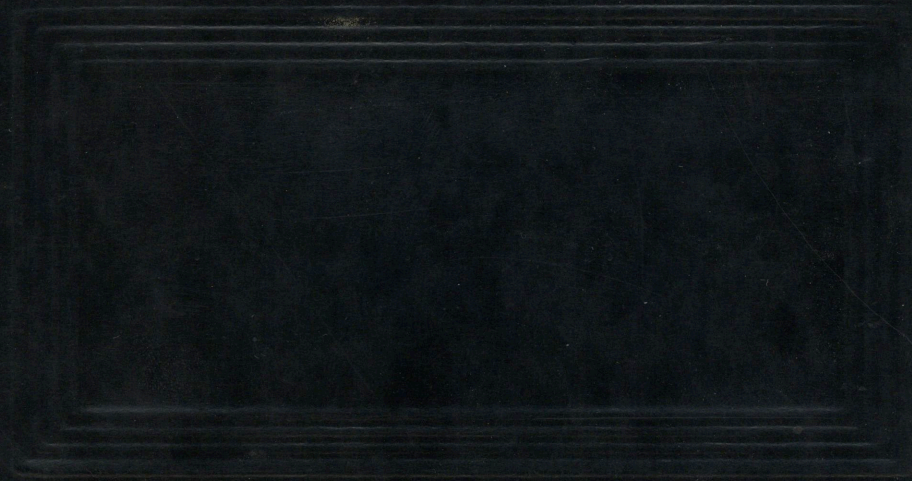


DONALD J. JOHNSON

UNIVERSITY LUTHERAN CHURCH,
BOZEMAN: MONTANA

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THESIS IN ARCHITECTURE

Preliminary Research for
University Lutheran Church
Bozeman, Montana

Donald J. Johnson
Architecture 490
Montana State College
Bozeman, Montana
March 15, 1963

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INTRODUCTION

Religious architecture, to me, is one of the most interesting and challenging branches of the profession. Historically, the most outstanding examples of the various periods of architecture are religious buildings. The pyramids and temples of Egypt, the Parthenon, Pantheon, Santa Sophia, Romanesque and Gothic Cathedrals all stand out as milestones in architectural history. The fascinating traditions and symbolism of religions present opportunities for design not found in other architectural work.

This paper is the first phase of the required undergraduate thesis in architecture. It is not intended to be experimental, but rather, it is a collection of known information relative to the project. The paper covers the following points of investigation:

1. Conditions creating a need for the particular project.
2. Local conditions (geographical, economic, social, historic, climatic, etc.)
3. Site conditions (orientation, adjacent environment, topography, vegetation and other natural features, zoning regulations, soil analysis, prevailing winds, immediate and distant views, availability of utilities, traffic patterns etc.)
4. Function of the building--the activities and the people it is to house (the numbers and types of people and their circulation, the various activities to take place within the building, the space and equipment needed for them, circulation of items other than people, possible organization of these activities with respect to division of space, etc.)

5. Aesthetic considerations (the building as a part of the total environment, the desired mood or character to be expressed).
6. Economic considerations (construction costs, site and site improvement costs, operation and maintenance costs, rental return, amortization, etc.)

PART I - NEED

In 1959, First Lutheran of Bozeman, completed a new church building located on the corner of Curtis and Black Street. When contemplating this building program, the idea of choosing a site near the Montana State College campus was presented. The proposal was rejected in favor of the Curtis and Black location. The seating capacity of the church is about 300, with an overflow of 50 seats in the small chapel. The present facilities are adequate for the 405 baptized and 241 communicant members. Membership at First Lutheran has doubled in the past ten years. If this trend continues, another building program, within a short time, is inevitable.

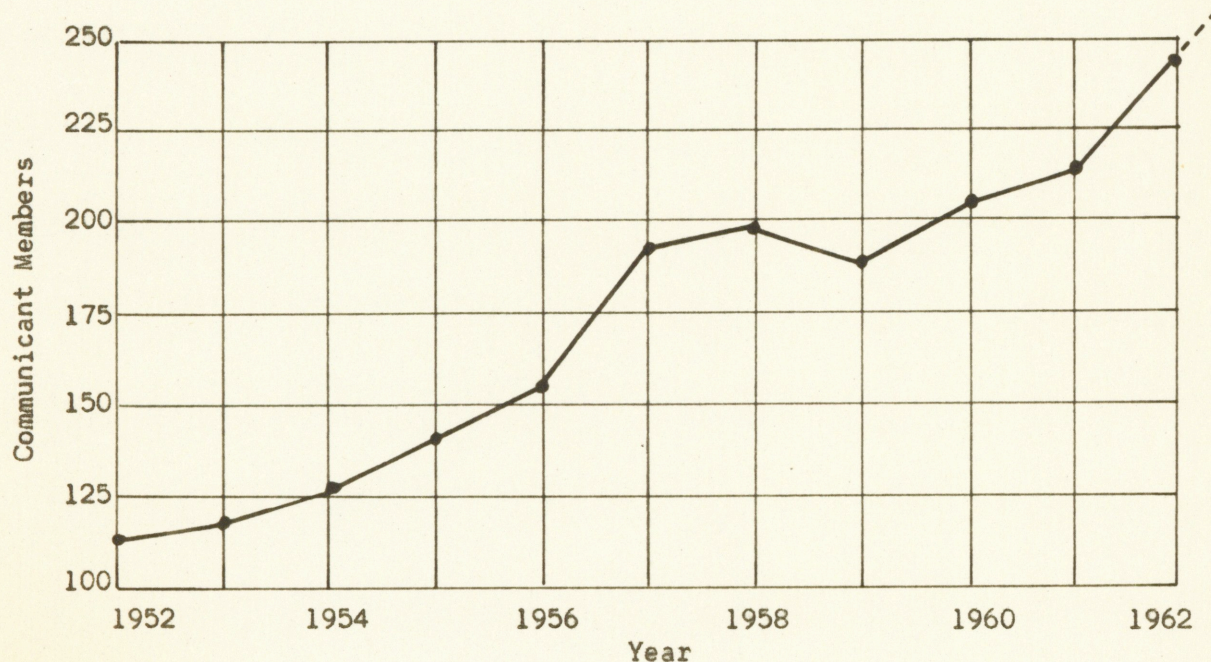
In an interview with Rev. O. F. Wagner, Pastor of First Lutheran, we agreed that a near campus site would be the logical step in future building. In doing so, the growth pressure would be removed from First Lutheran by the number of students and faculty forming the new congregation. A much needed, full-time campus pastor would serve this congregation as well as work with students in various campus activities. At present, Pastor Wagner is serving a small church at Three Forks, Montana, in addition to his regular duties in the Bozeman parish. He finds it difficult to devote as much time as he would like to college work.

Many large colleges and universities have churches of the various faiths adjacent to their campus. The advantages of this type of church are many. For example, some of the students do not have transportation to the downtown areas where the churches

are located. The "collegiate" atmosphere in such a church would attract students who might otherwise neglect attending. In Bozeman, students must walk over a mile to most of the churches. Cold weather prevents many students from walking during the winter months. In a few years, the need for expanding the First Lutheran Parish will be here. With the new "University Lutheran," this need could be eliminated and an opportunity for the church's better serving the people at Montana State College could be seized. The following graphs show the growth patterns of First Lutheran and Montana State College:

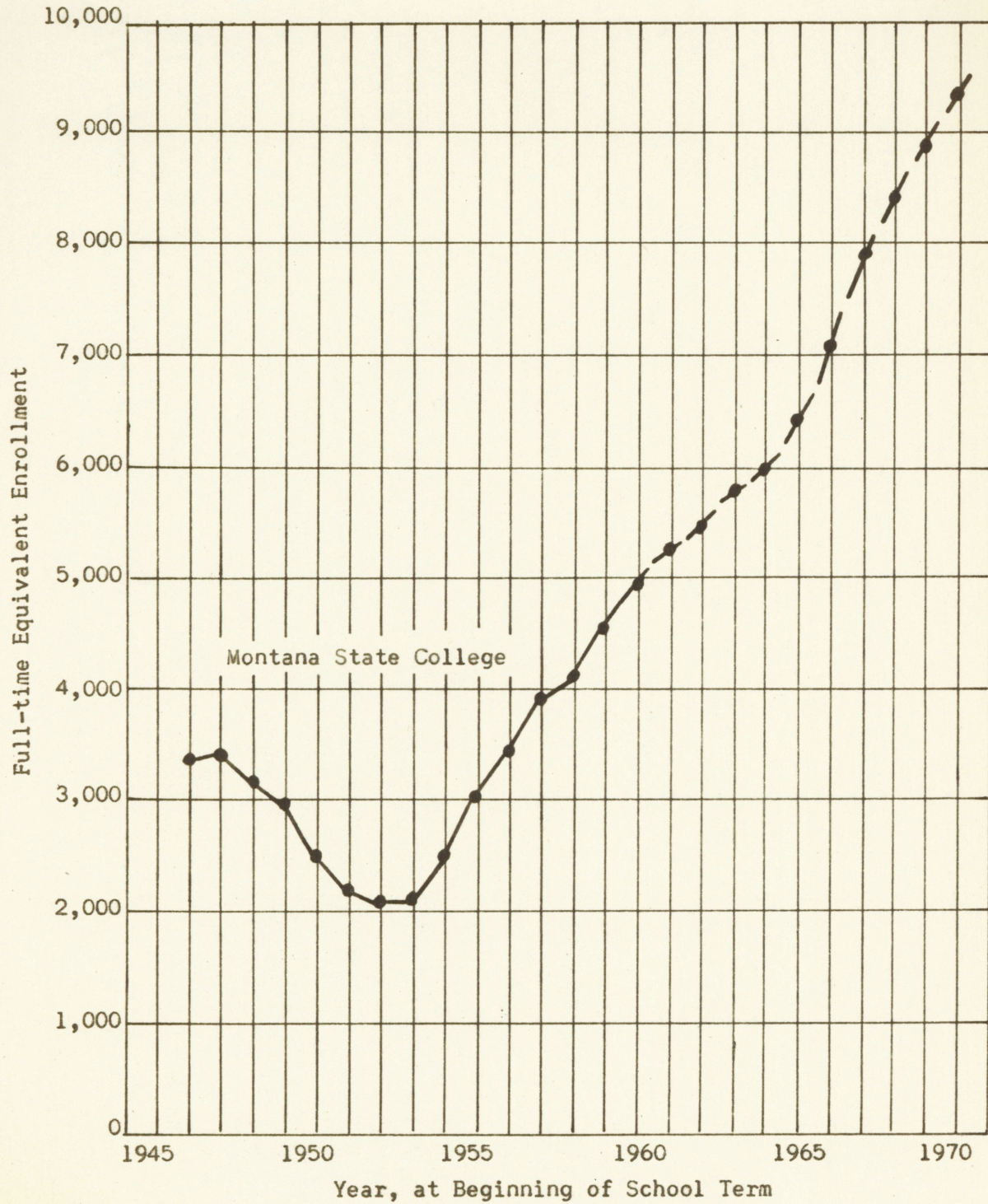
DECADE OF GROWTH
FIRST LUTHERAN CHURCH
1952-1962

Source: Parish Report, First Lutheran Church, 1962.



ACTUAL AND PREDICTED ENROLLMENT
1945 to 1970

Source: Wessel Thesis, University of Washington, 1959



PART II - LOCAL CONDITIONS

HISTORIC

The first Lutheran service held in Bozeman was on April 29, 1885. By 1886, the congregation of 50 people met in a house which rented for five dollars per month. The old Seventh Day Adventist Church on South Black Street was used for worship from 1915 to 1936. In 1929, the congregation formally organized and affiliated themselves with the Lutheran Church, Missouri Synod. In 1936, First Lutheran erected a small stone church on the corner of Curtis Avenue and Black Street. This beautiful little church now serves as a chapel for the new "A frame" structure designed by O. Berg, Jr. The present facilities include seating for 300 with overflow for 50, choir space, office and study, kitchen and Sunday school in basement, adjacent parsonage and parking lot.

SOCIAL-ECONOMIC

A slight feeling of dissension exists between the Bozeman citizenry and the college personnel. College professors, by nature of their work, are naturally good leaders and consequently assume key positions as church officers. Many townspeople who might otherwise fill these positions are sometimes excluded. The formation of a new campus church, comprised mainly of college people, would improve this situation. Racial problems in the congregation are nonexistent. The economic Status of the people range from poor to rich with the majority in the middle income

bracket. First Lutheran is financially sound, however, the 1959 building project is still being paid for.

If a campus church were to be built, district funds would be available for it. With the support of the local congregation, and loans from the Lutheran Church Extension Fund, the building project seems to be entirely possible. (See part 6 for more detailed information.)

CLIMATIC AND GEOGRAPHICAL¹

Bozeman is situated in the Gallatin River Valley. Clean dry air coupled with a comparatively large amount of sunshine give Bozeman a pleasant, cheerful atmosphere. The amount of wind received here is low compared to the rest of Montana. Mountain vistas are visible in almost any direction from the city. Main routes of travel to Bozeman include the Northern Pacific Railway and U. S. Interstate 94.

Climate and Geographic Data

Average mean temperature 42.8°

Average annual precipitation 20 inches

	<u>Minimum Temperature</u>	<u>Maximum Temperature</u>
Spring:	26	80
Summer:	39	98
Fall:	34	76
Winter:	-40	50

Population - 15,450 (Greater Bozeman)
Altitude - 4,792 feet above sea level
Latitude - 45° 40'
Longitude - 111° 03'

¹Information obtained from Bozeman Chamber of Commerce.

PART III - THE SITE

Site requirements for a church of this type are essentially the same for that of other churches except for the orientation. Obviously, a site near the college and preferably near the dormitories is desirable. City ordinances demand a great deal of off-street parking and this means that a fairly large site is necessary. Aesthetically, the site must have reasonably pleasant surroundings. The neighborhood environment is also important. In choosing the site, I found that there were no vacant lots large enough to satisfy the requirements. This made it necessary to carefully weigh the possibilities of location against the cost of buying and removing existing buildings.

ORIENTATION

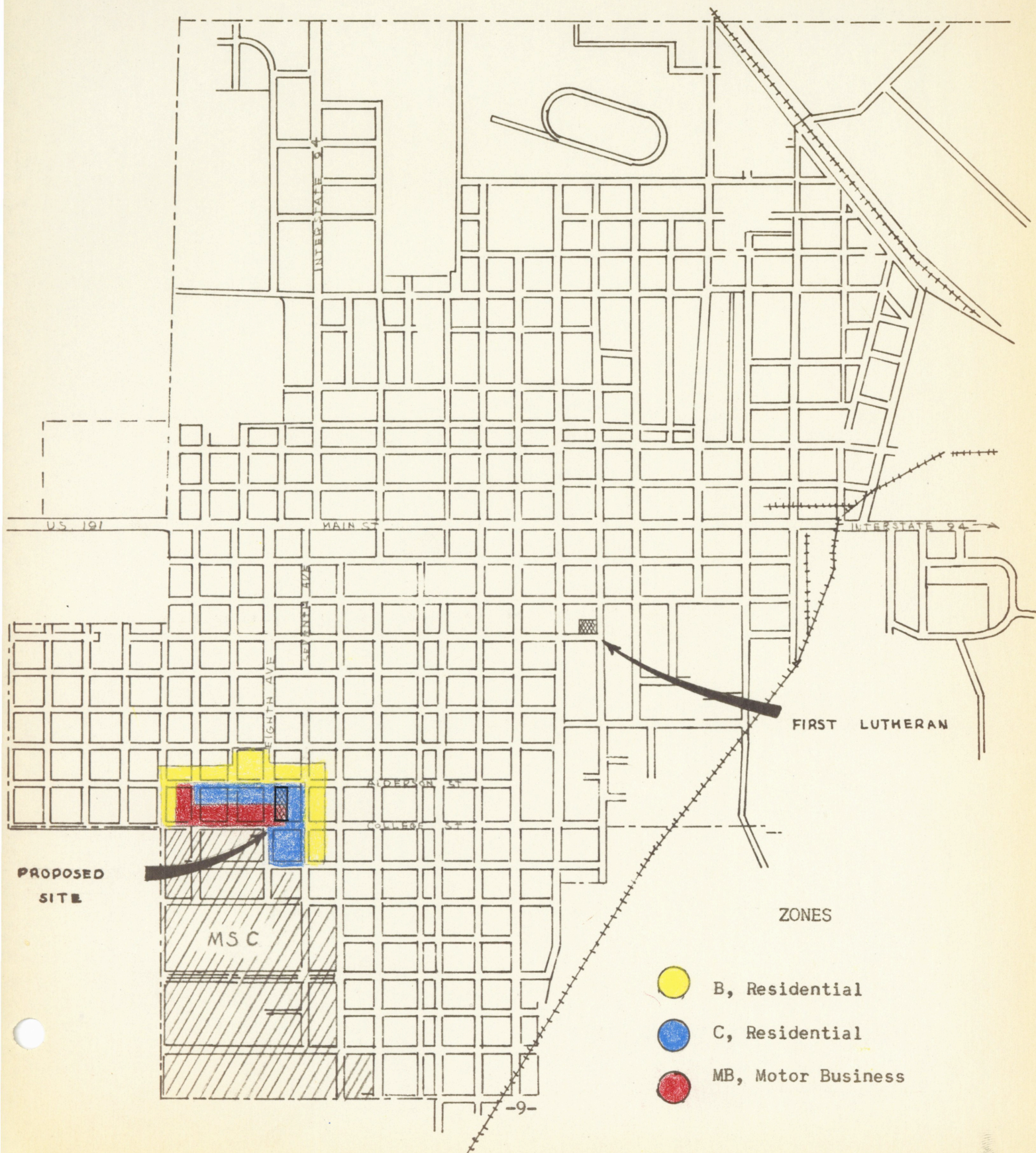
My final choice for the site was the west half of the block bordered by Eighth Street, Alderson Avenue, Seventh Street, and College Avenue. (See map #1) Eighth street, which is the main access street to the college, is a double street with a grass strip down the middle. When approaching the college on Eighth Street, the site lies to the left just before entering the campus. A church in such a position would be seen by everyone on campus. This site is within three blocks walking distance from any dormitory, and within five to six blocks from most married housing units.

ADJACENT ENVIRONMENT

The site lies in a fairly old, but well-kept residential



MAP NO. 1
CITY OF BOZEMAN



area. Lewis and Clark Dormitories are across the intersection to the southwest. Irving Elementary school is across the intersection to the northwest. There is a small motel across the alley. All other buildings surrounding the site are residences. Moderate growth of shrubs and shade trees are found in the yards of adjacent residences. All streets in the area are paved and sidewalks are in place. (See map #2)

TOPOGRAPHY

The site slopes to the northeast at about six feet per 100. No prominent topographical irregularities exist on the site.

NATURAL AND MAN-MADE FEATURES

Two small houses with garages and a Texaco service station now exist on the site. There are a few trees and shrubs near the houses. The vacant lots are bare except for wild grass and weeds.

SOIL ANALYSIS

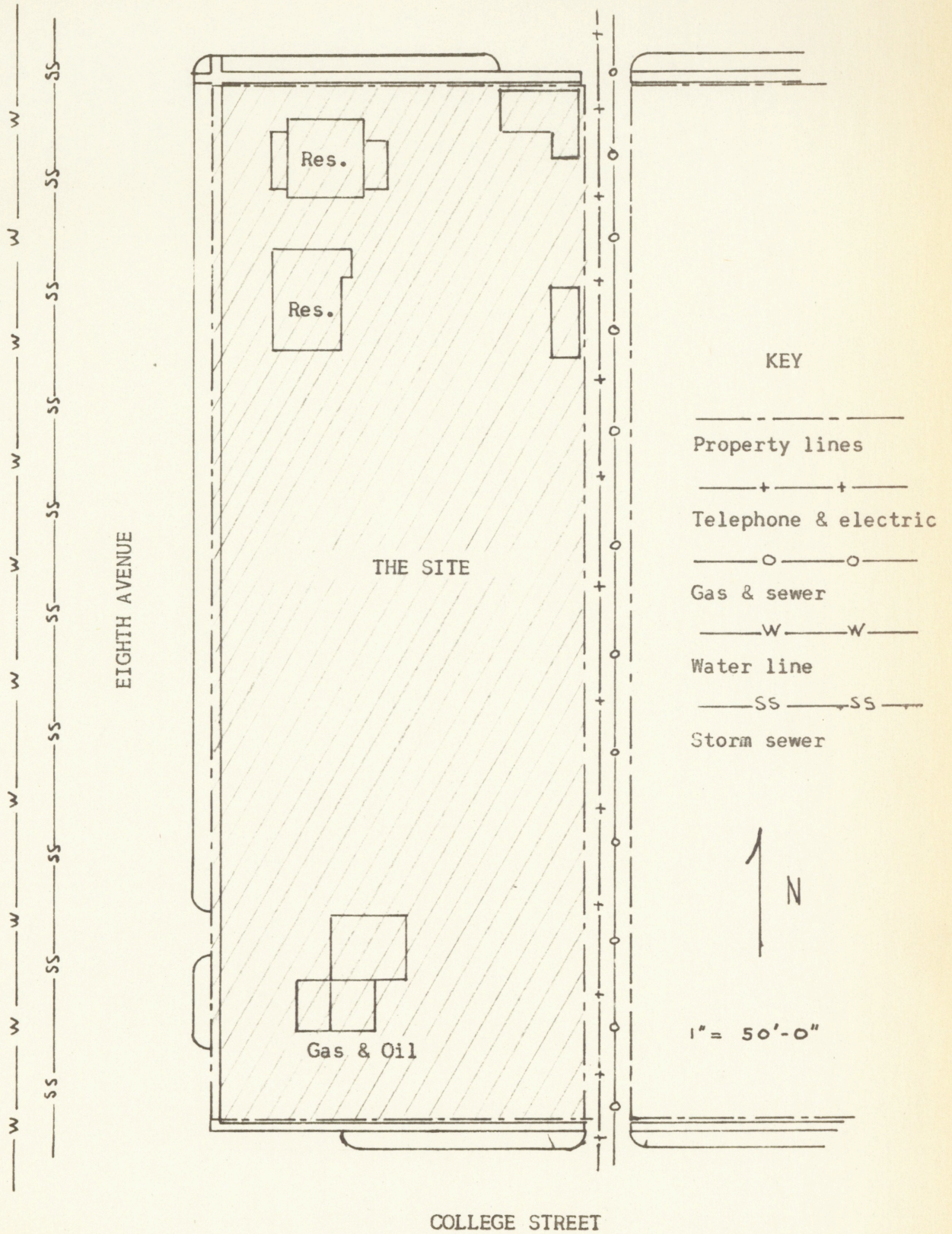
Because the site was selected in January, soil testing is impossible until spring. Soil testing, for the purposes of determining load capacities would be done by a special firm after preliminary design has been completed.

PREVAILING WINDS

Prevailing winds for Bozeman are west by northwest. Winds in the early morning hours are from the east. This east wind changes to west by northwest with the rising sun.

MAP NO. 2

ALDERSON STREET



Source: City of Bozeman

VIEWS

Immediate views include residences and buildings mentioned in "Adjacent Environment" above. The only distant view is the Bridger Mountains to the northeast. (See photo p. 13)

UTILITIES

Available utilities include water, sewer, gas, electricity, telephone, television cable, and storm sewer. (See map #2 for locations.)

ZONING REGULATIONS

The site lies in two city zones. (See map #1) The north half is in Zone C, a Residence Zone; the south half is in Zone MB, the Motor Business Zone. In such cases, zoning regulations of the most restricted zone hold true for the whole site. Therefore, Zone C regulations must be followed. The zoning regulations will allow for churches in Zone C. The following zoning regulations and restrictions pertain to this project:²

Minimum property frontage - 50 feet

Minimum distance between main
buildings and/or wings - 33 feet

Minimum front yard - 35 feet

Minimum side yard - 25 feet

Minimum rear yard - 30 feet

Required yards for
accessory buildings - 10 feet

²Bozeman City Ordinance No. 818.



Retaining walls, hedges, and natural growth, fences and structures used ornamentally or for gardening or private recreation purposes are permitted in yards and courts, provided that they are not higher than one-half the distance from such yard encroachment to any adjoining building occupied for residential purposes on the adjacent property or properties, or to the yard line of the adjacent property or properties, whichever is less, to a maximum of eight feet (8').

Vacant lots shall be used for gardening, tennis courts, playground or other recreational facilities only, and shall be kept free of all rubbish and/or garbage at all times; provided, that other uses of vacant lots may be permitted by written consent of the Director of Public Safety with the continuing consent of the owners of 80% of the property within 300 ft. of the vacant lot or lots.

Trash shall be provided for in a clean and sanitary condition in containers totally screened in an attractive manner, or buried so as to be out of sight of adjacent properties.

Trailers or boats may be parked on private property provided they are totally screened in an attractive manner so as to be out of sight of adjacent properties, or kept under cover in a building that conforms to the residential architecture.

Off-street parking spaces required:

Off-street parking spaces shall be provided in connection with the erection of increase by units or dimension of any building or structure in the following amounts:

Churches, senior high schools, auditoriums, theatres, and places of public assembly and/or entertainments: 1/each 4 seats or 1/each 30 sq. ft. of floor area, whichever is the greater.

Location of off-street parking areas:

No more than 25% of the parking spaces required may be located within any required side yard. No off-street parking areas are to be located in any required front yard and/or corner lot street side yard. Off-street parking spaces required by this ordinance shall be located on the same lot or premises as the use to be served by such parking areas, excepting those in the "MB" or "CB" zone, or those for apartment use which must be provided within 1,000 feet of the use to be served.

Landscape areas:

All yards or portions thereof required to be in landscape shall contain a minimum of one (1) living deciduous tree for each 400 sq. ft. or fraction thereof of yard required to be in landscape. Such trees must be continually maintained at a height of eight (8) feet or greater. All required landscape areas must be continually maintained in an attractive and clean condition.

PART IV - FUNCTION OF THE BUILDING

ACTIVITIES

The first step in planning a building is studying the activities that will be taking place in it. The five, basic congregational activities are:³

1. Worship
2. Education
3. Fellowship
4. Recreation
5. Administration

These activities will be further subdivided when specific requirements are developed.

PEOPLE

It is the nature of the Christian religion to exclude no one from learning its beliefs and becoming followers of the faith. In fact, gaining new followers is one of the main goals of the church. Theoretically, the church spans all races, social orders, and age groups; and it provides means of propagating Christian beliefs to all people. Although the church excludes no one, there is a natural tendency for people with like interests, background, etc. to group together. The Lutheran Church-Missouri Synod, the synod to which First Lutheran, Bozeman, is affiliated, was originated in this country by German immigrants. Consequently, most of the members of the local congregation have German backgrounds. Socially, the Lutheran Church is considered to be made up mainly of people from the middle class.

³Architectural Guide for Church and School Buildings, p. 8.

Specifically, for the campus church in Bozeman, I can imagine three main groups of people attending. These are college students, college faculty and interested townspeople. The faculty and townspeople would form a core of regular church attenders. The students, however, would be quite irregular in attendance because of vacations and the student turnover each year. This fluctuation of student attendance will pose a significant problem in the design of the worship space.

From present figures, I would estimate that in a campus church, half the congregation would be students, one fourth faculty, and one fourth townspeople. A seating capacity number for the church would be determined by future growth estimates and funds available for the project. Based on present growth figures for both First Lutheran and Montana State College, a 300 seat church would be a reasonable size.

SPACE REQUIREMENTS

Much research has already been done on space requirements for religious buildings. The following is a space requirement list prepared by P. M. Torraca, a member of the architecture faculty, University of Florida:

Church Proper

<u>Elements</u>	<u>Square Feet</u>
Narthex	1-1.5 sq. ft. per person
Nave (called Sanctuary, also)	7-9 sq. ft. per person (Variable depending on specific conditions)
Chancel	800-1000 sq. ft.
Baptistry (for churches practicing immersion)	Variable

Robing Room	250 sq. ft.
Vestry or Study	200-250 sq. ft.
Choir	5 sq. ft. per person (minimum)
Organ	100 sq. ft. (minimum)
Reposing Chapel	100-150 sq. ft.
Chapel	10-12 sq. ft. per person
Bell Tower - no set location	10-12 sq. ft. per person

Social & Educational

Entrance Lobby	1.5 sq. ft. per person
Offices	150 sq. ft. each
Lounge	6-8 sq. ft. per person
Coats	.6 sq. ft. per coat
Toilets	Variable
Social Hall	For dining - 9-12 sq. ft. per person served simultaneously For seating - 7-12 sq. ft. per person
Stage	800-1000 sq. ft. including wings
Kitchen	1.5-2.5 sq. ft. per person served
Dressing Rooms and Storage	Variable
Library	25 sq. ft. per person plus shelving space
Sunday School	15-25 sq. ft. per person
Size Range of Classroom	300-500 sq. ft., depending on age groups

The above space requirement list will be used later as a guide in preparing the building program. Before the building program can be set up, the following activity-space breakdown must be investigated. This breakdown gives specific requirements for "University Lutheran."

Worship

Chancel

The chancel is usually located in the front part of the church, or always in full view of the congregation. It is divided into two areas. The front area is called the choir (even if not used for seating a choir). The rear area is called the sanctuary, which is the space for placing the altar. Some

type of demarcation line should be devised to divide the chancel from the nave. Arches, steps, or other devices have been used to do this. An altar step, or pendella, must be placed in the sanctuary part of the chancel to give the altar the highest level in the chancel. A communion rail, behind which communicants kneel, must be placed somewhere in the choir part of the chancel or may be used to form a demarcation line between the nave and chancel. Because the altar is used as a table for the communion ceremony, a height of 39 inches is convenient. Stone is the preferable material for the altar. A satisfactory height for the communion rail is 24 to 27 inches. Kneeling pads are desirable for the rail. Other items found in the chancel include altar paraments, cross, Eucharistic lights, missal stand, credence, candelabra, flower stands, clergy seats, and flags. A great deal of symbolism is used in the design of all chancel furnishings. (see Aesthetic Considerations) Special attention should be given to the harmony and unity of both chancel and chancel furnishings.

Nave

The largest area in the worship section of the church is the nave. The congregation is seated on pews in the nave facing the chancel. The pulpit and lectern are located in the front of the nave. A baptismal font is usually located in the front of the nave, although it may be placed elsewhere if the design so dictates. Overflow seating, or an extension of the nave, should be considered because of the unpredictable attendance of

a campus church. Provisions should be made for processions, funerals, and festival pageants, as to the circulation of these ceremonies. Acoustical properties in the nave should be suited to public speaking as well as musical sounds.

Narthex

The entry space or narthex is not an essential part of the worship section. It is merely a convenience. In cold climates, such as we have, it serves as a barrier to cold air which would otherwise rush in on those already seated. Rest rooms should be located inconspicuously near the narthex. Coat hanging space and ushers' storage cabinets are also located here. Other items found in the narthex include guest book, tract rack, bulletin board, and ushers' intercom station.

Choir and organ

In modern churches, there has been a trend toward placing the choir in a balcony to the rear of the nave. By doing this, the congregation cannot see the singers and the director may direct more vigorously. Also, the people are not distracted by seeing the choir during the service. A space for choir rehearsal, prior to the service, is desirable. This space should be acoustically separate from the nave so as not to distract early worshipers there. The organ is usually placed near the choir so that the organist can easily see the director. A clear view of the chancel is also mandatory for the organist. Other requirements include: space for the organ amplifier (if electric), storage for choir robes, choir music, and intercom.

Sacristy or Vestry

The purpose of this space is to give the pastor privacy for making last minute preparations and for putting on the vestments. From here, he makes his entry into the chancel. A prayer desk, closet for vestments, lavatory with mirror, water closet, chairs and pastor's intercom station are items found in the vestry.

Working Sacristy

The working sacristy is a small room for storing some of the items used in the worship service. Cabinets for storing altar paraments, communion vessels, flower containers, funeral pall, candles, candle lighter, candle snuffer, wine and wafers, are required. A sink and work counter are also desirable.

Chapel

For a campus church, the desirability of a small chapel is evident. It is used for small weddings, baptisms, and devotional periods for the various church clubs and organizations. In the chapel, individual chairs, rather than pews, are desirable. The atmosphere, here should be intimate, warm, and private. The use of the present campus chapel may eliminate the need for this space.

Education

Parish education for Lutheran churches includes: Sunday school, Bible classes, vacation Bible school, Saturday school, Released-time classes and confirmation classes for both children and adults. A formal training program is usually followed. The

Sunday school and Bible class staff is headed by a superintendent and assisted by a secretary. The various age groups are departmentalized to facilitate better control. The number of departments depends on the total number of students enrolled. The facilities needed for parish education include:

- a. space for each department
- b. space for each class of each department
- c. storage for teaching aids and supplies
- d. receiving and distribution of lesson materials
- e. office for superintendent and secretary
- f. coat hanging space
- g. furniture and furnishings
- h. chalkboard and tackboard in each space
- i. library
- j. intercom system
- k. visual-aids equipment and storage

The following space requirement chart was prepared by the Lutheran Church-Missouri Synod as a guide for Christian education planning:⁴

⁴Architectural Guide for Church and School Buildings, p. 21.

Suggested Schedule of Space Requirements

<u>Group</u>	<u>Age</u>	<u>Recommended floor space per pupil in attendance</u>
Nursery Class	Up to 3 years	20-30 sq. ft. (not more than 10 children in one room or per teacher).
Kindergarten	4-5 years	18-25 sq. ft. (not more than 10-15 pupils in room or per teacher).
Primary	6-8 years	Workrooms for interest groups or classes, one of which will be large enough to seat all children, 7 to 8 sq. ft. for each. Classroom and workroom, 15 to 20 sq. ft. for each attendant.
Junior	9-11 years	6-8 sq. ft. in assembly room. Classroom, 10-15 sq. ft.
Young People's Division Inter- mediate or Junior High	12-14 years	8 sq. ft. in assembly room. Classroom, 10-12 sq. ft.
Senior	15-17 years	6-8 sq. ft. in assembly; 8-10 sq. ft. in classroom.
Young People Adult Division	18-22 years 23 years and above	Same as seniors. 6-10 sq. ft. for classrooms.

In connection with the above chart, the following survey form is helpful in estimating the desired square foot allowances for each space:⁵

⁵Architectural Guide for Church and School Buildings, p. 25.

Membership Survey Form

Christian Education				
Age Group	Members Enrolled	Average Attendance	Possible Enrollment	Attendance Anticipated 10 years hence
Nursery to 3 years				
Kindergarten, 4-5 years				
Primary, 6-8 years				
Junior, 9-11 years				
Junior High, 12-14 years				
Senior High, 15-17 years				
Post High School, 18-22 years				
Yound Adults, 23-34 years				
Middle Age, 35-64 years				
Senior Adults, 65 and over				
Family Groups				
Special Groups				

Fellowship

Fellowship can be obtained only by doing things together. A parish hall for a campus church is certainly something to be desired. It is a meeting place for the various clubs and organizations of the church. It provides a space for banquets, recreation, scout meetings or any church activity which is not a proper activity for the worship section of the church.

Multipurpose Room

This room is probably one of the most difficult design problems of the church. It usually doubles as an education classroom with dividers separating the various classes. It must be used as a dining room for various groups, both large and small. Recreation, movies, plays and group meetings also occur here.

Gamma Delta Chapter Room

Gamma Delta is an international organization of Lutheran (Missouri Synod) college students. A small room is desirable for the purpose of holding chapter meetings, pledging and initiation ceremonies. It is not desirable that this room be used by any other organization.

Entrance Lobby

A transition space is needed between the parish hall and the church proper. Coat racks and toilets should be located near the entrance lobby.

Lounge

If funds permit, a parish lounge is a space to consider. It may double as a crying room and serve as a space for those waiting for someone, or some activity to begin. It is also a good place for informal executive or board meetings. Soft chairs, coffee tables, ash trays, and perhaps a fireplace are appropriate.

Kitchen

Kitchen facilities for the parish hall must be adequate for

serving the full capacity of the hall. Ample storage for dishes and food must be provided. If the parish hall is very large, a service entrance should be provided.

Storage

Space for storage in the parish hall must not be underestimated. Foldable tables and chairs, recreational equipment, lecterns, visual aid equipment, materials for the various organizations all need storage space.

The following questionnaire is helpful in determining the size of parish hall needed and the storage requirement:⁶

This questionnaire, when completed by each organization, will help determine the future needs for fellowship and recreation. The information will greatly help in planning for recreational and devotional activities as well as storage and the areas needed by each group for various activities.

NAME OF ORGANIZATION.....
President.....Secretary.....
How often does this group meet?.....
On what date are meetings held?.....
At what hour are meetings held?.....
Total number of members in group.....
Approximate number of members at each meeting.....
What was approximate total membership five years ago?.....
What would you like your total membership to be in five years?...
Do you have a devotion period? (check one): Yes.....No.....
Do you have a business period? (check one): Yes.....No.....
Do you have a recreation period? (check one): Yes.....No.....
Does your group show movies? (check one): Yes.....No.....
Does your group show slides? Never.....Sometimes.....
Often.....
Does your group play games? Never.....Sometimes.....Often.....
Do you need facilities for refreshments? Yes.....No.....
Stove.....Refrigerator.....Tables.....
Dishes.....Silverware.....

⁶Architectural Guide for Church and School Buildings, p. 26.

Do you need a piano? Yes.....No.....
 Do you need storage space for group property? Yes.....No.....
 Do you have outdoor activities? Never.....Sometimes.....Often.....
 Give details of outdoor activities.....

 Does your group sponsor congregational activities such as programs,
 dinners, etc.? Never.....Sometimes.....Often.....
 Does your group have joint meetings with other groups? Yes...No...
 If answer is yes, please state approximate total number attending

 Comments.....

Recreation

Fellowship and recreation are almost inseparable terms.
 Fellowship is rarely found without recreation and vice versa.
 Recreational space requirements are covered in the above section.
 The thing to consider, here, is to what extent, and what type of
 recreational facilities are appropriate. For a campus church,
 games which appeal to the intellect such as cards, chess, or
 scrabble, are certainly called for. Other games such as shuffle
 board and table tennis also make for good recreation. Basketball
 or any sport for which the college provides facilities would be
 considered unnecessary.

Administration

Contrary to popular belief, the pastor is not the administrator
 of the congregation. Lutheran congregations elect church officials
 whose job is administration. When important decisions are to be
 made, the congregation must vote on it. Generally, the adminis-
 tration or office section of the church is located near the entrance
 lobby for convenience and better control. This part of the church

is the most used and therefore sturdier materials and furnishings are in order, here.

Reception and Secretarial

In a church of this size, a full-time secretary seems a little extravagant. If a part-time secretary is employed she would probably have a small desk in the workroom.

Workroom

This room is used for duplicating bulletins, mailing, and general secretarial duties. Cabinets for storage of office supplies, counter space, sink table, chairs and space for operating office machines are requirements for this space.

Vault

A small fireproof vault for the storage of valuable documents, church archives and money, is usually placed in the pastor's study or the workroom.

Pastor's Office or Study

This space is used by the pastor as his private office. Here, he prepares sermons and tends to the general duties of a pastor. The furnishings in this room are probably left up to the preference of the pastor. It usually contains the pastor's desk, chairs, files, and his private library. An indirect connection to the entrance lobby is desirable. A small, private rest-room in the administration section is worth considering. It would save time, however, the budget may determine whether or not to include it.

Library

A small library with card catalogue and check-out system would be an asset to a campus church. Books on religion and related subjects would be helpful to students in preparing academic papers or topic speeches for the church organizations. The library is also an "extra" and its existence will be decided by the budget of the building program.

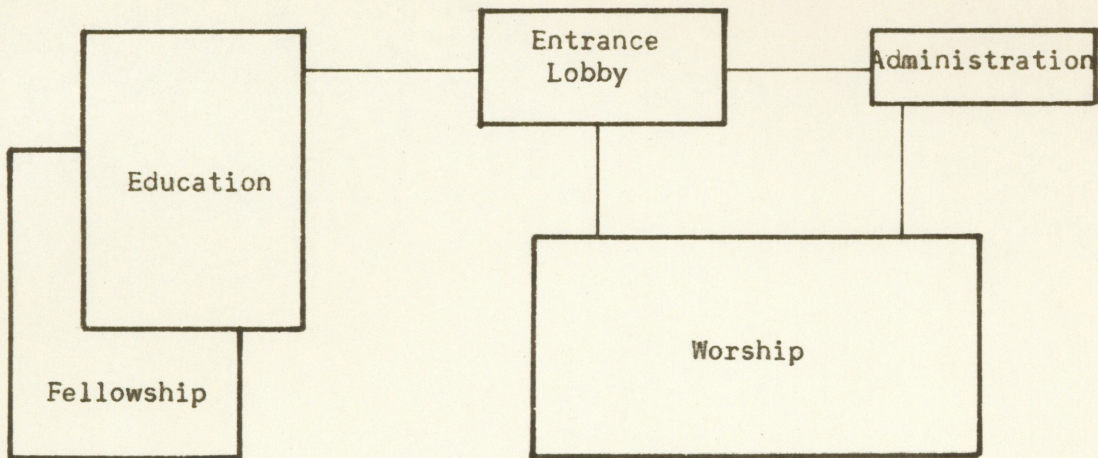
Utilities

A space must be set aside for housing the mechanical equipment. A good heating system is mandatory, but air conditioning for Bozeman's climate is questionable. Items in this space include a heating system, hot water heater, ventilating fans and equipment and electrical boxes. A janitor's sink and equipment may or may not be housed in the same space.

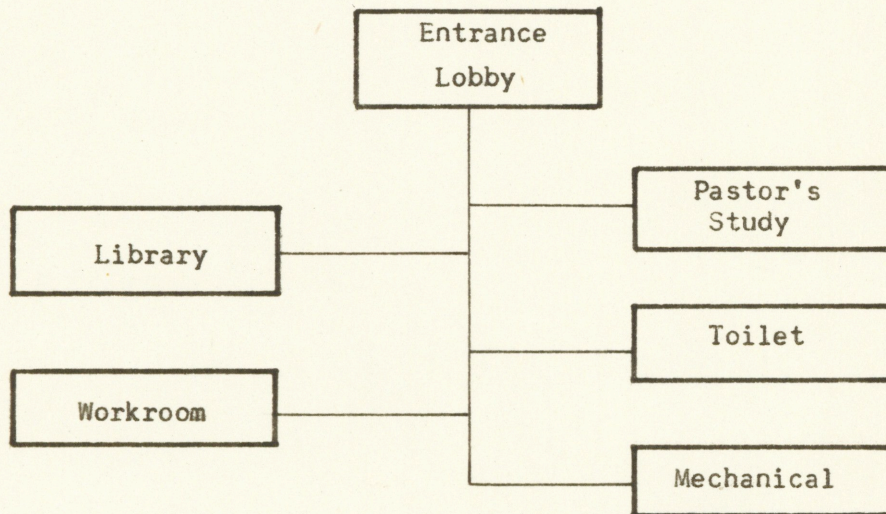
CIRCULATION

The following diagrams show relationships between the required spaces. The boxes represent required spaces, and lines connecting the boxes indicate passage between spaces. The first diagram shows relationships between general activity spaces, worship, fellowship, education, and administration. The remaining diagrams explain each separate activity space.

Chart No. 1

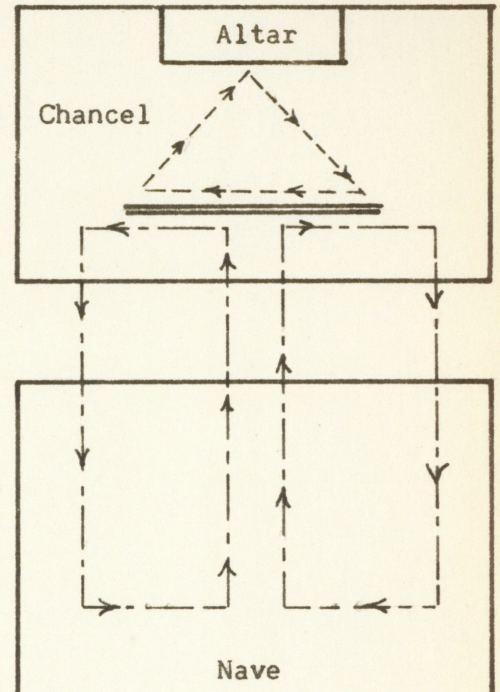
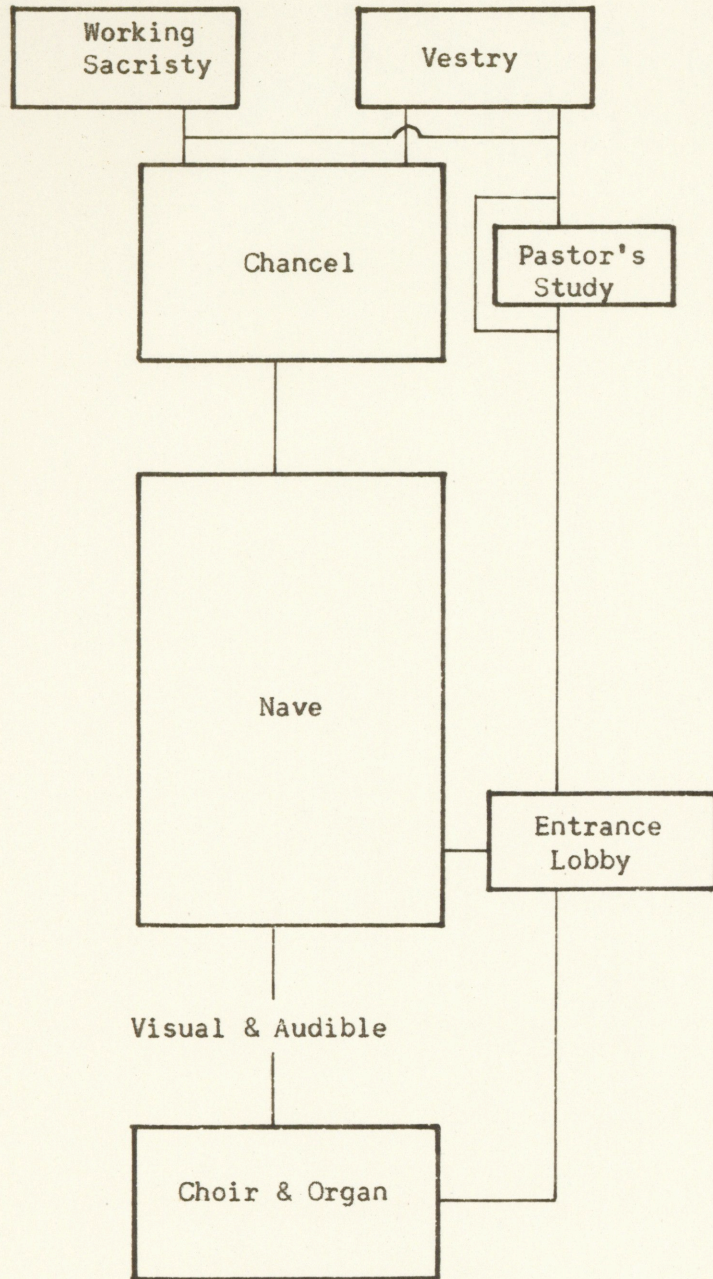


GENERAL ACTIVITIES



ADMINISTRATION

Chart No. 2



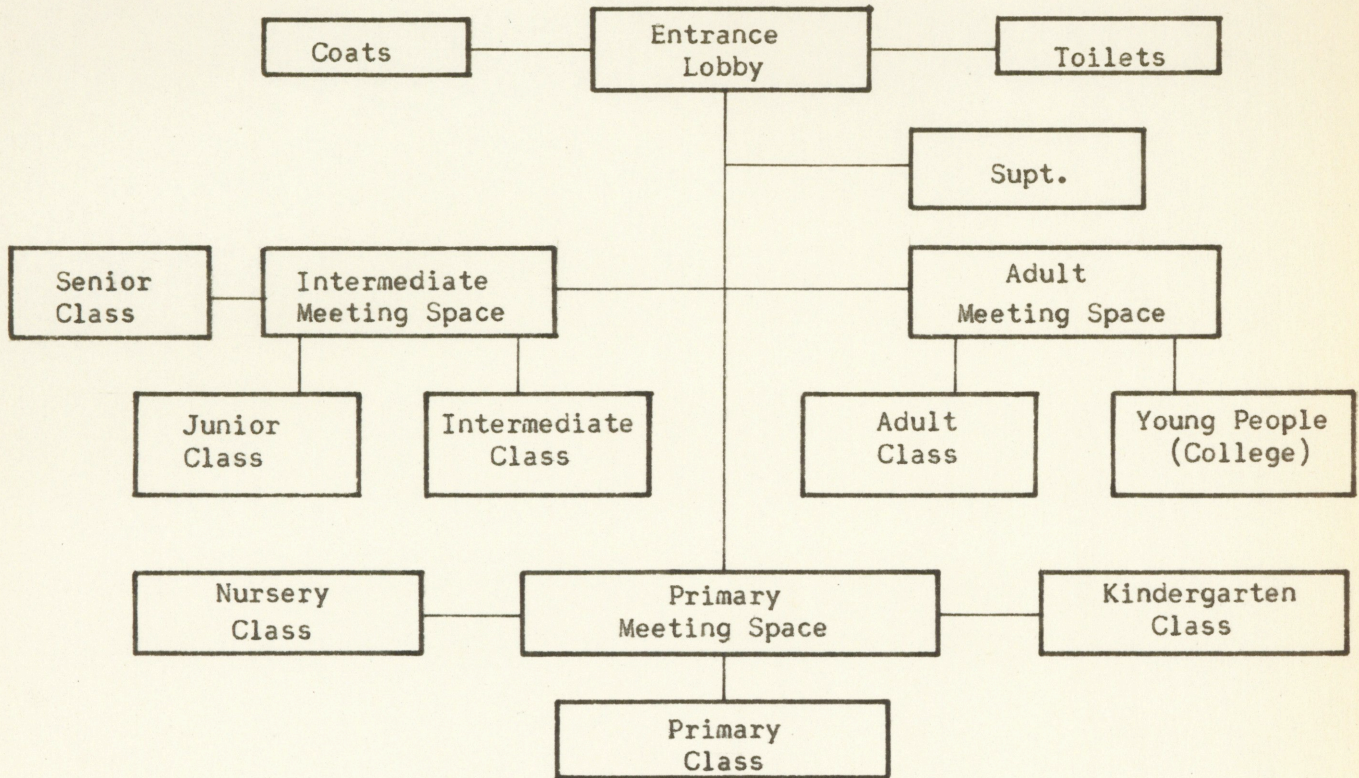
↑
Communion Circulation

Pastor's Circulation

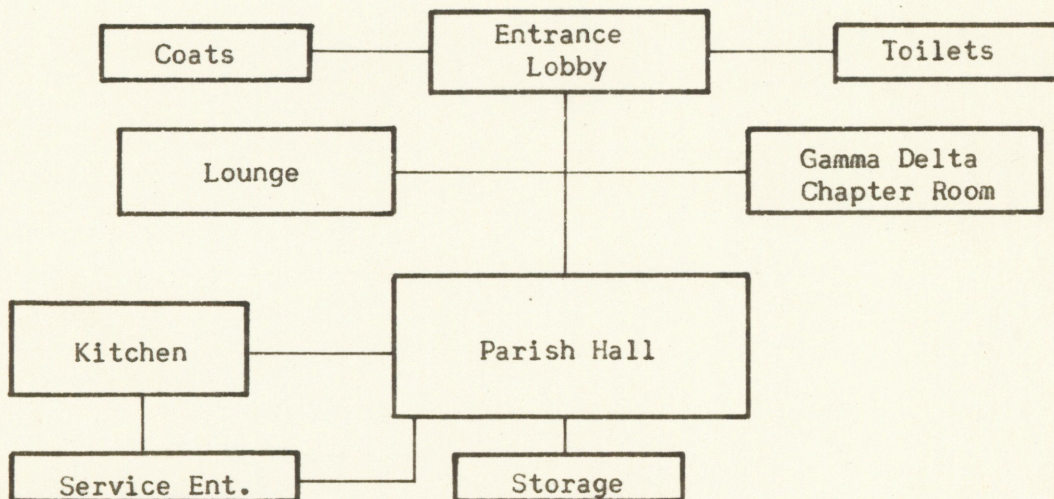
Communicant's Circulation

WORSHIP

Chart No. 3



EDUCATION



FELLOWSHIP

PART V - AESTHETIC CONSIDERATIONS

Aesthetic considerations at this point in development are valid only in the most general of concepts. I cannot tell what the building will look like or even what basic form it will take. If I could, I would be violating a basic architectural rule—"form follows function."

I am told that a church must look like a church, and will agree that it would be a failure if a sign were necessary to identify it. What, then, does a church look like? One person will say that it should resemble a Gothic cathedral, another would fashion it after the old Colonial church, still another prefers a concrete shell of some unidentifiable shape. These examples are what people see in their mind's eye when the word "church" is mentioned. They further argue that these examples were highly successful and wouldn't it be nice if we had such a building. The fallacy here is obvious. If previous examples of architecture are successful, they are so because they did a good job of utilizing materials, were useful for their intended purpose, and expressed the philosophy and spirit of their particular time and locality. In modern society, churches have many added functions such as clubs and organizations, banquets and educational facilities. To house all these under a Gothic structure is folly. I am not in favor of abandoning the past but rather using the good and bad examples of the past as lessons in future planning.

We may agree that a church should look like a church, but should a Lutheran church look like a Roman Catholic or Unitarian church? This is where the subtlety and fineness of design detail enters the picture. Although, many functions of the churches mentioned above are similar, their traditions and doctrines are very different. The Catholic church has the oldest tradition of the three and has an air of authority and strictness about it. The Lutherans boast of the reformation, although show much more restraint in throwing off tradition than do most protestant denominations. The Unitarian church seems to neglect tradition and holds to the modern philosophies. These characteristics of church background give clues to the designer for determining the precise mode of feeling he must create. The problem which arises for the designer of the older organized churches is: How can he retain the old traditions and express the philosophies of the campus and the Bozeman area. Can all these things be incorporated in a pleasing unity? This is a point upon which the aesthetic success or failure of the "University Lutheran Church" depends. An important item in bringing tradition into new form is symbolism. This can be done by abstracting the traditional symbols into new forms. Some general knowledge of Lutheran background must be at the architect's disposal before even preliminary design of the church is begun. He must also acquaint himself with the symbolism used in the church and religious architecture.

Lutheran Customs and Symbolism

Lutheranism, named after the German reformer, Martin Luther, dates back to the sixteenth century. In initiating the Reformation, Luther's prime purpose was not to start a new religious order, but rather to reform some aspects of the Roman Catholic Church which, he felt, had become corrupt. Although, a definite break occurred between Lutheranism and the Roman Church, Lutherans retained many of the ancient customs of the Church such as liturgies and episcopal forms of government. In contrast, the Calvinist (Reformed) and "free" churches, formed after the Reformation, abandoned virtually all Roman Catholic traditions.

When Lutherans came to America from Europe, each ethnic group formed its own synod or branch of the church. The Missouri Synod is the German branch. Since then, many of the synods have merged, however, the Missouri Synod still remains unaligned.

Almost all Lutheran congregations follow the ancient liturgy in their worship (there are two commonly used). Traditional hymns and chorales are sung by both congregation and choir. Lutherans follow the church calendar and use candles in worship as well as other ancient symbolic devices. There are no set rules on using these worship aids, and each individual congregation decides if, or how to use them.

Lutheran doctrine holds that there are three sacraments or "means of grace": the Word of God, the Sacrament of the Lord's Supper, and the Sacrament of Baptism. This fact is architecturally significant because the architecture must somehow

emphasize these sacraments. The church building is not considered holy in itself but should seem to be the habitation for holy events and men. Neither are the church furnishings or symbols considered holy, but should serve the purpose of reminding people of holy things. Some of the more common symbols used in Christianity are as follows:⁷

THE FISH - Jesus, baptism, "fishers of men"

THE CROSS - Christ's death and man's hope

THE LAMB - Christ (the "Lamb of God")

THE LION - Christ (the "Lion of Judah")

THE PELICAN - emblem of redemption

THE DRAGON - Satan

THE SERPENT - sin

THE PEACOCK - change from life to immortality

THE HEART - solitude

THE UNICORN - female chastity

THE DOVE - Holy Spirit or the soul of the dying

THE OLIVE - peace

THE PALM - martyrdom

THE LAMP - heavenly wisdom

FIRE - zeal and fervor

THE CROWN - victory

THE CHALICE - faith

THE BOOK - scriptures

⁷Waters, A Handbook of Christian Symbols, pp. 2-36.

THE SHIP - the church

THE ANCHOR - hope

WHITE - purity, virginity, innocence, faith, joy, and light

RED - royalty, fire, divine love, the Holy Spirit, creative power, and heat

RED (Negatively) - blood, war, and hatred

BLUE - heaven, heavenly love, truth, consistency, and fidelity

GREEN - spring, hope, victory

YELLOW OR GOLD - sun, marriage, and fruitfulness

PURPLE - passion, suffering, love, and truth

GREY - penance, humility, mourning or accused innocence

BLACK - darkness, wickedness, and death

THREE TRIANGLES

CIRCLES - The Trinity

FISHES

 - chi-rho, first two Greek letters for CHrist

IHS - first three Greek letters for JESus

Perhaps, at first glance, one may fail to see what application these symbols have to the architecture. They give significance to the floor plan, interior decoration, and even the structural system of a church. Most ancient churches used the "cross" plan for their floor plans. Colors of vestments and paraments hold symbolic meanings, as do letters and inscriptions on vessels and church furnishings. The "A" frame of a modern church forms a triangle, which symbolizes The Trinity. The variety and unlimited possibilities in using the symbols of the church give the architect a great challenge in aesthetic considerations.

PART VI - ECONOMIC CONSIDERATIONS

CONSTRUCTION COSTS

The cost of the new church, of course, depends directly on the quality of workmanship and materials used. Only rough estimates can be given at this point. The following construction cost estimate data was taken from the Marshall Valuation Service⁷ booklet:

<u>Class</u>	<u>Type</u>	<u>Characteristics</u>	<u>Cost/sq. ft.</u>
A	Good church	stone, good curtain walls, leaded windows, ornamental special lighting, P. A. system, good plumbing, steam heat	\$24.17
A	Average church	concrete metal, some leaded windows, stone trim, plaster, some ornamentation, terrazzo, hardwood, asphalt tile, adequate lighting and plumbing, steam heat	20.29
B	Good church	stone, good curtain walls, leaded windows, ornamental, ornamental plaster, and details terrazzo, marble, vinyl tile, special lighting, P. A. system, good plumbing, steam heat	20.72
B	Average church	concrete, metal, some leaded windows, stone ornamentation, terrazzo, hardwood, asphalt tile, adequate lighting and plumbing, steam heat	17.61
A-B	Basement	plaster, finished rooms, asphalt, adequate lighting and heating, steam heat	12.11
A-B	Balcony	steeped, plaster soffit, adequate mechanical	3.71

⁷Marshall Valuation Service, Marshall and Stevens Publishing Company, Los Angeles, 1962.

C	Excellent church	fine masonry, windows, and roof, special terms finest plaster and wood detail, terrazzo, vinyl tile, special lighting, P. A. system, good plumbing, tile restrooms and steam heat	\$21.69
C	Good church	good plaster and detail, vinyl tile, hardwood, good lighting and plumbing, P. A. system, steam heat	17.15
C	Average church	block or brick, stucco trim, few stained windows, some plaster, asphalt tile, hardwood, carpet on concrete, adequate plumbing and heating, forced air heat	13.88
D	Low cost church	brick, block, little trim, composition roof, plain windows, painted, plywood trim, concrete or softwood floor, minimum mechanical with wall furnace	10.98
C-D	Basement	plaster interior finished rooms, asphalt tile, adequate mechanical and steam heat	8.81
C-D	Balcony	stepped, plaster soffit, adequate mechanical	3.30
D	Good church	brick veneer, good stucco, stained glass, ornamental, good plaster and hardwood trim, terrazzo, vinyl tile, good lighting and plumbing, P. A. system, forced air system	15.21
D	Average church	stucco and siding, few stained windows, some trim, plaster and veneers, hardwood, asphalt tile, carpet on concrete, adequate lighting and plumbing, forced air	12.25
D	Low cost church	cheap siding or stucco, plain windows, little trim, dry wall and veneers, softwood or concrete floors, minimum mechanical, wall furnace	9.76

The following explains what is meant by class A, B, C, and D above:

Key to Class

Class "A" buildings have fireproofed structural steel frame with reinforced concrete or masonry floors and roofs.

Class "B" buildings have reinforced concrete frames and concrete or masonry floors and roofs.

Class "C" buildings have masonry exterior walls, and wood or steel roof structure.

Class "D" buildings have wood or steel frame and roof structures.

A quicker, but less accurate method of estimating the cost of a church, is the "cost per seat" method. This method can be very helpful in the early planning stages of the building program.

Cost per Seat

The following are average costs per seat of churches including pews, organs, and bells:

	<u>Large</u> (over 500 capacity)	<u>Small</u> (under 500 capacity)
Good	\$478	\$666
Average	311	444
Low cost (without organ),	---	270

The preceding estimates include only the cost of the church proper. The educational portion will cost an additional \$10 to \$20 per square foot, depending upon the quality of construction. All of the above costs do not include architect's fees or contractor's profit.

SPECIAL EQUIPMENT

Some items in the church, which may or may not be included in building construction estimates, will constitute a sizable part of the total cost. The final decision as to the quality of these items are usually left up to the church building committee. They are as follows:

Equipment Costs

Pews

Plain hardwood, per linear foot.....	\$10-15
Good hardwood with book racks, prayer bench, per linear foot.....	15-25
Excellent hardwood, carved and ornamented, with book racks, prayer bench, per linear foot	25-35
Altar.....	360-800
Lectern.....	100-250
Pulpit.....	150-525

Organs

Electric.....	2,000-6,500
Pipe organ (installed) per stop or "rank" or pipes.....	1,450

Bells

Iron bell, 12"-36" in diameter	75-500
Bronze bell, 12"-36" in diameter	450-3,500
Cast bell chimes, set of 12-15	12,000-18,000
Carillon, cast bell 2-2½ octaves	12,000-20,000
Carillon, cast bell 4 octaves	50,000
Carillon, electronic	1,500-8,000

Stained glass windows

<u>Type</u>	<u>Cost per square foot</u>
Leaded glass:	
Plain clear glass	\$3.50-12.00
Colored or opalescent	4.10-13.40
Painted and fired:	
Minimum painted	10-15.00
Geometric symbols	28-165.00
Rose windows	19-140.00
Figure background	18-40.00
Simple figures	45-65.00
Detailed figures	67-110.00
Fancy detailed figures	110-170.00

Add \$2-5 for installation per square foot.

SITE COSTS

The site, which is described on page 8, is owned by several parties. To estimate the cost of the whole site would involve contacting each owner and bargaining with him. This, I feel, is beyond the purpose of my research. Other site costs include disposing of present structures, connecting to existing utilities, site improvement and landscaping. These costs must be calculated after working drawings are completed. (See map #3)

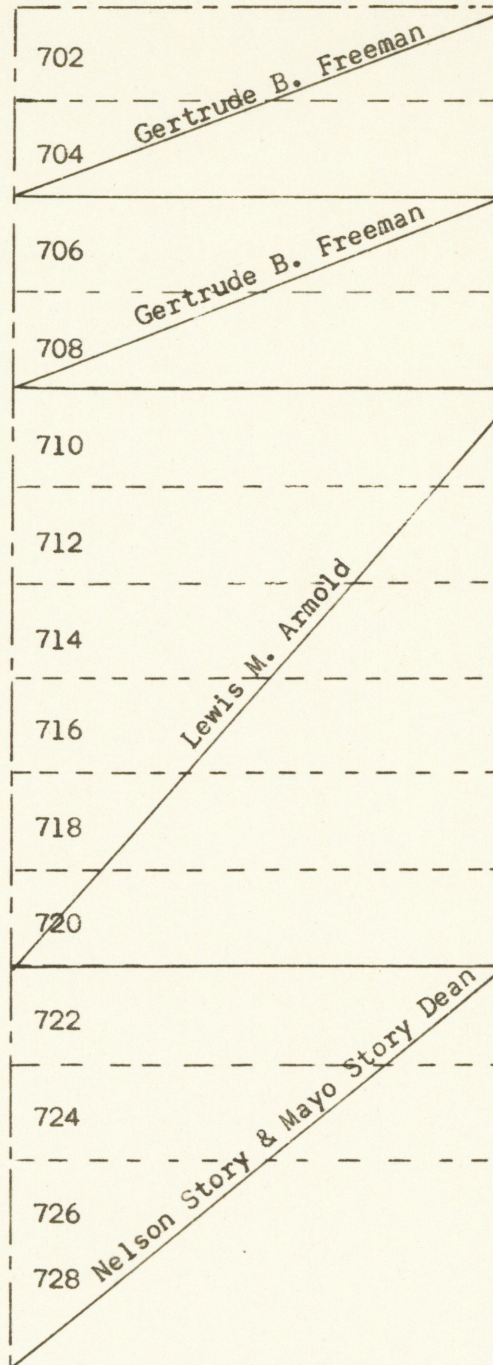
MAINTENANCE

A good architectural design will keep maintenance costs to a minimum. More permanent materials which raise the initial cost of the building may be cheaper over a period of years.

This, along with appearance and building life expectancy, must

ALDERSON STREET

EIGHTH AVENUE



N

1" = 50'-0"

PRESENT PROPERTY OWNERSHIP

be carefully considered by the church committee and the architect. When a decision is made about these matters, the architect can select the appropriate materials for the church.

AVAILABLE FUNDS

Money is available for the promotion of college work from the Montana District, of the Lutheran Church, Missouri Synod. A campus church for Bozeman would certainly be eligible for obtaining this money. Loans from the Lutheran Church Extension Fund are also available. For a 300 seat church with an educational wing (Sunday school etc.), I would estimate the project to cost between \$150,000 and \$200,000. This does not include purchasing the site. If the need for the new church does not initiate action in the next ten years, these figures would probably be obsolete. The amount of money that could be raised in fund drives depends largely on the economic situation in the community at that time. Perhaps a state-wide fund drive, consisting of small donations from all parishes in Montana, could be set up. This could be justified by the fact that Montana State College is a state institution and the campus church will be mainly for the students' use.

BUILDING PROGRAM

ATTENDANCE ESTIMATE

In preparing a building program, I immediately encountered the difficulty of obtaining specific information. This happened because the need for the new campus church will not be evident for perhaps, ten years. In order to give myself a design program, I will assume that ten years have passed and the church has obtained sufficient funds to begin building. All survey forms have been returned and careful estimates have been made. The size of the new congregation is as follows:

Function or Organization	Number	Number 10 years hence
<u>Worship</u>		
Congregation	150	300
Congregation (summer)	100	200
Choir	20	30
<u>Education</u>		
Nursery class	10	20
Kindergarten	8	20
Primary	8	20
Junior	6	14
Intermediate	5	10
Senior	5	10
Young people (college)	20	40
Adult	20	30
Confirmation class	5	10
<u>Fellowship</u>		
Walther league	20	40
LWML (ladies)	20	40
Married couples	15	30
LLL (men)	25	50
Gamma Delta	30	60
Mission festivals	100	200
Freshman banquet	100	250

Administration

Pastor	1	1
Secretary	part time	1
Janitor	1	1

SQUARE FOOT REQUIREMENTS

Worship

<u>Space</u>	<u>Sq. ft.</u>
Chancel	800-1000
Nave	2100-2700
Narthex	300-450
Choir and organ	300-500
Sacristy or vestry	150
Working Sacristy	150
Chapel	600-700

Education

Meeting space for each department

Primary	350
Intermediate	250
Adult	500

For each class

2 - Nursery	each 400-600
2 - Kindergarten	each 360-500
Primary	200-300
Junior	200-300
Intermediate	100-150
Senior	100-150
Young people	400-480

Adult	180-300
Confirmation	60-80
Storage for each class	as needed
Superintendent's office	60-100
Storage for teaching aids	40-60
Coat room	60-100
Toilets	variable

Fellowship

<u>Space</u>	<u>Sq. ft.</u>
Multipurpose room or parish hall	2000-2500
Gamma Delta chapter room	600-800
Entrance lobby	200-300
Lounge	500-700
Kitchen	300-500
Storage	100-200
Coats	100-200
Toilets	variable

Administration

<u>Space</u>	<u>Sq. ft.</u>
Workroom	200-300
Pastor's study	150-250
Library	300-400
Mechanical room	100-200
Toilet	optional

Many of the above functions may use the same space at different times. Consequently, the total square feet of the building cannot be accurately estimated at this time.

THE SITE

All present buildings will be removed from the site. There is no usable foliage on the site, consequently, the entire plot must be landscaped. Items to be included on the site are as follows:

- building complex

- parking lot for minimum of 90 cars

- necessary walks and driveways

- exterior cross

- device for displaying time of services

- small outdoor play area for children

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