

**ADAPTIVE RE-USE OF UNIVERSITY BUILDINGS.
A
CASE STUDY OF
FOUR ACADEMIC BUILDINGS
ON THE
PIETERMARITZBURG CAMPUS
OF THE
UNIVERSITY OF NATAL**

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Supervisor: Professor W. Peters

Peter R. Howe

Pr Arch. M.I.A. KZNIA

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On various occasions during the course of my research I questioned the underlying reasons for pursuing this study and was eventually persuaded that it was an educational experience - one to really be enjoyed. It was certainly made so by the encouragement and guidance of Professor Walter Peters to whom I shall be eternally grateful. Thank you Wally for the hours of enlightening discourse that revealed exciting new dimensions to the subject of architecture.

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To my wife Rene', thank you for your understanding encouragement and support especially when I have been seeing more of the computer than of you.

ABSTRACT

This study investigates the capacity of buildings to be adapted when required by changing circumstances or situations. Furthermore it has special reference to buildings constructed for academic teaching and research purposes.

At the outset the author reviews the reasons for buildings outlasting their original functions and identifying the various possible causes for the change. The ability to sustain modifications and the varying extent of the modification is established with examples being cited of both commercial and academic typologies.

The thesis then explores some examples of early adaptations of buildings such as basilicas and the influence on the architecture of the early and later Christian churches. In later years cathedrals and monasteries became the precursor of the early universities that were born out of the evolution of secular teaching and education and the need for repositories for books. The architecture and form of these buildings was dictated largely by the development of the towns into cities and the concurrent need to expand these centres of learning.

The history of the University of Natal is discussed from the years preceding its formal inception and subsequent interventions relating to the development of the Pietermaritzburg campus. A model upon which a measure may be made of four buildings of differing era's and occupancy are discussed identifying their original plan form and the changes that have ensued over three decades. These modifications are critically evaluated and tabulated graphically thereby indicating the comparative changes as a ratio of the area of the change against the area of the entire building.

The notable Old Main Building was found to be a rigid building, built in load bearing brickwork and large high ceilinged spaces that sub-divide with ease while ensuring the retention of its integrity. Conversely the Main Science Building, a reinforced concrete framed structure with brick in-fill, is of an amorphous plan shape that lends itself to modification at the expense of its external character. The Rabie Sanders Building, a formal neo-classical building of framed reinforced concrete construction with face brickwork in-fill and a rigid facade does not, by virtue of its plan form and elevation, have the capacity for external alteration but has the potential for extensive internal. Finally the New Arts Building, a linear five storey precast reinforced concrete structure with free standing continuous modular window provides infinite variability of the interior whilst the exterior remains unaffected and there is no possibility of extending.

The changes, varying in complexity and extent, clearly indicate that the buildings are indeed malleable and with creative planning, the changes can have an enhancing impact on the internal spaces. This information should be considered as a working guide to provide the institution with pointers for the future design of campus buildings.

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Chapter 1

Introduction: Terminology and Context

The purpose of this discourse is to examine the upgrading, re-cycling, conversion, adjustment or what is possibly more appropriately referred to as “adaptive reuse” of space in the context of buildings in general but particularly to those structures that form the built environment of a University with specific reference to the University of Natal - Pietermaritzburg.

Many descriptions have been given to this type of work and often reflect differing interpretations and so as to avoid confusion the terms should be categorised and define these according to The Concise Oxford Dictionary, Sixth Edition 1976.

Adaptive re-use	To fit, adjust or to make suitable for another purpose.
Adjustment	Adapt.
(Building) Regeneration	Bring (a building) into a renewed existence
Conversion	Adaption (of building) for new purpose.
Creative Adaption	(Inventive) Adjustment making it suitable for another purpose.
Change.	To make different.
Intervention	To bring about to modify the result.
Rebuilding	To alter, improve or renew.
Recycling	Convert for another use.
Refit	(Remove the finishes or fittings of the interiors and replace with new).
Refurbishment	To renovate. (Normal cycle of renovation work)
Rehabilitation	Restore to effectiveness (usually as long term cycle work)
Renovations	Make new again, repair, restore to good condition.

* Descriptions given in parenthesis are those by the author

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Retrofit	Change the character and functions of the internal spaces
Upgrading	Raise in rank, status or condition.

Whilst “adaptive re-use” is deemed to be an American term - possibly coined by Giorgio Cavaglieri (Diamondstein, 1978: 26) the noted American “re-cycler” of public buildings - it certainly best describes the essence of this discourse. The application of the term can be a variable one made in reference to an entire community of buildings; a single building or if necessary simply parts of a building.

It could be said that the popular perception of architecture is the creation of new timeless developments that are located on green field sites. Little acknowledgment is given to the rehabilitation of the remnants of a rundown building that seemingly presents little opportunity for creativity, yet this restoration project may in fact have an enhancing contribution to the urban environment .

Architecture as a discipline is actively engaged in varying design and construction challenges which are affected by economic volatility, technological advancements, changes in organisational structures and many other forces that impact on the built environment. To this end architects have a duty to consider a new approach to design philosophy and embrace experimentation rather than follow the traditional approach to solving the end user requirements. According to Francis Duffy the authority on office design (Duffy, 1997: 78) “change is badly needed in the detailed arrangement of office interiors by many hard pressed and rapidly changing organisations - it needs to happen not next century, not next year, not tomorrow but today.” Change is a universal and indisputable fact and one that impacts on all organisations. It is pertinent not only to the commercial sector but the institutional as well where structures are even more immutable and protected by the culture of the institution.

Old buildings however are a resource as they represent a considerable amount of capital invested over the years, particularly in the United States of America and Europe. Society in recent times has to a large extent supported the notion of

reusing these buildings for more modern or appropriate activities. The design approach to each building project requires different criteria and to a large degree depends on the nature of the buildings. Whilst highly visible architecture may appear to be all about newness, and for a few practices this work is the norm, but main stream architectural practices find much of their work in the realm of building conversion. During years of national fiscal growth in the United States of America the development of new office buildings would appear to predominate yet upon evaluation it will be noted that in times of plenty we only add two to three percent to our office building stock each year whilst the adaption or conservation of existing buildings exceeds that by two to three times that. To put the conservation of buildings into financial terms; in 1990 an amount of \$ 200 billion was spent in the United States of America on the maintenance, retrofitting or adaptive-reuse of approximately 1,200,000 commercial and institutional buildings which had been constructed prior to 1940. Such building activity constitutes seventy five percent of all construction and is therefore a major contributor to the economy and society. (Kay,1991;1)

Just how important is renovation or adaptive re-use work in comparison to the creation of a new building. It is acknowledged that to compare costs of building new against that of renovation can be misleading due to varying factors and influences since both have equal "value" and there are few yardsticks by which one can measure the cost or effectiveness against the other. Each must be judged on its own merits.

Chapter 2

2.0 The Phenomenon of Buildings outlasting their Function

As buildings age so their function inevitable changes - a phenomenon that has affected structures throughout the eons of history and a matter that has been dealt with in a variety of fashions. Many projects have been successfully restored or modified whilst others have had paid little respect to the integrity of the original design.

There are invariably many major issues to be considered when one is faced with considering the economic viability of an existing building yet so often the “demolition” notion is pursued rather than considering the option of conserving and adjusting the original structure to suit the new spatial, environmental and service needs.

If the client is only concerned with the enhancement of external appearances then it may be necessary investigate the potential of an adjustment to the facade yet even this is a contentious matter having regard to the era of the building. Another option is to “shield” or apply a mask which will alter that character of the building and this in my opinion is actually nothing but subterfuge and a solution that should rarely be considered. On the other hand a purist may argue that by retaining the exterior and undertaking major changes within is also modifying the original design integrity of the building. This is a debatable matter as are most design solutions regarding the conversion of an older building.

Personal experience of this type of conversion was the demolition of the interior of an old Georgian building on Princess Street in Edinburgh, Scotland. The exterior was shored and braced whilst the spider web of steel columns and beams were erected behind. Being a student and a purist at the time, I viewed the construction work taking place on this busy main street of the city and mentally criticised the lie that was being developed before my eyes. An attempt at maintaining the historic street facade but in fact it could be likened to the temporary structure of a film set.

I learnt shortly thereafter that during the course of the following week the said street elevation collapsed, depositing a mountain of what was now building rubble into Princess Street. Miraculously no pedestrians were killed or injured at the time nor were any vehicles damaged.

Notwithstanding, there are at times, factors that mitigate for the retention of a notable facade whilst undertaking the reconstruction of the building behind. A recent example (2002) being the large department store of Peter Jones in Sloane Square, London. This was a project where the store had become too small for effective trading and it became necessary to enlarge the building. The client however, for commercial reasons, did not wish to relocate whilst the site on the other hand was congested precluding any further lateral development. Thus the architects John McAslan and Partners were commissioned to extend the building vertically whilst retaining the Modern Movement facade of the 1930's. (See Figures 2.1 & 2.2). This major project was undertaken and programmed in such a manner as to permit the client to continue trading in 75% of the store at any one time. (The Architectural Review; May 2002; 10 & 11). In this we see a typical example of what Diamonstein refers to as a "collection of buildings that have historic relationships and the space that surrounds these provides the community with a sense of space, place and belonging"(Diamonstein, 1978: 14).

Having shown examples on the international arena regarding the adaption of old buildings there are examples of such work closer to home. The Pietermaritzburg city centre is renown for its Victorian architecture with many of these old buildings remaining in reasonably sound condition retaining their original character of ornate pediments and parapets with cast iron columns supporting the verandahs. Others carry the scars of poorly designed modifications. A once popular department store known as "Irelands" closed down and the building was subsequently occupied by various tenants. In 1985 it was bought by the "Edgars" chain of department stores who wanted to construct a modern store behind the original facade. In this instance the entire structure was demolished with the exception being the front and part of the return facades. As a result the central city streetscape has been retained and the owners of this building have been acknowledged for the sensitive

retention of the facade even to the moulded brass and timber shopfronts.

No matter if the “demolish and rebuild” or the “conserve and adapt” option is pursued there are other factors and implications that have to be taken into account. In real terms one is not only considering financial issues but also the social and environmental needs of the neighbours. Thus cognisance has to be given to this matter. One’s sense of history and pride in a heritage is generally reflected through the maintenance of its culture and art of which architecture and the built form comprises a major component.

For many the American culture of the 1960s of “change” took charge where “Change” meant progress - progress meant newness and newness meant throwing out what was old including the built world”. (*Diamonstein; 1978; pp 14*) Working at that time (1969) in the Johannesburg office of the large international architectural practice, Skidmore, Owings and Merrill, the author was swayed by this very rational argument. Amongst many debates on the subject, one minor issue that had a particular impact was, that maintenance crews of tall office towers were instructed that all fluorescent lamps had to be changed simultaneously no matter what their condition. This was to avoid a negative effect on productivity due to eye strain which in turn was due to the diminishing output efficiency of the luminaire. A simple example of the throw away culture which permeated the values of that entire society and to some extent influenced the thinking of the rest of the developed world that subscribed to the “time and motion” philosophy. The sheer volume of garbage at the tips became a problem of immense proportions and required strategic thinking before the country was swamped in its own discarded waste. Throughout Europe today, the majority of waste is considered re-cyclisable thus reducing energy generation and other attendant costs as well as the reduction of refuse dumps.

When considering that a large proportion of one’s wakening hours are spent in a working environment the familiarity of that space can make for livability, comfort and could have an effect on productivity. Often, upon leaving the office of an evening and looking back through the glass doors the discernable feeling of the

warmth of that familiar and personalised space and walk away knowing that the day had been an enjoyably productive one enhanced by an affinity with that environment. We are all affected by our immediate and wider surroundings and possibly the spaces occupied by architects and other creative disciplines represent their colourful occupations. It is a recognised fact that one's psyche and interaction with others is indeed influenced by one's environment.

Why is it then that the first consideration is to tear down the old and build because concentrated levels of newness can leave people - not only occupants but also those from without - feeling uprooted, disorientated and lacking in locational identity.

Adaptive re-use can be described as adapting a building for usage which differs from that for which it was originally intended, better suited to the functions of new criteria. Furthermore it may be considered to be a conservation intervention in its widest context and encourages one to reflect with pride in a heritage and a respect for the craftsmanship of a previous era. This form of rehabilitation could contribute to the upgrading of an entire community of buildings as this undertaking may become "contagious" where owners are inspired by other's successes and strive to increase the value of their investment.

The design of older buildings (pre World War 2) offered greater human qualities than those of later eras. They had better energy conserving features such as deeply recessed windows and high ceilings for comfort in hot climates. They also incorporated stylised features externally as well internally that gave the building a particular identity. This aspect appears to be becoming a characteristic of some recent buildings especially in the hospitality sector. Furthermore these older structures were well constructed, designed to last and lend themselves to adaption, unlike those of the 1950 -1960 generation where the buildings were deemed to be a medium term investment.

A regional example of this is the re-development of the South Beach area of

Durban into a major tourist attraction. The Victorian buildings in the adjoining Point Road have been degenerating into varying states of disrepair yet with the renewed focus on the South Beach area these owners are now engaged in rehabilitation work and these historic buildings are regaining their original appeal and a historic streetscape is being resurrected.

To cite an example of reuse in Durban: The relocation of the Durban railway station from the city centre in the 1970s meant that there was no longer a use for the original railway workshops. These enormous steel framed structures reflecting the railway architecture of the past were unique in their location as the city had, over eighty years grown around them. Being close to the docks and the city centre they were converted into a shopping complex with mezzanine floors added at strategic points to give added interest to the vast volumes of the buildings now known as "The Workshop". The conversion of this building complex has in turn led to the modernisation and development of many buildings in the immediate vicinity. "Conserving the resources of the built environment in a way that makes them consistent with contemporary needs and demands" is how Elizabeth Malloy would have described the conservation of this project. (Diamonstein, 1978: 28)

Georgio Cavaglieri stated that buildings and their grouping and assemblage are more than the shelter of our activities; they represent us beyond our life, they interpret us to posterity and they illustrate our past to us. It is in this context that the preservation of examples from the past acquires enormous importance in a culture. (Diamonstein, 1978: 13)

Factors mitigating for "recycling" or "adaptive reuse" are many and vary from case to case but may include issues such as:

The age of building is such that in order to attract and maintain tenant occupation, the building has to be upgraded. This does not necessarily however imply that there would be significant external or internal alterations.

A building may have changed ownership and if occupied solely by the owner may require a complete re-planning to cater for these new needs be they accommodation or operating activities.

Where a building has been designed and constructed in the past for a specific function and this function has been affected by change the fabric and interior alone may require modification.

The building could be in an advanced state of decay requiring not only rehabilitation but also the integration of new services and technology.

In the past buildings were serviced by plant that was large and space consuming. With the miniaturization and computerisation of plant, part of the original space may become available for re-allocation and integration into the building.

A review of "Life cycle" costs may initiate a re-plan in order to use the space more cost effectively.

In some instances modification of a building is more cost effective whilst in others it is appreciably more expensive. There is no specific rule which dictates the option to follow:

Frank Duffy (1983: 57) in discussing this alternative architecture rightly states that "this is not an architecture without vision. Sometimes this vision is the recovery of a lost aesthetic....Sometimes the vision is the brilliant juxtaposition of one kind of architecture with another....Sometimes the vision is the application of new technology". Whatever the vision it provides intellectual and creative opportunities for problem solving as well as architectural innovation.

2.1 Architecturally Sound Interventions

2.1.1 The building should remain a reflection of an era:

Viollet-le-Duc (1814 - 1879), a controversial and self styled “restorer” of buildings wrote at length on the subject of restoration. Whilst this untrained architect acknowledged the fundamentals of the retention of the original and ensuring that the new looked of a late age, he very often disregarded his own rules. He expounded at length on the issue of restoring old environments which however is not the subject of this discourse.

Notwithstanding that statement, very often an architect is faced with the dilemma of creating new space adjoining an existing building of an earlier vintage. Returning to Viollet-le-Duc, he questioned the connecting of two buildings of differing times and categorically stated “Should we unite the two constructions of different periods....No: We shall carefully preserve the distinct jointing of the two parts - the unbondings; so that it may always be apparent the chapels were afterwards added” (Hearn, 1990: 273). Thus a clear distinction between old and new should remain. This is the hallmark in judging an extension to an old building where each reflects the era of its design.

2.1.2 Recycling is sympathetic to the original building:

The re-cycling of a building in many instances is restricted to the modification of the interior and the architect has to carefully plan within the constraints of the existing structure. A completely new interior may emerge with the finishes reflecting a modern idiom quite in contrast to the exterior. There are no sound reasons why the vintage of the exterior should be emulated in the interior since the notion of eclecticism is a well acknowledged and accepted approach to design.

Should the existing facade be of architectural significance the constraints of the exterior must be recognised and the architect must design the interior acknowledging this, as was that case of the Law Library on the Howard College Campus of the University of Natal, Durban.

When addressing the modification of the exterior the philosophies of both John Ruskin (1819 - 1900) and Eugène-Emanuel Viollet-le-Duc (1814 - 1879) must be considered and incorporation of contrived embellishments must be avoided and in essence - be honest. Ruskin, a near contemporary of Viollet-le-Duc, who, although not an architect was Professor of Fine Arts at Oxford University , travelled through France gathering information on the essence of Gothic architecture. Ruskin also advocated the recognition of and distinction between mere building and Architecture. The former may be applied to the construction of a ship, a house, a garage or an aeroplane, but none is architecture. "There are few buildings which have not some pretense or colour of being architecture....Architecture concerns itself only with those characters of edifice which are above and beyond its common uses !" (Ruskin, 1989: 9)

2.2 Adaptive re-use of buildings in History

The basilicas of the Roman Empire were the structures that served as centres of justice and featured prominently in their town planning . Located on the Forum - the most public of places where roads converged - these basilicas would attract traders who would set up shop in the precincts of the building and together with their customers would watch the law being implemented. A clear indication of the importance that Rome placed on the public expounding on and the enforcement of Law. It is probably for this reason that the principle of constructing churches on prominently positioned sites developed.

The basilica was the progressive link between Classical and Christian architecture according to Banister-Fletcher (Fletcher, 1954: 212). The Romans were not dogmatic regarding originality of design and their structural forms were in all probability based on the early temples of Greece. In many instances the Roman architecture included borrowed orders. (Mansell, 1979: 25). Since Christianity had its birth in Judea which was part of the Roman Empire, it was natural that the early Christians were influenced by a plan form that they were familiar with. The ruins of

Roman buildings in all probability provided the Christians with the materials and decorations for their basilican churches and no doubt they would most often use the foundations of the ruins and developed their churches upon these. The Romans may have abandoned their buildings once their influence in an area was no longer deemed important and would move elsewhere in their quest to expand the Empire. The notion of restoration was in all probability not even considered in those days. This is possibly the reason for the large number of ruins that dot the landscape in European countries and in particular, Ireland. It is only in recent times that pressures on land and the efficiencies of cost have encouraged a culture of restoration and conservation and for these reasons the implementation of sound maintenance programmes has come into its own.

Albeit inadvertently, it is from the relics of the past that the future has been created. Early Christian architecture was built on the ruins of and influenced by the Romans. The profile of the classical cathedrals in turn grew from the form of the basilicas. It is therefore essential that we understand the reasoning for retaining the integrity of the past as a record for our future for without it all will have escaped us and our heritage will be the poorer for it.

Chapter 3

3.0 University Buildings and Adaptability

The character of universities is one that has developed over centuries and their existence is due in the main to philosophers and clerics. Students would gather in an informal way on the steps of the temples or public buildings to listen and learn from the great philosophers. These however were informal places of learning and no structure or specific environment dedicated to learning really existed. The church in due course assumed responsibility for teaching and the ecclesiastic buildings also served as places of instruction. As Pevsner (Pevsner, 1976: 92 -93) writes, “ the thirteenth century is the century of the establishment of universities, even if in Italy and Paris they had begun earlier”. The Sorbonne, a college of the University of Paris, was established in 1254 while in Oxford, Hertford College was started in 1284. Universities became an important adjunct to the developing society where towns were growing and a vibrant commercial life demanded more literate and people skilled in writing. Books became an essential adjunct in more and more every day situations. Where in the past these had been kept in the cathedrals and abbeys, the responsibility of secular teaching was now no longer the domain of the clergy. A repository, preferably within a place of learning, would be the ideal locale for the storage of volumes upon which the scholars could draw. Thus it was that Universities were created out of the need for libraries.

It was the friars who settled in the towns to mission there, and so they participated in the development of universities as teachers. Hence it was that universities such as Oxford, Cambridge and Durham were located within the towns. Initially the library would have been the first building to be constructed and later added to in such a way that the final four sided plan form closed to create a courtyard or quadrangle. As the towns expanded so did the universities and invariably there was congestion which resulted in the campuses becoming rather convoluted. Thus it was that their buildings meandered in a form that was dictated by the neighbouring buildings. The advantage of this evolutionary process is that it created circulation spaces of great interest as well as intimate spaces for quiet

contemplation.

A university campus represents a unique urban environment and many of the afore arguments that apply to commercial buildings do not usually apply to the University environment. In the view of Professor Brenda Gourley, former Vice Chancellor of the University of Natal (1994 - 2002) however, universities are in business, the business of teaching and research, where annual budgets exceed those of many large corporations.

Notwithstanding this buildings within a campus environment are generally designed for a very specific occupancy or function and as a result are seldom if at all considered for demolition since academic institutions seldom have the financial resources to fund new buildings. Upon an initial review most spaces in older university buildings appear to be so immutable in their structural system, geometry or fenestration that any changes are beyond consideration. Furthermore suitable temporary space available to accommodate existing dispossessed staff and facilities during a demolish and rebuild programme is seldom to be found. Even a partial re-plan course of action has its pitfalls in that the occupied spaces have to be vacated and often when work comprising structural modification is being considered it is preferable that the entire building be vacated due to the disruptions emanating from the noise, vibration and dust of building operations.

Some common reasons for adaptive reuse are:

The age of a building and its facilities or equipment have become outdated and no longer space efficient. Referring to outmoded science buildings of the late 1950s Schaeffner states that " although there was logic in the layout of the floors there was little flexibility built in to make changes" (Schaeffner, 1997: 27)

Change in associations or relationships of occupying academic departments that require closer proximity for interactive relationships with other departments.

The common cry of any university planning office is the increased demand for space due to increase in student numbers or new programmes and little latitude is available within the existing building for this to occur.

Often as a consequence of the previous example, spaces require modification due to a change of function such as lecture venues being converted into offices or offices being transformed into laboratories.

A change in operating method. As an example, a building may have been designed with academic offices, laboratories and lecture venues all located on one floor but with increasing student numbers, circulation and security may become a problem resulting in a decision to separate the offices from the main stream circulation routes and to concentrate the teaching venues away from the "quiet" areas*.

A review of "Life cycle" costs of a building may result in a decision to initiate a re-planning exercise.

3.1 Universities engaging in Expansion and Change

In this sub-chapter the writer discusses and cites examples of the solutions adopted by other Universities in addressing and resolving their space constraints.

3.1.1. De Montfort University, Leicester, England

The reason for selecting this campus is that it provides a basis for comparison since its buildings like those on the Pietermaritzburg campus vary significantly in age and style.

The city of Leicester located in the east midlands of England is the seat of two Universities - one being the original university in the tradition sense and the second being an amalgam of a number of "re-cycled polytechnics" that under "The

1992 Further and Higher Education Act” received full University status.

The university is named in honour of Simon de Montfort - the reputed founder of English parliamentary democracy.

The afore-going is a simplistic and very abbreviated history of an institution that had its origins in a School of Art established in 1871 and where classes were given voluntary. These art classes were largely directed at textile design given the major textile producers in the area and within five years the student population grew to three hundred and twenty one.

As a matter of progression 1885 saw the birth of the Technical School where classes were given in subjects such as Building, Engineering and Machine Drawing. Later a much wider range of technical and commercial subjects were offered to meet the skill demands for the industrial growth of the region.

The two colleges remained independent of each other until 1926 when they merged to become The Leicester Colleges of Art and Technology. By 1936 this title had changed and the one college again became two. The one known as the College of Arts and Crafts whilst the other the College of Technology. The White Paper of 1966 “A Plan for Polytechnics and Other Colleges” recommended the establishment of 30 Polytechnics. Thus in 1969 the City of Leicester Polytechnic was created.

The present day De Montfort University comprises a number of campuses in areas such as Lincoln (Agriculture); Bedford (Higher Education) and Milton Keynes- (Architecture and Allied Disciplines) however this discourse focuses on the Main Campus in Leicester where it is located at the junction of residential tenements and older light industrial at the western side of the city. Hardly the environment where one would expect to find a pro active institution that boasts a prodigiously productive and financially self sustaining Innovation Centre and a wide variety of other notable schools of academic endeavour.

Another reason for this background information is to provide an understanding of the history of many of the buildings that constitute the Leicester Campus.

A number of De-Montfort's buildings are inherited structures of the late 1800's, others are from the 1920's decade whilst others are system built accommodation that was typical of the 1960's - possibly "CLASP" in design - and have long passed their prime. "CLASP" was a modular building system developed in the early 1950's to provide "instant" accommodation during the reconstruction of England after the second world war. These buildings were typified by their nine hundred millimetre module, of vertical posts and square windows. The roof was "flat" waterproofed with malthoid. As with most temporary structures they have tendency to become permanent and the de Montford buildings are no exception. By contrast these buildings are located adjacent to modern (mid 1990's) innovative low energy structures representing the vision of the University and its commitment to notable, sound and environmentally conscious design.

The Early Renaissance style face brick Hawthorn Building is sited on the ruins of the 1354 Church of the Annunciation of our Lady, (was opened in 1897 and later extended in 1909, 1927 and 1935) today houses the largest concentration of students, laboratories and lecture facilities of this university under one roof. As described earlier, the building dates back to the origins of the institution and having started out as an art school, today it is a major venue for the science and engineering disciplines. (See Figure 3.1).The original footprint was largely linear with lecture theatres and laboratories facing the street and park whilst the corridors and central toilet and circulation core being inward looking. The various extensions have resulted in the building ultimately occupying two city blocks with the central area becoming a series of courtyards. (See Figure 3.2). This is an example of a style and period of old building that has successfully endured a long useful life due to its loose fit, low energy design. Unlike those modern buildings that subscribe to the "idiom of "form following function" these older buildings do not accurately reflect the changes that have taken place behind the facade although the potential for the sub-division of the interior spaces of the original is limited due to the fenestration of the facade.

How has this building withstood the test of time of adapting to the changes in occupancy, usage and advancements in technology and service requirements.

As with many institutions occupying old buildings, progress into the technological age has been inhibited by the lack of adequate provision for the integration of various and necessary services. This is especially the case where additional electrical and or computer cables are required and the integration into the fabric presents a significant challenge. Inevitably one finds these ugly cables cleated to or loosely draped along walls or tucked behind other projecting and add-on services. This is compounded by the universal trend of cabling contractors to follow the most visible and direct route from the server / hub to the terminals / no matter what. Here the university facilities or physical planning staff have a responsibility to guide the installers / contractors in matters of environment and aesthetics.

As the laboratories became more sophisticated and the need for ventilation or fume extraction became a priority so these facilities were located to the newer wings and faced onto the courtyards to avoid the external elevations becoming defaced with ducting and other services. Today these ducts are becoming more convoluted as demand on research facilities grows. Symptomatic of a time when suitable space is at a premium - the common denominator of all universities - thus the matter of maintaining the original style of the building facade becomes more difficult.

With a growing research programme an endeavour was made to maximise on the potential of the existing building through a adaptive process that was initiated a few years ago. The last vestige of re-cyclicable space was the basement of the oldest section of the building which until that time was uninhabitable due to lack of ventilation, suitable access and the ruins of the 1354 church. The matter of access was suitably addressed by the construction of a wide staircase down from the main ground floor entrance. The preserved ruins have been given prominence and being sensitively displayed. (See Figure 3.3)

The entire area was air conditioned where the distribution system was concealed behind a wing-shaped profiled slatted metal suspended ceiling as were a large number of other services. The remaining services that required easy access were wall mounted in trunking painted in a contrasting colour to emulate a dado rail. The original granolithic floors have been replaced by a combination of carpet and decorative tiles which in turn sets off the tiled skirting and dado of the replastered large columns. This make-over has transformed the dungeon like basement to a notable and appealing venue accommodating a major research centre for Science and Engineering (SERC). The success of this renovation is due to the fact that the design is a sensitive one and acknowledges the influence of the ambience on the environment by uplifting and inspiring users and visitors alike.

3.1.2 University of Newcastle-upon-Tyne, England

The regional capital of the North East of England, Newcastle upon Tyne, has a history that precedes the Roman Empire's occupation of that part of England. There abounds in the area significant archaeological evidence of Roman occupation of the region and this has become a major tourist attraction. A walk along Hadrian's Wall is in itself an exercise in endurance as the remains of this hand built stone wall - wide enough for two chariots to pass - start just outside the city and meander for many kilometres extending through the countryside towards the west. The remains of a later city wall and gate stand on a ridge at the edge of and overlook the river Tyne. They are a monument to the past yet incorporated into the present fabric of a modern urban environment.

Newcastle was noted for its coal mines and shipbuilding yards, during the 19th century. In the years gone by the River Tyne was abuzz with the noise of various elements such as the construction of boats and the harbour at Tynemouth was the scene of much coming and going of merchant ships and fishing boats. But that has all changed - gone are the huge sheds, cranes and trains - the quay side of today is the site of beautiful buildings and landscaped walkways with the few static cranes being the only sculptured museum pieces of a bygone era.

The city of Durham was in the past however the educational main stay of the north east and under its authority the School of Medicine and Surgery at Newcastle was founded in 1834. A hospital (later to become the Royal Victoria Infirmary) had long existed at the city to serve the port, city and coal mining environs - thus the School of Medicine was an essential adjunct to this facility. Not unlike the duality relationship of the Durban and the Pietermaritzburg campuses of the University of Natal so was the umbilical relationship between Durham and Newcastle, both being separate entities of the same Durham University.

With the growth of the region and the city in particular, it was natural that in due course an independent University of Newcastle-upon-Tyne would be established. Today this compact institution with a student population of approximately 12 000, is located on a single 45 acre site adjoining the commonage called "Castle Leazes" on one side and the periphery of the city centre on the other. (See Figure 3.4)

The architecture of this campus is a mixture of styles from the early and late Renaissance period - found fashionable in the late 1800s - to the more modern twentieth century buildings ending with the non descriptive styles of the 1980's. (See Figure 3.5)

This study makes particular reference to the old library building that by the mid 1980's had long since past its prime and in due course a new expandable building was constructed to cope with the larger student population and growing stock of books (this new library building was extended in 1996).

At a time when demand for computer aided instruction and general access to computer terminals for students was at a premium, the University investigated the proposal of converting the old library which is centrally positioned on the campus to serve an alternative function. The original building comprised a ground and first floor. Since the ground floor was considerably higher than the external ground level the possibility of creating a usable space below ground was investigated. After excavating around the foundations it was discovered that the bases were 1,8m

below ground - too shallow to develop any meaningful space.

Undaunted, the planners proposed excavating to an acceptable depth and exposing the original foundations which would then be underpinned and the introduction of beams to support the existing ground floor . A new internal staircase had to be constructed and to add to the issue, constraints were imposed on the use of large machinery due to restricted dimensional access to the site but this was overcome and in due course work did proceed.

The old library presently accommodates a large well designed functional language centre - the university has a large population of non European Union students - and material is available on video and or audio tape, satellite and computer. Material is collected / compiled by the centre staff and remotely connected to each work station at the clusters of carrels. All services are reticulated in concealed ducts to either a free standing carrels or a cluster of carrels positioned around a structural column. The retention of the finely detailed joinery work has been enhanced and expanded with the new carrels and the help desk being constructed of a contrasting coloured timber. (See Figure 3.6)

Downstairs in the new basement computer laboratory, the airconditioning plant has been successfully concealed in “cupboards” within the circulation areas and the only reference to the original structure can be seen in the large masonry columns of the underpinning that articulate with the footprint of the original foundations. These give added interest to the geometry of the structure and do not compromise the functionality of this computer facility.

A short walk from the old library is Kensington Terrace where the offices of the Administration of the University and the Vice Chancellor are located. These facilities are in fact accommodated in a group of old terrace houses. The need to interlink each was essential to provide security and logistical interaction for each division within this administration complex. Externally the setting is one of elegance and peace as they front onto rolling lawns of a park-like verge edged with large trees - yet internally one is confronted by narrow tortuous passages. The floors and

ceilings of the adjoining buildings are at varying levels and a mishmash of dry-walling to form a semblance of offices in what are dense cellular spaces of former residential buildings. A sad reflection of “make-do” when in fact such sound solutions were implemented in the nearby old library.

3.1.3 University of Durham - England

The city of Durham, some 30 kilometres to the south east of Newcastle has its history in the seat of the gentry, and is famous for its late Norman cathedral and nearby castle located on the “Mound” surrounded by the River Wear which in those days as a natural moat. The restored castle forms part of the present Durham University and at one time served as the School of Music. In due course as with many universities, additional space was required for academic pursuits and a number of adjoining terraced house were acquired to alleviate the problem but these co-joined properties had their own unique problems. With the need to use two or more adjoining houses to accommodate a single department such as Geology, party walls had to be demolished so as to integrate the spaces and it was found that these adjoining spaces had misaligned floors and ceiling levels. The floors were not level and equipment could not be accurately calibrated.- desk legs had to be adjusted where possible to ensure their stability. In all, the investment was not that successful and the occupants were most unhappy over their second rate accommodation. In reality the conversion of this type of building into an academic facility requires careful functional and cost in use analysis prior to purchase.

Information gathered during a personal communication with:

Allan Gemmill (Assistant Director - Projects) - Durham University

3.1.4 Howard College, University of Natal, Durban

Situated on the crest of a hill overlooking the harbour and residential buildings of a leafy suburb of this sub-tropical city, with the prominent feature of The Bluff in the distance, the “Howard Davis University College” building was the first to be erected on the Durban Campus of the University of Natal. This building project was funded by Mr. T. B. Davis, a businessman whose son was killed in 1915, at the Battle of

Somme, France. It was the desire of the benefactor to commemorate the death of his son Howard by constructing a building to his memory. For this purpose he engaged the services of the architect William Hirst in 1929 to design a building, the main entrance of which was to be orientated on axis with Howard Avenue.

The design acknowledges the climate of the area and comprises a building designed around two courtyards opening off colonnades which induces the movement of air. Access to the classrooms and laboratories, at both ground and first floor levels, was from these colonnades. The features of this building include not only the landmark dome but a strong horizontal emphasis created by the timber framed windows and the deep overhang of the eaves which shields the first floor from the sun.

In 1986 the building was declared a National Monument.

Approximately two decades ago the Faculty of Law relocated to this building and mezzanine floors were incorporated in an attempt to alleviate the shortage of space for their library needs but this intervention did not meet with the Faculty's expectations. Various designs were prepared but the costs of these schemes were beyond the university's means. In 2001 the Durban architectural practice of Emmett and Emmett were commissioned to undertake this project. Their proposal was that the courtyard adjoining the current Law Library be fully enclosed and incorporate a mezzanine over part of the area. The floor immediately below the mezzanine be raised to the level of the colonnades. To achieve this concept, the spaces between the columns of the western colonnade were glazed at ground and first floors thereby retaining the transparency of the colonnade, while the voids between the other columns were fitted with workstations. The scheme necessitated the inclusion of a strategically positioned door within the original corridor thus defining the extent of and securing the library and access to toilets was provided from within this extension. The Provincial Heritage Authority (*Amafa uKwaZulu-Natali*) was fully engaged in the project at the design stage to ensure that the integrity of the building was not compromised in any way. (See Figures 3.7 & 3.8) (KZNIA Journal, 2/2003: 6)

3.2 Conclusions:

The campuses described in this chapter are located within city environs and have a common thread being the restricted space upon which to extend their physical resources. These universities were built on the suburban or city fringes a century or more ago and with urban densification and the increase in student numbers, the campuses have been limited in their capacity to expand, with the result that all have resorted to adaptive re-use endeavours.

Each building presents unique problems requiring unique solutions, even to the point of having to integrate and enclose corridors and internal courtyards to achieve the additional space required. It is by creative design that many of the perceived obstacles are in fact opportunities to colonise areas hitherto deemed to be utilitarian or non-functional spaces. At Harvard University one of the original buildings constructed in 1857 has been remodelled six times in its history and “the renovations give evidence that contemporary design standards need not be compromised as new uses are fitted into old buildings”. Dober, 1996:71)

CHAPTER 4

CASE STUDY - UNIVERSITY OF NATAL, PIETERMARITZBURG

4.1 University of Natal - Early History

In 1877 a Bill was drafted by Sir Henry Bulwer, the presiding Governor of Natal, for the establishment of a "Royal College of Natal". The college was intended to provide "an education which, whether ending at the college itself or continued and completed elsewhere, would attain a University standard". This Bill was rejected on the second reading as it was deemed to be premature and the matter was laid to rest. (Brookes, 1966: 2)

As the years progressed so various schools in Durban, Pietermaritzburg and further afield at Michaelhouse found that they were dealing with increasing numbers of matriculant and post matriculant students who wished to further their education and this was only possible through the University of the Cape of Good Hope - which was purely an examining body. (Brookes, 1966:1) Thus teachers became lecturers for these matriculation students and pressure on the Department of Education increased for the creation of a University College.

One initial proposal was that such a University should be built gradually as the needs demanded. This was rejected, and in 1904 a Commission was appointed to investigate the matter. Some six months later, when the Commission presented its report, a division had developed between its members and this was clearly the origin of the dual campuses of Pietermaritzburg and Durban. Many more years went by with ongoing lobbying by notable members of the community who were finally successful in having the two institutions become a reality. It was as result of this division that the Natal Technical College was established in Durban and the Natal University College was to located in Pietermaritzburg. (Brookes, 1966: 3).

That was not the end of the saga, another commission was appointed and the wrangling went on until finally on the 24th August 1909 the signed report of the commission was submitted stating that it strongly recommended the creation of a University College in Pietermaritzburg (Brookes, 1966:10). On the 16th November

1909 it was moved in the Legislative Assembly and the second reading of the University College Bill subsequently became Act 18 of 1909.

During the years of debate on the matter of higher institutions of learning “lectures” were being delivered in various courses at Maritzburg College which by now had changed its name from the of “High School” to “College”. Subjects were being taught in an inauspicious two roomed temporary building on the Maritzburg College campus and the examinations were conducted by the University of the Cape of Good Hope. Upon commencement of the Natal University College in February 1910, it was in this temporary structure on the Maritzburg College campus that lectures began and, that Chemistry practicals were given in the school laboratory.

4.2 University of Natal, Pietermaritzburg Campus

Pietermaritzburg has its origins in 1838, when it was established as a settler village. Later however, with growing colonisation of the region and subsequent wars, it became a garrison town. Being situated (See Figure 4.1) eighty kilometres from Durban and on the main transportation route inland to Johannesburg, it enjoys the status of the Capital of the Province of KwaZulu-Natal. (See Figure 4.2) A medium sized city with a thriving mix of commercial opportunities it is situated in the heart of agricultural country with many of its industries are allied to this and the forestry sector. It is also a notable educational centre offering both private and public schooling as well as a university that attracts both locally based students as well as those from distant places.

The University is located approximately four kilometres from the centre of Pietermaritzburg and comprises three sub-campus (Main Campus, Life Sciences Campus and the Golf Course Campus) that are “co-joined” in a linear form, yet each with its own identity. (See Figure 4.3)

The original campus now referred to as the Main Campus, was established in

1909, with building development taking place as the campus grew over the years. In 1947 the Biological Sciences Campus was established which was to focus on agriculture and related enterprises. The Golf Course Campus was purchased from the city council in 1969 and the first building, The New Arts Building, being constructed in 1973.

4.2.1. Main Campus, King Edward Avenue, Pietermaritzburg

History of the Site and its Development

Late in 1909 the Pietermaritzburg Corporation donated approximately 100 hectares of land, situated on a ridge in the suburb of Scottsville overlooking the town, for the development of the University College of Natal.

In early 1910 when The Natal University College was founded there were 57 registered students with eight Professors teaching in Science, Humanities and Law of whom were to give lectures albeit at different venues such as Maritzburg College, the Natal Museum and the City Hall. The Old Arts Buildings was the first building to be constructed and was officially opened in 1912. However, in 1917 whilst the final battles of the World War 1 (1914 - 1918) were being fought, the building was requisitioned by the military as a hospital, where soldiers injured in the front lines were being sent for nursing.

After the war, building activities commenced on the new Halls of Residences for women and men as was the new Chemistry Building. The late 1940's saw the development of the first phase of the Science Building and the Students Union.

In the 1950's a further number of Halls of Residence were completed, as was the Main Library and the Fine Arts complex and a new Students Union since the first one had burnt down.

During the 1960's the University systematically acquired a number of large residential properties located on King Edward Avenue but separated from the

campus by Milner Road. These properties as well as a section of Milner Road, which was later purchased from the City Council, all form an integral part of the present university environment. These houses have at various times accommodated academic departments, been residences for matrons and students. As well as providing transit accommodation for new staff. Later they were converted into offices for the support entities such as the Finance Division, Human Resources, Student Counselling, Clinics, Student Affairs, the International Student Office, Physical Planning and a number of research and specialist academic activities.

4.2.2. Life Sciences Campus, Carbis Road, Pietermaritzburg

History of the Site and its Development

At this juncture the circumstances of how and when the University was granted the land originally referred to as the "Pietermaritzburg Outspan" is unclear. This tract of land, some 32 hectares in extent, is situated one kilometre from the main campus and approximately four kilometres from the city. "In 1947 The Wattle Growers Association and the Department of Education jointly funded the construction of the building on a site allocated by the University" (Brookes, 1966: 103) to house the embryonic Wattle Research Institute. At this juncture the Wattle Growers Association was ultimately responsible to the University Council but had its own Board of Control with representatives from the growers, the University and the Department of Forestry.

During this time there were moves to appoint a Director of the Natal Agriculture Research Institute based in Pietermaritzburg and thus it was that Professor Malherbe - Principal of the University (1945 - 1963) managed to secure the services of Dr A R Sanders for this position and later this post was combined with that of Dean of Agriculture. (Brookes, 1966:13). In May 1947, cost estimates for the development of the agriculture building were approved and in 1952 a large building was constructed near the Wattle Research Institute building.

To aid the research endeavours of the Faculty, a Phytotron was later constructed to the south of the main building. This complex comprises a series of glass houses, cold rooms, constant temperature environment rooms, laboratories, packing rooms and store rooms. It was here that long term experiments under controlled conditions were carried out. A number of years and much of the research published by the faculty were based on the results of work researched in this building.

In 1983 a group of new buildings was completed at the cost of R10 300 000 (1983 value) and was to be officially known as "The John Bews Complex" accommodating the disciplines of Botany and Zoology as well as the Centre for Electron Microscopy. This building was constructed to the west of and adjoining the Rabie Sanders Building linked with inter-connecting walkways.

4.2.3. Golf Course Campus

History of the Site and its Development

In 1969 the Maritzburg Golf Course was purchased from the city council. As a golf course it was limited by its geometry being a long and narrow nine hole course no longer satisfying the challenges demanded by serious golfers. Since this site is located to the east of and diagonally opposite the main campus - separated only by a road intersection - it was the natural location for the expanding spatial needs of the University and the only development was the original Club House.

The University appointed Professor Paul Connell (1915 - 1997) as Director of Physical Planning and Development and former Head of the School of Architecture. He was instructed to prepare a Master Plan for the development this campus. It was to be a plan embracing a vision that was far reaching to the point that subsequent developments have in the main adhered to this plan and it was a vision that embodied of tenets of sound urban planning.

Paul Connell was born in York, England and studied Architecture at the University of the Witwatersrand. This was at a time when the profession world wide was in a state of transition and excited about the advent of the "International Style". As a student he was member of Rex Martienssen's Transvaal Group where he served as secretary at the time (1938) that Le Corbusier attended the Town Planning Congress in this country. As a result it was he who responsible for communicating with the respected international Architect. This was his first foray in liaising with renown personages noted for inventive design approaches and many years later in 1958 he was responsible for inviting the American mathematician and philosopher, Buckminster Fuller to visit the University of Natal. At the age of thirty four Connell was one of the youngest professors to be appointed to the University of Natal. He later joined the staff of the University of Cape Town then moved on to Pretoria joining the National Building Research Institute of the Council for Scientific and Industrial Research. It was under his guidance that the N.B.R.I. produced much ground breaking work and subsequently these reports were made available to the architectural, engineering and construction disciplines. In due course he returned to Durban to take up the Chair in Architecture and in 1964 he relinquished this post to take up the Directorship of Physical Planning of the University. (KZNIA Journal, 3/1997: 0)

The University was indeed fortunate in having an architect of his intellect in the position of Physical Planner. He not only had a clear understanding of the architectural issues of university design, in its widest context, as was reflected in the quality of his later briefing documents, but it was very clear yet non-prescriptive direction that made the difference to the articulation of the spaces and buildings. The "Broad Walk" so named as it formed the link between the New Arts, Commerce and Law buildings was in fact the roof of an underground tunnel housing services and in part formed a plenum for return air from the Hexagon Theatre to the plant room adjoining the tunnel. Such was the wisdom of the Master Plan that these buildings forming the development of the Golf Course Campus are the only ones on the Pietermaritzburg Campus that truly relate each to each other and provide meaningful circulation and interactive spaces both within the buildings and externally.

The approval of the Master Plan was followed in late 1969 by the preparation of a comprehensive brief for architects regarding the design of buildings for Law, Commerce and Economics. In 1970 he produced the brief for the design of buildings for Education and Psychology, and finally in 1971 he compiled the brief for a four storey building to accommodate the Arts / Humanities.

The University Council considered the recommendations submitted by Prof Connell and in due course the first of these buildings was designed by the Pietermaritzburg firm of architects Small, Pettit and Baillon.

Gordon Small (1927 - 1995) the principle member of this practice was the doyen of Pietermaritzburg architecture, arts and theatre. He enthusiastically initiated the popular walks of the historic city lanes pointing out all the notable and not so notable landmarks. He served on the Elevations Control Committee of the City Council for many years and played an important role as a member of the Acquisitions Committee of the Art Gallery. Gordon was very active in the provincial Institute of Architects and was later to become the President in Chief of the South African Institute of Architects.

4.3. Pietermaritzburg Campus Buildings - Case Study

The buildings selected for this comparative study are:

Old Arts Building (c1912)

Main Science Building (c1948)

Rabie Sanders Building (c1952)

New Arts Building (c1976)

The question will be asked as to why these buildings in particular have been selected for this study and the answer is that they represent different eras, each with solutions to differing problems at the time of their commissioning. For the purpose of this thesis the intention is to investigate and question the success or otherwise of the design solutions. Were they too rigid and inflexible or did they provide opportunities for modification to suit the changing needs of the university. Engage in the evaluation of later adjustments, debating the success or otherwise of these as well as tabulating the potential for adaption as a ratio of new work to that of the original buildings.

The first example was indeed the inaugural building erected for the new University College which was designed to provide facilities for a multi disciplinary occupancy. The solution was to locate lecture venues and offices at the ground and basement levels with the laboratories and some offices located at the upper floor level.

The second building was built after the World War 2 (1939 - 1945). Its purpose was to cater for the growing number of servicemen being demobilised who were wished to pursue a university education.

The third example, is the result of pressures being placed on the government to establish a academic research and teaching facility for the agricultural industry of the region.

Finally the New Arts Building was developed at a time when the university was facing unprecedented expansion and an additional large tract of land had been acquired to cater for this expansion.

4.3.1. Old Arts Building:

Context of its Development:

It was the first building to be built on the campus and was completed in 1912 and designed in the Edwardian style with a squat clock tower. The tower being an emulation of the domes designed by Sir Edwin Lutyens (1869 - 1944) which were to become the hallmark of this notable architect, especially in his later buildings constructed in India. (See Figures 4.4 and 4.5)

Initially the building accommodated the disciplines of Humanities, Physical and Biological Sciences and was later enlarged by extending the northeast wing

Introduction:

In August 1909 the Government of Natal embarked on a competition, * for the design of the first building of the new University College which was to be located on the highest point of the tract of land donated by the Pietermaritzburg Corporation. (Hillebrand, 1975:102) Architects were invited to submit designs together with drawings, schedules of accommodation and bills of quantities to the Chief Engineer, Public Works Department Pietermaritzburg. This invitation was received with mixed sentiments by some local architects who believed that the invitation should have been restricted to architects practising in the province and in due course the dissident group disassociated themselves from the competition.

The eventual winner was Cape Town based architects of Tulley, Walters, Cleland and Smith.

* See Appendix 1: Natal Government Conditions of Competition

John Collingwood-Tulley was born in England and served his articles with R. J. Johnson who was Diocesan Surveyor for Northumberland and Durham. Collingwood -Tulley was awarded Associateship of the R.I.B.A. in 1886. His talent was given recognition by the awarding of a bronze medal for architectural design at the Plymouth Fine Art Exhibition. In April 1889 he arrived in Durban and was attracted to the goldfields where he worked as a contractor's engineer to supervise the construction of the Johannesburg Stock Exchange Building. Later he relocated to Bloemfontein and from there to Cape Town where he was employed by Cecil John Rhodes as a clerk of works on Sir Herbert Bakers, Groote Schuur. Later he joined the practice of Spencer Walters in that city and upon winning the University College competition Tulley relocated to Pietermaritzburg in 1910 as was required by the competition rules, to become the resident project architect.

Other notable buildings he designed Pietermaritzburg are the Voortrekker Museum 1910 - 1912 and the YWCA 1912 - 1913 (Hillebrand, 1975: 164)

In May 1910, the contract sum of £30 000 (R60 000) was signed by the Natal Government and excavation of the trenches for the foundations commenced. The official laying of the foundation stone by the Duke of Connaught took place on the 1st December 1910. Twenty two months later on the 9th August 1912 the building was opened by Mr F. S. Malan the Union Minister of Education.

The Edwardian building sits grandly on an elevated platform overlooking the city, with distant views of Worldview.

In 1917 the building was requisitioned in part by the *military to be used as a hospital, whilst the remaining spaces continued to be occupied by the university.

As was prevalent during those times, the Government, during the course of construction, advised the University that funding for the project had been cut and that insufficient funds were available for furniture and floor coverings let alone funds for the clock in the clock tower - a feature of the building to this day. So it

was that the laboratories were ill-equipped and many offices had no carpeted floors.

The clock tower has over the years been regularly assailed by revelling male students who, aided by liquored courage, scaled the dome in the hours of darkness and inevitably placed various items of underwear on its lightening mast much to the delight of the applauding female spectators.

In recent times the Head of the History Department has traditionally been assigned the original meeting room as a study - a room with a wonderful view of the city and the distant mountains. During the 1990s the clock tower once again became the subject of much discussion for early one evening after a storm, the incumbent Professor had shortly left his study when the heavy lead counterweight of the clock mechanism, having been struck by lightening, broke from its cable and crashed down through the ceiling of this room, smashing the desk and lodged itself into the floor. The following day the shocked Professor, who was an amateur artist, produced a cartoon of the event which was duly published in both the campus and city newspapers.

After the construction of the Main Science Building and the relocation of the Science disciplines from the Old Arts Building it has since largely been the domain of the Humanities disciplines.

In 1986 the building was declared a National Monument.

* Interestingly, the university had a narrow timber spiral staircase constructed in the south east corner in order that Prof John Bews might have access from his office on the ground floor to the Botany laboratories at first floor in order not disturbing the "hospital" activities.

** See Appendix 2: Letter of commendation from architect to clerk of works, Mr. R. C. Geddes, whose granddaughter was employed in the Physical Planning office of the Pietermaritzburg campus

Design and Construction:

(See Figures 4.6, 4.7 and 4.8)

Topography:

The being located on the highest point of the site the natural ground falls from south to north as well as north to south and from east to west.

Geomorphology:

The site has very little top soil and is underlain with deep shale - so typical in this part of the city. In addition there is a geological fault line that passes close to the building.

Extent of the Building:

The building comprises two floors and a semi-basement and is 3 660m² in extent.

Structure:

The building comprises a load bearing brick structure with what appears to be precast concrete stairs.

Climate Control:

The orientation of the building was carefully considered. Not only was it centred on the "Worlds View" mountain for the vistas point of view but also to avoid the hot sun on the teaching venues. The building works well even without artificial cooling, the open corridors to allow convection induced air movement in the courtyards. These being internal courtyards are in themselves, cool for majority of the time. The teaching venues are shielded from the heat by the colonnaded porches and the lecture rooms have glazed high level top-lights that may be opened.

It is only the west elevation that does not enjoy meaningful solar protection since these windows have no overhang or other device to inhibit the migration of the intense heat of summer and are unfortunately large in size. Photographs of the building taken many years ago show these windows fitted with semi-circular

awnings indicating that the problem of heat gain is not new. A number of the offices located on this elevation have in recent years had to be fitted with air conditioning. This in turn has created the problem of the concealment of condensers and lagged piping. To "solve" this problem a large condenser was located on the upstairs verandah above the main entrance from which pipes were taken into the old meeting room at skirting level and linked to the units in the adjoining rooms. The result is that the condensers are well concealed and are not being visible from ground level or from the other offices.

Extent:

Originally the building comprised a semi-basement with ground and first floors to the front as well as one side wing and the remaining building having a ground and first floor. Thus comprising a structure of 9 367m² in extent

Later both floors of the north wing were extended. There is only cursory evidence of this addition notably the offset corridor, suspended timber floor at ground and first floor levels as well as the roof ridges not aligning.

External Character of Building:

The plan form of the original building can be described as having a west facing frontage linking the north wing and south wings. Interestingly this "main" elevation which includes the clock tower and entrance is thrust forward with the north and south wings set back - quite the reverse as one would expect the wings to project and 'embrace' the main entrance facade. Set between the two wings and separated from these by courtyards is a "Great Hall" and the centre of the hall is articulated with the dome and main entrance foyer. The corridors to both floors run around the sides of the courtyards with waist high parapet walls from which series of arched brick columns rise giving a colonnaded character which. These corridors provide effective climate control for the offices and lecture venues which is especially necessary given the hot humid climate of Pietermaritzburg.

The facade has a plinth of Greytown blue stone whilst the walls above of face brick with tuck pointed joints and perpend. The roof covering being clay Marseilles tiles.

The columns supporting the semicircular entrance porch are of Steeple sandstone from the Transvaal as is the moulded cornice to the canopy and pediment over this porch. Similarly the profiled dressings to the doors and windows and clock tower are constructed of this same sandstone. The material used for the steps to the main, rear and side entrances is granite that was quarried in the Townbush area located in the hills outside the city. (The African Architect, 1912: 60)

On the north elevation one is conscious of the deeply recessed colonnaded porch protecting the lecture room from the sun, whereas on the south elevation a matching colonnaded effect not only protects a lecture venue but also forms the enclosure of a light-well serving the semi-basement.

To the rear of this building and located at the Ridge Road boundary of the site stands a single roomed structure designed in the same facebrick style as the main building complete with parapet walls and tiled roof. This was the location for the incoming electrical main supply from the city's reticulation. Although the equipment has long since been removed the building has been retained and restored as a reminder of the history of this campus.

Interior Character of the building:

The entrance doors and frames are of teak glazed with bevelled glass - the original glass was Flemish - and above the main entrance door is a round timber top light of matching teak that articulates with the vaulted ceilings. The interior walls of the vestibule are clad in red sandstone with stylised pilasters in matching sandstone all from Warmbaths near Pretoria. Large squares of black and white marble form the floor covering to the vestibule. (The African Architect, 1912: 60)

In the Great Hall one is conscious of the light penetrating through the large round high level windows that face onto the courtyards. These windows are complemented by the high vaulted ceiling that creates a sense of grandeur even up on the gallery one has the sensation of the ceiling being very high. The ceiling is constructed in steel, covered with expanded metal lathing and plastered and embellished with ribs thereby creating the impression of a recessed panelled

ceiling. Within this steel framework are “ladders” used by the electricians to access the winches that allow for the large suspended light clusters to be lowered thereby facilitating the changing of the lamps. (Personal communication: Owen Benn University electrician)

The grandeur and enclosure of the formal entrance vestibule comes to an end at a set of teak double doors from where on the finishes become more utilitarian. Floor finishes to corridors are now red granolithic and the external walls of the colonnaded corridors are facebrick with brick on edge double bullnosed capping. The corridor walls enclosing the various rooms have a face brick dado with a plaster finish above. Similarly the corridor ceilings at ground floor level are plastered. At first floor level the corridor ceilings are constructed of tongue and grooved timber that was originally painted and the internal ceilings have a plaster finish. The floors of the various rooms generally are tongue and grooved boards on timber battens finished at the door openings with a timber threshold.

Function:

Originally, being the only building on the campus it was built to accommodate both the Science and Humanities disciplines.

The original building comprised a Reception office to the left of the ground floor main entrance and the Registrars Office to the right. Beyond the Registrars office was a Museum, Mens Common room, Chemistry lecture room, Chemistry Preparation Room and a Research laboratory for the Professor of Chemistry. Located to the right of the main entrance and reception office was the Woman's Common room, the Mathematics lecture room, Modern Language lecture room and a private room for the Professor. At first floor level the Library, Professors Common room and Meeting room were over the main entrance and Reception and Registrars rooms. The rooms on the south wing were used as laboratories for Botany, Geology and Physiology as well as lecture rooms. Tucked away in a narrow recess adjoining the Meeting Room, was a hoist to convey botanical material from the semi-basement to the first floor level. Today these spaces are used as cleaners cupboards. The semi-basement was allocated to classrooms

where windows faced into the light-wells referred to earlier. On the west or main elevation the rooms faced into narrow light-wells covered by steel gratings making the rooms prison-like.

Structural Module:

The building is constructed in load bearing brickwork with the floor slab spanning between the external wall and the internal corridor wall and on to the colonnaded wall of the courtyards. The first floor of the later addition is constructed of timber joists with tongue and grooved boarding on top and a softboard ceiling type material below. The wall and ceiling junction is covered by a rectangular timber cornice.

Services:

Electrical:

Originally the local authority electrical supply terminated in the High Voltage Switch Room. A freestanding building located to the back of the building in the present parking area. From here an underground cable ran to a main distribution board located in the semi-basement, rising to a single distribution board at each floor level. In later years a new high and low voltage switch room was constructed in a more central location to serve this campus more effectively.

The first floor corridor has a suspended ceiling, the void of which serves as an ideal location for the wire-ways, both past and present. Elsewhere all conduits are cast into the concrete or built into the walls. This rigid infrastructure has in a way been the reason for the retention of the integrity of the building however on the other hand it has led to the need for the installation of power trunking to cater for flexibility and integration of computer cabling. At the time of the university needing to install computer cables it was recommended that where possible the timber floors should be lifted locally and underfloor ducting installed but this was rejected due to the disruption and cost. A compromise was reached when a timber boxed skirting was agreed to and installed rather than a "modern" type of trunking

in sheetmetal or plastic. Access into the buildings for cabling has also presented a problem since the plinth is of “blue stone” and very hard. The option of coring was rejected as it would deface the facade so an alternative solution had to be found. Positioned in a corner adjoining the main entrance and hidden behind the garden was a brick sized metal vent which was carefully cut to permit the passage of the incoming electrical supply cable.

Water:

Being a Science building in part and a need for water in the laboratories presented little problem for the architect since the lightwell referred to at the south elevation also served as a service duct. This is the side where the science laboratories were located at both floor levels as well as the male toilets at semi-basement level. In 1916 a fire sprinkler system was installed and the pipes of the system were exposed and attached to the ceilings. The original linen drawing of this installation was discovered by the supplier, “Mathers and Platt”, who presented it to the campus Planning Office in 1986.

Implementation of Changes:

(See Figures 4.9, 4.10 and 4.11)

Over the years little in the way of major modifications have taken place and the elevations have remained unchanged. In the course of time various large spaces have been sub-divided using lightweight partitioning that permits easy removal should further changes be required. Through careful planning no additional door openings were required in the original facebrick walls and care has also been taken not to damage the existing features such as the moulded dado and picture rails and skirtings. These features have been replicated and incorporated into the new subdivided spaces.

As described earlier, the various science disciplines which had been accommodated within this building were relocated to other venues within the newly

constructed Science building which was completed in 1948. At that juncture all of the original laboratory benches and fittings were removed as the occupancy of this Arts building was to be restricted to the Humanities disciplines only. Because of the loose fit nature of the laboratories little restoration of the fabric of the building was required with the conversion of spaces. Since the building needed to accommodate more staff than previously, additional offices were required and the spaces occupied by the former laboratories at first floor level were sub-divided using lightweight timber studded partitioning. To avoid defacing the corridors with the introduction of new doorways cut into the facebrick walls. A sub-corridor was created behind the main perimeter corridors. These were accessed through the original doorway but without a door or frame. Whilst understanding the reasoning behind this decision it introduces an anomalous and not very inviting corridor space. It has a different floor finish with the tongue and grooved boarding having no defining or transitional edge against the granolithic of the external corridor .

The location of the Lecture rooms were retained due to their central ground floor position as well as being protected from the sun and radiant heat by the deep colonnaded porches. This position also meant that students had easy access to these facilities whilst leaving the juxtaposed staff offices quiet and private. The tiered seating of the Lecture rooms is to this day still in the original timber construction thus continuing as a living museum.

By 1933 the registered number of students had grown and additional staff were employed since all the space was fully utilised the building had to be extended. It has not been established who the architects of the addition were but the character of the original building has emulated most successfully. Once inside the building the only real telltale sign of this being an extension is the suspended floor construction at both levels.

In 1934 a double storey extension was added to the north east wing of the building. Acknowledging the argument postulated by Ruskin with regard to the principles of "restoration" of old buildings where he believes it to be categorically wrong to attempt to replicate the original material during the course of restoration, this

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extension to this Arts building was not in the realm of restoration but that of an addition. The material and detailing have indeed been replicated with infinite precision even the colour and size of the bricks are identical to the original hence the coursing matches the original. This is surprising since it was at this time that the clay pits from where the "maritzburg red" was excavated, closed due to the clay being exhausted. It is almost impossible to note a variation in the colour of the mortar of the tuck pointing is uniformly the same. Obviously the matter of supply and consistency of materials in those days was infinitely better than today and even the teak window frames match. An unfortunate telltale indication of this later addition is the style of the side door on the north elevation which is more "modern" than the others of the older part of the building and the door frame to is devoid of the finesse of the original, lacking in detail to elements such as the moulded glazing beads. The rather unattractive heavy door frame simply finishes against the wall with a quadrant. The reason for discussing this extension to the building within the context of adaptive re-use is because additions by their nature may have a significant impact on the integrity of the original design.

4.3.1.1. Changes in the 1973 to 1982 period:

- 1 The former Physics and Chemistry laboratories at the back of the building were converted into tiered lecture venues and this conversion is noticeable by the undecorated plastered end walls of the brick and concrete tiers. All the tiered seating to the original lecture venues was constructed in Oregon Pine timber. The existing lecture venue between these laboratories remained but later was converted to a store room for Fine Art material and only one of the original stores was retained to be used as an office. Later a mezzanine type platform was constructed in mild steel sections and tongue and grooved boarding over part of the large storage space. When the Fine arts Store was created an external door was installed. Unfortunately this was built-in and the brickwork around the door frame were badly miss matched. Ruskin would have insisted on a plaster surround being applied to this opening which would have been more in keeping with the sandstone quoins at the corner of the "new wing" facing the door in question.

- 2 The Dramatic Society was the unofficial forerunner of the Drama Department - used to produce many Shakespearian plays all of which required a large stage. The original platform of the Hall was too small for these productions and was extended to include a false proscenium. To house the very large collection of costumes and provide dressing rooms, a rather uncharacteristic "L" shaped building named the "Temple" was constructed in the northern courtyard and linked to the "wing" of the Hall.
- 3 The "Women's Common Room" at ground floor level was sub-divided to form offices for the Head of the Department of Economics and his secretary.

Evaluation of the Changes 1973 - 1982

- 1 Whilst the spaces created are functional, the aesthetics of the approach to the offices is disturbing. The alteration emphasises the changes to the original room now sub-divided. It may well have been a better solution to have cut into the passage facebrick wall and fitted two new door frames rather than retain the single door opening.
- 2 This building is very intrusive on the courtyard, and out of character. It should be demolished but has been colonised and become a base for post graduate students. The position of the building has resulted in inaccessible nooks and crannies that cannot easily be cleaned.
- 3 This project was successful simply because a lobby was created at the entrance to this suite.

4.3.1.2.Changes in the 1983 to 1992 period:

- 4 The south western corner Seminar Room at first floor level was converted into three Offices and a small tea preparation space for Political Science.
- 5 The false proscenium and the extended stage were removed to restore the Hall to its original size. The newly appointed Vice-Principal, Professor Colin

de B. Webb, a notable historian with many publications on the history of the province to his credit, gave his blessing to the restoration of the entire Hall and the interior of the building. He had been a student at the university and recalled with clarity the detail of the building during his years of undergraduate and some post graduate study. What appeared to be flush panel doors were in fact panelled doors of oregon pine - simply later covered in hardboard to make them look more "modern". Throughout the building the original doors were restored but regrettably the 1910 vintage ironmongery had disappeared.

- 6 The face brickwork of the colonnades had in years past been painted. After much research into suitable products for stripping away the paint the bricks were cleaned down and majority of the paint was successfully removed without any damage to the face of the bricks.
- 7 A north facing Lecture Room at first floor level was sub-divided into an office and Seminar Room and further along, at the end of the corridor in the 1934 wing, two Seminar Rooms were converted out of a large Lecture Room. The matter of fire within the building was always of concern and at the time of the latter sub-division a steel fire escape stair was constructed outside this venue.

All the partitioning to the areas described were of the drywall type to allow for any unprecedented changes that may be required.

Evaluation of the Changes 1983 - 1992

- 4 This project was also successful in that it created a suite of offices for the same department encouraging interaction between occupants of the adjoining offices.
- 5 The restoration work enhanced the venues and offices.
- 6 Removing the paint and restoring these walls was well done with no signs of permanent damage to the brickwork.

4.3.1.3. Changes in the 1993 to 2002 period:

As in the previous decade little change of any substance took place until the last year of this period when the University, embracing the culture of change, decreed that Departments would now become Disciplines combined into Schools within a reduced number of Faculties. The object of the new planning endeavour was to locate a consolidated School or a number of Schools in a specific building or on an entire floor of a building. This was an emotive time and the final outcome met with much discussion and negotiation. The spaces within the Arts Building were easily sub-divisible and the School of Language, Culture and Communication fitted into the entire building.

- 8 The modifications undertaken at this point comprised the conversion of two basement rooms into a language laboratory.
- 9 The latest conversion of space that has taken place is in the former Fine Arts Store. The University having privatised its telephone system required space for its expanding communications network. The office, which until recently served the Store has been retained as an office and the remaining front space (originally two store rooms) has become the telephonists station with purpose designed integrated workstations for four people. Within the remaining space and under the mezzanine floor, a workshop and an office have been created. This is for accommodating the two telephone technicians.

Evaluation of the Changes 1993 - 2002

- 7 A project that is both functional and aesthetically pleasing.
- 8 This was a successful project marred only by the dungeon-like approach to the spaces.
- 9 This was a very successful project.

4.3.2. Main Science Building.

Context of its Development:

The first phase of the building was designed and constructed in 1948 to accommodate demobilised servicemen wishing to undertake undergraduate studies. Two additional floors were added in 1959 and in 1990. A part floor was constructed at third floor level. (See Figures 4.12 and 4.13).

The “E” shaped building provided better and bigger Biological Science laboratories than were available in the Old Arts Building.

During the course of 1984 a major re-planning programme was implemented to house those disciplines to be relocated from the Rabie Sanders Building and consolidated in the Science Building.

A minor upgrading exercise was undertaken to the second floor laboratories.

Introduction

The Principal's Report of 1948 / 49 refers to the fund raising drive that was launched in 1946 to attract funding for the development of much needed new buildings on the campus. Particularly for hostels for the ever growing student population and former Science laboratories. The latter to replace the few existing small Biological Sciences located in the Old Arts Building. By December 1948 a total of £400 000 had been raised for this purpose.

With the post war influx of demobilised soldiers who were now aspiring to be university students it was decided to commission Pietermaritzburg architects Corrigan & Crickmay to design a new Science Building. Wisely the University took, at that time the pragmatic view, that the structural design of all new buildings should make provision for an ultimate building height of five storeys.

Thus it was that this building was originally designed for five storeys but initially only the basement, ground and first floors were built and duly opened on the 15th May 1948. In this original form the building accommodated the departments of Botany, Zoology, Geology. In 1959 when the second and third floors were built these additional floors were to house the departments of Geography, Mathematics and Physics who were moved from the Old Arts Building.

With the University originating in Pietermaritzburg it had been the natural seat of the University. The Principal, Registrar, Accountant and other administrative staff had their offices in this Science building. However, once the University had an established presence in Durban pressure was brought to bear to have Durban take on the administrative functions of the institution. This was much to the dismay of those on the Pietermaritzburg campus as well as the city in general. This was the brainchild of the Principal Professor E. G. Malherbe who decreed that the move take place in late 1953. The reasoning was clear. By forcing the relocation of the various entities to Durban, that campus would have to be further developed to accommodate the increasing populace leaving Pietermaritzburg to become a "backwater" campus. It was also his intention to relocate a number of well established Pietermaritzburg based academic departments - Fine Arts included - to Durban. The proposal was abandoned amidst the furore and thus it was that the Fine Arts Department remained. Albeit in its various and not very salubrious accommodation in "temporary" (upgraded internally and still fully utilised in 2003) buildings on the Ridge Road side of the campus as well as in the basement of the Main Science Building.

Design and Construction:

(See Figures 4.14; 4.15; 4.16; 4.17 and 4.18)

The Site:

The building is located on the main campus adjacent to Ridge Road. The reason for the selection of this site is not clear as a more appropriate site for the building would have been next to the Old Arts building on the site of the "old" Library. This library building was constructed after the Science Building and now accommodates

extension to this Arts building was not in the realm of restoration but that of an addition. The material and detailing have indeed been replicated with infinite precision even the colour and size of the bricks are identical to the original hence the coursing matches the original. This is surprising since it was at this time that the clay pits from where the "maritzburg red" was excavated, closed due to the clay being exhausted. It is almost impossible to note a variation in the colour of the mortar of the tuck pointing is uniformly the same. Obviously the matter of supply and consistency of materials in those days was infinitely better than today and even the teak window frames match. An unfortunate telltale indication of this later addition is the style of the side door on the north elevation which is more "modern" than the others of the older part of the building and the door frame to is devoid of the finesse of the original, lacking in detail to elements such as the moulded glazing beads. The rather unattractive heavy door frame simply finishes against the wall with a quadrant. The reason for discussing this extension to the building within the context of adaptive re-use is because additions by their nature may have a significant impact on the integrity of the original design.

4.3.1.1. Changes in the 1973 to 1982 period:

- 1 The former Physics and Chemistry laboratories at the back of the building were converted into tiered lecture venues and this conversion is noticeable by the undecorated plastered end walls of the brick and concrete tiers. All the tiered seating to the original lecture venues was constructed in Oregon Pine timber. The existing lecture venue between these laboratories remained but later was converted to a store room for Fine Art material and only one of the original stores was retained to be used as an office. Later a mezzanine type platform was constructed in mild steel sections and tongue and grooved boarding over part of the large storage space. When the Fine arts Store was created an external door was installed. Unfortunately this was built-in and the brickwork around the door frame were badly miss matched. Ruskin would have insisted on a plaster surround being applied to this opening which would have been more in keeping with the sandstone quoins at the corner of the "new wing" facing the door in question.

- 2 The Dramatic Society was the unofficial forerunner of the Drama Department - used to produce many Shakespearian plays all of which required a large stage. The original platform of the Hall was too small for these productions and was extended to include a false proscenium. To house the very large collection of costumes and provide dressing rooms, a rather uncharacteristic "L" shaped building named the "Temple" was constructed in the northern courtyard and linked to the "wing" of the Hall.
- 3 The "Women's Common Room" at ground floor level was sub-divided to form offices for the Head of the Department of Economics and his secretary.

Evaluation of the Changes 1973 - 1982

- 1 Whilst the spaces created are functional, the aesthetics of the approach to the offices is disturbing. The alteration emphasises the changes to the original room now sub-divided. It may well have been a better solution to have cut into the passage facebrick wall and fitted two new door frames rather than retain the single door opening.
- 2 This building is very intrusive on the courtyard, and out of character. It should be demolished but has been colonised and become a base for post graduate students. The position of the building has resulted in inaccessible nooks and crannies that cannot easily be cleaned.
- 3 This project was successful simply because a lobby was created at the entrance to this suite.

4.3.1.2.Changes in the 1983 to 1992 period:

- 4 The south western corner Seminar Room at first floor level was converted into three Offices and a small tea preparation space for Political Science.
- 5 The false proscenium and the extended stage were removed to restore the Hall to its original size. The newly appointed Vice-Principal, Professor Colin

de B. Webb, a notable historian with many publications on the history of the province to his credit, gave his blessing to the restoration of the entire Hall and the interior of the building. He had been a student at the university and recalled with clarity the detail of the building during his years of undergraduate and some post graduate study. What appeared to be flush panel doors were in fact panelled doors of oregon pine - simply later covered in hardboard to make them look more "modern". Throughout the building the original doors were restored but regrettably the 1910 vintage ironmongery had disappeared.

- 6 The face brickwork of the colonnades had in years past been painted. After much research into suitable products for stripping away the paint the bricks were cleaned down and majority of the paint was successfully removed without any damage to the face of the bricks.
- 7 A north facing Lecture Room at first floor level was sub-divided into an office and Seminar Room and further along, at the end of the corridor in the 1934 wing, two Seminar Rooms were converted out of a large Lecture Room. The matter of fire within the building was always of concern and at the time of the latter sub-division a steel fire escape stair was constructed outside this venue.

All the partitioning to the areas described were of the drywall type to allow for any unprecedented changes that may be required.

Evaluation of the Changes 1983 - 1992

- 4 This project was also successful in that it created a suite of offices for the same department encouraging interaction between occupants of the adjoining offices.
- 5 The restoration work enhanced the venues and offices.
- 6 Removing the paint and restoring these walls was well done with no signs of permanent damage to the brickwork.

4.3.1.3. Changes in the 1993 to 2002 period:

As in the previous decade little change of any substance took place until the last year of this period when the University, embracing the culture of change, decreed that Departments would now become Disciplines combined into Schools within a reduced number of Faculties. The object of the new planning endeavour was to locate a consolidated School or a number of Schools in a specific building or on an entire floor of a building. This was an emotive time and the final outcome met with much discussion and negotiation. The spaces within the Arts Building were easily sub-divisible and the School of Language, Culture and Communication fitted into the entire building.

- 8 The modifications undertaken at this point comprised the conversion of two basement rooms into a language laboratory.

- 9 The latest conversion of space that has taken place is in the former Fine Arts Store. The University having privatised its telephone system required space for its expanding communications network. The office, which until recently served the Store has been retained as an office and the remaining front space (originally two store rooms) has become the telephonists station with purpose designed integrated workstations for four people. Within the remaining space and under the mezzanine floor, a workshop and an office have been created. This is for accommodating the two telephone technicians.

Evaluation of the Changes 1993 - 2002

- 7 A project that is both functional and aesthetically pleasing.
- 8 This was a successful project marred only by the dungeon-like approach to the spaces.
- 9 This was a very successful project.

4.3.2. Main Science Building.



Context of its Development:

The first phase of the building was designed and constructed in 1948 to accommodate demobilised servicemen wishing to undertake undergraduate studies. Two additional floors were added in 1959 and in 1990. A part floor was constructed at third floor level. (See Figures 4.12 and 4.13).

The “E” shaped building provided better and bigger Biological Science laboratories than were available in the Old Arts Building.

During the course of 1984 a major re-planning programme was implemented to house those disciplines to be relocated from the Rabie Sanders Building and consolidated in the Science Building.

A minor upgrading exercise was undertaken to the second floor laboratories.

Introduction

The Principal’s Report of 1948 / 49 refers to the fund raising drive that was launched in 1946 to attract funding for the development of much needed new buildings on the campus. Particularly for hostels for the ever growing student population and former Science laboratories. The latter to replace the few existing small Biological Sciences located in the Old Arts Building. By December 1948 a total of £400 000 had been raised for this purpose.

With the post war influx of demobilised soldiers who were now aspiring to be university students it was decided to commission Pietermaritzburg architects Corrigan & Crickmay to design a new Science Building. Wisely the University took, at that time the pragmatic view, that the structural design of all new buildings should make provision for an ultimate building height of five storeys.

Thus it was that this building was originally designed for five storeys but initially only the basement, ground and first floors were built and duly opened on the 15th May 1948. In this original form the building accommodated the departments of Botany, Zoology, Geology. In 1959 when the second and third floors were built these additional floors were to house the departments of Geography, Mathematics and Physics who were moved from the Old Arts Building.

With the University originating in Pietermaritzburg it had been the natural seat of the University. The Principal, Registrar, Accountant and other administrative staff had their offices in this Science building. However, once the University had an established presence in Durban pressure was brought to bear to have Durban take on the administrative functions of the institution. This was much to the dismay of those on the Pietermaritzburg campus as well as the city in general. This was the brainchild of the Principal Professor E. G. Malherbe who decreed that the move take place in late 1953. The reasoning was clear. By forcing the relocation of the various entities to Durban, that campus would have to be further developed to accommodate the increasing populace leaving Pietermaritzburg to become a “backwater” campus. It was also his intention to relocate a number of well established Pietermaritzburg based academic departments - Fine Arts included - to Durban. The proposal was abandoned amidst the furore and thus it was that the Fine Arts Department remained. Albeit in its various and not very salubrious accommodation in “temporary” (upgraded internally and still fully utilised in 2003) buildings on the Ridge Road side of the campus as well as in the basement of the Main Science Building.

Design and Construction:

(See Figures 4.14; 4.15; 4.16; 4.17 and 4.18)

The Site:

The building is located on the main campus adjacent to Ridge Road. The reason for the selection of this site is not clear as a more appropriate site for the building would have been next to the Old Arts building on the site of the “old” Library. This library building was constructed after the Science Building and now accommodates

the Executive and Faculty Administration. The oblique positioning of this is evidence of poor future planning and lack of strategic thinking of the time. Universities of the traditional kind have a legacy of structured planning concepts developed as a result of many years of experience. These planning concepts are not reflected in the relationships or rather the lack thereof of the buildings on the main campus.

Topography:

The site falls from south to north. A platform for the building and a large car park was created as well as a part basement which was accessed from the south via a ramp.

Geomorphology:

The site has very little top soil and is underlain with deep shale - so typical in this part of the city. There is a geological fault line that passes close to the building.

Extent of the Building:

The building currently being 9 367m² in extent comprises a semi-basement, ground, first, second and third floors

Structure:

The building comprises a framed concrete structure with brick infill. The presence of the geological fault and the need for a “flexible” building may have influenced the structural concept of cross columns at 1:3 ratio. That is, an off centre column demarcating the corridor width and reducing the span in view of the loading capacities required for laboratory equipment.

Extent:

Originally the building comprised a semi-basement with ground and first floors. Two additional floors were added later followed by a part floor at third floor level.

External Character of Building:

The building can be described as having an “E” shape with the offices generally

along the longest wing and the laboratories taking up the remaining three right angled wings. A tangentially positioned fan shaped projecting building, independent of the main building accommodates a Council Chamber at ground floor level and a major lecture venue above. These facilities are accessed independently from the Science building thus permitting after hours usage without compromising the security of the remainder of the building.

The building has a quarry tiled plinth extending to window cill height with a face brick finish above. This brickwork has deeply ruled joints to emphasise the horizontality of the structure whilst the perpendents are flushed with the face of the bricks. A mono pitched metal roof is hidden behind parapet walls and the gutters are contained within the three sided courts formed by the various wings.

Above the main entrance to the building is a full height curved panel having a terrazzo finish which identifies the entrance. This feature together with the curved walls enclosing the staircase ascending from the ground floor lobby to the Council Chamber wing are influences attributable to Corbusier. These elements are incorporated in his building for the Paris Exhibition. The entrance to the Council Chamber is sheltered by a cantilevered reinforced concrete canopy slab tapering from the extreme ends inwards thus accentuating the slim profile. At the junction with the building the canopy is supported on circular columns constructed out of reinforced concrete and the steps are finished in terrazzo.

All the windows have projecting plastered surrounds and in many instances these surrounds group a number of windows. The north facing office windows are narrow deeply recessed into the wall. They have projecting plastered fins which provide good solar control. The remaining windows to the other wings, mainly to the laboratories are large and the proportions of which leave a lot to be desired. Also they acknowledge factors such as glare and heat gain, none the less on the East facade they permit the ingress of road generated noise.

Interior Character of the building:

In the main entrance lobby at ground floor level one finds that the finishes are

utilitarian with the walls painted plaster and the floor terrazzo finished. The ceiling in this lobby is suspended below the general ceiling level of the corridor beyond the doors that enclose the lobby. The stairs are terrazzo finished and the balustrade wall of the stair is painted . A round hardwood handrail is fixed on brass brackets that raise the handrail above the profiled plaster capping of the wall. This building is equipped with a lift which is located within the entrance lobby. Walking through the doors that separate the lobby from the remainder of the building one is conscious of the suspended ceiling that encloses the services being distributed from the rising service duct. At the extreme opposite end of the building is another staircase and minor entrance lobby, the finishes of which, emulate those of the main entrance vestibule.

At the upper floors a deterring feature of the design is that the level of the lift cum stair lobby is at a different level to the corridors making access to each floor for disabled persons impossible. Similarly, the movement of heavy or large goods from the lift is made difficult by this change of level. The feature curved wall described earlier, is reflected at the upper level lift lobbies where display units containing model answers to recent tests are fitted. On these upper levels the stair remains in terrazzo whilst all the floors including that of the lift lobby are vinyl covered.

Function:

To accommodate science disciplines as well as general computing and support staff. The building comprised staff offices - laboratories - mini library - teaching and seminar venues.

The "E" profile creates semi courtyards thus providing access to natural light for all the major teaching laboratories as these are positioned at the back of the building and facing east. The large windows are separated by piers and did not provide much space for major vertical services.

The research laboratories were located internally with views into the courtyards and again the large windows were separated by narrow piers which do not provide meaningful space for vertical services.

The narrow window and pier modules offer many possibilities for the variable subdivision of the existing offices which in the days of phase one were large being approximately 28m². The smallest offices (14m²) have a depth of 6m , these face north and have distant views.

The “legs” of the building differ in width, which varies from 10m to 12,5m. The latter has an off centre corridor of 2,4m width with the offices being some 6m wide and the remaining depth being approximately 4m. One finds the utility, support spaces and vertical circulation are located on this side and for these functions the depth is adequate.

Structural Module:

The structural module generally 2,45m x the depth of the building and as mentioned earlier this varies between 10m and 12,5m. There are no mid span columns thereby allowing easy sub division in two directions. The downstand beams are 250mm wide x 320mm deep and the floor to soffit of beam dimension is 3,05m.

Services:

Electrical:

The electrical distribution is served from the High Voltage and Low Voltage Rooms in the basement where the diesel powered standby generator is also located. The building has two main rising electrical ducts located towards the ends of the building and the power supply rises to a distribution board in each duct at each floor level.

The off centred corridor has a suspended ceiling in which all the electrical services are housed and distributed, via bulkhead that link the suspended ceiling and the power trunking located on the external perimeter walls. The trunking is a relatively recent concept used by the university and has been integrated into the building during various phases of upgrades over the past 20 years. This system of distribution allows for infinite flexibility of services especially computer networks.

In all the laboratories benches are fitted with power points and where in some instances these benches are of the island or freestanding type the conduits are required to be chased into the screed, rise and are then fixed to a leg of the freestanding bench. This is preferable to services being dropped from the ceiling which impede sight-lines - essential for teaching laboratories where television monitors are often used in large venues.

Water:

The ground floor slab of the east wing of the building is elevated above natural ground and the water and waste pipes are suspended from the soffit of this slab and connect to main sewer pipes. These pipes are reticulated in rising ducts located in the north south cavity walls of the laboratory wings. In years past water pipes were cast into the floor slab and taken to all benches including the free standing ones. The quality of the galvanising was however of a much superior standard than that which is produced today and has regrettably been the cause of flooding or migrating dampness once pinholes form in the pipes. With recent planning of laboratories one prefers to locate all sinks and water cooled equipment along perimeter walls where pipes can be surface fixed behind removable modular under bench type cupboards.

Gas:

The disciplines accommodated within this building require very little gas and to satisfy their needs small cylinders are used and fixed to cradles within close proximity of the apparatus.

Implementation of Changes:

(See Figures 4.19; 4.20; 4.21; 4.22 and 4.23)

The building underwent a number of changes due in the main to the completion in 1984 of the new John Bews Complex on the "Agriculture Campus". As a result the departments of Botany and Zoology were relocated from the Science Building to this new venue thus concentrating these and the agricultural disciplines in one "Life

Sciences” campus and as a consequence making the basement, ground and first floors of the Main Science Building available for remodelling.

This “adaptive re-use” was to be quite a radical process given that quantum progression had taken place in the sciences which required a complete re-allocation of space. This was partly to assist the construction / occupancy process, whilst on the other hand to ensure that disciplines would not be divided across different floors. Finally, that all new laboratories would be fitted out to a standard that complied with current safety protocol and would incorporate solutions for the easy and flexible distribution of services.

Prior to this, the Department of Geology had been accommodated in an old double storey house - owned by the University - on King Edward Avenue. Due to its “ground breaking” research specialities in Antarctic and other forms of mining geology, this department had grown in student and staff numbers and was no longer able to be accommodated in the house. As a natural consequence it was decided that the Geology department should also be located to the Science Building. Amongst the special requirements for this department was a sound proofed and independently founded rock crushing laboratory with attendant storage facility which had to be developed and partly integrated into the existing building. To achieve this an add on part underground structure was designed with an internal staircase up to ground floor level where offices serving this laboratory were to be located. It was of vital importance that the impact of the crushing device was not transmitted to the main building thus the need to separate the new structures including foundations from the existing. A further requirement was that the fine dust from this facility was to be extracted and discharged at high velocity into the atmosphere. The work of this particular discipline was held in high esteem by the mining sector and significant funding was given for research. In due course this resulted in the need for further specialised laboratories within the existing building for equipment such as mass spectrometers and other high technology apparatus all of which required provision for flexible access to services.

When some nine months later the construction work was finally complete the

departments of Biometry, Statistics and Information Technology Division, who were previously housed at the Rabie Sanders Building, were relocated to the Science Building. At the time of re-planning it was felt that the burgeoning department of Computer Science should also be located in the Science Building as there were clear synergies developing between departments, this resulted in logical merging of the disciplines of Mathematics / Statistics and Computer Science all of whom were located on a single floor.

In 1987 the building was again subjected to a remodelling programme but this time the university took a conservative approach in which it restricted the work largely to the upgrading of laboratories and attendant spaces on the second floor and very little adaptive reallocation was considered. One deviation was that a new laboratory utilising radio active material should be developed in a space vacated by the Department of Geography at third floor level. The entire area was gutted and the laboratory together with a preparation room and radio active material store were constructed within the existing space. To provide direct access to this third floor laboratory from the second floor, an external staircase constructed of steel and clad in polycarbonate material was “attached” to the external wall.

Some three years later during a period of unprecedented growth in student numbers, the Department of Geography found that insufficient space was available to accommodate its very large and to some extent, unique map collection used extensively for teaching and reference purposes. Considering this and the lack of facilities for Geographical Information System computing, which at this stage was fundamental to any self respecting geography department, a special usage investigation was undertaken to analyse various accommodation solutions. Fortunately one part of the “E” footprint had not been extended at third floor level during the 1958 addition and this made it possible to develop space on the “roof” over the physics department located below. Thus it was that a steel and glass structure was designed and constructed to enclose this area as well as the re-planning of the adjoining existing spaces. A light weight structure was essential due to the superimposed loading of the many map cabinets and the question of whether or not the existing structure at that point was able to withstand any

additional loads was to be investigated.

After researching the capacity of the existing foundations to withstand the additional load of another floor this new wing was designed. The solution was for the structure to project beyond the face of the building to provide "table top" space for map viewing whilst allowing maximum floor space for the storage of the map cabinets. Even here careful consideration had to be given to the concentrated loading of the floor due to the extreme point loading weights of the map cabinets and to ensure this, a diagram was prepared indicating the exact position of each cabinet. The fabric enclosure was to be a light weight steel and glass structure that projected beyond the original building perimeter and the projection acted as the worktop described earlier. The out-rigger supporting these tops returned at forty five degrees at each side of the building as a bracing whilst above to extended upwards to form a portal frame that supported the flat roof. The large square windows were glazed in "Solarshield" to limit the ingress of radiant heat yet whilst permitting slightly diffused natural lighting for those working with maps. The roof covering was a sandwiched type insulated profiled metal sheeting to limit the passage of radiant heat and notwithstanding these levels of thermal insulation as well as the solar reflective glass, allowance was made for recessed cassette type ceiling air conditioning units. This was considered essential since the space is voluminous and designed to accommodate a large number of students which would add to the heat gain. Regrettably this project has its detractors who are justified in their criticism of the noise factor. In spite of the insulation between the sheeting the exposed metal roof is noisy during heavy rain and hailstorms, thereby limiting the use of the venue at such times to research, as a lecturer presenting material is inaudible during storms.

Laboratory fittings:

To facilitate flexibility within this building all laboratories are fitted with modular benches that have interchangeable under bench type cupboards. This provides easy access to wall mounted services behind and the ability to swap wide or narrow units where best suited to the type of work been undertaken at the time.

Furniture:

Most shared offices, be they used by support staff or post graduate students, are fitted with wall mounted desks that provide a reasonable amount of working surface whilst maximising on the utilisation of the available space. The days of the free standing desk that takes up a large proportion of the open floor area are over and various configurations of desk work spaces are investigated.

4.3.2.1. Changes in the 1973 to 1982 period: Refer to Floor Plans

- 1 The large space occupied by Zoology in the basement was sub-divided to allow for the development of the new Electron Microscope Unit.

Evaluation of Changes:1973 - 1982:

- 1 This project - largely a series of dark rooms for specialised microscopes - was successful albeit utilitarian.

4.3.2.2. Changes in the 1983 to 1992 period: Refer to Floor Plans

- 2 A section of the basement was gutted to make way for a new H.V and L.V. rooms as well as a standby generator room. In addition space was made for a new Physics Store.
- 3 At ground floor level the spaces were redeveloped incorporating new offices for the Information Technology Division.
- 4 Geology laboratories, lecture room and offices developed concurrently with the construction of the other spaces at this level.
- 5 At first floor level existing large offices were sub-divided and upgraded to accommodate the disciplines of Mathematics, Statistics and Computer Science. In addition all remaining venues were fully modernised and equipped as lecture and tutorial venues.
- 6 The burgeoning Science Foundation Programme teaching under-prepared students wishing to take a science degree, was allocated space for its endeavour at ground floor. This required a separate entrance and the creation of offices and integrated lecture facility.
- 7 A conservative element of upgrading was undertaken at second floor level

and was limited to the provision of new laboratory benches and services to these. Certain specialised facilities were constructed to house sensitive equipment. A new external stair was added.

- 8 The new Map Room was constructed on the roof over the Physics Department and an adjoining Computer Laboratory as well as Dark Room and photographic facility.
- 9 The "old" staff common room was converted into a Student Computer Laboratory.

Evaluation of Changes: 1983 - 1992: Refer to Floor Plans

- 2 The area in question is utilitarian and by virtue of the nature of the usage of the spaces they are functional.
- 3 As with all aspects of the dynamic computer industry these spaces have changed even after occupation and remain "pliable".
- 4 A very successful conversion especially commented upon by the donor organisation who supported the research.
- 5 A functional floor well converted with no evidence of change of character to the building.
- 6 This was a mediocre conversion of the venue since the offices were small due to space constraints whilst the adjoining lecture space being square in shape was ideal in terms of proportion, audibility and sight lines.. Whilst no change to the structure other than the introduction of an external double door protected by a canopy were made, this entrance did impact on the character of the building in a detrimental manner.
- 7 This did not really constitute a change of any significance since the laboratories were largely upgraded and modernised.
- 8 A functional open space was created beyond the confines of the existing building. Its detractors are; the noise of rain on the roof negates the optimum usage of the space for teaching purposes.
- 9 A project that does not really allow adequate space between the workstations and gives the feeling of mild congestion and claustrophobia. .

4.3.2.3. Changes in the 1993 to 2002 period: Refer to Floor Plans.

- 10 A Soils Laboratory was constructed in the space remaining after the development of the Physics Radio Active Laboratory and further down the corridor the Geography Honours Laboratory was converted into a seminar room surrounded by carrels for these students.
- 11 An additional Computer Laboratory was developed within the “old” staff common room.
- 12 The former Undergraduate Geology Laboratory was converted into a fifty station Student Computer Laboratory providing day and night access to registered students.
- 13 The original Post Graduate Geology Undergraduate Laboratory was converted into a thirty station Computer Laboratory specifically for Mathematics Students. This project received and was constructed with donor funding.

Evaluation of Changes: 1993 - 2002:

- 10 A very functional and successful project.
- 11 In this phase of the development of the area additional space was allowed for each workstation and this resolved the claustrophobia problem.
- 12 Formally a junior Geology Laboratory now a very functional and successful teaching Computer Laboratory project that is heavily utilised and liked by the users.
- 13 Similar to No. 12 but slightly smaller - this was previously a senior Geology Laboratory effectively converted into a Computer Laboratory.

4.3.3. Rabie Sanders Building:

Context of its Development:

Originally designed and built for the state Department of Agriculture and Technical Services in 1952. (See Figures 4.24 and 4.25)

The architects of this project were Powers and Powers, a Durban based practice originally started by Ernest Powers and later joined by his sons Bob and Ernest. In 1975 this practice amalgamated with the well known Johannesburg practice of Gluckman, de Beer and Margoles, a move initiated in the main by Bob Powers' son Michael, who was in fact a partner of the latter. Besides the Rabie Sanders Building, another notable university building designed by this practice is the Memorial Tower Building on the Durban campus of the University of Natal and in 1986 this building was declared a National Monument. Upon his retirement the KwaZulu-Natal Institute of Architects awarded Bob Powers (1911 - 2000) with Honorary Life Membership. He also served as President of the Natal Provincial Institute of Architects for the period 1942 to 1943. This practice no longer exists (*KZNIA Journal; 2/2000 vol 25; p 12*)

Later in 1958 the third floor was added.

In 1975 a large lecture room was established on the lower roof on the main axis of the building.

The building was and remains a laboratory intensive one.

Introduction:

Agricultural Sciences & laboratory intensive building designed for govt department in 1950 and a third floor was added in 1958

Major re-cycling took place in 1987 and again in 2001

Design and Construction:

(See Figures 4.26; 4.27; 4.28; 4.29 and 4.30)

The Site:

The building is located some 1 kilometres from the main campus and adjoins the Epworth School.

Topography:

The site falls from south to north and in platforming for the building a deep cut (approximately 3,5m) with little compensating fill took place.

Geomorphology:

The site has very little top soil with a deep shale underlay.

Extent:

Originally the building comprised a semi basement with ground, first and second floors. A part third floor comprising a Board Room and Lift Motor rooms formed a termination to the columned entrance feature. Later a complete third floor was added. Presently the building measures 12 755m² in extent.

Structure:

The building comprises a framed concrete structure with brick infill.

External Character of Building:

The main entrance is centrally positioned and comprises a three storey sand stone surround and projecting canopy with two intermediate sandstone columns rising from an elevated platform set off by a wide external granite stair which is flanked by stepped wall capped in dressed sand stone.

The semi-basement appears to emerge from the ground revealing a locally quarried dressed granite plinth is capped by a profiled sandstone base which extends to ground floor level. Above that the building is constructed of "Windsor" facebricks with sandstone window surrounds. Originally the building extended to

second floor where it was terminated by a profiled sandstone capping and a slate roof set back to enhance the capping. Later the third floor was added with the finishes emulating that below. At the extreme four corners the building projects forward and returns on reaching second floor level thus creating the effect of “balconies”. Given the pressure on space, academics have for years endeavoured to have these enclosed to provide additional space. This plan has fortuitously been thwarted by the structural implications of a high upstand beam designed to carry the offset wall above.

Originally the roof to the building was covered by slate tiles. At some stage however the roof trusses to one section required replacement and due to a misguided maintenance division all the original slate tiles were removed and replaced with “Harveytile”. A clear example of the importance of a campus having architectural expertise to advise on the retention of aesthetics and integrity of restoration.

Climate Control:

This building was the first on the campus to incorporate a system of climate control and was mechanically ventilated by equipment located in plant rooms in the southern section of the basement and at opposing ends of the building. The south wall of the basement was largely under ground whereas the north wall faced in part onto an internal courtyard. The plant rooms were linked to the remainder of the building by 2m x 3m deep south/north under floor ducts to rising ducts in the office section. From these risers, the air was transported throughout the building, contained within the passage ceiling void, in sheetmetal ducting. From these lateral supply ducts the air was “Teed” off to discharge into offices and research labs through high level grilles. Having pressurised the offices the air was allowed to pass into the passages through another set of grilles in the offices.

Each air handling plant comprised of large metal vaned turbine of approximately 2,5m in diameter (resembling an oversized hamster exercise wheel) fitted within a sheetmetal enclosure. The steel shaft of the turbine nestled in huge bearings which in turn were seated on large concrete bases. The turbine was driven by a powerful

electrical motor linked to the shaft pulleys by fanbelts and operated by a 2 stage "Stardelta" button operated starter and a brass lever switch which was to increase the amount of power required to turn the motor from its standing start.

The air intake to the plant rooms was via a very large timber louvred panel built into the courtyard wall. Behind this were two enormous filters approximately 5m wide x 4m high and set one behind the other through which the air was drawn.

Whilst the system was a sound idea, little thought was given to the extensive cleaning required to keep the air hygienically clean. Ultimately the system was abandoned due to the contamination of air and its effect on occupants and experimental material.

Function:

To accommodate the Department of Agriculture scientists and technical support staff. It was these scientists who were the original agricultural discipline academics who taught the students. A variety of research activities took place in the building supported by the field work done at the Ukulinga Research Farm

The building comprised staff offices - laboratories - library, teaching and seminar venues.

The major footprint of the building is basically rectangular in profile, with four internal courtyards that provide natural light and ventilation for all the laboratories facing onto these. Projecting from the back of the building is a fan shaped pod housing a large tiered lecture venue and lecture venue above.

The major teaching laboratories were positioned at the back of the building and faced south. The large windows are separated by a series of narrow piers which do not provide adequate space for vertical services and furthermore the distance between the window cill and the laboratory bench top is too shallow to accommodate electrical socket outlets. These have either to be located on the piers which has the effect of equipment requiring long electrical leads or positioning

the outlets on the bench top which reduces the effective work space.

The research laboratories were located in-board facing into the internal courtyards and again the large windows, separated by narrow piers, had the same detractions as described earlier.

Each of the north facing offices has one window and given the width of the offices the windows are set well apart from the other precluding any possibility of modification of the office geometry. Each office is 19m² in extent, which under normal circumstances is too large for one person but too small for sub-division.

Structural Module:

The column grids on the north south axis are 3,7m and in the east / west direction they are at 5,3m centres with the passages being 1,8m wide and flanked by columns. The regimented grid is very impractical, being too deep for an office on the one elevation, yet on the other, a functional depth for laboratory purposes.

The large windows to the laboratories permit little potential for sub-division of the space with one being restricted to the 3,7m structural module. Of all the buildings on the campus this has the least potential for major modification to variable sized spaces.

Services:

Electricity

This building is energised by the local authority supply which terminates at a miniature substation adjoining the building. An 11kVa cable links the miniature substation and the high voltage room in the basement. From the adjoining low voltage room a cable is taken to a three phase distribution board located in a service duct at each floor from where the power is distributed laterally to sub-distribution boards at the east and west sides of the building. The difficulties presently being experienced are that, due to the small diameter of the original conduits which are built into the structure, one is unable to upgrade cable sizes to meet the needs of research

equipment demands. Over the years a network of exposed power skirting has been installed to provide some flexibility in the location of power and Local Area Network points to the offices and laboratories. Being an add-on installation - implemented in 1990 - the power skirting is not an aesthetically enhancing feature of the building although care has been taken to minimise the visual impact.

Water

The water supply to the building is reticulated in the same service duct as the electricity but within a separate section for obvious reasons. The duct is located at the back of the building adjoining the teaching laboratories from where it is distributed laterally along the inside face of the external wall. To reach the research laboratories it rises vertically within the laboratories and crosses the passage where it is enclosed within the suspended ceiling and reappears in the research laboratories. Here again it is located against the external walls. The detracting aspect of this is that, until recently, these pipes were concealed by the cupboards below the benches housing chemical and loose equipment. This presented a maintenance problem should a leak occur. During the recent re-modelling programme all laboratories were gutted and fitted with modular laboratory unit that permitted easy access to the utilities.

Gas

The original building incorporated a gas reticulation system, the main supply of which was located on the internal face of the external south wall. In order to supply the bench top gas outlets a feed was teed from the main supply. From here the pipe was set into the screed and then rose up under the free standing bench and connected into the gas outlets. Isolating valves were also invariably difficult to access due to equipment and the situation became dangerous as the encased pipes began to corrode and leak. A new gas bank was constructed in the late 1980s and the distribution was upgraded and currently the entire gas reticulation is located at high level and all laboratories including those with free standing benches are fitted

with droppers to each bench and each laboratory has an isolating valve at the entrance to the laboratory.

Implementation of Changes:

(See Figures 4.31; 4.32; 4.33; 4.34 and 4.35)

Basement Meat Laboratory and Taxonomy Laboratory:

The Department of Dietetics and Home Economics was originally accommodated in one of the houses located on King Edward Avenue (described earlier). This was due to expediency since there was no other venue available for the new department. Once it was established that the most appropriate accommodation would be with the agriculturists it was decided to relocate them to the basement of the Rabie Sanders Building and whilst not ideal it was the only area where venues could be vacated.

The original design concept envisaged the Basement as the most suitable location for a taxonomy and anatomy laboratory / museum to house a collection of skeletons and embryo of various animals. Needless to say this sterile looking room was clad in white glazed tiles from floor to ceiling and the floor was covered in vitreous tiles for ease of cleaning.

Since available space was at a premium and the occupying department (under duress) having evaluated their usage of venues it was decided to vacate this laboratory and the abattoir (euphemistically referred to as the Meat Laboratory) across the passage. In due course the former laboratory was converted into offices since it was north facing albeit partly underground. The location of latter laboratory was in any case an emotive issue since the slaughter of animals within the confines of such a building was contentious one and well founded from a health regulation perspective. The conversion of the meat laboratory into a "laboratory" kitchen for the Home Economics discipline was an extensive one involving major demolition and drainage work as well as the sterilisation and de-contamination of the spaces. The walls and floor of this venue had to be

fully tiled; floors re-screeded and laid to falls to interior floor drains prior to the installation of preparation tops and a large extractor system over a cluster of cooking ranges.

Conversion of Biometry Laboratory to Student Computing Facility:

Upon the completion and occupation of the adjoining John Bews Complex a number of departments relocated to the Main Science Building owing to the integration of certain disciplines amongst them being Biometry, an inaugural department in the Rabie Sanders Building. Previously occupying two large laboratories on the third floor these vacated spaces were re-configured and converted into student computing facilities. Floors had to be fitted with anti-static carpeting and the area had to be air conditioned since the computers malfunctioned in environments where the temperature exceeded twenty three degrees Celsius. Due to aesthetic constraints and access for maintenance the units had to be carefully positioned and after having calculated their loading and weight distribution requirements a crane was hired to hoist and position the units on the roof above the recently vacated library. The ducting from the air conditioning units was located above the ceiling within the roof space void. With the recent demise of the main frame computers and not understanding the requirements for the design of personal computer workstations a lot of guesswork took place. This was followed by the installation of the units - long lengths of six hundred millimetre deep post formed "Formica" on mild steel framed legs at nine hundred millimetre centres. In due course the depth of the tops was found to be too shallow and the space allocated to each student too small to accommodate reference books alongside the computer. The cable reticulation system however was ideal. In recent times this facility has been upgraded and the only significant variation is that deeper worktops have been installed.

The Orchard Laboratory - Basement Conversion:

In 1984 a number of non-core agricultural departments were relocated to

the main Campus and to the Main Science Building in particular. This was done in order to consolidate the science disciplines and to allow for the expansion of the agriculture departments. The move made available for re-use large laboratories such as those previously used for the teaching of Biometry. Given the increasing usage of computers this space was reconfigured into a number of general computing laboratories for undergraduate and postgraduate students.

Notwithstanding this, there was still a shortage of large undergraduate teaching laboratories, particularly for the departments of Soil Science and Biochemistry. The dilemma was just how to create such spaces. An investigation was undertaken and this revealed that the only possible potential space was the basement where the air handling plant was located as well as the cavernous storage space housing ancient soil samples and other nefarious material. In general - a rabbit warren of unused voids rife with rising damp. Suspended from the soffit of the slab were a multitude for waste and supply water pipes and a spider web of sewer pipes.

Having observed this, the question of how was one to dispose of the waste water in the proposed new laboratory was posed. Added to this, there was limited access to the outside for the introduction of natural light and ventilation let alone for exhausts from fume cupboards and ovens (both essential features of any soil science laboratory). In addition to the above safety would be compromised, as there was no access to the exterior for emergency evacuation purposes. Various solutions to these matters were debated including the creation of an internal staircase that would present more problems than solving them. Careful measurements were taken in an attempt to establish exact wall and services positions and in the final analysis walls that formed dead ends were opened up and one was able to establish a clearer view of the whole picture.

Whilst one had access to the original drawings of 1950 these were no guarantee of accuracy and it was a case of trial and error. Relief came

when suddenly one was uncovering history - discovering unrecorded large main stormwater drains the inverts of which were three metres below basement level. As is usually the case it is the thoroughness of the investigative process that in the end pays dividends.

The planning proceeded and in the final design the space was effectively utilised to provide one major laboratory that could easily be divided into two with stations for fifty students in each. The solution was first to establish a space for the air conditioning plant room where there was easy access to the outside air. Next was to plan the sizes and levels of the a/c ducts. This was done by running the duct down the circulation / passage space which was to be against a side wall thereby allowing maximum laboratory bench space. These ducts were enclosed by a formed steel panel type ceiling with integrated lighting whilst the ceiling to the remaining space was exfoliated vermiculite sprayed onto the soffit of the slab. This provided an acoustic function and aesthetically created a contrast in colour to the walls and beams. With services crisscrossing each other the co-ordination of the services played a significant role in the project and required constant monitoring to ensure that no clashes occurred. A difficult job at best but when the ducts were three hundred to four hundred millimetres in diameter fractions counted. All specialist sub-contractors were required to submit shop drawings for checking prior to the fabrication of the components and this course of action paid handsomely.

The laboratories are totally artificially lit, ventilated and fully serviced with gas, water, fume cupboards that extracted to the outside air and access was from within the building allowing for each laboratory to have its own access when required. The solution involved the removal of the ancient and defunct air handling plant and all the sheetmetal ducting; the filling in and sealing in of the underground tunnel that traversed the building to ensure that no underground water migrated into the void. The rising duct that serviced the upper floors was sealed at each floor level to prevent the possible spread of fire. Even the raking soffit of the stairs above provided

an enclosure for the oven rooms but here the ducts required to extract the heat had to cross the main a/c duct located in the purpose-made steel panelled ceiling which was so articulated so to house light fittings. It was problems such as these that made the project a challenging one and even to this day these laboratories are the showcase of the building.

The Conversion of the Old Library:

This building originally had at first floor level a double volume library. At the time of the planning of the adjoining John Bews Complex (discussed earlier) it was resolved that the new building should house a Life Sciences Library. This would consolidate the book and journal holdings of the agricultural disciplines as well as those of botany and zoology. Having constructed and occupied the complex the university left the old library vacant until a decision was taken as how best to utilise the space. It seemed that every departmental head creatively mustered up an emotional motivation as to why his or her department would be the best recipient of the vacant space.

A decision was taken by the planning committee that the space should remain vacant until such time as its reallocation was essential and in due course this happened. It was decided that a multi-purpose Microbiology laboratory was required. This laboratory was to be used for both practicals as well as lectures and would need to be subdivided as and when necessary.

At the time of its original construction the main access to this library was from the first floor. Upon entering the space one was aware of the centrally positioned staircase that at mid height split in two directions each terminating at the surrounding cantilevered gallery. The tapered cantilever beams sprung from the columns positioned in the external wall resulting in a totally column free lower space that gave the library flexible area in which to house its book collection. All that was required was to remove the concrete staircase and install a floor in the left over void. The average unsupported span of which was a mere six metres. The solution was to install rolled steel

joists which would be bolted to the face of each cantilevered beam and then lay over these beams a galvanised mild steel permanent shutter onto which the reinforced concrete would be poured. A simple solution until the logistics of the operation were considered. The project would have to be undertaken during the vacation period as jack hammers would be used to demolish and remove the rubble of the staircase. Each beam to beam dimension was to be measured accurately leaving minor latitude for movement and wedging. The beams had to be craned up to this floor level and because of their length the crane would have to manoeuvre the beams through a window opening onto scaffolding erected below the existing void of the double volume. A system of steel pipes were used as rollers and the beams rolled into their final location, and where necessary jacked into position for bolting to the concrete. In due course the concrete slab was cast again using the crane technique of getting the concrete into the building. Integrated in the slab were ducts for power, gas and water supplies to the modular laboratory benches. As with the Orchard Laboratory this new conversion was equipped with air conditioning that was housed in a centrally positioned bulkhead.

Staff Tea Room Conversion:

The Staff Tea Room was deemed to be sacrosanct space where debates and transfer of information took place three times a day. This jealously guarded space was centrally located at second floor level and the ambience very institutional.

The windows were shielded against the sun by the deeply recessed wall over the main entrance, the floor finish was of Rhodesian teak parquet laid to a herringbone pattern. In order to accommodate a newly funded research programme studying Waste Disposal Technology this space was colonised. The parquet floors were lifted and the screed hacked off to eliminate the original bitumen adhesive. Coved skirtings were introduced at the time of re-screeded the floor slab and the whole covered in welded vinyl sheeting. The use of hardwood laboratory bench tops was a contentious issue

regarding the matter of sustainable forests etc. Hitherto iroko timber tops had been used on all laboratory benches. Eventually it was agreed that Eucalyptus Saligna would be used and treated with marine varnish to provide some protection against chemical attack. Finally the laboratory had to be provided with water, gas and waste water reticulation. This was to be a difficult since none was available in the vicinity. The gas installation presented the greatest challenge in order to comply with the stringent regulations.

The outcome was a very successful one being space efficient and very functional. Scientists other than the occupants, have visited and worked in the laboratory commenting approvingly on the facilities and the benefactor continued funding the research.

Reallocation of space:

In 2001 the university embarked on a programme of consolidation which resulted in a number of departments merging into a single School under the authority of a Faculty. The Life and Biological Sciences, most of whom occupy space in the Rabie Sanders Building had to develop new synergies which resulted in the need to amalgamate. Various space reallocation schemes were prepared and much debate followed. Finally agreement was reached, the proposal costed and presented to the Executive for approval and funding. The exercise affected the entire building and necessitated a large number of sequential moves by staff members from one office to another, possibly even to another floor and laboratories converted to suit the needs of the new occupants.

The preplanning that took place over many months identified many conflicting issues and potential problems that were addressed prior to the implementation of the programme. Given the proportion of the project this exercise took thirteen months to accomplish it required many diplomatic discussions to placate those who had occupied the same office for thirty years or more. Many of the laboratories remained unmodified since the

construction of the building and disgruntled staff were placated by the new modern facilities occasioned by this reallocation of space.

4.3.3.1.Changes in the 1973 to 1982 period: Refer to Floor Plans.

- 1 Conversion of former Records Room to Laboratory.
- 2 A new large lecture venue is constructed on the roof over the double volume vestibule. This has a light weight roof that initially presents water tightness problems.

Evaluation of Changes 1972 - 1983

- 1 The conversion of this utilitarian space has had a number of subsequent changes all of which have been functional. .
- 2 This lecture venue has solved the problem of lack of space for teaching rooms. Its disadvantages are: A light weight roof that is noisy during the rain; a floor to ceiling height that is too low in relation to its footprint, resulting in a spatially and acoustically incorrect volume.

4.3.3.2. Changes in the 1983 to 1992 period: Refer to Floor Plans.

- 3 Conversion of Meat Laboratory into Dietetics Laboratory.
- 4 Conversion of Animal Science Museum into Offices.
- 5 Conversion of old Dairy Laboratory to Home Economics Sewing Laboratory.
- 6 Conversion of Biometry Laboratory into Student Computing Laboratory and offices for a Water Research Unit
- 7 Conversion of Plant Room and voids into a teaching Laboratory
- 8 Adding a floor to the double volume space of the old Library and converting the space into Offices and Laboratories

Evaluation of Changes: 1982 - 1993

- 3 This proved to be a very costly project due to the extent to which one had to demolish existing finishes and services. The area had to be rendered sterile and hygienically clean after a being used as a Meat Laboratory or butchery.
- 4 A practical conversion that created additional offices..

- 5 This conversion has been a success given its spaciousness for the teaching of subjects such as dressmaking where large cutting tables are essential.
- 6 Initially not a very well detailed project due in the main to the narrowness of the worktops forming the computer stations. In a later upgrade this was problem was rectified and the venue is well utilised.
- 7 A very functional and successful conversion of space. Possibly the show piece of the building. Its only detractor being that this partly underground venue is without visual access to the outside. A fact which has not drawn any criticism from users.
- 8 This was a well constructed project making both floors functional. Unfortunately at the upper floor level where the laboratory is used for both teaching and practical demonstrations, the space is too large and requires the use of cameras and monitors for those students seated at the back of the venue to be able to see the demonstrations taking place.

4.3.3.3. Changes in the 1993 to 2002 period: Refer to Floor Plans.

- 9 Decommissioning of remaining Basement Plant Room and conversion to teaching venue.
- 10 Conversion of Staff Common Room into Waste Technology Laboratory.
- 11 Re-allocation and conversion of existing Offices, Laboratories and Lecture Venues throughout the building

Evaluation of Changes: 1992 - 2003

- 9 Like that described for item number 7 this old plant room was converted into a sophisticated teaching venue with sliding doors that open onto the adjoining internal courtyard. A user friendly and functional space for the Dietetics and Home Economics students who use the space for formal catering projects.
- 10 This has been a very well received, functional conversion that has received praise from the donor commissioning the research.
- 11 The reallocation of space and consolidation of Schools within the building like that for the New Arts building was emotive and initially criticised. Most of

the conversions and reconfigured laboratories have functioned well. Those venues that have evoked critical comment have been specifically been the spaces where there is an apparent congestion of post graduate students. These rooms have been fitted with carrels specifically designed for post graduate student accommodation and the notion that initiated this, was to provide research students with a base where they can write up research notes and house their other personal possessions.

4.3.4. New Arts Building

Context of the Development:

This building was constructed in the 1970's.

A modern modular building designed to be constructed using a precast concrete system of columns, beams and floor slabs. The building is well serviced with rising ducts strategically positioned within the building. (See Figure 4.36 and 4.37)

As the name suggests the disciplines of the Faculty of Humanities are housed here hence it is laboratory free environment making it comparable to that of the Old Arts Building in functional terms.

Introduction:

The University, upon acquiring the "Maritzburg Golf Course in 1969, set about the development of a number of buildings to satisfy the burgeoning demand for student places on the campus. A Master Plan for this new campus had already been developed by Professor Paul Connell and approved by the University Council. The briefing documents for the various buildings were produced between 1969 and 1971 with these buildings to accommodate the Faculties of Law, Commerce and Arts. The brief to the architects for the Education and Psychology buildings following later.

Design and Construction:

(See Figure 4.38; 4.39; 4.40; 4.41 and 4.42)

The New Arts Building was designed in 1973 by Small, Pettit and Baillon, a Pietermaritzburg firm of architects with the project being led by Gordon Small (1927 - 1995). Born in Scotland in 1927, he arrived in South Africa with his family at the

age of nine. He attended school in Durban and upon completing his schooling, joined the army. After being demobilised in 1945 he enrolled at the University of Natal to study architecture and in 1948 was awarded a Certificate of Architecture. He commenced practising architecture in Pietermaritzburg in 1958 and in 1964 was joined by Eric Pettit. The two architects complemented each other, each having differing strengths of expertise and together they developed a practice well known for its sound and innovative architectural design. The group of four buildings on the Pietermaritzburg campus, of which the New Arts Building is one, are amongst the legacies of this practice as is the new Supreme Court Building in the city. As an innovative converter of buildings Gordon Small was responsible for the re-cycling of the landmark Schlesinger Tudor Playhouse, later to become known as the Natal Playhouse in Durban. At much the same time he was commissioned to undertake the conversion of the Old Supreme Court into the Tatham Art Gallery. These and other local buildings bear testament to the talents of this practice. In due course Gordon Small became President-in-Chief of the South African Institute of Architects and was later awarded their gold medal for his outstanding contribution to the profession. (*KZNIA Journal*; 3 / 1995; p 9)

The Site:

The building is located on what is referred to as the Golf Course Campus which is separated from the Main Campus by two intersecting suburban roads and is approximately four kilometres from the city centre.

Topography:

The site has a gradual east to west slope whilst it falls considerably from north to south. The building north / south orientated and is positioned midway on upper and lower platforms.

Geomorphology:

The site comprises very little top soil and is underlain with deep shale.

Extent:

The main building is 10 647m² in extent and comprises a lower ground, ground,

first, second and third floors with an adjoining wing of a lower ground and ground floor levels which houses an experimental drama theatre and attendant rooms and workshop. To the east is a freestanding yet loosely attached tiered lecture theatre.

Structure:

The building is a precast concrete framed structure. All concrete has an off-shutter finish for aesthetic and functional reasons. The externally located twin columns, set on a four metre module, constitute a major feature of the building by accentuating the vertical articulation and giving balance to the length of the structure. The internal and external columns have splayed haunches to support the precast beams. The internal columns are off-set to the corridor.

The roof over the third floor is a combination of a waterproofing membrane on a "Heraklith" substrate on a mild steel structure laid to a slight fall to the centrally located concrete box gutter. This drains to rainwater pipes positioned within the ducts referred to earlier. In order to provide natural light into the "deep" interior spaces of the third floor, the roof pitches locally to shelter high level windows.

All walls at ground and lower ground floor levels, including the drama theatre, service room and lecture theatre are constructed in terracotta facebrick which provides a contrast to the off-shuttered concrete.

External Character of Building:

The New Arts Building takes the form of a rectangular four storey building, widest at the top and diminishing in width to the ground floor. The building has a very strong horizontal emphasis created by the continuous line of recessed louvred windows, presenting a heavy dark band, which are set on deep off-shutter concrete beam cum window cills. Twin columns, seven hundred and fifty millimetres apart on a four metre module, have a complementary yet contradictory emphasis to the horizontality of the "window cill" beam which ties the structure together. The well proportioned and detailed timber framed windows are a feature of the lower floor levels and entrance vestibule. The remaining windows - which predominate - are aluminium framed glass louvred type. Due to the height and

exposed position of the building these windows are not functional since the building is subject to significant negative and positive pressures which result in dust and rain migrating into the building between the louvre blades even when in the closed position.

Adjoining the main building yet integrated are a number of separate structures one of which is the aptly described "Hexagon" theatre complex as this building is eight sided with battered facebrick walls which are capped by a off-shutter concrete perimeter compression beam. This is profiled in a "U" to form a box gutter and to some degree conceals the roof. The low pitched copper clad roof is supported on "Heraklith" woodwool insulation which rest on mild steel purlins and lattice structures that incorporate theatre lighting gantries.

The "Broadwalk" is the name given to the main pedestrian walkway, paved in ceramic tiles and linking the New Arts Building to the Commerce and Law buildings, and is in fact the top of a very large underground tunnel accommodating the common services as well as the air conditioning plant for the "A1" Lecture. This facility was one of the prescribed requirements set out by Professor Paul Connell in his briefing document to the architects of the project. Having this service duct has been most fortuitous, since over the years additional cables and pipes have been fixed to the walls with hangers and brackets negating the need to excavate trenches around these buildings into which sleeves would have been laid to take the necessary services into the buildings. This also acts as a return air plenum from the "Hexagon" theatre to the main air conditioning plant room.

On the opposite side of the building facing east is the large "A1" lecture venue. This facebrick building was designed as a "pod" attached to the side of the main building. The design concept indicates the long term proposal of adding a number of similar pods to the building thereby developing a lecture venue complex accessed externally. Presently a number of disciplines are conducting evening classes and having facilities that are self contained and do not compromise the security of the main building is a decided advantage.

Internal Character of the Building:

The extent lower ground floor to the main building is limited to the south entrance lobby and vertical circulation core. This entire area is constructed in off-shutter concrete, including the lift shaft, and all elements of the stairs are of precast concrete. To the one side of the building at this level is an access point into the "Hexagon" theatre complex via an angular stair which is also in-situ concrete.

The ground floor of the main building comprises large circulation space, the exception being an enclosed formal entrance on the north which embodies the vertical circulation facilities. Also at this level are the student toilets, cafeteria and congregating area.

The first floor is dedicated to teaching spaces on the east and west sides of the wide central corridor and the staff common room at the extreme north end.

The second floor has a three metre wide central corridor with venues of varying capacities allocated to lecture and seminar activities. Positioned at the extreme north end are five computing venues with capacities varying from two to fifty stations. The south end is the domain of an academic discipline. Both of these ends node are self-contained zones and have controlled access. The internal walls of all rooms, including the corridor, are constructed in facebrick for low maintenance purposes. The well detailed door and continuous top light frames are in varnished hardwood whilst both sides of the solid core flush panel doors are covered in contrasting white "Formica" for low maintenance. The top lights are fitted to the top of the walls either side of the corridor to allow the penetration of natural light into the corridor. This detail is typical to the first and second floors.

The floors to offices, lecture and computer venues as well as corridors throughout the building are carpeted in "Floatex", an imported floor covering material that has been in place for thirty years and showing very little sign of wear. This in itself was a sound long term investment.

The third floor being the widest comprises three zones and it is there that one

would find a concentration of offices. Some being located on the east and others on the west sides with the remaining internal deep space zone being taken up by seminar room and service rooms. These rooms are top lit by high level windows described earlier. Being centrally located these rooms may be accessed from either corridor. Midway along the west corridor is a open staircase linking the third and second floor levels. This no doubt was to shorten the distance that staff have to walk to the lecture rooms on the floor below, since the greatest detractor of this design is the location of the main vertical circulation routes being relegated to the extreme north and south ends of the building making the corridors very long. In addition to the main vertical circulation routes the building has enclosed and well located fire escape stairs at the extreme ends of the building and one centrally located.

The attached "Hexagon" building is a facility used by the Drama Department as a teaching laboratory and one where the public can review the students public performances. This theatre is entered from a ground floor lobby and the mobile seating units are tiered down to lower ground floor level where the "playing" floor is located. Being an experimental theatre, the subject on which the architect was a specialist, there is no formal stage as the mobile seating is in the "round" and looks down upon the players. At the same lower level are to be found the Green Rooms, Dressing Rooms, toilets and double volume workshop as well as a minor intimate theatre. The floor above accommodates the specialist areas including Costume Making Room, Fitting Rooms, Costume Store, Sound Recording Studio and Control Room.

Linking the "Hexagon" complex to the main building at second floor level is a tubular "skywalk" constructed in clear curved "Perspex". This was occasioned by the fact that originally the offices of the drama teaching staff were at this level and gave direct access to the theatre area.

Climate Control:

The building relies on natural ventilation in the majority of spaces including lecture venues the exceptions being the "A1" lecture theatre and the "Hexagon" Theatre

and Sound Recording Studio. The lecture theatre and "Hexagon" complex each have their own localised plant rooms to reduce loss of volume and length of insulated ducting. The plant room to the "A1" lecture theatre is located directly under the raked concrete tiers and within the tunnel described earlier making for a very economical installation in terms of the ducting requirements. A different solution was adopted with regard to the air conditioning of the "Hexagon" complex. Here the main plant room is located distant from the venues it serves, however the air is ducted to the theatre and sound recording studio, and returned to the plant room in a masonry plenum within the underground tunnel.

Function:

An academic teaching complex comprising offices and lecture venues for the Humanities disciplines incorporating specialised and public venues for performances by the Drama Department. The building is also used on Saturdays by student organisations engaged in school subject coaching outreach programmes and similarly a number of programmes are directed at part-time students who attend lectures in the evenings and who also require access to cafeteria facilities.

Due to public engagement within the building careful planning and control of access to the facilities was required.

Services:

Electricity

This building is the location for the High Voltage and Low Voltage equipment servicing this section of the Golf Course campus. The distributing cables are ducted from this facility to the large rising ducts strategically located within the building. These ducts are generally accessed off the landing to the stairs at each floor level and the power and computing cables are contained within power trunking integrated in the concrete window "cill". Initially the trunking was single compartment since computer networking was not of concern in the early 1970s, and the conversion to three compartment trunking presented a challenge due to

the increased size. The greatest obstacle was extending the trunking across the stairways since the floor finish and stair treads at this point are ceramic tiled. Eventually it was decided to fix the trunking vertically in the corner of the rooms adjoining the stair and cross over against the soffit of the slab over.

Water:

The distribution of water within the building is concentrated in specific areas such as toilets and kitchens and these are located one above the other in all cases as are the fire hose reels. All piping is exposed in rising ducts ensuring easy access for maintenance purposes and the facilities referred to previously back onto the ducts.

Implementation of Changes:

(See Figures 4.43; 4.44; 4.45; 4.46 and 4.47)

Changes in the 1973 to 1982 period: Refer to floor plans.

- 1 Nil

Changes in the 1983 to 1992 period: Refer to floor plans.

- 2 The offices allocated to the Drama Department had been designed so as to permit them to perform a dual teaching and office function. With space becoming a premium these rooms had to be divided. To achieve this the party wall between two offices was demolished and two new walls constructed in facebrick to match the existing, so forming three offices of reduced area.
- 3 A number of seminar room have been partitioned creating a lobby and two offices off the lobby.

Evaluation of Changes: 1983 - 1992

- 2 These rooms were previously for both teaching and as staff offices. The lecturers were encouraged to hold the Drama practicals in the "Hexagon" theatre thus enabling the university to create smaller offices.

- 3 This sub-division of the original space created a suite of rooms that provided a self contained entity for the tenant users.

Changes in the 1993 to 2002 period: Refer to floor plans.

- 4 This was the era of reallocation of space throughout the campus resulting from the merging of Departments and the subsequent creation of Schools. The final plan required the move by a number of departments (now called Disciplines) from one building to another in order to consolidate the various Schools. As the school with the largest number of disciplines it was logical that the School of Human and Social Studies be accommodated within this building which it had to share in part with the School of Business.

This exercise required providing offices of similar size for all occupants within the constraints, in so far as possible, of the existing sub-division of spaces over the three floors. The notion of retaining the original character of the building by constructing new facbrick party walls between offices was abandoned. This decision was influenced by constraints of timing - the entire project had to be completed within six weeks over the Christmas vacation - furthermore the extent at which changes occur within the university meant that dry-walling partitioning was the preferred solution.

Evaluation of Changes: 1993 - 2002.

- 4 These conversions and adaptations have in the main been successful although the staff had to contend with smaller yet well configured offices with the exception of the School of Theology where additional staff, over and above those allocated and approved by the university, have had to be congested into very small spaces. The building is now at a point where no further adjustments can be entertained due to there being no further space available for colonising. Forward planning is now requiring serious consideration.

4.3.5. Case Study Conclusions.

The buildings examined in this study were found to have divergent characteristics which in turn affected their ability to withstand changes or adaptations as demanded by the institution in its attempt to accommodate expanding needs.

The graphical models (Figure 4.48 & 4.49) track the extent to which the buildings were subjected to adaptive re-useage over three decades and one should note that three of the buildings, namely the Old Arts Building, the Main Science Building and the Rabie Sanders Building, had significant additions or extensions made prior to the period under review . These however are not evaluated in this study.

The Old Arts Building (1912):

A Pavilion Style building constructed in load bearing brickwork. The design is formal with well defined main and secondary entrances. The “front” has a strong, “ceremonial” and symmetrical facade and is a building that represents “The University” in the public eye. Its elevations dictate the configuration of the interior space (in a similar way, to the strong classical theme of the original Hawthorn Building at De Montford University - Leicester).

Its high ceilings and internal courtyards ensure that the building remains cool and well ventilated, without the assistance of air conditioning, in the hot and humid climate of Pietermaritzburg.

The building is poorly provided with ducts or facilities for incorporating infra-structural services into the building which is an advantage in respect of the retention of its character.

This rigid building has withstood internal alterations over the decade and in-spite of these has maintained its integrity and dignity, evidence of a true “landmark” building. The potential for extending the building was acknowledged when in 1937 an additional wing was constructed to its rear

elevation. Thus, in considering the variety and extent to which changes have taken place, one concludes that its potential for adaptive reuse, whilst retaining its design integrity, is good.

The Main Science Building (1948):

This is a building that reflects no particular style is of a framed reinforced concrete construction with in-fill face brick. The amorphous “E” plan form has “wings” projecting on either side of the main circulation core which have the effect of divorcing those spaces from the body of the building impacting on the potential for interactive discourse between staff and students. Another accretion is a two storey fan shaped building housing a large lecture theatre and Council Chamber.

The elevations all vary in character with no particular “reference” to each other and there are no formal or well defined main and secondary entrances with the result that the building does not have an acknowledged “front”. It is acknowledged that many visitors have difficulty identifying an access point to the building.

The north elevation however is modular thus permitting the sub-division of the spaces without affecting the exterior. The high ceilings of the lower floors assist with maintaining temperate internal conditions whilst the third floor is extremely uncomfortable in summer due to the low mono pitched roof concealed behind a parapet wall. The lecture venues and offices located on the west side of the building are uncomfortably hot in the afternoons hence precluding the effective usage of those spaces.

This was the first building to be designed for vertical expansion as decreed by the University Council in 1947. This building has been the one to have undergone extensive modification over the three decades. It has experienced significant internal and external changes and due to these its character has been compromised. The provision of ducts for integrating

cables and accommodating services is poor although the extent of false ceilings does to some extent ameliorate the position.

It is interesting to note the universal consensus that buildings of the 1950 - 1960 era are subject to maximum change in character due to the transition of design and construction capacity. Whilst recognising its capacity to change, the university has to accept the consequential impact of the degradation its facades in an architectural context. A fact that should not be disregarded lightly.

Rabie Sanders Building (1952):

A stylistic "Pavilion" building in concept, with two internal courtyards and two storey projections on all four corners, constructed in famed reinforced concrete with in-fill face brickwork. Its design is formal with a contrasting plinth and well defined main and secondary entrances. The "front" facade is symmetrical around a triple volume columned entrance and is a building that in a way represents "The University" albeit a structure that is removed from the perceived "main" campus.

Due to its high ceilings and internal courtyards the building remains cool and well ventilated, however the exposed north elevation with its dark face brickwork absorbs the radiant heat resulting in the building requiring the air conditioning of certain areas during the hot and humid summers.

The building is poorly provisioned with vertical ducting or suspended ceilings making the distribution of services extremely difficult, in some cases resulting in the defacing of the interior.

The building was extended vertically by an additional floor in 1958 and this has, to some extent, a detracting effect on the building. The shape precludes any lateral extension of the building and considering the variety and extent to which changes have taken place, one has established that its potential for adaptive reuse, whilst retaining its design integrity, is good.

New Arts Building (1973):

An award winning modern building constructed in precast reinforced concrete with continuous bands of modular windows. The design is a linear one on an east west axis and its main and secondary entrances are well defined. Given the elevated location of this landmark building ensures that it represents "The University" in the public eye.

The changes to the internal spaces has had no effect on the elevations due to the modular fenestration making it a very flexible building. Even though it has high ceilings the orientation is such that many of the west facing offices are uncomfortable in the afternoons and require air conditioning. The integration of split air conditioning units into the building is impossible without compromising the design integrity.

The structure is well provided with large vertical ducts and power trunking - a feature of modern buildings which facilitate the distribution of cables required in this era of rapidly changing technology.

The building has been subjected to a number of internal alterations over the three decades of its being, and given the structural dictates there is no potential for extending the building, the University is ensured that the design integrity will be maintained. In contrast, there is the possibility of adding a number of additional freestanding lecture pods at ground level to the east elevation alongside the existing "A1" lecture theatre. These will be accessed from the student "congregating" area at ground floor level and would be an asset to the institution by relieving pressure on the already heavily occupied building.

4.3.5.1 Assessment of Building Typology:

In summation, one concludes that buildings planned as complete compositions are in themselves difficult to extend whilst a building with potential for growth is more likely to be subjected to change and by any

number of changes and suffer a loss of identity as a consequence. Anonymous buildings are able to expand the easiest and present the institution with an economic investment but in many instances, at the loss of architectural status.

The continued development of university buildings as freestanding entities has an architectural advantage however this may be at the expense of a cohesive and unified campus. A campus, by its very nature, is a microcosm of the urban environment and it is essential to create a sense of unification through the proximity of the buildings and their relationship to each other. Where this is not possible due to historic developments, an option of ensuring that buildings embrace each other is by a common thread such as paths and landscaping and every new project should have a landscaping component factored into the budget.

Chapter 5

5.0. Conclusions

Any comparison between commercial buildings and those serving an academic endeavour can be misleading if not fallacious yet the two should be considered the two as one from a built environment perspective.

5.1. Universities in General:

From the descriptive evaluation of the cycle of adaption indicated in the previous chapter there is clear evidence that most university buildings do indeed have the capacity to change with some having a greater capacity to change than others. As reflected in the investigation, primary factors that permit ease of adaption are; structural modules, widths of each floor, the aspect of the building, climate control, size and location of windows especially to laboratory areas, location of the passage in relation to the column positions and the siting as well as accessibility of service ducts. Secondary factors include the loose modular fittings, especially in the domain of laboratories, reticulated laboratory services, access to each floor by immobile persons and for the delivery of goods or equipment.

Notwithstanding the age or nature of the buildings that have to undergo a make-over there has to be a paradigm shift with regard to the re-configuration of existing university buildings. For too long institutions have simply opted for make-do's but in an age of concern they have to take into consideration the environmental impact of their decisions and in many instances society looks to the universities for innovative thinking and application and even more so when the physical, such as a building, is the subject of concern.

University buildings by virtue of the equipment located within are high energy users and one has to be cognisant of the capacity to load-shed when power peaks

are being reached. The designs of new buildings should incorporate low energy or passive techniques for ventilation or cooling and lighting. This feature of natural ventilation was evident in the buildings of the universities of Oxford and Cambridge where the internal "Courts" or "Quads" are iconic. Often the buildings had covered walkways or corridors as a transition between the interior and the exterior, which in turn gave access to the courtyards. The disadvantage of the courtyard surrounded by open colonnades example is the noise factor of voices from below that migrate with the air movement. An effective feature of the older buildings, examples being the Old Main Building and Rabie Sanders Building, is the internal courtyard system which induces the movement of cool air through the building. This convection air approach is an ancient technology and one that is used extensively in the villages of North Africa and the Middle East. Recently a number of buildings have emulated this technique by incorporating chimneys into the design and an effective example is the Queens Building at De Montford University, Leicester Campus.

The transfer of radiant heat and traffic noise into the building are issues that need to be addressed. Similarly the choice of materials and how these impact on the functionality of the building is of vital importance especially in the realm of ongoing and long term maintenance.

The horizontal and vertical reticulation of services are imperative design matters and the need for these to achieve optimum flexibility is paramount.

To compare the flexibility of buildings is in itself not sufficient to glean experience for future commissions, it is to understand and to assess the functionality of earlier design decisions. The architect should be briefed on past experience of users occupying similar buildings and this evaluation can be the subject of a Workplace Performance Survey (Duffy, 1997: 228) to be undertaken at pre-design stage where short comings as well as benefits can be identified. The questions embodied in this survey will range from lighting levels, furniture to staff performance levels. It is the author's opinion that once a building has been occupied it should be beholden upon the project architect to undertake a Post

Occupancy Evaluation Survey (Preiser, 1988: 17) where impartial and honest feedback is documented regarding the performance of the completed project in relation to the expectations of the users. This evaluation is done using carefully worded questionnaires, interviews with end users and physical inspections. These surveys are imperative in developing a sound knowledge, understanding of the performance and usage of differing buildings for the edification of both the client and architect.

With regard to the *modus operandi* of university office, teaching and research accommodation, for too long the traditional academic has been entrenched in the aura of a large book lined study where a cluster of students “kneel at the feet of the master” and ingest all that is said. Recognising that space is expensive, it must be effectively utilised in the creation of functional offices and teaching spaces. It has been the authors experience that a well designed and well configured university office dedicated to one occupant and a visitor need be no larger than ten square metres. Well designed and fitted teaching venues having good sight lines and acoustics can be space efficient and flexible offering varying seating layouts. In an era of interactive learning the shift is away from the large formal lecture facility to venues where the space is variable by the sub-division of bigger spaces.

5.2. University of Natal:

Presently the University of Natal comprises four campuses namely, the Howard College Campus and the Nelson Mandela Medical School located in Durban, The Edgewood Campus - Pinetown - which is dedicated solely to the teaching of Education and finally the Pietermaritzburg Campus. What has been described in the preceding chapters is the University of Natal - Pietermaritzburg Centre as at 2003. However the University of Natal finds itself at the cross roads of its history as it embarks on a merger process with the University of Durban-Westville, a process that will, on the 31st December 2003, see the end of the two Universities as they are currently constituted. As with all consolidation experiences these

shifts in structure result in added pressure on physical resources. Whilst the three campuses making up the Pietermaritzburg Centre and its buildings will remain, it is speculated that certain faculties and disciplines will change thus the buildings will experience further adaptive re-use undertakings in the near future.

Even though the future is uncertain the buildings on the campus comprise a significant investment of approximately R185, 000, 000 and have to have a sustained level of acceptable preventative maintenance. The buildings reflect the university no matter what the name and their integrity must be retained. To ensure the implementation of this process, a dedicated local architect, sensitive to the nature, functionality and aesthetic of the buildings should advise on all modifications and additions. It is trusted that this document may in a way serve as a guide line to those who are to be accorded this privileged.

5.3. The Future University:

What of the university of the future? In 1997 Peter Drucker, an American futurist predicted that by the 2027 there will no longer be any large university campuses as we know them (Hirsch and Weber, 1999: 4). Some believe the conventional universities will not survive the changes and their buildings will be quite unsuitable. There is already a significant growth in global distance learning institutions with lectures being delivered via correspondence, the internet, satellite or even two way video. With the decline in public funding of universities (54% of income is derived from government in South Africa, whilst some Canadian universities only receive a 45% subsidy from their government) so the institution of learning has become a serious business, a fact substantiated by the advertisements in newspapers, with universities offering internationally acceptable certification.

However, what of the research element of universities. This too is taking on a new dimension with many institutions developing self sustaining Centres of Innovation that are attracting substantial contracts, to the point where large buildings have been constructed to accommodate those engaged in advanced technology

research. These organisations are entering into joint ventures enterprises as well as commercialising and marketing the university owned intellectual property in order to realise royalties and licence fees.

There to, is an increasing trend towards what is referred to as "mode 2 knowledge production". Here the shift is away from discipline specific research by core research units and moving to research being conducted by inter-disciplinary teams. Immediately this has planning implications as it will impact on the siting and equipping of laboratories as well as the service areas and workstations for those engaged on the research. What is ideally required is the provision of "unified facilities that encourage interaction and interdisciplinary discovery" (Stephens, 2000: 25). This is echoed by Anthony Blackett when he refers to the need for future spaces as being "fluid and being able to respond to the full range of potential technologies". (Blackett, 1998: 30)

What is clear is that, whilst universities are unable to predict the future designs of their buildings, they must ensure that all developments are sufficiently adaptable to adjust to unknown future space demands and the integration of rapidly advancing technology.

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PROPOSED NEW UNIVERSITY COLLEGE

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2. A premium of £250 is offered for the design which may be placed first, and further premiums of £150 and £50, respectively, for those placed second and third.

The premiated designs will be selected by the Government, who will be assisted in their selection by the Superintendent of Education, and the Chief Engineer, Public Works Department.

The decision of the Government will be final.

3. The three premiated designs, together with the reports and estimates, shall become the absolute property of the Government to be carried out departmentally without further reference to the author, or otherwise as the Government may deem fit; and the Government shall be at liberty to make any use that it may think proper of any of the premiated designs in the design which may be carried out.

4. In the event of the author of the design placed first, being required by the Government to proceed with the erection of the building as Architect, he will be paid for his services by a commission calculated at the rate of five per centum on the amount of the cost of the erection of the building, and he will be required to enter into an agreement with the Government, to be prepared by the Secretary, Law Department, setting forth the terms of his engagement, which is to contain any reasonable conditions which the Government may deem necessary or advisable.

The commission named, will be the Architect's sole remuneration and will include all professional charges and expenses in connection with the design, superintendence, travelling, office expenses, stationery and printing.

Should the selected Architect be unable, during the erection of the building, to reside within a distance satisfactory to the Government, the Government shall have the right to insist upon the appointment of a competent Resident Architect to supervise the work at the sole cost of the Architect. Such appointment to meet the approval of the Government.

The premium of £250 awarded to the author of the design placed first, will, in the event of his being engaged as Architect, merge into the foregoing five per centum commission.

All Plans, Drawings, Specifications, Bills of Quantities (if any), Measured Bills, and other documents of whatsoever kind, prepared by the Architect who may be employed as above set forth, in connection with the carrying out of the works, shall become the absolute property of the Government, the same to be handed over to the Chief Engineer, P.W.D., immediately on the completion of the works.

Should the Government decide to supervise the erection of the building departmentally, the author of the design will, in addition to the premium, be paid a commission of 2½ per centum of the estimated cost, for complete approved working drawings and specifications.

5. The Government reserves the right to appoint a Quantity Surveyor, if necessary, as also a Clerk of Works, and the Quantity Surveyor's fees and the Clerk of Works' salary will be paid by the Government.

6. Until the award has been given officially, no drawings, photographs, printed, written or other matters or statements descriptive of, or alluding to, any of the competitive designs shall be sent to any member or official of the Government, or the public, nor shall there be any canvassing of the Government or officials connected therewith, in favour of any particular design. The design of any competitor violating these conditions will be forthwith excluded from the competition.

7. The Government reserves the right to publicly exhibit, for a period not exceeding one month, all designs and supporting documents submitted in the competition, but will not do so until the award has been officially made public.

8. Each intending competitor, on payment of one guinea deposit fee, will be supplied with a copy of these conditions and instructions, with schedule of accommodation required, together with site plans and an official envelope into which he must put his name and address, also a declaration that the design is his own work, and that the drawings, etc., have all been prepared under his personal supervision. This envelope must be sealed and returned in the same case with his design and other documents enumerated below. The deposit will be refunded to each actual competitor after the awards have been officially made public, or upon the return of these documents, if the competitor declines to compete within one month after their issue. Copies of the conditions may be inspected at the places advertised free of charge.

9. Each set of drawings submitted for competition, together with all supporting documents, including the author's name and address sealed up in the envelope as explained in the preceding clause, must be packed in one case, such case to be labelled "Competitive Design," addressed to the Chief Engineer, Public Works Department, Pietermaritzburg, and delivered, free of charge, on or before Monday, the eighth day of November, 1909.

No name, motto, handwriting or signature, device or distinguishing mark of any kind whatever which might lead to the identification of the competitor, is to be put on any of the drawings, supporting documents, sealed envelope or case, either by the competitor or his agents. When each case is unpacked, it and its contents, together with the sealed envelope, will be marked by the Government for identification.

The designs of the unsuccessful competitors will be returned to their respective authors free of cost.

10. All enquiries relating to the competition will be answered, as far as practicable, by the Chief Engineer, Public Works Department, Pietermaritzburg, to whom they must be addressed direct, and a copy of the questions and answers will be sent to each competitor. No enquiries received later than Monday, the 4th October, 1909, will be answered.

11. The following drawings, etc., will be required:—

- (a) A Plan of each Floor, $\frac{1}{8}$ inch scale.
- (b) Four Elevations, $\frac{1}{8}$ inch scale.
- (c) Two Sectional Elevations, $\frac{1}{8}$ inch scale.
- (d) One Sheet of Details of Main Front, $\frac{1}{2}$ inch scale.
- (e) Perspective View.

12. The above drawings are to be executed on double elephant size sheets of white drawing paper, mounted on pine stretchers, which must be of an uniform size of 3 feet 6 inches by 2 feet 6 inches, and without framing or glazing.

13. The drawings to be in black ink, without colour, etching, or shading of any description, except a flat wash of black ink in openings, doors, windows, etc., and a thick ink line to one edge of projections in elevation. All lettering must be in plain upright block characters in black ink.

All walls in section are to be blackened.

The perspective drawing only, may be finished in any way the competitor desires.

The dimensions of all rooms, corridors, etc., must be figured on the plans and sections.

14. All reasonable care will be taken of the drawings and supporting documents, but the Government will not hold itself responsible for loss or injury to same, from whatever cause arising, while in its charge or in transit.

15. Accompanying the design of each competitor, estimates of the cost of the works must be submitted, giving the details of how such estimates of cost are arrived at, cubing prices and dimensions, and method of arriving at same.

The maximum cost of the Building may be taken at £30,000, inclusive of heating, Grinnel sprinkler installation, electric lighting, and all sanitary fittings, with water carriage drainage to King Edward Avenue, but only such fixtures and fittings as may be considered integral portions of the scheme.

A typewritten specification or description is to accompany the estimates, explaining the construction, materials, system of heating, lighting, ventilating, etc., proposed to be adopted. A schedule giving the area and position of each apartment must be attached to the specification.

Both the estimate and specification are to be typewritten on white foolscap size paper.

J. F. E. BARNES,
Chief Engineer, P.W.D.

Pietermaritzburg,
August, 1909.

Natal University College.

Testimonial.

This is to certify that

Mr R.E. Geddes

acted as Clerk of the Works for the Natal University College. The foundation stone was laid on December 1st. 1910, by His Royal Highness, the Duke of Connaught, K.G. etc., and the building was opened on August 9th. 1912, by the Honourable F.S. Malan, Minister of Education for the Union of South Africa.

Mr. Geddes has carried out his duties to the entire satisfaction of the Architects, who have always found him courteous, and attentive to his work. He has a sound practical knowledge of Building Construction in all its branches and the manner in which he has supervised the erection of this important building reflects the care and ability he exercised in his capacity as Clerk of Works.

We are certain that Mr. Geddes, when engaged on other works, will carry out his duties with credit to himself and satisfaction to his employers.



Tully Waters Cleland &
Pentland Smith.
Architects

J. Collingwood Tully, F.R.A.S.
Resident Architect

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The decision of the Government will be final.

3. The three premiated designs, together with the reports and estimates, shall become the absolute property of the Government to be carried out departmentally without further reference to the author, or otherwise as the Government may deem fit; and the Government shall be at liberty to make any use that it may think proper of any of the premiated designs in the design which may be carried out.

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Should the Government decide to supervise the erection of the building departmentally, the author of the design will, in addition to the premium, be paid a commission of 2½ per centum of the estimated cost, for complete approved working drawings and specifications.

5. The Government reserves the right to appoint a Quantity Surveyor, if necessary, as also a Clerk of Works and the Quantity Surveyor's fees and the Clerk of Works' salary will be paid by the Government.

6. Until the award has been given officially, no drawings, photographs, printed, written or other matters or statements descriptive of, or alluding to, any of the competitive designs shall be sent to any member or official of the Government, or the public, nor shall there be any canvassing of the Government or officials connected therewith, in favour of any particular design. The design of any competitor violating these conditions will be forthwith excluded from the competition.

7. The Government reserves the right to publicly exhibit, for a period not exceeding one month, all designs and supporting documents submitted in the competition, but will not do so until the award has been officially made public.

8. Each intending competitor, on payment of one guinea deposit fee, will be supplied with a copy of these conditions and instructions, with schedule of accommodation required, together with site plans and an official envelope into which he must put his name and address, also a declaration that the design is his own work, and that the drawings, etc., have all been prepared under his personal supervision. This envelope must be sealed and returned in the same case with his design and other documents enumerated below. The deposit will be refunded to each actual competitor after the awards have been officially made public, or upon the return of these documents, if the competitor declines to compete within one month after their issue. Copies of the conditions may be inspected at the places advertised free of charge.

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No name, motto, handwriting or signature, device or distinguishing mark of any kind whatever which might lead to the identification of the competitor, is to be put on any of the drawings, supporting documents, sealed envelope or case, either by the competitor or his agents. When each case is unpacked, it and its contents, together with the sealed envelope, will be marked by the Government for identification.

The designs of the unsuccessful competitors will be returned to their respective authors free of cost.

10. All enquiries relating to the competition will be answered, as far as practicable, by the Chief Engineer, Public Works Department, Pietermaritzburg, to whom they must be addressed direct, and a copy of the questions and answers will be sent to each competitor. No enquiries received later than Monday, the 10th October, 1909, will be answered.

11. The following drawings, etc., will be required:—

- (a) A Plan of each Floor, $\frac{1}{8}$ inch scale.
- (b) Four Elevations, $\frac{1}{8}$ inch scale.
- (c) Two Sectional Elevations, $\frac{1}{8}$ inch scale.
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All walls in section are to be blackened.

The perspective drawing only, may be finished in any way the competitor desires.

The dimensions of all rooms, corridors, etc., must be figured on the plans and sections.

14. All reasonable care will be taken of the drawings and supporting documents, but the Government will not hold itself responsible for loss or injury to same, from whatever cause arising, while in its charge or in transit.

15. Accompanying the design of each competitor, estimates of the cost of the works must be submitted, giving the details of how such estimates of cost are arrived at, cubing prices and dimensions, and method of arriving at same.

The maximum cost of the Building may be taken at £30,000, inclusive of heating, Grinnel sprinkler installation, electric lighting, and all sanitary fittings, with water carriage drainage to King Edward Avenue, but only such fixtures and fittings as may be considered integral portions of the scheme.

A typewritten specification or description is to accompany the estimates, explaining the construction, materials, system of heating, lighting, ventilating, etc., proposed to be adopted. A schedule giving the area and position of each apartment must be attached to the specification.

Both the estimate and specification are to be typewritten on white foolscap size paper.

J. F. E. BARNES,
Chief Engineer, P.W.D.

Pietermaritzburg,
August, 1909.

Natal University College.

Testimonial.

This is to certify that

----- **Mr R.E. Geddes** -----

acted as Clerk of the Works for the Natal University College

The foundation stone was laid on December 1st. 1910, by His Royal Highness, the Duke of Connaught, K.G. etc., and the building was opened on August 9th. 1912, by the Honourable F.S. Malan, Minister of Education for the Union of South Africa.

Mr. Geddes has carried out his duties to the entire satisfaction of the Architects, who have always found him courteous, and attentive to his work. He has a sound practical knowledge of Building Construction in all its branches and the manner in which he has supervised the erection of this important building reflects the care and ability he exercised in his capacity as Clerk of Works.

We are certain that Mr. Geddes, when engaged on other works, will carry out his duties with credit to himself and satisfaction to his employers.



Tully Waters Cleland &
Pentland Smith.
Architects

J. Collingwood Tully, F.R.A.S.
Resident Architect

Figure 2.2: Peter Jones Department Store - London
Exploded View of Components of Proje

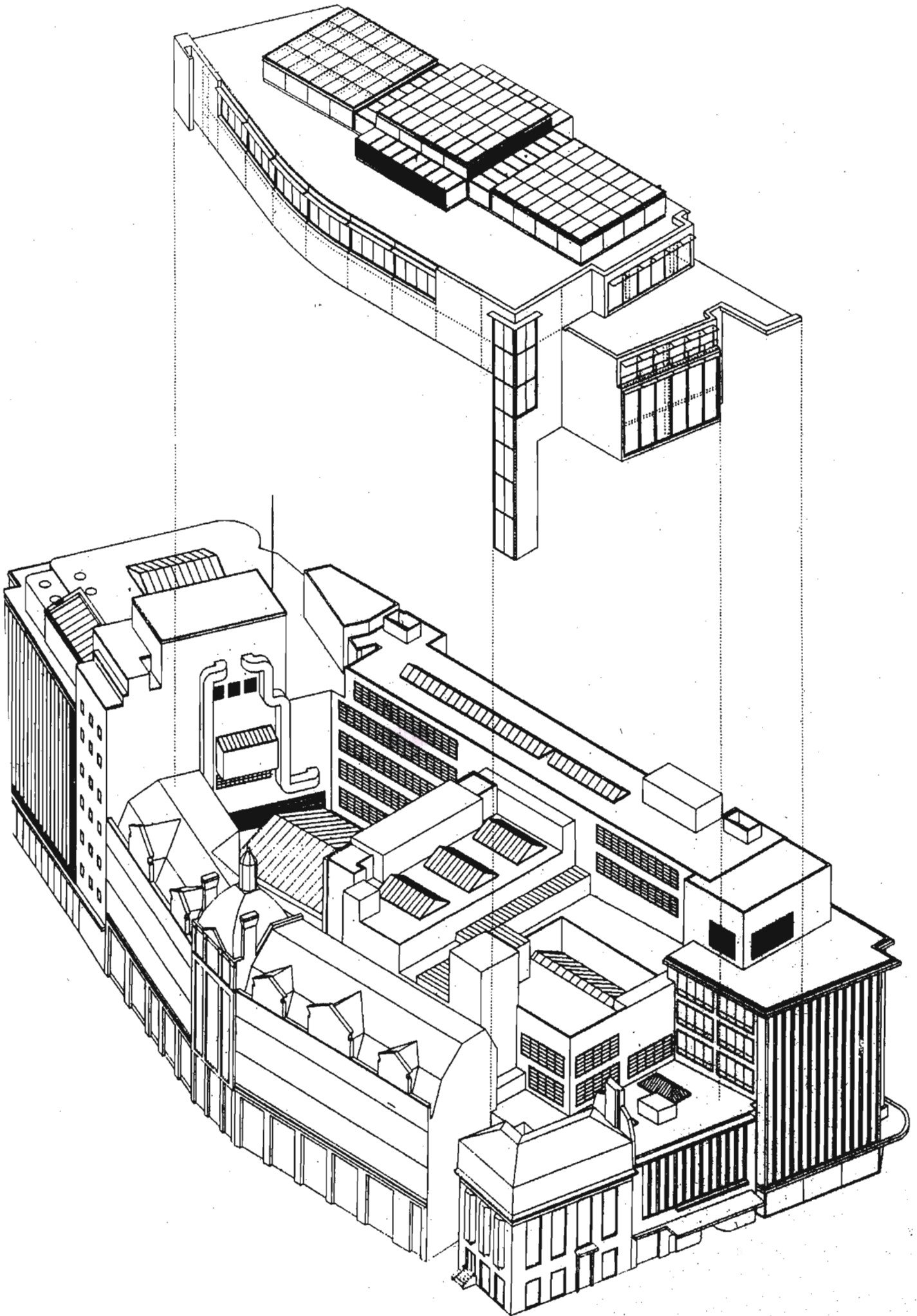


Figure 2.2: Peter Jones Department Store - London
Exploded View of Components of Proj

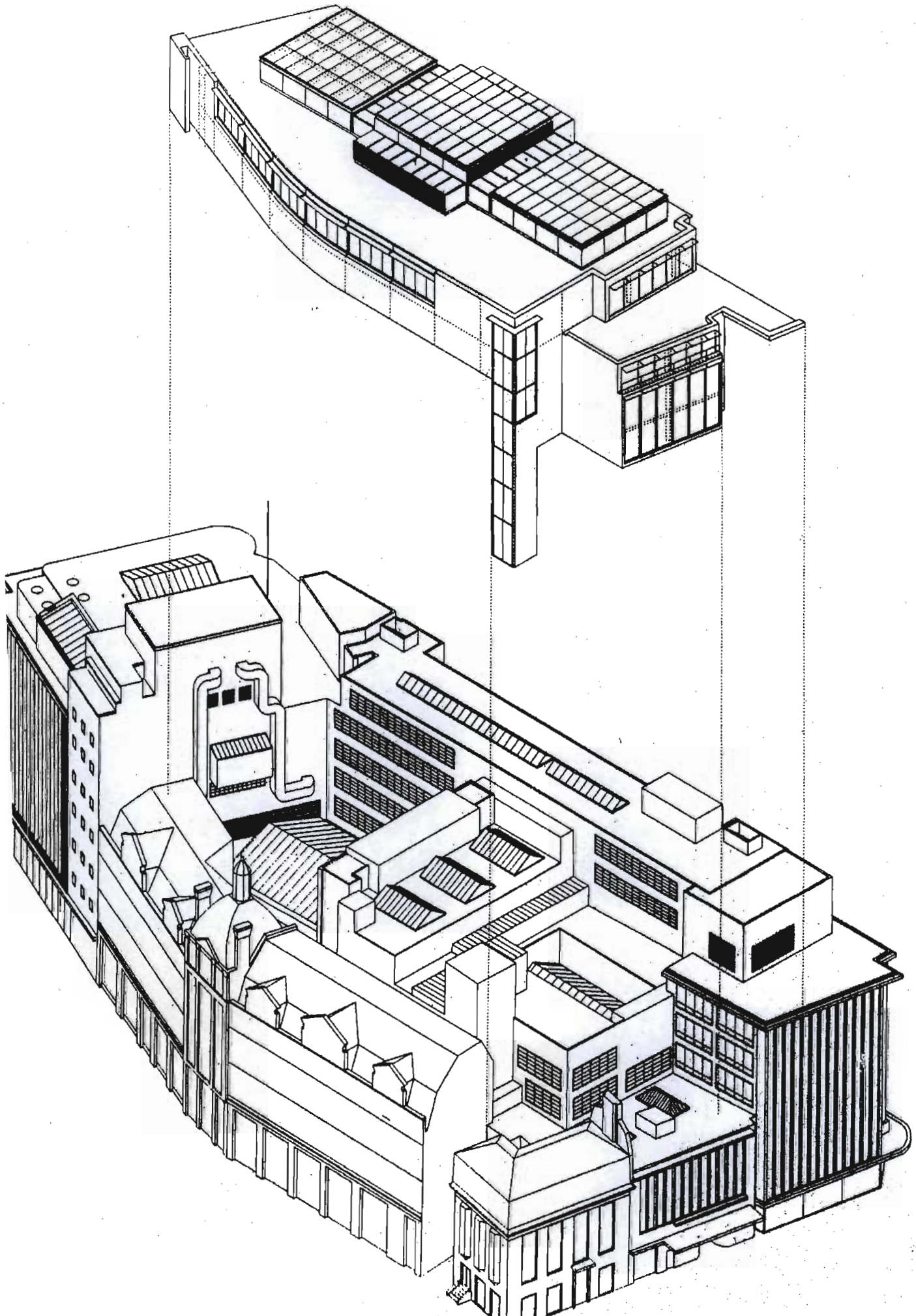




Figure 2.1: Peter Jones Department Store - London
Shoring of Original Structure



Figure 3.1 De Montford University - Leicester
The Original Hawthorn Building Facade

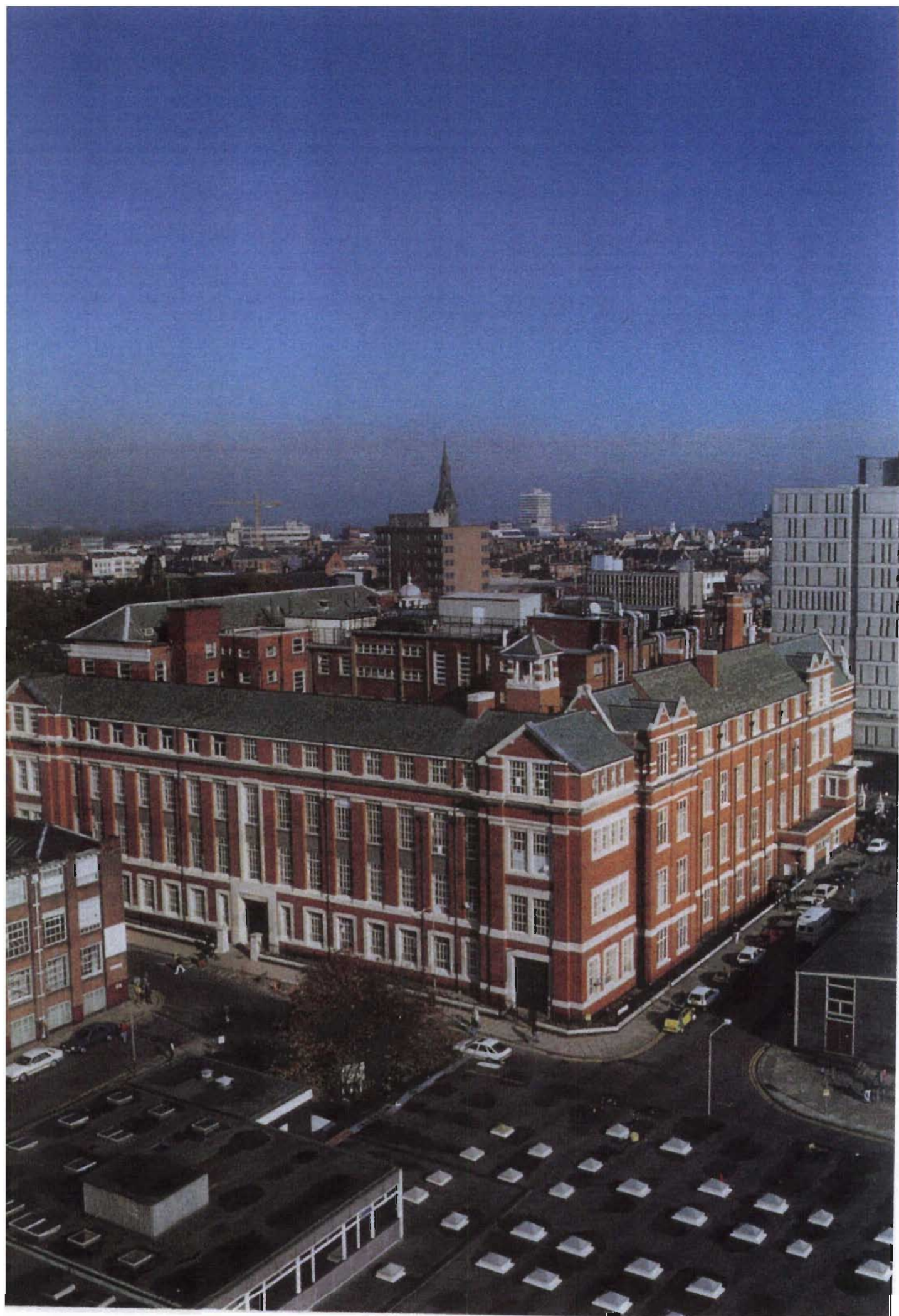
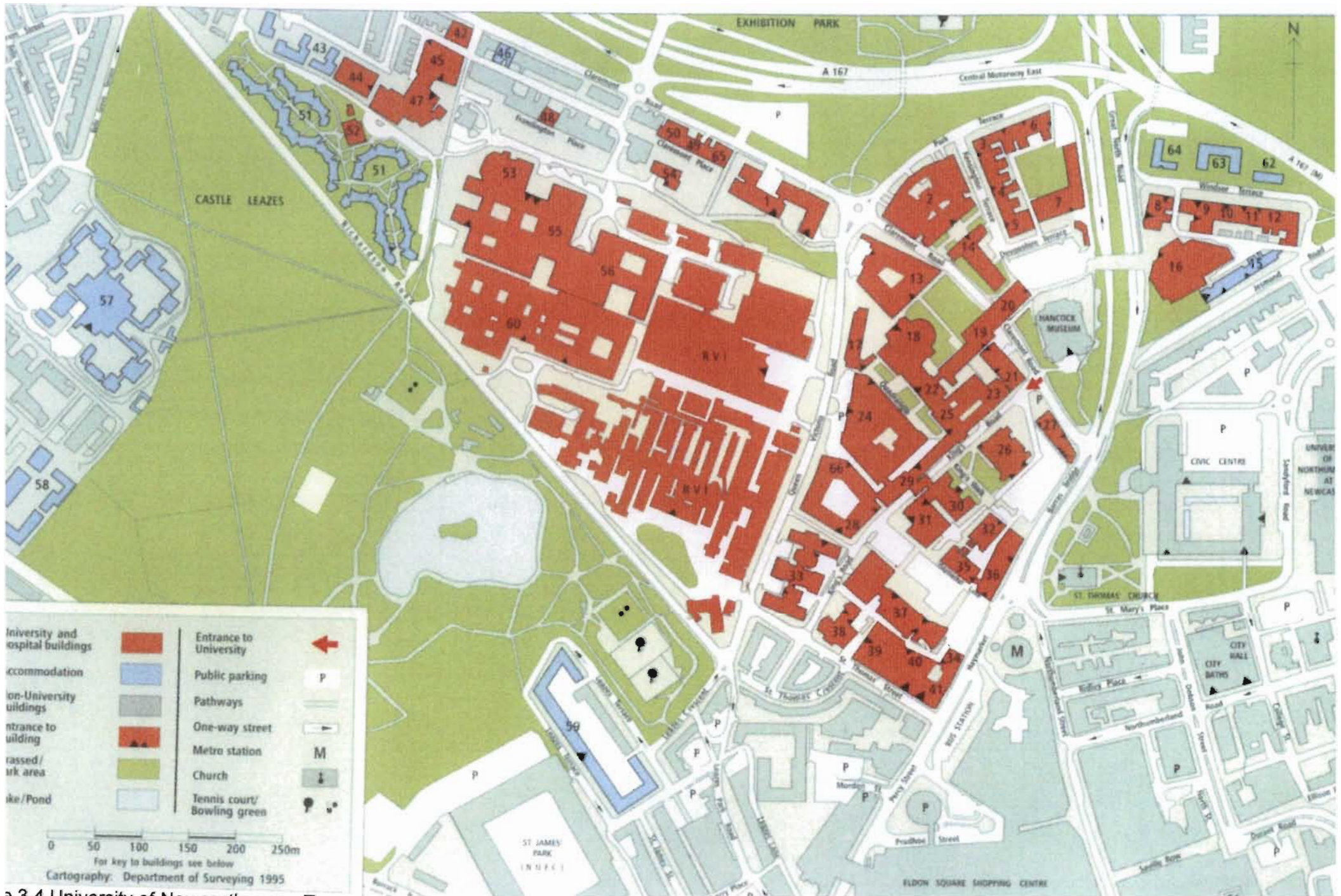




Figure 3.3 De Montford University - Leicester
The Refurbished Interior of the Hawthorn Building.



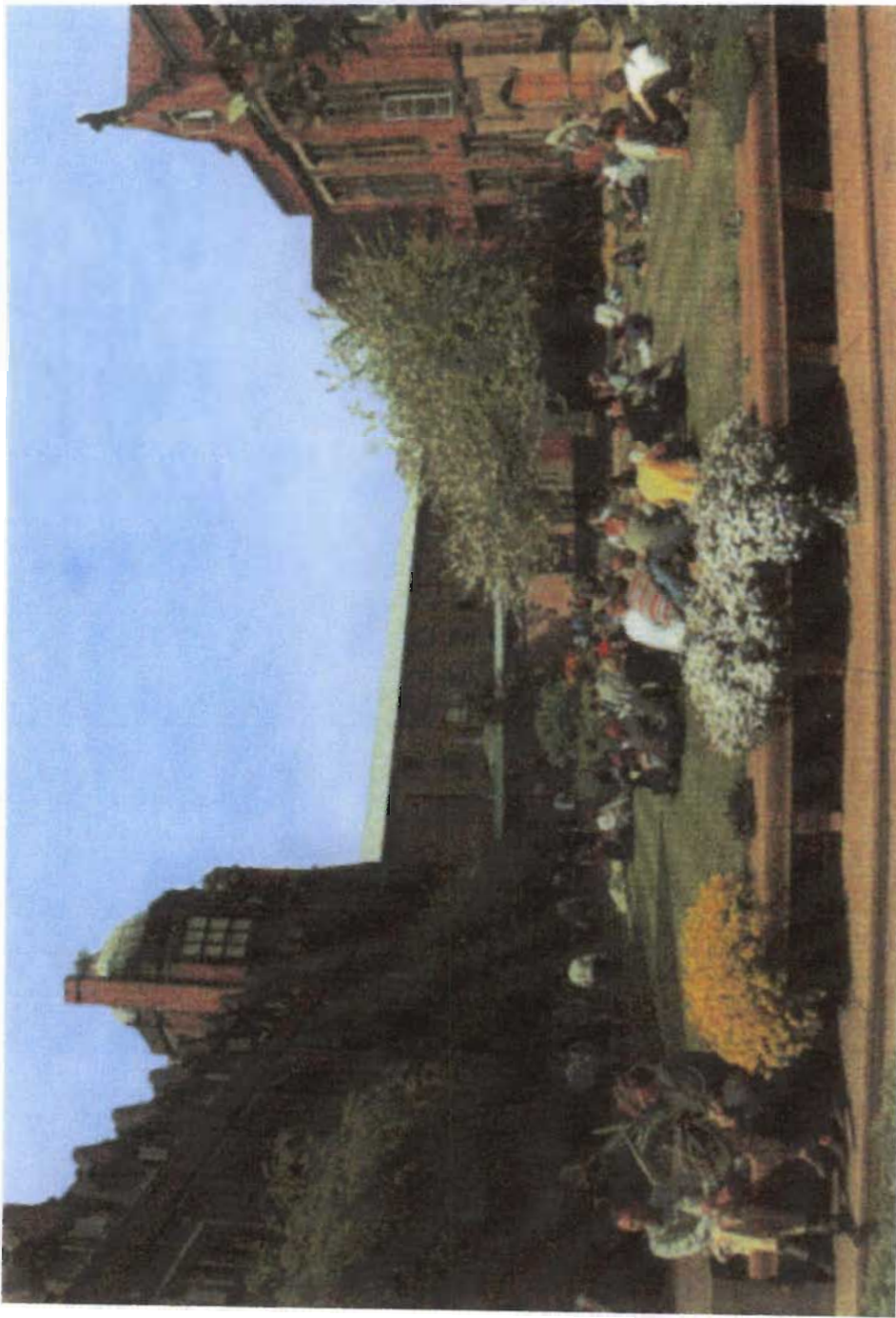


Figure 3.5 University of Newcastle-upon-Tyne
The Buildings around the Library Quad

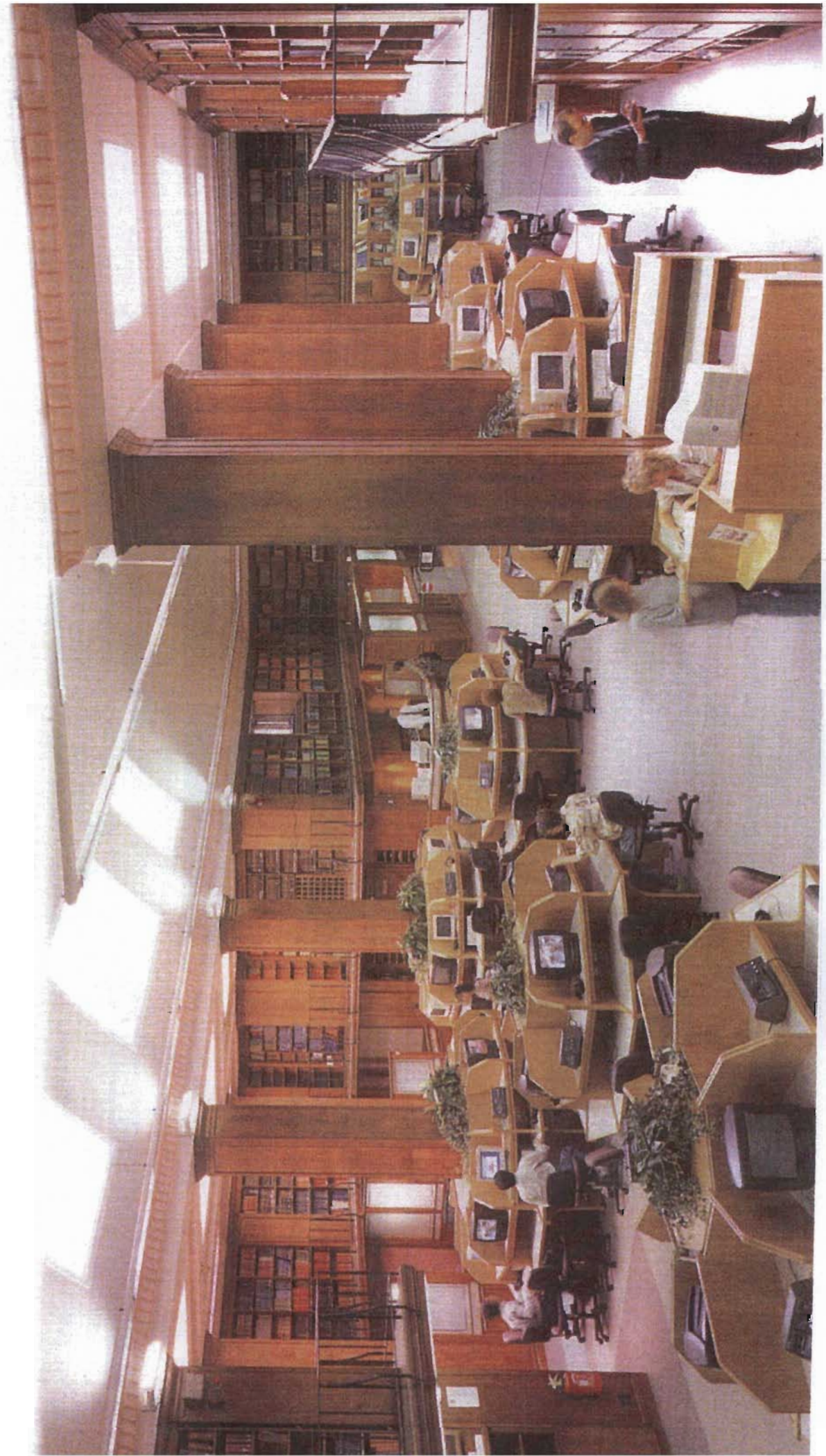
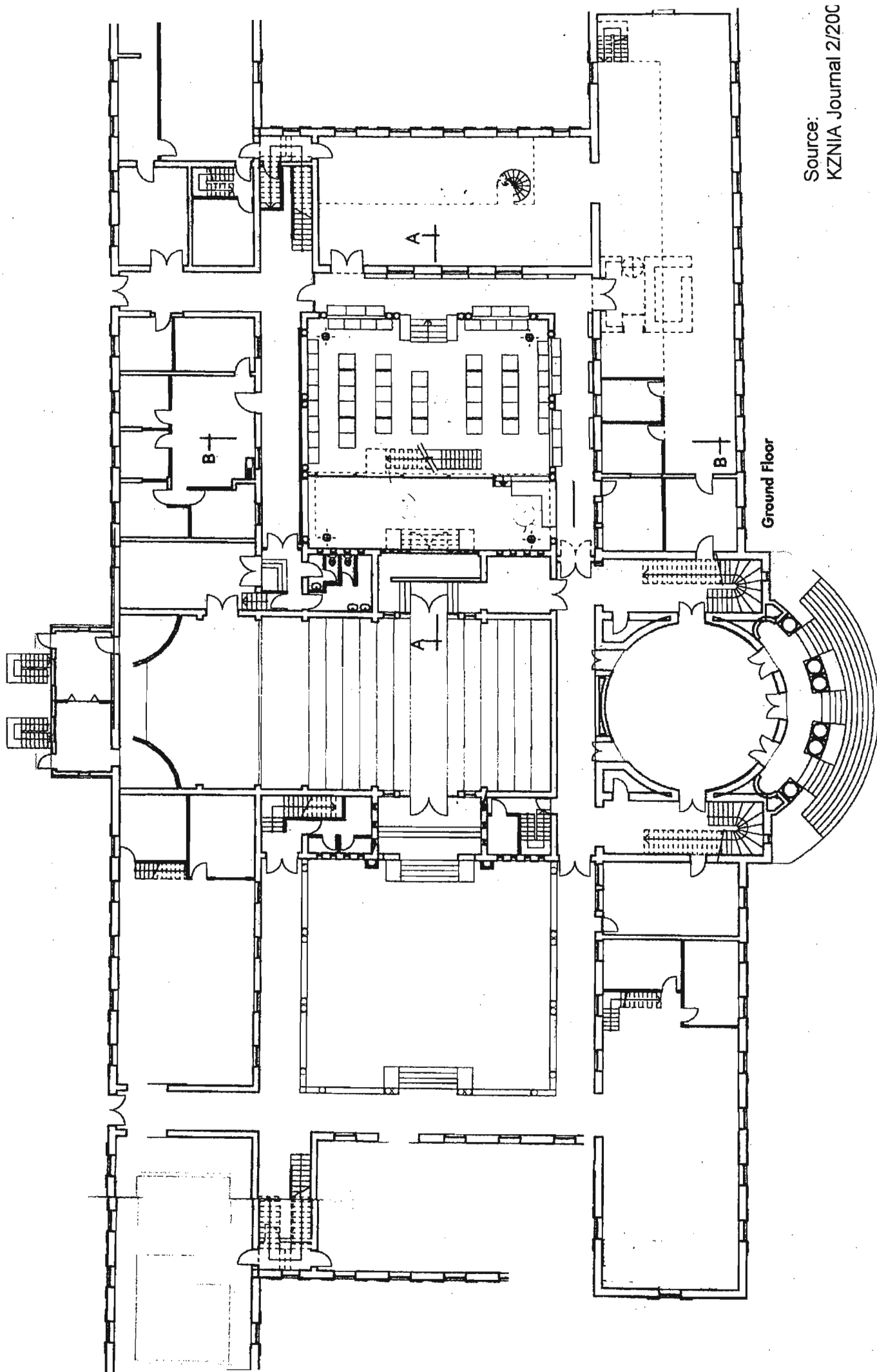


Figure 3.6 University of Newcastle-upon-Tyne
The Converted Old Library



Figure 3.8 Howard College - University of Natal - Durban

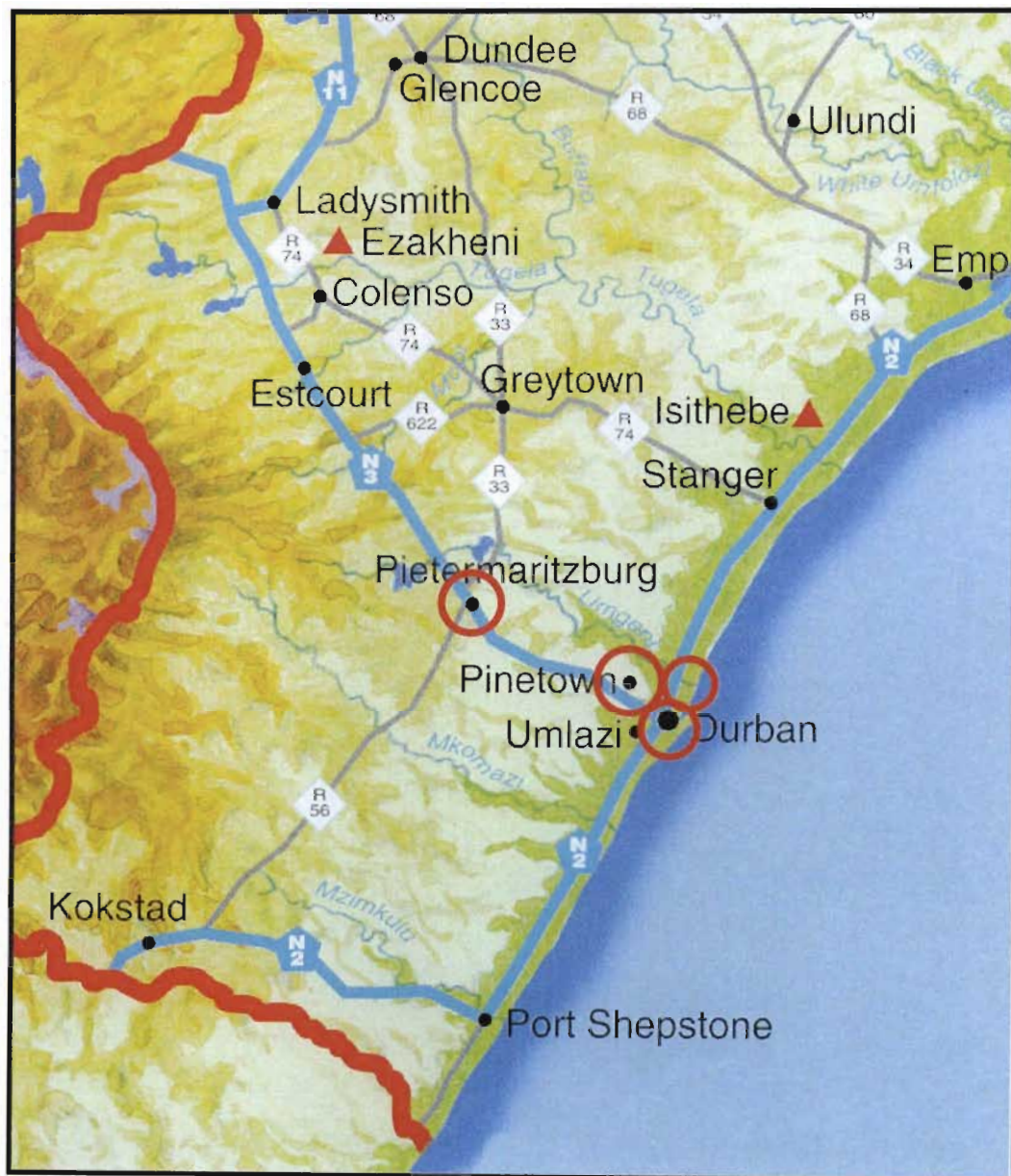
Source:



Source:
KZNIA Journal 2/200

Figure 3.7 Howard College - University of Natal - Durban

Location of University of Natal Campuses and Faculties



D=Durban, E=Edgewood (Pinetown), P=Pietermaritzburg

Faculties of:

Community & Development Studies

D

Education

P,E,D

Engineering

D

Human Sciences

P,D

Law

P,D

Medicine

D

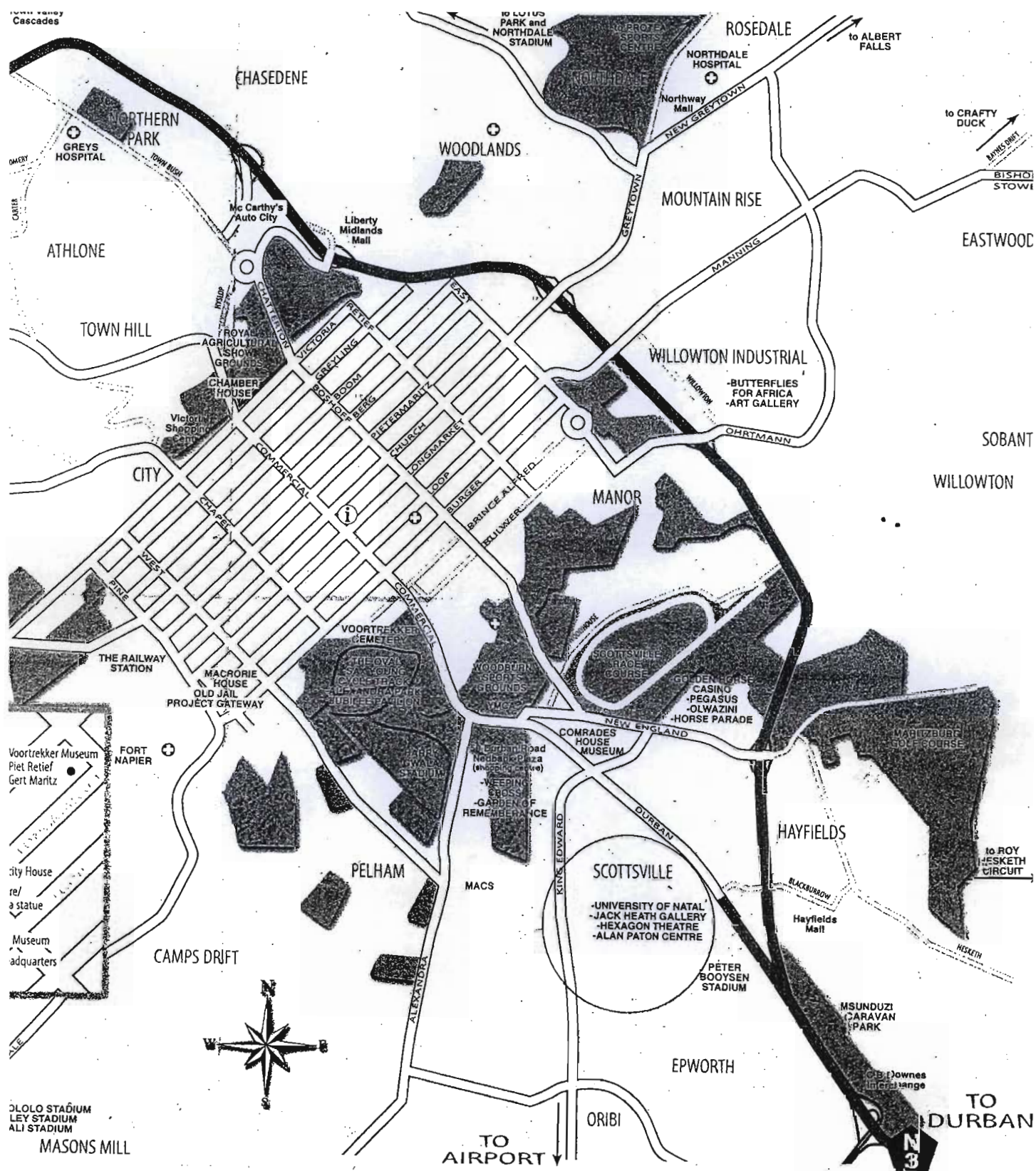
Science & Agriculture

P

Science

D

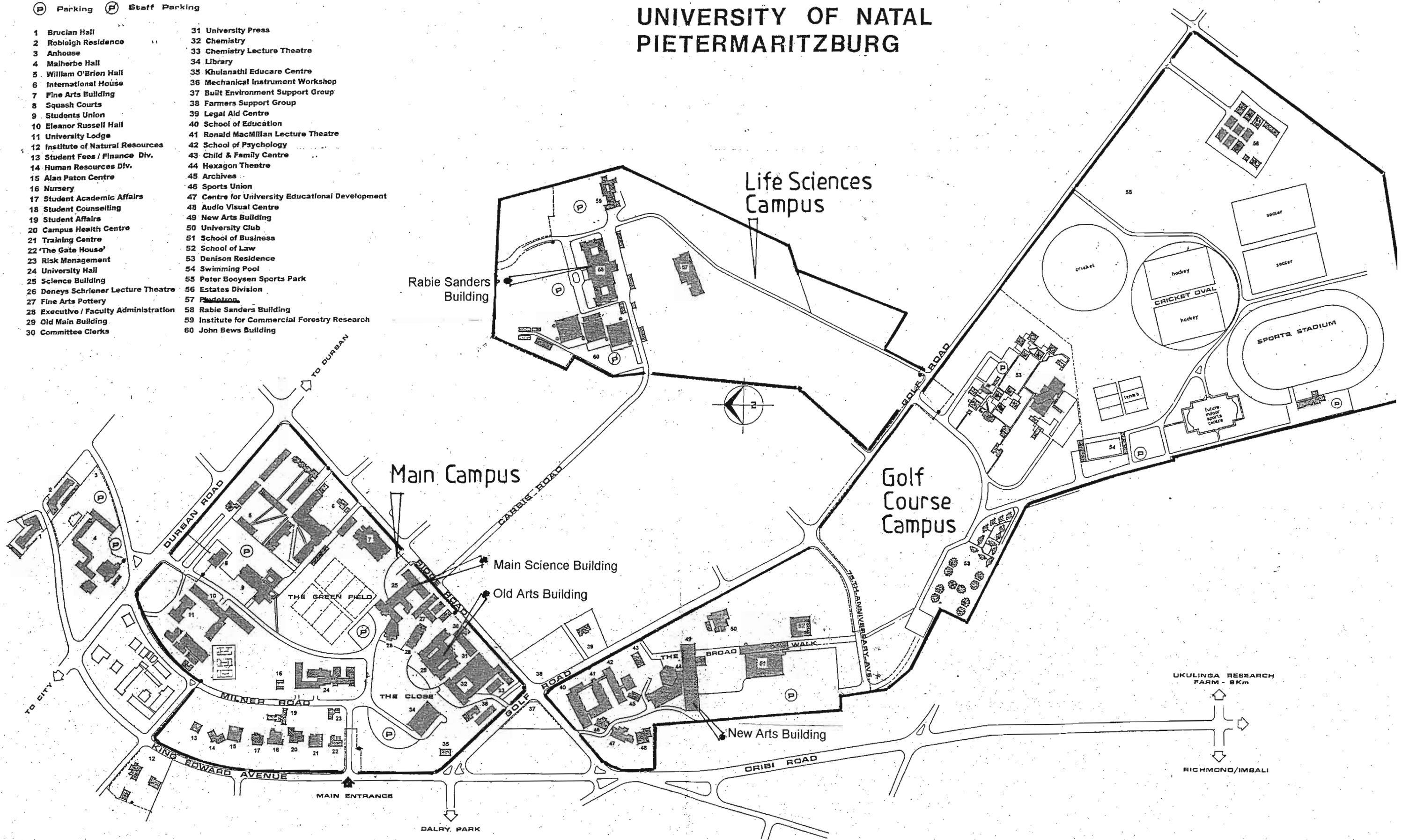
Figure 4.1 Locality Map of East Coast



(P) Parking (P) Staff Parking

- | | |
|---------------------------------------|--|
| 1 Brucian Hall | 31 University Press |
| 2 Robleigh Residence | 32 Chemistry |
| 3 Anhouse | 33 Chemistry Lecture Theatre |
| 4 Malherbe Hall | 34 Library |
| 5 William O'Brien Hall | 35 Khulanathi Educare Centre |
| 6 International House | 36 Mechanical Instrument Workshop |
| 7 Fine Arts Building | 37 Built Environment Support Group |
| 8 Squash Courts | 38 Farmers Support Group |
| 9 Students Union | 39 Legal Aid Centre |
| 10 Eleanor Russell Hall | 40 School of Education |
| 11 University Lodge | 41 Ronald MacMillan Lecture Theatre |
| 12 Institute of Natural Resources | 42 School of Psychology |
| 13 Student Fees / Finance Div. | 43 Child & Family Centre |
| 14 Human Resources Div. | 44 Hexagon Theatre |
| 15 Alan Paton Centre | 45 Archives |
| 16 Nursery | 46 Sports Union |
| 17 Student Academic Affairs | 47 Centre for University Educational Development |
| 18 Student Counselling | 48 Audio Visual Centre |
| 19 Student Affairs | 49 New Arts Building |
| 20 Campus Health Centre | 50 University Club |
| 21 Training Centre | 51 School of Business |
| 22 'The Gate House' | 52 School of Law |
| 23 Risk Management | 53 Denison Residence |
| 24 University Hall | 54 Swimming Pool |
| 25 Science Building | 55 Peter Booysen Sports Park |
| 26 Deneys Schriener Lecture Theatre | 56 Estates Division |
| 27 Fine Arts Pottery | 57 Platation |
| 28 Executive / Faculty Administration | 58 Rabie Sanders Building |
| 29 Old Main Building | 59 Institute for Commercial Forestry Research |
| 30 Committee Clerks | 60 John Bews Building |

UNIVERSITY OF NATAL PIETERMARITZBURG



UKULINGA RESEARCH FARM - 8 Km

RICHMOND/IMBALI



Figure 4.5 Old Arts Building West Elevation

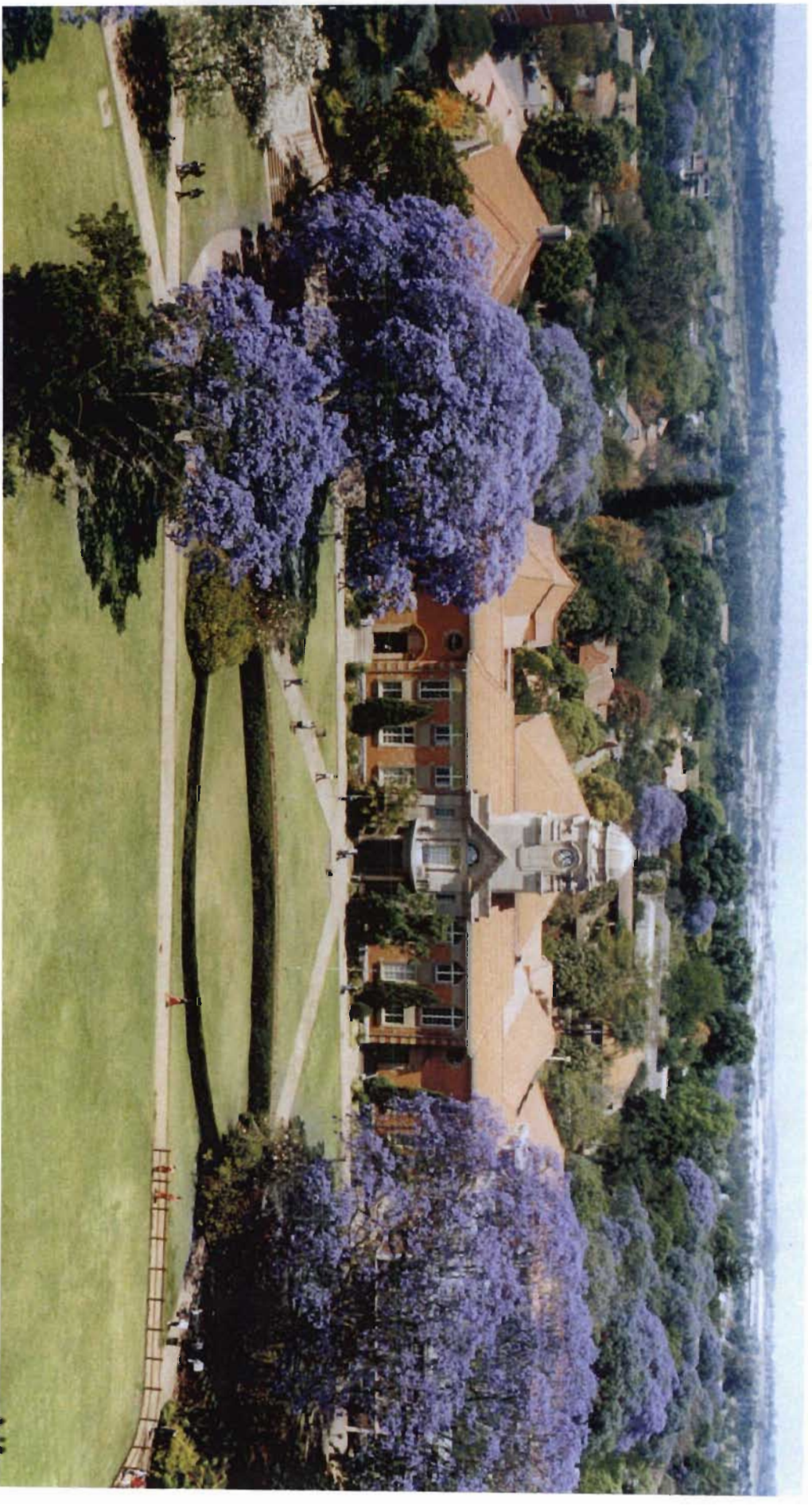
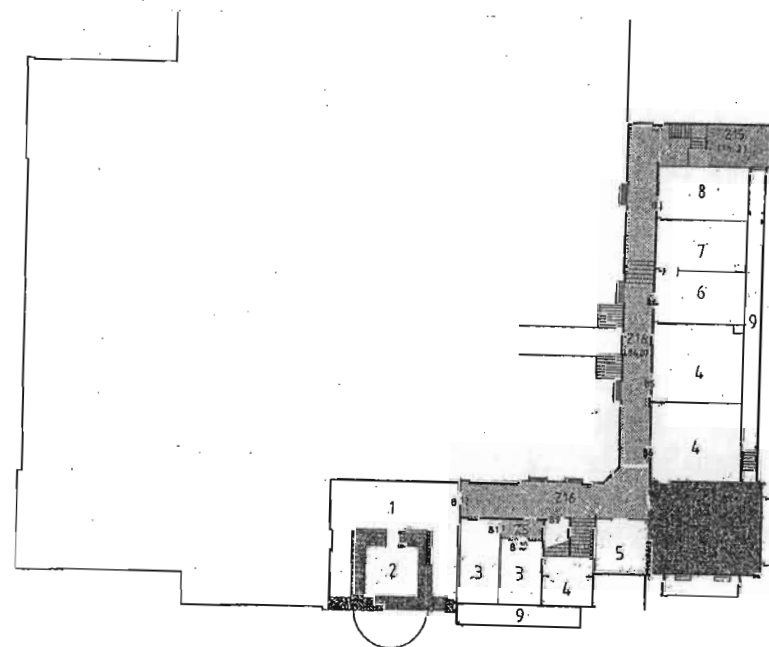


Figure 4.4 Old Arts Building Aerial View



Old Arts Building

CIRCA 1910

Basement



- 1 Record Room
- 2 Strong Room
- 3 Professors Ante Room
- 4 Store
- 5 Dark Room
- 6 Optical Laboratory
- 7 Chemical Store
- 8 Gas Store
- 9 Lightwell



Figure 4. 6: Old Arts Building: Basement Layout. Circa 1910

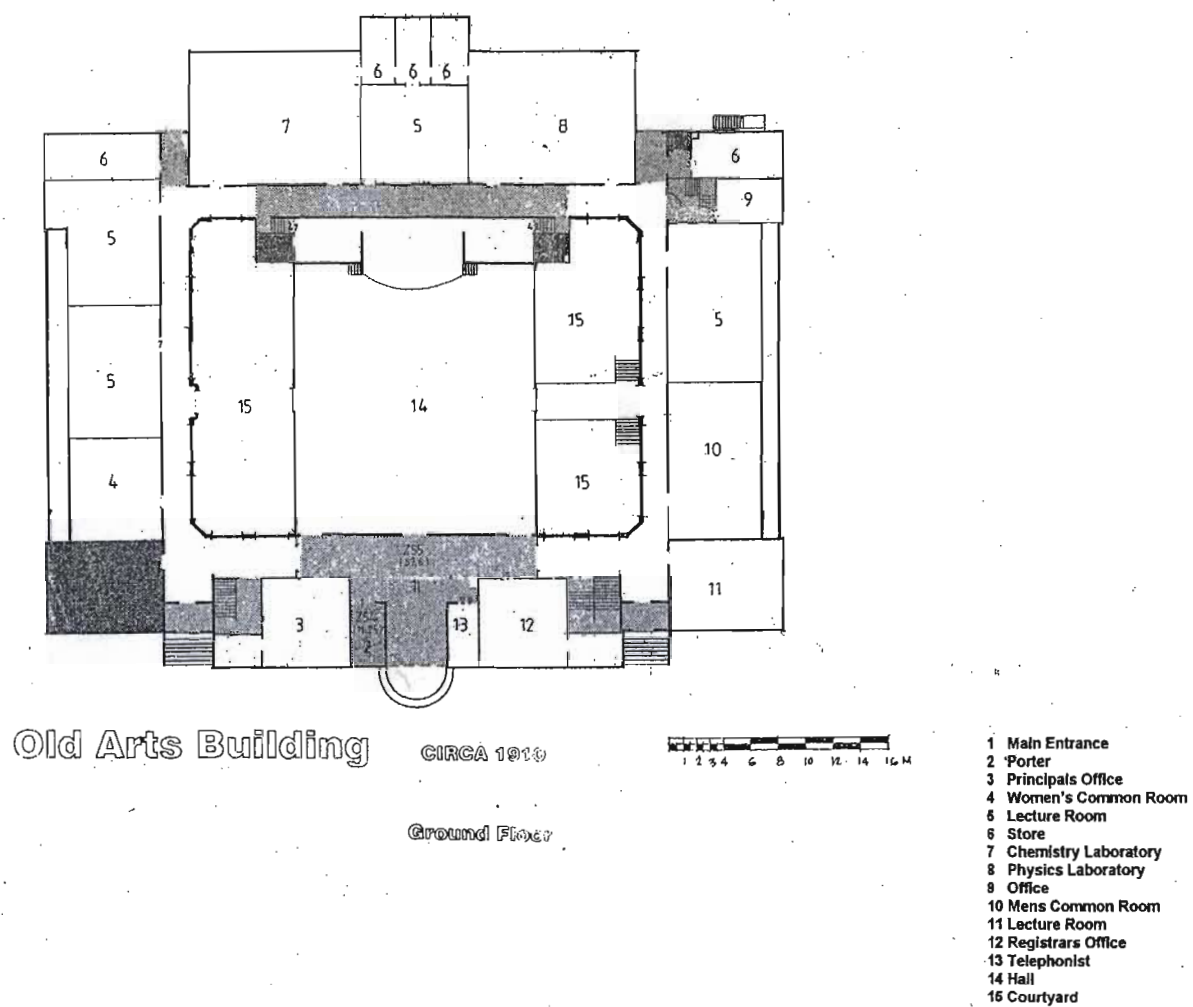
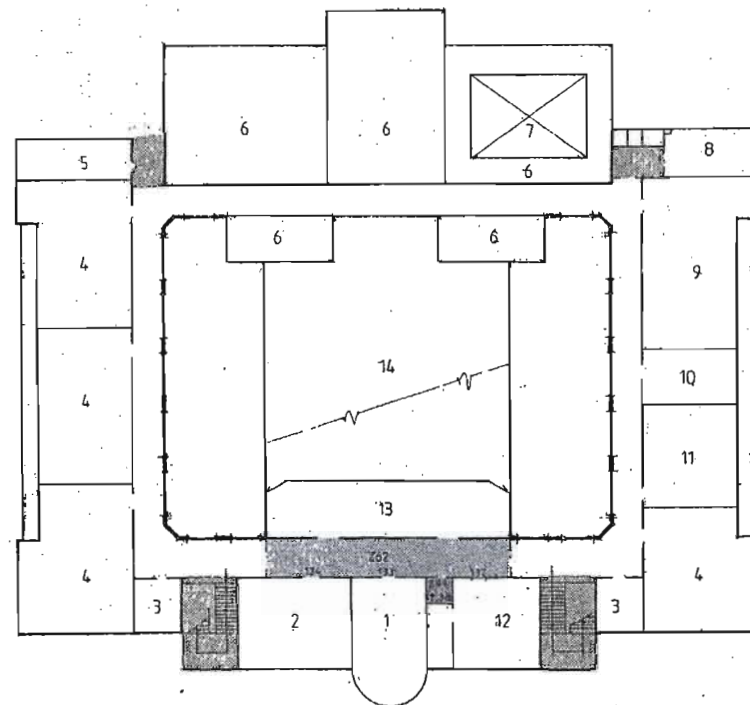


Figure 4. 7: Old Arts Building Ground Floor



Old Arts Building

CIRCA 1910

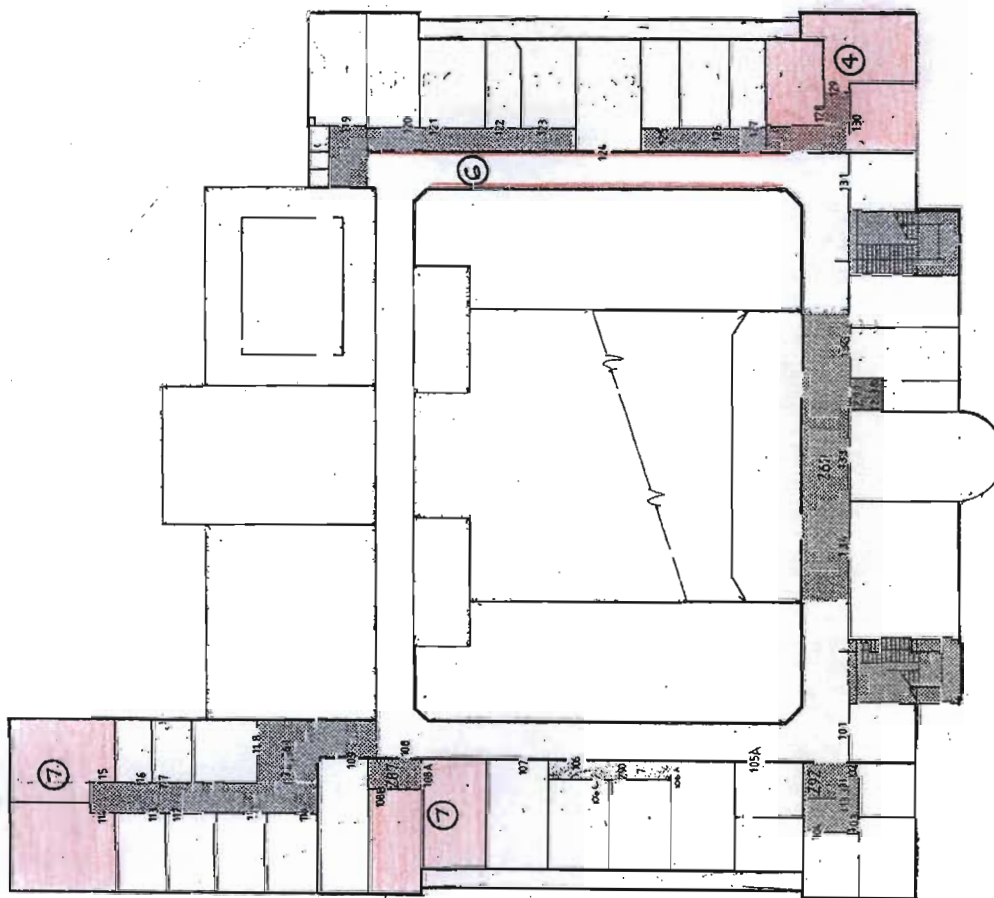


First Floor



- 1 Committee Room
- 2 Library
- 3 Store
- 4 Lecture Room
- 5 Cleaners Room
- 6 Roof
- 7 Glasshouse
- 8 Office
- 9 Botany Laboratory
- 10 Physiological Laboratory
- 11 Geology Laboratory
- 12 Professors Common Room
- 13 Gallery to Hall
- 14 Double volume of Hall

Figure 4. 8: Old Arts Building: First Floor Layout, Circa 1910

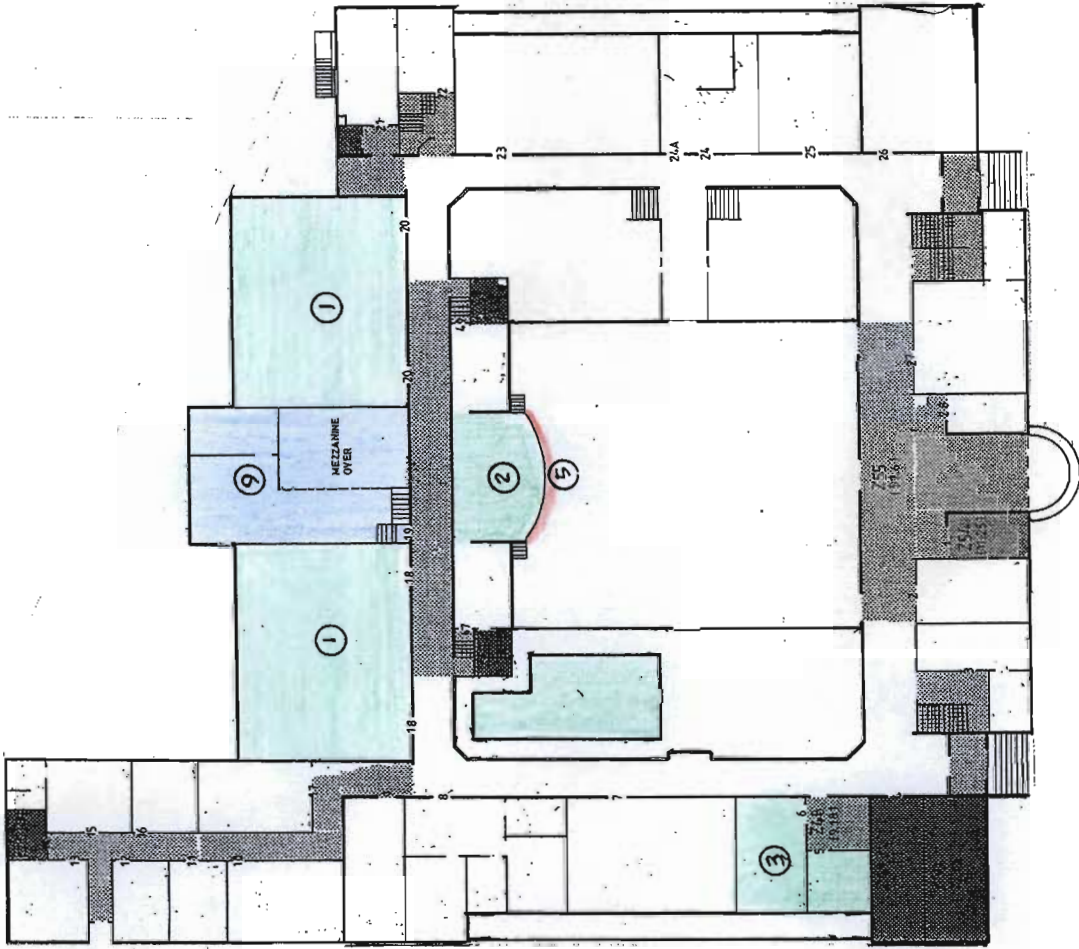


Old Arts Building

First Floor



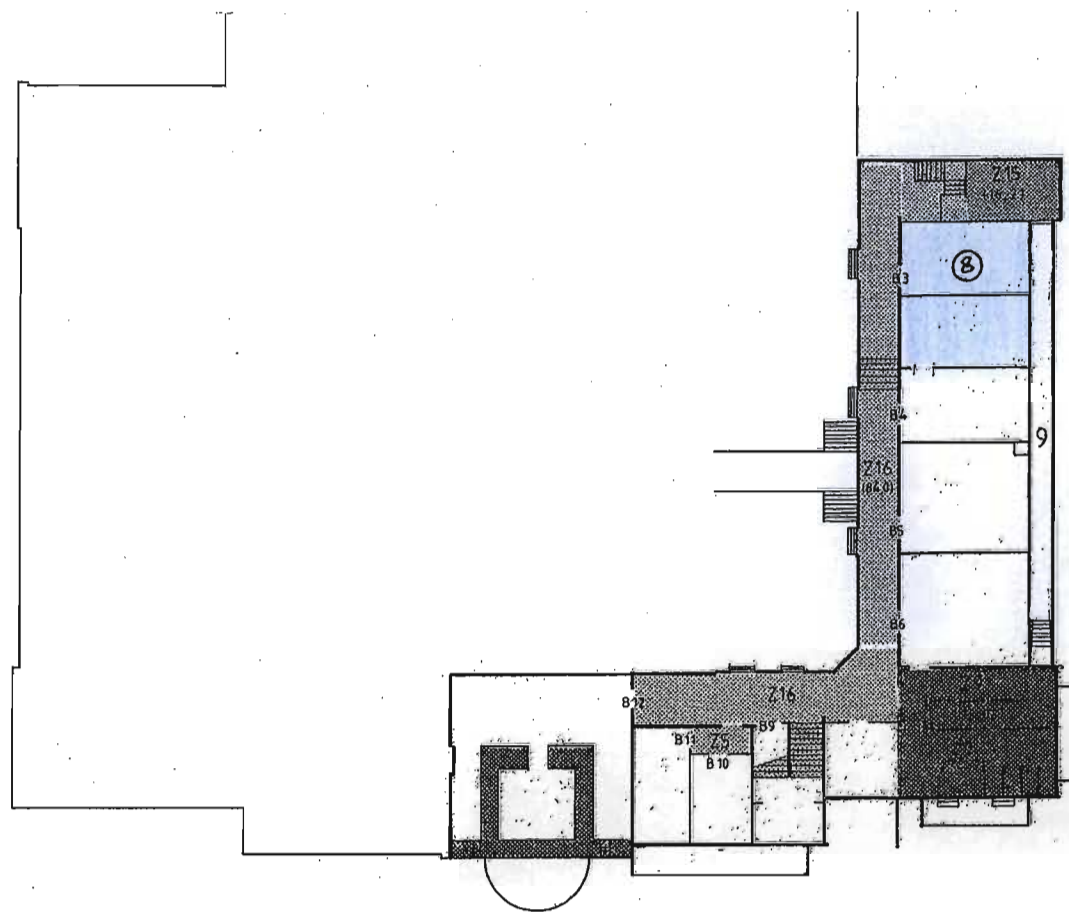
- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



Old Arts Building

Ground Floor

- Modifications 1973 - 1982
- Modifications 1983 - 1992



Old Arts Building

Basement



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

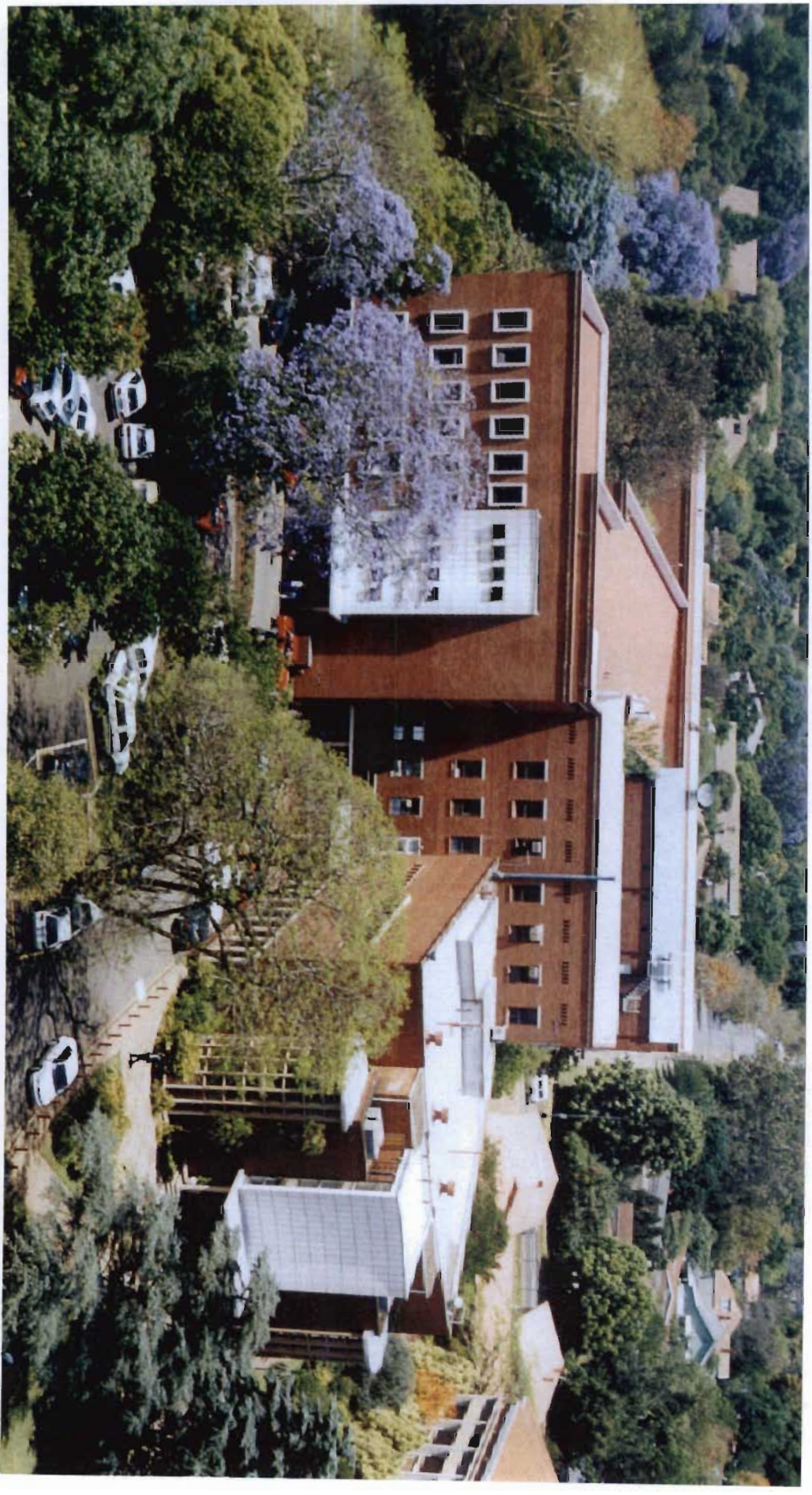
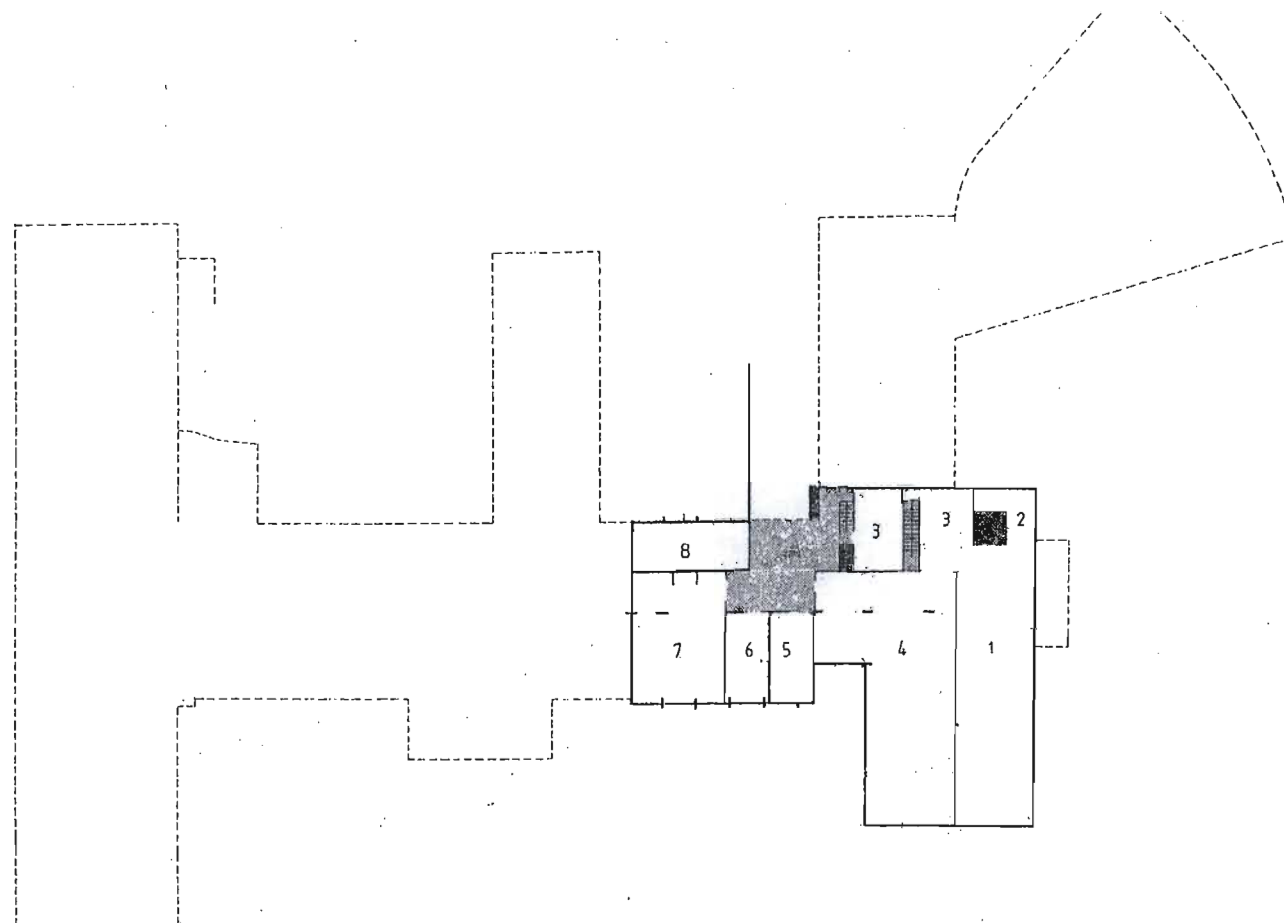


Figure 4.12 Main Science Building West Elevation



Figure 4.13 Main Science Building East Elevation



Main Science Building

CIRCA 1948



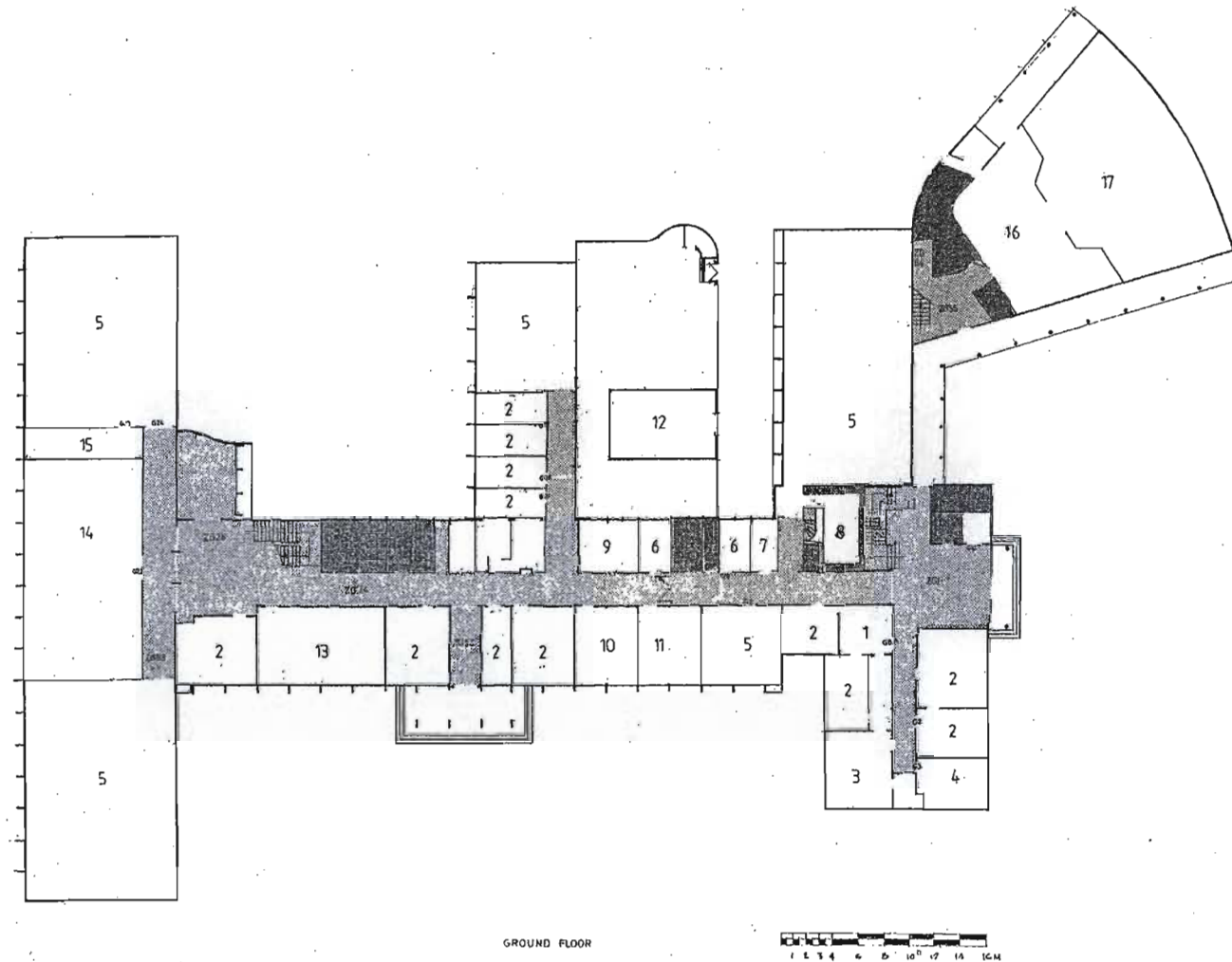
BASEMENT

G.S.M. = 544sq.m.

- 1 Zoology Honours Students
- 2 Ecology Store
- 3 Specimen Store
- 4 Fine Arts Studio
- 5 Rat Breeding Room
- 6 Workshop
- 7 Constant Environment Room
- 8 Frog Tanks and Water Filtration Plant



Figure 4.14: Main Science Building: Basement Layout - Circa 1948
Architects: Corrie & Corrie

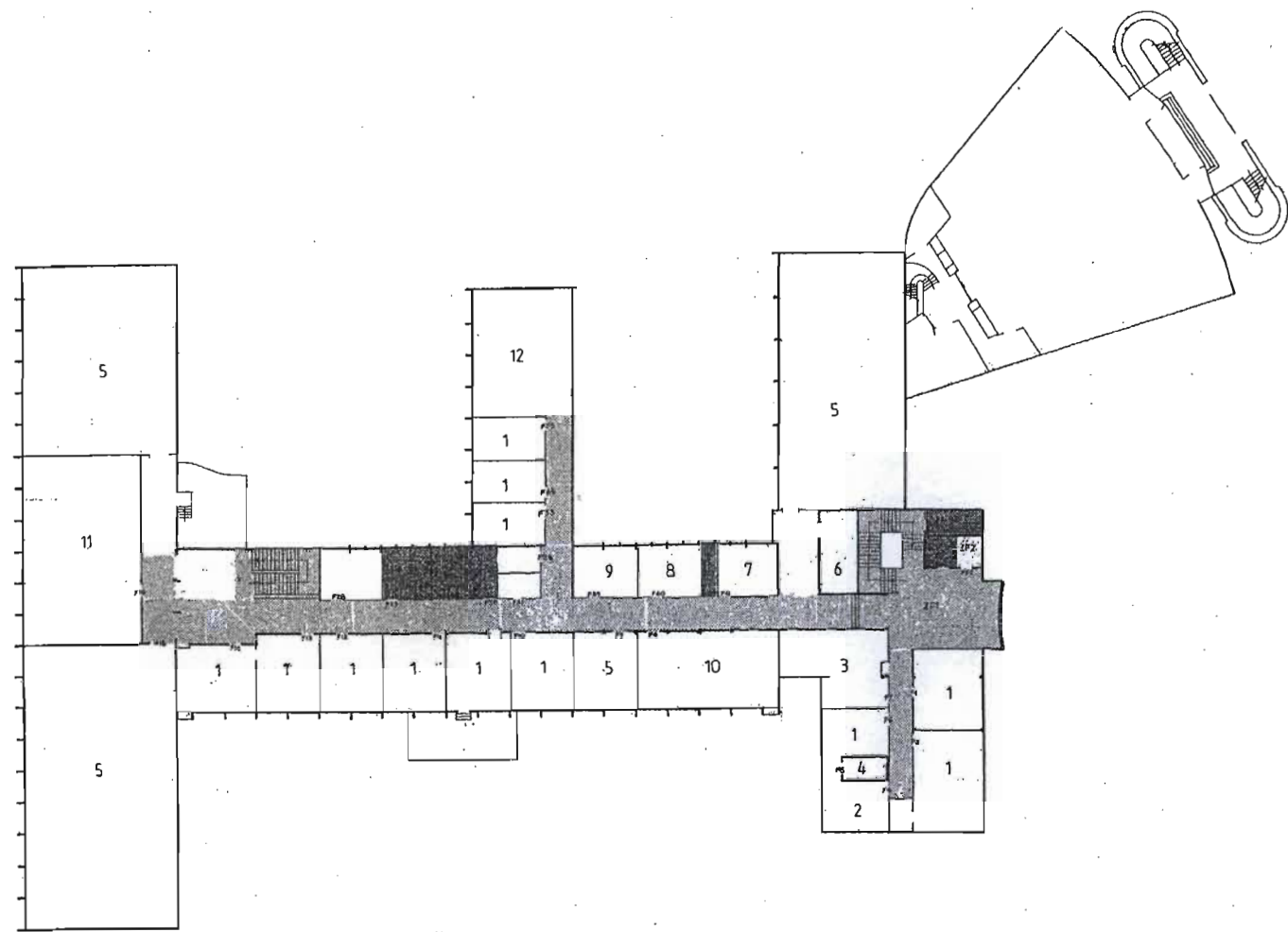


Main Science Building

CIRCA 1948

- 1 Reception
- 2 Office
- 3 Principal's Office
- 4 Registrars Office
- 5 Laboratory
- 6 Store
- 7 Glass Blowing Room
- 8 Balance Room
- 9 Aquarium
- 10 Library
- 11 Proto Zoology Laboratory
- 12 Glasshouse
- 13 Lecture Room
- 14 Museum
- 15 Preparation Room
- 16 Future Staff Common Room

Figure 4.15: Main Science Building: Ground Floor - Circa 1948
Architects: Carrigan & Crickmay



FIRST FLOOR

Main Science Building

CIRCA 1948



- 1 Lecture Room
- 2 Office
- 3 Optics Laboratory
- 4 Senior Laboratory
- 5 Junior Laboratory
- 6 Battery Room
- 7 Honours Laboratory
- 8 Workshop
- 9 Store
- 10 Dark Room
- 11 Library
- 12 Vacuum Physics Laboratory
- 13 Radio Active Room
- 14 Spectroscopy Laboratory
- 15 X-Ray Research Laboratory
- 16 Cloud Chamber
- 17 General Laboratory
- 18 Upper volume of Main Lecture Theatre

Figure 4.16: Main Science Building: First Floor Layout - Circa 1948
Architects: Corriall & Crickmay

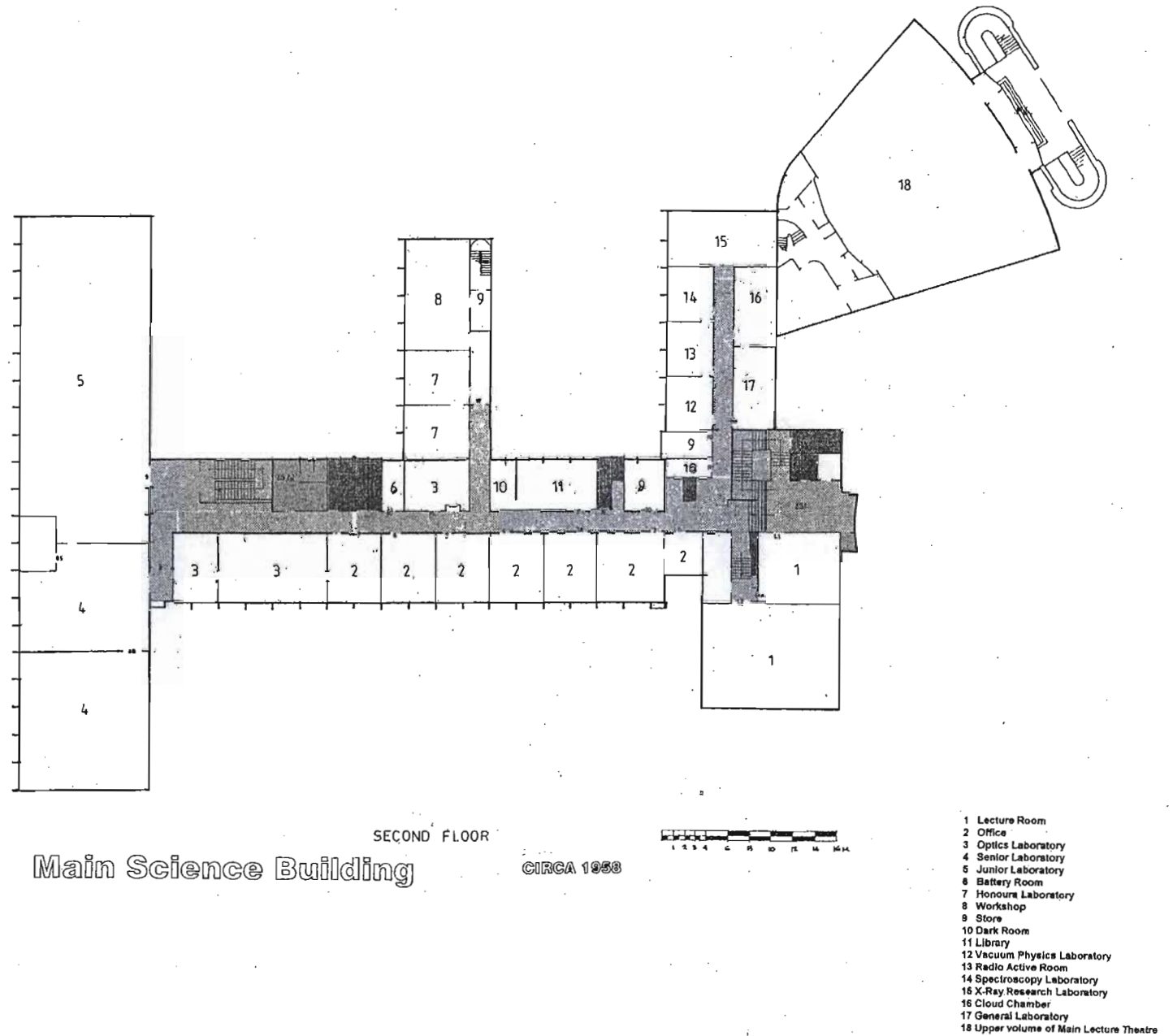
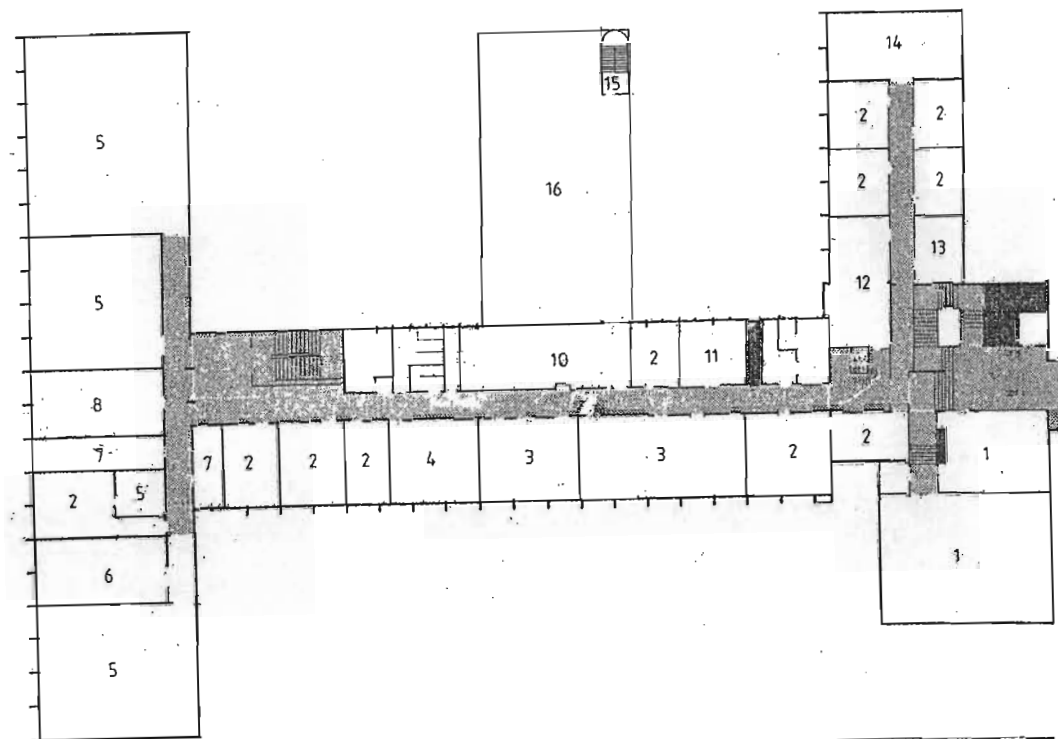


Figure 4.17: Main Science Building: Second Floor Layout - Circa 1948
 Architects: Carrigal & Crickmay



Main Science Building

CIRCA 1948

- 1 Lecture Room
- 2 Office
- 3 Tutorial Room
- 4 Research Laboratory
- 5 Laboratory
- 6 Geology Museum
- 7 Equipment Room
- 8 Geography Laboratory
- 9 Dark Room
- 10 Map Room
- 11 Post Graduate Room
- 12 Maths & Statistics Lecture Room
- 13 Applied Maths Lecture Room
- 14 Library & Post Graduate Students
- 15 Stairs down to Physics Workshop
- 16 Roof

Figure 4:18: Main Science Building: Third Floor Layout - Circa 1948
Architects: Corrigan & Crickmay

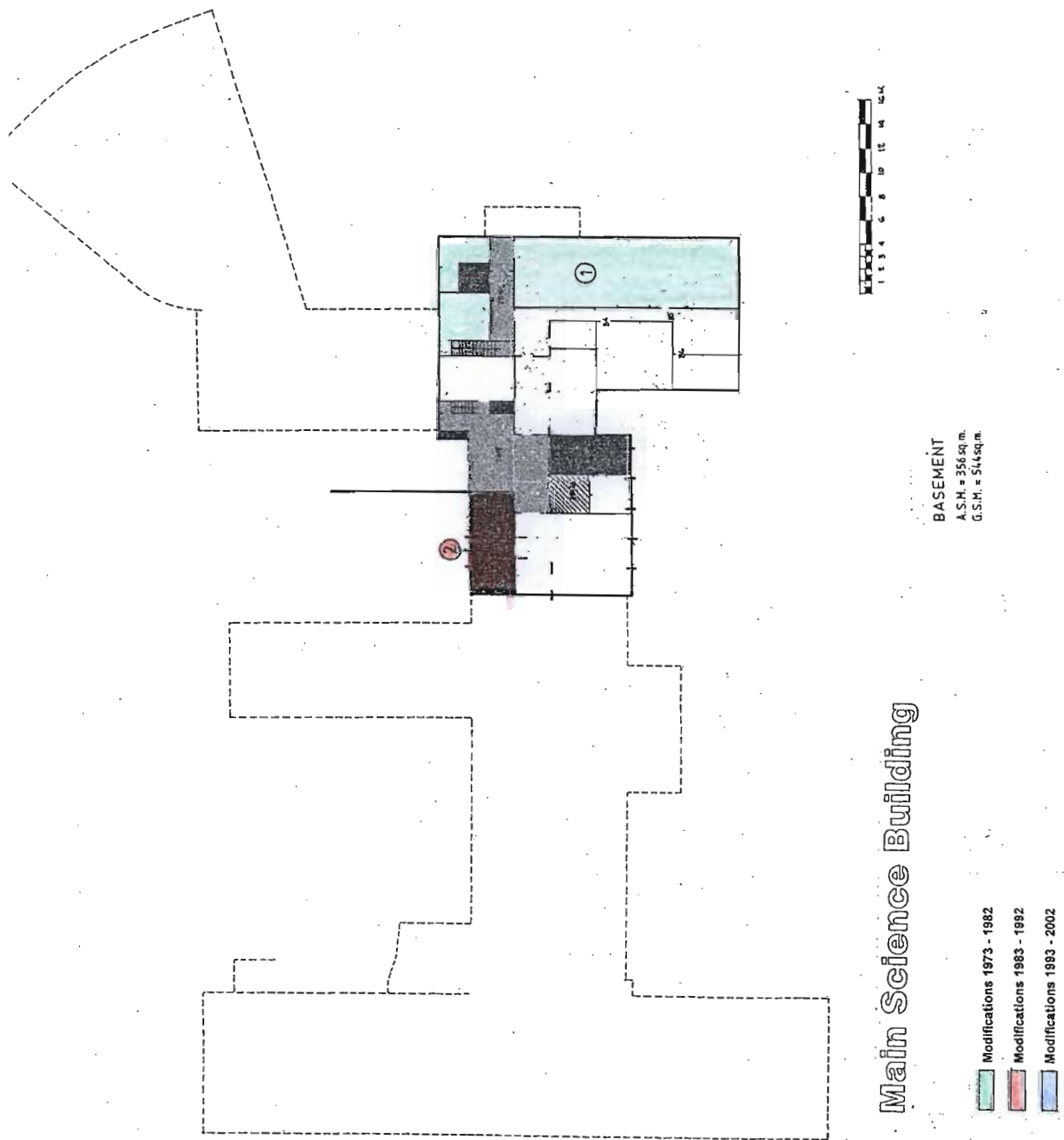
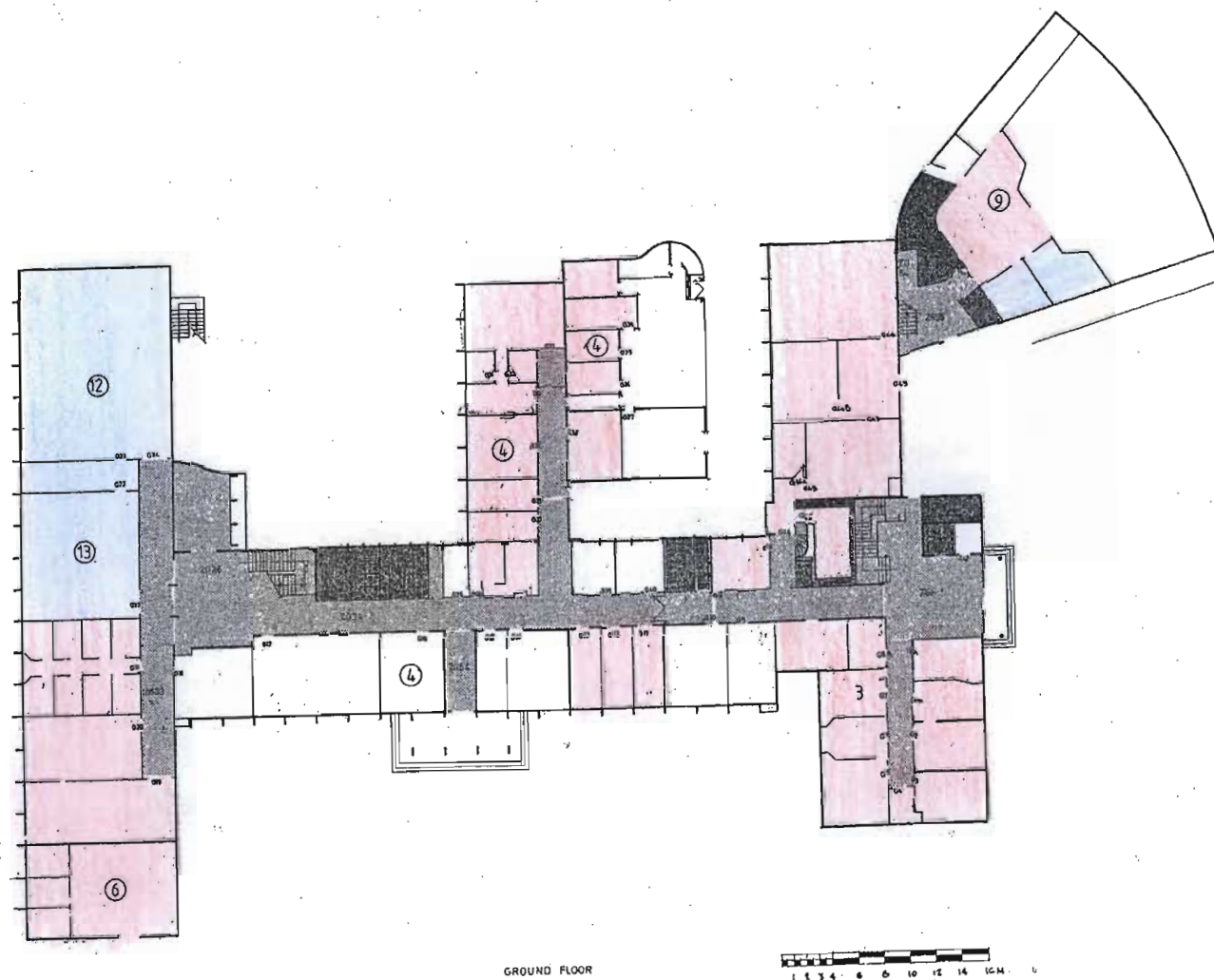


Figure 4.19: Main Science Building: Basement Layout - Changes



Main Science Building

Figure 4.20: Main Science Building: Ground Floor Layout - Changes

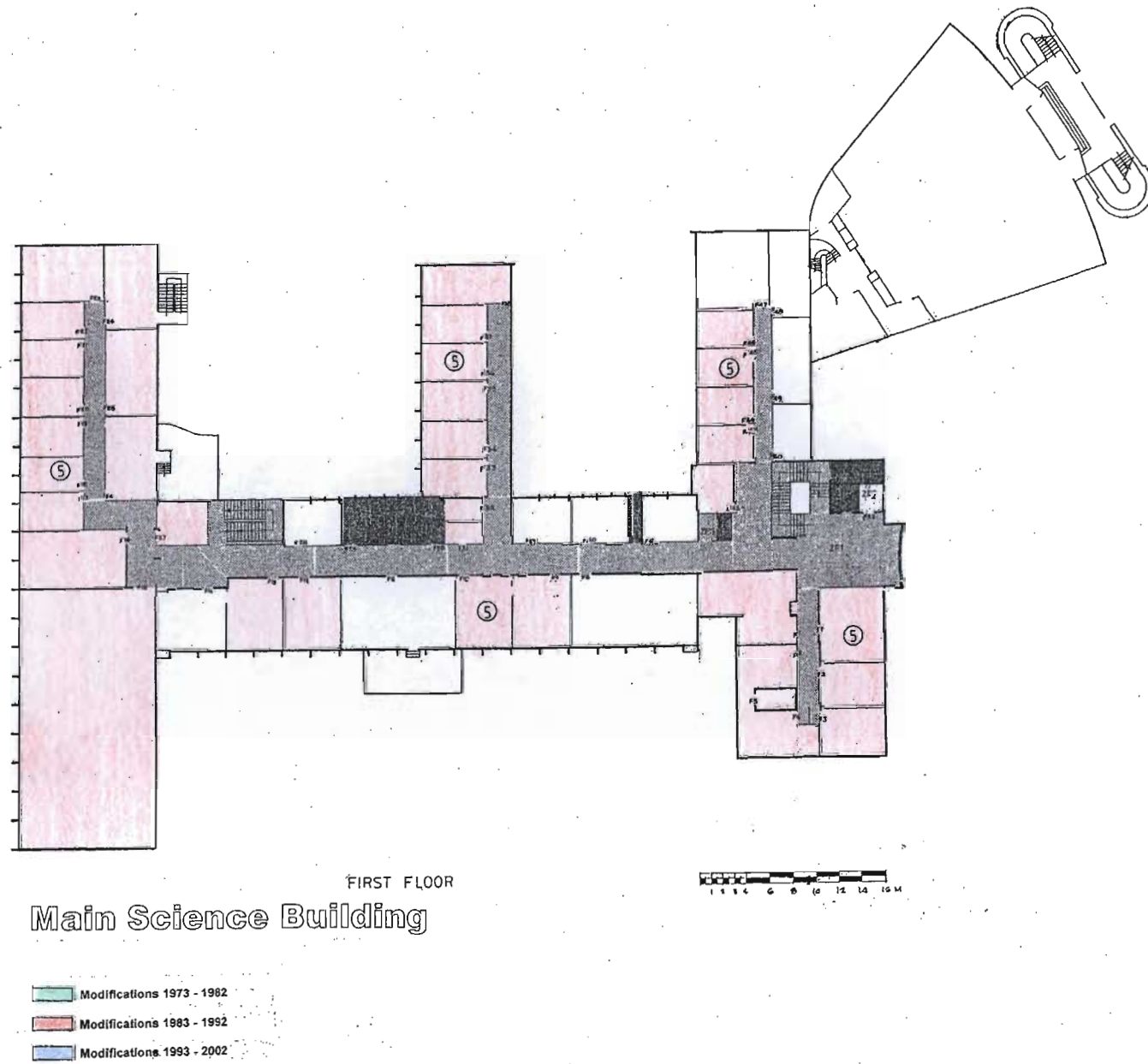
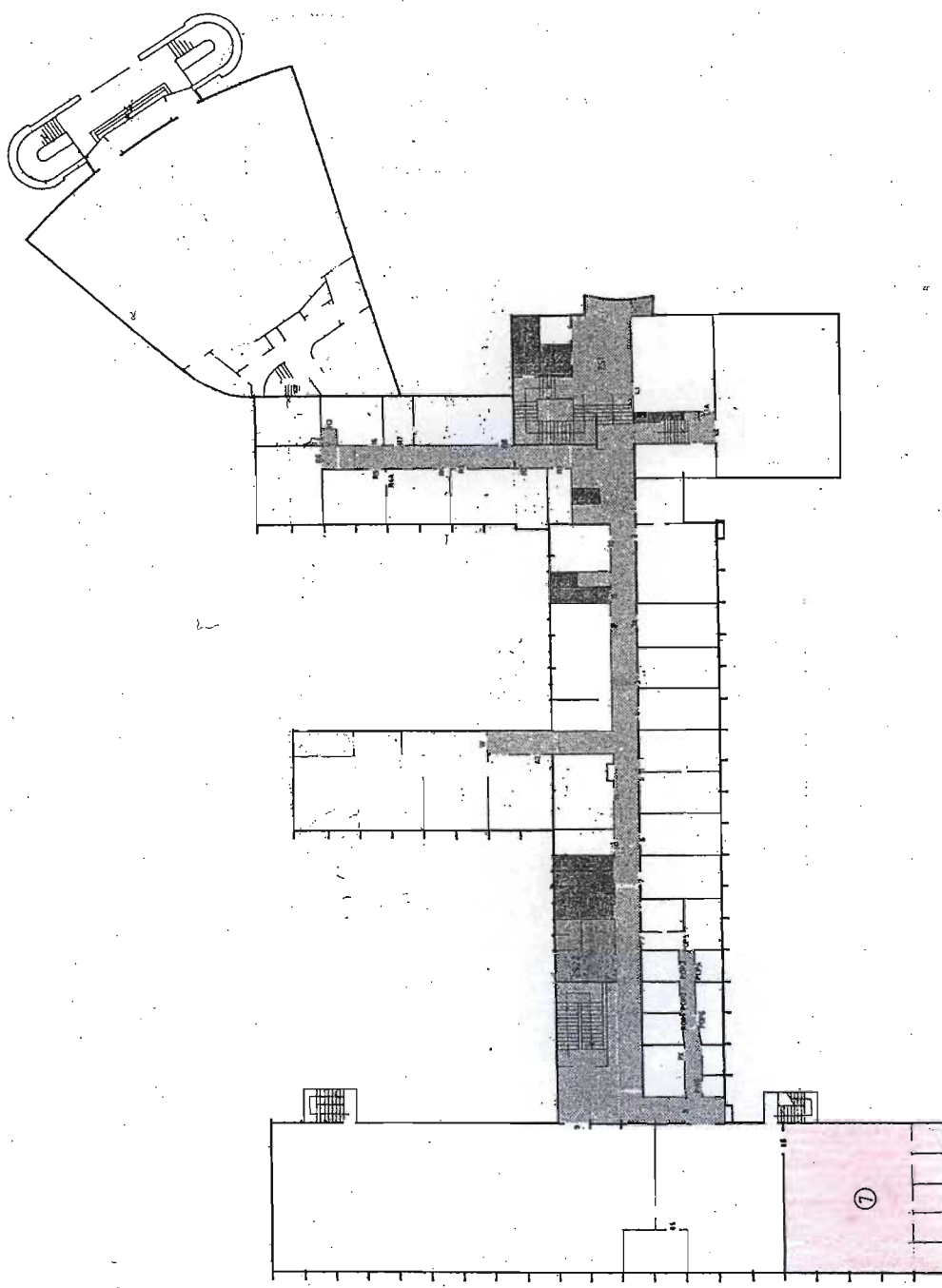


Figure 4.21: Main Science Building: First Floor Layout - Changes



SECOND FLOOR

Main Science Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

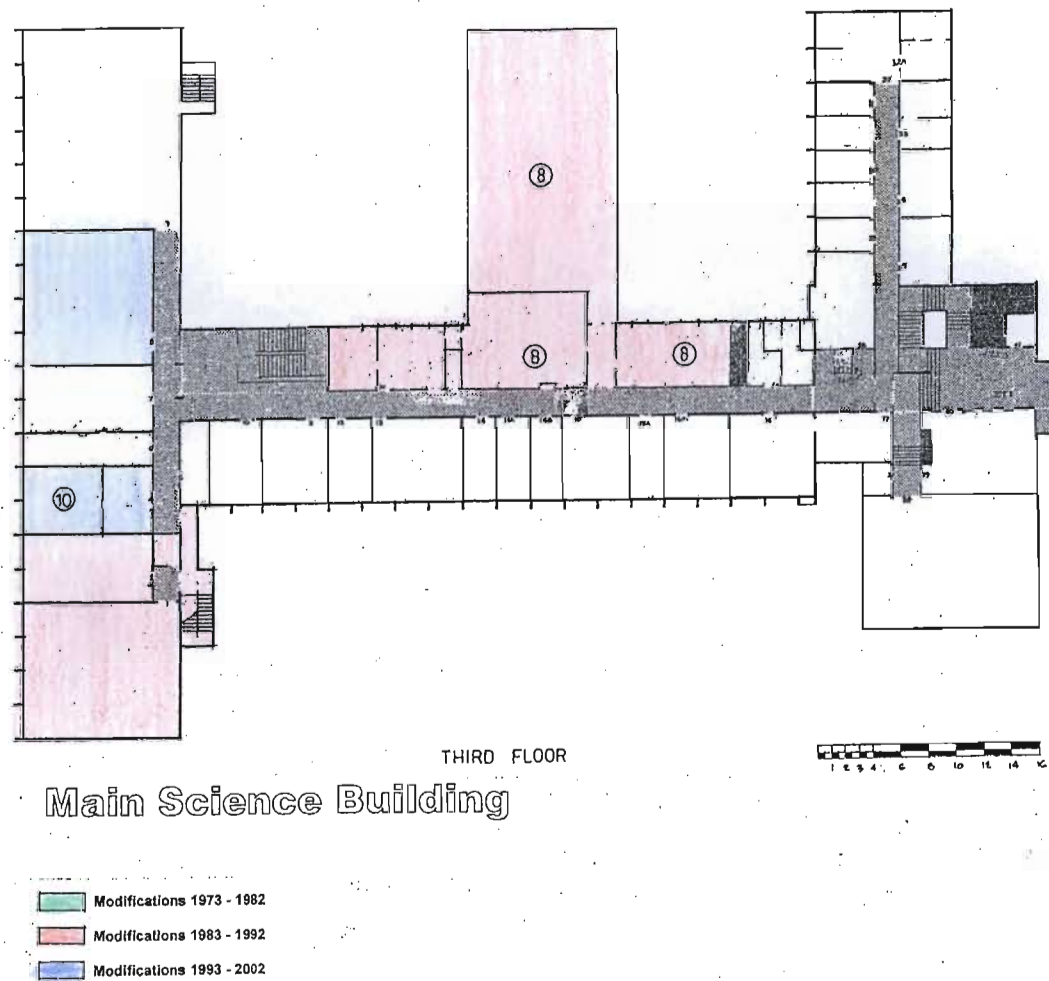


Figure 4.23: Main Science Building: Third Floor Layout - Changes

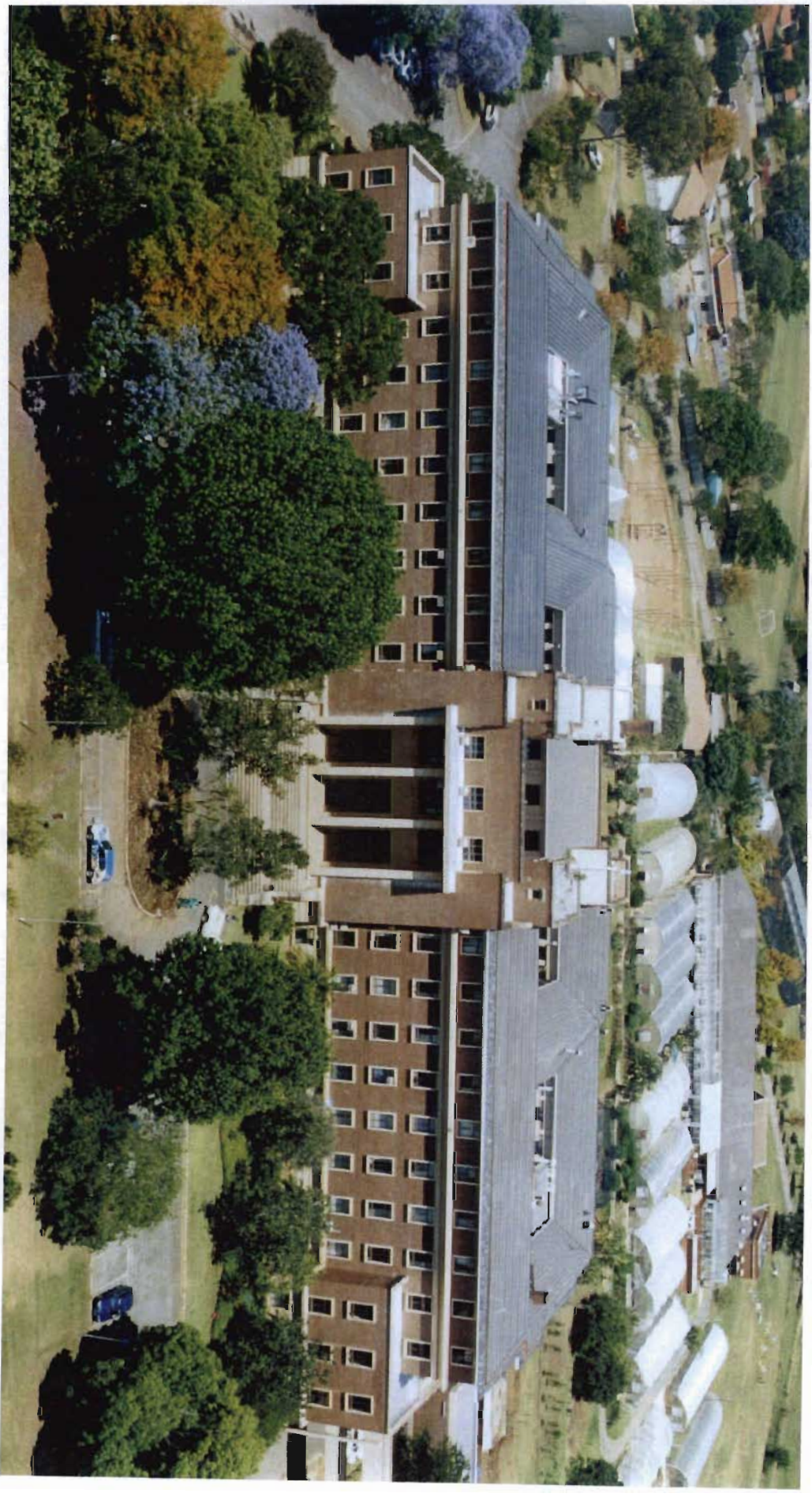
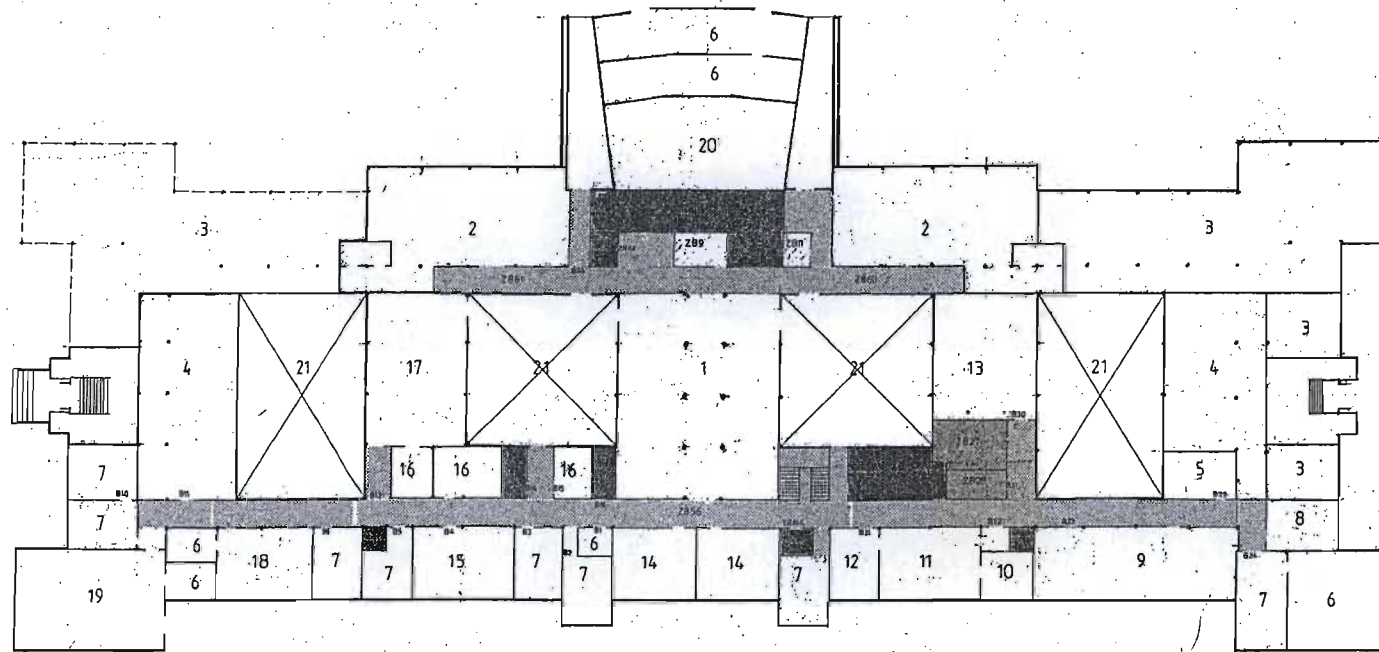


Figure 4.24 Rabie Sanders Building - North Elevation



Figure 4.25 Rabie Sanders Building - East Elevation



Rabie Sanders Building

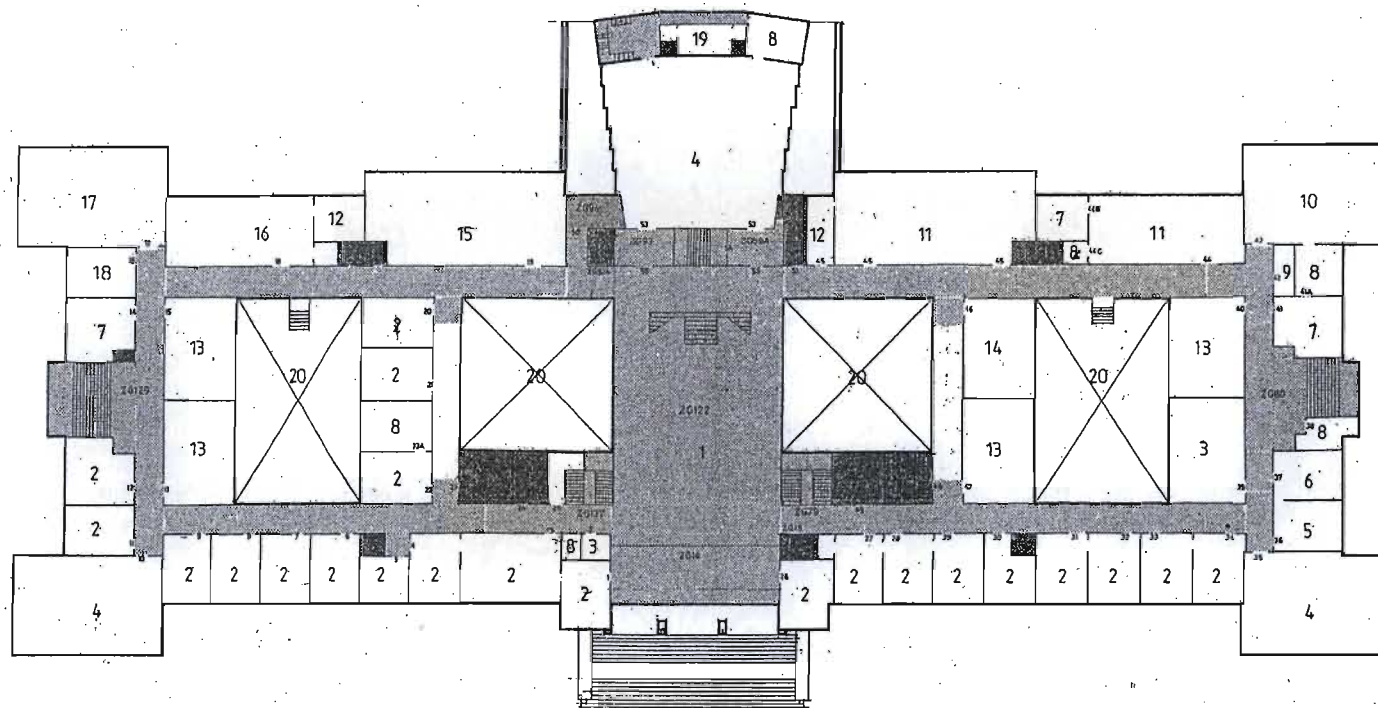
BASEMENT

CIRCA 1950

G.S.M. = 2535 sq.m.



- 1 Exhibition Hall
- 2 Plant Room
- 3 Void
- 4 Under Ground Greenhouse
- 6 Laboratory
- 6 Store
- 7 Office
- 8 Acid Store
- 9 Record Room
- 10 Photo, Chemicals
- 11 Dark Room
- 12 Photo Apparatus
- 13 Implement Workshop
- 14 Strong Room
- 15 Meat Laboratory
- 16 Cold Room
- 17 Dairy Laboratory
- 18 Insectary

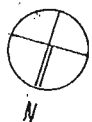
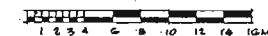


Rabie Sanders Building

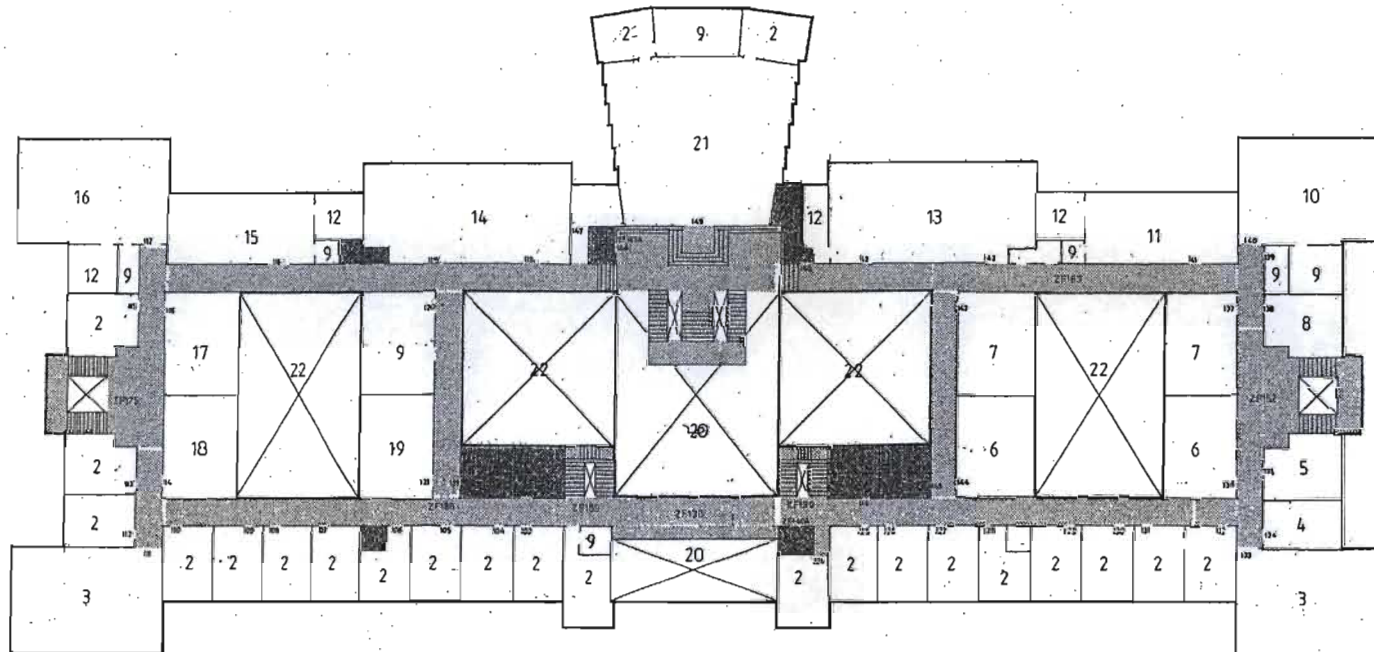
GROUND FLOOR

CIRCA 1950

G.S.M. = 2905sq.m.



- 1 Entrance Foyer
- 2 Office
- 3 Porter
- 4 Lecture Room
- 5 Furnace Room
- 6 Kjeldahl Room
- 7 Balance Room
- 8 Store
- 9 Distilled Water
- 10 Bio-Chemistry Laboratory
- 11 Analytical Laboratory
- 12 Chemical Laboratory
- 13 Research Laboratory
- 14 Laboratory
- 15 Field Husbandry Laboratory
- 16 Pasture Research Laboratory
- 17 Radioisotope Laboratory

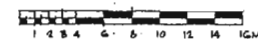


Rabie Sanders Building

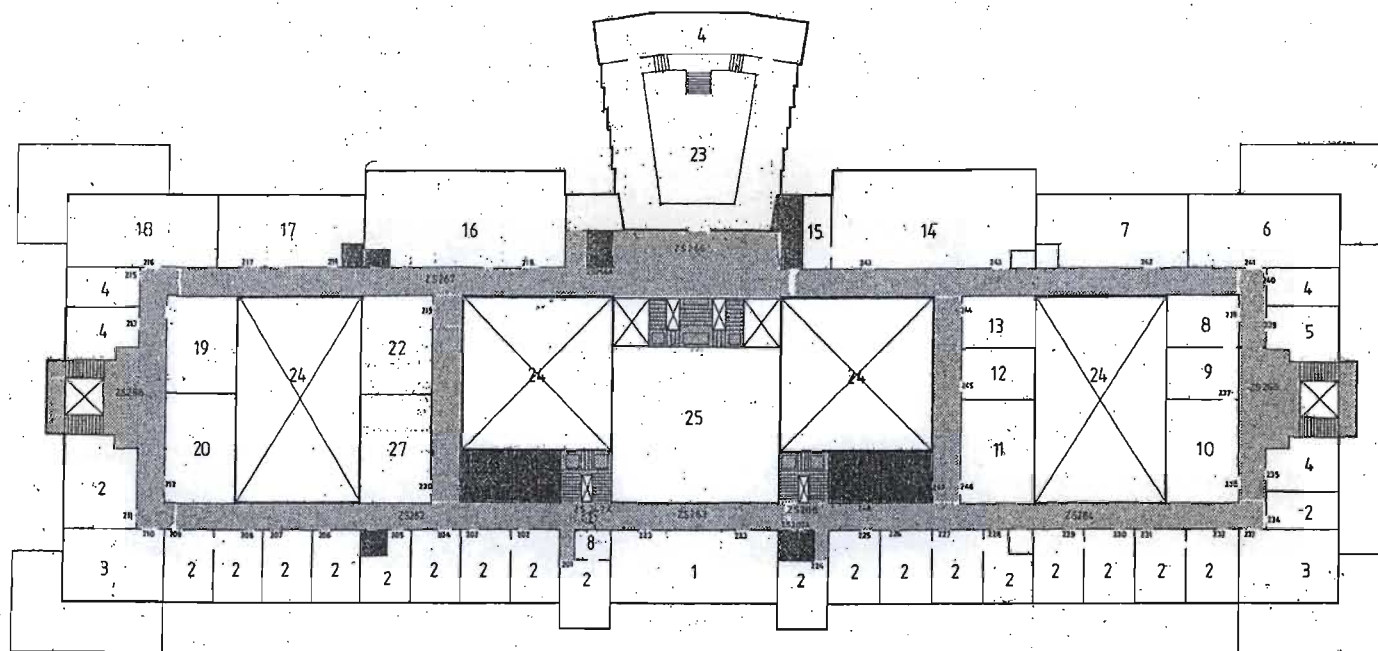
FIRST FLOOR

G.S.M. = 2653 sq.m.

CIRCA 1960



- 1 Bridge
- 2 Office
- 3 Lecture Room
- 4 Germination Room
- 5 Cytology Store
- 6 Cytology Research Laboratory
- 7 Horticulture Research Laboratory
- 8 Specimen Receiving Room
- 9 Store
- 10 Horticulture Laboratory
- 11 Cytology Laboratory
- 12 Preparation Room
- 13 Genetics Laboratory
- 14 Physiology Laboratory
- 15 Poultry Laboratory
- 16 Veterinary Science Laboratory
- 17 Poultry Research Laboratory
- 18 Students Room

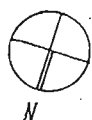
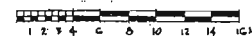


Rabie Sanders Building

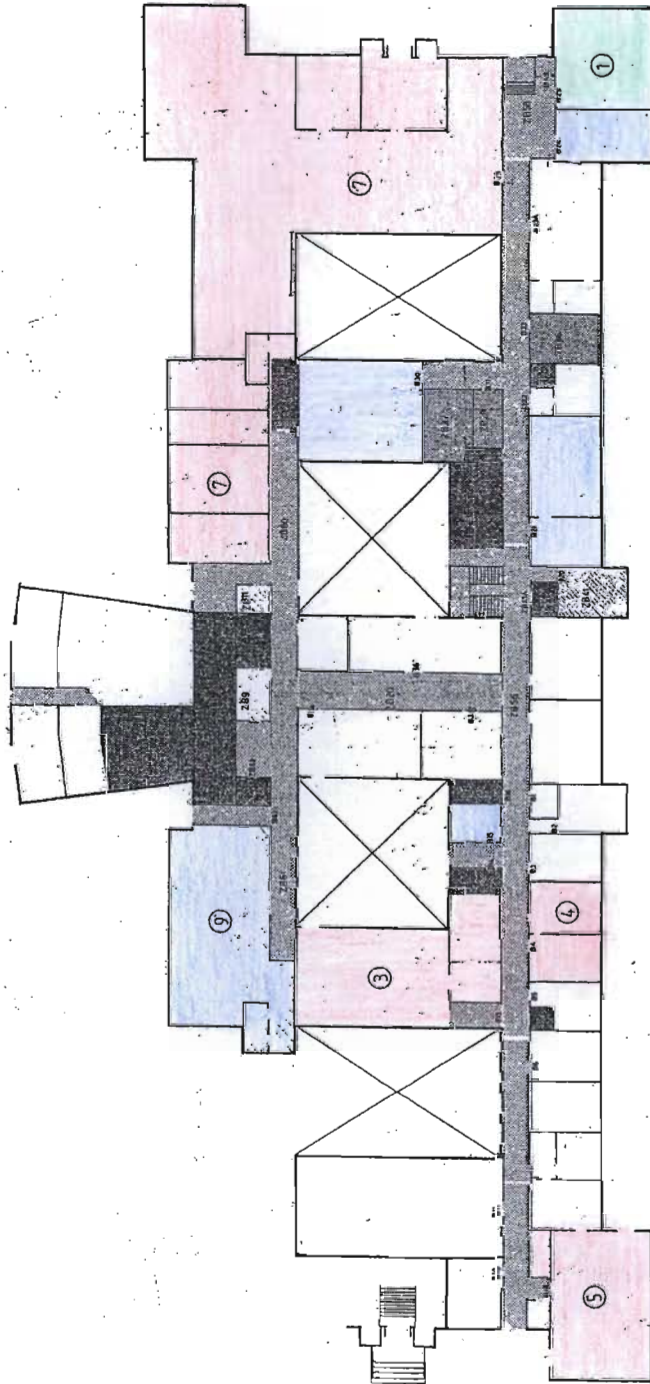
SECOND FLOOR

G.S.M. = 2538 sq.m.

CIRCA 1950



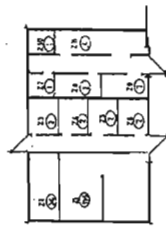
1. Staff Common Room
2. Office
3. Lecture Room
4. Store Room
5. Specimen Receiving Room
6. Entomology Demonstration Laboratory
7. Entomology Laboratory
8. Culture Room
9. Steriliser Room
10. Entomology Research Laboratory
11. Plant Pathology Research Laboratory
12. Incubation Room
13. Laboratory
14. Plant Pathology Laboratory
15. Preparation Room
16. Agricultural Engineering Drawing Room
17. Dairy Laboratory
18. Forestry Laboratory
19. Dairy Laboratory
20. Forestry Specimen Room
21. Seminar Room



BASEMENT
G.S.M. = 2535 sq. m.

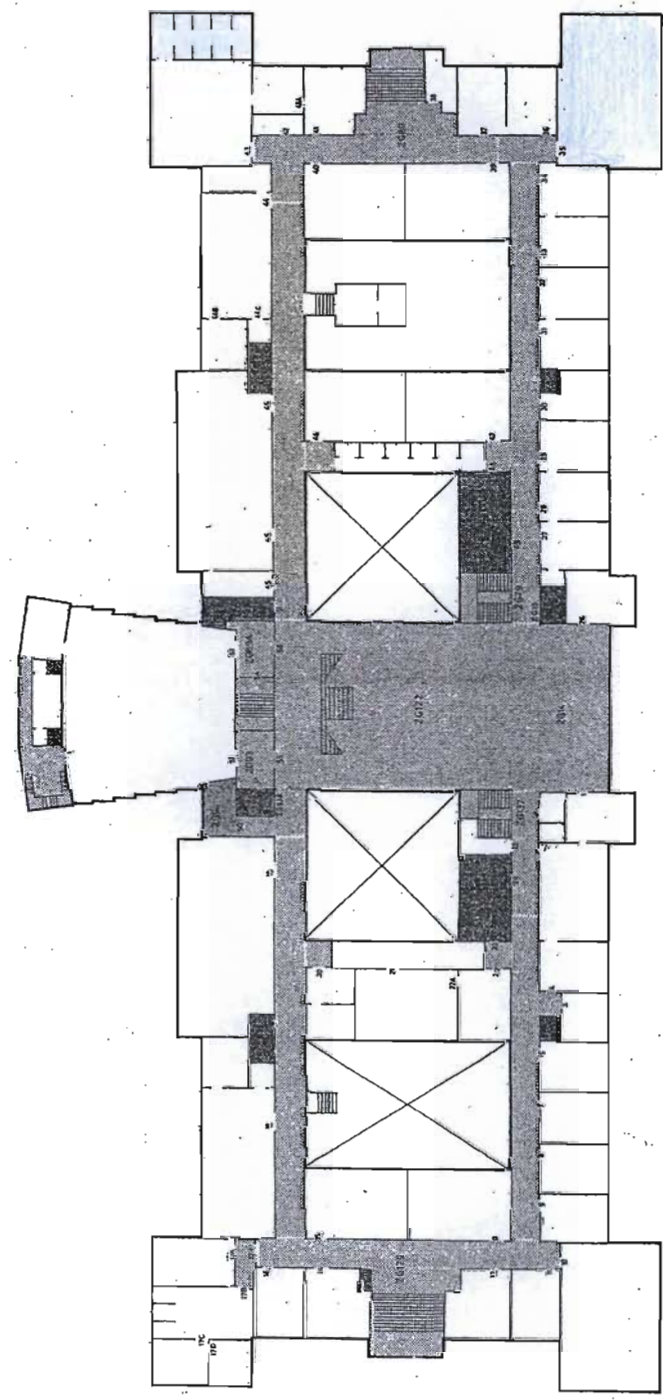
Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



SOLVENT AND ACID STORE

ASH 33mm
GSM 405mm



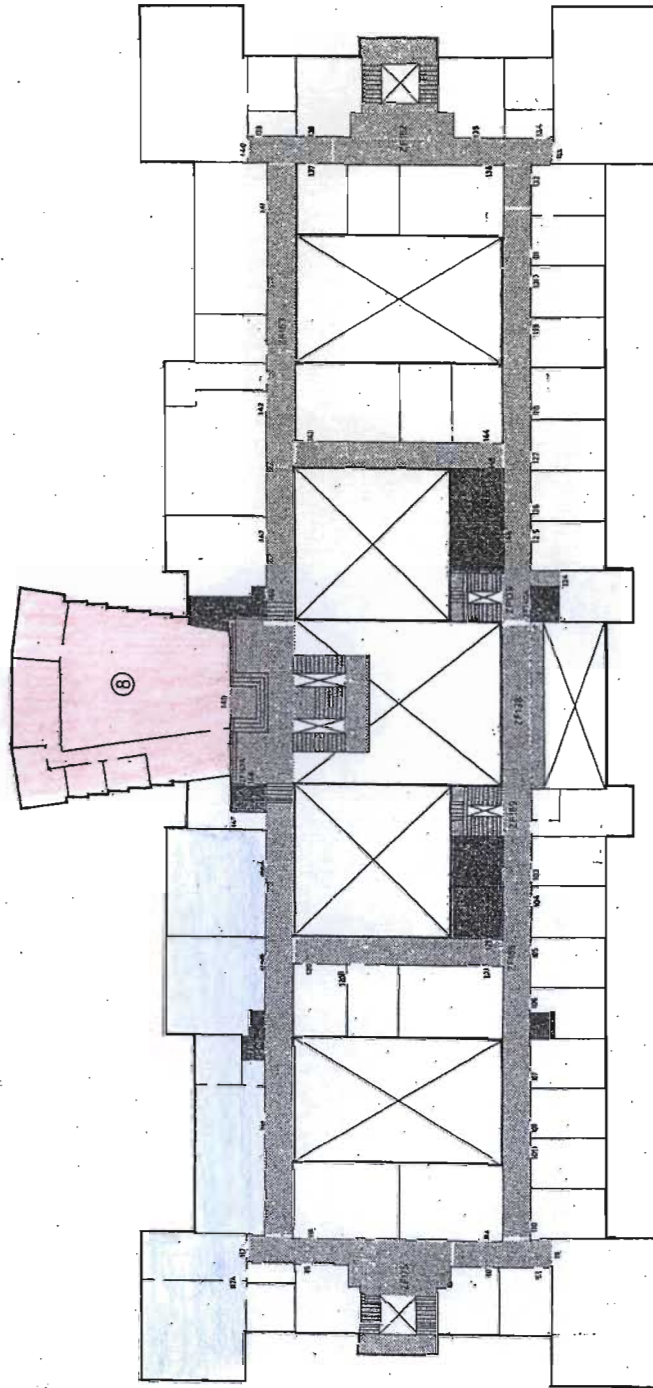
GROUND FLOOR

G.S.M. = 2905sq.m.



Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

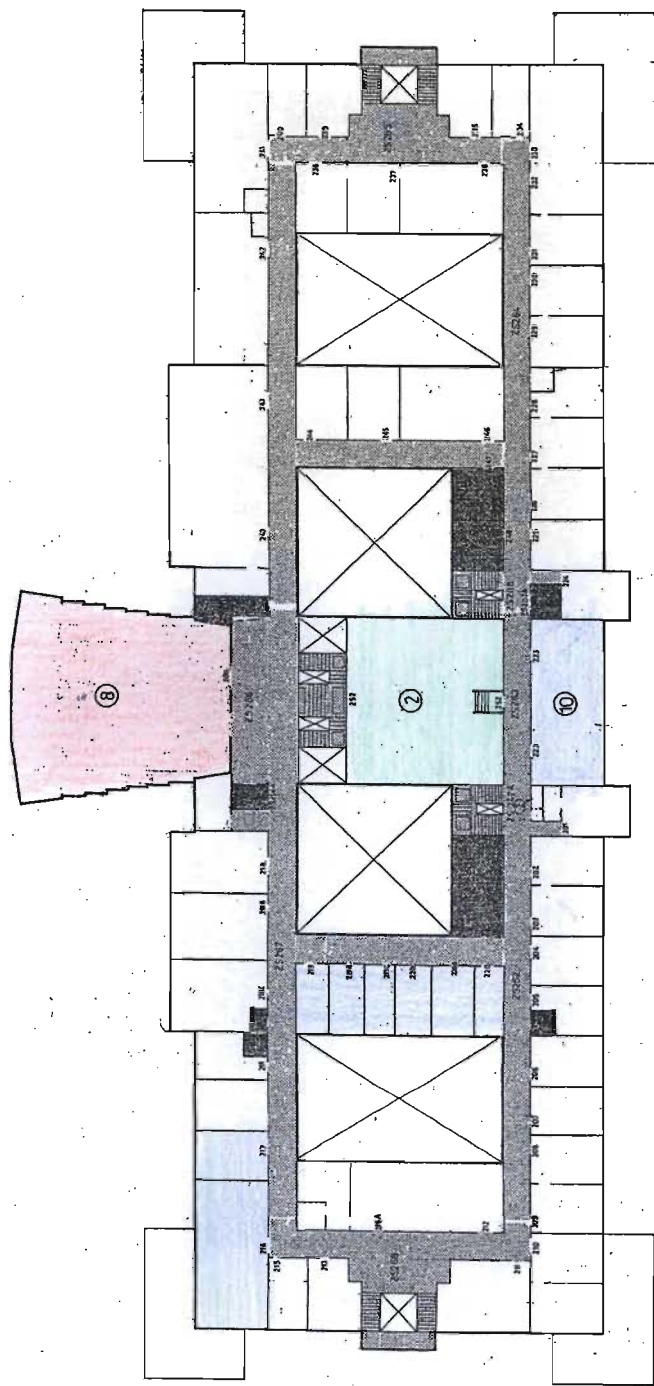


FIRST FLOOR

G.S.M. = 2653sq.m.

Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

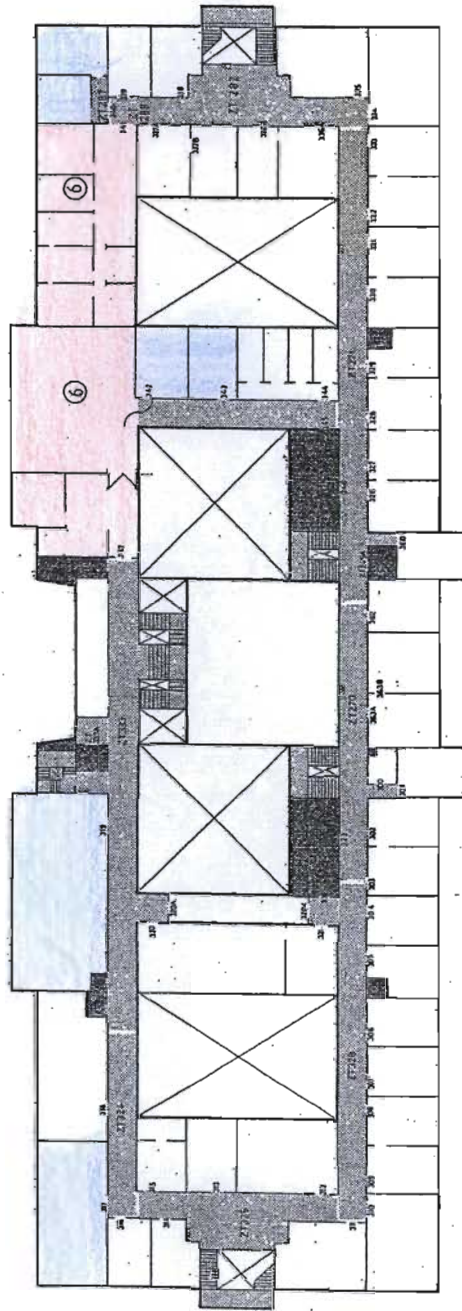


SECOND FLOOR

G.S.M. = 2538 sq.m.

Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



THIRD FLOOR
G.S.M. = 2124 sq.m.



Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



Figure 4.36 New Arts Building - East Elevation

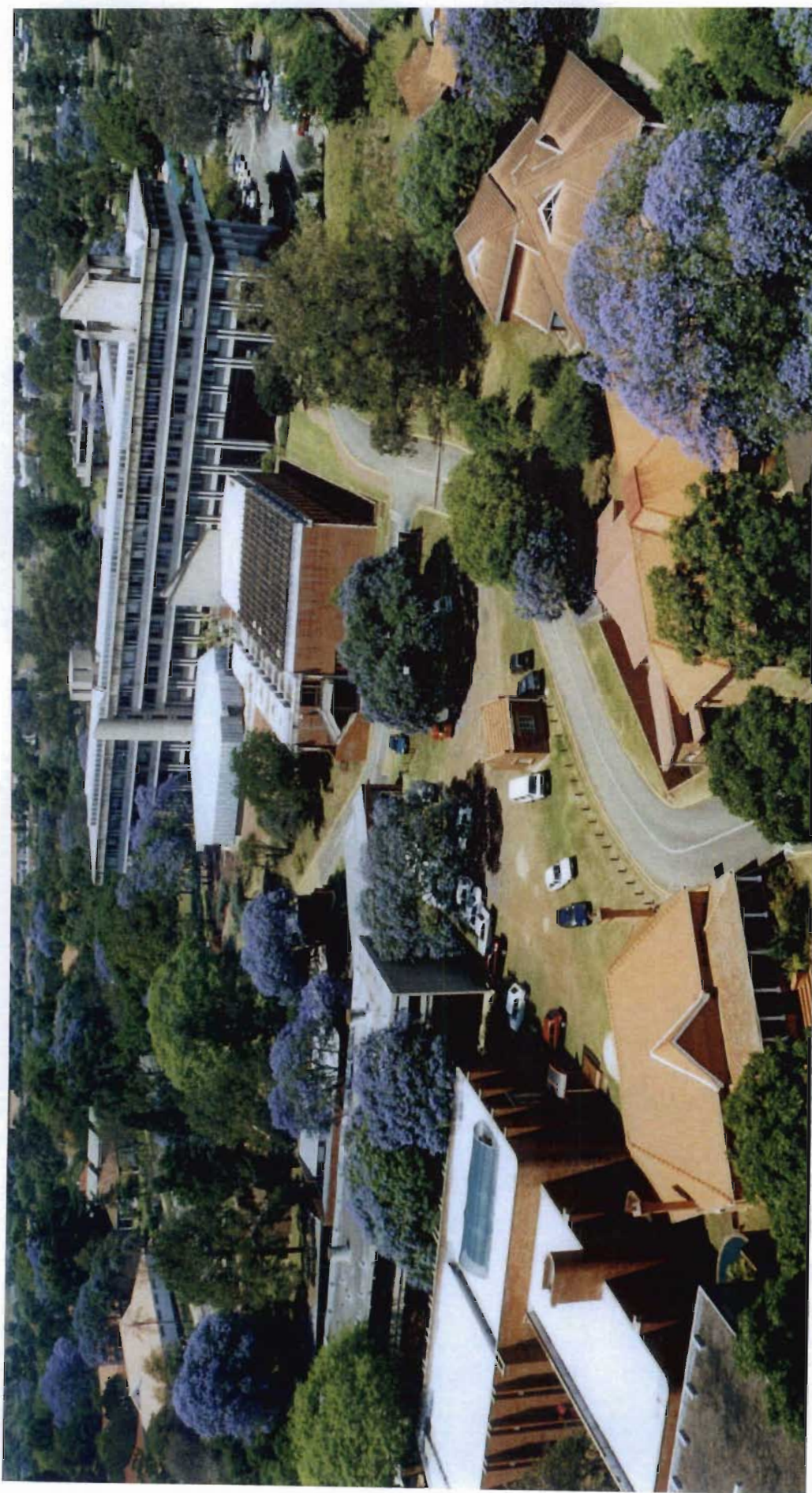


Figure 4.37 New Arts Building - West Elevation

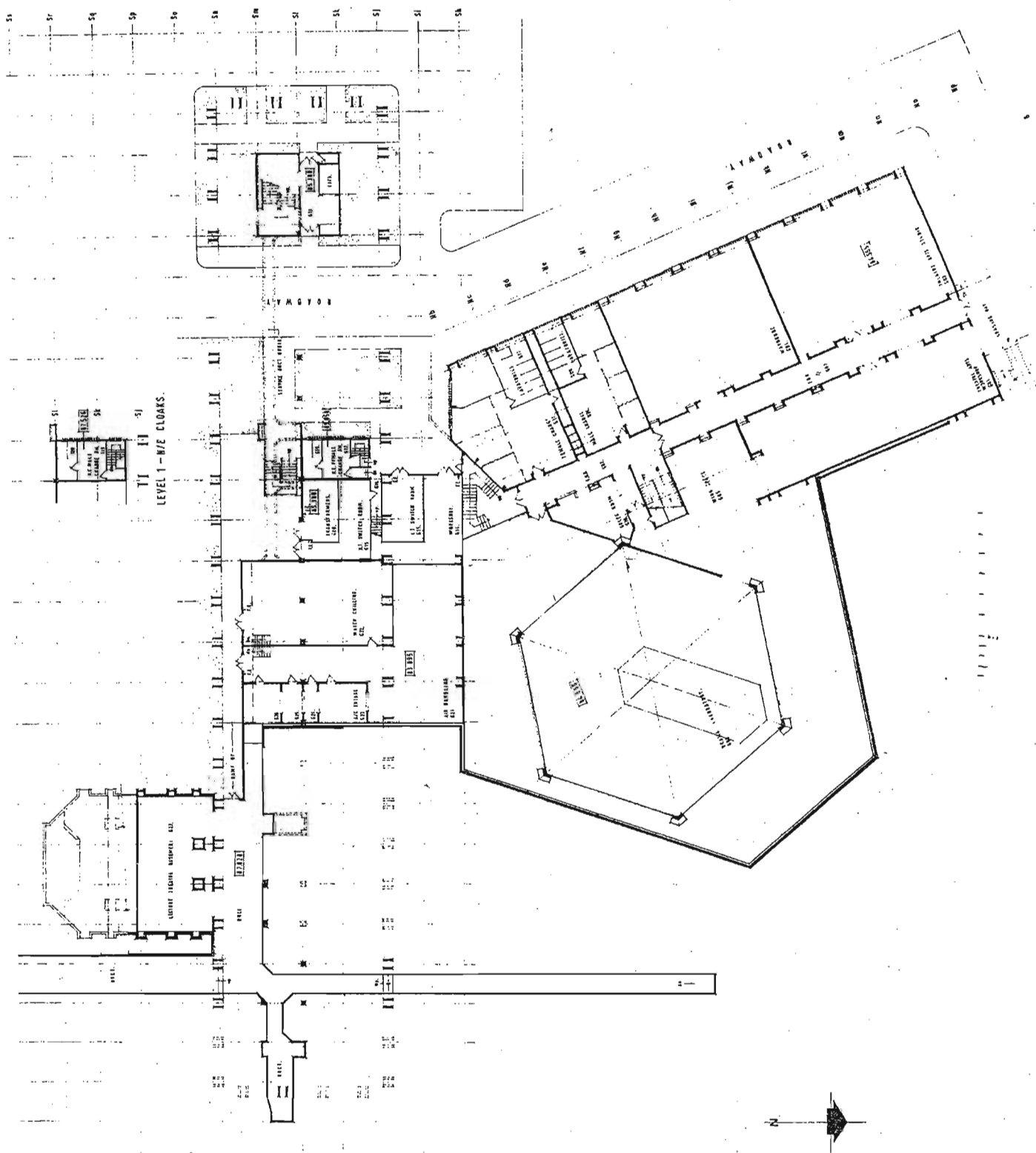


Figure 4.38 New Arts Building: Lower Ground Floor Layout - Circa 1973

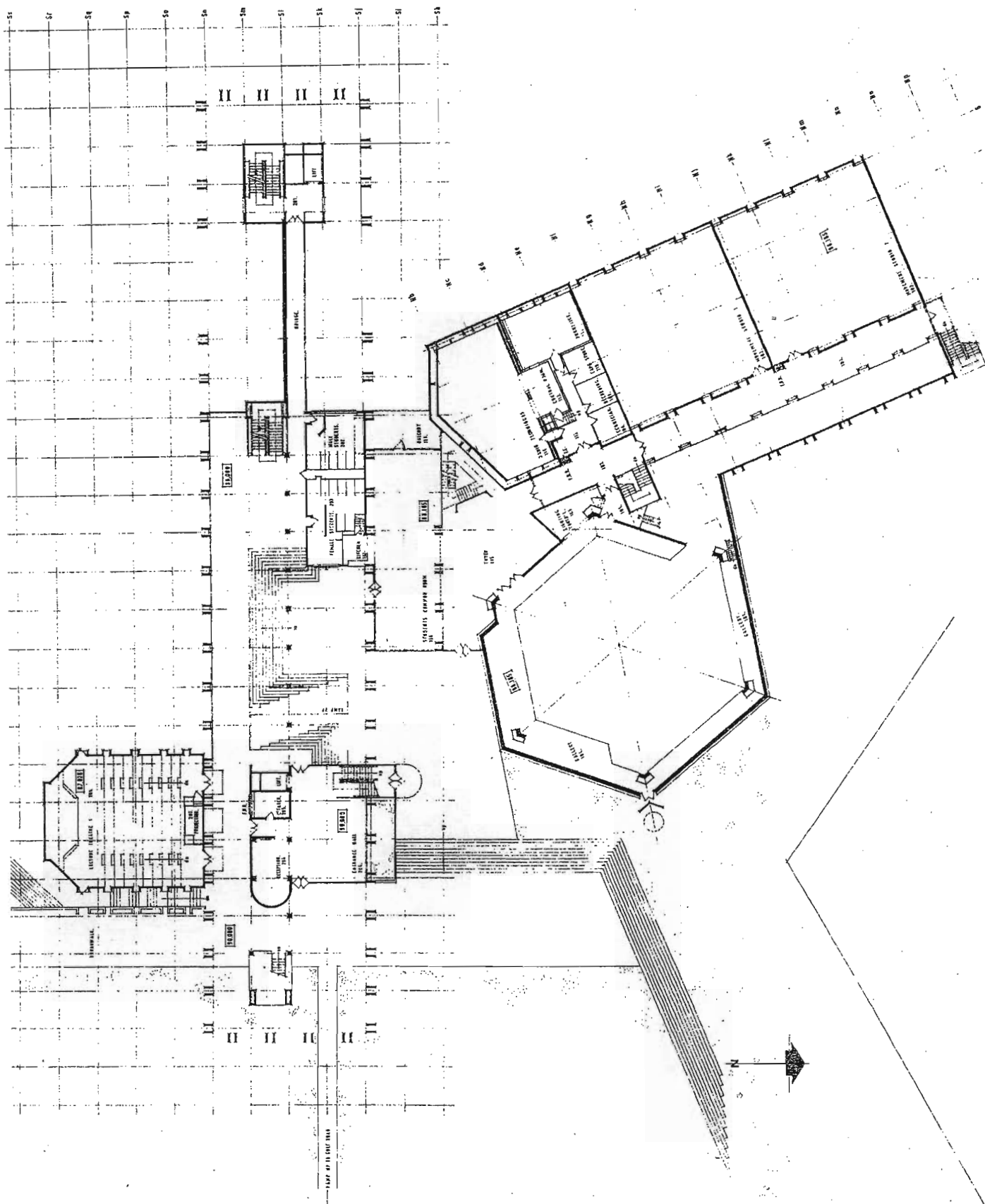


Figure 4.39: New Arts Building: Ground Floor Layout - Circa 1973

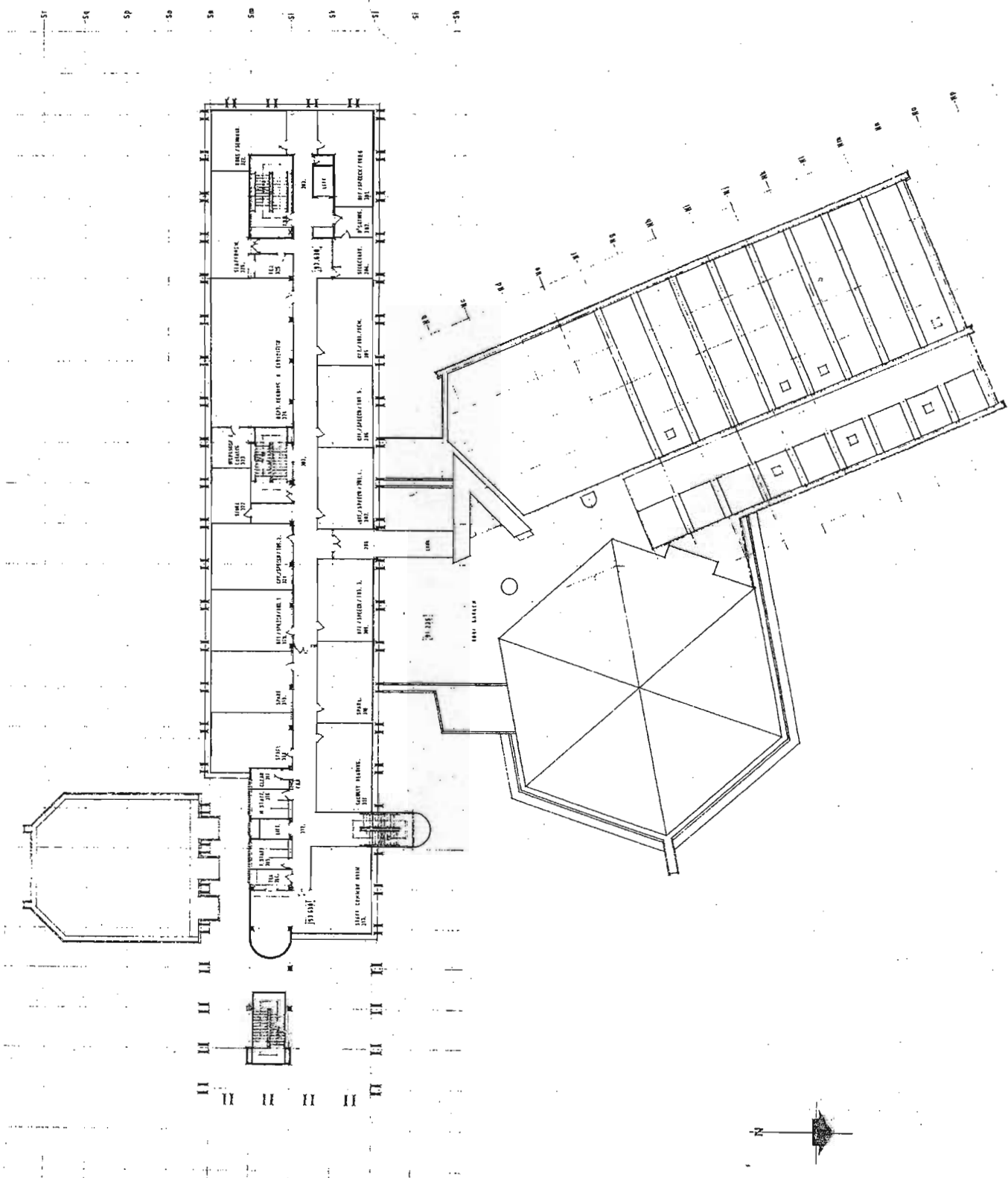


Figure 4.40: New Arts Building: First Floor Layout - Circa 1973
Architectural Office

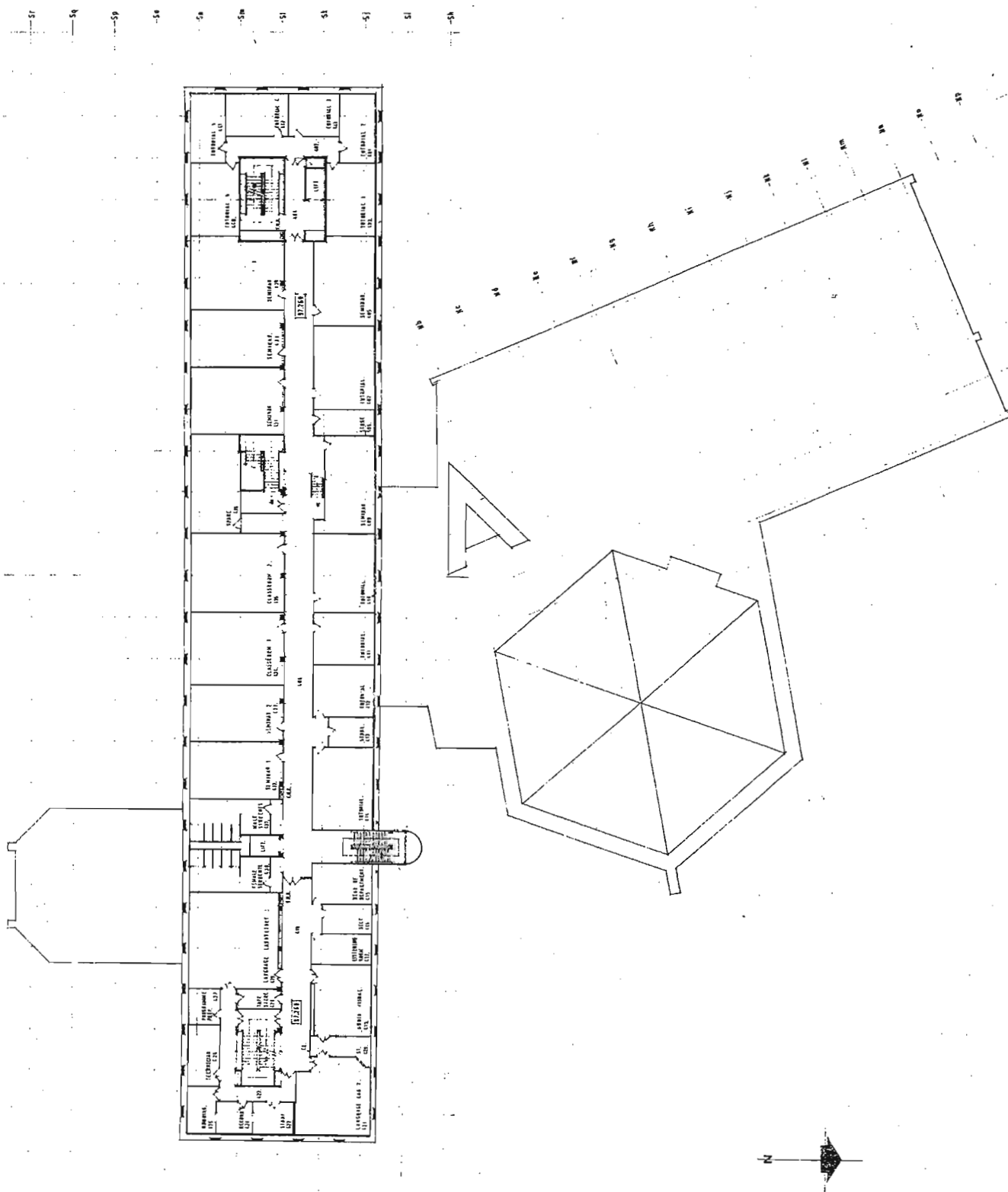


Figure 4.41: New Arts Building: Second Floor Layout - 2000

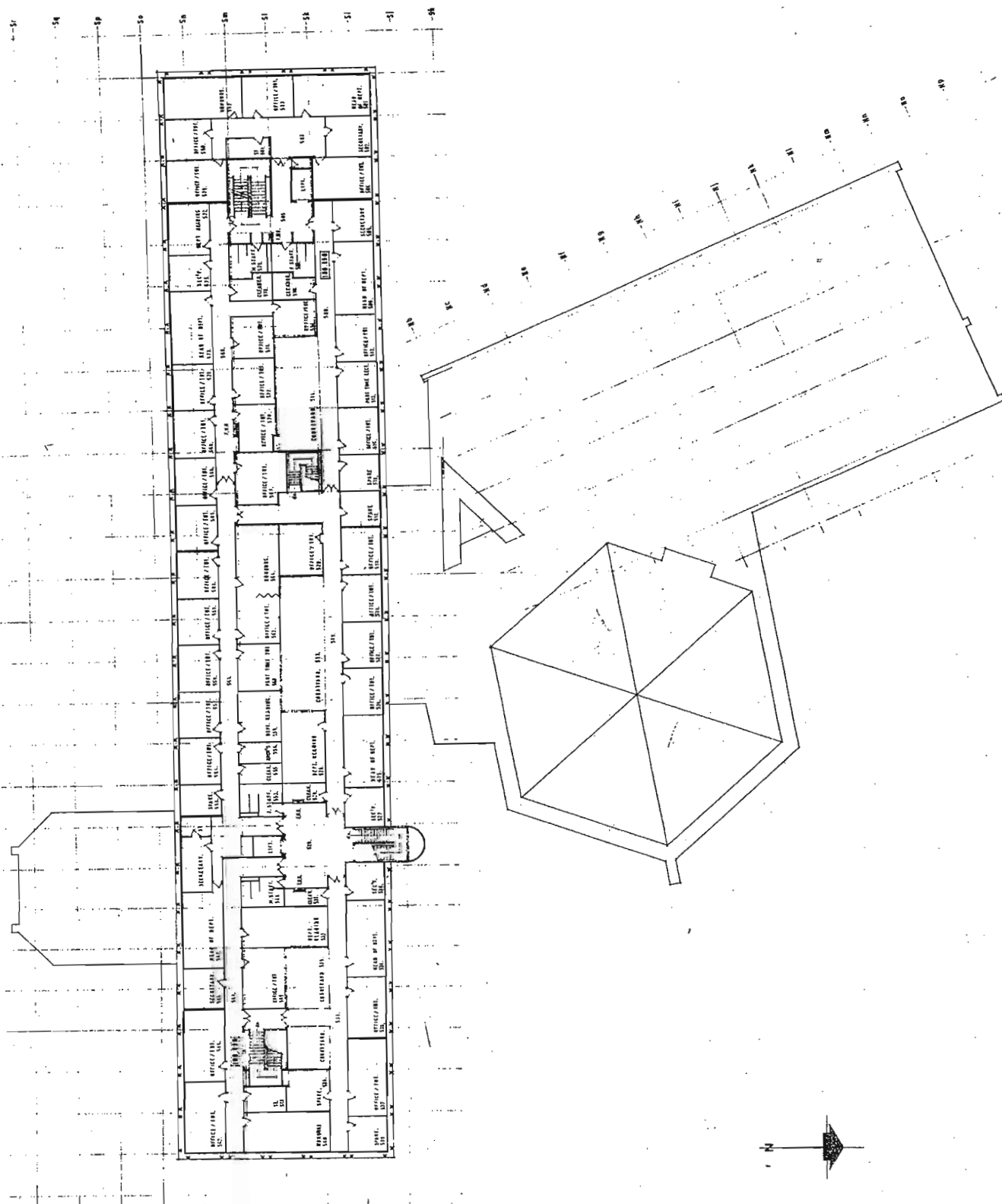


Figure 4.42: New Arts Building: Third Floor Layout - Circa 1973

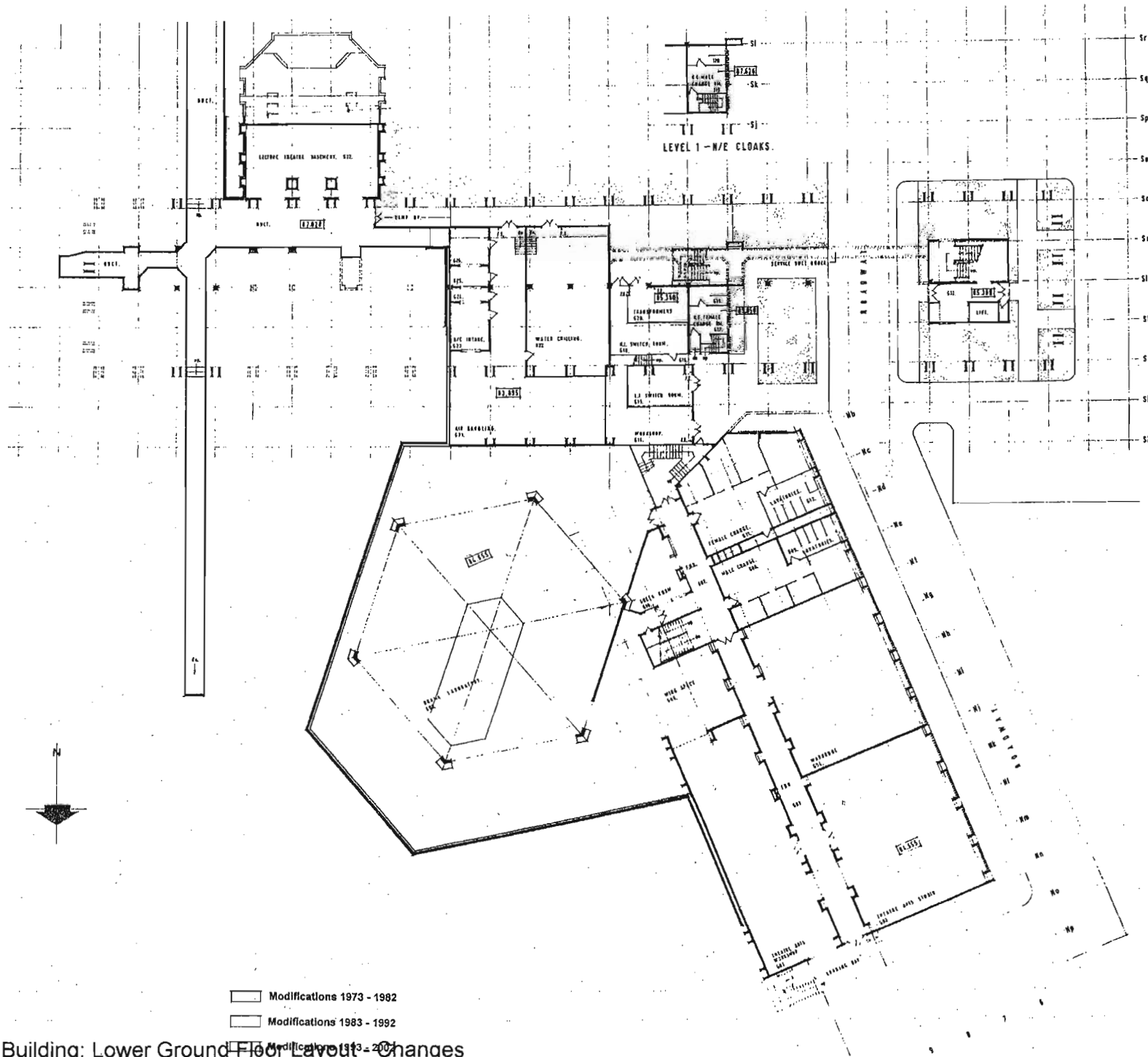
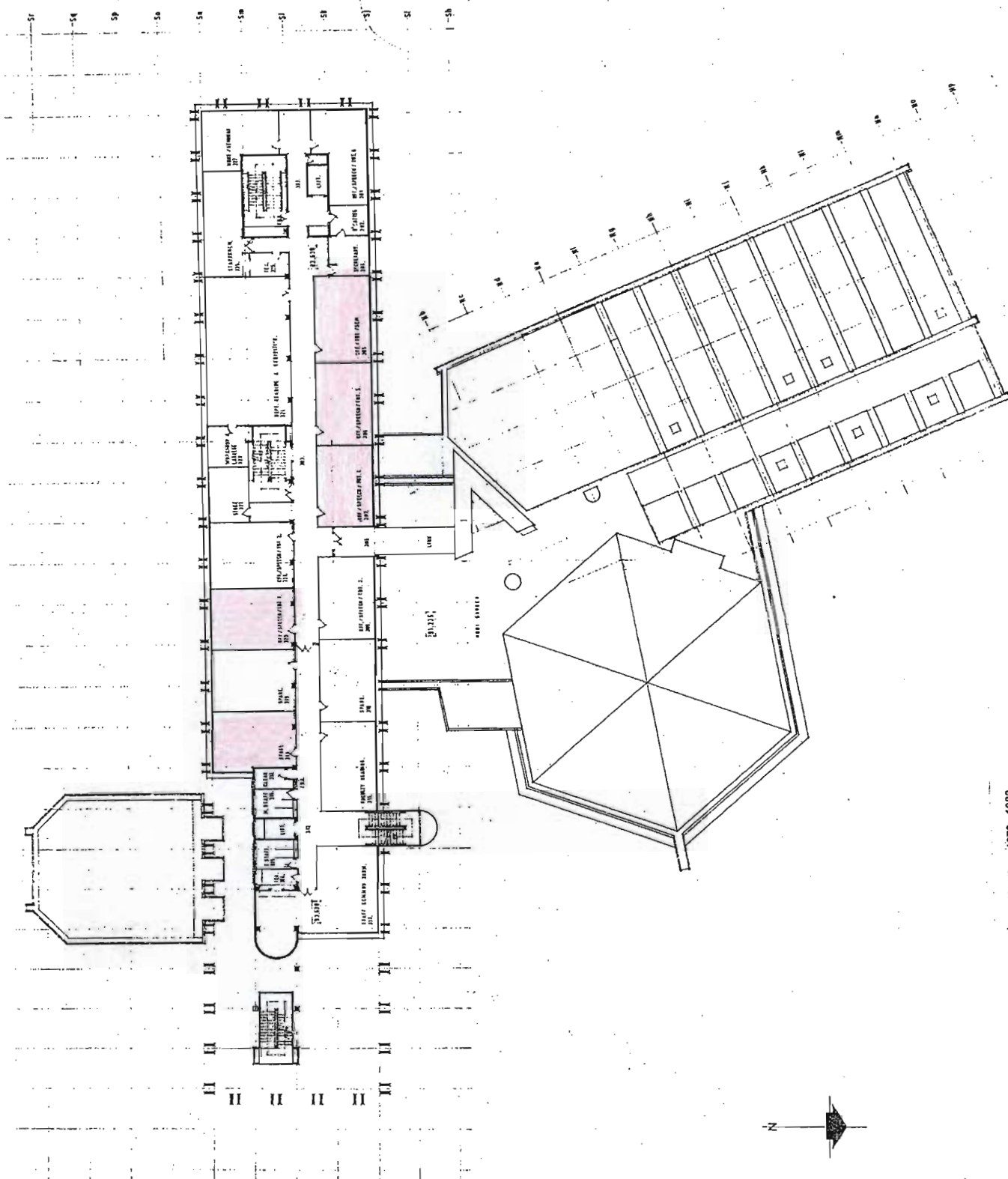


Figure 4.43 New Arts Building: Lower Ground Floor Layout - Changes



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

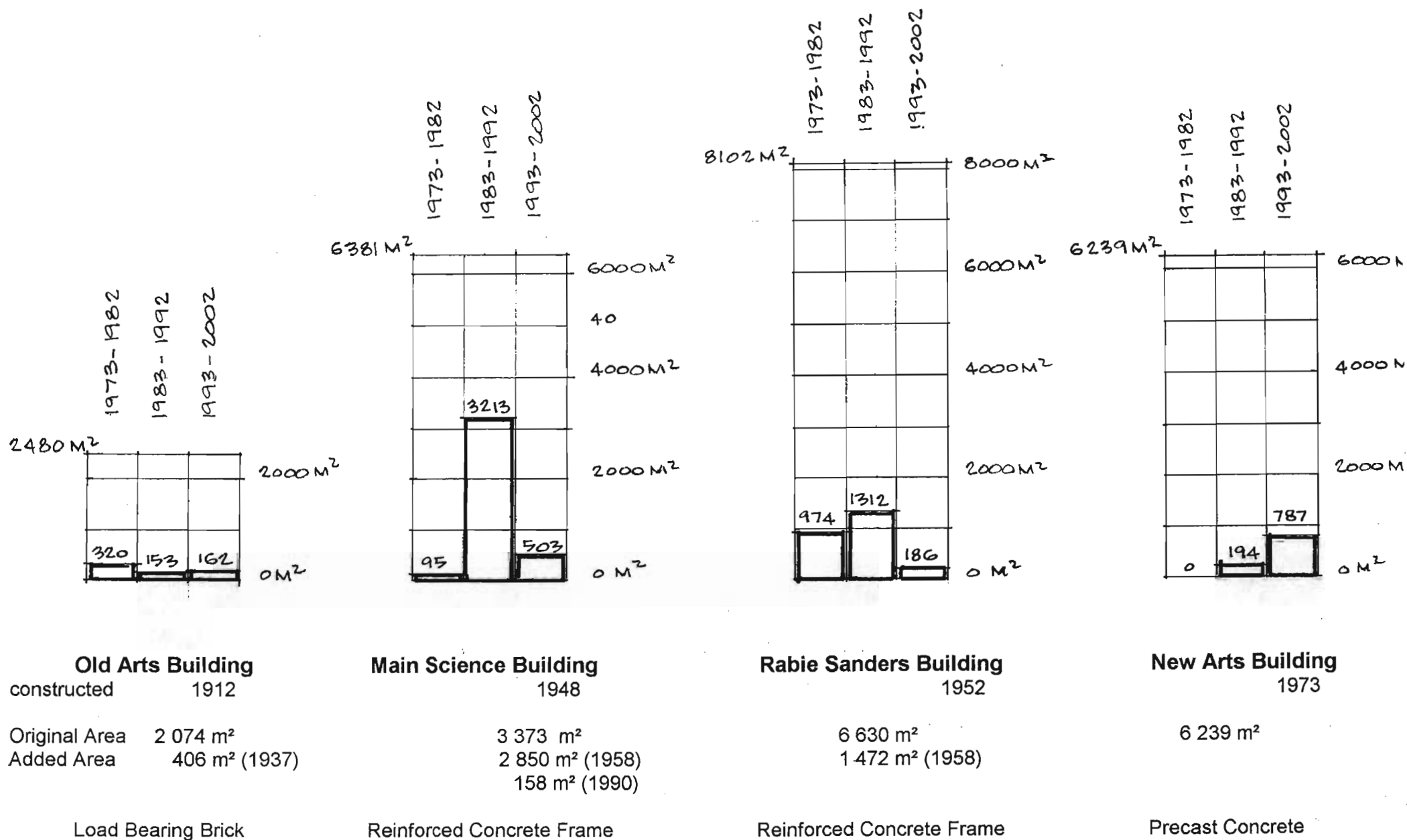
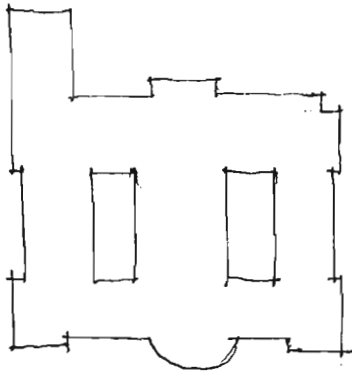
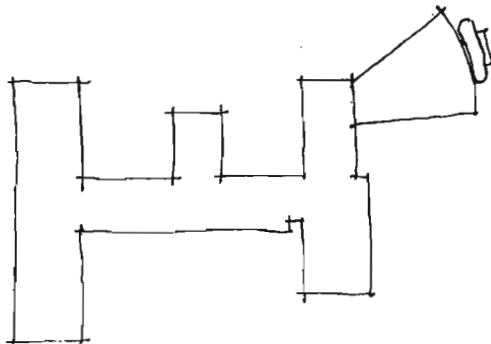


Figure 4.48 Comparative Graphs indicating the extent of Changes of the various Buildings



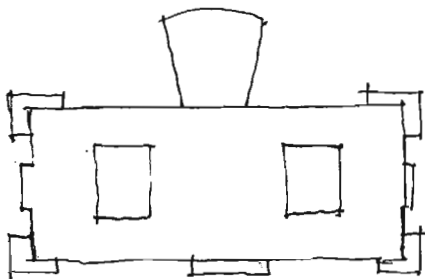
OLD ARTS BUILDING

Load bearing brick structure.
 Two internal courtyards.
 Well defined entrances.
 Strong Image - National Monument.
 Teaching venues recessed on colonnaded porch.
 North / South orientation.
 West facing main facade - venues uncomfortable in summer.
 Malleable interior spaces - no effect on the exterior
 The building may be extended at the rear.



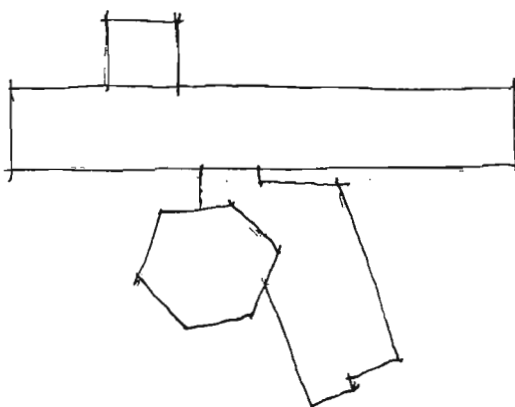
MAIN SCIENCE BUILDING

Framed reinforced concrete structure - brick infill.
 Amorphous shape
 No defined entrances.
 Anonymous building image
 West facing facade - uncomfortable venues in summer.
 Malleable interior spaces which have an impact on the exterior
 The building may be extended.
 Sound investment but poor architectural quality.



RABIE SANDERS BUILDING

Framed reinforced concrete structure - brick infill
 Two internal courtyards.
 Well defined entrances.
 Strong Neo-Classic Image.
 Teaching venues in projecting corners of building
 North / South orientation.
 West facing main facade - uncomfortable rooms in summer.
 Malleable interior spaces - no effect on the exterior



NEW ARTS BUILDING

Precast reinforced concrete structure.
 Landmark building
 Well defined entrances.
 Strong Image.
 East / West orientation.
 West facing facade - uncomfortable in summer.
 Malleable interior spaces - no effect on the exterior
 May only be extended using attached freestanding lecture pods at ground floor level.

The dimensions of all rooms, corridors, etc., must be figured on the plans and sections.

14. All reasonable care will be taken of the drawings and supporting documents, but the Government will not hold itself responsible for loss or injury to same, from whatever cause arising, while in its charge or in transit.

15. Accompanying the design of each competitor, estimates of the cost of the works must be submitted, giving the details of how such estimates of cost are arrived at, cubing prices and dimensions, and method of arriving at same.

The maximum cost of the Building may be taken at £30,000, inclusive of heating, Grinnel sprinkler installation, electric lighting, and all sanitary fittings, with water carriage drainage to King Edward Avenue, but only such fixtures and fittings as may be considered integral portions of the scheme.

A typewritten specification or description is to accompany the estimates, explaining the construction, materials, system of heating, lighting, ventilating, etc., proposed to be adopted. A schedule giving the area and position of each apartment must be attached to the specification.

Both the estimate and specification are to be typewritten on white foolscap size paper.

J. F. E. BARNES,

Chief Engineer, P.W.D.

Pietermaritzburg,

August, 1909.

Natal University College.

Testimonial.

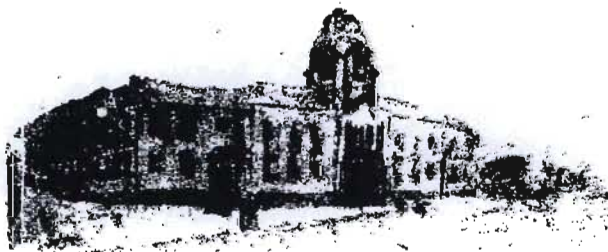
This is to certify that

— **Mr R.E. Geddes** —

acted as Clerk of the Works for the Natal University College. The foundation stone was laid on December 1st. 1910, by His Royal Highness, the Duke of Cornwall & Devon, K.G. etc., and the building was opened on August 9th. 1912, by the Honourable J.E. Maseko, Minister of Education for the Union of South Africa.

Mr. Geddes has carried out his duties to the entire satisfaction of the Architects, who have always found him courteous, and attentive to his work. He has a sound practical knowledge of Building Construction in all its branches and the manner in which he has supervised the erection of this important building reflects the care and ability he exercised in his capacity as Clerk of Works.

We are certain that Mr. Geddes, when engaged on other works, will carry out his duties with credit to himself and satisfaction to his employers.



Tully Waters Cleland &
Pentland Smith.
Architects

J. Collingwood Tully F.R.A.S.
Resident Architect



Figure 2.1: Peter Jones Department Store - London
Shoring of Original Structure



Figure 3.1 De Montford University - Leicester
The Original Hawthorn Building Facade

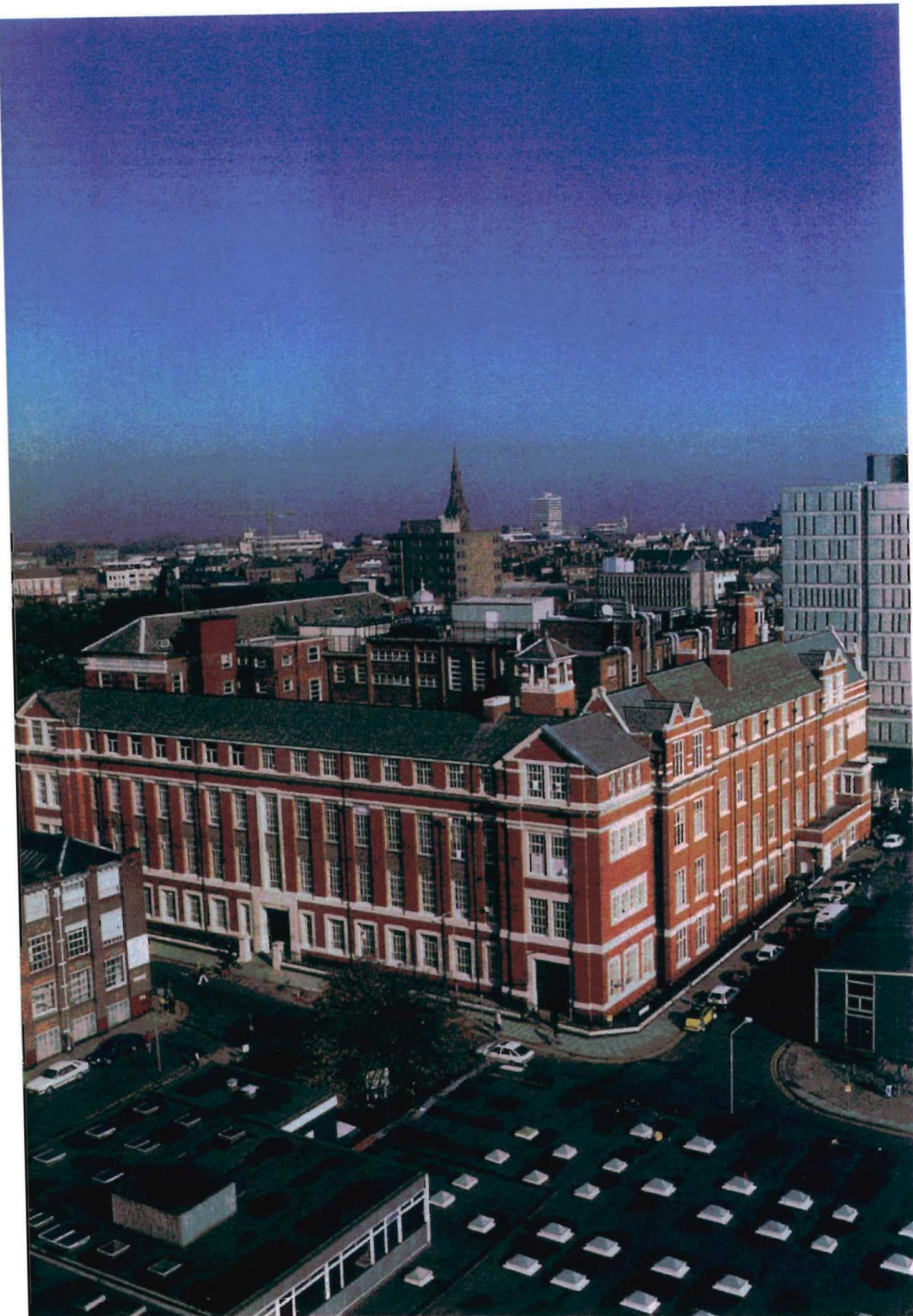


Figure 3.2 De Montford University - Leicester

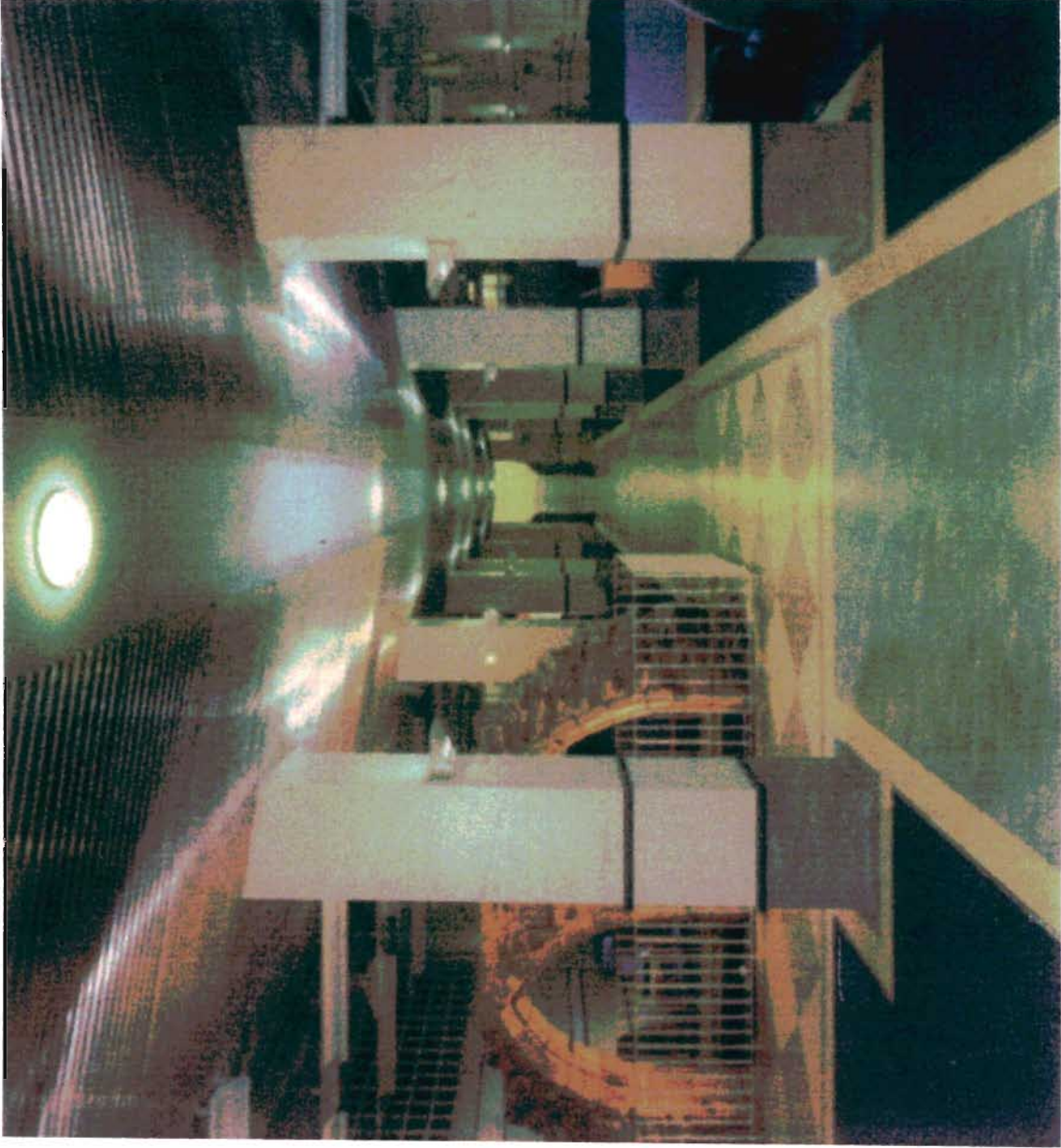


Figure 3.3 De Montford University - Leicester
The Refurbished Interior of the Hawthorn Building.

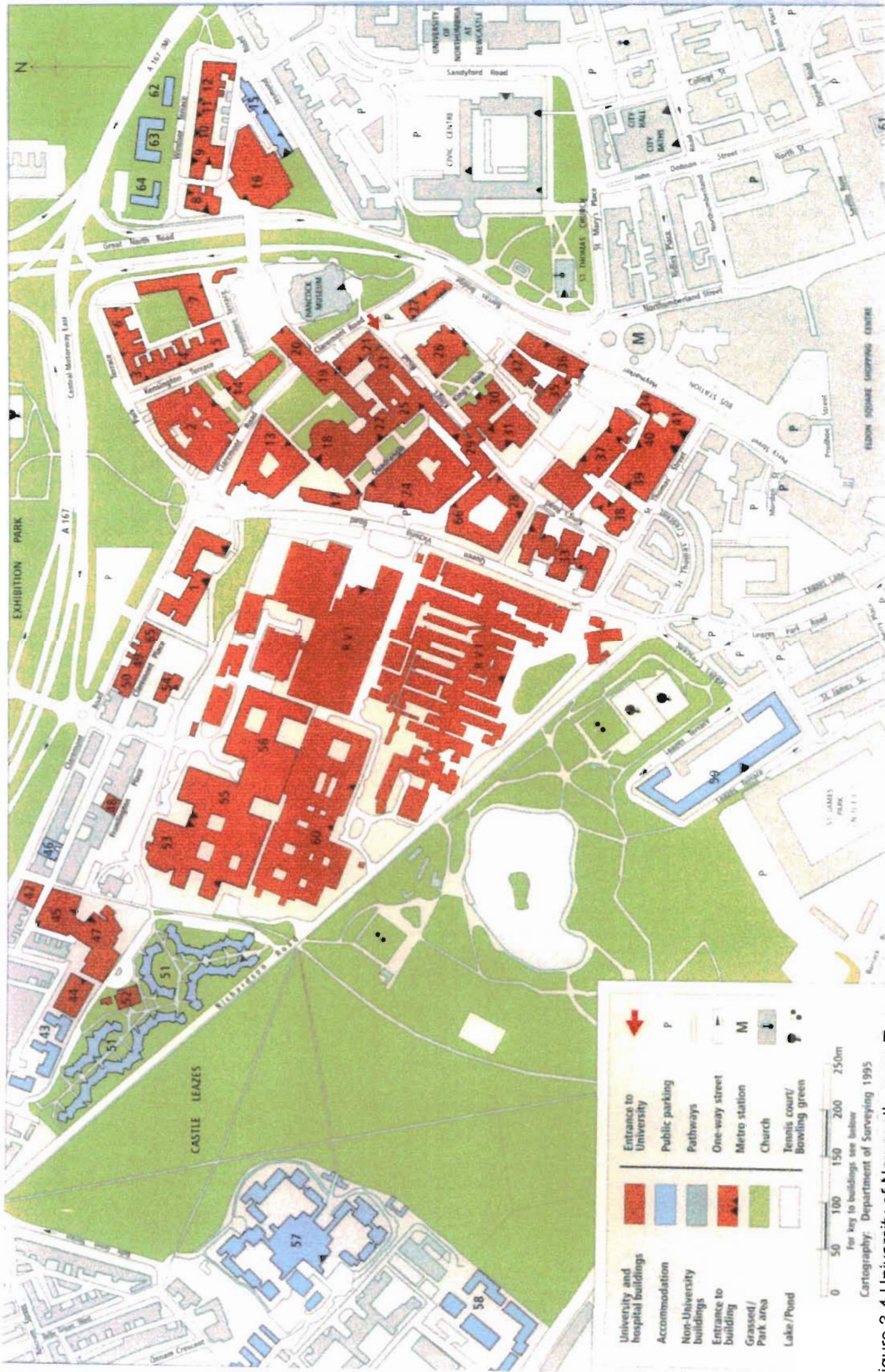


Figure 3.4 University of Newcastle-upon-Tyne



Figure 3.5 University of Newcastle-upon-Tyne
The Buildings around the Library Quad

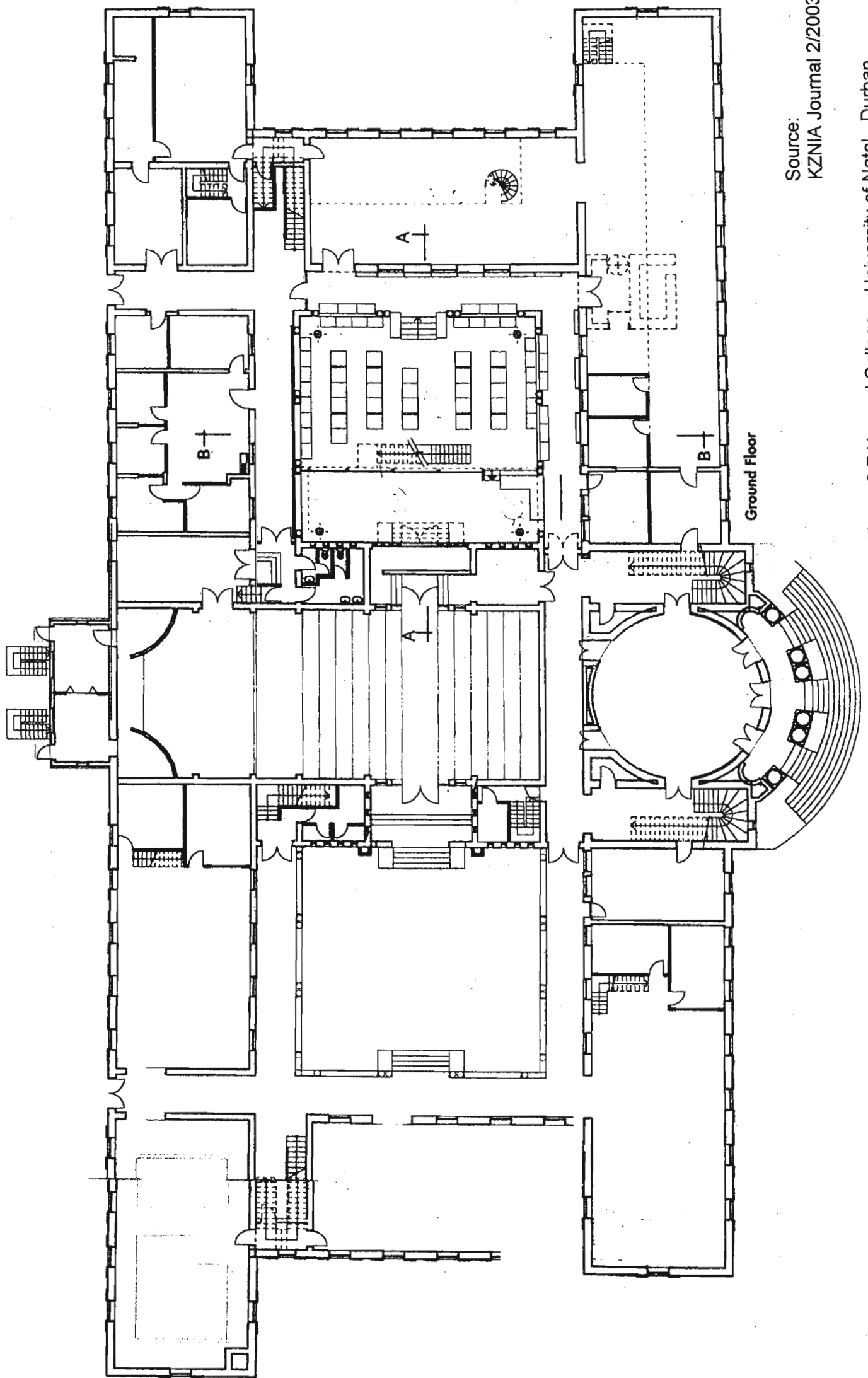


Figure 3.6 University of Newcastle-upon-Tyne
The Converted Old Library



Figure 3.8 Howard College - University of Natal - Durban
Interior of Enclosed Court as extension to Law Library

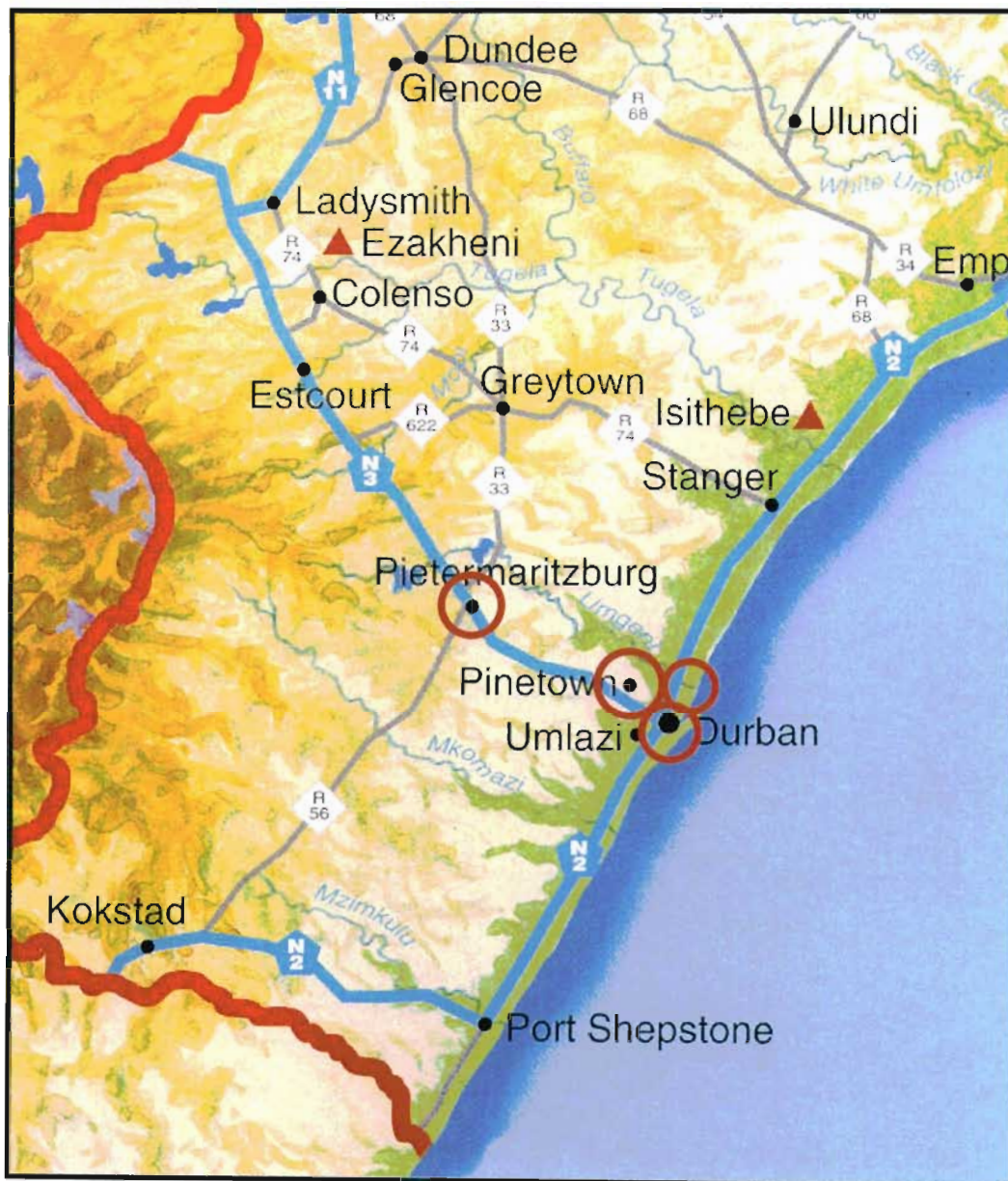
Source:
KZNIA Journal 2/200



Source:
KZNIA Journal 2/2003

Figure 3.7 Howard College - University of Natal - Durban

Location of University of Natal Campuses and Faculties



D=Durban, E=Edgewood (Pinetown), P=Pietermaritzburg

Faculties of:

Community & Development Studies

D

Education

P,E,D

Engineering

D

Human Sciences

P,D

Law

P,D

Medicine

D

Science & Agriculture

P

Science

D

Figure 4.1 Locality Map of East Coast

UNIVERSITY OF NATAL
PIETERMARITZBURG

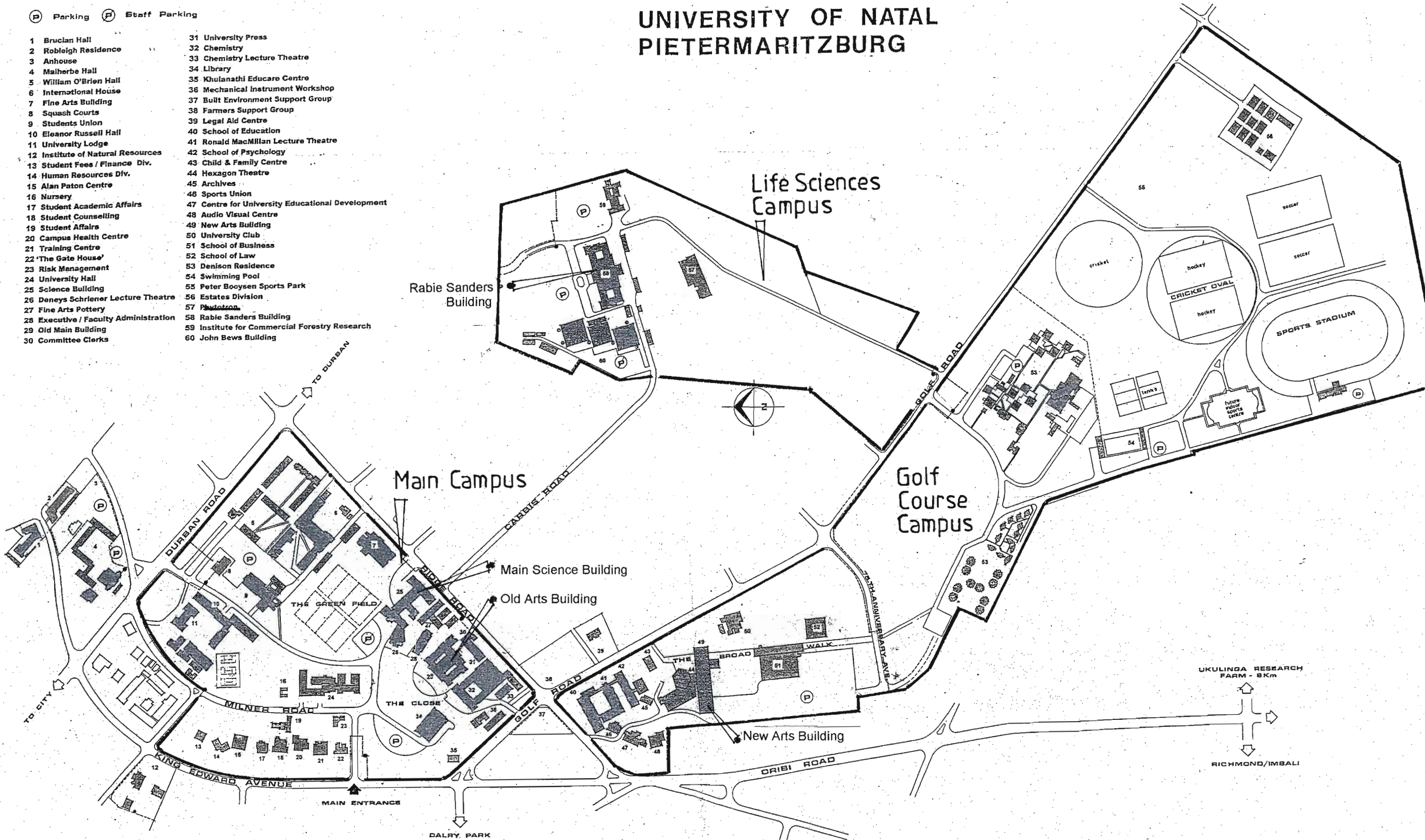


Figure: 4.3 Map of University of Natal - Pietermaritzburg Campus



Figure 4.5 Old Arts Building West Elevation

UNP, AVC, Photo library

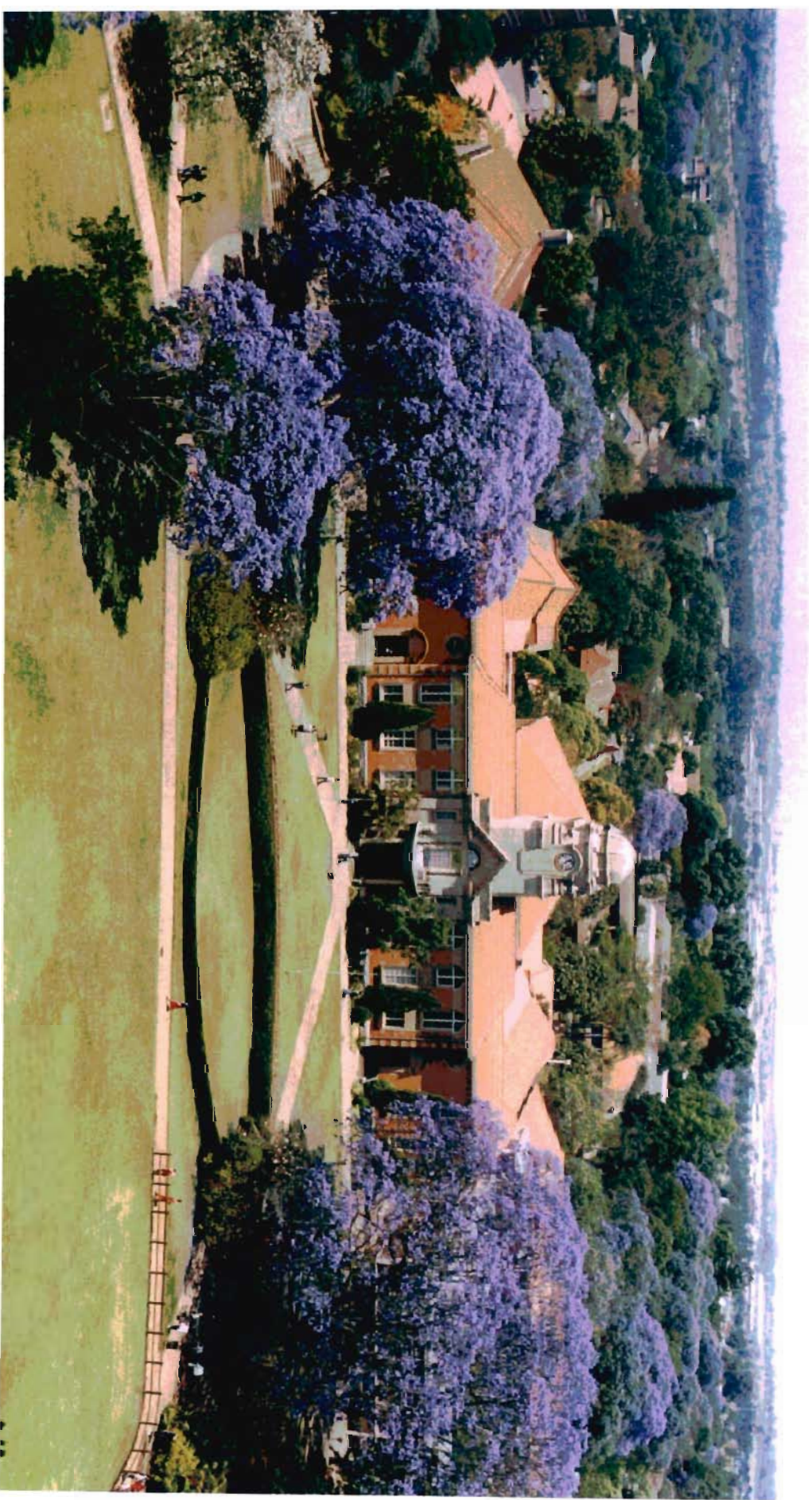


Figure 4.4 Old Arts Building Aerial View

UNP, AVC, Photo library

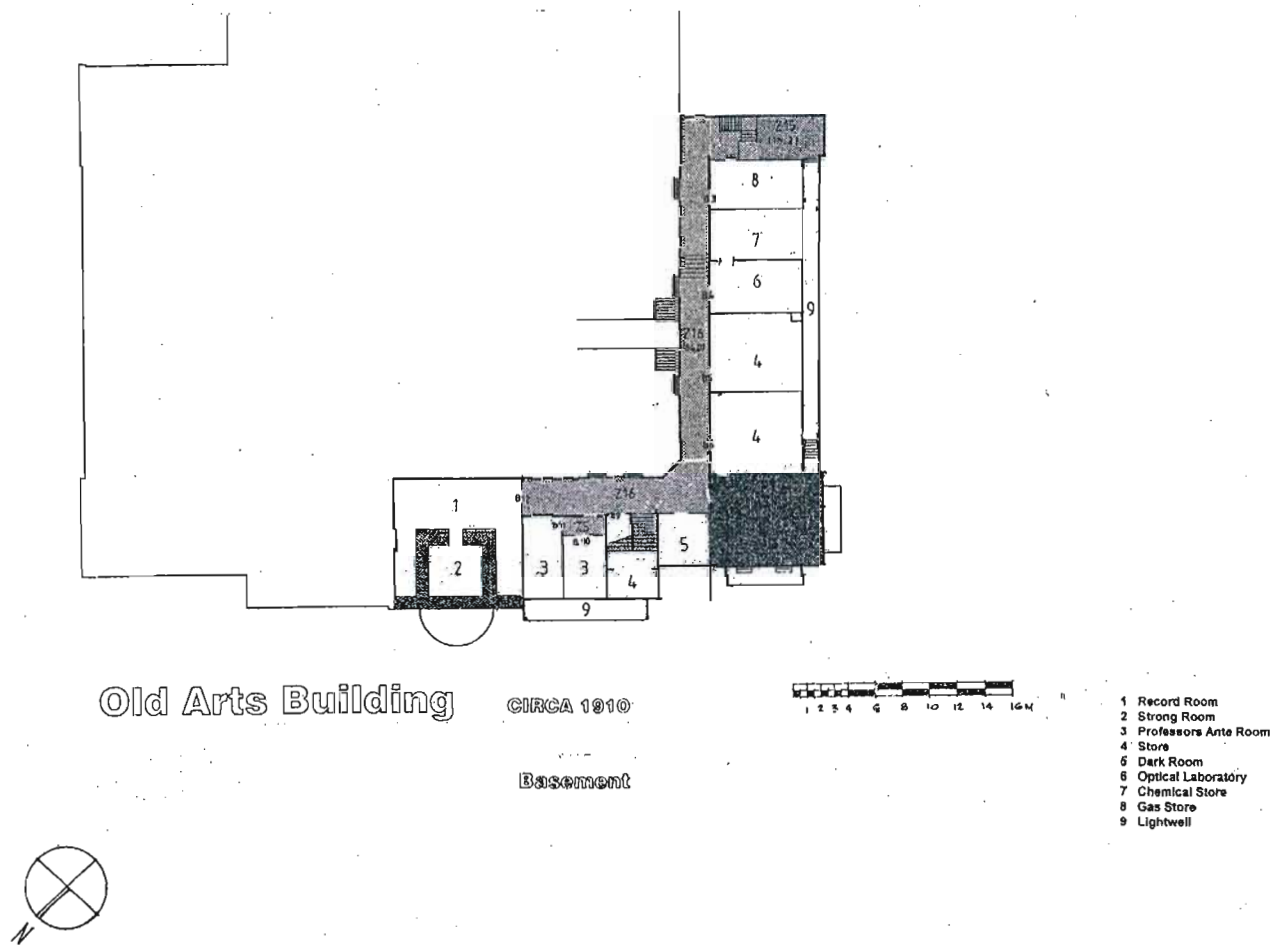


Figure 4. 6: Old Arts Building: Basement Lavout - Circa 1912

Architect: J. G. ...

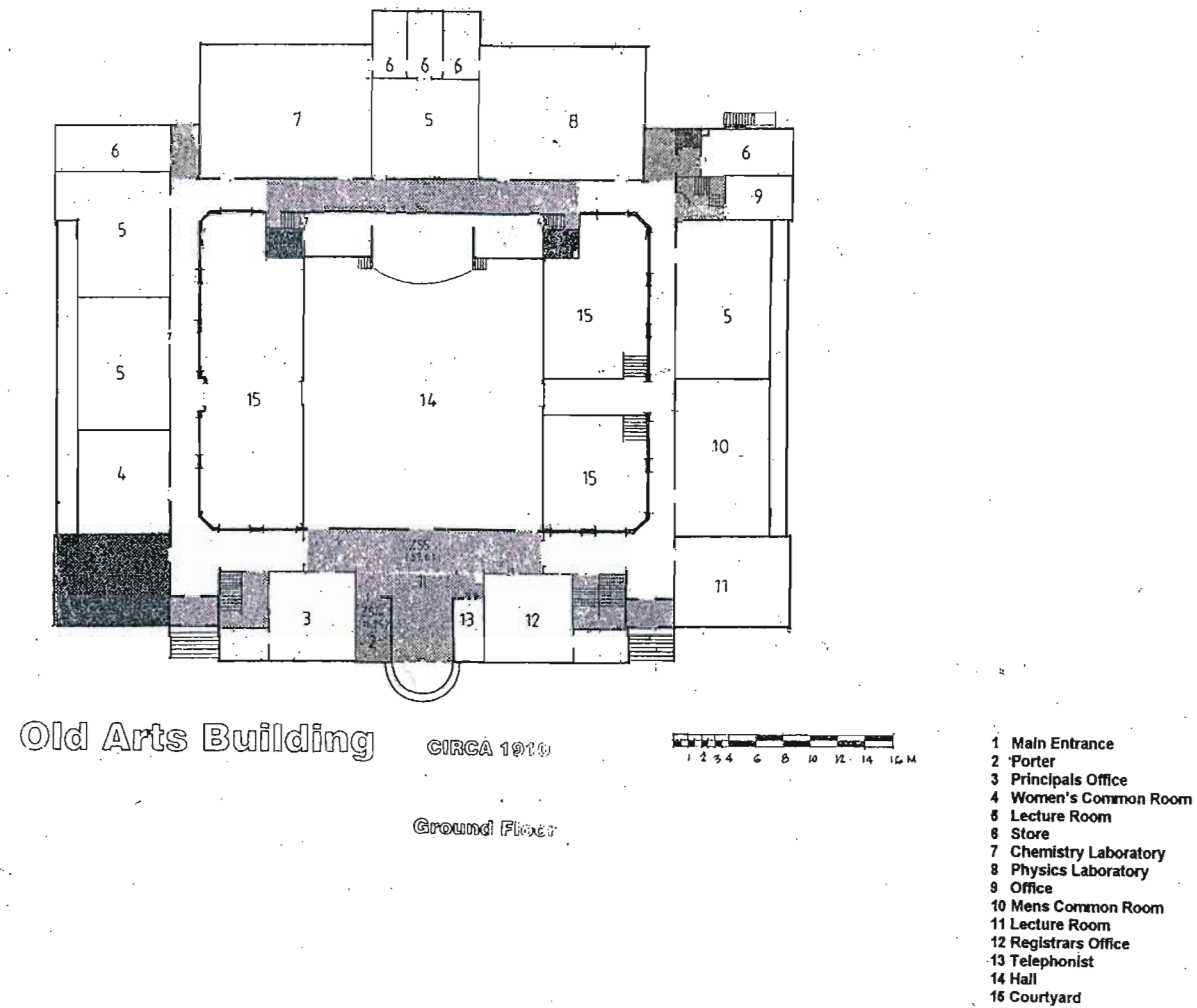
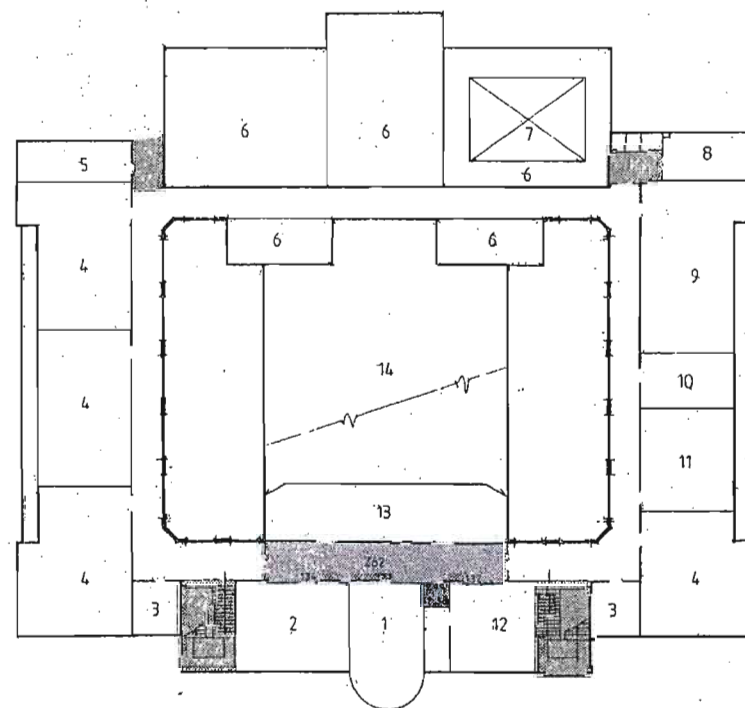


Figure 4. 7: Old Arts Building: Ground Floor Layout - Circa 1910



Old Arts Building

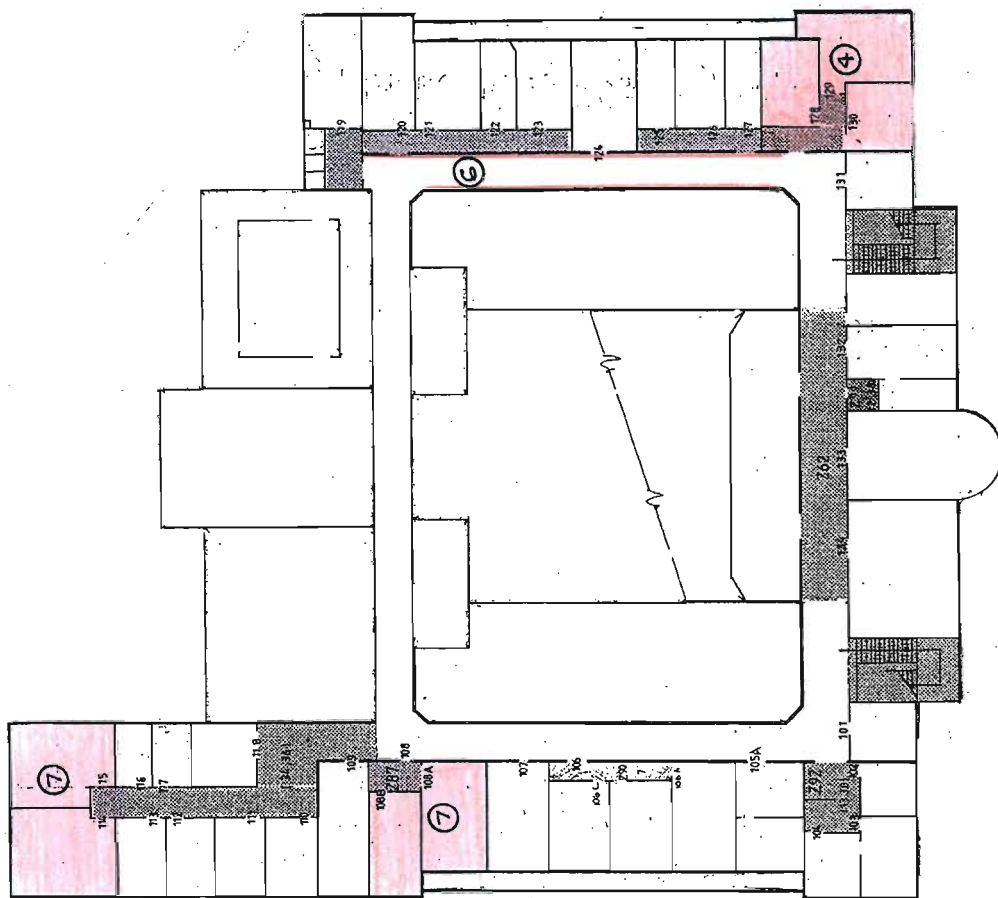
CIRCA 1910



First Floor

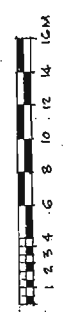
- 1 Committee Room
- 2 Library
- 3 Store
- 4 Lecture Room
- 5 Cleaners Room
- 6 Roof
- 7 Glasshouse
- 8 Office
- 9 Botany Laboratory
- 10 Physiological Laboratory
- 11 Geology Laboratory
- 12 Professors Common Room
- 13 Gallery to Hall
- 14 Double volume of Hall

Figure 4. 8: Old Arts Building: First Floor Layout - Circa 1912

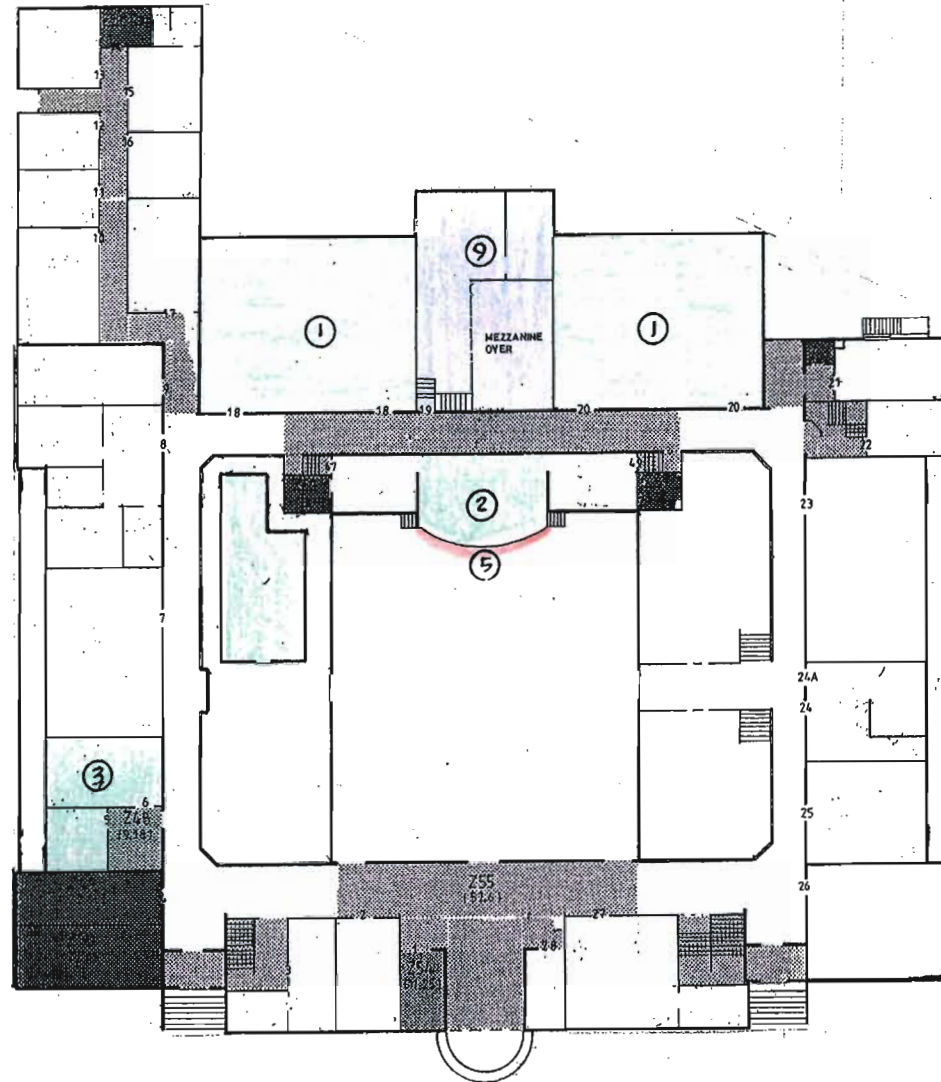


Old Arts Building

First Floor

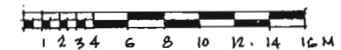


- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



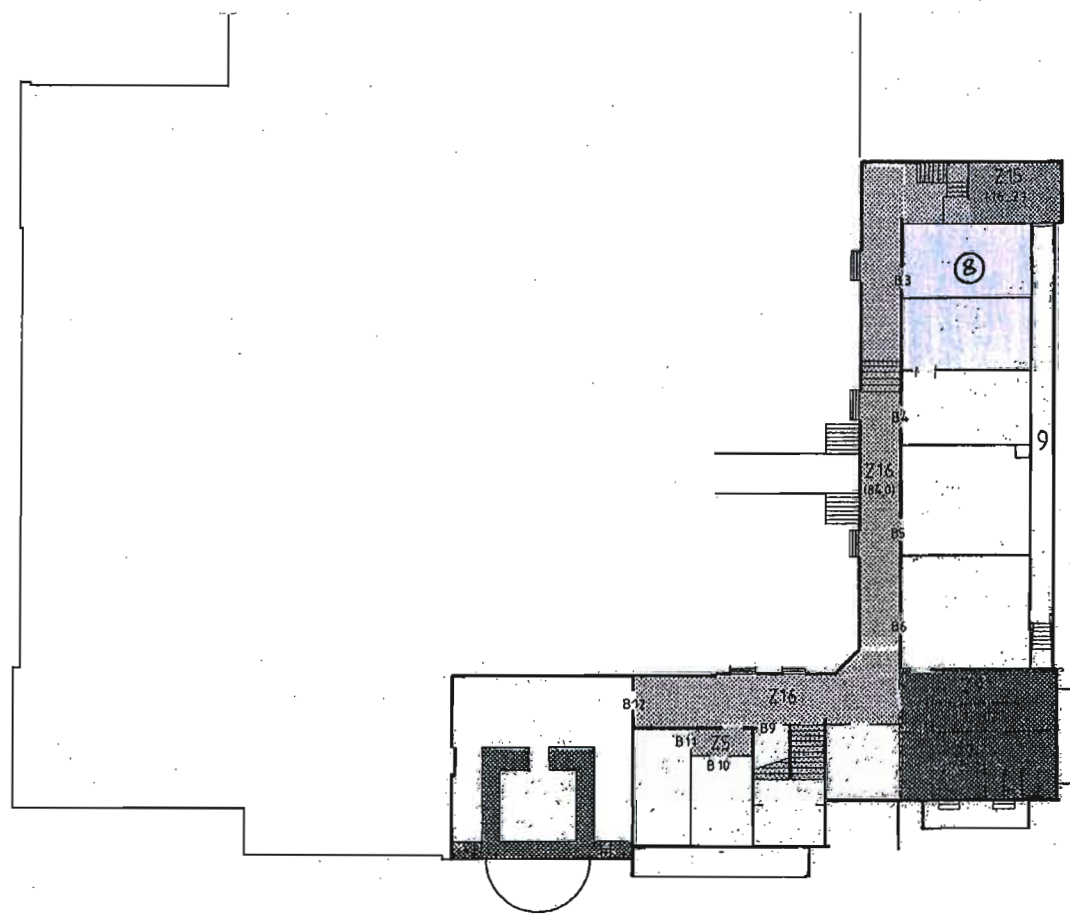
Old Arts Building

Ground Floor



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

Figure 4.10: Old Arts Building Ground Floor



Old Arts Building



Basement

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

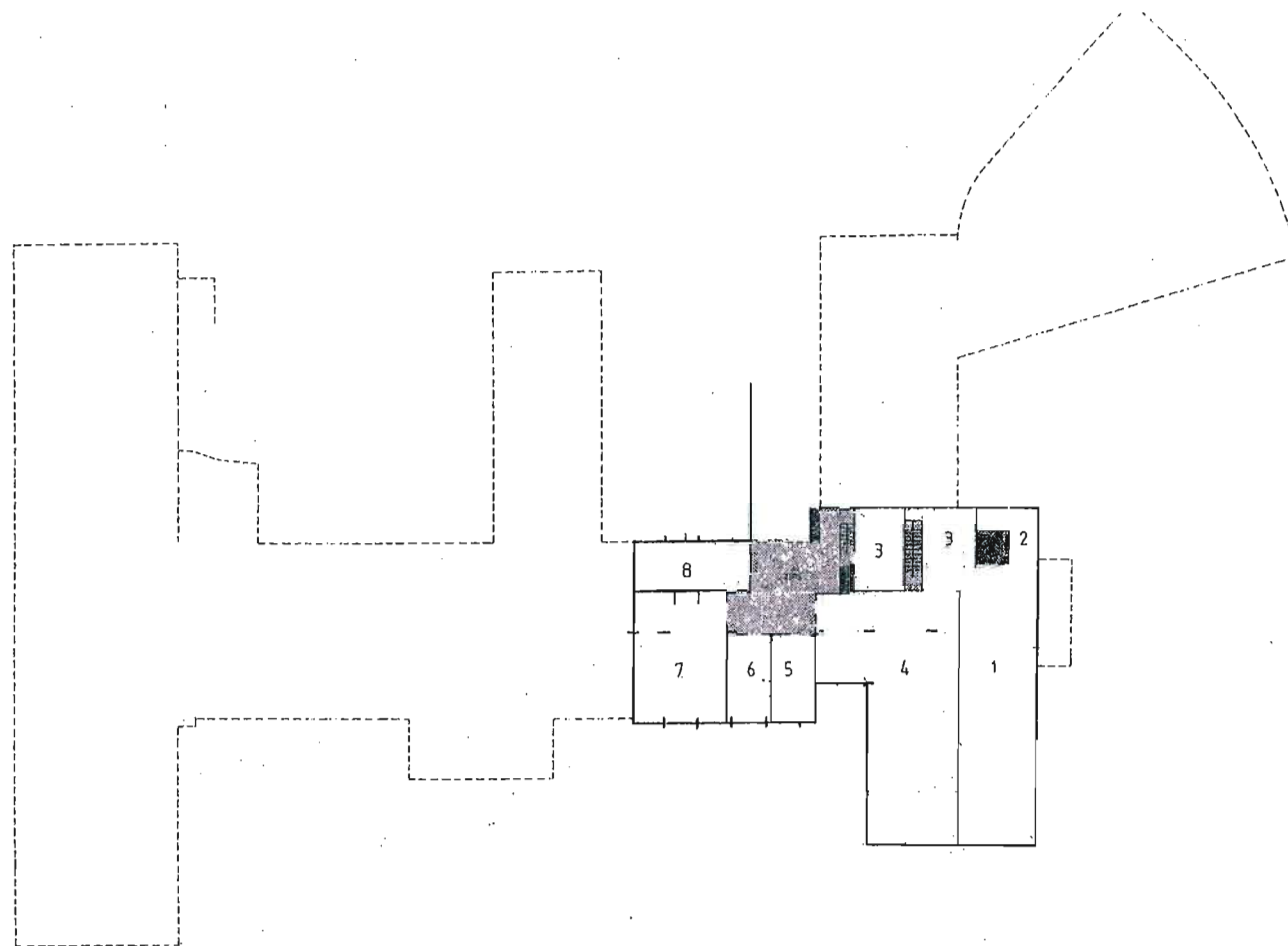
Figure 4.11: Old Arts Building Floor Plan - Basement



Figure 4.12 Main Science Building West Elevation



Figure 4.13 Main Science Building East Elevation



Main Science Building

CIRCA 1948



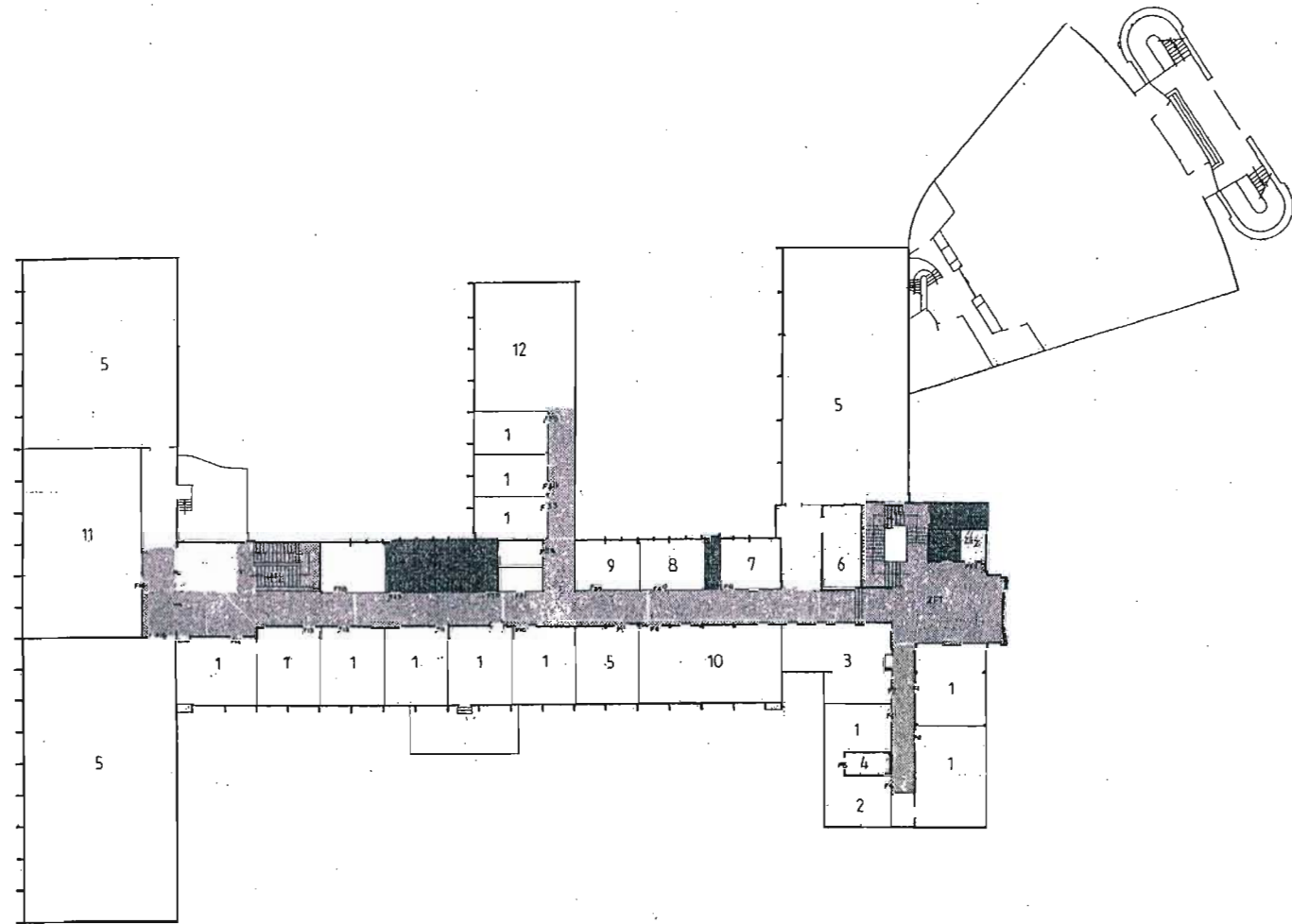
BASEMENT

G.S.M. = 544sq.m.

- 1 Zoology Honours Students
- 2 Ecology Store
- 3 Specimen Store
- 4 Fine Arts Studio
- 5 Rat Breeding Room
- 6 Workshop
- 7 Constant Environment Room
- 8 Frog Tanks and Water Filtration Plant



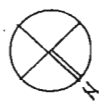
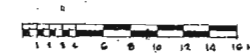
Figure 4.14: Main Science Building: Basement Layout - Circa 1948
Architects: Corriall & Crickmay



FIRST FLOOR

Main Science Building

CIRCA 1948



- 1 Lecture Room
- 2 Office
- 3 Optics Laboratory
- 4 Senior Laboratory
- 5 Junior Laboratory
- 6 Battery Room
- 7 Honours Laboratory
- 8 Workshop
- 9 Store
- 10 Dark Room
- 11 Library
- 12 Vacuum Physics Laboratory
- 13 Radio-Active Room
- 14 Spectroscopy Laboratory
- 15 X-Ray Research Laboratory
- 16 Cloud Chamber
- 17 General Laboratory
- 18 Upper volume of Main Lecture Theatre

Figure 4.16: Main Science Building: First Floor Layout - Circa 1948
Architects: Corrigan & Crickmay

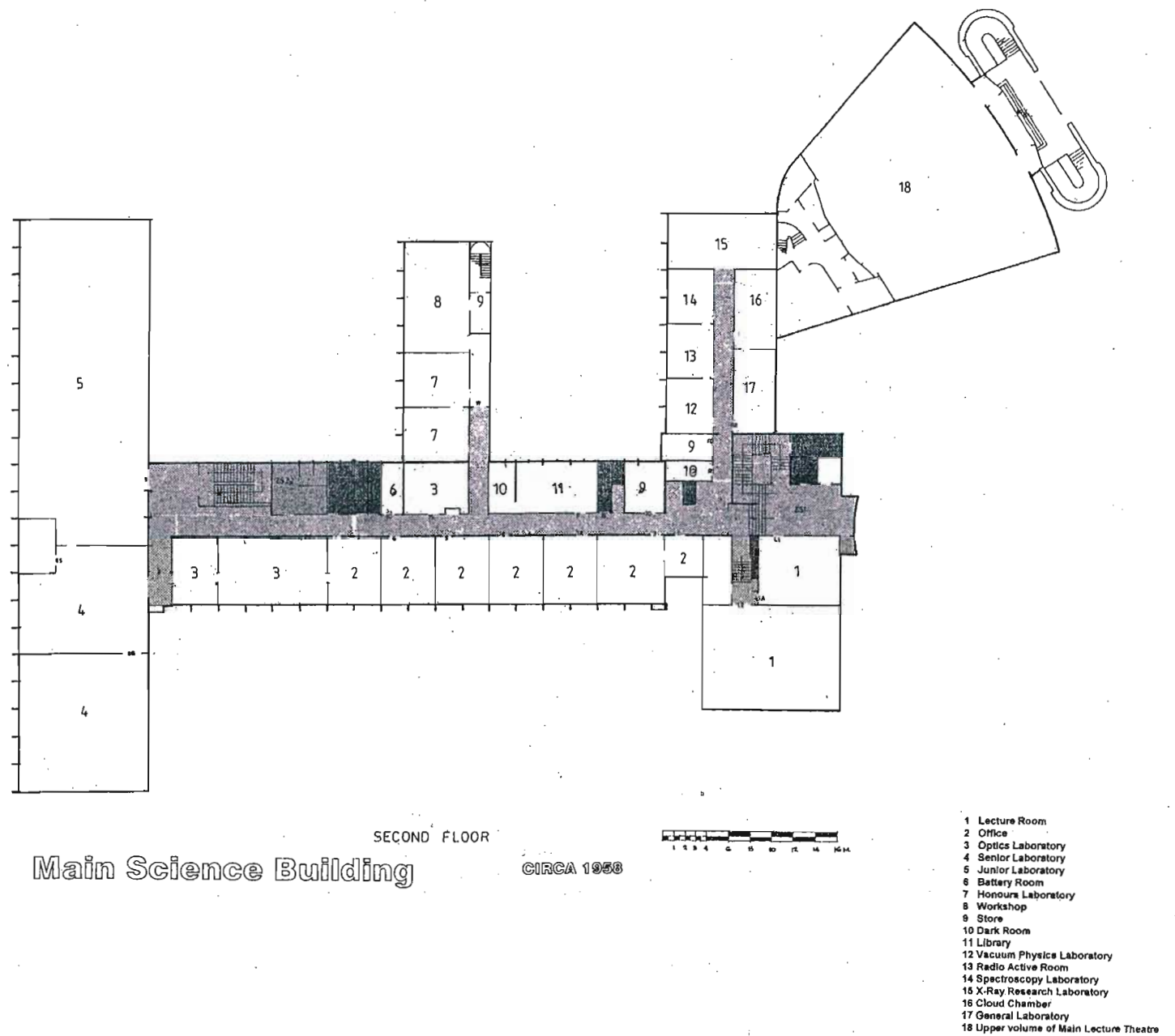
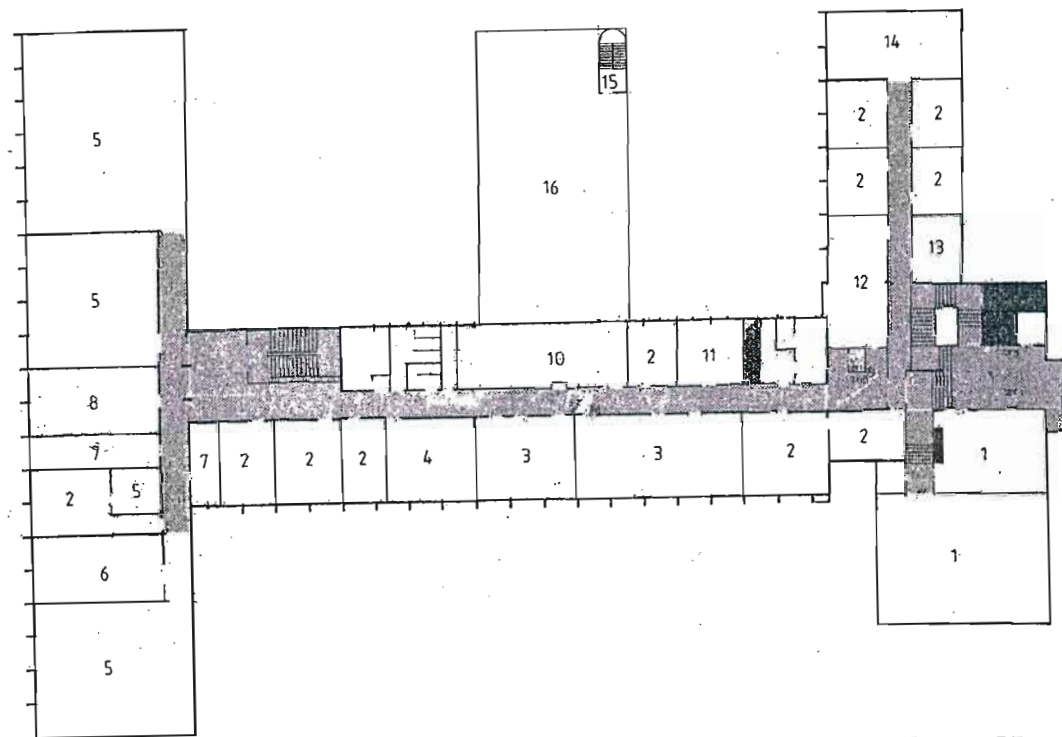


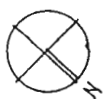
Figure 4.17: Main Science Building: Second Floor Layout - Circa 1948
 Architects: Corrigan & Crickmay



THIRD FLOOR

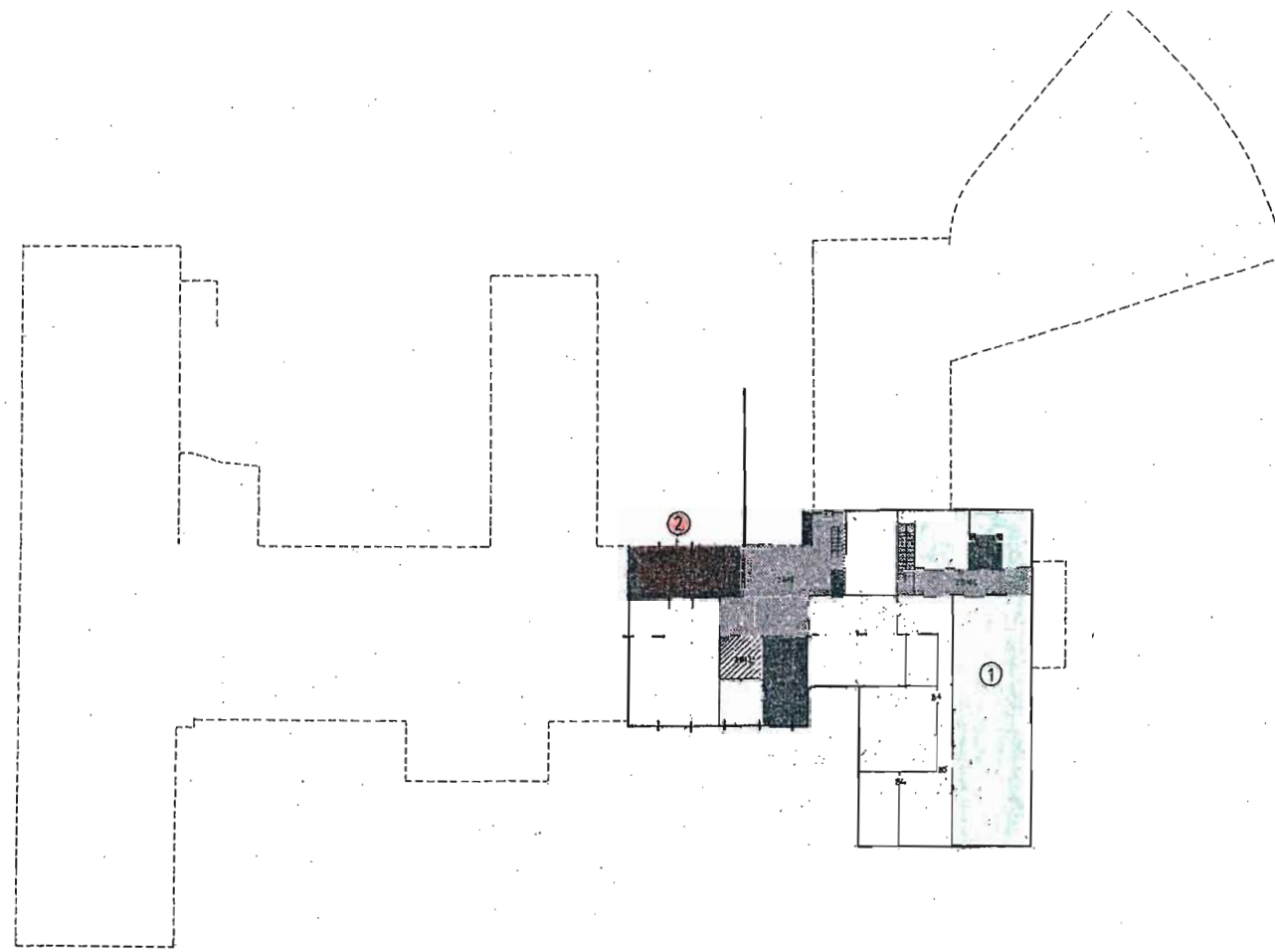
Main Science Building

CIRCA 1958



- 1 Lecture Room
- 2 Office
- 3 Tutorial Room
- 4 Research Laboratory
- 5 Laboratory
- 6 Geology Museum
- 7 Equipment Room
- 8 Geography Laboratory
- 9 Dark Room
- 10 Map Room
- 11 Post Graduate Room
- 12 Maths & Statistics Lecture Room
- 13 Applied Maths Lecture Room
- 14 Library & Post Graduate Students
- 15 Stairs down to Physics Workshop
- 16 Roof

Figure 4:18: Main Science Building: Third Floor Layout - Circa 1948
Architects: Corrigan & Crickmay

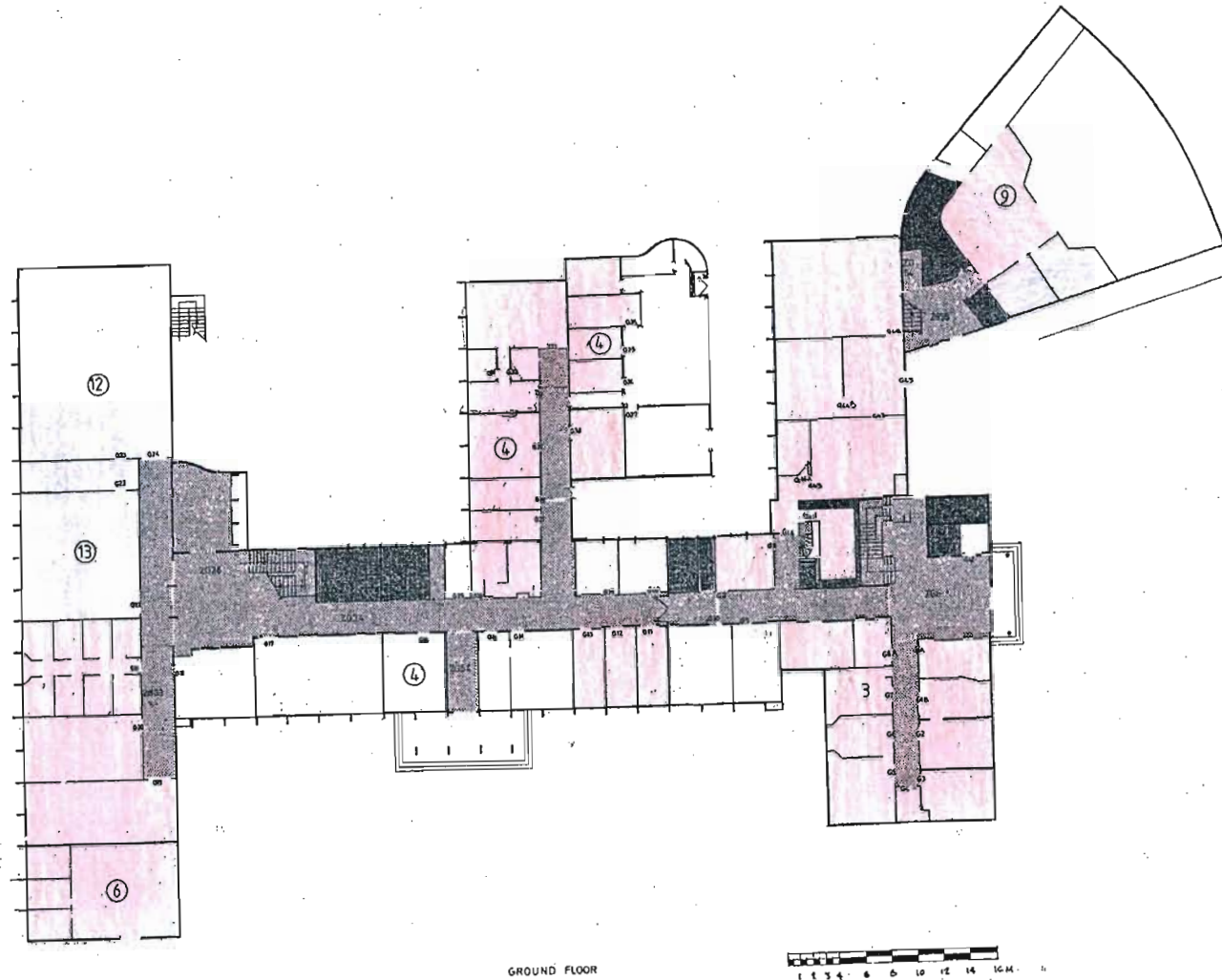


Main Science Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

BASEMENT
A.S.M. = 356 sq.m.
G.S.M. = 544 sq.m.

Figure 4.19: Main Science Building: Basement Layout - Changes



Main Science Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1983 - 2002

Figure 4.20: Main Science Building: Ground Floor Layout - Changes

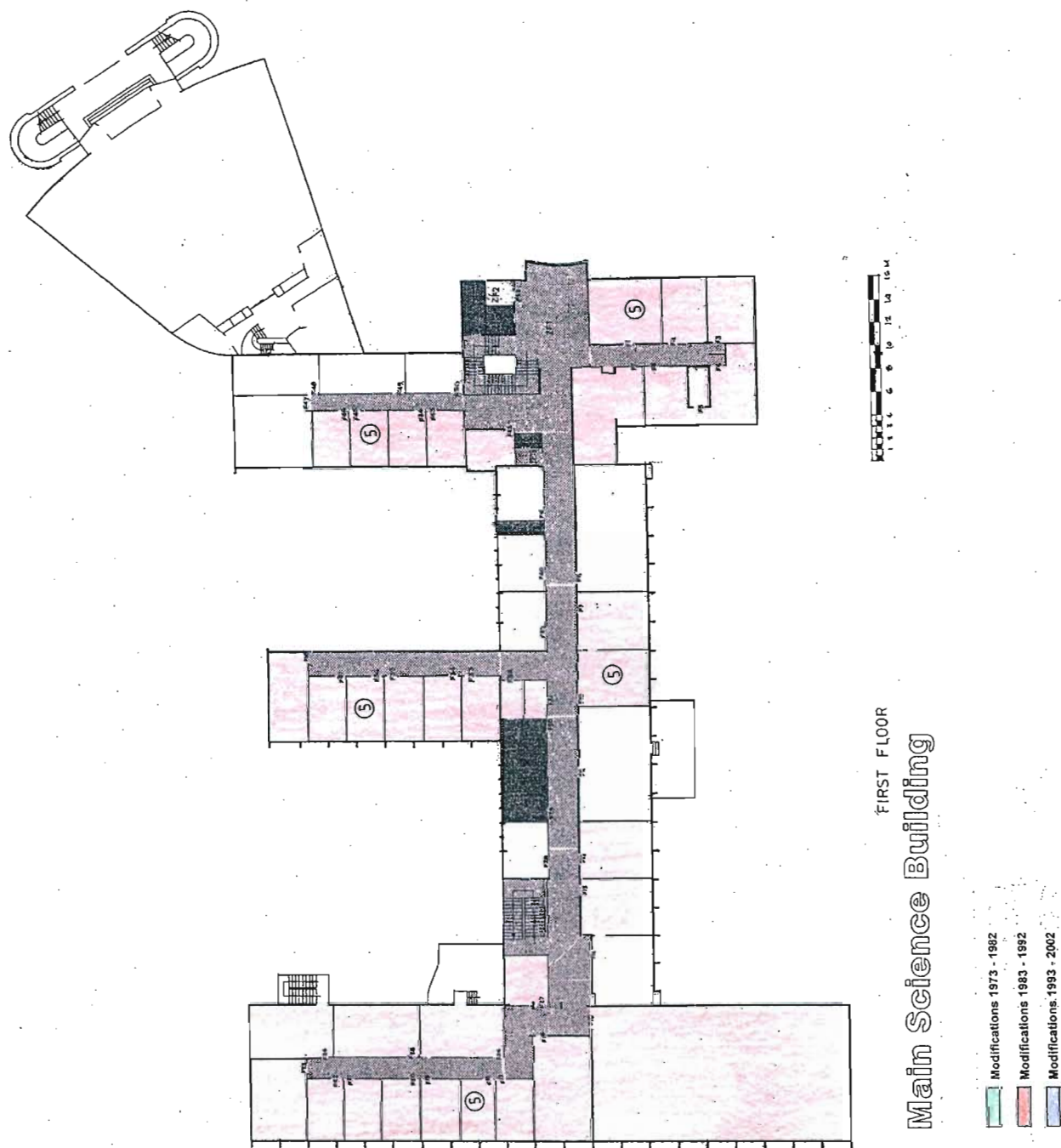
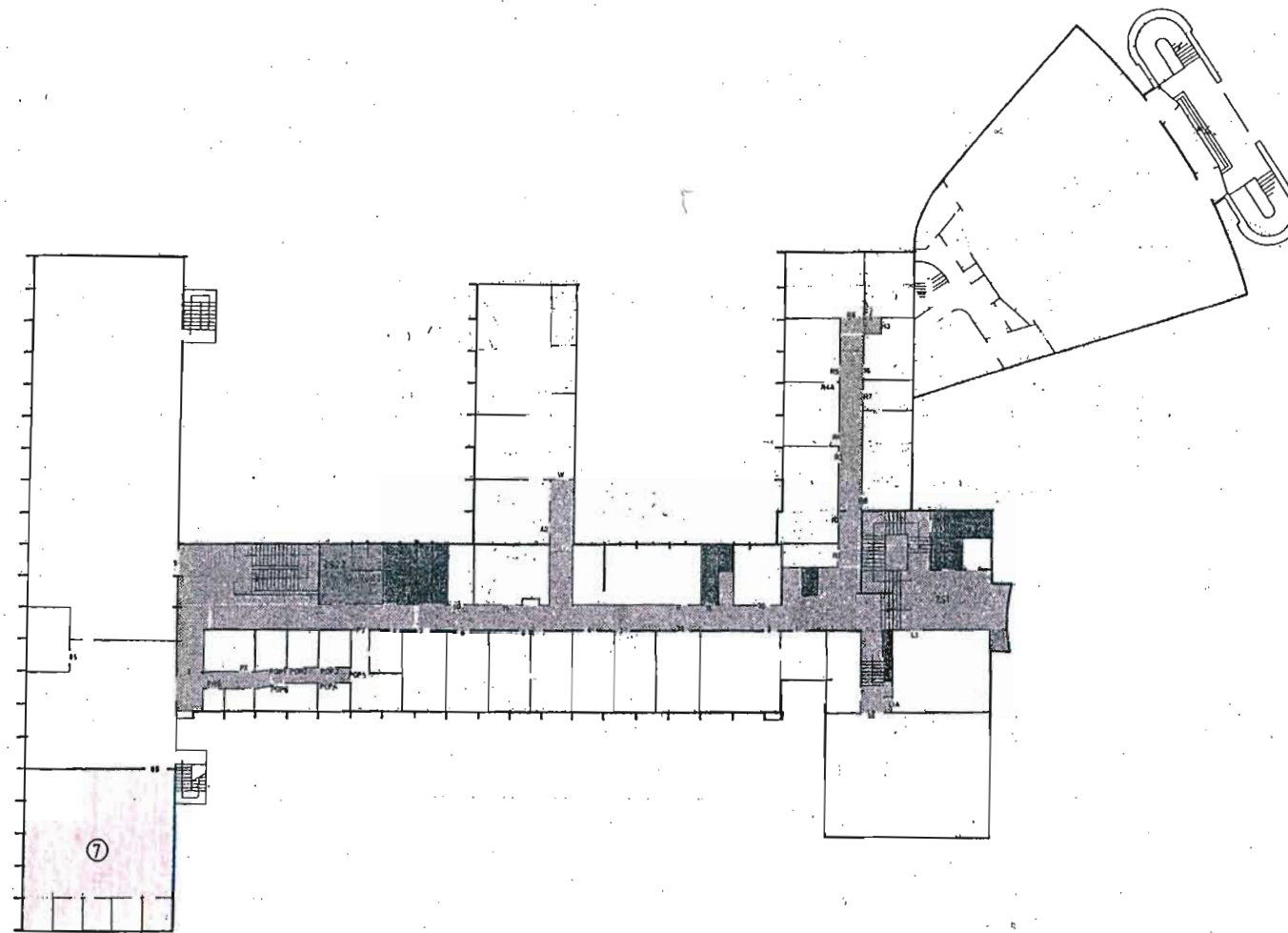


Figure 4.21: Main Science Building: First Floor Layout - Changes



SECOND FLOOR

Main Science Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

Figure 4.22: Main Science Building: Second Floor Layout - Changes

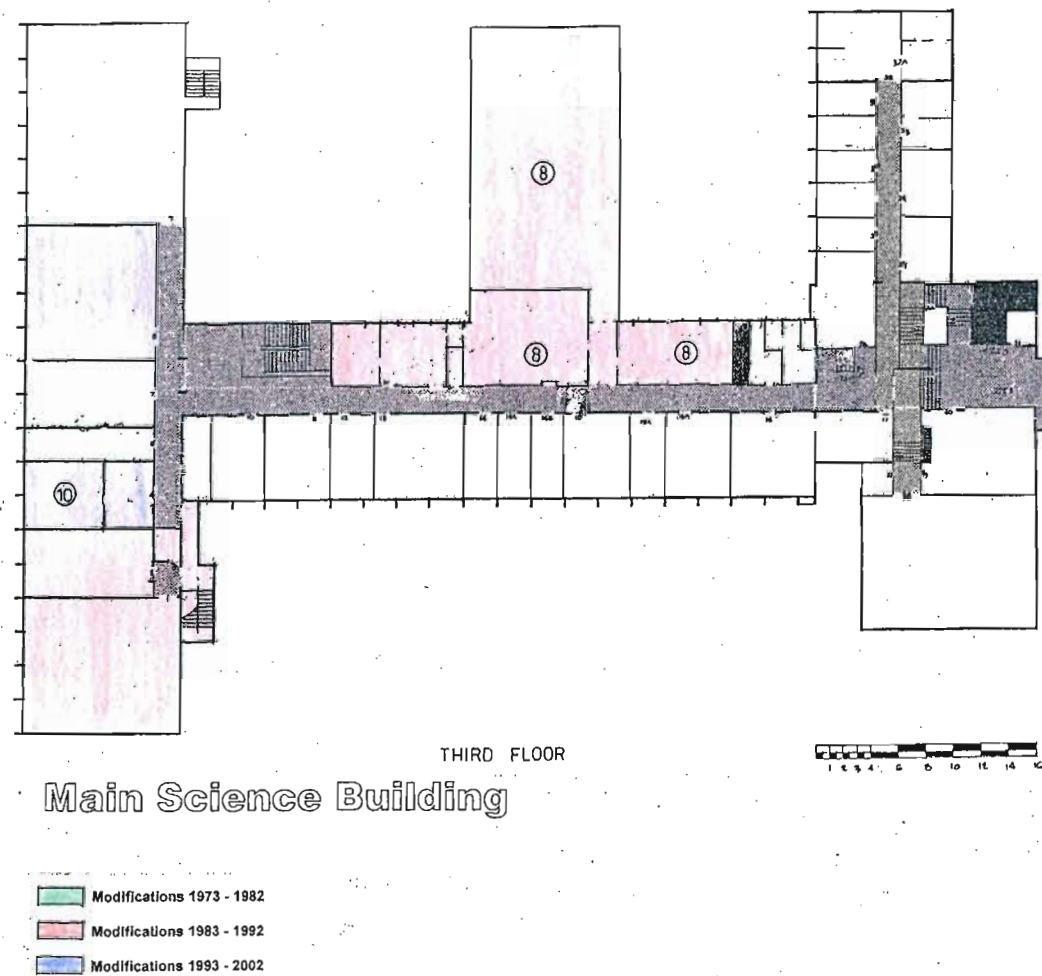


Figure 4.23: Main Science Building: Third Floor Layout - Changes

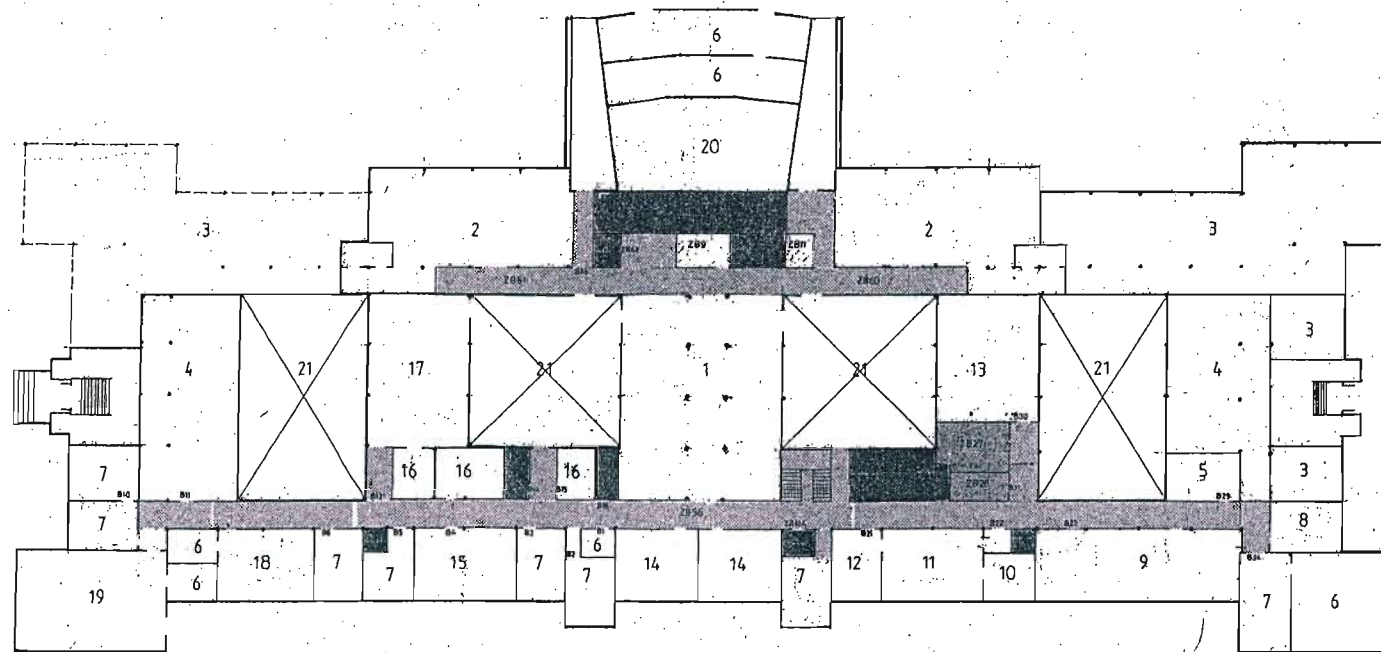


Figure 4.24 Rabie Sanders Building - North Elevation

UNP, AVC, Photo library



Figure 4.25 Rabie Sanders Building - East Elevation

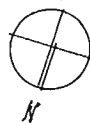
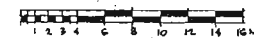


Rabie Sanders Building

BASEMENT

CIRCA 1950

G.S.M. = 2535 sq.m.



- 1 Exhibition Hall
- 2 Plant Room
- 3 Void
- 4 Under Ground Greenhouse
- 5 Laboratory
- 6 Store
- 7 Office
- 8 Acid Store
- 9 Record Room
- 10 Photo. Chemicals
- 11 Dark Room
- 12 Photo Apparatus
- 13 Implement Workshop
- 14 Strong Room
- 15 Meat Laboratory
- 16 Cold Room
- 17 Dairy Laboratory
- 18 Insectary
- 19 Nutrition laboratory

Figure 4. 26: Rabie Sanders Building: Basement Layout - Circa 1950

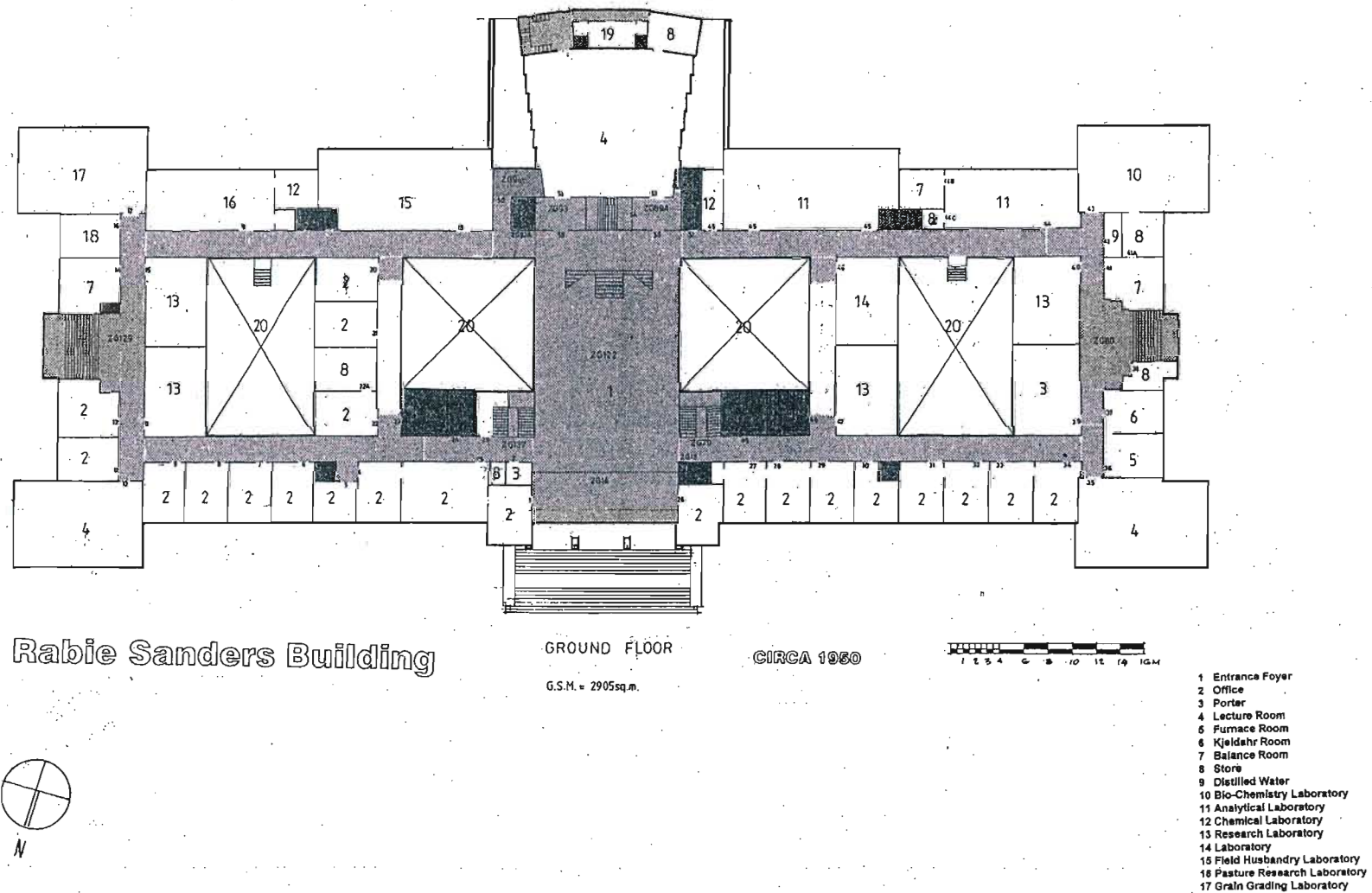
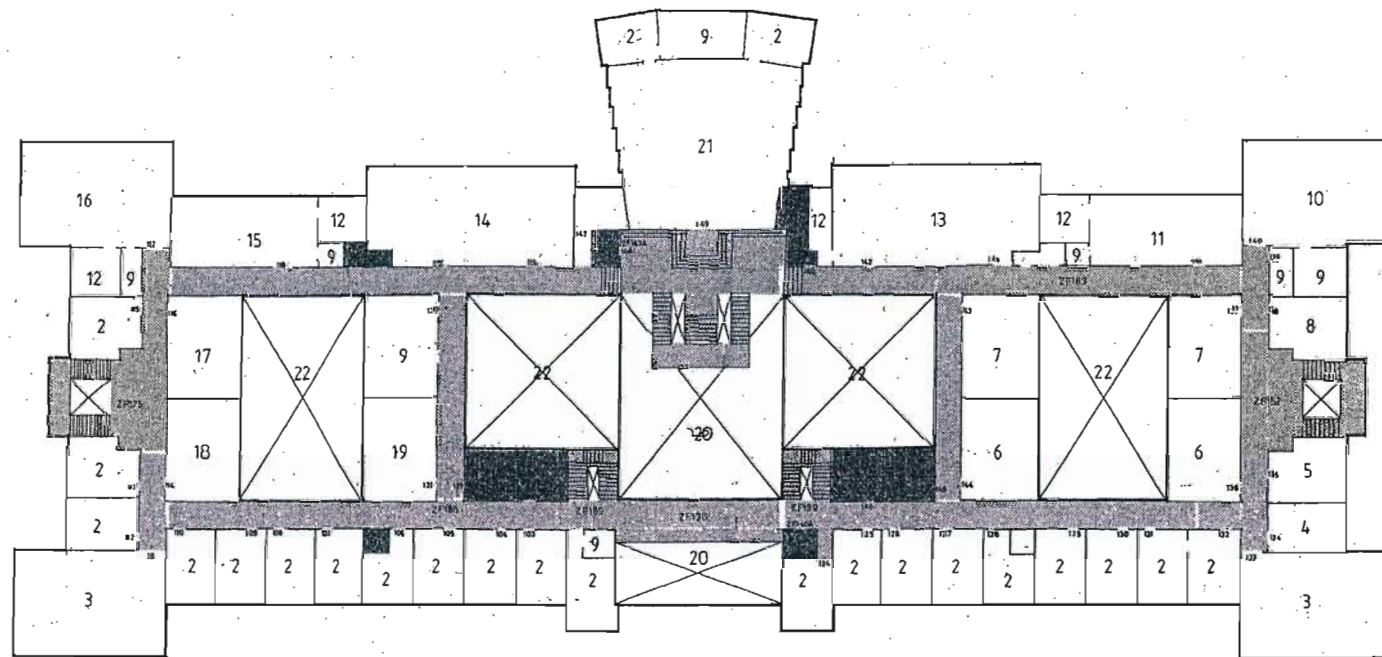


Figure 4. 27: Rabie Sanders Building: Ground Floor Layout - Circa 1960

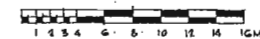


Rabie Sanders Building

FIRST FLOOR

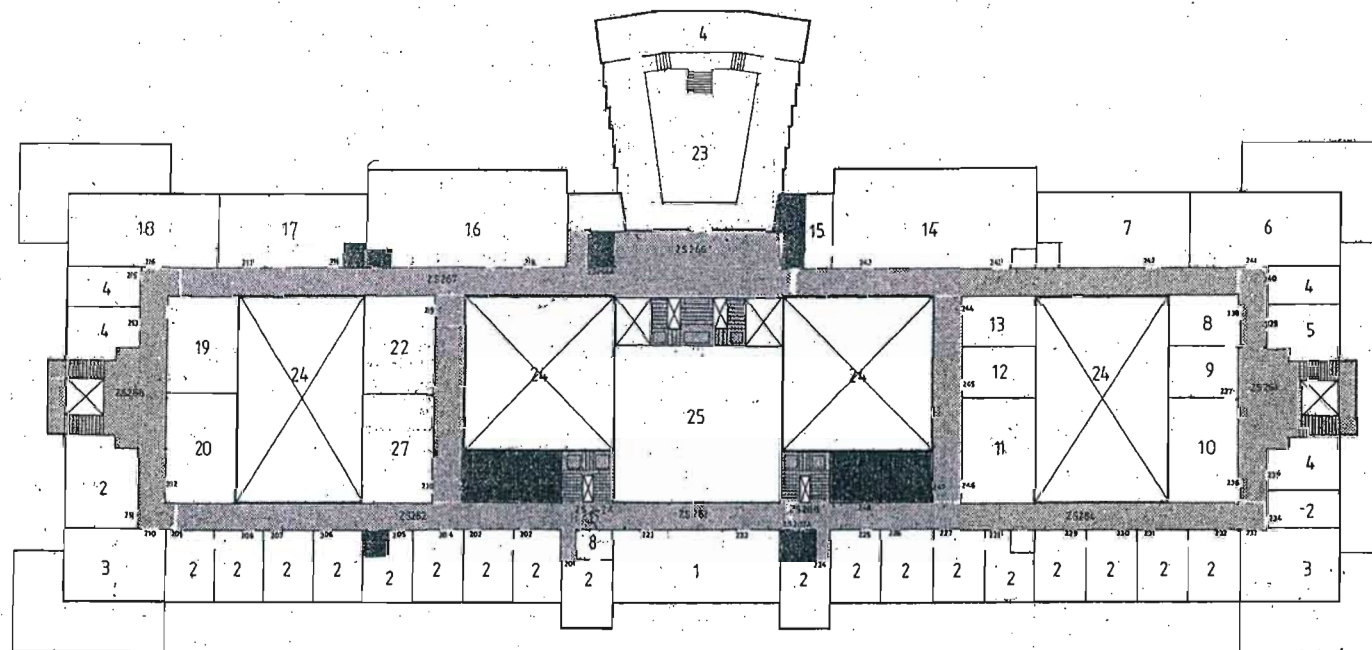
G.S.M. = 2653sq.m.

CIRCA 1950



- 1 Bridge
- 2 Office
- 3 Lecture Room
- 4 Germination Room
- 5 Cytology Store
- 6 Cytology Research Laboratory
- 7 Horticulture Research Laboratory
- 8 Specimen Receiving Room
- 9 Store
- 10 Horticulture Laboratory
- 11 Cytology Laboratory
- 12 Preparation Room
- 13 Genetics Laboratory
- 14 Physiology Laboratory
- 15 Poultry Laboratory
- 16 Veterinary Science Laboratory
- 17 Poultry Research Laboratory
- 18 Students Room
- 19 Seminar Room

Figure 4. 28: Rabie Sanders Building: First Floor Layout - Circa 1950

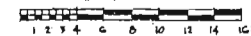


Rabie Sanders Building

SECOND FLOOR

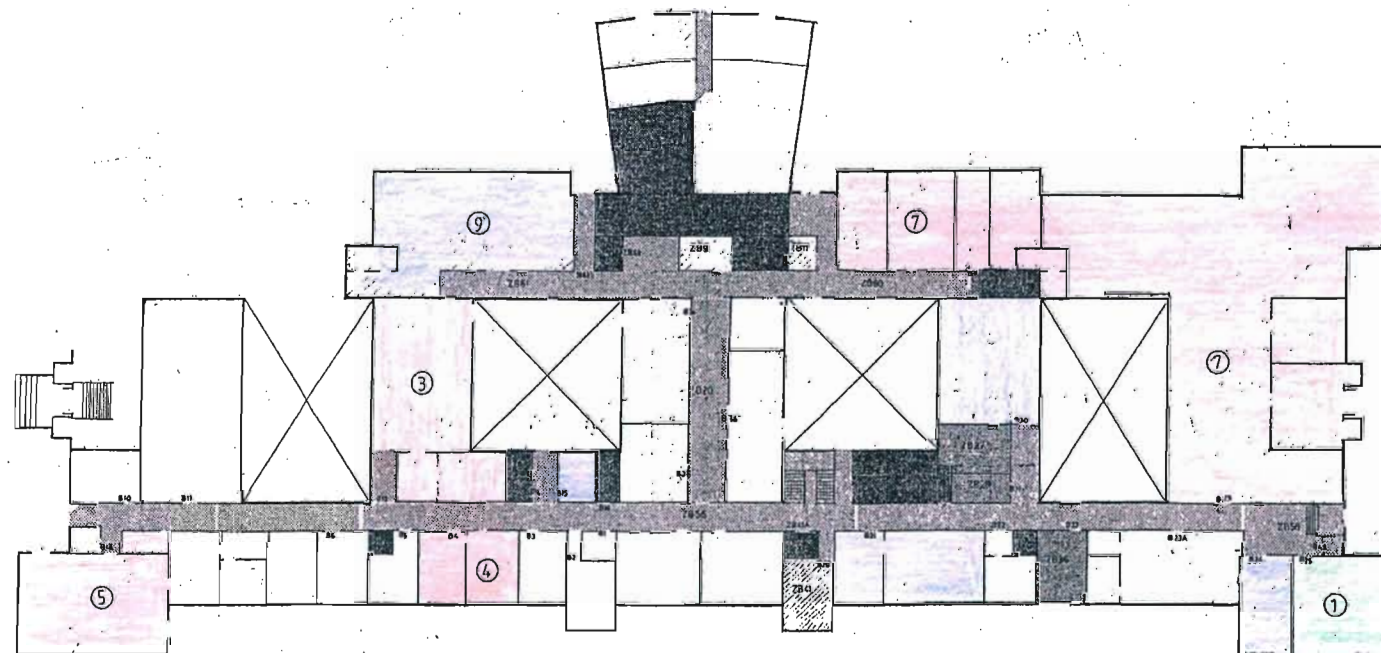
G.S.M. = 2538 sq.m.

CIRCA 1950



- 1 Staff Common Room
- 2 Office
- 3 Lecture Room
- 4 Store Room
- 5 Specimen Receiving Room
- 6 Entomology Demonstration Laboratory
- 7 Entomology Laboratory
- 8 Culture Room
- 9 Steriliser Room
- 10 Entomology Research Laboratory
- 11 Plant Pathology Research Laboratory
- 12 Incubation Room
- 13 Laboratory
- 14 Plant Pathology Laboratory
- 15 Preparation Room
- 16 Agricultural Engineering Drawing Room
- 17 Dairy Laboratory
- 18 Forestry Laboratory
- 19 Dairy Laboratory
- 20 Forestry Specimen Room
- 21 Seminar Room
- 22 Agricultural Engineering Drawing Room

Figure 4. 29: Rabie Sanders Building: Second Floor Layout. Circa 1950.



Rabie Sanders Building

BASEMENT

G.S.M. = 2535 sq.m.



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

Figure 4. 31: Rabie Sanders Building: Basement Layout - Changes

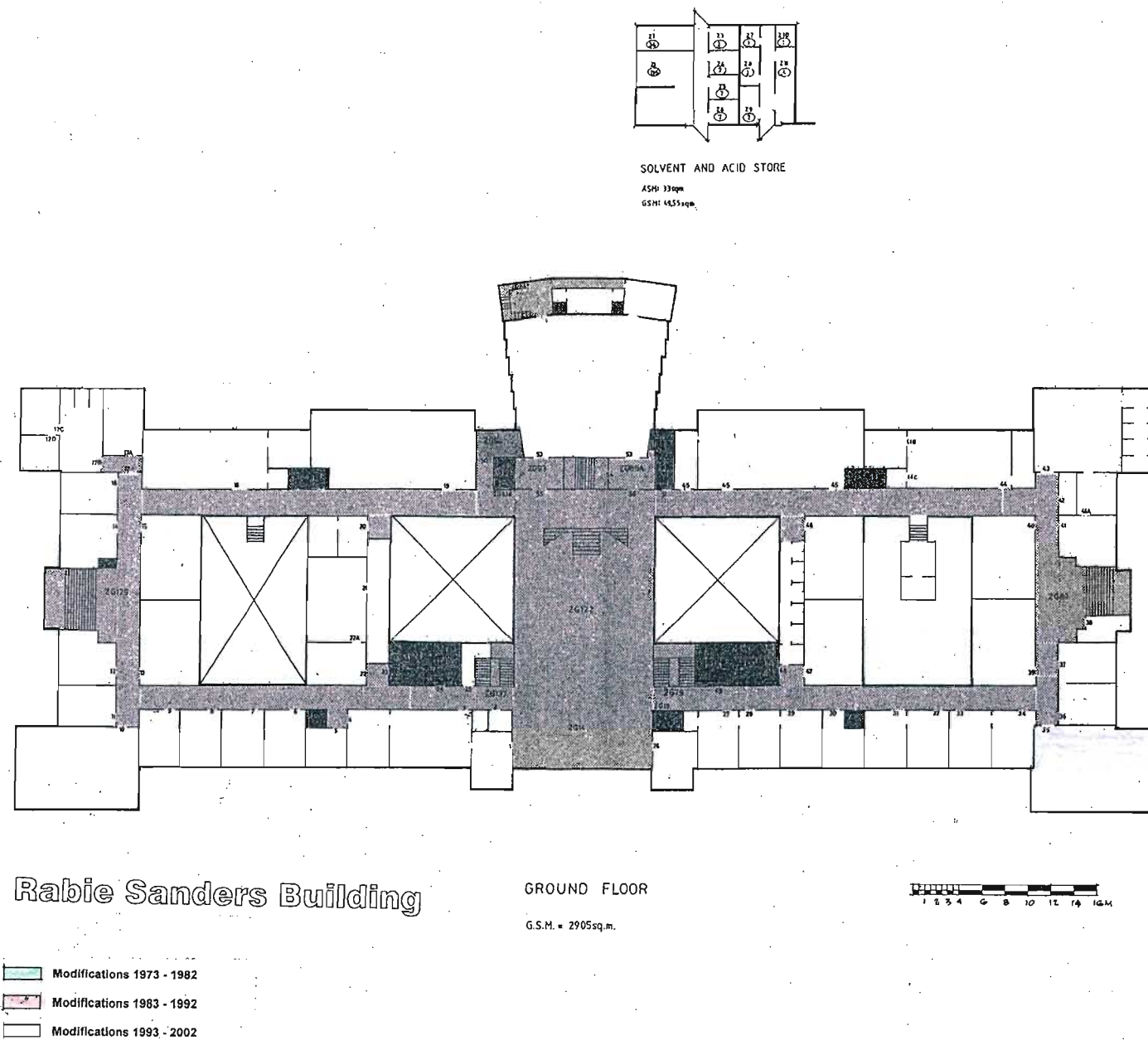
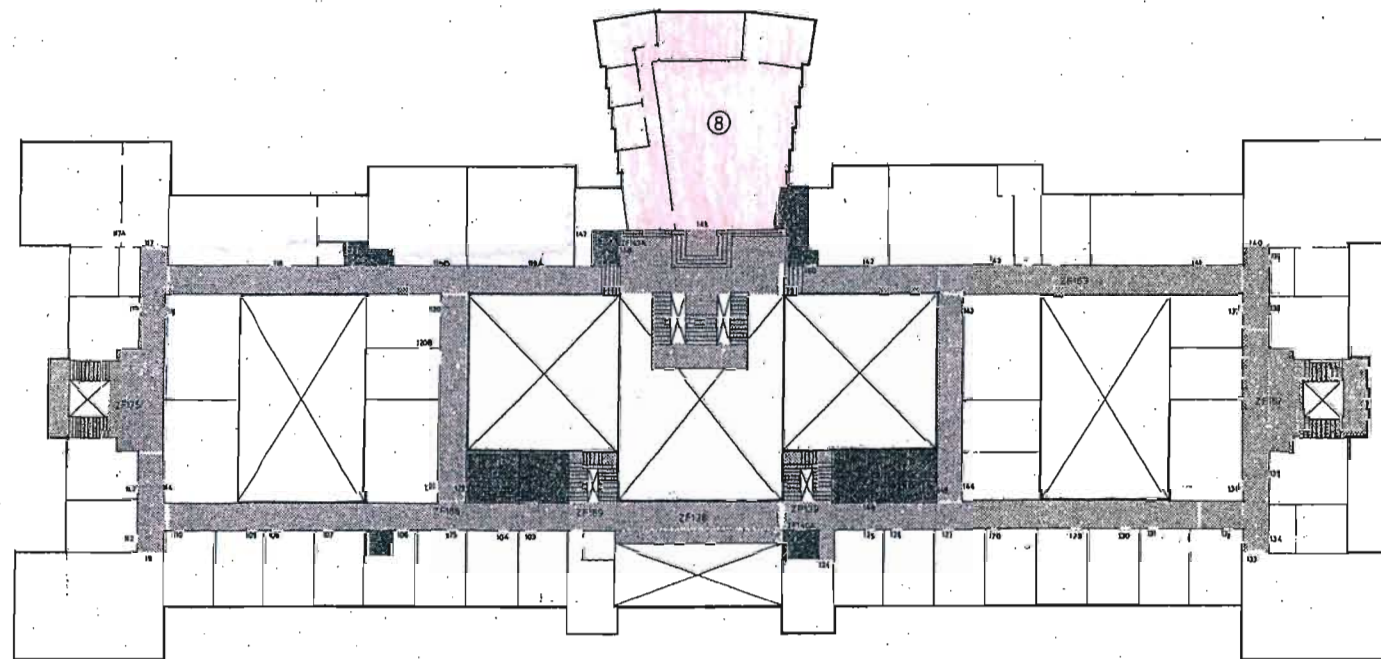


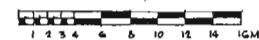
Figure 4. 32: Rabie Sanders Building: Ground Floor Layout - Changes



Rabie Sanders Building

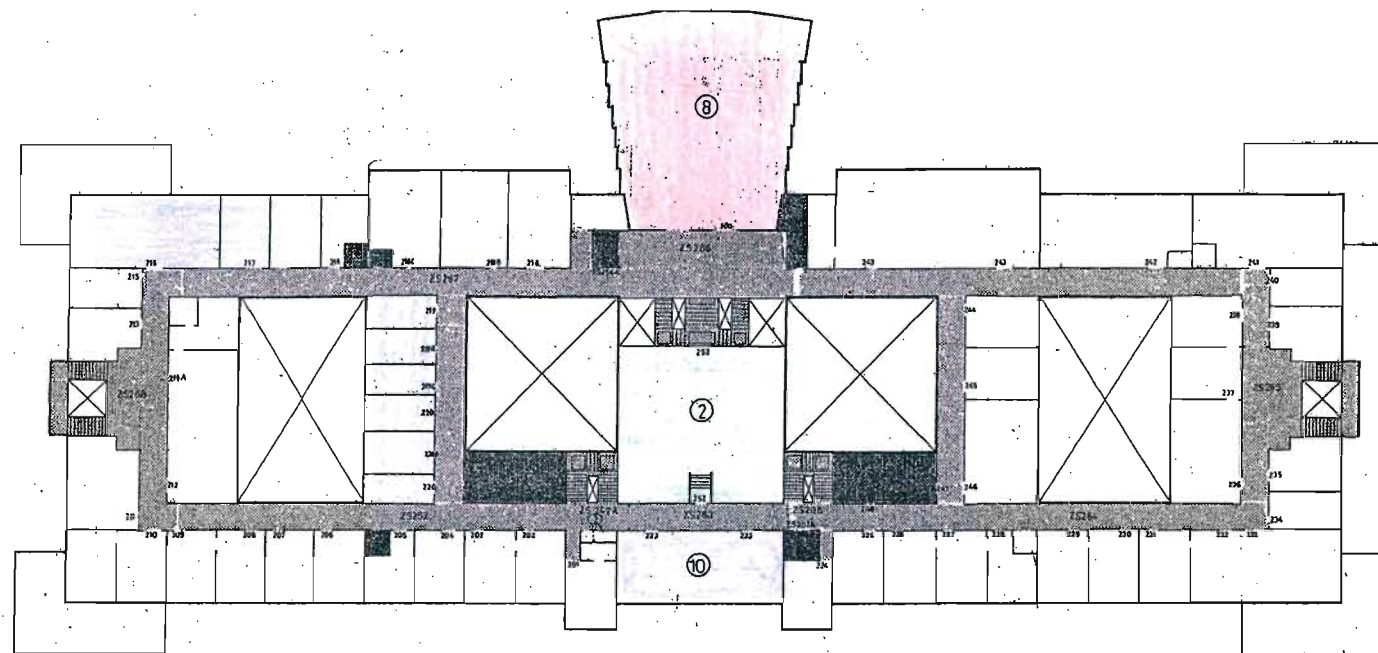
FIRST FLOOR

G.S.M. = 2653sq.m.



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

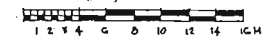
Figure 4. 33: Rabie Sanders Building: First Floor Layout - Changes



Rabie Sanders Building

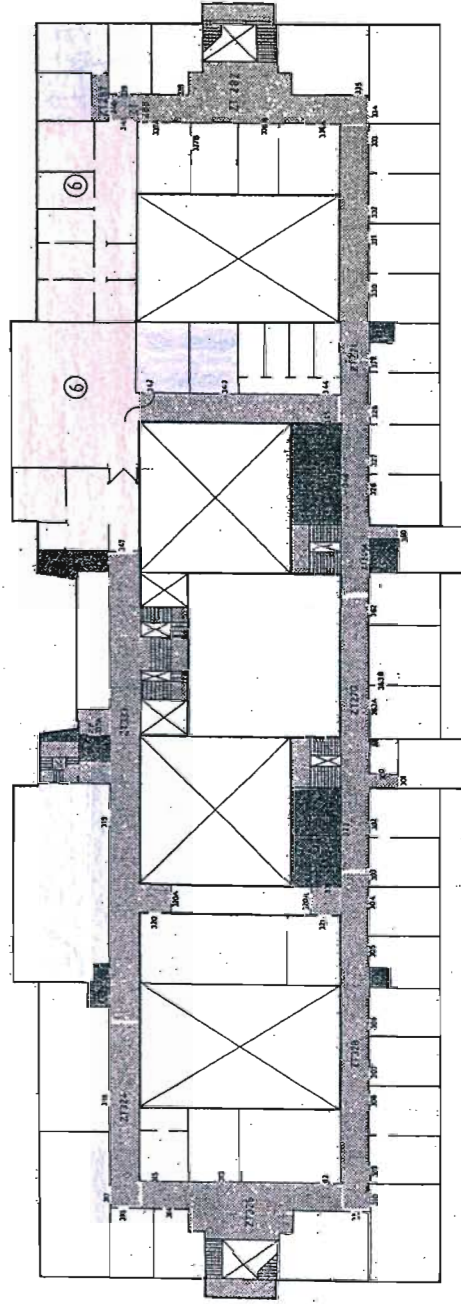
SECOND FLOOR

G.S.M. = 2538 sq.m.



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

Figure 4. 34: Rabie Sanders Building: Second Floor Layout. G.S.M.



THIRD FLOOR
G.S.M. = 2124 sq. m.

Rabie Sanders Building

- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002



Figure 4.36 New Arts Building - East Elevation

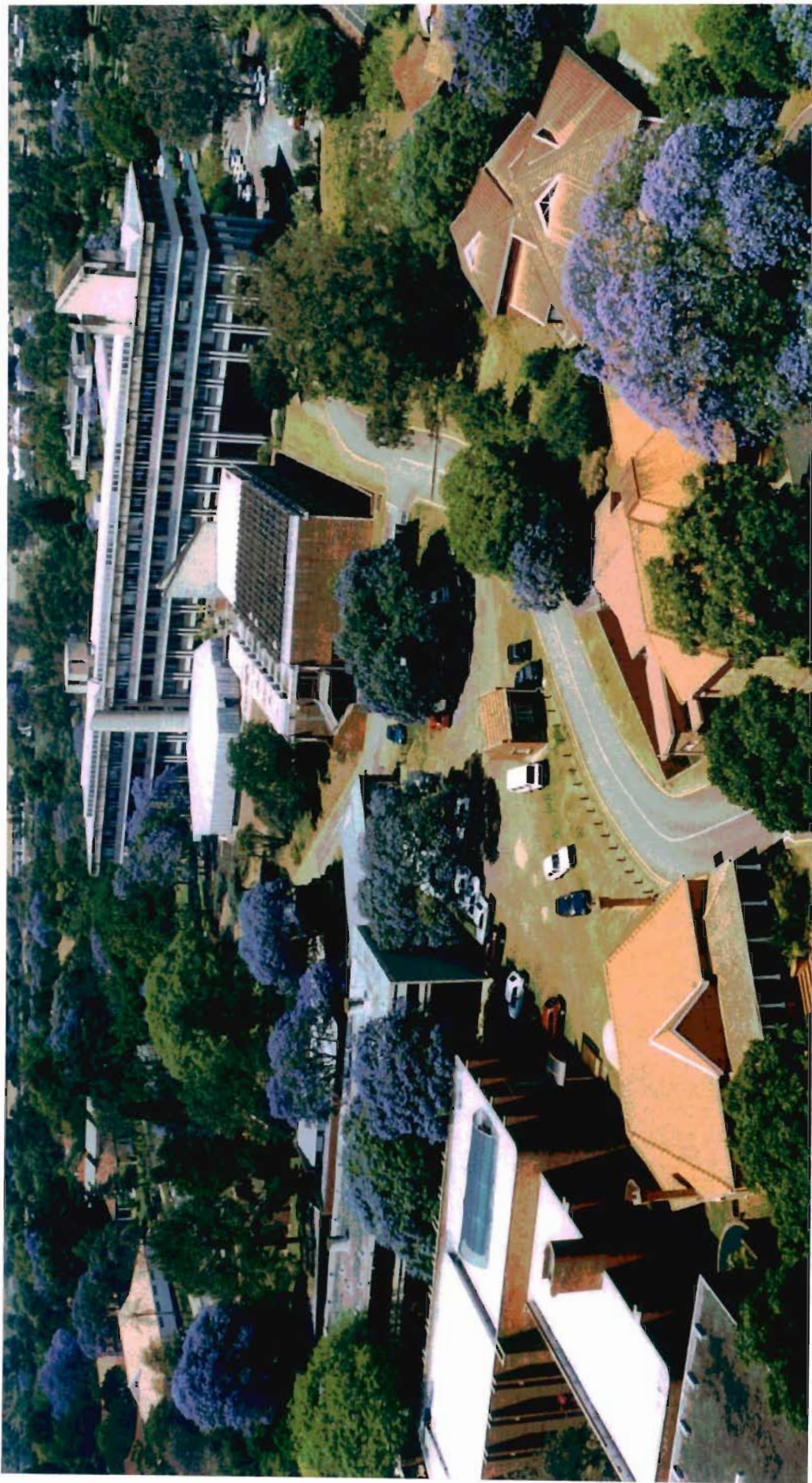


Figure 4.37 New Arts Building - West Elevation

UNP, AVC, Photo library

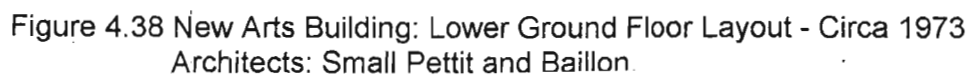


Figure 4.38 New Arts Building: Lower Ground Floor Layout - Circa 1973
Architects: Small Pettit and Baillon.

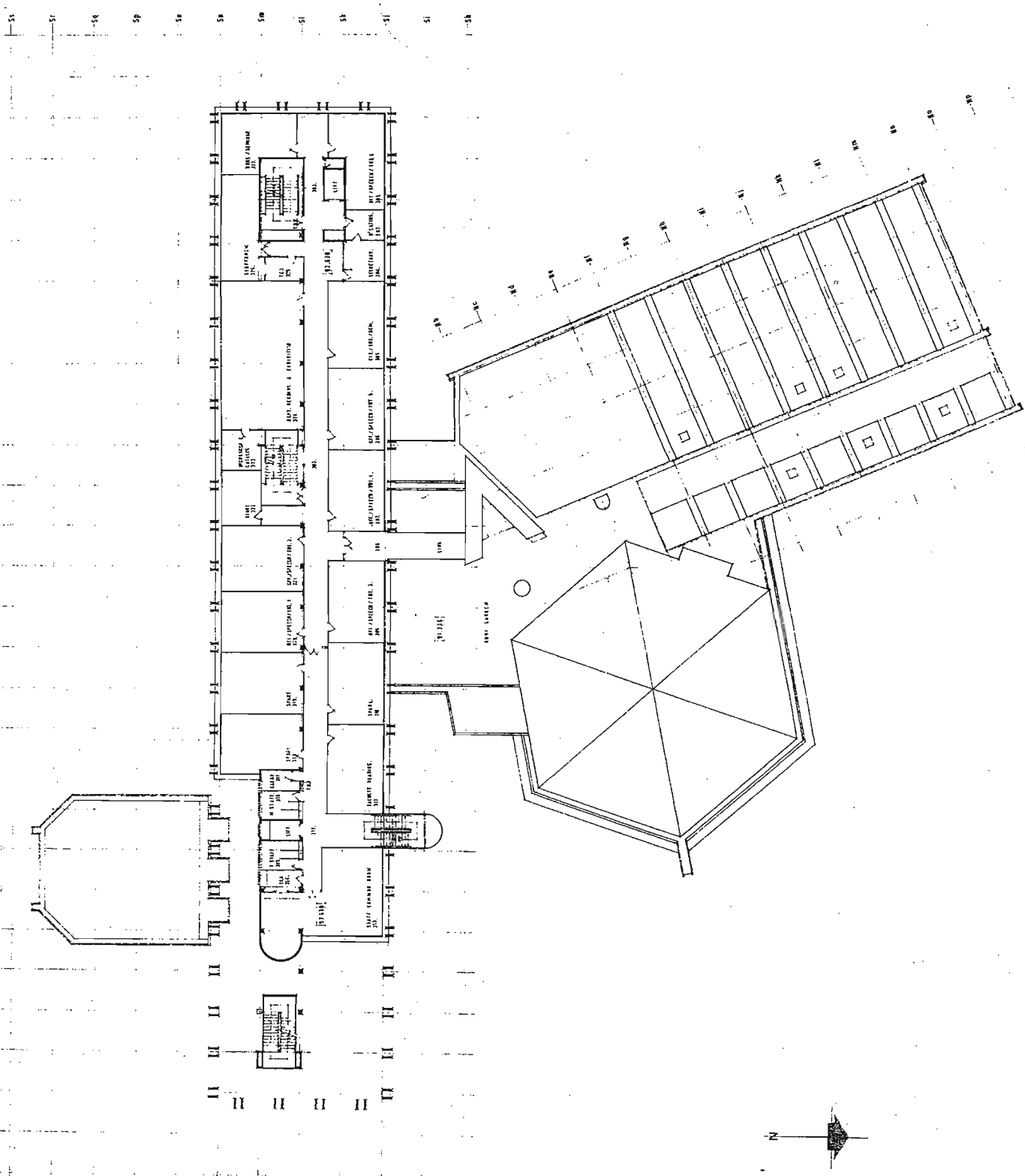


Figure 4.40: New Arts Building: First Floor Layout - Circa 1973
Architects: Small Pettit and Bailon

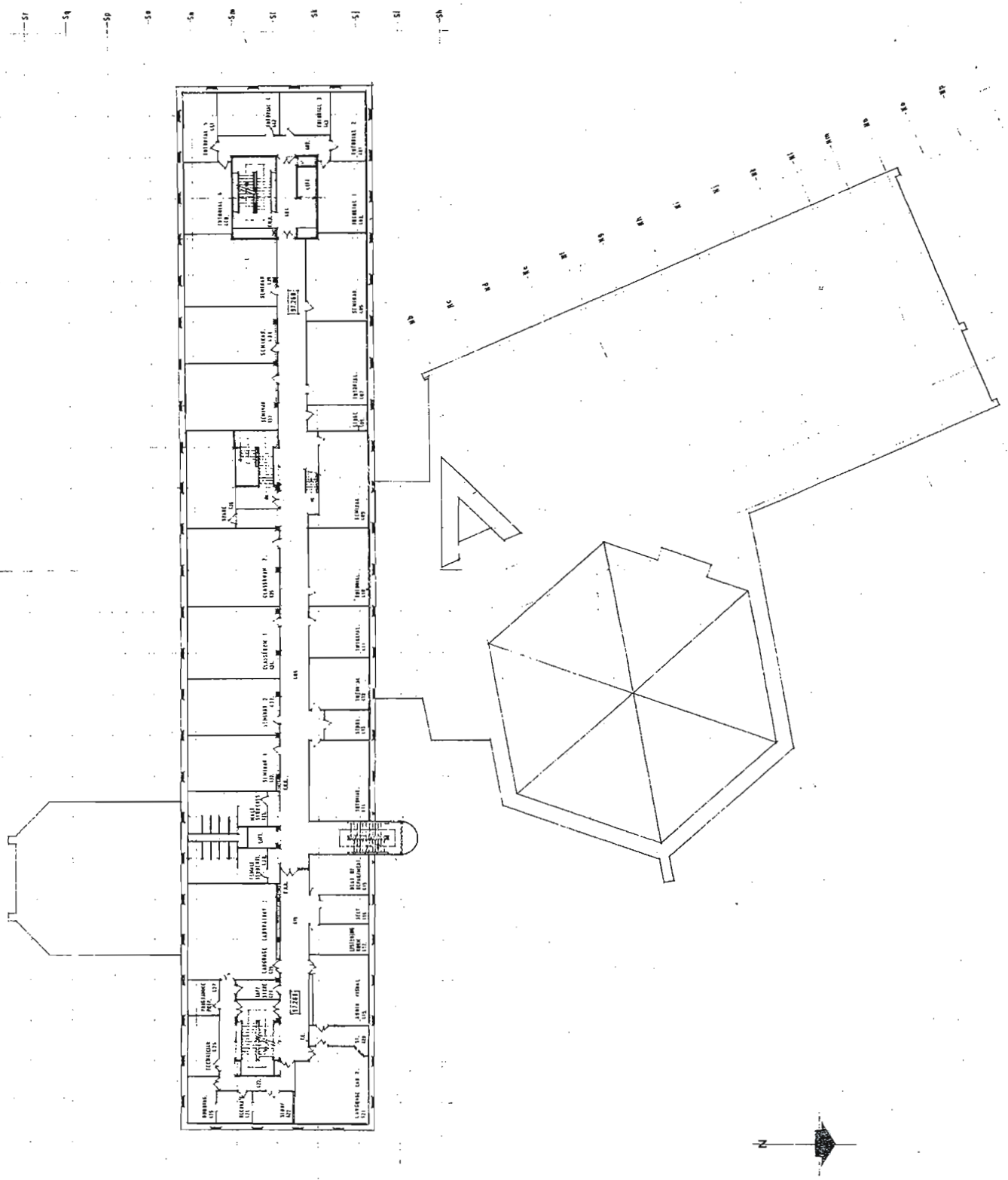
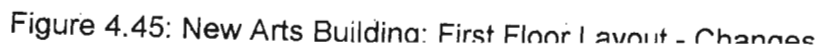


Figure 4.41: New Arts Building: Second Floor Layout - Circa 1973
Architects: Small Partners and Partners



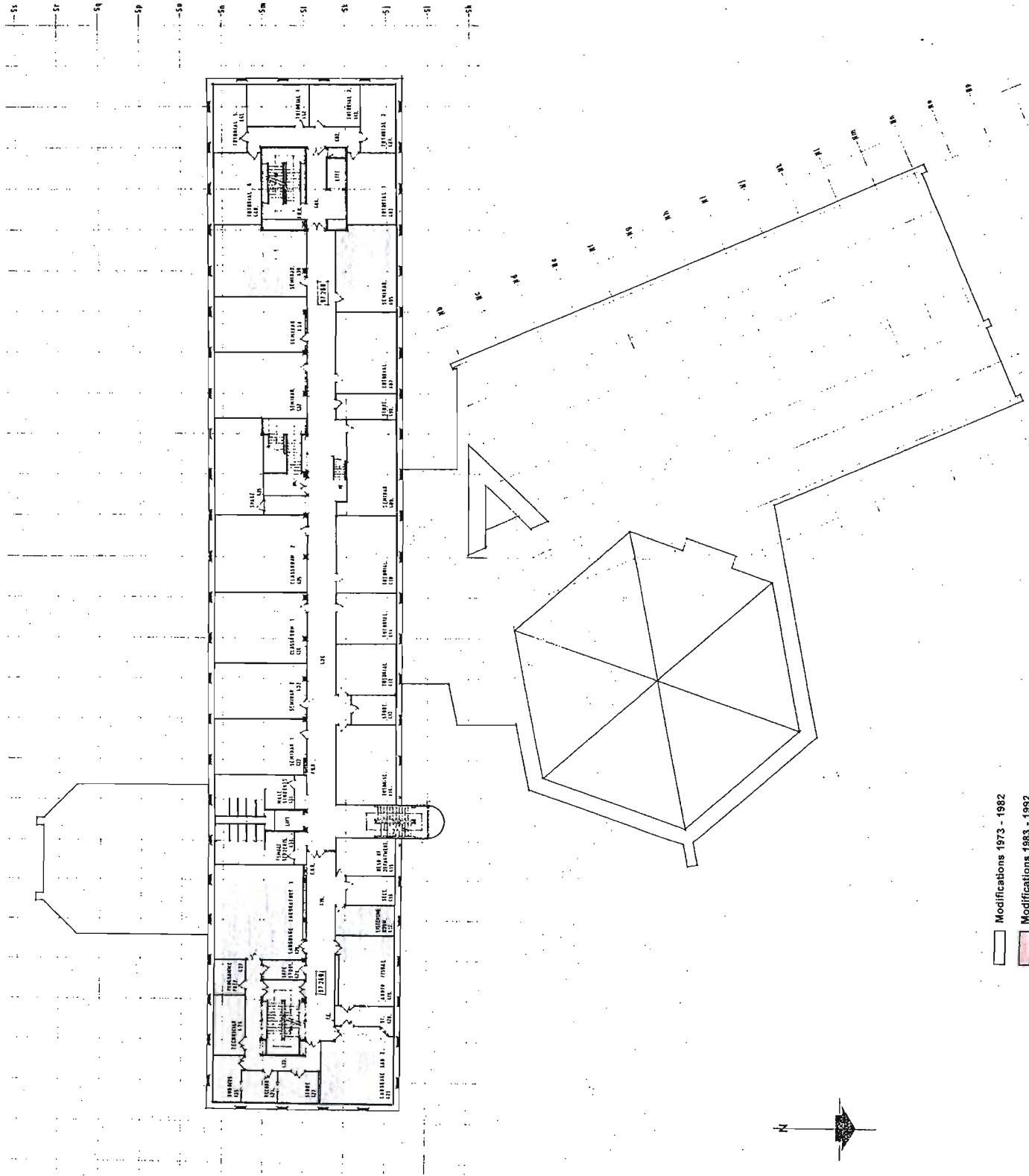
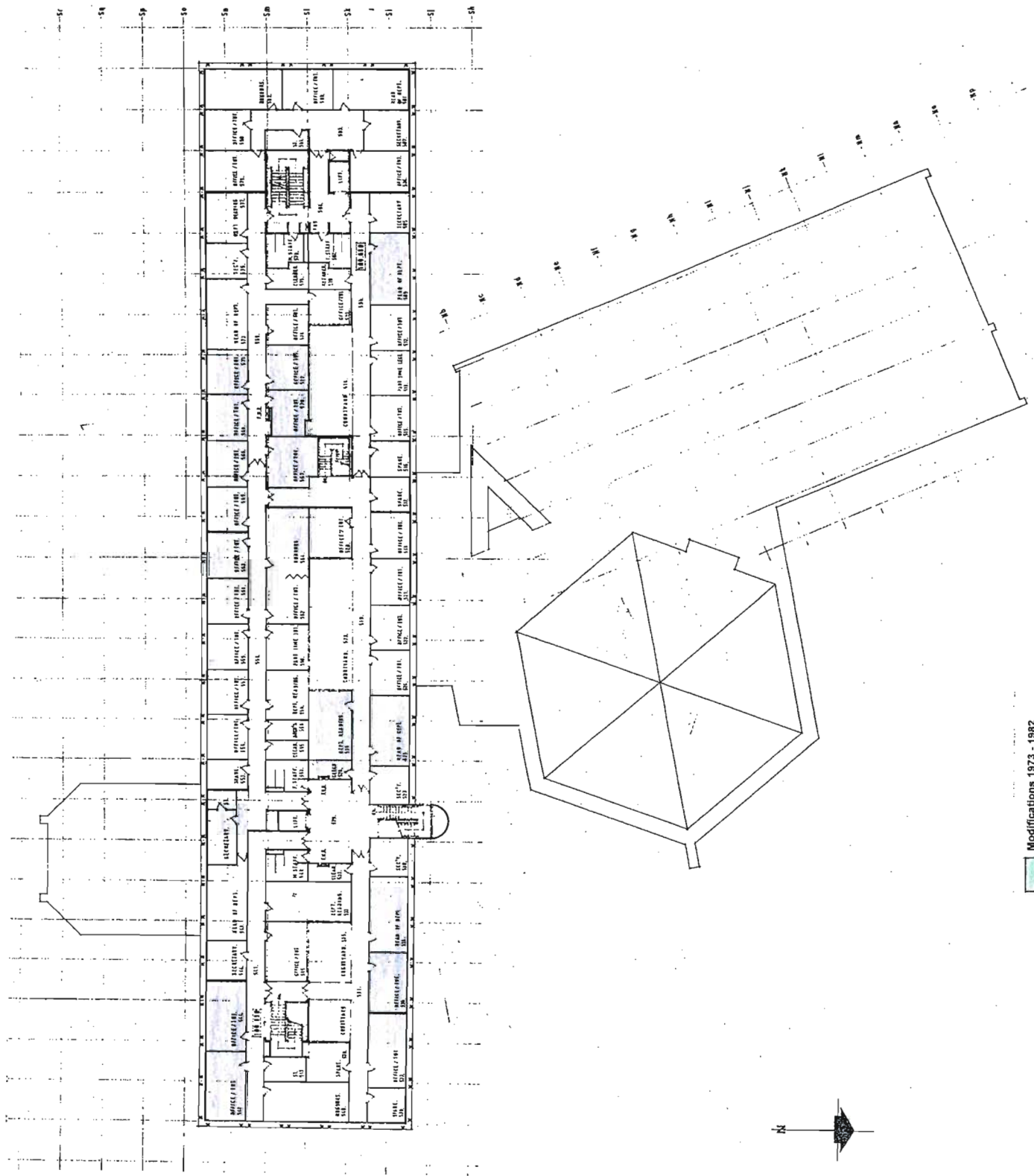
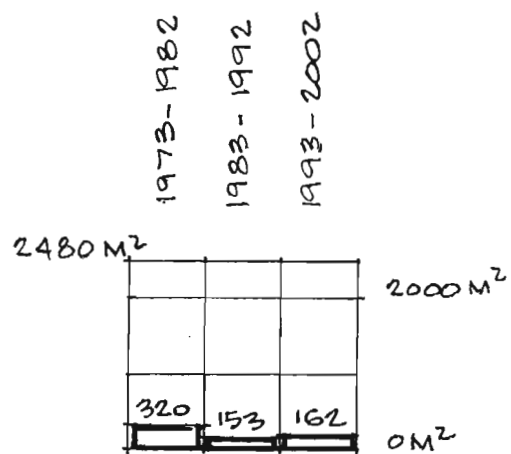


Figure 4.46: New Arts Building: Second Floor Layout - Changes



- Modifications 1973 - 1982
- Modifications 1983 - 1992
- Modifications 1993 - 2002

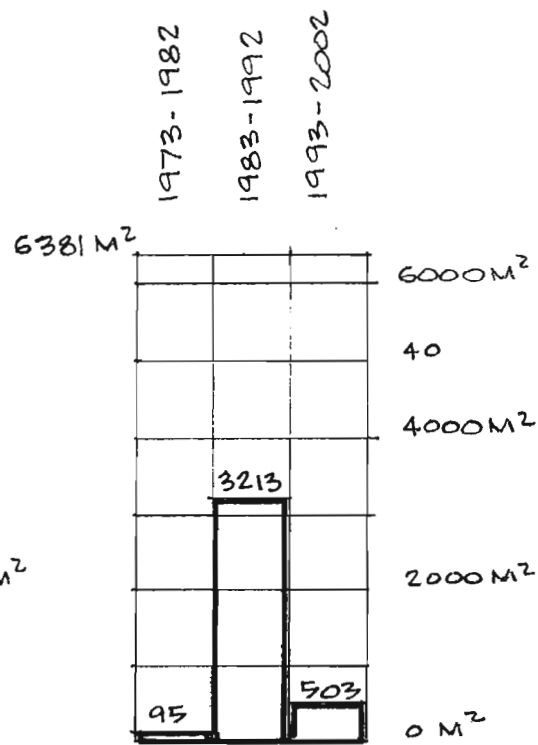
Figure 4.47: New Arts Building: Third Floor Layout - Changes



Old Arts Building
constructed 1912

Original Area 2 074 m²
Added Area 406 m² (1937)

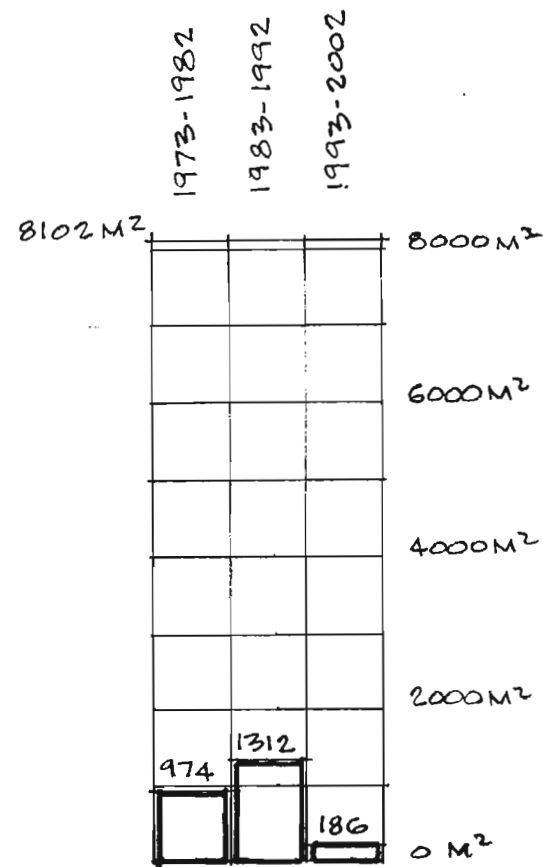
Load Bearing Brick



Main Science Building
1948

3 373 m²
2 850 m² (1958)
158 m² (1990)

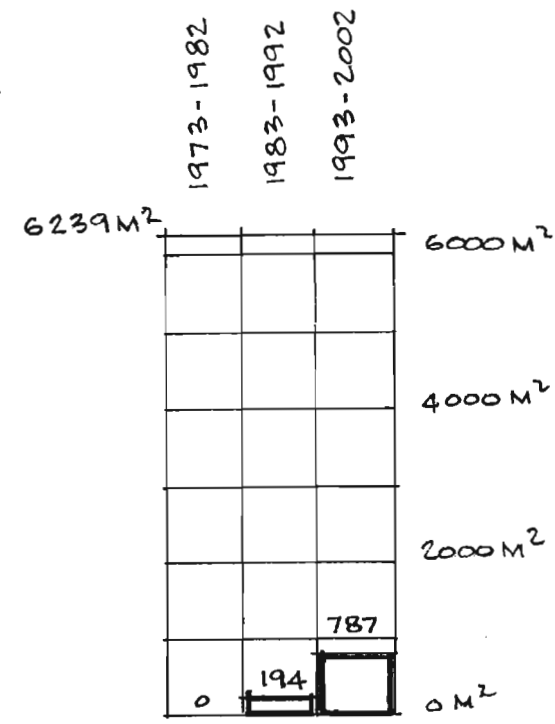
Reinforced Concrete Frame



Rabie Sanders Building
1952

6 630 m²
1 472 m² (1958)

Reinforced Concrete Frame

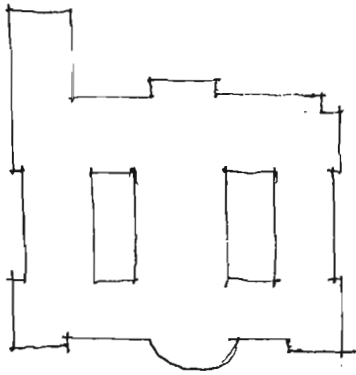


New Arts Building
1973

6 239 m²

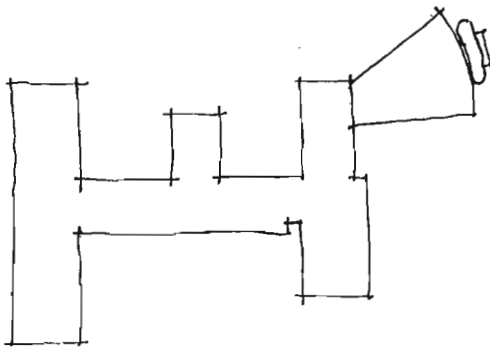
Precast Concrete

Figure 4.48 Comparative Graphs indicating the extent of Changes of the various Buildings



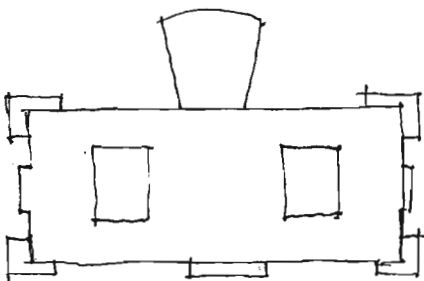
OLD ARTS BUILDING

Load bearing brick structure.
 Two internal courtyards.
 Well defined entrances.
 Strong Image - National Monument.
 Teaching venues recessed on colonnaded porch.
 North / South orientation.
 West facing main facade - venues uncomfortable in summer.
 Malleable interior spaces - no effect on the exterior
 The building may be extended at the rear.



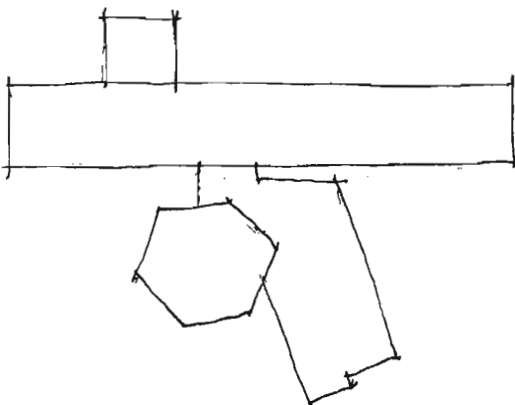
MAIN SCIENCE BUILDING

Framed reinforced concrete structure - brick infill.
 Amorphous shape
 No defined entrances.
 Anonymous building image
 West facing facade - uncomfortable venues in summer.
 Malleable interior spaces which have an impact on the exterior
 The building may be extended.
 Sound investment but poor architectural quality.



RABIE SANDERS BUILDING

Framed reinforced concrete structure - brick infill
 Two internal courtyards.
 Well defined entrances.
 Strong Neo-Classic Image.
 Teaching venues in projecting corners of building
 North / South orientation.
 West facing main facade - uncomfortable rooms in summer.
 Malleable interior spaces - no effect on the exterior



NEW ARTS BUILDING

Precast reinforced concrete structure.
 Landmark building
 Well defined entrances.
 Strong Image.
 East / West orientation.
 West facing facade - uncomfortable in summer.
 Malleable interior spaces - no effect on the exterior
 May only be extended using attached freestanding lecture pods at ground floor level.

Figure: 4.49 Profiles of Buildings and Summaries of Building Types.