ARCHITECTURE ENVIRONMENT

Lana City

Prepared by : Ahmed Nabil
Rana Amer

Supervised by : Mrs. Fenk Dlawar

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- Weather Analysis
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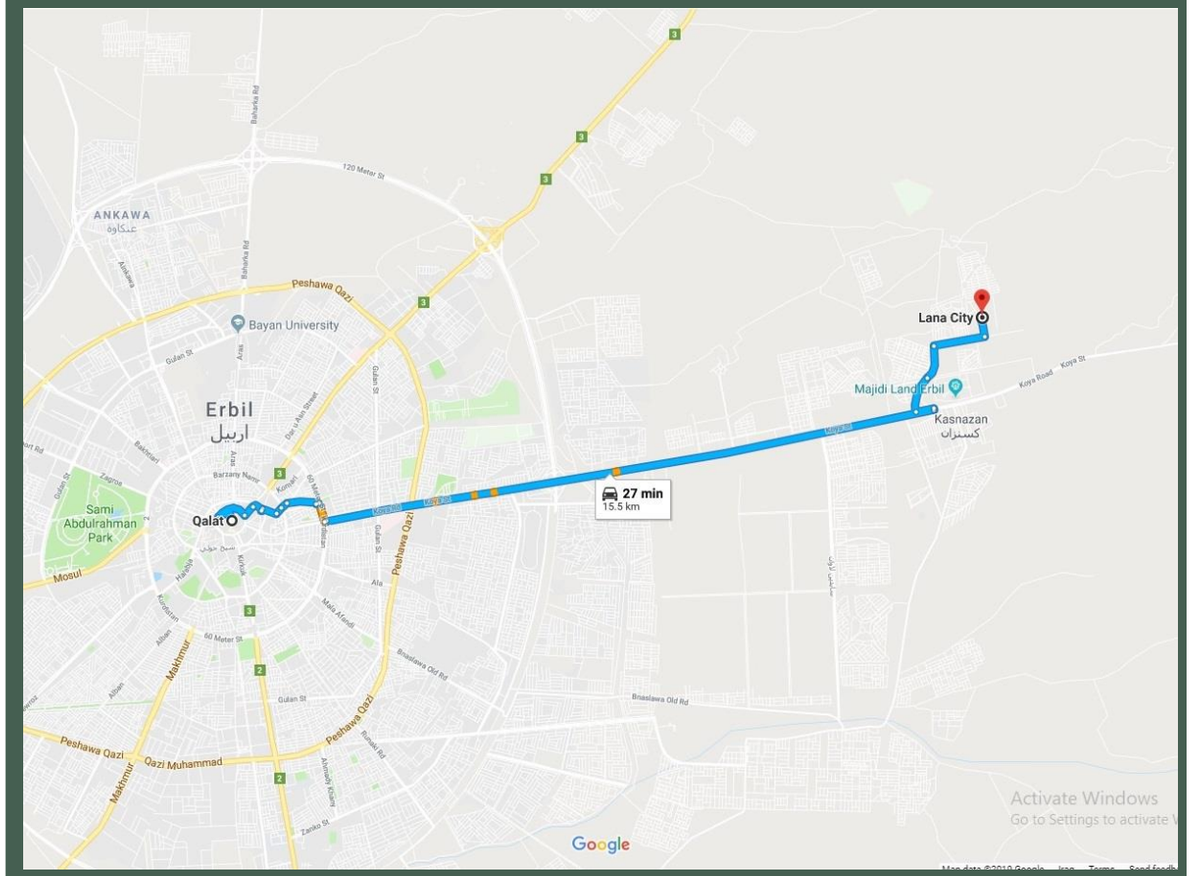
Location Of Site

Lana City (Erbil)
Address: Iraq – Kurdistan – Erbil – Kasnazan Road – Near Majidi Land

Lana City (Erbil)
Area : 252,000 m^2
Abstract of the project:
Investment

From Qalat to Lana City : 15.5 km ,
27 min by vehicles



3D and Plan

OZAL CITY

ATLANTIC CITY

ZHIAN CITY

STREET 30M

STREET 20M

(1) Primary school area:6224 m²

(2) Kindergarten and Nursery area:2738 m²

(3) Masjid area:3272 m²

Well

water tank

5 2150 m²

4 2185 m²

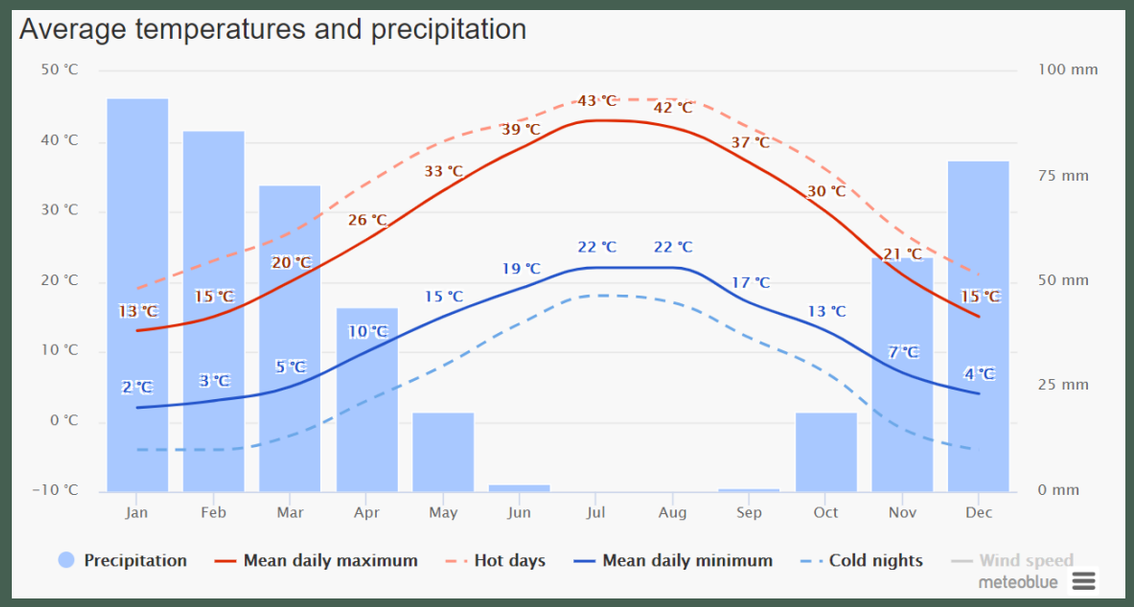
6 578 m²

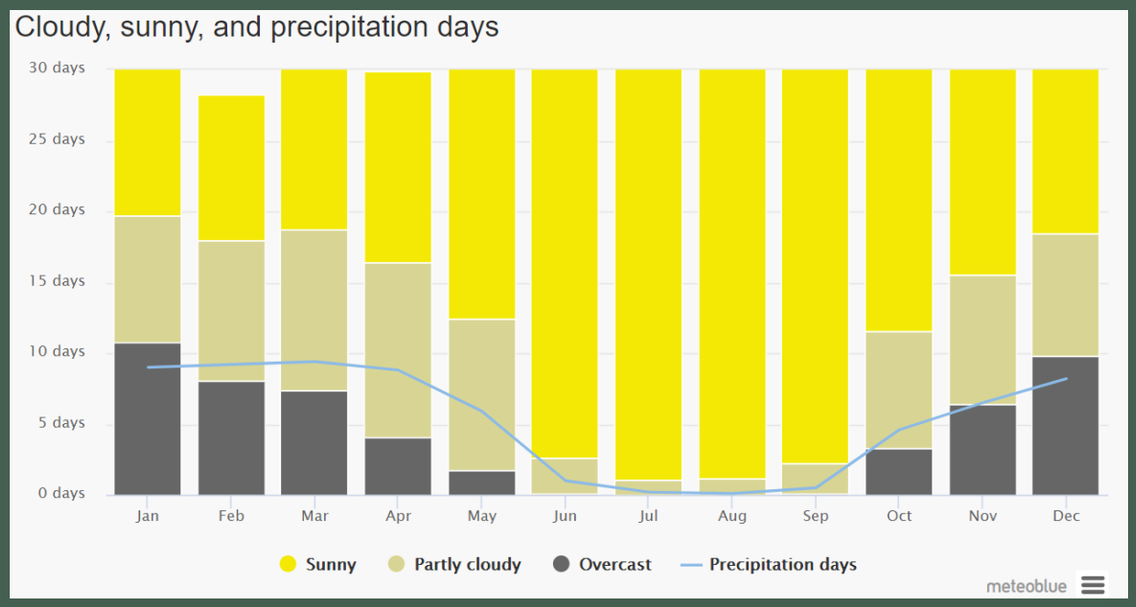
Generators

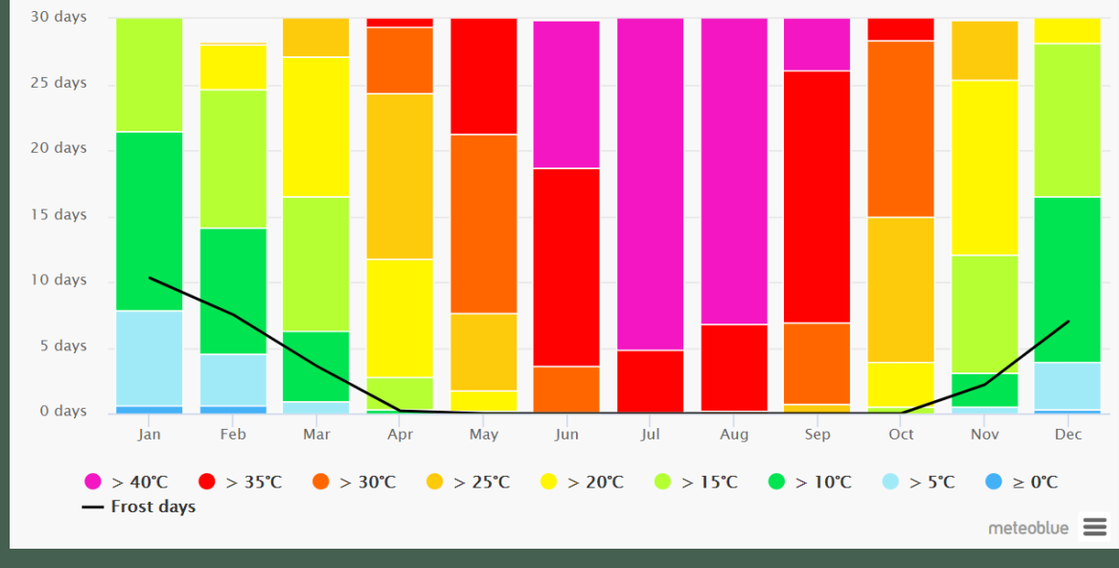
B-1 B-2 B-3 B-4 B-5 B-6 B-7 B-8 B-9 B-10 B-11 B-12 B-13 B-14 B-15 B-16 B-17 B-18 B-19 B-20 B-21 B-22 B-25 B-26 B-27 B-28 B-29 B-30 B-31 B-32

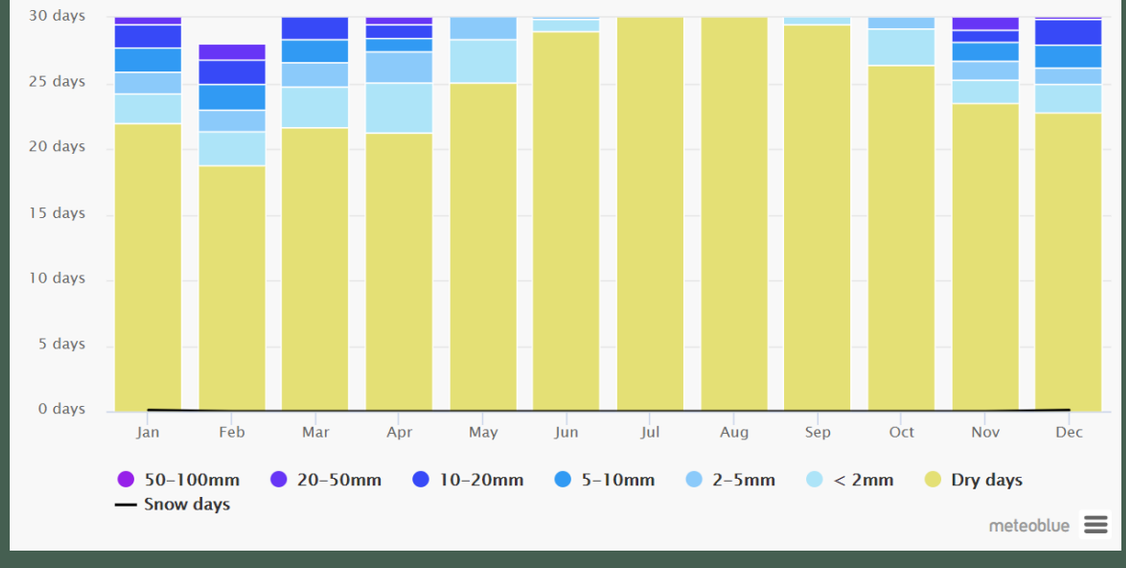
DASHTI BAHASHT PROJECT

Weather of Lana City



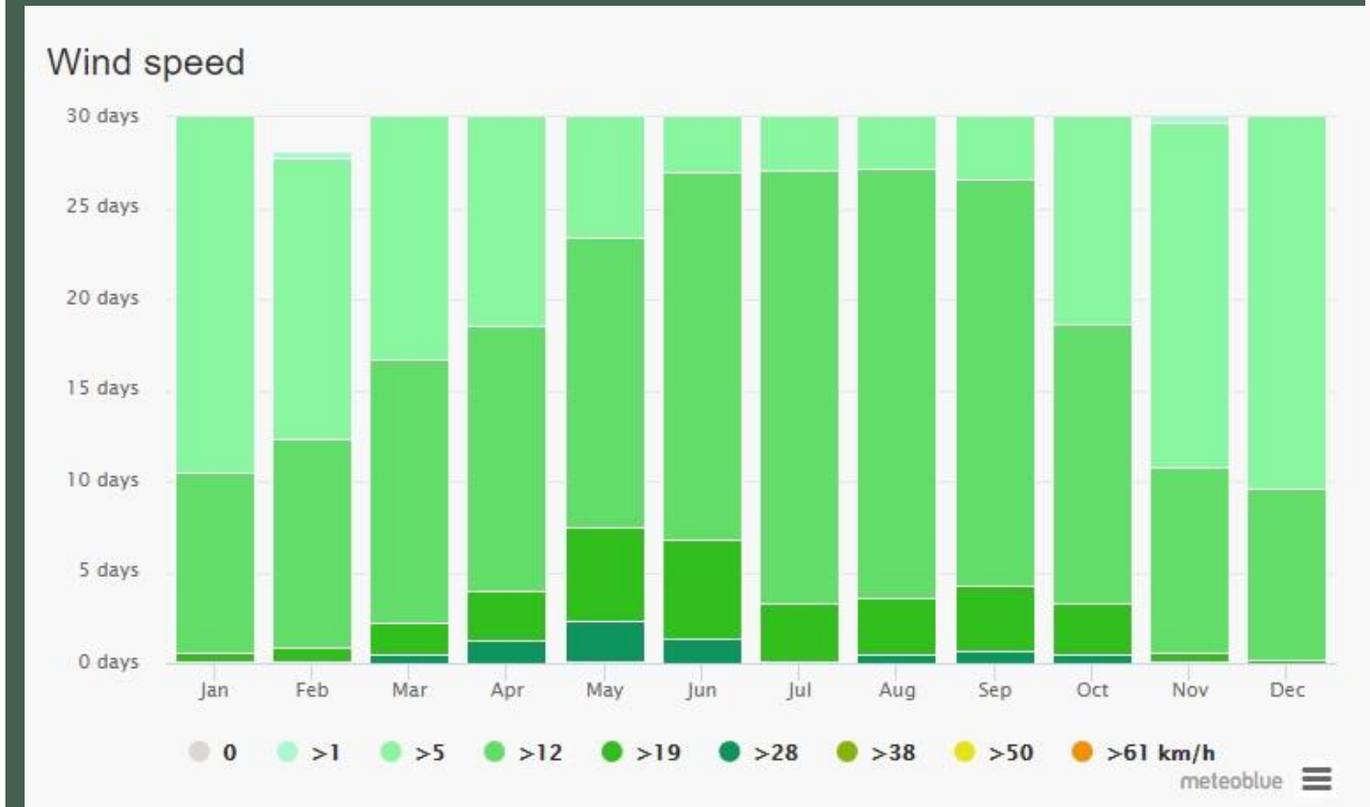


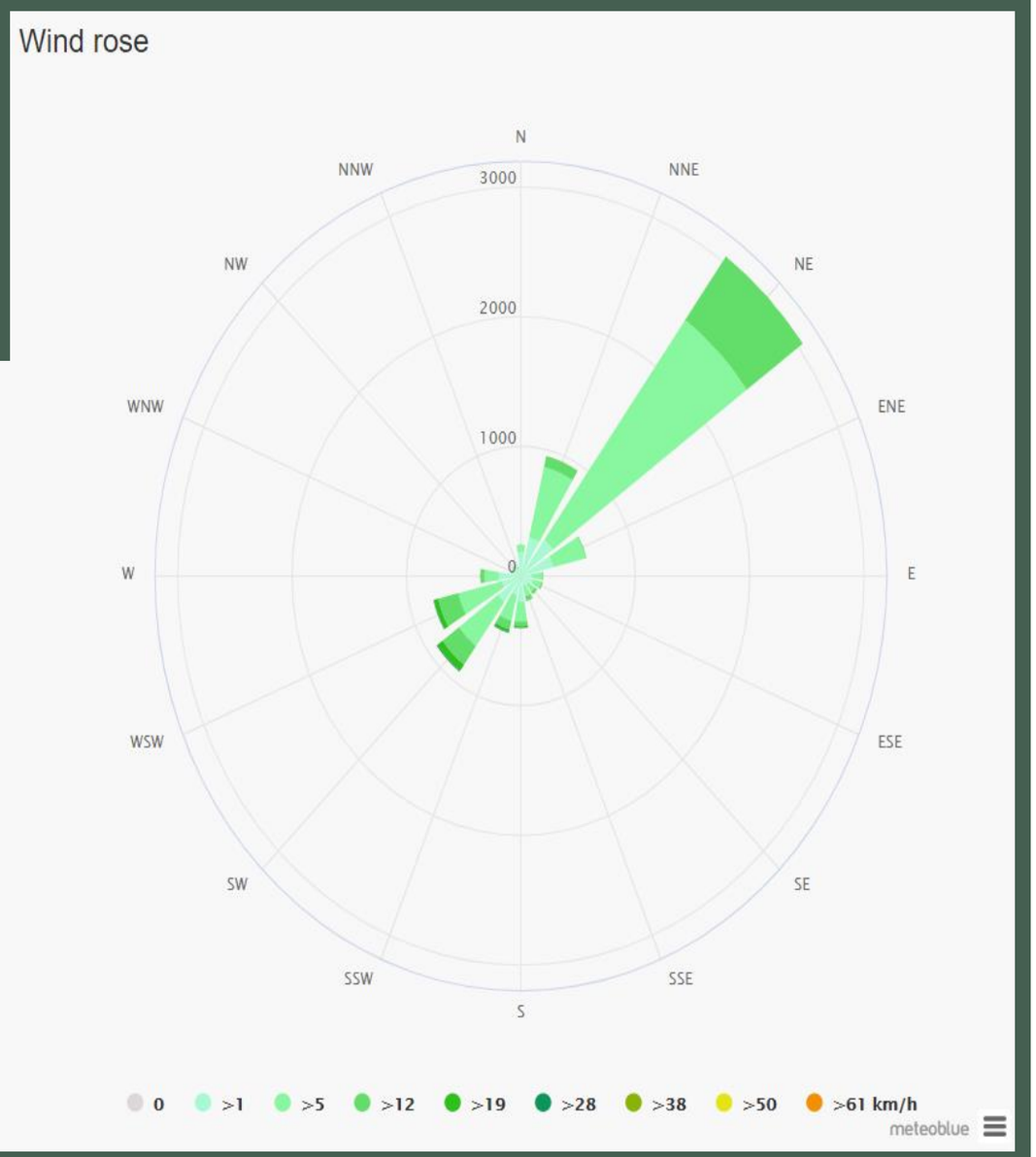




Weather of Lana City

Wind Speed In Erbil

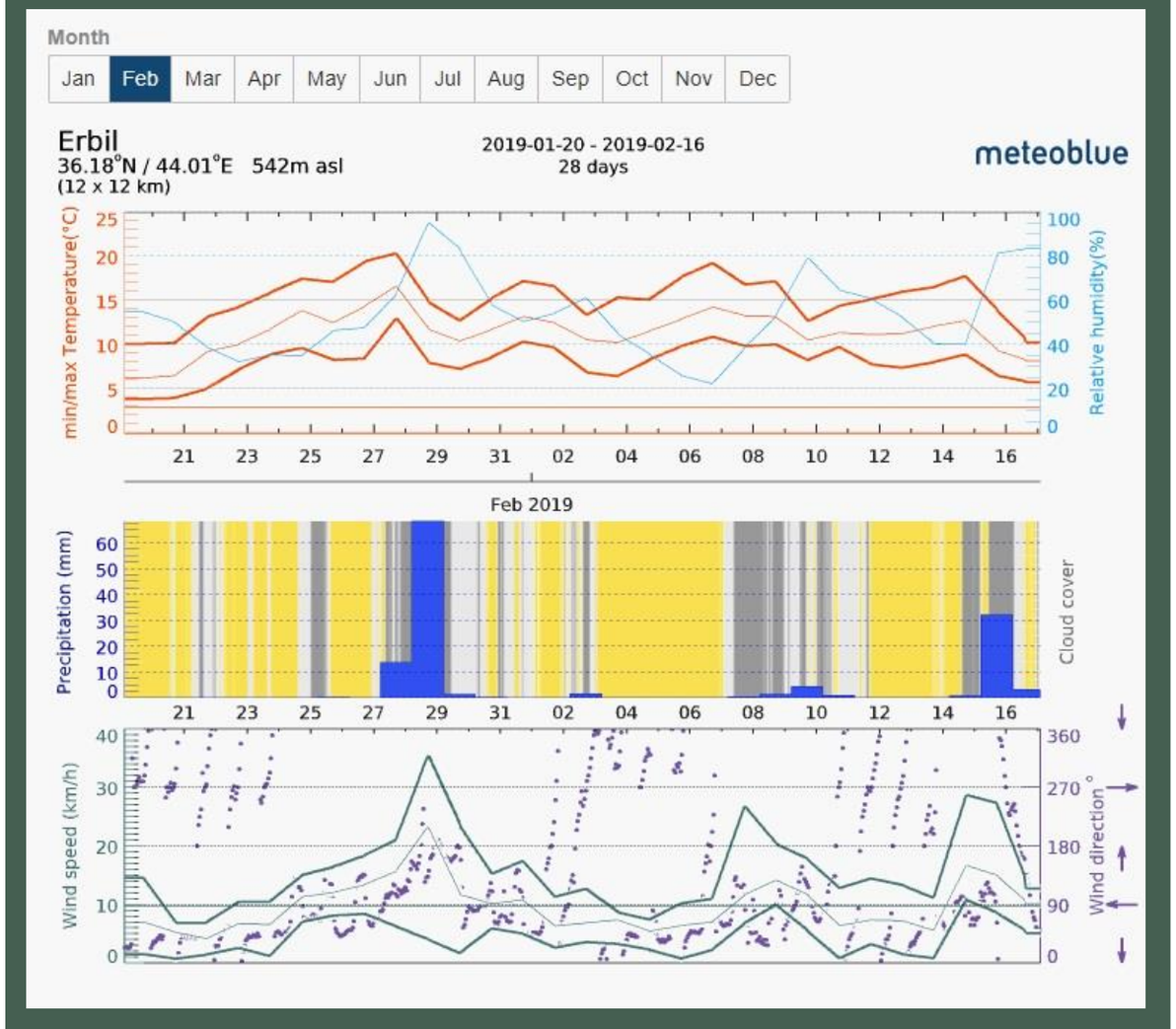


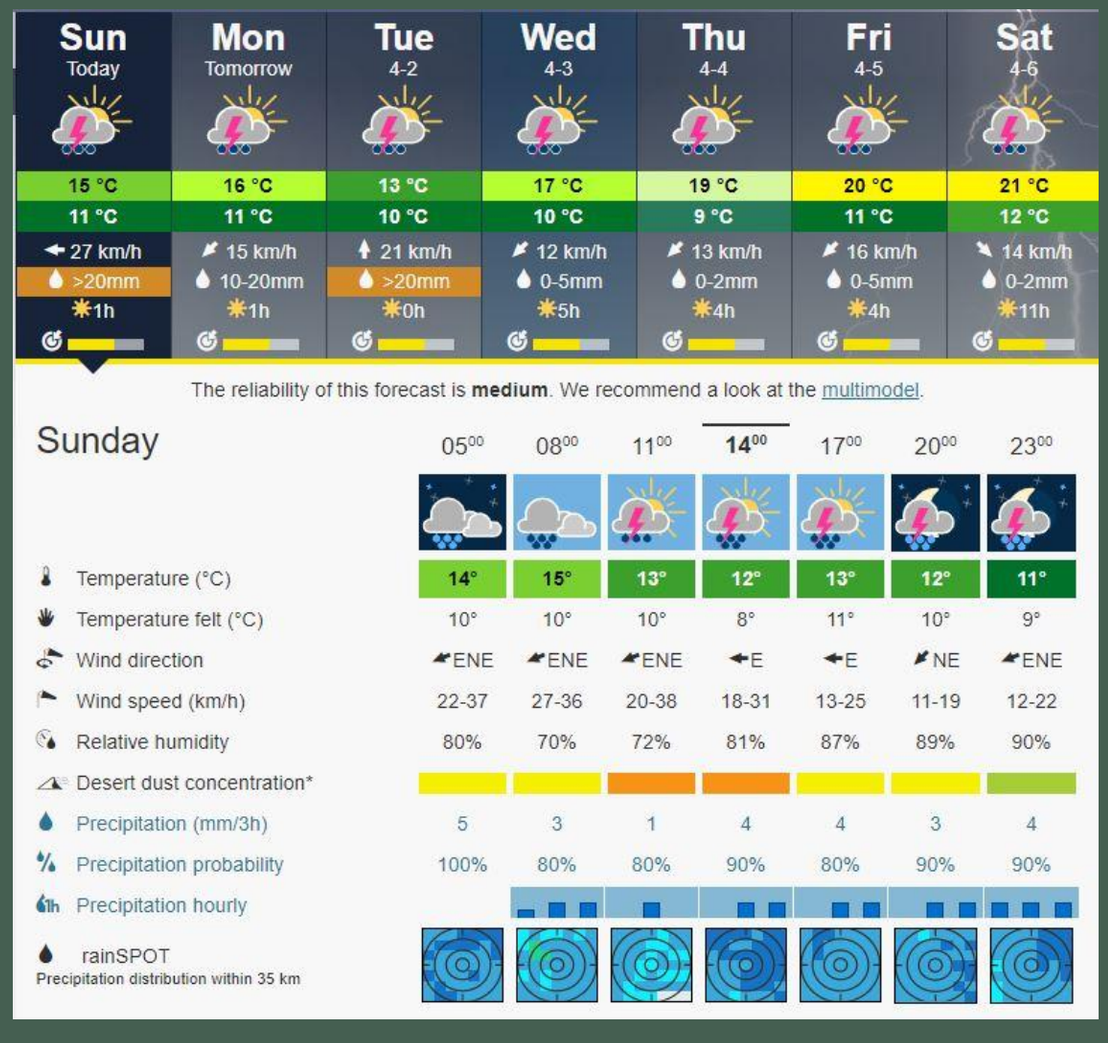


7 day Weather In Kasnazan – Lana City

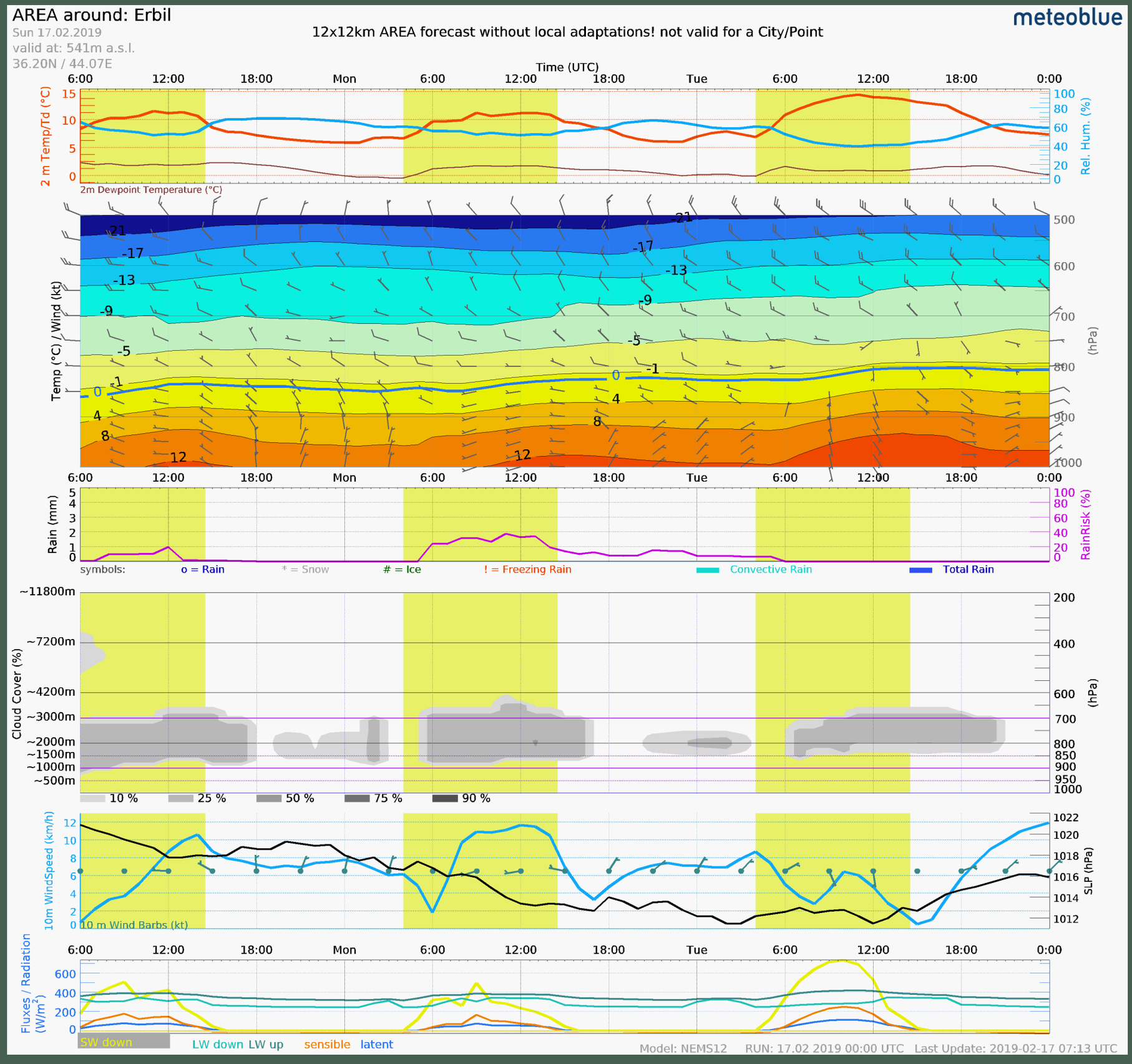
Temperature
Precipitation
Wind speed

From :
Sunday 31/3 To
Sunday 7/4



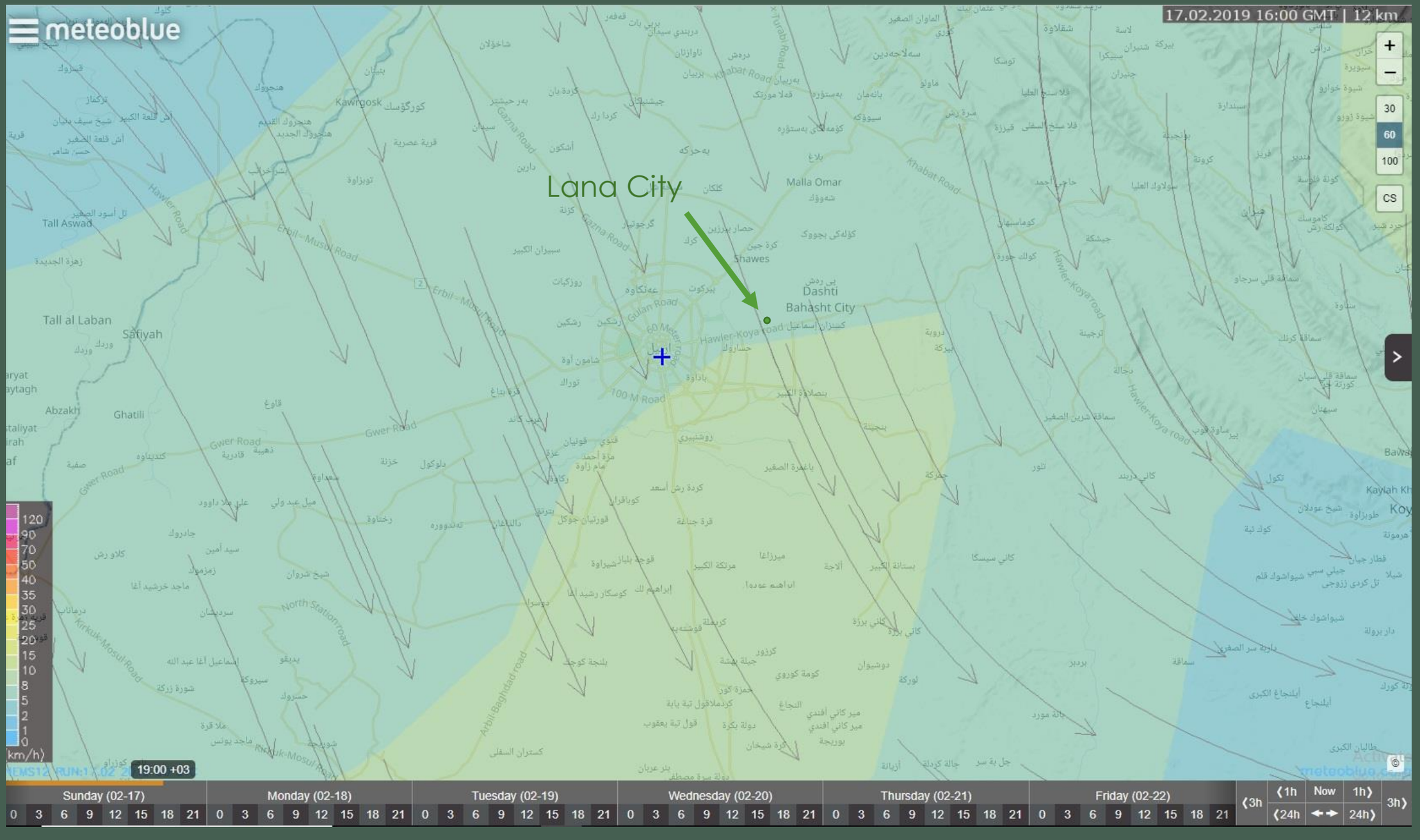


Air In Erbil

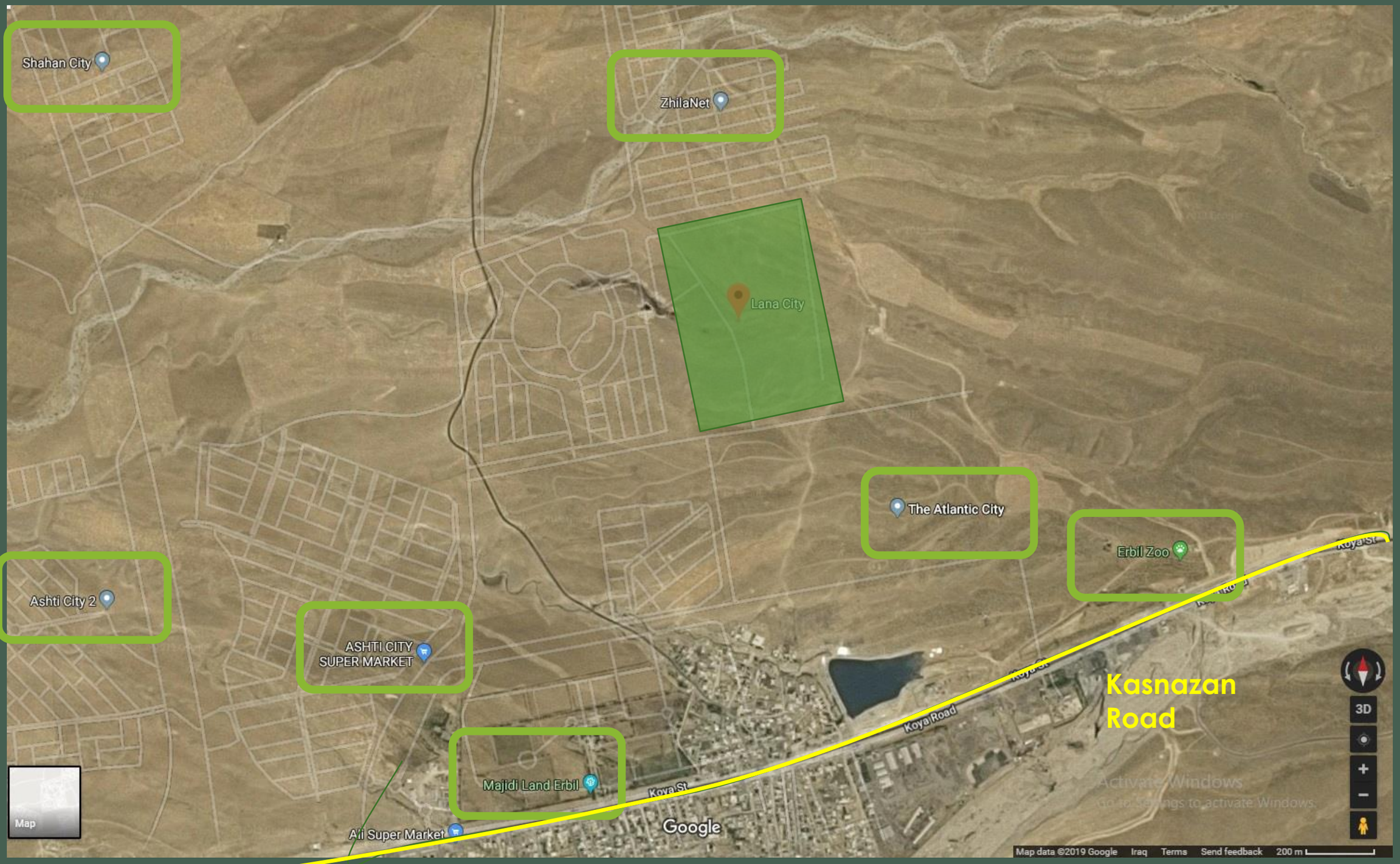

AREA around: Erbil
Sun 17.02.2019
valid at: 541m a.s.l.
36.20N / 44.07E
12x12km AREA forecast without local adaptations! not valid for a City/Point
meteoblue
Time (UTC)
6:00 12:00 18:00 Mon 6:00 12:00 18:00 Tue 6:00 12:00 18:00 0:00
2 m Temp/Td (°C)
Rel. Hum. (%)
2m Dewpoint Temperature (°C)
Temp (°C) / Wind (kt)
(hPa)
Rain (mm)
RainRisk (%)
symbols: o = Rain * = Snow # = Ice ! = Freezing Rain Convective Rain Total Rain
Cloud Cover (%)
~11800m
~7200m
~4200m
~3000m
~2000m
~1500m
~1000m
~500m
10 % 25 % 50 % 75 % 90 %
10m WindSpeed (km/h)
10 m Wind Barbs (kt)
SLP (hPa)
Fluxes / Radiation (W/m²)
SW down LW down LW up sensible latent
Model: NEMS12 RUN: 17.02 2019 00:00 UTC Last Update: 2019-02-17 07:13 UTC

Weather Of Lana City

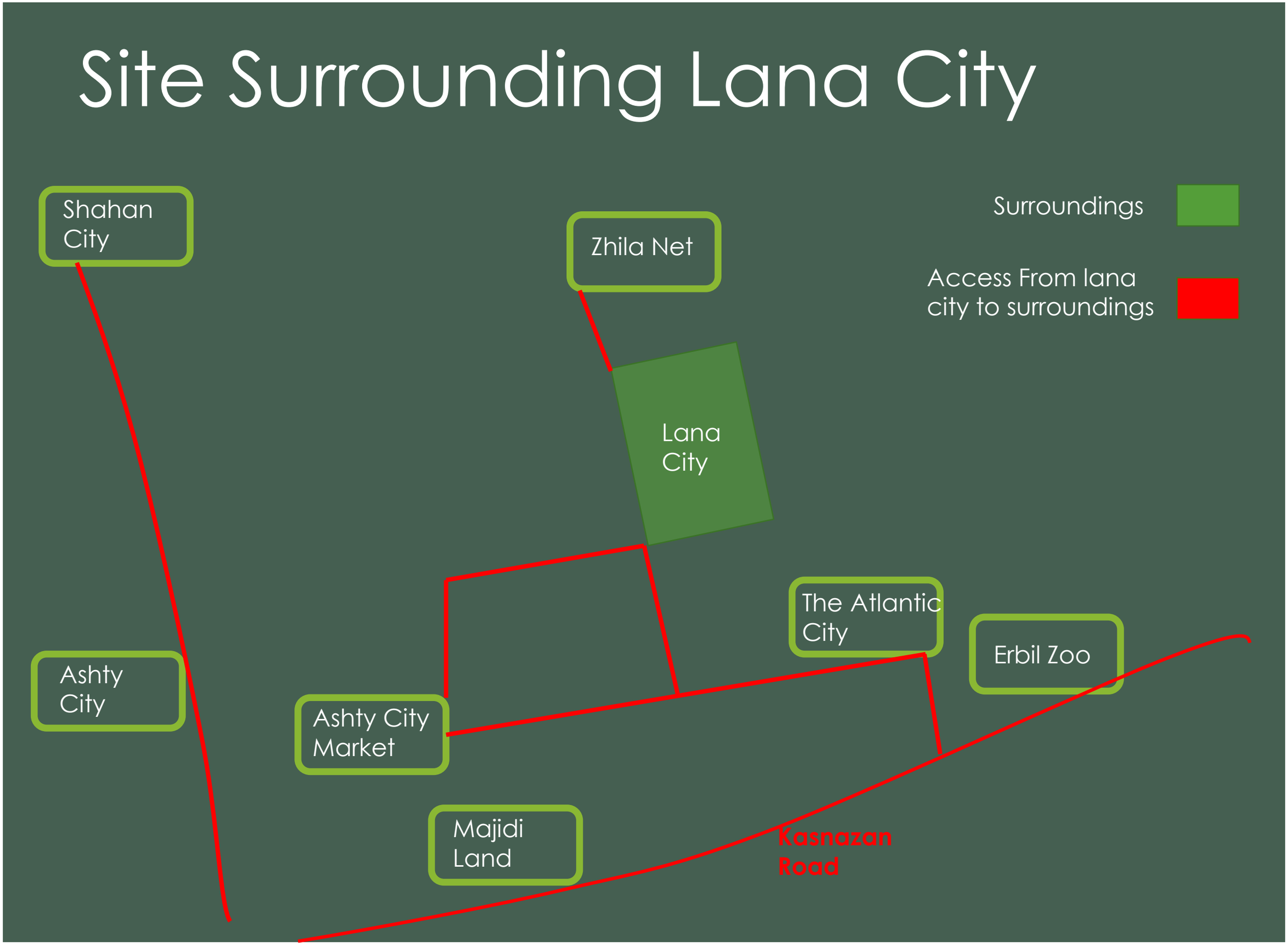
Wind Direction



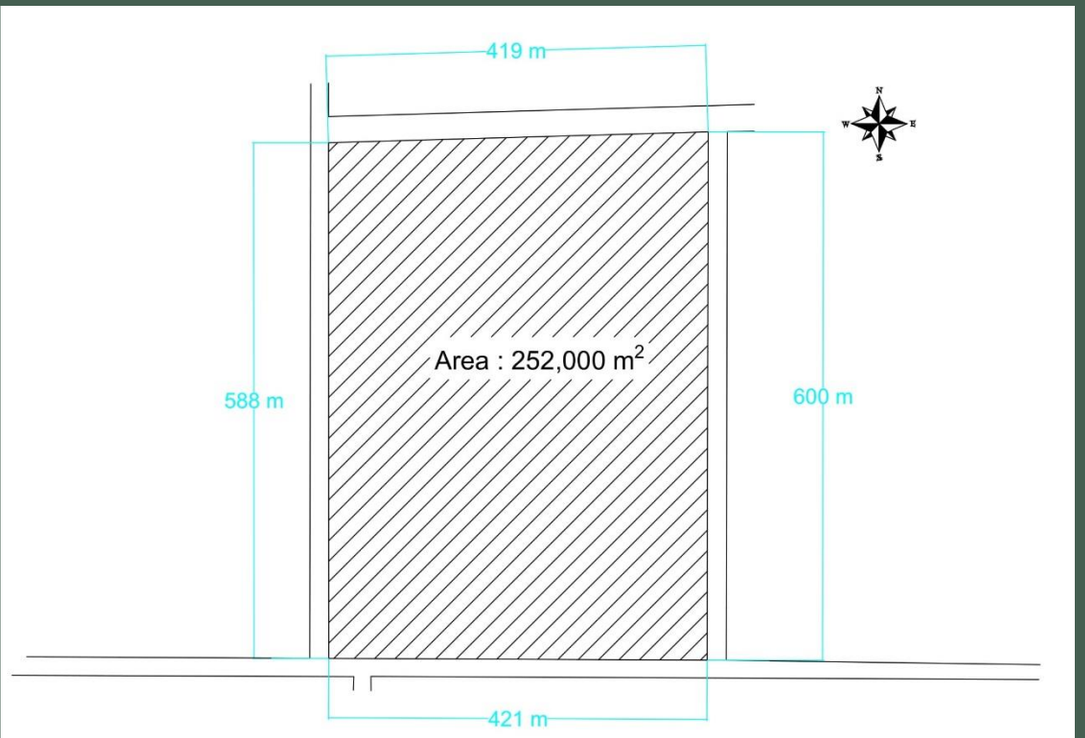
Site Surrounding Lana City



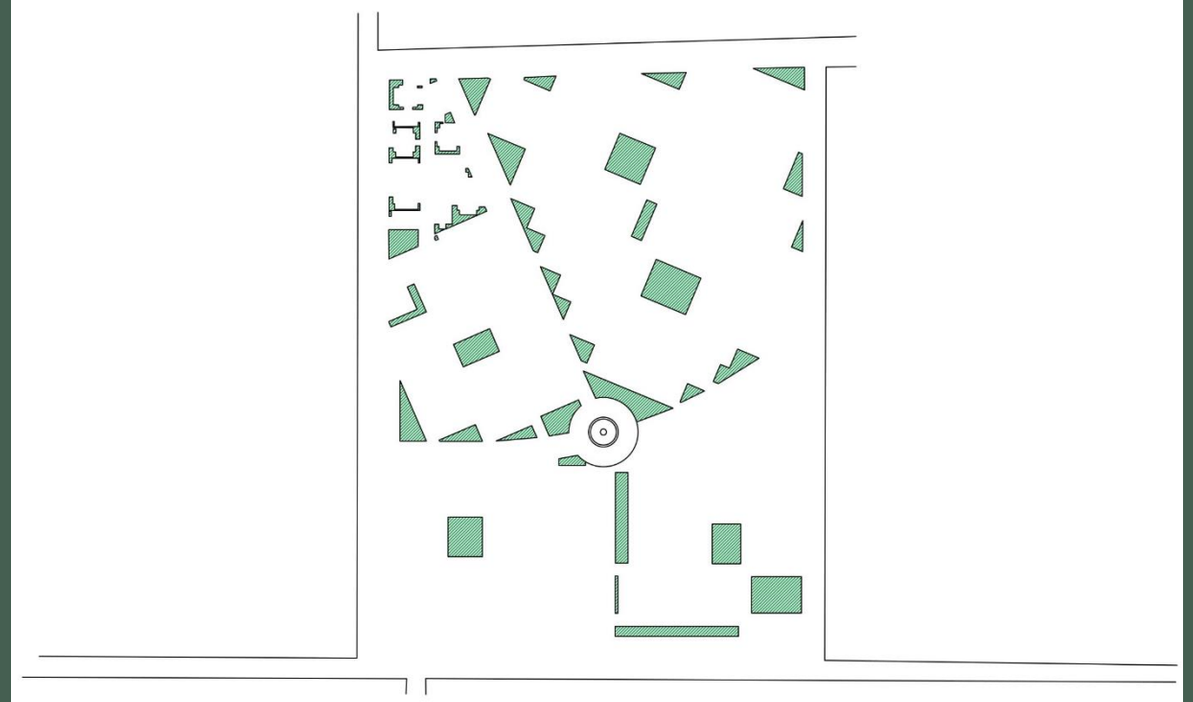
Site Surrounding Lana City



Site Analysis



Site Dimension – Orientation

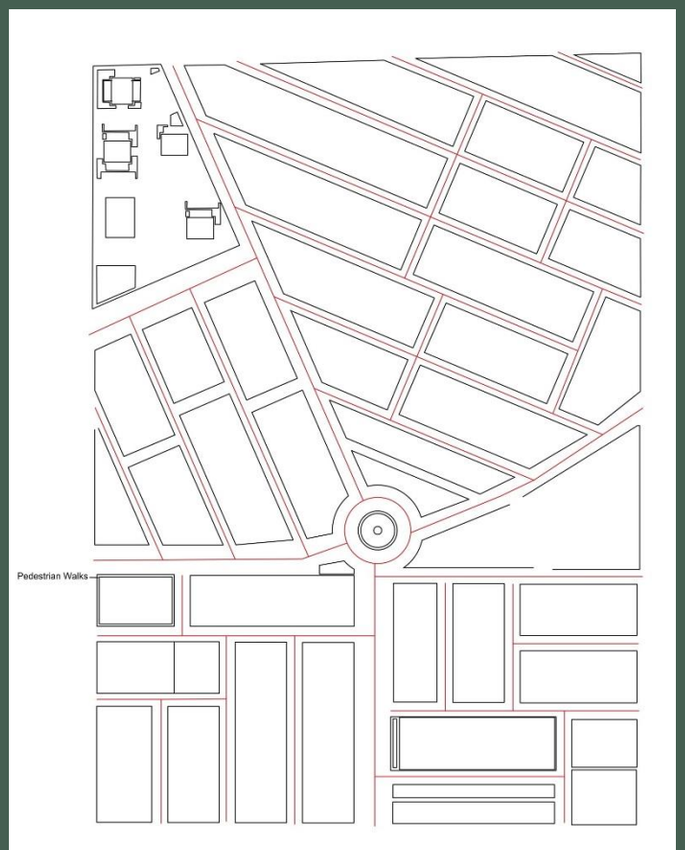


Site Vegetation

Site Analysis

Site Traffic

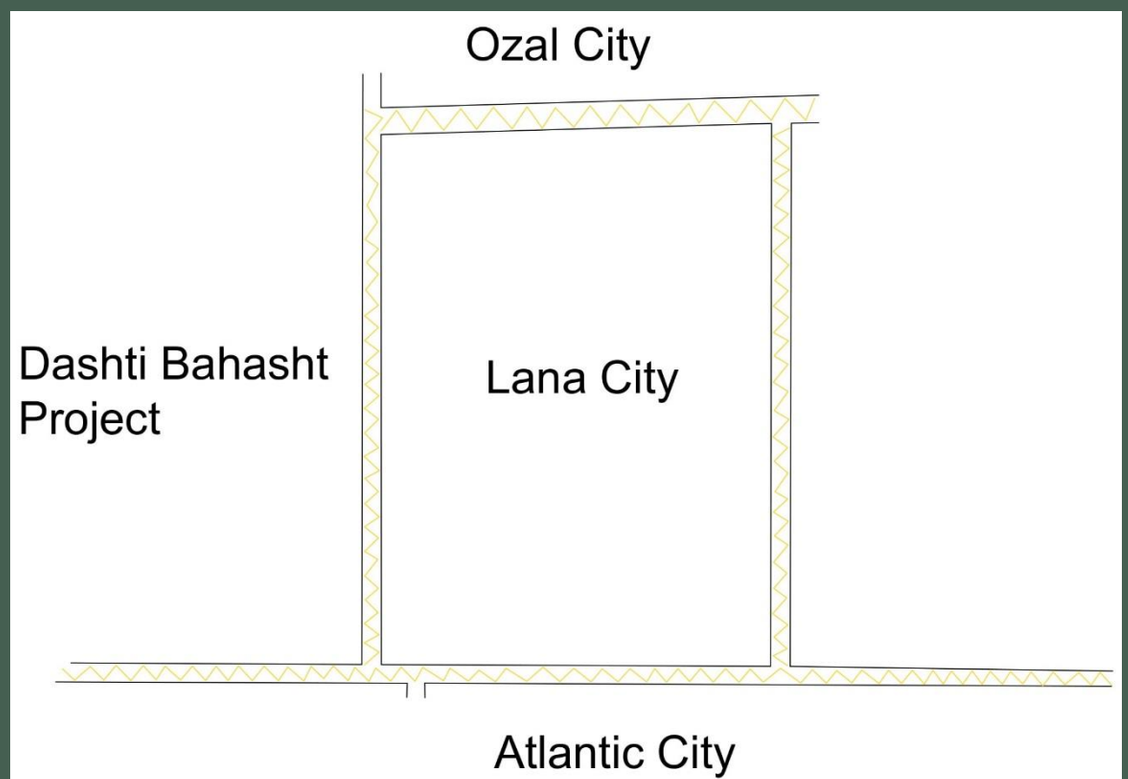
The site has traffic for vehicles and pedestrian, the city streets are for kinds if vehicles and the pedestrian which are around the blocks are for people.



Streets

Noise Analysis

Lana City has a surrounding of medium noise, the noise around it doesn't come from main streets, but rather it comes from other cities around lana city, which makes for a better environment.

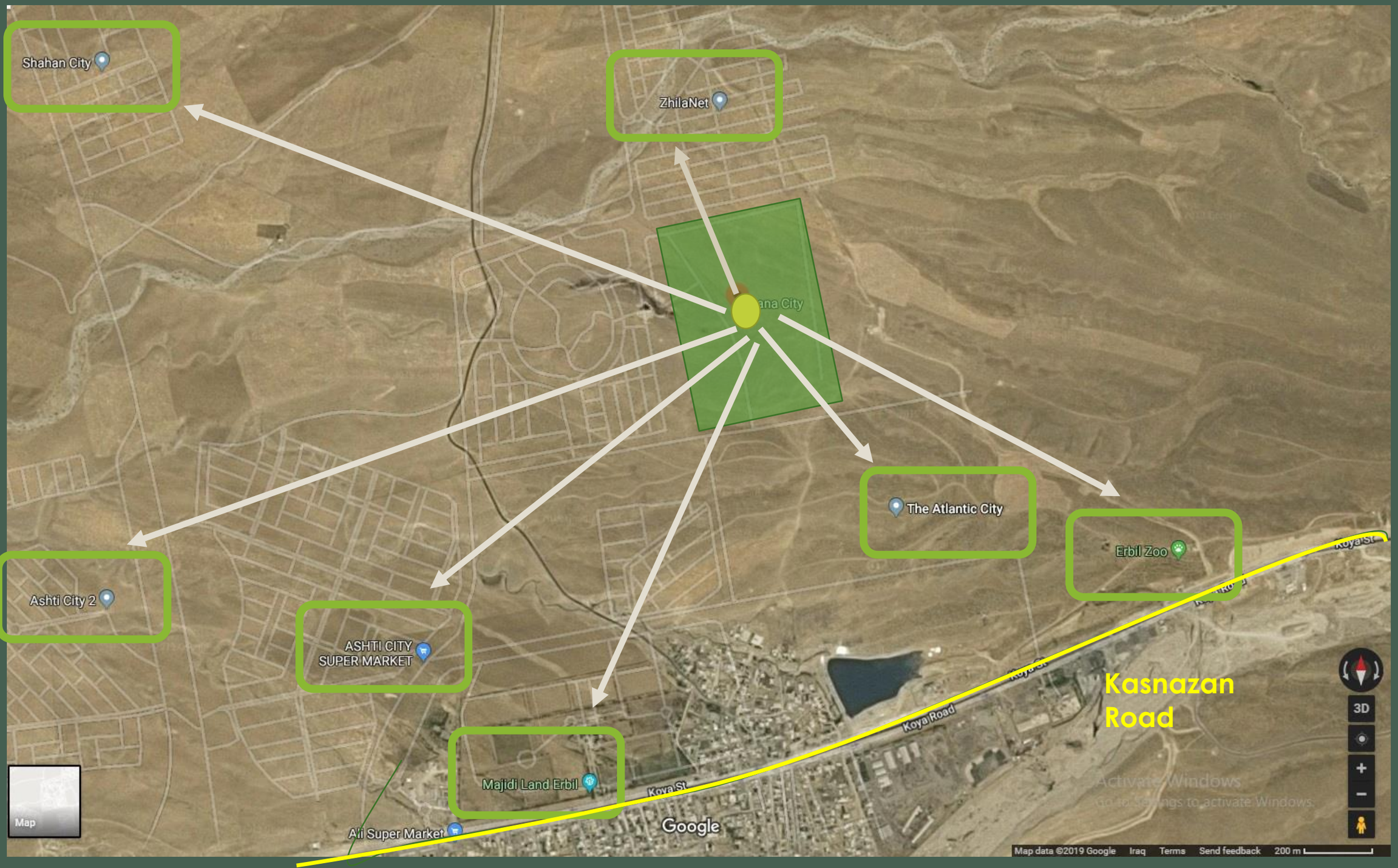


Site Analysis

Site View

The site has views from all of its sides, from one side there's the erbil zoo, and from the other sides, there are other cities around it, from one side there's majidi land.

Views From The site



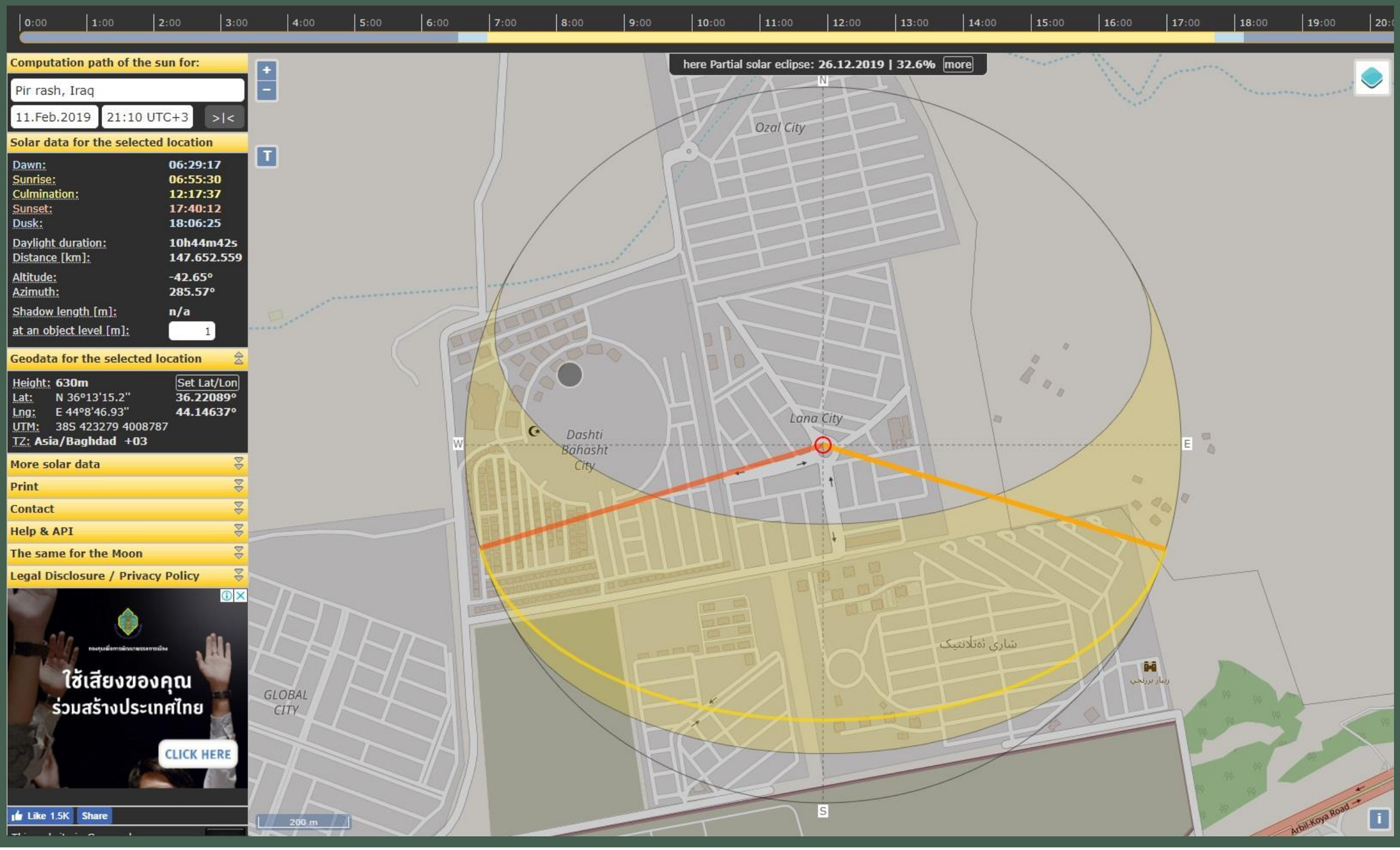
View To Ashti City

View To Shahan City

View To Erbil Zoo

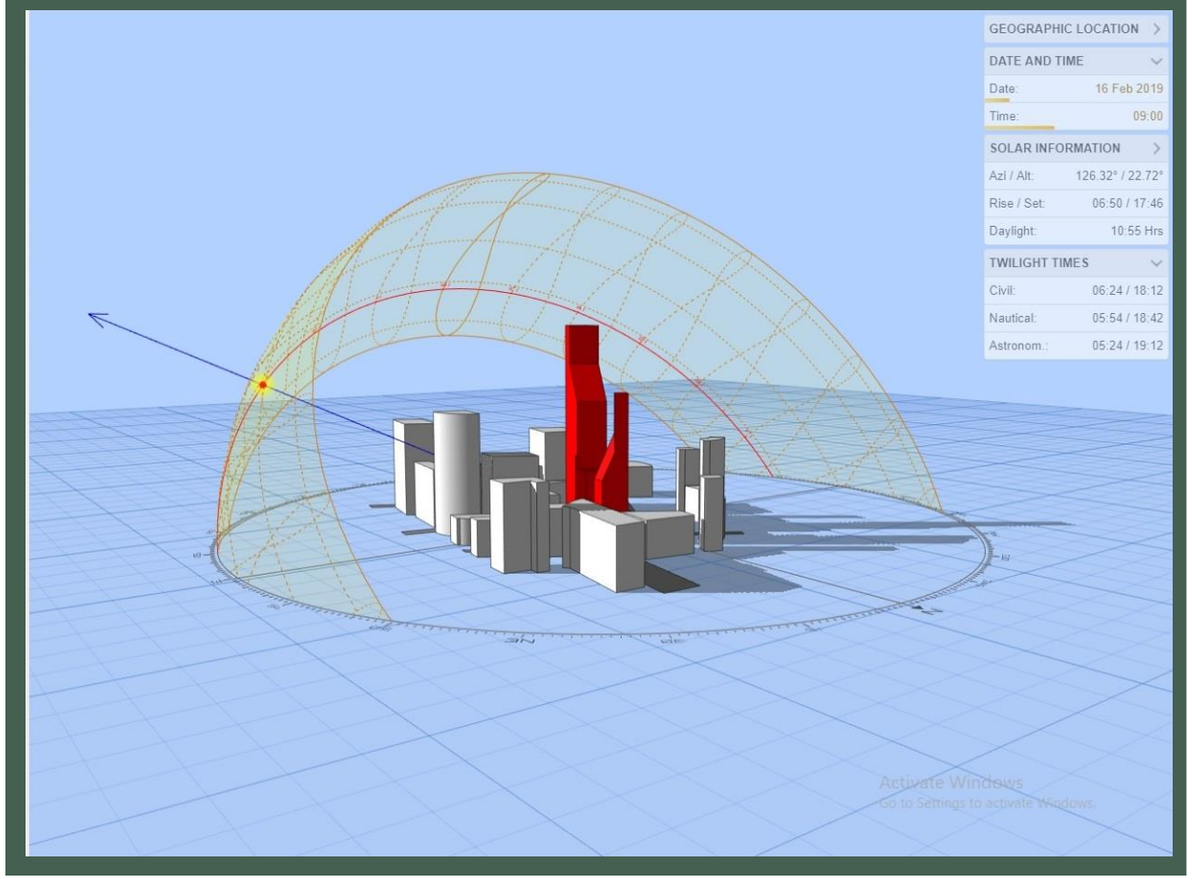
View To Atlantic City

Sun Path Diagram

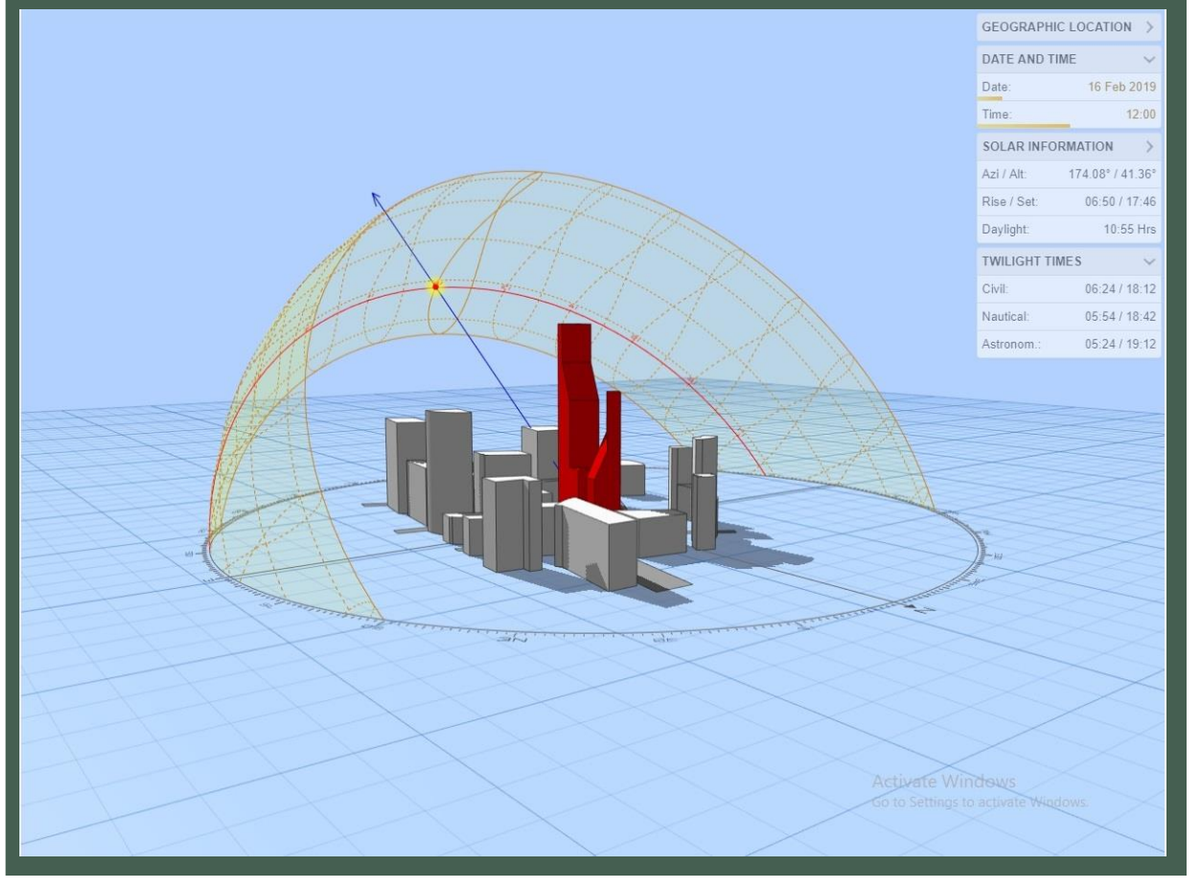


Sun Path Diagram

Sky Dome And Sun path diagram at 9:00 AM

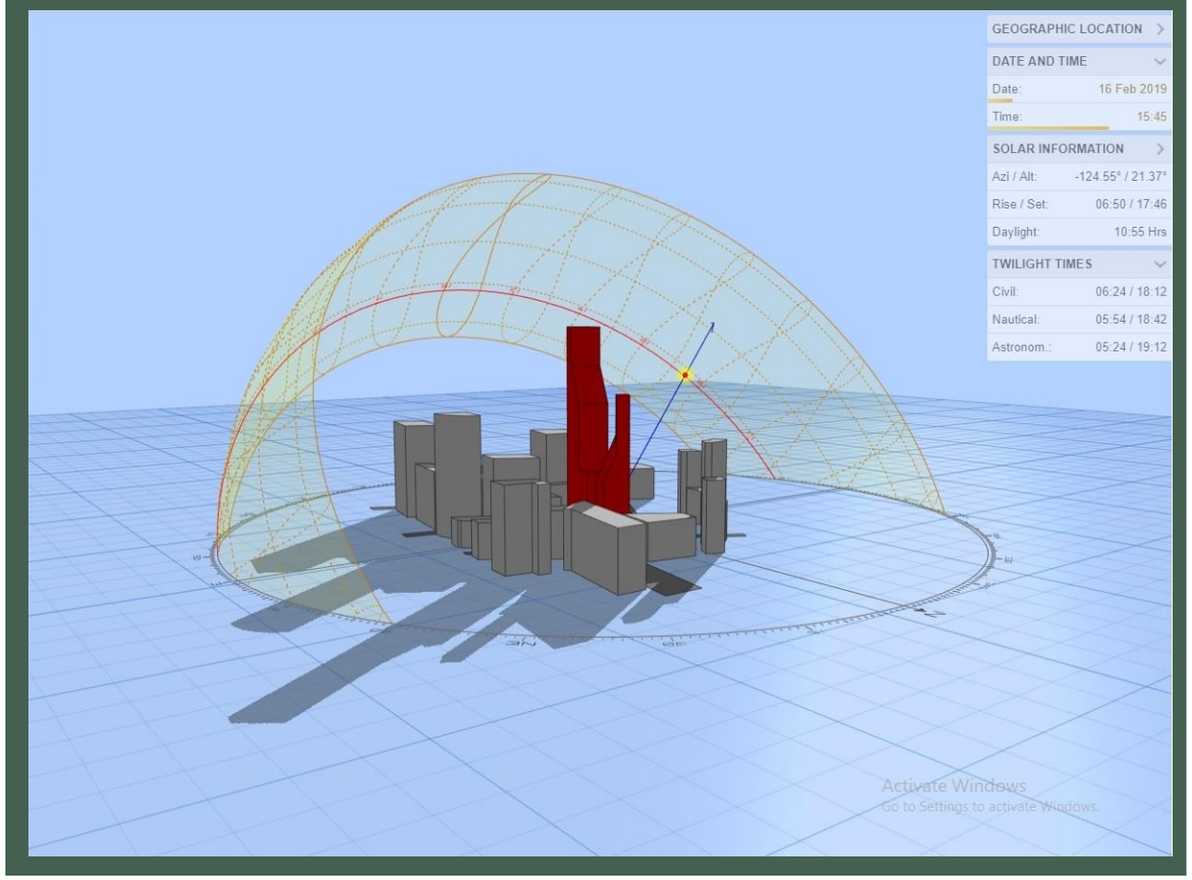


Sky Dome And Sun path diagram at 12:00 PM

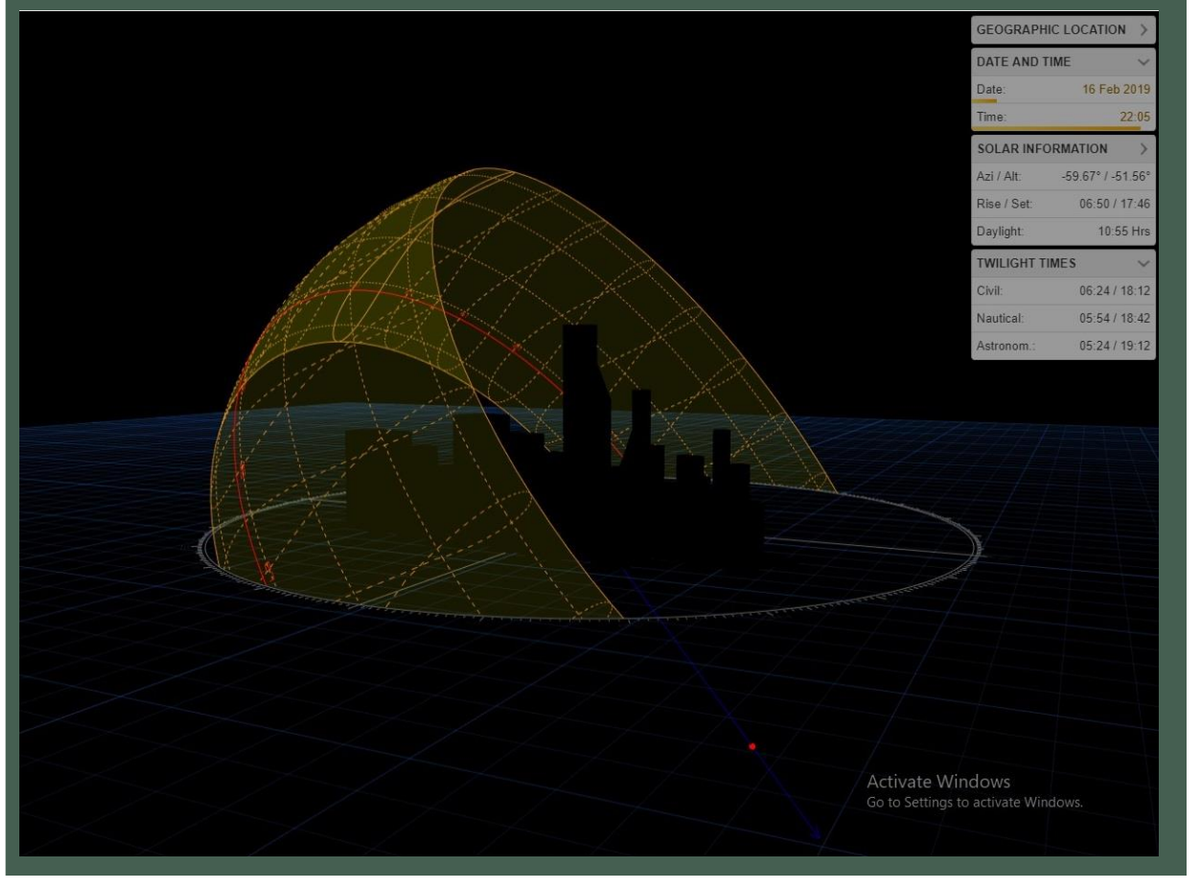


Sun Path Diagram

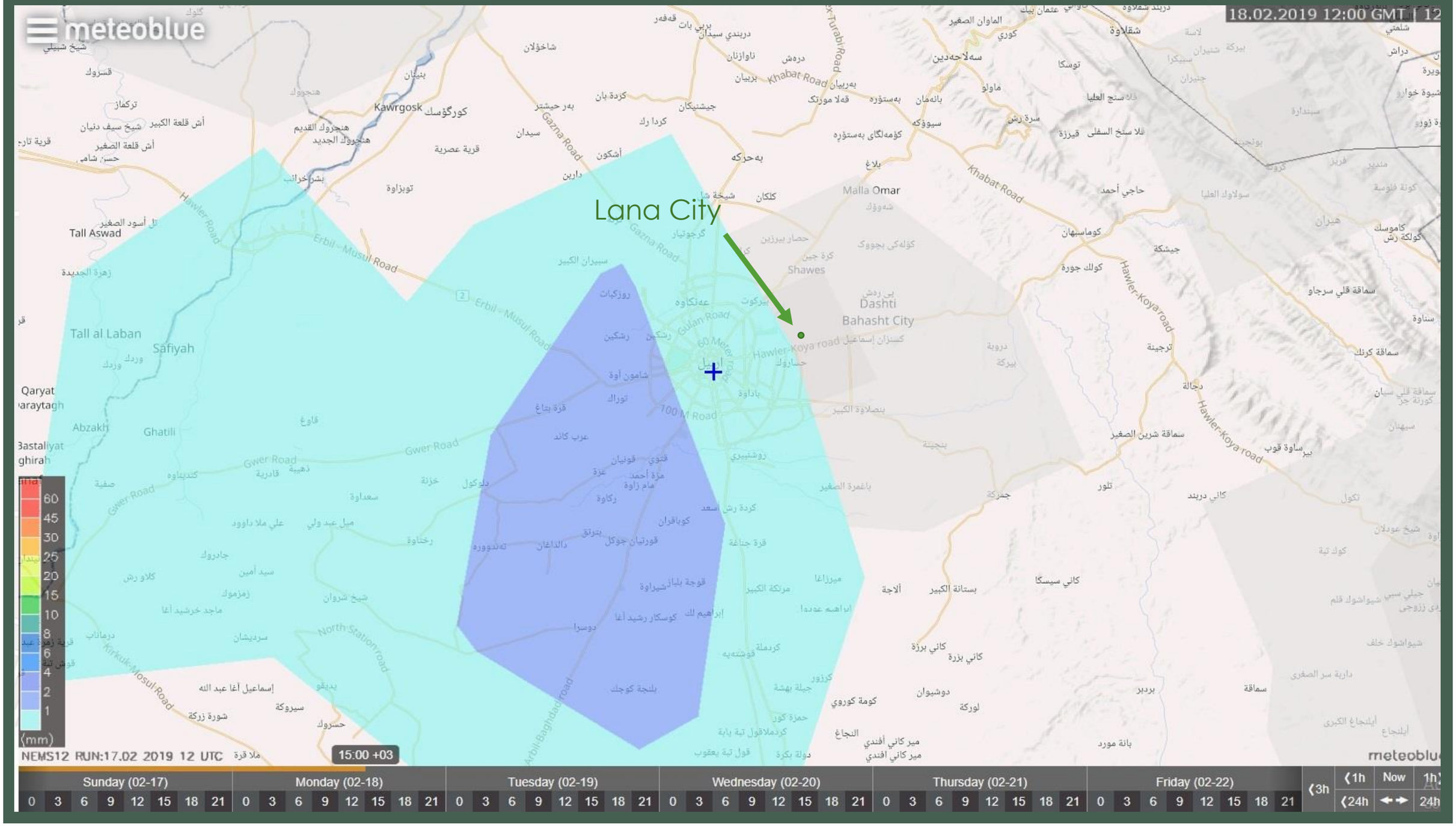
Sky Dome And
Sun path diagram at 15:45 PM



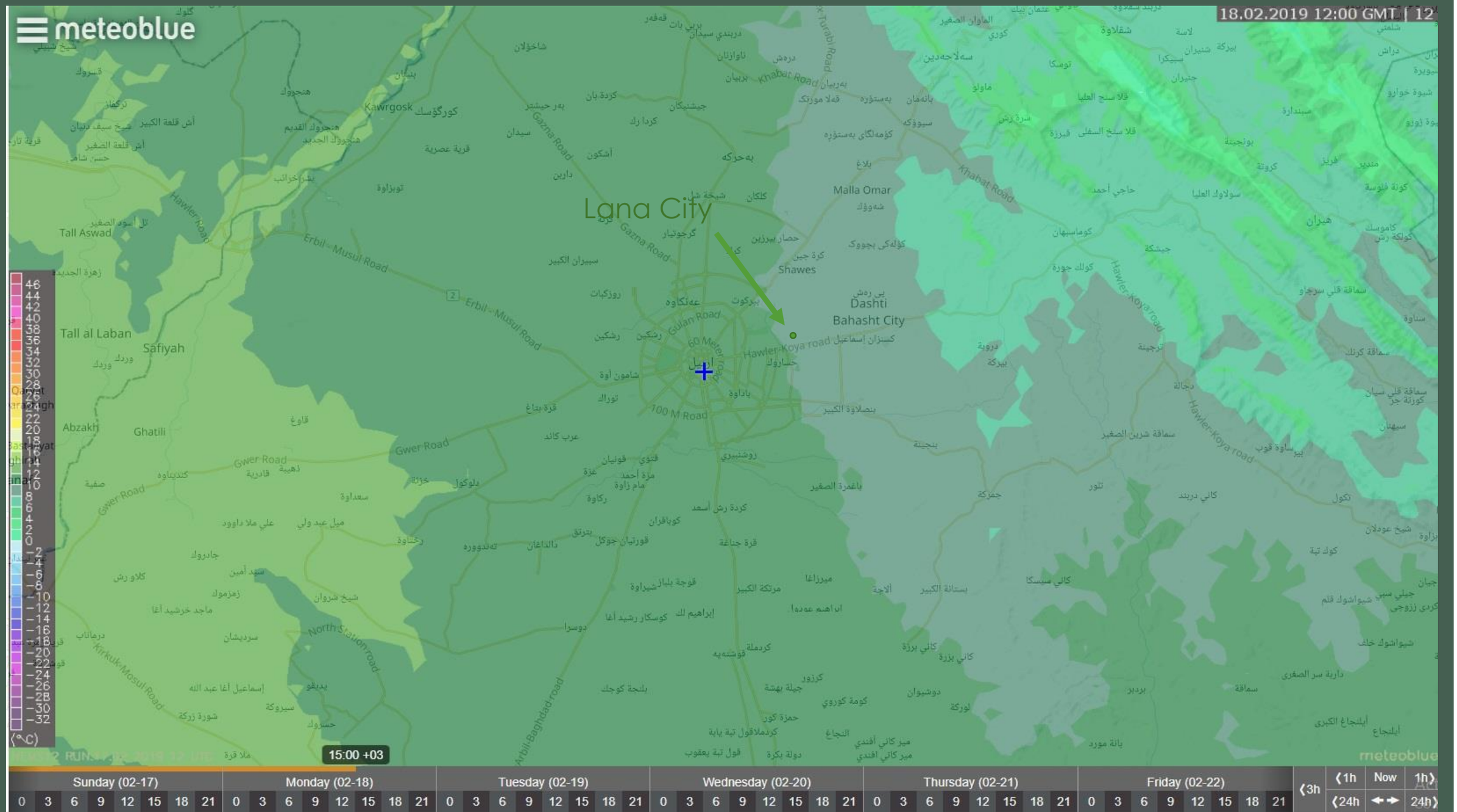
Sky Dome And
Sun path diagram at 22:05 PM



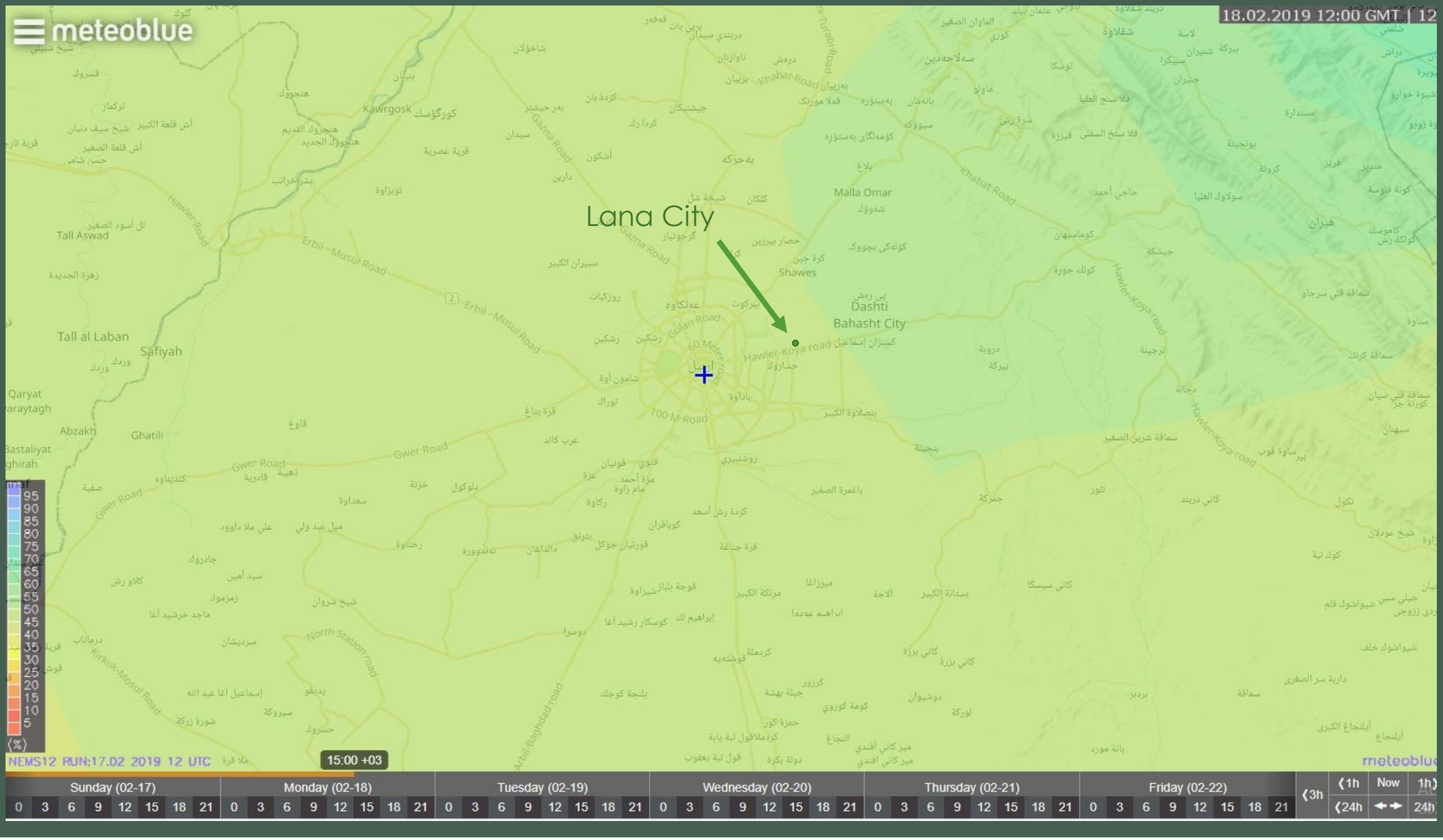
Clouds Analysis



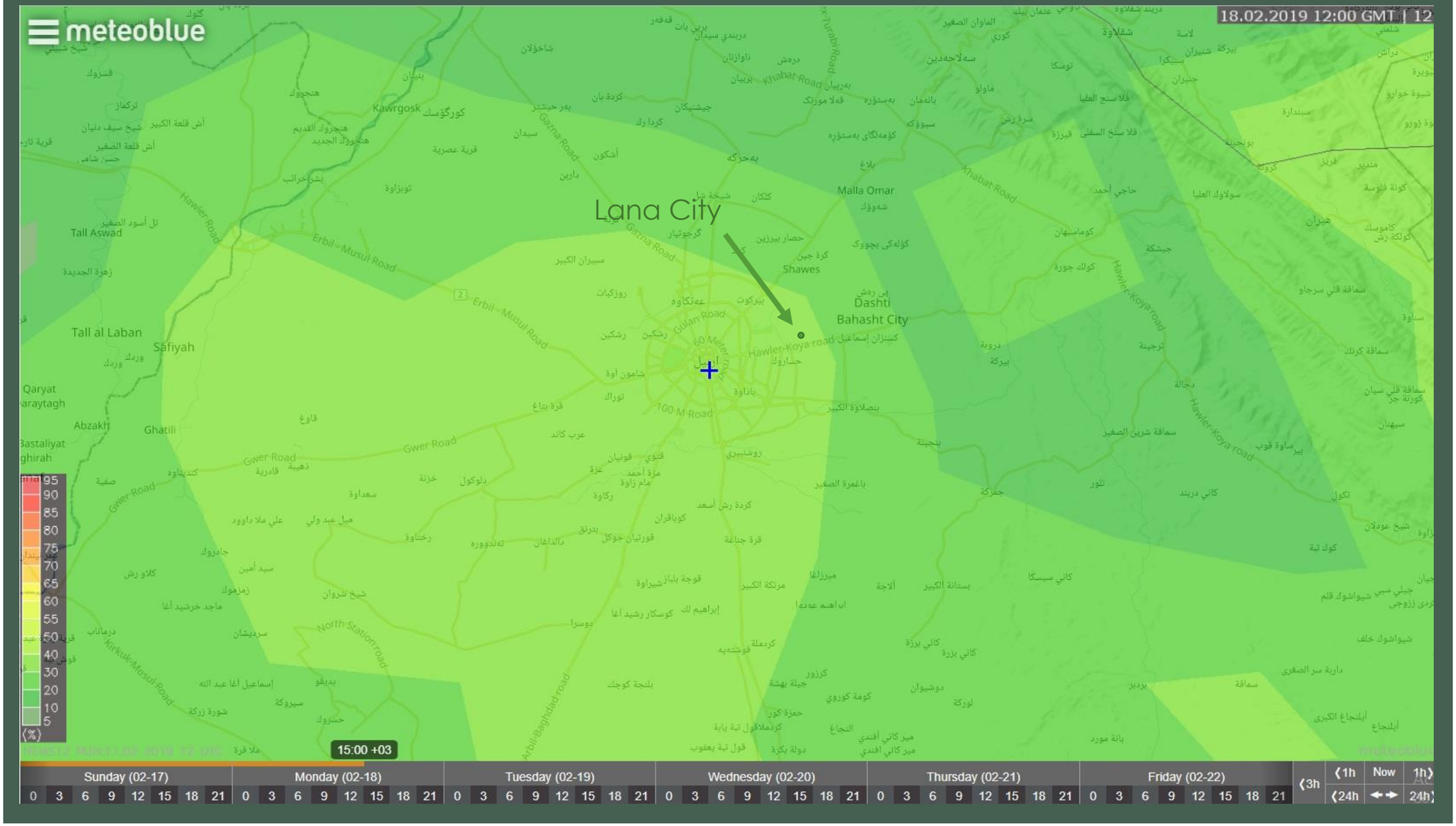
Temperature Analysis



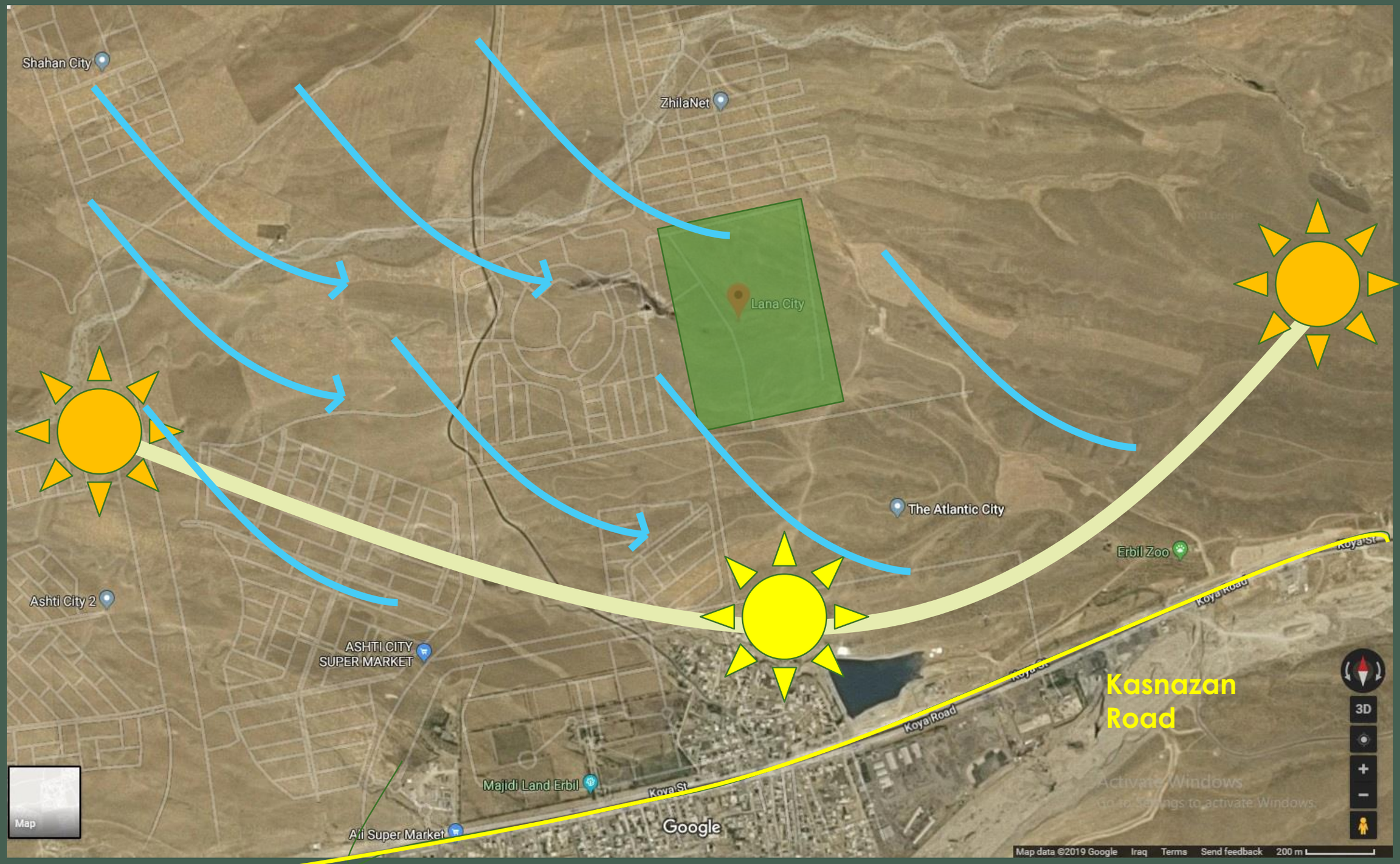
Relative Humidity



Precipitation Humidity



Site Analysis

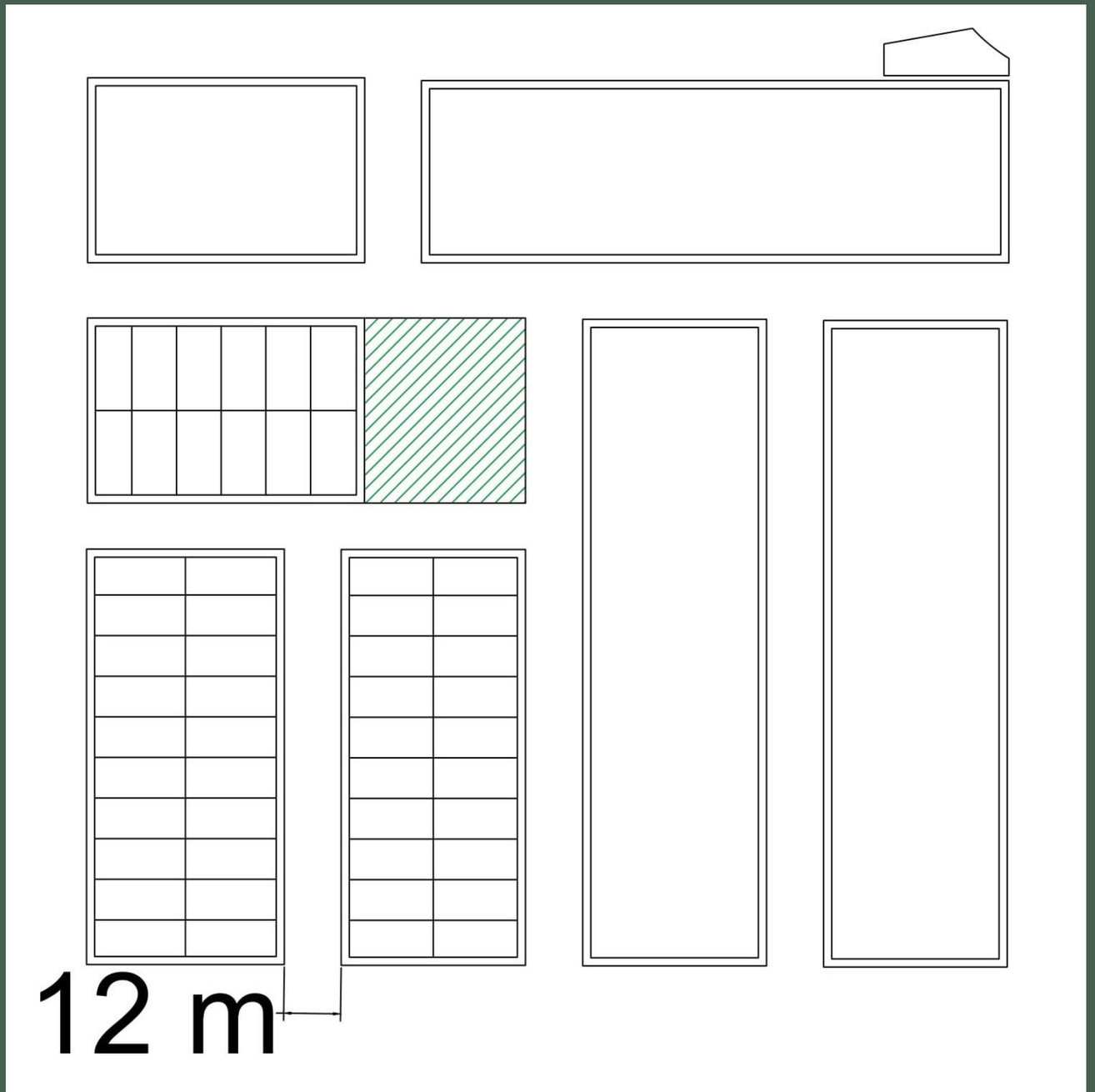


Sun Analysis

Space Between Houses

In most of the city's design the houses are in row pattern, there is no space between the houses.
That's nearly %75 percent of the project.

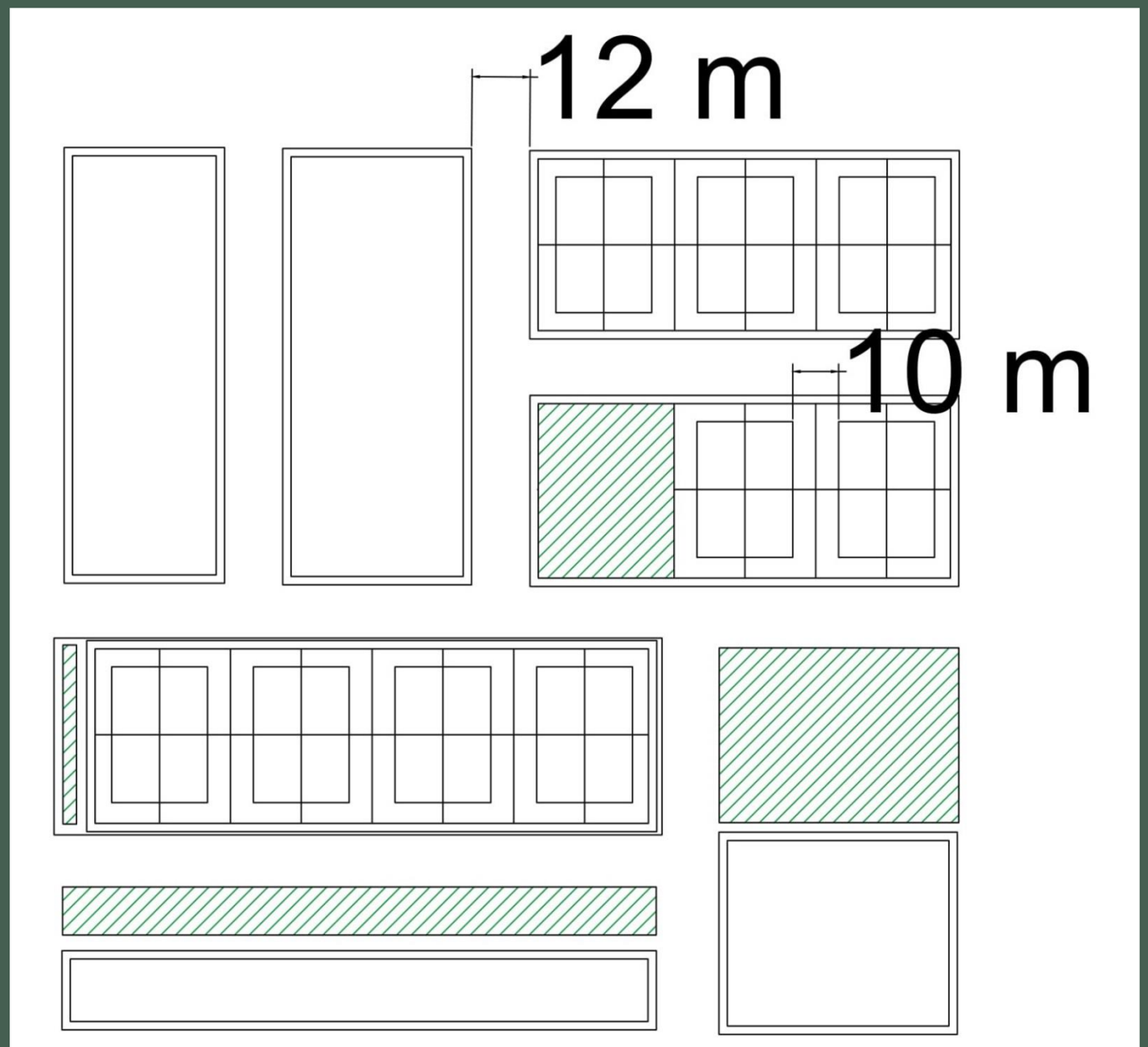
The streets are 20 meters.



Sun Analysis

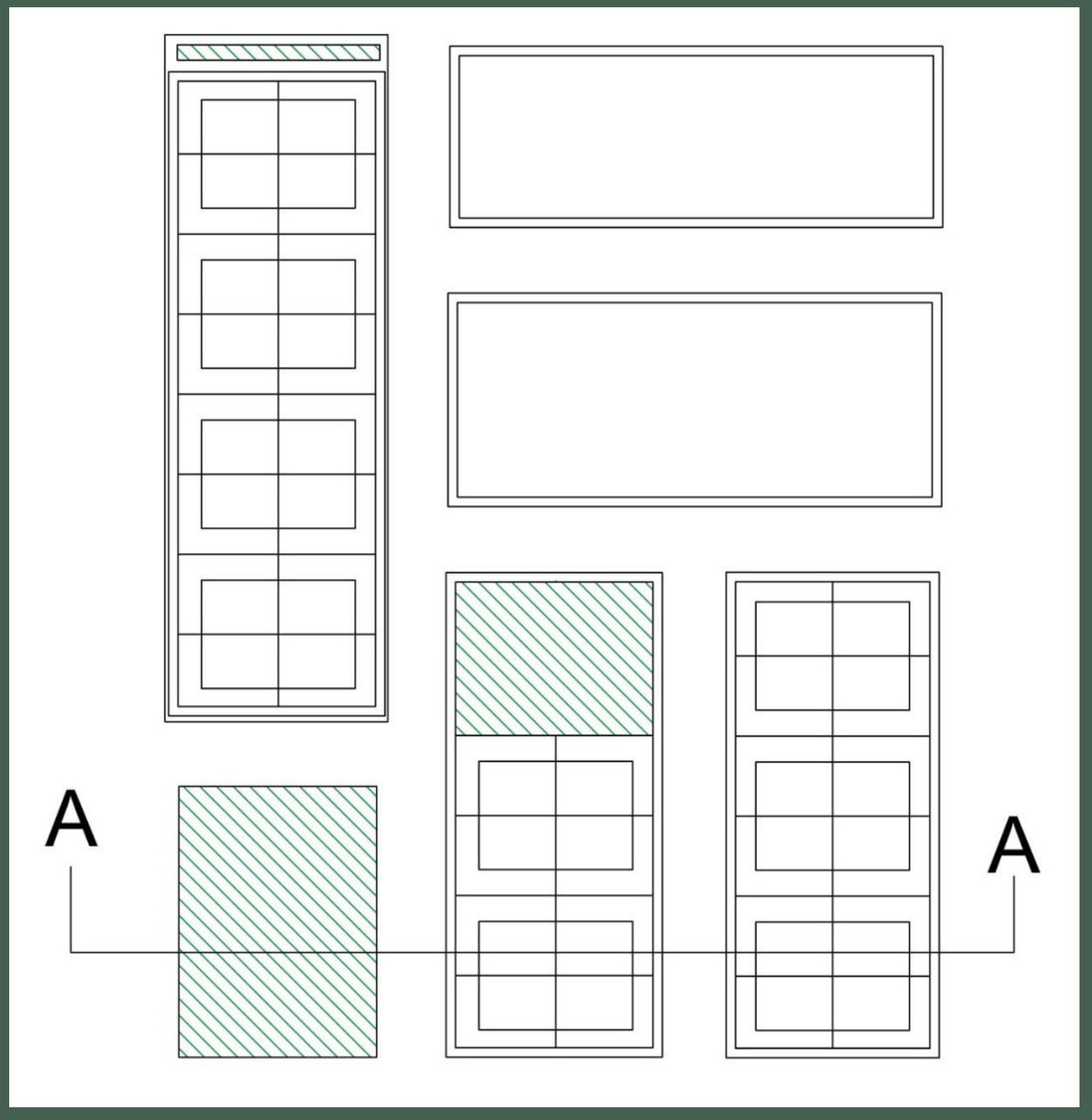
Space Between Houses

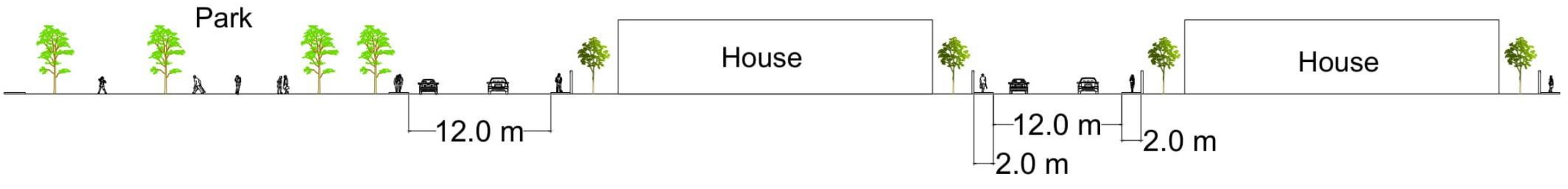
The other %25 of the city are villas, the villas are semi-detached houses, they are connected from 2 sides, the space between each one is 10 meters, 5 meters of one villas, 5 of the other, as a total of 10 meters.



Street Section

The street section shows the dimension of the street and the pedestrian walks, pedestrian walk does not have trees on the way, rather in every block there is a park or a small garden, that's go for relaxing and gives its beautiful green look.





Section A-A

Light Analysis of single House

Ratio of window size to floor area, type of window

Windows and doors are an important aspect of any house design. They are required for physical and visual connections, but their interaction with heat gain/loss and natural ventilation make them and their design critical to a home's good passive design.

As a general guide, the total window area should be less than ***25*** per cent of the total floor area of the house. Most of the windows should be located to the north where good solar access is easiest to manage, with minimal amounts on the east and west facades. Windows on the south can help encourage good ventilation, but can be the source of heat loss. They should be used sparingly.

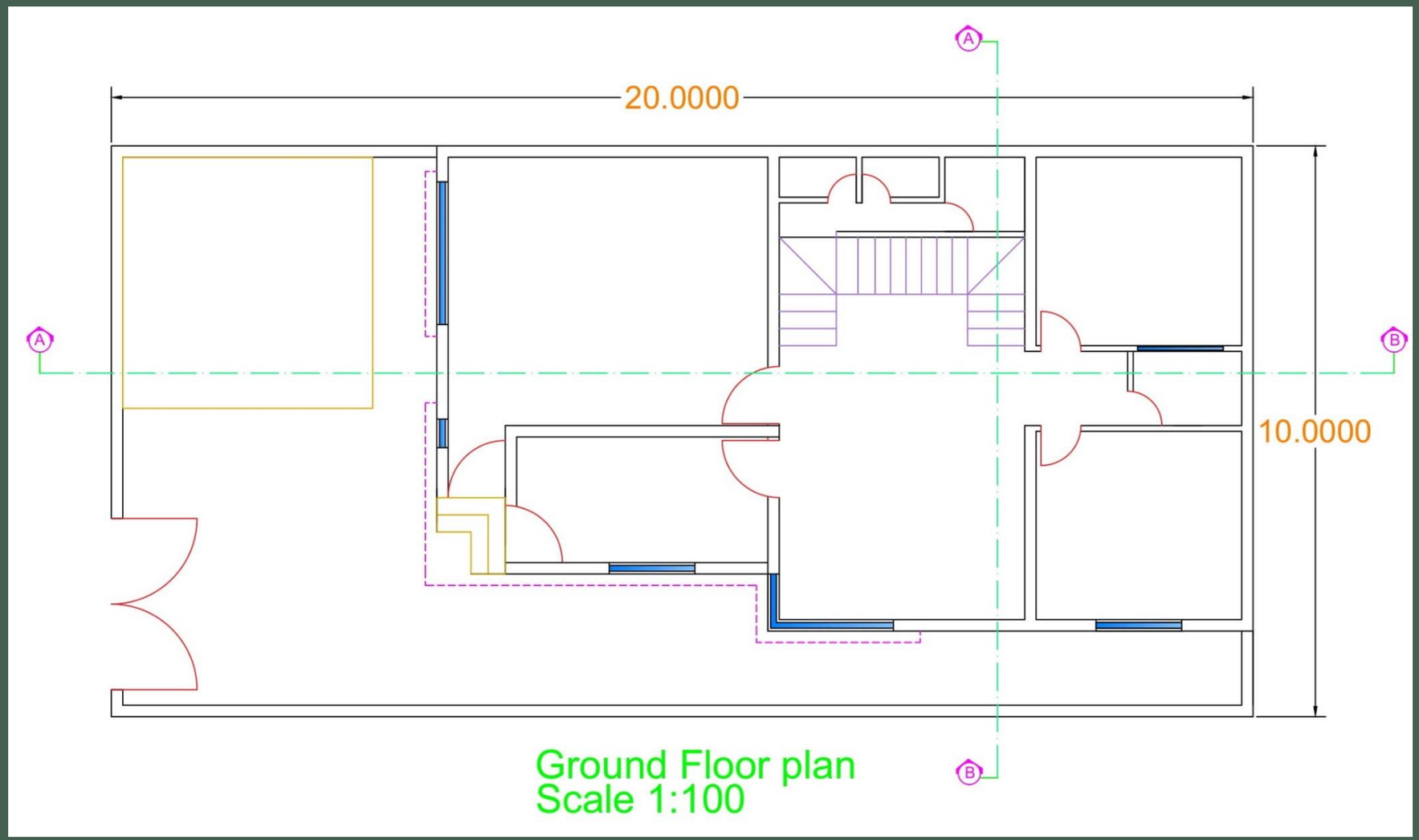
Light Analysis of single House

Ratio of window size to floor area, type of window

Gross Area of House =200 m2

Net Area of House =122 m2

Ratio of window size to net area= 16%



Light Analysis of single House

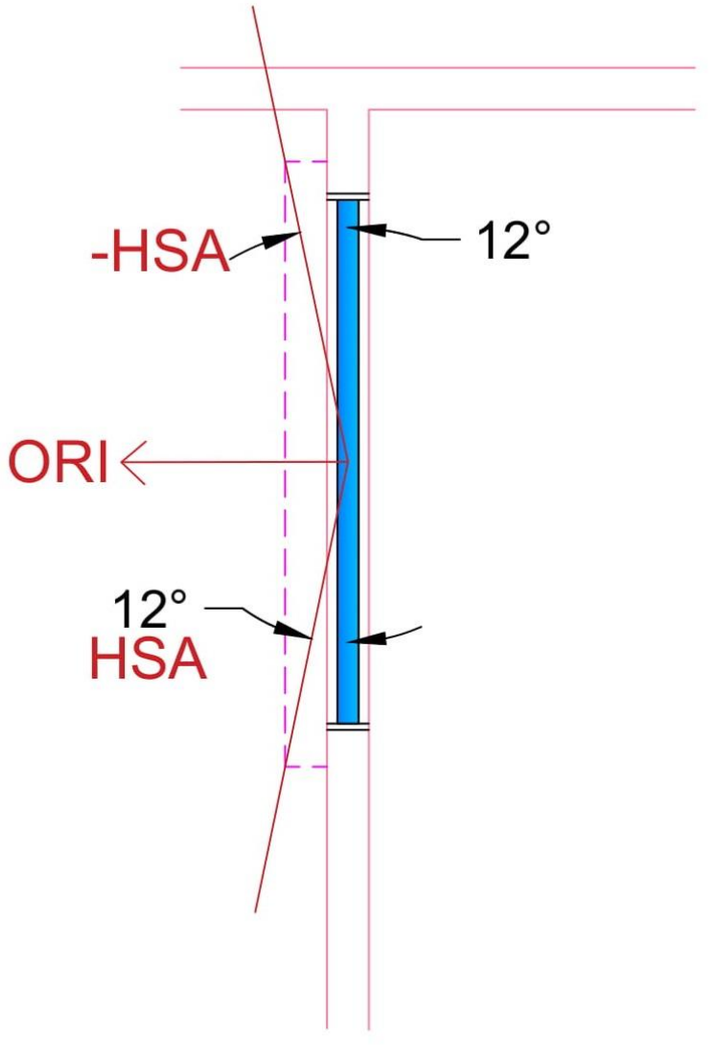
Type of windows

Casement Windows

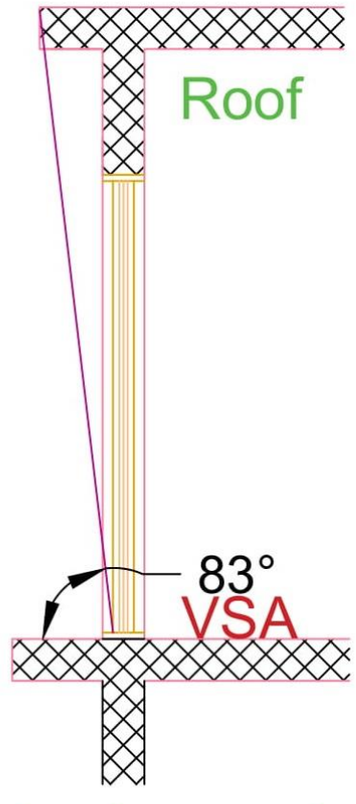
Slide Windows

Light Analysis of single House

Shading devise analysis(Type-Material-Drawing)



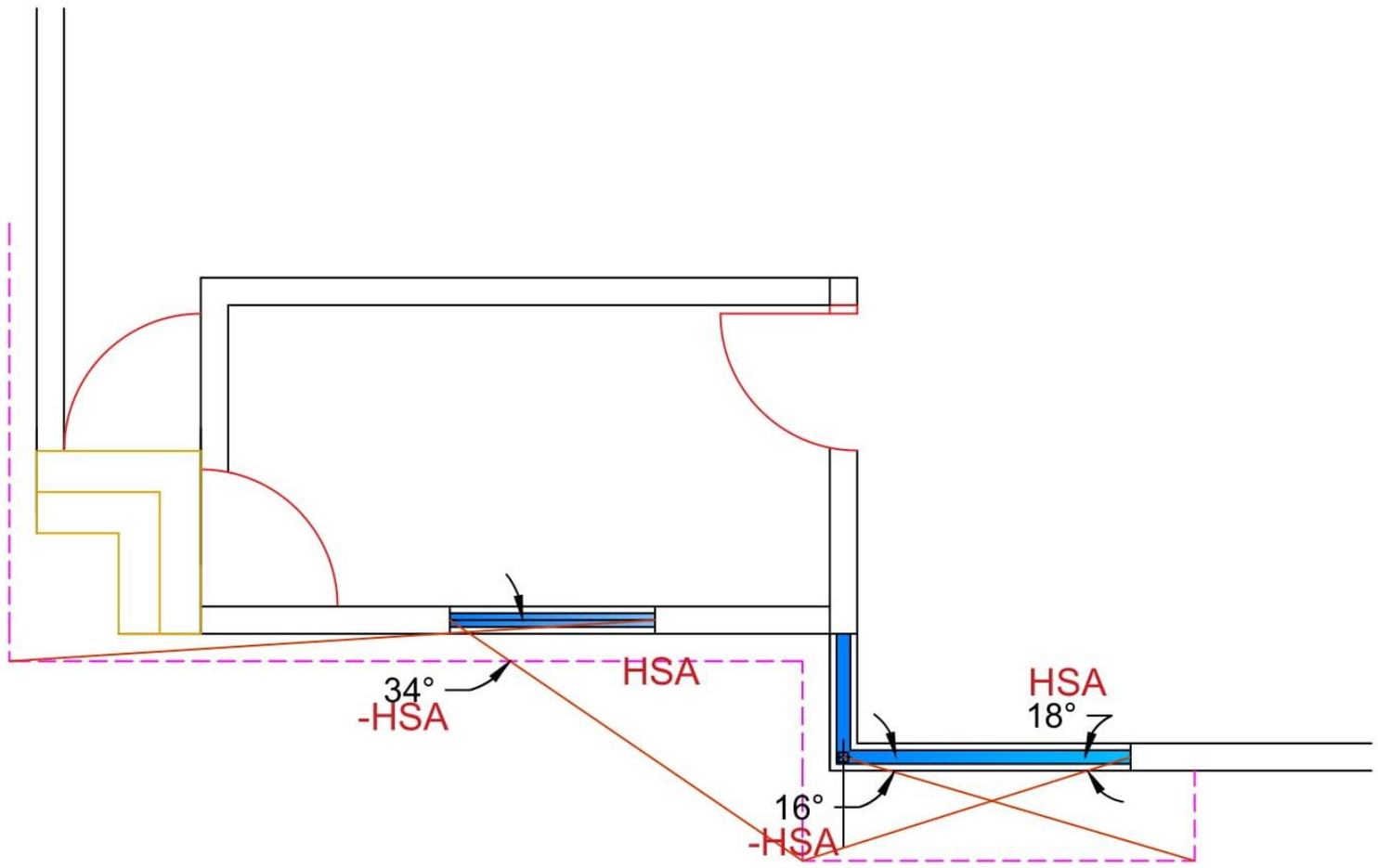
Horizontal shadow angle plan



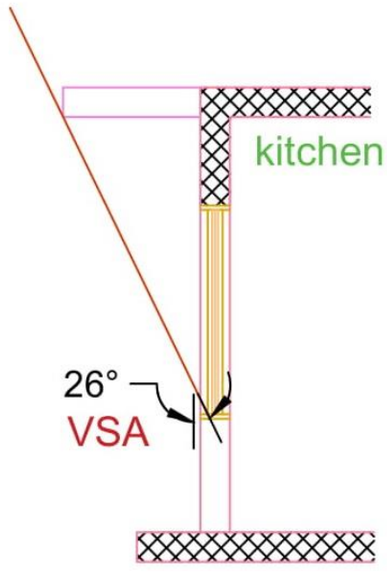
Vertical shadow angle plan

Light Analysis of single House

Shading devise analysis(Type-Material-Drawing)



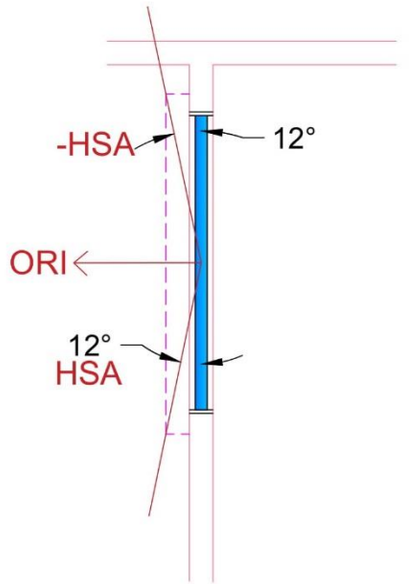
Horizontal shadow angle plan



Vertical shadow angle plan

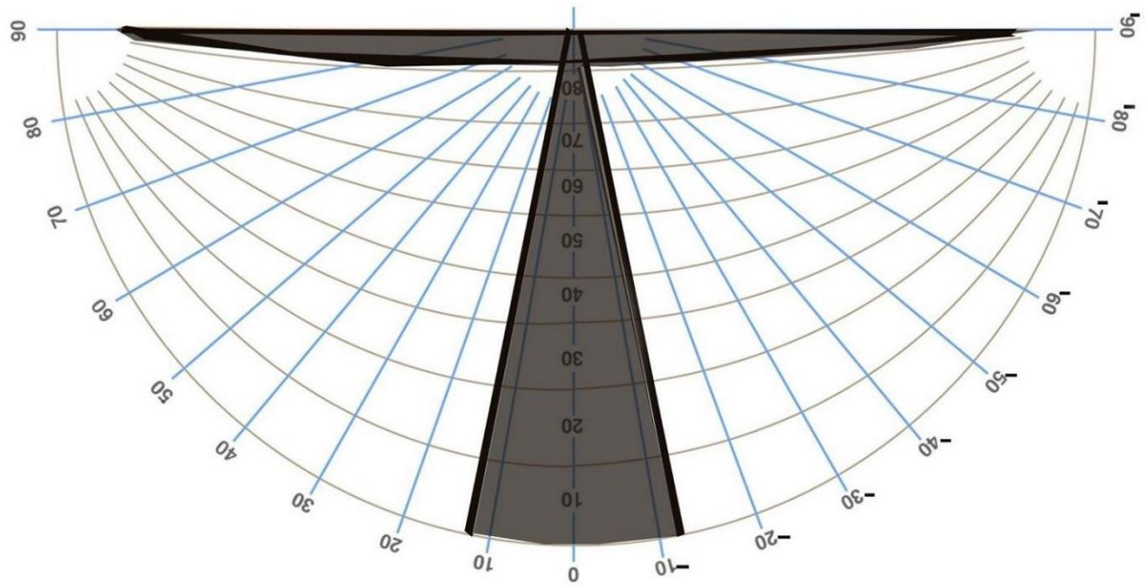
Light Analysis of single House

Shading devise analysis(Type-Material-Drawing)



Horizontal shadow angle plan

Vertical shadow angle plan

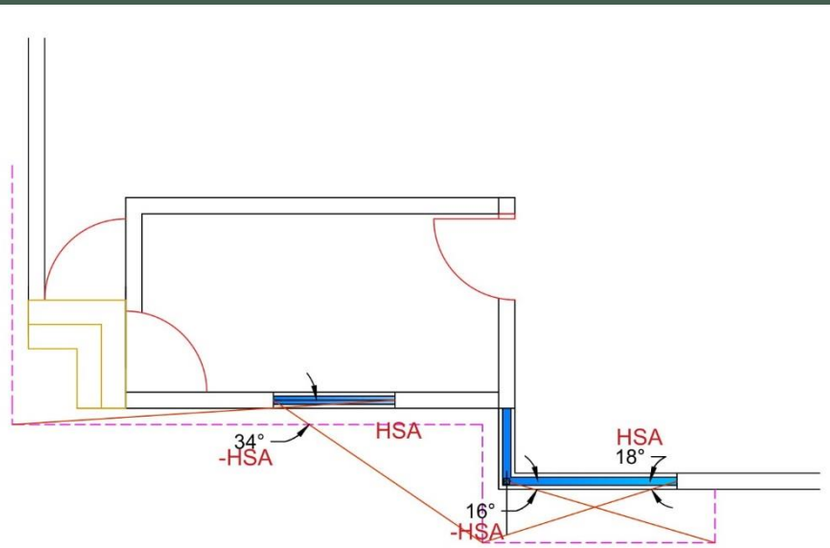


HAS = 12
VSA = 83

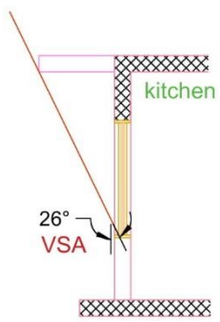
Plan **Section** **Drawing Shading Mask**

Light Analysis of single House

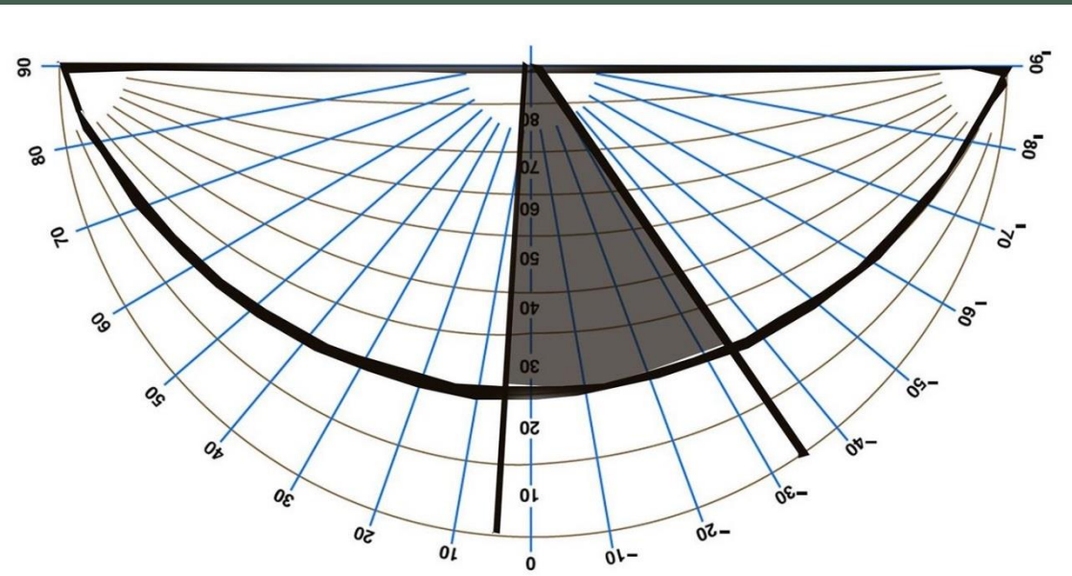
Shading devise analysis(Type-Material-Drawing)



Horizontal shadow angle plan



Vertical shadow angle plan

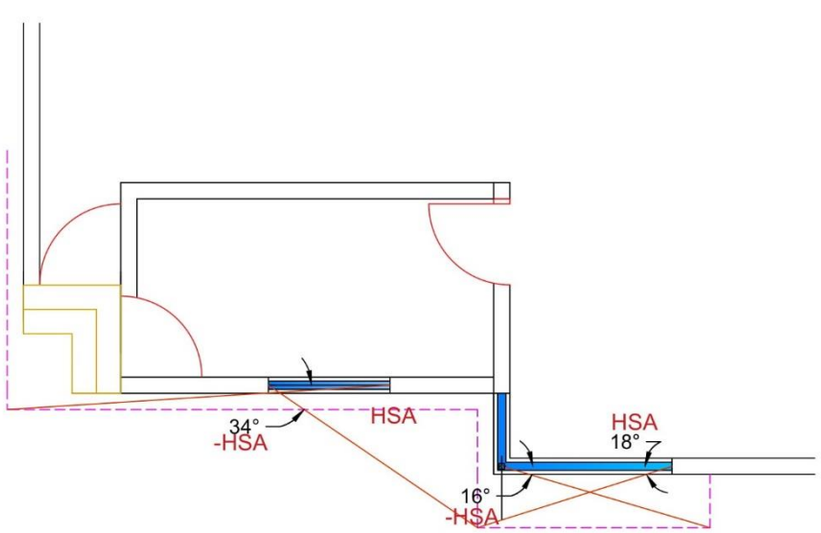


HAS = 4/34
VSA = 26

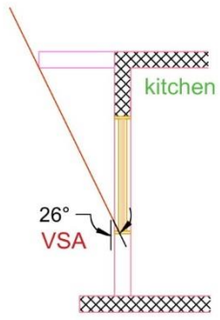
Plan **Section** **Drawing Shading Mask**

Light Analysis of single House

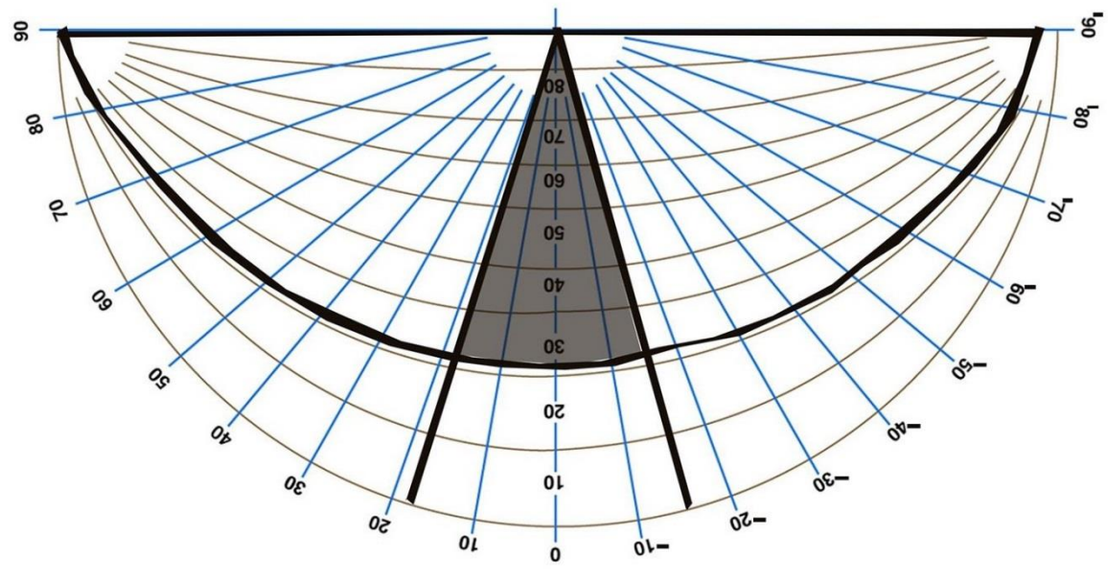
Shading devise analysis(Type-Material-Drawing)



Horizontal shadow angle plan



Vertical shadow angle plan



HAS = 16/18
VSA = 26

Plan **Section** **Drawing Shading Mask**

Light Analysis of single House

House Shading

Thermal analysis of material

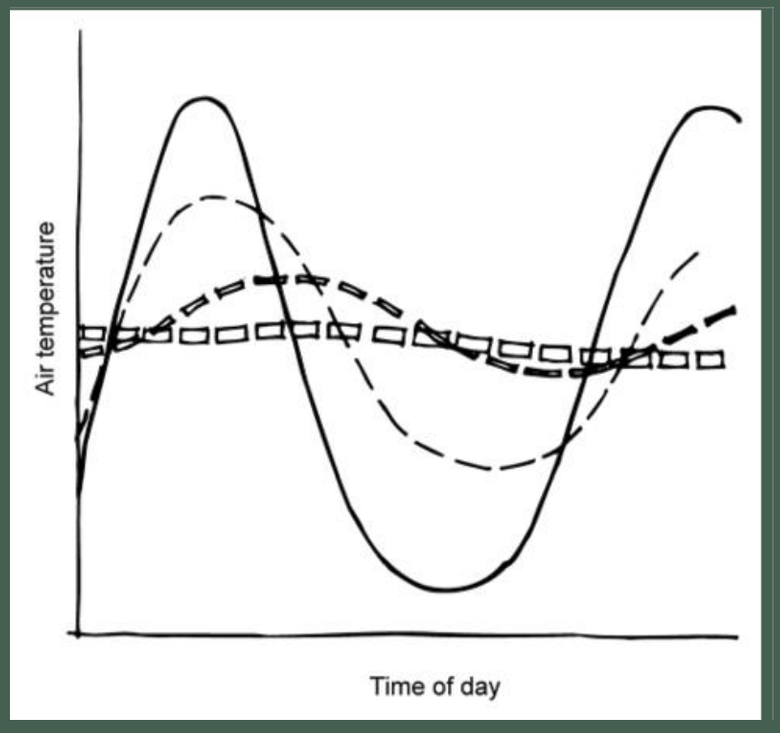
Thermal analysis refers to any technique for the study of materials which involves thermal control. Measurements are usually made with increasing temperature, but isothermal measurements or measurements made with decreasing temperatures are also possible.

Used Materials

- Tiles
- Concrete blocks
- Stones
- Concrete Slabs for roofs
- Marble
- Glass
- Wood

Thermal analysis of material

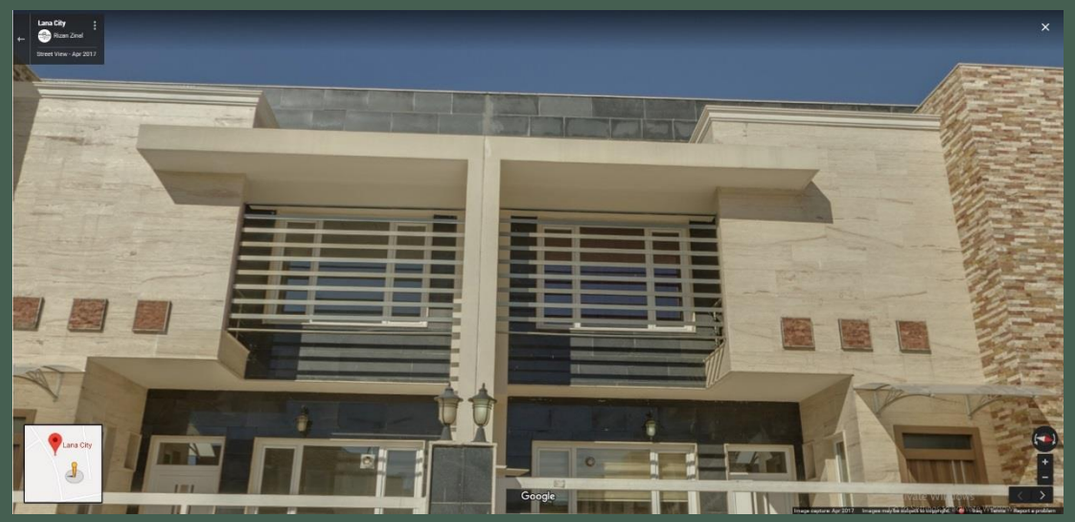
- Thermal mass materials. Probably the simplest form of thermal mass is a concrete slab floor. You can also use concrete blocks, tiles, brick, rammed earth and stone. ... dense and heavy, so it can absorb and store significant amounts of heat (lighter materials, such as wood, absorb less heat)



Thermal analysis of material

Stones

Marble



Thermal analysis of material

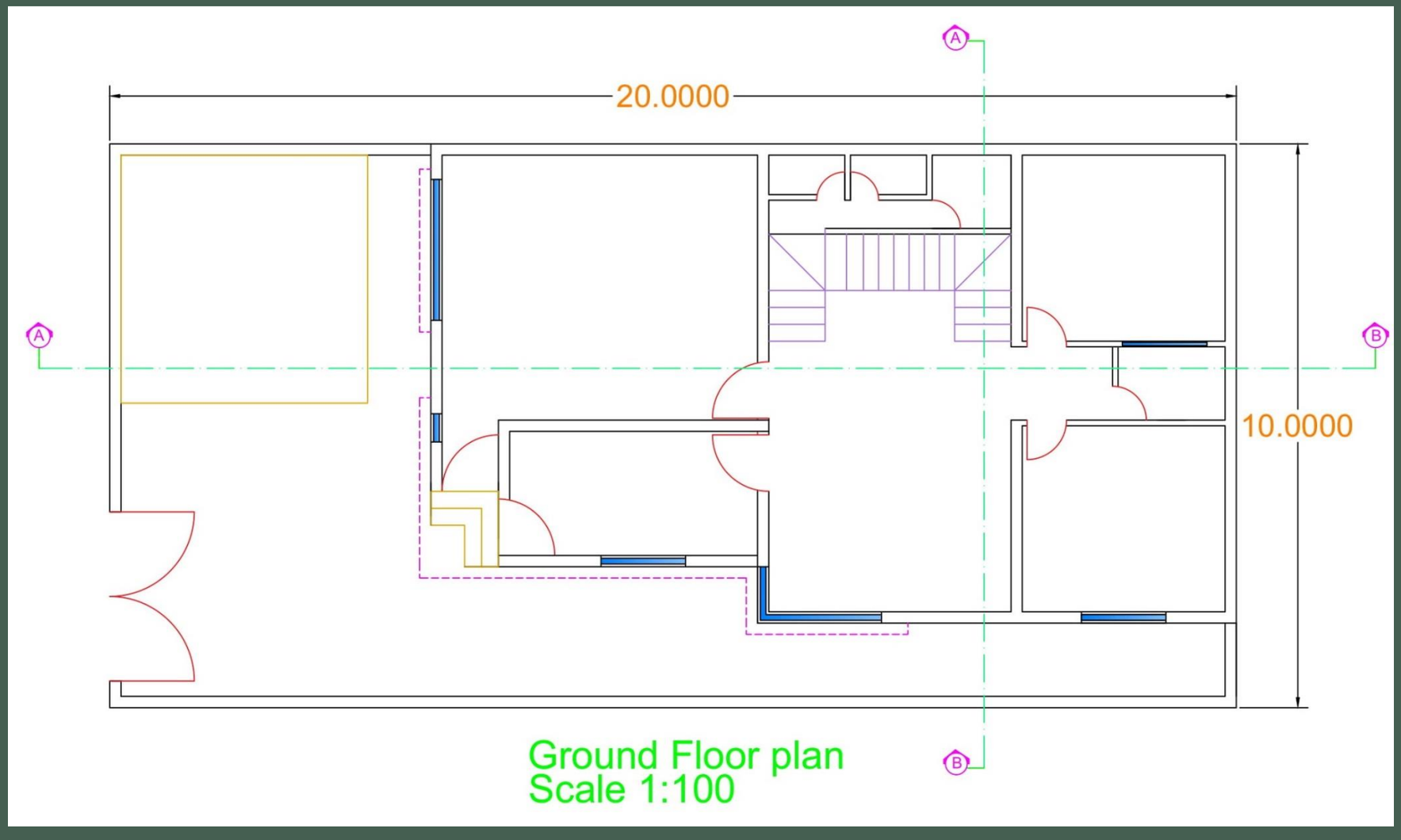
Tiles

Wood

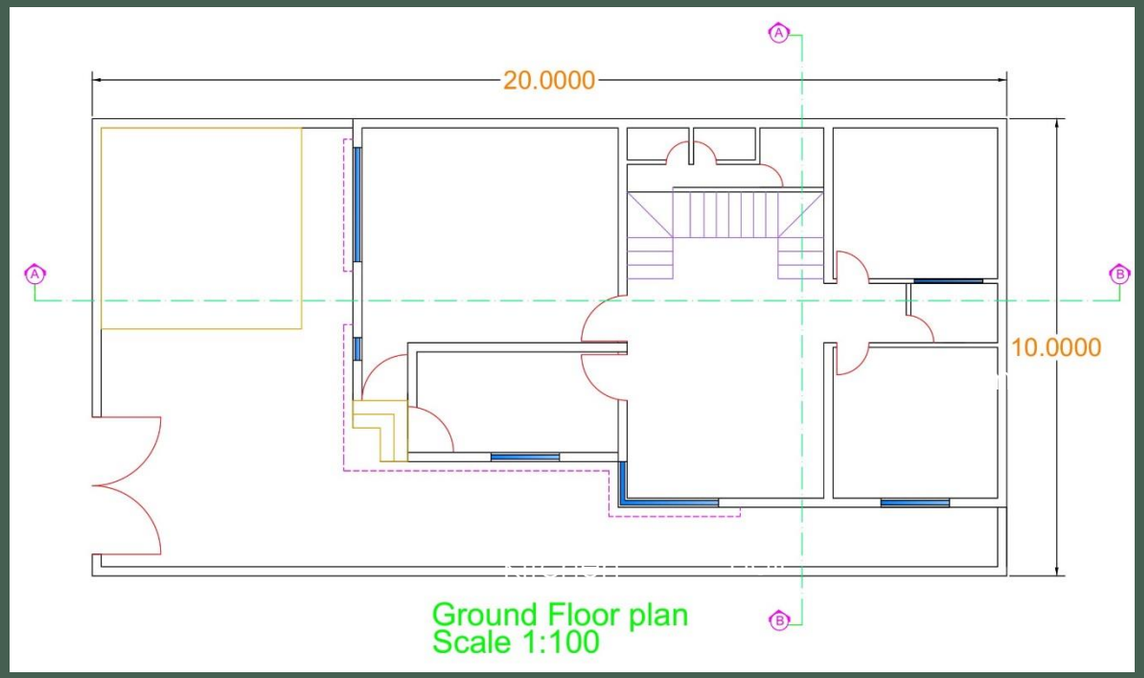
Thermal analysis of material

Gable Roof

Heat Gain of one house



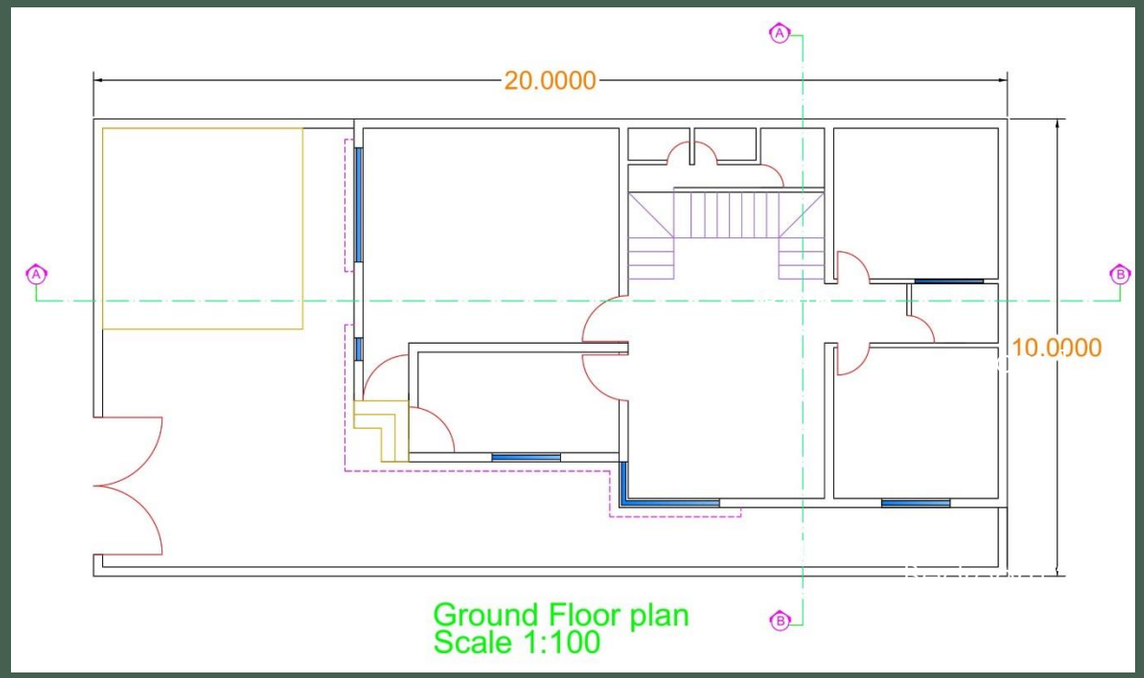
- Reception (4 people)
- Sensible heat gain = 70 W
- Latent Heat Gain = 44 W
- Total Sensible Heat Gain = $\frac{4\,(70)}{1000}$ = 0.28 KW
- Total Latent Heat Gain = $\frac{4\,(44)}{1000}$ = 0.176 KW
- Total heat gain = 0.28 + 0.176
- = 0.456 KW



- Kitchen (3 people)
- Sensible heat gain = 78.5 W
- Latent Heat Gain = 78.5 W
- Total Sensible Heat Gain = $\frac{3\,(78.5)}{1000}$ = 0.235 KW
- Total Latent Heat Gain = $\frac{3\,(78.5)}{1000}$ = 0.235 KW
- Total heat gain = 0.235 + 0.235
- = 0.471 KW

- Hall (6 people)
- Sensible heat gain = 70 W
- Latent Heat Gain = 44 W
- Total Sensible Heat Gain = $\frac{6\,(70)}{1000}$ = 0.42 KW
- Total Latent Heat Gain = $\frac{6\,(44)}{1000}$ = 0.264 KW
- Total heat gain = 0.42 + 0.264
- = 0.684 KW

- Bath (1 people)
- Sensible heat gain = 64 W
- Latent Heat Gain = 30 W
- Total Sensible Heat Gain = $\frac{1\,(64)}{1000}$ = 0.064 KW
- Total Latent Heat Gain = $\frac{1\,(30)}{1000}$ = 0.030 KW
- Total heat gain = 0.064 + 0.030
- = 0.094 KW



- Bedroom (2 people)
- Sensible heat gain = 64 W
- Latent Heat Gain = 30 W
- Total Sensible Heat Gain = $\frac{2\,(64)}{1000}$ = 0.128 KW
- Total Latent Heat Gain = $\frac{2\,(30)}{1000}$ = 0.060 KW
- Total heat gain = 0.128 + 0.060
- = 0.188 KW

- Bedroom (1 people)
- Sensible heat gain = 64 W
- Latent Heat Gain = 30 W
- Total Sensible Heat Gain = $\frac{1\,(64)}{1000}$ = 0.064 KW
- Total Latent Heat Gain = $\frac{1\,(30)}{1000}$ = 0.030 KW
- Total heat gain = 0.064 + 0.030
- = 0.094 KW

U-Value of out city elements

Metals		Gases		Building Materials		Other Materials	
Aluminum	235	Air (dry)	0.026	Asphalt	0.75	Cotton	0.04
Brass	109	Argon (gas)	0.016	Brick dense	1.31	Cotton wool	0.029
Copper	401	Carbon dioxide (gas)	0.0146	Brick, fire	0.47	Diamond	1000
Gold	314	Helium	0.15	Brick, insulating	0.15	Engine Oil	0.15
Iron	67	Hydrogen	0.18	Concrete	0.8	Graphite	168
Lead	35	Krypton (gas)	0.0088	Fiberglass	0.048	Ground or soil, dry area	0.5
Nickel	91	Methane (gas)	0.03	Polyurethane foam	0.024	Ground or soil, moist area	
Silver	428	Nitrogen (gas)	0.024	Rock wool	0.043	Polyethylene - low density	0.33
Sodium (liquid)	86	Steam, saturated	0.0184	White pine	0.11	Polypropylene, PP	0.1 - 0.22
Sodium (solid)	135	Xenon (gas)	0.0051	Window glass	1	Porcelain	1.5
Stainless steel	14			Wood, oak	0.17	Sulfur, crystal	0.2
Steel, Carbon 1%	43					Uranium dioxide	8.8
Thorium (metalic)	38					Water	0.58
Uranium (metalic)	27.6						
Zirconium	22.6						
Zirconium alloy (1% Nb)	18						

U-Value of our city elements

Wood Door

Used in houses and apartments
1 layer = Wood

U = 1/R
= 1/ 0.4
= 2.22 W/ m^2 K

R = s/k
= 0.04 m / 0.17
= 0.235 + inside and outside thermal Resistance 0.17

Steel Door

Used in houses and apartments
1 layer = Steel

U = 1/R
= 1/0.042
= 23 W/ m^2 K

R = s/k
= 0.03 m / 15.1
= 0.002 + outside thermal resistance 0.04

U-Value of our city elements

Window

Used in houses and apartments
2 layer = Glass + Frame (Aluminum)

U = 1/R
= 1/ 0.206
= 4.8 W/ m^2 K

Glass
R = s/k
= 0.01 m / 0.1
= 0.01

Frame (Aluminum)
R = s/k
= 0.06/235
=0.026

+ inside and outside thermal
Resistance 0.17

U-Value of our city elements

Wall

Used in houses and apartments
2 layer = Concrete + Tiles

	Concrete	**Tiles**
U = 1/R	R = s/k	R = s/k
= 1/ 6.2	= 0.2 m / 0.8	= 0.006/0.6
= 0.7 W/ m^2 K	= 0.25	=0.1

+ inside and outside thermal Resistance 0.17

2 Layers = Concrete + Gypsum Board

	Concrete	**Gypsum**
U = 1/R	R = s/k	R = s/k
= 1/ 1.05	= 0.2 m / 0.8	= 0.02/0.25
= 0.95 W/ m^2 K	= 0.25	=0.8

+ inside and outside thermal Resistance 0.17

U-Value of our city elements

Roof

Used in houses and apartments
3 layer = Concrete + lightweight concrete + gypsum

	Concrete	**lightweight concrete**	**Gypsum**
U = 1/R	R = s/k	R = s/k	R = s/k
= 1/1.24	= 0.2 m / 0.8	= 0.01/0.7	= 0.02/0.25
= 0.8 W/ m^2 K	= 0.25	= 0.0139	= 0.8

+ inside and outside thermal Resistance 0.17

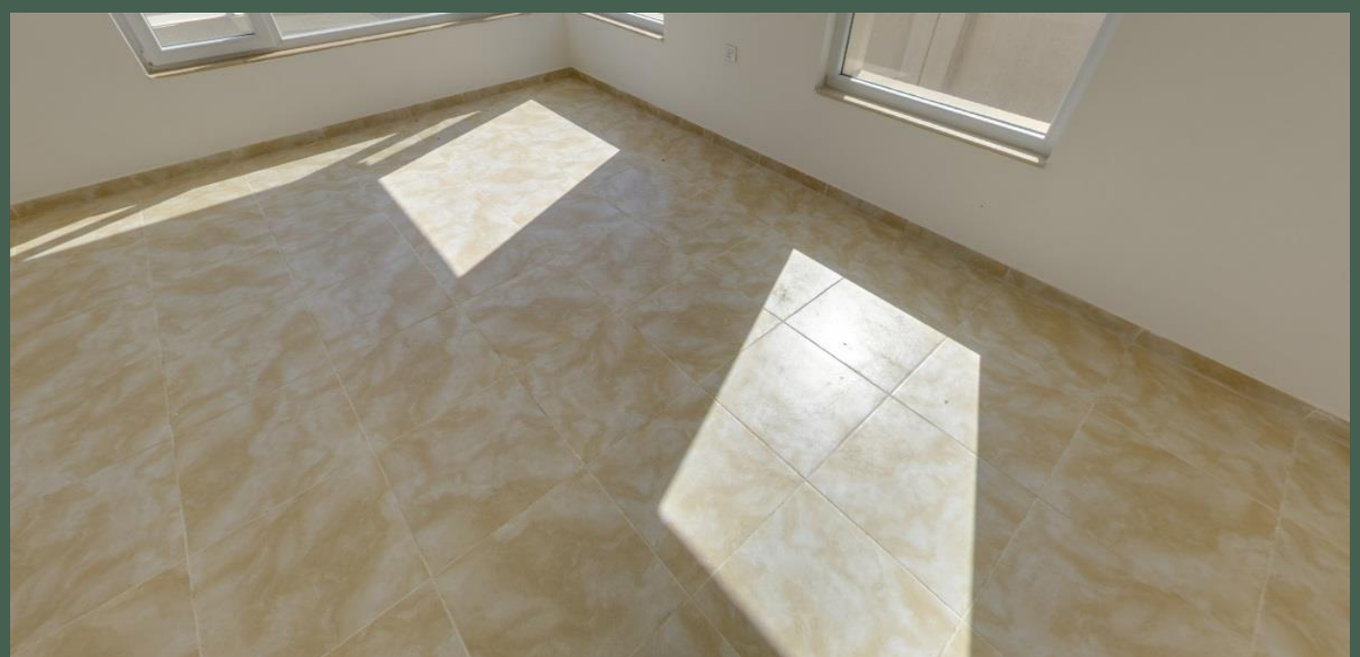
U-Value of our city elements

Floor

Used in houses and apartments
3 layer = Concrete + Cement Mortar + Tiles

	Concrete	**Cement Mortar**	**Tiles**
U = 1/R	R = s/k	R = s/k	R = s/k
= 1/0.6	= 0.2 m / 0.8	= 0.02/0.7	= 0.006/0.6
= 1.6 W/ m^2 K	= 0.25	= 0.028	= 0.1

+ inside and outside thermal
Resistance 0.17



Problems

- the unfinished building sites around it, which is left like that for years, is causing a bad view.
- The crowded of the surroundings cities.
- Hard to access the site
- Its far from city center
- Access to the strong winds of the area
- Lack of services
- Lack of green area

Solutions:

- 1- the finishing of the surrounding, the zoo especially for the better environment and better view
- 2- providing easy access to the site, and improving the roads that reach the city.
- 3- Providing good access to city center, like buses.
- 4- Providing better green areas.