
TYNDALL AFB, FLORIDA

325th Civil Engineering Squadron



Facility Excellence Plan

The Tyndall Air Force Base Facility Excellence Plan

29 AUGUST 1997

325 CES
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Tyndall AFB, FL
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Updated
31 AUGUST 1998



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Introduction

Purpose

Achieving architectural compatibility requires careful planning and articulation of standards. The purpose of the Facilities Excellence Plan (FEP) is to establish and document installation-specific standards and provide a tool to assure these standards are consistently applied. The FEP strives to recognize the cultural, environmental, climatic and existing facility conditions peculiar to Tyndall AFB , and define the appropriate styles, finishes, materials and furnishings to be used to achieve the best facility life-cycle costs and still retain the appropriate environment for people to achieve their highest productivity and efficiency.

- The FEP promotes aesthetically pleasing design and cohesiveness while eliminating the existing visual confusion and imbalance. It provides an information and assessment tool for key military and civilian personnel who make decisions regarding facilities or are responsible for procuring or maintaining elements of the installation's built environment. It is intended to facilitate decision-making regarding building exteriors, building interiors and furnishings, landscaping and other site amenities.
- The FEP supports the goals and objectives of the Air Education and Training Command (AETC) Guide to Installation Excellence. The guide states that installations will be developed in a manner that maximizes mission accomplishment, optimizes existing facilities, and provides the most efficient, professional surroundings possible. The FEP serves as an integral tool, along with the General Plan, for achieving facility and installation excellence at Tyndall AFB .

Audience

- The primary audience for the FEP includes the individuals involved in all phases of the facility delivery process. This includes programmers, planners, designers, project managers, design agents, A-E consultants and contractors.

- The secondary audience is the installation leadership as it becomes a tool to chart a course towards installation excellence and provides a means to assess the installation's progress in achieving that end.

Organization

- The FEP has been organized to promote ease of use and to be easily updated and expanded. The following sections describe the primary areas addressed and how they are organized.

Exterior Architectural Compatibility

- Facility exteriors are the basis for the most lasting impression of an installation. This impression results from the relationship between scale, massing, proportion, texture, color and many other elements. To achieve excellence, these elements and their interrelationship to new construction or renovation projects should be blended to enhance the facility's exterior appearance with the natural surroundings.
- Exterior architectural compatibility for Tyndall AFB is addressed by establishing standards that apply installation-wide. These standards promote and strengthen a unified, consistent appearance and level of quality for facilities throughout the base.

Interior Design Compatibility

- The variety of functions on Tyndall AFB requires many different and unique facilities to support the programs and people. This presents a challenge for designers regarding quality standards, use of materials, functional requirements and budget limitations. Standardizing interior building finishes throughout the Tyndall AFB facilities establishes a benchmark of desired results. The establishment and consistent application of standards helps ensure facilities keep their architectural integrity and interior scheme as functions change.
- Interior design compatibility is addressed in the FEP by first discussing the overall objectives and approach to interior design for Tyndall AFB. This serves to establish the basis for the identified standards. The standards for interior finish materials are organized by the function of the facility and its level of use. Further guidance is provided for specific functional areas within a facility.

Landscape Development

- Landscape architecture is the art and science of designing exterior areas to improve visual appeal and functionality. It is one of the most effective means of improving the appearance and unity of an installation. Quality landscape design and implementation also improves the quality-of-life for our people and visitors.
- Landscape development standards are first addressed at the installation level. These standards, including a plant list, irrigation, maintenance, site furnishings, paving, signs, utilities and fencing/screening, provide a means for improving continuity throughout Tyndall AFB.

- Additional standards are provided for various development areas and site specific conditions. A hierarchy of streetscape development is also established that corresponds to both vehicular and pedestrian traffic patterns.

Use

- The FEP is intended to be utilized at all stages of the facility delivery process from programming through construction, and even operations and maintenance. It is essential that the FEP be provided to the design agent and A-E consultants early in the design process to assure that the entire design team understands the applicable design standards and objectives for the project.

Implementation

- In order to ensure the FEP is followed as projects are conceived, designed, and constructed, a single person at the installation is designated as the Facilities Excellence Coordinator. This person reviews all projects which alter the appearance of the installation for conformance with the FEP. The coordinator annually updates the FEP to ensure that it reflects the most current design objectives and standards for Tyndall AFB . The FEP has also been written to simplify the understanding of architectural compatibility concepts as well as to provide specific information to use when performing routine maintenance, renovating the facilities, or procuring new furniture. This specific information will make implementing the plan a natural part of the day-to-day business of operating the 325th CES.



General

Contracts

- The following clauses will be incorporated into the contract documents as well as Tyndall's standard General Requirements in Attachments.
- Specifications and Drawings for projects involving work on the airfield and flight line shall incorporate language that contractors must comply with restrictions outlined in the Bird Airstrike Hazard (BASH) Plan and our standard airfield restriction language.
- A special clause is required for merchantable timber if site clearing includes trees. The Natural Resources Flight will provide guidance.
- If Government furnished equipment is to be provided to the contractor, provide the delivery date, location, who will store, who will assemble, install, test and operate.
- Restrict the contractor's staging areas in the contract documents to indicated areas or the specific construction site or provide time restrictions on how long he could store material at remote locations prior to installation. This may require the contractor to double handle materials. Sites shall not be cleared specifically for material storage. Contractor staging can occur in prepared parking areas.
- Ensure the contract specifies that the contractor will maintain the job site in a neat and orderly manner including grounds maintenance (i.e., grass cutting) and clean-up of the site at the end of each day's work.
- Specify the maximum practicable amount of recovered materials, consistent with performance requirements, availability, price reasonableness, and cost effectiveness. Consider energy conservation, pollution prevention, and waste reduction to the maximum extent practicable

- Existing buildings on Tyndall AFB may contain asbestos and/or lead paint. Include testing and results for all designs.
- Refer to Section 3, Landscape Development, for clauses requiring specific contract actions and submittals.

Cost Estimating

- If estimate is above authorized funding, identify recommended options to reduce CWE PA in the design submittal package.
- Provide cost estimates with all design submittals for review.
- Refer to Section 3, Landscape Development, for landscape planting requirements. Planting and irrigation requirements shall not be cut to accommodate high CWE's.

Permits

- Assure permits are coordinated with federal, state/local agencies and host base environmental. These include sewer, domestic water, waste water storm water, air, dredge and fill, NPDES, construction permits, irrigation and tree cutting for construction.
- The A-E shall determine the required clearances (permits) required from the authorities. The following special clauses will be included in the project specifications: contractor must obtain local construction permit for disruptions of aircraft or vehicular traffic, disruptions of base utility services, or subsurface excavation; contractor must coordinate planned interruption to utility services; and contractor must stockpile merchantable pine lumber for pickup by the Air force forestry contractor.

Construction

- Assure construction phasing is addressed. Provide recommended construction time with every submittal to reflect any changes.
- Identify construction staging area. If site is congested, provide supplemental staging.
- Tyndall AFB has a year round construction season.
- Address screening of construction area for safety and aesthetics.
- All construction debris shall be hauled off base.



Sitework

Civil

General

- Empty conduits will be placed at strategic locations beneath all new paved areas for future requirements. This will be coordinated with the Base Pavements Engineer and the Communications Squadron.
- Swales should be used where possible for stormwater treatment. Do not create wet retention ponds without the base's written concurrence. A/E must follow Florida Standard 62-25 Florida Administrative Code. Refer to Section 3, Landscape Development for additional information.
- Tree removal and replacement - refer to Section 3, Landscape Development.
- Coordinate traffic flow with BCE Office. Ensure building and parking area does not fall within the explosive clear zone. Use of yellow paint striping on curbs is prohibited. Handicap pavement markings will be blue and the parking striping adjacent to the symbol will be blue.
- Investigate proper limits of explosive clear zones. Obtain Q/D zones and building corner coordinates in writing from Base as required. This information is available on Tabs E-9 and D-6.
- Keep slopes as flat as possible, but still provide for adequate runoff. Use paved flumes where runoff is concentrated off parking lots and roads.
- Ensure that adequately sized service drives and turnarounds are provided for maintenance vehicles.
- Ensure that refuse collection pads with privacy screens are sized and provided with necessary access to accommodate the large vehicles. The concrete pad should extend beyond the front of the dumpster enclosure to absorb the punishment of the loading garbage truck. Ensure access is straight into dumpsters and provides for safe, easy backing and turnaround. Refer to Section 3, Landscape Development for dumpster enclosure standards.

- Ensure irrigation plans match site and planting plans to avoid irrigating pavements, buildings and chillers.
- Investigate geotechnical requirements with unusual soils (landfills and previously completely undeveloped areas). For soil density tests, three tests minimum of all lab work. All test results will be reported in writing to the Contracting Officer. Soils will be identified, designed, and installed using MIL-STD-619B and MIL-STD-621A (Unified Soil classification System). Compactive efforts and tests will use the American Society for Testing and Materials (ASTM) for identification. Do not use the AASHTO designations.
- Jack and bore all utilities that must go under existing pavements. Provide for enough depth to avert road damage.
- Trenching across tree roots well not be tolerated. Refer to Section 3, Landscape Development for policy and guidelines.
- Ensure that sufficient ground cover is provided for load protection of buried lines.
- Ensure that provisions are made for locating nonmetallic buried pipes.
- Soil conditions at Tyndall are very sandy and are not stable on steep slopes, making them subject to severe washouts. Site drainage off pavement sometimes concentrates water flows without provision to stabilize slopes. Provide flumes where runoff is concentrated off pavement and flatten slopes as much as possible.
- Typical soil profile for the base: Soil is typically (SP) to 9 feet in depth. There are no known expandable clays in the area. Do not use clay except to provide for minimal cohesive properties.
- Water table depth: The ground water level will fluctuate with the weather, tide, and seasons; but will generally range from 2 feet to 5 feet in depth. On the airfield, ground-water occasionally may be found at the bottom of the pavement.
- Ensure that proper actions are taken to control erosion and storm water runoff.

Rigid Pavements

- Check that design provides for joints to be spaced not greater than twenty feet for repairs to existing pavements and 12'6" for new pavements. Joint patterns will be square in all but matching or radii configurations. Joint patterns for repairs shall match the existing pavement.
- Joint width should be a minimum of 1/2 inch regardless of joints seal types; i.e., performed or field poured. Joint widths less than 1/2 inch have not performed satisfactorily.

- Neoprene compression seals are initially more expensive than filed-poured sealants but have a longer performance life. They will be used on all new pavements. Silicone joint seal will be used on repairs to existing pavements.
- Metal joints inserts are not to be used on Air Force pavements.
- For airfield pavements, specifications used in highway construction will not be allowed. Only Tyndall or Corps of Engineer Guide Specifications will be used. Specifications must provide for testing of joint sealant by an Air Force approved laboratory to ensure that they meet applicable federal or ASTM specifications. Make sure tests adequately reflect true field conditions.
- For airfield pavements, sizing and geometry decisions will not be made without referring to AFI 32-1024, AFI 32-1026, TM 5-825-2/AFM 32-8008 Vol. 2, Rigid Airfield Design (RAD v1.0) computer-aided design program, or the Air Force Civil Engineering Support Agency (AFCESA) Airfield Pavement Evaluation for Tyndall AFB dated May 1995.

Flexible Pavements

- Streets, parking lots, sidewalks shall be designed in accordance with TM 5-822/AFM 88-7, Chapter 1, AFJMAN 32-1019, MTMCTEA Pamphlet 55-17, and FDOT Roadway and Traffic Design Standards, dated January 1994.
- Ensure that curb and gutters are provided on streets and parking areas to contain traffic and protect pavement edges. Design shall be similar to the major portion of those existing on base or use details from FDOT (types E and F, section 300).
- Ensure that the proper type of pavement is designed for areas subject to kerosene, gasoline, or oil spillage. Portland cement concrete should be used to minimize surface deterioration. In areas subject to acid spillage, an acid resistant coating should be applied to PCC pavement.
- Pavement thickness will be 2" asphalt / 6" limerock, minimum. If necessary, the thickness' may be greater. The asphalt will be type S-I or S-III, in accordance with FDOT specifications, section 330. Crushed Florida limerock/limestone (FDOT section 200) will be used as a stabilized aggregate base course.
- Roadway lane widths will be 12'. Parking stalls will be 9' (12' or 13' for handicap). Parking lots will be laid out at 90 degrees unless space does not permit. The parking lot lane widths will be set in a 18' -24' -18' -18' -24' -18' pattern. The entrance radii to parking lots may not be less than 15', 20' is preferred. This allows cars to quickly and easily enter and leave traffic. On roadways, provide 45 feet radii where possible (especially for truck traffic).

Water/Waste/Storm Systems

General

- Check fire flow test data for quantity/pressure requirements Test data cannot be more than six months old.
- Pipelines/Manholes: Manholes shall be 36 inches in diameter. Manhole spacing shall not exceed 300 LF. All junctions shall be in manholes. Water and sewer lines shall be apart on paralleled lines with sewer lines below water lines. Line crossings shall be separated 6 inches with potable lines on top. Sleeves shall be used under roadways. Maximum / minimum depths of cover: The minimum depth shall be 18” and the maximum depth due to the high water table shall be 48”. Long force mains shall have air relief. Check valves shall be installed at the discharge of all lift station pumps.
- Check with Base Civil Engineering Office for determination of water and sewer permitting requirements. The current sewage treatment plant is in compliance with discharge requirements. A new advanced waster water treatment state plant is scheduled to be operational in 1998.
- Screen backflow preventer when placed above ground level.
- Provide adequate access with walkways and stairs to equipment and tank sidewalks for maintenance and cleaning.
- That pipes and valves are color coded and have flow direction arrows.
- That sufficient sampling taps are provided throughout the system for adequate testing and process control.
- Cathodic protection should be considered for all buried pipelines.
- Trenching across tree roots will not be tolerated. Refer to Section 3, Landscape Development for policy and guidelines.

Water and Water Distribution

- Water Supply Treatment Requirements: The only treatment for Base potable water is chlorination. With new EPA Regulations we may need further treatment at each well.
- Well details and data will be provided to allow for later servicing, repair, and redevelopment.
- Potable water storage facilities will be designed to Preclude stagnation of the water.
- Looped systems are used if at all possible.

Waste and Waste Water Distribution

- Flow Capacity: The Bay County Advanced Waste Water Treatment Plant (construction completion 1999) with tertiary treatment provides a capacity of 10 million gallons per day (MGD).
- Through 1999 the wastewater flow and available design capacity for treatment average a daily flow of 1 MGD.
- Minimum collector line sizes; 8 inches, 6 inches in Housing areas.
- Manholes with a minimum diameter of 3 feet shall be provided. Cleanouts shall be provided on all building tie-ins.
- Emergency power connections shall be provided so standby generators can be used in the event of power failure.
- Manholes and tanks will have ladders that are securely anchored to the wall.
- Black iron will not be used for ladders or handrails, etc. Ferrous metals exposed to sewage gases should be galvanized.
- Traps and separators will be provided to prevent oil and grease from entering the sewage system.
- Drains from sources which have possible oil or grease contamination will have satisfactory separator units.

Lift Stations

- A study shall be made of the lift station serving an area to ascertain that it can handle any additional load.
- Each station shall be equipped with dual pumps and motors to provide fully standby in the event of one failure. An exhaust system shall also be a part of the lift station to be used when maintaining the station.
- Controls shall be mounted with a weatherproof control panel located aboveground.
- Extra manhole capacity shall be provided to give additional storage in the event of power failure.
- Dual submersible pumps with automatic alternating lead pump controls with a manual override.
- Adequate wastewater storage for short power outages of maintenance down time.

- Easy access for maintenance personnel and pump replacement provisions.
- External switch provided for quick connection of mobile emergency generator.

Storm Drainage

- The existing site drainage is done by swales and percolation. The designer shall be responsible for all permits required to construct project.
- Design Precipitation: Use zone 1 of Rainfall Intensity-Duration-Frequency Curves from the FDOT Drainage Manual.
- Check with Base Civil Engineer's office for use of a central retention pond system. This is not commonly used.
- Refer to Section 3, Landscape Development for additional information.



Site & Landscape Development

Overall Objectives

- The visual environment at Tyndall AFB has a profound impact on the perceptions visitors and assigned personnel have about the base. Site and landscape development has an enormous impact on installation appearance and energy conservation and as such shall be included as an integral part in all facility designs and construction/renovation projects. Successful development of site and landscape designs that use low maintenance materials and minimize impacts on the environment contribute to an enhanced working environment, an improved public relations profile, and more efficient staff performance in pursuit of the installation's mission.
- The overall objective for site and landscape developments is to achieve a positive image and level of quality through visual compatibility and unity.
- The guidelines contained in this section are provided to plan a direction for site and landscape development on all projects at Tyndall AFB. Considerations that address perceptions of the landscape and the visual condition of the installation are provided as design guidance. These guidelines are to be used in support of the guidelines set forth in the Base Master Plan, Base Landscape Plan and the USAF Landscape Design Guide. All facility designs shall be reviewed for content, accuracy and completeness, and approved by the base Landscape Architect prior to implementation.

Design Theme

The design theme can be summarized by the following elements:

- Integrate Existing Components - The placement, arrangement, and composition of elements within a landscape can have a major impact on the visual quality of an area. Consider elements including buildings, paved areas (sidewalks streets, parking lots), street furniture, signage, and plant materials. Arrange these elements in an integrated

and coordinated fashion and then relate them to the land use and circulation to positively impact the visual quality and functionality of an area.

- Enhance Existing Assets - Identify and preserve existing areas on the installation that are well landscaped and/or visually attractive. Benefits can be derived with the integration of these areas with proposed landscape improvements.
- Consider Aesthetic Impacts - Improve the aesthetic and visual quality of a site by the effective placement of landscape materials (including plant materials, hard surfaces, furniture, fences, Signage, etc.). Use plant material to reduce the scale of large buildings while at the same time softening the lines of the building. Use plant material to introduce color, texture, and form to the environment.
- Non-planting Aesthetic Considerations - Locate in areas that are away from direct view from building entrances, windows or from passing vehicles or pedestrians such items as transformers, HVAC chillers, meter boxes, backflow to reduce the scale of large buildings while at the same time softening the lines of a building. Use plant materials to introduce color, texture, and form to the environment. Prevention valves, loading docks, trash dumpsters, raised drainage inlets, and other facility elements of an industrial/utility nature.
- Consider Mature Sizes of Plants - The potential mature size of plants must be considered in a landscape design. Improper selections create plantings along building foundations where plants have overgrown window and door openings. This condition creates a negative visual image and also requires additional site and/or building maintenance.
- Consider the Level of Landscape Development - The location and land use of a particular site determines whether a formal or informal landscape design is appropriate. Areas where a formal design and layout are appropriate include gates, administrative areas, street intersections, and occasionally street corridors. Informal arrangements typically favor open spaces, wooded edges, and housing areas.
- Establish Theme Along Primary Vehicle Routes - Provide mature canopy trees along vehicle routes and corridors to help better define its space. Plan for trees to be planted in tree lawns with sufficient distance between the edge of the road and the sidewalk can accomplish this and provide shade for the pedestrian. Canopy trees should be planted no closer than 10 feet away from the edge of the road, unless the road is curbed. Sidewalks should be placed directly adjacent to the road edge or 8 to 10 feet away to discourage planting strips that are only 12 to 24 inches wide.
- Incorporate Planned Planting with Existing Vegetation - Where possible, retain existing wooded areas and replace woods that may have been removed under other projects or maintenance requirements. Manipulation of these edge zones should include the addition of shrubs and small ornamental trees to help improve the appearance.
- Manipulate Views - Buildings that face high volume vehicle and pedestrian traffic shall incorporate landscaping on all sides. Emphasis should be given to the high visibility sides. Loading docks on the high traffic. shall be screened.

- Parking Areas - Screen from view of vehicle and pedestrian traffic using low berms and planting. Parking lots should be constructed no closer than 15 feet to the edge of any street. No drainage swales associated with the parking should be located between the street and parking lot.
- Street Intersections - Provide street intersections with special attention. More formal planting can occur at each corner where trees, shrubs, ground covers and signage are integrated. Maintain proper setback to insure a driver's line of vision is not obscured.

General Installation Standards

Designs that exemplify a positive image and level of quality can be attained by considering and implementing the following guidelines:

- Highlight important building entrances with landscaping.
- Match plant characteristics (size, shape, color, texture) with the appropriate site context.
- Create shrub massing and establish naturalistic forms with sweeps of plant materials where possible to replace the existing technique of single-spaced shrubs.
- Integrate the built environment into the landscape. For example, form retention ponds into free form basins that replicate natural features.
- Frame important views with landscape planting.
- Screen undesirable views with shrub and tree plantings in conjunction with berms (such as parking areas, fuel tanks, utility yards, etc.).
- Use a select group of plants from the approved plant list when incorporating plant material. Plant materials shall be suitable for climatic conditions found in Northern Florida.
- Incorporate landscape designs that are compatible with the architectural styles and colors of the buildings found at Tyndall AFB.
- Establish levels of landscape developments based upon the intensity of activity being conducted in area. For example, reserve formal developments for key administration, ceremonial grounds, community support facilities and primary vehicular routes. Correlate medium and low intensity sites and landscape development with facilities and collector circulation roads with a lesser intensity of use. The occurring frequency of site amenities, development and landscape plantings should directly correlate with the importance and priority of the area and circulation route.
- Use landscape development to enhance traffic circulation patterns and facility development patterns. Pedestrian paths should maintain consistent landscape and site

features along the length of the path. Appropriate site amenities focused on pedestrian needs and tree planting for shade are the unifying elements.

- Establish landscaped areas at appropriate buildings or sites to convey the importance of the activity that takes place there.
- Create appropriate landscaped areas at facilities and spaces that are most frequently seen by visitors.
- Incorporate site amenities such as plazas, entry courts, and sidewalks at buildings most used by personnel on a daily or special event basis.
- Emphasize the use of native plants which can be obtained from local nurseries.
- Encourage the growth and development of areas containing natural canopy and plants where it is appropriate.
- Minimize the design of landscape developments that require intensive landscape maintenance practices.
- Utilize irrigation only for landscaped areas that occur in high profile areas.
- Minimize mowing requirements in tree clusters by replacing grass with under story trees, shrub beds and mulch.
- Encourage the use of recycled water for irrigation where appropriate.
- Promote areas that can be returned to the natural state. Establish maintenance zones that identify areas of high, medium, and low maintenance.
- Locate shade trees along pedestrian paths, outdoor gathering areas and parking lots.
- Create outdoor spaces with plant materials that direct cooling breezes.
- Expand existing wooded areas where appropriate with native canopy and plants.
- Create animal corridors by establishing areas away from the flight line with diverse native plant material. Minimize bird sanctuaries from around the flight zone.

Demolition

construction .

- Wherever possible, preserve or reuse as much of the existing vegetation as possible. Sites will not be clear-cut for the expedience of construction .
- Storage of materials, parking of POV's, equipment, and stockpiling of soils or overburden around and under trees and shrubs is not acceptable. Vegetation that is to remain shall be protected from injury to bark, branches and root systems.

- Vegetation damaged by the contractor shall be repaired in accordance with acceptable horticultural practices or replaced with comparable materials (size, type, quantity) and in a location as determined by the base Landscape Architect. Substitutions must be approved by the Landscape Architect.
- Removal of any tree over 4" diameter measured at breast height caliper (BHC) requires approval by AETC/CE. All new project listings that call for tree removal must be approved by AETC/CC prior to design completion and start of construction. Refer to section *Landscaping Requirements* for further information on protected trees and tree replacement policies.

Earthwork/Berming

- Berming shall be used as a standard method of greenbelt buffer treatment to delineate edges of exterior spaces and create visual barriers between activities and areas.
- Berming and earthwork shall be integrated into parking lot peripheral visual screening treatments. Side slopes shall not exceed 3 to 1 grades, and maximum top elevation shall not exceed 5 feet in height. Do not design berms with greater than 4:1 slopes as they dry out and erode.
- Incorporate appropriate erosion control and ground cover treatment to side slopes on all earthwork areas.

Slope Protection & Erosion Control

- AE must follow Florida Standard 62-25 Florida Administrative Code.
- Keep slopes as flat as possible to minimize erosion. Use paved flumes where runoff is concentrated off parking lots and roads.
- Include the use of vegetation as an alternative to armored embankments as a means of slope protection and erosion control. Primary vegetation for slope protection of swales shall be solid sod. Use Centipede grass in irrigated and high profile sites and Argentine Bahia in all other areas.

Soil Treatment

- Spray weeds and grass in areas designated for planting beds with systemic herbicide (prior to grubbing operations. Re-apply as needed.
- Spread pre-emergent herbicide on prepared shrub bed areas after planting and prior to installing mulch material. Pre-emergent shall not be used in areas that are to be seeded with grass and flowering annual plantings.

Paving and Surfacing

- Common pavement for general pedestrian traffic shall be concrete with applied broom finish. Sidewalks to entrances of command facilities and community buildings can be exposed aggregate or pavers to accentuate the facility entrance.

Unit Pavers & Accessories

- Use pavers in lieu of ground cover or lava rock in the interior of parking areas to avoid plant stress due to pedestrian trampling. The expanses of paver pavements in parking areas and plazas shall be broken every 15 l.f. with a large canopy tree and tree grate installed flush with the surrounding pavement.
- Support edges of paver pavements with concrete curbing or metal edging developed for that purpose.
- Use pavers installed on concrete as special feature crosswalks at major pedestrian/vehicular intersections.

Concrete Paving

- General finish of most concrete walks shall be broomed finish that runs perpendicular to the direction of pedestrian traffic.
- Use of pavers, exposed aggregate concrete or non-slip quarry tile at primary entrances to major facilities is acceptable if within budgetary constraints.

Utilities

- Create utility corridors and place utilities in common trenches to minimize the impact of trenching across sites.
- Do not trench across roots of trees not scheduled for removal. Hand dig utilities under tree roots. Contractor shall be held responsible for replacement of trees damage by his trenching operations.
- Locate utility valves, boxes, meters, fire hydrants and other industrial type fittings and fixtures away from the front sides and entrances to facilities. Screen those items that cannot be located away from view. Exception to this action would be post indicator valves for fire water lines. These will be directly visible for inspection purposes, but can be painted to visually blend into the background.

Pavement markings

- Use tactile warning markers such as “wash board” ribbing installed perpendicular to pedestrian flow in sidewalk ramps at curbs

and intersections.

- Identify handicapped parking by painting the handicap symbol on the pavement. Avoid the visual clutter of post or curb mounted handicapped signs at each slot.

Water Wells

- Irrigation systems shall be supplied from shallow wells located in unobtrusive locations away from direct view (i.e.: mechanical yards). Wells require a permit.
- All applicable permits and metering devices shall be applied for and supplied in accordance with the Environmental Flight requirements.

Ponds and Reservoirs

- Use swales where possible for storm water treatment. Do not create wet retention ponds without the base's written concurrence. The AE must follow the Florida Standard 62-25 of the Florida Administrative Code.
- Integrate the built environment into the natural landscape. For example, form retention ponds into free form basins that replicate natural features.

Irrigation Systems

- Provide a screened shallow well irrigation system. Connecting an irrigation system to the potable water system is not permitted.
- Water from wells at Tyndall contain iron. Design and adjust installed system not to spray on vertical surfaces or over pavements. Use bubbler type nozzles or drip irrigation systems in shrub beds near buildings and walls.
- Irrigation sprinkler heads shall be at least 6 feet from edge of asphalt pavement where no curb is present. Mount heads on flex pipe to lessen damage by vehicle impact. Control valves and boxes must be 6 feet from edge.
- Provide for a pressure test of the main line at full operating pressure for one hour that provides for not more than 5 PSI loss.
- Irrigation system shall be designed for 100 percent coverage, 50 percent (minimum) overlap, and match precipitation rates on each zone.
- The irrigation system shall include a one-year materials and labor guarantee and maintenance.

- Pop-up spray heads as well as rotor heads shall be Toro, Rain Bird, Hunter, K-Rain, or approved equal. Control wires are to be marked in each valve box to identify which zone it controls.
- Valve boxes shall be durable plastic with black or gray-green covers (never bright green, metal or concrete).
- Irrigation controllers shall be solid state type with non-volatile memory and/or rechargeable nickel battery.
- Use SCH 40 PVC pipe in conjunction with Black "Funny" Flex pipe for swing joint connections to sprinkler heads. No hard piping of heads should be allowed.
- All tees and elbows must be installed horizontally underground.
- Timer must be wheel type, not a digital.
- Flow gauge must be installed on outlet side of pump near or at pump location (Florida EPA and Base Environmental requirements).
- All pipe and wires must be sleeved under sidewalks and roads.
- Mount a hose bib vertically on the top of the pump.
- Each zone must have a different color wire to help in identification of which wire controls which valve.
- Provide control system with a rain override device - Rain and Bypass Switches shall be from Toro, Rain Bird, Hunter, or approved equal.
- Pumps shall be sized to adequately power the irrigation system. Pump-start relays to be 220 V. Provide a 220 V~60 amp enclosed molded case switch (weatherproof and non fused) next to pump-start relay as a kill switch.
- Provide minimum cover of 18 inches for pressure main line and 12 inches for lateral. Install control wires in the same trench as the pressure main to help CE crews locate the mains underground.
- Lateral lines may be installed over main lines. Provide minimum 18-inch clearance to top of sleeve from bottom of pavement when installed under pavement.
- Provide accurate as-built record drawings (full size) and a reduced, laminated copy for the inside of the controller.

Fences/Dumpster Enclosures

- Fencing and dumpster enclosures for aesthetic purposes shall include brick, architectural concrete block, or stucco masonry to match or blend with the style or type of adjacent building construction.
- Wood fencing is not appropriate.

Site Furniture/Benches

- Benches and tables shall be wood or plastic coated metal construction and located in areas of high use, including building entries, pedestrian nodes and walkways.
- Orient seating to user needs for socializing and relaxing, provide pleasant setting and minimizing sun exposure.
- Furniture shall typically be anchored.

Trash Receptacles

- The trash receptacles shall blend with the architectural style of the adjacent facility by using materials that are visually compatible to the facility facade. A prevalent installation trash receptacle is the concrete or exposed aggregate unit with top.
- Any alternate trash receptacle style must be approved by Civil Engineering.

Pavilions

- Incorporate planting or screen fencing around pavilions to blend them visually with the supported facility.
- Architectural compatibility of these structures will help unify the base character as well as create community identity.

Bicycle Racks

- Bike racks should be provided in all project and near buildings where there is a high number of bicyclists (dormitory area,etc.)
- Bike racks should be located on paved areas, typically on unit pavers, where they will not impede pedestrian movement or block building entrances.
- A low profile, galvanized metal bike rack is recommended for use in all areas of the base. Bike racks must be approved by the base CE.

Tree Grates

- Tree grates should be used when installing trees in paved areas such as pedestrian plazas, walks and at entrances to buildings. Tree grates and planting pits should be a minimum of 5'x5'. Grates shall be painted cast aluminum or steel that is factory primed for application in the coastal conditions of Tyndall.

Bollards/ Lighted Walks

- Walkway bollards and lighted bollards need to remain consistent throughout the installation. Locate bollards such that they do not impede pedestrian movement.
- Do not place bollards as separate elements in grass areas so that they require individual trimming.

Barbecue Facilities

- Barbecue and picnic facilities, if existing or required, shall be located out of view or discreetly screened with planting materials or fencing.

Signs

- Exterior installation signs must clearly identify functions and direct people to their intended destination. Exterior and interior signs will have a standard installation format, color, and size as specified in applicable Air Force directives.(AF Sign Standards AFP 88-40 - soon to be replaced by AFPAM 32-1097)
- Install directional signs only where needed to guide visitors and new base personnel. Keep signs to an absolute minimum and maintain conformity with a building. Remove all unneeded signs that do not meet the above criteria.
- Handicapped parking signs shall comply with AF standards. Only these signs will be required for designation of handicapped parking spaces. Painting of the handicapped symbol on the asphalt paving shall not be used.
- Signs shall be utilized to designate general reserve space. Nomenclature for general reserve signs shall be obtained from the Project Engineer for each specific project. Nomenclature will include either the general designation i.e., VISITOR or a specific government official parking i.e., SUPPORT GROUP COMMANDER.

- Exterior signs shall meet Tyndall AFB and AFP 88-40 standards. Building function shall be 10” letters, Helvetica font, of dark bronze plastic. This shall be placed near the primary entrance to be visible from the main access street. The building address shall be labeled on the main entrance door in accordance with AETCCS 32-1001, para 7. No other exterior signs of accent shall be placed on the building.
- Building number signs shall be in accordance with AFP 88-40 (soon to be replaced by AFPAM 32-1097).
- Traffic control signs shall conform to the Manual on Uniform Traffic Control Devices (Department of Transportation). Posts for traffic control signs should be non-galvanized metal (if they are to be painted) or a vinyl sleeve over post if galvanized. Non-galvanized posts, vinyl sleeves, and backs of traffic control signs shall match Federal Standard Color #37769.
- Directional signs showing the way to activities, buildings, or locations on the base must be constructed of reflective materials with white upper and lower case letter (Helvetica style) and ½” white border on brown background.
- There will be one street sign for each street at intersections. Signs will not be mounted more than 15 feet from the cross-street curb line. Signs will be mounted with the bottom of the sign not less than 7 feet above ground. Signs will have a standard width of 6 inches. The length will determined by the number of letters in the street name, though signs will not be longer than 30 inches. Colors will be white letters and border on engineer-grade brown background. Reflective materials will be used and shall conform to Fed Spec LS-300C. Street name letters and numbers will be 4 inch upper case. Conventional abbreviations for street (ST), avenue (AVE) and boulevard (BLVD) are acceptable except for the street name. Posts are the same as for traffic control signs.

Landscape Planting

- First plant selection should be large trees which will provide greater amounts of shade, require less maintenance, and visually have a longer lasting impact over smaller vegetation which is shorter lived and requires greater maintenance.
- Reserve smaller trees and shrubs for use adjacent to buildings to provide accent color and integrate the structures into the landscape.
- Use evergreen trees primarily to provide winter accent or buffer obtrusive views. Tree plantings shall be massed in groups to provide visual impact. Individual and spotty-type plantings should be avoided since they increase maintenance requirements.
- Layout planter beds to allow mower access to all lawn areas which are adjacent to building walls. Design beds that have a radius not smaller than 5 feet wherever

possible. This provides for easy mowing and a more pleasing visual effect. Small lawn areas less than 3ft. wide adjacent to buildings should be avoided. Small planting islands in parking lots should be planted with ground cover, dwarf shrubs or paver units to reduce grass cutting.

- Incorporate trees into beds wherever possible. This reduces mowing around and damage to the trees. For trees that are in grass areas, provide a circle of pine needle mulch and edging approximately 5 feet in diameter.
- Edging shall be black anodized aluminum ¼" x 4" with stakes per manufacturer's instructions. Do not use black plastic edging, wood edging, landscape timbers nor cross ties. In transitions to natural areas, use aluminum edging or none.
- Do not use plastic or fabric weed barriers. Use biodegradable blankets for short term weed control until plantings become established.
- Mulch shall be Long-leaf pine straw distributed evenly over the planting beds to a minimum depth of 4 inches. Inert materials such as lava rock, crushed stone or river rock are not acceptable mulch materials.
- Fertilize trees, shrubs, and ground covers (after mulch is in place) with commercially available slow release fertilizer with a 18-6-12 ratio.
- Fertilizer for turf (after sod is down) shall be a commercially available organic lawn fertilizer with a 16-4-8 ratio. Weed and feed types of fertilizer are not acceptable.
- Landscape planting design shall emphasize low maintenance plants and materials.
- Provide for stabilization of slopes by planting of ground cover or sod.
- Place landscaping along roads and at intersections in order not to interfere with a driver's line of sight. Plant locations must respect a 200-foot field of vision for every 10 mph of vehicle speed.
- Provide adequate screen walls or landscape planting for exposed equipment, dumpster pads, transformers, etc.
- Provide soil tests that include pH, Potassium, Phosphorus, Calcium, Magnesium, Nematode Count, and Soil Amendment recommendation (N-P-K).
- Require a one year Warranty on all trees, shrubs, and ground cover and 30 day warranty for all turf.
- Fill sand for landscaping shall be Clean Yellow Fill, No.4-200 Sand, with a pH of 5.5 to 6.6.
- Soil Amendment for Plants:

- Gro-Tone Bed Mix-50 lb. per 1,000 SF.
- Black Cow Manure-100 lb. per 1,000SF.
- Gel-Scape Polymer-2 lb. per 1,000SF (not in turf).
- Post-Emergent Herbicide-Commercially available
- Guying for Tree -- Solid rubber guys with 24-inch stakes.
- Ninety days of maintenance for trees, shrubs, and ground covers and 30 days maintenance for turf shall be included in the specifications.
- Use Centipede sod for developed grassed areas and Argentine Bahia in remote areas unless otherwise requested by the Base. Sod all slopes. Bermuda grass shall not be used on base.
- Use indigenous vegetation where possible. Do not use palm trees. Emphasize long-lived, hurricane resistant, native trees such as Live Oak, Magnolia, Hickory, and Bald Cypress. The recommended plant list represents plants that would normally be readily obtainable and hardy in the Tyndall AFB area. Use only plants indicated on the list in appendix.

Maintenance Schedule

- Include a schedule in specifications that details the work to be accomplished during the Maintenance/ Warranty period of the landscape development.
- Mowing shall be done on a regular basis as needed, but shall not be done less than once a week from May 1 through September 30, provided the grass is actively growing and is not subject to prolonged dry periods.
- Use of mulching mowers should be encouraged to minimize grass clippings.
- Mowing height shall not be less than 3 inches. During rapid periods of growth, this height may be too short and browning may occur. In that case, mowing height shall be such that only half of the foliage is removed each time mowing occurs.
- All plant beds shall be edged by mechanical means or with herbicides no less than two times a month or as required.
- All grass areas adjacent to hard surfaces shall be edged no less than two times a month or as required.
- All clippings shall be removed from all plant beds, grass and hard surface areas.

- Minimize the amount of pruning and limit to removing damaged limbs. Remove plants that infringe with pedestrians and windows to limit pruning requirements.
- All outdoor pest control for turf areas, trees and ornamentals shall be done using least-toxic integrated pest management techniques as described in the Tyndall AFB Integrated Pest Management (FM) Plan. Scheduled, preventative applications of pesticides shall not be used except if needed to control fungal diseases on golf course greens. Emphasis shall be placed on non-pesticide solutions to pest problems, e.g. improving turf vigor through proper selection of turf grass varieties, proper fertilization based on routine soil testing, selection of pest resistant native trees and shrubs, and replacement of managed turf grass with naturalized mixes of native grasses and wildflowers wherever possible.
- Pest population and damage monitoring in landscaped areas shall follow guidelines in the WM Plan. All pesticides used by in-house or contract personnel must be approved as part of the IPM Plan, and usage data must be reported monthly to Civil Engineering Pest Management. All pesticides shall be used according to label directions and shall be applied only by DOD or state-certified pesticide applicators.
- Shrub Beds - Weed control in shrub and ground cover areas shall be accomplished by the use of pre- and post-emergent herbicides. It shall be distributed by either liquid or granular means at the rate of one pound of active ingredient per 1.000 square feet of
- Any weeds growing, despite control attempts, and reaching a height of 4-6 inches shall be removed by pulling and digging. To obtain control of weed growth during the initial years of growth, the use of Round-up may be required to eradicate persistent weed growth. Use as recommended by the manufacturer.
- Turf Area - Weed control in turf areas shall be accomplished by the use of chemicals suited to the specific lawn and turf and applied at rates in accordance with the manufacturer's recommendations. Turf areas shall be maintained 95 percent weed free.
- Mulching shall be accomplished for planting beds on an annual basis and/or as required throughout the year to provide 100 percent coverage by the material.
- Mulch material shall be the same as originally used in the plant bed.
- Maintain tree mulch rings as part of general mulching maintenance.
- All paved areas including, but not limited to, walks, curbs, parking lots and roadways shall be cleaned of litter, trash and clippings from other maintenance operations on a weekly basis immediately following other maintenance operations in the same area.
- Weed control within paved areas shall be accomplished by the use of chemicals suited for the specific area, weed type and adjacent landscape development. Chemicals shall be applied at rates in accordance with manufacturer's recommendations. Paved areas shall be maintained 99 percent free of visible weed growth.

- Trash and Debris Removal - The maintenance personnel shall be responsible for the removal from the site of all litter, trash and debris..
- Fertilizer Formulation - Fertilizer containing nitrogen, phosphorus and potassium in approximate equal concentrations with approximately 30 percent of the nitrogen in the water insoluble organic or synthetic organic form shall be used. A standard micronutrient blend containing manganese, magnesium, iron, zinc, and copper shall be incorporated into the micronutrient formulation.
- Method of Fertilization - The fertilizer shall be spread in accordance with manufacturer’s direction for application. Plant material shall receive a minimum of one application of fertilizer towards the end of the Warranty/Maintenance period.
- Trees will be fertilized according to size. Trees with a trunk diameter of 6 inches or less shall receive 5 ounces of actual nitrogen, phosphorus and potassium per inch of trunk diameter per year. Trees with a trunk diameter of more than 6 inches shall receive 8 ounces of actual nitrogen, phosphorus and potassium per inch of trunk per year.
- Shrubs and Groundcover - Shrubs and ground covers shall receive 5 ounces of actual nitrogen, phosphorus and potassium per 100 square feet of cover per year.
- Lawn Area - All lawn areas shall be fertilized on a yearly schedule beginning in January. Fertilizer shall be in the ratio of 16-4-8 NPK, at the rate of 4 pounds of nitrogen per 1,000 square feet per year.
- Florida soils vary greatly, and the amounts of each fertilizer element needed should be properly determined by a soil test.
- When to Fertilize : Because of the difference in temperature and growing season, and the wide variety of trees, fertilizer applications vary considerably. In all parts of the state, trees should be fertilized in the early winter so that the plant food will be available to the roots prior to bud development. Usually, one application a year or one every two years is sufficient for good tree growth.

Tree and Landscape Instructions

- The purpose of this instruction is to establish protective requirements for trees and landscaped areas within the boundaries of the base. Such areas preserve the ecological balance of the environment, control erosion, sedimentation, and storm water run oft provide shade and reduce heat and glare; abate noise pollution; and buffer incompatible land uses. The intent of this instruction is to encourage the preservation of existing trees and to require the planting of new trees on newly developed sites. It is critical that a balance be maintained between developed areas and

natural/landscaped areas with appropriate existing and/or newly planted trees and other vegetation.

Applicability

- The provisions of this document shall be applicable within the following land use districts:
 - Residential Areas.
 - Office Areas.
 - Commercial Areas. Industrial Areas.
 - Other Areas - The provisions of this section shall also be used as guidelines in reviewing site plans in other areas within the boundaries of the base, airport transition zones, and in applications for special planned developments.
 - Exemptions - The designated clear zone areas around the airfield, and any other area identified by the Base Civil Engineer as critical to aircraft operations, shall be exempt from this document.

Landscaping Requirements

- The following landscaping requirements apply to all development sites in all areas listed in residential areas of this instruction.
- The minimum percentage of the total site that shall be devoted to landscape planting, unless otherwise specified in this instruction, shall be as follows:

Residential Areas	20
Commercial and Office Areas	15
Industrial Areas	10

- Perimeter Requirements - A 15-foot-wide strip of land abutting the road edge of pavement located along the front and side property line(s) of the site to be developed shall be landscaped. In no case shall this strip be less than 15 feet wide. Widths of sidewalks shall not be included within the 15-foot wide perimeter landscape area. Sidewalks shall be located on the street side of the development site boundary. The perimeter landscape requirement shall be credited toward the percentage required for the total developed site in "Landscape Area Requirements" above. Material requirements in perimeter areas are as follows:

- One tree for each 40 feet of linear foot of frontage as measured along the street shall be required. Trees planted to meet this requirement shall measure a minimum of 3 inches in diameter at 4 feet above grade and may be clustered. The remaining area within the perimeter strip shall be landscaped as appropriate to minimize maintenance and screen views of parking.
- All trees and other landscaping required in the perimeter strip shall be maintained to assure unobstructed visibility between 3 and 9 feet above the average grade of the adjacent street and the driveway intersections through the perimeter strip.
- Interior planting areas in parking lots shall be determined by subtracting the area set aside in the 15-foot perimeter strip from the total minimum area required to be landscaped in "Landscape Area Requirements" above. The remaining percentage shall be allocated throughout the parking lot or in areas adjacent to other than in the perimeter strip. Interior planting areas shall be located to accommodate storm water runoff and provide shade in large expanses of paving and contribute to orderly circulation of vehicular and pedestrian traffic. Minimum size of interior planting areas are as follows:
 - A minimum of 100 square feet of planting area shall be required for each new species of tree identified.
 - A minimum planting area of 50 percent of the dripline area of the tree shall be required for all existing trees. If conditions warrant that an area greater than 50 percent is need to preserve the tree, additional areas may be negotiated between the applicant and the Base Civil Engineer.
 - Vehicles shall not overhang more than 2 feet into any interior planting area.
 - Where landscaping is installed in interior or perimeter strip planting areas, a continuous curb shall be provided. Such a curb shall be designed to allow percolation of the water to the root system of the landscape material. Where existing trees are preserved, tree wells, tree islands, or a continuous curb shall be utilized to protect the trunk and root system from alterations to surrounding grade elevations and damage from automobiles. A drainage system sufficient enough to allow percolation into permeable soil shall be provided in the area defined by the drip line of the tree(s).

Protected Trees

- Protected trees are defined as any tree over 4 inches in diameter identified as a native species in *Table 1, Recommended Plant List*. Where protected trees are identified on a site proposed for clearing within the development site, the number of trees to be preserved shall be based on a ratio of one tree for 3,600 square feet of impervious surface area or fraction thereof. The perimeter and interior landscaped areas required in "Perimeter Requirements" and "Interior Planting Areas" shall be located on the site to incorporate this preservation of said trees, where possible.

Tree Credits

- Any existing protected tree located on the development site with a crown extending over planned paved parking area, within the perimeter or interior landscaped areas, shall

be eligible for credit against the number of trees required to be planted. The following credit schedule may be applied for preserving existing trees on site:

Credit Schedule

Diameter of Existing Crown Spread of Preserved Tree	Diameter of Tree Trunk of Preserved Tree	Number of Required Credited
60' or Greater	30" or Greater	3
40' to 59'	20"to29"	2
18' to 39'	6"to19"	1

- Credits shall be subject to approval of the Base Civil Engineer. Crown spread measurements shall be rounded off to the nearest whole foot, and the tree trunk diameter measurement shall be rounded off to the nearest whole inch. Diameter of a tree shall be measured at a height of four feet above the natural grade.
- A reduction of required parking spaces may be allowed by the Base Civil Engineer when the reduction would result in the preservation of a protected tree with a trunk of 12 inches in diameter. This credit is per tree and not a total site credit. The following reduction schedule shall apply:

Required Parking Spaces	Allowable Reduction
1 to4	0
5 to 9	1
10 to 19	2
20 or Above	10 Percent of Total Number of Spaces

Relocation, Removal, and Replacement of Protected Trees

- Where a proposed site plan cannot be designed to accommodate existing protected trees on the site, a permit shall be obtained from the Base Civil Engineer to remove any such protected tree as specified in "Tree

Removal Permit."

- Where practical, when proposed improvements necessitate removal of protected trees, said trees shall be relocated on the site in the required perimeter or interior landscaped areas. If the relocation of said trees is impractical. the protected tree may be removed

and replaced with a protected tree species or a species identified on the "Recommended Plant List," Table 1. The replacement tree shall measure a minimum of 3 inches in diameter, 4 feet above grade in order to comply with "Tree Credits." A replacement ratio of 3:1, three new trees for every one protected species removed, shall be applied. Trees identified as diseased or dead shall not be required to be replaced.

New Planting of Protected Trees

list or the tree replant list. Trees shall be a minimum of 3 inches in diameter measured 4 feet above grade for each 3,600 square feet of impervious surface area. New trees or replacement trees shall be planted within a time appropriate to the growing season of the species in question, not to exceed one year.

- On sites proposed for development where no existing protected trees are identified, the contractor shall be required to plant one new tree species identified in the protected tree

New Residential

no existing acceptable tree in the front yard. Acceptability of existing trees(s) will be determined by the Base Civil Engineer or his representative.

- In new residential developments, a minimum of one tree planted in the front yard no closer than 20 feet to the edge of paving shall be required, provided there is
- Where a protected or replanted tree species is required to be replanted, such tree shall be a minimum of 3 inches in diameter, measured 4 feet above grade.
- The location of an existing protected tree on the site or the proposed location of a new protected or replanted species, where required in this section, shall be identified on the landscape plan submitted to the Base Civil Engineer.

Road Tree Protection Zone

agency shall cut, remove, trim, or in any way damage any protected tree in any road tree protection zone or create any condition injurious to any such tree without first obtaining a permit to do so from the Base Civil Engineer. The location of all existing trees adjacent to the road and/or within the tree protection zone must be evaluated to determine if there is a conflict with a driver's field of vision.

- The road tree protection zone is the strip of land lying parallel to the road, 10 to 30 feet behind the edge of paving behind the pavement edge. No person, organization, or
- The Base Civil Engineer may issue an annual permit to public utility companies exempting them from the provisions of this section concerning tree preservation. In the event of flagrant or repeated disregard for the intent and purpose of the tree protection zone, the Base Civil Engineer may revoke said permit. The reasons for revoking such a permit shall be provided in writing to the offender.
- In no case shall the utility company be permitted to prune more than 30 percent of the an existing tree canopy.

Review

- The Base Civil Engineer shall have 30 working days after receipt of a completed application filed pursuant to this instruction in which to approve or deny the requested permit. In the event an application is denied, the Base Civil Engineer shall specify to the applicant in writing the reason for said action.

Tree Removal Permit

- Unless otherwise exempt from the provisions of this section, no person shall cut, remove, trim, or in any way damage any protected tree without first obtaining a permit from the Base Civil Engineer as provided below.

Permit Application Information

- The following information shall be submitted to the Base Civil Engineer before a tree removal permit shall be issued:
 - Prior to commencing any development activity, including removal of vegetation for site preparation, in any residential, office, commercial, or industrial area identified herein, an accurately scaled drawing shall be prepared by a land survey, architect, engineer, or landscape architect which includes the following information:
 - Location of all protected trees noting species, size, and general condition.
 - Location of proposed structures, driveways, parking areas, required perimeter and interior landscaped areas, and other improvements to be constructed or installed.
 - Identification of trees to be preserved, trees to be removed, including dead trees, and trees to be replanted.
 - Proposed grade changes that might adversely affect or endanger trees with written instructions on how to maintain the trees.
 - In addition to this graphic information, a written statement shall be included noting the reasons why tree removal is requested.

On-Site Inspection

- Trees scheduled for removal shall be tagged by the requester with colored plastic tape to help the Base Civil Engineer with the identification of the subject trees. Prior to issuance of a tree removal permit, the Base Civil Engineer or his/her representative shall conduct an on-site inspection.

Conditions of Approval

- The Base Civil Engineer may approve the permit if one or more of the following conditions is present:

- Safety Hazard - Necessity to remove trees that pose a safety hazard to pedestrians or vehicle traffic or threaten to cause disruption of public services, or that pose a safety hazard to persons or buildings.
- Diseased or Weakened Trees - Necessity to remove diseased trees or trees weakened by age, storm, fire, or other injury.
- Good Forestry Practices - Necessity to observe good forestry practices.
- Construction of Improvements - Necessity to remove trees in order to construct proposed improvements such as:
 - Need for access around the proposed structure for construction equipment.
 - Need for access to the building site for construction equipment.
 - Essential grade changes.
 - Surface water drainage and utility installations.
 - Location of driveways, buildings, or other permanent improvements.

Enforcement

Stop Work Order

- Whenever the Base Civil Engineer determines that a violation of this instruction has occurred, the following actions shall be initiated:
 - Written notice by personal delivery or certified mail to the contractor or organization violating this instruction of the nature and location of the violation, specifying what remedial steps are necessary to bring the project into compliance. Such person or organization shall immediately, conditions permitting, commence the remedial action and shall have 10 working days after receipt of said notice, or such longer time as may be allowed by the Base Civil Engineer. to complete the remedial actions set forth in said notice.
 - If a subsequent violation occurs during the 10 working days referred to in "Written Notice" above, or if remedial work specified in the notice of violation is not completed within the time allowed, or if clearing and development of land is occurring without a permit, then the Base Civil Engineer shall issue a stop work order immediately. Said stop work order shall contain the ground for its issuance, and shall set forth the nature of the violation. The stop work orders shall be directed to the person or organization whose land is being improved and to the person(s) or firm

responsible for the development activity, directing him forthwith to cease and desist all or any portion of the work upon all or any geographical portion of the project, except such remedial

- Work as is deemed necessary to bring the project into compliance. If such person fails to complete the recommended remedial action within the time allowed, or fails to take the required action after the issuance of such stop work order, then the Base Civil Engineer may issue a stop work order on all or any portion of the entire project.
- Upon completion of the remedial work, the responsible person or organization shall notify, in writing, the Base Civil Engineer that such remedial work has been completed. The Base Civil Engineer shall inspect the work to verify remedial compliance.
- After inspection by the Base Civil Engineer and upon completion of remedial steps required by notice, the Base Civil Engineer shall issue a notice of compliance and cancellation of said notice or stop work order.
- The fine for violating this section shall be based on the size of the tree removed without a permit. Each day a violation of a stop work order continues shall constitute a separate offense. Each protected tree removed without a permit, or in violation of a permit, shall constitute a separate offense. The fine shall be based on the diameter of the removed tree. The minimum fine shall be \$300.00 per inch of diameter per offense per day until cancellation of said stop work order, but the fine may be increased by the Base Civil Engineer due to the type of tree removed.



Exterior Architectural Compatibility

Overall Objectives

- Architectural compatibility interprets and defines the interrelationship among individual structures and among those structures and their site. Compatibility is established by orienting comprehensively designed solutions to the physical properties and climatic forces of a particular site or region. Specific building designs establish compatibility by creating a uniform or harmonious architectural aesthetic that emphasizes recurring design themes. The use of identical roof pitches and building forms or the use of the same exterior building materials helps to realize such themes. Successful development of compatible architectural relationships using low maintenance materials and climate-responsive design contributes to an enhanced working environment, an improved public relations profile, and more efficient staff performance in the pursuit of the site's mission.
- The overall objective for exterior architectural compatibility is to:

Establish installation-wide guidelines and standards that reinforce a consistent design theme. These standards will promote and strengthen a unified, consistent appearance and level of quality for facilities throughout the installation.

Installation-Wide Guidelines

- The guidelines contained in this section direct the planning and design of the exterior visual environment for facilities throughout Tyndall AFB. This provides the basis for maintaining and improving a unified architectural character and visual theme across the installation.

- Tyndall AFB is visually and physically separated into two functional sectors. The divider is Highway 98 that separates the northern **Operations** Sector of the base from the southern **Support** Sector.
- The **Operations** Sector is comprised of facilities that house flightline and industrial activities.
- The **Support** Sector is comprised of the following functional areas:
 - Administrative
 - Dormitories/Lodging
 - Training
 - Community
 - Recreation
 - Family Housing
- In addition to the two major functional sectors, there are several “stand alone” compounds that are located remotely from the main base. These areas represent distinct, stand-alone uses that are architecturally and functionally independent from the main base areas. The primary objective is that each of the following areas establish unifying color schemes and material palettes to create and maintain a consistent visual identity:
 - Reserve Alert Area
 - Weapons Systems Area
 - Drone Launch Area
 - Silver Flag Exercise Area
 - Wright Laboratory Area
- Material finishes have been selected to ensure architectural compatibility within Operations and Support sectors when new facilities are constructed or existing facilities renovated. These materials are selected as guidelines, however it is sometimes necessary to select other accent materials to visually marry the buildings with surrounding site and facility contextual concerns. This is where information regarding future facility renovation, use or demolition will be important and can be found in the General Plan. The designer shall discuss the conceptual approach with the base architects at the pre-design meeting.

Design Theme

- The design theme can be summarized by the following elements:
 - Architectural treatment which is consistent with the symmetry, balance and style of the dominant structures in the surrounding area
 - Spatial organization and site development which respects the organization and context of existing buildings

- Use of integrally-colored CMU as the primary exterior wall material and sloped standing-seam metal as the standard roof material on all new construction

Primary Design Considerations

- Primary design considerations address elements that establish the physical appearance and character of the individual building. They include: Mass/Scale, Form/Proportion, Fenestration/Window Openings, Materials/Details, Roofs, Entrances, Color, Thermal & Moisture Protection.

Mass/Scale

- Mass refers to the overall bulk or volume of space which a building encloses. Scale is comparing elements of the building to the human body.
- Proposed buildings will be scaled to be compatible with overall mass and individual parts of buildings in the visual district.
- Limit height of new buildings to less than 10% above adjacent buildings.
- New construction on the base should avoid designs using one rectangular mass.
- Major administrative buildings will have a more formal massing than any other building type, signifying their relative importance. This can be achieved through a more balanced, symmetrical design with less articulation.
- Avoid vast blank building walls facing streets.
- Conveyed by using normal floor to floor heights and floor to eave heights. For large buildings, human scale is improved to the extent that the mass is broken into smaller elements. Except for major buildings, the scale for all buildings will be human, not monumental. This human scale is achieved by using small (normal sized) windows, doors and details.

Form/Proportion

- The form and proportion of a building's facade and roof are basic characteristics that are important in relating a new building to existing buildings and to its setting.
- Forms for all buildings shall be derived from the local traditional style, but interpreted in a contemporary manner.
- Use a roof form and shape similar to adjacent buildings. The predominant existing roof style for the base is a sloped gable roof with a variety of dark brown roofing materials.
- Avoid using large roof overhangs which dominate the building.
- Stress horizontal proportions in the design of the facade. Design windows, entrances and detailing to complement the horizontal proportions of the facade.

- Emphasize the parts of all buildings to clearly show a division of roof, walls and base. Utilize color, materials and/or details to express this division.
- In terms of detailing, currently fashionable or “trendy” forms will be avoided.

Fenestration/Window Openings

- The fenestration of a building is the openings within the building envelop.
- Express openings in the wall as punched openings rather than large contiguous areas or bands
- Design openings to form a unified composition in proportion to the building elevation.
- Window placement should relate to internal areas. Mullion shaping should provide a good module for internal layout of office space, entrances, common use areas, etc.
- Oversized fenestration elements that create a monumental scale should be avoided.

Materials/Details

- Cohesive and consistent architectural character can be achieved in new construction through the use of exterior building materials and details that are similar or compatible with adjacent buildings.
- Precast concrete sills and copings shall be integrally-colored to match the CMU.
- Use predominant and secondary facade materials consistently and uniformly on all sides of the building.
- Building materials that are not considered appropriate as facade materials are:
 - Wood
 - Glazed porcelain panels
 - Reflective glass curtain walls
 - Glass Blocks
 - Materials that imitate other materials such as masonite exterior panels.
- Locate all above-grade utility connections, vents and other projections through the building away from high-visibility areas. Do not locate any utility projections, such as air conditioning units, on the street side of the building.
- For freestanding walls, use materials and colors similar to those on the main building.
- During the conceptual design phase consideration should be given to the thermal and vapor properties of the masonry units being utilized in the design.
- Avoid exterior surface-mounted conduits, electrical boxes, etc.

Roofs

- Various roofing systems are used on Tyndall AFB. The primary concern is that the specified roof is the most appropriate system for the project design.
- For all new construction, standing seam metal roofs will be used, unless a built-up roof is the most effective for a large surface area such as a warehouse.
- Built-up roofs shall be designed in accordance with Air Force standards and specifications. Provide walkways for traffic areas.
- Single-ply roof installation will be approved if budget constraints and the design will allow successful implementation of the system. Single-ply roofs will not be specified on roofs that have numerous penetrations or will have frequent maintenance traffic.
- All roof systems at Tyndall will require a 20 year warranty.
- Roofs should be designed with the least number of penetrations possible. In this interest, roof-top mechanical systems should be avoided whenever possible. If roof-top units are unavoidable, mechanical roof “courtyards” should be considered to minimize visual impact.
- When designing roofs, the Architect should consider the drainage path from the roof to the ground plane. Consideration shall be given to ensure that roof slopes do not cause water to drain on entries, outdoor gathering areas, outdoor service areas and access paths.
- Gutters and downspouts shall direct water away from the facility and if possible to encourage drainage into storm drains. This will minimize stagnant water on site.
- If downspouts direct water into landscaping areas, care shall be taken to ensure excessive water pressure/drainage will not adversely effect surrounding soils, plants and groundcover.
- Provide roof gutter systems which are not “attached” to the side of the building. Standing seam metal roofs with integral gutters are the standard.
- Downspouts must work into building architecture. They will be specified to match color of block wall. Interior downspouts are prohibited.

Entrances

- Building entrances allow access into a building. The scale and detailing of an entrance gives the pedestrian a visual clue to identify function and importance of a building. Building entrances should be readily distinguished as the “entrance” to all buildings.
- Locate primary building entrances to relate to adjacent building entrances and major pedestrian circulation routes.
- Locate main entrances away from service areas.

- Design entrances which are clearly visible and recognizable from parking lots and pedestrian circulation routes.
- Entrances should be an integral part of building design by means of:
 - Building recess
 - Building projection
 - Ornamental or decorative detailing
 - Glazed areas
- Location of building entrances should be a careful balance between the desired site arrangement and the internal layout of the building.
- Avoid steps leading to an entrance to provide convenient access by the physically handicapped.
- Upgrade the walking surface at entrances by using brick/block borders, exposed aggregate washed concrete, textured finished concrete, etc., instead of just broomed or burlapped finished sidewalks.
- Avoid downspouts that empty onto the entry sidewalks.

Color

- Proper use of color integrates new and adjacent buildings to each other and creates a positive visual impression of the base.
- Select materials with integral color to reduce long-term maintenance.
- Paint schemes for existing painted facilities shall specify L4 by Glidden for the exterior wall color and L15, OI5, L18, or 018 by Glidden for trim.
- Exterior appurtenances shall match the color they are set against, i.e. roof penetrations shall match the roof color, and items attached to or adjacent to walls shall match the wall color.
- Exterior CMU walls and accent materials shall be integrally-colored to match or compliment the nearest or adjacent facilities. All finish color proposals shall require government approval during the design phase.
- Style: Split-face CMU in the Support Sector, Split-ribbed CMU in the Operations Sector.
- Color: match “Light Tan Creme” or “Vanilla Creme” by Grasselli (Support Sector), match “Vanilla Creme” or “Light Brown” by Grasselli (Operations Sector)
- Use medium bronze anodized aluminum for exposed framing on windows, doors, barrel vaults, handrails, etc.
- Metals roofs shall match medium bronze, slate gray, dove gray, or sandstone by Englert as specified by the base. The color of the roof shall require approval of the government with the overall finish schedule submittal.

- Shingle roofs shall match shade of Cedar Blend by GAF, Woodtone by Celotex or Desert Tan by Owens Corning.

Thermal & Moisture Protection

- Interior condensation of non-treated ambient air is a severe problem at Tyndall AFB.
- The single largest contributor to this problem is untreated ambient air in spaces above the ceiling coming in contact with the cool metal of the fluorescent light fixtures. The ceiling grid is insulated, but the light fixtures are not, creating an inoperable vapor barrier. If insulation is installed above a suspended ceiling grid, the design must ensure that the entire system is a true, sealed vapor barrier.
- The design of vapor barriers will be the responsibility of the Architect to ensure that the selected system will successfully integrate into the overall design.
- Assure that a positive vapor barrier is coordinated with the Mechanical Engineer. The designer shall be required to provide dew point and permeability calculations for all envelop assemblies to ensure proper location of the vapor barrier..
- Concrete walls which appear intact and watertight during the time of design often have unseen hairline cracks which allow water to penetrate. Flashing both vertical and horizontal portions of the walls will eliminate leaks on the first effort and will result in a satisfied customer.

Alternate Design Considerations

Alternate design considerations should encompass the following:

- Renovation/Rehabilitation
- Maintenance/Operations
- Temporary Buildings

Renovations/Rehabilitation

- Renovations provide the opportunity to change materials which are no longer serviceable and add form enriching elements which would result in a building more consistent with the character of the base.
- Use exterior materials and details that are compatible with those of adjacent buildings. Architectural character, form and style must be especially compatible.
- In the construction of additions to existing buildings, use materials and details that are similar in color, texture and order to those on the existing building.
- Avoid the infill of windows and doorways except where dictated by security concerns.
- Paint schemes for existing painted facilities shall specify L4 by Glidden for the exterior wall color and L15, OI5, L18, or O18 by Glidden for trim.

Maintenance/Operations

- Maintenance requirements need to be considered during the planning and design process for all buildings.
- Design buildings to minimize life cycle cost, energy consumption and maintenance through the selection of proper materials and construction standards.
- Ensure that the facility orientation and wall sections do not encourage excessive passive heat gain.
- Wall assemblies shall be designed to minimize vapor infiltration and condensation. To this end, vapor barriers are required for the local climatic conditions.
- The architect shall ensure that all masonry materials indicated for use at Tyndall AFB have been specified to be adequately cured and properly sealed to prevent efflorescence and moisture damage.
- Use materials with integral colors to minimize repainting.

Temporary Buildings

- Buildings classified as temporary in the real property inventory, will be demolished as permanent replacements are constructed.

These buildings require maintenance to provide protection from weathering and deterioration until demolition. In most cases, these buildings are utilized well beyond their design life. The following guidelines should govern removal of these structures:

- Demolish and remove temporary buildings as soon as permanent replacements are constructed.
- Undertake maintenance work which is consistent in scope and cost with the anticipated time period until demolition.

0-5 Years: Continue scheduled maintenance as needed. This includes painting and minor repairs to roofs, doors and windows.

5-15 Years: Schedule recladding, new windows and doors as needed. Use compatible materials and colors. Design building modifications to be consistent with the character of the building. Do not construct any building additions.

15-25 Years: Treat temporary buildings with this life span as permanent buildings. For rehabilitation work, follow the guidelines for new construction and use appropriate material, details and color.



Interior Design Compatibility

Overall Objectives

- TAFB interior design policies and practices support the Air Force Civil Engineer Strategic Plan. These practices are an essential element for wise facility investment strategies. In this era of right sizing and limited funding, smart selections of building materials and furnishings are necessary. Well designed interiors is a major component in providing Air Force Personnel with quality facilities, which in turn attract and retain quality people, sustaining the force. Adjustments may be necessary to effectively design interior space. Design issues, whether pertaining to interiors or exteriors, are all Civil Engineer issues. Decision making for all aspects of design should flow through the design expertise at the Civil Engineer Flight.
- Quality interior design assures facilities are attractive, environmentally safe, operationally efficient, and maintainable. The interior designer must strive for sound, economical, functional, and aesthetic design achievements. Well designed facilities satisfy the user's needs, install pride in ownership, and promote productivity in the workplace. Standards for interior finishes and furnishings must be an integral part of the installation's Facility Excellence Plan (FEP).
- Functional interior design ensures each aspect of the interior environment performs efficiently for the user. A good working relationship between the user and designer will help accomplish this goal. Each facility type presents unique functional requirements which will ultimately affect the selection of finish materials and furnishings. It is important for the designer to investigate all aspects of these requirements with the end user to determine appropriate finishes and furnishings.
- All interior selections must reflect the best buy for the Air Force in terms of aesthetic value, maintenance characteristics and life-cycle costs. Inexpensive, short-term solutions do not necessarily produce cost savings over time.

- The designer must consider product performance and longevity of appeal, as well as initial cost when making selections. If the appearance of the surface of a furniture item degrades, the user will want to replace it prematurely. A product which keeps its appearance and shape longer may be a better choice over time even if the initial cost is higher.
- Durable designs and finishes help facilities pass the “test of time.” The designer must be concerned with material durability and wear while considering budget restrictions and monetary resources. Selection of quality materials and products must also be appropriate to the function and level of use. Extra consideration needs to be given to products specified in heavy-use areas and specific functional areas, such as flight line operations.
- The use of easily maintained finishes is critical. Establishing standard materials and finishes is helpful. While certain finishes may provide excellent durability, the designer must give serious consideration to maintenance and the effort required to maintain the appeal of certain products. It is important to be familiar with finishes which wear well with low maintenance requirements.
- Tyndall AFB has its own architectural and environmental compatibility plans reflecting regional, environmental, and architectural considerations. The designer should be familiar with the installation’s plans to achieve a unified sense of scale, tradition, and facilities excellence. Interiors should reflect the aesthetics of the region in which it is located, in this case, the beautiful coastal region of the Florida panhandle.
- Facilities must meet as many “human” needs, at as many levels as possible, especially the need to feel good about one’s surroundings. Working and living environments are increasingly within the control of those who design and build them. The design team’s responsibility is to provide a facility which fosters productivity and job satisfaction. Well designed interiors can provide efficient work spaces, and spaces for relaxation in recreational facilities.
- Budget constraints place increased importance on design creativity. Proper planning, and research of innovative design features, will help the designer provide quality facility interiors within restricted budgets.
- Flexible designs are essential to meet the dynamic requirements of our mission. While the primary function of each facility must be the priority, the designer must keep in mind that functions evolve, and facilities may require future modifications. Rapid technological advancements often demand upgraded equipment, power, and communications requirements. Buildings should be hard-wired for future technologies.
- The elements of pure design, including structural expression, suitability of materials, harmonious visual and tactile features, and classic furnishings will always remain the foundation of good design. Designers should avoid trendy or dated finishes and design features. Interiors should be creative but not extreme, reflect quality but not opulence, and be capable of being updated without requiring major changes to materials, spaces, and functions.

- Provide timeless color coordination which will be attractive to the majority of people.
- Use neutral colors for permanent background finishes to support a variety of color schemes. For example, architectural materials such as ceramic tiles, stone, and bathroom fixtures should be neutral to be compatible with future changes in materials and furnishings..
- Vary the intensity of color and create patterns to provide visual relief from the monotony of neutral colors.
- Use accent colors for fabrics and finishes which are subject to periodic change and to create interesting focal points, for example, use color and pattern for carpet and for upholstery fabrics.
- Provide small amounts of intense color in accessories and artwork for visual stimulation.

Design Development

- The design development process begins after the designer has a clear picture of the design intent and requirements. The designer must communicate effectively the design, and ensure the users know their needs are being met. During the development of the design, the designer is required to make presentations to convey ideas and make sure everyone is on the right track. Design documentation is necessary to illustrate the comprehensive design theme and interior detailing. The designer should provide written explanations such as design narrative to help the user understand the design and why specific selections were made. Various visual presentations, including renderings, elevations, perspectives, finish and furniture boards, must be provided to the user for approval. Renderings and finish boards must clearly illustrate the carefully planned and well coordinated color concept.
- The user's satisfaction is an important goal, in addition to the longevity of the design. Educate the user to appreciate the long-term quality of the design. The designer should offer the user options for his input throughout the submittal process.

Design Execution

- Specific guidance, presentation format and detailed information on the development of the Structural Interior Design (SID) and Comprehensive Interior Design (CID) packages can be found in the Air Force Center for Environmental Excellence (AFCEE)'s *Air Force Interior Design Presentation Format*. This handbook is available through the AFCEE homepage on the Internet. It explains in detail the specifications and drawings required during the submittal process and the format the should be presented. It includes a CID cost estimating guide, as well as A-E contract information, and an index of reference standards to be used by the interior designer during design development.

- The product specifications are critical for achieving a successful final product. They must be very detailed, but not proprietary, to ensure the Air Force receives quality products, materials, and craftsmanship. The specification should be very tightly written and closely reviewed by the user and Base Civil Engineer's interior designer.
- Address specific requirements (raised floor, security/SCIF areas, vaults, weapons, narcotic and drug storage, etc.) in the project definition or concept design submittal. Assure electrical and mechanical requirements are coordinated.

Standards

Philosophy

- The missions at Tyndall Air Force Base require many different types of facilities to support our programs and people. This presents a challenge for designers regarding quality standards, use of materials, functional requirements, and budget limitations. Standardizing interior building finishes throughout base facilities establishes a benchmark of desired results.
- The text on the following pages define criteria for building types and functional areas, as well as standards for building finish materials. These standards should be used as general guidelines for choosing the most advantageous products available. Due to varying locations, circumstances and requirements, alternate material choices may be required. The designer must research these with the user early in the project.

Functional Groups

- The main factors affecting finish material selection and application include foot traffic; presence of food, liquids, chemicals, grease, or other potential soiling agents; the activity type, and the level of quality required. Functional groups have been created to align similar facilities which have related requirements. Each functional group has a reference chart in Attachments 1 through 10 which illustrates the types of material selections appropriate depending on the use category. Specialized functional areas are addressed to provide specific design requirements needed to accomplish a successful project.
- Some facilities do not fit easily into only one functional group. In these cases, the designer must use judgment in determining the proper blend of interior finishes and furnishings. Examination of several functional groups may be necessary to compile the requirements for one project. For instance a building in the office/administrative

group may include a large cafeteria thus requiring information from the food service group.

- When designing any facility keep in mind the storage of coats and rain gear.

Training/Educational

extension programs. Attachment 8 provides a convenient reference for the types of materials which are most suitable in different use conditions.

- Education facilities include grade and high schools for dependent children, specialized training facilities, professional and technical classrooms, and centers for college

Office/Administrative

furniture, to large arrangements of systems furniture. Consider all areas carefully when selecting finish materials. Care should be taken to coordinate and conceal the electrical, communications, and LAN cables. Carpet should be used for all corridors and stairwell landings which are not accessed from a loading dock, industrial area, or delivery area. Conference and meeting rooms should be carpeted to help with acoustic controls. Attachment 4 provides a convenient reference chart for the types of materials which are most suitable in different use conditions.

- Office/administrative areas often have the highest number of occupants. These areas vary from private offices, to open bay work spaces filled with conventional and modular

Maintenance and Warehouse Facilities

weather, product dust, and dirt. Most areas within these facilities fall under the heavy-use heading. Attachment 5 provides a convenient reference for the types of materials which are most suitable in different use conditions.

- Maintenance/warehouse facilities include all functional areas in which vehicles or heavy equipment are operated, chemicals are used, and bulk items stored. There is exposure to

Lodging

VOQ's and VAQ's are equivalent to mid-priced hotels and maintain very high occupancy rates. These facilities require heavy-use quality materials and furnishing which conform to established Air Force Standards. TLF's are small temporary housing units used by families arriving and leaving the base. These facilities reflect a residential quality in furnishings and materials, but require commercial quality furnishings and finishes for durability and maintenance. See attachment 2 for guidance on finish materials.

- Transient lodging facilities, consists of visiting personnel quarters (VOQ, VAQ) and temporary living facilities (TLF).

Recreation

- Recreation facilities encompass the most diverse functions of all the categories. They include gymnasiums, fitness centers, golf course club houses, bowling, youth and community centers, libraries, and theaters. Facilities such as fitness centers have constant traffic throughout the day, while facilities such as theaters have high concentrations only during short periods. Golf courses, clubhouses, and bowling centers contain food service. Many of these facilities require a specialized flooring treatment for each activity and acoustical wall treatments to control sound. Attachment 6 provides a convenient chart for the types of materials which are most suitable in different use conditions.

Food Service

- Food service facilities include dining halls, flight kitchens, open mess facilities (officer and enlisted clubs), snack bars, and cafeterias. Most areas in these facilities can be considered heavy-use because they are subject to high traffic and frequent food and beverage spills. Carpet is required in the seating areas of dining halls and open messes. It is also desirable in seating areas of some other food service areas such as golf course club houses, and large cafeterias in administrative areas. Some food service facilities may have wood, metal, or other structural materials used for a decorative affect. Structural and mechanical elements can be exposed if blended in the overall design scheme. Consideration should be taken to provide dedicated areas for shared use of microwaves, refrigerators, and counter space, as well as electrical outlets. Use materials which will baffle the noise from the kitchen and dish washing room. Provide attractive menu boards which coordinate with the room finishes and are easily changeable in the field without having to remove the entire board. Attachment 3 provides a convenient reference chart for the types of materials which are most suitable in different use conditions.

Dormitories and Family Housing

- The residential category is composed of Military Family Housing (MFH) and Unaccompanied Personnel Housing (UPH), also known as dormitories.
- Attachment 1 provides a convenient reference chart for the types of materials which are most suitable in different use conditions. Refer to the *Air Force Dormitory Design Guide* for more details.

Chapels & Religious Activities

- Chapel facilities include all facilities for worship. This includes community worship, individual meditation, pastoral counseling, and religious education. The worship area is a very sacred place and receives a great deal of traffic, putting it in the high-use

category. Although it is high-use it should convey warmth and beauty through the materials and furnishings specified. Attachment 9 provides a convenient reference chart for the types of materials which are most suitable in different use conditions.

Flight Line Operations and Maintenance

- Flight line facilities include squadron operations, aircraft maintenance units, aircraft hangars, VIP reception areas, food service facilities, warehousing, fire stations,

and the control tower. These facilities run the gamut of very upscale to very greasy and dirty work areas. Attention to finish materials is extremely important. Grit, grease, oil, and dirt are indigenous to the flight line. Careful consideration must be given to pedestrian traffic patterns. With the exception of VIP reception areas, facilities on the flight line require extremely durable furniture and finish materials. The wear category would be heavy-use. See Attachment 10 for guidance.

Functional Areas

General

- All new facility design on Tyndall AFB shall include consideration for operable windows. The goal is to introduce natural light into the facility and allow for exterior

ventilation during the temperate autumn, winter and spring months. All glazing used at Tyndall will be a minimum of double-paned glass and should include a factory fabricated sun glaze which will reduce Ultraviolet light infiltration, passive solar gains and glare. Colors shall be limited to clear, gray and medium bronze. This will allow for some design articulation through the glazing. Exterior sunscreens should be avoided whenever possible, but if the windows are operable, a window screen will be used.

- Metal stud walls are the predominate assembly for interior walls at Tyndall.

Entry/Lobby

- Building entries and lobbies provide a transition from the exterior to interior. First impressions are formed here and are difficult to alter once a person enters the

main building. Consequently, the highest quality materials possible should be used within these spaces. Nonskid natural stone should be used whenever economically feasible. The initial up front cost can be justified by comparing the life-cycle costs. The Security Police Facility is an excellent example of a beautiful stone floor entry. Quarry tiles or ceramic tiles in a flexible neutral color would be the second alternative to be used on floor surfaces and wall base. These are durable and easy to maintain in high traffic areas and hold up to exposure from the outside elements. Provide walk-off mats or stiff bristle-type mats which are recessed into the floor within all entry

areas prior to reaching any carpeted area. This is especially important for entry points that do not have a vestibule which are common throughout Tyndall AFB.

- The light level may be low and either incandescent or indirect in lobbies. Information desks, elevator doors, directories, artwork, etc. should be highlighted.
- Bringing the exterior wall/floor finishes into a lobby makes a good transition, provided these materials are attractive. An interesting brick pattern or changes in relief of the brick on the walls could provide a dynamic focal point. Well placed light fixtures can then provide texture with shadowing.
- Lobbies are also a good place to use live foliage, further making the transition from outdoors to indoors a seamless process.
- Signs with good directions are important if there is no reception area.
- Consider soft textures against hard surfaces. If seating is required, use a carpet island to define the space. Well placed artwork can also add to the decor to create an exciting and interesting area.
- The fire alarm system should be discreet while easily accessible in emergencies.
- Overall, a lobby should have extremely durable finishes and introduce the facility with a theme or pleasant environment. It should be clutter free and welcoming.

Corridors

- A combination of a chair rail and lighting which runs the length of corridor, and carpet border only enhances the length of a long corridor. Emphasize vertical elements for

balance. Corridors can be made interesting by adding a flooring pattern, lighting to accent artwork, wall washing, or wall sconces.

- After the entry lobby, corridors are the most public portion of building interiors and, as such, convey a strong visual statement. Corridors also receive more wear than interior rooms, therefore require extra care when selecting finish materials. Avoid designing corridors that have a long “tunnel like” appearance. Installing carpet “islands” with borders running perpendicular to the walls will shorten a long corridor. If carpet islands or borders are used, the center area should be either darker than the border or “busier” than the border, such as a pattern design. Do not accent horizontal elements. Integrating 12” x 48” lighting fixtures, installed perpendicular to the corridor walls, will also visually shorten a long corridor.
- If the corridor is narrow, consider wall washers for light fixtures, this will visually push the wall outward. Also, a darker color on the floor than the walls will “widen” the corridor.
- Interior finishes in the corridors should coordinate with the other finishes within the facility. Carpet should be used for all corridors that are not accessed from a loading dock, industrial, or delivery area. Corridors can be made interesting by adding a flooring pattern, lighting to accent artwork, wall sconces, or indirect lighting.

- Corridors used as storage or collection areas create a fire hazard. If carpet is not a good option, patterns and borders can be created using VCT, sheet vinyl, or ceramic tiles at little additional cost, if any. An utility corridor does not have to be dull.

Stairwells/Landings

- Significant stairwells and landings with high public visibility such as those off lobby areas should have finish materials installed that complement the adjacent areas and not be treated as a separate entity. Stairwells can be used as a transition space that ties all floors together for a coordinated overall interior design. Utility stairwells and fire exits need durable finishes which are easy to maintain. Stairs in dormitories must be able to withstand frequent moves in and out of the facility.

Doors and Hardware

- Consideration to sound transmission of doors shall be required in new and renovation construction. Doors should be considered as part of the envelope assembly and should have a sound transmission rating which equals that of the wall assemblies.
- Door hardware: Tyndall AFB has a “Best” master keying system in place. Use the Tyndall standard specification.
- Standard door frames should be metal, with wood being used only as an exception.
- All doors and door hardware should meet ADA requirements.
- All hardware finishes should be standardized for ease in maintenance. Polished metal surfaces require more maintenance. Non-conforming hardware shall be replaced during renovations or as money is available.
- Interior wood doors should never be painted unless the wood species is a paint grade. Use one species and stain color for all wood doors within a building for consistency.

Restrooms

- Design restrooms for easy cleaning and maintenance, but not at the expense of quality. Restroom fixtures can be wall mounted for easy cleaning of the floors.
- Accessories should include paper towel dispensers, mirrors, soap dispensers, clothes hooks on toilet partitions and in shower areas, and trash receptacles. The paper towel dispenser needs to be adjacent to the lavatories, not across the room. Polished metal surfaces are not easy to maintain. Lavatories should be integral with the counter or installed in the counter. Decorative free-standing sinks should have a separate vanity area in the vicinity. Avoid small medicine cabinet style mirrors. The entire toilet fixture should be one color. Do not use a black seat on a white toilet. Ceilings and walls in all bathrooms and locker areas need to be a hard board, water resistant, tiled

or painted surfaces. Flooring should be tile, preferably non-slip. It is recommended that tile be used on all walls behind wet areas such as sinks, toilet, urinal and showers. Lighting needs to be bright for grooming and cleaning.

Locker Rooms

- Locker rooms should be well ventilated, provide an accurate number of lockers, and be designed with materials that are easily cleaned. Space between the top of the lockers and ceiling shall be finished and flush with the front of the lockers to avoid dust collecting on top of the locker units. Lockers need to have a vent, and include a shelf and clothes hook. Lockers shall be a factory baked enamel finish.

Conference Rooms

- Maximize the flexibility of conference rooms through the use of adjustable lighting, multipurpose seating, creative ceiling finishes, acoustical and/or tackable wall treatment, and multi-media presentation systems. Carefully plan the location of electrical outlets and consider flush mounted floor outlets for audiovisual equipment and computers. Chairs around the conference table should have casters. Those along the wall should be stationary. Consider using pop-up electrical/telephone connections located in the top of the conference table.

Control Centers/Computer Rooms

- The use of a raised flooring system is appropriate for access to cables and wiring. Use static dissipate vinyl tile, conductive vinyl tile, or low KV (<2.5) static rated carpet. A furniture system can be configured for the different types and sizes of equipment used. Quality ergonomic seating is a requirement for all office personnel who frequently work at computer terminals for one or more hours.

Vending Machine Areas/Break Areas/Coffee Bars

- These areas require interior finishes which are easily cleaned and maintained. A counter area with a sink and storage for coffee, snacks, utensils, etc. is desirable. Larger areas may include a designated space and electrical outlet for a refrigerator and microwave. Areas used for eating and drinking should have a tile or VCT floor for ease in cleaning spills. Washable floors should also be provided in front of vending machines. Always provide an adequate quantity of electrical outlets, appropriately placed.

Copy/Fax Areas

- Hard surface flooring should be used in this area, appropriately incorporated into the overall space. Toner staining is impossible

to remove from carpeting.

Interior Finish Material Guidance

- SABER projects and self-help stores should comply with all established Air Force, HQ AETC, and Tyndall AFB standards and regulations. The base interior designer should certify material selections before procurement for all projects to assure this standard is being met.
- Whenever possible, finishes should be factory applied or integral to the finish material.

FLOOR FINISHES

General

provide walk-off mats both inside and outside. A hard-surface or resilient floor covering, installed adjacent to the entry, is also recommended for facilities without vestibules.

- Walk-off mats should be recessed into the entrance area flooring. This will reduce flooring maintenance for the rest of the facility. If the facility has no vestibule
- Raised (computer) flooring on sealed or epoxy concrete floors must be indicated on the finish schedule.

Natural Stone

with a non-slip surface are the recommended hard surface material. These natural materials require little Long-term life-cycle and will often validate the additional up-front cost

- Entrances into the building should incorporate non-slip natural stone surfaces whenever economically feasible. Natural stones, such as granite, marble, or slate,

Ceramic Floor Tile

instructions.

- In heavy traffic areas, such as building entrances, bathrooms, etc., a quarry or heavy duty non-slip porcelain tile is recommended. Always install according to manufacturers'
- Larger tiles require less grout seams, therefore are easier to maintain.
- Grout used for floor tile should be a darker shade than the actual floor tile. This will cut down on maintenance.
- A mottled or speckled tile is easier to maintain than an overall flat color.

Rubber Tile

- Rubber tile is often used as an entrance material, and on stairs and landings. Some have a raised disc or radial square for better traction. These products require specialized maintenance and the user needs to be educated to maintain rubber tiles appropriately.

Sheet Vinyl

- Minimum of .085” (2.16 mm) gauge, pattern to go full depth of wear level (.050” or 1.27 mm).
- Avoid “white” as the predominant color.
- Install according to manufacturers’ instructions, giving special care to seams.
- “No wax” finishes should be limited to residential or light traffic wear.

Solid Vinyl or Vinyl Composition Tile (VCT)

- 12”x 12” (305 mm x 305 mm) tile, 1/8” (3.2 mm) gauge, pattern to go full depth of tile.
- “No wax” finishes should be limited to residential or light traffic wear.
- Install according to manufacturers’ instructions.
- Avoid “white” as the predominant color.

Carpet

- All carpet selections must be coordinated with the interior designer in Base Civil Engineering.
- Patterned carpets help to “mask” soiling in traffic areas. Use patterned carpets that have distinguishable designs of two or more colors and not shades of the same color. Multi-colored tweed carpets for medium-use areas are also acceptable. Solid colored carpets should only be used in commanders suites, chapels, DV suites and Family Housing Units.
- See ETL 94-3 Air Force Carpet Standards. This is available through the AFCEE homepage on the Internet. Also see HQ AETC Carpet Policy for all facilities.
- See Air Force Family Housing Carpet Standards dated Sept 94. This is available through the AFCEE homepage on the Internet. Also see HQ AETC Carpet Policy.
- See the *Air Force Carpet Selection Handbook* for guidance on carpet selection. This is available through the AFCEE homepage on the Internet.
- Provide reducers, metal strips, or other edging in areas where carpet abuts other floor surfaces.
- Carpet is an expensive investment and should be maintained properly to keep its original appearance. A maintenance plan must be developed for each installation.

See the *Air Force Carpet Selection Handbook* for guidance on carpet cleaning methods and how to develop a carpet maintenance program. This is available through the AFCEE homepage on the Internet.

WALL FINISHES

General

- Painted CMU walls are unacceptable for entries, lobbies, or stairwells. Use gyp board, textured coatings, plaster, or integrally tinted CMU instead.
- Special attention should be taken to conceal all conduit, pipes, electrical wires, communication and computer cables. Electrical outlets and telephone jacks should be hard-wired into the building to accommodate multiple furniture arrangements. Where these items cannot be concealed they should be painted to match the adjacent wall or ceiling color. All fire extinguisher cabinets, panels boxes and other equipment should be recessed in the wall and match the wall color. The fire extinguishers should be placed in a metal cabinet that is flush or semi-flush with the wall. Fire extinguisher's hanging on the wall from a hook is not acceptable. Signs for fire extinguishers or fire notices/exits etc., and the alarm fixture itself do not have to be red.
- Electrical switch plates, electronic devices, and light switches should blend with the adjacent surface, i.e. light on light, dark on dark. Levers should continue to be used and shall be in compliance with the Americans with Disabilities Act.

Vinyl Wall Covering

- Fabric-backed and paper-backed vinyl wall covering are best for cleanability. Fabric-backed are the most durable. Roll goods are generally 27 to 28 inches wide and sold by finish. This material adds textural interest to the wall and can be painted.
- the roll (approximately 5 1/3 lineal yards); yard goods are 53 to 54 inches wide and sold by the lineal yard.
- In extremely high traffic areas where walls will receive extreme abuse, Types II or III should be installed.
- In areas where acoustical properties are important (or behind dart boards) acoustical wall covering should be used in lieu of carpet on the walls. Acoustical wall coverings are generally 36 to 40 inches or 53 to 54 inches wide and sold by the lineal yard. Carpet does not meet vertical burn tests and therefore should never be used on walls.
- All walls to receive wall covering should be painted with one coat of oil base primer sealer. Always install according to manufacturers' instructions.
- Vinyl or acoustical wall covering should not be used over CMU surfaces prior to preparation with a skim-coat of plaster or fur the wall.
- Vinyl wall covering and paneling used in corridors, stairs, fire exits, or sleeping rooms, must have a Class A fire rating.

- Wherever possible end wall covering in an inside corner. If this is not feasible, always provide edging to protect exposed edge.
- All textile wall coverings must be tested and pass the vertical burn test specified in UBC 42-2.

Paint

- Use lead free (<.05%) paint only.
- Eggshell to satin latex paint is preferred on most walls. Kitchens, bathrooms, and areas where walls require frequent cleaning, require a satin gloss. Semi-gloss enamel is preferred for doors and trim.
- One standard neutral color should be established for all facilities. Accent colors may vary within the facility.
- Avoid stark whites. Off-whites and “toned-down” or subdued hues are best for hiding soil.
- Specify room paint colors on a finish schedule, not in the text of the specifications.

Plaster

- For maintainability, plaster walls should be painted with an eggshell latex paint.
- Installing a “paper” textured wallcovering increases material and labor cost. Insure wallcovering meets Class A requirements.

Ceramic Wall Tile

- This material should be neutral in color.
- Wall applications of ceramic tile should incorporate a similar color for grout. The tiles may be glazed or unglazed.
- Floor to ceiling on wet walls, such as showers, and at least wainscot height behind lavatories and toilets is preferred.
- Always install according to manufacturers’ instructions.

Wood Paneling

- Due to the expense of Class A wood paneling, it is best kept to a minimum. Wood paneling is much more expensive than the standard wall treatment of paint.
- Exposed edge of paneling at chair rail (30” to 32” on center) or wainscot (42” to 48”) height should be finished with a wood trim molding stained to match paneling.
- Paneling with an imitation wood finish paper or vinyl top application should not be used.

Wall Panels

- Acoustical wall panels are an excellent choice for conference rooms, areas which require speech privacy, or areas adjacent to noise from the outside.

Wall Base

- Wall base can be wood, rubber, ceramic tile (where applicable), poured in place flooring material turned up the wall, or sheet vinyl.
- If carpet or sheet vinyl flooring is used as base, install a cove cap.

CEILINGS

Acoustic Tiles

- Specify 2' x 2' acoustic ceiling tile throughout the entire base for ease of maintenance. The tile should be white unless approval from Base Civil

Engineering has been granted. Specify the same performance specification on all drawings.

- Acoustical tiles should be used in most administrative areas for easy access above the ceiling and for easy maintenance.
- Suspension systems can be exposed, semi-exposed, or concealed depending on the look desired, but must not be a contrasting color or material.
- Acoustical tiles should not be used in family housing.
- Do not use acoustical tiles on walls for sound absorption. See Wall Finishes above.
- The finish schedule must be clear when a room has no ceiling finish material and the exposed metal deck and joists are to be painted.
- Water marked or damaged ceiling tiles should be replaced immediately. Purchase additional ceiling tile stock to have on hand for replacement. Systematically replace the existing 24" x 48" tiles with a 24" x 24" system.
- Wood ceilings should be reserved for special applications only.

Gypsum Board

- Surfaces may be painted or vinyl wall covered.
- Preferred finish for residential interiors.

Other Finishes

- Wood (must have Flame Spread 25 or under) and properly trimmed.

Built-in Casework

- Plastic laminates, Corian, or solid acrylic top surfaces should be mottled or speckled for ease in cleaning. Avoid white and light colors.

Colors for all Finishes

- Designers should be cognizant of the environment and the use of the facility.
- Office areas should be neutral in color, but is not to be non-stimulating and dull.
- Housing facilities should be neutral so occupants can add their preferred accent colors.
- In general avoid large surfaces of bright, bold colors, however small amounts can be exciting and stimulating.
- It is desirable that colors selections for Tyndall AFB reflect the beauty of its coastal region as well as the generally warm, temperate climate. Light colors are cooler than dark colors. Possible color themes are off-whites to represent the white sand beaches and clouds. Warm grays which represent the driftwoods found on the local beaches. Soft pastels to represent seashells, blue skies, and sunsets. Forest greens, aquas, and teals to reflect the pine trees and palms as well as the gulf waters.
- Floor covering should be a medium tone color to hide soil brought in from the outside.

WINDOW COVERINGS

- Window treatments which can control heat gain are desirable. One suggestion is the use of perforated window coverings that deflects light and heat, but still allows one to see outside, while keeping the interior cooler. One type of treatment is a woven plastic material that simulates fabric. This heavy duty shade has varying degrees of openness and light reflectance. One brand is the Mecho Shade available on GSA contract. Another way of handling this situation is using a perforated horizontal metal blind. A more expensive option is a horizontal blind that is mounted inside the window between two panes of glass.
- Draperies should be used in residential facilities, lodging, or executive areas only. They should not be used in most office environments. In most cases draperies should be lined, unless the fabric is specifically designed to be unlined.
- Exterior colors of window treatments should be a standardized neutral rather than a distinct, bold color.

LIGHTING

- Lighting should be compatible with the style of furnishings and accessories used throughout the space. Wall fixtures, overhead lighting, table lamps, floor lamps and accent lighting should all follow this guideline.
- Consider lighting when selecting colors. Rooms have a totally different ambiance at night. This is especially important to consider for the design of lodging and recreational facilities.
- Display lighting should be incandescent high intensity spotlights, such as MR lighting.
- Office fluorescent lamps should be standardized throughout an entire facility and throughout the base for maintainability.
- Parabolic louvers are preferred for administrative areas or areas with a heavy concentration of computers.

Furniture

- Interior furnishings should be designed in conjunction with the design for the construction project. Users must program funding for the purchase of interior furnishings. The interior designer in Civil Engineering should coordinate on all interior design projects. Along with this process, coordination among other disciplines, such as Communications and electrical, are also needed to support most furniture installations.
- Specifications in this chapter provide the minimum standards for furniture purchased by the Air Force. A very important feature to consider when purchasing any furniture item is the warranty. Research how each manufacturer deals with their warranties and response time.
- There are different acquisition methods and forms to be used depending on the type of furniture which is being procured. The interior designer in Base Civil Engineering can provide this guidance as well as the *Air Force Interior Design Presentation Format* which is located through the AFCEE homepage on the Internet.
- When selecting furniture for a space, coordinate the wood finishes with the wood used in the facility. For example, it is typically not ideal to mix an oak stain door with a mahogany stain furniture piece.
- Conventional furniture is the arrangement of free-standing furniture, including, but not limited to: administration furniture, dormitory furniture, lobby furniture, dining furniture, etc. Conventional furniture is usually acquired on a DD Form 1348-6 through base supply. Installation is normally performed by the using activity.

Task Seating

- Ergonomic task seating should be used at work spaces and around conference tables. Use a 5 prong base for stability. Casters should be a dual hard wheel for carpet or single soft wheel for hard floor surfaces. Arms should be replaceable or removable in the field. Use a molded plastic arm for most applications as upholstered arms tend to soil and tear with high use. Adjustable arms are required for intensive use computer operators. Chair frame should be chrome or a powder coated epoxy finish. Wood can be used in executive conference rooms or executive areas. All task seating must be of commercial quality and ergonomically designed. Some manufacturers on GSA contract are now producing ergonomic chairs in small, average, and large sizes.

Stationary Chairs

- Use four posted legs for stationary chairs which are not often moved around when occupied, such as perimeter seating in a conference room. Use a sled based chair for sliding motion when scooting in and out from under a table or desk. Provide appropriate glides for either carpet or hard floor surfaces. Use clear glides on hard floor surfaces as black glides tend to leave marks.

- Dining seating, whether freestanding chairs, booths, or banquettes, should use a stain-resistant fabric or a vinyl upholstery. A combination of a vinyl seat with a fabric back is very effective in utilizing the best of both upholstery materials. A “wipe-out channel” for ease of cleaning or a separate back and seat which do not touch will eliminate the problem of captured food crumbs and debris.

Lounge Seating

- All Lounge seating is defined as upholstered seating such as sofas, loveseats, larger chairs, sectional sofas, or modular seating which are often used in lobbies, waiting areas, lounge areas, day rooms, private offices, etc.

- All internal frame parts should be kiln-dried hardwood. All exposed parts should be cut from #1 common or better grade of hardwood with uniform grain and color uniformity.
- Frame joints should be carefully fitted and secured with dowels. Frames must be reinforced with corner blocks, mitered to fit securely.
- Seat foundation is to be 8½ gauge sinuous wire springs clinched to insulated tie wires and strapped to the tie rails and back post. Back construction is 11 gauge wire spring construction stretched between top and bottom spring rails and secured with double staples. The spring system should be covered with noise free insulating fabric and stapled to the frame on all sides.
- Seat to be cushioned with 1.80 lbs. density polyurethane foam with 32 lbs. of construction. Each seat cushion is wrapped with resin treated polyester fiber to give a smooth even finished cushion. The back and arm cushions should be 1.10 lbs. density

polyurethane foam with 20 lbs for back and 35 lbs. for arm compression. Back and arms should be topped with blended fiber batting for a smooth even units should be constructed to allow for field reupholstering and repair.

- All upholstery should be treated with soil retardant. All patterns should be matched on the vertical and horizontal for a uniform pattern on the same piece. Patterned fabrics are highly recommended for use on upholstered pieces for interest and to camouflage soils.
- Waiting area seating for medical facilities should accommodate children, pregnant women, elderly, heavy or tall people, and the physically weak. All seating should have arms to aid people in and out of the seated position. Seats of the chairs shall be firm, level with the floor and not at a decline towards the back of the chair.
- Heavy duty lounge furniture such as Modu-Form are recommended for some applications with unique problems, such veterinary offices, or areas where standard upholstered lounge furniture would not hold up.

Tables

- For standard use, a laminate top with a vinyl edging, self-edge, or solid wood edge is appropriate. A mottled or speckled top will show less wear and tear. Wood veneer top is appropriate for conference rooms and executive areas. Tops should not exceed 30 inches in height for sitting applications, and 36 inches in height for standing applications.

- Tops should be a one piece construction unless the table length is too long to fit in a doorway and must come shipped in pieces. Core material must meet or exceed strength requirements for commercial standards. Particle board must have a minimum density of 48 lbs per cu ft. The core must be sanded top and bottom and without any rough edges. Laminate or veneer must be glued uniformly and evenly to ensure adhesion and stability. Applied edging must be mitered to ensure perfect edging. All wood edges must be a hardwood.
- All bases must be appropriately sized to match the top. All metal bases should be a powder coated finish. Wood bases are appropriate for all wood table tops. There tends to be more maintenance as people kick the base under the table. All bases should have leveling glides. Suggest using several smaller tables to make one large conference table to allow flexibility in table arrangement and break-up. High quality folding tables may be used for dining rooms to allow changes in table layout.

Freestanding Office Furniture: Casework

- This category of office furniture includes desks, credenzas, computer tables, executive units, and bookcases.

- Metal units with laminate work surfaces should meet the standards and construction of systems furniture, but be floor supported and stand alone. Wood units should be a veneer with a hardwood edge. All units should have glides for leveling.
- All drawers should be able to receive dividers. Dovetail construction should be used on all corners. File drawers must use full extension, stop action progressive slides with precision ball bearing for no metal to metal connection for a smooth, quiet operation. File drawers must accommodate various filing options.
- All drawers should be lockable with removable cylinders for re-keying. All locks within one workstation should be keyed alike.
- All desk tops should have two grommets a minimum of 2 inches diameter in size to allow for electrical cords. Location of grommets will vary depending on application. Work surface tops with a rolled/soft edge are preferred to a straight edge for comfort.

Filing Cabinets

- Metal cabinets should be rolled metal seamless on 3 sides with rounded corners for a smooth look. Wood cabinets should use a veneer with a hardwood edge.
- All cabinets require an interlock system on drawers so only one drawer may be extended at one time. Drawers should have a ball-bearing suspension system with an anti-rebound device. Drawer pulls should be recessed so they do not get knocked off or get in the way of pedestrian traffic.
- All lateral files should have front-to-back and side-to-side filing options. Options should be allowed for a fixed shelf on five high units, roll-out shelves and drawers. All units should have glides or leveling devices to ensure drawers or doors open properly. A posting shelf at stand-up height is very useful and convenient.
- Color should be electrostatically applied at the factory.

Dorm & Quarters Casework

- This furniture includes headboards and bed frames, night stands, units with drawers or open shelves, TV armoires, desks, writing tables, dressers, chests, mirrors, end tables, coffee tables, desk/dining chairs, dining tables, computer accessibility, etc.
- All solid parts and wood veneers should be northern red oak or equal hardwood for durability. The finished product can be treated and stained to get the color required to match the rest of the room. All furniture should be constructed of solid wood veneers or hardwood solids or five-ply lumber-core with wood veneers. Particle board and cardboard are not acceptable. Back piece must be equal to the sides in thickness or a minimum of ¼ inch. Desk tops may be surfaced in a plastic laminate to match the wood grain and finish of other exposed items. Hardwood impact edges should be used.

- Drawer fronts, doors, desk tops, and other components should be removable and replaceable on site. This extends the life of a product by changing individual damaged parts rather than ordering an entire new unit.
- Preferred method of construction is a dry construction method with metal-to-metal connections. This method creates a stronger, more durable case due to the absence of glue joints which tend to fail. The screws, hinges, etc., should be concealed or inserted into the solid lumber. This gives a clean, high quality look. Units held together with only glue and staples are unacceptable.
- All drawer joints should have dove-tail joinery. All pulls should be flush or recessed for dormitory furniture with high use. This prevents the pulls from being pulled or knocked off, and lost. Drawer bottoms should sit in a grooved area of the drawer sides and be reinforced. Use epoxy coated metal drawer slides with nylon bearing rollers and have an automatic stop feature.
- TV armoires and shelving units should have grommet holes in the back to run electrical and telephone cords. All large units should come with leveling glides.

FURNITURE SYSTEMS

- Furniture systems are also known as systems furniture, modular furniture, and ADP furniture. It is distinguished from conventional furniture by its modularity. Components, such as panels, hanging shelves and files, work surfaces, and storage units are arranged to create a custom work space. The work space may be wired through panels or conventionally. The system may have panels, stacking panels or be floor supported with no panels. Furniture systems are generally used in administration or medical facilities. Sometimes reception desks are also created with these components. Furniture systems are usually acquired using an AF Form 9 and are procured directly through the base contracting office. Base Supply is not involved. Installation is normally performed by the furniture system contractor. All organizations requiring a furniture system must submit an AF Form 332 to Base Civil Engineering requesting interior design service. Civil Engineering will either design the package or contact a contractor. MILCON projects typically are reviewed/approved by a HQ AETC interior designer.
- Furniture systems are a combination of various sized panels which support individual components to create a work area or workstation. System furniture is typically used in an open office plan and should not be used in individual offices. It is not cost effective to purchase panels to put up against existing walls which already provide privacy. Individual hard wall offices should use conventional or modular furniture. Systems furniture components consist of work surfaces, shelving, file cabinets, storage units, lighting, counters, overhead storage and drawers. Accessory items include coat hooks, tack boards, paper organizers, and shelf dividers. The overhead storage bins are a good opportunity to introduce accent colors.
- Systems furniture allows for a high degree of flexibility in open office plans and flexibility in individual workstations. It is a modular system with a wide variety of components to choose from to meet the users needs. Specialized components are available to meet the needs of office areas, libraries, medical clinics, and educational

systems. Most systems provide hanging slots at 1” increments, maximizing height adjustment possibilities for all components. System furniture offers various electrical components and raceways and options for both ambient and task lighting.

- Open office plan is the elimination of interior hard walls while maintaining essential divisions and building support, but not an enclosed division. Semi-private spaces are developed through the use of partial height panels arranged to facilitate the work flow and functional tasks. To accommodate the dual needs of privacy and communication, work areas should provide visual privacy one direction, but personal interaction when facing another direction. For more complex tasks and team settings, private work areas surrounding common group areas should be provided. Use panels to separate adjacent work areas only where necessary to avoid excessively compartmentalized mazes. When designing open office plans, do not forget to plan dedicated areas for coffee, vending machines, coat storage, and break areas.
- A single type of manufacturer of systems furniture should be used throughout an entire facility. A hierarchy of spaces should be designed which range from clerk/admin. level to office worker to supervisory levels based on workstation size, additional components, and privacy. Each standard workstation layout should be standardized throughout an entire facility.
- Vary the height of the panels throughout an area to add interest and match specific function. Use a lower panel, plus or minus 42” high, for reception or waiting areas permitting a longer viewing distance or for panels against a window, utility vent, or fire pull. Use a plus or minus 60” high panel for spaces requiring visual privacy and acoustical support when at a seated position. Panels cannot exceed 68” in height. For higher panel requirements, full height movable walls should be specified. Tall panels should be used to a minimum and can be incorporated into a design at various locations to add a vertical element. A subtle pattern on the panel fabric adds dimension and interest to the system.
- Most of the office systems furniture typical layouts rely heavily or exclusively on square component shapes and orthogonal space layouts. The introduction of curved panels, panels placed at different angles, and panel windows will provide physical and visual relief, helping to break-up the “boxy” maze of repetitive spaces. Locations appropriate for this treatment include corner panels at the beginning or end or a series of paneled spaces, at intersections of circulation aisles, and at panels near reception areas. Glazed, fire-rated panels offer privacy without confinement and should be integrated into the overall interior landscape. Acrylic window panels are unacceptable as they exceed flame and smoke development requirements.
- Acoustical performance ratings should be based upon the workstation design. While the sound transmission class (STC) and noise reduction coefficient (NRC) rating contribute to the overall acoustical performance, the acoustical role of panels is relatively minimal in the overall environment when compared to sound absorptive properties of other finish surfaces. In addition, panel hung components greatly reduce the quantity of acoustical contributing area. Acoustical panels should be used judiciously and used only where they can truly be effective.

- An overall review of the electrical system should be done by a qualified electrical engineer prior to the purchase of the system furniture to be sure the building can support the new furniture.

Prewired Workstations

- Prewired workstations is a term currently used by the Army Corp of Engineers for systems furniture funded with Military Construction funds (MILCON/3300 funds) and provided by the building contractor. At this time, the Air Force no longer funds prewired workstation with MILCON dollars, however, furniture systems still may be provided by the construction contractor, using O&M/3400 funds. See the *Air Force Interior Design Presentation Format* for more clarification. The AFCEE homepage on the Internet will provide the most recent information on these issues.

ARTWORK

- Artwork should be used in all areas. This includes waiting areas, lobbies, corridors, conference rooms, break rooms, lodging rooms, and recreational areas.
- Artwork throughout an entire facility should follow set standards for matting and framing. There should also be a consistent theme.
- Security locks should be used on any artwork located in areas where it may have a tendency to be pilfered. All artwork must be attached to the wall in a manner which keeps the piece straight and aligned. One suggestion is to use a mounting device on the left and right sides of the picture.
- All future procurements of artwork should follow the established standards for framing and matting and have a consistent theme for each facility.

ARTIFICIAL PLANTS

- Artificial plants shall be flame retardant rated.

BULLETIN BOARDS/TACKBOARDS

- Bulletin boards or tack boards should be provided at common areas to display notices and announcements. They can also be incorporated into individual workstations. Do not allow anything to be taped to the walls, doors, windows, or furniture surfaces. It looks unprofessional and the tape creates a tacky film and harms the surface finish.
- The type and style of board should coordinate with the signs and other adjacent building finishes.

Interior Signs

- Interior signs should conform to the standards established in the AFP 88-40, Air Force Sign Standards, the future AFPAM 32-1097 which will include ADA

requirements. The HQ AETC standard is to have all interior signs in a facility consistent and uniform in color, style, type, and format. To the maximum extent possible, this consistency should be maintained throughout the base. Uniform signs look professional and contributes to an organization's credibility.

- Signs should be designed as an integral part of the facility and include base contextual standards.
- The interior sign system selected for a facility should be easily maintained and as maintenance free as possible. Assure the sign system is flexible to accommodate frequent changes in personnel and/or missions as well as office reconfigurations or relocations.
- Develop a long-term program to replace existing non-conforming signs. Start by replacing all painted signs and vinyl letter signs placed directly on the wall surfaces.
- Ensure interior signs are compatible with interior architectural color schemes. Keep interior signs to a minimum to provide a clutter free environment. Ask: "Is this sign necessary?" Make area signs clear and meaningful. Ask: "How important is this message?" Hard-walled areas usually require an ADA compliant sign.
- Q AETC has standardized on System 2/90 signs which can be provide by Federal Prison Industries' UNICOR product line or on GSA contract.



Structural

- All construction shall conform to the Standard Building Code and NFPA 101 ‘Life Safety Code’ most recent edition. All other references to applicable codes shall be taken from the most recent editions and latest standards.
- Tyndall Air Force Base is located within seismic zone 0 as per AFM 88-3. All structures shall be designed to wind loads as defined in ASCE 7-95.
- A complete design analysis shall be presented identifying each sheet by project number, engineer’s name, date, and numerical sequence of each sheet. The analysis must show in a logical sequence the technical decision making process the engineer used in reaching the final conclusions; including any assumptions, existing conditions, special instructions and references to applicable codes. Illustrations shall be presented in support of the design to convey the engineers model. An executive summary of the design analysis shall be presented with the package (typed).
- The design of foundations, retaining walls and slabs-on-grade shall be based on a minimum soil bearing pressure of 1500 psf unless properly engineered by soil parameters specifically taken to support the design.
- Wood structural panels shall conform to the requirements of U.S. Product Standards PS-1 or PS-2. Oriented strandboard (OSB) shall never be used as a substitute for plywood when used for roof sheathing.
- All finished floor elevations shall be established 12” above the appropriate Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map.
- Specifications for applicable sections and notes used in drawings shall be scrubbed to eliminate references to work not associated with the specific project.

Mechanical



Facility HVAC Matrix

DX COOL/GAS HEAT FURNACE - SINGLE COMPRESSOR	DX COOL/GAS HEAT PACKAGED - MULTIPLE COMPRESSORS	AIR TO AIR PACKAGED HEAT PUMP	GROUND COUPLED HEAT PUMP	AIR COOLED CHILLER - SINGLE COMPRESSOR	AIR COOLED CHILLER - MULTI COMPRESSOR	WATER COOLED ROTARY COMPRESSOR CHILLER	WATER COOLED RECIP COMPRESSOR CHILLER		CONSTANT VOLUME SINGLE ZONE AIR HANDLER	CONSTANT VOLUME MULTI-ZONE AIR HANDLER	VARIABLE VOLUME AIR HANDLER		NO ECONOMIZER - MINIMUM OUTSIDE AIR	ECONOMIZER (ENTHALPY CONTROL)		GAS FIRED CAST BOILER	GAS FIRED UNIT HEATERS	GAS FIRED FURNACE	
X		X	X						X				X						LESS THAT 7.5 TONS
	X		X						X	X			X						7.5 - 125 TONS
				X					X	X			X			X			15 - 19 TONS
					X						X		X			X			20 - 39 TONS
						X					X		X	X		X			40 - 59 TONS
						X					X		X	X		X			60 - 99 TONS
						X	X				X		X	X		X			100 - 119 TONS
							X				X								GREATER THAT 120 TONS
																	X		SHOP AREAS
																X	X		REMOTE AREAS

General

- In new buildings or buildings undergoing major remodeling, an appropriate mechanical room or rooms will be provided. Chillers shall be installed in walled mechanical yards.
- Maintenance access shall be given high priority consideration in system and equipment selection and layout. Install air handling units in equipment rooms where possible. If air handling units are installed high overhead or above suspended ceilings, provide a working level platform with suitable clear working space and access ladders or stairs. Ensure clearances are provided for filter servicing, fan shaft and coil removal, tube pulling and cleaning, and similar work. Locate terminal devices over common use areas where possible to reduce interference with building occupants, especially for unit commanders, during maintenance activities. Do not use roof mounted equipment.
- Clearances surrounding all mechanical equipment will be clearly shown on drawings and will be adequate on all sides to allow maintenance, repair, and replacement of the equipment. Provide equipment pads eight inches wider than the equipment in all directions.
- All projects shall include meters to measure consumption of water, natural gas, electricity, etc.
- No asbestos-containing materials shall be allowed or specified.
- New or replacement refrigeration equipment shall use chloro-fluorocarbon (CFC-22) rather than other chloro-fluorocarbon refrigerants.
- For buildings that will be affected by construction, the Architect/Engineer (AE) shall interview the building manager (building occupants) to determine scheduling or security requirements.
- All mechanical systems shall be designed in accordance with ASHRAE, ANSI, NFPA, NEC, AABC and SMACNA standards. All weather data criteria shall be obtained only from the current edition of AFM 88-29. MIL HDBK 1008B and all applicable ETL's per Corps of Engineer Design Standards 1992 shall be referenced for all designs.
- Projects designed for Tyndall AFB shall use humid environment criteria.
- A life cycle cost analysis shall be accomplished for all projects using BLCC or equivalent software.
- All Mercury-Containing Devices shall be salvaged to recover the mercury. These "devices" include thermostats and switches. The devices can be turned in at Building 6011 on Tuesdays and Thursdays by the Contractor for disposal.

Design Analysis

Minimum requirements to be included in each project design are as follows:

- List of applicable codes used for guidance and governing design.

- Detailed cooling and heating load calculations. Include actual lighting loads (not watts /sf) and actual equipment loads where known. Proportioning of cfm based on area is not acceptable.
- Detailed equipment selection for each item.
- Manufacturer product/equipment specification sheets for each item selected.
- Sizing of equipment based on the size of existing equipment is not acceptable.
- Selection of air handlers shall include a calculation of system static pressure losses.
- Selection of pumps shall include a calculation of system head. Pumps shall be sized and specified to be non-overloading under all conditions.
- Minimum outdoor air requirements for ventilation shall be as indicated in Table 2 of ASHRAE Standard 62. These requirements shall be met through introduction of outside air at the air handler and building pressurization. Infiltration is not an acceptable method of providing outside air.
- Generally, HVAC systems should be selected according to the HVAC matrix at the end of this section. Systems should be coordinated through the Base Civil Engineer, Contracts Element, Mechanical Design Group, (904) 283-4766. Provide central building heating and air conditioning systems wherever possible.

Heating, Ventilating, and Air Conditioning

Air Movement and Distribution

Fans and Air Handlers

- Variable speed drives shall be used for Variable Air Volume (VAV) systems in lieu of inlet vanes or bypass dampers whenever possible. Fan powered VAV units may not be specified.

Generally use ducted supply and plenum return air systems for air conditioning utilizing central station type air handling units with economizer air cycles. Use ducted returns only where not able to use plenums and only for constant volume systems. Normally return fans are not required; verify that return fans are actually required before including them in the design. Fan tracking, if a return fan is required, shall be accomplished by using the current standard Direct Digital Control (DDC) system used by Tyndall AFB.

- Provide access doors for cleaning coils, drain pans and fan blades. Access doors shall be provided on both sides of coils. Access doors shall be sited according to purpose, i.e. a coil access door shall allow a person to easily reach all areas of the coil.
- Select equipment in mid range of cataloged performance to allow for adjustment during commissioning.

- Provide lights inside air handlers with larger than 25 square feet of coil area.
- Ensure that all equipment is installed to allow full opening of all access doors.
- If return fans are required, ensure a minimum distance of 2-1/2 time the equivalent fan discharge duct diameter (6 times for outlet velocities 6000 fpm and higher) is provided between the fan and the return air and exhaust air dampers.
- Provide exhaust fans with variable inlet vanes, variable pitch blades, variable discharge dampers, or motor speed control, for all systems with economizer control strategies.
- Do not rely on relief vents to provide adequate exhaust capability. If tracking is required, see note .
- Install air handling units within equipment rooms when possible.
- Air handlers shall not be installed on roofs.
- Fan and motors shall be selected so as to be non-overloading on all points of the curve.
- All motors shall be of the high efficiency type.
- Exhaust outlets and outside air inlets should be located on vertical surfaces rather than through roofs.

Fans and Air Handlers

- Specify adequate space between cooling and heating coils to facilitate cleaning.
- Use copper tube, copper fin coils for all coils exposed to an excess of 25 percent outside air.
- Specify drainable and cleanable coils. Air handler coils shall be 8 fins per inch when possible. Make adequate provisions for air bleeding.
- On multizone systems, install pressure plates across heating coil/bypass to equalize pressure drops of entire system.

Filter Sections

- Provide pressure gauges across all medium and high efficiency filter sections. Use angled filter banks wherever possible.
- Filters: Air handling unit filters shall be the throw - away type. Preferably pleated 35% efficiency.

- Specify that air handling unit filter/filters be replaced by the contractor on all renovation projects prior to completion.

Louvers, Dampers and Mixing Boxes

- Do not locate fresh air louvers adjacent to heat rejection equipment.
- Specify pressure independent balancing dampers on VAV systems.
- Provide full quadrant balancing dampers in both fresh air and return air ductwork to air handling units.
- Provide duct access doors on both sides of all dampers.
- Specify high efficiency dampers for all fresh air dampers and mixing boxes.
- All outside, air dampers shall be specifically manufactured for corrosive (saltwater) environments.

Ductwork

- Fiberglass ductwork shall not be permitted.
- Sheet metal ductwork shall be constructed in accordance with SMACNA, Low Pressure Duct Construction Standards or High Pressure Duct Construction Standards, as applicable.
- Specify maximum ductwork leakage rates of 2 percent for round and 5 percent for rectangular (to be tested and verified during air balance).
- Provide vapor barrier material on all insulation intended for air conditioning ductwork. Where thermal insulation is sole requirement, use external duct insulation in lieu of duct liner. Duct liner shall be used within the supply air plenum, return air plenum or in special circumstances.
- Provide access doors at all locations which require periodic cleaning or inspection; e.g., reheat coils, VAV terminals, smoke detectors and dampers.
- Offset branch ducts (branch connections on opposite sides of trunk duct should not be installed directly across from one another) for improved “balance ability.”
- Design supply and return ductwork to prevent stratification. Use baffles if necessary.
- Do not use splitter-type dampers as volume control dampers.
- Provide manually operated, opposed blade or single blade, quadrant-type volume dampers in each branch duct takeoff after leaving the main duct.

- Provide double thickness or single thickness extended edge turning vanes in rectangular elbows.
- Do not use volume extractors as volume control dampers.
- Do not use diffuser/damper combinations. Provide manual volume dampers at branch duct connections upstream of registers or diffusers. (Register or diffuser dampers cannot reduce high volumes without creating high noise levels.)
- Locate all volume dampers at least two diameters from a fitting and as far as possible from outlets.
- Provide straight duct sections of at least 7-1/2 duct diameters from fan discharge, elbows, or open duct ends for accurate traverse readings.
- Provide fire dampers where ducts penetrate any fire wall.
- Install duct smoke detectors IAW NFPA standards.
- Provide protective coating over insulation in all exposed areas (i.e., equipment rooms).

Terminal Devices

- Specify pressure independent terminals.
- Provide duct access doors upstream of VAV terminals, adequately sized to allow cleaning and lubrication.
- Generally, reheat coils (even in VAV applications) are not allowed, however, if reheat coils are used, provide access doors, both sides, and a drip pan beneath coil.
- Do not use VAV or dual-duct terminals that have distribution plates, orifice plates, or any other similar device that is susceptible to dirt entrapment.
- Locate terminal devices over common use areas (where possible) to reduce interference with building occupants during maintenance activities.

Piping

- Lead free pipes, solder and flux shall be used. Solder and flux may not contain more than 0.2 percent lead. Pipe and fittings may not contain more than 8.0 percent lead..

Chilled and Hot Water

- Provide pressure taps and thermometer wells at inlets and outlets of all heat exchange devices; i.e., converters, chillers, water cooled condensers, boilers, coils, etc. Provide a wall

mounted cabinet with a minimum of two pressure gauges and thermometers for each range specified.

- Provide air vents, with isolation valves at all high points and at heat exchangers.
- Provide vapor barrier material on all chilled water piping insulation.
- Use cellular glass insulation (Foam glass or equal) on all chilled water lines and hot water in exposed areas. Do not use fiberglass insulation on chilled water lines.
- Provide pot feeders for water treatment.
- Provide backflow preventers in make-up water lines.
- Use copper pipe up to 2-1/2", black steel larger than 2-1/2" with a contractors option to use copper.
- Provide aluminum jackets and waterproofing on all piping exposed to the weather.
- Utilize "TACO" type flow control valves for all chilled and heating water coils.

Refrigeration Piping

minimum gas velocities of 1000 fpm.

- Ensure piping is designed to provide adequate oil return.
- Size suction and discharge gas risers for a minimum gas velocities of 1000 fpm.
- Size horizontal suction and discharge gas lines for minimum gas velocities of 500 fpm.
- Provide traps at the bottom of all gas risers with more than 8 feet of vertical run.
- Provide double gas risers for systems with unloading compressors.

Condensate Lines

- Ensure that the piping is properly sized, sloped and well insulated to prevent algae growth or condensation. Use PVC piping

Cooling Towers

- Only shall be considered in systems over 100 tons.
- Provide adequately sized domestic water and drain connections to allow bypass of towers during maintenance.

- Provide water tight spill containment to house chemical drums.
- Do not locate cooling towers on roofs.
- Specify induced draft towers.
- Tower construction shall be for a corrosive (saltwater) environment.

Water Cooled Condensers

- Allow ample space to brush condenser tubes.
- Provide flanges (or unions) and isolation valves in condenser water piping located so as to allow removal of piping and headers immediately in front of tubes. Provide adequate access space to clean and inspect tubes.)
- Provide taps, with hose bibs, to allow chemical feeding for cleaning purposes.
- Provide backflow preventers in make-up water lines.

Air Cooled Condensers

- Select condensers to provide a maximum condensing temperature of 20°F above design ambient temperature.
- Consider solar effects and other site specific operating conditions when specifying condenser capacity.
- Specify multiple fans and necessary controls for head pressure control.
- All air cooled condenser coils shall be copper coils with copper fins.
- Use microprocessor based controls.

Compression Refrigeration Equipment

- Locate compressors in equipment rooms when possible.
- Provide suction, discharge, and oil pressure gauges permanently mounted on equipment room wall or free standing partition. (Do not mount on equipment.)
- Water Cooled: Locate within equipment rooms. (Do not locate on roofs.)
- Air Cooled: Locate on concrete pads, at ground level. (Do not locate on roofs.)

Heat Exchangers

- Provide flanges or couplings and isolation valves so as to allow removal of piping directly in front of device (above, below, and/or to the side of the device).
- Slope all devices to allow for drainage.
- Make adequate provisions for air bleeding.
- Provide taps, with hose bibs, to allow chemical feeding for cleaning purposes.

Heat Recovery Units

- These units must be used in applications that required domestic hot water and air conditioner, i.e., dormitories. A feasibility study shall be performed to determine if these units are cost effective.
- Units shall be constructed using copper coils with copper fins.
- Design will include provisions for winterizing the system.

Specialties

- Strainers: Provide strainers upstream of all control valves, coils, and pumps.
- Meters: Make provisions to remove meters with no down time.
- Valves: Specify ball valves in lieu of gate or butterfly valves.

Controls

- The base standard utilizes Landis-Staeffa DDC controllers. All new HVAC systems in excess of 10 tons shall be provided with DDC controls. Where small packaged units are provided, provide electronic programmable thermostats with seven-day time clocks for each unit.
- Use enthalpy controls for economizer cycle operation.
- Where utilized, air dryers for pneumatic control systems shall be the refrigerated type.
- Use remote sensors so that controllers can be centrally located in the Mechanical Room.

- Logical grouping of controllers, adapters, relays and power supplies in an easily accessible controls cabinet mounted away from vibrating machinery.
- Inclusion of pneumatic test ports and electronic-system terminal strips cross-referenced to the control schematic to facilitate troubleshooting and calibration.
- Provide structural support (steel channel) for any actuators installed on less than 16 gauge sheet metal.

Design Requirements

- A fully labeled control schematic which details all set points, throttling ranges, actions, spans, proportional bands, and any other adjustment. The key characteristics of a control schematic

are:

- It is drawn to a very large scale. This allows ample space to indicate all performance parameters such as set point, throttling range, action, etc. These large scale drawings are also easily read by the mechanics as part of their maintenance documentation.
- It is cross-referenced to the elementary diagram and the control panel detail by the numbered terminal points enclosed in hexagons. These terminal points will also serve an important maintenance function. For example, to check the status of the air flow switch, AF, the mechanic will check continuity between the appropriate terminals. As the air flow switch is not nearly as accessible as the terminal strip, maintainability is enhanced.
- Each control component is identified by an alpha-numeric designator such as C1 or SQ3. This provides for cross-referencing to the description of components and the control sequence.
- On the pneumatic design, test ports for pressure measurements are required at all key points in the system.
- A fully labeled elementary diagram (ladder diagram). The key characteristics of an elementary diagram are:
 - It is drawn to a very large scale for easy reading and to provide space for indicating performance parameters.
 - It is cross-referenced to the control schematic and the control panel detail through the use of the numbered terminal points enclosed in hexagons. Provide an I/O summary of all EMCS points.
- A sequence of control on the drawings cross-referenced to the control schematic and elementary diagram. The control sequence is a verbal statement of the sequence of operation. It should be as complete as possible, and it should refer to components by their alphanumeric designator. In describing the operation of a system, it is best if the system is first broken down into sub-systems such as fan section, mixed air section, heating coil, etc.

- A generic, functional description of each control component shown on the drawings. The components should be referred to by their alphanumeric designator. The contractor should not be allowed to combine components or change performance parameters. This approach will enhance standardization and maintainability.

Electrical Devices

- Provide motor starter contractors rated for cyclic loadings.
- Provide 3-phase protection on all motor starters 2 HP and above.
- Provide fused disconnects for all HVAC equipment.
- Use high efficiency meters, 93% or greater.
- Provide sufficient clearance between HVAC equipment and electrical equipment per NEC.

Pumps

- Specify horizontal split case pumps.
- Packing glad seals shall be used.
- Use variable speed pumps if economically feasible.

Structures

General

- Do not insulate on top of suspended ceilings (insulate at roof deck) below ductwork.

Equipment Rooms

- Locate equipment rooms along exterior walls with exterior doors where possible (even if not at ground level).
- Provide sufficiently large doors or easily movable sectional walls to pass largest pieces of equipment.
- Provide sloped floors with drains.
- Provide domestic water with hose bibs and 115 volt power outlets.
- Provide adequate wall space or full standing partitions for mounting of controls.
- Provide adequate space to allow wire brushing of water cooled condensers, chillers, and coils; filter removal; access to control actuators; pull coils; any other miscellaneous maintenance; etc.

Identification

- Lettering shall be provided as scheduled on the drawings, shall be block type, and shall be black enamel. Samples shall be approved before application.
- All valves shall be labeled with a numbered brass tag, connected to the valve with a brass jack chain. Tags shall be 2” round or square (minimum) with stamped backfilled lettering. In addition to numbers, tags shall be lettered to indicate fluid carried through the valve; e.g., “CW.” Numbers shall be keyed to the mechanical construction drawings.
- Underground Utilities: All underground utilities shall have a warning/magnetic tape. Tape shall be installed 12” below grade.
- Provide ANSI standard color coded labels on all piping at ten feet intervals. Colored pipe labels shall be printed to indicate the type of fluid carried; e.g., chilled water supply, hot water return, etc., and direction of fluid flow (arrows). Painted labels are acceptable is easily readable at a distance of 25 feet.

Table I. COLOR CODES FOR MARKING PIPE			
Material	Band	Arrow*	Legend
Fire protection water	Red	Black	FIRE PR. WATER
Hot water (domestic)	White	Black	H.W.
Hot water recirculating (domestic)	White	Black	H.W.R.
High temp. water supply	Gray	Black	H.T.W.S.
High temp. water return	Gray	Black	H.T.W.R.
Boiler feed water	Gray	Black	B.F.
Low temp. water supply (heating)	Gray	Black	L.T.W.S.
Low temp. water return (heating)	Gray	Black	L.T.W.R.
Condenser water supply	White	Black	COND.W.S.
Condenser water return	White	Black	COND.W.R.
Chilled water supply	White	Black	C.H.W.S.
Chilled water return	White	Black	C.H.W.R.
Treated water	Blue	Black	TR. WATER
Chemical feed	Blue	Black	CH.FEED
Compressed air	Gray	Green	COMP. AIR
Natural gas	Yellow	Brown	NAT. GAS
Freon	Gray	Black	FREON
Fuel oil	Yellow	Black	FUEL OIL
Steam	Gray	Black	STM.
Condensate	Gray	Black	COND.

* Where black is indicated, white shall be used if necessary to provide contrast.

TABLE II. COLOR CODE MARKING SIZES

Outside Diameter of Pipe Covering	Width of Color Band	Arrow Length x Width	Size of Legend Letters and Numerals
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		Numerals	
Less than ½”	1	2” x ½”	½”
1 ½” to 3 ½”	1	4” x 1”	¾”
3-1/2” to 6”	2	8” x 2”	1 ¼”
6” to 9”	2	12” x 3”	2”
9” to 13”	2	16” x 4”	3”
Over 13”	6	20” x 5”	3 ½”

Spare Parts and Tools

- Specify that difficult-to-obtain and manufacturer unique spare parts are to be provided upon contract completion.
- Specify that any special tools required to service equipment shall be supplied with the equipment, and that a lockable metal box be provided to hold the tools.

Documentation

O&M Manuals

- Provide four manuals to include:
 - Specification sheets showing capacity data, catalog cuts, and parts list. Unnecessary information should be removed from manufacturer’s catalogs so that a lean usable document is provided.
 - Operation and maintenance information.
 - Contacts or identification of local representatives for each item of equipment.
 - Specify O&M manuals are to be submitted within 30 calendar days after approval of equipment submittals and resubmitted 15 calendar days prior to scheduled training for use in training sessions. Any corrections required to the manual as a result of the training effort are to be corrected by the contractor. Final submittal of the manual is to occur within 15 calendar days after training completion.

As-Built Drawings

- The contractor shall provide corrected contract drawings, indicating as-built conditions, 15 calendar days prior to contract completion. Deficiencies discovered shall be corrected by the contractor, and completed drawings are to be submitted, on mylar using AutoCAD version 12 or 13.

Contract Drawings

- The designer shall provide a separate full sheet drawing of the mechanical equipment room, showing layout of all equipment with adequate clearances for proper maintenance and repair.
- Provide a separate piping diagram for each pipe system showing location of all valves. Valves are to be numbered on the diagram and are also to be listed in a valve schedule. Valve numbers are to agree with valve tags (see IDENTIFICATION).
- Provide control system drawings.
- Provide a large scale (small size) floor plan showing all zone boundaries with numerical identification of each zone.

Mechanical Room Documentation

- Specify that the contractor is to provide the following information, each sheet laminated and permanently mounted under clear Plexiglas, in each mechanical equipment room:
 - Half-sized ductwork plan.
 - Piping schematics and valve schedules.
 - Control schematics and description of operation.
 - Control panel layout and description of components.

Mechanical Specifications

- Use high efficiency motors for all applications. Follow the guidelines in NEMA Standard MG-1 and Energy Policy Act 1992 Efficiency Levels.
- All underground non-metallic piping shall be provided with bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4 mil thick. Tape shall include a magnetic detectable conductor and be manufactured for direct burial service.
- Do not use direct drive fans unless belt drive is not available due to small size.

Air Devices

- Ceiling diffusers: Perforated face with fully adjustable and removable face fabricated of steel with baked enamel finish. Round neck adapter If required. Provide with opposed blade damper. Krueger series 1100 or approved equal.
- Ceiling return and exhaust grilles: Extruded aluminum frame containing a fixed core of ½" x ½" x ½" fabricated aluminum squares. Baked enamel finish. Provide with opposed blade damper only for ducted return or exhaust systems with multiple grilles. Krueger series EGC-5 or approved equal. Grilles in T-bar type ceilings shall be either 10"x 22" or 22" x 22".

- Supply grilles: Vertical front with horizontal rear deflection blades, spaced on ¾” centers, individually adjustable front and rear, 1-1/4” margin frame with countersunk screw mounting. Fabricate of aluminum extrusions with factory clear lacquer finish. Provide with opposed blade damper. Krueger series AL5880 V or approved equal.
- Return and exhaust grilles: Vertical front deflection blades, spaced on ¾” centers, individually adjustable, 1-1/4” margin frame with countersunk screw mounting. Fabricate of aluminum extrusion. Provide with opposed blade damper. Krueger series AL580 V or approved equal.

Circulating Pumps

- Circulating pumps for closed hot-water and chilled-water systems shall have mechanical seals. Provide two spare seals for each pump supplied.

Air Filters

- Air filters shall be disposable type. Provide 30% pleated type for all designs.

Heating Hot Water Boilers

- Hot water boilers shall be jacketed, sectional cast-iron type with solid state electronic flame safeguard protection and appropriate flame response time.

Fire Dampers

- Fire dampers shall be specified with blades out of air stream.

Energy

- All designs shall comply with ASHRAE Standard 90.1
- For the type of equipment selected, opt for the most energy efficient equipment available.
- Waste heat shall be recovered for use in any re-heat within air conditioning systems.

Testing and Balancing

- AABC forms shall be included as part of the specification for all projects requiring test and balancing as part of the specification.
- All new HVAC work or renovation shall include Test and Balancing as part of the specification

Plumbing

- Fixture faucets shall be specified as Delta Model 300 WF for kitchen applications, Model 101 or 570 WF for lounge sink applications, Model 2121 HDF for janitor sink applications, Model 520 WF (Model 516 WFHDF for handicap) for lavatory applications, Model 621 for

shower applications and Model 641 for bathtub applications or approved equal, utilizing the same repair kits as the Delta faucets, to match the base standard.

- Flushometers shall be specified as Sloan Royal water saving flushometers, or approved equal, to match the base standard.
- Provide the floor drains in every area that has a water closet. Provide a hose bib to prime trap or provide trap primers.
- Underground water service piping less than 4" in diameter shall be black AWWA C901 polyethylene plastic with ASTM D2657/D3261 butt fusion fittings and joints and pre-manufactured anodeless service risers. Use 1" and 2" sizes only. Underground water mains 4" and greater shall be AWWA 0900, Class 150 PVC with AWWA C111, cast iron fittings and ASTM D3139 compression gasket ring joints. Use even sizes only.
- Provide cathodic protection for all underground metallic piping, valves, etc.
- Generally, combine vents from different stacks throughout the facility and provide only a single vent-thru-roof for entire facility.
- Are hazardous/toxic/flammable fluids used in the facility? Is an oil/water separator, acid neutralization or holding tank required?
- Specify dielectric couplings for dissimilar metal connections.
- Potable water source: The base water supply system.
- Piping materials and special outlets: All tapping shall be done with tapping tees.
- Hot water requirement: Hot water will be required for the latrines. Hot water will be generated with a gas fired water heater and hot gas heat recovery units on the chiller.
- Drinking fountains shall be provided in a convenient recessed location.
- Drain and Waste, and Venting pipe shall be PVC.
- Natural Gas: Natural gas piping from the main, to and including the gas regulator is provided by the Base gas supplier, West Florida Natural Gas Co. ((904) 872-618). Piping is of plastic and coated steel pipe.
- Hot/chilled water systems: Black steel pipe and copper tubing shall be used. Isolators shall be used where piping materials change.
- Backflow preventers shall be installed on all fire suppression systems tied into the Base water supply.

Natural Gas Supply

- Building gas service regulators for reduction from medium pressure (30-35 PSI) service to 5/8" inch w.g. will be installed outside of buildings with piping rising to above grade before entering building. Select new service regulators to include the following features: internal high pressure relief, manual reset low pressure cutoff, and orifice size, spring range, and date of manufacture stamped on the outer casing. Provide gas meter directly downstream of regulator. Provide parts listing and service/repair instructions for gas regulator and meter.
- Provide plug cocks on inlet and outlet on regulator/meter assembly with provisions to remove meter for service with minimum downtime. Service line connections to existing mains to be pressure or hot-tap, with service valve at or near connection to main.
- Underground gas piping shall be medium density yellow ASTM D2513 PE 2406 SDR11 pipe category CEC polyethylene plastic with ASTM D3261 butt fusion fittings and joints and pre-manufactured anodeless service risers. Use only 1," 2," 4," 6," and 8" gas piping.
- Underground gas valves shall be plastic and rated for that service. Provide details showing typical installation.
- Provide cathodic protection (sacrificial anode), at the point where plastic piping connects to steel piping.

Specialties

- Identify lift requirements (capacity, hook height, number of hooks, track layout, frogs, etc.).
- Provide only aboveground fuel storage tanks. Make sure they are visually screened. Check cathodic protection on connecting fuel lines (as well as cathodic protection for complete project).
- Assure elevators comply with local regulations and maintenance contractual requirements. Provide automatic rail oilers.



Electrical

Interior

- Identify all hazardous locations (NFPA 70, Article 500, and NFPA 101) and
- Symbolize fire rated construction. All fire protection equipment (alarm/detection, suppression, etc.) shall be shown on the FP series drawing. See Section 6B for fire protection, alarm and detection, design standards.
- When required, the security system shall conform to the existing base standard (Vindicator - sole source).
- Compute facility electrical demand for new construction. Modification and/or Repair to existing facility may require seasonal three day load recording to correctly establish demand. Demand plus 25% shall establish transformer size.
- Use copper conductors only. The minimum conductor size shall be #12 AWG unless approved otherwise. Conductors shall be one piece without splices except where the distance exceeds the standard lengths in which the conductor can be furnished.
- Raceway (conduit/duct, etc.) cannot be utilized as a grounding conductor. A copper conductor shall be used for grounding purposes.

- Wireways and similar type raceways shall not be used for wire taps. Taps shall be at the overcurrent protection terminal or in terminal cabinets unless preapproved.
- Conductors connected to control devices, power panels, and multipole equipment (other than 1-phase lighting, etc.) shall be labeled or tagged to reflect the terminal it is connected to and shall correspond with applicable wiring diagram/details.

Examples:

Relay - R1, R1-1 (Pole No. 1); Lighting Panel LP1, LP1-13 (Circuit No. 13);
(Hand) Manual Switch Controller - HSC1, HSC1-3, (Pole No. 3)

- Conduit/duct shall be as follows:

1/2-inch minimum size.

RSC and IMC shall be used for above grade exterior, exposed interior, fire alarm circuits and may be used for other interior circuits.

EMT may be used for non-exposed interior circuits other than fire alarm circuits, and for exposed circuits not subject to damage (as approved). EMT shall not be used in poured concrete walls and/or flooring. Indenture type fittings cannot be used.

Rigid non-metallic conduit (RNC) shall be used for underground circuits. Use Schedule 80 heavy wall RNC when not concrete encased. All conduit used for 7200 volt or greater shall be concrete encased and include spare conduit of equal capacity.

PVC coated RSC (NEMA RN1) shall be used for underground to aboveground transitions.

ENT shall not be used except for preapproved applications.

Perforated strap (plumber's tape) shall not be used to support conduit.

- Electrical enclosures shall be NEMA 4X for exterior and wet locations and NEMA 1 for interior dry locations unless approved otherwise.
- Lighting (LP) and power (PP) panelboards shall conform to FED-SPEC W-P-115, Type 1, requirements and include full size, bolt-on, circuit breakers conforming to FED-SPEC W-C-375. Each panel shall have a neatly typewritten directory with the name and/or number of the room or the equipment serviced by each circuit breaker which shall correspond with the final circuit arrangement. Where spare circuit breakers or spaces for circuit breakers occur in the directory, the directory shall be neatly marked "spare" or "space" in pencil. Nonusable spaces shall be typewritten to

read “nonusable space.” Each directory shall be mounted in a metallic index card holder behind a clear plastic window.

- Standard wiring devices shall be specifications grade. Wires shall be connected to wiring devices by means of wrapping wires around binding screws or by means of screw-on spring compression-type connectors for devices with pigtail leads.
- Device plates for finished interior walls shall be specification grade satin finished metal. Plates for unfinished walls and/or concealed areas shall be stamped metal.
- Lighting shall be energy efficient type and concur with the Energy Policy Act (EPACT) of 1992. The following shall be used as minimal requirements.

Variable/reduced lighting shall be accomplished by multiple switching and cove lighting to the extent practical.

Incandescent shall not be used except by special permission.

Standard length “T8” and compact fluorescent (color - 3500 degrees K) with matched electronic ballast (minimum 90% power factor, maximum 15% total harmonic distortion (THD)) shall be utilized for facility interior design. Fixture shall be designed for T-8 lamps since existing fixtures lose their “UL” approval when retrofitted, and their reflector surface is not designed for T-8 lamps. The use of a parabolic reflector lens should be considered if affordable. High bay locations are exceptions to this requirement.

High pressure sodium luminaries shall be utilized for high bay locations except where approved otherwise.

Exterior lighting shall be as shown on electrical details drawing ED1.

Egress/emergency lighting, when required, shall be as shown on electrical details drawing ED2. Exceptions include where electrical back-up is not required or the facility is provided with stand-by electric generation.

- Motor Control Center (MCC) shall be used versus individual motor starters for facilities with multiple motor applications unless otherwise approved. Short circuit and overload devices shall be specified for all motors. Stipulate that the contractor is responsible for obtaining approval and for all changes to the electrical system and design drawings if the actual motor(s) provided requires different than that designed.
- Generated emergency power transfer shall be accomplished by a combination automatic-transfer/bypass-isolation switch.

- Ground rod shall be minimum 5/8 inch diameter galvanized steel x 20 feet for secondary equipment and panels, x 20 feet for manholes and poles, and x 40 feet for primary equipment (transformers, switches, etc.).
- Lightning protection is normally required for facilities 10 meters (approximately 30 ft) or greater in height. Design shall consider facility mission and value and include a calculated risk analysis for areas of uncertainty. Design in accordance with NFPA 780 and AFI 32-1065.
- All equipment shall have identification nameplates in accordance with the examples shown in Appendix E1.
- Keying of all new electrical equipment shall match existing master keying (shall be “Best” removable - core type, or accept a “Best” core).
- Three phase KWH/KW meter shall be a “Landis & Staeffa” solid state type AXS4 with a programmable electronic register, KYZ output, 32K recorder under glass and a telephone modem. Single phase KWH/KW meter shall be a “Landis & Staeffa” type DXMX or DXMS with a programmable electronic register and KYZ output. Meter shall have Type II Optical Port and be capable of being read and programmed by “Landis and Gyr” DG1100 software (Government’s Lap Top Computer, remote mainframe, etc.). The recorder is/shall be capable of recording/storing a minimum of four data points and transulating via the government’s software system (L&G DG1000) in conjunction with tapping into any facility telephone line. Telephone line need not be dedicated as the recorder is/shall be intelligent to incoming/outgoing telecommunications and allow normal telephone usage. Due to the accuracy of electronic metering, Class 20 shall be minimum for transformer rated and Class 200 minimum for self-contained. Polyphase Meter shall be 3-phase, 4-wire, WYE, 3 stator. Meter socket shall have lever operated bypass with removable handle. When using remote instrument transformers, conductors to the meter shall be color coded. Conductor insulation shall be black, blue, red, and white (neutral) for voltage signal and purple, orange, yellow, and gray (neutral) for current signal conductors.
- Electrical and communications equipment spaces shall not be included in the mechanical room, a room or rooms shall be dedicated to such equipment. Minimal clearances required by the NEC (Article 110, 384) shall not be infringed upon.
- For designs involving the removal of fluorescent bulbs, the following will be included in the contract documents. Contractor will pick up empty fluorescent bulb containers from CEV and bring back the full containers to Building 6011 (open Tuesdays and Thursdays, phone 3-4780). Every precaution must be taken to preclude breaking the bulbs. Under no circumstances will fluorescent bulbs be thrown in the garbage.

Fire Protection

- All design shall be accomplished by an experienced engineer that is knowledgeable concerning the products of combustion and the protection of life and property. Such experience shall be documented in the form of registration or a verifiable resume.
- All fire protection design drawings shall be identified as such using FP series numbering system (FP1, FP2, etc.).
- Construction of fire protection systems shall be accomplished under the direction of experienced professionals licensed to work on the equipment specified. The fire protection equipment manufacturers representative shall certify the system as operational with respect to performance.
- The existing Fire Alarm Receiving Station (FRS) is a Monaco D500 plus, proprietary receiving/recording console. Coded alarms and trouble mode signals are transmitted to the FRS via wireless transceivers. Supervision is accomplished between the FRS and the FP by the same mode of communication.
- Fire protection shall utilize Cerberu Pyrotronics/Models MXL-IQ or MXL or, for small facilities requiring only simple detection (heat detector), Monaco Model M1 fire alarm control panel (FP). Although the MXL-IQ is more commonly used, the Monaco FP is a combination panel and transceiver (FX) and well suited for the small, remote, low value and non-mission essential facilities. The FP shall be the type equipment specified on the project drawings and be fully compatible with the existing FRS. The FX shall be either Monaco BT2-3 or BT2-4 for operation with Monaco antenna model BSA1 (omni-directional) at 138.925 Mhz. A directional type antenna may be required for some applications. A sketch and parts list showing all additional equipment/devices required for this compatibility shall be supplied. Where these additional equipment/devices would normally be included in the FP, they shall be supplied (i.e., dry contact relay modules).
- As previously stated most facilities shall utilize an intelligent FP (Cerberu Pyrotronics Model MXL-IQ) and a system of smoke detectors for quick response to the first product of combustion. Minimum requirements for wiring shall be Class B, Style 4, for signal line circuit (SLC), Class B, Style Y, for notification appliance circuit (NAC), and Class B, Style C, for initiating device circuit (IDC). The use of Class A SLC wiring and the mandated dual circuit and raceway configuration requires pre-approval. Detector and alarm device cable shall be a minimum of 14 AWG, copper, 300 volt, 105 degree C, for use in accordance with NFPA 70, Article 760. Use shielded cable when recommended (certain applications) by the FP manufacturer. Cable shall be listed for fire alarm use and be distinctly marked for the permitted application.
- Wiring shall be installed in EMT conduit unless in a Class I Division I area or if exposed to extreme weather conditions. External wiring between the control panel,

stations, and bells shall connect to terminal strips. Connections to the terminal strips shall be made with terminal spade lugs. A terminal cabinet with lock shall be installed any point along a circuit where a tap is made.

- Battery system shall be IAW NFPA 72, 1-5.2.5 (24 hr/5 min), be 24 volt and sized for the amperehours required plus an additional 30% minimum and be sealed nickel cadmium or approved substitute. System to include battery monitor that samples battery(s) under loaded conditions to determine capability of responding during emergency situation, and battery trouble indication. Charger as a minimum shall be UL listed, and include ammeter, voltmeter, charger “on” indicator, charger “fault” indicator with remote alarm capability, and “High Rate” indicator.
- Power source shall be in accordance with NFPA 72, 1-5.2.8.2. Panel directory shall read “Fire Alarm Circuit Control” and breaker shall be painted red similar to Fed Std 595, color 11105.
- Unless otherwise approved, total coverage detection, as per NFPA 72, 5-1.3.4, is required.
- Installed system communication with and graphic display into the FRS shall be supervised by the FP manufacturer. No more than three levels of display will be required for supervision, trouble, and alarm conditions. Programming and access to the FRS shall be coordinated with the base Fire Department (283-4777).
- Lightning/surge protection shall be a standard feature provided for all main system components. Generally, no protection is required on individual detectors and alarms unless highly recommended (proven to be necessary) by the manufacturer.
- Where electric/electronic devices, circuit boards, and like components are located in an area subject to moisture and corrosion such shall be coated and/or enclosed to resist contamination. Components in high noise areas may require shielding to protect against the effect of noise contamination. Duct (HVAC) smoke detector shall be located and mounted in such a way as to be maintenance accessible and prevent moisture into electronics/circuitry. Manufacturer shall guarantee that moisture build-up will not be a cause for failure, either by inherent design of detector or by manufacturer provided mounting (detector orientation, insulation, drains, etc.) instructions.
- Duct detector shall be provided with a visible means for indicating air flow through the detector/housing assembly. In-lieu-of a visible indication, the manufacturer and/or contractor shall measure the static pressure difference between the inlet and outlet tubes. If the manufacturer’s specified pressure differential cannot be obtained, relocate detector until satisfactory results can be obtained. Patch all unused duct penetrations and submit the measurement results for approval.
- Detector shall have a local, visible, alarm indicator. Remote alarm indicator shall be provided for detector locations not readily visible and/or accessible (plenums, above

ceilings, below raised floors, etc.). The location of such alarm indicator shall be the nearest readily visible point to the detector.

- Audible signal device shall be heavy duty and of a sound level adjustable type. Bell, chime, and horn shall be interchangeable or be a programmable unit capable of producing these audibles. When using a standard bell, gong shall be red, 6-inch diameter, die cast steel.
- Plastic tags shall be provided to identify cable and conduit runs, wiring circuits, and all spare parts. Tagging shall be consistent for cable, conduit, and circuit runs, and use a readily identifiable numbering/lettering system (zone no/FP-ZN1, circuit no/FP-TB2-10, or etc.). Field wiring shall be color coded not tagged. Color coding shall be consistent throughout system using different coding for non-identical zones.
- All locks shall be keyed alike; keys shall conform to the government's existing key requirements.
- Manual pull station shall be a non-break glass type with key lock for test and reset that matches the existing base standard key.
- Temperature detectors shall be tested by approved heat guns and smoke detectors by the use of artificial smoke.
- Manufacturer's representative shall conduct a training course at the location of the installed system. The course shall consist of hands-on operation and include the use of applicable programmer/tester, software-driven type equipment. The proper method of maintenance, troubleshooting, and programming all system components shall be covered. Training shall be coordinated with the approving authority.
- The contractor shall obtain a written warranty, the same that is offered to the general public, and deliver same to the approving authority. The warranty shall include parts, labor, prompt field service, and pick-up delivery.
- Fire flow test data is often inadequate or incorrect by the time a contract is awarded and contractor design is initiated. Fire flow test data shall be confirmed just prior to advertisement. Also, if the upgrade of water supply lines is required in project, perform Hardy Class Analysis with new supply.

Exterior

- Generally exterior design will not include overhead (pole mounted) extension's to the electric utility system. Extensions and/or service taps to the system shall be designed for underground utility service. Overhead to underground pole attachments (risers) shall include the clearances specified in ANSI C2 and these clearances reflected on the drawing(s). Include a new pole(s) in the design when these clearances (horizontal, vertical, etc.), including ground clearances of ANSI C2, Table 232-1, cannot be achieved using the existing pole as the attachment point. New poles shall be designed

to comply with ANSI C2 for Grade B construction in heavy loading district. Preservative treatment shall be chromated copper arsenate (CCA).

- Trenching across tree roots will not be tolerated. Refer to Section 3, Landscape Development for policy and guidelines.
- Conductors shall be copper. Use Type “USE” service entrance cable (NEMA WC8, NEMA WC7, UL 854) for low voltage (600V) underground service to facilities. Use EPR (NEMA WC8) or XLP (NEMA WC7) cable for medium voltage (15KV) underground distribution. 15KV cable shall be 133 percent insulation level, have metallic shield or concentric neutral, and have overall jacket. 15KV XLP cable shall be tree-retardant type (TR XLP).
- Medium voltage termination’s shall be the factory preformed type. Tape type build-up termination’s shall not be used.
- Pole mounted insulators shall have 25KV minimum rating.
- See Section 6A (8d) for duct/conduit requirements.
- Padmounted transformer shall be loop-feed dead-front type. Three-phase transformer (ANSI 57.12.26) shall have stainless steel enclosure (cabinet), pan, door pins, and hinges. Single phase transformer (ANSI 57.12.25, Type 1) shall have stainless steel tank, enclosure, and hardware. Include loadbreak switching and surge protection for transformer primaries, thermo-magnetic fault protection for single phase units, fault indicator that is observable from outside the transformer, and mounting provisions for any miscellaneous equipment (instr xfmr, meter, etc.).
- Transformer shall be selected from the following list of approved manufacturers to eliminate to cost of destructive testings. This testing is accomplished routinely on representative models in the selected manufacturers testing facility and is well documented. Only the normal production line testing is required.

Cooper Power Systems (RTE Transformer)

ABB Power T&D

General Electric

- Normal production line testing for transformers includes the following:

Resistance measurements

Polarity and phase relation

Core loss (NLL) and exciting current

Impedance and load loss (LL)
 Low frequency dielectric

Applied potential

Induced potential

Pressure leak

Sound level/temperature. Duplicate units of same rating require that one only be tested. Record test may be submitted.

- In addition certification is required to verify each transformer has passed a production line impulse test consisting of one reduced-wave and one full-wave lightning impulse test on each fully-insulated high-voltage terminal.
- Padmounted 15KV switchgear shall be dead-front, liquid filled, with stainless steel enclosure and hardware, fault indicator (observable from outside the enclosure), and mounting provisions for miscellaneous equipment. Switchgear shall have resettable over current mechanism with adjustable trip settings (dip switch, etc.).
- Miscellaneous padmounted equipment (sectionalizer, capacitor, reclosure, regulator, etc.) shall have stainless steel construction when available as an option.
- Equipment shall have identification nameplates IAW examples shown in Appendix E1.
- All equipment shall be secured by bolts, embedment, or other acceptable means. The use of resisting seismic or other natural forces by friction is not acceptable.
- All equipment over current/short circuit protection shall be fully coordinated with existing protection and be verified by graphic representation. Extensions to the existing distribution system will require system analysis (load flow, short circuit, etc.).
- Details for base standard underground and overhead electrical distribution design are available from 325 CES/CECC.
- Transformers and switchgear shall be sited to minimize their visibility yet allow maintenance access. They shall not be placed in swales.

Communication

- Criteria specified herein are minimum voice and data requirements. Design shall ensure that all communications systems (LANS, SIMMS, CATV, etc.) are identified.

Where design includes secure type systems a special working atmosphere and security clearance may be required.

- Buildings should be wired using the Electronic Industries Association (EIA) and Telecommunications Industry Association (TIA) 568A standard for the design of the cable plant. New structures or buildings must have a complete local area network and integrated voice and video infrastructure included with the design and construction of the building. All new or remodeled buildings should be connected to the Base Network Control Center (BNCC) via high speed single-mode fiber optic cable with a sufficient number of cable pairs (12 to 36 strand) to allow for future expansion.
- Generally a minimum of one voice/data instrument location shall be provided for every 48 square feet of floor area that is dedicated to administrative and information systems. Standard detail drawing ED6 (see Attach 2) shall be used as a design guide. Plan for each working station (desk or office space) at least two 10 megabit, category 5, connections. High volume data users, such as unit commanders, directorates, teleconference centers, computer aided design areas, and information systems centers shall be provided with multi-mode fiber optic cable at workstation desktop.
- All facilities whose furnishings will include systems type furniture shall be wired through underfloor ducting systems to provide two individual 4-pair telephone cables to each person's work station. All work stations will have dual non-keyed, eight-pin outlet telephone jacks installed and terminated.
- Dual modular telephone outlets shall be provided. The outlets shall comply with REA specifications, PE-76, Modular Telephone Set Hardware and FCC Rules and Regulations Part 68, Subpart F. Each non-keyed eight-position jack in the modular outlet shall contain screw terminals or tin plated phosphor, bronze type 66 clips for each conductor in the cable. Wall mounted jacks will be of the modular type and flush mounted with the "push in"/"slide down" type connector. Each outlet shall be numbered on the inside for easy identification and location, as referenced on the provided blueprint.
- Provide all auxiliary equipment/devices such as distribution rings, tie bars, etc. required for a high grade installation.
- Check requirements for cable television. Installation will be coordinated with the base franchise cable contractors.

A -Plant List

Botanical Name	Comon Name	Deciduous	Evergreen	Tolerates			Native	Water Reqmnt	Soil Requirement	Recommened Installation Size (Cal/Height Rang
				Drought Tolerant	Excessive Water	Light Requirement				
Tree -- Large (50' to 100')										
Acer rubrum	Red Maple	x		x	x	PS	x	L/M/H	Any	2"/12'-14'
Carya species	Hickory	x			x	PS	x	H	Wide Range	1-1/4"/8'-10'
Fraxinus americana	White Ash	x		x	x	PS	x	L/M/H	Acid to Alkaline	2"/12'-14'
Liquidambar styraciflua	Sweetgum	x		x	x	PS	x	L/M/H	Acid to Alkaline	1-1/4"/8'-10'
Magnolia grandiflora 'Claudia W'	Claudia W.' Southern Magnolia		x	x	x	S		M	Slightly Acid	2"/12'-14'
Magnolia grandiflora 'D. D. Blanchard'	D.D. Blanchard' Southern Magnolia		x	x	x	S		M	Slightly Acid	1-3/4"/10'-12'
Magnolia grandiflora 'Green Giant'	Green Giant' Southern Magnolia		x	x	x	S		M	Slightly Acid	1-3/4"/10'-12'
Magnolia grandiflora 'Little Gem'	Little Gem' Southern Magnolia		x		x	S		M	Slightly Acid	1-1/4"/8'-10'
Magnolia grandiflora 'Smith Fogle'	Smith Fogle' Southern Magnolia		x	x	x	S		M	Slightly Acid	1-1/4"/8'-10'
Magnolia grandiflora 'St. Mary'	St. Mary' Southern Magnolia		x	x	x	S		M	Slightly Acid	1-1/4"/8'-10'
Magnolia virginiana	Sweetbay Magnolia		x	x	x	PS	x	M	Acid	1-1/4"/8'-10'
Pinus elliotii	Slash Pine		x	x		FS	x	M	Acid	3/4"/6'-8'
Pinus palustris	Long Leaf Pine		x	x		FS	x	M	Acid	3/4"/6'-8'
Quercus falcata	Southern Red Oak	x		x		PS	x	M	Sandy to Clay	2"/12'-14'
Quercus laurifolia 'Darlington'	Darlington Oak		x	x	x	S		M	Wide Range	2"/12'-14'
Quercus michauxii	Swamp Chestnut Oak	x					x	M	Well Drained	1-1/4"/8'-10'
Quercus phellos	Willow Oak	x					x	M-H	Wide Range	2"/12'-14'
Quercus shumardii	Shumard Red Oak					PS	x	M	Fertile/Acid/Alka	2"/12'-14'
Quercus virginanna	Live Oak	x	x	x		S	x	M	Well Drain/Acid	2"/12'-14'
Taxodium distichum	Bald Cypress			x	x	S	x	L-H	Wide Range	2"/12'-14'

FACILITY EXCELLENCE PLAN

Botanical Name	Comon Name	Deciduous	Evergreen	Tolerates			Native	Water Reqmnt	Soil Requirement	Recommened Installation Size (Cal/Height Rang
				Drought Tolerant	Excessive Water	Light Requirement				
Trees -- Medium (20'-50')		x								
Betula nigra	River Birch			x	x	PS	x	L-H	Slightly Acid	1-1/4"/8'-10'
Diospuros virginiana	Persimmon	x		x	x	S	x	L-H	Wide Range	3/4"/6'-8'
Gleditsia triacanthos 'Skyline'	Skyline Honeylocust	x		x	x	FS		L-H	Acid to Alkaline	1"/8'-10'
Gordonia lasianthus	Loblolly Bay	x	x		x	PS	x	H	Acid	1"/8'-10'
Ilex latifolia	Lusterleaf Holly		x			S		M	Acid, Well Drain	1"/8'-10'
Ilex opaca	American Holly		x	x	x	PS	x	L-H	Acid, Well Drain	1"/8'-10'
Ilex x attenuata 'Eagleston'	Eagleston Holly		x	x		PS		M	Slightly Acid	1"/8'-10'
Ilex x attenuata 'East Palatka'	East Palatka Holly		x	x		PS		M	Slightly Acid	1"/8'-10'
Ilex x attenuata 'Hume'	Hume Holly		x	x		PS		M	Slightly Acid	1"/8'-10'
Juniperus virginiana silicicola	Easter Red Cedar		x	x		S	x	M	Acid to Alkaline	1-3/4"/10'-12'
Nyssa spp.	Tupelo (Black Gum)			x	x	PS	x	M	Slightly Acid	1"/8'-10'
Oxydendron arboreum	Sourwood	x		x	x	PS	x	M	Well Drain, Acid	1"/8'-10'
Pinus thunbergiana	Japanese Black Pine	x	x	x		S		L	Well Drain, Fertile	1"/8'-10'
Pistache chinensis	Chinses Pistache					S		M	Wide Range	1"/8'-10'
Pyrus calleryana 'Bradford'	Bradford Pear	x				PS		M	Wide Range	1"/8'-10'
Quercus stellata	Post Oak	x								1"/8'-10'
Ulmus parvifolia	Chinese Elm	x		x	x	PS		M	Acid to Alkaline	1"/8'-10'
Trees -- Small (10'-20')		x								
Acer barbatum	Florida Maple			x	x	PS	x	M	Acid to Alkaline	1"/8'-10'
Aesculus pavia	Red Buckeye	x		x	x	S	x	M	Acid to Alkaline	1"/8'-10'
Chionanthus virginicus	Fringe Tree	x			x	PS	x	M	Acid	3/4"/6'-8'
Cornus florida	Dogwood	x				S	x	M	Acid	1"/8'-10'

Tolerates

Recommened

FACILITY EXCELLENCE PLAN

Botanical Name	Comon Name	Deciduous	Evergreen	Drought Tolerant	Excessive Water	Light Requirement	Native	Water Reqmnt	Soil Requirement	Installation Size (Cal/Height Rang
Tree -- Large (50' to 100')										
Crataegus lacrimata	Pensacola Hawthorne			x Well Drained	x Well Drained	FS	x	M	Acid to Alkaline	3/4"/6'-8'
Cyrilla racemiflora	Titi	x	x		x		x	H	Wide Range	3/4"/6'-8'
Ilex cassine	Dahoon Holly		x		x	FS	x	M-H	Acid	1"/8'-10'
Ilex vomitoria 'Pendula'	Weeping Yaupon		x	x	x	FS/PS		M	Acid to Alkaline	1/2"/5'-6'
Ilex vomitoria 'Roundleaf'	Tree Form Yaupon		x	x	x	FS		M	Acid to Alkaline	3/4"/6'-8'
Lagerstroemia indica 'Basham's'	Basham's Party Pink Crape Myrtle			x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Biloxi'	Biloxi Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Miami'	Miami Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Muskogee'	Muskogee Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Natchez'	Natchez Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
			x							
Trees -- Small (10'-20')										
Lagerstroemia indica 'Potamac'	Potomac Crape Myrtle			x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Regal Red'	Regal Red Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Lagerstroemia indica 'Tuscarora'	Tuscarora Crape Myrtle	x		x		FS		M	Acid to Alkaline	1-1/4"/8'-10'
Ligustrum japonicum	Tree Form Ligustrum	x	x	x		FS/PS		M	Acid to Alkaline	3/4"/6'-8'
Magnolia soulangiana	Suacer Magnolia				x	PS		M	Slightly Acid	1-1/4"/8'-10'
Magnolia stellata 'Royal Star'	Star Magnolia	x			x	PS		M	Well Drain,Fertile	1-1/4"/8'-10'
Myrica cerifera	Wax Myrtle	x	x	x	x	FS/PS	x	L-H	Wide Range	1"/8'-10'
Vitex agnus-castus	Lilac Chaste Tree			x		FS		L	Wide Range	7 Gal.
		x			Tolerates					Recommendec
				Drought	Excessive	Light		Water	Soil	Installation Size

FACILITY EXCELLENCE PLAN

Botanical Name	Comon Name	Deciduou	Evergreen	Tolerant	Water	Requirement	Native	Reqmnt	Requirement	(Cal/Height Rang
Shrubs -- Large (8' to 15')										
Aesculus parviflora	Bottlebrush Buckeye			x	x	FS	x	L-H	Acid to Alkaline	5-7 Gal.
Camellia japonica	Japanese Camellia	x	x			FS/PS		M	High Organic/Acid	7 Gal.
Cleyera japonica	Japanese Cleyera		x	x		S/PS		M-H	Well Drain/Med Fert	3 Gal.
Feijoa sellowiana	Pineapple Guava		x	x		FS/PS		L	Organic	3 Gal.
Hibiscus syriacus	Shrub Althea					S/PS		L-M	Acid to Alkaline	3 Gal.
Ilex cornuta 'Burfordii'	Burford Holly	x	x	x		FS/PS		M	Slightly Acid	7 Gal.
Ilex cornuta 'Nellie R. Stevens'	Nellie Stevens Holly		x	x		FS/PS		M	Slightly Acid	7 Gal.
Illicium parviflorum	Anise		x	x	x	FS/S		M	High Fertility	5 Gal.
Michellia figo	Banana Shrub		x	x		PS		M	Acid	7 Gal.
Nerium oleander	Oleander		x	x		PS		M	Alkaline	5 Gal.
Osmanthus fragrans	Tea Olive		x	x		FS/PS		M	Acid	5 Gal.
Philadelphus coronarius	Mockorange			x		FS/PS		M	Wide Range	3 Gal.
Pittosporum tobira	Pittosporum	x	x	x		FS/PS		M	Slightly Acid	3 Gal.
Punica granatum	Pomegranate			x		FS/PS		M	Wide Range	3 Gal.
Raphiolepis 'Majestic Beauty'	Majestic Beauty Hawthorne	x	x	x		FS		M	Slightly Acid	3 Gal.
Viburnum odoratissum	Sweet Virburnum		x	x		FS		M	Wide Range	3 Gal.
Shrubs -- Medium (4'-8')										
Aucuba japonica	Japanese Aucuba		x			S		M	Acid	3 Gal.
Buddleia davidii	Butterfly Bush		x			S		M	Alkaline	3 Gal.
Callicarpa americana	Beauty Bush			x	x	PS	x	M-H	Acid to Alkaline	3 Gal.
Calycanthus floridus	Carolina Allspice	x		x	x	FS	x	M	Wide Range	3 Gal.
Camellia sasanqua	Sasanqua Camellia	x	x	x		FS/PS		M	Slightly Acid	5 Gal.
Fatsia japonica	Fatsia		x	x		PS		M	Organic	3 Gal.
Hydrangea macrophylla	French Hydrangea					PS		M	Acid to Alkaline	3 Gal.
Hydrangea quercifolia	Oakleaf Hydrangea	x				PS	x	M	Acid to Alkaline	3 Gal.

Recommended

Tolerates

FACILITY EXCELLENCE PLAN

Botanical Name	Comon Name	Deciduous	Evergreen	Drought Tolerant	Excessive Water	Light Requirement	Native	Water Reqmnt	Soil Requirement	Installation Size (Cal/Height Rang
Tree -- Large (50' to 100')										
Ilex cornuta 'Burfordii Nana'	Dwarf Burford Holly		x	x		FS/PS		M	Slightly Acid	3 Gal.
Ilex cornuta 'Needlepoint'	Needlepoint Holly		x	x		FS/PS		M	Slightly Acid	3 Gal.
Juniperus chinensis 'Pfitzeriana'	Pfizer's Juniper		x	x		FS		M	Alkaline to Acid	3 Gal.
Mahonia bealei	Leatherleaf Mahonia		x			PS		M	Acid to Slightly Alk	3 Gal.
Pittosporum tobira 'Variegata'	Variegated Pittosporum		x	x		FS/PS		M	Slightly Acid	3 Gal.
Rhododendron canescens	Piedmont Azalea			x		PS	x	M	Slightly Acid	3 Gal.
Rhododendron species	Southern Indica Azalea	x	x			PS		M-H	Acid Organic	3 Gal.
Rosa laevigata	Cherokee Rse		x			FS		M	Wide Range	3 Gal.
Spirea species	Bridal Wreath			x		FS		M	Wide Range	3 Gal.
Weigela florida	Weigela	x		x		FS		L-M	Wide Range/Drained	3 Gal.
Yucca filamentosa	Adam's Needle	x	x	x		FS	x	L	Wide Range/Drained	3 Gal.
Yucca pendula	Soft-Tipped Yucca		x	x		FS	x	L	Well Drain/Alkaline	3 Gal.
©										
Shrubs -- Small (1' to 4')										
Buxus microphylla japonica	Japanese Boxwood		x			PS/S		M	Slightly Acid	3 Gal.
Cycas revoluta	King Sago		x	x		PS/S		M	Fertile, Slightly Acid	3 Gal.
Deutzia gracilis'Nikko'	Dwarf Slender Deutzia							M	Acid to Alkaline	3 Gal.
Ilex cornuta 'Carissa'	Carissa Holly	x	x	x		FS/PS		M	Slightly Acid	3 Gal.
Ilex crenata 'Compacta'	Japanese Holly		x	x		FS/PS		M	Slightly Acid	3 Gal.
Ilex crenata 'Helleri'	Helleri Holly		x	x		FS/PS		M	Slightly Acid	3 Gal.
Ilex vomitoria 'Schilling's'	Stoke's Dwarf Yaupon		x	x		FS/S		L-M	Acid to Alkaline	3 Gal.
Juniperus chinensis 'Nick's'	Nick's Compact Juniper		x	x		FS		L-M	Wide Range	3 Gal.

Botanical Name	Comon Name	Deciduous	Evergreen	Drought Tolerant	Tolerates Excessive Water	Light Requirement	Native	Water Reqmnt	Soil Requirement	Recommended Installation Size (Gal/Height Range)
Juniperus davurica 'Expansa'	Parson's Juniper		x	x		FS		L-M	Wide Range	3 Gal.
Juniperus procumbens	Japanese Garden Juniper		x	x		FS		L-M	Alkaline to Acid	3 Gal.
Shrubs -- Small (1' to 4')										
Philodendron selloum	Split-Leaf Philodendron			x		FS/S		M-H	Moiste Fertile	3 Gal.
Pittosporum tobira 'Wheerli'	Wheeler's Dwarf Pittosporum	x	x	x		FS/S		M	Slightly Acid	1 Gal.
Raphiolepis indica 'Alba' or 'Clara'	Indian Hawthorn		x	x		FS/PS		M	Slightly Alkaline	3 Gal.
Rhododendron 'Red Ruffle'	Red Ruffle' Azeala		x					M	Acid/Organic	3 Gal.
Serenoa repens	Palmetto		x	x		S	x	M-L	Alkaline to Acid	7 Gal.
Groundcovers (6" to 18")										
Ajuga repens	Buglewood		x		x	FS/PS		M-H	Well Drained	1 Gal.
Cyrtomium falcatum	Holly Fern		x			S		M	Organic	3 Gal.
Hedera helix 'Hahn's'	Hahn's Ivy		x	x	x	S		M-H	Organic	1 Gal.
Juniperus chinensis 'Sargeantii'	Sergeant's Juniper		x	x		FS		L-M	Wide Range	1 Gal.
Juniperus conferta 'Blue Pacific'	Blue Pacific Juniper		x	x		FS		L	Wide Range	1 Gal.
Juniperus horizontalis 'Plumosa Compacta'	Andorra Compacta Juniper		x	x		FS		L	Slightly Alkaline	1 Gal.
Juniperus horizontalis 'Wiltonii'	Blue Rug Juniper		x	x		FS		L	Slightly Alkaline	1 Gal.
Juniperus procumbens 'Nana'	Dwarf Japanese Garden Juniper		x	x	x	S		L	Alkaline to Acid	1 Gal.
Liriope muscari 'Evergreen Giant'	Evergreen Giant Liriope		x	x		S		M	Wide Range	1 Gal.

B - Interior Design Materials Selection Charts

1. Residential Interior Design Materials Selection Chart
2. Lodging Interior Design Materials Selection Chart
3. Food Service Area Interior Design Materials Selection Chart
4. Office/Administrative Interior Design Materials Selection Chart
5. Maintenance/Warehouse Interior Design Materials Selection Chart
6. Recreation Interior Design Materials Selection Chart
7. Medical Interior Design Materials Selection Chart
8. Educational Interior Design Materials Selection Chart (Heavy use)
9. Religious Activities Interior Design Materials Selection Chart (Heavy use)
10. Squadron Operations/Aircraft Maintenance Units

Categories of use as identified in Attachments 1 through 9 are:

HEAVY-USE AREAS: Wet areas (restrooms, kitchens, laboratories), high traffic areas, and areas requiring maximum product durability

MEDIUM-USE AREAS: Areas used every day, but not by large numbers of people. Generally the finishes do not experience heavy wear and tear

LIGHT-USE AREAS: Areas which experience low traffic and light daily use
Residential Interior Design Materials Selection Chart (Heavy-Use)

1 Residential Interior Design Material Selection Chart (Heavy-Use)

Materials	Heavy-Use high traffic areas, entrance foyers, day rooms, kitchens, bathrooms, stairwells, laundry, vending areas, corridors, hallways,	
	DORMITORIES	FAMILY HOUSING
HARD SURFACE FLOOR	ceramic tile quarry tile vinyl composition tile	natural stone ceramic tile sheet vinyl wood
CARPET	loop pile	cut pile loop pile
BASE	ceramic tile quarry tile rubber base	ceramic tile wood
WALLS	ceramic tile paint (semi-gloss to gloss) plastic laminate	paint (eggshell, semi-gloss, or gloss) vinyl wallcovering (limited)
CHAIR RAIL	molded plastic plastic laminate wood	wood
CEILING	acoustical tile gypsum board	gypsum board plaster
LIGHTING	fluorescent incandescent	fluorescent (kitchen & bath only) incandescent
WINDOW COVERING	vertical blinds horizontal blinds lined draperies	shades lined draperies horizontal blinds
UPHOLSTERY	fabric (50,000+ DR*)	N/A

*DR = Double Rubs

1 (cont'd) Residential Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use family room, dining room, offices, sleeping rooms	
	DORMITORIES	FAMILY HOUSING
FLOORS	carpet (cut or cut & loop)	wood carpet (cut or cut & loop)
BASE	wood rubber base	wood rubber base
WALLS	vinyl wallcovering paint (eggshell)	paint (eggshell) vinyl wallcovering wall paper
CHAIR RAIL	wood	wood
CEILING	acoustical tile gypsum board	gypsum board plaster
LIGHTING	fluorescent incandescent	incandescent
WINDOW COVERING	vertical blinds horizontal blinds lined draperies w/ blinds	shades lined draperies horizontal blinds vertical blinds sheer draperies
UPHOLSTERY	fabric (25,000+ DR)	N/A

2 Lodging Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use registration desks, lobby foyers, stairwells, elevators, corridors, laundry rooms, snack areas, vending areas, & restrooms
	LODGING
FLOOR	natural stone carpet (loop) ceramic tile quarry tile vinyl composition tile
BASE	natural stone ceramic tile quarry tile rubber base wood
WALLS	ceramic tile paint (eggshell to gloss) fabric wallcovering (heavy duty) vinyl wallcovering masonry (if carried in from the exterior)
CHAIRRAIL/CORNER GUARDS	molded plastic plastic laminate wood
CEILING	acoustical tile gypsum board plaster specials
LIGHTING	fluorescent incandescent specials
WINDOW COVERING	vertical blinds horizontal blinds lined draperies heavy duty shades
UPHOLSTERY	fabric (50,000+ DR)

2 (cont'd) Lodging Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use sleeping rooms, dressing areas, management and administrative areas
	LODGING
FLOOR	carpet in admin areas (loop & cut loop) carpet in sleeping rooms/dressing areas (cut pile, loop, or cut & loop)
BASE	rubber base wood
WALLS	fiberglass wallboard w/ paint (eggshell) paint (eggshell) vinyl wallcovering
CHAIR RAIL	limited
CEILING	plaster acoustical tile gypsum board
LIGHTING	fluorescent (lamps & building lighting) incandescent
WINDOW COVERING	vertical blinds horizontal blinds lined draperies
UPHOLSTERY	fabric (50,000+ DR)

3 Food Service Area Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use high traffic areas, lobby, wet areas, restrooms, corridors, and serving lines
	FOOD SERVICE
FLOOR	natural stone ceramic tile quarry tile vinyl composition tile
BASE	ceramic tile quarry tile rubber base
WALLS	fiberglass wallboard w/ paint (satin to glossy) ceramic tile paint (satin to glossy) vinyl wallcovering masonry (if carried in from the exterior)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic plastic laminate wood
CEILING	plaster gypsum board (water resistant) specials
LIGHTING	fluorescent incandescent specials
WINDOW COVERING	vertical blinds horizontal blinds heavy duty shades
UPHOLSTERY	fabric (50,000+ DR) vinyl

3 (cont'd) Food Service Area Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use dining areas, management and administrative areas
	FOOD SERVICE
FLOOR	carpet in admin areas (loop pile) carpet in dining rooms (cut or cut & loop pile) vinyl composition tile natural stone (dining area only)
BASE	rubber base wood
WALLS	paint (eggshell) vinyl wallcovering masonry (if carried in from the exterior)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	wood molded plastic
CEILING	fluorescent gypsum board specials
LIGHTING	fluorescent incandescent
WINDOW COVERING	vertical blinds horizontal blinds specials heavy duty shades
UPHOLSTERY	fabric (25,000+ DR) vinyl seat with fabric back

4 Office/Administrative Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use entrances, foyers, lobbies, main circulation corridors, stairwells, elevators, restrooms, large conference or meeting rooms, snack bars, coffee areas, loading dock, and media production areas
	OFFICE/ADMINISTRATIVE
FLOOR	natural stone carpet (loop) ceramic tile quarry tile vinyl composition tile
BASE	natural stone ceramic tile quarry tile rubber base wood
WALLS	ceramic tile paint (eggshell to gloss) vinyl wallcovering masonry (if carried in from the exterior) fiberglass wallboard with paint (eggshell to glossy)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	plaster acoustical tile gypsum board specials
LIGHTING	fluorescent incandescent specials
WINDOW COVERING	vertical blinds horizontal blinds lined draperies heavy duty shades
UPHOLSTERY	fabric (50,000+ DR) vinyl seat with fabric back

4 (cont'd) Office/Administrative Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use internal circulation, staff office areas, and small conference rooms
	OFFICE/ADMINISTRATIVE
FLOOR	carpet (loop & cut & loop)
BASE	wood rubber base
WALLS	paint (eggshell) vinyl wallcovering fabric wallcovering (heavy duty) masonry (if carried in from the exterior)
CHAIRRAIL/CROWN MOULD	molded plastic wood
CEILING	acoustical tile plaster gypsum board
LIGHTING	fluorescent incandescent specials
WINDOW COVERING	vertical blinds horizontal blinds lined draperies
UPHOLSTERY	fabric (25,000+ DR)

4 (cont'd) Office/Administrative Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use commander's suite and private office areas
	OFFICE/ADMINISTRATIVE
FLOOR	carpet (loop, cut & loop, cut)
BASE	wood rubber base
WALLS	paint vinyl wallcovering fabric wallcovering masonry (if carried in from the exterior) wood (wainscot)
CHAIRRAIL/CROWN MOULD	wood
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent incandescent specials
WINDOW COVERING	vertical blinds horizontal blinds lined draperies
UPHOLSTERY	fabric (25,000+ DR) leather

5 Maintenance/Warehouse Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use areas constantly subject to traffic, cleaning, abrasion, weather, or other deterrents to building finishes
	MAINTENANCE/WAREHOUSE
FLOOR	concrete (sealed) ceramic tile quarry tile
BASE	ceramic tile quarry tile rubber base
WALLS	paint (semi-gloss to gloss) masonry (if carried in from the exterior)
CHAIRRAIL/CORNER GUARDS	molded plastic
CEILING	exposed gypsum board (water resistant)
LIGHTING	fluorescent HID specials
WINDOW COVERING	horizontal blinds heavy duty shades
UPHOLSTERY	vinyl

5 (cont'd) Maintenance/Warehouse Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use administrative areas located separately from the heavy-duty areas
	MAINTENANCE/WAREHOUSE
FLOOR	carpet (loop) vinyl composition tile
BASE	rubber base
WALLS	paint (eggshell to semi-gloss) masonry (if carried in from the exterior) vinyl wallcovering
CHAIRRAIL/CORNER GUARDS	molded plastic
CEILING	acoustical tile
LIGHTING	fluorescent
WINDOW COVERING	horizontal blinds vertical blinds heavy duty shades
UPHOLSTERY	fabric (25,000+DR) vinyl

5 (cont'd) Maintenance/Warehouse Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use commander's suite if separate from high-use areas
	MAINTENANCE/WAREHOUSE
FLOOR	carpet (loop, cut & loop, cut)
BASE	wood rubber base
WALLS	paint (eggshell) masonry (if carried in from the exterior) vinyl wallcovering fabric wallcovering fiberglass wallboard with paint
CHAIR RAIL	wood
CEILING	acoustical tile gypsum board plaster
LIGHTING	incandescent fluorescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies
UPHOLSTERY	fabric (25,000+DR) leather

6 Recreation Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use most areas because of the high volume of customers - entrances, foyers, lobbies, main circulation corridors, stairwells, restrooms, locker rooms, weight rooms, meeting rooms, snack bars, coffee areas, kitchen and eating areas
	RECREATION
FLOOR	carpet (loop); carpet food service areas (cut pile) vinyl composition tile ceramic tile quarry tile wood specials natural stone
BASE	ceramic tile quarry tile rubber base
WALLS	paint (eggshell to gloss) masonry (if carried in from the exterior) vinyl wallcovering ceramic tile acoustical wallcovering (heavy duty)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	exposed gypsum board (water resistant) acoustical tile
LIGHTING	fluorescent HID incandescent
WINDOW COVERING	horizontal blinds vertical blinds heavy duty shades
UPHOLSTERY	vinyl seat with fabric back fabric (50,000+DR)

6 (cont'd) Recreation Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use internal circulation, staff offices, and administration areas
	RECREATION
FLOOR	carpet (loop, cut & loop)
BASE	rubber base
WALLS	paint (eggshell) masonry (if carried in from the exterior) vinyl wallcovering acoustical wallcovering (heavy duty) fiberglass wallboard (painted)
CHAIRRAIL/CROWN MOULD	molded plastic wood
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent HID incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shades
UPHOLSTERY	fabric (50,000+DR)

7 Medical Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use clean areas, patient rooms, wet areas, loading docks, selected corridors, restrooms, locker rooms, and areas where chemicals are used.
	MEDICAL
FLOOR	monolithic poured floor vinyl composition tile ceramic tile quarry tile sheet vinyl special carpet tiles in corridors
BASE	poured floor turned up the wall as a base ceramic tile quarry tile rubber base coved sheet vinyl
WALLS	paint (semi-gloss to gloss) ceramic tile vinyl wallcovering (heavy duty)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	gypsum board (water resistant) acoustical tile
LIGHTING	fluorescent HID special
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shades
UPHOLSTERY	vinyl fabric (50,000+DR)

7 (cont'd) Medical Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use patient waiting areas, administrative and doctor's offices, and selected corridors.
	MEDICAL
FLOOR	vinyl composition tile carpet or carpet tile (loop)
BASE	rubber base wood
WALLS	paint acoustical wall treatment vinyl wallcovering (heavy duty)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic
CEILING	gypsum board (water resistant) acoustical tile
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shades
UPHOLSTERY	vinyl fabric (50,000+DR)

7 (cont'd) Medical Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use commander's office suite and conference rooms.
	MEDICAL
FLOOR	carpet (loop, cut & loop, cut)
BASE	rubber base wood
WALLS	paint (eggshell) acoustical wall treatment vinyl wallcovering (heavy duty) fabric wallcovering
CHAIRRAIL/CROWN MOULD	wood
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies
UPHOLSTERY	fabric (25,000+DR) leather

8 Educational Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use entrances, foyers, snack bar and cafeteria service areas, restrooms, fitness areas, simulator rooms, and technical classrooms.
	EDUCATIONAL
FLOOR	natural stone carpet (loop) vinyl composition tile/sheet vinyl ceramic tile quarry tile
BASE	natural stone ceramic tile quarry tile rubber base coved sheet vinyl
WALLS	paint (semi-gloss to gloss) ceramic tile vinyl wallcovering (type II)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent HID
WINDOW COVERING	horizontal blinds vertical blinds heavy duty shades
UPHOLSTERY	vinyl molded plastic vinyl seat with fabric back

8 (cont'd) Educational Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use administrative offices, conference and briefing rooms, classrooms, and corridors
	EDUCATIONAL
FLOOR	carpet (loop) vinyl composition tile/sheet vinyl
BASE	rubber base coved sheet vinyl
WALLS	paint vinyl wallcovering (type II) acoustical wall treatment (heavy duty)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	wood molded plastic
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shade
UPHOLSTERY	vinyl fabric (50,000+DR) molded plastic wood

8 (cont'd) Educational Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use principal's office and commandant's suite
	EDUCATIONAL
FLOOR	carpet (loop, cut & loop, cut)
BASE	rubber base wood
WALLS	paint (eggshell) vinyl wallcovering) fabric wallcovering
CHAIRRAIL/CROWN MOULD	wood molded plastic
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies
UPHOLSTERY	fabric (25,000+DR) leather

9 Religious Activities Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use worship area, sanctuary, narthex, choir room, cry room, blessed sacrament and reconciliation room, entrance foyer, kitchen, cafeteria/assembly room, activities center, restrooms
	RELIGIOUS ACTIVITIES
FLOOR	natural stone carpet (loop, cut & loop) vinyl composition tile ceramic tile quarry tile
BASE	natural stone ceramic tile quarry tile rubber base wood
WALLS	paint (eggshell to gloss) ceramic tile vinyl wallcovering (type II)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	gypsum board acoustical tile (not suspended in sanctuary) special
LIGHTING	fluorescent HID
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shades
UPHOLSTERY	fabric (50,000+DR) vinyl molded plastic wood

9 (cont'd) Religious Activities Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use administrative offices, conference and briefing rooms, classrooms, and corridors
	RELIGIOUS ACTIVITIES
FLOOR	carpet (loop or cut & loop) vinyl composition tile/sheet vinyl
BASE	rubber base
WALLS	paint acoustical wall treatment vinyl wallcovering (type II)
CHAIRRAIL/CORNER GUARDS/CROWN MOULD	molded plastic wood
CEILING	acoustical tile gypsum board
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies heavy duty shades
UPHOLSTERY	fabric (25,000+DR) vinyl molded plastic

9 (cont'd) Religious Activities Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use chaplain's office and commander's suite
	RELIGIOUS ACTIVITIES
FLOOR	carpet (loop, cut & loop, cut)
BASE	rubber base wood
WALLS	paint (eggshell) fabric wallcovering vinyl wallcovering
CHAIRRAIL/CROWN MOULD	wood
CEILING	gypsum board acoustical tile
LIGHTING	fluorescent incandescent
WINDOW COVERING	horizontal blinds vertical blinds lined draperies
UPHOLSTERY	fabric (25,000+DR)

C - Electrical Identification Nameplates

- Major items of electrical equipment shall be permanently marked with an identification nameplate to identify the equipment by a specific equipment number. Unless otherwise specified, all identification nameplates shall be made from laminated plastic in accordance with FED SPEC L-P-387 with black outer layers and a white core. Edges shall be chamfered. Plates shall be fastened with black-finished round-head drive screws or approved non-adhesive metal fasteners. Identification number for different equipment types shall have 1/4” or 1/8” high letters as follows:

Min 1/4-Inch High Letters

Panelboards (PP 1, LP 2)
 Equipment Air Handling Units
 Starters (MSI)
 Exhaust Fans
 Pumps (AHI, Efl, PCWI, etc.)
 Disconnect Switches (Dsl)
 Transformers (XDI)

Min 1/8-Inch High Letter

Control Power Transformers (XC1)
 Control Devices (Relays, Contactors, Fire Protection Control Panel, etc. - RI, LCI, FPI, etc.).

- Provide nameplates for the following types of equipment and where indicated on the project drawings.

Panelboards

LTG P1 (NEC 348-14)
 POWER PP1
 SWITCHBOA SB1
 SWITCHGEA SG1

Transformers

LIGHTING XL1
 DISTR XD1
 CONTR PWR XC1
 STEPPING, E XB1

Motor Control

MOTOR CON MCC1
 MOTOR STA MS1
 MANUAL COIMC1
 LTG CONTR LC1
 CONTACT OF C1
 RELAY R1
 CONTROL P/ Cp1

Disconnect Switch

FUSED DS1
 NON-FUSED DS1
 Note: Differentiated by Dwg symbology
 EMER SHUT I SD1

Switching

TIMER TM1
 PHOTOELEC PE1
 PUSHBUTTC PB1
 SELECTOR SL1
 EMER SHUT I EPB1
 FLOW FS1
 PRESSURE PS1
 LEVEL VS1
 LIMIT LS1
 ELEC (SOLEI) ES1

Name Tag / Nameplate Examples

MC!, LATRINE FAN R3 (FIRE ALARM),
 FAN SHUTDOWN (NFPA 37,3-3.1 (G))
 Note: Abbreviations used for description
 shall be in accordance with ANSI Y1.1.

Equipment

CHILLER CHL1
 BOILER BLR1
 AIR HANDLIN Ah1
 EXHAUST FA EF1
 HVAC / PACK AC1

Emergency Power

XFER SWITC XS1
 ENGINE / GE GN1
 BATTERY CHAF BC1

Fire Protection

FACP FP1
 FIRE ALARM FX1
 DATA TERM DTC1
 HVAC CONTI EC1
 HEATER-UNI HT1
 PUMP-FIRE PFW1
 PUMP-COOL PCW1
 PUMP-HOT V PHW1

Miscellaneous

TELE BOARD TB1

D - Acknowledgments

- We would like to thank the following people for their support in the preparation of this document:

Lt. Col. James P. Holland	325 th CES/CC
Chaman L Khanna	325 th CES/CECC
Michael Giniger	325 th CES/CECC
John Sabochick	325 th CES/CE-1
Ken Gleason	325 th CES/CEC
Capt. Kurt Bergman	325 th CES/CECC
Derryl Sullivan	325 th CES/CECC
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Keri Barnes	325 th CES/CECC
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