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DEVELOPMENT PLAN

UNIVERSITY OF LETHBRIDGE

Prepared by:
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I. PREFACE

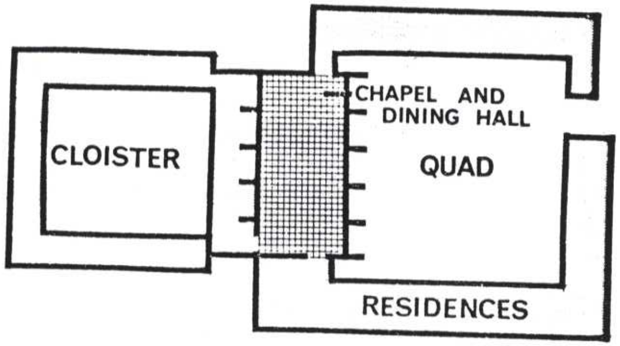
This planning report has been prepared for submission to the Board of Governors of the University of Lethbridge. Its purpose is to present a comprehensive long-range development plan for the University, together with all pertinent data. Though such information is necessarily complex, an order of presentation has been adopted which, it is hoped, will reduce the difficulty. The report first considers the basic prototypes of university design, past and present, in order to indicate the kind of place the University of Lethbridge might become. But this ideal goal can only be objectified by relating it to established University aims and policy, and to the nature of the particular site. Analysis of these factors finally leads to a definable set of objectives for the campus. The Master Plan for achieving these objectives, and the method of implementing the Plan, complete the main body of the report.

II. INTRODUCTION

1. Basic Models

The early colleges of Oxford or Cambridge evince a profound attitude towards education. The English college was a residence where all important instruction took place and all aspects of life were accommodated. In the rhythm of the day, there was a complete fusion of instruction with worship, sport, dining and social mingling - everything was provided to round off the whole man.

The college was patterned after the medieval monastery, an archetypal design for study and reflection. Buildings were arranged around a quadrangle (a mingling space common to the great hall, chapel and residences) and a cloister, a space as in its monastic prototype designed exclusively for meditation. All buildings, whether residences, dining hall or chapel, were continuously linked together. The chapel dominated the complex, just as it influenced the curriculum and the goals of the early university.



1. EARLY ENGLISH COLLEGE PLAN

2. Statement of Goal

It is natural not only to attempt to incorporate many of the best features of earlier designs in the proposed plan for the University of Lethbridge, but also to carry these concepts a stage further.

Consequently, the idea was developed that the fragmentation of University life so common in North America, could be overcome by a design which integrated functions usually separated and isolated from one another.

In its initial form this idea represented a radical departure from the traditional pattern. The proposal was that the whole university be built as a village, mixing academic space with residential and commercial space - so that a classroom might be next to a grocery store, a residence might be placed over a laboratory.

However, investigation soon disclosed that the proposal was not practical. Present methods of financing, and the prevailing attitudes of academic, administrative, and governmental bodies, required a modification of the original concept. Modifications to the original concept were proposed which retained the idea of breaking down many of the traditional barriers to the free exchange of ideas, while maintaining important features of the traditional system.

To illustrate, it was evident from discussions with faculty members that the plan would have to accommodate the existing strong orientation of teachers towards academic disciplines. At the same time, faculty favoured increased interaction and exchange between disciplines.

It was also agreed that the classroom was not always the space most conducive to learning. Learning occurred in many places under many circumstances: in the residence, in the cafeteria, in the lounge, wherever the atmosphere was right. It was not inconceivable, therefore, to combine classrooms, residences and offices as alternate learning spaces. It remained only to define further the <u>kinds</u> of space, and the circumstances, that are most conducive to the learning experience.

Where residence space, it has been found, can be substituted for private study space, a more intimate relationship is established between social and academic pursuits, as formerly realized in the Oxbridge system. The university then becomes more rounded, less fragmented in its educational approach. Learning becomes part of living.

The first broad objective of the plan for the University of Lethbridge is, then, to extend the teaching-learning process beyond the narrow confines of the classroom so that it may embrace all aspects of university life.

3. Method of Approach

This statement of general aim and purpose, however clearly understood, remains an idealized goal, until it is realized in concrete terms. This means that the general aim must be defined as a set of real and attainable goals. The question is: what are the major factors that must be analysed and evaluated before these specific objectives can be defined? First to be accounted for is the laid-down policy of the Administration and Faculty; second, is the complex set of facts determining the nature of the site for the University of Lethbridge.

III. STATEMENT OF UNIVERSITY GOALS*

1. Academic Philosophy

The University of Lethbridge endeavours to cultivate humane values; it seeks to foster intellectual growth, social development, aesthetic sensitivity, personal ethics and physical well-being; it seeks to cultivate the transcendental dimension of the scholar's personality.

Flexibility and openness to innovation will be the distinguishing feature of the University of Lethbridge.

A University is composed of a variety of individuals from a variety of backgrounds and cultures. The aim of the University should be to accommodate these individuals.

The University ought to be organized in such a way that individuals are encouraged to interact, but not compelled to do so.

The undergraduate is, and should remain, the focus of the University's endeavour. Students are invited to participate in all phases of university life.

The multi-disciplinary approach ought to be one of the features of the program planning.

The University should actively seek to develop interrelated programs with other institutions of learning.

The University recognizes its responsibility for contributing to the total educational needs of the community and the wider society.

The University commits its allegiance to the world-wide community of scholars, and wishes to emphasize the fact that learning transcends national boundaries.

The University asserts its right and responsibility for free expression and communication of ideas. It is self-evident that a University cannot function without complete autonomy in this domain.

*Excerpts from THE UNIVERSITY OF LETHBRIDGE ACADEMIC PLAN AND USERS' REPORT, September 27, 1968

2. Academic Plan

The University of Lethbridge expects to be a multi-faculty institution, limited for the near future to the Faculties of Arts and Science and Education. There will be a program of Continuing Education integrated intimately with the offerings of the Faculties but also limited to where the resources of the University can be useful to special demands in the community.

Within the programs to be offered, the University expects to emphasize teaching in small classes where this is considered valuable plus communication by means of modern techniques and media where these are useful. Optimum interaction between faculty and students is a primary goal. To ensure the quality of the total educational experience, facilities and resources for individual faculty and student scholarship will be made available. Particular and continuing emphasis will be directed to undergraduate education. However, it is recognized that by definition a University must ultimately include post-graduate development. Therefore, the University is actively preparing a plan whereby a gradual involvement in graduate studies in ways that are consistent with local resources, provincial needs and this University's philosophy can be achieved.

Important considerations for a University seriously oriented towards undergraduate students are adequate residences, adequate library resources for learning and scholarship, flexibility in units of learning such as is allowed by the semester system, flexibility of curriculum, optimum availability of information presented by all media of communication, and the best possible counselling.

3. Academic Policies

It has been the policy of the University, and the understanding of its community, that from the inception of the University a very significant emphasis should be placed on the Fine Arts. Therefore, the University proposes to develop Art, Music and Drama to a much greater extent than would normally be associated with an institution of a Liberal Arts type. The Arts will be simultaneously an integral part of the academic core of the University and a base for University involvement in the cultural affairs of the community.

The University has legislated so that multi-disciplinary approaches to learning may flourish. It will legislate specific programs when the academic initiative and resources are available. Meanwhile, the kind of conference and departmental space specified at this time is essential for such multi-disciplinary efforts.

The Faculty of Arts and Science regards it as absolutely essential that the individual laboratory experience of students in beginning courses be redesigned and up-graded to the point where it is the major if not only component in those courses. Our present and proposed programs will also include individual student research as an essential component in many senior undergraduate courses.

The present and proposed programs of the Faculty of Arts and Science are designed so as to accommodate a wide spectrum of student needs, including those that would be identified with Honors students elsewhere.

The Faculty of Education accepts its unique opportunity to experiment with new approaches to teacher education. The new approaches involve: joint responsibilities, at both the pre-service and in-service stages of teacher education, by universities, the teaching profession, school systems, and the Department of Education; a high degree of individualization in instruction to counter the mass assembly approach to teacher education; a heavy research orientation, particularly in applied research by faculty and students; integration of theory and practice through the professional semester; emphasis on student teaching and other field experiences; and a university-wide approach to teacher education, featured by the pre-education phase in Arts and Science. These new approaches, and particularly the research orientation, independent study, and involvement of professional personnel outside the University, demand the utmost of flexibility of facilities provision and use.

4. Residence Policy

Though there is a diversity of opinion in the University regarding residential development, a concensus has been achieved with regard to the following:

A. The University should encourage the students to live in residence in order to obtain the greatest exposure to and benefits from the academic experience.

B. To the greatest extent possible the University should seek sources outside the University's budget to finance the building of residences.

C. Even in the earliest stages of development, the University should resolve NOT to adopt the *in loco parentis* approach to its housing program.

D. In keeping with the institution's philosophy and objectives, there should be a variety of types of housing in order to satisfy the needs of the individual.

IV. THE SITE

1. ENVIRONMENTAL DATA

The city of Lethbridge is located in the southerly portion of the province of Alberta within a climate area which may be classified as semi-arid, characterized by relatively low annual precipitation and hot dry winds in summertime. Climatic data is recorded in Figures in Appendix A.

A. Wind

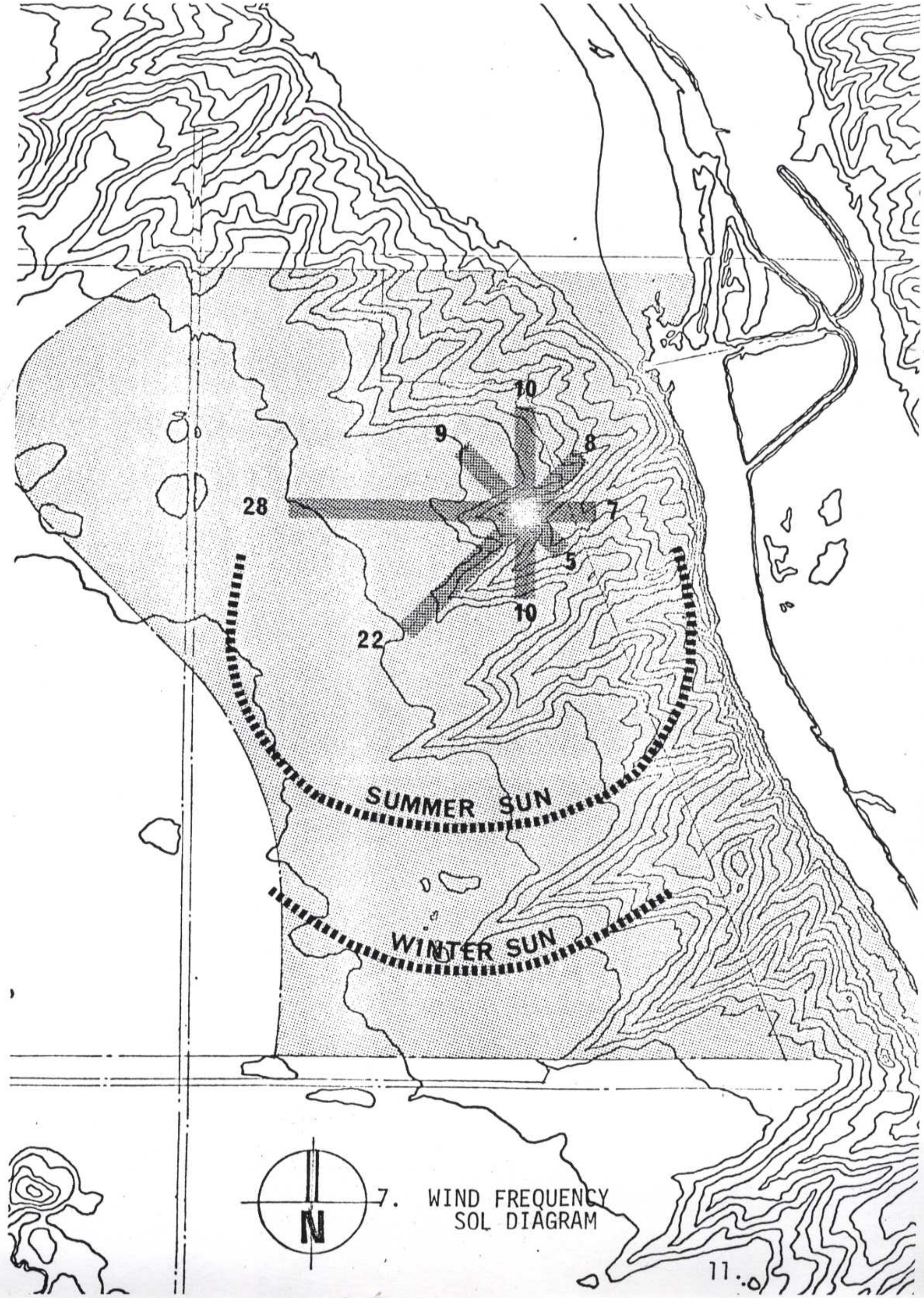
Wind prevails from west-southwest (50% frequency). Wind velocity is greatest from these directions. Warm periods during winter occur as a result of westerly winds (chinooks). Cold winter winds are from the north and northeast.

B. Sun

Sun exposure is a serious consideration since the mean monthly and annual hours of bright sunshine are appreciable. The south-southwest exposure of the site, unprotected across the prairie, must be treated with special care.

C. Temperatures

Monthly mean temperatures do not indicate extreme conditions but there can be extreme and short-term variations particularly in winter. Monthly maximum and minimum range from -45°F in winter to 104°F in summer.



7. WIND FREQUENCY SOL DIAGRAM

D. Precipitation

A yearly average precipitation of 10.66 inches with maximum rainfall occurring in June of 3.15 inches clearly indicates regional dry climatic conditions. Maximum recorded 15-minute and 1-day rainfalls are 0.5 inches and 3.5 inches. Droughts in area are frequent and evaporation is fairly high.

Snowfalls, although recorded in all months, occur largely in the period from October to April. Maximum monthly snowfalls occur in November and February. Snowfalls are frequently followed by relatively rapid melting and runoff. Snow drifting is a common occurrence. Site observation suggests that slopes facing south will be covered with deep snow following storm periods, whereas north exposures will have little snow cover. Drifting of snow also occurs with chinooks.

E. Microclimate

No physical data has been collected for the river bottom or west site of Lethbridge. Observed experience on site indicates that appreciable wind protection is offered by coulee formation and existing caragana shrubs. Local wind and snow conditions should be investigated as design for individual projects proceeds.

2. TOPOGRAPHY AND VEGETATIVE COVER

The site for the expansion of the City of Lethbridge and the University slopes gradually from a ridge near the Oldman River, west of the University site, to the tributary gullies of the Oldman River in the east. The elevation difference between the highest land at the site and the Oldman River is approximately three hundred feet.

The site for the university is penetrated by tributary gullies deepened and widened by a progressive erosion cycle. Native vegetation occurs in the tributary gullies and the prairie land west of the river has been cultivated for cereal crops.

3. SOILS

A. Strata

B1 - B7

General subsoil conditions consist of lacustrine deposits of layers of sands, silts and clays overlying stiff glacial till soils. The soils are badly weathered and desiccated to a depty of approximately 15 feet.

The glacial till underlying the entire site consists of stiff to very stiff, silty clay containing gravel and coal particles. Pockets and layers of sand are located within the glacial till deposit.

B. Groundwater

The long-term static groundwater table at the site is located at depth. Temporary perched water tables may be encountered across the site as a result of leakage from water storage facilities and irrigation canals and movement of runoff towards the adjacent river valley.

C. Coulee Stability

The natural slopes of the erosion gullies on the east side of the proposed University site range from 2.0 to 3.5 horizontal to 1 vertical. There is evidence of surface creep movement and shallow slump movements

is 2.0 the max. slope?

are any steeper slopes present & what to be done with them.

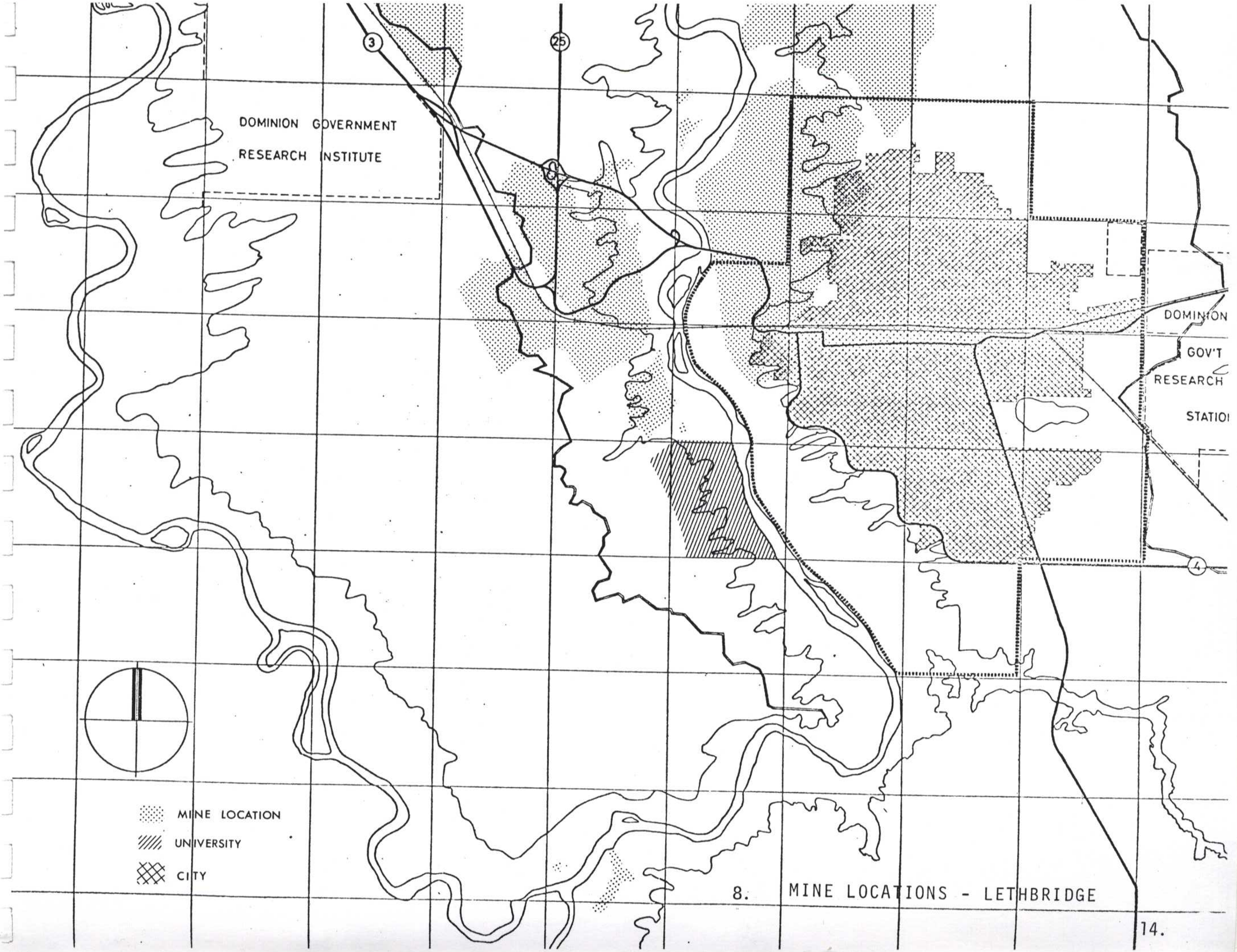
along the gullies in both Sections 24 and 25. Observations and slope stability analyses indicate that gully slopes having a gradient of 2 horizontal to 1 vertical, or flatter, are generally stable. *

D. Erosion

Water erosion is of great concern. The existing native vegetation at the bottom of the gullies should be left undisturbed and consideration should be given to the establishment of additional drought-resistant vegetation. (How compatible are paths with this (see p. 27)

E. Mine Locations

Abandoned mines are located to the north and far to the south of the site, as indicated in Figure 8. Examination of all available data indicates that mined areas in Section 35 are the nearest to the University site and that mined areas do not occur at the site.



8. MINE LOCATIONS - LETHBRIDGE

4. PRAIRIE LANDSCAPE

The prairie landscape is a distillation of the multitude of various elements that compose other landscapes into the basic elements of earth and sky. Objects caught between these vast and simple elements appear trivial unless emerging intrinsicly from one or the other or unless reflecting in generosity of size the prairie scale.

Thus, the cluster of farm buildings, widely spaced across sections of land, became isolated accents in the sweeping folds of the prairie: or the group of elevators rising out of the small town at the railway stop became majestic focal points for vast areas of land and sky. But build a subdivision over the subtle folds of the land and the prairies is destroyed. The grades are too gentle, the contours too soft, to survive the onslaught of an endless scattering of buildings. Without breathing space, vast quantities of it between clusters of buildings, the prairie dies.

Reduced to elementals--the sky as space, the earth as form, every aspect of these becomes poignantly clear. The pattern of clouds, of plowed fields or river coulees, each vividly conveys a meaning. Color is the sky under storm, wheat stubble in the snow, a newly-turned earth. Each set of colors unveils meaning.

Thus, to maintain harmony with the land, one must submit to its rules. One must use space generously or not at all. Buildings must grow out of the ground, clustered with other buildings or trees, but never sit blatantly on top of the ground. Forms must be simple and geometrically concise, as elaborate forms and fussy detail show as weakness. As the geometry of the section measures out the landscape, one must work with an equally clear geometry or appear indecisive. Just as the prairie landscape has been reduced to essentials, so must its buildings be as elemental.

The light of the prairies has the clarity of the land forms. The moods are definite, indisputable and range over the base extent of the sky. The light nakedly exposes the land forms and if the forms are weak, extinguishes them. Surfaces become significant, as the reflectors of light, the envelope of form, the source of pattern and color.

5. AESTHETIC INFLUENCE OF THE SITE

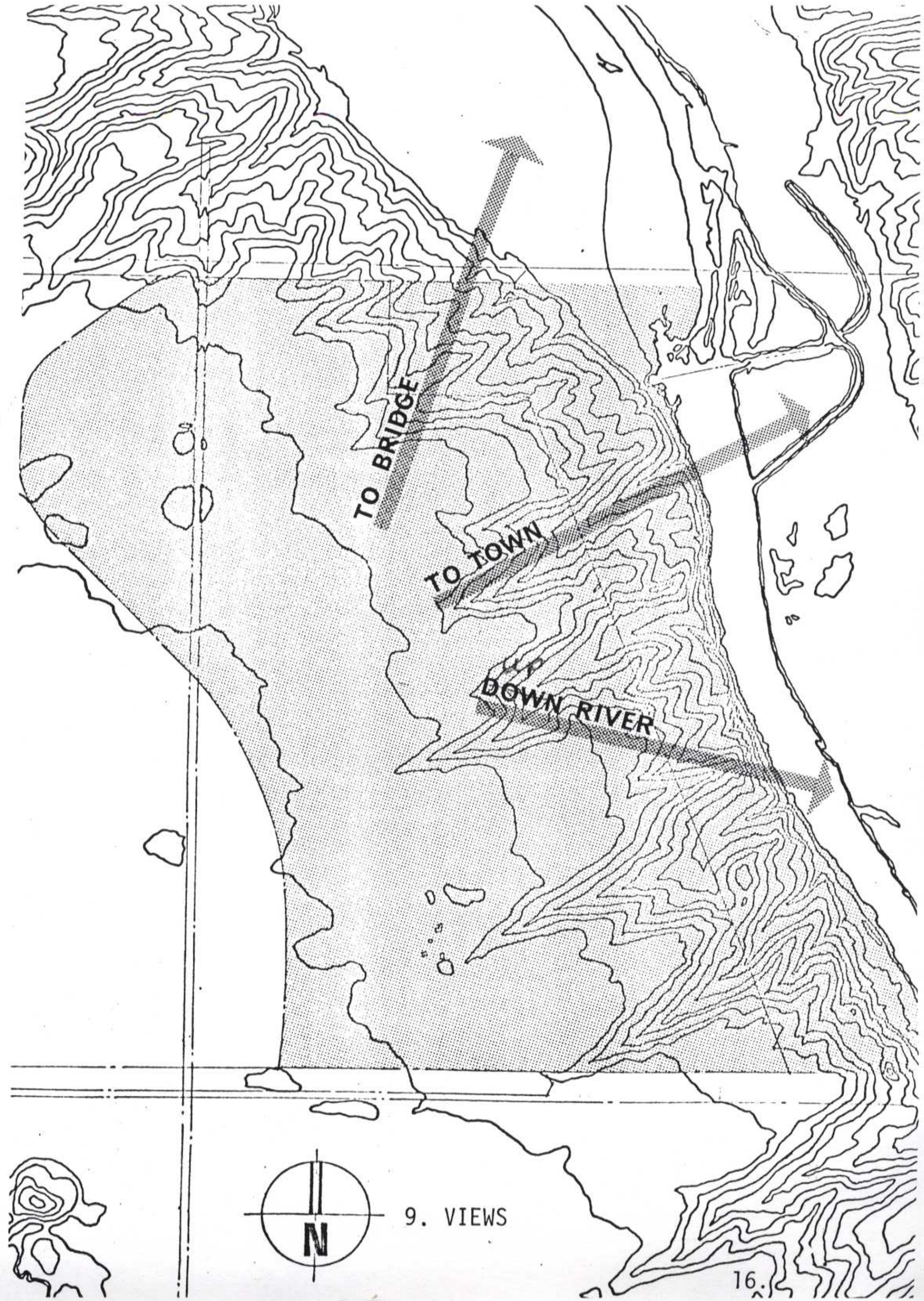
A. The Coulee

The specific site of the University of Lethbridge has not only aspects of the prairie site, it is also the edge of the Coulee. The approach to the prairie coulee gives no indication of its existence. Only at the edge of the coulee does the prairie take on another dimension of space. Where one could previously look only to a horizon at eye level, one can now look down, across and over. The basic human need for a vantage point, a lookout, to oversee, is fulfilled. Down in the coulee, one finds shelter from exposure, the framed view, the slopes of the coulee towering above to a smaller patch of sky.

B. Views

From the projecting flanks of the coulee at the University site, the whole river valley is exposed to view, the wide green parkland of willows and cottonwoods extending the length and breadth of the river valley.

Across the valley stretches the unique railway bridge of Lethbridge, a feat of early railway engineering as awesome as the Roman aquaducts that cross the river valleys of France. The track bed draws a level line across the prairie, and by its flatness, accentuates the contours of the plains.



9. VIEWS

Directly across the river from the University site is the city of Lethbridge. By virtue of the river coulee, one can look to the city, and from the city one can look to the University.

The site offers an extraordinarily rich variety of views. To the north, the railway bridge; to the east, the city of Lethbridge; to the south, the untouched river valley, down to the river, into the coulees and up from within the coulees.

C. Preservation of Site Views

The views encompassed from the University site are viable only if certain measures are taken to preserve them. As previously stated, the beauty of the prairie is so fragile that only a concerted effort of those concerned can preserve it. Thus the river valley must be treated as a preserve of the city, and extreme care exercised in the placement of buildings, roads or bridges. So also the west bank of the coulee both to the north and to the south from the University site should be kept clear of structures so that the very unique aspect of the view from the edge is not lost. The edge should be kept as public preserve.

From the city of Lethbridge the site appears as a tilted plain, running back from the coulee edge. Any building or any object placed on it will read clearly and distinctly in the composition of the whole university plan. The plan, therefore, has to read as an organic whole, with nothing out of place. It also will relate in composition with the railway bridge and should reflect some of its aspects of purposeful simplicity. Random elements such as automobiles must be kept out of sight. — Snowdrifts

D. Native Landscape

buckbrush (Symphoricarpos)

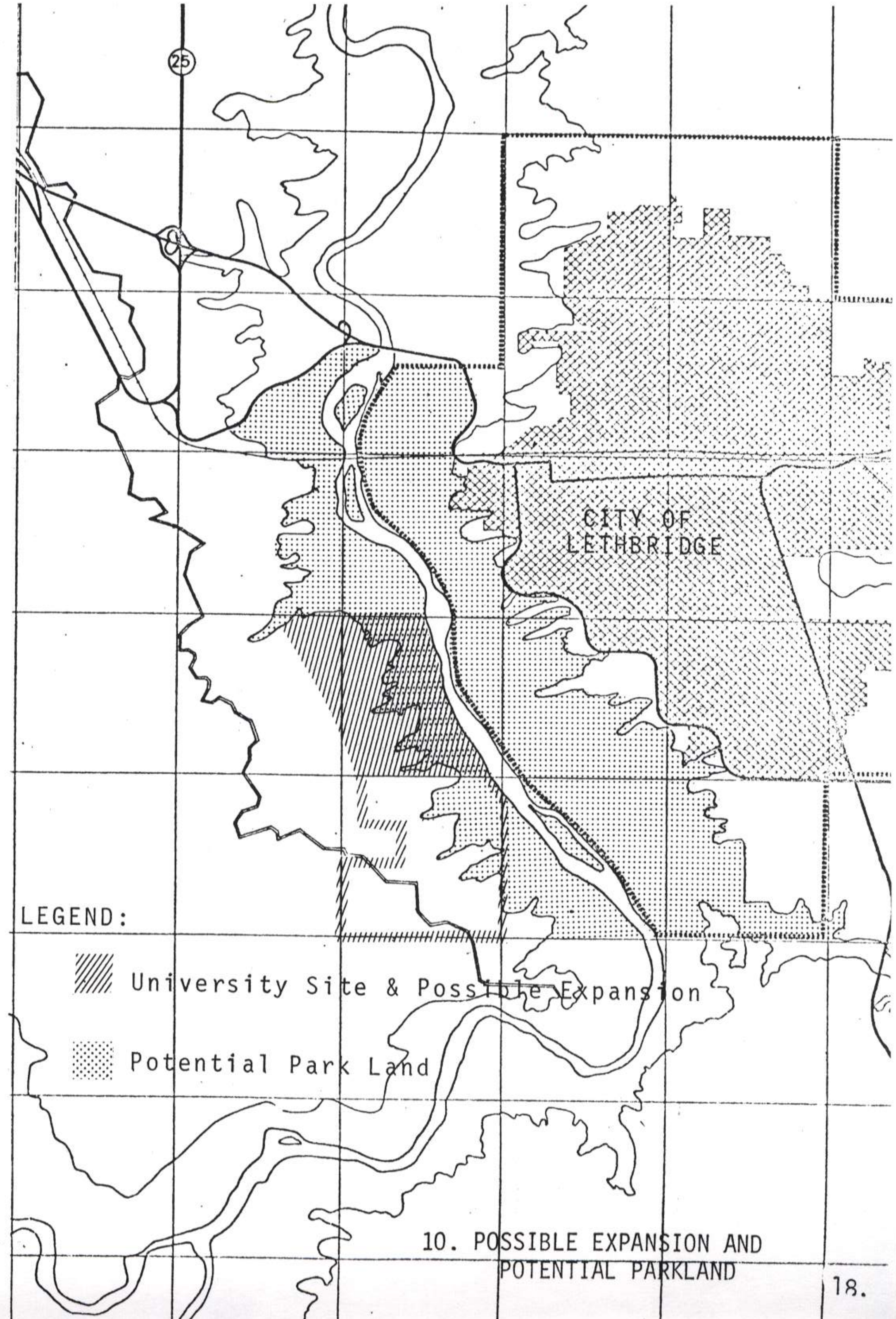
The prairie site has already a natural disposition of plant growth that should be respected. The grasses of the plains, the scrub of the coulee flanks, and the cottonwoods, birches and willows of the river valleys represent an ecological system determined by conditions of climate, soil and drainage. The introduction of buildings will modify this and create new valleys and plains for sheltered or exposed plant growth. To maintain the continuity of the total landscape of the Oldman River Valley, the University landscape should not be a break with what is existing, although what exists could be considerably enriched.

Wolfwillow - Shepherdia
Buffalo berry -
Dogwood -

6. COMMUNITY DEVELOPMENT

A. Parkland

The Oldman River Regional Planning Board has stated that an objective of placing the University west of the river is to offset the imbalance of the city's development and to bring the focus of the population back towards the center of the City. The river valley is visualized as a green park at the center of the city, with the green space extending up the coulees to include the Indian battle park and the University site. Pedestrian walkways would thus be provided from the community through green areas in the University to the river valley.



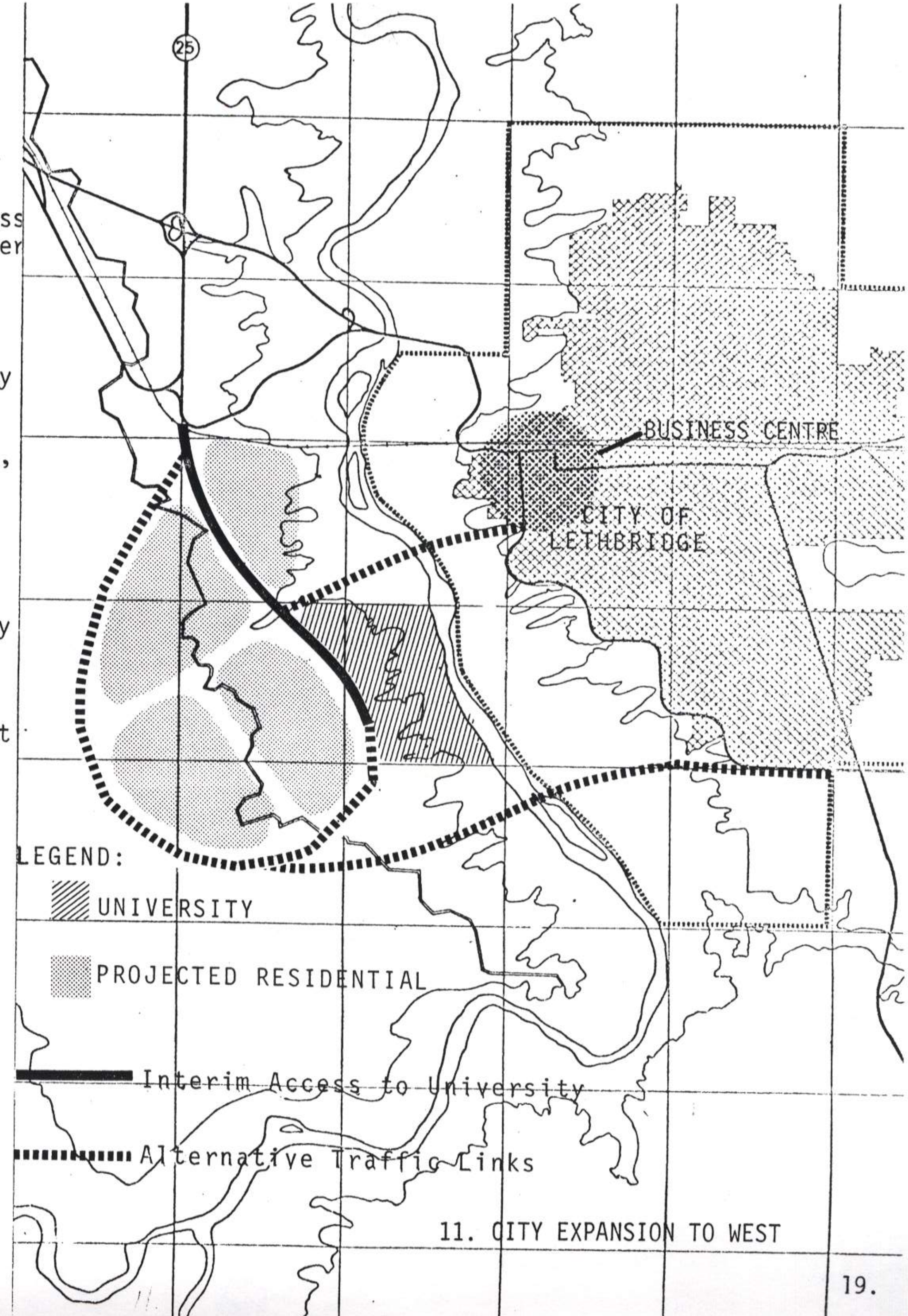
10. POSSIBLE EXPANSION AND POTENTIAL PARKLAND

B. Access

Although the location of the permanent access roads to the west side are undergoing further study, the road pattern currently being considered by the city is from the foot of 6th Avenue descening to the river valley, crossing the river and ascending along the bottom of the coulee north of the University site. An interim connection will be made to the University from the present crossing of Highways 25 and 3, coming from the north, and turning into the University.

C. City Expansion to the West

Preliminary planning anticipates a community of approximately 20,000 to 25,000 people in three to five neighborhoods of 6,000 people each. Each of these neighborhoods would be developed in stages, with the first stages expanding out from the University.



11. CITY EXPANSION TO WEST

V. OBJECTIVES OF THE PLAN

1. External

A. The university plan should encourage direct communication between the university and the adjacent residential community as well as the university and the city centre of Lethbridge.

B. Attractive pedestrian walkways, linking directly the green areas of the community and the university, should provide a continuity of green space and parkland from the community through the university to the river valley.

C. A simple and clear organization of the university is needed to produce simple explicit forms for the university that in every way possible will represent the most suitable plan and building form for the prairies.

D. The most important view of the university will be from the east of the Oldman River, and the massing and disposition of the buildings from this prospect must be particularly effective.

E. The buildings should be arranged to take particular advantage of the views of the river, coulee, bridge and city.

F. The buildings should be sited so that the retention and use of the coulees, as protected landscaped areas, is encouraged.

2. Internal

A. Reflection of Academic Philosophy:

The University of Lethbridge, in view of the great changes taking place in the educational policy of today, in view of legitimate student discontent, in view of the portending technological advance in electronic teaching and recording methods, and in view of the philosophy and attitudes already expressed by its faculty and administration, should take a significant step to demonstrate in its layout and physical plant its participation in the evolution of the modern university.

B. Relationship of Disciplines:

Concomitant with this goal, the plan should reflect the earnest intent of the university to obtain as much value as possible from the interaction between various disciplines, within the limits of the academic objectives of each specific discipline. To facilitate this, the plan should concentrate on the juxtaposition of facilities so as to benefit from cross-fertilization.

C. Flexibility and Expansion:

The plan should accommodate rapid and slow change in various disciplines either by the easy expansion of one department into another space, or by providing for suitable increments for building expansion.

D. Centralization of Common Space:

Experimentation with learning situations should be encouraged, which takes the teaching space out of the classroom into a common space which can be changed easily in size and character to accommodate specific devices or experiments in teaching methods. The potential of all spaces within the university should be analysed with the intention of maximizing the exchange of knowledge and ideas.

E. Circulation:

Wherever possible the pedestrian circulation should be simple, direct and under cover, so that all parts of the university are reached without having to venture outside. At the same time, it should be attractive to traverse the university by outside routes.

VI. THE DEVELOPMENT PLAN

1. Land Use

A. Parkland:

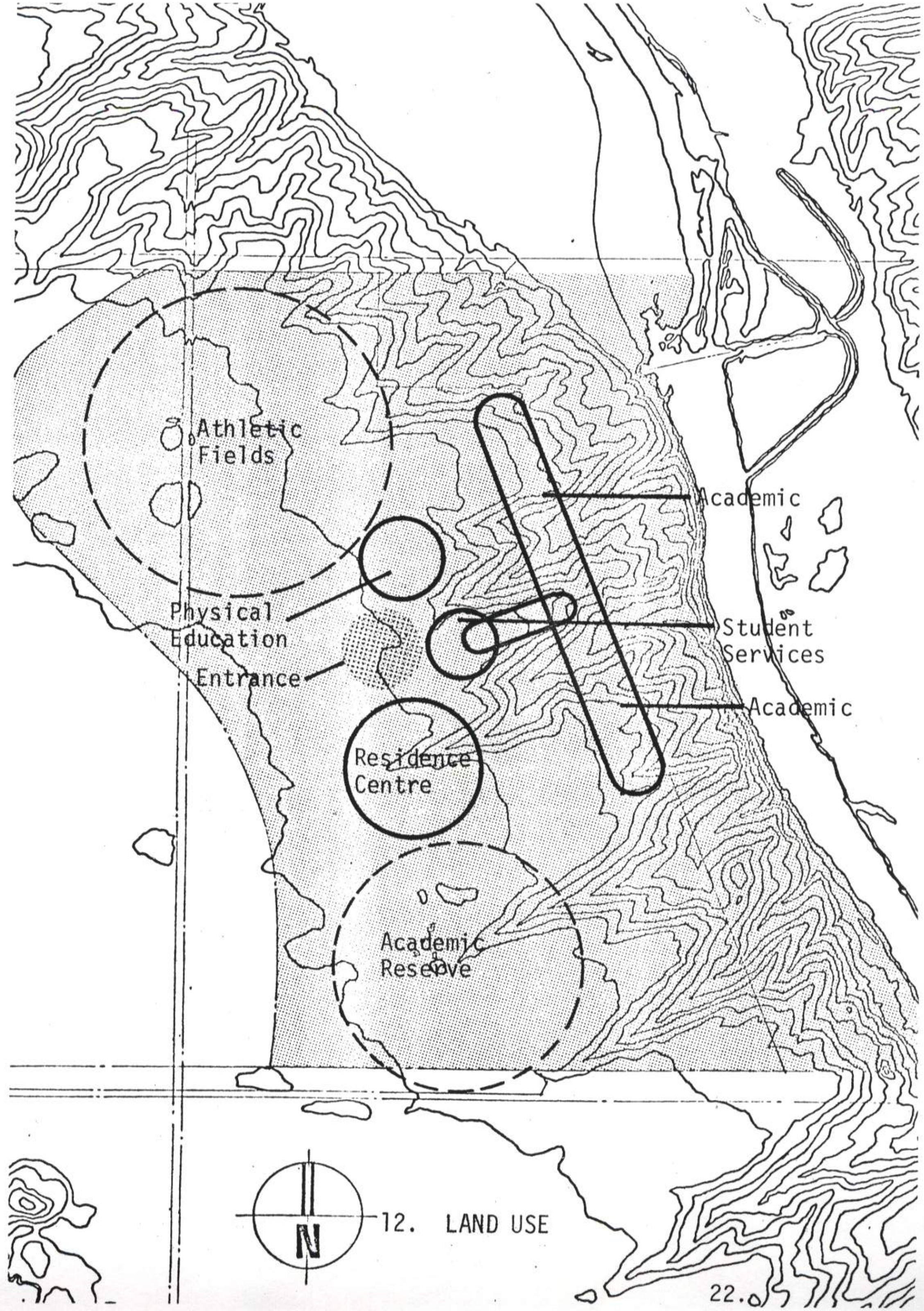
The river parkland and green space extends up the coulees.

B. Academic Area:

The academic area is located where it can best take advantage of the views up and down the river and into the coulees. Rather than placing the academic area where it could only have a removed view of the city and river, it is placed in intimate contact with them and direct contact with all levels of the coulee. This frees the open flat areas of the site for use as athletic fields, parking and expansion, connects the long indentations of the coulees and makes the upper flatland more useful.

C. Academic Reserve:

Academic expansion is to the north and south, with a large academic reserve to the south for the location of related institutions which are expected in the future development of the University.



12. LAND USE

D. Student Residences:

Student residences in the initial stages take the form of minimal rooms, arranged around common lounge and study space. Sheltered in the bottom of the coulees, they look out and have access to the landscaped coulees. Situated below the academic area, they have direct access to the central university space, so that all areas of the university become extensions of the private living space of the student.

E. The Entrance:

At the entrance to the university, the university facilities which are frequented by the community are placed around an entrance court.

F. The University Centre:

The student services are at the main entrance to the university. Here are collected, in one building, the student newspaper and club offices, meeting and games rooms usually associated with a student centre, as well as counselling, health and employment services, the bursar and registrar. At the entrance are also lounges, eating facilities, perhaps a pub, the main theatre and meeting spaces for the university. The restaurant and lounges look down into the outdoor theatre in one coulee and the garden in the other.

G. Recreation Complex:

A recreation facility at the entrance to the university contains the athletic facilities: the women's and men's gyms, exercise rooms, classrooms and swimming pool, that are needed at the university. The gymnasium has direct access to the playing fields and the bleachers on the earth banks west of the main field.

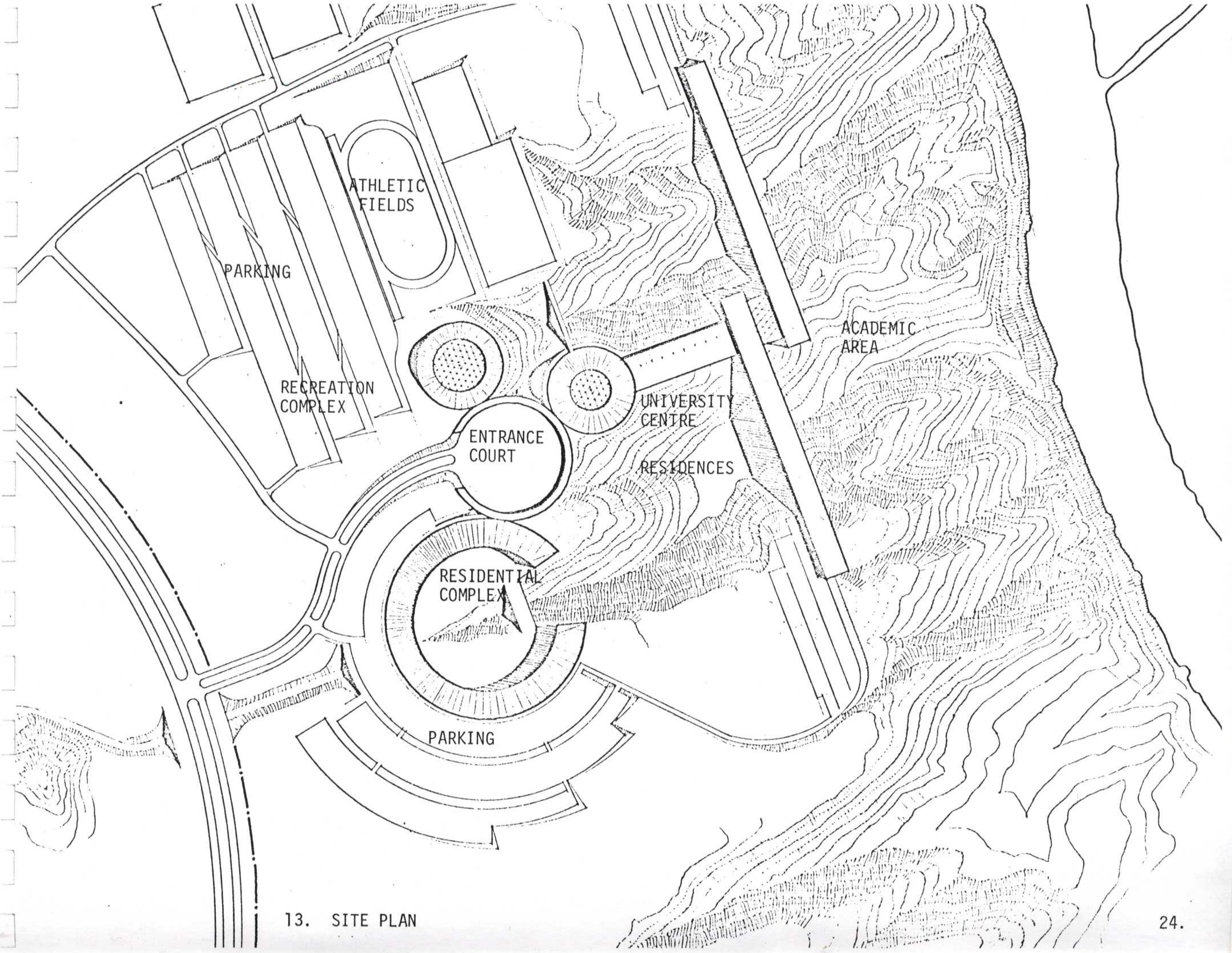
H. Residential Complex:

In keeping with the university's stated desire of providing a variety of student residential space, a Residential Complex containing apartment accommodation for students is located at the entrance court. Within this complex would be found various commercial facilities associated with any university, such as a bank, post office, bookstore, barber, pharmacist, as well as possibly a restaurant or coffee house.

The university needs certain facilities early in its growth that would provide services for its own population. It is not intended that these services should be extensive nor competitive with the central business development of the city or shopping areas in the west when these are required by an expanding population. The residential centre is intended as part of a unique facility at the entrance to the university, available to the community, but primarily a residential and service space for students.

I. Athletic Fields:

Between the university and the site of the proposed Battle Park along the edge of the coulee, an area is designated for athletic fields. Thus the green space-parkland is extended from the north into the site.


ATHLETIC
FIELDS
PARKING
ACADEMIC
AREA
RECREATION
COMPLEX
UNIVERSITY
CENTRE
ENTRANCE
COURT
RESIDENCES
RESIDENTIAL
COMPLEX
PARKING

13. SITE PLAN

2. Circulation

A. Entrance Court:

The arrival point of the University is between the University Centre, Residential Complex and Recreation Complex. Buses and vehicles would load or discharge passengers here and would proceed through the activity sections of the university to the academic core.

B. Vehicular Movement and Parking:

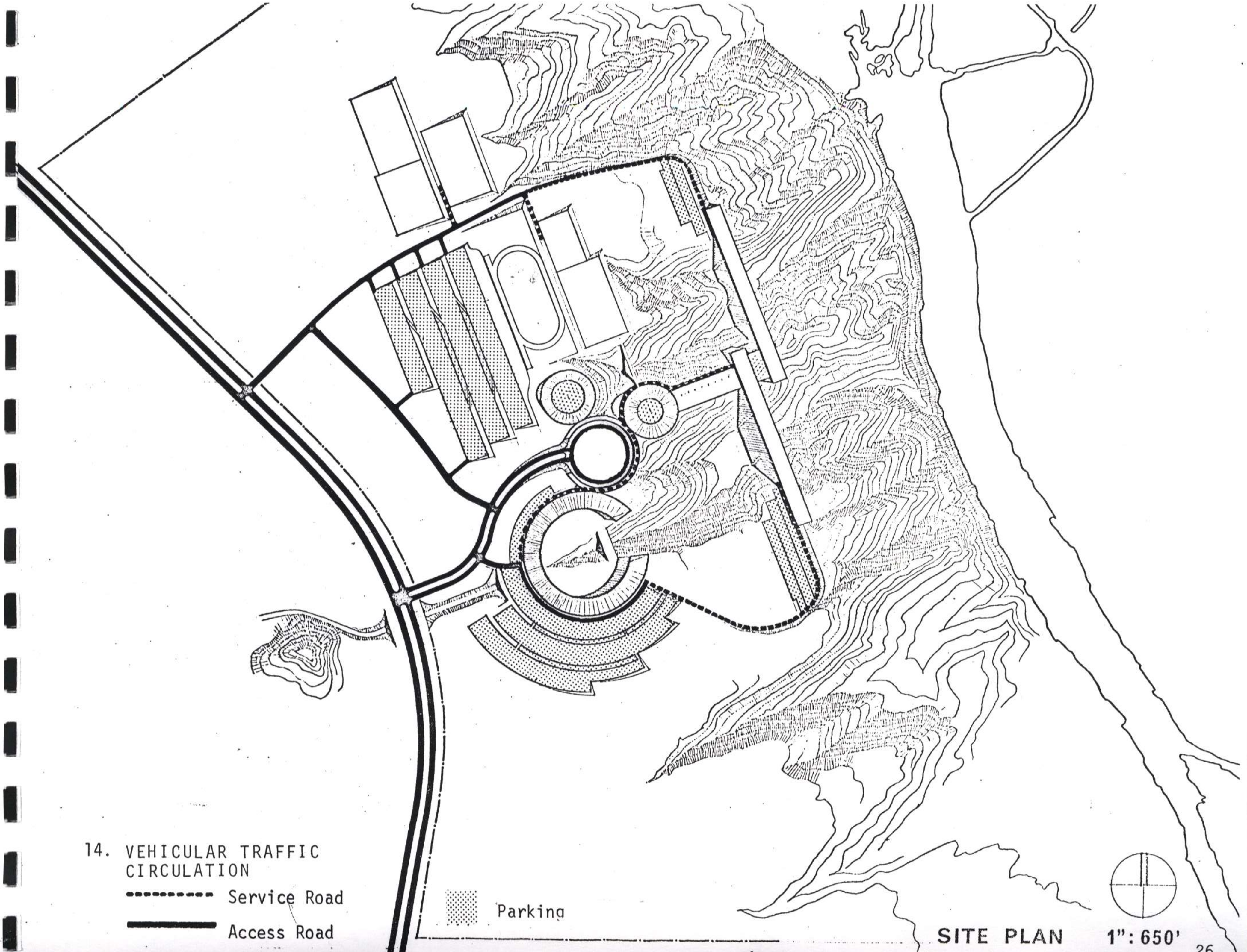
On approaching the university, one would enter by a divided boulevard circling the Residential Centre to the entrance circle, discharge passengers and enter a main parking lot behind the Recreation Complex. The main parking area is directly accessible from a second entrance to the north. If the destination were the Residential Complex, one would enter its parking directly off the entrance road.

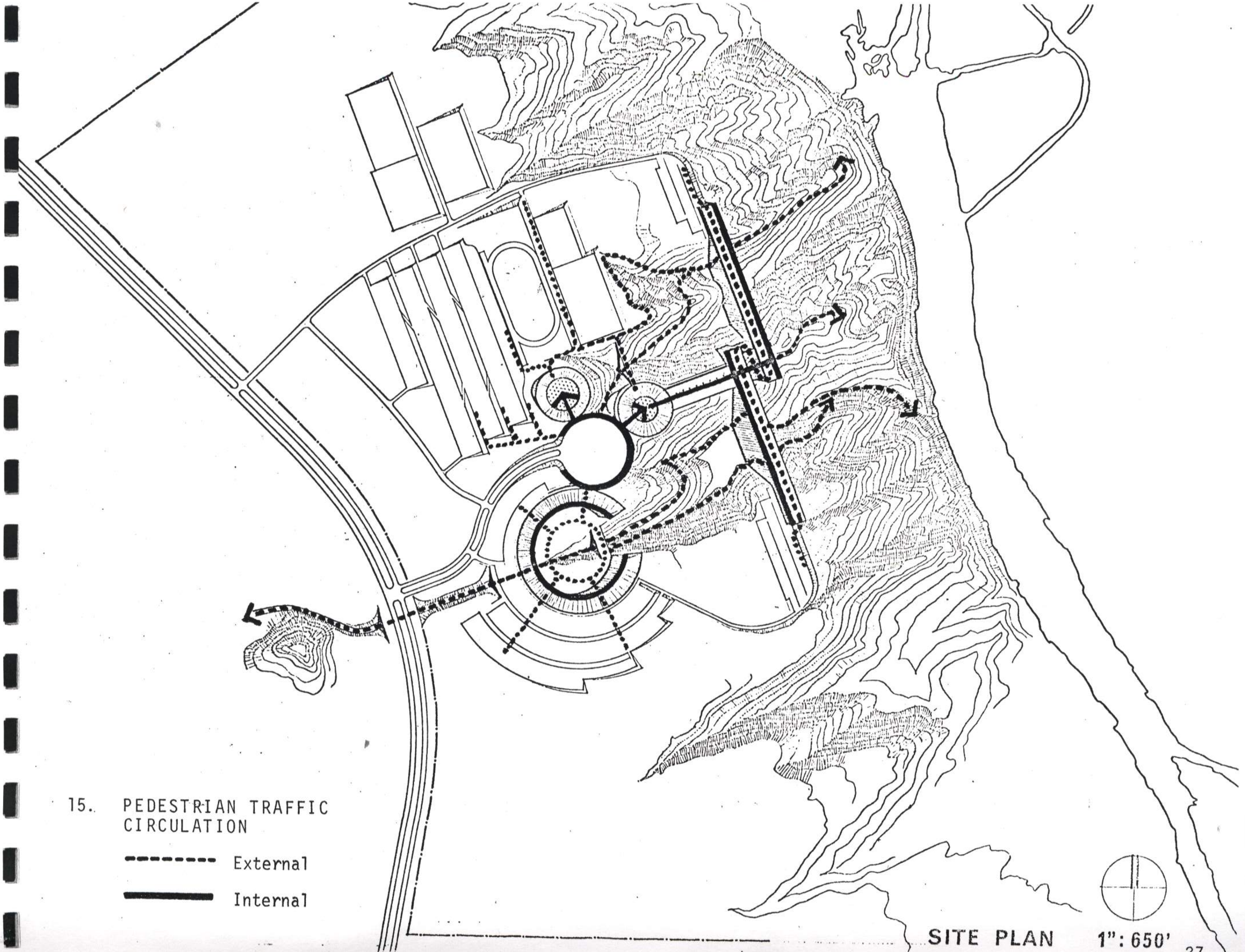
Further parking associated directly with the north and south blocks of the academic area would be reached by the service roads at the east and south ends of the campus. Service and emergency access to the academic buildings is at north and south and via access road along the west wing to the centre of the academic area.

C. Pedestrian Circulation:

External access is possible to all parts of the campus by means of walks and walkways around the edge of or down through the coulees, or over the roofs of the academic buildings. Thus a great variety of alternate routes with differing aspects and views are available.

The pedestrian also has complete covered and indoor access to all parts of the university through a main concourse level, varying only by two floors throughout the university. This concourse level gives access up or down one storey to all academic facilities except for the library, which is multi-storey.


14. VEHICULAR TRAFFIC CIRCULATION
Service Road
Access Road
Parking
SITE PLAN 1":650'



15. PEDESTRIAN TRAFFIC CIRCULATION

External

Internal

3. Form and Massing

A. Academic Space:

The academic space is contained in a linear multi-storey building crossing the two coulees that penetrate the central campus. The multi-storey space is built into the coulees rather than up, so that the building mass remains low on the landscape.

The primary objective is the achievement of an uninterrupted roof line, a strong horizontal, which by its very flatness contrasts with, and enhances the richness of contour ofthe coulees.

Since a great variety of spaces will probably be reflected in the facade of this structure, the strong horizontal of the roof parapet is needed to express the boldness demanded by the open site.

B. The Residences:

Residences are domestic in nature and should achieve a certain intimacy of scale in contrast with the academic space. The first of these, placed at the base of the building, look into and step down the coulee, to achieve this intimacy of outlook and scale.

C. University Centre:

As a collecting point in the university and the centre of student life, the University Centre has been massed into a single concentric building. The conical form reflects the angle of slope of the coulees, and suggests mass as against the linear aspect of the academic building.

D. Recreation Complex:

The Recreation Complex was contained within a similar form, since it was found that these forms were harmonious to one another and the landscape. More elaborate and less geometric forms disturb the quiet counterbalance between the land and the buildings.

E. Residential Complex:

The task is to contain a variety of functions within a single building complex that relates to the existing forms of the campus. The conical form was adopted, but opened to the coulee which ran into its centre space. It becomes another earth mass, at the head of a coulee, and inside a protected courtyard containing part of the coulee is surrounded by shops and apartments.

4. Landscape

To maintain the concept of the prairie landscape, the upper levels of the university are left in a natural open field-like landscape treatment. Playing fields will be terraced, and parking lots both terraced and bermed, so that the automobile is kept out of sight and wind and drifting snow are controlled. The coulees adjacent to the academic area, however, will be planted to provide shelter and shaded relief from the exposure of the open fields.

5. The Academic Area

A. Space Relationships:

i. Space Relationships Defined by Function:

The provision of spaces in as great a variety and flexibility possible is a prime objective of the Lethbridge plan. These spaces can be divided into a number of basic types:

a. The spaces where privacy and isolation for individual work can be found such as one's room, private study space or an office.

b. The spaces where intimate exchange of ideas could occur, such as one's room, an office, a table, a corner somewhere.

c. The spaces where a small group could exchange ideas in conversation or seminar.

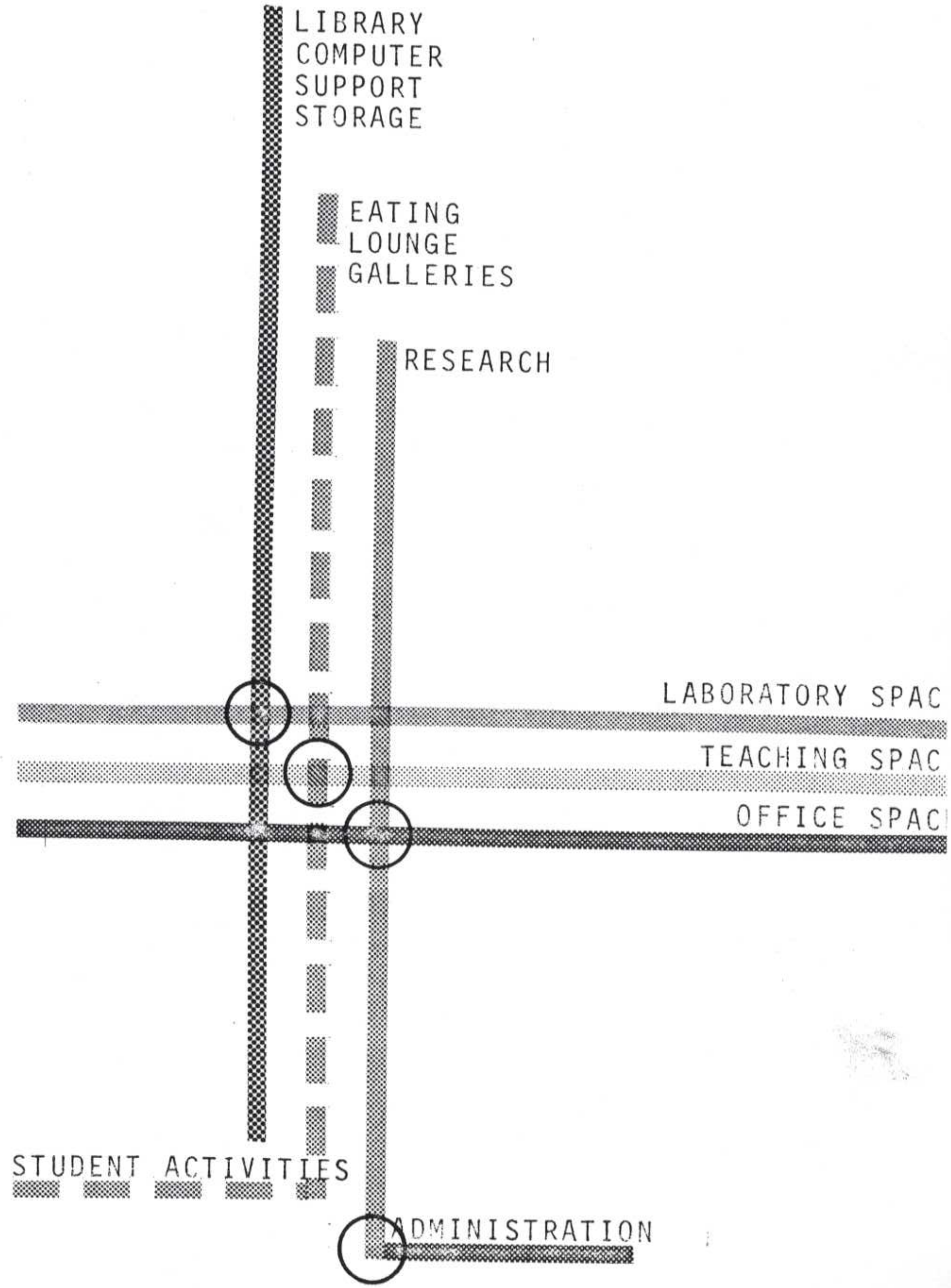
d. The larger spaces where an audience/speaker relationship exists.

e. The spaces designed for specific work and study tasks such as laboratories, both large and small.

f. The spaces where ideas are stimulated by the activity of the surroundings such as the cafeterias, pub, etc.

g. The major meeting spaces involving many hundreds, where exchange is minimal and public.

Of these various types of space within the University community, an interrelated system can be defined. Private work, study and research spaces share common needs. Instructional and discussion areas share common use with lounges and other meeting spaces. Special laboratory, instructional laboratory and support space can also be linked together.



SPACE DEFINITION

ii. Space Relationship Defined by Discipline:

Table I (in Appendix G) records the primary (O) and secondary (X) inter-disciplinary relationships between faculties and departments gathered during discussion with the University faculty.

iii. Breakdown of Spaces by Discipline and Function:

Using data prepared by the University (Users' Report), the estimated spaces required by each discipline for each use (special instructional, instructional, laboratory, office, research, support and service) have been tabulated for the 2,200 and 5,500 student university populations (see Tables II-VII, Appendix G). These totals of space, both by discipline and use, have formed the basis for the preliminary planning.

iv. Space Relationship Defined by Service Requirements:

When needs for services and supply systems are common, spaces would also be grouped. Examples of this would be class laboratories in science, which would be stacked vertically or extend horizontally.

v. Open Space:

An examination of all of the space types reveals that only certain spaces require acoustic or visual isolation. To illustrate, speaker/audience spaces require enclosure for acoustic reasons. Other spaces, however, can be left open to be shaped to the purposes of the user. A general open space, therefore, by means of sound baffles or visual barriers as simple as furniture or plants, can serve for seminars, group discussions and teaching sessions of many types, as well as study, lounge and lunchroom space.

vi. Space Relationships Within Disciplines:

From data gathered in discussions with the university, certain basic relationships of space have been clarified within each of the departments, suggesting three basic associations of space.

a. Instructional-Office

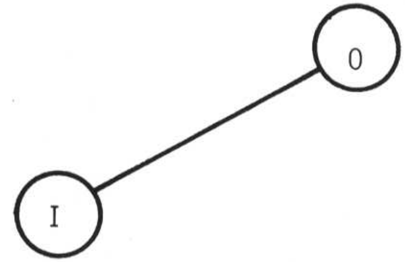
Humanities (e.g. philosophy, English, economics, history) where research is carried out in space similar to office space.

b. Instructional-office-laboratory

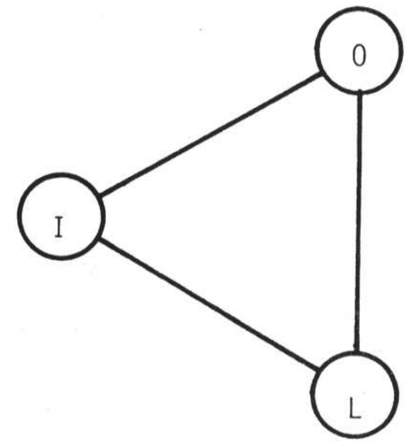
Social Sciences (e.g. psychology, geography) where research largely occurs in spaces similar to class laboratory areas.

c. Instruction-office-laboratory-research

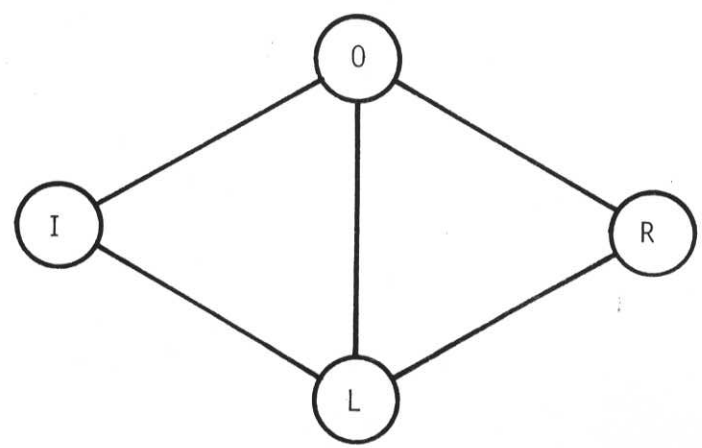
Physical and Life Sciences (e.g. physics, chemistry, biology) where office and research and class laboratories are separate spaces.



a.



b.



c.

17. SPACE RELATIONSHIPS WITHIN DISCIPLINES

B. Organization of Space:

i. Functional Organization:

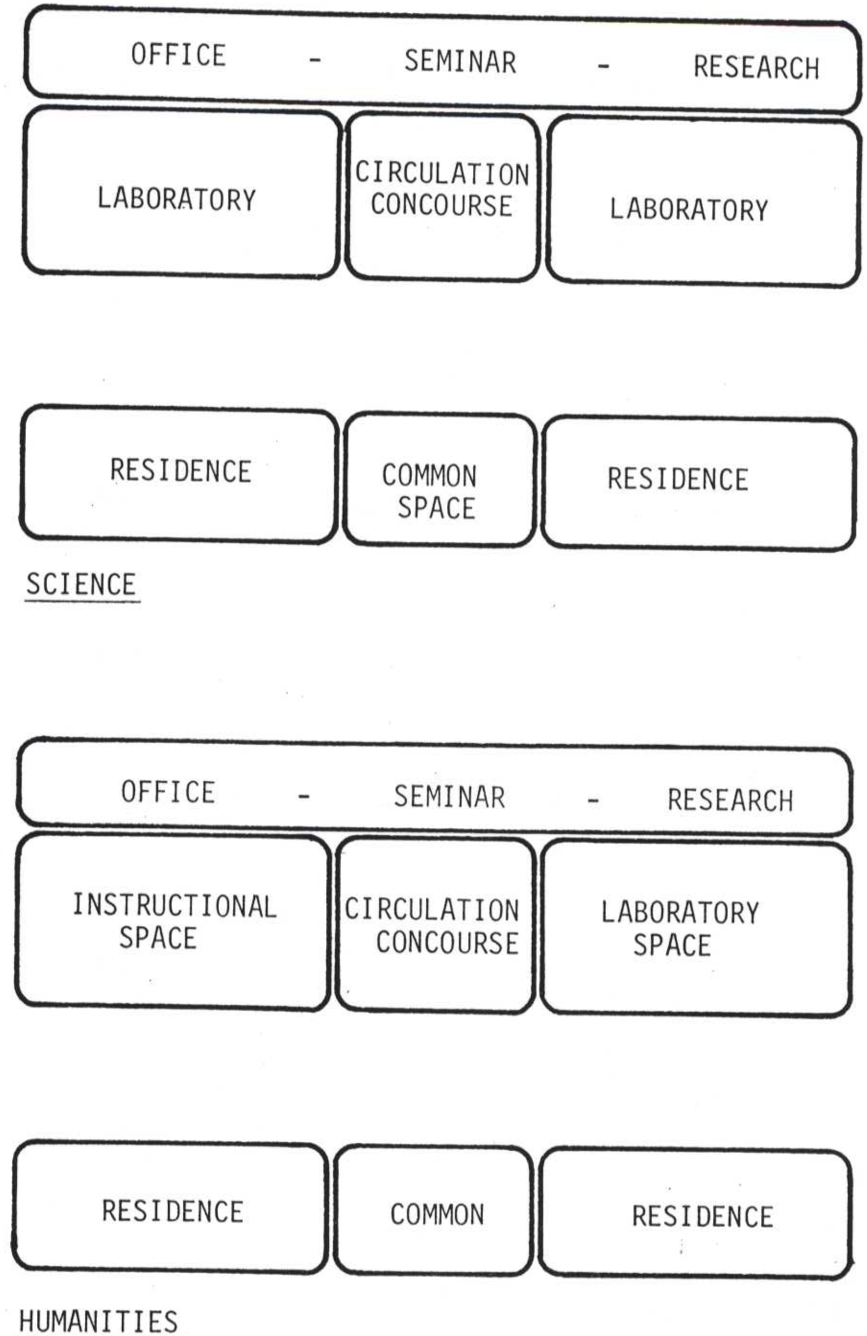
Assuming that all disciplines require discussion, study and office space, and that each discipline occupies a section of building, these facilities should occur in the required proportion in that building section.

Although disciplines may have slightly different requirements, by grouping disciplines with similar requirements, they benefit from proximity and can expand simply by exchanging spaces or moving to other locations.

The suggested cross-sectional organization of spaces of the university would incorporate these potential combinations, by zoning the space, as in the diagram, with office, instructional and research-laboratory-support space in three sectors allowing for possible overlapping of functions where this is required.

ii. Discipline:

Specific arrangements for discipline centres along the horizontal pedestrian pathway will be continuously examined as the university grows. The intention is not to define specific faculty or departmental centres, but allow space assignment to vary as growth and expansion within disciplines occurs. Since the precise development of the university at the 5,500 student level cannot be predicted, this approach is necessary if the university is to contend with changing needs.



18. CROSS-SECTION ORGANIZATION OF SPACE BY FUNCTION

iii. Open Space Principle:

A flexible, changeable, open snace contiguous to offices and class laboratories, continuous through the length of the university, is substituted for classroom space.

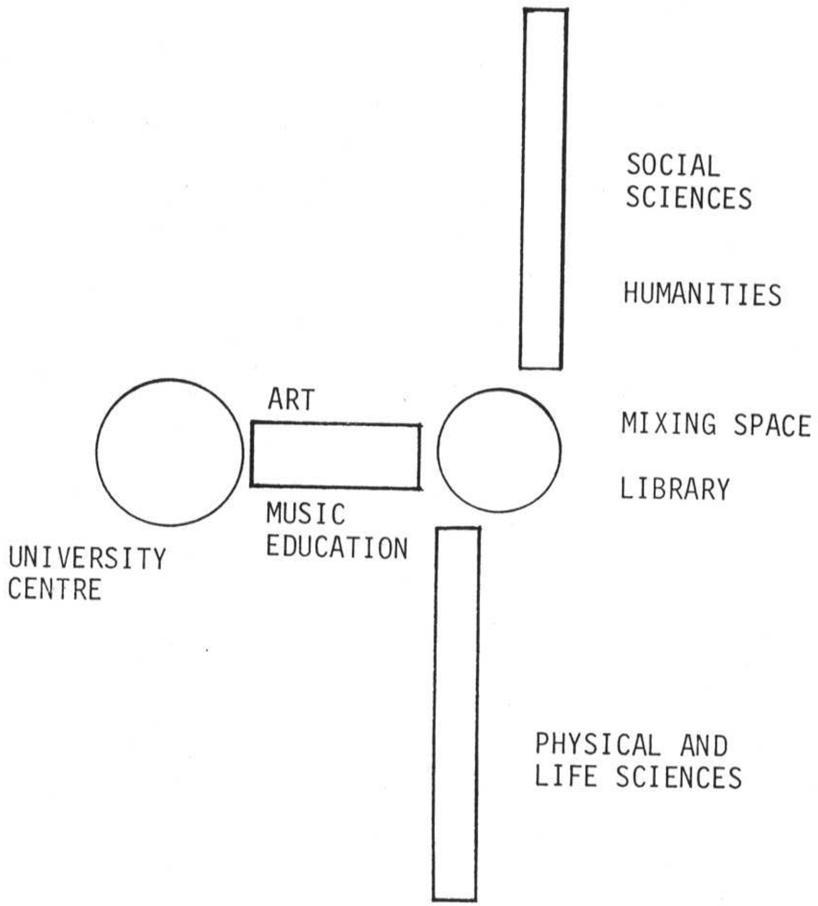
iv. Flexibility:

A repetitive modular structure is essential to provide both simplicity of structure and interchangeability of space, so that necessary variations of space can be provided along its length.

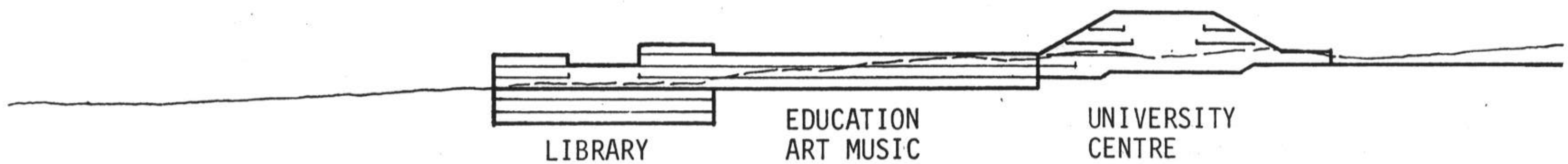
C. Plan for the Academic Area:

After assessing all of the various relationship requirements, a plan has evolved in which the overall academic area is divided into three sectors: the social sciences and humanities in the north; the physical sciences in the south; and education, art, drama and music (with exhibition space, recital hall and theatre) to the west. The west sector serves as the main concourse connecting to the university centre.

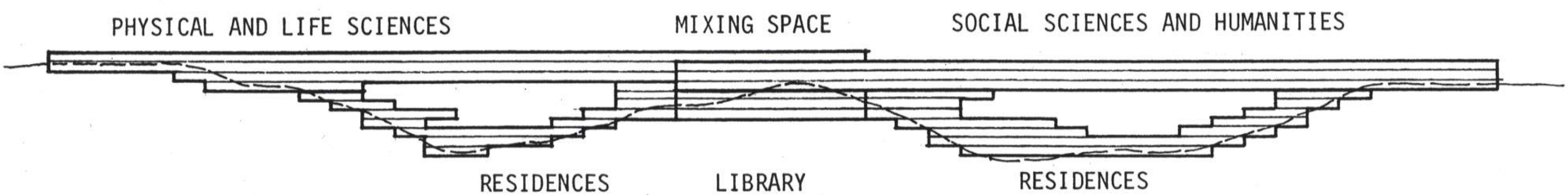
The library is at the centre of the three sectors connecting directly to the concourse-lounge-teaching space. All paths converge on the central mingling space over the library. This is visualized as a large skylit space - a huge lobby to the University off which are lounge areas, central eating area, main lecture theatres, library and senior academic administration.



19. ACADEMIC AREA



EAST-WEST SECTION



NORTH-SOUTH SECTION

20. ACADEMIC AREA
LONGITUDINAL SECTIONS

VII. IMPLEMENTATION

1. Procedure for Implementation

Following the acceptance and adoption of this plan, it will become the guideline for future development. Many details and design criteria, however, will be established only during the design of Project 1, the first stage of development. Since the plan is not easily comparable to past examples, detailed recommendations for space modules, servicing systems, materials, lighting, for example, are best left unspecified until a complete and sufficient analysis of all possible systems is undertaken during the design of Project 1.

As project 1 will proceed immediately, with a target completion date set for University to open by September, 1971, a decision is required as to which elements of the University should be constructed initially. This decision can be made only after evaluation of these factors:

A. The initial facilities should provide basic academic space.

B. The University has set out in its user's report the space needs for a 2200 student population.

C. The total budget for Project 1 is twelve million dollars. Provisional distribution of this sum is suggested in Table I.

D. The construction in Phase I must be efficient and economical, since time and budget are particular constraints.

E. Expansion beyond Project 1, likely occurring as a continual process, should be simple and direct.

Although the final decision on which element of the plan forms Project 1 can only be made after detailed studies of soil and structural systems are complete, the initial recommendation is that the two structures connecting the coulees should proceed first, since they provide basic teaching space, connect the upper land area, include student residence space programmed at the initial stage and can be constructed in the coulees with less difficulty initially.

TABLE I

University of Lethbridge

Provisional Budget for Project 1

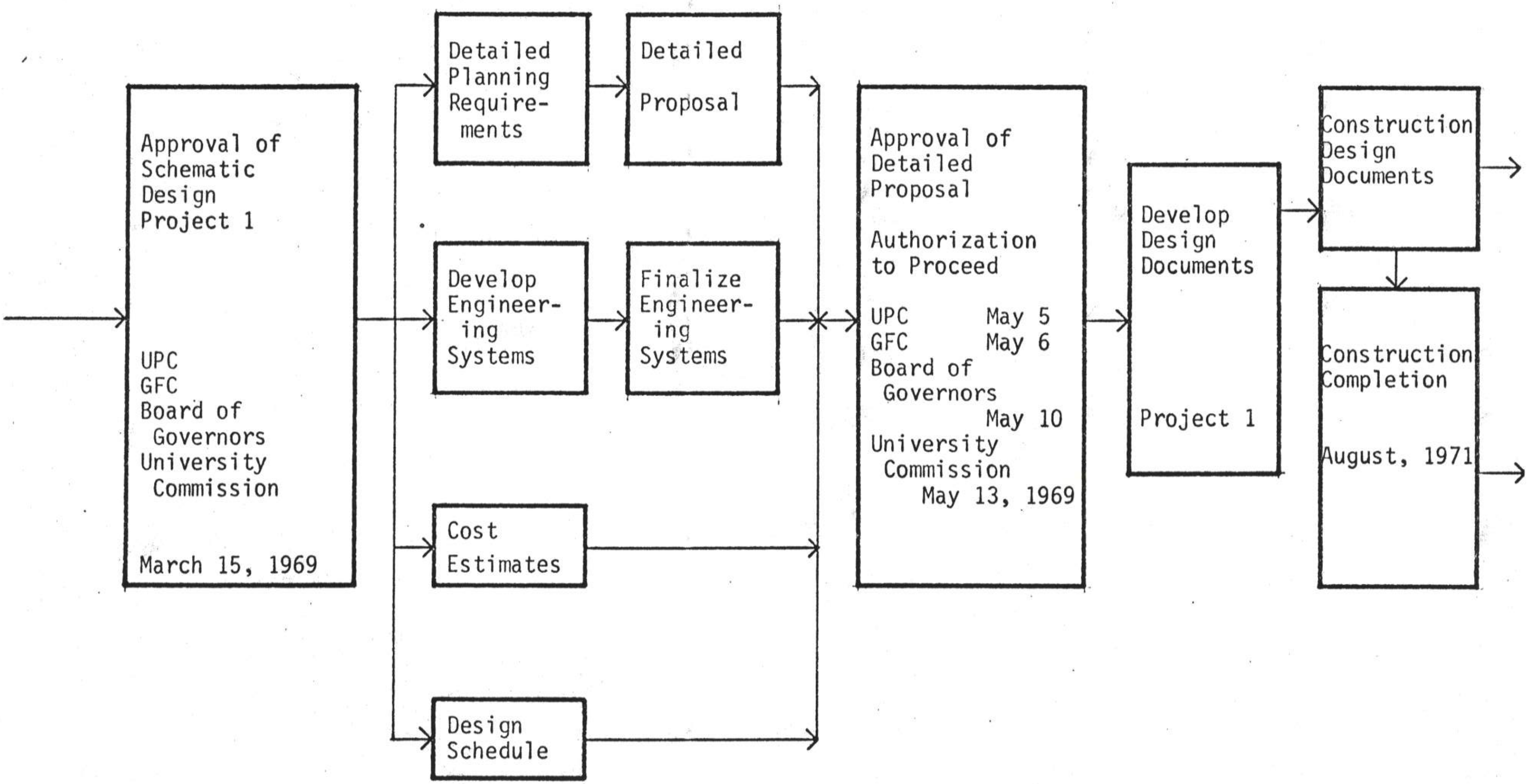
1.	Site Development, Engineering and Landscaping (including services and residences)	$ 1,400,000
2.	Relocation Costs (temporary structures)	200,000
3.	Furniture and Equipment	1,200,000
4.	Buildings*	9,200,000
	TOTAL	$12,000,000

*Building budget to include university share of financing of student residences with remainder to be financed through Central Mortgage and Housing Corporation.

2. Principles of Development and Review

The physical plan for a university establishes a framework for development by setting objectives, planning principles and criteria to guide development. The plan for the University of Lethbridge, as presented, is a guideline for development and not a final design solution for future physical planning of the University. Many problems are yet to be solved as design of initial and later development progresses. It is anticipated, however, that detailed design will be in the spirit of the principles stated in this report.

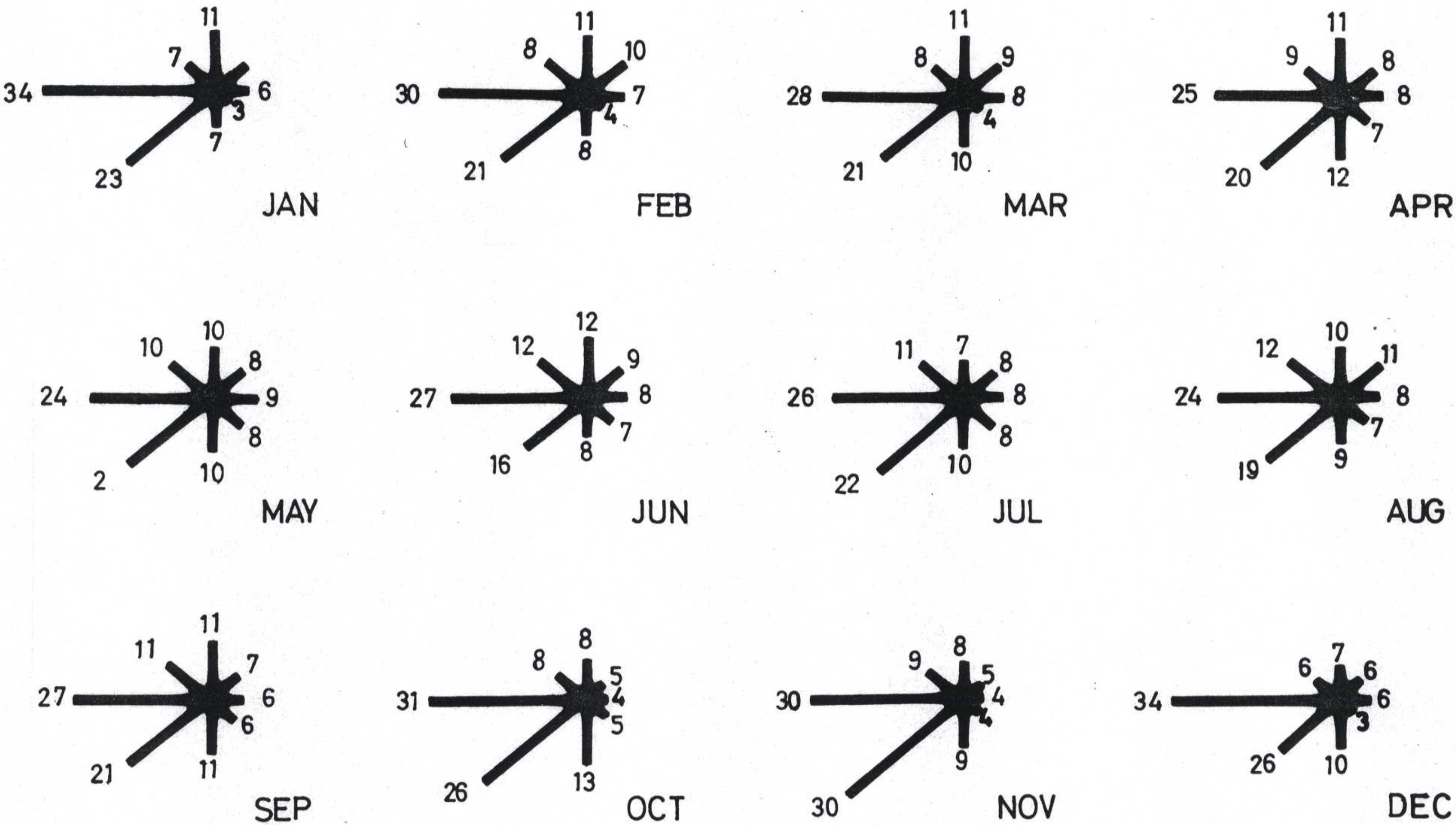
As the University grows, its goals and needs will change; thus, planning will be an evolving process, particularly in this time of rapid technological and social change. For each situation, in a continuing process of review and assessment, needs and ideas will be tested against the principles and criteria of the development plan. As a consequence, the application of the plan will necessitate a constant dialogue between all those concerned with the University.



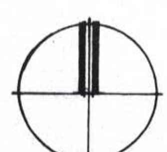
21. PROJECT 1 SCHEDULE
UNIVERSITY OF LETHBRIDGE

APPENDIX A

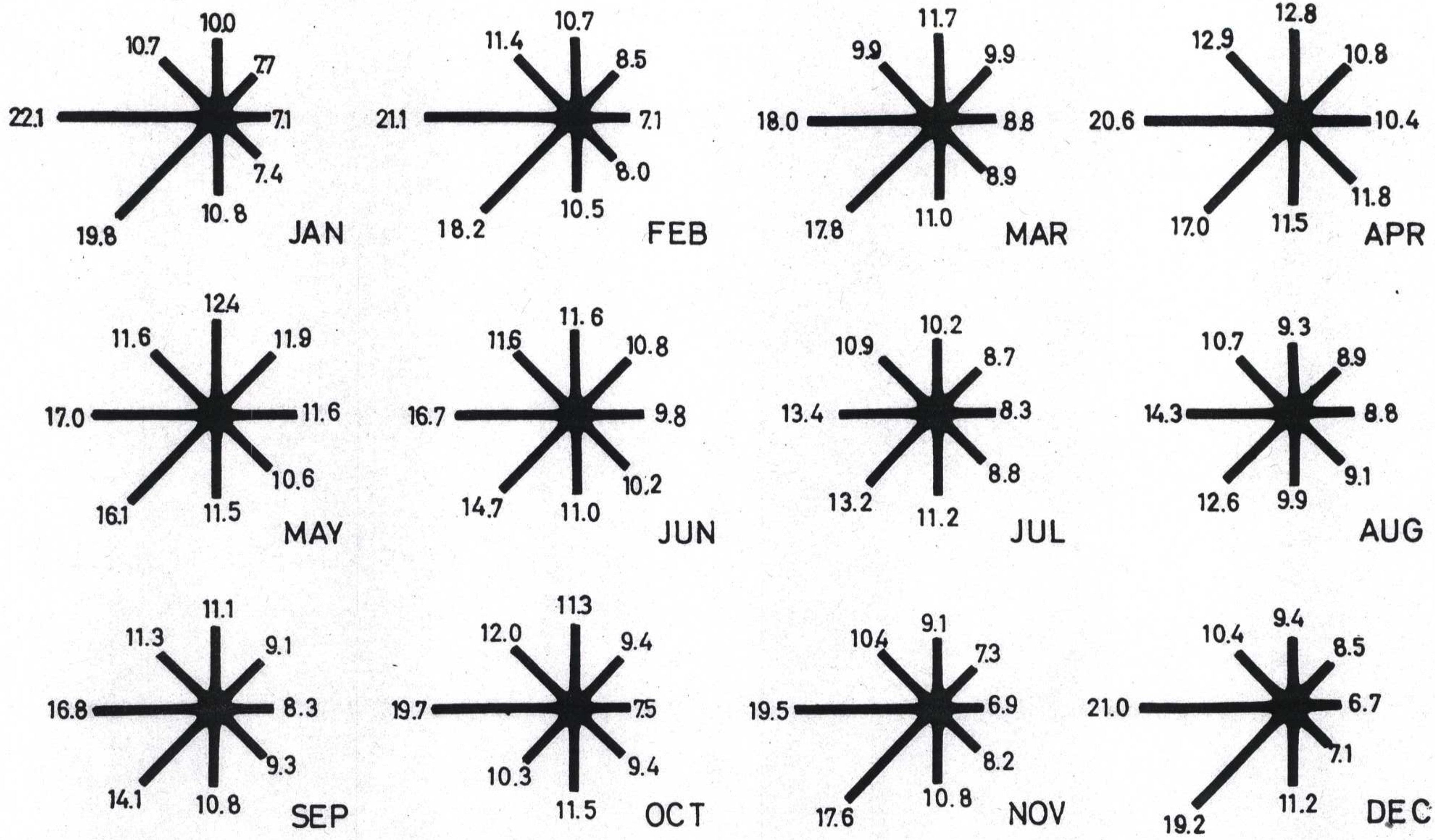
CLIMATIC DATA FROM SUMMARIES PROVIDED BY
D. H. SMITH
REGIONAL METEOROLOGIST
DEPARTMENT OF TRANSPORT
EDMONTON, ALBERTA



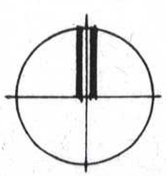
MONTHLY % FREQUENCY OF WIND



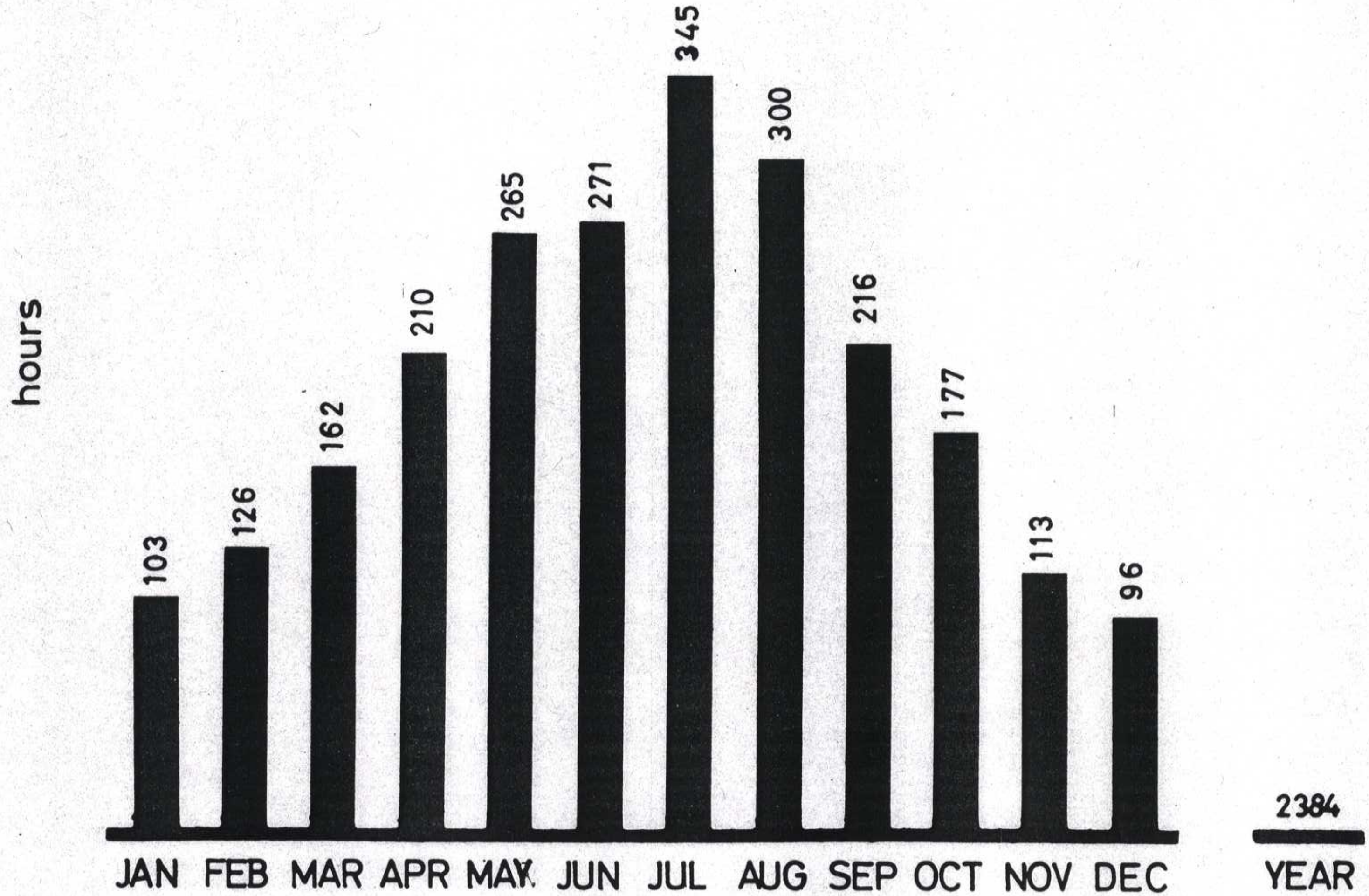
A1



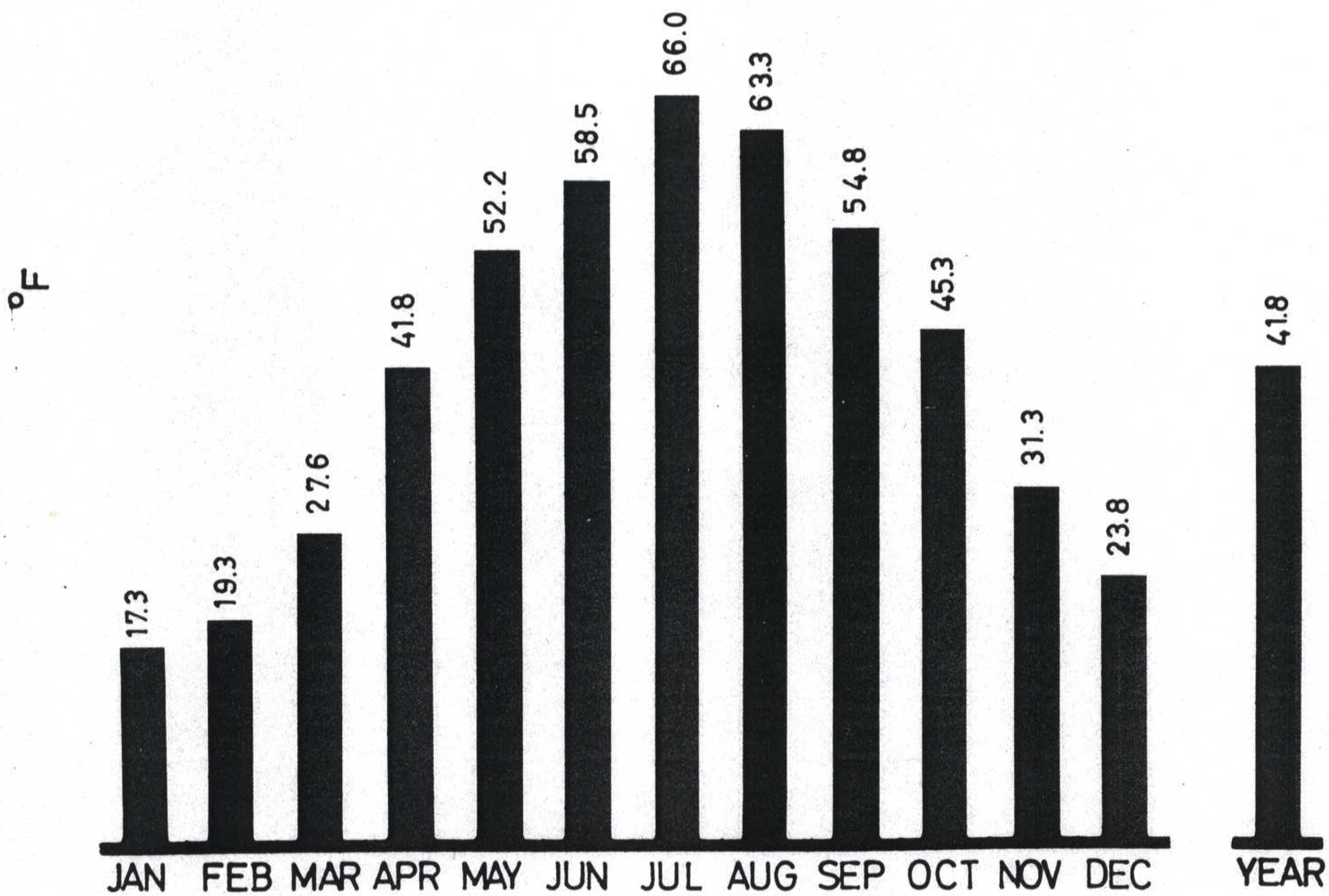
MONTHLY WIND VELOCITY (MPH)



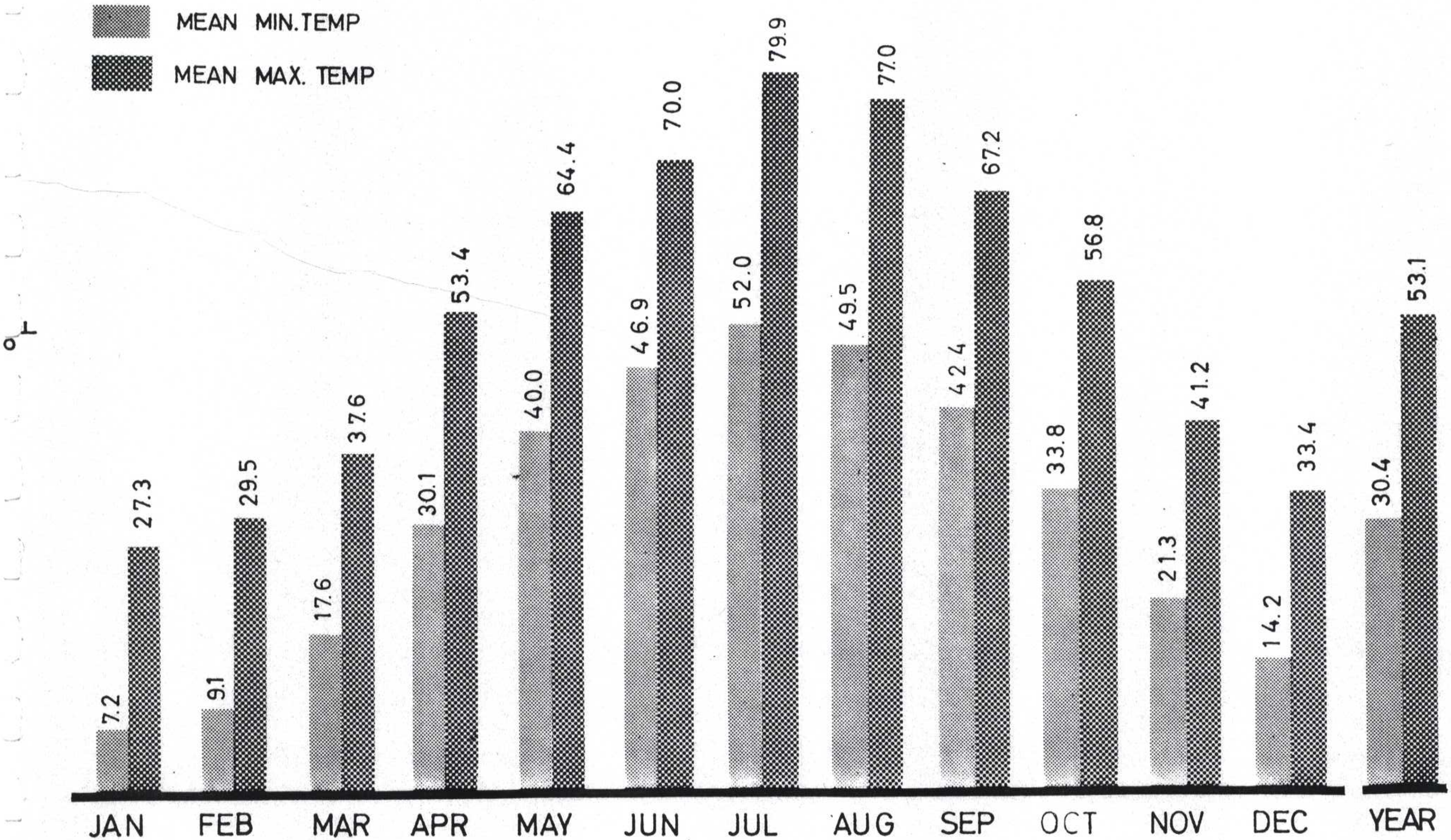
A2



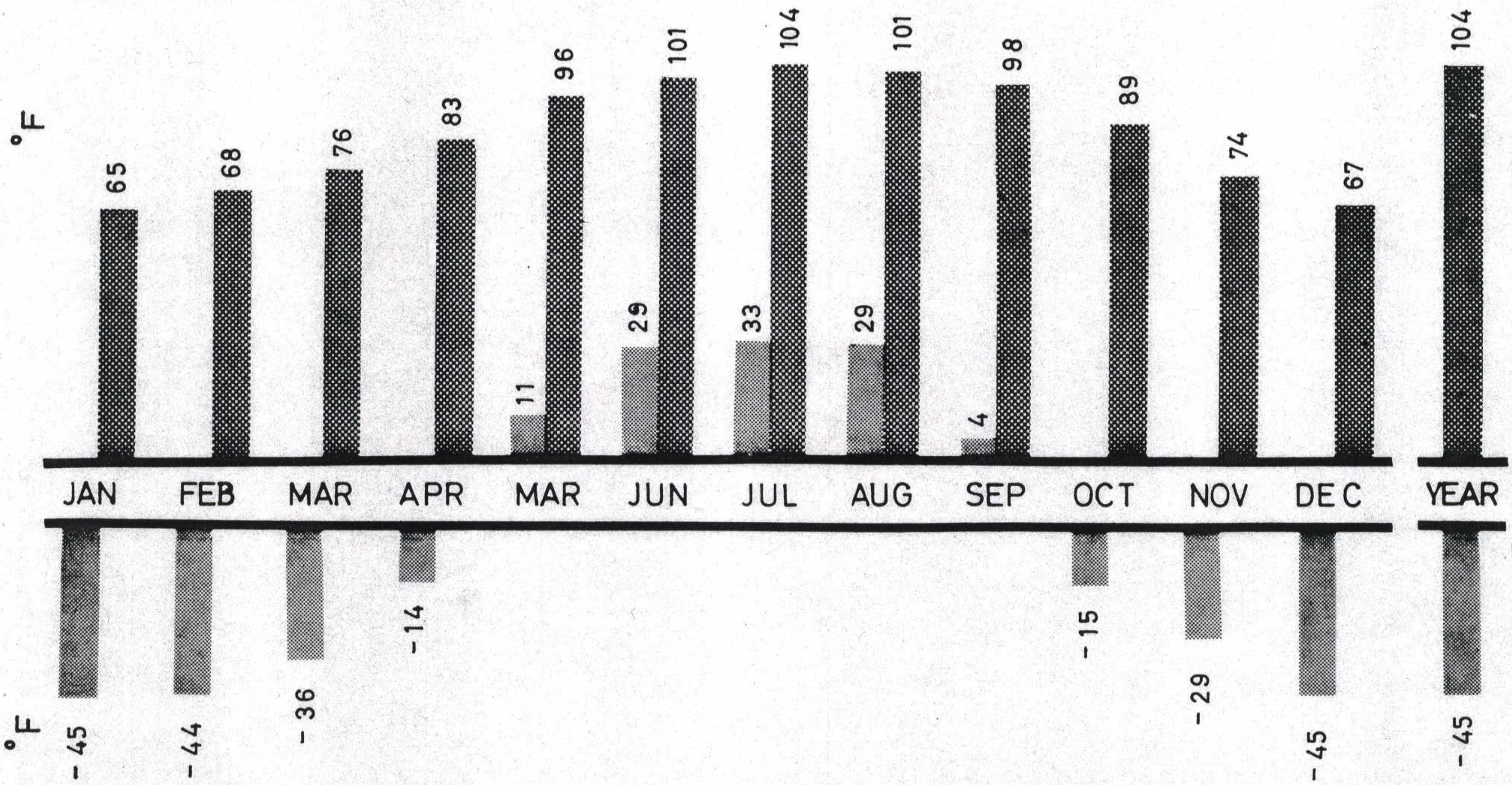
MEAN MONTHLY & ANNUAL NUMBER OF HOURS OF BRIGHT SUNSHINE



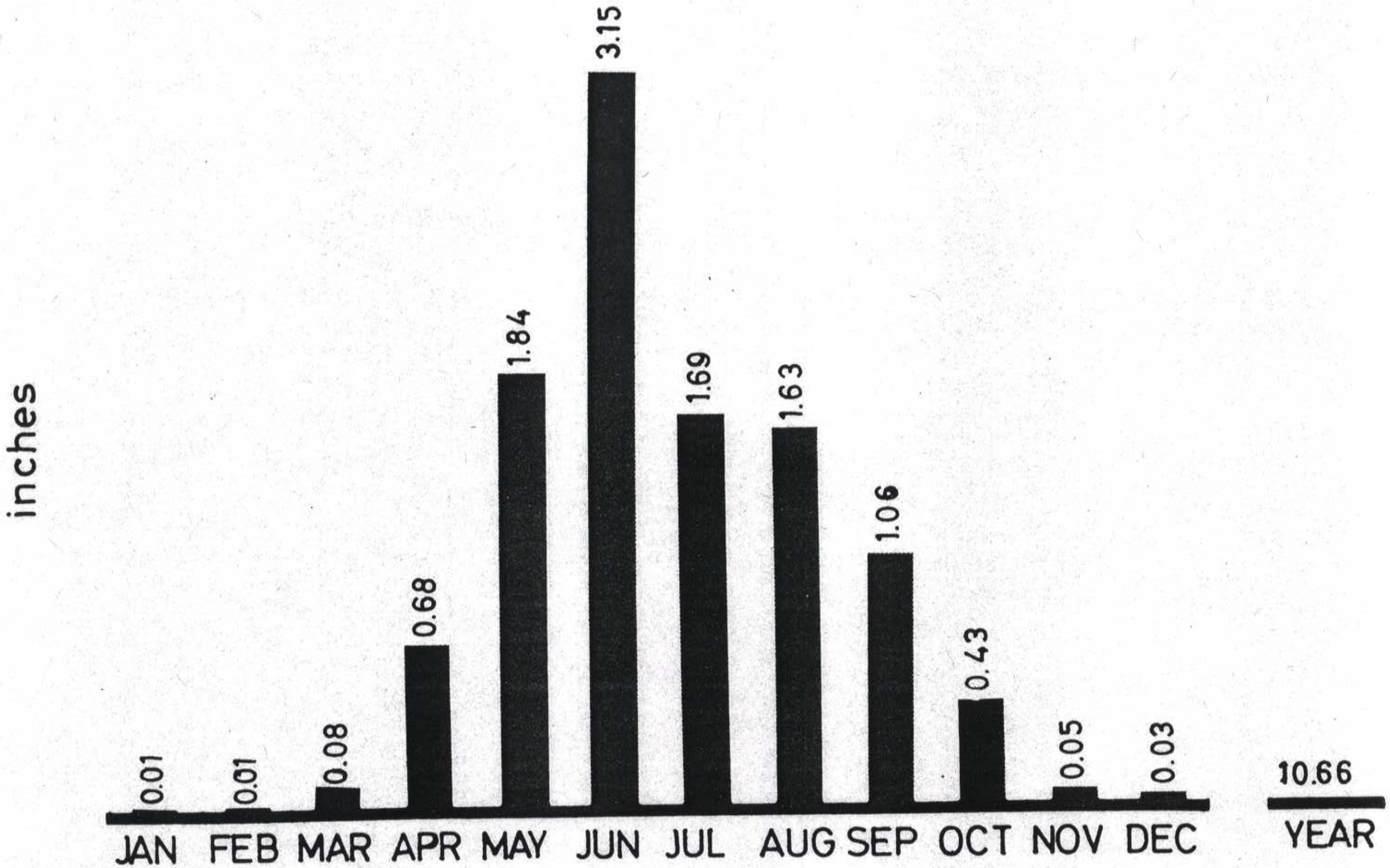
MONTHLY & ANNUAL MEAN TEMPERATURE



MONTHLY & ANNUAL MAX. & MIN. TEMPERATURE RANGES

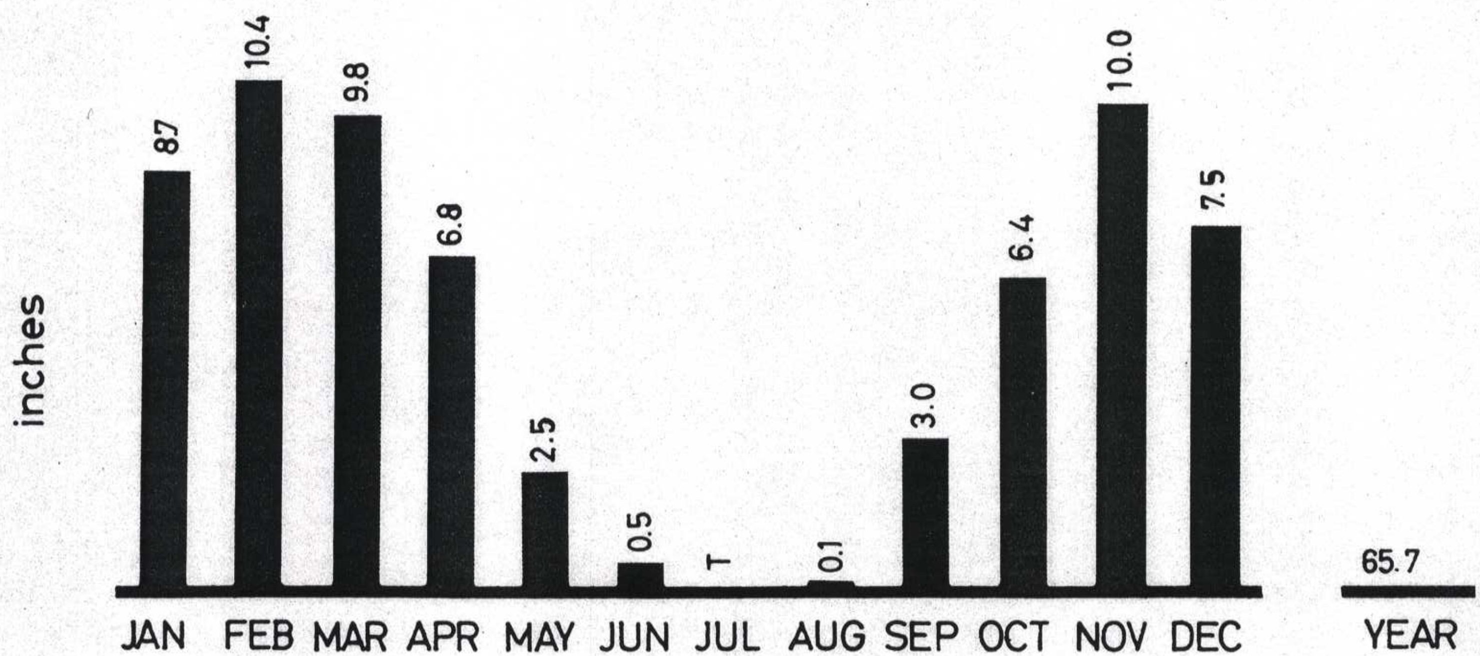


MONTHLY & ANNUAL EXTREMES OF TEMPERATURE



MONTHLY & ANNUAL PRECIPITATION IN INCHES

RAIN



MONTHLY & ANNUAL PRECIPITATION IN INCHES

SNOW

APPENDIX B

PRELIMINARY SUBSOIL INVESTIGATION

EXCERPTS FROM REPORT PREPARED BY
RIPLEY, KLOHN, LEONOFF & BROOKER LTD.

APPENDIX B

PRELIMINARY SUBSOIL INVESTIGATION
UNIVERSITY OF LETHBRIDGE
LETHBRIDGE, ALBERTA

Prepared by:
RIPLEY, KLOHN, LEONOFF & BROOKER LTD.

I. INTRODUCTION

This report presents the results of our preliminary subsoil investigation at the site of the proposed University of Lethbridge, together with analyses of data and general recommendations concerning foundation support for structure and stability of slopes.

At the time of writing, the type and location of the proposed structures had not been finalized; however, the architects have indications for the initial structures. The field investigation was, therefore, carried out within these areas.

II. CONCLUSIONS AND RECOMMENDATIONS

A. Assessment of Subsoil Conditions

In general, subsoil conditions across the proposed University site are good. On the basis of the information available to date, the foundation conditions within Sections 24 and 25 are essentially the same.

The subsoils consist of lacustrine deposits of layered sands, silts and clays overlying stiff glacial till soils. The soils are badly weathered and desiccated to a depth of approximately 15 feet below ground surface.

The lacustrine deposits are more predominent towards the west half of Section 25 and were not encountered in test holes drilled on Section 24. However, we expect that the lacustrine soils will be located in isolated patches throughout the area. We estimate that the thickness of the lacustrine materials will not exceed approximately 15 feet below ground surface.

not likely over 10' - below

The glacial till underlying the entire site consists of stiff to very stiff, silty clay containing gravel and coal particles. Pockets and layers of sand are located within the glacial till deposit. The till is relatively incompressible, has a low swelling potential and exhibits high shear strength. Wherever possible, foundation support for structures should be located within undisturbed glacial till soils.

The long term static ground water table at the site is located at depth. Test results indicate that the soil deposits are only partially saturated to depths in excess of 50 feet; however, temporary perched water tables may be encountered across the site as a result of leakage from water storage facilities and irrigation canals and movement of runoff downslope towards the adjacent river valley.

The natural slopes of the erosion gullies on the east side of the proposed University site range from 2.0 horizontal to 1 vertical to 3.5 horizontal to 1 vertical. There is evidence of surface creep movement and shallow slump movements along the gullies in both Section 24 and Section 25.

B. Support of Structures Not Adjacent to Gully Slopes

Either spread footings or augered, cast-in-place concrete piles may be employed for foundation support for structures located on glacial till subsoils. The final choice of the method of foundation support will depend upon the relative economics of the two foundation types, design loads, basement requirements, the depth to glacial till, etc.

Allowable footing pressures for the glacial till subsoils will vary across the site due to the natural variability of the till soils and the presence of perched water tables. As a preliminary estimate, we expect that the allowable net bearing pressures for spread footings located within the glacial till soils will fall between the following values:

square or
rectangular footing......5500-7500 psf

continuous or
strip footing...........4000-6000 psf

Augered, cast-in-place, concrete piles can be successfully installed in the glacial till soil at this site. However, at locations where perched groundwater tables are encountered, casing or sleeving may be required to maintain open pile holes during placement of foundation concrete. We expect that pile bases can be belled without difficulty in the glacial till. The following range of skin friction and end-bearing values are to be expected for augered, cast-in-place concrete piles in glacial till soil:

skin friction (neglect
upper 6 feet of soil)..........500-750 psf

allowable end-bearing
(will depend upon depth and
diameter of pile base).......6000-12000 psf

Relatively light structures, such as small buildings, roadways, parking lots, etc., may be founded directly on the lacustrine soils. However, these soils are variable and load-settlement characteristics will vary from location to location. In addition, isolated patches of highly plastic clay soils having relatively high swelling potentials may be encountered. Thus, recommendations concerning allowable footing pressures for foundation on the lacustrine soil deposits cannot be made at this time and must be based on field investigations carried out at individual structure locations.

C. Support of Structures Adjacent to Gully Slopes

Our field observations and slope stability analyses indicate that gully slopes having a gradient of 2 horizontal to 1 vertical, or flatter, are generally stable. Buildings can be constructed adjacent to the upper edges of the stable gully slopes. These structures will probably require deep foundations, design provisions for disposal of runoff water and minimum disturbance of native vegatative cover adjacent to the structures. Specific recommendations will be dependent upon proposed building loads, structure locations and building configuration. Water and sewer lines must not leak to avoid increases in subsoil moisture on the gully slopes.

D. Control of Erosion *

Runoff from roof drains and from paved areas should be disposed of into storm sewers. The runoff should not be allowed to discharge into the gullies. The existing native vegetation at the bottom of the gullies should be left undisturbed. Consideration should be given to the establishment of additional drought-resistant vegetation within the gullies.

E. Depth of Footings and Services

To ensure that footings and service lines will be unaffected by frost, we recommend that all footings should be located at a minimum depth of four feet below finished outside grade. Service lines such as water and sewer should be located at a minimum depth of six feet below ground surface.

F. Soil Sulphates ? point of consideration

Analyses of the soluble sulphate content of the soils at the proposed University site indicates that a relatively high concentration of soluble sulphate is present. For the concentrations indicated, normal practice is to utlize sulphate resistance cement in all concrete in contact with the native soil. However, the groundwater conditions at this location are not adverse and it may be possible to utilize normal Portland Cement in foundation concrete provided migration of groundwater through the concrete does not occur.

III. CLIMATE AND GEOLOGY

The City of Lethbridge is located in the southerly portion of the Province of Alberta within a climate area which may be classified as semi-arid, characterized by relatively low annual precipitation and hot dry winds in summertime. The approximate mean annual temperature for the area is 40°F. The National Building Code of Canada lists the mean annual precipitation as 17 inches. Droughts in the area are frequent and evaporation is fairly high. Maximum recorded 15-minute and one-day rainfalls are 0.5 inches and 3.5 inches, respectively. Heavy snowfalls followed by relatively rapid melting and runoff are not uncommon. The depth of frost penetration into the ground is variable and depends upon surface vegetation, snow cover, soil type, groundwater conditions, etc.; however, the average depth of frost penetration is less than that experienced in the Calgary or Edmonton areas.

The sequence of the deposits in order of increasing depth is summarized as follows:

Material	Approximate Thickness (feet)
Lacustrine	0 - 25
Glacial Till	150 - 250
Saskatchewan Sand & Gravel	10 - 25
Bedrock	-

The bedrock in the Lethbridge area consists of Cretacious sandstones, siltstones, coal seams and shale beds.

Geological reports indicate that the area has been subjected to several stages of glaciation during the Pleistocene period. It has been estimated that the maximum thickness of the glaciers that covered the area is of the order of 2200 feet. Prior to glaciation, the area was crossed by a drainage system of rivers and streams. The preglacial valleys were infilled with deposits of sand and gravel (Saskatchewan Sands and Gravels) that were subsequently buried beneath the more recent glacial deposits. East of the University site, the Oldman River channel intersects a preglacial valley, and the Saskatchewan Sand and Gravel deposits are exposed on the valley walls. Where these gravels outcrop, they are dry, suggesting that the general migration of water from precipitation and irrigation is downward through the surficial deposits into the pervious gravels.

Geologic investigations have shown that at least four till sheets mantle the Saskatchewan Sands and Gravels. The total thickness of the glacial till deposits ranges from 150 to 25 feet. During the last glacial advance, the ice thickness has been estimated at 2000 feet. Thus, the till deposits have been quite heavily preloaded.

The surface soils consist of lacustrine silts and clays containing pockets of pervious sand. The lacustrine sediments have been laid down on the surface of a hummocky moraine.

Irrigation of farmland in the Lethbridge area is carried on extensively. Irrigation canals, ditches and surface storage reservoirs and "dug-outs" are located throughout the area. The long term, static groundwater table is located well below ground surface. However, infiltration of water from rainfall, snow melt and leakage from the irrigation system may result in temporary perched water tables located at relatively shallow depth below ground surface. Within the City of Lethbridge, problems have been encountered with groundwater seepage into basement excavations and augered foundation pile holes. It is extremely difficult to predict those locations where groundwater seepage may prove troublesome as this will depend upon the random scattering of sand pockets within the upper lacustrine soil and within the till deposits.

IV. FIELD AND LABORATORY INVESTIGATION

Fifteen test holes were drilled using a rotary drilling machine. All but one of the test holes were dry-augered; drilling water was not utilized to advance the test holes. The field drilling program extended over the period June 3 to June 10, inclusive. A total of approximately 600 feet of drilling was completed in this time. Disturbed and undisturbed samples of soil were obtained from all test holes for the purpose of classifying the soils encountered. Standard penetration tests were performed at selected depths in each test hole. Slotted galvanized metal standpipes were installed in four test holes across the site to permit periodic observation of groundwater levels.

All samples were visually examined and classified in our laboratory. Water content determinations were carried out on each sample. Atterburg Limit tests were performed on selected samples in order to assist in the classification of the soils. The unconfined compressive strength of 14 samples was determined using standard laboratory shear strength testing techniques. In addition, the unconfined compressive strengths of both shelby tubes and split tube samples were obtained using a calibrated penetration device. Four consolidation tests were run on representative undisturbed soil samples to determine the load-settlement and swelling characteristics of the native subsoils. Consolidated-quick triaxial tests with pore pressure measurements were carried out to determine the effective stress parameters of the glacial till soil. In addition, direct shear tests were performed to determine the residual strength parameters of the clay till.

V. DESCRIPTION OF SITE AND SUBSOIL CONDITIONS

The major topographic features at the site are the Oldman River Valley with its numerous tributary erosion gullies that extend 1500 to 3000 feet westward from the river channel. The gullies are separated by spur-like extensions of the upland area.

The ground surface west of the tributary gullies slopes in an easterly direction towards the Oldman River. The difference in elevation between the highland and the Oldman River Channel is approximately 300 feet. On this highland or prairie level, the ground surface is gently undulating and is presently utilized as cultivated cereal crop farmland. This farmland has been irrigated in the past and small water reservoirs have been created by damming natural runoff channels at several locations on Section 24 and Section 25. The approximate location of the major irrigation canal in the area is shown on Drawing No. A-59-1.

Approximately 15 feet of lacustrine silt and clay are present in a roadcut in the northwest corner of Section 25. A previous investigation carried out in 1963 indicated that silt materials were located along the north-south road bounding the west side of Section 25. In the majority of the test holes drilled during the present investigation, lacustrine silts or clays were not encountered and glacial till soils were present at ground surface. This indicates that, at the eastern part of the site, the surface lacustrine soils have been removed by erosion.

The glacial till consists of a low to medium plastic sandy clay containing gravel and salt accumulations. The till has been badly weathered to a depth of approximately 15 feet, through seasonal and long-term moisture content changes. Drying or desiccation of the soils has resulted in the formulation of a nuggety soil structure and development of vertical fissures. The fissures are infilled with deposits of salt and sodium sulphate (gypsum) and the fissure faces are coated with oxides. Below a depth of approximately 15 feet, weathering and fissuring is less pronounced; however, examination of the soil samples in all test holes shows that the soil has been weathered and oxidized to a depth of at least 50 feet.

Some seepage water was encountered in test holes 1004 and 1009; however, the measured water levels in these test holes do not reflect the long-term static groundwater level in the area, but are a result of seepage of water from surface storage reservoirs, the irrigation canal west of the site and from migration of precipitation downslope towards the river.

Test holes on cultivated ground generally exhibited higher soil water contents near the ground surface than did those test holes located on uncultivated pasture or meadow areas. This difference in moisture content in the upper soil between cultivated and uncultivated areas is a result of topography, irrigation and land use. In the immediate vicinity of irrigation canals and water storage reservoirs, "perched" water tables resulting from leakage will occur. The resulting increased soil moisture content will lead to softer soil conditions than occur in adjacent weathered or desiccated soils.

VI. SLOPE STABILITY

The architects have indicated that the proposed University development will probably be located close to the east side of the site. Thus, a major consideration in the design of the structures, access roadways, service lines, etc., is the short-term and long-term stability of the river banks in the vicinity.

As part of this preliminary investigation, slopes on both the east and west sides of the Oldman River near the proposed University site were critically examined by the writer. A number of landslides were observed. These landslides may be classified into two general types:

(a) deep-seated, rotational slides within the glacial till, involving many thousands of cubic yards of soil moving towards the Oldman River;

(b) relatively shallow, slump-type slides with movement on slip surfaces parallel to ground surface, occurring on the sides of tributary erosion gullies.

Two deep-seated rotational-type slides were observed. The unstable areas are along the Oldman River, north of the proposed University site at a location where the river flow impinges on the bank. The most northerly slide encompasses the west abutment of the Canadian Pacific Railway trestle which apparently has experienced some movement and has required repairs.

An abandoned coal mine is located on Section 35, Township 8, Range 22, W4M. According to information received from Mr. M.S. Mitchell, of Robins, Mitchell and Watson, the mined area extends to approximately the south boundary of Section 35, where mining of the coal was discontinued when difficulties were encountered in maintaining roof support for the mine tunnels. We suspect that the deep-seated movement observed within Section 35 is associated with subsidence of the overburden materials into the old mine working and with river erosion at the toe of the slopes. Mr. Mitchell indicated that he had conducted a survey of the mine operators in the area and learned that the coal mine located on Section 35 is the nearest known area of mining to the proposed University site. Serious subsidence and resulting damage to structures founded above previously-mined areas are common. A double check of available records should be made to assure that mining has not been carried out beneath the surface of the proposed University site.

The second type of slope failures observed in the bround survey are relatively shallow, surface slumps, occurring in a direction perpendicular to the main axes of the tributary erosion gullies. Examination of a number of these slides indicates that they are caused by saturation of the weathered and fissured surface soils during periods of heavy rainfall or following periods of rapid snow melt and runoff. The surface layer of soil to a depth of 10 or, perhaps, 15 feet becomes saturated and the fissures become filled with water. The increase in soil pore water pressure and hydrostatic pressures due to water in the fissures causes slumping and downhill movement.

Slope stability analyses were carried out, based on the results of triaxial tests and probable groundwater conditions at the time of slope failure. The analyses indicate that gully slopes of 2 horizontal to 1 vertical, or flatter, will remain stable, provided that adequate slope drainage is provided and toe erosion is not allowed to occur.

In addition to the two types of slides mentioned above, a third type of slope failure was also observed on the east side of the Oldman River in two tributary gullies into which storm sewer water was discharged. Discharge from the storm sewers has resulted in deep erosion cuts in the base of the gullies. In places, the erosion cuts have proceeded through the overlying till, the Saskatchewan Sands and Gravels, and into bedrock. Vertical erosion faces in excess of 30 feet in height have been left standing in the base of the gullies. These vertical slopes disintegrate through drying and development of hydrostatic water pressures in vertical fissures, resulting in triangular wedges of soil being carried into the base of the gully.

These photographs point out the necessity of preventing excess flow down the gullies and show that the native glacial till and lacustrine soils are extremely susceptible to erosion.

To summarize, it would appear that the process of valley widening and downcutting along the east side of the Oldman River follows the following sequence: the tributary gullies are deepened and lengthened by headward erosion resulting from runoff discharging down the gully. As the base of the gully is eroded, movement of soil as blocks or chunks occurs perpendicular to the axis of the gully. The gully is then progressively widened by downslope creep movements and localized shallow slump movements.

We expect that deep-seated slope movements at the heads of spurs between gullies will not occur on the east side of the proposed University site on Sections 24 and 25. However, slow creep movements involving a relatively shallow depth of soil are to be expected along the gullies and localized shallow, planar, slump movements may also occur. The possibility of occurrance of these shallow slope movements will be increased if precautions are not taken to prevent erosion at the base of the gullies caused by discharge of surplus runoff down the gullies.

Under the present conditions of topography and vegetative cover, a delicate state of balance exists. Present runoff conditions have produced active erosion at isolated locations at the bottom of the existing gullies.

The development of roofed and paved areas adjacent to the upper edges of gully slopes will greatly increase the amount of runoff available from the upland areas. Runoff from roof drains and paved areas must be disposed of by means of storm drains. If the runoff were to be discharged into the gullies, rapid erosion would occur at the bottom of the gullies. The development of a deep erosion notch in the bottom of a gully would lead to creep movements and instability of the side slopes.

APPENDIX C

TRAFFIC AND PARKING

REPORT PREPARED BY
STANLEY ASSOCIATES ENGINEERING LTD.

APPENDIX C

TRAFFIC AND PARKING
UNIVERSITY OF LETHBRIDGE
LETHBRIDGE, ALBERTA

Prepared by:
STANLEY ASSOCIATES ENGINEERING LTD.

We have studied the traffic and parking requirements of the proposed University of Lethbridge and are herein forwarding our final estimates for a student population of 5,000.

We recommend that 2,800 parking stalls be provided to accommodate a campus population of 5,000 students. This estimate includes parking stalls for students, staff, faculty, administration. Approximately one in four of the resident students will own cars, while the car occupancy ratio for off-campus students will be approximately 1.3. Transit is not expected to be a significant mode of transportation. Approximately ten per cent of the off-campus students will use transit as their principal mode of transportation and an additional ten per cent of the off-campus students will walk. Approximately 80 per cent of the staff, faculty and administration will own cars, of which 85 per cent will be on campus during the peak period; 75 per cent of the off-campus student vehicles will be on campus during the peak parking period.

In calculating the number of parking stalls required, the variability of on-site residence does not result in a correspondingly significant variation in the required number of parking stalls. The significant parameter in estimating the total number of parking stalls required is the car occupancy ratio for off-campus students. Car occupancy is a floating parameter which adjusts itself to the number of available parking spaces--the fewer parking spaces available, the higher the car occupancy ratio becomes and vice versa.

The recommended 2,800 parking stalls provides a parking ratio of 46 stalls per 100 persons, which will provide a good level of service when compared to existing universities.

Since the arrival of vehicles at universities of this size is concentrated into a relatively short 20 minutes before the first class commences, high capacity entrances and vehicular circulation networks must be provided. The design vehicular attraction rate for the University of Lethbridge (5,000 students) is 3,000 vehicles per hour (vph).

If, under ideal conditions, there was one four-lane roadway leading directly into the campus parking lot, then one entrance could be tolerated. Since this is highly unlikely, two high capacity entrances will be required to accommodate 3,000 vph. For the two entrances to be effective, they must be sufficiently separated so as not to interact with one another. This can most effectively be accomplished by locating one entrance near the north end of the campus and one at the south end of the campus.

To accommodate the peak hour vehicular generation rate of 3,000 vph, each entrance will require double left-turn lanes. Eventually, traffic signals will be required at these entrances because northbound through-traffic on the major north-south arterial road will conflict with the left-turning vehicles entering the campus. As the northbound traffic becomes larger, a decreasing amount of time will become available for the left-turning vehicles entering the campus. Eventually, conditions will exist when even these two entrances will not provide free flow, at all times, to the University traffic.

The turnabout at the entrance is an excellent concept that will provide a high level of service for transit vehicles.

We propose that 1,600 parking stalls be constructed. The cost estimate for Phase 1 is $430,000, comprised of $110,000 for the access roads and $320,000 for the parking lot (including earthwork, paving curbs, engineering design and supervision fees).

APPENDIX D

PRELIMINARY ENGINEERING STUDY OF
MUNICIPAL SITE SERVICING

EXCERPTS FROM REPORT PREPARED BY
STANLEY ASSOCIATES ENGINEERING LTD.

APPENDIX D

PRELIMINARY ENGINEERING STUDY OF MUNICIPAL
SITE SERVICING
UNIVERSITY OF LETHBRIDGE
LETHBRIDGE, ALBERTA

Prepared by:
STANLEY ASSOCIATES ENGINEERING LTD.

I. INTRODUCTION

The study area generally comprises the west half of Section 25 and a small portion of Section 26, Township 8, Range 22, W4. Water supply and distribution and sanitary sewage collection were considered relative to the development plan siting proposal. Storm drainage is related to the entire area west of the University involved in the development of a 5,000 FTE student University.

The easterly sloping trend is sharply broken by the same ravines with the sharp hogbacks which occur between adjacent gullies forming effective barriers to easy north-south sewer traverses.

II. POPULATION ASSUMPTIONS

Our study was based on an initial university population of 1,500 'full-time-equivalent students', increasing to an ultimate population of 5,000 FTE students.

We assumed, for purposes of both this study and our recently completed West Lethbridge Servicing Study that the University of Lethbridge will reach its ultimate size of 5,000 FTE students by 1980. University projections have subsequently been received which compare closely with the projections used for preliminary design.

The possibility of growth beyond 5,000 FTE students was considered for the sanitary sewer system, but it has not been considered in detail relative to the water supply system. Storm sewers and drainage provisions are not particularly affected by the number of students, drainage being mostly related to the characteristics and size of the drainage area. Only two stages of development have been considered with the timing for staging beyond the initial phase purposely omitted.

III. WATER SUPPLY

A. General

Utilizing information provided by Reid Crowther concerning potable water requirements and our estimate of cooling water, lawn sprinkling water and fire fighting needs, we forecasted the total university water demand for three sizes of university: 1,500, 2,000 and 5,000 full time equivalent students.

The source of water supply was assumed to be the proposed City supply which is to pass immediately north of the University buildings.

B. Design Criteria and Concepts

The various elements that comprise a water supply and basic distribution system are determined and sized on the basis of physical conditions, such as static head difference, desired performance levels, such as minimum line pressures, and on water demands for "domestic consumption; and for fire fighting. The physical conditions of the area and pertinent items such as the City's supply line location are illustrated on Figure C.A-1.

1. Operating Pressures

A normal pressure of 75 psi is provided at the campus with a minimum terminal pressure of 20 psi to be provided at the top floors of the structures.

The Canadian Underwriters' Association Standards recommend the design of waterworks system to provide a minimum residual pressure at fire hydrants of 20 psi during fire flows.

2. Water Demands

The University's water demand arises from four areas of requirement: potable water, cooling, lawn sprinkling and fire fighting needs. Two rates for potable water demand were estimated by Reid Crowther. The estimated peak hourly demands that they estimated were 680 and 2280 US gpm for a 2,000 and a 5,000 FTE Student University, respectively.

To determine maximum daily demands, a factor of 1.5 was assumed to represent the ratio between maximum daily and maximum hourly flow.

Cooling water required for system makeup only was estimated based on suggestions from the University planners as to possible types of cooling schemes which might be used. These estimates were recently confirmed by Reid Crowther.

Information supplied by the University planners was used to estimate the lawn sprinkling demand rate. This rate was applied to areas we estimated might be devoted to lawns at the three sizings of the University considered to determine water requirements for lawn sprinkling. If cooling water is taken directly from the river, some economy might result by using part of the outflow to replace City water for lawn sprinkling. This would reduce water requirements, both by eliminating cooling water makeup and sprinkling water. However, this would not significantly alter the pipe sizing established in this preliminary investigation.

3. Fire Flow Demands

Critical fire flow requirements, in conjunction with the previously outlined daily flow demands, establish storage requirements and related pumping needs, as well as feeder main sizing. Fire flow values are generally set by the Canadian Underwriters' Association for any area or building, dependent on occupancy, structural conditions and building congestion.

Discussions were held with Mr. A. MacDonald, Superintendent, Special Risks Division of the Canadian Underwriters' Association to ascertain a fire demand rate. Mr. MacDonald indicated that a fire flow of 2,000 US gpm for four hours for a sprinklered building would allow the University of Lethbridge buildings to be rated under the Canadian Underwriters' Association Standards for Sprinklered Risks, subject to a one-supply system. A copy of Mr. MacDonald's letter confirming these discussions is included in the detailed engineering report.

It should be emphasized that these discussions were held with full awareness of the intended City supply. Until this time, it was believed possible that the Underwriters' requirements might be so stringent as to necessitate the construction of a University storage facility. In view of these discussions, we are now of the opinion that no storage will be required because of the reliability of the City system.

4. Storage Requirements

In a waterworks system, storage is used to provide the following:

a. Fire flows (for critical fire demand);

b. Peak demands for the part of the day when demand exceeds supply capacity; and,

c. Water during shutdown of supply facilities due to maintenance or breakdown.

As the west development proceeds, the City will be adding ground storage to their system, thus providing a dual supply for the entire west side. In addition, as the residential area develops, a further connection to the City's feeder system will provide a "looped" connection for the University area.

C. Projected Water Demands

Water demands have been estimated in this section to permit the development of a preliminary design for water supply and distribution for the University and to allow us to establish a staging program.

Table 3-2

Estimated University of Lethbridge Water Demand (US gpm)

Table 3-2-1 Maximum Hourly Demand and Fire Flow

Year End	Population	Potable	Cooling	Sprinkling	Total	Fire Flow
1970	1,500	510	150	200	860	2,000
1971	2,000	680	150	200	1,030	2,000
1980	5,000	2,280	300	300	2,880	2,000

Table 3-2-2 Maximum Daily Demand

Year End	Population (FTE)	Potable	Cooling	Sprinkling	Total
1970	1,500	350	150	200	700
1971	2,000	450	150	200	800
1980	5,000	1,520	300	300	2,120

D. Water Supply and Distribution System Design

Based on the provision of water at the point required for the University of Lethbridge connection by the City, it is recommended that a watermain loop to serve the University of Lethbridge complex be constructed in two stages as indicated on Figure C.A1.

The first stage with related hydrants and connections would parallel the west side of the buildings. The second stage, to be undertaken as soon as the north-south primary City feeder along the road on the west University boundary is completed, would provide a preferable two-feed system.

The recommended size of this watermain loop is 14"Ø. Because of the large variation in elevation between the lowest levels of the complex and the upper floors of buildings located higher on the slopes, and because of the high City supply line pressure, rather higher pressures than requested will exist in the lines, ranging from a static high of about 165 psi in the low points of the gullies to a low of about 110 psi at the top floors of the University buildings and about 75 psi at the top floors of the Residential Village. We would suggest that these pressures should be maintained in the feeder main and for the building sprinkler system, but that a pressure reduction should be considered for the domestic water feeds.

Cost of hydrants have been included in the following estimates based on the Canadian Underwriters' Association recommendations concerning maximum spacing (400 feet) and minimum distance from buildings (50 feet). No hydrants have been suggested for the east side of the structures due to accessibility which will be difficult to that area.

Cost Estimate

Based on the foregoing, a system was devised as illustrated on Figure F.A1. The system components and estimated costs for the two stages of installation proposed are outlined in Table 3-3. Cost estimates were prepared on the bases of 14"Ø asbestos cement main and 14"Ø welded steel line.

Table 3-3

University of Lethbridge Water System Components and Estimated Costs

System Element	Estimated Cost of 14"Ø Asbestos Cement Main	Estimated Cost of 14"Ø Steel Main
Stage I		
1. Feeder Main parallel to the initial University of Lethbridge buildings (2,270 LF), including hydrants and appurtenances	$61,000	$ 98,000
2. Building connections (two)	9,000	12,500
Total Cost of Stage I	$70,000	$110,500
Stage II		
1. 14"Ø feedermain loop connection	$47,000	$ 71,000
Total Cost of Stage II	$47,000	$ 71,000

E. Recommendations

The recommended preliminary scheme for first stage water supply to the University of Lethbridge involves:

1. Connections to the City supply line for the west development;

2. Installation of approximately 2,270 LF of steel 14"Ø water feeder main to provide the water demand projected for the initial and ultimate stages of the University;

3. Installation of hydrants in reasonable proximity to the west side of the buildings at a maximum spacing of 400 feet apart; and,

4. Installation of two 10"Ø connections to the initial two University structures.

IV STORM AND SANITARY SEWERAGE SYSTEM

In order to provide comparative cost estimates in a concise format, both storm and sanitary sewers have been considered together in this section of the report.

A. Sanitary Sewers

The investigation of sanitary sewer systems is concerned with devising means of collecting and conveying the sanitary sewage generated by the University and related facilities to the sanitary outfall sewer provided by the City economically.

1. Design Criteria and Concepts

In devising a sanitary sewerage system, the design factors include a determination of annual average daily flow and maximum hourly flows and groundwater infiltration. The criteria used for the preliminary design in this study, and which are recommended for final design, are as follows:

The maximum hourly sewage flow for the University at the three stages of development considered in this study were established by equating them to the maximum hourly potable water demands as estimated by Reid Crowther. Average daily flows were estimated by assuming a peaking factor of 2.5 to represent the relationship between daily and maximum hourly flows. In view of the approximate nature of this preliminary design, the relatively short footage of sewer involved, the soil information relative to groundwater depth and the reliability of pipe joints considered for these sewers, infiltration was assumed to be negligible and no allowance was made for flow from this source. This assumption will be reviewed prior to final design.

Generally, sewer design should provide minimum line velocities in excess of two feet per second; and it was on this basis that the preliminary design in this study was carried out. Design must be undertaken with consideration given to the wide variation in flows from the initial University of Lethbridge to the ultimate student university contemplated.

2. Estimated Sewage Flows

The estimated sewage flows for the projected stages of University development and possible ultimate University flows are indicated in Table 4-1.

Table 4-1

Estimated University of Lethbridge Sewage Flows

Year	Population	Average Flow	Maximum Flow
1970	1,500	.29 US MGD	.73 US MGD (510 US GPM) (1.13 cfs)
1971	2,000	.39 US MGD	.98 US MGD (680 US GPM) (1.51 cfs)
1980	5,500	1.31 US MGD	3.28 US MGD (2,280 US GPM) (5.07 cfs)
----	10,000	2.62 US MGD	6.56 US MGD (4,560 US GPM) (10.14 cfs)

3. Alternatives

Three feasible basic alternatives exist for providing sanitary sewering for the University:

a. A tunnel parallel to the initial buildings at a depth permitting gravity flow from the buildings, leading northerly to the City outfall sewer;

b. A system involving lift stations and forcemains leading to a gravity line flowing west of the University and north to the City's outfall sewer; and,

c. Gravity sewers flowing around the ravine contours to the City's outfall sewer.

The economics of the various possibilities or combination of possibilities must be considered in conjunction with the storm sewering schemes in order to properly appreciate the economic comparisons; therefore, before detailing the sanitary sewer schemes considered, it is important to first review the storm sewer provisions to be made which will then permit the inter-relationship between the two systems to be discussed and total costs of alternatives expressed.

B. Storm Sewer

In view of the University siting within the coulees, it is important that storm water and melt water runoff be intercepted and conducted via storm sewers from the area west of the structures, from concentrated areas of collection (such as the building roofs and paved areas) and from the steep coulee areas in the immediate vicinity of the University structures.

1. Design Criteria and Concepts

To permit a preliminary economic evaluation of alternate schemes for purposes of this study, storm runoff computations were based on a five-year storm return period, such as is presently used for design in the City of Lethbridge.

2. Storm Sewer Design and Staging

Based on the design criteria and concepts outlined above, a number of alternative storm and sanitary drainage schemes were compared and costed.

There are, in fact, an almost infinite number of possibilities for collecting the storm runoff from the area achieved by slight variation in location, grade and direction of the lines and related surface grading. Two reasonable collection systems were considered, each having two stages - initial and final. For the cost estimates in this study, the alternatives selected are indicative of the relative costs associated with storm collection. The staging may require some adjustment as Project I development occurs.

C. Alternative Sanitary and Storm Sewering Systems

Several storm and sanitary collection schemes were considered on the basis of the design criteria presented and four feasible potential combined sanitary and storm systems were analyzed.

The significant features of each of the alternatives analyzed are briefly stated and the estimated costs associated with each scheme are shown in the following tabulation.

Table 4-4

Alternate Sanitary and Storm Sewering Scheme Components and Estimated Costs

Component	Estimated Cost Stage I	Estimated Cost Stage II
Scheme 1: Dual Outfall Tunnel	$875,000	$138,000
Scheme 2: Separate Storm Outfalls-Sanitary via Contours	$501,000	$138,000
Scheme 3: Sanitary Lift Station-Separate Storm Outfalls		
1. Lift Stations, Forcemains & Gravity Sanitary Sewer	$216,500	$ ----
2. Capitalized cost of 30-year maintenance	96,500	----
3. Sanitary Collection System	----	30,000
4. Storm Outfalls	150,000	----
5. Storm Collection System	175,000	150,000
Total Scheme 3:	$638,000	$135,000
Scheme 4: Sanitary Tunnel-Storm Outfalls with Maximum Possible Use of City Outfalls		
1. Sanitary Sewer Tunnel Outfall	$480,000	----
2. Storm Outfalls	145,000	----
3. Storm Collection System	171,000	98,000
4. Sanitary Collection System	----	33,000
Total Scheme 4:	$796,000	$131,000

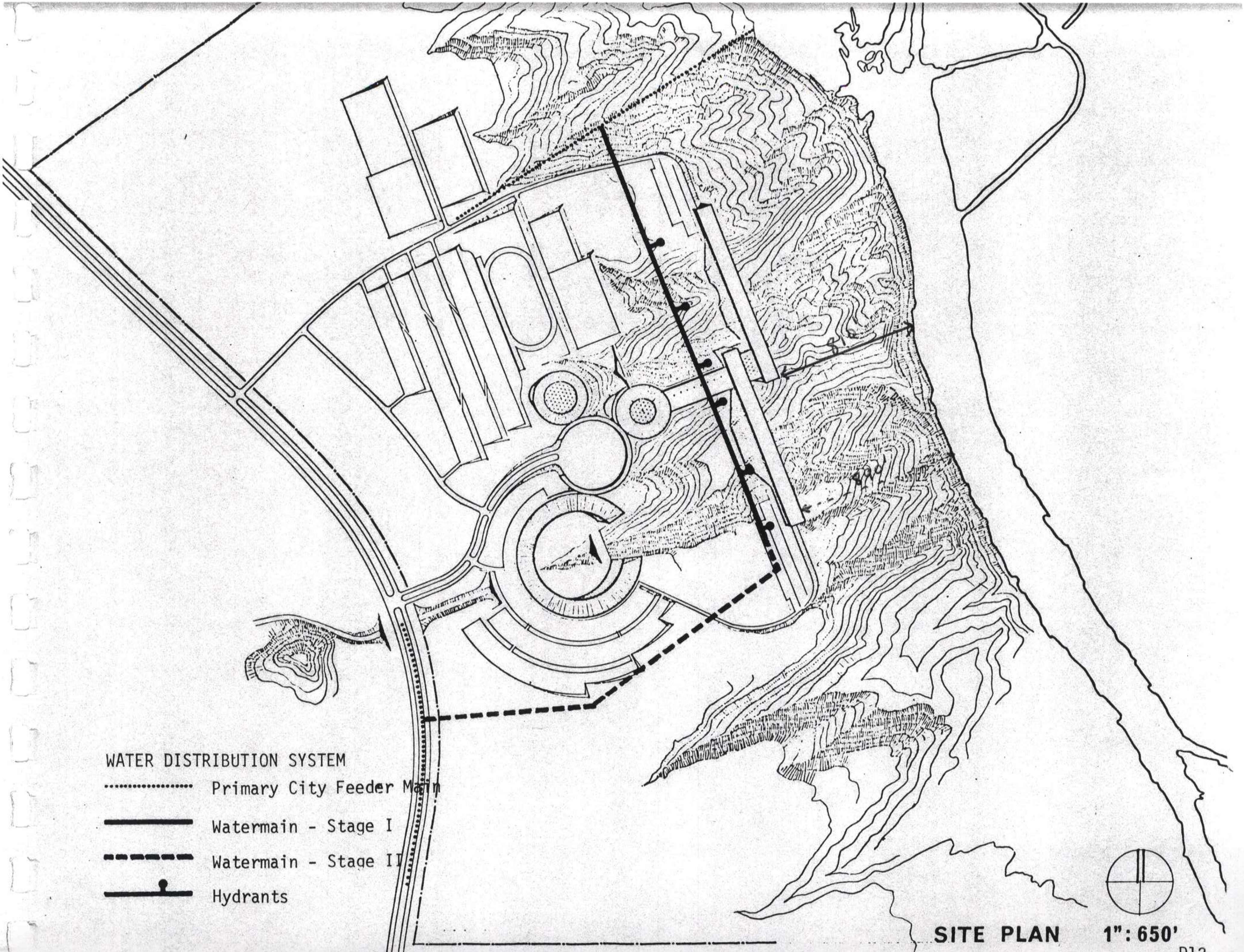
D. Recommendations

Scheme 1 is eliminated on the basis of cost.

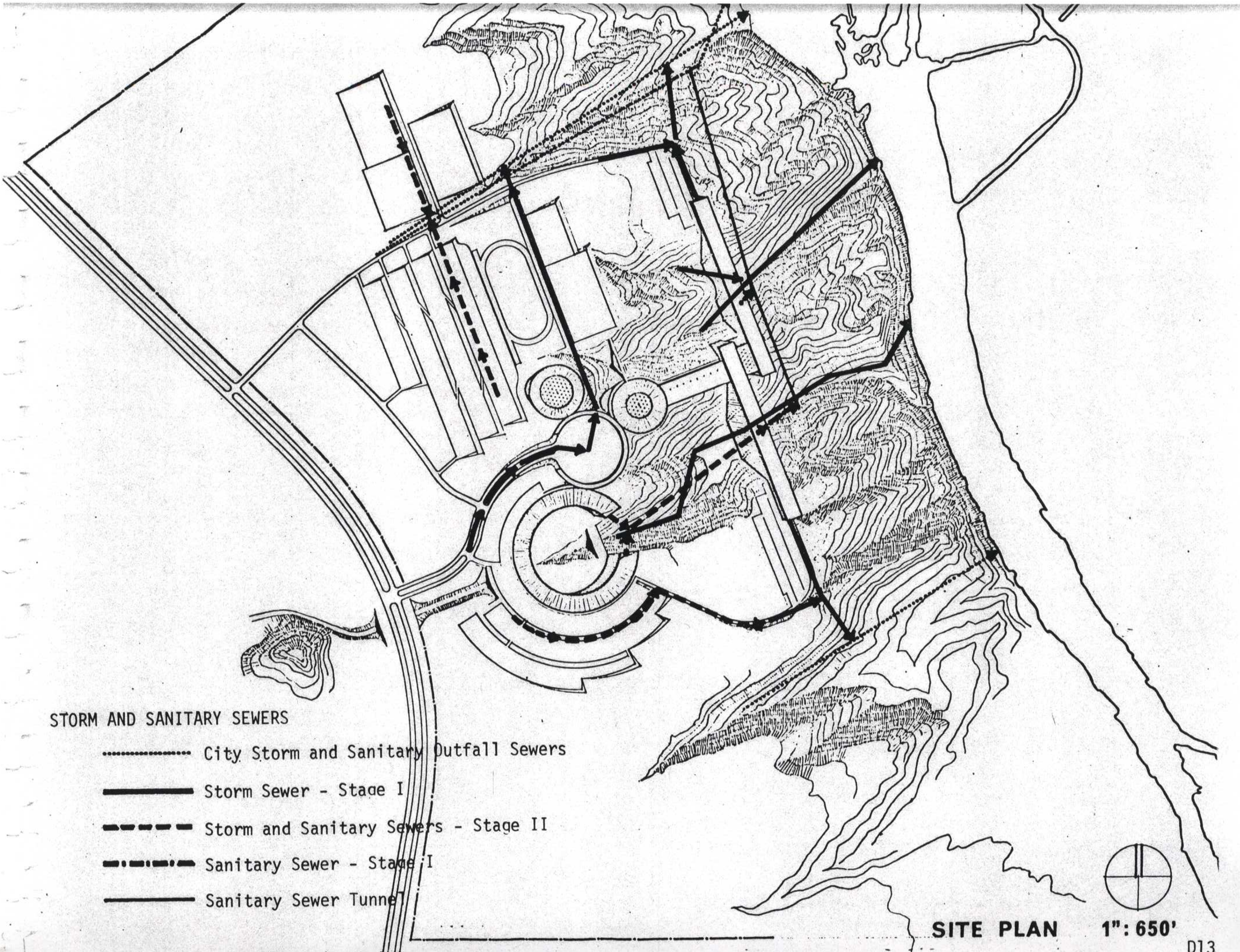
Although the comparison of storm and sanitary sewering alternatives indicates Scheme 2--involving a sanitary sewer line following the ravine contours--to be the most economical, it is our opinion that the cost does not reflect the undesirable factors involved in such a system. Although water leakage from the sewer could be eliminated by use of a cement-lined, yellow-jacketed steel pipe at an increased cost, there is still a possibility of surface water entering the cut during, or as a result of, construction, thereby upsetting slope stability. In addition, the line would still have a number of manholes which could considerably leak or, due to line blockage, overflow. The installation would also cause hillside scarring which would remain apparent for a number of years.

An effort to evaluate the nuisances of a lift station was made by including the capitalized cost of maintenance in the estimate of the lift station cost of Scheme 3.

Because of the unquantified disadvantages of the open cut alternative and the nuisances and limitations of a lift station system which would accomodate flows up to a design limit, it is our recommendation that detailed design be undertaken of Scheme 4--sanitary sewer tunnel scheme.



SITE PLAN 1":650'


STORM AND SANITARY SEWERS
City Storm and Sanitary Outfall Sewers
Storm Sewer - Stage I
Storm and Sanitary Sewers - Stage II
Sanitary Sewer - Stage I
Sanitary Sewer Tunnel
SITE PLAN 1": 650'

APPENDIX E

MECHANICAL REPORT

PREPARED BY
REID, CROWTHER & PARTNERS LTD.

APPENDIX E

MECHANICAL REPORT
UNIVERSITY OF LETHBRIDGE
LETHBRIDGE, ALBERTA

Prepared by:
REID, CROWTHER & PARTNERS LTD.

I. DESIGN CONDITIONS

The design conditions of the University will be based on maintaining a temperature of 72°F. and 20 per cent relative humidity during the winter months when the outside temperature reaches -30°F. with a wind velocity of 15 m.p.h. Although the equipment will be sized to maintain 50 per cent relative humidity, if this is done in cold weather, condensation will occur on the inside pane. A special exposure factor provides for the added heating load which occurs when high velocity winds are experienced. A temperature of 72°F. and 50 per cent relative humidity will be maintained during the summer months when the outdoor conditions are 90°F. dry bulb and 67°F. wet bulb.

Double glazing is assumed throughout with either heat-absorbing glass or clear glass, based on the understanding that, if clear glass is used, it must be shaded by external or internal means which provides a shading factor of .60. The walls and roof are assumed to be insulated to provide U factors not exceeding .15 BTU/Hr./Sq. Ft.

II. CENTRAL PLANT (HEATING AND COOLING)

A. Heating

In the proposed layout, the major building will be served from a central heating plant.

With the University providing heating from its own plant, steam, high temperature hot water over 250°F., or low temperature hot water under 250°F. might be used. In general, either of the water systems are preferable to a steam distribution system on the campus because a simpler piping design is possible than with steam; supply and return piping has a longer life in the water systems if expansion is correctly allowed for because the system contains a closed circuit of water and very small quantities of make-up water are necessary, thus reducing the amount of oxygen that might be introduced to the system and, hence, less corrosion to the piping; the system is under pressure and can be graded as required rather than set at a definite pitch; no regular blowdown is required to maintain a clean boiler, thus eliminatng heat losses due to this operational need; the piping system has a thermal storage factor and allows a reduction of total boiler capacity as heat can be stored in the pipe mains during the off-peak hours.

A low temperature hot water heating plant is the most economical for the proposed campus. Because of its low temperature (below 250^{o}F.), the boilers can be left unattended and, therefore, reduce operating costs. The boiler plant is best located at the lower level of the intersection of the T forming the three wings of the major building.

B. Cooling

The refrigeration machines will be located in the same major equipment room with the boilers. The owning and operating costs of absorption or electrical centrifugal refrigeration equipment differ very little. The selection will be based on the load calculations at the final design stage.

The heat rejected from the refrigeration equipment can be dissipated into the atmosphere by means of cooling towers or through pumping river water up to and through the refrigeration units which would be best located underneath the first floor of the first stage of the construction program. The owning and operating costs of these two methods are very similar. It would, therefore, seem most desirable to use the river water system where the water can be used for other uses.

C. Building Systems

The heating of the buildings will be done by low temperature hot water. Temperature of the water within the buildings will be modulated by outdoor controllers to suit the rise and fall of outside temperatures. The radiation will be sized to heat the buildings without the fan systems in operation.

The type of air conditioning system will vary with the structures and their use. The first building to be constructed will have a multiplicity of uses. With the type of building proposed, more than one fan system will be economical. Each fan system will provide individual or area temperature control and be flexible enough to meet the probable changes in use over the life of the building. The final choice of the air system will be made during design of Project 1.

The building plumbing systems will include distribution piping which will provide hot water where required and other special systems as needed to meet the University's academic program. Waste piping will be provided for sanitary and laboratory needs.

Fire protection systems shall include a system of piping to fire hose cabinets to standpipes and to areas which require sprinkler heads.

D. Outside Services

Gas piping will be brought to the property line by the utility company. At that point, it will be metered and piped to the buildings to provide fuel for the boiler plants and for laboratory and other needs.

APPENDIX F

ELECTRICAL REPORT

PREPARED BY
REID, CROWTHER & PARTNERS LTD.

APPENDIX F

ELECTRICAL REPORT
UNIVERSITY OF LETHBRIDGE
LETHBRIDGE, ALBERTA

Prepared by:
REID, CROWTHER & PARTNERS LTD.

I. TOTAL ENERGY

A study of demand loads and estimated power consumption indicates that a total energy plant would be near a break even investment even when considered over a long period of operation. It also requires a large initial capital investment. The balance of this report will assume, therefor, that power will be supplied from the City of Lethbridge.

The preliminary demand loads have been based on design standards of an average of 1.5 watts per square foot in the residences and 6.0 watts per square foot in the balance of the University based on gross areas.

II. POWER SUPPLY

It is proposed that power would be supplied to the University from the City of Lethbridge by means of a 13.2 KV 3 phase aerial feeder from the City Power Plant. Once across the river, this aerial crossing would convert to a buried underground cable which would run up a coulee to the main substation at the University. This substation would be located indoors in a central service area of the building so that it would not detract from the aesthetics of the campus.

The cable feeds through to the service area and beyond to enable the City to serve future residential areas.

III. DISTRIBUTION SYSTEM

The main substation would be arranged to permit radial 13.2 KV feeders to present and future distribution centers at the major load concentrations. At these locations, power would be transformed to 347/600 volts 3 phase 4 wire and 120/208 volt for distribution to the various lighting, power and miscellaneous electrica loads.

IV. WIRING METHODS

Wiring within the various buildings would be concealed and would generally be in conduit.

Wiring to car heater outlets, lighting and other facilities throughout the grounds would be installed using underground means.

V. SPECIAL SERVICES

A. Fire Alarm System

A fire alarm system which can be expanded to service the ultimate campus is proposed for the University of Lethbridge. This system would be of the supervised type, with a central annunciator to designate the location of a fire and with a connection to the Municipal Fire Department.

B. Telephone System

A conduit and raceway system would be provided to accomodate the Alberta Government Telephone System selected for the University, including provision for an automatic telephone switch-board.

The incoming telephone service routing would generally parallel that of the power supply and would be installed underground to the campus buildings by means of a buried cable.

C. Intercommunication System

An internal telephone-type intercommunication system is proposed to service the administrative offices of the University as an integral portion of the Alberta Government Telephone System.

D. ETV System

Provision is proposed for the installation by others of an ETV system including program origination, audio visual system, monitors, video taping facilities with consideration of overhead and rear view projectors.

E. Clock System

A central clock system is proposed to regulate all clocks which are provided throughout the University.

F. Emergency Power System

An emergency power system is proposed to provide power to essential lighting and power loads through the campus. This system would be primarily lighting serving "means of egress" and major assembly areas. A gas engine-driven generator, battery units or a combination of both would be utilized to provide this emergency power.

G. Car Heater Outlets

Electrical outlets can be provided in staff and student residential parking areas to meet University requirements.

VI. LIGHTING

Lighting systems will be integrated with the architectural and structural design to produce lighting effects and levels compatible with the required seeing tasks.

APPENDIX G

UNIVERSITY DATA

From University of Lethbridge,

ACADEMIC PLAN AND USER'S REPORT

September 27, 1968

With Amendments following discussions with departments, User's Committee and University Planning Committee.

	PHYSICS	CHEMISTRY	BIOLOGICAL SCIENCE	MATHEMATICS	EDUCATION	GEOGRAPHY	PSYCHOLOGY	ECONOMICS	SOCIOLOGY & ANTHROPOLOGY	PHILOSOPHY	HISTORY	POLITICAL SCIENCE	MODERN LANGUAGE	ENGLISH	MUSIC	ART	PHYSICAL EDUCATION
PHYSICS		0	0	0		X											
CHEMISTRY	0		0	0	0		X										
BIOLOGICAL SCIENCE	X	0					0										
MATHEMATICS	0	0	0		0	X		X		0		X					
EDUCATION							0		0			X					
GEOGRAPHY	0		0	0	0			0	0		X	0					
PSYCHOLOGY		X	0	X	0				0								
ECONOMICS				0		0			0		0	0					
SOCIOLOGY & ANTHROPOLOGY					0		0			0	0						
PHILOSOPHY				0	0							0					
HISTORY						0		0	0			0			X		X
POLITICAL SCIENCE				X		X	X	X		X							
MODERN LANGUAGE											X				X		
ENGLISH										0	0			0		0	0
MUSIC	X				0												0
ART																X	
PHYSICAL EDUCATION			0													X	X

INTERDISCIPLINARY RELATIONSHIPS

PROJECT I   ENROLLMENT PROJECTIONS

To provide some basis for planning projections, some estimate of future enrollment is required. The following table gives enrollment projections of full-time students based on a survival rate and average annual increase analysis (using provincial averages) using the 1967-1968 enrollment base:

Year	Arts & Sci. FT Students	Education FT Students	University FT Students
1967/68	362	308	670
1968/68	586	414	1000
1969/70	776	499	1275
1970/71	855	570	1425
1971/72	941	634	1575
1972/73	1045	705	1750
1973/74	1150	775	1925
1974/75	1265	860	2125

Full-time equivalent enrollments are shown in Table G3.

It can be predicted with some degree of accuracy that the University's enrollment will be at a level of 2,000 full-time students prior to 1975; however, the integration of part-time and full-time students in the University's operation requires that part-time registrations in the regular session be included with full-time enrollments to arrive at a full-time equivalent enrollment which University facilities must accommodate. Converting part-time registrations to full-time enrollments by analyzing part-time registrations in terms of percentage of full course-load produces a full-time equivalent student population which must be accommodated.

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LONG RANGE ENROLLMENT FORECAST

Year	Full-time Enrollment	Part-time Registration	Enrollment F.T.E.	Full-time Equivalent Enrollment
1967/68 (Actual)	670	250	50	720
1968/69 (Actual)	1050	385	77	1127
1969/70	1360	460	92	1452
1971/72	1855	605	121	1976
1972/73	2135	675	135	2270
1973/74	2350	745	150	2500
1974/75	2590	820	165	2755
1975/76	2850	900	180	3030
1976/77	3140	990	200	3340
1977/78	3455	1090	220	3675
1978/79	3805	1200	240	4045
1979/80	4185	1320	265	4450
1980/81	4610	1455	290	4900
1981/82	5075	1600	320	5395

NOTE: In calculating total F.T.E. University populations, add 20 per cent of F.T.E. students to allow for faculty and support staff.

To facilitate physical planning, it is necessary that certain enrollment levels be chosen as planning "mileposts" or levels at which the academic and physical facilities plans for the University might be described in rather detailed fashion. In choosing such enrollment levels, a number of things are considered. First, the levels chosen must denote major increments of growth for which a qualified and quantified User's Report or physical facilities report can be produced for an amount of space which can be planned.

NOTE: The above projections have been made on the basis of present Faculties, Departments and Programs at the University. Appropriate reviews and adjustments will be required as present programs develop and as new developments are anticipated and realized.

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FORM D 5500 students

NOTE: Numbers in brackets not to be totalled

DATE: March 7, 1969

ERICKSON/MASSEY ARCHITECTS

REFERENCE NUMBER	SPACE ITEM	(1) 100 CLASS FACILITIES	CLASS LABORATORIES AND SUPPORT (2) 210 (3) 215 (4) 220	OFFICE RESEARCH ADMINISTRATIVE AND SUPPORT (5) 250 (6) 300	(7) MISCELLANEOUS ACADEMIC SUPPORT	(8) NON=ACADEMIC SUPPORT & SERVICE	(9) SOCIAL & RESIDENTIAL FACILITIES	NET AREA TOTALS	
A	EDUCATION (Cur.Study)								
B	EDUCATION (Research)	(14100)	28200	67600	--	--	--	95800	
C	EDUCATION (Reading)								
F	DEAN ARTS & SCIENCE	--	--	800	--	--	--	800	
G	PHYSICS	(2050)	10350	10100	--	--	--	20450	
H	BIOLOGICAL SCIENCE	(4200)	12450	22400	--	--	--	34850	
J	CHEMISTRY	(3750)	18700	21600	--	--		40300	
K	MATHEMATICS	(5600)	7600	9900	--	--		17500	
M	ECONOMICS	(3250)	--	5800	--	--	--	5800	
N	ENGLISH	(5900)	--	10900	--	--	--	10900	
P	GEOGRAPHY	(3100)	11800	7500	--	--	--	19300	
Q	HISTORY	(5000)	--	10650	--	--	--	10650	
R	MODERN LANGUAGE	(2100)	4200	4000	--	--	--	8200	
S	PHILOSOPHY	(3550)	--	7600	--	--	--	7600	
T	POLITICAL SCIENCE	(3800)	--	9000	--	--	--	9000	
U	PSYCHOLOGY	(7400)	14800	29500	--	--	--	44300	
V	SOCIO. & ANTHRO.	(6900)	7800	20700	--	--	--	28500	
W	MUSIC	(2200)	7600	4000	--	--	--	11600	
X	ART	(2300)	24850	8100	--	--	--	32950	
Y	PHYSICAL EDUCATION	(2700)	6000	12700	--	106300		125000	
	TOTAL ARTS & SCI(F-Y)	(63800)	126150	195250	--	106300	--	427700	
	TOTAL EDUC+ARTS&SCI	(77900)	154350	262850	--	106300	--	523500	G4

FORM D 5500 students

DATE: March 7, 1969

REFERENCE NUMBER	SPACE ITEM	(1) 100 CLASS FACILITIES	CLASS LABORATORIES AND SUPPORT	(2) 210 (3) 215 (4) 220		OFFICE RESEARCH ADMINISTRATION AND SUPPORT (5) 250 (6) 300		(7) MISCELLANEOUS ACADEMIC SUPPORT	(8) NON-ACADEMIC SUPPORT AND SERVICE	(9) SOCIAL AND RESIDENTIAL FACILITIES	NET AREA TOTALS	
AA	SEMINAR ROOMS											
BB	CLASSROOMS	77900	14100 Educ 63800 Arts & Sci			--		--	--		77900	
CC	LECTURE ROOMS											
DD	THEATRE	--		--		--		4000	--			
EE	SCIENCE SUPPORT	--		--		--		31700	--	--	31700	
FF	FINE ARTS SUPPORT	--		--		--		10000	--	--	10000	
GG	LIBRARY	--		--		--		85000	--	--	85000	
HH	AUDIO-VISUAL MEDIA	--		--		--		12000	--	--	12000	
JJ	COMPUTER	--		--		--		5000	--	--	5000	
KK	ADMINISTRATION	--		--		--		--	17800	--	17800	
LL	STUDENT SERVICES	--		--		--		--	20000	--	20000	
MM	STUDENT ACTIVITIES	--		--		--		--	12700	--	12700	
NN	MEETING FACILITIES	--		--		--		--	5000	--	5000	
PP	PLANT MAINTENANCE	--		--		--		--	23500	--	23500	
QQ	BOOKSTORE & PRINTING	--		--		--		--	5000	--	5000	
RR	RESIDENCES	--		--		--		--	--	(330000)	(330000)	
SS	FOOD SERVICES	--		--		--		--	--	30000	30000	
YY	PHYSICAL EDUCATION	--		--		--		--	(766000)			
	TOTALS THIS PAGE	77900		--		--		147700	84000	30000	339600	
	SUB-TOTAL FROM PAGE 1	--		154350		262850		--	106300	--	523500	
	TOTALS	77900		154350		262850		147700	190300	30000	863100	G5