

UNIVERSITY OF COLORADO BOULDER

BAMS

BUILDING AREA MEASUREMENT SYSTEM

FACILITIES MANAGEMENT—PLANNING, DESIGN AND CONSTRUCTION

CAD Office

Updated 8/07/2012

Z:\Procedures\CASP

**A COMPREHENSIVE DOCUMENT DESCRIBING UNIVERSITY OF
COLORADO BOULDER CAD OFFICE'S SYSTEM OF MEASUREMENT
FOR BUILDINGS AND RELATED AREAS.**

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PURPOSE OF THE BUILDING AREA MEASUREMENT SYSTEM

Accurate measurement data regarding University buildings is needed by many departments at the University. Planning, Engineering, Accounting and other departments expect accurate measurement data that can be used for energy modeling, cost accounting, master-planning, and other uses. However, different departments use information for different purposes and all have different expectations regarding how the data is measured. There might be just as many ways to measure a building as there are engineers, architects and accountants!

The CAD Office measures University buildings primarily in scaled computer drawings. Floor plans created by the CAD office, either measured directly from buildings or based on consultant drawings produced for new buildings are the most frequently consulted drawings used for these measurement procedures. These floor plans are available on-line as PDFs and in the original dwg format from our office. The original CAD files are unavailable to others (outside the CAD office) for modification. The drawing are constantly being updated and modified based upon current proposed and completed projects, as well as field observations by CAD staff. As a result of this constant adjusting, updating and modification, they are a dynamic set of documents with a certain amount of included human error.

The Building Area Measurement System (BAMS) is a clarifying document, designed to illustrate concepts used in processes of measuring University related buildings, rooms, spaces on and off campus. There are two measurements we document in our each of our maintained scaled drawings: GSF (gross square feet) and Space. There are primarily two sources referenced by CAD Office FICM (Facilities Inventory and Classification Manual: 2006 edition) and BOMA—Building Owners and Managers Association. BOMA has two standards we reference: The Office Standard: ANSI/BOMA Z65.1-2010 Legacy Method, and The Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method”.

SPACE MEASUREMENTS:

As a post- secondary education facility, The University of Colorado Boulder relies upon FICM (Facilities Inventory and Classification Manual: 2006 edition) as the **basis** for many of the definitions and statements regarding standard space measurements. In regard to this relationship between BAMS and FICM, BAMS has been designed to:

1. More clearly illustrate concepts which may be vague, incomplete or difficult to understand.
2. And, **supersede** FICM in authority in the instance of disagreement or discrepancies between the two.

Many of the examples and illustrations are directly from FICM (Facilities Inventory and Classification Manual: 2006 edition) and may have been adjusted and molded to fit the University of Colorado Boulder, specifically.

In certain instances, where University space is to leased out to external organizations, we use the BOMA 2010 Office Standard illustrated in “Office Buildings: Methods of Measurement” (ANSI/BOMA Z65.1-2010). These spaces are not as common and the procedure for generating such measurements is more tedious, requiring manual calculations which are not part of our automated autocad functions.

GROSS AREA (GSF) MEASUREMENTS

The primary concern for measuring GSF has been consistency: creating a simplified means of measurement applied to all our buildings GSF. As a recognized building industry standard, the “BOMA method” Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method”, has become the **basis** for BAMS when measuring GSF. However, much of the “BOMA method” has been simplified, and shortened to apply to University related buildings. This “modified BOMA approach” allows us to provide a more consistent set of data for use by our staff and other departments, during planning, design and construction, as well as operation of our buildings. The procedure for measuring GSF, as outlined in FICM (Facilities Inventory and Classification Manual: 2006 edition) has been largely ignored due to conflicting means of measure.

GOALS OF THE BUILDING AREA MEASUREMENT SYSTEM

In developing BAMS, two main goals have been kept in mind: Standardization and Accuracy.

STANDARDIZATION

A primary goal of the Building Area Measurement System is developing a series of clearly understood standards by which the CAD staff may be able to consistently measure buildings utilizing the tools at our disposal. These standards are to be integrated into practices used by CAD Staff during measurement procedures.

ACCURACY

Once the standards have been established it is expected that there will be a more accurate set of data produced and maintained by the CAD department. The measurements issued can be expected to fluctuate much less as CAD staff is properly trained in the correct procedures for measuring utilizing this document.

With this increased accuracy there is also a newly established expectation regarding accuracy. Since the apparent acceptable margin for error established by “the BOMA method” Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method” is less than 2%, we can expect a similar level of accuracy.

MEASUREMENT TERMS

The following is taken directly from FICM:

In a building inventory, it is important to be able to determine the amount of space that can be assigned to people or programs. However, buildings necessarily contain other types of space as well. Technical definitions and examples of types of space are provided in [chapter 4](#) (FICM).

*Although **definition of space use** falls under the responsibility of CASP, the CAD office is required to define the spaces within FAMISCAD. Consequently, a list of relevant assignable spaces follows:*

The amount of space that can be used for people or programs is known as the Net Assignable Area.² The area of an Assignable space is the area measured within its interior walls. The Net Assignable Area of a building (or all buildings in an inventory) is the sum of the space allocated to the 10 major assignable space use categories: classrooms, laboratories, offices, study areas, special use space, general use areas, support rooms, health care, residential, and unclassified space...

Net Assignable Area = Sum of the 10 Major Space Use Categories of Assignable Space

The amount of space within a building that is essential to the operation of the building but not assigned directly to people or programs is known as the Nonassignable Area. The area of a Nonassignable space is the area measured within its interior walls. The Nonassignable Area of a building (or all buildings in an inventory) is the sum of the space allocated to the three major nonassignable space use categories: Building Service Area, Circulation Area, and Mechanical Area...

Nonassignable Area = Sum of the Three Major Space Use Categories of Nonassignable Space

The aggregate interior area of a building, known as the Net Usable Area,³ is the sum of Assignable Area and Nonassignable Area.

Net Usable Area = Net Assignable Area + Nonassignable Area

It is also important to know that the Gross Area (GSF) of a building is the floor area of a structure within the outside faces of the exterior walls. This value is either physically measured or scaled from as-built drawings.

The CAD Office measures from scaled drawings.

The difference between the exterior or Gross Area (GSF) and the interior or Net Usable Area is the Structural Area, the floor area upon which the exterior and interior walls sit and the unusable areas in attics and excavated basements. Structural Area is calculated as the difference between the Gross Area of a building and the Net Usable Area of that building.

Structural Area = Gross Area - Net Usable Area

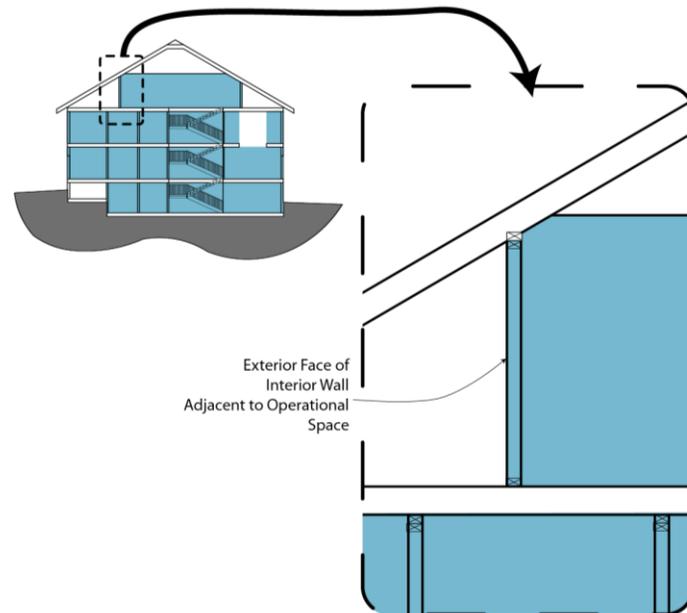
GROSS AREA (GROSS SQUARE FEET—GSF) BASED ON BOMA

Most of the disagreement regarding building measurement has to do with Gross Area (GSF). The University of Colorado Boulder uses a modified BOMA method to determine GSF. The following has been adjusted from Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method”

Definition - (the following has been extracted from Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method”, called EGA, exterior gross area, and modified to fit our system) the total of all horizontal floor areas (as viewed on a floor plan) of all floors of a building contained within their measure lines, excluding voids (with the exception of occupant voids), interstitial space, unexcavated space and crawl space. Make no deductions for columns or any structural elements within the GSF Line.

Basis for Measurement - (the following has been extracted from Gross Standard: “ANSI/BOMA Z65.3- 2009 EGA Method” and modified to fit our system) Gross Area is computed by physically measuring or scaling measurements from the outside faces of exterior walls, disregarding overhangs, awnings, eaves, sills, casings, gutters, downspouts, shutters, attached mechanical or electrical systems, cornices, pilasters, buttresses, etc., that extend beyond the wall faces. The footprints of stairways, elevator shafts, and vertical duct shafts are to be counted as Gross Area (GSF) on each floor through which they pass. Spaces which are not fully enclosed are not included, with the exception of the top level of a parking structure and external circulation. Restricted headroom spaces (less than 3') are not included. For floors having attic space: do not extend the GSF line out to the roof edge. Only draw the GSF Line to the exterior face of the interior wall of a usable space. (See illustration detail) Open-to-below areas such as open areas adjacent to balcony overlooks and atriums are not to be included in the floor's footprint as they are part of the stair volume.

Extent of GSF line for usable space in attics



Comment: There are two areas of particular difficulty in measuring University of Colorado Boulder buildings. Since most buildings on campus have a sloping roof there is generally a large amount of area on the floor immediately under this roof which is not to be included in the GSF: Areas which are not usable, are structural spaces and should not be included in GSF. And, many of the older buildings have unusable crawl spaces which if unexcavated or under 5 feet high shall not be included in GSF.

Measured in terms of Gross Square Feet (GSF),

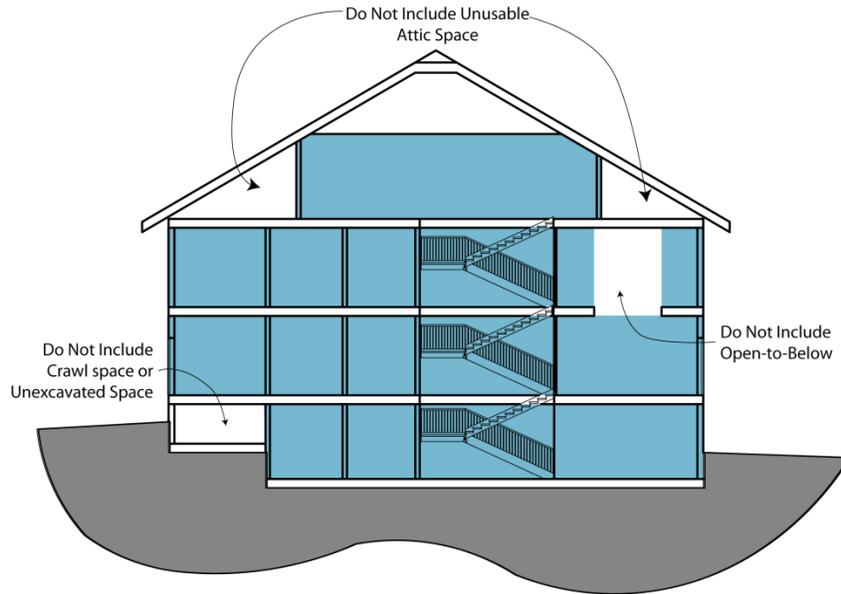
GSF = Net Usable Area + Structural Space

Limitations. Spaces which are not fully enclosed are not included, with the exception of the top level of a parking structure and external circulation. Restricted headroom spaces (less than 5') are not included. Floors having attic space: do not extend the GSF line out to the roof edge. Only draw the GSF line to the exterior face of the interior wall of a usable space. Open-to-below areas such as open areas adjacent to balcony overlooks and atriums are not to be included in the floor's footprint.

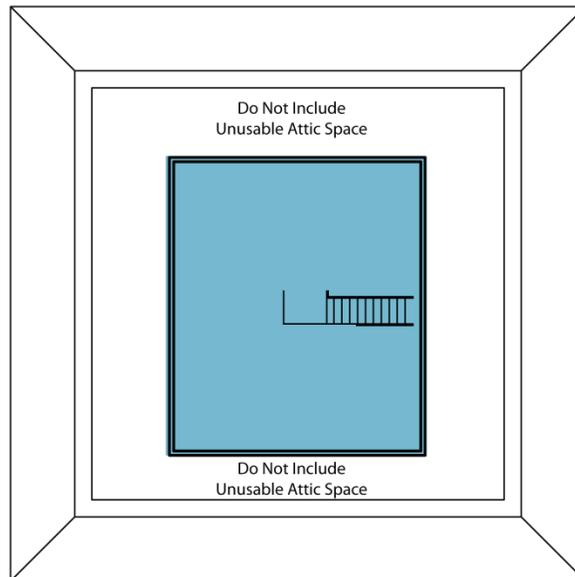
Exception. Include top, unroofed floor of parking structures where parking is available.

GROSS AREA OF A BUILDING BY FLOOR (GSF) ILLUSTRATION

Notice: GSF is from exterior face of wall. Unusable attic space is not included. Crawlspace is not included. Open to Below is not included.

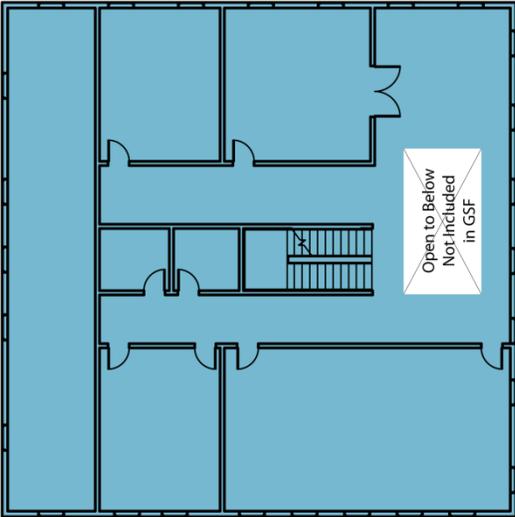


Building Section

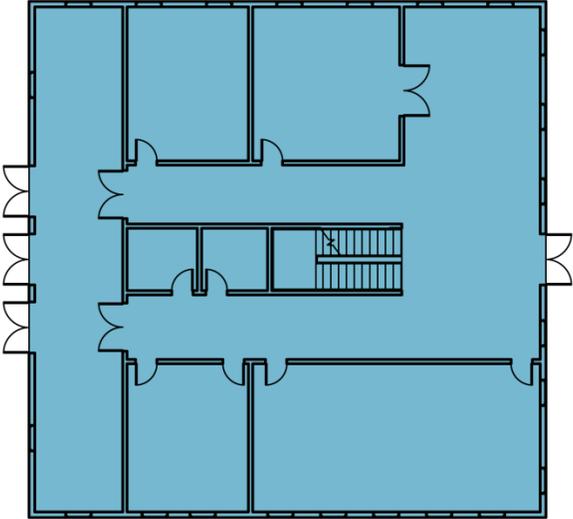


Third Floor

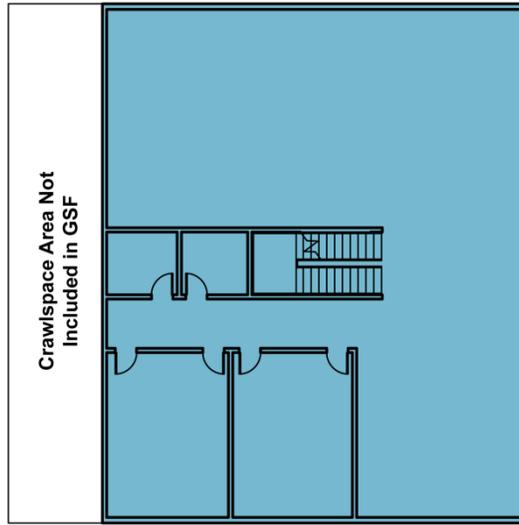
(and Area Under Roof)



Second Floor



First Floor



Basement Floor

NET ASSIGNABLE AREA (NET ASSIGNABLE SQUARE FEET—NASF)

Definition - The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use.

Basis for Measurement - Net Assignable Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than a 3-foot clear ceiling height unless the criteria of a separate structure are met...

Measured in terms of Net Assignable Square Feet (NASF),

NASF = Sum of Areas Designated by the 10 Assignable Major Space Use Categories

Description - Included should be space subdivisions of the 10 major space use categories for assignable space—classrooms, labs, offices, study facilities, special use, general use, support, health care, residential, and unclassified—that are used to accomplish the institution's mission.

Limitations - Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas defined as building service, circulation, mechanical, and structural should not be included.

BUILDING SERVICE AREA

Definition - The sum of all areas on all floors of a building used for custodial supplies, janitorial sink rooms, janitorial closets, and public rest rooms. (Note: Building Service Area includes all areas previously classified as Custodial Area in the pre-1992 FICM, and public rest rooms previously classified as mechanical area in the pre-1992 FICM).

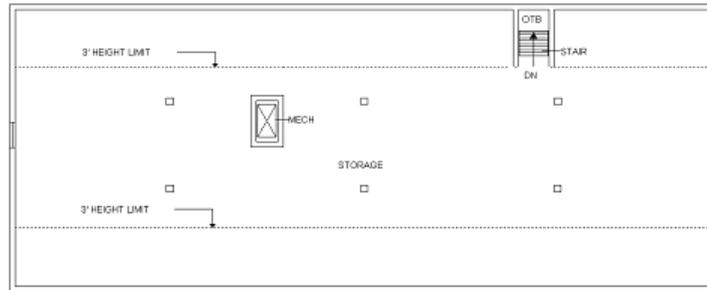
Basis for Measurement - Building Service Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form boundaries of the designated areas. Exclude areas having less than a 3-foot clear ceiling height unless the criteria of a separate structure are met.

Description - Included should be janitor closets or similarly small custodial spaces, maintenance material storage areas, trash rooms exclusively devoted to the storage of nonhazardous waste created by the building occupants as a whole, and public rest rooms.

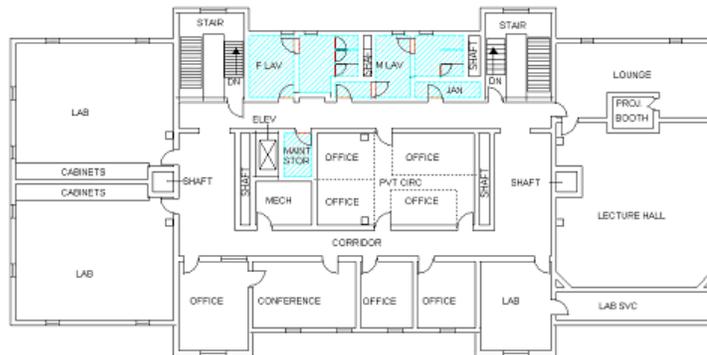
Limitations - Deductions should not be made for necessary building columns and minor projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Assignable areas classified as Shop (720), Central Storage (730), Central Supplies (870), or special purpose storage or maintenance rooms such as linen closets and housekeeping rooms in residence halls should not be included. Do not include private rest rooms that should be classified as Office Service (315).

BUILDING SERVICE AREA ILLUSTRATION

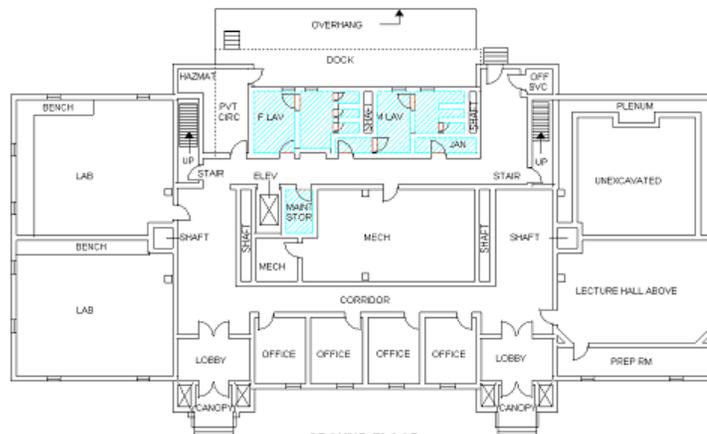
Notice: Building Service Area is defined with polylines in FAMISCAD as other spaces are defined. Categorization of space is done by CASP.



ATTIC



SECOND FLOOR



GROUND FLOOR

COURTESY OF INSITE

CIRCULATION AREA

Definition - The sum of all areas on all floors of a building required for physical access to some subdivision of space, whether physically bounded by partitions or not.

Basis for Measurement - Circulation Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than a 3-foot clear ceiling height unless the criteria of a separate structure are met.

Description - Included should be fire towers, elevator lobbies, tunnels, bridges, and each floor's footprint of elevator shafts, escalators, and stairways. Also included are public corridors or walkways, whether walled or not, provided they are either within the outside face lines of the buildings to the extent of the roof drip line or, if covered, to the extent of their cover's drip line. Receiving areas, such as loading docks, should be treated as circulation space. Any part of a loading dock that is not covered is to be excluded from both Circulation Area and gross area.

Limitations -. Deductions should not be made for necessary building columns and minor projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. When determining corridor areas, only spaces required for public access should be included. Restricted access private circulation aisles used only for circulation within an organizational unit's suite of rooms, auditoria, or other working areas should not be included. A loading dock, or portions thereof, that is also used for central storage should be regarded as assignable area and coded as Central Storage (730).

MECHANICAL AREA

Definition - The sum of all areas on all floors of a building designed to house mechanical equipment, utility services, and shaft areas.

Basis for Measurement - Mechanical Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than a 3-foot ceiling height unless the criteria of a separate structure are met.

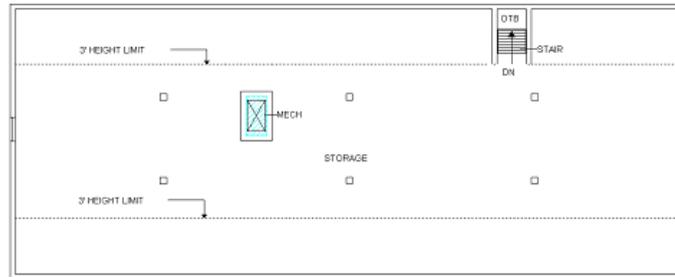
Description - Included should be mechanical areas such as central utility plants, boiler rooms, mechanical and electrical equipment rooms, fuel rooms, meter and telecommunications closets, and each floor's footprint of air ducts, pipe shafts, mechanical service shafts, service chutes, and stacks.

Limitations - Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas designated as public toilets are not included in this category but are included under Building Service Area.

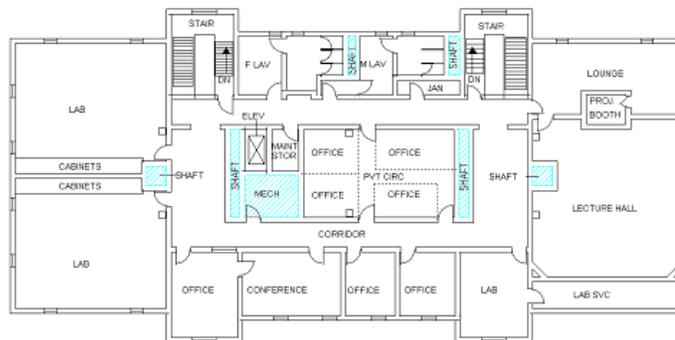
Note: We do not measure each floor's footprint of air ducts, pipe shafts, mechanical service shafts, service chutes and stacks. We will include these footprints if they are located within a space or room designated as Mechanical.

MECHANICAL AREA ILLUSTRATION

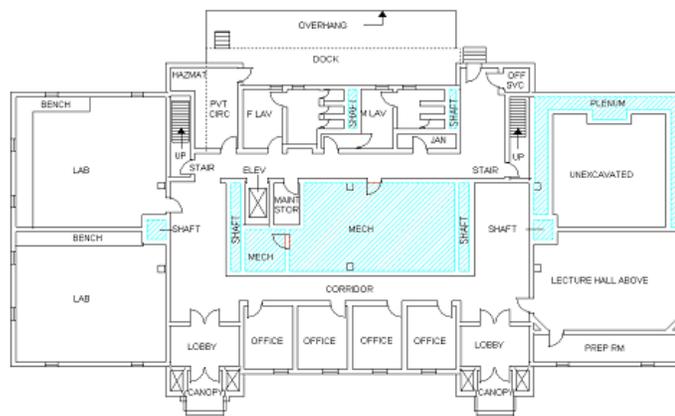
Notice: The colored areas defined in this drawing are not shown as CAD Office defines space using polylines. Typically shafts and interstitial mechanical spaces are not identified. Only relevant mechanical rooms are identified.



ATTIC



SECOND FLOOR



GROUND FLOOR

COURTESY OF INSITE

NET USABLE AREA

Definition - The sum of all areas on all floors of a building either assigned to, or available for assignment to, an occupant or specific use, or necessary for the general operation of a building.

Basis for Measurement - Net Usable Area is computed by summing the Net Assignable Area and the Nonassignable Area.

Measured in terms of Net Usable Square Feet (NUSF),

NUSF = Net Assignable Area + Nonassignable Area

Description - Included should be space subdivisions of the 10 assignable major space use categories and the 3 nonassignable space categories.

Limitations - Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas defined as structural should not be included.

Clarification: Sum total of all polylines defining interior spaces is the Net Usable Area.

STRUCTURAL AREA

Definition - The sum of all areas on all floors of a building that cannot be occupied or put to use because of structural building features.

Basis for Measurement - Precise computation by direct measurement is not possible under this definition. It is determined by calculating the difference between the measured gross area and the measured net usable area.

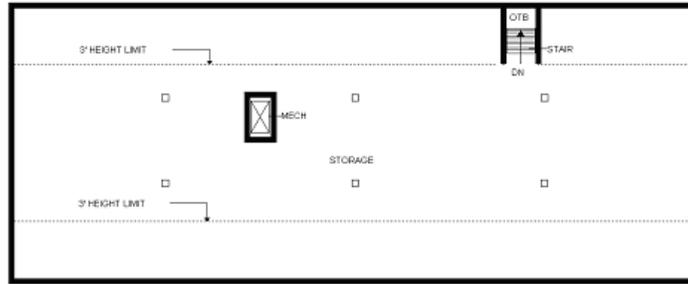
Measured in terms of area,

Structural Area = gross area - Net Usable Area

Description - Examples of building features normally classified as Structural Areas include exterior walls, fire walls, permanent partitions, unusable areas in attics or basements, or comparable portions of a building with ceiling height restrictions.

STRUCTURAL AREA ILLUSTRATION

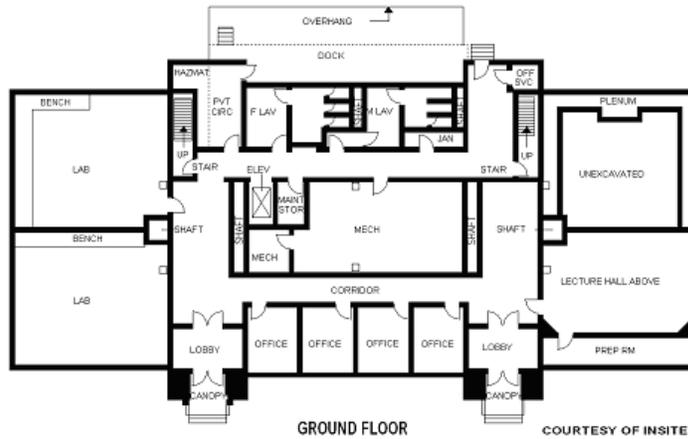
Notice: This drawing shows structural areas. There appear to be some errors. The Area outside of the GSF should not be included, since by definition; Gross Area= Structural Area + Usable Area.



ATTIC



SECOND FLOOR



GROUND FLOOR

COURTESY OF INSITE

PARKING STRUCTURES

From FICM:

Due to the absence of specific guidance in previous editions of this manual, parking structures or decks are classified differently by institutions across the country. Because these structures may represent a large portion of campus facilities space, the specific method for classifying these areas can have significant impacts on campus-level statistics. For internal accounting of the maintenance and operational activities such structures require, campus parking surveys, and inter-institutional comparisons, it is recommended that data on parking structures be maintained and reported as are the data for any other campus building. Two different methods of classifying parking structures are suggested.

Classification - With Assignable and Gross Square Footage (preferred method). This method determines statistics for the structure that are commensurate with all other major inventoried campus buildings (i.e., assignable space, gross square footage, estimated replacement cost, etc.). In this approach, parking space square footage, including upper level unroofed parking areas, is assigned the Vehicle Storage (740) use code. Standard Nonassignable Areas (Building Service, Circulation, and Mechanical) are appropriately classified. Other standard assignable areas (offices, etc.) are classified with the appropriate space use codes. Ramps and other driving areas are classified as nonassignable Circulation Area.

Classification - With Gross Square Footage Only (default method). Many institutions maintain only the gross area and other building-level data for parking structures and do not classify parking areas as assignable space. Standard assignable areas within the parking structure, such as offices, may be appropriately classified. Only the gross area recorded within the building file becomes a significant square footage statistic. Institutions may also maintain parking structure data separately from the formal building and space inventory files.

University of Colorado Boulder uses the first method of measurement, Since many of the parking structures on campus have another operational component besides parking, and because parking structures in the future are certain to co-house other operations, we continue to capture the use of these spaces in these structures. However, all parking areas (including “vehicle circulation”) are classified as parking (code PPP) NOT AS nonassignable Circulation Area.

PRORATION AND PHANTOM WALLS (SPACE LINES)

When a room serves several purposes or users, the institution may choose to prorate and allocate the square footage between two or more space uses, functions, or organizational units. For institutions with major sponsored research activities, proration of multiple functions is often necessary to identify accurately how each space is used. Other cases may require the recognition of two or more distinctly different architectural uses within a space (e.g., a departmental conference room housing a substantial reference library) or the sharing of an office by two or more departments. Proration can be done either on the basis of the relative time expended on each activity or on the basis of the proportion of the room area dedicated to each activity.

There are two basic approaches to proration. One method is to prorate from floor plans by the insertion of “phantom walls,” indicated by dashed lines or other artificial boundaries on floor plans to separate adjacent uses or assignments. The use of phantom walls requires that each *space* (i.e., each part) of the room be given a unique space identifier, which can be accomplished by adding an additional digit or character to the existing room identifier. For example, Room 210, which is used as a storage room by both Biology and Chemistry, could be identified as Space 210A and Space 210B, and the pro rata organizational assignment and share of space can be identified with each. The other method is to apply percentage figures to each assignment, use, or function being prorated. Whatever method is used, the resulting information should be capable of being summarized into standard space use codes and related categories for external reports, utilization studies, and institutional planning.

University of Colorado Boulder uses “space lines” or “phantom walls” to distinguish between distinct operational functions within larger spaces. For example, a built-in office counter and the area behind it may be classified as a staff office, a use different from the waiting area adjacent to it. In practice, during space surveys conducted by CASP, these changes are noted and incorporated into our drawings as the inventory is updated.

AREA MEASUREMENT QUESTIONS AND ANSWERS (SPACE LINES)

Question: How should I report an area that is covered, but not enclosed, on all four sides?

Clarification: To be included in GSF, The area must be enclosed on all four sides. The exception being a top floor of a parking structure.

Question: There is a permanent eating area, equipped with tables and chairs, which is located in a covered, unenclosed area of our Student Union Building. Is this space assignable even though the facility only has one wall? Should I count this space as part of the gross area?

Clarification: To be included in GSF, The area must be enclosed on all four sides. This space does not meet that definition.

Question: Should I inventory underground pedestrian tunnels and above-ground pedestrian bridges that connect buildings?

Clarification: Underground Tunnels are generally not included, as they protrude past the buildings structural foundation. Underground tunnels falling within the building footprint are included in the GSF, as that area of the building is effectively a corridor. Note: a stricter interpretation of BOMA methods would require counting this space and classifying as vault space. Above-ground pedestrian bridges are only included if they are enclosed. We do not count this space.

Question: On our campus, we have “buildings” that are really contiguous structures built at different times to meet new needs. For example, a library wing was added to a classroom structure, and later a structure housing laboratories was added. However, they all share walls and are physically connected. Should these be inventoried as a single structure or several different buildings?

Answer: It is preferable to treat each addition/wing as a separate structure, depending upon factors such as the source of the funds; the separation of each structure’s mechanical, electrical, or plumbing systems; the age differences of the two joined facilities, etc. If treated as separate structures, commonly shared walls would be prorated one-half with each of the respective facilities.

Question: We have several houses that were converted into administrative offices. The uppermost usable floor has a vaulted ceiling. The floor to ceiling distance is 4’0” around the perimeter of the exterior rooms. Should the area be calculated from the edge of the kneewall? The ceiling height in the attic is 5’0” and contains HVAC equipment. Should this space be considered a Building Service area?

Clarification: Gross area measurement of this floor should extend to the exterior face of the interior wall adjacent to a usable space. The determination of the ceiling height of interior space is only verifiable during space surveys. Therefore, unless there is firsthand knowledge or the area is obviously a restricted headroom space, this area is counted as GSF.

CAD PROCEDURES FOR BUILDING AREA MEASUREMENTS

The following is a list of procedures regarding building area measurements—common processes occurring with the CAD office by staff on a weekly if not daily basis.

PLANNING STAFF GSF RESPONSE VERIFICATION PROCEDURE

Requests for verification of GSF during planning phase of major projects may require verification of figures.

1. Verify GSF line.
2. Check for “open-to-below “ errors.
3. Check for figures against Famis numbers.
4. Generate a GSF Calculation Report summarizing findings.
5. **Double-check by another CAD Staff member.**

University of Colorado Boulder

CAD/GIS Office

GSF Calculation Report for: Building Name

bldg #	xxx
bldg code	XXXX

Report Created:	date
Created By:	cad staff name
Report Checked:	date
Checked By:	cad staff name

floor	gsf polyline on floor	open to below polyline	Calculated gsf=gsf poly - otb poly	gsf check from small scales titleblock	
1f	0	0	0	0	
2f	0	0	0	0	
3f	0	0	0	0	
4f	0	0	0	0	
1b	0	0	0	0	
	0	0	0	0	totals

* Totals showing in dark blue should match (or be very close)

0 total reporting in famis

Comments:

Example: Verified gsf and found no errors.

CASP RELATED PROCEDURES

Frequently we are asked to verify or calculate differences in GSF because of new or remodel construction. Our new Meridian document management system will eventually allow us to look at how our drawings were configured previously, allowing us to provide pre-construction, post construction and addition measurements directly in the small scale drawings we use on a daily basis. Verifying building measurement changes prior to our new Meridian system requires a different approach.

Since we have not recorded the previous small scale drawing configurations, any verification will require researching our archived construction documents. We will have to measure the building before construction and after construction. Once the changes have been verified, issue a GSF Change Calculation Report.

University of Colorado Boulder				
CAD/GIS Office				
GSF Change Calculation Report for: Bldg Name				
bldg #	0	Report Created:		xx
bldg code	xxxx	Created By:		xx
		Report Checked:		date
		Checked By:		cad staff name
PreConstruction				
floor	gsf polyline on floor	open to below polyline	Calculated gsf=gsf poly - otb poly	gsf check from small scales titleblock
1f	xxxx	0	#VALUE!	xx
1b	xxxx	0	#VALUE!	xx
	0	0	#VALUE!	xx
* Totals showing in dark blue should match (or be very close)				0
total reporting in famis				
Post Construction (estimate)				
floor	gsf polyline on floor	open to below polyline	Calculated gsf=gsf poly - otb poly	gsf check from small scales titleblock
1f	x	0	#VALUE!	0
1b	x	0	#VALUE!	0
	x	0	#VALUE!	0
* Totals showing in dark blue should match (or be very close)				0
total reporting in famis				
Comments:				
1f	xxxx	x	#VALUE!	
1b	xxxx	x	UE!	

SPACE DEFINING MEASUREMENTS REGARDING RESEARCH BUILDING SPACES

University of Colorado Boulder CAD Office Staff draws space polylines to include door threshold areas of rooms within research buildings. During normal “poly-lining” of spaces draw around the threshold to capture the entire footprint of the doorway. The intent is to capture additional space for research related activities. Consequently, the line should be drawn to capture the room’s additional space when adjacent to a hallway or circulation corridor.

BOMA MEASUREMENT PROCEDURES

“BOMA measurements” generally are requested from RPS (Research Property Services). There is an existing set of BOMA related layers showing BOMA space and annotation information. These layers are independent of FAMISCAD and FAMIS and thus must be manually entered and calculated. The official standard used when a set of “BOMA” measurements must be issued, is the Office Standard: ANSI/BOMA Z65.1-2010 Legacy Method.

GLOSSARY

The following definitions may be helpful. They are drawn from FICM (and BOMA where noted).

As-built Drawings

Architectural and engineering drawings that record the *current* locations of primary building features, walls, primary building equipment, mechanical system outlets, and equipment.

Assignable areas

Assignable areas refers to codes used in the FAMIS database to classify space. This is different than Net Assignable Area which is defined.

BOMA

Building Owners and Managers Association.

Building

A roofed structure for permanent or temporary shelter of persons, animals, plants, materials, or equipment. A *building* is a) attached to a foundation; b) roofed; c) serviced by a utility, exclusive of lighting; and d) a source of significant repair and maintenance activities. See section 2.3 Office FICM (Facilities Inventory and Classification Manual: 2006 edition) What to Include in a Building Inventory, for inclusions and exclusions.

Building Data

Descriptive characteristics of a building, such as gross area, assignable area, condition, ownership, estimated replacement cost, and year of construction. See section 5.2, Required Data Elements, section 5.3, Optional Data Elements, and section 3.2, Definitions of Building Areas FICM (Facilities Inventory and Classification Manual: 2006 edition).

Building Service Area

The sum of all areas on all floors of a building used for custodial supplies, sink rooms, janitorial closets, and public rest rooms. See section 3.2, Definitions of Building Areas FICM (Facilities Inventory and Classification Manual: 2006 edition).

CAFM

Computer-aided facilities management systems. CAFM systems offer one or more solutions, often differing in nature, of these facilities management activities: call center work, design and construction drawings including specifications, equipment and furniture inventories, hoteling, lease management, real property portfolio tracking, preventive maintenance, project management, safety, security, space management, utilization studies, wire and cabling, and more.

Circulation Area

The sum of all areas on all floors of a building required for physical access to some subdivision of space, whether physically bounded by partitions or not. See section 3.2, Definitions of Building Areas FICM (Facilities Inventory and Classification Manual: 2006 edition).

External Circulation

Unenclosed pedestrian circulation providing the minimum path for access to tenant suites, egress stairs, elevators, refuge areas, toilets, and building entrances, and required by local building code to meet egress requirements, only when there are no fully enclosed pedestrian corridors serving a floor or portion (such as a wing) thereof. (from Gross Standard: "ANSI/BOMA Z65.3- 2009 EGA Method".)

Facilities

Any physical structure or space required by the institution for the performance of its programs and related activities.

Facilities Inventory

A database containing statistical information on buildings, including both building and room/space data as defined in this glossary.

Fixed Equipment

Permanently attached appurtenances such as elevators, fire protection systems, lighting, plumbing, heating, ventilation, and built-in air conditioning systems (excluding window or console air conditioning units that require no duct work or cooling towers).

Gross Area

Gross Area is the sum of all areas on all floors of a building included within the outside faces of its exterior walls, including *all* vertical penetration areas, for circulation and shaft areas that connect one floor to another. See section 3.2, Definitions of Building Areas. FICM (Facilities Inventory and Classification Manual: 2006 edition.

GSF Line

The GSF Line (Gross Square Foot Line) is the imaginary line determining extent of building area (GSF) utilizing the BAMS method. The GSF Line is also a "poly-line" created in our cad drawings representing this defining line. It is similar to the Measure Line as defined in Gross Standard: "ANSI/BOMA Z65.3- 2009 EGA Method".

HVAC

Heating, ventilation, and air conditioning systems.

Infrastructure

Physical assets with a long useful life that are normally stationary in nature and can be preserved for a significantly greater number of years than most capital assets. Examples of infrastructure assets include roads, bridges, tunnels, drainage systems, water and sewer systems, dams, and lighting systems.

Measure Line

A term used in the Gross Standard: "ANSI/BOMA Z65.3- 2009 EGA Method". It is the closest to what CAD office staff uses in order to determine GSF. The term, GSF Line is used in place of Measure Line when GSF measurements are determined utilizing our BAMS method.

Mechanical Area

The sum of all areas on all floors of a building designed to house mechanical equipment, utility services, and shaft areas. See section 3.2, Definitions of Building Areas. FICM (Facilities Inventory and Classification Manual: 2006 edition.

Mezzanine

An intermediate horizontal load bearing structure that is between a floor and the floor or roof immediately above which contains a fraction of the area of the floor below, where there exists adequate headroom above and below the mezzanine, and which shares service areas (toilets, fan rooms, etc.) with the floor immediately below it. (from BOMA)

Multi-Institution System

An institution that has either 1) two or more sites or campuses responsible to one administration which may or may not be located on one of the sites or campuses, or 2) a primary site or main campus with one or more branches attached to it.

Net Assignable Area

Net Assignable Area is the sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use. See section 3.2, Definitions of Building Areas. Note: assignable areas are spaces coded in FAMIS and is a different term than Net Assignable Area.

Net Usable Area

Net Usable Area is the sum of all areas on all floors of a building either assigned to, or available for assignment to, an occupant or specific use, or necessary for the general operation of a building. See section 3.2, Definitions of Building Areas. FICM (Facilities Inventory and Classification Manual: 2006 edition).

Nonassignable Area

The sum of all areas on all floors of a building not available for assignment to an occupant or for specific use, but necessary for the general operation of a building. See section 3.2, Definitions of Building Areas. In FICM (Facilities Inventory and Classification Manual: 2006 edition).

Plenum

A duct created to direct the flow of air either into or out of a building. Plenums are generally made of sheet metal but may be constructed of any material and be of any shape. They may also be insulated and have devices in them to regulate their flow of air.

Postsecondary Education

The provision of a formal instructional program whose curriculum is designed primarily for students who are beyond the compulsory age for high school. This includes programs whose purpose is academic, vocational, and continuing professional education, and excludes avocational and adult basic education programs.

Postsecondary Education Institution

An institution that has the provision of postsecondary education as its sole purpose or one of its primary missions.

Room

A covered contiguous area enclosed on all sides by walls, or imaginary boundary lines (referred to as “phantom walls”) where a wall does not exist; it may consist of one or more spaces (see Space). Covered play areas, covered patios, and covered walkways are exceptions to the enclosure criterion.

Room Data

Descriptive characteristics of assignable interior spaces of a building, including standard room use categories, institutional organizational units, academic discipline and functional codes, assignable floor areas and, in some instances, numbers of stations. See section 5.2, Required Data Elements, and section 5.3, Optional Data Elements. FICM (Facilities Inventory and Classification Manual: 2006 edition).

Space

A covered contiguous area enclosed on all sides by walls or imaginary boundary lines (referred to as “phantom walls”) where a wall does not exist, that accommodates a single use; the smallest discrete spatial unit or data element used, tracked and analyzed in an institution’s space inventory. A *space* may be part of a *room*, and a *room* may contain several *spaces*.

Space Measurement System

A codified system of classifying various categories for physical space, defining their boundaries, and measurement techniques.

Structural Area

The sum of all areas on all floors of a building that cannot be occupied or put to use because of structural building features; the *Gross Area minus Net Usable Area*. See section 3.2, Definitions of Building Areas.

Unique Space Identifier

A means, such as an alpha-numeric code, to identify each individual *space* in a facilities inventory database.