To the Graduate Council:

I am submitting herewith a thesis written by Nancy W. Rennie entitled "Master Planting Plan for Roane State Community College." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Ornamental Horticulture and Landscape Design.

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MASTER PLANTING PLAN FOR ROANE STATE COMMUNITY COLLEGE

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Nancy W. Rennie

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3058012

DEDICATION

This thesis is dedicated to
my husband, John C. Rennie,
for his encouragement and support
during its preparation

ACKNOWLEDGMENTS

The following people gave of their time, knowledge, and support in the preparation of this thesis: from Roane State Community College were Jeri Fulmer, Secretary, K. M. York, Superintendent of the Physical Plant, Fred Martin, Dean of Administrative Services, and Claire Karr, Coordinator, Institutional Research and Reporting; from Crouch and Adams, Inc. was Don Quinly, Architect; and from the Department of Ornamental Horticulture and Landscape Design, The University of Tennessee, Knoxville was D. B. Williams, Head and Professor, H. v. d. Werken, Associate Professor, and J. W. Day, Associate Professor.

ABSTRACT

The purpose of this study was to create a master planting plan for the Roane State Community College campus. A master plan for development of campus facilities was completed by an architectural firm but it contained few concepts concerning the landscaping of the campus. A planting plan was needed for the entire campus which would take into account future expansion and which could be implemented along with the facilities master plan.

Five guidelines to be used in planning the community college landscape were developed for this study. These were:

1. landscape development should fit the site,
2. landscape development should be relevant to the uses of the grounds,
3. the campus should be developed with the goals and programs of the college in mind,
4. landscape development should relate the campus to the surrounding land and community, and
5. the campus landscape, although composed of many parts, must function as one unit.

At the time of the study there was a need for trees in the campus landscape to provide scale and unity and to define spaces. The three planting plans were designed for this and to relate the campus to the surrounding landscape. The plants that were specified were chosen for their form, color, and texture; for their mature height and spread; for

their resistance to diseases and insects; and for their ability to perform well in the study area.

It was recommended that the campus landscape be given the best possible maintenance using proper management practices and realizing that over time the landscape will change. Maintenance must be sensitive to this change.

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CHAPTER I

INTRODUCTION

The establishment of a community college in Roane County, Tennessee, was authorized by the 1969 Tennessee General Assembly. Operation of Roane State Community College (referred to as Roane State hereafter) began in the fall of 1971 in temporary facilities in Harriman. Two years later it was moved to the permanent campus which is located approximately equidistant between the cities of Harriman, Kingston and Rockwood (13, p. 1). Figures 1 and 2 show the location of the campus within the state of Tennessee and within the college's service area.

The campus consists of 104 acres that were formerly pastureland, hay and corn fields, and pine woodland. It is bisected by a relatively new road, Patton Lane, which connects U.S. Highways 27 and 70. The surrounding land is mostly agricultural and woodland with the eastern boundary adjoining an arm of Watts Bar Lake. To the southeast is a residential area and to the south and southwest is a small factory. The area is changing with commercial and residential developments being built along the two U.S. highways.

The first phase of construction was begun in 1971 and resulted in the completion of an interconnecting three-part structure that includes the administration/library building, the classroom building, and the gymnasium (14, pp. VIII-1, Appendix X-4). A second structure, the technologies building, was completed in December 1978. Other facilities constructed during this phase were two parking lots and their access

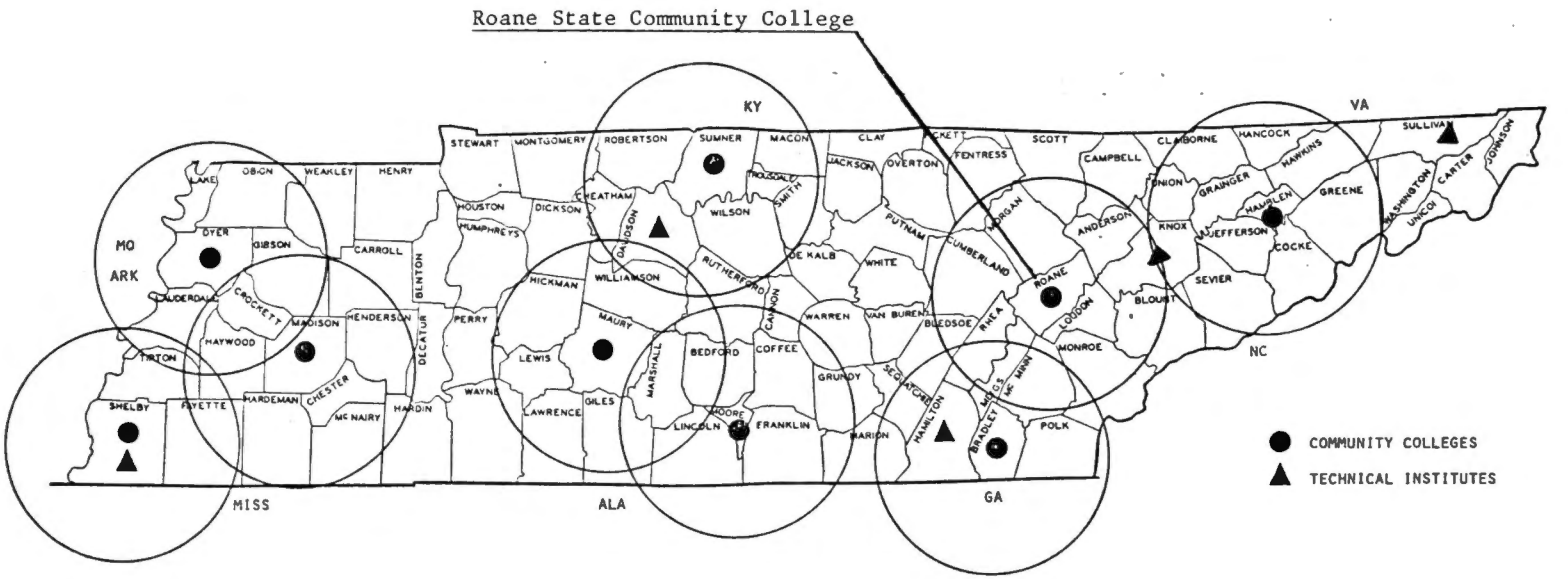

Figure 1. Location of Tennessee's Community Colleges and Technical Institutes (14, p. 49).

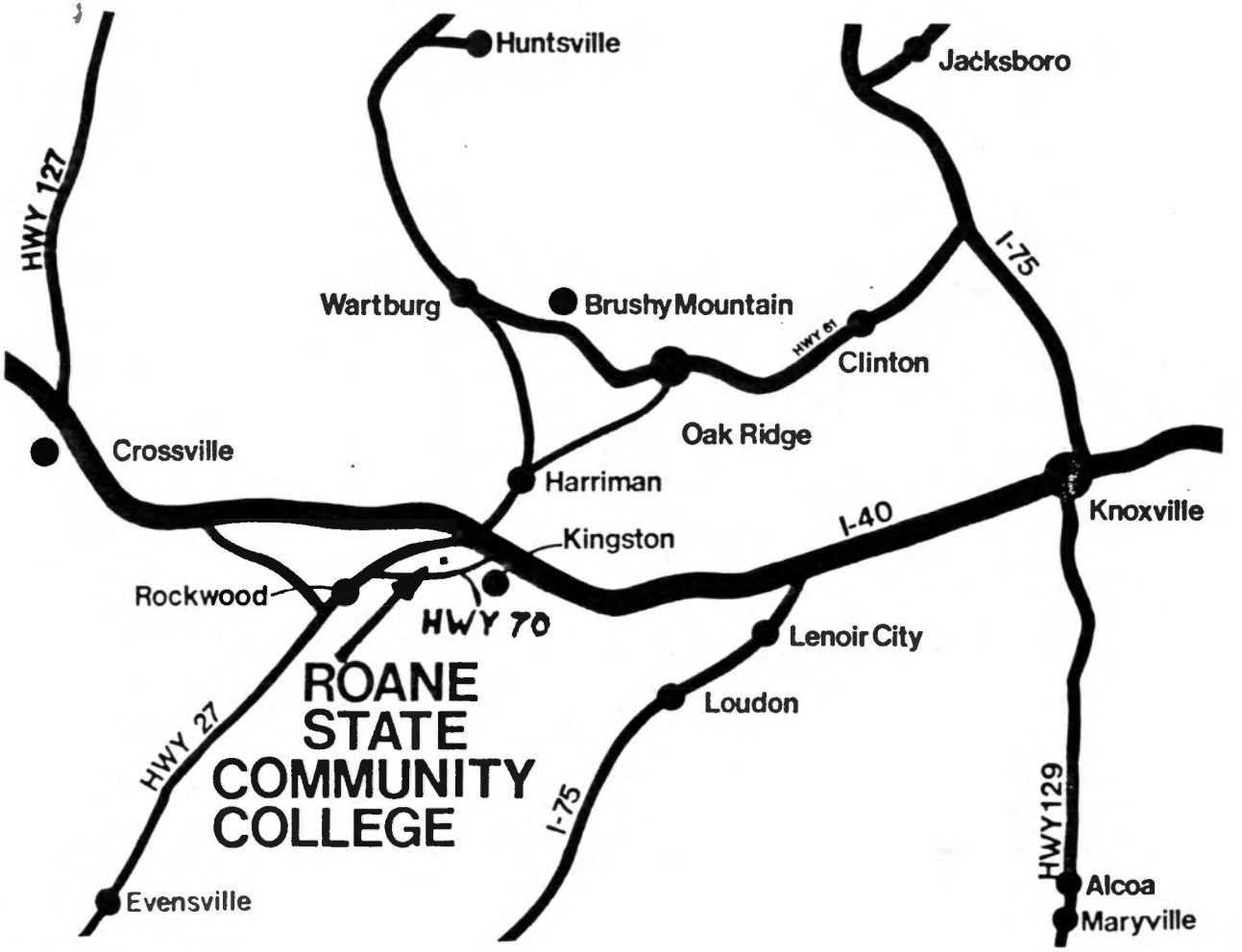

Figure 2. Location of Roane State Community College within Its Service Area (10).

roads, four tennis courts, a three acre multi-purpose field, and a baseball field. Only a limited amount of landscaping was initiated during this time and consequently the campus appeared unfinished.

Campus Expansion Phase II, begun in early 1978, is currently underway. A library/learning resource center building, a maintenance building, the expansion of student parking facilities, and landscaping in the immediate vicinity of these has been completed. Other construction planned includes the completion of four additional tennis courts and renovation of internal building space.

The future development of Roane State has been planned through a master plan, completed in April 1977, by Crouch and Adams, Inc. (hereinafter referred to as Crouch and Adams) and is included as an Appendix. It involves three additional stages of construction based on enrollment as measured by full time equivalents (FTE) of students. These stages are designed for construction of additional buildings to begin at FTE levels of 2000, 2500, and 3000 (3, p. 8). As of fall quarter, 1981 the enrollment was 2,216 FTE (9). This master plan gives design concepts for future buildings, but contains very few concepts for planting the campus landscape. Particularly, there is no mention of the relationship of the campus as a whole to the surrounding land and communities.

CHAPTER II

PURPOSE

The purpose of this thesis is to create a master planting plan for the campus landscape at Roane State Community College. A plan is needed which encompasses the entire campus and which can be implemented along with the Crouch and Adams master plan as the college grows.

CHAPTER III

COMMUNITY COLLEGES

Community colleges are post secondary educational institutions which offer mainly two year curricula in three general types of programs: transfer, career or occupational education, and community service. They are public supported, in contrast to the independent junior colleges, and are involved in the educational, cultural and civic activities of the community (7, p. 7). They are distinguished from the technical institutes by offering other types of programs along with the career oriented ones, by community involvement, and by concern with ". . . educating whole persons, not simply the labor-force portion of the person" (8, p. 112).

The Carnegie Commission on Higher Education (2, pp. 1, 2, 15) made several proposals concerning the purpose and goals of community colleges. The Commission stated that community colleges should be within commuting distance and should be accessible to all persons throughout their lives. They should be comprehensive, providing students with a wide range of educational options, including academic, occupational and general education programs. Qualified students should be provided with full transfer rights to four-year institutions, and the occupational programs should be geared to the changing requirements of society. It was recommended that they should remain two-year institutions with an optimum size of between 2,000 and 5,000 students. Additionally, there

is a further responsibility of the community colleges to enrich the cultural life of the communities served (2, pp. 1, 2, 15).

1. Purpose and Goals of Community Colleges in Tennessee

Richard Henry Gould (7, pp. 24, 87, 88) gives a review of the development of the community college in the United States and specifically in Tennessee. In 1971 the State Board of Education adopted a statement concerning the role and scope of Tennessee's community colleges which reflected the consensus of the presidents of the community colleges existing at that time. It stated that the community colleges should admit all high school graduates, or the equivalency, and others who can benefit from further post secondary education. This open-door policy requires a broad curriculum due to the differing scholastic aptitudes and interests of the students. To further broaden educational opportunities the fee structure should be relatively low. The community colleges are basically two-year institutions and should be leaders in two year degree programs. The statement gives as objectives for Tennessee's community colleges that they should provide:

1. academic programs that are transferable toward a bachelor's degree at another institution
2. occupational education required for employment in technical and vocational fields, and adult education courses for better job placement or for maintaining current employment levels
3. community service courses and programs for those in the community who want to broaden their educational and cultural experiences
4. developmental and remedial educational programs for those who need it

5. educational counseling and guidance services to the community
6. leadership in the cultural development of the community (7, p. 88).

2. Purpose and Goals of Roane State Community College

In the spring of 1978 the faculty and staff of Roane State completed an institutional self-study report for the Southern Association of Colleges and Schools. The college accepted as its purpose

> The development of the cultural, intellectual, physical and vocational resources of the people of the surrounding area through qualified teaching, professional counseling and guidance and supplementary services offered to students and community (14, p. I-14).

The report adds to the State Board of Education's 1971 list of objectives that Roane State Community College shall strive to give the community options for more effective use of leisure time. The college also seeks to enable each individual to develop and mature toward the realization of his/her full potential (14, pp. I-14, I-15).

CHAPTER IV

PLANNING THE COMMUNITY COLLEGE LANDSCAPE

The community college campus, unlike the grounds surrounding commercial buildings and factories or even public parks, must be planned for a great diversity of uses and functions. Thus, many of the problems encountered in planning the campus landscape, similar to that of other institutions of higher learning, are different from those found in other landscape developments. The following are guidelines to aid in planning the landscape of a community college and are based on the goal of making the landscape "of the greatest possible service and satisfaction to its users, physically, intellectually, emotionally" (11, p. 195).

1. Landscape Development Should Fit the Site

As in any landscape development, the community college site must be thoroughly studied before any planning can take place. "Planning that disregards the compelling forms, forces, and features of the total site fails to utilize the full site potential for the project" (12, p. 76). One must know what exists in order to intelligently plan further landscape development. The site is analyzed for what is actually present in terms of buildings, pavements, underground and overhead utilities, and landscaping, noting the materials used for each where it is appropriate. Other aspects of the site to be studied are topography, drainage patterns, soils, natural features, vegetation, and the land surrounding the site.

If the community college site has been chosen and planning has begun, the architect's drawings with the proposed development plans can be consulted for many of the features listed above. If the college is already under operation, consulting the architect's plans, which are drawn to scale, may save time; however, they should be checked by field observation to see that any changes have been noted. These plans should also contain a topographic survey of the site and an analysis of the structural characteristics of the soils in areas where buildings are or will be built. Drainage patterns can first be surmised from the topographic survey and then checked by on-site observation. Careful consideration must be given to any plans which alter existing drainage patterns, create ponding, or result in erosion.

For agricultural characteristics of the soils, the local office of the Soil Conservation Service can be consulted. A soil survey of the college site can be made if one does not exist. This survey will include an aerial photograph with each soil series identified and a written description which includes the soil's fertility, erodability, depth, and any unusual characteristics of each series.

The nature of the land within sight of the campus should be observed and the probable use of it in the future should be investigated. With this in mind, the views from within the site should be observed and decisions made on which views should be left open, which should be channeled, and which should be screened. Also, views from outside looking into the site should be studied and decisions made on their desirability.

2. Landscape Development Should be Relevant to the Uses of the Grounds

For planning purposes it is useful to divide the community college site into areas classified by use. The following is a list of basic use areas, some of which will overlap:

(a) Those areas used specifically for teaching and support, such as classroom, office and library buildings and the associated outdoor space around them.

(b) Those areas used for organized sports (collegiate, physical education, and intramurals) including indoor gymnasiums as well as outdoor athletic fields, tennis courts, swimming pools, etc.

(c) Those areas used for passive recreation such as student service areas used between classes and their associated outdoor areas.

(d) Those areas used for access to facilities, for parking, and for providing service to buildings.

(e) Those areas that are used by the community as a whole, such as theaters, concert hall, gym, meeting rooms, and areas where the public has a view of the campus.

(f) Those areas that are as yet undeveloped but which are designated for future development.

(g) Those areas that are as yet undeveloped and which for some reason are unsuitable for development, including areas with unusual natural features which are more valuable left unaltered. Other classifications may be found for particular sites.

Each use area will require a different landscape character. Whether it is large or small will depend on the nature of the use. For example, areas used for sports by necessity will be open and more or less expansive, while those used for teaching and study will be more confined and intimate. The community use areas may combine elements of both the above yet they will be slightly different from either because of the public image the college wishes to project. The parking, access, and service areas are designed primarily for automobile use, whereas the recreation areas are designed for use by people on foot. Areas designated for future development may remain very much in their preconstruction state with a minimum of management, while those areas that are unsuitable for development because of unusual natural features may remain unchanged.

3. The Campus Should be Developed with the Goals and Programs of the College in Mind

The goals of community colleges, as discussed above, are concerned with providing educational opportunities, being accessible, remaining small, and enriching the cultural life of the communities served. Landscape development can help further these goals in several ways. Every part of the landscape should have the potential for creating learning experiences. These can come from using natural and constructed features of the campus as an outdoor laboratory for biology, agriculture and related fields; as material and examples for art classes; and as outdoor classrooms for other courses such as drama and English.

While the physical accessibility of the campus site is little affected by landscape development, landscaping can, through proper planning, make the campus appear attractive and inviting. Buildings which are surrounded by only grass and pavement appear unfinished and the total site is unattractive, no matter how beautiful or imposing the buildings. Add a few well placed trees and shrubs, different ground covers and pavings for variety, flowers for accent and color, and the site is completely transformed. These should be placed according to a carefully prepared plan to make the best use of the site and to produce the desired effect.

The third goal of remaining small implies that community colleges should strive to overcome the image which the large universities have given to higher education; that of being lost in a crowd and of indifference and unfriendliness. Well planned landscaping can make a difference, producing either an open, friendly atmosphere or an intimate, contemplative atmosphere. These feelings are produced as one moves about and views the campus, and, coupled with personal contacts with faculty and staff, can aid in student recruitment. In a recent issue of the Michigan State University Alumni Association Magazine it was reported that

> Current administrators fully realize the value of the campus park in student recruiting. Students polled in recent years frequently remarked that the gardens, winding paths and groves of trees were a major factor in their decision to come to Michigan State (1, p. 9).

Landscape development can further the goal of enriching the cultural life of the community by setting an example of good design and

maintenance. The use of a well-conceived plan is of great importance and, ideally, should be developed along with the plans for buildings. Thus the two plans can be integrated to make the best use of the total site. Both plans

> should be based upon a specific program . . . that . . . should in turn be based upon: (1) the people who will use it—their cultural needs, individual desires, and economic abilities; (2) the climate; (3) the site . . . ; and (4) the available materials and methods of fabrication. These . . . interlocking variables . . . [are] coordinated by . . . the discerning application of principles and theories (11, p. 113).

4. Landscape Development Should Relate the Campus to the Surrounding Land and Community

Community colleges are closely linked in their activities to the communities they serve. Landscape development can make this link visually apparent by treating the college site as a part of the total space in which it lies, rather than as an entity separate from the surrounding land and community. The Utah State Building Board in a master plan summary for Utah Technical College Provo/Orem states "It does not hold that there should be a distinct difference between the campus and the community. . . . The goal . . . is to blend sympathetically with the surrounding community . . ." (16, p. 8). Campus landscape planners must recognize that the campus site space ". . . flows into the spaces of other sites and the community as a whole . . ." and that ". . . since . . . integration with the total landscape [is] dependent upon this continuity [of space], excessive blockage of it should be judicially avoided" (11, p. 63). To maintain

this flow of space views should be preserved or opened, both those looking into the campus and those looking out of the campus, and the site should not be "walled-off" from its surroundings by buildings or plantings.

Through being sensitive to the nature of the surrounding land and incorporating what is appropriate into the campus landscape, the community college campus can present an image of belonging to the community and of being in harmony with its surroundings. The integration and harmonious relationship of the campus with the surrounding land can produce positive feelings toward the college in those who enter for the first time, even before they encounter any college personnel. According to Simonds "The perception of harmonious relationships produces for man an experience of pleasure" (12, p. 227). It should be our goal as campus planners to create a campus landscape experience that is pleasurable.

5. The Campus Landscape, Although Composed of Many Parts, Must Function as One Unit

The campus landscape is composed of many parts, each with its own function, character and landscape expression. All parts should be designed such that, while retaining their integrity, they show a clear relationship to one another, thereby producing a unified and harmonious overall effect.

> A landscape composition may be likened to a chemical compound, where the elements react upon each other to create a substance totally unlike any of them individually. If any is lacking or is present in too great an amount, the

> desired compound may not be produced at all. Likewise, a compositional unity cannot result when the parts are so incompatible that they cannot interact to produce a single effect (11, p. 51).

Each part or element of the campus landscape when combined with all the other parts should produce a total image, feeling, and experience that is "unlike any of them individually." This is called "unity" and is extremely important for the success of a landscape project in terms of user satisfaction.

> Unity in man's environment, as well as between man and that environment, is a prime prerequisite for happiness. Although unity does not of necessity achieve beauty, beauty is impossible without unity (11, p. 51).

CHAPTER V

LANDSCAPE PLANS FOR ROANE STATE COMMUNITY COLLEGE

The master landscape planting plans for the Roane State Community College campus follow the development master plan of Crouch and Adams which is divided into three stages based on student enrollment as previously discussed in Chapter I. The landscape plans are designed to be implemented along with the building stages and follow the guidelines in Chapter IV. The accompanying design concepts and rationales are of particular importance since specific parts of the development plans may be changed. Even though the development plans are altered the concept of the planting design should still be valid.

The content of the planting plans is almost exclusively of trees. Trees are particularly needed for their ability to provide scale and unity and to define spaces within the landscape.

> The link to the general landscape and to the human scale must be made with trees, which redefine the buildings in a way we are used to. Indeed we unconsciously use trees as our measure of judging size out-of-doors (6, p. 91).

> Trees as dominant masses which define space, are of inestimable value in producing order and unity in the total landscape (11, pp. 80, 81).

Trees also have other uses in the landscape such as those listed by Eckbo: "(Trees) moderate the climate, reducing extremes of heat, wind, aridity, and glare. . . . Likewise trees moderate the visual landscape" (5, p. 14). While shrubs, flowers, and groundcovers are integral parts of the landscape they are considered secondary to trees in these master planting plans but would still be utilized in the final plans.

1. The Present Campus

In the Master Plan for Roane State Community College (Appendix) Crouch and Adams undertook studies of several aspects of the campus site, called Site Determinants. The following is a summary of these studies as they relate to landscape development.

Due to the predominantly gentle slopes, the land east of Patton Lane is best suited for parking and outdoor recreation. This is also an area of sinkholes and thus unsuitable for buildings. The vegetation is grass and brush with a few scattered trees. There are large mature trees along the eastern boundary adjacent to Watts Bar Lake.

The area southeast of the original buildings is the most suitable area for future buildings. Slopes are in the 5-10% range and the bearing capacity of the upper 20 feet of soil is generally good. Structures should be limited to two or three stories with a minimum of subsurface excavation due to the unpredictable soil bearing capacity below 20 feet.

To the north of the original buildings the soil bearing capacity becomes less acceptable and thus is unsuitable for building sites. A large portion on the campus drains through a low-lying part of this area with the adjacent land to the west and the north contributing a significant amount of surface runoff. Any change in land forms in and around this area could greatly increase the volume of surface drainage. Any facilities constructed in this area should include plans for positive drainage control.

West of the original buildings the slopes are greater than 10% and thus are not suitable for buildings or other conventional campus land uses. This area should not be disturbed because of the steep slopes and the thick stand of pine trees which cover it. Since the rest of the campus is predominantly open with a few scattered trees these woods are quite valuable to the campus landscape.

The views from anywhere within the campus are pleasant and give long distance vistas of mountains. From without the campus there are limited views of the buildings and parking facilities. Only when approaching on Patton Lane from the north is there an excellent view of the existing buildings. This view should be maintained.

The concept of site development set forth by Crouch and Adams is also appropriate for landscape development:

> In response to a flexible program, it is necessary that a growth pattern be established which accommodates change and yet at the same time have [sic] a sense of completeness and cohesiveness at any particular phase of development (3, p. 6).

Landscape development also should be able to adjust with the changing campus as facilities and programs are added, deleted, or altered.

Figure 3, taken from a drawing by Crouch and Adams for their master plan, shows the campus as it currently exists. The plants are drawn to scale using three-fourths of their mature diameter. This was determined from information found in Dirr's Manual of Woody Landscape Plants (4). Table 1 is a key to the symbols on Figure 3. The botanical and common names are also from Dirr (4). The same procedures have been followed in all of the figures and tables in this thesis.

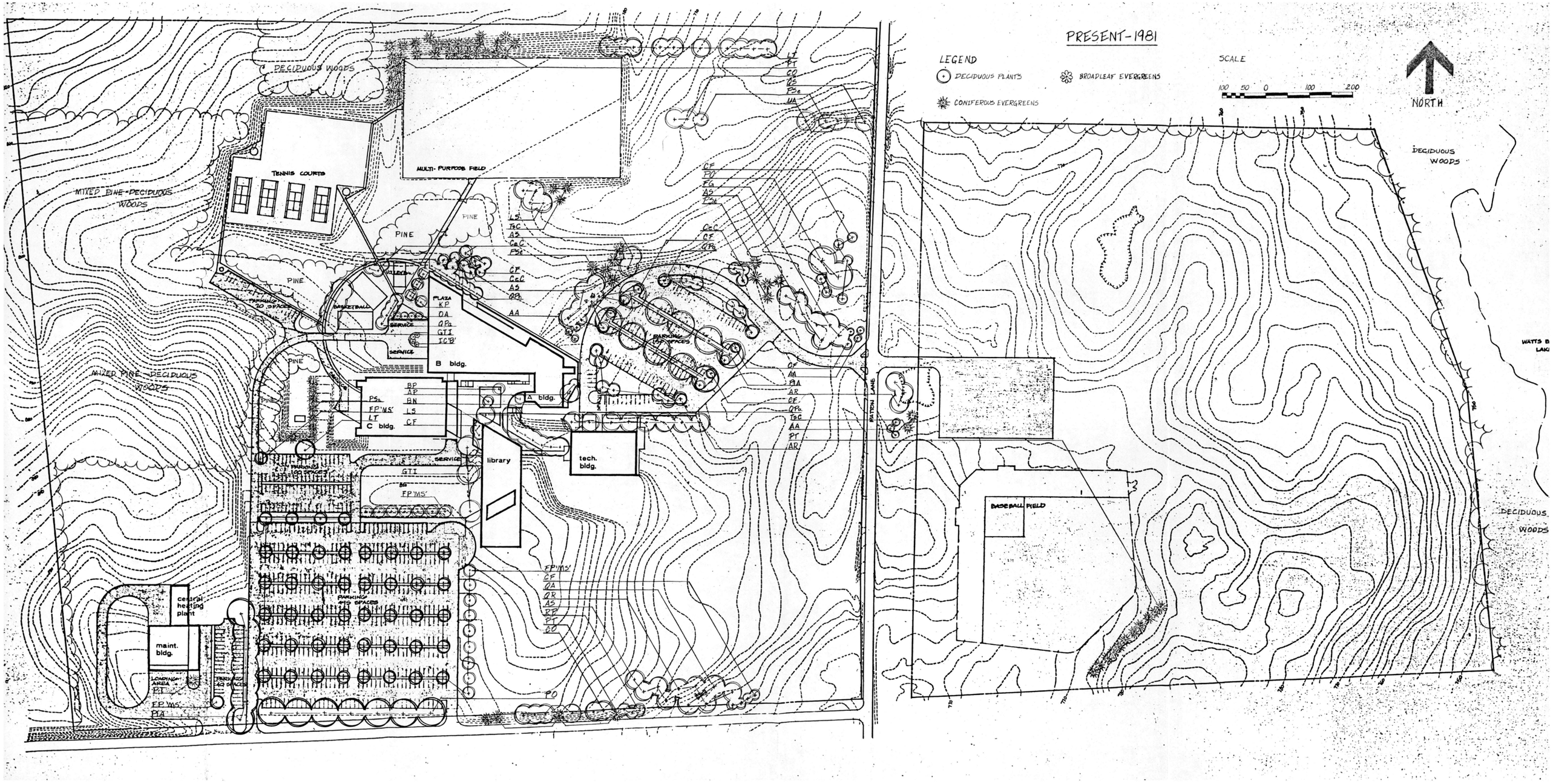
PRESENT-1981
LEGEND
DECIDUOUS PLANTS
BROADLEAF EVERGREENS
CONIFEROUS EVERGREENS
SCALE
100 50 0 100 200
NORTH
DECIDUOUS WOODS
MIXED PINE-DECIDUOUS WOODS
TENNIS COURTS
MULTI-PURPOSE FIELD
PINE
PLAZA
KP
OA
QPa
GTI
IC'B'
AA
BASKETBALL
SERVICE
B bldg.
A bldg.
C bldg.
PSL
FP'MS'
LT
BP
AP
BN
LS
CF
library
tech. bldg.
central heating plant
maint. bldg.
LOADING AREA
PT
PIA
PARKING SPACES
PATTON LANE
BASEBALL FIELD
WATTS B
LAK
LT
PT
CO
QS
PSe
UA
CF
PO
FG
AS
TSL
CeC
QR
BA
AR
DD

Table 1. List of Symbols to Accompany Figure 3

Symbol	Scientific Name	Common Name
AA	Amelanchier arborea	downy serviceberry
AP	Acer palmatum	Japanese maple
AR	Acer rubrum	red maple
AS	Acer saccharum	sugar maple
BN	Betula nigra	river birch
BP	Betula pendula	European white birch
CeC	Cercis canadensis	eastern redbud
CF	Cornus florida	flowering dogwood
CO	Celtis occidentalis	common hackberry
FG	Fagus grandifolia	American beech
FP 'MS'	Fraxinus pennsylvanica 'Marshall's Seedless'	Marshall's Seedless green ash
GTI	Gleditsia triacanthos var. inermis	thornless honeylocust
IC 'B'	Ilex cornuta 'Burfordii'	Burford Chinese holly
KP	Koelreuteria paniculata	goldenraintree
LS	Liquidambar styraciflua	sweetgum
LT	Liriodendron tulipifera	tuliptree
OA	Oxydendrum arboreum	sourwood
PlA	Platanus acerifolia	London planetree
PO	Platanus occidentalis	American planetree
PSe	Prunus serotina	black cherry
PSt	Pinus strobus	eastern white pine
PT	Pinus taeda	loblolly pine
QA	Quercus alba	white oak
QPa	Quercus palustris	pin oak
QPh	Quercus phellos	willow oak
QR	Quercus rubra	red oak
QS	Quercus stellata	post oak
RP	Robinia pseudoacacia	black locust
TsC	Tsuga canadensis	Canadian hemlock
UA	Ulmus americana	American elm

The Crouch and Adams master plan notes that "there is a general lack of planting around the buildings and paved areas which gives the campus an unfinished appearance" (3, p. 3). Since the completion of the master plan this has been remedied to a large extent with subsequent landscaping and construction projects.

2. Plan for FTE 2000

A. Plan

See Figure 4 and Table 2.

B. Plan Rationale

As the Crouch and Adams master plan is followed and the number of buildings increases there is created a central pedestrian plaza. It is composed of two major axes, a short north-south axis and a longer east-west axis. The center of campus activity now shifts from the existing plaza north of the library to the new one and consequently the older plaza is less important than it formerly was.

The new plaza should be developed as an inviting, friendly and stimulating place for students and staff to congregate. With its large amount of paving there will be a great need for shade in the summer, yet in the winter it will be advantageous for the sun to strike the paving melting ice and snow. For this reason evergreen trees and shrubs should be kept to a minimum so as not to shade heavily used areas. Also, seating benches should be appropriately placed to take

FTE 2000

LEGEND

- DECIDUOUS PLANTS
- BROADLEAF EVERGREENS
- CONIFEROUS EVERGREENS

SCALE

100 50 0 100 200

NORTH

TENNIS COURTS

3-CeC
4-IO
1-GTE'W'
3-QPh
4-LT

MULTI-PURPOSE FIELD

VOLLEYBALL

BASKETBALL

PLAZA
4-LT
3-CF
3-M'A'
2-GTE'W'
3-M'B'
4-PC'B'

B bldg.

A bldg.

10-PSc
6-M'B'
14-IC'B'
3-KP

C bldg.

greenhouse

library

9-ICC'
1-GTE'W'
1-CD'K'

6-M'A'
8-OA
10-LS

PLAZA

tech. bldg.

PLAZA

3-MG
1-PN
2-GP
5-PC'B'
6-CF
16-GTE'W'
12-ICC'
3-TIC

3-IO
20-ICC'
1-PN
3-KP
3-IA
6-CF

auditorium

humanities bldg.

central heating plant

maint. bldg.

LOADING AREA

PARKING 150 SPACES

PARKING 100 SPACES

PATTON LANE

WATTS LA

BLEACHERS
TRACK

3-PSc
8-PSc
4-PIA

TEMP. PARKING 100 SPACES

BLEACHERS / LOCKER ROOM

BASEBALL FIELD

7-LS
3-FG
4-PSc
3-QR
3-AS
3-PT
6-CeC
8-JC'P
2-PSc
2-LT

3-MG
3-TIC
3-PSc
7-PIA
3-LT

3-TIC
3-CeC
4-PSc
2-LT
3-CeC
12-PT

Table 2. List of Symbols to Accompany Figure 4

Symbol	No.	Scientific Name	Common Name	Size
AS	3	Acer saccharum	sugar maple	2 - 2-1/2" cal. B&B
BN	2	Betula nigra	river birch	2 - 2-1/2" cal. B&B
CD'K'	1	Cedrus deodara 'Kashmir'	Kashmir deodar cedar	7 - 8' ht. B&B
CeC	15	Cercis canadensis	eastern redbud	1-1/2 - 1-3/4" cal. B&B
CF	15	Cornus florida	flowering dogwood	1-1/2 - 1-3/4" cal. B&B
FG	3	Fagus grandifolia	American beech	2 - 2-1/2" cal. B&B
GB	2	Ginkgo biloba	ginkgo	3 - 3-1/2" cal. B&B
GTI'M'	20	Gleditsia triacanthos var. inermis 'Moraine'	Moraine thornless honeylocust	2 - 2-1/2" cal. B&B
IA	3	Ilex aquifolium	English holly	2-1/2 - 3' ht. B&B
IC'B'	14	Ilex cornuta 'Burfordii'	Burford Chinese holly	3 - 4' ht. B&B
IC'C'	41	Ilex cornuta 'Carissa'	Carissa Chinese holly	15 - 18" ht. cont.
IO	7	Ilex opaca	American holly	3 - 4' ht. B&B
JC'P'	8	Juniperus chinensis 'Pfitzeriana'	Pfitzer Chinese juniper	18 - 24" spr. cont.
KP	6	Koelreuteria paniculata	goldenraintree	2 - 2-1/2" cal. B&B
LS	17	Liquidambar styraciflua	sweetgum	2 - 2-1/2" cal. B&B
LT	15	Liriodendron tulipifera	tuliptree	2 - 2-1/2" cal. B&B
M'A'	9	Malus 'Adams'	Adams crabapple	1-1/2 - 1-3/4" cal. B&B
M'B'	9	Malus 'Beverly'	Beverly crabapple	1-1/2 - 1-3/4" cal. B&B
MG	6	Magnolia grandiflora	southern magnolia	6 - 7' ht. B&B
OA	8	Oxydendrum arboreum	sourwood	7 - 8' ht. B&B
PC'B'	9	Pyrus calleryana 'Bradford'	Bradford callery pear	2 - 2-1/2" cal. B&B
PlA	4	Platanus acerifolia	London planetree	2-1/2 - 3" cal. B&B
PM	7	Pseudotsuga menziesii	douglasfir	4 - 5' ht. B&B
PSt	36	Pinus strobus	eastern white pine	4 - 5' ht. B&B
PT	15	Pinus taeda	loblolly pine	2 - 2-1/2' ht. cont.
QPh	3	Quercus phellos	willow oak	2 - 2-1/2" cal. B&B
QR	3	Quercus rubra	red oak	2 - 2-1/2" cal. B&B
TiC	6	Tilia cordata	littleleaf linden	2 - 2-1/2" cal. B&B
TsC	3	Tsuga canadensis	Canadian hemlock	4 - 5' ht. B&B

advantage of both the shade from buildings and deciduous trees in summer and the warming rays from the sun in winter.

The east-west axis of the plaza contains a row of large planting areas arranged in a straight line. To break the monotony of straight lines and to give a feeling of movement and vitality to this area, the dominant plant forms, the trees, are planted in a curvilinear arrangement. Besides softening the straight lines of the surrounding buildings and plaza, this arrangement ties the planting areas together and provides a pattern that can be expanded as the plaza enlarges in succeeding building stages.

A variety of deciduous and evergreen plants are used in the east-west axis. Bradford callery pears along with Adams and Beverly crabapples are used for their spring flower colors of white, red, and pink, respectively. Additional seasonal interest comes from the red fall color of the Bradford callery pear and the decorative red fruit of the crabapples. Moraine thornless honey locusts are used in planters with these because they will provide some shade on the pavement below them, yet will not overly shade the flowering trees. Two ginkgos are used in the large round planting area of the east-west axis for their dominating mature size, their unusual leaf form, and their yellow fall color. Two low evergreen hedges of Carissa Chinese holly are placed along the temporary eastern end to visually mark it and still allow the flow of space beyond it.

The southern portion of the north-south axis is separated from the rest of the plaza by elevation and is in a very prominent position.

Because of this it should be distinctively planted while still being related to the rest of the plaza. The circular planting area, on the highest part of the plaza and at the major entrance to it, is planted with a Kashmir deodar cedar for its distinctive and graceful form and its blue-green color. Adams crabapples are used in a row parallel to the curving humanities building to emphasize the curve and help tie this area to the east-west axis. Goldenraintrees are used in the steps from the main student parking area for their yellow flowers in summer and because they will not shade the steps in winter. They are also used in the steps on the northeast side of the auditorium.

Sweetgum trees are used on the southern side of the Humanities Building rather than continuing with a row of Marshall's Seedless ash. The ash is used extensively in this area and the unusual shape of the leaves and the fall color of the sweetgum will add variety. These emphasize the curve of the building and the adjacent parking lot in contrast to the straight lines prevalent in the rest of the campus. They also act as a sunscreen in summer while in winter allowing the sun to pass through adding its heat to the building. The main trunk of underground utilities lies in this area and the trees have been placed as far away from it as possible in the event additions or repairs are needed.

Deciduous trees are used in the islands of the parking area to the southeast of the auditorium. They will not only provide shade during summer months but will also help screen the view of parked cars from the buildings and roads.

The steep bank to the southwest of "C" building is planted with pines to eliminate mowing. Beverly crabapples are planted above the bank and at the southeastern end of this building for their spring flowers and to add variety. Deciduous trees are added to the northwest side to help bring the building into scale with the landscape.

Because the tennis courts and the multi-purpose athletic field will be in almost constant daily use, deciduous and evergreen trees are planted between them for separation and screening. Groups of Burford Chinese hollies are used to the immediate west of the greenhouse to partially screen it from view while not heavily shading it.

Southern magnolias are planted on the eastern edge of the parking lot north of the technologies building to add variety with their summer flowers and large evergreen leaves. In the corner created by Patton Lane and the road to the maintenance building, a row of Pfitzer junipers backed by two groups of redbud trees are planted to partially screen the parking lot beyond from the view of motorists on Patton Lane, while not totally blocking the view into the campus.

The portion of the campus which lies to the east of Patton Lane is to be used for expansion of athletic and parking facilities. As mentioned in the Crouch and Adams master plan (3, pp. 1, 2) this is the best use of this area because of its gentle slopes and because the presence of sinkholes makes it unsuitable for buildings. It is also separated from the rest of the campus by Patton Lane. A variety of deciduous and evergreen trees are placed around the southern edge of the baseball field to screen the residential area beyond. Redbud trees are

used to add interest with their spring flowers and because the players will not confuse the white baseballs with the flowers' red color. Partial screening of Patton Lane is also desirable to keep the traffic from distracting the players. Occasional views are left open between groups of several species of deciduous and evergreen trees.

Tuliptrees, sweetgums, and white pines are used around the temporary parking area to help soften the visual impact of a mass of cars, to provide shade, and to create a separation between the lot, the baseball field, and the track. The baseball field and the track are separated from each other by evergreen and deciduous trees so that they can be used at the same time without distracting each other. Rather than creating a continuous screen, openings have been left to keep a feeling of spatial continuity between the two. White pines are placed at the north end of the track to screen it from the adjacent privately owned land. This land is currently agricultural but its use may change in the future.

3. Plan for FTE 2500

A. Plan

See Figure 5 and Table 3.

B. Plan Rationale

With the construction of the technologies building addition, the east-west axis of the central pedestrian plaza is expanded eastward. Landscaping of the plaza is continued along the plan given in FTE 2000

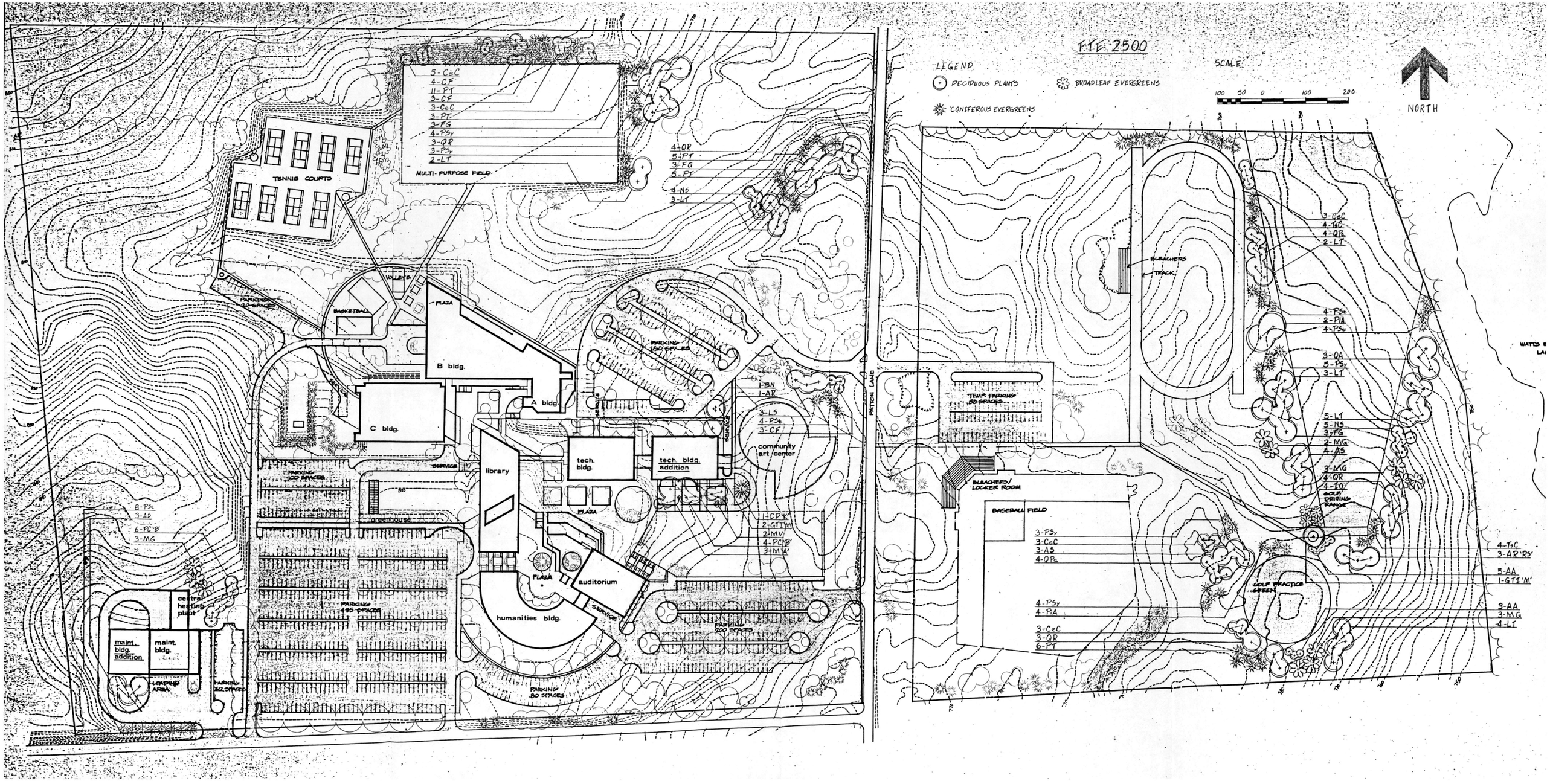
FIE 2500
LEGEND
DECIDUOUS PLANTS
BROADLEAF EVERGREENS
CONIFEROUS EVERGREENS
SCALE
100 50 0 100 200
NORTH
TENNIS COURTS
MULTI-PURPOSE FIELD
5-CeC
4-CF
11-PT
3-CF
3-CeC
3-PT
3-FG
4-PSy
3-QR
3-PSy
2-LT
4-QR
5-PT
3-FG
5-PT
4-NS
3-LT
PARKING 120 SPACES
BASKETBALL
TOILETS
PLAZA
B bldg.
C bldg.
A bldg.
SERVICE
PARKING 150 SPACES
1-BN
1-AR
3-LS
4-PSe
3-CF
community art center
library
tech. bldg.
tech. bldg. addition
PARKING 150 SPACES
greenhouse
PLAZA
1-CP'K'
2-GT1'M'
2-MV
4-PC'B'
3-MA'
8-PSe
3-AS
6-PC'B'
3-MG
central heating plant
maint. bldg. addition
maint. bldg.
LOADING AREA
PARKING 120 SPACES
PARKING 495 SPACES
humanities bldg.
auditorium
PARKING 150 SPACES
PARKING 150 SPACES
PATTON LANE
TEMP. PARKING 150 SPACES
BLEACHERS
TRACK
3-CeC
4-TsC
4-QR
2-LT
4-PSe
2-PIA
4-PSe
3-QA
5-PSy
3-LT
5-LT
5-NS
3-FG
2-MG
4-AS
3-MG
4-QR
4-TO
GOLF DRIVING RANGE
BLEACHERS/ LOCKER ROOM
BASEBALL FIELD
3-PSy
3-CeC
3-AS
4-QRa
4-PSy
4-PIA
3-CeC
3-QR
6-PT
GOLF PRACTICE GREEN
4-TsC
3-AR'RS'
5-AA
1-GT1'M'
3-AA
3-MG
4-LT

Table 3. List of Symbols to Accompany Figure 5

Symbol	No.	Scientific Name	Common Name	Size
AA	8	Amelanchier arborea	downy serviceberry	1-1/2 - 1-3/4" cal. B&B
AR	1	Acer rubrum	red maple	2 - 2-1/2" cal. B&B
AR'RS'	3	Acer rubrum 'Red Sunset'	Red Sunset red maple	2 - 2-1/2" cal. B&B
AS	10	Acer saccharum	sugar maple	2 - 2-1/2" cal. B&B
BN	1	Betula nigra	river birch	2 - 2-1/2" cal. B&B
CD'K'	1	Cedrus deodara 'Kashmir'	Kashmir deodar cedar	7 - 8' ht. B&B
CeC	17	Cercis canadensis	eastern redbud	1-1/2 - 1-3/4" cal. B&B
CF	10	Cornus florida	flowering dogwood	1-1/2 - 1-3/4" cal. B&B
FG	9	Fagus grandifolia	American beech	2 - 2-1/2" cal. B&B
GTI'M'	3	Gleditsia triacanthos var. inermis 'Moraine'	Moraine thornless honeylocust	2 - 2-1/2" cal. B&B
IO	4	Ilex opaca	American holly	3 - 4' ht. B&B
LS	3	Liquidambar styraciflua	sweetgum	2 - 2-1/2" cal. B&B
LT	19	Liriodendron tulipifera	tuliptree	2 - 2-1/2" cal. B&B
M'A'	3	Malus 'Adams'	Adams crabapple	1-1/2 - 1-3/4" cal. B&B
MG	11	Magnolia grandiflora	southern magnolia	6 - 7' ht. B&B
MV	2	Magnolia virginiana	sweetbay magnolia	1-1/2 - 1-3/4" cal. B&B
NS	9	Nyssa sylvatica	black tupelo	2 - 2-1/2" cal. B&B
PC'B'	10	Pyrus calleryana 'Bradford'	Bradford callery pear	2 - 2-1/2" cal. B&B
PiA	4	Picea abies	Norway spruce	5 - 6' ht. B&B
PlA	2	Platanus acerifolia	London planetree	2 - 2-1/2" cal. B&B
PSt	20	Pinus strobus	eastern white pine	4 - 5' ht. B&B
PSy	19	Pinus sylvestris	scotch pine	4 - 5' ht. B&B
PT	30	Pinus taeda	loblolly pine	2 - 2-1/2' ht. cont.
QA	3	Quercus alba	white oak	2 - 2-1/2" cal. B&B
QPa	8	Quercus palustris	pin oak	2 - 2-1/2" cal. B&B
QR	14	Quercus rubra	red oak	2 - 2-1/2" cal. B&B
TsC	8	Tsuga canadensis	Canadian hemlock	4 - 5' ht. B&B

with Bradford callery pears, Adams crabapples, and Moraine thornless honeylocusts. The two sweetbay magnolias add variety and interest with their dark evergreen leaves and silver undersides and are placed where they will least shade the pavement. To help give unity to the plaza design another Kashmir deodar cedar is placed in the semicircular area on the extreme eastern end.

Adjacent to the property line south of the maintenance building a line of white pines is used to screen from view the small factory on the neighboring land. Southern magnolias and Bradford callery pears are added to the north of this building to help provide a setting for it and to screen the coal pile and the equipment in the rear from view from the parking lot to the east. Three sugar maples are placed on the southern side of the addition to this building to give shade in summer.

The plantings on the bank north of the multi-purpose field are continued with a mixture of loblolly pines, flowering dogwoods, and redbuds. These are expanded around the eastern end with a greater variety of species. This band of trees helps to control erosion, eliminates mowing on the bank, and defines and screens the field from view of the neighboring land to the north and of Patton Lane to the east.

Between the multi-purpose field and Patton Lane, the small group of trees remaining from an old fence row is expanded with an informal arrangement of deciduous and evergreen trees. This creates a natural setting of pasture and woodland that is prevalent in the surrounding landscape and helps to unify the campus with its surroundings. As

mentioned in the Crouch and Adams master plan, care is taken not to block the existing view of the campus buildings from the north on Patton Lane.

South of the entrance to the interior parking lot an informal group of trees is added to complement the existing ones on the north side. Because the community art center will be built in this area, either in this stage or the next, the group is placed as close to the entrance road as possible so as not to interfere with the construction of this future building. A red maple is added on the north side of the technologies building addition to complete the row of this species and a clump of river birch is placed nearby for the variety of its graceful form.

The athletic facilities east of Patton Lane are expanded with the construction of a golf practice green and a driving range. Informal groupings of mixed deciduous and evergreen trees are placed beside these to separate them from other activities while still allowing some continuity of space. The grouping of trees on the south side of the practice green is used for separation and screening of the adjoining residential area. A large number of species are used here for variety and to simulate the mixed deciduous and pine woods of the surrounding landscape.

4. Plan for FTE 3000

A. Plan

See Figure 6 and Table 4.

FTE 3000

LEGEND

DECIDUOUS PLANTS

BROADLEAF EVERGREENS

CONIFEROUS EVERGREENS

SCALE

100 50 0 100 200

NORTH

TENNIS COURTS

MULTI-PURPOSE FIELD

VOLLEYBALL

BASKETBALL

PARKING 40 SPACES

PLAZA

B bldg.

A bldg.

C bldg.

C bldg. addition

SERVICE

PARKING 120 SPACES

library

4-IA

3-APR'S'

3-IA

library addition

greenhouse

tech. bldg.

tech. bldg. addition

community art center

8-PC'B'

5-KP

2-GTI'M'

PATTON LANE

general classroom

auditorium

humanities bldg.

PARKING 400 SPACES

central heating plant

maint. bldg. addition

maint. bldg.

LOADING AREA

5-AA

4-TsC

2-TsC

4-LS

5-LT

5-PS

4-AS

3-CF

3-PS

4-QR

4-PS

3-CF

24-TC

5-AA

4-10

4-GTI'M'

4-PIA

3-IA

4-AS

5-PC'B'

3-MG

6-M'B'

5-AA

3-IA

3-AA

3-PC'B'

4-M'A'

3-FS

4-PIA

3-AA

4-M'A'

3-LS

GOLF DRIVING RANGE

GOLF PRACTICE GREEN

Watts B

Lak

Table 4. List of Symbols to Accompany Figure 6

Symbol	No.	Scientific Name	Common Name	Size
AA	21	Amelanchier arborea	downy serviceberry	1-1/2 - 1-3/4" cal. B&B
AR'RS'	3	Acer rubrum 'Red Sunset'	Red Sunset red maple	2 - 2-1/2" cal. B&B
AS	8	Acer saccharum	sugar maple	2 - 2-1/2" cal. B&B
CF	6	Cornus florida	flowering dogwood	1-1/2 - 1-3/4" cal. B&B
FS	3	Fagus sylvatica	European beech	2 - 2-1/2" cal. B&B
GTI'M'	6	Gleditsia triacanthos var. inermis 'Moraine'	Moraine thornless honeylocust	2 - 2-1/2" cal. B&B
IA	13	Ilex aquifolium	English holly	2-1/2 - 3' ht. B&B
IO	4	Ilex opaca	American holly	3 - 4' ht. B&B
KP	5	Koelreuteria paniculata	goldenraintree	2 - 2-1/2" cal. B&B
LS	7	Liquidambar styraciflua	sweetgum	2 - 2-1/2" cal. B&B
LT	5	Liriodendron tulipifera	tuliptree	2 - 2-1/2" cal. B&B
M'A'	8	Malus 'Adams'	Adams crabapple	1-1/2 - 1-3/4" cal. B&B
M'B'	6	Malus 'Beverly'	Beverly crabapple	1-1/2 - 1-3/4" cal. B&B
MG	3	Magnolia grandiflora	southern magnolia	6 - 7' ht. B&B
PC'B'	16	Pyrus calleryana 'Bradford'	Bradford callery pear	2 - 2-1/2" cal. B&B
PiA	8	Picea abies	Norway spruce	5 - 6' ht. B&B
PSt	4	Pinus strobus	eastern white pine	4 - 5' ht. B&B
PSy	8	Pinus sylvestris	scotch pine	4 - 5' ht. B&B
QR	4	Quercus rubra	red oak	2 - 2-1/2" cal. B&B
TiC	24	Tilia cordata	littleleaf linden	2-1/2 - 3" cal. B&B
TsC	6	Tsuga canadensis	Canadian hemlock	4 - 5' ht. B&B

B. Plan Rationale

With the construction of the parking lot east of Patton Lane, the library addition, the general classroom building, and the community art center, expansion of campus facilities is completed into the foreseeable future. The latter two buildings also complete the formation of the central pedestrian plaza creating a permanent eastern end. No additional landscaping is needed here other than the replacement of diseased or dying plants and the addition of new ones for embellishment.

To help provide a setting for the community art center and add three-season interest with flowers and leaves, a line of Bradford callery pears is placed next to the pavement to the north of it. Moraine thornless honeylocusts are placed in the two circular planting areas on the southeast side where they will provide a wide area of filtered shade in the summer, with none in the winter to hinder the melting of ice and snow. Next to Patton Lane a row of goldenraintrees are added for the variety of their yellow summer flowers. These will also help provide a setting for the building, while not completely hiding it from motorists on Patton Lane.

The large rectangular area south of the community art center and east of the general classroom building will most likely be used for expansion beyond FTE 3000. With this in mind a variety of evergreen and deciduous trees have been located around the periphery, leaving the central portion open for informal student recreation or for construction of a future building. Spring flowering Adams crabapple and downy serviceberry are used here along with European beech and Norway spruce.

A group of Bradford callery pears are placed next to Patton Lane at the drive southeast of the community art center. These complement the existing group just to the south. South of the general classroom building three sweetgums are added for shade and the variety of their leaf shape and fall color.

West of the library addition English hollies are used as a partial screen for the greenhouses while not overly shading them. Red Sunset red maples are placed just south of the greenhouses to provide shade and add variety with their fall leaf color.

A large parking lot is constructed east of Patton Lane and the temporary lot is removed. Mixed deciduous and evergreen trees are used to screen the lot from Patton Lane and from the track to the east. Littleleaf lindens are planted in the islands to provide summer shade and to break the monotony of a mass of cars. Informal groupings of deciduous and evergreen trees are also used in and around the circular drive between the parking lot and the baseball field. These provide separation of facilities and add interest to the landscape. Spring flowering downy serviceberry, Beverly crabapple, Bradford callery pear, and flowering dogwood are used in these plantings for variety and to add interest.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

A community college landscape, as with any landscape, must be carefully planned in order to realize the full potential of the site and to achieve a high level of user satisfaction and service. The subdivisions of Chapter IV are meant to be general guidelines for this planning and are applicable to almost any community college site. They are specifically applicable to the Roane State site.

The Roane State campus is inherently beautiful, possessing great landscape development potential. The planting plans in Chapter V are planned to bring out this potential. As seen in Figure 3, as the campus currently is, more trees are needed to provide scale and unity and to define spaces within the landscape. This occurs in the three succeeding figures, developing along with the campus facilities and activities. Interior spaces are not entirely enclosed, instead they flow from one space into another.

The best views of the surrounding landscape are framed, while the undesirable ones are screened. The views into the campus from the road which bisects it are also framed or screened as needed. The surrounding landscape is made up of a mixture of open fields and woodlands containing a variety of deciduous and evergreen trees. To relate the campus landscape to this a large variety of species and cultivars are used, some of which are native and some of which are exotic.

The plants that are specified in the plans are chosen for their form, color, and texture and for their ability to perform well in the study area. Other considerations were mature height and spread and resistance to diseases and insects.

The continued success of any landscape plan depends on the care it is given once the plan is executed. As the landscape is divided into ever smaller units by facilities for its users it requires more meticulous care. This is inevitable but can be simplified by using proper management practices. It is recommended that the Roane State landscape be given the best possible maintenance, realizing that over time the landscape will change and that maintenance must be sensitive to this change.

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LIST OF REFERENCES

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APPENDIX

MASTER PLAN FOR ROANE STATE COMMUNITY COLLEGE

Prepared by:

Crouch & Adams, Inc.
Architects-Engineers-Planners-Surveyors
Oak Ridge, Tennessee

April 15, 1977

C&A Project No. 76340

Master Plan for Roane State Community College

INTRODUCTION:

In preparation of the Master Plan, we strove to create a high level of user involvement in the planning process by holding interviews and design charrettes with Roane State faculty, students, administrators, and the State Board of Regents. We believe the information contained in this report and the accompanying drawings to be valuable as a guideline for future facility planning; however, periodically the plan should be re-evaluated and updated to respond to changing programs.

Master Plan for Roane State Community College

SITE DETERMINANTS

Introduction:

Certain aspects of the site were observed and studied including slope, site drainage, geological considerations, vegetation and views. The results of this study gave some determinations for the design of the Site Development Plan.

Slope Analysis:

A slope analysis was done to determine which areas of the site would be most appropriately planned for various land uses. It was determined that the land east of Patton Lane has slopes predominantly in the 0-5% and 5-10% range which suggests that this area be planned for parking and outdoor recreational activities. The area southeast of the existing buildings has slopes within the 5-10% range which makes it suitable for building. West of the existing buildings, the land has steep slopes of greater than 10% which could be considered prohibitive for buildings or other campus land uses.

Site Drainage:

The over-all drainage pattern runs generally in a west to east direction where it eventually flows into Watts Bar Lake. There is a significant portion of the site which drains through a low-lying area to the north of the existing buildings onto which adjacent properties to the west and north contribute a significant amount of surface drainage. Recognition should be made that alteration of land forms by adjacent property owners could affect the volume of surface drainage in this area. Any facilities planned in this area should have provisions for positive drainage control.

It should also be noted that there are five areas of the site which are or suspected of being sink holes.

Geological Considerations:

In order to gain an over-view of the geological conditions which exist on-site, a visual observation of surface land forms and review with geological consultants suggested a number of recommendations that may have some influence on the planning and design of future buildings.

Master Plan for Roane State Community College

SITE DETERMINANTS

1. It was found that in the construction of the existing buildings, the bearing capacity of the soil was insufficient to carry the building loads on spread footings and that the bearing capacity worsened as tests were made to the north of the building. Due to the high cost of caissons which would be necessary for buildings constructed to the north of the existing building, it is recommended that this area should not be considered for future building sites.

2. To reduce costs, future buildings should have a steel frame structural system rather than poured-in-place concrete and should have relatively small column bay spacings in order to lighten the loads on the soil so that spread footings can be used.

3. The soil bearing capacity in the area to the southeast of the existing buildings has been found to be generally good and should be able to support a 2 or 3 story structure.

4. It is recommended that future buildings be set as close as possible to existing grades in that the soil bearing capacity below the upper 20 feet or so is unpredictable and is likely to be less than the soil above.

5. It was observed that there are five areas of the site which are suspected of being sink holes. Buildings should not be located over sink holes because intolerable differential settlements can be expected due to the instability of the subsurface conditions. The Master Plan has sited all structures away from sinkhole locations.

6. The subsurface rock is fragmented and varies in depth from 10-40 feet below the surface.

7. The water table is relatively low, no water was encountered in test holes for the Technologies Building.

Vegetation Analysis:

Vegetation east of Patton Lane consists of high grass, low brush, some scattering of small trees and large mature trees along the eastern boundary of the property at Watts Bar Lake. This area is largely undeveloped and the vegetation is providing no particular enhancement to the campus. The area to the west of the existing buildings is heavily wooded with predominantly pine trees. This wooded area is a

SITE DETERMINANTS

definite plus for the campus and should not be disturbed by future development. The remainder of the site is grassed pasture-like land with a few scattering of trees. There is a general lack of planting around the buildings and paved areas which gives the campus an unfinished appearance.

Views:

The property is located in a natural setting with almost no man-made intrusions such that there are pleasant long distance mountain views in a 360° circle. Approaching the campus from the north on Patton Lane, there is a marvelous view of the buildings which lets you know that you have arrived and should be maintained. Except for this view, views of the buildings and parking facilities are limited or non-existent from Patton Lane which presents some problem of orientation for first-time users. The buildings are hidden from view from the main parking lot by an earth berm which has its aesthetic purposes but again provides some orientation problems. It is possible, standing on the high point of a knoll south of the existing buildings to look down on the roofs of the buildings, which is not a particularly pleasing experience. Future building design for this area should be cognizant of this fact.

USE DETERMINANTS

Introduction:

Interviews with users and on-site observation have indicated some problems with the existing facilities which were studied to see if they could be relieved by elements of the Master Plan.

Existing Buildings:

There were positive aspects often stated about the existing buildings which were its' openness and informality and the way it seems to foster a personal interest in the students. Many of the negative aspects had to do with growing pains of simply not having enough space, which will be relieved by campus expansion and renovation of existing facilities. A main area of concern is the difficulty in scheduling concerts, guest lecturers, seminars and the like because there are no appropriate spaces

for these types of activities without interferring with other functions of the campus. The auditorium, as shown on the Site Development Plan for Phase FTE 2000, is intended to accommodate this need.

Parking:

There are two general problems associated with the parking lot facilities, one being insufficient number of spaces and the other being lack of security. The insufficient number of spaces can be partially relieved by striping of the main parking lot which, by the absence of striping, is operating at a reduced efficiency. Immediate plans for increasing the parking capacity including the lot under construction in connection with the Technology Building and the programmed 440 additional spaces under Campus Expansion Phase II, should provide sufficient parking until the campus grown to an enrollment of 3000 students. At Phase FTE 3000, an additional 300 parking spaces needs to be added. From experimental estimates; one parking space per two FTE should provide adequate but not over abundant parking facilities.

The problem of security is due to the fact that the parking lots are not able to be monitored from the buildings or from any inconspicuous vantage point. With the addition of the new library and successive buildings, the parking lots will be able to be visual controlled from the buildings.

Vehicular Circulation:

Traffic flow even during peak usage periods of the day does not appear to be a real problem. There is one intersection at the east entrance to the main parking lot which is congested at times due to improper regulation of parking. There is a particular congestion problem with delivery trucks in the service court west of the existing maintenance facilities which will be relieved when the new Maintenance Building is built.

Traffic flow on Patton Lane is fairly high speed which may need some restriction as the vehicular population grows. It may be necessary to provide a pedestrian activated traffic signal at the entrance to the Technology Building parking lot to protect pedestrians crossing Patton Lane.

Master Plan for Roane State Community College

USE DETERMINANTS

Pedestrian Circulation:

Walking distances were charted from parking facilities to the building entrances and it was found that the distance from the southwest corner of the main parking lot to the building was no greater than from the temporary lot east of Patton Lane. This suggests that it is not unreasonable to provide parking facilities east of Patton Lane, particularly if the campus is growing in that direction. There also needs to be a pedestrian link between the buildings west of Patton Lane and the recreational facilities east of Patton Lane.

The topography of the site necessitates level changes in the access ways to the building entrances which creates problems for the handicapped. As an example, the main entrance to the campus from the main parking lot has a set of steps which make it inaccessible for the student confined to a wheelchair.

The existing building has but one service elevator which is used by the handicapped to go from floor to floor. Elevators, in future buildings, should be situated so that they can serve double duty for passengers and for servicing the buildings without treating the handicapped as second class citizens.

As the campus now exists, there is little outdoor area where students can congregate informally. A series of walks and plazas should be developed to link the campus together and to encourage interaction among students.

Orientation:

The problems associated with orientation involving vehicular and pedestrian movement is due partially to the lack of a comprehensive signage system. Difficulties are continually experienced, particularly by first time users in locating proper access points for parking and service entrances. It is unclear for the pedestrian which entrance of the building is most appropriately entered for him to arrive at his destination. It is suggested that a uniform signage and graphics system be developed such that a person can properly and unaided make the transition from car to parking to building.

This signage system should be kept uniform to reduce the visual disorder of competing graphics and to maintain a logic of conveying information.

Master Plan for Roane State Community College

SITE DEVELOPMENT PLAN

Introduction:

The Site Development Plan is presented in three phases showing the extent of campus development at each phase. Each phase is shown at a large scale to show in more detail the main building development west of Patton Lane and at a smaller scale to show the total campus development including the site east of Patton Lane.

Concept:

The Community College, but its nature, in responding to the educational needs of the surrounding communities has a program which is less predictable in terms of educational emphasis and in number of students than a state university for example. In response to a flexible program, it is necessary that a growth pattern be established which accommodates change and yet at the same time have a sense of completeness and cohesiveness at any particular phase of development.

Goals:

Included below is a list of goals which were established for the design of the Site Development Plan.

1. The plan should have a complete appearance at any state of development.

2. Facilities should be sited with respect to the topography.

3. Provide a weather protected pedestrian circulation system between buildings.

4. Tie together the eastern and western halves of the campus.

5. Provide easy service access to each building.

6. Provide easy access to all buildings for the handicapped.

7. Locate buildings so that they can take advantage of views.

8. Disburse parking to keep human scale.

9. Establish multiple entry points.

Master Plan for Roane State Community College

SITE DEVELOPMENT PLAN

General Description of the Plan:

Beginning with the new library, the future buildings are added to the campus in linear increments of growth with buildings being closely spaced and connected by cores containing circulation space and building services. The buildings follows the contours of the land minimizing changes in level and creating a series of pedestrian plazas. Arranged around the periphery of the buildings are parking and vehicular circulation systems which allow service access to each building as it is added.

The main pedestrian entrance to the campus is through an arcade formed by the new library to a plaza from which most of the buildings are accessible without negotiating a level change. The pedestrian plazas are seen to be stepped at different levels to follow the topography with level changes between plazas accomplished by stairs and a system of ramps so that all buildings are easily accessible to the handicapped from the campus core. Once inside the buildings, by their being interconnected, it is virtually possible to traverse the campus without having to go outdoors.

There are two areas of recreational and athletic facilities, one to the east of Patton Lane and the other to the northwest of the existing buildings. The area east of Patton Lane is seen to be used for more structured types of activities, whereas, the other is viewed to be used more casually as an outdoor extension of student services space.

Parking areas are reduced in size and scattered around the campus to reduce the scale and visual intrusion and to minimize walking distance. As the campus expands to the east and as additional parking needs are realized, parking is added east of Patton Lane which would jointly serve the academic buildings as well as recreational facilities.

The central heating plant will be coal-fired with a stockpile of coal adjacent to the plant and the Maintenance Building needs to be readily accessible for incoming deliveries and service to the campus. Several locations were considered for the facilities, one being the area in the vicinity of the tennis courts northwest of the existing buildings and the other being an area to the southwest of the main parking lot. The latter location was selected because it was felt that it would have less of an intrusion on the other activities of the campus and would be more accessible to vehicular traffic.

Master Plan for Roane State Community College

PHASING OF MASTER PLAN

Introduction:

The State Board of Regents has developed a system for planning of future facilities based on enrollment, independent of the function of time, which responds more accurately to the unpredictable manner in which a community college grows. The student enrollment is designated as FTE (Full Time Equivalent) of students registered on-campus which represents one variable. The second variable is NASF (Net Assignable Square Footage) which is separated into nine categories of spaces of which each serves a particular function within the college. Here again the State Board of Regents has developed a mathematical model which determines the amount of NASF required for each category of space based on FTE. The idea is that, as new facilities are planned or renovations to existing facilities are made, the planned additions will be as close to the model as possible so that a well balanced facilities plan be achieved.

The phasing of the Master Plan is being considered in three phases: FTE 2000, FTE 2500 and FTE 3000. It has been determined at each of these levels of enrollment that deficiencies in space will occur to the extent that it will become necessary to add new facilities to the campus or make renovations to existing facilities.

Refer to Tables entitled, "Comparison Between Planned and Model Net Assignable Square Footage for Campus Expansion." These tables show how NASF is being added at each phase of expansion and a comparison between facilities planned and the model determined by the State Board of Regents.

Phase FTE 2000:

In order to arrive at a total square footage for FTE 2000, it is necessary to include an inventory of existing facilities, facilities under construction and facilities programmed and funded under Campus Expansion Phase II.

1. Inventory—1976:

   Inventory-1976 includes the "A" Building, "B" Building and "C" Building as they exist with no renovations or adjustments in space being made.

PHASING OF MASTER PLAN

2. Technology Building:

   Presently under construction, the Technology Building will provide class lab space supplanting class lab space in the "B" Building which would be converted to general classrooms.

3. Campus Expansion Phase II and Building Renovations:

   a. Library/LRC:

      The new library/LRC will house reading and developmental studies in addition to library functions. This facility will affect changes in the existing "A" Building and "B" Building by vacating space used to accommodate the present library and associated activities. Individual study labs presently in the "B" Building will be incorporated into the new library with the space being vacated converted to general classrooms.

   b. Existing Library Renovation:

      Space vacated by the existing library in the "A" Building would be converted to administrative and instructional offices.

   c. Student Services Renovation:

      Student service space will be expanded by renovation of instructional and administrative offices in the "B" Building and by renovation of the area vacated by maintenance facilities.

   d. Maintenance Building (Phase I):

      The addition of a new maintenance building which includes a central heating plant would remove these functions almost entirely from the "B" Building.

These additions and renovations fall short in providing the amount of NASF needed to accommodate enrollment at the FTE 2000 level; therefore, additional facilities and renovations need to be planned. Planned additions with allocations of NASF by category is made in such a way to satisfy both the anticipation of expanded educational programs and to bring the planned development at FTE 2000 as close to the FTE 2000 model as possible.

PHASING OF MASTER PLAN

4. Additional Facilities Planned for Phase FTE 2000: The FTE 2000 plan includes the addition of a humanities building of 15,000 NASF, renovation of 3156 NASF for physical education activities in the "C" Building presently used for music classrooms and the addition of a 1200 NASF greenhouse. In conjunction with the humanities building is the addition of a 400 seat lecture hall/auditorium which is not assigned to any one category of space function.

Phase FTE 2500:

By comparison of the FTE 2500 model and the FTE 2000 planned facilities, deficiencies are evidenced across the board in almost all categories of space functions, which indicates the need for further additions and renovations to the facilities:

1. Technology Building Addition:

   The Technology Building Addition is seen to be a 22,000 NASF addition including general classrooms, class labs and instructional offices.

2. "A" Building Renovation:

   2000 NASF of instruction offices located in the "A" Building by Campus Expansion Phase II will be converted to administrative offices with those instructional offices displaced being located in the Technology Building Addition.

3. "B" Building Renovation:

   General classroom space of 4000 NASF will be renovated for the expansion of student service activities.

4. "C" Building Renovation:

   General classroom space of 1550 NASF will be renovated for the expansion of physical education activities.

5. Library/LRC Renovation:

   Instructional office space of 1000 NASF which was programmed into the library on an interim basis under Campus Expansion Phase II will be

renovated for library expansion. The instructional office space displaced will be incorporated into the Technology Building Addition.

6. Maintenance Building (Phase II):

   An addition of 5,500 NASF would be added as an expansion to the Maintenance Building (Phase I).

7. Locker Room:

   The addition of 2000 NASF of locker rooms under new bleacher facilities would be added at the existing baseball field located east of Patton Lane.

Phase FTE 3000:

Again as the FTE 3000 model and the FTE 2500 planned facilities are compared, it is evidenced that further expansion is necessary.

1. Library/LRC Addition:

   A programmatic requirement of the Campus Expansion Phase II for the addition of stack area by 10,000 NASF is seen to be needed at FTE 3000.

2. General Classroom Building:

   As expansion of student services occurs within the "B" Building displacing general classroom space and keeping in pace with increased enrollment, a general classroom building of 23,000 NASF would be added.

3. "A" Building Renovation:

   Instructional offices are moved to the new General Classroom Building and the 2000 NASF space vacated is taken over by expansion of administrative offices.

PHASING OF MASTER PLAN

4. "B" Building Renovation:

   2000 NASF of general classroom space is moved to the new general classroom building with the space vacated renovated for expansion of student services.

5. "C" Building Addition:

   The "C" Building Addition would be an expansion of the existing "C" Building of 6000 NASF to be used for Phys. Ed. activities.

6. Greenhouse Addition:

   An additional greenhouse of 1200 NASF would be added next to the greenhouse constructed at Phase FTE 2000.

There are several items which need mentioning in regard to the phasing of the Master Plan. One is that as spaces are renovated in the existing buildings to accommodate expansion of certain activities, the existing buildings are becoming more and more specific in function as the plan develops, for example, the "B" Building is becoming almost exclusively used for student services. It is suggested that alternate locations be considered for all types of functions throughout the campus to provide a vitality and at the same time provide a homogeneous mixture of activities. The second item is that even though specific titles have been given facilities such as "Technology Building Addition," and square footage assigned specifically to one type of space, this is not intended to mean that these facilities are fixed and rigid. There should remain a high level of flexibility within the design of individual buildings to respond to changing campus programs.

FTE 2000 COMPARISON BETWEEN PLANNED AND MODEL NET ASSIGNABLE SQUARE FOOTAGE FOR CAMPUS EXPANSION

		General Classrooms	Class Labs	Individual Study Labs	Instructional Offices	Administrative Offices	Library and/or LRC	Physical Education Activity	Student Services	Physical Plant	Totals
INVENTORY 1976	"A" BLDG - FTE 350					9,651	7,091				16,742
	"B" BLDG - FTE 350	16,457	12,964	2,989	7,029				11,708	4,009	55,156
	"C" BLDG - FTE 350							17,121			17,121
	TECH. BLDG	(+4,574) 5,662	(-4,574) 16,921		4,598	1,150					28,331
CAMPUS EXPAND PHASE II AND RENOVATIONS	LIBRARY/LRC	(+2,624)		(-2,624) 3,852	1,976	620	15,670				22,118
	MAINT. BLDG. (PHASE I)					360				10,790	11,150
	STUDENT SERVICES RENOV.				(-4,958)	(-1,582) (-2,654)			(-9,293) (-2,708)	(-3,906)	- 1,007
	EXIST'G LIB. RENOV.				(+5,128)	(+2,000) (-465)	(-7,091)				- 428
FTE 2000 AS PLANNED	PHYS ED. RENOV.	(-3,156)		(-365)				(+3,156)			- 365
	GREENHOUSE		1,200								1,200
	HUMANITIES BLDG	1,500	7,500	500	5,000				500		15,000
	FTE 2000 PLANNED	27,661	34,011	4,352	18,773	14,538	15,670	20,277	18,793	10,893	165,018
	FTE 2000 MODEL	24,900	30,000	3,000	18,660	14,000	16,250	20,000	18,500	10,898	156,208
	DIFFERENCE	+ 2,761	+ 4,011	+ 1,352	+ 113	+ 588	- 580	+ 277	+ 293	- 5	+ 8,810
		111%	113%	145%	101%	104%	96%	101%	102%	100%	106%

MASTER PLAN FOR ROANE STATE COMMUNITY COLLEGE
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FIGURES IN PARENTHESES REPRESENT RENOVATED SPACES

FTE 2500 COMPARISON BETWEEN PLANNED AND MODEL NET ASSIGNABLE SQUARE FOOTAGE FOR CAMPUS EXPANSION

	General Class-rooms	Class Labs	Individual Study Labs	Instruc-tional Offices	Admins-trative Offices	Library and/or LRC	Physical Education Activity	Student Services	Physical Plant	Totals
FTE 2500 MODEL	31,125	37,500	3,750	23,325	16,500	20,000	25,000	23,125	13,525	193,850
FTE 2000 PLANNED	27,661	34,011	4,352	18,773	14,588	15,670	20,277	18,793	10,893	165,018
DIFFERENCE	- 3464	- 3,489	+ 602	- 4,552	- 1,912	- 4,330	- 4,723	- 4,332	- 2,632	- 28,832
	89%	91%	117%	80%	88%	78%	81%	81%	81%	85%
TECH. BLDG ADD.	9,500	4,000		8,000				500		22,000
"A" BLDG RENOV.				(-2,000)	(2,000)					
"B" BLDG RENOV.	(-4,000)							(4,000)		
"C" BLDG RENOV.	(-1,550)						(1,550)			
LIB./LRC RENOV.				(-1,000)		(1,000)				
MAINT. BLDG (PHASE II)					200				5,300	5500
LOCKER ROOM							2,000			2,000
FTE 2500 PLANNED	31,611	38,011	4,352	23,773	16,788	16,670	23,827	23,293	16,193	194,518
FTE 2500 MODEL	31,125	37,500	3,750	23,325	16,500	20,000	25,000	23,125	13,525	193,850
DIFFERENCE	+ 486	+ 511	+ 602	+ 448	+ 288	- 3,330	- 1173	+ 168	+ 2,668	+ 668
	102%	101%	117%	102%	102%	83%	95%	101%	120%	100%

MASTER PLAN FOR ROANE STATE COMMUNITY COLLEGE
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FTE 3000 COMPARISON BETWEEN PLANNED AND MODEL NET ASSIGNABLE SQUARE FOOTAGE FOR CAMPUS EXPANSION

	General Class-rooms	Class Labs	Individual Study Labs	Instruc-tional Offices	Adminis-trative Offices	Library and/or LRC	Physical Education Activity	Student Services	Physical Plant	Totals
FTE 3000 MODEL	37,350	45,000	4,500	27,990	19,000	23,750	30,000	27,750	16,150	231,490
FTE 2500 PLANNED	31,611	38,011	4,352	23,773	16,788	16,670	23,827	23,293	16,193	194,518
DIFFERENCE	- 5,739	- 6,989	- 148	- 4,217	- 2,212	- 7,080	- 6,173	- 4,457	+ 43	- 36,972
	85%	84%	97%	85%	88%	70%	79%	84%	100%	84%
LIBRARY/LRC. ADD.						10,000				10,000
GEN. CLASSRM BLDG	8,000	7,000		6,000				2,000		23,000
"A" BLDG. RENOV.				(-2,000)	(2,000)					-0-
"B" BLDG RENOV.	(-2,000)							2,000		-0-
"C" BLDG ADD.							6,000			6,000
GREENHOUSE ADD		1200								1,200
FTE 3000 PLANNED	37,611	46,211	4,352	27,773	18,788	26,670	29,827	27,293	16,193	234,718
FTE 3000 MODEL	37,350	45,000	4,500	27,790	19,000	23,750	30,000	27,750	16,150	231,290
DIFFERENCE	+ 261	+ 1211	- 148	- 17	- 212	+ 12,920	- 173	- 457	+ 43	+ 3,428
	101%	103%	97%	100%	99%	112%	99%	98%	100%	101%

MASTER PLAN FOR ROANE STATE COMMUNITY COLLEGE
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Master Plan for Roane State Community College

UTILITIES DEVELOPMENT

Introduction:

The Utility Plan was designed with three goals in mind which were to tie in with the existing utilities with a minimal amount of changes to eliminate interference between different types of services and to provide a systematic pattern of providing services to future buildings as the campus expands. The Utilities Plan shows full development at the FTE 3000 Phase to which pieces would be added as required during preceding phases of development.

Storm Sewer:

The proposed locations of the future building sites are at an elevation that should offer no problem for adequate drainage. Main collector trenches are shown on the Utility Plan. It shall be necessary to place catch basins and junction boxes as required to facilitate low areas in the courtyard and allow for proper maintenance.

Sanitary Sewer:

Again, the proposed building sites are located such that all waste will drain by gravity to the existing treatment plant. Close coordination with the operators of the treatment plant is recommended to insure that adequate capacity is added to the plant as required to handle the additional load as the master plan progresses. Manholes are located to collect the main waste line from each building and also to offer proper cleanout spacing.

Domestic and Fire Water:

The water supply is shown looping the proposed new building sites. This will provide optimal access from a maintenance standpoint. It is recommended that isolation valves be placed at intervals around the loop in order to prevent shutting down the entire plant in the event of a ruptured line.

Master Plan for Roane State Community College

UTILITIES DEVELOPMENT

Heating Water:

All future heating water shall originate from the proposed new heating plant to be located in the southwest portion of the property. The supply and return piping is shown on the outer extremity of the new building sites. This will provide optimal access. The present buildings are heated with an existing hot water boiler. This plan would use the existing piping on the southeast corner of the gym to backfeed from the new heating water from the new heating plant.

Cooling Water:

The cooling water source shall originate from the existing equipment room in the original classroom building. The routing of the cooling water piping shall be the same as the heating water piping from the point of intersection from the heating plant. A new chiller shall be required as the Master Plan progresses.

Electrical:

The existing primary source of power is a 13.2 KV service fed underground to the existing classroom building equipment room. This plan shows the extension of the 13.2 KV feed to facilitate the new buildings. The underground feed shall take the same routing as the water piping. A manhole is shown at the entrance of each building. This shall facilitate pulling as well as serving as a splice box to serve each building. This plan proposes the use of indoor unit substations to serve the interior power requirements of the particular building.

TV and Communications:

When the original building was erected, empty conduits were stubbed out for future TV and telephone service. This plan shows the extension of the existing conduits and follows the routing of the power line. Necessary pull boxes should be placed as required.

Master Plan for Roane State Community College

ARCHITECTURAL DESIGN STUDY

Introduction:

In this Architectural Design Study for the Master Plan of Roane State Community College are presented ideas and concepts for the overall design as well as identification of those aspects of the design of the existing buildings to which we feel the design of future buildings should respond.

Concepts:

The existing building designed by McCarty, Bullock, Church and Holsaple is a very strong architectural statement in concept and execution, which we feel should be carried through in the future buildings.

The Site Development Plan was designed in such a way that the buildings are closely spaced and linked together in a continuous manner so that individual buildings are not perceived individually but as a part of the whole composition of the campus. We see this continuity being carried through in the design of each future building so that the total campus development will be read as essentially one building. This is an extension of the concept of the original building that all functions of the campus be housed under one roof.

Aspects of the Design:

1. Use of Materials:

   The existing buildings have established a strong precedent in their use of poured-in-place concrete; however, for structural reasons and for quality control reasons, it is suggested that precast concrete and steel frame be used. The question arises as to whether to duplicate the poured-in-place concrete by using precast concrete panels or to introduce a new material such as metal panels or brick. There remains enough of the campus to be built that if a change in materials is made early in the development and carried through in future buildings, then the cast-in-place concrete will become less dominant and assume an equal and contrasting posture with an alternate material. In considering alternate materials, there are some advantages and disadvantages to each.

It is possible, by using precast concrete, to essentially duplicate the existing building at the same time giving a high level of quality assurance and design flexibility. Color and texture can be controlled so that future buildings will match existing buildings and it can reduce construction time when compared with masonry. Some disadvantages of precast concrete are that it is relatively heavy which means an increase in the cost of the supporting structure and it has a relatively low thermal insulation value.

Metal panels can be erected quickly, are light-weight and once in place, be a total wall system finished inside and out with thermal insulation sandwiched in between. They could be easily removed and replaced with glass responding to a high level of flexibility of the interior spaces.

Brick masonry could add some warmth to the campus but has many disadvantages, which are: its weight, its duration of construction time, low insulation value and the problem of matching. For these reasons, it is not recommended for the buildings, however it could be used as paving for the outdoor plaza areas to provide a common unifying element.

2. Scale:

The existing building has a sense of scale which sensitively responds to the distance between the viewer and the building. Large scale expansive elevations of the building are exposed where the building is viewed from a distance and where people are close to the building it assumes a low profile with an embracing feeling. To maintain this same sensitivity of scale in future buildings, it is suggested that elevations facing the interior plaza areas be limited to one or two stories in height. It is further suggested that expansive opaque wall surfaces unbroken by window openings be avoided where people walk next to the buildings. Items such as trees and planting, exterior lighting fixtures, seating and modulation of pedestrian pavement should also be considered in keeping a human scale.

3. Treatment of Openings:

Attention was given to solar control at window openings in the design of the existing buildings. Windows on the south elevation are protected by recessing the windows back from the wall plane and

by projecting baffles out from the face of the windows. Windows facing north are set flush with the plane of the wall. In future buildings, these plus other solar control devices should be considered such as addition of vertical baffles on the east and west windows, addition of double glazing and reduction of the ratio of glazing to wall surface area. An important feature in developing a continuity among future buildings is to treat window openings similarly, providing interest and variety by responding to solar control on different elevations of the building.

The manner in which entrances to the existing buildings have been treated has a consistency which should be continued. Entrances are inset so that a penetration is made into the building before actually entering the building.

4. Other Aspects:

Some other aspects of the design which should be perpetuated are the flat roofs, concealment of roof-top mechanical equipment, detailing of exterior stairs, and use of a consistence graphics system to identify areas and rooms of the buildings.

VITA

Nancy W. Rennie was born in Nashville, Tennessee, on January 15, 1944. She attended elementary schools in that city and was graduated from West End High School in June 1962. The following September she entered Maryville College, Maryville, Tennessee. She transferred as a sophomore to The University of Tennessee, Knoxville in September 1963 and received her Bachelor of Science degree in Botany in June 1966.

The following six years involved various pursuits, including a teaching assistantship at North Carolina State University, a part-time position in tobacco research with the U.S. Department of Agriculture, and the management of a home. In September 1972 she entered the Graduate School of The University of Tennessee, Knoxville and pursued her degree while being employed in several areas of ornamental horticulture. She received her Master of Science degree in Agriculture with a major in Ornamental Horticulture and Landscape Design in March 1982.

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