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A MAINTENANCE COMPLEX FOR GLACIER NATIONAL PARK

Part I

Undergraduate Thesis in Architectural Design

By

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INTRODUCTION

INTRODUCTION

To me it seems very odd that in the space age, when men can walk on the moon, that there is still a need for a man with a shovel. Throughout time, the shovel has been improved and made more complex, but none-the-less, it is still a shovel. Bull-dozers, road graders, and snow plows are all forms of shovels, and it takes strenuous physical labor to operate them.

This thesis is dedicated to all "blue-collar" workers, whether shovel operators or shovel builders.

CONDITIONS CREATING A NEED

CONDITIONS CREATING A NEED

Today, when clean air and water, and wilderness areas are at a premium, national parks, such as Glacier, are attracting record numbers of visitors. Over one million visitors a year tour the park and this figure is, naturally, increasing. (See Graph #1) With this rising visitation factor, plus the vast expanse of the park itself, it is not difficult to determine that a highly efficient maintenance operation is needed to keep the park functioning.

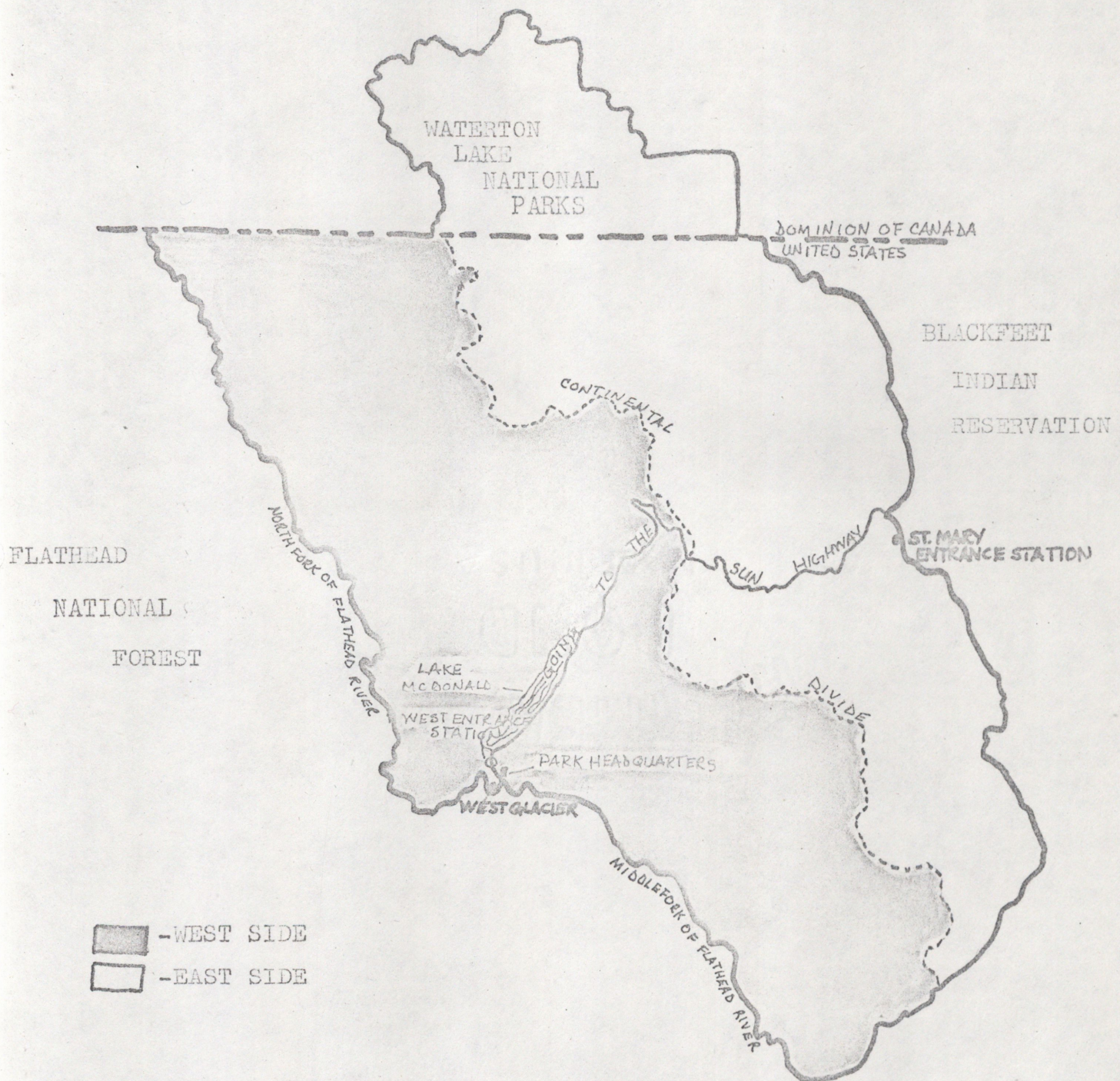
Glacier has two major maintenance complexes at present. One is located at St. Mary on the east side of the park, and the other larger complex is at park headquarters, West Glacier. (See Map #1) This facility at West Glacier functions as maintenance headquarters and major maintenance decisions are made here. The St. Mary facility handles work on the east side of the park only. Map #1 shows how the work is divided between the two areas. This report is concerned with the westside operations and the facility at park headquarters. 2

Roads and trails maintenance, building maintenance, equipment maintenance, grounds keeping and sanitary pick-up (garbage collecting) are the major duties performed. These duties are presently being carried out and directed from shacks and buildings, some fifty years old. Many of the buildings are too crowded and are not sufficient to handle new equipment and methods. In many situations,

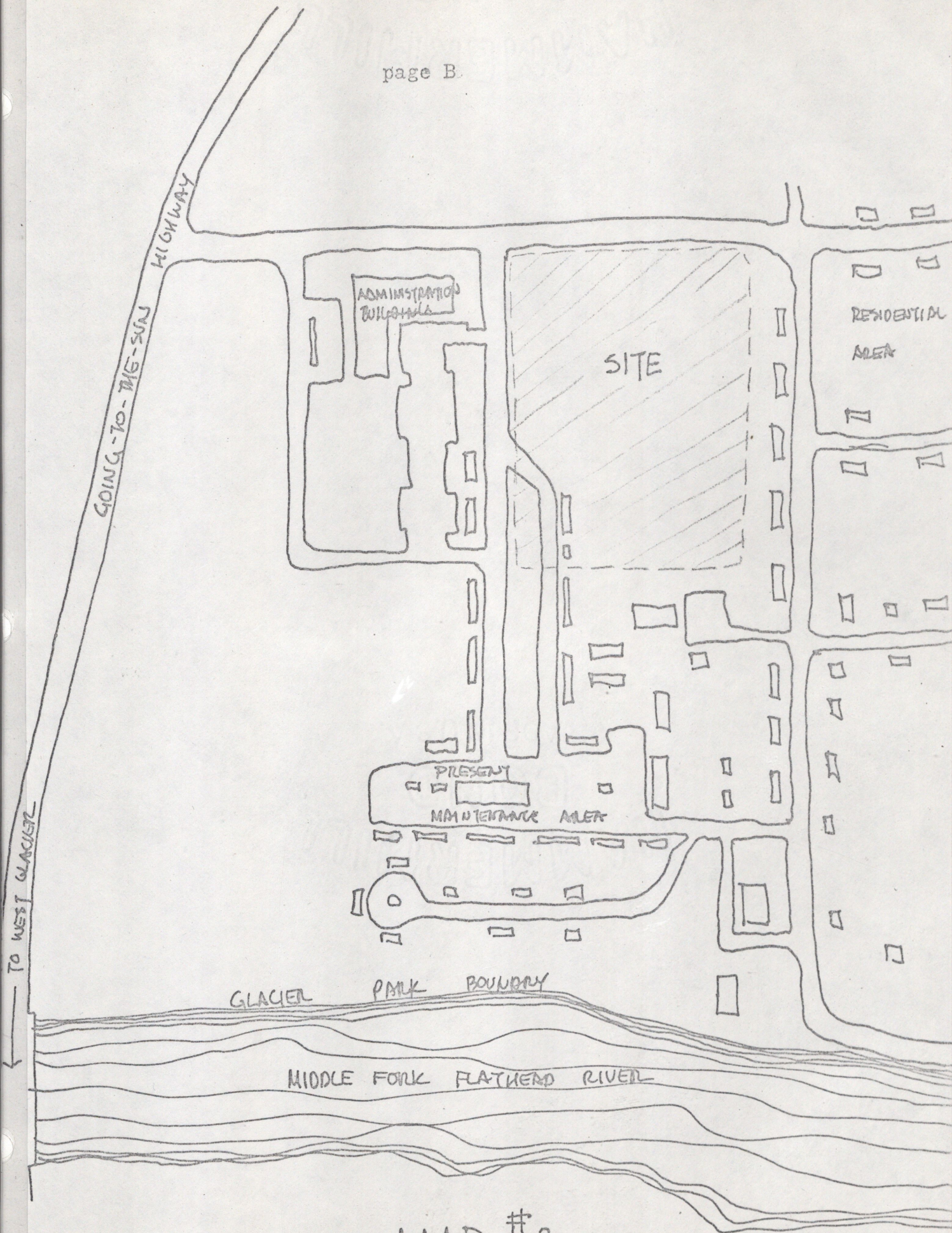
there is no relation between buildings which have related functions. To handle new and expanded tasks, remodeling and converting have taken place, forcing functions into spaces that cannot handle them. Consequently, the area is one of inefficiency and confusion, and not at all in phase with the newer administration building and residential area, which are better organized and arranged.

In proposing a new maintenance complex, I am assuming that improved working conditions and attitudes are needed in Glacier. Also, that the task of improving conditions could greatly increase the efficiency of the maintenance operation. Studies have been made concerning the working environment and its relationship with the quality of the work produced. They show, very simply, that improved conditions result in better products. If, therefore, the working environment is improved, then it follows that work quality will also be improved. If this can be done, the need of improving conditions, will be satisfied.

MAP NO. 1



GLACIER NATIONAL PARK



LOCAL CONDITIONS

LOCAL CONDITIONS

Historical

Glacier National Park was established on May 11, 1910 to preserve its unusually rugged beauty. (1-p.6) Its nearly one (1) million acres contains some of the most scenic areas of the Rocky Mountains. When the park was established, only crude trails were available to visitors. It was not until 1933 that a road, the "Going-to-the-Sun Highway", was built through the park. (2-p.24) This highway, the only road through the park, crosses the Continental Divide at Logan Pass. (See Map #1) Most visitors to the park use the road, while the more energetic people use the park's 1,000 miles of trails. 4

Geographical

Glacier Park straddles the Continental Divide in northwest Montana. It is bordered on the north by Alberta, Canada; on the south by the Middlefork of the Flathead River; on the east by the Blackfeet Indian Reservation; and on the west, by the Northfork of the Flathead River. (See Map #1) The park is the fourth largest in the nation.

The thesis project site is in the southwestern part of the park between the west entrance and the Middlefork of the Flathead River.

Climatic

Weather conditions are the main reason for the park's short work season. Heavy snowfall throughout the park limits most park activity to the months of May through September. Up to four (4) feet of snow at a time will fall at park headquarters with much more at higher elevations.

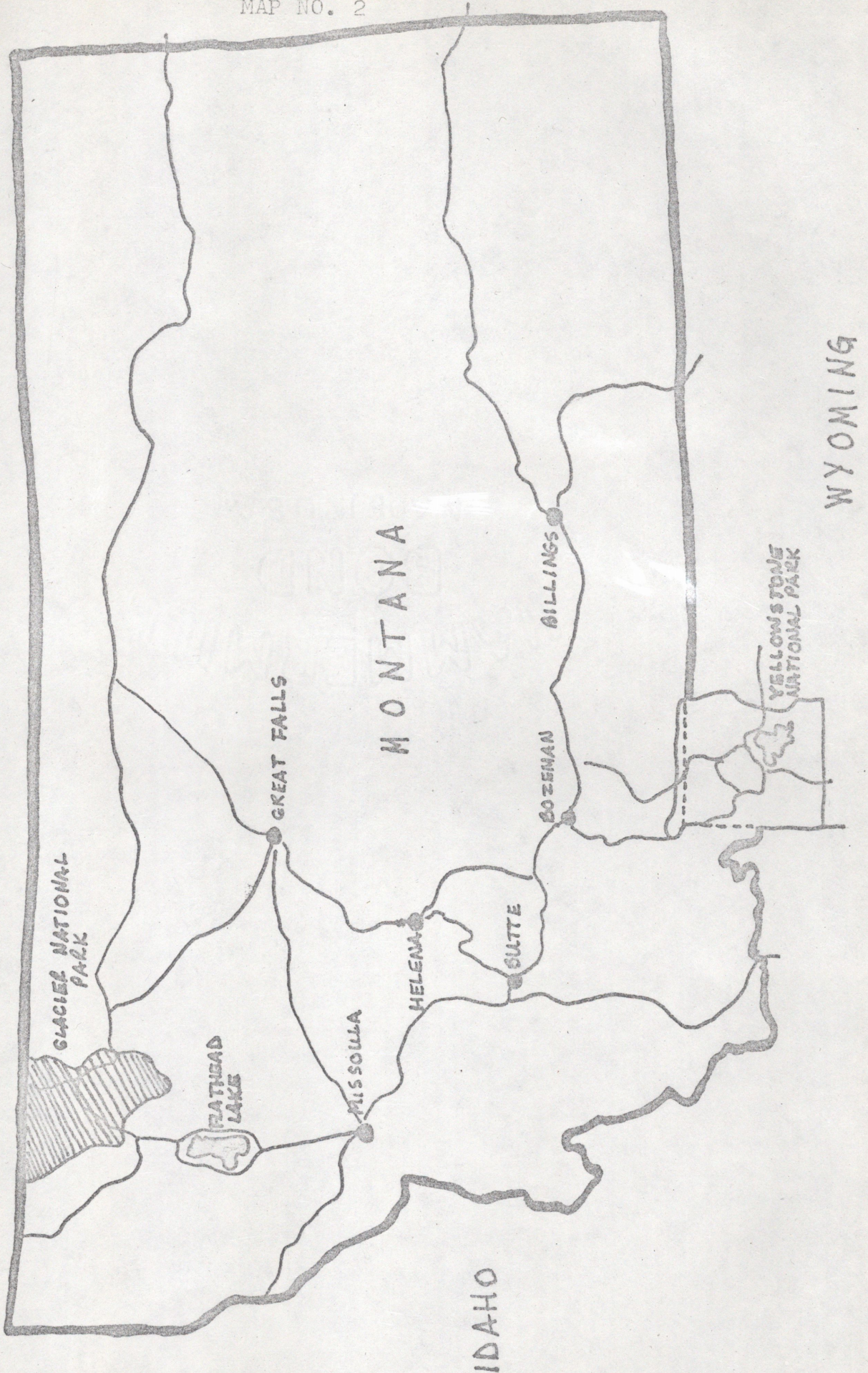
Temperatures in the winter reach as low as -40° F. and go as high as 90° F. in the summer. Summer nights are usually quite chilly with temperatures dropping into the thirties.

Winds on the westside of the park and particularly at the site are not important enough to take into consideration. They blow high in the trees and seldom reach the ground. There is one bad effect of this wind, however. The Lodgepole pines of the area break off easily and sometimes cause minor damage.

August has the greatest amount of rainfall with approximately four (4) inches. Rain seldom causes any damage except on very rare occasions such as the 1964 flood. This flood caused extensive damage throughout the park.

Generally, working conditions related to weather are very good in the summer months (May-September), but rather poor in the remaining months. Summertime employment doubles winter employment.

CANADA

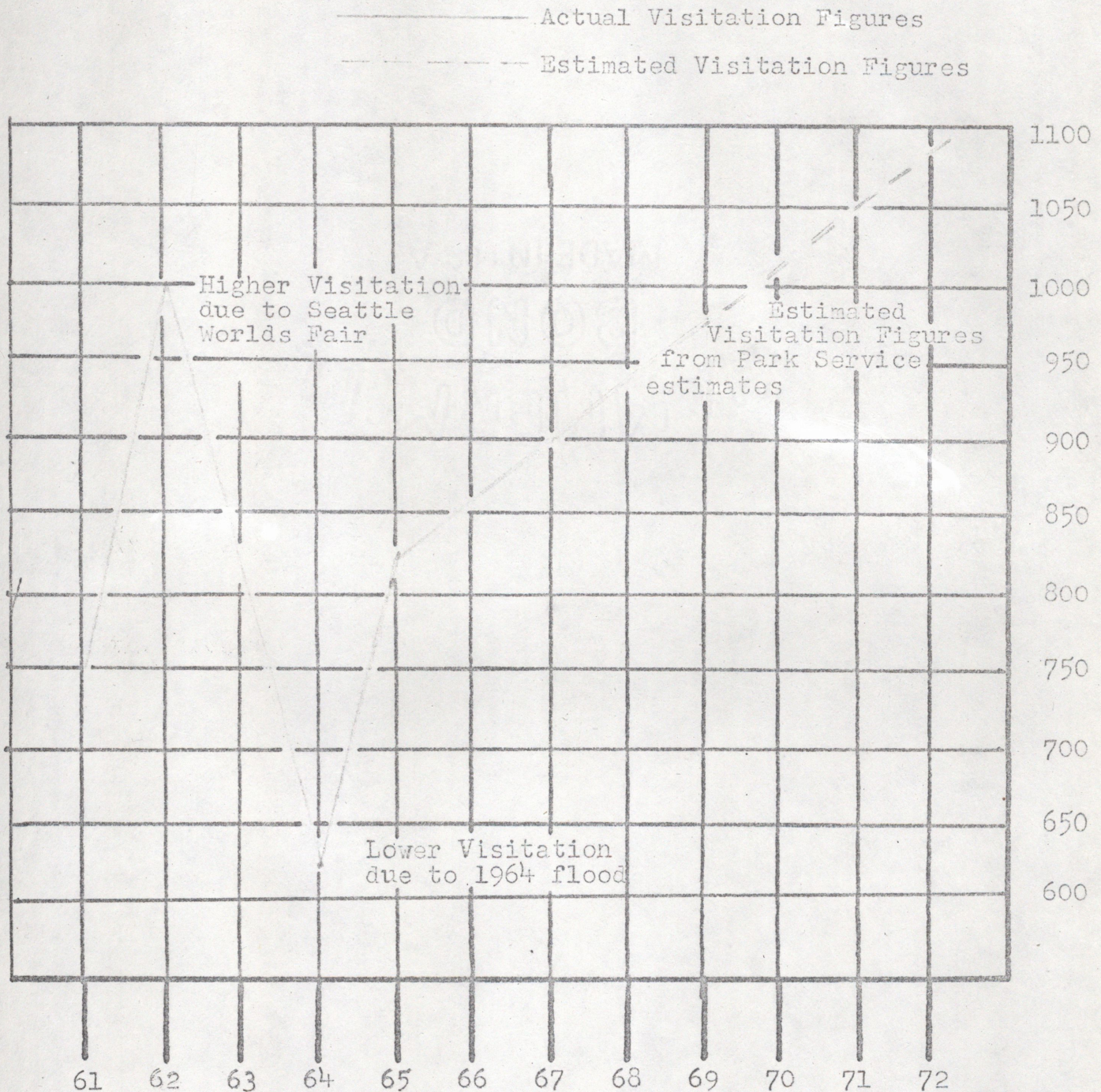


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GRAPH #1



VISITATION OF GLACIER NATIONAL PARK

1961 to 1972

SITE CONDITIONS

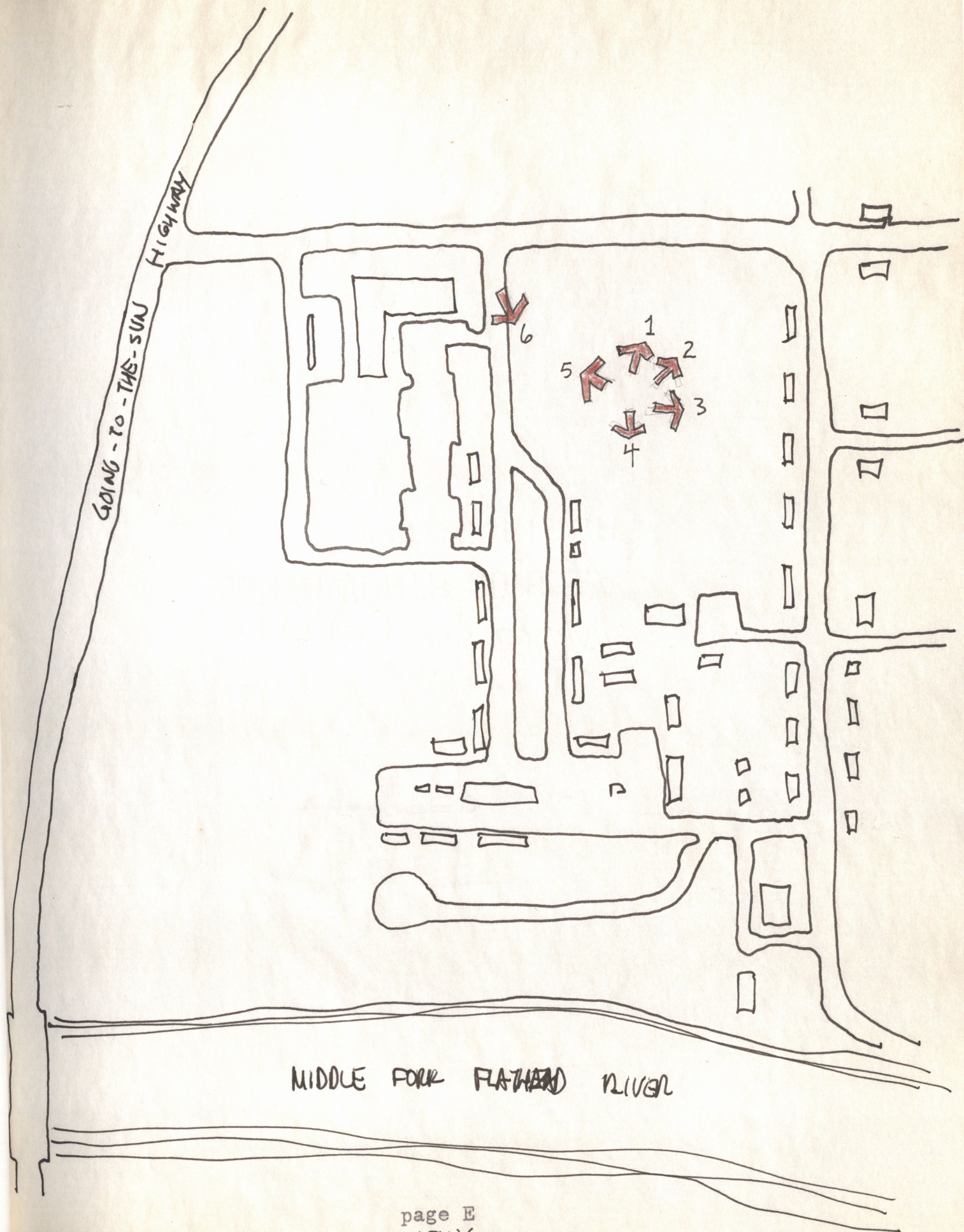
SITE CONDITIONS

The proposed site is a cleared lot centrally located within the headquarter's area. (See Map #3) A thin row of pine trees separates the site from the residential area while only a service road is between the site and administration building. (See Photos)

The general area around and including the site is quite flat with no outstanding topographical features. Pine trees dominate the area except for the site itself which has been cleared. (See Photos) Many types of low bushes and shrubs are found in the area which is a favorite grounds for huckleberry pickers.

Most traffic through the park never sees the headquarter's area. The main road, the "Going-to-the-Sun Highway", passes just beyond the perimeter of the area. (See Map #3) Occassionally some tourists will stop off at the administration building for information, but they seldom enter the maintenance area or the residential area. Traffic in and around the site is almost exclusively park and service vehicles.

Views from the site are pleasant, but not spectacular. Low tree-covered (5,000 ft.) mountains can be seen in almost any direction. However, unless one is in a cleared area, such as the site, thick woods prevent any distant views.





VIEW 1



VIEW 2



VIEW 3





VIEW 5



VIEW 6

FUNCTION

FUNCTION

Besides a home base for maintenance men and equipment, the maintenance complex can be broken down into four basic areas; offices, work shops, meeting or conference rooms and storage spaces.

These four areas apply to each of the departments of the maintenance operation. The following is a list of these departments and the specific requirements they must accommodate.

ROADS DEPARTMENT

Most work done by the roads office is done outside of the headquarter's area. The work consists of everything from paving roads and plowing snow to building guardrails and campsites. 7

Wintertime activity is almost all snowplowing and sanding roads, while spring and summer work is quite varied.

The months of April and May are usually dedicated to opening Logan Pass on "Going-to-the-Sun Highway". (See Map #1) This is a very slow and dangerous job. The crew consists of six men: three permanent employees and three seasonal. They try to have the pass opened by Memorial Day when the park is officially scheduled to open.

From June through September, most of the road crew's time is spent paving and maintaining the "Going-to-the-Sun

Highway", which is the only paved road through the park. Freezing and thawing breaks up the pavement, which causes quite a bit of work each year. The summertime road's crew usually employs twenty to twenty-five additional seasonal men.

Road's Department office space should be suitable for two men. There will be a small amount of storage and closet space and a work area suitable for laying out and studying 4' X 4' maps.

A large amount of vehicle and equipment storage will be allocated to the Road's Department. The following is a list of vehicles and equipment that requires storage space:

- twelve (12) Gravel Trucks
- one (1) Gravel Spreader
- six (6) Pickups
- two (2) Small Tractors
- one (1) Road Stripper
- two (2) End-Loaders
- Handtools, such as picks and shovels, to supply up to thirty men.

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TRAILS DEPARTMENT

As stated earlier, the park has over 1,000 miles of trails and each summer every trail must be opened and maintained.

Trails maintenance is basically a summertime operation,

employing up to one hundred and fifty (150) men. Twenty of these 150 men are based at the headquarters Trails Department. The rest of the men are sent to other parts of the park and are at headquarters only when they are hired and again when they terminate. College students make up most of trail crews. Wintertime employment is usually only three or four men.

Office space will be adequate to house two men, a foreman and a timekeeper. Included with the office will be a work space and storage area. The workspace will be large enough for a sign-making machine plus room for maintaining equipment such as chainsaws. Equipment and vehicles needing storage are as follows:

- three (3) Six Passenger Pickups
- two (2) Three Passenger Pickups
- five (5) Chainsaws
- Other handtools, such as axes, picks and shovels, to equip 25 men.

CARPENTER DEPARTMENT

All phases of carpentry are handled by the carpenter department from heavy timber construction to cabinet building. Also all types of painting and finishing are done here.

Unlike in the previously mentioned departments, the carpenter shop or workspace will be much more important. There will be space for tools such as two (2) table saws,

one (1) band saw, one (1) drill press, one (1) jointer, one (1) lathe and many smaller tools.

A building supervisor is in charge of the Carpenter Department and all building construction done in the park except that which is done by private contractors. An office and drafting space will be available for the supervisor.

Employment of the Carpenter Department is usually four (4) permanent men including the supervisor and four (4) seasonal carpenters.

Storage space will be needed for the following vehicles:

- two (2) 1½ Ton Trucks
- three (3) Pickups
- one (1) Passenger Car

Other storage space will be for the following:

- Nails, glue, paint, and other carpenter supplies.
- 10,000 board feet of lumber.

A sign shop will be related to the carpenter shop.

The sign shop will make all signs used in the park except trail signs. The signs are made of (3)-foot wide wood boards with the letters made by a routing machine. Space to make signs 10' X 10' will be supplied. One (1) to two (2) men work in this shop.

MECHANICAL OR SERVICE DEPARTMENT

Every division of the maintenance complex requires service and upkeep of it's vehicles and equipment. The Service Department is in charge of this servicing and upkeep.

Like in the Carpenter Department, the shop or work-space is the most important part of the Service Department. Vehicles from the Administrative element of the park are also serviced here making the Service Shop one of the busiest in the park.

Requirements of the Service Shop will be as follows:

- Office space for two(2) shop clerks.
- 1,000 square feet of storage space for parts.
- Space to completely overhaul large Caterpillar tractors and automobiles.
- Space for washing and servicing 6-yard gravel trucks and passenger cars.
- Space for welding and doing all kinds of metal-work.
- Space for painting trucks and cars.
- Space for repairing tires (all sizes).
- Storage space for three (3) shop vehicles.

Service shop employment is usually three (3) permanent men in the winter, plus three (3) seasonal men during the summer.

FIRE CACHE AREA

Practically every year forest fires, some man-caused and other lightening caused, plague Glacier. As a result, a fire cache area has been established. It's purpose is to function as an operation center during forest fires and maintain and dispatch fire fighting equipment.

The fire cache will have office and workspace for six (6) people. Usually only two (2) men work but during a fire, timekeepers and other personnel are on duty requiring the additional space.

Other spaces will be as follows:

- 1,500 square feet for storage of fire fighting equipment.
- Workspace for maintaining equipment, for example: sharpening axes and fixing broken handles. 12
- Storage space for two (2) pickups.
- Loading docks for dispatching supplies.

PLUMBING DEPARTMENT

The plumbing department has a variety of duties to perform. Besides regular service calls to park employees' residences and other park buildings, this department is in charge of grounds keeping and garbage collecting.

Winter months, as in many of the other departments, there is a minimum amount^{of} work and only three (3) or four (4) men are employed. Summertime, however, brings about more work and a need for four (4) to five (5) more men.

Spaces allocated to the plumbing will be as follows:

- Office space for one supervisor.
- 500 square feet of work space.
- 500 square feet of storage space.
- Storage for three (3) pickups and two (2) one ton trucks and one (1) garbage truck.

WAREHOUSE

The warehouse must store and handle supplies for maintenance departments. Therefore, it will be located centrally with relation to the different departments. Each department will have a certain amount of storage, however, the warehouse will be the main supply house.

Spaces in the warehouse will be as follows:

- General storage of 15,000 square feet.
- 900 square feet for cold storage.
- Office for six (6) clerks.
- Area for issuing supplies.
- Loading dock capable of handling large tractor-trailer units.
- Vehicle storage for two (2) 1½ Ton trucks, two (2) pickups, and one (1) fuel truck.
- Fuel storage located in convenient area for dispensing to vehicles.

MISCELLANEOUS AREAS

Electrician Shop

The park employs one (1) permanent electrician. Approximately 500 square feet of workspace will be provided

plus storage for one (1) vehicle.

Radio-Repair Shop

Two-way radios are used by all departments and require specialized attention. A workspace of 500 square feet will be provided plus storage for one (1) vehicle.

It is a policy of the park service to have "safety talks" and other conferences with employees, so meeting places will be provided for each department. These meeting spaces can also be used for coffee breaks.

Restrooms will be available for all departments.

AESTHETIC CONSIDERATIONS

AESTHETIC CONSIDERATIONS

The proposed site is located between the park residences and the park administration building. As stated earlier, this area is surrounded by tall pine trees and in the distance at any direction low (5,000 ft.) tree-covered mountains can be seen. These factors lend themselves in giving the area a feeling of seclusion. Keeping this in mind, I will try to retain the secluded feeling within the development of this complex -- not by sealing off all windows, but by making the complex a view-master of the surroundings. Rather than a building of walls and small windows, which isolates the interior environment from the exterior, this complex will attempt to integrate the two. Open courts, large windows, and viewing courts could be part of the solution. A maintenance complex does not have to be groups of shops with many skylights, ignoring everything except function. Mental pleasure can ease physical strain.

This complex should not try to hide in the surroundings environment. It must be as definite as the site it is on. Park Service building policy is to complement the site as much as possible. This idea is fine as long as the buildings are not hidden within the environment.

Natural materials such as stone and wood seem to be a logical choice of materials. These materials can be

used to complement the area and also to give the buildings their own character.

Color is one aesthetic consideration which in past use was very limited. Almost exclusively, a brown color with green trim was used on all buildings. This trend is now on the way out and brighter colors, such as yellow are in use. This new use of color can brighten the area considerably and this project will attempt to take advantage of this new trend. Anything to lighten or make more pleasurable the workload is a goal and if, through colors, this can be done, partial success is achieved.

ECONOMIC CONSIDERATIONS

ECONOMIC CONSIDERATIONS

Annually, Glacier Park submits a budget request to Congress. This budget is to cover all costs for coming year's operation plus an emergency budget for disasters like forest fires.

If this new maintenance complex were wanted, it's cost would have to be added to the budget request. Since only a request is made, there is no guarantee that money for such a complex would be immediately available.

SUMMARY

SUMMARY

This summary will include some of the basic thoughts behind the design of the accompanying maintenance complex.

My basic idea was to provide a pleasant working atmosphere in the shops and areas involved in the complex and also to make as comfortable and functional the buildings to the maintenance operation as possible.

One of the major features of the complex is the elevated deck or walk which extends around the four main buildings. This elevated deck simplifies loading and unloading of trucks and also provides a dry outdoor workspace.

Large amounts of natural light have been provided in all work spaces making them well lit plus making the beauty of the natural surroundings available to the interiors. I have used shapes, lines and materials in the buildings which I felt work well with the site.

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The layout of the complex is rather rigid and came about in searching for a pattern of circulation that went along well with the maintenance operation.

When compared to other problems, this program or design problem might be considered somewhat simple; however, I feel it important and I have dealt with it as such.

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