Executive Summary

To understand architectural compatibility and how it affects the Air Force, an understanding of the term is necessary. Compatible is generally defined as "the ability to exist and perform in harmonious combination." Architectural compatibility results from designing and building facilities in harmony with their natural and surrounding built environment. Therefore, architectural compatibility is concerned not only with the physical appearance of buildings, but with site planning, landscape development, security, and sustainability.

Military installations should provide efficient and pleasant physical environments conducive to attracting and retaining skilled and motivated personnel. The design, location, and maintenance of individual elements such as buildings, roads, parking lots, signs, and landscaping create the quality of the environment. Each of the elements should be functional, attractive, and harmonious with each other. This helps to create an environment that enhances the capability of the installations to support their mission and fosters pride in, and a commitment to military service.

Adoption of these guidelines by base leadership will ensure compliance and result in a homogenous community fabric improving overall installation appearance and mission effectiveness.

Specific study objectives include:

- To promote the sense of a unified community by strengthening the prevailing character of the base
- To define goals and objectives leading to more consistency for leadership decision-making
- To provide a view of the base in terms of Visual Districts
- To discuss recommended architectural themes for each Visual District

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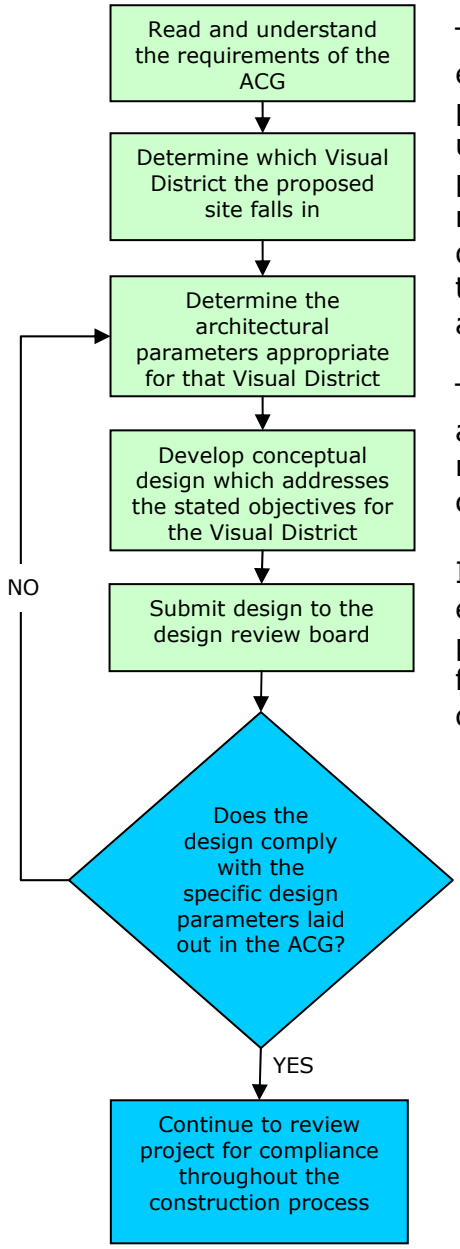
1 Introduction

1.1 Purpose

The purpose of the Architectural Compatibility Guide (ACG) is to establish and document installation-specific standards and provide a tool to assure these standards are consistently applied. The ACG strives to recognize the cultural, environmental, climatic and existing facility conditions particular to Keesler AFB and define the appropriate styles, finishes, and materials to be used to achieve the best facility life-cycle costs and still retain the appropriate environment for people to achieve their highest productivity and efficiency.

- Provide a record of established goals, objectives, and decisions leading to more consistent decisions when a change in installation leadership occurs.
- Improve the environment through the installation's construction projects.
- Provide a mechanism for environmental design continuity.
- Develop a baseline for review and, if necessary, for changes that may occur as a result of redirection in goals and objectives.
- Establish consistency in installation development which takes into account all elements of the environment.
- Influence design expression. These principles should not be so specific that design freedom is restricted. A designer should have sufficient latitude for creativity.
- Provide clear and consistent communication between the Air Force and designers; whether they are in-house or contracted professionals.
- Improve programming and budgeting by limiting the range of options and promoting consistency.
- Impart a sense of pride, organization, vitality, and good management. The installation should convey the feeling that it is a good place to work and live. It should reflect a leadership that cares about its people.

1.2 Use & Implementation



The ACG is a tool to chart a course towards installation excellence and provides a means to assess the installation's progress in achieving that end. The ACG is intended to be used at all stages of the facility delivery process from programming through construction, and even operations and maintenance. It is essential that the ACG be provided to the design agent and AE consultants early in the design process to assure that the entire design team understands the applicable design standards and objectives for the project.

The ACG is by no means a stand-alone document. It should always be used in conjunction with the planning and design resources found in chapter 4 of this document to ensure compliance with Base standards and goals.

Implementing a strict design review process is important to ensure the Architectural Compatibility Plan is followed as projects are conceived, designed, and constructed. The flowchart to the left outlines the typical process for ensuring compliance with this guide.

2 Base Information

2.1 Installation Profile

2.1.1 Location

Keesler AFB is located in Biloxi, Mississippi, approximately midway between Mobile and New Orleans. The installation is on a narrow peninsula running west to east, with the Back Bay of Biloxi to the north and the Mississippi Sound, part of the Gulf of Mexico, to the south. US Highway 90 parallels the base's southern border and provides access, by US Highways 49 and 110, to Interstate 10.

2.1.2 Mission Summary

Keesler is the home of one of the largest technical training centers and the second largest medical group in the Air Force. The 81st Training Wing is the host unit. Major associate units are: Headquarters Second Air Force, the 403rd Wing, and the 738th Engineering Installation Squadron.

2.1.3 History of Base

During the Great Depression, Biloxi officials sought ways to spur economic development through the use of parkland. The city provided land for a Veterans Administration hospital and built an airport. The airport, with 1,563 acres, was donated for the 1941 establishment of an Army Air Corps technical training school. Keesler Army Airfield was named in honor of Second Lieutenant Samuel Reeves Keesler, Jr. A combat aerial observer from Greenwood, Mississippi, he was killed in action in France during World War I.

During World War II, Keesler trained 142,000 aviation mechanics and 336,000 recruits. Most B-24 bomber mechanics were Keesler graduates. Since 1947, when aircraft mechanics training was moved to other centers and the Air Force's radar training school moved to Keesler, the primary mission has been electronics training.

The base underwent a multimillion dollar building program to meet the challenge of the Korean Conflict. Changes in radar and communications during the 1950s were reflected in

technical training at Keesler. Communication and control courses moved to Keesler from Scott AFB. Missile and computer training began in the 1950s. In the 1960s, flying training was added to the training center's mission with pilot training for foreign nationals, mostly from South Vietnam, in T-28, T-41, and C-47 aircraft. In 1968, personnel and administration courses were moved to Keesler from Amarillo AFB, and astronautics and space systems courses were added.

During the 1970s, tenant support expanded. The base's primary aircraft became the C-130, used by new cartographic, weather reconnaissance, and Reserve tactical aircraft tenants. To meet the needs of the C-130s and the c-9 aeromedical flights, the base extended the runway in 1974.

Throughout the 1970's and the 1980s, training at Keesler AFB was continuously improved to be more cost effective and to develop the "whole person". Two areas of training received increased attention in the early 1980s—the Airborne Warning and Control Systems (AWACS) and the Ground Launched Cruise Missile (GLCM). In 1981, when President Regan fired striking civilian air traffic controllers who were trained at Keesler stepped in to fill in the gap.

The 1990s brought the nation another military conflict, Operation Desert Storm. Many Keesler personnel played and active role, not only supporting troops and equipment movement, but also deploying to the Middle East. The 1990s has also brought Keesler new missions, resulting from base realignment and closure. Weather training was moved from Chanute AFB in 1993. Flying training returned in 1994 with the instruction of pilots in C-12 and C-21 aircraft. The Second Air Force was reactivated in 1993 as part of AETC and was Headquarters at Keesler. Kessler AFB remains the largest technical training center in the Air Force, having graduated nearly two million students, from every military branch and from more than 50 countries.

Wing Headquarters portico

Triangle Dorm cornice detail

2.2 Local Characteristics

2.2.1 Climate & Weather

The climate of the region is subtropical, with mild winters and warm, moist summers. The high humidity should influence construction material and building system selection. Average temperatures range from 52 degrees in the winter to 83 degrees in the summer. Average annual precipitation is 61 inches, with July the wettest month and October the driest. In the autumn and winter, winds are predominantly from the north, and in the spring and summer, they are predominantly from the south. Wind velocity at the base averages six miles per hour; however, the maximum wind speed recorded at the base was 130 miles per hour during a hurricane.

2.2.2 Prevailing Architectural Character

The character of Keesler AFB has been preserved and enhanced through the use of contemporary architecture with regional detailing. Examples of the regional detailing can best be seen in the cornice details at the triangle dorm area and the portico at the Wing Headquarters building. Roof overhangs can reinforce the climate and sun conditions of the area. Consistent color schemes and materials used throughout the base help to establish a good basis for architectural compatibility at Keesler.

2.2.3 Topography

The Gulf Coast Geosynclines dominate the regional geologic structure. It is a large sinking trough of the delta-deposited sediments in the Gulf of Mexico. Records of on-base drilling show recent and coastal deposits directly overlaying the Graham Ferry formation contain layers of gumbo, shells, clay, sand and shale. The geologic units underlying Keesler AFB are not disrupted by faulting of other geologic discontinuities. The coastal area of Mississippi has not been seismically active in recent time and lies in a zero zone of seismicity.

Keesler AFB is located within the Pamlico Plain, a major landform in the East Gulf subdivision of southern Mississippi. The Pamlico Plain is generally flat or gently undulating with elevations averaging from 5 to 30 feet above mean sea level. Depressions are frequently wet and poorly drained. Ground elevation on Keesler ranges from sea level to approximately 30 feet above sea level.

Small tidal creeks drain into the Back Bay of Biloxi along Keesler's northern edge. The stormwater sewer system dominates surface water hydrology in the interior. A manmade lake is located on the golf course. Water has been found less than three feet below the surface. The water table occurs as a replica of the topographic surface and slopes gently towards the Back Bay and the Mississippi Sound. Citronelle Aquifer is the shallowest significant source of ground water in much of southern Mississippi; however, the extent of it near Keesler is unclear. The Miocene Aquifer at Keesler AFB extends from 20 to over 3,500 feet below land surface.

3 Architectural Design Guidelines

3.1 Landscape/Site Design

3.1.1 Introduction

Landscaping and site design should provide developed outdoor spaces to promote social interaction and foster a sense of community on the base. Existing features, such as trees and views should be capitalized on whenever possible.

3.1.2 Installation Boundaries

The appearance of installation boundaries can be enhanced by providing simple and low maintenance plantings. These plantings can also serve to limit sight lines into the facility, thus improving security.

3.1.3 Circulation

Streets

Provide access to facilities from secondary (collector) streets to reduce congestion associated with main arterial streets. Where possible, divide main entrances with landscaped traffic medians between entry and exit lanes.

Troopwalks

Troopwalks should be considered during development as a base planning element. They are pedestrian circulation on a larger scale.

- Troopwalks should be 10-12 feet wide.
- Road crossings should incorporate a crosswalk with flashing lights to warn motorists.
- Vehicle access should be prohibited and controlled through the use of bollards. Extra consideration for emergency vehicles should be made if the troopwalk is to support that function, both in location and design.

- Materials should match the adjacent facilites. Colors and detailing should be repeated with special attention to walk intersections.

Sidewalks

Sidewalks, plazas, and covered walkways should be an important element in any new construction project.

- Sidewalks should be separated from vehicular traffic whenever possible.
- Walkways to building entrances should be 8 feet wide.
- Sidewalks should typically be 6 feet wide.

Bicycle Paths

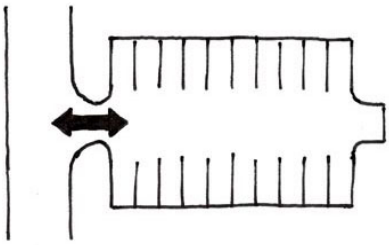
Bicycles comprise an alternate form of transportation at Keesler AFB, but often they must compete with motorized vehicles and pedestrians for roadway space. Dedicated bicycle paths are encouraged to allow safe movement by bicycle to all major areas of the base.

- Separate bike routes from both roadways and sidewalks.
- The width of the bike routes shall be a minimum of 8 feet.
- Provide concrete paving for bike routes.
- Crossings shall be marked with clearly visible painted stripes.
- Careful attention should be paid to curb cuts at roadway intersections.

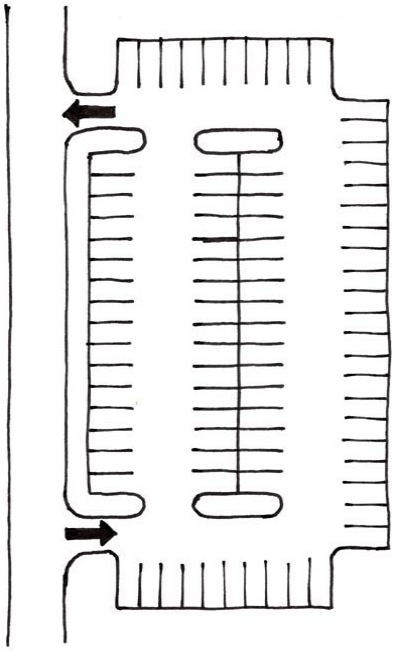
Parking Areas

Vehicle parking areas consume more site space and impact more on the physical environment than any other site feature. Paving increases storm water runoff, results in increased reflected and absorbed radiation, and raises the ambient air temperature of the surrounding area. Parking areas also contribute to reflected sun glare off vehicles, increased air pollution, and concentrated contamination of runoff from leaking oil and antifreeze. Parking lots should effectively remove vehicles from the street, be well lit, and include convenient walkways from the parking spaces up to the main entry of the building they serve.

Small parking areas are usually preferable to large parking areas, as they enhance the visual environment by increasing the percentage of landscaped area to paved area.



Dead-end parking may only be used to serve 20 or fewer parking spaces.

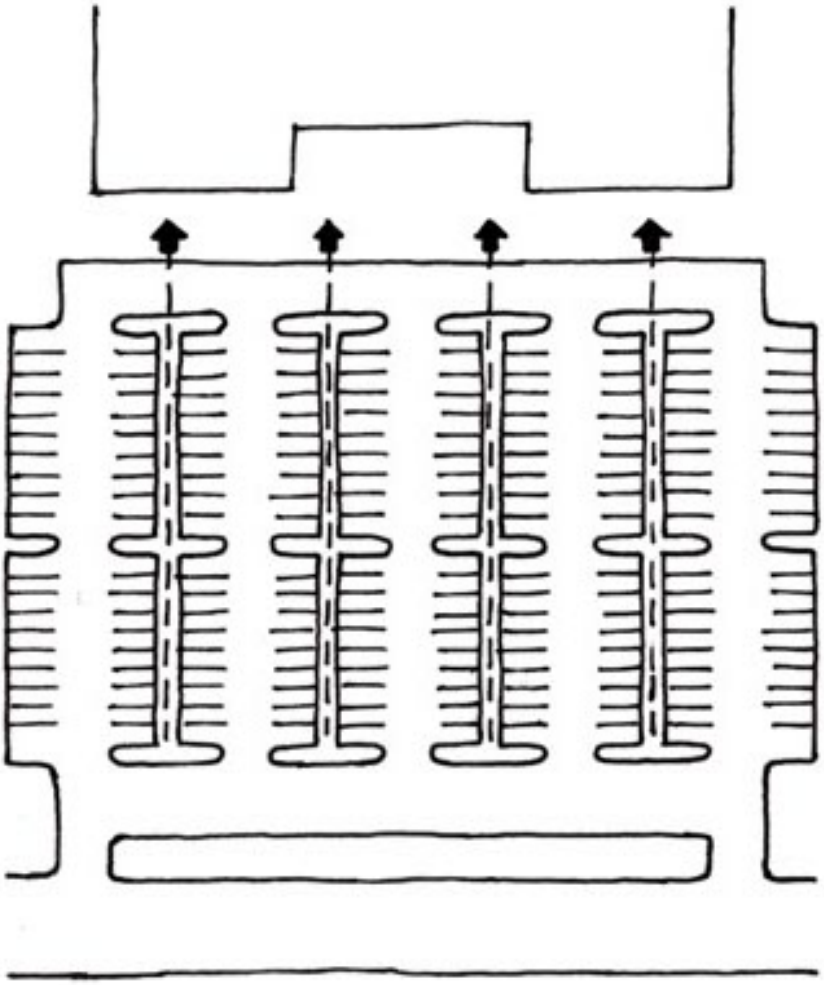


Parking lots with more than 20 spaces require separate ingress/egress drives.

Parking areas shall be designed based on the following criteria:

- Parking lots should be located to maximize sharing with other related facilities.
- Typical parking bay shall be 9 feet x 19 feet.
- 90-degree spaces and two-way traffic aisles are the desired configuration.
- Minimum distance between parking areas and buildings shall be 82 feet (25 meters).
- One-way drives should be a minimum of 12 feet wide.
- Two-way drives should be between 24-26 feet wide.
- Curbing shall be continuous where possible and serve as wheel stops.
- Avoid on-street parking.
- Parking lots that promote cross-traffic between parallel streets should be avoided.
- On-street, head-in parking that would require backing of a vehicle onto any street should not be permitted.
- Parking and crosswalk striping should follow base standards or the Military Traffic Management Commander transportation agency (MTMC).
- Perimeter screen planting shall be encouraged to minimize the visual impact of parking areas.
- Within large parking areas rows shall be divided by a center island. Islands shall be at least 8 feet wide if they are to contain trees.
- Avoid planting shrubs in islands. Trees are acceptable.
- Lighting poles shall be located in center or side islands.
- Comply with the requirements of the Americans with Disabilities Act (ADA) for the design of parking areas.
- Accessible parking shall be provided at the following ratios: Up to 100 spaces: 1 accessible bay per 25 bays. 100 to 200 spaces: 1 accessible bay per 50 bays. 200 to 500 spaces: 1 disabled bay per 100 bays
- Accessible parking spaces shall be designated by a sign showing the symbol of accessibility.
- Ramps should be provided for the handicapped as required.

- Angled parking shall be as per the Military Traffic Management Commander transportation agency (MTMC).



Orient driving aisles perpendicular to the facility, minimizing pedestrian aisle crossings.

3.1.4 Open Spaces

Open spaces are an important feature to include in facility development. They are especially important in housing, dormitory, school, and community districts. Outdoor spaces may be formally or informally defined. Courtyards and atriums are examples of formal outdoor spaces. Informal outdoor spaces are typically defined with the use of site furnishings or landscaping.

- Provide proper lighting at outdoor spaces that are intended for evening use.
- Paving should be kept to a minimum in order to reduce reflected solar radiation.
- Playground equipment shall conform to safety and accessibility standards.
- Provide site amenities such as barbeque pits, picnic tables, and pavilions adjacent to housing and community districts.

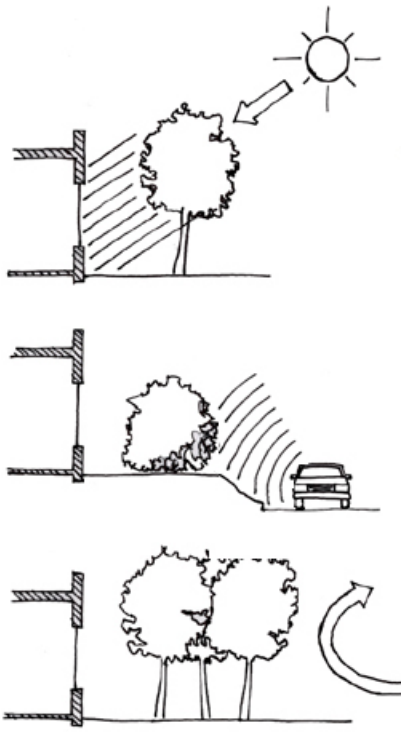
3.1.5 Planting

Landscaping has an enormous impact on installation appearance and resource conservation. The creative and appropriate use of trees, shrubs, plants, and topography can create pleasant and stimulating surroundings for work, home, and recreation.

Among the functional uses of plants are:

Shade Provision – Deciduous trees planted to the south, east, and west of facilities provide summer shade. As these trees lose their leaves in winter, they allow for solar heat gain.

Sound Attenuation – Trees and shrubs can be effective noise buffers. A combination of deciduous and evergreen trees and shrubs is more effective than exclusively deciduous plants.



Functional uses of landscaping

Wind Protection – Dense masses of large evergreen trees can be used to intercept prevailing winter and summer winds. This can influence the energy efficiency of facilities and increase the livability of outside spaces.

Glare Control – Trees, shrubs and vegetation can dramatically reduce glare and reflection especially in parking lots.

Air Filtration – Large masses of plants can physically and chemically filter and deodorize the air, reducing air pollution. Trees help to clean the air by removing poisonous gases and particulate matter such as pollen and dust. Trees also reduce atmospheric levels of carbon dioxide.

Architectural – Plants can effectively be used to define exterior spaces. The following are some of the architectural uses of plants:

- Provide context for a building.
- Soften corners, angles, bare walls, and hard architectural lines.
- Accent entry areas and serve as focal points.
- Provide a transition between the vertical walls of a building and the horizontal ground plane.
- Function as a barrier to vehicular or pedestrian traffic.
- Screen undesirable features such as mechanical equipment, substations, transformers, and service areas.
- ATFP unobstructed space requirements must be considered.

3.1.6 Xeriscaping

Xeriscape is the conservation of water and energy through creative and adaptive landscape design. Xeriscape landscapes provide attractive solutions that save water and maintenance. Xeriscape is an attractive, sustainable landscape that conserves water and is based on sound horticultural practices.

Xeriscaping should not be confused with "zero-scaping". Any landscape can be a Xeriscape if attention is given to conserving water and using indigenous plantings. Xeriscaping is a method, not a style, of landscaping.

Xeriscape Principles

By applying the following principles of xeriscape design, Keesler AFB can use valuable water resources efficiently and lower maintenance requirements while increasing the aesthetic appeal of the landscape:

- **Plan and design comprehensively –**

Have a plan. Find out where things are. Consider the view, slope, exposure and soils of the area. Take into account the existing vegetation and topography of the site and intended use. Decide where things will be. Decide when things will be done. Most landscapes are best done in phases.

- **Minimize Turf Areas –**

The type and location of turf areas should be considered a major design element of the landscape. The selection and location of turf should be decided on the same basis as other plantings, such as your purpose and function of the landscape. The reduction or elimination of high water-use turf areas, and locating them separately so that they may be watered more efficiently, can result in significant reductions in water use.

- **Improve the Soil –**

Improve the soil through the addition of organic matter. Plants will grow better and use water more effectively and efficiently.

- **Irrigate Efficiently –**

If an irrigation system is to be installed, it should be well planned and well managed. Turf areas should be watered separately. Group plants with like water needs, and water each group on separate zones. Not all plants need the same amount of water. Irrigation needs to change with the season and the weather. Irrigate according to the needs of the plants, rather than watering on a fixed schedule. Even plants used in Xeriscape will require supplemental irrigation until they become established (two or three years).

- **Select Appropriate Plants –**

Plant selection should be based on the intended use in the landscape. Use of more plants with low water needs and native plants will allow the maximum water conservation.

- **Use Organic Mulches –**

Mulch minimizes evaporation, reduces weed growth, slows erosion and helps prevent soil temperature fluctuations. Organic mulch such as wood chips or bark is best, and although this mulch will decompose slowly over time, it will improve the soil by adding nutrients. The use of plastic is not recommended because it will cause organic mulch to slide and prevent air and water from filtering into the soil.

- **Practice Proper Maintenance –**

Proper pruning, weeding and fertilization, plus attention to the irrigation system, will preserve and enhance the quality of Xeriscape. A landscape adapted to the environment will require less maintenance, less fertilizer and reduce the use of pesticides and other chemicals.

Some maintenance practices that can save water are:

- Raise the height of turf grass mowers.
- Regularly inspect irrigation sprinklers.
- Replenish mulch around plants.

Base Entry Signage

Typical Monument Signage

3.1.7 Exterior Signage

Only signs that professionally communicate direction and location to those functions and activities that truly warrant identification shall be used. The number of signs on each installation shall be held to the absolute minimum required for directions, identification, and customer service. Develop and execute a plan that standardizes sign material, color, style, and placement throughout the base.

General Standards

Exterior and interior signs will have a standard installation format, color, and size as specified in UFC 3-120-01 United Facilities Criteria Air Force Sign Standard. Particular attention is directed to the following:

- Interior signage shall comply with Chapter 11.
- Exterior signage shall comply with Chapter 4.
- Main gate signs shall conform with Section 4B, pages 66 thru 75.
- Signs placed in and around the airfield environment, must comply with the requirements of AFI 32-1044, Visual Air Navigation Systems.

The command publication "AETC Installation Excellence Guide" should also be used as a reference.

Exterior signs (except traffic control signs) should be in shades of brown and in 3-dimensional letters mounted directly on the facility or sign compliant with the base exterior sign program and color scheme. All signage must be consistent with the installation's architectural guidelines.

Entry Signs

Installation entry signs greet the visitor and set the "first impression" of the base. Use unpainted stainless or aluminum letters on a stucco background which is compatible with the base architectural theme.

Base entry signs shall contain only the following information:

- Air Force Symbol
- The words "U.S. AIR FORCE"
- The installation name

Typical directional signage

Directional
Install directional signs only where needed to guide visitors and new base personnel.

Buildings
Identify buildings with 3-dimensional letters mounted directly to the facility. Ensure individual letter-type signs affixed to buildings are readable from a reasonable distance on the frontage street. See base exterior sign program for more details. Do not place logos, emblems, or murals on buildings.

Street Signs
Street signs will have brown background with white letters and will display the AETC shield to the left of the street name. Consolidate traffic signs to extent allowable on the same posts.

Warning Signs
Install warning signs only where required by codes. Use warning colors (red, yellow, etc.) as accent, not as background. Keep lettering sized to what is required: for example, if a sign is to be readable at 25 feet, do not install a sign that's readable at 200 feet. Consolidate multiple hazard signs at a single location rather than spreading them across the building. Do not place signs on doors unless it is necessary to provide information concerning the room behind the door. For example, a sign considered necessary would be a warning sign for a high-voltage electrical equipment room. Do not place warning signs on the outside of utility or equipment room doors unless required by code (and then use the minimum size allowable). Ensure signage design is consistent throughout a facility and installation.

Other Signs
Traffic control signs must be consistent (in color, format, size, and placement) with the manual of Uniform Traffic Control devices and state laws.

Monument-type signs should be used only for Wing Headquarters, numbered Air Force Headquarter facilities, and Family Housing entries. Light monument signs for night visibility if required. Electronic marquee signs should be located at primary base entrances and base operations runway entrance only.

Strictly limit reserved parking signs to visitors, customers, handicapped, and key officials. Use metal (framed) signs approximately 4 inches high and mechanically fastened to the vertical curb face. Design and color should match the installation-wide system.

Picnic table

Typical park bench

3.1.8 Site Furniture

Along with landscape development, the appropriate selection of site furniture can give a project a finished appearance. Site furniture also serves to make outdoor spaces more inviting and encourages their regular use. Site furniture that is compatible with the architectural style of the facilities compliments the base and makes the outdoor spaces more usable and appear more organized. Poorly selected or poorly placed site furniture and signage can draw attention away from an otherwise well designed site and building.

The landscape architect should coordinate the selections with the architect and interior designer to ensure smooth transitions are made in the procession from within the building to the outdoors and vice versa. Effective transitions are achieved when building materials, colors, and design details from the building are incorporated into paving materials, signage and site furnishings. Items such as benches, trash receptacles, tables, etc. should be standardized. The uncontrolled placement of unrelated site items should not be permitted.

Site furniture consisting of bollards, landscape lighting, outdoor seating, trash receptacles, tree grates, and bicycle racks play an important function in unifying the features of a project. These features properly coordinated and integrated with architectural styles, colors, and materials provide the basis for a fully integrated design. Site furniture selections should be composed of unifying elements, which relate well with each other.

Typical outdoor trash receptacle

Compatible outdoor shelter

In cases where trees are proposed in outdoor paved areas, tree grates should be used to provide a maintenance free planting environment and protection of new trees. Selection of tree grate style, design, and color should be coordinated with other site furniture needs. Likewise, tree grates provide a continuum of the ground plane without an uneven surface hazard. Trees planted in these environments also have special subsurface anchoring requirements since they provide no above ground obstacles for site users.

- Seating should be oriented to user needs of waiting and resting.
- Locate tables together with seating that is oriented to the user needs of relaxing, or eating in less formal spaces with a pleasant setting and attractive view.
- Trash receptacles should be located along walkways, and at all building entrances, seating areas, and vending machines. Keep trash receptacles clear of circulation paths.
- The size of trash receptacles should be dependent upon the location and use of receptacle.
- Trash containers should be located in areas enclosed by walls or plant material that screen the receptacles.
- Utilize bollards to separate vehicular and pedestrian traffic, to direct access, or as decorative elements in pedestrian areas.
- Bicycle rack design should be same throughout the installation.
- Playgrounds should be consistent throughout the installation and meet specific criteria of materials, color and design.
- Movable planters shall be used in paved pedestrian areas to provide screening or aesthetic appeal.
- The sizes and design of these planters shall be standardized and meet ATFP requirements.
- A specific type of shelter should be defined to be utilized installation-wide for bus shelters.
- Picnic shelters should be strategically located and sized for shared use.
- Avoid rowlock detailing at brick wall caps to prevent efflorescence. Alternate detailing can be accomplished with pre-cast concrete caps which minimize the number of joints. These joints should be filled with sealant rather than grout.

Typical street lighting

Typical street lighting in family housing areas

3.1.9 Site Lighting

Site lighting is an integral part of any construction project. It ensures that occupants have a means of safely moving within outdoor spaces.

- Building entrances should be accentuated with light allowing them to be readily identified at night.
- Security lighting should be mounted on buildings wherever possible to reduce the number of poles.
- Provide adequate site lighting at any point where there is a change in grade requiring steps, near handicapped and motorcycle parking areas, and near main entrances to buildings.
- Streetscape lighting should be standardized throughout the base to one or two types and styles. Consider both compatibility and durability.
- In general, use overhead lighting in lieu of low level lighting, as it more efficient and economical.
- Streetscape lighting should be mounted on individual poles, and not on the exterior of facilities.
- Sight hazards such as steps, ramps and steep embankments should be illuminated with a combination of low level and high level lighting.
- Trees and landscaping should be considered in lighting distribution, as they can negate lighting levels.
- Fixtures should provide an overlapping illumination pattern of approximately 2 meters.
- Set parking area lighting at a standard height of 9 to 15 meters above grade.
- Use the recommendations of the IES Lighting Handbook to establish illumination levels.
- Energy-efficient, high-pressure sodium lamps with color correction ensure optimum visual acuity and are recommended for energy-conscious site lighting.

Typical path lighting

Typical lighted bollard in marina district

Typical pole lighting in marina district

3.2 Anti-Terrorism/ Force Protection

Raised planter beds prevent vehicular access

Alternating barrier types can avoid monotonous streetscapes

3.2.1 Introduction

Anti-terrorism/force protection measures have an enormous impact on the visual aesthetics of the base. AT/FP measures should be integral to the design process so as not to appear as an afterthought. Barriers and bollards should be consistent with the architectural theme of the base and should be of like materials, finishes and detailing.

The image and quality of life at Keesler AFB has suffered in the absence of a well-coordinated and unified approach to the design of building perimeter security. Installation of repetitive elements such as highway barriers or bollards along streets will continue to degrade the aesthetic value of these spaces.

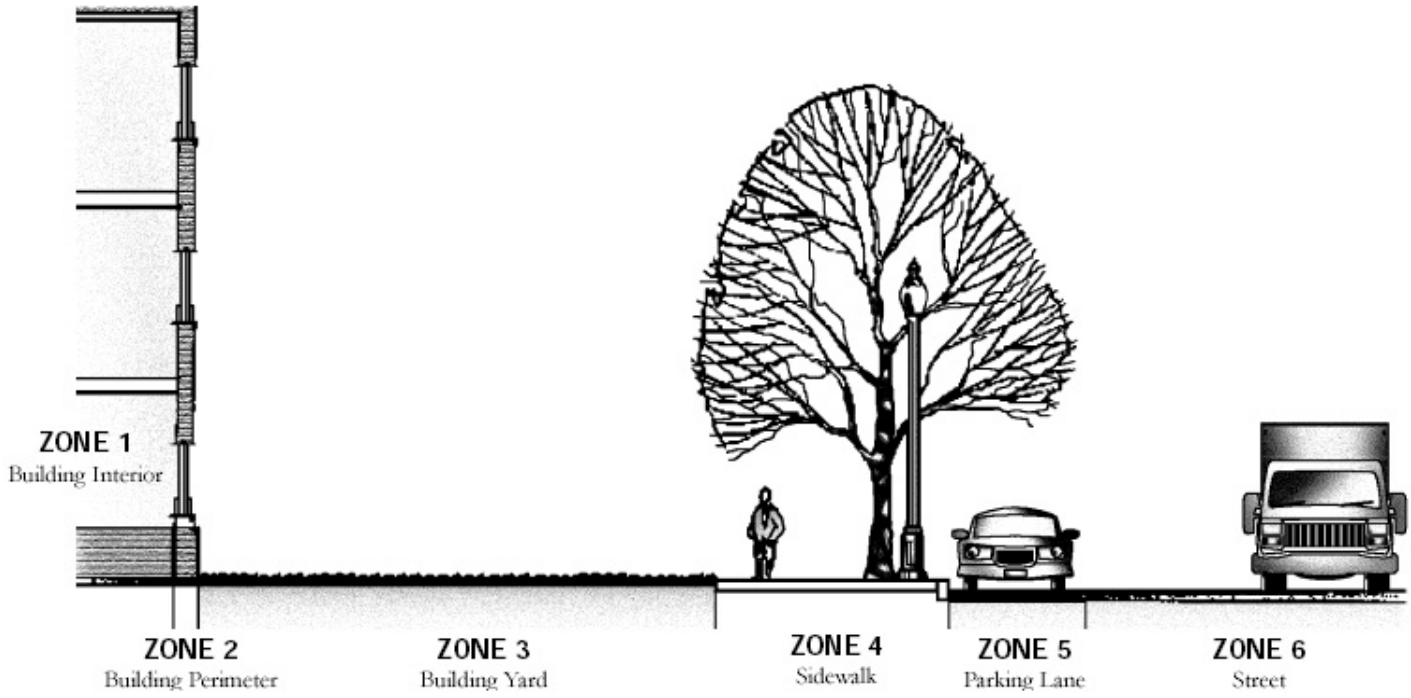
To restore the beauty and dignity of these spaces, building perimeter security should be integrated into an attractive system of streetscape and landscape designs.

When designing installation security measures, keep the following goals in mind:

- Provide security in the context of site beautification, rather than as a separate or redundant system of components whose only purpose is security.
- Expand on the palette of elements that can gracefully provide perimeter security in a manner that does not clutter the landscape, while avoiding the monotony of endless lines of jersey barriers or bollards, which only evoke defensiveness.
- Provide perimeter security in a manner that does not excessively restrict or impede operational use of sidewalks or pedestrian and vehicular mobility, nor impact the health of existing trees.
- Identify an implementation strategy that can be efficiently coordinated in the most cost effective manner.

3.2.2 Building Security Zones

The issue of installation security may be looked at in terms of security zones. These security zones correspond to building and site relationships. Each of these zones, ranging from the building's interior to the public streets around the building, have different security risks and responses. These can be translated into different architectural, landscape, and streetscape responses to meet those needs.



Zone 1: Building Interior

Zone 1 deals strictly with building interiors and is beyond the scope of this document.

Raised planters

Zone 2: Building Perimeter

A building's perimeter is its last line of defense from exterior threats. The following are recommended guidelines for security measures to be implemented at the building's perimeter:

- Ensure that the main entrance does not face an installation perimeter or other uncontrolled vantage point with direct lines of sight to the entrance.
- The use of sloped roofing systems is preferred.
- Consider the use of ductile materials which are capable of large deformations without complete failure.
- Avoid reentrant corners which magnify the effects of an explosive blast.
- Consider using small windows instead of large expanses of glass.

Plinth wall

Zone 3: Building Yard

The building yard is that portion of the site located between the building's exterior envelope and the sidewalk or street. The following are recommended guidelines for security measures to be implemented in the building yard zone:

- Security measures should relate primarily to the character of the building itself.
- Do not impede pedestrian access to building entries or pedestrian circulation on adjacent sidewalks.
- Use raised planters, plinth walls, or landscaped berms as vehicular barriers.
- Use bollards, light poles, planters, or other furnishings to create secure gaps and limit vehicular access through pedestrian access points.

Zone 4: Sidewalk

The sidewalk zone is located between the building yard and the curb or parking lane. The following are recommended guidelines for security measures to be implemented in this zone:

- Design security measures to relate primarily to the character of the visual district.
- Incorporate security design within the design of street lighting, planters, bollards, and landscaping.
- Do not impede pedestrian access to entries or pedestrian circulation on the sidewalks.
- Integrate design elements such as planters and bollards into the overall streetscape design.

Zone 5: Curb or Parking Lane

The curb or parking lane is that portion of the street adjacent to the curb. The following are recommended guidelines for security measures to be implemented in the curb or parking lane security zone:

- Avoid on-street parking wherever possible.
- Curbside loading zones and service access should be located where such use can be controlled and monitored.

Zone 6: Street

The thoughtful planning of vehicular circulation can reduce or eliminate the potential for automobiles to become a threat to buildings and pedestrians. A balance must be found between providing efficient vehicular circulation and providing a safe environment.

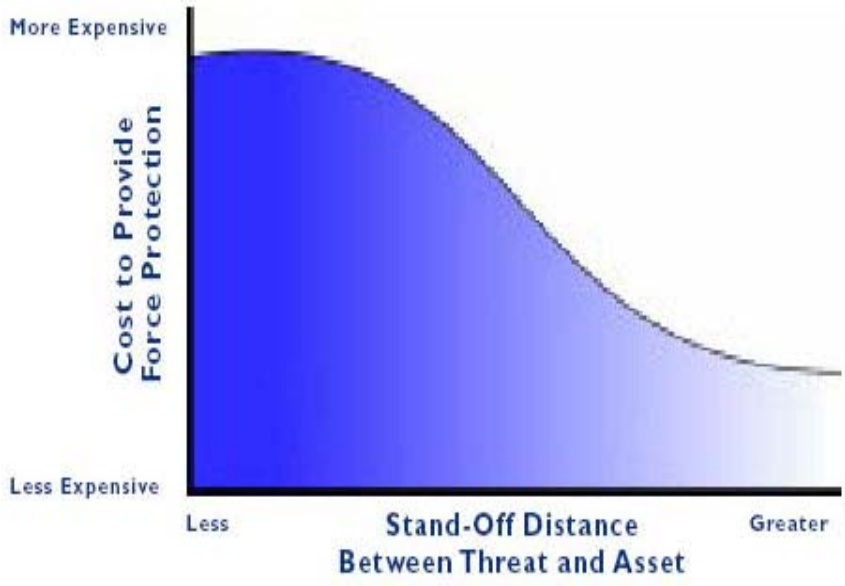
- Traffic calming devices can be used to slow the speed of vehicles near high risk facilities.
- Thoughtful street closures and traffic rerouting can produce pleasant pedestrian campuses.
- Avoid direct or straight-line access to high risk facilities.
- When planning new roads, route major corridors away from concentrations of high risk facilities.

3.2.3 Building siting

Proper siting is the first step in creating safe and efficient facilities. A properly sited facility reduces its attractiveness as a viable target for malicious acts. When possible, take advantage of existing site features, such as trees or berms which may enhance security.

Standoff Distances

The easiest and least costly opportunity for achieving the appropriate levels of protection against terrorist threats is to incorporate sufficient standoff distance into project designs. While sufficient standoff distance is not always available, maximizing standoff distance always results in the most cost-effective solution. Maximizing standoff distance also ensures that there is opportunity in the future to upgrade buildings to meet increased threats or to accommodate higher levels of protection.



In general, the cost to provide force protection decreases as the distance between an asset and threat increases.

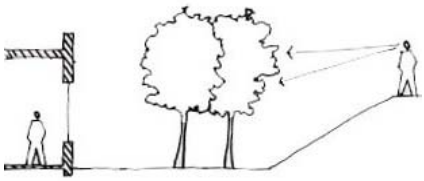
High speed vehicle approaches

Minimizing a vehicle's speed allows vehicle barriers to be lighter and less expensive should vehicle barriers ever become necessary. To facilitate reductions in vehicle speeds in the future, ensure there are no unobstructed vehicle approaches perpendicular to inhabited buildings at the required parking and roadway standoff distances.

Unobstructed space

It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where these explosive devices could be visually detected by building occupants observing the area around the building. Therefore, ensure that obstructions within 10 meters (33 feet) of inhabited buildings or portions thereof do not allow for concealment of explosive devices 6 inches or greater in height. This does not preclude the placement of site furnishings or plantings around buildings. It only requires conditions such that any explosive devices placed in that space would be observable by building occupants.

Vantage points



Eliminate vantage points to increase security for building occupants.

Vantage points are natural or man-made positions from which potential aggressors can observe and target people or other assets in and around a building. Identify vantage points outside the control of personnel in the targeted building and either eliminate them or provide means to avoid exposure to them. Means to avoid exposure may include actions such as reorienting the building or shielding people or assets in and around the building using such measures as reflective glazing, walls, privacy fencing, or vegetation.

Even well-designed barriers can be overwhelming if used repeatedly.

Retaining wall integrated with pedestrian circulation

Building Entrance Layout

The areas outside of installations are commonly not under the direct control of the installations. Where the main entrances to buildings face installation perimeters, people entering and exiting the buildings are vulnerable to being fired upon from vantage points outside the installations.

For new inhabited buildings, ensure that the main entrance to the building does not face an installation perimeter or other uncontrolled vantage points with direct lines of sight to the entrance.

3.2.4 Vehicular Barriers

Vehicular barriers are commonly the most visible AT/FP elements. Although barriers must be functional to withstand the force of a moving vehicle, they may also be designed as elements which improve the overall streetscape. A one-size-fits-all approach should be avoided. Instead, a kit of parts should be developed to address the issue of AT/FP while avoiding monotony.

- Avoid the excessive use of temporary barriers (i.e. concrete or water filled jersey barriers)
- Temporary barriers should be removed in a timely manner after permanent barriers have been put in place.
- Site furnishings such as benches, planters, and fountains may be hardened to act as vehicular barriers.
- Retaining walls can form effective barriers if properly engineered.
- Rows of trees may be used as part of a barrier system.

3.2.5 Building Forms

Effective design of building layout and orientation can significantly reduce opportunities for terrorists to target building occupants or injure large numbers of people.

Even where the minimum standoff distances are achieved, many aspects of building layout and other architectural design issues may be incorporated to improve overall protection of personnel inside buildings.

- Utilize sloped roofing systems which will deflect objects thrown on them.
- Avoid reentrant corners which magnify the effects of an explosive blast.
- Avoid exposed structural elements on the exterior of a facility.
- Do not allow drive-up/drop-off areas to be located under any inhabited portion of a building.
- Parking beneath buildings or on rooftops shall not be allowed.

3.3 Sustainable Design

3.3.1 Introduction

Building construction and operation has an enormous direct and indirect impact on the environment. As economies and population continue to expand, designers and builders face a unique challenge to meet demands for new and renovated facilities that are accessible, secure, healthy and productive while minimizing their impact on the environment.

The main objectives of sustainable design are to avoid resource depletion of energy, water, and raw materials; prevent environmental degradation caused by facilities and infrastructure throughout their life cycle; and create built environments that are livable, comfortable, safe and productive.

3.3.2 Optimize Site Potential

Creating sustainable buildings starts with proper site selection. The location of a building affects a wide range of environmental factors - as well as other factors such as security and accessibility - like the energy consumed by occupants for commuting, the impact on local ecosystems, and the extent to which existing structures and infrastructures are utilized. If possible, locate buildings in areas of existing development and consider renovating existing buildings and historic properties.

Sustainable site planning should consist of a whole system approach that seeks to:

Minimize Development of Open Space

- Retrofit an existing building.
- Use disturbed land/brown fields.

Control Erosion Through Improved Landscaping Practices

- Use vegetation, anti-erosion grading and stabilization techniques to keep the soil in place.
- Infiltrate storm-water runoff on site, design for storm-water retention on site and use other retention methods.
- Use vegetated swales and depressions to reduce runoff.

Reduce Heat Island Using Landscaping and Building Design Methods

- Landscape using, preferably, existing trees and other vegetation to shade walkways, parking lots, and other open areas. Ensure that site work and landscaping are integrated with security and safety design.
- Cover walkways, parking lots, and other open areas that are paved or made with impermeable materials. Ensure that shading devices do not block critical sightlines for security.
- Finish the facility's roof with light-colored materials to reduce energy loads and extend the life of the roof.

Minimize Habitat Disturbance

- Use environmentally responsible methods to keep local vegetation in place.
- Reduce building and paving footprints.
- Limit site disturbance to a minimal area around the building perimeter.
- Plan construction staging areas with the environment in mind.

Restore the Health of Degraded Sites

- Focus on restoration of degraded areas, increasing the existence of healthy habitat for native species.
- Conserve water use through xeriscaping with native plants.

Design for Sustainable Transportation

- Site the building with public transportation access in mind and limit on-site parking.
- Use porous alternatives to traditional paving for roads and walkways.
- Make provisions for bicycling, walking, carpool parking, and telecommuting; and provide refueling/recharging facilities for alternative fuel/electric vehicles.

3.3.3 Minimize Energy Consumption

A building should rely on a mixture of conservation, passive design measures and fossil fuels for its operation. It should meet or exceed applicable energy performance standards. During the facility design and development process, building projects must have a comprehensive, integrated perspective that seeks to:

Reduce Heating, Cooling and Lighting Loads Through Climate-Responsive Design and Conservation Practices

- Use passive solar design; orient, size and specify windows; and locate landscape elements with solar geometry and building load requirements in mind.
- Use high-performance building envelopes; select walls, roofs and other assemblies based on long-term, insulation and durability requirements.

Employ Renewable or High-Efficiency Energy Sources

- Evaluate the use of common, on-site renewable energy technologies such as day lighting, and solar water heating.
- Investigate the use of emerging, on-site renewable energy technologies such as photovoltaic and wind turbines.
- Evaluate purchasing electricity generated from renewable sources or low polluting sources such as natural gas.

Specify Efficient HVAC and Lighting Systems

- Use energy efficient HVAC equipment and systems.
- Use lighting systems that consume less than 1 watt/square foot for ambient lighting.
- Evaluate energy recovery systems that pre-heat or pre-cool in-coming ventilation air in commercial and institutional buildings.
- Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, and off-peak thermal storage.

Optimize Building Performance and System Control Strategies

- Use sensors to control loads based on occupancy, schedule and/or the availability of natural resources such as light or ventilation.
- Evaluate the use of modular components such as boilers or chillers to optimize part-load efficiency and maintenance requirements.
- Evaluate the use of Direct Digital Controls.

Monitor Project Performance

- Use a comprehensive, building-commissioning plan throughout the life of the project.
- Use metering to confirm building energy and environmental performance through the life of the project.

3.3.4 Protect and Conserve Water

In many parts of the country, fresh water is an increasingly scarce resource. A sustainable building should reduce, control or treat site-runoff, use water efficiently, and reuse or recycle water for on-site use when feasible.

The protection and conservation of water should be considered throughout the life of the building.

Reduce, Control, and Treat Surface Runoff

- Use vegetated swales and depressions to reduce runoff.
- Reduce and filter surface runoff.
- Use pervious paving materials.

Use Water Efficiently

- Incorporate efficiency in construction specifications.
- Use ultra water-efficient plumbing fixtures and integrate other water-saving devices into buildings.
- Design landscape for water efficiency through use of native plants tolerant of local soil and rainfall conditions.
- Install water-conserving cooling towers designed with delimiters to reduce drift and evaporation.
- Reduce evaporation through scheduled irrigation at dawn and dusk.
- Eliminate leaks; caulk around pipes and plumbing fixtures; conduct annual checks of hoses and pipes.

Improve Water Quality

- Install water quality ponds or oil grit separators as surface water runoff filtration systems.
- Eliminate materials that are lead polluting.
- Use non-toxic bathroom and kitchen cleaning products.

Recover Non-Sewage and Gray Water for On-Site Use

- Use non-sewage wastewater.
- Use roof water and ground water for on-site activities.
- Use ground water from sump pumps.

Design Waste Treatment and Recycling Programs

- If feasible use biological waste treatment systems to treat waste on site.
- Use gray water, roof water, and ground water for on-site activities.

3.3.5 Use Environmentally Preferable Products

A sustainable building should be constructed of materials that minimize lifecycle environmental impacts such as global warming, resource depletion, and human toxicity. In a materials context, lifecycle includes raw materials acquisition, product manufacturing, packaging, transportation, installation, use, and reuse/recycling/disposal.

During the facility design and development process, projects should have a comprehensive, integrated perspective that seeks to:

Renovate Existing Facilities, Products and Equipment

- Use reconditioned products and equipment, such as furniture, whenever economically feasible and resource efficient.
- Evaluate if components of existing buildings or facilities, such as windows or metal doorframes, can be incorporated in any new construction. Ensure that the windows and doors meet the new facility's security requirements.

Evaluate Environmental Preferability Using Life-Cycle Assessment (LCA)

- Consider tradeoffs among multiple environmental impacts (e.g., global warming, resource depletion, indoor air quality) when determining environmental preferability.
- Consider tradeoffs among life-cycle stages (i.e., raw materials acquisition, manufacturing, use, transportation, installation, and waste management) when determining environmentally preferability.

Maximize the Recycled Content of All New Materials

- Within an acceptable category of product, use materials and assemblies with the highest percentage available of post-consumer or post-industrial recycled content.
- Within an acceptable category of product, evaluate the use of materials and assemblies with low embodied energy content.

Specify Materials Harvested on a Sustained Yield Basis

- Use timber products obtained from sustainably managed forests, certified through third-party agencies.
- Evaluate the substitution of bio-based materials or products, such as agricultural-fiber sheathing, for inert or non-recycled alternatives.

Encourage the Use of Recyclable Assemblies and Products

- Within acceptable levels of performance, evaluate the use of de-mountable or de-constructible products and assemblies.
- Establish a waste management plan in cooperation with users to encourage recycling.
- Investigate providing locations at the project site for organic waste composting.

Limit Construction Debris

- Require the development and implementation of a plan for sorting construction waste for recycling.
- Use products and assemblies that minimize disposable packaging and storage requirements.

Eliminate the Use of Materials that Pollute or are Toxic During Their Manufacture, Use or Reuse

- Within an acceptable category of product, use materials and assemblies with the lowest level of volatile organic compounds (VOCs).
- Eliminate the use of asbestos, lead and PCBs in all products and assemblies.
- Eliminate the use of chlorofluorocarbons (CFCs) and hydro-chlorofluorocarbons (HCFCs) as refrigerants in all HVAC systems.
- Evaluate the use of materials and assemblies whose manufacture does not pollute or create toxic conditions for workers.

Give Preference to Locally Produced Materials with Low Embodied Energy Content

- Evaluate the use of locally produced products to stimulate local economies and reduce transportation burdens.
- Evaluate the use of materials and assemblies that require minimum "embodied" energy for raw materials acquisition, manufacture, transport, installation, and use.

3.3.6 Enhance Indoor Environmental Quality (IEQ)

The indoor environmental quality (IEQ) of a building has a significant impact on occupant health, comfort, and productivity. Among other attributes, a sustainable building should maximize day lighting, have appropriate ventilation and moisture control, and avoid the use of materials with high-VOC emissions.

During the facility design and development process, projects should have a comprehensive, integrated perspective that seeks to:

Value Aesthetic Decisions

- Appreciate the importance of providing windows in all occupied spaces for view and natural ventilation.
- Respect the ability of users to value quality craftsmanship and superior detailing.
- Demand that individual buildings or facilities are consciously integrated into their natural and man-made context.

Provide Thermal Comfort

- Evaluate the use of access floors with displacement ventilation for flexibility, personal comfort control, and energy savings.
- Understand moisture dynamics as key criteria in the selection of wall and roof assemblies. Evaluate the benefit of specifying high-performance windows to increase mean radiant temperature (MRT).

Supply Adequate Levels of Ventilation and Outside Air

- Implement a construction management program that ensures key ventilation components are protected from contamination during construction.
- Test to assure that adequate ventilation rates have been achieved prior to initial occupancy.
- Investigate the use of separate outside air and conditioned air distribution networks.
- Assure fresh air intakes are located away from loading areas, exhaust fans and other contamination points.
- Investigate the use of a permanent air quality monitoring system.

Avoid the Use of Materials High in Pollutants

- Limit the use of volatile organic compounds (VOCs) in such products as paints, sealants, coatings, and adhesives.
- Avoid products containing formaldehyde.
- Remove asbestos-containing material or contain it in a manner that precludes the possibility of future exposure.
- In areas where it is prevalent, include measures to control and mitigate radon buildup.
- Create safe, convenient and secure storage spaces for housekeeping chemicals.

Assure Acoustic Privacy and Comfort

- Minimize noise through the use of sound-absorbing materials, high sound transmission loss walls, floors and ceilings, and equipment sound isolation.

Control Disturbing Odors

- Minimize disturbing odors through contaminant isolation and careful selection of cleaning products.

Create a High Performance Luminous Environment

- Use day lighting for ambient lighting wherever feasible.
- Supplement natural light with integrated, high-performance ballasts, lamps, fixtures, and controls.
- Reduce direct glare from both natural and man-made sources in the field of view-particularly in spaces with highly reflective surfaces, such as video terminals.
- Use task/ambient systems that provide reduced levels of diffuse, general illumination, and supplement with task lighting.

3.3.7 Optimize Operational and Maintenance Practices

A sustainable building should be designed to take into account the energy and environmental impacts of operating and maintaining the building. Designers shall be encouraged to specify materials and systems that reduce the need for maintenance, and/or require less water, energy, and toxic chemicals and cleaners to maintain.

No matter how sustainable a building may have been in its design and construction, it can only remain so if it is operated responsibly and maintained properly. The use of toxic cleaning products can deteriorate indoor air quality, failure to test sensor control points can compromise energy efficiency, and poor training can lead to early system failures. Buildings must be operated and maintained with the security, safety, health, comfort and productivity of their occupants in mind, and with an understanding of the next generation's need to reuse and recycle building components.

Throughout the building's life cycle, operations and maintenance should seek to:

- Train building occupants, facilities managers, and maintenance staff in sustainable design principles and methods.
- Purchase cleaning products and supplies that are resource-efficient and non-toxic.
- Use automated monitors and controls for energy, water, waste, temperature, moisture, and ventilation.
- Reduce waste through source reduction and recycling to eliminate disposal off-site.

3.3.8 Air Force Sustainable Design Policy

The Air Force Sustainable Development Policy is a memorandum from HQ USAF/ILE, dated Dec 2001. It states that:

- A sustainable facility as one that achieves optimum resource efficiency and constructability while minimizing adverse impacts to the built and natural environments through all phases of its life cycle.
- Sustainable development concepts will benefit the Air Force by creating high-performance buildings with long-term value. They are to be integrated into the development process and balanced with all other design criteria to achieve best value for the Air Force.
- The U.S. Air Force has adopted the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) as a tool to apply sustainable design principles, and subsequently as a metric to measure the sustainability achieved through the design and building process. The goal is to have all MILCON projects secure LEED certification by FY 09.

3.4 General Design Standards

3.4.1 Introduction

The purpose of these standards is to identify the form, material, and color of the buildings and provide a design vocabulary, which can be applied to all buildings on the base. The following design standards will serve as a common thread of architectural compatibility providing continuity across visual districts and will reinforce the desired character of the installation.

3.4.2 Context

A combination of function and surroundings make up a building's context. Buildings can be defined as having either a "background" or "foreground" context. Buildings with a background context are those which do not require a prominent visual image or location (i.e. warehouses or industrial buildings). Buildings with key functions assume a foreground context. Some foreground buildings with especially significant functions can be further defined as destination buildings (i.e. Wing Headquarters or Base Exchange).

It is important to identify destination buildings because they act as focal points for base activity. They define nodes, around which all activity on the base circulates. Due to their prominence, it is important that these buildings exemplify the desired architectural style for the base.

The following is a list of destination buildings at Keesler:

- 81st Training Wing HQ
- Keesler Medical Center
- Chapels
- BX/Commissary complex
- Sablich Center
- Keesler Club

3.4.3 Site Planning

Site planning is a critical phase of the design process. An otherwise successful design can become a total failure if not sited properly. The following factors should be taken into account during the site planning phase of any design project:

- Buildings shall be sited in accordance with the Keesler AFB General Plan.
- Projects should be oriented to take advantage of views.
- Entrances should be oriented with respect to established circulation paths.

3.4.4 Form

Mass and shape define form. Mass refers to the volume defined by a structure relative to its surroundings and to its apparent solidity and weight. Shape is the complexity of the surface planes.

- Simple building shapes and massing with facade proportions that are integrated with adjacent facilities shall be encouraged.
- Break up large volumes such as gymnasiums, warehouses by integrating with smaller scale elements or entranceways.
- Avoid vast blank building facades facing streets.
- Administrative buildings will have a more formal massing than other building types, signifying their relative importance.
- Emphasize the parts of all buildings to clearly show a division of roof, walls and base. Utilize color, materials and/or details to express this division.

3.4.5 Scale

Figure 3.6 – Human scale

Figure 3.7 – Monumental scale

Scale is the comparison of the sizes of a building's various components to its surrounding context and the human form.

- New proposed buildings shall be scaled to be compatible with overall mass in its visual district.
- In general, building design should relate to human-scale.
- Avoid monumental building designs, except where appropriate (i.e. major administrative buildings, memorials, etc.)

3.4.6 Articulation

Materials

Cohesive and consistent architectural character can be achieved in new construction through the use of exterior building materials that are similar to or compatible with adjacent buildings.

Roofs

- The predominant roof material shall be standing seam metal.
- Asphalt shingles are appropriate in family housing districts.

Exterior Walls

- Brick is the desired architectural finish throughout all districts at Keesler AFB due to its low maintenance needs and durability.
- All bricks shall be laid in a running bond except accent elements.
- Design basis for the Keesler AFB standard brick is no. 561, Dark Gray Bartex manufactured by Boral Bricks, Inc.; or equal approved by the Base Architectural Compatibility Manager.

Trim

- Trim material should be anodized aluminum of complementary colors.

- A cluttered, cosmetic application of a number of different materials on a facade should be avoided.
- Materials should be used consistently on all facades of a building.
- For freestanding walls, use materials and colors similar to those on the main building.

Fenestration

Fenestration is the design and rhythm of window and door openings within the building envelope. Window and doorframes should have a complementary accent color; usually tan, gray or a lighter shade of the wall color. Window frames should be of dark brown anodized aluminum. Exterior doors can be either aluminum or steel. Aluminum storefront doors should match the windows. Steel doors should blend with the surrounding wall color.

- Design openings to form a unified composition in proportion to the building elevation.
- Window placement should relate to internal areas. Mullion spacing should provide a good module for internal layout of office space, entrances, common use areas, etc.
- Locate windows to overlook exterior pedestrian areas or landscaped grounds.
- Glazing should be designed to be shaded from the summer sun on the south, east and west sides of each building.
- With the exception of major buildings, oversized fenestration elements which create monumental scale should be avoided.
- Consider the use of building forms or shading devices where significant energy savings can be achieved.
- Use predominant and secondary facade materials consistently and uniformly on all sides of the building.
- Use anodized aluminum of a complementary color for windows, doors, handrails, etc.

Color

Color unifies or emphasizes elements of a building. Related colors are a means to harmonize different elements while maintaining visual interest. Building colors should be in the local vernacular. These include light earth colors such as light brown, beige, and sepia. Make every effort to minimize exposed mechanical appurtenances, but where necessary they should be the same color as the surrounding wall, or roof material.

Not all buildings, or parts of buildings, need to be painted the same color scheme, but should blend well to create a consistent image in each visual district.

- In general, colors should be integral rather than applied to exterior building materials. Avoid surfaces that require costly periodic repainting.
- Colors should be selected on the basis of the desired appearance and attractiveness of the building, its compatibility with adjacent building colors and the prevailing color scheme of the architectural and natural landscape character of the installation.
- Colors should be carefully selected for their ability to modify climatic conditions. Generally, light-colored building exteriors tend to reflect solar radiation and promote heat loss, but increase glare; dark-colored exteriors tend to absorb solar radiation, promote heat gain and reduce glare.
- Exterior building colors should be limited in number and controlled by an established color palette for use throughout the installation. This palette should specify a limited number of coordinated and complementary colors that are subdued and harmonious.
- Strong, loud colors should generally be avoided and used only for special identification purposes; where they are employed they should not dominate or overpower the visual character of the setting.

- Exterior appurtenances should match the color they are set against, i.e. roof penetrations shall match the roof color, and items attached to or adjacent to walls should match the wall color.
- Downspouts should be visually integrated into the facility architecture. They should be specified to match or blend with the color of the adjacent wall material.
- Avoid the use of "supergraphics" painted on building facades.

Keesler AFB Standard Base Colors

SW6238	Icicle	Semi Gloss
SW6239	Upward	Semi Gloss
SW6240	Windy Blue	Semi Gloss
SW6241	Aleutian	Semi Gloss
27778	Parchment	Semi Gloss
27880	Dover White	Semi Gloss
23617	Dublin Tan	Semi Gloss
37769	Cream	Flat
27925	White	Exterior Semi Gloss
	Battleship Gray	Floor paint
10099	Saddle Brown	Gloss
20099	Saddle Brown	Semi Gloss
30099	Saddle Brown	Flat
B66T104	Youth Center Bronze (Saddle brown color is being changed over to Youth Center Bronze)	

Base Housing Interior

TTP295	White	Interior Flat
TTE508C	White	Interior

3.4.7 Interior Design

Well-designed interiors are major components in providing quality facilities that, in turn, attract and retain quality

personnel to sustain the Air Force. Well-designed facilities also satisfy user's needs, instill pride in ownership, and promote productivity in the workplace.

Interior finishes shall conform to Uniform Building Codes - Fire and Life Safety, and the Americans with Disabilities Act (ADA).

Interior Design Principles

- **Function –**

Functional interior designs ensure that each aspect of an interior environment performs efficiently for its user. Each facility type presents unique functional requirements that will ultimately affect the selection of finish materials and furnishings.

- **Cost Effectiveness –**

All interior selections should reflect the "best buy" in terms of aesthetic value, maintenance characteristics and life-cycle costs.

Durability –

Designers shall be concerned with material durability and wearability. Selections of quality materials and products shall also be appropriate to the function and level of use of each facility.

- **Maintainability –**

The use of easily maintained finishes shall be encouraged. While certain finishes may provide excellent durability, designers shall give serious consideration to maintaining the appeal of materials.

3.5 Visual Districts

3.5.1 Introduction

The term "Visual District" can be described as an area where design components have a consistent and unifying character. Form, scale, color, texture and massing are defined for each of the districts to create a sense of continuity.

Keesler AFB is divided into 10 visual districts. The following sections describe each Visual District, and begin to illustrate the desired design features for each district. For each district; appropriate building forms and materials will be established. In addition, visual assets and liabilities for each district will be identified to help focus the application of new standards where the greatest improvements in architectural compatibility can be realized.

Insert Visual District Map

81st Training Wing Headquarters

Wing Headquarters entry detail

Airman Leadership School

3.5.2 Administrative District

Location

The administrative district is located to the east side of the community district and to the west side of the industrial district. Significant facilities within the administrative district include the Wing Headquarters, Airman Leadership School, and NCO Academy.

Character

The administrative district should be characterized by buildings with formal massing and details indicating their significance.

Assets

- The Wing Headquarters incorporates regional detailing at its entry, while staying compatible with the base architectural theme.

Liabilities

- Although the ALS and NCO Academy are compatible in terms of color and form, the vertical brick and EIFS banding is inconsistent with the architectural theme on base.

Objectives

- When renovating and constructing new buildings special consideration should be applied to insure that details such as roof pitch, downspouts, fenestration, signage and colors are consistent with the surrounding buildings.

Building Forms

- Buildings with administrative functions should display a more formal massing, indicating their significance.
- Low sloping hip and gable type roofs are appropriate within this district (3:12 slope recommended).

Materials

- Exterior walls shall be brick with EIFS accents.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- The use of interior leaders should be minimized to avoid potential leakage.
- When compatible with the base standard colors, EIFS is acceptable to accent masonry construction. The use of EIFS shall be limited to upper floors, canopies and fascias.

Commissary

Larcher Blvd. Chapel

Sablich Center

3.5.3 Community District

Location

The community district is located centrally within the installation. This district is bounded by the medical district to the north and the industrial district to the south. Significant facilities within the community district include the BX/ Commissary Complex, Credit Union, Larcher Blvd. Chapel, and the Sablich Center.

Character

The community district is characterized by a diversity of building forms thus reflecting the array of activities that take place there. The character of many of the buildings are retail in nature. As this district is highly trafficked and is stipulated along the main axis of the base, architectural compatibility is of the foremost.

Assets

- The community district is well sited to facilitate its use by off-base visitors.
- There is an abundance of mature landscaping in this district which adds to the character of the base.
- Lott Hall is an excellent example of how the mass of a large facility can be broken up through thoughtful façade articulation.

Liabilities

- Although the Sablich Center is compatible in terms of color and scale, it could benefit from the addition of a sloped standing seam metal roof.

Objectives

- Unify the buildings in this district with the use of common colors, details, and materials.
- Facilities should be sited to promote pedestrian circulation throughout this district, minimizing the need to drive between activities.

Lott Hall

Vosler Academic Development Center

Child Development Center

Building Forms

- Low sloping hip roof forms are preferred (3:12 slope recommended).
- Modulating the form and facade of massive buildings with setbacks and repetitive details can soften their physical appearance, enabling them to blend with the surrounding structures.

Materials

- Exterior walls shall be brick with EIFS accents.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- Integrated glazing and/or storefront systems may be incorporated based on the entrance design.
- The use of interior leaders should be minimized to avoid potential leakage.
- Trim elements shall be anodized aluminum of complementary color.
- When compatible with the base standard colors, EIFS is acceptable to accent masonry construction. The use of EIFS shall be limited to upper floors, canopies and fascias.

Levitow Training Support Facility (front elevation)

Levitow Training Support Facility (rear elevation)

Typical pipeline dormitory

3.5.4 Training District

Location

The training district is located on the south perimeter of the base between the flight line and industrial districts.

Character

This district is characterized by large scale training facilities and pipeline dormitories which are formal in appearance. The facilities within this district are organized to promote a campus-like atmosphere which is complementary to the training mission at Keesler AFB.

Assets

- Architectural compatibility standards are well defined in this district.
- The training facilities are well consolidated in this area.
- The troopwalk system in this area is well developed which minimizes disruption of vehicular traffic due to troop movements.

Liabilities

- The area is somewhat landlocked and will require careful planning to ensure the most efficient future land use.

Objectives

- Future development of the training district should continue to reinforce the campus-like atmosphere. This may be accomplished by locating parking lots at the perimeter, and establishing good pedestrian circulation between facilities.
- Continue to develop the troop walk system using existing detailing as model.

Typical pipeline dorm entry detail

Typical training district cornice detail

Building Forms

- Low sloping hip roof forms are preferred (3:12 slope recommended).
- Building entrances should be readily identifiable and incorporate elements of human scale.
- Modulating the form and facade of massive buildings with setbacks and repetitive details can soften their physical appearance, enabling them to blend with the surrounding structures.

Materials

- Exterior walls shall be EIFS with brick wainscoting.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Window and door frames shall be medium bronze.
- Standing seam metal roofs shall be medium bronze in color.

Detailing

- Cornice details shall match those used in the Triangle dorm area.
- Integrated glazing and/or storefront systems may be incorporated based on the entrance design.
- The use of interior leaders should be minimized to avoid potential leakage.
- Trim elements shall be anodized aluminum of complementary color.
- When compatible with the base standard colors, EIFS is acceptable to accent masonry construction. The use of EIFS shall be limited to upper floors, canopies and fascias.

Keesler Medical Center

Keesler Medical Center Outpatient Services Building

Keesler Medical Center (rear elevation)

3.5.5 Medical District

Location

The medical district in located on the northeast corner of the base at the terminus of Larcher Boulevard. This district is sited south of Oak Park family housing and north of the community district.

Character

The Keesler Medical Center is the most prominent building in this district and is institutional in character. The other facilities in this district are less formal in appearance and provide a transition to the surrounding context.

Assets

- The Tyler House appropriately provides a visual transition from the institutional character of the Medical Center to that of the rest of the base.

Liabilities

- The adjacent Oak Park Family Housing area lacks visual screening from the rear of the Medical Center.

Objectives

- Accessible design is of prime importance in this district. Development in this area should adhere to current ADA guidelines.
- Buildings on the outer edge of this district should continue to offer a transition from the medical district character to that of the rest of the base. This can be achieved through the thoughtful combination of materials and detailing.
- Incorporate visual screening between the medical district and Oak Park housing.

Tyler House

Fisher House

Building Forms

- Low sloping hip roof forms are preferred (3:12 slope recommended).
- Modulating the form and facade of massive buildings with setbacks and repetitive details can soften their physical appearance, enabling them to blend with the surrounding structures.
- Building entrances should be readily identifiable and contain elements of human scale.

Materials

- Exterior walls shall be EIFS with brick wainscot.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- Integrated glazing and/or storefront systems may be incorporated based on the entrance design.
- The use of interior leaders should be minimized to avoid potential leakage.
- Trim elements shall be anodized aluminum of complementary color.

Typical Permanent Party Dorm

Brungard Manor

Cole Manor

3.5.6 Dormitory District

Location

The dormitory district at Keesler AFB is divided into three distinct areas. The permanent party dorm area is located just inside the Larcher Boulevard gate. At the intersection of Larcher and Meadows, there is a grouping of visitor's quarters. Additionally, several TLF's can be found at the eastern perimeter of the base, north of Pinehaven Family Housing.

Character

This district generally consists of multi-story residential dormitory and lodging type facilities with exterior balcony configurations. The TLF's are similar in form and design, but are smaller in scale.

Assets

- The dormitory district is adjacent to several community facilities which are complementary in function.
- Several site amenities are present, which are compatible with the surrounding architecture.
- Brungard and Cole Manor exemplify the desired architectural features for future dormitory and lodging construction.

Liabilities

- There are several flat roofed facilities in this district.
- The Skills Development Center is a metal building which is not compatible with the surrounding architecture.

Objectives

- As new facilities are built in this district, they should be consistent with the established architectural character.
- Site furnishings should be of a consistent design which complements the character of this district.
- Consider retrofitting flat roofed facilities with sloped standing seam roofs if feasible.

Temporary Lodging Facility

Muse Manor

Building Forms

- Utilize exterior balcony configurations help to break up facades and provide a residential scale to the facilities.
- Low sloping hip roofs are appropriate within this district (3:12 slope recommended).
- Dormitory and lodging buildings are very repetitious, by their nature. This effect can be downplayed by modulating the floor plan to avoid a simple rectilinear "box-shape".

Materials

- Exterior walls shall be brick with EIFS accents.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- The use of interior leaders should be minimized to avoid potential leakage.
- Trim elements shall be anodized aluminum of complementary color.
- When compatible with the base standard colors, EIFS is acceptable to accent masonry construction. The use of EIFS shall be limited to upper floors, canopies and fascias.

Typical Pinehaven housing unit

Typical Bay Ridge housing unit

3.5.7 Family Housing District

Location

There are seven distinct family housing areas at Keesler AFB. Thrower Park, East and West Falcon Park, and Shadowlawn are located to the west of the base. Oak Park is located on the northern perimeter of the base. Pinehaven is located on the eastern perimeter of the base. Harrison Court is located to the east of the base.

Character

The family housing district is characterized by one and two story single and duplex homes with gable and hip style roofs. With the exception of Pinehaven, family housing at Keesler AFB is of typical 1950-60's ranch style residential design. Pinehaven consists of recently constructed housing units which are contemporary in design.

Assets

- All of the family housing subdivisions contain meandering street layouts which reinforce the residential character of these areas.
- Open spaces with playgrounds.
- Mature Landscaping.

Liabilities

- Some family housing areas are geographically separated from the main base. This may complicate maintenance and security issues.
- The bus shelters in the family housing areas are pre-manufactured systems which have little relation to the surrounding architecture.

Objectives

- Develop and enforce standards for landscape elements such as privacy fencing, bus shelters, and playground equipment.

Typical Shadowlawn Housing

Playground

Building Forms

- Family housing should exhibit informal massing except for high ranking officer's quarters, which should display a more formal massing to indicate their relative importance.
- Roofs shall be gable or hip style or a combination of the two.
- Roof slopes shall match that of adjacent housing units.
- Covered porches should be provided at the entrance to family housing units.

Materials

- Exterior walls shall be a combination of brick and siding with EIFS only considered as an accent material.
- Roofs shall be asphalt composition shingle.
- Windows shall be double glazed, aluminum framed.

Colors

- Asphalt composition roofs shall be grey or brown to match existing roof colors.
- Family housing should be allowed greater flexibility in color schemes to avoid the monotony which can occur in these areas.

Detailing

- Provide screen walls around mechanical equipment and trash containers.
- Roofs shall have a continuous overhang of a depth which matches adjacent units.
- Entrances should be accented by the use of landscaping and roof projections.

Civil Engineering Building

SABER Building

Electrical Substation

3.5.8 Industrial District

Location

The industrial district is located the southeast perimeter of the installation west of the training district.

Character

The industrial district consists of predominantly warehouse type buildings that are utilitarian in character.

Assets

- The precast aggregate panel screen fencing used in this district is low maintenance and is compatible with the surrounding buildings.

Liabilities

- The industrial district is bordered on most sides by districts with non-compatible land uses. Visual screening between it and neighboring districts is of primary importance.

Objectives

- Unify all the industrial buildings with common colors, form and materials.
- Create common outdoor activity areas to be shared among grouped buildings.
- Consolidate outdoor storage areas wherever practical.
- Consider relocating facilities with functions which are inappropriate for this district.
- Provide visual screening between non-compatible uses along the district edges.

DRMO Building

Transportation

Refueling Station

Building Forms

- Roofs should be sloped to match existing roof slopes (3:12 slope recommended).
- Building entrances should be obvious to the pedestrian.
- New structures should attempt to match or complement the scale and mass of adjacent buildings when feasible.

Materials

- Brick with EIFS accents shall be used on administrative type facilities within this district.
- Metal siding with ribs running vertically is permitted on other facilities within the industrial district.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Whenever possible, use factory coated/painted materials to minimize maintenance.

Colors

- All metal siding shall be factory-finished with the manufacture's standard paint colors to match the Keesler AFB standard paint scheme as closely as possible.
- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- Equipment exposed to the exterior should be factory painted, if possible, to match adjacent structures or concealed by screening.
- Stainless and galvanized steel should not be painted
- Roof-mounted equipment should be avoided and limited to vents and similar appurtenances.
- Install exterior lighting on facilities to provide safe and secure access and to illuminate outdoor storage areas.

Old hangar facility

Fire Department

Base Operations

3.5.9 Flightline District

Location

The flightline district is centrally located within Keesler AFB. This district is sited between the recreation district and the training district. This district includes facilities such as the Fire Department and the Base Operations.

Character

The character of this district is functional, consisting of warehouse buildings and large hangars.

Assets

- The new hangar facility displays the desired character for future hangar buildings.

Liabilities

- Several Oak Park housing units are located within the airfield clear zone.
- Visual screening is required where the flightline district borders Oak Park housing.

Objectives

- When renovating and constructing new buildings special consideration should be applied to insure that details such as roof pitch, downspouts, fenestration, signage and colors are consistent with the surrounding buildings.
- Provide visual screening between non-compatible uses along the district edges.
- Relocate facilities that infringe on the airfield clear zone

Hangar facility

815 AS

New hangar (under construction)

Building Forms

- The flightline building forms are typically large hanger and warehouse type buildings.
- The flightline should exhibit buildings with informal massing.
- Low sloping shed or hip roofs forms are preferred.
- Roof slopes shall match that of adjacent buildings (3:12 slope recommended).

Materials

- Brick with EIFS accents shall be used on administrative type facilities within this district.
- Metal siding with ribs running vertically is permitted on other facilities within the flight line district.
- The primary roofing system will be a sloped standing seam metal roof to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- EIFS shall match paint color #37769 (Cream).
- All metal siding shall be factory-finished with the manufacture's standard paint colors to match the Keesler AFB standard paint scheme as closely as possible.
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

Detailing

- The use of interior leaders should be minimized to avoid potential leakage.
- Trim elements shall be anodized aluminum of complementary color.
- When compatible with the base standard colors, EIFS is acceptable to accent masonry construction. The use of EIFS shall be limited to upper floors, canopies and fascias.

Larcher Boulevard

Running track

Bay Breeze Golf Clubhouse

3.5.10 Recreation District

Location

The recreation district is located along the west side of the installation and includes the Bay Breeze golf course. Also included in the recreation district are Meadows Drive, Larcher Boulevard and Division Street, which act as the main axes on the base.

Character

The recreational districts help to promote the Keesler AFB community by providing areas for organized outdoor sports and activities. Many structures in this area are informal, such as picnic shelters and storage buildings.

Assets

- Larcher and Meadows form strong axes on the base and have potential to be further developed as such.
- A wide variety of outdoor activities are provided.

Objectives

- As the main entry gate is relocated, further define Meadows Drive and Division Street as formal thoroughfares for the base. Larcher Boulevard should be used as a model for this development.
- Institute a 30 foot setback from Meadows Drive, Larcher Boulevard and Division Street to be reserved for landscaping elements and definition of this drive.
- Consider the prominence of the intersection between Meadows Drive and Larcher Boulevard and landscape this intersection accordingly.

Bay Breeze Pool House

Building Forms

- Structures in this area should endorse a relaxed environment and not compete visually with the natural landscape.
- Outdoor structures (gazebos) should be of consistent design throughout the recreation district.

Materials

- Exterior walls shall be brick.
- Roofs shall be standing seam metal to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- Brick shall match installation standard color and texture (no. 561, Dark Gray Bartex).
- Standing seam metal roofs shall be medium bronze in color.
- Any fabric type structures should be bronze or tan to match the adjacent facilities.
- Window and door frames shall be medium bronze.

Typical pier

Marina Clubhouse

3.5.11 Marina District

Location

The marina district is located along the northwest perimeter of the installation on the Back Bay of Biloxi. The marina district is sited west of the flightline district and north of the recreation district.

Character

This district is characteristic of typical Gulf Coast marinas. This character is reinforced not only through the materials and building forms, but also through the site furnishings and details used in this area.

Assets

- The abundance of mature landscaping adds to the character of this district.
- Gazebos are provided to promote outdoor activity.

Objectives

- Preserve the ecological importance of the marina recreation park.
- When renovating and constructing new buildings special consideration should be applied to insure that details such as roof pitch, downspouts, fenestration, signage and colors are consistent with the surrounding buildings.

Building Forms

- Structures in this area should endorse a relaxed environment and not compete visually with the natural landscape.
- Outdoor structures (gazebos) should be of consistent design throughout the recreation district.
- Low sloping hip roofs shall be used and may be accented by the use of a cupola.

Boat docks

Typical marina district gazebo

Materials

- Exterior walls shall be EIFS.
- Roofs shall be standing seam metal to match installation standards.
- Windows shall be double-glazed, aluminum framed.

Colors

- EIFS shall be grey with white trim to match that on the Marina Clubhouse.
- Standing seam metal roofs shall be medium bronze in color.
- Window and door frames shall be medium bronze.

4 Planning & Design Resources

Refer to the following resources for additional information:

USAF

- AETC Installation Excellence Guide
- AFM 88-43 Installation Design (Mar 81)
- AFP 86-10 Landscape Planning and Design (Apr 86) p. (Publications found at: http://afpubs.hq.af.mil)
- AF123-1024 Standard Facility Requirements (May 94) r. AFH 32-1084 Facility Requirements (Sep 96)
- AFI 32-7062 Air Force Comprehensive Planning (Oct 97)
- Air Force Environmental Responsibility Facilities Guide
- http://www.afcee.brooks.af.mil/dc/dchome.asp

Design Guides

- http://www.afcee.brooks.af.mil/dc/products/dcproducts.asp

Unified Facilities Criteria (UFC) Documents

- UFC 3-120-01 Air Force Sign Standard (Feb 02)
- http://65.204.17.188//report/doc_ufc.html

Anti-terrorism/Force Protection

- UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings
- Air Force Protection Design Guide
- http://www.hnd.usace.army.mil/techinfo
- http://criteria.navfac.navy.mil/
- http://www.ccb.org/

General

- The Whole Building Design Guide (http://www.wbdg.org/index.php)
- ADAAG- Americans with Disabilities ACT Accessibility Guidelines
- UFAS- Uniform Federal Accessibility Standards
- MTMC- Military Traffic Management Commander

Keesler AFB design documents

- Keesler AFB General Plan
- Keesler AFB approved plant list