AIR COMBAT COMMAND

Installation Development and Design (ID2)

Dyess Air Force Base, Texas

ID2

October 2010

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1 Introduction

This document addresses planning, design, and construction criteria guidance for Dyess Air Force Base (AFB) (Figure 1-1) so that implementing Sustainable Development and High Performance Green Building Design (SD&HPGBD) objectives become primary considerations along with building site, context, program needs, and function.

Located in Abilene, Texas, the host unit at Dyess AFB is the 7th Bomb Wing (BW). The 7th BW operates B-1B bombers and the Air Force's only B-1B combat crew training squadron. A primary tenant at Dyess AFB is the 317th Airlift Group, which operates C-130 aircraft.

- The strategic vision for the installation is "*preparing teams of airmen to provide bombing, airlift support, formal training and combat support, delivering rapid, decisive and sustainable airpower to combat commanders anytime, anywhere*…"
- The Dyess AFB mission is "…*to provide world class Airmen and air power for the warfighter*."

1.1 Document Scope, Applicability, and Audience

Current guidance removes design process short-circuits by realigning constraints, changing mandates into a performance framework and limiting prescriptive requirements to those critical in meeting Command and Installation functional requirements. Prior editions of design guidance, both at the Command level and the Installation level, relied heavily on mandates and prescriptive formula relating to the building form, aesthetics and materials, and this often narrowed design phase investigations into plan arrangement exercises.

Installation-level development and design guidance focuses on the identification of regional and local design characteristics, common building methods and preferences, architectural context, landscape standards, infill and building density opportunities, future vision and the establishment of installation centric preferences and strategies. Building aesthetics and character cannot be fully established prior to conducting the concept charrette, as aesthetics develop and evolve in response to multiple drivers. Designing and then evaluating aesthetics and architectural character is highly subjective and has to be approached on a project-by-project basis.

Companion information to this document is provided in the form of an Installation 3D mass model, photographic log database and the Installation Sustainability Assessment (ISA). The Installation 3D mass model is dimensionally accurate and reflects overall building massing, height and form. The photographic log database includes all structures on the installation, with the exception of family housing units and utility sheds. The ISA serves to provide a current-state snapshot of the Installation's "green posture" and will serve as a way to measure changes over time; indicators should change for the better over time as more green design strategies and processes are put into place.

1.1.1 Applicability

Publication of this document serves to supersede previous installation-level design guidance. All external references to installation-level guidance documents now refer to the Installation Development and Design (ID2) Handbook. The ID2 serves to inform Future Year Development Plan site selections, Area Development Plan (ADP) designs, Requirements Document investigations and Concept Charrette Document packages. The ID2 will be summarized in the installation Electronic General Plan (eGP).

Architect-Engineer Scope of Work descriptions, Request for Proposal solicitation and, Design-Bid-Build and Design-Build contracts shall explicitly identify Headquarters (HQ) Air Combat Command (ACC)/A7P SD&HPGBD requirements and objectives as functional requirements.

The ID2 shall not be referenced in Design and/or Construction solicitations as establishing mandates relative to facility aesthetics, character or form. All Design and/or Construction solicitation packages shall include contract provisions citing the ID2 as containing broad considerations and shall require government review of design proposals in the source selection trade off and evaluation process. Contractor's responsiveness to ID2 considerations shall carry weight as a significant evaluation factor in determining the overall acceptability and value of the proposal to the government.

1.1.2 Audience

This document provides criteria and considerations used in the planning, development and design of projects and are in addition to technical criteria readily available to professional architects, planners, engineers and interior designers. This document and companion information sources shall be used as primary reference in all planning/siting considerations, building renovation projects and new construction projects.

DYESS AIR FORCE BASE

Vicinity Map

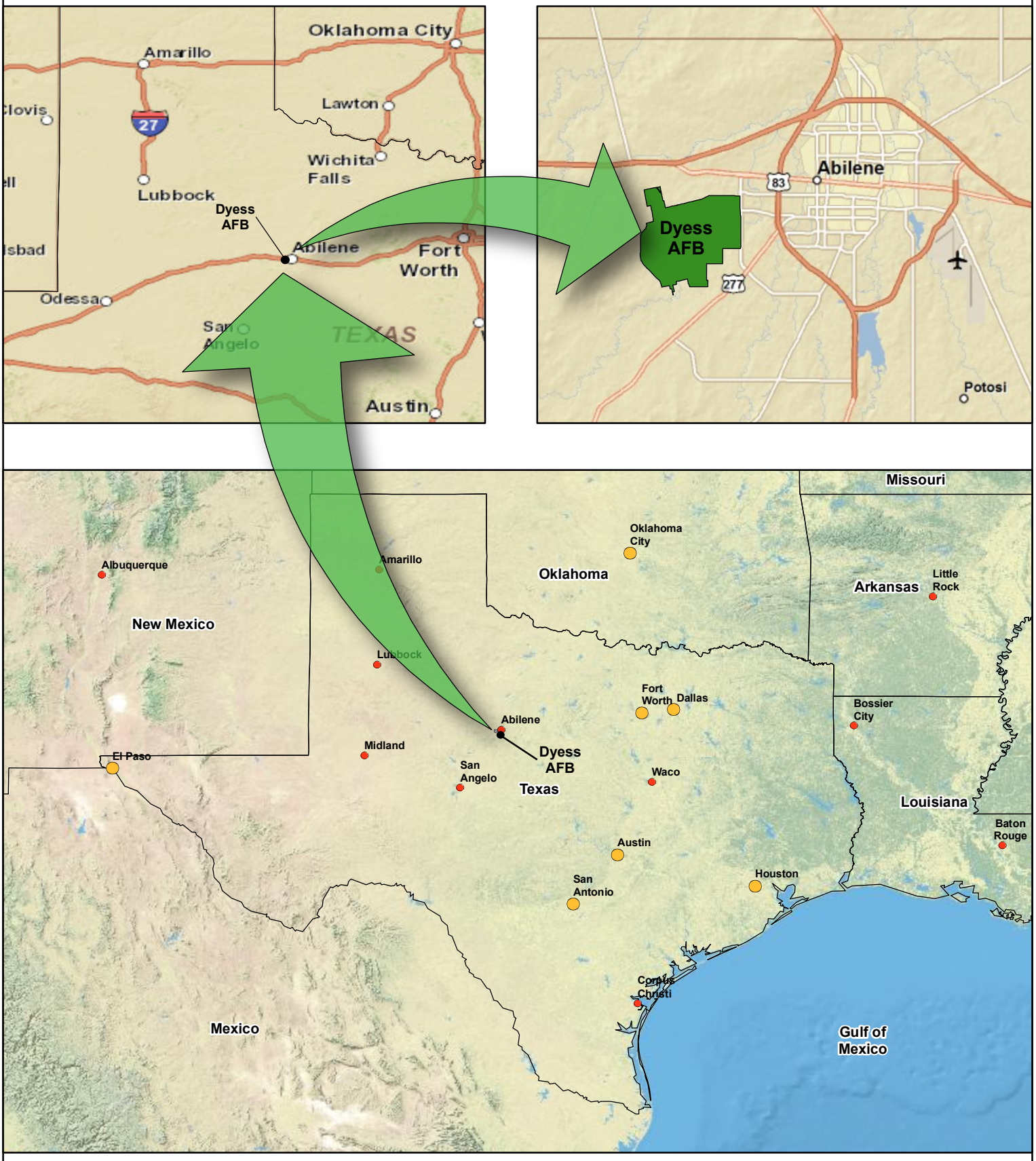


Figure 1-1

1.2 Development and Design—A Holistic Approach

1.2.1 HQ ACC/A7P

The Command's vision is to lead by example and serve as a role model for SD&HPGBD in the Air Force, Department of Defense (DoD) and the federal government. When "Green Design" is infused into every facet and decision, immediate and long-range benefits including healthier working environments, reduction of the installation's carbon footprint and enhancing the enduring quality of facilities while lowering the total cost of facility ownership will be realized. To this end, development and design strategies must consider a myriad of factors and influences and ensure solutions are appropriate to the site, sensitive to the built and natural context, reflective of functional needs, responsive to aesthetic considerations and that they embody green building design.

Green design is not optional. Implementing green building design (functional constraints) objectives is required to produce a complete and usable facility or a complete and usable improvement to an existing facility. A green building design approach forms the functional and technical foundation for all performance requirements, development consideration and design constraints made, referenced or otherwise used in this document.

"Green Design" is synonymous with "Quality Design." Quality design strategies produce results that conserve energy; make efficient use of resources; produce visually appealing structures; reduce environmental degradation; create built environments that are livable, comfortable, safe, enduring and productive; and shrink the environmental impact of our operations.

1.3 Development and Design—Requirements and Evaluation Metrics

1.3.1 HQ ACC/A7P Requirements

Command-level requirements are described in ACC Instruction, ID2 (publication forthcoming). This document establishes SD&HPGBD objectives as primary functional constraints, prescribes HQ ACC/A7P review and oversight processes, identifies architectural and engineering design considerations and promulgates performance and prescriptive constraints.

1.3.2 Installation Requirements

The ID2 aligns with command-level guidance and is intended to be a vital component in developing strategies appropriate to smart growth development and the building site, sensitive to the built context, reflective of building program and scale and responsive to object/background importance. It should also fully implement SD&HPGBD objectives. The ID2 describes constraints and identifies objectives necessary to accomplish quality design. Topics and focus areas include installation context, architectural context, an Illustrative Plan, overarching development and design guidelines, site selection and development considerations, landscape design issues, architectural design objectives and technical constraints.

Technical constraints can be generally categorized either as "Non-Negotiable," such as compatibility with existing fire-alarm communication or keying systems, or "Negotiable," such as a brick blend generally used throughout the installation. "Non-Negotiable" constraints should not directly or indirectly predetermine building aesthetics, character or form or limit/restrict investigation of high performance green building design strategies.

1.3.3 HQ ACC Development and Design Review Board (D2 Board) Evaluation Metrics

Projects meeting threshold levels established in the *ACC Instruction* (publication forthcoming) will be evaluated by the HQ ACC D2 Board. D2 Board evaluations seek to validate conformance with requirements established by Command-level guidance and in this document and seek to validate adherence to principles of quality design, such as optimizing benefits from site selection and energy use, protecting and conserving water resources, utilizing environmentally preferable products, enhancing indoor environmental quality and optimizing operational and maintenance practices. All development and design solutions must embody an *"appropriate response"* and reflect a responsible use of public funds.

Evaluations of aesthetics and architectural design are inherently subjective, and the D2 Board reserves latitude in evaluating design strategies on a project-by-project basis. Design aesthetics, architectural character and appropriate building form cannot be prescriptively determined in advance of conducting a concept development charrette, as these characteristics arise only *after* consideration and synthesis of all design drivers. Setting aesthetic preconditions short-circuits design development and will be avoided.

1.3.4 HQ ACC D2 Board Evaluations

D2 Board evaluations may produce recommendations (non-mandatory), directives (mandatory) or a combination of both. In extreme cases, D2 Board directives may include project stoppage in order to address continued or critical failure in meeting functional constraints.

Directives must be implemented, unless in very rare and extenuating circumstances a waiver is first endorsed by the D2 Board and then approved by HQ ACC/A7. Waiver requests must be submitted by the Base Civil Engineering Squadron Commander and must clearly document the basis for non-compliance and describe actions that will be taken to offset the deviation. Issuance of a waiver does not establish precedent or a basis for justifying other projects' non-compliance.

1.3.5 Installation Evaluation Metrics and Evaluations

Installation metrics are those used by the D2 Board with additional interest in evaluating the implementation of installation-centric technical requirements. Installation evaluations may result in recommendations (non-mandatory), directives (mandatory) or a combination of both.

1.4 Organization of this Document

This ID2 Handbook is organized into five main chapters:

- **Chapter 1, Introduction—**Familiarizes the reader with the need, scope and applicability, requirements and organization of the document.
- **Chapter 2, Installation Image—**Provides insight into the existing conditions found on base, specifically in areas where new development can be accommodated.
- **Chapter 3, Development Considerations—**Provides information regarding opportunities and constraints found within the development areas.
- **Chapter 4, Illustrative Plan—**Provides a view of potential development opportunities in the next 10 to 20 years.
- **Chapter 5, Development and Design Guidelines—** Highlights approaches to areas of SD&HPGBDs, site development and architectural design.
- **Appendices—**Identify specific technical considerations and constraints and other supporting materials.

2 Installation Image

This section presents a discussion of the installation context, which identifies the natural and manmade condition present at the installation. It is within these conditions that planning, design, and construction decision are made. The context discussion is followed by a discussion of design goals that help define the future "image of the base." Also identified and evaluated are the physical elements of the installation that make up the current "image" of the base. These elements include paths, edges, nodes, landmarks and districts. This report uses the element framework established in Kevin Lynch's *The Image of the City*, which was first published in 1960 by the M.I.T. Press.

The physical elements that make up an image of a community or military installation form an impression of the installation for military and civilian personnel, families and visitors. The sense of place that is established through the combination of paths, edges, nodes, and landmarks adds to the quality of life for installation residents and workers. The way these elements are treated can add to the knowledge or perception of the important locations on the installation and provide visual directions for traversing the installation.

- A well-established hierarchy of roads (or paths) provides a driver with strong clues as to whether they are in the right location. An important element of road hierarchy is how the streetscape is treated. Roads should be limited, serve a defined purpose and, in most instances, the streetscape should be shared with pedestrians.

  The hierarchy of paths also extends to the pedestrian environment. Paths should provide a pleasant way to walk, bike or jog throughout the installation and should be designed appropriately for their task, which ranges from simple access to a building, an installation-wide bike trail or pedestrian plazas and walkways in high-density nodes.

- Edges can physically separate areas and function, but edges can also form screens to reduce or eliminate views of certain areas. Edges can be used to frame a visitor's perspective of an installation, frame nodes and highlight landmarks.

- Nodes are associated with multiple image elements, such as locations where decisions are made or locations that draw higher densities of people. A node is in many cases distinctly different from many other locations on an installation because that area is a relatively constant center of gravity for social or work-related gatherings. Nodes can be highlighted and identified through the establishment of a landmark.

- Although signage is necessary to assist people in wayfinding, landmarks are an important way to direct people from one place to another. Landmarks serve many purposes, from inspirational to simple functional structures. Height, scale and site are typical elements of a landmark; however, they are not always used to the maximum extent. Everybody always seems to know where the water tower is located, but on some installations the Wing HQ is "hidden."

The functions of paths, edges, nodes and landmarks can vary. An example would be the static aircraft displays along Arnold Avenue. They function as both an edge and a landmark. Within this edge or landmark is a path that is used for recreation as well as access to the aircraft displays.

2.1 Installation Context

Planning, design, and construction decisions need to be based on the fundamental tenets of sustainable design[1] and require an understanding of natural resource conditions from the region to the site, the needs of personnel to effectively complete their tasks, the needs of families for a safe and healthy community and the fiscal constraints that all federal agencies must adhere to. In addition to guidance provided in this report, master planners and designers need to be familiar with all other relevant reports such as the Dyess AFB eGP, Integrated Natural Resources Management Plan, Integrated Cultural Resources Management Plan, and many others. The Dyess AFB GP will direct the reader to all relevant documents. The following is a brief overview of base, which is culled from relevant Dyess AFB documents.

Dyess AFB is located in the Rolling Plains of west Texas, known for its vast expanses of prairie and range land (Figure 1-1). Elevation on the base ranges from 1,730 to 1,818 feet above mean sea level. The climate is warm, temperate steppe; however, the base is near the boundary between the humid climate of East Texas and the semiarid climate of West Texas. The average annual temperature is 64˚ Fahrenheit (F) with winter days averaging 54˚F and summer days averaging 94˚F. Average rainfall in the area is 23.5 inches and occurs in late spring and early fall, with thunderstorms being a common source of rainfall. Prevailing winds are southerly and often persist for several days. Warm temperatures and brisk, dry winds promote a high evaporation rate and lessen the effectiveness of

[1]Sustainability is generally considered to be the integration of ecology, sociology, and economics in addressing master planning and building design; however, master planning and design for military installations requires additional considerations. Sustainable planning and design solutions for military installations such as Dyess AFB are directly linked to mission sustainment, quality of life for personnel and families, conservation of natural resources, and economic realities.


Wind farms are a growing source of alternative energy; however, their height and potential for radar interference can be a constraint.

precipitation. Dust storms do occur and are generally related to soil conditions north and west of Taylor County.

The base is drained by Little Elm Creek (and its tributaries) that flow from west to east on the base. Little remains of the original riparian environment of the tributary; it has been radically altered to a system of canals that were designed for conveyance of flood waters. However, segments of the altered system have been modified to a more natural state, and there are plans to alter other areas of the conveyance system. The floodplain extends beyond the storm water channel and influence development patterns on the installation. Broad floodplains are associated with these streams.


Mesquite is a dominate, but invasive, species on the Dyess landscape.

The land cover of the base includes open grasslands, mixed grassland/woodlands (known as savannahs) and woodlands comprised of mature mesquite trees. Most soils on base are formed from calcareous clay loams.

There are numerous opportunities at Dyess AFB to incorporate sustainable design practices. Existing facility spacing provides excellent infill opportunities while the bases continued suppression of mesquite and other invasive species can protect and restore habitat and provide infill opportunities. The lakes and ponds on base provide some storm water quantity and quality control, and there are opportunities adjacent to the broad floodplains onsite to provide additional storm water controls. Located within a semi-arid climate, Dyess' use of water efficient landscaping and effluent irrigation significantly reduces the demand for potable water usage.

The orientation of the existing grid street network provides opportunities for good solar orientation for buildings. Because the area has a relatively temperate year-round climate, the use of windows that can be opened can positively affect indoor environmental quality. However, with a lack of natural shade from large trees, the use of architectural shading techniques should be considered in conjunction with tree shading to improve the thermal comfort of building occupants. The lack of shade and hot temperatures in the summer are also further impediments to promoting pedestrian movement that need to be overcome.

This region is favorable for the development of alternative energy sources. With a regional wind power classification of 3, the region is suitable for utility-scale wind turbine applications. Already, significant wind energy development has occurred in portions of the Callahan Divide, to the south and west of the installation. However, any wind energy project must be considered in light of mission needs. Currently, wind farm projects proposed near airports or military airfields are evaluated by the Federal Aviation Administration to determine if they would be an obstruction or hazard to air navigation or interfere with surveillance radar.

The following is location information for Dyess AFB.

- Latitude = 32°25′15″N
- Longitude = 099°51′17″W
- Altitude Above Sea Level = 1,789 feet
- Winter Outdoor Design Temperature = 22°F
- Heating Degree Days = 2,584 (based on 65°F)
- Cooling Degree Days = 2,451 (based on 65°F)
- Sun Altitude Angles: Noon on 21 December = 33°
  Noon on 21 June = 68°
- USDA Plant Hardiness = Zone 8
- Annual Rainfall = 23.5 inches

- Annual Snowfall = 4.1 inches
- Wind Power Classification = 3 (good winds)
- Annual Clear Days = 149
- Annual Cloudy Day = 121

2.2 Installation Goals and Objectives

The 7th BW established architectural and planning goals that provide the overall guidance for land development, including land use, facility sitings, and infrastructure development. The design guidelines in this document have been developed in response to those goals as well as the Command's goal for a holistic approach to sustainable design and development. The installation's planning goals and objectives are the following:

Site Conditions

- Provide site improvements and building forms that are appropriate to any new, future or existing buildings.
- Locate facilities with similar or related functions in the same vicinity.
- Relegate parking to a subordinate element of the landscape.
- Encourage pedestrian circulation.
- Relate building forms to each other.
- Create small clusters of related buildings, as opposed to spreading buildings out across the landscape.

Environmental

- Design facilities in ways to enhance environmental quality and minimize consumption or disruption of natural resources.
- Tightly cluster buildings that are related to each other, creating walk-able campuses.
- Design accordingly to ACC guidance and appropriate sustainable programs such as Leadership in Energy and Environmental Design (LEED).

Layouts

- Provide functional layouts that are logical and satisfy users' needs both on the inside and outside of the facility as well as layouts that have the ability to accommodate other future users.
- Anticipate and plan for expansion.

Low Maintenance

- Use permanent low maintenance exteriors that are compatible with base standards and their natural and manmade environments.
- Use materials that do not require painting during their lifetime.
- Emphasize low life-cycle costs.
- Use indigenous landscaping that requires little or no irrigation and little or no maintenance.

Technology

- Provide technically sound buildings at low costs.
- Take advantage of emerging technologies

Cost

- Reduce life-cycle costs.
- Concentrate on low life-cycle costs as opposed to low initial costs.
- Design, construct and maintain facilities to last decades.
- Reduce labor-intensive maintenance procedures.

Approval

- Obtain user and command approval of design concept layout prior to design development stage in order to prevent costly changes during final design, contracting and construction.

2.3 Installation Development

Dyess AFB began as a World War II era air training base. The buildings of the Tye Army Air Field, as Dyess AFB was originally named, were constructed to serve as temporary, makeshift facilities. Since it was not a permanent installation, consideration of an overall architectural theme was neglected. At the end of the war, this policy of neglect continued. Inactivated as an Army Air Corps base on 31 December 1945, the 1,500-acre base was converted to a minor training installation for the Texas National Guard and seemed destined for oblivion.

The outbreak of the Korean War kindled a pressing need for military installations. A group of prominent Abilenians and Texas Congressional leaders joined forces to lobby Washington for a permanent military installation. The

Abilenians raised $893,000 to purchase an additional 3,500 acres for the pre-nascent base. Their efforts successfully culminated in an announcement from the DoD in July 1952 that Congress had approved $32,273,000 to construct an AFB in Abilene. After groundbreaking ceremonies on 24 September 1953, construction of the base progressed rapidly. The base was formally dedicated as Abilene AFB on 15 April 1956. On 6 December of that same year, Abilene AFB was renamed in honor of Lt. Col. William Edwin Dyess.

This early period, when the base was being reconstituted as a permanent military installation, presented an early opportunity to establish an overall architectural philosophy. Unfortunately, the first generation of architects and designers did not approach designs within the boundaries of an overarching theme, and thus, this opportunity was forfeited. The aesthetics of buildings built in the early years, for the most part, lacked a common thread. A unified architectural theme has instead been developed in increments over a period of decades.

By the diligent commitment of the second and third generations of designers, an overall architectural theme eventually surfaced from the eclectic mix; the theme evolved from the syncretism of several diverse regional influences—historical, climatic, and geographical. The first edition of these guidelines, published in June 1995, drew together the disparate parts of the emerging architectural theme into a more coherent whole. Subsequent editions have further refined the theme.

In the 1950s, the base adopted "Cherokee Mingle," an earth tone brick blend with shades of red umber, which is the signature wall veneer for the base's administrative and community facilities. Eventually, Cherokee Mingle became so identified with the base that it was renamed the "Dyess Blend." The earth tones of the Dyess Blend brick led to the adoption of Scotchlite brown as the complementary paint color. Earth tones of different gradations were used for industrial and medical facilities. These facilities are clad with metal panel walls of a sandstone color (or Exterior Insulation and Finish Systems (EIFS), whose texture recalls the Spanish colonial stucco common to this area) and dark brown roofs.


Dyess Blend brick with earth tone stucco.

Based on the existing pattern of clustered functions, Dyess AFB is divided into design compatibility districts. Each design district is distinctive by, among other factors, its geographical location, functions and the particular exterior materials used.

2.4 Image Elements

Figure 2-1 illustrates the overall pattern of elements at Dyess AFB. Installation image elements include paths, edges, nodes, landmarks and districts. They form the basic pattern of the installation form and the way personnel and visitors perceive and relate to the installation.

2.4.1 Paths

Paths can be essentially defined as movement corridors. On Dyess AFB, paths include roads, sidewalks and walk/bike trails. They function as basic orientation to the installation by providing the means to access most areas on base. Beyond their basic utility as a mover of people, paths provide the traveler with visual experiences with the other elements that comprise the installation image.

The primary paths at Dyess AFB are the arterial roads, which are Arnold and Dub Wright Boulevards. These paths direct the highest volume of travelers to their desired destinations on the installation or to the gates to exit the installation. Other roads (paths) radiate from the arterials.

For the most part, the function of the DAFB road system is to move vehicles in and out of the installation. The high-volume roads (arterials) extend from the Main Gate and direct travelers to a traffic circle, where they decide on how to most efficiently get to their destination. From that point, most drivers are likely to stay on arterials. Because the arterials at Dyess AFB are focused on moving high volumes of traffic in and out of the installation, there are limited pedestrian amenities along these roads. The secondary roads in the core area of the installation are not highly used, partly due to the high number of curb cuts available along the arterials. The high number of curb cuts is particularly noticeable on Avenue B from Fifth to Fourth Streets. There are approximately 10 curb cuts and 3 pedestrian crossings in less than a quarter mile along this arterial. Although the secondary roads in the core area of Dyess AFB are not extensively used, the streetscape is very similar to the arterials. These streetscapes are typically a wide road width with limited or no pedestrian paths.

- Over time, the installation should upgrade certain portions of the road system to improve the pedestrian realm as well as enhance the visual elements of the streetscape. The first step in improving the overall circulation system would be to update the Dyess AFB Traffic Study or Transportation Plan.

DYESS AIR FORCE BASE

Installation Image Elements

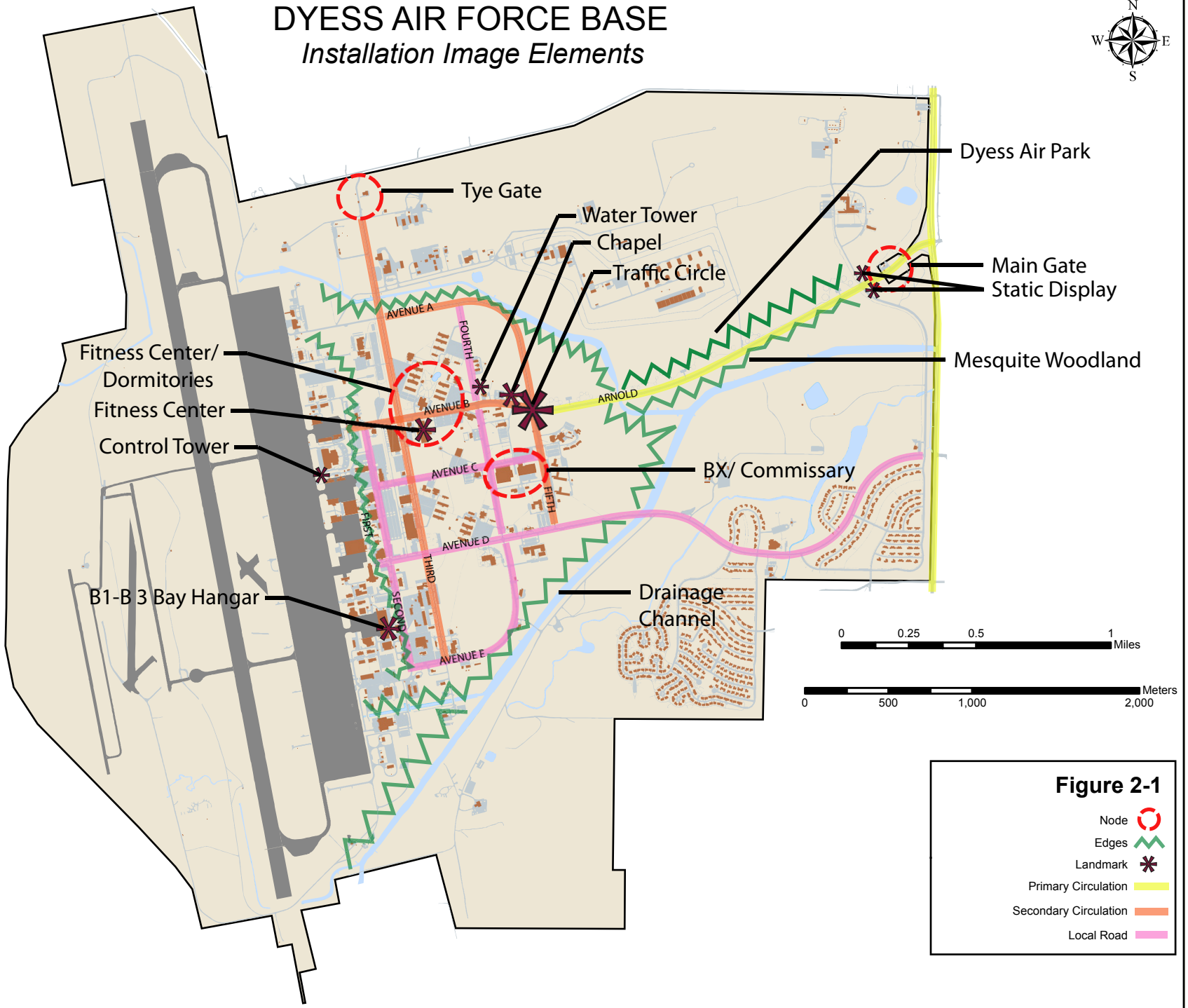


Figure 2-1

Node

Edges

Landmark

Primary Circulation

Secondary Circulation

Local Road

Arnold Boulevard is the primary "path" taken by installation personnel and visitors in and out of the installation. This is a streetscape that primarily focuses on the motor vehicle.

Walking trails (sidewalks) are an alternative mode of transportation and provide a different experience for personnel walking through the installation; however, they are not multipurpose trails and are only conducive to walking. The width of the sidewalks should be upgraded.

Some sidewalks lack connectivity and pedestrian amenities.

Sidewalks and walking/bike paths provide opportunities for installation personnel to experience elements at a different pace; they also provide a different experience in the form of exercise.

Although there is an extensive sidewalk system that connects most portions of the installation, the sidewalk system is, in some locations, disjointed. In addition to some connectivity issues, another issue with these paths is the lack of pedestrian amenities. There are very few shade trees and no other pedestrian amenities such as benches along sidewalks.

- The pedestrian environment would be further enhanced with improvements to the existing trail (sidewalk) system that will result in a multipurpose pedestrian circulation system that links the entire base.

2.4.2 Edges

Edges are defined by Lynch as "*linear elements that are not used or considered as paths…*" These elements are primarily boundaries between areas. They may function as visual or physical barriers and can be simple walls, fences, vegetation or infrastructure. Typically, these features are not as dominant in a person's mind as primary paths, such as arterial roads, but they can be significant organizing features for land form. Edges can also be an important element of green infrastructure.

The most prominent edges on the installation are formed by mesquite woodlands, which account for a large portion of the undeveloped areas of the base. Because of their growth pattern, mesquite can be managed to create a distinct, yet natural edge. However, they also pose problems in managing a natural landscape and have a detrimental effect on soil moisture.

Another natural form of edge is the storm water drainage canals. These edges define major development areas on Dyess AFB. The canals provide separation between the main base, the munitions area and the single-family housing area, and they frame the golf course.

Although the drainage canals are engineered edges, they still operate as green infrastructure and to some degree provide movement corridors for plants and animals.

- Restoring some upstream portions of the canal back to its more natural setting will improve its green infrastructure role.

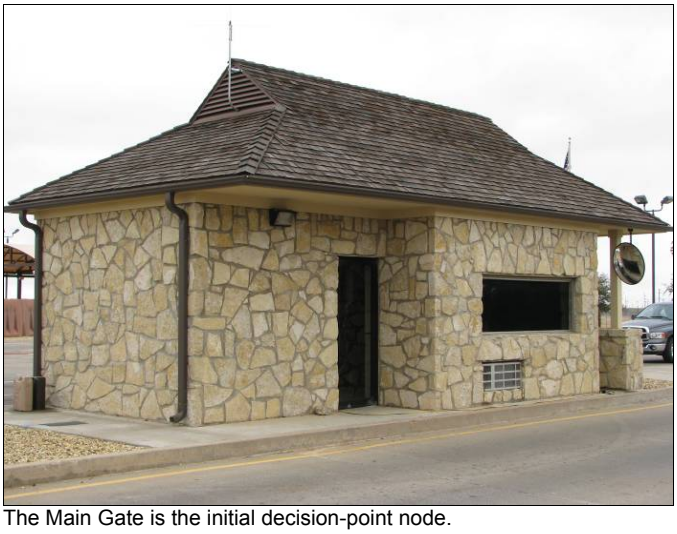
The static display areas at the Main Gate and along the north side of Arnold Avenue function as a combined structural and natural edge. This edge, which combines numerous static displays of aircraft and landscaping, screens distant views into the munitions storage area.

A less prominent edge is the security fence along the eastern edge of the flightline. The masonry wall is intended to be a strong barrier between the flightline and other portions of the installation. It is less prominent because it is has a color scheme that blends well with the surrounding buildings. Another positive example of incorporating security measures into the surrounding design context are the barrier walls at the entry gates. The materials used on the barrier walls are being introduced into other portions of the installation as signage. Edges are also illustrated in Figure 2-1.

The color scheme for the security fence along the flightline is unobtrusive, yet forms a strong barrier.

2.4.3 Nodes

Nodes are typically destination areas, but can be considered decision points (or reference points) at breaks in paths and strategic locations such as the gates where people enter and exit the installation.



The Main Gate is the initial decision-point node.

Another prime example of a decision node is the traffic circle at the intersection of Arnold Avenue and Fifth Street.

There are also destination or activity concentration nodes at the base. The BX/Commissary complex is an example of this type of node; this is a place where people concentrate, particularly during lunch and on Saturdays.

The Fitness Center is a major social/destination node and is also a landmark on the base.

Another destination with concentrated activity is the fitness center, which generates considerable pedestrian traffic from the nearby dormitories. The destination nodes at Dyess AFB are primarily a result of facility size and resulting activity levels rather than unique design, decision-making, or building density. There is only one area on base that can be considered a density node. The anchor of this node is the unaccompanied dormitory area, which includes the dining hall and overlaps with the fitness center activity node. These nodes all help form the Downtown Dyess concept, Section 3.2.

Nodes that are based on a high density of buildings, particularly in a downtown setting, provide many opportunities for personnel to live, work, and play. A high density of buildings, with a strong pedestrian realm, will encourage walking between facilities. Such a setting will encourage longer stays within an area and provide opportunities for social contact and gatherings.

- On Dyess AFB, the relationships between activity and density nodes can be enhanced and expanded to form a compact node of diverse activities—similar to a small town center—which would increase the reasons for personnel and families to extend their stay in the area.
- Compact nodes of buildings should be complemented with outdoor gathering areas that further enhance the public realm and quality of life. This type of node, with

well thought-out pedestrian movement amenities, should reduce the reliance on automobiles. Although automobiles cannot be ignored, they should be subordinate to the pedestrian realm within a compact node of diverse activities.

- Continued examination of the DAFB Community Center and Dormitory areas should be conducted to determine if a compact high density of buildings or a "downtown" can be established.

Primary nodes are illustrated in Figure 2-1.

The outdoor recreation area next to the unaccompanied airmen dormitories adds another feature to the large activity (social gathering) node associated with the dining hall and fitness center.

2.4.4 Landmarks

Although nodes can be considered reference points, landmarks are probably the most common reference point for people. In some cases, they are simple objects, such as a sign or tree, or they can be more complicated, such as some type of structure. They can also be symbolic, such as the flagpole in the traffic circle or static aircraft displays. Although landmarks can be simple objects, they can be important to wayfinding for personnel and visitors because they can be seen from a distance. An example of a simple object that is a likely landmark is the water tower. Landmarks are illustrated in Figure 2-1.

Dominant buildings in a landscape are often very important landmark elements. Civic buildings, such as Wing HQ and the chapel, should be strong landmarks; however, Wing HQ is not a dominant building in the Dyess AFB landscape. The siting of the chapel and the somewhat unique design of the building elevates the "status" of this civic building to a landmark along Avenue B. Building 5110 (B1-B hangar) can be seen from a moderate distance, but the scale of the building form certainly identifies its location along the flightline. Due to its size and prominence in the landscape, the fitness center is another landmark building. In these cases, landmarks should be significant elements of the overall character of a district.

The B1-B static display is a prominent landmark at the installation Main Gate.

- Dominant buildings and facilities important to daily living and installation operations should be evaluated during the programming and design process as to whether they would function as landmarks. The early determination of a buildings "status" will affect site orientation.

The flagpole is a primary example of an installation landmark. This flagpole serves double-duty with the traffic circle as a node.

Wing HQ is not a dominant/landmark facility on the base.

B1-B Hanger—A Landmark Facility


The Chapel—A Landmark Facility

2.4.5 Districts

Districts are small to large areas within the installation that have a common identifiable character. The districts[2] are illustrated in Figure 2-2. The common characteristics signify a place. Because of their scale, districts will incorporate some or all other image elements. Lynch stated, "*physical characteristics that determine districts are thematic continuities which may consist of an endless variety of components: texture, space, form, detail, symbol, building type, use, activity, inhabitants…*"

Districts at the base are characterized by certain functions, materials and scale and are defined as Mission/Industrial and Administration/Community Center. To ensure future design appropriate to location, undeveloped areas of the base are also included in districts.

[2]Dyess' family housing areas are not included in the districts because housing is being privatized. Design elements for housing are determined through collaboration between the Air Force and the developer.

2.4.5.1 District 1—Mission/Industrial

District 1 is characterized by the industrial and aircraft operations functions of the installation. These areas include flightline facilities, support facilities, munitions storage, training, medical facilities and the entry gates. Most of the functions in this district are industrial, which in many cases requires larger structures, but with a relatively low density of personnel. Other factors in this district that contribute to a low density of people are safety and security requirements and the overall incompatibility of industrial functions with housing and community support activities

- The low density of people in the industrial area of District 1, make it unlikely that a strong pedestrian circulation system can be established.

The administrative facilities within the district supporting these industrial activities provide a higher working-population density and are used as transitional land use activities between districts of different function and scale.

- There should be improved pedestrian connection between District 1 administrative facilities and facilities and District 2.

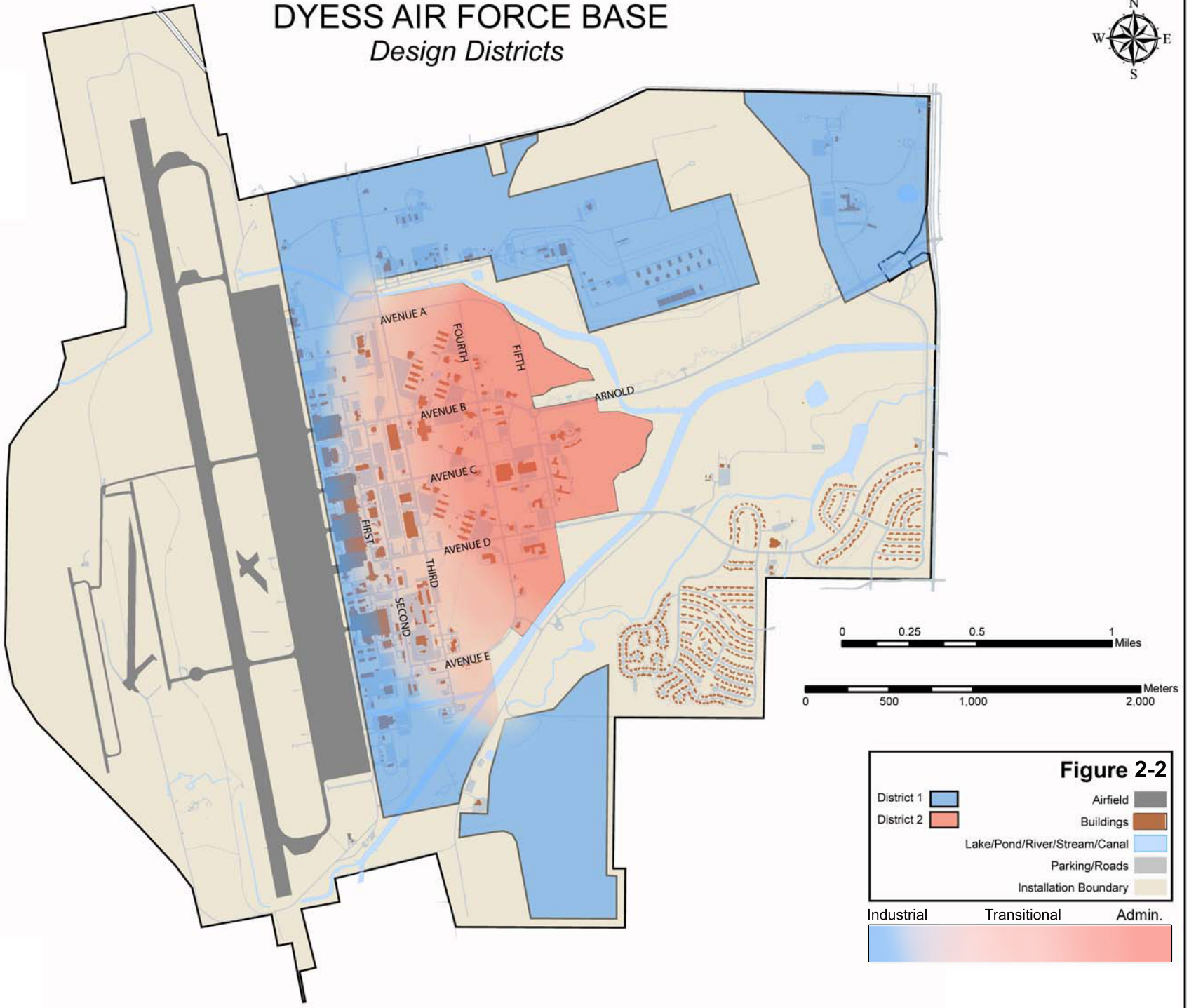
The flightline facilities located along the entire eastern edge of the runway are oriented to support the flying mission, which is the primary "sustainability" issue at Dyess AFB.

- Therefore, optimal building orientation is for the mission with all other orientation issues secondary. When possible, building orientation that reduces energy loads should be implemented.


A pedestrian connection extends through the industrial portion of District 1, but there are no pedestrian amenities and very few personnel that utilize the connections.

DYESS AIR FORCE BASE

Design Districts



Architectural Characteristics

Color schemes (typically sandstone) have been adhered to in a very consistent manner and building materials have been limited to EIFS, also called synthetic stucco, metal panel walls and metal roofing.

Recent construction in District 1 has included elements (Dyess Brick) from District 2. The characteristics of the two entry gates are distinctly different than other facilities in this district. Fieldstone is the exterior veneer on the buildings and security barriers. The roofs are wood shake shingles. These facilities—because they are the first facilities that a visitor sees on entering the installation—begin to establish a mental image of the architectural style for the installation. However, the materials are not repeated in any other building on the installation. They are only evident in some signage (e.g., Marine Corps Reserve Center).

The Visitor Control Center at the Main Gate has a distinctive architectural style.

The Marine Corps Reserve Center is a good example of incorporating the fieldstone from the entry gates into industrial facilities site development in District 1.

The Marine Corps Reserve Center may influence the design of the Armed Forces Reserve Center.

2.4.5.2 District 2—Administration/Community Center

District 2 extends east of Third Street and is comprised of unaccompanied airmen housing, administrative facilities, community services and community commercial functions. Other functions in this district are primarily temporary housing, the chapel and the club. The unusual shape of the eastern portion of this district is formed by the floodplain of the installation storm water drainage canals.

Many of the facilities in this district function as gathering places for living, working, shopping and recreating, and as a result support higher densities of people than in District 1. The types of facilities and land use activities within this district are similar to those found in a small downtown. However, the density of the development patterns is not typical of a downtown, and infill is needed. When taken in that context, a development pattern for the district can be visualized. A typical downtown has a higher density of buildings, many that are multi-story structures. The higher density of buildings is supported by a pedestrian circulation system that encourages walking or riding bikes to a variety of uses within that district. The vehicle circulation system is downplayed, and vehicle parking is subordinate to buildings and the landscape.

Other typical features of a downtown district are parks and formal outdoor spaces. The Parade Ground is a large open space, but is not conducive to public gatherings. A formal park would be an inviting gathering place that could physically tie all downtown facilities at a central location.


The chapel is a primary building within District 2. A "landmark" is in the background.

Although a mental image of a higher density downtown with a pedestrian-oriented landscape can be seen as the potential for Dyess AFB, currently there is no pedestrian landscape or high building density in the core area of the installation.

Architectural Characteristics

The primary architectural characteristic in District 2 is the Dyess Blend brick. Virtually every building in this district is completely clad in this brick. There are some recent building additions—the commissary is an example—where the construction resulted in an imperfect match of exterior materials.


The Airmen Dining Hall complex is a recently constructed building that updates the look of the buildings with Dyess Blend brick.

2.4.5.3 Transition Areas Between Districts

To provide flexibility in facility design, some portions of districts will no longer have a distinct edge that separates one district from another. A transition area between districts will allow designers to utilize design elements and building forms from each of the bordering districts for a new facility. The transition areas are shown as the lighter shaded area between districts in Figure 2-2. The ability to integrate design elements from neighboring districts increases as the shading gets lighter, which is in the middle of the transition zone.

Recent construction of the squadron operations/ maintenance facility and fire station along the flightline are hybrid buildings. These buildings have elements of both districts in the exterior construction.

Although recent construction in District 1 has incorporated Dyess Brick from District 2 in flightline facilities, there have been no transitional buildings in District 2 that incorporate elements from District 1.


The squadron operations and maintenance facility is a prominent "transitional" building in District 1 that includes elements of both Districts.


The Fire Station is a good example of a "transitional" facility design. It utilizes the basic design elements of District 1, with accent materials from District 2.

INSTALLATION IMAGE

The three-bay hangar is a prominent facility on the flightline that incorporates elements of brick from District 2.

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3 Development Considerations

Installation development and sustainability can work hand in hand and, to a degree, has over the decades. The installation has been reusing buildings for many years and continues to do so in limited situations; however, the age of many structures and the requirement to reduce the amount of square feet of facilities is making building reuse less viable. Large-scale building reuse is not a likely scenario in the short-term; however, there are many opportunities for development of new facilities on vacant parcels at Dyess AFB and on previously developed sites.

Infill development allows the development of modern facilities that more effectively meet the needs of the Air Force to maintain their mission capabilities, reduce energy consumption and enhance the working conditions of personnel and the overall quality of life for families. Infill development should be prioritized to fill in vacant parcels to create a dense, compact development pattern. Redevelopment of previously developed sites should also be a high priority. The lower priority development areas are previously undeveloped areas farther removed from the center of the installation.

This section identifies and provides an assessment of the existing condition at the base from which opportunities for the implementation of sustainable design and practices can be realized.

3.1 Reuse Opportunities

Many buildings on Dyess AFB were constructed in the 1950s era. And many of these buildings were designed for different functions than their current ones. It is intended for some of these older, single-story, single-function buildings to be demolished and replaced with larger buildings that include a higher-density working population at appropriate locations on the installation. In addition to functional considerations, structures will be demolished to meet the Air Force requirement to reduce installation building footprint by 20 percent by the year 2020. Some buildings will be backfilled and used as swing-space as the installation redevelops based on the eGP and associated ADP recommendations.

One of the few buildings that will be fully reused for a function differing from its current use will be Building 6222. This building was originally scheduled for demolition; however, it was determined that reuse was the better option. This building will become part of a larger Base Chapel campus. The Base Theater is currently being rehabbed for use as an auditorium and conference center.

Building 6222 is one building that will be retrofitted for a different function.

3.2 Infill Opportunities

Along the flightline, orientation to the runway and the aircraft parking apron is the primary consideration for facility development. The installation has prepared ADPs for infill development along the flightline. The ADPs identify infill development on previously developed sites and some development of the few vacant parcels still remaining in this area.

There are many acres of undeveloped land at Dyess AFB. Some of this land has limited or no adjacent development due to natural or operational constraints; however, as shown in Figure 3-1, there is a large number of acres that are “gaps” in development in the central part on the installation. A number of these gaps offer opportunities for infill development.

- As the Dyess AFB mission grows and functions are consolidated into new facilities, the development gaps within a half-mile radius of Fourth Street and Avenue C should be a high priority for infill sites.

These development gaps are in proximity to existing development and are areas that are both vacant and currently developed. The intersection of Fourth Street and Avenue C functions as the center of what is referred to as “Downtown” Dyess AFB. The half-mile radius from this corner incorporates many diverse uses such as the fitness center, outdoor recreation, the Heritage Club, Shoppette, BX/Commissary, Base Theater, bank, credit union, plus others. Some of the undeveloped parcels within the half-mile radius are addressed in previously prepared installation ADPs. These ADPs, which can be found in the base’s eGP, have been reviewed as part of

DYESS AIR FORCE BASE

Development Gaps

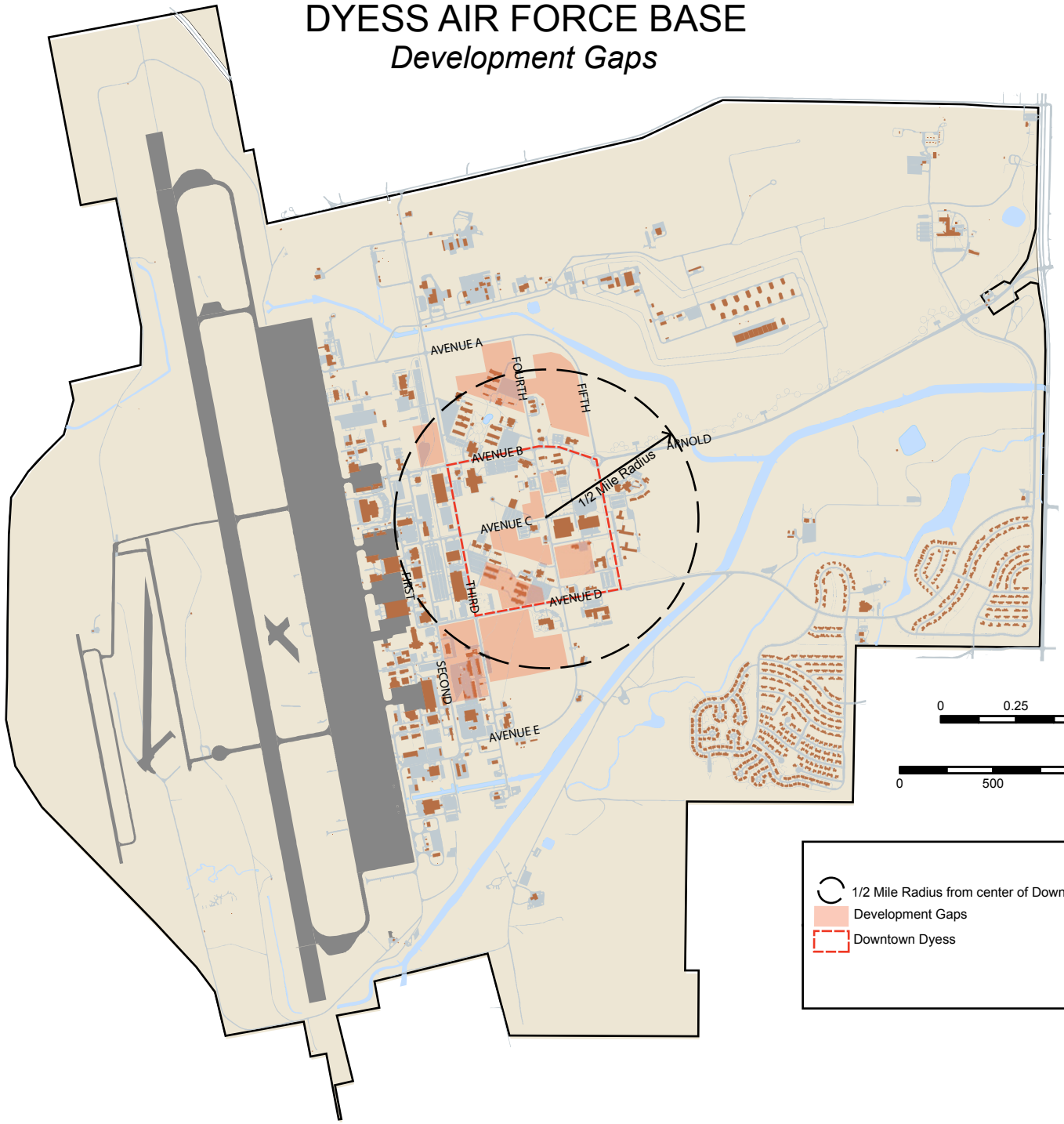


Figure 3-1

- 1/2 Mile Radius from center of Downtown
- Development Gaps
- Downtown Dyess
- Airfield
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

the ID2 development process and have been found to be consistent with the sustainability intent of this document. When implemented, these ADPs will fill in some of the development gaps.

- The Dyess AFB Community Center ADP recommends construction of numerous buildings that consolidate functions in close proximity to the Fourth Street Avenue C intersection. The proposed facilities would significantly increase personnel density within a half mile of that intersection during the workday. Recommendations include further enhancement of recreation and entertainment opportunities.

- The Dormitory ADP recommends redevelopment of the unaccompanied housing area immediately north of Avenue B. The ADP recommendations would create an increase in personnel residing within a half mile of the center of Downtown Dyess.

The infill sites shown in Figure 3-2 will increase development density, enhancing the commercial, recreation, entertainment, educational and administrative core of the installation. Buildings will be closer to each other and site development will enhance the pedestrian environment through landscaping and centralized shared-use parking lots. Development density will focus on multi-story construction and consolidation of functions. Mixed-use (consolidation of functions) opportunities in the multi-story buildings reduce the distance personnel will need to walk and promote less reliance on vehicle use.

In addition to the land use planning and social beneficial impacts of denser development, there are also opportunities for:

- Reducing storm water runoff through a reduction in impervious surface.

- Minimizing the heat island effect.

- Centralizing heating and cooling systems to reduce the base's carbon footprint through less energy consumption. Lower maintenance cost and staffing requirements can also be realized.

3.2.1 Infill Site #1

This site is adjacent to the core area of Dyess AFB. This undeveloped site allows the relocation of the entire Civil Engineering (CE) compound. This location allows improved accessibility for customers, and the squadron building could be sited with a solar orientation. The main entrance to the squadron building would be on Avenue D, which locates a high density of personnel within a half mile of the intersection of Fourth Street and Avenue C. This intersection should be considered the center of Downtown Dyess. Relocation of the CE compound to this location creates another infill opportunity for industrial or aircraft operations or maintenance functions. The former CE compound could be redeveloped with large industrial or maintenance facilities, centrally located shared POV parking and outdoor areas for socializing.

3.2.2 Infill Site #2

This site would be created by the demolition of Buildings 7219, 7220 and 7221. This area is appropriate for administrative functions. The buildings should orient toward Avenue D, which could provide solar orientation. Because this site is within the Downtown Dyess area, pedestrian access to numerous, diverse uses is provided. The proximity of the Child Development Center to Downtown Dyess and this infill site is an additional benefit to the quality of life for installation personnel.

3.2.3 Infill Site #3

This site is located on the west side of Fourth Street, across from the proposed Consolidated Mission Support Facility. This site fills in the "gap" along Fourth Street with a building that could include administrative, educational or consolidation of numerous functions. The building entrances should face the street, but the balance of the buildings can be situated for solar orientation.

Although the Marine Corps Reserve Center is in the industrial area (District 1) and outside of the Downtown Dyess area, it is within walking distance of many diverse uses in that area.

3.2.4 Infill Site #4

Future development of this parcel fills in a development gap and further increases personnel density within Downtown Dyess. Development on this parcel could be a transitional building and potentially associated with administrative or training functions. A solar orientation would be appropriate for this development, while still reflecting existing building setbacks.

DYESS AIR FORCE BASE

Infill Sites

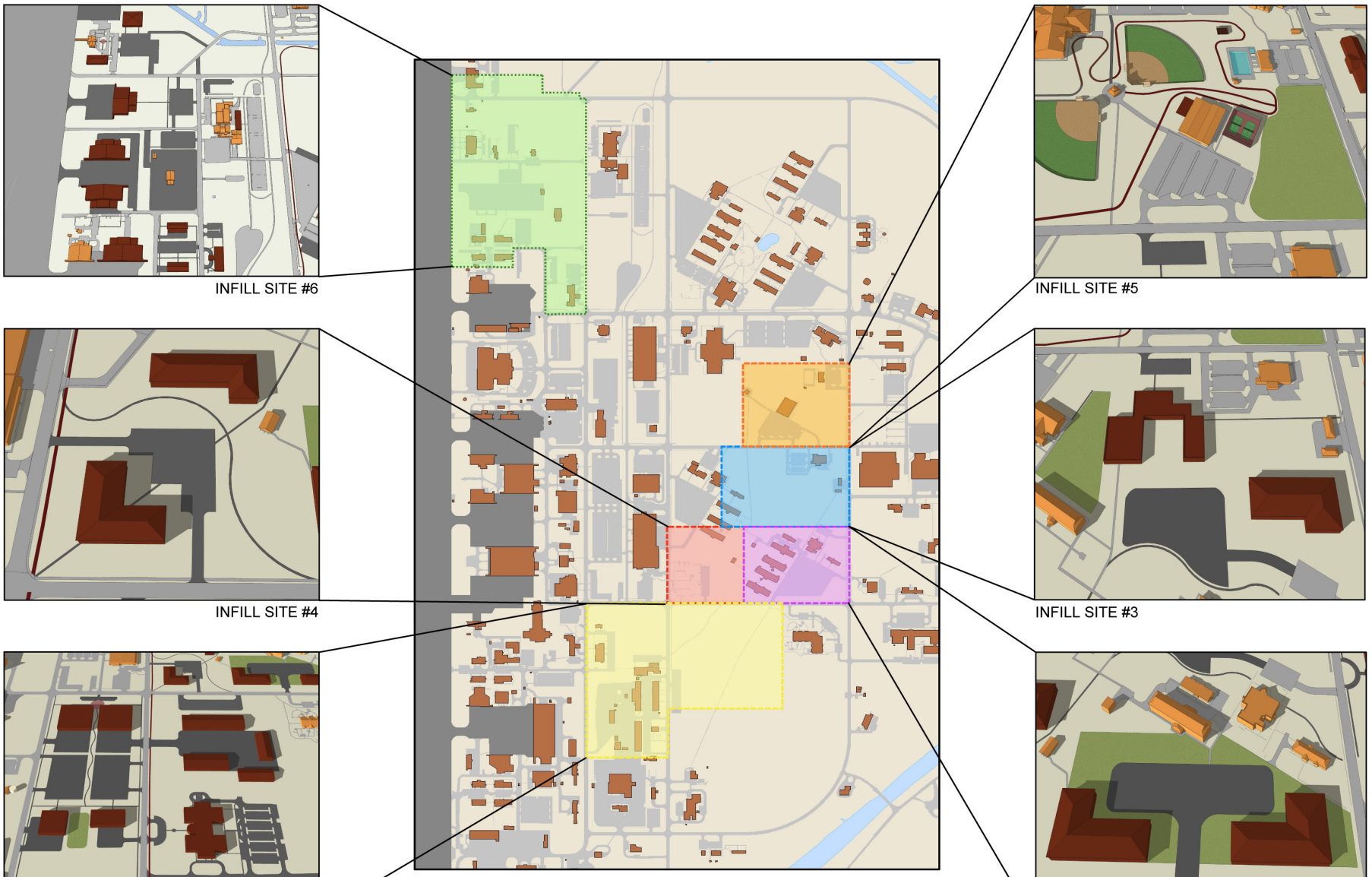


Figure 3-2

3.2.5 Infill Site #5

This site is too small for construction of a viable administrative or commercial facility; however, this site is appropriate for an urban park at the heart of Downtown Dyess. The park could provide shelters for gatherings, a playground near the swimming pool and a landmark or memorial. Parking should be shared with the Bowling Alley.

3.2.6 Infill Site #6

Redevelopment at the north end of the flightline should accommodate new missions, new maintenance facilities and operations. Security of the flightline would require reconfiguration of the flightline security fencing, which would prohibit POV access and have some influence on pedestrian connectivity. The variety of functions and lack of development density at this end of the flightline does not warrant extensive pedestrian amenities; however separation of vehicles and pedestrians should be accomplished when possible. Although an extensive streetscape landscape is promoted for "Downtown Dyess," fewer street trees are recommended for the flightline; primarily as a safety issue. Safety is enhanced through a simplification of the vehicle circulation pattern and reduction in curb cuts. In many instances, building orientation maximizes solar orientation; however the functions some buildings may not allow maximum solar orientation.

Overall, the infill sites would result in a much denser urban feel for the Downtown Dyess area. The compact nature of this development pattern would help reduce the reliance on automobiles and encourage pedestrian circulation to and through the area. Increased development density should be enhanced with significant improvements to the pedestrian circulation system, shared-use parking lots and additional opportunities for outdoor recreation. The development pattern will result in a much larger work-day population as well as encourage personnel and families to spend additional time beyond the work day in this area.

3.3 Circulation

3.3.1 Vehicle Circulation

The installation circulation pattern radiates off Arnold Boulevard and Avenue B (see Figure 3-3). These primary roads account for a large volume of traffic. All secondary and tertiary roads serve the balance of the installation. Most proposed infill areas would not require significant road construction. In most cases, there would be minor connections to new development in those areas. The Dyess AFB eGP has detail on existing and future transportation needs.

Although the installation is well served by roads, the "current" Dyess AFB Traffic Study was prepared 14 years ago and is in need of an update.

Roads within the installation are generally bare of pedestrian amenities and there is no apparent distinction (other than the number of lanes) between major roads such as Arnold Boulevard and secondary roads like Fourth Street. The primary role for Arnold Boulevard is to move high volumes of traffic in and out of the installation.

Fourth Street is in the heart of Downtown Dyess, but this road and others within this area are not pedestrian oriented. Few buildings are oriented to the street.

Arnold Avenue is a high volume road that does not require an extensive pedestrian environment.

3.3.2 Pedestrian Circulation

Pedestrian circulation is limited to some sidewalks and walking trails. Sidewalks are scattered and not well connected in some locations. Walking trails provide access throughout much of the installation. The walking trails typically do not have adequate width to be considered multi-use trails for pedestrians on foot and those on bicycles. Bike traffic is limited to installation streets.

- The installation pedestrian system needs to be expanded in District 2. Walking trails should be expanded to accommodate multi-use functions.

DYESS AIR FORCE BASE

Circulation

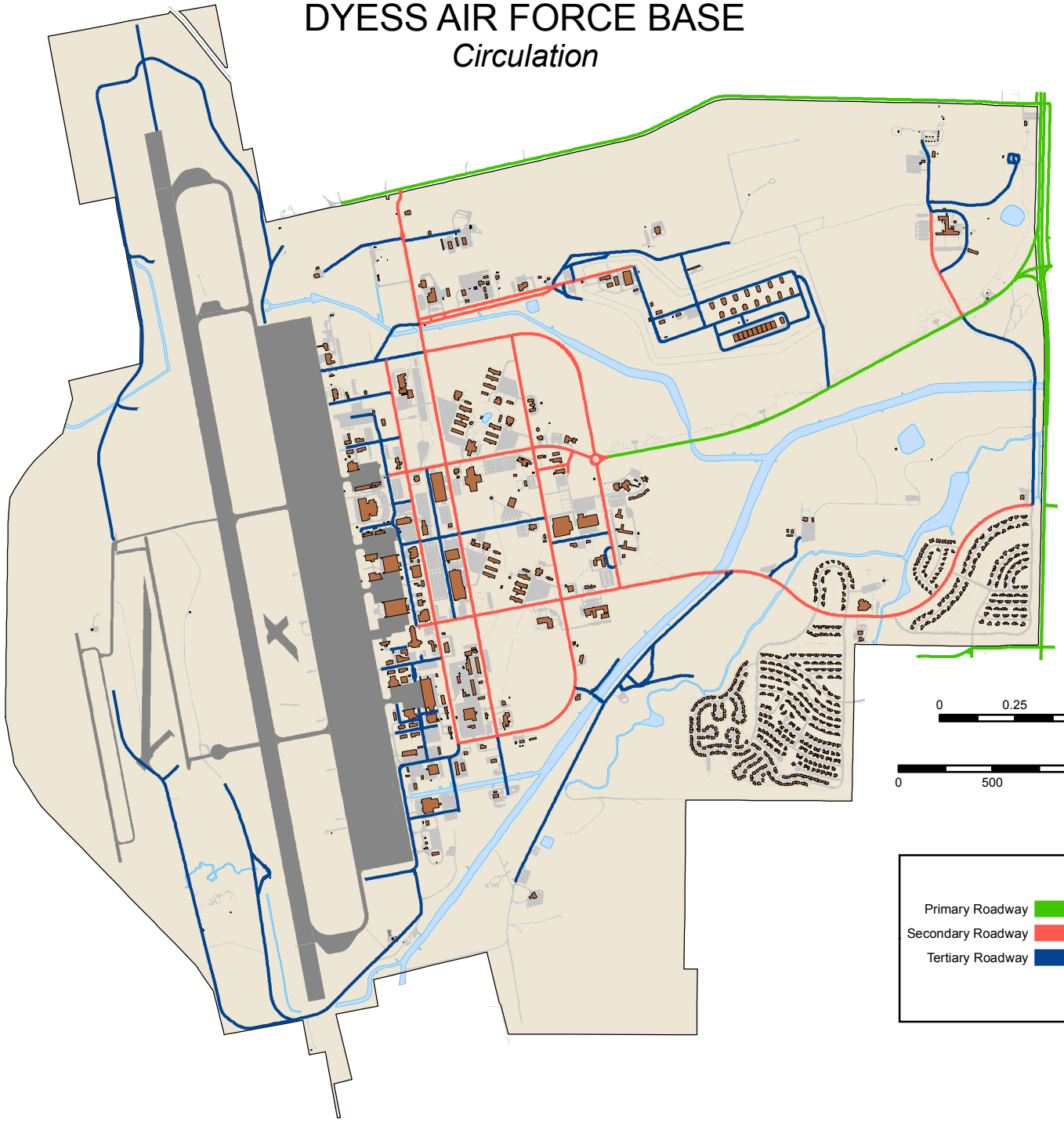


Figure 3-3


Connecting sidewalk through mesquite vegetation lacks shade.


An example of a disjointed pedestrian connection.


Walking paths connect many portions of the main base, but the width of the pavement does not support multi-use trails.

3.4 Utilities

Although the installation is well served with all required utilities, there are no well-established utility corridors. Utility figures are provided in Appendix A, Figures A-1 through A-4. Arterial and collector streets could be considered corridors because these streets have a high density of utility systems along the road alignments. Road widths in locations such as Third and Fourth Streets would allow development of utility corridors. The following are the utility service providers for Dyess AFB.

- Potable Water—City of Abilene
- Sanitary Sewer—City of Abilene
- Electricity—Electric Reliability Council of Texas
- Natural Gas—ATMOS Electric & Gas

3.5 Land Use

The existing land use (Appendix A, Figure A-5) layout of Dyess AFB has been logical and has followed basic Air Force planning guidance design to support the base's mission. Future land use (Appendix A, Figure A-6) locations identified in the eGP are similar to the existing land use found on the base; very little change is proposed. Similarly, the infill/Downtown Dyess concept presented in this ID2 is not a significant deviation from the existing/future land use configurations. Creating the downtown concept involves the allocations of land for activities associated with administration, commercial, outdoor recreation and dormitory housing.

- The future land use map in the eGP should be modified to reflect the land use change presented in this ID2. An example of an appropriate change to the Future Land Use is in the eastern portion of District 1, which is shown as Open Space in the Future Land Use Map. This area should be considered for administration or some function (housing, education, outdoor recreation) supporting the higher density development tied to the Downtown Dyess concept.

3.6 Sustainability Initiatives

Dyess AFB has undertaken a number of initiatives to reduce their consumption of natural resources and their impact on the environment. These initiatives also help to reduce their dependency on off-base resources. Design teams need to be aware of these initiatives to continue to improve upon them.

3.6.1 Natural Area Preservation and Restoration


Mesquite and grassland vegetation.

Dyess AFB has a significant amount of natural open space in the form of restored grasslands, mesquite stands, and floodplains that frames the main base. This open space is best suited for passive recreational activities and natural habitat (Appendix A, Figure A-7). Another significant natural feature on the base is the drainage canals that form linear wildlife corridors of significant size away from the airfield. The following are restoration efforts by Dyess that are underway.

- A restoration and conservation effort for the riparian corridors along the Little Elm Creek diversion system was initiated in 2004. This project has resulted in the establishment of vegetative buffer strips of native riparian over-story and mid-story species along the Little Elm Creek system. This project provides numerous long-term positive benefits to wildlife as well as improving storm water quality and ground water recharge.

- Dyess AFB is part of a regional effort among federal, state and private landowners to control or minimize the negative impact of mesquite and juniper on underground water resources and rangeland. Dyess AFB participates by actively removing areas of mesquite and, in its place, promoting native bunch/prairie grass habitat. The replacement will reduce fire hazards by removing the woody mesquite areas with more easily maintained grasslands. The replacement will also promote groundwater infiltration, restoring storm water runoff rates to not only lower than pre-development runoff levels, but also to levels prior to historic invasion of the mesquite.

- These restoration programs should be considered in the facility siting process for opportunities to further restore native grasslands and reduce storm water runoff rates.

3.6.2 Recreational Areas

The active outdoor recreation areas, which include the golf course, the equestrian center, and the static displays along Arnold Boulevard, provide a human connection with the out-of-doors and opportunities for fitness. The natural and improved recreational areas at the base are shown in Figure 3-4. Most notable is the proximity of outdoor recreation right in the heart of Downtown Dyess. Multiple ball fields and the running track/trail are collocated with the fitness center in the central location. This provides the installation's daytime working population with the opportunity to make a short trip for daily PT and a short walk for airmen from the dormitories. Another notable green space in Downtown Dyess is the Parade Field.

Open space areas are located adjacent to the barracks buildings north of Avenue B and include several nodes of picnic tables, benches, barbecue grills and special paving materials.

- Shade structures are needed for outdoor spaces to make them more comfortable in the summer months.


Open space at Troop Housing Area lacks adequate shade.

3.6.3 Energy Conservation Initiatives

Over the years, Dyess AFB has implemented a number of initiatives to reduce their energy consumption rates and costs of energy.

- Dyess implements a "no heat and no cool" program for non-essential buildings from 15 March to 15 May and 15 October to 1 December. This program needs to be considered during the facility siting and design phase.

- The base constructed a small central ice plant (Building 6130) as a cooling system for multiple buildings (Appendix, Figure A-8). The system uses a water-cooled chiller and an ice storage system that is capable of storing 4,600 ton-hours. A pond is used for additional heat rejection in support of the cooling towers. The plant provides cooling for 13 dorms and the B-1 simulator building. There are opportunities for other local facilities to hook into the system.

- Substantial efforts have been made towards metering and advance metering of facilities throughout the base (Appendix A, Figure A-9). Advanced metering and a control management system are installed in buildings larger than 35,000 square feet with some additional sub-metering in place for reimbursable tenants

DYESS AIR FORCE BASE

Green Infrastructure

N
W E
S

0 0.25 0.5 1 Miles

0 500 1,000 2,000 Meters

Figure 3-4

- Airfield
- Buildings
- Lake/Pond/River/Stream/Canal
- Floodplain
- Parking/Roads
- Installation
- Existing Tree Thicket
- Outdoor Recreation

(Appendix A, Figure A-10). In addition, automated building management systems have been installed at a number of buildings. Dyess has installed metering for most of the base's reimbursement facilities and commands.

- There is an ongoing effort to replace natural gas mains and regulators. The replacement program is approximately 75 percent complete, with the fourth and final replacement phase to be completed in 2010.

3.6.4 Water Conservation Initiatives

Dyess AFB has also implemented a number of initiatives to reduce their use of potable water on the base as well as the amount of water collected and diverted to waste water treatment facilities.

- Completed in 2003, Dyess AFB uses a pipeline to receive wastewater effluent from the city of Abilene's wastewater treatment plant. The effluent is used to irrigate the base golf course and other landscaped areas of the base (Appendix A, Figure A-11). The water is stored in a storage pond at the northeast end of the golf course and distributed by pumping for use on the base through a raw water piping system. There are opportunities for using this effluent water[1] to serve new facilities.

- The Dyess team has retrofitted many existing water fixtures in base facilities with low-flow and automatic (low-use) fixtures (Appendix A, Figure A-12). The base will continue to use low-flow water fixtures and automated faucets in base facilities to the maximum extent feasible.

- The base has made a significant effort to replace its aging water distribution network (Appendix A, Figure A-13). Phase I replacement of distribution system piping involved 35,000 linear feet of water line. Phase II, which has yet to be started, will include 51,000 linear feet of distribution line. The planned looping of water distribution line during this phase is expected to help with the drop of chlorine residuals in the water and reduce the need for system flushing. Design teams should consider opportunities for the use of the flushing water.

- Although all sewer main pipes were pipe bursted or slip-lined during 2002 and 2003 in an attempt to eliminate infiltration and inflow (I&I) problems, sewer service laterals were not renovated. Since then, there have been continued I&I issues with the sanitary sewer system. An updated I&I study has been completed. It is suspected that the continued I&I issues may be a result of H2S damaging seals at manholes.

3.7 Constraints

Constraints to development and the use of green technologies include natural resources, operations and safety/security. Figure 3-5 illustrates composite constraints at Dyess AFB. In summary, there are generally few significant constraints that will affect development at Dyess AFB.

Floodplains associated with the storm water drainage canals are a limitation to development; however, they also provide opportunities for pedestrian circulation and are part of the installation's green infrastructure. An example of the influence of floodplains is the meandering shape of the eastern boundaries of District 2.

Another constraint to development is the noise contours associated with aircraft operations. Noise is a quality-of-life issue and can directly affect human health if not attenuated through appropriate construction.

Safety and security of Air Force assets, personnel and families drive Antiterrorism/Force Protection (AT/FP) setbacks for construction of facilities. The AT/FP setbacks limit opportunities to create truly compact development patterns on the installation. They also limit the ability to site a building that addresses the road and sidewalk in a "new urbanist" style. However, buildings may share the standoff distance created between them, which will help in creating a denser development pattern.

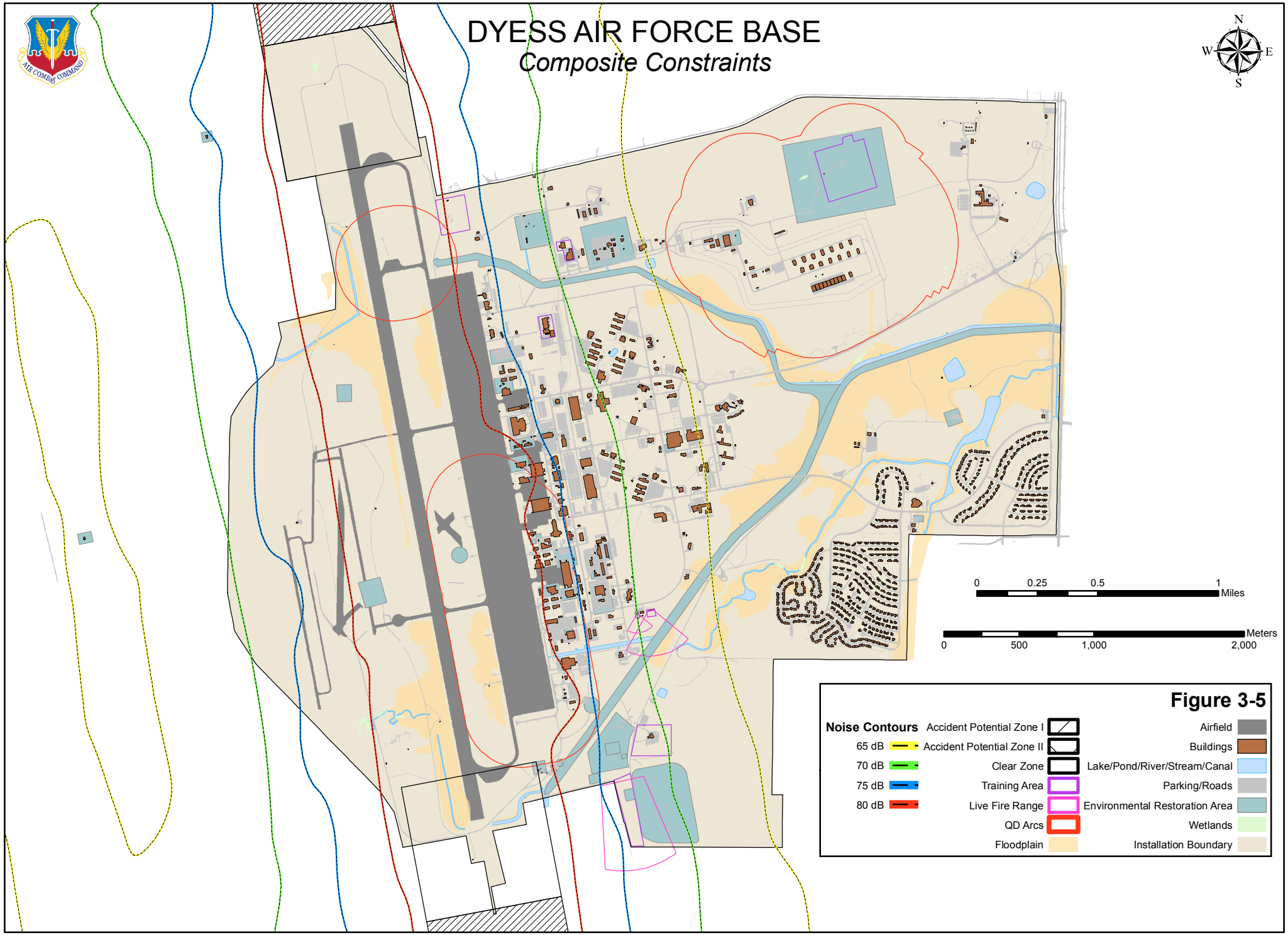
The availability of water and energy/power sources are not considered constraints to development at the installation, although the nature of the installation and local climate do limit some opportunities for renewable energy generation. The military airfield limits the feasibility of wind turbine projects on the base due to the potential for creating an obstruction or hazard to air navigation or to interfere with surveillance radar. Wind turbine projects are evaluated by the Federal Aviation Administration.

High frequency of damaging hail storms in the Abilene, Texas, area has precluded the implementation of large-scale solar projects due to the potential damage of the solar panels. However, new technology utilizing vacuum tube panels may enable these types of panels to be used for thermal (hot water) solar systems on the base.

[1]Effluent water is not used for irrigation in the family housing area due to the perception of issues with human contact, although treatment level of effluent water makes it safe.

DYESS AIR FORCE BASE

Composite Constraints



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4 Illustrative Plan

The purpose of the illustrative plan (see Figure 4-1) is to graphically illustrate the desired, future state of Dyess AFB by:

- Incorporating the sustainable recommendations found in this document.
- Using the infill opportunities that were discussed in Section 3 and shown in Figure 4-2
- Integrating current Dyess ADPs and demolition plans.

Implementation of the plan will result in a much denser urban feel for the Downtown Dyess area. The compact nature of this development pattern will help reduce the reliance on automobiles and encourage pedestrian circulation throughout the area. Increased development density will be enhanced with significant improvements to the pedestrian circulation system, shared-use parking lots and additional opportunities for outdoor recreation. The development pattern will result in a much larger work-day population as well as encourage personnel and families to spend additional time beyond the work day in this area. The redevelopment of the area provides opportunities for low- or no-cost sustainable building design solutions as well as opportunities for sustainable utility and infrastructure design. Figures 4-3 and 4-4 provide subarea views of the core.

On Figure 4-1 the design concepts and components embodying infill development for the base are labeled as:

1A. Development of a CE compound on this undeveloped site substantially increases the density of personnel within a half mile of Downtown Dyess and allows for improved accessibility for compound customers. Site buildings can be situated for solar orientation.

1B. Demolition of the former CE buildings provides opportunities for large scale industrial and maintenance facilities. Site buildings can be situated for solar orientation.

2. Building demolition at this site creates opportunities for administration functions. Buildings are oriented towards Avenue D for solar orientation. Pathways provide pedestrian access to numerous, diverse uses.

3. Situated across from the proposed Consolidated Mission Support Facility, this site could be used for administrative, educational or consolidation of numerous functions. The building entrances should face the street, but the balance of the buildings can be situated for solar orientation.

4. Development of this parcel fills in a development gap and further increases personnel density within Downtown Dyess. Solar orientation is achievable for this site, while still reflecting existing building setbacks.

5. The size of this site is appropriate for an urban park at the heart of Downtown Dyess, which provides shelters for gatherings, a playground near the swimming pool and a landmark or memorial.

6. Redevelopment of this flightline area accommodates new missions, new maintenance facilities and operations. A simplification of the vehicle circulation pattern and reduction in curb cuts enhances safety. In many instances, building orientation maximizes solar orientation; however, the functions of some buildings may not allow maximum solar orientation. Pedestrian and streetscape amenities are enhanced, but not to the degree of Downtown Dyess because of the lack of development density and population.

Overall, development infill occurs in redevelopment areas where existing buildings are scheduled for demolition and in areas where there is available vacant land and it makes sense to increase the density of development. The infill buildings are sited to align with the existing road grid, which is close to the optimum solar orientation. Good solar orientation will result in a reduction in energy consumption.

- Although it is best to face structures directly into the sun, it can be oriented up to 30 degrees away from due south and lose only 5 percent of the potential savings.

Other site features envisioned as part of the illustrative plan include:

- Street tree plantings in the Downtown Dyess area to provide shade and create windbreaks.
- Strategic plantings for shading buildings and pathways.
- Extension and enhancement of pedestrian and recreation corridors to create multi-purpose trails that provide connectivity throughout the installation
- Encouragement of larger shared-use parking areas, reductions in smaller building oriented parking lots, and landscaping to screen parking lots from roadways.
- Introduction of low impact development stormwater management consistent with the availability of land on base for managing stormwater.
- Increased development density to promote the use of centralized cooling and heating systems.

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DYESS AIR FORCE BASE

Illustrative Site Plan

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DYESS AIR FORCE BASE

Downtown Dyess

Figure 4-2

- Infill Building
- Existing Buildings
- New Paved Areas
- Existing Paved Areas
- Park
- Trails

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DYESS AIR FORCE BASE

Downtown Dyess Subarea #1

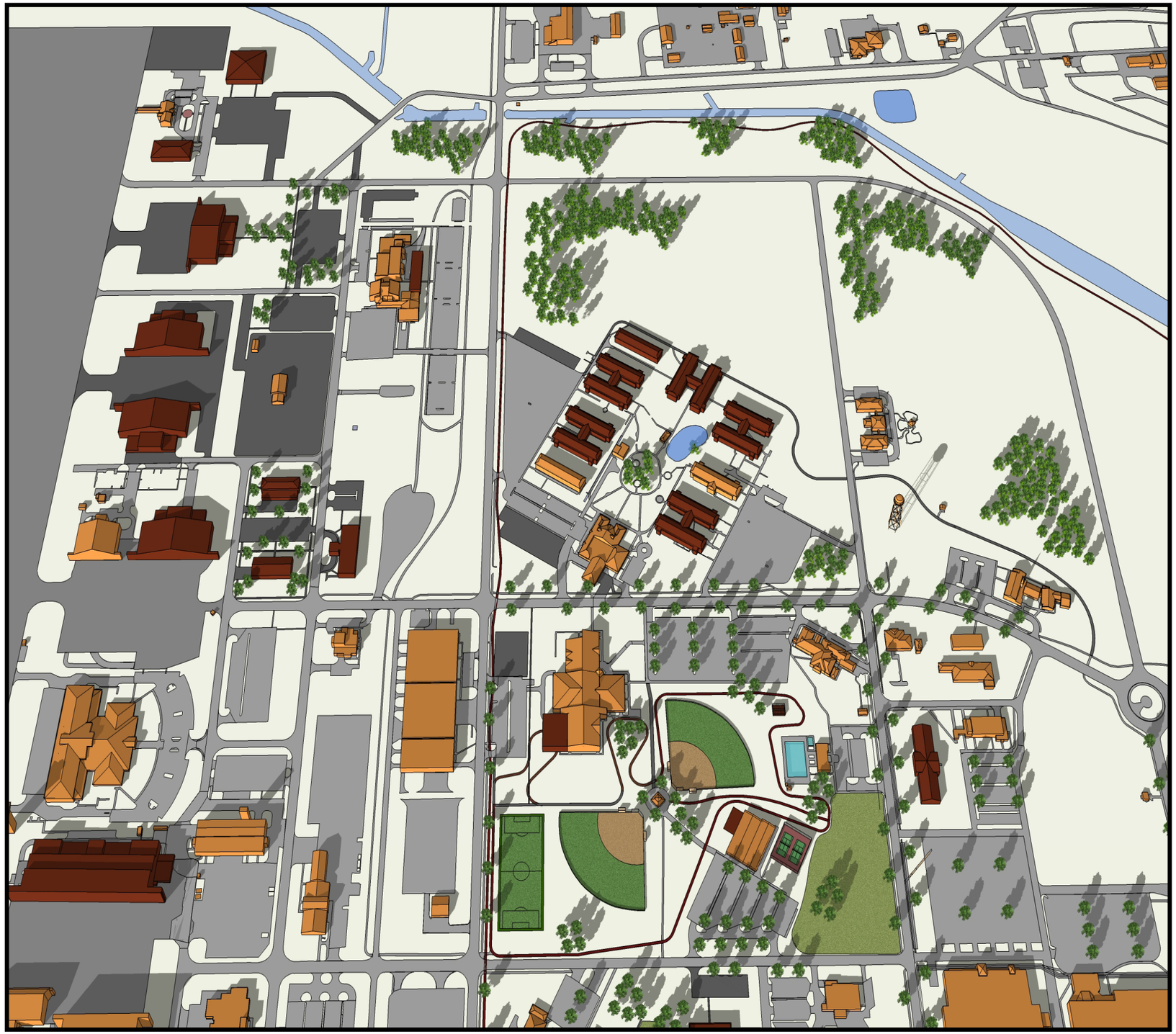

Figure 4-3

- Infill Building
- Existing Buildings
- New Paved Areas
- Existing Paved Areas
- Park
- Trails

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DYESS AIR FORCE BASE

Downtown Dyess Subarea #2

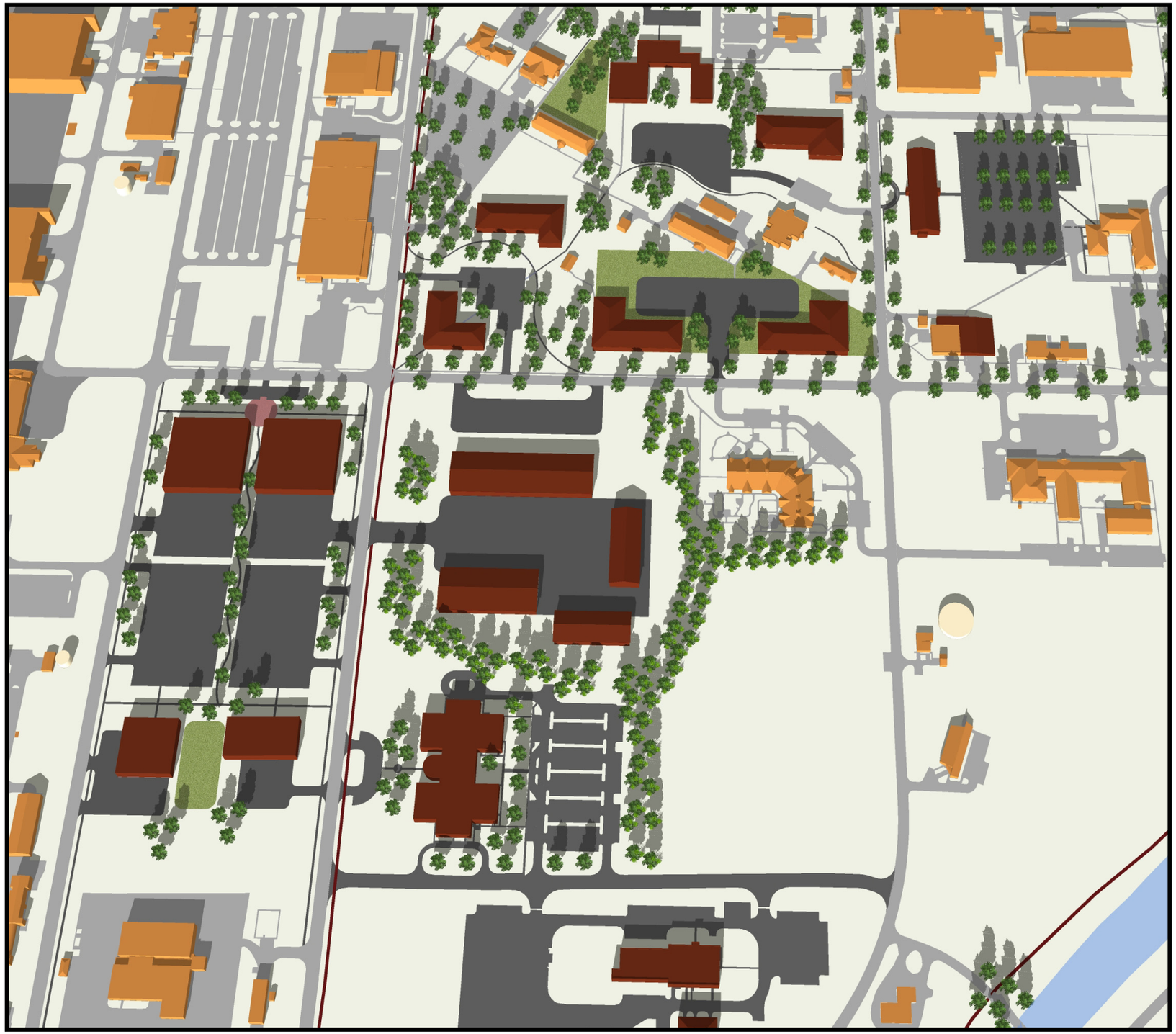

Figure 4-4

- Infill Building
- Existing Buildings
- New Paved Areas
- Existing Paved Areas
- Park
- Trails

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5 Development and Design Guidelines

5.1 Sustainable Development and High Performance Green Building Design (SD&HPGBD)

ACC has realigned planning, design and construction practices so implementing SD&HPGBD objectives become primary considerations. These changes will allow SD&HPGBD strategy opportunities to influence the building form.

Dyess is also committed to SD&HPGBD to improve the quality of the installation and reduce resource consumption. Initiatives currently in place include the purchase of "green power" and focused efforts to reduce energy and water consumption.

Dyess AFB uses *the ACC SD&HPGBD Scorecard (Scorecard)* as its green building self-assessment metric. The scorecard assembles and consolidates Executive Orders, Public Laws and Federal Agency rulemaking on SD&HPGBD requirements with the LEED Rating System. Using the scorecard is a way to achieve the desired LEED rating and meet critical statutory minimum requirements.

When applied in context, the scorecard can illuminate opportunities for sustainable design, often with low- or no-cost choices. Some choices carry an upfront cost but provide long-term operational cost savings and are value-added building features. Scorecard requirements can guide and inform building projects towards lower lifecycle costs and enhanced sustainability.

This section provides guidelines related to site development and infrastructure systems as well as architectural order and elements necessary for achieving SD&HPGBD.

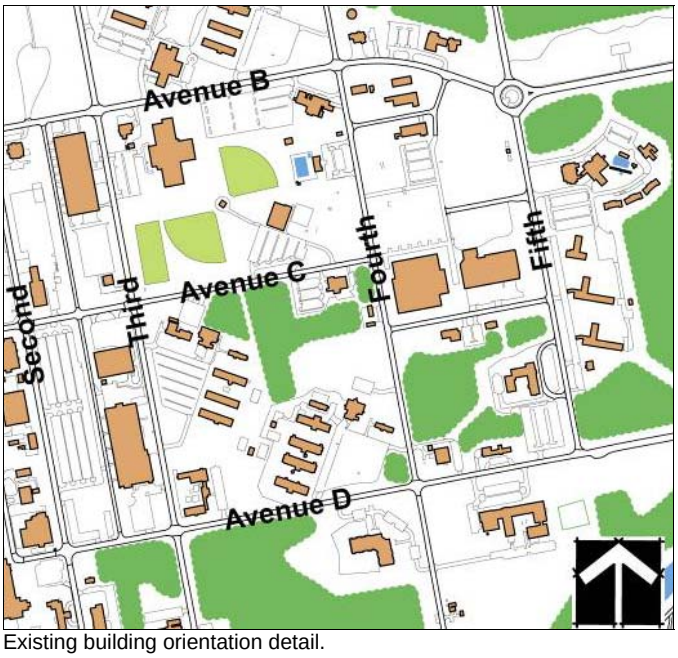
5.2 Site Development

Site development guidelines focus on building siting and orientation, access, parking/roads, landscape, open space, energy, utilities, and storm water. Each section includes a brief description of existing conditions. The intent of these guidelines is to provide the designer with general background information for the installation and to provide recommendations for site development. The recommendations identified will help foster the base's green infrastructure.

5.2.1 Solar Orientation and Building Siting

5.2.1.1 Solar Orientation

The existing buildings at Dyess AFB are mostly oriented parallel and perpendicular to the roadway grid. In fact, all of the buildings west of Third Street follow that grid alignment. The barracks and some community buildings east of Third were aligned diagonally to the grid for no other apparent reason than to add some contrast to the development from the juxtaposition in the siting. These buildings are not necessarily sited to follow an ideal solar orientation but the diagonal arrangement creates some interesting and pleasing open spaces. The graphic below shows the contrast in the existing building orientation in the core area of the installation.



Existing building orientation detail.

Design and planning teams should maximize the future solar orientation of buildings through land development planning. All future ADPs in areas without an established road system must be laid out and new buildings oriented, such that solar heat gains/losses are optimized. This is generally with the long axis of buildings east-west and solar exposures to the north and south. The layout of new streets in an ADP often dictates the future orientation of buildings toward the street and as such, aligning the street grid according to the sun is critical. Aligning streets and buildings on an east-west axis will serve the dual purpose of also optimizing those buildings to host rooftops solar panels, should the opportunity arise. The planners or designers of any ADP or building not designed to optimize passive solar gains need to give justifications for these omissions during concept design and design development reviews.

When siting a building and developing early schematic design, the designer shall maximize the shape and orientation of the building with respect to the sun for passive solar heating, cooling, and daylighting. This will help maximize energy performance.

- Passive solar design of buildings can reduce a building's energy demand by as much as 30 percent, at essentially no cost. Dyess cannot afford to develop new buildings without maximizing solar orientation for energy savings.

5.2.1.2 Building Siting

Numerous factors need to be considered when siting new facilities. Some of these factors include the following:

- Existing and future land use
- Functional relationships between activities
- Opportunities for LEED credits through orientation and location
- AT/FP
- Building function and size, including consideration of the minimum size and footprint necessary to serve the function
- Parcel shape and size
- Operational and natural constraints
- Infill opportunity
- Vehicular and pedestrian access
- Proximity to utility corridors
- Planning for a dense enough development pattern to support a combined heat and power plant (co-gen) or separate district heating and cooling plants

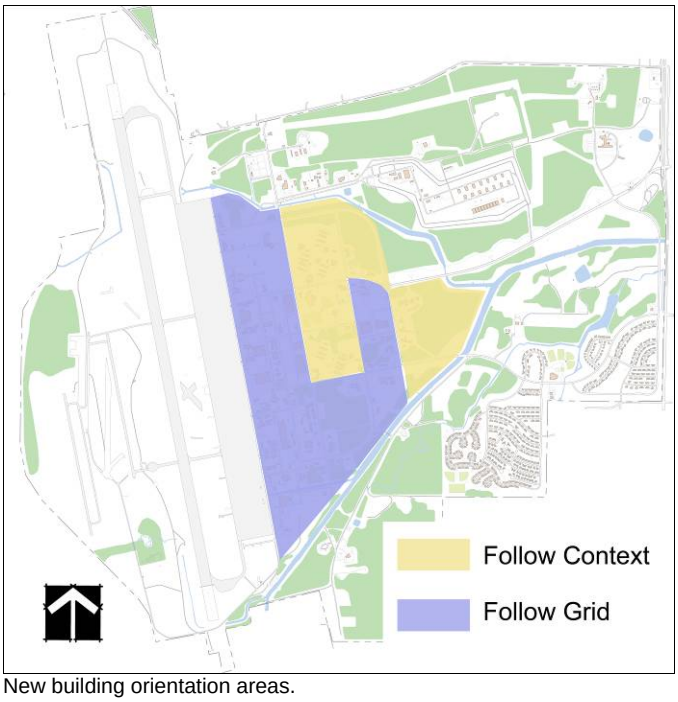
Some of the above factors provide low–to-no-cost development opportunities.

The following graphic identifies the sites on Dyess AFB that need to follow a specific orientation unless a specific design solution can provide more beneficial results.

- New buildings sited in the yellow areas in the graphic should follow the context of the existing building orientation in that district. Most buildings in this area are oriented at a diagonal to the roadway grid.

- New buildings sited in the "blue" areas in the graphic should be sited to follow the roadway grid, but should have a long axis following the east-west orientation of the grid to maximize passive solar orientation.

Any buildings sited outside of the aforementioned areas can follow the optimum passive solar orientation.



New building orientation areas.

5.2.2 Access

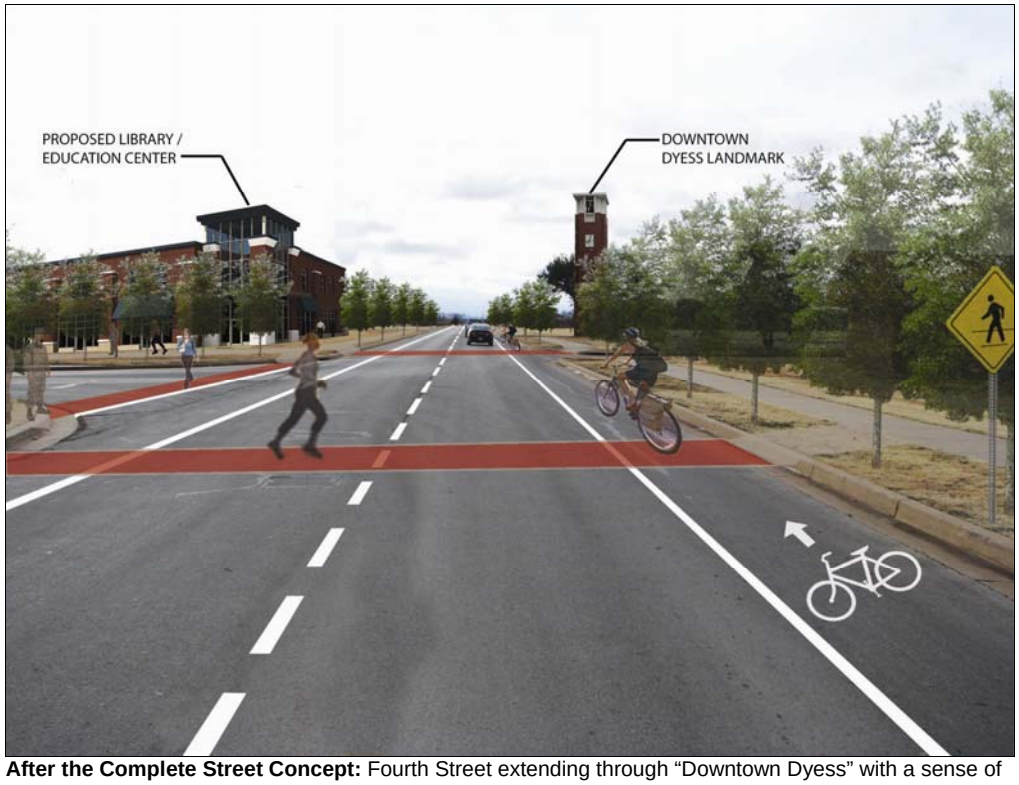
As discussed in Section 3.3, roads within the installation are generally bare of pedestrian amenities. The network of sidewalks that do exist generally follow the road network and in some cases have been located to connect major activity centers through large, open space areas. These sidewalks lack shade tree planting and adequate development of crosswalks and curb ramps.

To improve access and the movement of pedestrians and motorists throughout the base, with a particular emphasis on Downtown Dyess, streetscape improvements should be implemented following a complete streets concept.

Lynch describes complete streets as ones "…*designed and operated to enable safe access for all users. Pedestrians, bicyclists and motorists of all ages and abilities must be able to safely move along and across a safe street*." Complete streets could include bike lanes, sidewalks on both sides of the street, frequent street crossings and median islands. The streetscape should include pedestrian amenities, such as benches and landscaping.

The complete street concept can be further enhanced with the application of sustainable design features, such as permeable pavement or permeable gutters and curb cuts to rain gardens within the landscaped areas to reduce storm water runoff and pollution. The following page shows what Fourth Street, extending through Downtown Dyess, currently looks like and what it could look like with complete street amenities.

Before the Complete Street Concept: Fourth Street extending through "Downtown Dyess" with a similar feel as a major road, such as Arnold Boulevard.



After the Complete Street Concept: Fourth Street extending through "Downtown Dyess" with a sense of safe pedestrian and vehicle movement.

The application of streetscape (or the complete street concept) improvements is seen as one of the ways to enhance pedestrian connectivity. As a result, it is recommended that:

- Streetscape features in the Administrative/ Community Center District should be pedestrian oriented and patterned on the "Complete Streets" concept.
- Streetscape improvements in the Mission/Industrial District should not require the same level of care as "Complete Streets," because this area is not envisioned as a social/gathering area, but appropriate pedestrian circulation paths are necessary to minimize pedestrian and vehicle conflicts.

It is also recommended that the design team look beyond the development site for pedestrian improvement opportunities that connect new development sites with adjacent services and amenities, which will provide an alternative to short-trip driving, ideally embodying the LEED concept of "Community Connectivity."

Appendix B provides additional measures for pedestrian amenities, landscaping, and plant selection.

Inappropriate crosswalk development: no path exists to receive the crosswalk traffic.

5.2.3 Parking and Roads

The amount of parking at the base seems to be more than adequate to meet the need. Newer facilities have parking lots that were developed at the appropriate distance from the building to meet AT/FP standards. Most lots have limited or no shade-provided storm water management systems, which are designed to benefit the site as a whole. The lack of shade intensifies the heat island effect making the area less comfortable for people.

- Include sustainable design features, such as green infrastructure design solutions for storm water management that are appropriate to locate in a new parking lot development. These systems can be as simple as draining storm water to landscaped areas instead of collection systems to promote infiltration and slow down excess runoff.
- Consider reductions in new and existing street sections and parking to reduce runoff and heating effects.
- Limit parking to what is required, and no more. Consider shared parking between users in the Downtown Dyess commercial/retail district.
- Consider the use of narrower roads where appropriate. Road sections are commonly oversized instead of sized to meet the design speed and typical traffic volume to accommodate infrequent truck traffic. Post truck routes and prohibit regular truck traffic to reduce a 24'-wide road section to 20'-wide[1] or to incorporate a bike lane into the existing section.
- Where on-street parking may be utilized, consider providing the additional pavement only at the location needed and returning to a standard two-lane section beyond. Excess pavement increases the amount the installation pays to have installed and then must maintain. It also increases storm water runoff and contributes to heat.
- Design parking lots to have islands within them where trees can be planted. When selecting trees for parking lots, use rounded, high-branched, dense and relatively fast-growing trees. Additionally, select trees that can withstand harsher conditions such as sun, glare, heat and reduced water supply. Avoid trees with low-growing branches. Choose trees and shrubs that require minimum maintenance and will not litter the parking area with branches, fruit or nuts.

Parking area lacks shade.

[1]UFC 3-250-18FA allows a 20' wide road section for two-lane roads with no truck traffic and an ADT less than 1,000 and peak hour volume of 150 vehicles, which may match with some of the lower volume roads with Dyess AFB.

- Set aside 5 percent of parking for car/vanpools and 5 percent for low-emitting vehicles in preferred locations near building entrances, embodying the LEED concept of limiting environmental impacts from automobile use and encouraging alternative transportation.


View of low wall barrier around HQ Building.

Site design for parking is include in Appendix B, B.2. Landscape guidelines are included in Appendix B, B.7.

5.2.4 Landscape

Landscape development is limited by the central Texas environment. Long, hot summers with low rainfall quantities make it a challenge for ornamental plant material to thrive. Existing vegetation at Dyess AFB includes hardy oak trees and drought-resistant shrubs. Dyess also makes use of low barrier walls as a landscape element. The landscape shrub beds include drip irrigation and other xeriscape elements that are appropriate for this climate. Most of the irrigation water used at Dyess AFB is effluent water from the city of Abilene's sewage treatment plant.

- The source of irrigation for all future landscaping should be effluent water.

- All future landscape should be designed to avoid the need for long-term irrigation. Where irrigation is essential, only drip irrigation should be used, unless a more efficient/sustainable solution can be provided by the design team.

- Strategically placed landscaping should be provided for all new facilities to provide necessary shading for the facilities' solar orientation. This should include the use of deciduous trees on the south, east and west sides to shade buildings during the summer but allow sun in the winter months.

- Due to the environmental conditions and limited landscape development at Dyess AFB, all reasonable measures should be taken to preserve existing trees, especially large specimens over an eight-inch caliper.

More specific landscape recommendations are included in Appendix B, B.7.


Xeriscape development at the Base Exchange.


Plants at the Medical Center help buffer the security wall.

5.2.5 Open Space

As discussed in Section 3.6.2, there are both active and passive open space areas on the base. Passive areas include expanses of mesquite vegetation, grasslands, floodplains and canals while the active recreational areas include ballfields, parade grounds, parks, picnic areas, etc.

The recommended level and frequency of open space development should vary depending on the district where it is located.

- In either district, open space development and amenities for new buildings should largely be designed to support the needs of surrounding land uses.
- Large, active open space areas should be preserved to function as gathering/multi-use spaces especially in the administration and troop housing areas.
- ADPs as well as site-specific developments need to consider open space linkage between the areas/site and the rest of the base. Linkage corridors need to be enhanced.

Typical mesquite vegetation.

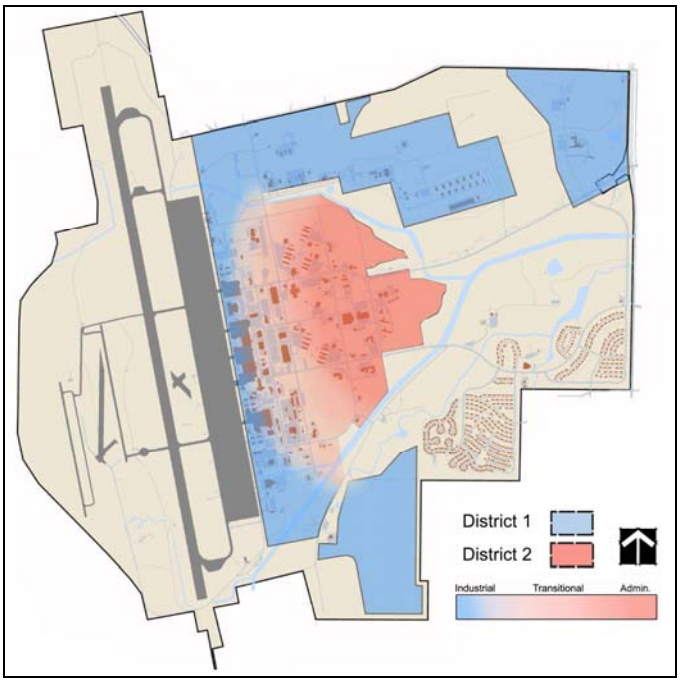
In District 1, shown in blue on the District Map, open space development for new buildings should include the following:

- Small outdoor break areas with picnic tables and/or benches that include recycled plastic lumber.
- Provisions for shade and shelter from the wind. Shade and windbreaks can be achieved through planting of landscape material and earth berming. Shade can also be achieved through the use of shade structures that are compatible in color, form, and materials with the adjacent buildings.

In District 2, shown in red on the District Map, open space development for new buildings should include the following:

- Gathering nodes similar to what exist now—special pavement (colored concrete or precast concrete pavers), picnic tables and barbecue grills.
- Provisions for shade through plant material or structures should be included. Any shade structures that are developed should be compatible in color, form and materials with the adjacent buildings.

Refer to Appendix B, B.7 and B.9, for recommended species of plants. Site furnishing and component recommendations can be found in Appendix B, B.8.



5.2.6 Energy and Utilities

Dyess AFB has undertaken a number of energy and water efficiency projects to meet higher-level policy goals and directives. Further reduction of the base's resource consumption is a complex problem that will only be solved by approaching energy and water utilities in a holistic way.

Energy saving recommendations presented in the section are taken from the Dyess AFB ISA, 2010. The recommendations build upon sustainability initiatives already in place and are specific to the local conditions and previous, successfully implemented practices. Recommendations should be reviewed by planning and design teams for consideration in ADP and capital improvement projects as well as site specific projects.

5.2.6.1 Heating and Cooling

Air conditioning is the primary thermal load at Dyess AFB. The base has been successfully operating a central ice storage plant and chilled water loop system that provides cooling to the dormitory campus and adjacent buildings, including some cooling for the flight simulator building. The water-cooled chiller at Building 6130 provides cooling for the ice plant equipment while it runs at night.

Most other buildings on the base use individual chillers and boilers to provide cooling and heating to the building they serve, while a few buildings use direct-expansion package units.

- In all cases, distributed water heating and cooling systems should be considered for new construction. Such systems will allow for greater flexibility in the future to connect to centralized cooling systems or solar thermal heating systems.

- Increasing density through infill development with centralized utility plants and distribution systems serving multiple buildings within a campus offers a possible order of magnitude improvement in energy savings compared to current development practices. It can also provide an opportunity to utilize renewable energy sources as a fuel at the central plants to provide heating, cooling and electrical power through co-generation for the campus that is served.

- Where feasible and when sufficient cooling load is available, connect to the existing chilled water loop served by the existing ice storage system central plant.

- Consider construction of additional ice storage/central plants on the base to create a district cooling system. Larger cooling districts attached to a single, central plant provide more benefits because the distribution system acts as a thermal reservoir (a "flywheel" effect) and the aggregation of equipment is often more efficient and easier to maintain than individual units at each building.

- Air conditioning condensate from air-handling units should be collected and used as makeup water for water-cooled air conditioning systems, site irrigation, and toilet flushing.

Heating systems on the base consist mostly of gas-fired boilers (50 percent by Btu) and resistance electric and/or electric heat pumps (50 percent by Btu).

- Any modification to the type of heating used should favor non-electrical power sources to reduce the Source 2 greenhouse gas emissions caused by the local energy provider's use of coal to generate electricity.

- Consider a high-temperature hot water system that distributes hot water under pressure to minimize construction and maintenance costs of the distribution network when compared to individual units.

- As the existing boilers (and hot water heaters) require replacement, upgrade to 94 percent or higher condensing-type boilers in the event that district heating or other more sustainable systems cannot be used.

- Within individual buildings, consider using variable refrigerant flow systems to capitalize on internal heat gains to minimize heating required for the exterior envelope of buildings as an alternative to water source heat pump systems.

5.2.6.2 Metering and Controls

Advanced metering and control management systems are installed in buildings larger than 35,000 square feet, which is the ACC standard with some additional sub-metering in place for reimbursable tenants. The new Air Force Facility Metering Policy, Memorandum, 10 July 2009, provides specifications for use of advanced metering and water metering.

- Ensure advanced metering and control systems are compatible with existing systems to enable the Base Energy Manager to control the energy load of the building based on current energy demand and varying rates in the most advantageous manner to minimize energy use and energy costs.

- Consider including real-time energy use displays in each facility, so users are aware of energy consumption. This practice often results in significant savings since building occupants take charge of their own energy habits.

5.2.6.3 Water Utilities

Dyess AFB has completed a project to install low-flow fixtures throughout the base. The base also uses a pipeline to receive wastewater effluent from the city of Abilene's wastewater treatment plant. The effluent is used to irrigate the base golf course and other landscaped areas of the base.

- Consider the use of the effluent system to satisfy irrigation needs for each new project. See section 5.2.4 for the use of effluent water and xeriscaping for water irrigation.

- Consider extending the effluent system beyond the project limits to eliminate other existing uses of potable water irrigation.

- Consider using effluent water for toilet flushing and other non-potable water uses in new construction on the base, as acceptable to local plumbing code.

- Continue the use of high-efficiency water fixtures that implement automatic fixture sensors, flow restrictors and flow aerators as well as low-consumption toilets and waterless urinals for each new project.

- Consider the practicality/ integration of hydrant flushing water into the project.

5.2.6.4 Renewable Energy Infrastructure

Location conditions at Dyess AFB provide a number of opportunities for using renewable energy sources. However, the development of some of these renewable energy projects are not without concern to mission and maintenance costs. These potential sources should never be totally discounted because advances in technology continue to provide more durable and reliable products.

Solar Energy

Because of the frequency of hailstorms at the base, the use of solar energy systems is a concern at Dyess. The application of solar technology and use should consider the following:

- Evacuated tube technology solar hot water panels. Damaged tubes can be easily replaced without replacing the entire panel. Water does not leak from the panels when they are damaged since the evacuated tubes are exposed and do not contain water, and the panels continue to allow water throughput and heating even when individual tubes are broken.

- Selective use of small grid arrays of photovoltaic panels rather than large array systems. These are less costly to repair on a panel-by-panel basis in the event that a significant hailstorm creates damage.

Should the use of solar energy systems become a more acceptable application of renewable energy at the base, solar-ready construction with the following traits should be considered during building siting and design:

- Orient the building with a south-facing roof that is un-shaded from 9 AM to 3 PM with a large rectangular area free from vent pipes, skylights and other penetrations. Roofs do not need to be exactly south facing, but should be within a southeast to southwest orientation. The roof should have adequate uninterrupted square footage for a useful system of panels. At a minimum, at least 200 square feet is required for any solar array. This provides sufficient room for the array, maintenance access, and to comply with most fire codes. Ultimately, the size of a solar thermal system should be determined by estimating the buildings' hot water demands. Sizing of a photovoltaic array is usually constrained by available space and budget, as excess electricity can be returned to the grid.

- Include wire and piping in new construction or renovations so that at a later date the building can be easily augmented with solar PV (electric) and/or solar hot water systems.

- Ensure structural capacity to carry future panels and equipment related to solar energy capture, including wind load considerations.

- Provide roof access for installation and maintenance.

Solar-ready construction allows the Dyess AFB energy manager to procure PV or solar hot water systems as funding becomes available, and/or through power purchaser agreements with the local utility without costly and disruptive facility renovations.

Ground Source and Turbines

Local conditions at Dyess are suitable for ground source geothermal and wind power. These technologies are probably most suitable for remote locations where being tied into a district system is not financially practical. Consider:

- Ground source geothermal heat pump systems for heating and cooling.

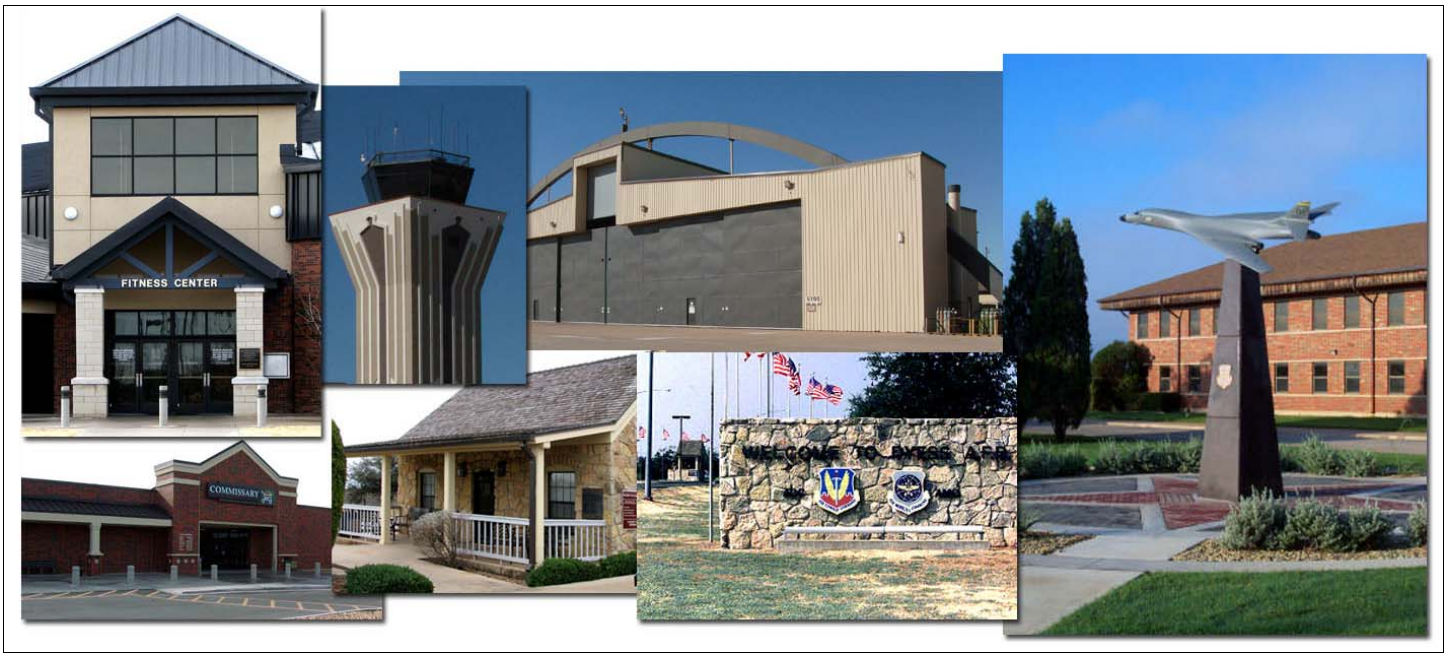
- Wind turbine power for primary or backup power. Local wind conditions are suitable for utility-scale wind turbine applications. Wind turbine application must be considered for its potential effect on the mission. An example of where a turbine might be used is at the medical center for emergency backup power (with battery storage). As noted in Section 3, the use of wind turbines needs to be evaluated for potential impacts to the mission.

Waste to Energy

Dyess AFB has previously examined concepts for developing a waste-to-energy plant on the base. Future development plans should consider a dense enough development pattern that would support a combined heat and power plant (co-gen), burning biomass or municipal solid waste if possible (and natural gas if not) to provide renewable electric and thermal energy. District heating enables the use of co-generation plants to heat and power multiple buildings independently of local utilities, subsequently increasing installation operability in extreme circumstances.

5.2.7 Storm Water

Dyess AFB currently operates a storm water system that focuses on the collection and conveyance of storm water away from facilities on base. The storm water from the airfield is collected and discharged into the sanitary sewer system to prevent a recurrence of an unanticipated fuel spill. Sections of the primary drainage channel on the base have been improved to restore habitat and provide some water quality treatment to small storm water flows.



Development plans for the base should acknowledge that these practices are not sustainable and should consider the following, mostly simple, improvements to existing facilities to disconnect the flow of storm water from collection systems to encourage infiltration and reduce the rate of storm water runoff:

- Disconnect downspouts from underground, piped systems and redirect the discharge to splash on-grade blocks.
- Add curb cuts along existing streets to redirect water collected in gutters to landscaped areas.
- Where grades allow, remove the curb and gutter along parking areas to sheet the water off of the parking lot into grass and landscaped areas.
- Consider opportunities for creating surface storage retention of airfield drainage so the runoff can be held until verification that it is not contaminated is complete, it is treated, if necessary, and then discharged to surface waters instead of the sanitary sewer system. The retention basin could also provide a source of water for irrigation or other non-potable uses in an area too far removed from the effluent water system. Creating a bird/wildlife air strike hazard must be considered in the application of this recommendation.

EISA Section 438 requires all new and redeveloped federal facilities over 5,000 SF to "use site planning, design, construction, and maintenance strategies for the property to maintain or restore…the predevelopment hydrology…" To meet this requirement, designers of new projects at Dyess AFB should consider the following:

- Where development is adjacent to mesquite areas, work with the base natural resource manager to remove mesquite and restore with native grasslands. The improved infiltration of the restored area could help to offset additional runoff from the development.
- Designers should be aware that conveyance channels and systems for high flows will still be necessary to accommodate larger, high-intensity storm events common at Dyess AFB.
- Collocate storm water management features with AT/FP clear zones to the extent allowable by AT/FP requirements.

5.3 Architectural Design

Buildings at Dyess AFB consist of a variety of types and designs that convey a fairly unified aesthetic throughout the installation due mainly to a common palette of exterior materials and colors. One goal of this section is to convey which architectural elements are encouraged to be maintained in order to preserve this installation's unique image.

Although the buildings at Dyess AFB convey some general uniformity, visual cues are also used to indicate various districts throughout the installation. These districts, formerly known as compatibility zones, are defined in *Section 2 Installation Image*. Each district, while containing various elements and materials from other districts, has a few components that separate it visually from other areas of the installation.

The purpose of this portion of the document is to provide architectural guidance that will result in providing the installation with a degree of visual order, while allowing designers to seek creative solutions that respond to the unique challenges associated with the contextual setting of the base as well as each individual site and building. It will also serve to guide the designer in maintaining positive elements of each district and upholding some of the existing overall architectural consistency, without inhibiting the flexibility to provide imaginative design solutions.

5.3.1 Architectural Order

Architectural order requires a holistic planning approach that considers solutions appropriate to the building site, sensitive to the built context, reflective of the program needs and scale, responsive to the hierarchical importance, and fully implements SD&HPGBD objectives. Building form shall no longer be the factor that drives building design.

5.3.1.1 Plan Complexity and Geometry

A significant portion of the existing buildings' plans tend to be simple due to the straightforward function of the building. Examples of this simplicity would be hangars, maintenance or storage buildings, which are more predominant in the industrial areas and flight line areas (District 1). In other areas of the installation (District 2), simple rectangular plans also are prevalent in buildings such as the Commissary, BX, barracks, and administration buildings.

For future development, plan complexity and geometry should be derived primarily from the building's type or function. Less complex programs will still likely result in straightforward plan geometries. However, more complex programs and uses should be seen as an opportunity to provide more interesting buildings, which can better respond to site constraints or better support sustainable design goals such as providing better views and enhanced daylighting.

Complex plan geometry of B1 Training Facility (Building 6030).

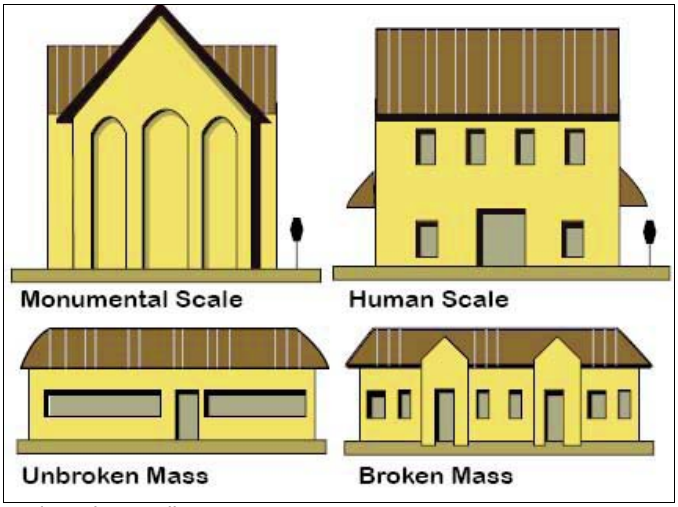
A good example of the use of complex plan geometry is the B1 Training Facility (Building 6030). It is evident that multiple internal functions inform the plan geometry of this building. The complex form provides a more visually interesting building than that of a simple rectangular plan.

5.3.1.2 Building Scale and Proportion

Scale refers to the size of building elements in relation to people and surrounding buildings. Buildings of monumental scale feature predominantly vertical facades that dwarf a person and surrounding buildings. Buildings of human scale have more horizontal facades designed to relate to the size of a person. Additionally, the sizes of roof forms, windows, ornament and landscaping all affect a building's scale. In general, larger windows, plants and taller roofs relate less to the human scale than do smaller elements. The scale of most existing buildings on Dyess AFB is human rather than monumental scale. Obvious exceptions to this would be hangars and other large flight line or industrial facilities.

Unless necessary due to building function, monumental architectural design should be reserved for more ceremonial buildings, such as worship centers and HQ complexes. These buildings often make use of large, glazed areas at entrances and oversized fenestration elements to draw users to the building entry and to create a scale appropriate to the building's use.

For new developments, building scale and proportion should vary by building type, which in turn will usually vary by district. In general, buildings should be of a scale appropriate for their use or importance. If a building has functions that require large scale building masses, but is not of particular importance or a ceremonial use, effort should be taken to humanize the building scale. One way to achieve this is to surround large-scale functions with smaller-scale functions, thus making a more human scale at the points where people see or approach the facility. A good example of this approach is the Squadron Operations Building 4216.



Scale and mass diagrams.


Humanizing building scale at Squadron Operations (Building 4216).

Another good practice for buildings with large uninterrupted masses is to use horizontal banding to minimize the impact of these forms by giving them some visual interest. Banding can be in the form of a contrasting material or recesses in the main building veneer. In the case of EIFS exterior walls, notched grooves and variation in color can create banding, such as on the Marine Corps Reserve Center. When brick is used, recessed or projected brick soldier courses can create a band, as shown on the Dyess AFB Youth Center.

Appropriate uses of banding.

Water tables, or wainscot, may be used to create more of a human-scale for buildings. Water tables should be made of a durable material such as brick or stone. At pedestrian-accessed buildings, the height of the water table should be about one-third the height of the total wall. At larger structures, such as hangars, the proportion should be closer to one-fifth. At buildings that have only one veneer material, the appearance of a water table can be created using banding, or varying wall projections and colors. Good water table examples are shown in below photographs of buildings at Dyess AFB.

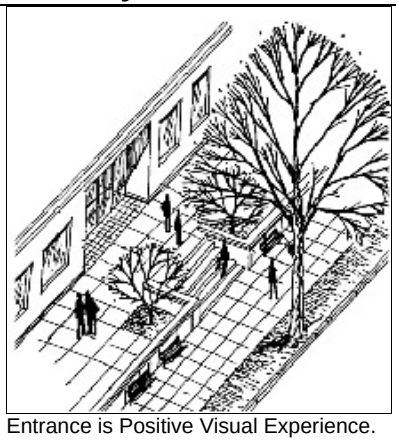

Appropriate uses of water tables.

Efforts should be made to modulate vertical elements of the façade, as well. Windows along long stretches of walls could be arranged into groups of two or three and patterned along the wall. Long, straight walls can also receive vertical treatment to break up monotonous horizontal planes. This can be achieved by the use of pilasters and downspouts or varying the protrusion of the wall itself. Successful use of both aforementioned tactics can be seen on existing Building 6030 pictured below.


Appropriate window and façade modulation (Building 6030).

5.3.1.3 Symmetry/Hierarchy of Elevations

Major building elements should be sectioned into order of importance. Entrances, walkways and non-accessible building faces should all have distinct characteristics that give occupants visual signals as to how the building may be accessed.


Entrance is Positive Visual Experience.

Main entrances should be covered for shade and weather and have a vertical appearance that provides a strong indication of pedestrian access. Main entrances should also face the road and be clear of visual obstructions that would block the view of the entrance from the street.

Secondary entrances should have a low roof covering. The appearance of secondary entrances should be minimal in scale and not compete with the main building entrances.

Walkways or colonnades along the face of a building might have a roof covering. In these instances, the roof should be lower than the roof over the main entrance, in order to provide a visual indication of a secondary hierarchy that leads into the larger, main hierarchy.

Major building facades that do not relate to entering the building should be relatively simple and clear of architectural elements that would deter from the building's entrances. Roofs at these areas should have continuous, straight eaves and ridge lines.

5.3.1.4 Building Open Spaces

Open spaces relating to the interior of the building deal mostly with public buildings, such as recreation and dining facilities along with some areas in barracks. Efforts should be made to create a strong connection between large interior spaces and outdoor spaces. With the harshness of the summer sun in this climate, the key to making outdoor spaces useable is to provide shade. An example of an existing outdoor space that could be successful with the addition of proper shading is at the Fire Station (Building 5013).

Building open space lacking shade at Fire Station (Building 5013).

Daylighting and views to the outside are significant elements that support sustainable design goals and must be incorporated whenever possible. Additional vertical height typically seen in large open spaces, such as vehicle maintenance bays or dining halls, should be leveraged to provide as much natural daylighting as possible. Translucent panels, in the form of skylights, clerestories and wall panels, should be used to furnish additional daylighting. DAFB promotes the use of daylighting as shown in the photographs on this page.

Successful use of daylighting systems (Child Development Center).

Daylighting systems (Hangar 4316).

Entries and vestibules should have a strong visual connection to outdoor spaces. These areas also provide a transition between indoor and outdoor environments. Any space inside a building that has access to a courtyard, main entrance or other pedestrian-friendly area should have as much glazing as is possible and practical.

5.3.2 Architectural Elements

Along with the items that define architectural order, there are also various architectural elements that define the overall look of Dyess AFB. These elements include fenestration, roof elements and exterior building materials.

5.3.2.1 Fenestration

The majority of windows on existing Dyess AFB buildings are punched openings, which is an appropriate window form for this locale due to the harshness of the summer sun. Large areas of glazing are sometimes used on more prominent buildings or to highlight building entrances.

In new construction, large areas of glazing should not be used anywhere on a building unless it is north facing, or can be properly screened from direct summer solar gain. The use of curtain walls or storefronts can be an appropriate feature of main building entrances, if north facing or properly shaded. Translucent wall panels can be an attractive way to provide natural light for large interior spaces when views are not possible, such as at clerestories or skylights. All new or replacement glazing must be insulated, tinted and have a Low E coating to achieve a high level of energy efficiency.


Fenestration well shaded by a deep overhang at Dining Hall (Building. 6132).

5.3.2.2 Roof Features and Form

Most buildings on the installation have simple roofs with a gabled end.

Existing fascias on roofs with standing-seam metal roofing on Dyess AFB often have a thick profile, about 1'-6" to 2'-0", and are clad with standing-seam roofing at the eaves and prefinished metal at the rake edges.

A typical roof slope for steep-sloped roofs is about 4:12 for most of the installation. Very large buildings, such as hangars, can have a more minimal slope of 1:12 if an appropriate, structural-type standing seam metal roof is provided. All roofs for new construction should slope unless the building design or other factors do not allow it, however “low slope” roofs (1/4:12) can be a good solution for larger building masses. If low slope roofs are used, a white membrane roof with high solar reflectivity should be used in order to help reduce the heat island effect and utility usage. Roofs at major building elements can have a steeper slope in order to create visual interest. Slopes should not exceed 8:12 at these areas.


Typical steep slope roof forms.

Manufacturers are responding to the market demand for higher solar reflectivity in dark roofing material. The market now produces standing seam metal roof in dark bronze with a 30 SRI. If a roof is "steep" sloped (according to LEED, that’s >2:12 slope), it has to have at least an SRI of 29 to earn the credit.

Roof overhangs can be implemented into new construction, where possible. Overhangs can be especially important elements at south-facing glazing to reduce direct solar gain in summer months.


Minimum/flush overhang.

Industrial buildings that are not in close proximity to Districts 2 may have minimal or flush overhangs.

5.3.2.3 Other Building Features

At main building entrances in District 2, exposed trusses are often used as a visual element for canopies covering entrance walks. This design feature could be appropriate for new construction that will have numerous occupants entering the building daily, such as a dining facility or at the Fitness Center main entry shown below.

Open truss design at Fitness Center (Building 7104).

Some newer buildings in District 1 have elements of vertical brick pilasters and columns. New construction in District 1 near buildings in District 2, in the “transitional area,” could incorporate such transitional elements. Brick pilasters and/or columns would be most appropriate closer to main entrances and walkway coverings. Areas that are more remote from entrances could have just a brick water table with EIFS or metal wall panels above.


Positive use of transitional elements: brick columns/pilasters and cast stone.

Decorative lighting may be used for visual interest at major architectural elements. Light fixtures should have a simple profile and be a "cut-off" type that will not contribute to light trespass.


Exterior light fixture.

Cast stone caps and banding have historically been used sparingly. Cast stone is typically seen in Districts 1 and 2 at high-profile building elements. For example, brick piers at an entrance canopy may be capped with a stone cap, or stone banding may be used to top a brick water table. For horizontal banding on a brick building, recessed or projected brick soldier courses and rowlock sills are preferred.

5.3.2.4 Materials—District 1

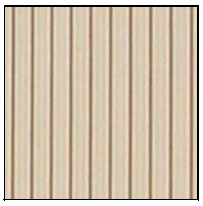
The District 1 industrial and flight line areas consist mainly of pre-engineered metal buildings, with some buildings having stucco/EIFS and brick veneers with metal roofs. The distinction between these building material palettes should relate to their proximity to the other district. If a building is constructed closer to the flight line, a metal building would be more appropriate. If it is near a community building in District 2, stucco and brick would be a better alternative.

The predominant existing material palette in District 1 includes the following:

- Stucco or EIFS Color: Sandstone

- Metal Roofing and Trim: Charcoal (when over stucco/EIFS)

- Pre-engineered Metal Buildings Color: Sandstone



- Brick: Dyess Blended Valour Modular Mingle Brick


District 1: Typical Stucco and Brick with Metal Roof


District 1: Typical Pre-Engineered Metal Construction

District 1 also contains two different minor building material palettes. The first type is the gatehouse, which is a small building with fieldstone veneer, wood shake shingles and painted wood trim. Shingle roofs and painted exterior wood should generally be avoided on new construction. The second type is the medical center, which is mainly painted stucco/EIFS and concrete with a flat roof.

Secondary existing material palettes in District 1 include the following:

- Gatehouse Veneer: Field Limestone

- Gatehouse Roofing: Wood Shake Shingles

District 1 Gatehouse.

- Medical Center Stucco or EIFS Color: Beige

- Metal Roofing and Trim: Dark Bronze

5.3.2.5 Materials—District 2

District 2 consists mainly of all-brick buildings with metal roofs and stucco and stone accents.

The predominant existing material palette in District 2 includes the following:

- Brick: Dyess Blended Valour Modular Mingle Brick

- Metal Roofing and Trim: Dark Bronze

- Stucco or EIFS Color: Sandstone

District 2: Fitness Center with Dyess brick.


Chapel is typical District 2 construction.

5.3.3 Additional Architectural and Design Direction

Appendix B provides additional architectural and design direction that is preferred by the base.

Appendix B includes:

- B.1 Background
- B.2 Parking
- B.3 Site Components
- B.4 Fences and Barrier Walls
- B.5 Exterior Lighting
- B.6 Infrastructure
- B.7 Landscape Guidelines
- B.8 Ste Furnishings
- B.9 Plant Material
- B.10 Walls
- B.11 Doors
- B.12 Windows
- B.13 Roofs
- B.14 Additions
- B.15 Accessory Buildings
- B.16 Metal Buildings
- B.17 Colors
- B.18 Utility and Dumpsters
- B.19 Interior and Exterior Signage
- B.20 Special Notes

6 List of Acronyms

ACC	Air Combat Command
ADP	Area Development Plan
AFB	Air Force Base
AT/FP	Antiterrorism/Force Protection
BW	Bomb Wing
CE	Civil Engineering
D2 Board	Development and Design Review Board
DoD	Department of Defense
eGP	electronic General Plan
EIFS	Exterior Insulation and Finish Systems
F	Fahrenheit
HQ	Headquarters
I&I	infiltration and inflow
ID2	Installation Design and Development
ISA	Installation Sustainability Assessment
LEED	Leadership in Energy and Environmental Design
SD&HPGBD	Sustainable Development and High Performance Green Building Design

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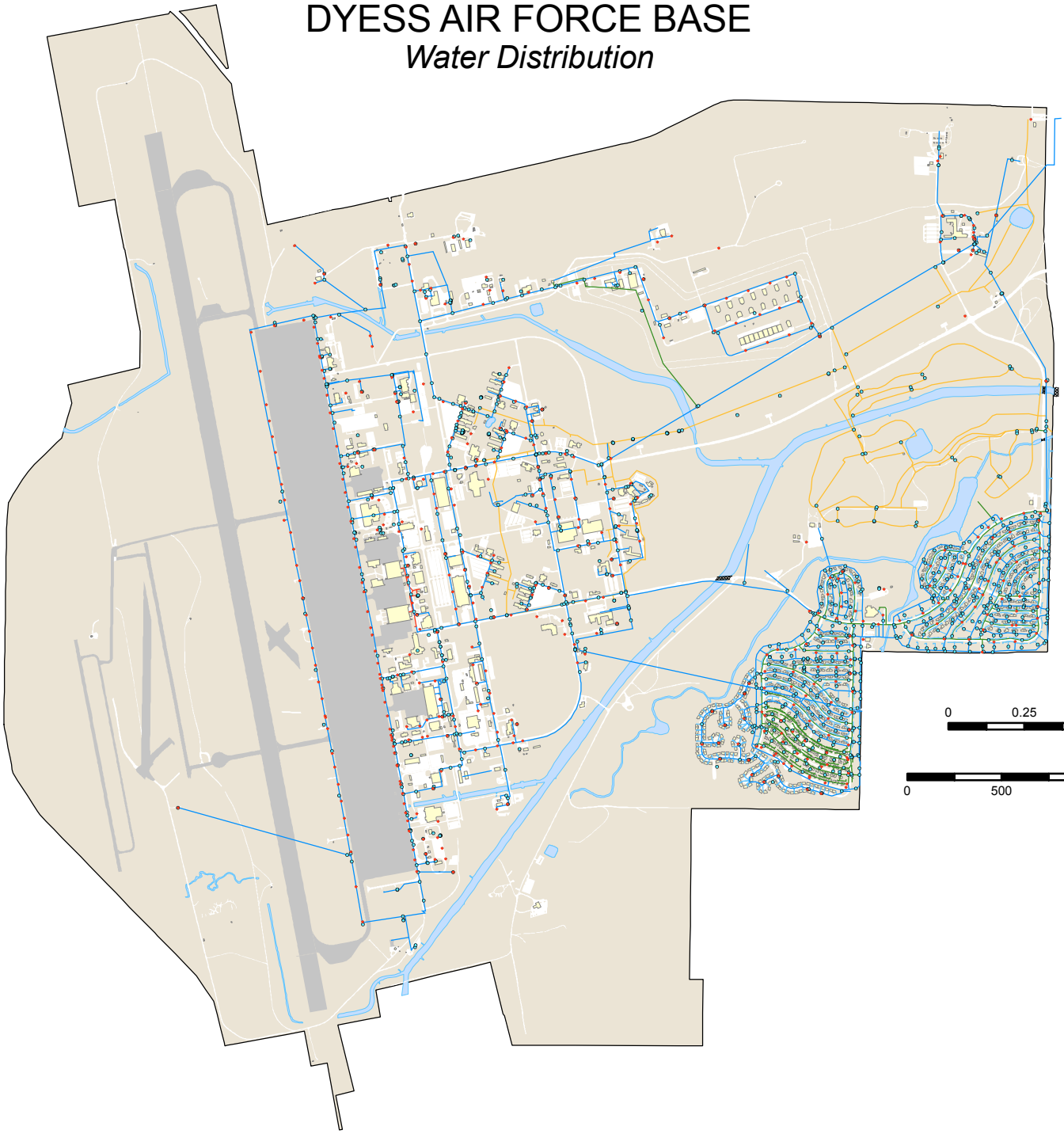
A Figures

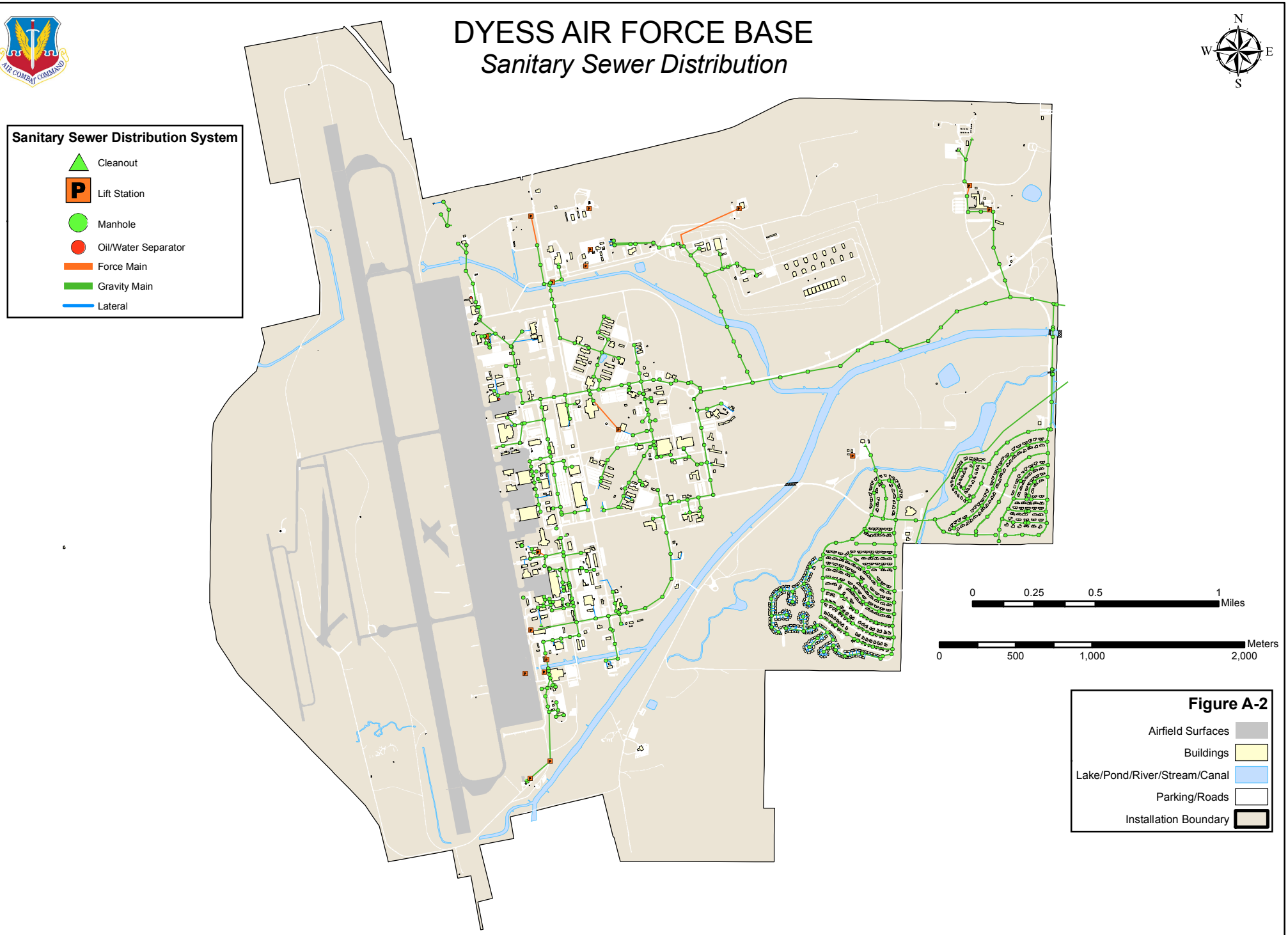
DYESS AIR FORCE BASE

Water Distribution



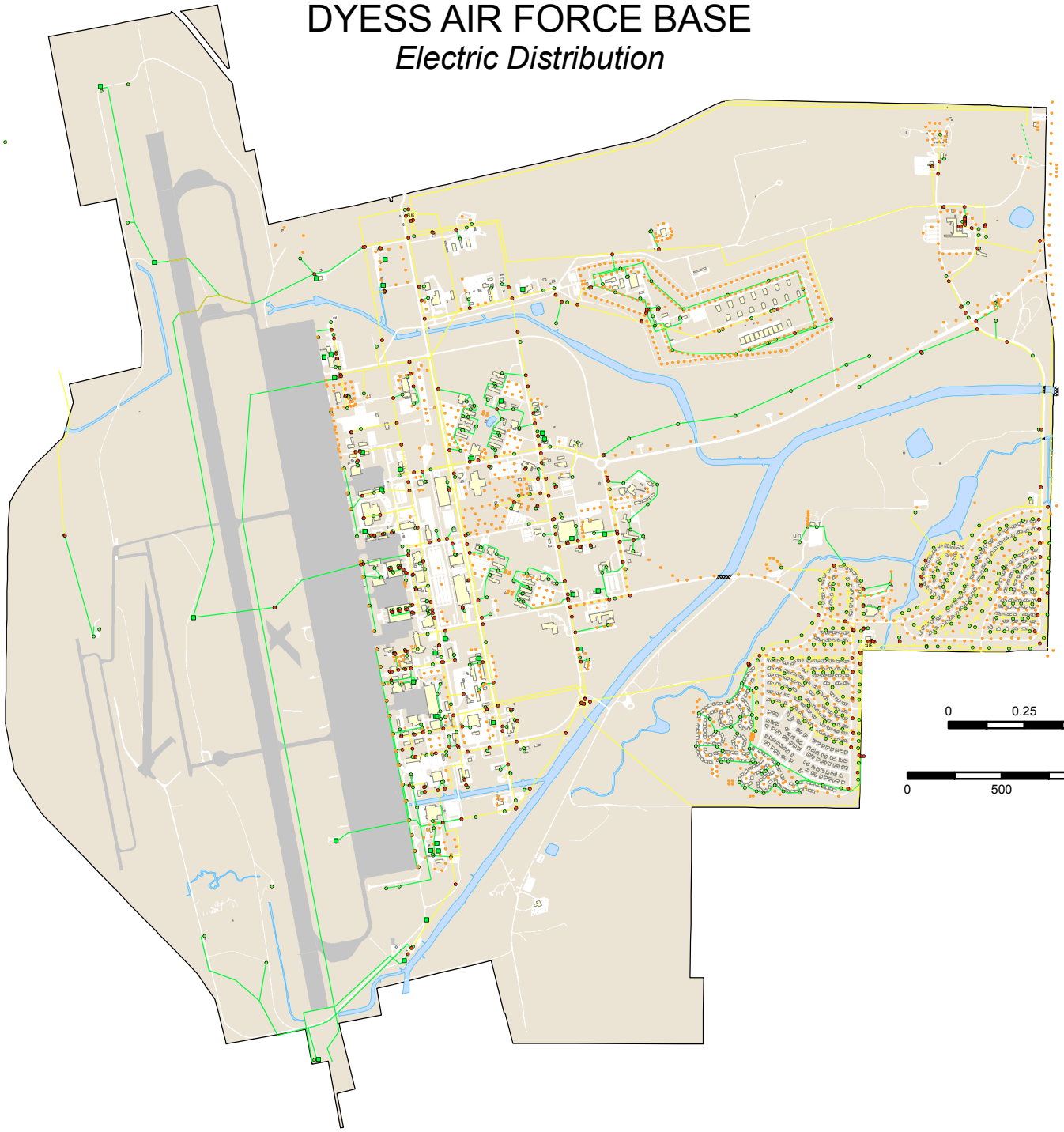
DYESS AIR FORCE BASE

Sanitary Sewer Distribution



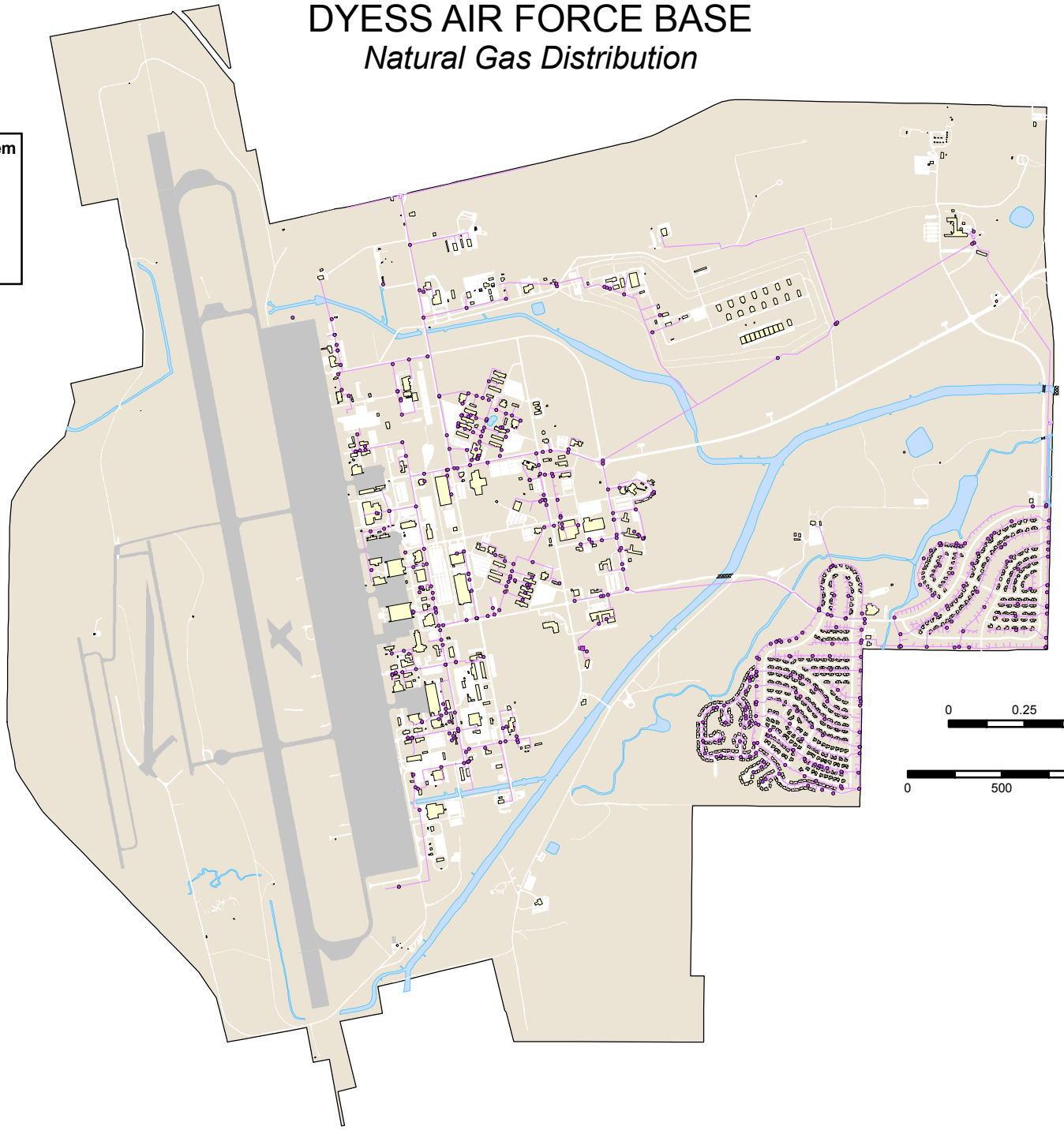
DYESS AIR FORCE BASE

Electric Distribution



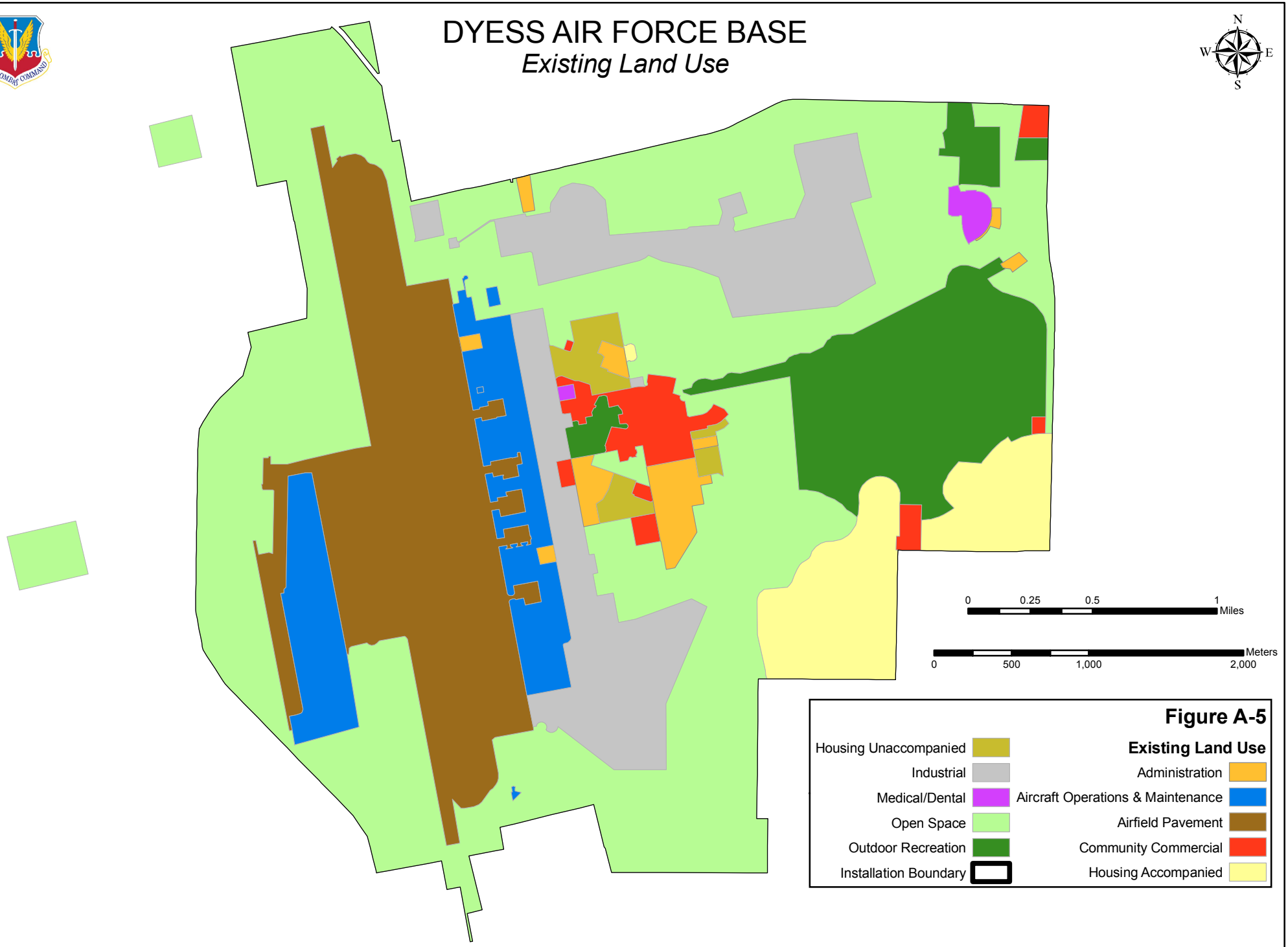
DYESS AIR FORCE BASE

Natural Gas Distribution



DYESS AIR FORCE BASE

Existing Land Use



DYESS AIR FORCE BASE

Future Land Use

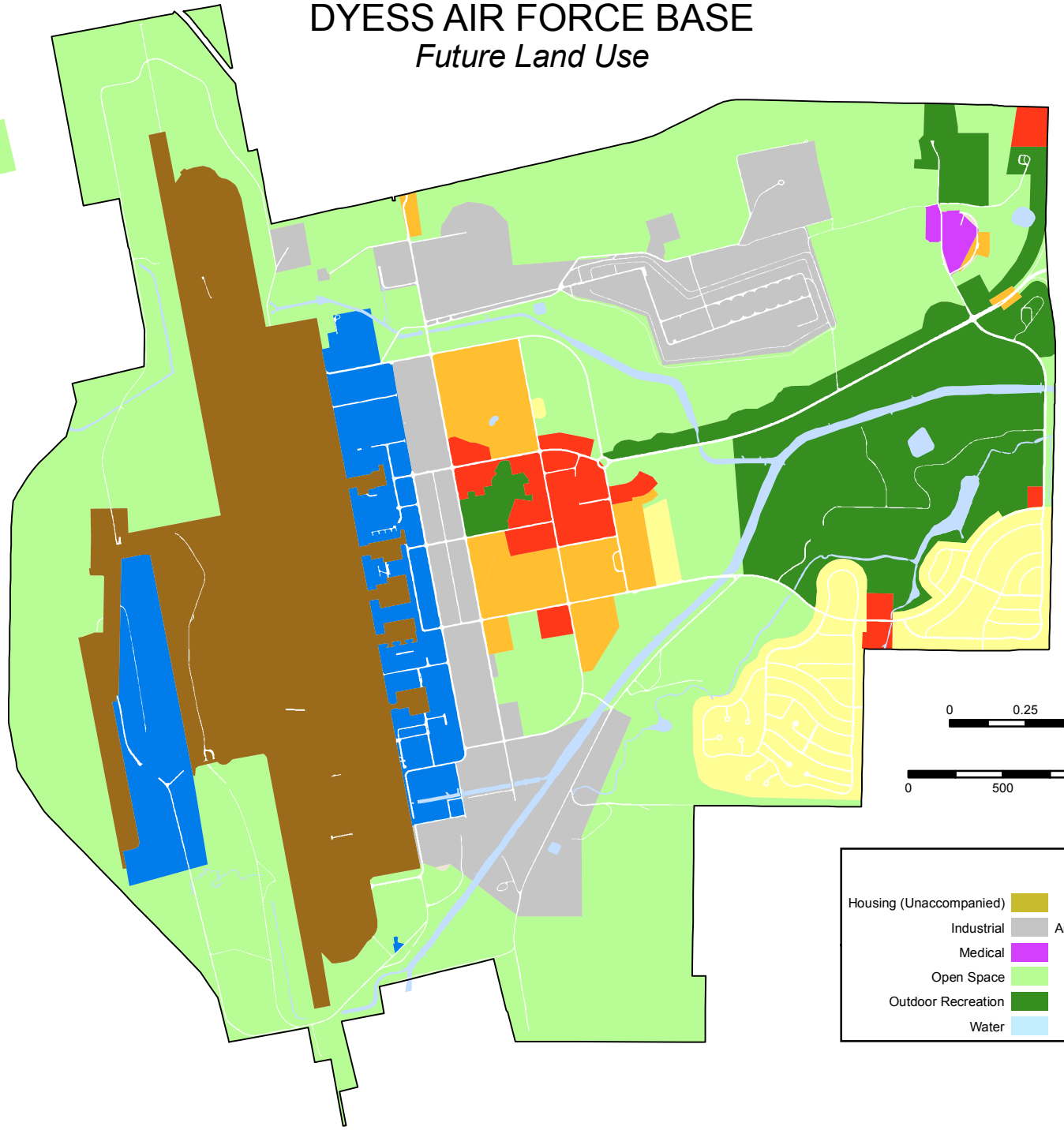


Figure A-6

DYESS AIR FORCE BASE

Habitat Areas

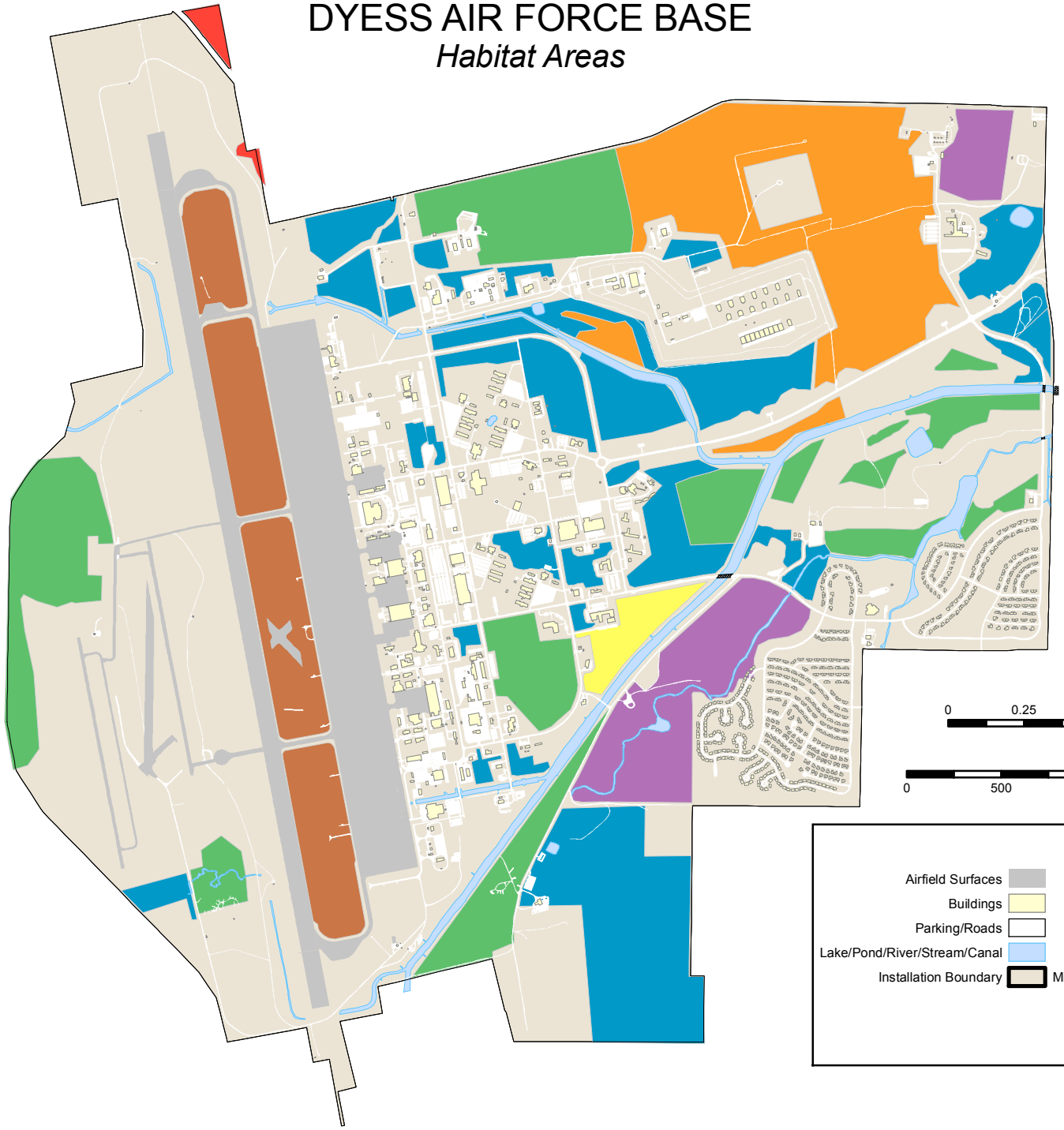


Figure A-7

DYESS AIR FORCE BASE

Buildings Served
By Chiller Plant

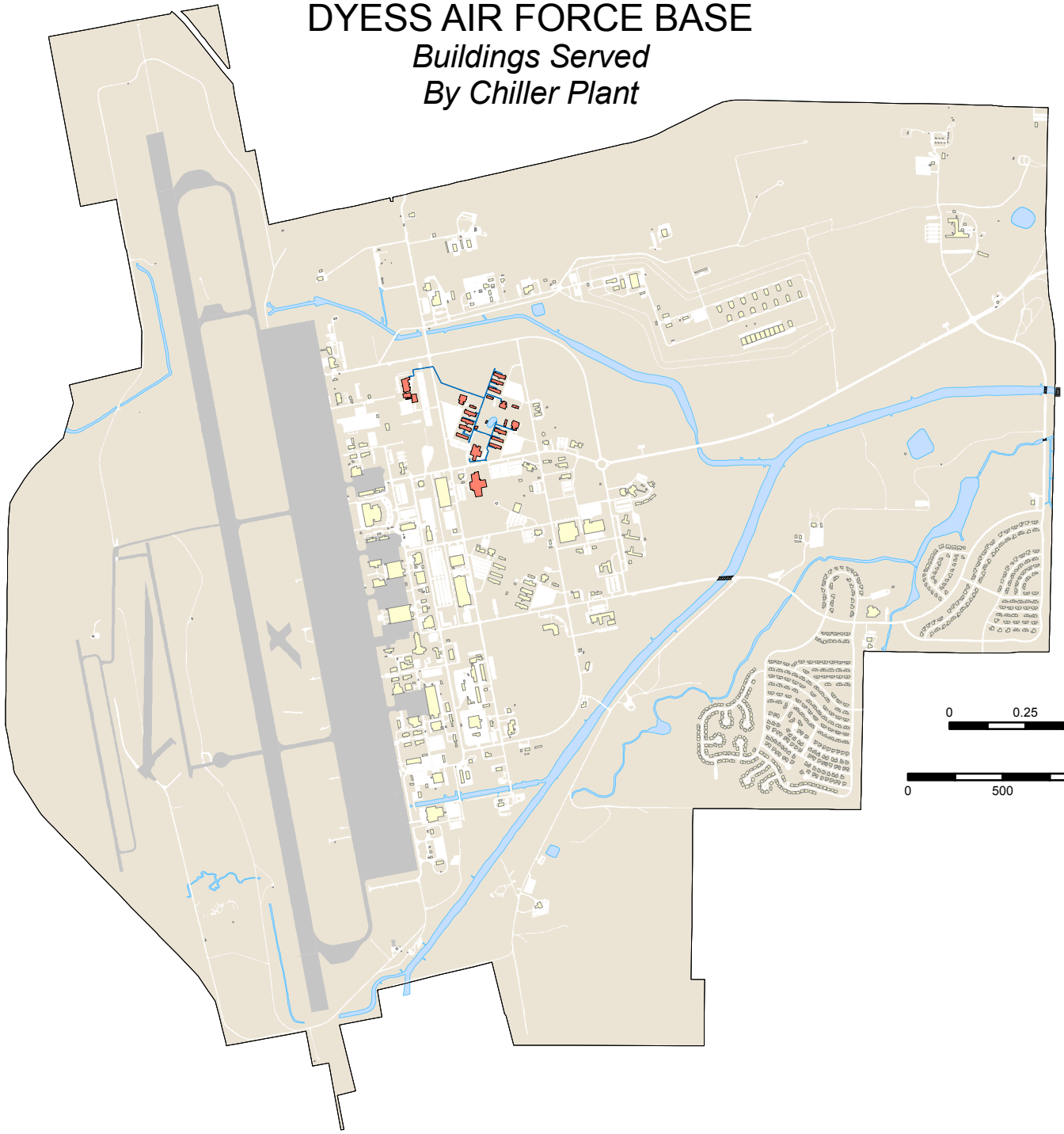


Figure A-8

- Chiller Lines
- Airfield Surfaces
- Buildings Served by Chiller
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

DYESS AIR FORCE BASE

Buildings with
Advanced/Automated Systems

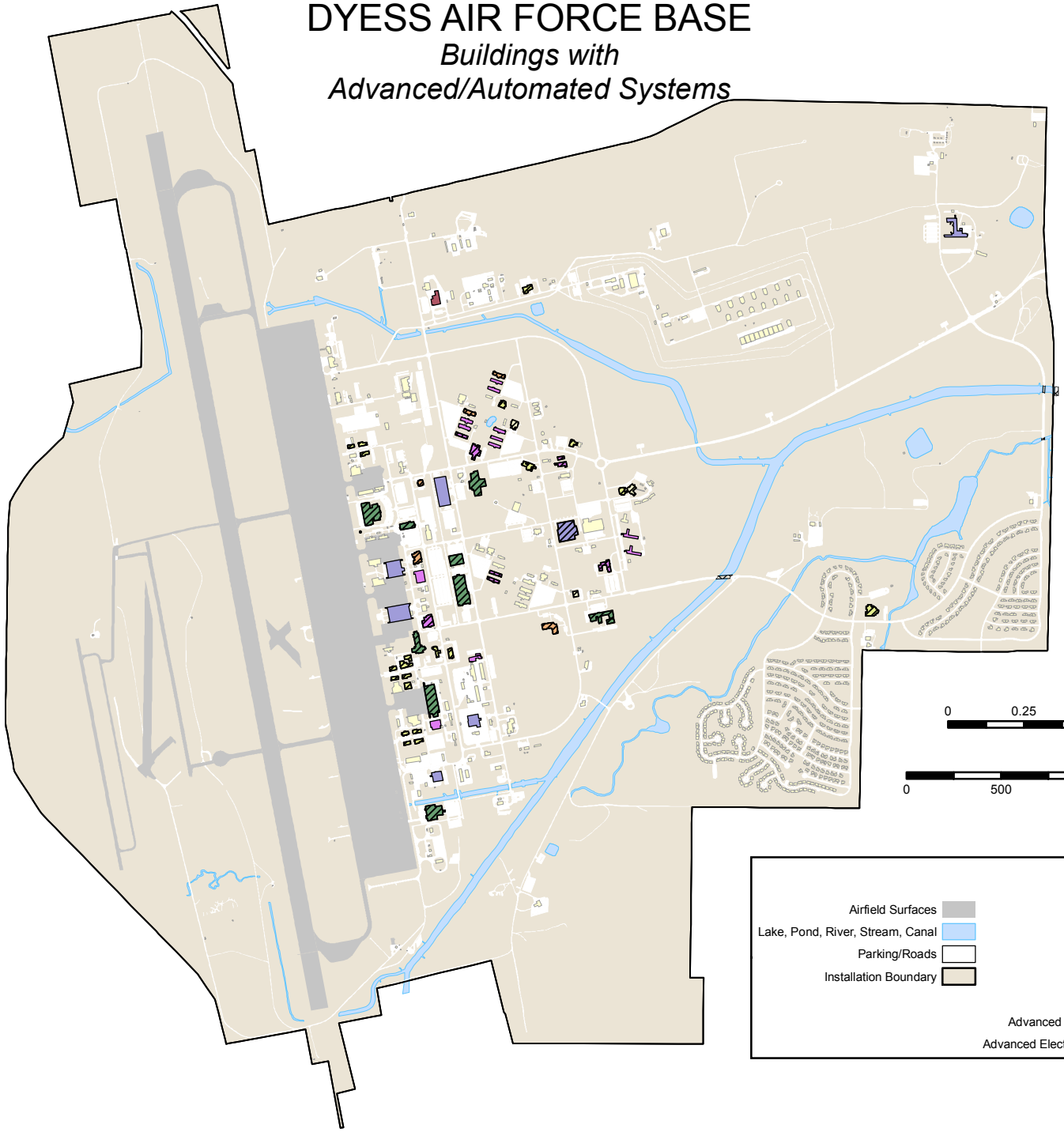


Figure A-9

DYESS AIR FORCE BASE

Buildings with Sub Metering

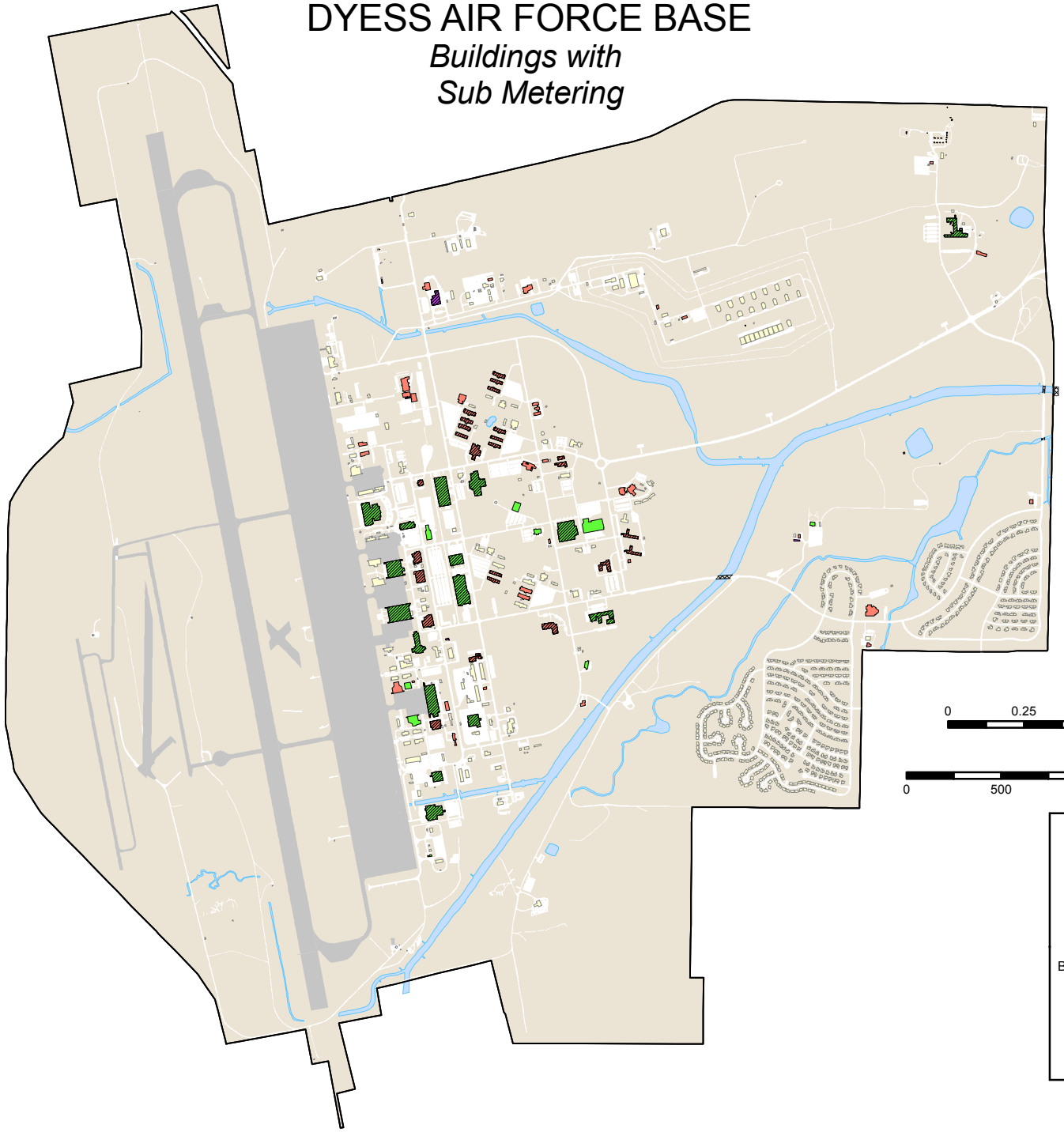


Figure A-10

- Airfield Surfaces
- Advanced Sub-Metering
- Buildings with Electric Meter
- Buildings with Gas Meter
- Buildings with Electric & Gas Meters
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

DYESS AIR FORCE BASE

Effluent Irrigation

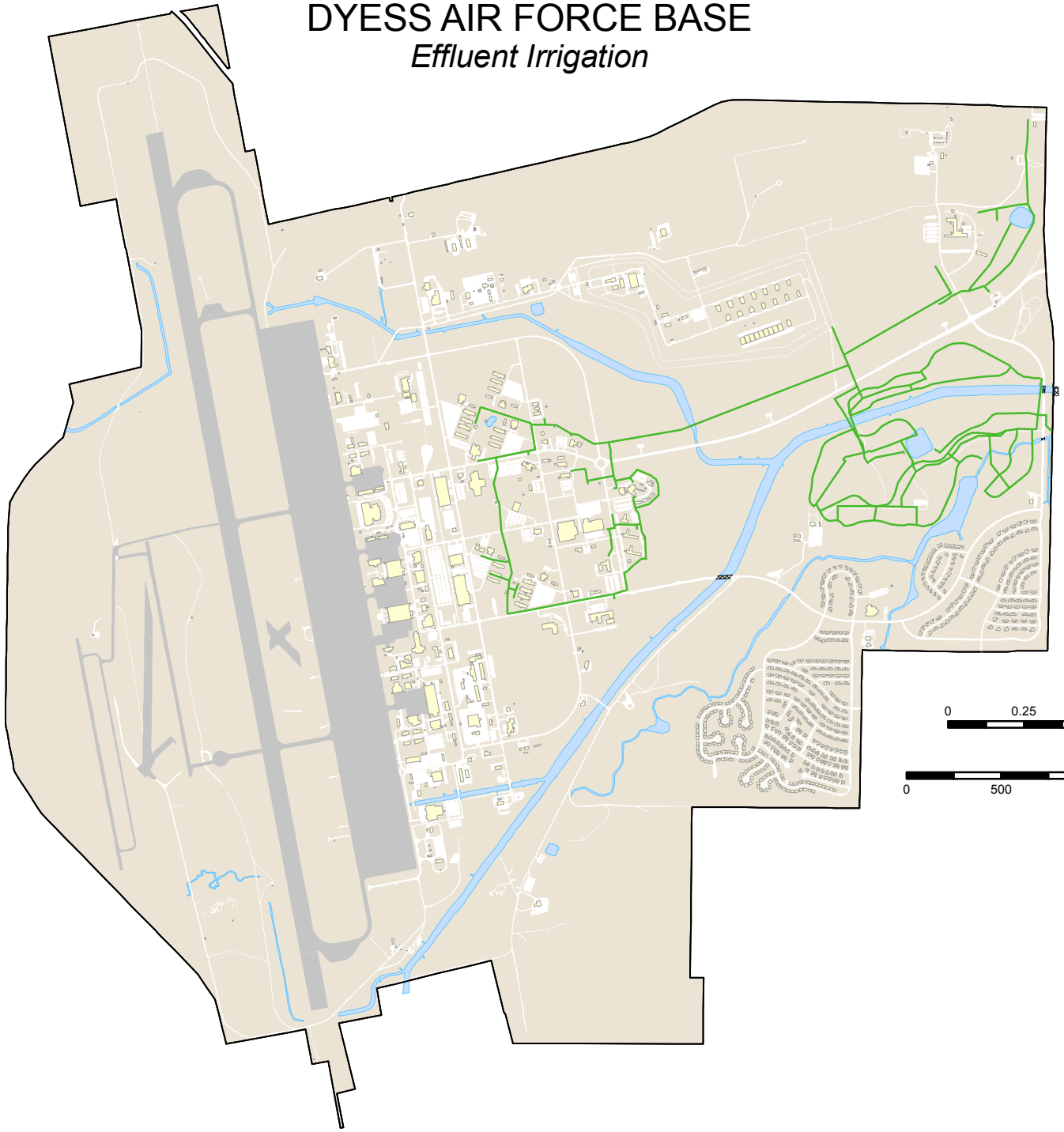


Figure A-11

- Effluent Irrigation
- Airfield Surfaces
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

DYESS AIR FORCE BASE

Buildings with
Retrofit Water Fixtures

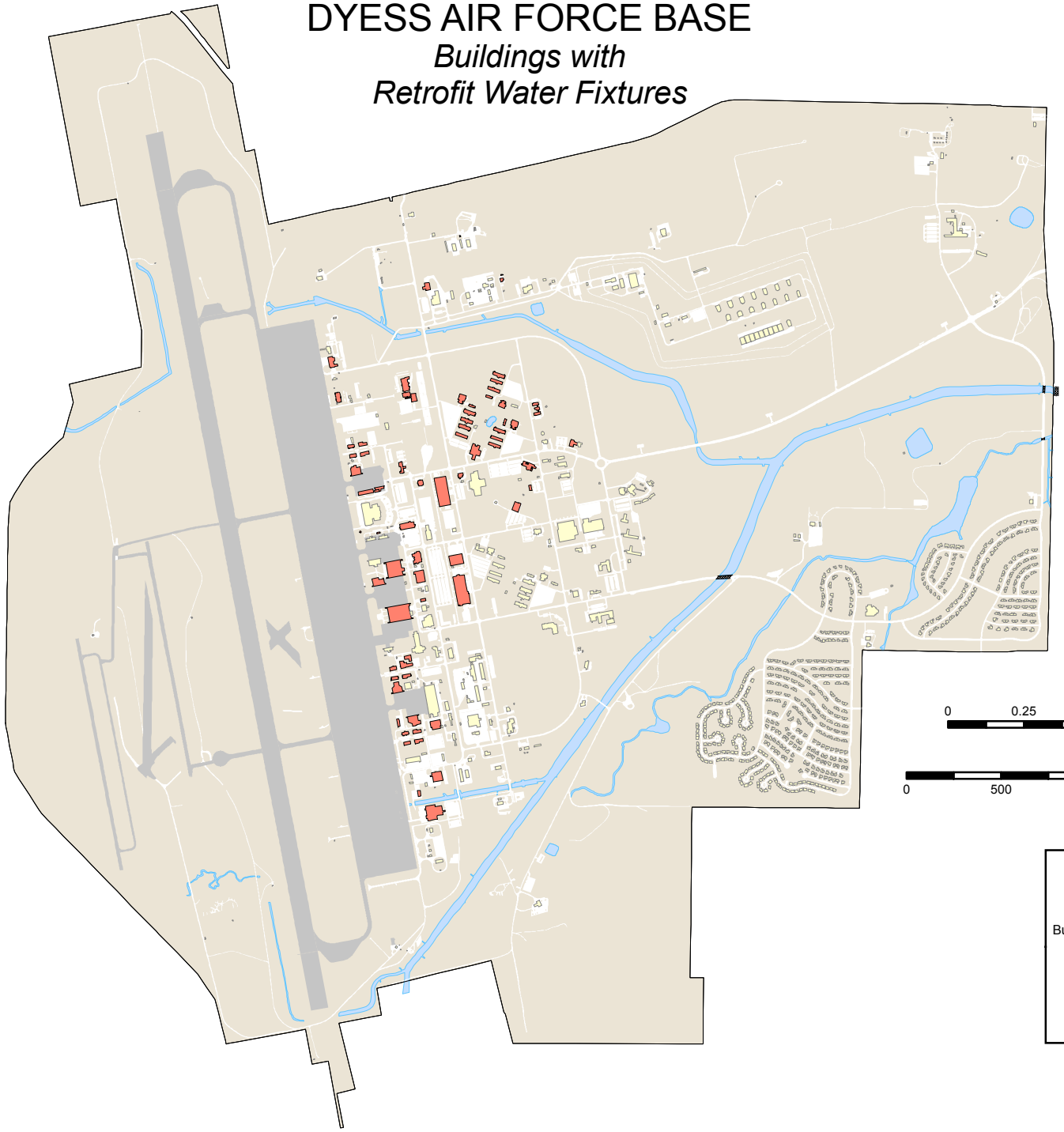


Figure A-12

- Airfield Surfaces
- Buildings with Retrofit Water Fixtures
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

DYESS AIR FORCE BASE

Automatic Water Line
Flushing Locations

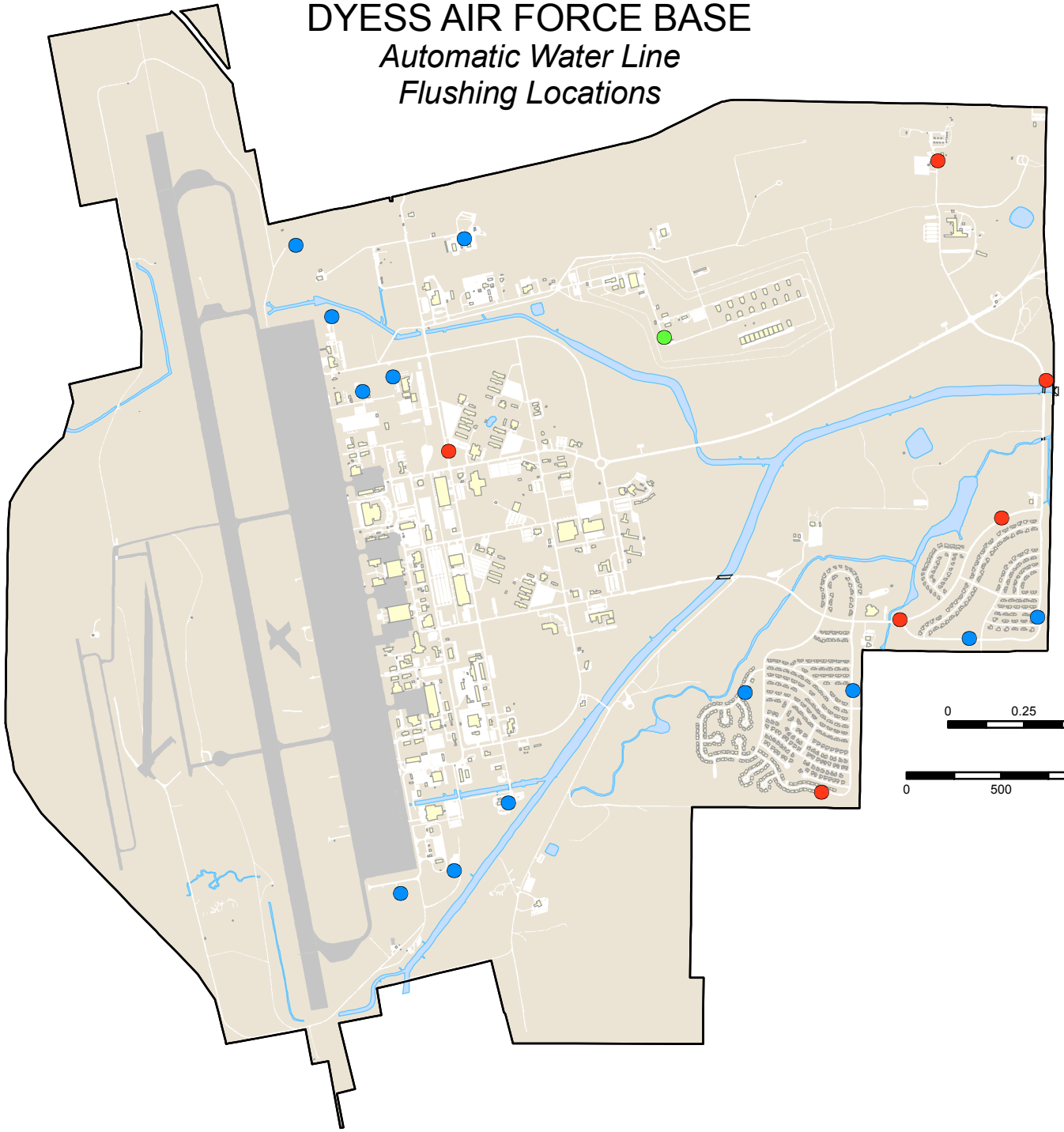


Figure A-13

Flushing Locations

- Active
- Inactive
- Status Unknown
- Airfield Surfaces
- Buildings
- Lake/Pond/River/Stream/Canal
- Parking/Roads
- Installation Boundary

B Technical Constraints and Considerations

B.1 Background

B.1.1 General

This section provides installation-centric background information and identification of functional-technical considerations necessary for a fully successful design. It identifies preferred systems and technical components and is intended to describe best practices related to planning, architecture, engineering and interior design. It identifies materials, furnishing, systems, practices, approaches, and finishes historically used and having proven success over time. It is not intended to serve as a comprehensive list of all applicable building codes, regulations, directives and references or to identify facility-centric or unique user requirements. Functional-Technical Constraints and Considerations need to be specifically addressed in the Basis of Design analysis written during the concept development phase and the design development phase. Understanding the driving forces behind these constraints and considerations will greatly contribute to a successful project outcome.

B.1.2 Brand Name References

References to equipment, materials, articles, or patented processes by trade name, make or catalog number, shall be regarded as establishing a standard of quality and not construed as limiting competition.

B.2 Parking

Maintain setbacks between facilities and parking lots per AT/FP regulations. In general, signage and parking lot design shall comply with the Dyess AFB Traffic Engineering Study.

B.2.1 Parking

- Use size, location, and screening to prevent parking from becoming a dominant feature.
- Use drop off areas at high use facilities to decrease close in parking.

B.2.2 Buildings and Parking Lots

- Avoid locating parking directly in front of buildings or entrances.
- Avoid locating parking between the main viewing street and buildings.
- Dyess prefers locating parking behind buildings.
- Consider building shape and relationship to other buildings to provide as much screening as possible.

B.2.3 Parking Lot Size

- Use separate smaller parking lots of 50 cars or less rather than one large lot.
- Landscape at least 10 percent of the area within the lot.

B.2.4 Paving

- Avoid asphalt sidewalks and curbs.
- Dyess prefers the use of concrete for sidewalks and curbs.
- Consider special unit pavers for courtyards, plazas, entrances and other high profile sites.
- Provide a landscape buffer between all buildings and paved areas.

B.2.5 Streets

- Avoid utility or other cuts in pavement. Use tunneling technologies to go under pavement with conduits or piping.
- Streets should intersect at right angles and offset intersections should be avoided.

B.2.6 Curbing

- The use of curbing should not preclude/ interfere with the use of low impact development stormwater management practices.
- Painted curbs are prohibited because they are very difficult to maintain.
- Provide mower ramps over curbs for access to grass areas.

B.2.7 Walkways

- Use concrete walkways at least 72 inches wide to link facilities and promote pedestrian use.
- Illuminate walkways used heavily at night.
- Provide walkways on at least one side of every street and between all facilities.
- New roads in developed areas should have sidewalks on both sides of the road.

- Avoid placing utility poles or signs too close to sidewalks.
- Locate walkways judiciously and in accordance with the Manual on Uniform Control Devices.

B.2.8 Disabled Access

- Ensure disabled access is provided at crosswalks, intersections, and wherever UFAS and ADA require them to be.

B.3 Site Components

Site components include site furniture, bicycle racks, trash receptacles, etc.

B.3.1 Materials

- Use durable materials which are appropriate for the architectural context and the environment

B.3.2 Outdoor Seating

- Provide comfortable benches or seat walls near building entrances and in courtyards.

B.3.3 Receptacles

- Place litter receptacles and planters on paved sites where they are clear of circulation.
- All litter receptacles require attached lids.
- Ash receptacles must match outdoor furniture.

B.3.4 Bollards

- Bollards shall be set into paving or placed in sleeves to allow access.
- Use bollards to enhance facility and pedestrian protection, provide vehicle control, and act as AT/FP barriers.

B.3.5 Bicycle Racks

- Bicycle racks should be located near entrances in secure, visible areas, and must be on a hard surface.

B.3.6 Flag Poles

- Locate flagpoles in accordance with AFR900-3.

B.3.7 Playground Equipment

- Playground equipment shall be age-appropriate.
- Only licensed designers shall select equipment and design playgrounds.

B.3.8 Color

- Use site furnishings to complement exterior color schemes.

B.4 Fences and Barrier Walls

B.4.1 General Requirements

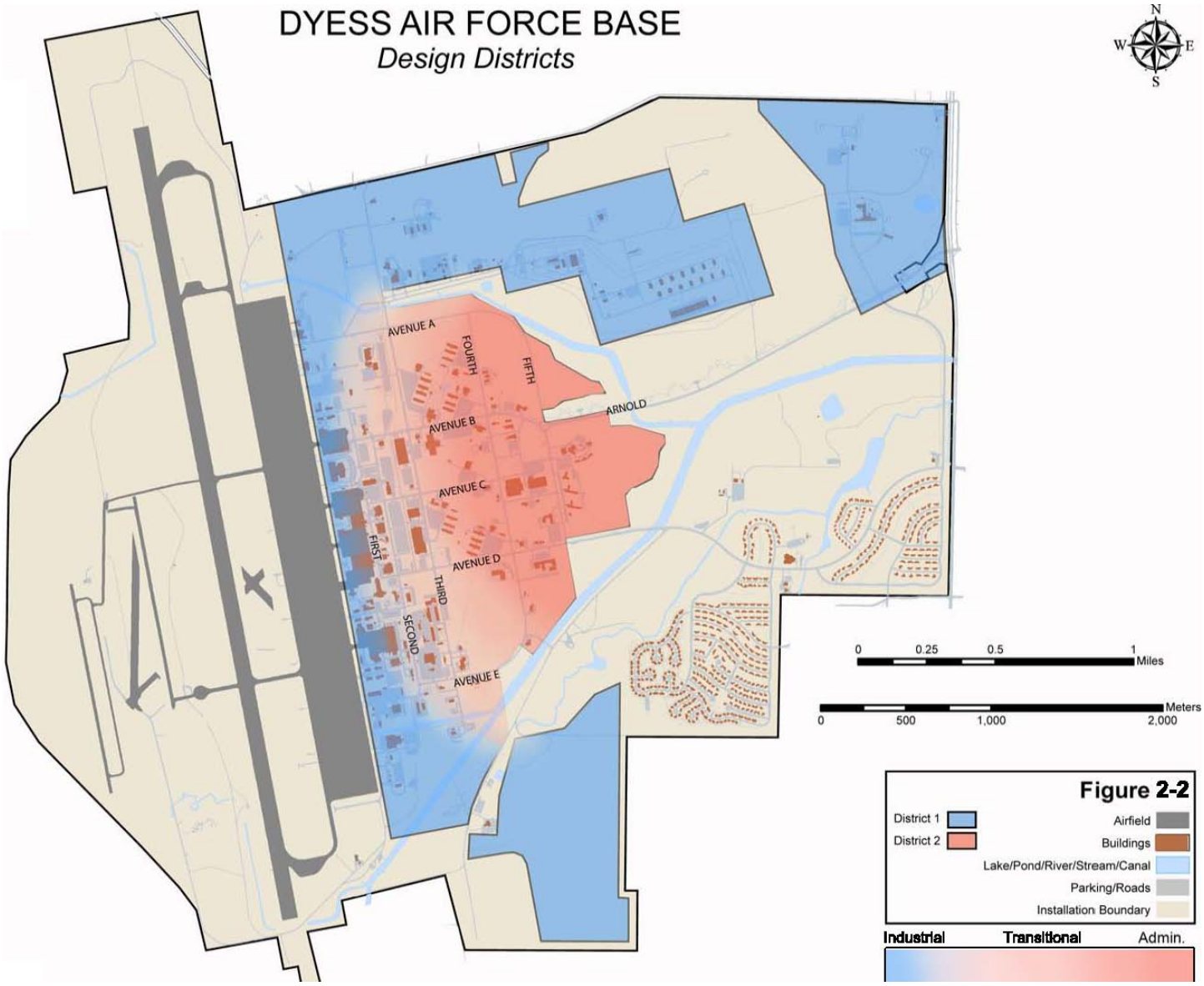
Six fence standards have been identified and are to be used within their respective districts (see district figure on the next page). Portions of fence can be replaced in phases, with the ultimate goal of achieving a consistent fence design within each district.

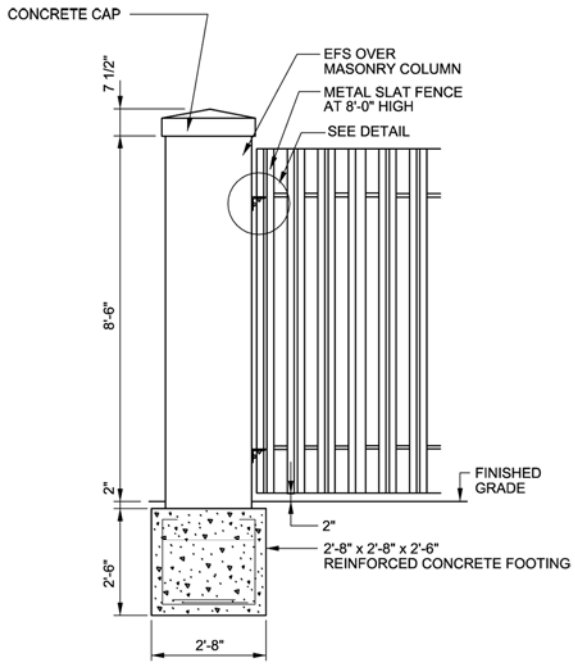
Although chainlink is not listed as an approved fence type, it may be used to fulfill requirements that cannot be satisfied with the approved fence types. Examples of these exceptions include fences where force protection regulations require transparency or at playgrounds where head entrapment is a paramount concern. A waiver request must receive base approval before chainlink fencing can be included in any design. Refer to the following pages for a detailed description of allowable fence and barrier wall types.

District	Fence Type
1	Types A, B, E, and F[1]
2	Types C and D

[1]This fence/wall is limited to only those areas included in the main base entries.

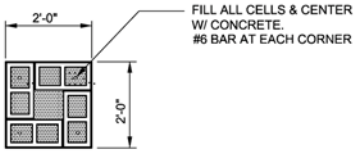
District	Barrier Wall Type
1	Brick or EFS Type
2	Brick Type


DYESS AIR FORCE BASE
Design Districts
N
W
E
S
AVENUE A
FOURTH
FIFTH
ARNOLD
AVENUE B
AVENUE C
FIRST
AVENUE D
THIRD
SECOND
AVENUE E
0
0.25
0.5
1
Miles
0
500
1,000
2,000
Meters
Figure 2-2
District 1
District 2
Airfield
Buildings
Lake/Pond/River/Stream/Canal
Parking/Roads
Installation Boundary
Industrial
Transitional
Admin.



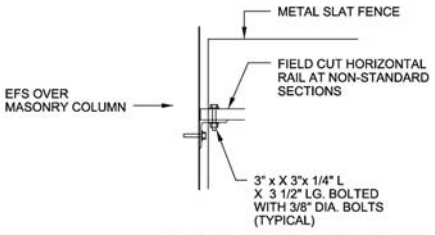
BRICK PIER DETAIL

NO SCALE



PIER PLAN

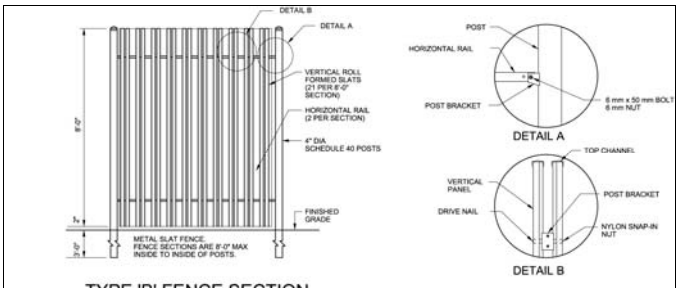
NO SCALE



ATTACHMENT DETAIL

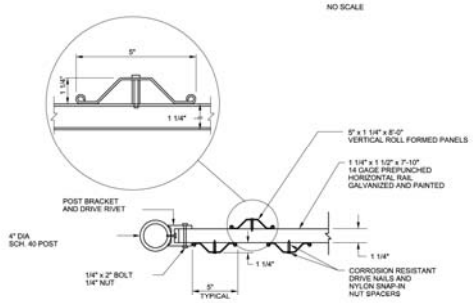
NO SCALE

FENCE TYPE "A"



TYPE 'B' FENCE SECTION

NO SCALE



FORMED PANEL MOUNTING DETAIL

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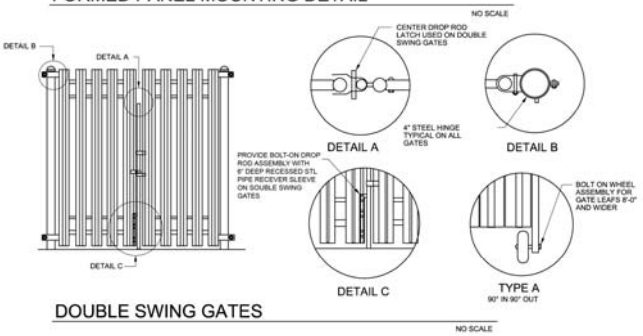
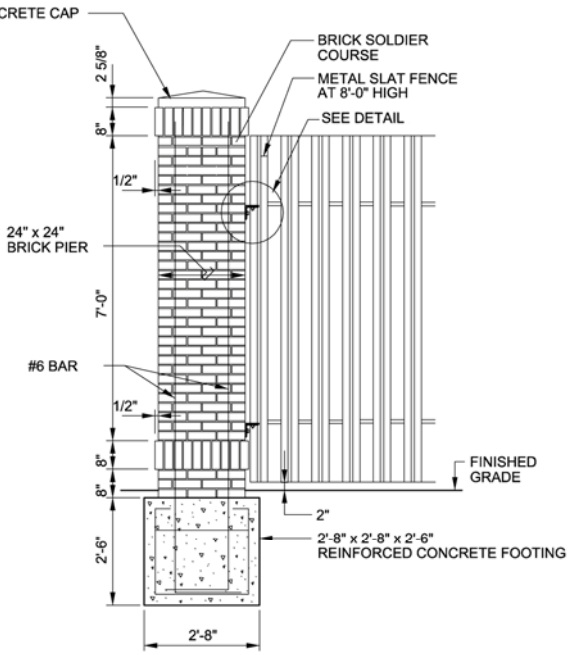


DOUBLE SWING GATES

NO SCALE

FENCE TYPE " B"



BRICK PIER DETAIL

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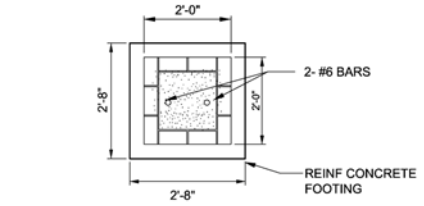
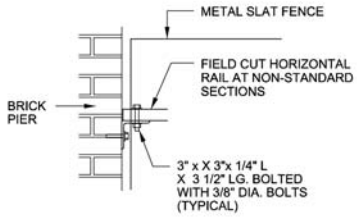


BRICK PIER PLAN

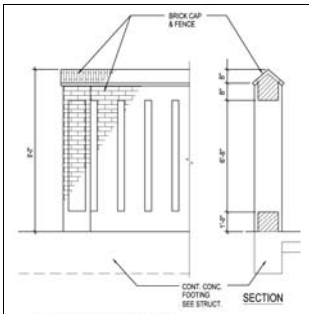
NO SCALE



ATTACHMENT DETAIL

NO SCALE

FENCE TYPE "C"



BRICK PIER DETAIL

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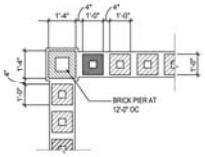
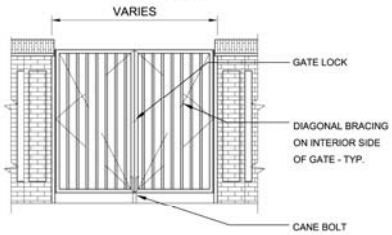


BRICK PIER PLAN

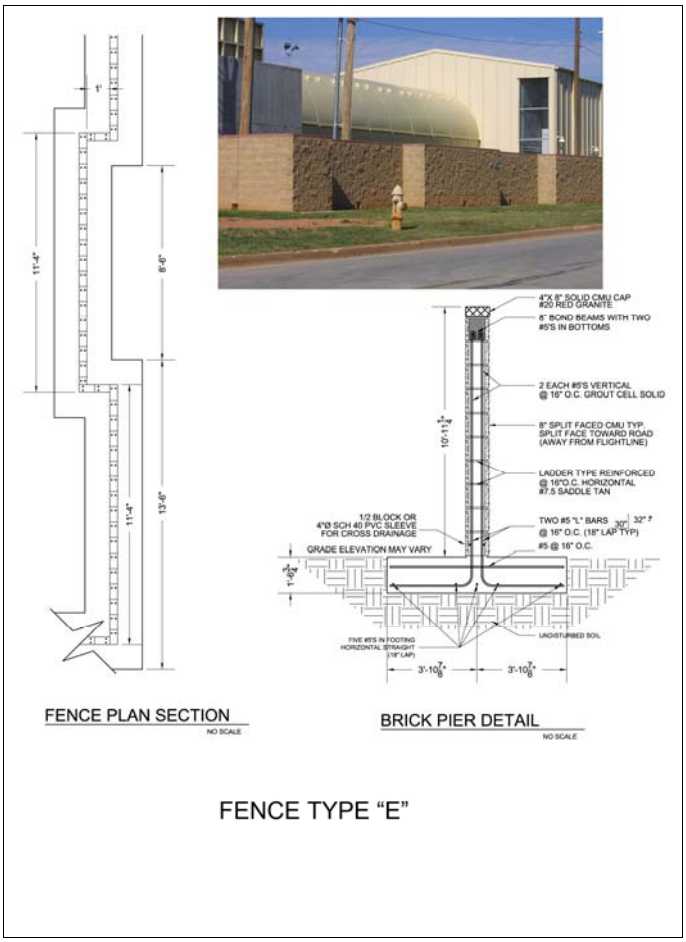
NO SCALE



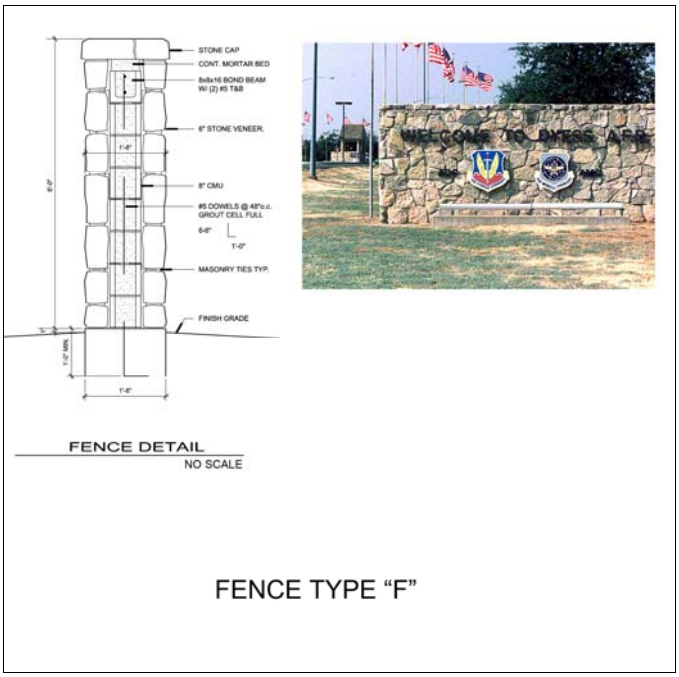
GATE ELEVATION

NO SCALE

FENCE TYPE "D"



FENCE TYPE "E"



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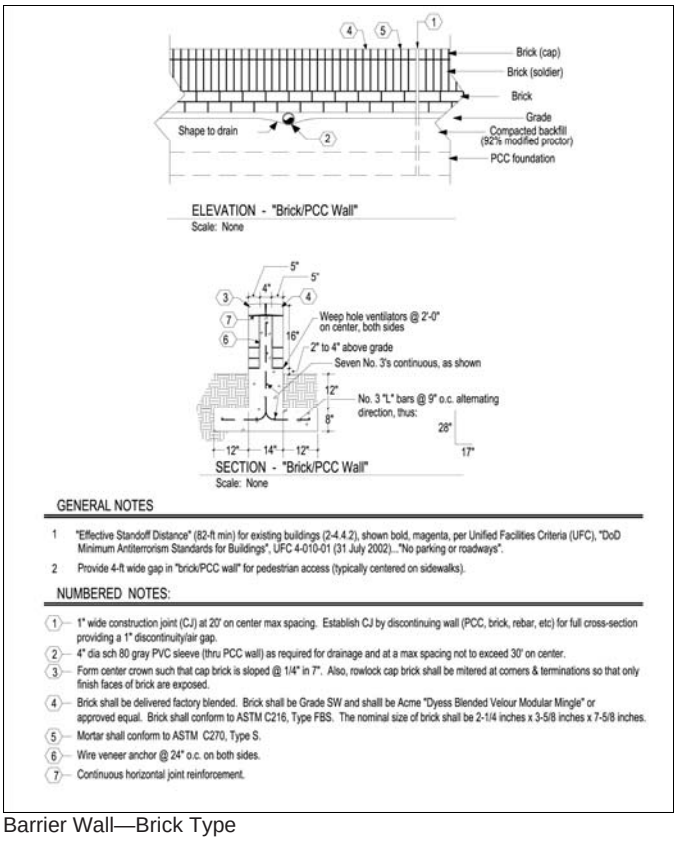
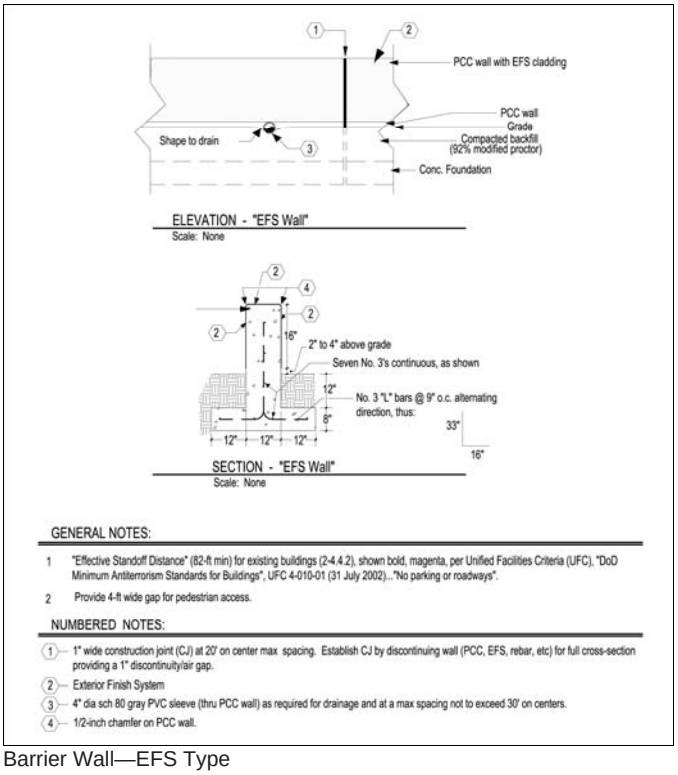


Barrier Wall—Brick Type



Barrier Wall—EFS Type

B.4.2 New Construction

- **Fence Type A: Metal Slat—**Fences and Compounds Adjacent to Buildings District 1
  - **Description—**24" x 24" piers at 9' 9-5/8" o.c. with high impact resistant exterior finish system—to match the adjacent building structure. The fencing material is a metal slat system.
  - **Color—**Charcoal (FSC 26044) near EIFS veneered facilities; or Scotchlite brown (FSC 10091) near brick veneered facilities. Where width of metal slat panel exceeds eight feet, provide intermediate post in center of panel.
- **Fence Type B: Metal Slat—**Fences and Compounds in Industrial Area District 1
  - **Description—**A metal fence system 8'-12' high is a metal slat system .This fence type does not require piers, but posts shall be embedded in concrete. Where width of metal slat panel exceeds eight feet, provide intermediate post in center of panel.
  - **Color—**Charcoal (FSC 26044); near EIFS veneered facilities or Scotchlite brown (FSC 10091) near brick veneered facilities. This fence type does not require piers.
- **Fence Type C—**Fences and Compounds Adjacent to Buildings and along streets District 2
  - **Description—**24" x 24" piers at 12' o.c. with brick and precast concrete cap—color of cap to match brick. Fencing material is a metal slat system. Where width of metal slat panel exceeds eight feet, provide intermediate post in center of panel.
- **Fence Type D—**Fences/Walls Adjacent to Buildings District 2
  - **Description—**On all brick fences/walls to be used for buildings requiring more ceremonial treatment. This fence type is an option and should be considered for use in more prominent areas of the base.
- **Fence Type E—**Fences/Walls Adjacent to Flight line District 1
  - **Description—**On all masonry fences/walls to be used as flight line security. This fence type may also be appropriate for use in more prominent areas along flight line perimeter.
- **Fence Type F—**Fences/Walls in Main Base Entry Gates District 1
  - **Description—**This fence/wall is limited to only those areas included in the main base entries.

B.4.3 Alteration/ Renovation/Replacement

- **Fence Type A—**Fences and Compounds Adjacent to Buildings District 1
  - **Description—**Fencing and compounds that need to be replaced should be replaced with Fence Type A. Portions of fence can be replaced in phases.
- **Fence Type B—**Fences and Compounds in Industrial Area District 1
  - **Description—**Fencing and compounds that need to be replaced should be replaced with Fence Type B. Portions of fence can be replaced in phases.
- **Fence Type C—**Fences and Compounds Adjacent to Buildings and Along Streets District 2.
  - **Description—**Fencing and compounds that need to be replaced should be replaced with Fence Type C. Portions of fence can be replaced in phases.
- **Fence Type D—**Fences/Walls Adjacent to Buildings District 2 1
  - **Description—**This fence/wall can replace existing, less ceremonial fencing/walls in prominent areas of the base.
- **Fence Type E—**Fences/Walls Adjacent to Flight line District 1
  - **Description—**This fence/wall can replace existing, less ceremonial fencing/walls along the flight line.
- **Fence Type F—**Fences and Walls District 1
  - **Description—**This fence/wall is limited to only those areas included in the main base entries.

B.5 Exterior Lighting Design

The pole system selected should be used consistently throughout the Base

- All poles should be aluminum; square shaped (straight); bronze anodized finish.

- When mounting height exceeds 35 feet, a square steel pole is to be used (tapered at top)—Bronze Finish.
- Parking and roadway luminaries should be arm mounted rectilinear with a luminaire light distribution where the candela per 1000 lamp lumens does not exceed 25 (2.5 percent) at an angle of 90 degrees, and 100 (10 percent) at a vertical angle of 80 degrees.
- Luminaire and pole shall be provided with a bronzed, anodized finish and appropriate NEMA distribution for the intended purpose.
- All lamps should be provided in high pressure sodium in order to facilitate the same color rendition. These lamps should be used until more efficient and compatible lamps are identified and approved for use.

B.5.1 Walkway and Plaza Lighting

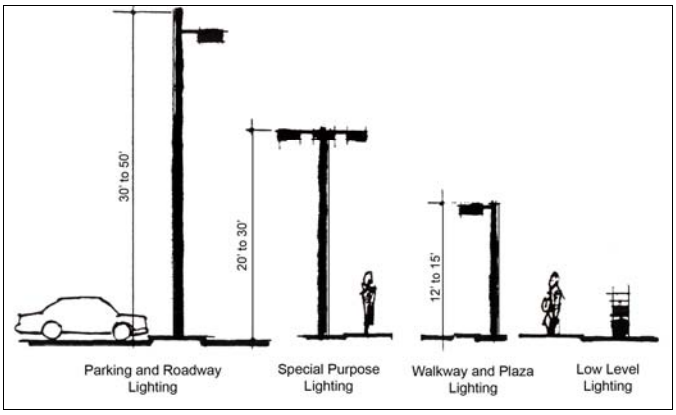
- Provided by fixtures mounted at average heights between 12 to 15 feet.
- Selection of light poles and fixtures should be consistent throughout the Base.

B.5.2 Special Purpose Lighting

- Provided by fixtures mounted an average height of between 20 and 30 feet.
- Selection of light poles and fixtures should be consistent throughout the Base.

B.5.3 Parking and Roadway Lighting

- Provided by fixtures mounted at average heights of between 30 to 50 feet.
- Lighting poles and fixtures should be consistent throughout the Base.



B.6 Infrastructure

B.6.1 Color

- New equipment should have a factory applied color appropriate to the installation standards.
- Transformers especially shall be factory painted with paint suitable to withstand high temperatures.
- Paint existing equipment to match.
- Avoid galvanized or green finishes.

B.6.2 Screening

- Use walls and landscaping to screen all utility equipment but maintain required access and clear districts.
- Avoid the use of wood fencing. Use chainlink fencing only with base approval.

B.6.3 Special Purpose Lights

- Use lighted bollards along high use walkways.
- Inset stair and wall lights for plazas and high use walkways.

B.6.4 Fuel and Water Storage Tanks

The base prefers well screened, appropriately sited aboveground tanks. Ideally this means that each tank is located out of view from any major road, main building entrance or significant outdoor space and well screened with a screen wall that matches its parent facility If this is not possible, use a below grade vaulted aboveground tank and size the manholes adequately for maintenance and inspection or use an approved storage tank compliant with ACC manual 32 7051.

Dyess AFB has adopted a no-exception, “No Underground Storage Tank (UST) Allowed,” policy. No USTs, regardless of materials, construction or intended application, are permitted. Aboveground storage tanks shall utilize single finish color; multiple colors, super graphics, logos, and glossy finishes are prohibited. Color shall be consistent with background colors in the visual district where located. Aboveground storage tanks may not display the AF shield. Siting for all aboveground storage tanks requires HQ ACC/A7P approval.

B.6.5 Security

- Use quartz lights in secure areas and controlled access points where an instant on feature is required.
- Do not use lighting to enhance architectural features.

B.6.6 Fire Protection

- All facilities must be designed and constructed in accordance with UFC 3-600-01 dated 17 April 2003 and other applicable ETLs, codes, and standards

B.6.7 Sewer

- When siting multiple facilities, use gravity flow sewers. Pumping stations may only be used with base approval.

B.6.8 Efficient Use of Utilities

- New facilities must be designed and constructed to minimize life cycle costs or exceed energy performance standards.
- Active and passive solar will be considered in new designs.
- Water conservation initiatives are encouraged.

B.7 Landscape Guidelines

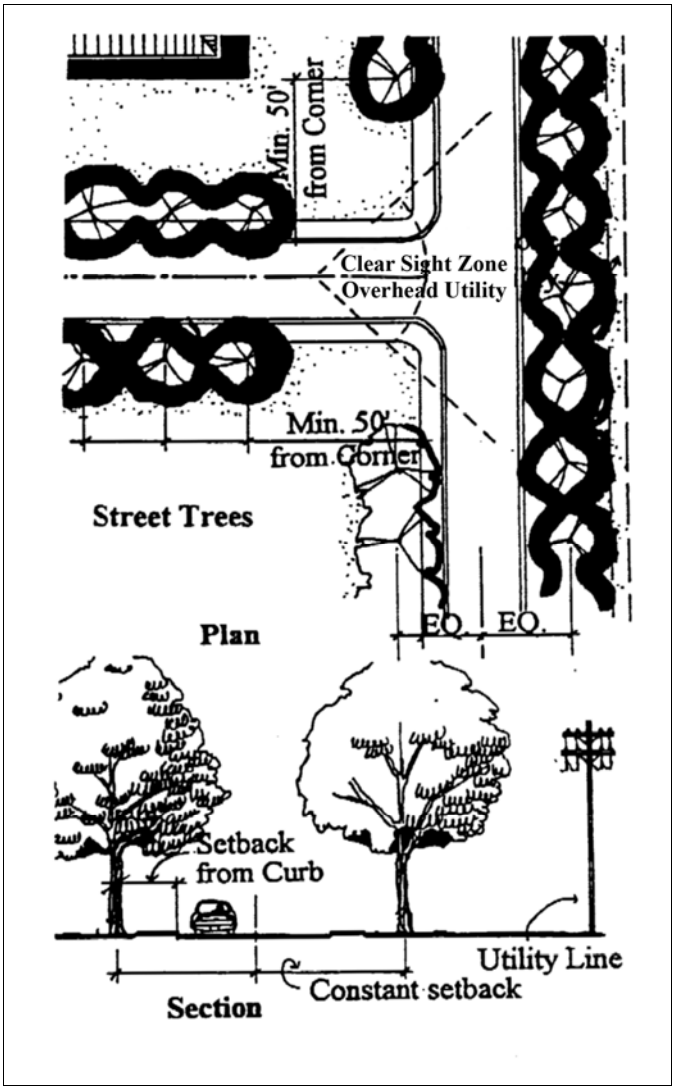
- The source of irrigation for all future landscaping should be effluent water.
- All future landscape should be designed to avoid the need for long-term irrigation. Where irrigation is essential, only drip irrigation should be used, unless a more efficient/sustainable solution can be provided by the design team.
- Planting pits should be at least twice as large as the root ball of the plant being installed. An additional area one foot wide around the pit shall be loosened.
- Special soil mixes should be discontinued and the plants should be planted in the native soil after it has been tilled and cleaned of clods and extraneous matter.
- Tree trunks shall not be wrapped unless the particular tree has a thin bark susceptible to damage.
- Guy wires with rubber hose shall not be used. Ties shall be of a non-abrasive type which will not cut into the tree trunk.
- Where shallow root systems may be a problem, root barriers should be utilized.
- The plant materials listed in Section B.9 have been selected for their ability to survive in the central west Texas environment. Plants not on the attached Plant Material Schedules shall be used only with base approval.
- Where irrigation is not used or used only minimally, xeriscaping features shall be incorporated in the design. An example of xeriscaping is ground cover of river rock in lieu of turf.

B.7.1 Planting Street Trees

- Deciduous canopy trees are most desirable for street trees as they provide shade in the growing season and let sunlight through in the winter months.

B.7.2 Specifics

- Trees shall be planted in straight lines along the roadway with a consistent setback.
- Make sure that large trees are not planted beneath utility wires or above underground utilities.
- Small ornamental trees (15' to 20') may generally be used below overhead wires.

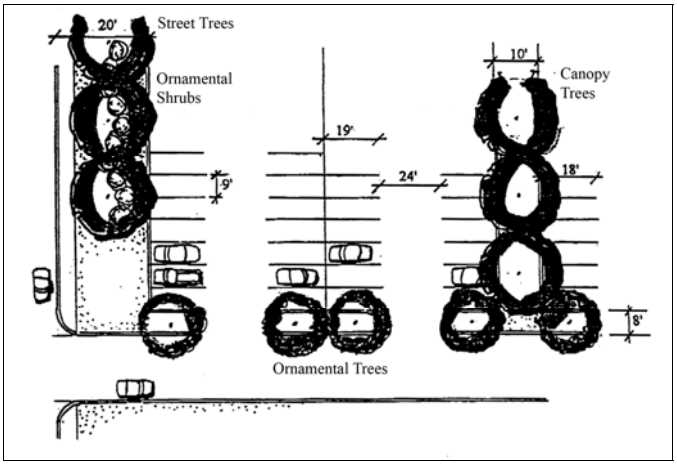


- Where possible, locate trees between roadway and overhead wires.
- Maintain clear sight lines at intersections.
- Provides some variety of street trees so that a monoculture is not created; a predominance of one tree type is more susceptible to pest and disease damage.
- Street trees shall be provided with a 'drip' irrigation system or a convenient, freeze proof hose connection every 100'.
- Plantings for street trees shall be selected from the attached Plant Schedule.
- Recommended desirable minimum setback from street curb to center line of tree

Primary Roadway	Minimum 15'
Secondary Roadway	Minimum 15'
Tertiary and Other Roadways	Minimum 10'

B.7.3 Parking Area Layout

- Maintain setbacks between facilities and parking lots per AT/FP regulations.
- In general, signage and parking lot design shall comply with the Dyess AFB Traffic Engineering Study.
- In many relatively unconstrained sites a 90 degree system works best.
- For aesthetics and environmental reasons, screening and buffer strips and planting islands are called for.
- Planting island and buffer strips can provide shade, windbreaks, and visually break up large expanses of paving.
- Plantings for parking lots shall be selected from the attached Plant Schedule (Section B.9).
- **Ornamental and Evergreen Trees and Shrubs—** Large and medium.

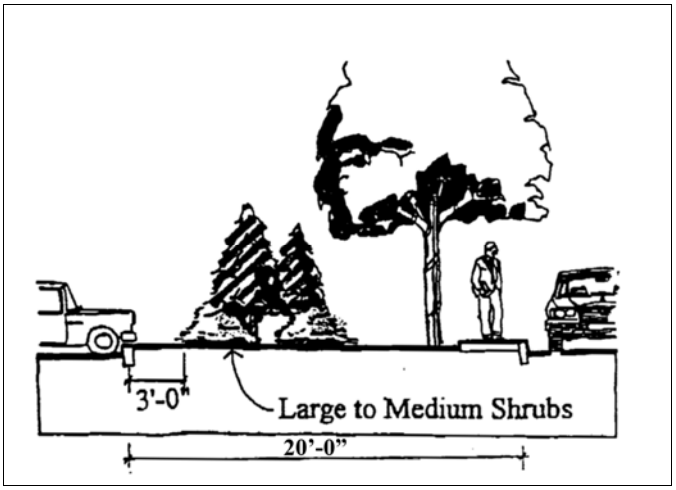


B.7.4 Screening Parking Areas

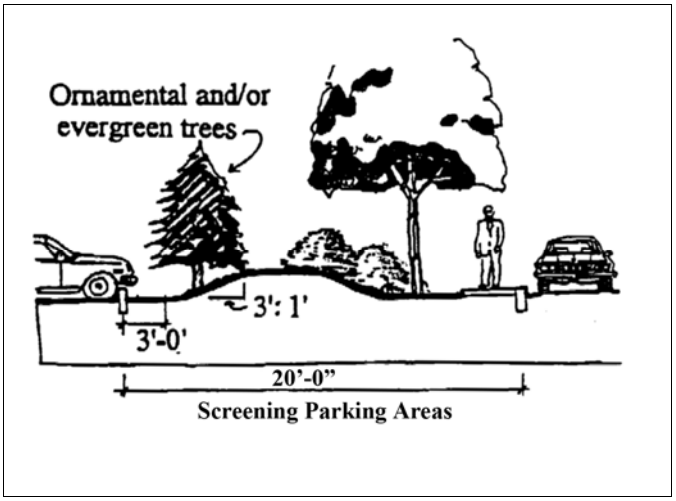
- Parking areas shall be screened or buffered from streets, housing areas and administrative facilities
- Medians separating parking areas from streets and roads shall be a minimum of 20 feet in width.

B.7.5 Screening Methods (Can Be Used in Combination)

- One way to facilitate screening is to use earth berms. These should be used carefully at Dyess since the general impression is of a 'flat' landscape.
- Another way is vegetative screening
- Plantings for parking lot screening shall be selected from the attached Plant Schedule.

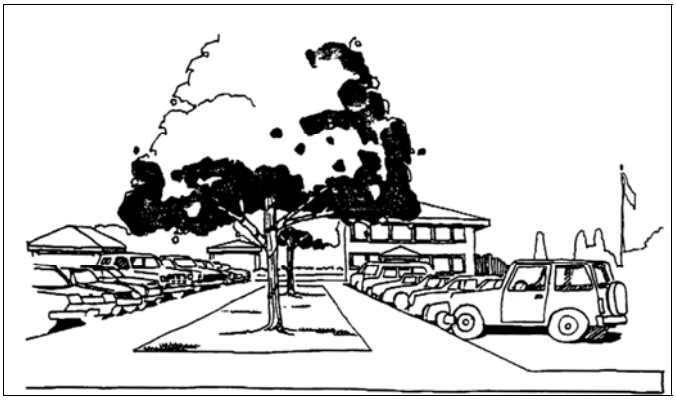


- **Ornamental and Evergreen Trees and Shrubs—** Large and medium.



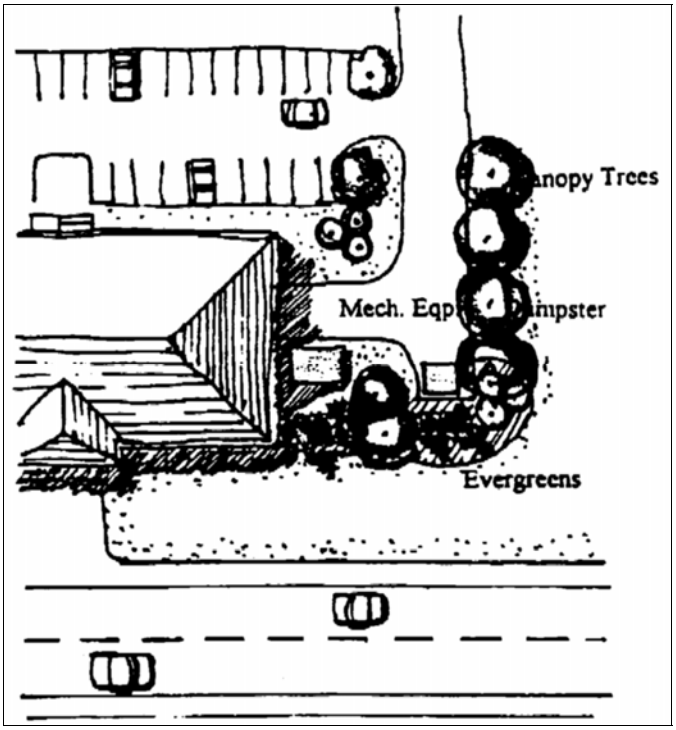
B.7.6 Planting Existing Islands

- Existing islands shall be utilized for the planting of large deciduous canopy trees in existing parking areas. These areas offer immediate opportunities to provide shade and reduce heat build up as well as improve the visual environment.
- Plantings for existing parking lot island shall be selected from the attached Plant Schedule (Section .9).
- **Ornamental and Evergreen Trees and Shrubs—** Large and medium.



B.7.7 Screening Dumpsters

- Dumpsters are required elements in all districts but need to be screened from general view.
- Dumpster openings shall be oriented away from entry areas and main streets. Where this is impractical, gates shall be installed.
- Masonry construction is appropriate for all districts.
- Exterior screening finishes shall be compatible with adjacent buildings.
- In all cases, concrete filled steel bollards shall be utilized to protect the enclosure.
- A concrete pad for the dumpster and a reinforced landing for the truck shall be provided at all sites.
- Dumpsters shall be located in accordance with AT/FP standards.
- Plantings for existing parking lot island shall be selected from the attached Plant Schedule (Section B.9).
- **Ornamental and Evergreen Trees and Shrubs—** Large and medium.



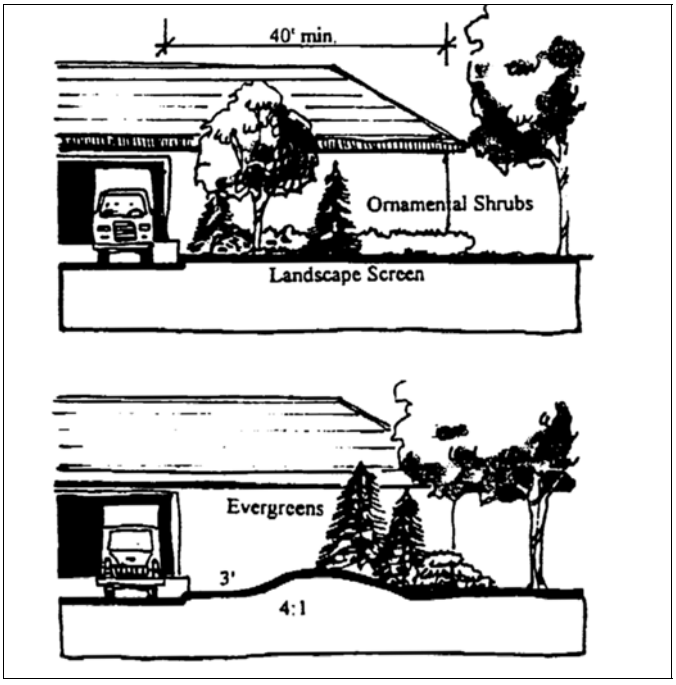
B.7.8 Locating and Screening Mechanical Equipment

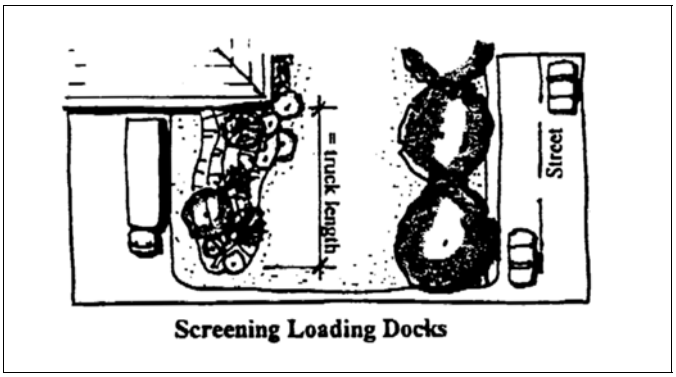
- Mechanical equipment should be located away from building fronts and other high visibility areas such as entries.
- Where possible, these elements can be located near or in association with loading and service areas to the rear or at building ends.

- Landscape or architectural screening should be used to reduce visibility from public areas and to soften the elements.
- Plantings for mechanical equipment shall be selected from the attached Plant Schedule.
- **Ornamental and Evergreen Trees and Shrubs—** Large and medium.

B.7.9 Screening Loading Docks

- Loading docks and service areas shall be buffered and screened from high visibility areas and streets.
- Landscape buffers should consist of a mixture of medium to large evergreen shrubs and some ornamental and evergreen trees where space permits.
- The planting shall be extensive enough to block the visibility of the dock area and trucks using the area.
- In high visibility areas, earth berms with landscape screening may be utilized for more effective results.
- In situations where space is severally limited, walls or fences may be utilized.
- Plantings for loading dock screening shall be selected form the attached Plant Schedule.
- **Ornamental and Evergreen Trees and Shrubs—** Large or medium.





Screening Loading Docks

B.7.10 Screening Secure Areas

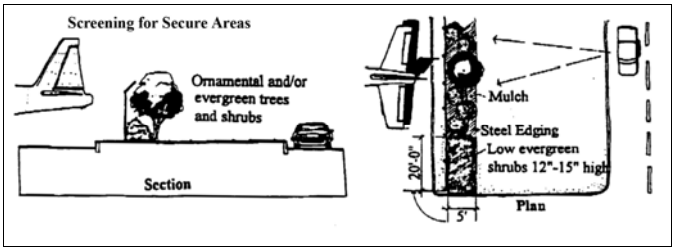
Secure areas are predominantly found in District 1 associated with the Flight Line. Primary functions in secure areas are training and munitions storage. These areas are generally enclosed by chainlink fencing. The flight line area along First Street is most visible and should be screened for security and aesthetic reasons.

B.7.11 Planting Strip

- A planting strip 5 feet wide minimum shall be utilized adjacent to and outside the fence line.
- Plants within the strip should be a mix of ornamental and evergreen trees and shrubs.
- Low maintenance landscaping techniques shall be used.

B.7.12 Fence Openings

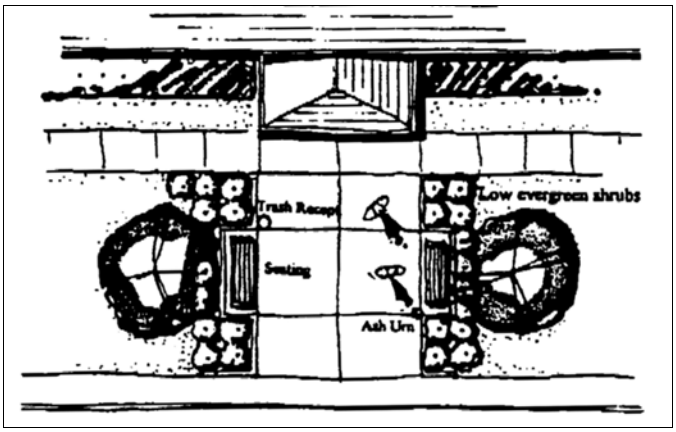
- Where streets penetrate the fence line, a 20 foot long strip either side of the gateway shall be planted with low evergreen shrubs of 12" to 15" height for improved security observation.
- Plantings for secure area screening shall be selected from the attached Plant Schedule.
- **Ornamental and Evergreen Trees and Shrubs—** Large, medium, and small.



B.7.13 Entry Plazas

Entry plazas are appropriate for major buildings in all districts where intense use and high visibility occur. Plantings, special pavements and a full complement of site furnishings and amenities shall be provided to identify and distinguish these buildings as important structures and activity areas at Dyess.

Plantings selections from all schedules may be utilized in these areas (Section B.9).



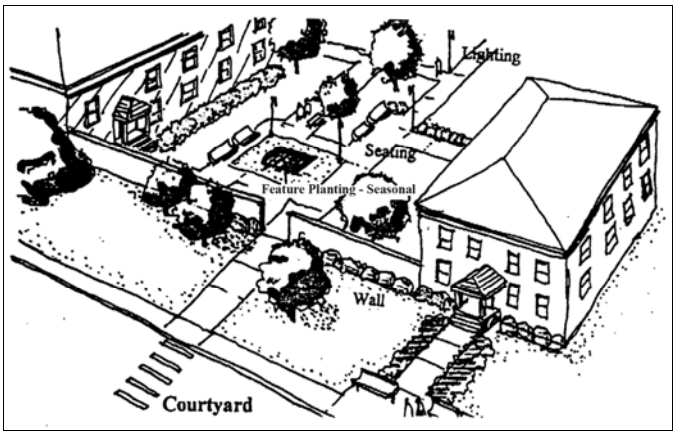
B.7.14 Courtyards

Courtyards can provide useful and attractive spaces for building occupants in all districts. These enclosed, shaded outdoor spaces should be provided at Dyess to offer relief from the brightness and heat of mid summer days and convenient, useful, outdoor areas.

Where a degree of privacy is desired screening may be provided by plantings and/or walls. Plantings should provide shade and visual interest and seating, trash receptacles and lighting should be provided.

Plantings for courtyards shall be selected from the attached Plant Schedule (Section B.9).

- **Ornamental and Evergreen Trees and Shrubs—** Large, medium, and small groundcovers.

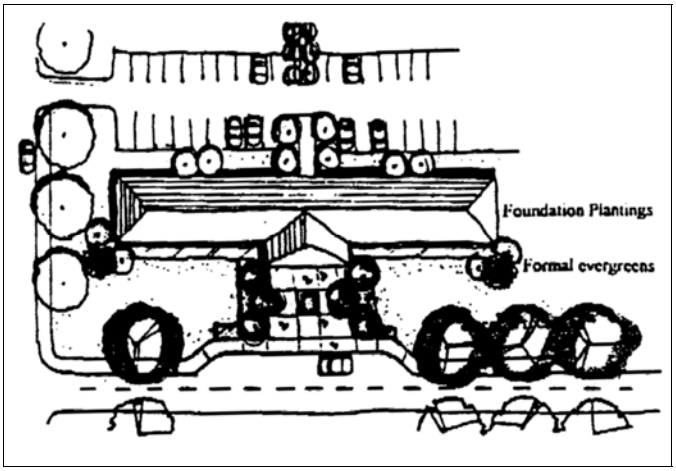


B.7.15 Landscaping for Major Buildings

Landscaping shall be treated somewhat more formally with an emphasis on evergreen shrubs. For example, plantings and other landscaping at primary entrances shall be arranged to define processional paths and gateways. Examples of major buildings are the Wing HQ and Group HQ buildings.

Plantings for major buildings shall be selected from the attached Plant Schedule (Section B.9).

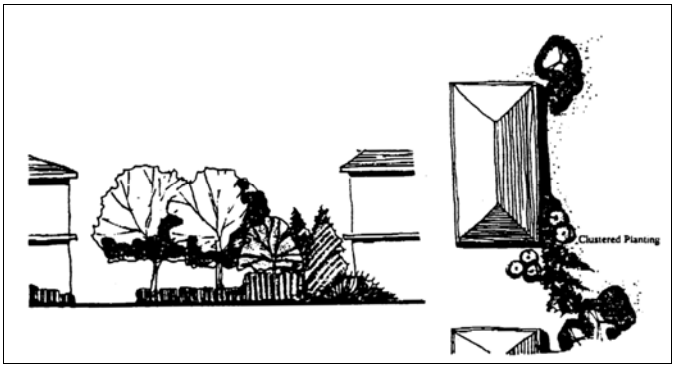
- **Ornamental and Evergreen Trees and Shrubs—** Large, medium, and small groundcovers.



B.7.16 Planting Adjacent to Buildings

- Planting adjacent to buildings shall assist in defining the primary spaces relating to the buildings(s).

- Landscape shall be appropriate in scale to the particular building(s) and shall convey identity, privacy and direction.
- Plantings shall be more substantial near the building and shall diminish as distance increases.



- Where buildings abut open space and the 'Back to Nature' program efforts, there shall be an appropriate transitional lawn area of at least 50 feet.
- Plantings adjacent to buildings shall be selected from the attached Plant Schedule.
- **Ornamental and Evergreen Trees and Shrubs—** Large, medium, and small groundcovers.

B.8 Site Furnishings

Site furniture and related pedestrian amenities should be standard throughout the base in order to facilitate an orderly and visually harmonious physical development.

B.8.1 Benches

Preferred benches are plastic benches with backrest, Bench 131 of steel and recycled plastic as manufactured by DuMor Inc., PO Box 142, Mifflintown, Pennsylvania 17059, phone: 800.598.4018.

B.8.2 Trash Receptacles

Preferred trash receptacles are Receptacle 40, 22-gallon of plastic and steel construction and bronze finish as manufactured by DuMor Inc., PO Box 142, Mifflintown, Pennsylvania 17059, phone: 800.598.4018. Provide manufacturer's optional lid.

B.8.3 Ash Urn

Preferred ash urns are Model S 20 as manufactured by Victor Stanley, Inc. Metal finish shall be anodized bronze or Model #2812 by Columbia Cascade.

B.8.4 Bike Rack

Preferred bike racks are TimberForm Super CycLoops, Model No. 2175, of steel construction as manufactured by Columbia Cascade Company, phone: 800.547.1940, x850. Finish color shall be consistent with surrounding facilities/amenities.

B.8.5 Barbecue Pits

Preferred pits are Model #1140-00 Single Standard Barbecue with 2-7/8" O.D. Pedestal with Model #8802-20-3/16" x 8" 12" Utility Shelf, as manufactured by P.W. Athletic Manufacturing Company, 140 North Gilbert Road, MESA, Arizona 85203, phone: 800.687.5768. Finish shall be manufacturer's standard black.

B.8.6 Pavilion Shelters

Preferred pavilion shelters are of steel construction with standing seam steel roofing as manufactured W. H. Porter, Inc., 4240 136th Avenue, Holland, Michigan 49424, phone: 616.399.1963 or, the 24' Pittsburgh Square by Litchfield Industries. Finish color shall be consistent with surrounding facilities/amenities.

B.9 Plant Material

The plant materials identified and recommended on the following schedules have been selected for their suitability to the central west Texas environment of Abilene. Hot, dry summers combined with a prevailing breeze, low humidity and an alkaline soil create conditions, which are not most favorable for general, domesticated plant growth. Where irrigation systems may be used, most all plants will do well. However, without irrigation, plants must be naturally hardy. For these reasons, the Mesquite, Desert Willow, Cactus and Yucca have been included because they are characteristic of the region and will thrive without assistance. These plants are appropriate to a landscape of plant materials, which require a minimum of water.

Street Trees

Botanical Name	Common Name	Recommended Size	Root Treatment	Mature Size	Hardiness	Leaf Texture	Best Uses
Carya illinoensis	Pecan	2" 3" Cal. 14' to 16'	B&B	80' to 100'	Very Hardy	Medium	Shade, Canopy
Fraxinus velutina	Arizona Ash	1" 2" Cal. 10' to 12'	B&B cont.	40'	Hardy	Medium	Shade, Canopy
Platanus x acerifolia	London Plane Tree	2" 3" Cal. 14' to 16'	B&B	70' to 100'	Hardy	Coarse	Shade, Canopy
Ulmus crassifolia	Cedar elm	2" 3" Cal. 14' to 16'	B&B	50' to 70'	Very Hardy	Medium	Shade, Canopy
Quercus texana	Texas Oak	1" 2" Cal. 10' to 12'	B&B cont.	40'	Very Hardy	Medium	Shade, Canopy
Quercus stellata	Post Oak	1" 2" Cal. 10' to 12'	B&B cont.	50'	Very Hardy	Medium	Shade, Canopy

Ornamental and Evergreen Trees

Botanical Name	Common Name	Recommended Size	Root Treatment	Mature Size	Hardiness	Leaf Texture	Best Uses
Ornamental Trees							
Cercis canadensis	Eastern Redbud	5 Gallon	Container	to 40'	Very Hardy	Medium	Accent, Specimen
Cercis texensis	Texas Redbud	5 Gallon	Container	to 40'	Very Hardy	Medium	Accent, Specimen
Chilopsis linearis	Desert Willow	5 Gallon	Container	25' to 30'	Very Hardy	Fine	Accent, Specimen
Lagerstroemia indica	Crape Myrtle	5 Gallon	Container	15'-20'	Hardy	Medium Fine	Accent, Specimen
Prosopis glandulosa	Mesquite	5 Gallon	B&B cont.	to 40'	Very Hardy	Fine	Accent, Mass
Rhamnus caroliniana	Carolina Buckthorn	5 Gallon	B&B cont.	to 25'	Very Hardy	Medium	Accent, Specimen
Evergreen Trees							
Arbutus zalapensis	Texas Madrone	5 Gallon	B&B cont.	to 30'	Very Hardy	Medium	Screen, Wind Break
Ilex vomitoria	Yaupon Holly, Tree Form	5 Gallon	Container	to 25'	Hardy	Medium Fine	Screen, Accent
Juniperus ashei	Ashe Juniper	5 Gallon	Container	to 25'	Very Hardy	Fine	Screen, Wind Break
Punus eldarica	Afghan Pine	5 Gallon	Container	to 60'	Hardy	Fine	Screen, Accent

Shrubs

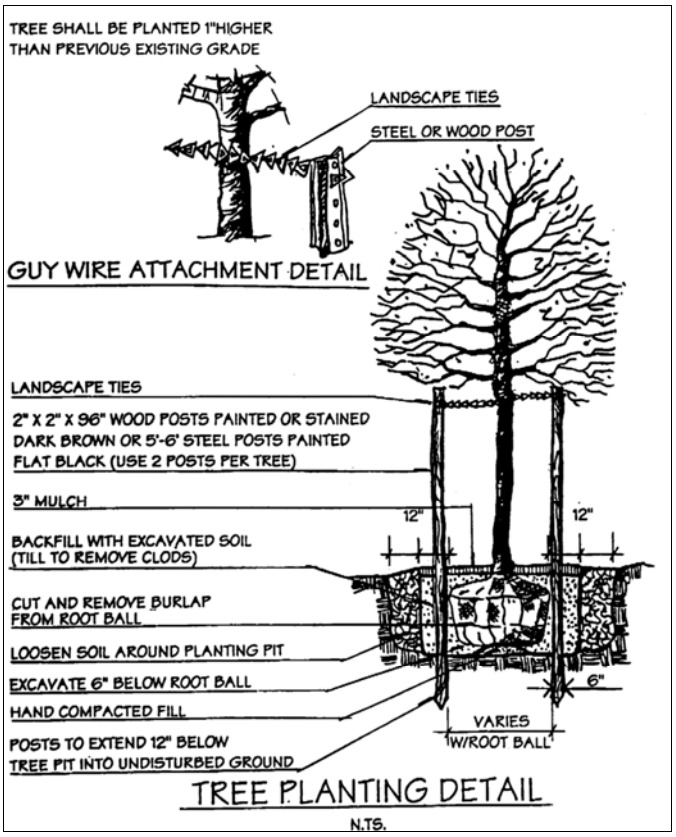
Botanical Name	Common Name	Recommended Size	Root Treatment	Mature Size	Hardiness	Leaf Texture	Best Uses
Small Shrubs (1' to 3' Typical Mature Size)							
Acacia angustissima, hirta	Fern Acacia	2 Gallon	Container	H 3' W 3'	Hardy	Fine, Medium	Foundation, Mass
Chrysactinia mexi-cana	Damianita	2 Gallon	Container	H 3' W 3'	Hardy	Medium	Foundation, Mass
Agave parryi	Parry Agave	2 Gallon	Container	H 3' W 3'	Hardy	Medium	Mass, Accent
Salvia greggii	Autumn Sage	2 Gallon	Container	H 3' W 3'	Hardy	Fine, Medium	Foundation, Mass
Ilex vomitoria nana	Dwarf Youpon Hlly	2 Gallon	Container	H 3' W 3'	Hardy	Fine	Foundation, Mass
Abelia X grandiflora 'Compacta'	Compact Abelia	3 Gallon	Container	H 3' W 3'	Hardy	Fine, Medium	Mass, Accent
Berberis thunbergii 'Atropurpurea Nana'	Crimson Pygmy Barberry	2 Gallon	Container	H 2' W 2'	Hardy	Fine	Mass, Accent
Juniperus tamarish	Tam Juniper	2 Gallon	Container	H 2' W 6'	Hardy	Fine	Mass, Foundation
Buxus var. (No Japanese)	Boxwood	2 Gallon	Container	H 2' W 2'	Hardy	Fine, Medium	Mass, Foundation
Pyracantha Koidzumii 'Santa Cruz'	Santa Cruz Pyracantha	5 Gallon	Container	H 2.5' W 5'	Hardy	Fine, Medium	Mass, Accent
Acanthus quadrifi-des, var. wrightii	Flame Acanthus	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Medium Shrubs (3' to 6' Typical Mature Size)							
Dasylirion wheeleri	Desert Sotol	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Euonymus japonica 'Aurea variegata	Gold Spot Euonymus	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Euonymus japonica 'Silver King'	Silver King Euonymus	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Euonymus kiautschovia 'Manhattan'	Manhattan Euonymus	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Hesperaloe parviflora	Red Yucca	5 Gallon	Container	4' to 6'	Protected from Winter Winds	Medium To Coarse	Accent, Specimen
Ilex cornuta 'Burfordii nana'	Dwarf Burford Holly	5 Gallon	Container	3' to 6'	Hardy	Medium	Hedge Accent, Specimen
Juniperus chinensis 'Pfitzeriana'	Pfitzer Juniper	5 Gallon	Container	3' to 5'	Hardy	Fine	Hedge, Mass
Leucophyllum frutescens 'compacta	Compact Texas Sage	5 Gallon	Container	3' to 5'	Very Hardy	Fine	Mass, Accent
Nandina domestica	Heavenly Bamboo	5 Gallon	Container	3' to 5'	Hardy	Fine, Med.	Accent, Specimen
Yucca aliofolia	Spanish Dagger	5 Gallon	Container	1' to 10'	Very Hardy	Medium	Accent, Mass
Caesalpinia mexicana	Mexican Bird of Paradise	5 Gallon	Container	5' to 8'	Hardy	Medium	Accent, Specimen
Dalea Formosa	Feather Dalea	5 Gallon	Container	H 3' W 4'	Hardy	Medium	Accent, Specimen
Ilex cornuta 'Burfordii'	Burford Holly	5 Gallon	Container	5' to 8'	Hardy	Medium	Hedge, Accent, Foundation
Ilex x 'Nellie R. Stevens'	Nellie Stevens Holly	5 Gallon	Container	15' to 20'	Hardy	Medium	Hedge, Accent, Specimen
Ilex vomitoria	Youpon Holly	5 Gallon	Container	15' to 20'	Hardy	Medium	Hedge, Accent
Lagerstroemia indica (dwarf var.)	Crapemyrtle	5 Gallon	Container	5' to 8'	Hardy	Medium	Accent, Specimen

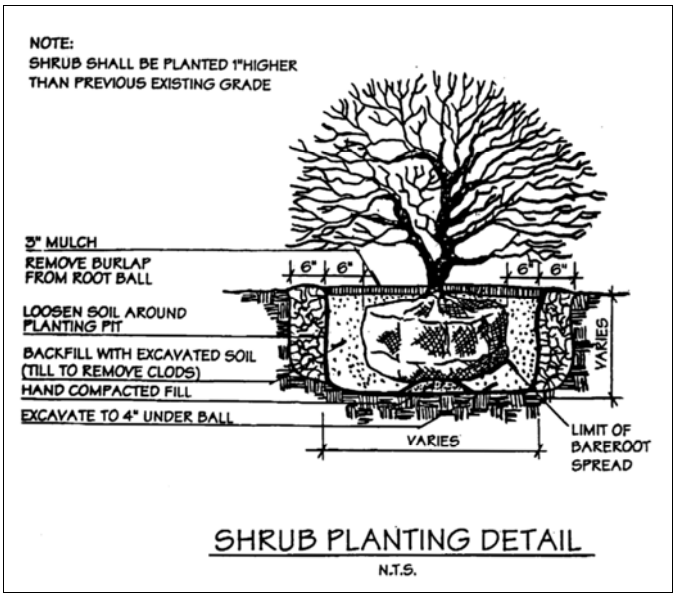
Shrubs (Continued)

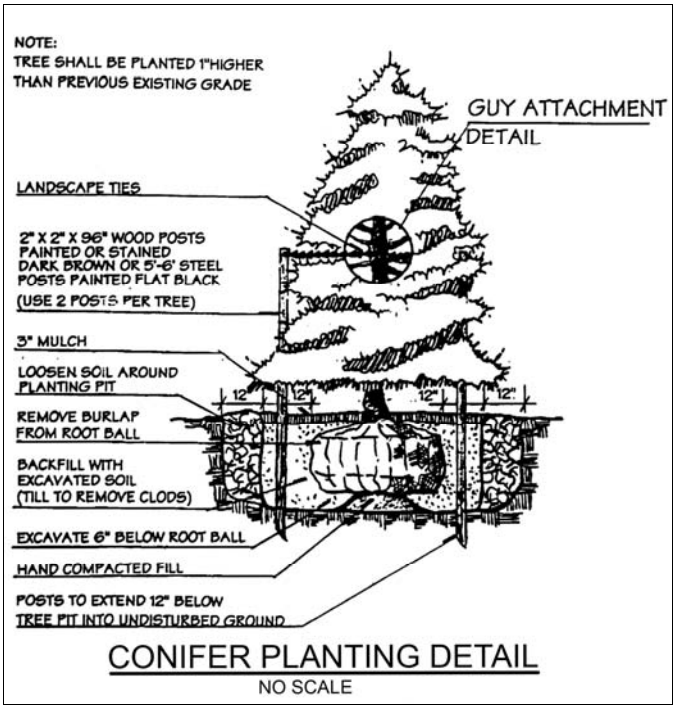
Botanical Name	Common Name	Recommended Size	Root Treatment	Mature Size	Hardiness	Leaf Texture	Best Uses
Medium Shrubs (3' to 6' Typical Mature Size)							
Ligustrum japonicum 'texanum'	Waxleaf Ligustrum	5 Gallon	Container	6' to 10'	Hardy	Medium	Hedge, Accent, Foundation
Photinia x fraseri	Fraser's Photinia	5 Gallon	Container	8' to 10'	Hardy	Medium, Coarse	Hedge, Accent, Mass

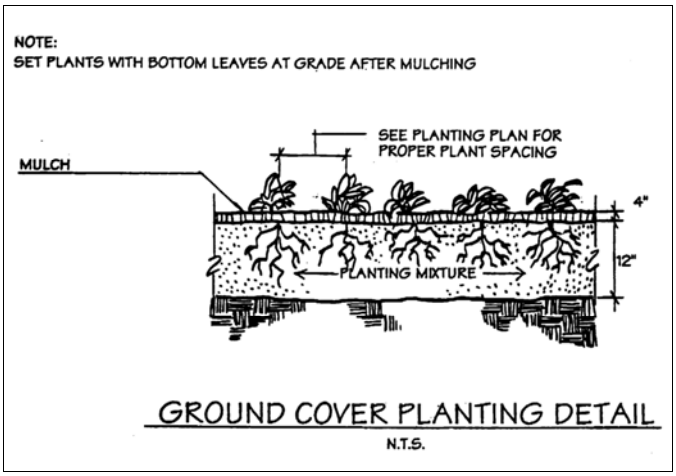
Ground Covers

Botanical Name	Common Name	Recommended Size	Root Treatment	Mature Size	Hardiness	Leaf Texture	Best Uses
Dalea Formosa	Feather Dalea	5 Gallon	Container	3' to 4'	Hardy	Medium	Accent, Specimen
Juniperus Procumbens	Procumbens Juniper	5 Gallon	Container	H 1' W 10'-15'	Hardy, sun, dry, alkaline Soil	Fine	Mass, Large Area
Santolina Chamaecyparissus	Gray Santolina	1 Gallon	Container	H 1 2' W 2 4'	Hardy, sun, dry	Fine	Mass, Accent
Vinca Major	Vinca, Periwinkle	1 Gallon	Container	H 1' W 18"	Hardy sun/shade	Medium	Mass, Large Area
Cotoneaster horizontalis	Cotoneaster	5 Gallon	Container	H 2' W 5 8'	Hardy, sun, dry, but well drained	Fine	Mass, Large Area
Opuntia huifusa	Prickly Pear	1 Gallon	Container	H 2 3' W Varies	Hardy, Sun/Dry, Alkaline Soil	Coarse	Mass, Accent


TREE SHALL BE PLANTED 1"HIGHER
THAN PREVIOUS EXISTING GRADE
LANDSCAPE TIES
STEEL OR WOOD POST
GUY WIRE ATTACHMENT DETAIL
LANDSCAPE TIES
2" X 2" X 96" WOOD POSTS PAINTED OR STAINED
DARK BROWN OR 5'-6' STEEL POSTS PAINTED
FLAT BLACK (USE 2 POSTS PER TREE)
3" MULCH
BACKFILL WITH EXCAVATED SOIL
(TILL TO REMOVE CLODS)
CUT AND REMOVE BURLAP
FROM ROOT BALL
LOOSEN SOIL AROUND PLANTING PIT
EXCAVATE 6" BELOW ROOT BALL
HAND COMPACTED FILL
POSTS TO EXTEND 12" BELOW
TREE PIT INTO UNDISTURBED GROUND
12"
12"
6"
VARIES
W/ROOT BALL
TREE PLANTING DETAIL
N.TS.


NOTE:
SHRUB SHALL BE PLANTED 1"HIGHER
THAN PREVIOUS EXISTING GRADE
3" MULCH
REMOVE BURLAP
FROM ROOT BALL
LOOSEN SOIL AROUND
PLANTING PIT
BACKFILL WITH EXCAVATED SOIL
(TILL TO REMOVE CLODS)
HAND COMPACTED FILL
EXCAVATE TO 4" UNDER BALL
6"
6"
6"
6"
VARIES
VARIES
LIMIT OF
BAREROOT
SPREAD
SHRUB PLANTING DETAIL
N.T.S.


NOTE:
TREE SHALL BE PLANTED 1"HIGHER
THAN PREVIOUS EXISTING GRADE
GUY ATTACHMENT
DETAIL
LANDSCAPE TIES
2" X 2" X 96" WOOD POSTS
PAINTED OR STAINED
DARK BROWN OR 5'-6' STEEL
POSTS PAINTED FLAT BLACK
(USE 2 POSTS PER TREE)
3" MULCH
LOOSEN SOIL AROUND
PLANTING PIT
REMOVE BURLAP
FROM ROOT BALL
BACKFILL WITH
EXCAVATED SOIL
(TILL TO REMOVE CLODS)
EXCAVATE 6" BELOW ROOT BALL
HAND COMPACTED FILL
POSTS TO EXTEND 12" BELOW
TREE PIT INTO UNDISTURBED GROUND
12"
12"
12"
12"
CONIFER PLANTING DETAIL
NO SCALE


NOTE:
SET PLANTS WITH BOTTOM LEAVES AT GRADE AFTER MULCHING
SEE PLANTING PLAN FOR
PROPER PLANT SPACING
MULCH
4"
12"
PLANTING MIXTURE
GROUND COVER PLANTING DETAIL
N.T.S.

B.10 Walls

Minimize use of curves, cants or angles other than 90 degree corners. Use only as clearly justified by the adjacent architecture, building function or layout.

B.10.1 Material

- On exterior walls use low maintenance durable materials.
- Use of brushed, honed or sandblasted concrete is uncommon at the base.
- Do not use materials that require painting on new buildings.
- Avoid the use of materials that require painting on renovation projects.
- Use of bricks, blocks, or grout containing fly ash or other byproducts is encouraged.
- Use concrete containing fly ash or other recycled materials.
- Use autoclaved cellular cement where appropriate.

B.10.2 Metal

Metal walls are generally found in District 1 facilities.

B.10.3 Painting

Do not paint new buildings and do not use materials that are typically restored by painting such as stucco, metal fascia, and various kinds of siding on renovations.

B.10.4 Anodized Aluminum

- Common at the base is the use dark bronze anodized aluminum for exterior metals normally associated with walls such as fascia, gutters, downspouts, windows, and building entrances.
- Fire exit doors and other secondary doors and frames may be painted for economy; they should be painted to match the primary entrance.

B.10.5 Brick

The majority of brick buildings at Dyess AFB, particularly in the area east of Third Street, have been built with Acme—"Dyess Blended Valour Modular Mingle." This brick is a multi color brick that includes two shades of red and two shades of charcoal uniformly blended. Brick with a nominal size of 4" x 4" x 12" was used on buildings constructed in the early decades of the base. In recent years, 4" x 4" x 8" brick has been used.

On additions to existing buildings, a very carefully articulated blend should be provided to match existing brick. The original building brick came from different lots and one brick blend will not necessarily satisfactorily match all original brick buildings. Each batch of new brick must be blended separately and a good match is mandatory.

The brick of any American manufacturer that can provide a good match is acceptable if it meets the other quality standards.

When referring to the "Acme Dyess Blended Valour Modular Mingle" as the brick for Dyess AFB.

Exterior wall finishes currently used in Districts 1 and 2 include.

District	Exterior Finishes Used in Districts 1 and 2
1	**Exterior Insulation and Finish System** Color: Sandstone (FSC 23531) with Charcoal Trim (FSC 26044) **Pre-Engineered Metal Buildings** Color: Sandstone (FSC 23531) with Charcoal trim (FSC 26044) **Leuders limestone Veneer**
2	**Brick Exterior** Color: Dyess Blended Valour Modular Mingle Brick with Scotchlite Brown Trim (FSC 10091) **Brick Exterior** Color: Dyess Blended Valour Modular Mingle Brick with Scotchlite Brown Trim (FSC 10091)

B.11 Doors

Aluminum anodized, factory finished doors and frames are preferred for most exterior locations. The use of tinted, energy efficient glazing is mandatory.

B.11.1 Door Hardware—All Districts

In an effort to unify the appearance and quality of door hardware throughout the Base, the following hardware guidelines are established:

- **ANSI—**American National Standards Institute
- **BHMA—**Builder's Hardware Manufacturers Association

B.11.2 Hinges—Exterior Doors

- **Full Mortise Hinges—**Heavyweight ball bearing
- **ANSI A5111—**Stainless steel
- **Finish—**BHMA 630/US32D, stainless steel

B.11.3 Hinges—Interior Doors

High use doors and doors with closers:

- **ANSI A5112—**Stainless steel, ball bearing
- **Finish—**BHMA 630/US32D, stainless steel

B.11.4 Low Use Doors

- **ANSI A5113—**Stainless steel, plain bearing
- **Finish—**BHMA 630/US32D, stainless steel

B.11.5 Locksets—Interior and Exterior Doors

- **Finish—**BHMA 630/US32D, satin stainless steel

B.11.6 Door Hardware

- BHM Series 4000, Grade 1, knob trim, removable core function as required (see BHMA ANSI functions F75-F93).
- All parts of lockset (i.e., strike, latchbolt) to match finish of knob/lever.

B.11.7 Miscellaneous Hardware (Stops, Flushbolts, Etc.)

Provide in GHMA 630/US32D Satin Stainless Steel. BHMA 626/US26D Satin Chromium Plated is acceptable if item is not manufactured in BHMA 630/US32D.

B.11.8 Keying

Lock cores shall be removable type keyed in sets or subsets as scheduled. Lock cores shall be seven (7) pin. Cores shall be pinned for an A-3 (.018 differential) type system. Lock cores shall be keyed to existing base master key system in sets or subsets in accordance with the approved schedule. Dyess' existing master key system is by "BEST." Locks shall be furnished with the manufacturer's standard construction cores and key system. Permanent cores and keys including a typewritten key codes/biting schedule shall be sent by the lock manufacturer directly to Dyess AFB by registered mail or other approved means. The address is:

7 CES/CEOL2
ATTN: Locksmith
718 Third Street
Dyess AFB, Texas 79607.1618

Keys for locks shall be stamped with change number and the inscription "U.S. Property—Do Not Duplicate."

Dyess uses a "K" and "L" type keyway. Keys shall be supplied as follows:

- **Locks—**Two (2) change keys each lock
- **Master Keyed Sets—**Six (6) keys each set
- **Construction Keys—**Six (6) total
- **Blank Keys—**One (1) per lockset provided
- **A3 Key Kit—**One (1) kit for each 100 locksets (or fraction thereof)

The keys shall be furnished to the Contracting Officer arranged in a container specifically designed for key control system storage in sets or subsets as scheduled.

B.11.9 Keying Schedule

Before any hardware is delivered, a proposed keying system schedule shall be prepared and submitted to the Contracting Officer for approval (GA). The lock manufacturer and/or their supplier must be furnished by the contractor with this project number, contract number, title, street address, and building number(s) before correct schedule can be developed. The base Locksmith shall be contacted (address above) to secure existing key codes/bitting if necessary to successfully master key new work under this contract.

B.11.10 Lockets and Latchsets

Locksets and latchsets shall meet ANSI A156.2, series 4000, grade 1, bored type with roses. Handles/levers shall be provided on required handicapped accessible doors only. Locksets and latchsets shall be capable of accepting "BEST" removable cores. Other hardware manufacturers ("FALCON") have successfully demonstrated full capabilities of providing totally and completely interchangeable cores (round top/unslotted) including pins, springs, etc., with Dyess' existing "BEST" system and can provide locksets and latchsets which accept same.

B.12 Windows

B.12.1 General Information

- Aluminum anodized, factory finished window frames are common throughout the base.
- Tinted, energy efficient glazing is mandatory. Operable windows are encouraged.
- Provide window screens where windows are operable.

- Provide screens for Unaccompanied Enlisted Personnel Housing (UEPH).

B.12.2 Window Characteristics —All Districts

Aluminum environmental control windows (thermally broken frames). Characteristics of the windows being used at Dyess include:

- **AAMA Classification "HC"—**Heavy commercial finish, Architectural Class 1 AA M10C22A44, dark bronze
- **Glass—**Tempered
- **Exterior Lite—**Tinted (bronze)
- **Interior Lite—**Clear aluminum mesh screens

-or-

- **Interior Lite—**Baked On Electro Statically Applied Enamel Coating of 1.0 +/ .2 mils dry film thickness
- **Color—**Dark Bronze (FSC 26044)

B.13 Roofs

B.13.1 General Requirements

- When compatible, a standing seam metal roof on metal trusses is preferred.
- Gutters and downspouts are commonly used for all roofs. Exposed copper gutters and downspouts are used throughout District 2.
- Dyess prefers that all vent piping, flues, exhaust fans, etc., penetrating roofs not be visible from the view of the building front/main entrance. These penetrations are considered trim material and should be painted/ manufactured for consistency/compatibility with the facility.
- Dyess prefers the use of bear joists or trusses on a steel frame, instead of masonry walls, especially at facilities with long spans such as gymnasiums and warehouses. Obtain base approval for using load bearing masonry walls in design.

B.13.2 Roofing Materials Used at Dyess AFB

B.13.2.1 District 1 Roofing

- **Sloped Shingled Roofs (Asphalt Shingles)—** Shingle Color: Timberline Single—"Cedar Blend" as manufactured by GAF or Summit Shingle—"Desert Shake" as manufactured by Georgia-Pacific (colors are subject to prior approval)
- **Sloped Non-Shingled Standing Seam Metal Roof—** Metal Roof Color: Dark Bronze from PAC in Kynar 500 finish
- **Sloped Shingled Roofs (Cedar Shakes)—**Shingle Color: Natural, do not paint or stain

B.13.2.2 District 2 Roofing

- **Sloped Shingled Roofs (Asphalt Shingles)—** Shingle Color: Timberline Single—"Slate Blend" as manufactured by GAF or Summit Shingle—"Hearthstone Grey" as manufactured by Georgia-Pacific (colors are subject to prior approval)
- **Sloped/Shingled Roofs (Concrete Roof Tiles)—** Shingle Color: Charcoal (FSC 26044)
- **Sloped/Non Shingled Standing Seam Metal Roof—** Metal Roof Color: Dark Bronze from PAC in Kynar 500 finish
- **Sloped Shingled Roofs (Asphalt Shingles**)— Shingle Color: Timberline Single—"Cedar Blend" as manufactured by GAF or Summit Shingle—"Desert Shake" as manufactured by Georgia-Pacific (colors are subject to prior approval)
- **Sloped/Shingled Roofs (Concrete Roof Tiles)**— Shingle Color: Grey (FSC)

B.14 Additions

When building additions are proposed, careful coordination is needed.

B.14.1 Small Addition

When additions are less than 25 percent of the existing building's floor area, it is usually more appropriate to design additions to match the original construction. However, opportunities to meet the current standards of the ID2 should be investigated.

B.14.2 Large Additions

When additions exceed 25 percent of the original building area, it is more appropriate to upgrade the existing facility to comply with current standards of the ID2.

B.14.3 Compatibility

In either case (large or small), when additions are complete, they should be architecturally compatible rather than obvious add-ons.

B.15 Accessory Buildings

Accessory buildings, such as sheds, should be compatible with the materials and design of the primary building. With the exception of the industrial areas in District 1, metal construction is discouraged from use as accessory buildings. Even in District 1, they should be compatible in design with the primary structure.

B.16 Metal Buildings

Metal buildings should mainly be limited to large structures such as hangars or temporary facilities. When large buildings are metal a masonry base proportionate to the height of the building is a good design addition. The base must be an integrally colored, textured masonry base for durability. Temporary buildings must be removed within one year. Specialized facilities such as water towers and fuel tanks may be metal.

B.16.1 Location

Use metal buildings where they are compatible with adjacent structures. Do not use temporary metal buildings in highly visible locations. Temporary metal buildings used anywhere should be well screened with walls or vegetation.

B.17 Colors

The use of dark bronze anodized aluminum for storefront doors and frames has been commonly used. Exit doors, downspouts, etc. are Scotchlite brown or charcoal.

B.17.1 Exterior Metals

The use of neutral anodized colors such as bronze is common throughout the base. When aluminum, hollow metal, and wood are mixed on one building, hollow metal and wood may be painted to match the aluminum color or adjacent walls. Avoid use of a third color.

B.17.2 Color Use

Dyess prefers the use of two colors on a building to produce the best appearance—one wall color and one trim color. The use of more than three colors—one wall color and two trim or accent colors such as exposed aggregate fascia, columns, beams, etc is discouraged.

B.18 Utility and Dumpsters

Use an enclosed yard to conceal miscellaneous support items such as generators, transformers, trash, lawn equipment, flammable storage, HVAC, meters, and aboveground tanks.

B.18.1 Enclosures

Design enclosing walls similar to the building wall material. Split faced CMU is a good durable material. When this is not possible, metal slats and planting may be used. The use of open panel block is permitted when enclosing electrical substations, transformers, or switches for proper heat dissipation.

B.18.2 Gates

If possible locate trash and mechanical enclosures so the access to the enclosure in not visible from major streets or major building entries. If this is not possible, provide gates for trash enclosures. Also provide gates for enclosures where accessibility needs to be limited. Gates shall be designed to be strong and durable enough to withstand normal wear and tear without bending, warping, or coming apart.

B.18.3 Subdivide

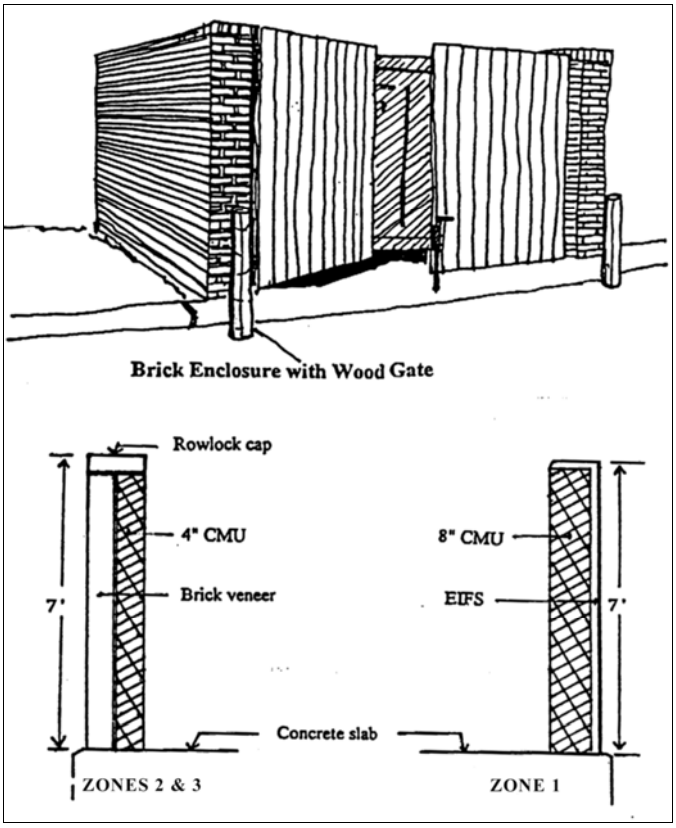
Organize and layout the service yards by responsibility. For instance, HVAC equipment should not be in the trash enclosure. Many of the functions may require separation and separate access such as tools, lawn mowers, fuel, etc.

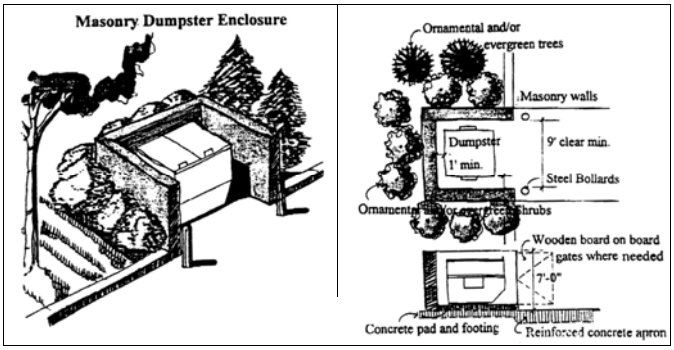
B.18.4 Pavement

Provide vehicular access and surfacing such as pavement, grass pavers, or gravel to reduce maintenance.

B.18.5 Service Areas

Integrate service areas with the building design and match adjacent materials.





B.19 Interior and Exterior Signage

All interior and exterior sign must conform with ACCI 32-1054, Exterior Signs and UFC 3-120-01 Air Force Sign Standard. Marquee signs (or electronic signs) are seen as "advertising" and have no place on an Air Force Installation with the possible exception to clubs and the installation entrance if permitted by all applicable sign standard as well as 7 CES/CEOS at Dyess. Within the standards, it is very clear that signage on each installation needs to be limited to the absolute minimum required for directions, identification and customer service. This approach reduces visual clutter and results in an efficient, cost effective and attractive system that creates a unified professional appearance. Marquee signs also require extensive site work with trenching and connection to a power source and foundations and need a fairly high level of ongoing maintenance."

B.19.1 General Requirements

- All interior and exterior signage must be approved by 7 CES/CC at Dyess.
- Illustrate on the site plan the sequence of information to be conveyed. Precisely define, locate and key to all directional and regulatory information.
- Provide signs only where a need exists.
- Eliminate unnecessary or conflicting signs.
- Ensure that the placement of signs relates to their function.

B.19.2 Reserved Parking Policy

Refer to Dyess AFB Supplement 1 to ACCI 32-1054 for reserved parking policy.

Signage using Dyess blend brick.

B.20 Special Notes

B.20.1 Return Ducts

As a strategy to comply with the goals of the federal energy conservation program, a return duct system shall

be designed for every project. Using attics for plenum return is not acceptable

B.20.2 Cleanouts

The designer shall ensure that a sufficient number of cleanouts are provided so that any part of the sewer piping system, regardless of difficulty of access, may be readily routed. Likewise, a sufficient quantity of isolation valves shall be provided to ensure that only the absolute minimum number of fixtures will be temporarily out of service.

B.20.3 Lighting Troffers

If troffers are specified as luminaires for suspended acoustical ceilings, the only size approved for troffers is 2'x4'.

B.20.4 Advanced Metering and Controls

The base has been installing systems with LON control interfaces and Siemens APOGEE systems for advanced metering systems. Use APOGEE systems (or APOGEE compatible) for all new projects for ease of maintenance, maintenance training and system control.

B.20.5 HVAC

Dyess prefers the use of Trane or Trane compatible HVAC equipment because the parts are more interchangeable than other brands and using fewer brands means less training necessary to perform maintenance.

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