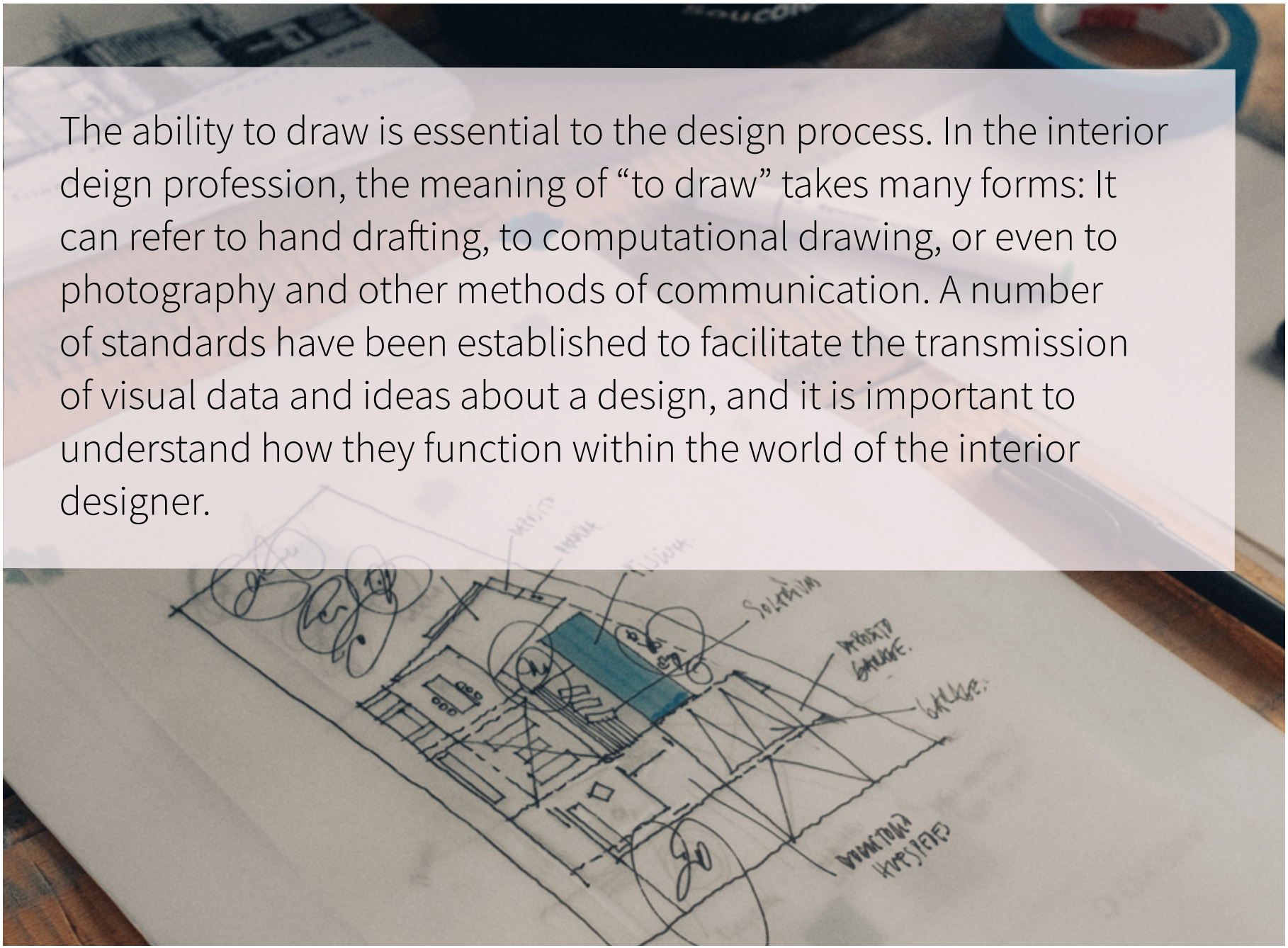
10/19/2020

DRAWING
Basic

Cebu Technological University - Pinamungajan Campus
IDT111 Interior Design Materials and Application 1
Professor: HANNAH PAÑARES - ABASA

The ability to draw is essential to the design process. In the interior deign profession, the meaning of “to draw” takes many forms: It can refer to hand drafting, to computational drawing, or even to photography and other methods of communication. A number of standards have been established to facilitate the transmission of visual data and ideas about a design, and it is important to understand how they function within the world of the interior designer.



Measurement in INTERIOR DESIGN

Before the first line is drawn, the interior designer must grasp the language of measurement. The worldwide system of measurement collectively known as the International System of Units, or SI, is the most widely used standard for determining the length, weight, or volume of an object and its relation to other objects. It comprises a decimal system whose the base unit is the meter, which when increased or decreased by a power of 10, generates all other units of measure. Designers should be familiar with metric system and customary units system.

Converting Units of Measure

Often, dimensional units are interchanged freely, and it is helpful to know how to translate between units. Designers will find a range of publications and websites with extensive conversion tables for length, area, and volume, among other measurements. Numerous online calculators also allow for swift conversions of specific dimensions. Interior designers will most frequently turn to the following formulas.

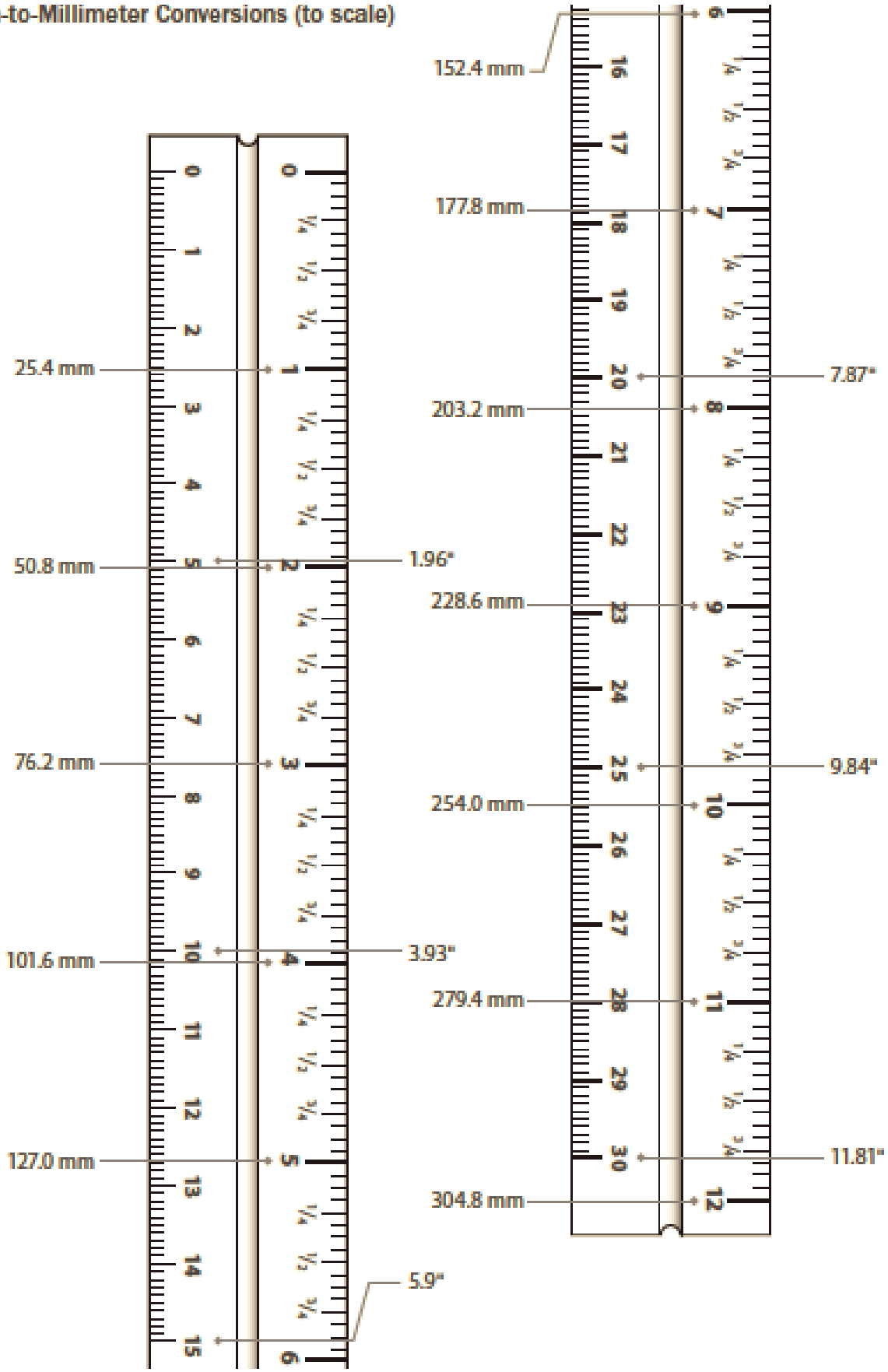
Useful Conversion Formulas

Multiply	by	to obtain	Multiply	by	to obtain
inches	25.4	millimeters	millimeters	0.039 370	inches
feet	304.8	millimeters	millimeters	0.003 281	feet
feet	0.304 8	meters	meters	3.280 8	feet
yards	914.4	millimeters	millimeters	0.001 093 6	yards
yards	0.914	meters	meters	1.093 613 3	yards

Multiply	by	to obtain	Multiply	by	to obtain
square inches	645.16	square millimeters	square millimeters	0.001 550 0	square inches
square feet	92903.04	square millimeters	square millimeters	$1.076\ 391 \times 10^{-5}$	square feet
square feet	0.09290304	square millimeters	square millimeters	10.763 910	square feet
square yards	836127.36	square millimeters	square millimeters	$1.195\ 990 \times 10^{-6}$	square yards
square yards	0.83612736	square millimeters	square millimeters	1.195 990	square yards

Inches	Millimeters (mm)	Centimeters (cm)	Meters (m)
0.25	6.35	0.635	0.00635
0.5	12.7	1.27	0.0127
0.75	19.1	1.91	0.0191
1	25.4	2.54	0.0254
1.25	31.8	3.18	0.032
1.5	38.1	3.81	0.038
1.75	44.5	4.45	0.045
2	50.8	5.08	0.051
3	76.2	7.62	0.076
4	101.6	10.16	0.102
5	127.0	12.7	0.127
6	152.4	15.24	0.152
7	177.8	17.78	0.178
8	203.2	20.32	0.203
9	228.6	22.86	0.229
10	254.0	25.4	0.254
11	279.4	27.94	0.279
12	304.8	30.48	0.305
24	610.0	61.0	0.610
36	914.5	91.45	0.915
48	1219.2	121.92	1.219
60	1524.0	152.4	1.524
72	1828.8	182.88	1.829

Inch-to-Millimeter Conversions (to scale)



Manual Drafting Tools

Although the computer has taken over as the primary method of drawing in most interior design practices, manual tools continue to be a part of the design process. Manual drafting is often used for developing quick ideas and details and is still employed quite frequently for final perspective drawings.

Drawing Tools

Lead Holders

Device that hold leads of 2 millimeters diameter; a spring-push action increases the length of lead for sharpening.

Mechanical Pencils

Leads, in various diameters up to 0.9 millimeter, that do not require sharpening.

Other Pencils

Standard wood-encased pencils; good for freehand drawing and sketching.

Lead Pointers

Manual sharpener whose blades give leads a specified sharpness.

Graphite

Leads in various hardnesses; good for drawing or sketching on tracing papers and vellum.

Colored Leads

Nonprint and nonphoto varieties do not show up on certain reproduction machines.

Plastic Leads

Leads designed for use on drawing films such as vellum and Mylar.

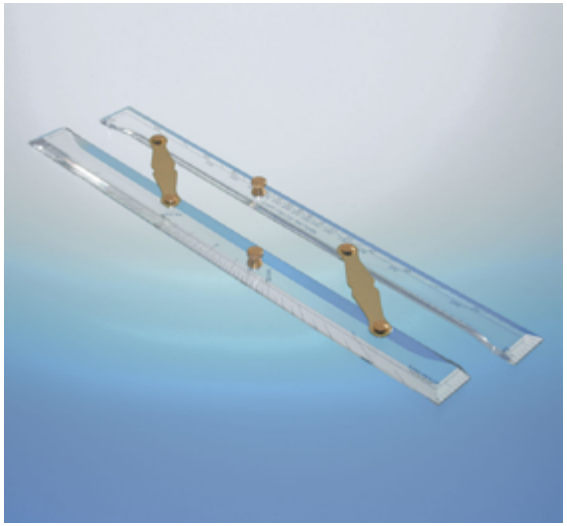
Technical Pens

Pens of specific widths designed for drafting; used exclusively on drafting films and vellums; tips can dry out and require frequent cleaning.

Parallel Tools

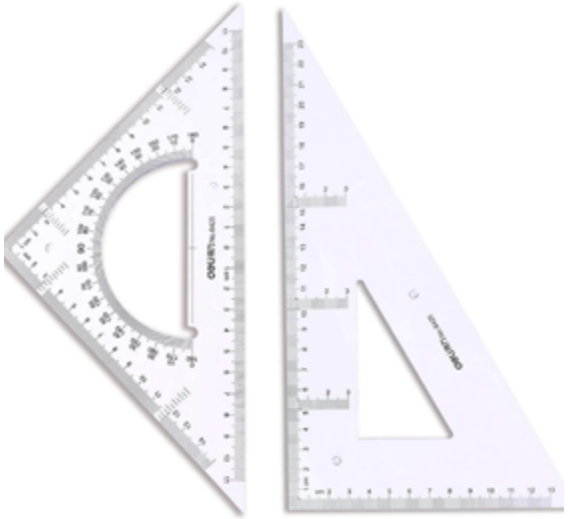
T-squares

Plastic straightedges with a perpendicular attachment at one end to ensure that vertical lines on the page remain perpendicular to horizontal lines.



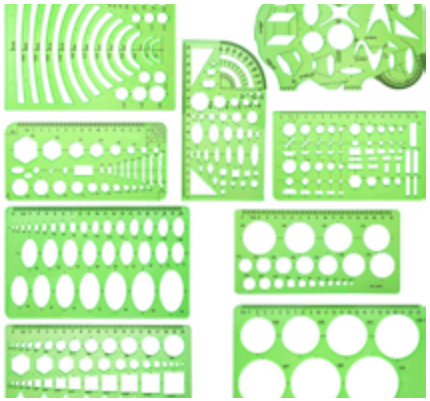
Parallel Rules

Plastic straightedges whose system of cables, rollers, and springs provides an edge that can move in one direction on a drawing surface.



Triangles

Clear plastic triangles that come in 45/90-degree and 30/60/90-degree variations.

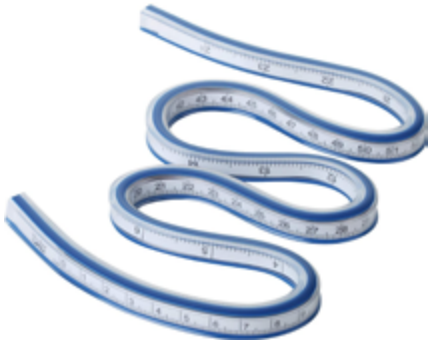


Templates

Wide variety of plastic sheets whose cutouts simplify drawing repetitive elements such as circles, polygons, and furniture..

Adjustables Triangles

Clear plastic triangles that can be set to any angle.



Flex Curves

Measurable rulers that can flex to a user-defined curve or arc.

French Curves

Plastic guides that offer many curved radii.

Paper

Tracing Paper

Description:
thin, transparent paper that comes in white or yellow

Sizes:
rolls in standard drafting sizes (12”, 18”, 24”, and 36”)

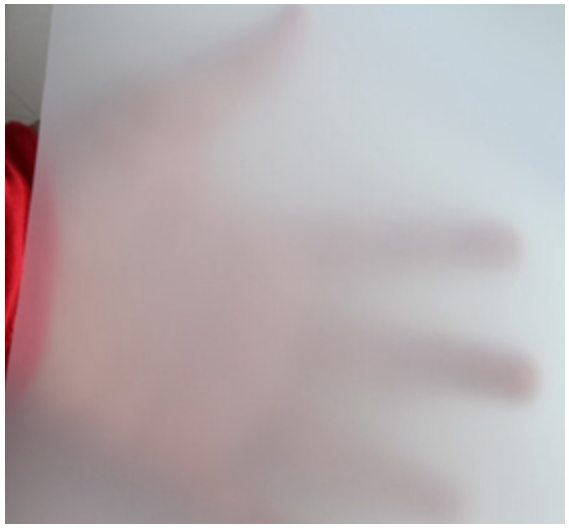
Best Use:
sketching and drafting details; overlay work; pencil, ink, and marker

Vellum

Description:
thicker than trace; available in various weights (16, 20, and 24 lbs); transparent and smooth finish

Sizes:
sheets and rolls

Best Use:
construction documents; hard-line detail drawings; perspective drawings; pencil, ink, and marker



Drafting Film

Description:
often referred to as Mylar; one- or two-sided drawing surface; of its various weights .003 and .004 are the most common

Sizes:
sheets (in standard drafting sizes) and rolls (36” and 42”)

Best Use:
construction documents; plastic lead and ink; erases well and is resistant to tearing

Bond

Description:
opaque paper that comes in a variety of thicknesses and finishes of which hot- and cold-pressed are the most common

Sizes:
sheets of varying sizes

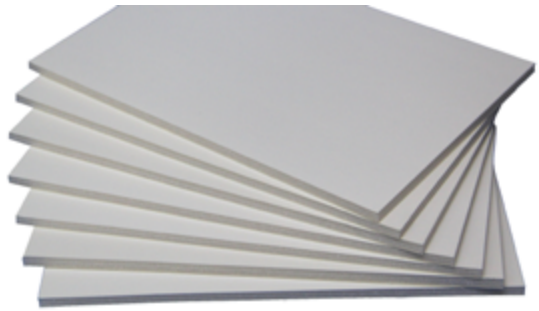
Best Use:
final drawings; pencil, though ink and watercolor can be used on certain papers

Illustration Board

Description:
finish paper laminated to a cardboard backing; comes in single ply (1/16”) and double ply (3/32”)

Sizes:
sheets of varying sizes

Best Use:
finish presentation drawings; model making

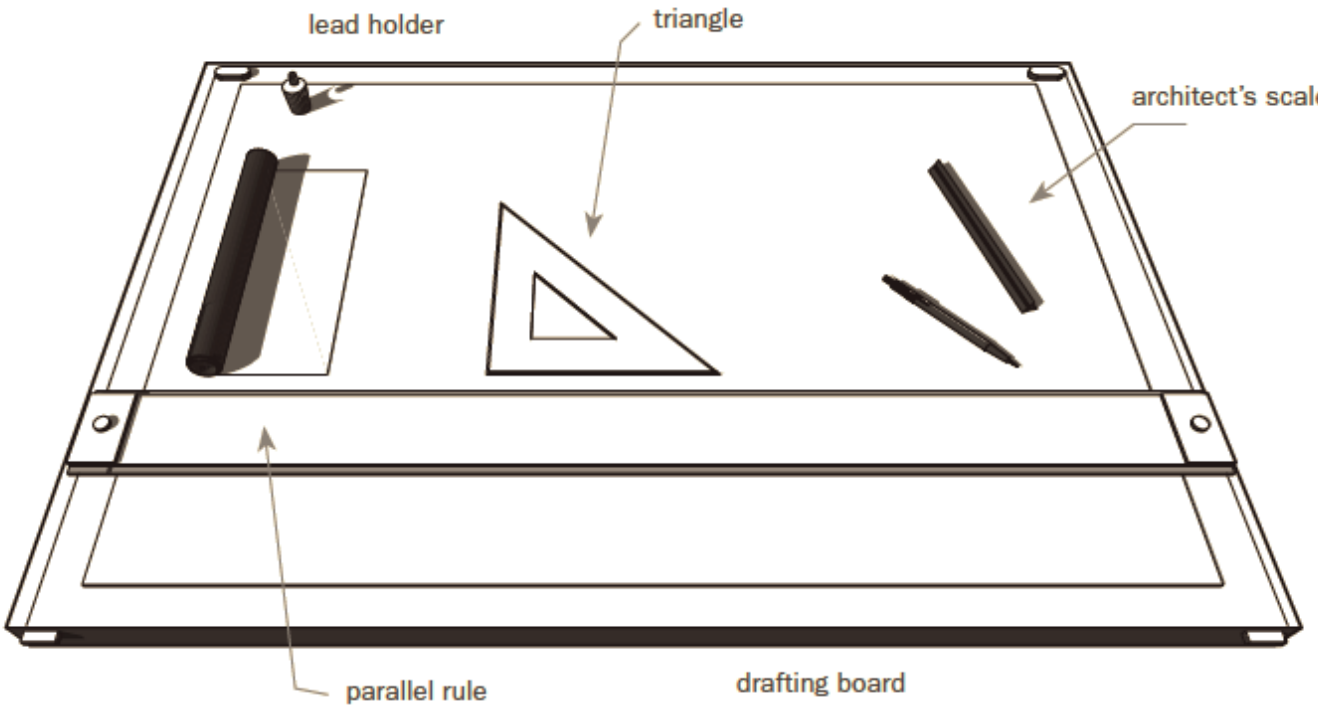


Foam Core

Description:
polystyrene core faced with clay papers; comes in a variety of thicknesses

Sizes:
sheets up to 48” x 96”

Best Use:
quick model studies; dry mounting presentation boards



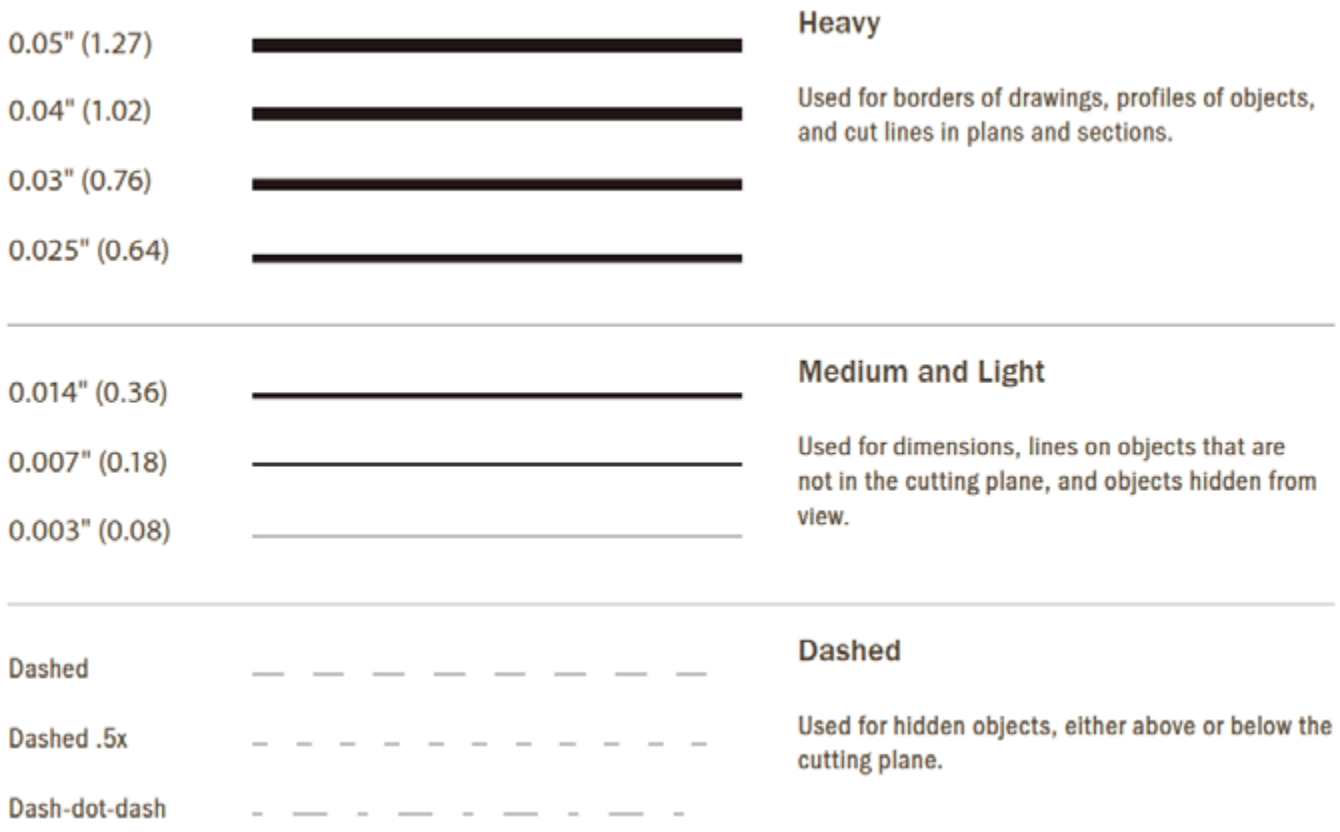
Understanding Drawing Conventions

For legibility and comprehension, designers employ a number of graphic conventions in their drawings that communicate the designs equally to clients, consultants, and contractors. In a necessary abstraction, lines, symbols, and text all combine to convey the designer's vision.

Lines Weights and Types

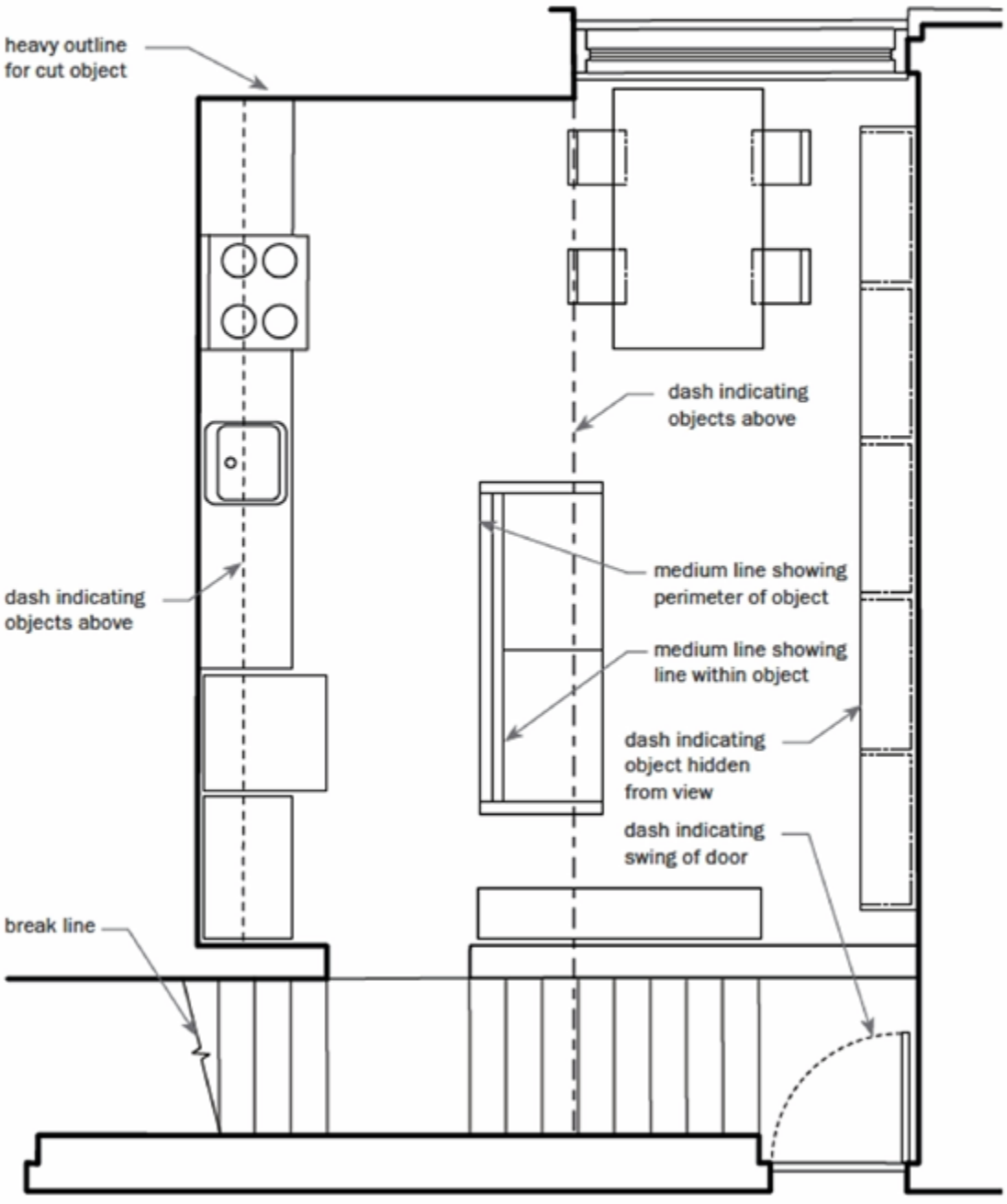
Lines are essential to the communicative language of an interior designer. Lines convey a project's intended plan, demonstrate the sectional quality of the space, and visually cue the reader to matters of hierarchy, type, and intent. Line weights and types can be created through various media, both manually and digitally.

Line types have many functions in an interior drawing. The designer determines the relative meaning for different weights; however, heavier lines are typically reserved for plans and section cuts, while lighter lines form the outlines of surfaces and furniture within a room.



Dashed lines represent many different elements, from objects that are hidden from view to objects above the cut plane (e.g., cabinets above kitchen counters), from the type of wall construction to changes in level. They can also be tied to consultant trades, showing, for example, structural grids, electrical wiring, lighting and switching, or mechanical routing.

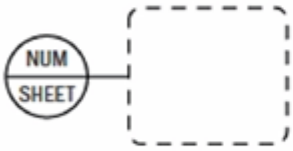
Hierarchy *in a plan drawing is established through the careful use of line weights and types.* Here, the walls that are cut are the most heavily rendered; furniture and built-ins are lighter; and hidden elements such as shelving and cabinetry are expressed with dashed lines.



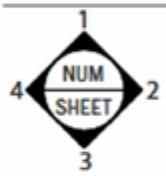
DRAWING SYMBOLS

Drawing symbols provide a *codified language* by which to specify the essential elements in drawings across a set. Below are some of the symbols typically used for an interior set.

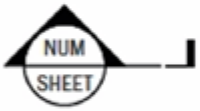
standard drawing identifier



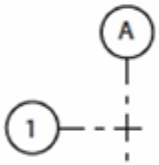
enlarged detail reference



interior elevation



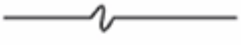
wall or detail section



column grid

drawing label

revision cloud and number



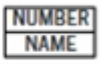
break line

window type 

door type 

wall type 

centerline 

room tag 

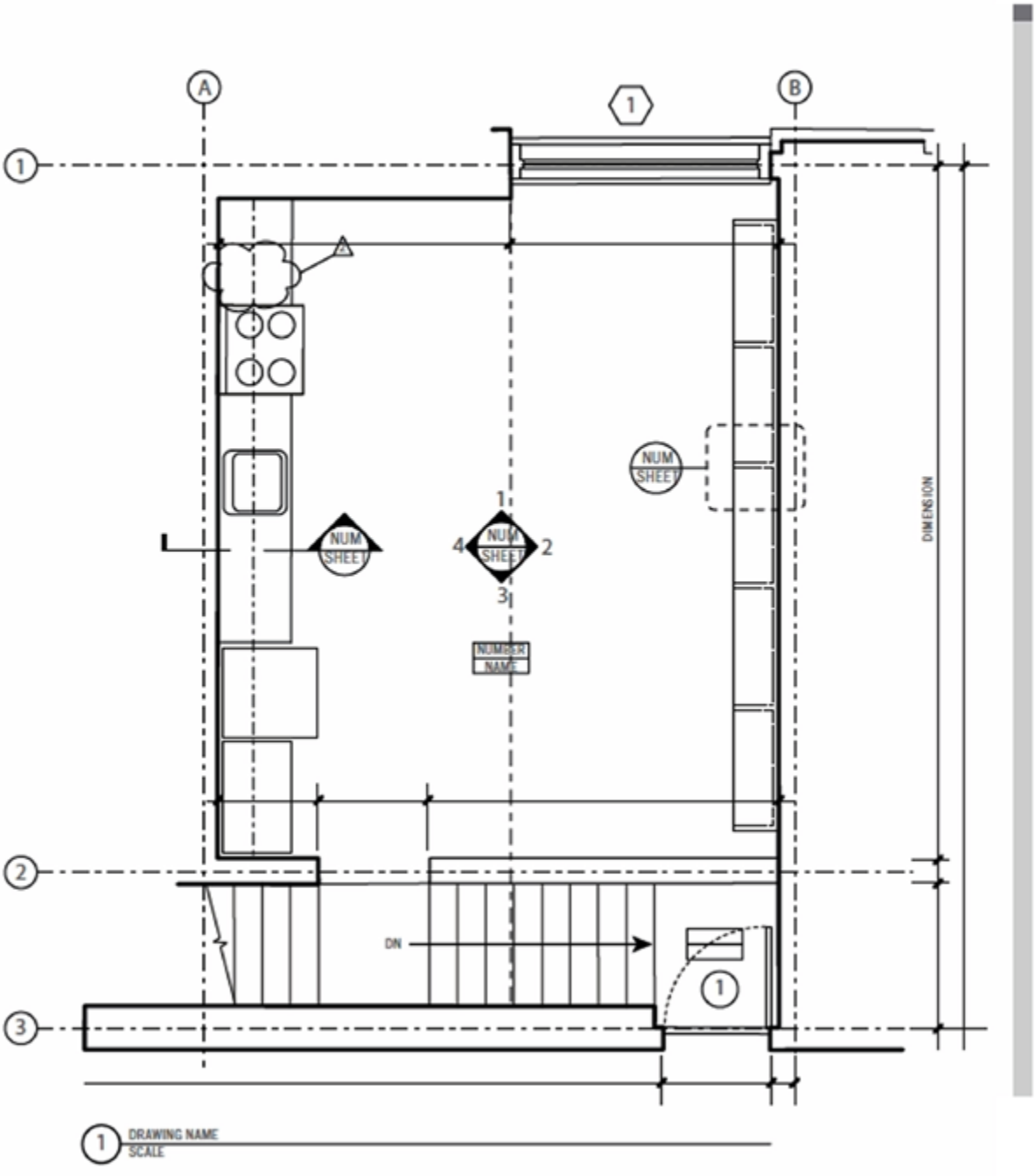
wall coverings 

floor coverings 

wall finishes 

lighting fixture 

Symbols on a plan drawing are keyed to other drawings in the set, including reflected ceiling plans, elevations, sections, and details. Elements needed to implement a design are thus easily read from drawing to drawing, and revisions are readily coordinated. Dimensions are indicated in strings around the plan, or in some cases, within the plan itself. Legibility of text and numbers is crucial to reading a plan.

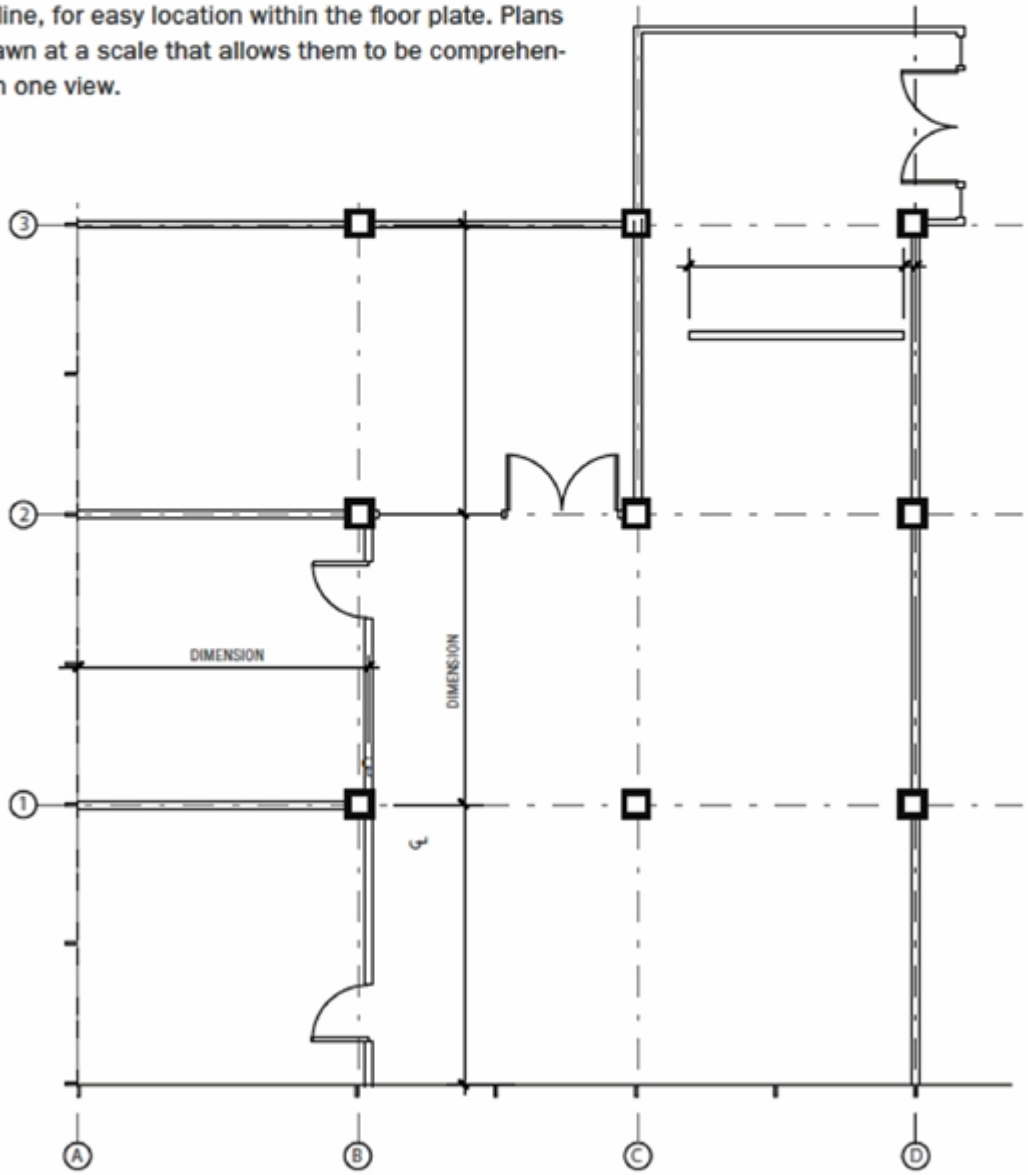


TYPES OF DRAWINGS IN INTERIOR DESIGN

Drawings are the main communicative tool in an interior designer's arsenal. Some drawing types will overlap with those of other disciplines, such as architecture or electrical engineering, while others are unique to interior design. The following pages *demonstrate the typical drawings with which an interior designer should be familiar.*

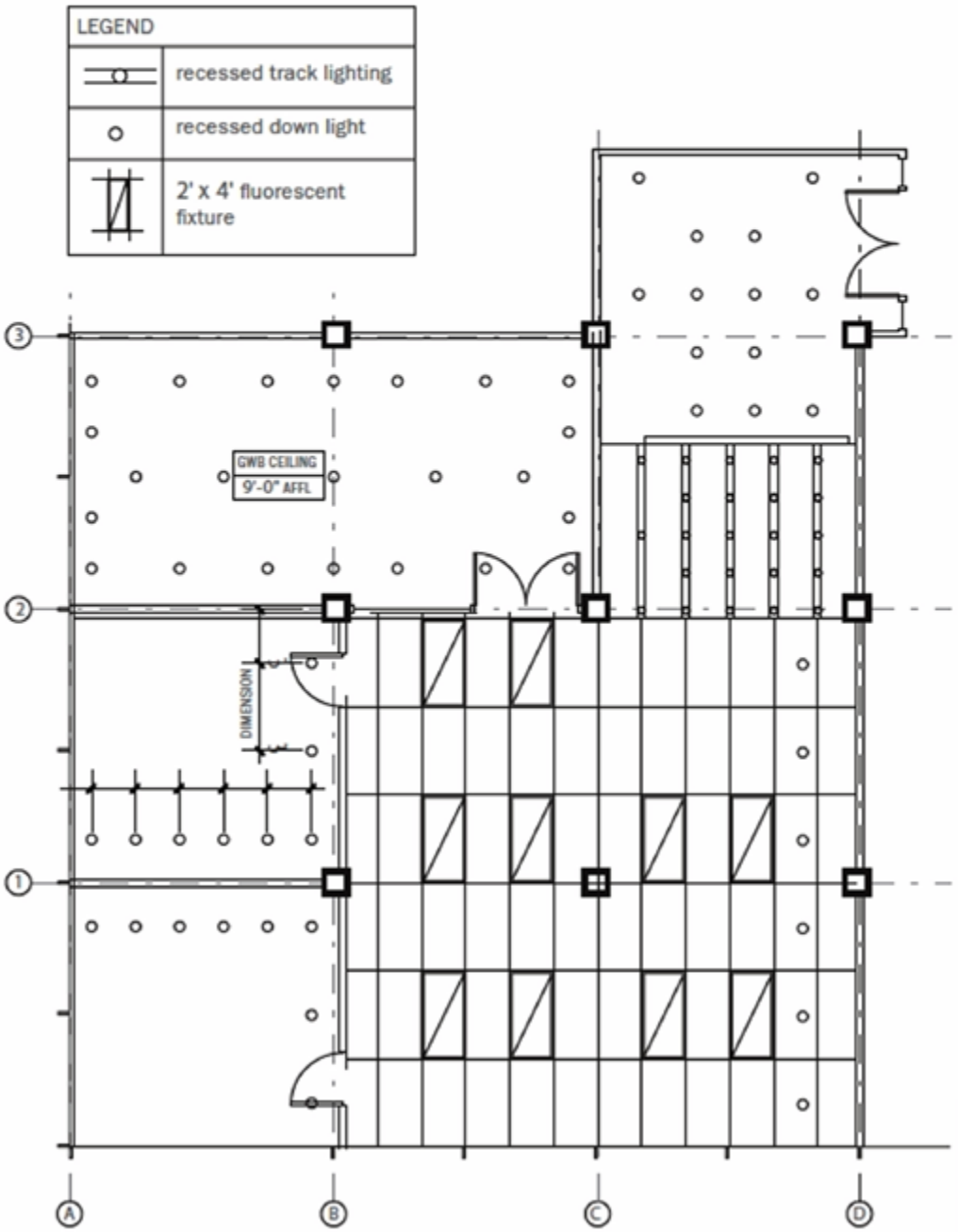
Floor Plans

Floor plans establish the limits—from demising partitions to exterior walls—that will frame the project. Walls are indicated by their dimensions, and doors by their centerline, for easy location within the floor plate. Plans are drawn at a scale that allows them to be comprehensible in one view.



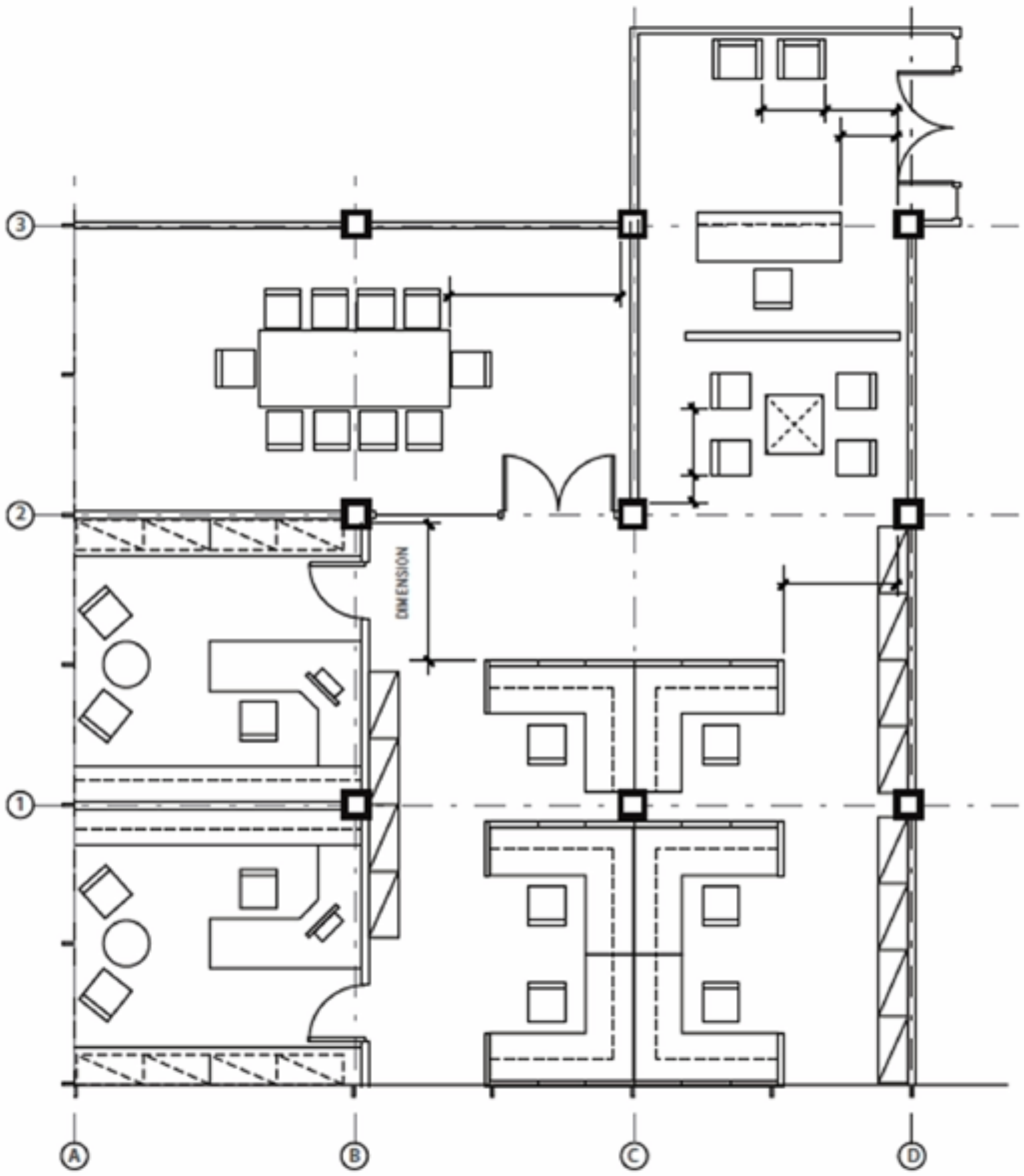
Reflected Ceiling Plans

Reflected ceiling plans (RCPs) *depict the upper surface of a room as viewed through a mirror.* All light fixtures, soffits, transoms, and other ceiling data such as heights and materials are noted on RCPs. Standard symbols are used to describe fixture types and location and are keyed to a legend on the drawing sheet.



Furniture Location Plans

Interior designers often specify furniture—both custom and purchased—for their projects. These items are indicated on many other plans, but *furniture location plans specifically dimension their placement within the project.*

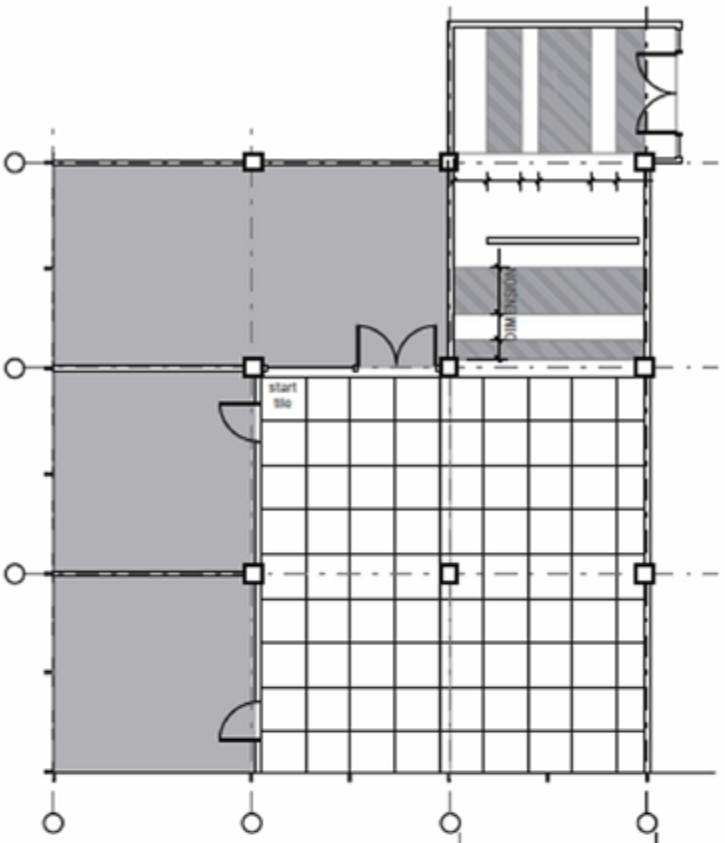


Floor Finish and Wall Finish Plans

Floor finish and wall *finish plans describe the various finishes used in a project.* The finishes are dimensioned as necessary. Standard symbols that identify finish types are tied to a legend that accompanies each plan.

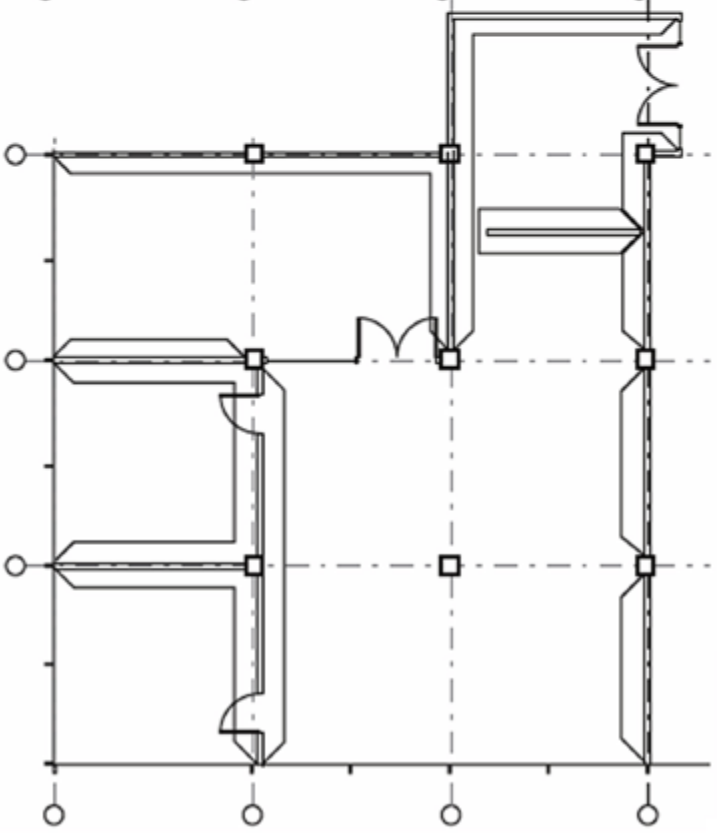
Floor Finish Plan

Floor finish plans set the type, location, and dimensions of any pattern that is within the scope of the design, including, if necessary, a start tile.



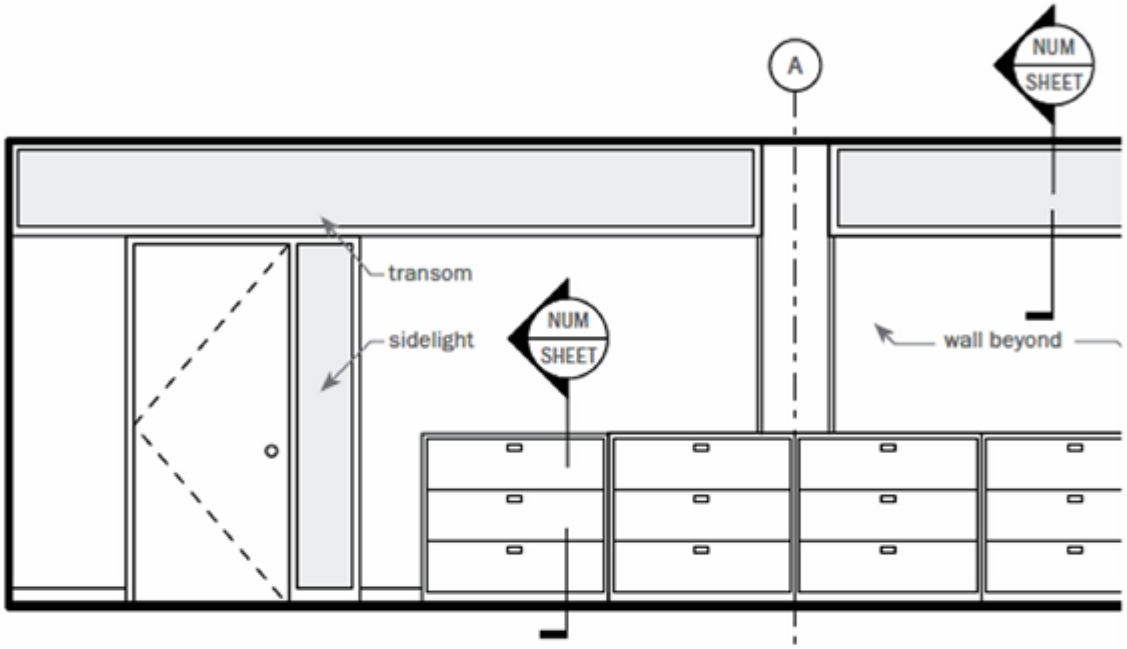
Wall Finish Plan

Wall finish plans, with a simple tagging system, provide the data for start and stop points of color, for materials such as wallpapers and other wall coverings like wood paneling, and for acoustic treatments.



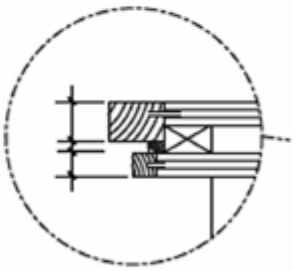
Interior Elevations

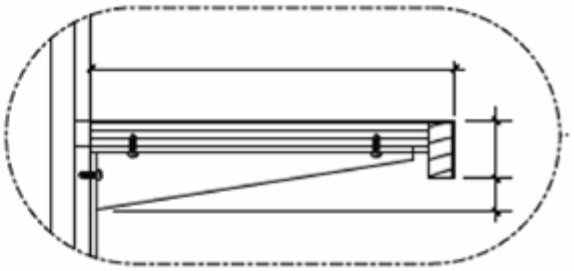
Elevations are typically drawn at a larger scale than the plans of a project. This allows for the inclusion of more detail, such as specific information about the dimensional and material qualities of objects in the interior. Elements on elevational drawings are cross-referenced to section and plan details that further develop the design. Here, cabinets, transoms, door and glazing details, and custom fixtures are highlighted.

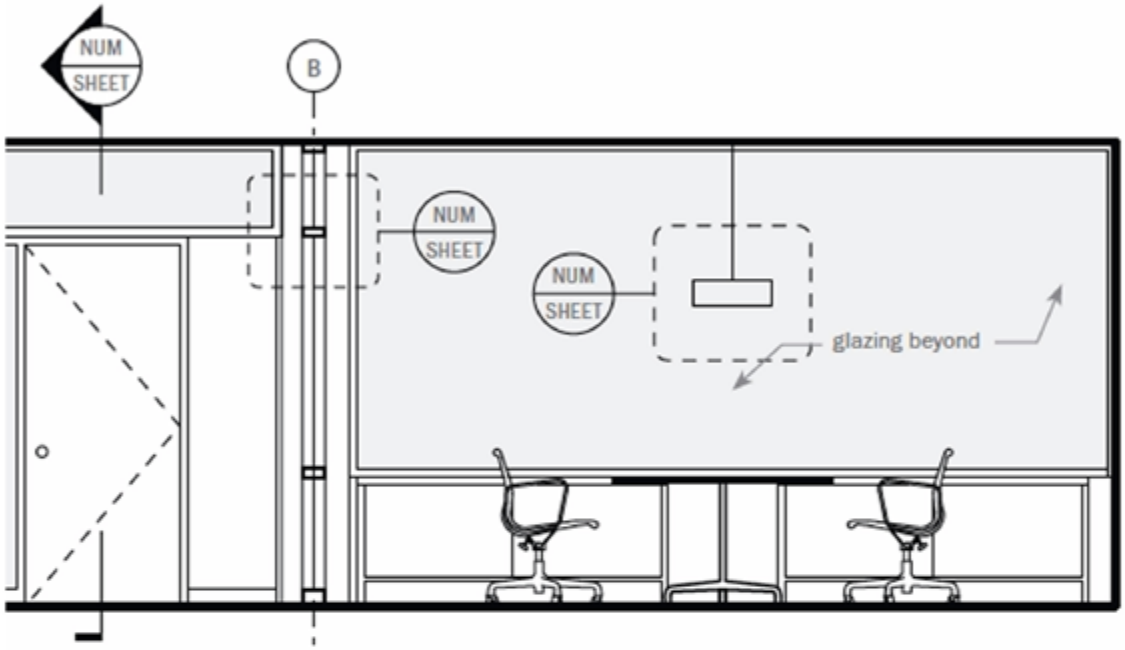


Details

Details indicate how the design is to be fabricated and range from wall sections to mechanical coordination details to millwork construction. They are produced at a larger scale than all other drawings in the set. Scales for details can be as small as ¼" = 1" (1:2) through to full scale. Occasionally, details are drawn at larger than full scale to transmit clearly the intent of the designer to the fabricator or contractor. In detail drawings, materials are rendered symbolically, and annotations specify the material and fabrication methods to be used.



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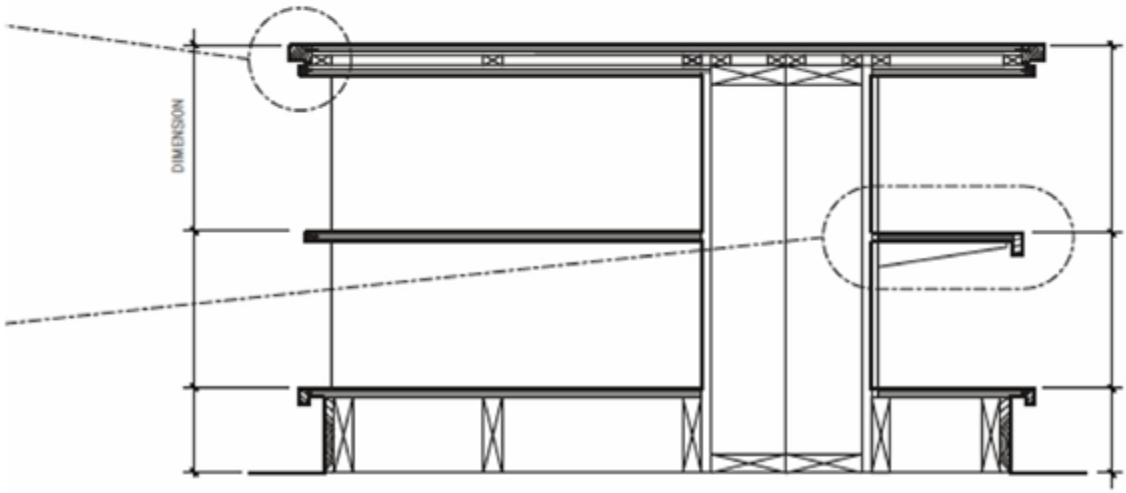
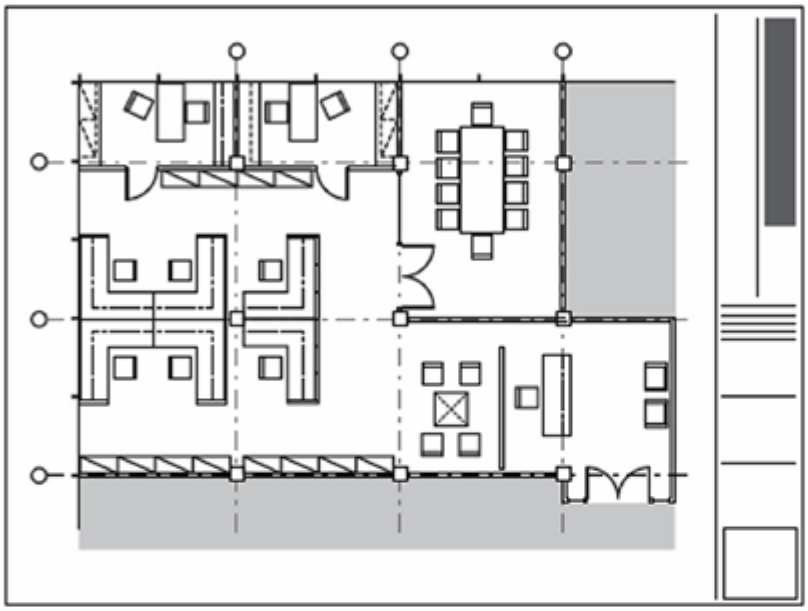
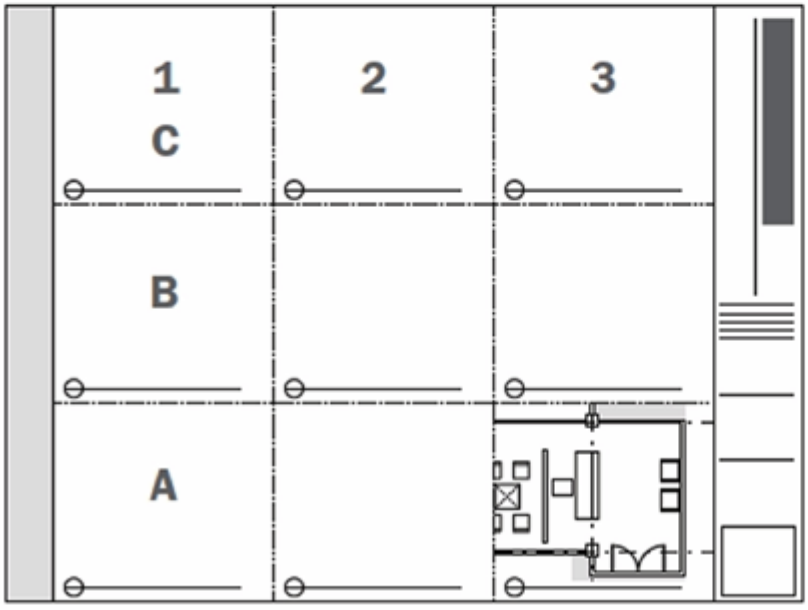

DIMENSION

DRAWING NAVIGATION

Single sheets are often used for overall plans, whether complete or partial. Multiple drawing sheets are typically used for elevations, details, and millwork drawings that require greater elaboration of the design intent and at a larger scale than plan drawings. These types of drawings are numbered by a coordinate system outlined at bottom.



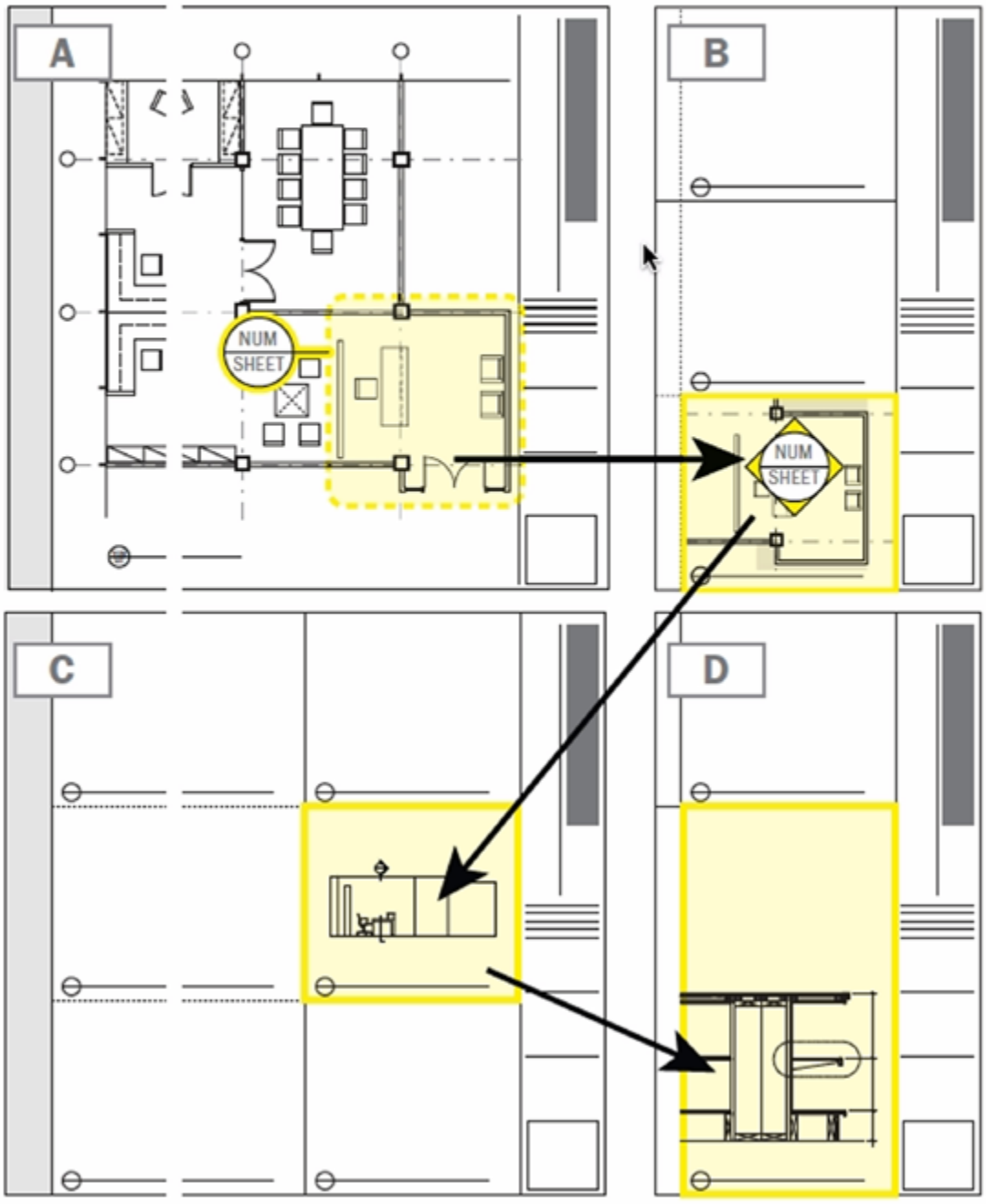
In interior practices, all floor plans, RCPs, and coordination plans that can fit on one sheet are drawn at the same scale, typically 1/16", 1/8", or 1/4" (1:200, 1:100, or 1:50).



When many types and scales of drawings are contained on a single sheet, their arrangement flows from bottom left to top right, and they are numbered in the manner shown. Cells, which contain single drawings, can be added to the sheet, but legibility is key to how many can fit comfortably on a sheet.

Chasing the Details

A typical sequence for following the links in a drawing set is illustrated below. A plan drawing (A) contains information regarding, among other things, an enlarged plan. Navigating to the cross-referenced sheet (B) indicates a further link to room elevations (C), which are marked with sectional information found on yet another sheet (D). As with the multidrawing sheet, the gridded coordinate system allows for more details to be easily added as necessary.



DRAWING ORDER

The order of drawings may vary from one design firm to another. For clarity and organization, the types of drawings that comprise an interior design set are numbered in sections that generally move from overall plans to specific details. After these drawings, consultants' sets should follow in a sequence similar to that listed below.

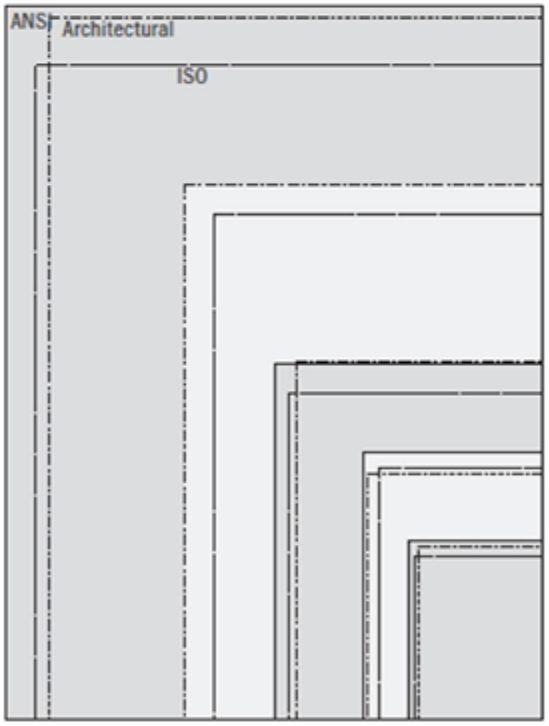
Section	Drawings	Purpose
	Cover Sheet	Gives project name and location and firm information
	Index Sheet	Outlines drawings in the set, abbreviations, etc.
	Site or Location Plan	Provides context for project
100	Demolition Plans	Outline extent of demolition (if required)
200	Floor Plans	Delineate new wall and opening locations
300	Reflected Ceiling Plans	Locate lighting and ceiling fixtures
400	Finish Plans	Specify finishes and finish locations
500	Furniture Installation Plans	Indicate furniture type and placement
600	Elevations	Locate heights of details and finishes
700	Wall Sections	Detail wall construction and classification
800	Millwork	Develop custom furniture designs
900	Details	Provide construction information

S	Structural	
Q	Equipment	
F	Fire Protection	
P	Plumbing	
M	Mechanical	
E	Electrical	

PAPER SIZES

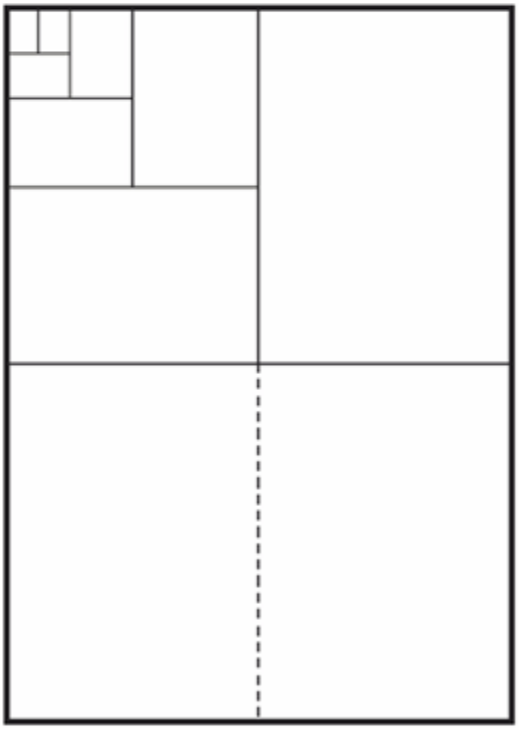
Various paper sizes are used for the presentation of a working set of drawings. In the United States, the common format is the architectural classification. Other formats include the engineering format ANSI (American National Standards Institute) and in Europe and elsewhere, the A-Series ISO 216 (International Organization for Standardization).

ANSI			Architectural			ISO 216		
	Inches	Millimeters		Inches	Millimeters		Inches	Millimeters
A	8.5 × 11	216 × 279	ARCH-A	9 × 12	229 × 305	A0	33⅛ × 46¾	841 × 1 189
B	11 × 17	279 × 432	ARCH-B	12 × 18	305 × 457	A1	23⅜ × 33⅛	594 × 841
C	17 × 22	432 × 559	ARCH-C	18 × 24	457 × 610	A2	16½ × 23⅜	420 × 594
D	22 × 34	559 × 864	ARCH-D	24 × 36	610 × 914	A3	11¾ × 16½	297 × 420
E	34 × 44	864 × 1 118	ARCH-E	36 × 48	914 × 1 219	A4	8¼ × 11¾	210 × 297



Relative Paper Sizes

The drawing above illustrates all of the paper sizes overlaid. The various ratios and sizes can be seen clearly.



The ISO 216 Series

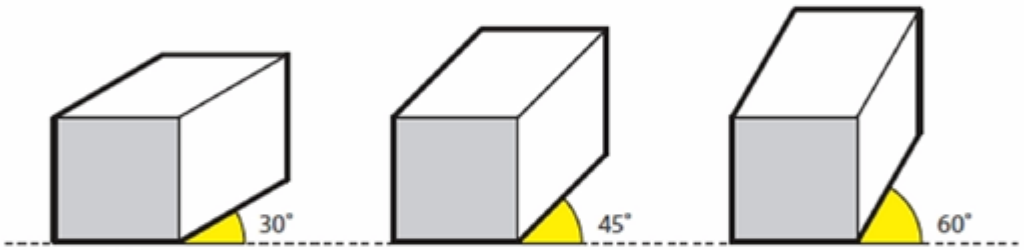
Each smaller paper size in the ISO series is derived by dividing in half the previous paper size parallel to its smaller side.

THREE-DIMENSIONAL DRAWING TYPES

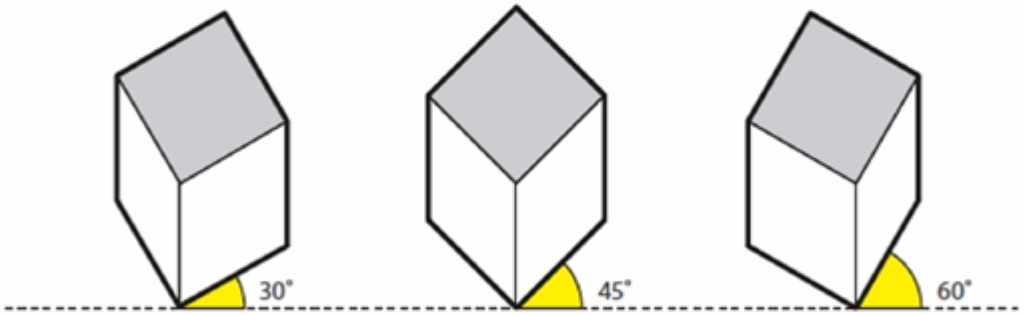
Three-dimensional drawings are used in interior projects to demonstrate aspects of the design that cannot be readily understood through two-dimensional representations. In general, three-dimensional drawings should clarify the intent of the design. In interiors, they can demonstrate and explain many aspects of a project: furniture details, color, finish, light, and shadow. Numerous types of three-dimensional drawings can be incorporated into a project, including paraline drawings—where all lines in the image remain parallel to each other—and perspective drawings—where lines converge to points on a horizon.

Paraline Drawings

Also known as axonometric, isometric, and oblique, paraline drawings are extremely useful to the designer as they represent the third dimension in ways that are parallel and measurable and combine plan, section, and elevation into a single drawing. The choice of angle will emphasize certain parts of the object; choosing the correct angle and projection method is essential to the success of the drawing as a communicative tool.



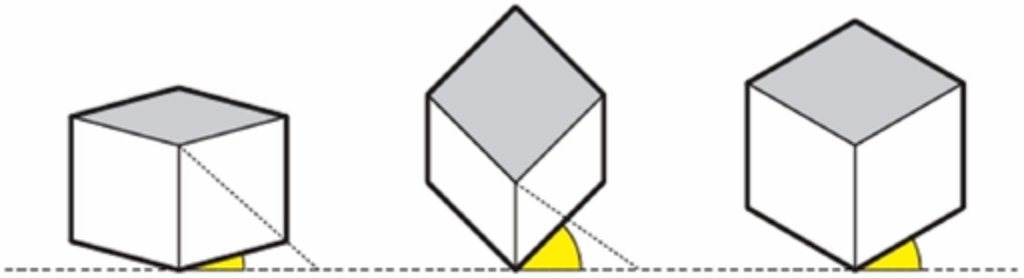
Elevation Obliques



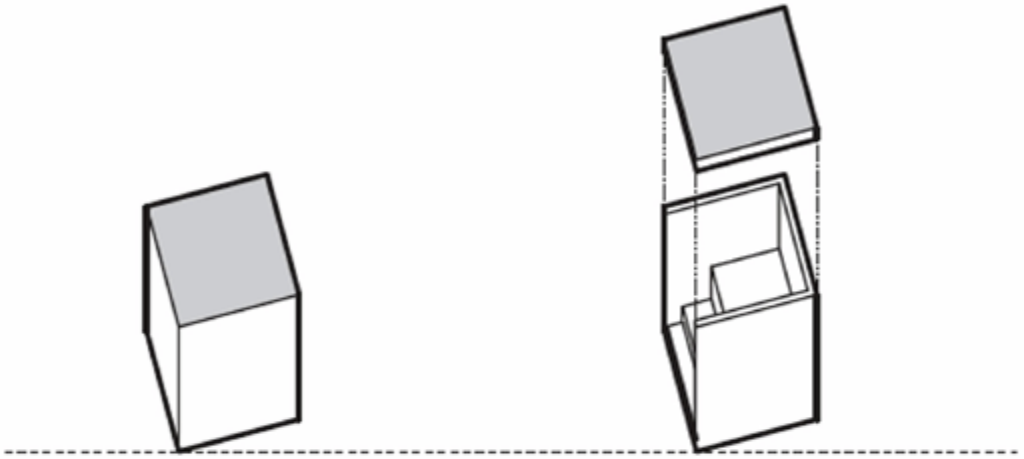
Plan Obliques

Oblique Projections

Oblique projections can be either plan- or elevation-based. Plan obliques allow for a true plan to be used in the construction of the drawing. The angle of view is also higher than in other projections. Elevation obliques draw a true elevation in the picture. For both, an angle is chosen to represent the volume of the object (usually 30 or 45 degrees), and the depth of the object is extruded from the picture plane. Oblique drawings often appear distorted and are compressed by a third or a half to restore proportion to the object.



Isometric and Dimetric



Trimetric

Exploded Axonometric

Isometric, Dimetric, and Trimetric Projections

Isometric, dimetric, and trimetric projections constitute the second classification of paraline drawings, and all are referred to as axonometric drawings. In these, the angles from which the object is viewed is lower than in obliques. Often, plans and sections cannot be used as the basis of the drawing, as there is inherent distortion in each projection. In an isometric projection, the three axes of the object are equal in angle to the picture plane and are foreshortened equally. Because of this equality, isometric projection is the most popular of the axonometric types. A dimetric projection foreshortens two axes and the third is either elongated or shortened to prevent distortion. In a trimetric drawing, all axes are foreshortened by different amounts.

On occasion, designers may prefer the exploded axonometric, a technique of pulling individual faces away from the object to reveal elements within. Key to the exploded axonometric drawing is the ability for the eye to reconstitute the complete object. Dashed lines are added to this drawing to indicate the direction and length to which the drawing has been taken apart.

Perspective Drawings

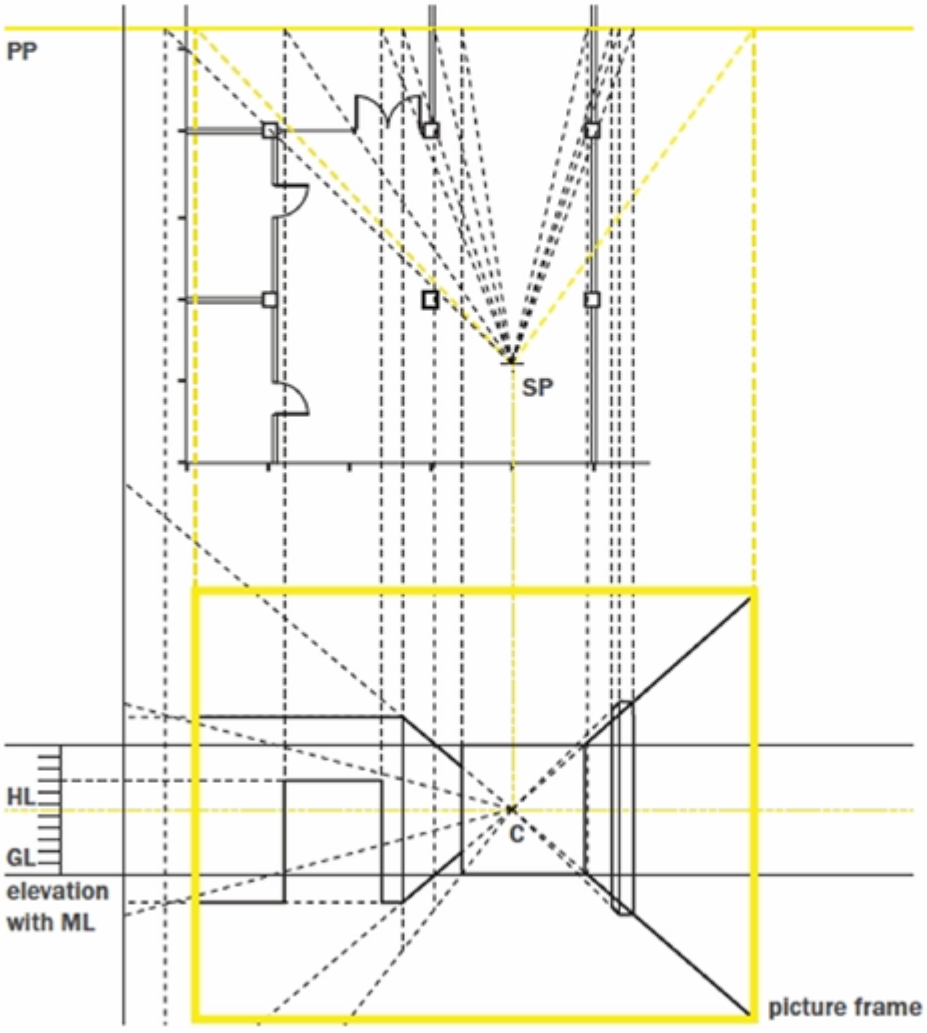
Interior perspective drawings do not differ in construction from their architectural counterparts, though their obvious focus on the interior makes the choice of reference point much easier. Care must be taken, however, not to distort the image by making the cone of vision too large an angle or the picture frame too wide.

Picture Plane (PP): Flat surface, always perpendicular to the viewer's center of vision, on which the image in perspective is projected.

Station Point, or eye point (SP): Locates the position and height of the viewer.

Horizon Line, or eye height (HL): Locates the horizon as established by the viewer's height; it is typically projected from the vertical measuring line (ML).

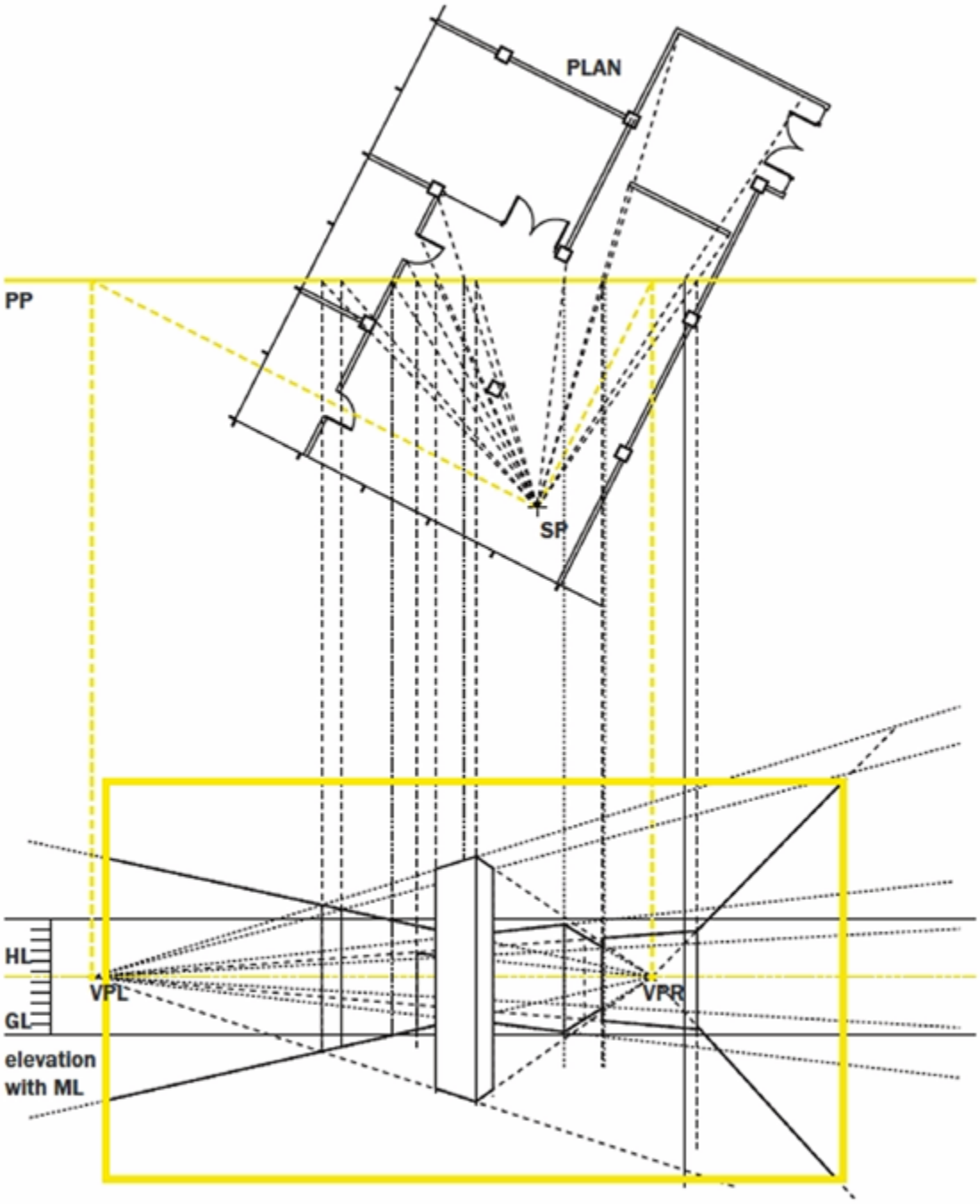
Ground Line (GL): Represents the intersection of the ground plane and the picture plane.



One-Point Perspective

Center of Vision (C): In a one-point perspective, a line perpendicular to the horizon line is drawn from the center of vision to establish the point to which all lines converge.

Vanishing Point (VP): Vanishing points in a two-point perspective are found by projecting lines parallel to each axis of the plan until they meet the picture plane. Lines are then projected perpendicular to the horizon line.



Two-Point Perspective