UFC 4-750-07
20 April 2020

UNIFIED FACILITIES CRITERIA (UFC)

RECREATIONAL AQUATIC FACILITIES

UNIFIED FACILITIES CRITERIA (UFC)

AQUATIC FACILITIES

U.S. ARMY CORPS OF ENGINEERS

NAVAL FACILITIES ENGINEERING COMMAND (Preparing Activity)

AIR FORCE CIVIL ENGINEER CENTER

Record of Changes (changes are indicated by **1**\ ... /**1**/)

Change No.	Date	Location

This UFC supersedes Air Force Pamphlet (AFP) 88-52 *Swimming Pools*, dated 1984.

FOREWORD

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD (AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA). Therefore, the acquisition team must ensure compliance with the most stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Center (AFCEC) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale may be sent to the respective DoD working group by submitting a Criteria Change Request (CCR) via the Internet site listed below.

UFC are effective upon issuance and are distributed only in electronic media from the following source:

- Whole Building Design Guide web site http://www.wbdg.org/ffc/dod.

Refer to UFC 1-200-01, *DoD Building Code*, for implementation of new issuances on projects.

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UNIFIED FACILITIES CRITERIA (UFC)
NEW DOCUMENT SUMMARY SHEET

Document: UFC 4-750-07, *Aquatic Facilities*

Superseding: Air Force Pamphlet (AFP) 88-52 *Swimming Pools*, dated 1984.

Description: This UFC 4-750-07 provides minimum requirements for natatoria, outdoor swimming pools, wading pools, spas, spray grounds, pool decks and all other functional building areas associated with recreational aquatic facilities.

Reasons for Document: This document provides minimum unified requirements and coordinating guidance for planning, designing, constructing and renovating recreation level aquatic facilities and will enhance DoD aquatic recreation facilities by:

- Providing application of existing aquatic model codes and industry standards to DoD facilities.
- Creating an interactive space program to quickly develop sizes of functional areas for each Service.
- Providing material criteria specific to aquatic facilities to increase facility longevity and decrease maintenance.

Impact: There are negligible cost impacts. However, the following benefits should be realized.

- Elimination of ambiguities that could lead to design and construction conflicts.
- Enhanced communication between disciplines involved in the design of aquatic facilities.
- The incorporation of existing model codes and industry standards improves the ease of updating and revising this reference document as technological advances occur in the industry.

Unification Issues:

- Army, Navy and Air Force have Service-specific documents related to design, construction and operation of natatoria and outdoor swimming pools. There are differences noted in this document that are attributed to specific functional spaces or systems. Service exceptions to the requirements of this UFC are written into the applicable section of the document.

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CHAPTER 1 INTRODUCTION

1-1 BACKGROUND.

UFC 4-750-07 was originally drafted in 2006 by the Air Force to develop a new unified facility criterion for use in the design of aquatic facilities primarily used for recreation; however, the draft document was not finalized for implementation. Continued developments in the aquatic industry have resulted in advances in disinfection and recirculation technology, the introduction of unique programming and design elements, the passing of the Virginia Graeme Baker Act, development of the Model Aquatic Health Code, and development of the International Swimming Pool and Spa Code as part of the International Building Code. UFC 4-750-07 provides applicability of model building codes and government-unique criteria for aquatic facilities (including swimming pools, natatoria, non-medical spas, wading pools, spray grounds and pool decks), typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, sustainability, and safety.

1-2 PURPOSE AND SCOPE.

Unified Facilities Criteria (UFC) 4-750-07 provides technical criteria and requirements for planning, designing, and constructing natatoria and outdoor aquatic facilities for recreational use. Alteration and renovation projects should update existing facilities to meet this criteria within budgetary constraints. This UFC is intended to promote innovative designs that are functional, economical, safe, aesthetically pleasing, and meet the expectations for modern aquatic facilities. Each design should satisfy the unique requirements of each Installation and at the same time be compatible with the local environment and specific site conditions.

Customized, individual solutions meeting the needs of each project is the primary objective of this UFC. Use this UFC in conjunction with Department of Defense (DoD) criteria, service-specific documents, aquatic industry publications, and regulatory agencies, as applicable. Obtain additional information on the unique program and design requirements of local projects from the Installation points of contact.

1-3 APPLICABILITY.

This UFC applies to all military services and contractors involved in planning, programming, design, and construction of aquatic facility projects, including additions, alterations, and renovation projects worldwide.

1-4 GENERAL BUILDING REQUIREMENTS.

Comply with UFC 1-200-01. UFC 1-200-01 provides applicability of model building codes and government unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, high performance and sustainability requirements, and safety. Use this UFC in addition to UFC 1-200-01 and the UFCs and government criteria referenced therein.

1-5 CYBERSECURITY.

All control systems (including systems separate from an energy management control system) must be planned, designed, acquired, executed, and maintained in accordance with UFC 4-010-06, and as required by individual Service Implementation Policy.

1-6 GLOSSARY.

APPENDIX B contains acronyms, abbreviations, and terms used in this UFC.

1-7 REFERENCES.

APPENDIX C contains a list of references used in this document. The publication date of the code or standard is not included in this document. In general, the latest available issuance of the reference is used.

1-8 BEST PRACTICES.

APPENDIX A identifies background information and practices for accomplishing certain aquatic facility design and engineering services. The Designer of Record (DoR) is expected to review and interpret this guidance as it conforms to criteria and contract requirements, and apply the information according to the needs of the project. If a Best Practices document has guidelines or requirements that differ from any UFC or the Unified Facilities Guide Specifications (UFGS), the UFC and the UFGS must be given a higher order of precedence.

1-9 AQUATIC FACILITY CLASSIFICATIONS.

Two general types of aquatic facility classifications include outdoor pools and natatoria (indoor pools).

1-10 OPERATIONAL IMPLICATIONS.

Procedures for Installation level recreation programs, aquatic activities, operation, and maintenance of pools, including natatoria, are provided in the following documents:

- AFI 34-101
- AFI 32-1067
- AFMAN 48-114
- UFC 3-230-02
- MAHC
- TB Med 575
- TM 5-662
- Technical Criteria for US Army Physical Fitness Facilities

- NAVMED P5010-4

Consider operational and procedural issues during the design process. Include the facility user groups in determining operational, procedural, and program requirements, since project requirements vary, and successful incorporation is critical to the design of the project.

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CHAPTER 2 PLANNING AND PROGRAMMING

2-1 PLANNING CONSIDERATIONS.

Chapter 2 provides requirements and information for planning and programming DoD aquatic facilities and the infrastructure to support them. Aquatic facility development planning and the programming of facility space are different for every project depending upon the unique factors regarding each Installation. Consider local requirements concerning building programs, design criteria, technical systems and the adequacy of existing facilities to meet current and future needs.

2-1.1 Operating Policies.

Selected programs and spaces for each facility may vary widely depending on the anticipated operating policies of each facility. Determine early in the planning process the preferred operating procedures for the types of programs and activities to be provided.

2-1.2 Programs and Activities.

Analyze the activities to be provided to determine facility requirements. Coordinate with Installation personnel to identify specific requirements for the programs and activities they plan to implement (e.g. open swimming, diving, water polo, wading, aquatic fitness/therapy, swimming/life-saving instruction, and Morale, Welfare, and Recreation (MWR) specialty programming). Consider building related requirements (e.g., access, security, and lighting) for pools where activities will be offered outside normal operating hours.

2-1.3 Competitive Swimming.

Consider the impact of specific institutional and host nation requirements if competitive swimming will be a part of the program requirements. Major sport swimming sanctioning organizations include:

- AAU – Amateur Athletic Union
- FINA –Federation Internationale de Natation
- NCAA – National Collegiate Athletic Association
- NFSH – National Federation of State High School Associations
- USA Swimming

2-1.4 Toilet/Shower/Clothing Storage.

Locate toilet and shower fixtures adjacent to changing areas. Position changing area entries to be accessible and visible from facility check-in point and to pool deck.

Provide half or full-height lockers located within the dressing room area or on the pool deck.

2-1.5 Supervision and Observation.

A strict system of observation and control is crucial in an aquatic facility. Organize the customer spaces to facilitate surveillance requirements to minimize staff numbers and customer movement. Surveillance of three activities is essential:

- Check-in and check-out system – ensures entry by approved users only.
- Storage of clothes – reduces opportunity for theft.
- Pool and pool deck activity – ensures proper safety for customers.

2-1.6 Check-In and Check-Out Procedures.

Design the entrance with clear line of sight and a means for controlling the entry to and exit from the facility. Considerations for entry control design include: type of identification required, method of verification, payment (if required), and supervision (e.g., if payment is required, provide sufficient counter space for payment processing and storage).

2-1.7 Scheduling.

Consider the preliminary program schedule in designing aquatic and support spaces. Identify programs that must occur simultaneously and the impacts this will have on pool design. For example, if competitive swimming and diving are required to occur concurrently at a specific Installation, consider “L” shaped pools, bulkheads, or separate pools.

2-1.8 First Aid.

Provide a location where first aid can be performed and associated equipment can be stored (e.g., first aid kit, personal protective equipment). Provide space for a cot and storage. Provide direct access from the pool deck to the first aid location.

2-1.9 Employee Training.

Provide a training room or multipurpose room for regular employee training. Visually isolate the training/multipurpose room from the pool area to limit distractions during training. Provide storage for training-specific items.

2-1.10 Food and Beverage Service.

Policies on food service may vary from no food permitted, vending machines, or a snack bar. Coordinate with Installation personnel to determine adjacencies and design considerations relating to location, trash removal, and types of food and beverage containers anticipated.

2-2 SPACE PROGRAM.

The space program for new aquatic facilities is developed using an interactive worksheets. It is completed by first entering the appropriate Service and then selecting the appropriate size basis for the facility. These selections generate the default space program. In some cases, there are options to modify the default numbers or to add optional spaces. This worksheet is available for download as a Microsoft© Excel© file from the Whole Building Design Guide (WBDG) Website under the DoD page, then Unified Facilities Criteria page and selecting this UFC title to view the attachment under the 'Related Materials' field. In developing the space program for an individual facility, consider the issues of overall facility design and the functional relationships described in this UFC.

Each Installation may also determine that different or additional requirements are relevant to its local program. These considerations can affect the functional areas and spaces included in the program and their relative sizes. Space allowances for aquatic facilities are based on standards developed for each DoD service component.

2-2.1 Facility Size.

Determine the overall facility size by analyzing the particular needs of each Installation, including the following factors:

- Size of the U.S. and host nation military population in the area served by the Installation.
- Number of youth and children served by the Installation. These are typically the most frequent users of aquatic facilities and associated activities.
- Number of dependent spouses, retirees, host nation personnel, contractors, and other authorized users to be served by the facility.
- Availability of other aquatic facilities on, or near, the Installation.
- Anticipated need for conducting competitive swimming events.
- Anticipated need for pool use in training activities, such as SCUBA and deep-water survival training.

2-3 FACILITY REQUIREMENTS.

Consider the parameters affecting overall facility design and the functional relationships discussed in paragraph DESIGN and paragraph FUNCTIONAL AREA TECHNICAL REQUIREMENTS when developing the space program for an individual facility. Facility requirements are based on local conditions and identified requirements of the community served.

2-3.1 Core Functional Areas.

Most aquatic facilities will need four core functional areas while allowing for local variation in the scope of operation under each category. Provide the following four core functional areas in the design of the aquatic venue:

- Water areas
- Pool deck
- Bathhouse (outdoor facilities) / Changing/Restroom (natatoria)
- Filtration, circulation, and chemical equipment

2-4 SITE SELECTION.

Locate aquatic facilities near the center of Installation activities and facilities such as the physical fitness center and the youth center, where possible. Aquatic facilities should be located with compatible functions as defined by the Installation Master Plan. Avoid locations near busy intersections, roadways or roads, airfields, and industrial facilities. Evaluate the potential impact of natural site features on the proposed facility design, in accordance with UFC 1-200-01, 2-100-01, and 3-201-02. Existing natural site features may be incorporated into required site elements like Antiterrorism/Force Protection (ATFP) standoff distances provided in UFC 4-010-01 or vehicle barriers that may help to blend the facility into the natural setting of the site. Select potential sites for aquatic facilities to minimize or eliminate problems in design, construction cost, and pool function.

2-4.1 Site Size.

Select a site large enough to accommodate all the components of the facility and anticipated future expansions. These components may include vehicle access, parking, pedestrian access, open areas that can be used for playing fields (e.g., throwing Frisbees, horseshoes, and similar recreational activities). Consider each site component as it relates to each specific project. In addition, size the site to allow for open or landscaped spaces around these components as required in UFC 3-201-02. For initial planning purposes, a site size can be considered satisfactory if the area of the site is at least the sum of the following:

- Exterior circulation and parking areas.
- Fire Lane with required fire truck turning radius.
- Stormwater management areas.
- The area of the swimming pool, surrounding pool deck, and internal circulation areas.
- The area of the spray ground, wading pool, or spa and surrounding deck.
- The gross area required for changing areas, storage areas, offices and support spaces, spectator areas and other building support areas.

- The gross area needed for water circulation, filtration, and chemical equipment facilities.
- Required easements, setbacks, and standoff distances.

More area may be needed if the site has any special features, such as irregular contours or perimeter, existing trees, or unusual landscape conditions. Accommodate the required number of parking spaces and AT/FP setback requirements in accordance with UFC 4-010-01. Provide for future expansion in site size determination, if practical.

2-4.2 Site Considerations.

Select sites for aquatic facilities in accordance with UFC 1-200-02 and the following criteria:

- Approach the site by sidewalk, without requiring pedestrians to cross heavily traveled streets or circulation areas within the parking lot.
- The necessary utilities, water, sanitary sewer, natural gas, and electricity are readily available.
- The topography is level enough for constructing the pool.
- The soil is stable and free of rock, which is costly to excavate.
- The site is not close to heavy industrial smoke or other unpleasant or harmful pollutants.
- The site is near other recreational activities, such as youth centers, clubs, and athletic facilities.
- Facility should be sited in accordance with compatibility guidelines as defined by the Installation Master Plan.
- Select a site that minimizes wind-blown debris and reduce wind damage to structures, furnishings, and equipment.

2-4.3 Site Access.

Provide easy access by pedestrians, automobiles, and Installation public transportation. Address accessibility issues for people with disabilities in accordance with the accessibility requirements identified in paragraph ACCESSIBILITY. A facility easily identifiable from approaching cars and pedestrian pathways is desirable. Provide a dedicated service drive near the filtration and chemical storage areas for maintenance vehicle access. Provide a service drive with convenient access to the pool deck areas, to be utilized by emergency responders for evacuation of injured customers without exiting through the bathhouse or locker rooms.

2-4.4 Site Utility Requirements.

Evaluate potential sites to determine the availability of utility services and conformation of easement and property lines. Locate aquatic facilities where access to major utilities is readily available (e.g., water, sewage, electricity, telecommunications (voice and

data), and natural gas). Provide storm or sanitary sewer systems capable of handling large-volume water discharge in accordance with local codes and pool filtration equipment selections. Provide water service, natural gas, steam service or fuel oil system (whichever is used), electricity, security, and fire alarm service to the building in accordance with UFC 1-200-01 and Installation requirements.

2-4.5 Topography and Sub-Soil Conditions.

Evaluate existing topography of potential sites to determine the impact of existing conditions on construction. Conduct geotechnical investigations to identify sub-soil conditions, the elevation of the water table, and the bearing capacity of the soil in accordance with requirements in UFC 1-200-01. Solicit recommendations regarding the locations of soil borings from the A/E. Evaluation of the geotechnical report should be a primary consideration of potential sites. Determine the most effective foundation system based on evaluation of the geotechnical data. Consider the impact of existing subsurface rock on the position of the pool, buildings, parking areas, and other structures so excavation can be minimized.

2-5 ACCESSIBILITY.

Design and construct new facilities, additions, and renovations of existing facilities in accordance with the Architectural Barriers Act (ABA) and UFC 3-101-01.

Provide one or more accessible entry into pools utilizing primary and secondary means established in the ABA requirements.

2-6 BUILDING CODES.

Provide all aquatic facilities in accordance with DoD criteria and Installation design guides. These criteria are based on national standards, private sector consensus standards, and model codes. Refer to UFC 1-200-01, *Design: General Building Requirements* for specific guidance. In the event of conflicts between codes and DoD criteria, use DoD requirements. For OCONUS situations where there is a conflict between mandatory code requirements, the most restrictive code takes precedence. Consider local codes where design choice impacts the exterior of the Installation.

2-7 AQUATIC INDUSTRY CODE COMPLIANCE.

For all new pool construction and renovations to existing pools, conform to the current version of the following documents:

- International Swimming Pool and Spa Code (ISPSC)
- Model Aquatic Health Code (MAHC)
- Federation Internationale de Natation (FINA) Standards; Facility Rules
- Local, State, Military Agency, Federal, and host nation codes, if applicable

In cases of conflict between the code documents, utilize the more stringent requirement.

2-8 ANTITERRORISM/FORCE PROTECTION.

Design the facility to comply with UFC 4-010-01 and UFC 4-020-01.

2-9 SUSTAINABLE DEVELOPMENT.

Design and construct new construction, additions, and renovations in accordance with UFC 1-200-02. Use an integrated approach to the planning and design of aquatic facilities in accordance with UFC 1-200-01.

2-9.1 General Sustainability Requirements.

Apply sustainable development concepts in the planning, design, construction, environmental management, operation, maintenance, and disposal of facilities and infrastructure projects that are consistent with budget and mission requirements. Comply with guidance for High Performance Sustainable Buildings compliance, tracking and policies in accordance with UFC 1-200-02.

2-9.2 Energy and Water Conservation.

Design new construction and renovation projects in accordance with UFC 1-200-02. The MAHC states that the IAQ proper removal of the chemical, biological, and physical contaminants, is the top priority, Treat the water filtration systems dedicated to the natatoria area as a process load

Provide pool covers in accordance with ISPSC and ASHRAE Standard 90.1. Include water conservation features such as manual and automatic stopping of aquatic features such as waterfalls and play features to reduce evaporative losses. Design spray grounds as recirculated systems or capture used, untreated water for irrigation or similar purposes requiring non-potable water. Employ other aquatic-specific sustainable practices on a project-specific basis where warranted by design and budget.

2-10 ENVIRONMENTAL ISSUES.

Aquatic facilities have specific environmental considerations, such as backwashing of filters and the disposal of waste water. Dispose of all chemically treated water in accordance with State and local code requirements. Incorporate safe provisions for storing and handling of pool chemicals.

Require procurement of construction materials and building supplies that have a lesser or reduced effect on human health and the environment over their lifecycle, when compared with competing products or services that serve the same purpose, in accordance with UFC 1-200-02.

2-11 MODIFICATION OF FACILITIES AND EQUIPMENT.

The configuration of existing facilities may limit the ability to meet the requirements for aquatic facilities at the Installation. Provide modifications of facilities and equipment that conform to these requirements to the greatest extent possible.

2-11.1 Renovation and Repairs.

Leaking pools and piping systems may require significant renovation and repairs. Low capital investment options, such as vinyl liners, are acceptable. Gutter systems may be replaced with stainless steel gutter systems. New gutter systems may be designed to handle the surge capacity requirements and eliminate the need for adding a surge tank system or additional underground piping.

2-11.2 Restoration and Preservation.

Older DoD aquatic facility renovations may require restoration of pool and deck surfaces. Use cost comparisons to determine if restoration or replacement is the most cost-effective option.

2-11.3 Upgrades and Additions.

Improvements to existing aquatic facilities may include replacing wading pools with spray grounds or adding play amenities detailed in this UFC. Typical upgrades to existing facilities may also include new gutters, surge control systems, circulation/filtration systems, energy upgrades, ABA compliance, or APSP-16 compliance. Give priority to upgrades and additions that enhance the safety of the existing aquatic facility over upgrades to enhance recreational value.

CHAPTER 3 DESIGN

3-1 GENERAL.

Chapter 3 provides general design and material requirements, including detailed requirements for the site, infrastructure, water areas, pool deck, bathhouse, and other buildings or structures. These criteria address design requirements for site and building layout, architectural character, function, circulation, and facility systems. Information is provided regarding the preferred materials and finishes that deliver the required durability yet while remaining functional and aesthetically pleasing.

Facility system requirements for circulation, filtration, chemical storage, structural considerations, HVAC systems, plumbing, electrical, fire protection, life safety, telecommunications, alarm/security systems, and acoustical requirements are included in this chapter. Special considerations for operational requirements, Installation-specific programs, and the renovation of existing facilities are addressed in APPENDIX A.

3-1.1 Design Development.

Provide designs that comply with the general criteria and provide a compatible solution for the specific project requirements. Provide individual designs that enhance the surrounding built environment and natural character of the Installation. Other factors that determine the success for the design include:

- Value and Cost: Design facilities than can be constructed within the project budget and economically maintained.
- Operating Efficiency: Arrange individual spaces to meet specific needs of the user population and allow for maximum staff efficiency.
- Project Cost: Design to minimize construction and operating costs. Use a compact floor plan that minimizes floor area for personnel circulation, walls, and structure. Reduce structural, architectural, and mechanical costs through compact building volume and careful placement of mechanical and filter rooms to reduce the length of pipe runs.
- Simplified Construction: Use familiar building assemblies and terms that do not require a specially qualified labor force or special construction equipment for installation. Include durable, water-resistant materials that have a low life-cycle cost. Minimize the number of different materials used and select materials that are locally available. Consider the use of pre-engineered building systems where they are locally available and architecturally compatible with the Installation building standards. Use systems that can be supplied and maintained economically, especially for natatoria.
- Energy Management: Reduce operating costs for natatoria by applying the principles of passive solar design, optimizing the effective use of insulation based on a life-cycle study, and using fuels that can be provided

economically for the life of the facility.

- Environmental Influences: Design for the specific climate of each Installation. Where unheated pools and open-air bathhouses are planned, environmental considerations include the control of sunlight and wind by shading, tunneling, blocking, or other methods.

3-1.2 General Design Process.

Prepare designs through an iterative process of submittals, user reviews, and discussions to reconcile comments in accordance with A/E Statement of Work and service-specific design procedures (e.g., FC 1-300-09N).

3-2 SITE DESIGN.

Site the aquatic facility so the main entrance is clearly visible, and the architecture provides intuitive wayfinding cues to guide visitors to the main entrance. Preserve and utilize natural site features, such as topography, trees, greenery, and unusual landscape features to help define the site and accent the building. Use landscape elements to provide definition, screening, and focus for the site. Locate the pool, spray ground or wading pool, spa, bathhouse, and non-aquatic outdoor recreational areas to reflect local climate and micro-climate conditions. Provide protection from wind and glare for aquatic elements.

3-2.1 External Circulation.

Provide an external circulation system to include an access road, vehicle drop-off, parking lot for staff and customers, connections to on-site walkways, service drive with gate for easy access to the circulation/filtration equipment and chemical storage, and emergency responder vehicle access to the pool deck. Pave paths or walkways leading into the pool area with concrete, pavers, brick, stone, or other hard surface to eliminate tracking loose materials onto the pool deck. Provide a concrete apron for garbage dumpsters and recycling containers adjacent to the service drive.

3-2.2 Vehicle Circulation.

Provide a loop road or similar drop-off area in front of the aquatic facility that will accommodate buses and vans. Consider a one-way, double-lane width drop-off area to allow loading and unloading of buses and vans onto adjacent sidewalks, yet still allow privately owned vehicles (POV) to pass and drop-off or pick up customers. Locate bus stops and shelters conveniently near the aquatic facility with direct sidewalk access to the main entrance. Coordinate with the Installation to incorporate any additional requirements in accordance with Installation design guides.

Locate parking areas to the side of the entry building, where possible.

3-2.3 Building Access.

Provide clearly identified pedestrian access to the main entrance. Reinforce

connections to related Installation facilities with clear, direct pathways. Provide separate vehicular access for a main entrance drop-off area and for the service/emergency responder vehicle entrance.

3-2.4 Zoning.

Zone the pool deck, associated pools, spray grounds, sunbathing, recreation, and food service areas for maintenance and safety. Segregate children's play areas, spray grounds, and wading pools from the main pool by low fencing. If permanent spectator seating is provided, utilize low, transparent barriers to segregate the seating area from the pool area. Provide a separate entrance from an external pedestrian walkway system for spectators. Segregate food service areas with landscaping, low barriers, or fencing to provide controlled access between the pool and food service area. Place trash receptacles at the access point.

3-2.5 Landscaping.

Provide landscaping for the facility in accordance with UFC 3-201-02. Depending on project location, minimize the use of deciduous trees and plant varieties that shed materials around an outdoor pool to minimize deck and pool maintenance. Do not use bark mulch, small rocks, or similar ground covering materials near the pool deck or in areas where these materials may get washed into the pool or scattered about the pool deck area.

Coordinate with the Installation to incorporate any additional requirements in accordance with Installation design guides.

3-2.6 Site Signage.

Provide an exterior signage system in accordance with UFC 3-120-01. Coordinate exterior sign programs with the exterior design of the building and Installation requirements. Also, provide site signs that identify dedicated parking areas, service areas, accessible entrances, and other facilities for the disabled. Provide information regarding the facility's hours of operation and force protection condition (FPCON) on exterior signage located near the main entrance that is visible to customers from their vehicles.

3-2.7 Sunlight and Glare Control.

Outdoor aquatic facilities require special consideration to minimize excessive sunlight and control the effects of glare on patrons and staff. Provide accommodations for moveable lifeguard stations that can be easily relocated throughout the day to minimize the effect of glare on the water from sunlight or facility lighting. Provide shade for children's areas, patrons on the pool deck, lifeguard stations, food service areas, and for staff members at the check-in area and administrative areas. Provide portable shade accommodations at each lifeguard station.

For natatoria, orient the building and windows to reduce sunlight and glare throughout

the day.

3-2.8 Exterior Lighting.

Provide exterior lighting and controls for parking lots, building entrances and exits, pedestrian walkways, wheelchair ramps and plazas, vehicle roadways, streets and driveways in accordance with UFC 3-530-01. Design the exterior lighting system for the lighting zone in which the aquatic facility will be constructed. Provide a wall-mounted sign light to illuminate the building sign from above. Refer to paragraph POOL LIGHTING for detailed specifications for pool deck and underwater lighting.

3-3 WATER AREA DESIGN.

Water areas include swimming pools, diving pools, wading pools, spray grounds, non-medical spas and all spaces or equipment within these areas.

3-3.1 Pool Size and Capacity.

The maximum allowable pool size is determined by paragraph SPACE PROGRAM. The size of pools depends upon the unique program requirements at each Installation. The main pool may be a free-form general use pool, a lap swimming pool, or a combination of these two, depending on Installation-specific programming.

3-3.2 Shape, Slope, and Depth.

Design pool floor slopes and depths to the most stringent requirement in MAHC, ISPSC, ABA or in accordance with the event sanctioning body, unless paragraph FUNCTIONAL AREA REQUIREMENTS requires otherwise.

3-3.3 Lap Swimming Pool Size Standards.

These requirements cover pools for swimming laps, or competitive swimming events.

- Limit pools programmed for lap or competitive swimming to rectangular shape. Where diving is also a required program, diving may be incorporated into the deep end of the pool in a stretch or “L” configuration, when topographic conditions, site shape, natatorium enclosure challenges, or budget limit design options. The shape of training, recreation or wading pools is optional, with much more flexibility for unique shapes and configurations.
- Pool Lengths: 25 meters (82 feet, 1/4 inch) or 50 meters (164 feet, 1/2 inch). Provide an additional 0.03 meter (1-3/16 inches) of length to competitive pool nominal lengths to allow for electrical timing touch pads.
- Pool Widths: Six lanes – 18 meters (59 feet); eight lanes – 22.86 meters (75 feet). When pool width will be used for cross-course competitive swimming, provide an additional 0.03 meter (1-3/16 inches) to allow electrical timing touch pads.

- Lane Widths: Design all lanes equal width with lane lines in place. Provide additional space adjacent to the outside lanes, commonly referred as “buffer lanes”, to accommodate the overall width of the pool.
- Pool Depths: Pool depth requirements vary depending upon different levels of competition and the anticipated intended use or programs. Exceed depth requirements specified by sanctioning organizations at starting platform locations. Provide a depth of 3 feet, 6 inches to 4 feet, 0 inches (1.1 to 1.2 meters) at the shallow end of the pool for a minimum of 800 square feet (74.3 square meters). Coordinate with Installation point of contact for program specific requirements.

3-3.4 Diving.

For pools provided with spring boards or platform diving, provide the minimum dive envelope (length, width and depth) required by FINA*, unless the Installation-specific competitive diving sanctioning standards are more stringent.

*For Navy facilities: Provide the minimum pool length ahead of the plummet in accordance with NAVMED P-5010-4, Chapter 4.

3-3.5 Deep Water Activities.

For pools with drop-style slides or play features requiring deep water, provide the minimum pool dimensions required by the manufacturer of the play equipment.

3-3.6 Pool Construction.

Design and construct pools and spray pads of impervious and structurally sound material(s), which provide a smooth, yet slip-resistant, easily cleanable, watertight structure. The following construction types are approved for use:

- Reinforced concrete walls and gutter:
  - Cast-in-place concrete; or
  - Shotcrete (pneumatically-applied concrete).
- A combination of reinforced concrete walls with a metal gutter system.
- Metal (aluminum or stainless steel)

3-3.6.1 Metal Pools and Gutters.

Provide corrosion-resistant metal pools and gutters constructed of type 304 or 316 stainless steel. Provide aluminum pools with a system for minimizing corrosion (e.g., provide sacrificial anodes).

3-3.7 Pool Finishes.

For concrete construction, provide a ceramic tile pool interior or a combination of

ceramic tile and quartz aggregate interior. Provide ceramic tile at the perimeter waterline, freeboard, racing course markings, end wall targets, slope line break, and at stair and bench nosing. Provide a painted finish for metal pools.

Provide a white or light blue pool finish color in accordance with the MAHC. Provide contrasting finish color for depth markers, racing course markings, end wall targets and stair and bench nosing. Provide a pool coping or gutter system that contrasts in color from the surrounding deck color or provide a contrasting perimeter tile band between the gutter/coping and deck finish. Provide slip-resistant finishes on all horizontal surfaces and on vertical surfaces in competition or lap swimming pools. Provide a hand hold on all portions of the pool deeper than 2 feet (0.61 meters).

3-3.8 Surface Skimming.

Provide all pools with a means of surface skimming in accordance with the ISPSC, MAHC and Service-specific requirements.*

*For Army facilities: Provide only fully or semi-recessed overflow systems sized to provide the required surge volume. Where skimmers are used, provide an equalization fitting in accordance with TB MED 575.

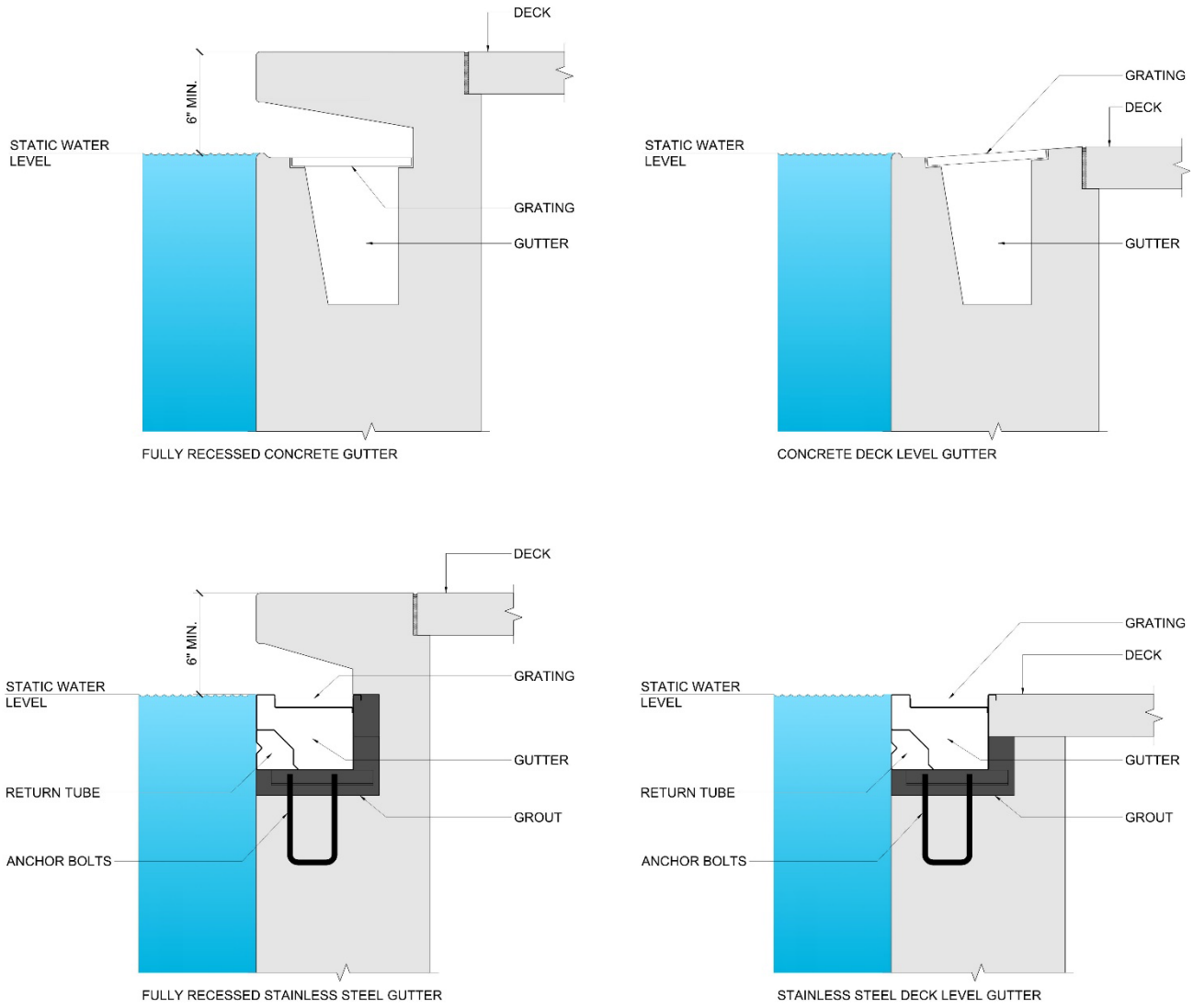
3-3.8.1 Overflow Systems.

Provide continuous perimeter overflow systems in accordance with the MAHC. Allowable overflow systems include fully recessed and deck level gutters as indicated in Figure 3-1: Overflow Systems. Cover overflow systems with a corrosion-resistant, structural grating. Fully recessed overflow systems may be provided without grating if the maximum opening does not exceed four inches (.01 meters). Design overflow systems to drain to the surge tank via gravity.

3-3.8.2 Skimmers.

Pools not required to have a complete perimeter overflow system may utilize manufactured skimmer systems in lieu of overflow systems.

Figure 3-1 Overflow Systems



3-3.9 Recirculation and Filter Systems.

Use air gap fittings to supply potable water into the pool, either directly or into the recirculation system. Provide air gap fittings between the swimming pool recirculation system and the sanitary or storm sewer system such that there is no direct physical connection. Provide complete, continuous recirculation of water through all parts of the swimming pool by appropriately sized, non-corrosive pipes. Use Schedule 40 polyvinyl chloride (PVC) or Schedule 80 PVC for most recirculation and activity pump piping requirements. For heater and heat exchanger piping, provide copper or chlorinated polyvinyl chloride (CPVC) pipe. Size the valves and draining system for the pool to prevent flooding (surcharging) of the sanitary or storm drainage system. Provide a centrifugal recirculation pump with capacity to achieve the minimum turnover rate of the pool, plus an additional allowance of 30 percent. Provide a pool turnover rate in accordance with the more stringent requirement between ISPSC and MAHC for all

venue and pool types.

3-3.9.1 Recirculation System Minimum Requirements.

Provide a recirculation system consisting of pumps, piping, filters, feeders, water-conditioning equipment, city water make-up, surge tank, and other accessories to filter and disinfect the swimming pool volume of water in the turnover time required in paragraph RECIRCULATION AND FILTER SYSTEMS. Recirculate water from the main drains and overflow system into the circulating pumps via the surge system under normal operating conditions. Size overflow gutter piping and main drain piping according to the requirements in the MAHC. Provide valves and regulating devices that allow for adjustment of the ratio of water through the main drains and overflow gutter.

3-3.9.2 Surge Tanks and Surge Control.

Equip recirculation systems with concrete, cast-in-place surge tanks, unless the maximum surge requirements of the pool are handled by surge contained in the gutter or freeboard. Provide the minimum surge capacity required by ISPSC and MAHC. Provide flow control valves to modulate water flow from the main drain and from the surge tank.

3-3.9.3 Motor Controls and Auxiliaries.

Provide magnetic starters for the control of the recirculation pump, including corrosion-resistant enclosures. Use NEMA 4X fiberglass-reinforced polyester (FRP) components for all electrical and control items subject to corrosion. Provide integral capacity motors that meet the requirements for Premium Efficiency Motors in accordance with EPAct05.

Provide variable frequency drives (VFDs) for all filter pump motors and for activity pump motors greater than 10 HP. For filter pump motors, interlock the flow meter with the VFD to maintain constant design flow regardless of system variables.

3-3.9.4 Pumps.

Provide centrifugal style pumps for all recirculation and activity pumps. Provide basket strainers immediately in front of all centrifugal pumps to protect the internal components of the pump. Provide an extra basket strainer for each pump system. Provide a pump pit adjacent to the surge tank or pool to provide a flooded suction condition*. If a pump pit cannot be included, provide self-priming pumps or other means for pump priming. Provide a flow control valve on the pump effluent pipe for manual control of flow and isolation for system testing and maintenance.

*For Army facilities: Provide flooded suction design for all pumps except fractional or small horsepower pumps for special uses.

3-3.9.5 Flow Meters.

Provide a flow meter in each main line serving a pool. Provide flow meters on a straight, uninterrupted section of pipe at least 10 pipe diameters downstream from the

last fitting and five diameters distance beyond. In addition, provide a mercury-type manometer flowmeter or magnetic flowmeter at the discharge of the recirculation pump to monitor primary flow and backwash.

3-3.9.6 Filters.

Acceptable types of pool filters are sand filters* and regenerative media filters. Provide a filtration rate for high rate sand filters that does not exceed 13 gallons per minute per square feet of filter bed (32 cubic meters per hour per square meter of filter bed). Provide a filtration rate for regenerative media filters of 1.3 gallons per minute per square feet of filter bed (3.2 cubic meters per hour per square meter of filter bed) or less. Provide pearlite media for regenerative media filters. Discharge backwash water and regenerative media drain water via an air gap fitting into the sanitary or storm sewer where allowed by code. Diatomaceous earth for filter media is not allowed.

*For Army facilities: Provide only regenerative media filters.

3-3.9.7 Drains and Inlets.

Provide main drain and outlet systems in accordance with ANSI/APSP/ICC 7 and ANSI/APSP-16. Provide at least one main drain in the deepest part of the swimming pool. For pools at least 30 feet (9.1 meters) wide, space multiple drains no more than 15 feet (4.5 meters) from a side wall, but no greater than 20 feet (6.1 meters) apart. Provide hydrostatic relief valves in each drain. Provide flat, not domed, drain grating in pools where the water depth at the main drains is less than five feet (1.5 meters). Provide drains flush with the pool floor.

Provide a minimum inlet quantity as required by ISPSC, spaced in accordance with MAHC. For wall inlets, use butterfly ball-and-globe-style inlet valves made partially or completely of PVC or other high-quality plastic for new pools and renovations. For stainless steel gutter pools, provide wall inlets integral to the pool gutter and floor inlets in accordance with MAHC. Provide an automatic fill system with manual bypass. Supply fresh water through an air gap at least 6 inches (150 millimeters) above the pool deck elevation. Locate fill spout and controls in a location that is inaccessible to users.

3-3.10 Heating and Water Temperature.

Provide a means for heating for all indoor pools and for outdoor pools where the climatic conditions warrant their use. Provide water heaters and heat exchangers specifically designed for use with swimming pool water and sized to bring the pool up to temperature within 24 hours (main pool) or 4 hours (spa pool or wading pool) or less, if required by the local Installation or pool program. Provide a heater or heat exchanger that can maintain the temperature range required for the anticipated programming of the pool. Where gas-fired pool water heaters are specified, provide direct vent/sealed combustion.

Provide an insulated pool cover in accordance with ISPSC, UFC 1-200-02, and paragraph SUSTAINABLE DEVELOPMENT.

3-3.11 Water Quality.

Coordinate design and method for pool disinfection with the Installation's agency responsible for water quality testing and certification. Use of chlorine gas is not allowed at new construction. Allowable sanitizers include sodium hypochlorite (liquid chlorine), calcium hypochlorite (solid chlorine), and on-site generation of chlorine from sodium chloride (salt). Pipe filtered water to chemical rooms for introduction of chemicals rather than running chemical lines through occupied spaces.

Provide automatic chemical controllers to analyze pool water and automatically feed chemicals. Provide supplemental disinfection/sanitization utilizing an ultraviolet (UV) light disinfection system or ozone generator in accordance with the MAHC and ISPSC*. Supply fresh make-up water to the pool automatically utilizing an automatic water level control system.

*For Army facilities: Provide supplemental disinfection on all indoor pool filtration systems.

3-3.12 Pool and Deck Lighting.

Lighting is required for swimming pools and pool deck areas. Provide lighting systems as described below and in accordance with UFC 3-530-01, MAHC, and ISPSC.

Provide artificial lighting for swimming pools that will be used at night, or which do not have natural lighting, so that all portions of the pool, including the bottom and drains, are readily seen without glare.

3-3.12.1 Overhead Lighting Criteria.

Provide overhead luminaires installed along the pool edge, not over the water, for ease of maintenance from the pool deck with the aid of portable ladders or scaffolding. Arrange overhead luminaires to provide uniform distribution of illumination. Where pool size or geometry requires overhead luminaires to be installed over the pool water surface, or where they cannot be maintained from the pool deck, they must be arranged so that they are readily accessible from permanently-installed catwalks.

For recreational pools, provide a minimum of 30 horizontal foot candles overhead illumination on the water surface when underwater lighting, in accordance with paragraph UNDERWATER LIGHTING CRITERIA, is used. Without underwater lighting, provide a minimum of 50 horizontal foot-candles on the water surface. Provide a minimum of 10 horizontal foot-candles overhead illumination on the pool deck surface.

3-3.12.2 Overhead Lighting Controls.

For indoor pools, where artificial lighting is used to meet the light level requirements, provide manual means to control the overhead luminaires. Separately control luminaires in daylighted areas through continuous dimming photocontrol to reduce light output when natural light is available. For outdoor pools, where natural lighting methods

are used to meet the light level requirements, provide automatic lighting controls based on light levels or time of day to turn lights on and off.

3-3.12.3 Emergency Lighting.

In the pool area, provide emergency illumination in accordance with ISPSC. In addition to the prescriptive requirements of ISPSC, provide emergency egress lighting that produces a minimum of 0.5 foot-candles along the path of egress in the pool area. Avoid placing emergency light fixtures over the pool water surface area or in areas where they cannot be maintained from the deck.

3-3.12.4 Underwater Lighting Criteria.

Provide underwater lighting systems to meet the performance requirements of the ISPSC and MAHC, and the installation requirements of NFPA 70. Use non-dimmable light-emitting diode (LED) luminaires for underwater lighting. Where LED luminaires are prohibited or not practical, use incandescent luminaires for underwater lighting. Provide underwater light fixtures in standard voltage (120 volts) or low voltage (12 volts). When low-voltage light fixtures are specified, locate the transformer in accordance with NFPA 70. Either wet niche or dry niche fixtures may be used.

Consider pool use, agitation of water, and overhead lighting design when designing the underwater lighting system. For competition swimming, provide lights on the side walls and, for competitive pools with cross-course swimming, centered under lane anchors on the start and turning ends of the pool. If lights are provided at the start and turning ends of a pool used for competitive events, provide a turn-off switch for racing.

3-3.12.5 Underwater Lighting Controls.

Provide manual lighting controls to turn underwater luminaires on and off. Dimming controls are not permitted.

3-4 POOL DECK DESIGN.

Provide impervious, slip-resistant deck area around each pool to serve as a circulation path and lounging area for pool users. For outdoor pools, shade areas of the pool deck to provide protection from the sun for customers and staff. Optional amenities, such as concession areas and spectator seating areas, may require additional deck space to accommodate the desired programs.

3-4.1 Deck Size and Capacity.

Provide deck area for outdoor pools at a ratio of two to three times the pool water area. Locate spray grounds for children on the pool deck and consider additional space to accommodate these areas. Provide deck space for natatoria at a ratio of 0.75 to 1.5 times the pool water area. Provide separation of deck spaces into walkways and other uses. Provide minimum walkway clearance in accordance with ISPSC.

Provide the following minimum clear pool deck widths:

- SIDES: 10 feet (3.05 meters) Indoor Pools, 12 feet (3.6 meters) Outdoor Pools
- SHALLOW END: 15 feet (4.6 meters) Indoor Pools, 20 feet (6.1 meters) Outdoor Pools
- DEEP END: 20 feet (6.1 meters) Indoor Pools, 20 feet (6.1 meters) Outdoor Pools

3-4.2 Slope and Drainage.

Slope the pool deck away from the pool so that water on the deck (either from pool overflow, splashing, rain or surface water run-off) is not allowed to flow into the pool. Provide a minimum deck slope of 0.25 inch (6 millimeters) per 1 foot (0.30 meter) and not more than 0.5 inch (12 millimeters) per 1 foot (0.304 meter). Provide deck drains such that all areas of the deck slope to a drain to eliminate ponding on the deck. For natatoria designs, locate deck drains between the pool and building wall and slope all areas to drain. Route piping from the deck drainage to the sanitary sewer (indoor pools) or storm sewer (outdoor pools) unless required otherwise by State and local codes where drainage leaves the Installation.

3-4.3 Materials and Surface Finishes.

Provide pool decks of a long-lasting, easily cleanable, UV-resistant and impervious material. Acceptable materials include concrete, ceramic tile, or equivalent materials. Provide all deck surfaces with slip-resistant finish. Where appropriate for outdoor pools, use cool decking materials that do not build up excessive heat when exposed to direct sunlight. Provide slip-resistant, permanent depth makers in the pool deck at the edge of the pool.

3-4.4 Spectator Seating.

Provide seating for spectators according to the program requirements and separated from walking paths.

3-5 BATHHOUSE AND NATATORIUM DESIGN.

Provide structures and finishes capable of resisting corrosion from moisture and chemical vapor. Provide interior and exterior walls of masonry construction with brick, block, composite material siding, metal panels, stucco, or similar materials that are architecturally compatible with the Installation-specific guidelines. Provide moisture- and mildew-resistant, easily cleaned surfaces. Dressing rooms, shower rooms, drying areas, and toilets are considered wet areas. Provide materials for stalls, walls and floors in wet areas that are impervious to water and able to be hosed down for cleaning. Provide slip-resistant wet area floors pitched to floor drains. Provide elevated concrete pads for lockers and other equipment to facilitate cleaning and reduce the corrosive effects of frequent exposure to water.

3-5.1 Natatoria Design.

Select building materials to economically span the pool and deck width with moisture-resistant materials such as concrete, galvanized steel, and laminated wood. Coat all exposed metal surfaces to resist the corrosive climate within the natatorium. Design exterior walls and openings for climate impact. Evaluate seasonal impact of indoor and outdoor humidity to properly locate vapor barriers. Conduct dewpoint analysis on exterior walls and roofs. Provide thermal breaks in window -and door-frame openings. Provide acoustic control of natatorium space through use of natatorium specific baffles or panels. Comply with dimensional requirements detailed in FINA for minimum ceiling heights in natatoria with diving. Provide minimum 16-feet (5 meters) clearance for facilities without diving. Locate windows in the natatorium to avoid glare on the water surface. Provide fixed sun screens on southern exposures. Tint deck level windows if provided along the sides of the pool.

For enclosure of existing outdoor pools, evaluate existing deck slope. Provide deck drains to completely remove deck water.

3-5.1.1 Vestibules and Airlocks.

Provide vestibules and airlocks in natatoria based upon the climatic issues at each Installation. When designing entry vestibules, provide double sets of entrance doors to create an airlock. Comply with accessibility requirements identified in paragraph ACCESSIBILITY. Provide walk-off mats inside the airlock and removable rugs in lobby areas. Consider built-in drains inside recessed walk-off mats in foyers to allow water to drain off, and heated mats in cold-weather climates. Provide ventilation or climate control to prevent moisture accumulation or condensation.

3-5.2 Building Organization and Circulation.

Organize bathhouse and natatorium spaces to take advantage of local climate conditions, such as prevailing winds and sunlight. Consider the desired flow of customer traffic from the entry control point to the pool deck and the need to provide convenient access to the shower areas to encourage customers to shower before entering the pool. Provide a pool office located with direct visual access to all pools.

For natatorium designs, separate wet and dry areas. Provide a dry circulation path from the entry to the control point and locker rooms. Provide a wet circulation path from the locker rooms, through the shower area, and onto the pool decks. Where spectator seating is provided, provide access to that seating on the dry circulation path. Provide an entry lobby with waiting/display, control desk, equipment storage and vending space. Provide a control desk in lobby for customer check-in. Provide a training/classroom accessible from both the dry and wet corridors.

3-5.3 Clothing Storage.

Provide lockers for storage of customer clothing and valuables. Determine appropriate locker size for local program and climate requirements. Locate lockers within changing rooms, on pool deck or a combination of both locations.

3-5.3.1 Locker Systems.

Provide non-corrosive, moisture-resistant, vented lockers, that are durable, easily cleaned, and do not accumulate water. The optimal arrangement of lockers is two tiers to permit the hanging of adult street clothes. Increase the number of lockers to meet the authorized capacity, but do not exceed the comfortable reach limits for an averaged sized person or reach limits required by the ABA for accessibility. The most efficient locker arrangement is a back-to-back layout with alcoves off of circulation aisles. Provide locker systems capable of use with user-provided locks.

Provide a 16 inch (410 millimeter) high bench in the middle of each aisle for the entire length of the aisle minus circulation clearance where an aisle meets a wall.* Locate benches a minimum of 2 feet, 8 inches (810 millimeters) clear of locker doors, in the open position, or as to comply with ABA accessibility requirements. When a row is more than 16 lockers long, provide a 3 foot (910 millimeter) long break every 15 feet (4.6 meters). Alternatively, provide 16 inch (400 millimeter) wide benches integral to the locker system. Lockers required to comply with ABA must have benches a minimum of 20 inches (500 millimeters) to maximum 24 inches (600 millimeters) in depth; 42 inches (1050 millimeters) minimum in length; seat height of 17-19 inches (425-475 millimeters) above floor. Provide a minimum 6 inches (150 millimeter) concrete base. Provide a recessed toe kick at the base.

*For Army facilities: Provide benches that are integral with the locker base.

3-5.4 Pool Equipment Storage.

An extensive amount of equipment is required for the operation and safety of the pool and other components of the facility. Carefully size and design storage areas to accommodate required equipment. Provide ventilation and a drain in the pool equipment storage room. Provide storage for lifesaving equipment in the pool area (e.g., hang life hook/pole and backboard on building wall) in a location that facilitates instant access to those items related to lifesaving procedures.

3-5.5 Surveillance and Security.

Orient bathhouse or natatoria and overall site to allow effective, continuous monitoring of the facility with a limited staff. Locate a prominent check-in/check-out counter near the main entrance with unobstructed views of all entrances and exits. Locate the pool office with complete and unobstructed surveillance of the entire deck and pool area. Lifeguard stations have specific surveillance requirements depending upon the configuration of the pool and other facilities. Refer to paragraph LIFEGUARD STATIONS for detailed information regarding location and quantity requirements.

Where direct visual contact of the lobby, entrances into locker rooms, and pool areas cannot be made from the check-in/check-out counter, or other designated control desk location, provide security cameras to facilitate surveillance of those areas from the designated control desk location*

*For Army facilities: Provide surveillance infrastructure, including conduit, cabling, raceways, wires, conductors, power, and junction boxes for a complete and operational system. Provide 2-inch empty conduit routed from security camera sources to control counter base cabinets and continue into ceiling cavity above counter for present and future video cabling. Conduit system to be concealed. Place a surveillance-system CCTV monitor connection in the staff office or check-in counter where it can be easily viewed by the facility director and staff. Provide a surveillance-system CCTV monitor connection in the director's office and ensure the system can record and back-up information. Provide waterproof surveillance-system equipment when located within the pool deck envelope or natatorium.

3-5.6 Architectural Character.

Bathhouse and building designs express the recreational role the aquatic facility plays in the life of the community and should project a feeling of informality. Although there is no single mandatory style, the design respect of the style, scale, and character of the surrounding area is desirable. Coordinate material selections, course lines, roof slopes, scale of windows, and other building elements to ensure the building style complies with the Installation-specific architectural compatibility guidelines and better buildings in the local area. Bathhouses that are removed from surrounding structures offer opportunity for a more unique architectural form, while remaining compatible with the overall styling and character of the Installation, as well as the geographic region. Locate unsightly elements, such as pool equipment and garbage dumpsters, at the back of the facility where they are not visible from roads and parking areas. Screen these items and similar elements, when needed, with landscaping, walls, fencing, and other architecturally compatible materials.

Provide architectural and interior design of aquatic facilities that is integral and related. Both involve functional analysis and consideration of the appropriate environmental character, building organization, circulation, supervision, and flexibility requirements, as well as finishes and furnishings. Present an open, inviting image while providing visibility of attractive activities from the approach and entrance. Admit only controlled, indirect daylight into dressing rooms and administrative areas through clerestories, skylights, or windows.

3-6 INTERIOR DESIGN.

Use NCIDQ-certified interior designers with experience in aquatic facility design to prepare the Comprehensive Interior Design. Provide interior surface materials, finishes and designs that are suitable for use in aquatic facilities and that enhance the overall architectural theme and aesthetic of the facility. Carefully select interior surfaces, details, finishes, fixtures, and fittings for resistance to wear, impact, and vandalism.

Select materials that are resistant to water and mildew due to the high humidity and corrosive environment associated with pools and showers. Base interior design selections on consideration of anticipated use, maintenance characteristics, life-cycle cost, fire protection, and other safety requirements. Coordinate with Installation personnel to incorporate local interior design requirements.

3-6.1 Interior Finishes.

Consider the safety and hygiene of customers in every aspect of the design development. Provide slip-resistant floor and deck surfaces in wet areas. Select wall surfaces to minimize abrasions in case of accidents or stumbles by customers and staff. Coordinate material, finish, color, texture, and furniture selections to complement the overall building design and image. Use colors, textures, and finish materials on the walls and floors to support circulation patterns. Select surface materials and furnishings that are moisture-and mildew-resistant and express a warm, intimate, and relaxed atmosphere. Use local materials to the greatest extent practicable to reinforce the user's sense of place or region.

3-6.2 Flooring.

Use slip-resistant ceramic tile, concrete, or other slip-resistant material for bathhouse or natatorium floors and in other administration areas. Select walking surface finishes with a minimum wet dynamic coefficient of friction (DCOF) as dictated by MAHC. Ensure that flooring materials, such as rubber, comply with applicable service and installation criteria. Slope floors to drains to prevent standing water. Provide coved tiles at wall to floor intersection in wet areas (e.g., dressing rooms, showers, toilet areas, etc.) to minimize dirt accumulations and for ease of cleaning.

3-6.3 Interior Walls.

For wet areas, construct walls with nonabrasive materials, like smooth block or brick. Dry area walls may be painted concrete masonry unit (CMU) block, painted masonry, moisture-resistant gypsum board, Portland cement plaster, or high-strength gypsum plaster. Construct dry area non-concrete or masonry cavity walls with galvanized metal studs raised upon a 6-inch concrete curb. A protective ceramic tile finish may be installed either full height or as a wainscot. Provide doors and frames that comply with SDI/Door A250.8, physical performance Level B, and be 316L stainless steel or fiberglass at wet area service. Door hardware must be 316L stainless steel.

3-6.4 Ceilings.

Provide a ceiling clear height of least 9 feet (2.75 meters).

3-6.4.1 Public Spaces.

For wet areas, provide moisture-resistant, sound absorbent, light reflective ceiling materials such as moisture-resistant gypsum board, plaster, galvanized metal, or other finishes impervious to moisture and mildew. For dry areas, provide moisture-resistant,

sound absorbent, light reflective ceiling materials such as moisture-resistant gypsum board, plaster, tegular acoustical tile, galvanized metal, or other finishes resistant to water and mildew.

3-6.4.2 Natatorium Ceilings.

Provide moisture-resistant materials such as galvanized metal, or other finishes impervious to moisture mildew. Suspended ceilings of any type are not allowed in the natatorium.

Provide a clear ceiling height over diving boards in accordance with FINA, unless the Installation-specific competitive dive standards are more stringent.

3-6.5 Furniture, Fixtures, and Equipment.

Provide furnishings and equipment with materials, finish selections, manufacturing methods and usage suitable for use in aquatic facilities for both indoor and outdoor furnishings, and that enhance the overall architectural theme and aesthetic of the facility. Choose interior furniture, fixtures, and equipment (FF&E) that is durable, comfortable, attractive, water and mildew-resistant. Consider modular components that match the office, staff break area, and training room. Provide highly durable surfaces for check-in and concession counter fronts, as they are subject to heavy use. Consider metal, solid-surface composite materials or stone for the front counter panels and counter tops. Provide corrosion-, moisture- and graffiti-resistant furniture and materials in dressing rooms.

3-6.6 Interior Signage.

Interior signage is important to support the functionality of the facility and for wayfinding. Provide interior signage system in accordance with UFC 3-120-01 and ABA requirements. Coordinate with Installation personnel to meet additional local design criteria requirements.

3-7 FACILITY SYSTEMS.

Facility systems include specific guidelines for core building systems, such as structural, mechanical, electrical, plumbing, lighting, fire protection, life safety, security, and acoustics. For natatoria, provide facility systems, components, and finishes and hardware that are moisture- and corrosion-resistant.

3-7.1 Structural.

Select an economical structural system based on facility size, projected load requirements, local availability of materials and labor, and wind, snow, seismic, geologic, and permafrost conditions. Select and design the structural system based on analysis of projected future needs to accommodate future expansion requirements easily and economically. However, do not over-design the initial construction. Structural bay sizes should reflect space requirements, economy, and subsystem

dimensions, such as masonry units and ceiling grids. Coat all exposed metal surfaces with appropriate coating to resist the corrosive environment within the natatorium. Provide structural bay sizes compatible with standard shelving and locker unit sizes and standard row-to-row dimensions.

Buildings should be limited to one or two stories to avoid the additional costs associated with AT/FP progressive collapse requirements.

3-7.2 Heating, Ventilation, and Air Conditioning (HVAC).

3-7.2.1 General.

Provide HVAC systems in accordance with UFC 3-410-01, UFC 3-410-02, UFC 4-010-01 and other applicable UFCs. Additional criteria specific to aquatic facility HVAC systems is included herein*

*For Army facilities: Provide designs in accordance with Technical Criteria for US Army Physical Fitness Facilities, Chapter V Natatorium and Technical Bulletin 575, Recreational Water Facilities.

**For Air Force facilities: Provide designs in accordance with AFMAN 48-114, Recreational Waters & Mission Training Pools.

3-7.2.1.1 Determine heating and cooling system design loads for sizing systems, appliances, and equipment in accordance with UFC 3-410-01. Include analysis of UFC 1-200-02, ASHRAE 189.1, ASHRAE 62.1 and ASHRAE 55 for thermal environmental conditions for human occupancy in the HVAC design.

3-7.2.1.2 Natatorium/indoor pool spaces must be on a separate ventilation system from the rest of the facility, including administrative space, showers, toilets and locker rooms. Provide HVAC systems for natatorium/indoor pool environments that comply with the recommended natatorium practices in the 2015 ASHRAE Handbook – HVAC Applications (Chapter 5 Places of Assembly – Natatoriums) for humidity control, room pressure control, ventilation requirements (outdoor and exhaust air) for indoor air quality (IAQ), air distribution, duct design, pool water chemistry and evaporation rates.

3-7.2.2 Outdoor Environmental Conditions.

Size equipment and all system components to maintain and control indoor design conditions at the outdoor conditions in accordance with UFC 3-410-01.

3-7.2.2.1 Natatorium/Indoor Pool Environments: These spaces are to be considered Spaces Conditioned for Specialized Technical Requirements in accordance with UFC 3-410-01. Due to the significant ventilation load requirements for these spaces, pay close attention to the 1.0 percent humidity ratio and corresponding Mean Coincident Dry Bulb (MCDB) condition.

3-7.2.3 General Indoor Environmental Conditions.

Size equipment and all system components to maintain the following indoor design conditions. Provide design conditions, including temperature, humidity, filtration, ventilation and air changes required.

3-7.2.4 Administrative/Office/Restroom/Locker Room Environments.

Maintain indoor heating and cooling design conditions for both occupied and unoccupied hours in accordance with UFC 3-410-01.

Bathhouses for outdoor pools are not heated or air-conditioned except for administrative areas. Because of the high humidity produced in the shower and dressing areas, as well as the potential odor associated with locker storage, provide the bathhouse with a ventilation system in accordance with the International Mechanical Code, ASHRAE 62.1 or a minimum of six air changes per hour, whichever is greater. Provide mechanical ventilation fans in dressing rooms, showers, and toilets to help reduce excessive humidity and odor.

3-7.2.5 Natatorium/Indoor Pool Environments.

3-7.2.5.1 Maintain indoor air temperature at the pool and wet deck 2 to 4 degrees Fahrenheit (1.1 to 2.2 degrees Celsius) above the water temperature at a relative humidity of 50-60%.

3-7.2.5.2 This paragraph applies to Army and Air Force facilities. Provide a separate direct outside air system (DOAS) for the pool deck that delivers the greater of 2.2 CFM per square foot (of pool surface area) or the recommended air changes per hour (ACH) per the current ASHRAE Handbook, HVAC Applications, “Places of Assembly.” This criterion will insure sufficient ventilation air to maintain healthy IAQ and control the build-up of toxic chloramines, such as dichloramine and trichloramine, that off-gas into the air due to water treatment. Add occupancy and other ventilation air requirements per ASHRAE Std 62.1 as necessary. See paragraph NATATORIUM/INDOOR POOL ROOM HVAC SYSTEMS for specific HVAC system design strategies/requirements for these spaces.

3-7.2.5.3 This paragraph applies to Navy and Marine Corps facilities. Provide sufficient supply air delivery rate and outdoor ventilation air to maintain healthy IAQ and control the build-up of toxic chloramines, such as dichloramine and trichloramine, that off-gas into the air due to water treatment. See paragraph NATATORIUM/INDOOR POOL ROOM HVAC SYSTEMS for specific HVAC system design strategies/requirements for these spaces.

3-7.2.5.4 Maintain a supply air delivery rate of 4-6 air changes per hour for recreational pools with no spectator areas, 6-8 air changes per hour for competition pools with spectators, and 4-6 air changes per hour for therapeutic pools. The supply air rate must be adjusted to meet space sensible loads while maintaining a comfortable supply air temperature for swimmers; 65 degrees Fahrenheit (18.3 degrees Celsius) is a

practical minimum supply air temperature.

3-7.2.5.5 This paragraph applies to Army and Air Force facilities. Provide minimum outside air for ventilation of 2.2 CFM per square foot (of pool surface area) at all times unless an increase in the ventilation rate is determined to be required by the recommendations of the current ASHRAE HVAC Applications Handbook (chapter on "Places of Assembly"). The minimum requirement at the breathing zone of the swimming pool and wet deck area (3 inches to 72 inches above the deck) is 0.48 cfm per square foot (2.4 l/s per square meter). The breathing zone is 3 inches to 72 inches (75 millimeters to 1830 millimeters) above the deck. Adjust this requirement based on the ASHRAE activity factor for the facility type in accordance with the procedure detailed in the ASHRAE Applications chapter on natatoriums. The minimum for spectator areas and deck areas not considered to be wet is 0.06 cfm per square foot (0.3 l/s per square meter) with an additional 7.5 cfm/person (3.8 l/s per person).

3-7.2.5.6 This paragraph applies to Navy and Marine Corps facilities. Provide minimum outdoor air for ventilation in accordance with ASHRAE 62.1, unless an increase in the ventilation rate is determined to be required by the recommendations of 2015 ASHRAE Applications Handbook, Chapter 5. The quantity of outdoor air must provide adequate dilution of contaminants generated by the pool water. The minimum requirement at the breathing zone of the swimming pool and wet deck area (3 inches to 72 inches above the deck) is 0.48 cfm per square foot (2.4 l/s per square meter). The breathing zone is 3 inches to 72 inches (75 millimeters to 1830 millimeters) above the deck. Adjust this requirement based on the ASHRAE activity factor for the facility type in accordance with the procedure detailed in the ASHRAE Applications chapter on natatoriums. The minimum for spectator areas and deck areas not considered to be wet is 0.06 cfm per square foot (0.3 l/s per square meter) with an additional 7.5 cfm/person (3.8 l/s per person).

3-7.2.5.7 Maintain pool and spa areas at a negative pressure of 0.05 to 0.15 inches of water (12.5 to 37.4 pascals) relative to adjacent spaces and the outdoors; implement active pressure control if feasible. Design system so exhaust air rate exceeds the supply air delivery rate such that the excess exhaust is 10% of the supply air volume; acceptable range for excess exhaust is 2% to 10%.

3-7.2.6 Administrative/Office HVAC Systems.

Heating, ventilating and air conditioning systems must be separate from those serving the natatorium/indoor pool environment. Fully duct all supply and return air distribution systems. Provide zoning to maintain different environmental conditions in each required functional area.

3-7.2.7 Natatorium/Indoor Pool Room HVAC Systems.

3-7.2.7.1 Deterioration of materials from condensation should be anticipated and minimized with mechanical design and construction material selection resistant to chemical corrosion from the pool atmosphere. Construct metal ductwork, diffusers, registers and grilles of aluminum. Fabric ductwork with grilles sewn in may be

acceptable for exposed ductwork in pool areas. Use of duct liner is prohibited. Steel hangers and supports must be painted with an epoxy-based paint or other durable finish suited to protect the metal from corrosion in a natatorium environment. Aluminum is the preferred material of construction for interior walls and floors of air handling sections of air conditioning units, including drain pans, dampers, fan wheels and heat exchangers; provide phenolic or baked epoxy coating for coils. Any steel components must have a phenolic or baked epoxy coating. Provide filters that are resistant to moisture degradation.

3-7.2.7.2 Do not locate equipment requiring maintenance above the pool or spa.

3-7.2.7.3 Direct supply air to building envelope surfaces, particularly glass, to prevent condensation. Direct supply air over the water surface toward low return/exhaust intakes to remove chloramines from the breathing zone of swimmers. Limit the air velocity over the water surface to 30 fpm (0.15 m/s) or less. Locate high and medium return intakes to capture warm, humid air for return to the ventilation system, minimize short-circuiting of supply air, and limit chloramine recirculation. Locate low exhaust intakes to optimize the capture of chloramines and limit their recirculation. Locate return and exhaust intakes at the warmest bodies of water and those with the most agitation, as these areas off-gas at higher rates than traditional pools; always provide exhaust intakes directly over spas.

3-7.2.7.4 For pools with spectator areas physically separate from pool area, the preference is to provide a dedicated air handling unit to provide supply air to the space at a temperature more comfortable for spectators and separate spectator ventilation requirements from pool area ventilation requirements for improved ventilation/energy efficiency. If a single unit is provided to serve both the spectator viewing and pool areas, then it must be sized to include the spectator ventilation load at full occupancy during swim meets and events.

3-7.2.7.5 Provide system with method of air-to-air energy recovery between exhaust and outdoor air streams. Justification must be provided to not include this energy recovery feature (economically unfeasible due to existing conditions, system size, etc.). Desiccants are broken down by chlorides and are not to be used.

3-7.2.7.6 HVAC system serving the pool area must include a purge mode to replace indoor air with outdoor air after chemical treatment process of “shocking” the pool as recommended by the Model Aquatic Health Code. Design the system to provide 100% outside air during this operation.

3-7.2.7.7 Consideration must be given to energy saving strategies such as, but not limited to, the following:

- Use of increased outdoor air ventilation for dehumidification and increased IAQ in conjunction with air-to-air energy recovery
- Use of waste heat from air conditioning and dehumidification to heat pool water

3-7.2.8 Chemical Storage Rooms.

Space must be kept at a negative pressure with dedicated exhaust air system meeting the requirements of the MAHC. Each chemical storage room must have an independent, dedicated exhaust system to prevent mixing of acid and chlorine vapors. Provide exhaust air intakes within 6-inches (150 millimeters) of the floor to capture chemical vapors heavier than air. Minimum flow rate to be the greater of 1.5 cfm per square foot (7.5 l/s per square meter) or 10 air changes per hour, unless the MSDS or manufacturer of the chemicals being stored requires a higher rate. Materials of construction must be resistant to corrosion. Construct ductwork, registers and grilles of aluminum or fiber-reinforced plastic (FRP). Provide exhaust fan(s) made of aluminum or FRP construction. Steel elements, such as hangers and supports, must be painted with an epoxy-based paint or other durable finish suited to protect the metal from corrosion in this environment.

3-7.2.9 Pump and Water Treatment Equipment Rooms.

Keep space at a negative pressure with dedicated exhaust air system meeting the requirements of the MAHC. Provide exhaust air intakes within 6-inches (150 millimeters) of the floor to capture chemical fumes heavier than air. Meet the minimum flow rate requirements of ASHRAE 62.1 or other applicable standards for chemicals and equipment being utilized, as well as heat gain from equipment. Ventilation system must be capable of accommodating venting of surge tanks, if applicable. Materials of construction must be resistant to corrosion. Construct ductwork, registers and grilles of aluminum or fiber-reinforced plastic (FRP). Provide exhaust fan(s) made of aluminum or FRP construction. Paint steel elements, such as hangers and supports, with an epoxy-based paint or other durable finish suited to protect the metal from corrosion in this environment.

3-7.2.10 Pool Equipment Storage Rooms.

Keep space at a negative pressure with dedicated exhaust air system providing a minimum flow rate of 1.0 cfm per square foot (5 l/s per square meter) or 10 air changes per hour, whichever is greater. Materials of construction must be resistant to corrosion due to chlorides. Construct ductwork, registers and grilles of aluminum or fiber-reinforced plastic (FRP). Provide exhaust fan(s) made of aluminum or FRP construction. Paint steel elements, such as hangers and supports, with an epoxy-based paint or other durable finish suited to protect the metal from corrosion in this environment.

3-7.2.11 HVAC Controls - General.

If facility is provided with a direct digital control (DDC) system, it must comply with UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems and UFC 4-010-06 Cybersecurity of Facility-Related Control Systems. If connecting to Installation BAS/UMCS system, UFC 3-470-01 Utility Monitoring and Control System (UMCS) Front End and Integration is applicable.

Do not locate thermostats and temperature sensors on exterior walls or adjacent to windows, doors, water or other features that would influence an inaccurate reading.

3-7.2.12 Administrative/Office HVAC Controls.

Provide night and weekend setback capability for the HVAC system and zone control for maintaining different environmental conditions in each required functional area. If facility is not provided with a DDC system, then provide 24-hour/7-day programmable thermostats. Utilize security features so that thermostats are only accessible to authorized personnel.

3-7.2.13 Natatorium/Indoor Pool Environments HVAC Controls.

3-7.2.13.1 HVAC system controls are to be integrated with swimming pool process control system, as applicable, for coordination of system operational functions such as supply air temperature set point vs pool water temperature, purge mode, etc.

3-7.2.13.2 Provide packaged pool room air conditioning and dehumidification equipment with microprocessor controls. If facility has a building Direct Digital Control (DDC) system, packaged equipment must have manufacturer-provided open protocol interface for communication with this DDC system.

3-7.2.13.3 Do not implement night temperature setback to reset the space temperature down; this increases pool water evaporation and possibility of condensation.

3-7.2.13.4 The strategy to shut off the ventilation air during unoccupied hours to save energy by reducing load on the dehumidification system may be implemented, however careful consideration must be made with regard to potential negative impact to air and water quality. For natatorium/pool environments with separate air handling units for the spectator area, the ventilation air to the spectator zone may be reduced to zero during unoccupied periods.

3-7.3 Plumbing.

3-7.3.1 General.

Provide toilet and bath facilities in accordance with ISPSC, MAHC and UFC 3-420-01. Provide automatic mixing valves on showers where hot water is over 105 degrees Fahrenheit (40 degrees Celsius). Provide shut-off valves at all plumbing fixtures. Provide floor drains in all dressing rooms, shower rooms, toilet areas, and custodial closets. Provide metering for gas service, if used. Supply hot and cold water to all restrooms, sinks, and custodial closets. Hot water temperature is not to exceed 105 degrees Fahrenheit (40 degrees Celsius) at the outlet. Provide frost-free hose bibs on exterior walls to enable hose access to the entire pool deck and locate interior hose bibs to enable hosing down of all wet areas within the bathhouse. Provide separate water service with meter for the pool. Provide a dedicated backflow preventer in the pool equipment room*

*For Army facilities: Provide designs in accordance with the requirements of Technical Criteria for US Army Physical Fitness Facilities, Chapter V Natatorium and Technical Bulletin 575, Recreational Water Facilities.

3-7.3.2 Surge Tanks.

Provide PVC vent pipe leading to the outdoors for surge tanks located below the pool deck, if applicable. Size vent for surge volume required by MAHC. Terminate vent at gooseneck with birdscreen.

3-7.4 Electrical.

Provide electrical service to the aquatic facility in accordance with UFC 3-550-01. Provide distribution equipment, wiring methods, receptacles, grounding, interior and exterior lighting, controls, and emergency lighting, in accordance with UFC 3-520-01 and the published Installation-specific design requirements. Provide voltages and frequencies for overseas locations in accordance with UFC 3-510-01. Coordinate with Installation personnel to determine the quantity of electrical outlets, and their placement, for specific equipment such as vacuums, public-address systems, timing devices, and score boards.

3-7.4.1 Wet and Corrosive Areas.

The chemical storage rooms and pool area are considered wet and corrosive. Design the electrical system within the chemical storage room using equipment and wiring methods that are drip-proof and corrosion-resistant.

Provide devices that are specification-grade, with stainless-steel cover plates within the pool area.

3-7.4.2 Service Entrance Equipment.

Provide service entrance equipment sized for the facility on the calculated load plus 15% empty (bussed) space and 15% spare capacity (ampacity), rounded up to the next standard service size. Provide metering for electrical power in accordance with the Installation's utility metering requirements.

3-7.4.3 Lightning Risk Assessment.

Conduct a lightning risk assessment and, if required, provide a lightning protection system in accordance with UFC 3-575-01.

3-7.5 Fire Protection and Life Safety.

Provide fire protection and life safety designs in accordance with the following standards and criteria:

- UFC 3-600-01
- Latest edition of the applicable National Fire Protection Association

(NFPA) Codes and Standards

3-7.6 Communications and Data.

Provide a minimum of one telephone and one data outlet with high-speed internet connection in the check-in and office area. Provide wireless local area network (LAN) connectivity for all office areas, and for pool areas for patrons. Because of the technical nature and rapidly changing communications and data requirements, refer to UFC 3-580-01 for detailed guidelines and specifications:

Provide junction boxes with rigid conduit within the ceilings and walls that includes the required infrastructure for telephone and data connections. Provide telecommunications outlets with stainless-steel cover plates within the pool area. Telephone and data outlets may be independent of each other or combined into a single junction box. If these connections can be combined into a single junction box, the cover plate to that junction box must allow for multiple connections. Coordinate with the Installation POC for Information Technology (IT) systems to determine if additional local requirements or preferences are applicable to the project.

3-7.7 Public Address System.

A centrally-controlled public address (PA) and two-way communication system is required for all pool facilities. Incorporate PA capability with the phone system to allow paging from all staff phones, where possible. All PA components located in the pool area must be suitable for installation in wet and corrosive environments.

Provide a PA system at the circulation desk if it cannot be incorporated in the phone system. Provide at least one PA speaker in each dressing room, office, check-in, public toilet, and lobby (at indoor pools). Provide one indoor speaker for every 800 sq. feet (74.3 sq. meters) of net floor area. Provide a minimum of two outdoor speakers for every 25-meter pool and at least three speakers for every 50-meter pool. Provide an interface between the PA system and the Installation Wide Area Mass Notification System (MNS).

3-7.8 Interior Lighting.

Provide interior lighting fixtures, design, materials, finishes, and placement that support the architectural and interior design function of each space and enhance the design aesthetic of the facility. Provide wet-area-rated light fixtures in wet areas like the natatorium, showers, dressing areas, and toilets. Provide light fixtures that minimize glare and shadowing.

Where artificial lighting is used to meet the light level requirements, provide manual means to control the luminaires. Separately control luminaires in daylighted areas through continuous dimming photocontrol to reduce light output when natural light is available.

3-7.9 Alarm Systems.

Provide an alarm system for intrusion detection to protect equipment and assets. Coordinate at the Installation level to provide alarm system equipment that is compatible with the systems used at each Installation. Provisions for an alarm system must be justified during the planning and programming process.

3-7.10 Cable Television (CATV) System.

For CATV service, provide the facilities and infrastructure to accommodate routing of the CATV service trunk-line entry from the nearest source on the Installation to the network headend in the facility telecommunications room (TR). Provide a distribution conduit pathway from the TR to one outlet in the office area. Coordinate with the Installation personnel to determine where additional CATV outlets are required.

3-7.11 Closed-Circuit Television (CCTV) System.

Coordinate with the Installation personnel to provide facilities and infrastructure for CCTV in the pool area for displaying messages, for instructional purposes, and for marketing announcements, for pool supervision, and for electronic surveillance. Provide distribution pathways to head-end equipment and connectivity to the LAN.

CHAPTER 4 FUNCTIONAL AREA TECHNICAL REQUIREMENTS

4-1 GENERAL.

Chapter 4 presents requirements specifically applicable to the design of each functional area and space of aquatic facilities. Specific criteria are provided concerning critical dimensions, storage requirements, furnishings, equipment, and technical requirements for each component space within each functional area. The technical requirements provided in this chapter address only items with special criteria for each individual space. General planning requirements are presented in paragraph DESIGN.

The requirements in this chapter apply to all sizes and types of aquatic facilities. Specific space allocation is provided in accordance with paragraph SPACE REQUIREMENTS.

4-2 SITE FUNCTIONAL AREA REQUIREMENTS.

Provides technical requirements for siting pools, structures, parking areas, pool deck, recirculation and filtration equipment, chemical storage, service drive, and non-water recreation areas.

4-2.1 Non-Water Recreational Areas.

Physically separate non-water recreation areas from the main pool with a low fence, wall, or barriers with a self-closing gate. Provide low barriers in accordance with the MAHC for barriers not serving as part of the aquatic facility enclosure.

Provide shaded areas and shelters for protection from the sun.

4-2.2 Outdoor Showers.

Provide a minimum of one outdoor rinse shower at the entrance to the pool deck. Locate drains to prevent water from outdoor showers from accumulating on the pool deck.

For natatorium, provide a minimum of two rinse showers in the pool enclosure, on the pool deck, near the entrance into the pool area.

4-2.3 Parking Areas.

Provide customer parking spaces in accordance with UFC 3-201-01 at peak capacity, plus one for each full-time staff member. Provide dedicated spaces for motorcycles and bicycle racks in accordance with LEED or sustainable design guidelines and Installation design requirements. Provide bicycle racks near the main entrance in a secure location. Provide artificial light levels at night in all parking areas in accordance with by UFC 3-530-01 for security and safety.

4-2.4 Fences, Gates, and Wind Screens.

Enclose the pool and surrounding deck area completely with a barrier. For pools where unauthorized access may be an issue, provide a minimum fence height of 8 feet (2.4 meters). Segregate areas within the deck (e.g., food service areas, spectator seating) with low barriers compliant with MAHC barriers not serving as part of the enclosure. Do not use chain-link fencing for internal segregation. Use fencing that is architecturally compatible with the fencing in nearby areas and is visually permeable, so Installation security personnel can easily monitor activities within the compound. Use fence materials that match or complement the exterior bathhouse and building materials. Use brick or masonry walls to screen equipment and provide protection from wind. Emergency access gates must be a minimum of 6 feet (1.83 meters) wide to accommodate emergency responder personnel and equipment. Provide MAHC-compliant gates in perimeter fencing for landscaping maintenance equipment.

4-2.5 Filtration, Recirculation, and Heating Systems.

Separate all pool mechanical equipment and chemical storage areas from public access. Pool mechanical systems may be located inside a building structure or outside within a fenced or enclosed exterior compound. Equipment includes pumps, pipes, filter tanks, water heaters, chlorine and disinfectant feeders, surge tanks, and control panels. Locate all equipment with convenient access for maintenance. Provide sufficient space for the placement, replacement, and servicing of each piece of equipment. Size doors or openings to permit future replacement of all equipment. Provide ventilation for motors and heaters.

4-2.6 Chemical Storage.

Provide chemical storage rooms or secured structures to house chlorine and other chemicals independent of the other pool mechanical equipment. Provide separate, independent rooms for oxidizing chemicals and pH adjustment chemicals. Locate the storage rooms within the mechanical equipment compound or adjacent to the pool equipment in a space that is not accessible to the public. Secure doors from break-ins and unauthorized access. Post warning signs in accordance with MAHC for chemical storage room doors and additional signs requiring protective clothing and equipment. Provide fire- and explosion-proof chemical storage rooms. Refer to paragraph HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) for air change and exhaust requirements. Provide an OSHA-approved drench shower and eye wash station, gloves, protective goggles, and gas masks in the pool equipment and all chemical storage areas. Do not provide floor drains in the chemical storage rooms.

For renovations of existing facilities utilizing gas chlorine, provide a storage space meeting the requirements of MAHC and provide an audible and visual alarm to alert of chemical leak.

4-2.7 Service Drives and Emergency Vehicle Access.

Coordinate with the Installation to determine the sizes and weights of required

emergency and service vehicles before planning the service access areas. Design all service and emergency drives for the weight of the vehicles anticipated and consider the inclusion of the pool deck as part of the emergency access drive. Provide direct access to the pool deck for emergency vehicles and do not cross outdoor activity areas with service/emergency access.

Avoid dead-end service drives and service drives that exceed 100 feet (30 meters) in length. Provide a backup spur for dead-end and service drives that exceed 100 feet (30 meters) in length. Provide a service drive access to the recirculation/filtration equipment and chemical storage area for chemical delivery, maintenance and waste removal. Screen or separate the service area from public use or traffic areas with attractive fences, walls, depressions, berms, or landscaping. Provide proper drainage if depressions are used. Asphalt or concrete access drives to the loading dock must be a minimum of 12 feet (3.6 meters) wide for access by trucks and emergency vehicles. Provide access for maintenance of overhead lighting, if provided. Comply with AT/FP standards as provided in UFC 4-010-01, particularly for dumpster separation and access control. Provide easy access to dumpsters or outside trash containers located on paved areas or a concrete pad.

4-3 WATER AREA REQUIREMENTS.

Water areas include the main pool swimming and diving areas, wading pool, spray ground areas, and spa areas. Locate the staff office to enable constant visual monitoring of the water areas. Locate access to the pool from the bathhouse or dressing room areas near the shallow end, wading pool, or spray ground area.

4-3.1 Lap and Competitive Swimming Areas.

Provide a dedicated area for lap swimming. Follow sanctioning agency detail requirements for competitive swimming facilities. Consult AAU, NCAA, NFHS, USA SWIMMING or FINA regulations for detailed requirements and additional information since these requirements are subject to annual review and change. Default to FINA requirements when sanctioning entity is not known.

4-3.2 Lane and Area Dividers.

Provide racing lane dividers consisting of a set of continuous disk-type, wave quelling floats strung on a cable or cord running the full length of the lane. Provide permanent recessed anchors integral to the pool deck, wall or gutter for lane divider attachment. Provide lane dividers with a tensioning device so that they can be stretched tight and held in position. Provide one racing lane divider to separate each racing course lane and additional dividers to separate outside lanes from additional space adjacent to the pool wall. In the general-use pools, separate deep water (the diving area) from shallow water using a lane divider, bulkhead, or an area divider. Provide area dividers consisting of a rope with buoys spaced along the length. Provide recessed anchors centered between racing lanes, at the line separating diving from free swim areas, and to isolate specific program areas. Provide an area divider 1 foot (.30 meter) to the shallow side to mark the 5-foot (1.5-meter) depth point during recreational swim periods.

4-3.3 Racing Lanes and Target Markings.

Provide racing lane and target markings according to the appropriate event sanctioning entity that may be involved in competitive events (e.g., NCAA, FINA). Default to FINA requirements when sanctioning entity is not known. For a 25-meter course, provide a recall line 40 feet (12 meters) from the starting end. For a 50-meter course, provide a recall line 50 feet (15 meters) from the starting end. Hang the recall line from removable stanchions. Provide a cover for the stanchion anchors when not in use and design anchor to prevent standing water. If provided, specify touch pads to be a minimum of 6 feet, 6 inches (1.98 meters) wide by 2 feet (610 millimeters) tall. Install in a fixed position in the center of the lane and vertically positioned in accordance with the requirements of the event sanctioning body. Provide slip-resistant race lane and target markings.

4-3.4 Bulkheads.

Provide bulkheads for competition pools where the length of the pool is greater than the required course length for competition. Provide bulkhead locations such that the required course dimensions are met when the bulkhead is anchored into position.

Use moveable bulkheads with “flow thru” vertical surfaces where displaced water moves through the bulkhead for easier movability. Avoid bulkhead designs that have a “trampoline effect” or are required to maintain constant air pressure for structural integrity.

*For Army facilities, provide motorized bulkheads.

4-3.5 Diving and Deep-Water Areas.

Diving and deep-water areas are used for competitive diving, recreational diving, SCUBA training, survival training, rock wall climbing and other activities requiring deep water. Provide a diving envelope size and depth compliant with or exceeding FINA minimum requirements or in accordance with play feature manufacturer (e.g., climbing walls). Diving and deep-water areas may be accommodated in three possible ways:

- The preferred method is to locate diving areas adjacent to the deep end of a general-use pool in a typical “L”-shaped configuration.
- Incorporate the diving area into the deep end of a general-use pool. Utilize bulkheads to separate program spaces.
- Provide a separate pool exclusively for diving or deep-water training and programs.

For Army facilities, provide a recessed toe-ledge in the pool wall no less than 4 feet (1.22 meters) below the water surface on all sides of any pool where the water depth exceeds 5 feet (1.52 meters).

4-3.6 Diving Boards and Platforms.

Where desired by local Installation, provide diving boards that are manufactured from aluminum, fiberglass, or wood, coated with a slip-resistant surface. For springboards of 10 feet (3 meters) or more above the water surface or for competitive diving, provide springboards that comply with FINA or the sanctioning organization. For diving boards over 2 feet (610 millimeters) in height, provide 3 feet (910 millimeter) high double guard rails on each side of the board extending to the water's edge. Where desired by the local Installation, provide 1 meter (3.3 feet) and 3 meter (9.9 feet) platforms compliant with FINA requirements. Cover fulcrum mechanisms to prevent injury to fingers or toes.

To increase visibility of the water surface, provide a water surface agitator using water jets at deck level or air bubble inlets in the pool bottom.

4-3.6.1 Special Diving Requirements.

Where required by the local Installation, provide high-diving platforms of 7.5 meters (24.3 feet) and 10 meters (32.8 feet) high. Provide concrete construction compliant with FINA.

4-3.6.2 Water Slides.

Where desired by the local Installation, provide recreational water slides compliant with ASTM F2376 in the water areas. Provide water slides designed for feet-first sliding only. Provide the water depth and pool floor profile required by the slide manufacturer and MAHC at the termination of the slide. Water slides may terminate in an independent landing pool, on the pool deck in a fiberglass runout or in a general pool. For slides landing in a multi-use pool, provide barriers to isolate the slide landing area. Provide an egress point(s) within the landing area such that riders do not cross the path of another rider to exit the pool. Provide a landing pad and pool floor-mounted barriers for children's slides terminating in shallow water.

Provide a minimum clear height from the water slide starting tower to the lowest overhead obstruction of at least 8 feet (2.4 meters).

4-3.7 Play Structures and Aquatic Play Equipment.

Where desired by the local Installation, include play structures and other aquatic features compliant with ASTM F2461 as part of the spray ground areas or wading pool to create a water park environment. Where desired, provide play structures/sprays located inside the main pool zero-depth entry and other water areas. Consider climbing walls for deep-water pools. Provide water area, depths and feature construction for play structures and aquatic feature equipment in compliance with MAHC and the manufacturer's requirements.

4-3.8 Spray Grounds/Interactive Water Play.

Design spray grounds with all points of the spray area sloped to drain such that no

standing water is present. Provide spray ground equipment for the dependent population at each facility. Install ground sprays flush with the spray ground finish. For overhead spray equipment, provide protective coverings over flanges and anchor hardware, or anchor feature below grade to prevent toe-stub hazards. Spray grounds may be designed with either recirculated or potable water for features.

Physically separate spray ground areas from other pool areas with a low fence or barriers with a self-closing, self-latching, lockable gate. Provide low barriers in accordance with the MAHC for barriers not serving as part of the aquatic facility enclosure.

4-3.8.1 Recirculated Systems.

For recirculated systems, design the spray ground recirculation independent from any other pool or spray ground system. Provide a turnover rate compliant with MAHC and ISPSC. Provide supplemental disinfection system in accordance with MAHC.

4-3.8.2 Potable Water Systems.

Potable water supplies connected directly to play features are acceptable as an alternative to recirculated spray grounds. For potable water systems, discharge waste water (water that has been sprayed through a feature and has then contacted the spray ground finish) into the sewer as permitted by the Installation and according to local codes or collect water for reuse in grey water applications.

4-3.9 Wading Pools.

The depth of wading pools* may range from 0 to 18 inches (150 to 450 millimeters). Provide a pool floor slope between 1:15 and 1:20. Provide an independent water recirculation system for wading pools.

Locate wading pools at the shallow end of the main pool. Provide adult seating opportunities for at least one parent for each child at maximum capacity. Physically separate wading pools from the main pool with a low fence or barriers with a self-closing, self-latching, lockable gate. Provide low barriers in accordance with the MAHC for barriers not serving as part of the aquatic facility enclosure.

*For Navy facilities: Do not provide wading pools in new construction projects. Existing shallow wading pools may be maintained, as needed, for small children to play and swim.

4-3.10 Recreational Spa Pools.

These requirements apply to spas used for non-medical purposes. Provide a spa depth between three feet (0.9 meters) and four feet (1.2 meters). Provide underwater bench seating a maximum of 18 inches (0.45 meters) below the normal operating water level. Provide underwater pool steps to the spa pool floor. Utilize skimmers and wall inlets for recirculation. Provide flat main drains installed flush with the pool floor at the deepest

point of the spa pool floor. Spa pools may include water or air induced hydrotherapy jets.

4-3.11 Pool Access.

Pool access may be accomplished in several ways.

4-3.11.1 Accessible Ramps and Equipment.

Provide accessible entry and equipment in accordance with paragraph ACCESSIBILITY.

4-3.11.2 Zero-Depth Entry Area.

Design slip-resistant zero-depth entry areas with a slope between 1:15 and 1:20 for main pools and wading pools. Provide a perimeter overflow gutter with pre-fabricated grating at the normal operating water level to assist in debris removal and reduce maintenance.

If provided, group spray play features to maintain a path free of spraying water adjacent to the play area.

4-3.11.3 Ladders and Grab Rails.

Provide steps and ladders recessed into the pool wall. No ledges or projections are permitted under the water surface. Grab rails with recessed steps are preferred over projecting ladders. Locate grab rails and recessed steps at both ends of the long walls near the corners for 25-yard or 25-meter pools. For 50-meter or uniquely shaped pools, provide intermediate grab rails and recessed steps in accordance with the MAHC.. Where steps, step holes, or ladders are located within the pool, provide a grab rail on both sides extending over the edge of the deck.

Locate a ladder or recessed step with grab rails no more than 16 feet, 5 inches (5 meters) from a diving board or water slide. Position ladders or recessed steps so swimmers don't have to cross the landing areas of diving boards and water slides.

4-3.11.4 Pool Steps and Ramps.

Provide one set of shallow water steps or a sloped-entry compliant with ABA for access into the shallow end of the pool unless prohibitive. Design underwater steps recessed into the pool wall. Provide slip-resistant finish on ramps and stair treads, on the leading edge of stair treads and grab rails. Provide a contrasting color, permanent marking on the leading edge of each tread.

4-4 POOL DECK AREA REQUIREMENTS.

Provide the following deck equipment: lifeguard stands and stations, backboards, head immobilizer, rescue tubes, a drinking fountain, emergency telephone, lounge chairs, umbrellas and other sun screens, and night lighting. Other potential furniture, fixtures,

and equipment (FF&E) includes supplemental chairs, dining tables, occasional tables, basketball goals, volleyball nets and poles, pace clocks, floor stand portable signs, starting blocks, starting block safety covers, backstroke stanchions, lockers, storage carts, lane lines and area dividers, lane line reels, pool cover, and pool cover reels.

4-4.1 Lifeguard Stations.

Provide portable lifeguard stations for different activities and conditions. Provide a minimum of one elevated lifeguard station for pools with a surface area of over 2,000 square feet (186 square meters). Provide a minimum of two lifeguard stations for pools over 4,000 square feet (371 square meters), and one for every successive 2,500 square feet (232 square meters) or majority fraction thereof. Consider pool layout, shape, and elevated features in the determination of the required quantity of lifeguard chairs.

Require lifeguard stations capable of securing portable lifesaving equipment (e.g., ring buoys). Provide lifeguard stations capable of securing UV protection compliant with MAHC.

4-4.2 Life Safety Equipment.

Provide one rescue (reaching) pole fitted with a life hook or shepherd's crook and one ring buoy for each 2,000 square feet (186 square meters) of water area. Provide two wound throwing ropes of length equal to one-and-a-half times the pool width. Provide a minimum of one backboard with straps and head immobilizer for each pool. Locate required items in the immediate vicinity of the pool. Provide a rescue tube at each lifeguard station.

Provide a first aid kit, cot, blanket, pillow, and Automatic External Defibrillator (AED)*, in the first aid room.**

*For Navy projects: Provide (AED) in the pool enclosure with immediate access from the pool deck.

**For Army facilities: Refer to the MAHC for minimum life safety equipment requirements.

4-4.3 Depth Markings.

Locate deck depth markers on the pool deck beside the pool edge. For pools with a freeboard of 4 inches (10 cm) or greater, provide vertical wall depth markers at or above the water level. For pools with a freeboard less than 4 inches (10 cm), place wall depth markers as high on the wall as possible. For deck level pools, provide wall depth markers below the water level, as high as possible on the pool wall.

4-4.4 Starting Platforms.

When competitive swimming is a program requirement, provide starting platforms for each course lane in the pool. Mount starting platforms above the water level at the

dimension required by the sanctioning institution governing the competitive events. Mount the front edge flush with the vertical end wall of the course. Provide a minimum platform width of 20 inches (510 millimeters). Slope the platform's surface at not more than 10 degrees and provide a slip-resistant surface. Number starting platforms according to FINA. Provide anchors for starting platform installation. Provide winterizing covers for when platforms are stored.

4-4.5 Automatic Timing Devices.

Where required, equip timing devices to be initiated by the starting system. Provide automatic timing devices that display all recorded information and finish contact pads activated by a light hand touch. Where automatic timing devices are installed, provide in deck timing system connections, such that there are no exposed wires on the pool deck.

4-4.6 Chairs, Tables, and Umbrellas.

Provide a variety of chairs, tables, and umbrellas designed for outdoor use around the pool deck. Use reclining lounge-style chairs for sunbathing and general pool-side use. Provide some chairs and tables grouped together. For outdoor pools, provide movable umbrellas for shaded, informal seating areas. Use stackable chairs, where possible, to facilitate storage. Provide chair and umbrella fabrics that are moisture-resistant and designed for outdoor use. Do not use glass table tops.

Provide a line of demarcation in the pool deck to delineate between seating/lounging areas and walking areas. Use permanent, slip-resistant finish materials, contrasting in color to the pool deck surface.

4-4.7 Sun Screens.

For outdoor pools, provide large pool deck areas protected by overhead sun screens (shade structures), especially around the check-in and bathhouse areas. Provide shade structures that provide shading for a portion of the pool water areas, common grass areas, and at least half of the spray ground or wading pool areas. Provide shade accommodations at each lifeguard station that are adjustable and can be moved according to changing sun conditions.

4-4.8 Deck Equipment Storage.

Provide freestanding or built-in storage for instructional and recreational equipment, such as kickboards, floats, buoys, fins, masks, SCUBA equipment, noodles, pennants, swim trainers, scoreboard, chalkboard, electric clock, water polo goals, water basketball goals, volleyball equipment, pool cleaning equipment, lane markers, pool covering, thermometer, backstroke lines, personal flotation devices (PFD), aquatic exercise equipment, and other miscellaneous items. Consult with Installation-level personnel and the aquatic facility director regarding storage areas needed to meet program and operating policy requirements.

4-4.9 Locker Areas.

Locker storage for clothing may be located on the pool deck or within the dressing rooms.

4-4.10 Water Fountains.

Provide public water drinking fountains accessible from the pool deck in accordance with MAHC.

4-4.11 Deck Signage.

Provide signs regarding pool rules at the entrance to the pool deck and within the water areas. Include signs that provide emergency numbers near the office telephone, warnings outside the pool area, room names, entry prohibitions, and instructions necessary for diving or special equipment. Provide signs in accordance with UFC 3-201-02.

4-5 BATHHOUSES AND NATATORIUM AREA REQUIREMENTS.

Bathhouses normally contain the following core spaces: check-in area, male and female dressing rooms, showers, toilets, storage, offices, and administrative areas. These core spaces may be contained within the same building or separated into different structures, as desired. Food service, filter rooms, chemical storage, and mechanical equipment may also be contained within the bathhouse building; however, some of these components may not be required to be located within a building structure and may need to be located in separate areas of the site for safety and functionality. Typical bathhouse spatial relationships are shown in Figure A-3: Bathhouse Functional Area Relationships.

4-5.1 Entry Control Checkpoints.

This area serves to monitor the flow of people in and out of the facility. If valuables storage is handled in this area, provide 12 inch by 12 inch (127 millimeter x 127 millimeter) lockers. Additionally, this space also serves as a surveillance station for the pool and deck area. Locate check-in areas immediately adjacent to the entrances to both dressing areas. Visibility of and direct access to pool and deck areas is required.

4-5.1.1 Entry Control Checkpoint Area FF&E.

FF&E required for entry control areas include locker systems for valuables, desk or check-in counter, staff chairs, telephone with PA systems, cash register, and an exterior clock visible from the pool area. Provide storage for small equipment and lost/found items. Optional items include a bulletin board.

4-5.1.2 Natatorium Lobbies.

Incorporate a lobby area in designs for natatoria that serves as the primary entrance to the facility for all participants, visitors, and spectators. Direct access from the lobby is

required to spectator viewing areas and dressing rooms. Locate public toilets, staff office, and concession areas (if provided) adjacent to this space. Visual monitoring of the lobby is required from the staff office or the check-in area. Accommodate at least 50 percent of the visitors in the largest spectator seating areas. Include chairs, trash receptacles, and bulletin boards.

4-5.2 Dressing Rooms.

Provide separate facilities for men and women. Locate dressing areas to be easily accessible to the pool deck and check-in area. Design the locker room/changing room to prevent visibility from public areas. Locate showers, lavatories, toilets, and drying areas within or adjacent to each dressing room. Lockers may be located inside the dressing room or on the pool deck for increased visibility and security. Include floor slopes to drain for hosing and cleaning.

4-5.2.1 Family Dressing Rooms.

Provide separate family dressing room(s)* with showers, toilets, sinks and baby changing stations to serve the needs of single-parent families or special needs of the disabled or elderly. If accessible off the pool deck, these family dressing rooms may also serve as public toilets. Provide lockers outside of family dressing rooms in separate, non-lockable area.

*For Navy and Air Force facilities: Evaluate requirement for family dressing rooms on a project-specific basis. Family dressing rooms are required for Army facilities.

4-5.2.2 Dressing Room FF&E.

Provide a locker for each user based upon the overall pool capacity. Provide additional lockers dedicated for use by the staff. Other furnishings and equipment include benches, vanity mirrors, one full-length mirror, and ceiling fans. Optional equipment includes a clock, hair driers, and a bulletin board. Provide wooden or recycled plastic bench seating, mirrors, soap dispensers, and paper towel dispensers or blowers conveniently located near the lavatories. Provide sanitary napkin dispensers and disposal units inside the female dressing rooms. Provide at least one GFCI electrical outlet near the vanity sinks and vanity mirrors spaced every 30 inches (762 millimeters) on center. Provide baby changing accommodations in both male and female dressing rooms*. Provide a minimum of one swimsuit dryer (spinner)** in each dressing room wired on a dedicated GFCI branch circuit and plumbed to drain. Provide two to five dressing cubicles with seats or benches in each dressing room.

*For Army facilities: Provide baby changing stations in the family dressing rooms only.

**For Army facilities: Provide swimsuit dryer located in a tiled alcove out of the traffic path. Provide floor drain below dryer.

4-5.3 Showers.

Provide showers located inside or adjacent to each dressing room for customer personal hygiene use before and after swimming. Provide direct access from the showers to the dressing area. Provide separate facilities for men and women. The exact size requirements for showers depend upon the peak number of potential customers and the type of shower facilities desired. Provide fixtures in accordance with UFC 3-420-01.

Provide all private showers with attached drying area enclosures for new construction and major renovations. Provide a bench in each adjacent drying area. Do not allow direct views into the shower room areas. Provide commercial-grade built-in soap dispensers inside shower stalls and at lavatory sinks. Provide built-in towel racks and clothing hooks in drying areas. Use natural lighting whenever possible and waterproof lighting fixtures in all showers. Furnish shower stalls with showerheads mounted on a side wall to permit users to initiate shower without getting wet. Locate tempering controls beneath shower head. Provide all fittings and fixtures to feature cut-off valves and be of commercial quality. Provide for proper drainage of each stall by using floor drains or perimeter trench drains, or a combination of the two. Do not allow discarded water from bathers to pass into adjacent shower spaces.

4-5.4 Toilets and Urinals.

Provide both male and female toilet stalls in or near each respective dressing room area. Provide at least one low mounted urinal near the men's toilets for children. Provide direct access from the toilets to the dressing room areas. Locate toilets next to the showers and lavatory sinks for each sex. Refer to UFC 3-420-01 for the quantity of toilets and urinals required according to the overall size of each facility.

Provide flushometer-style commercial toilets that are durable and require less maintenance than tank-top residential models. Provide graffiti-resistant and corrosion-resistant toilet stall partitions that are attractive and complement the interior design of the dressing room area. Provide a separate exhaust system for the toilet areas in both the male and female dressing rooms.

4-5.4.1 Public Toilets.

Locate public toilets near the lobby in natatoria. Locate public toilets readily accessible to spectator viewing areas. Provide separate accessible restrooms according to ABA guidelines for both men and women. Include a lavatory, mirror, soap dispenser, paper towel dispenser or blower, baby changing station, and a separate exhaust fan for each restroom. The peak number of spectators and visitors anticipated will establish the quantity of public toilets. Provide fixtures in accordance with UFC 3-420-01.

4-5.5 Office and Administration Areas.

Locate office and administrative areas adjacent to the entry control checkpoint. Provide visual monitoring of and easy access to the water and deck areas from these spaces.

Provide furnishings that are durable, moisture- and mildew-resistant. Use non-woven, impermeable materials in lieu of fabrics for seating. Include floor drains and floor slopes to prevent standing water.

4-5.5.1 Administration Office.

Provide an office with a lockable door for use by the aquatic facility director and staff. Provide a separate small lounge area for pool staff and lifeguards. Provide a desk with compatible chair in the office area and at least two visitor's chairs along with a telephone, data and phone connections, file cabinets, shelving units, and a bulletin board.

4-5.5.2 Staff Lounge.

Locate central controls for the public address, security, lighting systems, and all environmental controls in the staff lounge or administrative office. Provide a work table with chairs, as needed to accommodate the staff, bulletin board, staff lockers, time clock, refrigerator, microwave, storage shelves, first aid kit, and cabinets in the staff lounge.

4-5.5.3 Training Rooms.

For small facilities, this room may be combined with the staff lounge. Design the room so it can be darkened for video presentations. Provide locally controlled dimmer switches for lights. Consider the need for telephone and video conferencing and provide the required infrastructure for these capabilities. Provide a lockable credenza or storage cabinets, a table, stacking chairs, television with media player, and a trash can. Provide modular furniture appropriate for wet conditions, a conference table, computer data connections with high-speed Internet access, a speaker phone, and electrical power accommodations. Provide furnishings that are durable, moisture- and mildew-resistant. Use non-woven, impermeable materials in lieu of fabrics for seating. Provide a whiteboard and a cork bulletin board for posting changeable information. For natatorium, provide access to the training room from both the wet and dry circulation path.

4-5.6 Safety & First Aid.

Provide a first aid room immediately off the pool deck with hand sink, cot, first aid kit, and telephone compliant with MAHC requirements. For small facilities, this room may be combined with staff lounge. Provide privacy screens or treatments on vision pathways. Furnish first aid equipment per MAHC.

4-5.7 Concession, Resale, and Vending Areas.

Provide public water fountains located near the administrative areas of the bathhouse or in a covered, shaded area of the pool deck. Consider the need for food and beverage service within the aquatic facility compound. Coordinate with the aquatic facility director regarding their policies for a resale and concession area that may offer a variety of food

and beverage options. Determine functional need for indoor concession service, locate concessions and concessions seating to serve this need. Outdoor pools may include a concession area that includes tables and seating as desired at each facility. Locate seating areas to have good visibility of the pool and deck and some shading. Refer to the current FDA Food Code and supplements when considering a concessions area to ensure inclusion of all required sanitary areas. If food like hamburgers and hotdogs will be cooked on-site, ensure that the concession kitchen meets the requirements outlined in NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

Provide concession and vending areas in the shade, adjacent to, or easily accessible from the pool deck and major sunbathing areas. For facilities with picnic areas, locate concessions near picnic area with easy access by vendors with pushcarts. Separate concession and vending areas from the pool area. Provide service access through an entrance separate from the customer entrance to the facility. Provide power outlets, water service with hose bibs, and drainage for cleaning the concession and vending areas. Consider the need to provide electrical, water, and parking space to accommodate a mobile concessions trailer that may be located near the pool deck and moved when not in use. Use materials and finishes that are water- and mildew-resistant and can be easily cleaned.

4-5.8 Mechanical Rooms.

Mechanical rooms are required for natatoria and the bathhouses for outdoor pools to accommodate HVAC equipment, plumbing, electrical, hot water, telephone, fire suppression, and other building systems equipment. To minimize noise and service disruptions, locate mechanical rooms so the entry and service doors are located on the outside of the building. Avoid locating the entrance to the mechanical rooms at the front of the facility; locate mechanical entrances to the side or rear (allowing for access by maintenance staff).

For indoor pools, provide sound attenuation at pool mechanical room walls common to natatoria and other public spaces. Slope floors to drains for rooms with equipment involving water or exposed piping. Separate all pedestrian and vehicular circulation associated with mechanical services and maintenance operations from circulation provided for participants and the public. Locate mechanical rooms to minimize the lengths of distribution services or “runs.” Treat service doors architecturally in a manner that will minimize their visibility or impact on the building design.

4-5.9 Electrical Room.

Provide a dedicated electrical equipment room for the installation of service-entrance equipment and other major electrical equipment that serves the facility.

4-5.10 Telecommunications Room.

Provide a dedicated telecommunications room (TR) to house the point-of-entrance of the telecommunications service, telecommunications equipment, cable terminations,

cross-connect cabling, data and telecommunications systems, and other low-voltage systems such as fire-alarm, CATV, CCTV, and electronic security and surveillance systems. Coordinate with Installation communications POC for size and other requirements for this space.

4-5.11 Equipment Storage.

Provide storage for life-saving, instructional, and competition swimming supplies and equipment. Also consider requirements to accommodate pool-cleaning equipment, supplies, and other items related to pool operations. Equipment storage space must open directly onto the pool deck and be readily accessible by staff members. Provide the storage room with a minimum width of 8 feet (2.44 meters) to allow storage of materials on either side of a small aisle. The minimum length is defined by program of stored equipment, and accommodating overnight storage of reach poles and other first aid equipment. Access the storage room through double doors with a minimum width of 6 feet (1.83 meters).

Verify storage requirements with aquatic facility personnel at each Installation, since special storage requirements may be required for instructional items (e.g., kickboards), lane lines, ropes, flags, starting platforms, and other competition equipment, as well as equipment for games or water shows. Pool maintenance equipment includes a pool vacuum, water-testing supplies, hose reels, sprinklers, scoop nets, and miscellaneous tools. Typical safety equipment includes shepherd's crook, ring buoys, reach poles, life lines, resuscitator, first aid equipment, backboard, and a stretcher. Provide lighting in accordance with UFC 3-530-01. Ventilate the equipment room per paragraph HEATING, VENTILATION AND AIR CONDITIONING (HVAC), slope floor to floor drains to help reduce moisture and mildew.

4-5.11.1 Natatorium Storage.

For natatoria, provide storage capacity that complements pool programming. For pools with competition equipment, provide storage capacity for lane lines, timing equipment and instructional aids.

4-5.11.2 Seasonal Storage.

For seasonal outdoor facilities, consider out-of-season storage requirements. Properly size access to dressing rooms and other open spaces to accommodate movable equipment and furnishings during the off-season.

4-5.12 Maintenance Storage.

Provide space to store equipment and supplies required for the maintenance of the facility. Maintenance storage spaces require floor drains if storing pool equipment. Provide lighting in accordance with UFC 3-530-01. Ventilate the maintenance storage room in accordance with paragraph HEATING, VENTILATION AND AIR CONDITIONING (HVAC).

For natatoria, provide storage capacity that compliments facility size and programming. Accommodations for pool vacuums, hoses, test kits, cleaning supplies and equipment are required. The final size requirements must be determined after coordination with Installation personnel on a project-specific basis. For outdoor facilities, additional equipment such as lawn mowers, trimmers and ladders, will dictate the size requirements. Include space for other maintenance items, like rakes, brooms, clippers and cleaning equipment.

4-5.13 Custodial Closets.

Provide a custodial closet for storing janitorial equipment and supplies, including other maintenance items with access to the dressing rooms, showers, and toilets. Include a floor-mounted mop sink, dry storage for supplies, shelves for maintenance supplies, and a sloped floor with a floor drain. Provide water-resistant finishes for all surfaces. Provide shelves and hooks for cleaning and maintenance equipment and supplies. Provide lighting in accordance with UFC 3-530-01. Ventilate the custodial closet in accordance with paragraph HEATING, VENTILATION AND AIR CONDITIONING (HVAC).

APPENDIX A BEST PRACTICES

A-1 PLANNING AND PROGRAMMING.

Each project requires a unique design tailored to the local character of the Installation, the site, and the needs of the user population. Consider the following items when planning aquatic facility projects.

- The type of competitive swimming events to be hosted at an aquatic facility has a major impact on the planning of the facility. Facility requirements and rules vary depending upon the different institutions that sanction competitive events. For example, lane bottom and target wall marking requirements are different for many of the governing institutions that sanction events.
- Consider small lockers for valuables only, such as phones, wallets and keys.
- Consider first aid procedures in the planning of aquatic facilities, including timely access to the pool deck for emergency responders and their equipment. Consider inclusion of a sink.
- Consider location of chemical storage and chemical storage venting. Prevailing winds, locations of patron walkways, patron access, and ease of chemical delivery should be considered in siting chemical storage areas.
- Consider the possibility of recycling excavated rock for alternative uses.
- Consider geothermal heat sources for heating pools where easily accessible, co-generation (the simultaneous generation of electric power and useful heat), and time-controlled activity pumps. Consider retractable roof structures over pool areas where climate is favorable to reduce HVAC energy consumption and to provide natural lighting.

A-2 DESIGN.

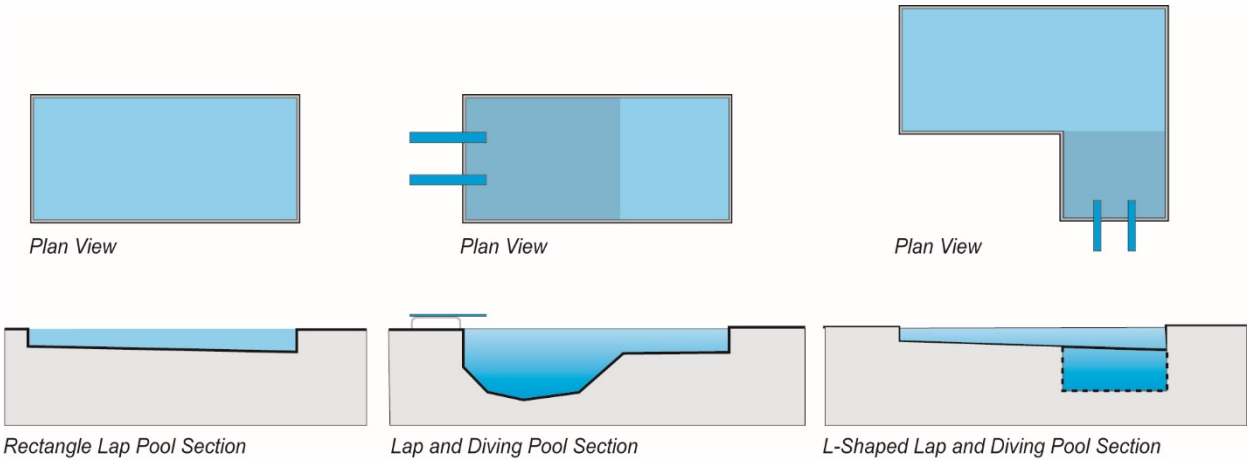
A-2.1 Landscaping.

Deciduous trees are acceptable in picnic or play areas, but do not allow their drip line to extend over the pool deck. Evergreens and shrubs can be beneficial as wind screens or visual barriers, and grass sunbathing areas inside the pool complex are always appreciated but must be designed to minimize “tracking” grass clippings onto the pool deck.

A-2.2 Lap Pool Layouts.

Traditionally rectangular, lap swimming centric pools have been utilized for the main pool, however the requirements are not intended to prevent new recreation centric pool designs of unique shapes and program capabilities. Traditional layouts for lap pools are shown in Figure A-1: Lap Pool Layouts:

Figure A-1 Lap Pool Layouts



The shape of the pool is affected by the placement of the diving area, if provided. Provide a simple rectangle pool shape for free swimming area, with a diving well placed on either side of the deep end to create an overall "L" shaped pool. If the depth of water in the swimming course is held to a maximum of 5 feet (1.5 meters), the "L"-shaped plan will offer the largest-capacity pool.

A-2.3 Zero-Depth Entry.

Use zero-depth entry pools to create a beach-like, gradual entrance to the water. These pool entrances are commonly used for play areas and access to the shallow end of a pool to help accommodate the needs of children, the elderly, and weak swimmers. If properly designed, zero-depth entry pools meet the requirements for accessible entry.

A-2.4 Pool Construction.

The three methods of construction addressed in Chapter 3 increase in durability (as well in cost) in the order provided. The normal lifespan of a concrete pool is eleven to twenty-five years. Considering budget and durability, a concrete pool with a metal gutter system is recommended for normal use. This type of pool is less expensive than a metal pool and outlasts a concrete or shotcrete pool because the metal gutter system is placed at the point of maximum wear. This type of construction provides not only an integral continuous overflow perimeter gutter system but can also provide a majority of the pool's supply return and surge plumbing requirements.

A-2.5 Pool Finishes.

Painted finishes require repainting every three to five years, depending on water quality and use. Many metal pools have been in place for over twenty-five years and show no sign of need for replacement. Consider a metal pool under the following circumstances:

- Where questionable soil conditions exist.

- In an area where extreme vandalism is prevalent.
- Where unusual structural and/or site conditions require a lightweight, prefabricated structure.

Maintaining proper water balance is essential for pool finish longevity. Metal gutter systems (usually stainless steel with plastic accessories) require no finish.

A-2.6 Gutter Systems.

Prefabricated, stainless steel surge gutter systems are preferred because they provide constant skimming of the surface water to help remove debris and can provide surge storage capacity for water displaced by swimmers. Scuppers that utilize a thin layer of water falling over a weir may be used to skim water from wading and training pools; however, they are not appropriate for the large surge requirements of main pools.

A-2.6.1 Drains and Inlets.

Fresh water fill can deliver water to the pool or surge tank via an air gap. To prevent injuries and to slightly disturb the water for better diver visibility in the diving area, provide spout with no sharp edges and locate under one of the diving boards. Where diving boards are not provided, or where inclusion on the deck would present a safety hazard, the fill spout may be located remote from the pool and flow via gravity to the surge tank or pool wall.

A-2.7 Heating and Water Temperature.

The use of a condensing boiler design is preferred for pool heater design. Consider solar heating for the hot water side of a heat exchanger if provided.

Consider automatically-deployed insulated pool covers to address the extensive labor and storage space required by traditional pool covers.

A-2.8 Secondary Sanitizers.

Secondary sanitizers may be used to reduce chlorine demand; however, coordinate with the Installation to comply with their minimum free available chlorine residual requirements.

A-2.9 Deck.

Consider using a resilient deck surface for spray grounds and around wading pools (if provided). Consider the existing slope and drainage of the pool deck during the design of an enclosure for an existing outdoor pool.

A-2.10 Seating.

For a small number of spectators at a family-type recreational pool, a raised platform or pavilion is sufficient. For competitive events, consider the need for portable seating for up to 600 people that can be rolled for convenient storage or moved for use at other

sport facilities on the Installation. For larger numbers, the following guidelines are suggested:

- Bench seating with 2 feet (610 millimeters) of length provided for each spectator.
- Provide 6 to 8 square feet (0.55 to 0.74 square meter) of space for each spectator.
- Provide access from a pedestrian path outside of the pool area for visitors attending events. Fence off spectator seating areas from the pool. Provide a see-through fence and lockable gate between the bleachers and the pool deck to separate spectators from competitors.
- Locate spectator seating parallel to the racing lanes in the pool.
- Construct permanent bench seating from concrete, wood, non-corrosive metal (aluminum), or recycled plastic. For temporary or movable bench seating provide metal bench seating specifically designed for sporting events.
- Provide spectator seating that is stepped in elevation to allow maximum visibility.
- Provide full or partial shading options in the spectator seating area.

A-2.11 Storage.

Locker storage located on the pool deck reduces problems associated with theft and vandalism because the lockers are more visible to customers and staff. Consider locating the administrative and entry control checkpoint in the center of the building with changing facilities on each side to provide separation between male and female facilities.

A-2.12 Electronic Surveillance.

For Air Force and Navy facilities, consider the need for an electronic surveillance system to facilitate surveillance of the entire facility.

A-2.13 Underwater Lighting.

For recreational-only swimming pools, consider providing a programmable, color-changing LED lighting system for underwater lighting. The illumination requirements described in Chapter 3 must be maintained for color-changing systems.

A-2.14 Drowning Detection System.

To support the lifeguard, consider providing a computer-aided drowning-detection system for recreational swimming pools. Systems may include overhead cameras, underwater-binocular cameras in water deeper than 7 feet (2.13 meters), redundant servers with uninterruptible power supplies, supervision workstation, audio/visual alert

stations for indoor pools, and lifeguard pagers for outdoor pools.

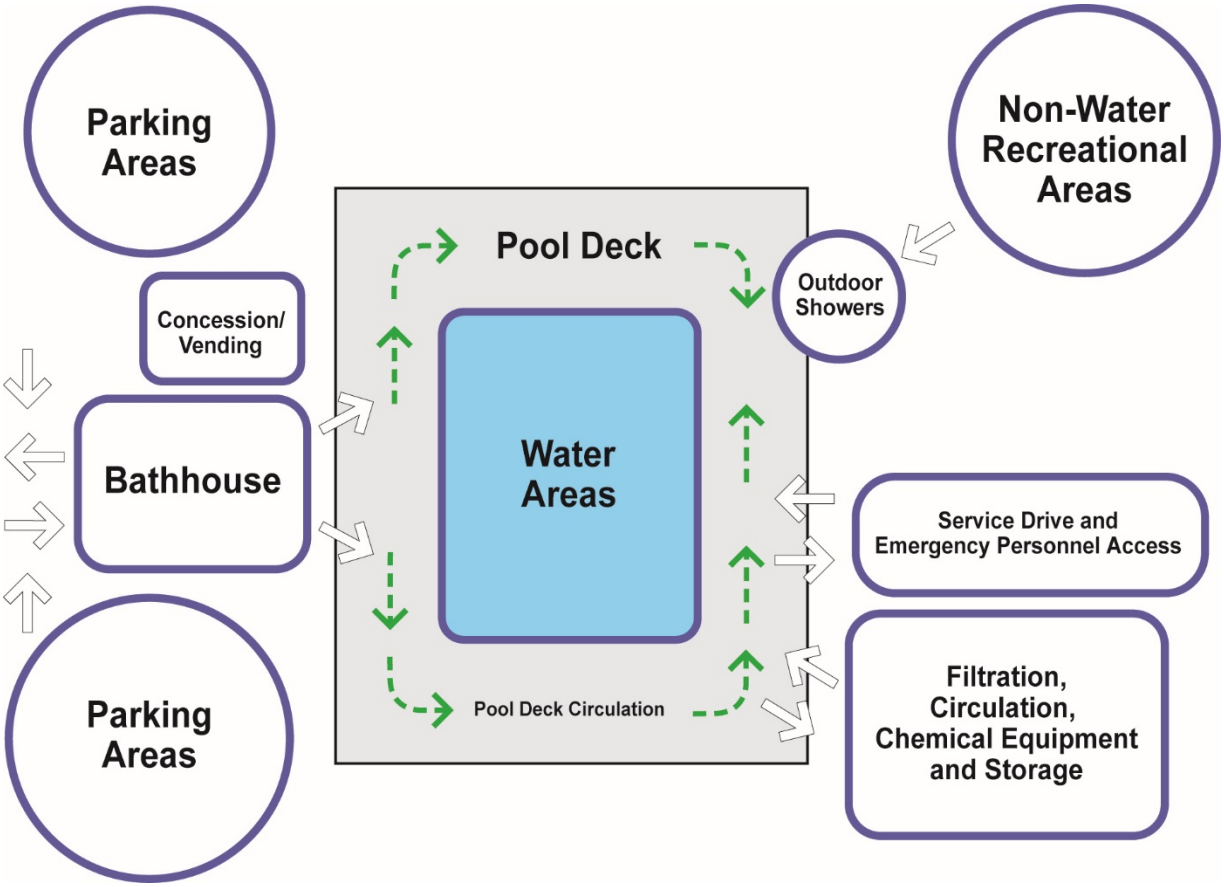
A-2.15 Natatorium/Indoor Pool Room HVAC

Consider the use of high-volume, low-speed fans to prevent stratification and provide mixing at upper elevations for facilities with high ceilings (35 feet plus).

A-3 FUNCTIONAL AREA REQUIREMENTS.

Typical spatial relationships for aquatic facilities are shown in Figure A-2: Functional Area Relationships.

Figure A-2 Functional Area Relationships



A-3.2 Recreational Areas.

Depending on the design of the site and local conditions, outdoor recreation areas may be desired in grass areas surrounding the pool deck. Consider the need for non-water-related recreational areas located inside the pool compound, such as sand volleyball courts and grass areas for sunbathing, throwing Frisbees, horseshoes, picnics, and similar activities. Consider the need for picnic tables, outdoor grills, and similar site furnishings for birthday parties and other group functions that are compatible with the

Installation's facility standards.

Rinse showers allow swimmers to rinse off dirt, sand, and sweat before entering the pool, which reduces maintenance and chemical use.

A-3.3 Low Barriers.

The purpose of a low barrier is to prevent children from wandering into the pool area; it is not designed to prevent unauthorized access when the pool is closed. In some areas, consider the need for combination fencing that has brick or masonry bases with fencing material mounted on top; this type of fencing may help prevent grass clippings and other debris from entering the pool compound.

A-3.4 Miscellaneous Considerations.

- Consider locating filtration, recirculation and heating system equipment outside near the service drive, if possible—it is usually more cost-effective and easier to provide working space around each component.
- Consider the use of portable platforms that may be placed into the main pool to create shallow water environments that can be used for training or instructional courses, and can be removed, as needed, for other pool functions.
- Consider additional recessed rope anchors for equipment and recreational features (e.g., inflatables, recreational water polo goals, etc.) based on coordination with Installation personnel.
- Consider the need for a recall line suspended above the racing course at least 4 feet (1.22 meters) above the water surface or alternative recall methods as dictated by the sanctioning organization. Consider the need for automatic timing touch pads.
- Consider the need for movable fiberglass or stainless-steel bulkheads to divide the water surface area for multifunctional use. Movable bulkheads are very useful for competitive swimming events to provide variable short course lengths, as desired, and other recreational activities.
- Orient outdoor diving boards facing north or east (northern hemisphere) or south (southern hemisphere) where possible, to help eliminate visibility problems associated with sunlight and glare reflecting off the water. An elevator or man-lift is recommended for easy access to high dive platforms. Detailed requirements for competitive diving will depend upon the sanctioning agency sponsoring certain events. For springboards over 10 feet (3 meters) in height, consider a stair access in lieu of a ladder access for diver safety.
- Consider different types of slides for recreation pools, e.g., body slides, drop slides, children's slides. A wide variety of commercially

manufactured play structures and play features designed for use in aquatic environments is available from different specialty companies.

- Consider using rigid board or closed cell sprayed insulation in natatorium areas to prevent moisture build-up in the insulation that might occur using fiberglass insulation. Do not use fiberglass insulation.

A-3.5 Spray Grounds.

Spray grounds are referred to by the MAHC as Interactive Water Play Venues. Spray grounds are recommended instead of wading pools as they are generally safer because there is little to no standing water to create a drowning hazard for children. Spray grounds may include a wide variety of water play equipment designed specifically for children, offering a greater variety of recreational opportunities than traditional wading pools. Spray grounds may include ground sprays, overhead sprays, climbable play structures, slides and other apparatus specifically manufactured for interactive water play.

For potable water spray pads, consider collecting spray ground waste water for alternative purposes, such as irrigation or washing cars and aircraft, especially in areas where water conservation is critical.

A-3.6 Wading Pools.

Typical wading pool construction uses scuppers instead of a continuous perimeter overflow system. Parental supervision of children in wading pools is mandatory for safety.

A-3.6.1 Pool Access.

Aquatic lifts may also serve a dual purpose by providing an effective method to get an injured swimmer on a backboard out of the pool.

Providing an egress within the specified minimum distance allows lifeguards to keep their focus at all times on the area around the board or slide by eliminating the need to track an exiting swimmer who has to leave the immediate area of the board or slide, making supervising the next diver or slider problematic.

A-3.7 Depth Markers.

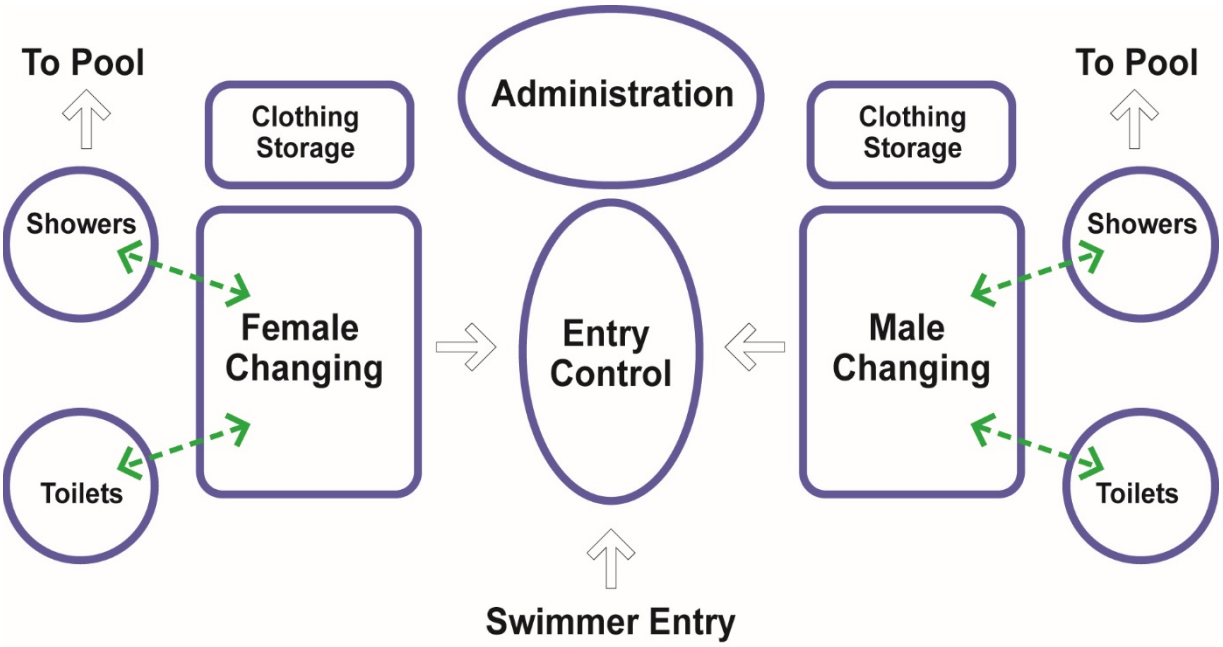
In addition to the required pool wall depth markers, for deck level gutter designs, consider site and pool specific design conditions and place depth markers around the pool, above the water line, on buildings, fences, or walls to clarify the pool depths. Refer also to MAHC annex for rationale.

A-3.8 Bathhouse.

Consider the following items when designing the bathhouse. Refer to Figure A-3: Bathhouse Functional Area Relationships

- Consider placement, type and number of toilet and shower fixtures when designing toilet/shower/clothing storage spaces.
- Consider using recycled plastic toilet and urinal stall partitions because they are non-corrosive, cost-effective, durable, and environmentally friendly.
- For large facilities, consider the need for additional public toilets for visitors and spectators because of the limited access requirements to the dressing room areas.
- The staff lounge, training rooms, and food service areas may be located away from the entry control checkpoint. Locate with views of the water and deck areas, where possible. Consider the need for a washer and dryer in the staff lounge.
- Consider the need for a drop-down projection screen and wall-mounted white boards.
- A storage room length of 16 feet (4.88 meters) is recommended if safety equipment has not been selected prior to design.

Figure A-3 Bathhouse Functional Area Relationships



A-3.9 Showers

Consider the following items when designing showers:

- Consider the need for vandal-proof showerheads.

- Consider adding shower caddies or built-in shelves in each stall for storing soap and accessories.
- Glass and glazing must not allow visual access from adjacent buildings or outside areas into shower areas.

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APPENDIX B REFERENCES

B-1 GOVERNMENT PUBLICATIONS.

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AFI 34-101, *Air Force Morale. Welfare, Recreation (MWR) Programs and Use Eligibility*, http://www.e-publishing.af.mil/

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http://www.access-board.gov/attachments/article/1029/ABAstandards.pdf

Centers for Disease Control, *Healthy Swimming*, http://www.cdc.gov/healthyswimming/

Consumer Product Safety Commission, *Guidelines for Entrapment Hazards: Making Pools and Spas Safer*
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UFC 1-200-01, *DoD Building Code*,
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UFC 3-120-01, *Design: Sign Standards*,
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UFC 3-470-01, *Utility Monitoring and Control System (UMCS) Front End and Integration*
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UFC 3-510-01, *Foreign Voltages and Frequencies Guide*
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-575-01, *Lightning and Static Electricity Protection Systems*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 4-010-06 *Cybersecurity of Facility-Related Control Systems,*
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UFC 4-020-01, *DoD Security Engineering Facilities Planning Manual,*
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

Whole Building Design Guide, http://www.wbdg.org

B-2 NON-GOVERNMENT PUBLICATIONS.

ANSI/APSP-16 *Standard Suction Fittings for Use in Swimming Pools, Wading Pools, Spas and Hot Tubs*. https://webstore.ansi.org

ASHRAE Standard 55 *Thermal Environmental Conditions for Human Occupancy*.
https://www.ashrae.org/

ASHRAE Standard 62.1 *Ventilation for Acceptable Indoor Air Quality.*
https://www.ashrae.org/

ASHRAE Standard 90.1 *Energy Standard for Buildings Except Low-Rise Residential Buildings* https://www.ashrae.org/

ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings.* https://www.ashrae.org/

ASTM F2376 *Standard Practice for Classification, Design, Manufacture, Construction, and Operation of Water Slide Systems,* https://www.astm.org/

ASTM F2461 *Standard Practice for Manufacture, Construction, Operation, and Maintenance of Aquatic Play Equipment,* https://www.astm.org/

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LEED™ Green Building Rating System, http://www.usgbc.org

Model Aquatic Health Code, https://www.cdc.gov/mahc/editions/current.html

NFPA 70, *National Electric Code,* http://www.nfpa.org

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* http://www.nfpa.org

B-3 INDUSTRY ORGANIZATIONS.

Association of Pool and Spa Professionals (APSP), http://www.apsp.org/splash

B-4 COMPETITIVE SWIMMING ORGANIZATIONS.

Amateur Athletic Union (AAU), http://aauswimming.org/

Federation Internationale de National (FINA), http://www.fina.org/

National Collegiate Athletic Association (NCAA), http://www.ncaapublications.com/

National Federation of State High School Associations (NFSH), https://www.nfhs.org/

USA Swimming, https://www.usaswimming.org/

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APPENDIX C GLOSSARY

C-1 ACRONYMS AND ABBREVIATIONS.

AAU	Amateur Athletic Union
ABA	Architectural Barriers Act
A/E	Architect/Engineer
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPAM	Air Force Pamphlet
AFSVC	Air Force Services Center
ANSI	American National Standards Institute
APSP	Association of Pool and Spa Professionals
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
AT/FP	Antiterrorism / Force Protection
CCTV	Closed Circuit Television
CPSC	U.S. Consumer Product Safety Commission
DCOF	Dynamic Coefficient of Friction
DDC	Direct Digital Control
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoE	Department of Energy
FDA	US Food and Drug Administration
FF&E	Furniture, Fixtures, and Equipment
FINA	Federation Internationale de Natation

FPCON	Force Protection Condition
GFCI	Ground-Fault Circuit Interrupter
HVAC	Heating, Ventilating, and Air Conditioning
IAC	Indoor Air Quality
ICC	International Code Council
ISPSC	International Swimming Pool and Spa Code
LAN	Local Area Network
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
MAHC	Model Aquatic Health Code
MILCON	Military Construction
MWR	Morale, Welfare, and Recreation
NAVFAC	Naval Facilities Engineering Command
NAVMED	Naval Medical Command
NCAA	National Collegiate Athletic Association
NFPA	National Fire Protection Association
NFHS	National Federation of State High School Associations
OCONUS	Outside Continental United States
OPNAV	Chief of Naval Operations
OSHA	Occupational Safety and Health Administration
PA	Public Address
PFD	Personal Floatation Device
PVC	Polyvinyl Chloride
SCUBA	Self Contained Underwater Breathing Apparatus
SDI	Steel Door Institute

TBMED	Technical Bulletin Medical
TM	Technical Manual
UFC	Unified Facilities Criteria
UMCS	Utility Management and Control System
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USGBC	United States Green Building Council
UV	Ultra-violet (light)

C-2 TERMS.

Aquatic facilities may have a variety of different components, depending upon the unique requirements for each facility. Below are some common definitions associated with major aquatic facility components:

- Swimming Pool: Any artificial basin of water constructed, installed, modified, or improved for the purpose of swimming, wading, diving, recreation, or instruction. It does not include pools designed to be used exclusively for military training or operations.
- Natatorium: An indoor or enclosed swimming pool.
- Spa: An artificial basin of water designed for recreational use and/or therapeutic use and is not drained, cleaned, and refilled for each individual user. Spas may include hydro jets, hot or cold water, air induction systems, or any combination thereof. It does not include pools used under the direct supervision of medical personnel.
- Wading Pool: A pool that is no more than 18 inches (0.45 meter) deep and intended to be used by young children.
- Slip-Resistant: A surface meeting the minimum coefficient of friction for slip-resistance in accordance with the MAHC.
- Spray Ground: An area, with no standing water, that includes water-spraying devices and other water related recreational equipment intended to be used by young children. May also be referred to in the industry as a splash pad, spray pad, or spray deck or wet deck.
- Pool Deck: The concrete or hard surface area surrounding the pool water areas.
- Bathhouse: A building that typically contains changing areas, restrooms,

and locker areas. Bathhouses may also contain administrative, entry control, food service, storage, mechanical, and other related functions or areas.

- Zero Depth Entry: A sloped means of access into the pool starting from the deck elevation and continuing into the body of water until the first point of slope change.
- Freeboard: Vertical distance between the normal operating water elevation and the deck elevation.
- Fiberglass Runout: The fiberglass portion of manufactured slide that is used to decelerate and stop the slider.
- Surge Tank: A tank used to hold water displaced by bathers in the pool.
- Skimmer: A manufactured device installed in a pool wall that is used to remove floating debris from the surface of the water.
- Weir: A barrier over which water flows.
- Flooded Suction: A term used to describe the installation of a pump where the suction pipe is below the normal operating water elevation of the tank or body of water connected to the pump suction.