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evaluating floor plans and styles of older minnesota homes



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Three Queen Anne houses located in south Minneapolis and currently being restored.



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evaluating floor plans and styles of older minnesota homes

The most important variable influencing the liveability of a home is the design and layout of the floor plan. Even a house which is structurally and mechanically sound will be a source of dissatisfaction and conflict if the floor plan is deficient. If you are buying or remodeling an older home, become familiar with different floor plan features and learn to identify and remedy deficiencies.

Floor plan evaluation can be fun as well as worthwhile if you learn a few basic principles. The information presented in this folder will help you learn those principles and apply them to assess a wide variety of floor plans.

Age of the dwelling is not a major factor, except that the traditional features found in many older homes may not be compatible with the lifestyles of today's families. On the other hand, many homes constructed more recently have been designed and built for a hypothetical "average" consumer, and these speculative homes may not meet an individual's or family's unique requirements. It is important for home buyers to invest the time needed to thoroughly evaluate floor plans, keeping their own requirements in mind. An inexpensive home of poor design is a bargain only if it can be improved at a reasonable cost. Buyers of older homes should realize that both well planned, inexpensive homes and poorly planned, expensive homes can be found in every Minnesota community.

Remodelers face a slightly different challenge than buyers since, generally, remodelers have lived in the home for a period of time and have become familiar with plan deficiencies. Remodelers can take advantage of this situation and correct deficiencies before investing in redecorating (repainting, carpeting, etc.) which only superficially improves liveability.

Remodelers should realize that a building permit from the local community or county government is not only desirable but legally required in Minnesota before making any structural changes or doing any major remodeling. Local inspectors can tell the remodeler if a permit is needed to comply with a local housing code, a local zoning code, or the state building code. Since these codes are designed as guidelines for safety and a minimum level of quality, they must be followed. **REMEMBER, FOR YOUR OWN PROTECTION, ALL MAJOR HOME IMPROVEMENTS SHOULD BE STARTED ONLY AFTER A PERMIT IS OBTAINED.**

PLAN REQUIREMENTS

To evaluate a home's floor plan, it is necessary to look beyond an initial reaction to appearance. Interior decoration, wall color, flooring materials, and window treatment all are items that can be easily and relatively inexpensively changed to fit your personal tastes. A poorly designed floor plan, however, has an undesirable influence on the liveability of the home and generally will be more difficult and expensive to change.

A well designed floor plan reflects a "common sense" arrangement of interior space. This arrangement is not simply a combination of rooms and hallways. A well designed floor plan includes: 1) a clustering or concentration of rooms in which related activities occur, 2) adequate room sizes and proportions, 3) areas linked by efficient traffic or circulation paths, 4) well placed windows, and 5) adequate storage facilities. A discussion of these five points follows.

Distinct Area Separation

It is more efficient for similar types of activities to be concentrated within a single area than spread throughout the entire house. A well designed floor plan separates interior space into three distinct, concentrated areas: work, public, and private. In this way, a family may carry out three quite different activities simultaneously without conflicting with each other. For example, guests can be entertained in the public area while dirty dishes and unwashed clothes are piled in the work area and while another family member sleeps in the private area. In further detail, the three areas are:

WORK AREA — the space within the home where food preparation and cleanup, laundering, household financial management (e.g. paying bills), and similar maintenance activities occur. This area includes rooms such as the kitchen, office, and laundry.

PUBLIC AREA — the space within the home where family interaction, entertaining, and similar social activities occur. Commonly included are rooms such as living, family, dining rooms, and porches.

PRIVATE AREA — the space within the home where reading, serious study, sleeping, bathing, dressing,

and other quiet or personal activities occur. Commonly included are bedrooms, bathrooms, and studies or dens.

The type of separation between areas occurring in well designed floor plans is two-fold:

VISUAL SEPARATION — through the use of walls, doors, and other screening devices.

ACOUSTICAL SEPARATION — through the use of sound deadening materials and construction methods (e.g. carpeting; acoustical ceiling tile; double studded, insulated interior walls; storage closets placed as buffers; acoustical ceiling clips; change in floor level; etc.).

Remember, a good floor plan: 1) concentrates rooms into three distinct areas — work, public, and private; and 2) separates these visually and acoustically. Diagrams 2 through 5 illustrate both good and poor area separation.

Adequate Room Sizes and Proportions

A well designed floor plan includes rooms of adequate size and proportion. What is adequate is determined by the furnishings, equipment, and/or activities planned for the room. Home economics research has produced minimum space standards for a substantial number of household activities. Some of these standards include:¹

BEDROOM

- make bed 22 inches
- clean under bed 48 inches
- space to use dresser 40 inches
- space to use closet 36 inches

Thus, a bedroom with a twin bed (3 feet 3 inches by 6 feet 10 inches), a dresser (1 foot 6 inches by 3 feet 3 inches), and a minimal closet could be accommodated in approximately 90 square feet.

KITCHEN

- work space in front of appliance and counters 38 inches
- work space in front of front opening dishwasher 42 inches
- distance between refrigerator, sink, and range (work triangle) 10 to 22 feet

DINING ROOM

- rising from chair at table 32 inches
- edging past person seated at table 36 inches

LIVING ROOM

- easy conversation from one seating area to another 8 feet (maximum)

Most of these research findings have been translated into lower space standards required by codes such as the U. S. Department of Housing and Urban Development Minimum Property Standards (HUD-MPS) for new construction. These code requirements, however, have not been applied to the vast majority of Minnesota's existing homes. Buyers, therefore, should expect considerable variation in room sizes.

Just as important as room size is proportion. It is widely accepted, for example, that rectangular rooms are the easiest to furnish and most usable when proportions are within the following ranges:

- minimum of 1.0 to 1.2 — for example, 5 by 6 feet, 10 by 12 feet, 12 by 15 feet
- maximum of 1.0 to 1.8 — for example, 5 by 9 feet, 10 by 18 feet, 12 by 20 feet

Efficient Circulation

A well designed floor plan also must include efficient circulation or traffic paths into the house and between the three activity areas. A good circulation pattern permits the easy movement of family members and guests, with a minimum of interference into the activities of others. The key parts of a circulation system are:

ENTRANCE PLACEMENT — The exterior doors of a home should be located to provide direct access from: 1) the guest approach (drive, sidewalk) and entrance (front door) to the public area of the home; 2) the garage and exterior work areas (back door and/or garage door) to the work areas of the home; and, perhaps, 3) private entrances to private areas within the home — bedrooms, a separate apartment, a home office, and so on.

HALLWAYS — A minimum amount of space should be provided to link the entrances with appropriate areas and to provide movement between the areas of the floor plan. Hallways should provide visual and acoustical separation between areas. For example, a direct view into the bathroom, kitchen (sink area), and laundry from the living room or guest entrance is not desirable. Furthermore, hallways should be designed to permit movement of furniture, appliances, and wheelchairs, if necessary (3 feet is normal minimum, 4 feet for wheelchairs). Where circulation through a room is necessary (e.g., from the front door through the living room to a hallway), it is undesirable to cross the room diagonally.

STAIRWAYS — Circulation between levels in a home should be accomplished in a minimum amount of space while providing a high degree of safety. Thus, stairways should be at least 3 feet

¹Examples partly adapted from *Selecting the Plan* (no date) prepared by C. J. Combrink, Florida Cooperative Extension Service, University of Florida, Gainesville, Florida.

wide, have slip resistant treads² (steps) with a uniform depth of 9 or more inches, have risers between the treads with a uniform dimension of 8 or fewer inches, and have safe, secure hand-rails. The following types of stairway situations are undesirable:

- exterior stairways, due to snow and ice accumulation problems.
- circular stairways providing the only access to another level, which would make moving furniture difficult.
- a single step between rooms or at entrances, making perception of changes in levels difficult.
- a doorway opening onto the top of a stairway.
- windows or doors located directly at the bottom of a stairway.

Remember, a good floor plan will: 1) locate entrances near the appropriate area of the plan in order to reduce the need for circulation space; and 2) provide direct, simple, and safe circulation between areas of the home in order to minimize circulation through rooms. Diagrams 2 through 5 illustrate plans with both good and poor circulation.

Well Placed Windows

A well designed floor plan includes windows which: 1) take advantage of views, 2) provide maximum natural light and minimum winter heat-loss and summer heat-gain, 3) provide maximum natural ventilation, 4) permit a variety of furniture arrangements, 5) provide maximum safety and security, and 6) are attractively placed from the exterior point of view.

ADVANTAGE OF VIEWS — Windows in many older homes overlook busy, noisy streets. If remodeling, it often is desirable to orient major glass areas toward the rear yard or to create an interesting landscape barrier of varied plantings between the windows and unattractive features of the location.

MAXIMUM NATURAL LIGHT AND MINIMUM HEAT-LOSS — A well oriented home will generally have the largest amount of glass area on the south side and the least on the west and north exposures. If west and north windows are necessary, wind breaks should be established to reduce winter heat-loss and summer heat-gain. Certain types of windows, such as jalousie windows, result in excessive heat-loss.

MAXIMUM NATURAL VENTILATION — Window placement should permit the maximum amount of

natural ventilation. For example, in corner rooms windows should be located as far from the exterior corners as possible to permit effective "cross-ventilation." Certain types of windows, such as casement and awning windows, allow for maximum ventilation.

VARIETY OF FURNITURE ARRANGEMENTS —

Generally it is more aesthetically desirable to have windows concentrated together on a wall rather than spread with short wall sections between. Some windows, such as hinged windows which swing inward, create additional problems for furniture placement and draperies.

MAXIMUM SAFETY AND SECURITY — The placement of glass areas should reflect concern for safety and security:

- Avoid windows at the bottom of any stairway.
- Avoid windows over kitchen ranges, due to fire hazards.
- Avoid windows over bathtubs, due to cold down-drafts and the necessity of stepping into the tub to clean or open and close the windows.
- Avoid high, ribbon-types of windows which may make escape in case of fire difficult.
- Avoid glass areas adjacent to doors, since they invite break-ins.
- Use reliable window locks to make break-ins less likely.

EXTERIOR APPEARANCE CONSIDERATIONS — In addition to the primarily interior considerations listed above, a well designed home will have windows which look attractively placed from the outside of the house. Windows should be the same size, style, and proportion with generally no more than one variation per exterior wall, and spaced to create visual balance.

Efficient Storage

A well designed home has adequate specialized and general storage. Specialized storage includes space for storage of items near their point of use. Efficient storage includes:

- guest entrance closet.
- bedroom clothes closets at least 24 inches deep and with at least 4 feet of rod space for each family member (note — HUD-MPS require only 2½ feet of rod space in double occupancy bedrooms; more is desirable).
- kitchen storage with at least 6 linear frontage feet (10 feet more desirable) of base cabinets and an equal amount of wall cabinets.
- bathroom linen and safe medicine storage.
- utility area storage for laundry and cleaning supplies and equipment.

²Slip resistant treads would include: tightly woven attached carpeting; unwaxed and unglazed tile; unwaxed linoleum; and wood.

- exterior storage for lawn equipment (may be in garage if large enough).

General storage also should be available for out-of-season clothes, sports equipment, holiday decorations, and other articles not used on a daily or weekly basis.

Unique Needs and Desires of the Family

Each family has different housing needs and desires which modify the need for meeting the critical plan

requirements just reviewed. Give these needs and desires special consideration before the buying search or remodeling planning process is seriously begun. Self-assessment questions presented in diagram 1 are typical of the types of considerations each family should make in terms of its unique physical, social, and psychological needs.

When you review the strengths and weaknesses of the plans illustrated in diagrams 2 through 5, consider how seriously these characteristics would influence *your* family.

DIAGRAM 1: Self-Assessment of Relative Unique Needs for Housing

CONSIDERATIONS

Circle number that best applies to your family

Physical

Is any family member limited or likely to be limited in the future by any physical condition?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: avoid stairs, seek kitchens and bathrooms requiring minimum physical energy.
 If 4 or 5: multi-level floor plans and greater maintenance requirements are more acceptable.

Is the size and composition of the family likely to change in the near future?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: if increasing, seek expandable home, perhaps with unfinished space; if decreasing, consider undersized home or one which can be subdivided.
 If 4 or 5: seek house to accommodate current and desired activities.

Social

To what extent do family members entertain others at home?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: seek house with greater proportion of space devoted to public area.
 If 4 or 5: seek house with greater proportion of space devoted to private area.

To what extent do family members enjoy doing things together at home?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: seek house with greater proportion of space devoted to public area.
 If 4 or 5: seek house with greater proportion of space devoted to private area (including hobby space).

Psychological

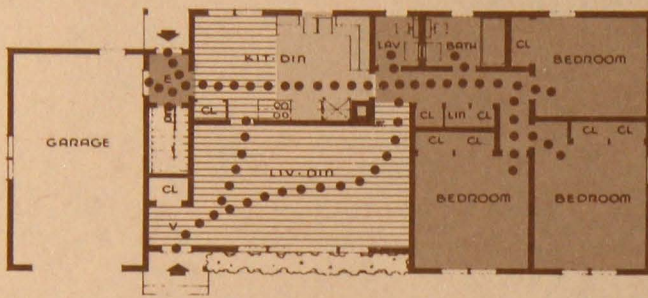
To what extent do family members enjoy pursuing individual activities which are not compatible (e.g. serious reading versus playing "hard rock" music; woodworking versus sewing)?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: seek house with excellent visual and acoustical space separation.
 If 4 or 5: space separation is less critical.

To what degree is individual privacy important for intimate relations, bathing, dressing, sleeping, reading, studying, dreaming, thinking, and so on?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 Very much Not very much
 If 1 or 2: seek house with excellent visual and acoustical space separation.
 If 4 or 5: space separation is less critical.

DIAGRAM 2



Assessment key
 [Hatched box] Public area
 [Light grey box] Work area
 [Dark grey box] Private area
 [Dotted line] Circulation

DIAGRAM 2

Area separation and concentration — Moderately adequate visually (entire kitchen visible from dining room and lavatory visible from living room); no apparent acoustical barrier between public and private areas.

Room size and proportion — Generally adequate; dining area in kitchen minimal size.

Circulation — Front entrance placement creates undesirable diagonal circulation across living room and conflicts with dining area, thus reducing the utility of the living room and dining area; front entrance is not visually separate from living room; rear entrance placement creates circulation through kitchen work triangle; rear entrance area size is marginal in regard to the number of door openings; if public (e.g. recreational) space is provided in basement, circulation is necessary from living room through dining and rear entrance areas; circulation from bedrooms to laundry (basement) is excessive and involves stairs.

Window placement — Reasonable cross ventilation achieved; visual orientation unknown, and may be questionable if house faces busy street or west.

Storage — Generally adequate; rear entrance closet marginal in location.

DIAGRAM 3

Area separation and concentration — Excellent visual and acoustical separation between first floor public and second floor private areas; fair acoustical separation between first floor private area and living room (if front and rear bedroom-bath arrangement were reversed, acoustical separation would be improved); poor separation between public (dining) and work (kitchen) areas.

Room size and proportion — Second floor bedroom excessive in size compared to living room; first floor bath wastes space (if rearranged, additional storage or half bath would be possible).

Circulation — Front entrance placement creates undesirable diagonal circulation across living room and is not visually separated from the living room; rear entrance placement creates undesirable circulation through kitchen work triangle; circulation from living room to dining room and from living room to public space in basement (e.g. recreation) must pass through kitchen work triangle and is, therefore, undesirable; bedroom to laundry (basement) circulation is excessive and may involve up to two flights of stairs; placement of stairway to second floor prohibits efficient use of second floor space (i.e. additional bedroom impossible).

Window placement — Reasonable cross-ventilation achieved on first floor, marginal cross-ventilation on second floor; visual orientation unknown, may be questionable if house faces busy street; no apparent sun orientation.

Storage — Generally adequate; good relationship between closets and entrances.

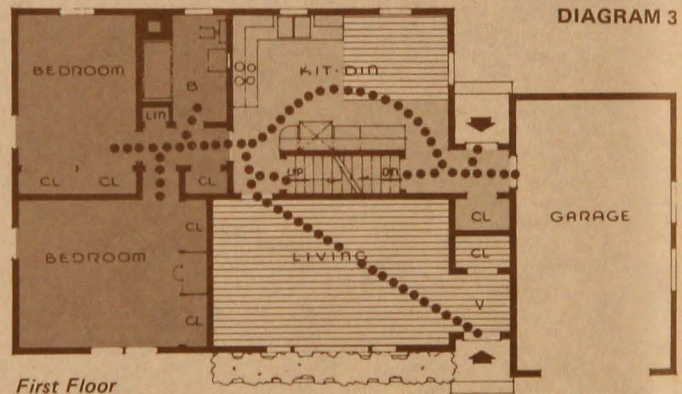
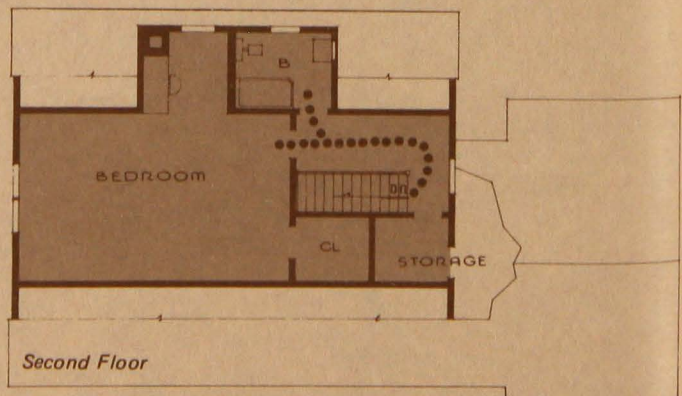


DIAGRAM 3

First Floor

Assessment key
 [Hatched box] Public area
 [Light grey box] Work area
 [Dark grey box] Private area
 [Dotted line] Circulation



Second Floor

DIAGRAM 4

Area separation and concentration — Excellent overall public-private separation; private-work concentration in first floor bathroom undesirable (unless laundry equipment screened); poor separation between living room and dining-family room makes simultaneous use for different activities extremely difficult; bathroom visible from front entrance.

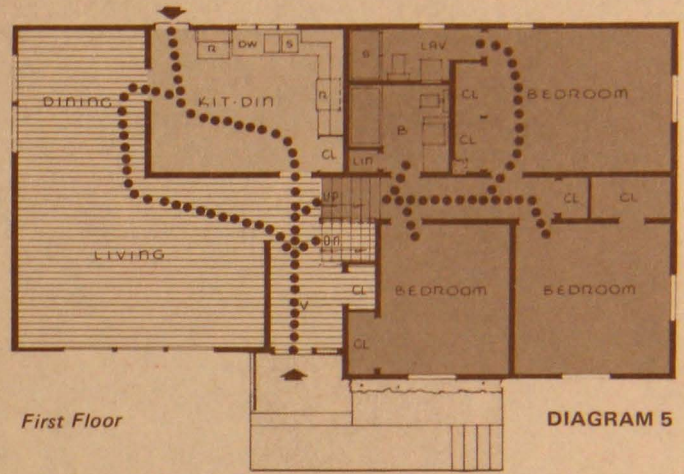
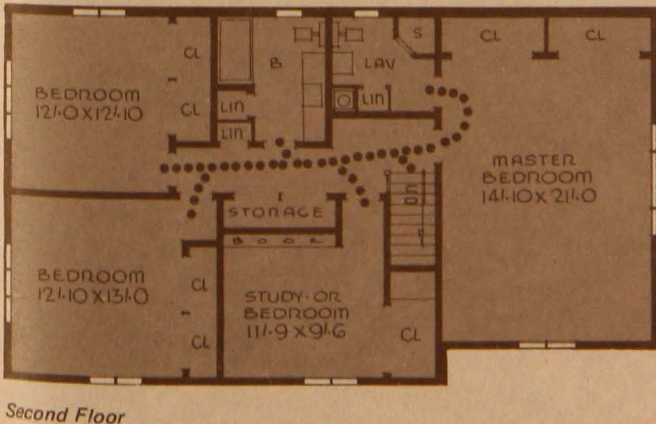
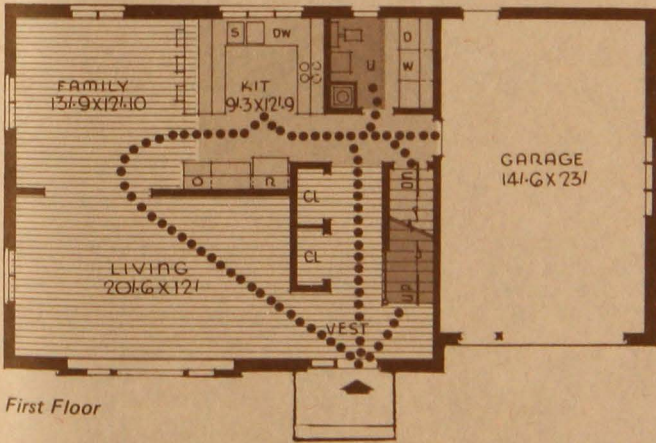
Room size and proportion — Generally adequate although usable space in first floor dining-family room is greatly reduced by circulation pathways and kitchen counter.

Circulation — Front entrance placement eliminates most diagonal living room circulation; front entrance is visible from living room (to remedy, shift closet toward door); laundry-kitchen circulation is excessive and involves stairs; occasional, undesirable circulation through kitchen work triangle; good circulation from living room to basement recreational space (if any); lack of direct access to rear yard limits use (e.g. for entertaining friends, serving refreshments).

Window placement — Good cross ventilation achieved wherever possible; visual and sun orientation unknown and not apparent.

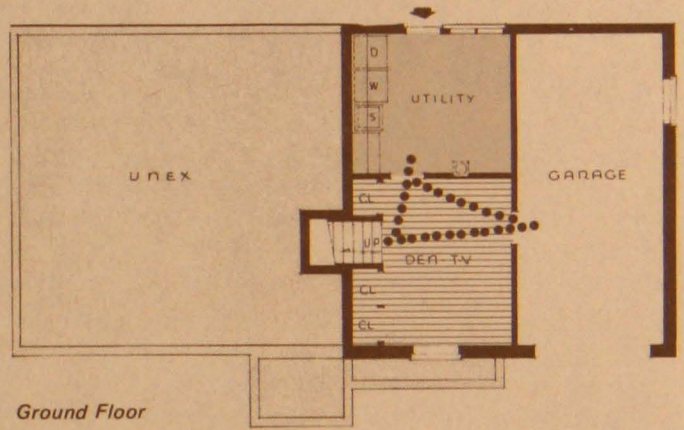
Storage — Generally adequate; closet near front entrance is good, while closet near rear entrance is fair.

DIAGRAM 4



First Floor

DIAGRAM 5



Ground Floor

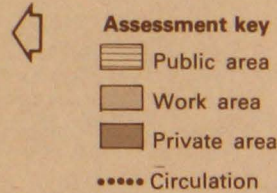


DIAGRAM 5

Area separation and concentration — Basically excellent visual and acoustical separation between public and private areas; bathroom, however, is visible from living room; marginal separation between utility room and den.

Room proportion and size — Generally adequate although ground floor circulation reduces usable space in utility room and den; garage width marginal.

Circulation — Front entrance visually separated from living room and eliminates most diagonal circulation; kitchen and bedroom circulation to laundry necessitates stairs; garage to kitchen circulation (e.g. for groceries and garbage) necessitates stairs and is excessive; circulation through center of den is extremely poor; rear entrance into kitchen is marginal and causes

diagonal circulation across kitchen; however, it does provide direct access to rear yard (e.g. for entertaining and other forms of outdoor living); exterior sidewalk stairs are undesirable due to snow and ice build-up (problem may be intensified by roof run-off).

Window placement — Cross ventilation achieved when possible; visual and sun orientation unknown and not apparent.

Storage — Generally adequate except for kitchen (base and wall cabinet space may be insufficient); no rear entrance closet. (If utility room also used as sewing or hobby area, more storage space is desirable.)

PLAN ASSESSMENT METHODS AND TECHNIQUES

With an understanding of critical plan requirements and the family's unique needs, it is possible to effectively analyze floor plans using several different methods and techniques including: rule of thumb size method, comparative space method, activity-space method, and overlay technique. Each method or technique has a different degree of effectiveness depending on your particular situation.

Rule of Thumb Size Method

The easiest way to evaluate an existing or remodeled floor plan is to use the minimum sizes recommended for various rooms (see diagram 6).

These standards are based upon a limited amount of research concerning space required for "typical" types of furnishings and activities. They do not, however, reflect the family's special needs nor the adequacy of area separation, circulation pathways, room proportion, or layout. Thus, the rule of thumb method should be used in combination with other plan assessment methods and the overlay technique.

Comparative Space Method

For a family that has lived together for a period of time, the comparative space method is a relatively easy and moderately effective procedure for evaluating floor plans (see diagrams 7 and 8). It simply involves analyzing the adequacy of space the family has now and the degree to which more or less space would be available in the remodeled house, or in another house, if buying. The effectiveness of this method rests upon its reflection of family activities and furnishings. The weakness of this method, however, is that it is based primarily upon the family's housing experience. Since most families move or remodel relatively few times, they encounter the strengths and weaknesses of only a few plans. Consequently, a family using only this method may trade the existing inadequacies of one home for a new set of inadequacies in another home. This limitation may be overcome, however, by serious application of the overlay technique of plan assessment.

DIAGRAM 6: Rule of Thumb Size Method of Plan Assessment (HUD-MPS Minimum Square Feet by Number of Bedrooms)

Room	Two bedroom	Three bedroom	Four bedroom	Minimum width or length	Assessment of proposed plan (compare)
Living room (LR)	160	170	180	11'0"	_____
Dining room (DR)	100	110	120	8'4"	_____
Combined LR/Dining area (DA)	210	230	250	NG*	_____
Kitchen (KIT)	NG*	NG*	NG*	NG*	_____
Combined KIT/DA	120	140	160	NG*	_____
Combined KIT/LR	270	300	330	NG*	_____
Master bedroom	120	120	120	9'4"	_____
Other bedrooms	80	80	80	8'0"	_____
Bathrooms	NG*	NG*	NG*	NG*	_____
Den, family room, etc.	80	80	80	8'0"	_____

* NG indicates not given.

SOURCE: — HUD *Minimum Property Standards, One and Two Family Dwellings*, U.S. Department of Housing and Urban Development, U.S. Government Printing Office, Washington, D.C. 1973.

— HUD-MPS standards do not give overall minimum sizes for:

- kitchens, although they do present minimum standards for counter and cabinet dimensions. Some individuals accept the following dimensions for kitchens: 60 square feet (for a house under 1,000 square feet); 70 square feet (for a house with 1,000 to 1,400 square feet); and 80 square feet (for a house with over 1,400 square feet).
- bathrooms, although they do present minimum requirements for the size of fixtures. It is generally accepted that 35 square feet is the minimum required for a full bath, and 20 square feet for a half bath.

DIAGRAM 7: Comparative Space Method of Plan Assessment — Size

Room or area	Size (enter)	PRESENT HOME — ADEQUACY OF SIZE (CIRCLE) (1=too small or none) (3=about right) (5=too large)					Size (enter)	PROPOSED HOME OR PLAN — ADEQUACY OF SIZE (CIRCLE) (1=too small or none) (3=about right) (5=too large)				
		1	2	3	4	5		1	2	3	4	5
Living room	_____	1	2	3	4	5	_____	1	2	3	4	5
Family room	_____	1	2	3	4	5	_____	1	2	3	4	5
Dining room	_____	1	2	3	4	5	_____	1	2	3	4	5
Kitchen	_____	1	2	3	4	5	_____	1	2	3	4	5
Laundry/utility	_____	1	2	3	4	5	_____	1	2	3	4	5
Main bathroom	_____	1	2	3	4	5	_____	1	2	3	4	5
Bathroom 2	_____	1	2	3	4	5	_____	1	2	3	4	5
Bathroom 3	_____	1	2	3	4	5	_____	1	2	3	4	5
Bedroom 1	_____	1	2	3	4	5	_____	1	2	3	4	5
Bedroom 2	_____	1	2	3	4	5	_____	1	2	3	4	5
Bedroom 3	_____	1	2	3	4	5	_____	1	2	3	4	5
Bedroom 4	_____	1	2	3	4	5	_____	1	2	3	4	5
Office or den	_____	1	2	3	4	5	_____	1	2	3	4	5
Garage	_____	1	2	3	4	5	_____	1	2	3	4	5
Other	_____	1	2	3	4	5	_____	1	2	3	4	5
Total number of 1's_____							1's_____					
2's_____							2's_____					
3's_____							3's_____					
4's_____							4's_____					
5's_____							5's_____					

NOTE: For a family which is likely to grow smaller in the immediate future, it is generally more desirable to have a greater number of 1's and 2's circled. The opposite is true for a family that is likely to grow larger in the immediate future. This method also may be used to assess the adequacy of space separation, circulation, window placement, storage, and so on, as illustrated in diagram 8.

Diagram 8: Comparative Space Method of Plan Assessment — Features

Feature	PRESENT HOME — ADEQUACY (CIRCLE) (1=very adequate) (3=so-so) (5=very inadequate)					PROPOSED HOME OR PLAN — ADEQUACY (CIRCLE) (1=very adequate) (3=so-so) (5=very inadequate)						
	1	2	3	4	5	1	2	3	4	5		
Area separation and concentration												
• Distinct visual separation	_____	1	2	3	4	5	_____	1	2	3	4	5
• Distinct acoustical separation	_____	1	2	3	4	5	_____	1	2	3	4	5
• Related areas grouped together (kitchen near dining room, etc.)	_____	1	2	3	4	5	_____	1	2	3	4	5
Circulation												
• Guest entrance to public area	_____	1	2	3	4	5	_____	1	2	3	4	5

Diagram 8: (continued)

Feature	PRESENT HOME — ADEQUACY (CIRCLE) (1=very adequate) (3=so-so) (5=very inadequate)					PROPOSED HOME OR PLAN — ADEQUACY (CIRCLE) (1=very adequate) (3=so-so) (5=very inadequate)						
	1	2	3	4	5	1	2	3	4	5		
● Service entrance to work area	_____	1	2	3	4	5	_____	1	2	3	4	5
● Private entrance to off., apt., etc.	_____	1	2	3	4	5	_____	1	2	3	4	5
● Hallways between areas	_____	1	2	3	4	5	_____	1	2	3	4	5
● Stairways	_____	1	2	3	4	5	_____	1	2	3	4	5
Window placement												
● Advantage of views	_____	1	2	3	4	5	_____	1	2	3	4	5
● Natural maximum light	_____	1	2	3	4	5	_____	1	2	3	4	5
● Minimum heat-loss	_____	1	2	3	4	5	_____	1	2	3	4	5
● Maximum natural ventilation	_____	1	2	3	4	5	_____	1	2	3	4	5
● Adequate security	_____	1	2	3	4	5	_____	1	2	3	4	5
● Furniture arrangement	_____	1	2	3	4	5	_____	1	2	3	4	5
● Exterior appearance	_____	1	2	3	4	5	_____	1	2	3	4	5
Storage												
● Guest entrance	_____	1	2	3	4	5	_____	1	2	3	4	5
● Bedrooms	_____	1	2	3	4	5	_____	1	2	3	4	5
● Kitchens	_____	1	2	3	4	5	_____	1	2	3	4	5
● Bathroom	_____	1	2	3	4	5	_____	1	2	3	4	5
● Utility area	_____	1	2	3	4	5	_____	1	2	3	4	5
Total number of 1's_____						1's_____						
2's_____						2's_____						
3's_____						3's_____						
4's_____						4's_____						
5's_____						5's_____						

Activity-Space Method

The most effective but also most time-consuming method of plan assessment involves profiling the individual and joint activities and interests of household members and space features needed to perform them (see diagram 9). This requires that each member lists the activities he/she presently carries out in the home, with whom the activities are involved, and the importance and frequency of the activities. This method also requires that members list interests they presently desire but do not carry out or find difficult to carry out because of existing conditions.

The more carefully each household member profiles his/her views of activities, the more effectively each can be involved in the decision-making process. For this reason, it is suggested that diagram 9 be copied and each household member be asked to complete his/her own assessment. Following this individual

assessment, the household should sit down as a group and translate the individual assessments into a single priority list of:

- "Requirements" — features necessary for convenience, health, and comfort.
- "Must have's" — very important, very desirable features of the home.
- "Wishes" — important, desirable features which may be traded off.

The major limitations of this method include: 1) many households have difficulty allowing members to share in the responsibilities of decision-making; and 2) the method itself does not guarantee that the household will not buy another house or remodel the present home with adequate consideration of area separation, circulation, and window placement. This latter limitation, however, may be overcome by using the overlay technique described on pages 13 and 14.

DIAGRAM 9: Activity-Space Method of Plan Assessment

Activity or Interest	Who	Private	Shared w/Family	Shared w/Others	Importance	Desirable House Features
(e.g.) woodcarving	Joan	usually	seldom	seldom	so-so	well-lighted, screened-off shop
(e.g.) entertaining, dining	Mary, Dave	no	sometimes	usually	so-so	space for 10 at oval table
(e.g.) take out garbage	shared	no	always	no	required	kitchen door to garage

Overlay Technique

To effectively analyze space separation, circulation, window placement, and storage in a floor plan, it is desirable to use an overlay technique as illustrated in diagram 10. This technique is very simple, quite effective, and complements the plan assessment methods previously listed. The overlay technique involves the following procedure:

Materials needed: five colored pencils; one good ruler; several sheets of ¼-inch squared paper and transparent tracing paper; and a roll of drafting tape (similar to masking tape) available from any stationary store.

STEP 1 — Obtain a floor plan of the house to be purchased or the house as it would look after remodeling. If an existing floor plan is not available, the following alternatives exist:

- if buying, make a rough sketch of room layout, window and door placement, number of stair treads, and other factors; obtain approximate room dimensions from the agent’s or seller’s listing sheet; and use ¼-inch squared paper to draw a scaled floor plan.
- if remodeling, carefully measure the interior size and location of rooms, doors, windows,

plumbing fixtures, heating equipment, and other features; carefully measure exterior dimensions to check interior measurements; use ¼-inch squared paper to draw a scaled floor plan; and use a single transparent overlay for each remodeling plan alternative.

STEP 2 — Test plan for space separation. Using a piece of tracing paper over the scaled plan and colored pencils, draw in the boundaries of the public, private, and work areas.

STEP 3 — Test plan for circulation. Using the tracing paper and colored pencils, draw in public, private, and work circulation. For example, on the paper, trace circulation paths to accomplish the following: (public) meet guests at entrance and move to nearest coat closet, dining room, living room, and family room; move guest to bathroom; (private) route children to bathroom from outside and from bedrooms; (work) carry groceries from car to kitchen, garbage from kitchen to exterior.

STEP 4 — Test plan for window placement. Using the tracing paper and a colored pencil, indicate general ventilation flow, views, and sunlight. Use another colored pencil to indicate areas where furniture placement may be difficult due to window placement.

STEP 5 — Test the plan for storage. Using a colored pencil, indicate on the tracing paper the location and amount of storage including guest entrance closet, service entrance closet, bedroom clothes closet, linen storage, and so on.

STEP 6 — Refer to the household's activity-space priorities (diagram 9) and determine to what degree the plan complements those priorities. Will the plan bring members together in joint activities and yet maintain the separation desired to pursue individual private activities? Will the plan allow flexibility of furnishings and equipment desired by members as well as adequate circulation? When households find it difficult to achieve the degree of space separation desired, there are at least two alternatives: 1) look for another house or plan which "fits" better or 2) attempt to manage conflicting activities by separating them according to time rather than according to space (requires communication, respect, and sensitivity).

- no built-in food or equipment storage in kitchen.
- no coat storage at guest entrance and other entrances.
- most bedrooms lack closet space altogether, and what closets there are are inadequate.

DIAGRAM 10: Overlay Technique of Plan Assessment

SPACE SEPARATION

- extremely poor (typical of older houses), especially private-public separation.
- inadequate separation between kitchen and dining area.

CIRCULATION

- extremely poor door placement throughout.
- dissecting pathway from entrance across living room.
- entrance directly into dining room.
- pathway through kitchen work triangle.
- major pathway through pantry (store room).
- door directly at bottom of narrow stairway.
- entrance porch too narrow for effective use.
- bedrooms open off other rooms.

ROOM SIZE AND PROPORTION

- no bathroom facilities.
- living room size is adequate although door openings reduce useable space.
- poor door placement and generally long, narrow proportions are undesirable features of bedrooms.

WINDOW PLACEMENT

- extremely poor placement throughout.
- opportunity for cross-ventilation missed in all rooms except living room, second floor SW bedroom, and first floor NE bedroom.
- natural lighting inadequate.

STORAGE

- both general and specialized storage is totally inadequate.

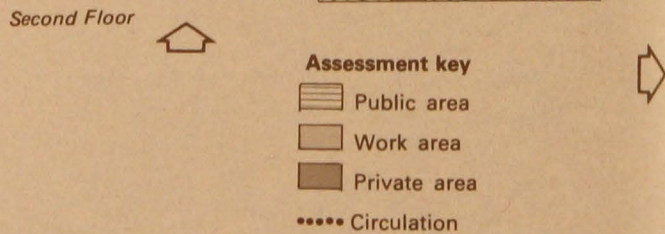
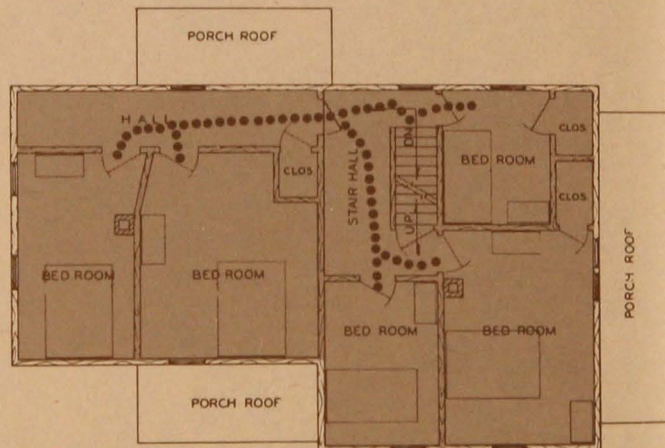
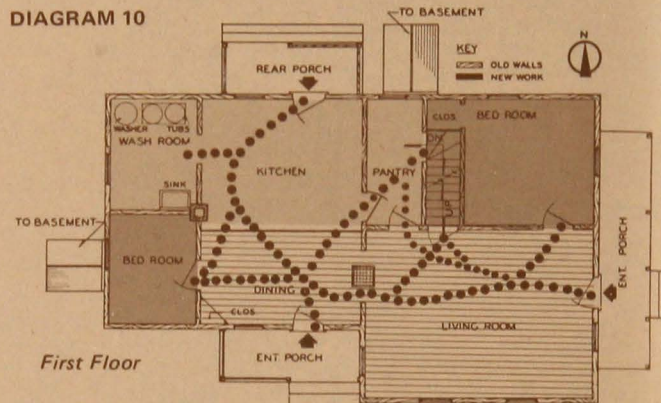


DIAGRAM 11: Overlay Technique of Plan Assessment for Remodeling (Comparison with Diagram 10 Plan)

GENERAL

All changes have been made within the existing structure with the exception of the attached garage. New plumbing has been added. Heating system and chimney have been replaced. Number of bedrooms has been reduced from seven to five.

SPACE SEPARATION

- good general public, private, work separation.
- possible acoustical problem between living room and first floor bedroom remains.

- excellent kitchen-dining-living room relationship.
- good bathroom placement.

CIRCULATION

- guest entrance location reduces living room pathway although it still is not visually separated.
- good isolation of kitchen work triangle.
- stairways: garage door opens onto lower landing (moving garage entrance approximately 5 feet to the west would be more desirable); window at bottom of upper landing undesirable; two 90° turns on stairways marginal.

ROOM SIZE AND PROPORTION

- very good.

WINDOW PLACEMENT

- cross ventilation achieved in all major rooms.
- natural lighting good, although opportunity to increase southern exposure has not been maximized.
- west kitchen casement window poses safety threat over adjacent walkway.
- undesirable lack of window concentration remains unchanged on south living room wall and south wall of second floor, SE bedroom.

STORAGE

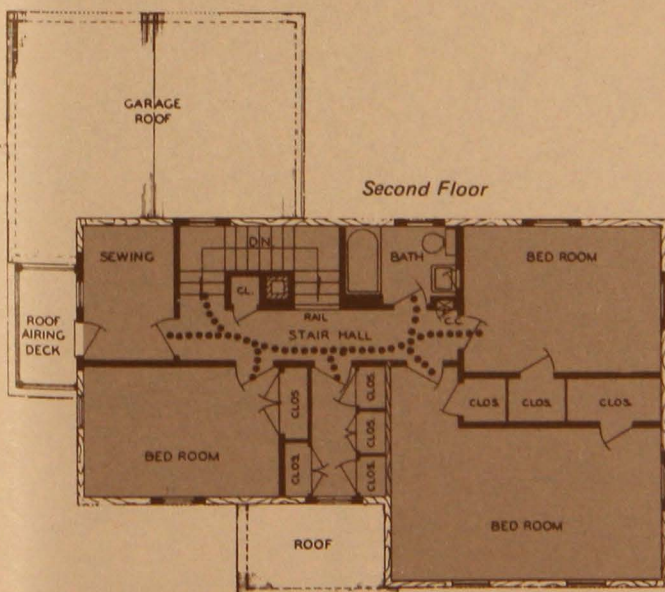
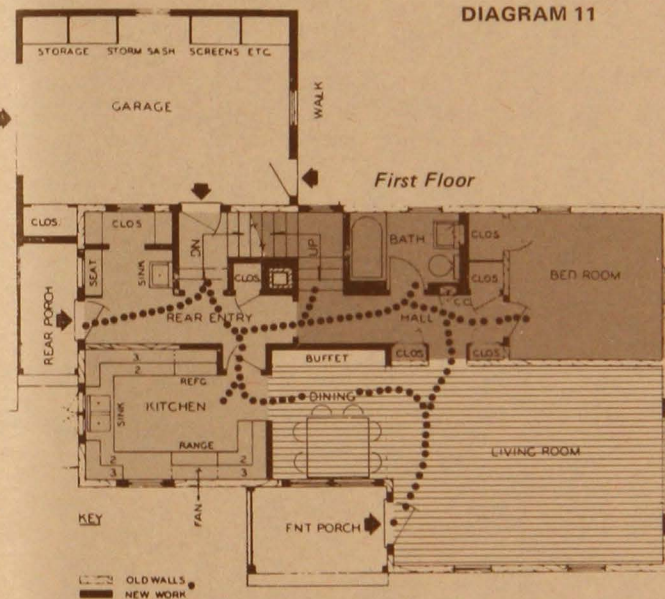
- generally adequate, although no guest entrance closet.

BASIC PLAN AND STYLE TYPES — PROS, CONS, ALTERNATIVES

Before reviewing floor plans, it is important to recognize several facts about housing styles:

- Housing styles reflect distinctive design elements and materials used during a period of time. Furthermore, traditional styles often are revived in new housing construction in limited cosmetic or surface treatment of mass-produced dwellings.
- Housing styles have resulted from the work of designers and architects responding largely to the "fashionable" tastes and social, economic, and technical situations of the time or have resulted from popular "pattern book" plans (for example, two story square homes built from about 1900 to 1930).
- The vast majority of homes built during every period of time are owner- or builder-designed and generally do not reflect the purer aesthetic quality of architect-designed styles.
- Homes reflecting distinctive styles are valuable both in terms of their economic worth and their contribution to the uniqueness of neighborhoods and communities. For this reason, special care should be exercised during remodeling to preserve or enhance rather than to destroy the style of a home reflecting unique design elements and materials. On the other hand, a house without a particularly distinctive style can be given a "face lift" by incorporating design features typical of a period.

DIAGRAM 11



One Story Type of Floor Plan

The one story home has been the backbone of American non-farm home ownership. Appearing shortly after 1900 and peaking in popularity during the 1920's, one story bungalows became the first homes owned by many middle-income families. After World War II, the bungalow lost its characteristic front porch to the picture window of the ranch style. Today there are several contemporary variations to the rectangular floor plan of the ranch: L-, T-, U-, and H-shaped plans.

Despite these variations, one story houses have several common advantages and disadvantages:

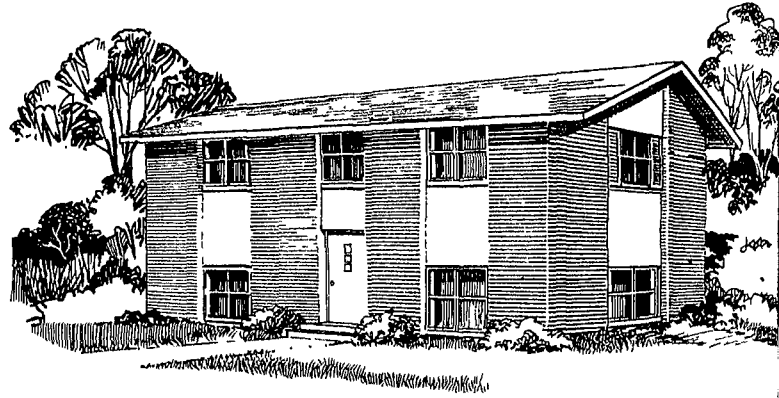
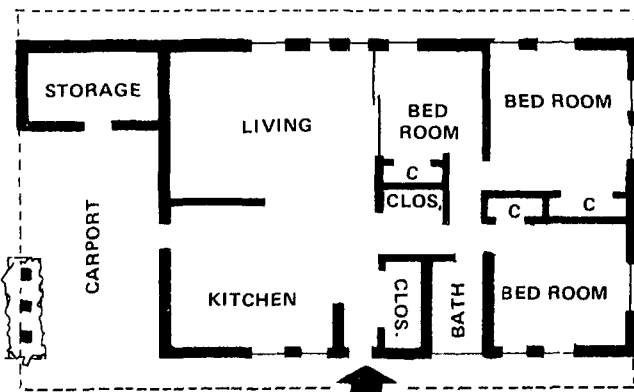
Advantages

- All activities, areas, and rooms are on one level; the absence of stairs can result in less fatigue and greater safety.
- Exterior maintenance is simplified.
- Appears larger than a one-and-one-half or two story house of similar size.
- Easier to use open planning to give spacious appearance.
- Easier to achieve a good interior-exterior relationship between similar types of areas (public, private, work).
- Easier to build an addition to gain new interior space.

Disadvantages

- Uses twice as much of the lot to achieve the same amount of interior space as a two story house of similar size.
- Has approximately twice as much roof surface and ceiling-attic area as a two story house of similar size (greater heat loss).
- Exterior privacy in bedrooms and bathrooms is more difficult to obtain.
- Effective circulation and space separation is more difficult to obtain, especially with more than three bedrooms.
- Unless properly planned, longer heating and plumbing runs are necessary, thereby reducing efficiency and increasing maintenance and operating costs.
- Generally is most suitable for a level site rather than a rolling, hilly lot (with the exception of a one story with walk-out basement).
- Exterior aesthetic quality is frequently sacrificed through the use of more than two exterior materials, different sizes and types of windows, large garage doors, and massive, heavy and/or varied roof lines.

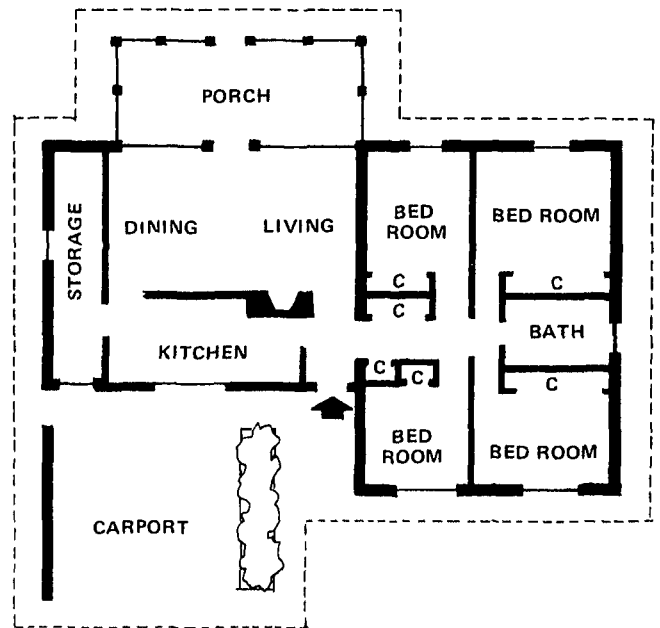
In addition to the basic square or rectangular floor plan (below) of the one story dwelling, there are several relatively recent variations. Each variation has its own modifying influence on the advantages and disadvantages.



SPLIT-ENTRY OR RAISED RANCH — a variation of the one story ranch style home with approximately half of the basement above ground.

Advantages: increases liveability of basement by providing better natural lighting and ventilation; appears larger than one story home with same amount of main floor area; and is suitable for a variety of sites.

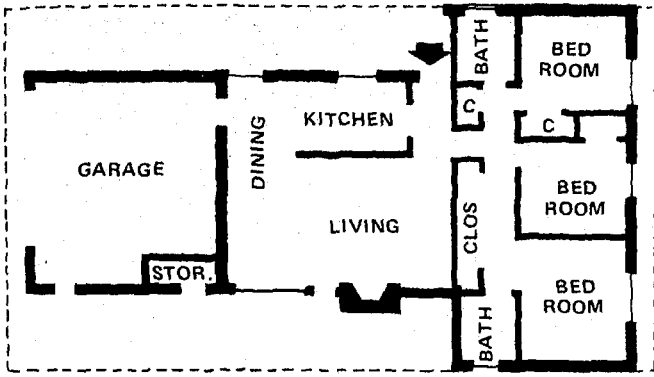
Disadvantages: usually requires half-flight of stairs between entries and service areas (e.g. garbage and groceries, to and from kitchen); lower level masonry walls generally are inadequately insulated and heating systems are inadequate for maintaining lower level winter comfort; and exterior appearance frequently lacks aesthetic quality.



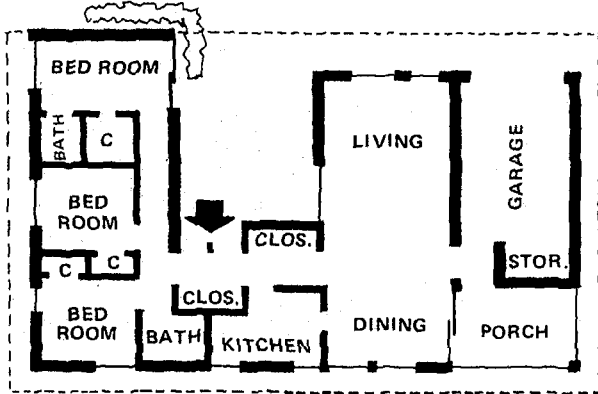
L-SHAPED PLAN — a variation of the basic rectangular-shaped one story plan.

Advantages: generally a more effective separation between public and private areas is achieved than in rectangular plans; and better cross ventilation and a greater variety of room orientations are possible.

Disadvantages: more complicated framing often increases maintenance costs and purchase price.



T-SHAPED PLAN — a further refinement of the L-shaped plan. Advantages and disadvantages of the L-shaped plan are magnified.



U- AND H-SHAPED PLANS — the most substantial refinement of the one story plan.

Advantages: excellent separation of areas; excellent interior-external relationship of areas (including

private patios); and cross-ventilation possible in every room.

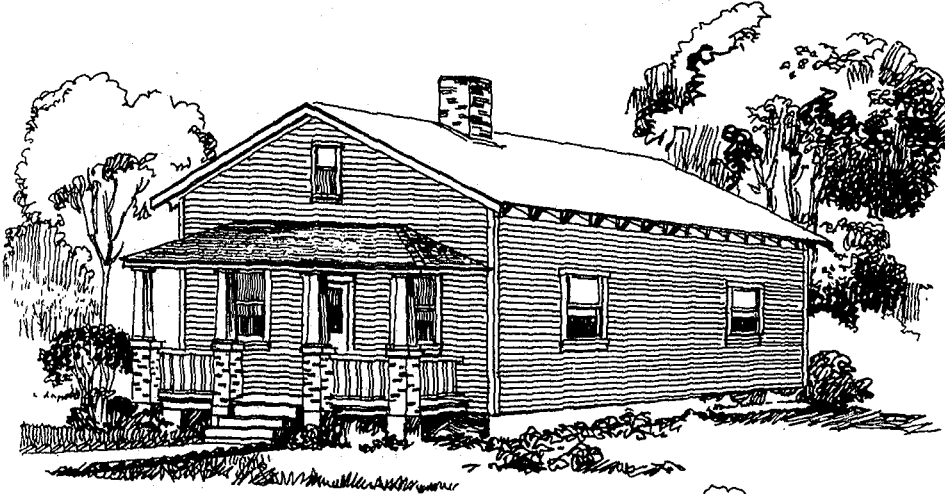
Disadvantages: in comparison to rectangular plans, the greater amount of wall area increases heat-loss and requires greater maintenance; plumbing and heating runs are quite long and, thus, efficiency is reduced and maintenance and operating costs are higher; a large building site is required; and increased site and construction costs usually increase (resale value) purchase price.

COMMON STYLES — Two typical styles of one story plans, the bungalow and the ranch or rambler, are illustrated below.

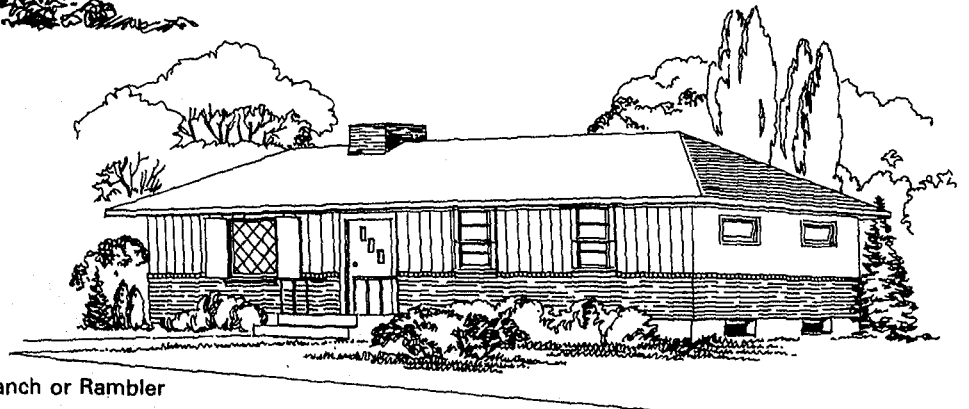
One-and-One-Half Story Type of Floor Plan

One-and-one-half story homes have a special place in the history of American homeownership. The one-and-one-half story Cape Cod home was the first type of "permanent" dwelling built by American colonists in New England. With the arrival of Swedish immigrants, log cabins, the majority of which were one-and-one-half story, came into extensive use. The reason for the extensive use of one-and-one-half story dwellings was quite simple: heat would rise from the main floor cooking and living areas to warm the upper half story sleeping area (loft) long after the family retired.

In the 1920's, after the advent of central heating, the one-and-one-half story Cape Cod was revived and surpassed the one story bungalow in popularity, especially in urban areas with small lots. As lot size increased during the 1950's, one story ranches or rambler regained popularity with homeowners.



Bungalow



Ranch or Rambler

The fluctuating interest in one-and-one-half story dwellings reflects several common advantages and disadvantages:³

Advantages

- Private area is generally on the second floor and, thus, excellent space separation is possible.
- Provides up to 75 percent more floor space than a one story house on a similar size foundation (therefore is more effective on a smaller lot).
- Often the second floor is not finished when built and, thus, functions as expandable space the owner may finish off as needed.
- Lower initial construction cost per square foot may reduce purchase price.

Disadvantages

- Often the second floor area is inadequately insulated and ventilated; thus, roof ice-damming and excessive heat-loss in the winter and excessive heat-gain in the summer are problems.
- Natural lighting and ventilation of the second floor are often inadequate unless dormers are used, which increases costs.
- Generally no more than two rooms are possible on the upper level.

³For one-and one-half story homes, these advantages and disadvantages may be modified by those associated with L-, T-, U-, and H-shaped variations.

- Second floor sloping ceilings and kneewalls reduce effective living area, although greater storage may be obtained.
- Stairways are necessary, possibly increasing occupant fatigue and safety concerns.
- Often there is no bathroom located in the second floor sleeping area.
- Exterior maintenance is more difficult than for a one story dwelling.
- Appears smaller than a one story dwelling of the same size.
- Exterior aesthetic quality frequently is criticized as being unimaginative.

COMMON STYLES — The more typical styles of one-and-one-half story plans are illustrated below.

Other less common types of one-and-one-half story styles are:

- Cotswold Cottage (English) — usually masonry exterior of stucco and stone with steeply pitched gambrel roof; massive front fireplace dominates.
- Cape Ann Colonial (Early American) — similar to Cape Cod but with gambrel roof.
- smaller French Normandy (French) — usually masonry exterior, central turret, and steeply pitched roof.
- smaller French Farm House (French) — usually uses half-timbers as exterior accent, dormers on a steeply pitched hip or gable roof.
- "A" Frame.



"Builder's" Cape Cod



Cape Cod

Two Story Type of Floor Plan

Whereas one and one-and-one-half story homes have been the most popular types of plans for the emerging middle-income homeowners, two story homes have been the predominant choice of more wealthy homeowners. For this reason, some of the most notable architectural styles have been reflected in two story homes. Emulating this situation, more modest two story "builder's" models also have emerged. Typical of the more modest two story homes are the square dwellings, 24 to 32 feet on a side, built between about 1900 and 1925 in both urban and rural areas. The popularity of the two story dwelling is based upon several common advantages and disadvantages:⁴

Advantages

- Separation of private area (second floor) is excellent.
- Appears large, impressive, and usually more formal in character.
- Requires only half as much lot surface to obtain the same amount of floor area as a one story house.
- Exterior privacy for bedrooms and bathrooms is achieved.
- Unless ceilings are quite high, heating is easier and more effective than in a one story house, since heating runs are shorter and only half as much ceiling-attic area is exposed to climatic situations.

Disadvantages

- Requires stairways and, thus, possibly increases occupant fatigue and chance of accident.
- Since more public and work area space generally is desired on the first floor than private area space on the second floor, balance is difficult to achieve (i.e. first floor rooms often are cramped or poorly proportioned).
- Bathroom situation frequently is inadequate: often no bathroom on first floor; second floor bathroom often at head of stairs and, thus, visible from first floor.
- More difficult to achieve a good interior-exterior relationship between private areas.
- Exterior maintenance is more difficult than for a one story dwelling.
- Exterior aesthetic quality frequently is criticized as appearing "boxy," especially on smaller two story dwellings.

COMMON STYLES — The more typical and some of the better known styles of the two story plans are:

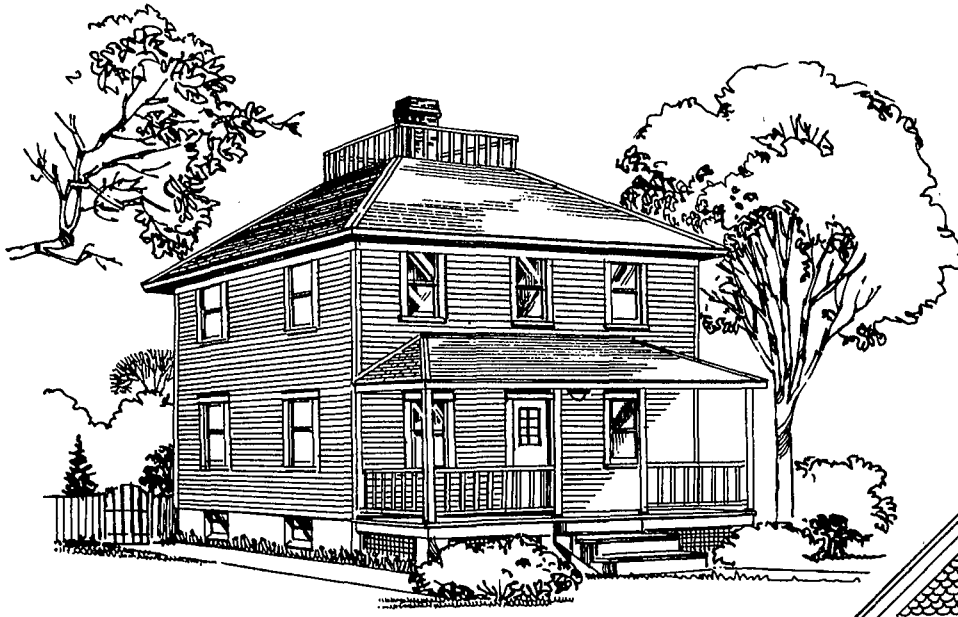


"Builder's" Colonial



Dutch Colonial

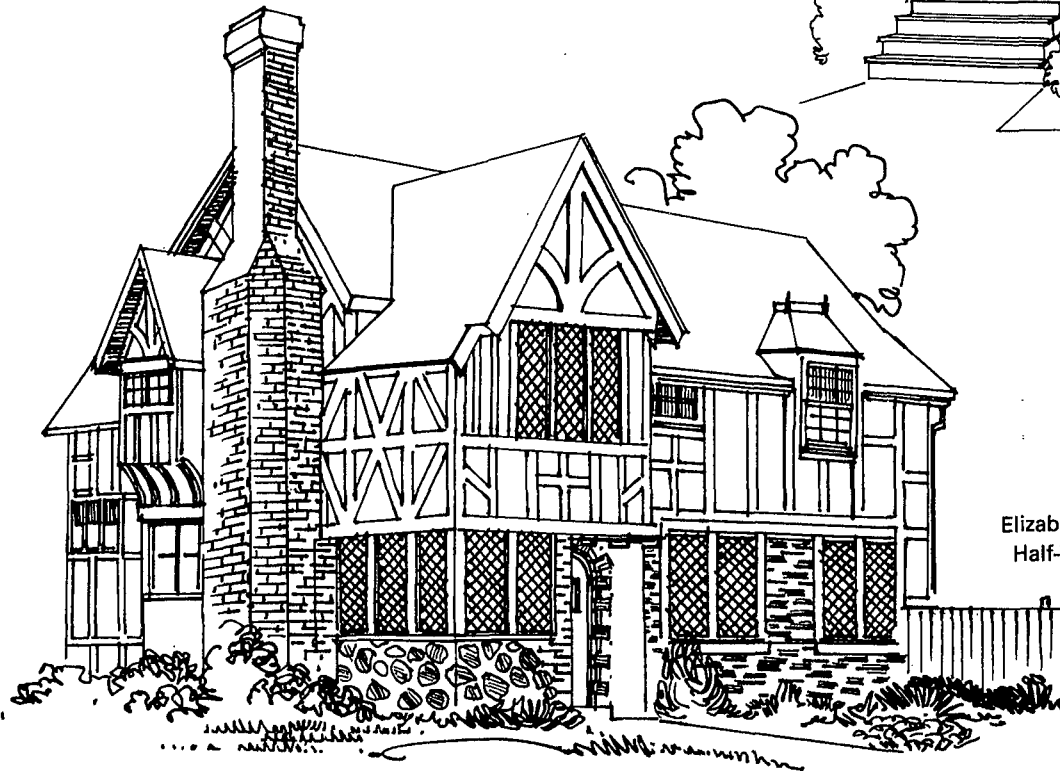
⁴For two-and-one-half story homes, these advantages and disadvantages will be modified by those of the one-and-one-half story home. Likewise, L, T, U, and H variations to two story rectangular plans will be modified by the features associated with those specific variations.



"Pattern Book"
Square



Eastlake



Elizabethan or
Half-Timber

In addition to these more common styles of two story homes, there are the following styles:

- Federal (Early American)—symmetrical, box-shaped with flat roof surrounded by balustrade.
- Adams Colonial (Early American)—similar to Federal style with more elaborate windows.
- New England Farm House (Early American)—pitched roof, central chimney, simple, box-shaped.
- Garrison (Early American)—general two-and-one-half story with second story overhang in the front.
- Salt Box (Early American)—roof extends down to first floor in rear.
- Pennsylvania Dutch (Early American)—massive appearing two-and-one-half story with stone exterior.
- Williamsburg Georgian (English)—rectangular hip roof, simple exterior lines, few decorative touches.
- Regency (English)—similar to Georgian although simpler; octagonal window over front door.
- Tudor (English)—L-shaped, two-and-one-half story with brick exterior, gable roof, and massive front dormer extension.
- French Provincial (French)—balanced, formal one-and-one-half to two-and-one-half story with steep hip roof.
- Early Gothic Revival (19th Century)—generally two or two-and-one-half story with steep gable and gambrel roofs, substantial “jig-saw” decoration.
- Carpenter Gothic (19th Century)—massive two-and-one-half story with prominent three to four story “tower” porch, and extreme variation in shapes and decoration.
- High Victorian Gothic (19th Century)—pointed arches and peaks, using many exterior materials.
- High Victorian Italianate (19th Century)—symmetrical, different types of arches, ornate.
- American Mansard (19th Century)—mansard roof, decorative moldings, and metal work.
- Romanesque (19th Century)—massive appearance, stone with semicircular arches.
- Queen Anne (19th Century)—similar although more ornate than Eastlake.
- Row or Townhouse (19th Century)—common sidewalls, two to four stories.

Split Level Type of Floor Plan

Popularized during the late 1950's and early 1960's, the split-level floor plan introduced a new alternative to home buyers. The most common split-level home has a somewhat contemporary

appearance and may have as many as five levels, although three levels are more common. The common advantages and disadvantages of the split level plan include:

Advantages

- Provides excellent separation of public, private, and work space.
- Excellent alternative for hilly, sloping, rolling lots.

Disadvantages

- Stairways required for almost all circulation including that between the kitchen and garage, and the kitchen and family room.
- If less than 45 feet long, rooms tend to be small and cramped.
- Exterior maintenance more difficult than for a one story.
- Exterior aesthetic appearance frequently lacks unity, especially when the house is built on a flat lot.

EVALUATION PROCESS AND ASSISTANCE

Since design is critical to the liveability of a home, both buyers and remodelers should become sensitive to design influences.

Buyers should establish a clear set of guidelines to use for screening choices. Prior to the search process, it is generally easier to be more analytical; goals may be set high and houses not meeting family standards may be eliminated early. When several houses appear satisfactory, a comparison of assets and deficiencies of both design and style is in order. It may be that none of the houses completely meets the family's goals. In this situation, there are several alternatives: 1) continue searching; 2) purchase and force the family to compromise its' goals; 3) purchase with a plan to improve deficiencies; or 4) purchase and remodel before moving in.

Remodelers with a basic sensitivity towards design and style may wish to seek assistance from a number of sources including:

Local Public Libraries. The community library is probably the consumer's single best source of unbiased information on remodeling planning and construction. Even in smaller communities, interlibrary loans bring a wealth of information to the consumer. Individuals, however, should recognize that many library references will be dated or otherwise not applicable to Minnesota's climatic and code requirements. Therefore, it is important to be selective and thorough in your library search. Remember not to overlook recent issues of popular home improvement magazines and U.S. Government Printing Office publications.

County Extension Service. Supported by the University of Minnesota's research and faculty, this

unit of county government provides many relevant consumer-oriented references and non-credit short courses on home improvement.

Stop at your county extension office and ask:

- for free copies of home improvement publications to meet specific needs.
- to review the Housing Handbook, a collection of more than 220 popular consumer housing references.
- to review the county's listing of 2,500 consumer housing references available free or at a modest cost from over 400 organizations.
- what short courses and workshops on home improvement are available.

Community Design Center (CDC). Low and moderate income families may wish to seek design assistance from CDC, 118 East 26th Street, Minneapolis. CDC also maintains an extensive home improvement and do-it-yourself library.

Local Housing and Redevelopment Authorities (LHRA). LHRA's, especially in larger communities, have services available to owners desiring to buy or remodel, including: information about loans and grants; lists of approved remodeling contractors; free inspection and planning services in target neighborhoods; and so on.

Vocational Technical Schools. For individuals desiring to understand and do their own wiring, plumbing, or other remodeling work, courses offered by area VOC-TECH schools offer an excellent opportunity to perfect important skills.

Material Suppliers. Many retail material suppliers, such as lumberyards, hardware stores, and plumbing fixture outlets, offer relevant workshops, do-it-yourself publications, and individual consultation.

Historical Societies. Both the Minnesota and county historical societies can help you research the architectural history of your home and refer you to other sources of information especially helpful in restoration.

Neighborhood Organizations. In many communities, residents have organized to help each other in the maintenance and upgrading of entire neighborhoods. In fact, some of the most effective rehabilitation efforts have grown through neighborhood organizations: lobbying for improved municipal services; obtaining material and labor discounts for work contracted for several homes at the same time; etc.

Trade Associations. Although biased by their desire to promote their own trade, associations can provide information about their products, as well as about members providing specific types of services, such as dwelling evaluation and improvement. Examples of trade associations (addresses found in Minneapolis, St. Paul, and other phone directories) are listed:

- Minnesota Chapter of American Society of Landscape Architects (ASLA)—can provide information about landscaping design as well as a list of members providing landscape architectural services.
- Home Builders Association (HBA)—in larger communities can provide information about remodeling contractors.
- Minnesota Association of Plumbing, Heating and Cooling Contractors (MAPHCC)—can provide information about plumbing and hot water and steam radiant heating as well as members doing this type of work.
- Minnesota Association of Concrete and Masonry Contractors (MACMC)—can provide information about concrete as well as masonry contractors.
- Minnesota Electrical Association (MEA)—can provide information about electrical systems as well as contractors and suppliers.
- Minnesota Masonry Institute (MMI)—can provide information about concrete, block, brick, and stone suppliers and masonry contractors.
- Minnesota Society of Architects (MSA)—can provide information about design as well as a list of architects doing specialized remodeling work.
- Sheet Metal, Air Conditioning, and Roofing Contractors Association (SMARCA)—can provide information about forced-air heating systems as well as contractors doing this type of work.

Utility Suppliers. Most electrical and fuel suppliers are anxious to provide information about energy conservation questions, such as those involving insulation, storm windows, weatherstripping, and so on.

SOURCES

Illustrations have been adapted from the following sources:

- Design. United States Savings and Loan League, Chicago, IL. (1963)
- Gebhard, David and Martinson, Tom. A Guide to the Architecture of Minnesota. University of Minnesota Press. Minneapolis, MN. (1977)
- Harrison, Henry S. Houses. Realtors National Marketing Institute, Chicago, IL. (1976)
- Larock, Max J. et.al. When You Remodel Your Farm Home. Extension Service, University of Wisconsin, Madison, WI. (June, 1947)
- Master House Plan Book. Small House Plan Bureau, St. Cloud, MN. (1971)
- Stith, D.J. and Meyer, R.P. Styles and Designs in Wisconsin Housing. University of Wisconsin Extension, Madison, WI. (January, 1974)

