

"Site dominates the Structure, which dominates the Skin, which dominates the Services, which dominate the Space plan, which dominates the Stuff." (Brand. 1994:17)

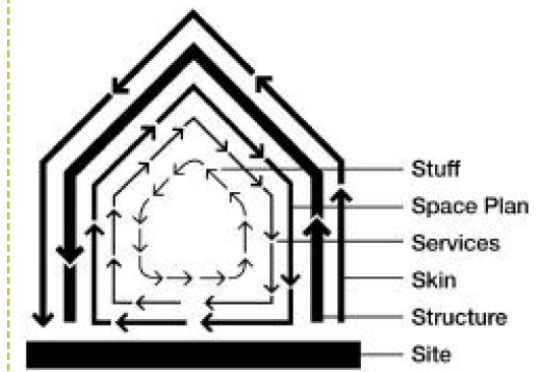
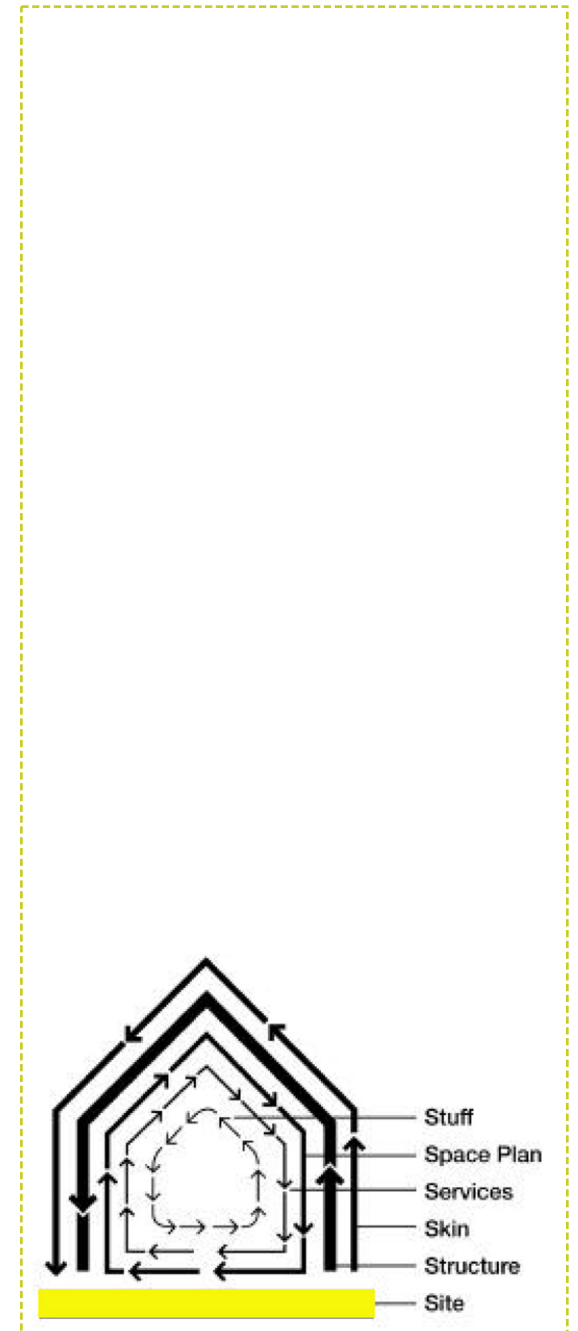
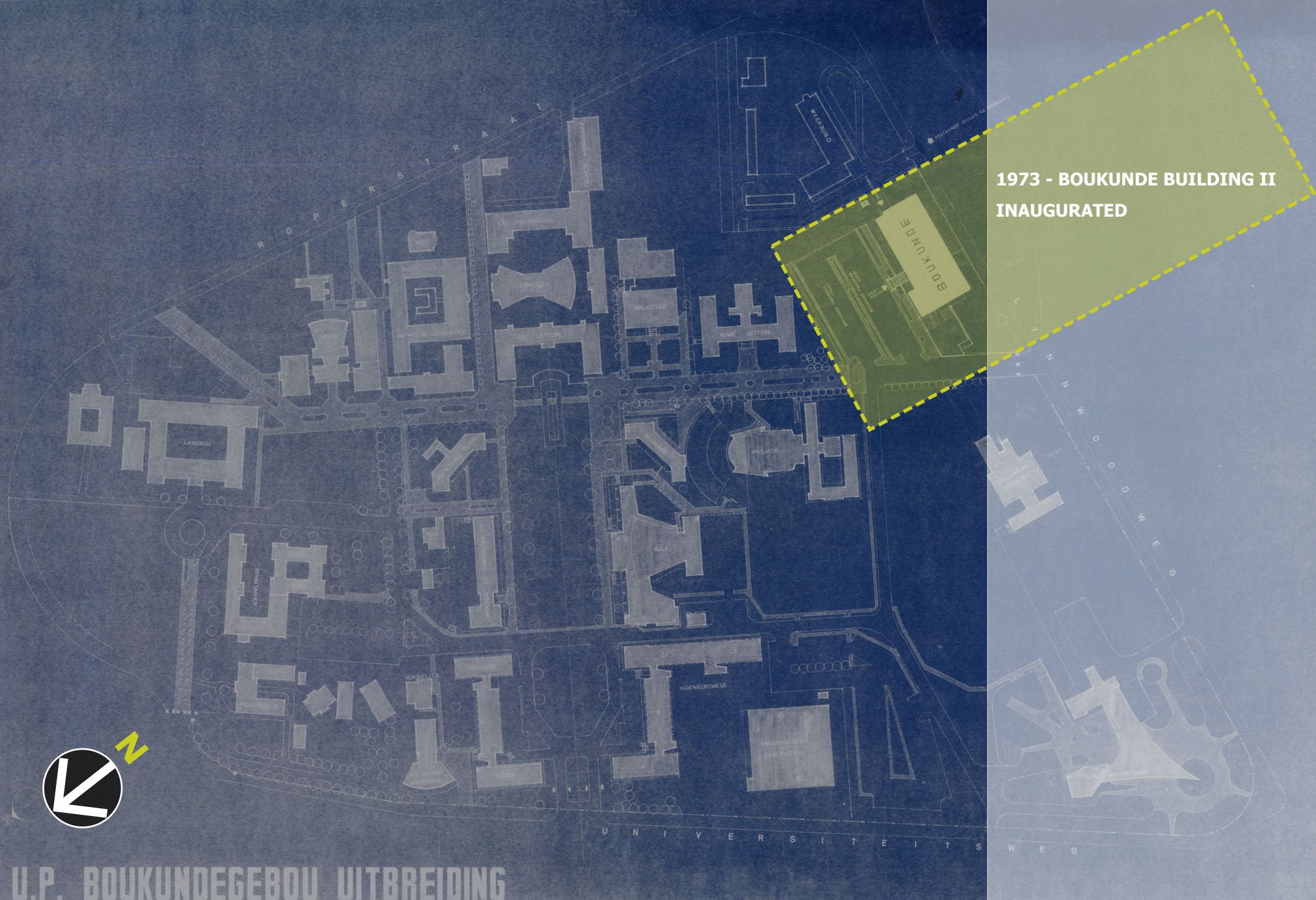


Figure 14 : Shearing Layers of Change (Brand. 1994:13)

# intuitive analysis



**analysis : site**



1973 - BOUKUNDE BUILDING II  
INAUGURATED

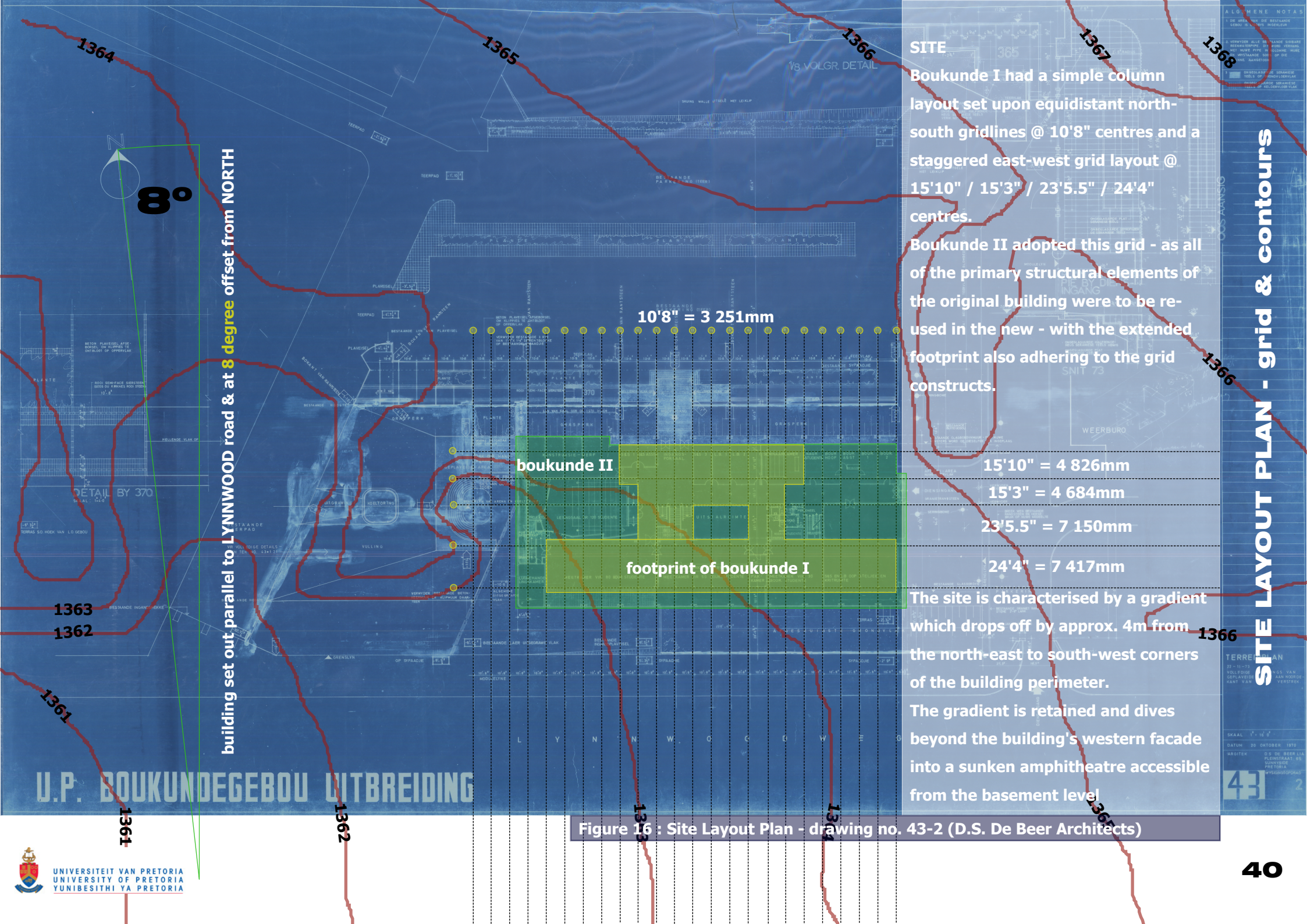
CAMPUS LAYOUT PLAN - 1973

U.P. BOUKUNDEGEBOU UITBREIDING

CAMPUS UITLEG  
SKAAL 1:700 OF 1:625  
DATUM 28 OKTOBER 1972  
ARCTEK D.S. DE BEER 14  
PUNENSTRAAT 54  
PRETORIA

43

Figure 15 : Campus Layout Plan - drawing no. 43-1 (D.S. De Beer Architects)



building set out parallel to LYNNWOOD road & at 8 degree offset from NORTH

**SITE**  
 Boukunde I had a simple column layout set upon equidistant north-south gridlines @ 10'8" centres and a staggered east-west grid layout @ 15'10" / 15'3" / 23'5.5" / 24'4" centres.

Boukunde II adopted this grid - as all of the primary structural elements of the original building were to be re-used in the new - with the extended footprint also adhering to the grid constructs.

10'8" = 3 251mm

15'10" = 4 826mm

15'3" = 4 684mm

23'5.5" = 7 150mm

24'4" = 7 417mm

boukunde II

footprint of boukunde I

The site is characterised by a gradient which drops off by approx. 4m from the north-east to south-west corners of the building perimeter.

The gradient is retained and dives beyond the building's western facade into a sunken amphitheatre accessible from the basement level

Figure 16 : Site Layout Plan - drawing no. 43-2 (D.S. De Beer Architects)

SITE LAYOUT PLAN - grid & contours



**SITE**

Most of the pre-existing vegetation on the east- & west flanks of the building has been kept as is, with minor planting of new vegetation directly against the northern- & southern extents of the buildings footprint. Planters have been added to divide the paving expanse in front of the building, as well as the parking area pedestrian island. The tarred parking area is largely exposed to the northern sun, and the 'heat island' effect that it generates in summer is scarcely attenuated by the plants to the building's north. The large trees to the west offer no overshadow for the western facade, whereas the trees to the east do significantly overshadow the eastern face.

**SITE LAYOUT PLAN - hard & soft landscape**

Figure 17 : Site Layout Plan - drawing no. 43-2 (D.S. De Beer Architects)



**SITE**

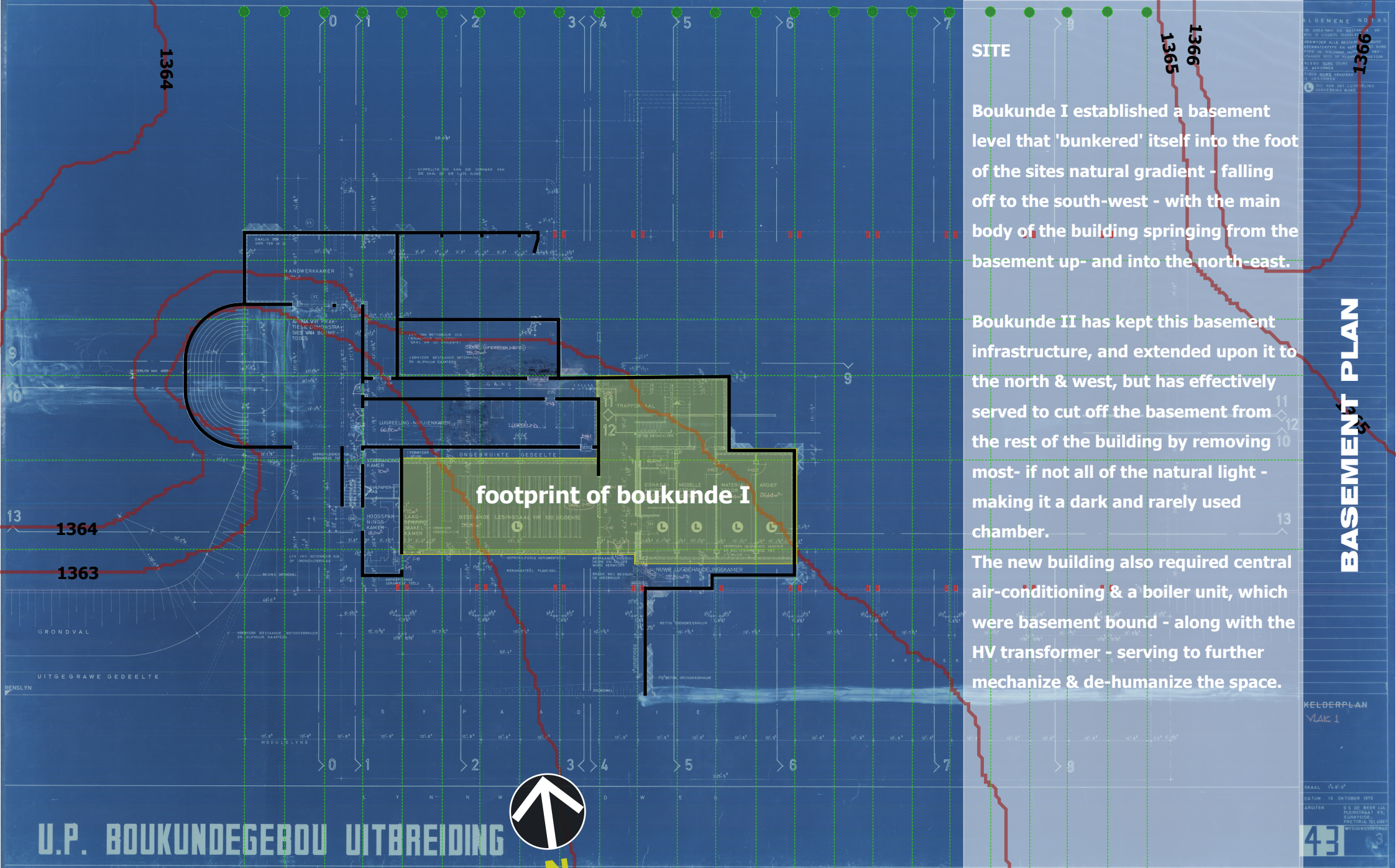
Certainly urban campus development presents a dichotomous institutional agenda, which needs to negotiate the prospects of open engagement and the campus as an academic refuge designed for the contemplation, analysis and resolution of "...lifes great problems". According to Blaik, this quest for cloistered serenity results in three problematic physical characteristics namely "inward-looking orientation, zones of separation and defensive building design". (Blaik, 2006:B25)

Boukunde II has made a conscious effort to orientate itself inward, and employs defensive design on its southern elevation by displaying a solemn, protective concrete facade to Lynnwood road.

Boukunde I had some measure of connection to the south with its main entrance being to the west, whereas currently the building is entered from the insular north side of the building.

**CAMPUS & IMMEDIATE ENVIRONS**

Figure 18 : Aerial View over UP Main Campus (Google Earth)



**SITE**

Boukunde I established a basement level that 'bunkered' itself into the foot of the sites natural gradient - falling off to the south-west - with the main body of the building springing from the basement up- and into the north-east.

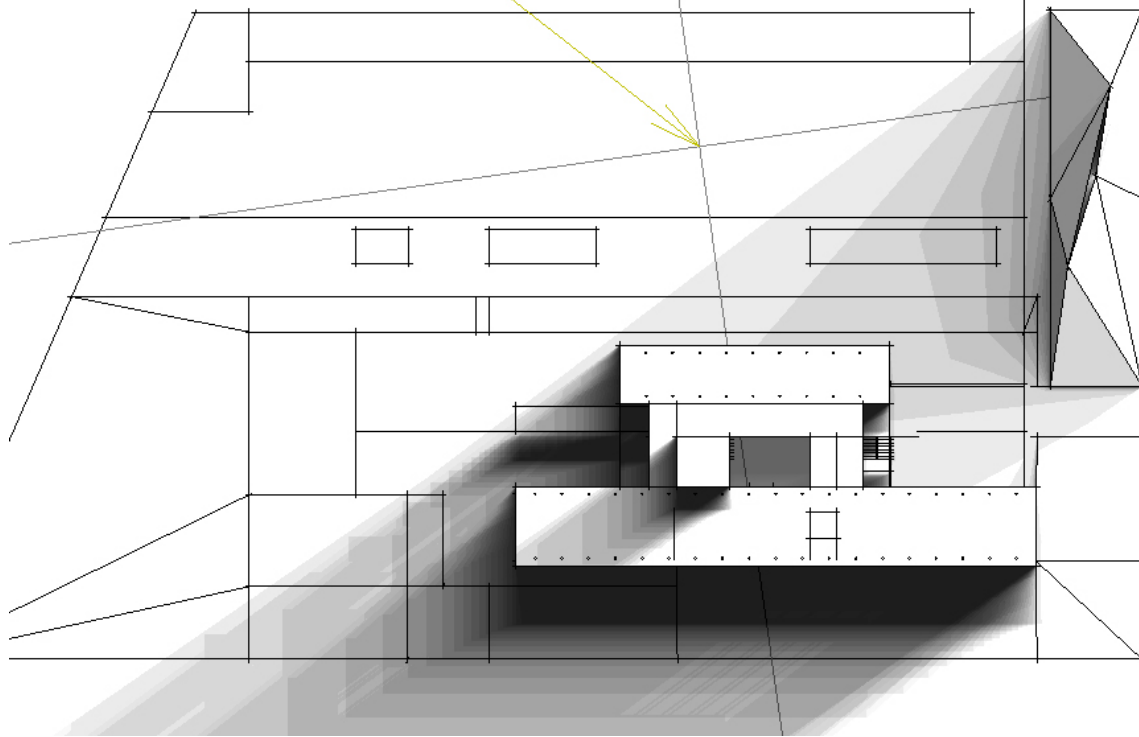
Boukunde II has kept this basement infrastructure, and extended upon it to the north & west, but has effectively served to cut off the basement from the rest of the building by removing most- if not all of the natural light - making it a dark and rarely used chamber.

The new building also required central air-conditioning & a boiler unit, which were basement bound - along with the HV transformer - serving to further mechanize & de-humanize the space.

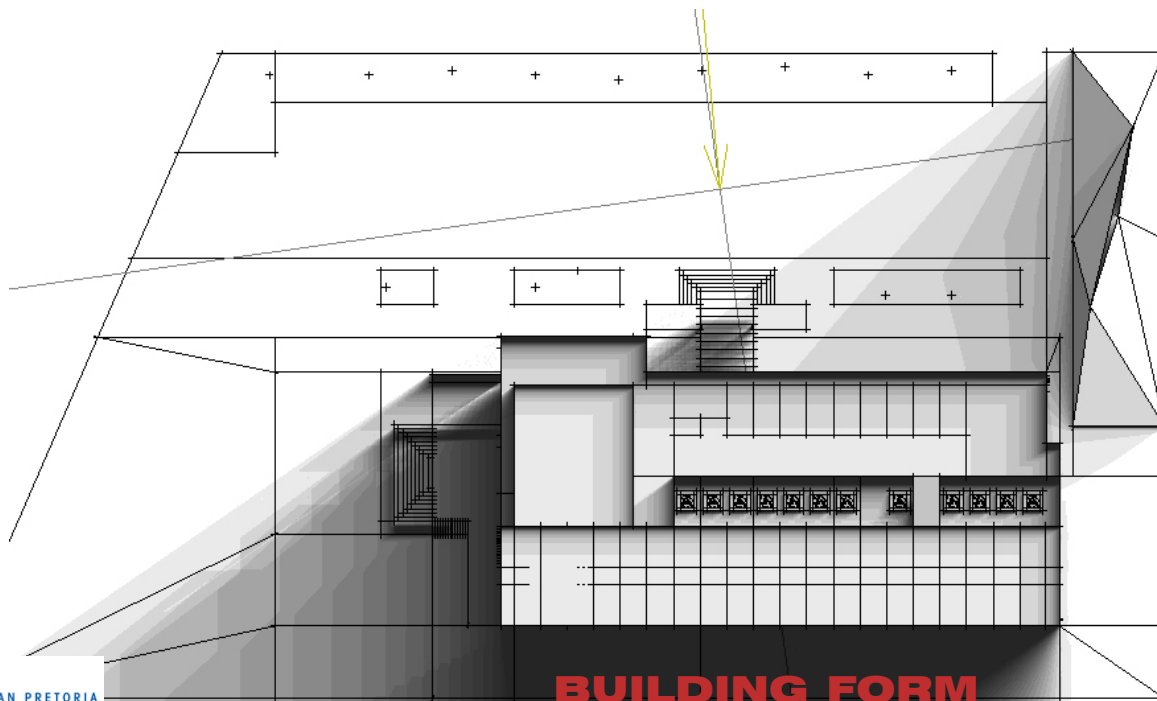
**BASEMENT PLAN**

**U.P. BOUKUNDEGEBOUW UITBREIDING**

Figure 19 : Basement Plan - drawing no. 43-3 (D.S. De Beer Architects)



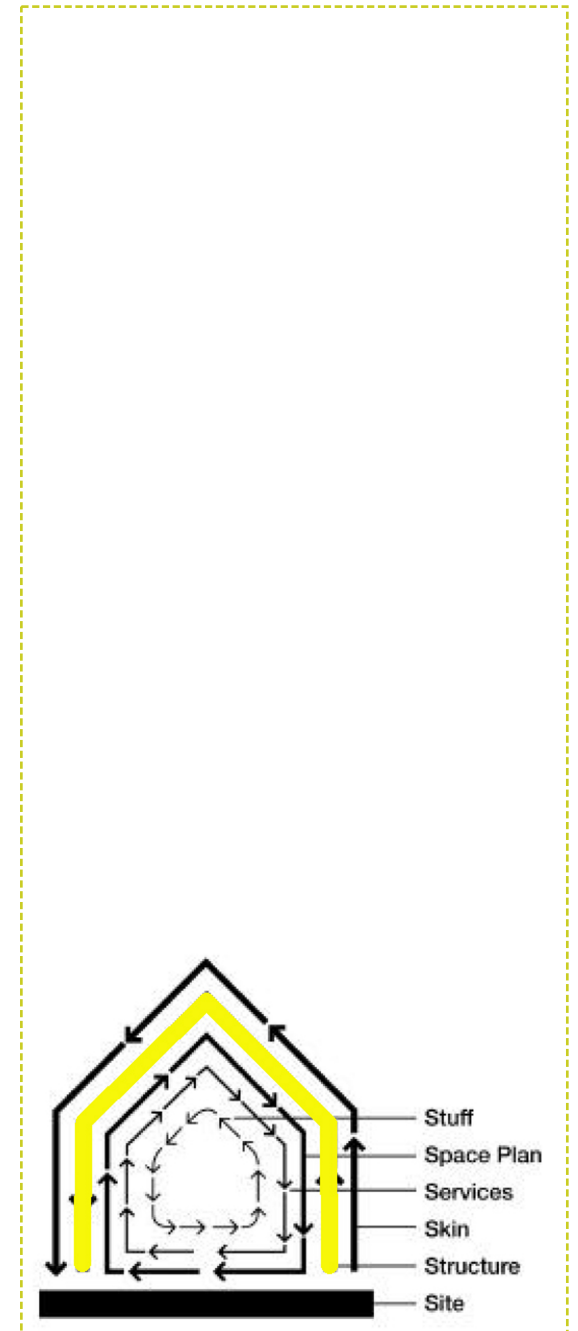
**BOUKUNDE I** building form comprised 2 east-west oriented flanks with north-south passage connections between the 2. The resulting central space was turned into an open-air courtyard with visual connection to the building's internals on all 4 sides. This transparency translated into exposure of the floor plan to unfavourable east & west daylight conditions. The courtyard and circulation routes served to separate the northern office / classroom flank from the southern studio / workshop flank.



**BOUKUNDE II** has substantially increased the floor surface area with the additional level (2nd floor) as well as the supplementary lecture halls (2-6 & 3-3) on the western flank of the building. The result is effectively an inward-looking closure of the building - relieving east & west daylight exposure. The central courtyard has remained in principle, but is no longer exposed to the elements. The circulation routes and segregation of functional space remains generally as it was, but with increased studio space and office allocation.

**BUILDING FORM**





# Analysis : structure

**STRUCTURE**

"After Site comes Structure, at the base of which is the all-determining foundation. If it is out-of-square or out-of-level, it will plague the builders clear to the roof line..." "If it is weak, it permanently limits the height of the building." (Brand. 1994:19)

Due to the fact that Boukunde II was essentially built upon the pre-existing footprint, the original foundation layout and construction is pertinent in evaluating future prospects.

All of the original structural elements still stand today and have been reinforced via 'gunite' or extra brickwork layering, and ultimately supplemented by new column sets where necessary.

The building's levelling and construction has been set into the existing land profile, which means that there has been minimal excavation disturbance of the existing terrain and a sound structural legacy is the result.

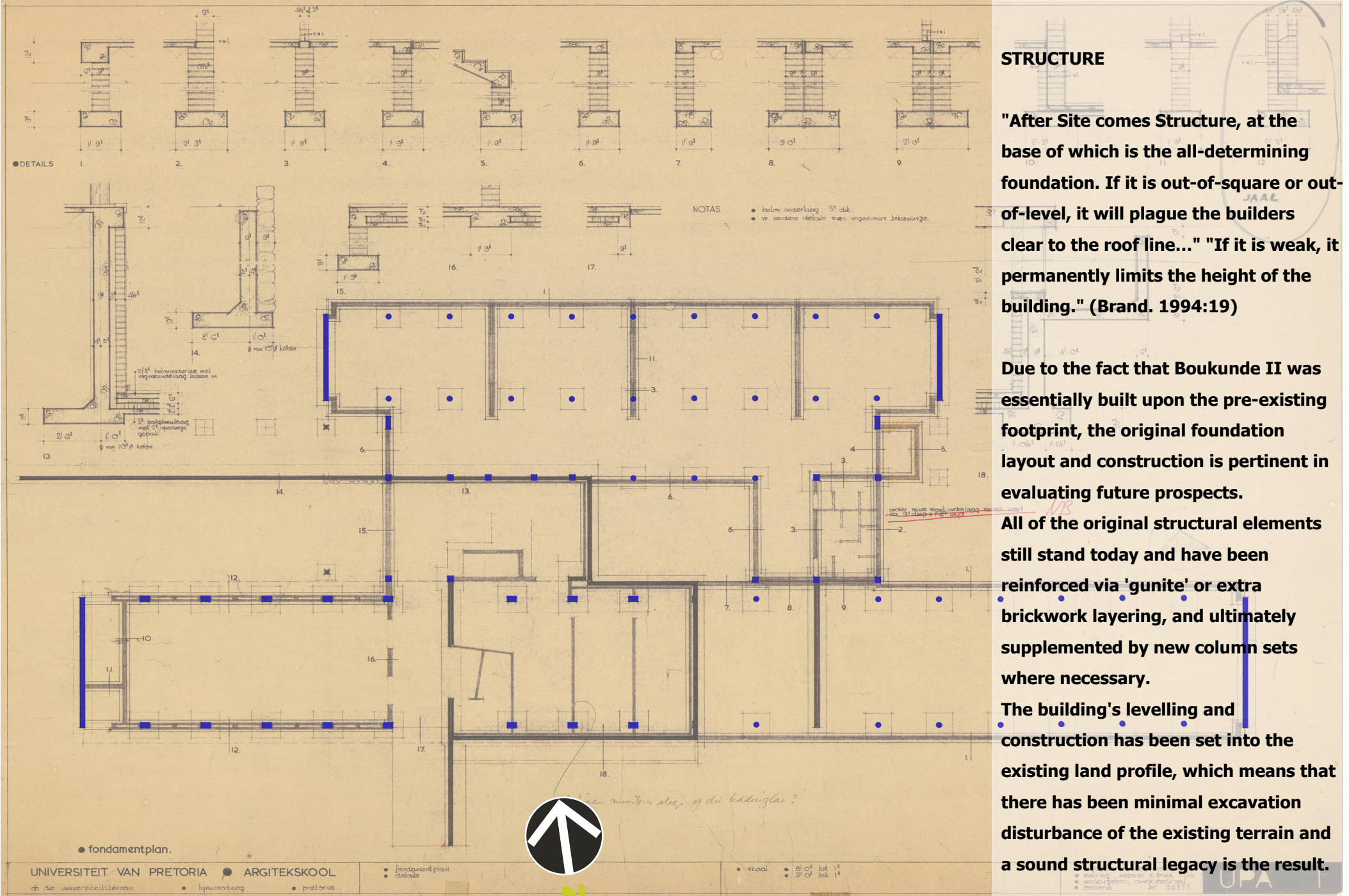
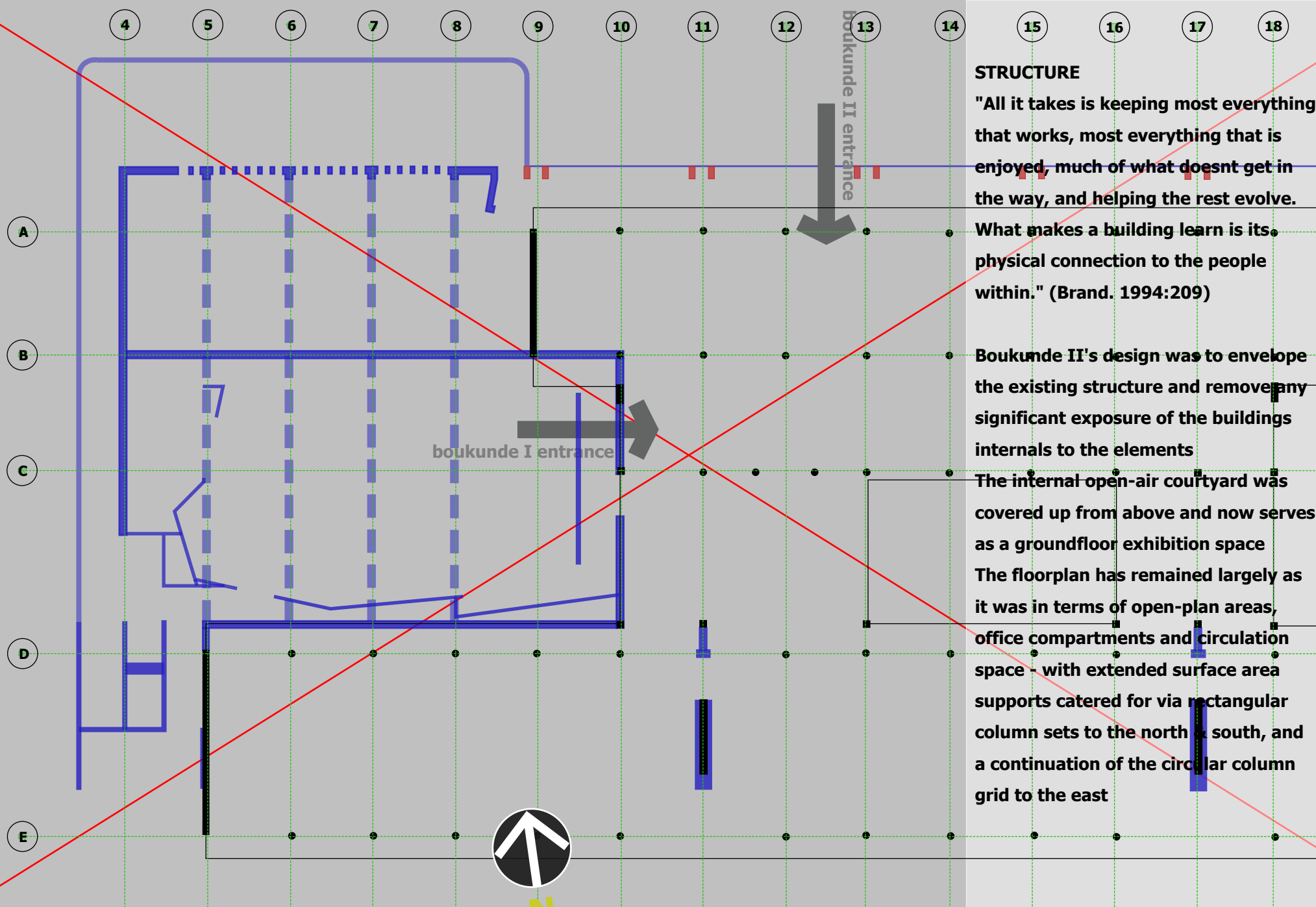


Figure 20 : Foundation Plan - drawing no. UPA 1 (UP School of Architecture)



**STRUCTURE**

"All it takes is keeping most everything that works, most everything that is enjoyed, much of what doesn't get in the way, and helping the rest evolve."

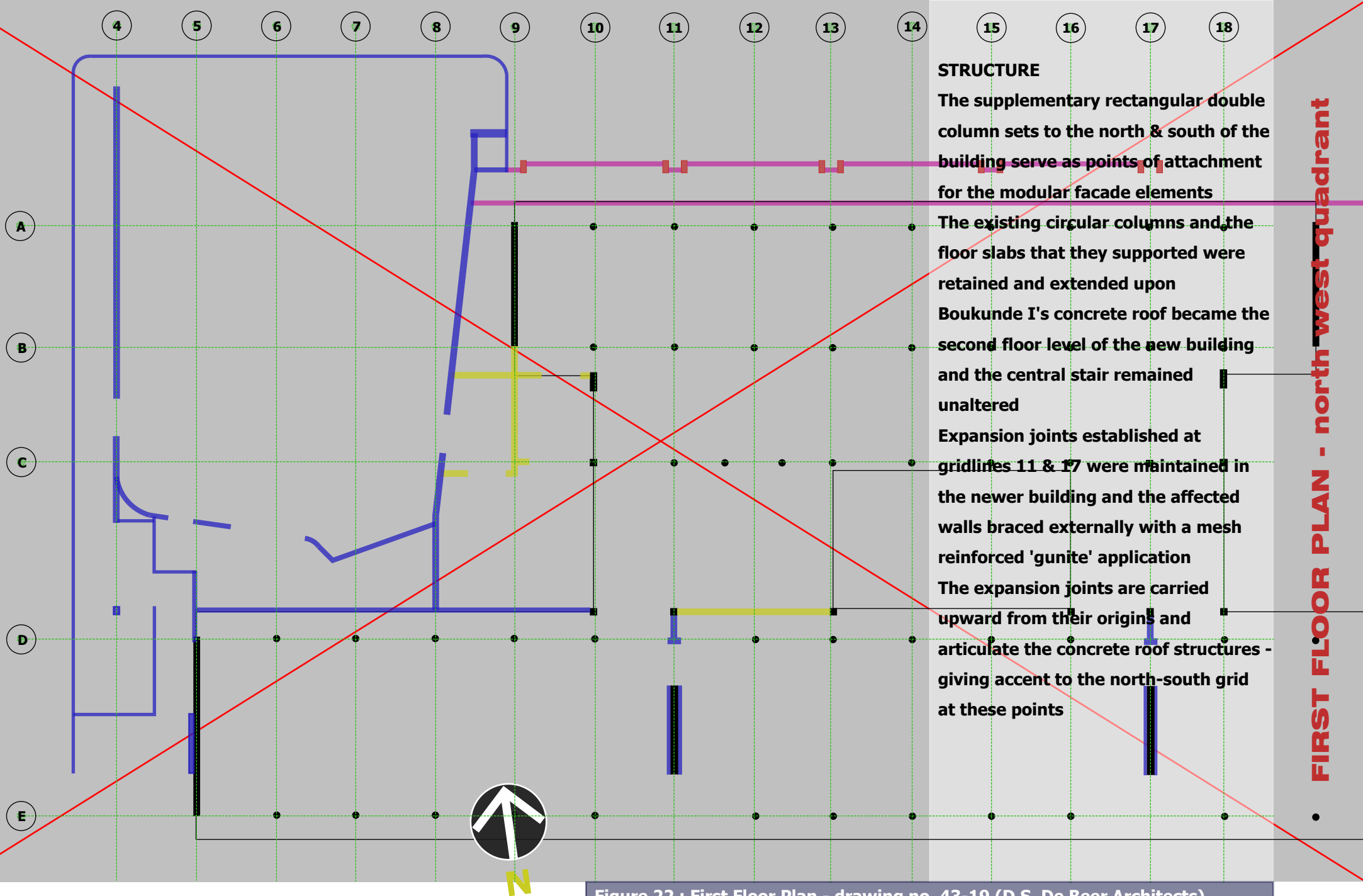
What makes a building learn is its physical connection to the people within." (Brand. 1994:209)

Boukunde II's design was to envelope the existing structure and remove any significant exposure of the buildings internals to the elements

The internal open-air courtyard was covered up from above and now serves as a groundfloor exhibition space  
 The floorplan has remained largely as it was in terms of open-plan areas, office compartments and circulation space - with extended surface area supports catered for via rectangular column sets to the north & south, and a continuation of the circular column grid to the east

**GROUND FLOOR PLAN - north west quadrant**

Figure 21 : Ground Floor Plan - drawing no. 43-17 (D.S. De Beer Architects)



### STRUCTURE

The supplementary rectangular double column sets to the north & south of the building serve as points of attachment for the modular facade elements

The existing circular columns and the floor slabs that they supported were retained and extended upon Boukunde I's concrete roof became the second floor level of the new building and the central stair remained unaltered

Expansion joints established at gridlines 11 & 17 were maintained in the newer building and the affected walls braced externally with a mesh reinforced 'gunite' application

The expansion joints are carried upward from their origins and articulate the concrete roof structures - giving accent to the north-south grid at these points

FIRST FLOOR PLAN - north-west quadrant

Figure 22 : First Floor Plan - drawing no. 43-19 (D.S. De Beer Architects)

## STRUCTURE

The second floor of Boukunde II is in effect the roof of Boukunde I, with the roofs of the newer building supported by the new north & south rectangular column sets - supplemented by new internal columns and concrete wall structures set onto the grid

The new roof elements introduced by Boukunde II - which are the roof over lecture hall 3-3 and the 'flying' clerestory over the second floor studios are supported via their own independently founded concrete structures with non-structural brick infill making up the remainder of the partitioning on this level

SECOND FLOOR PLAN

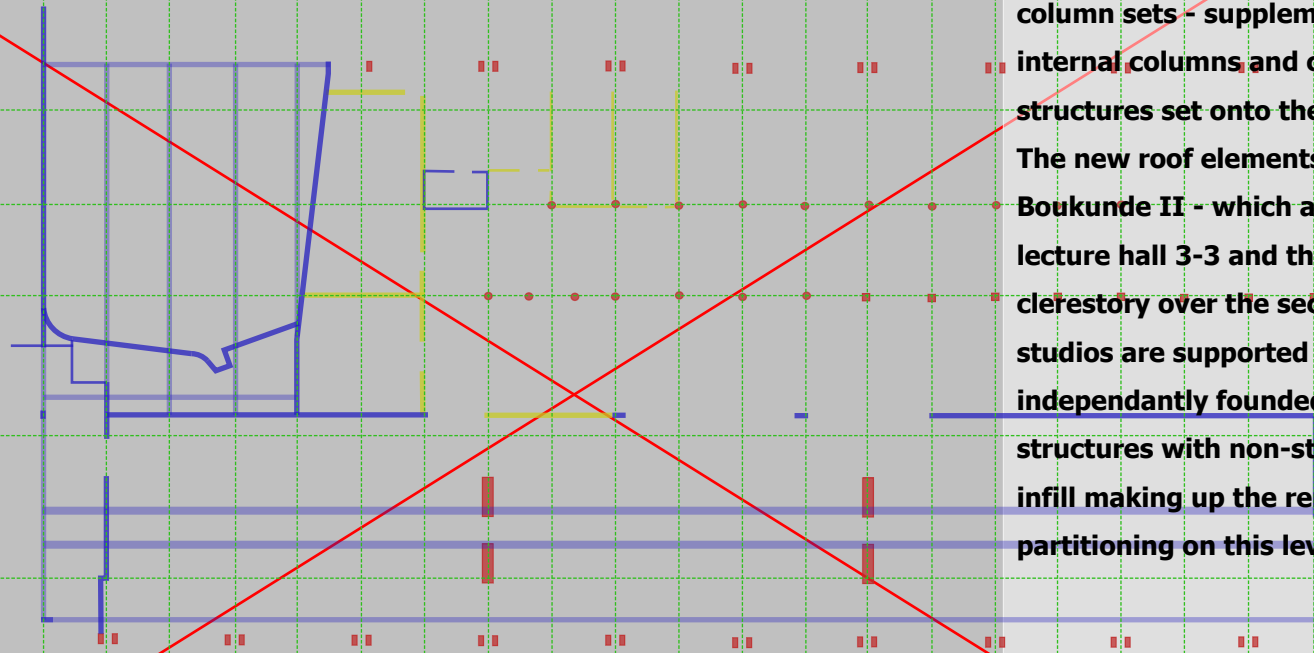
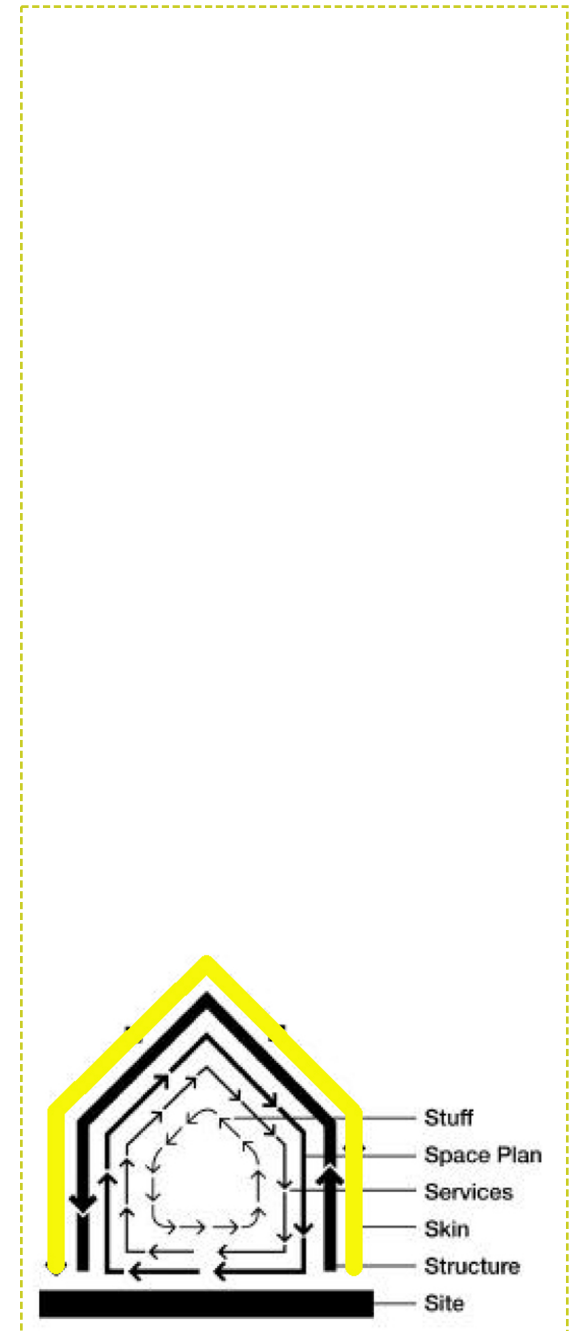


Figure 23 : Second Floor Plan - drawing no. 43-53 (D.S. De Beer Architects)



**analysis : skin**

west & east facades: 6" (152mm) thick off-shutter concrete shell minimal fenestration

decisive aspect: general noise attenuation

positive consequence: noise is successfully excluded from the studios & lecture halls on all 3 levels

negative consequence: east-, west- & southern extremes of building require air conditioning to maintain perennial comfort levels

northern facade: 5'1" (1550mm) deep balcony offset from external facade with 1:2 ratio of brick : glazing over full vertical surface area

decisive aspect in choice of materials / construction: allowing natural light and ventilation to enter building through office areas

positive consequence: offices along northern perimeter act as light shelves and do facilitate limited air change potential for the northern half of the building

negative consequence: facade was over exposed at first and required a solar shade retrofit to restrict heat gains

southern facade: 7" (178mm) thick off-shutter concrete panels spanning 21'4" (6502mm) centres

decisive aspect in choice of materials / construction: lynnwood road traffic noise attenuation

positive consequence: traffic noise is successfully excluded from the studios on all 3 levels

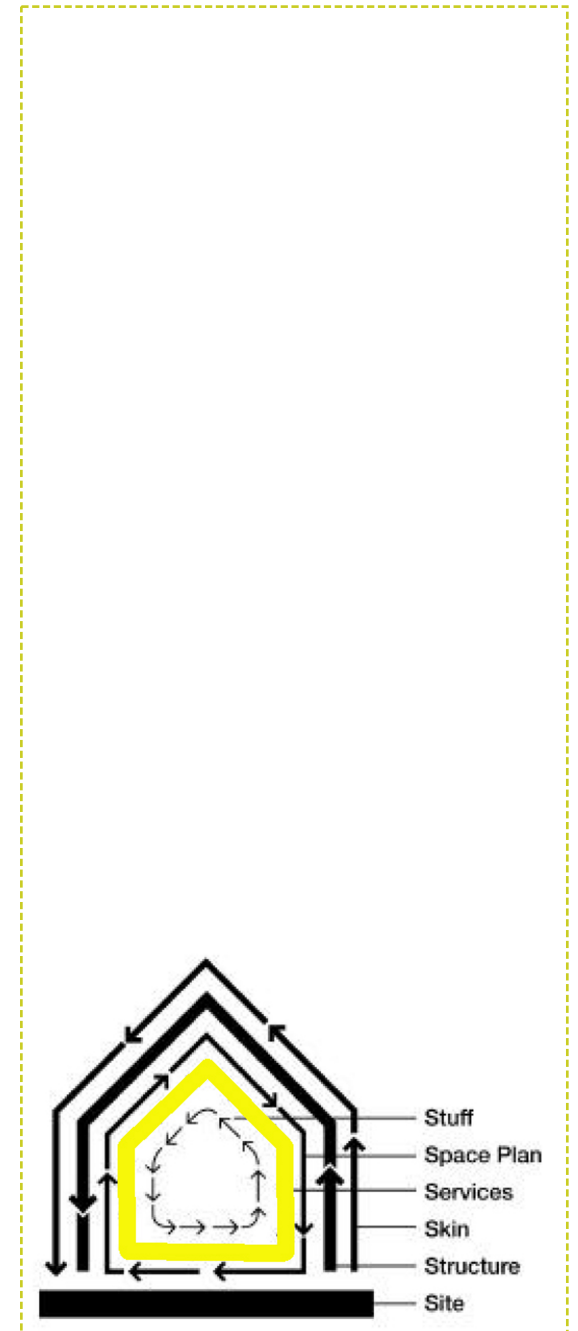
negative consequence: narrow double glazed window units of 1'8.25" (515mm) width provide negligible natural light and ventilation to the studios



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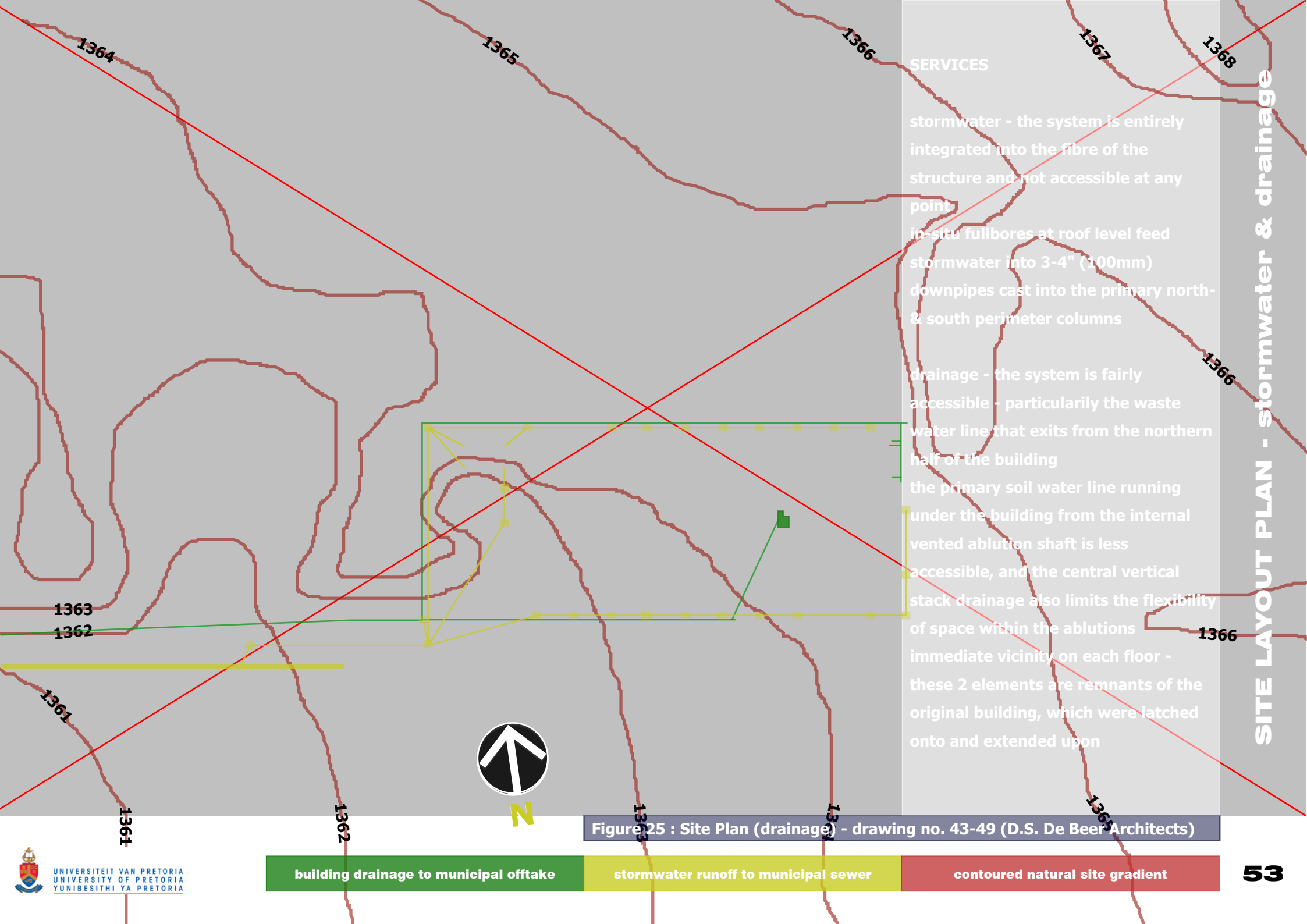
SECOND FLOOR PLAN

Figure 24 : Second Floor Plan - drawing no. 43-53 (D.S. De Beer Architects)



# analysis : services





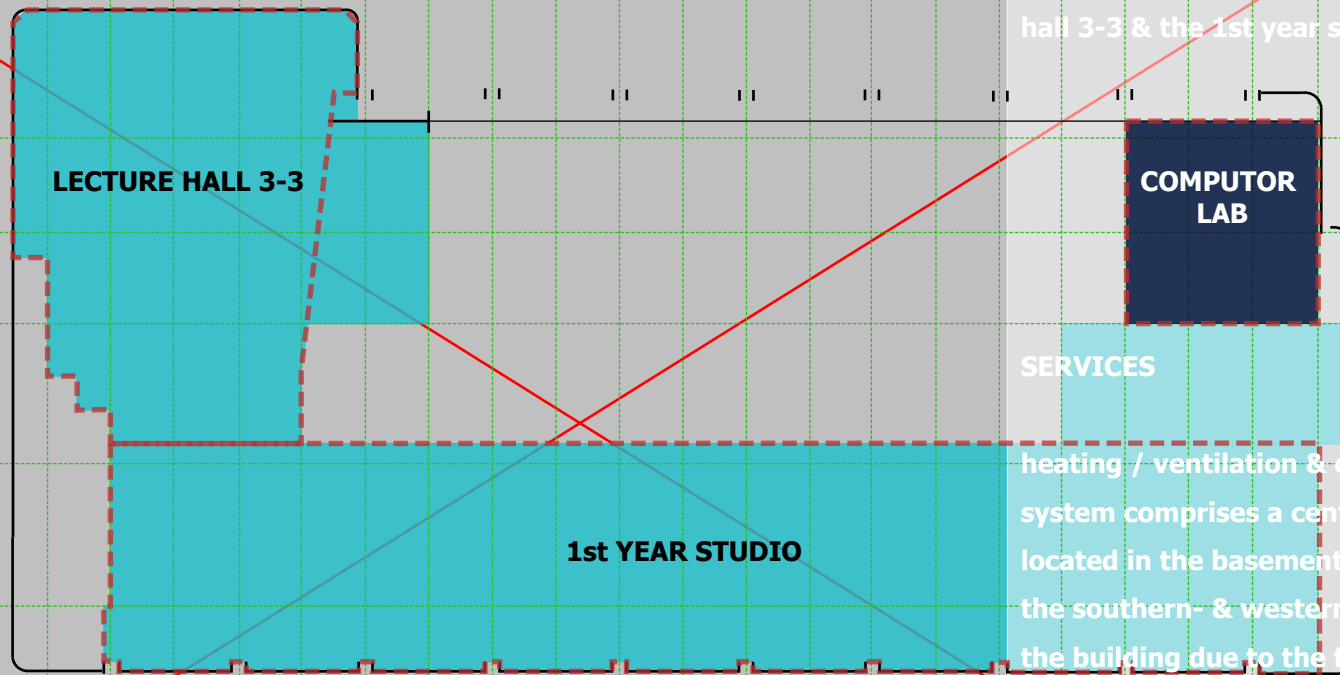
**SERVICES**

stormwater - the system is entirely integrated into the fibre of the structure and not accessible at any point  
 in-situ fullbores at roof level feed stormwater into 3-4" (100mm) downpipes cast into the primary north- & south perimeter columns  
 drainage - the system is fairly accessible - particularly the waste water line that exits from the northern half of the building  
 the primary soil water line running under the building from the internal vented abluion shaft is less accessible, and the central vertical stack drainage also limits the flexibility of space within the ablutions  
 immediate vicinity on each floor - these 2 elements are remnants of the original building, which were latched onto and extended upon

**SITE LAYOUT PLAN - stormwater & drainage**

Figure 25 : Site Plan (drainage) - drawing no. 43-49 (D.S. De Beer Architects)

building drainage to municipal offtake	stormwater runoff to municipal sewer	contoured natural site gradient
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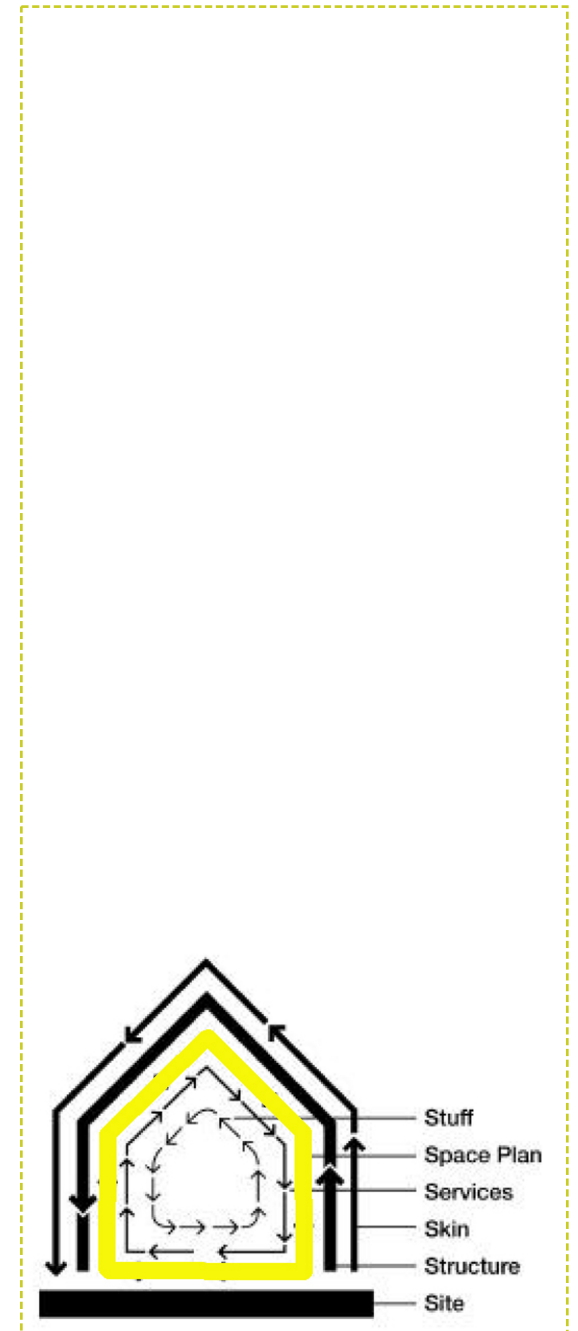
The 2 largest consumers of conditioned air - due to their high ceilings, large volumes & potentially high dynamic heat loads - are lecture hall 3-3 & the 1st year studio.

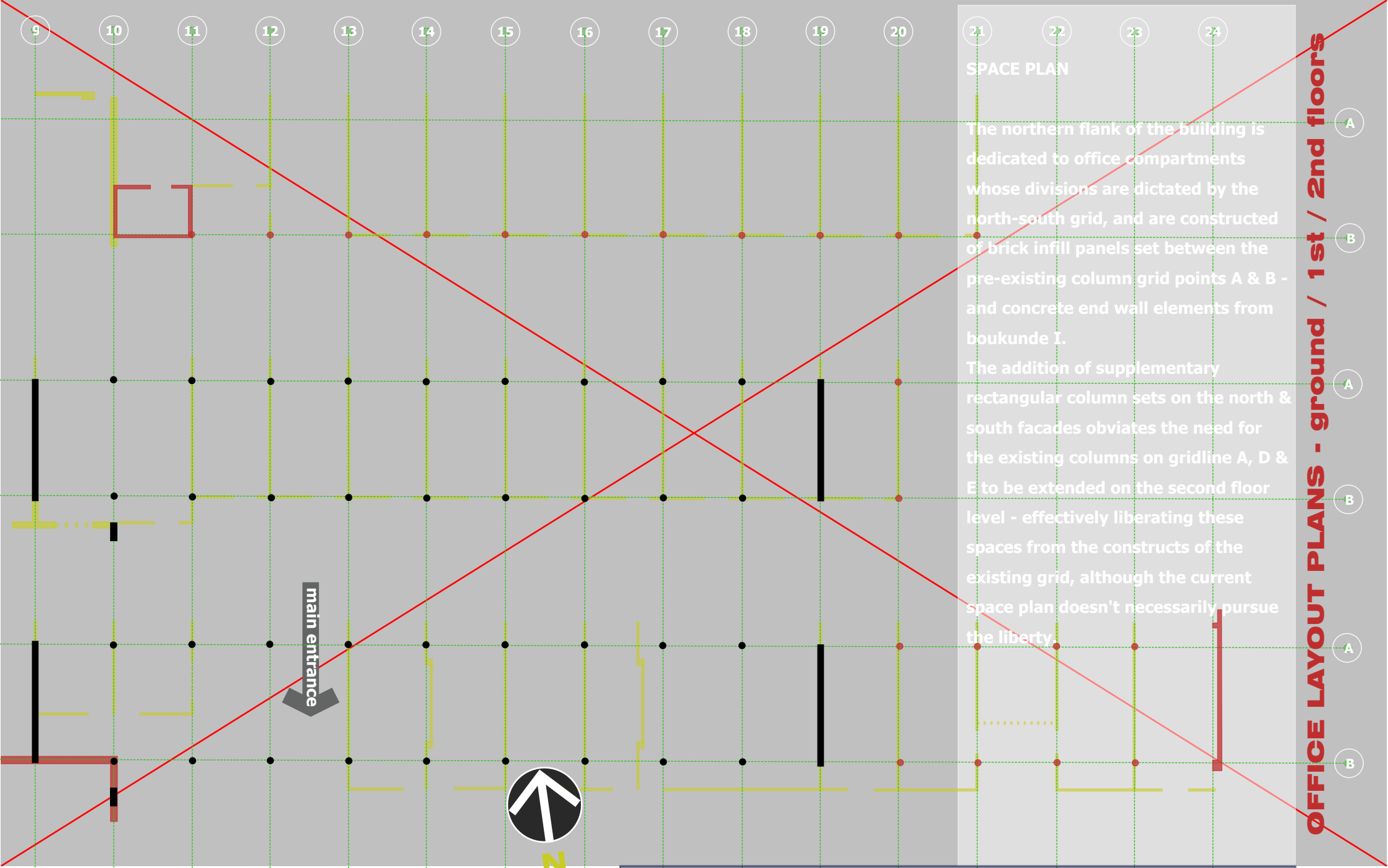
heating / ventilation & cooling - the system comprises a central a/c unit located in the basement which serves the southern- & western extremes of the building due to the fact that fenestration is limited in these areas - to reduce traffic noise in the studios and lecture halls.

The 2nd floor computer lab is also mechanically ventilated via split units located on the roof - an afterthought due to the fact that in 1973 architectural computer labs were probably considered science fiction.

**SECOND FLOOR PLAN - air conditioning**

Figure 26 : Second Floor Plan - drawing no. 43-53 (D.S. De Beer Architects)





SPACE PLAN

The northern flank of the building is dedicated to office compartments whose divisions are dictated by the north-south grid, and are constructed of brick infill panels set between the pre-existing column grid points A & B - and concrete end wall elements from boukunde I.

The addition of supplementary rectangular column sets on the north & south facades obviates the need for the existing columns on gridline A, D & E to be extended on the second floor level - effectively liberating these spaces from the constructs of the existing grid, although the current space plan doesn't necessarily pursue the liberty.

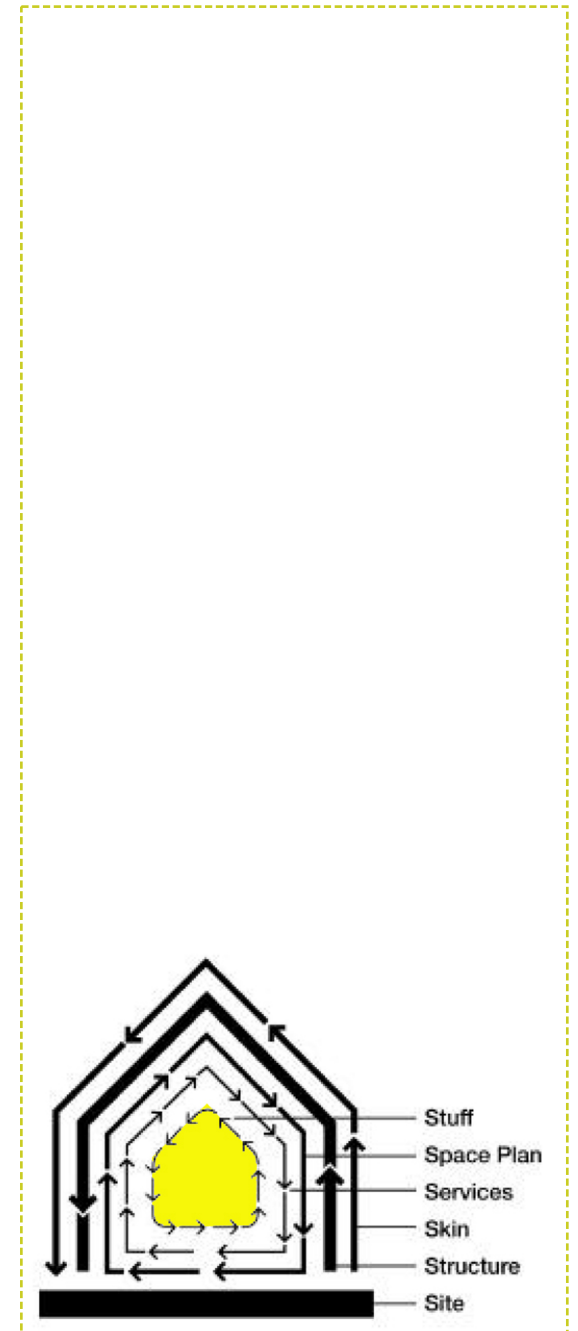
OFFICE LAYOUT PLANS - ground / 1st / 2nd floors

Figure 27 : Office Layout Plans - drawing no. 43-57 (D.S. De Beer Architects)

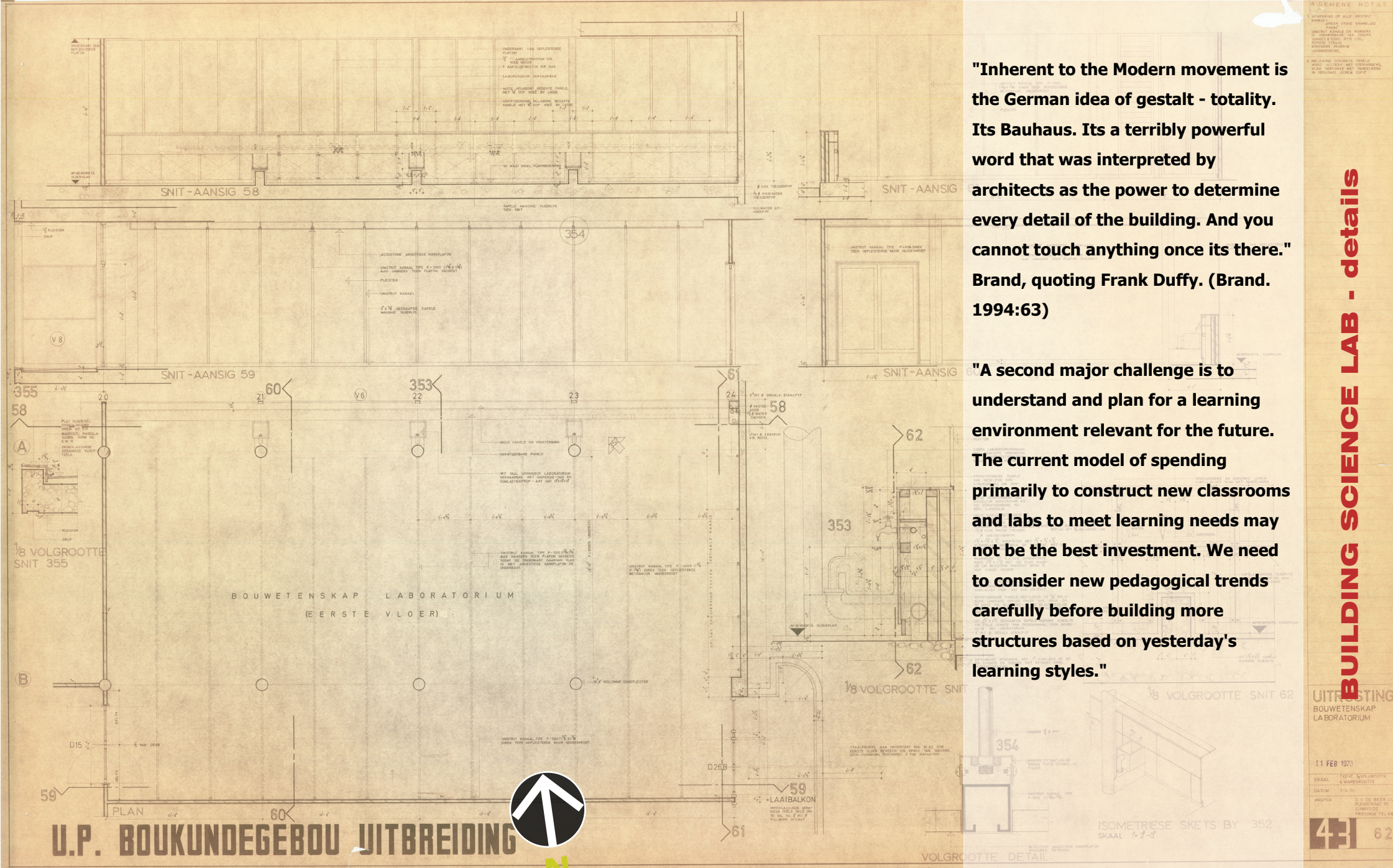
BOUKUNDE I - original concrete works

BOUKUNDE II - supplementary concrete

BOUKUNDE II - supplementary brick infill



**analysis : stuff**



"Inherent to the Modern movement is the German idea of gestalt - totality. Its Bauhaus. Its a terribly powerful word that was interpreted by architects as the power to determine every detail of the building. And you cannot touch anything once its there." Brand, quoting Frank Duffy. (Brand. 1994:63)

"A second major challenge is to understand and plan for a learning environment relevant for the future. The current model of spending primarily to construct new classrooms and labs to meet learning needs may not be the best investment. We need to consider new pedagogical trends carefully before building more structures based on yesterday's learning styles."

Figure 28 : Building Science Lab - drawing no. 43-62 (D.S. De Beer Architects)

BUILDING SCIENCE LAB - details

AGEMEEN NOTAS

OPMERKING OP ALLE ONTRUWINGEN: GEDRUKTE TEKST EN BELANDINGSPLAATJES. ALLE ONTRUWINGEN EN VERANDERINGEN MOETEN VOORAF VEREENKLAARD WORDEN MET HET BUREAU. VERANDERINGEN MOETEN WORDEN VERTEKENDE IN VERANDERINGEN EN VERANDERINGEN. VERANDERINGEN MOETEN WORDEN VERTEKENDE IN VERANDERINGEN EN VERANDERINGEN.

11 FEB 1973

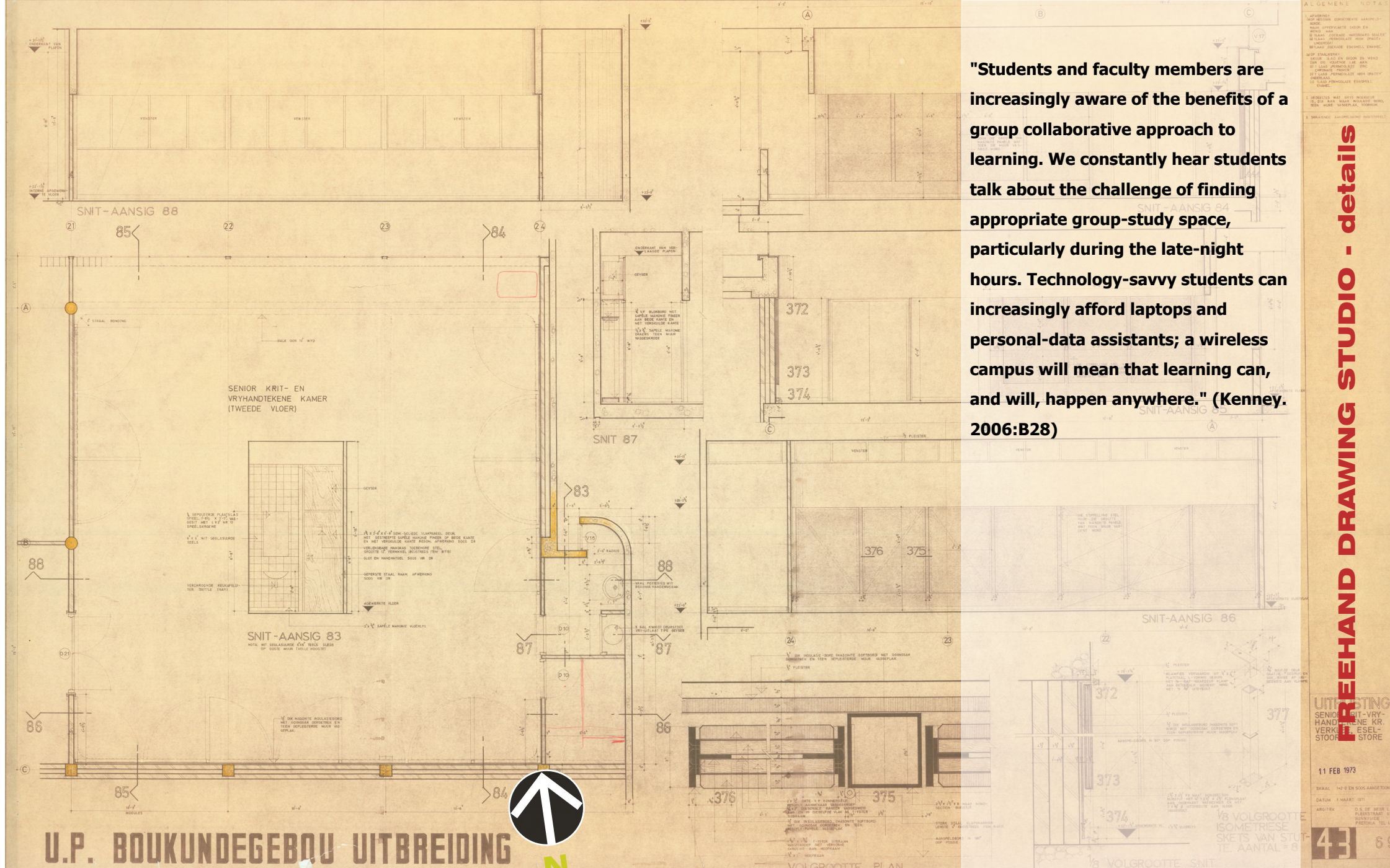
SKAAL: 1/8 VOLGROOTTE & WAREGROOTTE

DATE: 1-1-73

ARBEID: U.P. BOUWETENSKAP LABORATORIUM

PRETORIA TEL. 400

43 62



"Students and faculty members are increasingly aware of the benefits of a group collaborative approach to learning. We constantly hear students talk about the challenge of finding appropriate group-study space, particularly during the late-night hours. Technology-savvy students can increasingly afford laptops and personal-data assistants; a wireless campus will mean that learning can, and will, happen anywhere." (Kenney, 2006:B28)

FREEHAND DRAWING STUDIO - details

Figure 29 : Freehand Drawing Studio - drw no. 43-69 (D.S. De Beer Architects)