



IPAR - TDK 2018

SCHOOL FOR NEW GOURNA, LUXOR WEST BANK

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Abstract

Our approach to the projects origins from understanding the uniqueness and cultural richness of the site, surrounded by the few still standing buildings of architect Hassan Fathy. The mosque and khan designed by Fathy create a strong stylistic and historical environment which can't be ignored. We will try to respect the local traditions, through embracing Hassan Fathy's creations while implementing technologies that can enhance the learning experience of the students. Additionally, we aim to create spaces that give the opportunities for students for self-learning, interacting and cooperation according to a more up-to-date way of teaching.

There are no design standards or benchmarks for the environmental performance of school buildings in Luxor. So we will use local thermal and solar data to set what we thought was the right performance standard for the school. Due to the hot and dry climatic condition, specific design guidelines were explored to cope with this harsh climate. Consequently we are targeting that the final design could be implemented as a prototype for similar conditions, specifically focusing on the characteristics in Upper Egypt.

Existing schools in Luxor struggle to provide good natural lighting. To avoid solar glare, they have small windows. But this restricts the amount of daylight that can get into the building — something that's essential in areas where electricity is not always present.

The school building should be designed considering New Gourná's community at its core. Dialogue with the local community if it was possible should inform the design process and the school should be built by local builders using local materials. This not only provides training and employment, but also increases the community's attachment to their school. It would also encourage the community to take part in maintaining the building later on.



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Absztrakt

Tervezési módszerünk a kulturális légkör, és az egyedülálló környezet megértésén alapszik, melynek fő elemei a telek közvetlen szomszédjában álló Hassan Fathy által tervezett épületek. A mecset és a Khan erőteljes stilisztikai és történeti környezetet teremt, ami megkerülhetetlen egy új tervezési programban. Az iskola programjának kialakítása, és az épület tervezése során szem előtt szeretnénk tartani Fathy örökségét és a helyi tradíciókat, ehhez illeszkedő, de egyben újító, korszerű épületet létrehozni.

Annál is inkább szükségesek a korszerű technológiák, mivel Luxorban nincsenek konkrét tervezési sémák, vagy kipróbált megoldások a környezettudatos és gazdaságos építésre. Éppen ezért a helyi napsugárzási és klimatikus hatásokat vizsgáljuk kiindulásképp, hogy megtaláljuk az ideális tanuló környezet kialakításának legmegfelelőbb eszközeit. Lévéen, hogy a luxori időjárás rendkívül száraz és meleg, ennek megfelelő speciális eljárásokat szeretnénk minél jobban megismerni és alkalmazni.

Az egyik legfontosabb probléma a helyi iskolaépületekben a természetes fény bebocsátása. A legtöbb épületen apró ablakok találhatóak, hogy a tűző napfénytől megóvják a tanulókat. Ez azonban azt is megakadályozza, hogy a napfény megfelelő mértékben bejuthasson az épületbe, holott az elektromos áram nem mindig áll korlátlan mennyiségben rendelkezésre, így a természetes fény kihasználása rendkívül fontos lenne.

Az említett szempontokon felül nagy jelentőséget tulajdonítunk Új Gouna lakóinak, akik részvétele az új épület kialakításában elengedhetetlen. Nem csak az építkezés során tartjuk fontosnak, hogy helyi mesterek is részt vegyenek az iskola kialakításában, hanem már a tervezés kezdetén igyekszünk figyelembe venni, hogy milyen igények merülnek fel a helyi közösség részéről. Ennek megértéséhez nagy segítséget nyújt a *Hassa Fathy Survey Mission* munkája, illetve a Parajdi Mester László által tervezett épületek logikája. A helyiek bevonása a projektbe azon felül, hogy munkát és szakmai tudást adhat a helyieknek, egyben ösztönözheti is a közösséget az épület későbbi fenntartására.



Preface



Picture 1: Child of New Gourná , Luxor – Júlia Pokol, 2017.

Importance of the Project for a New School

They say, children are the future. If there's something to change and better our current wasteful and unequal system, it is surely based on education. And that, among other ideas, was our greatest motivation to deliver a design for the village of New Gourná in Luxor, Egypt.

Before getting into the details of our design we have to ask you to start from a wider perspective and take a look at the site not a part of the „touristic Egypt”.

Please forget the camels and the Great Pyramids, delete the colourful pictures of the bazaar from your minds' eye. New Gourná, as indicated before, is located on the West bank of the Nile



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in Luxor, the non-touristic part, with streets covered in mud, litter and mortal remains of dead animals where kids run around barefoot. Great many people here are living in conditions which we, the inhabitants of Europe, can't even imagine.

We both have relations to the plot, as one of us was born and raised in Egypt, while the other had the chance to visit the site in question two times, thanks to the *Hassan Fathy Survey Mission's* work in Luxor. Thus we both are somehow aware of the restrictions, needs and possibilities for making a new project to this very complex situation.

New Gourna

Construction of New Gourna was executed between 1945 and '48. It was originally launched by the Egyptian Department of Antiquities to relocate the inhabitants of Old Gourna over the royal necropolis in Luxor. Fathy delivered the project in a caring and considerate mood according to his writings in his later published book entitled *Architecture for the Poor*.

"In Nature, no two men are alike. Even if they are twins and physically identical, they will differ in their dreams. The architecture of the house emerges from the dream; this is why in villages built by their inhabitants we will find no two houses identical. This variety grew naturally as men designed and built their many thousands of dwellings through the millennia. But when the architect is faced with the job of designing a thousand houses at one time, rather than dream for the thousand whom he must shelter, he designs one house and puts three zeros to its right, denying creativity to himself and humanity to man. As if he were a portraitist with a thousand commissions and painted only one picture and made nine hundred and ninety nine photocopies. But the architect has at his command the prosaic stuff of dreams. He can consider the family size, the wealth, the social status, the profession, the climate, and at last, the hopes and aspirations of those he shall house. As he cannot hold a thousand individuals in his mind at one time, let him begin with the comprehensible, with a handful of people or a natural group of families which will bring the design within his power. Once he is dealing with a manageable



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group of say twenty or thirty families, then the desired variety will naturally and logically follow in the housing."

Through Fathy's revolutionary ideas the new village became an experiment mixing traditional and contemporary techniques to elaborate an „Environmentally appropriate and low cost” way of building.

However, inhabitants did not like their new homes partly because of that, and because of the inappropriate materials used in the foundations which dissolves in water. At the time when it was created the plan intended to include 77 households, now there are 174¹ households because of the dynamic growth of the population. Thus the original buildings disappeared and new ones made of concrete and bricks appear all over the place.



Pic. 2.: View of New Gurna, 2018 – photo by Júlia Pokol

¹ Source of data: Steele, James. 1989. The Hassan Fathy Collection. A Catalogue of Visual Documents at the Aga Khan Award for Architecture. Bern, Switzerland: The Aga Khan Trust for Culture, 16-18. & archnet.org



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Though Fathy made the design for a school building too, the original site plan was not built entirely, thus our task is also continuing the work of Hassan Fathy in a contemporary context. Furthermore, New Gournia is on the list of UNESCO's World Monuments Watch List of Most Endangered Sites since 2010.

Concept and design guidelines



Pic. 3.: Mosque of New Gournia designed by Hassan Fathy – photo by Prof. Zsolt Vasáros



Ars poetica

In short, Hassan Fathy's houses are hard to maintain and keep, but the people living here are attached to this place and that's something we can't neglect. As locals say: we should

„Rebuild Hassan Fathy's spirit without Hassan Fathy's mud.”

We aim to design a school building that would benefit the education of its users, creating interesting places which could encourage the pupils' creativity, and rooms which are appropriate for effective studying. At the same time we ought to keep in mind the surrounding Hassan Fathy buildings: the Mosque and the Khan – the two biggest remaining edifices of New Gourná. For these incorporated elements from the motives Fathy used on his facades and some of the techniques he applied to improve the climatic features of his houses.

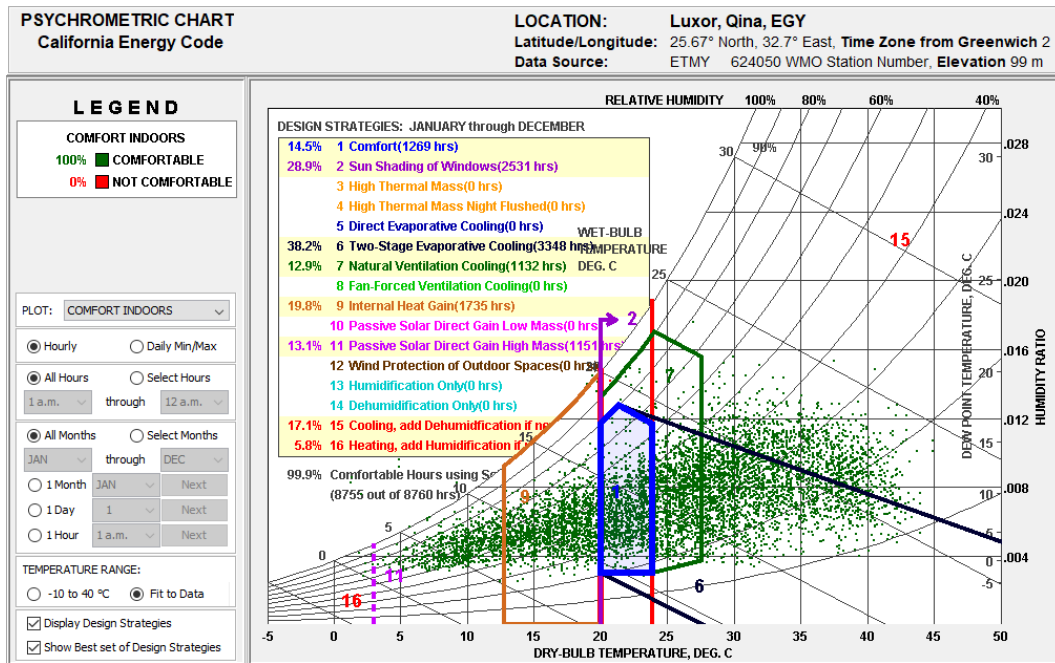
Climate

According to the local requirements and the guidelines of László Parajdi Mester, the new schoolbuilding is optimised considering materials, structures and spaces to avoid direct sunstrikes, and give as much air and shade to the students as possible. At the same time we tried to lower the need for artificial light, letting the northern natural ambient light in, so that the school could cut off on its spendings.

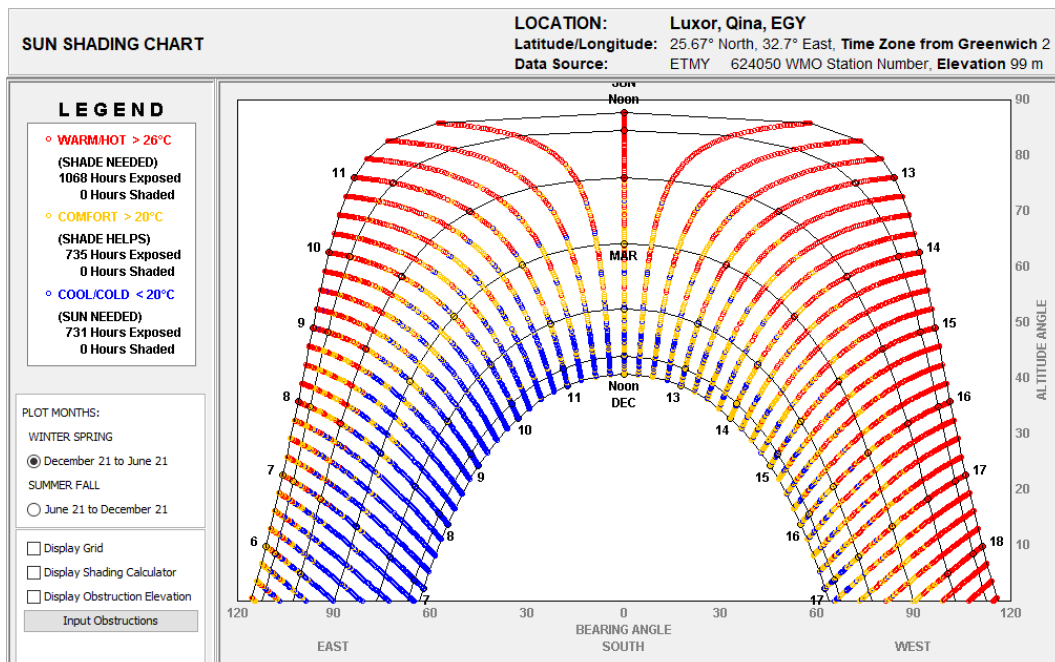
We checked the climate conditions with the help of *Climate Consultant 6.0* software and created several charts to see the exact data of the local weather. Thus we could study the shading, the amount of sunny hours, the yearly temperature range and the typical wind direction as visible in the pictures below.



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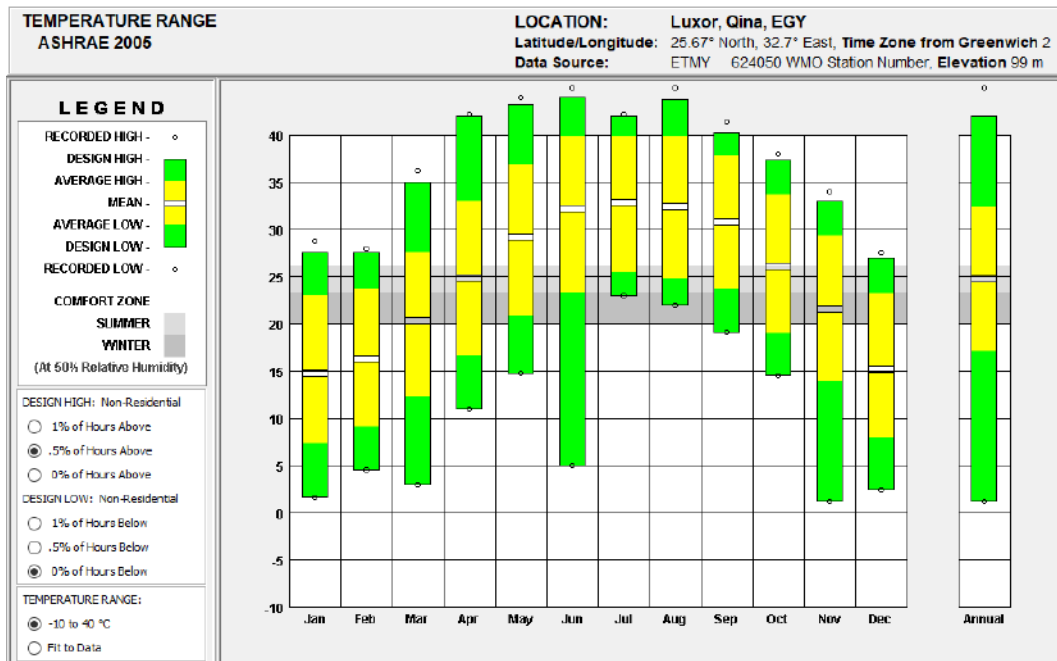
Picture 4 – Source: Climate Consultant 6.0



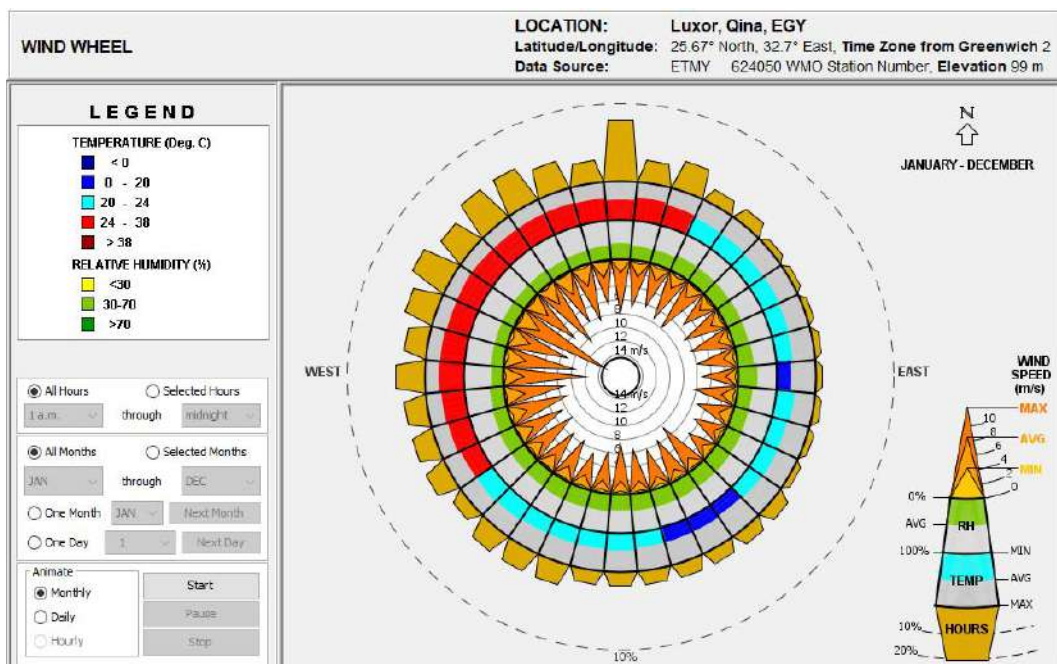
Picture 5 – Source: Climate Consultant 6.0



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Picture 6- S.: Climate Consultant 6.0



Picture 7: Wind Wheel – Source: Climate Consultant 6.0



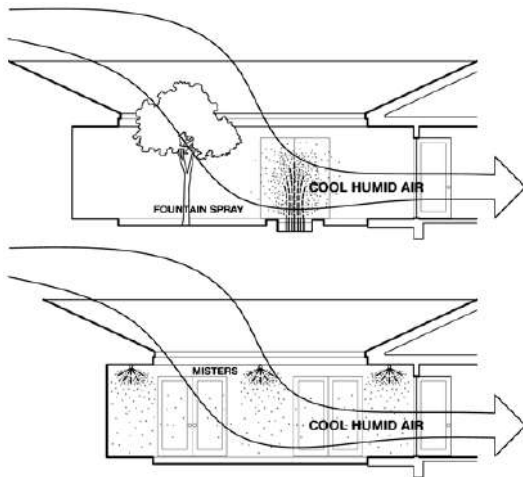
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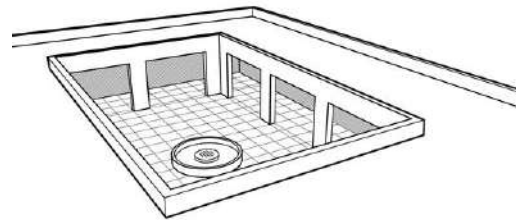
Design guidelines

We studied and selected some of the following tricks to adapt our design to the extreme conditions of heat and brightness. First of all we applied wind catchers.

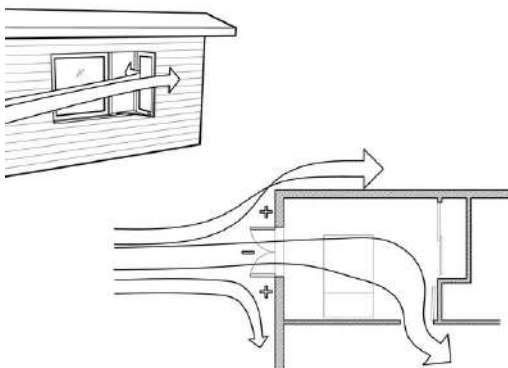
Cooling techniques:



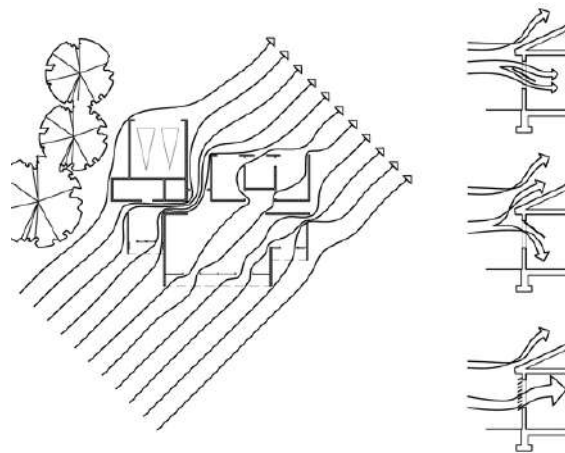
Picture 8: Wind Catcher- S.: C.C.6.0



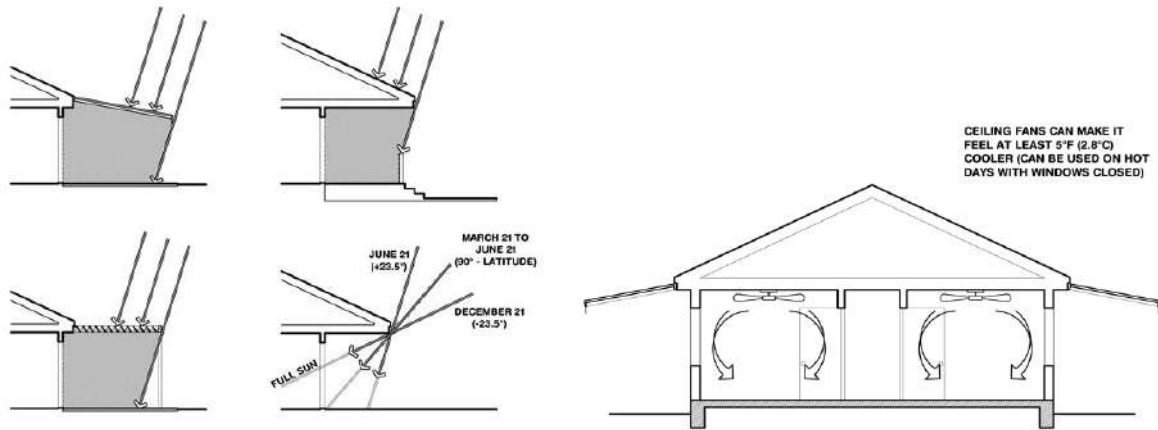
Picture 9: Microclimate - S.: C.C.6.0



Picture 10: Natural ventilation- S.: Climate Consultant 6.0



Picture 11: Up-wind facing openings- S.: C.C.6.0

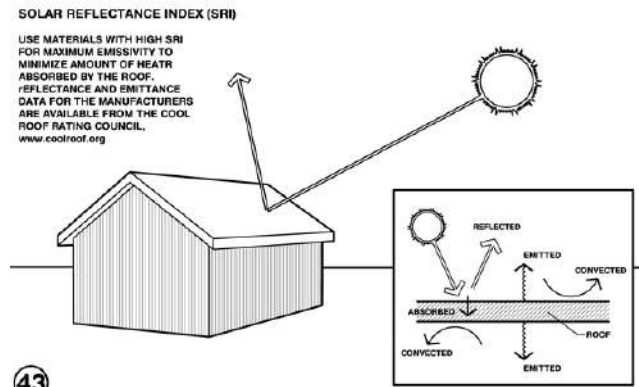


Picture 12: Shading – S.: Climate Consultant 6.0

Picture 13: Indoor air motion – Source: Climate Consultant 6.0

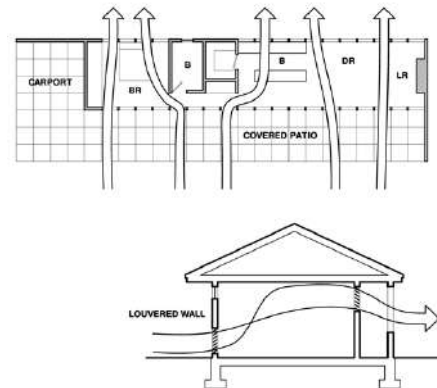
In case of the shading system we created a covered corridor on the southern part of each classroom that provides cool entering zone and a shaded community place to the students where they can sit together before their lessons start. The same element appears at the main entrance of our building complex.

We used white on most surfaces of the facade that reflects the heat of the sun, and helps with getting natural light into the classrooms and to minimize conducted heat gain.

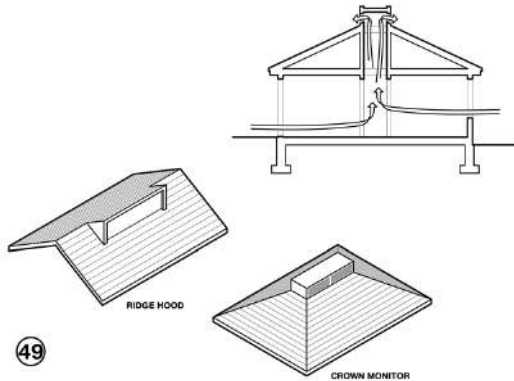


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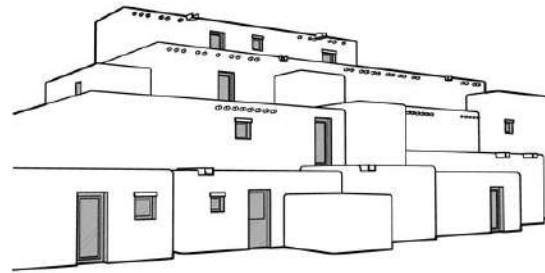
Picture 14: Reflecting surfaces – Source: C.C. 6.0



Picture 15: Options for Ventilation – S.: C.C.6.0



Picture 16: Natural ventilation – S.: C. C. 6.0



Picture 17: Traditional Passive Techniques – S.: C.C.6.0

According to traditional techniques we applied smaller openings on the southern and none on the western and eastern sides of the classrooms to avoid their overheating during the day. This is based on the orientation of the masterplan guided mainly by the North – South axis, that enabled us to let natural light in and have a clear rhythm of open spaces and buildings.

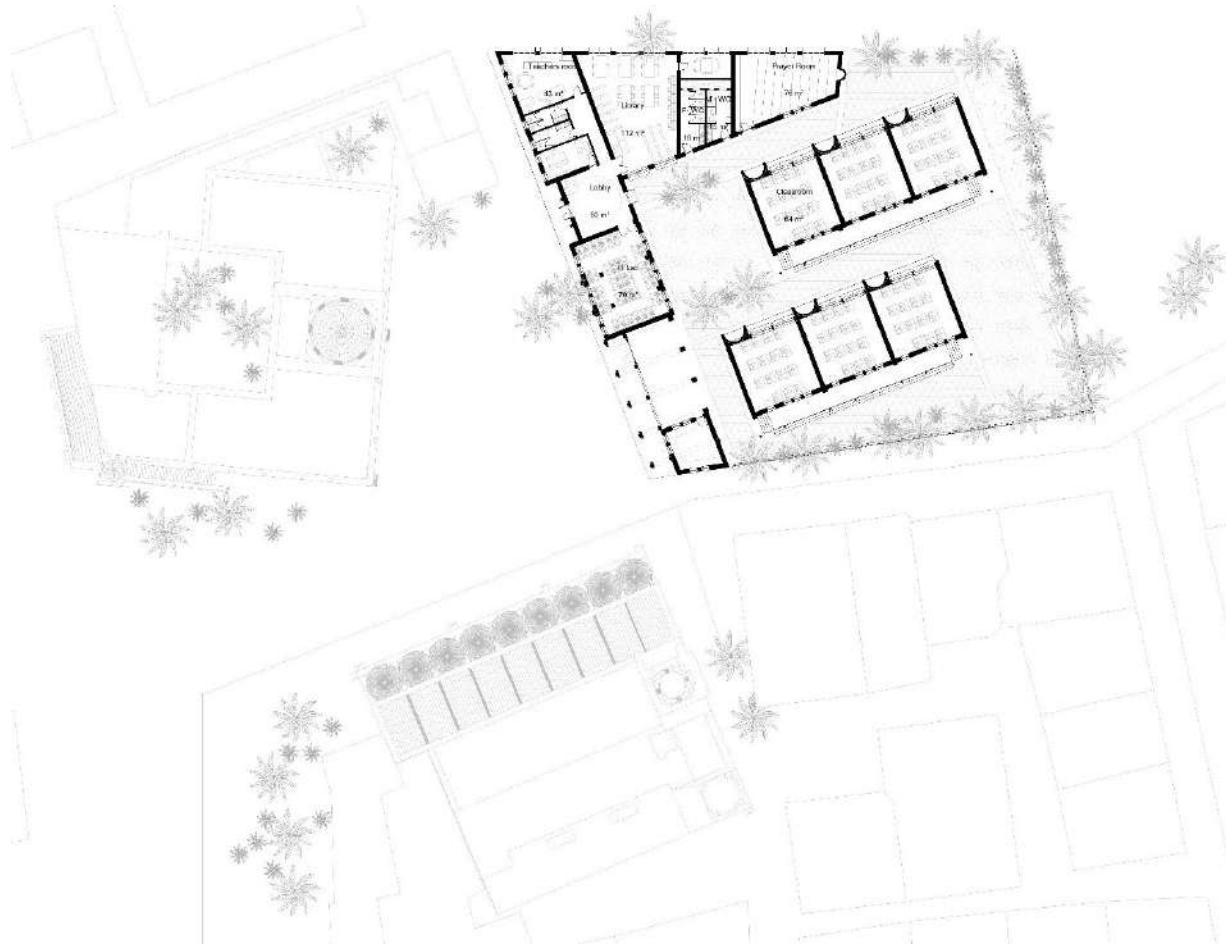
Description of the project

Orientation and Entrance

Our building complex is opened towards the main square housing Hassan Fathy's Mosque and the Khan. We interpreted this space as the main access route to the School building and a meeting point for the future users. We created two separate entrances: one to the central administrative block and another closer to the piazza. This double entrance reflects the possibilities in the operation of the school: we can imagine courses for local adults in the IT labs and other afternoon activities held between these walls.



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Picture 18: Ground plan of the School building design next to Fathy's Mosque and the Khan

This second entrance is surrounded by a shaded corridor covered by Nubian vaults which leads inside to the school's courtyard, but also reaches a public cafeteria and the IT labs from the piazza, so that the IT teaching and the Café can also operate independently of the school time.



Central Block

Connected to the main entrance we created a block of administration, the teachers room, a library which is also accessible from the garden, and a Prayers room at the most remote and silent corner of the block.



Picture 19: Elevation of the main entrance and the Cafeteria of the designed School

Classrooms and Details

Facing this assembly stands the two block of the classrooms, each row containing three-three halls inside.



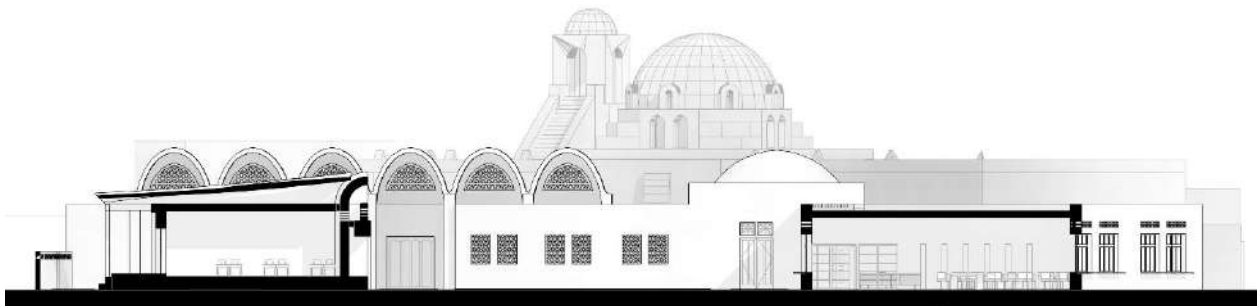
Picture 20: View of the three-classroom-block



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During the design process we created a structure that is later expandable if the number of students would require more rooms in the future. The supporting system is based on a reinforced concrete beam-pillar structure completed with mudbrick walls. To avoid crumbling and shrinking we elevated the buildings by 5 steps on a concrete foundation, so that the rain or humidity wouldn't affect the classes. This massive structure is practical not only for its durability, but it's also a technique we saw in traditional building to keep a cool and pleasant climate indoors. A metal light roof is covering the study rooms that is easily removable if a second construction would take place, and enables natural ventilation through the ceiling. Also this light covering is created in white colour to reduce the heat of the spaces.



Picture 21: Section of the classrooms through the wind catcher system and the library.

The natural ventilation is enforced by wind catcher tubes located on the northern facades of each room. These structures also provide a sitting area outside the classes where kids can have rest and play between school time.



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Picture 22: View of the classroom-blocks' wind catchers and the public areas

All the classrooms have a standard size of 8 by 8 meters, which is a bit bigger space than the originally required 2 m^2 per pupil. We believe that education of small children should include moving, using the space available in a creative and free way. According to the current researches of the Brain Imaging Centre of the Hungarian Scientific Academy movement and musical sounds are highly important for the development of small kids, and these encourage creative and innovative thinking. Based on this information we tried to create a freer and more comfortable environment which could help introducing modern teaching methods in this region.

Open Spaces

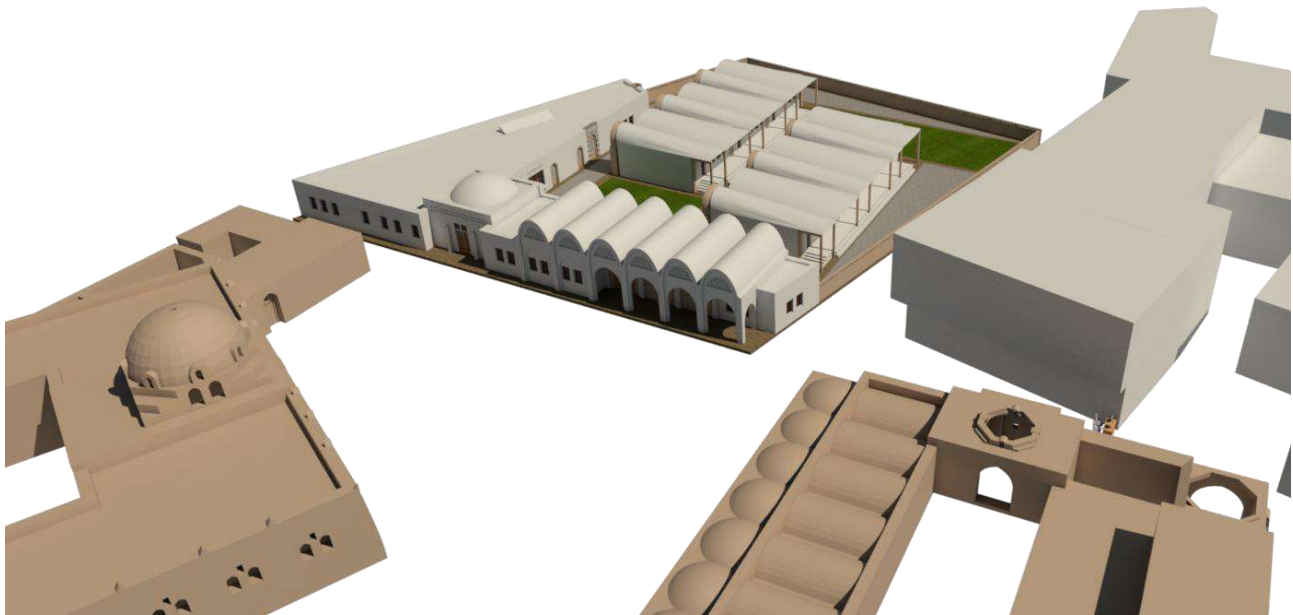
The three block of buildings are surrounded by sandy playgrounds and areas covered with artificial grass to avoid the need of extra watering. To increase the amount of shaded areas we planted more palm trees on the master plan which can also serve as meeting points for the kids and possible elements of the playground, and create a friendlier environment for those staying inside.



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Conclusion



Picture 23: Bird's-eye view of the site

During our work we concentrated on making an innovative, yet harmonizing plan to complete the frame of this important historic site, and elaborate a space which can help the community to learn not only via lessons, but through the participation and the use of this complex. Of course it was a really demanding task to put down the lines next to the work of a great architect and to try to solve the problems of a community in which we spent very little time. In any case we hope our work can benefit the improvement of the conditions in New Gourná, and the development of the local education, even if just some small ideas can be integrated in the future constructions of the design. It is an honour to be part of this project and to help an issue so crucial and urgent in contemporary architecture and social building.



Sources

WEB

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<https://www.wmf.org/sites/default/files/article/pdfs/New%20Gourna%20Report%20Final%202015%20Meg.pdf>

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World Monuments Fund - *New Gourna Village: Conservation and Community* – New York, 2011



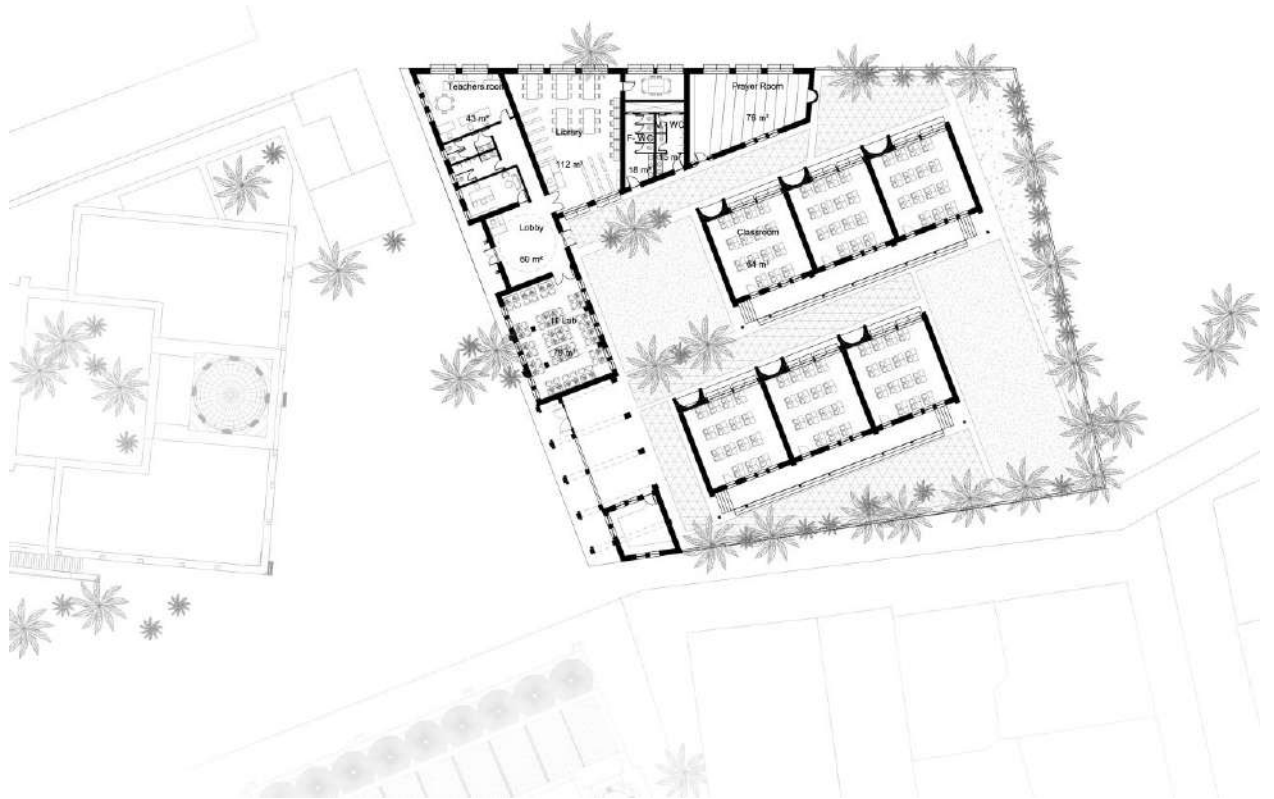
Appendix

List of Drawings

- Site Plan – Scale = 1:1000
- Ground floor plan – Scale = 1:200
- Sections – Scale = 1:200
- Elevations – Scale = 1:200
- View of the main entrance
- Northern and Southern view of the classrooms
- Birds eye view
- 2 A1 panels of the drawings



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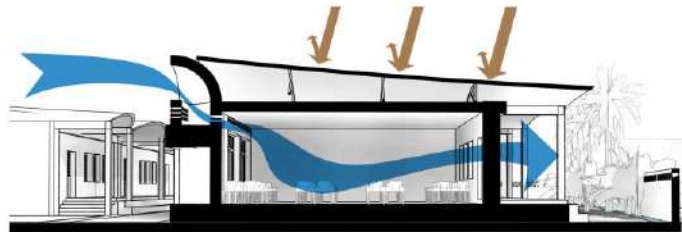
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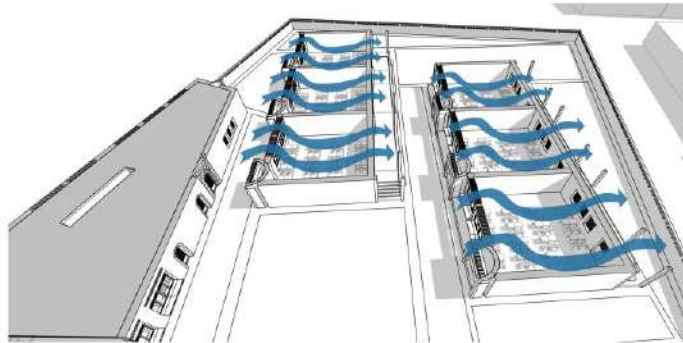
Site Plan 1:1000



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The windcatcher and the openings above the windows enforce natural ventilation. The light corrugated roof act as a protection layer against direct conducted heat from the harsh sun of upper Egypt. This light structure could easily be removed in case of future addition of other classrooms above the existing ones, and the wind catcher will be working for both the upper and lower classrooms.





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The north west view of the classrooms



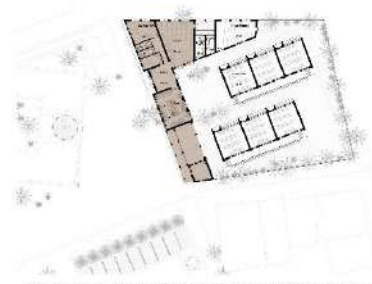
The south east view of the classrooms



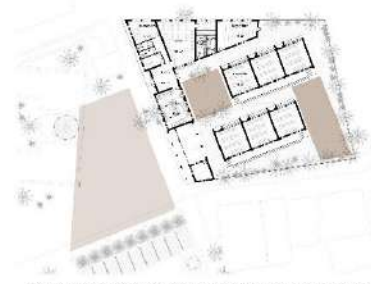
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Orienting the classrooms to be facing the northwest, since this is the direction of the prevailing wind. Additionally the main lighting openings are facing this direction so that classrooms are lighted with ambient light with no glare.



Having the main entrance of the school facing the main plaza of the village, was intended to further define the plaza, through the educational services building. Connecting the library and the IT lab from the entrance lobby, and separating these functions from the rest of the school. Accordingly these spaces can also be used by the community.



After defining the plaza using the school entrance facade. Smaller courts were created to serve the primary school students' needs. Due to compactness of the layout, most of the alleys and courts are shaded with various sitting areas. The plain wall facing the court is used as a graffiti wall for the children.



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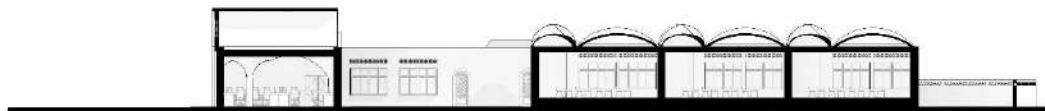
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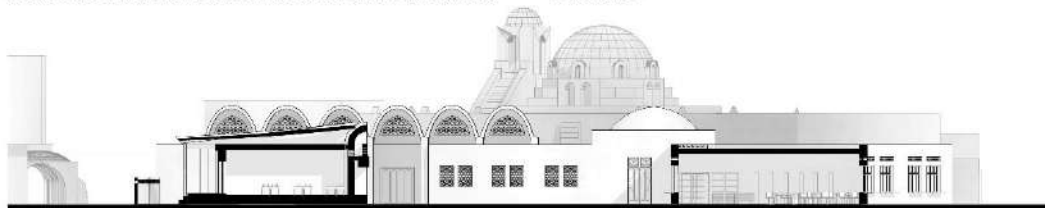
Main entrance elevation Scale: 1:200



Northern Elevation of the Classrooms and Section of the Entrance Scale: 1:200



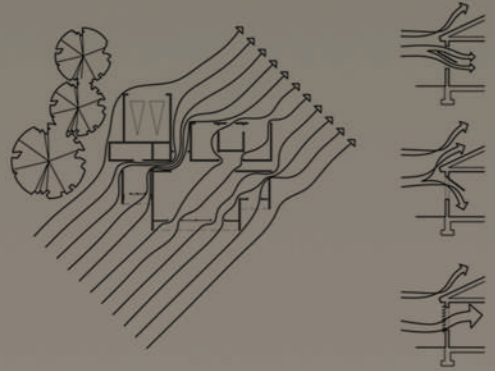
Northern Elevation of the Classrooms and Section of the Library Scale: 1:200



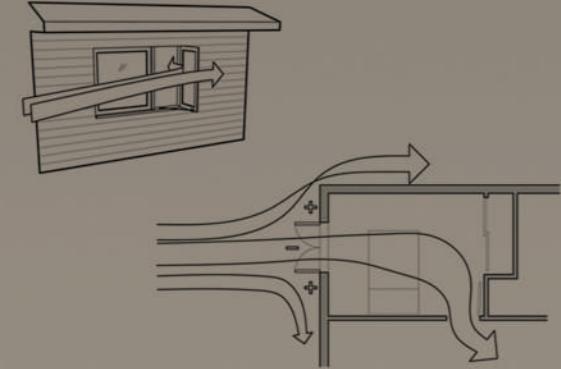
Northern Elevation of the Classrooms and Section of the Library Scale: 1:200

Design Guidelines

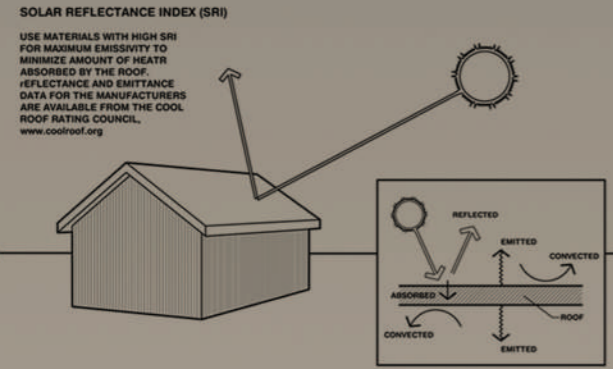
Here are the most relevant guidelines we used while approaching the design of the project.



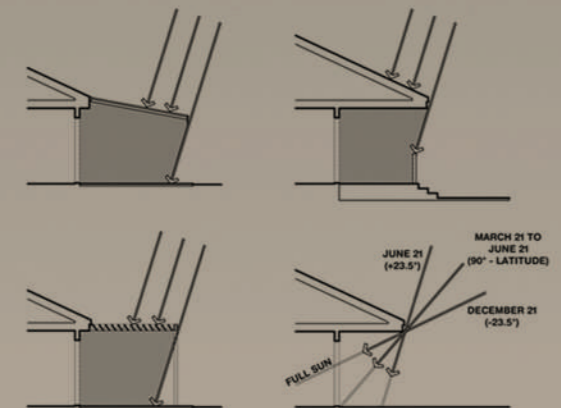
To facilitate cross ventilation, locate door and window openings on opposite sides of building with larger openings facing up-wind if possible



Good natural ventilation can reduce or eliminate air conditioning in warm weather, if windows are well shaded and oriented to prevailing breezes



Use light colored building materials and cool roofs (with high emissivity) to minimize conducted heat gain



Window overhangs (designed for this latitude) or operable sunshades (awnings that extend in summer) can reduce or eliminate air conditioning

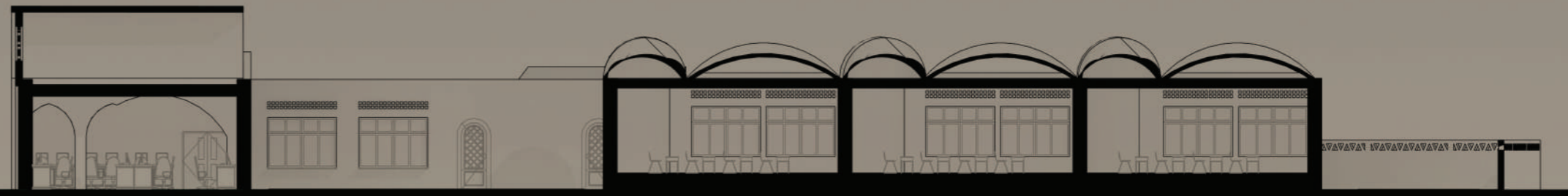
Elevations and Sections of the School building



Main entrance elevation Scale: 1:200



Northern Elevation of the Classrooms and Section of the Entrance Scale: 1:200

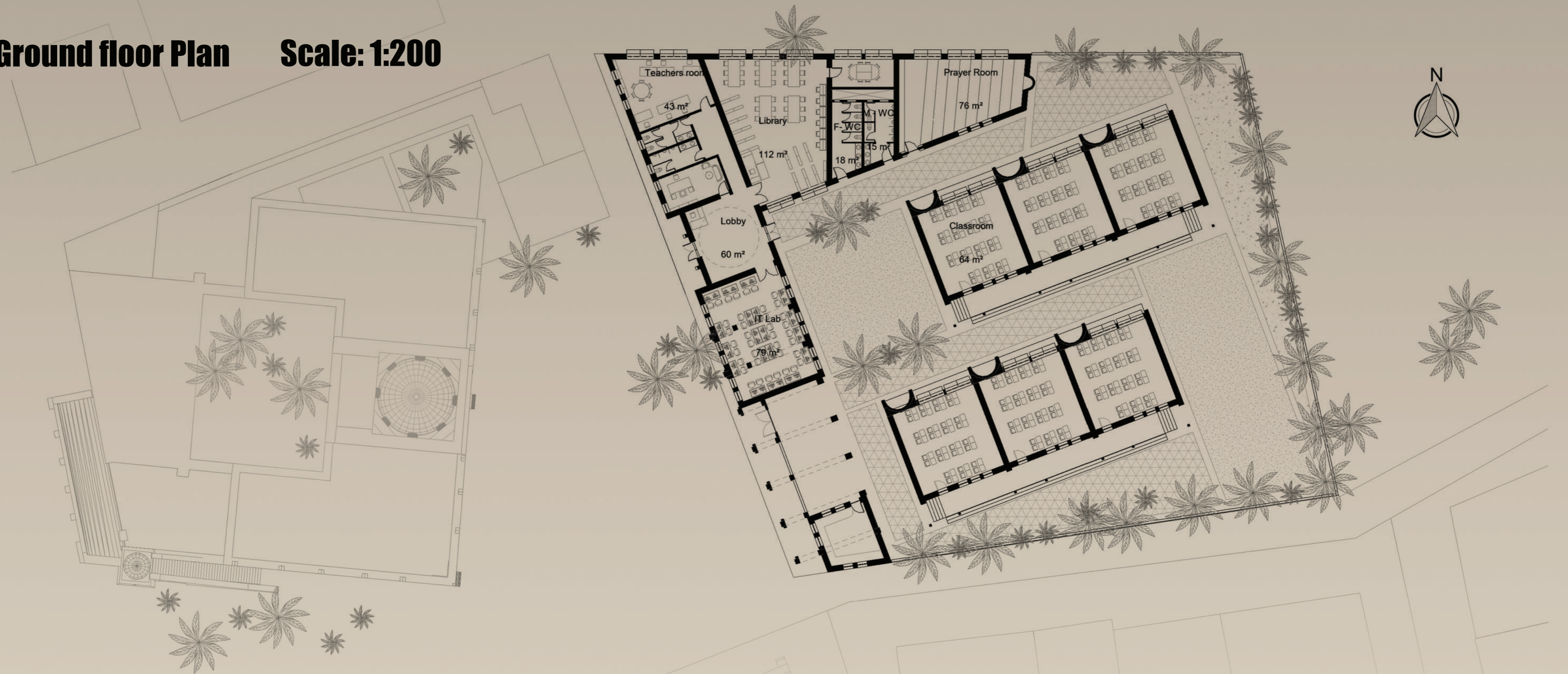


Northern Elevation of the Classrooms and Section of the Library Scale: 1:200



Northern Elevation of the Classrooms and Section of the Library Scale: 1:200

Ground floor Plan Scale: 1:200



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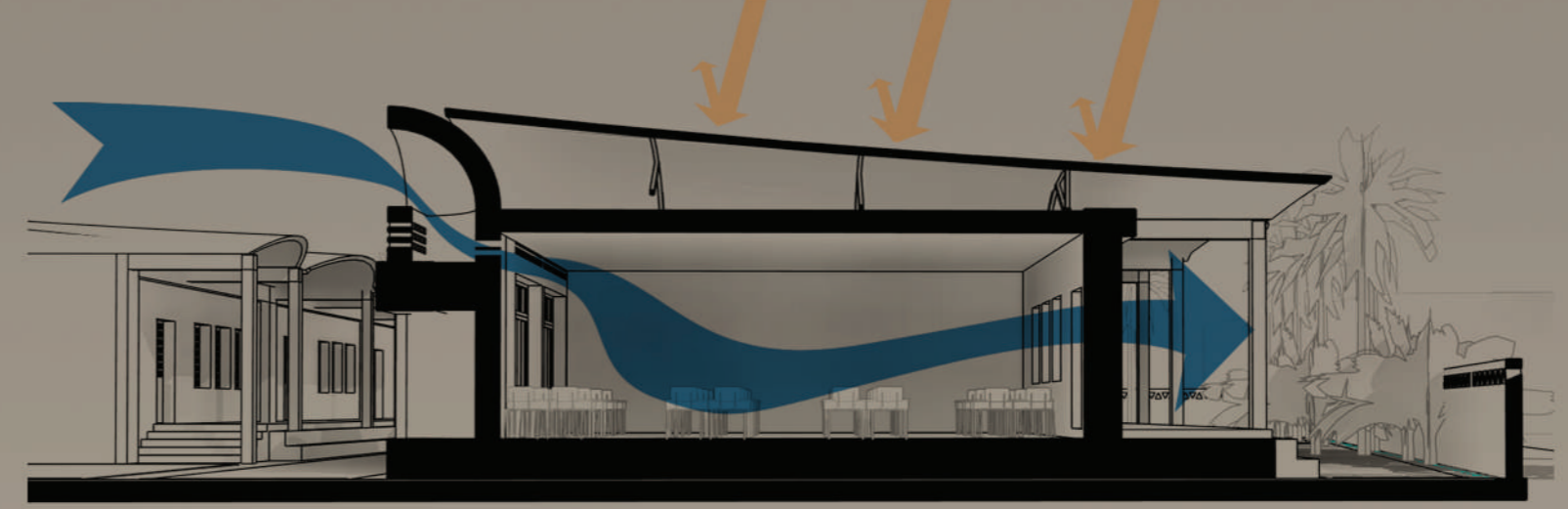
The north west view of the classrooms



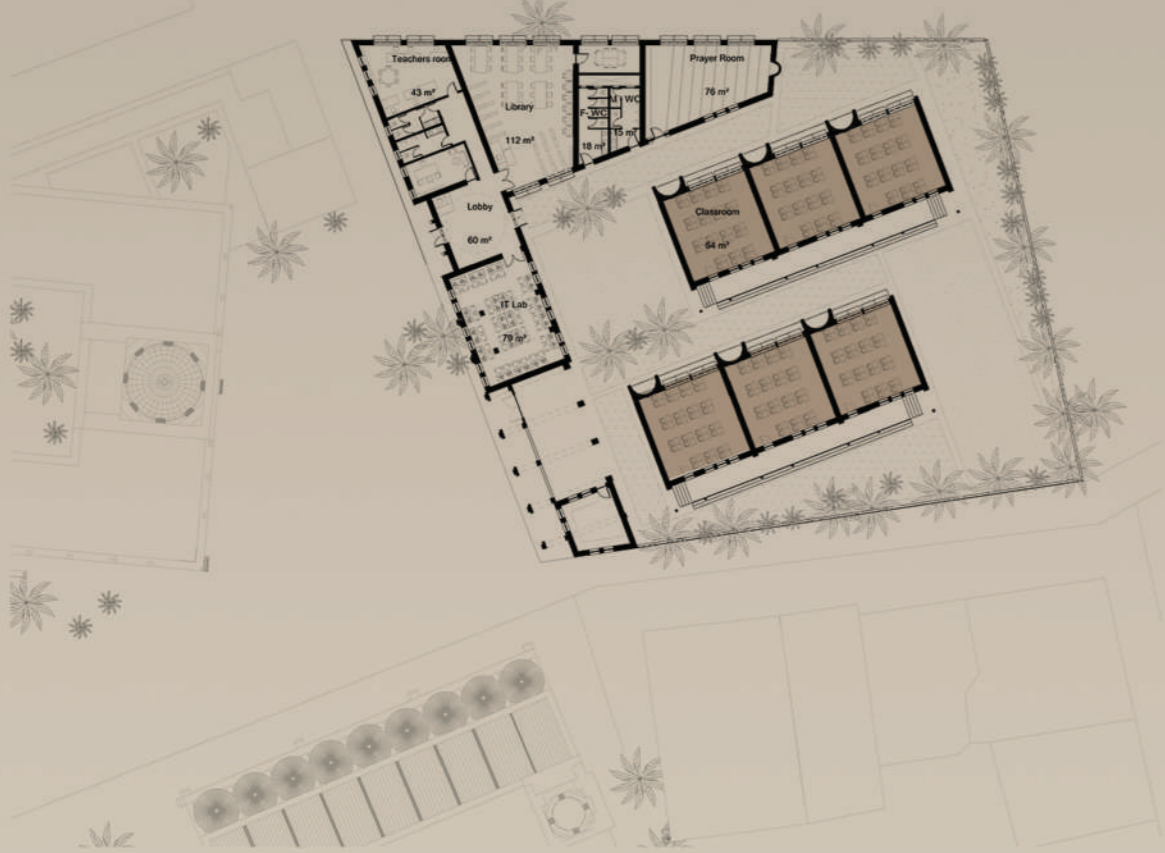
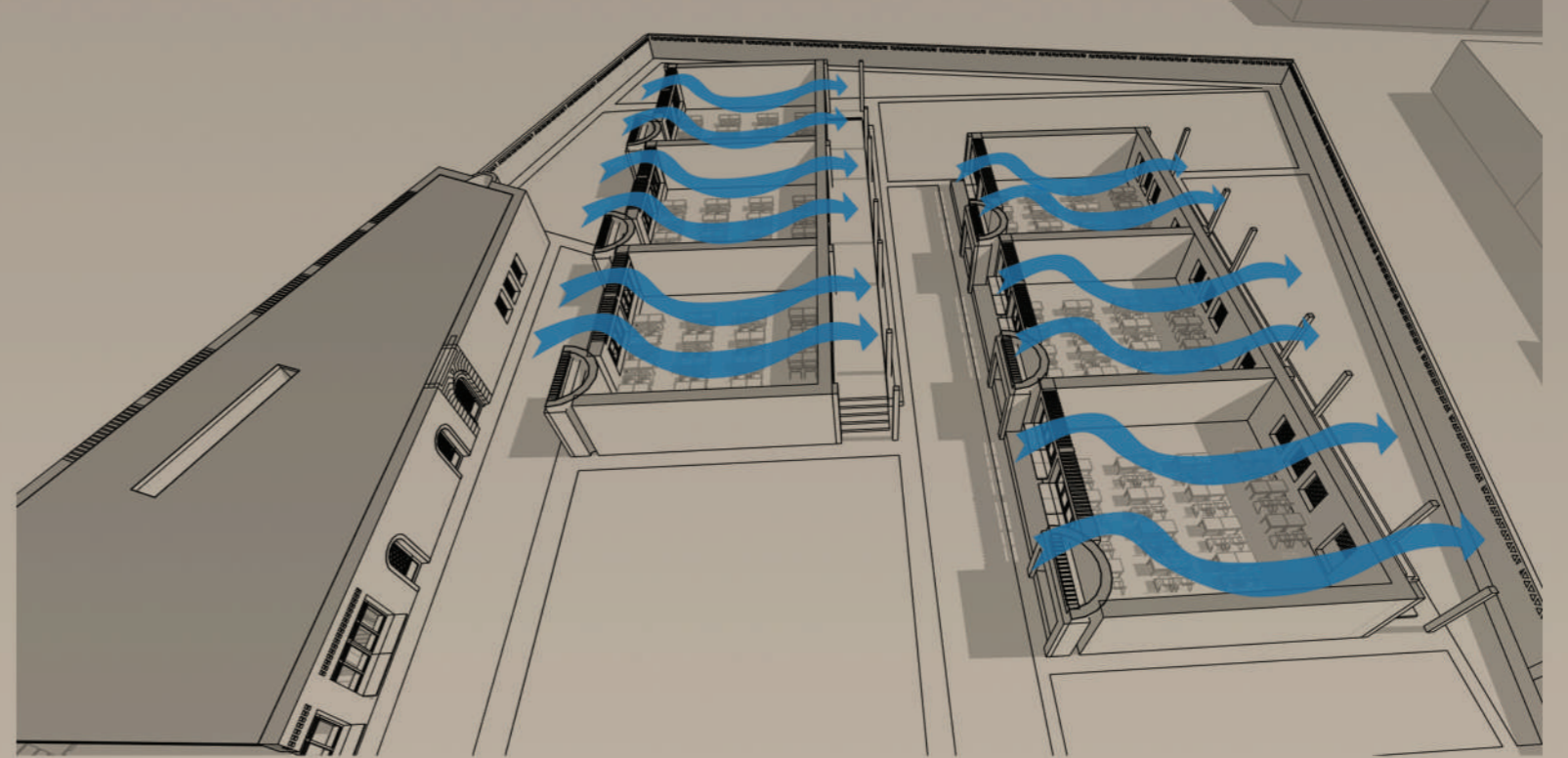
The south east view of the classrooms



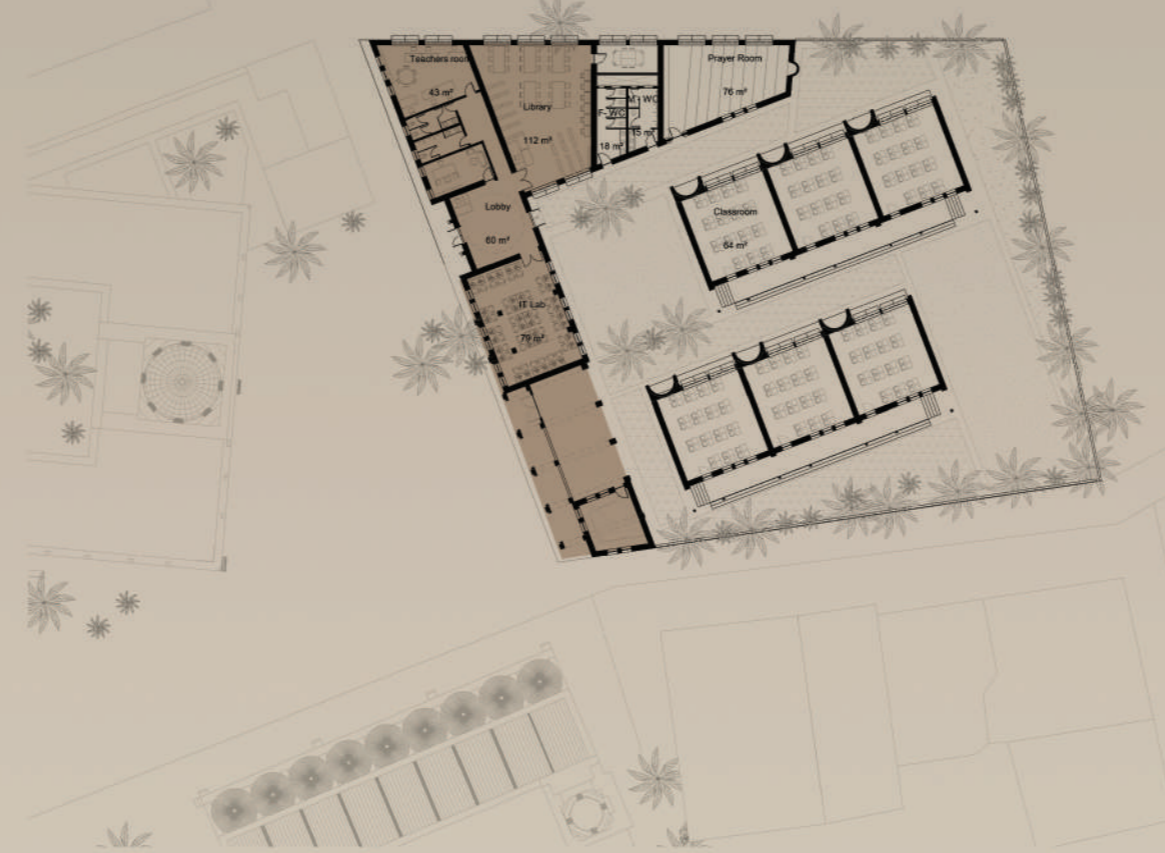
Site Plan 1:1000



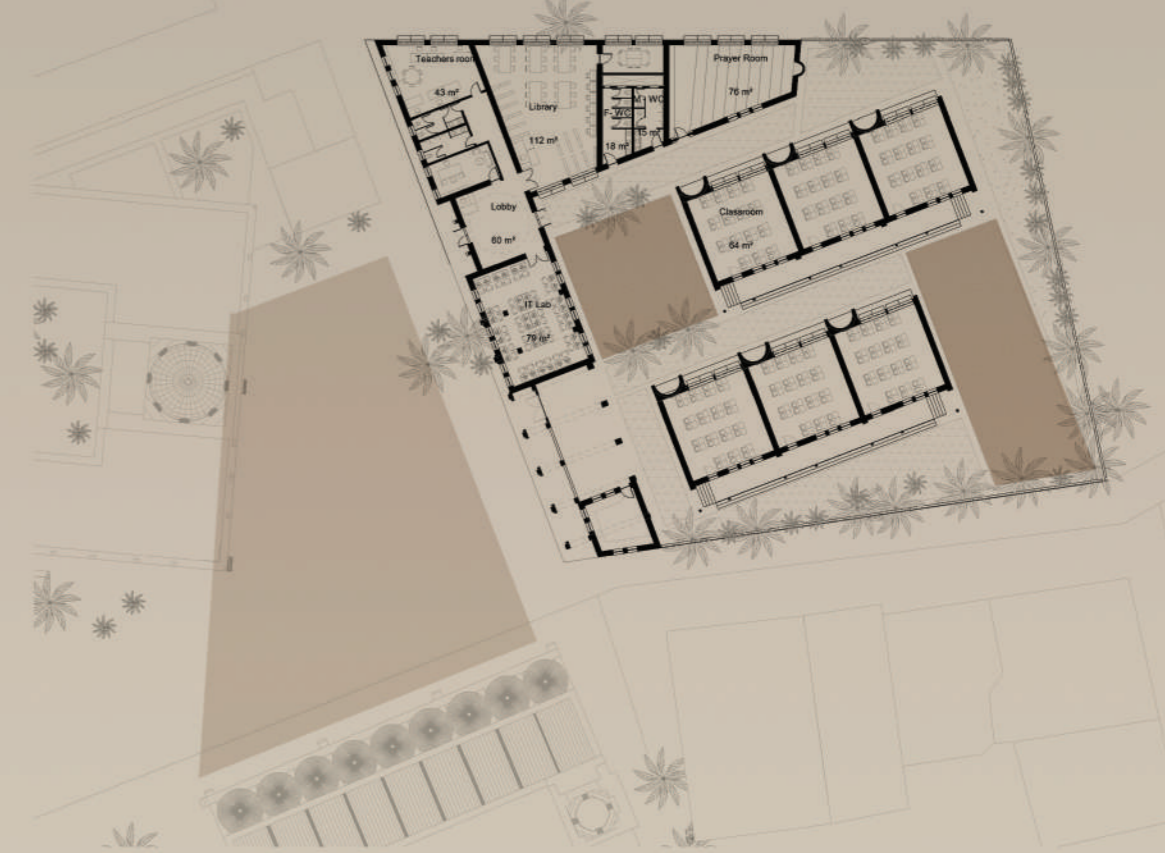
The windcatcher and the openings above the windows enforce natural ventilation. The light corrugated roof act as a protection layer against direct conducted heat from the harsh sun of upper Egypt. This light structure could easily be removed in case of future addition of other classrooms above the existing ones, and the wind catcher will be working for both the upper and lower classrooms.



Orienting the classrooms to be facing the northwest, since this is the direction of the prevailing wind. Additionally the main lighting openings are facing this direction so that classrooms are lighted with ambient light with no glare.



Having the main entrance of the school facing the main plaza of the village, was intended to further define the plaza, through the educational services building. Connecting the library and the IT lab from the entrance lobby, and separating these functions from the rest of the school. Accordingly these spaces can also be used by the community.



After defining the plaza using the school entrance facade. Smaller courts were created to serve the primary school students' needs. Due to compactness of the layout, most of the alleys and courts are shaded with various sitting areas. The plain wall facing the court is used as a graffiti wall for the children.



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