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A PLANNED HOUSING DEVELOPMENT

LOCATED AT

KARST IN THE GALLATIN CANYON

Undergraduate Thesis in Architecture

by

Perry L. Bergum

Submitted to the School of Architecture
as partial fulfillment of the requirements

for the degree of

Bachelor of Architecture

at

Montana State University

Bozeman, Montana

June, 1975

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Introduction

My thesis project was undertaken as a reaction to the type of development that is taking place throughout Montana, and specifically in the Gallatin Canyon where the site for the project is located.

By doing this project, I feel that I now have a better understanding of the implications of development in the Canyon and in other similar semiprimitive recreational areas.

I hope that my proposed development could prove to be an alternative to the typical subdivision type of development taking place in the Canyon at the present time.

I would like to express my appreciation to my advisor, Professor Hugo Eck, and to Professor Francis Woods who donated their expertise in criticism as the project developed. I also would like to express my special thanks to Terry Kalil and James Donham for the many long hours they spent in helping with the final presentation.

THESIS STATEMENT

The architect's obligation is to evaluate a client's preconceived ideas and present new points of view with which to solve the client's immediate needs by (1.) creating an environment that is physically and emotionally acceptable for the given set of conditions, and (2.) planning for the long-term social and environmental needs of society at large.

This indicates that the architect is also obligated to determine the given set of conditions and resolve the conflict between parts 1 and 2 of the statement.

Project

The project for my thesis is a proposal in the form of a recreational housing development for the area known as Parkview West, a "planned recreational subdivision," located at Karst in the Gallatin Canyon.

The existing plan consists of 39 individual lots which will each be used as a site for a single family type residence or vacation home.

Rather than do a study to determine what use would be best suited for the land, I am assuming the same land use so that a comparison can be made between the existing plan and my proposal.

If a study had been undertaken to determine what was the best land use for the area, it is highly possible that something other than recreational housing would be indicated.

I am personally in favor of a no development policy for the Gallatin Canyon. However, with the present land boom in Montana and the ever-increasing use of recreational areas, this is not going to happen. Therefore, I feel that it is imperative that any development that takes place should have the least impact on the area possible so that future generations can enjoy the area in as close to its natural state as possible.

With the condition that the site would be used for recreational type housing, the next step was to determine the type and number of units to be in the development.

This was accomplished by interviewing several real estate agents who are familiar with land development in the Gallatin Canyon and compiling their information and recommendations. The final determination of type, size and number of units is as follows.

Multifamily units:

1 Bedroom	-	8 units
2 Bedroom	-	14 units
3 Bedroom	-	6 units

Single family units:

1 Bedroom	-	3 units
2 Bedroom	-	6 units
3 Bedroom	-	3 units

Single family lots - 10

Total - 53

HOUSING DEVELOPMENT PLAN

A PLANNED RECREATIONAL DEVELOPMENT

LOCATED IN THE E 1/2 OF SECTION 1, T. 6 S., R. 4 E., P.M.M.
GALLATIN COUNTY, MONTANA

U.S. FOREST SERVICE

U.S. FOREST SERVICE



AREAS	
LOTS	47.633 ACRES
ROADS	9.760 ACRES
OPEN SPACE	0.939 ACRES
PARK	3.809 ACRES
TOTAL	64.141 ACRES

Total combined lot area = 47.633
1/9 Park requirement = 5.298
This is according to section 11-3864 (1) RCM.



NOTE: Soil Borings & Percolation Tests Performed By Morrison-Maierle, Inc., Consulting Engineers, August 1974.

CURVE DATA				
NO.	DELTA	RADIUS	ARC	CHORD BEARING AND DISTANCE
1	70° 32' 38"	88.70'	110.76'	S. 34° 32' 14" W. 103.70'
2	60° 00' 00"	100.00'	104.72'	S. 28° 45' 55" W. 100.00'
3	85° 15' 55"	19.00'	22.32'	S. 14° 07' 58" W. 20.32'
4	94° 44' 05"	19.00'	24.90'	N. 73° 52' 02" E. 22.07'
5	82° 00' 00"	207.21'	239.33'	S. 67° 30' 03" E. 271.88'
6	93° 36' 58"	20.00'	32.49'	N. 46° 49' 30" W. 29.17'
7	54° 00' 37"	80.00'	57.43'	N. 27° 28' 18" E. 55.34'
8	59° 47' 37"	180.00'	195.84'	S. 24° 56' 49" W. 149.33'
9	26° 23' 32"	180.00'	86.48'	N. 07° 44' 46" E. 66.93'
10	18° 00' 00"	427.42'	118.38'	N. 12° 28' 32" E. 118.97'
11	42° 37' 51"	128.48'	94.08'	N. 25° 45' 27" E. 91.93'
12	132° 00' 30"	38.00'	61.20'	N. 66° 27' 49" W. 64.18'

CURVE DATA				
NO.	DELTA	RADIUS	ARC	CHORD BEARING AND DISTANCE
13	50° 48' 01"	209.00'	181.76'	N. 26° 24' 01" W. 176.88'
14	30° 19' 23"	420.00'	222.88'	S. 32° 56' 40" E. 219.88'
15	24° 55' 14"	488.11'	211.43'	N. 08° 01' 05" W. 208.77'
16	30° 00' 00"	470.48'	246.33'	N. 03° 44' 56" W. 243.83'
17	173° 43' 02"	150.68'	436.83'	N. 74° 38' 29" W. 300.91'
18	11° 30' 00"	1038.00'	207.74'	S. 24° 15' 00" W. 207.39'
19	30° 00' 00"	742.34'	389.69'	N. 10° 00' 00" E. 384.26'
20	46° 55' 17"	400.00'	327.89'	N. 51° 36' 32" E. 316.61'
21	25° 06' 00"	1273.57'	638.97'	N. 15° 24' 28" E. 634.90'
22	15° 00' 00"	764.49'	200.14'	N. 4° 40' 03" W. 198.87'
23	16° 47' 38"	892.41'	892.79'	N. 20° 55' 50" W. 890.87'
24	26° 30' 00"	643.63'	297.88'	S. 13° 18' 00" E. 295.04'

LT & ASSOCIATES
Land Surveying
Bozeman, Montana

HISTORY

History of Development in Gallatin Canyon

To a great extent, the topographical setting of the Gallatin Canyon has determined its use and history.

With the Yellowstone on the east and the Madison on the west, the broader valleys of these larger rivers became the natural highways of the frontier settlements. This left the upper Gallatin relatively untouched and unknown in the early days.

As the primitive people and Indians before them had done, the early white men traveled through the Gallatin Canyon picking up furs and whatever else they could find of value, leaving little behind. Their geographical knowledge of the upper Gallatin died with them.

There were several attempts to exploit the resources of the Gallatin Canyon. Gold prospectors invaded the area in the early 1860's but there were no large strikes. However, the Gallatin Valley was settled in response to the mining rushes with farmers being attracted to the fertile valley by high food prices in the neighboring mining camps.

In the early 1880's an attempt was made to interest the Northern Pacific Railroad into putting a line into Yellowstone Park through the Canyon. The N.P.'s decision to go through the upper Yellowstone meant continued isolation for the Gallatin Canyon.

Large scale corporate logging for railroad ties was attempted in the early 1900's but labor and financial problems eliminated this consumptive use of the timber resources of the Canyon.

Grazing began in the Canyon in the 1890's but the large operations lasted only 30 years or so in the upper Gallatin.

Although early Canyon residents such as Pete Karst and Tom Michener tried to develop the Canyon in terms of a Milwaukee Railroad spur, mining and dude ranching, all that really succeeded was dude ranching. Karst's Kamp took in 83 dudes in 1909 and 600 in 1910. Tourism in the form of dude ranching became the basis of the Canyon economy.

With the building of a road through the upper Canyon to Yellowstone Park and obtaining permission for cars to enter the Park, tourism had really arrived in the area by 1930.

The next 25 years produced little change in the Canyon and although the building of a dam at Spanish Creek was considered and oil drilling was tried at Pika Mountain, both ventures failed.

After World War II more and more people began to use the Canyon and, amid great controversy, a new road was started in 1952 and completed in the mid 1960's. Increased activity in the Canyon generally brought increased controversy. Such topics as the size of the Spanish Peaks Primitive Area and the size of the elk herd were especially hot issues.

It is interesting to note that the Canyon area came close to being "developed" several times in the past. However, as recently as 1970, the area could be considered an essentially semi-primitive environment with the limited amount of intrusion by man that such designation suggests. The area was sparsely populated and commercial activities were largely devoted to livestock, dude ranching and lumbering.

In 1970 construction was started on Big Sky of Montana, a large recreational development located on Taylor Fork. This initiated an increase in land sales, prices and subdivisions. Big Sky is not the major reason for this increase in land sales since Montana is experiencing a veritable land rush but rather acted as the catalyst in the Canyon.

As early as 1958 there was an attempt to impose some kind of planning and zoning in the Canyon. At that time approximately 75-85% of the residents in the Canyon favored planning and zoning. The percentage of residents favoring planning and zoning has remained relatively constant but those opposed have been so vociferous that nothing has been done and at the present time there are still no zoning regulations in effect in the Canyon.

At the present time, developers are restricted by Montana and Gallatin County subdivision and sanitary regulations. However, the only real restraint imposed on developers has been in

the form of lawsuits enacted against them by such environmental groups as Trout Unlimited and the Montana Wilderness Association.

As was mentioned before, there was very little development in the Gallatin Canyon until approximately 1970. However, since that time changes have been taking place rapidly. One of the major changes is the commitment and proposed commitment of more land to residential and commercial development. Impacts of present and proposed changes are currently open for debate. Private individuals and various local, state, and federal agencies control the decisions for changing land uses in the Gallatin Canyon.

Beaver Creek South is a proposed subdivision located $3\frac{1}{2}$ miles south of Big Sky. The subdivision when complete would provide housing for approximately 600 people. This would almost double the 1974 permanent population of the Canyon. Within five years Beaver Creek South will add 300 students to the Ophir School which has a present capacity of approximately 120 students. The school has required emergency funding for the last three years. It is questionable when or if taxes will cover the costs of providing expanding school services. Montana laws do not limit development based on lack of or cost of providing public services.

Beaver Creek is located in a winter game range for elk, deer, moose, and game birds. Montana laws do not prevent development on winter game ranges. Beaver Creek is also located adjacent to the Gallatin Game Range. The game range is used by hunters, creating a potential for conflicts between hunters and nearby residents.

Beaver Creek subdivision has been approved by the Gallatin Commissioners and approval of the water supply and sewage treatment is pending from the Montana Department of Health and Environmental Sciences.

Another subdivision, Parkview West, seven miles north of Big Sky, is divided into 37 individual lots. This subdivision was completely approved in December of 1974 and at the present time the lots are being sold.

Three new subdivisions near Hebgen Lake, Rancho Vista Addition, Horse Butte Acres Subdivision Unit Number 2, and Horse Butte Estates, plan to subdivide a total of 210.64 acres for 49 single family residences and 25 guest cabins. Neither state or county approval has been received for the subdivisions. The Forest Service Multiple Land Use Plan for Hebgen Lake is being prepared and will determine policy for Forest Service lands in the area and the type of use for Hebgen Lake.

Ski Yellowstone is a proposed multimillion dollar ski resort on the north shore of Hebgen Lake. The preliminary development plan would use 1,400 acres for 375 lodging units, 695 condominiums, and 245 single family residences and commercial areas. Ski Yellowstone has applied for a permit to construct 16 ski lifts on Mount Hebgen which is Forest Service land. The Montana Wilderness Association has also applied for a ski permit on Mount Hebgen for cross-country skiing and snowshoeing only. Granting one of the permits or denying both will be determined when the Forest Service Multiple Land Use Plan is complete.

Development of Big Sky is not complete yet. Original plans were for 1,600 condominiums and 1,600 homesites. The Big Sky Mountain Village is located in Madison County and there is no direct road between the Mountain Village and Madison County Schools at Ennis. Negotiations between Madison and Gallatin Counties are necessary to provide schooling for children in the Mountain Village at the nearby Ophir School.

Big Sky power demands prompted construction of a 69 kilovolt line from Gallatin Gateway to Big Sky. The power line is currently carrying 50 KV. Montana Power has applied to the Forest Service for permission to construct a 169 KV line from Clyde Park to Dillon across Forest Service and Burlington Northern Railroad lands. The proposed line and alternate lines would connect Ennis to Big Sky, running through the Jack Creek drainage. The line would provide projected power demands of Big Sky as well as insert a loop into the regional power grid. The Jack Creek,

through which the proposed power line would run, has been proposed as an addition to the Spanish Peaks Primitive Area. Inclusion of the Jack Creek area in the proposed Spanish Peaks Wilderness would ban a power line in the area. Projected power demands of other proposed and existing subdivisions in the Gallatin Canyon have not been discussed in the proposal. Any power lines must have the approval of the Montana Department of Natural Resources' Energy Planning Office and the U.S. Forest Service.

There has been considerable discussion of construction of a road to connect Big Sky and Ennis. The road would follow a route similar to the proposed 169 KV power line and eventually connect with the Big Sky spur road. The Big Sky to Ennis road would go through the proposed Jack Creek Wilderness Area.

The Policy of Yellowstone National Park affects the Gallatin Canyon area, a major route to the Park. In 1973, the Park introduced a policy to limit overnight accommodations within Yellowstone Park. The National Park Service would encourage and assist in the development of overnight visitor accommodations within an hours drive of the Park. This proposed policy has caused considerable pressure on the Gallatin Canyon for the development of more campgrounds and overnight accommodations.

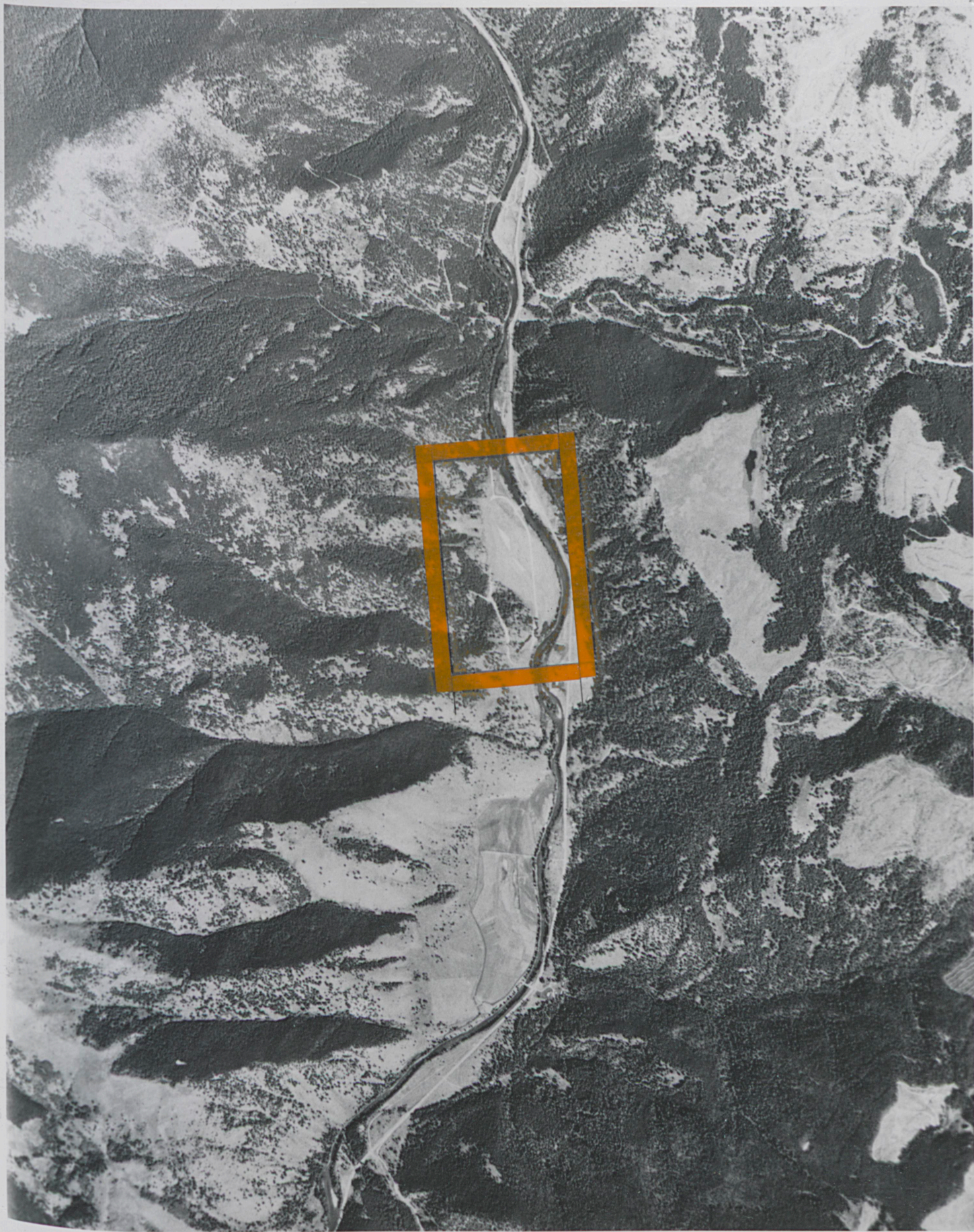
By identifying and mapping unique and critical areas, such as archeological sites, avalanches, deciduous vegetation, alpine areas, winter game ranges, and others, areas deserving of special consideration in land use policy can be located. Once this is done, each area can be considered and evaluated on the basis of its own unique combination of special qualities and in terms of the social and economic factors involved.

The thesis site is located approximately 20 miles south-
west of Arcadia in the California Desert. The location is directly
west and across the California Desert from Laramie, as shown in the
following aerial photograph.

SITE INFORMATION

Location

The thesis site is located approximately 20 miles southwest of Bozeman in the Gallatin Canyon. The location is directly west and across the Gallatin River from Karst, as shown in the following aerial photographs.























Climate

General

There are no significant climatic factors that would severely limit development in the area; however, several conditions do exist that must be taken into account when planning for future development uses.

Temperatures in the summer feature warm days and cool nights, with freezing temperatures possible at higher elevations. In the area of the site, the freeze-free season is approximately 70 days long. Winters can be quite cold with temperatures reaching the -30° F. range.

Residues from burning fuels (fireplaces, cars, etc.) collect near the ground on calm nights. Thunderstorms are relatively common in late spring and summer. They may produce locally strong winds, hail, and high precipitation amounts in short periods. During these storms, lightning-caused fires will occur in forested areas. Buildings should have adequate lightning protection.

Precipitation

Average annual precipitation in the area of the site ranges from 20 to 30 inches. Most of this is in the form of snow (December through May) and rain from thunderstorms (late spring and summer). The snow depth is between three and four feet with drifting occurring in open areas.

In the valleys, at elevations under 6,000 feet, the highest monthly precipitation amounts occur during late spring and early summer. This heavy precipitation often is associated with thunderstorms. At higher elevations, the greatest precipitation amounts occur in the winter, usually in the form of snow. Snowfall is moderate in low elevations, but becomes quite heavy at 7,000 to 8,000 feet.

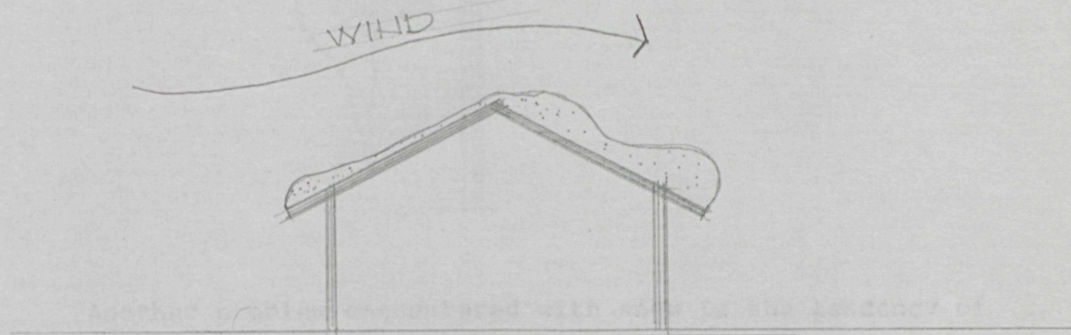
Snow

The one weather condition which will most likely have the greatest effect on the building design is snow.

The actual effect of snow on a building is greatly influenced by temperature and wind conditions both during the snowfall and subsequent to it; the pitch of the roof; the nature of the roofing material; the orientation of the building to sun and wind; the tree cover of the land; and, the presence or absence of heat in the building.

Snow depth in the area can reach depths of between 24 and 48 inches with winds causing drifting in areas most protected by trees or other vegetation.

There are several problems which are caused by snow, one of these being eccentric loading. There is a tendency for snow to slip off the sunny south side of the roof and remain on the north side.

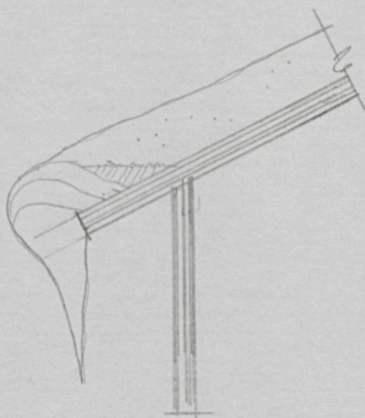


Wind will cause the snow to strip off at the ridge of a sloped roof, but it will continue to build up at the eaves. The eccentricity of this type of loading can literally tear a building apart. Roofs with major overhangs often have heavy concentrations of snow on the overhangs beyond the wall line and little or no snow inside the wall line. This is due to a combination of ice damming at the eaves and wind stripping at the ridge. This can either collapse the eave or tear the building apart at the ridge.

Another problem common in snow country is ice damming. This occurs when water from melting snow comes in contact with cold air and freezes, causing a blockage. The water behind the ice rises and floods over the top (or around the sides) and refreezes when it again contacts freezing air; thus, the dam builds.

The formation of ice can greatly increase the loads on roof overhangs, cause snow to remain on a roof where it would normally slide off, close, flood or shear off vents, and force large amounts of water through both roofs and side walls.

The most common ice dam is at the eave line where water running under the snow blanket freezes when it encounters cold air and causes eave ice and icicles to form.



Another problem encountered with snow is the tendency of snow to avalanche. Balconies below the eaves of a pitched roof should be protected by roof overhangs. If heavy, wet snow dumps off a roof slope onto an exposed deck or balcony, it can collapse the deck, shear off the railing, or injure people on the balcony.

Wind

In mountainous regions, winds at a given time will vary greatly from one location to another.

The strongest winds will be generally associated with weather frontal systems. Typically, southerly pre-frontal and northwesterly post-frontal winds will be strongest and most persistent with the

land forms reorientating these flows locally to the Canyon orientation. These systems are strongest in the winter and spring months when winds up to 50-60 miles per hour may occur.

In the area of the site, winds generally flow from south to north following the orientation of the Canyon.

Sun

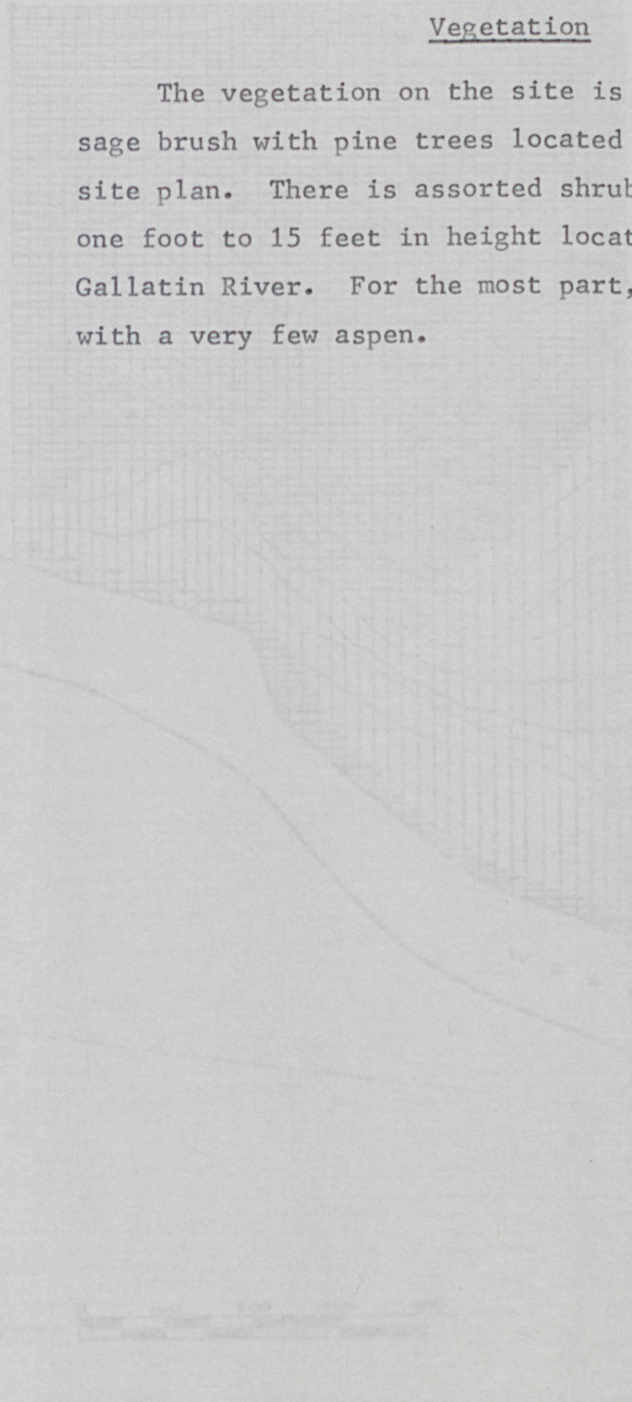
Because of the fact that the site is located in a canyon, the mountains will block the early morning and late afternoon sun. At this particular location, sunrise will range from 5:00 am. in the summer to 9:00 am. in the winter. Sunset will occur between 7:00 pm. and 3:00 pm. in the winter.

Wildlife

The only noticeable wildlife living on the site is the ever-present gopher. Elk and deer have been observed on the site. However, the site is not located on a big game winter range. The nearest big game winter range is located approximately two miles to the south.

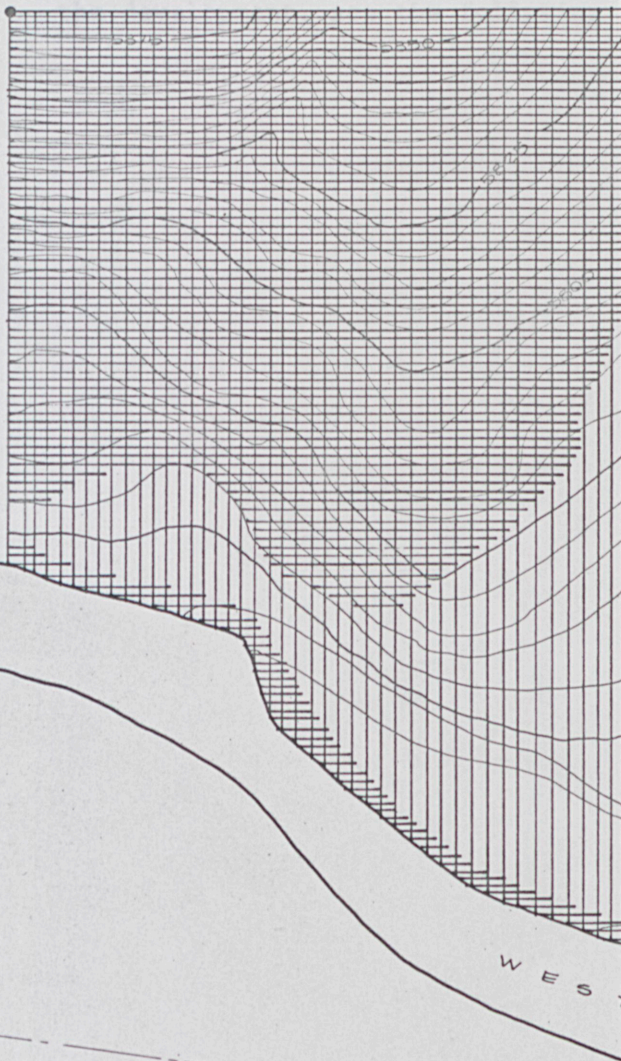
Vegetation

The vegetation on the site is primarily wild grasses and sage brush with pine trees located as indicated on the following site plan. There is assorted shrub-type vegetation varying from one foot to 15 feet in height located along the west bank of the Gallatin River. For the most part, tree species are fir and pine with a very few aspen.

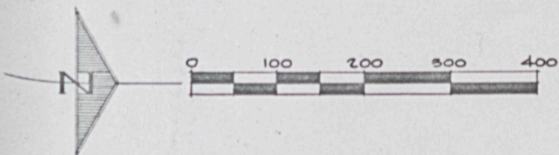


The topography of the development is to be of a terraced type nature. The formation by the West Gallatin River is 75% of the development. The remainder sloping to steeply sloping areas.

For more detailed information



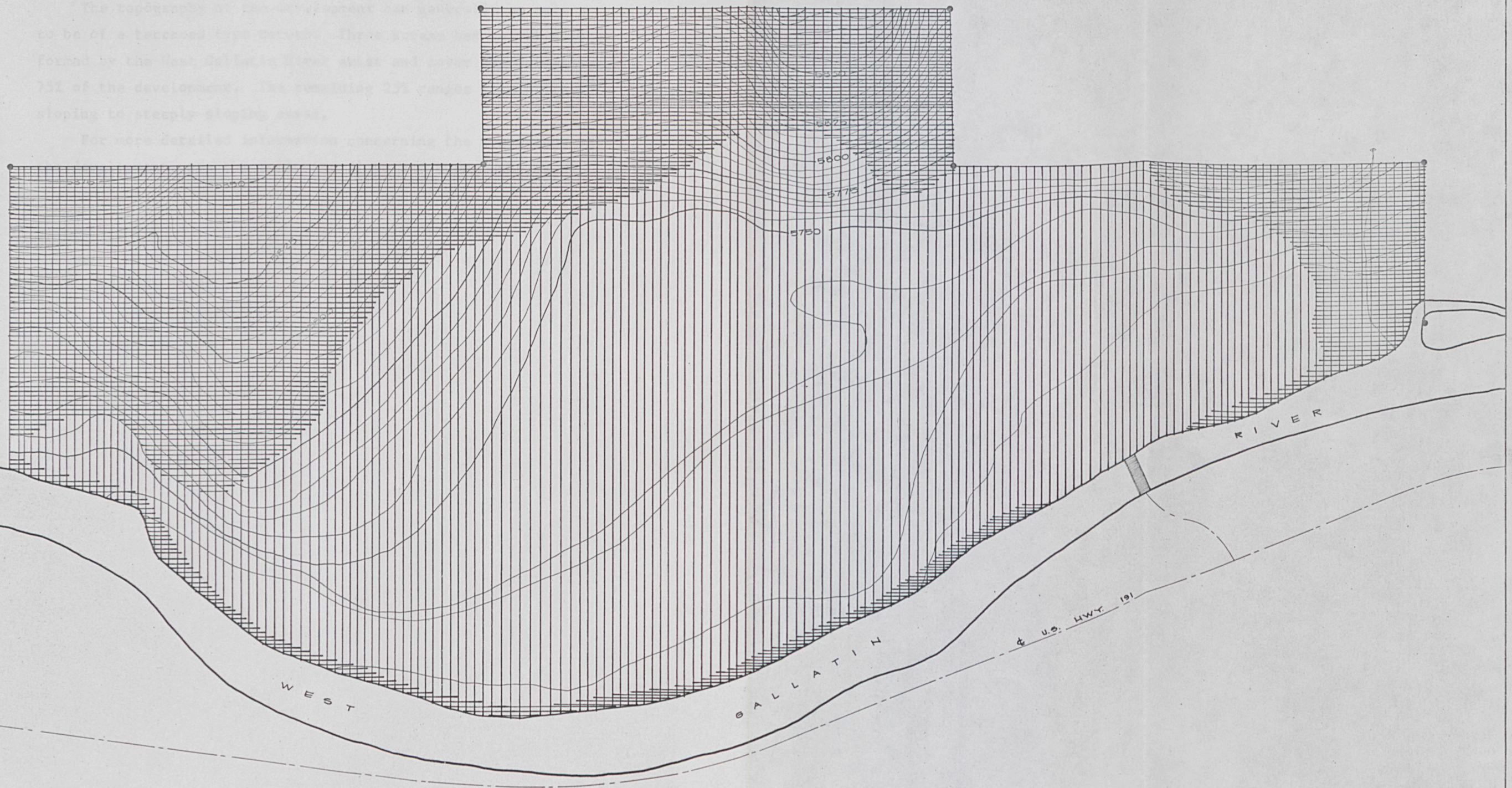
WEST



VEGETATION

WILD GRASSLAND
CONIFER TYPE

VEGETATION



WILD GRASSES - SAGEBRUSH



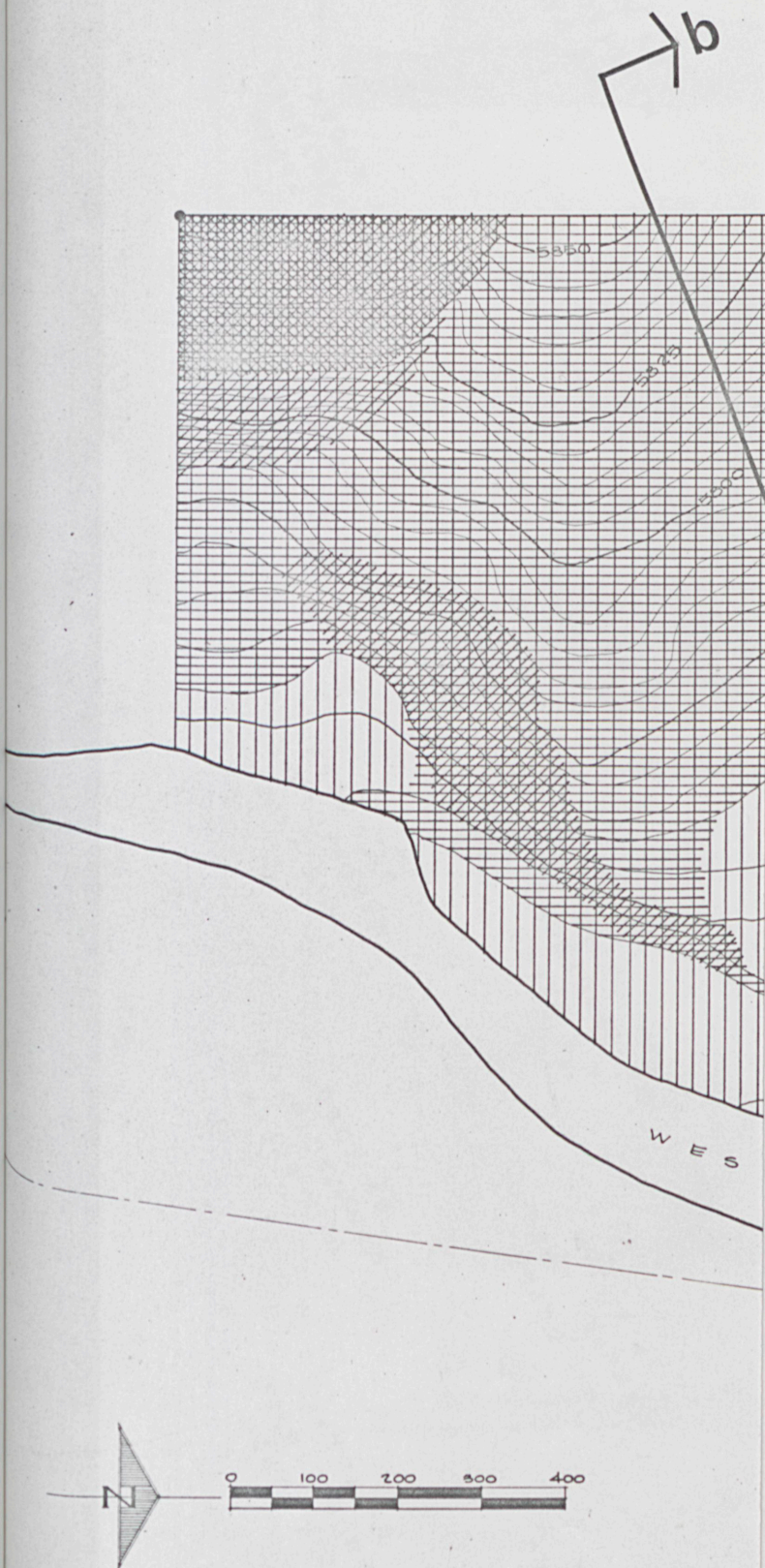
CONIFER TYPE TREE COVER

TOPOGRAPHY

The topography of the development can generally be said to be of a terraced type nature. Three stream bed terraces formed by the West Gallatin River exist and cover approximately 75% of the development. The remaining 25% ranges from slightly sloping to steeply sloping areas.

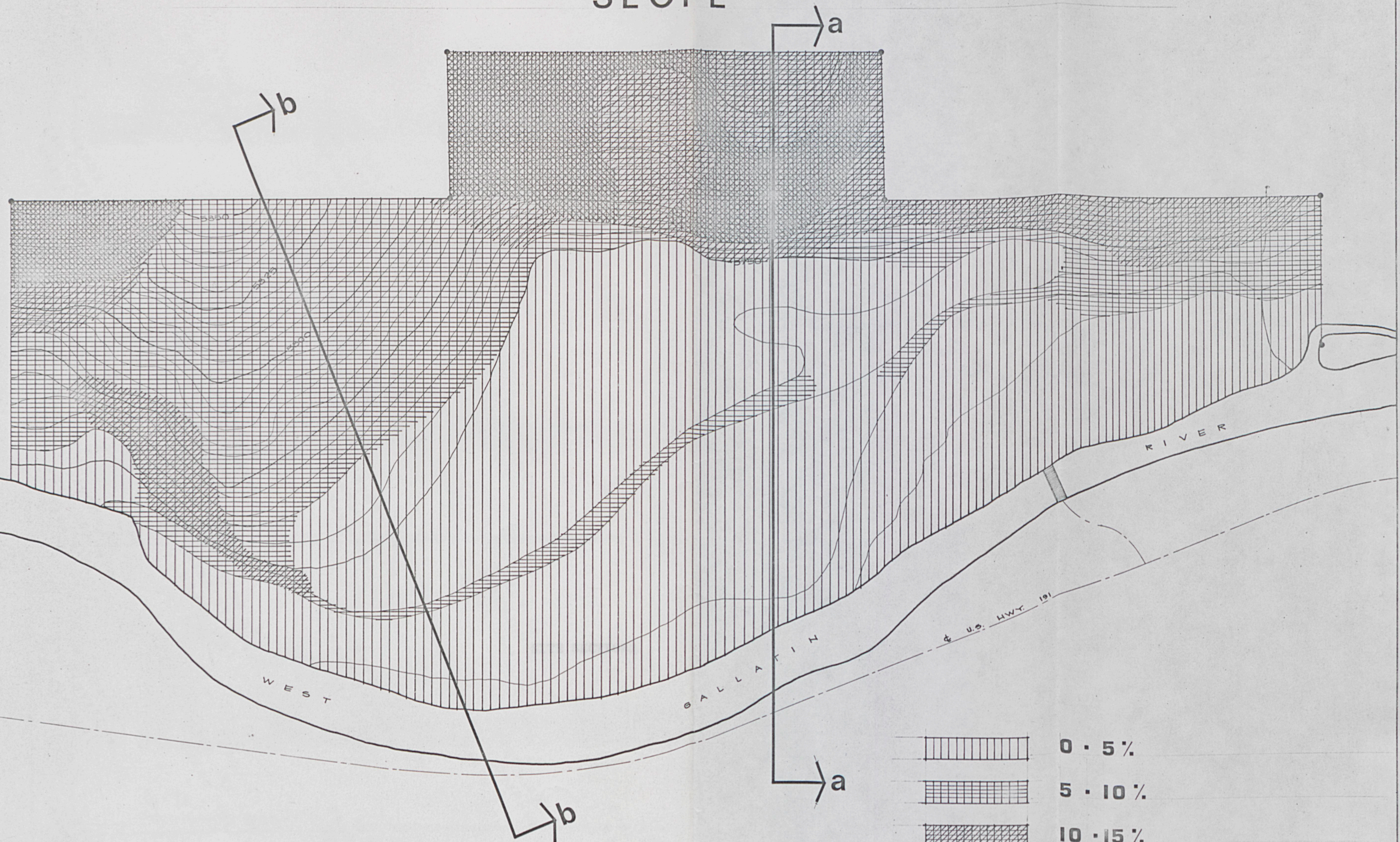
For more detailed information concerning the topography of the development, see the following slope and topography maps.



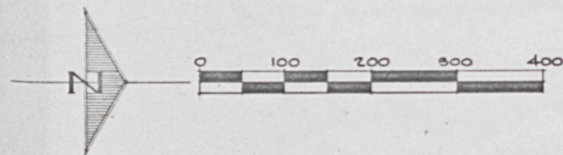


SLOPE

SLOPE

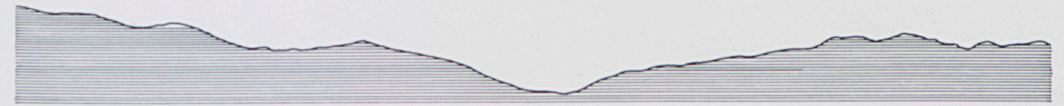
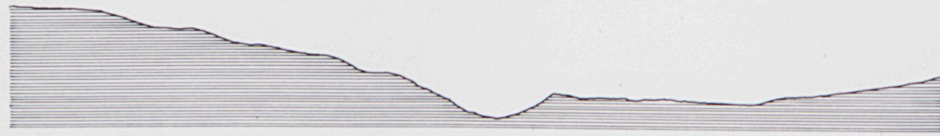


	0 - 5 %
	5 - 10 %
	10 - 15 %
	15 - 25 %



SITE SECTIONS

SITE SECTIONS

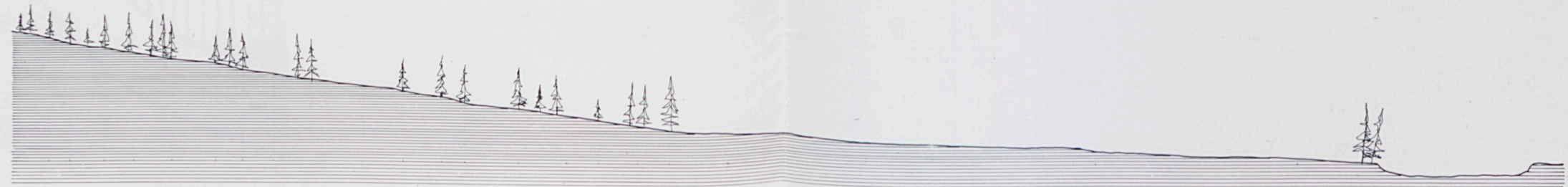


0 1 MILE 2 MILES



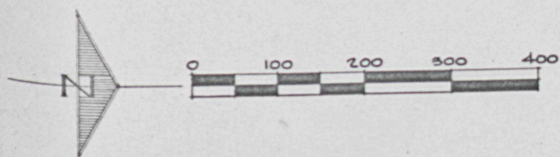
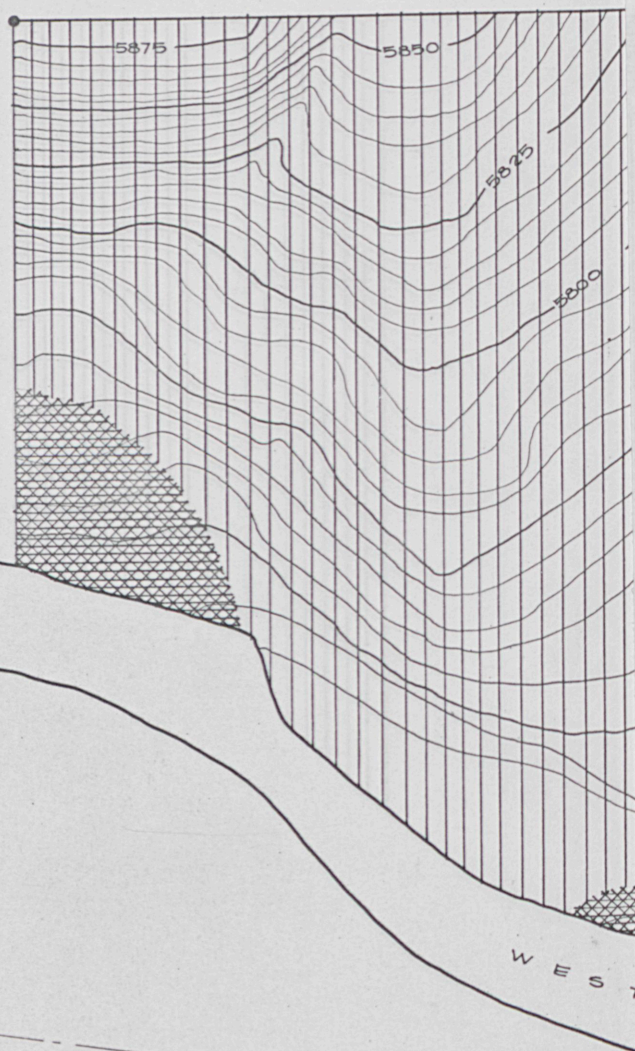
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0 50 100 200



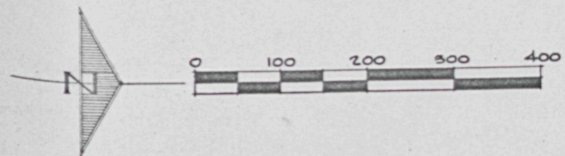
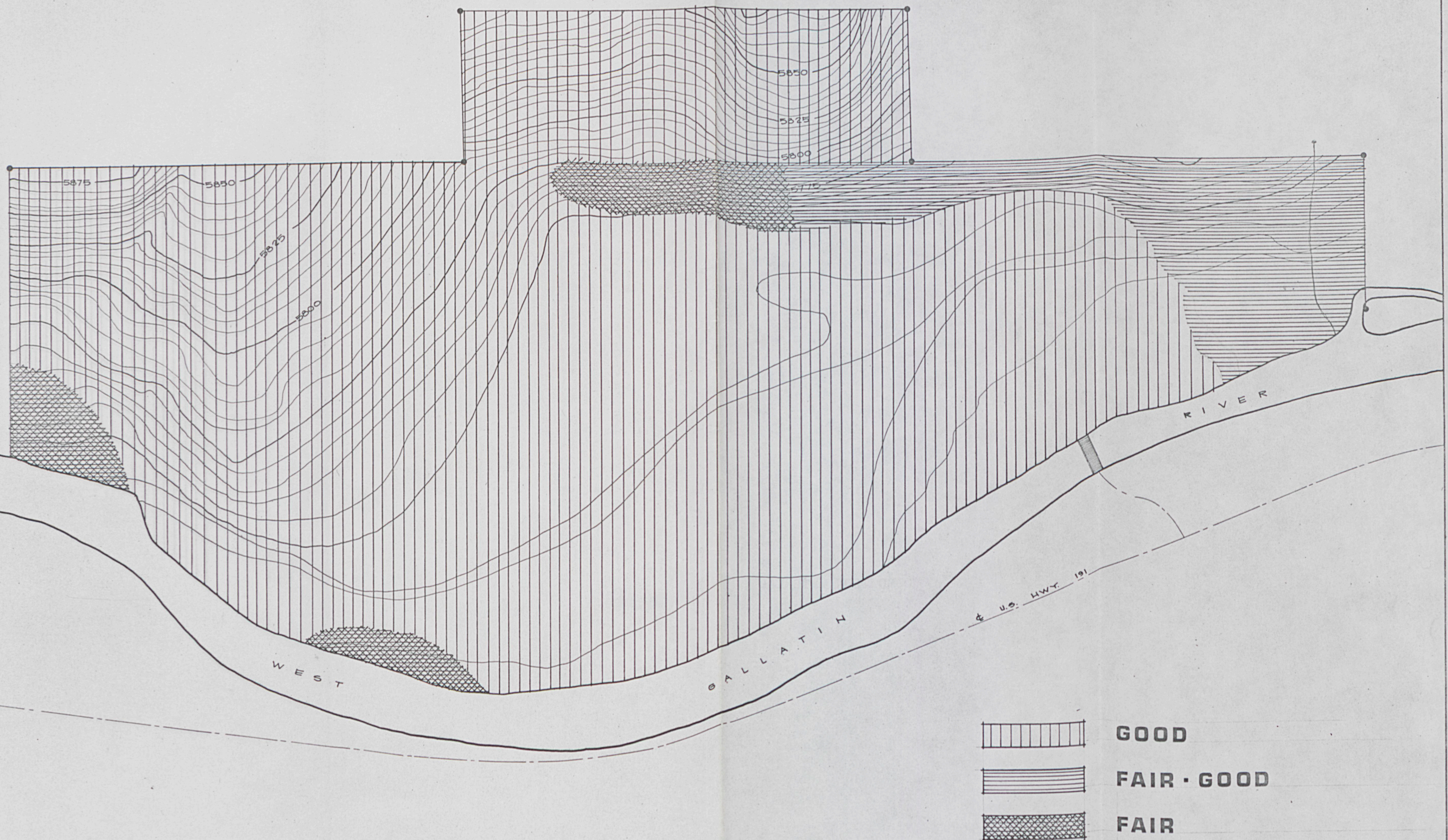
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0 50 100 200



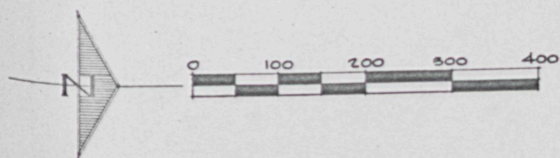
FOUNDATION MATERIAL

FOUNDATION MATERIAL

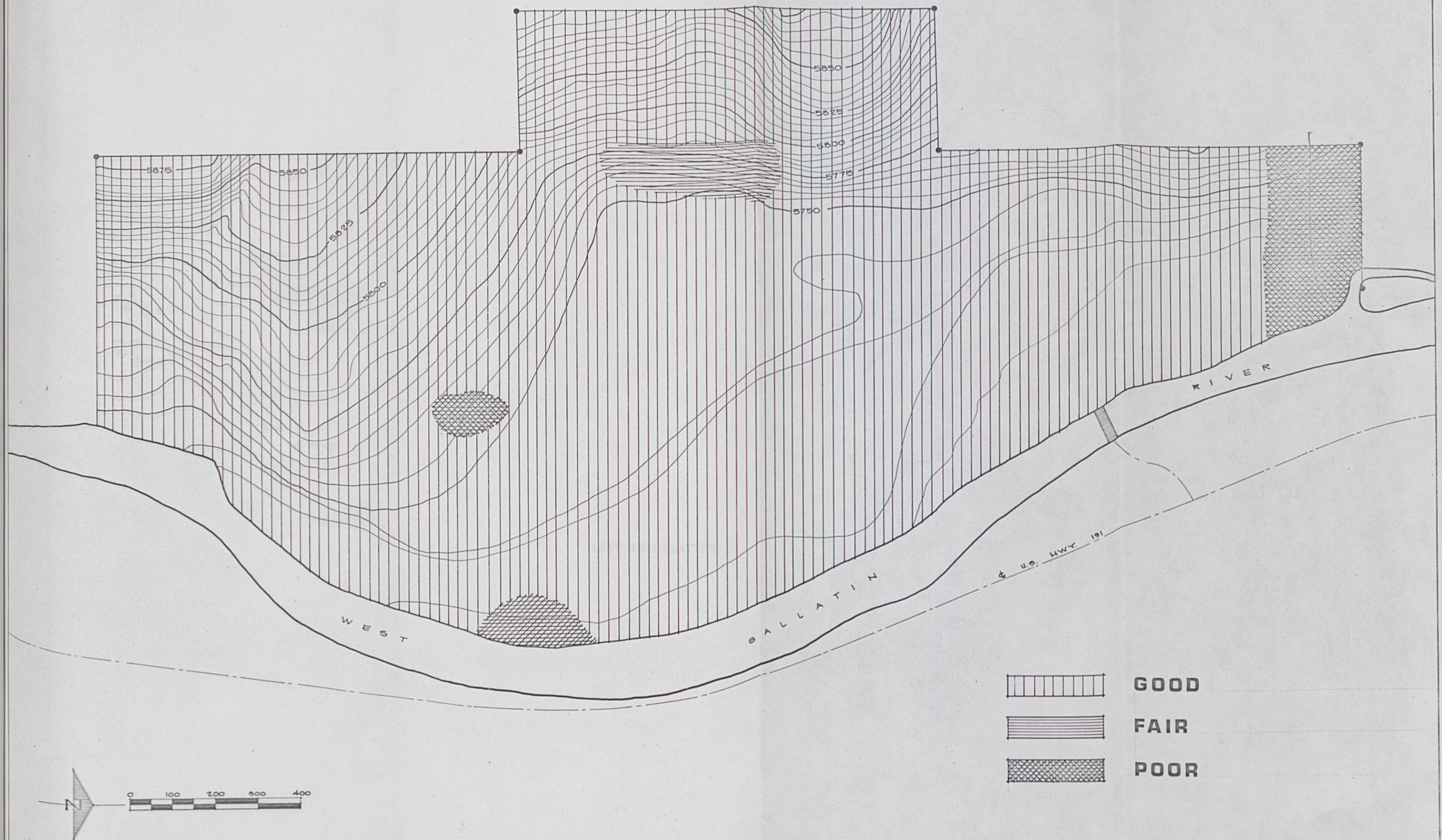


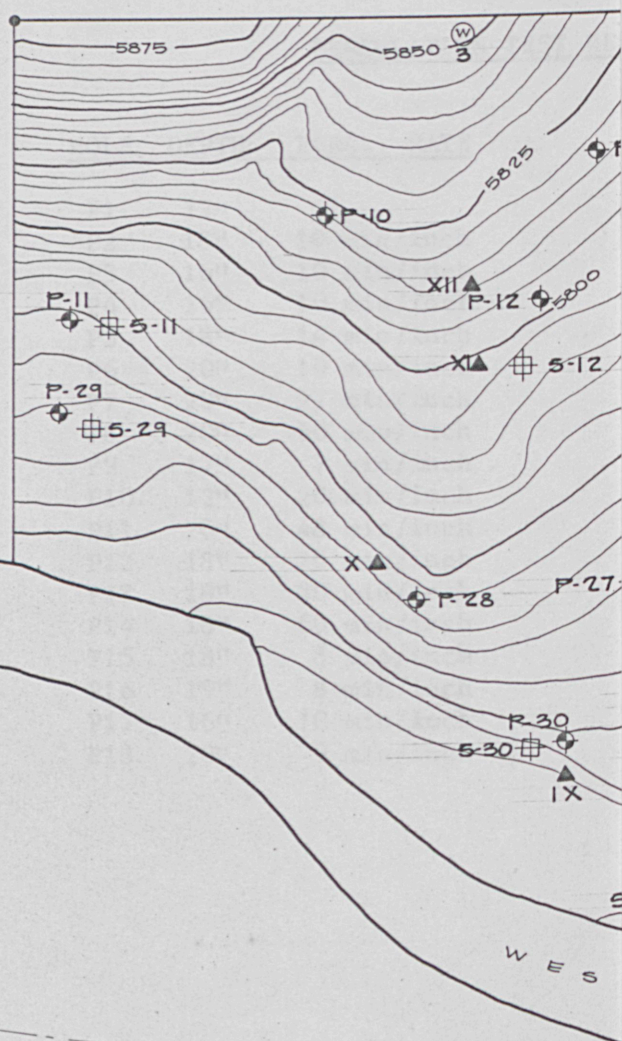


DRAINAGE



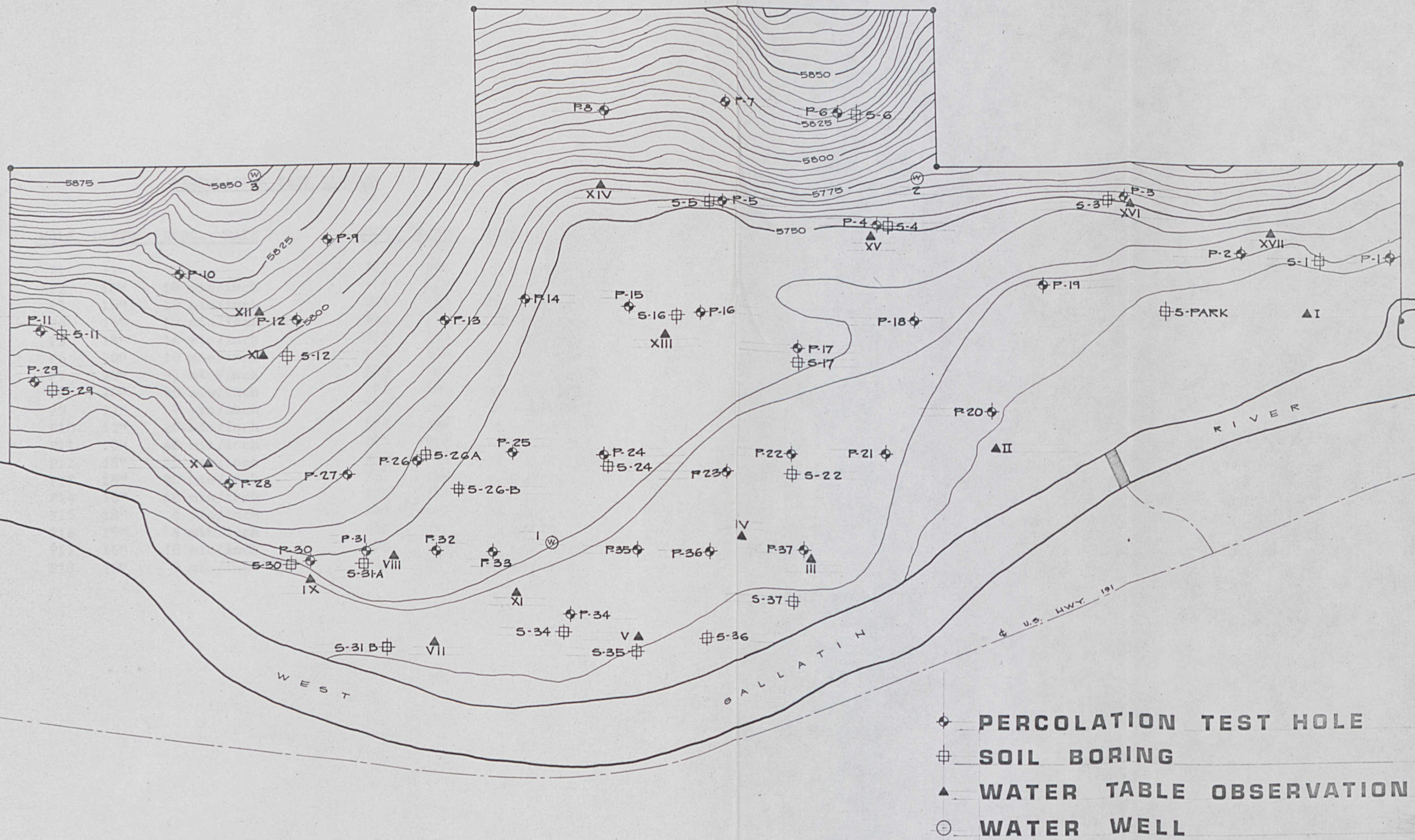
DRAINAGE





TEST INFORMATION

TEST INFORMATION



PERCULATION TEST RESULTS

HOLE	DEPTH	PERC.	RATE
P1	17"		
P2	18"	10 min/inch	
P3	16"	10 min/inch	
P4	16"	10 min/inch	
P5	18"	14 min/inch	
P6	20"	10 min/inch	
P7	20"	27 min/inch	
P8	20"	60 min/inch	
P9	17"	7 min/inch	
P10	12"	20 min/inch	
P11	20"	48 min/inch	
P12	18"	20 min/inch	
P13	18"	30 min/inch	
P14	18"	60 min/inch	
P15	18"	8 min/inch	
P16	19"	8 min/inch	
P17	16"	10 min/inch	
P18	20"	9 min/inch	

HOLE	DEPTH	PERC.	RATE
P19	20"	8 min/inch	
P20	15"	12 min/inch	
P21	19"	11 min/inch	
P22	17"	9 min/inch	
P23	17"	9 min/inch	
P24	17"	15 min/inch	
P25	18"	6 min/inch	
P26	18"	16 min/inch	
P27	18"	16 min/inch	
P28	18"	56 min/inch	
P29	22"	10 min/inch	
P30	18"	44 min/inch	
P31	18"	10 min/inch	
P32	18"	12 min/inch	
P33	18"	10 min/inch	
P34	18"	10 min/inch	
P35	19"	10 min/inch	
P36	22"	10 min/inch	

SOIL LOGSSL

0-24" Silty Sandy Top Soil
24"-60" Silty Sands Water Seeping in at 36" (GM)
60"-120" Silty Sands (Grey) with rounded coarse granular material to 16" (GM)
Water Table at 36" (Approximate elevation 5732)

S2

0-40" Silty Sandy Top Soil
40"-120" Poorly graded gravels with rounded coarse granular material to 18" (GP)
No Water Table observed to 120"

S3

0-30" Silty Sandy Top Soil
30"-120" Poorly graded gravels with rounded coarse granular material to 30" (GP)
No Water Table observed to 120"

S4

0-4" Silty Sandy Top Soil
4"-48" Silty Sands (SM)
48"-120" Poorly graded gravels with rounded coarse granular material to 12" (GP)
No Water Table observed to 120"

S5

0-24" Silty Sandy Top Soil
24"-96" Silty Sands (SM)
96"-120" Poorly graded gravel with rounded coarse granular material to 12" (GP)
No Water Table observed to 120"

S6

0-12" Silty Sandy Top Soil
12"-120" Poorly graded gravels with angular blocky material to 18" (GP-SP)
No Water Table observed to 120"

S10

0-8" Silty Sandy Top Soil
8"-120" Poorly graded gravels with angular blocky material
to 18" (material transitions from silty material
to sandier at 120") (GP)
No Water Table observed to 120"

S11

0-12" Silty Sandy Top Soil
12"-96" Poorly graded gravels with angular blocky material
to 12", sands being dark colored (GP)
96"-120" Poorly graded gravels with angular blocky material
to 12", sands being lighter brown (GP)
No Water Table observed to 120"

S12

0-6" Silty Sandy Top Soil
6"-108" Poorly graded gravels with angular blocky coarse
granular material to 30" (GP)
No Water Table observed at 108"

S16

0-14" Silty Sandy Top Soil
14"-30" Silty Sands medium brown (GM)
30"-120" Poorly graded gravels with rounded coarse granular
material to 24" (GP)
No Water Table observed to 120"

S17

0-7" Silty Sandy Top Soil
7"-18" Poorly graded gravels with rounded coarse granular
material to 8" (GP)
18"-120" Poorly graded gravels with rounded coarse granular
material to 14" (GP)
No Water Table observed to 120"

S22

0-10" Silty Sandy Top Soil
 10"-30" Poorly graded gravels with rounded coarse granular material to 6" (on north side of hole, top soil extends to 36") (GP)
 30"-120" Poorly graded gravels with rounded coarse granular material to 16" (GP)
 No Water Table observed to 120"

S24

0-10" Silty Sandy Top Soil
 10"-24" Poorly graded gravels with rounded coarse granular material to 6" (GP)
 24"-120" Poorly graded gravels with rounded coarse granular material to 20" (GP)
 No Water Table observed to 120"

S26A

0-20" Silty Sandy Top Soil
 20"-78" Silty gravels with rounded coarse granular material to 19", slightly plastic (GM)
 78" Water Table (Approximate elevation 5749)

S26B

0-6" Silty Sandy Top Soil
 6"-108" Poorly graded gravels with rounded coarse granular material to 19" (GP)
 No Water Table observed to 108"

S29

0-20" Silty Sandy Top Soil
 20"-72" Poorly graded gravels mixed with silty sandys with some scattered angular blocky coarse granular material to 12", slightly plastic (SW-SP)
 72"-120" Poorly graded gravels with angular blocky granular material to 12" (GP)
 No Water Table observed to 120"

S30

0-20" Silty Sandy Top Soil
 20"-30" Silty Sands slightly plastic (SM-SW)
 30"-120" Poorly graded gravels with rounded coarse material
 to 20" (GP)
 No Water Table observed at 120"

S31A

0-12" Silty Sandy Top Soil
 12"-30" Silty gravels, gravel-sand-silt mixtures to poorly
 graded gravels with rounded coarse granular material
 to 16" (GM-GP)
 30"-120" Poorly graded gravels with rounded coarse granular
 material to 16" (GP)
 No Water Table observed to 120"

S31B

0-24" Silty Sandy Top Soil
 24"-60" Silty Sands (SP)
 60"-96" Poorly graded gravels with rounded coarse granular
 material to 16" (GP)
 96" Water Table (Approximate elevation 5728)

S33

0-7" Silty Sandy Top Soil
 7"-40" Silty Sands slightly plastic (SM)
 40"-78" Clayey gravels, gravel and clay mixtures with rounded
 coarse granular material to 36", moderately plastic (GC)
 78" Water Table (Approximate elevation 5727)

S34

0-6" Silty Sandy Top Soil
 6"-18" Silty gravels, gravel sand mixtures with rounded
 coarse granular material to 8" (CP)
 18"-120" Poorly graded gravels with rounded coarse granular
 material to 20" (GP)
 No Water Table observed to 120"

S35

0-5" Silty Sandy Top Soil
5"-36" Silty gravels, gravel-sand-silt mixtures with rounded coarse granular material to 8" (GM)
36"-104" Poorly graded gravels with rounded coarse granular material to 22" (GP)
104" Water Table (Approximate elevation 5726)

S36

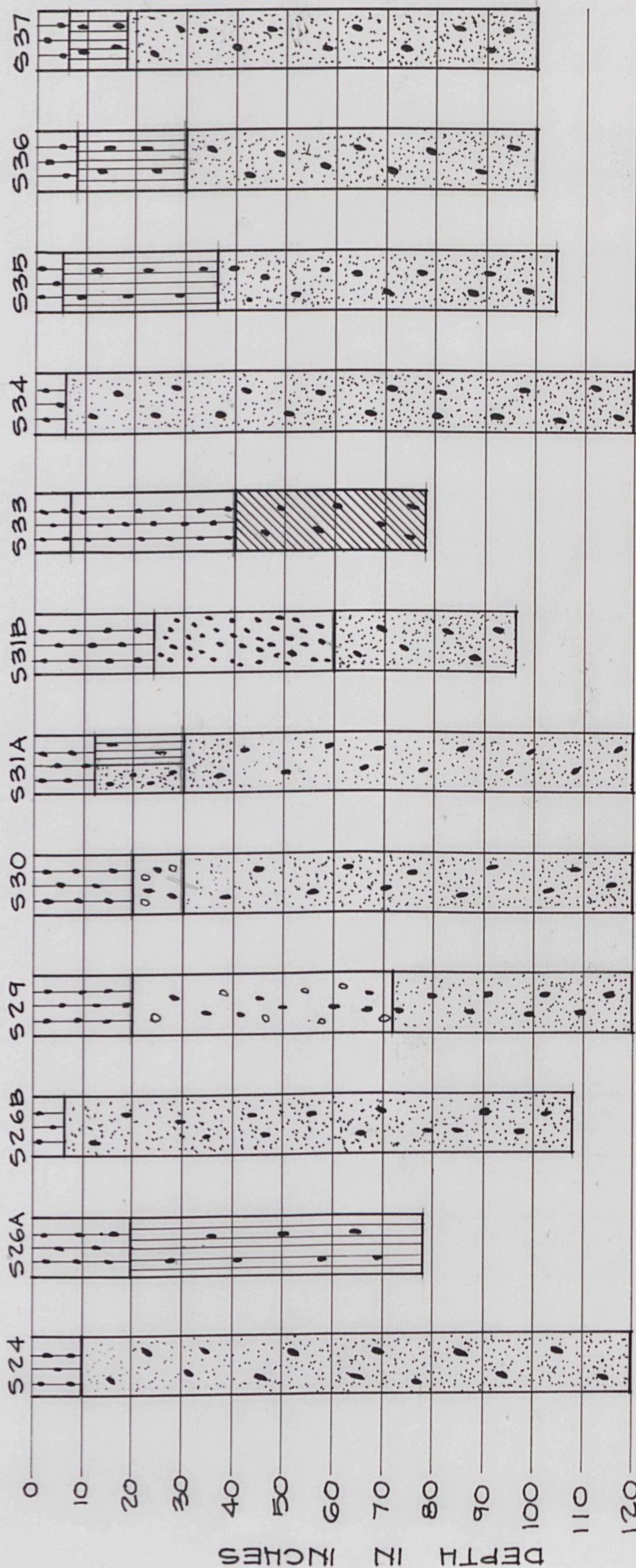
0-8" Silty Sandy Top Soil
8"-30" Silty gravels, gravel-sand-silt mixtures with rounded coarse granular material to 8" (GM)
30"-90" Poorly graded gravels with rounded coarse granular material to 20" (GP)
90" Water Table (Approximate elevation 5727)

NOTE: Above description on west side test hole, on east side test hole, sandy, silty, clayey material extends from 24"-48" then transitions to poorly graded gravels.

S37

0-6" Silty Sandy Top Soil
6"-18" Silty gravels, gravel-sand-silt mixtures with rounded coarse granular material to 8" (GM)
18"-90" Poorly graded gravels with rounded coarse granular material to 16" (GP)
90" Water Table (Approximate elevation 5730)

SOIL BORING PROFILES

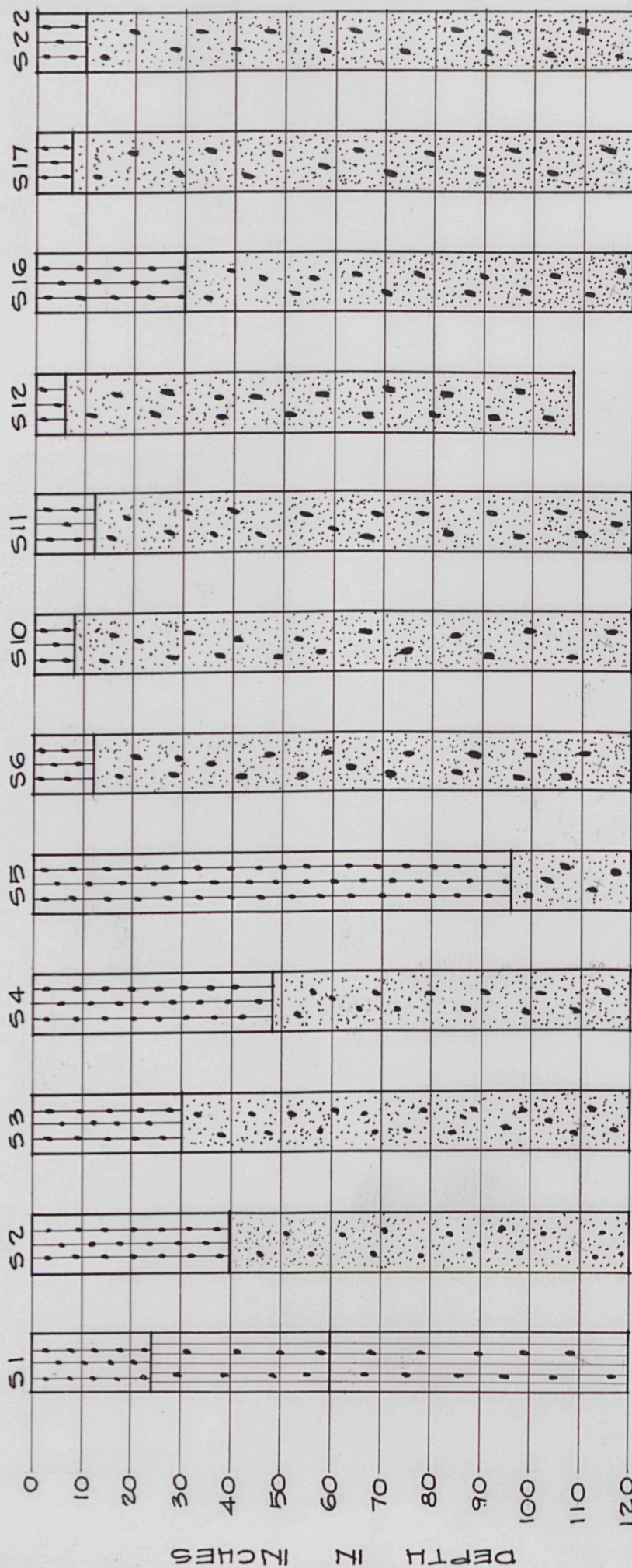


POORLY GRADED GRAVEL, OR GRAVEL SAND MIXTURES, LITTLE OR NO FINES.

POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

COMBINATION POORLY & WELL GRADED SANDS OR GRAVELLY SANDS LITTLE OR NO FINES.

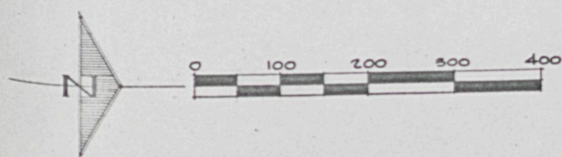
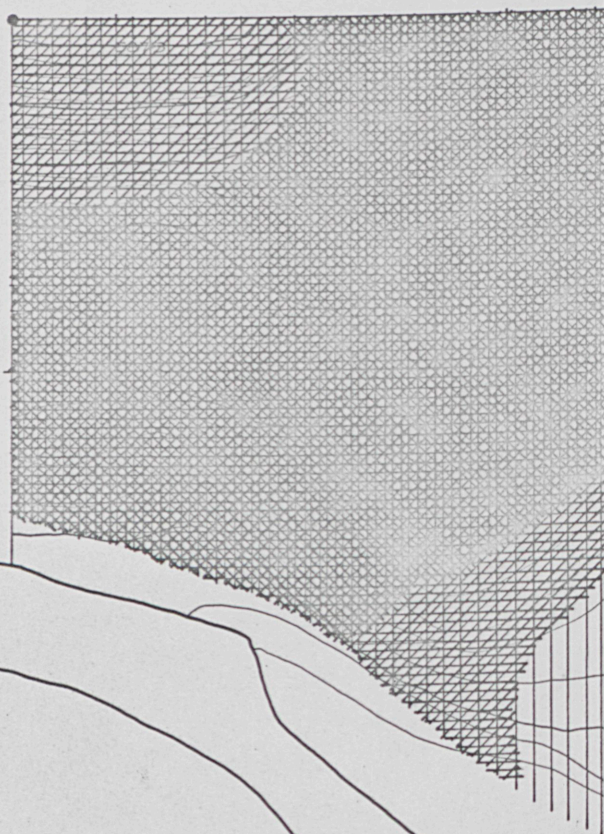
SOIL BORING PROFILES



SILTY SANDS, SAND SILT MIXTURES

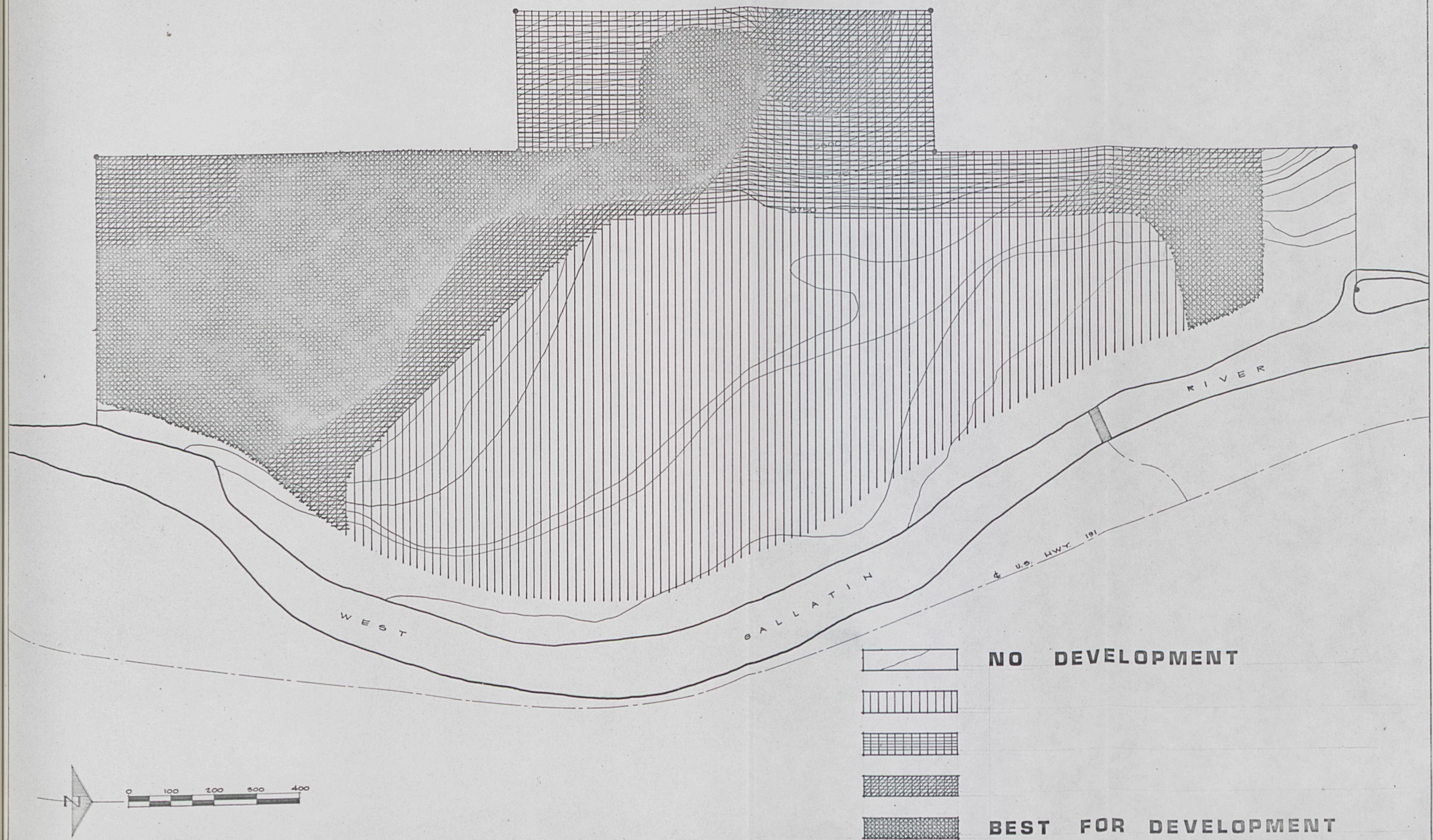
SILTY GRAVELS, GRAVEL SAND - SILT MIXTURES

CLAYEY - GRAVELS, GRAVEL - CLAY SAND MIXTURES



LAND USE

LAND USE



Residents

The 1970 permanent population of Gallatin Canyon was 154 with the people living in the West Fork area. The 1974 estimated population is 719 permanent residents in the Gallatin Canyon and of these approximately 365 live in the West Fork area.

Seasonal residents amounted to approximately 1,100 in 1970. In 1973 there were about 1,400 seasonal residents in the Canyon area. In 1974 with the increase in housing, there were an estimated 1,600 seasonal residents.

Changes in land ownership in the Canyon have resulted in some changes in the characteristics of Canyon property owners. In 1970, 22% of the land parcels were held by out-of-staters. A 1973-74 survey shows increases in holdings of out-of-staters to 28%. The percentage of property owners who were high school graduates changed from 78% in 1970 to 92% in 1974. The ages of property owners were similar for both 1970 and 1974 with almost 30% being between 46 and 55 years old.

In 1970, 36% of the property owners earned less than \$10,000, while in 1974 only 13% earned less than \$10,000. Of the 87% (in 1974) earning more than \$10,000, 36.5% reported yearly incomes greater than \$25,000. Some of the increases in yearly income can be attributed to inflation. However, some are also the result of changes in the composition of the population of property owners.

The following set of covenants are intended as a
guideline for maintaining a high standard of living
and people living in the community and the people
that may be subject to the same.

COVENANTS

COVENANTS

The following set of covenants has been written as a guideline for maintaining a quality environment for both the people living in the development and the general public that may be exposed to the development in some manner.

Covenants

It is the intention of the developers that a non-profit association to be called the Development Association, hereinafter called the Association, be formed to care for the roads and all open areas maintained for the general good of the development and vacant and unimproved lots in the development whether such lots be owned by the developers or not; to remove weeds and any unsightly or obnoxious thing therefrom and to do any other things and perform any labor necessary or desirable in the judgement of such non-profit association to maintain the development in good repair and condition.

After eighty percent (80%) of the lots in the platted land have been sold by the developers, then all privileges, rights, powers, duties and authority of the developers contained in these Reservations and Protective Covenants shall thereupon vest in the association and thereafter such privileges, rights, powers, duties and authority shall be exercisable by the association, and thereafter, whenever herein the term developers is used, it shall be taken to mean the association.

All persons purchasing property in the platted land, by acceptance of their deeds or execution of their purchase agreement, do agree to the formation of this non-profit association and do agree to become a member thereof immediately upon its formation or upon signing their respective agreements to purchase a lot or dwelling unit and further agree to contribute their pro rata share of the funds necessary to the performance of its aforesaid functions. Membership fee for each lot or dwelling unit shall be in such sum as a majority of said members shall determine to be equitable and necessary to fulfill the purposes of the association but in no event shall said fee exceed the sum of \$50.00 per annum, unless at least ninety-five percent (95%) of the members shall concur. Membership fee for each lot or dwelling unit shall be paid annually and shall become a lien upon the applicable lot or dwelling place when the purchaser thereof is billed.

When eighty percent (80%) of the lots or dwelling units have been sold and the non-profit association shall have been formed, proper By-Laws and Articles of Association will be adopted by the members for the governing of the said association, but nothing contained therein shall modify, amend, or invalidate any of these protective covenants unless amended pursuant to the protective covenants hereinafter provided for.

I

ARCHITECTURAL COMMITTEE

It is the intention of the developers that an architectural committee shall be formed and shall be composed of the architect in charge of the development, the developer, and one other person to be appointed by the architect and developer. When a position is vacated on the committee, the remaining two committee members will appoint a new member with the condition that a registered architect must remain on the committee at all times.

When eighty percent (80%) of the units in the development have been sold, the association shall have the exclusive right to replace, remove or elect a member of this committee, however, a registered architect must still remain on the committee at all times.

II

RESIDENTIAL LAND USE REGULATIONS FOR SINGLE FAMILY LOTS

(a) Use Permitted

1. Individual lots are intended for single family dwellings only.
2. In addition to the dwelling, there may be added a private garage.
3. No single family dwelling house on any lot shall have less than eight hundred square feet total area exclusive of a garage or any exterior porches or decks.
4. One temporary building, such as a storage shed or shop, may be used on any lot during the course of continuous construction.

5. No permanent dwelling building can be used as a dwelling until the house is completely enclosed and the roof is on.
6. No store, theater, tavern, or entertainment establishment of any kind, or any shop of any kind, set up as a permanent or temporary business for the purpose of a livelihood, shall be permitted upon any lot at any time.
7. The exterior construction of all dwelling houses shall be completed within one (1) year after the date of the start of the construction upon the same.
8. No dwelling house shall be constructed on any of the individual lots in the development until the plans for said dwelling house have been submitted to and approved by the architectural committee.
9. Each lot owner will provide a hard surfaced driveway from a garage to the permanent road. If no garage is built, then a hard surfaced driveway to accomodate at least one car will be provided.
10. Snowmobiles or motorcycles or any other motor vehicle will not be allowed on any common land except on roadways provided by the developer.
11. Temporary sanitary facilities will be provided during construction of each dwelling house and until such time as when permanent sewer facilities have been approved by the Gallatin County Sanitarian.

(b) Livestock and Poultry

1. No livestock or poultry will be allowed within the development.
2. Two domestic pets will be allowed for each residence. Each owner will be responsible for said pets and shall prevent them from being a nuisance to other residents in the development.

(c) Storage of Materials

The storage of supplies, equipment, boxes, refuse, trash, materials, machinery or machinery parts or otherwise that shall distract from the aesthetic values of the property shall not be allowed.

(d) Signs

No signs of any kind shall be displayed to the public view on any part of the property, except one sign of not more than four (4) square feet for identification purposes, or one sign of not more than four (4) square feet advertising the property for sale.

III

GUIDELINES FOR BUILDING AND SITE DESIGN ON SINGLE FAMILY LOTS

1. All buildings in the development are to be designed by a registered architect licensed in the State of Montana.
2. Building features should be designed to coincide with the natural environmental features of the site in such a way as to diminish the visual impact of the development. Dwellings designed for single family lots should maintain the character of the other buildings in the development.
3. Use natural or compatible building materials in various textures throughout and compliment them by using earth tone stains.
4. Extensive grade and fill operations that substantially alter the topography of a site should be avoided.
5. Protect all sound healthy trees and ground cover vegetation.
6. Use plant materials found in the natural landscape.
7. All buildings are to be designed using energy conservation measures.

IV

SANITARY RESTRICTION

No building or shelter, the use of which necessitates supplying water, sewage or waste disposal, shall be used as a dwelling until the water supply system, including location and construction thereof, together with location and construction of sewage or waste disposal system, shall have been approved by the Gallatin County Sanitarian and any other governing body having jurisdiction thereof.

Each of the various owners of any lot or lots within the development covenants and agrees to fully and completely abide by the laws of the State of Montana, the rules and regulations of

the office of the County Sanitarian or Gallatin County insofar as the placement of any individual water well for the supply of domestic water and insofar as the placement and construction of any individual septic tank and drain field for the disposal of sanitary waste.

V

PRESERVATION OF PUBLIC LAND

In an effort to maintain the quality of the public land within the development, no person shall be entitled or allowed to cut, mutilate, or destroy any of the vegetation existing on the public land or to in any manner cause harm to the existing environment.

VI

NUISANCES

No noxious or offensive activity shall be carried on upon any portion of the property, nor shall anything be done thereon which may be or may become an annoyance or nuisance to the neighborhood.

VII

GARBAGE AND REFUSE DISPOSAL

No part of the property shall be used or maintained as a dumping ground for rubbish, trash, slash, garbage debris, or other waste, except when kept in sanitary steel containers which shall be disposed of promptly. Each of the various owners of an individual lot or lots within the development, covenants and agrees to contract with a commercial trash and refuse hauler for the disposal of any and all trash and refuse accumulated on any of the several lots within the development on a regular basis.

VIII

FENCES

The construction of all fences will be approved by the architectural committee. Generally, only fences to prevent or divert snow drifting, and privacy fences will be allowed. Boundary fences will generally not be allowed. All fences will be built of wood and be not more than six feet high.

IX

UNDERGROUND UTILITIES

It is expressly agreed and understood by and between the several lot owners within the development that all utility lines such as electrical power transmission lines, telephone lines and other similar utility lines shall be placed underground, and the owners of the several lots within the development agree that at such time or times as the respective lines are placed underground, to pay their respective share of the cost of the same. In this connection, such cost shall be paid by the individual lot owner within thirty (30) days of the tendering of a bill for the same and if remaining unpaid for a period of thirty (30) days after the tendering of such a bill, such costs shall become a lien upon the applicable lot in the development, collectable by the developers or the association, as the case may be, by any means available to them, in law or in equity.

X

TERM OF COVENANTS

Except as provided herein, each of the conditions, covenants, restrictions, regulations and reservations set forth herein shall continue to be binding upon Parkview West Association and upon its successors and assigns, and upon each of them, and all parties and all persons claiming under it or them, for a period of ten (10) years from the day and year that these covenants are filed of record in the office of the Clerk and Recorder of Gallatin County, Montana, and automatically shall be continued thereafter for successive periods of five (5) years each; provided, however, that the record owners of sixty percent (60%) of the lots within the development, subject to this declaration, may release all the land so restricted from any one or more of said restrictions at the end of said ten (10) year period or any successive five (5) year period, by executing and acknowledging an appropriate agreement or agreements, in writing, for such purposes and filing the

same of record in the office of the Clerk and Recorder of Gallatin County, Montana.

XI

ENFORCING OF COVENANTS

The grantors, and every person hereinafter receiving any right, title or interest in any lot in said property shall have the right to prevent or stop violation of any of the said restrictions by injunction or other lawful procedure, in law or in equity, against the person or persons violating or threatening to violate these restrictive covenants. Any person who shall prosecute an action successfully may recover damages resulting from such violation, and it is expressly understood by all persons purchasing this property that if an action is successfully brought against him for a violation of these covenants, that a reasonable attorney's fee shall be assessed against him in addition to any other damages.

Failure by the grantors or any other landowner to enforce any restrictive covenants, condition or agreement herein contained shall in no event be deemed a waiver of the right to do so thereafter as to the same breach or as to one occurring prior or subsequent thereto.

Any person purchasing any property hereby expressly agrees that in the event any covenants or conditions or restrictions herein captioned, or any portion thereof, are invalid or void, such invalidity or voidness shall in no wise affect any other covenant, condition or restriction.

Violation of any covenant or restriction may be restrained by any court of competent jurisdiction.

XII

VOTING

For purposes of voting, it is understood and agreed that each lot shall be entitled to one (1) vote.

XIV

SEVERABILITY

Invalidation of any one of these covenants, or any part thereof, by judgements or court order shall in no wise affect any of the other provisions hereof, which shall remain in full force and effect.

General Recommendations of the

Murray-McDonnell Environmental Group

Gallop Canyon Planning Study

Future residential development within the Canyon should be clustered in areas which are least sensitive to the impact of development on the natural landscape and which are least likely to be visible from the Canyon. The impact of development should be minimized by the use of natural screening and by the use of low profile buildings. The impact of development should be minimized by the use of natural screening and by the use of low profile buildings.

Design Criteria

Buildings should be located away from the Canyon rim and on the edge of the Canyon rim. Buildings should be located away from the Canyon rim and on the edge of the Canyon rim.

Plan development in areas which are least sensitive to the impact of development on the natural landscape and which are least likely to be visible from the Canyon.

Buildings should be located away from the Canyon rim and on the edge of the Canyon rim. Buildings should be located away from the Canyon rim and on the edge of the Canyon rim.

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Buildings should be located away from the Canyon rim and on the edge of the Canyon rim. Buildings should be located away from the Canyon rim and on the edge of the Canyon rim.

DESIGN

Protect sand, dune, and grass cover vegetation.

Use native plants and animals in landscaping.

Use energy conservation principles.

Use native plants and animals in landscaping.
Use native plants and animals in landscaping.
Use native plants and animals in landscaping.

General Recommendations of the
Murray - McCormick Environmental Group
Gallatin Canyon Planning Study

Future residential development within the Canyon should be in clusters as opposed to typical subdivision patterns. The intent being to keep the impact of the development on the natural landscape to a minimum and to create the least possible visual impact. Cluster housing and development would help concentrate man's activities resulting in less disruption of the natural landscape and wildlife habitat.

Design Criteria

Building clusters should be located away from or on the edge of open meadows and in sufficient tree cover for screening purposes.

Plan development features to coincide with the natural environmental features of the site.

Utilize sloping topography and vegetation wherever possible to screen or soften the visual impact of building construction.

Avoid extensive grade and fill operations that substantially alter the topography of the site.

Use natural or compatible building materials throughout the project.

Protect sound, healthy trees and ground cover vegetation.

Use different types of living units within concentrated areas.

Use energy conservation principles:

- Volume — floor area ratio
- Window — wall area ratio
- Orientation on site.

Design

Development of the site has been generally in keeping with the land use plan developed during the first quarter's work. This plan indicated that in general the southern 1/3 of the site with tree cover would be best suited for development.

It was determined that approximately 50 dwelling units could be located in this area with little crowding and sufficient space for all utility runs. By keeping all of the development on the southern area rather than spreading it over the entire site, the amount of roads and utility runs could be minimized.

Also by limiting development to this portion of the site, the buildings could be located in the trees thereby protecting them from wind and drifting snow and minimizing the visual impact.

There are two types of buildings on the site along with the individual lots. One type is the condominium units which includes one complex of eight units and three complexes of six units each. The second type is the single family clusters which includes three clusters of four houses each.

The condominiums are positioned approximately 28° west of south or 28° east of south and each unit is stepped back. This allows acceptable orientation to the sun and contours of the land.

The basic unit of the condominiums measures 18' x 28'. A one bedroom efficiency condominium would use one of these units, a two bedroom makes up two units, and a three bedroom makes up three units.

Exterior building materials for the condominiums were chosen to be natural and compatible with the area, while avoiding the vertical siding, hand-split cedar shakes, stereotyped appearance of many condominiums in the mountains. The basic exterior materials used on the condominiums are: stone veneer foundation walls, concrete block bearing walls with stucco finish, horizontal level cedar siding and bronze tinted standing seam metal roofing. This combination of materials provides a variety of

colors and textures which gives the buildings an interesting appearance.

The southern facing facades of the condominiums have large areas of glass which allow the winter sun to penetrate and provide heat while decks, sun shades, and roof overhangs provide shading devices to keep out the summer sun.

Roof overhangs cover the exterior decks to prevent snow from falling on people using the deck or breaking guard rails.

All entrances and exterior stairs are covered to protect against the weather.

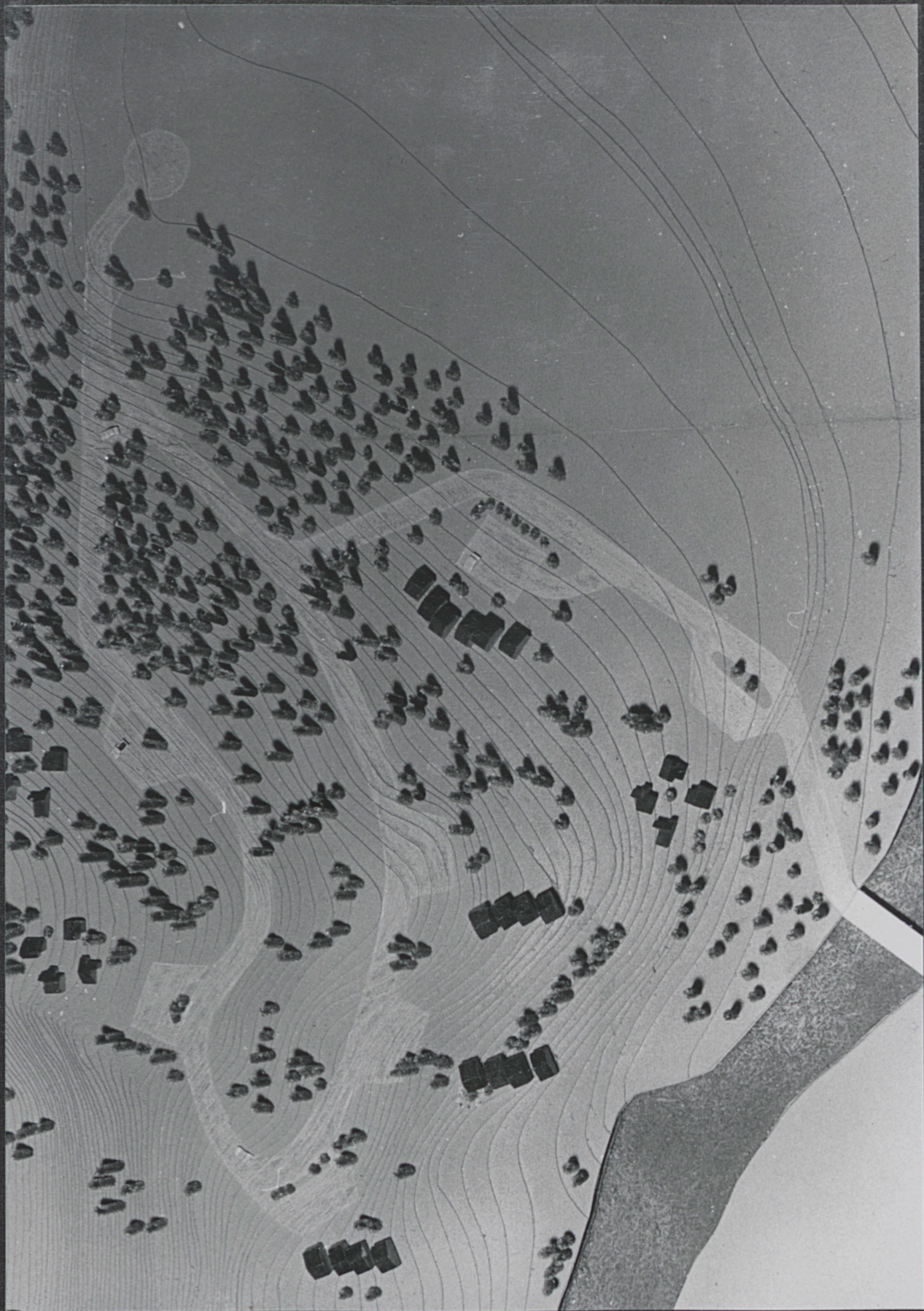
The basic plan for the single houses in the clusters is the same. However, the exterior designs of each cluster will vary to give each cluster its own architectural character. Exterior materials will be basically the same as for the condominiums.

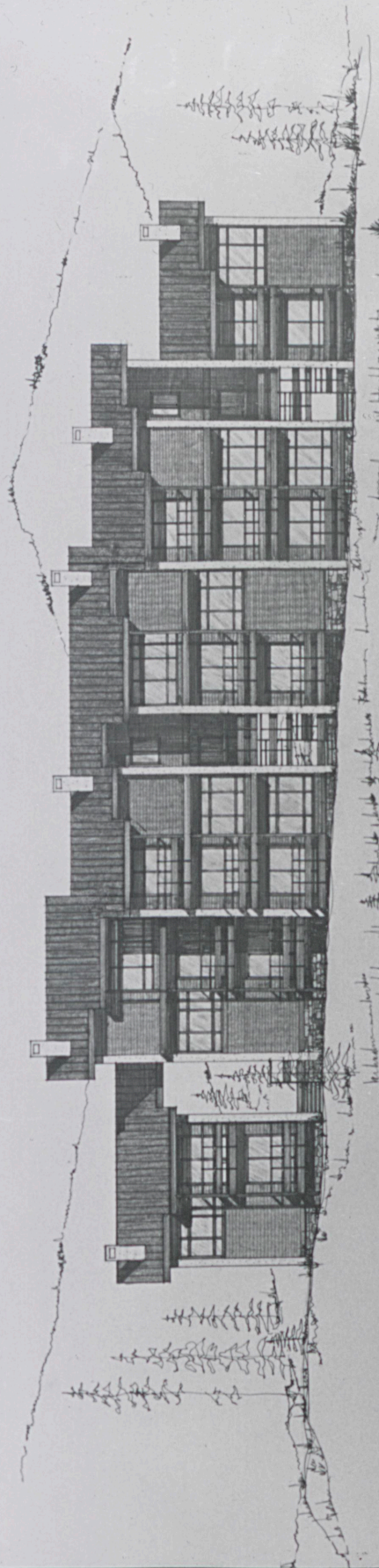
Each unit in the development will have its own sewage treatment plant so that septic tanks will not be required. Water is provided by several wells on the site with each well providing water for approximately eight to ten units.

In an effort to keep electricity consumption at a minimum, propane gas will be used for heating fuel. Hot water heating will be used in all of the units.

At the present time, electricity is supplied to the Canyon from a 69 KV line running from Gallatin Gateway to Big Sky. Montana Power Company has proposed a new 169 KV line to run from Clyde Park to Dillon. However, at this time it is being opposed by the environmental groups and there is the possibility that there could be an electrical shortage in the Canyon in the near future.

FINAL PRESENTATION

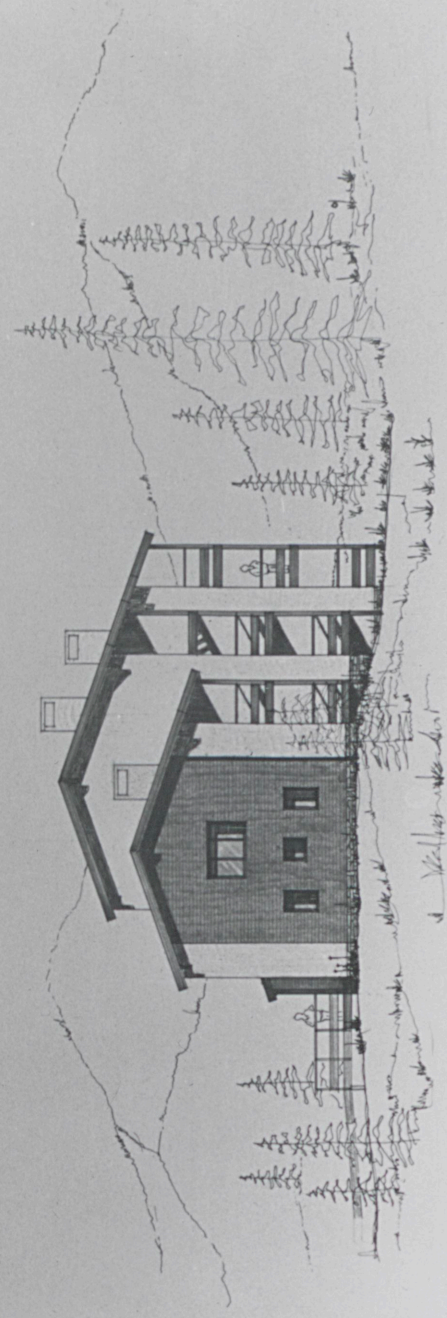




SOUTH

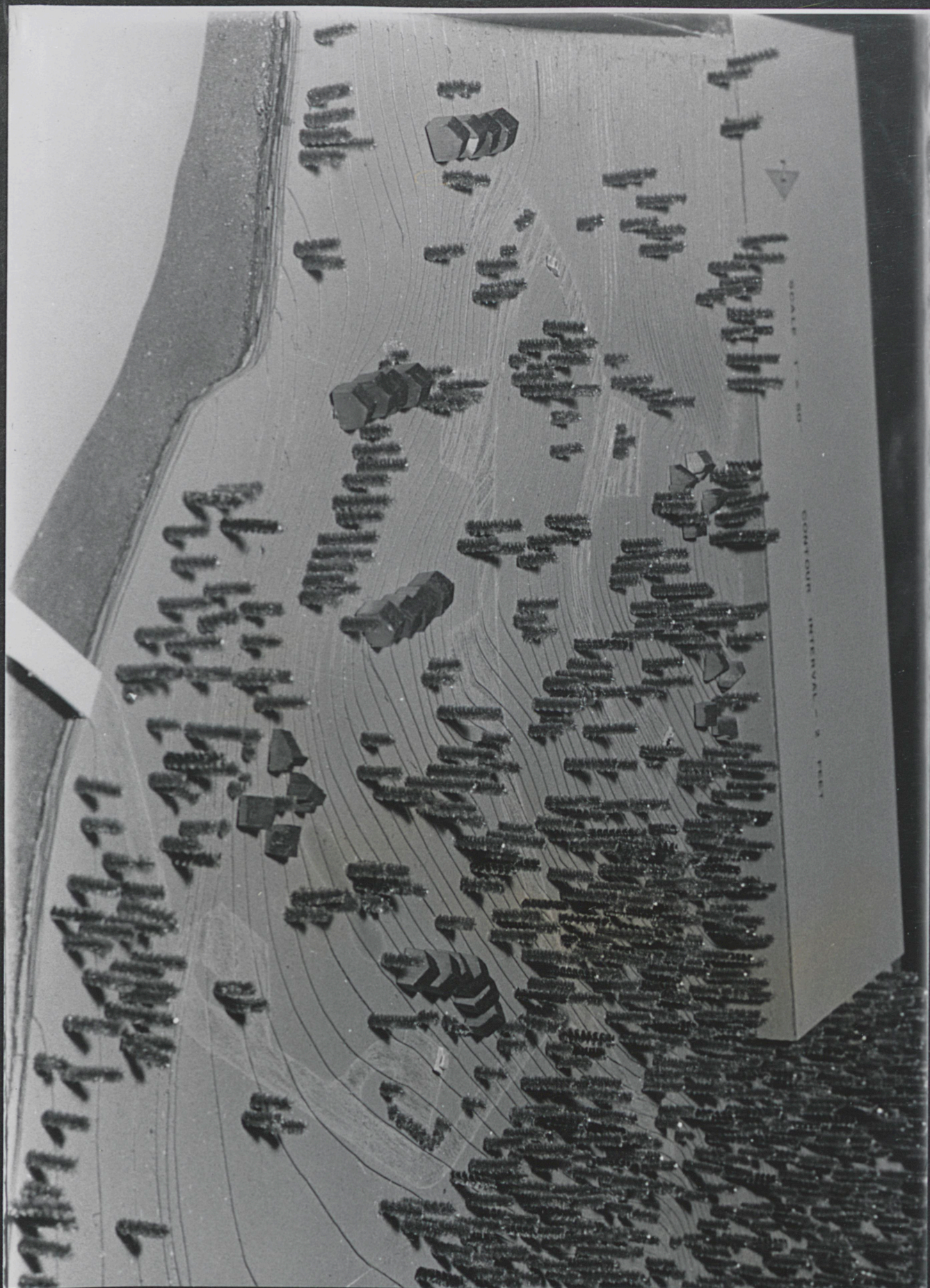
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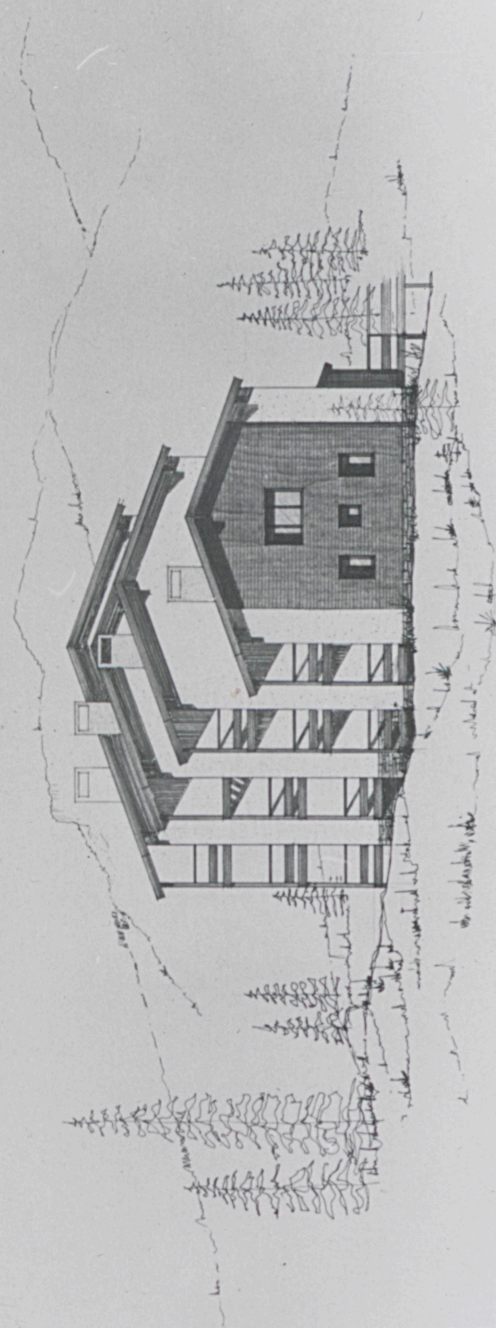
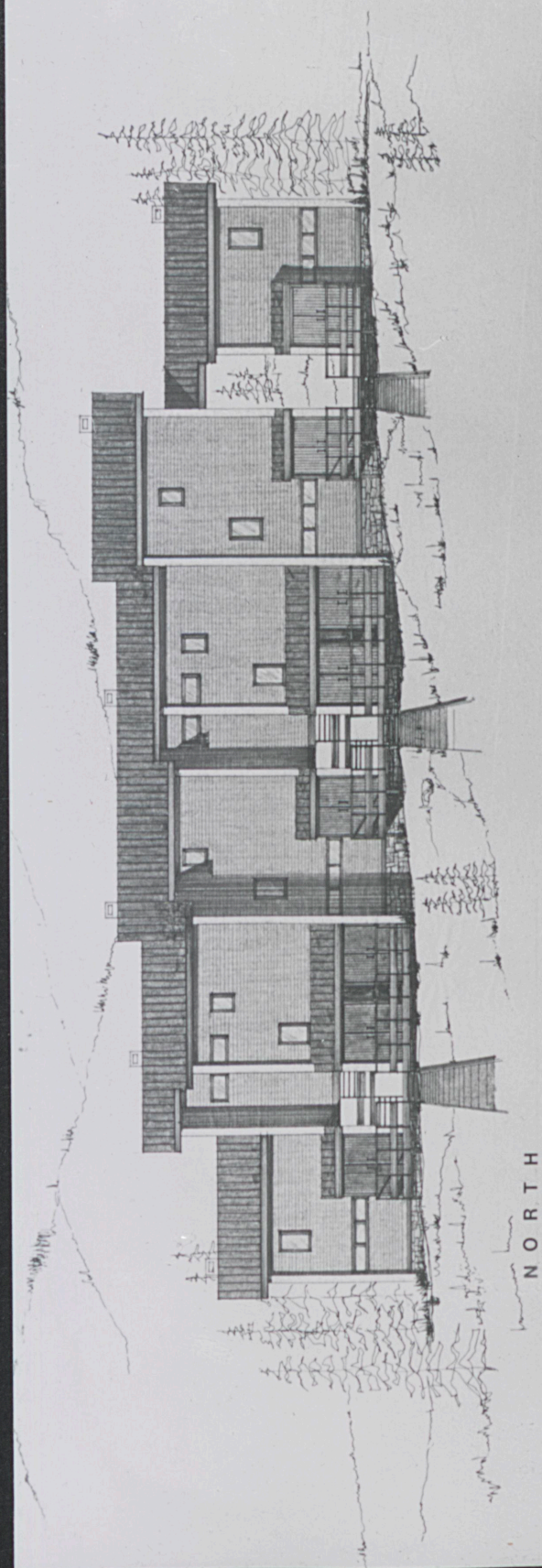
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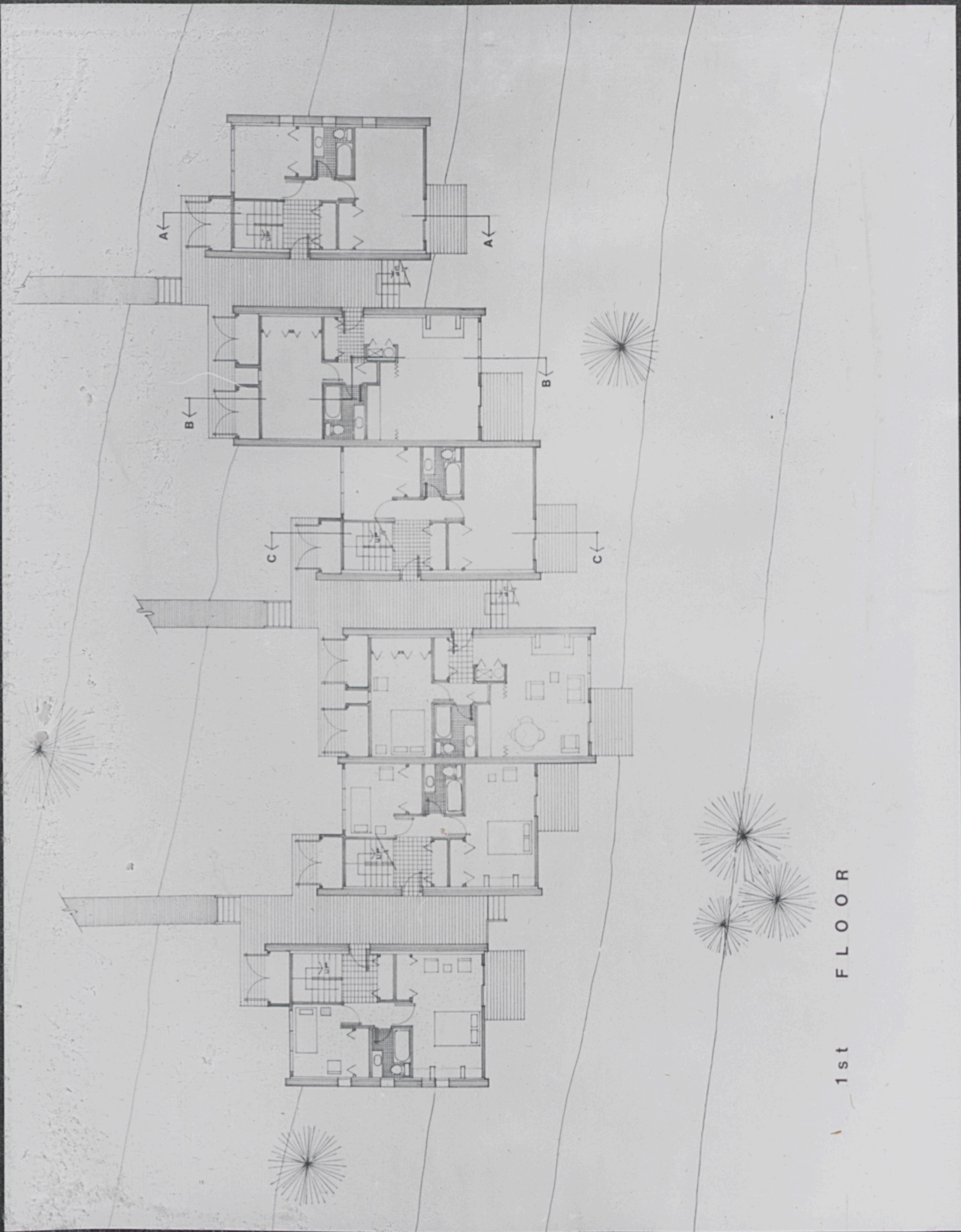


WEST

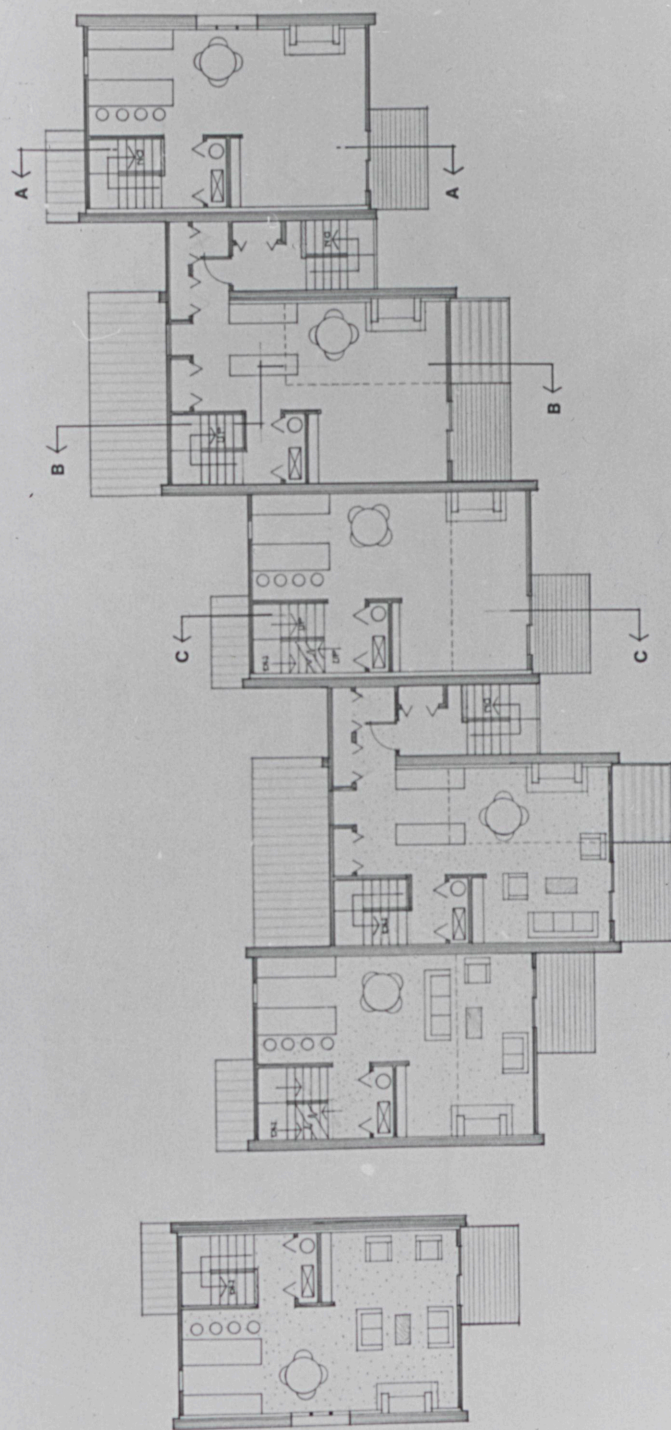
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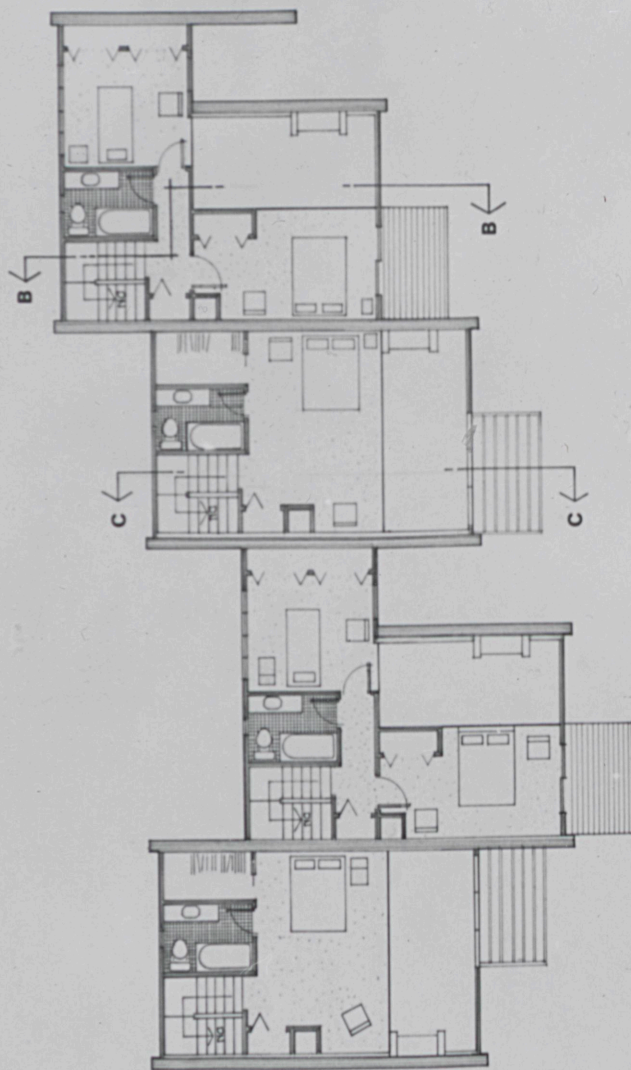




1st FLOOR

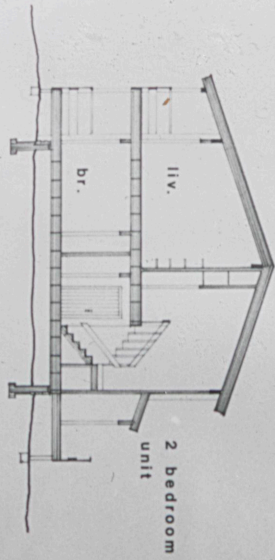


2nd FLOOR

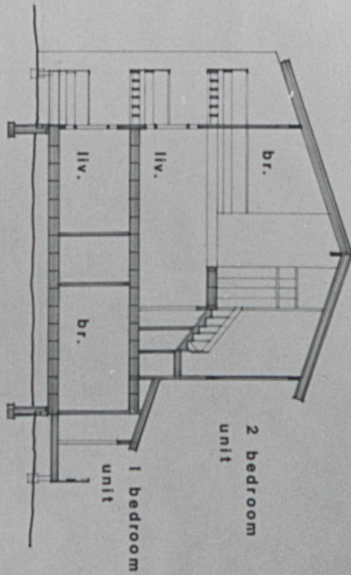


3rd FLOOR

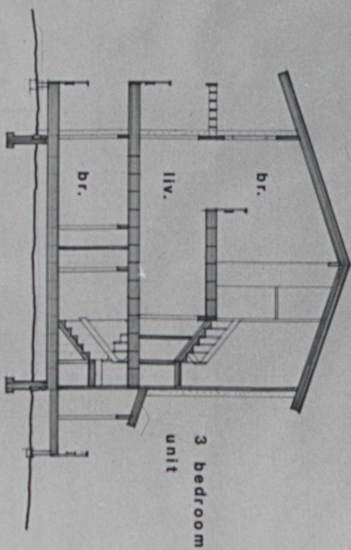
SECTIONS



A-A



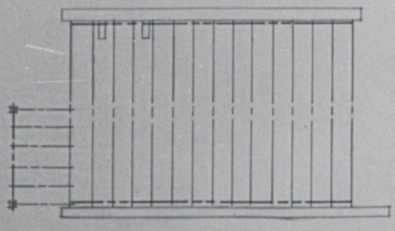
B-B



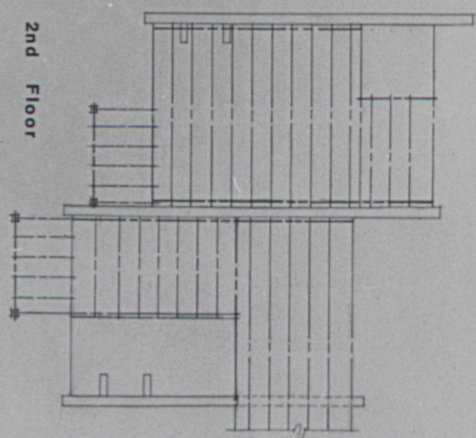
C-C

TYPICAL FRAMING PLANS TYPICAL HEATING PLANS

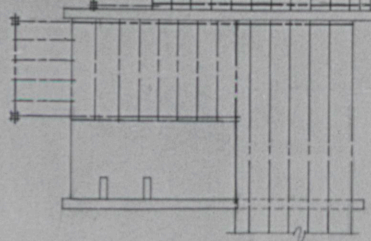
1st Floor



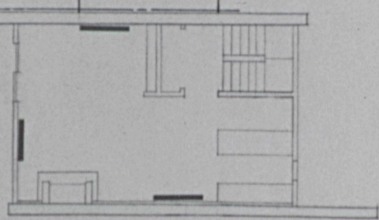
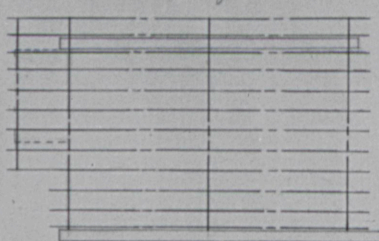
2nd Floor



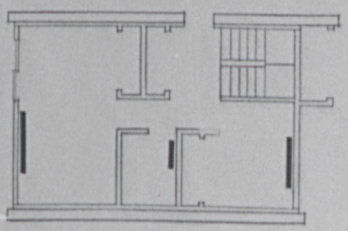
3rd Floor



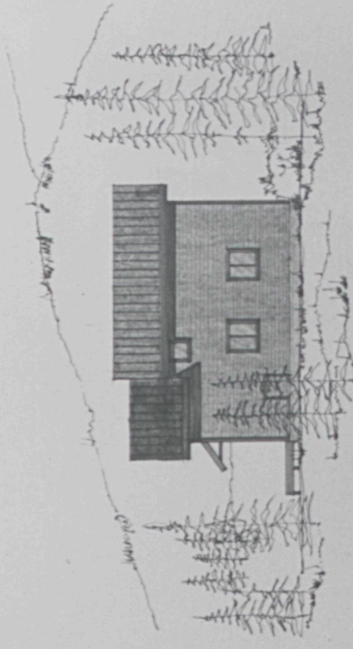
Roof



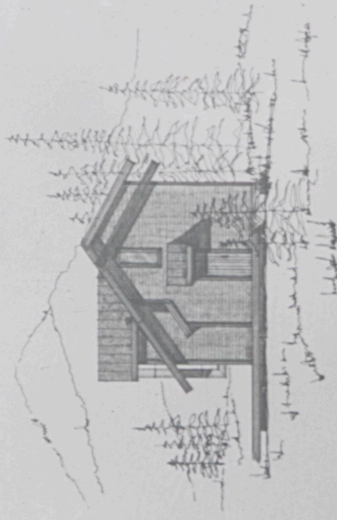
Baseboard Heating Units



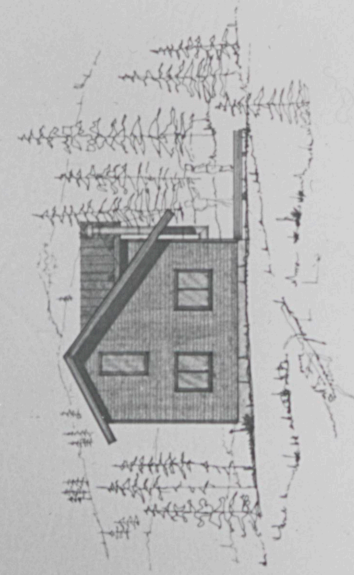
HOUSE 1



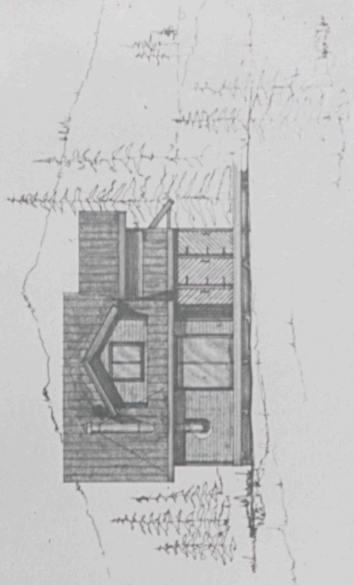
NORTH



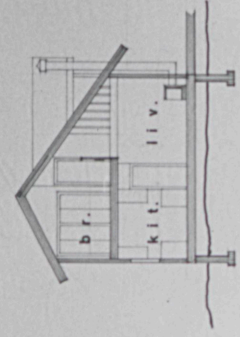
EAST



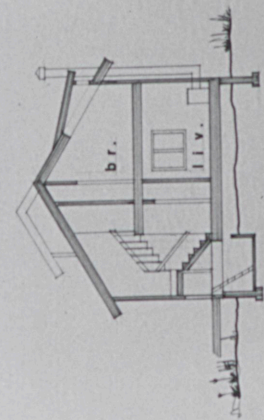
WEST



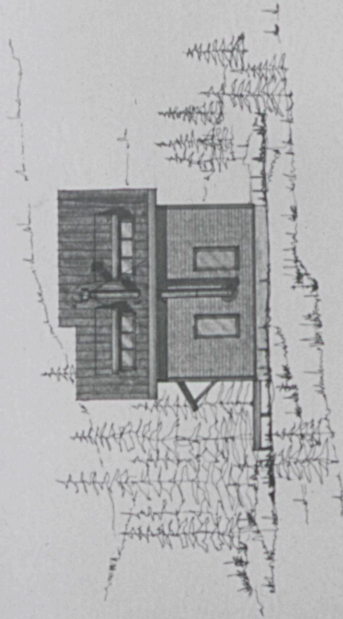
SOUTH



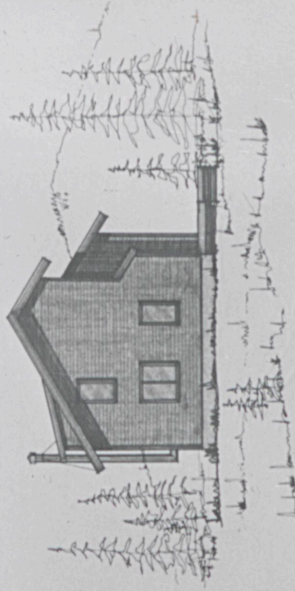
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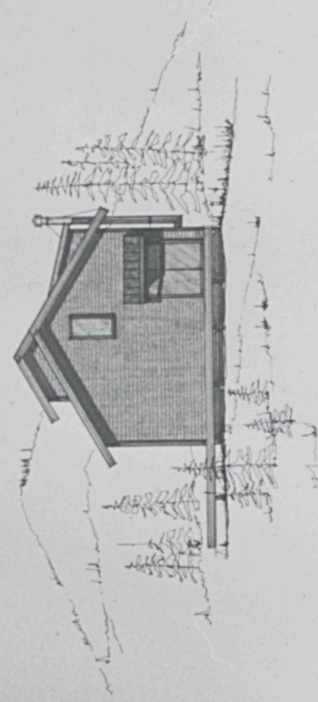
SECTION



EAST



NORTH



SOUTH



WEST

HOUSE

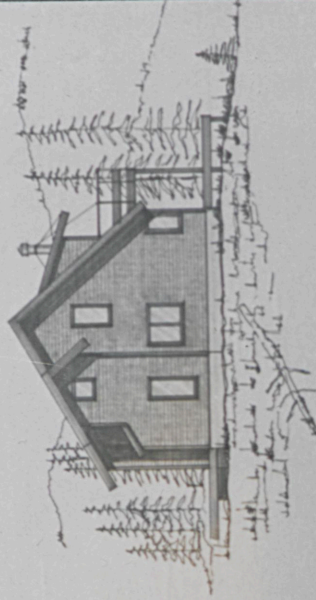
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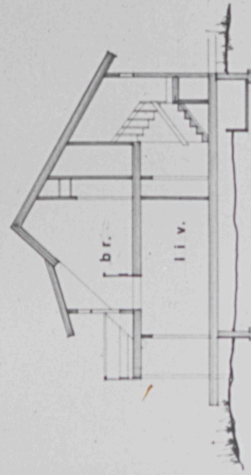
HOUSE



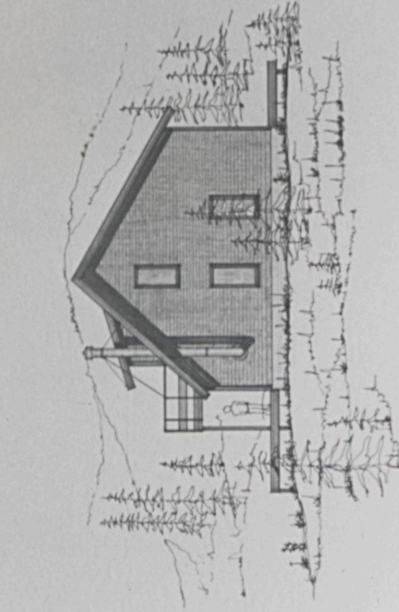
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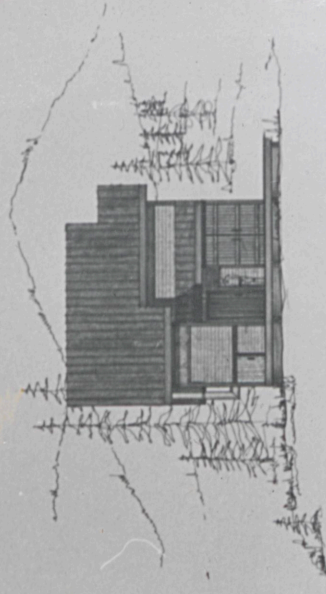
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SECTION

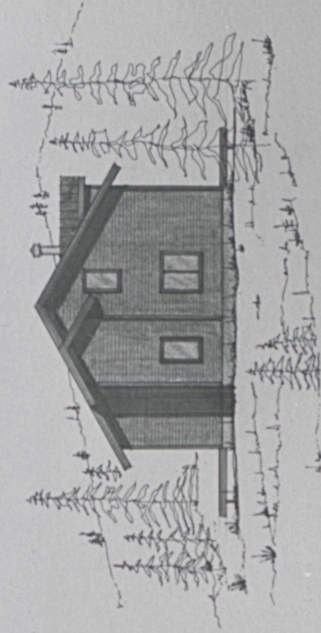


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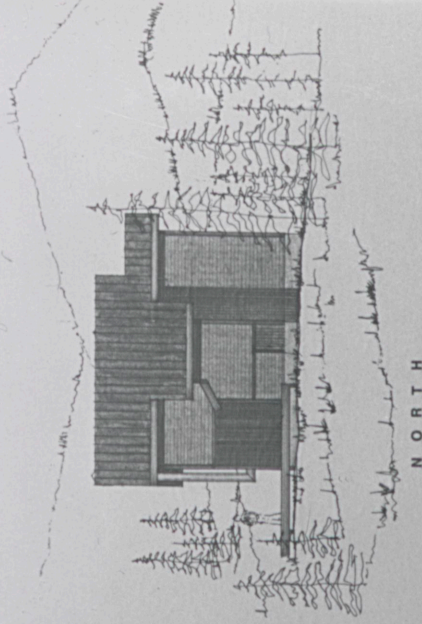


NORTH

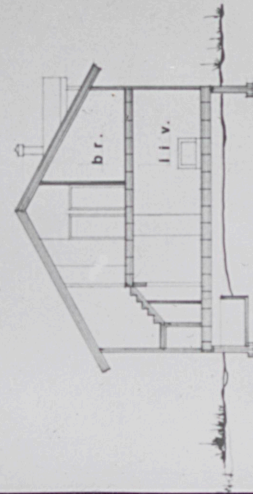
HOUSE 4



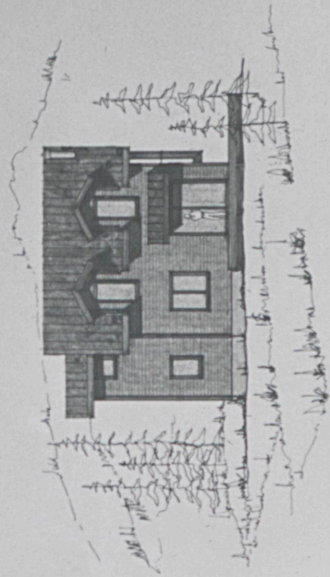
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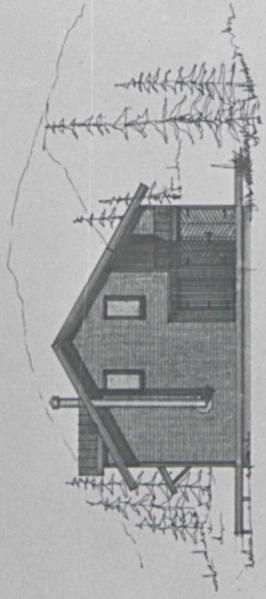
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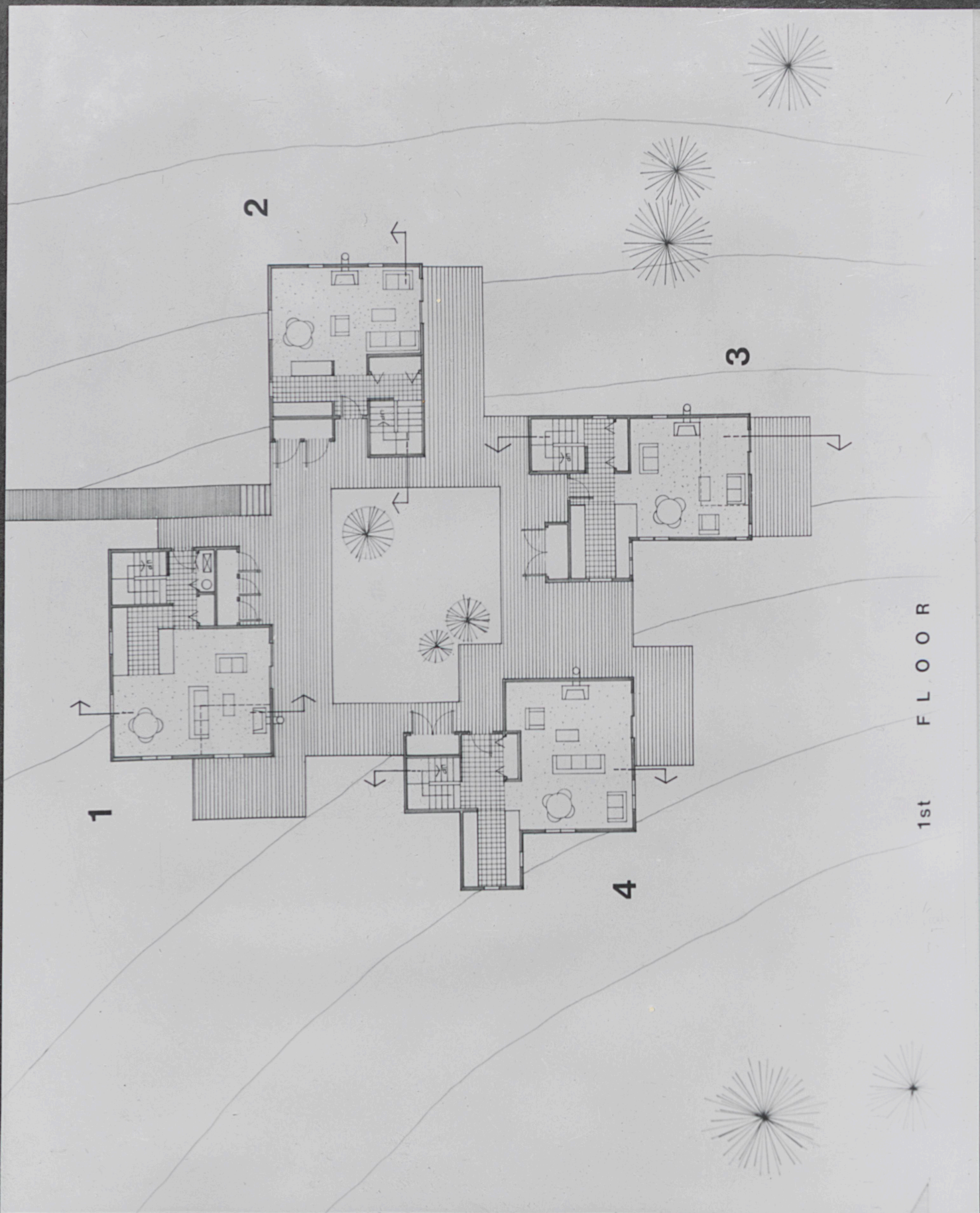
SECTION



SOUTH

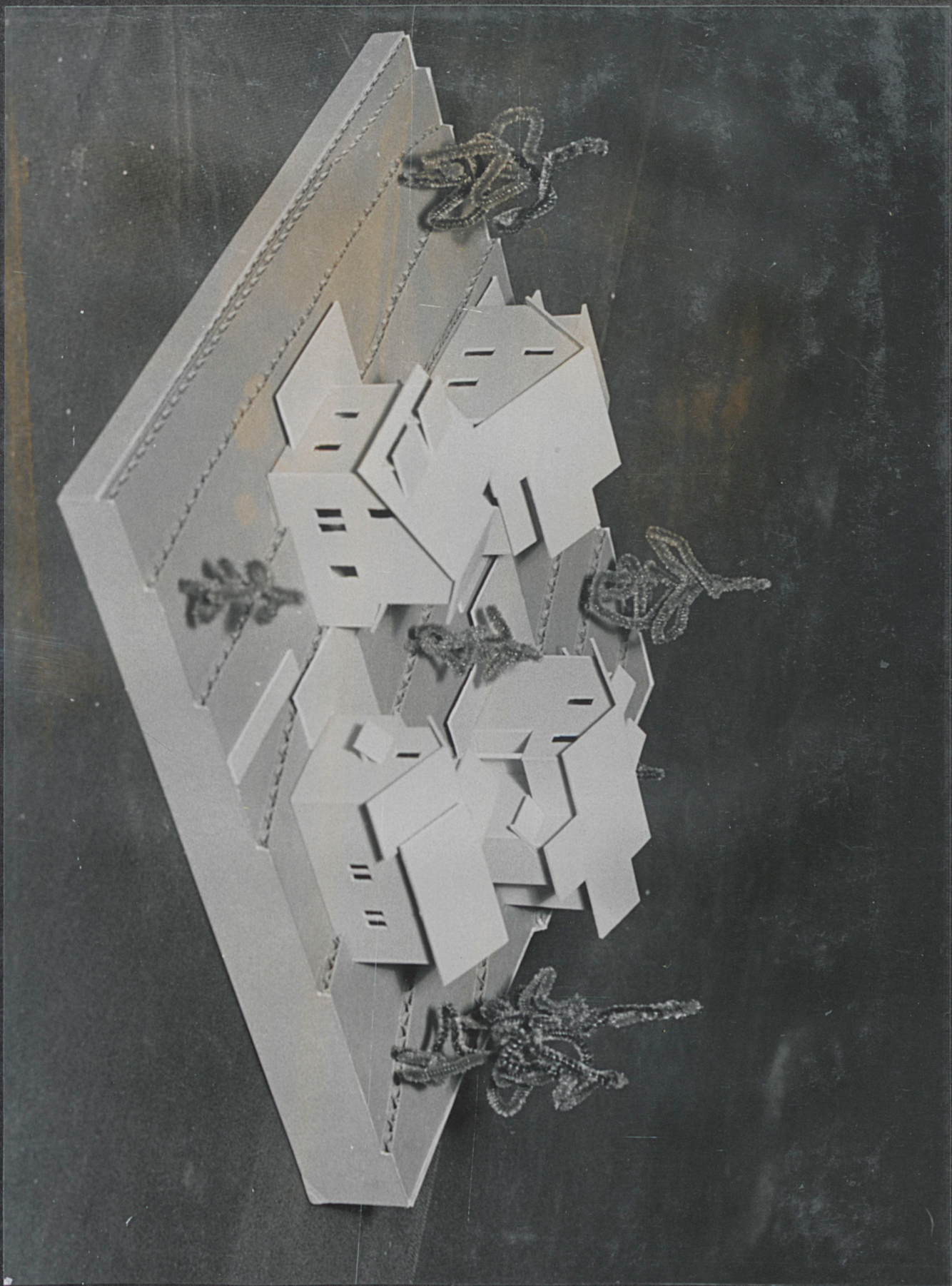


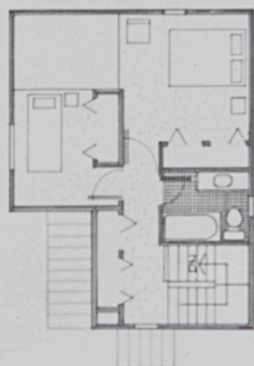
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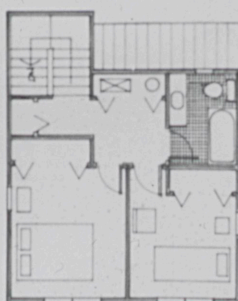
1st FLOOR

1st

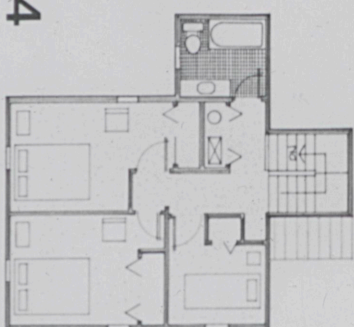




1



2



4



3

2nd

F L O O R

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