

CHAPTER 7.

PATTERNS: DESIGN PRINCIPLES

The proposition is that the *patterns of design principles* may be introduced into the typical process of design in practice, so as to assist designers and help them think through many possibilities.

7.1. INTRODUCTION - DESIGN PRINCIPLES:

Design principles can be defined as *fundamental truths as a basis of reasoning* in terms of design theory (see definition of terms). These principles should be portrayed by design patterns that go to the root of design theory.

In the study of Ching (1979), reviewed in chapter 2, he says :

'This is a study of the art of architecture. It is a morphological study of the essential elements of form and space and those principles that control their organization in our built environment. These elements of form and space are the critical means of architecture. While utilitarian concerns of function and use can be relatively short-lived, these primary elements of

form and space comprise the timeless and fundamental vocabulary of the architectural designer.'

The design principle patterns should help in the process of exploration, as set out by Lawson:

1. *first insight*, 2. *preparation*, 3. *incubation*, 4. *illumination*,
5. *verification*. (see chapter 6.)

The aim of an appropriate design tool should be to provide input into all these creative stages and assist the designer at the right time to make decisions, to inspire, to help explore, to define the parameters and limits. To integrate these actions, it is important that the manner of presenting them must be integrated as well.

This can be achieved by grouping principles into fields as shown in the following proposed menus:

7.2 INTRODUCING PATTERNS AND CHECKLISTS

Theoretical design principles can be introduced in practice by a systematic grouping of the principles and relating these to the following fields of design patterns. These groupings can form menus within the software programme or web site which has relevant patterns in a database library together with checklists of constraints : (*See also menus and checklists proposed, following*)

7.2.1	SITE: PATTERNS RELATED TO A SPECIFIC NEED OF THE SITE
7.2.2	FORM TYPE: PATTERNS RELATED TO TYPES OF FORMS
7.2.3	COMPOSITION OF FORM: PATTERNS RELATED TO HOW FORMS ARE PLACED OR COMPOSED
7.2.4	SPACE: PATTERNS RELATED TO HOW SPACE IS CREATED
7.2.5	ENVIRONMENT: PATTERNS RELATED TO HOW THE DESIGN FITS INTO THE ENVIRONMENT
7.2.6	GRID/MODULES: PATTERNS RELATED TO REPETITION AND DESIGN MODULES
7.2.7	INDOOR/OUTDOOR: PATTERNS RELATED TO HOW THE INSIDE AND OUTSIDE RELATES

TABLE 7-1 FIELDS (MENUS IN SOFTWARE PROGRAMMES OR WEB-PAGES)

In the following tables each of the above fields should show a checklist of constraints. In a software programme each of the above fields can form a menu from which checklists are worked through with regard to constraints, and to which design principle-patterns are linked, as with Web-site hyper-links.

The patterns should form a database which should help the designer in his / her research. The constraints give a picture of delimitations that will develop the design and ensure that the design is relevant. For the purpose of this study only an example of each principle field will be analyzed and illustrated.

The checklist of the constraints mentioned above can be further extended; these checklists can be fine-tuned with user-group interactions.

It would still be the choice of the individual architect whether he / she wants to use the constraints checklists or not. They should be helpful though, to the practising architect.

7.2.1 SITE MENU

THE INFORMATION RELATED TO THE SITE IS OF CRITICAL IMPORTANCE TO THE EARLY DESIGN CONCEPT.

This menu has to give the designer options and alternatives to explore patterns to how his/her building will fit the site.

Important information is shown by the site and it's environment. The designer should first do a site/context investigation and see what exists with regards to:

Possible relationships with other buildings,

Ideal areas on site for Public access,

Axes that can be formed if required

The context,

How the concept can relate to the site,

Any intersections which may occur,

The existing environment.

The patterns shown are, as previously mentioned, only examples of what can be included in a database. The possibilities of patterns are probably endless. The constraints checklist could assist the designer, or he/she could choose to ignore them.

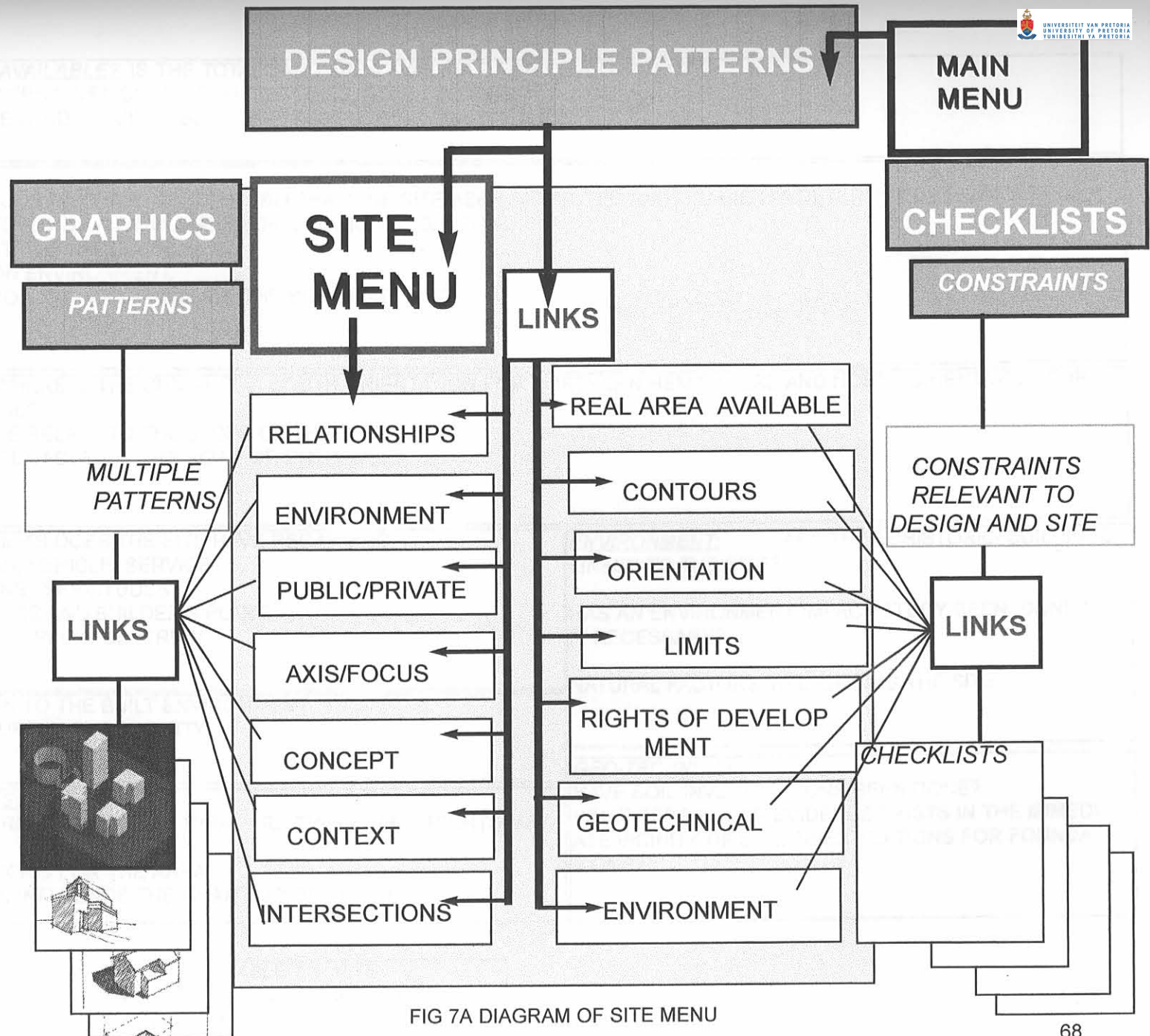
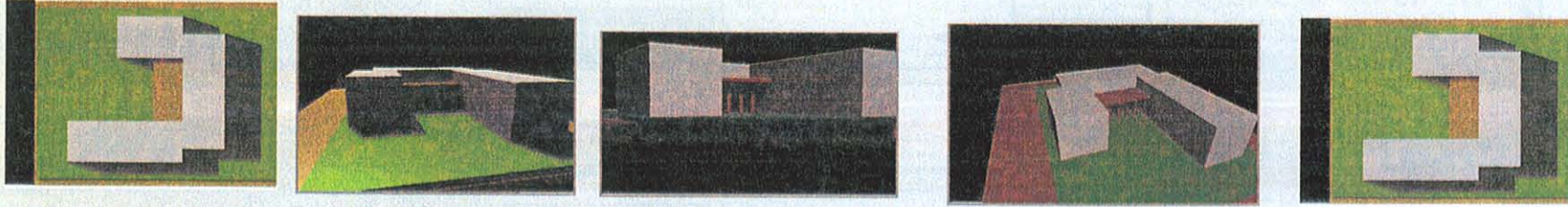


FIG 7A DIAGRAM OF SITE MENU

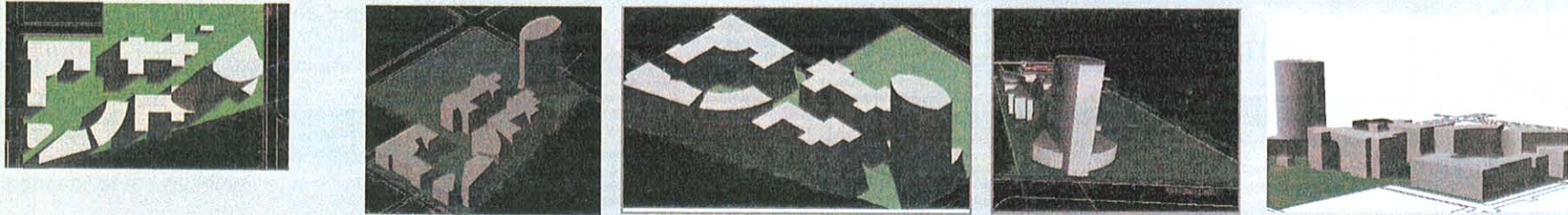
<p><u>REAL AREA AVAILABLE?</u> IS THE TOTAL LAND AREA AVAILABLE FOR DEVELOPMENT ? WHAT PHYSICAL BARRIERS EXIST, SUCH AS :FLOOD LINES, STEEP SLOPES ? WHAT PORTION OF THE LAND IS BUILD ABLE?</p>	
<p><u>CONTOURS?</u> IS CONTOUR INFORMATION AVAILABLE?HAS THE SITE BEEN INSPECTED AND GRADIENTS DETERMINED VISUALLY?ARE CONTOURS SLOPING TOWARDS A FAVOURABLE ORIENTATION REGARDING: VIEW, ORIENTATION, STATUS / ADDRESS, IMPACT OF BUILDING ON ENVIRONMENT, CAN AVAILABLE TECHNOLOGY ACCOMMODATE THE SITE GRADIENT?</p>	
<p><u>ORIENTATION ?</u> WHERE IS THE SUN ANGLE: SOUTH ORIENTATION FOR NORTHERN HEMISPHERE AND NORTH ORIENTATION FOR SOUTHERN HEMISPHERE? HOW DOES THIS ANGLE RELATE TO THE SLOPE OF THE SITE : THE VIEW , IF APPLICABLE THE ROAD OR ENTRANCE?</p>	
<p><u>LIMITS?</u> WHAT LIMITS DOES THE SITE HAVE REGARDING: ACCESS : PEDESTRIAN, VEHICLE, SERVICE BUILDING RESTRICTIONS : SERVITUDES CONSTRUCTION PROCESS AND BUILDER'S PLANT EXPOSURE (AS WITH SHOPPING CENTRES)</p>	<p><u>ENVIRONMENT:</u> ARE THERE HISTORIC/ BUILDINGS LINKED TO THE SITE? HAS AN ENVIRONMENT IMPACT STUDY BEEN DONE?. IS IT NECESSARY? NATURAL FACTORS INFLUENCING THE SITE</p>
<p><u>CONTEXT:</u> IN RELATION TO THE BUILT ENVIRONMENT OR NATURE IN THE VICINITY</p>	<p><u>GEO-TECHNICAL:</u> HAVE SOIL INVESTIGATIONS BEEN DONE? WHAT REPORTS OR EVIDENCE EXISTS IN THE IMMEDIATE VICINITY OF SOIL INVESTIGATIONS FOR FOUNDATIONS?</p>
<p><u>DEVELOPMENT RIGHTS:</u> ARE THERE EXISTING RIGHTS IN PLACE, WHAT ARE THEY? WHAT RIGHTS MAY BE GRANTED? LOCAL PLANNING POLICIES FOR THE AREA HOW WILL THE DESIGN INFLUENCE THE GRANTING OF RIGHTS?</p>	

TABLE 7-1 SITE
CONSTRAINT CHECKLIST

FORM TYPE: 'ORGANIC'



INSIDE/OUTSIDE: 'OPEN COURTYARD'



SITE: 'ENVIRONMENT'

EXAMPLES OF PATTERNS

FIG 7-1

THIS MENU SHOULD ASSIST IN EXPLORING POSSIBILITIES OF FORM.

The designer should have some initial idea of which form could be appropriate. Client's needs could give some direction. Some clients would want to make a statement, others want to be discreet. The constraints checklist should assist. The designer may have his/her own notebook to which information can be added or deleted.

The patterns of form should clearly show possibilities which the designer can use, develop or even elaborate upon:

Simple form: other than complex,

Complex form: forms that are composite (forms put together to form a whole),

Geometrical form: related to basic geometrical surfaces or solids,

Addition: a form created by adding similar of the same module-types,

Subtraction: a form created by subtracting forms from it (cut-outs),

Conceptual form: a form that creates the concept of the building,

Forms creating space: the emphasis is not on the form itself but the space that it creates.

The patterns shown should be self explanatory. Links to **architectural language** may also have advantages, (see Chapter 9).

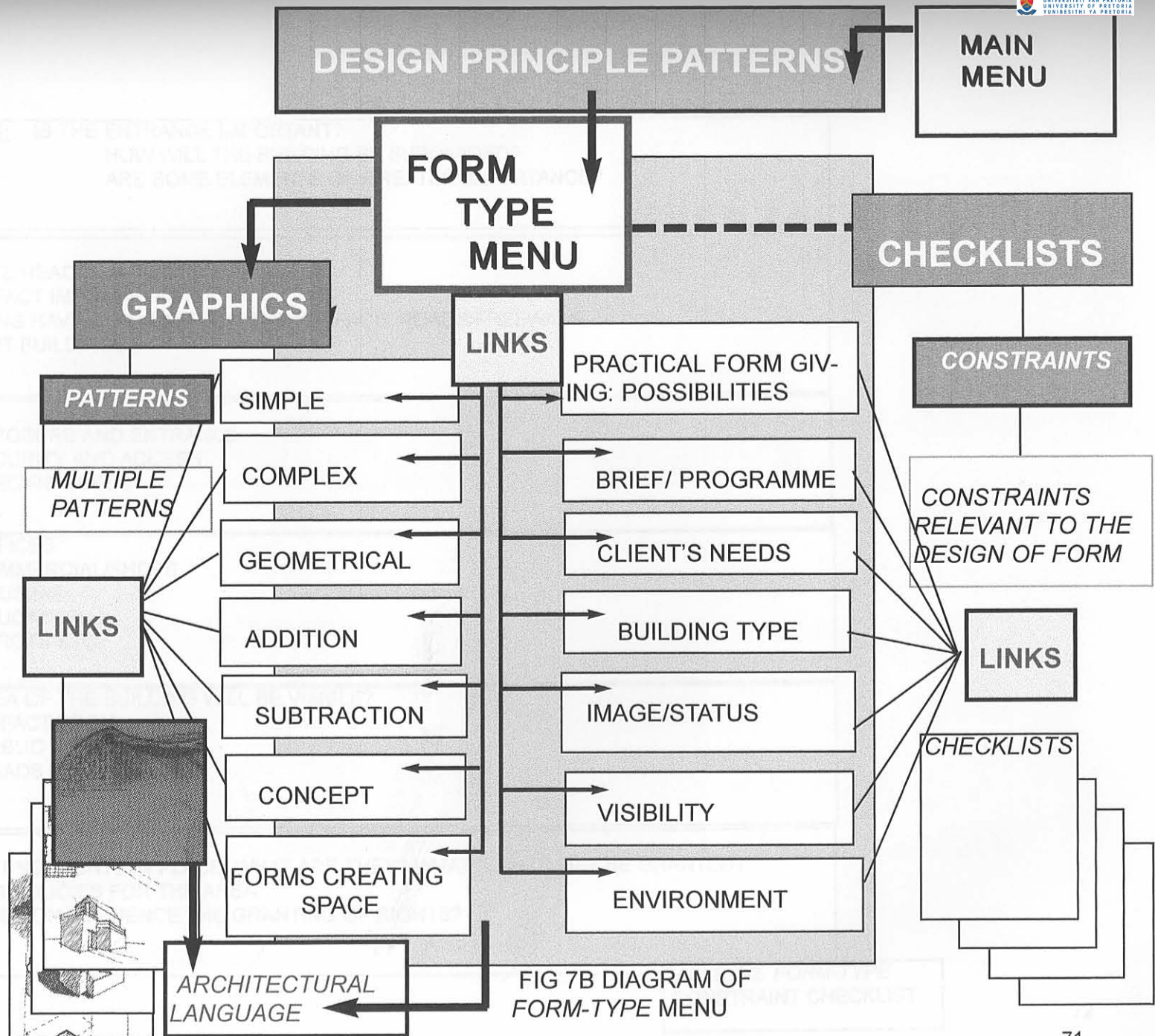


FIG 7B DIAGRAM OF FORM-TYPE MENU

**CONSTRAINTS:
FORM TYPE**

PRACTICAL FORM GIVING: IS THE ENTRANCE IMPORTANT?
HOW WILL THE BUILDING BE SUBDIVIDED?
ARE SOME ELEMENTS OF GREATER IMPORTANCE?

IMAGE/STATUS:
IS IT A CORPORATE HEADQUARTERS?
IS THE VISUAL IMPACT IMPORTANT?
DOES THE BUILDING HAVE EXPOSURE TO: PUBLIC SPACE, ROADS/FREEWAYS,
OTHER IMPORTANT BUILDINGS ?

CLIENTS NEEDS: EXPOSURE AND ENTRANCE
SECURITY AND ACCESS
SPECIFIC NEEDS

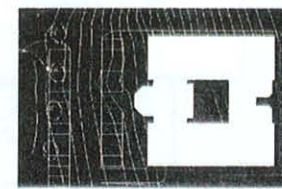
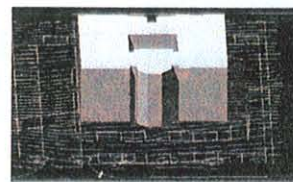
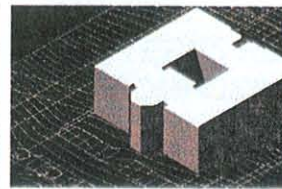
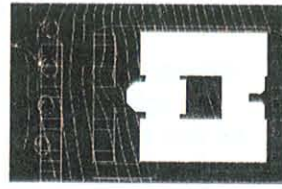
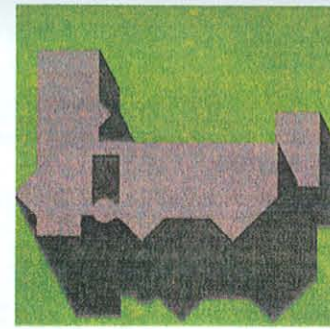
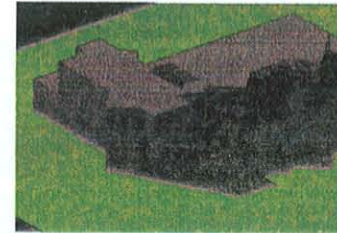
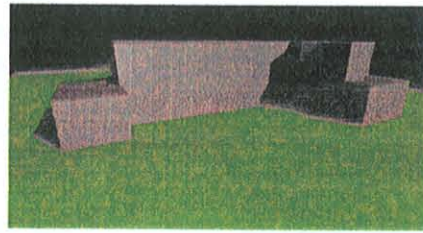
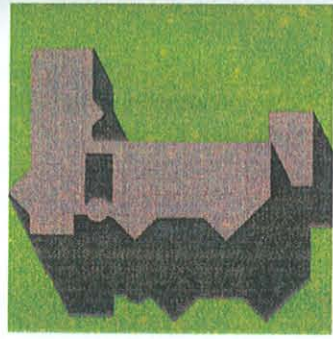
BUILDING TYPES: OFFICES
COMMERCIAL/SHOPS
HOUSING
EDUCATIONAL
SPORTS ETC.

VISIBILITY: WHAT AREA OF THE BUILDING WILL BE VISIBLE?
VISUAL IMPACT FROM:
PUBLIC SPACE
ROADS OR FREEWAYS

ENVIRONMENT:
ARE THERE EXISTING RIGHTS IN PLACE, WHAT ARE THEY? WHAT RIGHTS MAY BE GRANTED?
LOCAL PLANNING POLICIES FOR THE AREA
HOW WILL THE DESIGN INFLUENCE THE GRANTING OF RIGHTS?

TABLE 7-2 FORM-TYPE
CONSTRAINT CHECKLIST

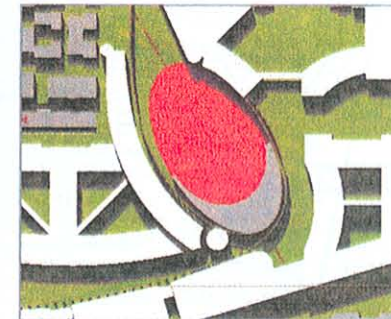
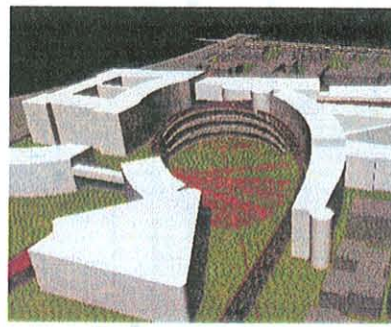
FORM TYPE: 'COMPLEX'



FORM TYPE: 'SYMMETRY'



FORM COMPOSITION:
'SPIRAL CONCEPT'



EXAMPLES OF PATTERNS

FIG 7-2

7.2.3 COMPOSITION OF FORM MENU

THE COMPOSITION OF FORM MENU WILL EXPOSE THE DESIGNER TO HOW THE DIFFERENT BUILDINGS OR SECTIONS OF A BUILDING WILL RELATE TO ONE ANOTHER AND HOW THIS GROUPING WILL BE COMPOSED.

If only a single building is being designed, this menu may not have a role to play. Groups of buildings, such as complexes or campuses or a building in its urban context should benefit from design patterns shown here.

The constraints checklist may assist the designer in fine-tuning the clients' brief or design programme. (Each designer will differ in the way he / she approaches this section.)

The following patterns are shown:

Axis: how the buildings are grouped around it,

Symmetry: as used in the grouping of buildings, or **Asymmetry,**

Scale: the scale of buildings in relation to each other and the environment,

Relationship: spatial or ordering relationships,

Grouping: Forming clusters of different groups for example.

Forms creating space: how several forms, grouped and composed can create space.

Links to **social preferences** menu could be useful.

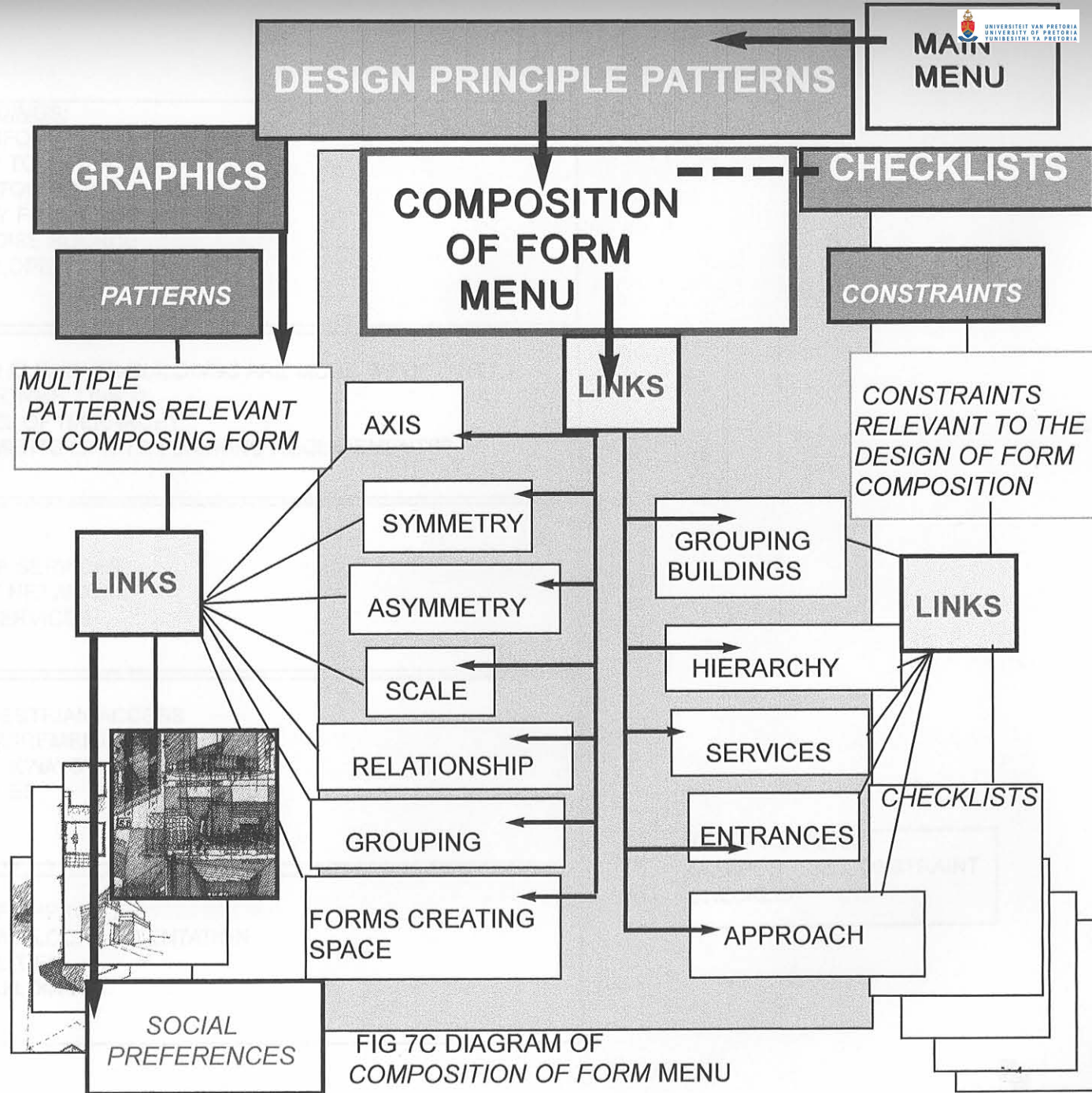


FIG 7C DIAGRAM OF COMPOSITION OF FORM MENU

GROUPING OF BUILDINGS:

FORMAL OR INFORMAL ARRANGEMENT
RELATIONSHIP TO ENTRANCE/AXIS
ORIENTATION TOWARDS SUN ANGLE
AWAY FROM WIND DIRECTION
or NOISE SOURCE
CONTOURS: SLOPE OF SITE

HIERARCHY: WHICH ELEMENTS/BUILDINGS ARE MORE IMPORTANT?

DIVISION OF FORMS: LINKS?
SECOND LEVEL OF HIERARCHY
HOW DO ELEMENTS LINK TO PLANNING REQUIREMENTS?

SERVICES:

NETWORK
CONCEPTS OF SERVICES
ECONOMY OF NETWORKS
ACCESS TO SERVICES

ENTRANCE:

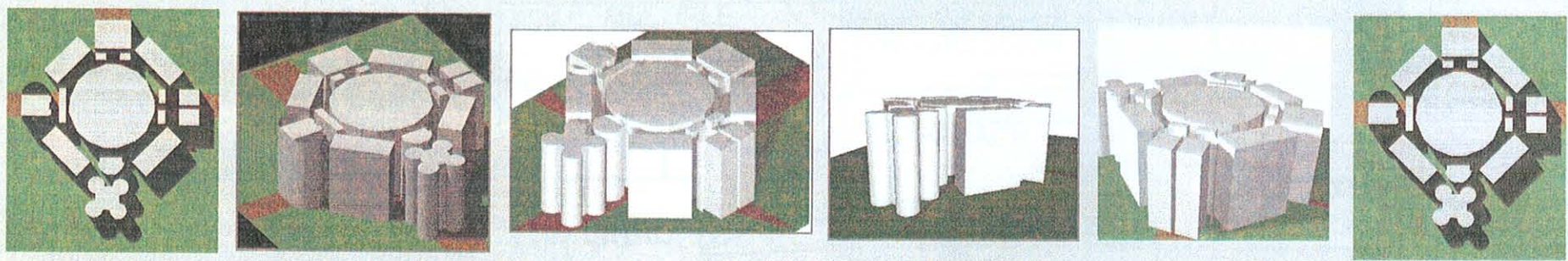
VEHICLE/ PEDESTRIAN ACCESS
PARKING REQUIREMENTS
COVERED WALKWAYS
FOYERS/LOBBIES

APPROACH:

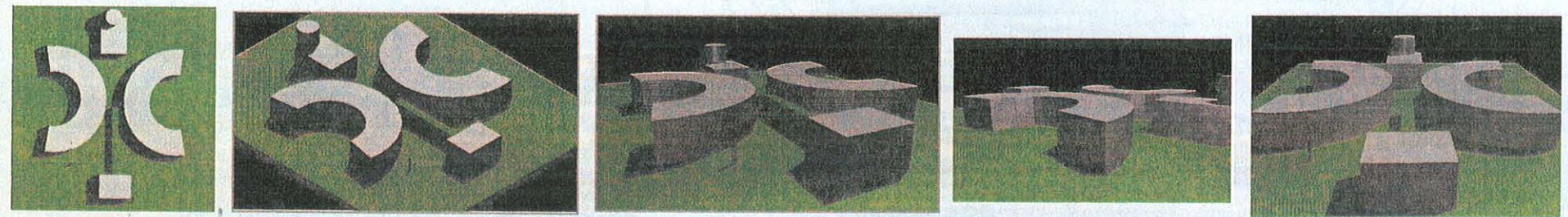
DIRECTION OF APPROACH
APPROACH AND LOCAL ORIENTATION
AXIS POSSIBILITIES
HEIGHT OF BUILDINGS

TABLE 7-3 *FORM
COMPOSITION CONSTRAINT
CHECKLIST*

COMPOSITION OF FORM:
'ASYMMETRY'



FORM: 'COMPLEX'



COMPOSITION OF FORM:
'SYMMETRY'

EXAMPLES OF PATTERNS

FIG 7-3

7.2.4 SPACE MENU

THE SPACE MENU WILL GIVE MORE THREE-DIMENSIONALITY TO THE DESIGN CONCEPT. IT IS RELATED TO THE PREVIOUS MENUS, BUT THE VERTICAL DIMENSION ALSO COME INTO FOCUS:

This menu may also work well with a group of designers: Brain-storm sessions and graphically exploring ideas together. The analysis of the aspects of space may be too complex for one designer to pursue in isolation.

Progression: How space is experienced or can be experienced by the person moving through it.

Approach: what elements could assist in defining the approach to a building,

Transition: How the one space is linked to the other and how the experience of moving from one space to another can be manipulated by the designer,

Formal or Informal Space: could be related to the architectural language chosen,

Public or Private Space: may be related to the security or access to certain areas, with its practical implications,

Links to Landscaping possibilities could assist early thinking in these lines.

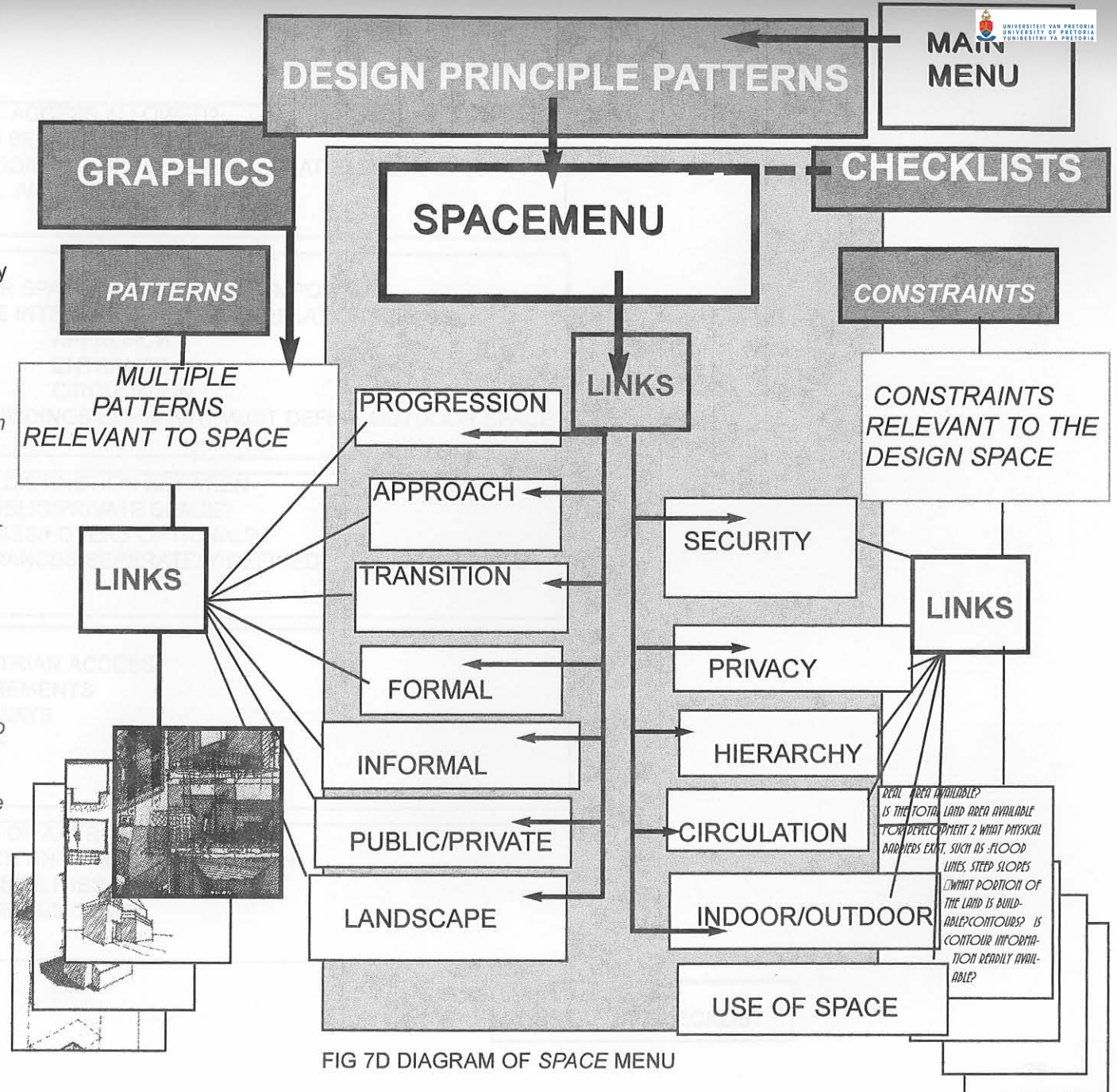


FIG 7D DIAGRAM OF SPACE MENU

**CONSTRAINTS:
SPACE**

SECURITY: IS PUBLIC ACCESS ALLOWED?
ITEMS TO BE PROTECTED
PROTECTION REQUIRED AGAINST WHAT ELEMENTS?
HOW WILL ACCESS BE MONITORED?

HIERARCHY: IS OUTDOOR SPACE PROGRESIVELY IMPORTANT
DOES THE INTERIOR SPACE HAVE RELATIONSHIP TO:
APPROACH
ENTRANCE
CIRCULATION
WHICH BUILDINGS ELEMENTS MUST DEFINE OUTDOOR SPACE

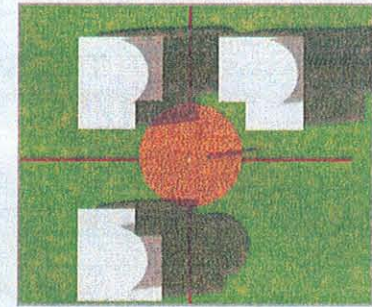
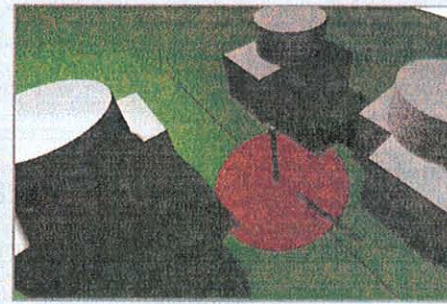
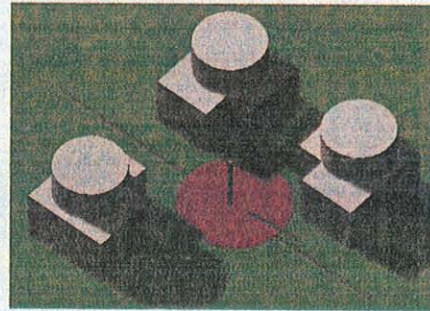
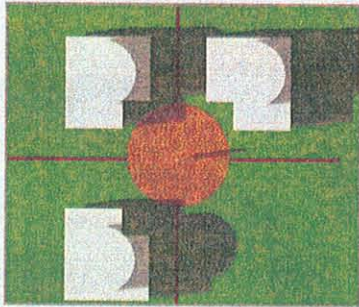
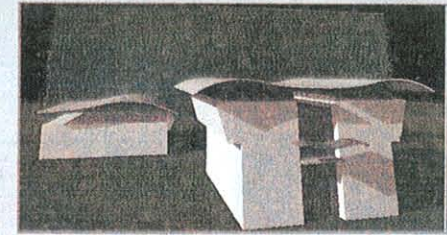
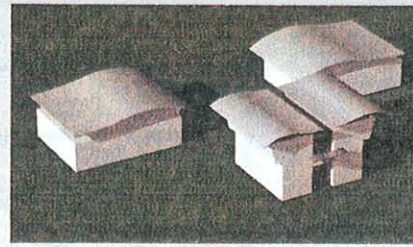
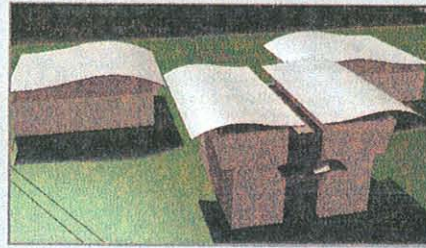
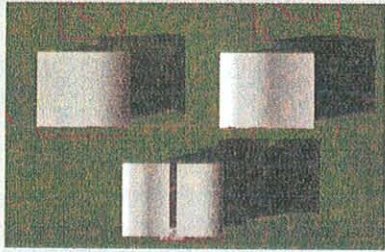
PRIVACY: IS THERE DISTINCTION BETWEEN
PUBLIC/PRIVATE SPACE?
ARE LOBBIES/FOYERS OPTIONAL?
ARE ENTRANCES SEPERATELY DEFINED(GROUPS OF BUILD
INGS)?

ENTRANCE:
VEHICLE/ PEDESTRIAN ACCESS
PARKING REQUIREMENTS
COVERED WALKWAYS
FOYERS/LOBBIES

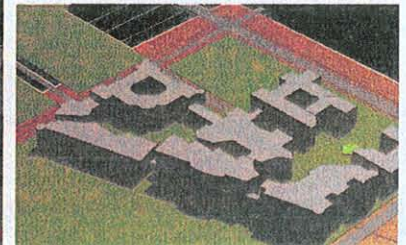
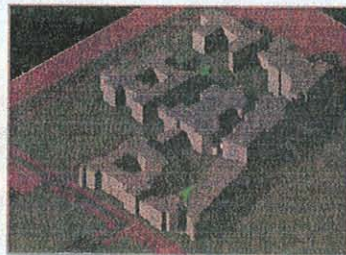
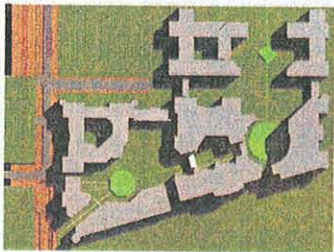
APPROACH: DIRECTION OF APPROACH
APPROACH AND LOCAL ORIENTATION
AXIS POSSIBILITIES
HEIGHT OF BUILDINGS

TABLE 7-4 SPACE
CONSTRAINT CHECKLIST

FORM COMPOSITION: 'RELATIONSHIP'



FORM COMPOSITION: 'RELATIONSHIP 2'



COMPOSITION OF FORM 'GROUPING'

EXAMPLES OF PATTERNS

FIG 7-4

7.2.5 ENVIRONMENT MENU

THE INFORMATION RELATED TO THE ENVIRONMENT IS THE RELATIONSHIP WITH THE BUILDING IN IT'S CONTEXT

This menu has to give the designer options and alternatives to explore patterns to how the building can relate to buildings, elements and steets around it.

Possible *relationships* with other buildings,

Approach possibilities,

Axes that can be formed if required,

The *context*,

How the *concept* form can relate to the environment,

Landscaping in the area,

The *scale* of the buildings in relation to others.

The patterns shown are, as with the other menus, only examples of what can be included in a database. The possibilities of patterns are probably endless. The constraints checklist could here benefit the search for environment clues.

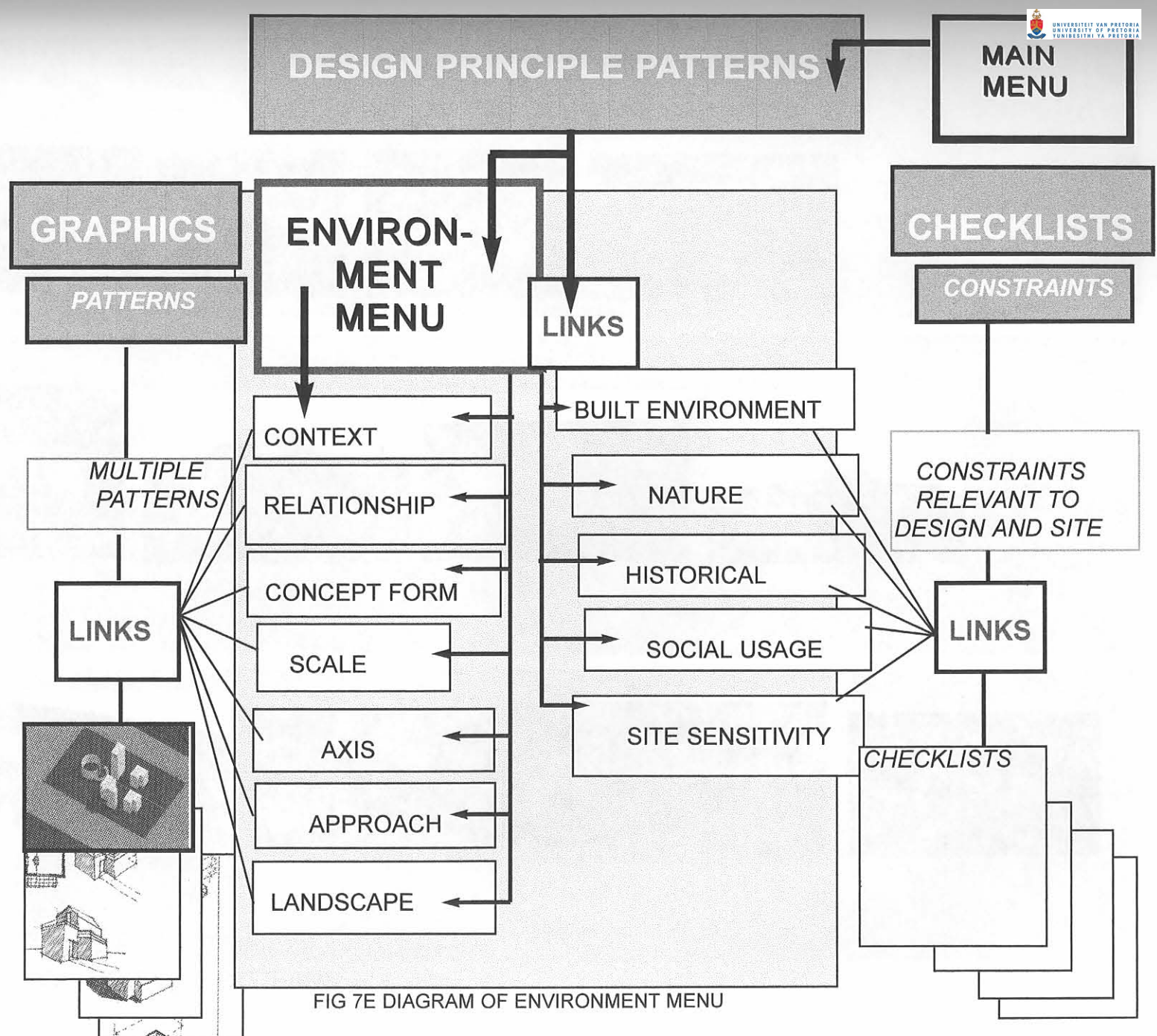
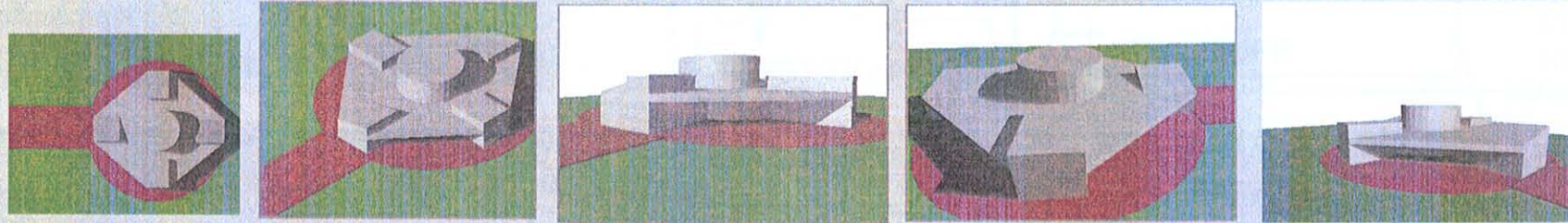
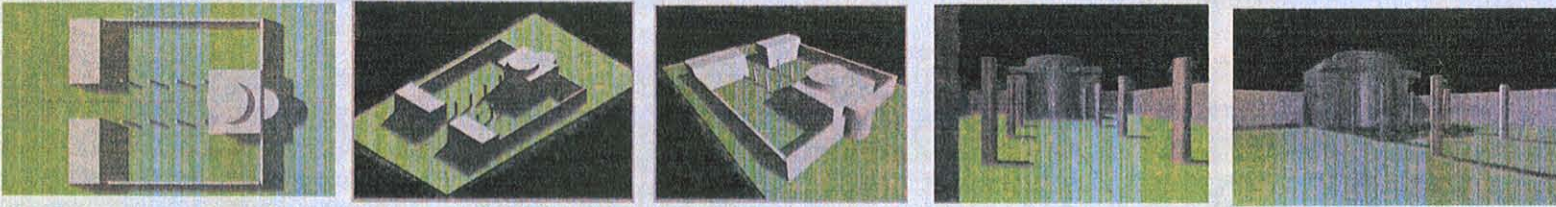


FIG 7E DIAGRAM OF ENVIRONMENT MENU

COMPOSITION OF FORM:
'ASYMMETRY'



FORM: 'COMPLEX'



COMPOSITION OF FORM:
'SYMMETRY'

EXAMPLES OF PATTERNS

FIG 7-5

7.2.6 GRID/MODULES MENU

THE INFORMATION RELATED TO THE GRID/MODULES MENU HAS TO DO WITH STRUCTURE AND REPETITION.

This menu has to give the designer options and alternatives to explore patterns to how the modules and grid of the building can influence the concept.

Repetition of modules,

Rhythm possibilities,

The type of grid required:

Freedom or Constrained or Ad Hoc

How Landscaping can complement or contrast the grid,

The patterns shown are, as with the other menus, only examples of what can be included in a database. The constraints checklist could here assist the search for early decision-making on items that could also follow later in design development. Thinking about them at this stage may help to avoid many changes to the design concept.

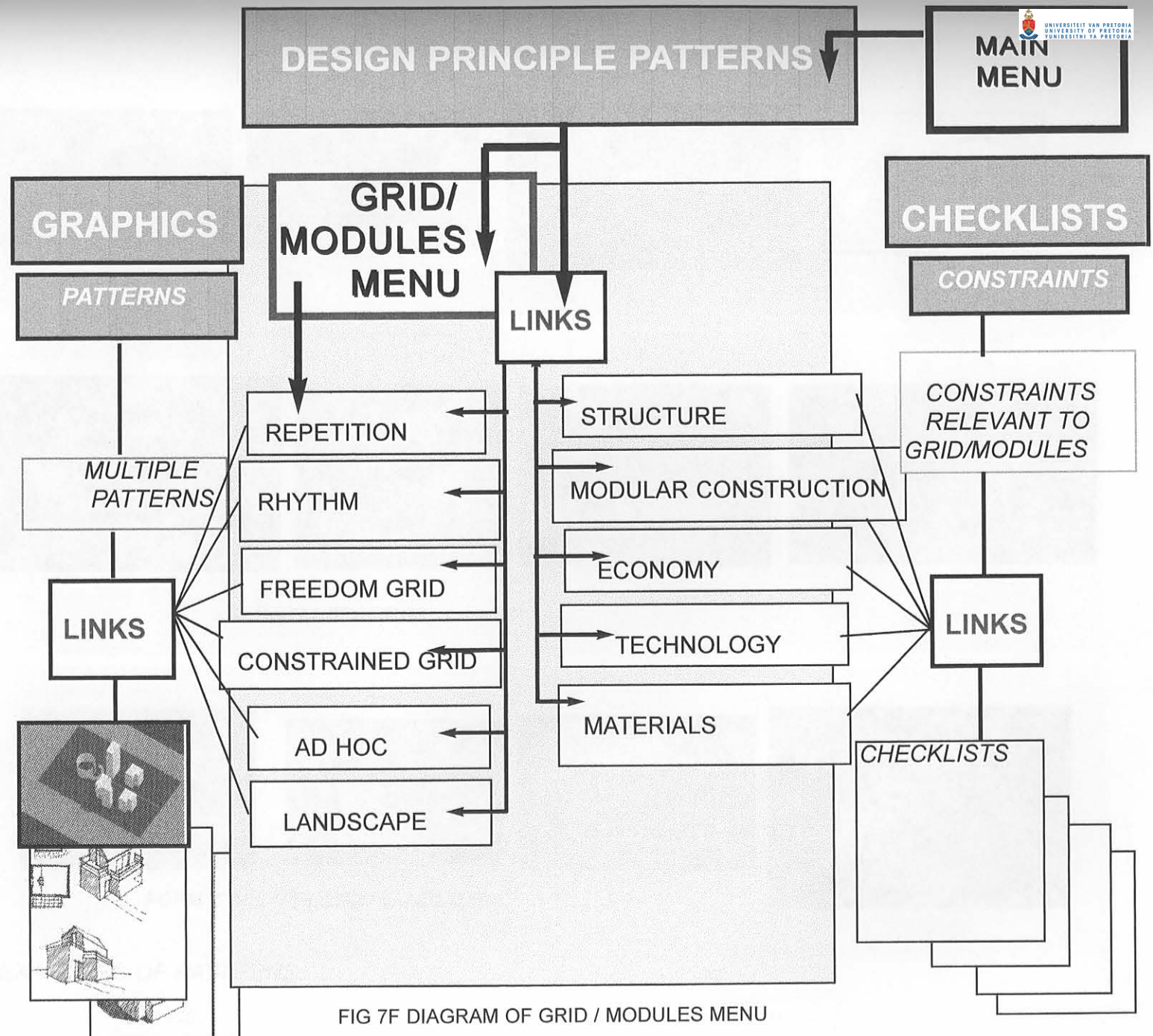
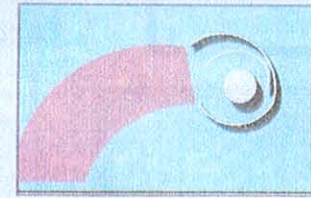
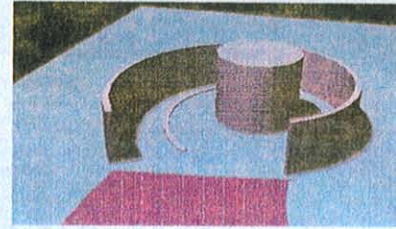
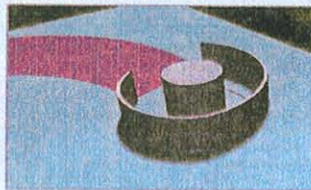
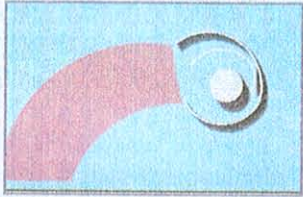
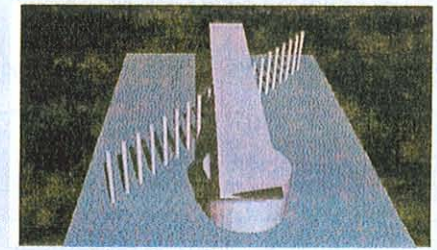
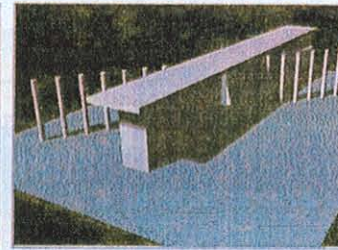
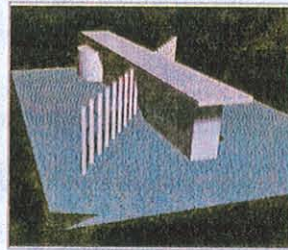
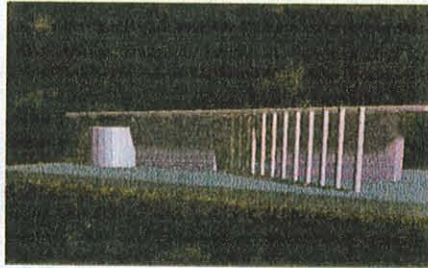
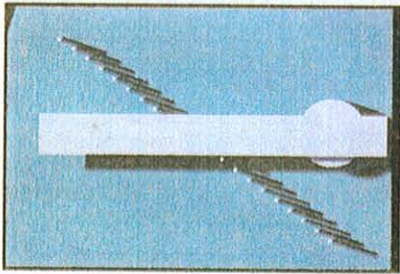


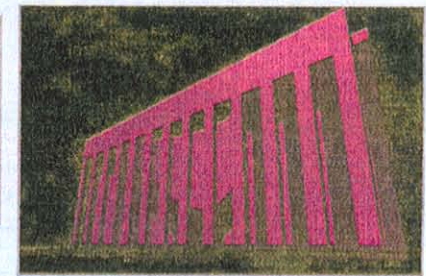
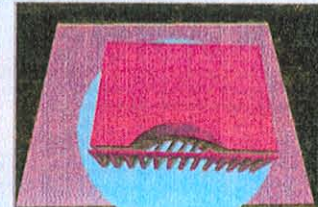
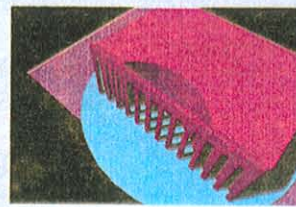
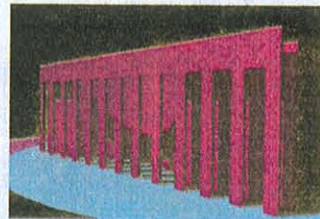
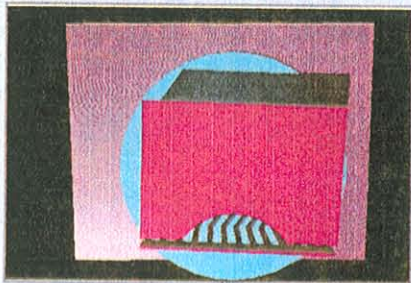
FIG 7F DIAGRAM OF GRID / MODULES MENU



FORM TYPE: 'SPIRAL'



SITE: 'INTERSECTIONS'



FORM TYPE: 'PRECEDING FACADE'

EXAMPLES OF PATTERNS:

FIG 7-6

7.2.7 INDOOR/OUTDOOR MENU

THE INFORMATION RELATED TO THE INDOOR/OUTDOOR MENU SHOWS HOW THE OUTSIDE OF THE BUILDING AND INTERIOR IS LINKED.

This menu has to give the designer options and alternatives to explore patterns to how indoor space and outdoor space can be formed:

Squares,

Courtyard possibilities,

Recessed space:

Building and Landscape interaction,

How mass or scale can complement the outdoor space,

The patterns again are shown as with the other menus as only examples of what can be included in a database. The constraints checklist could here assist the search for how outdoor space would function.

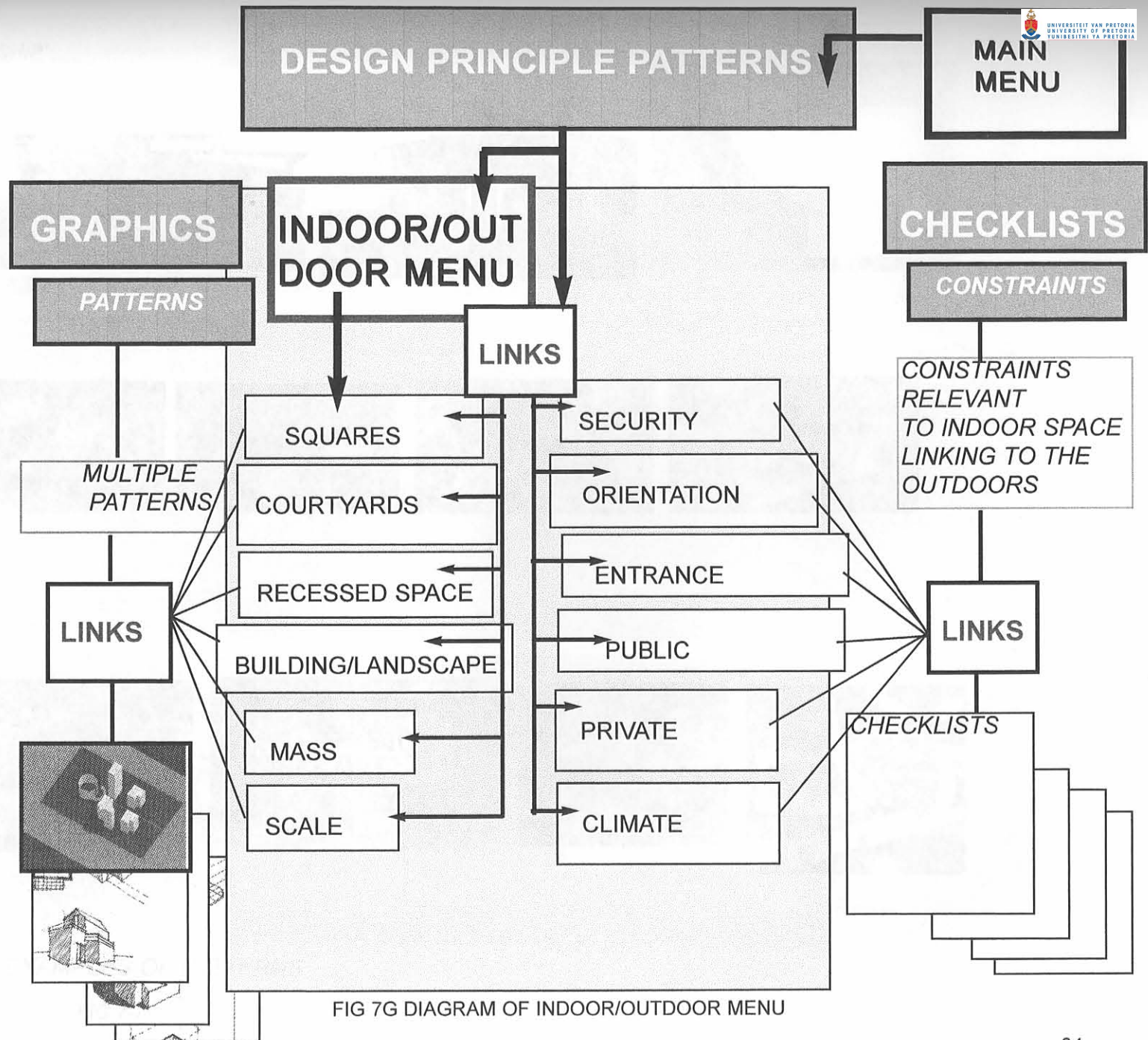
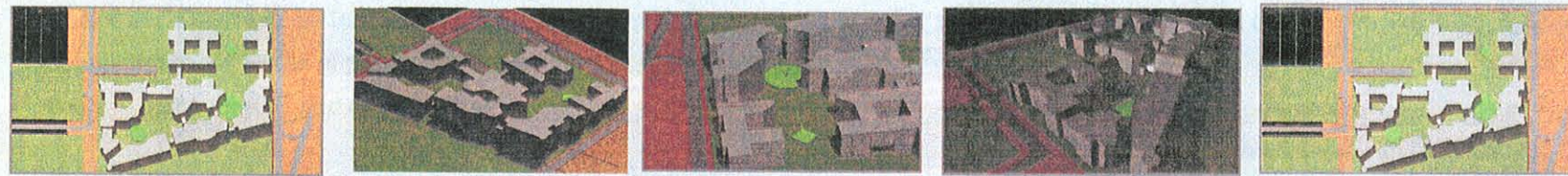
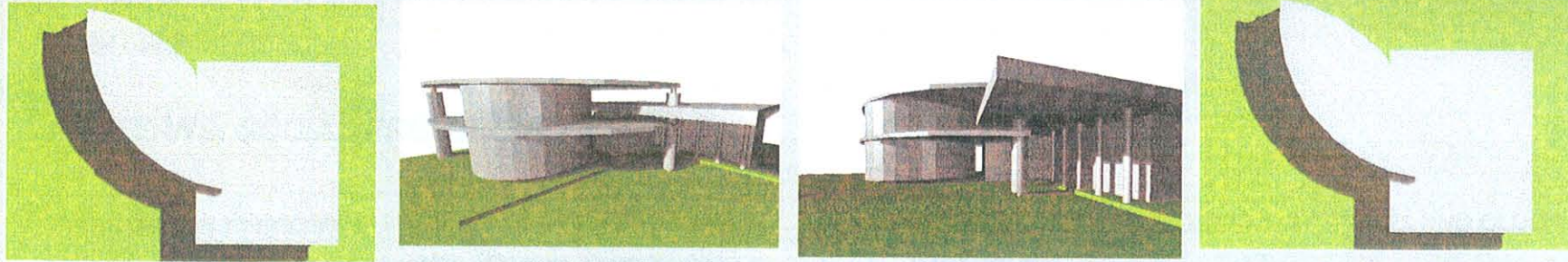
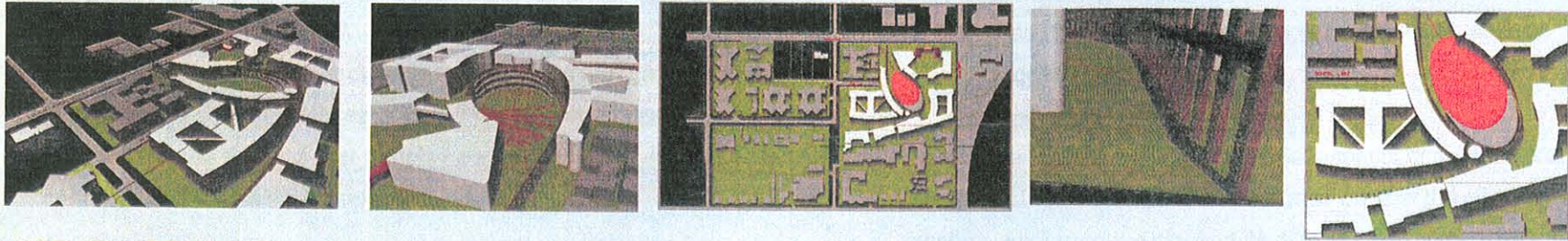


FIG 7G DIAGRAM OF INDOOR/OUTDOOR MENU

FORM COMPOSITION: 'RELATIONSHIP'



SITE: 'RELATIONSHIP'



SITE: 'ENVIRONMENT'

EXAMPLES OF PATTERNS

FIG 7-7