



TREEHOUSING International Wood Design Competition | Projets d'étudiants

INTEGRATION

Using the idea of a **JUNGLE GYM** as an ENABLING STRUCTURE which promotes organic and creative lifestyles, open mindedness and equality.

A NON- LINEAR, fractal structure open to multiple kinds of engagement and allowing for NON- LINEAR movement and COLLABORATION- a space which directly responds to the peoples movements and needs.

A space which lacks hierarchy and does not negate anyone person from being able to occupy the space- all children are EQUAL on a

JUNGLE GYM.

A structure which defines 'IN BETWEEN' spaces and is able to be translated throughout the city as a space which RESISTS rigid institutional structures. It contradicts the conventional thinking of how living spaces in a city should be constructed.

The physical structure is a reflection of a **JUNGLE GYM** and is raised above its context so as to not impose, but only enhance the informal practices on the site as well as facilitate movement through the site.



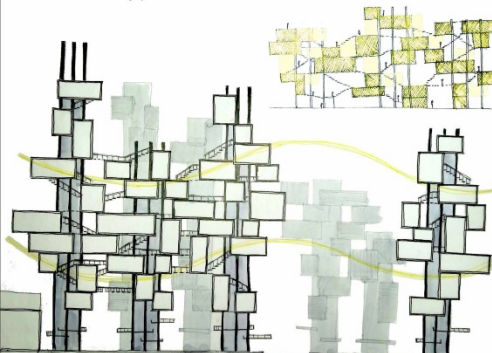
INNOVATION

A FLEXIBLE structure which can directly accommodate peoples changing needs

A light structure which allows for INTIMATE, yet INDEPENDENT spaces to connect above ground level

A mixed use structure which is not organised in a layered fashion, but with residential, retail and commercial connecting with each other and supporting each other on MULTIPLE LEVELS.

JUNGLE GYM as a structure which allows for CHOICE and freedom, with adaptable spaces spread throughout the site and MULTIPLE ROUTES to every place.



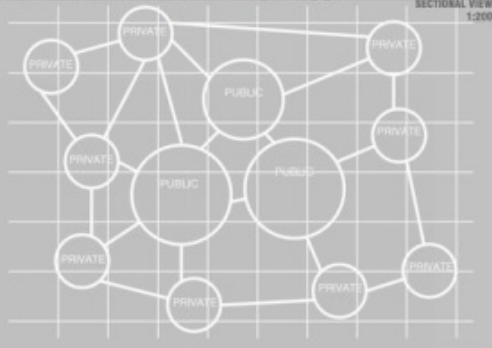


AFFORDABLE LIVING

The idea of affordable housing needs to be derived directly from the clients needs and movements; the client being the PEOPLE themselves. The people who affordable housing is being provided for are often incapable of affording the current models, being the 30- 50 m² unit designs.

The idea for affordable living in a city can be quite UNCONVENTIONAL. The treehouse essentially allows for the private spaces in a home to be enclosed by timber panels with openings, which can be sectioned off by the occupant with a curtain, an installed door, a screen etc. The idea is that space allows for PERSONALIZATION. The public spaces of a household are communal spaces that are open to everyone. The costs are then equally shared enabling a stronger SENSE OF OWNERSHIP throughout the building and not just in the private spaces.

All of these spaces need to FLEXIBLE and MOVEABLE to accommodate for the changing needs of the people, as well as to accommodate for different cultures, ethnic groups and economic classes. The structure then becomes something that is not seen as a link between poverty and wealth, a step to help people jump up the economic ladder, but as a space in which a community can live and grow together. COLLABORATING with each other for an IMPROVED LIFESTYLE.



STRUCTURE

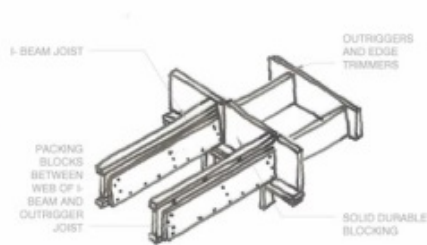
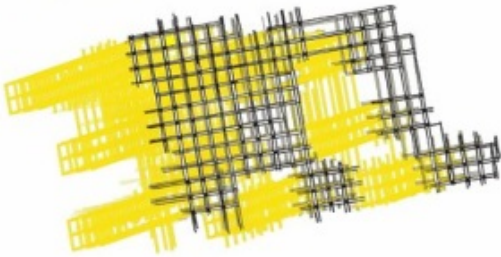
Testing timbers structural ability to SPAN and CANTILEVER, which allows for as little as possible to physically impose on the site.

Reflection of the MODULAR construction of a **JUNGLE GYM**.

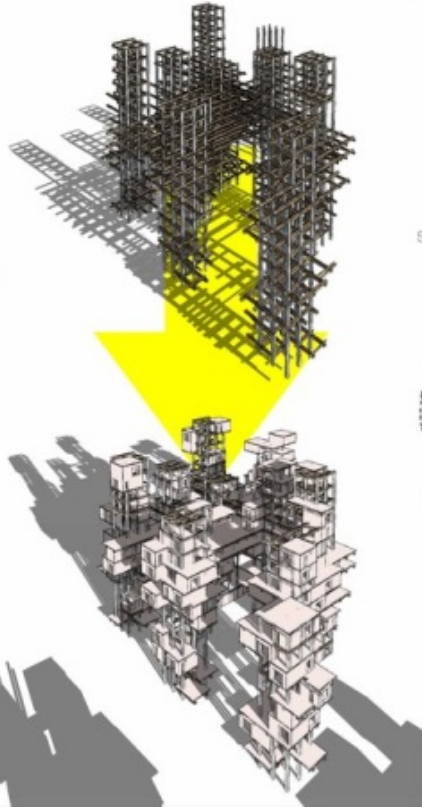
Consist of laminated composite columns joined by a moment connection. Nine of these columns make up one tower, which are spread throughout the site on a REGULAR GRID. The timber beams then connect the towers above ground level.

The towers are heavily braced and reinforced in order to anchor the buildings and allow for FLEXIBILITY in spanning between the towers.

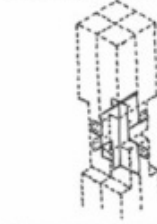
Spaces are defined within the structure through the placement timber panels, which are easily MOVABLE and ADAPATABLE, therefore the **JUNGLE GYM** needs to enable this option for change.



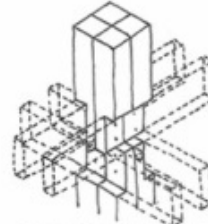
TYPICAL CANTILEVER OUTRIGGER DETAIL



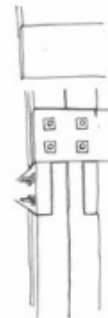
GLULAM TIMBER COMPOSITE COLUMNS



STEEL PLATE CONNECTIONS



GLULA BEAM WITH STEEL PLATE TAB FOR CROSS-BRACING



COMPOSITE ACCOYA COLUMNS - A CONCRETE PLINTH IS NOT NECESSARY AS ACCOYA WOOD IS INDIGESTIBLE AND CAN EXIST UNDER GROUND



TECHNICAL SECTION 1:100

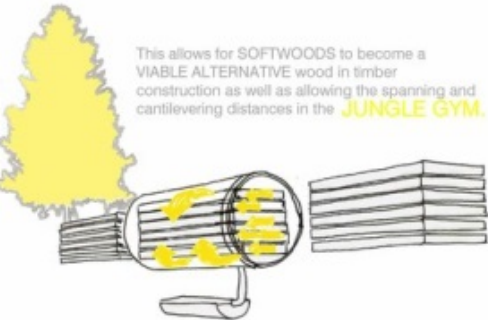
ENVIRONMENT

SOFTWOODS are more environmentally sustainable and have lower Carbon emissions than Hardwoods do. Constructing large structures out of softwoods will greatly decrease the demand and illegal deforestation of tropical hardwoods.

ACETYLATION is a chemical process used in MODIFIED WOOD TECHNOLOGIES which reduces carbon dioxide emissions and increases carbon sequestration.

The process is NON TOXIC and does not add any element into the wood that doesn't already exist. It improves the woods durability and structural strength.

This allows for SOFTWOODS to become a VIABLE ALTERNATIVE wood in timber construction as well as allowing the spanning and cantilevering distances in the **JUNGLE GYM**.



DEFORESTATION

INVASIVE ALIEN PLANTS are one of the biggest environmental issues in South Africa. They monopolize light and water, causing the native plants to become threatened or extinct. This issue is specifically bad in the Cape's fynbos biome. The invasive plants disrupt the hydrological cycle causing periodic flooding, water shortages, erosion, disrupted stream flow and an increase in the spread of wild fires.

Fortunately, one of these invasive species is RADIATA PINE, an excellent softwood used in the acetylation process to form the brand named wood, ACCOYA RADIATA PINE. This wood is not only sourced from sustainable harvesters, but is environmentally sustainable in terms of carbon emissions and is as strong and durable as hard wood.

WORKING FOR WATER is a government organisation involved in solving sustainable development issues through the CLEARING of INVASIVE PLANTS and EMPLOYING people from MARGINALIZED AREAS and providing them with skills development and training.

The scheme aims to connect the deforestation of alien species with the process of modifying wood to benefit the construction industry by allowing for soft wood to become structurally viable as well as providing the opportunity to hire and train disadvantaged people for longer periods of time in the process of constructing out of MODIFIED TIMBER.

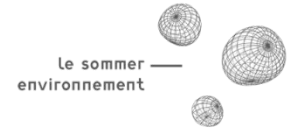


AREA SCHEDULE

- 1) Residential: the residential component is kept very open and flexible with the opportunity for personalization given to the residents. They are spaces which will consist of only private spaces, namely a place for beds, storage of personal belongings and possibly a desk or workspace.
- 2) Communal Areas: these spaces consist of all the public spaces one would find in a household, namely bathroom facilities, lounge areas and kitchens. They can also be defined as any other sort of communal gathering spaces such as meeting places, roof gardens etc.
- 3) Supporting Facilities: these are commercial or retail spaces or any space which supports the needs and movements of the residents. They will include training and skills development facilities, clinics, counselling, office spaces, libraries, gyms, daycares/ aftercare and spaces for informal trade and storage.

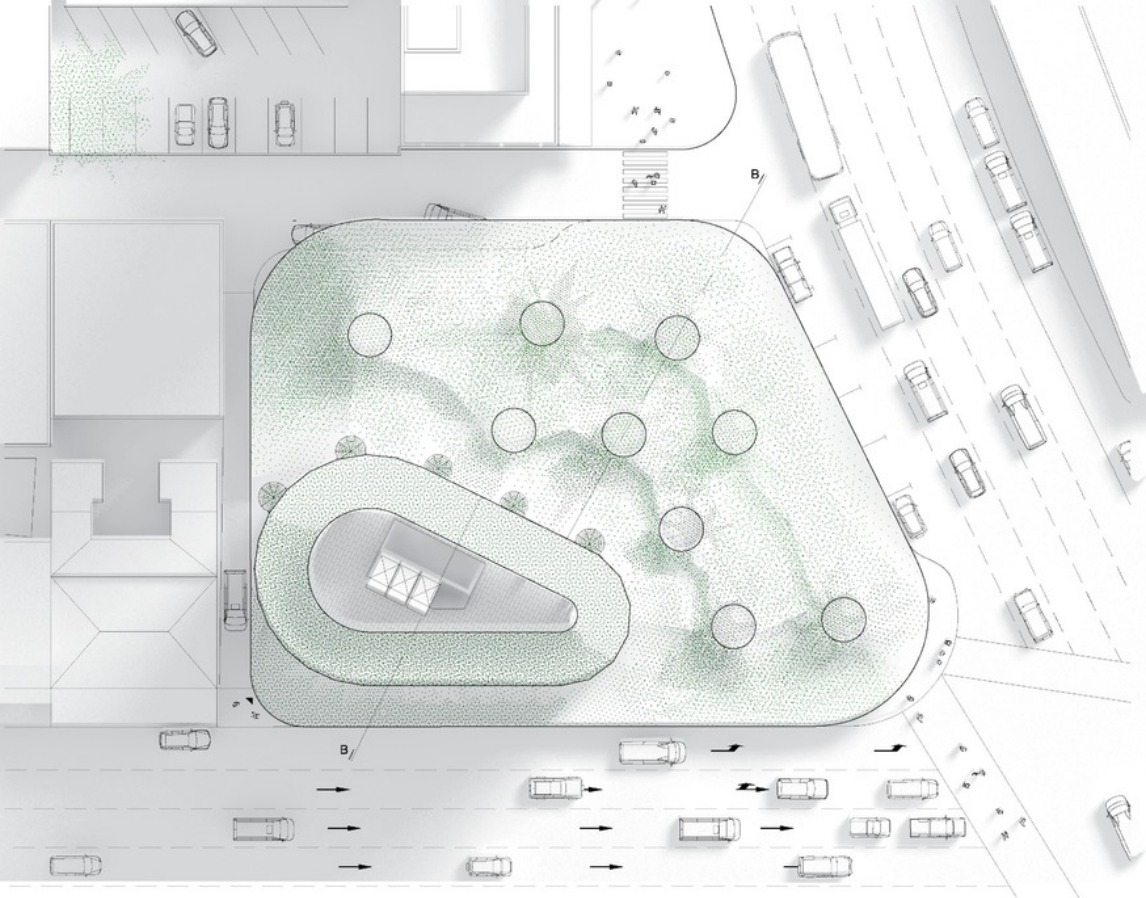


Bois acétylé

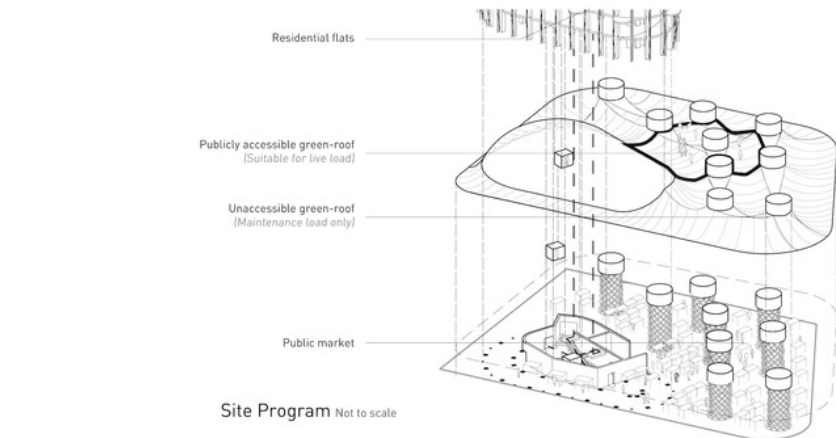


L'acétylation est un procédé qui modifie la structure des cellules constitutives du bois, et permettant d'influer sur l'hydrophilie du bois, et donc sur les propriétés de retrait et de gonflement des bois. En effet, l'acétylation permet de réduire de près de 80 % le retrait et le gonflement d'une essence de bois. Le taux d'humidité d'équilibre du bois acétylé est nettement moins élevé que celui du bois non traité. La classe de durabilité des bois pourrait ainsi être améliorée jusqu'à la classe de durabilité 1 (bois très durable à durable) selon les essences. Cette amélioration du comportement dépend du degré d'acétylation lors du traitement, c'est-à-dire la teneur en groupe acétyles. L'influence sur les propriétés mécaniques est faible avec le procédé d'acétylation. La dureté du bois, toutefois, augmente de près de 30 %. En principe, le bois acétylé se prête bien à l'usinage, au collage et à la finition. Toutefois, la composition chimique du bois a été modifiée, modifiant ainsi les propriétés physiques et chimiques du bois. Les couches de finition ont une tenue plus importante grâce à la diminution des phénomènes de retrait et de gonflement.

- [Acétylation du bois, Pour un usage des bois non durables en extérieur](#)
- [Accoya Deck : Accoya Bois - Acetylation Bois modifié](#)

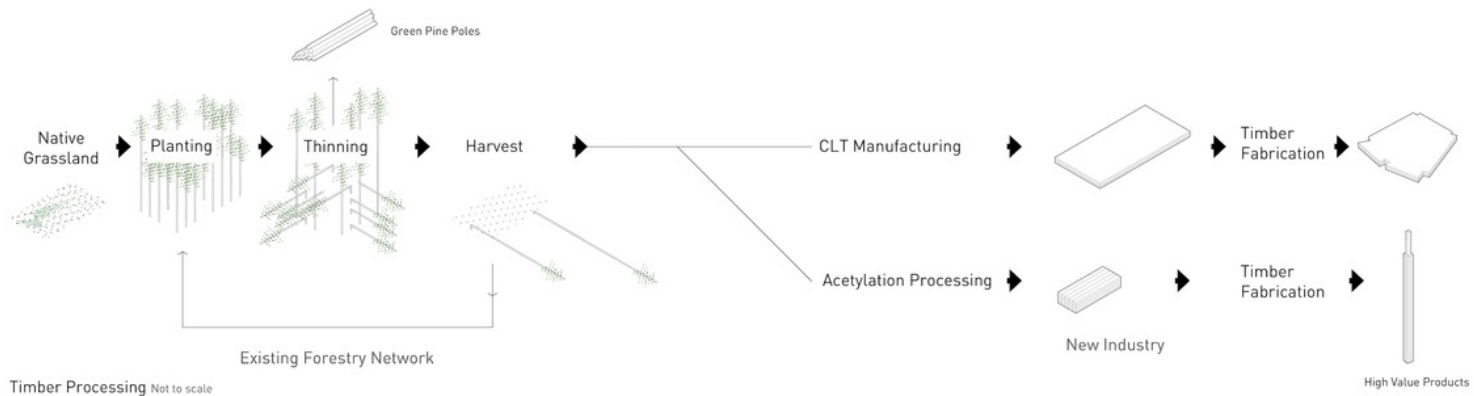


Site Plan 1:300



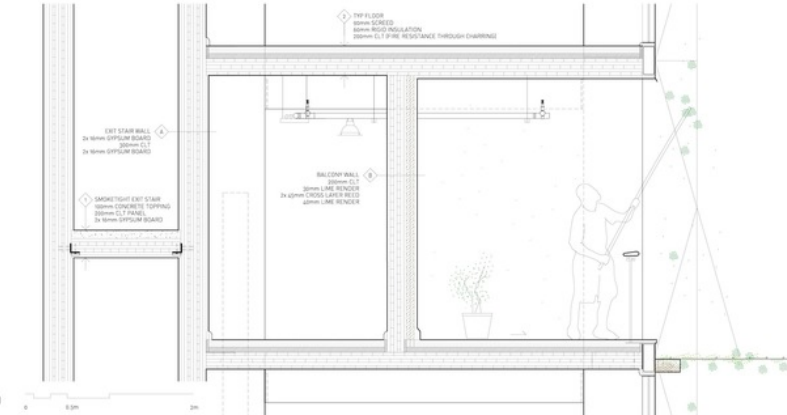
Site Program Not to scale



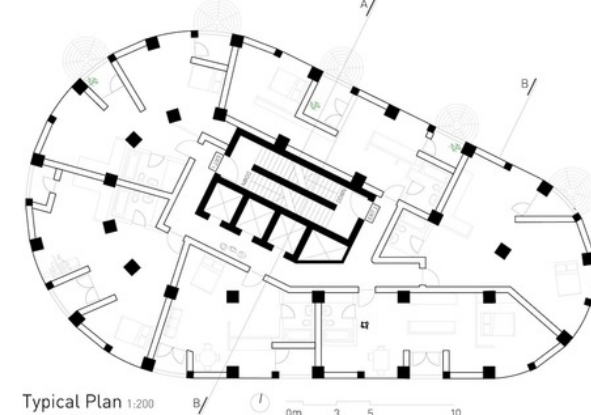




1. 2x 4" x 8" x 10' x 12' x 14' x 16' x 18' x 20' x 22' x 24' x 26' x 28' x 30' x 32' x 34' x 36' x 38' x 40' x 42' x 44' x 46' x 48' x 50' x 52' x 54' x 56' x 58' x 60' x 62' x 64' x 66' x 68' x 70' x 72' x 74' x 76' x 78' x 80' x 82' x 84' x 86' x 88' x 90' x 92' x 94' x 96' x 98' x 100' x 102' x 104' x 106' x 108' x 110' x 112' x 114' x 116' x 118' x 120' x 122' x 124' x 126' x 128' x 130' x 132' x 134' x 136' x 138' x 140' x 142' x 144' x 146' x 148' x 150' x 152' x 154' x 156' x 158' x 160' x 162' x 164' x 166' x 168' x 170' x 172' x 174' x 176' x 178' x 180' x 182' x 184' x 186' x 188' x 190' x 192' x 194' x 196' x 198' x 200' x 202' x 204' x 206' x 208' x 210' x 212' x 214' x 216' x 218' x 220' x 222' x 224' x 226' x 228' x 230' x 232' x 234' x 236' x 238' x 240' x 242' x 244' x 246' x 248' x 250' x 252' x 254' x 256' x 258' x 260' x 262' x 264' x 266' x 268' x 270' x 272' x 274' x 276' x 278' x 280' x 282' x 284' x 286' x 288' x 290' x 292' x 294' x 296' x 298' x 300' x 302' x 304' x 306' x 308' x 310' x 312' x 314' x 316' x 318' x 320' x 322' x 324' x 326' x 328' x 330' x 332' x 334' x 336' x 338' x 340' x 342' x 344' x 346' x 348' x 350' x 352' x 354' x 356' x 358' x 360' x 362' x 364' x 366' x 368' x 370' x 372' x 374' x 376' x 378' x 380' x 382' x 384' x 386' x 388' x 390' x 392' x 394' x 396' x 398' x 400' x 402' x 404' x 406' x 408' x 410' x 412' x 414' x 416' x 418' x 420' x 422' x 424' x 426' x 428' x 430' x 432' x 434' x 436' x 438' x 440' x 442' x 444' x 446' x 448' x 450' x 452' x 454' x 456' x 458' x 460' x 462' x 464' x 466' x 468' x 470' x 472' x 474' x 476' x 478' x 480' x 482' x 484' x 486' x 488' x 490' x 492' x 494' x 496' x 498' x 500' x 502' x 504' x 506' x 508' x 510' x 512' x 514' x 516' x 518' x 520' x 522' x 524' x 526' x 528' x 530' x 532' x 534' x 536' x 538' x 540' x 542' x 544' x 546' x 548' x 550' x 552' x 554' x 556' x 558' x 560' x 562' x 564' x 566' x 568' x 570' x 572' x 574' x 576' x 578' x 580' x 582' x 584' x 586' x 588' x 590' x 592' x 594' x 596' x 598' x 600' x 602' x 604' x 606' x 608' x 610' x 612' x 614' x 616' x 618' x 620' x 622' x 624' x 626' x 628' x 630' x 632' x 634' x 636' x 638' x 640' x 642' x 644' x 646' x 648' x 650' x 652' x 654' x 656' x 658' x 660' x 662' x 664' x 666' x 668' x 670' x 672' x 674' x 676' x 678' x 680' x 682' x 684' x 686' x 688' x 690' x 692' x 694' x 696' x 698' x 700' x 702' x 704' x 706' x 708' x 710' x 712' x 714' x 716' x 718' x 720' x 722' x 724' x 726' x 728' x 730' x 732' x 734' x 736' x 738' x 740' x 742' x 744' x 746' x 748' x 750' x 752' x 754' x 756' x 758' x 760' x 762' x 764' x 766' x 768' x 770' x 772' x 774' x 776' x 778' x 780' x 782' x 784' x 786' x 788' x 790' x 792' x 794' x 796' x 798' x 800' x 802' x 804' x 806' x 808' x 810' x 812' x 814' x 816' x 818' x 820' x 822' x 824' x 826' x 828' x 830' x 832' x 834' x 836' x 838' x 840' x 842' x 844' x 846' x 848' x 850' x 852' x 854' x 856' x 858' x 860' x 862' x 864' x 866' x 868' x 870' x 872' x 874' x 876' x 878' x 880' x 882' x 884' x 886' x 888' x 890' x 892' x 894' x 896' x 898' x 900' x 902' x 904' x 906' x 908' x 910' x 912' x 914' x 916' x 918' x 920' x 922' x 924' x 926' x 928' x 930' x 932' x 934' x 936' x 938' x 940' x 942' x 944' x 946' x 948' x 950' x 952' x 954' x 956' x 958' x 960' x 962' x 964' x 966' x 968' x 970' x 972' x 974' x 976' x 978' x 980' x 982' x 984' x 986' x 988' x 990' x 992' x 994' x 996' x 998' x 1000'



Section A 1:40



Typical Plan 1:200

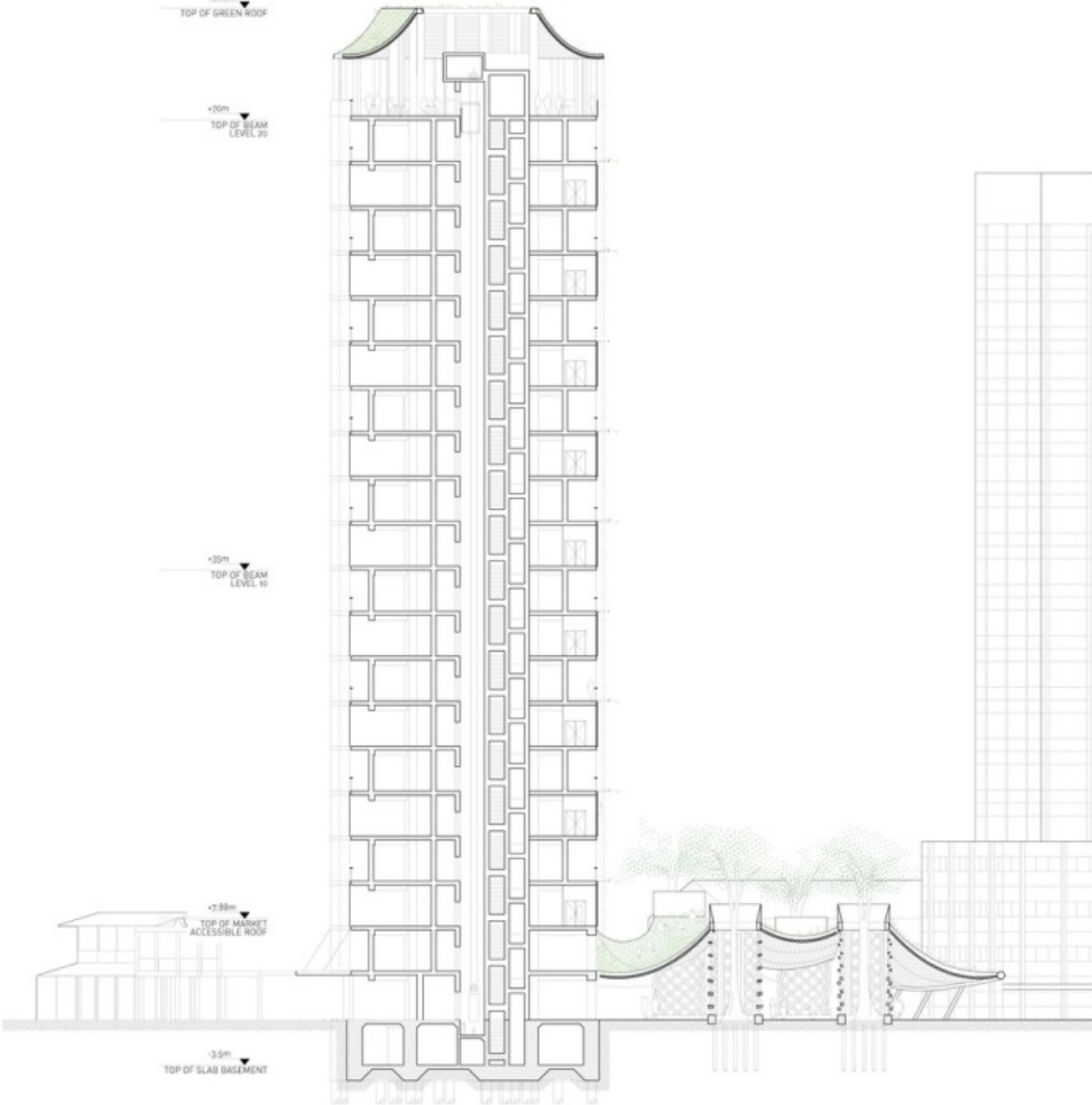
+78.7m
TOP OF GREEN ROOF

+70m
TOP OF BEAM LEVEL 20

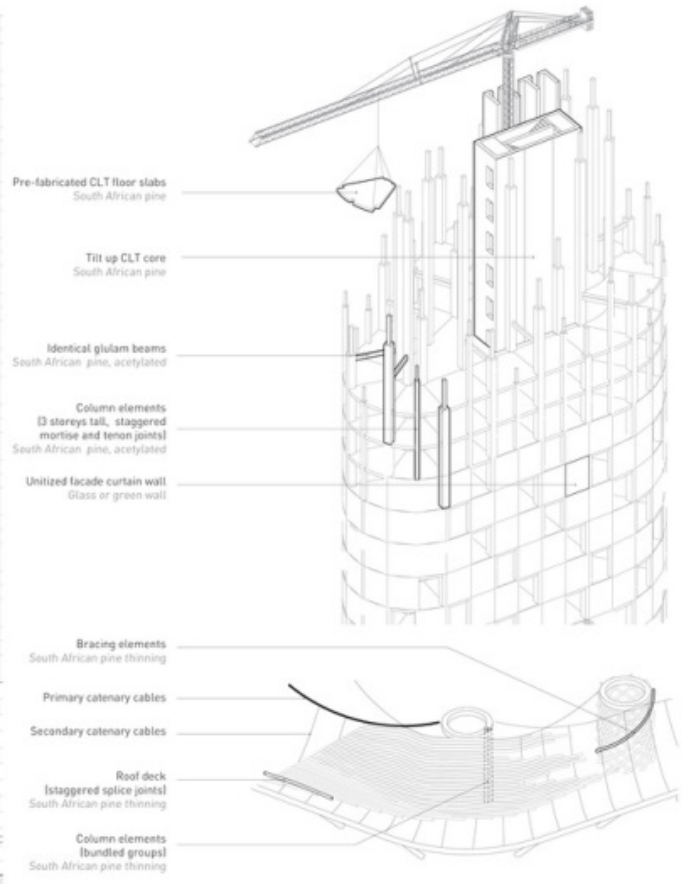
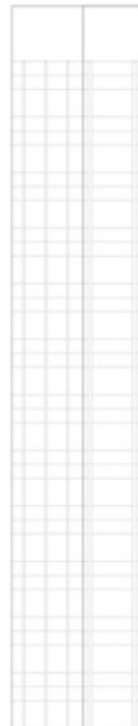
+35m
TOP OF BEAM LEVEL 10

+7.88m
TOP OF MARKET ACCESSIBLE ROOF

-3.5m
TOP OF SLAB BASEMENT



Section B 1:200
0m 5m 10m



- Pre-fabricated CLT floor slabs
South African pine
- Tilt up CLT core
South African pine
- Identical glulam beams
South African pine, acetylated
- Column elements
(3 storeys tall, staggered mortise and tenon joints)
South African pine, acetylated
- Unitized facade curtain wall
Glass or green wall
- Bracing elements
South African pine thinning
- Primary catenary cables
- Secondary catenary cables
- Roof deck
(staggered splice joints)
South African pine thinning
- Column elements
(bundled groups)
South African pine thinning

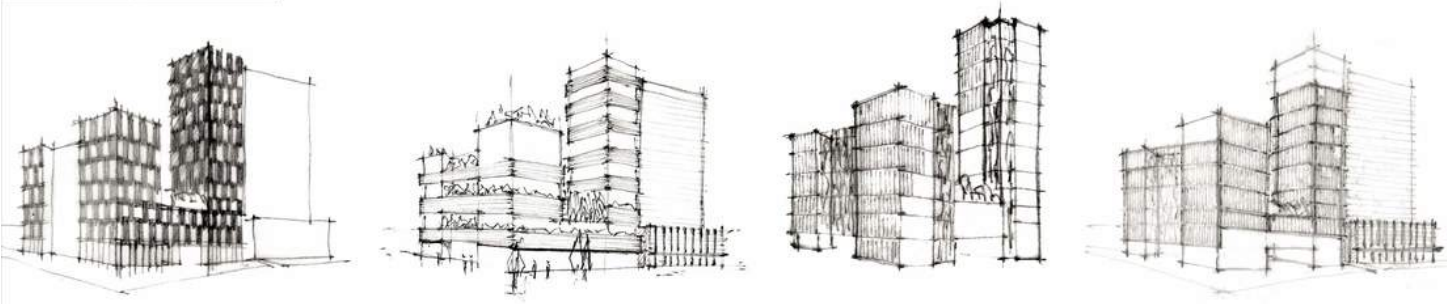
Primary Building Elements Not to Scale

THE SOCIAL NET WOOD

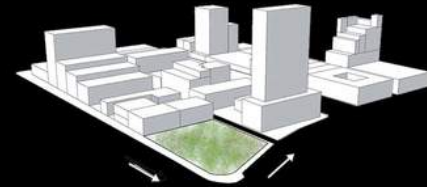
DURBAN-SOUTH AFRICA



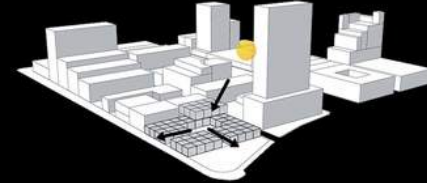
PERSPECTIVE VIEW - JOE SLOVO STREET



SKETCHES - PROPOSITION STUDIES



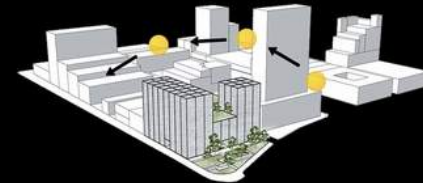
Site of the project - Crossroad : Joe Slovo Street - Johannes Nkosi Street - Identification of the potentialities.



Identification of the main accesses - Shaping the project : Natural Lighting study



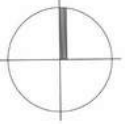
Development of the base volume - Inspiration from the urban context - Shaping the gathering areas.



Emergence of the building - Sustainable design to take advantage of all the natural resources of the site - Extrusion of the main "high-rise" volumes.



Final shape of the building - Study of "the grouper habitat" - Development of common spaces and terraces.



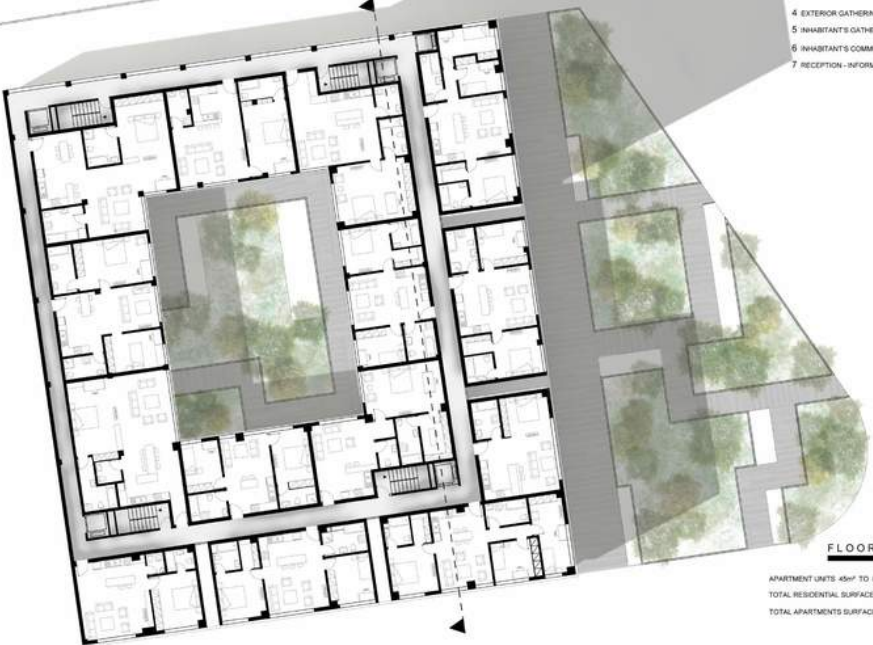
GROUND FLOOR PLAN

- SHOPS AREA 630 m²
- 1 SHOP 210m²
- 2 SHOP 180m²
- 3 SHOP 230m²
- 4 EXTERIOR GATHERING AREA 660m²
- 5 INHABITANT'S GATHERING AREA 400m²
- 6 INHABITANT'S COMMON ROOM 150 m²
- 7 RECEPTION - INFORMATION 20 m²



FLOOR 5 PLAN

- APARTMENT UNITS 40m² TO 80m²
- TOTAL RESIDENTIAL SURFACE 730m²
- TOTAL APARTMENTS SURFACE 900m²
- CO-HOUSING TERRASSES SURFACE 4TH FLOOR 600m²



FLOOR 1-3 PLAN

- APARTMENT UNITS 45m² TO 80m²
- TOTAL RESIDENTIAL SURFACE 1330m²
- TOTAL APARTMENTS SURFACE 1100m²

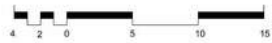


FLOOR 7 PLAN

- APARTMENT UNITS 65m² TO 80m²
- TOTAL RESIDENTIAL SURFACE 400m²
- TOTAL APARTMENTS SURFACE 330m²
- CO-HOUSING TERRASSES SURFACE 5TH FLOOR 80m²
- CO-HOUSING TERRASSES SURFACE 6TH FLOOR 240m²



SOUTH ELEVATION



EAST ELEVATION



INTERIOR GARDEN VIEW



INTERIOR-VIEW



INTERIOR-VIEW





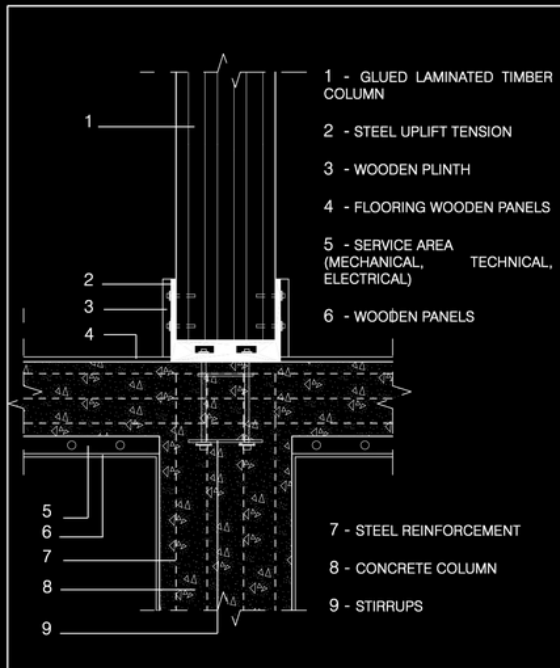
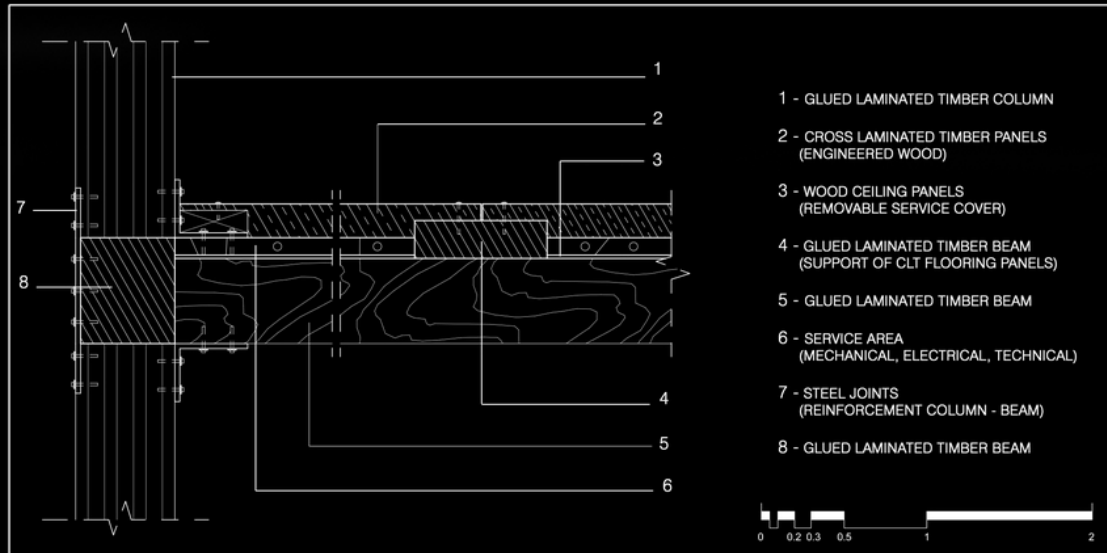
SECTION



THIS 15 STOREY ENGINEERED WOOD PROPOSITION USES A HIGH WOODEN SYSTEM. AS CAN BE SEEN IN THE STRUCTURAL DETAILS, THE STRUCTURE IS EXPRESSED THROUGH THE USE OF GLUED LAMINATED TIMBER COLUMNS AND BEAMS WITH A WOOD FLOOR SYSTEM. OF PARTICULAR INTEREST ARE THE STEEL FITTINGS THAT REINFORCE THE HIGH PRESSURE POINTS AT THE JUNCTION COLUMN-BEAM.

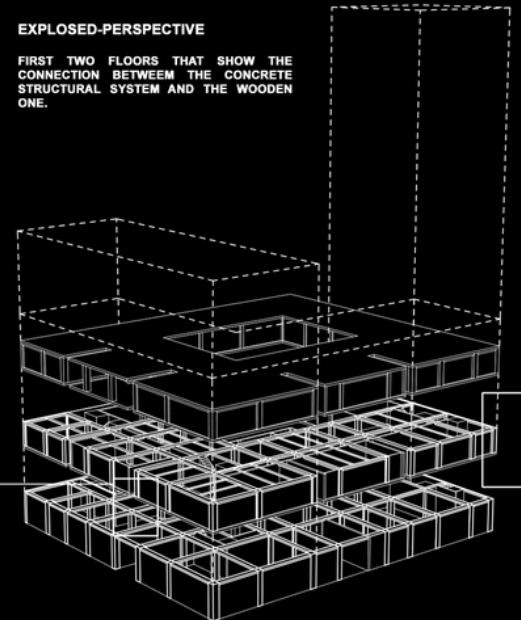
THE FOUNDATIONS AND THE GROUND FLOOR ARE COMPOSED OF A CONCRETE STRUCTURAL SYSTEM TO SUPPORT THE CHARGE OF THE WHOLE BUILDING. THE COMPLEMENTARITY BETWEEN THE CONCRETE STRUCTURAL SYSTEM AND THE WOODEN ONE IS ASSURED BY STEEL UPLIFT TENSION TRANSMITTING THE STRENGTH DIRECTLY TO THE FOUNDATIONS.

THE ELEVATOR SHAFTS PRESENT EACH ONE A SOLID TIMBER WALL THAT HAVE A COMPLEMENTARY ROLE WITH THE PILLARS AND BEAMS IN TRANSMITTING CHARGES. AS SHOWN IN THE SECTION THE 3 FIRST WOODEN STRUCTURAL STOREYS PRESENT A 60X60CM PILLARS IN SENSITIVE PARTS OF THE BUILDING THAT ARE EXTENDED UNTIL THE 10 STOREY OF THE HIGHEST TOWER, THE LAST STOREYS ARE COMPOSED OF 40X40CM SIZED GLT COLUMNS..



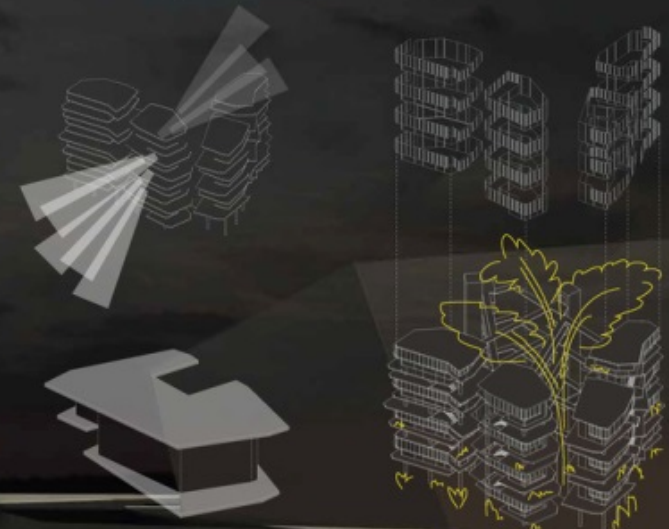
EXPLODED-PERSPECTIVE

FIRST TWO FLOORS THAT SHOW THE CONNECTION BETWEEN THE CONCRETE STRUCTURAL SYSTEM AND THE WOODEN ONE.



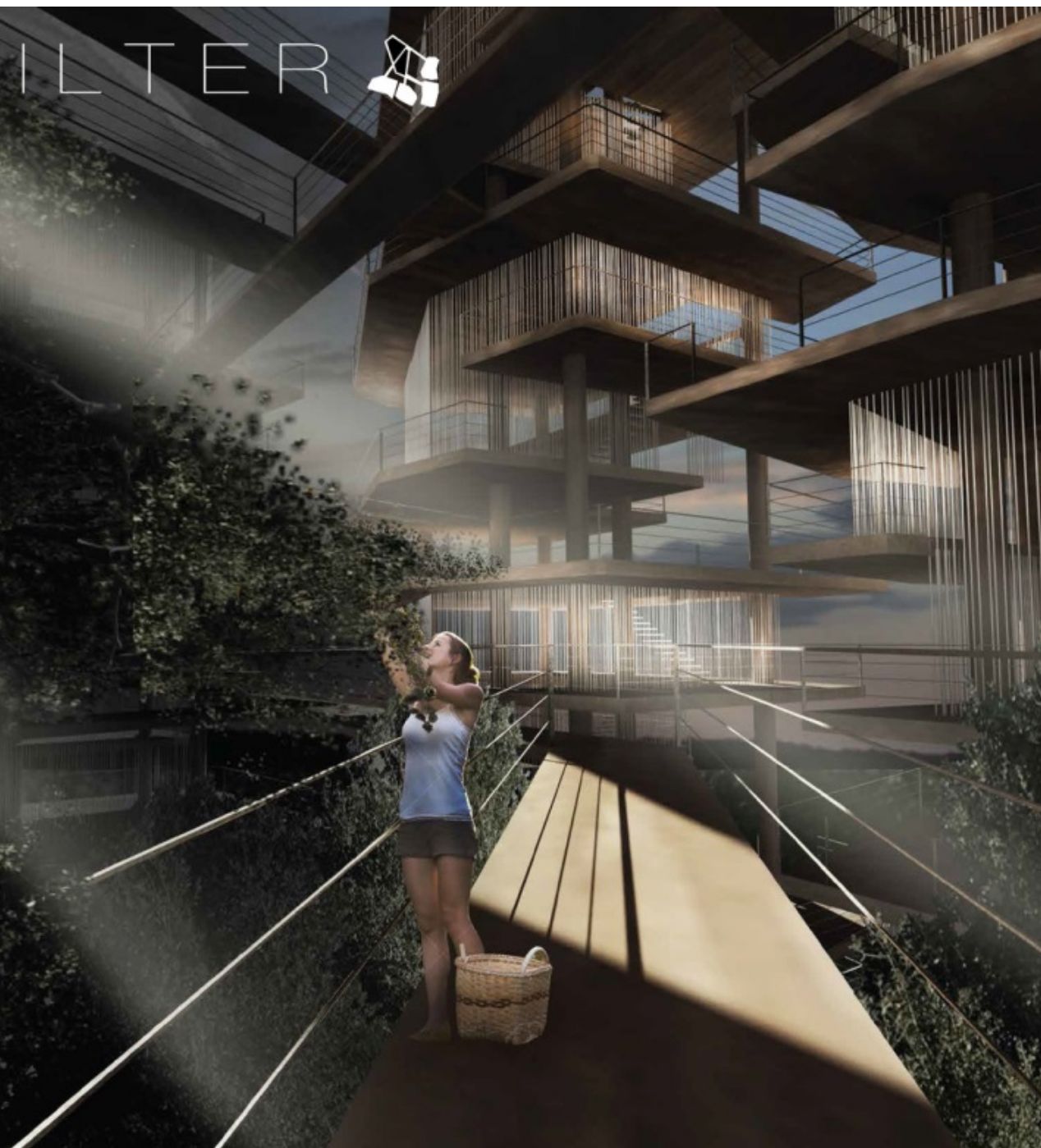
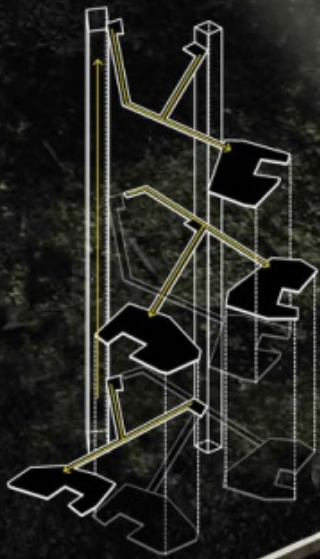
LIVE IN FILTER

The Live-in Filter in Durban, South Africa endeavors to address both the problems of deforestation and housing for the world's growing population. These problems result in a high-density amount of big concrete buildings, creating an unpleasant experience for its pedestrian who passes through. Secondly, the idea of creating a forest in between the sea of buildings emerged, wanting to create a sense of calmness between it all. The first solution in regard to this problem was to design a building attached to the borders of its site to eliminate the space given in the corner of its intersection and provide a safer, more pleasant way to pass through the other side. Secondly, The Live-in Filter intends to retaliate deforestation by creating a statement that incorporates not only its structural design, but also integrating a small-scale forest in its interior. To emphasize even more this idea the building itself serves as a link between the divided of greenery, being an exemplar of connectivity of these two different worlds. While the project intends to engage with the general public and intends to create a harmonious relationship with its context, it must do likewise with its residents. Given this, the residents of the housing complex will be able to experience a direct relationship with the trees up closely passing through a series of bridges that lead them towards their individual apartments. Each apartment must be entered from a terrace above that serves as a perfect transition from public to private for the residents, providing as well more required footage of "leaves" rather than inside space. The idea is for the building to be perceived as extremely open and translucent serving as that connectivity with what is perceived by the eyes. Because of this, it will have an extremely open façade providing the residents a direct contact with nature and the outsiders an indirect contact based on the transparency of the façade. The building is to define itself as an agglomeration of different entities serving a same purpose, therefore interconnected by light structures to emphasize on the architectural promenade.



AC0602

LIVE-IN FILTER



AC0602

LIVE-IN FILTER



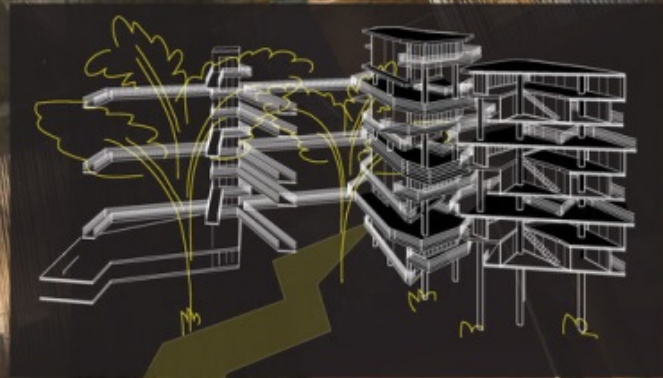
Ground floor plan



Typical floor plan



Roof plan



AC0602