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Architectural Program

**A PHYSICAL SCIENCES
BUILDING
FOR THE
21ST CENTURY:**

**Harnessing the Telecommunications
Revolution for Instruction and Research**

Fort Hays State University

Physical Sciences Building

The following committee members were appointed to serve on the Physical Sciences Building Committee by Dr. Edward H. Hammond, President, Fort Hays State University.

Dr. James Murphy, Provost, Chairman
Dr. Leland Bartholomew, Dean, School of Arts and Sciences
Dr. Larry Nicholson, Chairman, Department of Chemistry
Dr. Michael Nelson, Chairman, Department of Earth Science
Dr. Kwo-Sun Chu, Chairman, Department of Physics
Mr. Keith Faulkner, Director, Computing Center
Mr. LaVerne Weigel, Supervisor, Building Maintenance
Ms. Jayne Dick, Student Representative

Preparation of the Architectural Program was coordinated by Mr. Eric King, Director, Facilities Planning.

August 1989

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Introduction

The process of proposing a new facility for an institution of higher learning should begin with some idea of what the institution is, and what it should be in the future. This guideline encourages institutional policymakers to build from a base of what is toward conceptions of the future. The planners of a new facility must consequently build toward what they visualize that institution as becoming.

At Fort Hays State University, we have carefully woven our proposal for a new science building into the institution's historical emergence as a regional, comprehensive, liberal arts university. Because of this historical evolution, it is imperative that the University provide first-rate science facilities to the people of western Kansas. At a time when our nation is in a struggle for its future, there will be no substitute for highly trained and motivated scientists to wage this battle. As the only comprehensive university serving approximately 48,000 square miles, the time has arrived for Fort Hays State to add to its physical facilities to meet this immediate need.

Yet, it is equally important to build a facility that will go beyond current needs to accommodate future objectives, constraints and opportunities. The Kansas Board of Regents has assigned Fort Hays with a unique mission among state institutions. According to the institution's mission statement:

"Fort Hays State University is a regional university principally serving western Kansas and dedicated to providing instruction within a computerized environment in the arts and sciences, business, education, agriculture, and the health and life sciences. The institution's primary area of emphasis is liberal education, including the arts, the sciences and the fine arts. A major responsibility of the University will be the application of computer technology to the educational environment and work place . . ."

The world is currently in the middle of a profound technological revolution with which Fort Hays State University must contend. The propelling technologies in this revolution are those in telecommunications including not only computers, mainframe and personal, but also the audio-visual technologies of two-way interactive video, worldwide data retrieval, document exchange, audio recording and even robotics. Inherent in this proposal is the belief that Fort Hays State University can help "invent the future" of instruction and research in science by harnessing these technologies in a unique facility unlike most other science buildings.

Form and Function at Fort Hays State University: Historical Development of the Physical Facilities

When the federal government abandoned the 7600 acre Fort Hays Military Reservation in western Kansas in 1899, area residents petitioned the government to turn over the property for an experimental station, a park, and a state college. The legislation was signed in 1900 and the college opened on June 23, 1902, as the Western Branch of the Kansas Normal School of Emporia with 4,160 acres of land. Later, in 1914, the University became independent from the Emporia State Normal School and the name of the institution was changed to Fort Hays Kansas Normal School.

The Western branch started with a two year appropriation of \$12,000 and thirty-four students. The original campus was sited south of its present location at the fort, and consisted of the hospital building, the guard house, three officers quarters and the block house. The hospital, which was later moved to the new campus was the main building.

Planning for a new campus began at the very start. The fort location was unsuitable due to a lack of water and the distance to Hays City. The handicaps of the hill top location were alleviated in 1903 when the state legislature appropriated money for a permanent building for the School. The site chosen for Academic Hall, later Administration Building, and now Picken Hall was a flat area bordered on the south by Big Creek and on the north by the railroad. Construction was completed in 1904. A gymnasium, later named Martin Allen Hall was built in 1905. Subsequent wing additions to Picken Hall were completed in 1908.

Two major buildings were constructed in the next decade. The Agricultural High School Building was constructed in 1912. Later this building was called the Industrial Building, and then Rarick Hall. Old Rarick Hall was razed in 1978. Sheridan Coliseum was completed in 1917. Originally built as a multi-purpose and classroom building, the structure was later used to house University offices. The original power plant constructed in 1911 was destroyed by fire in 1930. Its replacement, built in 1932 is now referred to as the Old Power Plant that sits at the northwest corner of campus. A modern power plant was constructed in 1968 south of the tennis courts and is in use today.

Several buildings were constructed in the 1920's, including Elizabeth Custer Hall, completed in 1923 and Cody Commons cafeteria in 1923. Two academic buildings were added, Forsyth Library, now McCartney Hall, was finished in 1926 and would house the Library for about forty years. Albertson Hall was built a year later. The name of the school was changed in 1923 to Kansas State Teachers College of Hays, and again in 1931 to Fort Hays Kansas State College.

The Great Depression years of the 1930's saw little state funding for buildings. The building and renovation that took place during this period was through the federal New Deal programs. Improvements such as foot bridges, tennis courts, the lily pond and fish pool were typical projects during this era. One major WPA project during this time, was construction of Lewis Field Stadium, completed in 1939. In addition to the stadium seating, the structure was designed for dormitory, recreational and study space beneath the seats and press box.

The Second World War had a significant effect on future building at the college. The influx of veterans returning to school after the war exerted enormous pressures for physical growth. This, compounded with the lack of development during the depression years, created a need to make up for a nearly twenty-year lapse in construction. However, the only new building constructed during the 1940's was McGrath Hall, which was completed in 1942.

The 1950's and 1960's were vigorous decades for new construction and remodeling. The Applied Arts Building, now Davis Hall, was completed in 1952, as well as an addition to Custer Hall that same year. A south wing was added to McGrath Hall in 1952 and a new center wing in 1955. The President's residence was completed in 1954. Agnew Hall, a dormitory for women was completed in 1957. A major addition to Cody Commons was renamed the Memorial Union and dedicated to alumni and former students who died in the nation's wars. A subsequent addition to the Union in 1970 included the razing of Cody Commons.

Construction of the first married students' apartments named Wooster Place, and a new men's dormitory, Wiest Hall, were completed in 1961. McMinderes Hall for women was constructed in 1963, and additional married student apartments were built in 1964. An addition to McMinderes in 1965 completed this building.

A fine arts building, Malloy Hall, was constructed in 1965 and Forsyth Library was built in 1967. Originally designed as a three story structure, the library's top floor was omitted due to budget complications. Other projects completed in the 1960's included a new wing to Albertson Hall in 1962, and service buildings constructed in 1960 to house garage, maintenance shop and warehouse functions.

The physical education and field house complex, named Cunningham Hall and Gross Memorial Coliseum, was completed in 1973. This was the only new building constructed in this decade, however, there were extensive renovation projects in several buildings including Picken and Albertson Halls, the remodeling of McCartney Hall and finishing Forsyth Library basement. In 1977, the college became a university, and was given its current name - Fort Hays State University.

Construction projects in the 1980's have included three new buildings: Stroup Hall which houses the School of Nursing; Rarick Hall, a large general classroom building; and Heather Hall, the home of the radio and television department. All three structures were completed in 1981. A major renovation of Sheridan Coliseum is currently in progress and when completed will include a performance hall and administrative offices.

Noteworthy physical features on campus include Big Creek that meanders through campus and which on occasion has reached flood stage, thus the levee network that bounds campus; a predominance of stone can be found to be the favored exterior building material; the quadrangle in the center of the central campus core provides a park-like setting that is used for a number of events; and the classical colonnade on the west side of Picken Hall provides a sense of academe and is the inspiration for the University's logo.

A Physical Sciences Building for the 21st Century: The Proposal

A Basic Premise

Technological innovation and evolution have profound impacts on the way we live and work. There is no question that the shift to an information-based society has already begun to change teaching and research within institutions of higher learning, and will eventually change the physical features of universities themselves. In recognition of these developments, the Kansas Board of Regents has designated Fort Hays State University as the single institution with a clearly-defined mission to apply computer and telecommunications technology to the educational environment and workplace. **Consequently, it is a basic premise of the proposal that harnessing these technologies and incorporating them selectively into all aspects of the teaching and research mission of the University will be an absolutely essential institutional focus during the next two decades.** This proposal is designed to produce a science building with the necessary space and features to realize the full potential of that assigned mission.

The Proposal

The historical development of the University's physical facilities has been tied closely to the constantly changing needs and evolution of 20th century mass society and the industrial age. Automobiles, paved roads, and telephones enabled people to break out of their hometowns and residential communities. The number and locations of people with whom one interacted increased dramatically. Mass affluence and wealth created unprecedented opportunities for mobility. These changes produced a demand for more and better educational training and facilities. As mass society grew and expanded, there was a corresponding growth in the facilities supporting the Fort Hays State University physical plant. There was nothing wrong with this evolutionary process. It fit nicely with the academic and research demands of that particular epoch in our country's development.

We are now making the transition, however, into yet another era which has been labeled the information age. It is based on a dramatic improvement in computers and telecommunications, the marriage of which is producing unbelievable advances in our ability to identify, sort, retrieve, transmit, and apply useful information. **The next stage in the historical development of the University's physical facilities must contend with this movement from a mass society to an information age society.**

In order to accommodate the demands of this powerful shift, Fort Hays State University must have a physical sciences building with several features. Each of these features is essential to enhance access, excellence and efficiency already being promoted through the implementation of the University's commitment to a high-tech, high-touch electronic educational environment.

First, the building must be capable of accommodating the University's Computing Center. The Center is the focal point of the communicative process at Fort Hays State University. It houses and administers the instruction, research and service efforts of academic users as well as the management information system utilized by the campus community. Complete administrative support is also provided by the Center. All buildings are connected by an Information Systems Network (ISN) which provides the path for electronic mail and will have the capability for full transmittal of voice, data and video transmission. The Center provides technical expertise for academic and administrative applications as well as direction for future automation processes. The Center currently occupies Martin Allen Hall which is inadequate for the demands placed upon it. It is designed for a curriculum and technology which is years out of date. The space is limited, outmoded and because of inferior electrical design, incapable of handling increased demands.

Second, the building must provide sufficient space, equipment and support to house the Departments of Chemistry, Earth Sciences and Physics. This configuration will allow those disciplines the opportunity for the cross-fertilization of ideas and increased efficiency due to proximity. All three are housed in a deteriorating Albertson Hall which is incapable of handling the space requirements, as well as the electrical demands placed upon it by changing curricular patterns and new technology. In addition, these departments are organizationally situated within the School of Arts and Sciences. In an effort to minimize further physical dispersion of departments within that School, it is necessary to provide office space for the Dean of Arts and Sciences in the building. The amount of space devoted to this area is negligible, particularly when compared to the efficiencies regained by housing the Dean near three of the departments within Arts and Sciences.

Third, the facility will be unique in its capability to facilitate the use of computer simulations, two-way interactive video, computer disc technology and accessibility to mainframe and external databases. Much of the time, these technologies will be utilized for on-campus instruction and research. **Equally important, however, will be the building's potential to deliver long-distance learning off-campus.** Despite an increasing interest in long-distance learning technologies, efficient utilization of the potential of these telecommunication advances remains spotty and demand relatively weak across the nation. With 48,000 square miles of service area to cover, however, it is easy to understand how Fort Hays State University has become known as a pioneer in applying long-distance learning approaches. **By linking this new science facility into a regional fiber optics network, and the University's five off-campus centers, it will create a state-of-the-art educational facility that is certain to serve as a model for small to medium size science buildings of the 21st century.** The following chapters provide a detailed technical description of this unique structure.

General Considerations

7
(revised 3/1/90)

GC- 1 Program Statement Purpose

The purpose of this statement is to provide information needed for preliminary planning by the associate architect. Although this is the primary purpose, this document will also be used to communicate information to others including the Kansas Board of Regents, Division of Budget, Division of Architectural Services, Joint Committee on Building Construction, and legislative staff. Therefore, this is a multi-purpose document, and the contents may not be applicable to all involved.

Additional details as required will be developed in concert with the architect by personnel representing the units assigned to the facility as coordinated by the Office of Facilities Planning.

GC- 2 Performance Guidelines

The associate architect will be selected in accordance with current state statutes and regulations, and will comply with the guidelines established by the Division of Architectural Services in its latest Manual of Policies and Procedures.

GC- 3 Building Site

A potential building site has been identified and a plan is included in this document. The architect shall explore alternative sites early in the preliminary design stage if the proposed site is found to be restrictive or unsuitable for whatever reason.

It should be noted that the University lies in a flood plain and has experienced flooding in the past. Certain Federal and State design criterion exist which require that the main or first floor level elevation shall be established at least 1 foot above the Corps of Engineers Intermediate Regional Flood (100-year) Level.

GC- 4 CADD Drawings

In order to readily maintain University inventory drawings and to expedite future remodeling projects, the associate architect will be required to furnish CADD (Computer Aided Drafting/Design) drawings on diskettes that are compatible with the hardware and software that are owned by the Office of Facilities Planning.

Hopefully all drawings will be computer generated, however, minimum requirements include drawings for the following: architectural floor plans, reflected ceiling plans, roof plans, lighting plans, electrical power plans, plumbing plans, and HVAC plans. Plans shall include all dimensions, notes, legends, etc. suitable for construction purposes.

GC- 5 Planning for the Physically Disabled

Fort Hays State University is committed to providing a barrier free environment for this special population. Design of the building should not only comply with the latest edition of ANSI Standard A117.1, but the architect is encouraged to exceed these requirements whenever practical.

GC- 6 Telecommunications

It is anticipated that this building will make use of the latest telecommunications technology available with such features as full video, data and voice transmission and continued use of the current Information Systems Network (ISN) which provides for electronic mail, access to the library etc. A full discussion of design requirements will take place further into the project, however, minimum requirements will include: fiber optics cable and hardware from the mainframe telecommunication switch to the building; main trunks between floors to individual terminal rooms; two conduits per office on opposite walls and at least one conduit per laboratory and classroom.

GC- 7 Lighting

Lighting design shall follow the recommended and accepted illumination levels consistent with energy conservation and visual performance. The number of foot candles of illumination for particular functions should be in accordance with the Illumination Engineering Society (IES) Handbook, latest edition. Special consideration shall be given to eliminating glare at all locations where the potential for computer utilization exists.

GC- 8 Doors, Windows, and Hardware

Where aluminum and glass doors for outside entrances are used, they shall be sturdy, heavy gauge metal with wide stiles, and rails. The frames need to be of equal quality, strength, and stability.

Where windows are provided, the windows shall be operable to allow ease of cleaning from within the building and to allow ventilation in the event that the HVAC system becomes inoperable. Windows must be lockable and provisions for sun control shall be considered.

The University's master key system utilizes Sargent cores. Although other door sets can be considered, they must be compatible to accept the Sargent cores. Generally, it is assumed that each department will be keyed to submaster keys, the building will have a master key and all doors will accept a grand master key.

GC- 9 Identification of Areas

The final design development plans for each floor will include a table showing room number and description, room code from this program, and the net assignable square feet (NASF) of each room. The plans will also show the total NASF and gross square feet (GSF) for each floor and for the building.

Room numbering shall be consistent with the University system. The architect will submit plans for room numbering prior to completion of construction documents. The room numbers identified on the construction documents are to be the same as the signage placed on the doors and/or walls at completion of the project.

Construction documents shall address both interior and exterior signage for the building. In addition to room numbers, a system of room names, directional and informational signage, building directory(ies) and exterior building signs will be needed.

GC-10 Landscaping

It is assumed that landscaping planning will be required around and in the vicinity of the new building. Circulation walks, planters, bicycle parking, outdoor seats, outdoor lighting and other items may be desirable in order to provide an aesthetic setting.

GC-11 Movable Equipment

All movable equipment will be furnished by the University and will not be a part of the construction contract unless stated otherwise in this program statement.

GC-12 Building Expansion

Possible future expansion shall be an integral part of the planning process. It is impossible to predict the growth certain departments may experience, therefore, consideration shall be given to allowing the building to grow horizontally and/or vertically. This impacts on the design, raising such issues as site restrictions, orientation, structural loads, etc.

GC-13 Refinement of Program Statement

It is possible that revisions and certainly expansion of the information contained in this document will be forthcoming. This program statement is but the first step in the planning process and not an end product. Unknowns at the time of this writing such as the schedule for funding and possible changes within departments will require that the document be reviewed in upcoming months.

The Site

The proposed site for the new Physical Sciences building was one of five sites studied. The advantages and disadvantages of all five sites were weighed and the site shown on the accompanying plan was selected based on the following attributes: 1) The adjacency to the central power plant will significantly limit costly utility runs; 2) The close proximity to the University Library is viewed as an asset and the proposed placement of the building will help to establish the Library as a central hub in the campus core, this being a long-range planning goal; 3) Two large parking reservoirs already exist in the vicinity of the building. The Malloy lot directly north of the site currently accommodates 307 vehicles and the Cunningham Hall/Gross Coliseum lot, which is accessible via the pedestrian footbridge spanning Big Creek, will accommodate 681 vehicles; 4) Vehicular access for loading and unloading can be easily provided off of Lyman Drive; and 5) It has long been a goal to relocate the tennis courts adjacent to the physical education facilities and this project provides the impetus for that move.

The site is bounded on the north by the Malloy parking lot, to the east by Lyman Drive, to the south by the Power Plant and to the west by Big Creek. A major utility tunnel originating from the power plant bisects the site. This tunnel contains an 8" steam supply line; a 4" steam return line, a 2" cold water line; a 12" cable tray carrying 4160 v. primary feeds; telephone trunk lines and fiber optics cable from the telephone switch rooms and CCTV coaxial cable. Geological testing will be required, however, two buildings in the immediate vicinity are founded on pilings with depths reaching approximately 35 to 40 feet. Additional site survey and utility information will be furnished as needed.

Site development must address a broad spectrum of issues associated with a building of this type. Pedestrian entrances, service entrances and loading docks, handicapped accessibility, utility connections, orientation, etc. are but a few considerations. Preliminary discussion has taken place concerning a mall or green space north of the building whereby some of the parking would be eliminated. This concept should be investigated further to determine whether there is sufficient merit to warrant the elimination of some parking in the Malloy lot. Finally, consideration should be given to landscaping of the site and a plan developed for implementation.

Physical Sciences Building Site Plan



Space Projections

Unit and Category of Use Name Type		Activity Load ¹	Unit	Guideline Value ²	Projected Area (NASF)	Existing Area (NASF) ³	Surplus/ (Deficit)
Arts & Sciences							
Office	300	4	FTE	165	660	591	(69)
Chemistry							
Laboratory	200	420	WSCH	3.1(L)	1,302	5,662	3,016
Laboratory	200	143	WSCH	9.4(U)	1,344		
Research Lab	250	4	HC	1,300(F)	5,200	135	(5,065)
Research Lab	250	0	HC	250(S)	0		
Office	300	6.5	FTE	165	1,073	1,071	(2)
Study/Gen. Use	400/600	6.5	FTE	30	195	0	(195)
Earth Science							
Laboratory	200	40	WSCH	3.1(L)	124	1,894	1,018
Laboratory	200	80	WSCH	9.4(U)	752		
Research Lab	250	6	HC	1,300(F)	7,800	1,538	(8,762)
Research Lab	250	10	HC	250(S)	2,500		
Office	300	7.5	FTE	165	1,238	937	(301)
Study/Gen. Use	400/600	7.5	FTE	30	225	0	(225)
Physics							
Laboratory	200	48	WSCH	3.1(L)	145	4,082	2,847
Laboratory	200	116	WSCH	9.4(U)	1,090		
Research Lab	250	5	HC	1,300(F)	6,500	0	(7,250)
Research Lab	250	3	HC	250(S)	750		
Office	300	4.5	FTE	165	743	786	43
Study/Gen. Use	400/600	4.5	FTE	30	135	0	(135)

Unit and Category of Use Name	Type	Activity Load ¹	Unit	Guideline Value ²	Projected Area (NASF)	Existing Area (NASF) ³	Surplus/ (Deficit)
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Computing Center

Laboratory	200	3,231	WSCH	1.6	5,170	1,803	(3,367)
Office	300	Type B	Type B	9,300	9,300	2,513	(6,787)
Study	400	Type B	Type B	1,200	1,200	0	(1,200)
Support	700	Type B	Type B	<u>6,700</u>	<u>6,700</u>	<u>1,852</u>	<u>(4,848)</u>
TOTALS					54,146	22,864	(31,282)

General Purpose Classroom⁴

Classroom	100	41,430	WSCH	.833	34,511	49,975	15,464
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Notes:

1. From FHSU Space Utilization Report, Fall, 1988.
2. Guideline values are taken from the Physical Development Planning Manual established by the Board of Regents.
3. From FHSU Facilities Inventory, Fall, 1988.
4. Classroom needs are projected on a campus wide basis. Since the University shows a surplus of classroom space campus wide, this space category is not included in the totals.

Space Summary

A. Arts and Sciences

A- 1	Dean's Office	200
A- 2	Assistant Dean's Office	160
A- 3	Secretarial Office	340
A- 4	Workroom	100

Total for Arts and Sciences 800

B. Chemistry

B- 1	Introductory Chemistry Lab	1,900
B- 2	General Chemistry Lab	1,900
B- 3	Organic & Biological Chemistry Lab	1,900
B- 4	Advanced Lab	1,440
B- 5	Multipurpose Lab	1,100
B- 6	Instrument Room	250
B- 7	Instrument Rooms	2 @ 290 580
B- 8	Balance Rooms	2 @ 290 580
B- 9	Storerooms	850
B-10	Dispensing Rooms	1,000
B-11	Bulk Storage/Receiving Area	300
B-12	A-V Storage/Classroom Prep Area	200
B-13	Glassworking Room	200
B-14	Electronics Technician Shop	800
B-15	Alcohol Closet	75
B-16	Chairman's Office	200
B-17	Faculty Offices	6 @ 120 720
B-18	Secretarial Office/Storage	200
B-19	Workroom/Copy Room	120
B-20	Storeroom Manager	150

Total for Chemistry 14,465

C. Earth Science

C- 1	Geology Lab	950
C- 2	Geology Lab Storage/Prep/Grad Students	450
C- 3	Geology Lab Research	250
C- 4	Rock Lab	750
C- 5	Rock Lab Storage/Prep/Grad Students	450
C- 6	Rock Lab Research	250
C- 7	Fossil Lab	750
C- 8	Fossil Lab Storage/Prep/Grad Students	450
C- 9	Fossil Lab Research	250
C-10	Map Lab	450

C-11	Microscope Lab	250
C-12	X-Ray Lab	200
C-13	Computer Mapping Lab	450
C-14	Saw Room	250
C-15	Chairman's Office	200
C-16	Secretarial Office/Copy Room/Reception	300
C-17	Faculty Offices	4 @ 120 480

Total for Earth Science 7,130

D. Physics

D- 1	Electricity & Mechanics Lab Cluster	2,100
D- 2	Electronics & Modern Physics Lab Cluster	1,900
D- 3	Physical Science Labs/Storage	1,900
D- 4	Research Cubicles	3 @ 80 240
D- 5	Darkroom	100
D- 6	Chairman's Office	200
D- 7	Secretarial Office	200
D- 8	Workroom	100
D- 9	Faculty Offices	4 @ 120 480
D-10	Teaching Assistant's Offices	2 @ 50 100

Total for Physics 7,320

E. Computing Center

E- 1	Training Center	300
E- 2	Computer Room	3,550
E- 3	Supplies Storage	1,000
E- 4	Equipment Storage	400
E- 5	Off Campus Vendor Repair	100
E- 6	Tape Vault	120
E- 7	Documentation/Manual Room	150
E- 8	Micro Repair/Consulting	300
E- 9	Documentation/Manual Room	200
E-10	Output	100
E-11	Training Room	100
E-12	Director's Office	200
E-13	Assistant Director's Office	160
E-14	Secretarial Office/Waiting/Workroom	350
E-15	Staff Offices	25 @ 100 2,500
E-16	Work Areas	2 @ 200 400
E-17	Academic Computing Coordinator's Office	120
E-18	Data Communications Coordinator's Office	120

Total for Computing Center 10,170

F. General Use/Shared Space

F- 1	Lobby and Display Area		500
F- 2	Student Study Rooms	3 @ 200	600
F- 3	20-Person Conference		400
F- 4	20-Person Conference/ Seminar	3 @ 400	1,200
F- 5	40-Person Classsroom	2 @ 600	1,200
F- 6	80-Person Tiered Classroom		1,200
F- 7	24-Station Computer Lab	2 @ 1200	2,400
F- 8	30-Station Computer Lab	2 @ 1500	3,000

Total for General Use/Shared Space	<u>10,500</u>
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Total Net Assignable Square Feet (NASF)	50,385
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Estimated Gross Square Feet (GSF)	84,580
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Space Descriptions

<u>Room Code</u>	<u>Room Name</u>	<u>NASF</u>	<u>Fixed Equipment, Utilities and Movable Equipment</u>
A- 1	Dean's Office	200	This room will be used as an office and work area. Small conferences will be held here. The following utilities will be required: computer, telephone, and 110V power. The room will contain a desk and chair, filing cabinet, bookcase, pc work station, 4 chairs for visitors, and a work table. This room should be adjacent to Room A-3.
A- 2	Assistant Dean's Office	160	This room will be used as an office and work area and for small conferences. The following utilities will be required: computer, telephone and 110V power. The room will contain a desk and chair, 2 chairs for visitors, 2 file cabinets, bookcase, pc work station, and work table. This room should be adjacent to Room A-3.
A- 3	Secretarial Office	340	This room will be used to receive the public and will provide work space for the secretary and student secretary. The room will be provided with large wall cabinets for storage. The following utilities will be required: 2 computer lines, telephone and 110V power. The room will contain 2 desks/typewriter stations/pc work stations, 6 file cabinets, reception furniture and area tables. This room should be located near a circulation corridor and adjacent to Rooms A-1 and A-2.

A- 4 Workroom

100 This room will be used as a work area and for storage. The room will be provided with full length base cabinets, including usable counter top with sink, and wall cabinets above. The following utilities will be required: water, telephone, and 110V power. The room will contain 1 table and 2 chairs. This room should be located adjacent to Room A-3.

B- 1 Introductory Chemistry 1,900 Lab

This room will be a 24-station lab for instruction in introductory and inorganic chemistry, Chemistry 120 and 122.

The room will be provided with: 4 island benches, approximately 5' x 15', with center trough and sink at one end, a chemically resistant top with lockable drawers below and "turret" type utilities including gas, air, water, and 110V power for 6 work stations per bench; 2 wall benches of approximately the same length with the same utilities and wall mounted storage cabinets above (one wall bench at seated height equipped with two work stations for handicapped students); a minimum of 48' of fume hood space to provide 4' of work space for each of 12 students; 2 sets of gas, air and water utilities for each student station; full length storage cabinets, approximately 16' long; a 9' long demonstration bench located perpendicular to the island benches on a slightly elevated platform; a liquid marker board behind the demonstration bench; and a projection screen.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain lab carts and small bench mounted lab equipment.

Flooring should be chemical and stain resistant, as well as skid resistant, even when wet. Ventilation should be very good and isolated from the remainder of the building as much as possible. The room should be located so students may use the services of a dispensing room, a balance room, and an instrument room without entering a hallway. Empty conduits terminating at each student station would allow future computer capabilities at each work station. The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket, and fire extinguishers.

B- 2 General Chemistry Lab 1,900

This room will be a 24-station lab for instruction in general chemistry, Chemistry 102. This room will be provided with 4 island benches, approximately 5' x 15', with center trough and sink at one end, a chemically resistant top with lockable drawers below and "turret" type utilities including gas, air, water, and 110V power for 6 work stations per bench; 2 wall benches of approximately the same length with the same utilities and wall mounted storage cabinets above (one wall bench at seated height equipped with two work stations for handicapped students); a minimum of 48' of fume hood space to provide 4' of work space for each of 12 students; 2 sets of gas, air and water utilities for each student station; full length storage cabinets, approximately 16' long; a 9' long demonstration bench located perpendicular to the island benches on a slightly elevated platform; a liquid marker board behind the demonstration bench; and a projection screen.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain lab carts and small bench mounted lab equipment.

Flooring should be chemical and stain resistant, as well as skid resistant, even when wet. Ventilation should be very good and isolated from the remainder of the building as much as possible. The room should be located so students may use the services of a dispensing room, a balance room, and an instrument room without entering a hallway. Empty conduits terminating at each student station would allow future computer facilities at each work station. The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket, and fire extinguishers.

B- 3 Organic and
Biological Chemistry
Lab

1,900

This room will be a 24-station lab for instruction in organic and biological chemistry, Chemistry 304, 360, 340, 342, 562 and 564.

This room will be provided with: 4 island benches, approximately 5' x 15', with center trough and sink at one end, a chemically resistant top with lockable drawers below and "rack" type utilities including gas, water, air, and 110V power for 6 work stations per bench; 2 wall benches approximately the same length with the same utilities and wall mounted storage cabinets above (one wall bench at seated height equipped with two work stations for handicapped students); a minimum of 48' of fume hood space to provide 4' of work space for each of 12 students; 2 sets of gas, air and water utilities for each student

station; full length storage cabinets, approximately 16' long; a 9' long demonstration bench located perpendicular to the island benches on a slightly elevated platform; a liquid marker board behind the demonstration bench; and a projection screen.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain lab carts and small bench mounted lab equipment.

Flooring should be chemical and stain resistant, as well as skid resistant, even when wet. Ventilation should be very good and isolated from the remainder of the building as much as possible. The room should be located so students may use the services of a dispensing room, a balance room, and an instrument room without entering a hallway. Empty conduits terminating at each student station would allow future computer facilities at each work station.

The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket, and fire extinguishers.

B- 4 Advanced Lab

1,440

This room will be a 16-station lab for instruction in analytical and physical chemistry, Chemistry 250, 430, 632, 634, and 656.

This room will be provided with: 4 island benches, approximately 5' x 15', with center trough and sink at one end, a chemically resistant top with lockable drawers below and "turret" type utilities including gas, air, water, and 110V power for 4 work stations per bench; 2 wall

benches of approximately the same length with the same utilities and wall mounted storage cabinets above the wall benches. A minimum of 24' of fume hood space to provide 4' of work space for each student station; 2 sets of gas, air and water utilities for each student station; full length storage cabinets, approximately 16' long; and a projection screen.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain lab carts and small bench mounted lab equipment.

Flooring should be chemical and stain resistant, as well as skid resistant, even when wet. Ventilation should be very good and isolated from the remainder of the building as much as possible. The room should be located so students may use the services of a dispensing room, a balance room, and an instrument room without entering a hallway. Empty conduits terminating at each student station would allow future computer facilities at each work station. The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket, and fire extinguishers.

B- 5 Multipurpose Lab

1,100

This lab will be used for students doing individual research projects, organic analysis, advanced lab techniques, and for faculty research.

The room will be provided with: 3 island benches, approximately 5' x 15', with center trough and sink at one end, a chemically resistant top with lockable drawers below and "turret" type utilities including gas, air, water and 110V power for 4 work stations per bench; 2 wall benches of approximately the same length with the same utilities and wall mounted storage cabinets above; a minimum of 24' of fume hood space to provide 4' of work space for each of 6 students; 2 sets of gas, air and water utilities for each student station; and full length storage cabinets, approximately 16' long.

The following utilities will be required: water, gas, computer, telephone, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain lab carts and small bench mounted lab equipment.

Flooring should be chemical and stain resistant, as well as skid resistant, even when wet. Ventilation should be very good and isolated from the remainder of the building as much as possible. The room should be located so students may use the services of a dispensing room, a balance room, and an instrument room without entering a hallway. Empty conduit terminating at each student station would allow future computer facilities to each work station. The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket, and fire extinguishers.

B- 6 Instrument Room

250 This room will house instruments most often used in conjunction with the organic and biological chemistry lab.

The room will be provided with a wall lab bench with complete utilities along one longer wall; wall mounted, above-counter cabinets along both walls; ample supply of 110V and 220V outlets along the wall without benches for free-standing equipment; and a liquid marker board.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain a nuclear magnetic resonance spectrometer, infrared spectrophotometers, gas chromatograph, refrigerated centrifuge, and mass spectrometers.

The room should be adjacent to Room B-3. A special load bearing floor as vibration free as possible is required. Positive pressure is necessary to protect equipment from fumes and strict temperature control is required.

**B- 7 Instrument Rooms
(2 @ 290)**

580

Room A (290 sf) will be used to house fixed equipment most often used in conjunction with the advanced lab. Room B (290 sf) will be used to house equipment which is most often set up, used, and returned to storage. Both rooms will be provided with a lab bench with full utilities along both walls and wall mounted storage cabinets above; and a liquid marker board.

The following utilities will be required: water, gas, computer, 110V and 220V power, compressed air, and acid resistant drains. Room A will contain a differential scanning colorimeter, atomic absorption, and various spectrophotometers. Room B will contain polarimeters, fluorometer, refractometer, osmometer, spectrophotometers, and pH meters.

Room A is best located adjacent to Room B-4. Both require positive pressure air ventilation and strict temperature control.

B- 8 Balance Rooms
(2 @ 290)

580 Room A (290 sf) will be used to house analytical balances; Room B (290 sf) will be used to house top loading balances.

Room A will be provided with solid, heavy, vibration damping balance tables located along both long walls, with above counter storage cabinets. Room B will be provided with solid, heavy, vibration damping balance tables along one wall and lab benches on the opposite wall, with wall mounted storage cabinets on both long walls.

The following utilities will be required: water, gas, computer, 110V power, compressed air, and acid resistant drains.

Room A will contain analytical balances and stools; Room B will contain top loading balances and balance stools.

Room A should be adjacent to Room B-4. Room B should be adjacent to Rooms B-1 and B-2. Both rooms require strict temperature control and positive air pressure ventilation.

B- 9 Storerooms
(1 @ 250)
(1 @ 200)
(1 @ 400)

850 Room A (250 sf) will provide storage for organic solvents and organic compounds. Room B (200 sf) will provide storage for inorganic chemicals and acids. Room C (400 sf) will provide storage for glassware, equipment and other supplies.

Room A will be provided with shelving along 3 walls and island shelving securely attached to floor and ceiling. Shelving must have a lip to contain spills. Rooms B and C will contain shelving as in Room A and Room B will have special acid storage cabinets.

The following utilities will be required: 110V power. The rooms will contain ladders for reaching high shelving.

These rooms should be part of the central storeroom complex which also includes Rooms B-10 and B-20. Rooms A and B should be ventilated with 4 changes of air per hour. They should be isolated from the remainder of the building by heavy duty walls, should have blow out panels to the exterior, floor guttering to contain spills and explosion proof electrical supply. Room C should be equipped with an explosion proof electrical supply.

B-10 Dispensing Rooms
(1 @ 450)
(1 @ 300)
(1 @ 250)

1,000

Room A (450 sf) will be used as the main dispensing area and preparation area for the central storeroom. Room B (300 sf) will serve as the satellite dispensing and preparation area for Rooms B-1 and B-2. Room C (250 sf) will serve as the satellite dispensing and preparation area for Room B-3.

Room A will be provided with a large double sink, 12' of bench space, 6' of fume hood space, storage for flammable solvents, shelving with lips for chemical storage, and shelving for glassware storage. Rooms B and C will be provided with a large double sink, a minimum of 8' bench space, 4' of fume hood space, and shelving as listed for Room A.

The following utilities will be required: water, gas, computer, 110V power, compressed air, and acid resistant drains.

The room will contain lab carts and stepladders.

Room A is part of the central storeroom complex which includes the storeroom, manager's office and storage areas. Room B should be adjacent to Rooms B-1 and B-2. Room C should be adjacent to Room B-3. All dispensing rooms should have the complete range of safety equipment supplied in a lab.

**B-11 Bulk Storage/
Receiving Area**

300 This room will be used for long storage of infrequently used lab equipment, gas cylinder storage, and for receiving and unpacking supplies.

The room will be provided with wall mounted bolts for securing gas cylinders shelving 3' deep along walls, a minimum of 6' of bench space and a small sink.

The following utilities will be required: water, telephone, and 110V power.

The room will contain gas cylinder carts and lab carts.

This area should be located near an exterior loading dock with easy access by elevator to the central storeroom complex. The outside end should be separated from the remainder of the room by a heavy door to serve as gas cylinder storage.

**B-12 A-V Storage/
Classroom Prep Area**

200 This room will serve as a preparation area for lecture demonstrations and for storage of audio-visual materials.

The room will be provided with a 4' fume hood, 8' of lab bench space with over counter cabinets and full length cabinets along one wall.

The following utilities will be required: water, gas, 110V power, compressed air and acid resistant drains.

The room will contain lab and AV carts.

This area should be in close proximity to as many classrooms as possible and have a door that leads to Room F-6.

B-13 Glassworking Room

200

This room will be used for construction of glass apparatus and instruction in glassworking techniques.

The room will be provided with shelves for storing 4' lengths of glass, approximately 8' of bench space and a large sink with splash boards.

The following utilities will be required: water, gas, 110V power, compressed air, and acid resistant drains.

The room will contain an annealing oven, glass lathe, glass saw and polariscope.

The room should be located near the central storeroom complex and Room B-14.

B-14 Electronics Technician Shop

(1 @ 120 sf)
(1 @ 300 sf)
(1 @ 380 sf)

800

Room A (120 sf) will serve as office space. Room B (300 sf) will be an electronics shop. Room C (380 sf) will be a mechanical shop.

The office will be provided with a liquid marker board. The electronics shop will have a wall mounted work bench with 110V and 220V outlets, storage cabinets for tools and parts, a small fume hood, and a wall mounted peg board. The mechanical shop will have an island work bench with sink, storage racks, 110V and 220V outlets, and a wall mounted peg board.

The following utilities will be required: water, gas, computer, telephone, 110V and 220V power, compressed air, and acid resistant drains.

Room A will contain a desk, chair, 2 file cabinets, drafting table, bookcase and a chair for visitors. Room B will contain cart mounted oscilloscopes and a work stool. Room C will contain a drill press, radial arm saw, band saw, metal lathe, and bench grinder.

Room B-14 is equally shared with the Physics Department. Room A should be located adjacent to Rooms B and C. Room B should be adjacent to Room A and near Room C, but separate from both. Room C should be adjacent to Room A and near the Room B, but separate from both.

B-15 Alcohol Closet

- 75 This room will serve as secure storage for "tax free" alcohol. The room will contain shelving for storage of 1-pint bottles and 5-gallon drums of alcohol. The following utilities will be required: 110V power. The room should be part of the central storeroom complex. Lighting should be explosion proof.

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| B-16 Chairman's Office | 200 | This room will house office activities of the departmental chairman and small meetings. The room will be provided with a liquid marker board. The following utilities will be required: computer, telephone, and 110V power. The room will contain a desk, desk chair, 4 file cabinets, 2 chairs for visitors, computer desk, and 8' of full length bookshelves. The room should be accessible from Room B-18. |
| B-17 Faculty Offices
(6 @ 120) | 720 | These rooms will provide office space for faculty members. Each room will be provided with a liquid marker board. Each will require the following utilities: computer, telephone, and 110V power. Each room will contain a desk, desk chair, 2 file cabinets, 8' of full length bookshelves, a computer desk and a chair for visitors. These offices should be distributed near the labs. |
| B-18 Secretarial Office/
Storage | 200 | This room will be used as office space for the departmental secretary and for a reception area. The following utilities will be required: computer, telephone, and 110V power. The room will contain 2 desks with attached typing stations, computer desk, 2 file cabinets and chairs for visitors. The room should be accessible from the hall and Rooms B-16 and B-19. |
| B-19 Workroom/Copy Room | 120 | This room will be used as space for duplicating and office equipment and a work area for office staff. The room will be provided with a minimum 10' base cabinet and a sink with storage above and below the cabinet and 8' of full length shelving. The following utilities will be required: water, computer, and 110V power. The room will contain duplication equipment and thermo-fax machines. This area should be accessible Room B-18. |

- B-20 Storeroom Manager 150 This room will serve as office space for the storeroom manager whose responsibilities include purchasing and record keeping. The room will be provided with a liquid marker board. The following utilities will be required: computer, telephone, and 110V power. The room will contain a desk, desk chair, computer desk, 8' of full length bookshelves, 4 file cabinets and a chair for visitors. This office should be part of the central storeroom complex.
- C- 1 Geology Lab 950 This room will serve as a 20-station lab for various introductory and advanced geology courses. The room will be provided with a lab table with pull-out writing tablets and drawers for student storage; electrical outlets on the sides of the tables; permanent projection screen with facilities for projection of microcomputers and AV equipment; locking bookcase; liquid marker boards; cork boards on walls; and a permanent work station for instruction at the front of the room.
- The following utilities will be required: CCTV, computer, telephone, and 110V power.
- The room should be located adjacent to Rooms C-2 and C-3 below.
- C- 2 Geology Lab Storage/
Prep/Grad Students 450 This room will serve as a storage room for maps and classroom/research assignments associated with general geology, geomorphology and geography. It will be a work room for faculty and graduate assistants and provide office space for 4 graduate students.

The room will be provided with large storage drawers for maps, lockable cabinets for geology equipment, storage drawers for rock, mineral and fossil collections and adequate electrical outlets.

The following utilities will be required: water, gas, computer, telephone, 110V power, compressed air, and acid resistant drains.

The room will contain a slide cabinet, large cabinets for surveying equipment, 4 desks, tables with electrical outlets, and a small sink with sediment trap. The room should be located adjacent to Rooms C-3 and C-1.

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| C- 3 | Geology Lab Research | 250 | <p>This room will be used by geology and geography faculty, students and visiting professionals. The room will be provided with bookshelves along one end of the room. The following utilities will be required: computer, telephone and 110V power. The room will contain 2 desks with computer space and tables with power supply. The room should be adjacent to Rooms C-1 and C-2 above.</p> |
| C- 4 | Rock Lab | 750 | <p>This room will serve as a 15-station lab for various mineralogy, petrology, sedimentology and geophysics classes. The room will be provided with a lab table with pull-out writing tablets and drawers for student storage; electrical outlets on the sides of the tables; permanent projection screen with facilities for projection of microcomputers and AV equipment; locking bookcase; liquid marker boards; cork boards on walls; and a permanent work station for instruction at the front of the room.</p> |

The following utilities will be required: water, gas, CCTV, computer, telephone, 110V power, compressed air, and acid resistant drains.

The room will contain a table or built-in box at the back of the room for movie/slide projectors. The room should be adjacent to Rooms C-5 and C-6 below.

C- 5 Rock Lab Storage/
Prep/Grad Students

450

This room will be used for storage for research/classroom rock and mineral collections; as a workroom, as a rock specimen preparation area, and for office space for 4 graduate students. The room will be provided with full length storage drawers for small rocks, open shelving for storage of large rocks, a sink with large sediment trap and work area, exhaust fan, adequate electrical outlets and prep tables as space allows.

The following utilities will be required: water, gas, computer, telephone, 110V power, compressed air and acid resistant drains.

The room will contain 4 desks and tables with electrical outlets as space allows. The room should be adjacent to Rooms C-4 and C-6.

C- 6 Rock Lab Research

250

This room will serve as a research area for geology faculty, students and visiting professionals. Activities include examination of specimens and maps, drafting, figuring and writing. The room will be provided with bookshelves along one end of the room. The following utilities will be required: computer, telephone and 110V power. The room will contain 2 desks with computer space, and tables with power supply. The room should adjacent to Rooms C-4 and C-5.

- C- 7 Fossil Lab 750 This room will serve as a 15-station lab for various paleontology classes. The room will be provided with a lab table with pull-out writing tablets and drawers for student storage; electrical outlets on the sides of the tables; permanent projection screen with facilities for projection of microcomputers and AV equipment; locking bookcase; liquid marker boards; cork boards on walls; and a permanent work station for instruction at the back of the room. The room should be adjacent to Rooms C-8 and C-9 below.
- C-8 Fossil Lab Storage/
Prep/Grad Students 450 This room will be a storage room for research/classroom fossil collections; a workroom; an area to search screened residue for fossils and prepare for accession into Sternberg Memorial Museum; and office space for 4 graduate students. The room will be provided with full length storage drawers for small fossils, open shelving for storage of large fossils, a sink with large sediment trap and work area, exhaust fan, and adequate electrical outlets.
- The following utilities will be required: water, gas, computer, telephone, 110V power, compressed air and acid resistant drains.
- The room will contain 4 desks and tables with electrical outlets as space allows. The room should be adjacent to Rooms C-7 and C-9.
- C-9 Fossil Lab Research 250 This room will be a research area for paleontology faculty, students and visiting professionals. Activities include examination of specimens, drafting, figuring and writing. The room will be provided with bookshelves along one end of the room. The following utilities will be required: computer, telephone and 110V power. The room

will contain a camera copy stand, light table, drafting table, 2 desks with computer space, and tables with power supply. The room should be adjacent to Rooms C-8 and C-7.

C-10 Map Lab

450 This room will be a drafting room for use in various geology classes and research and a research room for the Western Kansas Mapping Project. The room will be provided with cork board on the walls, numerous electrical outlets, and a liquid marker board. The following utilities will be required: CCTV, computer, telephone and 110V power. The room will contain 2 desks with computer space, 4-6 drafting tables, 1-2 light tables and facilities for expansion into a CAD (computer aided drafting) room. The room should be adjacent to one faculty office.

C-11 Microscope Lab

250 This room will be a dedicated lab for use of petrographic rock (rock thin section) microscopes. The room will contain special microscope tables with chairs, a permanent projection screen that allows for images to be transmitted from an instructor's work station at the front of the room, cork board on the walls, liquid marker boards, bookshelves, locking cabinets, and a small sink.

The following utilities will be required: water, CCTV, computer, telephone, and 110V power.

The room will contain a work station which could be portable. Since petrographic microscopes are very fragile, they will permanently reside with the work stations. Future plans call for interfacing the instructor's microscope with a monitor and/or computer. The room should be adjacent to one faculty office.

C-12 X-Ray Lab

200 This room will be a dedicated lab for an x-ray diffractometer. The room will be provided with tables along 2 walls, bookshelves, adequate electrical outlets with voltage regulator, locking wall cabinets, liquid marker board, and cork board. The following utilities will be required: computer, telephone, 110V and 220V power. The room will contain an x-ray diffractometer and 1 desk with computer space. Air conditioning is a necessity even at times when the entire building is not cooled. Future plans call for interfacing the diffractometer with a computer system.

C-13 Computer Mapping Lab

450 This room will be a dedicated geology lab. The geology department presently has a grant funded computer lab. Maps which correlate to electric logs are entered into a computer program. The room will contain approximately 10 student stations and 1 instructor station, a permanent projection screen that will allow for image transmission from the instructor's work station, cork board on the wall, and liquid marker boards. The following utilities will be required: CCTV, computer, telephone, and 110V power. The room will contain a computer image projector. The room must be provided with an adequate power supply and air conditioning. Air conditioning will be required to cool the room when the entire building is not being cooled.

C-14 Saw Room

250 This room will function as a lab in which to construct rock thin sections, to conduct sedimentological research and classroom exercises, and to use and store chemicals. The room will be provided with a fume hood, exhaust fan, double sink with work area, sediment trap on sinks, locking

cabinet for chemicals, cabinet for supplies, open shelving for specimens and adequate electrical outlets.

The following utilities will be required: water, gas, 110V and 220V power, compressed air, and acid resistant drains.

The room will contain large and small rock saws, various crushers, grinders and other thin section equipment and a desk. A good exhaust fan is a necessity. Large saws use a hydrocarbon mixture and small saws and grinders use water. Sinks should have large sediment traps. The lab should have complete safety facilities including eye wash, safety shower, first-aid kit, fire blanket and fire extinguishers.

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| C-15 | Chairman's Office | 200 | <p>This room will be the office for the departmental chairman. The room will be provided with adequate bookcases. The following utilities will be required: computer, telephone and 110V power. The room will contain 2 desks, file cabinets and a computer work station. The room should be adjacent to Room C-16.</p> |
| C-16 | Secretarial Office/
Copy Room/Reception | 300 | <p>This room will provide office space for the departmental secretaries, a reception area and a copy room. The room will be provided with mail boxes and bookshelves. The following utilities will be required: computer, telephone, and 110V power. The room will contain 3 secretarial desks, 2 computer work stations, file cabinets, storage cabinets, 2 chairs for visitors and copy machine(s). The room should be adjacent to Room C-15.</p> |

C-17 Faculty Offices
(4 @ 120)

480

These rooms will provide office space for faculty members. Each room will be provided with bookcases. The following utilities will be required: computer, telephone and 110V power. Each room will contain a desk and desk chair with computer space and file cabinets. One office should be adjacent to Room C-10 and one office should be adjacent to Room C-11. The other offices should be located near the other rooms assigned to the geology department.

D- 1 Electricity &
Mechanics Lab Cluster

2,100

This area will house (2) 16-station labs for instruction in mechanics, wave motion, heat, thermodynamics, electricity, magnetism, light and optics, Physics 111, 211, 112 and 212. This area will also be used for equipment storage, preparation area and experiment design. The room will be provided with 2 chalkboards, 2 projector screens, wall cabinets, 2 lecture demonstration desks, and 2 cork boards.

The following utilities will be required: water, gas, CCTV, computer, 110V power, and compressed air.

The area will contain (17) 30" x 6' lab tables with 110V power, 34 chairs, 16 pc work stations with video disk, monitor and printer, overhead projector and screen, 2 adjustable height stools and 4 equipment carts. The labs in this suite should be back to back, separated by a large room for equipment storage, experiment preparation and experiment design. Windows should have shades for total room darkening. Four cold water, duplex air and gas jets and cup sinks should be along the wall in each lab. Unistrut molding should run in both directions along the center of the ceiling.

D- 2 Electronics & Modern Physics Lab Cluster 1,900

This area will house 8-station and 6-station labs for instruction in electronic circuits, analog and digital electronics, microcomputer techniques, advanced lab and senior seminar, Physics 431, 432, 433, 575, 651, and 654. This area will also be used for storage, preparation, and experiment design. The area will be provided with 2 chalkboards, 2 projector screens, 1 lecture demonstration desk, and 2 cork boards.

The following utilities will be required: water, gas, computer, telephone, and 110V power.

The area will contain (15) 30" x 6' lab tables with 110V power, 16 chairs, 14 pc work stations with measurement interfaces, video disk, monitor and printer, 1 adjustable height stool, 1 desk and 4 equipment carts. The labs in this suite should be back to back, separated by a large room for equipment storage, experiment preparation and experiment design. Windows should have shades for total room darkening. Four cold water, duplex air and gas jets and cup sinks should be along the wall in each lab. Unistrut molding should run in both directions along the center of the ceiling.

D- 3 Physical Science Labs/ Storage 1,900

This room will house a 24-station physical science lab and storage. The room will be provided with a liquid marker board and perimeter work benches with water, gas, air and 110V power. The following utilities will be required: water, gas, telephone, 110V power, compressed air and acid resistant drains. The room will contain 12 tables and 24 chairs. The room will have 2 small storage rooms on one end, a small prep room/teaching assistant's room on the opposite end and a dividing curtain.

- D- 4 Research Cubicles 240 This room will be used for 3 light-tight research cubicles, each 8' x 10'. Each cubicle will be provided with a 10' x 24" work bench and 110V outlet strips the length of the room. The following utilities will be required: water, gas, computer and 110V power. The rooms will contain numerous pieces of optical and electronic equipment. The rooms should be located adjacent to each other, all in one line, with 18" x 18" windows between each room.
- D- 5 Darkroom 100 This room will be used to develop negatives and print enlargements for scientific pictures. The room will be provided with 2 standing height work benches and storage cabinets and a stainless steel photographic sink with rack and temperature controlled water. The following utilities will be required: water, gas, telephone, power and acid resistant drains. The room will contain a photo enlarger, dry mount press, print washer, print processor, safe lights and a dust free film drying cabinet.
- D- 6 Chairman's Office 200 This room will be used as office space for the department chairman. The room will be provided with a chalkboard. The following utilities will be required: computer, telephone and 110V power. The room will contain 1 desk and chair, 2 file cabinets, 1 bookcase, 1 pc work station, and 3 chairs for visitors. The room should be adjacent to Room D-7.
- D- 7 Secretarial Office 200 This room will be used to receive the public and will provide work space for the secretary. The room will be provided with a storage cabinet and bookshelf. The following utilities will be required: computer, telephone, and 110V power. The room will contain

1 desk with typewriter station and pc work station, 1 desk with typewriter station, 2 desk chairs, 2 chairs for visitors, 1 small table and 2 file cabinets. This room should be adjacent to D-6.

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| D- 8 Workroom | 100 | This room will be used as a work area and supply area. The room will be provided with wall cabinets and shelves with usable countertop and a small sink. The following utilities will be required: water, telephone and 110V power. The room will contain 1 table, 2 chairs, 1 Heyer-type duplicating machine and 1 thermofax machine. The room should be located adjacent to D-7. |
| D- 9 Faculty Offices
(4 @ 120) | 480 | These rooms will provide office space for faculty members. Each room will be provided with a chalkboard and a cork board. The following utilities will be required: computer, telephone and 110V power. Each room will contain a desk and chair, pc work station, 2 file cabinets, bookcase, and 2 chairs for visitors. |
| D-10 Teaching Assistant's
Offices (2 @ 50) | 100 | These areas will provide office space for graduate teaching assistants. Each area will be provided with a chalkboard and a cork board. The following utilities will be required: 110V power. Each room will contain a desk, 2 chairs, and a bookcase. |
| E- 1 Training Center | 300 | This room will be a 10-station training center to train users on computer applications on a continual basis year round. The room will be provided with 12 microcomputer tables, liquid marker board, projection screen, and a storage cabinet. The following utilities will be required: video signal capability, 11 computer lines, telephone, and 110V power. The room will contain 11 swivel chairs, 11 microcomputers and |

printers, projection panel, and overhead projector. The public must have access to this room yet security must be possible.

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| E- 2 Computer Room | 3,550 | <p>This room will house the mainframe computer. The room will be provided with 5 microcomputer tables, lateral file, storage cabinet, 2 tape racks, monitor stand, and work table. The following utilities will be required: 2 telephone lines, 208V power for the mainframe, and 110V power for all other equipment. The room will contain 4 side chairs and a tape cart. As the key ingredient to the department, all sub-departments function around this room. All the technical staff need convenient access, but the room must have absolute security from vandalism. The room must be on separate air conditioning and humidity control, have an uninterruptable power source, have a raised floor with entry ramps, and be adjacent to Room E-3.</p> |
| E- 3 Supplies Storage | 1,000 | <p>This room will be used to temporarily store computer room supplies. The room will be provided with storage shelving. The following utilities will be required: 110V power on each wall. The room will contain a 2 wheel cart and a 4 wheel cart. The room must have humidity control, must have an outside entrance with loading dock for delivery of supplies and equipment and must be adjacent to Room E-2.</p> |
| E- 4 Equipment Storage | 400 | <p>This room will be used to temporarily store computer equipment as it is coming into or leaving the department. The room will be provided with storage shelving and a work table. The following utilities will be required: 1 computer line, 1 telephone line, and 110V power on</p> |

each wall. The room will contain a side chair. The room must be adjacent to Room E-3 to utilize the loading dock.

- E- 5 Off Campus Vendor Repair 100 This room will be used by vendor maintenance personnel to repair small computer equipment and to store computer parts. The room will be provided with a work bench, bookcase and 2 storage cabinets. The following utilities will be required: 1 computer line, 1 telephone line and 110V power on each wall. The room will contain 2 swivel chairs and a portable cart. The room must have 24 hour outside access and be secured from both inside and outside.
- E- 6 Tape Vault 120 This room will be used to temporarily store computer tapes. The room will be provided with tape racks and a work table. The following utilities will be required: 110V power on 2 walls. The room will contain a tape cart. The room must be fire proof to prevent any damage to stored tapes. The location should be remote to the computer but staff must have 24 hour access.
- E- 7 Documentation/Manual Room 150 This room will be the repository for hard copy output for a professional sub-department (Configuration Control). The room will be provided with 4 lateral computer output files, a microcomputer table and a work table. The following utilities will be required: 1 computer line, 1 telephone line and 110V power on 2 walls. The room will contain a microcomputer and 2 chairs. The room needs to be convenient for all of the staff to access but access by the public needs to be limited.

- E- 8 Micro Repair/Consulting 300 This room will be used for diagnosis and repair of microcomputer components. The room will be provided with 2 work benches, 2 storage cabinets, parts bins, storage shelf, bookcase, and 2 microcomputer tables. The following utilities will be required: video signal capability, 1 computer line, 2 telephone lines and 110V power on each wall. The room will contain 4 chairs and a portable cart. The room must have limited access but be near the building entrance. The room must be adjacent to staff offices.
- E- 9 Documentation/Manual Room 200 This room will be the repository for hard copy output for a professional sub-department (Administrative Programming). The room will be provided with 4 lateral computer output files, a microcomputer table and a work table. The following utilities will be required: 1 computer line, 1 telephone line and 110V power on 2 walls. The room will contain a microcomputer and 2 chairs. The room needs to be convenient for all of the staff to access but access by the public needs to be limited.
- E-10 Output 100 This room will house the printers for staff output. The room will be provided with 3 microcomputer tables and a work table. The following utilities will be required: 1 telephone line and 110V power on each wall. The room will contain 3 printers and a chair. The room must be convenient to staff offices yet have limited public access.
- E-11 Training Room 100 This room will be used by all of the staff on an individual basis to utilize the training material for staff improvement and development. The room will be provided with a storage cabinet, 2 microcomputer tables and a work

table. The following utilities will be required: video signal capability, 1 computer line, 1 telephone line, and 110V power on each wall. The room will contain a TV monitor, a microcomputer and printer, and a video player. There must be limited public access to this room.

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| E-12 Director's Office | 200 | This room will provide office space for the director with room to conduct small meetings in privacy. The room will be provided with a desk, credenza, sofa, chair, bookcase, lateral file and microcomputer table. The following utilities will be required: video signal capability, 1 computer line, 1 telephone line and 110V power on each wall. The room will contain a desk chair, TV monitor, video recorder, microcomputer and printer. The room must be located for limited access, convenient to Room E-14. |
| E-13 Assistant Director's Office | 160 | This room will provide office space for the assistant director with room to conduct small meetings in privacy. The room will be provided with a desk, credenza, microcomputer table, bookcase, and lateral file. The following utilities will be required: video signal capability, 1 computer line, 1 telephone line, and 110V power on each wall. The room will contain a desk chair, 2 chairs and a microcomputer and printer. The room should have limited access and be convenient to Room E-14. |
| E-14 Secretarial Office/
Waiting/Workroom | 350 | This room will provide an office and private work area for the department secretary and a waiting area for visitors. The room will be provided with a desk, 2 microcomputer tables, lateral file, 4 chairs, magazine table, 2 work tables, 2 storage cabinets and a bookcase. The following utilities |

will be required: video signal capability, 1 computer line, 2 telephone lines, and 110V power on each wall. The room will contain 2 microcomputers, printer, copy machine, Fax machine, and portable cart. The room must be convenient to Rooms E-12 and E-13. It must be accessible to the public yet be secure.

E-15	Staff Offices (25 @ 100)	2,500	<p>These rooms will provide office space for staff professionals or technicians. Each room will be provided with a desk, microcomputer table, bookcase, and lateral file. The following utilities will be required for each office: 1 computer line, 1 telephone line and 110V power on 3 walls. Each room will contain a desk chair, side chair and microcomputer. The rooms must have privacy against distractions from production work. Sub-department offices should be clustered near the sub-department manager with limited access by the public.</p>
E-16	Work Areas (2 @ 200)	400	<p>These rooms will be used for construction and/or repair of computer components. Each room will contain 2 work benches, 1 storage cabinet, 1 parts bin, 1 lateral file, 1 microcomputer table and 1 bookcase. The following utilities will be required in each: 2 computer lines, 1 telephone line and 110V power on each wall. Each room will contain 2 technician chairs, 1 side chair, 1 microcomputer and printer, and a portable cart. The rooms should have convenient exterior access and be adjacent to the sub-department manager. The rooms should have public access yet be secure.</p>

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| E-17 Academic Computing
Coordinator's Office | 120 | This room will provide office space for the academic computing coordinator with room to conduct small meetings in privacy. The room will be provided with a desk, microcomputer table, lateral file and bookcase. The following utilities will be required: video signal capability, 2 computer lines, 1 telephone line and 110V power on each wall. The room will contain a desk chair, 2 side chairs and a microcomputer. The room should have limited access and be convenient to Room E-14. |
| E-18 Data Communications
Coordinator's Office | 120 | This room will provide office space for the data communications coordinator with room to conduct small meetings in privacy. The room will be provided with a desk, microcomputer table, lateral file and bookcase. The following utilities will be required: video signal capability, 3 computer lines, 1 telephone line, and 110V power on each wall. The room will contain a desk chair, 2 side chairs and a microcomputer. The room should have limited access and be convenient to Room E-14. |
| F- 1 Lobby and Display Area | 500 | Sufficient space should be provided inside the main building entrance to allow for social interaction and to display demonstrations or other works of public interest. Adequate floor and wall space should be provided. The area should include lounge furniture and 110V power. |
| F- 2 Student Study Rooms
(3 @ 200) | 600 | These rooms will be the primary casual space for students in the building. Students will congregate in these areas for study and conversation. These areas may also be used after hours. The following utilities will be required: 110V power. The rooms will contain tables and chairs and lounge type furniture. These rooms should be |

strategically distributed throughout the building and should be acoustically isolated from offices and classrooms.

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| F- 3 | 20-Person Conference | 400 | <p>This room will be used and scheduled primarily by the Computing Center, but it will also be utilized by all departments for training, interdepartmental meetings and meetings with off-campus representatives. The room will be provided with liquid marker boards and a motorized projection screen. The following utilities will be required: CCTV, telephone and 110V power. The room will contain conference table(s), chairs and portable audio-visual equipment. The room should be designed for media presentations and have variable lighting capabilities. The room should be located in the vicinity of the computing center office complex.</p> |
| F- 4 | 20-Person Conference/
Seminar (3 @ 400) | 1,200 | <p>These rooms will be used for small classes, seminars, committee meetings, oral examinations, etc. They should be designed for media presentations. The rooms will be provided with liquid marker boards and a motorized projection screen. The following utilities will be required in each: CCTV, telephone, 110V power and floor outlets. The room will contain tablet armchairs, a portable demonstration bench and audio visual equipment. These rooms will utilize voice, data and video capabilities. They should have variable lighting capabilities and be strategically distributed throughout the building.</p> |
| F- 5 | 40-Person Classroom
(2 @ 600) | 1,200 | <p>These rooms will be used for lectures, group discussions and media presentations. The rooms should be fully treated for 2-way video transmission. This may or may not require the addition of a manned camera control booth. The</p> |

rooms will contain combination chalkboards and liquid marker boards and a demonstration bench. The following utilities will be required: water, gas, CCTV, computer, telephone, 110V power, compressed air, acid resistant drains and interactive video capabilities. The rooms will contain tablet armchairs and audio visual equipment. Each room should have an amplification system for the hearing impaired.

F- 6 80-Person Tiered Classroom 1,200

This room will be used for class lectures, group discussions and media presentations. The room will have tiered seating and a lecture platform area. The room will be provided with fixed tables and movable chairs, combination chalkboards and liquid marker boards, and a demonstration bench. The following utilities will be required: water, gas, CCTV, computer, telephone, 110V power, compressed air and acid resistant drains. The room will contain audio visual equipment. The room should have an amplification system for the hearing impaired.

F- 7 24-Station Computer Lab (2 @ 1200) 2,400

These labs will meet the on-going needs for training in the use of microcomputer hardware and software, as well as providing classes and independent study for students. Students will also use the lab for processing. The rooms will be provided with liquid marker boards. The following utilities will be required: computer (micros wired to the mainframe), telephone and 110V power. The rooms will contain microcomputers, peripheral equipment - plotters, scanners and printers, audio visual equipment, and computer tables and chairs. The room should have 24 hour accessibility.

F- 8	30-Station Computer Lab (2 @ 1500)	3,000	<p>These labs will meet the on-going needs for training in the use of microcomputer hardware and software, as well as providing classes and independent study for students. Students will also use the lab for processing. The rooms will be provided with liquid marker boards. The following utilities will be required: computer (micros wired to the mainframe), telephone and 110V power. The rooms will contain microcomputers, peripheral equipment - plotters, scanners and printers, audio visual equipment, and computer tables and chairs. The room should have 24 hour accessibility.</p>
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Total NASF 50,385

Budget Estimate

Estimated Construction Costs:

Construction Including Fixed Equipment	\$10,150,000	
Site Work - Tennis Court Relocation	<u>250,000</u>	10,400,000

Estimated Non-Construction Costs:

Architect's Fee	557,500	
Contingency	520,000	
Movable Equipment	310,000	
Miscellaneous Costs	<u>212,500</u>	<u>1,600,000</u>

Estimated Cost of Total Project \$12,000,000

Notes:

- Assuming bids are taken in 1993, total development costs for this building type are estimated at \$139/gsf. $\$139 \div 1.16$ would make actual construction costs @ \$120/gsf.
- $\$10,150,000 \div \$120 = 84,580$ gsf
 $84,580 \div 50,385$ nasf = 1.68 gross/net ratio
- Maximum architects fees are computed as follows:

1st million @ 7%	=	70,000
2nd million @ 6.25%	=	62,500
3rd million @ 5.5%	=	55,000
7,400,000 @ 5%	=	<u>370,000</u>
		557,500
- Miscellaneous costs include 1% fee paid to Division of Architectural Services per Senate Bill 303.

Projected Time Frame



