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married student's housing . .

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Prof. H. C. Rose', Director
School of Architecture
Montana State College
Bozeman, Montana

Dear Professor Rose':

I am submitting this preliminary research in partial compliance with the requirements of Arch. 490.

In this thesis I have presented research material for new married student's housing on the campus of Montana State College. Because of the many external as well as internal influences on a project of this nature, I have presented material concerning existing conditions, history, functions, aesthetics, economics, and the site. Also I included the summation of this research in the form of a project building program; this includes size, function, equipment, and etc. pertaining to the space.

It is the purpose of this thesis to provide research material necessary in the design of married student's housing at Montana State College.

Respectfully submitted,

Eugene K. Hoover

Eugene Keith Hoover

Copy III

PRELIMINARY RESEARCH FOR NEW MARRIED STUDENT'S HOUSING FOR MONTANA STATE COLLEGE - - - - - BOZEMAN, MONTANA

PART ONE OF AN UNDERGRADUATE DESIGN THESIS . . . . .

SUBMITTED TO THE SCHOOL OF ARCHITECTURE AT MONTANA STATE COLLEGE FOR PARTIAL REQUIREMENTS TOWARD A DEGREE OF BACHELOR OF ARCHITECTURE . . . . . .

BY: EUGENE KEITH HOOVER . . . . . MARCH 22, 1963

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ACKNOWLEDGEMENT

I am greatly indebted to Gary L. Jacobson, whose previous work on the subject of married student's housing for Montana State College, did so much to make this document possible.

I also wish to thank Professor H. C. Rose' and Professor J. Parker who gave of their time to provide advice and guidance throughout the preparation of this research.

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a proposal . . . . . .

PROPOSAL

Married student's housing units on the campus of Montana State College, originally temporary in nature, are near the end of usefulness. After many years of service, these units must soon give way to new, more efficient and comfortable units. When this time arrives, any previous research concerned with housing at Montana State College will be of some assistance in programming the project. For this reason I have chosen to do as an architectural thesis new married student's housing for Montana State College.

I propose to present this research in the following manner:

First quarter (Winter quarter 1963)

1. Collect research material concerning the project,
2. Study and select a site for the project,
3. Present a program of the future needs as well as present of the entire project.

Second quarter (Spring quarter 1963)

4. Present a design solution of the living units (including all drawings, models, etc.) utilizing the research information,
5. Present a solution of the landscaping and site layout of the entire project.

history of existing housing . . . .

HISTORY

With the end of World War II, the influx of married students under the G. I. bill brought about the need for some type of college housing. It was the considered opinion of everyone concerned at the time that this heavy influx of married students would be of a temporary nature and would last only until the education of the G. I's. was completed.

Thus, in 1945 the college obtained some 125 trailer houses, 21 small pre-fabs, and 64 apartments through surplus and set them on the campus proper. In 1946 an additional 200 housing units were obtained and re-erected on land used by the Horticulture and Animal Industry Departments, west of 11th and south of Huffine Lane. Since the college owned only half the land that it does at present, it was necessary to divert as few acres as possible to housing sites. Provision for the parking of 30 student-owned trailers was also provided for on this land.

The temporary nature originally intended for these units gave reason to locate them where the utilities were readily available and a minimum of expense would be entailed in the construction of roads and extension of services. Because of fewer cars at that time, only one car parking space per unit was provided.

With these thoughts in mind, the housing units were laid

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[6] Whalen, Martin, Letters to the Editor of the Exponent, Montana State College, (1962, May), p. 2.

out to use a very minimum amount of land, thereby disrupting experimental work the least possible. Construction costs were held to a minimum, since no one expected that there would be a need for these units in five or six years. It was not thought that these units could possibly pay for themselves during such a short period of use.

These surmises appeared to be correct until such time as Congress extended the G. I. Bill to cover Korean Veterans. The demand for housing had dwindled steadily, and the trailer houses had been disposed of by this time. In 1951 almost half of the 'strips' were empty and a program to demolish them had begun. Eighty of the two-hundred apartments were stripped of plumbing fixtures, doors, etc., and were to be razed. This was to be done in late 1952. However, that summer a rush of applications for housing came in, mostly from Korean Veterans, and the eighty apartments had to be refurnished and ready for fall quarter use.

The demand for college housing has steadily increased since then. It was necessary to relocate the fifteen prefabs and dismantle forty apartments to make way for construction of Lewis and Clark and Langford dormitories in the 1950's. These apartments plus the trailer houses are the only units removed from the campus since the College was first involved in housing for married students.

Since 1955, the college has constructed 108 additional student units, either of the single or duplex type. Provisions were made for adequate parking, yard space, etc. to provide a

better atmosphere for living. The rents of these units are $55. to $60., while the strips rent for $36.

The improvements made to date since the original prefabs were replaced on their present site include:

1. Concrete sidewalks throughout the entire housing area, replacing wood and gravel sidewalks;
2. Gravel surfacing of all street areas;
3. Removal of all coal boxes and wood bins;
4. Installing of all natural gas ranges, hot water tanks and heaters to replace coal ranges and heaters;
5. Installing of new permanent roofs;
6. Replacing of all outside plumbing and war-time plumbing;
7. Repainting of all outside surfaces;
8. Fencing of all play areas;
9. Replacing of all underground water lines and installing fire hydrants.

conditions creating a need for housing

CONDITIONS CREATING A NEED FOR NEW MARRIED STUDENT'S HOUSING

GENERAL CONDITIONS

> "Housing, in itself, is only a means to an end. Its quality is, therefore, of great importance. If housing is to serve an educational function, the time has long passed when placing a roof over the heads of the student body is the only duty an institution owes to its students in the way of living facilities. A college or university which prides itself on its modern classroom buildings and its up-to-date equipment, its valuable scientific apparatus, and its large and valuable collections of books and objects precious to the student of the past, cannot with any logic justify housing and dietary arrangements which force its students to put up with meager lighting, poor study conditions, and unpredictable plumbing."[1]

The present married student's housing at Montana State College, with the exception of the one-story units recently completed, were originally prefabs obtained through government surplus (1947). It was once thought that these temporary barracks units would be in use as married student's housing only a short time, however with the increase of married students on campus, it became necessary to keep those already erected and obtain even more.

Now, some sixteen years later, the same units are still in use.

PHYSICAL CONDITIONS

Generally these units are shabby, dismal, and old. They have no foundations, thus creating drafty floors, have inad-

---

[1] Strozier, Robert M., Housing of Married Students, (1950), p. 46.

equate ventilation, lighting, electrical services, and storage.

The construction provides no insulation in either the walls or ceilings, thereby creating a problem of frozen plumbing in the cold months as well as drafty, uncomfortable living conditions.

The second or two-story units are unsafe and in violation of the National Fire Code, in that they are provided with no fire escapes, a minimum requirement in wood-frame construction of this type serving the purpose these units do.

PSYCHOLOGICAL CONDITIONS

The 'strips' (for the purposes of this document, 'strips' refers to the married student's housing of the two-story, prefab type) were not originally designed for the purposes of housing married students, but for the use of the several branches of the military service as barracks in World War II. They, therefore, do not have the character that a unit for such a function should have. Also, their use as housing creates problems in lighting, ventilation, and privacy.

Generally the dismal, old, shabby appearance of the 'strips' is depressing in itself, and that added to by the surrounding landscaping, poor streets, and close compact layout of units having on open play areas to relieve the monot-

ony of 'brown and green' units, leaves much to be desired aesthetically.

> "Allowing a college student of today to work in a well-equipped laboratory which is housed in a completely modern structure while he spends his nights in squalor does not constitute a very flattering tribute to the student's sense of proportion. It is not implied that elaborateness or luxury have any place in student quarters. But physical conditions of life which are safe, hygenic, clean, light, airy, and which provide useful, but by no means extravagant facilities, represent physical equipment which is absolutely necessary to collegiate housing."[2]

FUTURE CONDITIONS

The future growth of Montana State College must be considered in an assessment of the needs of married student's housing on campus a decade from now.

It is anticipated that the enrollment at Montana State College ten years from now or 1970 will be over 7000 students.[3] From past percentage averages of married students to total enrollment of students and nation-wide averages, it can be seen that about 1470 or 21% of this enrollment figure will be married students needing housing.

This growth will only exagerate the need for more and better housing on campus. Shall we continue to build units of twenty-year duration which are aesthetic failures, or begin to replace the existing units with more satisfactorily planned, constructed, and oriented units? I feel that

---

[2] Ibid., p. 47.

[3] Scalabrin, Joe, Preliminary Research for an Arts and Architecture Building, p. 32.

these units should be replaced and it is, therefore, this objective that I plan to undertake in this thesis and for which this document is being prepared.

The following photographs help convey this need for new, more permanent married student's housing. Also photographs used in the remainder of this document will help the reader visualize this need.



inadequate storage. . . . .



insufficient insulation. . .



unpaved streets . . . . .



unpaved streets . . . .



inadequate garbage facilities



insufficient warehouse. . .

local conditions . . . . . .

LOCAL CONDITIONS

GEOGRAPHICAL

Married student's housing on the campus of Montana State College is located in Bozeman, Montana, of latitude 45° 42' and longitude 111° 3', at an elevation of 4950 feet.

The city of Bozeman has a population of 15,000, and is located in the Gallatin Valley surrounded on three sides by mountains. It is set at the base of the western slope of the Bridger Mountains.[4]

CLIMATE

The climate of Bozeman and vicinity is generally of a mountainous nature, that is, with extremes of temperature and elements.

The winters are relatively cold and severe, with an average winter temperature of 25° and an average low of -20°. However, temperatures up to 35° have been recorded in January and February and are not unusual. The average snowfall in Bozeman is from 30 to 50 inches with the greater part of this falling between November and March.

Summers in Bozeman are warm and pleasant, with periods of extremely high temperatures being infrequent. Extreme temperature conditions are not unusual, but last for short periods of time, usually not more than ten days. Uncomfortable humid con-

---

[4] U.S. Weather Bureau, Climates of the States, Yearbook, (1941), p. 217.

ditions are rare. Precipitation falls mostly in the form of showers, with some hail in the months of July and August. One-half of the precipitation falls between May and July.

Prevailing winds are from the northwest with storm winds coming from an easterly direction.[5]

AVERAGE RAINFALL

Month	Mean Temperature	Precipitation
Jan.	20.2	.92 in.
Feb.	25.2	.76 in.
March	27.8	1.55 in.
April	42.5	2.34 in.
May	51.1	3.06 in.
June	57.3	1.08 in.
July	66.4	1.12 in.
Aug.	64.9	1.65 in.
Sept.	55.8	1.45 in.
Oct.	46.0	1.07 in.
Nov.	32.1	1.30 in.
Dec.	24.8	.91 in.

Annual temperature - 42.9° F.

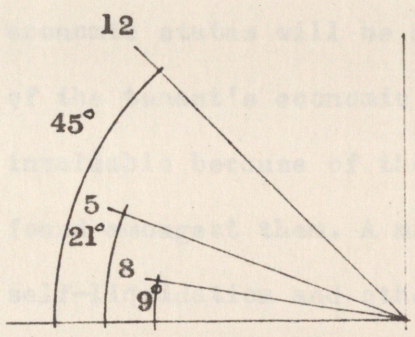
Annual Precipitation - 17.62 in.

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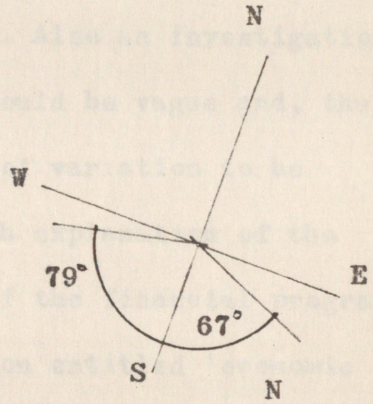
[5] U.S. Department of Agriculture, Climate and Man, No. 59, (Washington D.C., 1959), p. 122-123.

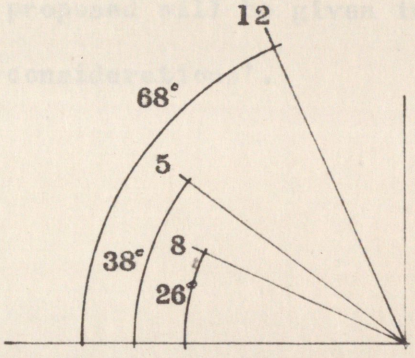
SUN ANGLES

Vertical **Horizontal**

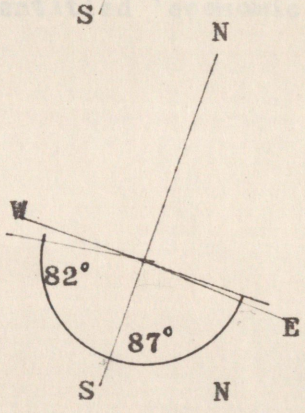


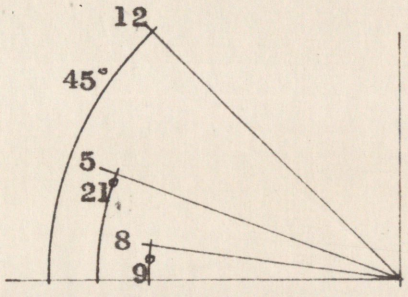
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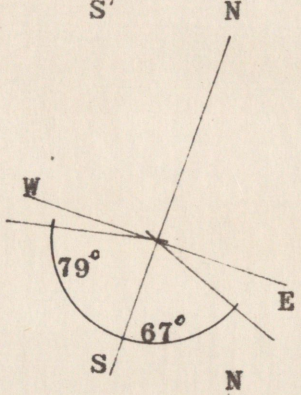


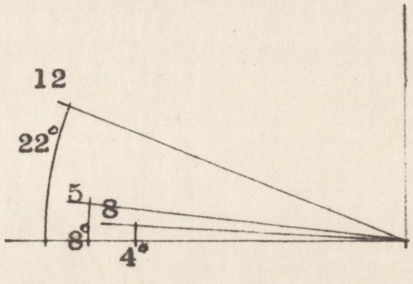
June



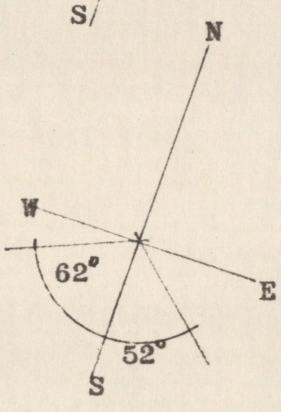


Sept.





Dec.



ECONOMICS OF CLIENT

Being that I plan to make and design the project on a self-liquidation basis, an investigation of the client's economic status will be unnecessary. Also an investigation of the tenant's economic standing would be vague and, thus, invaluable because of the extremes of variation to be found amongest them. A more thorough explanation of the self-liquidation and other phases of the financial program proposed will be given in the section entitled 'economic considerations'.

site analysis . . . . . .

SITE ANALYSIS

GENERAL

In the consideration of a site for the placement of married student's housing, I found that only one location offered immediate advantages. This was the present location of the housing for married students. See figure 7.

To understand these advantages and why this plot was selected for the site, one must try to anticipate the future growth and expansion of the campus. As can be seen in figure 8, the location of married-students on the proposed site, along with the inevitable removal of the dairy barns and the buildings in the area of the ROTC department, would create a band of housing bordering the west, north, and northeast sides of the campus. With this band of housing and the location of athletic facilities in their present area, the future growth of the campus will be forced to the southwest. This would, therefore, create a central core of the campus somewhere in the vicinity of the McGill Museum.

If this anticipated center is realized, the present and the projected location of married student's housing will be close to the center of campus and thus cut walking (an almost inevitable mode of transportation on campus ten to fifteen years hence) distances to classes to a minimum.

Also the present location for the site would permit new student housing to be programmed in two, three, or

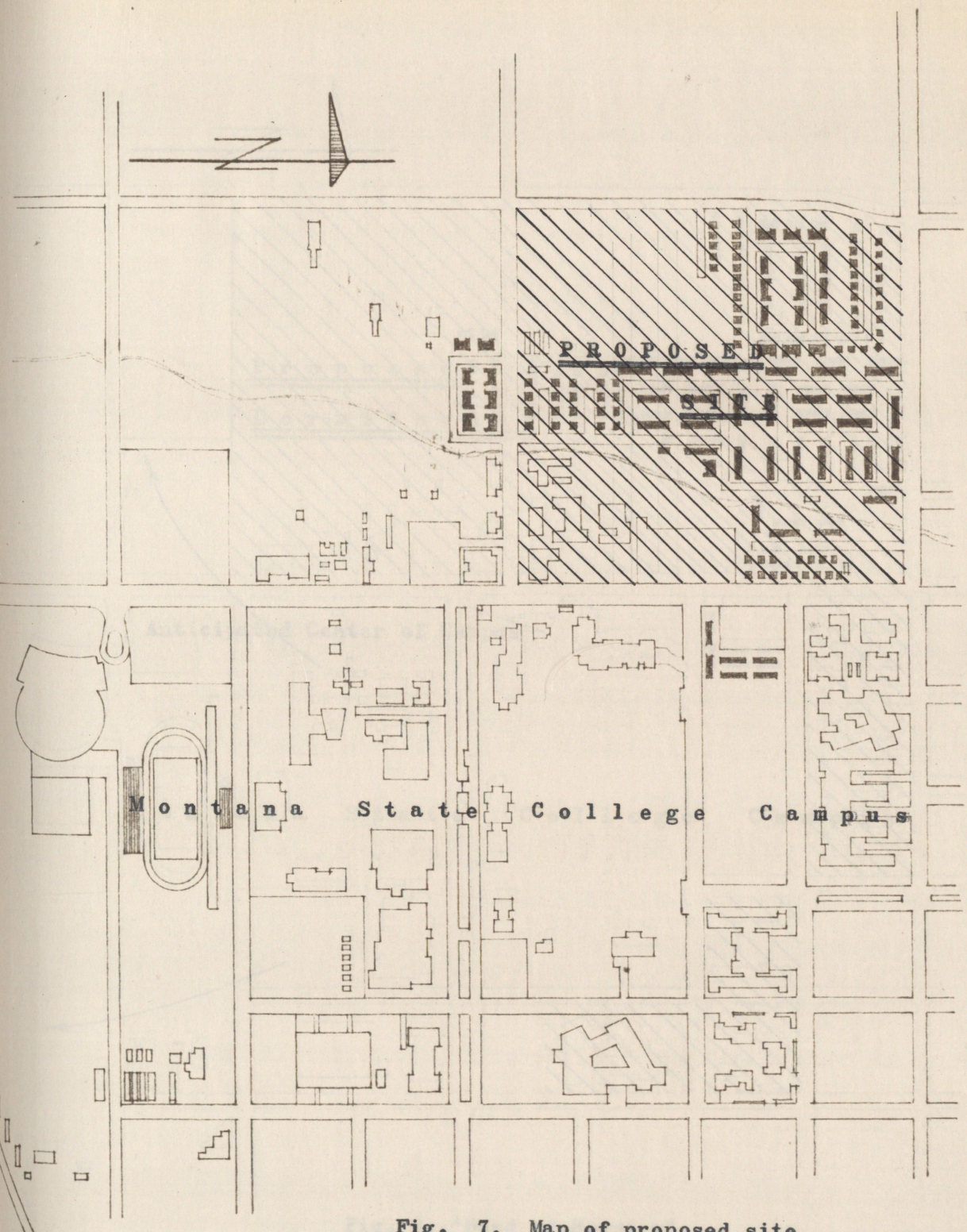


Fig. 7, Map of proposed site

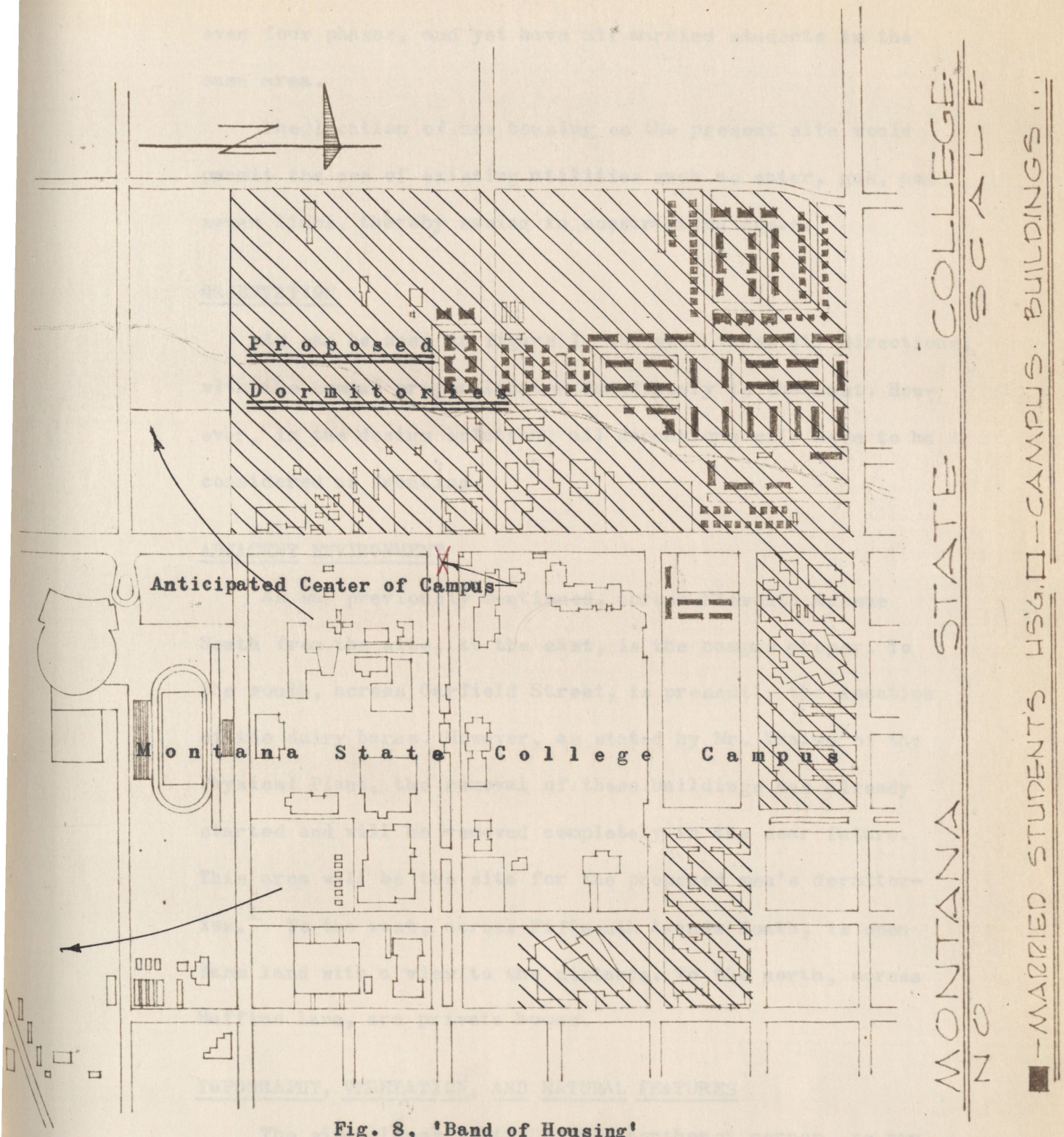


Fig. 8, 'Band of Housing'

Indicates Future Growth Direction

even four phases, and yet have all married students in the same area.

The location of new housing on the present site would permit the use of existing utilities such as water, gas, and sewer lines, thereby saving in construction costs.

ORIENTATION

As can be seen in figure 1, the site faces all directions, with the campus proper located immediately to the east. However, in the design solution, all directions will have to be considered as fronting.

ADJACENT ENVIRONMENT

As was previously mentioned, across Eleventh Avenue South from the site, to the east, is the campus proper. To the south, across Garfield Street, is presently the location of the dairy barns. However, as stated by Mr. Whalen of the Physical Plant, the removal of these buildings has already started and will be removed completely in the near future. This area will be the site for the proposed men's dormitories.[1] To the west, across Fifteenth Avenue South, is open farm land with a view to the distance. To the north, across Huffine Lane, are private homes.

TOPOGRAPHY, VEGETATION, AND NATURAL FEATURES

The site slopes gently to the northeast corner, as can be seen from figure 9, with Spring Creek flowing from the

---

[1] Whalen, Martin, 'Interview on Jan. 14, 1963', Head of Montana State College Physical Plant.

FIG. 9.

VET RESCH

AUTOPSY

PROPOSED DORMS (IN SHADOW)

HOG BARN

CATTLE SHED

BEEF BARN

PARKING

YELLOWSTONE CT.

MUSEUM

GRANARY

BEEF FEEDG.

CARFIELD STREET

ENTO.

MEDICAL SCI.

EXT BLDG.

A.H. BLDG.

AGR BLDG.

STOCK PAV.

SHEEP

AG. GREEN-HOUSE

GOPHER ST.

AGRONOMY

FOX STREET

ELK STREET

EXPERIMENTAL

PARKING

GLACIER COURT

DEER STREET

DEER STREET

COUGAR ST.

MADISON CRT.

BUFFALO

JEFFERSON COURT

ANTELOPE ST.

SOUTH BARRACKS

AGR.

WOOL

NORTH BARRACKS

MILIT.

Q

ELEVENTH AVENUE SOUTH

12th AVENUE SOUTH

13th AVENUE SOUTH

HUFFINE LANE

N

SCALE: 1" = 100'-0"

SEWER

GAS

WATER

EXISTING HOUSING

PROPOSED HOUSING

south to the north side. There are a few trees located in the area of the dairy barns together with some small shrubery along the creek. The remainder of the site is gravel and dirt, with some grass in the areas around the units and along the creek. See figures 10 and 11.

SOIL ANALYSIS

To date there have been no known soil borings, strata tests, or loading tests taken on the site. However, from past experience of excavations in the area, it is known that the top two or three feet of soil is clay covering an unknown depth of gravel base. The water table in the area during the dry season is approximately four feet below grade, while during the irrigation season it rises to within three feet of grade.[2]

ZONING REGULATIONS

Being that the married student's housing site is State property and part of the campus, it has not been annexed into the City of Bozeman. Therefore, there are no zoning limitations, either concerning the site or the individual units. However, all federal fire and building codes apply. These generally state the minimum type and quality of construction that can be used.

PREVAILING WINDS

Prevailing winds are from the northeast.

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[2] Ibid.



view of existing landscap'g.



view of existing landscap'g.

IMMEDIATE AND DISTANT VIEWS

Immediate views were discussed in the section entitled 'adjacent environment'. Also, figures 12, 13, 14, and 15 show the views in each direction.

In the distant northeasterly direction are the Bridger Mountains, while in the near distance is the city of Bozeman. To the south are the Hyalite Mountains.

AVAILABILITY OF UTILITIES

As can be seen in figure 9, there are existing utilities in the area of the present married student's housing. However, in the area of the dairy barns there are no gas or sewer lines. There are also electrical and telephone services in the area of the housing but they have not been shown on the map, figure 9.

TRAFFIC PATTERNS

Anticipated traffic patterns have been shown in figure 16, with the two main arteries being to the campus and downtown areas.

PROPOSED SITE SIZE

The proposed site is approximately 1330 ft. by 1290 ft., with an area of 1,715,700 square feet.

FUTURE EXPANSION

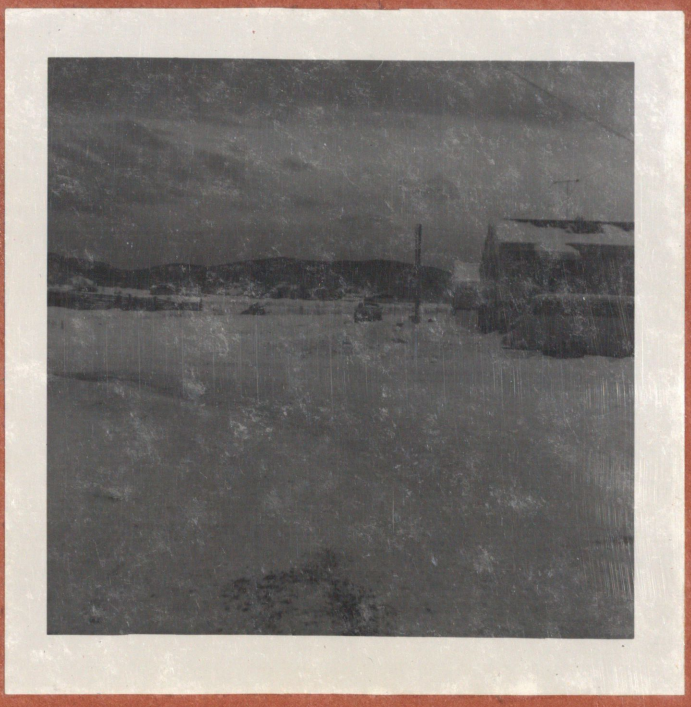
Possible expansion could be to the west across Fifteenth Avenue South on land which is presently Montana State College farm land.



view to northeast . . . .



view to north . . . . . .



view to south . . . . . .



view to west . . . . . .

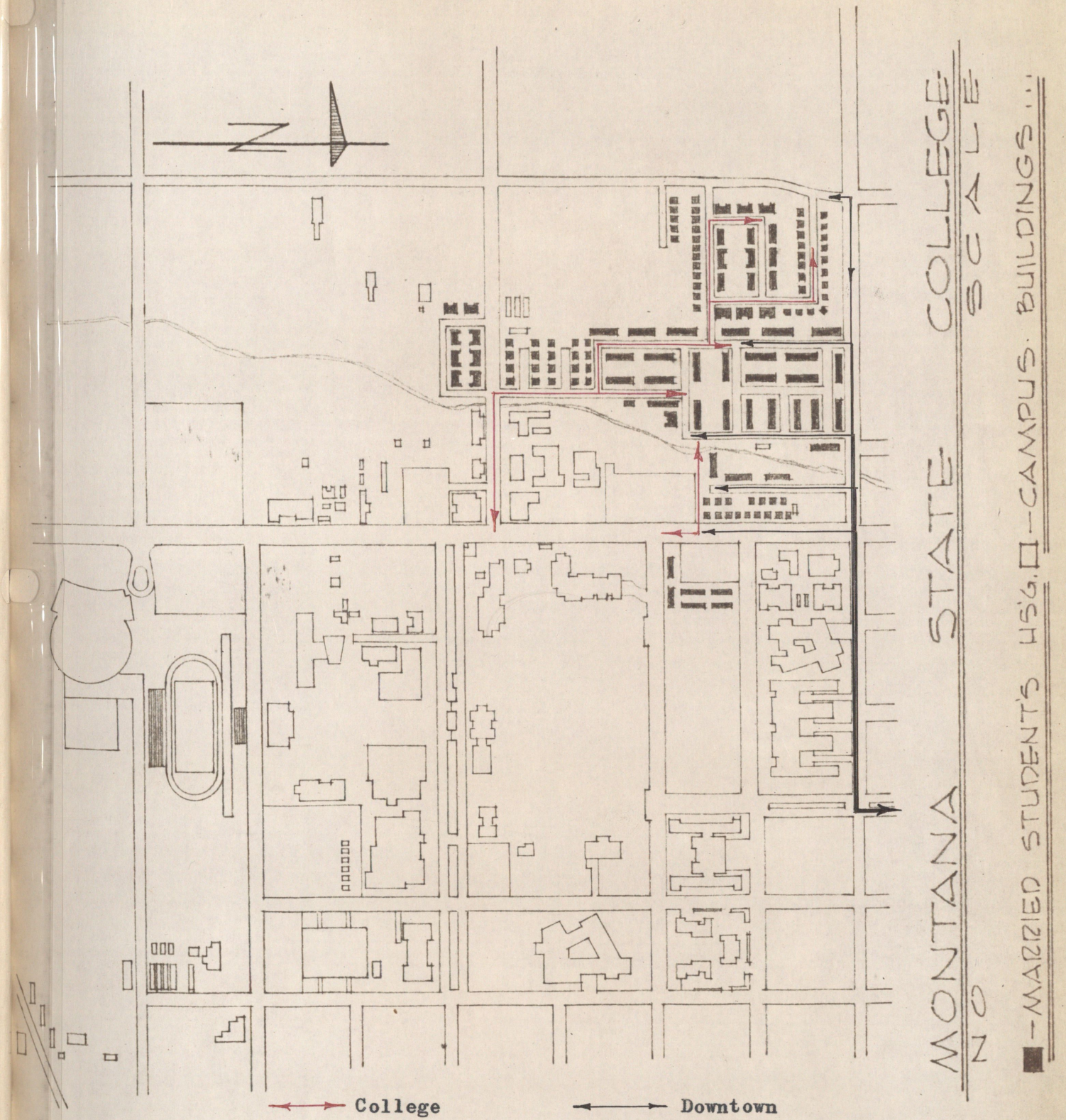


Fig. 16, Traffic patterns to and from college married student's housing.

function of the buildings . . . . .

FUNCTION OF THE BUILDINGS

GENERAL

Married students are a post-World War II phenomenon that shows every sign of becoming a fixed fact of campus life. In 1960, about 24% of the total college population, or about 866,000 students, were married.[1] Here at Montana State College, there were 757 married students constituting about 19.2% of the total enrollment.

Their housing problem is relatively simple: they need apartments. How many are needed and what part of the need should be met, however, depends on policy as well as cost. It has been the policy here at Montana State College to provide housing for the excess of students unable to obtain living facilities elsewhere in the area. Also, it is the policy of this College to keep rental rates down to a minimum and provide adequate but not elaborate housing for the students.

Unfortunately, however, married student's housing is more costly and elaborate than that required by single students. Sleeping and study facilities are not enough. An apartment must be an adequate home for a family, often including children. Minimum facilities should include a living room, kitchenette, dining space, bath, one or more bedrooms, and storage.

HOUSING REQUIREMENTS - GENERAL

The design of married student's housing will be influenced

---

[1] Riker, Harold C., College Students Live Here, (1961), p. 23.

by two obvious, yet basic elements: the student will have a wife with possibly a child or children; and he will have a minimum of finances and therefore be able to pay only a minimum for rent.

In order to cut construction and planning costs, similiar floor plans should be used in each of the several apartment types, thereby making possible assembly line or mass production. Thus, it will be necessary to design the units in as flexible a manner as possible, making variations between apartments through furniture and interior decoration arrangements.

The construction of these units should be of durable, relatively permanent materials. They should be chosen with the initial economical costs in mind as well as desirable low maintenance factors. The interior finish should be of such a nature as to take a reasonable amount of punishment from children, as well as be easily cleaned and painted.

These units should have sufficient insulation to provide for comfortable living in the hot summer and cold winter months as well as to help maintain frost free plumbing.

Privacy between and within the units is of prime importance in such a housing development. The units should be oriented and screened in ways that will facilitate personal, intimate living conditions.

STUDY AREA

Regardless of married student status, the tenant-student is first of all a student. Accordingly, definite and adequate study space must be provided within the living unit or elsewhere. Such a space should permit a measure of student isolation during study hours. An ideal arrangement would be the inclusion of a separate room within the unit to accommodate the student's study needs and equipment. However, the rental rates and construction costs will probably determine whether such a room can be included.

A desk of sufficient size, desk chair, and bookshelves should be considered basic equipment for this study room. Since living patterns vary, this equipment might well be movable for placement in the living or bedroom.

LIVING CONDITIONS

In addition to study area, the housing unit must serve such functions as sleeping, eating, lounging, storing of clothes and equipment, and entertaining of guests. Also such things as garbage storage and disposal units, clothes washers and dryers, and heating units have to be included in the design.

Living Room

The central and perhaps the largest area of the living unit is usually the living room. Here most of the leisure indoor hours are spent visiting, watching television, relaxing, etc. Therefore such a room should have

a pleasant, comfortable, and restful atmosphere.

This room, just as the bedroom, may be and usually is used for a multitude of functions, such as studying, recreation, and other miscellaneous chores of the wife, as well as serving as a combination living-dining room.

A sofa, two or three easy chairs, end tables, and possibly a coffee-table should be considered as basic furniture for the living room. Additional, but not necessary pieces, would include pictures, vases, lamps, a television set, a radio, and desk. Since these items will affect the design of such an area considerably, careful consideration should be given to their size and placement within the room.

Bedrooms

It has sometimes been said that the least debatable room in a house or apartment is the bedroom; it is admittedly a necessity. However, a possibility of variation lies in the idea of giving the master bedroom some additional function or functions, such as combining it with a study or sewing area. This is especially true in a compact unit, such as is necessitated for married student's housing, in that it provides the wife with a work area aside from the living room.

Minimum equipment required in the master bedroom would include either twin beds or a double bed, clothes

storage closets, a dressing table with clothes storage included, and possibly a night table and dresser.

Other bedrooms in the two and three-bedroom units probably will be used either as sleeping quarters for any children the student may have or as a study room if a specific room for this purpose is not included. If this room is to be used as a bedroom, minimum equipment would include a bed, dresser, and storage for clothes. If it is used as a study room, a desk, desk chair, and bookshelves would be considered basic equipment. Therefore, with two very distinctly different functions being served by the same room, any built-in storage or shelves should be designed in a flexible manner.

Kitchen Area

Since a sizeable number of wives are likely to hold full-time or part-time jobs and therefore have a minimum of time for meal preparation, kitchen facilities should be efficiently arranged for speed in food service and cleaning. Interior and equipment finishes should be easily cleaned and require little maintenance.

The kitchen will likely include such equipment as a stove, refrigerator, sink, table, and sufficient storage for food, cooking utensils, and cleaning equipment. Also, this area may be used as a utility area and therefore include a washer, dryer, ironing board, and possibly some pre-iron clothes storage. This equipment should be

arranged in a manner that will minimize distances between the major appliances. Suggested schemes are shown in figures 17, 18, and 19.

Dining Area

The emphasis upon elimination of useless space in apartments and small houses has brought about either the combination of the living and dining areas or the kitchen and dining areas.

> "For the tiny house or apartment built to accommodate a very small family, this plan is often practical as well as charming; it is, of course, very informal and may prove embarrasing at times when strangers call during dining hours. Where there is no choice but two small, box-like rooms or one larger combination room, the latter is far more interesting; but whenever it is possible to confine the sight and odors of food to certain quarters, it is more satisfactory to do so."[2]

A table and four or five chairs should be considered minimum equipment in the dining area. The need for a china-closet is probably negligible being that the majority of the families are either too young to have started a collection of glassware or they feel that they cannot afford such a luxury.

Bathroom

There is no need for excessive floor space in the bath; it is self-evident and pretentious waste space.

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[2] Sooy, Louise, P., Plan Your Own Home, (1946), p. 27.

'THE STEP SAVING TRIANGLE'[1]

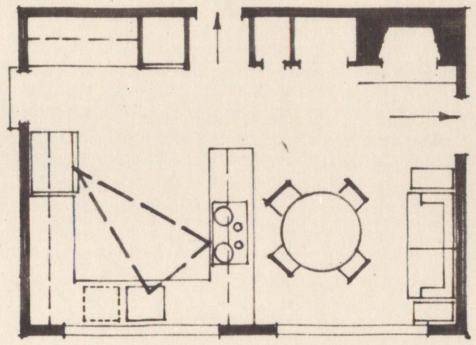


Figure 17,

U-shapped kitchen

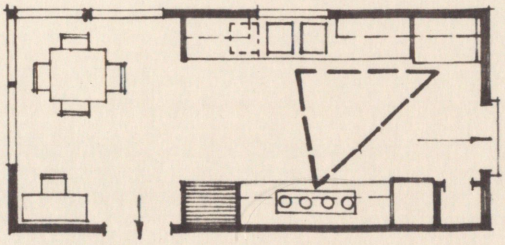


Figure 18,

Corridor type kitchen

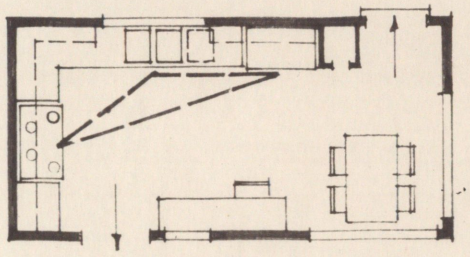


Figure 19,

L-shapped kitchen

See the appendix for further details of kitchen planning and layout.

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[1] Better Homes and Gardens, Kitchen Ideas in action, (April, 1961), p. 29.

Since only one person can normally use the bathroom at a time, a very minimum of space is needed. A 5 ft. x 8 ft. room is ample and it may even be as small as 6'-6" x 5'-0".

A small tub-shower combination, lavatory, water closet, and medicine cabinet should be considered minimum basic basic equipment required for the bathroom. However, counter or work space as well as miscellaneous storage is very desirable.

The bathroom should be finished with very durable, water and vapor resistant type wall and floor covering. Ceramic tile up to a height of five feet is recommended by the Federal Housing Administration, see Minimum Property Standards.

Mechanical Room

A mechanical room to house a unit-heater and water-heater would be a desirable although optional area to include in the units. If there was such a room, it could possibly also contain the clothes washer and dryer and thereby function as a utility room. It would be desirable to locate this room centrally within the unit and if possible, between the kitchen and bathroom. Such an arrangement would minimize plumbing and heating costs.

If such a room is not included in the planning of the units because of cost, the clothes washer and dryer might well be located in the kitchen.

General Provisions for Each Unit

In addition to the above rooms, storage must be provided

for the following, linen, personal items, cleaning equipment, and coat storage at the entrance.

All stairs and balconies should be designed with small children's safety in mind.

Minimum FHA Requirements

Minimum square footage and dimensions for the following rooms have been recommended by the FHA (Federal Housing Administration).[3]

Separate rooms

Unit size	L.R.	D.R.	Kit.	Totl B.R.	Min. B.R.
one-bedroom	160	80	60	120	----
two-bedroom	160	80	60	200	80
three-bedroom	170	95	70	280	80
Least dimension	11'	8'	3'-4"[1]	---	8'

[1] Clear passage space, face of base cabinet to face of base cabinet or face of opposite wall.

Combined rooms

Unit size	L.R.-D.S.	K.-D.S.	L.R.-D.S.-K.
one-bedroom	180	100	220
two-bedroom	180	100	220
three-bedroom	200	110	250
Least dimension	(1)	(2)	(1-2)

(1) Least dimension of:
- (a) Living room space, 11 feet
- (b) Dining space, 6 feet (only eating space in the unit)

(2) Least dimension of:
- (a) Kitchen, 3'-4" clear passage space
- (b) Dining space, 6 feet (only eating space in the unit)

Other habitable rooms 80 sq.ft., least dimension 8 ft.

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[3] Federal Housing Administration, Minimum Property Standards, (1960), p. 32.

COMPOSITE UNIT CONSIDERATIONS

Total number of units required

After considering enrollment fluctuations, per cent of married students in attendance, distribution of family sizes over the years, and other uncontrollable factors, one concludes that an exact, or even an estimate, of the number of units needed ten years hence, is almost an impossibility. However, since the present demand for housing is satisfied by the existing units, a ratio of married students to number of units could be determined and this ratio applied to projected enrollment figures to determine future housing needs. The present ratio of 2.3 students to 1 unit, applied to projected married student's enrollment in 1972 of 1600 requires 696 units. See table 1 for enrollment projections.

However, since this projected estimate may be very unreliable, and also that over half of the existing married student's housing will be adequate and sufficient for some years to come, I have decided to divide the entire proposed project into three or possibly four sections. Thus, as more housing units are needed, a section of new units can be built to replace deteriorated units. Via this method, long term enrollment projections are not an absolute necessity. It is anticipated that the 'strips' will be the first to be removed and replaced. The succeeding replacements will follow in the order shown in figure 20 as they are needed.

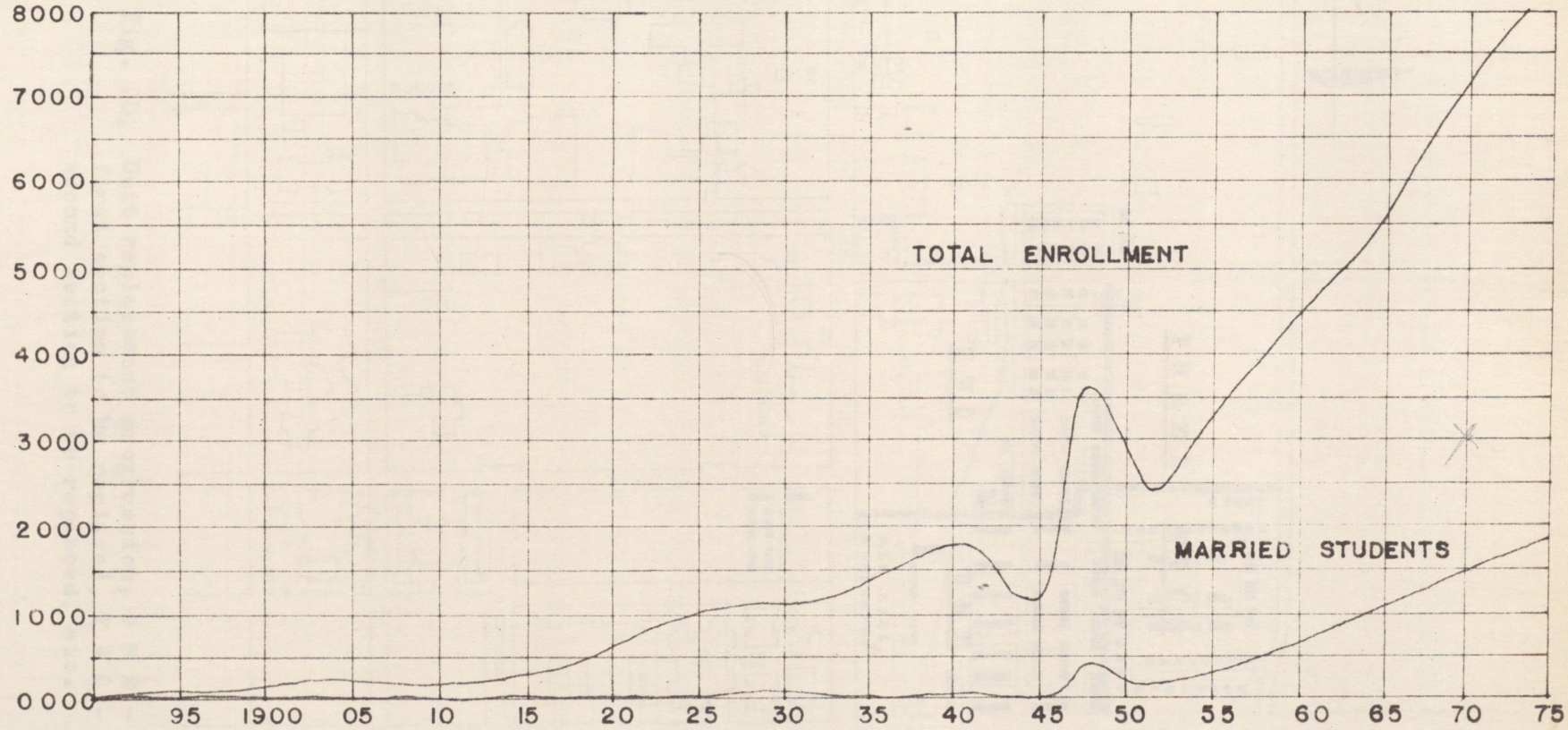


TABLE I SHOWING PAST AND PROJECTED GROWTH OF MSC AND MARRIED STUDENT'S ENROLLMENT

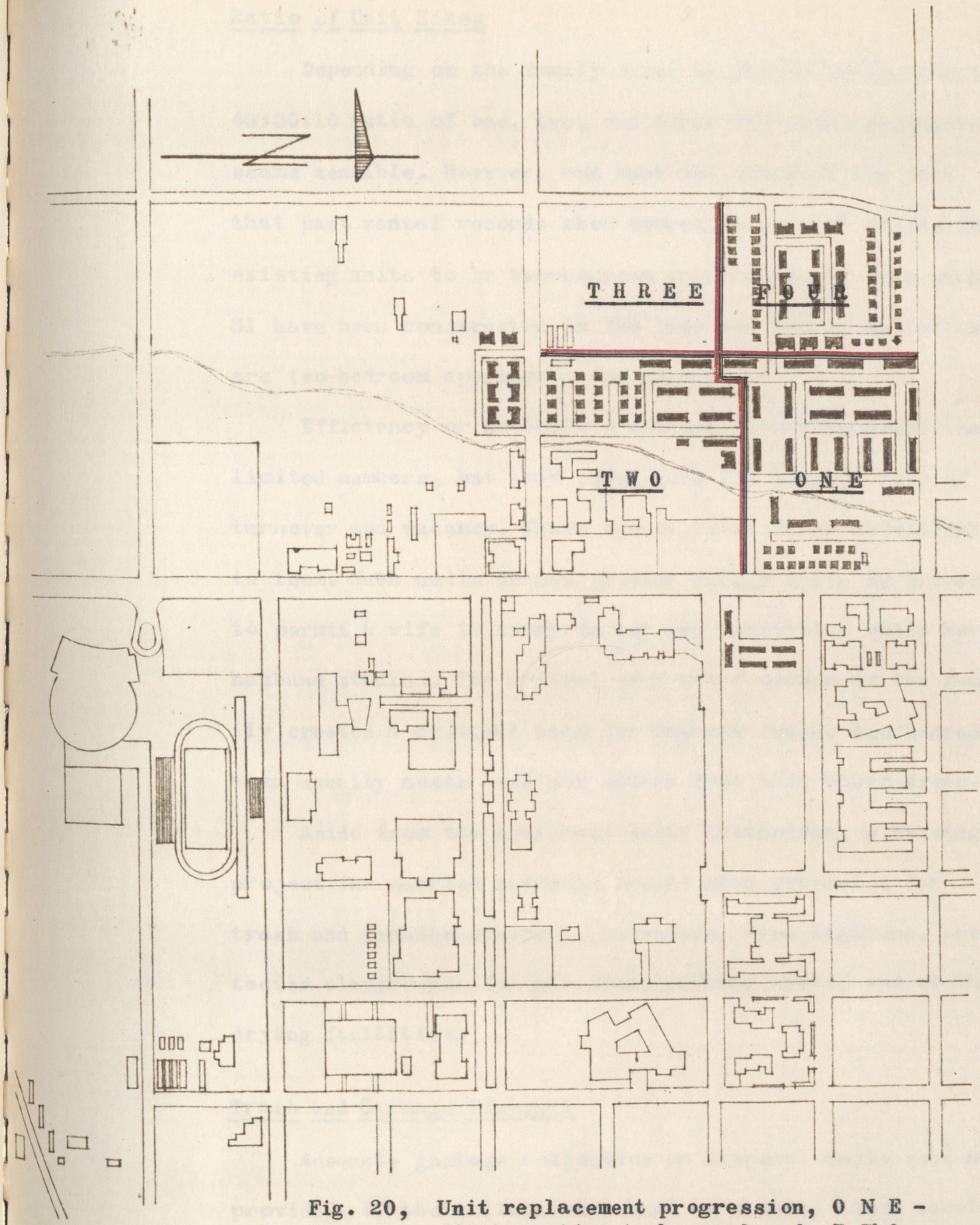


Fig. 20, Unit replacement progression, O N E - first section to be replaced, T W O - second section to be replaced, etc.

Ratio of Unit Sizes

Depending on the family sizes in future years, about a 40:50:10 ratio of one, two, and three bed-room apartments seems sensible. However, one must not overlook the fact that past rental records show approximately 66% of the 342 existing units to be two-bedroom apartments. Of this number 81 have been constructed in the last six years, all of which are two-bedroom apartments and houses.

Efficiency or no-bedroom apartments may be useful in limited numbers, but they often have the highest rate of turnover and vacancy. There are at least three objections to them. Such units do not provide enough space or privacy to permit a wife to carry on her own activities while her husband studies. The arrival of a third member of the family creates a critical need for bedroom space. And bedroom area usually costs less per square foot than other areas.

Aside from the apartment units themselves, a housing project for married students should have provision for trash and garbage disposal, sidewalks, area lighting, protected playgrounds for children, parking areas, and clothes drying facilities.

Trash and Garbage Disposal

Adequate garbage collection or disposal units must be provided. If the collection method is chosen, there should be a minimum of one garbage can per unit, with pick-up points

centrally located and easily accessible from either the street or alley. All containers should be located or mounted so that cats and dogs will not tip them over or be able to get into them.

Sidewalks

Footwalks of either concrete, gravel, or cinders should be provided interconnecting all units and the campus proper. Orientation of the sidewalks, as well as the units, should provide easy and direct access to the campus proper, car parking, and play lots.

Area Lighting

All streets should have adequate lighting for the safety of children and wives. All areas should be lit sufficiently to make travel via foot at night convenient and easy. Street lights should be located no more than 200 feet apart.

Play Yards

Play yards or lots should be provided for children within easy access of all units. It would be desirable if these lots were within sight of the units also. These areas should restrict the children from wandering, either by means of fencing or other restrictive means. Play equipment in the lot would be desirable.

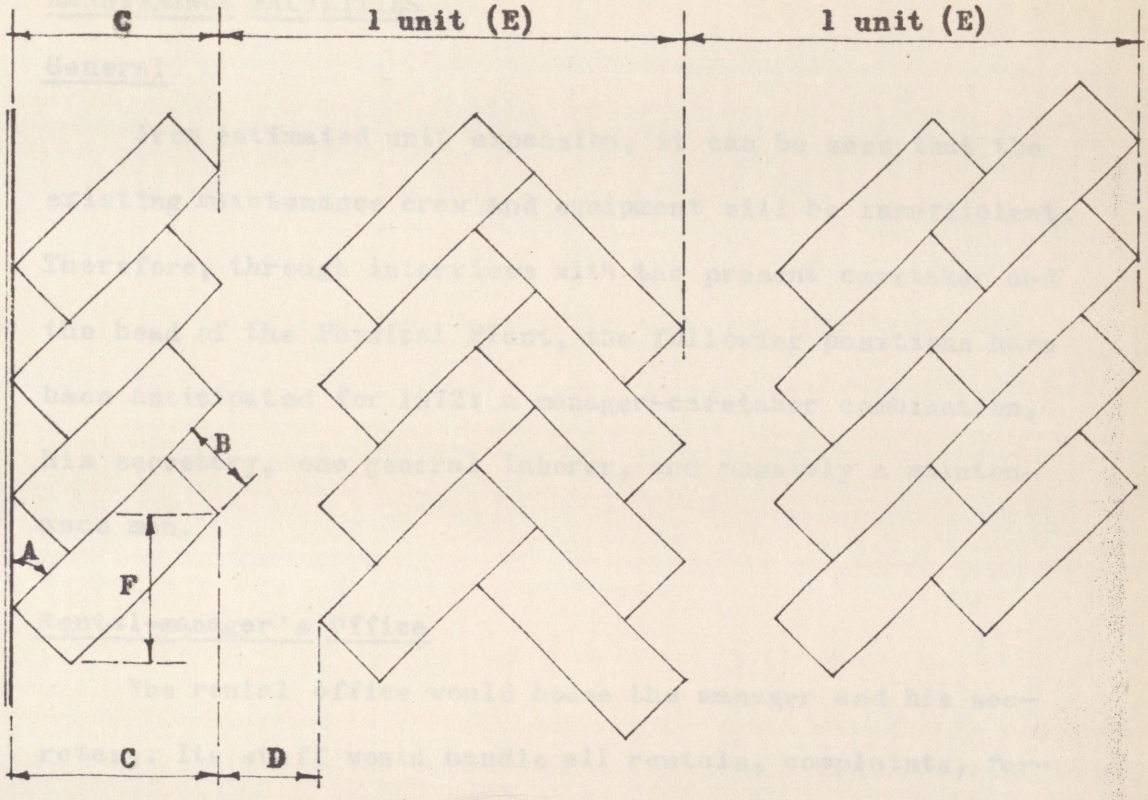
Parking Areas

A minimum of one parking space per unit is required with more spaces per unit being recommended wherever possible. An over-all average of 1.5 spaces per unit would be the most desirable. See figure No. 21 for minimum parking space sizes.

Clothes Drying Facilities

Even though automatic clothes dryers may be provided in the units, some clothes lines should be provided. They should be easily accessible from each of the units. Possibly one clothes line per every two units would suffice.

MINIMUM PARKING DIMENSIONS[1] Fig.21



Recommended Stall and Aisle Dimensions for Cars

A	Dir. of park'g.	B	C	D	E	Area per car
90	back-in	8'-0"	18'-0"	22'-0"	58'-0"	232 sq. ft.
60	back-in	8'-0"	18'-10"	17'-2"	55'-0"	254
45	drive-in	8'-0"	17'-2"	12'-8"	47'-0"	266
90	back-in	8'-6"	18'-0"	22'-0"	58'-0"	247
60	back-in	8'-6"	18'-10"	18'-4"	56'-0"	270
45	drive-in	8'-6"	17'-2"	12'-8"	47'-0"	282

Use 8'-6" for self-parking and 8'-0" for attendant parking.

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[1] Ramsey and Sleeper, Architectural Graphic Standards, John Wiley and Sons Inc., N.Y., (1956, 5th edition), p. 611.

MAINTENANCE FACILITIES

General

From estimated unit expansion, it can be seen that the existing maintenance crew and equipment will be insufficient. Therefore, through interviews with the present caretaker and the head of the Physical Plant, the following positions have been anticipated for 1972: a manager-caretaker combination, his secretary, one general laborer, and possibly a maintenance man.

Rental-manager's Office

The rental office would house the manager and his secretary. Its staff would handle all rentals, complaints, furniture checkouts, etc., with the present office in Montana Hall being abandoned. This method of handling married student's housing has already been discussed by the proper authorities and is expected to be initiated in the near future.

Minimum equipment for efficient operation of such an office would include two desks, two chairs, permanent and temporary paper storage, two or three reception chairs and possibly a conference table.

Such an office should conveniently be located adjacent to the manager's office in the central portion of the married student's housing project. Direct access from the manager's apartment to the office would be advisable as well as a separate exit to the outside.

Warehouse-maintenance Shop

For unused furniture, a storage warehouse needs to be provided. This building should be sufficiently large to permit the inclusion of a maintenance shop as well as a two-stall garage area for storage of a tractor and truck.

The maintenance shop would be used for small repairs such as lawnmower, furniture, etc., repair. It should contain a work bench, storage shelves, and some closet space. Provisions for hanging and storing of tools such as shovels, rakes, etc., would also be advisable.

aesthetic considerations . . . . .

AESTHETIC CONSIDERATIONS

Married student's housing should be designed and programmed to stimulate intellectual activity. This means providing proper educational facilities, developing workable plans for using them, and substituting sound social and academic leadership for conduct control.

At the same time such housing should reflect a unity and character inherent in the campus proper and its personality. Here at Montana State College such a unity and character, which I feel is determined by the physical environment of the school and its location, is lacking. Bozeman and the campus do not lend themselves to an urban atmosphere of multi-story glass boxes. The character of this area is reflected by the mountains, climate, and general atmosphere, and so, they must be reflected in the architecture of the area.

Therefore, I feel that we must attempt to start an indigenous unity which will reflect this physical environment. This start may have been made, theoretically at least, by Peter Remmen and Joe Scalabrin in their thesis projects, A Central Administration Building, and An Arts and Architecture Building for the campus. If this is true, and I feel it is, such a start has been made and should be followed.

As well as being in harmony with its external environment, the campus proper, such a project should also express an inner unity between the several units. However, in achieving this unity we must not forget the individuality and de-

sires of the tenants. Therefore, a monotony of identical units similarly oriented, colored, and sized should be avoided. The use of similiar materials throughout the project, if this use would cut construction costs, I feel would be desirable if used in different manners. For instance, if wood were used, on one unit it might be employed vertically, on another horizontally, and still another diagonally.

Also, even though not identically oriented, similiar floor plans would help achieve an inner unity between units, but even greater, it would cut construction costs considerably over that for individual floor plans for each unit.

Other than aesthetical considerations and relation between units, the landscaping, terracing, etc. will influence the over-all character of the project tremendously and, therefore, needs careful consideration. In general, I feel the landscaping should be planned in a carefree and playful manner, thereby conveying a restfulness to the observer. Considerable use of trees, shrubbery, and grass are a necessity in this restful approach, I feel.

Within as without there should be a simple but yet distinctive individuality expressed in each of the units. Because of the economy inherent in this project, this individuality might well be achieved through interior color schemes, furniture arrangements, etc. However this will necessitate the designing of a very flexible and open plan.

Perhaps, because of the special function, studying, to be served by these apartment units, a distinction should be made between them and public apartments. Possibly this could be done by making the study room stand out from the remainder of the unit through color, texture, or placement.

In the concept of married student's housing, the foregoing points should be carefully considered. Even a small dose of imagination in planning and design would bring about marked improvements over the present hodge-podge. These improvements are needed if the expenditure of time, money, and effort required to meet projected enrollments are to be justified; college housing will have to be better designed and constructed, better integrated into the community, and better administrated than existing units.

The photographs in figs. 22, 23, 24, and 25 give the reader a general idea of the aesthetic condition of the existing units and another reason for more adequate and better designed and programmed units in the future.



aesthetics . . . . . ?



aesthetics . . . . . ?



aesthetics . . . . . ?



aesthetics . . . . . ?

project program . . . . . .

PROJECT PROGRAM

GENERAL

The program for a project such as married student's housing will vary from school to school. The elements of the project and individual units are programmed according to the needs of a typical MSC student and his finances.

It should be made clear that this program is general in scope and is by no means unchangable. Unforseen changes can and will develop in the future and for this reason flexibility and expansion possibilities should be incorporated into the design of the project.

A brief description of the functions of each room or facility in the project was given in the section 'Function of the Buildings', however a condensed resume is included in this program to facilitate the designer in the preliminary design stages.

As mentioned in the section 'Function of the Buildings', this project will be divided into three or four design phases as shown in fig. of that section. Each section will consist of approximately 100 units in a 40:50:10 ratio of one, two, and three bedroom units.

PROGRAM

The following program represents the culmination of the foregoing research material.

BUILDING PROGRAM - ONE BEDROOM UNITS

Room	Quantity	Area
Living room Function: For use of leisure indoor-hours, such as visiting, relaxing, watching T V, etc. Equipment: Sofa, one or two easy chairs, and an end-table. Optional equipment: Another end-table, coffee table, T.V., desk, and lamps. Finish: Very good and durable, warm, relaxing colors, possibly a carpet.	1	160 sq. ft.
Study room Function: For use as study area for student and storage of his books and supplies. Equipment: Desk, desk-chair, bookshelves. Finish: Good and durable.	1	50
Dining-kitchen Function: Eating, cooking and storage of food. Equipment: Dining-table, four dining chairs. Kitchen-stove, refrigerator, sink, and storage (approx. 18 sq. ft., see appendix for further details). Also the washer-dryer may be placed in the kitchen. Finish: Kitchen - very durable and easily cleaned. Dining: Durable, warm color.	1	120
Master-bedroom Function: Sleeping area Equipment: Bed, either a double or two twin beds, (6'-6" x 4'-6", 6'-6" x 3'-3") dresser, vanity. Optional Equipment: chest-of-drawers, night tables, one or two chairs. Finish: Good and durable.	1	120

Room	Quantity	Area
Bathroom:	1	40 sq. ft.
Function: Personal hygiene		
Equipment: Bathtub, water closet, lavatory, storage.		
Finish: Very durable and easily cleaned.		
Mechanical room	1	25
Function: House heating unit and hot water heater.		
Equipment: Unit heater and a hot-water tank.		
Finish: rough.		

Storage

Linen closet (approx. 3 sq. ft., included in above areas.)

Broom closet (approx. 3 sq. ft., included in above areas.)

Coat closet (approx. 6 sq. ft., included in living room.)

Clothes closets (approx. 6 sq. ft., included in bedroom area)

Total area of one-bedroom unit in square feet = 515

BUILDING PROGRAM - TWO BEDROOM UNITS

Room	Quantity	Area
Living room Function: For use of leisure indoor-hours, such as visiting, relaxing, watching T.V., etc., Equipment: Sofa, one ot two easy chairs, and an end-table. Optional Equipment: Another end-table, coffee table, T.V., desk, and lamps. Finish: Very good and durable, warm, relaxing colors, possibly a carpet.	1	160 sq. ft.
Study room Function: For use as study area for student and storage of his books and supplies. Equipment: Desk, desk-chair, bookshelves. Finish: Good and durable.	1	50
Dining-kitchen Function: Eating, cooking and storage of food. Equipment: Dining - Table, four dining chairs Kitchen - Stove, refrigerator, sink, and storage (approx. 24 sq. ft., see appendix for further details) Also the washer-dryer might be placed in the kitchen. Finish: Kitchen - Very durable and easily cleaned. Dining - Durable, warm colors.	1	130
Master-bedroom Function: Sleeping area Equipment: Bed, either a double or two twin beds, (6'-6" x 4'-6", 6'-6" x 3'-3") dresser, vanity. Optional Equipment: chest-of-drawers, night tables, one or two chairs. Finish: Good and durable	1	120

Room	Quantity	Area
Second bedroom Function: Sleeping area for child or children; or study room Equipment: Bed (single), dresser, night table, clothes storage. Finish: Good and durable	1	90 sq. ft.
Bathroom Function: Personal hygiene Equipment: Bathtub, water closet, lavatory, storage. Finish: Very durable and easily cleaned.	1	40
Mechanical room Function: House heating unit and hot water heater. Equipment: Unit heater and a hot water tank. Finish: Rough.	1	30

Storage

Linen closet (approx. 3 sq. ft., included in above areas.)

Broom closet (approx. 3 sq. ft., included in kitchen)

Coat closet (approx. 6 sq. ft., included in living room)

Clothes slosets (approx. 6 sq. ft., included in bedroom area)

Total area of two-bedroom unit in sq. ft. = 620

BUILDING PROGRAM - THREE-BEDROOM UNITS

Room	Quantity	Area
Living room	1	170 sq. ft.
Function: For use of leisure indoor-hours, such as visiting, relaxing, watching T.V., etc.		
Equipment: Sofa, two or three easy chairs, and an end-table.		
Optional equipment: Another end-table, coffee table, T.V., desk, and lamps.		
Finish: Very good and durable, warm, relaxing colors, possibly a carpet.		
Study room	1	50
Function: For use as study area for the student and storage of his books and supplies.		
Equipment: Desk, desk-chair, bookshelves.		
Finish: Good and durable.		
Dining-kitchen	1	130
Function: Eating, cooking and storahe of food.		
Equipment: Dining - Table, six chairs.		
Kitchen - Stove, refrigerator, sink, and storage (approx. 30 sq. ft., see appendix for further details) Also the washer-dryer might be placed in the kitchen.		
Finish: Dining - Durable, warm colors.		
Kitchen - Very durable and easily cleaned.		
Master-bedroom	1	120
Function: Sleeping area.		
Equipment: Bed, either a double or two singles, (6'-6" x 4'-6", 6'-6" x 3'-3") dresser, vanity.		
Optional Equipment: chest-of-drawers, night tables, one or two chairs.		
Finish: Good and durable.		

Room	Quantity	Area
Second bedroom Function: Sleeping area for child or children; or study room. Equipment: Bed (single), dresser, night table, clothes storage. Finish: Good and durable.	1	90 sq. ft.
Third Bedroom Function: Sleeping area for child or children. Equipment: Bed (single), dresser, night table, clothes storage. Finish: Good and durable,	1	90
Bathroom Function: Personal hygiene. Equipment: Bathtub, water closet, lavatory, storage, 2nd lav? Finish: Very durable and easily cleaned.	1	40
Mechanical room Function: House heating unit and hot water heater Equipment: Unit heater and a hot water tank. Finish: Rough.	1	35

Storage

Linen closet (approx. 3 sq. ft., included in above areas)

Broom closet (approx. 3 sq. ft., included in above areas)

Coat closet (approx. 7 sq. ft., included in living room)

Clothes closet (approx. 6 sq. ft., included in bedroom area)

Total area of three-bedroom unit in sq. ft. = 730

MAINTENANCE FACILITIES PROGRAM

Room	Quantity	Area
Rental-manager's office	1	220 sq. ft.
Function: House the manager and his secretary, dispersal of furniture, rentals, and complaints.		
Equipment: Two desks, two deskchairs, and two or three reception chairs, conference table, permanent and temporary paper storage.		
Finish: Very durable and easily cleaned.		
Relation: Adjacent to the manager's apartment.		
Warehouse-maintenance shop	1	3000
Function: Storage of unused furniture, area for equipment repair, and garage for a tractor and truck.		
Equipment: Work bench, storage shelves, closet space, and hanging facilities.		
Finish: Rough and durable, resistant to oils, punctures, and abrasions.		

MISCELLANEOUS PROGRAM

Service	Quantity or Area
Parking Relation: close to units Function: To provide parking for tenants and visitors.	Min. - 1 car per unit Ideal - 1.5 cars per unit Max. - 2 cars per unit 1 space = 8'-6" x 18'-0"
Play lots Relation: close to units Function: To provide an area for children to play, etc.	Min. - Twice the floor area per unit.
Garbage-can racks Function: To contain all garbage cans. Relation: Adjacent to each unit	Min. - 1 rack per two units. Max. - 1 rack per unit. 1 rack - approx. 2'-6" x 6' to 10'
Clothes lines Function: To provide clothes hanging space other than dryers. Relation: Adjacent to each unit.	Min. - 1 line per unit Ideal - 3 lines per unit.

economic considerations . . . .

ECONOMIC CONSIDERATIONS

GENERAL

With only the proposed program determined, I can only estimate the probable cost of the units and miscellaneous project contingencies. Therefore, the following is to be used only to give an indication of completed construction costs to the client so that a budget may be prepared.

Much of the present equipment and furniture would be reused and any new equipment would be provided by the College through the Service Department. Cabinet work such as shelves, closets, and cabinets are built into the structure and are included in the construction figures.

ESTIMATED PROJECT COSTS

One-bedroom Units

Construction costs - based on an estimate of $10.50 per sq. ft. and 515 sq. ft. per unit.	$5407.
Other costs per unit - see section below.	1454.
total cost per unit	$6861.

Two-bedroom Units

Construction costs - based on an estimate of $10.50 per sq. ft. and 620 sq. ft. per unit.	$6510.
Other costs per unit - see section below.	1454.
total cost per unit	$7964.

Three-bedroom Units

Construction costs - based on an estimate of $10.25 per sq. ft. and 730 sq. ft. per unit.	$7482.
Other costs per unit - see section below.	1454.
total cost per unit	$8936.

OTHER COSTS PER UNIT

The following costs are based on an estimated average of 40 lin. ft. per unit except for streets and improvements which are based on an average of 15 lin. ft. per unit and laterals at 25 lin. ft. per unit. All costs are taken from the Marshall Valuation Service - Segregated Costs, Marshall-Stevens Co., Cleveland.

Utilities

Water	
Water main, 6 in. Transit $4.85 per lin. ft.	$194.
Lateral, 1 in. $1.35 per lin. ft.	34.
Fire hydrants, 600 ft. o. c. $80. per lin. ft.	30.
Catch basins $80. per lin. ft.	32.
Sewer	
Sewer main, 8 in. V.C. pipe $5.60 per lin. ft., 8 ft. deep, avg.	$220.
Laterals, 6 in. V.C. pipe $4.30 per lin. ft., 5 ft. deep, avg.	130.
Manholes, 600 ft. o.c. $.55 per lin. ft.	22.

Gas - paid for by the gas company - -

Electrical - paid for by the power Co. - -

Telephone - paid for by the telephone Co. - -

Streets and Improvements (assumed 40 ft wide St.)

General

"Costs for residential street improvements vary greatly due to local code requirements for different materials, street types and layouts, and utilities. The following costs are averages including ordinary charges for engineering, plans, and inspection. They do not include special charges sometimes levied against the subdivider such as annexation charges or cost of a new or existing trunk sewer. They assume that utilities are at or near the subdivision line with no special connection problems or costs."[1]

	cost per unit
Streets	
Grading and surplus disposal $1.94 per lin. ft.	$29.
4 in. rock base $4.50 per lin. ft.	68.
Paving, 4 in. asphaltic-conc. $10.67 per lin. ft.	160.
Curb and gutters	
6 in. conc. curb & 1 ft. gutter $3.40 per lin. ft.	51.
Conc. cross gutters at intersec. $.27 per lin. ft.	4.
Walks and paths	
Conc. entrance walk or slab $.49 per sq. ft.	90.
4 ft. project walks $1.95 per lin. ft.	100.
Gravelled paths $.40 per lin. ft.	20.

[1] Marshall-Stevens Co., Marshall Valuation Service, Cleveland, p. 198.

Street and project lighting

Street lighting $12.00 per lin. ft.	$120.
Project lighting $12.00 per lin. ft.	150.
Site improvements - by the Horticulture Dept., any cost incurred would not be an additional cost over keeping the existing units and landscaping them; they have no landscaping.	---
Rental-manager's office Construction costs - based on an average of $12.50 per sq. ft. and an area of 220 sq. ft.	7.
Maintenance-warehouse Construction costs - based on an average of $8.00 per sq. ft. and an area of 3000 sq. ft.	60.
Total of other costs per unit - - - - - - - - - -	$1454.

"The cost of complete street improvements with the components indicated above comes to $38. to $45. per lin. ft. of street in ordinary level subdivisions or from $20. to $24. per lin. ft. of lot, including side street allowances."[2]

CALCULATED RENTAL RATES

General

The following calculations are made to determine the rental rate per month needed to cover the entire project cost. I feel that such a project as housing, should be designed so that the income will entirely cover all construction costs and maintenance. Therefore, there will be no

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[2] Ibid., p. 301.

profit or loss to the College.

Because of the type of construction and insulation anticipated at this time, I feel that utility costs in the new or proposed units will be considerably less than they presently are; appropriate reductions have been made in the division 'Comparison of present and projected housing expenses'.

To finance the project, I have assumed that 40-year bonds would be sold at 3% (this is the percentage that bonds were sold for to finance the Field House and Langford Hall). Marshall Valuation Service estimates the life expectancy of this type of building to be 50 years. Therefore, I feel that the 40-year amortization period of the bonds is sensible.

All rental rates are calculated from the following formula prepared by the Community Facilities Administration of the Housing and Home Finance Agency.

$$x = \frac{(i)\ (a) + b}{.90}$$

where:

x = the annual rental charge per unit

a = the annual cost of the construction loan per student or unit

b = the annual operating cost per unit

i = a factor of 1.35 which represents debt coverage (used specifically in the College Housing Loan Program)

.90 = An annual vacancy loss of 10%, however here at MSC units are filled as fast as they are built so .95 will be used instead.

Summer rental rates are assumed to average one-half of the full rental rate. This is based on present regulations and statistics. Presently there are about 5% of the units either vacant or not being held over the summer, (one-half of the full rental rate must be paid for those units held over the summer months) and about 10% occupied in the summer with full rental rates being paid.

Rental Rate for One-bedroom Units

i = 1.35

a = Construction cost of $6861 requires an annual payment for principal and interest at 3% of $307.

b = $100.

$$x = \frac{1.35\ (307) + 100}{.95} \quad \text{or } x = \$541 \text{ per year}$$

$541 per year = $52. per school month and an average of $25. per summer month.

Rental Rate for Two-bedroom Units

i = 1.35

a = Construction cost of $7964. requires an annual payment for principal and interest at 3% of $345.

b = $100.

$$x = \frac{1.35\ (345) + 100}{.95} \quad \text{or } x = \$595 \text{ per year}$$

$595 per year = $58. per school month and an average of $24. per summer month.

Rental Rate for Three-bedroom Units

i = 1.35

a = Construction cost of $8936. requires an annual payment for principal and interest at 3% of $395.

b = $100.

$$x = \frac{1.35\ (395) + 100}{.95} \quad \text{or } x = \$639.\text{ per year}$$

$639. per year = $64. per school month and an average of $21. per summer month.

COMPARISON OF PRESENT AND PROJECTED HOUSING EXPENSES

One-bedroom Units

Present expenses	
Rent	$45.
Utilities (average per month)	16.
total present expenses	$61.
Projected expenses from proposed project	
Rent	$52.
Utilities (est. average per mo.)	12.
total projected expenses	$64.
Added expense to the tenant with new units	
Projected expenses	$64.
Present expenses	-61.
Added expense per month	$ 3.

Two-bedroom units

Present expenses	
Rent (average of $36, 50, 55, 60)	$47.
Utilities (average est. per mo.)	17.
total present expenses	$64.
Projected expenses from proposed project	
Rent	$58.
Utilities (est. average per mo.)	12.
total projected expenses	$70.

Added expense to the tenant with new units

Projected expense	$70.
Present expense	-64.
Added expense per month	$ 6.

Three-bedroom Units

Present expenses

Rent	$60.
Utilities (average per month)	19.
total present expenses	$79.

Projected expenses

Rent	$64.
Utilities (est. average per mo.)	15.
total projected expenses	$79.

Added expense to the tenant with new units

Projected expense	$79.
Present expense	79.
Added expense per month	$00.

MAINTENANCE COSTS

Present Costs (1958)

Type of unit	Number of: units	bdrms.	Yearly labor	per group matl.	totl.	Yearly per unit	Rent per unit/mo.
House	21	1	$ 846.	$ 480.	$1326.	$63	$45
House	16	2	777.	304.	1082.	67.	50. 55.
House	25	3	1320.	813.	2133.	85.	60.
Apartm't	161	2	12,729.	9278,	22,008.	136.	36.
Duplex	49	2	4260.	2428.	6689.	131.	55.

Projected Costs

All estimated maintenance costs have been included in the rental rates with the $100. per annum allotted as seen from the formula used in the calculation of the rates.

UNIT CONSTRUCTION COSTS; POSSIBILITIES

The following square footage costs have been taken from the Marshall Valuation Service and are given only to give the client an idea of the type and quality construction possible.

Single Family Residences

Type	Ext. walls	Int. finish	Mech.	Heat	Cost/s.f.
Low cost conventional	Brick, blk. asphalt or composition roofing, few sash.	Cheap plstr. or drywall, asphalt tile, low cost trct. housing	Min. ltg., and plumbing	Wall furn.	$8.21
Low cost modern	unfinished block, composition roof, cheap sash.	painted, drywall partitions, exposed beams, asphalt tile.	Min. ltg., and plumbing.	Wall furn.	8.59
Average conventional	brick, blk. wood or gd. asphalt shingle rf.	plaster or drywall or hardwood, vinyl asbestos tile	Adequate lighting, plumbing.	Wall furn.	10.13
Average modern	wood, block painted blk gravel roof some glass sliders, little trim	plaster or drywall, exposed beams, vinyl asbestos, carpet on slab.	Adequate lighting, plumbing.	Frc'd air.	10.56

Row Houses

Type	Ext. walls	Int. finish	Mech.	Heat	Cost/s.f.
Good	Brick, stn. trim, good stucco, built-up roofing	Plaster or sheetrock painted, hardwood, vinyl	Good lighting, plumbing, one bath for two bedrooms	Frc'd air.	$11.33
Average	Grouted brick or blk., some trim, blt-up roofing	Sheetrock and paint, hardwood, floor	Adequate lighting plumbing	Wall furn.	9.11
Low cost	Brick, blk. built-up roof, few sash	Sheetrock and paint, asphalt tile floor	Minimum	Wall furn.	7.53

Apartments

Good	Stucco, brick or stone trim	Good finish and hardwood floors	Many good fixtures	Frc'd air.	13.30
Aver-age	Some front ornament-tion	Typical FHA requirements	Average FHA	Wall furn.	10.84
Low cost	no trim	Min., asphalt tile	Minimum	Heat-ers	8.68

appendix

INTERVIEW

The following interview was conducted on January 19, followed by another included below on February 2, 1963, with Martin Whalen, Head of the Physical Plant at Montana State College. The following are some of the questions asked and the answers received:

Question: Would garages be of any value to tenants in housing of this nature?

Answer: No, they would probably be too expensive to be practical to students.

Question: Are there any zoning regulations in Married Student's Housing?

Answer: None

Question: What percent would bonds probably be sold for if they were to finance such a project?

Answer: Probably about 3% to 3.5% Bonds sold to finance the Field House were sold at 3%.

Question: Has there even been any one test the soil or take any other soil tests in this area?

Answer: No

Also maps of utilities, floor plans, and history of existing units were obtained from Mr. Whalen to facilitate in writing the foregoing document.

INTERVIEW

The following interview was conducted with Mr. H. Cottam's secretary on January 23, 1963. Mr. Cottam is the Head of the Housing Office at Montana State College. The following are some of the questions asked of her and her corresponding responses:

Question: Do you have any record of the number of children per family?

Answer: No, you will have to see Mr. Worthington.

Question: Do you have any record of the number of existing one, two, and three bedroom units?

Answer: Yes, 1 no bedroom, 20 1-bedroom apartments, 161 2-bedroom apartments, 31 3-bedroom apartments, 21 1-bedroom prefabs, 94 2-bedroom prefabs, and 14 3-bedroom prefab duplexes.

Question: Do students have to rent during the summer months to retain their apartment?

Answer: They have to pay one-half of the full rent.

Question: What percent of the units are either vacant or not being held during the summer.

Answer: About 5%

Question: What is the average utility bill during the winter months?

Answer: $16. to $20. in the cold months

Question: How many new units or units constructed in the last 10 years are there?

Answer: 108

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