5.4 COMMUNITY LIFE VISUAL THEME

5.4.1 Visual Character

The Community Life Visual Theme shares its eastern perimeter with the eastern extents of Ft. Campbell (Figure 5-17). The visual theme is broken into a north area and a south area. The two areas share the same functions at Ft. Campbell. The northern edge of this Visual Theme follows the boundary of the airfield, and excludes the corridor of JI Line Road, which is designated as Deployment on the land use map. This theme includes all of the family housing units on the installation, schools, the golf course, and the Combined Club.

5.4.2 Visual Analysis Map

The buffer along the eastern perimeter of the installation is currently representing the existing vegetative buffer. This buffer is important to maintain in order to separate the Family Housing Theme from Highway 41. There is also an interest to convert this buffer into a force protection barrier by installing concrete (noise) walls softened with earth berms and landscaping.

The buffer along the northeastern limit of the theme represents a separation between the Community Life areas and the airfield. This buffer consists of vegetation and open space.

There is a buffer of open space to the east of Indiana Avenue that separates the Family Housing units from the Barracks on the West side of Indiana Avenue.

The focal points within this Theme are the schools and the golf course.

While family housing and the schools are managed by outside agents at Fort Campbell, certain standards should still be met in order to maintain an aesthetically pleasing atmosphere.

5.4.3 Assets

Site Planning

The Marshall Elementary School site is a great example of architecture and landscape working together. Meandering covered walkways are playful, visually interesting, and a great asset to the site, especially when dealing with small children (Figure 5-18).

The majority of the family housing on the base is located in close proximity to each other.

Meandering streets are appropriate for the theme. They provide a soft, friendly approach suitable to the uses within this theme.

This theme area is located in some cases adjacent to related uses in the Town Center Theme.

Housing along Indiana Avenue is adjacent to a green space that provides areas for recreation for residents.

Play areas in the housing adjacent to Texas Avenue are incorporated into the centers of the housing blocks providing for safe haven for children.

The old hospital site has potential opportunity for future development (Figure 5-19). However, environmental concerns limit development options. Located between two housing developments, it is a prime location for future community development.

The golf course is a great asset to the theme; providing both recreational activities and generous open space.

Buildings

Marshall Elementary School (Building 84) is a wonderful example of 1950s architecture. Curving walls and rounded rooms with colorful windows are playful, and visually appealing.

The World War II buildings at the Old Hospital site are strong assets to this theme, and should be precedents for future large-scale construction in this area.

Cole Creek Cabin (Figure 5-20) is a significant and historic asset to the base.

The Combined Club (Figure 5-21) is a significant piece of new architecture in the theme area. It is nicely detailed, and has a consistent look with other new buildings on post by using similar materials and colors.

The General's Quarters are a significant historic asset to the base.

The vast amount of windows at the High School building creates an open feeling and relationship to the outside (Figure 5-22).



Figure 5-18 Marshall Elementary School



Figure 5-19 Old Hospital Site



Figure 5-20 Cole Park Cabin



Figure 5-21 Combined Club



Figure 5-22 Windows at the High School Provide Connection to the Outside



Figure 5-23 Kentucky Avenue Housing



Figure 5-24 Open Space Along Indiana Avenue

The Cole Park Housing area homes are highly maintained, and have an older character that is charming.

Residential units off Seminole and Indiana Avenue are well maintained.

The housing off of Bell Road introduces a new style of architecture into the mix.

The family housing off of Kentucky Ave. between 1st St. and Airborne St. is well maintained and the consistent use of materials and color help reinforce a community feeling (Figure 5-23).

The New Hammond Heights Housing development is nice addition to the post. The scale and proximity of the units to one another creates a nice community feeling and appeal.

Circulation

All housing areas have adequate connections to secondary roads.

All housing areas have at least one major artery, giving hierarchy to the streets.

Plant Material

All areas in this theme area contain old growth trees.

Specimen trees around Marshall Elementary School provide nice shade and a comfortable atmosphere.

Homeowner plantings in residential areas allow for individuality.

Open space plantings in the housing along Indiana Avenue provide a pastoral, user-friendly park-like setting (Figure 5-24).

Site Elements

Streetlights in housing area along Indiana Avenue are of an appropriate height and style for the theme (although, proportionally they are misconfigured) (Figure 5-25).

Several play areas are provided throughout the zone (Figure 5-26).

Force Protection

Force protection standards do not apply to residential areas.

The schools are appropriately set back from roadways.

The curving roadway limits speeds at the Marshall Elementary School.

5.4.4 Liabilities

Site Planning

Significant amounts of housing about the reservation boundary (Route 41A), and needs more adequate screening.

Screen the Northern housing areas adjacent to the Brigade Combat Team Theme area.

The open field behind Marshall Elementary School can be used to better advantage for the school.

The Old Hospital Site is contaminated due to past use. It will therefore have limited development possibilities.

Buildings

A lot of the family housing is poorly maintained (Figure 5-27).

The housing areas (in general) lack individuality and identity.

Adjacent units have conflicting colors schemes and exterior detailing.

Chain link fencing in backyards of houses detracts from neighborhood (Figure 5-28).



Figure 5-25 Indiana Avenue Housing Lights Are of an Appropriate Style



Figure 5-26 Werner Park Playground



Figure 5-27 Poorly Maintained Housing



Figure 5-28 Chain Link Fences Detract from Family Housing



Figure 5-29 Entry Signage is Not Emphasized



Figure 5-30 Shrubs Are Being Radically Pruned

Circulation

There are no visual clues within the housing areas to guide visitors.

Entrance signage is not emphasized (Figure 5-29).

Plant Materials

The shrubs at the High School are being radically pruned (Figure 5-30).

Open area plantings are minimal.

Site Elements

The screening used between the units at the duplex housing along Bastogne Avenue is not visually pleasing and are in disrepair.

Air conditioning units are exposed in the duplex housing, and occupy a significant amount of room in the already tiny backyards.

There are varying lighting styles throughout the zone.

Numerous sheds are located throughout this zone.

Force Protection

Not applicable

5.4.5 Recommendations

Site Planning

A site plan should be developed for the area between Marshall Elementary School and the General's Officer's Quarters (GOQ) that has two goals:

Provide a buffer for the General's house.

Provide more appropriate aged play spaces for the school and locate these play spaces closer to the school.

Provide a more effective buffer between the housing areas and Route 41. The solution must meet Force Protection Standards. Utilize topographical mounding and plantings to ensure it is suitable for a residential area.

As it stands, the old hospital site cannot be used for housing, but is suitable for more temporary activities (e.g. ball fields). Given the karst terrain of the region, a cap will not contain contaminants. Develop this site using progressive remediation techniques (e.g. Phytoremediation). The army has an opportunity with this site to be a leader in more environmentally sound treatments of contaminated grounds.

Buildings

Ensure all public buildings within the theme area are accessible. Incorporate modifications into buildings and landscape in an aesthetically pleasing way.

Maintain exterior of all buildings.

Remove all chain link fencing and replace with a more appealing solution to screen rear yards in residential areas.

New construction should be in context with adjacent buildings.

New additions or modifications should enhance and improve the original architecture.

The historic character of Cole Park Log Cabin and Cape Cod GOQ should be protected.

The Marshall Elementary School is a gem and should be protected and maintained. Any future additions should be carefully designed to maintain the character of the current structures.

Circulation

Create a hierarchy of roads within the housing areas.

Four foot sidewalks are mandatory for all future housing areas. These sidewalks should be separated from the concrete curb by a six foot grass buffer strip. Retrofit existing neighborhoods if possible. Create pedestrian connections to the Town Center.

Plant Material

Stop radically pruning shrubs (throughout the installation). Shrubs and trees should be allowed to grow to achieve natural shape and size with pruning on an as-needed basis for health and aesthetic appearance of the plant.

All trees should be evaluated by a certified arborist for health status.

Damaged trees (beyond repair) should be removed.

Mass plant groups of the same tree, shrub and groundcover for visual impact.

Plant the largest size possible of trees and shrubs for an immediate show of landscaping.

Parks and open areas should receive increased plantings of shade trees to create a more pastoral effect.

Site Elements

Coordinate all public planters, benches, trash cans, etc. throughout the zone.

Screen dumpsters and relocate them in more appropriate locations.

Remove all chain link fencing and replace with a more appealing solution in residential rear yards.

Increase the presence of benches and other site amenities in open park areas to encourage pedestrian occupation.

Force Protection

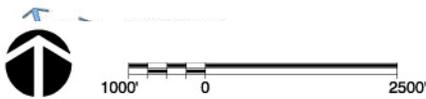
Provide barriers at public facilities. If possible, eliminate straight-on approaches to buildings.



Figure 5-31 Historic/Clarksville Base Visual Theme

LEGEND

-  ENTRANCE
-  FOCAL POINT
-  OPEN SPACE
-  SIGNIFICANT VEGETATION
-  PRIMARY ROAD
-  SECONDARY ROAD
-  VISUAL THEME LIMITS
-  BUFFER



5.5 CLARKSVILLE BASE VISUAL THEME

5.5.1 Visual Character

The borders of the Clarksville Base Theme area are established by Mabry Road to the north, McNair Road to the west, Jordan's Springs Road to the south and 101st Airborne Division Road to the east. The majority of this theme area is wooded, and most of the structures are ammunition storage units. This is the only portion of Ft. Campbell with historic significance.

5.5.2 Visual Analysis Map

The buffer on this map (Figure 5-31) represents a visual/spatial buffer between the surrounding roads and the ammunition storage bunkers within the site.

There is a significant amount of open space located around the Unaccompanied Personnel Housing (UPH). There is also an area of open space along the southern edge of the theme with good views.

5.5.3 Assets

Site Planning

The Little West Fork Creek runs through the site, which is an asset for wildlife.

Buildings

The structures in this area are historically significant. They consist largely of ammunition storage units used during the Cold War.

Circulation

Vehicular circulation through the site is limited.

Plant Material

The majority of the site is wooded, thereby providing a large wildlife habitat.

Site Elements

There are no site element assets.

Force Protection

There is only one entrance to the site. All other edges are wooded buffers.

5.5.4 Liabilities

Site Planning

The Little West Fork Creek runs through the site, making development of the site difficult.

Located peripherally to the rest of the base, it is isolated from other land uses.

Buildings

Not applicable

Circulation

Many of the existing roads are perhaps obsolete given the decommissioned nature of the site.

Plant Material

This is a potential area for invasive plants.

Site Elements

Not applicable

Force Protection

Given the site of the Clarksville Base site, its limits are a good percentage of the total base perimeter. As such, its boundaries are a potential weak spot for security.

5.5.5 Recommendations

Site Planning

Cluster new construction around existing buildings in the Northwest corner, near the UPH site.

Buildings

Renovate and repair historic buildings and structures.

Circulation

Minimize the construction of new roads through the site.

Plant Material

The health of all trees should be evaluated.

Invasive understory growth should be removed.

Maintain the wooded nature of the site.

Site Elements

Outdoor seating areas with adequate shade should be provided for all workers at the site.

Force Protection

Maintain the wooded buffers of the site. If force protection measures are needed, use topographical changes in order to minimize visual disturbance of the woodlands.

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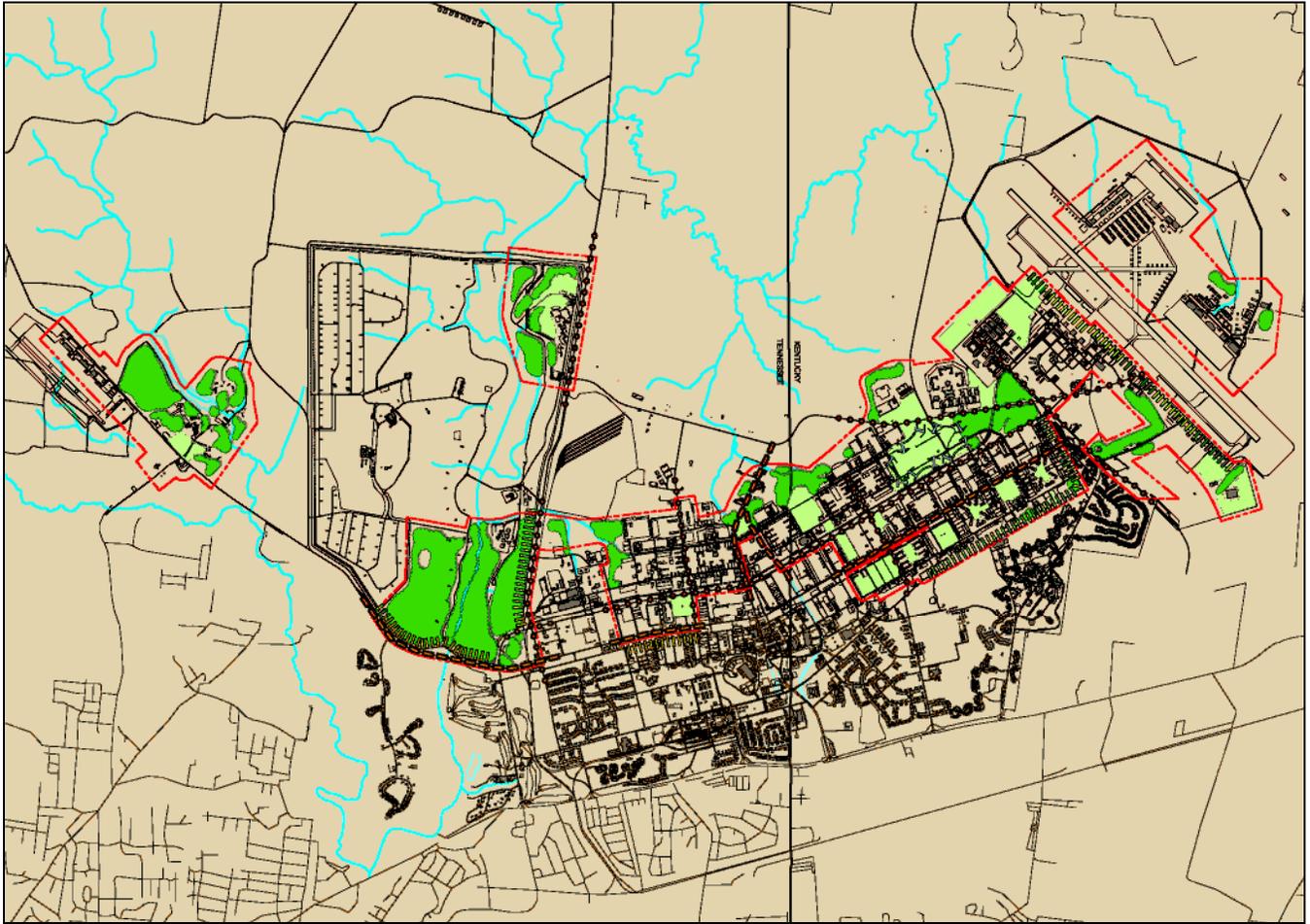


Figure 5-32 Brigade Combat Team Visual Theme Map

LEGEND

-  OPEN SPACE
-  SIGNIFICANT VEGETATION
-  PRIMARY ROAD
-  SECONDARY ROAD
-  PROPOSED REALIGNMENT OF SCREAMING EAGLE BOULEVARD
-  VISUAL THEME LIMITS
-  BUFFER



5.6 BRIGADE COMBAT TEAM VISUAL THEME

5.6.1 Visual Character

This visual theme includes two distinct visual zones: Operations/Maintenance and Troop Housing (Figure 5-31). There is a green space that runs along a north/south axis between Wickham Avenue and Desert Storm Avenue. This area contains a railway, which prohibits it from functioning as ‘open space’ for active use.

5.6.2 Visual Analysis Map

There are patches of open space within this theme, most of which are ball fields and unused spaces between buildings and parking lots. A small percentage of these spaces would fall within the Antiterrorism/Force Protection offsets from structures for security purposes.

The Parade Field is located in this theme, and is identified as open space.

5.6.3 Assets

Site Planning

Located on the western edge of the base, this theme area is partly buffered from the Community Life Theme area by the Town Center.

Larger block sizes allow for the scale of development needed to make Fort Campbell a power projection platform.

Buildings

The new troop housing buildings all use the same materials and same level of detailing.

Supporting facilities around the troop housing such as dining halls and brigade headquarters are close by and sited in a way that creates a campus setting.

LaPointe Medical facility has a nice entrance and screens the mechanical units and trash dumpsters well.

Two churches located along Indiana Avenue and 35th Streets respectively have an historic feel (Figure 5-33).

Circulation

There are four main routes through the theme area: Tennessee, Wickham, Desert Storm Avenues, and A Shau Valley Road. These four arteries provide for easy circulation for large-scale vehicles through the area.

Plant Material

There are numerous old trees scattered throughout the area.

The allée of trees along Wickham Avenue at the intersection of Glider Avenue is strong and should be considered a precedent for street plantings on the base (Figure 5-34).

Site Elements

The gate leading into the hammerhead buildings on Air Assault Street shows the character of the troops (Figure 5-35).

The Aviation Barracks Complex buildings create interior courtyards, which could be a great asset (Figure 5-36).

Force Protection

Buildings are adequately located away from roadways.

Plantings are minimal, and consist largely of trees and lawn.



Figure 5-33 35th Street Church



Figure 5-34 Allee of Trees Creates an Attractive Backdrop



Figure 5-35 Hammerhead Gate Shows Troop Character



Figure 5-36 Aviation Barracks Courtyard Has Potential



Figure 5-37 Inappropriate Stormwater Drainage



Figure 5-38 Hammerhead Barracks Detract From the Visual Aesthetic of the Base



Figure 5-39 Parking along A Shau Valley Road Creates a Dangerous Situation.



Figure 5-40 Shrubs Are Being Pruned Inappropriately at the Aviation Brigade Facilities

5.6.4 Liabilities

Site Planning

All parking is located along the street, on the front faces of buildings, instead of in the rear.

Inadequate storm water drainage swales occur all along A Shau Valley Road (Figure 5-37).

Buildings

The hammerhead barracks detract from the appeal of the post. They are poorly maintained and have no sense of entry (Figure 5-38).

Buildings along Indian Ave. have not been maintained.

Buildings lack appropriate landscaping.

Scale of troop housing is massive and uninviting.

Entrances to troop housing are not apparent.

Sheds in the theme are inappropriate storage solutions.

Circulation

Parking along A Shau Valley and Wickham Roads creates a dangerous situation as people pull out into traffic (Figure 5-39).

Plant Material

The health of all planted material should be evaluated for health status. Numerous trees along 38th Street and A Shau Valley Road appear to be in poor condition.

Troop housing areas have few trees.

Shrubs located in the Aviation Brigade facilities are severely pruned (Figure 5-40).

Site Elements

Trash dumpsters are poorly screened, are located in highly visible areas, are too close to roads, and occasionally create hazardous driving conditions (Figure 5-41).

Wheel stops add unnecessary visual clutter and are difficult to maintain.

Lighting is inconsistent throughout the theme area.

Force Protection

Dumpsters are not screened according to force protection standards (Figure 5-42).

5.6.5 Recommendations

Site Planning

Prototypical site plans should be created for buildings that provide outdoor seating areas for workers.

Buildings

Renovate hammerhead barracks to include a clearly defined entrance.

Develop new construction along Tennessee Avenue to build up density adjacent to Memorial Boulevard.

Use LaPointe Medical facility and buildings 7094, 7095 and 7096 as precedents for new construction in this area.

Maintain exteriors on all buildings.

Future troop housing units should be constructed at a scale that is different from maintenance and operations buildings.

Circulation

Create a network of walks through the entire troop housing area that will allow for movement between dorms, fitness enhancement, and pedestrian separation from vehicular traffic.

Plant Material

Site plans should be developed for all buildings. Troop housing areas should have more of a campus feeling, with large trees and lawn.

Site Elements

Lighting, benches, and trash receptacles should be consistent throughout the theme.

Dumpsters should be located more appropriately and adequately screened.

Force Protection

All dumpsters should be sited and screened according to force protection standards. Implement topographical techniques to secure dumpsters while allowing for a limited visual impact.



Figure 5-41 Dumpsters Create Hazardous Driving Conditions



Figure 5-42 Inappropriate Screening

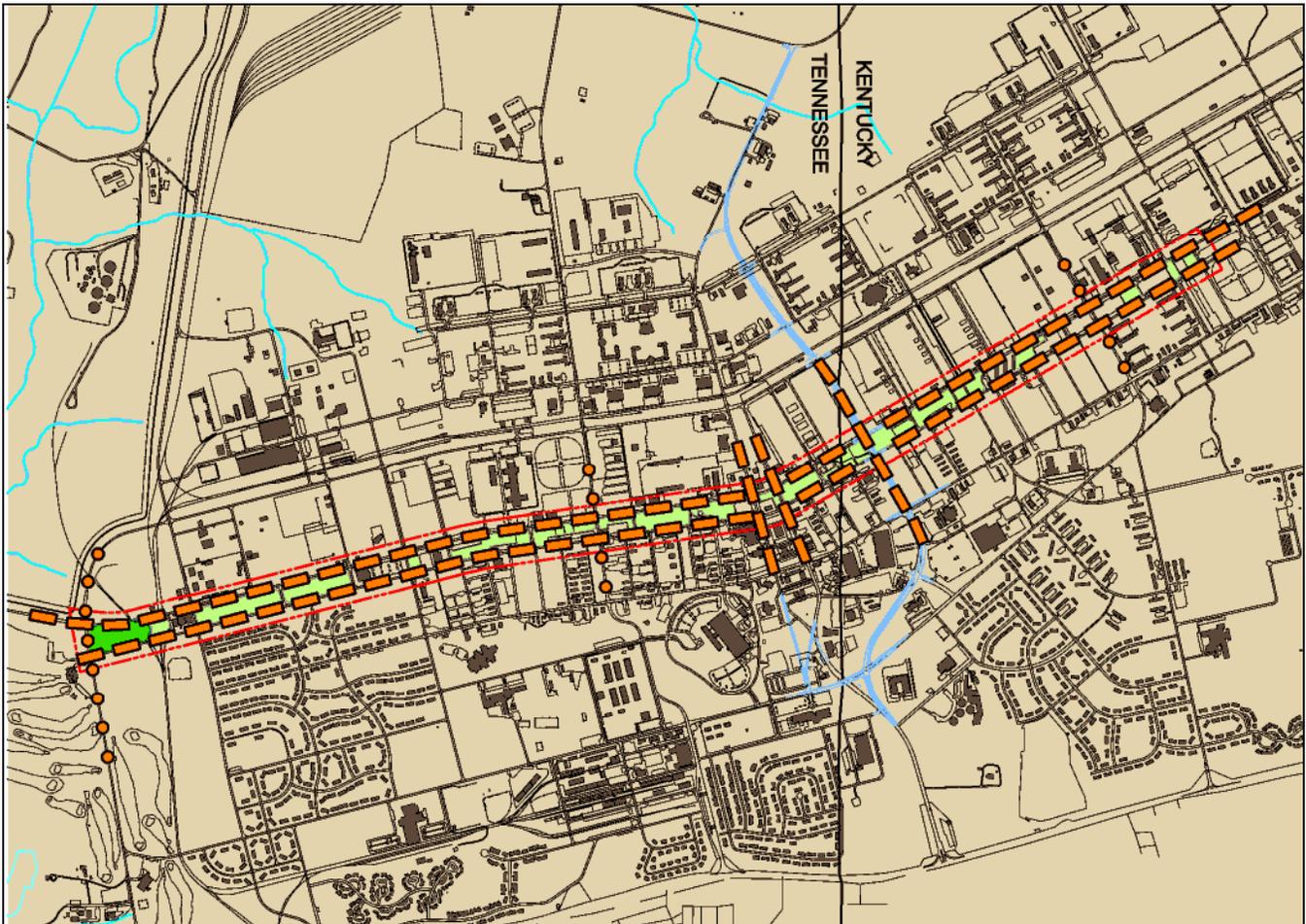
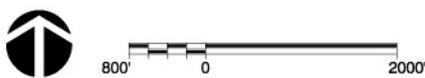


Figure 5-43 Memorial Boulevard Visual Theme Map

LEGEND

-  FOCAL POINT
-  OPEN SPACE
-  SIGNIFICANT VEGETATION
-  PRIMARY ROAD
-  SECONDARY ROAD
-  PROPOSED REALIGNMENT OF SCREAMING EAGLE BOULEVARD
-  VISUAL THEME LIMITS



5.7 MEMORIAL BOULEVARD VISUAL THEME

5.7.1 Visual Character

The northern extent of the green space is at 49th Street, where barracks and the BCT Theme take over (Figure 5-43). The southern extent is at 1st Street towards the golf course and the Community Life Theme. The boulevard provides Ft. Campbell with an opportunity to create a central recreational area for everyone on the base.

5.7.2 Visual Analysis Map

This visual zone is primarily open space.

This theme is located between Tennessee and Kentucky Avenues, which are secondary circulation routes on the installation.

5.7.3 Assets

Site Planning

Already consisting largely of open space and temporary structures, little would need to be done to transform the area into a valuable, open, passive recreational space. There are minimal buildings in the area between Kentucky and Tennessee Avenues.

Buildings

The bowling center and pool are good recreational facilities to have in this theme.

The general lack of buildings is good for the sake of the theme's character.

Circulation

The creation of a main boulevard creates a sense of place and direction on the base. It also establishes Kentucky and Tennessee Avenues as primary roads.

Plant Material

There is currently little plant material located in the site, creating a "blank slate" for future development into a park.

Site Elements

Not applicable

Force Protection

This zone can be used as a buffer between Community Life and Brigade Combat Team Theme areas.

5.7.4 Liabilities

Site Planning

There is currently a great deal of parking and storage located in this theme area.

There are future projects slated for construction in this theme area, including the Fifth Special Forces Administration Buildings.

Buildings

Future projects planned for this theme area are disruptive of the theme goals.

Circulation

Heavily used crossroads make it difficult to knit the blocks into one long, linear park.

Plant Material

Given the current use of the theme area, a great deal of site work would need to be done to prepare the space for planting.

Site Elements

Not applicable.

Force Protection

Not applicable.

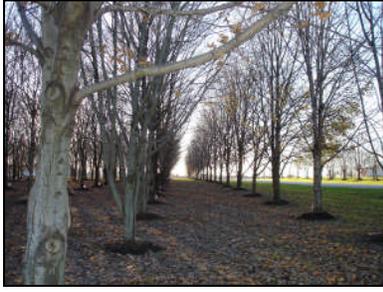


Figure 5-44 Gander Memorial Should Be the Main Focus of This Theme Area

5.7.5 Recommendations

Site Planning

This zone should be considered an ideal space for Gander Memorial (Figure 5-44). There is ample room to relocate all of the trees to spots where each tree can flourish, and become a place for everyone on the base to gather and remember.

Memorial Boulevard should be treated as a passive pedestrian park space. No development should occur within this zone. This means no parking, no buildings, no storage buildings; no recreations fields or play areas.

Buildings

The indoor pool-building exterior needs to be updated.

Any miscellaneous/temporary buildings should be removed from this area.

The future construction of buildings in this zone should be prohibited.

Circulation

Vehicular circulation through this site should be minimized. Specific “cross-town” routes should be established and their use encouraged.

Increase pedestrian circulation opportunities.

Eliminate parking areas in this area.

A multi-purpose trail/walk should be added.

Plant Material

Gander Memorial should be strengthened by making it the central focus of the base. A new site plan should be developed to optimize the growing condition of the Gander Memorial trees. Consult with a certified arborist and landscape architect prior to any restoration or relocation work. Transplant trees as necessary.

Tree plantings within the theme should be similar to the Community Life Theme.

The planting scheme for this zone should be shade trees (Gander Memorial), flowering trees and lawn. No other plantings should occur. The concept is to create a simple, elegant plant palette.

Site Elements

Site elements should compliment or relate to the Community Life Theme.

Force Protection

Not applicable.

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Figure 5-45 Industrial Visual Theme Map

LEGEND

-  **SIGNIFICANT VEGETATION**
-  **PRIMARY ROAD**
-  **SECONDARY ROAD**
-  **VISUAL THEME LIMITS**
-  **BUFFER**

5.8 INDUSTRIAL VISUAL THEME

5.8.1 Visual Character

The Industrial Visual Theme (Figure 5-45) is defined by 1st and Airborne Streets, Stillwell Road, and Tennessee Avenue. Located on the edge of the Memorial Boulevard Visual Theme, it is directly across the boulevard from the Werner Park housing community. Consisting of large buildings and containing the more utilitarian functions of the base, and little landscaping, the area is not visually appealing.

5.8.2 Visual Analysis Map

The main corridors through the zone are Wickham and Desert Storm Avenues. Buildings are set back from the road, and there is little to no buffer between the road and the monolithic expanses of buildings. A significant amount of open space gives an impression of “missing teeth”, or simply areas that have not been programmed yet. There are no architectural nor visual focal points within this theme.



5.8.3 Assets

Site Planning

The expanses of open space provide an opportunity for productive infill that is consistent with theme use.

Buildings

The industrial buildings all have the same color range which helps provide a consistent look to this theme's area (**Error! Reference source not found.**).

The scale of the buildings is very consistent.

Buildings on the site are centrally located and share parking areas.

Circulation

Consisting of two main cross streets (Desert Storm Avenue and 8th streets, circulation through the theme area is simple. There is ample parking for all buildings.

Plant Material

Lawns are well maintained (Figure 5-47).

Natural growth does provide some protection for the natural waterway that exists on the site.

Site Elements

There are no site element assets.

Force Protection

The lack of trees and shrubs is consistent with force protection standards.

5.8.4 Liabilities

Site Planning

The location of an industrial area, with its traditionally more hazardous applications would be more advantageously located away from natural waterways.

Storage units are unsightly.

Buildings

Buildings are in need of maintenance.

Wood outdoor sheds do not fit the character of this theme.

Circulation

There are no circulation liabilities.

Plant Material

The lack of shade trees provides for an inhospitable atmosphere for those who work in these buildings.

Site Elements

Outdoor seating areas are inappropriately located, and are not a proper style for the zone (Figure 5-48).

Force Protection

There are no force protection liabilities.



Figure 5-46 Buildings In the Industrial Theme Area Are Visually Consistent



Figure 5-47 Lawns Are Well Maintained



Figure 5-48 Inappropriate Outdoor Seating

5.8.5 Recommendations

Site Planning

Continue to congregate buildings in a central location.

Minimize the extent of parking lots by sharing between buildings and uses.

Relocate all hazardous activities as far away from natural waterways as possible.

Buildings

Organize construction of new buildings in a way that will conserve land.

Maintain exterior of all buildings and remove any structure that is beyond repair.

Circulation

Minimize the number of entrances into this theme area.

Maintain a grid system in this theme area.

Plant Material

Provide a planted buffer along Tennessee Avenue to screen theme activities from the residential area.

Provide shade trees. There is ample open space to plant trees for visual appeal as well as personal comfort for workers in the area.

Site Elements

The area should contain several outdoor seating areas, with shelters for workers. Shelters can consist of constructed or planted materials.

Seating areas should be located in proximity to the entrances of all buildings.

Seating areas should not be located near parking areas.

Replace wood gazebos with a shelter constructed in the same style and material as adjacent buildings.

Force Protection

Future plantings should comply with force protection standards.

5.9 REFERENCES

[Fort Campbell Technical Design Guide](#)

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Section 6 Improvement Projects

6.1 INTRODUCTION

Section 6 consists of projects generated from the recommendations presented in the visual zone analysis section starting at [paragraph 5.3](#). The projects may consist of enhancement of a single visual element or improvement of an area that includes a variety of visual elements. Depending on the project scope and cost, the projects could include: Military construction (MILCON), Non-appropriated-funded (NAF), Other Procurement, Army (OPA) and maintenance and repair, local minor construction, and self-help. Each improvement project is described and cost-estimated in enough detail to place each project within the appropriate project list or annual work plan, in an appropriate Fiscal Year, within the statutorily correct funding program. Projects require a Capital Investment Strategy.

The paragraphs below discuss each project at length and includes existing conditions, project description, design concept, cost estimate, primary and alternate recommended funding sources, photographs, sketches, maintenance impact as applicable and the benefits to the site if the recommendation is implemented.

[Appendix F](#) of this Army Installation Design Guide, the Prioritized Improvement Projects List, records information on each project and prioritizes them in accordance with the installation goals and objectives stated in [paragraph 3.2, Goals, Objectives and Recommendations](#). The appendix is an interactive form and designed to be altered as circumstances effecting the prioritization scheme change.

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Figure 6-1 Gate 4 Visitor's Center Landscape Plan

6.2 GATE 4 VISITOR'S CENTER



6.2.1 Existing Conditions

The Visitor's Center is an existing structure located at Gate 4 on the North side of Screaming Eagle Boulevard. The Visitor's Center is surrounded by mature deciduous and evergreen trees, but lacks aesthetic character for several reasons; there are no ornamental trees and very few shrubs, an expansive parking area with poor vehicular circulation results in wasted space, and there is no sense of arrival. Views are maintained from Screaming Eagle Boulevard onto the Visitor's Center site.

6.2.2 Design Concept

Gate 4 will be rebuilt in the near future, and a new vehicular circulation pattern will be implemented at the Visitor's Center (Figure 6-1). This design has been formulated using the new Visitor's Center layout. A design focused on solving existing problems without the need for major changes once Gate 4 is rebuilt is a necessity, therefore this design can be implemented prior to the Gate 4 construction or once it is complete.

The design objective is to enhance the aesthetic character of the Visitor's Center, and identify it as a welcoming component of Ft. Campbell. The objectives are met by:

- Strengthening the entry points to the Visitor’s Center
- Utilizing existing, and planting additional shade trees
- Increasing visual interest at the Visitor’s Center
- Increasing the efficiency of vehicular circulation
- Maintaining views from Screaming Eagle Boulevard.

The objectives are accomplished by incorporating several design elements. Ornamental shrubs and groundcovers are added to complement and draw attention to the signage at the entrance to the Visitor’s Center. deciduous trees have been placed to support the vehicular traffic flow, blend in with existing materials, and provide shade for the parking lot. An increased visual interest will be given to the Visitor’s Center by planting a variety of flowering trees, shrubs, and groundcovers that provide color and soften the structure. An additional curb cut has also been placed to provide two entry points to the Visitor’s Center parking lot. This measure will provide a more efficient circulation pattern by eliminating a dead end parking scenario. The Visitor’s Center is a destination point, and views have been maintained from Screaming Eagle Boulevard to allow for building identification to visitors at Ft. Campbell for the first time. As a whole, these design elements create a visually pleasing site and welcome visitors to Ft. Campbell.

6.2.3 Cost Opinion				
Gate 4 Visitor’s Center				
Quantity	Unit	Item	Unit Cost	Total
28	ea	Shade Trees	400.00	11,200.00
20	ea	Ornamental Trees	200.00	4,000.00
56	ea	Ornamental Shrubs	35.00	1,960.00
10	ea	Evergreen Shrubs	35.00	350.00
1,445	ea	Groundcovers	4.00	5,780.00
12,250	sy	Seeding	0.80	9,800.00
5	ea	Tree Removal	500.00	2,500.00
1	ls	Demolition	1000.00	1000.00
1	ls	Additional access Road and parking modifications	6,870.23	6,870.23
Grand Total				43,460.23

6.2.4 Maintenance Impact

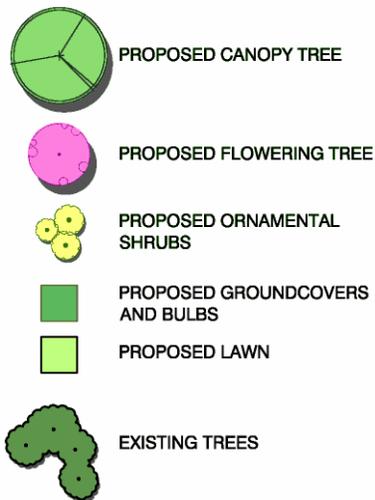
This design has minor impacts on maintenance through the use of site specific and low maintenance plant materials.

6.2.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-2 Wickham and Glider Roads Intersection Landscape Plan



6.3 WICKHAM AND GLIDER ROADS INTERSECTION

6.3.1 Existing Conditions

The intersection of Glider Road and Wickham Avenue is signalized with two travel lanes in all directions. The eastbound lane of Glider Road has a dedicated right turn lane onto Wickham Avenue. There are wooded areas on three sides of the intersection, and a row of deciduous trees along the southbound lane of Glider Road. The areas adjacent to the roadways are primarily open.

6.3.2 Project Description

There is a long-range project to conduct intersection improvements to the intersection of Wickham Avenue and Glider Road (Figure 6-2). This Priority Improvement Project (PIP) has been designed according to the existing layout of the intersection. However, the concepts and patterns can be applied to the future layout if and when the improvements are made.

This landscape concept visually enhances the intersection without jeopardizing its primary function of safe circulation. The canopy trees, flowering trees, and ornamental shrubs have been set back from the road edge to allow adequate room for growth, and to maintain clear sight windows for drivers in all directions. The canopy trees have been placed closer to the road edge along the southwest corner due to the existence of a dedicated turning lane. Groundcovers and bulbs have been placed

closer to the road to add color and texture to the ground plane without blocking views.

There is a lawn strip that has been left along the road edge to facilitate the implementation of a pedestrian sidewalk in the future without losing plant materials.

6.3.3 Cost Opinion				
Wickham and Glider Roads Intersection				
Quantity	Unit	Item	Unit Cost	Total
14	ea	Shade Trees	400.00	5,600.00
8	ea	Ornamental Trees	200.00	1,600.00
0	ea	Evergreen Trees	350.00	0.00
33	ea	Ornamental Shrubs	35.00	1,155.00
0	ea	Evergreen Shrubs	35.00	0.00
3,150	ea	Groundcovers	4.00	12,600.00
533	sf	Seeding	0.80	426.40
8	ea	Tree Removal	500.00	4,000.00
Grand Total				25,381.40

6.3.4 Maintenance Impact

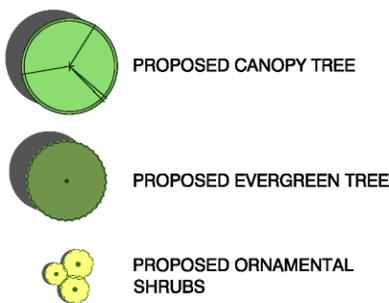
The design will impact maintenance requirements through the introduction of new landscaping; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

6.3.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-3 Glider Road Four Lane Expansion Plan



6.4 GLIDER ROAD FOUR LANE EXPANSION

6.4.1 Existing Conditions

Glider Road is a two-lane secondary road that traverses the cantonment area from Gate No. 7, west towards the Aviation Barracks Complex. The Brigade Combat Teams and Community Life Visual Themes both share adjacencies with Glider Road.

6.4.2 Project Description

This PIP has been designed in conjunction with a future project to convert Glider Road from two lanes to four (Figure 6-3). The conversion would occur between Gate No. 7 and Market Garden Road.

The concept for this PIP follows the typical section for a secondary roadway, [Section 9.2.4](#) of the IDG. This design only incorporates the landscape components of the typical section, however, the framework will be established for pedestrian circulation and lighting to be added if they are not part of the roadway construction.

In response to the various land uses which front Glider Road, two separate landscape treatments are proposed. The southern side of the roadway

runs primarily adjacent to residential land. This area will be planted with a mixture of deciduous canopy trees and evergreen trees. The understories of the canopy trees are planted with ornamental shrubs to enhance the screen at eye level. The objective of this pattern is to provide a continuous screen between the roadway and the adjacent homes.

The northern side of the roadway is planted with a single row of deciduous shade trees to provide balance and spatial integrity. Since the adjacent land is either open or wooded, there are no supporting plant materials.

The graphic depicting this project shows the overall planted area in schematic form, using the canopy tree symbol to represent the proposed screen. An enlargement of one block has been included to represent the patterns for both the south and north sides of Glider Road. These patterns should be continued along their respective sides of the road.

6.4.3 Cost Opinion				
Glider Road Four Lane Expansion				
Quantity	Unit	Item	Unit Cost	Total
178	ea	Shade Trees	400.00	71,200.00
143	ea	Evergreen Trees	350.00	50,050.00
290	ea	Ornamental Shrubs	35.00	10,150.00
Grand Total				131,400.00

6.4.4 Maintenance Impact

The design will impact maintenance requirements through the introduction of new landscaping; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

6.4.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.

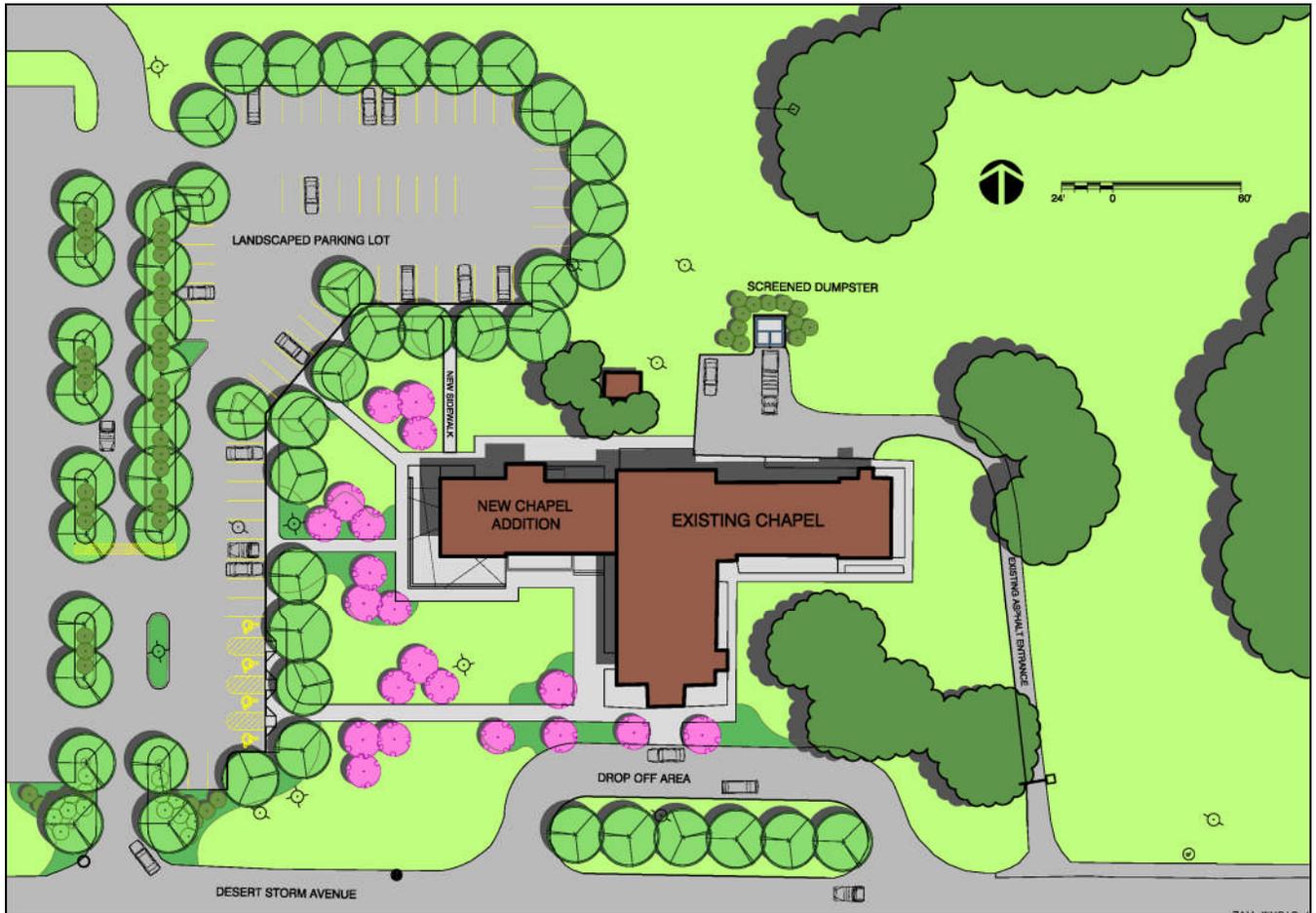


Figure 6-4 Chapel Addition Landscape Plan



6.5 CHAPEL MODIFICATIONS

6.5.1 Existing Conditions - Exterior

The Chapel Addition PIP has been designed in conjunction with the proposed site plan for the Chapel Additions project, with several proposed modifications explained in the following paragraphs. The site features canopy trees along its eastern and northern borders, with no additional plant materials. Views to the Chapel from Desert Storm Avenue are open.

6.5.2 Project Description - Exterior

The landscape design of the Chapel Addition PIP (Figure 6-4) focuses on providing a comfortable experience for the pedestrian, maintaining views from Desert Storm Avenue, and enhancing the sense of arrival to the Chapel.

The site plan for the Chapel addition project has been used in its entirety, but several additions have been made to enhance the functionality of the site. Two planter islands have been proposed in the parking lot at the northwest corner of the Chapel. These islands will provide locations for two canopy trees, which will in turn cast valuable shade onto the parking lot. Canopy trees have been proposed along the entire perimeter of the parking lot, and in the medians.

A new section of sidewalk has been proposed from the parking lot to the north side of the Chapel to facilitate a more functional pedestrian circulation pattern.

The sidewalks have been accented with flowering trees and a mixture of groundcovers and bulbs. The location for a dumpster has been proposed at the northern side of the Chapel. This location meets AT/FP setback distances, and is accessible to the street by an existing asphalt entrance. The dumpster has been screened from the parking lot using evergreen shrubs.

The drop off area along the southern portion of the site has been planted with flowering trees and groundcovers. The island between the drop off area and Desert Storm Avenue has been planted with canopy trees. These trees will ultimately create framed views to the Chapel, and provide shade. However, their placement will be dependent upon the location of overhead utilities.

6.5.3 Cost Opinion				
Soldier's Chapel Addition				
Quantity	Unit	Item	Unit Cost	Total
52	ea	Shade Trees	400.00	20,800.00
20	ea	Ornamental Trees	200.00	4,000.00
62	ea	Evergreen Shrubs	35.00	2,170.00
6,475	ea	Groundcovers	4.00	25,900.00
9,000	sf	Seeding	0.80	7,200.00
400	sf	Concrete Sidewalk	6.00	2,400.00
Grand Total				62,470.00

6.5.4 Maintenance Impact

The exterior design will impact maintenance requirements through the introduction of new plant materials; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

The interior design has minimal impact on maintenance.

6.5.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.

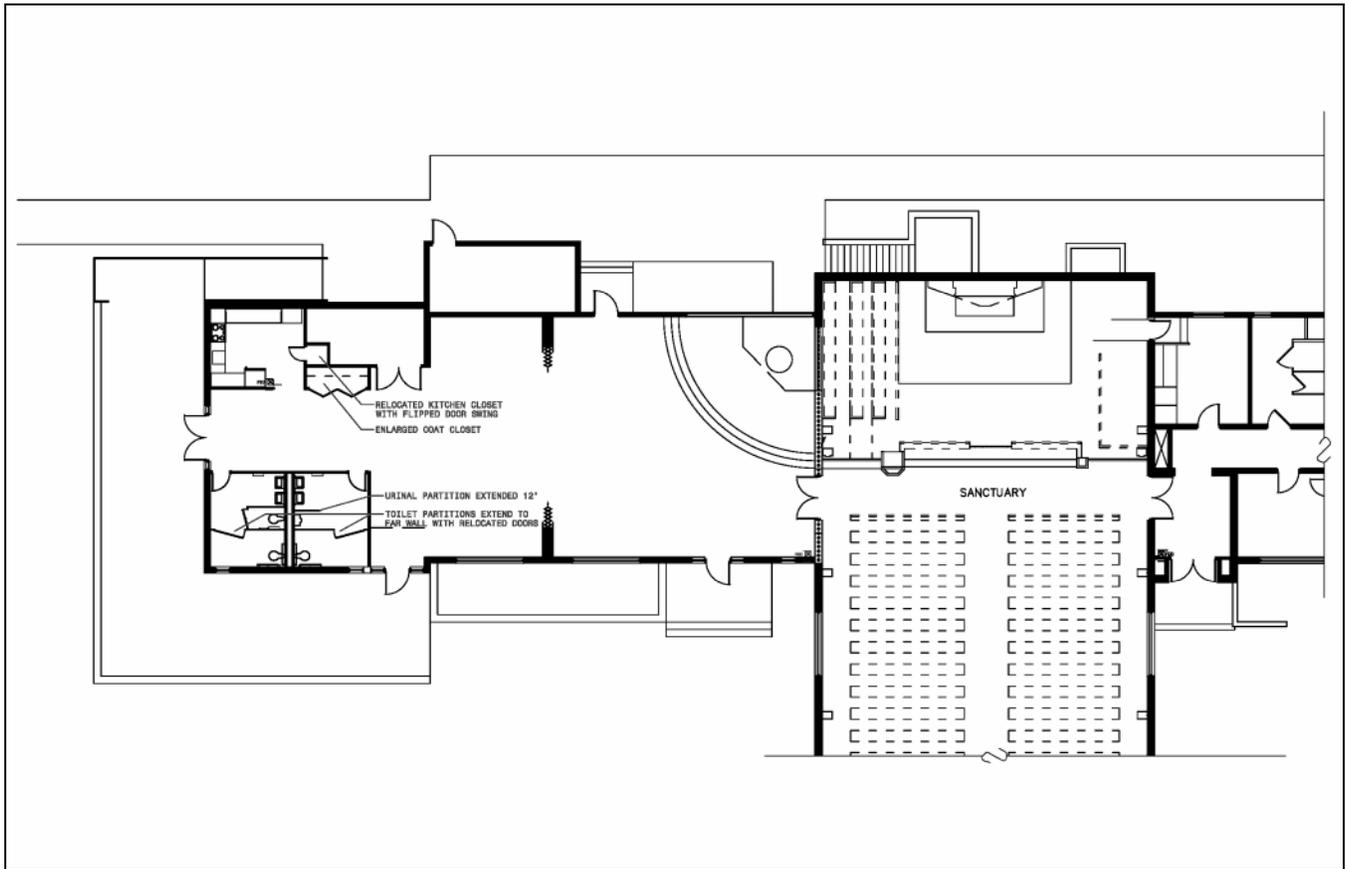


Figure 6-5 Chapel Addition - Internal Plan

6.5.6 Existing Conditions - Interior

The interior layout of the addition to the Soldiers Chapel functions fairly well as it is. There are only a few conditions that need to be addressed. Conditions such as a line of site issue into the men's bathroom and ADA compliance in the bathroom stalls as well as space allocation and organization around the kitchen area.

6.5.7 Project Description - Interior

Internally, the intent of this design exercise is to improve upon the floor plan for the Chapel addition (Figure 6-5). The design response is to introduce ways that will help the space function better and comply with standard codes. The men's bathroom urinal is viewable from the lobby area when the door is open. This is corrected by extending the partition wall 12". The men's and women's toilet partition walls in the handicap stalls will need to extend to the far wall to comply with ADA standards. The kitchen storage closet was relocated and the door swing flipped for better functionality and to provide the coat closet with the extra space that was needed.

6.5.8 Cost Opinion				
Soldier's Chapel Addition - Interior				
Quantity	Unit	Item	Unit Cost	Total
2	ea	Floor Mounted Handicap Partition	1600.00	3200.00
1	ea	Extended Urinal Screen	400.00	400.00
1	ea	Coat Closet Door	300.00	300.00
Grand Total				3900.00

6.5.9 Maintenance Impact

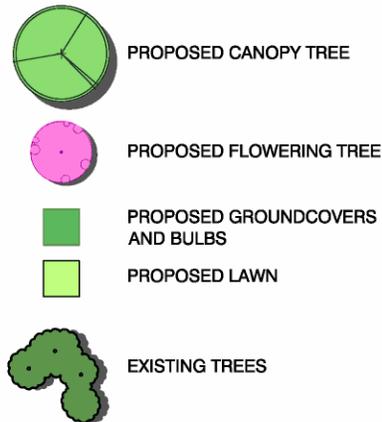
No additional maintenance will be required.

6.5.10 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-6 Hammerhead Barracks Landscape Restoration Plan



6.6 HAMMERHEAD BARRACKS

6.6.1 Existing Conditions

There are numerous blocks of hammerhead barracks scattered throughout the Fort Campbell cantonment area. The sites offer efficient pedestrian pathways between barracks, and in many instances have a defined courtyard with open grass areas and recreation amenities. The structure of the barracks site plan begins to breakdown along the road edge, and at the entryways to the barracks themselves.

The hammerhead barracks are constructed of concrete block with indiscreet concrete stairs at all entry points. The majority of the entrances have no overhead protection from rain or sun and provide no real sense of place or arrival.

6.6.2 Project Description

This PIP focuses on barracks 6942, 6943, 6944, and 6945 as an example of how to strategically accent entryways, and maintain continuity between barracks throughout Fort Campbell (Figure 6-6).

This set of hammerhead barracks has an existing parking area along 46th Street, but the parking lacks connection to the existing concrete walkways. Extending the existing walkways to the parking area will enhance pedestrian circulation. A new portion of concrete sidewalk has also been suggested from the parking area into the courtyard between barracks 6943

and 6944. This location serves as a central point along the block for building signage.

Canopy trees along the north side of the barracks provide shade for the walkways and the existing parking areas. Flowering trees, groundcovers, and bulbs accent the entryways to the barracks, and define the pedestrian corridors. Lawn areas are proposed along the remainder of the barracks foundation to adhere to AT/FP standards and match existing conditions around the remainder of the building.

This design also addresses the need for a reconfiguration of dumpster locations. There are streets within Fort Campbell that have dumpsters along the roadways in an effort to maintain safe distances from inhabited structures. In most of these instances the dumpsters remain inside the minimum AT/FP setback. This design suggests consolidating the dumpsters in a single location outside of the setback. Although this solution may not be convenient for all users, the AT/FP requirements are met and visual clutter has been reduced.

Entrances to the hammerhead buildings would be architecturally enhanced by architectural features designed to better identify entry locations (Figure 6-7). This is accomplished by introducing steel and glass canopies over an enlarged stairway (Figure 6-8). The handrails are reflective of the canopy detailing and give the entrance a completed look. Seating is provided with outdoor benches that help to delineate the areas between the entrances. These areas take on a sense of “place” that encourages social interaction and become places for outdoor “events”. In essence, this design solution enhances the buildings presence by enhancing all of the entrances to the barracks and by capturing this interim space as usable exterior space that articulates the sense of entry.



Figure 6-7 New Entrance Design for Hammerhead Barracks



Figure 6-8 Stainless Steel and Glass Entries Enhance the Hammerhead Barracks Entries

6.6.3 Cost Opinion - Site				
Hammerhead Barracks				
Quantity	Unit	Item	Unit Cost	Total
19	ea	Shade Trees	400.00	7,600.00
21	ea	Ornamental Trees	200.00	4,200.00
48	ea	Ornamental Shrubs	35.00	1,680.00
20	ea	Evergreen Shrubs	35.00	700.00
5,250	sy	Groundcovers	4.00	21,000.00
2,200	sf	Seeding	.80	1,760.00
6,725	sf	Concrete Sidewalk	6.00	40,350.00
415	sf	Concrete Trash Dumpster Pad	7.00	2,905.00
1	ls	Asphalt Trash Dumpster Access Way	14,275.80	14,275.80
80	lf	Trash Dumpster Enclosure Wall	85.00	6800.00
Grand Total				101,270.00

6.6.4 Cost Opinion - Entries				
Hammerhead Barracks - Entries				
Quantity	Unit	Item	Unit Cost	Total
1	ea	Metal Canopy Construction	5000.00	5,000.00
16	sf	Tempered glass on canopy	96.00	1,536.00
60	lf	Dark Annodized Metal Railing	167.00	10,020.00
300	cy	Concrete Stairs	90.00	27,000.00
4	ea	Exterior Benches	1,500.00	6,000.00
Grand Total				49,556.00

6.6.5 Maintenance Impact

The design will impact maintenance requirements through the introduction of new landscaping; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

Exterior improvements have minimal impact on maintenance.

6.6.6 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.

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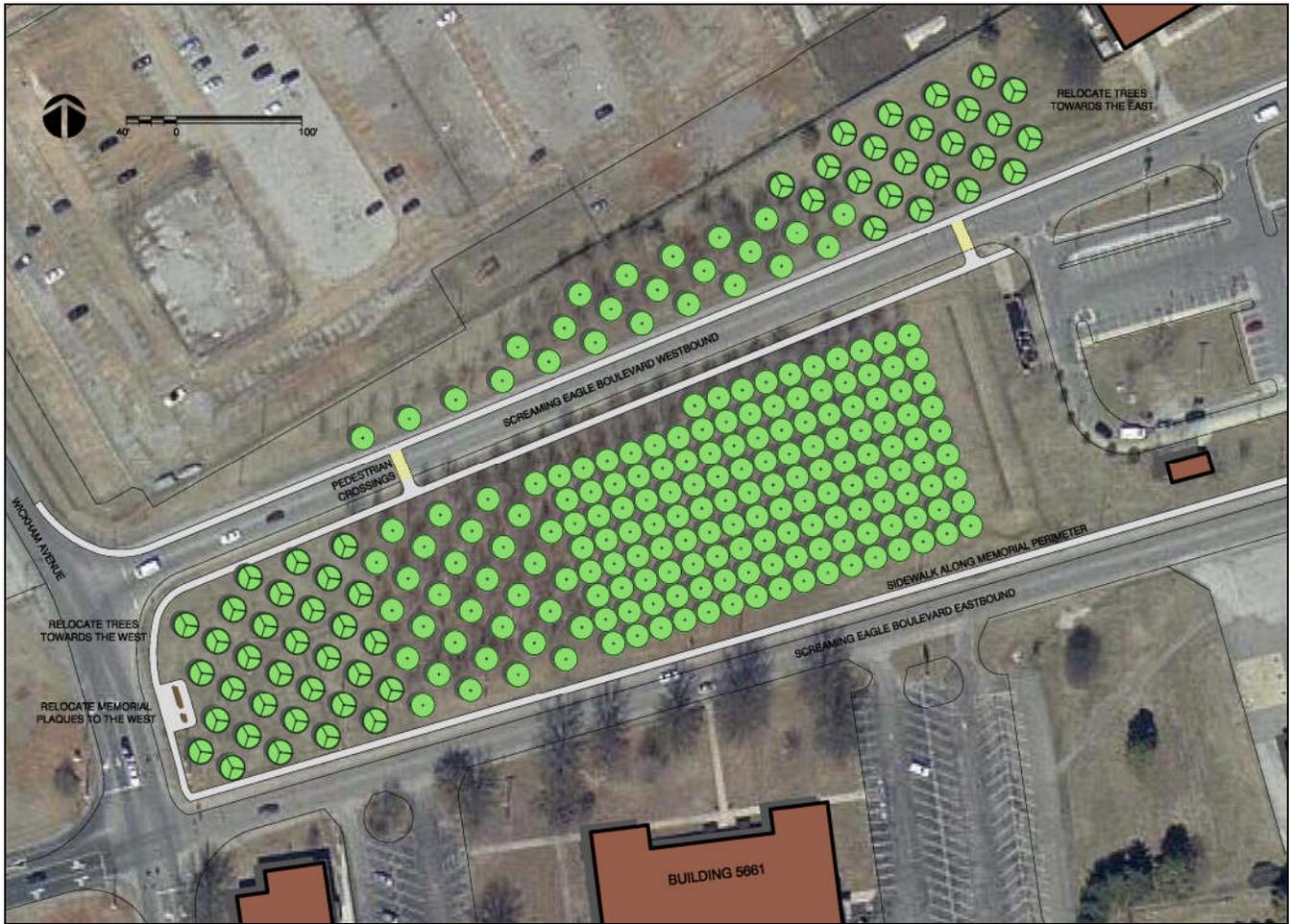
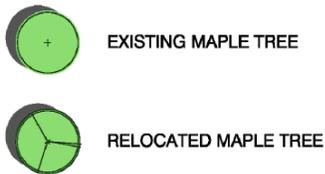


Figure 6-9 Gander Memorial Landscape Plan



6.7 GANDER MEMORIAL

6.7.1 Existing Conditions

The Gander Memorial is located in the parcel of land between the eastbound and westbound lanes of Screaming Eagle Boulevard, to the east of Wickham Avenue to the west. The memorial also occupies a portion of the parcel to the north of the eastbound lane of Screaming Eagle Boulevard.

The maple trees, which have been planted to commemorate fallen service men and women, are beginning to outgrow the confines of their designated areas. As the trees mature, sunlight will be blocked from a significant portion of the trees, and their branches will become entangled.

6.7.2 Project Description

This project attempts to mitigate these negative impacts by relocating as many trees as possible without stepping outside the confines of the existing memorial (Figure 6-9).

Realizing that the 'rank' and 'file' of the trees fall in perfect formation, a plan has been devised to continue the perfect formation on a new axis, with the intention that one day all of the trees will be relocated to the new axis. The design proposes relocating every other tree from its current location, starting at the western end of the site. The trees will be relocated to the open area that exists along Wickham Avenue. This new

pattern will increase the available growing area for the trees by approximately 40%.

This same expansion of the existing pattern through strategic tree relocations will occur in the portion of the memorial to the north of westbound Screaming Eagle Boulevard. These measures will allow approximately 55 trees to be relocated. This means that approximately 95 trees will require a relocated home in the future. These trees may be relocated to adjacent pieces of land within the Memorial Park Visual Theme as they become available.

The existing plaques within the park shall be relocated to the westernmost portion of the site to take advantage of its location at the terminus of the memorial. A set of linear pedestrian pathways has been proposed along Screaming Eagle Boulevard, and delineated street crossings have been added for increased safety.

6.7.3 Cost Opinion				
Gander Memorial				
Quantity	Unit	Item	Unit Cost	Total
55	ea	Tree Relocation	1750.00	96,250.00
31,000	sf	Concrete Sidewalk	6.00	186,000.00
1	ls	Plaque Relocation	3000.00	3000.00
Grand Total				285,250.00

6.7.4 Maintenance Impact

The design will reduce maintenance requirements by providing an increased area for the maples to grow, minimizing the potential for necessary pruning and tree mortality.

6.7.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-10 Aviation Barracks Complex Landscape Plan



6.8 AVIATION BARRACKS COMPLEX

6.8.1 Existing Conditions

The Aviation Barracks Complex is located along the south side of Glider Road, along the western portion of the cantonment area. The site contains no canopy trees, and plantings are limited to sparse foundation plantings at entry points to the barracks. The parking lots have been designed with medians to accommodate plant materials, but have not been utilized.

6.8.2 Project Description

This project focuses on one barracks building as a component of the entire complex (Figure 6-10). The proposed concepts can be repeated throughout the existing Aviation Barracks Complex to achieve a coherent sense of place.

The Aviation Barracks Complex design accomplishes multiple tasks. A strategic pattern of canopy and flowering trees creates a more livable environment by cooling the vehicular and pedestrian routes. The trees also frame views to the barracks from Glider Road, and support the circulation patterns formed by the roads and walkways. The planted islands have the potential to act as retention areas for storm water runoff, depending upon the contours of site.

The vehicular entry points to the Aviation Barracks have been accented with canopy trees and ornamental shrubs. A reduction in planting scale,

and the beginning of the flowering tree pattern, indicate the pedestrian point of entry to the site.

A series of foundation plantings have been proposed around the entire building to soften the architecture and provide visual interest. The points of entry to the barracks, as well as the interior courtyard, have been accented with canopy and flowering trees. The courtyard has also been designed to add color and comfort to the existing seating areas, and enhance the flagpoles as a focal point.

A dumpster enclosure has been screened in this design through the use of canopy and flowering trees. Although the materials will not produce a solid screen, focus is drawn away from the enclosure and towards the flowering trees.

6.8.3 Cost Opinion				
Aviation Barracks Complex				
Quantity	Unit	Item	Unit Cost	Total
84	ea	Shade Trees	400.00	33,600.00
93	ea	Ornamental Trees	200.00	18,600.00
20	ea	Ornamental Shrubs	35.00	700.00
11,250	ea	Groundcovers/Bulbs	4.00	45,000.00
17,500	sf	Seeding	0.80	14,000.00
Grand Total				111,900.00

6.8.4 Maintenance Impact

The design will impact maintenance requirements through the introduction of new plant materials; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

6.8.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-11 Buildings 2601 and 2603 Renovations Plan

6.9 BUILDINGS 2601 AND 2603 RENOVATIONS/REMOVAL



6.9.1 Existing Conditions

This PIP has been designed to support the future removal of Building 2603, and the renovation of Building 2601 from barracks to administrative space (Figure 6-11). The buildings are located in the Town Center Visual Theme, between the eastbound and westbound segments of Screaming Eagle Boulevard.

The existing conditions are assumed to be an administrative function in Building 2601 with a vehicular drop off area on the west side of the building, and parking lot to the east. Building 2601 is surrounded on all sides by canopy trees. The piece of land that is currently occupied by Building 2603 is assumed to be a completely vacant piece of land with no built components, and existing canopy trees.

6.9.2 Project Description

The intent of this design is to accommodate the increase of personnel in Building 2601 by increasing available parking, and creating an urban park within the Town Center Visual Theme. The vehicular circulation has been modified to maximize AT/FP setbacks within the confines of the existing site.

The access points to the proposed parking lots have been aligned with the existing parking to the north and south of Building 2604, and can be accessed from Indiana Avenue and the roadway to the west of Building

2604. There are 100 parking spaces located in the proposed park, and approximately 50 spaces in the existing lot east of Building 2601. The proposed parking lots are buffered from Screaming Eagle Boulevard with a row of canopy trees, a pedestrian pathway, and a lawn area.

The park consists of a series of sidewalks connecting the parking areas within the site, as well as creating access from the surrounding land uses. Delineated pedestrian crosswalks have been proposed to facilitate safe access to the park. The sidewalks lead to a circular gathering space with seating areas and a proposed water feature. This water feature could be replaced with a monument or memorial depending upon Fort Campbell's needs. Proposed canopy and flowering trees increase comfort and aesthetics, and existing canopy trees are utilized.

The drop off area to the north of Building 2601 has been removed and replaced with a pedestrian path that circles the building, connecting the existing parking area with the proposed park. Groundcovers and bulbs have been proposed along the foundation of the building to adhere to AT/FP guidelines, and an outdoor seating patio is proposed in the building's courtyard.

Due to the lack of sufficient setbacks from Building 2601, access control mechanisms will need to be integrated for utilization of the parking lot. A proposed location for the dumpster enclosure is provided, and has been screened with evergreen shrubs.

6.9.3 Cost Opinion				
Buildings 2601 and 2603 Renovations/Removal				
Quantity	Unit	Item	Unit Cost	Total
34	ea	Shade Trees	400.00	13,600.00
18	ea	Ornamental Trees	200.00	3,600.00
18	ea	Ornamental Shrubs	35.00	630.00
11	ea	Evergreen Shrubs	35.00	385.00
5,400	ea	Groundcovers	4.00	21,600.00
12,600	sf	Seeding	0.80	10,080.00
4	ea	Tree Removal	500.00	2,000.00
22,900	sf	Concrete Sidewalk	6.00	137,400.00
1	ls	Parking modifications	129,374.00	129,374.00
12	ea	Site Amenities - Benches	750.00	9,000.00
4	ea	Site Amenities - Tables and Chairs	1,250.00	5,000.00
1	ls	Site Amenities - Water Feature	15,000	15,000.00
Grand Total				347,669.00

6.9.4 Maintenance Impact

The design will impact maintenance requirements through the introduction of new plant materials; however, these impacts can be mitigated through the use of site specific and low maintenance plant materials. The additional parking that has been added will require routine maintenance, including re-stripping and cleaning. The water feature in the proposed park will also require routine pump maintenance and cleaning/sealing of the basin.

6.9.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-12 Alert Holding Area (AHA) Screening Plan

6.10 ALERT HOLDING AREA NEAR GATE 7



6.10.1 Existing Conditions

The Alert Holding Area (AHA) is located on the northeast corner of Glider and JI Line Roads. Vegetation to the north, and a field to the east surround the site. The western and southern edges of the AHA are bordered by secondary roadways.

6.10.2 Project Description

The AHA design is primarily focused on screening, but embraces its high visibility through the incorporation of color and diversity (Figure 6-12).

The east and west boundaries of the site are planted with a continuous row of evergreen trees to maximize the effectiveness of the screen in a confined area. The frontage along Glider Road provides a larger area, and has been planted with staggered groupings of both evergreen and deciduous trees. The evergreen trees will provide a solid screen while the deciduous trees provide visual interest with vibrant fall colors. The open areas between tree groupings and below the deciduous trees will be planted with flowering perennials such as daylilies to provide color at the ground plane.

Clear sight windows have been maintained at the entry points to the AHA to provide safe ingress and egress to the site.

6.10.3 Cost Opinion				
Alert Holding Areas				
Quantity	Unit	Item	Unit Cost	Total
16	ea	Shade Trees	400.00	6,400.00
0	ea	Ornamental Trees	200.00	3,600.00
0		Ornamental Shrubs	35	0.00
65		Evergreen Trees	350	22,750.00
0		Evergreen Shrubs	35	0.00
12,750	ea	Groundcovers	4.00	51,000.00
8,500	ea	Seeding	.80	6,800.00
0	ea	Tree Removal	500.00	0.00
0	sf	Concrete Sidewalk	6.00	0.00
1,200	sy	Demolition (Saw-Cut and Remove Bituminous)	3.80	4,560.00
Grand Total				91,510.00

6.10.4 Maintenance Impact

The design will impact maintenance requirements through the introduction of new plant materials; however these impacts will be minimal. The evergreen and deciduous trees require only occasional pruning, and the perennials require little maintenance.

6.10.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-13 Industrial Zone Screening Modifications Plans

6.11 INDUSTRIAL ZONE SCREENING MODIFICATIONS

6.11.1 Existing Conditions

The limits of the industrial zone at Fort Campbell are 1st Street to the south, Airborne Street to the north, Tennessee Avenue to the east, and Stillwell Road to the west. There are existing stands of mature vegetation in the southeast corner of the industrial zone, but the remainder of the site is primarily open. The eastern side of the industrial zone fronts a primary road and residential area.

6.11.2 Project Description

This PIP's primary focus is on screening the industrial area from adjacent land uses, but there is also a component that addresses interior screening (Figure 6-13).

The majority of the exterior screening has been directed towards the eastern border of the industrial zone to limit visual interaction from the residential areas. The screen itself consists of a mixture of evergreen and deciduous trees to ensure diversity and avoid monotony. A layer of native shrubs, grasses, and groundcovers will ensure a solid screen in the understory.



Wickham Avenue is a secondary roadway on Fort Campbell that bisects the industrial zone. An interior screen of identical materials has been proposed on the east and west sides of Wickham Avenue to limit the lines of sight.

The graphic depicting this project has one block of the industrial zone designed to scale. The remaining proposed screening locations have been designated by an enlarged canopy tree symbol. The cost estimate for this PIP provides the cost for the entire project, \$307,500, and also includes a linear foot cost for the screen, \$51.32. This will enable Fort Campbell to determine the cost of the project in phases if appropriate.

6.11.3 Cost Opinion				
Industrial Zone Modifications				
Quantity	Unit	Item	Unit Cost	Total
103	ea	Shade Trees	400.00	41,200.00
0	ea	Ornamental Trees	200.00	0
120	ea	Deciduous Shrubs	35.00	4,200.00
110	ea	Evergreen Trees	350.00	38,500.00
360	ea	Evergreen Shrubs	35.00	12,600.00
105,500	sf	Native Shrubs, Grasses, and Groundcover Mix	2.00	211,000.00
Grand Total				307,500.00

6.11.4 Maintenance Impact

The design will impact maintenance requirements through the introduction of new landscaping; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

6.11.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-14 Entry Gate Numbers

6.12 ENTRANCE GATE NUMBERS

6.12.1 Existing Conditions

There are seven gates which provide entry into the cantonment area of Fort Campbell. The gates are going through a transformation to an Access Control Point (ACP), to better maintain a secure environment. The ACPs are being designed to a strict set of criteria, which govern design, but do not address specific gate indicators through unique signage.

6.12.2 Project Description

This PIP focuses on supplementing the standard design for an ACP with an individual identity (Figure 6-14). Recognizing that a signage layout exists at eye level, the proposed design suggests incorporating the gate numbers within the gatehouse architecture. Internally illuminated metal block text attached above the fascia of the guardhouse roof provides the driver entering Fort Campbell with the appropriate gate identification without interfering with signs at street level. The metal should be chosen to complement the roof in both color and material.

This design reacts to the fact that each ACP has a unique site condition and set of existing constraints. Utilizing the architecture of the guardhouse, which is a constant component of the ACP, allows this solution to be implemented regardless of site conditions.

The cost estimate for the signage considers this treatment as a retrofit to the built ACPs, and can be expected to be reduced if it were a part of the original construction plans.

6.12.3 Cost Opinion				
Industrial Zone Modifications				
Quantity	Unit	Item	Unit Cost	Total
21	ea	Illuminated Block Letters/Installed	500.00	10,500.00
Grand Total				10,500.00

6.12.4 Maintenance Impact

The entrance gate numbers may require periodic maintenance; including bulb replacements and polishing/painting of the metal block lettering. Recommended

6.12.5 Funding Source

Operations and Maintenance Army (OMA) Funds.



Figure 6-15 Engagement Skills Trainer Building Landscape Plan

6.13 ENGAGEMENT SKILLS TRAINER

6.13.1 Existing Conditions

There are multiple Engagement Skills Trainer (EST) buildings at Ft. Campbell. Building 6084, on the north side of Screaming Eagle Boulevard, has been used in this PIP as a development prototype. Building 6084 is situated on an open site with no existing plant materials and a high visibility from Screaming Eagle Boulevard. The site provides no identifiable visual character, and fails to take advantage of strategic plantings for sustainable design. There is no reinforcement of vehicular or pedestrian circulation, and no sense of arrival from the roadway.

6.13.2 Project Description

The EST design focuses on two separate goals (Figure 6-15). The first is to establish a site plan that meets functional requirements, and the second is to enhance the building's visual aesthetic.

The parking lot layout has been modified to include landscaped islands, which in this scenario reduces the available parking spaces. Additional spaces, if needed, can be added by extending the distance between the curb cuts to Screaming Eagle Boulevard, subsequently increasing the available area for the parking lot. Deciduous shade trees have been placed to take advantage of their cooling effects; both on the pavement below and through the shadows cast upon the building.



The proposed sign along Screaming Eagle Boulevard should adhere to installation standards, and be enhanced with ornamental groundcovers to maintain visibility. Flowering trees have been proposed to add visual interest. A hedge has been added to separate the parking lot from the building, and guide users to the existing pathway. Groundcovers are proposed at the building's foundation to maintain visibility from an AT/FP standpoint, and flowering trees accent entryways.

A dumpster enclosure is proposed in a location that allows screening from adjacent roadways, while maintaining AT/FP setback distances from the building. The dumpster enclosure facilitates access from either entry to the parking area, and could be located at the opposite end of the parking lot in a mirrored configuration.

6.13.3 Cost Opinion				
Engagement Skills Trainer				
Quantity	Unit	Item	Unit Cost	Total
8	ea	Shade Trees	400.00	3,200.00
10	ea	Ornamental Trees	200.00	2,000.00
12	ea	Ornamental Shrubs	35.00	420.00
13	ea	Evergreen Shrubs	35.00	465.00
1,275	ea	Groundcovers	4.00	5,100.00
3,650	sf	Seeding	.80	2,920.00
1	ea	Tree Removal	500.00	500.00
1	ls	Demolition (Saw-cut and remove existing pavement)	1,000.00	1,000.00
1	ls	Addition to parking area to accommodate a dumpster enclosure	5,353.43	5,353.43
Grand Total				20,940.43

6.13.4 Maintenance Impact

The design will impact maintenance requirements; however these impacts can be mitigated through the use of site specific and low maintenance plant materials.

6.13.5 Recommended Funding Source

Operations and Maintenance Army (OMA) Funds.

6.14 REFERENCES

[Fort Campbell Technical Design Guide](#)

Section 7 Site Planning Design Standards



Figure 7-1 Site Plan

7.1 INTRODUCTION

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 that fulfills facility requirements and creates the optimal relationship with the natural site. See [Unified Facilities Criteria \(UFC\) 3-210-06FA, Design: Site Planning and Design](#) for detailed guidance on site planning to include program analysis, site analysis, site verification, and concept development. This UFC 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 [TI 800-01, Design Criteria, Chp. 3, Site Planning and Design Criteria](#). Environmental documentation will be prepared prior to site selection to support the construction activity in accordance [AR 200-2, Environmental Effects of Army Actions](#).

The site-planning component provides the spatial arrangement of the installation. (Figure 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.

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 Criteria

7.2 SITE PLANNING OBJECTIVES

The goal of site planning for the installation is to produce an attractive, safe and 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 (Figure 7-2). 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.

Preserve natural site features such as topography, hydrology, vegetation, and tree cover.

Locate facilities with consideration of climatic conditions such as wind, solar orientation, and microclimate.

Preserve the natural site by molding development to fill around existing landforms and features. This development approach minimizes extensive earthwork, preserves existing drainage patterns, and preserves existing vegetation.

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

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.

7.3.1 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)) (Figure 7-3). 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, Para 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. Modify existing structures for handicapped accessibility whenever possible, especially community facilities that are most likely to be used by families, veterans or visitors.

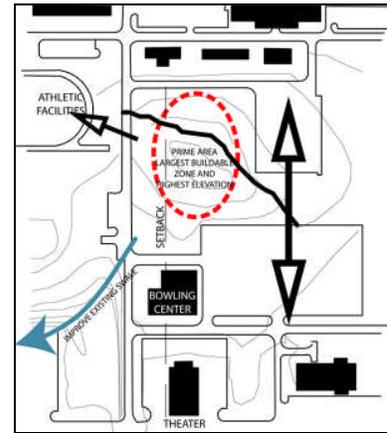


Figure 7-2 Site Opportunities and Constraints Plan



Figure 7-3 Handicapped Ramps Should Be Incorporated Into the Landscape or Architecture

7.3.2 Environmental

Environmental issues to consider in the preparation of a site plan include any action or proposal that has a detrimental affect on a site area's land, water, or air quality. The location of facilities on land that results in minimal disturbance to the existing topography, vegetation, and drainage patterns greatly reduces the negative impact on the environment. It is the Garrison Commanders responsibility to ensure that all National Environmental Policy Act (NEPA) documentation is started before the site selection process, as this process feeds the I391 process.

NEPA requires that an Environmental Impact Statement (EIS) be submitted to the U. S. Environmental Protection Agency (EPA) for major projects that may significantly effect the environment. The EPA reviews and responds to filed impact statements. 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 \(EISs\)](#)

Federal law requires that prior to the undertaking of activities which effect the nation's waterways, described as "navigable waters of the United States" and "waters of the United States" to include wetlands, a permit must be acquired. 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](#)

Include procedures for mitigating environmental concerns in the early stages of project development. To the maximum extend 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.

7.4 SITE PLANNING DESIGN CRITERIA

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

It is the goal of this installation to minimize disturbance of natural areas. Low Impact Development (LID) techniques must be incorporated into all development projects. <http://www.epa.gov/nps/lid/index.html> contains numerous fact sheets on LID practices.

7.5.1 Topography

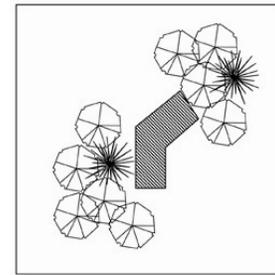
The natural terrain is a major determinant of the layout and form of the installation. The following guidelines should be used to maintain the natural topography of the installation (Figure 7-4 and Figure 7-5).

- Maintain natural ground slopes and elevations.
- Align roadways and buildings along topographic lines.
- Locate facilities that have expansive ground coverage on relatively flat terrain.
- Use moderately sloping areas for buildings with less ground coverage area.
- Avoid development on steep slopes.
- Avoid development in natural drainage ways and flood plains.
- Provide a reasonable balance of cut and fill.

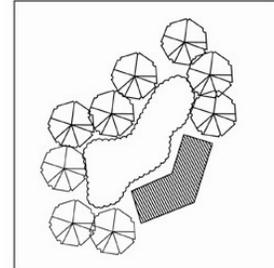
7.5.2 Hydrology

The site planning team will consider the following hydrologic concerns for natural drainage corridors, floodplains, and waterways during the site planning process.

- Preserve and maintain natural drainage areas and floodplains.
- Limit development in floodplains to open spaces and recreation uses.
- Preserve rivers, lakes, streams, or other waterways, and incorporate them into the design layout.

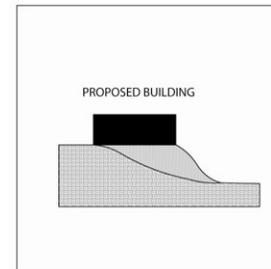


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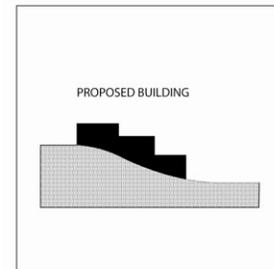


ADAPTED

Figure 7-4 Site Adaptations



NOT ADAPTED



ADAPTED

Figure 7-5 Topographical Adaptation

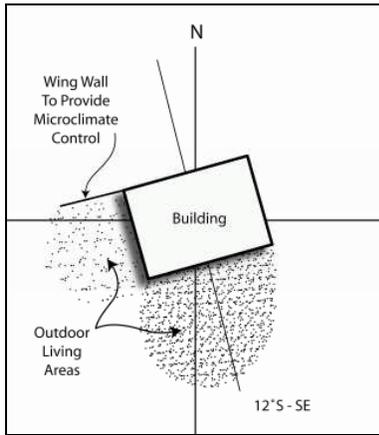


Figure 7-6 Orient Buildings for Optimal Environmental Utilization

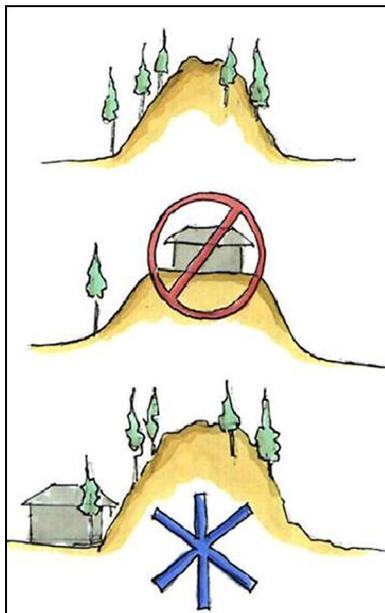


Figure 7-7 Develop Around Natural Landforms

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 (Figure 7-6).

Design buildings, and choose site locations in order to maximize the warming effect of solar radiation in winter and reduce the impact of cold winter winds.

7.5.4 Views and Vistas

Design to preserve and enhance scenic and other attractive views and vistas, and to screen unattractive views and vistas (Figure 7-7). 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. This preservation reduces maintenance and enhances sustainability. A preferred plant matrix ([Appendix K, Plant Palette](#)) is included in this Army Installation Design Guide. (Also, see Section 10 – Landscape Design Component).

7.6 MANMADE SITE CONDITIONS

The site plan provides the locations of the manmade development that 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 following site planning guidelines will be used in the visual and spatial review of the installation:

Cluster buildings to reduce impact on the natural environment, and reduce roadways and utility corridors needed to serve the development, however, at the same time giving full consideration to antiterrorism and force protection requirements.

Locate large buildings in relatively flat areas to reduce the need for cut and fill. Preserve the natural vegetation and drainage and orient buildings to topography (Figure 7-8).

Minimize solar heat gain for cooling and maximize solar heat gain and retention for heating.

Site buildings with respect to the microclimates of the site. These result in variances in wind or light because of adjacent land forms, structures, or trees.

Orient outdoor pedestrian areas to the most comfortable exposure and coordinate with ATRP measures.

Utilize lighter colored building surfaces exposed to the sun and darker colors on recessed surfaces to absorb radiation.

Orient windows according to impact of climatic conditions and in accordance with surveillance strategy.

Locate development on leeward side of hills.

Design and locate roads to provide a hierarchy of traffic carrying capacities.

Locate roads to blend with topography and vegetation.

Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles but ensure surveillance is possible.

Use plantings and biofiltration areas not only to beautify parking areas, but to manage storm water on site.

Design and locate pedestrian walkways and bicycle paths to fit the physical environment, and provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic (Figure 7-9).

Locate trees and shrubs to buffer harsh natural conditions while providing alternate surveillance so that inappropriate activities do not take place in these buffered areas.

Deciduous material provides for sun in the winter and shade in the summer. Evergreen material provides windbreaks for cold north winds.

Design and locate site elements to blend with and enhance the physical environmental.

Force Protection requirements should be designed and located to blend with the physical environment.

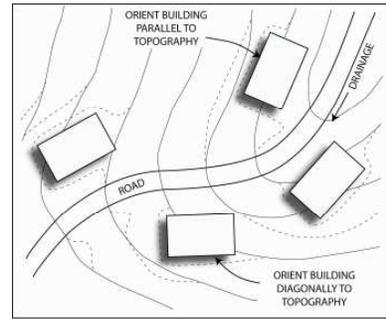


Figure 7-8 Orient Buildings and Roads to Topography

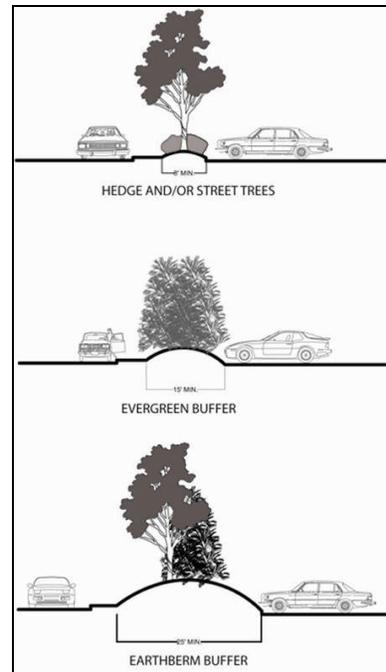


Figure 7-9 Screen Parking Areas

7.7 ARMY STANDARDS

The cited Army Standards shall be met.

- [Unified Facilities Criteria \(UFC\) 3-210-06FA, Design: Site Planning and Design](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)

7.8 REFERENCES

The following references are provided for guidance.

- [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](#)
- [Master Planning Instructions \(MPI\)](#)
- [Whole Building Design](#)
- [Fort Campbell Technical Design Guide](#)

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8.1 INTRODUCTION

8.1.1 Installation Image

The design character of an installation's buildings is important in shaping the installation's overall image. This section will assess the design quality of the buildings according to the visual theme in which they are located. It will make recommendations on the renovations and maintenance of existing structures as well as the design of new ones. The preservation of historically and culturally significant structures adds to an installation's character and provides a sense of heritage.

The understanding of the architectural character of existing buildings is necessary in order to provide coherent visual themes for the future. All of which play an important part of an installation's assets and liabilities. The visual analysis of structures also includes concern for accessibility, use of materials, placement of entrances, integration of additions and renovations, the incorporation of plazas and courtyards, interior design and the appropriateness and quality of building maintenance.

8.2 BUILDING OBJECTIVES

8.2.1 Sustainability

Sustainable Sites

Minimize the impact of placing a building on a site, with emphasis on land use compatibility and biodiversity. Channel development to installation areas with existing infrastructure, rehabilitate damaged sites, and reduce impact from automobile use.

Water Efficiency

Minimize the use of potable water for landscape irrigation and within the building.

Energy and Atmosphere

Ensure that buildings work as intended. Establish energy efficiency and optimization for the base building and for systems and encourage use of renewable and distributed energy systems. Reduce ozone depletion and support early compliance with the Montreal Protocol.

Materials and Resources

Reduce waste from construction and building occupants and redirect recyclable material back to the manufacturing process. Extend the life cycle of existing building stock, in part by extending the life cycle of targeted building materials. Increase use of building products with recycled building material and of locally manufactured building products. Reduce depletion of finite raw materials and encourage environmentally sensitive forest management.

Indoor Environmental Quality

Promote indoor air quality (IAQ) and prevent exposure to Environmental Tobacco Smoke (ETS). Provide a high level of individual occupant control

of thermal, ventilation, and lighting systems. Provide a connection between indoor spaces and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building. Provide appropriate acoustic conditions for user privacy and comfort.

Facility Delivery Process

Deliver a facility that optimizes tradeoffs among sustainability, first costs, life cycle costs and mission requirements. Assure that the delivery process insures efficient operation and maintenance of the facility.

Current Mission

Ensure that the delivery process establishes efficient operation and maintenance of the facility. Provide a high quality, functional, healthy, and safe work environment to promote soldier and workforce productivity and retention.

Future Missions

Require the understanding of: (1) The typical or likely lifespan of the function to be accommodated by the facility in order to recognize how soon the facility should be expected to adapt to a different use; and (2) The life spans of the building systems to understand when they will need to be updated during the lifespan of the facility and to design the facility in a manner that facilitates the updating of each system. Require design of the facility to maximize accommodation of future uses. The greater the future flexibility, the less likely it is that the facility will become a source for waste materials, or that it will require additional materials.

8.2.2 Building Design Objectives

The construction and location of new buildings and additions built onto existing buildings will be designed to strengthen the sustainability of the installation. Sustainable design can be used to reduce construction and/or maintenance costs, and to conserve energy requirements through proper construction and materials selection.

The following topics are good characteristics of sustainable design:

Site Adaptation

Adapt building designs and sitting to natural site and environmental conditions, such as sloped topography, predominant wind direction, solar exposure, position on hillsides, etc.

Land Preservation

Design buildings in clusters to preserve land and reduce construction and maintenance costs (Figure 8-1).

Coherent Architectural Styles

Develop a coherent architectural style that results in the blending of new and old structures. Figure 8-2 is an example of non-coherent architectural styles.

Emphasize Vertical Structures

Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas (Figure 8-3).

Multi-activity Facilities

Combine multiple activities in one building to reduce the number of building required and more efficiently utilize limited installation land areas.



Figure 8-1 Buildings Designed In Clusters Preserved Land



Figure 8-2 Non-Coherent Architectural Styles



Figure 8-3 Vertical Structures Reduce Footprints



Figure 8-4 Maximize Natural Light



Figure 8-5 Good Example of Color and Materials Palette For Fort Campbell

Multi-Use Facilities

Design multiple use facilities with the capability to quickly change interior layouts to accommodate changing requirements.

Indigenous Materials

Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness.

Window Location

Locate windows to maximize natural light and outward views (Figure 8-4). Use false windows to obscure sensitive areas.

Building Re-use

Consider adaptive reuse of buildings once their initial use is no longer required.

8.2.3 Architectural Styles

The architectural style for new buildings on Fort Campbell should be consistent regardless of the visual theme. The color and materials palette will be the same for Town Center, Community Life, Historic, Brigade Combat Training, and Memorial Boulevard Themes (Figure 8-5).

8.3 STRUCTURAL CHARACTER

8.3.1 Architectural Character

The character of installation architecture varies according to the use of the structure and when it was built. The use and age variation can result in character incompatibilities. It is important for the designer to understand the architectural character of the installations buildings and also the character of the individual visual themes in order to develop and maintain a character that is compatible.

8.3.2 Design Relationships

In order for an installation to have an identity there must be a coherent relationship between buildings. These relationships are what create a “sense of order” and a “sense of place”. To maintain this identity the designer, when adding on to an existing building, cannot ignore the design features of that building. These features are what give these buildings their identity. When a new building is constructed the designer must understand the design features of the surrounding buildings in order for the new building to fit into the context of the existing fabric. The following design techniques will help in achieving an installation that has a coherent structural character.

Scale

Scale refers to the size of a building facade in relation to humans. Buildings that include predominant vertical facades, which dwarf the individual, are defined as monumental in scale. Building with more horizontal facades designed to relate more to the size of the human figure are defined as human scale. The scale of most buildings on installations should be more human than monumental. All new construction should be compatible in scale with adjacent buildings. Monumental architectural design is typically utilized for more ceremonial buildings, such as worship centers, headquarters complexes, and hotel facilities. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building's use. Scale and relief should be provided through roof form, fenestration, building articulation and landscape plantings.

Massing

Massing refers to the overall bulk or volume of a building or buildings. The size and proportion of the individual buildings in a grouping of buildings should be designed to be proportionally compatible with the adjacent structures (Figure 8-6).

Form

The form of a building is determined by its size, mass, shape and proportions. The use of similar building forms provides continuity to the installations architectural impact. The Result is a more aesthetically pleasing environment (Figure 8-7).

Color

The use of a color scheme that is consistent throughout the installation, where possible, results in a continuity of buildings and contributes to a sense of place.

Texture

The use of materials of similar texture in buildings helps to provide visual continuity for the installation.

Materials

The use of the same materials in the exterior finish and trim of buildings helps provide visual continuity (Figure 8-8).

Fenestration

Building fenestration includes features such as doors, windows, and building decoration details. These features should be similar in arrangement, design, size and proportion for architectural compatibility and visual consistency and continuity.



Figure 8-6 Appropriate Massing



Figure 8-7 Similar Building Forms Create a Visually Appealing Impact



Figure 8-8 Visual Continuity Through Exterior Finish and Trim



Figure 8-9 Building Entrance Should Be Recognizable



Figure 8-10 Building Orientation Should Be In a Prominent Location



Figure 8-11 Aesthetically Pleasing Service Area Screening

8.4 BUILDING ENTRANCES

8.4.1 Entrance Definition

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 (Figure 8-9), but should not face adjacent uncontrolled roadways or parking areas to protect from blast and other direct attacks.

8.4.2 Entrance Detail

The details of an entrance should be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings (Figure 8-10).

8.5 SERVICE AREAS

8.5.1 Service Area Screening

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 (Figure 8-11). These spaces should be provided alternate means of surveillance to deter and detect inappropriate activities.

8.5.2 Location of Trash Areas and Dumpsters

Trash and garbage collection areas must be located a minimum of 25 meters (82 feet) from troop billeting, family housing areas (containing more than 12 units), and stand-alone retail facilities. They will be placed a minimum of 10 meters (33 feet) from all other inhabited structures ([UFC 4-010-01, Table B-1](#)). The surround should be maintained secured. If the surround design is not securable then the dumpsters should be maintained secured so that inappropriate items cannot be easily placed within. Screen walls should be in harmony with adjacent buildings.

8.6 BUILDING ACCESSIBILITY

8.6.1 Accessibility Standards

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.

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.

In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed messes, vehicle, and aircraft maintenance facilities.

8.6.2 Seismic Policy

The minimum performance objective for Army facilities is Substantial Life-Safety. 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.

Seismic evaluation. Guidance for the seismic evaluation of existing facilities is given in [TI 809-05, Seismic Design Evaluation and Rehabilitation for Buildings](#). Buildings will have a seismic evaluation performed when:

A change in the building's use causes a change in the occupancy category, as defined in [TI 809-04, Seismic Design for Buildings](#), to a category of greater importance (lower category number).

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.

8.6.3 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 facility is a one or two family dwelling, two stories or less, located in zone 1 or 2, as shown in [TM 5-809-10](#).

The gross area is less than 3000 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. Rehabilitation will be performed in accordance with [TI 809-05](#).

8.6.4 New Facilities or Additions or Extension of Existing Facilities

New facilities and additions or extension of existing facilities will be designed to provide the level of seismic protection required by [TI 809-04](#).

8.7 INDIGENOUS STRUCTURES

Sustainability in the design and construction of buildings includes incorporating time-proven building designs that are indigenous to the region. Indigenous design elements should be utilized in the design of new buildings.

8.8 HISTORICAL ARCHITECTURE

8.8.1 Maintain Integrity of Historic Buildings

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



Figure 8-12 Additions Should Be Consistent With Existing Architecture



Figure 8-13 Excellent Example of a Courtyard

preservation. When working with historic properties the Army uses the following three categories:

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.

Fort Campbell Historic Buildings:

- 5001
- 6081
- 1541

Historic District

A distinct group of buildings, structures, or landscapes that possesses significance and is listed in or eligible for listing in the National Register.

- Clarksville Base

National Historic Landmarks

Building, 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.

Historic Object

Wickham Statue

Treatment of Historic Properties

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](#).

Historic Preservation Guidelines

See [Appendix J](#), Historic Preservation Guidelines

8.9 RENOVATIONS AND ADDITIONS

When existing buildings are renovated or additions are constructed, the architectural character of the renovation or addition should be compatible with the architectural character of the existing building and the adjacent buildings. This is achieved by the correct use of materials, color, shape, size 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 (Figure 8-12).

8.10 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. Wide, paved entrance plazas need vehicular barriers (Figure 8-13).

8.11 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 (Figure 8-14).

8.11.1 Interior Design

Inhabited spaces, that require the selection of furnishings or equipment, should 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.

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.](#)

8.11.2 Engineering Regulation

[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.](#)

8.11.3 Space Planning

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

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.

Bubble Diagrams

Bubble diagrams show the working relationship of one group to another . 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.



Figure 8-14 Building Maintenance Is an Issue

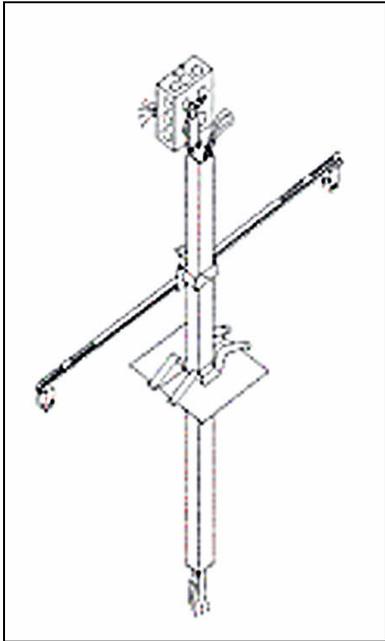


Figure 8-15 System Furniture Utility Column for Electrical and Communications Distribution

Block Diagram

An extension of the bubble diagram is the block diagram. The blocking diagram is made more regular and is for fit inside the proposed floor plan.

Space Plan

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.

8.11.4 Electrical and Communications

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.

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.

Compliance with NFPA 70 (The National Electric Code) is mandatory. Copies of the code can be purchased from www.nfpa.org.

Communication

Communications systems handle the transport of telephone and data networks (e.g. video, multi-media, teleconferencing, data transfer, facsimile transmission, and voice conversation).

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](#).

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 (Figure 8-15).

8.11.5 Color

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.

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](#), Chap. 3, Light and Color and in the Air Force Interior Design Guides, Chap. 9, Color Principles, [Part 1](#) and [Part 2](#).

8.11.6 Acoustics

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.

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](#).

8.11.7 Interior Lighting

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.

For Army installation buildings to achieve a high quality lighting environment, lighting equipment/systems selected must satisfy both performance and aesthetics (Figure 8-16). 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.

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 Chp. 5](#)
- [Air Force Interior Design Guides, Chp. 10](#)
- [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems, Appendix F](#)
- 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](#).

8.11.8 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.

Installation Finishes Standards. Installation finishes standards are found in Appendix G, Interior Finishes Standards of this guide.

8.11.9 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. 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.

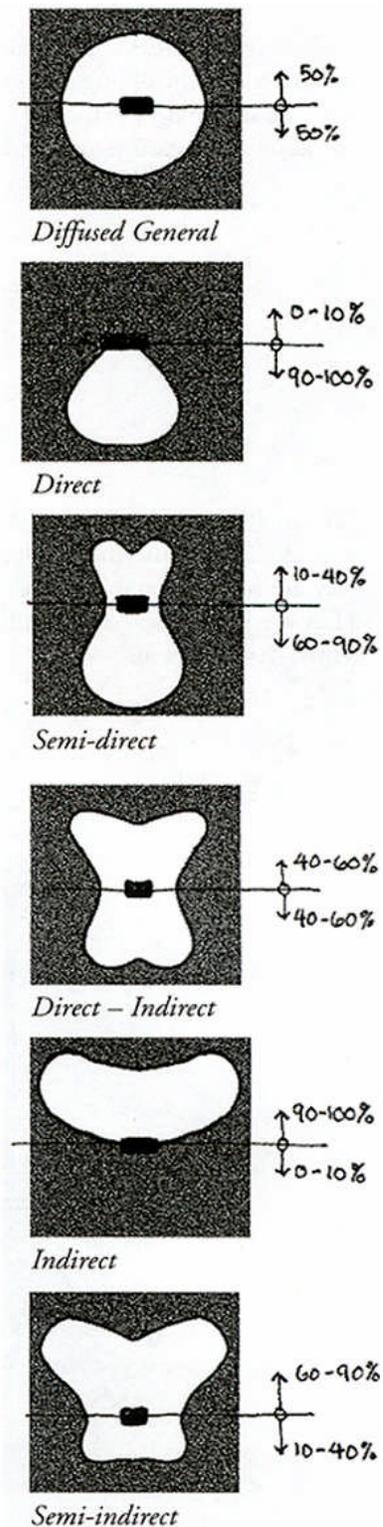


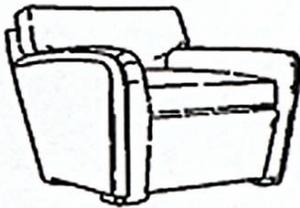
Figure 8-16 Typical Distribution of Light



Figure 8-17 Conventional Case Goods



Multiple seating



Lounge seating



Side chair



Desk/conference chair

Figure 8-18 Systems Furniture - Chairs

8.11.10 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 (Figure 8-17). 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. Modular case goods are manufactured as separate pieces that may be grouped into a number of different arrangements.

Systems Furniture

Systems furniture is ergonomically designed to meet a variety of conditions and requirements (Figure 8-18). 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 where they are needed. Provisions for furniture systems electrical and data requirements must be made a part of the construction systems documents. See [Section 8.11.4](#) for interior design standards for electrical and communications wiring respectively. Surface mounted conduit and power poles are unsightly and should be avoided.

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.

Budgeting for Furniture Systems

Furniture systems are listed on the [DD 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.

Systems Furniture Design Guidelines

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.

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
- Storage requirements

Panels

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.

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. Also place glass panels to view room entrances for an added access control component.

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.

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

Window Treatments

Window treatments serve many purposes in an interior environment. They provide privacy, light and sun control, reduced energy consumption, and decreased sound transmission. The type of treatment, as well as the type of material used, will determine the effective of the treatment in and give instance. 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.

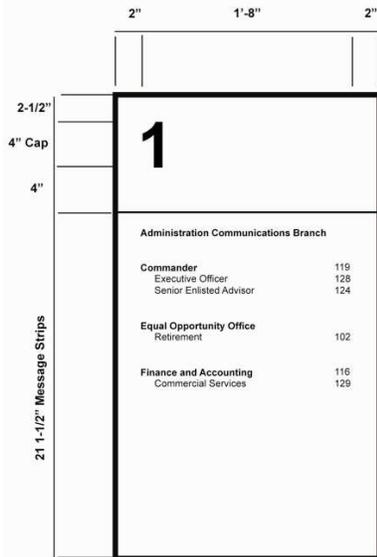


Figure 8-19 Directional Signal Directs Circulation

- Window treatments should complement and support the interior design of a space. 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
- Thermal properties
- Architectural style
- Historical context
- Desired level of surveillance

Signage

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 (**Error! Reference source not found.**).

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.

Accessories

Accessories may be either functional or decorative. Whatever the purpose, accessories serve to make a room appear inviting and personal.

- 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.

- Decorative Accessories

Decorative accessories are objects such as artwork and plants.

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 and Integration with design scheme.

Plants

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.

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.

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

8.1.1.11 Unified Facilities Guide Specifications

See the "Division 12 - Furnishings" section on the [Construction Criteria Base](#) website for Unified Facilities Guide Specifications for furnishings.

8.1.1.12 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:

- 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.

8.1.1.13 Interior Appearance Policy

The following are Army standards to follow.

- Keep work areas cleared of clutter. Cleanup, throw away.
- 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. Personal artifacts can communicate personal

information that can be used by criminals to harm the occupant either directly (hitting them with it) or indirectly (theft of item, identity theft, etc.)

- 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.
- 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.

8.12 BUILDING MATERIALS AND COLOR

8.12.1 Exterior Building Materials.

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.

Use the following guidelines when selecting exterior building materials

- Choose materials for their longevity and maintenance characteristics.
- Use materials with integral colors - avoid painting exterior colors.
- 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.
- Use pre-finished material where possible - gutters, window frames, doorframes, etc.
- Use blended colors on pitched roofs.

[Appendix H](#), Exterior Materials Charts list the building materials applicable to all theme areas at Fort Campbell.

8.12.2 Exterior Building Color

Color charts have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc. Color changes will be implemented during normally scheduled paint cycles (see [Appendix I](#), Exterior Color Charts).

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.

Repaint historic building or structure to match the existing colors or colors that can be documented to have been used on that building.

8.13 KEY FACILITY TYPES STANDARDIZATION

The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

8.13.1 Department of the Army (DA), Facilities Standardization Program.

Under the DA Facilities Standardization program, 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 (10%-15%) and once approved are mandatory for Army MILCON.

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 M](#), Army Facilities Standardization Program Centers of Standardization for a list of the various centers and the facility type assigned to each center.

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.

8.13.2 Unaccompanied Personnel Housing (Army Barracks Modernization Program).

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.

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; and
- Eliminates the separate soldier community building.
- See the above memorandum for detailed guidance.

Furnishings

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).

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.

Construction design criteria for COFs, BBN HQ buildings, BDE buildings, and DEFAC facilities can be viewed on the web at ProjNet.

8.13.3 Army Lodging

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.

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

8.13.4 Morale, Welfare, and Recreation (MWR) Branded Theme Operations

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.

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.

8.13.5 Range Standards

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.

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](#).

8.14 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 Antiterrorism measures.

8.15 SALE AND OUTLEASE OF ARMY ASSETS

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.

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; and
- Outlease of Personal Property.

The guide provides hyperlinks to Sale and Outlease governing regulations and legal and informational references.

8.16 ARMY STANDARDS

The cited Army Standards shall be met:

- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems](#)
- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Secretary of the Interior's Standards for the Treatment of Historic Properties](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Standards of Seismic Safety for Existing Federally Owned and Leased Buildings](#)
- [Army Barracks Master Plan, Appendix I, Army Barracks Standards](#)
- [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](#)
- [Design Manual for Remote Target Systems \(RETS\) Ranges, CEHCN 1110-1-23 Manual](#)
- [Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHCN 1110-1-23 Manual](#)
- [Revised Range Design/Construction Interface Standards](#)

8.17 REFERENCES

The following references are provide for guidance:

- [Army Regulation \(AR\) 190-13, The Army Physical Security Program](#)
- [Army Regulation \(AR\) 200-1, Environmental Protection and Enhancement](#)
- [Army Regulation \(AR\) 200-2, Environmental Effects of Army Actions](#)
- [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 \(UFC\) 2-600-01, Installation Design, Chap 8](#)
- [Unified Facilities Criteria \(UFC\) 1-200-01, Design: General Building Requirements, 20 June, 2005](#)
- [Unified Facilities Criteria \(UFC\) 4-510-01, Design: Medical Military Facilities](#)
- [Unified Facilities Criteria \(UFC\) 3-400-01, Design: 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](#)
- [U.S. Army Corps of Engineers, Design Guide \(DG\) 1110-3-122, Design Guide for Interiors](#)
- [Department of Defense \(DoD\) Interior Design Website](#)
- [Technical Instructions \(TI\) 800-01, Design Criteria](#)
- [Technical Instructions \(TI\) 809-04, Seismic Design for Buildings](#)
- [Technical Instructions \(TI\) 809-05, Seismic Design Evaluation and Rehabilitation for Buildings](#)

- [Technical Instructions \(TI\) 811-16, Lighting Design](#)
- [Technical Manual \(TM\) 5-683, Electrical Interior Facilities](#)
- [Technical Manual \(TM\) 5-688, Foreign Voltage and Frequencies Guide](#)
- [Technical Manual \(TM\) 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, Seismic Design for Buildings](#)
- [Technical Manual \(TM\) 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chap 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings](#)
- [Army Barracks Master Plan](#)
- [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](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Whole Building Design Guide](#)
- [Unified Facilities Guide Specifications \(UFGS\), "Division 12 - Furnishings", Construction Criteria Base](#)
- [Engineering and Construction Bulletins](#)

Section 9 Circulation Design Standards

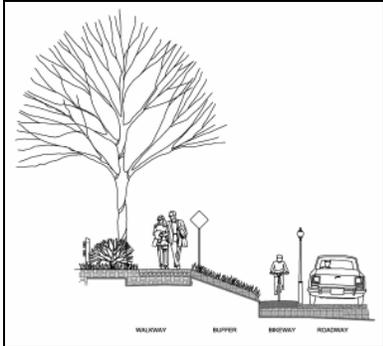


Figure 9-1 Separation of Pedestrian and Vehicular Traffic

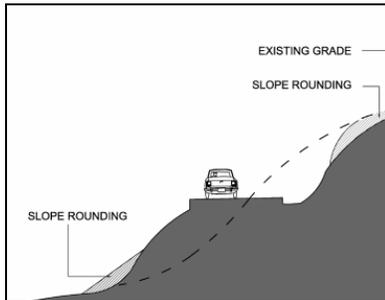


Figure 9-2 Adapt Circulation to Topography

9.1 INTRODUCTION

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 visually dominant elements of any installation. The location of primary circulation elements is presented in [Section 7](#), Site Planning. This section discusses the details of circulation design and impacts.

The circulation system provides a primary vantage point from which all installations are viewed. 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.

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.

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 antiterrorism 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 (Figure 9-1).
- Provide a system that includes hierarchies of vehicular and pedestrian traffic flow.
- Adapt the circulation system to the natural conditions of the site (Figure 9-2).
- Improve the existing circulation network for expansion, safety, way finding and appearance.
- Promote maintenance and repair of existing and proposed circulation systems.

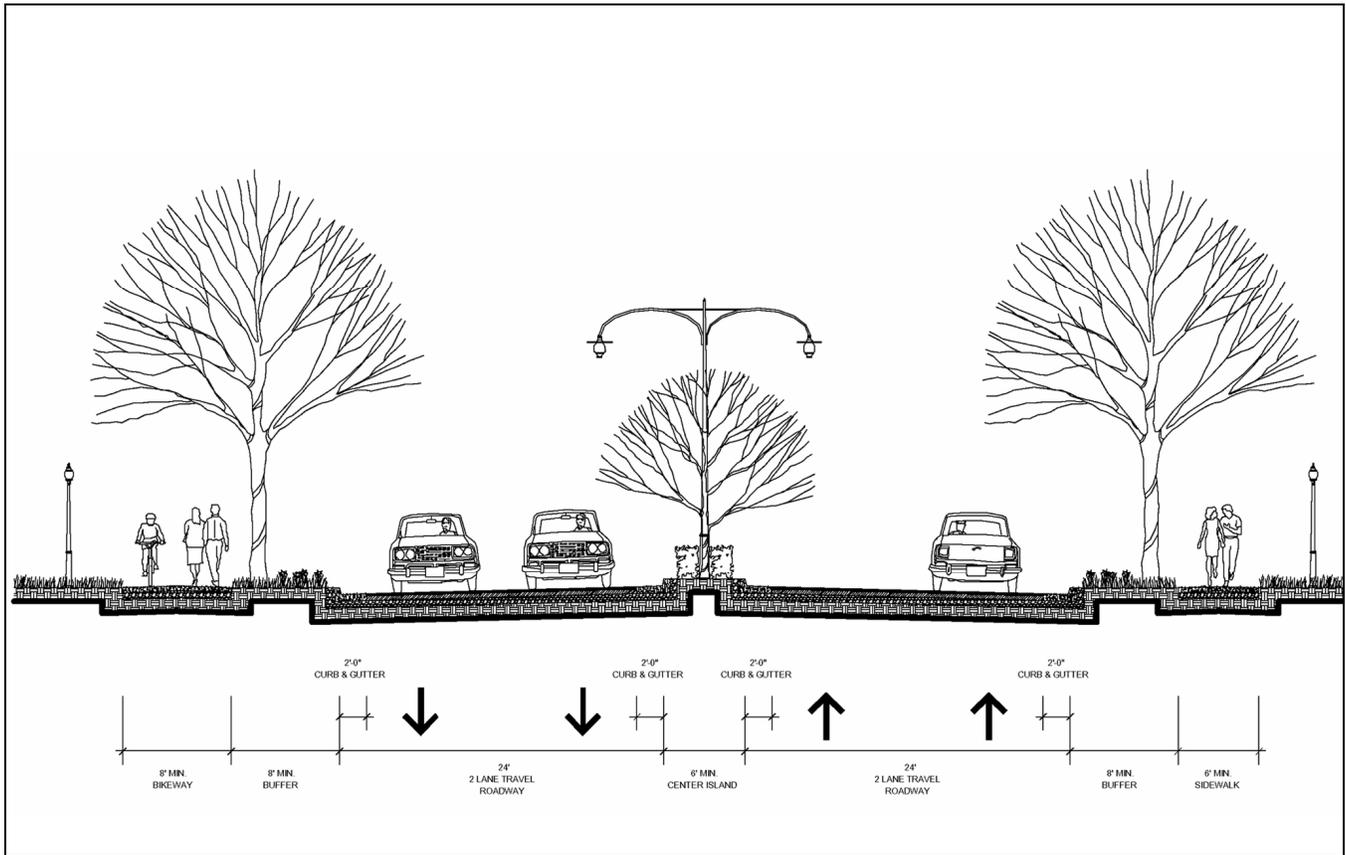


Figure 9-3 Highway

9.2.1 Roadway Hierarchy

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.

9.2.2 Highways

Highways (Figure 9-3) provide primary high-speed traffic access to, around, or through a military installation. The design includes:

- Continuous, relatively straight or large radii curvilinear alignments that carry high-speed through-traffic movement between major activity centers within a region.
- A minimum of two lanes on each direction typically divided by a median or median divider.
- Alignments that border lane use areas rather than bisect them, and green space buffers between the road and adjacent uses.
- Controlled access onto the road.
- Either grade-separated or at grade channelized intersections with traffic signal controls.
- Shoulders for emergency stopping but strict prohibition of on-street parking.
- Street signing, lighting, and planting that reflect the high-speed nature of traffic movement.

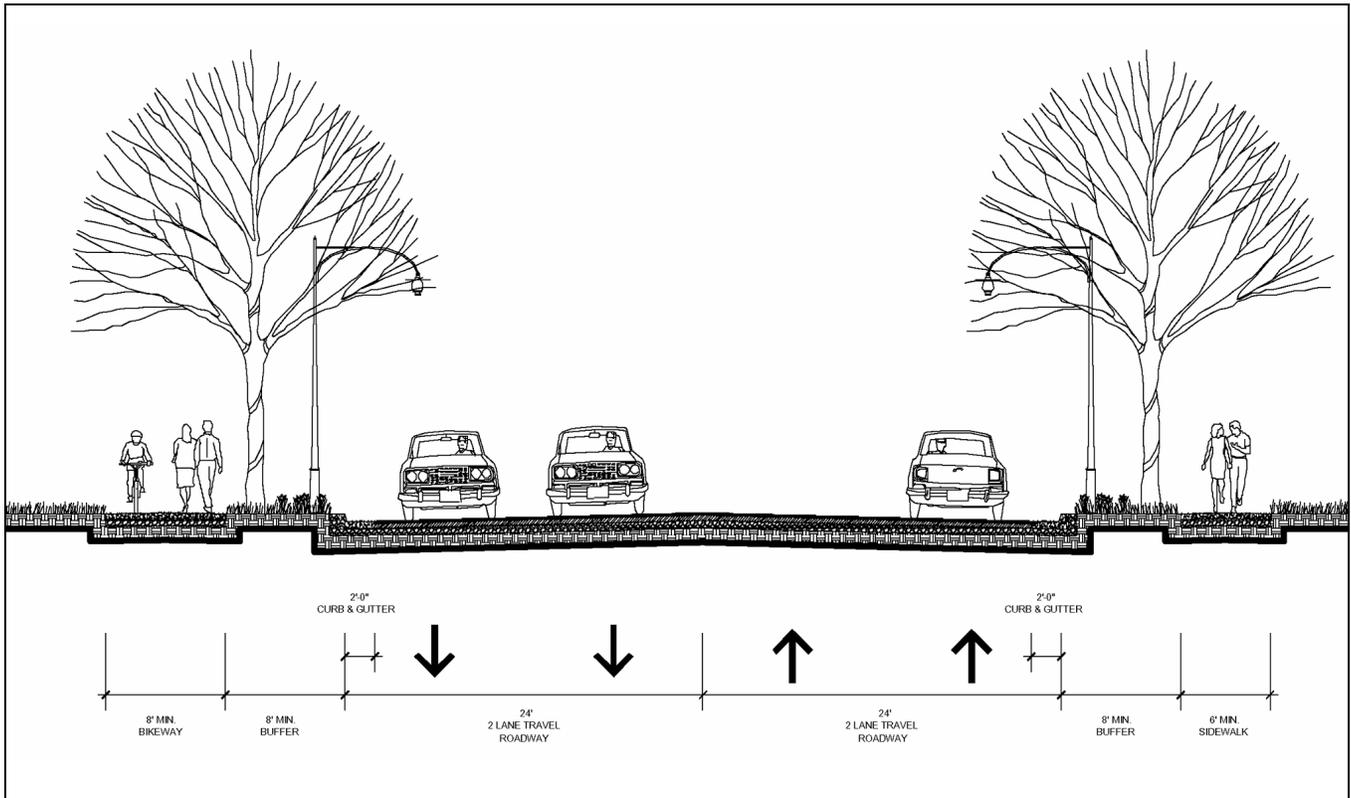


Figure 9-4 Primary Roadway Section



Figure 9-5 Primary Road at Fort Campbell

9.2.3 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 (Figure 9-4). 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 (Figure 9-5). Design characters include:

- Continuous, through-traffic alignments that are relatively straight or large-radii curvilinear to handle moderate to heavy traffic.
- Alignments that form the boundary between different land uses are preferable to alignments that transect a land use zone.
- Two or more moving lanes in each direction typically divided by a median.
- Controlled access and a minimum of curb cuts limited to entranceways to major facilities or building groups.
- At-grade intersections with signal controls.
- On-street parking prohibited.
- Medians, street lighting, signing, and planting that enforces the moderate- to-high speed nature and importance of the road.
- Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.

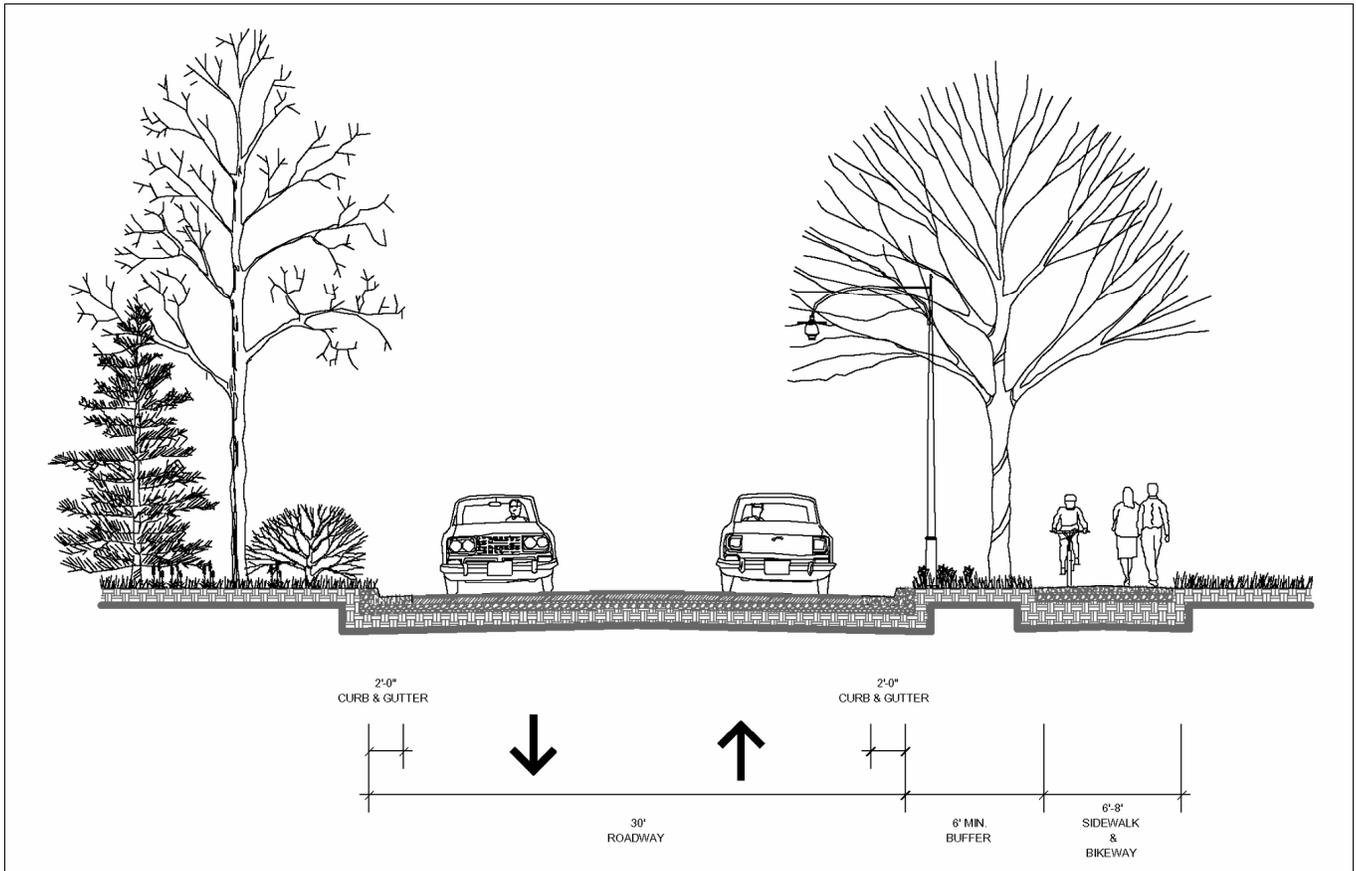


Figure 9-6 Secondary Roadway Section

9.2.4 Secondary Roadways

Secondary roadways serve as connectors between primary roads and tertiary roads and typically connect primary roads to adjacent land use zones (Figure 9-6). Secondary roads accommodate moderate to slow traffic speeds with one moving lane in each direction (Figure 9-7). On-street parking should be prohibited and left-turn lanes provided at intersections with primary roads. Design characteristics include:

- Continuous through-traffic alignment between primary roads, either straight or curvilinear based upon the design speed topography and land pattern.
- Direct access to abutting property.
- A maximum of two moving traffic lanes in each direction, either undivided or a boulevard with planted median.
- On-street parking generally prohibited.
- Sidewalk separated from the road by a planting strip.
- 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.
- Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.



Figure 9-7 Secondary Road at Fort Campbell

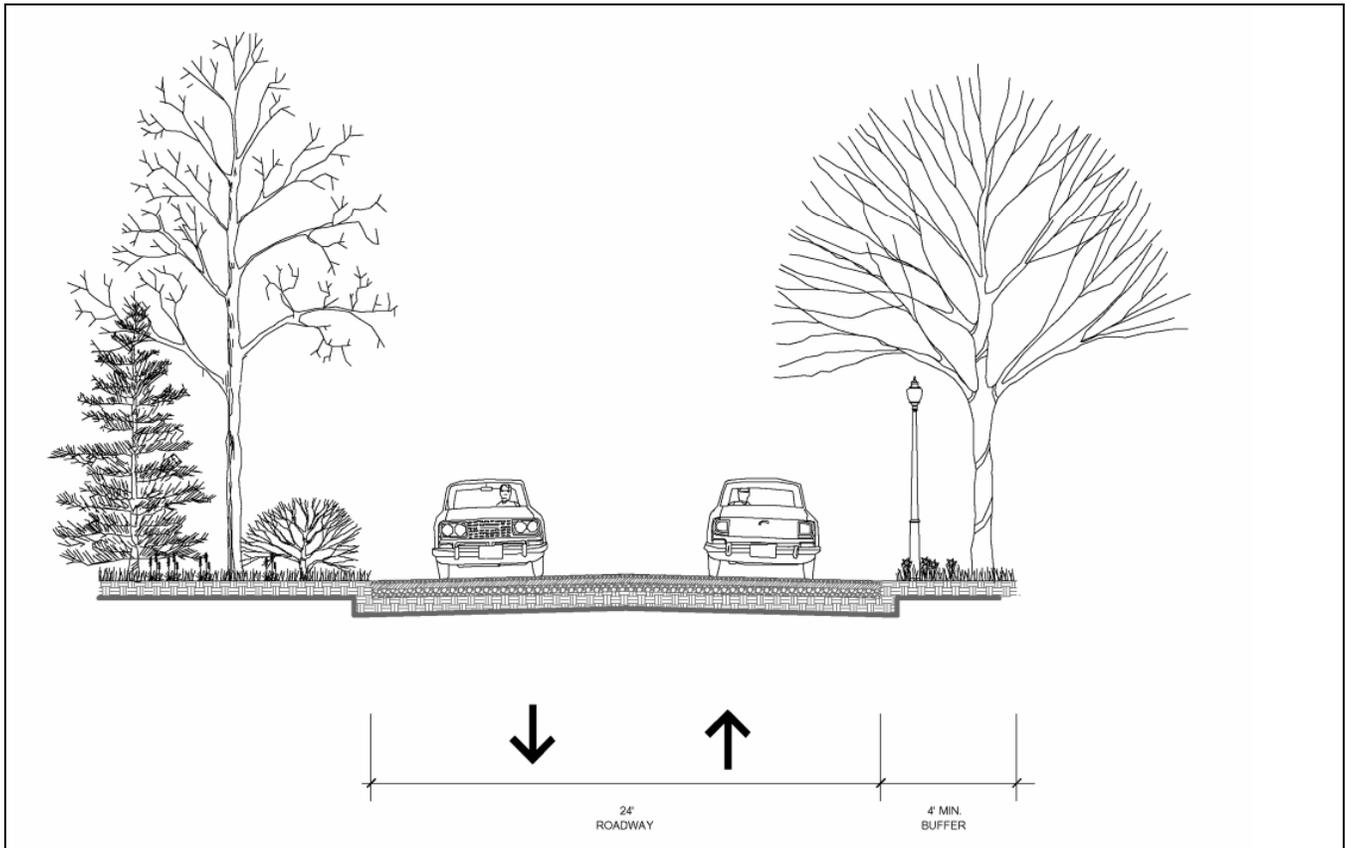


Figure 9-8 Tertiary Roadway Section



Figure 9-9 Tertiary Road At Fort Campbell

9.2.5 Tertiary Roadways

Tertiary roadways provide access to individual facilities, parking and service areas (Figure 9-8). They are designed to handle low speed, low volumes of traffic, with one lane in each direction (Figure 9-9). 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:

- Alignments designed to discourage through-traffic.
- Alignments are relatively short straight or curvilinear keeping with topography, land use, and slow speed nature of traffic.
- Generally a maximum of two moving traffic lanes, one in each direction.
- On street parking allowable on an infrequent overflow basis by the addition of a parallel parking lane or bay.
- Curbs, gutters, and sidewalks provided in all cantonment area and other residential areas with densities greater than two dwelling units per acres.
- Sidewalks maybe limited to only side, depending upon need.
- Street lighting, signing, and planting in character with slow speed nature of traffic and the land use area within which the road is located.

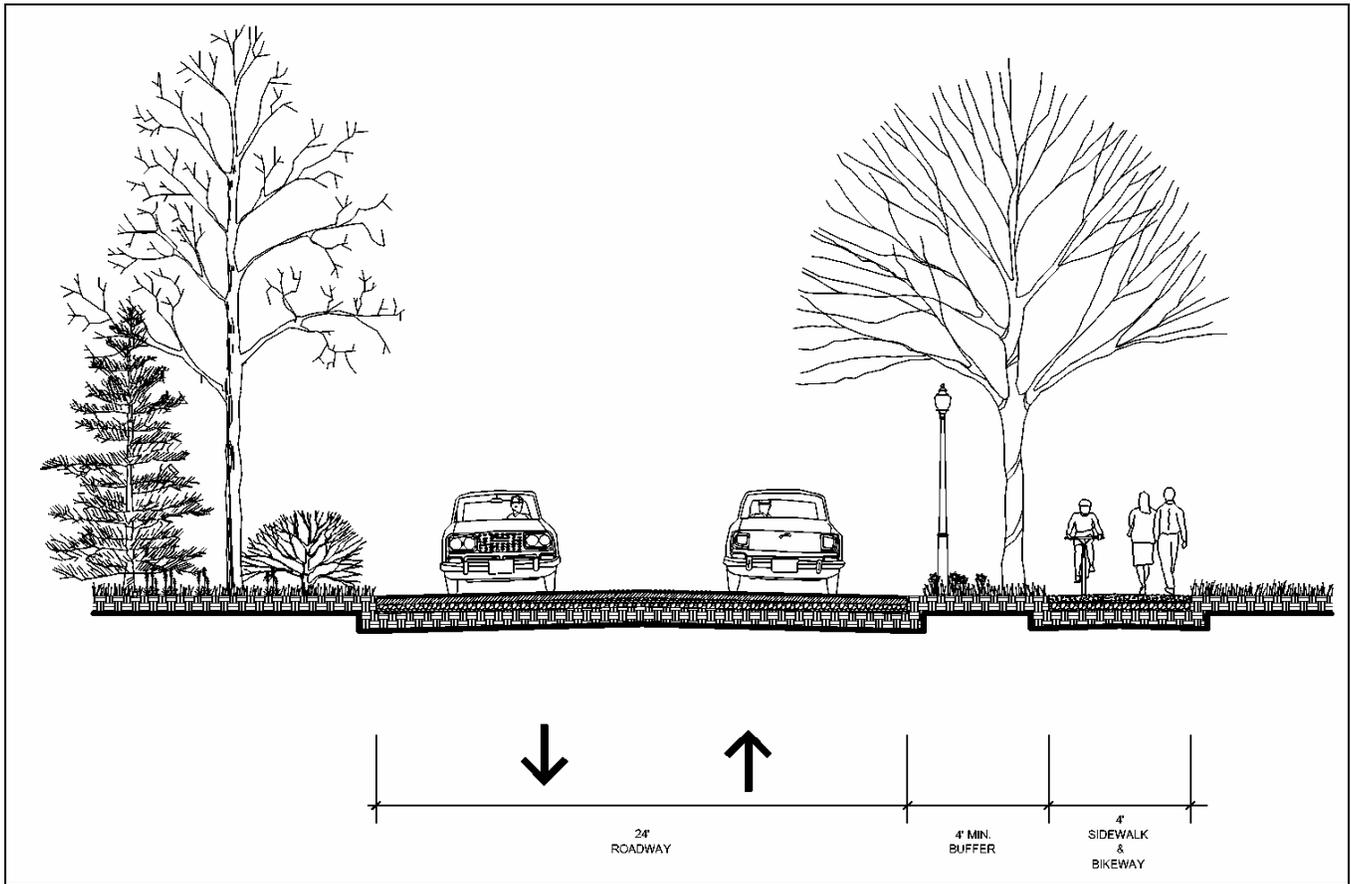


Figure 9-10 Cul-De-Sac Roadway Section

9.2.6 Cul-de-sac

Cul-de-sacs are short dead-end tertiary streets located primarily in residential areas (Figure 9-10). 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:

- Short, straight, or curvilinear alignment to serve abutting property.
- Generally a maximum of two traffic lanes, one in each direction.
- Generally a maximum length of 600 feet, or less, except in areas where terrain and low density justify a longer length.
- Turnarounds must include a diameter to accommodate fire and garbage trucks.
- Turnarounds can be either symmetrical or offset.
- Turnarounds should have center planting islands to reduce the expanse of paved area.
- Overflow parking can be provided on street in parking bays or within center of turnarounds.
- Sidewalks, if any, are generally limited to one side of the road.
- Street lighting, signing, and planting are in character with the slow speed nature of traffic and the land use area being served.

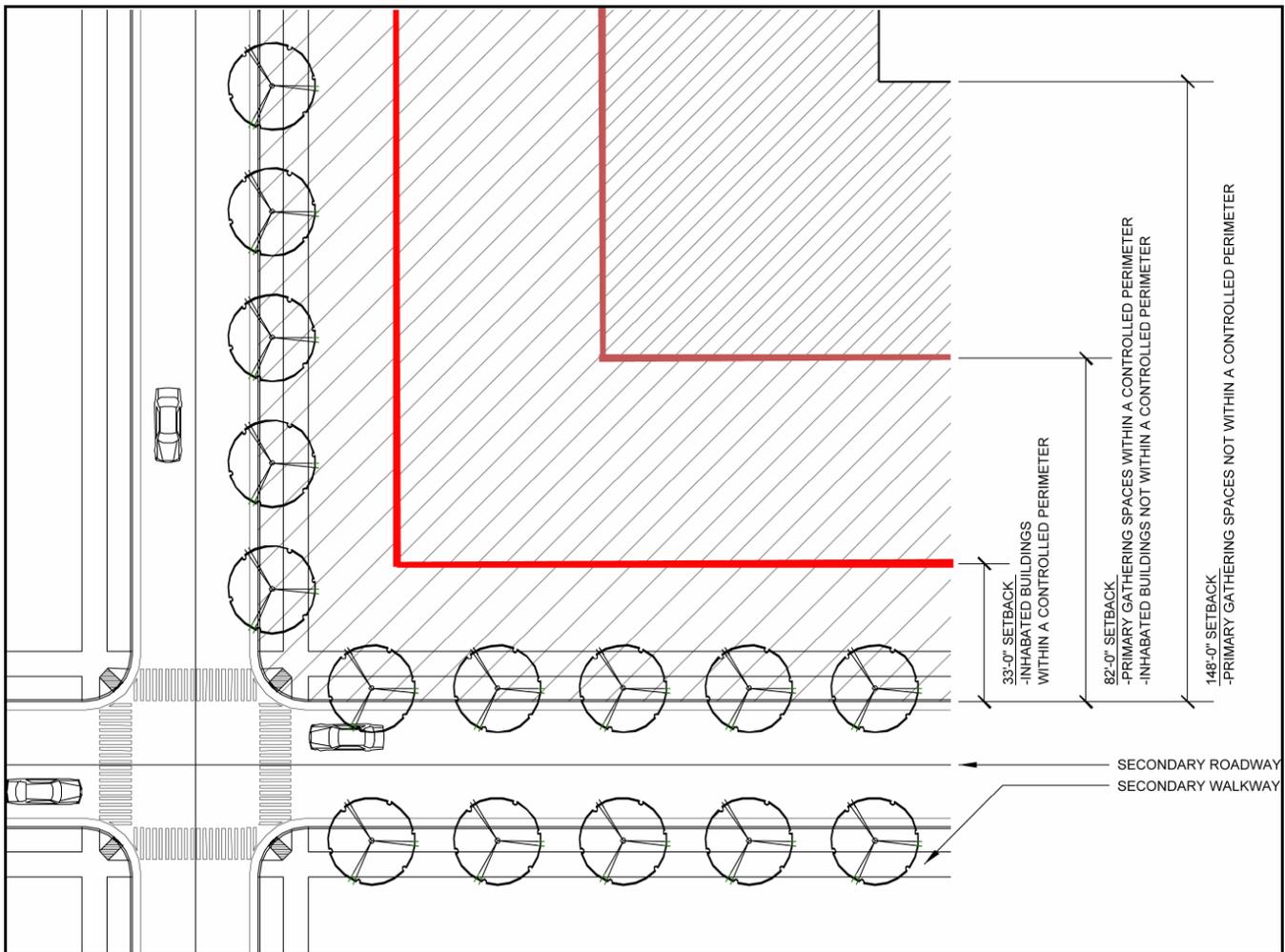


Figure 9-11 Roadway Setbacks

9.2.7 Tactical Vehicle Trails

Tactical Vehicle Trails provide alternative access for armored vehicles and other vehicles utilized in combat readiness training. They are recommended for installations with high use of armored 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 that these trails be hard surfaced within developed areas with suitable material to withstand designated load. 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.

9.3 ROADWAY SETBACK

Department of Defense Antiterrorism 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 (Figure 9-11). 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](#)).

9.4 ROADWAY SYSTEMS DESIGN

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. The following design techniques should be applied to circulation system design:

- 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.
- Minimize cut and fill by avoiding steeping terrain and aligning roadway, walkway, or bicycle system to cross slopes diagonally or parallel to the contours rather than perpendicular to the contours.
- Mold cut and fill slopes to blend into the natural landform.
- Blend road drainage ditches, swales, or channels into the natural landform.
- 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 antiterrorism requirements when developing cluster type facilities.
- Minimize pedestrian, railroad, and bikeway crossings of highway, primary, and secondary roads.
- Use natural topographic conditions to create grade separated pedestrian, railroad, and bikeway road crossings wherever possible especially on highways and primary roads.
- 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.
- Align roads through open areas rather than forested areas.
- Minimize cut and fill to reduce the limits of clearing.
- Clear only for sight distances rather than uniform right-of-way clearing.
- Utilize tree wells or retaining walls to preserve specimen trees or significant vegetation areas.
- Provide optimum conditions for re-vegetation by following proper planting and maintenance techniques.
- Restore vegetation to disturbed areas using naturalistic plantings of native plant material.

9.4.1 Minimize Adverse Impacts on Adjacent Land Uses

Air Pollution

Locate roadway alignments to minimize the impact of traffic-emitted pollutants on adjacent development. This can be accomplished by the following:

- Locate roads adjacent to land uses that are minimally affected by traffic-emitted air pollutants.
- 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.

Noise Pollution

Design and locate roadways to reduce the impact of traffic noise on adjacent development.

Roads should be physically separated from sensitive land uses including residential, medical, education, recreation, administration, religious, library, community, or childcare facilities.

Utilizing noise abatement techniques such as berms, sound barrier walls, and plant material to reduce noise levels.

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.

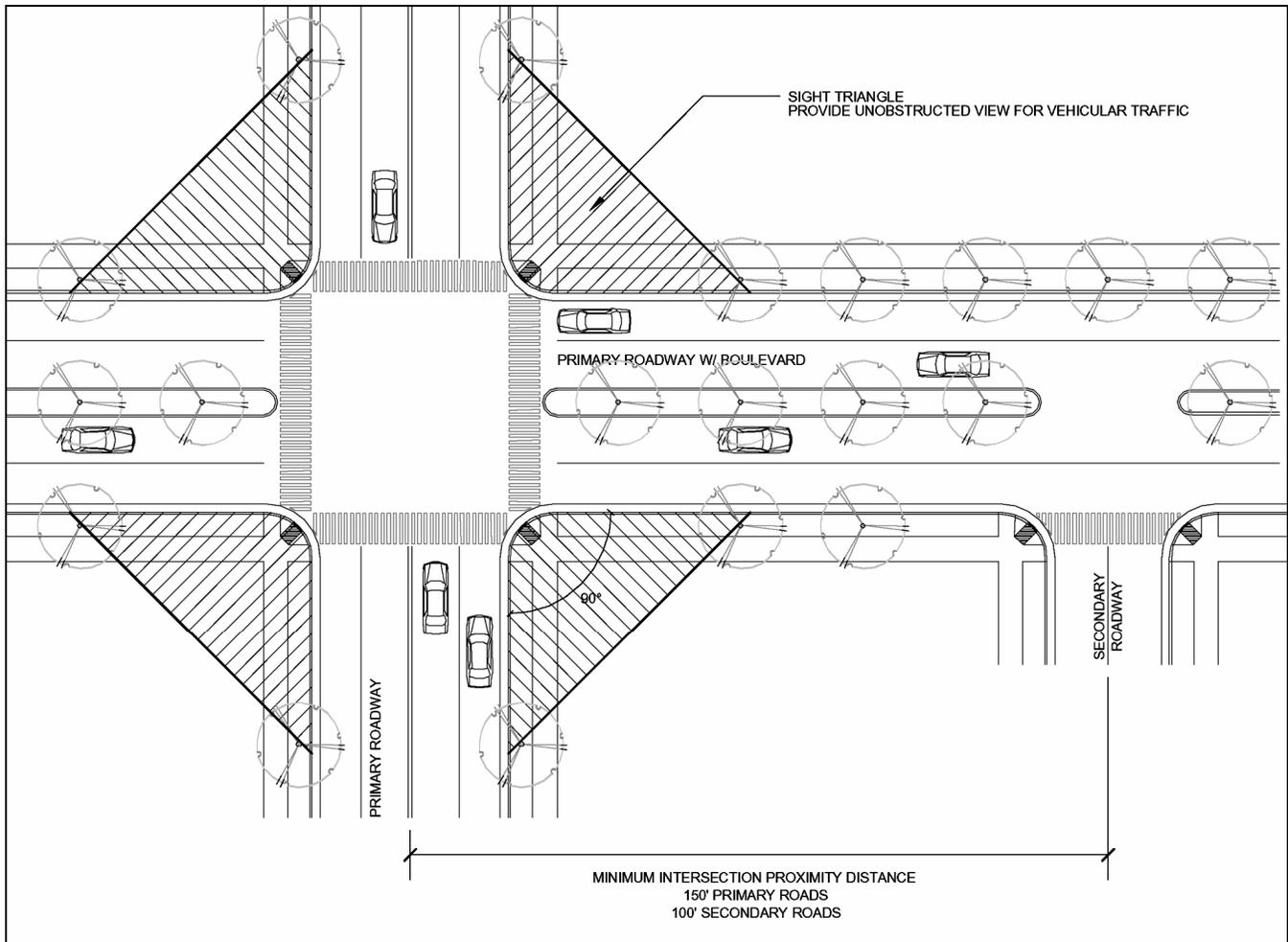


Figure 9-12 Intersection Plan

9.5 INTERSECTIONS

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 (**Error! Reference source not found.**):

- All roadways should intersect at right angles (90 degrees), although 85-95 degrees is acceptable.
- Avoid dangerous, complex intersections of more than two streets intersecting at one point or offset intersections.
- Eliminate intersections that are in close proximity to one another. They should be no closer than a minimum distance of 30 meters (100 feet).
- Use T-intersections for tertiary road intersections with secondary or primary roads to reduce conflict and promote safety.
- Provide turning lanes at all intersections along primary roads to eliminate interference with through traffic flow.
- 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.

- 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.
- Minimize pedestrian and bicycle intersections with primary streets.
- Provide crosswalks at all intersections where necessary, marked with paint or vinyl strips or identified with a different paving surface.
- 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.
- 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.
- 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.

9.6 ENTRANCE GATES

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 12.8](#) for information on the design standards for installation gates.

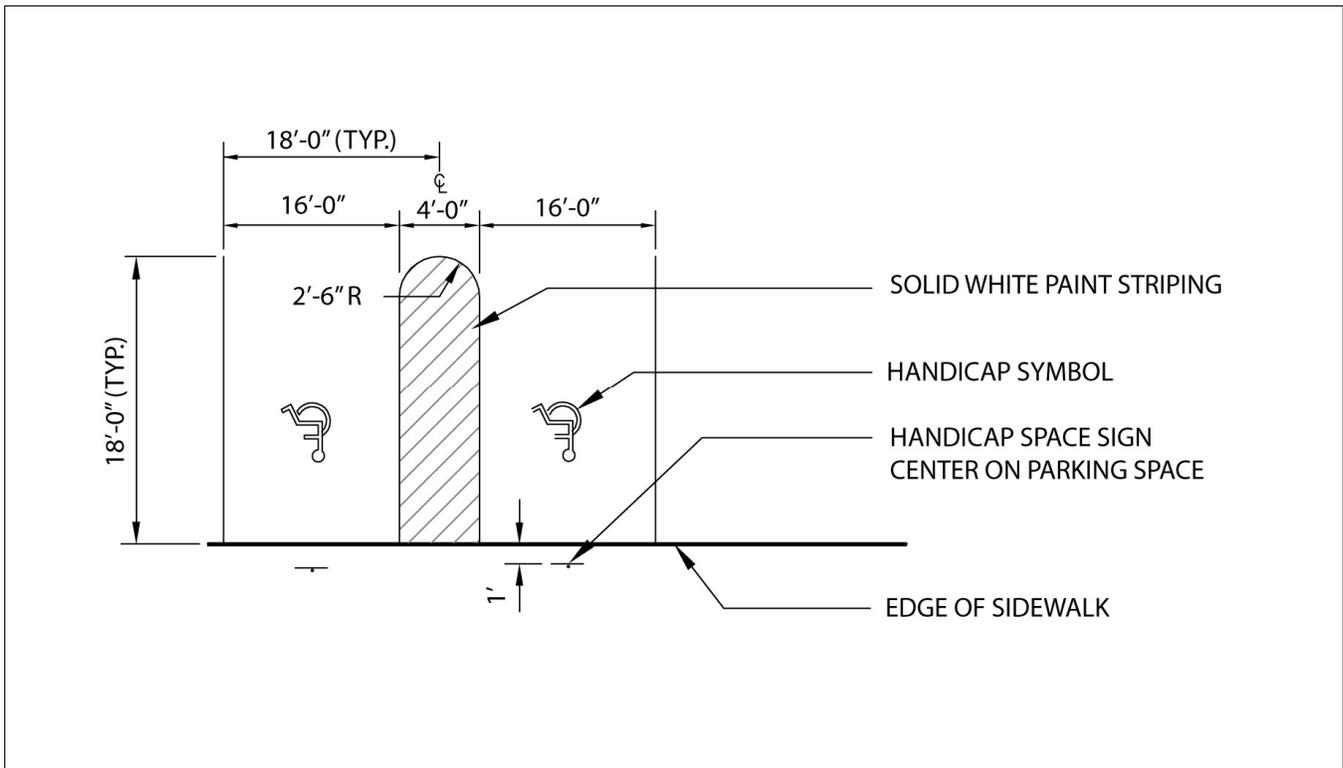


Figure 9-13 Handicapped Parking

9.7 PARKING REQUIREMENTS

This section provides guidelines to accommodate parking needs, prevent conflicts between parking areas and other uses, and reduce the visual impact of existing and future parking areas (Figure 9-13). 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.

All parking lots will be accessible to persons with disabilities in accordance with the requirements of the [UFAS, paragraph 4.1.1\(5\)\(a\)](#) . If parking spaces are provided for employees or visitors, or both, then accessible spaces shall be provided in conformance with the required minimum number of accessible spaces shown in Table 9-1

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 that make up a parking lot. This allocation is not withstanding tactical military vehicles.

Minimize parking space requirements of a facility by selecting a site that will allow the sharing of parking with related activities. 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 conformances to natural topography.

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. Promote means of access other than vehicular by providing alternative means of access such as walkways and bikeways.

Total Spaces in Parking Area	Required Minimum
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of total
1001 and up	20 + 1 for each 100 over 1000

Table 9-1 Required Minimum Number of Accessible Parking Spaces

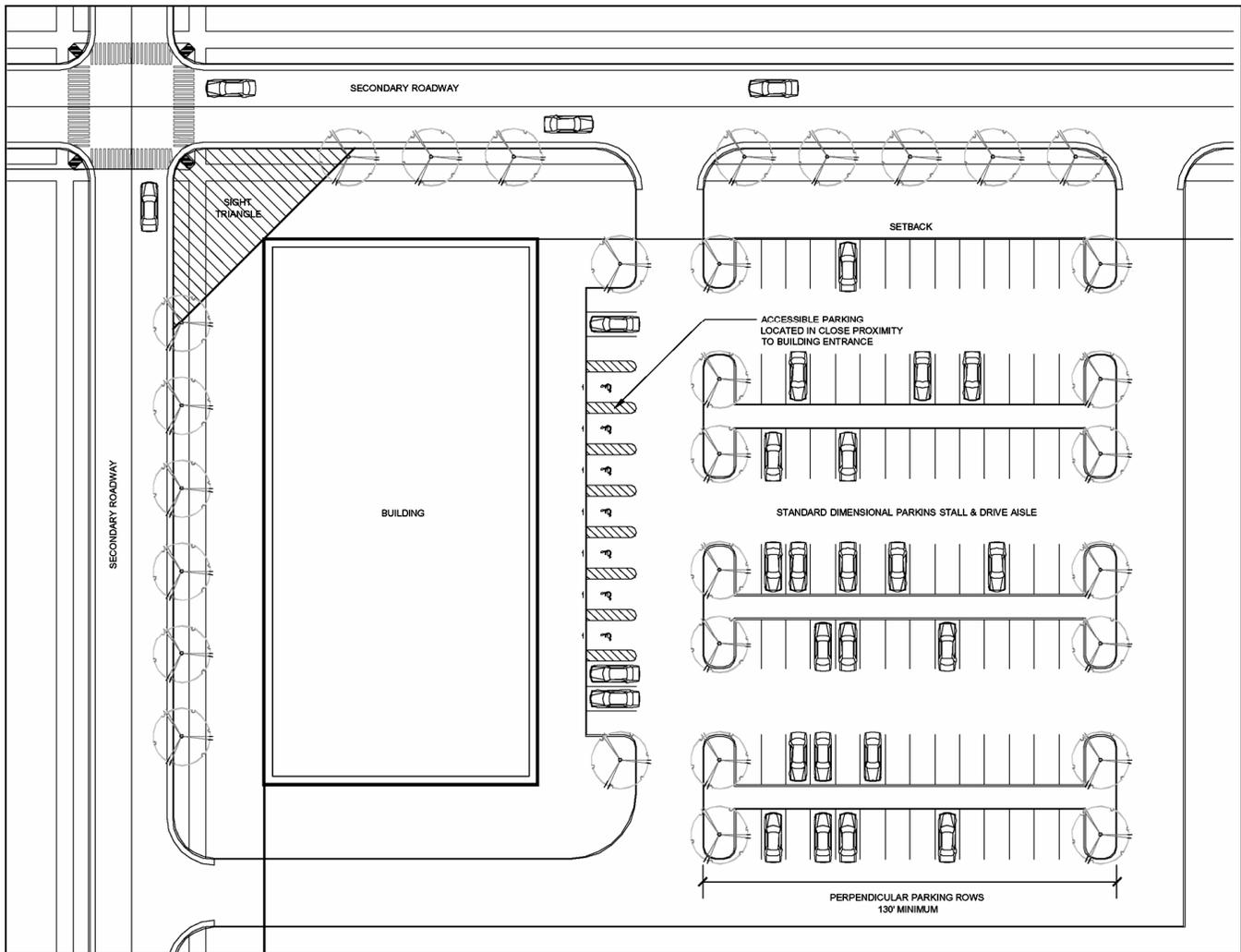


Figure 9-14 Parking Lot Design

9.8 PARKING LOT LOCATION AND DESIGN

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 (Figure 9-14):

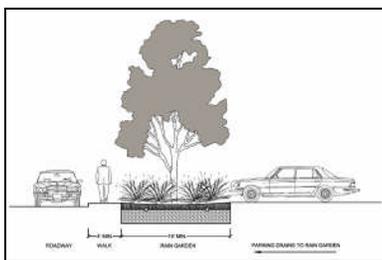


Figure 9-15 LID Practices in Parking Lot Design

- Locate parking lots between and behind buildings to reduce the visual impact from the circulation system.
- Locate parking lots on relatively level areas to avoid excessive cut and fill.
- 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.
- 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). Plantings should use native species to the largest extent possible.
- Use LID practices in parking lot design. Minimize containment of water from parking areas (Figure 9-15). Planted islands should be used to collect storm water, and allow it to percolate into the ground. When possible, utilize permeable pavements. See:

<http://www.epa.gov/nps/lid/index.html> for further information into LID practices.

- Use natural topography and existing trees to visually screen parking areas from adjacent facilities and other parking bays.
- 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.
- 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.
- Parking lots should be paved with concrete, asphalt, or other paving material. In less frequently traveled areas, when possible, use permeable pavements such as gravel, or permeable asphalt and concrete.
- 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 antiterrorism requirements.

9.8.1 Parking Area Design Guide

A comprehensive parking area design guide which 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.](#)

9.8.2 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.

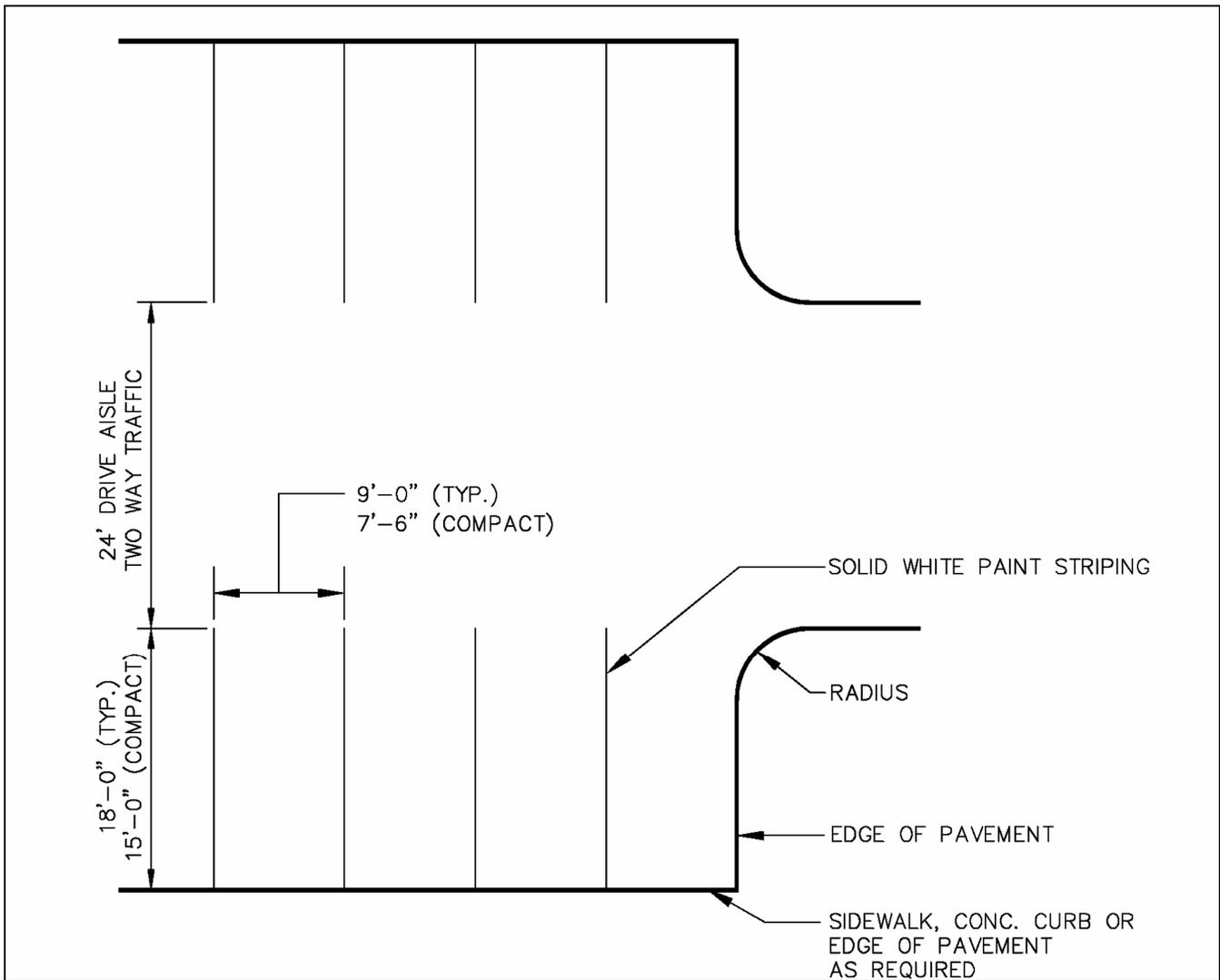


Figure 9-16 90° Parking

9.8.3 Parking Modules

90° Parking (Figure 9-16)

- 90° parking makes the most efficient use of space.
- Provide a two-way traffic lane at a minimum 24 feet wide.
- Use this module in parking areas that have a slow turn over rate.
- Space requirement: 365 square feet per vehicle, or
- Typical parking stall for compact cars: 7 feet 6 inches x 15 feet
- Typical parking stall for large cars: 9 x 18 feet, and
- Typical handicap parking stall: 13 x 18 feet.

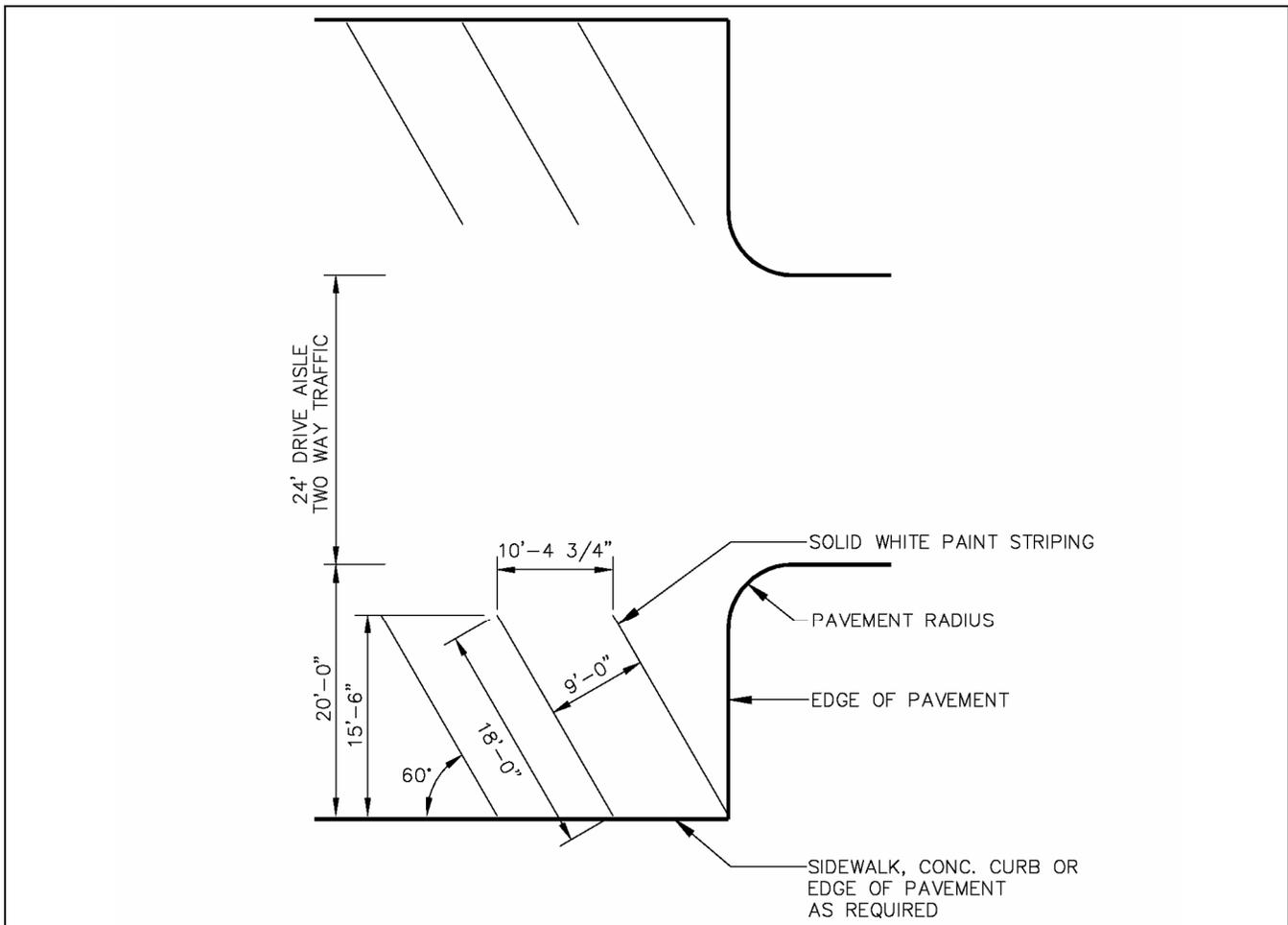


Figure 9-17 60° Parking

60° Parking (Figure 9-17)

- 60° parking can have one or two-way traffic lanes
- Maneuvering is easier than in 90° parking, and visibility for backing out is good.
- Use this model in areas that have a high turn over rate.
- Space requirement: 425 square feet per vehicle, or
- Typical parking stall for large cars: 10 feet 6 inches x 19 feet
- Typical parking stall for compact cars: 10 x 19 feet, and
- Typical handicap parking stall: 13 x 18 feet.

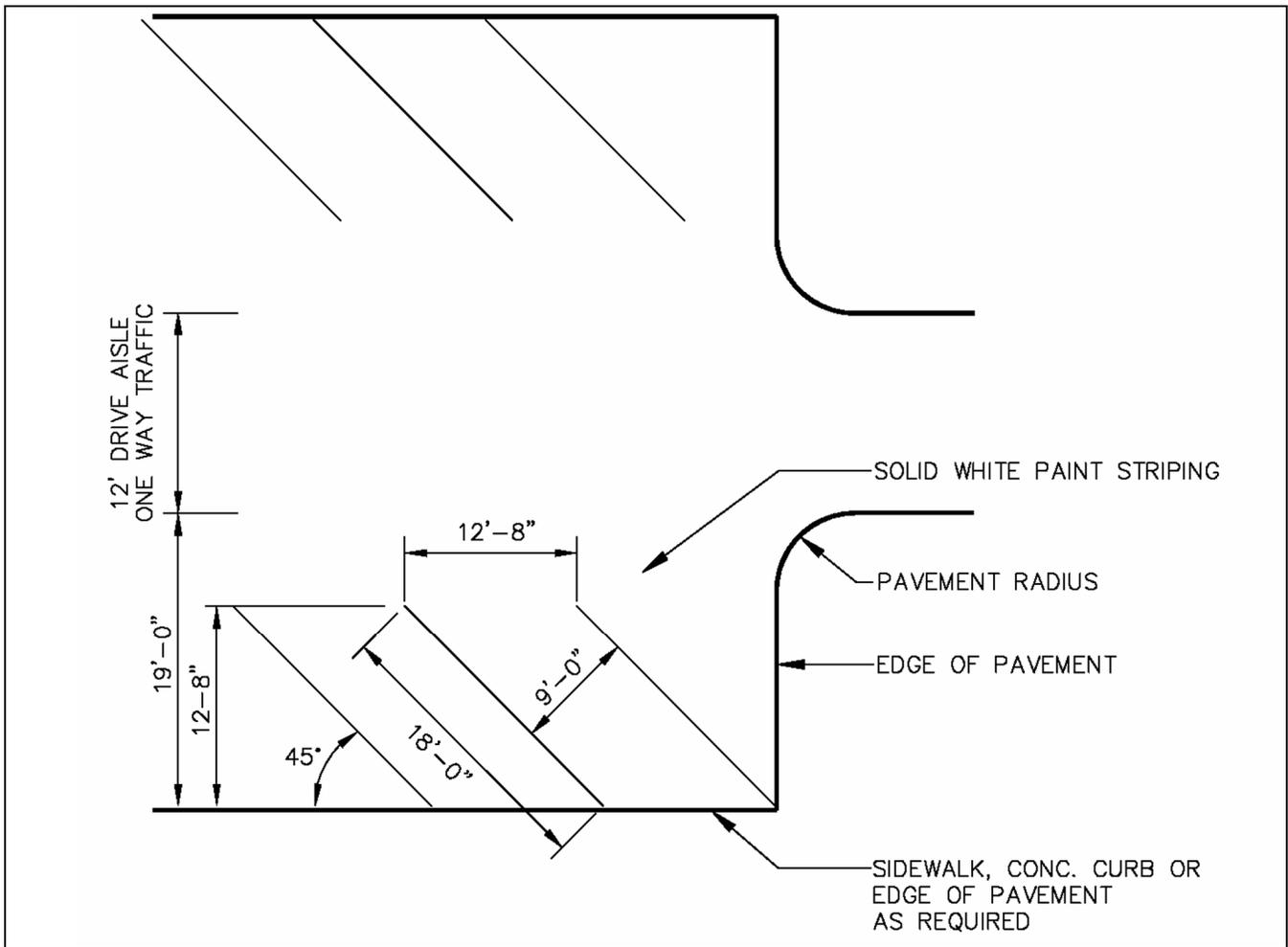


Figure 9-18 45° Parking

45° Parking (Figure 9-18)

- 45° Parking is used when width of parking area is restricted.
- Two rows of parking and a one-way traffic lane need a minimum of 50 feet.
- Rear visibility is good and maneuvering is easy.
- Use this module in parking areas that have a high turn over rate.
- Space requirement: 530 square feet per vehicle or:
- Typical parking stall for compact cars: 12 x 12 feet,
- Typical parking stall for large cars: 13 x 17 feet.
- Typical handicapped parking stall: 13 feet x 18 feet.

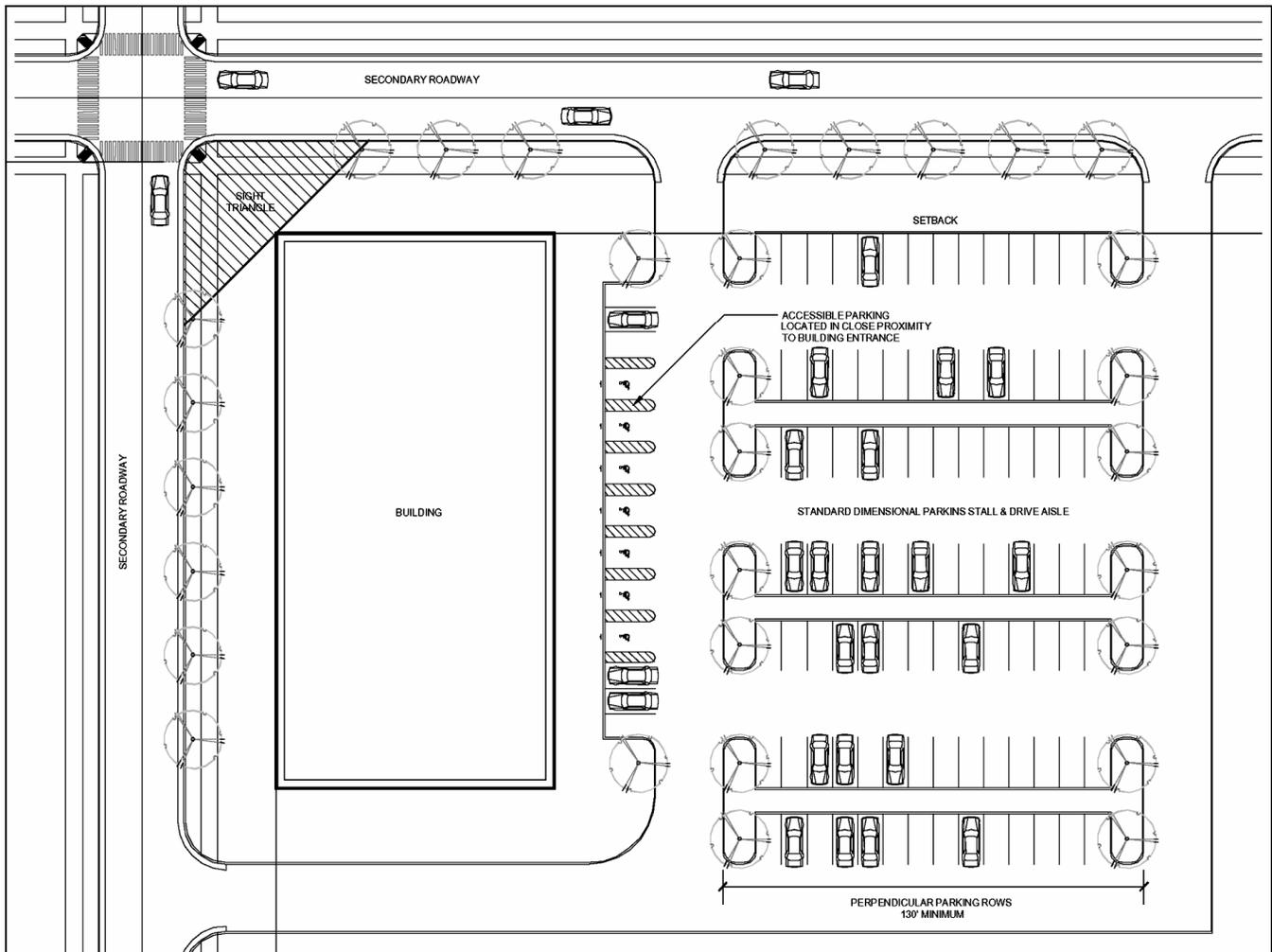


Figure 9-19 Off Street Parking

Off Street Parking (Figure 9-19)

Use reflective white paint or vinyl film appliqué to mark all exits, entrances, stalls, and traffic flow.

Design double loaded parking lots for more efficient use of space.

Provide Two Entrances for All Major 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 and not conflict with railroad operations. They should be screened from public view to reduce negative visual impacts. Service areas shall meet all antiterrorism requirements.

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. Antiterrorism 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 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.

9.8.4 Walking and Pedestrian Circulation

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.

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.

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.
- Provide links to major attractions and generators of pedestrian traffic.
- Provide design consistency throughout the walkway and be well drained.

9.8.5 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.

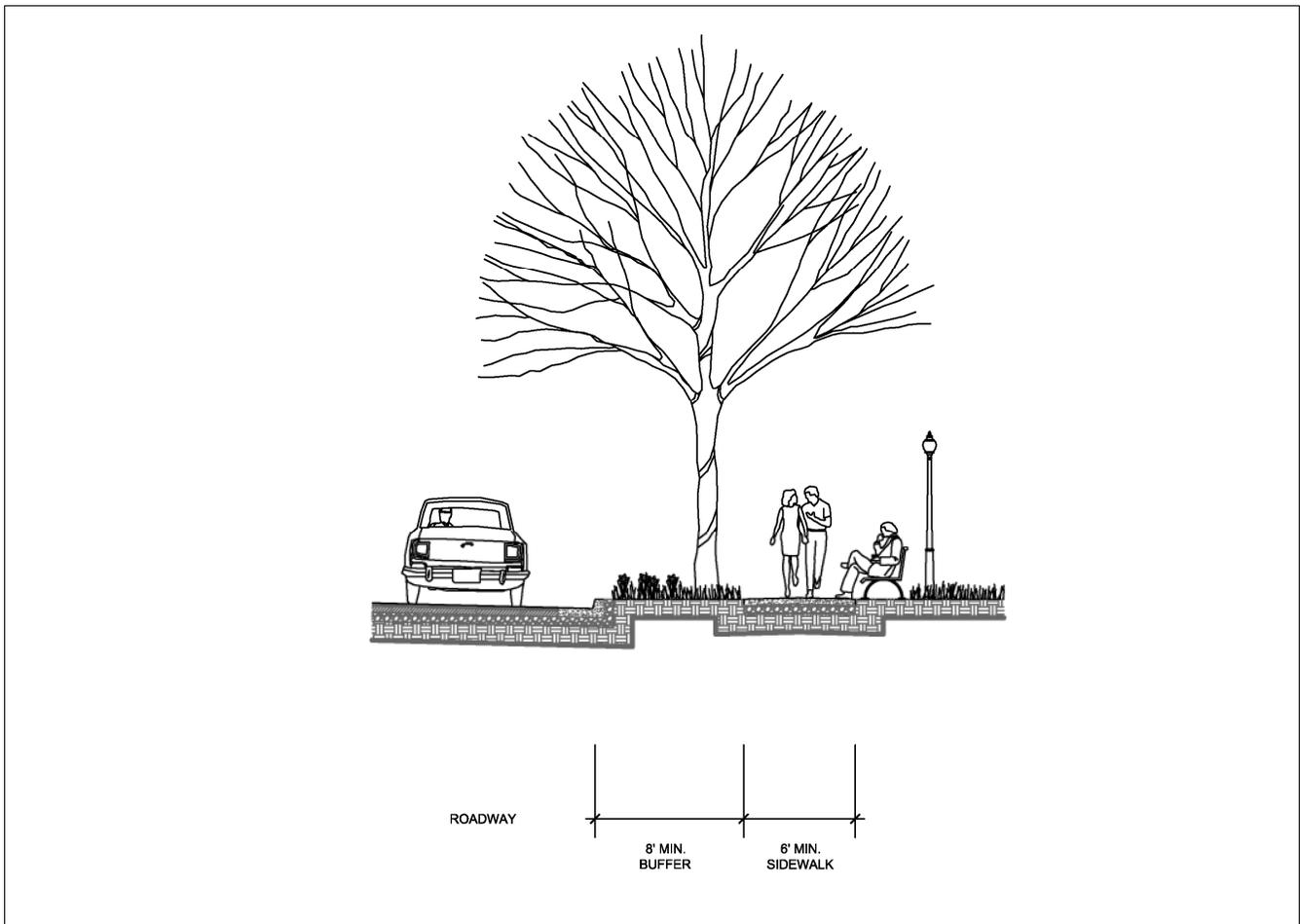


Figure 9-20 Primary Walkway

Primary Walkways

Primary walkways (Figure 9-20) 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.

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.

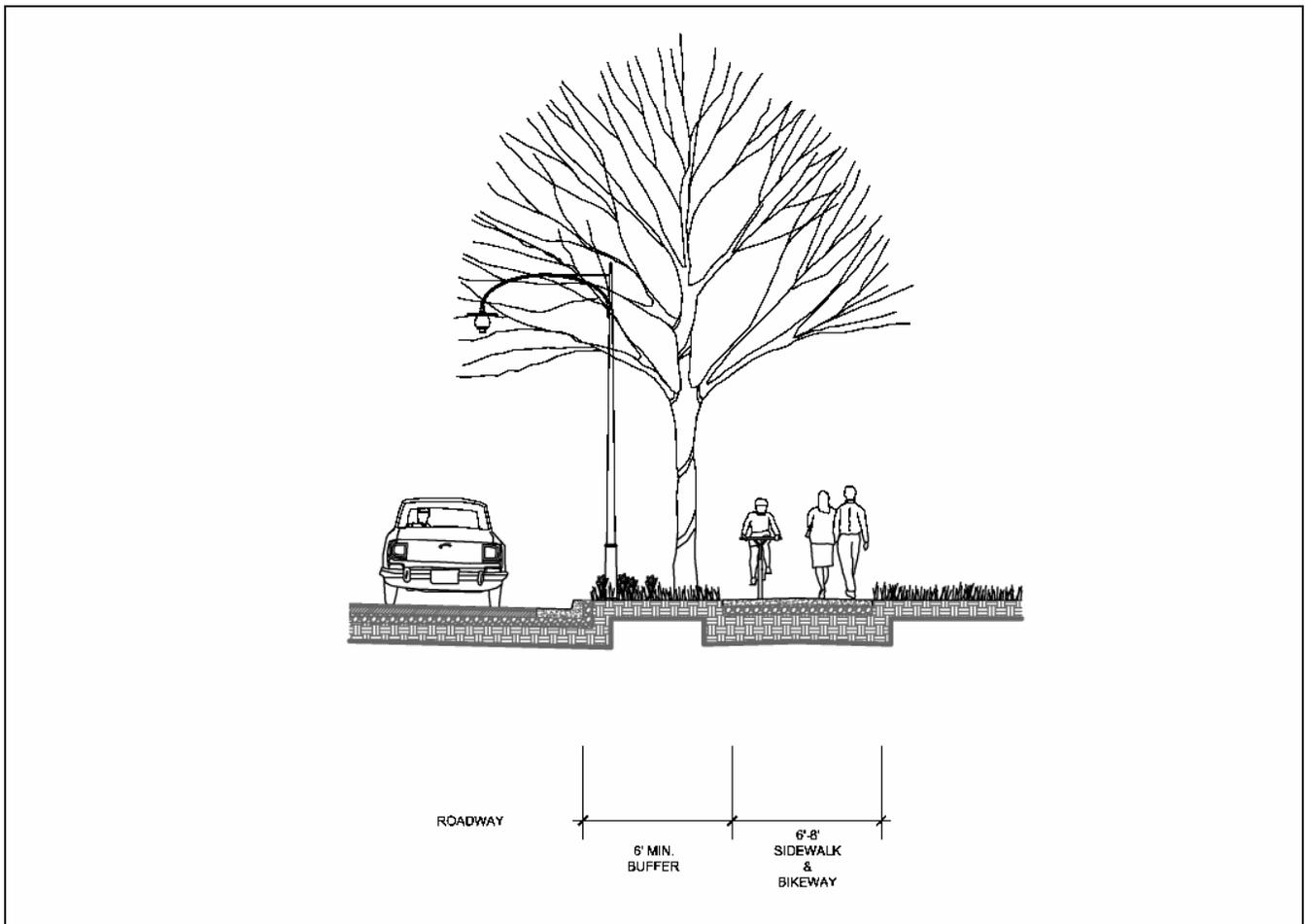


Figure 9-21 Secondary Walkway

Secondary Walkways

Secondary walkways (Figure 9-21) 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.

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.

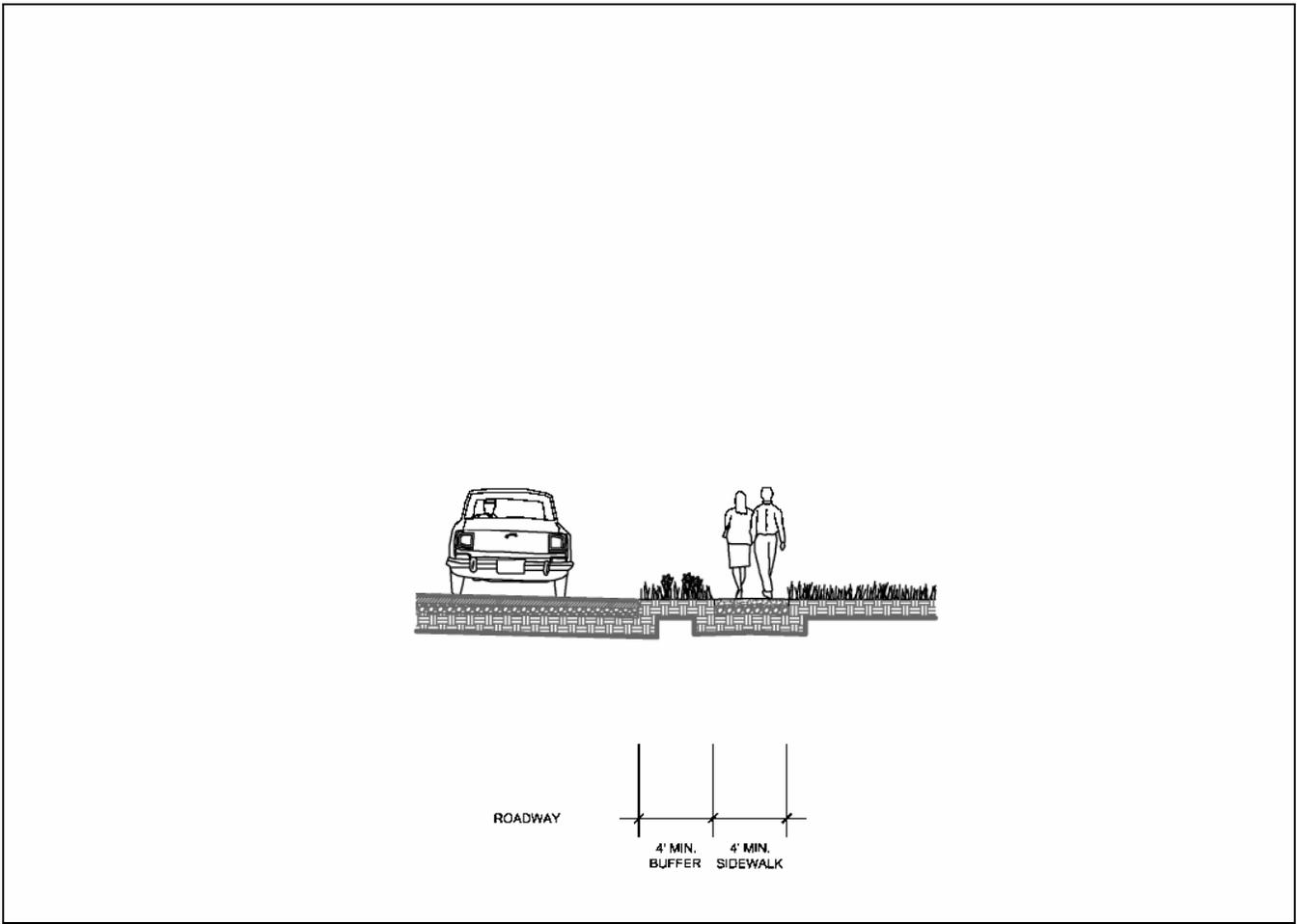


Figure 9-22 Tertiary Walkway

Tertiary Walkways

Tertiary walkways (Figure 9-22) 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). Where paths are designated for use by bicyclists and pedestrians, these widths should be increased an additional three feet for each bike lane.

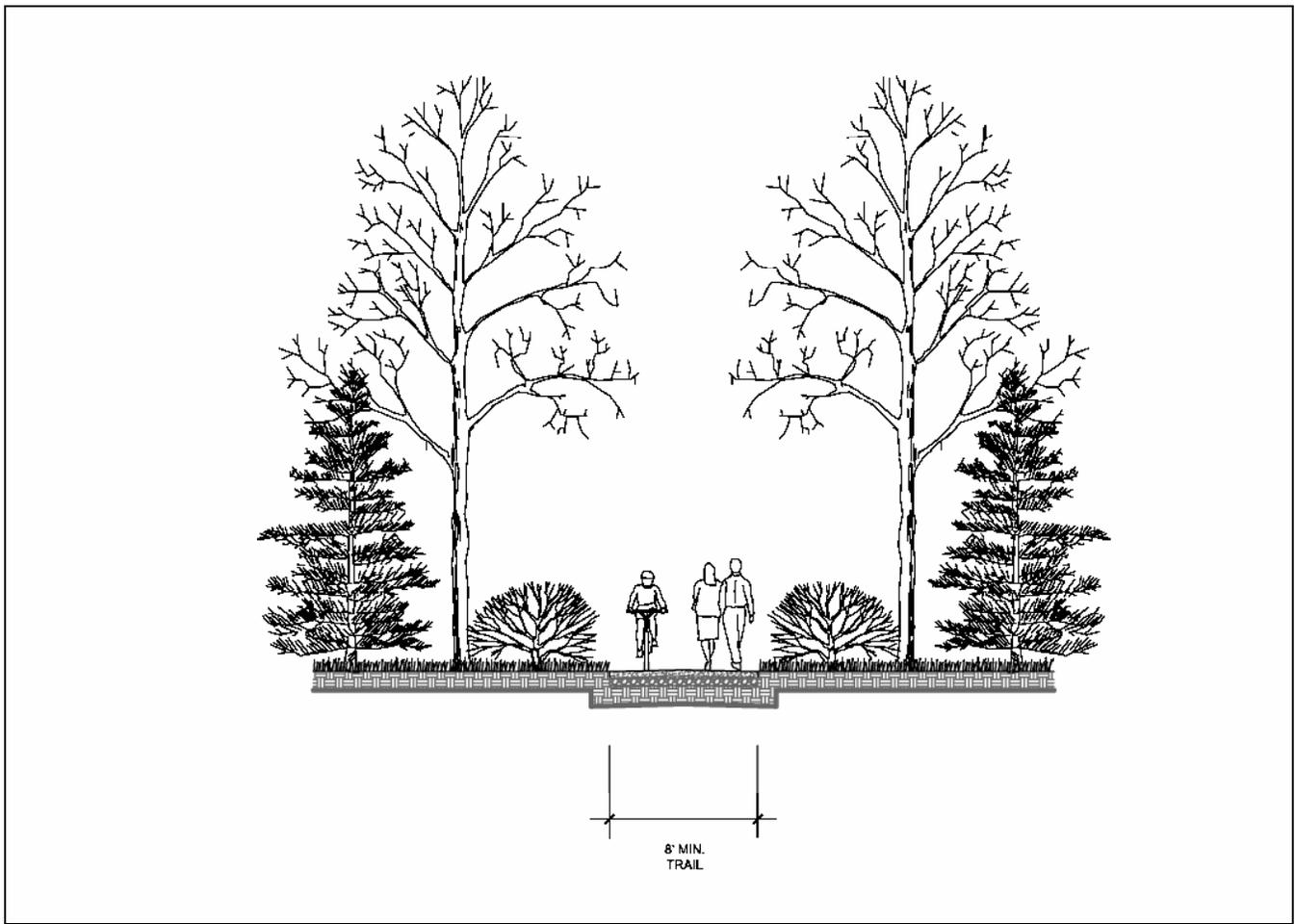


Figure 9-23 Trails

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 (Figure 9-23).

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 should be provided.

Site Amenities at Walkway

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.

Site furnishings should be placed at regular intervals along walkways, parallel to the walk and facing the flow of pedestrian traffic.

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 flowering/fruit bearing

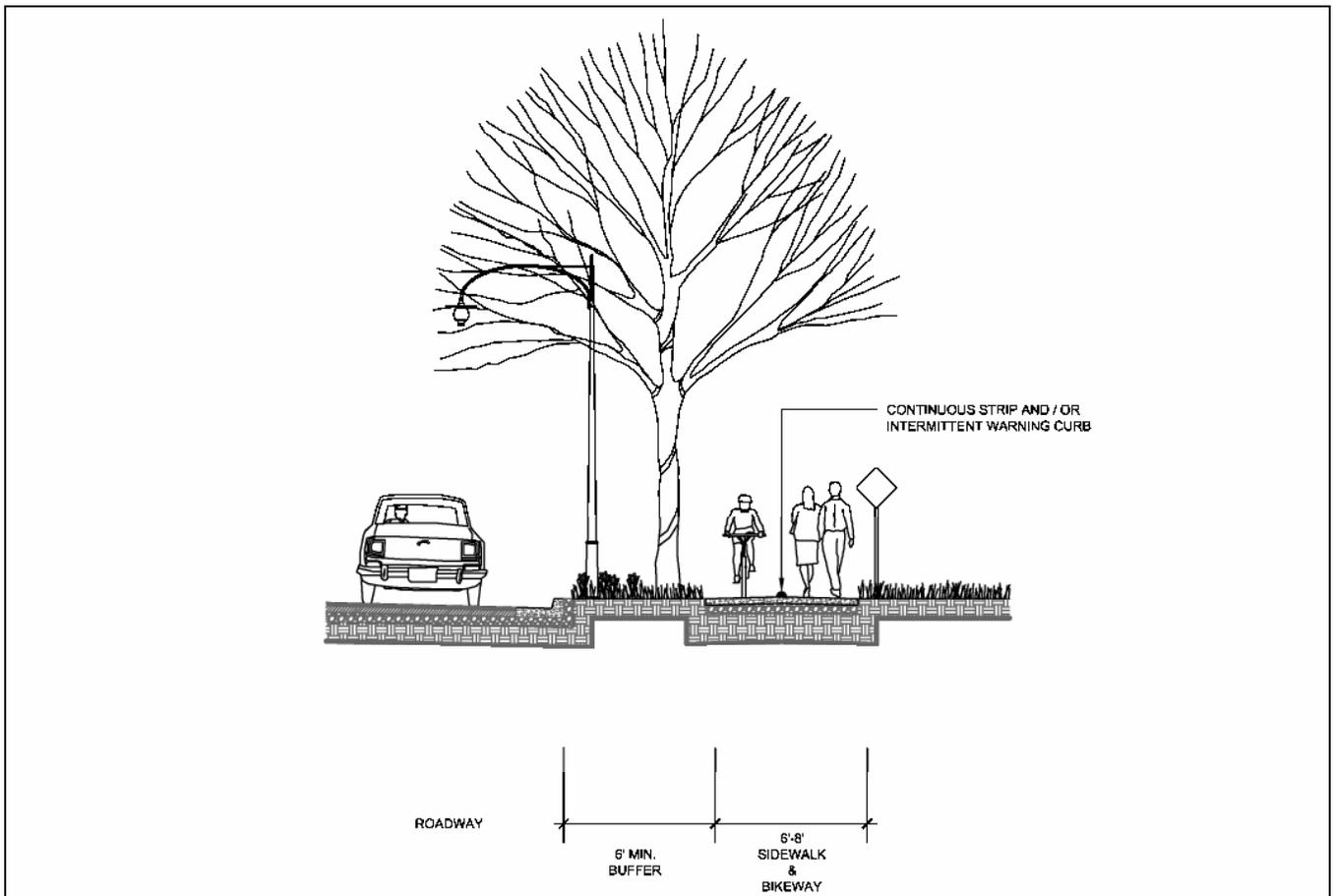


Figure 9-24 Class I Bikeway

trees and shrubs along walkways because of threat of insects or other problems.

9.8.6 Bikeways

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 enhanced by the availability of a safe and well-planned system of bike trails.

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 bikeway is physically separate them from both roadways and walkways.

Bikeways are designed according to the following classifications:

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 (Figure 9-24). 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.

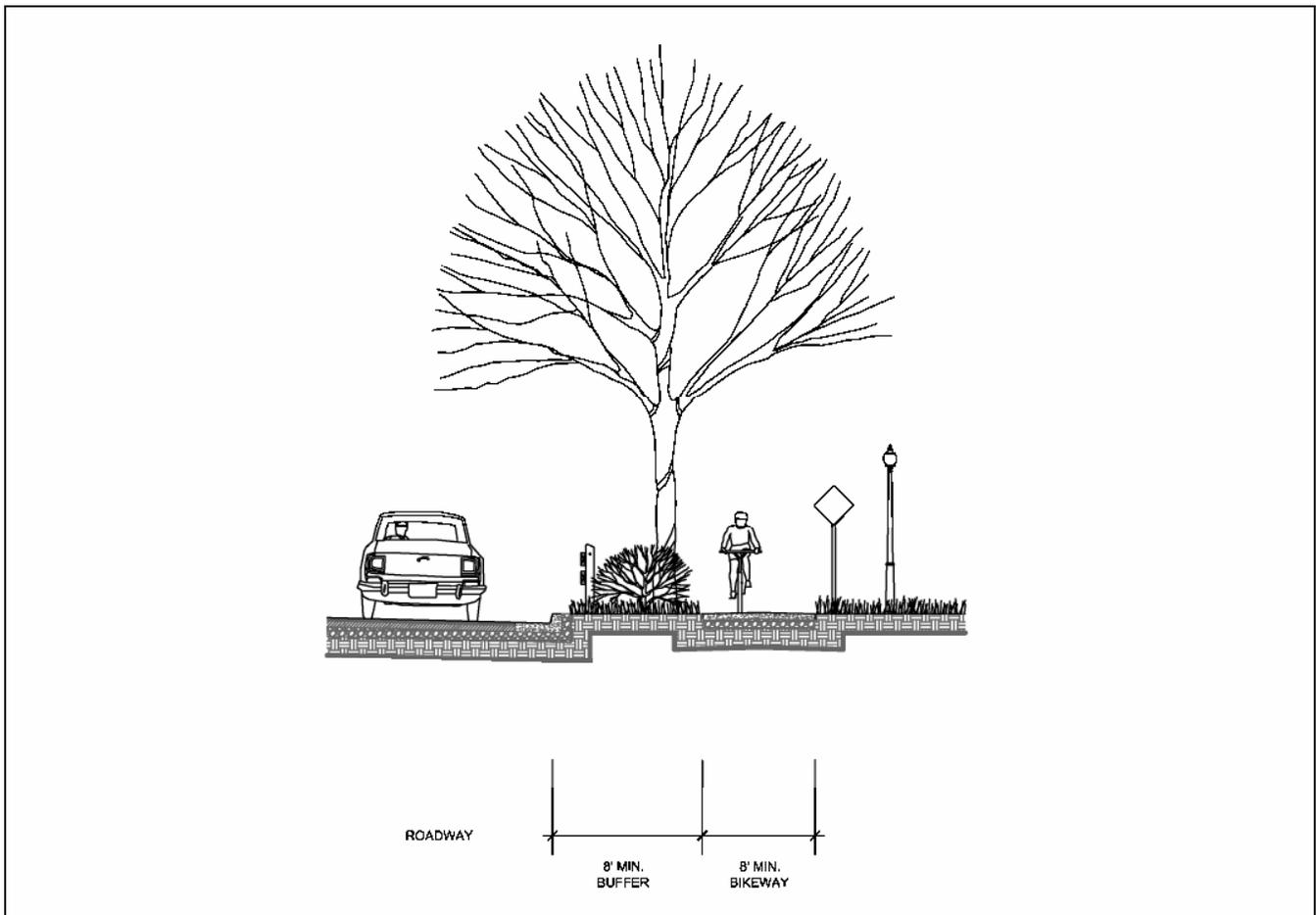


Figure 9-25 Class II Bikeway

- 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.

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 (Figure 9-25). Class II Bikeway considerations include:

- 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.

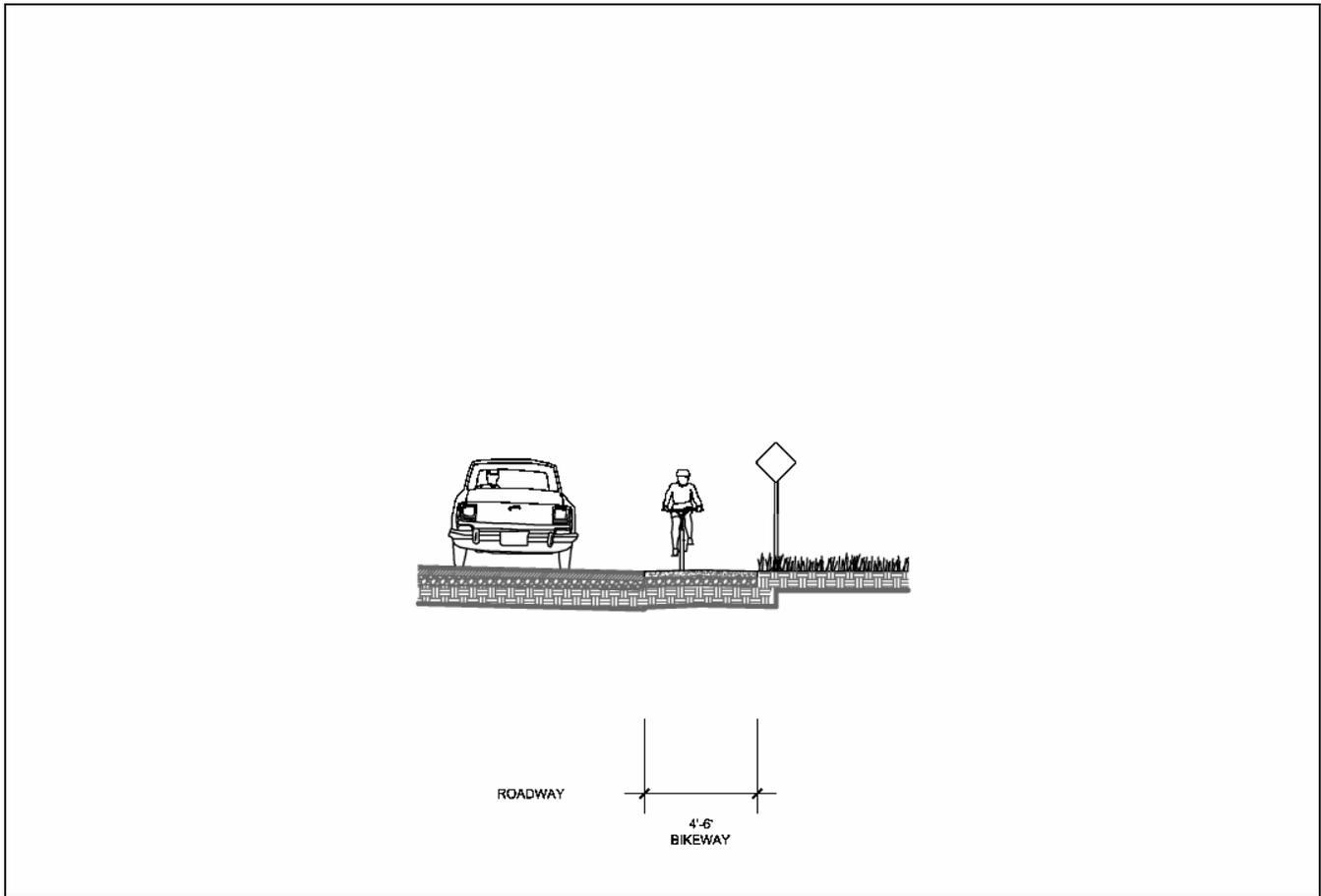


Figure 9-26 Class III Bikeway

- 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.

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 (Figure 9-26). Class III Bikeway considerations include:

- Because no separated 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.

9.8.7 General Guidelines

Wherever possible, provide a designated right-of-way for bike traffic, separate from vehicular and pedestrian routes.

Locate bikeway crossings away from vehicular intersections with crossings marked on the street pavement.

When separate bicycle right-of-ways are not feasible, designate bikeway lanes with paint on the right-hand side of roadways.

Bikeways should never share undesignated space with roadways except at crossings.

9.8.8 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.

9.8.9 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 should be covered, especially at barracks, and easily accessible to building entrances.

9.8.10 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.

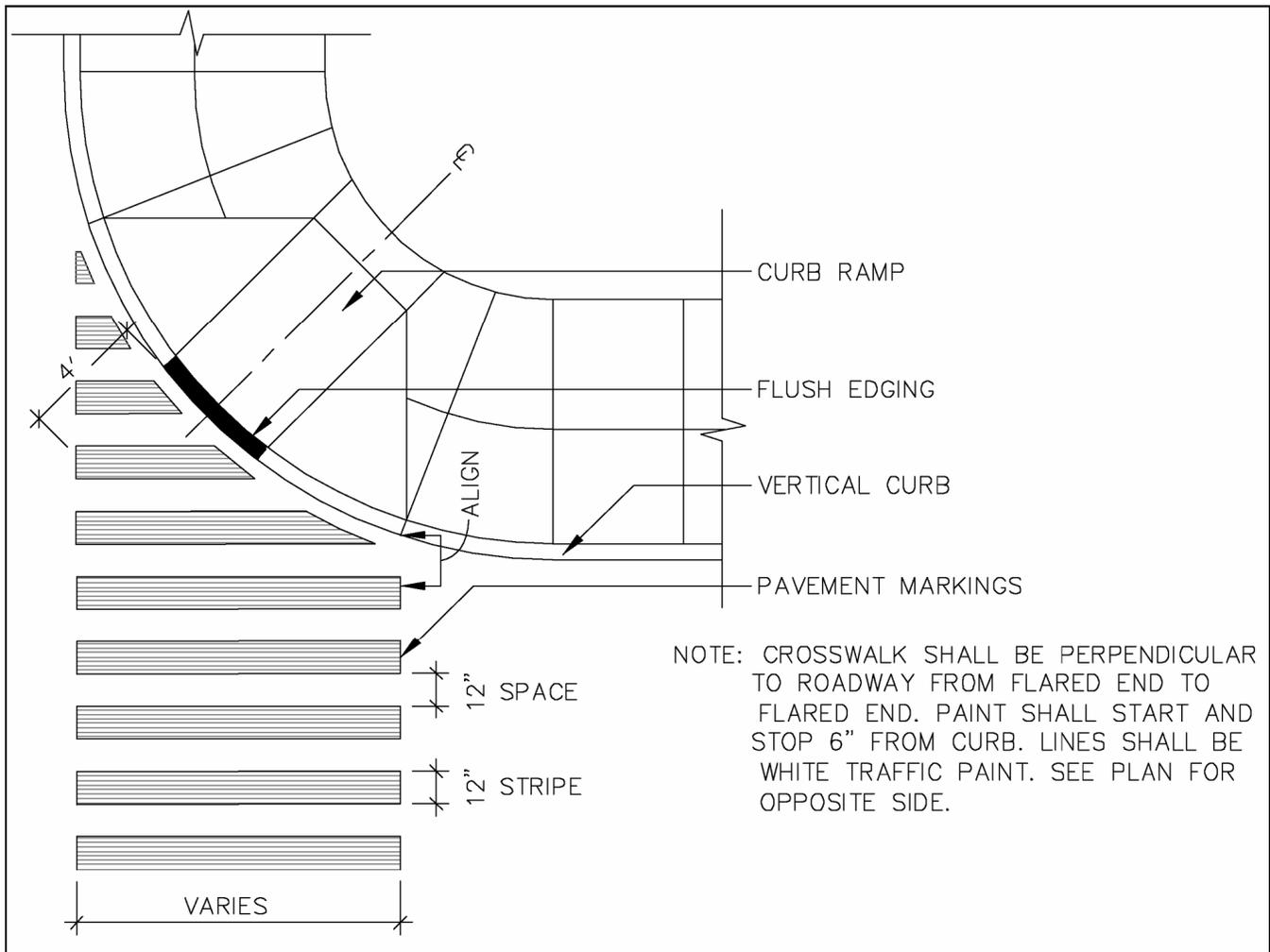


Figure 9-27 Crosswalk Detail

9.8.11 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 (Figure 9-27).
- Adequate light should be provided.
- Provide barrier-free access at all intersections or used raised crosswalks.

9.8.12 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.

Intensities

Values are dependent upon whether walkways and bikeways are adjacent to roadways or are isolated from vehicular traffic.

Adjacent to Roadways

Walkways and bikeways will be illuminated to not less than one-half the maintained illumination required for adjacent roadways. 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.

Remote from Roadways

Walkways and bikeways remote from roadways will have a minimum of 5 lux (.5 foot-candle) average illumination measured in 10-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.

Pole Design

Where pole mounted lights illuminate only walkways or bikeways, shorter poles are most suitable, but luminaire 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.

9.8.13 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.

9.9 ARMY STANDARDS

The cited Army Standards shall be met.

- [Army Regulation \(AR\) 420-72, Transportation Infrastructure and Dams](#)
- [Unified Facilities Criteria \(UFC\) 3-210-02, Design: 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](#)
- [Technical Manual \(TM\) 5-811-1/Air Force AFJMAN 32-1080, Electric Power Supply and Distribution](#)
- [Technical Manual \(TM\) 5-850-2/Air Force AFJMAN 32-1046, Railroad Design and Rehabilitation](#)
- [Manual For Railway Engineering](#)
- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Manual of Uniform Traffic Control Devices \(MUTCD\)](#)

9.10 REFERENCES

The following references are provided for guidance.

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 9](#)
- [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).

Section 10 Landscape Design Standards



Figure 10-1 Comfortable Pedestrian Environment



Figure 10-2 Plantings Reinforce Hierarchy of Circulation System



Figure 10-3 Buffer Incompatible Land Uses

10.1 INTRODUCTION

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.

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. The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation.

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

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:

- Preserve and enhance urban trees, forestlands, and detailed planting features such as shrubs and groundcovers.
- Improve the overall ecological viability of the installation through the use of native plant material.
- Blend the built environment with the natural environment.
- Provide scale and comfort to pedestrian environments (Figure 10-1).
- Reinforce the hierarchy of the circulation system (Figure 10-2).
- Screen unsightly views or elements.
- Buffer incompatible land uses (Figure 10-3).
- Minimize maintenance through the use of native plant materials that require less maintenance to survive.
- Enhance Antiterrorism capabilities.

10.3 PRINCIPLES OF LANDSCAPE DEVELOPMENT

Landscape design is based on the following principles (Figure 10-4).

10.3.1 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.

10.3.2 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.

10.3.3 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.

10.3.4 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.

10.3.5 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.

10.3.6 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.

10.3.7 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.

10.3.8 Spatial Articulation

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.

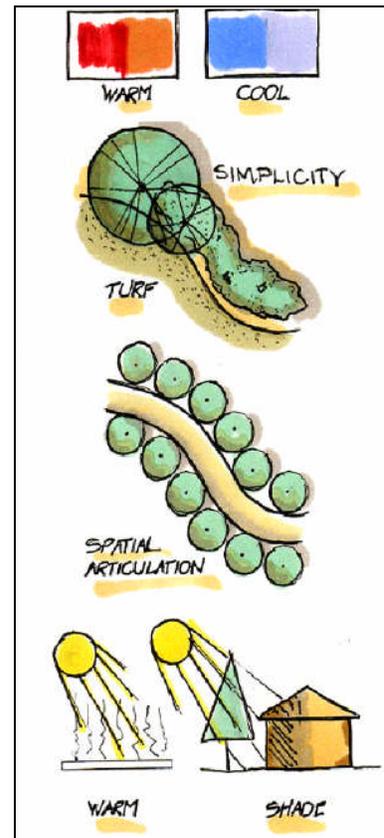


Figure 10-4 Principles of Design

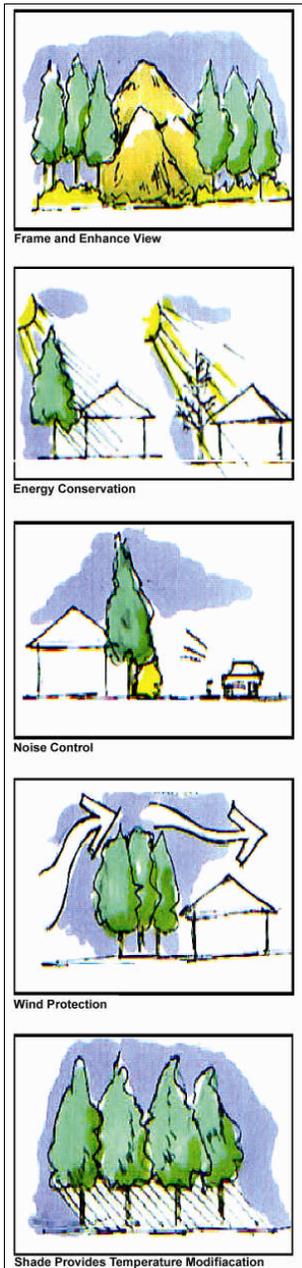


Figure 10-5 Sustainable Landscape Development Goals

10.3.9 Sustainable Landscape Development

The use of plant material on the installation promotes the sustainability of the development. 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 (Figure 10-5).

10.4 LANDSCAPE DESIGN GUIDELINES

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.

The following paragraphs present landscaping guidelines for the various locations of plant material use.

10.4.1 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 and helps create a sense of arrival. When developing foundation planting plans consideration should be given to antiterrorism measures (See [paragraph 10.10](#)).

Focal and seasonal plantings should be located at building entries for pedestrian interest.

Use the architecture of the building to evaluate the planting design and selection of plants.

Plant materials should not block windows and views from interior spaces.

Trees shall be setback from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.

A symmetrical foundation planting design should be used for a symmetrical building.

Due to the possibility of insect problems (bee stings, etc.) do not plant flowering plants near entrances.

10.4.2 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.

10.4.3 Screening of Dumpsters

Landscape planting should be used to supplement wood fence and masonry wall dumpster enclosures.

10.4.4 Buffer Planting

Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones.

10.4.5 Open Space Planting

Enhance open space areas with planting. Use a mix of evergreen, deciduous, and flowering trees. Plant the same kind of trees in massive groupings to impact the vast open areas (Figure 10-6).

10.4.6 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 (Figure 10-7). Also, in the design of a street tree planting, 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. Allees of trees are fine, as long as the same species of tree is not continually used. For pest management purposes, it is best not to have one species make up more than ten percent of the total population of canopy.

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. Again, a variation in tree species is ideal.

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. Spacing should be uniform, except where curb cuts interrupt regular spacing.

As a general rule, street trees should be deciduous species, resistant to salt and root pressure, and should have a 10' to 12' high clearance, when fully mature, between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches.

The street tree layout should be coordinated with the layout of proposed street lighting.

Appropriate plant heights (when mature) should be used within sight triangles to ensure safe views from intersections. Trees should not be planted any closer than ten feet to signs (stop, speed limit, etc.)

Weeping trees should not be used in locations where they may hang over the roadway or block views.

10.4.7 Parking Lot Plantings

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.

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.



Figure 10-6 Open Space Planting



Figure 10-7 Street Trees Provide a Visual Hierarchy

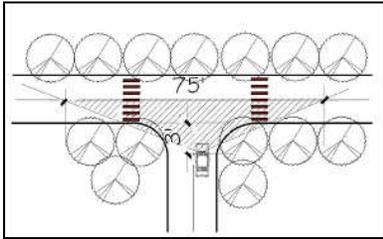


Figure 10-8 Consider Sight Distances When Selecting Plant Material



Figure 10-9 Entries Should Be Visually Strong

Choose trees and shrubs that require minimum maintenance and will not litter the parking area with leaves, fruit, or nuts.

Consider sight distances near entrances and exits when selecting and placing plant material (Figure 10-8).

Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, and reduced water supply.

Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.

Environmental Control Planting. When properly placed, plants can provide environmental benefits, as well as address visual concerns.

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.

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.

Use mixed massing of deciduous shrubs and evergreen trees and shrubs to provide sound control along primary and secondary roads.

10.4.8 Image Planting

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.

10.4.9 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 (Figure 10-9).

The landscape materials and planting areas should be proportional in scale to the hierarchy of the street on which they are located.

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.

10.4.10 Zeroscaping

Where appropriate, to conserve water and lower maintenance consider zeroscaping.

10.4.11 Xeriscape

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. The following website

provides guidance on specific design principles have the xeriscape design process and xeriscape design application: [USAF Landscape Design Guide, Xeriscape.](#)

10.5 PLANT MATERIAL SELECTION

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.

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.

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 (Figure 10-10):

- Canopy
- Barrier
- Screen (or Baffle)
- Groundcover

10.6 PLANT PALETTE AND PLANT CATEGORIES

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.

10.6.1 The Plant Palette

A select group of plant materials has been divided into the following six categories:

- evergreen trees
- deciduous trees
- shrubs
- perennials and
- groundcover

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 K.](#)

Characteristics have been listed for each plant: cultural (e.g., upright, narrow form), environmental (e.g., shade tolerant), ornamental (e.g., red fall color), functional (e.g., screening plant), cultural conditions (mature

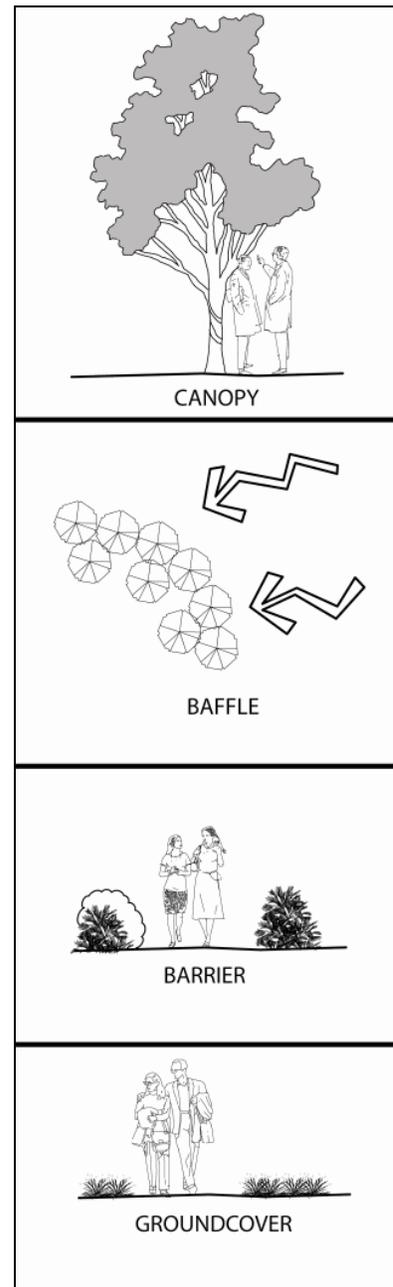


Figure 10-10 Design Categories

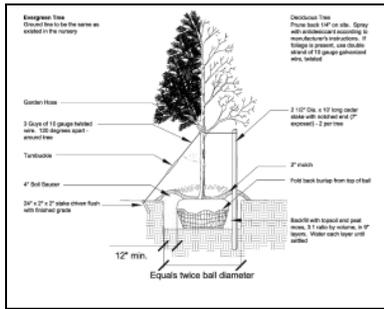


Figure 10-11 Tree Planting Detail

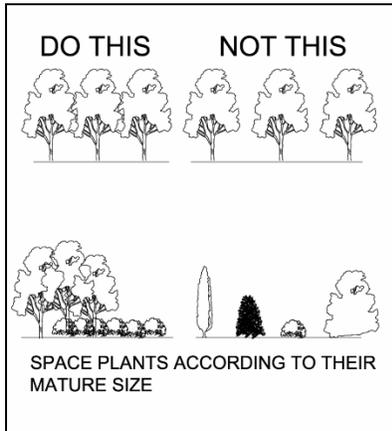


Figure 10-12 Plant Spacing Based on Mature Size

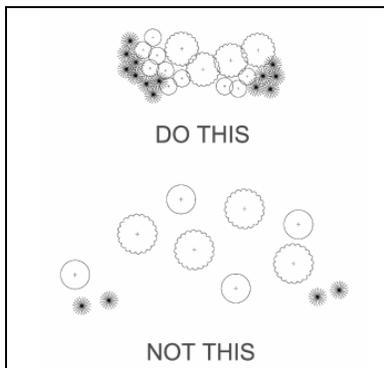


Figure 10-13 Install Plants in Groups

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 PLANT MATERIAL INSTALLATION

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 (Figure 10-11).

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.

The planting and establishment of trees, shrubs, ground covers, and vines is detailed in [TM 5-803-13, Chapter 3](#).

10.7.1 Ground Preparation

Beds must be prepared for planting in very different ways, depending on their location, compaction, and level of perviousness. Refer to [James Urban's "Soils and Fertility: Bringing Order to the Technical Dysfunction Within the Urban Forest"](#) for technical information, and soil preparation recommendations.

10.7.2 General Guidelines for Plant Installation.

Spray all evergreens with an antidesiccant within 24 hours of planting.

Water all plants thoroughly during the first 24-hour period after planting.

Site all plants and stakes plumb. Stakes should be removed as soon as the tree has grown sufficient roots to overcome the problem that required the tree to be staked, but the stakes should be removed before the end of the first full growing season from the date the tree was staked (Figure 10-11).

Space plants according to their mature size (Figure 10-12).

Install plant materials in groups for greater impact (Figure 10-13).

Installation of Lawn Areas.

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 evaluation, site preparation, selection of turf, and maintenance requirements.

10.8 MAINTENANCE OF PLANT MATERIAL

The ease of maintenance should be one of the primary goals when considering the success of any planting design.

10.8.1 Pruning

In general plant material should be allowed to conform to its natural shape. This practice allows the plant to mature in a health manner, and saves the time and energy required for trimming. The pruning of trees and shrubs is done to maintain overall plant health, direct plant growth, maintain a desired shape, and increase flower or fruit development.

Woody plant material should meet the American National Standards A300 (part 1)-2001 for Tree Care Operations – Trees, Shrubs and other Woody Plant Maintenance – Standard Practices (Pruning).

Removal of more than one third of the live crown is not recommended in trees and shrubs during one growing season.

Removal of dead and diseased branches should be the main priority when pruning. Second priority should be branches that are causing structure problems.

There is a possible health and management problem with tree grates. If too small of a circumference is used on the tree grate, the tree will grow to fill the open space of the grate, causing the tree to become girdled. Grates need to be selected to fit the mature size of the tree, or other solutions should be selected.

Pruning Shrubs

Do not prune shrubs flat across the top (Figure 10-14).

Prune branches yearly on thick-branched shrubs and at the base of the shrub.

When pruning deciduous shrubs prune shrub stems as close to the ground as possible and shrub branches as close to the stem as possible.

When "thinning out" deciduous shrubs, prune about one-third of all branches where they meet the main stem.

Pruning Trees

Remove limbs larger than 1" by making three cuts as follows (Figure 10-15):

Make the first cut at the bottom of the branch 12-24" from the branch attachment (Cut A, Figure 10-15).

Make the second cut on the top of the branch within 1" of the undercut (Cut B, Figure 10-15).

Make the final cut just beyond the outer portion of the branch collar (Cut C, Figure 10-15). The first two cuts were necessary to remove the weight of the branch to allow cut #3 to be clean without ripping the bark.

Never cut the central leader of the tree.

Coniferous evergreens trees should be pruned, during the spring, by snipping off new growth. Avoid geometrically shaping plant material while pruning.



Figure 10-14 Correct Shrub Pruning Technique

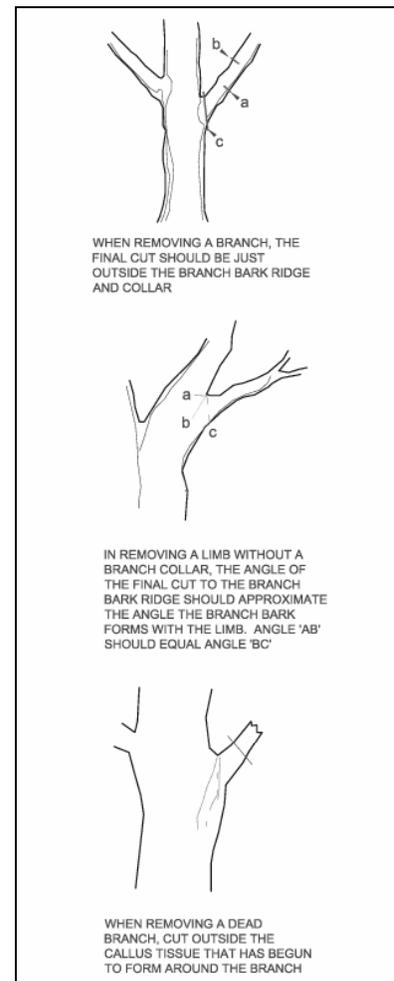


Figure 10-15 Correct Tree Pruning Technique

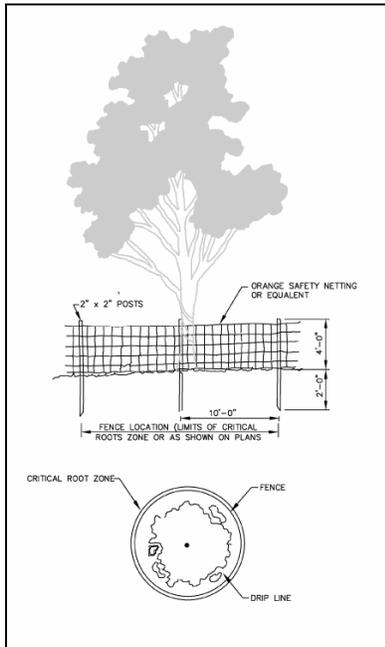


Figure 10-16 Use of Tree Barricades Is Essential

10.8.2 Mulching.

Use mulch around the base of plant material to provide for greater moisture and help inhibit the growth of weeds and grasses. Mulch should be maintained at a depth of two (2) to four (4) inches. Mulching the entire planting bed will help reduce maintenance, enhance the appearance and provide continuity to the landscape design. Mulch should not be placed against the woody stem. It should be placed 2 inches from the stem and extend out to the drip line of the plant.

The best time to mulch for water conservation is in the late spring. Apply mulch immediately to new fall plantings.

Possible mulch materials include:

- Shredded Bark (3-4")
- Pine needles (2-3")
- Lawn clippings (1-4")
- Chipper debris (3-4")

10.8.3 Ground Cover Maintenance

Although ground covers do not require pruning, they may be periodically dug up in the spring or fall for propagation and to prevent overcrowding in their beds.

10.8.4 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 Army Installation Design Guide (See [Appendix E](#)) 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.

10.9 TREE PROTECTION AND PRESERVATION

Existing urban trees and forest should be preserved if they are in good health. Construction should be planned to provide for the preservation of significant trees.

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 (**Error! Reference source not found.**). Existing trees that cannot be preserved should be considered for transplanting to a different location on site or to a different site.

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 least the size of the tree's canopy (the drip line).

10.10 ANTI-TERRORISM/FORCE PROTECTION CONSIDERATIONS

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.

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 Antiterrorism measures.

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.

10.11 ARMY STANDARDS

The cited Army Standards shall be met.

- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Unified Facilities Criteria \(UFC\) 3-210-05FA, Design: Landscape Design and Planting Criteria](#)
- [Technical Manual \(TM\) 5-630, Natural Resources Land Management](#)
- [American Standard for Nursery Stock, ANSI Z60.1](#)
- [Overseas \(Host Nation Standards\)](#)
- [American National Standards Institute – A 300](#)

10.12 REFERENCES

The following references are provided for guidance.

- Urban, James. “[Soils and Fertility: Bringing Order to the Technical Dysfunction Within the Urban Forest](#)”. *Arboriculture* 18 (2): March 1992.
- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 10](#)
- [USAF Landscape Design Guide](#)
- C. Brickell and D. Joyce. Pruning and Training, 1996.
- Himelick, E.B. and Watson, Gary W. Principles and Practice of Planting Trees and Shrubs. Savoy, IL, International Society of Arboriculture, 1997.
- Hoke, John, Editor. Ramsey Sleeper-Architectural Graphic Standards Ninth Edition, 1998 Cumulative Supplement. New York, NY. John Wiley & Sons, Inc., 1998.
- [Fort Campbell Technical Design Guide](#)



Section 11 Site Elements Design Standards

11.1 INTRODUCTION

Site elements include all visual elements of the installation that are considered utilitarian in use. These elements include the following four categories of utilitarian amenities:

- Site Furnishings
- Signs
- Lighting
- Utilities

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.

Overseas installations should reflect consideration of local design standards.

11.2 SITE ELEMENT OBJECTIVES

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:

- Provide site elements that are appropriate to their intended function.
- Establish a coordinated system of site elements that provide consistency and continuity throughout the installation to convey a sense of organization.
- The design and location of the various site elements should express an image, character, and scale appropriate to the installation.
- Design and locate all site elements to meet AT/FP requirements.
- Use recycled/salvaged materials wherever possible.
- Minimize maintenance and repair through the use of efficient products that are vandal-proof.
- Minimize negative visual impacts of all utility systems.
- Minimize environmental impacts of all utility systems.

11.3 SITE FURNISHINGS

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. 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 \(UFAS\)](#), with the most stringent standards to apply in the event of conflicts.

Site furnishings include the following:

- Benches
- Tables
- Shelters
- Kiosks
- Walls / Seating Walls
- Fences
- Trash Receptacles
- Dumpsters
- Flagpoles
- Movable Planters
- Bicycle Racks
- Bollards
- Play Equipment
- Mailboxes
- Monuments, Memorials, Military Equipment Static Displays
- Drinking Fountains

The following site element choices are examples of visual character. Listed manufacturers are only one of several manufacturers capable of supplying appropriate site furnishings.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
Community Life Theme		
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Scarborough</p> <p>Material: Powder coated cast aluminum</p> <p>Finish: Black</p> <p>Size: 72" length</p>	<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Austin</p> <p>Material: Ipe wood and powder coated aluminum</p> <p>Finish: Silver (legs)</p> <p>Size: 72" length</p>	<p>Manufacturer: Wausau Tile 1.800.388.8728</p> <p>Model: Terra Form – TF5027</p> <p>Material: Precast Concrete</p> <p>Finish: Weatherstone B2 – French Grey</p> <p>Size: 72" length</p>

11.3.1 Benches

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. 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. 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

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
Community Life Theme		
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Mingle</p> <p>Material: Powder coated cast aluminum</p> <p>Finish: Black</p> <p>Size: 2 - 6 seat styles</p>	<p>Manufacturer: Park n Pool 540-463-6510</p> <p>Model: J2 Series Table</p> <p>Material: Galvanized pipe Recycled Plastic Plank</p> <p>Finish: Top and Benches 72" length</p> <p>Size:</p>	<p>Manufacturer: Wausau Tile 1.800.388.8728</p> <p>Model: Terra Form – TF3035</p> <p>Material: Precast concrete</p> <p>Finish: Weatherstone B2 – French Grey</p> <p>Size: 66" diameter</p>

11.3.2 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.

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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Classic Recreation 1.800.697.2195</p> <p>Model: Country Garden</p> <p>Material: Steel frame and roof</p> <p>Finish: Jet Black 9005</p> <p>Size: 16' x 16'</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195</p> <p>Model: Scottsdale</p> <p>Material: Steel roof and stone</p> <p>Finish: Old Town Grey (roof)</p> <p>Size: 24' x 24'</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195</p> <p>Model: Marana</p> <p>Material: Steel frame and roof</p> <p>Finish: Sierra Tan (roof); Traffic White (frame)</p> <p>Size: 12' length</p>

11.3.3 Shelters

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.

Picnic shelters should be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the installation.

Picnic shelters can be open on all sides. The minimum size should be 20 feet square with a minimum 8-foot vertical clearance.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
Community Life Theme		
		
<p>Manufacturer: Landscape Forms Model: Kaleidoscope Material: Aluminum frames and steel posts Finish: Black Size: Approx. 10' length and width</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195 Model: Mingus Material: Steel roof and brick Finish: Old Town Grey (roof) Size: 9' x 18'</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195 Model: Orlando Material: Steel frame and roof Finish: Sierra Tan (roof); Traffic White (frame) Size: 10' x 20'</p>

11.3.4 Bus Shelters

Bus shelters should be located at major facilities along the bus route such as commissary/post exchange areas, barracks areas, hospital, and library. 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.

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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Forms + Surfaces 1.800.451.0410</p> <p>Model: Arcus</p> <p>Material: Aluminum frame and face panel extrusions</p> <p>Finish: Black</p> <p>Size: 15" width and 5" depth</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195</p> <p>Model: Charleston Kiosk</p> <p>Material: Steel frame and roof</p> <p>Finish: Old Town Grey (roof); Jet Black (frame)</p> <p>Size: 8' width</p>	<p>Manufacturer: Classic Recreation 1.800.697.2195</p> <p>Model: Orlando Kiosk</p> <p>Material: Steel roof</p> <p>Finish: Sierra Tan (roof); Traffic White (frame)</p> <p>Size: 6' x 8'</p>

11.3.5 Kiosks

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.

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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Scarborough</p> <p>Material: Powder coated cast aluminum</p> <p>Finish: Black</p> <p>Size: 30-gallon</p>	<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Pitch</p> <p>Material: Powder coated aluminum</p> <p>Finish: Silver</p> <p>Size: 30-gallon</p>	<p>Manufacturer: Wausau Tile 1.800.388.8728</p> <p>Model: Terra Form – TF2085</p> <p>Material: Precast concrete</p> <p>Finish: Weatherstone B2 – French Grey</p> <p>Size: 20-gallon</p>

11.3.6 Trash Receptacles

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. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas ([Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#), Table B-1).

11.3.7 Walls

Walls 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 should fulfill their function in harmony with the character and appearance of their seating.

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. 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. 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

11.3.8 Seating Walls

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. 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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	<div>Brigade Combat Team</div> <div>Community Life Theme</div> 	<div>Clarksville Base Theme</div> 
<p>Manufacturer: Monumental Iron Works, Inc.</p> <p>Model: Estate K, flat top pickets</p> <p>Material: Metal</p> <p>Finish: Polyester Powdercoat</p> <p>Size: 4' – 6' height</p>	<p>Manufacturer: Walpole Woodworkers</p> <p>Model: Privacy fences</p> <p>Material: Vinyl</p> <p>Finish: Olympic premium latex acrylic, various</p> <p>Size: 6' high between units Fixed or flanged mounted</p>	<p>Manufacturer: Riverdale 1.800.762.6374</p> <p>Model: Wire wall</p> <p>Material: Hot dipped zinc coated steel plus optional PVC or polyester coating</p> <p>Finish: Black or green</p> <p>Size: As required</p>

11.3.9 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.

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.

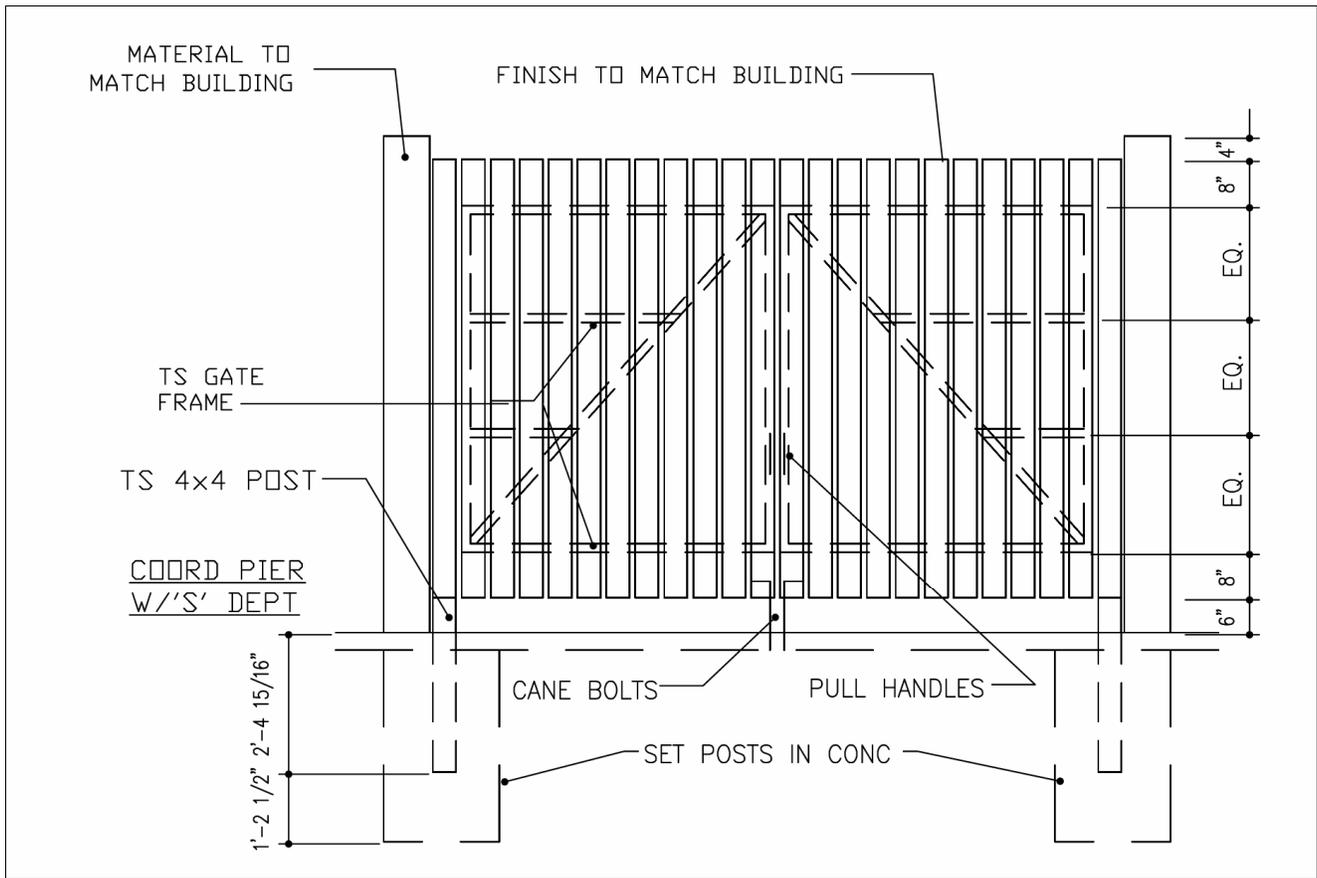


Figure 11-2 Vinyl or Composite Dumpster Enclosure

11.3.10 Dumpsters

The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning. To the greatest extent possible, incorporate dumpster placement into areas screened with walls, fencing, or plant material (Figure 11-2). Avoid locating dumpsters along major circulation or use areas. Dumpsters should be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas ([Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, Table B-1](#)).

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.

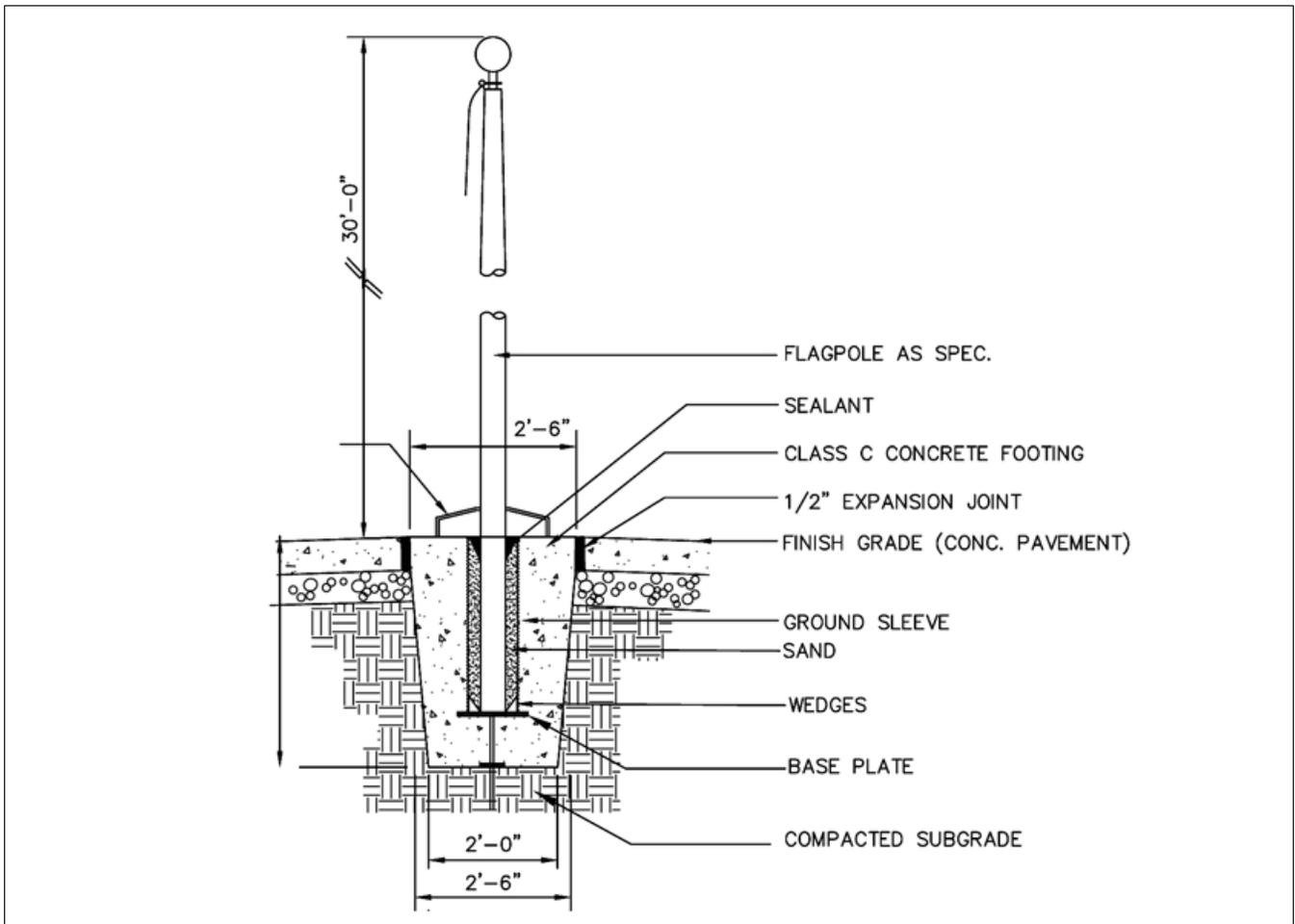


Figure 11-3 Flagpole Detail

11.3.11 Flagpoles

The standard flagpole for Fort Campbell will be tapered mill finish aluminum, fitted with a gold anodized finish “ball” finial (Figure 11-3). 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. Flagpoles should include lighting and may be accented with planting beds around the base of the flagpole.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Rosa</p> <p>Material: Polyethylene</p> <p>Finish: Polyethylene</p> <p>Size: 42" diameter</p>	<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Rosa</p> <p>Material: Polyethylene</p> <p>Finish: Polyethylene</p> <p>Size: 42" diameter</p>	<p>Manufacturer: Wausau Tile 1.800.988.8728</p> <p>Model: Terra Form - TF4144</p> <p>Material: Precast Concrete</p> <p>Finish: Weatherstone B2 – French Grey</p> <p>Size: 48" diameter</p>

11.3.12 Planters

Movable pre-cast concrete planters may be used outside building entrances to provide seasonal color and interest and function as security threat barriers. 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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Pi bike rack</p> <p>Material: Powder coated metal</p> <p>Finish: Black</p> <p>Size: 55" height</p>	<p>Manufacturer: Madrax 1.608.831.9040</p> <p>Model: Heavy duty winder - HW238-9</p> <p>Material: Structural steel</p> <p>Finish: Silver Grey</p> <p>Size: 7' length</p>	<p>Manufacturer: Madrax 1.608.831.9040</p> <p>Model: Circa 2000 - CIR-6</p> <p>Material: Structural steel</p> <p>Finish: Mesa Tan</p> <p>Size: 7' long</p>

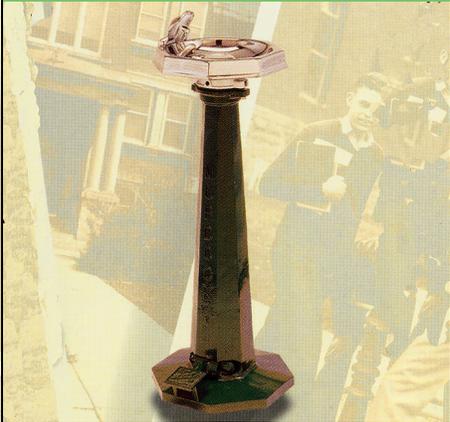
11.3.13 Bicycle Racks

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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Landscape Forms 1.800.521.2546</p> <p>Model: Annapolis</p> <p>Material: Structural steel with cast aluminum</p> <p>Finish: Black</p> <p>Size: 12" diameter</p>	<p>Manufacturer: Bega</p> <p>Model: 8216 P</p> <p>Material: Stainless steel</p> <p>Finish: # 4 brushed satin stainless steel</p> <p>Size: 2 sizes to choose from</p>	<p>Manufacturer: Wausau Tile 1.800.388.8728</p> <p>Model: Terra Form – TF6005</p> <p>Material: Precast concrete</p> <p>Finish: Weatherstone B2 – French Grey</p> <p>Size: 12" diameter</p>

11.3.14 Bollards

Bollards are utilized to separate vehicular and pedestrian traffic, to direct access, or as decorative elements in pedestrian areas.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Murdock 1.513.471.7700</p> <p>Model: 1776 Old Style</p> <p>Material: Iron with a polished brass bowl</p> <p>Finish: Black</p>	<p>Manufacturer: Murdock 1.513.471.7700</p> <p>Model: M – 30 “octagon design”</p> <p>Material: Steel</p> <p>Finish: Grey Iron</p>	<p>Manufacturer: Murdock 1.513.471.7700</p> <p>Model: PE – 40 Taparex</p> <p>Material: Exposed Aggregate</p> <p>Finish: Pebble</p>

11.3.15 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 \(UFAS\)](#) standards meet.



Figure 11-4 Consistent Playground Equipment

11.3.16 Playground Equipment

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 (Figure 11-4).

11.3.17 Playground Planning and Design

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.

11.3.18 Playground Inspection and Maintenance

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.

11.3.19 Recalled and Banned Playground Equipment

For updates on banned or recalled playground equipment consult the Consumer Product Safety Commission Press Releases and Recalls web site.

11.3.20 Mailboxes

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 Antiterrorism/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) from billeting and primary gathering areas ([Unified Facilities Criteria \(UFC\) 4-010-01](#), [DoD Minimum Antiterrorism Standards for Buildings](#), Table B-1).

The location should be coordinated with the Postal Services. If group mailboxes are required, provide central locations for them adjacent to hard-surface walkways but not to impede pedestrian movement.

11.3.21 Monuments, Memorials, and Military Equipment Static Displays

Monuments and static displays should be carefully designed and placed in prominent locations to serve as visual focal points within the installation. Static displays of equipment should be consolidated in one location to create a central museum or exhibition facility within the installation.

Memorials will conform to the guidance set forth in [Army Regulation \(AR\) 1-33, Memorial Programs](#).

11.4 SIGNS

Signs are used to visually communicate information. They are highly visible features that 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 that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in [Technical Manual \(TM\) 5-807-10, Signage](#).

11.4.1 Sign System Characteristics

There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

11.4.2 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.

11.4.3 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.

11.4.4 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.

11.4.5 Visual Hierarchy

The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

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.

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.

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.

11.4.6 Types of Signs

Information / Identification Signs

These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components. 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:

Typeface	
Lettering:	Lettering is self-adhesive backing material.
Building Title:	Helvetica Medium, Upper and lower case
Building Numbers:	Helvetica Medium, Upper and lower case
Building Addresses:	Helvetica Medium, Upper and lower case

Color	
Panel:	Dark Brown
Lettering:	White
Post:	Dark Brown
Exposed panel backs and edges:	Dark Brown
All paint:	Semi gloss

Materials	
Panel:	Double-face 1/8" thick aluminum
Lettering:	Steel Pipe
Post:	Concrete pier or direct burial

11.4.7 Building Identification

All Building Identification signage shall be consistent throughout the Installation. Please refer to The [Fort Campbell Technical Design Guide](#), or [TM-5-807-10](#) for specifications.

11.4.8 Housing Areas

The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board (RPPB).

11.4.9 Installation Identification Signs

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, para 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. 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.

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.

See [Technical Manual \(TM\) 5-807-10, Signage](#), paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

11.4.10 Street Signs

Street name identification signs should be designed with the same lettering, color, and materials as other information signs.

11.4.11 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.

11.4.12 Directional Signs

These signs guide the motorist or pedestrian in, around, and out of the installation. 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:

Typeface	
Lettering:	Lettering is self-adhesive backing material.

Arrow	
Arrow:	Lettering is self-adhesive backing material.
Stroke Width:	Helvetica Medium cap

Color	
Panel:	Dark Brown
Lettering:	White
Post:	Dark Brown
Exposed panel backs and edges:	Dark Brown
All paint:	Semi gloss

Materials	
Panel:	Double-face 1/8" thick aluminum
Lettering:	Steel Pipe
Post:	Concrete pier or direct burial

11.4.13 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. Related to these signs are pavement markings and traffic signals. These signs are designed to include the following:

Typeface	
Lettering:	Lettering is self-adhesive backing material.

Color	
Panel:	Dark Brown
Lettering:	White
Post:	Dark Brown
Exposed panel backs and edges:	Dark Brown
All paint:	Semi gloss

Materials	
Panel:	Double-face 1/8" thick aluminum
Lettering:	Steel Pipe
Post:	Concrete pier or direct burial

11.4.14 Traffic Control Signs

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.

11.4.15 OCONUS Installations

OCONUS installation streets and roads are to be considered extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation ([AR 420-72](#), Transportation Infrastructure and Dams, Para 2-15e).

11.4.16 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.

11.4.17 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.

11.4.18 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.

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.

11.4.19 Sign System Typography

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.

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.

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.

11.4.20 Reduce Visual Clutter

Over-signing detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

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.

11.4.21 Location Maps

The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer. The design and construction should be of compatible architectural materials found throughout the installation.

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

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

The primary visual problem that exists with exterior lighting on most military installations has been the lack of overall coordination of a lighting system.

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.

The proper type of lighting for various locations is shown in the Light Design Matrix (Table 11-1).

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. Lighting should meet “dark sky” compliance standards due to night vision goggle use.

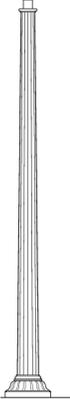
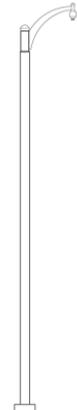
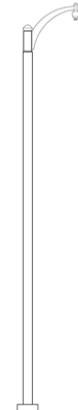
LIGHT DESIGN MATRIX		TYPICAL AREAS OF USE																		
		Entry Gates	Primary Roadways	Secondary Roadways	Tertiary Roadways	Primary Walkways/Bikeways	Secondary Walkways/Bikeways	Tertiary Walkways/Bikeways	Courtyards	Playgrounds	Ball fields	Basketball Courts	Tennis Courts	Buildings	Landscaping	Fence Parameters	Signs & Monuments	Large Parking Lots	Small Parking Lots	Training areas
LAMP	Incandescent													⊙						
	Halogen	⊙	⊙																	
	Mercury Vapor		⊙	⊙	⊙	⊙	⊙		⊙	⊙	⊙	⊙	⊙		⊙					
	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													⊙			⊙			⊙

Table 11-1 Light Design Matrix

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
	Community Life Theme	
		
<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: DS4 K</p> <p>Material: Cast Aluminum/Cast Iron</p> <p>Finish: Black</p> <p>Size: 39" H x 16" W</p>	<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: DS4 K</p> <p>Material: Cast Aluminum/Cast Iron</p> <p>Finish: Black</p> <p>Size: 39" H x 16" W</p>	<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: EH22ST GCF/ EH16ST GCF</p> <p>Material: Cast Aluminum/Cast Iron</p> <p>Finish: Black</p> <p>Size: 22.5" H x 22.5" W/ 16" H X 16" W</p>

11.5.1 Light Fixtures

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.

Town Center Theme	Memorial Boulevard Theme	Industrial Theme
	Brigade Combat Team Theme	Clarksville Base Theme
Community Life Theme		
		
<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: Detroit Series</p> <p>Material: Cast Iron</p> <p>Finish: Black</p> <p>Size: 10'8" – 20'-6"</p>	<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: Erotique</p> <p>Material: Steel</p> <p>Finish: Black</p> <p>Size: 4" – 5" W x 16-26' H</p>	<p>Manufacturer: Antique Street Lamps 512.977.8444</p> <p>Model: Erotique</p> <p>Material: Steel</p> <p>Finish: Black</p> <p>Size: 4" – 5" W x 16-26' H</p>

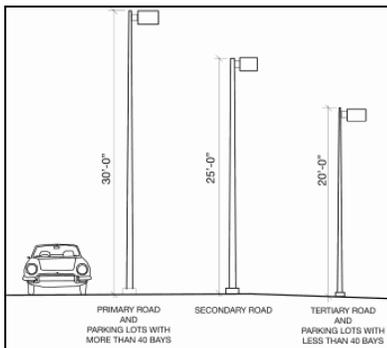


Figure 11-5
Pole Height Determination By Function

11.5.2 Light Poles

The light fixture size should be proportional to the intended pole height.

11.5.3 Light Fixtures and Poles

Light poles should be consistent and provide uniformity throughout the installation. The pole height shall be determined by their intended function as shown at right (Figure 11-5).

11.5.4 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.

11.5.5 Utility Lighting

Refers to simple, inexpensive fixtures that are used in industrial areas of low visibility.

11.5.6 Roadway Lighting

Requires large light patterns that reduce the amount of fixtures used. Locate lights in planted islands or around the perimeter of the area. Avoid spillover light into adjacent uses. There are several primary roads in Fort Campbell that should receive the same light treatment.

11.5.7 Pedestrian Lighting

Paths located adjacent to a road will be lit by the street lighting.

Paths not adjacent to roadways require additional lighting.

Light all stairs and entries.

Intersections may require additional lighting.

11.5.8 Parking Lot Lighting

Parking lot lighting should be used for security purposes. Lighting should be evenly spaced throughout the lot, with no “hot” or “cold” spots.

Lighting should be directional and inform pedestrians of building entrances, and/or locations, and/or crosswalk locations.

11.5.9 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.

11.5.10 Wall-Mounted Lighting

Refers to fixtures attached to the wall of a building or a wall bordering a walkway or stairway.

11.5.11 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. Recommended locations for the six types are included in Table 11-1.

Incandescent

- Superior color rendition
- Inexpensive
- Good optical control
- Short life span
- Lowest efficiency

High Pressure Sodium

- Poor color rendition
- Broad application
- Low maintenance
- Superior optical control
- Superior life span
- Excellent efficiency
- Expensive

Low Pressure Sodium

- Poor color rendition
- Good efficiency
- Superior life span
- Expensive

Fluorescent

- Good color rendition
- Poor optical control
- Good life span
- Good efficiency in mild climates
- Produces glare

Metal Halide

- Superior color rendition
- Superior optical control
- Efficiency better than mercury vapor but poorer than pressure sodium.
- Expensive

Mercury Vapor

- Good color rendition
- Good foliage lighting
- Good life span
- Good efficiency
- Inexpensive

11.5.12 Outdoor Architectural Lighting

Use to highlight buildings, building surroundings, and signage. Throws a reflection of light rather than direct light. Screen with landscaping or place in recessed area.

11.5.13 Wall-Mounted Lighting

Refers to fixtures attached to the wall of a building or a wall bordering a walkway or stairway.

11.5.14 Spotighting

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.

11.6 UTILITIES

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.

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 that 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.

11.6.1 Overhead Transmission Lines

Unightly 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 by using the following design techniques:

- **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 that 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.

- View Screening

Minimize long views or silhouette views of overhead transmission lines from along roads and other public viewing areas. 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.

- 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.

- 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.

11.6.2 Sewer and Water

All sewer and water facilities are the responsibility of CH2M HILL and shall be provided in accordance with the Ft Campbell Water and Wastewater Design and Construction Standards, available from CH2M HILL. See the [Ft Campbell Technical Design Guide](#) and contact CH2M HILL at 931-431-5677 or 2015.

11.6.3 Storm Drainage

Installation storm drainage systems should 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 that are contoured to be compatible with the natural landform, and utilize LID techniques for storm water filtration. Where large-scale 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. 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.

Large hard surfaced parking lots should have covered drainage at the entry to prevent water draining into adjacent streets. Storm water should, as much as possible, be managed using LID practices. See <http://www.epa.gov/nps/lid/index.html> for LID information.

11.7 ARMY STANDARDS

The cited Army Standards shall be met:

- [DoD 4525.8-M, DoD Official Mail Manual](#)
- [Army Regulation \(AR\) 420-49, Utility Services](#)
- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Army Regulation \(AR\) 420-72, Transportation Infrastructure and Dams](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Technical Manual \(TM\) 5-807-10, Signage](#)
- [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](#)

11.8 REFERENCES

The following references are provided for guidance.

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 11](#)
- [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 Campbell Technical Design Guide](#)

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Section 12 Force Protection Design Standards

12.1 INTRODUCTION

Accommodating the need for security and antiterrorism is a significant concern for all military facilities design. The security and antiterrorism requirements must be integrated into the total project.

Ultimately, Fort Campbell is responsible for determining the amount of risk it is willing to take. There are certain risks that we have agreed to accept given the evaluated level of risk to the base, and budget constraints. These are to be determined by the Risk Assessment Team. Other than risks determined to be acceptable by this team, all new construction, and certain existing facilities must meet current force protection standards.

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. 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.

Final design decisions to meet security and antiterrorism 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

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.

UFC 4-010-01 establishes the minimum building antiterrorism standards for all DoD components:

- Mandatory DoD minimum antiterrorism standards for new and existing inhabited buildings are contained in Appendix B.
- Mandatory DoD minimum antiterrorism standards for expeditionary and temporary structures are contained in Appendix D.
- Additional recommended measures for new and existing, inhabited buildings are contained in Appendix C.

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 Minimum Standoff Distances and Separation for Buildings:

The minimum standoff distances and separation for new and existing buildings are found in Table B-I of UFC 4-010-01.

The minimum standoff distances and separation for expeditionary and temporary structures are found in Table D-I of UFC 4-010-01.

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 standard for specific Combatant Commanders or based on Risk and/or Threat Analysis.

When the minimum standoff distances cannot be achieved because land is unavailable, the standards allow for building hardening to mitigate blast effects. Costs and requirements for building hardening will be addressed in the DoD Security Engineering Manual. (See para below for information regarding the DoD Security Engineering Manual).

12.3 IMPLEMENTING DESIGN GUIDANCE

Additional guidance on applying the DoD Minimum Antiterrorism Standards for Buildings will be found in UFC 4-010-02, DoD Security Engineering Manual. Currently, this document is in draft form. Until the DoD Security Engineering Manual is published, see the guidance provided on the [Security Engineering Working Group](#) website.

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.

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 procedure, contact the Protective Design Center (CENWO-ED-S) at (402) 221-3151 for instructions.

12.3.1 Orientation of Buildings on a Site

The following will be given consideration when determining the orientation of a building:

- 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.
- Protect against attack by selecting perimeter barriers to block sightlines such as obstruction screens, trees, or shrubs. Non-critical structures or other natural or man-made features can be used to block sightlines.
- Create "defensible space" by positioning facilities to permit building occupants and police to clearly monitor adjacent areas.



Figure 12-1 Fences Offer Various Force Protection Measures

- If roads are nearby, orient buildings so there are no sides parallel to vehicle approach routes.
- Design vehicular flow to minimize vehicle bomb threats, avoid high-speed approach into any critical or vulnerable area.
- Avoid siting the facility adjacent to high surrounding terrain, which provides easy viewing of the facility from nearby non-military facilities.

12.4 FENCING

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 (Figure 12-1). A fence will assist in controlling and screening authorized access to a secured area. Fences also serve the purposes listed below:

- As a platform for the Intrusion Detection System.
- As a screen against explosive projectiles.
- To stop moving vehicles if they are reinforced to do so.

Plants with tall growth habits and/or large mature growth will be located well away from security fences.

12.5 LANDSCAPE CONSIDERATIONS

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.

Establish clear zones along both sides of security fencing. Vegetation in the clear zone should not exceed four inches in height. ([DoD 0-2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence](#), Appendix EE, Table EE-4).

Strategically locate trees and planters to prevent penetration of an attack vehicle into the secure area perimeter.

Vegetative groupings and earth sheltering berms provide inherent blast effect reduction from external blast forces.

Plant material that can provide concealment will not be used adjacent to high security structures or fence lines.

Use dense, thorn-bearing plant material to create natural barriers to deter aggressors.

Screen play and outdoor recreation areas from public (off-installation) view.

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 could be to direct people to a community support or information center to obtain directions to high security activities. Another could be "All incoming personnel and visitors report to building number _____".

Place trash containers as far away from the facility as possible. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (Unified

Facilities Criteria [UFC] 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

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.

12.6 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 determine lighting system requirements. Often two or more types of lighting systems are used within a single area (Figure 12-2). Guidance on the use of security lighting may be obtained from [TM 5-811-1](#), Electrical Power Supply and Distribution.

12.7 BERMS

Use of berms for force protection can fulfill one of more of the following functions (Figure 12-3).

- Define boundaries of property or boundary limits.
- Provide a barrier to moving vehicles.
- Hinder pedestrian movement.
- Intercept projectiles.
- Obstruct lines of sight.

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 Army Technical Manual (TM) 5-853-3/AFMAN 32-1071, Vol. 3, *Security Engineering Final Design*.

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.

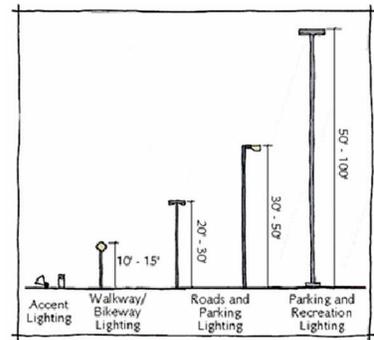


Figure 12-2 Lighting Creates a Deterrent



Figure 12-3 Berms Can Serve Many Force Protection Functions

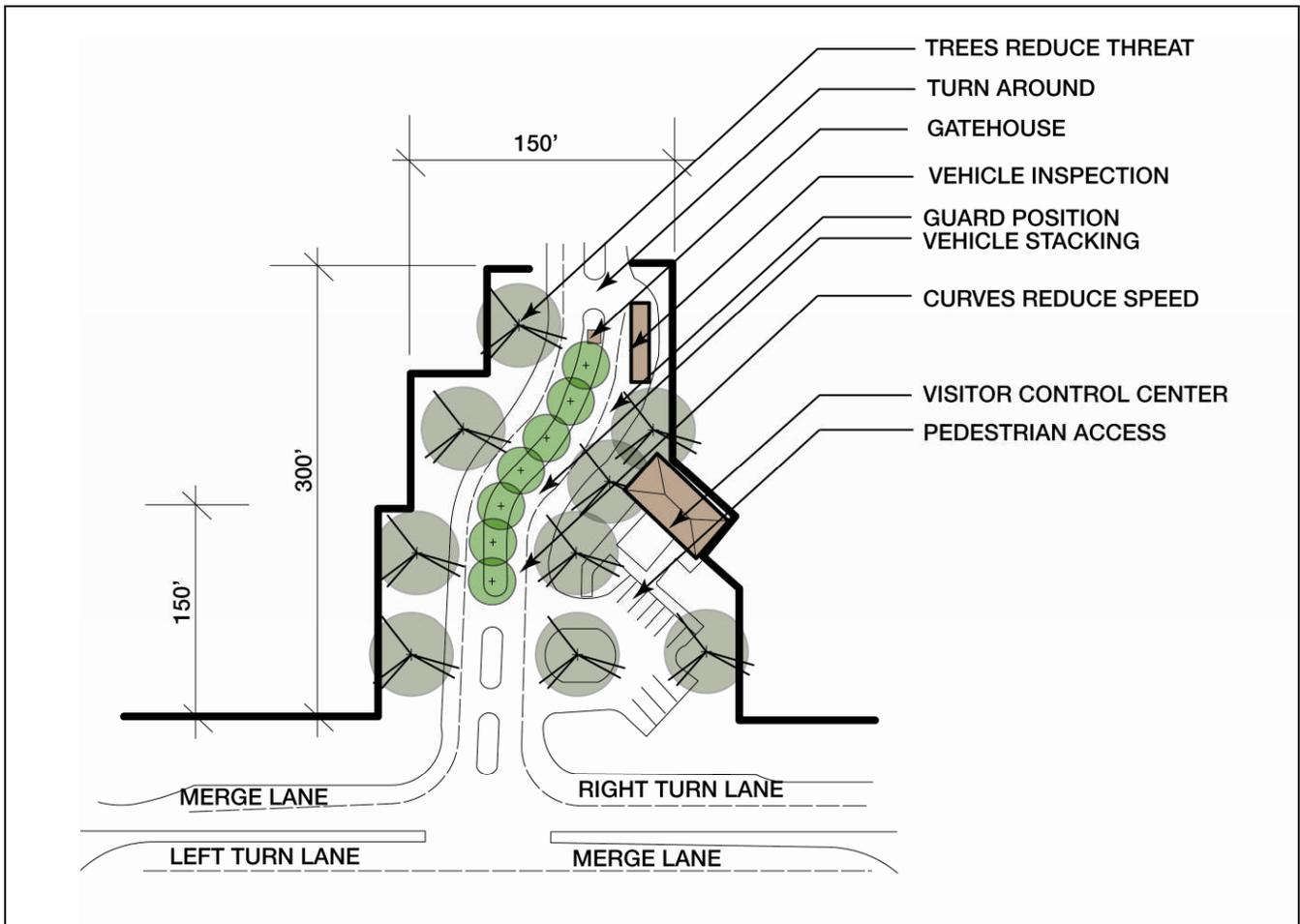


Figure 12-4 Conceptual Entrance Gate to Meet AT/FP Requirements

12.8 GATES AND ENTRANCES (ACCESS CONTROL POINTS [ACP])

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 (Figure 12-4).

The Headquarters Department of the Army, Deputy Chief of Staff for Operations and Plans, DAMO-ODL, office in coordination with the Protective Design and Electronic Security Centers of Expertise have developed standards for Army Access Control Points (ACP) ([UFC 4-022-01](#)).

12.8.1 Canopies for ACPs

ACPs will have a canopy, which will cover the full width of incoming lanes at the Guard Booth. 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.

The Interim Army Standard for Canopies at Army Installation Access Points, Feb. 2004.

12.8.2 Physical Security Equipment

The Product Manager, Force Protection Systems (PM-FPS) under DoD Directive 3324.3 is assigned the mission of developing, fielding, and supporting Force Protection Equipment (FPE) throughout its life cycle for the Army, Joint Services, and other Government agencies.

The DoD Directive assigns specific areas of responsibilities, which include: interior Physical Security Equipment (PSE), Command and Control Systems, security lighting, FPS, barrier and systems, and interior and exterior robotics. The PM-FPS homepage and the DA-approved equipment Blanket Purchase Agreements (BPA's) are listed below:

Product Manager - Physical Security Equipment Homepage

DA-approved PSE Equipment Blanket Purchase Agreements (BPAs)

12.9 ARMY STANDARDS

The cited Army Standards shall be met:

- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Unified Facilities Criteria \(UFC\) 4-010-10, 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\).](#)
- [Standards for Army Access Control Points \(ACP\) \(UFC 4-022-01\).](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Americans with Disabilities Act Accessibility Guideline \(ADAAG\)](#)
- [DoD Instruction 2000.16, DoD Antiterrorism Standards](#)

12.10 REFERENCES

The following references are provided for guidance:

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 12](#)
- 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. Users may contact the Point of Contact posted at the following website to obtain a copy of the Handbook). <http://www.dtic.mil/whs/directives/corres/html/o200012h.htm>
- Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the [Army Knowledge Online](#) web portal).
- UFC 4-020-01, *DoD Security Engineering Manual*, (This document is in draft form. See the [Security Engineering Working Group](#) website.
- U.S. Air Force, [Installation Force Protection Guide](#): (Contains information on installation planning, engineering design, and construction techniques that will preclude or minimize the effect of a terrorist attack).
- Technical Manuals/Air Force Manual series TM 5-853/AFMAN) 32-1071, Security Engineering, 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 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.

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, AAFES, 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, If the Master Planner or designated representative concurs, the plan and the signed checklist are forwarded to the installation master planner for review and final approval. The accepted checklist shall become a part of the project record files.

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.

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ARMY INSTALLATION DESIGN GUIDE (IDG) COMPLIANCE CHECKLIST

1. Project Title and Description:

Title: _____

Description: _____

2. Project Justification:

Title: _____

Description: _____

3. Sustainable Design:

Has SPiRiT Checklist been attached? (If not, obtain completed checklist)

Does SPiRiT meet or exceed Silver level? ("Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all other FY06 and future-year MILCON projects the minimum SPiRiT rating requirement is "Gold".)

Yes ___ (Review project as submitted).

No ___ (Return submittal to design team for revisions to meet SPiRiT).

4. Site Planning:

Was the site plan prepared for the proposed project utilizing the IDG Design Process included in Sections 2, 3, and 5 of the IDG?

Yes ___ No ___

Does the site plan include Site Planning Design Components Guidelines of the IDG?

Yes ___ No ___

Does the site plan meet AT/FP requirements identified in Section 12 of the IDG?

Yes ___ No ___

Design Comments on Site Planning:

Does the site plan comply with the IDG?

Yes ___ No ___ (If not, provide justification).

Does the site plan meet approved installation master plan siting compliance?

Yes ___ No ___ (If not, provide justification).

Has NEPA been initiated for the construction effort in accordance with AR 200-2?

Yes ___ No ___

Has airspace criteria been considered relative to airfield accident potential zones?

Yes ___ No ___

5. Buildings:

Does the building exterior design meet the Building Design Objective defined in the IDG?

Yes ___ No ___

Is the exterior building designed to meet the Structural Characteristics defined in the IDG?

Yes ___ No ___

If the project is a renovation or addition, does the proposed renovation or addition meet IDG Building Design and Structural Characteristics?

Yes ___ No ___

If the project is a renovation or addition to a historic building, does the renovation or addition maintain the design integrity of the original building or meet Historical Approval Agencies' requirements for any other deviations?

Yes ___ No ___

Does the building exterior design meet AT/FP requirements (if applicable)?

Yes ___ No ___

Designer comments on exterior building design:

Does building design comply with the IDG? If not, provide justification.

6. Circulation:

If the project includes roadway construction, does the proposed plan meet Federal Highway and/or Local Guidelines defined in the IDG?

Yes ___ No ___

If the project includes roadway construction, does the proposed plan meet AT/FP Roadway Setback Requirements defined in the IDG?

Yes ___ No ___

If the project includes roadway construction, does the proposed plan include applicable Roadway Alignment and Intersection Guidelines defined in the IDG?

Yes ___ No ___

If the project is an entrance gate, does the proposed plan include Entrance Gate Guidelines and Standards defined in the IDG?

Yes ___ No ___

If the project includes parking, does the proposed plan meet the Parking Lot Location/Design Guidelines defined in the IDG?

Yes ___ No ___

If the project includes pedestrian circulation, does the proposed plan meet the Walkways and Pedestrian Circulation Guidelines in the IDG?

Yes ___ No ___

If the project includes bicycle circulation, does the proposed plan meet the Bikeway Guidelines in the IDG?

Yes ___ No ___

Designer comments on circulation design:

Does circulation design comply with the IDG? If not provide justification.

7. Plant Material:

All projects for new construction should include the planting of trees shrubs and/or groundcover. Does the proposed project include a planting plan?

Yes ___ No ___

Does the proposed planting plan meet AT/FP requirements defined in the IDG?

Yes ___ No ___

Does the proposed planting plan include material recommended in selected Plant Palette Matrix included in the

IDG?

Yes ___ No ___

Design comments on landscape design:

Does landscape design comply with the IDG? If not, provide justification.

8. Site Elements:

If the project includes site furnishings, does the proposed plan follow the guidelines in the IDG?

Yes ___ No ___

If the project includes signs, does the proposed plan meet the Sign Standards in the IDG?

Yes ___ No ___

If the project includes exterior lighting, does the proposed plan meet the Exterior Lighting Guidelines defined in the IDG?

Yes ___ No ___

Will all power and distribution lines be located underground?

Yes ___ No ___

Will all substation and transformers be designed as to be screened from view?

Yes ___ No ___

Will all sewer and water lines to be located underground?

Yes ___ No ___

Are all storm drains systems designed to meet guidelines defined in the IDG?

Yes ___ No ___

Designer comments on site elements design:

Does site elements design comply with IDG? If not, provide justification.

9. Antiterrorism (Security):

Have installation boundary setbacks been included?

Yes ___ No ___

Have building setbacks from road, parking, and other buildings been included?

Yes ___ No ___

Do site plans and landscape plans include the criteria outlined for AT/FP?

Yes ___ No ___

Designer comments on AT/FP compliance:

Does AT/FP Design comply with the IDG? If not, provide justification.

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

Appendix B Project Requirements Checklist

PROJECT REQUIREMENT CHECKLIST

For Completion by Installation Personnel for Use in Preparation of the Request for Proposals (RFP).

Project Information:

Name: _____
Location: _____
DPW/DIS POC: _____
Phone: _____
Address: _____

Email: _____
Checklist Completed by: _____
Date: _____

I. General Information:

Maps and plans available:

(Provide copies with completed checklist)

Basic Information Maps (BIMs): (List Drawing Numbers).

(Maps should be provided in Spatial Data Standards (SDS) compatible GIS 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

Site Map

Aerial Photography (Preferred to Topographic).

USGS Map

Project Siting Plan (Proposed)

Environmental

Jurisdictional wetlands designation

Other historic concerns

Project Building Plans:
 (If renovation/addition or prior design, provide available information and plans)

Foundation
 Basement
 Floor
 Structural
 Roof
 Elevations
 Electrical
 Mechanical
 Plumbing
 Site Utilities
 Specifications
 Other

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 Building Requirements, 31 July 2002.
 Local Building Codes
 State and County Codes
 Environmental Regulations
 Cultural Regulations
 National Fire Protection Codes (NFPA), UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 17 April 2003
 Other

2. Temporary Facilities Available to the Contractor:

Facilities available to the contractor during construction:	Yes	No
General Site Plan has been annotated to show limits of construction site. (If the contractor requires the use of additional area, he must obtain written approval from the Contracting Officer.)		
Construction office available?		
Covered materials storage available?		
Uncovered materials storage available?		
NOTE: Security of construction site and materials is the contractor's responsibility. Select fill borrow areas, spoil areas, sanitary fill and haul routes are shown on attached installation map. List any restrictions or notes on the use of those areas:		

NOTE: Disposition of scarp and salvageable materials resulting from construction is the responsibility of the contractor unless otherwise noted and agreed.		

Utilities available to the contractor during construction:	Yes	No
Potable Water?		
Metering Required?		
Cost \$ _____ per _____		
Non-Potable Water (irrigation, machine washing, etc.)?		

<p>Metering required? Cost \$ _____ per _____ Electricity? Metering required? Cost \$ _____ per _____ Natural Gas? Metering required? Cost \$ _____ per _____ Sanitary Sewer?</p>		
<p>NOTE: Utilities used at the construction may be metered and/or charged to the contractor. The rate schedule for the 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 system shall be the responsibility and at the cost of the contractor.</p>		
<p>3. Requirements:</p>		
<p>Demolition Requirements: (Facilities for demolition, relocation, or retention)</p> <p>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 building demolition and debris material when ever possible.</p>		
<p>Paving Requirements:</p>	Yes	No
<p>Parking area(s) required? Location and brief description _____ _____</p>		
<p>Number of parking spaces for passenger vehicles: (Including _____ spaces for handicapped)</p>		
<p>Type of Pavement:</p>		
<p>Perimeter of parking area(s) to have concrete curb?</p>		
<p>Striping of parking spaces required?</p>		
<p>Width of stripes:</p>		
<p>Type of paint used:</p>		
<p>Special signage required:</p>		
<p>Concrete wheel stops required?</p>		
<p>Handicapped ramps/depressed curbs required?</p>		
<p>Service road(s) required?</p>		
<p>Location and brief description _____ _____ _____</p>		
<p>Type of Pavement:</p>		
<p>Concrete curbing required on both sides of the road?</p>		

Minimum roadway width: feet		
List any other special paving considerations or needs: _____ _____		
Sidewalks required?		
Type of paving material:		
Location:		
Minimum sidewalk width: feet		
NOTE: Minimum sidewalk thickness shall be 4" with welded wire fabric		
Concrete dumpster pads required?		
Number of pad(s): _____ each. (See note below)		
Size of each pad: _____ feet by _____ feet.		
Provide bumper stops at rear of pads?		
Provide architectural screening of pads?		
Type:		
NOTE: Building orientation or design may eliminate need for screening. Screening shall be in accordance with the Army Installation Design Guide (IDG).		
Utilities Service Requirements:	Yes	No
Electrical Service?		
Metered required?		
Type of system to installed: _____ aerial / _____ underground		
Type of transformer(s) to install: _____ Pole mtd. _____ Pad mtd..		
NOTE: Screen in accordance with IDG.		
Available voltage:		
Location of tie-in point:		
Water Service		
Metered required?		
Size and location of tie-in point:		
Additional fire hydrants(s) required:		
Sanitary Sewer Service?		
Size and location of tie-in point:		
Storm Drainage		
Design for _____ year occurrence.		
Type of system: _____ surface. _____ underground.		
Location of tie-in point for existing underground storm drainage system is incorporated in contractor's design. (See site plan).		
Gas Service: _____ natural _____ propane.		
Metered required?		
For heating?		
For domestic hot water?		
For laundry dryers?		
For kitchen equipment?		
Size and location of tie-in point:		

<p>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)..</p>		
<p>Coordination and notification required for utilities tie-in: Point of contact for coordination: Tel: _____ Email: _____</p> <p>NOTES: 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. If existing sidewalk, curbs, gutters, or paving are disturbed or removed during construction, the paving or concrete must be replaced by the contractor. 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.</p> <p>Road Closing: Can both lanes be closed for traffic? Maximum time road can be closed: Can road be closed over a holiday or weekend?</p> <p>Coordination and notification required for railroad track work: Point of contact for coordination: Tel: _____ Email: _____</p> <p>Railroad track closing: Can track be closed to traffic? Maximum time track can be closed: Can track be closed over a holiday or weekend?</p> <p>Minimum notification time required for utility outages, road, or railroad closing: Electrical Power: working days. Water: working days. Gas: working days. Steam: working days. Central AC lines: working days. Roads: working days. Railroads: working days.</p> <p>Are used track components to be sorted and properly stored? Are samples, ultra-sonic inspections, temperature recordings, and certificates to be submitted for ties, rail track components, or ballast? Are there special radio or communication requirements?</p> <p>NOTE: If existing sidewalk, curbs, gutters, drainage, ballast, or paving are disturbed or removed during construction, the paving, drainage, ballast, or concrete must e replaced by the contractor.</p>		

Architectural and Structural Building Design Requirements:	Yes	No
Seismic Design Zone:		
Basic wind speed: mph.		
Ground snow load: PSF (Plus code live load)..		
Maximum frost penetration: inches.		
Heat transmission: "U" Factors		
Walls:		
Floor (slab-on-grade) at perimeter foundation wall:		
Floor over ventilated crawl spaces:		
Ceiling and/or roofs:		
Roof		
Minimum pitch:		
Type:		
Suppers and drains are required (If a parapet type roof is proposed):		
Gutters and downspouts:		
Type:		
Drainage carry off:		
Splash blocks _____; or underground drainage system _____.		
(Internal roof drains not permitted.)		
Access to roof:		
NOTE: Catwalks to and around rooftop HVAC units and other equipment are required (Cary tread or equal). Where possible, architectural screening or visible rooftop equipment is required.		
Site Conditions		
Environmental assessment required?		
Completion date:		
EIS required?		
Completion date:		
(Provide copies of actions to date.)		
Cultural resources compliance completed?		
Topographical feature description:		

Confirm or identify subterranean hazards:		
Fill area?		
Old foundations?		
Unexploded ordnance?		
Existing/abandoned utility line?		
Tunnels/mines?		
Other:		
Soil investigation data available:		
At project location:		
Other:		
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.		
Building Exterior:		
Brick:		
Other:		
NOTES: 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 _____.		
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.		
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 <i>Uniform Federal Accessibility Standards (UFAS)</i> and the <i>Americans with Disabilities Act Accessibility Guidelines (ADAAG)</i> .		
Kickplates required on interior wood doors?		
Approximate total maximum occupancy:		
Female: _____ Adults _____ Children		
Male: _____ Adults _____ Children		
Total: _____		
Comments:		

Landscape Requirements:	Yes	No
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.		
Establishment of turf?		
Soil poisoning for termite protection is 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.		
Paint colors:		
List standard paint colors:		

Finishes: List standard finishes: <hr/> <hr/> <hr/> <hr/>		
Electrical Design Requirements:	Yes	No
Exterior Lighting? Type of lighting. _____ <input type="checkbox"/> High pressure sodium <input type="checkbox"/> Low pressure sodium <input type="checkbox"/> Mercury <input type="checkbox"/> Halogen <input type="checkbox"/> Other. _____ Average intensity: _____ foot candles per square yard with uniformity ratio of 4:1 Other: .(avg. to min.) Type of pole: Special mounting requirements: <hr/> <hr/> <hr/> <hr/>		
Switching type: <input type="checkbox"/> Manual <input type="checkbox"/> Clock _____ 7 day _____ 7 day <input type="checkbox"/> Astronomical <input type="checkbox"/> Photo electric <input type="checkbox"/> Combination of above is indicated <input type="checkbox"/> Other. _____		
Location: Lighting for plumbing and electrical chases required? NOTE: All electrical wiring (exterior and interior) shall be copper. 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.		
Electromagnetic shielding? List any electromagnetic shielding requirements: <hr/> <hr/> <hr/>		
Standby/backup power requirements?		

<p>List any electromagnetic shielding requirements:</p> <hr/> <hr/> <hr/> <hr/>		
<p>Mechanical/Plumbing Design Requirements:</p>	Yes	No
<p>Heating design data: Below is the outside dry bulb temperature that is equaled or exceeded 97 ½% of the time, on 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 % of the time. _____ Dry bulb temperature _____ Wind velocity _____ Degree days _____ 68°F Interior design temperatures</p>		
<p>Air conditioning design data: Outside dry bulb and wet bulb temperatures that are equaled or exceeded 2 ½% 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% dry bulb, wet bulb temperature. _____ Dry bulb temperature _____ Wet bulb temperature</p> <p>Interior design temperatures _____ Dry bulb temperature _____ Wet bulb temperature</p>		
<p>Heating and air conditioning system: Shall be deigned to provide a relative humidity of 50% + 10% or - 10%</p> <p>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 35° F shall be provided when it can be clearly shown that use of the economy cycle is cost effective.</p>		
<p>Install humidity control override?</p>		
<p>Automatic timer controls require for:</p>		
<p>Heating System?</p>		
<p>Air conditioning System?</p>		
<p>Heating and air conditioning source:</p>		
<p>Self contained plant for heat?</p>		
<p>Self contained plant for air conditioning?</p>		
<p>Purchased heat:</p>		
<p>Low profile roof mounted HVAC units are permissible?</p>		
<p>Automatic timer controls required for:</p>		
<p>Heating system?</p>		
<p>Air conditioning system?</p>		

<p>Heating fuel to be used: <input type="checkbox"/> Natural gas <input type="checkbox"/> #2 fuel oil <input type="checkbox"/> Propane</p>		
<p>Dual fuel heating plant required? <input type="checkbox"/> Primary fuel <input type="checkbox"/> Secondary fuel</p>		
<p>Outside air supply intake to close when building is occupied?</p>		
<p>Type of heating and air conditioning filters required: <input type="checkbox"/> Permanent <input type="checkbox"/> Disposable</p>		
<p>Covers and locks required on interior utilities controls?</p>		
<p>Plumbing design data:</p>		
<p>Exterior hose bibs: Minimum of _____ each with 3/4" hose connection on building exterior.</p>		
<p>Exterior hose bibs frost protection required?</p>		
<p>Exterior hose bibs removable cutoff handles required?</p>		
<p>Interior hose bibs: (See <i>Functional Requirements</i>)</p>		
<p>Grease trap(s) required?</p>		
<p>Location(s): _____ _____ _____ _____</p>		
<p>Commodos should be floor mounted flush valve types:</p>		
<p>Lift station required?</p>		
<p>Hot water heater(s) required?</p>		
<p>Energy source: <input type="checkbox"/> Natural gas <input type="checkbox"/> #2 fuel oil</p>		
<p>Required minimum temperature: System:</p>		
<p>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.</p>		
<p>Provide a minimum of _____ floor drain(s) in the laundry and mechanical room.</p>		
<p>Insulate all water pipes (hot & cold) above slab: 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. 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.</p>		
<p>Provide grease interceptor: Location: Type:</p>		

Other plumbing considerations or requirements:			
Minimum Requirements for Restrooms		Yes	No
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.			
Quantity	Item	Special Requirements	
	General: Men's and Women's		
	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 must be MUD SET.	
	Toilet Partitions	At all commodes and urinals. Overhead braced w/door bumpers baked enamel w/skirt.	
	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	
	Specific: Women's		
	Sanitary napkin disposal	Each commode stall	
	Sanitary napkin dispenser	Each restroom, coin operated.	
	Specific: Men's		
	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).			
Safety Requirements		Yes	No
Fire protection requirements:			
Sprinkler system required?			

<p>Type of system to be installed: <input type="checkbox"/> Wet <input type="checkbox"/> Dry</p>		
<p>Complete coverage throughout the structure? If no, describe proposed system, layout, etc.:</p> <hr/> <hr/>		
<p>Exterior Siamese connections are required.</p> <p>Detection system: Smoke detectors required? <i>(Radium type shall not be used.)</i> Heat detectors required? <i>(Rate of Rise Heat Detectors shall not be permitted.)</i> 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 135° 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. 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. Special fire suppression system(s) required: Describe type, location, and justification:</p> <hr/> <hr/>		
<p>Fire extinguishers (manually operated) are required: Government furnished?</p>		
<p>Quantity and locations shall be based upon building design, NFPA, requirements, and coordinated with Installation's fire department.</p>		
<p>Recessed cabinet mounted?</p>		
<p>NOTE: The Contractor (Offeror) shall furnish and install the recessed fire extinguisher cabinets. The cabinets shall be at a minimum 24 1/2" tall, 7" deep and 8 1/2" wide w/glass doors. All interior finish materials shall be per NFPA standards and UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 17 April 2003.</p>		
<p>Water supply lines: for the sprinkler system shall be black steel pipe.</p>		
<p>The installation's standard fire alarm panels shall be specified for ease of maintenance and sustainability</p>		
<p>Security Requirements:</p>		
<p>Building physical security:</p>		
<p>Intrusion detection system required?</p>		

<p>Type of system to be installed: Desired location of detectors: Exterior door alarm requirements: Exterior window alarm requirements: Duress alarm system(s) required? Type of system to be installed: Location(s): Safe(s) required? Type and number: Size: Secure to building? If yes, how?:</p> <hr/> <hr/> <hr/>		
<p>Connect to main intrusion system? Remote transmission of the intrusion system to the master system required? 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.</p>		
<p>Keying Requirements: _____ Rooms requiring card readers _____ Rooms requiring cipher locks _____ Rooms requiring individual keys _____ Rooms requiring master keys _____ Exterior keying requirements _____ At least six (6) keys shall be provided for each lock _____ Twelve (12) sub masters _____ Six (6) masters</p> <p>The Offeror shall provide fifty (50) key blanks in addition to the above keying requirements</p> <p>All exterior door shall have unremovable hinge pins. Panic hardware shall be in accordance with NFPA requirements. Hardened secure area(s) required? Location(s):</p> <hr/> <hr/> <hr/>		
<p>Fencing Requirements: Location(s): Type and height:</p>		

Gate requirements:		
Antiterrorism requirements:		
Blast resistant windows		
Setbacks		
Barriers		
Others:		
Risk/threat analysis requirements:		

Communications Requirements	Yes	No
Intercom system required?		
Give a brief description of the requirements for the system:		

Telephone system required?		
Type of system to be installed:		
Location:		
Pay telephone required?		
If yes, unit(s) will be wall hung. Contractor shall run wire and conduit from pay phone outlets to main panel. Phones to be provided by the 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.		
The basic telephone system shall be the "Centrax System" as provided by:		
The system functions shall include the following:		
Direct in dialing, with restrictions on receiving collect calls.		
Direct out dialing to local exchange number only.		
Restrictions on placing chargeable calls outside the local exchange, except for calls charged to credit card or calls made with the charges reversed.		
Television system required?		
The technical and installation requirements of the television system shall be coordinated with the local cable television provider.		
Location/number of internal outlets:		

Wiring and grounding shall be in accordance with the National Electric Code.		

<p>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.)</p> <p>Type of system to be installed:</p> <p>Signage Requirements: (excluding those required by NFPA and OSHA)</p> <p>Interior signage:</p>		
<p>Exterior signage: (All exterior signage shall conform to the Army Installation Design Guide and Post Wide Paint/Exterior Finish Standards and color charts.)</p>		

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Appendix C Sustainable Design



Figure C-1 Sustainable Site Design

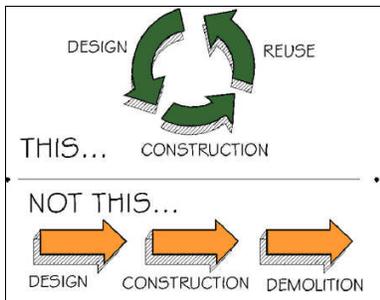


Figure C-2 Sustainable Design Process

C.1 WHAT IS SUSTAINABLE DESIGN

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 (Figure C-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 (Figure C-1). The basic objectives of sustainability are:

Reduce the consumption of energy, land, materials, water, and other non-renewable resources.

Minimize the waste of energy, land, materials, water, and other limited resources.

Protect the natural environment that is the source of all resources.

Create livable, healthy, and fiscally productive manmade environments for existing and future generations.

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.

C.2 SUSTAINABLE DESIGN AND DEVELOPMENT

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 (Figure C-3), healthy (Figure C-4), high-performance (Figure C-5), and safe buildings.

C.2.1 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 (Adapted from the HOK Guidebook to Sustainable Design).

Appendix C, Sustainable Design, discusses the sustainable design concept and its application to Army projects. Paragraph C.4 discusses the Sustainable Project Rating Tool (SPiRiT) developed by the U.S. Army Corps of Engineers (USACE). Per the Assistant Secretary of the Army (Installation & Environment) Sustainable Design and Development Memorandum and the Assistant Chief of Staff for Installation Management (ACSIM) endorsement of Sustainable Design and Development initiative, the SPiRiT rating system will be used by design professionals in all new construction, additions, or renovation of Army facilities for rating sustainability.

The SPiRiT document ([Appendix D](#)) was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System. See Website "SPiRiT Wizard" which outlines using SPiRiT, records and tracks rationale, generates SPiRiT rating and permits reuse of previous strategies for subsequent projects.

(Be aware that the Army will transition from SPiRiT to the US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) rating system effective with the FY 08 Military Construction Program.)

C.2.2 Army Rating Standard

The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18, 2003). For all other FY06 and future-year MILCON projects, the minimum SPiRiT rating requirement is "Gold". See Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.

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.



Figure C-3 Energy Efficient Lighting Contributes to Sustainability

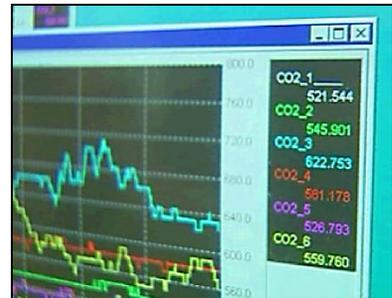


Figure C-4 CO₂ Measurements of Indoor Air Quality Assist In Creating A Healthy Environment



Figure C-5 Efficient Water Usage Contributes to a High Performance facility

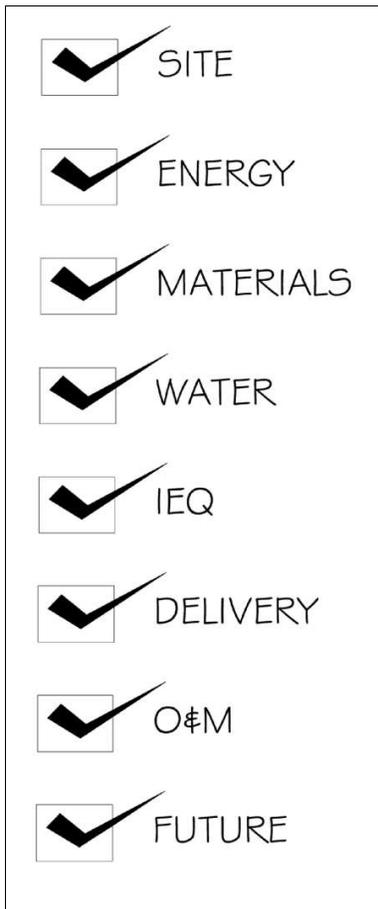


Figure C-6 SPIRiT Checklist Points Summary

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.

C.3 SUSTAINABILITY AND THE FEDERAL GOVERNMENT

The Federal Government has led the nation in the energy efficient, resource-conserving building design, construction, and operation. Executive Order (EO) 13123, “Greening the Government through Efficient Energy Management”, was issued June 3, 1999. This Order establishes that sustainable design principles shall be applied to all Federal projects in order to reduce pollution and other environmental costs associated with facility construction, operation, and eventual decommissioning. The principles of sustainable design for Federal Agencies established by EO 13123 include siting, design, and construction, as follows (Figure C-6):

- Site – Optimize site potential
- Energy – Minimize nonrenewable energy consumption.
- Materials – Use environmentally preferable products.
- Water – Protect and conserve water.
- Indoor Environmental Quality – Enhance indoor environmental quality.
- Facility Delivery – Holistic delivery of facility.
- O&M – Optimize operational and maintenance practices.
- Future Missions – Functional life of facility and support systems.

C.4 SPIRiT

The U.S. Army Corps of Engineers (USACE) has developed a checklist for sustainability to be used by design professionals in all new construction, additions, or renovation of Army facilities. This checklist is the “Sustainable Project Rating Tool (SPiRiT)”. The SPiRiT document was derived from the U.S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System.

SPiRiT is a rating tool that offers a checklist, strategies, and scores to provide sustainable facilities to the Army. SPiRiT allows environmentally responsible practices to be integrated into the process of facility delivery from the very beginning of the project. By using a “whole building” perspective, the SPiRiT rating tool (See Appendix E, SPiRiT Checklist) helps in preserving the environment and improving facility life-cycle management. SPiRiT is based on accepted energy and environmental principles.

The SPiRiT document includes eight (8) categories of design concerns (Fig. D.7). 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.

- SPiRiT Bronze 25 to 34 Points
- SPiRiT Silver 35 to 49 Points
- SPiRiT Gold 50 to 74 Points
- SPiRiT Platinum 75 to 100 Points

Per the [Military Memorandum dated January 5, 2006](#), the Army will transition from the Sustainable Project Rating Tool (SPiRiT) to the US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED®) rating system effective with the FY 08 Military Construction Program.

C.5 REFERENCES

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

Appendix D SPiRiT Checklist

SUSTAINABILITY PROJECT RATING TOOL (SPiRiT)							
Facility Points Summary							Maximum Points
1.0		Sustainable Sites (S)		Score	0		Max 20
1.R1 *		Erosion/Sedimentation/Water Quality Control					[Required]
1.C1 *		Site Selection					2
1.C2 *		Installation/Base Redevelopment					2
1.C3 *		Brownfield Redevelopment					1
1.C4 *		Alternative Transportation					4
1.C5 *		Reduced Site Disturbance					2
1.C6 *		Storm water Management					2
1.C7		Landscape & Ext. Design to Reduce Heat Islands					2
1.C8 *		Light Pollution Reduction					1
1.C9 **		Optimize Site Features					1
1.C10 **		Facility Impact					2
1.C11 **		Site Ecology					1
2.0		Water Efficiency (W)		Score	0		Max 5
2.C1		Water Efficient Landscaping					2
2.C2		Innovative Wastewater Technologies					1
2.C3 *		Water Use Reduction					2
3.0		Energy and Atmosphere (E)		Score	0		Max 28
3.R1 *		Fundamental Building Systems Commissioning					[Required]
3.R2 *		Minimum Energy Performance					[Required]
3.R3		CFC Reduction in HVAC&R Equipment					[Required]
3.C1 *		Optimize Energy Performance					20
3.C2 *		Renewable Energy					4
3.C3		Additional Commissioning					1
3.C5 *		Measurement and Verification					1
3.C6 *		Green Power					1
3.C7 **		Distributed Generation					1
4.0		Materials and Resources (M)		Score	0		Max 13
4.R1 *		Storage & Collection of Recyclables					[Required]
4.C1 *		Building Reuse					3
4.C2 *		Construction Waste Management					2
4.C3		Resource Reuse					2
4.C4 *		Recycled Content					2
4.C5		Local/Regional Materials					2
4.C6		Rapidly Renewable Materials					1
4.C7		Certified Wood					1
5.0		Indoor Environmental Quality (IEQ)		Score	0		Max 17
5.R1 *		Minimum IAQ Performance					[Required]
5.R2		Environmental Tobacco Smoke (ETS) Control					[Required]
5.C1 *		IAQ Carbon Dioxide (CO2) Monitoring					1
5.C2		Increase Ventilation Effectiveness					1
5.C3		Construction IAQ Management Plan					2
5.C4		Low-Emitting Materials					4
5.C5 *		Indoor Chemical and Pollutant Source Control					1
5.C6		Controllability of Systems					2
5.C7		Thermal Comfort					2
5.C8		Daylight and Views					2
5.C9 **		Acoustic Environment /Noise Control					1

5.C10 **		Facility In-Use IAQ Management Plan						1
6.0		Facility Delivery Process (P)		Score		0		Max 7
6.C1 **		Holistic Delivery of Facility						7
7.0		Current Mission		Score		0		Max 6
7.C1 **		Operation and Maintenance						3
7.C2 **		Soldier and Workforce Productivity and Retention						3
8.0		Future Missions		Score		0		Max 4
8.C1 **		Functional Life of Facility and Supporting Systems						2
8.C2 **		Adaptation, Renewal and Future Uses						2
				Total Score		0		Max 100
SPiRiT Sustainable Project Certification Levels								
		Army Standard - SPiRiT Bronze						25 to 34 Points
		Army Goal - SPiRiT Silver						35 to 49 Points
		SPiRiT Gold						50 to 74 Points
		SPiRiT Platinum						75 to 100 Points

The Army will transition from SPiRiT to the US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) rating system effective with the FY 08 Military Construction Program.)

Appendix E Landscape Maintenance Schedule

LANDSCAPE MAINTENANCE SCHEDULE	Inspection of Property	Snow Removal	Seasonal Clean-up	Weekly Watering	Overseed Turf Areas	Plant New Evergreens and Shrubs	Plant New Deciduous Shrubs	Prune Evergreens	Prune Early Flowering Shrubs	Prune Broadleaf Evergreens	Mulch Shrub Beds	Fertilize Shade Trees	Mulch Flower Beds	Weed Flower Beds	Plant Early Spring Annuals	Refresh Mulch Areas	Plant Summer Annuals & Perennials
January	o	o															
February	o	o	o						o								
March	o	o		o	o		o	o						o	o	o	
April	o			o	o		o	o			o		o			o	
May	o			o	o		o	o									o
June	o			o	o			o		o							
July	o			o	o												
August	o			o	o												
September	o			o	o	o		o				o					
October	o	o	o	o			o	o									
November	o	o	o	o			o	o									
December	o	o															

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Appendix F Prioritized Improvements Projects List

Prioritized Improvements Projects List						
INSTALLATION: Fort Campbell			<ul style="list-style-type: none"> • PRESS "ENTER" TO INSERT A NEW LINE. • PRESS "TAB" AT END OF LAST ITEM TO INSERT NEXT ITEM #. 			
DPW or EQUIVALENT - MASTER PLANNER						
NAME:		PHONE: EMAIL:		ADDRESS:		
PRIORITY NO.	PROJECT TITLE	RECOMMENDED FUNDING SOURCE	ALTERNATIVE FUNDING SOURCE	COST ESTIMATE	IDG PARA NO.	POINT OF CONTACT
1	Gate 4 Visitor's Center	OMA	-	\$42,460.23	6.2	
2	Wickham and Glider Roads Intersection	OMA	-	\$25,381.40	6.3	
3	Glider Road Four Lane Expansion	OMA	-	\$131,400.00	6.4	
4	Chapel Addition – Building and Landscape	OMA	-	\$35,470.00	6.5	
5	Hammerhead Barracks	OMA	-	\$150,836.80	6.6	
6	Gander Memorial	OMA	-	\$285,250.00	6.7	
7	Aviation Barracks Complex	OMA	-	\$111,900.00	6.8	
8	Buildings 2601 and 2603 Renovations/Removal	OMA	-	\$332,669.44	6.9	
9	Alert Holding Area (AHA) Near Gate 7	OMA	-	\$91,510.00	6.10	
10	Industrial Zone Screening Modifications	OMA	-	\$307,500.00	6.11	
11	Entrance Gate Numbers	OMA	-	\$10,500.00	6.12	
12	Engagement Skills Trainer	OMA	-	\$20,940.43	6.13	

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Appendix G Interior Design Guidelines

G.1 RESILIENT FLOOR COVERINGS

Materials	Advantages	Disadvantages	Applications	Cost Factor
Vinyl Composition Tile	Resistant to abrasion, oils, grease, acids, and alkalis	Does not tolerate standing water. Higher maintenance	Good for most commercial applications	Economical
Linoleum	Resilient, resistant to impact and abrasion	Susceptible to staining	Moderate traffic. Public areas.	Moderate
Cork	Resilient, resistant to impact and abrasion. Natural Product	Susceptible to staining	Moderate traffic. Public areas.	Expensive
Rubber	Resilient, resistant to impact and abrasion. Improves acoustics.	Not resistant to chemicals or grease.	General utility, floors and stairs.	Moderate
Sheet Vinyl	Waterproof. Resistant to most chemicals. Monolithic, weldable	Requires fairly smooth floor surface for installation.	Moderate traffic areas.	Moderate to Expensive
Static Conductive Tile	Dissipates static electricity.	Sensitive to extreme temperatures	Hospitals. Operating and Anesthetizing Areas, Computer rooms, Chemical Labs.	Expensive

G.2 HARD FLOOR COVERINGS

Materials	Advantages	Disadvantages	Applications	Cost Factor
Concrete (Untreated)	Non-slip, abrasion resistant. Can be painted or treated.	Gives off dust if not treated. Difficult to clean.	Utility flooring	Economical
Concrete (Treated)	Nonconductive. Non-dusting and non-slip. Abrasion resistant.	Requires special materials and method of application.	Industrial and Manufacturing areas where non-sparking is required.	Economical
Quarry Tile	Waterproof, resistant to grease and liquids.	Non resilient. May break under impact	Heavy traffic areas. Kitchens	Moderate
Ceramic Tile	Waterproof, resistant to most chemicals	Cold. May break under impact. Glazing can chip or crack.	High moisture areas, Bathrooms, Kitchens	Moderate
Brick	Resistant to abrasion, moisture and heat	Rough and uneven because of joints. Absorbs stains	Decorative	Expensive
Terrazzo	Durable in extreme weather conditions	Slippery when wet	Heavy traffic areas. Stairs, Hospitals.	Expensive
Stone	Durable in extreme weather conditions	Slippery when wet. Cracks under impact	Heavy traffic areas. Entries	Expensive
Wood	Relatively easy to clean and refinish.	Not resistant to abrasion or moisture.	Dry indoor locations, homes, gymnasiums	Moderate to Expensive
Laminate	Easy to clean. Easy to install. Abrasion resistant	Not ideal for wet areas. Unable to refinish.	Dry indoor locations.	Moderate

G.3 CARPET FIBER CHARACTERISTICS

(Properties listed are influenced by quality of construction, fiber modification and finishes)

	Wool	Nylon	Polypropylene/ Olefin	Acrylic/ Modacrylic	Polyester
Resiliency	Excellent	Good to Excellent	Good. Avoid high piles	Good to Excellent	Excellent to Fair
Abrasion Resistance	Good to Excellent	Excellent	Excellent	Fair to Excellent	Good to Excellent
Cleanability	Good to Excellent	Good to Excellent	Good. Should treat stains immediately.	Good	Good to Excellent. Should treat stains immediately.
Resistance to Sunlight	Poor	Good to Excellent	Loses strength and deteriorates.	Excellent	Good
Static	Builds up in low humidity.	Builds up in low humidity.	Builds up in low humidity at a lower level than wool or nylon.	Builds up in low humidity.	Builds up in low humidity.
Hand	Warm, soft.	Varies from warm, soft to cold, coarse.	Waxy, soft	Warm, soft.	Varies
Resistance to Mildew	Poor	Excellent	Excellent	Excellent	Excellent
Flammability	Burns slowly. Considered self-extinguishing.	Burns slowly. Melts in direct flame. Self-extinguishing	Melts at low temperatures.	Acrylic burns readily. Modacrylics are difficult to ignite, self-extinguishing and do not support combustion.	Burns slowly. Melts. Some are self-extinguishing.

G.4 WALLS

Materials	Advantages	Disadvantages	Applications	Cost Factor
Paint	Affordable. Easily applied and maintained. Available in a variety of colors, finishes and compositions.	One-dimensional. Its durability depends on its substrate.	Solid walls, faux finishes, patterns and graphics.	Economical
Vinyl Wallcovering	Relatively easily applied and maintained. Variety of colors, textures and patterns. Conceals flaws in substrate. Some acoustical benefits.	Susceptible to delamination. Not easy to repair.	Public spaces . Medium traffic areas.	Moderate
Fabric Wallcovering	Relatively easily applied and maintained. Variety of colors, textures and patterns. Conceals flaws in substrate. Some acoustical benefits.	Susceptible to delamination, fraying and raveling. Not easy to repair.	Low traffic and low abuse areas. Private Offices.	Expensive
Polyester High Performance Wallcovering	Relatively easily applied and maintained. Variety of colors, textures and patterns. Conceals flaws in substrate. Some acoustical benefits. Superior tear resistance. Washable/scrubbable (sometimes even with bleach). Often self-healing.	Difficult to repair.	All traffic areas. Private Offices.	Expensive
Ceramic Tile	Impervious. Available in wide variety of colors. Extremely durable.	Expensive. Brittle. Perceived as "cold feeling". Requires extraordinary substrate.	Wet areas. Clean areas. High traffic areas.	Expensive
Masonry	Extremely durable. Almost maintenance free	Perceived as less aesthetically pleasing.	High traffic areas. Wet areas.	Expensive

G.5 CEILINGS

Materials	Advantages	Disadvantages	Applications	Cost Factor
Painted Plaster or Drywall	Monolithic; Durable, Scrubbable;	Ceiling accessibility limited.	Areas where durability, cleanability	Economical
Vinyl Ceiling Panels	Easily installed. Relatively low initial cost. Easily maintained. Excellent ceiling accessibility. Color, texture and pattern options. Easy integration of lighting and HVAC. Scrubbable.	Less acoustical properties. Less aesthetics.	Food Prep areas; Wet areas	Moderate
Acoustical Ceiling Panels	Easily installed. Relatively low initial cost. Easily maintained. Excellent ceiling accessibility. Color, texture and pattern options. Easy integration of lighting and HVAC. Acoustical benefits.	Not easy to maintain or repair. Susceptible to moisture, soiling and impact damage. Difficult to clean.	Areas not susceptible to moisture or impact.	Moderate
Metal	Primarily aesthetic. Can conceal HVAC. Available in a wide variety of colors and patterns	Limited accessibility to ceiling.	Primarily Public spaces where aesthetics are important.	Expensive

G.6 ADMINISTRATIVE INTERIOR MATERIALS APPLICATIONS

Materials	Corridor	Office	Conference	Training	Class room	Toilet	Stairs
VCT	o	o	o	o	o		
Carpet	o	o	o	o	o		
Linoleum	o		o	o	o		
Cork			o				
Rubber	o						o
Sheet Vinyl	o	o	o	o	o	o	
Static Conductive Tile				o	o		
Concrete							o
Quarry Tile						o	
Ceramic Tile						o	
Wood							
Laminate							
Brick	o						
Terrazzo	o					o	o
Stone	o					o	

G.7 BARRACKS INTERIOR MATERIALS APPLICATIONS

Materials	Dry Room	Laundry	Corridor	Private Sleeping Quarters	Private Kitchenette	Private Toilet Room	Stairs
VCT	○		○	○	○		
Carpet							
Linoleum			○	○	○		
Cork							
Rubber							○
Sheet Vinyl		○		○	○	○	
Static Conductive Tile							
Concrete		○	○		○	○	
Quarry Tile		○		○	○		
Ceramic Tile		○			○	○	
Wood				○			
Laminate				○			
Brick			○				
Terrazzo			○		○		○
Stone			○		○		

G.8 RECREATIONAL INTERIOR MATERIALS APPLICATIONS

Materials	Gym	Multi-Purpose Room	Locker/Toilet
VCT		○	
Carpet		○	
Linoleum		○	
Cork	○	○	
Rubber	○	○	
Sheet Vinyl		○	
Static Conductive Tile			
Concrete			○
Quarry Tile			○
Ceramic Tile			○
Wood	○	○	
Laminate	○	○	
Brick			
Terrazzo			○
Stone			○

G.9 INDUSTRIAL INTERIOR MATERIALS APPLICATIONS

Materials	Office	Corridors	Locker/Toilet	Work Areas
VCT	o	o		o
Carpet				
Linoleum	o	o		
Cork				
Rubber		o		
Sheet Vinyl				
Static Conductive Tile				
Concrete	o	o	o	o
Quarry Tile			o	
Ceramic Tile			o	
Wood				
Laminate				
Brick				
Terrazzo			o	
Stone			o	

G.10 MEDICAL/HEALTHCARE INTERIOR MATERIALS APPLICATIONS

Materials	Office	Lobby	Toilet	Corridors	Exam
VCT	○	○		○	○
Carpet	○				○
Linoleum	○	○		○	○
Cork					
Rubber					
Sheet Vinyl	○	○		○	○
Static Conductive Tile					○
Concrete					
Quarry Tile			○		
Ceramic Tile			○		
Wood					
Laminate					
Brick					
Terrazzo		○	○		
Stone		○	○		

G.11 FORT CAMPBELL STANDARD INTERIOR FINISHES: SCHEME 'A'

(The following have been approved for use)

Materials	Manufacturer	Size	Color	Style	Name
VCT	Azrock	12" x 12"	Fieldstone	V957	Cortina Colors
Vinyl Base	Azrock	4"		CB-66	
Carpet	Lees	Broadloom	Mauve	115	Pebble Weave II
Carpet	Lees	Broadloom	Cloisonne	305	Pebble Weave II
Sheet Flooring	Tarket	6" x 6" Roll	Light Grey	12062	Eminent
Plastic Laminate (Vertical)	Wilsonart		Grey	I500N-60	
Plastic Laminate (Horizontal)	Wilsonart		Crystal Topaz	4582-07	
Solid Surface	Wilsonart		Lt. Beige Mirage	1521-MG	
Wall Paint	Sherwin Williams	Satin Finish	Garbo Silver	1017	
Trim Paint	Sherwin Williams	Semi-Gloss Finish	Garbo Silver	1017	
Ceiling Paint	ICI	Semi-Gloss	White High Hiding	2013	
ACT	USG	2'x2'x5/8"	White High Hiding	2120	Radar
ACT Grid	USG	15/16"	White		Donn DX
Window Blinds	Valencia Deluxe	1"	Metal	0285	

G.12 FORT CAMPBELL STANDARD INTERIOR FINISHES: SCHEME 'B'

(The Following have been approved for use)

Materials	Manufacturer	Size	Color	Style	Name
VCT	Azrock	12" x 12"	Windrift	V789	
Vinyl Base	Flexco	4"	Zephyr	VCB-031	
Carpet	Lees	Broadloom	Vienna Woods	204	Pebble Weave II
Sheet Flooring	Tarket	6" x 6" roll	Beige White	17770	Granit
Plastic Laminate (Vertical)	Wilsonart		Beige	1530-60	
Plastic Laminate (Horizontal)	Wilsonart		Caldera Beige	4608-60	
Solid Surface	Wilsonart		Alabaster Mirage	D431-MG	
Wall Paint	Sherwin Williams	Satin Finish	Garbo Silver	1017	
Trim Paint	Sherwin Williams	Semi-Gloss Finish	Garbo Silver	1017	
Ceiling Paint	ICI	Semi-Gloss	White High Hiding	2013	
ACT	USG	2'x2'x5/8"	White High Hiding	2120	Radar
ACT Grid	USG	15/16"	White		Donn DX
Window Blinds	Valencia Deluxe	1"	Metal	0023	

Appendix H Exterior Materials Chart

Building Design Element		Permitted Material Type	Notes (Hyperlinked)
Walls	Base (primary) material	Masonry, Pre-cast	
	Secondary material	Brick, Metal (as approved)	
Roof	Sloped areas	Asphalt Shingles, Standing Seam Metal (as approved)	
	"Flat" areas	Membrane Roofing	
Fenestration	Doors	Metal, Wood	
	Storm Doors	Metal	
	Door & Window Frames	Aluminum, Vinyl	
	Storm window or sash	Aluminum	
	Window	Clear Glass	
Trim Items	Fascia	Aluminum	
	Soffit	Aluminum	
	Gutters and D.S.	Aluminum	
	Awnings and canopies	Glass, Metal	
	Stair or balcony railings, balusters, and related trim/accessories	Metal	
	Handrails	Metal	

Building Design Element		Permitted Material Type	Notes
Trim Items	Fire Escapes	Metal	
	Grilles and louvers	Metal, Aluminum	
	Coping	Aluminum	
	Roof ventilators	Aluminum to match roof color	
Related Site Structures	Courtyard enclosure walls, retaining walls, fences, dumpster enclosures	Masonry, Metal	
	Porch crawl space enclosure	Masonry, Metal, Wood	

I.1 EXTERIOR COLOR CHARTS FOR INSTALLATION BUILDINGS

Colors schemes and building materials are critical design elements in relating adjacent buildings and creating a compatible visual environment within an installation. Related Army Standards are found in Chapter 3, Paragraph 3.5.5 Color, 3.5.5.2 Historic Buildings, 3.5.6 Texture, 3.5.7 Material, and 3.11 Renovations and Additions. This section identifies the Army standard palette of colors that will unify installations. 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. The 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.

their appropriateness to the building type, desired appearance, material to be painted, and prevailing architectural design and landscape character of the installation. Sustainability and ease of maintenance 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.

I.2 PANTONE® COLORS

The six digit color designations found in the Exterior Color Charts are **PANTONE® TPX** series numbers taken from the **PANTONE® for architecture and interiors color guide**, 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 and I800FP 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.

I.3 COLOR VALIDATION

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® TPX number and shall not be predicated on matching a computer-generated sample as seen in the Exterior Color Charts.

“White” when given without a number shall be construed as generic and is intended to cover those manufacturer’s paints and finished materials called “white”. Some slight variance may be discernible from one manufacturer to another.

I.4 COLOR NAMES

Names given for colors are not those assigned by **PANTONE®** but are rather the generic names used by the Army for general color identification only. Always use the six-digit **PANTONE® TPX** number instead of the generic name when specifying a color.

I.5 SUPPLEMENTAL COLOR BOARD

Included in this Appendix is a supplemental Color Board (Page L-4) containing squares with a simulation of each color used in the Exterior Color Charts. The electronic reproduction of this Color Board is, however, subject to some distortion and the color will probably be inaccurate to a greater or lesser degree depending on the printer used. A hard copy is available which contains accurate representations of all of the Army’s standard exterior colors. This hard copy is the **COLOR BOARD for the IDS APPENDIX L: HARD COPY VERSION** and may be requested by E-mail at: Baxter.Lawrence@mantech.com with a copy to Dannie.Fason@mantech.com.

If the E-mail is not acknowledged within three business days, call (703) 378-1030 to verify the request.

Provide the following information: quantity of color boards requested; name, title, and telephone number of person placing the order; mailing address; and the name of the installation.

I.6 FACTORY FINISHED MATERIALS

Colors given for surfaces that will be factory finished during manufacture are intended for guidance and are not intended to constitute a directive for a custom color or finish. Colors shall be selected from standard manufacturers colors with the exception of those manufactured products, which can be finished with a custom color at no additional cost and that would not result in diminishment of the standard material guarantee or serviceability.

I.7 SPECIALTY FINISHES

Site Elements, addressed in Chapter 6, are painted one of the colors used in the Color Charts and shown on the Color Board. Fire Hydrants (see Paragraph 6.6.6.5) which shall be Nutmeg Brown in color shall be finished in a standard manufacturer’s paint, suitable for this application, to which glass beads or other suitable reflective material has been added so as to create a light reflective finish meeting NFPA standards.

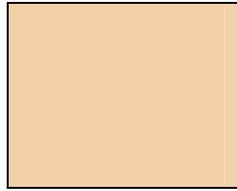
I.8 COLOR BOARD FOR THE ARMY INSTALLATION DESIGN STANDARDS

The color squares shown here are approximations of the **PANTONE® TPX** numbers indicated. They have been simulated using RGB values and are intended to be reproduced electronically. Color quality may vary with

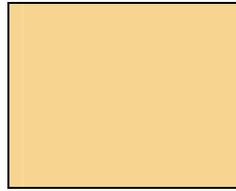
printer. **PANTONE® TPX** colors are a standard. In order to accurately reproduce the specified colors on these sheets and meet the required US Army standard, you must use the actual **PANTONE® TPX** swatch of the color indicated. A hard copy supplemental sheet with accurate color representations is available. See Paragraph L.5 for details.



11-0604 TPX
SHELL



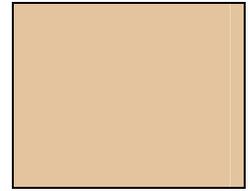
11-0907 TPX
ALMOND



12-0910 TPX
CUSTARD



12-4607 TPX
PASTEL SKY



13-1009 TPX
TAN



13-1013 TPX
ALLSPICE



13-1107 TPX
BEIGE



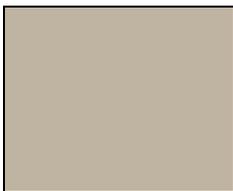
14-4506 TPX
BLUEGRAY



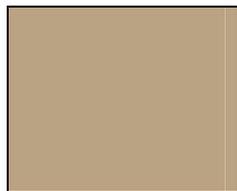
15-1306 TPX
TAUPE



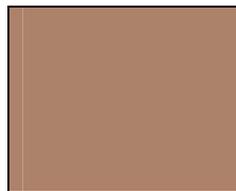
15-1309 TPX
NATURAL



15-5704 TPX
GRAY



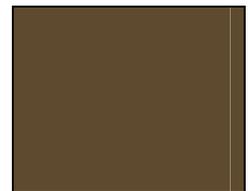
16-1210 TPX
MOCHA



16-1221 TPX
BROWN



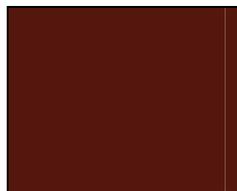
16-6216 TPX
METAL GREEN



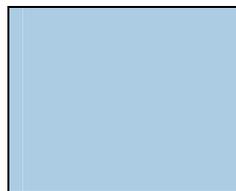
18-1027 TPX
DARK BROWN



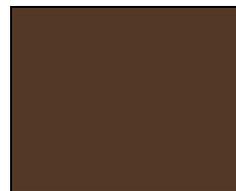
18-1444 TPX
SALSA



19-1540 TPX
MAROON



14-4318 TPX
SKY BLUE

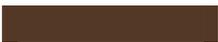


18-1027 TPX
NUTMEG BROWN

**LISTING OF ORIGINAL SOURCE FEDERAL OR COMMERCIAL MANUFACTURER'S DESIGNATION
WITH NEW IDS NAME & EQUIVALENT PANTONE® DESIGNATIONS**

Source	Old Federal Color Name and/or Number	Other Name and/or Number	IDS Name (Generic)	IDS and PANTONE® TPX Number	Process Number	(C-M-Y-K)
Federal Paint Number	Tan 23578		TAN	13-1009 TPX	24-7C	0-10-25-10
Federal Paint Number	Tan 23717		CUSTARD	12-0910 TPX	22-8C	0-5-15-0
Federal Paint Number	Gray 26492		GRAY	15-5704 TPX	329-9C	0-0-3-30
Federal Paint Number	White 20372		TAUPE	15-1306 TPX	31-8C	5-10-20-20
Federal Paint Number	Metal Green 24373		METAL GREEN	16-6216 TPX	285-7C	25-0-30-25
Federal Paint Number	Brown 20313		BROWN	16-1221 TPX	76-8C	0-25-25-20
Federal Paint Number	Mocha 20372		MOCHA	16-1210 TPX	48-9C	10-15-25-15
Federal Paint Number	Gray 25526		BLUEGRAY	14-4506 TPX	213-9C	20-03-03-15
Federal Paint Number	Ochre 31643		ALLSPICE	13-1013 TPX	36-8C	0-15-25-0
Duron	Oyster White 921	(Oyster White) Almond 5910W	ALMOND	11-0907 TPX	32-9C	0-5-10-0
Duron	Alcazar Brown 8306N	Dark Brown 5225N	DARK BROWN	18-1027 TPX	318-1C	70-80-100-30
Duron	Shell White 917	White 5770W	SHELL	11-0604 TPX	No Match	0-3-3-0
Generic (no mfg. ref.)	Chocolate		DARK BROWN	18-1027 TPX	318-1C	70-80-100-30
ICI	Dusty Trail # 425		NATURAL	15-1309 TPX	44-7C	20-20-30-5
ICI	Sand Motif # 422		MOCHA	16-1210 TPX	48-9C	10-15-25-15
ICI	Bisque # 436		BEIGE	13-1107 TPX	43-9C	10-10-15-0
ICI	Salsa # 123		SALSA	18-1444 TPX	83-3C	30-75-75-0
ICI	Liberty Red # 159		MAROON	19-1540 TPX	69-2C	20-75-80-30
Generic (no mfg.ref.)	Pastel Sky		PASTEL SKY	12-4607 TPX	247-8C	20-0-5-3
			SKY BLUE	14-4318 TPX	229-7C	40-5-5-0
SHERMAN WILLIAMS		JAVA SW6090	NUTMEG BROWN	18-1222 TPX	322-9C	50-55-55-0

EXTERIOR COLOR CHART: CENTRAL ATLANTIC USA

Building Design Element		Required Color Standard	Color Sample (See Note 4)	Notes (Hyperlinked)
Walls	Base (primary) Material	Red Brick or limestone neutral gray tones		
	Secondary Material	Almond 11-0907 TPX or Custard 12-0910 TPX		
		Mocha 16-1210 TPX or Blue Gray 14-4506 TPX		
Roof	Sloped Areas	Metal Green 16-6216 TPX		
		Clay Terracotta		
		Fiberglass Shingle Gray/White		
	“Flat” Areas	White		
Fenestration	Doors	Wood: White 11-0604 TPX		
		Steel: Dark Brown 18-1027 TPX		
	Storm Doors	White		
	Door & Window Frames	Brown 16-1221 TPX		
	Storm Window or sash	White		
	Window	White		
Trim Items	Fascia	White		
	Soffit	White		
	Gutters and D.S.	Brown 16-1221 TPX		
	Awnings and Canopies	Tan 12-0910 TPX		
	Stair or Balcony Railings, Balusters and related Trim	Dark Brown 18-1027 TPX		
	Handrails	Dark Brown 18-1027 TPX		

Building Design Element		Required Color Standard	Color Sample (See Note 4)	Notes
Trim Items	Fire Escapes	Dark Brown 18-1027 TPX		
	Grilles and Louvers	Brown 16-1221 TPX		
	Coping	Brown 16-1221 TPX		
	Roof Ventilators	Blend to match roof		
Related Site Structures	Courtyard Enclosure Walls, Retaining Walls, Fences, Dumpster Enclosures	Red Brick or Dark Brown 18-1027 TPX		
	Porch Crawl Space Enclosure	White		

NOTES:

Note 1

Color samples are electronic approximations of colors, which should not be construed as accurately representing the color standard. Paint shall match the PANTONE® number.

J.1 INTRODUCTION

J.1.1 Military Planning and Design

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.

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 Campbell.

J.2 HISTORIC PRESERVATION REGULATIONS

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)

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)

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)

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. 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.

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 (Installation Name) Integrated Cultural Resources Management Plan (ICRMP).

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.

J.3 STANDARDS AND GUIDELINES

J.3.1 Rehabilitation of Historic Properties

Design and renovation guidelines for historic districts, such as those within Fort Campbell 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.

New work should not:

- 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.

New work should:

- Seek to enhance and protect the historic quality and existing resources. For example:



Figure J-1 Make Every Effort to Use Historical Structures as Originally Intended



Figure J-2 Retain Distinguished Stylistic or Character Defining Features

- 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.

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.

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.

J.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.

J.3.3 Standards for Historic Preservation Projects

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 (Figure J-1).

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 (Figure J-2).

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.

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.

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.

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.

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.

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.

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.

Archaeological resources

All treatment work, which potentially affects surface or sub-surface pre-historic or historic archaeological resources, should be coordinated with an archaeologist.

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.

J.3.4 Guidelines for Historic Preservation Projects

Roof Guidelines

Preserve existing historic roofing. Repair and patch with matching materials (Figure J-3).

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 elements such as brackets, dentils, and cornices. When possible, restore missing decorative elements.



Figure J-3 Replace or Restore Roofs with Historic Materials



Figure J-4 Retain Existing Historical Porches

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.

Porch Guidelines

Retain or maintain existing original porches.

Remove historically inappropriate porches (Figure J-4).

Where possible, restore original porches that have been removed or enclosed.

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.

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.

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.

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.

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.

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.

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.

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](#).

J.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](#)

J.5 REFERENCES

- [Advisory Council on Historic Preservation, United States Army Environmental Center](#)

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM		USE		CONDITION		FOLIAGE		FEATURE		HEIGHT		GROWTH																					
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast						
Liquidambar styraciflua Sweetgum	o												o					o			o	o	o							o	o	o				
Liriodendron tulipifera Tulip Poplar	o			o	o								o					o					o	o			o				o		o			
Magnolia soulangiana Saucer Magnolia		o		o									o					o						o	o						o					
Magnolia stellata Star Magnolia		o		o									o					o						o	o						o					
Magnolia virginiana Sweetbay Magnolia	o			o	o								o	o	o		o	o						o	o						o					
Malus floribunda Flowering Crabapple		o		o									o					o						o	o						o					
Morus rubra Red Mulberry	o		o										o	o			o	o													o			o		
Platanus occidentalis Sycamore	o				o	o							o	o		o	o	o						o	o						o			o		
Populus deltoids Eastern Cottonwood	o				o					o			o				o	o									o	o				o			o	
Prunus cerasifera Purpleleaf Plum		o		o									o					o						o	o						o			o		
Prunus sargentii Sargent Cherry		o		o	o	o							o	o				o						o	o						o			o		
Pyrus calleryana Peartree		o		o	o	o							o	o				o						o	o						o			o		
Quercus alba White Oak	o			o	o	o							o	o				o						o	o						o	o			o	
Quercus bicolor Swamp White Oak	o			o	o	o				o			o			o	o	o						o	o						o	o			o	
Quercus palustris Pin Oak	o					o							o				o	o						o	o						o				o	
Quercus phellos Willow Oak	o				o								o	o				o						o	o						o	o			o	
Quercus rubra Northern Red Oak	o			o	o								o	o				o						o	o						o	o			o	
Salix nigra Black Willow	o			o									o	o				o						o	o						o			o		o
Sassafras verifolium Sassafras	o		o										o	o				o						o	o						o			o		o

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM			USE				CONDITION				FOLIAGE		FEATURE			HEIGHT			GROWTH										
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast		
Tilia cordata Little Leaf Linden	o				o	o	o					o	o				o					o			o							
Ulmus Americana American Elm	o		o					o							o							o			o						o	
Zelkova serrata Green Vase Zelkova		o				o	o	o		o			o					o				o				o						
Shrubs																																
Abelia grandiflora Glossy Abelia		o	o					o				o	o						o				o	o								
Aronia arbutifolia Red Chokeberry	o		o			o		o	o	o		o	o		o	o	o				o		o	o		o						
Azalea Azalea sp.		o	o					o	o	o		o	o					o	o			o	o			o						
Buxus sempervirens Boxwood		o	o					o		o		o	o						o	o					o		o	o				
Chaenomeles speciosa Flowering Quince		o		o				o		o		o	o					o			o		o		o							
Cornus amomum Silky Dogwood		o		o	o				o	o			o	o	o			o	o				o	o		o					o	
Cotoneaster Rock Spray		o	o	o				o			o	o						o			o	o	o	o	o			o				
Forsythia x intermedia Border Forsythia		o	o	o				o	o	o	o	o						o				o	o		o						o	
Hamamelis virginiana Witch Hazel	o		o					o	o	o			o		o			o					o	o								
Hibiscus syriacus Rose of Sharon		o	o	o				o	o	o		o	o					o			o		o	o		o						
Hydrangea quercifolia Oakleaf Hydrangea	o		o					o	o	o		o	o					o				o	o		o							
Ilex glabra Inkberry	o		o	o				o		o		o	o	o		o			o		o			o	o		o					
Ilex verticillata Winterberry	o		o	o				o		o		o	o					o			o			o	o		o					
Itea virginiana Virginia Sweetpire	o		o					o	o			o	o	o		o			o			o	o		o							
Juniperus chinensis Chinese Juniper		o	o	o				o	o	o		o			o			o						o	o	o	o	o				

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN	FORM	USE	CONDITION	FOLIAGE	FEATURE	HEIGHT	GROWTH
	Native Introduced	Irregular Oval/Round Upright Pyramidal Vase	Street Tree Accent/Residential Woodland Infill Barrier, Buffer/Screen Erosion Control	Sun Partial Shade Shade Drought Wet Conditions	Deciduous Coniferous Evergreen/Semi	Fragrance Fruit/Nut/Herb Fall Color/Interesting Bark Flower	Small Medium Large	Slow Medium Fast
Kalmia latifolia Mountain Laurel	○	○	○	○	○	○	○	○
Leucothoe catasbaei Drooping Leucothoe	○	○	○	○	○	○	○	○
Lindera benzoin Spicebush	○	○	○	○	○	○	○	○
Mahonia aquifolium Oregon Grape	○	○	○	○	○	○	○	○
Myrica Pennsylvanica Northern Bayberry	○	○	○	○	○	○	○	○
Nandina domestica Harbor Nandina	○	○	○	○	○	○	○	○
Pyracantha coccinea Scarlet Firethorn	○	○	○	○	○	○	○	○
Sambucus Canadensis American Elderberry	○	○	○	○	○	○	○	○
Rhododendron sp. Rhododendron	○	○	○	○	○	○	○	○
Rosa Scarlet Medland Rose	○	○	○	○	○	○	○	○
Rhus typhina Sumac	○	○	○	○	○	○	○	○
Taxus sp. Yew	○	○	○	○	○	○	○	○
Thuja occidentalis American Arborvitae	○	○	○	○	○	○	○	○
Viburnum dentatum Arrowwood	○	○	○	○	○	○	○	○
Viburnum opulus Cranberry Viburnum	○	○	○	○	○	○	○	○
Viburnum plicatum Doublefile Viburnum	○	○	○	○	○	○	○	○
Viburnum prunifolium Blackhaw Viburnum	○	○	○	○	○	○	○	○
Viburnum rhitidophyllum Leatherleaf Viburnum	○	○	○	○	○	○	○	○

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN	FORM	USE	CONDITION	FOLIAGE	FEATURE	HEIGHT	GROWTH
	Native Introduced	Irregular Oval/Round Upright Pyramidal Vase	Street Tree Accent/Residential Woodland Infill Barrier, Buffer/Screen Erosion Control	Sun Partial Shade Shade Drought Wet Conditions	Deciduous Coniferous Evergreen/Semi	Fragrance Fruit/Nut/Herb Fall Color/Interesting Bark Flower	Small Medium Large Slow Medium Fast	
Perennials								
Hemerocallis								
Daylily sp.	o		o o	o o		o	o o	o
Hosta sieboldiana	o	o						
Hosta sp.			o o	o o		o	o o o	o
Groundcover								
Chimaphila maculate	o							
Wintergreen		o	o	o	o	o	o	o
Liriope muscari								
Lilyturf		o	o	o o o		o	o o	o o
Mitchella repens	o							
Partridgeberry		o	o o	o o	o	o	o o	o o
Pachysandra terminalis								
Pachysandra	o	o	o	o o	o		o	o
Phlox subulata	o	o	o			o	o	o
Moss Phlox								
Senecio auerus	o	o	o			o	o	o
Golden Ragwort								

Appendix L Centers of Standardization

L.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.

L.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- 10 Years Old
	Physical Fitness Facilities
	Fire Station
	Hazardous Material Storage Facility
	Outdoor Sports Facility
	Close Combat Tactical Trainer (CCTT)
	Urban Assault Course (UAC) <i>replaces:</i> <i>Military Operations Urban Terrain (MOUT)</i>
	Training Range
	Youth Activity Center
	Bowling Center (RFP)
	Army Community Service Centers
	Consolidates 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, Mobile ATTN: CESAM-PM-SI P.O. Box 2288 Mobile, AL 36652-2288 Telephone: 251-394-3600	National Guard Armory
	Company Operations Facility (COF)
	Military Entrance Processing Station (MEPS)
U.S. Army Engineer District, Savannah ATTN: CESAS-EN-E P.O. Box 889 Savannah, GA 31402 Telephone: 912-652-5212	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. 101 ST 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

Appendix M Fort Campbell Standards and References

M.1 STANDARDS AND REFERENCES

Standards and References for the Army Installation Design Standards (IDS).

M.1.1 Chapter 2, Site Planning Design Standards

Army Standards

- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Army Regulation \(AR\) 200-2, Environmental Effects of Army Actions](#)
- [Army Regulation \(AR\) 210-20, Master Planning for Army Installations](#)
- [Army Regulation \(AR\) 415-15, Army Military Construction Program Development and Execution](#)
- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)

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 \(UFC\) 3-210-06A, Design: 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](#)
- [Technical Instructions \(TI\) 800-01, Design Criteria](#)
- [Technical Instructions \(TI\) 801-02, Family Housing](#)
- [Master Planning Instructions \(MPI\)](#)
- [Whole Building Design](#)

M.1.2 Chapter 3, Building Design Standards

Army Standards

- [Army Regulation \(AR\) 200-4, Cultural Resources Management](#)
- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems](#)
- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [UFC 4-171-05, Design: Guide for 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](#)
- [Technical Manual \(TM\) 5-807-10, Signage](#)
- [Technical Instructions \(TI\) 809-04, Seismic Design for Buildings](#)
- [Technical Instructions \(TI\) 809-05, Seismic Design Evaluation and Rehabilitation for Buildings](#)
- [Technical Manual \(TM\) 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, Seismic Design for Buildings](#)
- [Technical Manual \(TM\) 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chap 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Standards of Seismic Safety for Existing Federally Owned and Leased Buildings](#)
- [Army Barracks Master Plan, Appendix I, Army Barracks Standards](#)
- [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](#)
- [Design Manual for Remote Target Systems \(RETS\) Ranges, CEHCN 1110-1-23 Manual](#)
- [Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, Supplement to CEHCN 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 \(COF\)](#)

References

- [Army Regulation \(AR\) 190-13, The Army Physical Security Program](#)
- [Army Regulation \(AR\) 200-1, Environmental Protection and Enhancement](#)
- [Army Regulation \(AR\) 200-2, Environmental Effects of Army Actions](#)
- [Army Regulation \(AR\) 200-4, Cultural Resources Management](#)
- [Army Regulation \(AR\) 210-20, Master Planning for Army Installations](#)
- [Army Regulation \(AR\) 210-21, Army Ranges and Training Land Program](#)
- [Army Regulation \(AR\) 405-45, Real Property Inventory Management](#)
- [Army Regulation \(AR\) 405-70, Utilization of Real Property](#)
- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 8](#)
- [Unified Facilities Criteria \(UFC\) 4-510-01, Design: Medical Military Facilities](#)
- [Unified Facilities Criteria \(UFC\) 1-200-01, Design: General Building Requirements, 31 July 2002](#)
- [Unified Facilities Criteria \(UFC\) 3-400-01, Design: Energy Conservation](#)
- [Unified Facilities Criteria \(UFC\) 3-130-07, Arctic and Subarctic Construction - Buildings](#)
- [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](#)
- [Department of Defense \(DoD\) Interior Design Website](#)
- [Technical Instructions \(TI\) 800-01, Design Criteria](#)
- [Technical Instructions \(TI\) 811-16, Lighting Design](#)
- [Technical Manual \(TM\) 5-683, Electrical Interior Facilities](#)
- [Technical Manual \(TM\) 5-688, Foreign Voltage and Frequencies Guide](#)
- [Army Barracks Master Plan](#)
- [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](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Whole Building Design Guide](#)
- [Unified Facilities Guide Specifications \(UFGS\), "Division 12 - Furnishings", Construction Criteria Base](#)
- [Engineering and Construction Bulletins](#)
- [Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003](#)

M.1.3 Chapter 4, Circulation Design Standards

Army Standards

- [Army Regulation \(AR\) 420-72, Transportation Infrastructure and Dams](#)
- [Technical Manual \(TM\) 5-811-1/Air Force AFJMAN 32-1080, Electric Power Supply and Distribution](#)
- [Technical Manual \(TM\) 5-850-2/Air Force AFJMAN 32-1046, Railroad Design and Rehabilitation](#)
- [Manual For Railway Engineering](#)
- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Unified Facilities Criteria \(UFC\) 3-210-02, Design: 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](#)
- [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).

References

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 9](#)
- [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](#)".

M.1.4 Chapter 5, Landscape Design Standards

Army Standards

- [Unified Facilities Criteria \(UFC\) 3-210-05FA, Design: Landscape Design and Planting Criteria](#)
- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Technical Manual \(TM\) 5-630, Natural Resources Land Management](#)
- American Standard for Nursery Stock, ANSI Z60.1
- Overseas (Host Nation Standards)

References

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 10](#)
- [USAF Landscape Design Guide](#)
- C. Brickell and D. Joyce. Pruning and Training, 1996

M.1.5 Chapter 6, Site Elements Design Standards

Army Standards

- [DoD 4525.8-M, DoD Official Mail Manual](#)
- [Army Regulation \(AR\) 420-49, Utility Services](#)
- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Army Regulation \(AR\) 420-72, Transportation Infrastructure and Dams](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Technical Manual \(TM\) 5-807-10, Signage](#)
- [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](#)

References

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 11](#)
- [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 Instructions \(TI\) 811-16, Lighting Design](#)
- [Technical Manual \(TM\) 5-663, Child Development Center, Play Area Inspection and Maintenance Program](#)
- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design](#)

M.1.6 Chapter 7, Force Protection Design Standards

Army Standards

- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Unified Facilities Criteria \(UFC\) 4-010-10, 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](#)

References

- [Unified Facilities Criteria \(UFC\) 2-600-01, Installation Design, Chap 12](#)
- 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. Users may contact the Point of Contact posted at the following website to obtain a copy of the Handbook).

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<http://www.dtic.mil/whs/directives/corres/html/o200012h.htm>

- Army Regulation (AR) 525-13, The Army Force Protection Program (Available only through the [Army Knowledge Online](#) web portal).
- UFC 4-010-02, *DoD Security Engineering Manual*, (This document is in draft form. See the Security Engineering Working Group website).
- U.S. Air Force, [Installation Force Protection Guide](#): (Contains information on installation planning, engineering design, and construction techniques that will preclude or minimize the effect of a terrorist attack).
- Technical Manuals/Air Force Manual series TM 5-853/AFMAN) 32-1071, Security Engineering, 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 a standard publications account. The three volumes cover, Project Development, Concept Design, and Final Design respectively).

M.1.7 Appendix D, Sustainable Design

Army Standard

- The SPiRiT rating of "Silver" is the standard for all FY06 MILCON vertical construction projects currently under design (as of March 18 2003). For all other FY06 and future-year MILCON projects the minimum SPiRiT rating requirement is "Gold". See [Assistant Secretary of the Army memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003](#).

References

- [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](#)

M.1.8 Appendix J, Historic Preservation Guidelines

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](#)

References

- [Advisory Council on Historic Preservation](#)
- [United States Army Environmental Center](#)