THESIS 490

A HIGH-RISE APARTMENT HOUSE FOR BOZEMAN

R.W. LYLE

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THESIS 490

A HIGH-RISE APARTMENT HOUSE FOR BOZEMAN

*RESEARCH

*SOLUTION

*REVISION

r. w. lyle

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out to achieve. Explanation

The entire project has been superficially treated and assumptions look consistency with many 'answers' arbitrary w/o cause.

Looking at this paper as the summation of 5 credit hrs subsequent to the presentation at the end of Winter qtr, I feel that there is little expansion of subject, revisions are minor and mechanical. I do not feel that it is adequate for passing caliber work.. I would hesitate to accept it for more than 1 cr. hr (30 hrs work)

Myra

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INTRODUCTION

This paper is being written as a Thesis for Architecture 490, and is entitled "A High-Rise Apartment House For Bozeman." It has been considered a hypothetical problem and should be taken as such. The conslusions that have been arrived at in regard to the final design are undoubtedly not completely adequate. This is due to the great differential in time between the actual designing of the problem and the proposed construction 15 years from now. Other than these considerations, I believe the design to be adequate as a Thesis Problem.

I would like to acknowledge the cooperation given me by the staff of the School of Architecture, without which the solution would surely have been found lacking.

R. W. Lyle

EXPLANATION OF THE PROBLEM

This paper is being written as a Thesis for Architecture 490. The Thesis incorporates work done Winter and Spring Quarter, 1961, and as presented here, is the culmination of this work. Several assumptions have been made which will be of interest to the reader. They will be discussed below.

The assumptions include: (1) There will be a demand for a high-rise apartment house in Bozeman in the future; (2) It will be a luxury type apartment house, utilizing large square footages per apartment unit.

The first assumption listed above will perhaps explain the problem best. It can be assumed that there is a need for housing in Bozeman at present, but it is doubtful if a high-rise apartment house is the immediate answer. Proof of this statement is offered by Mr. Frank Hoey of Bozeman, who desired to build such a housing unit. Mr. Hoey engaged a local architect, Mr. Oswald Berg, to assist with the research for such a development. Their investigation concluded that it was economically unfeasible to build a high-rise in Bozeman at the present time.

This was mainly due to the high rent they would have to charge to realize the cost of the building.

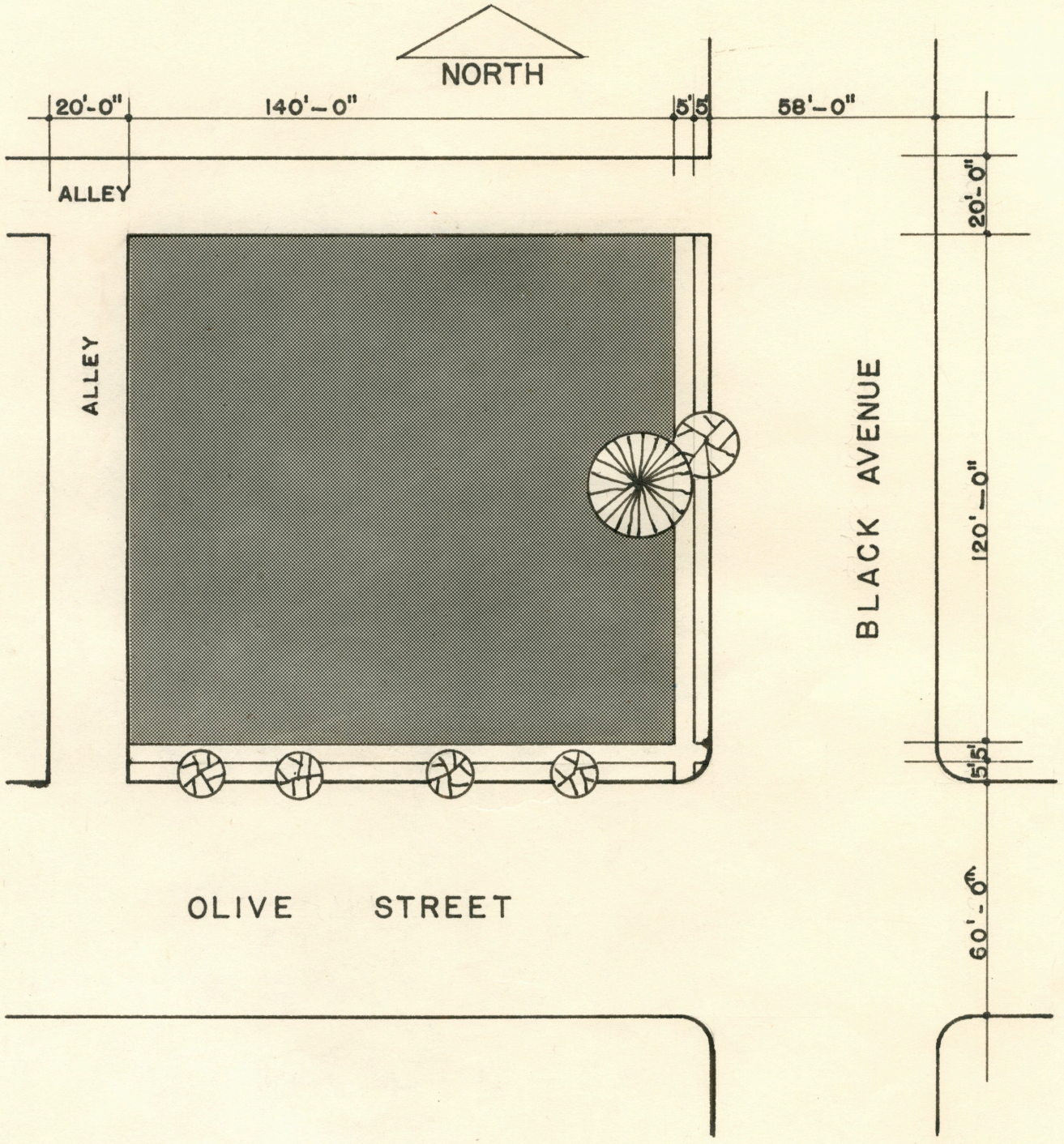
I had several talks with various realtors in Bozeman and they all felt that such an apartment house would be feasible sometime in the future. They cited the expected growth of Bozeman as being the primary reason for this. Hence, I chose an arbitrary date of 15 years in the future for my solution, realizing that it may be feasible at either an earlier or later date.

The second assumption came purely from a desire to design an elaborate type of apartment house, rather than a low-rent type. Perhaps the square footages, as stated later in the paper, are a bit large. However, it should be realized that I used them purely as a starting point and that they were subject to revision. This will become obvious as the paper progresses.

THE SITE

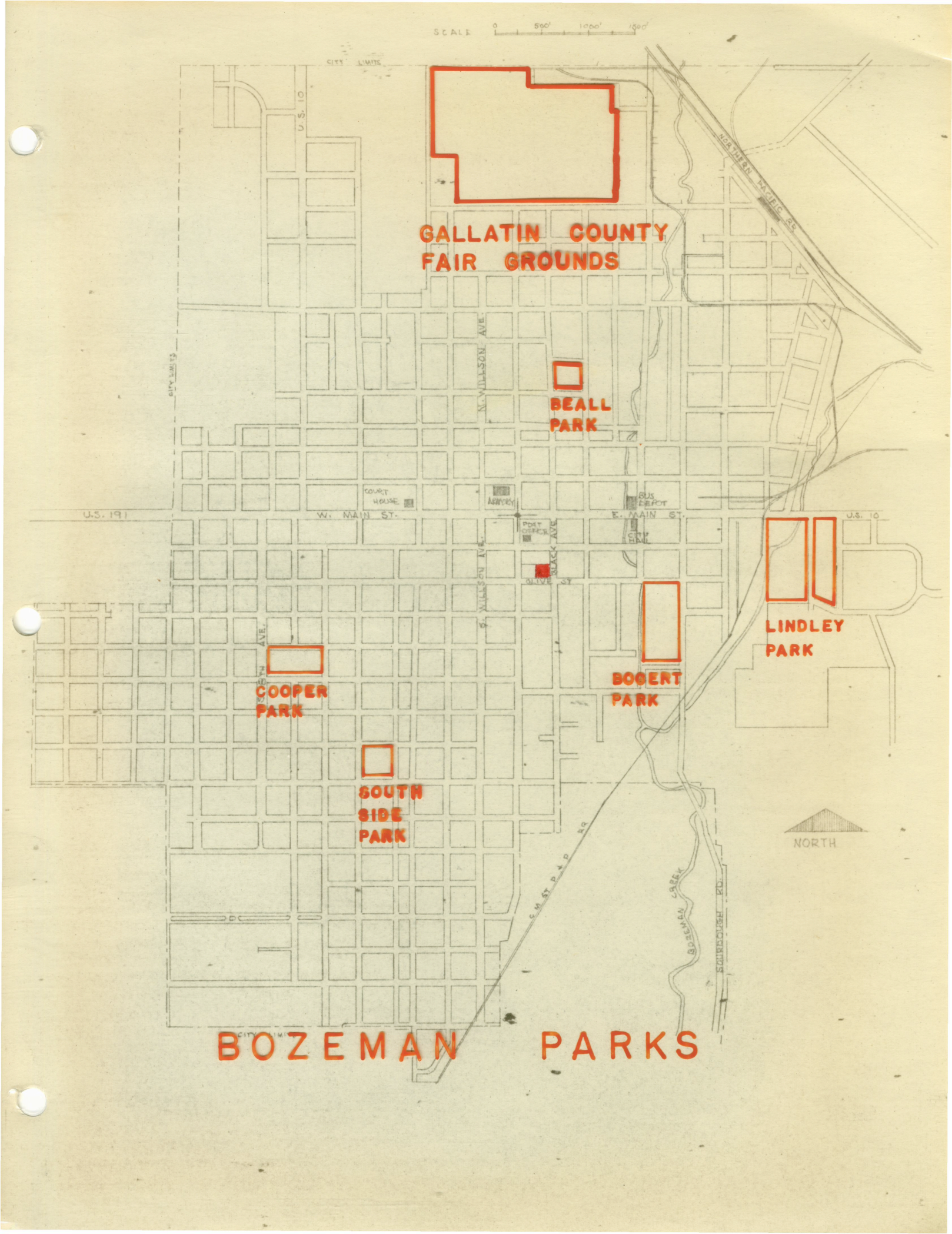
The site on the corner of Olive and Black was chosen for several reasons. Among these was its central location in Bozeman, and the changing of the zoning laws to include this area in the Central Business District. I felt that this would be one of the best sites for a high-rise apartment house due to the fact that this area would eventually need more adequate and luxurious housing for an expanding business community. It would also be convenient for tenants in that it is located within easy walking distance of stores, churches, schools, and parks. From this it can be assumed that most of the tenants would be prosperous businessmen, or the wealthy retired.

The following pages give a graphic description of the lot and its relation to the important places in Bozeman; the schools, churches, and parks, as well as other points of interest.

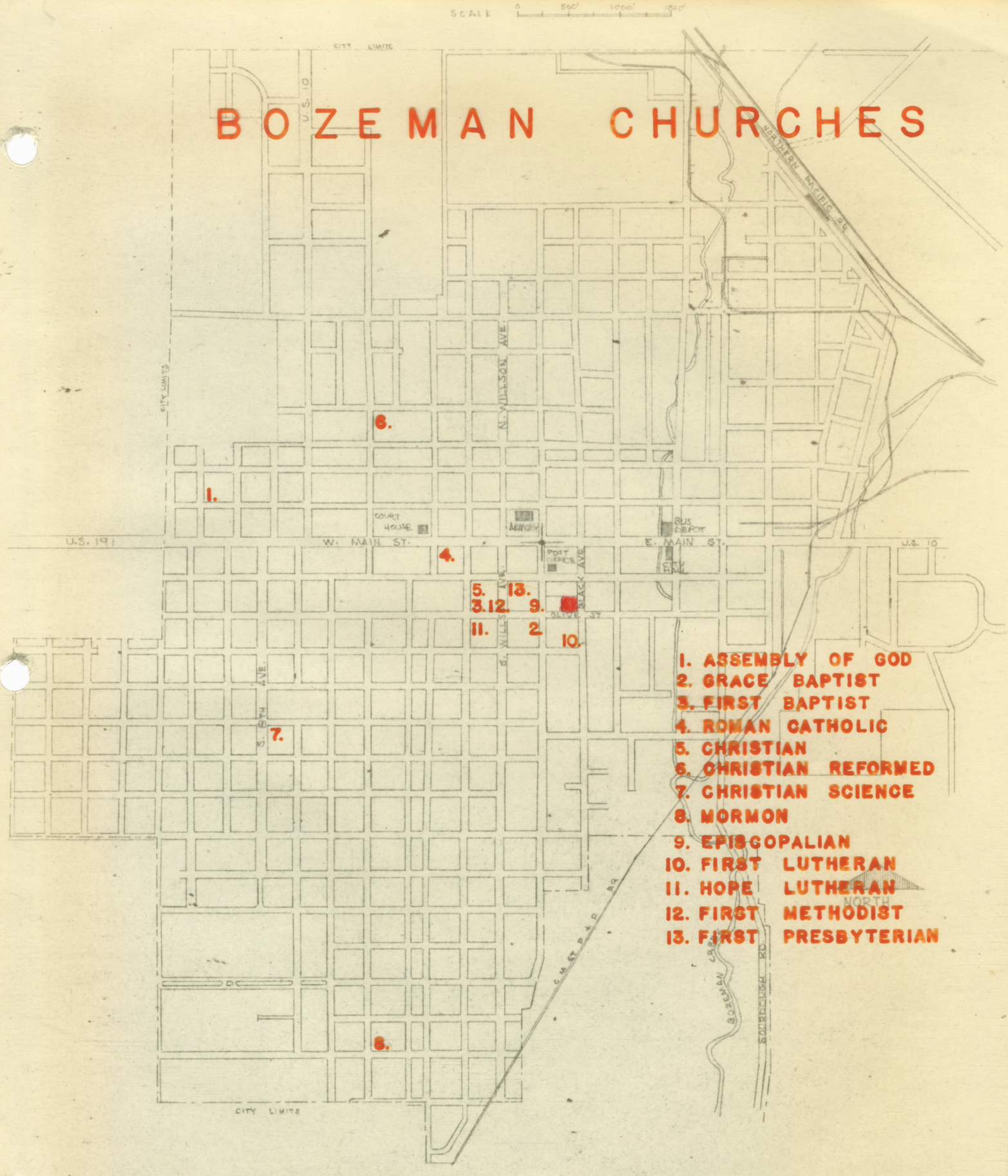


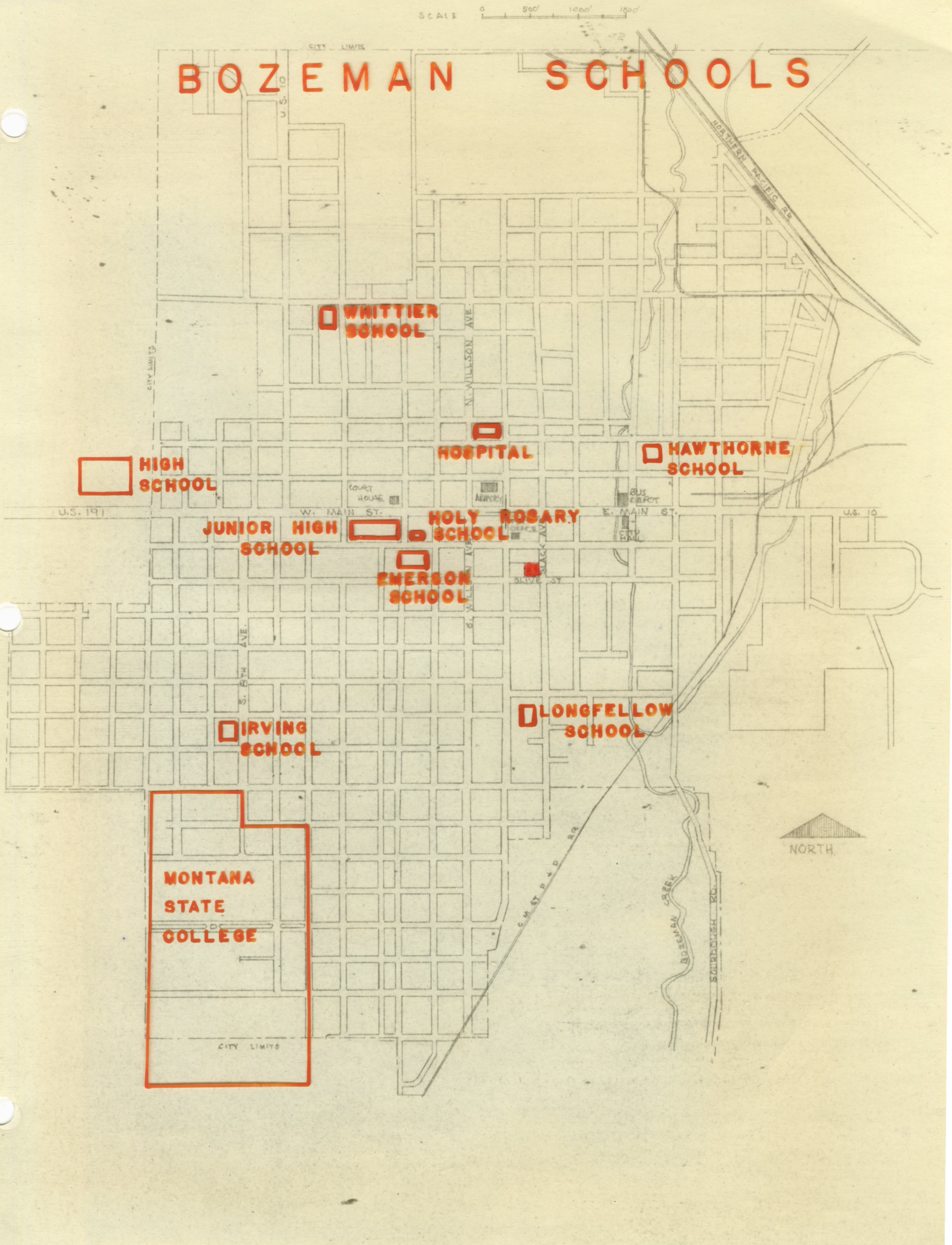
PLOT PLAN

SCALE — $\frac{1"}{40"} = 1'-0"$


SCALE 0 500' 1000' 1500'
CITY LIMITS
U.S. 10
GALLATIN COUNTY FAIR GROUNDS
NORTHERN PACIFIC RR
N. WILLSON AVE.
BEALL PARK
COURT HOUSE
ARMORY
BUS DEPOT
U.S. 191
W. MAIN ST.
E. MAIN ST.
POST OFFICE
CITY HALL
BLACK AVE
OLIVE ST
S. WILLSON AVE.
LINDLEY PARK
BOGERT PARK
COOPER PARK
SOUTH SIDE PARK
NORTH
C.M.ST.P.&P. RR
BOZEMAN CREEK
SOURDOUGH RD.
BOZEMAN PARKS

BOZEMAN CHURCHES




BOZEMAN SCHOOLS
SCALE 0 500' 1000' 1500'
CITY LIMITS
NORTHERN PACIFIC R.R.
WHITTIER SCHOOL
N. WILLSON AVE
HOSPITAL
HAWTHORNE SCHOOL
HIGH SCHOOL
COURT HOUSE
ARMORY
BUS DEPOT
U.S. 191
W. MAIN ST.
E. MAIN ST.
U.S. 10
JUNIOR HIGH SCHOOL
HOLY ROSARY SCHOOL
CITY HALL
EMERSON SCHOOL
BLACK AVE
OLIVE ST
S. 7TH AVE
IRVING SCHOOL
LONGFELLOW SCHOOL
MONTANA STATE COLLEGE
C.M.ST.P.&P. R.R.
BOZEMAN CREEK
SOURDOUGH RD.
CITY LIMITS
NORTH

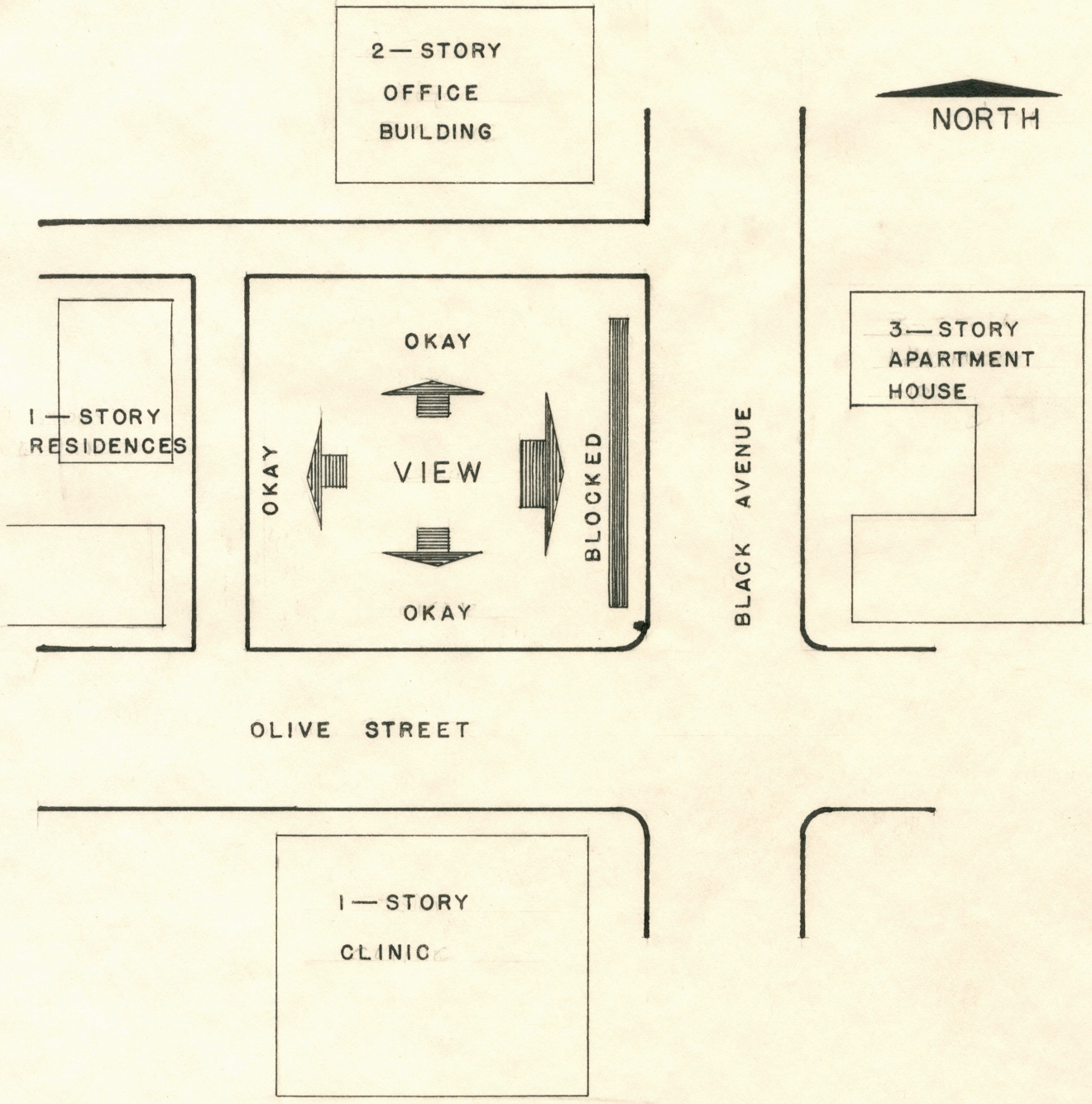
MAJOR VIEWS IN REGARD TO BUILDINGS EXISTING AROUND THE SITE

Since the site has been shown adequate as a location for an apartment building, the next step was to determine in which direction the major views should lie. I had originally planned on designing a building with all four sides enclosed by glass. However, the presence of an old apartment house lying to the east of the site caused me to reconsider this plan. Complicating the matter was the problem of assuming which of the surrounding buildings would still be standing in 15 years.

I had to assume that the old apartment house would still be standing in 15 years. Since it is somewhat shabby and unkempt, it become apparent that the view to the east would have to be blocked. In the remaining three directions, there are no really obtrusive structures, so I decided to enclose the north, south, and west walls with glass.

The drawing on the following page further illustrates this situation.

MAJOR VIEWS IN REGARD TO BUILDINGS EXISTING AROUND SITE



PROGRAM

The following is the program I used as a guide in designing the apartment house. I am including it to indicate the basis for the first design solution.

1. Apartment Units:

There shall be 20 apartment units, of two sizes, "A" and "B".

"A" apartments shall consist of: living-dining area; kitchen; bathroom; two bedrooms; adequate closet and storage space.

Maximum floor area: 1500 sq. ft.

"B" apartments shall consist of: living-dining area; kitchen; bathroom; one bedroom; adequate closet and storage space.

Maximum floor area: 1000 sq. ft.

2. Manager's Apartment:

The manager's apartment shall consist of: living-dining area; kitchen; bathroom; one bedroom; adequate closet and storage space.

Maximum floor area: 1000 sq. ft.

3. Penthouse:

The penthouse shall consist of: living-dining area; kitchen; bathroom; two bedrooms; adequate closet and storage space.

Maximum floor area: shall not exceed 50% of the total roof area, with the remaining 50% being split equally between terracing for the penthouse, and the public area.

4. Entrance-Lobby

Shall provide main entrance to building, along with public area for circulation. Included in the lobby area shall be an elevator, stairwell, phone booth, directory, and small lounge. Adjacent to the lobby will be an entrance to the manager's apartment.

5. Utilities:

Shall be orientated in the basement and consist of: heating unit; electrical switchboard; utility room.

6. Vertical Services:

Shall consist of: stairwell; elevator; pipe and electrical chase; trash chute.

7. Apartment Floor Lobby:

Small lobby area per floor providing access to elevator and stairwell, trash chute, apartments.

8. Parking:

Adequate parking for 30 cars shall be provided on the site, as well as a service drive.

9. Landscape:

Landscape shall be in general character with the design of the building. Particular emphasis will be placed on shielding the ground floor view from the surrounding area.

BASIC SHAPE OF THE BUILDING

Several basic considerations pertaining to the design of the building were determined through the use of the Bozeman Zone Requirement Chart.

The chart requires minimums of 600 sq. ft. for two bedroom apartments and 520 sq. ft. for one bedroom apartments. I felt that since this was to be a luxury apartment house, the floor areas should be much larger. Consequently, I chose maximums of 1500 sq. ft. and 1000 sq. ft. for two bedroom and one bedroom apartments, respectively. These may seem a little large, but the reader should remember that they were subject to revision, as were most of the assumed elements of the design.

The chart also gives a minimum lot area requirement. It requires the lot to contain at least 4000 sq. ft. plus 600 sq. ft. per apartment unit. Since the lot is 140' by 130', and contains 18,200 sq. ft., it was allowable to place 24 apartment units on the lot. (See next page).

BASIC SHAPE (continued)

Lot size: 130' x 140' = 18,200 sq. ft.

$$\begin{array}{r} 18{,}200 \text{ sq. ft.} \\ -\ 4{,}000 \text{ sq. ft.} \\ \hline 14{,}200 \text{ sq. ft.} \end{array}$$

$$\frac{14{,}200 \text{ sq. ft.}}{600 \text{ sq. ft.}} = 23.6 \text{ or } 24 \text{ apt. units}$$

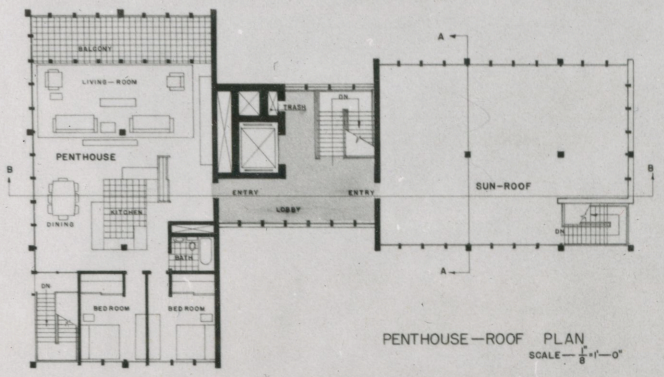
I then chose to arrange the apartment units two to a floor, making the structure 12 stories high. After some consideration, it was decided to place the two bedroom apartments in one element, connecting it to the one bedroom element by the vertical service core.

The chart also required space for parking 30 cars on the site. This space was located on the north side of the lot.

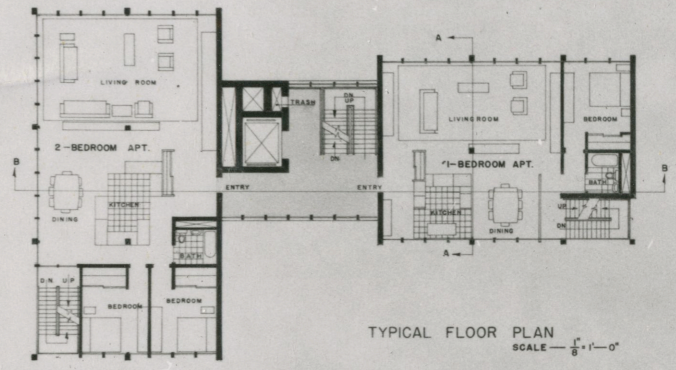
PRESENTATION

It would be difficult to show the steps in the actual design solution at this time, so instead of going through the whole procedure, I will allot the next five pages to photographs of the first solution. These drawings were done in color and ink on 30" by 40" white drawing board.

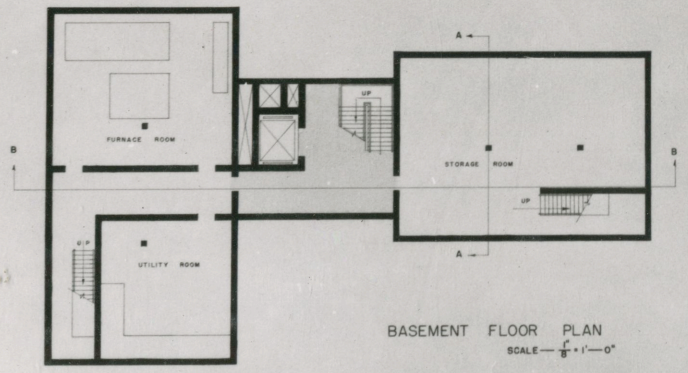
The scales range from 1/30" = 1' - 0", to 1/8" = 1' - 0". Included are floor plans, all elevations, sections, perspectives, and a plot plan.



PENTHOUSE—ROOF PLAN
SCALE— $\frac{1}{8}$" = 1'—0"

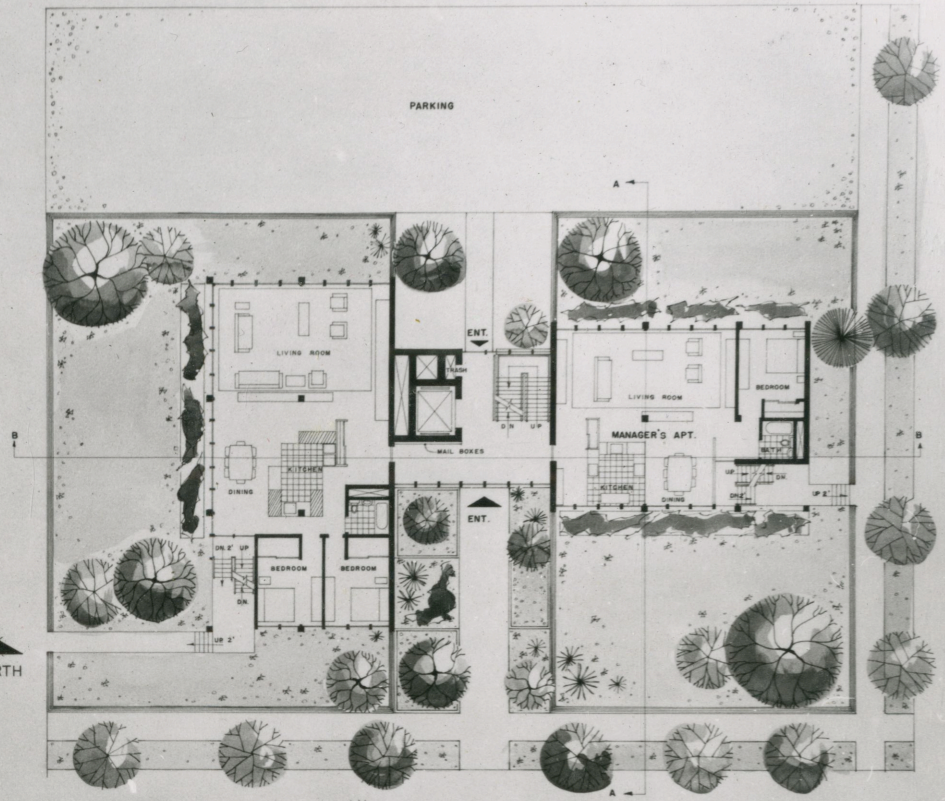


TYPICAL FLOOR PLAN
SCALE— $\frac{1}{8}$" = 1'—0"

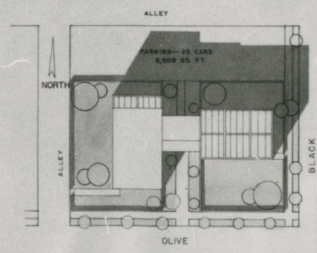


BASEMENT FLOOR PLAN
SCALE— $\frac{1}{8}$" = 1'—0"

NORTH



GROUND LEVEL FLOOR PLAN
SCALE— $\frac{1}{8}$" = 1'—0"



PLOT PLAN
SCALE— $\frac{1}{30}$" = 1'—0"

SITE— LEVEL
SITE AREA— 140' x 120' = 16,800 SQ. FT.
LOCATION— CORNER OF BLACK AND OLIVE
WITHIN WALKING DISTANCE OF CHURCHES, SCHOOLS, MAIN SHOPPING DISTRICT.
VIEWS— NORTH, SOUTH ONLY.

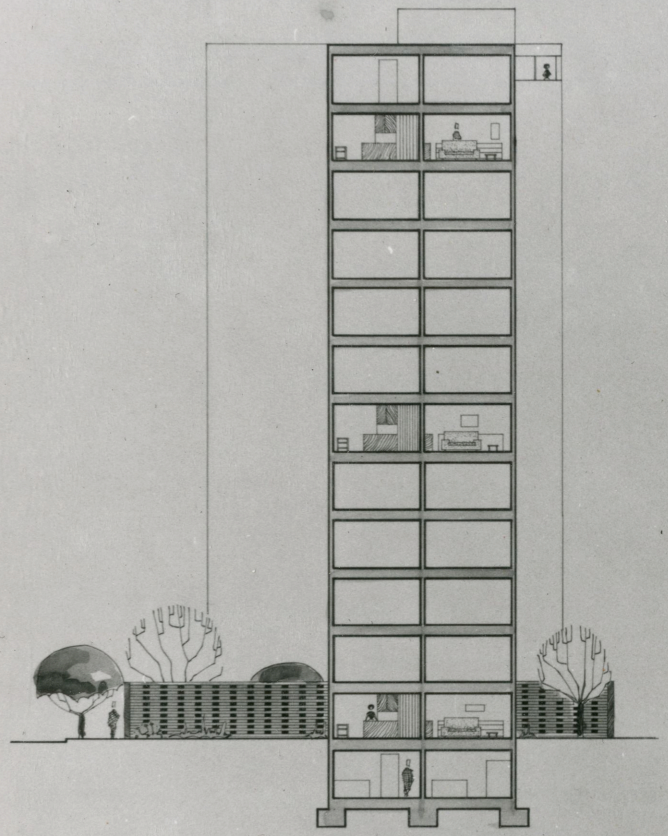
A HIGH-RISE APARTMENT

FOR BOZEMAN

THESIS PROJECT

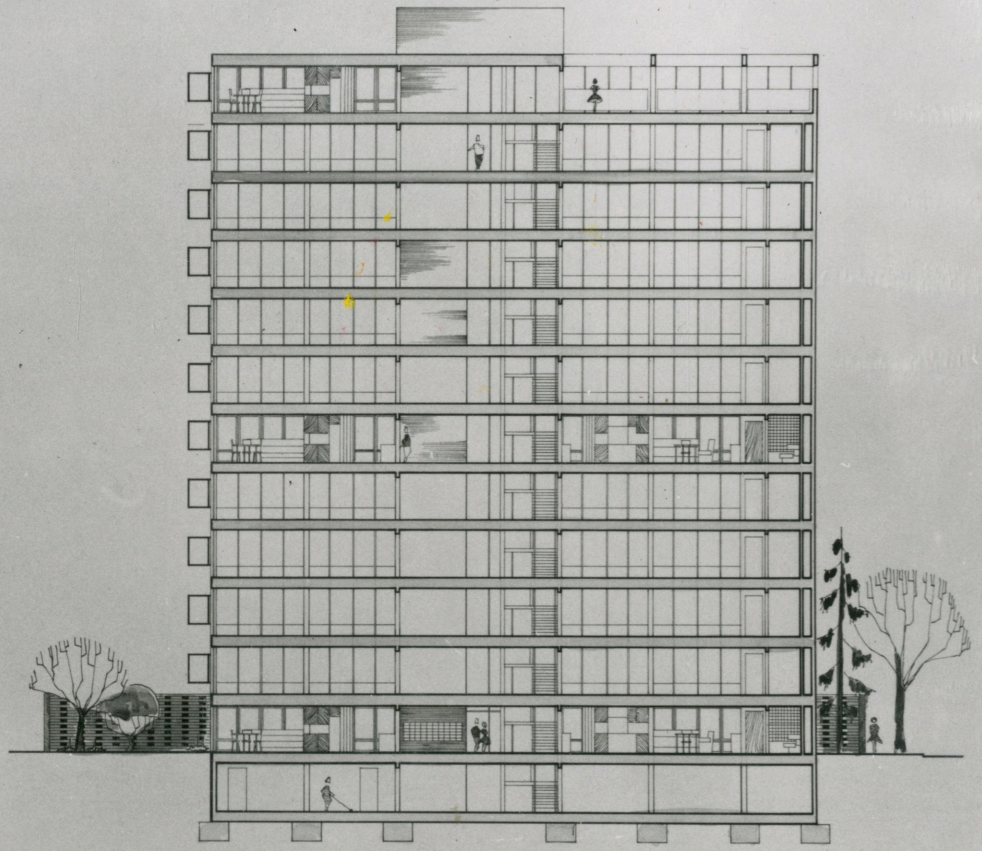
R. W. LYLE

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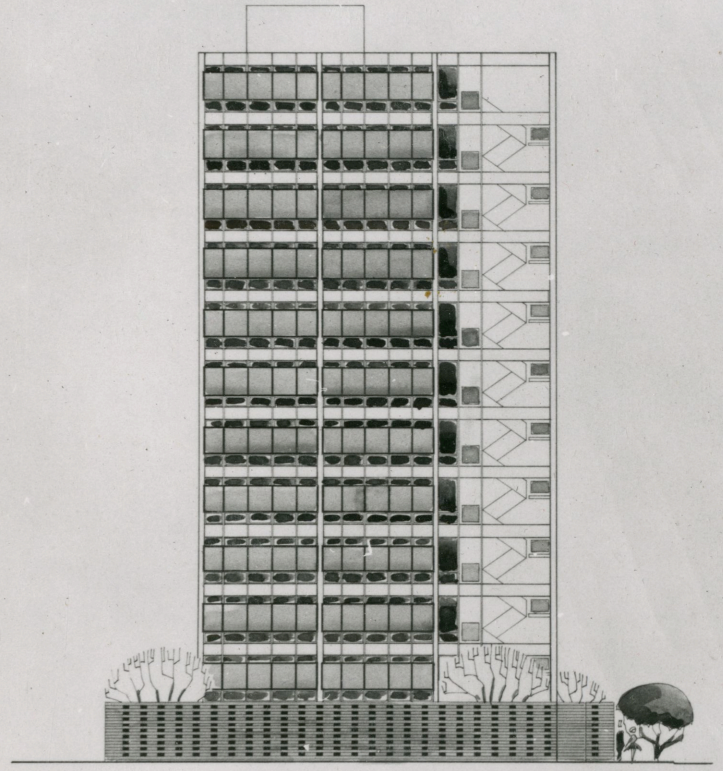
SECTION A–A

SCALE — $\frac{1}{8}$" = 1'–0"



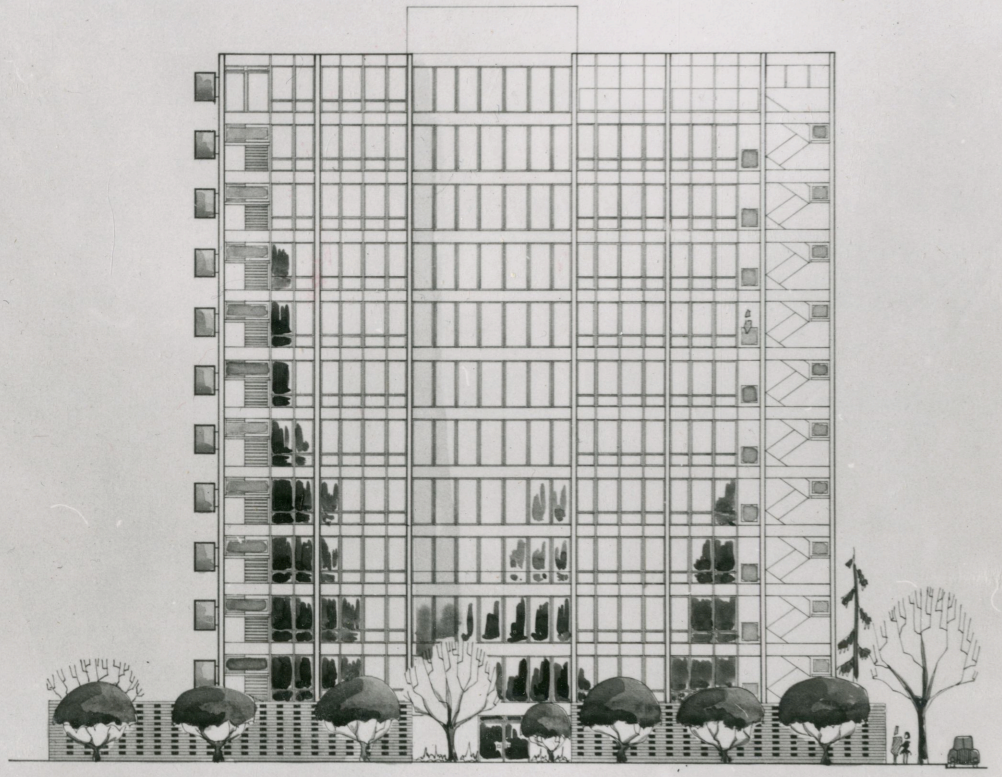
SECTION B—B

SCALE — $\frac{1}{8}$" = 1'—0"



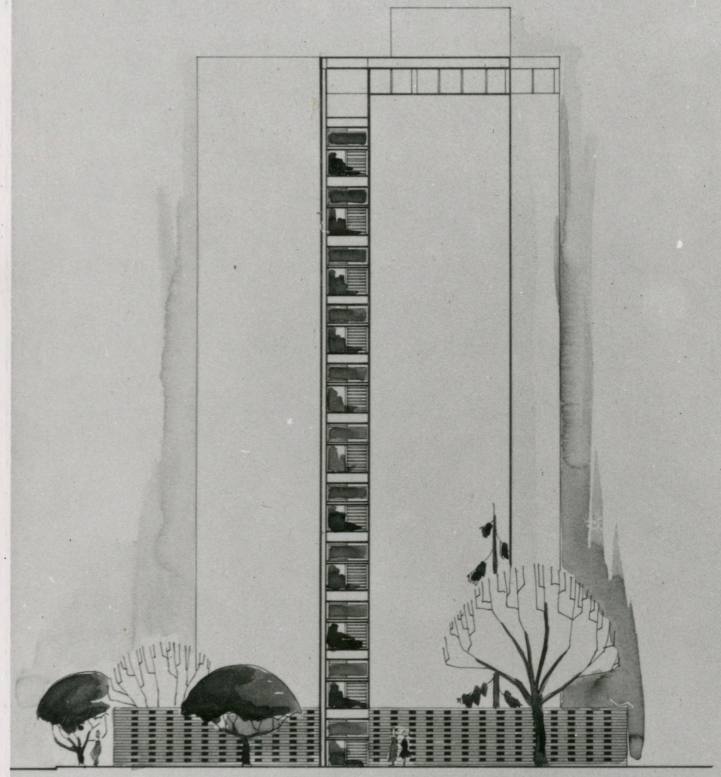
WEST ELEVATION

SCALE — $\frac{1}{8}$" = 1'—0"



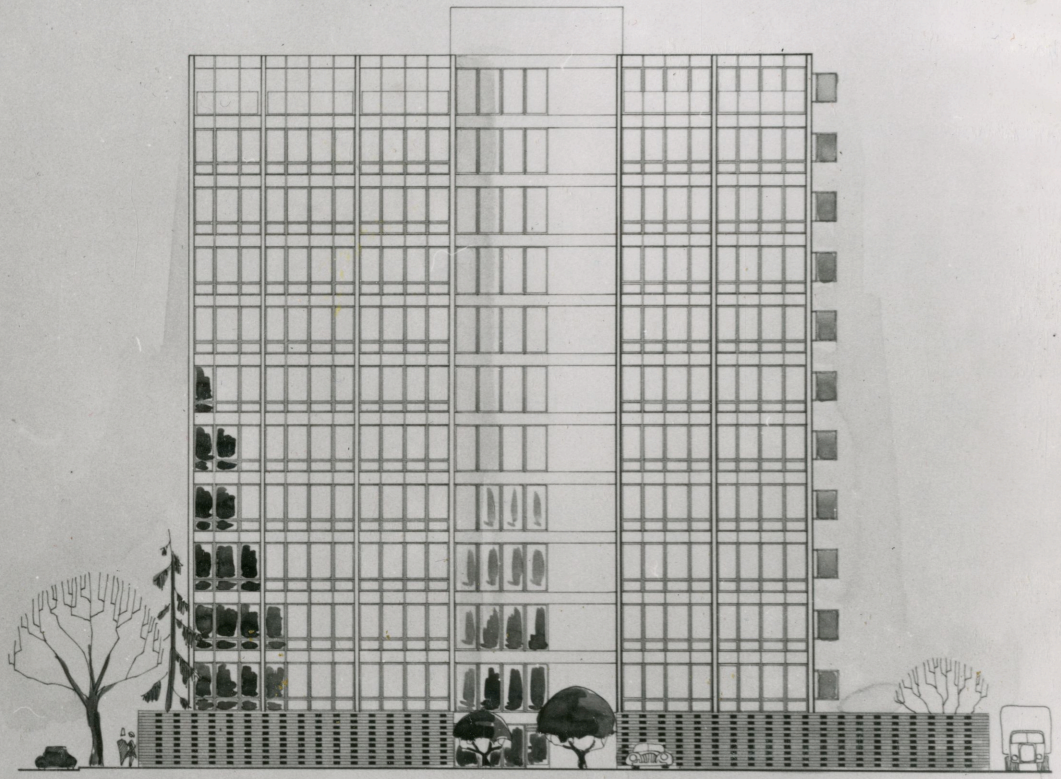
SOUTH ELEVATION

SCALE — $\frac{1}{8}$" = 1'—0"



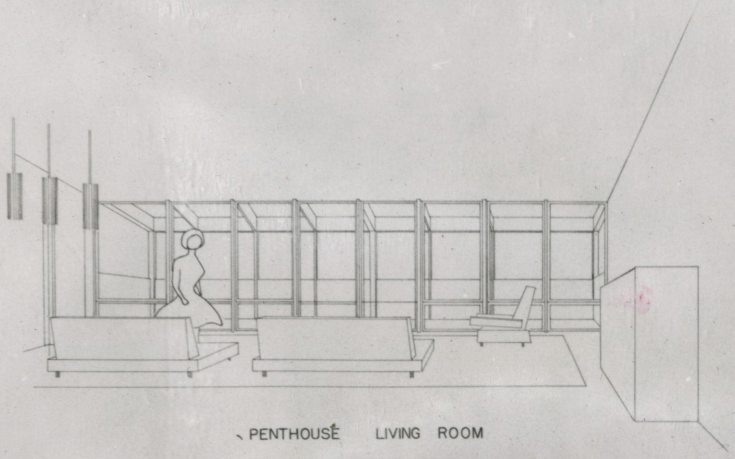
EAST ELEVATION

SCALE — $\frac{1}{8}$" = 1'—0"

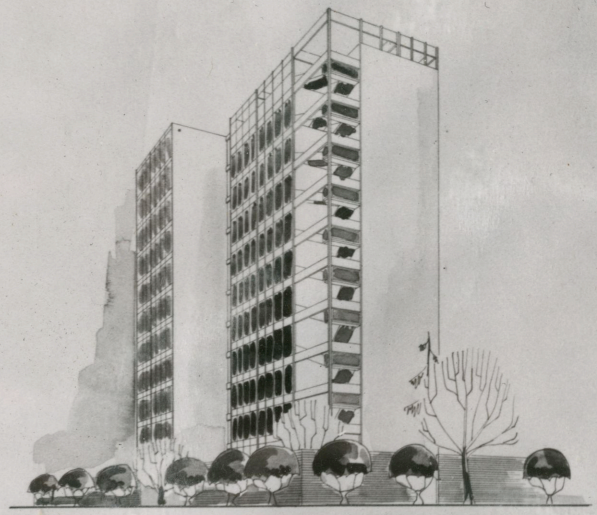


NORTH ELEVATION

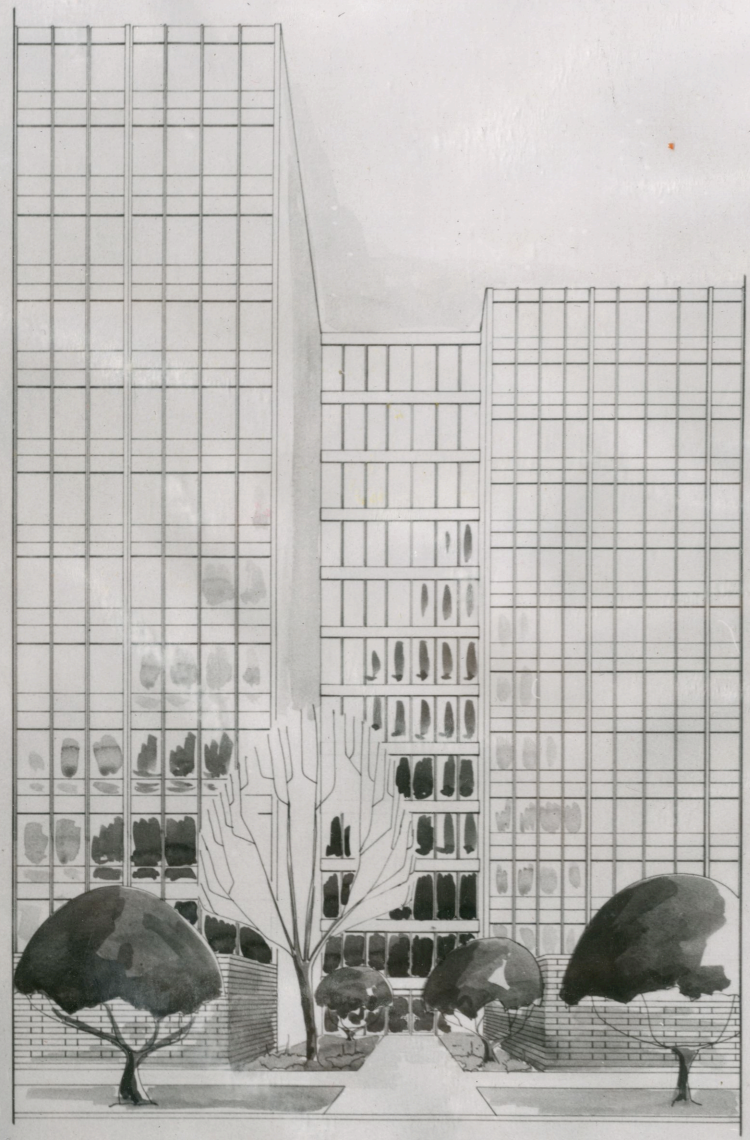
SCALE — $\frac{1}{8}$" = 1'—0"



PENTHOUSE LIVING ROOM



CORNER PERSPECTIVE



MAIN ENTRANCE

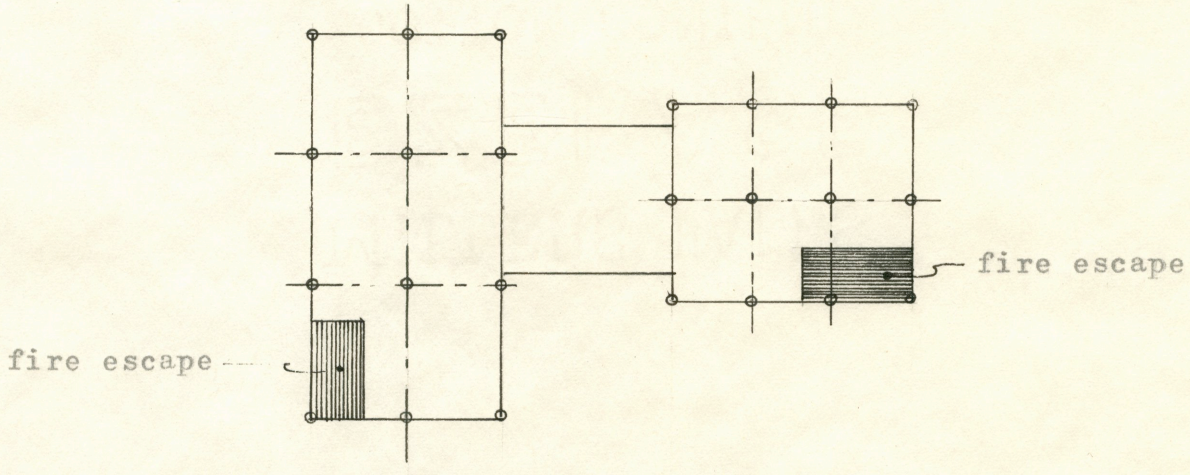
THESIS —— R.W. LYLE

REVISIONS

The following section contains revisions to the first design solution.

THE BAY SYSTEM IN RELATION TO THE FIRE ESCAPES

In designing the apartment house, I had trouble getting the fire stairs far enough away from the central core to meet the code requirements. Since I had two distinct apartment units to work with, both requiring their own fire escape, the problem was doubly complicated. After much consideration, I decided to use the fire stairs as separate exposed elements in a corner of each apartment wing.

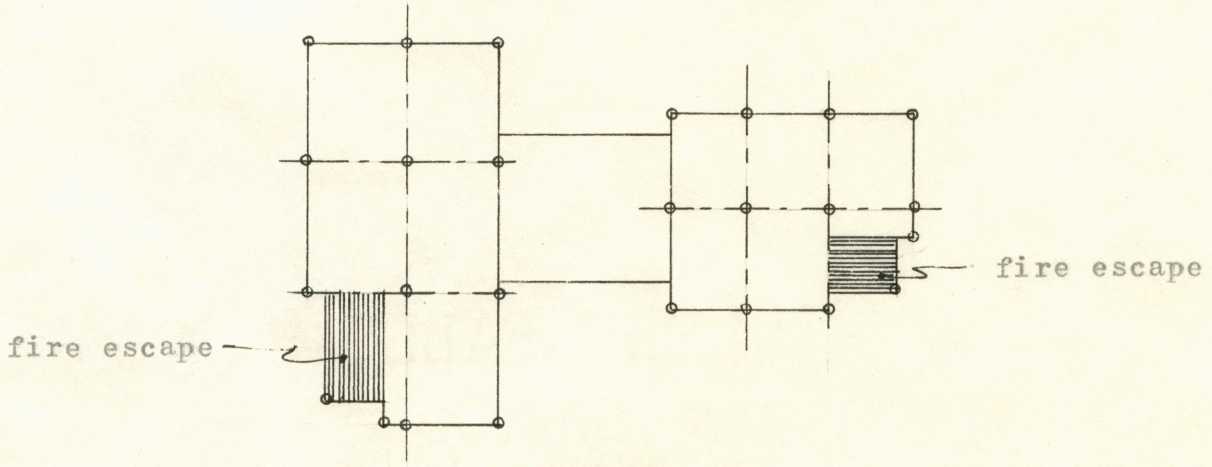


First Solution

Functionally, the solution was adequate. However, in elevation, it was a bit hard to determine just where the stairs began and the apartment unit ended. This was caused by the stair well overlapping from its primary structural bay into the next bay.

BAY SYSTEM (continued)

It would have been better to emphasize the fire stair more strongly by slightly changing the structural bay in which it was located, contrasting it with the main structural bays.



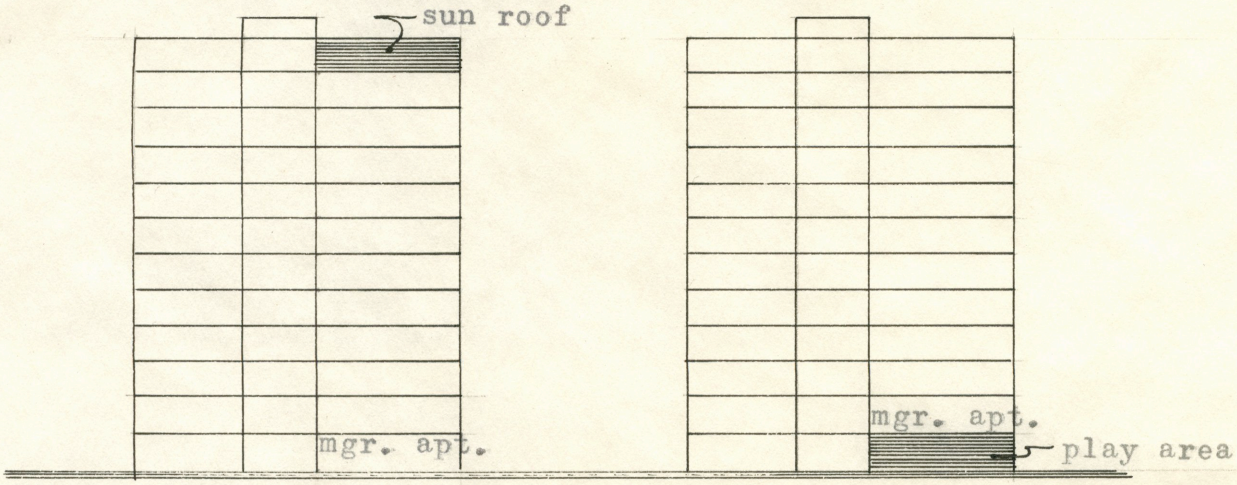
Revision

By doing this, the stair well would be clearly defined as a separate element without impairing its function.

ELIMINATION OF THE SUN ROOF AS A PLAY AREA

The question was raised by the committee concerning the use of the sun roof as a play area. As the problem was originally designed, the sun roof would be the only adequate play area, since the yards were to be used primarily by the ground floor tenants.

After giving it some thought, I agreed that it would be better to raise the one-bedroom apartment wing off the ground one story, and to use this open space as the main play area. This would necessitate moving all apartments of the element up one story and eliminating the sun roof. The two sketches illustrate the revision..



First Solution

Revision

SUN PROTECTION FOR THE WEST WALL

In the original solution, I designed a framed opaque sun screen for the west wall. I felt that this was necessary due to the fact that the sun would be shining directly into the apartments during the late afternoon, causing some discomfiture. The one thing wrong with this type of shading, however, is that the screens were immovable and consequently they blocked the view to the west.

Upon consideration of this problem, I decided that it would be better to use large, vertical panels mounted outside the west wall. These panels would rotate on central pivots and would be controlled from the individual apartments.

This type of shading would of course be expensive, but I felt that the resulting effect would merit the expense and still be within the general scope of the problem.

MINOR REVISIONS

There were numerous minor revisions that should have been made, and they will be discussed below.

The first of these revisions concerns the main stair well. In the design solution, the stair well was purposely left open to make it a pleasant means for getting from one floor to another. Upon looking at it now, it is obvious that it would be used very little, since most of the tenants would travel in the elevator. It would be better to enclose it and use it mainly as another fire stair.

One other aspect of the main stair concerns its connection between the lobby and the basement. It was designed as a main part of the lobby, opening into the interior of the building. It would be better, however, to change the ground floor access from the inside to the outside. This would facilitate such traffic as would be mainly interested in going to and from the basement. The change would be minor and would be definitely recommended.

MINOR REVISIONS (continued)

Another revision concerned the large area contained in the individual apartments. The purpose in creating such a large area was centered on making the interiors as flexible as possible. It became obvious that the space allocated for the living area was somewhat out of proportion to the other spaces, such as the bedrooms. It was my intention, however, to make these living areas large since they would be the most frequently used spaces in the apartments. Should the individual tenants find them too large, it would be easy to remodel the interiors through the use of movable partitions. I would recommend leaving them as they are.

The last revision to be discussed concerns adding a registration desk, a PBX, and facilities for maid service. I gave this considerable thought, but decided against recommending it. The reason for not adding these services is that in an apartment house of 23 units it is not really necessary. Were the project larger in scope, I think that these elements would have to be included through necessity; in this project, I doubt if the usage would warrant their inclusion.

SUMMARY

The primary point of concern in this problem was the assumption that Bozeman could eventually support a high-rise apartment house. During my talks with the various people who were interested in such a project, at no time was I able to get anyone to say definitely at what date in the future an apartment house of this type could be constructed. The only concrete statement was that eventually it could be done, depending upon the growth of the city, both economically and in population.

I can give no estimate of the structure's cost, since the estimates I received varied from $15,000 to $50,000 per apartment unit. I imagine the reason for this is that such a problem is too far beyond the local people's experience.

Consequently, this paper can serve only as a design guide for anyone interested sometime in the future in building a high-rise apartment house. As was stated before, the problem was mostly a hypothetical one; indeed as it progressed, it seemed to grow more so. I can only say that I hope it has served its purpose and that sometime it may be of use to somebody interested in the same problem.

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