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A NEW AIRPORT TERMINAL
GALLATIN FIELD

Part I
Undergraduate Thesis in Architectural Design

by

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Submitted to the School of Architecture
as partial fulfilment of the requirements
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1.0 CONDITIONS CREATING A NEED

The reasons why a new terminal should be built at Gallatin Field will be broken down into two areas: the present inadequate facilities, and the projected growth of the area served by Gallatin Field. A satisfactory case could be built to support the building of a new terminal just to handle the present traffic, but a look into the future will strengthen the argument, and will also be quite valuable in determining the type and size of facilities required in a new terminal.

1.1 PRESENT FACILITIES

1.1.1 BAGGAGE HANDLING

According to Mr. Iverson, the Airport Manager, the present facilities are inadequate to handle the present air traffic. The biggest problem is in baggage handling. At the present time, each airline is responsible for their own flights as far as baggage and passengers are concerned. The baggage is taken from the aircraft to the main desk of that particular airline, and handed out to the passengers. Similarily with departures, a passenger drops his luggage off at the desk of the airline he is travelling on, and it is loaded on a cart and taken out to the aircraft by the airline employees. There is no common system of baggage handling such as conveyors.

1.1.2 LOBBY AND WASHROOMS

Also, according to Mr. Iverson, the waiting room and washrooms are too small. This is especially noticeable at peak periods of travel, but even on a normal day, when a flight

has just arrived, the waiting area is very cramped.

1.1.3 FEDERAL AVIATION ADMINISTRATION OFFICES

According to Mr. Chetham of the F.A.A. (Federal Aviation Administration) the present facilities, though nearly adequate in size, do not function at all well.

1.1.3.1 WEATHER OBSERVATIONS

The F.A.A. is responsible for making weather observations and reporting them to the Air Traffic Controllers in Great Falls. In order to see the cloud conditions in the area, they must go outside and walk right around the building. They would prefer to have some sort of sky dome to observe from.

1.1.3.2 RUNWAY VISIBILITY

With respect to visibility, they also encounter a problem when it comes to seeing the aircraft in the air. On occasion, small aircraft have reported that they are about to land, but because they cannot be seen from the F.A.A. office, they are assumed to be in the landing pattern long after they have landed and taxied off the runway.

1.1.3.3 FLOOR PLAN

Just the floor plan for the present F.A.A. office is unsatisfactory which would seem to have no solution within the confines of their present space. Part of their meeting room was used to provide two offices, and the space left over is now too small for meetings, and the shape and location make it quite useless for anything else. They have also complained

about the area in which pilots file flight plans being too small, and there not being enough wall space in this area and throughout the office to place all their maps.

This seems to be a rather strong case against the present terminal, and the information following about the future of the airport will show how the case will be made stronger with each passing year.

1.2 THE FUTURE OF GALLATIN FIELD

The future of areas which provide an economic base for Gallatin Field both now and in the years to come help not only to determine the rate of obsolescence of the present facilities, but what facilities will be required in the future.

1.2.1 MONTANA STATE UNIVERSITY GROWTH

The growth of Montana State University, Bozeman, and the counties presently using Gallatin Field as their nearest commercial air traffic terminal, is very important in determining the future need for not only new terminal facilities, but also for related facilities such as industrial parks, runways, etc.

Montana State University has a campus that is rapidly expanding in enrolment and research, and as a result there is an ever increasing need for adequate and convenient air travel.

Following is a chart showing the projected Montana State University enrolment to 1979.

PROJECTED ENROLLMENTS - AUTUMN QUARTER

MONTANA STATE UNIVERSITY

Year	Growth Factor	Net	FTE (Full Time Equivalent)	Cum. Growth Factor	%LD (Lower Division)	LD	%UD (Upper Division)	UD	%Gr.	Gr.
1967		6768	6966		63	4389	33	2299	4	278
	1.067			1.067						
1968		7274	7433		62 1/2	4646	33	2453	4 1/2	334
	1.048			1.118						
1969		7560	7787		62	48]8	33	2570	5	389
	1.029			1.150						
1970		7780	8013		62	4968	32 1/2	2604	5 1/2	441
	1.028			1.183						
1971		8000	8240		62	5109	32	2637	6	494
	1.029			1.217						
1972		8230	8476		61 1/2	5213	32	2712	6 1/2	551
	1.030			1.254						
1973		8480	8734		61	5328	32	2795	7	611
	1.024			1.283						
1974		8680	8940		60 1/2	5409	32	2861	7 1/2	670
	1.028			1.319						
1975		8920	9188		60	5513	32	2940	8	735
	1.021			1.347						
1976		9110	9383		59	5536	32	3003	9	844
	1.027			1.384						
1977		9360	9641		58	5592	32	3085	10	964
	(1.025)			1.417						
1978		9594	9882		56	5534	33	3261	11	1087
	(1.020)			1.454						
1979		9834	10129		55	5571	33	3343	12	1215

Notes: 1967 & 1968 actual
1969 thru 1977 from Executive Secretary's Office as per phone conversation with

Marvin Holtz this date.

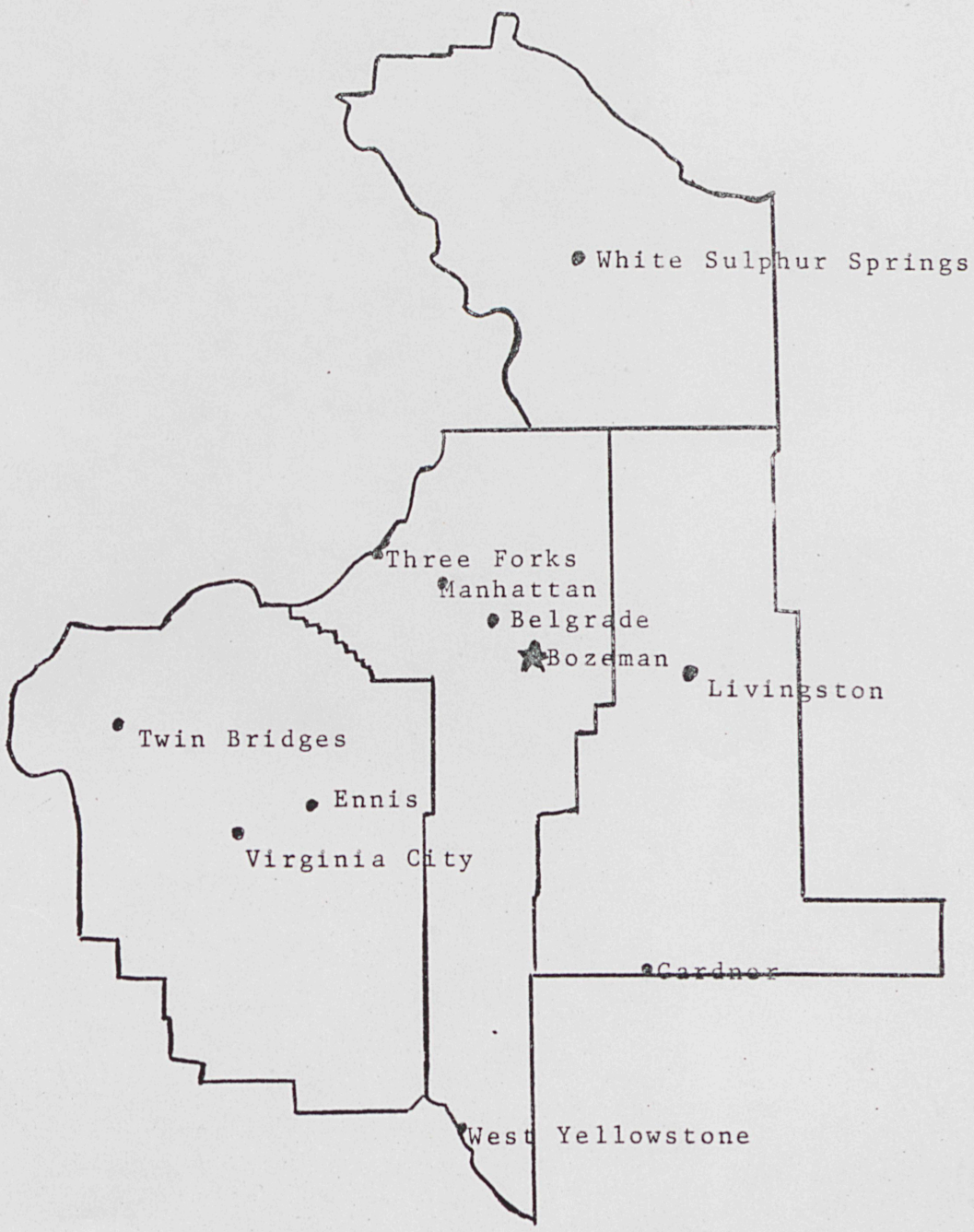
1978 thru 1979 a growth rate of 1.025 assumed % of LD, UD, and Grad. from "Space for the Seventies".

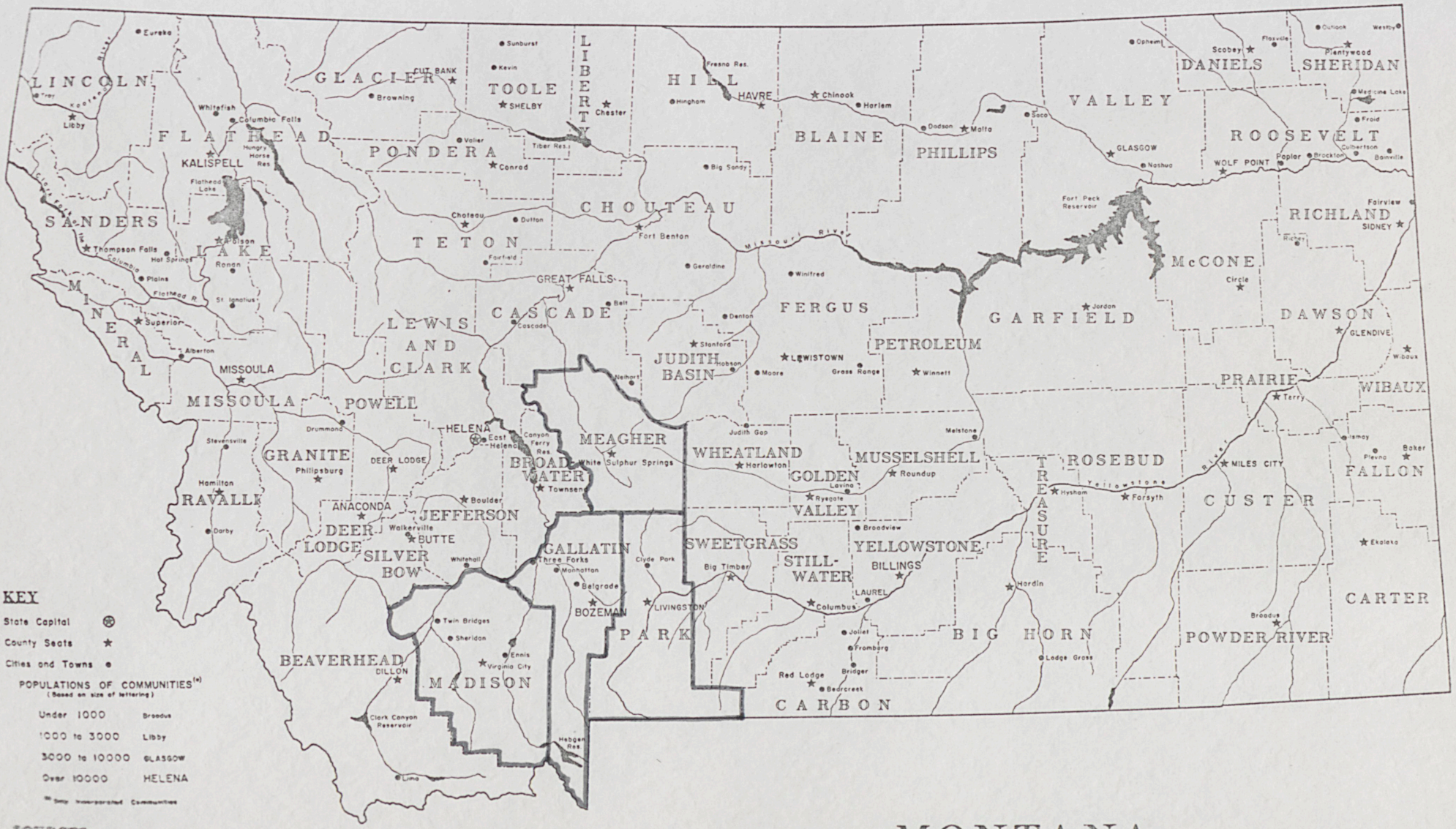
FTE/Net assumed equal to 1.03

1.2.2 COUNTIES USING GALLATIN FIELD

Gallatin Field is considered the air terminal for Gallatin, Park, Madison and Meagher Counties. Two principal urban areas lie within 30 minutes of the Gallatin Field. They are Bozeman and Livingston. Five other smaller population centers lie to the west of the Gallatin Field; Belgrade, Manhattan, Three Forks, Amsterdam and Ennis.

A map of these areas and a projection of growth to 1980 are on the following pages.


White Sulphur Springs
Three Forks
Manhattan
Belgrade
Bozeman
Livingston
Twin Bridges
Ennis
Virginia City
Cardner
West Yellowstone



KEY

State Capital ⊛

County Seats ★

Cities and Towns ●

POPULATIONS OF COMMUNITIES(*)
(Based on size of lettering)

Under 1000	Broadus
1000 to 3000	Libby
3000 to 10000	GLASGOW
Over 10000	HELENA

(*) Only incorporated Communities

SOURCES

U.S. Bureau of Population, 1960

Base map after U.S.G.S.

MONTANA

Table 1. Trade Area Population, 1960 and Projections for 1980 and the Percentage Changes.

Trade Area	1960	1980 Projections		1980 Projections Percentage Changes	
		Lower Limit	Upper Limit	Lower Limit	Upper Limit
Kalispell	54,282	71,153	80,102	31.5%	48.1%
Missoula	76,570	96,116	108,205	25.3%	41.2%
Anaconda	23,331	24,725	27,834	6.0%	19.3%
Butte	61,738	68,847	77,507	11.5%	25.5%
Helena	32,228	37,524	42,244	16.4%	31.1%
Great Falls	123,508	147,552	166,112	19.5%	34.4%
Havre	32,771	34,583	38,932	5.5%	18.8%
Lewistown	14,912	14,469	16,289	-3.0%	9.2%
Bozeman	26,045	34,583	38,933	32.8%	49.5%
Livingston	16,458	20,273	22,823	23.2%	38.7%
Glasgow	17,080	21,147	23,807	23.8%	39.4%
Billings	113,328	139,046	156,536	22.7%	38.1%
Sidney	10,504	11,607	13,067	10.5%	24.4%
Glendive	17,333	18,444	20,761	6.4%	19.8%
Miles City	32,688	33,390	37,590	2.1%	15.0%
Wolf Point	21,944	21,545	24,255	-1.8%	10.5%
Total	674,720	795,000	895,000		

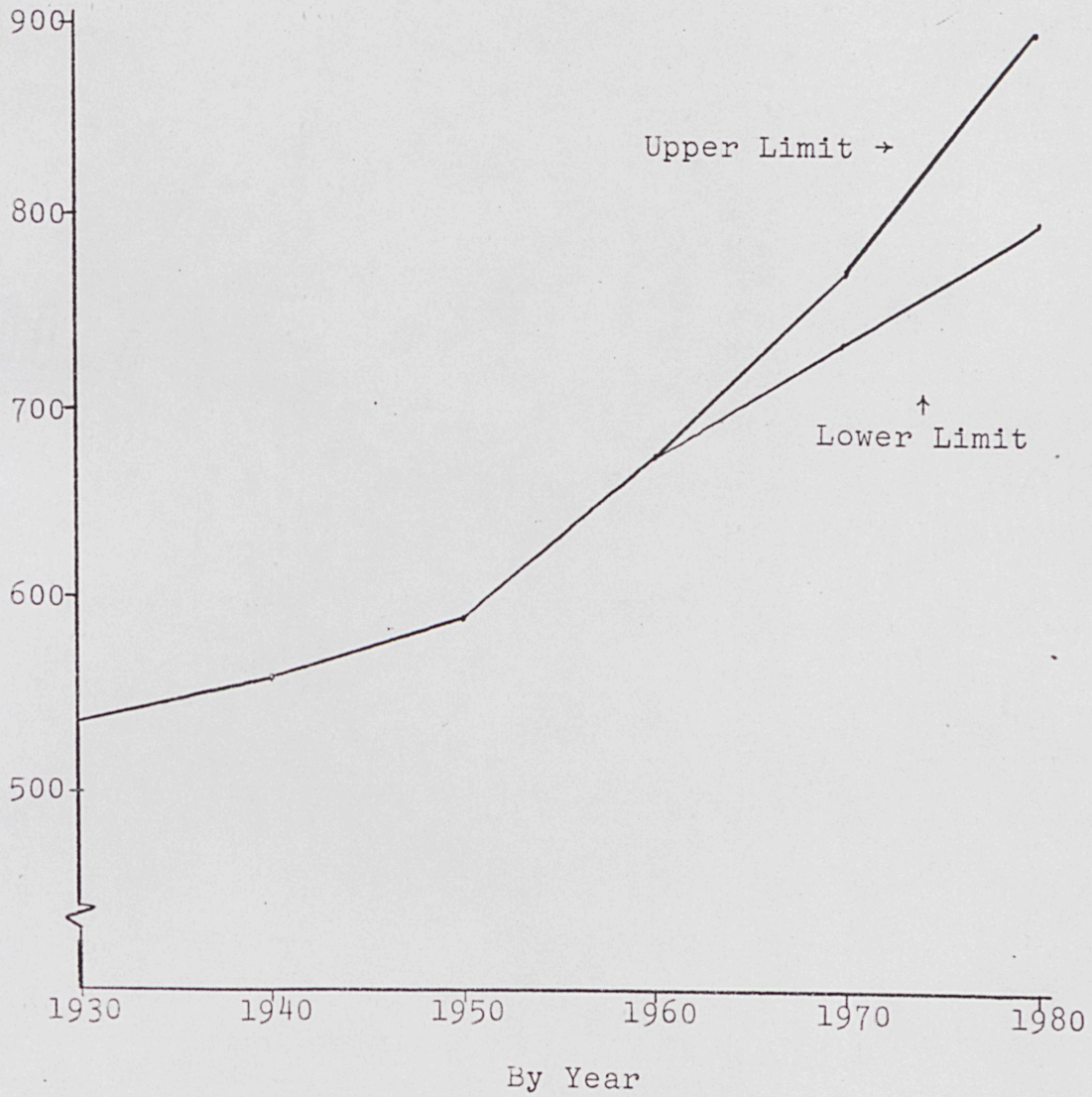
Source: W. D. Diehl, *Montana Tax Study*, Vol. 1, Part Four, 1965-1966, p. 14; J. M. Henderson and A. O. Krueger, *National and Economic Change in the Upper Midwest*, University of Minnesota Press, 1965, p. 25; D. E. Roth and W. V. Williams, *Factors Influencing the Economic Growth Rate of Montana*, North Star Research and Development Institute, 1964, p. 8.

Population of Gallatin, Park, Madison and Meagher Counties for 1950, 1960 and Projections for 1968 and 1970.[5]

Place	1950	1960	1968	1970
Gallatin County	21,902	26,045	31,331	32,653
Park County	11,999	13,168	13,808	13,971
Madison County	5,998	5,211	4,478	4,295
Meagher County	2,079	2,616	3,218	3,369
TOTAL	41,978	47,040	52,835	54,288
Gallatin plus Park Counties	33,901	39,213	45,139	46,624

[5]County population data from the Montana State Board of Equalization, Helena, Montana; urban area population data by John R. Borchert and Russel B. Adams, "Projected Urban Growth in the Upper Midwest: 1960-1975," Upper Midwest Economic Study, Urban Report No. 8, September 1964.

Figure 1. Montana's Population 1930 - 1960 with Projections to 1980.



1.2.3. BIG SKY SKI AREA

Big Sky Ski area should have a very great effect on Gallatin Field. Howard Nelson, a member of the Gallatin Field Board has predicted that the airport could double its traffic by 1972.

The projected number of guests per day at Big Sky by that time will be between 3,000 and 4,000. In five years, there could be as many as 8,000 to 9,000 people per day.

Big Sky will have its own aircraft landing strip which will handle smaller aircraft, so it seems quite likely that there will be an air taxi service from Gallatin Field to Big Sky.

Some people may be inclined to think that there is more chance of enlarging West Yellowstone's airport and using it for charter flights into the area, but the altitude of that airport is so high, it is very difficult to land large aircraft there.

2.0 LOCAL CONDITIONS

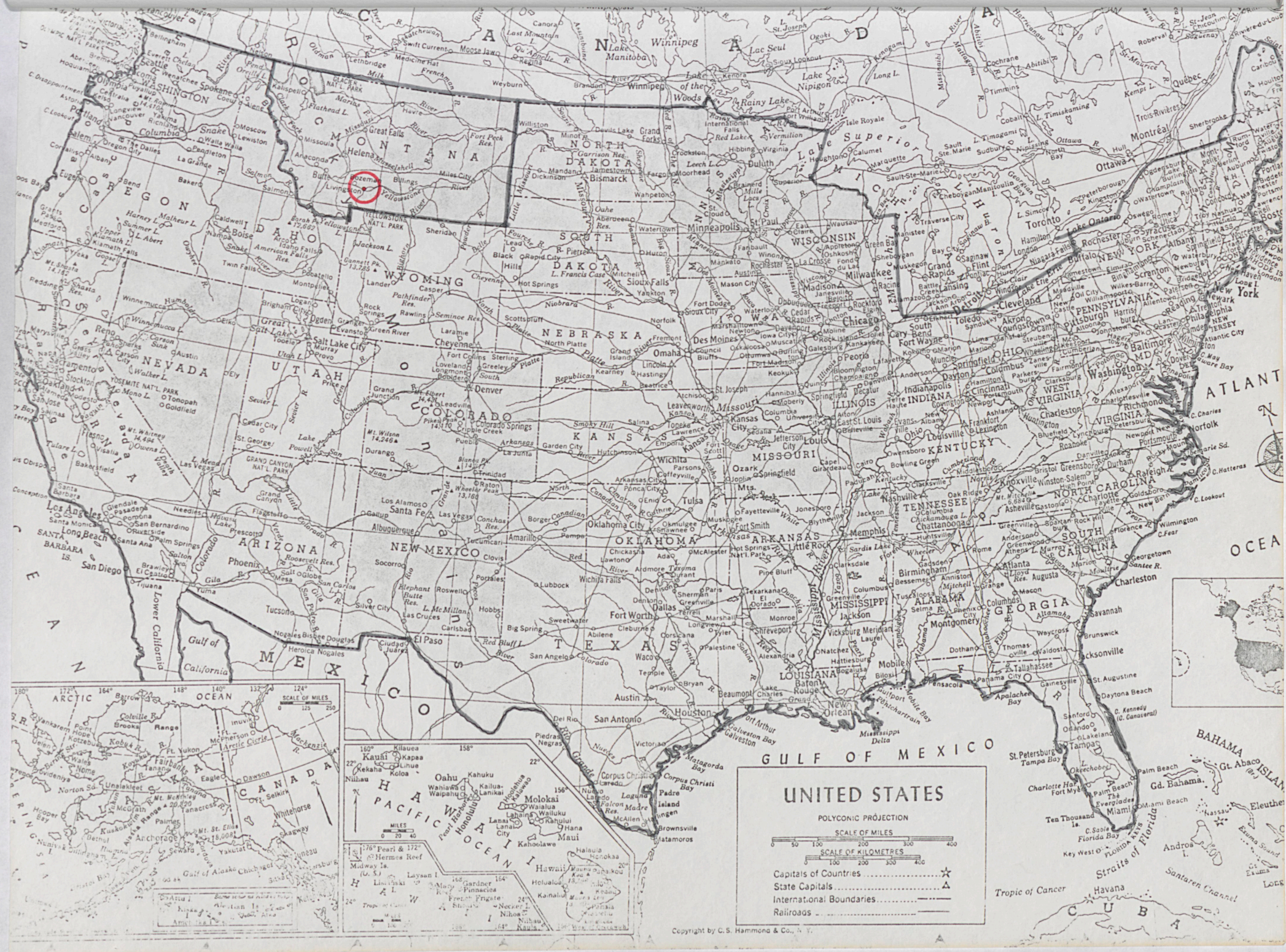
2.1 GEOGRAPHY

Montana is a North Western state bordered on the North by Canada, on the West by Idaho, on the South by Wyoming, and on the East by North Dakota and South Dakota.

Bozeman is in South Western Montana about 50 miles North of the North Western tip of Wyoming.

Gallatin Field is 10 miles North West of Bozeman on Highway #10, and about 3/4 of a mile from Belgrade.

See the maps on the following pages.


UNITED STATES
POLYCONIC PROJECTION
SCALE OF MILES
SCALE OF KILOMETRES
Capitals of Countries
State Capitals
International Boundaries
Railroads
Gulf of Mexico
Pacific Ocean
Hawaii
Alaska
Arctic Ocean
Canada
Mexico
Cuba
Bahama Islands
Gt. Abaco (Br.)
Gd. Bahama
Andros I.
Nassau
Eleuthera
Florida Straits
Straits of Florida
Tropic of Cancer
Havana
Santaren Channel
Key West
Miami
Tampa
Jacksonville
Charleston
Savannah
Atlanta
Birmingham
Memphis
Nashville
Louisville
Cincinnati
Indianapolis
Chicago
Detroit
Cleveland
Buffalo
Toronto
Montreal
Ottawa
Quebec
New York
Boston
Philadelphia
Washington
Baltimore
Richmond
Norfolk
Pittsburgh
Milwaukee
Minneapolis
St. Paul
Duluth
Winnipeg
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Seattle
Portland
San Francisco
Los Angeles
San Diego
Las Vegas
Salt Lake City
Denver
Albuquerque
Phoenix
Tucson
El Paso
Houston
Dallas
Fort Worth
San Antonio
Austin
New Orleans
Oklahoma City
Kansas City
St. Louis
Omaha
Des Moines
Sioux Falls
Fargo
Bismarck
Billings
Great Falls
Helena
Butte
Missoula
Spokane
Boise
Salt Lake City
Reno
Sacramento
Yellowstone Nat'l Park
Grand Canyon Nat'l Park
Yosemite Nat'l Park
Glacier Nat'l Park
Rocky Mts.
Mississippi R.
Missouri R.
Colorado R.
Rio Grande
Gulf of California
Lower California
Hawaiian Is.
Honolulu
Pearl Harbor
Kauai
Oahu
Maui
Molokai
Hawaii
Alaska Range
Mt. McKinley
Anchorage
Fairbanks
Juneau
Yukon R.
Mackenzie R.
Arctic Circle
Gulf of Alaska
Aleutian Is.
Midway Is. (U. S.)
Hermes Reef
Laysan I.
Gardner Pinnacles
French Frigate Shoals
Necker I.
Nihoa
Kaula
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LINCOLN
GLACIER
TOOLE
LIBERTY
HILL
DANIELS
SHERIDAN
VALLEY
FLATHEAD
PONDERA
BLAINE
PHILLIPS
ROOSEVELT
SANDERS
LAKE
TETON
CHOUTEAU
RICHLAND
McCONE
MINERAL
LEWIS AND CLARK
CASCADE
FERGUS
GARFIELD
DAWSON
JUDITH BASIN
PETROLEUM
MISSOULA
POWELL
PRAIRIE
WIBAUX
GRANITE
HELENA
MEAGHER
WHEATLAND
MUSSELSHELL
ROSEBUD
FALLON
RAVALLI
BROADWATER
GOLDEN VALLEY
TREASURE
CUSTER
JEFFERSON
DEER LODGE
ANACONDA
BUTTE
SILVER BOW
GALLATIN
SWEETGRASS
YELLOWSTONE
STILLWATER
BILLINGS
CARTER
BEAVERHEAD
MADISON
PARK
BIG HORN
POWDER RIVER
CARBON
Missouri River
Yellowstone River
Flathead Lake
Fort Peck Reservoir
Canyon Ferry Res.
Tiber Res.
Hungry Horse Res.
Clark Canyon Reservoir
Hebgen Res.
Fresno Res.
Eureka
Troy
Libby
Whitefish
Columbia Falls
Kalispell
Browning
Cut Bank
Sunburst
Kevin
Shelby
Chester
Havre
Hingham
Chinook
Harlem
Dodson
Malta
Saco
Opheim
Scobey
Flaxville
Outlook
Westby
Plentywood
Medicine Lake
Froid
Culbertson
Bainville
Glasgow
Nashua
Wolf Point
Poplar
Brockton
Fairview
Sidney
Richey
Circle
Jordan
Glendive
Wibaux
Terry
Miles City
Ismay
Baker
Plevna
Hysham
Forsyth
Ekalaka
Broadus
Lodge Grass
Hardin
Laurel
Columbus
Joliet
Fromberg
Red Lodge
Bridger
Bearcreek
Big Timber
Livingston
Clyde Park
Three Forks
Manhattan
Belgrade
Bozeman
Whitehall
Twin Bridges
Sheridan
Ennis
Virginia City
Dillon
Lima
Broadview
Roundup
Lavina
Ryegate
Melstone
Judith Gap
Harlowton
White Sulphur Springs
Townsend
Boulder
Walkerville
Drummond
Philipsburg
Stevensville
Hamilton
Darby
Alberton
Superior
St. Ignatius
Ronan
Hot Springs
Thompson Falls
Plains
Flathead R.
Columbia R.
Kootenai R.
Clark Fork R.
Choteau
Dutton
Fairfield
Fort Benton
Geraldine
Winifred
Great Falls
Belt
Cascade
Denton
Stanford
Hobson
Moore
Grass Range
Winnett
Lewistown
Neihart
Big Sandy
Conrad
Valier
Whitefish
Columbia Falls
Hungry Horse Res.
Flathead Lake
Kalispell
Libby
Troy
Eureka
Kootenai R.
Clark Fork R.
Sunburst
Kevin
Shelby
Cut Bank
Browning
Chester
Havre
Hingham
Chinook
Harlem
Dodson
Malta
Saco
Opheim
Scobey
Flaxville
Outlook
Westby
Plentywood
Medicine Lake
Froid
Culbertson
Bainville
Glasgow
Nashua
Wolf Point
Poplar
Brockton
Fairview
Sidney
Richey
Circle
Jordan
Glendive
Wibaux
Terry
Miles City
Ismay
Baker
Plevna
Hysham
Forsyth
Ekalaka
Broadus
Lodge Grass
Hardin
Laurel
Columbus
Joliet
Fromberg
Red Lodge
Bridger
Bearcreek
Big Timber
Livingston
Clyde Park
Three Forks
Manhattan
Belgrade
Bozeman
Whitehall
Twin Bridges
Sheridan
Ennis
Virginia City
Dillon
Lima
Broadview
Roundup
Lavina
Ryegate
Melstone
Judith Gap
Harlowton
White Sulphur Springs
Townsend
Boulder
Walkerville
Drummond
Philipsburg
Stevensville
Hamilton
Darby
Alberton
Superior
St. Ignatius
Ronan
Hot Springs
Thompson Falls
Plains
Flathead R.
Columbia R.
Kootenai R.
Clark Fork R.
Choteau
Dutton
Fairfield
Fort Benton
Geraldine
Winifred
Great Falls
Belt
Cascade
Denton
Stanford
Hobson
Moore
Grass Range
Winnett
Lewistown
Neihart
Big Sandy
Conrad
Valier
Missoula
Helena
East Helena
Butte
Anaconda
Deer Lodge
Clark Canyon Reservoir
Hebgen Res.
Canyon Ferry Res.
Tiber Res.
Hungry Horse Res.
Fresno Res.
Fort Peck Reservoir
Missouri River
Yellowstone River
Flathead Lake
KEY
State Capital
County Seats
Cities and Towns
POPULATIONS OF COMMUNITIES(*)
(Based on size of lettering)
Under 1000 Broadus
1000 to 3000 Libby
3000 to 10000 GLASGOW
Over 10000 HELENA
(*) Only Incorporated Communities
SOURCES
U.S. Bureau of Population, 1940
Base map after U.S.G.S.

MONTANA

2.2 HISTORY

In 1929 the town of Belgrade leased one and one-half acres of land for airport purposes and, with the use of volunteers picking rocks, Gallatin Airfield was born. In 1939, representatives of Montana State College proposed the founding of a civilian pilot training school, and in 1940 such a school was started under the direction of Mr. John F. Lynch.

The airport received a sum of $47,000 in 1940 from the Federal Government for developing the airport for national defense purposes. It received its official name, "Gallatin Field" in 1941. At that time there were four runways 4700 feet long and 150 feet wide. They were subsequently lengthened to 5100 feet, and later still the main NW-SE runway was extended to its present length of 6500 feet. With the increasing jet travel, the runway was again lengthened by 2500 feet in 1968.

By 1942 the flying school was the largest in Montana. To date, 530 pilots have been trained at this school. In 1943, seven private aircraft and eighteen government aircraft were based at the field. The number of private business and pleasure aircraft has continued to grow with the region's growing population and increasing rise in the amount of private flying.

Regularily scheduled commercial airline service was inaugurated in 1948 by Northwest Airlines and, with the exception of a brief period in the 1950's, has continued to the present time. In 1967 Northwest increased its east-west

service to Gallatin Field to two flights each direction daily. One flight is between Washington, D.C. and Seattle, and the other is between Billings and Seattle.

In 1967 Frontier Airlines began regularily scheduled flights from and to Gallatin Field. They now have six flights daily.

In 1951, a terminal building designed by Fred Willson, Architect, was dedicated and placed into service. Gallatin Field is owned jointly by the Gallatin County and the City of Bozeman, and is governed by a Board composed of citizens appointed by the City and County Commissions. The Airport is managed by a manager employed by the Bozeman and Gallatin County Airport Board.

2.3 REGIONAL ECONOMY

The Bozeman-Gallatin area economy is based principally on wheat and other grain farming, cattle ranching, Montana State University, tourism, and on the emergence of Bozeman as Southern Montana's major trade and service center between Butte, 90 miles west, and Billings, 140 miles east.

There are a significant number of the labor force involved in the following areas of economic activity: manufacturing, agriculture, construction, logging, transportation, utilities, wholesale and retail trade, services, finance, education, research, government.

Gallatin Field serves a region which is sparsely populated as compared with the United States population in general. However, its population and economic welfare, unlike those of

the State as a whole, appear to have growth factors which are solidly based on stable resources and economic activities. Of particular interest is the fact that those economic activities which may be most inclined to generate flight transportation are among the most vigorously growing in the region.

Big Sky Ski Area should have a great influence on the economy and especially on Gallatin Field. Any figures on the amount of money this development will bring to the Bozeman area are not readily available.

2.4 CLIMATE

The climate of the Gallatin Field area is quite varied, not only throughout the year, but within each season.

The average winter temperature is 25 degrees Fahrenheit and the average low is -20 degrees Fahrenheit. The coldest months are January and February, with temperatures reaching as low as -43 degrees Fahrenheit.

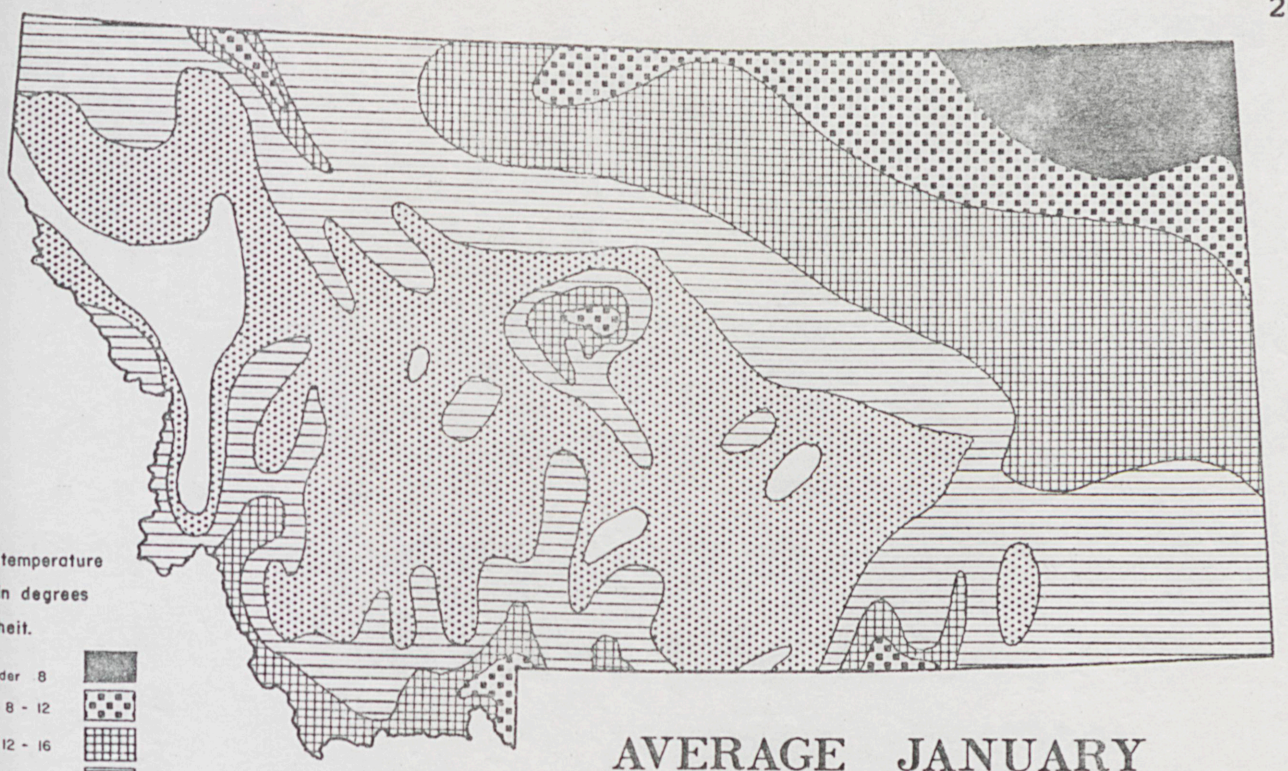
The summer is characterized by warm days and cool nights. The average temperature for the summer months is 66.5 degrees Fahrenheit. There are occasionally very warm periods when the temperature may reach as high as 90 to 100 degrees, but these periods last only 5 - 10 days.

The average mean temperature for Gallatin Field is 43 degrees Fahrenheit. The prevailing winds are south-east and north-west. The storms usually come in from the east and north-east. The winds reach a maximum velocity of 40 miles per hour.

The average annual rainfall is 17.50 inches, fifty per-cent of which falls from May to July. The summer precipitation

is usually rain, but sometimes occurs as hail.

The average snowfall in this area is from 30 - 50 inches, most of which falls between November and March.



KEY

Average temperature shown in degrees Fahrenheit.

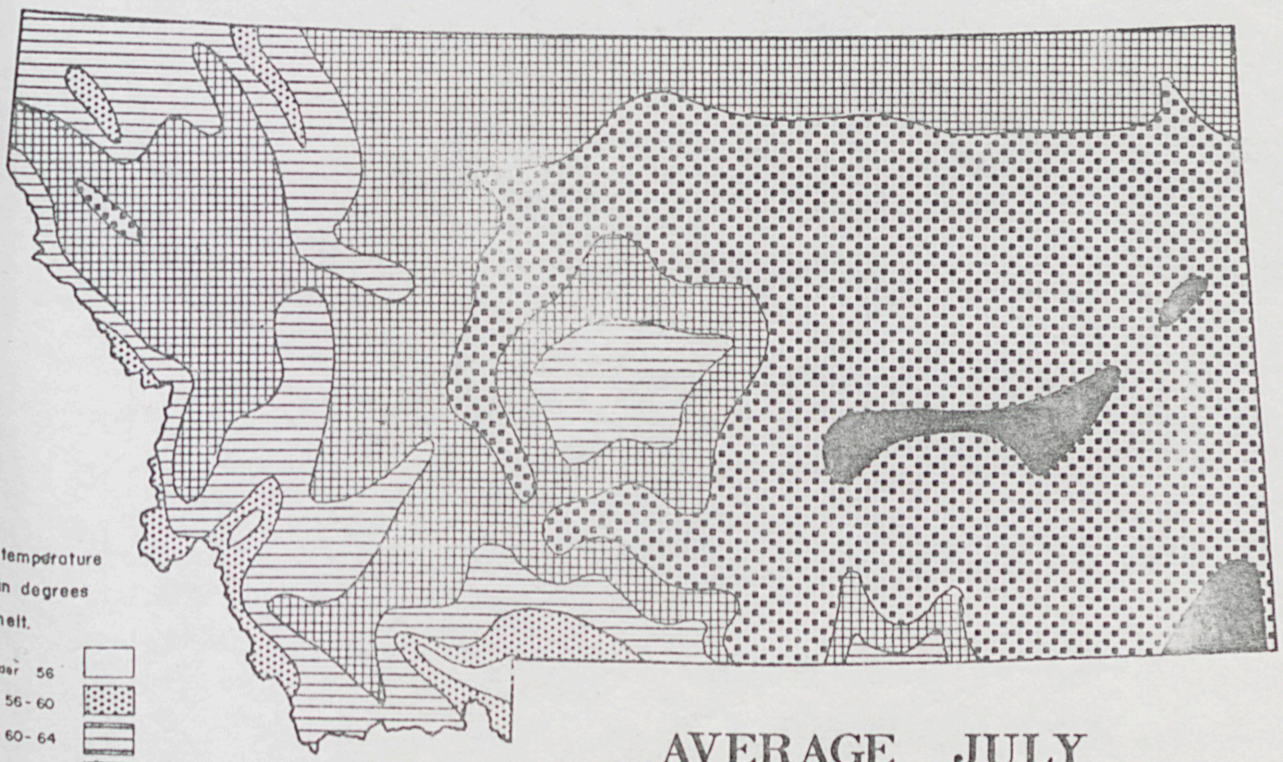
Under 8
8 - 12
12 - 16
16 - 20
20 - 24
24 - 28

AVERAGE JANUARY TEMPERATURE

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20



KEY

Average temperature shown in degrees Fahrenheit.

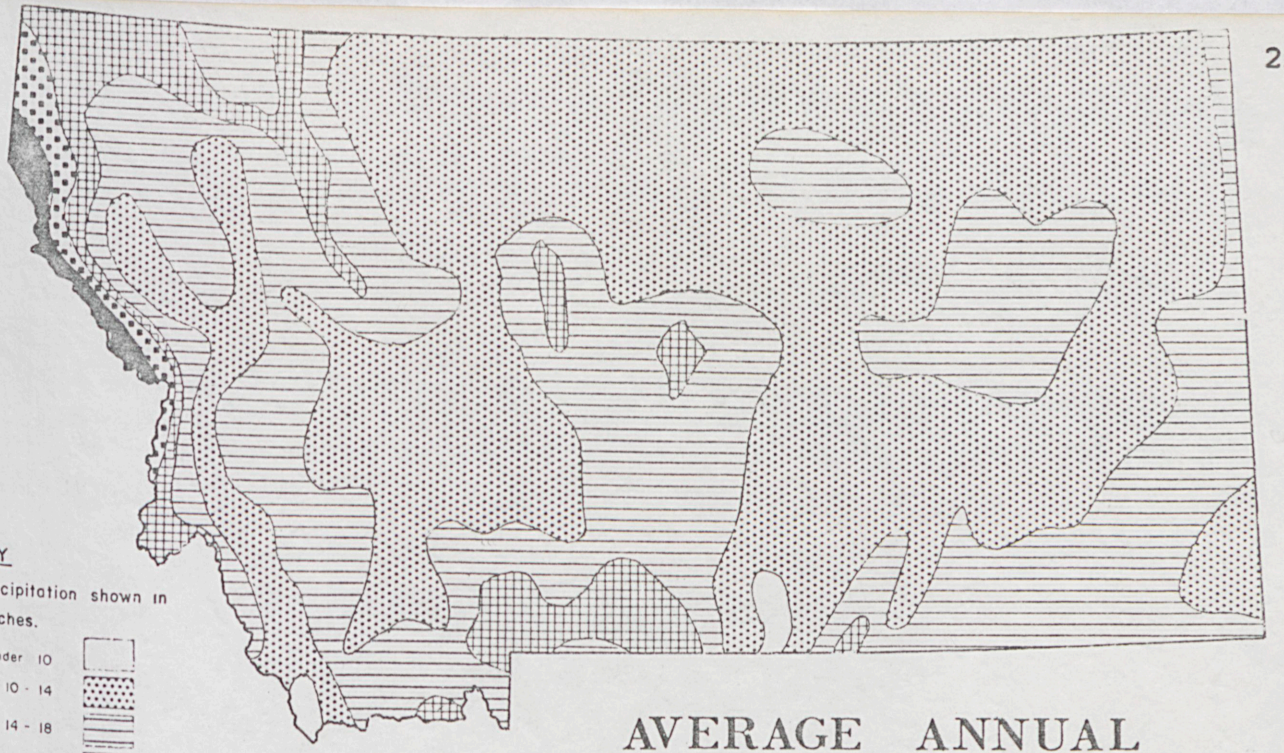
Under 56
56 - 60
60 - 64
64 - 68
68 - 72
Over 72

AVERAGE JULY TEMPERATURE

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20



KEY

Precipitation shown in inches.

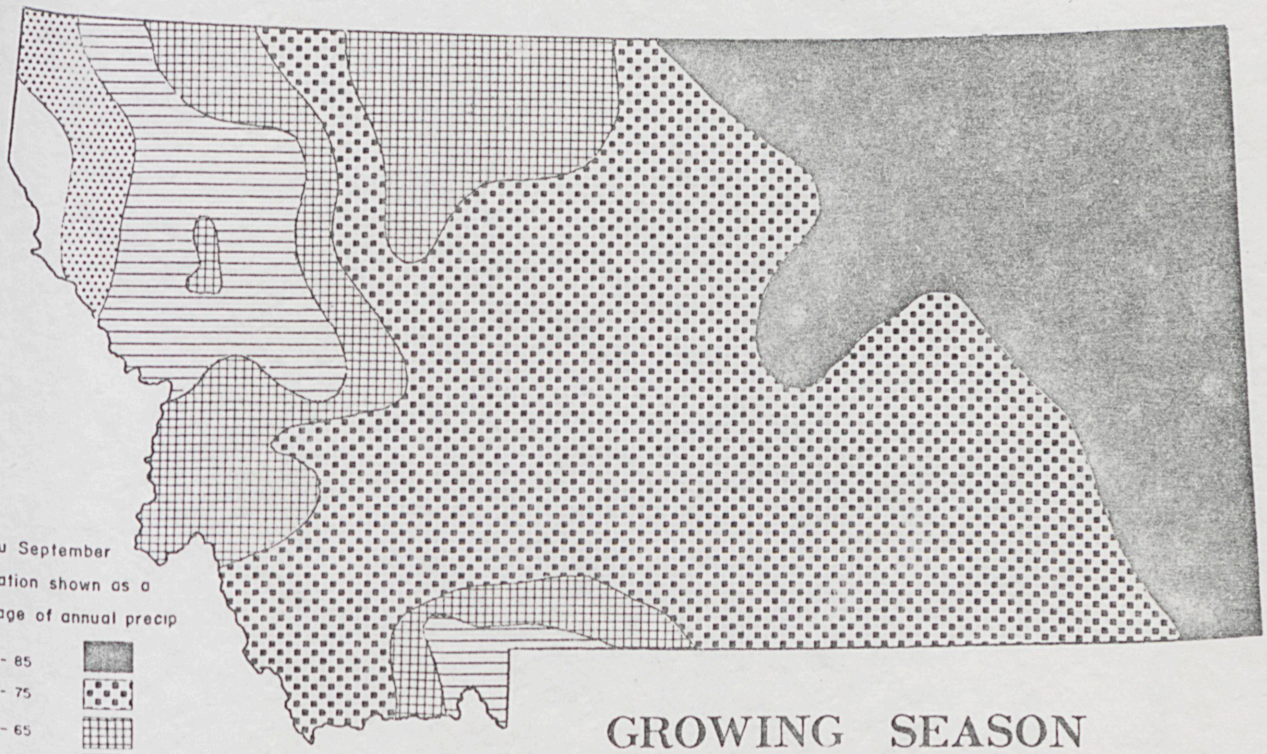
- Under 10
- 10 - 14
- 14 - 18
- 18 - 25
- 25 - 35
- Over 35

AVERAGE ANNUAL PRECIPITATION

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20.



KEY

April thru September precipitation shown as a percentage of annual precip

- 75 - 85
- 65 - 75
- 55 - 65
- 45 - 55
- 35 - 45
- 25 - 35

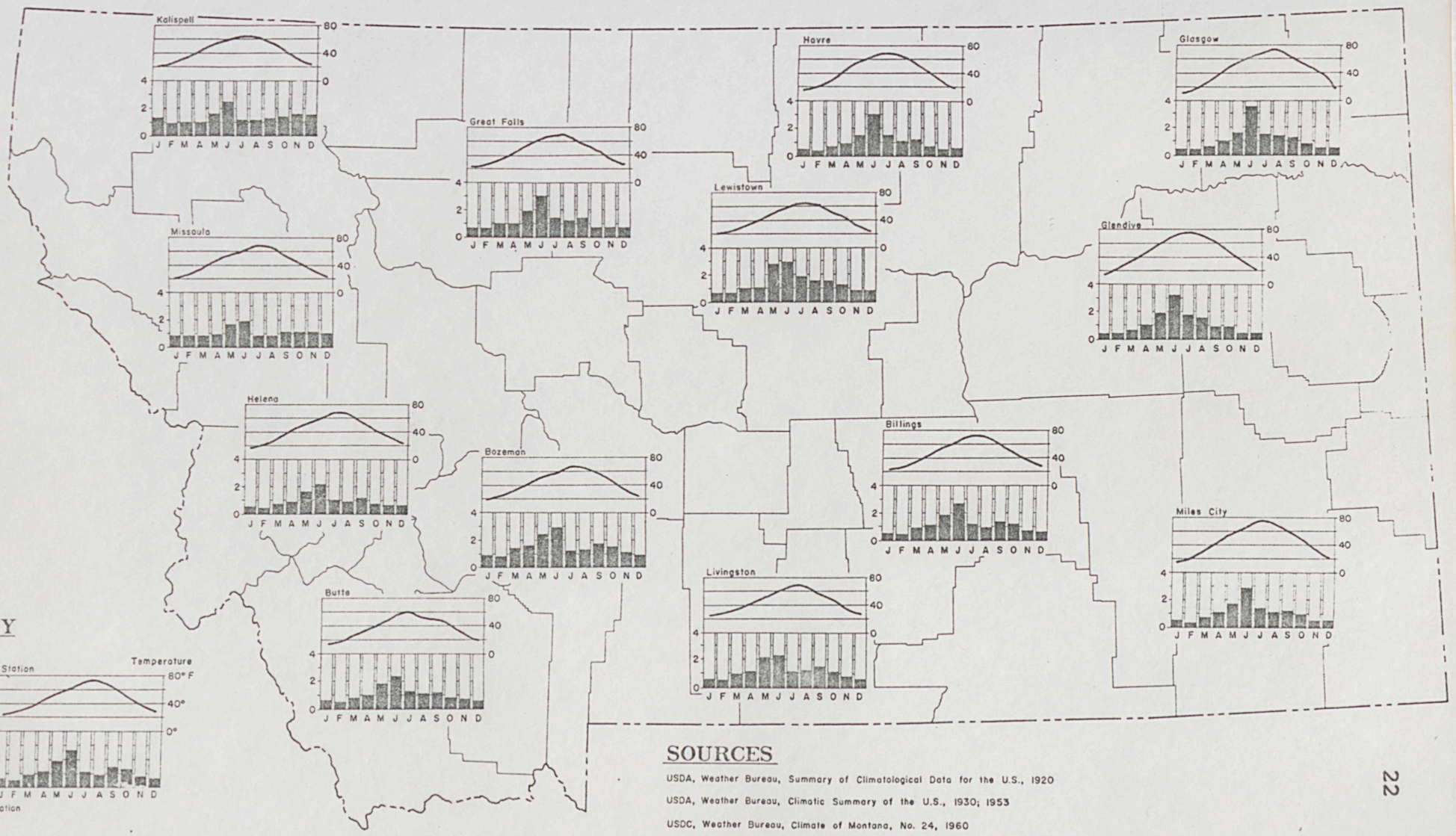
GROWING SEASON PRECIPITATION

SOURCE

USDA, Climate and Man

USDC, Bull. W and Supp. 11-20.

CLIMATIC DATA FOR SELECTED STATIONS



KEY

SOURCES

USDA, Weather Bureau, Summary of Climatological Data for the U.S., 1920

USDA, Weather Bureau, Climatic Summary of the U.S., 1930; 1953

USDC, Weather Bureau, Climate of Montana, No. 24, 1960

3.0 SITE CONDITIONS

3.1 SURFACE CONDITIONS

Gallatin Field is situated East of Belgrade, Montana, on nearly flat land which slopes very slightly to the north. The land is predominantly covered by native short grasses or under agricultural cultivation. No significant number of trees cover the surrounding landscape with the exception of a relatively recently planted row of trees about 12 to 15 feet high on each side of the main road from Highway #10 to the hangar area.

3.2 SUBSOIL

The subsoil conditions consist of a layer of gravel approximately one hundred feet deep, underneath which lie strata of volcanic ash and clay.

3.3 BUILDINGS

Gallatin Field presently has twelve buildings. The terminal contains offices of Northwest Airlines, Frontier Airlines, Hertz Rent-A-Car, Avis Rent-A-Car, the Airport Manager and the Federal Aviation Administration. In the hangar area are the offices of two local flying services: "Gallatin Flying Service" and "Flightline Incorporated". There are six hangars suitable for medium and small aircraft. The three other buildings are an old residence, a repair shop, and a National Guard Armory garage and storage depot.

3.4 UTILITIES

The airport is served by electric power and natural gas. A 3 inch gas line runs from Belgrade, along Highway #10, and then into the airport. The electric power line runs overhead from near Highway #10 in a northwesterly direction to the junction of the major access road near the Armory depot. It then branches southward with an underground line to supply all the hangars and the terminal building. Domestic water is supplied to all buildings by a single well. There has been talk of buying water from Belgrade, but very little headway has been made in that regard. With the imminence of fire fighting equipment at Gallatin Field, some additional source of water will be required whether from Belgrade or from an additional well. Sewage is taken care of by a septic tank and drain field which is located north of the airport buildings, across the runway. The current condition of utilities, while adequate for the present, is obviously not capable of absorbing much expansion.

3.5 ROADS

The main access road from Highway #10 is two-lane bituminous-paved. The new plantings of several rows of trees and shrubs which flank this road provide a pleasant break in the terrain. The other roads on and around the property are graded gravel. Therefore they can be easily changed to suit changes which come about in planning.

3.6 IRRIGATION DITCH

An irrigation ditch courses through the property roughly parallel to the main access road and west of the National Guard depot, then follows alongside the county road bounding the south-east side of the airfield. This ditch may prove to be useful for irrigation and aesthetic purposes in the projected development; therefore its legal status and year-round waterflow should be studied. If it cannot be usefully left in the vicinity of the airport buildings, then it can be relocated.













Frontier 727 Departing





Views From Existing Terminal - N. E. S. W.


FORD







Fixed Base Operators





Servicing Aircraft





Views Of The Terminal





4.0 FUNCTION OF AN AIRPORT TERMINAL

On the surface, an airport terminal would seem to perform a rather simple function: that of loading and unloading passengers from aircraft. But, this is a very sketchy picture of what an air terminal is really for.

4.1 MOVEMENT IN AN AIR TERMINAL

What happens in an airport terminal? Quite simply, the two main movements within a terminal are arrivals and departures.

4.1.1 ARRIVALS

When an aircraft arrives at an airport, for maximum efficiency, there are set procedures for unloading passengers and baggage, and servicing the aircraft. The procedure for this airport is as follows: There is a ground crew of two men who are responsible for taking care of the aircraft while it is on the ground. As the aircraft taxis up to the terminal, one of the ground crew directs it to where it is supposed to stop. The gas truck then drives up to fuel the aircraft. The other member of the ground crew either wheels up the unloading ramp, or in the case of the Boeing 727, goes to the rear of the aircraft and lowers the unloading stairway at the tail end of the fusilage.

4.1.1.1 PASSENGER UNLOADING

As the passengers unload, the ground crew unloads the baggage. The baggage is taken to the desk of that particular airline, and distributed to the passengers. The

passengers will likely leave the terminal by either renting a car, getting a taxi, having someone pick them up, or getting into their own car which they will have kept in the airport lot.

4.1.1.2 BIG SKY'S INFLUENCE ON ARRIVALS

With the introduction of Big Sky, the passenger is likely to be directed to any of a number of places. If the passenger comes in on a normal flight, he will likely pick up his baggage in the normal way, and will either rent a car, get into a bus which Big Sky would provide, or be directed to the Fixed Base Operators (aircraft charter services) to charter a flight to the area.

If the passenger is on a charter flight, he may be directed right to one of a number of smaller aircraft which would fly into the Lone Mountain area. In such a case, baggage would probably be picked up at the resort.

The same procedure would be followed for bus service.

4.1.2. DEPARTURES

When a person is departing on an aircraft, his procedure would be quite different. There are five common ways a person would arrive at the terminal. They would be driven by someone, drive their own car out and leave it in the airport parking lot, take a taxi, have a rented car which he would leave at the car rental service at the terminal, or arrive on a bus for charter flights.

With the introduction of chartered flights from and to Big Sky, a person may arrive at the terminal from the taxi strip.

Regardless of how a person arrives he will enter the terminal, and likely be carrying his own baggage.

The next step is a little more difficult to predict. The possibilities would include going to a bar, restaurant or magazine stand, taking the baggage to the airlines desk and picking up the tickets, or waiting in the lobby. All these facilities should be convenient.

4.2 ACTIVITIES

Within an airport terminal there are a number of related activities which complement one another in that the existence of one generates people for any of the other areas.

4.2.1 BAGGAGE

Probably the most complicated system in keeping an airport terminal running smoothly is baggage handling.

4.2.1.1 ARRIVALS AND BAGGAGE

In larger airports, when there are several aircraft loading and unloading at one time, there are complicated systems of conveyors which take the baggage for each flight and distribute it to different locations for the passengers to pick up. With this terminal, considering the prospective air traffic several years from now, two conveyors would be sufficient.

4.2.1.2 DEPARTURES AND BAGGAGE

When a person arrives at an airport, he takes his baggage to the desk of the airline he is boarding. The baggage is tagged, and then set on a conveyor which moves it to a sorting room. After being sorted, it is either put on a cart and taken out to the aircraft, or moved out to the aircraft by means of conveyors. In an air terminal the size of Gallatin Field, the baggage is loaded on the carts at the airline desk.

4.3 WAITING AREAS

The facilities which most directly affect a traveller's comfort are at the waiting areas. They would include a restaurant, a bar, a magazine store, the lobby, and the washrooms.

4.3.1 RESTAURANT

The restaurant should be close to the other waiting facilities, and the present airport management feel that it should be a counter type service selling mainly sandwiches and hamburgers rather than full course meals. Rather than using plates and silverware, cardboard serving containers would be used.

4.3.2 BAR

The bar would also be quite close to the other waiting facilities. It should include such things as a game room with pool tables, pin ball machines, etc.

4.3.3 MAGAZINE STORE

There should also be a store which would sell magazines, souvenirs, and pharmaceutical needs such as aspirins, sleeping pills, etc.

4.3.4 LOBBY

The lobby should be centrally located not only with respect to airlines desks and the other waiting facilities, but also with respect to the loading facilities.

4.3.5 OTHER FACILITIES

Other facilities which should be provided within the lobby area are car rentals, taxi stands, washrooms, and according to the present airport management, a flight insurance desk rather than a machine.

4.4 AIRLINES DESKS

Airlines desks and offices are very important with respect to the smooth running of an airport terminal. They should not only be close to the main entrance and the lobby area, but also to the passenger loading area. A person should be able to go to the airlines desk, unload his baggage and pick up his tickets, and go to any of the waiting facilities without having to travel any great distance.

4.5 BASIC FUNCTIONS

There are two functions of a terminal, which to the transient are not evident. The Federal Aviation Offices, and the Airport Management offices are responsible for keeping the airport running.

4.5.1 F.A.A.

The F.A.A. is responsible for taking weather readings and observations, controlling runway lights, guiding airlines in and out below 10,000 feet, and recording flight plans. They are responsible for all aircraft in the air within the vicinity of the air field, and they are responsible for informing any pilot leaving or flying to Gallatin Field of weather conditions along his route.

4.5.2 AIRPORT MANAGER

The manager's office is the administration center for the airport terminal. His staff keeps the airport functioning well with respect to tennants, and are directly in charge of the ground crew and janitors. The manager himself is representing the airport Board of Directors.

5.0 ECONOMICS

The economics involved in building a new terminal at Gallatin Field are extremely vague at this time. The following pages show some of the money spent for overall improvement to the airport, as well as plans for improvements up to 1972.

CAB DOCKET
NO. 16987, ET AL

EXHIBIT
BOZEMAN 930
Page 1 of 2

Airport Development Costs, 1960-1966.

Year	Developments	Federal Aid	Local	M.A.C.
1961	Federal Aid Project No. 9-24-003-6105 Reconstruct Runway 12-30, Taxiway "A" and Parallel Taxiway "D" New Runway Lighting System 12-30 New Apron Fixed Base Operators	139,589.97	131,458.54	none
1962	Land Acquisition		1,800.00	
1963	Federal Aid Project No. 9-24-003-C406 Construct and Light Extension to N.W. S.E. Runway 12-30, 1,100 Feet	36,197.00	22,694.00	10,000.00
1965	Airport Improvement Project New Entrance Road		6,650.00	
	Slurry Seal S.W. Taxiway and Apron		1,400.00	
1966	Federal Aid Project No. 9-24-003-C607 Reconstruct Taxiway "C" and Adjust and Install New Lights on Taxiway "C"	18,896.00	4,000.00	13,000.00
	Addition to Parking Lot, Seal Coat Road, Other Improvements to Parking Area		8,000.00	
	Completion Date for Last Two Projects September 21, 1966			

CAB DOCKET
NO. 16987, ET AL.

EXHIBIT
BOZEMAN 930
Page 2 of 2

Date	Developments	Federal Aid	Local	M.A.C.
	TOTAL	194,682.97	176,002.54	23,000.00

This data was obtained from Mr. Ed Iverson, Manager, Gallatin Field.

CAB DOCKET
NO. 16987, ET AL.

EXHIBIT
BOZEMAN 931
Page 1 of 1

Survey of Future Airport Developments at Gallatin Field.

Year	Developments	Federal Aid	Local	M.A.C.
1968	Obstruction Removal		5,000.00	
1969	Federal Aid Project 2,000 Foot Extension to Runway 12-30 Runway Lights Extended Taxiway "D" Extended and Lighted Warmup Apron on End of 12 Blacktop Road Relocated Land Acquisition Reconstruct and Enlarge Apron at Administration Building	192,125.00	110,375.00	60,000.00
1970	Changes in Admin- istration Building to Handle Increased Traffic		15,000.00	
1971	Light Aircraft Parking Area		8,000.00	
1972	I.L.S. Lighting System Acquiring Land and Relocate County Roads			

This information is based on projected estimates and future plans for Gallatin Field as supplied by Mr. Ed Iverson, Manager, Gallatin Field.

As can be seen from these pages, the local contributions almost equal the federal contributions. It is the opinion of Mr. Ed Iverson, that the local contributions should not be made only by Bozeman and Gallatin County as is presently the case, but should include contributions from all the counties using Gallatin Field.

At the present time, there seems to be no indication as to how much money would be spent on a new terminal for Gallatin Field. Mr. Iverson said that by 1975 a new terminal could be built and that 1½ to 2 million dollars would be a very rough estimate of the money available at that time.

There are a number of places from which this money could come: a 7¢ per gallon gas tax for Fixed Base Operators, a one dollar per passenger head fee for commercial flights, airport taxes, a bond issue, airport revenue or an obligation bond.

It seems likely that the money from these sources will not only pay for a new terminal, but for any other improvements in the overall site which would be necessary at that time.

6.0 AESTHETICS

The only aesthetic consideration which is really fixed is the orientation of the terminal. The position of the main runway dictates the direction which the terminal will face.

This is not as much of a restriction as it seems because the best views are from the Northwest through the Southeast, and the terminal should be facing North. So, the terminal should face the direction which happens to have the best view.

The materials which should be used in the terminal building should be readily available in this area. The materials which are most easy to come by locally are concrete and wood. There is a trend towards constructing buildings in this area out of brick, but brick has to be shipped in.

Because of the low winter sun, fenestration on the south exposure is a very important consideration. There are neither trees nor other buildings to shade the south of the building from the sun.

The development of the site itself is a problem which requires a great deal of consideration. The reason that it is a problem is that there should not be a large number of trees in the vicinity of the airport. Trees seem to be the first thing which come to mind when landscaping is mentioned, but they become quite a nuisance around an airport. The reason is that flocking birds will nest in the trees, and when a jet takes off they fly up in the path of the jet. They can be sucked into the engines or break the aircraft windshield. Such accidents are responsible for a great number of aircraft accidents.

I do not feel that a building, because it is in the mountains, should reflect the shape of the mountains, or because it is on flat land, should have a flat roof. This is carrying purity of architecture to an extreme. The important thing is that the building function well, and have a pleasing form. There is not one building at Gallatin Field which will remain as is for any length of time, which means that to date there has been no attempt to set a trend for future buildings. For this reason, no structure at Gallatin Field should be considered sacred. A new, fresh, individual structure can be designed with the hope that it will set a trend towards much better design, and a much cleaner site.

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BIBLIOGRAPHY

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16. FRONTIER BROCHURE AND TIMETABLE.

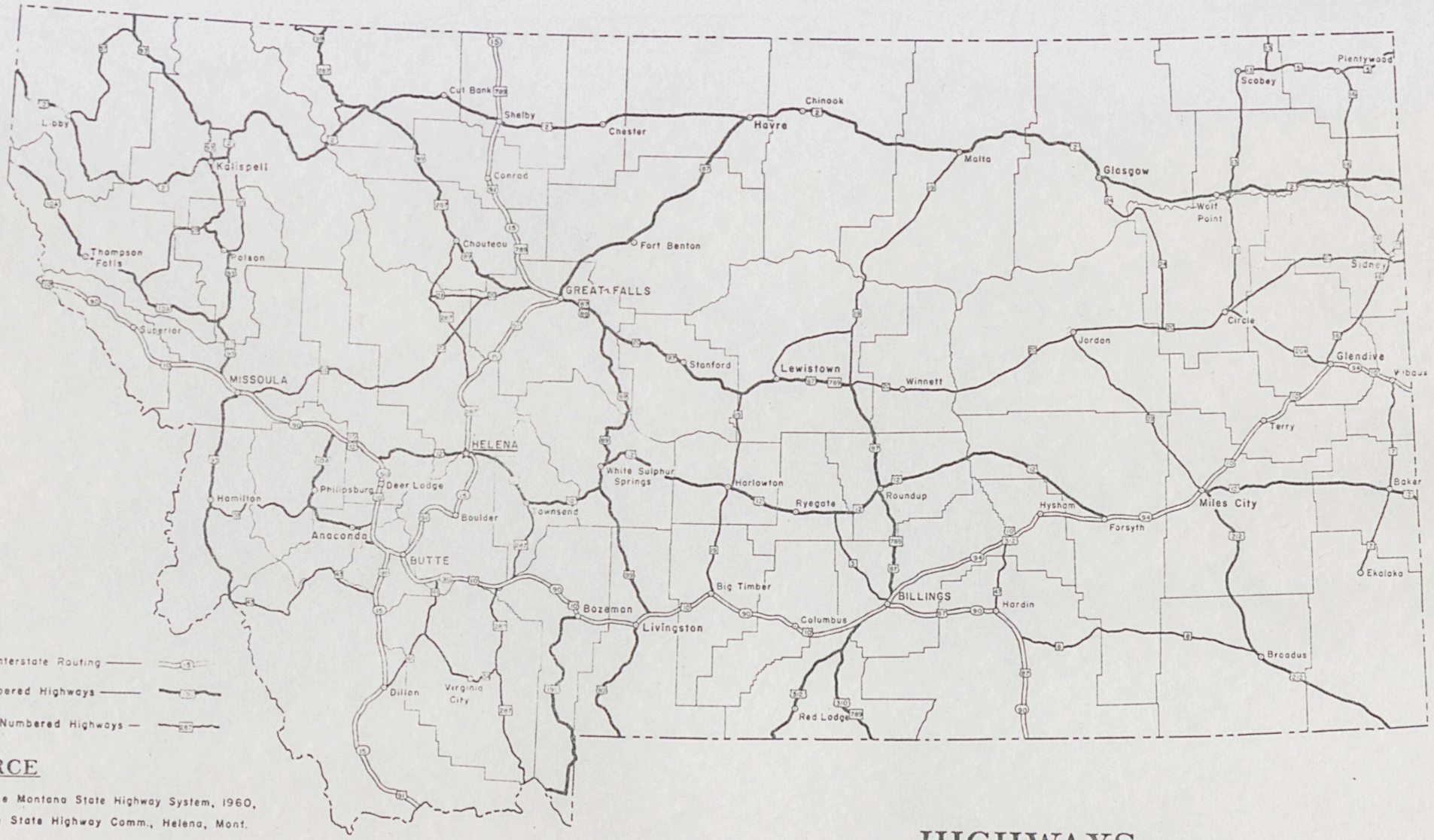
17. NORTHWEST BROCHURE AND TIMETABLE.

18. 1st Interview - Edwin Iverson, Airport Manager, (December, 1969).

19. 2nd Interview - Edwin Iverson, Airport Manager, (February 10, 1970).

20. Interview - Mr. Chetham, of F.A.A. (February 10, 1970).

APPENDIX A



KEY

Present Interstate Routing —— 15

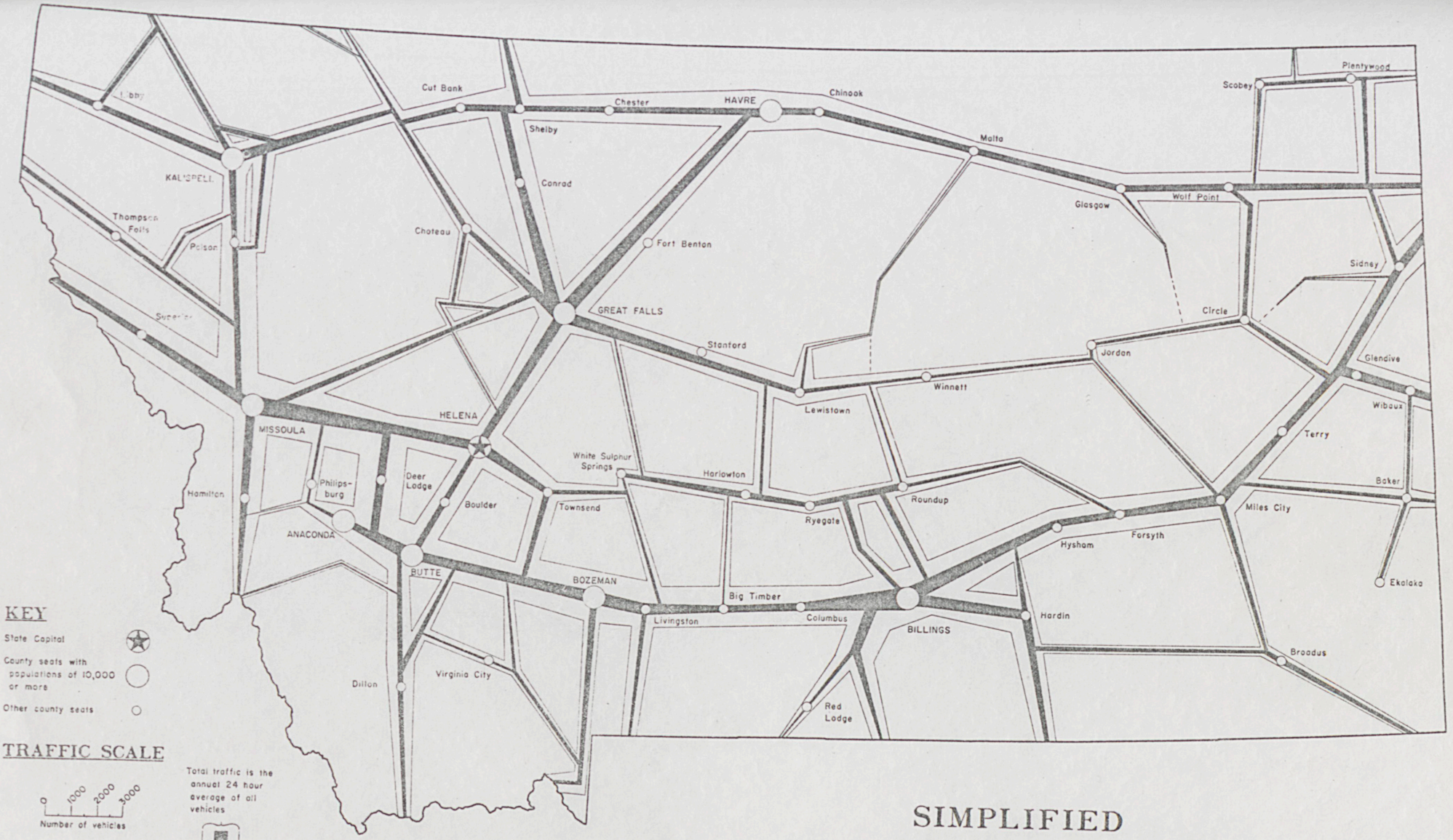
U.S. Numbered Highways —— 10

Montana Numbered Highways — 287

SOURCE

Map of the Montana State Highway System, 1960, Montana State Highway Comm., Helena, Mont.

HIGHWAYS



KEY

State Capital

County seats with populations of 10,000 or more

Other county seats

TRAFFIC SCALE

0 1000 2000 3000

Number of vehicles

Total traffic is the annual 24 hour average of all vehicles

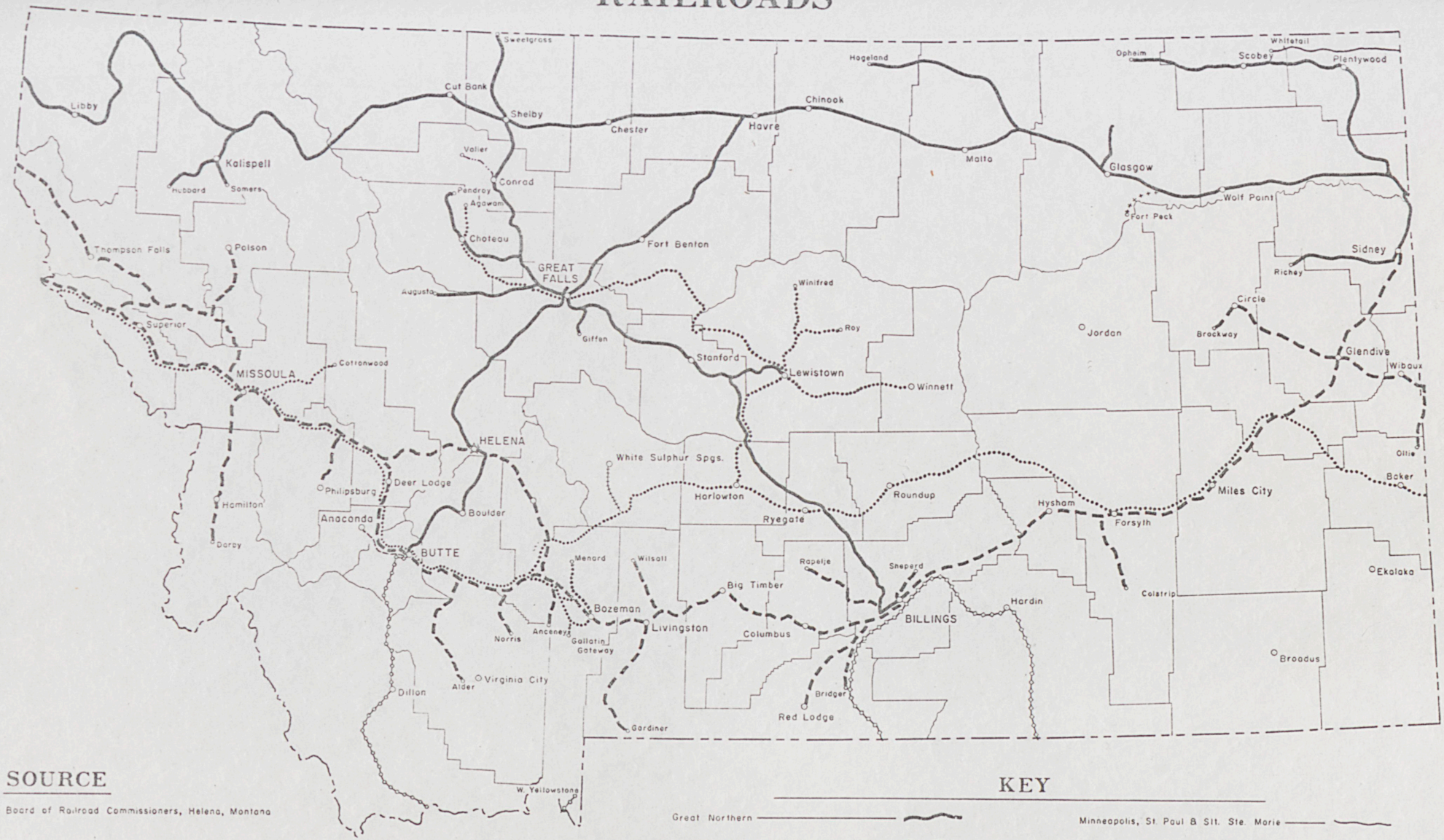
Commercial traffic is the annual 24 hour average of commercial vehicles

SOURCE

1958 Traffic Flow Map of Montana, prepared by Montana Highway Planning Survey

SIMPLIFIED TRAFFIC FLOW 1958

RAILROADS

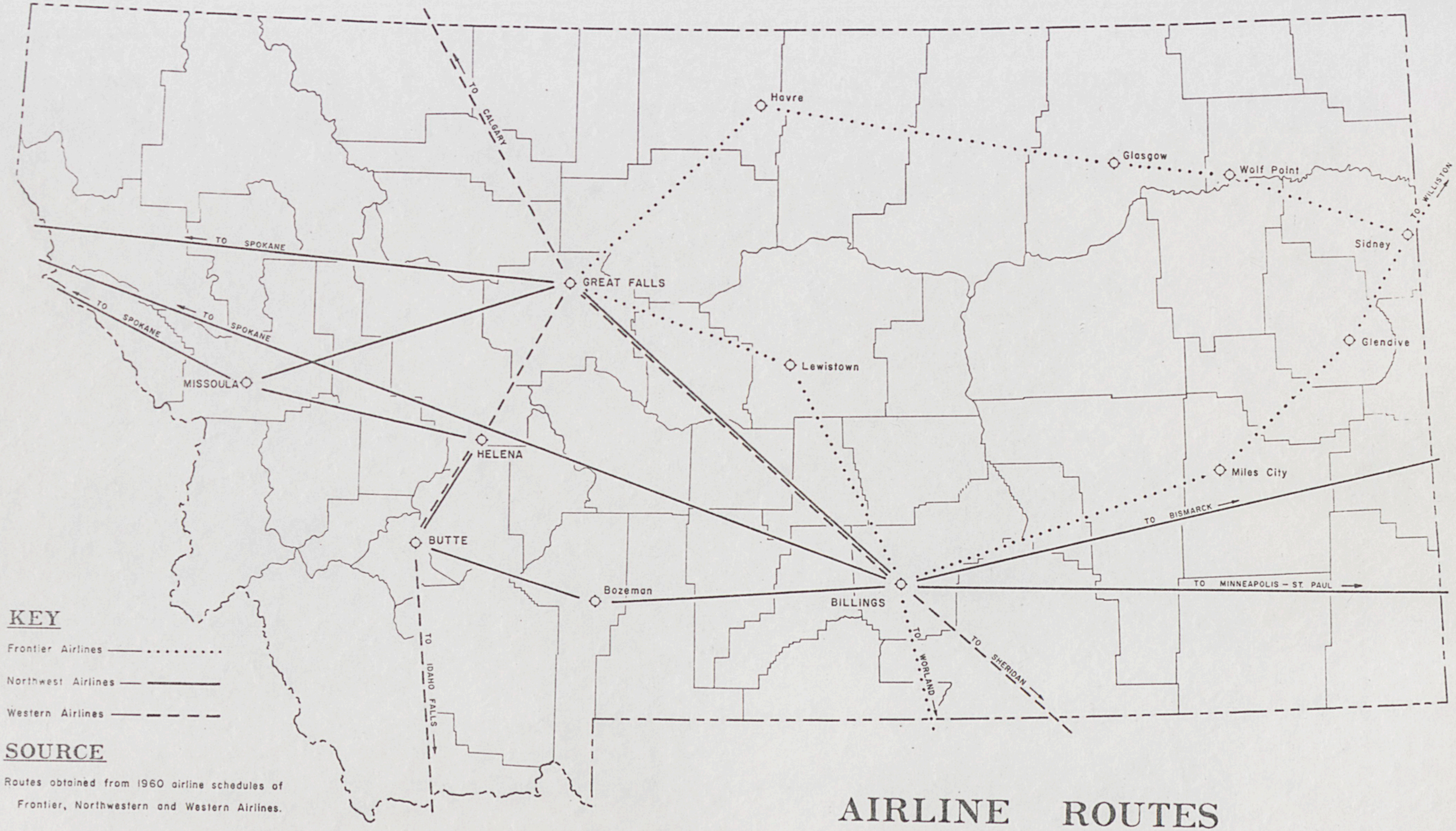


SOURCE

Board of Railroad Commissioners, Helena, Montana

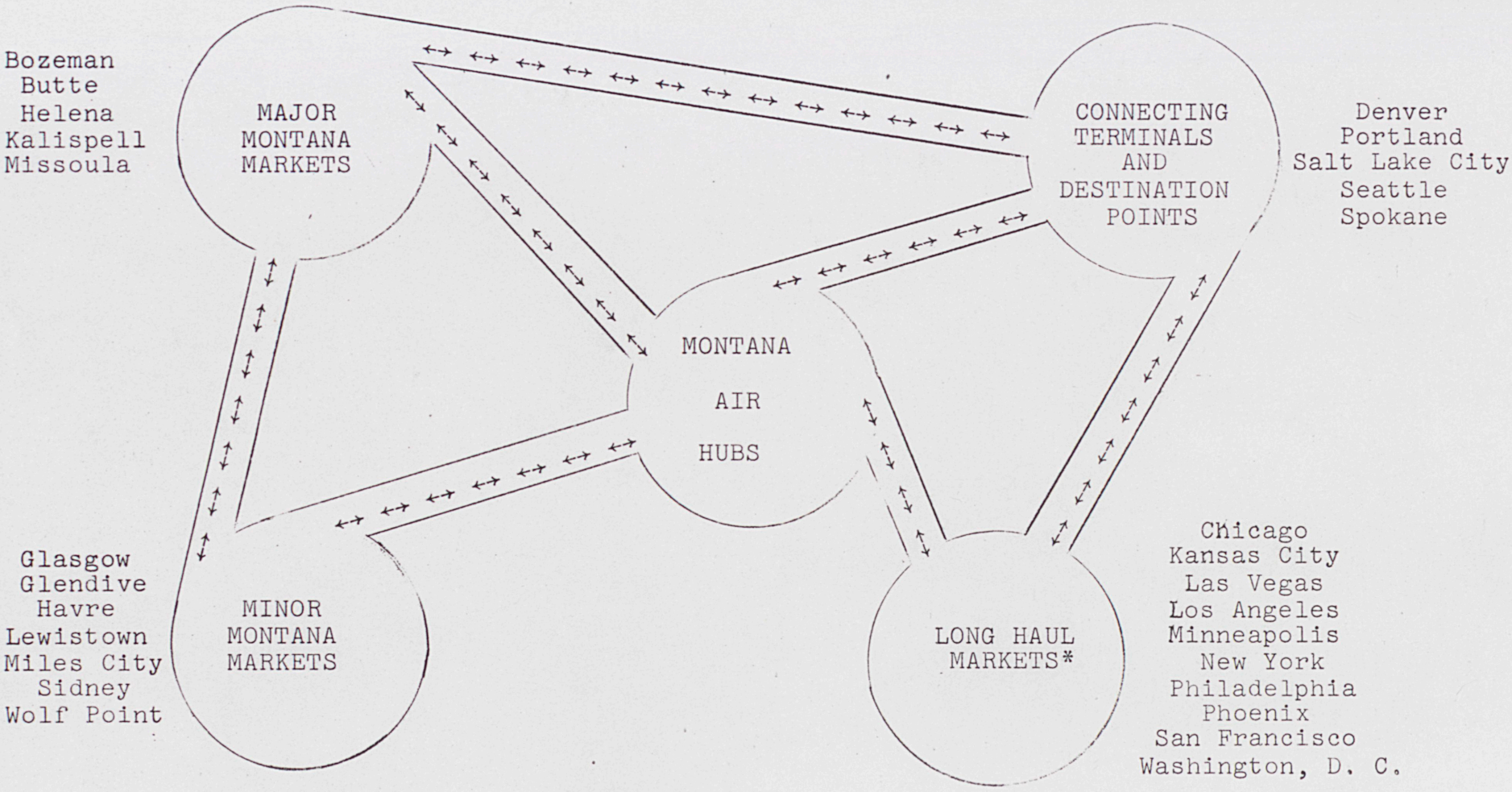
KEY

- Great Northern
- Northern Pacific
- Chicago, Milwaukee, St. Paul & Pacific
- Chicago, Burlington & Quincy
- Union Pacific
- Minneapolis, St. Paul & Slt. Ste. Marie
- Butte, Anaconda & Pacific
- Montana Western
- United States Government
- White Sulphur Springs & Yellowstone Park

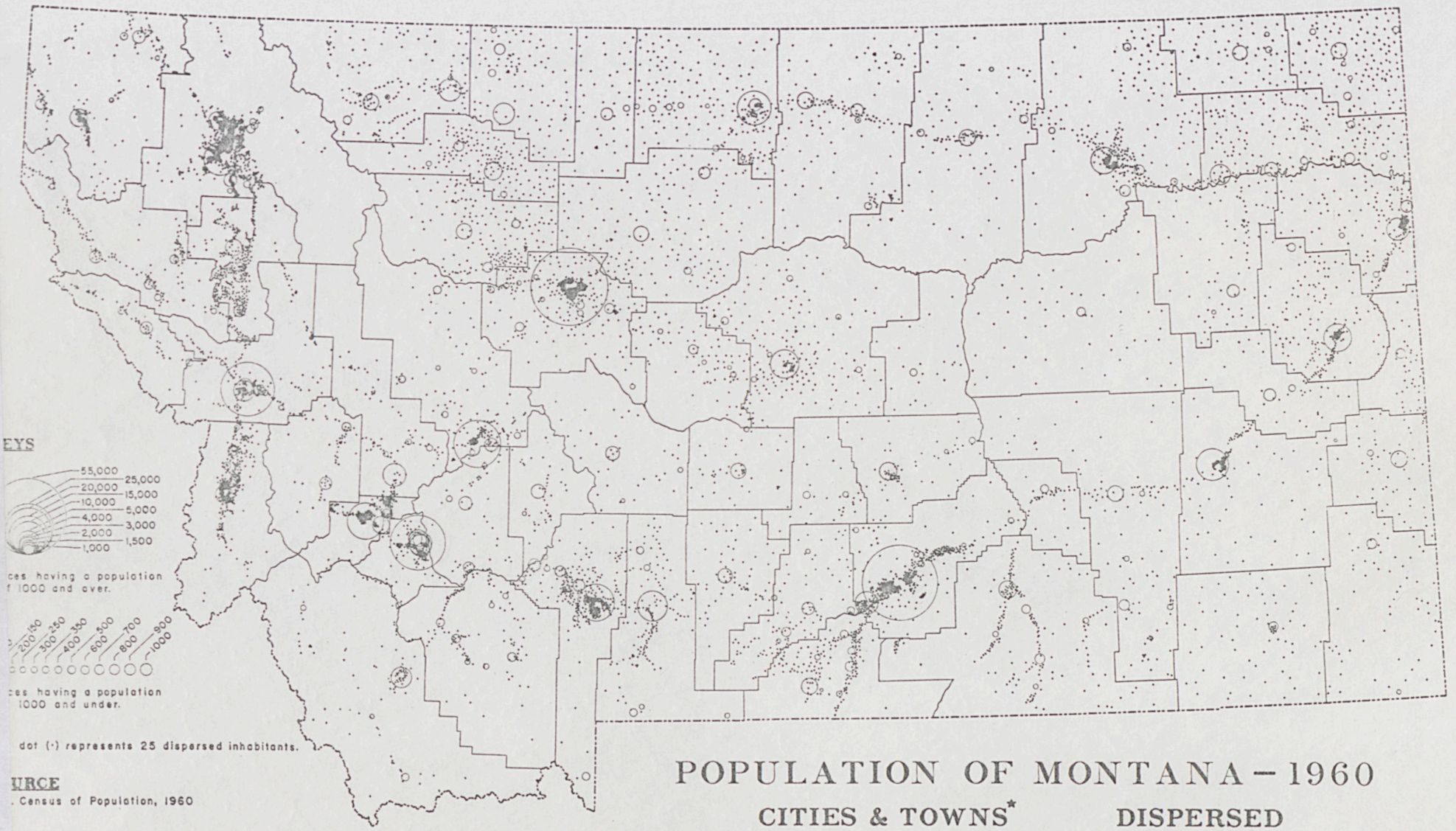


AIRLINE ROUTES

Figure 6. Recommended Montana Air Transportation System.



*The possibility of other significant markets for direct Montana traffic is very real and should not be ruled out.



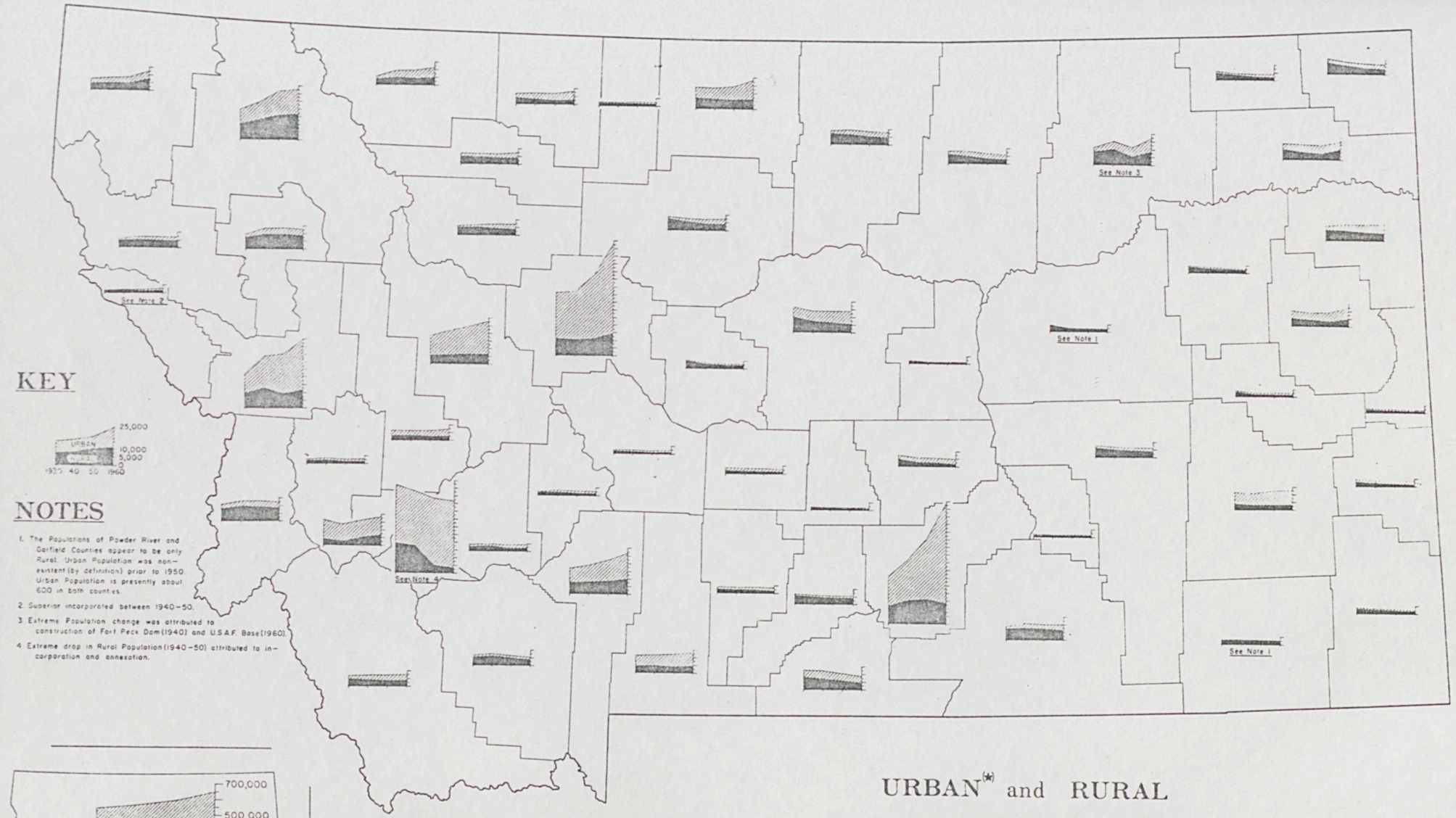
POPULATION OF MONTANA – 1960

CITIES & TOWNS* DISPERSED

*Includes all incorporated places; and those unincorporated places having populations of 100 or more.

t 1961, by Dept. of Earth Sciences, Montana State College

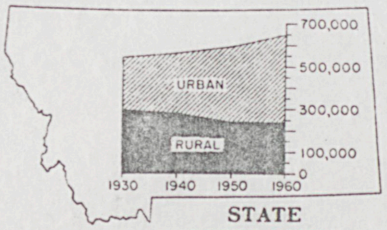
Compiled and drawn in the Dept. of Earth Sciences, M.S.C., by N.Holburn, M.J.Edie, J.Myers



KEY

NOTES

1. The Populations of Powder River and Garfield Counties appear to be only Rural. Urban Population was non-existent (by definition) prior to 1950. Urban Population is presently about 600 in both counties.
2. Superior incorporated between 1940–50.
3. Extreme Population change was attributed to construction of Fort Peck Dam (1940) and U.S.A.F. Base (1960).
4. Extreme drop in Rural Population (1940–50) attributed to incorporation and annexation.



STATE POPULATION TREND

SOURCES

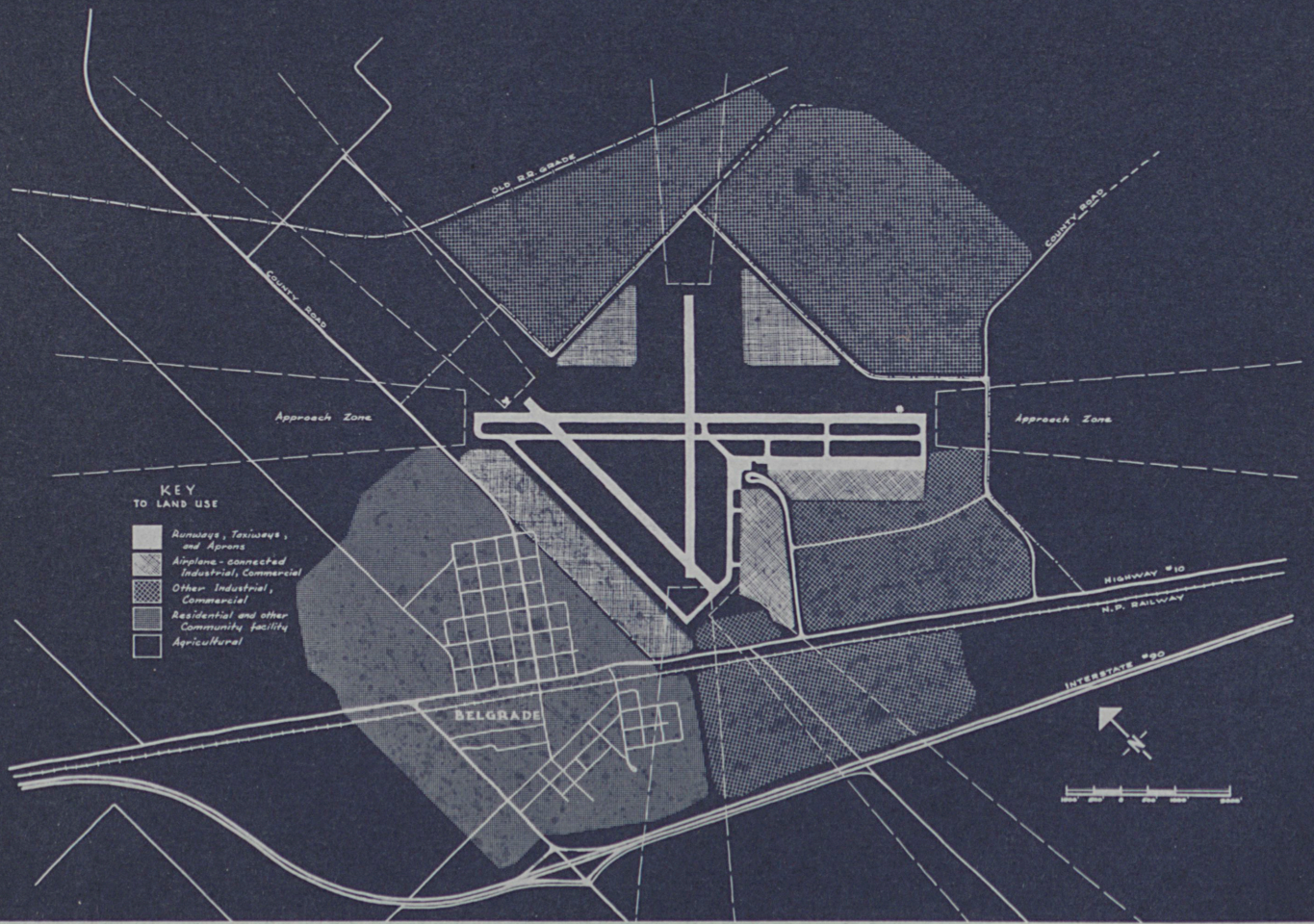
U.S.D.C., Bureau of the Census, Census of Population Characteristics for 1930, 1940 and 1950. 1960 Census of Population—Preliminary Report.

URBAN(*) and RURAL POPULATION TRENDS

1930 to 1960

(*)Urban Population based on all incorporated places; and, unincorporated places with populations of over 1,000.

APPENDIX B



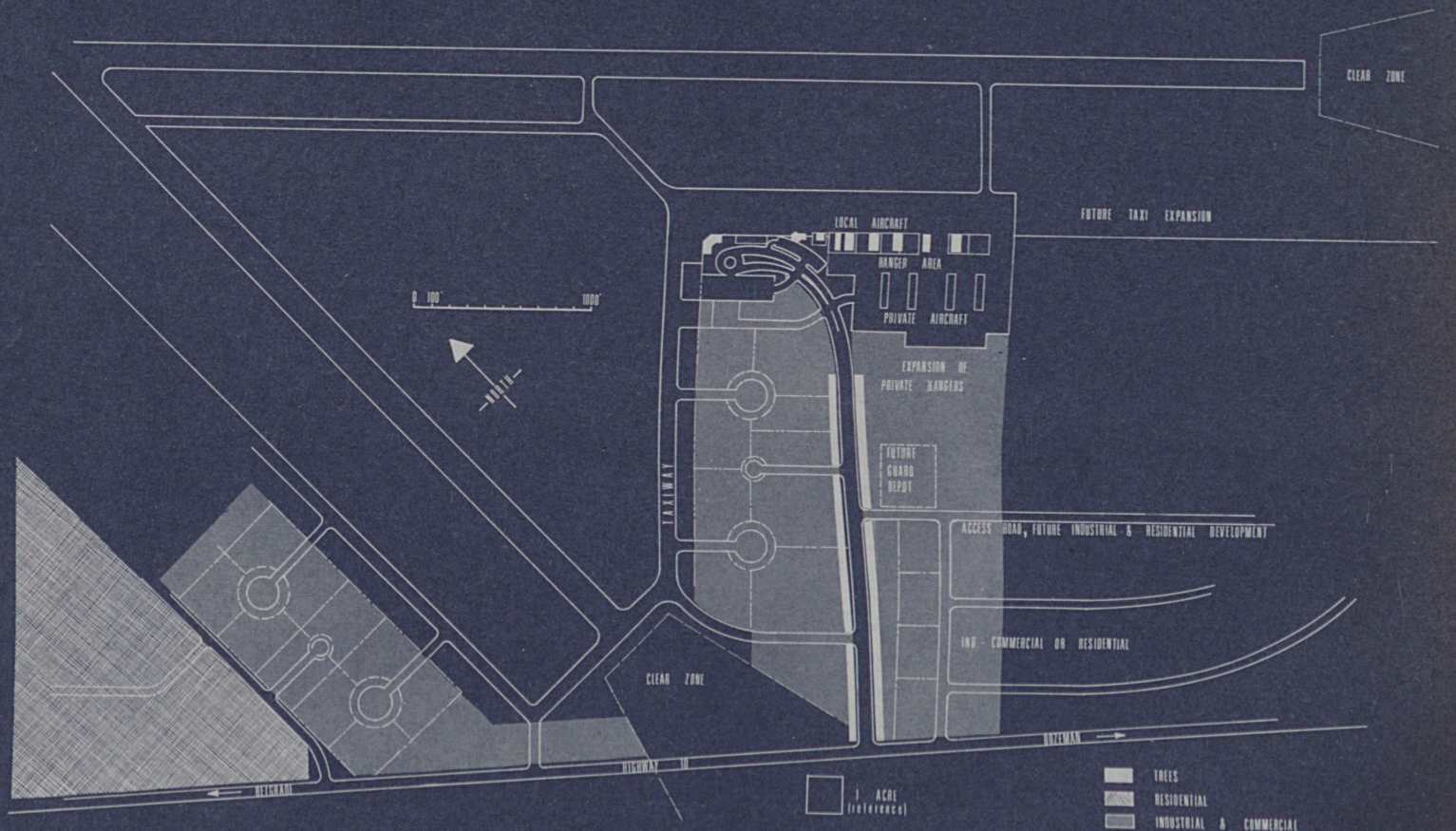
GALLATIN FIELD

SPECIAL PROJECT - M S U

GENERAL DEVELOPMENT PLAN

D. WESSEL

plate 1



PROTOTYPE AIR PARK SUBDIVISION DESIGN

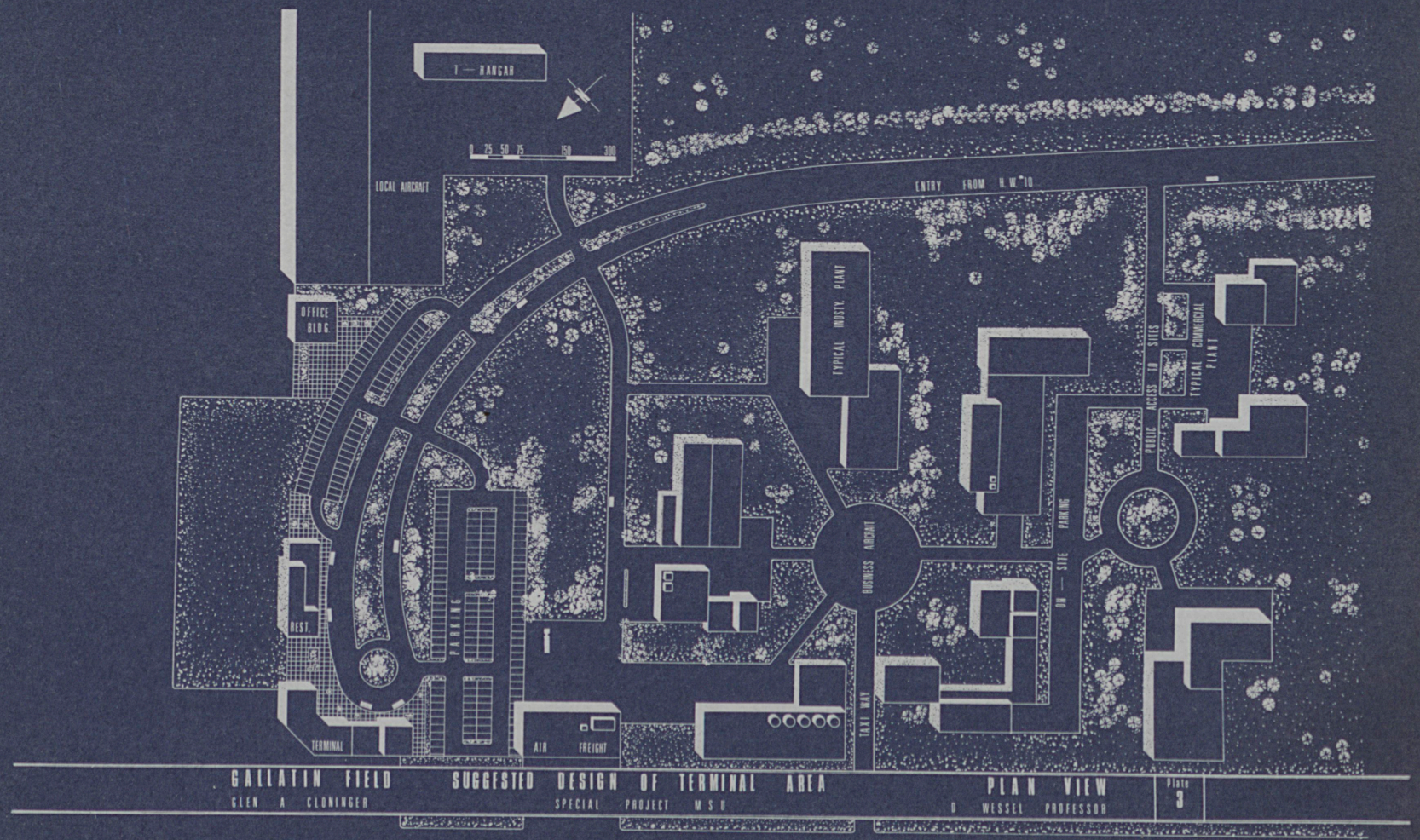
RONALD A. PATTERSON

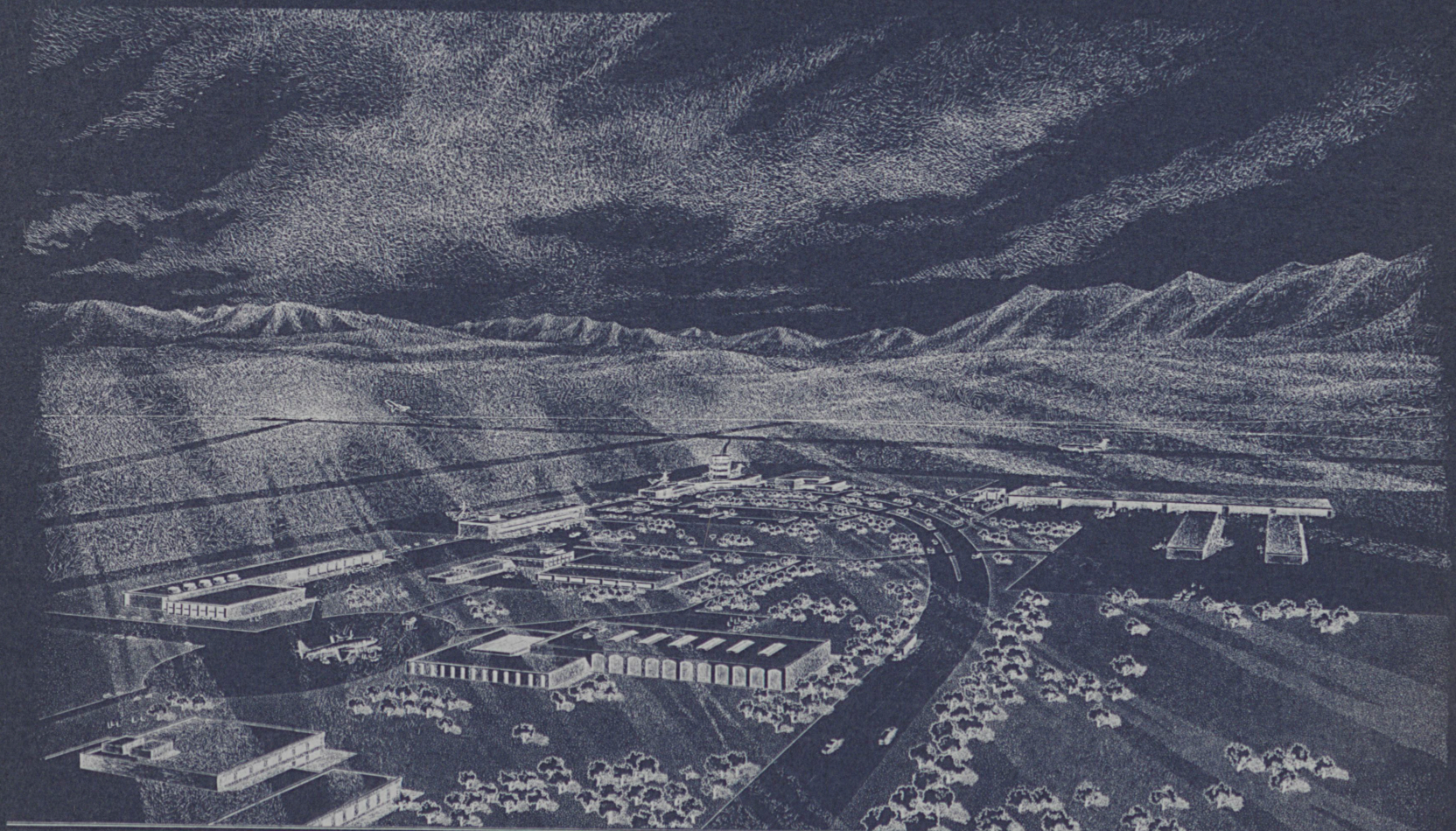
SPECIAL PROJECT MSU

GALLATIN FIELD

O. WESSEL PROFESSOR

PLATE 2


T — HANGAR
0 25 50 75 150 300
LOCAL AIRCRAFT
ENTRY FROM H. W. 10
OFFICE BLDG.
TYPICAL INDSTY. PLANT
PUBLIC ACCESS TO SITES
TYPICAL COMMERCIAL PLANT
REST.
PARKING
BUSINESS AIRCRAFT
ON — SITE PARKING
TAXI WAY
TERMINAL
AIR FREIGHT
GALLATIN FIELD SUGGESTED DESIGN OF TERMINAL AREA PLAN VIEW
GLEN A CLONINGER
SPECIAL PROJECT M S U
D WESSEL PROFESSOR
Plate 3



GALLATIN FIELD
ALAN A. MARUGAME

SUGGESTED DESIGN OF TERMINAL AREA
JUNE 24, 1967
SPECIAL PROJECT — M. S. U.

AERIAL VIEW
PROFESSOR D. WESSEL

Plate 4

PROSPECTIVE BUSINESS AND LAND USE DEVELOPMENTS AT GALLATIN FIELD

Because of modern transportation facilities, industrial areas tend to develop at relatively greater distances from urban centers than has been the practice in the past. This new trend of population and economic dispersal along major transportation routes is common throughout the United States, and is in the incipient stage in the Bozeman - Gallatin region. The modern trend of industry and business is to locate on spacious tracts which provide buffer zones for expansion, parking, and recreation, and which are convenient to the transportation forms they need.

Influences in its environs which could favorably affect the development of the Gallatin Field Air Park are:

A - Ready access to U. S. Highway #10 and Interstate 90, and to the Northern Pacific Railway;

B - Abundant availability of gas, electric power and water supply;

C - Abundant availability of economical land well suited to the purpose;

D - A not-too-rigorous climate for such economic activities and one which is very beneficial to humans;

E - Proximity of Bozeman, Belgrade and other towns, as well as many exurban locations which offer fine family living;

F - Availability of M.S.U. as a "knowledge resource".

Some likely potential enterprises for the Air Park are as follows:

1 - A general air-freight and warehouse business which would serve many small firms in the region.

2 - Farm machinery retailing and manufacturing firms, typical of those who would fly customers to see their wares rather than move the products to the prospects.

3 - Perishable goods rapid transit businesses.

4 - Manufacturers of electronic and other small bulk high value products.

5 - Sporting equipment sales and manufacturing enterprises. With the year-round outdoor recreation possibilities looming as an ever-bigger attraction to people from outside the region, the number of recreation - bent travelers can be expected to increase at the airport.

6 - Businesses which sell and service private aircraft.

7 - Service facilities which cater to the traveler, including restaurants, bars, motels, markets, shops, banks, etc.

8 - Vehicle - rental businesses.

9 - Helicopter, airplane, and auto taxi and charter services.

10 - Travel services.

11 - Offices and hangars of regional enterprises which operate their own business aircraft.

Plate 1 shows a general Land Use and Circulation plan. It is based upon Air Photos and maps by Morrison - Maierle, Inc.

The extent of development shown for industrial-commercial and residential properties is projected many years into the future, of course. It is expected that land development should take place in stages, where the tracts adjacent to the Terminal area, taxi strips, and existing improvements would be developed first. This "big picture" of possible development should be referred to constantly as a guide to installations of streets and other utilities as they are added in increments to serve land users. Until tracts are to be developed or redeveloped for future uses, they should remain in their current usages.

The roads and streets shown are the existing ones, with modifications as necessitated by runway additions and the general land use plan. Minor streets which would be part of future subdivisions are not shown.

This plan serves as a general guide only. Detailed subdivision designs should be prepared for all tracts according to the conditions of site and need at the times of their development.

Because of the proximity of the Town of Belgrade to Gallatin Field, both in an economic sense and a geographic sense, their future changes and developments are inextricably interwoven and therefore it would be wise for the Airport Board, County Commission and the Belgrade town government to collaborate in furthering this present planning effort and in jointly adopting comprehensive plans for their areas of mutual interest.

If railroad sidings were necessary to the functions of some eventual industrial enterprises, as well as ready contact with the airfield, it may be possible to run a spur of the N.P. existing line across Highway #10 to the airport side. Another possibility, especially for large scale industrial development, would be to reactivate the old railroad grade to the area north of the airfield.

Plate 2 shows our recommendation of the way in which the industrial - commercial tracts and the local aircraft hangar area which are adjacent to the taxiways should be developed.

The essence of this type of subdivision is an alternation of a vehicular cul-de-sac from a primary road to the heart of the tract with an aircraft taxi-cul-de-sac reaching from the airfield. This scheme gives adequate access to all business sites from both the highways and the airfield, without unduly mixing the two types of traffic involved. The pattern shown is schematic: lots could be varied in size, position and shape, according to the needs of the lessee businesses. The layout for the tract nearest to Belgrade presupposes the addition of a parallel taxi-way, as shown.

The layout of the hangar area proposes the development of a "campus" of T-hangars and aprons adjacent to the taxiway. The existing hangars could be replaced with new ones large enough for medium-sized craft and local flight businesses. Additional hangars for small business and pleasure craft could be developed south-west of them as shown. Further expansion of this function could take place S.E. along the extended taxi-way and/or S.W. of the first development. Special study of the growth possibilities of these functions would suggest the best detailed plan to develop.

SUGGESTED DESIGN OF TERMINAL AREA

Plate 3 shows in plan view our suggestion for development of the terminal area, the approach road from Highway #10, and the adjacent portions of the industrial-commercial tract and T-hanger area. Plate 4 is an aerial perspective view of approximately the same suggested design. (Note: there are variations of design as presented in the 4 Plates. We have allowed these variations, to emphasise the fact the Master Plan must be flexible in regard to the execution of the many parts of the total development).

The existing terminal building is of such condition as to warrant its remaining for a long time, being enlarged and remodeled as required to keep it apace with demands upon it. A small food service could justifiably be installed in the near future, we think, in the N.E. wing of the terminal building. In due time however, it is foreseen that a fine dining establishment could be economically feasible, close to the terminal building with views of the Field activities and the Bridger Mountains. Such an eating - recreation center would attract customers from the whole region. The access road from Highway #10 continues in its existing alignment (being widened to two lanes each way) until the present junction, where from it curves gracefully around to focus on a turn-around at the Terminal building. This portion of the access road widens in front of the Restaurant and Terminal to permit a stopping lane. The parking area S.W. of the Terminal serves those people involved with scheduled air travel. It also serves as a buffer space between Terminal functions and the Industrial - Commercial Air Park. The other parking area serves the Restaurant and the Office building of the local flight businesses.

Access to the hangar area is limited, to discourage indiscriminate public intrusion. Parking of vehicles is expected to be intermixed with that of the planes, thus not necessitating a large separate parking provision for users of this area.

Throughout this study of Air - Park possibilities, the distinct separation of "industrial" and "commercial" land uses has appeared impossible and unnecessary. Some largely "commercial" businesses would have at least minor "industrial" characteristics and vice-versa. Therefore, in this plan, there has been no distinct zoning of commercial uses separately from industrial uses. If each increment of land development is subject to analysis and approval by the governing body, it is hopeful that each establishment will be given the location, area size and design which will most encourage its economic welfare in consonance with that of its neighbors. A controlled and maintained landscape which is an inherent part of the Air Park development and the Terminal area will relate the separate entities to each other in a unified environmental whole. Generous amounts of landscape, as suggested in Plates 3 and 4, should prove to be feasible in view of the relatively low cost of use of airport land by the private enterprises. Possibly, the development and maintenance of landscaping could remain as a "community" function in the jurisdiction of the Airport management.

One prospective business only has had its site selected fairly precisely in this plan. The Air Freight Terminal has been placed as close as possible to the main terminal for convenience of big-plane unloading directly into the freight-transfer building.

In general it is thought that the Air-Park properties should be entered from the vehicular and aircraft culs-de-sac rather than directly from the approach road from #10 or the airfield. Those commercial businesses catering to the transient public, such as a motel, would be best located adjacent to the approach road from #10, or #10 itself.

The airfield area between the restaurant and the local flight business offices appears to be ideally situated for helicopter service, and a pad and facilities could be built here.

The costs of development of the terminal area and Air Park can be paid in part by use fees to the Gallatin Field Board by the users and in part by the increased County tax base their investments and business activities could create.

REGULATION OF DEVELOPMENT OF GALLATIN FIELD AIR PARK

The land uses of Gallatin Field property and the surrounding areas must be regulated for mutual protection and convenience of both the land users and the air traffic. This regulation can be effectuated by two primary means: Zoning and Land Use Covenants. An Airport Zoning Resolution enacted by the County Commission of Gallatin would establish the controls of land use, in privately held land around the airport, which are needed to ensure suitable clearances for aircraft. Such a zoning resolution follows hereinafter.

Recommendations are also given hereinafter for Covenants which would run with lease or land sale agreements between the Gallatin Field Board and the enterprises which obtain property rights from it.

In addition to the above-mentioned zoning provisions, it would be wise to prepare and enact zoning provisions for the lands surrounding airport property which would define residential, industrial-commercial, and agricultural neighborhoods and induce the best possible characters for them. Criteria for these neighborhoods should be similar to those which are found in modern municipal zoning laws. It appears logical for such a zoning law to include neighboring Belgrade in its scope. Therefore, efforts should be made toward enactment of a joint Town - County Zoning Law using the legal techniques allowable under Montana Statutes.

APPENDIX C

FORM OF AIRPORT ZONING RESOLUTION

AN ORDINANCE REGULATING AND RESTRICTING THE HEIGHT OF STRUCTURES AND OBJECTS OF NATURAL GROWTH, AND OTHERWISE REGULATING THE USE OF PROPERTY, IN THE VICINITY OF THE GALLATIN FIELD AIRPORT BY CREATING AIRPORT APPROACH ZONES, TRANSITION ZONES, HORIZONTAL ZONE AND CONICAL ZONE, AND ESTABLISHING THE BOUNDARIES THEREOF; PROVIDING FOR CHANGES IN THE RESTRICTIONS AND BOUNDARIES OF SUCH ZONES; DEFINING CERTAIN TERMS USED HEREIN; REFERRING TO THE GALLATIN FIELD AIRPORT ZONING MAP WHICH IS INCORPORATED IN AND MADE A PART OF THIS ORDINANCE ; PROVIDING FOR ENFORCEMENT; ESTABLISHING A BOARD OF APPEALS; AND IMPOSING PENALTIES.

This resolution is adopted pursuant to the authority conferred by The Revised Code of Montana. It is hereby found that an airport hazard endangers the lives and property of users of Gallatin Field Airport and of occupants of land in its vicinity, and also, if of the obstruction type, in effect reduces the size of the area available for the landing, taking-off and maneuvering of aircraft, thus tending to destroy or impair the utility of Gallatin Field Airport and the public investment therein. Accordingly, it is declared: (1) that the creation or establishment of an airport hazard is a public nuisance and an injury to the region served by Gallatin Field Airport; (2) that it is necessary in the interest of the public health, public safety convenience and general welfare that the creation or establishment of airport hazards be prevented, and; (3) that the prevention of these hazards should be accomplished, to the extent legally possible, by the exercise of the police power without compensation. It is further declared that both the prevention of the creation or establishment of airport hazards and the elimination, removal, alteration, mitigation, or marking and lighting of existing airport hazards are public purposes for which political subdivisions may raise and expend public funds and acquire land or interests in land.

Be it resolved by the Commissioners of Gallatin County:

SECTION I: SHORT TITLE

This ordinance shall be known and may be cited as "Gallatin Field Airport Zoning Ordinance".

SECTION II: DEFINITIONS

As used in this Ordinance, unless the content otherwise requires:

(1) AIRPORT - Means Gallatin Field Airport.
(2) AIRPORT ELEVATION - Means the established elevation of the highest point on the usable landing area.
(3) AIRPORT HAZARD - Means any structure, tree or use of land which obstructs the airspace required for or is otherwise hazardous to the flight of aircraft in landing or taking-off at the airport.
(4) AIRPORT REFERENCE POINT - Means the point established as the approximate geographic center of the airport landing area and so designated.
(5) BOARD OF ADJUSTMENT - Means a board consisting of five members.
(6) HEIGHT - For the purpose of determining the height limits in all zones set forth in this ordinance and shown on the zoning map, the datum shall be mean sea level elevation unless otherwise specified.

(7) INSTRUMENT RUNWAY - Means a runway equipped or to be equipped with electronic or visual air navigation aids adequate to permit the landing of aircraft under restricted visibility conditions.

(8) LANDING AREA - Means the area of the Airport used for the landing, take-off or taxiing of aircraft.

(9) NON-CONFORMING USE - Means any structure, tree, or use of land which is lawfully in existence at the time the regulation is prescribed in the Ordinance or an amendment thereto becomes effective and does not then meet the requirements of said regulation.

(10) NON-INSTRUMENT RUNWAY - Means a runway other than an instrument runway.

(11) PERSON - Means an individual, firm, partnership, corporation, company, association, joint stock association, or body politic, and includes a trustee, receiver, assignee, administrator, executor, guardian, or other representative.

(12) RUNWAY - Means the paved surface of an airport landing strip.

(13) STRUCTURE - Means an object constructed or installed by man, including, but without limitation, buildings, towers, smokestacks, and overhead transmission lines.

(14) TREE - Means any object of natural growth.

SECTION III - ZONES

In order to carry out the provisions of this Resolution, there are hereby created and established certain zones which include all of the land lying within the Instrument Approach Zones, Non-instrument Approach Zones, Transition Zones, Horizontal Zone and Conical Zone. Such areas and zones are shown on Gallatin Field Airport Zoning Map which is attached to this Resolution and made a part hereof. The various zones are hereby established and defined as follows:

(1) INSTRUMENT APPROACH ZONE - An instrument approach zone is established at each end of the instrument runway for instrument landings and take-offs. The instrument approach zones shall have a width of 1,000 feet at a distance of 200 feet beyond each end of the runway, widening thereafter uniformly to a width of 16,000 feet at a distance of 50,200 feet beyond each end of the runway, its centerline being the continuation of the centerline of the runway.

(2) NON-INSTRUMENT APPROACH ZONE - A non-instrument approach zone is established at each end of all non-instrument runways on Gallatin Field Airport for non-instrument landings and take-offs. The non-instrument approach zone shall have a width of _____* feet at a distance of 200 feet beyond each end of the runway, widening thereafter uniformly to a width of _____* feet at a distance of 10,200 feet beyond each end of the runway, its centerline being the continuation of the centerline of the runway.

(3) VFR APPROACH ZONE - A visual flight rules approach zone shall have a width of 200 feet at a distance of 100 feet beyond each end of the runway widening thereafter uniformly to a width of 500 feet at a distance of 3,100 feet beyond each end of the runway.

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* The applicable distance in feet must be based on runway lengths as set forth in Sections 77.27 and 77.25 of Part 77 of the Federal Aviation Regulations.

(4) TRANSITION ZONES - Transition zones are hereby established adjacent to each instrument and non-instrument runway and approach zone as indicated on the zoning map. Transition zones symmetrically located on either side of runways, have variable widths as shown on the zoning map. Transition zones extend outward from a line _____* feet on either side of the center line of the non-instrument runway, for the length of such runway plus 200 feet on each end; and 500 feet on either side of the center line of the instrument runway, for the length of such runway plus 200 feet on each end, and are parallel and level with such runway center lines. The transition zones along such runways slope upward and outward (1) foot vertically for each (7) feet horizontally to the point where they intersect the surface of the horizontal zone. Further, transition zones are established adjacent to both instrument and non-instrument approach zones for the entire length of the approach zones. These transition zones have variable widths, as shown on the zoning map. Such transition zones flare symmetrically with either side of the runway approach zones from the base of such zones and slope upward and outward at the rate of (1) foot vertically for each (7) feet horizontally to the points where they intersect the surfaces of the horizontal and conical zones. Additionally, transition zones are established adjacent to the instrument approach zone where it projects through and beyond the limits of the conical zone, extending a distance of 5,000 feet measured horizontally from the edge of the instrument approach zones at right angles to the continuation of the center line of the runway.

(5) HORIZONTAL ZONE - A horizontal zone is hereby established as the area within a circle with its center at the Airport Reference Point and having a radius of _____* feet. The horizontal zone does not include the instrument and non-instrument approach zones and the transition zones.

(6) CONICAL ZONE - A conical zone is hereby established commencing at the periphery of the horizontal zone and extending to a distance of _____* feet from the airport reference point. The conical zone does not include the instrument and non-instrument approach zones and transition zones.

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* The applicable distance in feet must be based on runway lengths as set forth in Sections 77.27 and 77.25 of Part 77 of the Federal Aviation Regulations.

SECTION IV: HEIGHT LIMITATIONS

Except as otherwise provided in this Resolution, no structure or tree shall be erected, altered, allowed to grow, or maintained in any zone created by this Resolution to a height in excess of the height limit herein established for such zone. Such height limitations are computed from the established airport elevation and are hereby established for each of the zones in question as follows:

(1) INSTRUMENT APPROACH ZONE - One (1) foot in height for each fifty (50) feet in horizontal distance beginning at a point 200 feet from the end of the instrument runway and extending to a distance of 10,200 feet from the end of the runway; thence one (1) foot in height for each forty (40) feet in horizontal distance to a point 50,200 feet from the end of the runway;

(2) NON-INSTRUMENT APPROACH ZONES - One (1) foot in height for each forty (40) feet in horizontal distance beginning at a point 200 feet from the end of the non-instrument runway and extending to a point 10,200 feet from the end of the runway;

(3) VFR AIRPORT APPROACH ZONES - One (1) foot in height for each twenty (20) feet in horizontal distance beginning at a point 200 feet from and at the centerline elevation of the end of the non-instrument runway and extending to a point 10,200 feet from the end of the runway;

(4) TRANSITION ZONES - One (1) foot in height for each seven (7) feet in horizontal distance beginning at a point _____* feet from the center line of non-instrument runways and 500 feet from the center line of the instrument runway, measured at right angles to the longitudinal center line of the runway, extending upward to a maximum height of 150 feet above the established airport elevation which is _____* feet above mean sea level. In addition to the foregoing, there are established height limits of (1) foot vertical height for each (7) feet horizontal distance measured from the edges of all approach zones for the entire length of the approach zones and extending upward and outward to the points where they intersect the horizontal and conical surfaces. Further, where the instrument approach zone projects through and beyond the conical zone, a height limit of one (1) foot for each (7) feet of horizontal distance shall be maintained beginning at the edge of the instrument approach zone and extending a distance of 5,000 feet from the edge of the instrument approach zone measured normal to the centerline of the runway extended.

(5) HORIZONTAL ZONE - One hundred fifty (150) feet above the established airport elevation or a maximum height of _____* feet above mean sea level elevation; and

(6) CONICAL ZONE - One (1) foot in height for each twenty (20) feet of horizontal distance beginning at the periphery of the horizontal zone extending to a height of _____* feet above the airport elevation.

(7) EXCEPTED HEIGHT LIMITATIONS - Nothing in this Ordinance shall be construed as prohibiting the growth, construction or maintenance of any tree or structure to a height up to 45 feet above the surface of the land.

Where an area is covered by more than one (1) height limitation, the more restrictive limitation shall prevail.

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* The applicable distance in feet must be based on runway lengths as set forth in Sections 77.27 and 77.25 of Part 77 of the Federal Aviation Regulations.

SECTION V: USE RESTRICTIONS

Notwithstanding any other provisions of this Ordinance, no use may be made of land within any zone established by this Ordinance in such a manner as to create electrical interference with radio communication between the Airport and aircraft, make it difficult for flyers to distinguish between airport lights and others, result in glare in the eyes of flyers using the Airport, impair visibility in the vicinity of the Airport or otherwise endanger the landing, taking-off, or maneuvering of aircraft.

SECTION VI: NON-CONFORMING USES

(a) Regulations not Retroactive. The regulations prescribed by this Resolution shall not be construed to require the removal, lowering, or other changes or alteration of any structure or tree not conforming to the regulations as of the effective date of this Resolution, or otherwise interfere with the continuance of any non-conforming use. Nothing herein contained shall require any change in the construction, alteration, or intended use of any structure, the construction or alteration of which was begun prior to the effective date of this Resolution, and is diligently prosecuted.

(b) Marking and Lighting. Notwithstanding the preceding provision of this Section, the owner of any non-conforming structure or tree is hereby required to permit the installation, operation, and maintenance thereon of such markers and lights as shall be deemed necessary by the _____# to indicate to the operators of aircraft in the vicinity of the Airport, the presence of such airport hazards. Such markers and lights shall be installed, operated, and maintained at the expense of _____☆.

SECTION VII: PERMITS

(a) Future Uses. Except as specifically provided in paragraphs 1, 2 and 3 hereunder, no material change shall be made in the use of land and no structure or tree shall be erected, altered, planted or otherwise established in any zone hereby created unless a permit therefor shall have been applied for and granted. Each application for a permit shall indicate the purpose for which the permit is desired, with sufficient particularity to permit it to be determined whether the resulting use, structure or tree would conform to the regulations herein prescribed. If such determination is in the affirmative, the permit shall be granted.

(1) In the area lying within the limits of the Horizontal zone and the Conical zone, no permit shall be required for any tree or structure less than 75 feet of vertical height above ground, except when because of terrain, land contour or topographic features such tree or structure would extend above the height limits prescribed for such zone.

(2) In the areas lying within the limits of the instrument and non-instrument approach zones but at a horizontal distance of not less than 4,200 feet from each end of the runways, no permit shall be required for any tree or structure less than 75 feet of vertical height above the ground, except when such tree or structure would extend above the height limit prescribed for such instrument or non-instrument approach zone.

Insert here the title of the appropriate official who may be charged with the duty for determining the necessity for lighting and marking.

☆ Insert here the name of the appropriate political subdivision or body.

(3) In the areas lying within the limits of the transition zones beyond the perimeter of the horizontal zone, no permit shall be required for any tree or structure less than 75 feet of vertical height above the ground except when such tree or structure, because of terrain, land-contour or topographic features would extend above the height limit prescribed for such transition zones.

Nothing contained in any of the foregoing exceptions shall be construed as permitting or intending to permit any construction, alteration or growth of any structure or tree in excess of any of the height limits established by this Resolution except as set forth in Section XV.

(b) Existing Uses. No permit shall be granted that would allow the establishment or creation of an airport hazard or permit a non-conforming use, structure, or tree to be made or become higher, or become a greater hazard to air navigation, than it was on the effective date of this Resolution or any amendments thereto or than it is when the application for a permit is made. Except as indicated, all applications for such a permit shall be granted.

(c) Non-conforming Uses Abandoned or Destroyed. Whenever the Airport Building Inspector determines that a non-conforming structure or tree has been abandoned or more than 80 percent torn down, physically deteriorated, or decayed, no permit shall be granted that would allow such structure or tree to exceed the applicable height limit or otherwise deviate from the zoning regulations.

(d) Variances. Any person desiring to erect or increase the height of any structure, or permit the growth of any tree, or use his property, not in accordance with the regulations prescribed in this Resolution, may apply to the Board of Adjustment for a variance from such regulations. Such variances shall be allowed where it is duly found that a literal application or enforcement of the regulations would result in practical difficulty or unnecessary hardship and the relief granted would not be contrary to the public interest but will do substantial justice and be in accordance with the spirit of this Resolution.

(e) Hazard Marking and Lighting. Any permit or variance granted may, if such action is deemed advisable to effectuate the purpose of this Resolution and be reasonable in the circumstances, be so conditioned as to require the owner of the structure or tree in question to permit the Gallatin Field Airport Board at its own expense, to install, operate, and maintain thereon such markers and lights as may be necessary to indicate to flyers the presence of an airport hazard.

SECTION VIII: ENFORCEMENT

It shall be the duty of the Airport Building Inspector to administer and enforce the regulations prescribed herein. Applications for permits and variances shall be made to the Airport Building Inspector upon a form furnished by him. Applications required by this Resolution to be submitted to the Airport Building Inspector shall be promptly considered and granted or denied by him. Applications for action by the Board of Adjustment shall be forthwith transmitted by the Airport Building Inspector.

SECTION IX: BOARD OF ADJUSTMENT

(a) There is hereby created a Board of Adjustment to have and exercise the following powers: (1) to hear and decide appeals from any order requirement, decision, or determination made by the Airport Building Inspector in the enforcement of this Resolution; (2) to hear and decide special exceptions to ceptions to the terms of this Resolution upon which such Board of Adjustment under such regulations may be required to pass; (3) to hear and decide specific variances.

(b) The Board of Adjustment shall consist of five members appointed by the County Commission and each shall serve for a term of three (3) years and until his successor is duly appointed and qualified. Of the members first appointed one shall be appointed for a term of one (1) year, two for a term of two (2) years and two for a term of three (3) years. Members shall be removable by the appointing authority for cause, upon written charges, after a public hearing.

(c) The Board of Adjustment shall adopt rules for its governance and procedure in harmony with the provisions of this Resolution. Meetings of the Board of Adjustment shall be held at the call of the Chairman and at such other times as the Board of Adjustment may determine. The Chairman, or in his absence the acting chairman, may administer oaths and compel the attendance of witnesses. All hearings of the Board of Adjustment shall be public. The Board of Adjustment shall keep minutes of its proceedings showing the vote of each member upon each question, or, if absent or failing to vote, indicating such fact, and shall keep records of its examinations and other official actions, all of which shall immediately be filed in the office of the Airport Building Inspector and shall be a public record.

(d) The Board of Adjustment shall make written findings of fact and conclusions of law giving the facts upon which it acted and its legal conclusions from such facts in reversing, affirming, or modifying any order, requirement, decision, or determination which comes before it under the provisions of this Resolution.

(e) The concurring vote of a majority of the members of the Board of Adjustment shall be sufficient to reverse any order, requirement, decision, or determination of the Airport Building Inspector or to decide in favor of the applicant on any matter upon which it is required to pass under this Resolution or to effect any variation in this Resolution.

SECTION X: APPEALS

(a) Any person aggrieved, or any taxpayer affected, by any decision of the Airport Building Inspector made in his administration of this Resolution, if of the opinion that a decision of the Airport Building Inspector is an improper application of these regulations, may appeal to the Board of Adjustment.

(b) All appeals hereunder must be taken within a reasonable time as provided by the rules of the Board of Adjustment, by filing with the Airport Building Inspector a notice of appeal specifying the grounds thereof. The Airport Building Inspector shall forthwith transmit to the Board of Adjustment all the papers constituting the record upon which the action appealed from was taken.

(c) An appeal shall stay all proceedings in furtherance of the action appealed from, unless the Airport Building Inspector certifies to the Board of Adjustment, after the notice of appeal has been filed with it, that by reason of the facts stated in the certificate a stay would, in his opinion,

cause imminent peril to life or property. In such case, proceedings shall not be stayed except by order of the Board of Adjustment on notice to the agency from which the appeal is taken and on due cause shown.

(d) The Board of Adjustment shall fix a reasonable time for hearing appeals, give public notice and due notice to the parties in interest, and decide the same within a reasonable time. Upon the hearing any party may appear in person or by agent or by attorney.

(e) The Board of Adjustment may, in conformity with the provisions of this Resolution, reverse or affirm, in whole or in part, or modify the order, requirement, decision or determination appealed from and may make such order, requirement, decision, or determination, as may be appropriate under the circumstances.

SECTION XI: JUDICIAL REVIEW

Any person aggrieved, or any taxpayer affected, by any decision of the Board of Adjustment, may appeal to the Court of _____ as provided in Section _____ of Chapter _____ of the Public Laws of Montana.

SECTION XII: PENALTIES

Each violation of this Resolution or of any regulation, order, or ruling promulgated hereunder shall constitute a misdemeanor and be punishable by a fine of not more than _____ or imprisonment for not more than _____ days or both such fine and imprisonment, and each day a violation continues to exist shall constitute a separate offense.

SECTION XIII: CONFLICTING REGULATIONS

Where there exists a conflict between any of the regulations or limitations prescribed in this Resolution and any other regulations applicable to the same area, whether the conflict be with respect to the height of structures or trees, the use of land, or any other matter, the more stringent limitation or requirement shall govern and prevail.

SECTION XV: SEVERABILITY

If any of the provisions of this Resolution or the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of the Resolution which can be given effect without the invalid provision or application, and to this end the provisions of this Resolution are declared to be severable.

SECTION XVI: EFFECTIVE DATE

WHEREAS, the immediate operation of the provisions of this Resolution is necessary for the preservation of the public health, public safety, and general welfare, and EMERGENCY is hereby declared to exist, and this Resolution shall be in full force and effect from and after its passage by the Gallatin County Commission and publication and posting as required by law. Adopted by the Gallatin County Commission, this _____ day of _____, 19____.

RECOMMENDATIONS REGARDING PROTECTIVE COVENANTS

A legally valid declaration by the Gallatin Field Board as owner, should be made to apply to all parts of its land which might be available for sale or lease to businesses or homeowners.

The general purposes of the covenants could be stated as follows:
The real property described heretofore is subjected to the conditions, covenants, restrictions, reservations and easements hereby declared to ensure proper use and appropriate development and improvement of each building site thereof: to protect the owners and lessees of building sites against such improper use of surrounding building sites as will depreciate the value of their property and operations; to guard against the erection thereon of structures built of improper or unsuitable materials; to encourage the erection of attractive improvements thereon, with appropriate locations thereof on building sites; to prevent haphazard and inharmonious improvement of building sites; to secure and maintain proper setbacks from streets, adequate free spaces between structures; and in general to provide adequately for a high type and quality of improvement on said property.

Conditions which should be stipulated in these Covenants would include:

1 - Prohibitions against offensive or noxious activities, unsightliness, odors, dust, fumes, smoke, or noise, in any way which would constitute a nuisance.

2 - Limitations on types of uses permitted.

3 - Height limitations.

4. - Setback requirements.

5 - Off-street vehicle parking and maneuvering requirements.

6 - Landscaping requirements.

7 - Advertising limitations.

8 - Requirement for each planned improvement to be approved before its initiation, by the Gallatin Field Board or its duly authorized agents.

APPENDIX D

Table 9. Projections for Freight, Mail, and Express for the State of Montana 1970 to 1980 (in tons)

	Freight		Mail		Express	
	Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit
Average Annual Rate of Increase Assumed for Freight, Mail, and Express Projections						
1966-1975	20%	16%	14%	10%	8%	6%
1975-1980	17%	13%	4%	4%	8%	6%
1970	971	1111	672	775	192	207
1971	1126	1334	739	884	203	223
1972	1306	1600	813	1007	216	241
1973	1515	1921	883	1149	229	261
1974	1757	2305	972	1309	242	281
1975	2038	2766	1069	1493	257	304
1976	2303	3236	1112	1553	272	328
1977	2602	3786	1156	1615	289	354
1978	2941	4430	1202	1679	306	383
1979	3323	5183	1251	1747	324	413
1980	3755	6064	1301	1816	344	446

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Total Air Traffic, All Classes of Service, Inbound Plus Outbound for Bozeman 1959 - 1965.

Year	Number of Passengers Inbound	Outbound	Inbound plus Outbound
1959	2,730	3,020	5,750
1960	2,860	2,560	5,420
1961	1,240	1,320	2,560
1962	2,270	2,170	4,440
1963	2,480	2,370	4,850
1964	2,950	3,110	o,060
1965			9,415[1]

[1]The 1965 estimate was claculated by taking the first three quarters directly from the Civil Aeronautics Board source and estimating the fourth quarter as one third of the first three quarters.

This data taken directly from Civil Aeronautics Board Origin and Destination Survey - sample expanded by a factor of 10.

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Total Air Traffic, All Classes of Service Inbound Plus Outbound for Bozeman 1959-1965.

Total Number of Passengers Inbound Plus Outbound, All Classes of Service for 1964 for Helena, Butte, Billings, Great Falls and Bozeman.

	Helena	Butte	Billings	Great Falls	Bozeman	First Four Cities Combined
East/ South East	3,800	6,620	34,170	23,560	3,220	68,150
West	3,170	3,930	20,460	19,990	1,900	50,550
North	880	3,210	12,060	290	50	16,440
South	6,700	20,580	43,510	63,880	890	134,670
East/West	6,970	10,550	54,630	43,550	5,120	115,700
North/South	7,580	23,790	55,570	64,170	940	151,110
TOTAL	14,550	34,340	110,200	107,720	6,060	266,810
% of Total East/West	48.0	30.7	49.6	40.4	84.5	43.3
% of Total North/South	52.0	69.3	50.4	59.6	15.5	56.7

This data taken directly from Civil Aeronautics Board Origin and Destination Survey - sample expanded by a factor of 10.

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Passenger Boardings and Mail, Express and Freight Loadings at Gallatin Field for the Calendar Years 1961 to 1966 by Quarters.

Year and Quarter	Passengers	Mail	Express - In Pounds -	Freight
1961 1st Quarter[1]	18	128	9	15
2nd Quarter	611	1,718	208	1,550
3rd Quarter[2]	413	1,289	309	336
4th Quarter	440	2,215	416	2,800
TOTAL	1,482	5,350	942	4,701
1962 1st Quarter	516	2,322	422	994
2nd Quarter	520	2,170	399	549
3rd Quarter	966	2,222	1,262	1,731
4th Quarter	554	2,635	940	2,875
TOTAL	2,556	9,349	3,023	6,149
1963 1st Quarter	482	1,884	1,304	8,293
2nd Quarter	734	1,924	563	2,618
3rd Quarter	992	1,782	620	7,515
4th Quarter	671	2,480	727	9,820
TOTAL	2,879	8,070	3,214	28,246
1964 1st Quarter	725	2,238	609	11,072
2nd Quarter	767	2,166	132	4,130
3rd Quarter	1,428	2,474	467	7,104
4th Quarter	808	2,555	715	9,091
TOTAL	3,728	9,433	1,923	31,397

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Year and Quarter	Passengers	Mail	Express - In Pounds -	Freight
1965 1st Quarter	1,007	2,345	99	7,151
2nd Quarter	982	2,443	159	3,165
3rd Quarter	1,700	2,364	1,058	8,298
4th Quarter	1,230	3,696	439	8,922
TOTAL	4,919	10,848	1,755	27,536
1966 1st Quarter	1,192	2,951	379	4,353
2nd Quarter	1,631	3,380	442	2,506

[1]Airlines Strike started January 9, 1961 at 8:00 a.m. and settled April 1, 1961.

[2]Gallatin Field closed for construction July 17, 1961 and reopened October 13, 1961.

Information supplied by courtesy of Northwest Airlines.

SUMMARY

With the facts and figures compiled in the body of this report, I set about working on a design concept. The most startling influence on the scope of the project is that there are presently about 40,000 passengers flying in and out of Gallatin Field in one year. By 1985, the projections are that there will be 200,000 passengers per year in and out of Gallatin Field. The present terminal is inadequate for the present traffic, and the new terminal will have to handle five times as much traffic.

With this in mind, I calculated the area requirements for the different facilities required in the terminal.

Then, forgetting these areas for the moment, I worked out a traffic flow pattern for aircraft, passengers and baggage. Confirming my traffic flow patterns with reference material, I felt that I had the best possible solution for circulation. As I worked the different terminal facilities around this circulation pattern, I was surprised to note that my building was quite symmetrical. As I traced my thought processes back, I noticed that this symmetry came about as a result of my traffic flow being symmetrical, a fact which I had not noticed before.

Both baggage and passengers would leave one side of the building, and arrive on the other.

With this in mind, I decided to try and make my building conform to this symmetry as much as possible. The resulting building is more or less all the facilities required in an airport terminal of this size, arranged around a well functioning circulation pattern.

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