

Oasis

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1. Analysis

- Environment
 - Hot summers, windy winters
 - +- 200mm / m² in five months
 - Impermeable soil
 - Camp placed in a valley
 - Flash floods



<https://data2.unhcr.org/en/documents/details/40612>

1. Analysis

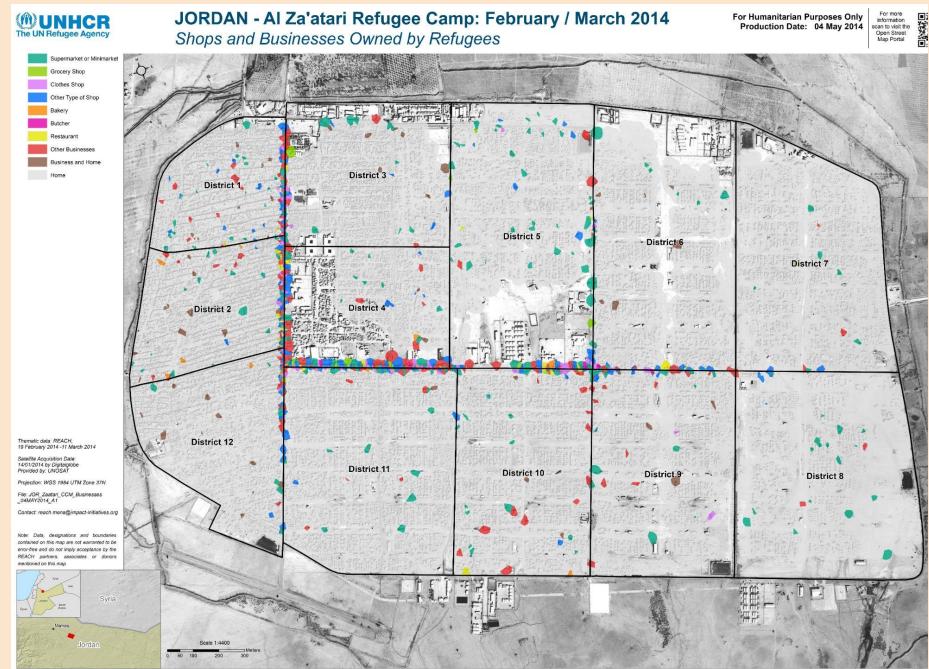
- 80.000 refugees
- Facilities
 - 32 Schools
 - 58 Community centers
 - 8 medical clinics
 - 362 wash centres
 - 2 supermarkets
 - Approx. 1600 shops



<https://reliefweb.int/map/jordan/jordan-al-zaatari-refugee-camp-general-infrastructure-map-november-2015-0>

1. Analysis

- Economy
 - Internal economy of ten million dollars per month
 - Illegal trade with surrounding villages and cities
 - 17% has an active working permit, 20% of this is female



<https://data2.unhcr.org/en/documents/details/40612>

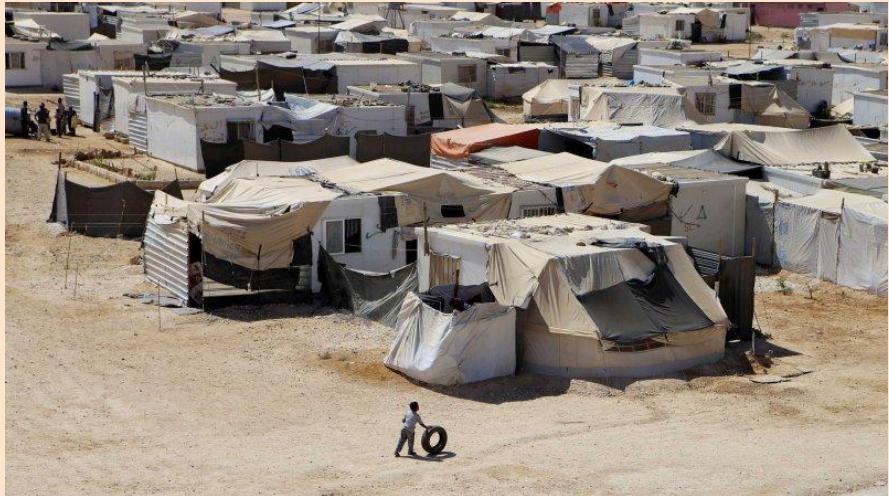
2. Problem statement

It's a city



<https://english.alarabiya.net/blog/2016/03/28/Behind-the-fences-of-Jordan-s-Zaatari-refugee-camp>

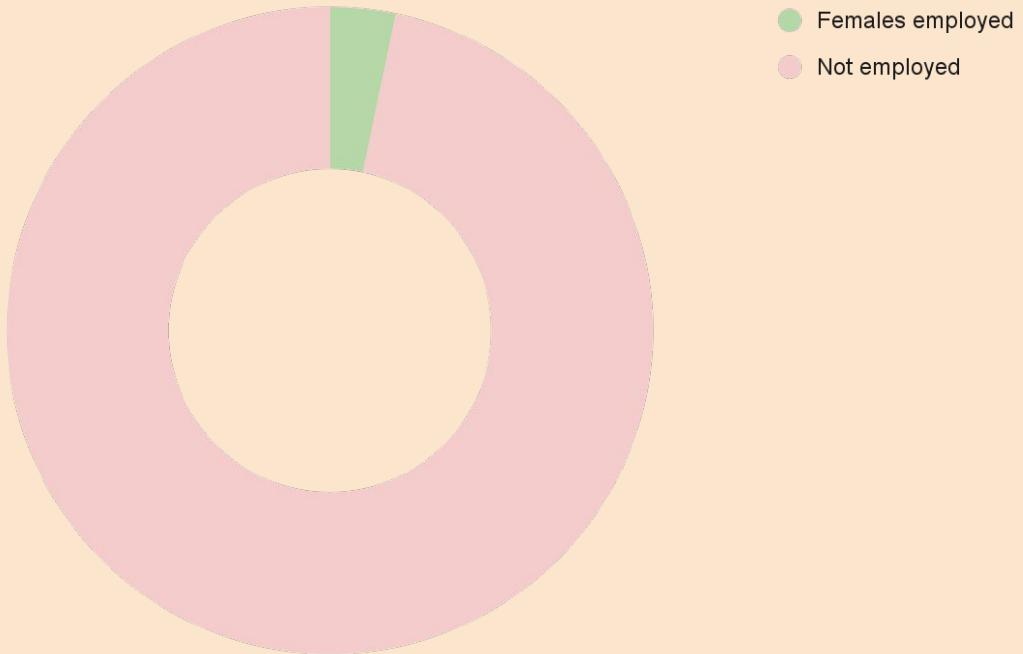
But it's not a city...



<https://time.com/4063674/zaatari-camps-empty-syria/>

2. Problem statement

- Low employment rate
 - Boredom
 - Poverty
 - Violence
 - Women even less employed



2. Problem statement

- Climate
 - Flash Floods
 - Hot days, cold nights
 - Water scarcity



<https://www.cbsnews.com/news/syrian-refugee-camps-slammed-by-rain-cold-making-miserable-conditions-unbearable/>

3. Vision

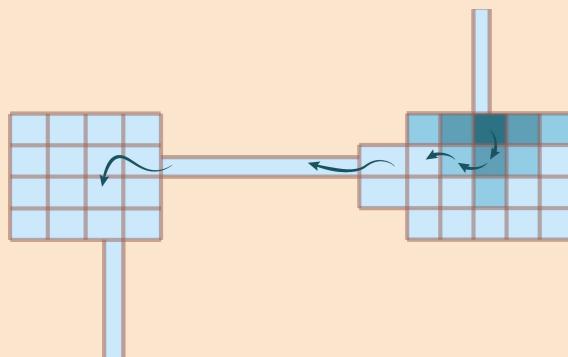
- Bazaar
 - Central point of facilities
 - Learning skills
 - Creating jobs
 - Opportunity for female employment
 - Legal economy



<https://theculturetrip.com/europe/turkey/articles/the-oldest-and-grandest-market-in-the-world/>

3. Vision

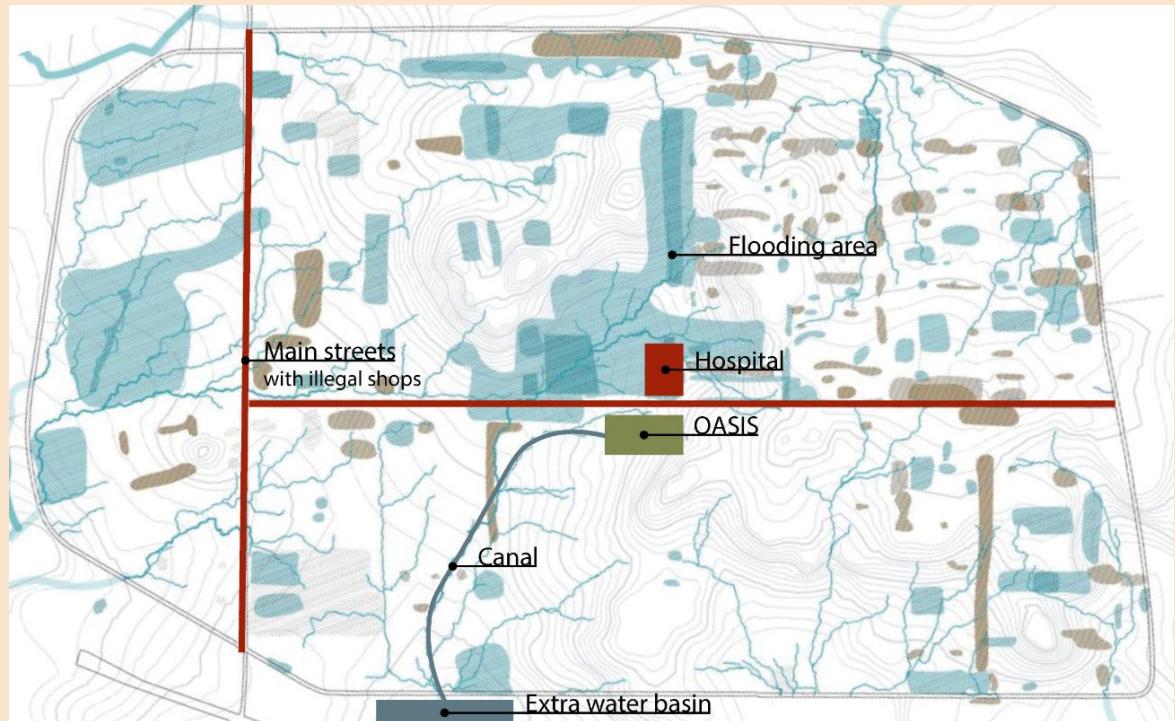
- Store rainwater
 - Growing crops
 - Cooling
 - Construction material
 - Washing
- Extra: Utilize dug out soil



https://www.reddit.com/r/ArtefactPorn/comments/2u3j14/the_basilica_cistern_is_the_largest_of_several/

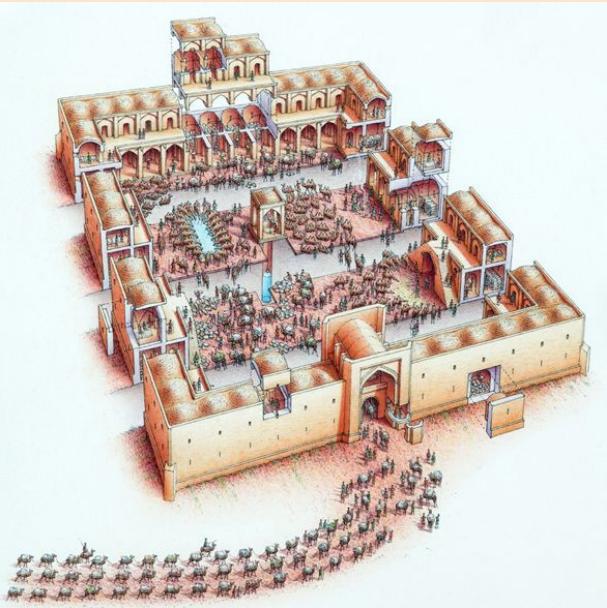
3. Vision

- Location
 - Large flooding area in the middle of the camp.
 - Replace illegal shops surrounding the main streets.
 - Central point.



4. References

Caravanserai



http://www.stephenbiesty.co.uk/galleries_Atmospheric_Cutaways_Caravanserai.html

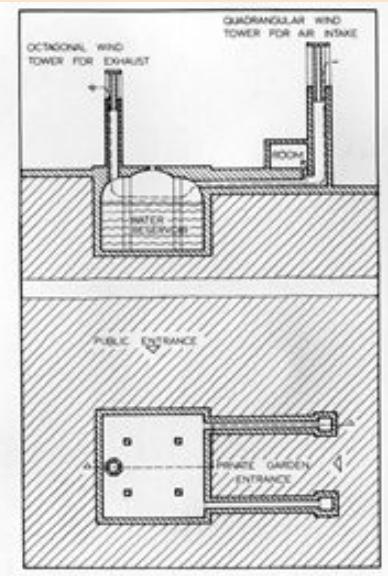
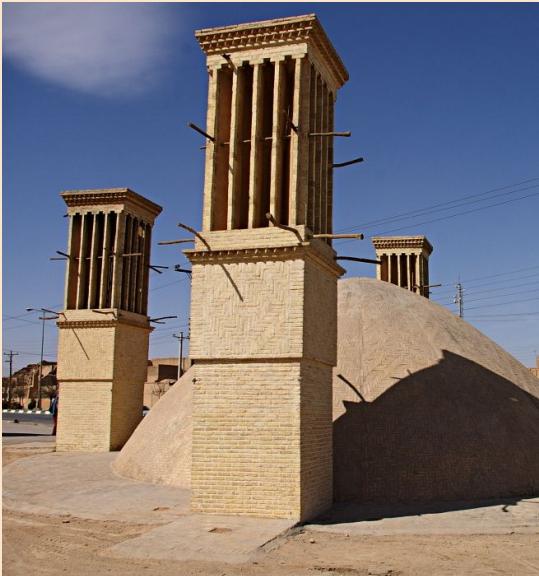
Bazaar



<https://www.likealocalguide.com/isfahan/bazaar-e-bozorg-grand-bazaar>

4. References

Ab Anbar



https://commons.wikimedia.org/wiki/File:Yazd-Ab_anbar_4_badghirs.jpg

Oasis



<https://en.wikipedia.org/wiki/Oasis>

4. References

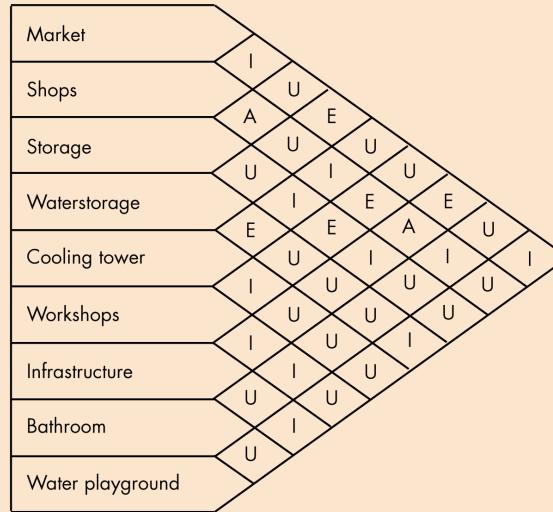
- Elements of an Ab Anbar
 - Storage tank
 - Walls of 2 m thick
 - Special baked bricks
 - watertight mortar (Sarooj)
 - Roof
 - Dome shaped
 - max 20m in span
 - Windtower
 - To prevent contamination of the water
 - Stairway
 - Ornamental portal



<https://www.wallswithstories.com/ancient/ab-anbar-a-roofed-underground-water-cistern.html>

5. Computational Design

- Rel chart
- General process for finding the layout

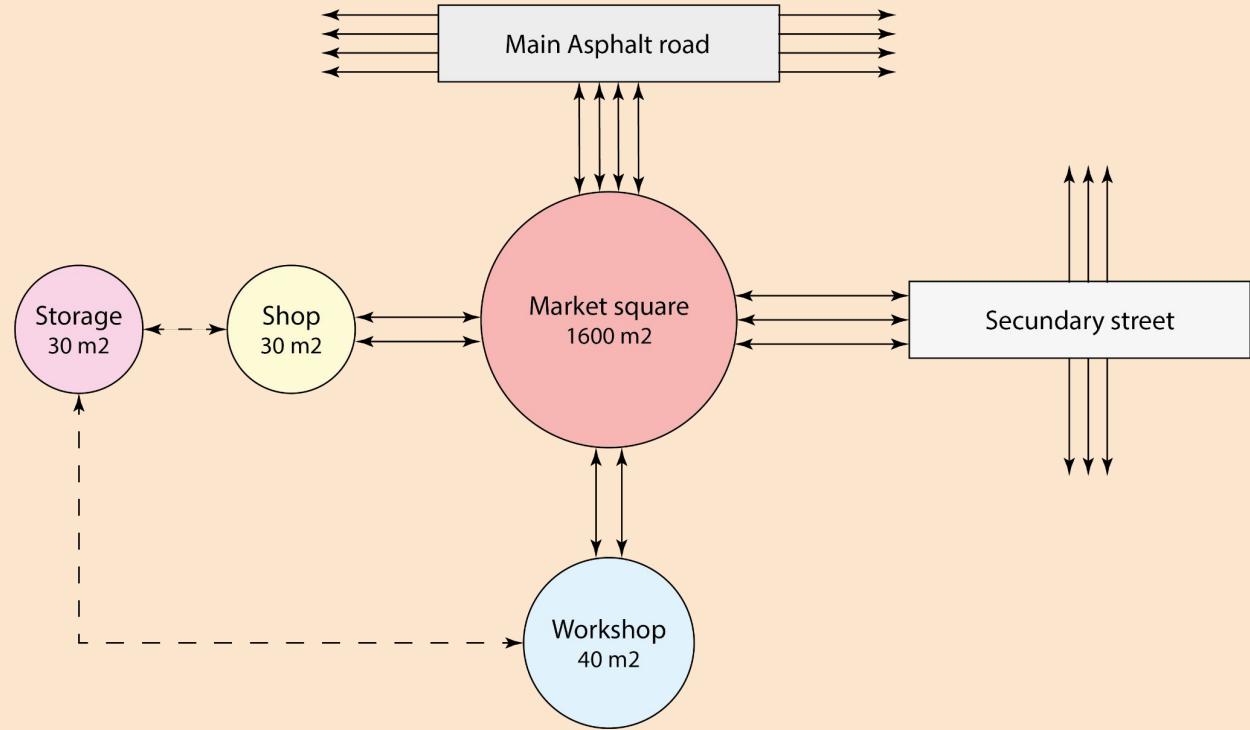


| | |
|---|---------------------------|
| A | Absolutely necessary |
| E | Especially important |
| I | Important and core |
| O | Ordinary |
| U | Unimportant |
| X | Prohibited or Undesirable |

5. Computational Design

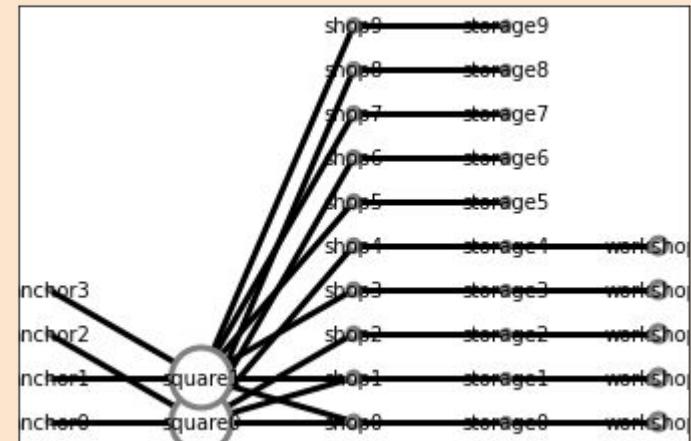
| Function | Area | Amount | Open/closed | Comments |
|---------------|----------|--------|-------------|--|
| Shop | 5 X 5m | | Closed | <ul style="list-style-type: none">• Visible entrance for pedestrians |
| Market square | 30 X 30m | | Open | |
| Water storage | | | Closed | <ul style="list-style-type: none">• Ventilate to prevent contamination• Create Compartments to prevent spreading of contamination• Use watertight mortar |
| Storage | 5 X 5m | | Closed | |
| Workshop | 10 X 5m | | Closed | |
| Cooling tower | 5X5m | | Semi-open | <ul style="list-style-type: none">• Higher than surrounding buildings• Opening in the West• Water used for evaporative cooling |

5. Computational Design

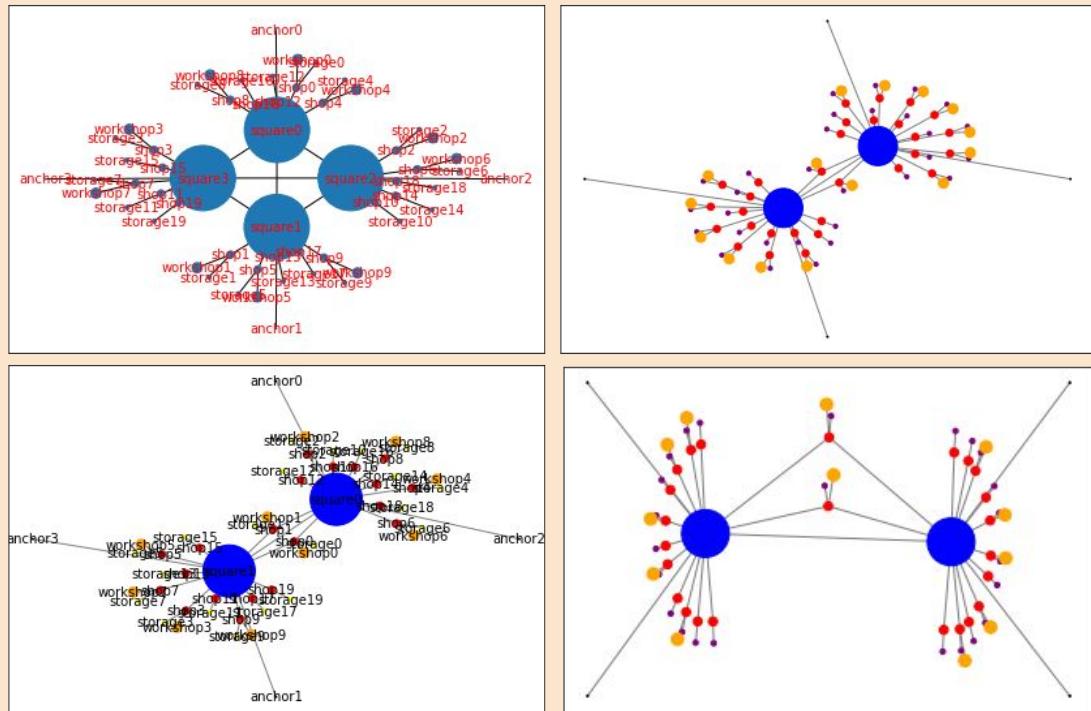
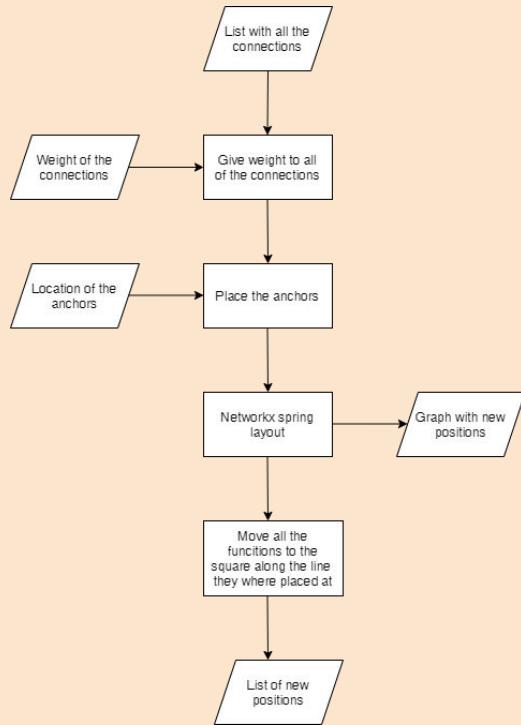


5. Computational Design

- Finding the connections.
- Initial layout to visually check for oddities.

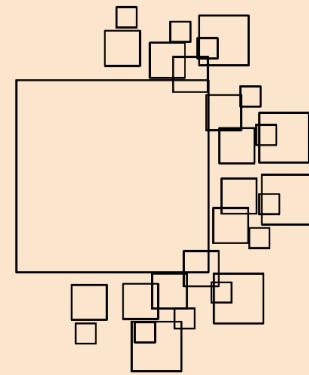
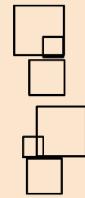
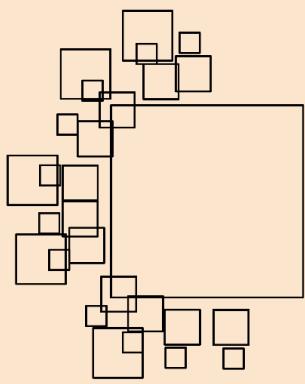


5. Computational Design

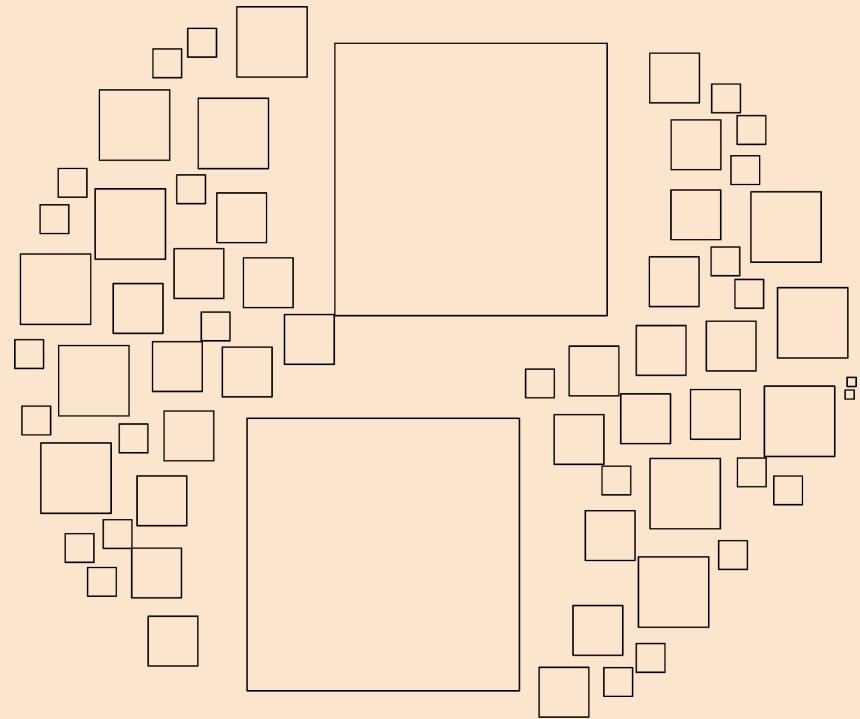
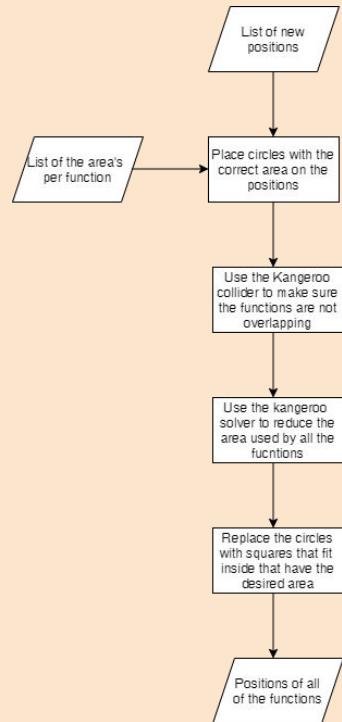


5. Computational Design

- Visualisation
bubble diagram in
Grasshopper.
- Exporting
coordinates.

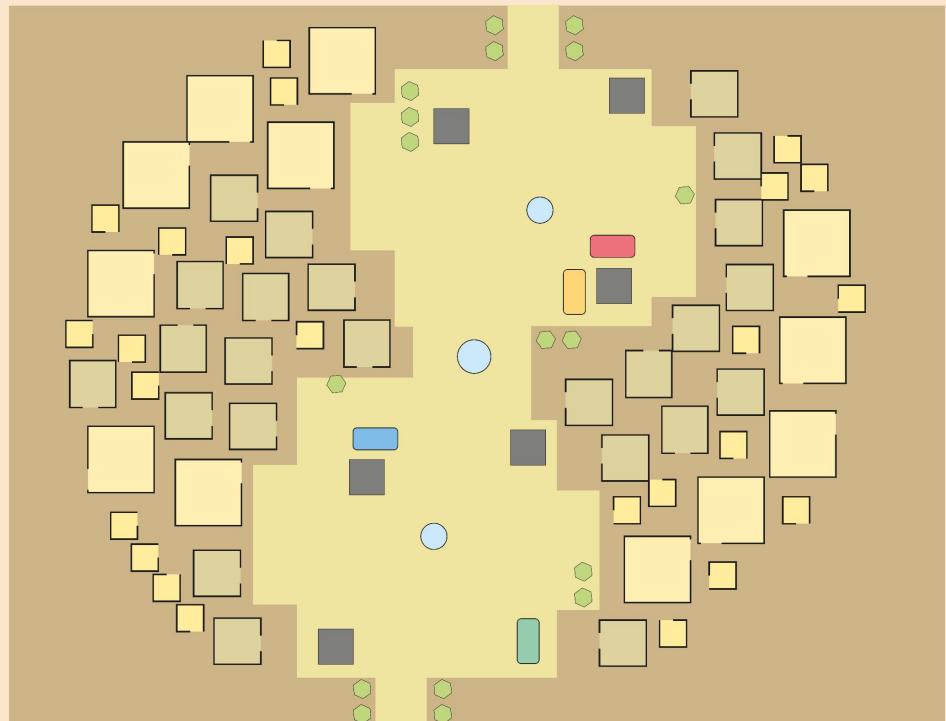


5. Computational Design



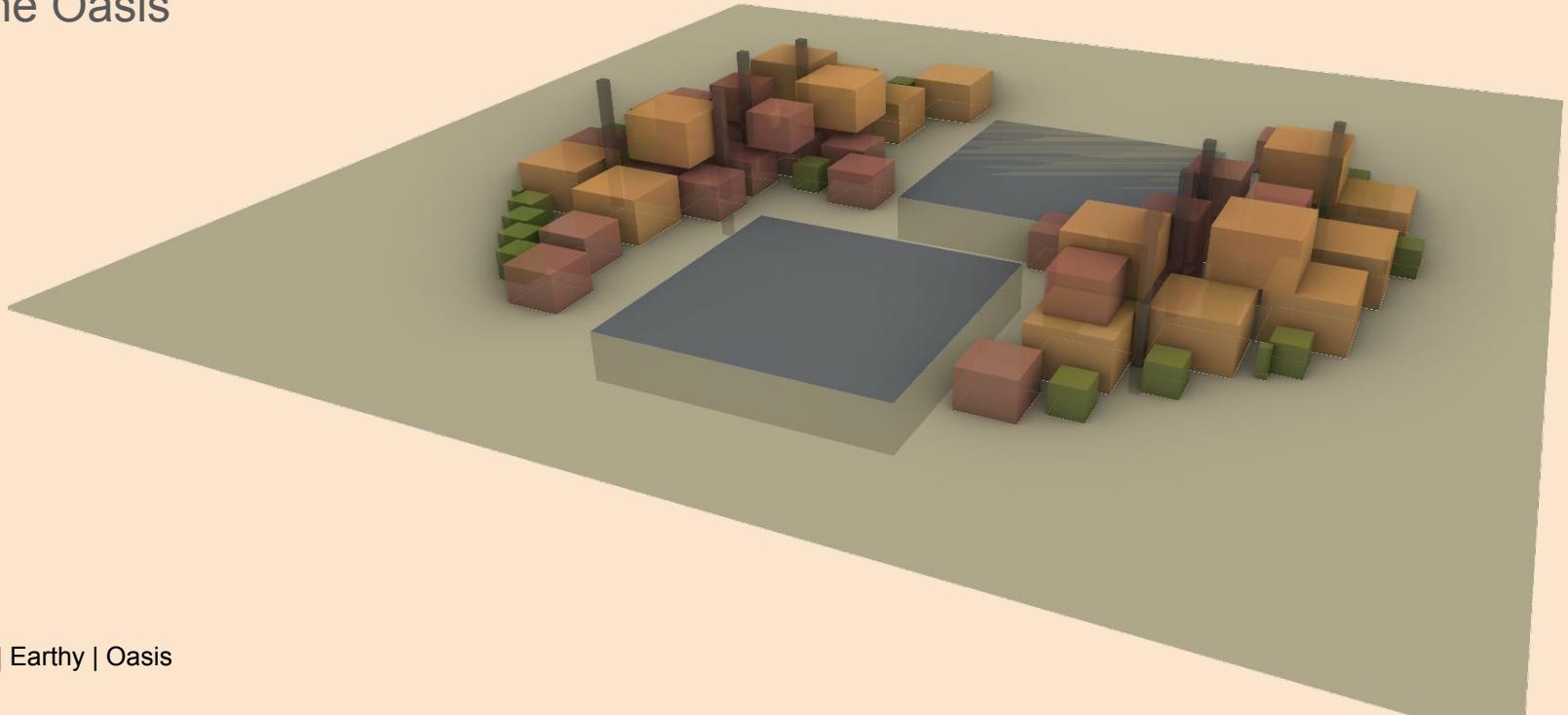
6. Generated design

- First floor plan of the Oasis.



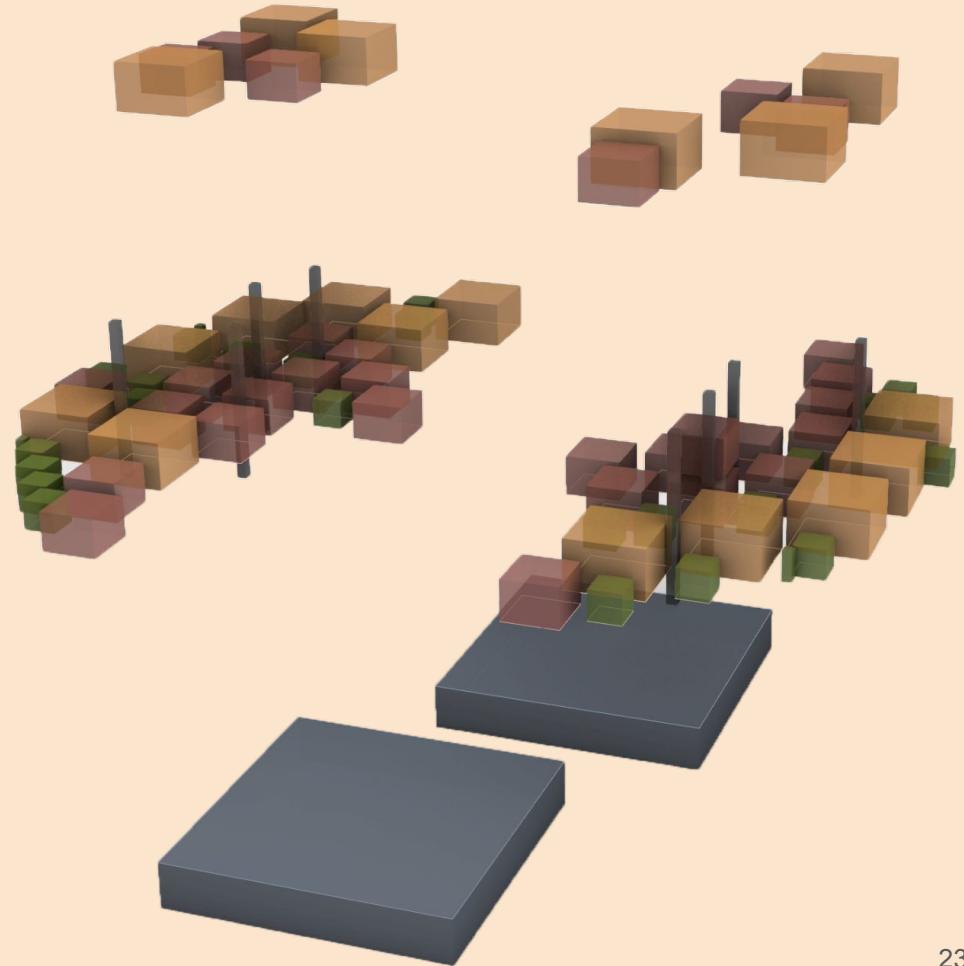
6. Generated design

- 3D visualisation of the Oasis

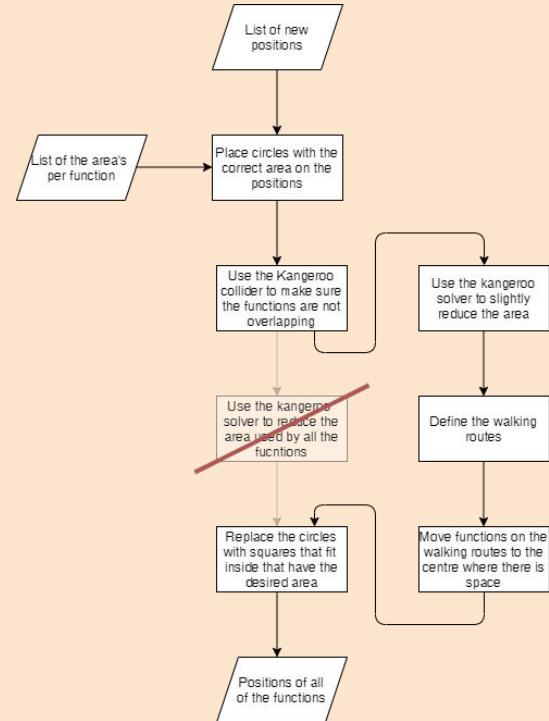
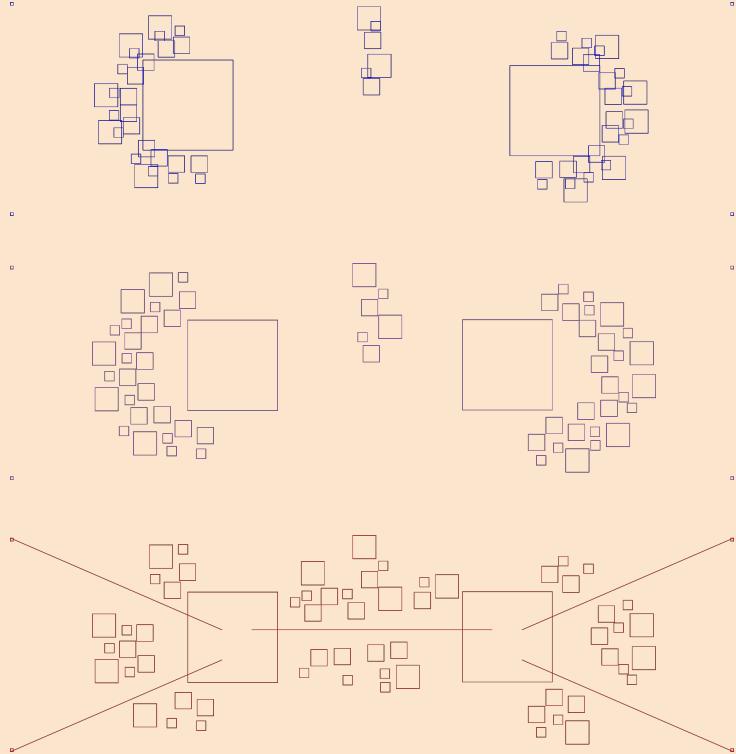


6. Generated design

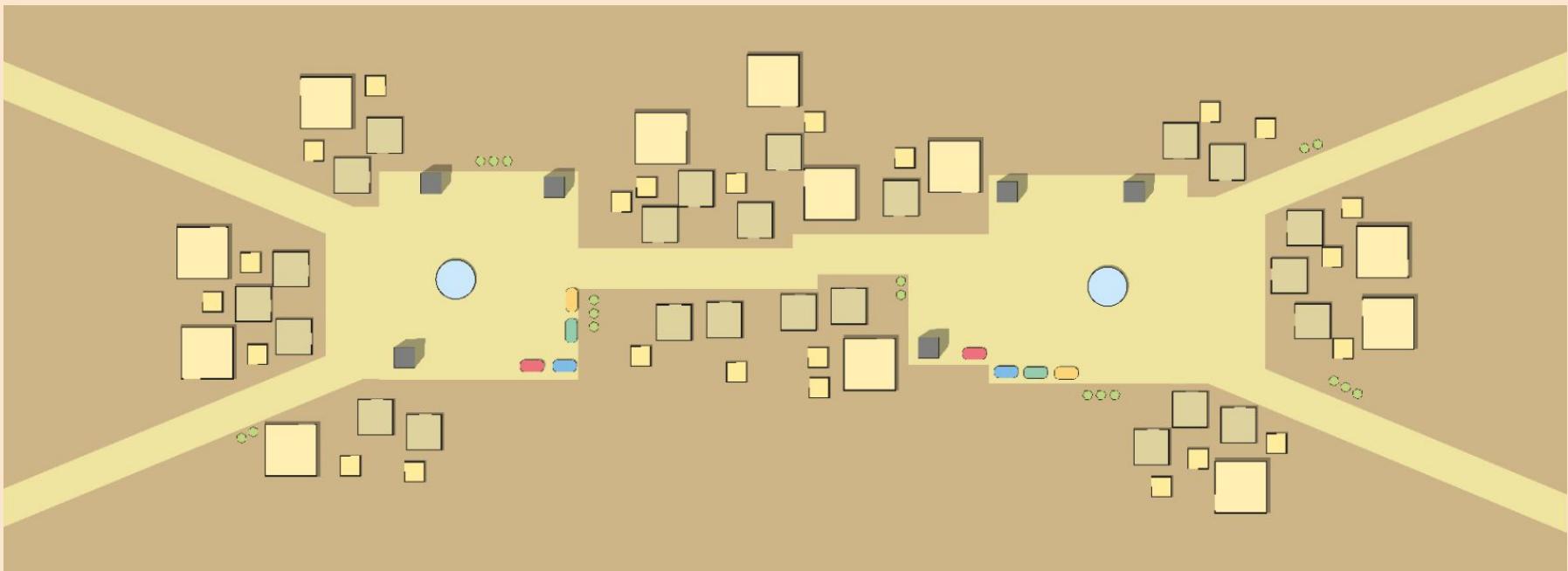
- Exploded view.
- Ventilation Towers.



6. Reworked computational design

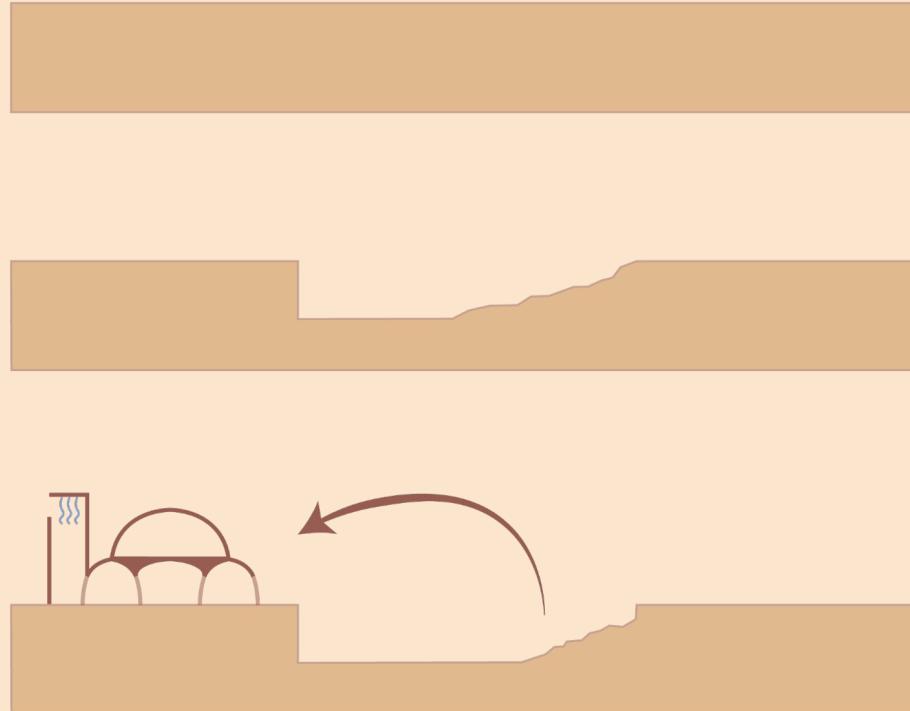


6. Generated design



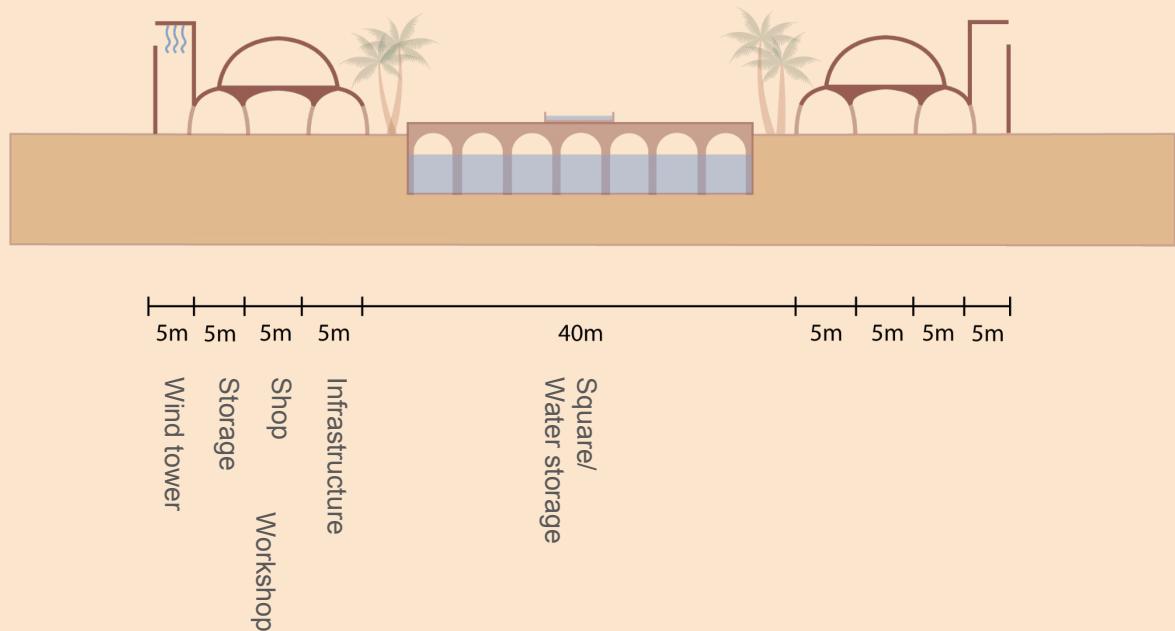
7. Shaping

- Area under the square is dug out
- Soil is used for making CEB for the building



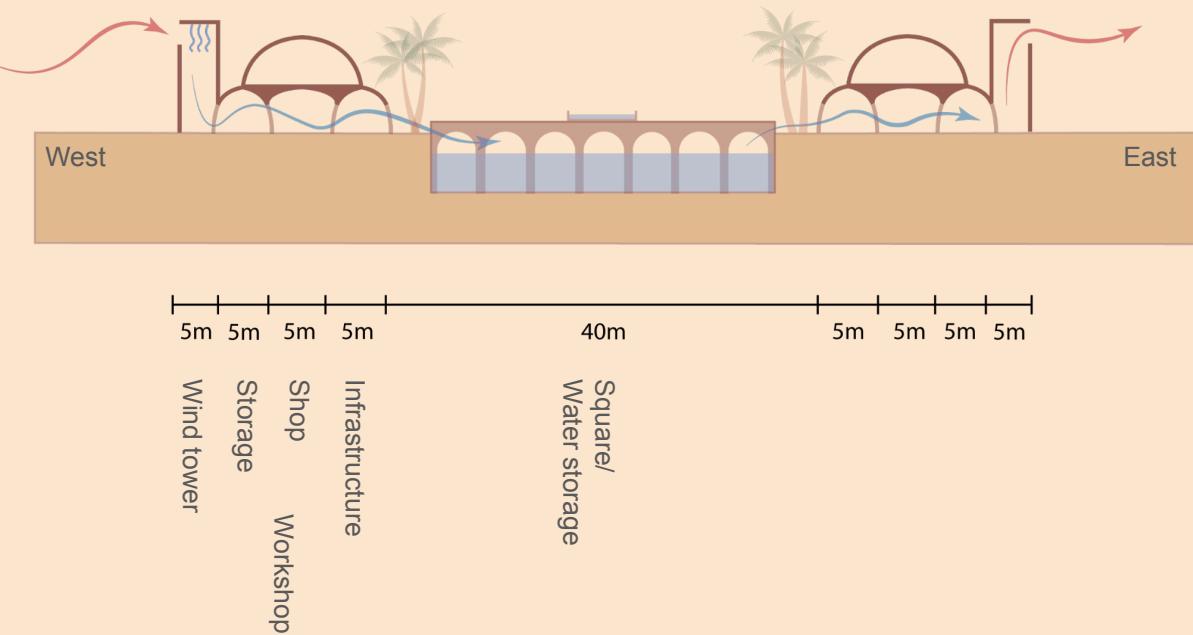
7. Shaping

- A market square is built on top of the hole.
- Water is stored under the market square.



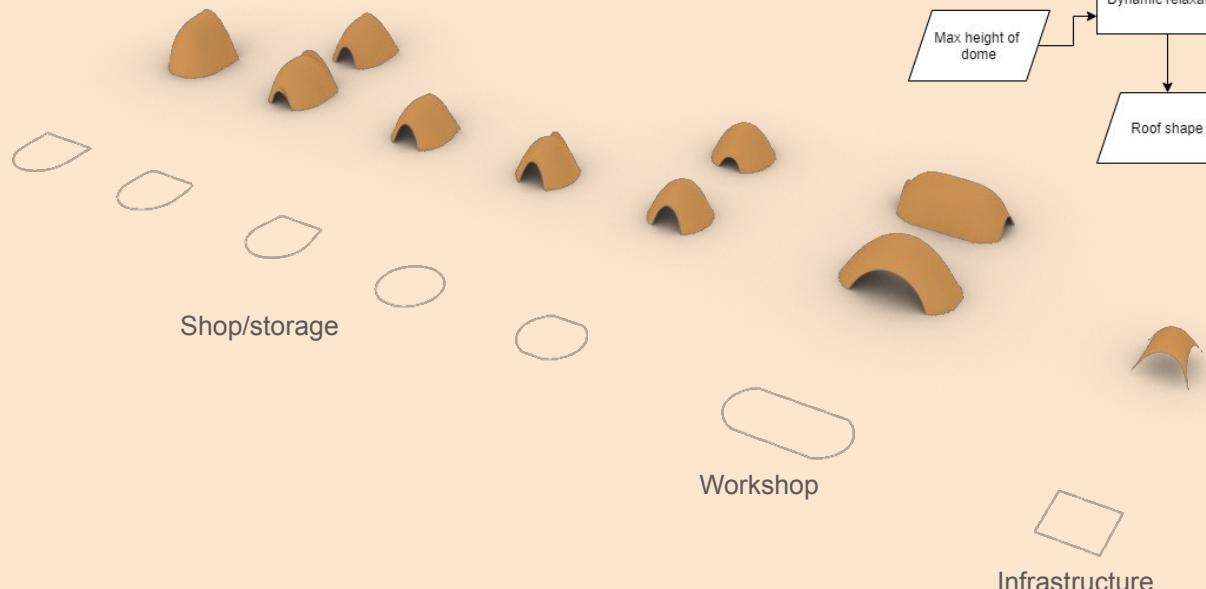
7. Shaping

- Main wind direction from the West
- Wind towers create a draft in the building
- Wet cloth in the tower in the west create evaporative cooling
- Draft goes over the water to cool the building and prevent contamination of the water



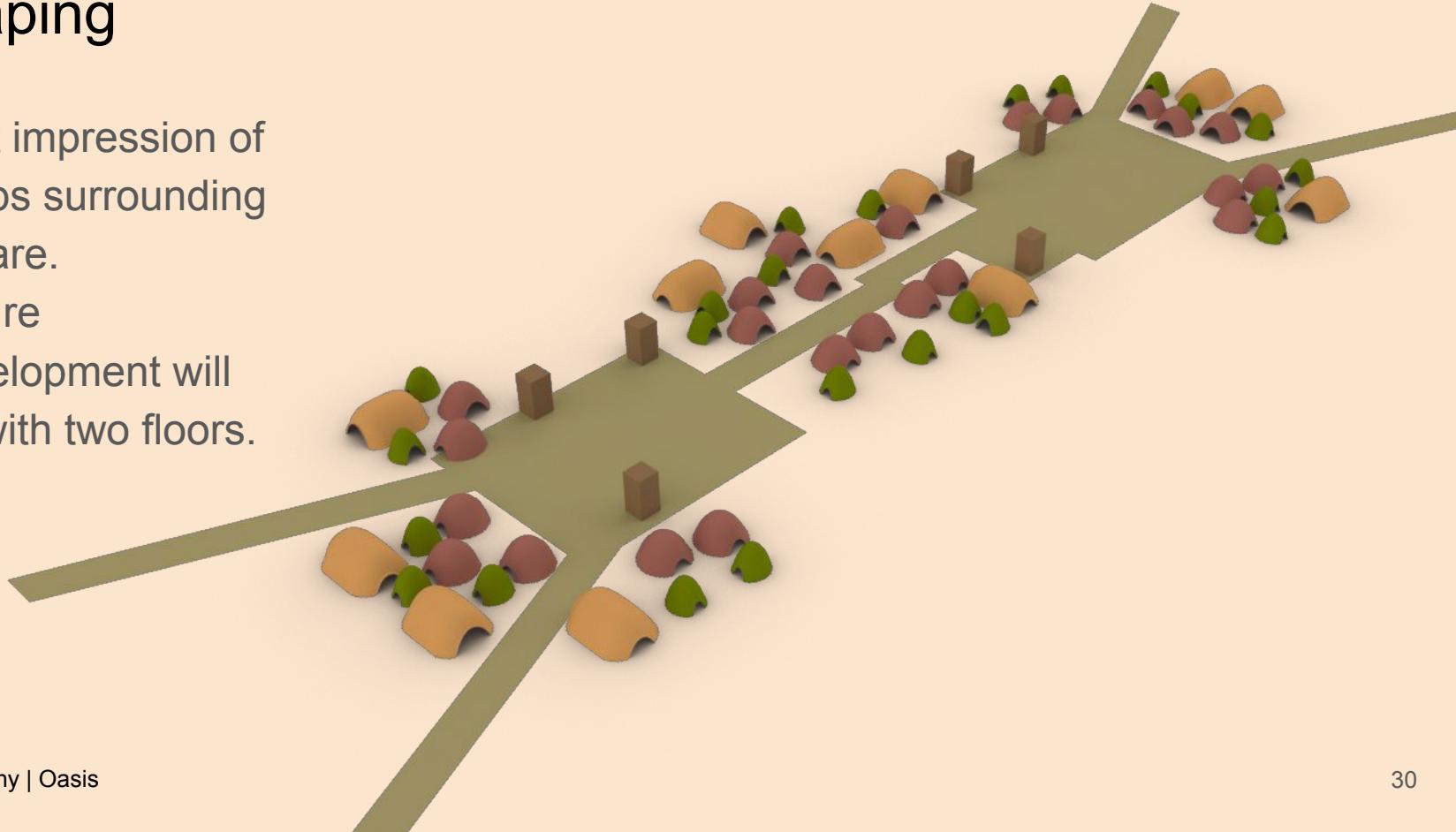
7. Shaping

- Shops need an front and back entrance.
- Set max height to 4m.
- Improve material usage by optimizing footprint.



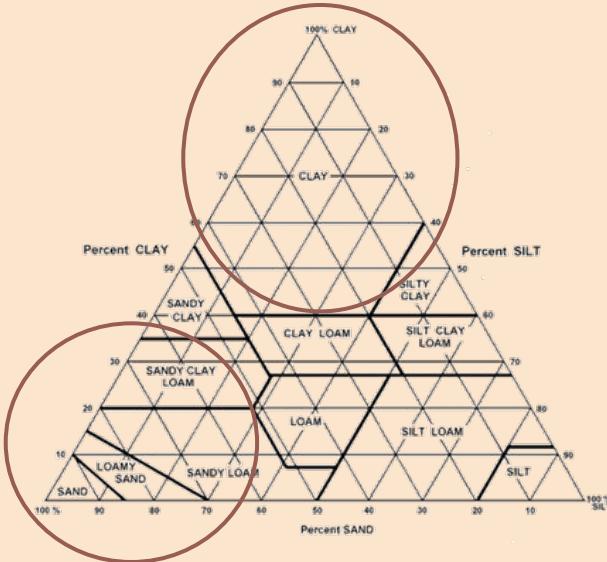
7. Shaping

- First impression of shops surrounding square.
- Future development will be with two floors.



8. Materials

- Soil contains mostly sand and clay. (van Vilsteren, 2019).
- Because of this soil, the camp becomes muddy during rain.



<https://www.pngkey.com/maxpic/u2e6r5y3u2u2i1o0/>



<https://www.esri.com/arcgis-blog/products/story-maps/sharing-collaboration/helping-syrian-refugees-share-their-stories-with-esri-story-maps/>

8. Materials

- Suitable for bricks.
- Massive production of bricks is easier.
- Optimisation of the shape
- Connection by shape or mud mortar.

COB / Adobe



<https://cornellcob.co.uk/about-us/blog/120-how-to-make-a-cob-brick.html>

CEB (Compressed Earth Blocks)



<http://eartharchitecture.org/?tag=compressed-earth-block>

8. Materials

- Bricks are suitable for domes and walls.
- Well behaviour in compression.
- CEB for compression



<https://www.dwf.org/en/english/woodless-construction-earth-vault-dome-roofing>



<https://www.dwf.org/en/english/woodless-construction-earth-vault-dome-roofing>

8. Materials

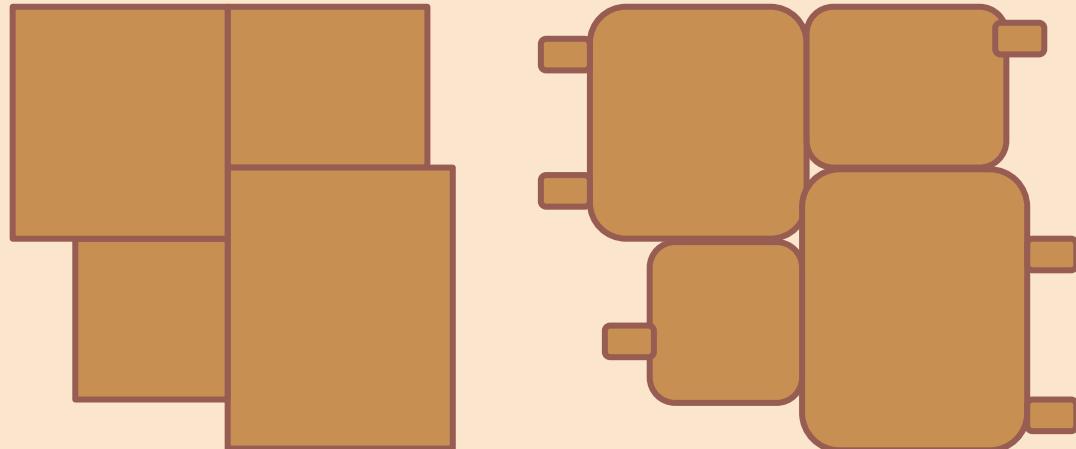
- Use mortar in the water storage to ensure waterproofing
- Sarooj was a mortar used in the Ab Anbar
 - ingredients:
 - 6 parts clay
 - 4 parts Lime
 - Egg whites
 - Straw
 - Goat hair
 - Ash



<https://iranindepth.com/ab-anbar-a-masterpiece-of-ancient-water-reservoir-architecture/>

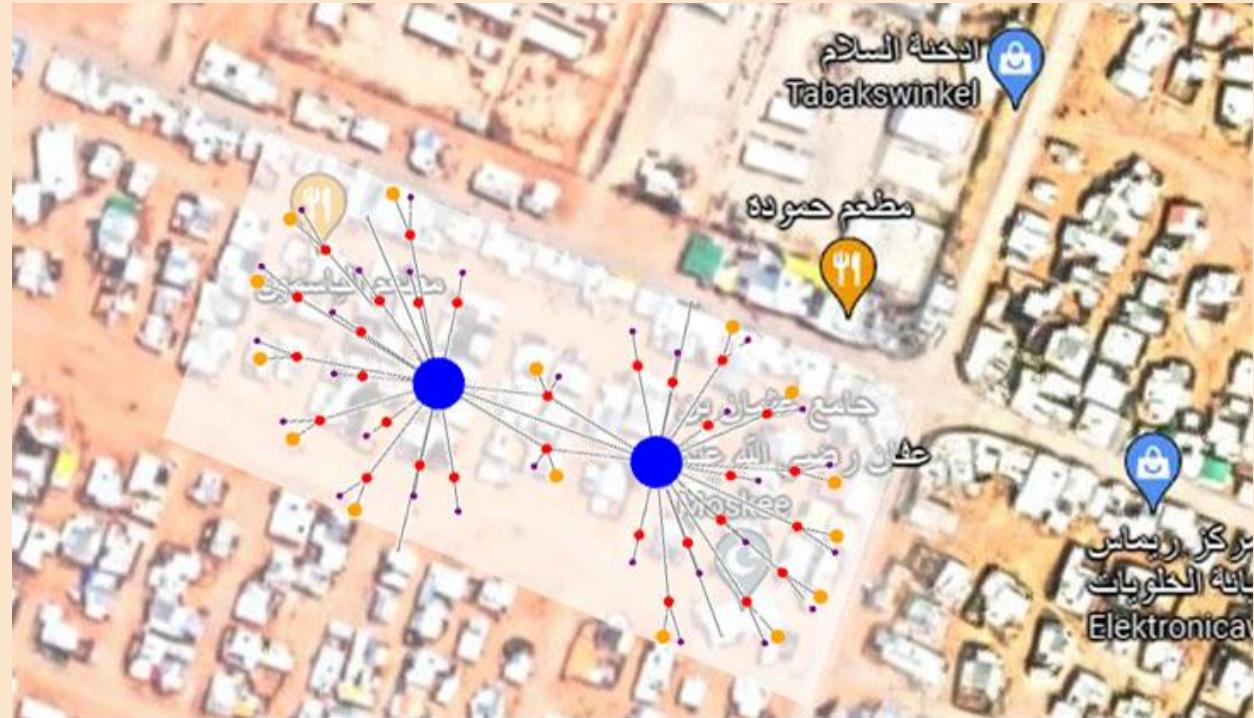
9. Challenges

- Avoid orthogonal shapes.
- Reduce lateral forces in corners
- Place extra stability if needed.



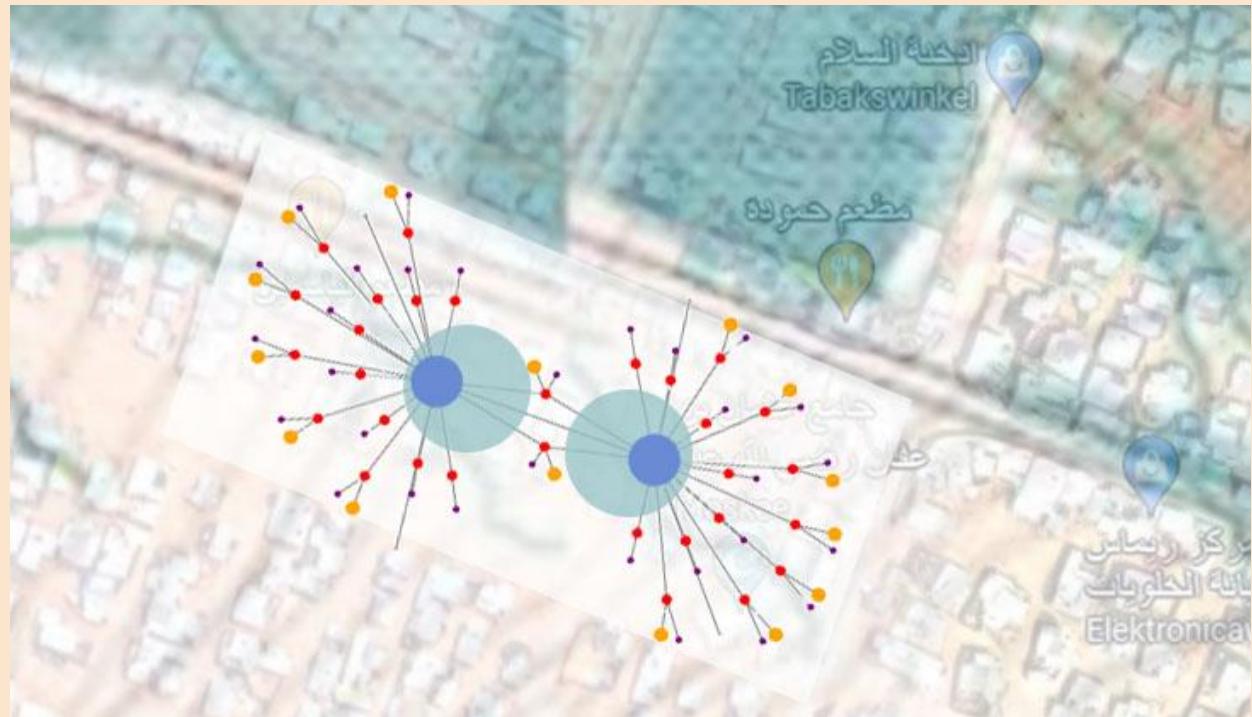
9. Challenges

- Find the shape that fits into the infrastructure of the camp.
- Scale the dynamic relaxation into the plot on the site



9. Challenges

- A lot of flooded area.
- Not that much area to store water in the bazaar.
- Optimise area of water storage in the urban context.



9. Challenges

- Width of paths is researched and designed.
- Social control by night.

