

DYNAMIC PROTOTYPE BIM MANUAL FOR A FITNESS CENTER – V1.0

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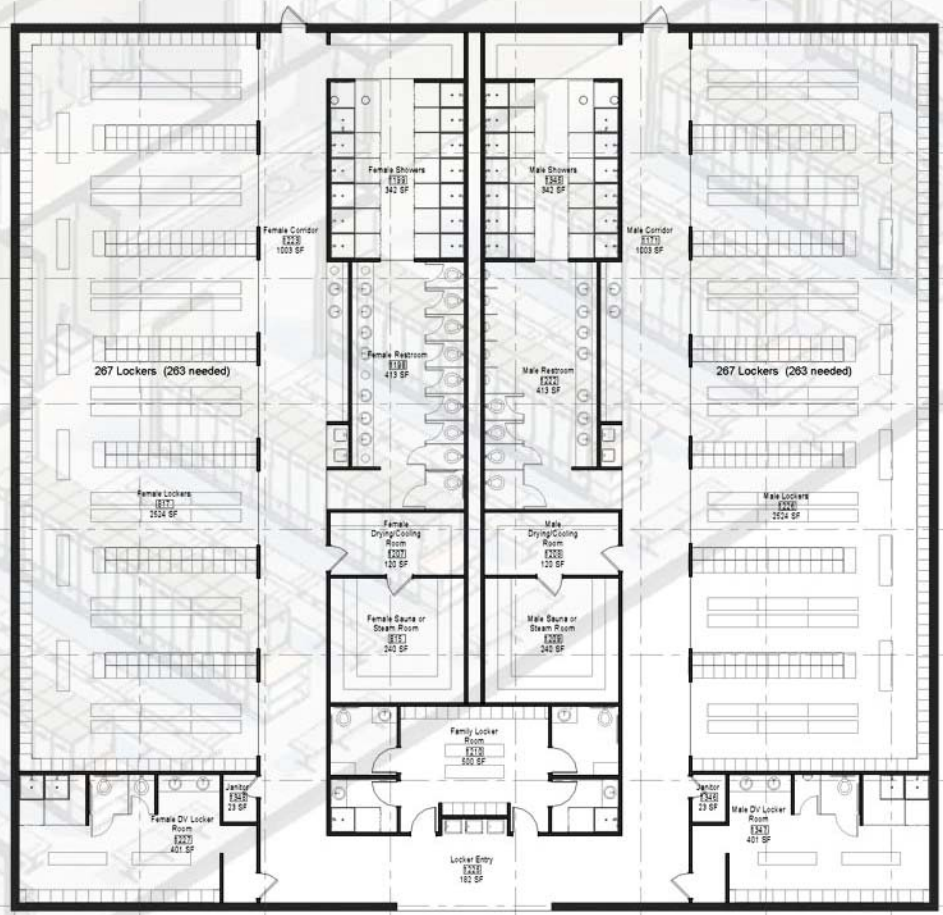
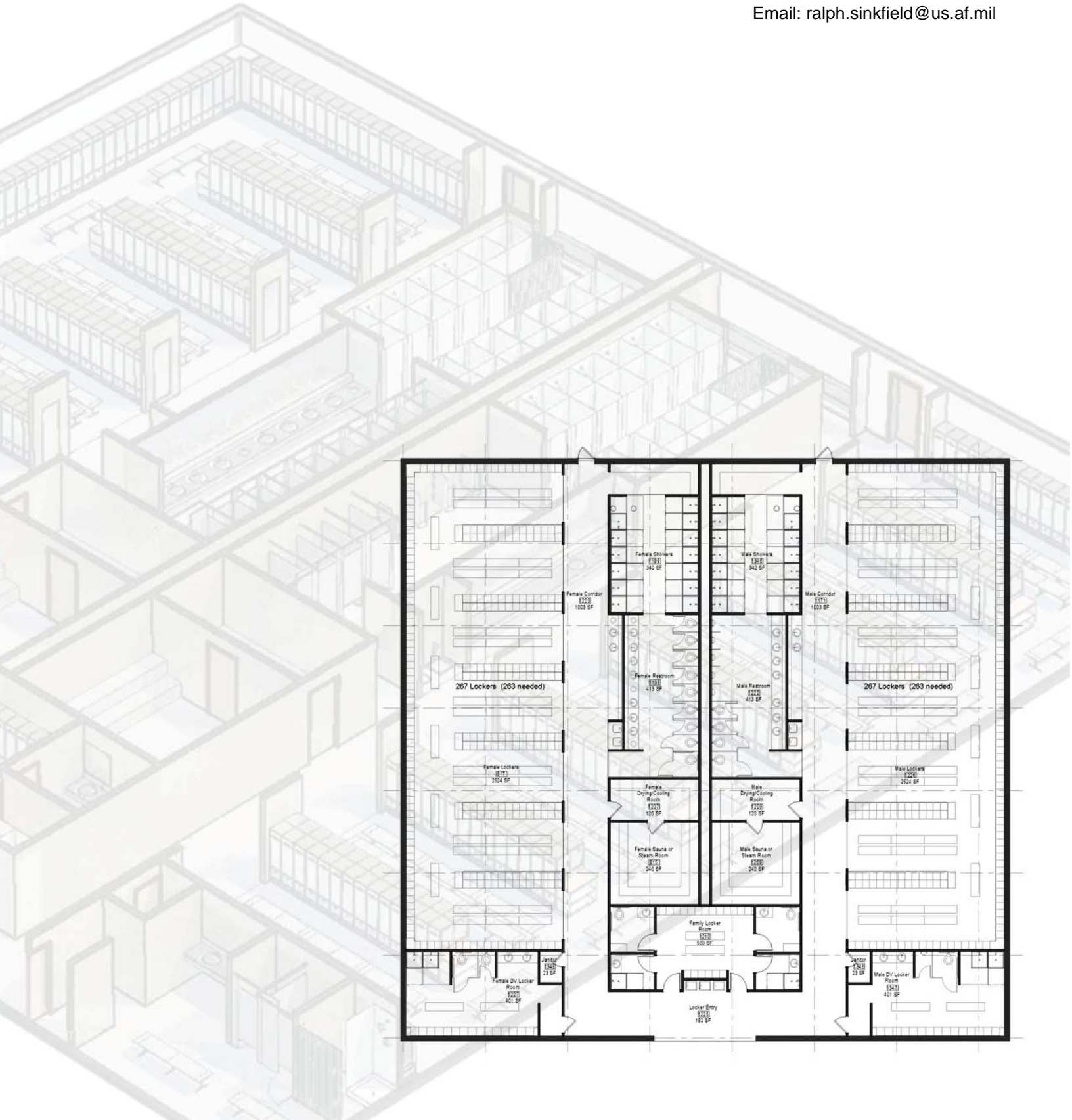




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REFERENCES

- Unified Facilities Criteria: Fitness Center
http://www.wbdg.org/ccb/DOD/UFC/ufc_4_740_02.pdf
- Air Force Facilities Design Guide: Fitness Center
<http://www.wbdg.org/ccb/AF/AFDG/fitguide.pdf>



INTRODUCTION

Executive Summary

The intent of this Dynamic Prototype Building Information Model (BIM) Manual is to describe the process for utilizing the electronic design tool to improve efficiency and effectiveness in the implementation of the Air Force Facilities Design Guide for Fitness Center (AFFDG-FC) and the Unified Facilities Criteria for Fitness Center (UFC-FC). This Dynamic Prototype is a flexible design model that leverages the advantages of BIM to standardize components of a building type (in this case a fitness center) through a schematic 3D model. Design models can vary from performance criteria to prescriptive criteria depending on the number of variables. For a fitness center the prototype is utilizing a kit-of-parts approach. The kit-of-parts model contains an Architecture model with the intent that other disciplines will be added as the A/E develops the site. This manual coordinates with both the Air Force Facilities Design Guide for Fitness Center and the Unified Facilities Criteria for Fitness Center describing the use of the Dynamic Prototype in relation to the recommended development of design within the existing guides.

Goals

The goal is to provide vital information from both the Air Force Facilities Design Guide for Fitness Center and the Unified Facilities Criteria for Fitness Center as well as lessons learned from installations in a BIM platform that will allow A/Es to quickly and easily produce a fitness center project design.

Scope and Use

In accordance with the Air Force Facilities Design Guide for Fitness Center and the Unified Facilities Criteria for Fitness Center the kit-of-parts models created comply with the space calculator spreadsheet. Additional assumptions for the models were made to test the assembly of the kit-of-parts models into a building that meets the space calculator spreadsheet. Examples of these arrangements can be found in the Design Guide - *Assembled Plan Examples*. The assumptions for Version 1.0 are as follows:

1. Program Assumptions

- Each module is designed based on its specific function.
- Medium 2, Large, and Mega 2 are the bases for conceptual design and sizing requirements.
- Space calculator spreadsheet is the governing factor for both the gross and net living area.
- All areas are open to adjustment to comply with relationships between groups
- Mechanical, Electrical, Telecommunication, and other building utility spaces will need to be designed and integrated depending upon the location and specific installation requirements.
- Between the Air Force Facilities Design Guide for Fitness Center and the Unified Facilities Criteria for Fitness Center the Unified Facilities Criteria for Fitness Center will govern with any discrepancy.
- It is recommended by the design guide to use structural systems that allow for flexibility and expansion, minimize the number of load bearing walls to allow for reconfiguration, and to use structural systems that allow for large column free areas. All building systems should be explored based on installation-specific requirements.
- Building envelope systems may be applied based on installation-specific requirements.
- All unit configurations have been approved by the appropriate Air Staff.
- Other reconfigurations of the units must meet the requirements listed in the Air Force Facilities Design Guide for Fitness Center and the Unified Facilities Criteria for Fitness Center.



2. Kit of Parts
 - a. Architectural
 - i. Kit-of-Parts (KoP) includes units: 01- Entry, 02-Administration, 03-HAWC, 04-FAC, 05-Restrooms, 06- Stairs 07-Support, 08- Racquetball, 09- Group Exercise, 10- Cardio/ Weight Room, 11- Locker Room, 12A-Track A, 12B- Track B, 13A- Basketball A, 13B- Basketball B, 14-Enhanced Entry with Juice Bar, 15- Expanded Retail, 16-Parent Child Area, 17- Massage Room, 18- Additional Stretching Area, 19- Enhanced Locker Room, 20- Support (Mechanical, Electrical, Comm)
 - ii. There may be multiple options per unit. However only one option per unit category should be used for every grouping.
 - b. Structural
 - i. Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.
 - c. Mechanical
 - i. Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.
 - d. Electrical
 - i. Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.
 - e. Plumbing
 - i. Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.
 - f. Fire Protection
 - i. Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.

GUIDELINE INTEGRATION

Site Design

Tool Utilization Strategies

1. Siting Requirements
 - Establish whether an interior or exterior track will be employed.
 - Establish whether the facility will incorporate a pool.
 - Determine sizing based on the space calculator spread sheet.
 - Utilize the KoP to assemble the initial massing model.
 - Configure model to the appropriate site dimensions and established setback requirements listed in the AFFDG-FC and the UFC-FC and other references.
 - After siting has been set ungrouping can be used to speed up work flow
2. Circulation
 - Ideas and concepts should be explored through other mediums quickly before narrowing the concepts to the selected proposition.
 - Establish site circulation to maximize building site efficiency.
 - Create outdoor spaces that are extensions of the building entrances allowing for small groups to stop and gather.
 - After all site circulation constraints and siting requirements have been established the A/E should utilize the prototype tool to configure the initial massing model.
3. Establishing the Model



- A/E is responsible for establishing a clear File Directory Structure (*Refer to Illustration 1 – File Directory Structure Example*).
- See Attachment F to the contract for full extent of BIM related deliverables.

Additional Requirements and Integration Concepts

1. Parking & Site Considerations
 - All disciplines need to have their own model that is linked to the master model.
 - All work shall be in 3D with associated parametric information and linked to the master model.
 - Establish finish floor and floor-to-floor elevations early in the process.
 - Coordinate utilities between all disciplines early in the process.
2. Site Amenities
 - Small structures shall reside within discipline models.
 - In the example of site furniture and site lighting establish the furniture in the landscape architect's model and the site lighting in the electrical engineer's.
 - Coordinate site amenities early and allocate the work to the responsible disciplines.
3. Landscape Architecture
 - Like Civil, the work developed within the discipline of landscape architecture is very specific to the installation and should be developed in 3D with associated data to inform and develop the coordination between other disciplines.

Building Design

Tool Utilization Strategies

1. Structural
 - Not included in the (KoP), intended to be designed and inserted on a project by project basis. Space has been allocated for such elements.
 - A/E shall provide cost analysis on 3 structural systems that satisfy AFFDG-FC and the UFC-FC requirements.
 - A/E will need to run load calculations and size members and spacing depending upon final building configuration.
2. Heating Ventilation and Air Conditioning
 - HVAC systems were not included in the (KoP) and should be determined by the A/E in accordance with AFFDG-FC and the UFC-FC requirements
3. Plumbing
 - Plumbing systems were not included in the (KoP) and should be determined by the A/E in accordance with AFFDG-FC and the UFC-FC requirements
4. Building Configuration
 - Building Circulation – In developing the site circulation the building circulation will become apparent. In deciding the building's circulation the A/E should be aware that the units presented are intended for any building footprint:
 - In developing the model it is required to use the provided kit-of-parts as a starting point. Each unit is a group and should remain a group to leverage the efficiency of BIM. There will be a logical point where it becomes more efficient to ungroup the units, this should occur when the final foot print has been established and any major changes to said footprint has slowed down.
5. Interior/Exterior Relationships
 - Building Circulation – Develop a clear path of travel, consider egress distances and associated site considerations to design not only the location of the hardscapes but the surrounding landscape and the creation of outdoor gathering areas.



- Civil and Landscape Models – 3D models that work with the specified BIM platform shall be developed concurrently with the other disciplines and maintained as a linked and integral part of the project development.
6. Noise Considerations
 - Wall types – Develop clear requirements as per the AFFDG-FC and the UFC-FC and manipulate existing wall types as needed.
 7. Architecture
 - Building Envelope – Designs shall amplify the local architectural character through the development of the building envelope.
 - Glazing Systems – The prototypes do not have windows at this point. It is intended for the A/E to insert windows as the overall layout has been established.
 - Coordinate chases within units after mechanical system is selected.
 8. Interior Design
 - Comprehensive Interior Design – The furniture provided within the model only dictates the scale and placement of furniture for the units. A/E's should develop a comprehensive interior design package per installation requirements.
 - Finishes and Materials – The prototype units have the Air Force's preference modeled. The A/E may explore other options as long as they meet or exceed the materials' characteristics listed.
 - Bathrooms and Kitchens – The prototype units provide cabinets and millwork for dimensional purposes only. The A/E can alter the style, countertops, and back splashes to fit the appropriate aesthetics of that particular installation.
 9. Electrical
 - Electrical design was not provided as a part of the (KoP) and should be determined by the A/E in accordance with AFFDG-FC and the UFC-FC.
 - Exterior lighting and other associated work with the buildings exterior or landscape will be developed as part of the local installation design.
 - Building electrical loads and service to be determined by A/E.
 10. Fire Protection
 - Sprinkler Systems were not provided as a part of the (KoP). Sprinkler Systems should be design by the A/E in accordance with NFPA 13, *Installation of Sprinkler Systems*.
 - Fire Alarm systems were not provided as a part of the (KoP) and should be determined by the A/E in accordance with NFPA 72, *National Fire Alarm Code*.



Specifications

Tool Utilization Strategies

1. e-SPECS for Revit 5.0 with MASTERSPEC 2004
 - e-SPECS links specifications sections with families in the Prototypes through the use of assembly codes listed within each family property elements.
 - After all of the specification sections have been properly bound to the objects within Revit notes on drawings will be coordinated, listing the same language tied to the specification language. Text will be consistent and concise.
 - Specifications for the prototypes have been developed based upon the AFFDG-FC and the UFC-FC and the developed Prototypes
 - Other specifications specific to the development of the full design at local installations will need to be developed. Some of these include:
 - Civil associated specifications
 - Landscape associated specifications
 - Foundation systems
 - Building envelope
 - Roof structure
 - Mechanical Specifications
 - Electrical Specifications
 - Plumbing Specifications
 - Fire Protection Specifications
2. Linking e-SPECS for Prototypes
 - A Microsoft SQL database will be provided on the website for download. This database will contain all information related to the prototype project manual. This also holds the bindings to each Revit file.
 - E-Specs for Revit should be installed per installation instructions given by InterSpec (<http://www.e-specs.com/>).
 - e-SPECS for Revit plug-in should also be installed per installation instructions given by InterSpec (<http://www.e-specs.com/>).
 - Special interaction will be required to ensure that the database file downloaded is set as the main database file during installation.
 - A uniformClassifications.txt file will be provided which contains information on bindings from and to Revit and E-Specs. This must be placed in the following directory: C:\Program Files\Revit Architecture 2009\Program
 - Once files have been downloaded all questions and problems related to integration and setup of E-Specs should be directed to InterSpec @ 888-50-SPECS.

LEED Checklist

Tool Utilization Strategies

1. LEED 2009 Checklist
 - Consolidates all points from Federal Mandates and creates an initial starting point for the A/E to utilize.

Software Requirements

Additional Requirements

1. Autodesk Revit 2011 or higher (latest Service Pack)
 - Revit was utilized in developing the Prototypes and shall be utilized in developing all discipline models.
2. E-Specs for Revit (latest release) with MASTERSPEC 2004



- E-Specs for Revit 5.0 was utilized in developing the Prototypes specifications and shall be utilized in developing the specifications throughout the completion of design.
- MASTERSPEC 2004 licenses must be purchased as E-Specs uses MASTERSPEC 2004 format.
- e-SPECS and Masterspec are separate entities and each require the purchase of software/licenses which can be coordinated through InterSpec.
- Software licensing agreements will supersede all information in this document and must be followed.



Illustration 45 – File Directory Structure Example

FILE DIRECTORY STRUCTURE

