25 PRINCIPLES OF BUILDING BIOLOGY

BIOLOGY IN BUILDINGS AND ECOLOGY IN BUILDINGS

Study of the best and worst principles in my building

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25 PRINCIPLES OF BUILDING BIOLOGY

Healthy Indoor Air

70% -Supply sufficient fresh air and reduce air pollutants and irritants
80% -Avoid exposure to toxic molds, yeasts, and bacteria as well as dust and allergens
60% -Use materials with a pleasant or neutral smell
15% -Minimize exposure to electromagnetic fields and wireless radiation
35% -Use natural, nontoxic materials with the least amount of radioactivity

Thermal and Acoustic Comfort

10% -Strive for a well-balanced ratio between thermal insulation and heat retention as well as indoor surface and air temperatures
60% -Use humidity-buffering materials
60% -Keep the moisture content of new construction as low as possible
80% -Prefer radiant heat for heating
30% -Optimize room acoustics and control noise, including infrasound

Human-based Design

60% -Take harmonic proportion and form into consideration
50% -Nurture the sensory perceptions of sight, hearing, smell, and touch
70% -Maximize daylighting and choose flicker-free lighting sources and color schemes that closely match natural light
40% -Base interior and furniture design on physiological and ergonomic findings
70% -Promote regional building traditions and craftsmanship

Sustainable Environmental Performance

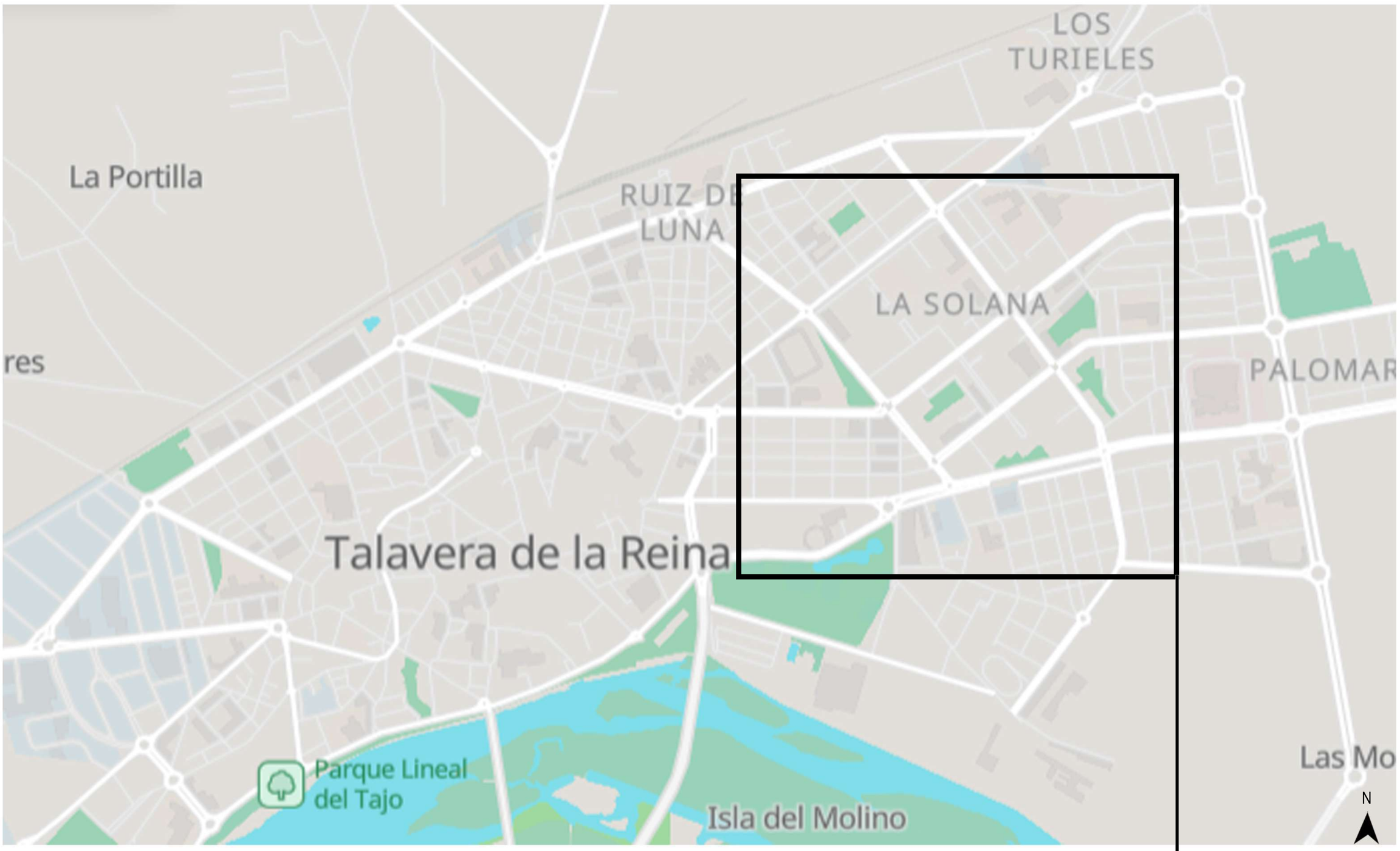
20% -Minimize energy consumption and use renewable energy
40% -Avoid causing environmental harm when building new or renovating
40% -Conserve natural resources and protect plants and animals
60% -Choose materials and life cycles with the best environmental performance, favoring regional building materials
80% -Provide the best possible quality of drinking water

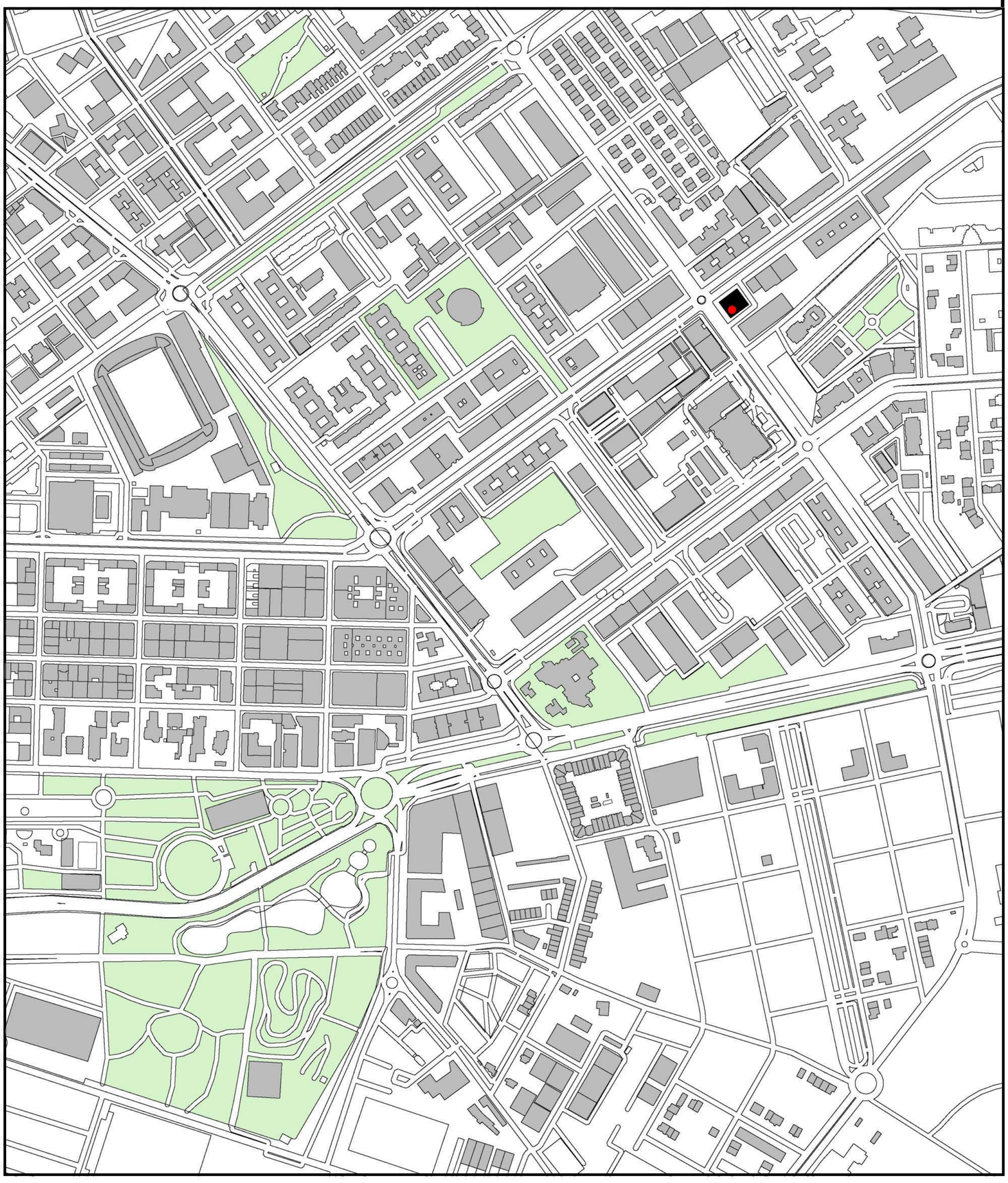
Socially Connected and Ecologically Sound Communities

95% -Design the infrastructure for well-balanced mixed use: short distances to work, shopping, schools, public transit, essential services, and recreation
70% -Create a living environment that meets human needs and protects the environment
85% -Provide sufficient green space in rural and urban residential areas
85% -Strengthen regional and local supply networks as well as self-sufficiency
80% -Select building sites that are located away from sources of contamination, radiation, pollutants, and noise

URBAN CONTEXT

My house is located on the outskirts of Talavera de La Reina, a small town two hours away from Madrid, the capital of the country.
And here I show with these maps the city and the area near my residence. This makes it easier to see the area where it is located.





Location map at a smaller scale to view the area, with the residence marked in black.

On page 7, the scale is increased to show the different uses in the area.

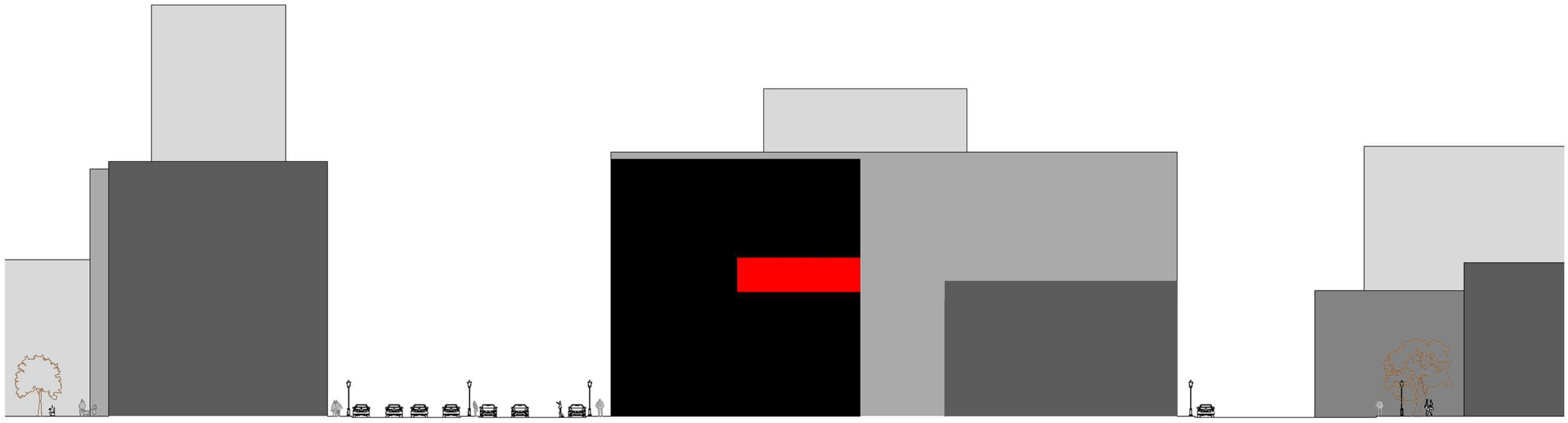
PRESENTATION OF MY FLAT

My house is on the 4th floor of the building, which has space for various shops on the first floor.
In the center of the building is the stair and elevator core, with a gap for an interior patio throughout the building.
Each floor has 4 apartments, creating symmetry.

The apartment has facades facing south, southeast, and southwest. The north-facing facade faces the interior patio and, therefore, the neighbor's facade, so it doesn't receive much light and has less privacy due to the proximity to the neighbor.

The apartment is old, both in design and layout. It had its first renovation about 30 years ago, and another renovation of just the bathroom 3 years ago.

Floor plan of the house showing the functions of each space and its context within the building, including the relationship with the neighbors.



Section of the house with the context, showing the different heights in the area and the distance between them, creating streets of varying widths.

DESIGN THE INFRAESTRUCTURES FOR WELL BALANCED MIXED-USE

BEST PRINCIPLE
95%

short distances to work, shopping, schools, public transit,
essential services and recreation

It is ideal to have all essential services close to home for various reasons:
- -Independence.
- -Save time.
- -Variety, comfort, diversity.
- -Economic reasons.

HEALTH AND POLLUTION (1)

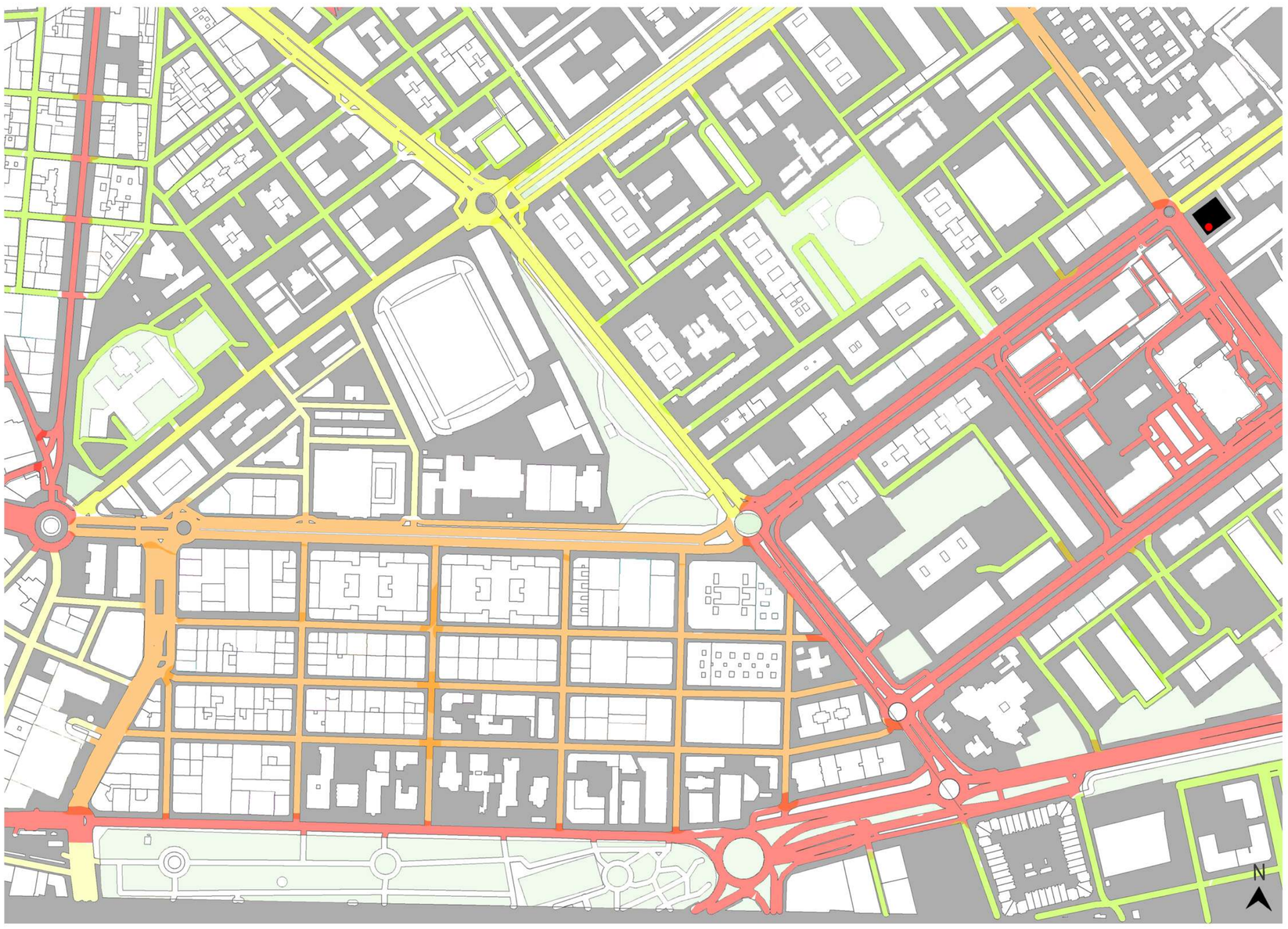
It s also a parameter that has repercussions on our health. It promotes **physical activity**, which helps prevent diseases caused by a sedentary lifestyle, such as obesity or cardiovascular problems.
Additionally, by reducing air pollution linked to car traffic, it improves air quality and reduces health risks for local residents. It also reduces stress by having everything nearby, eliminating the need for long car trips.

This lifestyle is also very practical and advantageous for the elderly and disabled. With everything within **easy reach** of the home, distances are reducede and so is the effort involved.

People will go to the shopping center and this also means there will be **traffic** and, therefore, **noise**, which leads to a certain level of pollution and stimuli. However, this is balanced out by the tranquility of the **residential area** on the other side. If you head towards the shopping center and other businesses, you'll notice the flow of activity, but if you go to the other side, you'll find only peace.

NEIGHBORHOOD AND SOCIAL

It promotes **coexistence and social cohesion** by creating neighborhoods where people regularly **meet with friends** in public spaces, encouraging **interactions.** What's more, by offering a variety of cultural, recreational, and leisure **activities** nearby, it contributes to the quality of life.



Traffic map of the area during weekdays, illustrating the general flow.

- Very busy
- Busy
- Slightly busy
- Not busy

DESIGN THE INFRAESTRUCTURES FOR WELL BALANCED MIXED-USE

short distances to work, shopping, schools, public transit,
essential services and recreation

BEST PRINCIPLE
95%

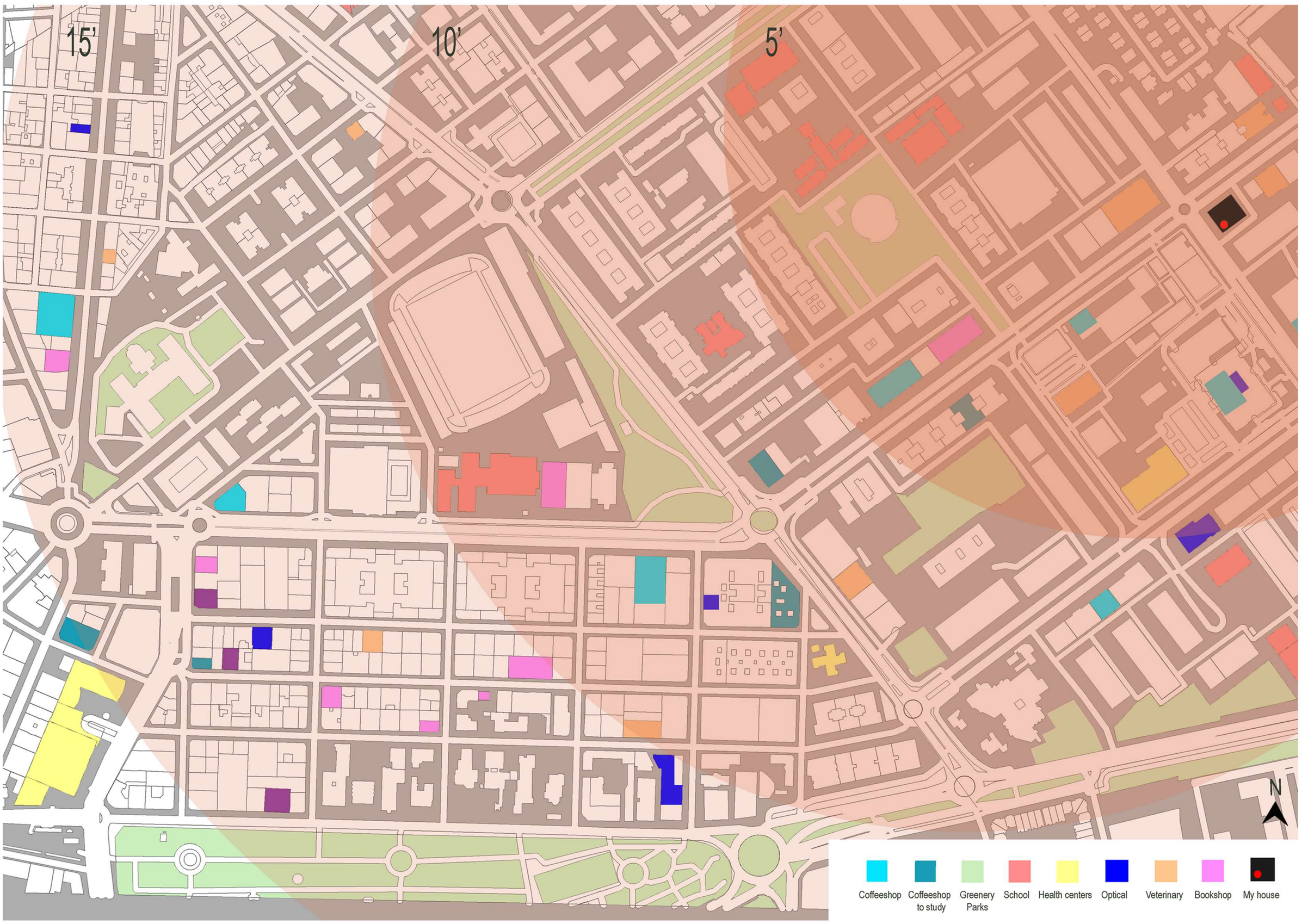
ADVANTAGES AND DISADVANTAGES (2)

ADVANTAGES

- I have all the shops I need nearby (supermarket, grocery shop, pharmacy, health center, veterinary...)
- If I use public transport (bus), i have to walk just 1 minute to take it
- My friends live nearby
- I can walk to anywhere because I'm a 15-minute walk from the center
- I live between a quiet area and a noisy one, so there is balance

DISADVANTAGES

-If I use the car, there are problems finding parking in the area with more shops, as there are not as many parking spaces as cars.



Distances plan.
Within a 15-minute range, we find the city center, where there are a multitude of shops and hospitality services, above all.
Within a 10-minute range, we find more green areas than in the area of my residence.
Within a 5-minute range, we have essential services and shops, but fewer green areas.

DESIGN THE INFRAESTRUCTURES FOR WELL BALANCED MIXED-USE

short distances to work, shopping, schools, public transit,
essential services and recreation

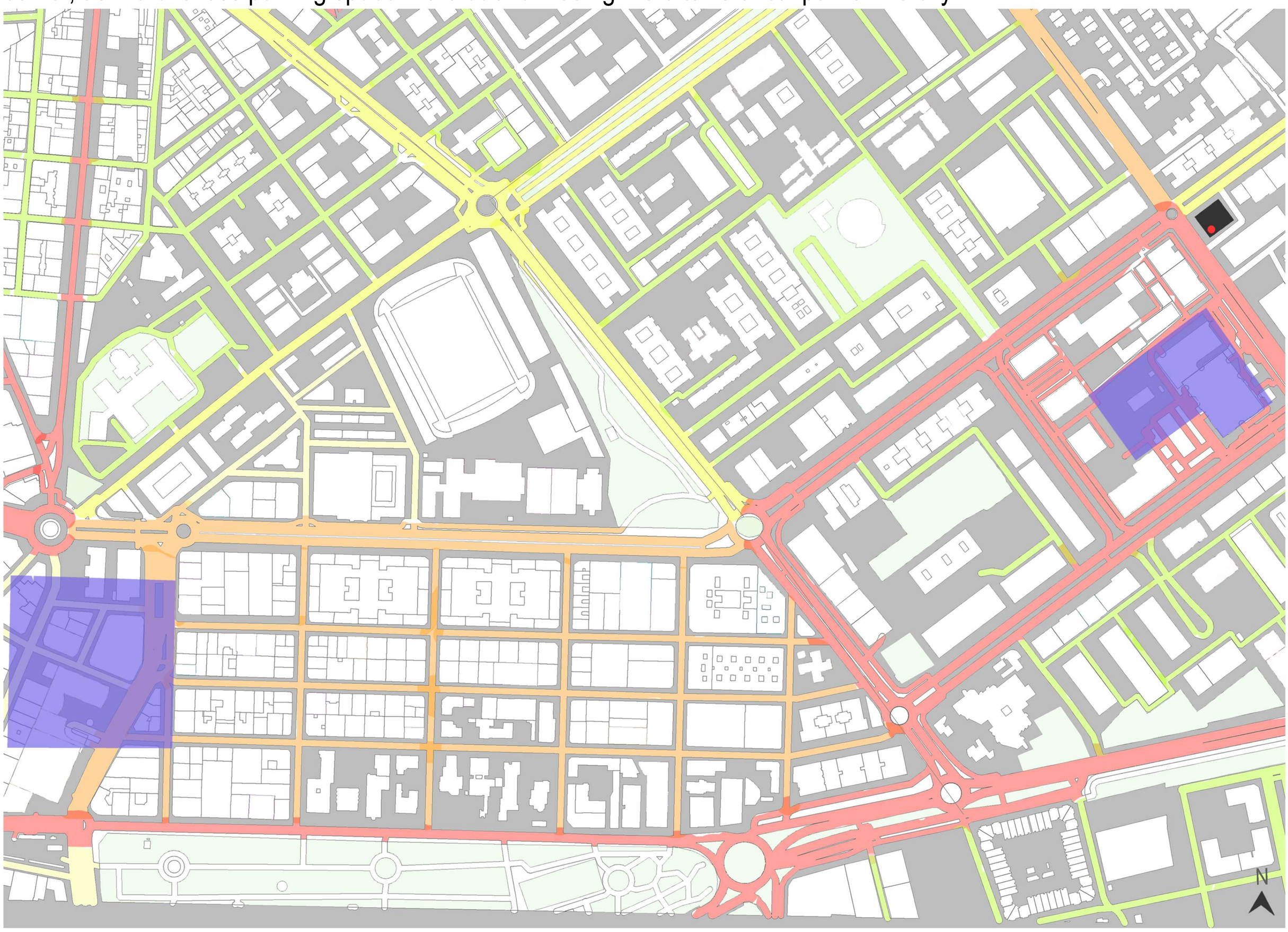
BEST PRINCIPLE
95%

HOW IT IS NOW

- As shown in the previous distance map, I have everything I need within a 15-minute walk.
- I have supermarkets, pharmacies, cafes, veterinarians... all within 5 minutes.
- I am also a 1-minute walk from the bus stop.
- My friends live within this 15-minute radius, so we often meet up to grab a drink, take a walk, go for a run...

WHAT SUGGESTIONS CAN I RECOMMEND

The only suggestion to improve the area would be the creation of underground parking lots to ease traffic flow and avoid wasting time searching for parking. However, this personally only affects me when I want to use the car to go to the city center, as there is less parking space there due to it being the old/historical part of the city.



General traffic map highlighting in blue the areas that could be converted into underground parking, as they currently serve as storage spaces. These cases are located at a shopping center (right) and near the bus station and a busy commercial area (left).

Traffic map of the area during weekdays, illustrating the general flow.

Very busy Busy Slightly busy Not busy

Public parking plan

PROVIDE SUFFICIENT GREEN SPACE IN RURAL AND URBAN RESIDENTIAL AREAS

BEST PRINCIPLE
85%

Green spaces are essential as they provide us with an area to disconnect, an escape from the city.

- A **recreational** area, a meeting place, where **interactions** between neighbors or people from further away are encouraged. Families take advantage of it so that **children** can have fun in a natural and safe environment.

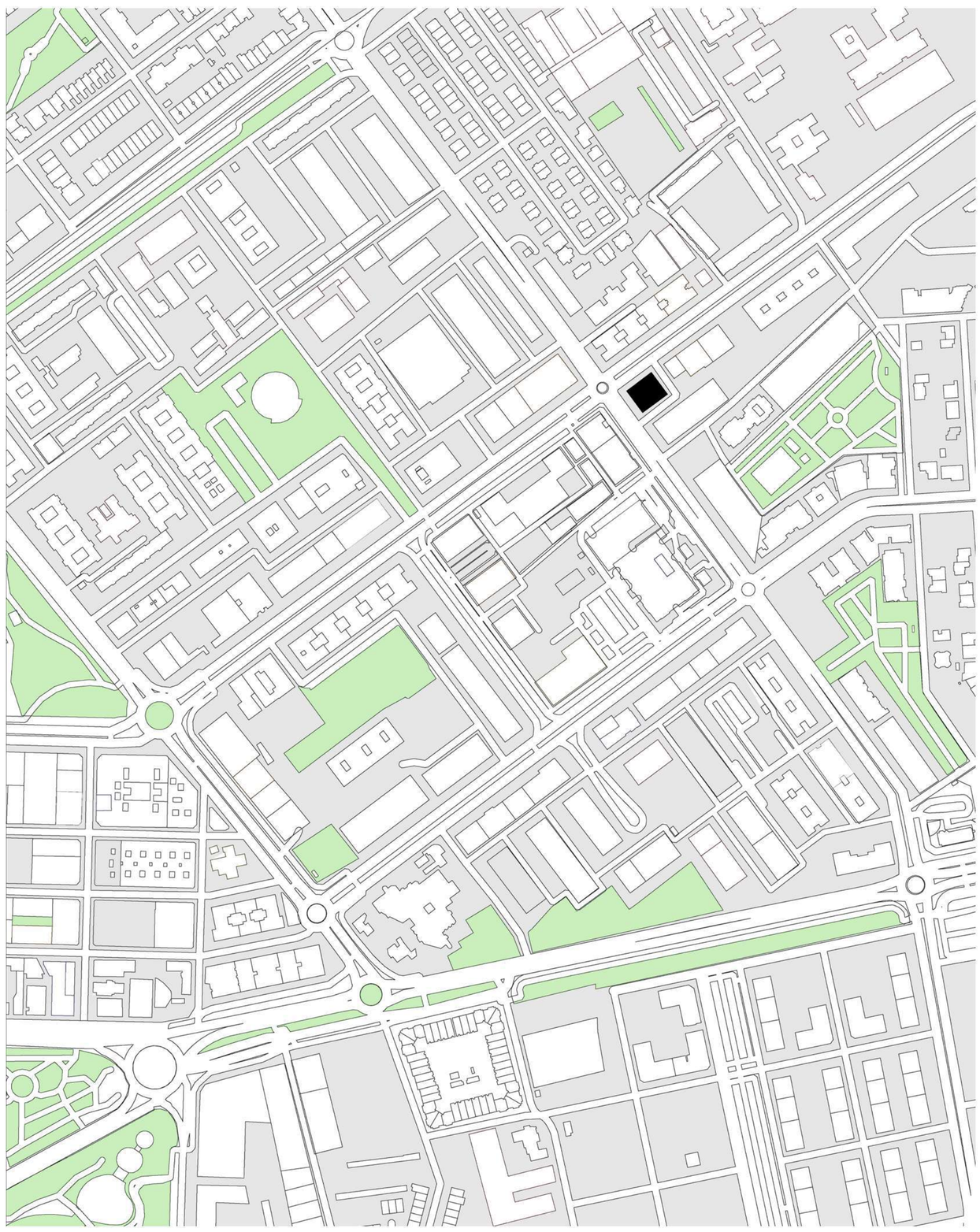
- An area where, if you have **pets** like I do, you can spend quality time with them, playing and walking on the grass instead of on the pavement of the city. This is very important because in summer, the asphalt reaches high temperatures that can be harmful to animals, while in the park, the freshness is maintained.

HEALTH (3)(4)
Cardiovascular health improvement: Walking, running, or exercising in parks promotes blood circulation and heart health, reducing the risk of cardiovascular diseases.

Increase in physical activity: Parks provide an accessible space for regular exercise, helping maintain a healthy weight, improve muscle strength, and increase physical endurance.

Improvement of mental well-being: Spending time in parks, surrounded by nature, can improve mood, enhance concentration, and reduce symptoms of depression and anxiety.

Better air quality: The plants and trees in parks help purify the air, reducing pollution and providing a healthier environment to breathe.



Map of the green areas in the city, showing that there are several green spaces near the residence.

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PROVIDE SUFFICIENT GREEN SPACE IN RURAL AND URBAN RESIDENTIAL AREAS

BEST PRINCIPLE
85%

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Outdoor activities.
- Time for relaxation and tranquility.
- A safe area away from the city's traffic.
- Cushion the pollution.

DISADVANTAGES

- The only disadvantage that personally affects me is allergies to certain plants, so in spring or when there is more pollen in the air, it becomes a problem for me. During those times, it is difficult for me to be in the park without taking medication.

HOW IT IS NOW

Currently, there are several green spaces in the area, of varying sizes. The closest one is just a 1-minute walk away. The largest green space in the city is less than a 15-minute walk, and that's the one I visit most often, as it has a large area and more vegetation.

WHAT SUGGESTIONS CAN I RECOMMEND

I can't think of an improvement; I think it's well balanced, but it could always be better. For example, a green space could be added in the residential area.

Map of existing green areas, highlighting the largest green area in the city, and proposing new green zones in locations currently occupied by ruins or vacant spaces.

Images of the largest green area in the city.

PROVIDE THE BEST POSSIBLE QUALITY OF DRINKING WATER

BEST PRINCIPLE
80%

The supply of high-quality water is **key** to the sustainable development of a city.
It is **essential** for domestic, commercial, and industrial activities. Furthermore, an efficient potable water system strengthens a city's resilience against natural disasters, such as droughts or floods.

HEALTH (6)

High-quality drinking water is the foundation for a **healthy life**. It not only prevents diseases but also improves quality of life, life expectancy, and reduces the burden on public health systems. Investing in safe drinking water is an investment in the collective health of the population.

- It prevents waterborne **diseases** such as cholera, diarrhea, and typhoid fever, which can spread quickly in densely populated urban areas.

- It also reduces exposure to **chemical contaminants** like lead or arsenic, which can cause long-term health problems.

- Pregnant women and children are especially sensitive to consuming contaminated water.

- Clean drinking water is essential for preparing **food safely**. Contaminants in the water can transfer to food, affecting nutrition and causing digestive problems.

Map of reservoirs, water tanks, and water treatment areas in Talavera de la Reina.

ENSURE HIGH-QUALITY DRINKING WATER

BEST PRINCIPLE
80%

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- The distribution of high-quality drinking water promotes responsible practices and reduces reliance on bottled water, helping to decrease plastic waste and preserve ecosystems.

- It is good for health, prevents diseases...

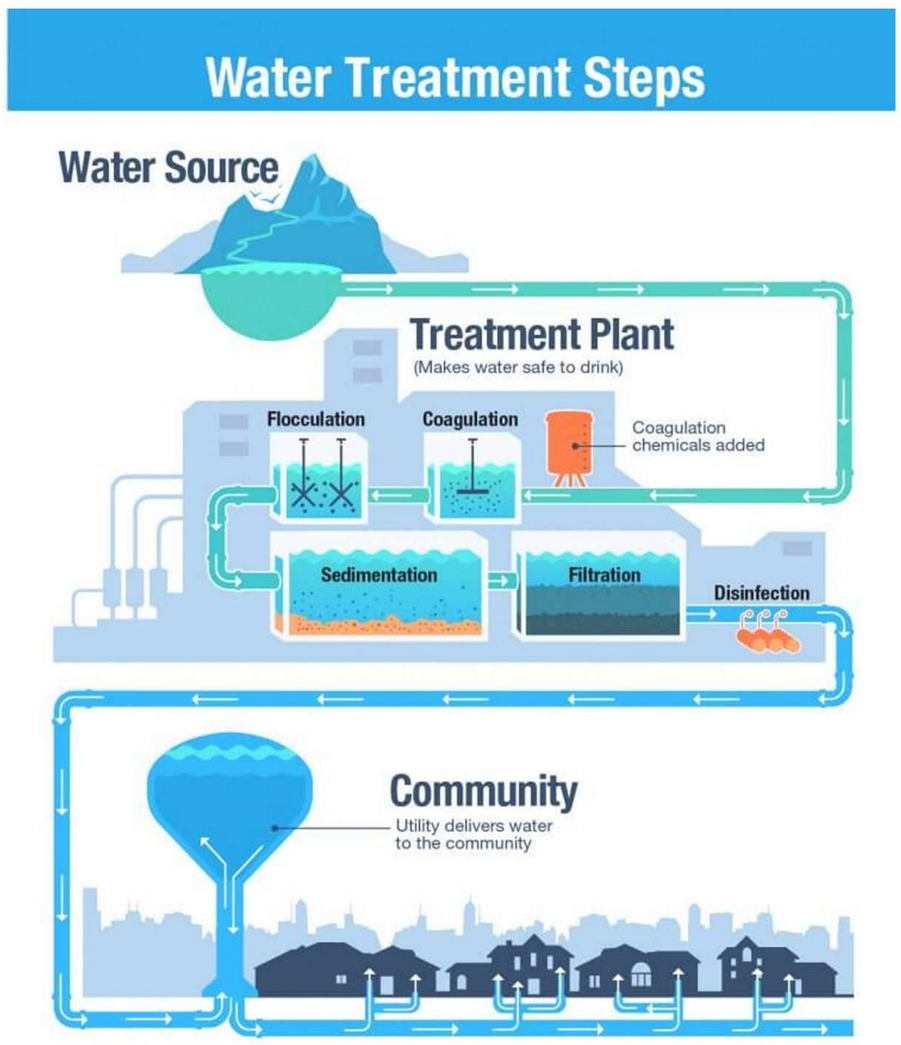
HOW IT IS NOW (5)

The drinking water that reaches Talavera is primarily managed through two large nearby reservoirs (3 km away), which, along with the water treatment plants, supply the city with potable water. There are various storage tanks around the city, as water is also supplied to 5 nearby towns.
The efficient management of these facilities ensures that the population has access to quality water for their daily needs.

The reservoir on the left of the map has a capacity of 5 hm^3 and a surface area of approximately 90 hectares, while the one on the right has a capacity of 7 hm^3 and a surface area of about 250 hectares.
The water is perfectly drinkable, but it is true that at least once a year, the water is cut off for a couple of days due to water treatment issues.

WHAT SUGGESTIONS CAN I RECOMMEND

Improvements have been planned for the water supply infrastructure. This expansion aims to ensure an adequate supply of water in both quantity and quality to meet the future needs of the city and its surroundings.
For technical purposes, I'm not sure how it could be improved.



In these images, a water treatment area of Talavera de la Reina is shown, and on the right, the water treatment process carried out at these facilities.

STRIVE FOR A WELL-BALANCED RATIO BETWEEN THERMAL INSULATION AND HEAT RETENTION AS WELL AS INDOOR SURFACE AND AIR TEMPERATURES

WORST PRINCIPLE
10%

In buildings primarily intended for housing, the insulation process must be completed properly, using the right materials and in the correct order to achieve the best possible insulation.

My building is **old**, and during its construction, proper insulation was not achieved, so the entire building has **poor insulation**.

The walls are thin, and the windows and doors do not provide perfect insulation. This results in some **acoustic pollution** inside the house, with neighbors, and to a lesser extent, from street traffic during peak hours.

Regarding temperature, thanks to the various materials in the house, such as the porcelain floor tiles, the kitchen wall tiles, and the brick and plaster walls, the house maintains a **low temperature** throughout the year. In winter, it is quite cold, and in summer, it retains the cold, keeping the temperature lower than the outside.

Poor insulation in a house can have several health consequences, including: (7)
- Respiratory problems: Poor insulation can allow moisture, mold, and fungi to enter, which can lead to respiratory issues such as asthma, allergies, or respiratory infections.
- Thermal stress: If the home is poorly insulated, indoor temperatures can be hard to regulate, causing discomfort and thermal stress, which affects overall well-being.
- Cold or heat-related illnesses: Poor insulation can let extreme cold or heat into the home, increasing the risk of weather-related illnesses such as colds, flu, or heat strokes.
- Higher risk of cardiovascular diseases: Sudden temperature changes and difficulty maintaining a constant temperature can put pressure on the cardiovascular system, especially in older individuals or those with pre-existing conditions.
- Stress and anxiety: A noisy or uncomfortable environment due to lack of insulation can increase stress and anxiety, affecting mental health.

Good insulation, on the other hand, improves air quality, regulates temperature, and reduces the risk of illnesses, creating a healthier and more comfortable environment.

Floor plan of the house showing the windows and the heating system with radiators.

radiator
windows

Floor plan of the house showing the warmest and coldest areas, influenced by the sun's exposure throughout the day.

Cold scale
< <

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STRIVE FOR A WELL-BALANCED RATIO BETWEEN THERMAL INSULATION AND HEAT RETENTION AS WELL AS INDOOR SURFACE AND AIR TEMPERATURES

WORST PRINCIPLE
10%

ADVANTAGES AND DISADVANTAGES (8)

ADVANTAGES

- Greater natural ventilation: If the house is not well insulated, there may be more air circulation, allowing the house to "breathe" more. This could be seen as an advantage in warm or dry climates, as the ventilation could help keep the air cooler, as it happens in summer.

DISADVANTAGES

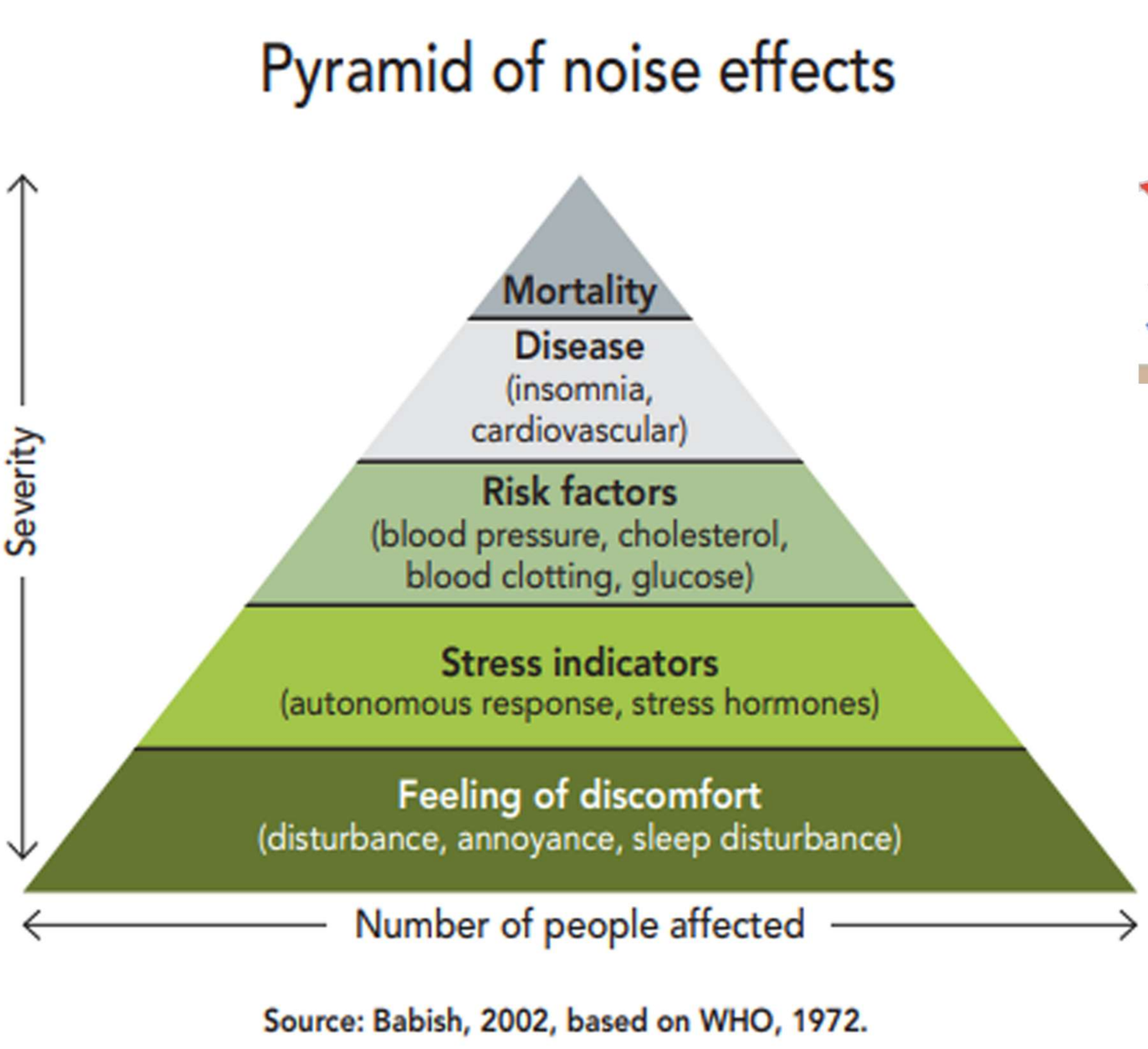
- Higher energy consumption: Without proper insulation, the house doesn't retain heat in winter or coolness in summer, which forces more energy use for heating or air conditioning, increasing electricity costs.

- Annoying noise: Poor acoustic insulation, which often accompanies poor thermal insulation, can allow external noises such as traffic, neighbor conversations, and other sounds to enter, reducing the quality of life and rest.

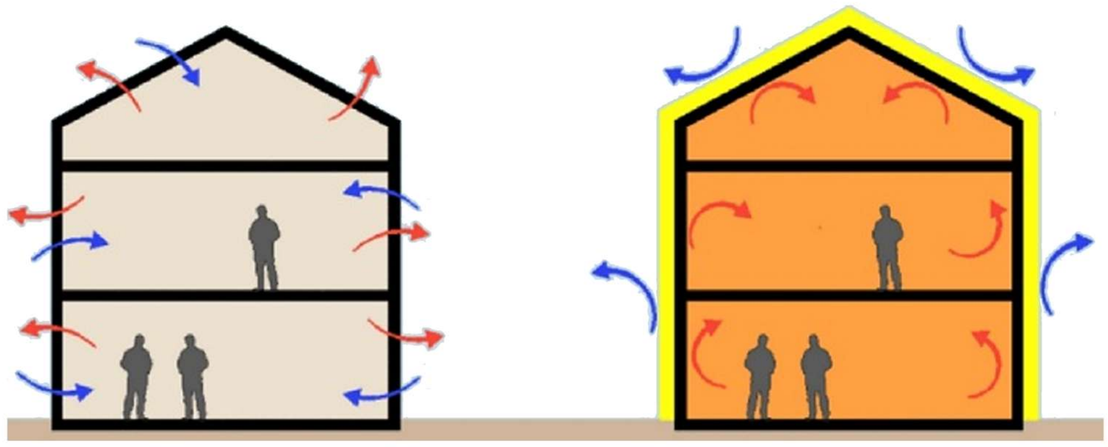
- Higher health risks: Extreme temperatures due to poor insulation can cause thermal stress, which especially affects the elderly, children, and people with pre-existing health issues.

- Higher environmental impact: Poor insulation contributes to a larger carbon footprint, as the higher energy demand to maintain indoor temperatures implies greater use of non-renewable resources, which impacts the environment.

- Accelerated wear of materials and structures: Lack of proper insulation can cause greater wear on building materials due to thermal fluctuations, which can affect the long-term durability of the home.



Source: Babish, 2002, based on WHO, 1972.



In these images, we can see at the top right what happens with good or poor insulation; at the bottom right, the efficiency ranges of homes based on energy consumption. In this case, my home would be around grade E.

STRIVE FOR A WELL-BALANCED RATIO BETWEEN THERMAL INSULATION AND HEAT RETENTION AS WELL AS INDOOR SURFACE AND AIR TEMPERATURES

WORST PRINCIPLE
10%

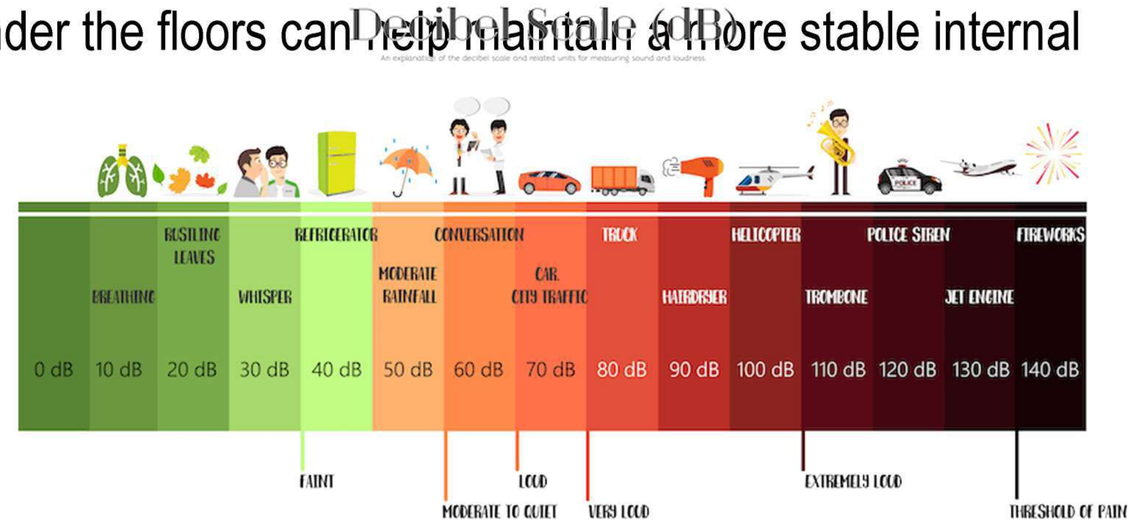
HOW IT IS NOW

Currently, a lot of heating is used in winter to warm the house, and even so, we notice the leaks because it doesn't warm up or stay warm for long. Additionally, we use electric heaters, which consume a lot of energy.
On the other hand, regarding noise pollution, we can hear the neighbors from both above, below, and next door. This can be quite annoying at times.

WHAT SUGGESTIONS CAN I RECOMMEND

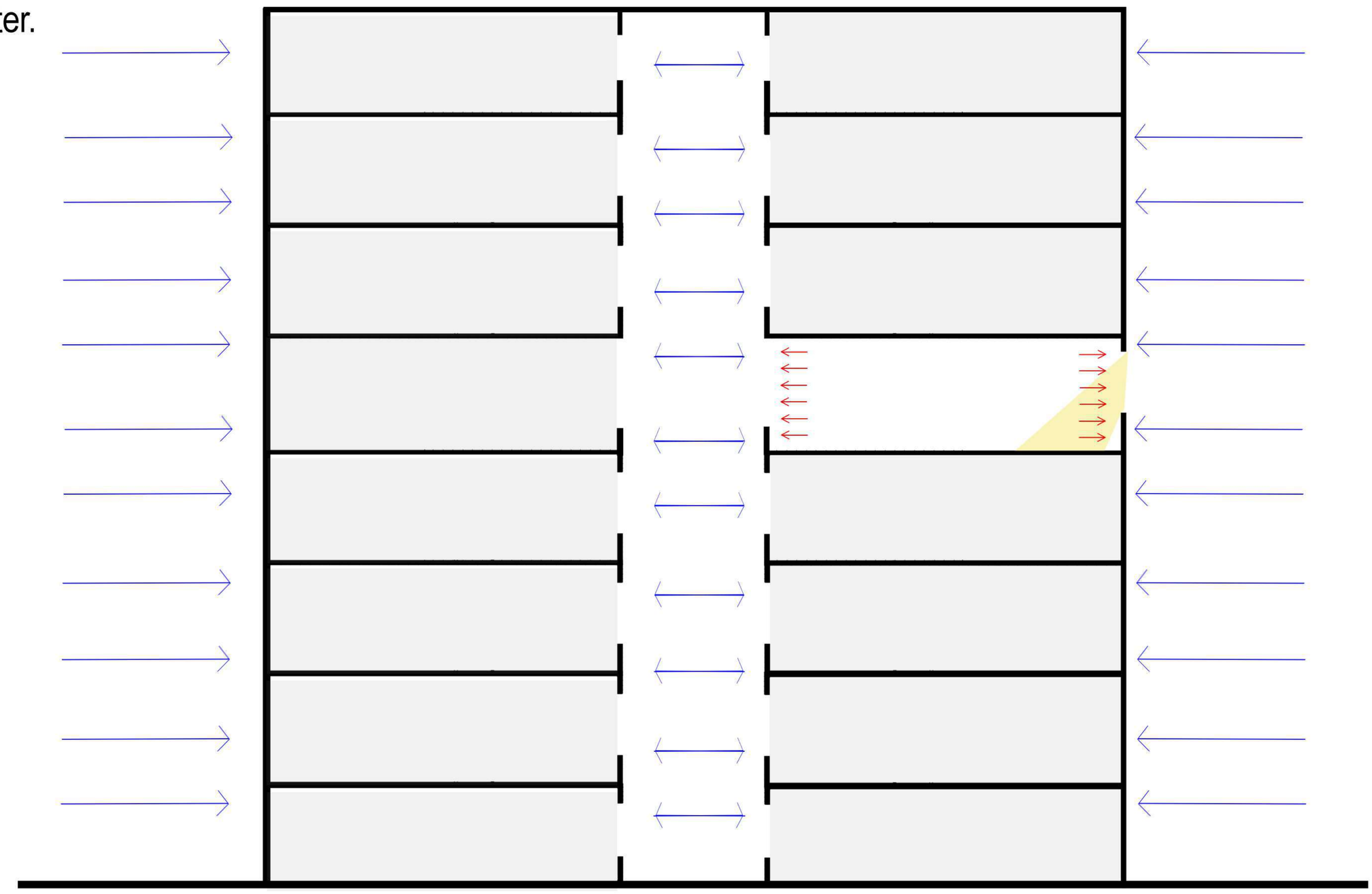
- Floor Insulation: In buildings with cold floors, placing insulation under the floors can help maintain a more stable internal temperature and reduce energy consumption for heating.

- Installation of Double or Triple Glazed Windows: Double-glazed windows with inert gas between the panes are one of the most effective ways to reduce heat loss. This improves both thermal and acoustic insulation.



- Sealing Windows and Doors: Using weatherstripping or sealants to seal cracks around windows and doors prevents air leakage and improves thermal insulation.

- Thermal Curtains and Blinds: Installing thermal curtains can help reduce heat gain in the summer and prevent heat loss in the winter.



Section of the entire building showing areas where external air leaks due to poor insulation.
In the section of my home, I illustrate how heat enters and escapes due to this..

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MINIMIZE EXPOSURE TO ELECTROMAGNETIC FIELDS AND WIRELESS RADIATION

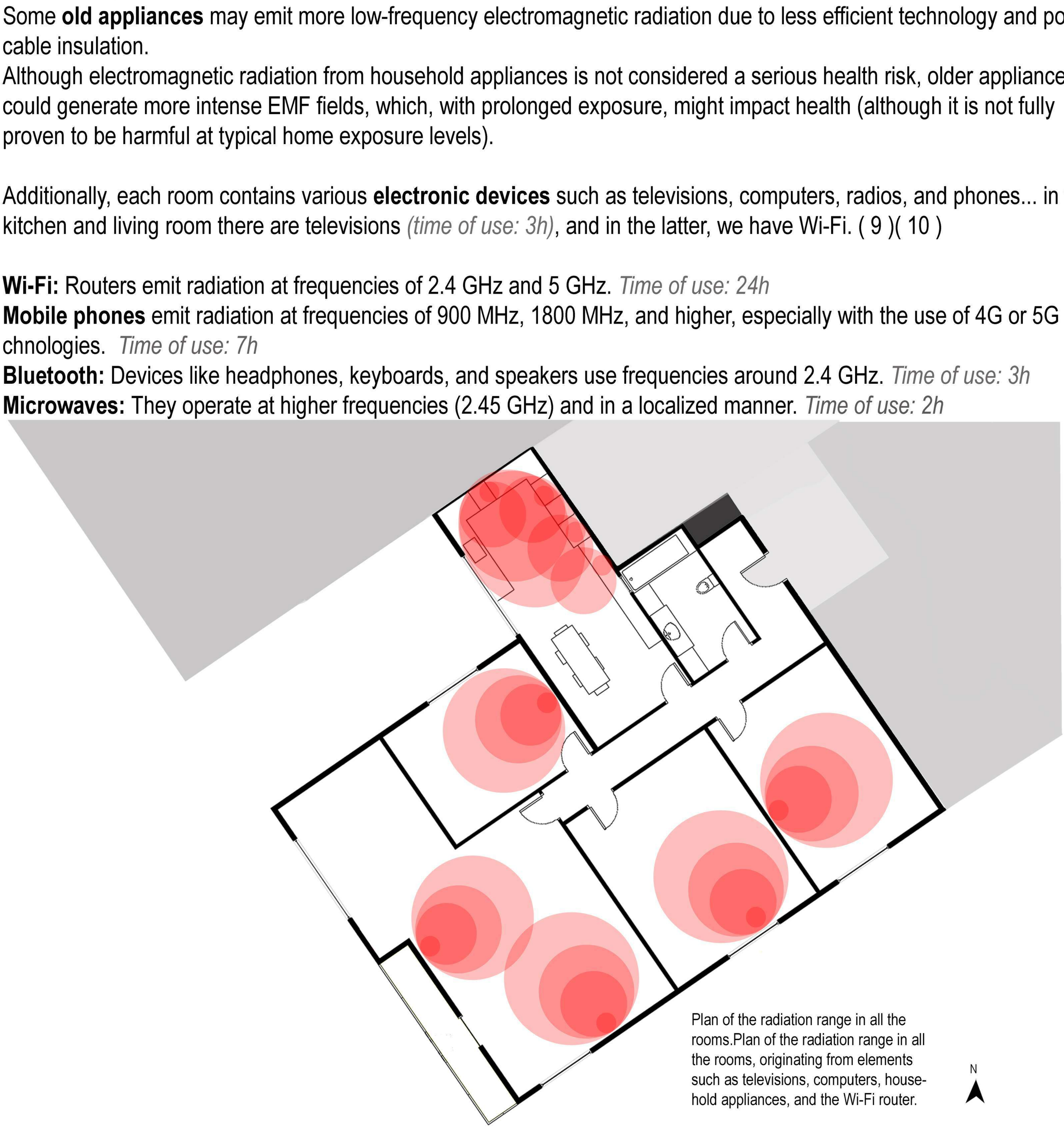
WORST PRINCIPLE
15%

The layout of spaces in a house directly influences **physical and mental health**. A proper design promotes rest by placing bedrooms in quiet and well-ventilated areas. It also helps maintain a healthy environment by controlling air quality and reducing the risk of accidents.
An appropriate arrangement of spaces contributes to disease prevention and improves safety and organization, creating a generally healthier environment. (10)

As for the layout of my house, the kitchen is located across from the bedroom.
Some **old appliances** may emit more low-frequency electromagnetic radiation due to less efficient technology and poor cable insulation.
Although electromagnetic radiation from household appliances is not considered a serious health risk, older appliances could generate more intense EMF fields, which, with prolonged exposure, might impact health (although it is not fully proven to be harmful at typical home exposure levels).

Additionally, each room contains various **electronic devices** such as televisions, computers, radios, and phones... in the kitchen and living room there are televisions *(time of use: 3h)*, and in the latter, we have Wi-Fi. (9)(10)

Wi-Fi: Routers emit radiation at frequencies of 2.4 GHz and 5 GHz. *Time of use: 24h*
Mobile phones emit radiation at frequencies of 900 MHz, 1800 MHz, and higher, especially with the use of 4G or 5G technologies. *Time of use: 7h*
Bluetooth: Devices like headphones, keyboards, and speakers use frequencies around 2.4 GHz. *Time of use: 3h*
Microwaves: They operate at higher frequencies (2.45 GHz) and in a localized manner. *Time of use: 2h*



Plan of the radiation range in all the rooms.Plan of the radiation range in all the rooms, originating from elements such as televisions, computers, household appliances, and the Wi-Fi router.

N

MINIMIZE EXPOSURE TO ELECTROMAGNETIC FIELDS AND WIRELESS RADIATION

WORST PRINCIPLE
15%

ADVANTAGES AND DISADVANTAGES (11)

ADVANTAGES

- Convenience and Connectivity: They allow wireless access to the internet, instant communication, and connection of devices without cables.
- Energy Efficiency: They are generally efficient in energy consumption, operating with low power.
- Ease of Use: They are easy to use, enhancing flexibility in daily tasks such as quickly heating food or connecting devices.
- Accessibility: They enable constant connection to information, communication, and remote work.

DISADVANTAGES

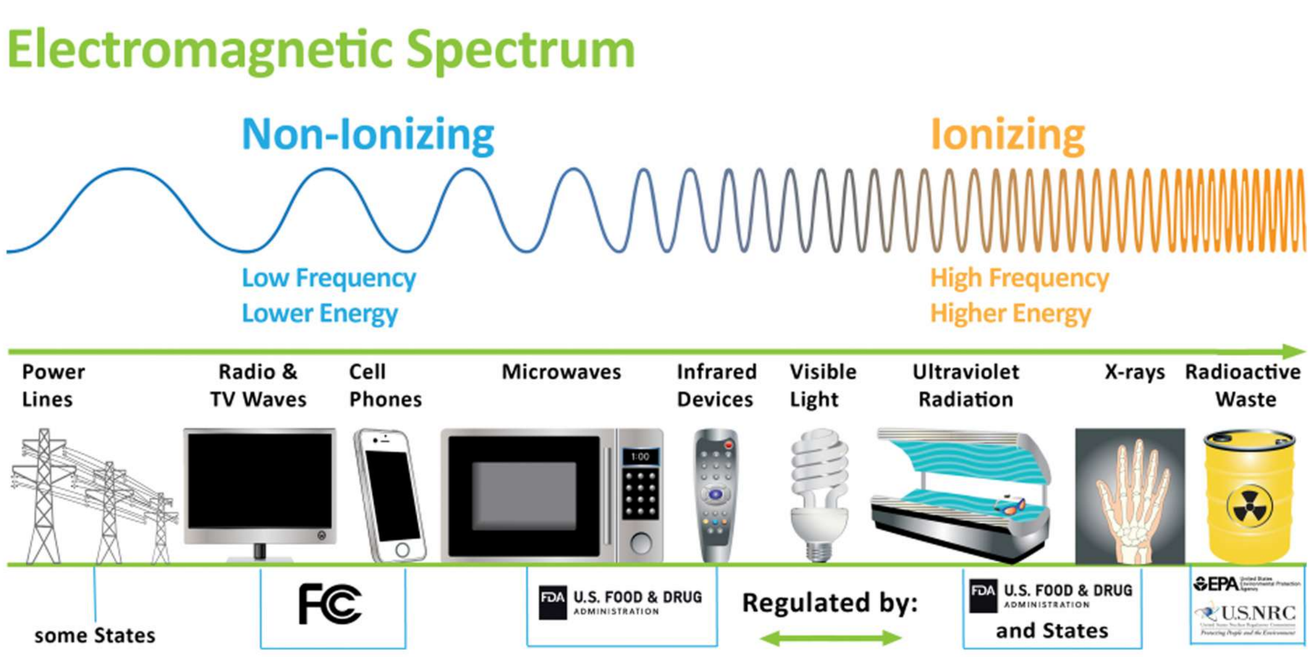
- Possible health effects: Although not conclusive, some studies suggest that prolonged exposure could have negative impacts on sleep and brain function.
- Interference: Signals from devices like Wi-Fi and Bluetooth can interfere with each other, affecting performance.
- Dependence on technology: Failures of these devices can cause disconnection or access issues.
- Privacy risks: They may be vulnerable to security attacks, compromising personal information privacy.
- Effects on the electrical grid: Excessive use can cause spikes in energy consumption, affecting efficiency.

HOW IT IS NOW

As seen in the floor plan of my house, there is close proximity to these elements. This was not taken into account in the house layout, and there would be no problem if the appliances were new, but that is not the case.

WHAT SUGGESTIONS CAN I RECOMMEND

To improve this situation, appliances should be replaced with newer, more efficient models that emit lower electromagnetic radiation. Additionally, certain devices can be turned off when not in use. The router should be placed in a location where people do not spend much time.



MINIMIZE ENERGY COMSUPTION AND USE RENEWABLE ENERGY

WORST PRINCIPLE
20%

Promoting practices that encourage energy conservation and the use of renewable energy is crucial to protect the environment, improve human health, and ensure a sustainable future.

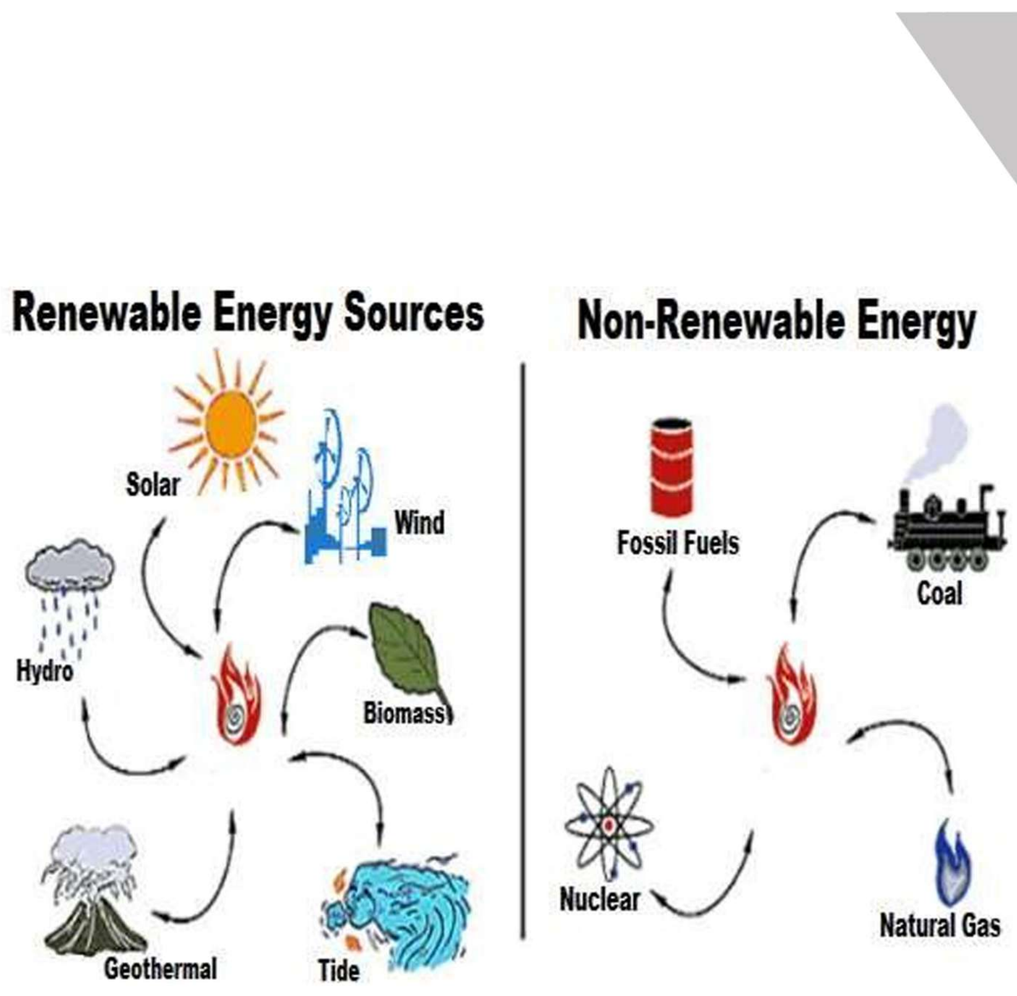
Non-renewable energy sources, such as fossil fuels, release greenhouse gases that accelerate global warming, whereas **renewable energies** like solar and wind are cleaner and help mitigate this issue.
Unlike fossil fuels, renewable energies are **inexhaustible** and do not deplete natural resources, ensuring a long-term energy supply.
As renewable technologies become more accessible, their **production and consumption costs decrease**, which can lower energy bills and reduce dependence on external sources. Additionally, the shift to cleaner energy sources **reduces air pollution**, benefiting human health by decreasing respiratory and cardiovascular diseases.

Finally, relying less on **external and limited energy sources** strengthens energy security at both local and national levels.

HEALTH
The relationship between energy use and health is direct and significant. Here's how:

Reduction of air pollution: The use of fossil fuels to generate energy (such as coal, oil, or natural gas) releases pollutants into the air, including fine particles, sulfur dioxide, nitrogen oxides, and carbon dioxide. These pollutants contribute to respiratory, cardiovascular, and other health issues like asthma, chronic bronchitis, heart disease, and strokes. By opting for renewable energy, which does not emit these pollutants, air quality improves, benefiting public health.

Effects on mental well-being: Living in an environment with clean air and less pollution can reduce stress and anxiety, as people tend to feel safer in cleaner environments.
(16)



Floor plan of my home showing the heating system with radiators, and the windows as points of heat escape, in addition to the walls, from the heat generated by the boiler. In the image on the left, we see examples of renewable and non-renewable energies; in my case, natural gas is used.

N

MINIMIZE ENERGY COMSUPTION AND USE RENEWABLE ENERGY

WORST PRINCIPLE
20%

ADVANTAGES AND DISADVANTAGES (15)

ADVANTAGES

-Reduction of long-term costs: Although the initial investment may be high, using renewable energy sources, such as solar panels or wind systems, can significantly reduce electricity bills in the long run, as operational costs are low and energy is free once installed.

-Reduced environmental impact: Renewable energy sources do not emit greenhouse gases or pollutants, helping to reduce the carbon footprint of the home and combat climate change.

DISADVANTAGES

-Environmental impact: Contributes to climate change and pollution if the energy comes from non-renewable sources.

-High costs: Electricity bills can increase significantly, raising monthly expenses.

HOW IT IS NOW
Currently, due to poor insulation in the house, a lot of energy is consumed to heat it during the winter. For this, radiators heated by a natural gas boiler controlled by an individual thermostat are used. Additionally, electric radiators are used when the heating is insufficient or when it's not in operation. This results in higher electricity and heating expenses.

WHAT SUGGESTIONS CAN I RECOMMEND
To reduce excessive energy consumption in a home, it's important to improve insulation, replace old appliances with energy-efficient ones, and use programmable thermostats to optimize heating and cooling. Using renewable energy sources like solar panels and switching to LED bulbs further reduces energy use.
These measures, when combined, help lower energy consumption and costs.

1. Install photovoltaic solar panels: This is one of the most accessible ways to generate renewable energy at home. Solar panels convert sunlight into electricity and are suitable for almost any home with sufficient sun exposure.

2. Use solar water heaters: This technology is simple to install and allows heating the home's water using solar energy, reducing the dependence on electricity or gas for this purpose.

3. Switch to LED bulbs: While not a renewable energy source itself, LED bulbs consume less energy, which reduces overall electricity consumption and can be complemented with other renewable energy sources.

These options are relatively easy to obtain and install, and they can provide immediate benefits by reducing energy consumption and bills.

OPTIMIZE ROOM ACOUSTICS AND CONTROL NOISE, INCLUDING INFRASOUND

WORST PRINCIPLE
30%

A good acoustic insulation is essential for various reasons:

- Improving quality of life
- Privacy
- Physical and mental health

Infrasound is commonly produced by natural events (such as earthquakes or storms) or artificial sources (such as machinery, engines, wind turbines, and large HVAC systems).

HEALTH (14)

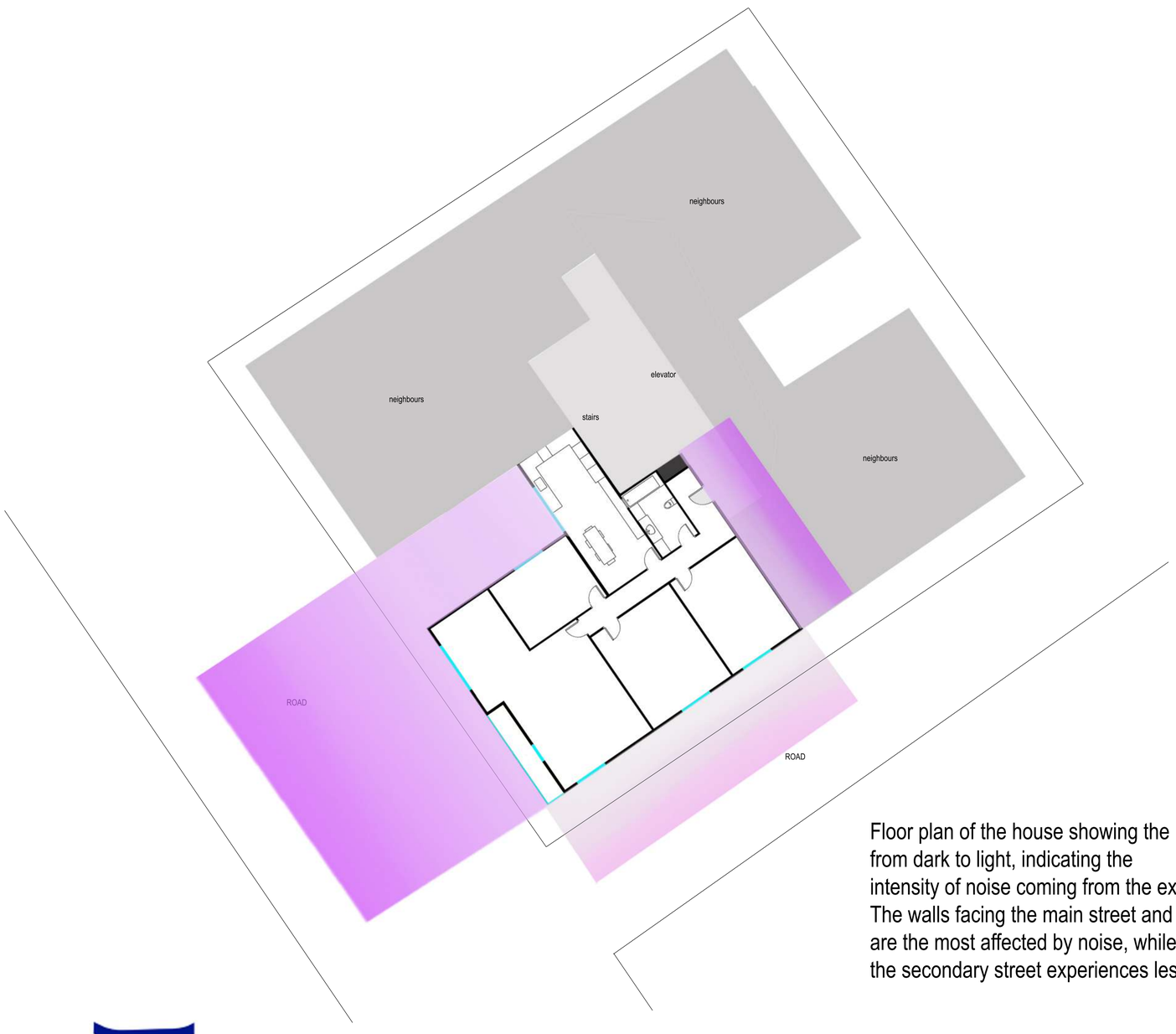
- Physical discomfort: Infrasound can cause physical discomfort such as nausea, headaches, and even generate feelings of anxiety in sensitive individuals.

- Psychological effects: It has been reported that infrasound can create feelings of unease, fear, or discomfort, even without the person being aware of the sound source.

- Sleep disruption: Nocturnal noise from neighbors can interrupt rest, leading to insomnia and fatigue. This affects both physical and mental health, increasing stress and reducing productivity.

- Stress and anxiety: The lack of privacy and constant noise from neighbors creates a sense of discomfort and anxiety. This can contribute to mental health issues such as irritability or generalized anxiety.

- Concentration and performance problems: For those who work or study at home, noise from neighbors can hinder concentration, reducing productivity and affecting academic or work performance.



Floor plan of the house showing the noise levels from dark to light, indicating the intensity of noise coming from the exterior. The walls facing the main street and the neighbors are the most affected by noise, while the wall facing the secondary street experiences less noise.

Traffic map of the area during weekdays, illustrating the general flow.

- Very busy
- Busy
- Slightly busy
- Not busy

N

OPTIMIZE ROOM ACOUSTICS AND CONTROL NOISE, INCLUDING INFRASOUND

WORST PRINCIPLE
30%

ADVANTAGES AND DISADVANTAGES (13)

ADVANTAGES

Actually:

- Poor acoustic insulation can make people more aware of the sounds around them, which may lead them to develop a heightened sense of auditory perception, although this "effect" could also become a stress factor if the sounds are disturbing.

Good insolation:

- Reduction of stress and anxiety: Constant noise and interruptions caused by acoustic pollution are stress factors. Good acoustic insulation promotes a more relaxed environment and is less likely to generate anxiety, irritability, and emotional fatigue, improving sleep quality and reducing the risk of insomnia.

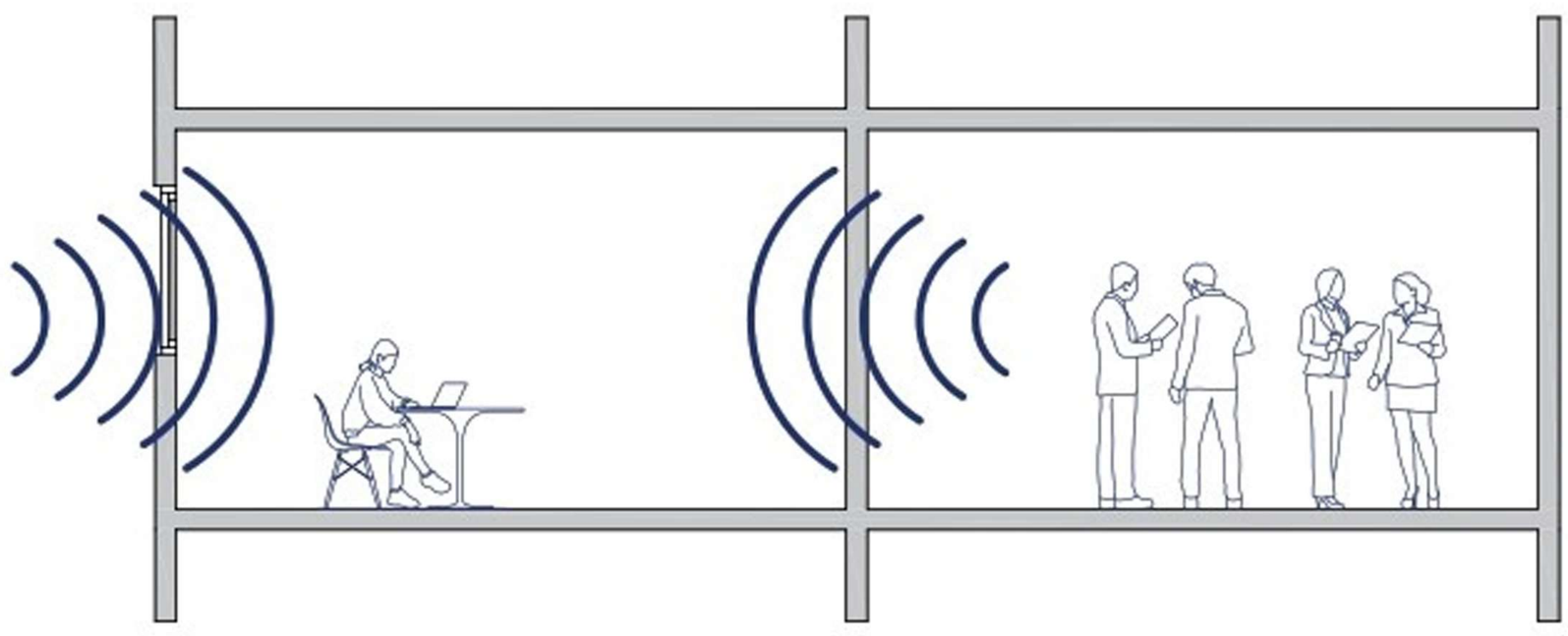
- Greater privacy: With good acoustic insulation, noises inside the home do not spread to the outside and vice versa. This allows for private conversations without neighbors overhearing, while also preventing external noises from invading personal space. Privacy is essential for emotional well-being and security.

DISADVANTAGES

- Generate chronic stress and mental health problems: Constant exposure to environmental noise can contribute to the development of disorders such as anxiety, depression, and irritability.

- Physical health problems: The combination of noise from different sources increases the risk of cardiovascular diseases, hypertension, and hearing loss.

- Difficulties in resting and concentrating: The lack of a peaceful environment, both inside and outside the home, makes it difficult to concentrate and relax, affecting productivity and overall well-being.



Three images illustrating types of noise that can affect a home and how they penetrate the interior due to poor or insufficient insulation.
Traffic noise, neighbor noise...

OPTIMIZE ROOM ACOUSTICS AND CONTROL NOISE, INCLUDING INFRASOUND

WORST PRINCIPLE
30%

HOW IT IS NOW

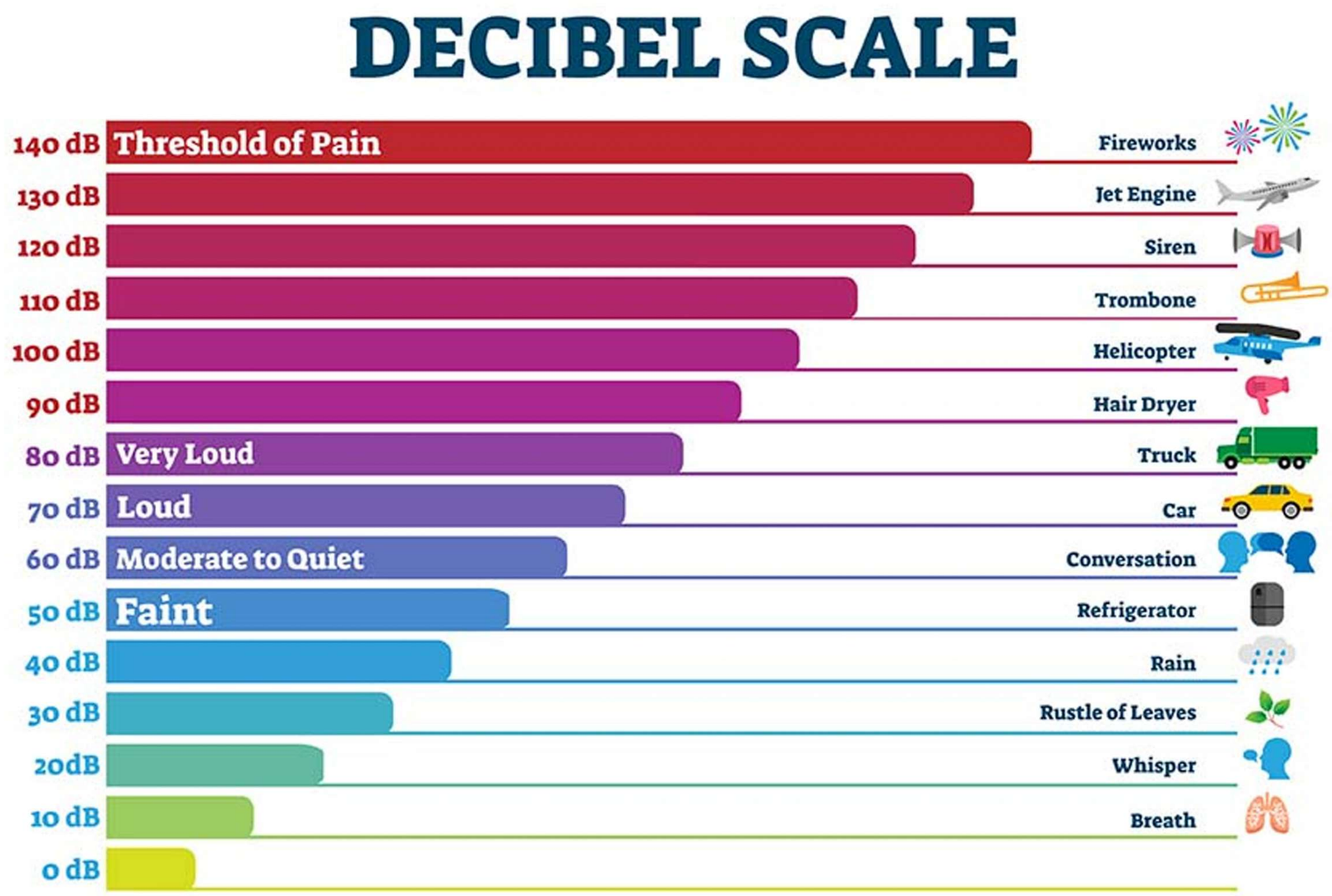
Currently, due to poor insulation in the home, noise from neighbors and the street filters through. As a result, privacy is lost as conversations can be heard, as well as the television or music. Regarding street noise, traffic noise is heard to a lesser extent during peak hours. During festive periods, the traffic, large crowds, and fireworks generate a lot of noise. As a consequence, this affects sleep, causing insomnia, stress and fatigue.

Noise Level	Effect
150 dB	cause instant loss of hearing.
120 dB	is physically painful and should be avoided.
100 dB	short periods of exposure cause a temporary loss of acuity (threshold shift) with prolonged exposure likely to cause irreparable damage to auditory organs.
90 dB	long term exposure at this level normally causes permanent hearing loss.
65 dB	long periods of exposure cause both mental and bodily fatigue.

WHAT SUGGESTIONS CAN I RECOMMEND (12)

To mitigate this, different measures can be taken:

- Soundproof windows: Double-glazed windows or those with soundproofing materials help block external noise.
- Acoustic curtains or panels: Placing thick curtains or acoustic panels on walls and windows can help reduce the noise entering from the outside.
- Communication: Talking to neighbors and reaching agreements on noise levels and timings can be an effective solution.
- Noise-cancelling technology: In some cases, using headphones or active noise-cancelling devices can help mitigate the impact of unwanted noise, although this can become bothersome in the long run.



USE NATURAL, NON TOXIC MATERIALS WITH THE LEAST AMOUNT OF RADIOACTIVITY

WORST PRINCIPLE
35%

The principle of using natural, non-toxic materials with the least amount of radioactivity in a home is essential for creating a **healthy and safe environment.** This approach is based on minimizing exposure to harmful chemicals and radiation, promoting a clean and sustainable indoor atmosphere.

Some building materials, such as certain types of **granite or cement**, can contain traces of radioactive elements like uranium or thorium. Although at low levels, continuous exposure can contribute to long-term health issues. Using materials with the least possible radioactivity mitigates this risk. (17)

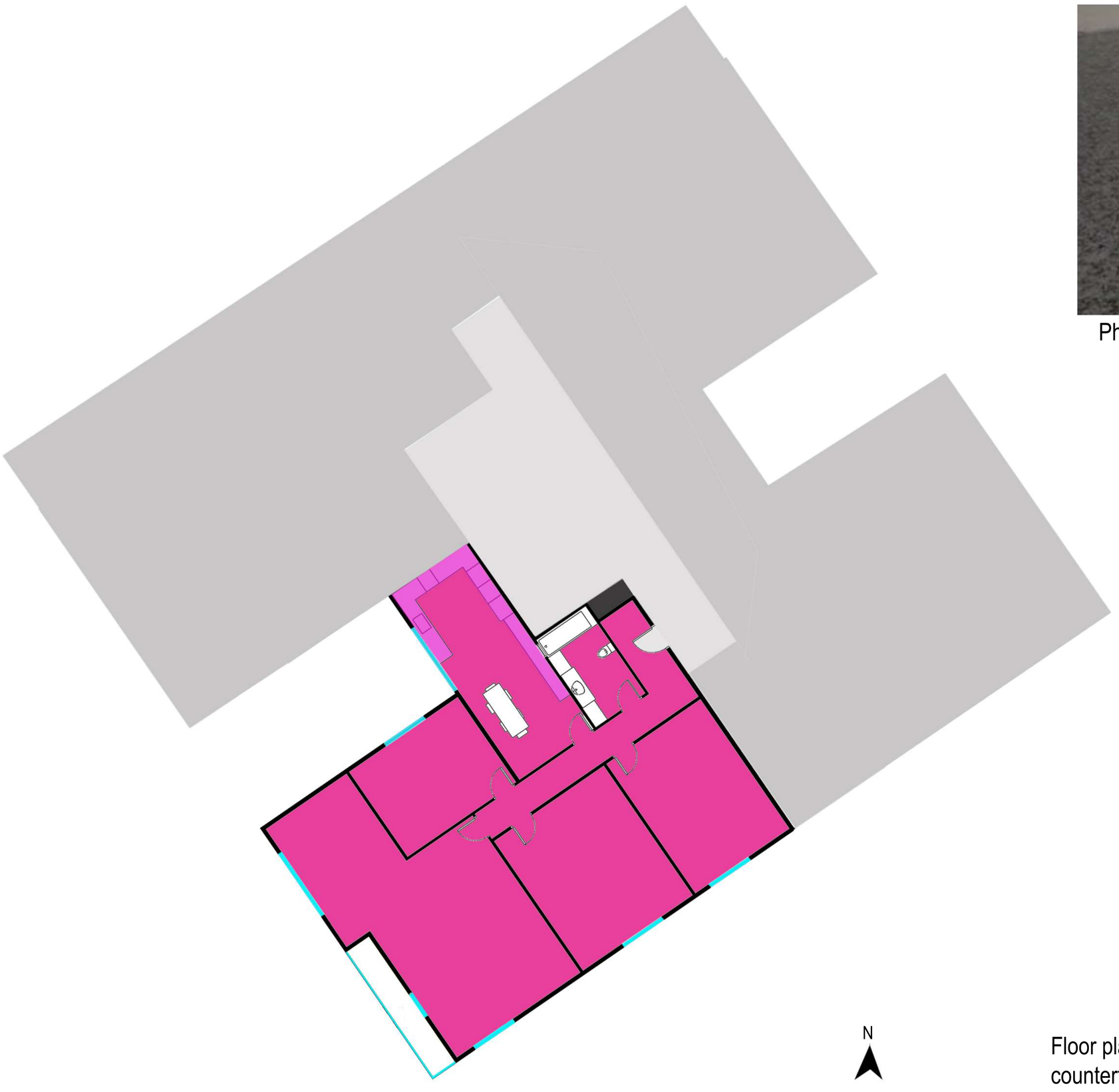
HEALTH

- **Disease Prevention**: Avoiding toxic materials reduces the risk of chronic and respiratory diseases.

- **Clean Indoor Environment**: Improves air quality inside the home, especially important for children, the elderly, and people with pre-existing conditions.

- **Stress Reduction:** An environment built with natural materials generates a sense of calm and connection with nature.

Photo of the granite countertop .



Floor plan of the house highlighting the granite countertop and the entire tiled floor with cement.

USE NATURAL, NON TOXIC MATERIALS WITH THE LEAST AMOUNT OF RADIOACTIVITY

WORST PRINCIPLE
35%

ADVANTAGES AND DISADVANTAGES (18)

ADVANTAGES
- Natural and non-toxic materials, such as certified wood, adobe, or eco-friendly paints, have a lower environmental impact in their production, transportation, and disposal, contributing to **sustainable development.**

DISADVANTAGES
- Natural, eco-friendly, or non-toxic materials are often **more expensive** than conventional materials.
- Many natural materials, such as wood or adobe, require regular **maintenance** to preserve their durability and aesthetic appeal.
- Without proper care, they can be more **susceptible to damage** from moisture, pests, or wear and tear.
- Although natural materials are generally sustainable, their extraction or production can have a significant **environmental impact** if not done responsibly, such as deforestation or over-exploitation of resources.

HOW IT IS NOW

In the kitchen, the entire countertop is made of granite, and cement was used for the flooring throughout the house. Therefore, there aren't many areas of the house with materials that contain radioactive elements, which is favorable, although not ideal.

WHAT SUGGESTIONS CAN I RECOMMEND

In the design/production:

- Select certified materials that are non-toxic and have low radioactivity.
- Use natural coatings.
- Incorporate natural thermal insulation, such as cork or wool.

In the current residence:

- Replace synthetic materials with natural alternatives during renovations.
- Incorporate air-purifying plants as a complement to the design.

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