

Resource Efficient Planning In Tirana, Albania: New Northern Boulevard & River Development

A booklet on sustainable ideas aiming to provide comprehensive investigation and proposals for Tirana to become a greener and more livable city. It addresses five key areas that have a significant impact on the environment and the quality of life of its inhabitants: water, energy, mobility, material, and waste management.



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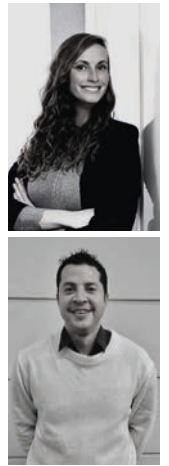
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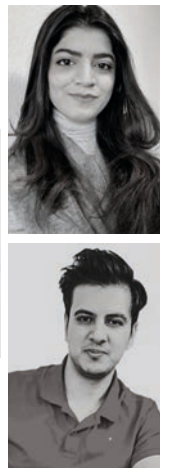
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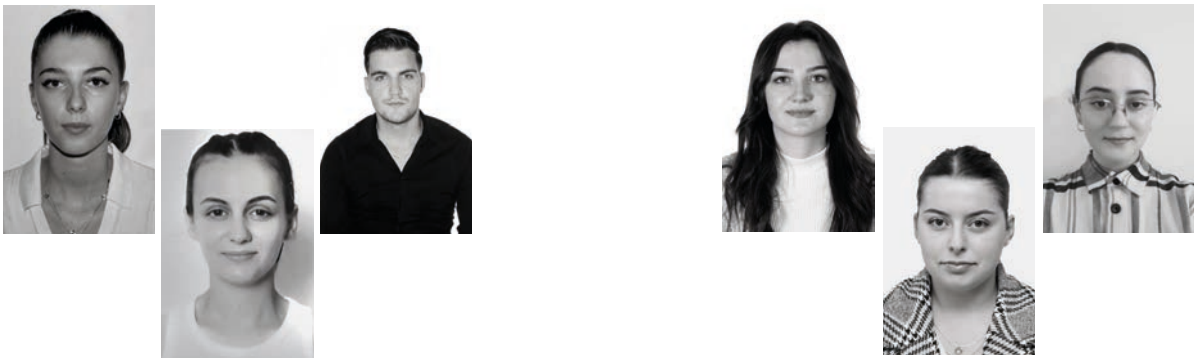
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TIRANA

An Introduction

INTRODUCTION

Armand Troci
Burak Bek

Historic Introduction

Tirana is the perfect complex example of a city in transition, which incorporates historical events in its urban context development. The city's history as a modern city began in 1614, when Sulejman Pasha Bargjini, a rich feudal, built four main buildings: a mosque, a Turkish bath, a bakery, and some inns, located in today's city center, where the first core of the city was built. From the middle of the 17th century, Tirana began to develop and a bazaar was built. In 1789, the construction of the Et'hem Beu mosque began, in 1830 the Clock Tower was erected, in the first half of the 19th century two bridges were built over the river Lana, the Tabaki bridge and the Terzij bridge. In 1920 Tirana was declared the capital of Albania, a city with an area of 305 hectares and a population of 15,000 inhabitants. The city developed around the market cell and the residential area lies mainly in the north and east of the city. The streets of Dures, Elbasan, Shkodër, Dibra, and Kavaje, were developed, all intersected in the center, hence the center of the city was the bazaar, where the production and commercial activities took place simultaneously. In 1923, the first regulatory plan was drawn up by Austrian architects and engineers. The plan sought to reach a solution between the construction of a regular rectangular road network and the adjustment and adaptation of the existing ones (Aliaj & Lulo, 2003).

In 1925, Armando Brasini, an architect, drafted the first idea about the reorganization of the new center of the Albanian capital, which consisted of a group of 6 ministry buildings and an eclectic central boulevard with a north-south orientation. This concept later materialized into a more pragmatic form by the Italian architect, Florestano Di Fausto, who added the bank building and Rinia Park. Brasini's idea was to create a Roman island in the city, with a pronounced character that did not alternate from the rest of the city, but would serve as a connecting hinge between the old city and the modern city that would continue to progress in the future. The second regulatory plan of 1926 was focused more on regulating infrastructure and increasing services for citizens (Tashi et al., 2014; Doka et al., 2015). The third regulatory plan was drawn up by Austrian architect Wolfgang Köhler in 1928. Here the square system of the road network is clearly visible, especially in the area of "new" Tirana which was almost uninhabited.

During the communist regime, the urban planning of the city was led only by the State. During 50 years, some main buildings, such as the Palace of Culture, the Art Gallery, the Historical Museum, the Pyramid, Palace of Congresses and many more were built. The second Ring of the city was planned and established, as well as two new hot spots of Kinostudio (cultural) and Kombinat (production) areas were built. In line with the other Eastern Bloc countries, new residential areas were constructed throughout Tirana outside the second ring of the city (Bashkia Tirane, n.d.).

Urban Development

Subsequently, the city of Tirana has undergone significant changes in terms of urban development, history, governance, and institutions since 1990. These changes have transformed Tirana into a more modern, dynamic, and open city, and have helped to position it for future growth and development (Pojani, 2010).

Prior to 1990, Tirana was a relatively small and isolated city, with a population of around 200,000 people. The city was heavily controlled by the communist regime of Enver Hoxha, and development was limited by the government's strict policies (de Waal, 2004)



Figure 1 Tirana Old City Center



Figure 2 Tirana Under Communist Rule

Source: (Tiranapitstop, n.d.)



Figure 3 Informal Living Areas in Tirana

Source: (Koha Jone, 2016)

However, after the collapse of communism in 1990, Tirana began to experience rapid growth and change.

One of the most notable developments in Tirana's urban landscape has been the emergence of informal settlements. Prior to 1990, the city was relatively compact, with a limited number of formal residential areas. However, in the years following the collapse of communism, Tirana has experienced a rapid influx of people from rural areas and other parts of the country, leading to the growth of informal settlements on the city's outskirts. These informal settlements are characterized by their lack of infrastructure and basic services, and often lack access to clean water, electricity, and sewage systems (Manahasa & Manahasa, 2020). The emergence of informal settlements in Tirana has had both positive and negative effects on the city. On the one hand, these settlements have provided much-needed housing and economic opportunities for many people who would otherwise be unable to afford it. On the other hand, they have also contributed to a number of urban problems, such as overcrowding, poor living conditions, and environmental degradation.

Moreover, Tirana has also experienced the construction of new roads, bridges, and buildings, as well as the modernization of existing infrastructure. This has helped to improve the city's connectivity and make it more attractive to both residents and visitors (Pillumbi, 2013). In addition, Tirana has also seen the growth of new commercial and residential areas, as well as the development of new parks and public spaces.

Another major change in Tirana has been the shift from a communist to a democratic form of governance. Under the communist regime of Enver Hoxha, Tirana was a heavily controlled and isolated city, with limited political freedom and economic opportunity. In the years following the collapse

of communism, Tirana has undergone a process of democratization, with regular elections and the establishment of a multi-party political system. This has led to greater political freedom and accountability in the city, as well as the development of a more vibrant civil society. The fall of communism opened the door to greater political and economic freedom, and paved the way for the city's transformation into a more modern and open place (de Waal, 2004).

Overall, the changes that Tirana has experienced since 1990 have been profound, and have helped to transform the city into a more modern, dynamic, and open place. While there are still challenges to be addressed, the city has made great strides in recent decades, and is well positioned to continue to develop and grow in the years ahead.



Figure 4 Tirana today

Source: (DAW, n.d.)

TIRANA

Introduction to the Project site

INTRODUCTION

Andrés Isaza Archer

The disorganized and rapid growth of the city of Tirana over past decades has affected the urban structure, as well as the social fabric of the city. It is expected that the population will continue to grow in areas of low-density within coming years, establishing great development potential in the area of the Tirana River. Separating the communities to the north and south, the river serves as a vital point of interest for the integral growth of the city. Currently, there are major efforts regarding the hydrological restoration of the river being performed through engineering processes, such as flood protection elements, embankment systems, and structures for flow management. However, the current condition of the Tirana River waterfront is still unfavorable due to pollution, meaning that its regeneration should be an important aspect for the positive development of the area (Grimshaw, 2018).

The zone under study, approximately 1.5 km², contemplates the intersection point between the Tirana River and the city center, through the New Boulevard with a length of 1.6 km. The boulevard is already in its construction phase, and it appears to be a good starting point for Tirana's transformation into a modern city. With an approximate width of 70 meters, 1/3 of it will be used for vehicular traffic and the remaining

2/3 will be dedicated to bike lanes, pedestrian areas, and green areas (ASIG, 2022). The new buildings will be constructed later, and in this case, they will respect their established area, proportions of green areas, and architectural harmony. This type of construction symmetry is very different from what has happened in the past.

However, the concept of just having a boulevard is not enough. Currently in the area, there are still informal settlements, which lack access to basic municipal services- water management and water treatment infrastructure are either missing or inadequate, and internal streets of different sizes with narrow or no sidewalks are among other aspects that are coming up short in comparison to normal urban parameters. All of these aspects have been identified as issues that must be improved. Concurrently, the scope of sustainable urbanism should be considered throughout this process. Ideally, all projects in the areas of energy, water, mobility, and urban planning take sustainability aspects into consideration. The following report presents sustainable proposals for the development of the project area, which includes the new Northern Boulevard and Tirana River.



Figure 5 Northern Boulevard of Tirana Project

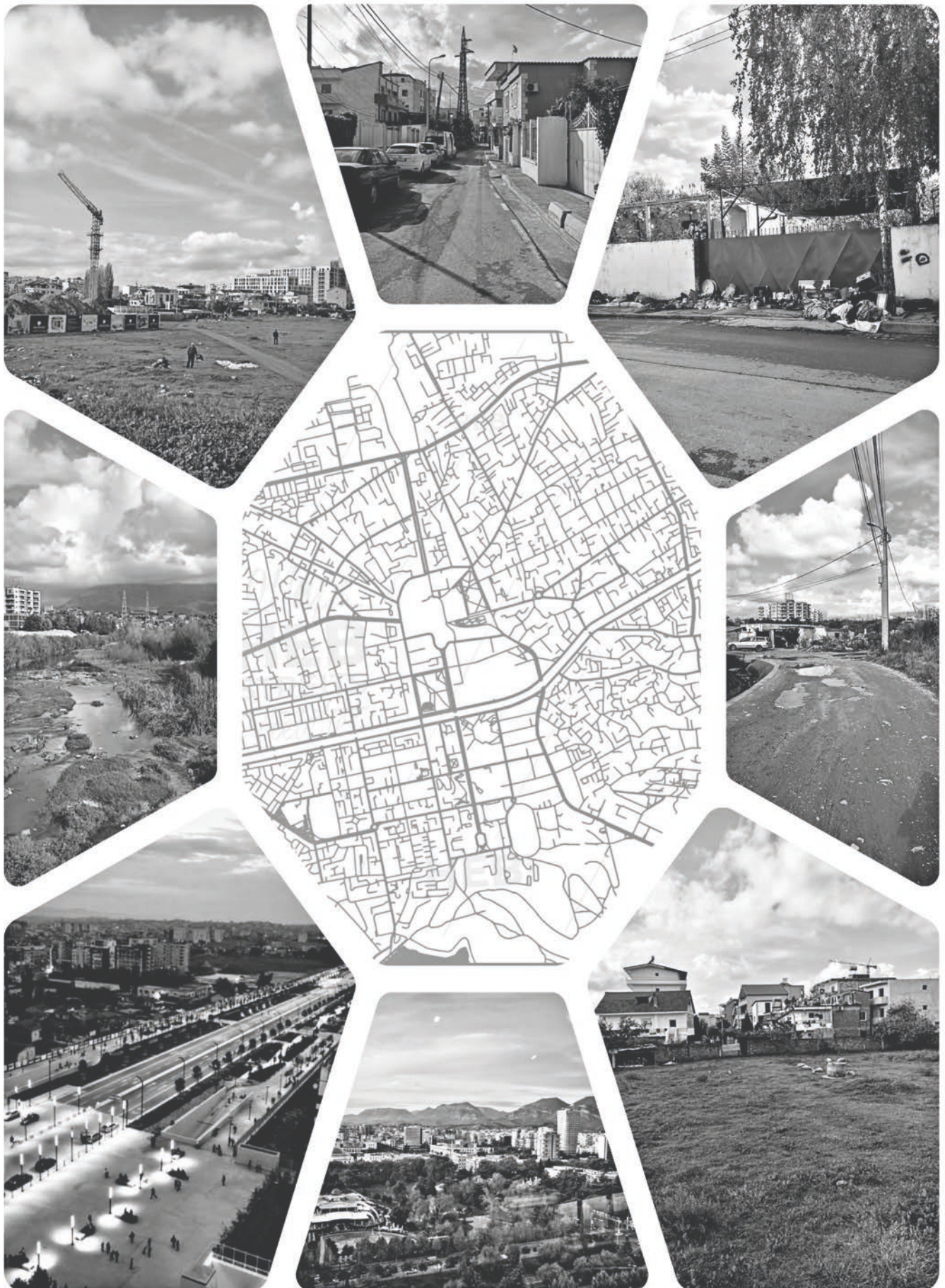
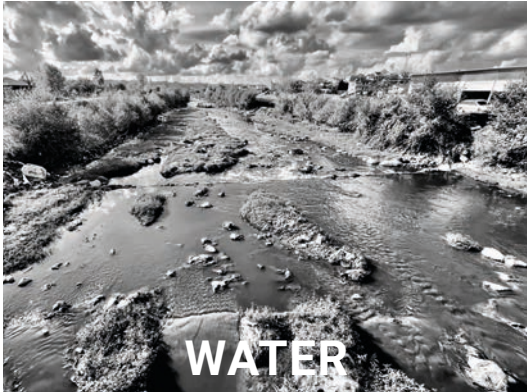


Figure 6 Project Site Impressions

REAP SCOPES



Picture taken by author



Picture taken by author



Picture taken by author



Picture taken by author



Picture taken by author



Picture taken by author

SUSTAINABLE URBANISM

REAP SCOPES

Élida Marques Dreer

An Explanation of “Sustainable Urbanism” as a Topic and its Relation to REAP

Following the concept of sustainable development proposed more than 30 years ago in the Brundtland report, “Our Common Future” (1987), developing life in urban agglomerations shall align with the human potential to meet current needs without compromising the potential of future generations. Since then, awareness of the impacts of economic and population growth on a planet with limited resources has been consolidated after the even more intense urbanization and the scientific recognition of climate change caused by human actions.

Cities absorb most of the world’s population. As much as they offer infrastructure to provide greater comfort and quality of life for people, current urban living standards are responsible for major environmental impacts. Meanwhile, access to urban infrastructure, especially in developing countries, is often unequal and restricted. The complexity and dynamism of urban systems challenge their ability to adhere to an ecosystem integrated with nature that is socioeconomically inclusive, hence cities become more vulnerable to extreme weather events (Roggema 2016; Bott, Grassl, Anders 2019).

Sustainable urbanism is a meaningful instrument used to simulate planning for cities to become adaptable urban spaces which “at any moment in time, anticipate uncertain, unexpected and unprecedented change, and grow stronger and become more resilient when uncertainty impacts [them]” (Roggema 2016). In the REAP program, students study sustainable urbanism with the aim of researching and practicing integrative methods for urban planning that promote the efficient use of resources for cities to sustain themselves with socio-economic improvements. Solutions and innovations for resilient cities, which contribute to mitigating and adapting to climate change in order to minimize the adverse effects for future generations, is also studied.

The methods and tools used within this scope instigate a holistic view for greater apprehension for and resolution of problems at different urban scales (from buildings to cities). They comprise various limiting and conditioning aspects of space, such as policies and legal instruments, technological feasibility, cultural identity, assessment of resources, flows and networks, with a focus on water, energy, materials, waste and mobility. Urban planning tools are also taken into account, such as land use and occupation, relevance of green

areas and social infrastructure, engagement of different stakeholders with governance approaches from citizens to public and private spheres, and the inclusion of diverse users of the space. Therefore, sustainable urbanism understands the social, environmental and economic spheres in an interdisciplinary way, recognizing the potential of interactions and interdependencies between them and technological innovation for managing the complexity characteristic of the urban system (Bott, Grassl, Anders 2019).

As Albania’s centralized society transitioned to a market economy, Tirana faced rapid expansion without structured urban planning, leading to increase of informality, spatial disconnections, and poor urban ecology (Nepravishta, Maliqari, Cuedari, 2015).

In this intercultural proposal, working groups evaluate the context of the new Northern Boulevard and Tirana River development, a project under implementation by the local municipality targeting local challenges through design, proposing improvements for layers such as the city’s green network, mobility infrastructure, economic activities and the transformation of the riverfront (Nepravishta, Maliqari, Cuedari, 2015).



Figure 7 View of Tirana from Grand Park

Source: Albinfo, 2015

ENERGY

An Explanation of “Energy” as a Topic and its Relation to REAP

REAP SCOPES

Emmanuel Obiri-Yeboah

Albania, with a population of around 2.8 million people, differs from the majority of southeastern European nations in that its power industry is nearly exclusively dependent on hydroelectricity (Instat, 2020). The Albanian Power Corporation, Korporata Elektroenergetike Shqiptare (KESH), owns three large hydro-power plants totaling 1.35 GW on the Drin River and 197 privately-owned micro hydro-power production facilities totaling 815 MW, as well as eight solar power plants totaling 15 MW (KESH, 2021).

There is presently no district heating in Albania. The transportation sector is responsible for the largest percentage of gross energy usage, accompanied by domestic usage and mixed-sectoral energy usage. There are about 21.79% transmission losses of electricity outdated technology and infrastructure (Gallop et al., 2021).

The electricity sector of Albania is predominantly made of hydro-power plants (HPP) with an estimated production of over 120% due to the abundance of water resources, but because of transmission losses and seasonal drought during the winter season, the annual electricity consumption is only 95% and the country is forced to rely on electricity imports from neighboring countries during periods of energy stress. Although Albania has a good record of renewable energy from HPP, its use of hydro-power has not proven to be very sustainable.

There have been reports of the destruction of aquatic life in the various rivers and dams where these HPP are installed as well as water-rights conflicts among various electricity companies. Fisheries and agricultural industries have also noted the stress on the exploitation of water resources. Furthermore, global warming is taking a toll on the country with increasing seasonal drought, putting Albania on the list of water stressed countries.

Albania has a high solar potential of about 1,700 kWh/m²a and a high potential for wind energy both onshore and offshore; however, it is under-utilized (ESMAP, 2017).

Currently, there are no installation for wind power in the country and there is approximately only 1% of solar energy used for electricity production.

Localization of energy generation with solar energy will be a great pilot project for the new boulevard and river devel-

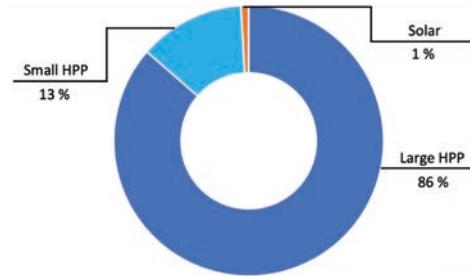


Figure 8 Electricity Production in Albania

Source: Ministry of Infrastructure and Energy

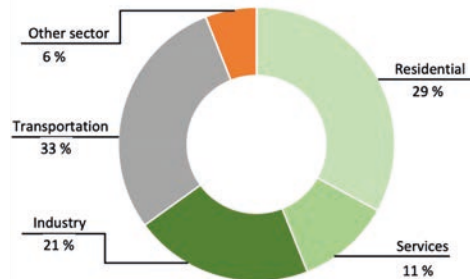


Figure 9 Energy Consumption by Sector in Albania

Source: EUROSTAT 2022 data and Contracting Party's Reports

opment project as a prospect of solving most of the country's energy challenges along with creating energy-sufficient neighborhoods.

These challenges and supposed weaknesses have provided a great opportunity for students in the Resource Efficiency in Architecture and Urban Planning (REAP) program at HafenCity Universität, Hamburg to collaborate with the Faculty of Architecture and Urbanism (FAU) at the Polytechnic University of Tirana. One of REAP's main focuses is the use of methods and technologies that catalyze resource efficiency, sustainability and adaptability.

Through the scope of 'energy', the study program is more focused on the use of renewable and sustainable forms of energy.

This includes energy efficiency and energy-efficient buildings, resource efficiency and refurbishment of buildings, and e-mobility, to mention a few examples. One goal of REAP is to maximize the effect of efficient energy management by matching a sustainable energy supply with efficient energy usage.

Working groups will attempt to do just that by assessing the current sources and use of energy in Tirana and identifying potential for them to become more energy efficient. This will be presented through their project analysis and intervention.

WATER

An Explanation of “Water” as a Topic and its Relation to REAP

REAP SCOPES

Merle Walsh

As part of the REAP program, students lead and direct the development of water, wastewater and storm water projects and gain experience in water distribution systems, wastewater/storm water collection systems, and water/wastewater treatment facilities. Working in teams, students supervise and support others to analyze and understand water cycles and their stressors in different contexts from different parts of the world.

Sustainable use of natural resources is an important responsibility of urban areas. The ongoing demographic shift from rural to urban areas poses the problem of water sourcing and distribution, increased water stress on local sources and the risk of transportation losses and infrastructure maintenance. It also poses great opportunities for management and monitoring, as well as centralized treatment.

Like many cities Tirana was built on a river to best harness this precious resource. The city is situated between the Tirana River and the Lana River, two tributaries to the Ishmi River system. It also has two lakes within city limits, Lake Pak-suqan, a natural lake, and Lake Tirana, an artificial lake and recreational space.

The city of Tirana receives most of its water from the Bovilla Reservoir upstream from Tirana River, as well as from the many groundwater sources throughout the country. With the increasing population also comes the demand for an efficient management of water. This includes the management of supply to prevent depletion, controlled use of municipal water, as well as treatment of polluted waters and sewage management (Mucaj,2012).

The annual precipitation of Albania varies between 1,300 and 2,000 millimeters per year and the precipitation usually arrives in short but heavy downpours that can lead to flooding. Highly eroded soil and impermeable surfaces within the city increase the chances of this risk.

To prevent their homes from flooding, homeowners along the riverbanks have lined the banks with various materials which was intended to serve as a barrier between the river and peoples' homes but could potentially increase the flooding risk and cause more severe damage (DEPEE, 2015).

One of the largest problems Tirana faces is the rapid development growth without proper infrastructure and management. The high demand for water services causes stress on the water supply and has led to illegal use and water hoarding. The piping system in place is old and outdated, leading to contamination and leaks (Floqi,2010).

Large areas of the town have developed as informal settlements which are not connected to municipal waste services. Subsequently, water quality has suffered through the illegal dumping of municipal household waste as well as industrial waste and agricultural runoff (Cullaj,2005).

While the amount of operational sewage infrastructure has increased in recent years, the currently installed system is purely a collection system and continues to discharge untreated wastewater into the Lana River. This problem was recognized and confronted through the building of a treatment plant in 2010, however, it remains unfinished still today (JICA,2018).



Figure 10 Solid Waste Pollution Tirana River

MOBILITY

An Explanation of “Mobility” as a Topic and its Relation to REAP

REAP SCOPES

Matin Akbari

The mobility system plays a fundamental role in cities. Tirana has been growing as the capital city of Albania with few or no guidelines from the municipality since the fall of the Communist Era in the 1990s. The number of cars has sharply increased from almost zero at the end of communism in the late 1980s to almost two thirds of inner-city households having at least one car in 2010 (Troy, 2010). Congestion, air pollution, extensive formal settlements, dysfunctional mobility networks, lack of public space, and dangerous and crowded streets due to the presences of cars are the consequences of this rapid development (Troy, 2021).

Despite having a relatively low rate of automobile ownership, Tirana’s principal and subsidiary road networks are severely congested due to the city’s compact urban layout, which forces all traffic to use the main radial and ring highways (SUMP for the City of Tirana | Eltis, n.d.).

Currently, There are only 7 kilometers of dedicated bus lanes throughout the entire public transportation network, which is also limited in terms of continuity. Poor network connections are the greatest weakness of the transportation system which is mostly because of a lack of legislation and poorly planned streets, leading to a lack of space to even implement bus lanes (TRT, n.d.).

Although the number of people riding bicycles in Tirana is considerable, cycling infrastructure is limited. As with the bus lanes, the lack of space makes it difficult to consider bike lanes. Walkways are another main problem with the majority of urban zones disconnected from one another. Other safety concerns regarding mobility networks in the city of Tirana include the positioning of storm water drains, which make it difficult to divert high levels of water on streets and walkways during periods of heavy rain, and the presence of potholes, cracks, and other signs of damaged infrastructure (TRT, n.d.).

Regardless of these factors, the percentage of residents whose main mode of transportation is either on foot or by bike is strong with 32% (TRT, n.d.). The number of people who use public transport is also quite impressive with 36% (TRT, n.d.). However, in order to improve the efficiency and comfort of getting around the city, as well as expanding the amount of inhabitants using alternate modes of transportation, quality improvements must be made.



Figure 11 Tirana New Northern Boulevard

Source: nla.London, 2023

Tirana is also a partner in the regional project “Sustainable Urban Mobility in South East European Countries II”(SUM-SEEC II) through the Open Regional Fund for South-East Europe – Energy Efficiency (ORFEE). The project is funded by the German Ministry for Economic Cooperation and Development (BMZ) and is implemented by GIZ (Giz, n.d.). Its main focuses include capacity building and technical support for capital cities, as well as associations of municipalities in south east Europe, by applying a sustainable approach to urban transportation planning with a special emphasis on the development of Sustainable Urban Mobility Plans.

The project has three main areas of intervention with multiple tools and demonstration projects:

1. Establishing a data-driven management structure and culture for sustainable urban mobility actions in Tirana.
2. Improving the service quality of the bus system through a better customer focus, quality management, and commercial performance.
3. Improving the quality and integration of walking and cycling (GIZ, n.d.).

MATERIAL & WASTE

REAP SCOPES

Lamia Haddad

An Explanation of “Material & Waste” as a Topic and its Relation to REAP

The waste & material scope in Albania is a very pressing topic. In the last 20 years, consumerism exploded in Albania along with the sporadic urbanization and escalating economic growth (Alcani et al., 2015). Consumerism can be considered one of the main drivers of the rapid increase of the amounts of materials and waste in the country, especially Tirana, the capital of Albania. The municipal waste production in Tirana is near the threshold of ‘higher waste generating’ countries with 1kg of waste per person per day (Albania Country Fact Sheet, 2020).

Additionally, the informal disposal and collection of waste contributed to the aggravation of this problem. In Tirana, while the downtown areas are designated as formal areas, informal settlements grew mostly around the peripheral areas and towards the outskirts after the fall of the communist regime. As a result, these areas are not covered by waste collection services. Furthermore, lack of financial and human resources and adequate technologies are the main challenges facing the country.

Until 2016, the main waste disposal option was the Sharra Landfill where the waste was brought in a “mixed” state (Albania Country Fact Sheet, 2020). The landfill is located 7km south west of Tirana’s center with a total surface area of 55,00 m². The household waste in Tirana is composed of different categories: food waste (47%), combustibles (28%), and recyclables (23%) (JICA, 2012). These recyclables include important materials, mainly plastic, glass, paper and metal. The high percentage of biodegradable matter (62.3%) of the waste dumped in landfills in Tirana represents a huge threat to the country but could serve as a potential opportunity (Alcani et al., 2018).

Methane is emitted into the air of Albania due to this untreated and uncovered organic waste disposal. This gas contributes more powerfully to global warming than CO₂ and poses a threat to human health. However, this gas can be captured and recovered for energy production.

In 2014, the annual report published from the Ministry of Environment stated that there are 12,000 informal individual collectors and 60 private recycling companies operating all over Albania (Jahaj, 2016). However, the total percentage of waste that goes to recycling remains insignificant compared

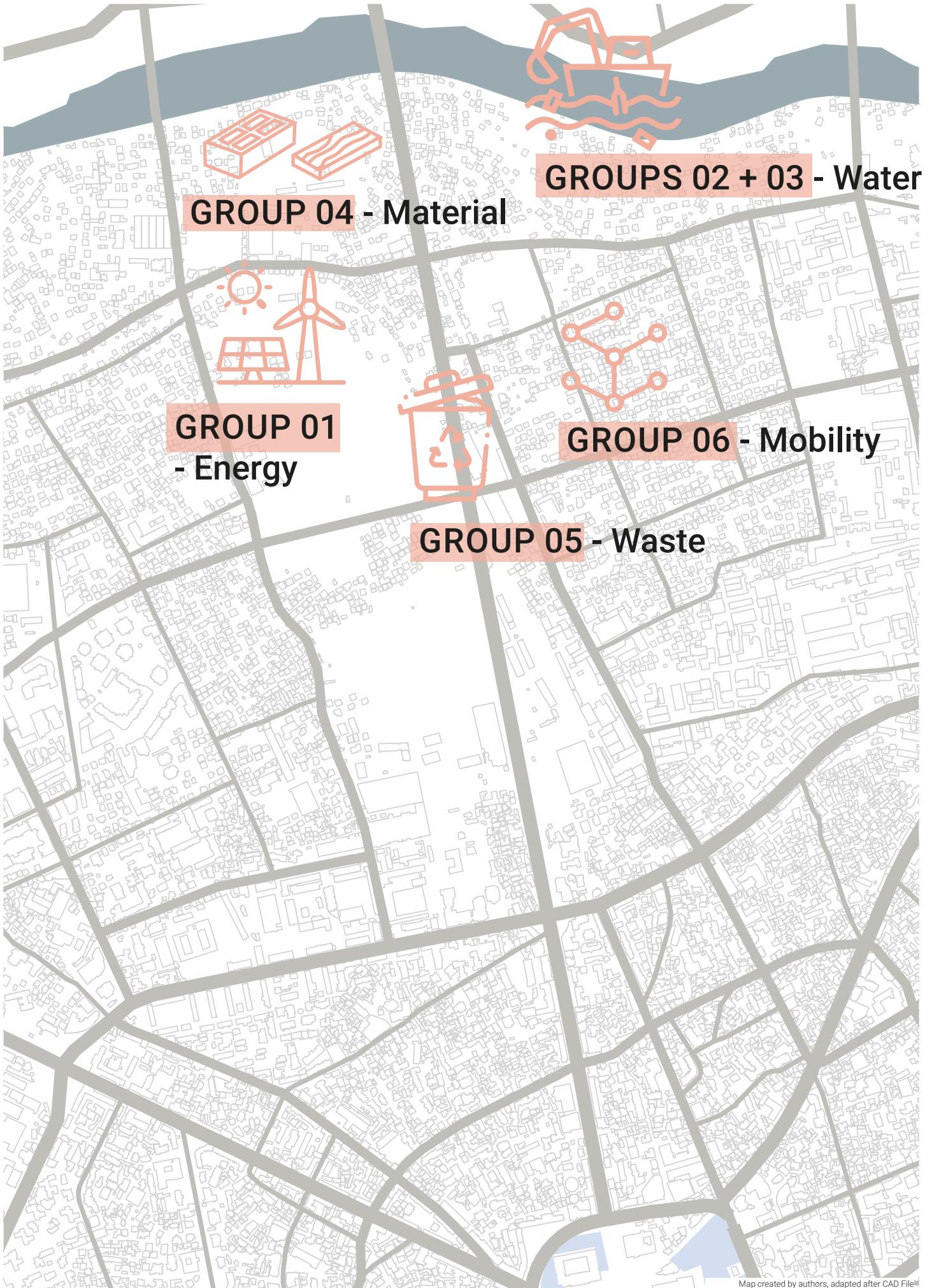
to that disposed of in landfills. Due to the poor data collection, no accurate information on the other methods of waste management, like incineration & composting, is provided.

The main stakeholders engaged in the national planning of a waste management system in Tirana are the Ministry of Environment, Ministry of Health, Ministry of Transportation and Infrastructure, Ministry of Economic Development, Trade and Entrepreneurship, Ministry of Agriculture, Rural Development and Water Resources, to name a few. The creation of laws governing waste management, as well as monitoring and overseeing their implementation, is their top priority. Local government plays a major role in the proper management of waste in Tirana. In addition to this, public recycling companies and NGOs participate in the waste management processes either directly or indirectly through awareness campaigns. (Jahaj, 2016)

Finally, National Solid Waste Management plans are set by the government with objectives: by 2015, 25% of total municipal solid waste (MSW) will be recycled or composted, by 2020, 55% of it, and by 2025, there are plans to recover energy from 15% of MSW (Alcani et al., 2015).



Figure 12 Uncontrolled Waste Dumping in Tirana



REAP Intervention Locations

20

Group 01 - Energy



24

Group 02 - Water



28

Group 03 - Water



32

Group 04 - Material



36

Group 05 - Waste



40

Group 06 - Mobility



ENERGY UTOPIA

GROUP 01

Palak Pandya

Emmanuel Obiri-Yeboah

Sylvain Zimmerger

Smart, Clean, Affordable and Customer-led Energy

Introduction and Methodology

Albania's situation concerning energy is at first sight rather positive. Energy from renewable sources accounted for 45.1% of Albania's energy consumption in 2020, coming in above the target of 38% set by the European Union Energy Community Treaty. The considerable increase of renewable energy sources is due to the Covid-19 pandemic, which caused a significant decline in energy usage, particularly in the transportation sector. Although nearly all of the electricity produced in Albania comes from renewable sources, only a very small portion goes toward heating, cooling, and transportation. Albania's virtually complete dependency on hydropower means its electricity output fluctuates greatly. Despite the development of additional hydroelectric capacity between 2010 and 2019, it barely fulfilled the nation's energy demands. Indeed, climate change and water stress, as well as the increasing energy demand, are threatening the energy supply of Tirana. Some of the main rivers that supply a large part of the country's energy were subject to droughts in recent years.

Analysis

In this sense, the new Northern Boulevard project can be an opportunity for better, more localized energy planning. If we look at the situation on-site, we see that electricity is distributed sometimes in a chaotic way. The fact that most housing is informal explains this lack of planning, which has led to a lack of safety for the population. On-site, the main electrical substation, and its primary and secondary power lines can sometimes be found in the middle of private land. On the other hand, electric poles are diverted and connected to multiple houses or slums without permission. Interviews in the non-rehabilitated parts of the area confirm recurrent power cuts, which affect the everyday life of residents. The new Northern Boulevard aims to improve economic and living standards and must aim to remedy these problems. By destroying the vast majority of informal settlements, the

Grimshaw architectural team's project proposes a new level of density for the neighborhood. With large populations moving from family houses to apartment buildings, this area will also be facing an increasing demand for energy that should be generated on-site. Albania has made progress in implementing the Energy Performance of Buildings Regulations set by the European Commission, but further development in energy efficiency is required, particularly in light of the current energy crisis. Environmental concerns over hydro-power production in the major rivers persists. Environmental impact assessment laws have yet to be fully implemented. Albania undoubtedly had a better start than other developing nations, but diversification of the energy mix is still desperately needed. Even though there have been two auctions for major solar installations, the nation's installed solar capacity by the end of 2019 was just 15 MW (PEET, 2021). Constraints surrounding the generation of electricity from hydro-power plants make this process an unsustainable energy source with regard to other issues in Albania.

One of the solutions for relocating energy and electricity may lie in the high solar potential that Albania enjoys every month of the year. Hence, our focus question is, **"How best can solar energy (sustainable and renewable) be used as an energy utopia for the new Northern Boulevard and river development area?"**

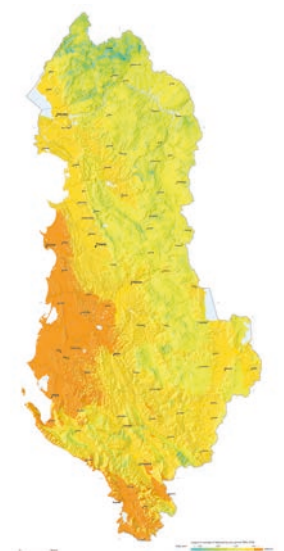


Figure 13 Albania's Average Annual Global Horizontal Irradiance

Source: (ESMAP, 2017)



Figure 14 An Electric Pylon on a Walkway (left) and Electrical Pole (right)

Source: Authors

Concept Development

People's living standards have been steadily rising over the past ten years as a result of a number of causes. The rise in average yearly power use, as seen in the solar irradiance map of Albania. This rise in energy consumption might also be a result of climate change and variability in the average monthly temperatures which causes an increase in the demand for space heating and cooling as well as household hot water supply (Bidaj et al. 2015). The only option when dealing with such a rising demand and concurrently aiming to achieve a worldwide climate objective is to use renewable energy sources. This demonstrates that Tirana has exceptional solar potential, however, this potential has not been utilized, since there are just 1% of photovoltaic installations nationwide, including in Tirana. Combining the worries of locals with the potential of readily available renewable resources, the team's focus is on energy and how to improve the neighborhood's livability by providing a clean and decentralized source of electricity.

As it is seen in the solar irradiance map of Albania, Tirana has a solar score of around 1,600 kWh/m². The city is ranked in the top 10 of the sunniest cities in Europe with a total of 2,544 hours of sun. This great potential was the starting point for the team to decide to develop a concept to make the whole project of the new Northern Boulevard electrified locally, by using renewable sources of energy. The main focus will be to utilize the solar potential of the area to create energy by using solar PV panels for generating electricity and solar thermal for producing domestic hot water (DHW) for the New Boulevard area. In this sense, the working group proposes using rooftop surfaces of future and existing residential buildings to optimize space and avoid ground installation.



Figure 15 Solar Potential Map of the New Boulevard Project Area

Source: Authors

The fact of using solar energy comes with the disadvantage of seasonal availability and fluctuation of solar energy. To overcome this disadvantage, the concept of Energy Utopia is not just limited to generating energy locally and utilizing it, it also includes storing the excess energy produced during the daytime or when there is more sun exposure, for example, in summer, in the form of hydrogen.

In fact, green hydrogen production with renewable energy sources, like solar, is a great opportunity for a developing country like Albania, as it can develop long-term economic opportunities and energy security. Hydrogen can be produced by using the electrolysis method, which will be carried out by using excess energy produced from PV panels to split water into hydrogen and oxygen. This hydrogen will then be stored in the storage tank and can be utilized when there is no availability of solar energy to produce electricity with the help of a hydrogen fuel cell.



Figure 16 Map of the Existing Buildings Remaining Near the New Boulevard

Source: (Grimshaw Architects, 2018)



Figure 17 3D Modelling of the New Boulevard concept

Source: Authors

There were three conceptual interventions proposed for this project; two main scopes, which are feasible for the project's current situation, and the other proposed recommendation intervention for seasonal energy storage with the concept of green hydrogen production for future prospects. In the first part, the application of the concept of generating energy locally through PV panels will be done on the roofs of the buildings which are currently in existence and are not going to be demolished or altered in the new master plan of the new Northern Boulevard. There are a total of 33 buildings that are already constructed within the site area, making a total roof surface area of about 24,209 m², which was calculated roughly by Google Maps. The average yearly electricity demand of these 33 buildings is calculated to be 3.59 GWh/a. By utilizing 60% of the roof area of these 33 buildings for the installation of PV panels, the electricity generation estimated is 4.32 GWh/a. Therefore, these existing buildings can theoretically be completely off-grid in terms of electricity and make up the first phase of the project.

The second phase of the intervention will be to implement the PV panels and solar thermal in the new buildings which are still going to be built on the new Northern Boulevard, while the third phase of the intervention is more like a recommendation for the area of the new Northern Boulevard to develop an infrastructure for storing energy in the form of hydrogen. On paper it seems that by implementing PV panels and solar thermal capabilities the whole area can be off-grid for electricity. However, as said earlier, solar energy comes with a drawback of seasonal fluctuations, which can be overcome by storing solar energy in the form of hydrogen. Figure 20 below illustrates the solar energy mix (photovoltaics for electricity and solar thermal collectors for domestic hot water) of each rooftop of each building of the new Northern Boulevard project. Different awareness campaigns and workshops will be organized to make people aware of the different financial support available for adopting renewable energy production for their home to make the new boulevard area more sustainable and carbon neutral.

The other main strategy for this project is to make a pilot project as a showcase project for others to illustrate to them that by adopting PV panels, their home can function completely off-grid, freeing them of paying monthly electricity bills. This pilot project will serve as a motivation for the rest of the new boulevard area.

Results / Conclusions

"The challenge of pollution and global warming is no longer the science, or the rate of innovation, but the rate of implementation: We have the clean solutions; now let's bundle them and install them" (Skibsted, 2015). Considering Albania's goal of reaching EU renewable energy standards on the one hand, and underdeveloped solar energy infrastructure on the other, the assumption that the market would quickly adjust to accomplish the defined targets of the National Renewable Energy Action Plans looks doubtful. In terms of the production and delivery of energy as well as the sources of DHW for the people of Tirana, it is noticeably deficient in sustainable solutions. Microgrids that run on solar energy have the ability to remedy these issues. To offer residents domestic hot water and on-site electricity generation and consumption, a unique hybrid system was created utilizing simulation software and published research papers. A grid connection is always required, even if the numbers are based on annual sums at present-day levels.

The intervention's goal is to make autonomous primary energy and DHW supply reliable and sustainable in the new Northern Boulevard project area. The whole roof area was anticipated to be used for electricity generation at 77 % and solar thermal collection for domestic hot water at 23 %. The authors argue that more environmentally friendly approaches to tackling this portion of energy consumption include improved building insulation and smart technology retrofitting. Space heating and cooling were thus left out of the study's scope. Procedures must aim to reduce resource usage and waste while protecting and renewing natural capital in order for a city to achieve a circular economy. The deployment of strategies that incorporate the integration of PV panels, solar thermal collectors, and seasonal energy storage systems suggests that a balance in the exchange of material, energy, and water within a residence is thus necessary. This will act as a pilot project for a larger effort to promote the concept of an energy-autonomous neighborhood, or Energy Utopia, through smart, clean, affordable, and customer-led energy.



Figure 18 Recommended Solar Energy Mix of a Building
Source: (CBSELECTRICS, 2014)

Recommendations

Community energy systems, such as the ones suggested in these interventions, are more problematic due to complex legislative limitations and difficulties in providing metering contracts for individual units. Pilot projects that eliminate multiple ownerships from the system are appropriate, according to theory and actual applications. Community energy systems, such as the ones suggested in these interventions, are more problematic due to complex legislative limitations and difficulties in providing metering contracts for individual units. Pilot projects that eliminate multiple ownerships from the system are appropriate, according to theory and actual applications. Such pilot projects will promote and improve awareness, and the replication of such programs, as well as

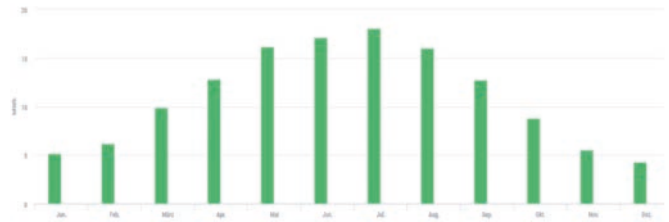


Figure 19 Monthly energy output from PV system in MWh
Source: authors using SolarEdge Software Tool, 2022

help to address weaknesses in the management and infrastructural systems. Throughout the project, data availability was a major source of concern. Estimations had to be made from surveys in some situations, while the most recent public data was even out of date in others. The economic evaluation revealed that the intended seasonal energy storage intervention (Green Hydrogen Production) is likewise not financially feasible based on the project's current condition and is envisioned to be a very long-term undertaking.



Figure 20 Summary of the Solar Energy Mix of the New Boulevard Project
Source: Authors

WATER

Restoring and Retaining the Banks of Tirana River Through Community Participation and Water Sensitive Urban Design

GROUP 02

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Introduction and Methodology

Tirana river and its surroundings are highly polluted, where trash is piled on the sides of the river. It also lacks accessibility, recreational and commercial activities. The deteriorating quality of the river banks coupled with the absence of climate adaptation strategies called for sustainability driven interventions that simultaneously engage the community in the various processes of development. Through this study, a water sensitive urban design is proposed. This proposal aims at increasing the resilience of the area in the face of climate change impacts in terms of floods, droughts and heat waves. Despite being sustainability oriented, the proposed interventions incorporate tools, elements and strategies that motivate community engagement.

Various methods were used to conduct this study; starting from an introduction about the city, analysis of the site, choosing a defined area as a prototype for proposing interventions, categorizing possible stakeholders and most importantly planning strategies and stages for community participation. A qualitative analysis was run through a problem tree, DPSIR model and Park method for project goals definition. Limitations, risks and challenges were discussed before concluding a final statement.

Analysis

An extensive analysis of the patterns of urban expansion in the area was conducted to better understand the urban context of the Tirana River and its surroundings, as well as its relationship to the population occupying that land. The analysis of the municipal zoning, land use patterns, formalities and informalities (Figure 22), and types of economic activities in the surrounding area were important components of the site analysis because they helped to create a concrete understanding of the current situation of the site from various angles. About 19.26% of the riverbank is built up (Figure 23), while 15.12% is covered in green space.

Undeveloped river banks, significant river pollution, and river overflow all damage the river's integrity and reduce the nei-

borhood's livability score. Due to sewage being dumped into the river, the water body is quite polluted. On top of that, it's common for people to pile trash on the banks of rivers and dispose of it informally. Building levels and water levels along some stretches of the river are almost equal (Figure 21). When there is a lot of rain, the river may in such situations flood the nearby areas. Despite its many issues, the Tirana River has great potential in terms of its climate, inhabitants, wildlife, and aquatic life.

A problem tree analysis has helped in identifying the root causes of the problem as well as establishing a relationship between these causes and their entailed effects. The main problem that is being addressed in this research is the deteriorating quality of the Tirana river banks.

Concept Development

Rationale

The main reasons that triggered the possible intervention scenarios introduced in the following sections were mainly three points. First, the presence of a master plan that developed a strategy for the development of this project's area, namely "The Grimshaw Project." (Architects, n.d.) However, upon reviewing this plan, two essential aspects were not addressed clearly: the role of the community in this project and considerations of the natural urban water cycle, precisely stormwater management. Furthermore, the climate change impacts on the country called for an urban water-sensitive approach. Although Albania doesn't contribute to global greenhouse gas emissions because most of its energy resources are renewable, it is considered the second highest country at risk in Europe when it comes to hazardous events such as flooding, droughts, and heat waves (World Bank Climate Change Knowledge Portal, n.d.). Finally, the urbanization pattern of the city of Tirana raises large cooling demands to mitigate the risks of urban heat island effects that can be caused by the large paved areas and lack of open green spaces.

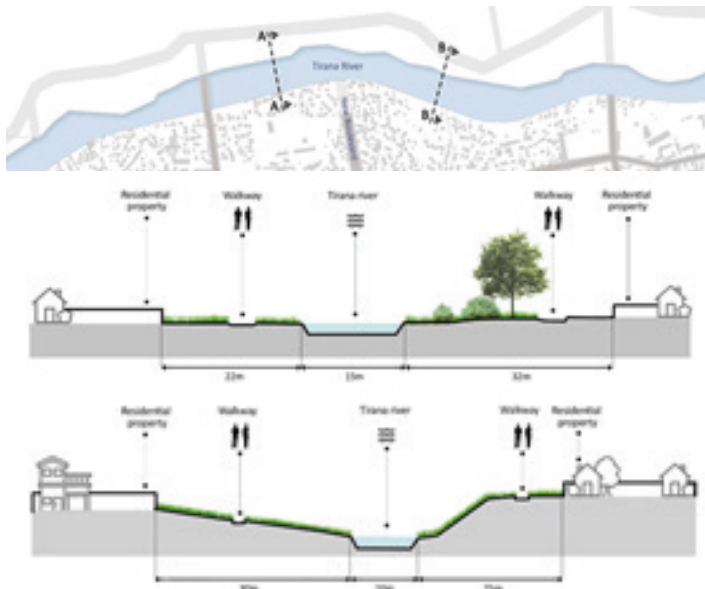


Figure 21 River Section A-A (top) and Section B-B (bottom)

Source: Authors

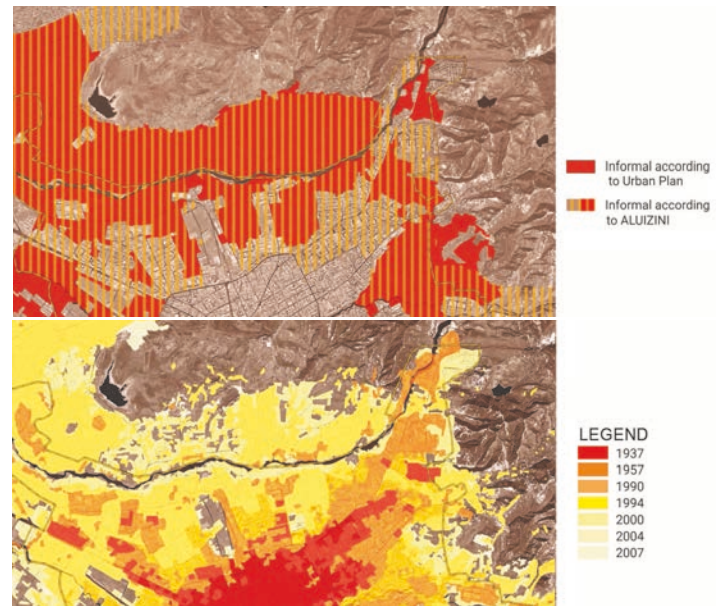


Figure 22 Informal Settlements of Tirana (top) and Urban Expansion Pattern of Tirana Municipal Area (bottom)

Source: (Bashkia, 2008)

Possible Scenarios

To address the previously mentioned issues three intervention groups were introduced. These interventions include water-related, community-related, and design-related categories. The viable water-sensitive urban design strategies that were adapted based on their compatibility with the scale of the project, general functions of the project, climate, and properties of the land include retention ponds, detention ponds, infiltration trenches, infiltration swales, and permeable surfaces. Community-related interventions are composed of different activities that are planned to be added along the riverside. These include gardening, farming, fishing, gathering, boating, etc. Architectural strategies are planned to be added to the context in the form of design elements. These elements include pathways (walkways, bike lanes, car lanes), bridges, monuments, hardscapes, vegetation (trees, shrubs, grass), and urban farms.

Different scenarios for the application of each of these interventions in the context of Tirana riverside are imaginable and are going to be explained in the following. (Figure 24)

In the current situation, the construction of legal and illegal housing has invaded the borders of the riverside and has extended to a close vicinity of the river at some locations. In order to prevent future damage to these properties, due to flooding, and to restore the riverside to its original state, it is obligatory for some of these houses to be removed and new pathways to be added. In this project, two potential locations for the addition of bridges with a distance of approximately 300 meters have been identified to connect two sides of the river. In accordance with those points, the spiral pathways have been suggested to provide equal access for passengers and visitors to the riverside through a constant flow.

The suggested location for the urban farms would be a distant location from the instant river borders to prevent damages in case of river overflows and flooding. Also, it is important

for these lands to have proper access to transportation vehicles and vehicle pathways for functional purposes. Another essential layer to be added to this area is the proper vegetation. Our proposal suggests the addition of trees near trenches and around the detention ponds to control and decrease soil erosion. It is recommended for the retention basins to be covered with the type of grass with high infiltration potential. Shrubs can also be added in a random manner around ponds and trenches for the same functions and to define borders. Figure 25 shows a proposal for the riverside development considering different interventions. The important thing to notice here is the ten regions that have been identified by our team as potential spaces to be designed through public participation. The functions of each of these regions can vary based on the community input; however, the example activities can be listed as using the trails along the river for walking, biking, and running, visiting parks along the river, nature/wildlife appreciation, picnic or social gatherings, boating, rowing, and fishing.

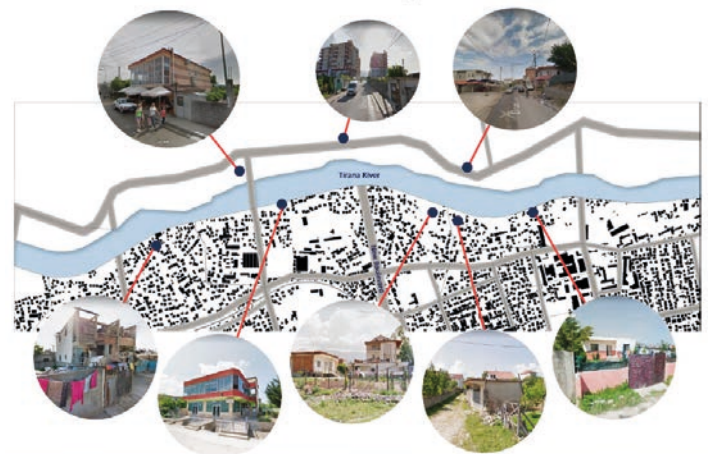


Figure 23 District Coverage Ratio Map

Source: Authors

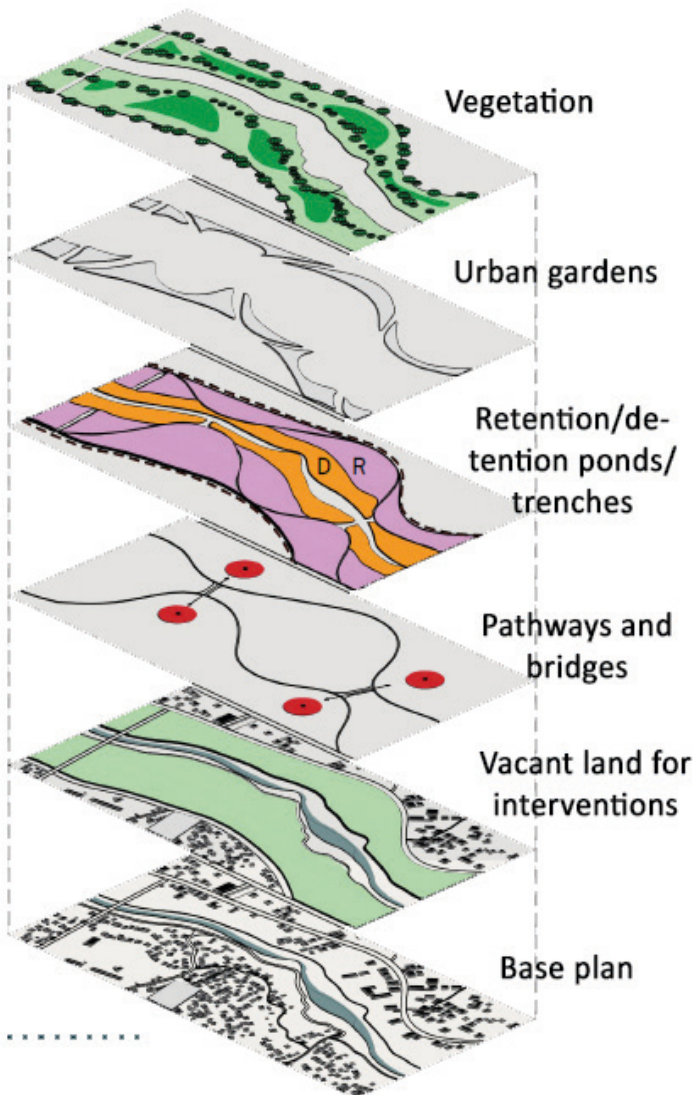


Figure 24 Exploded View of Proposed Scenarios

Source: Authors

Water-Sensitive Urban Design

To address the issues of over-exploitation of groundwater, climate change impacts and expected future irrigation and cooling demand, appropriate water-sensitive urban water cycle management strategies were adopted with the objective of maximum groundwater regeneration. The soil type of the site area is 70% loam and 20% sand which is appropriate for soil infiltration and groundwater recharge. Following are the different systems that were adapted (Figure 26):

- Infiltration trenches are proposed in the exterior-most layer of the bank area. These trenches hold the runoff from the adjacent built area and infiltrate them into the soil over time. It remains dry in the dry season thus the land can be used for various activities.
- Permeable pavement and swales were suggested to increase the effective infiltration area and a combined system to collect and convey the water swiftly to relevant ponds.

- Detention ponds were suggested to hold the excessive runoff volume during the rainy winter season. This pond holds the water and infiltrates the soil through different strategic soil layers. It remains dry during the dry seasons and thus can be used for different activities. Detention ponds have an outflow system and so were suggested in close vicinity to the river.

- Retention ponds were suggested in distances further from the river at higher elevations. These ponds collect runoff and stormwater from the surrounding area and circulate the water by infiltration and evaporation. It holds the water year-round and thus facilitates activities and functions that require the use of water.

Stakeholder Group

Depending on their role and scope within the project, the four major stakeholder groups identified for the projects are the government, investors, society, and experts. The Municipality, Ministry of Agriculture and Rural Development, Ministry of Finance and Economy, Ministry of Infrastructure and Energy, and Ministry of Tourism and Environment are the key players in the government category and they play a significant role in the legalization, financing, and monitoring process. Investors are the primary financial backers; among these are developers and real estate agencies, but donors and NGOs can also make significant contributions. Society, which consists of landowners, legitimate settlers, unauthorized settlers, neighbors, business owners, and future users like teenagers and students, is the most significant category. Proper communication and consultation with this group are essential for the project's success from the problem identification to the implementation stages, and their cooperation is essential in the maintenance phase. Planning, research, and consultation with experts from various fields, such as architecture, urban planning, civil engineering, relevant study groups, negotiators, context experts, and NGOs, are essential for the project's proper growth and completion.

Community Participation

In order to motivate community engagement, different schemes are adopted in this project which include NSS (National Service Scheme, 2023), Certificate of Participation, and different compensating measures. The National Service Scheme (NSS) is a Central Sector Scheme run by the Ministry of Youth Affairs and Sports of the Government of India. It allows students to participate in various community service activities and programs. The NSS' sole purpose is to provide young students with hands-on experience in community service. That is, "education through service" is their main motto. The student who participates in these activities will get an additional grace score at the academic level. This is the best tool to encourage students in Tirana to actively participate in this project. Additionally, the Certificate of Participation system, which awards youngsters and teenagers for their voluntary community services, will be useful for their career



Figure 25 Layout of the Proposed Intervention

Source: Authors

development. For the land owners, both legal and illegal settlers, compensating measures like Transfer of Development Rights schemes and usufructuary benefits on land plots are considered. The government provides land for people who will have to move from their current settlement areas as part of the project implementation through the transfer of development rights. In order to maximize community participation in the maintenance phase, the government also provides land for community gardens and other agricultural activities. However, in this instance, the ownership of the land is based on a contract or a lease system. Therefore, under this plan, both the community and the government will benefit.

Project Phases

The project is mainly classified in two phases, the “restore” phase and the “retain” phase. The restore phase aims at bringing the river banks back to their natural state before the impacts of informal urbanization while the retain phase is focused on sustaining long-term solutions. During the restore phase, two more sub-phases were classified. These two sub-phases are the research and development phase, which starts with building trust with the community and opening a dialogue between them and the different stakeholders, and the design phase where the community needs are collected and design drafts are shared for final review and confirmation. This process ensures the participation and involvement of different community sectors. Then, the use phase, where the community would actively participate in activities that increases their sense of belonging while also continuing the process of the development of the project area. According to Arnstein’s Ladder of Citizen Participation (Figure 27), the scope of the designed community participation level of this project ranges from informing to partnering up. However, the phases cannot be linear and are envisioned as a process loop, where buffers of consultation are considered between the different main and sub-phases to ensure real participation.

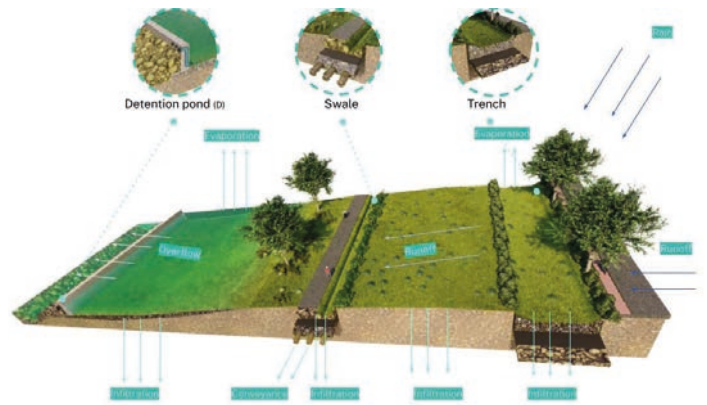


Figure 26 Typical Section of the River Bank With Different WSUD Elements

Source: Authors

Results / Conclusion

In order to ensure the manifestation of long-term development goals, the aspects of resource efficiency and community participation cannot be ignored for this project. The biggest risk could be the opposition, be it formal or social. Therefore, establishing a common ground, where all the stakeholders and community representatives are involved, could be the most important aspect of the different phases and scopes. Finally, this project can be considered a guideline that is based on research, reviewing and studying the different solution scenarios. However, it is limited to this scope and lacks real input from the community as well as on-site meetings with authority figures. It also does not address the other sides of the problem of pollution in the area, like sewage or waste dumping, but those aspects were addressed by the other projects included in this brochure.

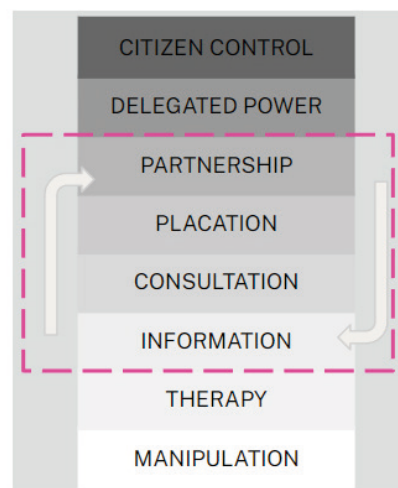


Figure 27 Arnstein’s Ladder of Citizen Participation (Imami & Dharmi, 2019)

Source: Authors

WATER

H2Oopen, Learning from Nature

GROUP 03

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Introduction and Methodology

The water resources of Albania are abundant, with the majority of water reserves in the form of rivers, lakes, and lagoons. The Ishmi River is a river in western Albania that brings water to the area north of Tirana, the capital of Albania. The Ishmi River is met by several other rivers, including two in Tirana: the Lana River, and, most notably, the Tirana River. The Tirana River is the largest and longest tributary of the Ishmi River and flows east from the mountains to the west through the city for a total distance of nearly 30 kilometers. However, years of industrial pollution and untreated residential wastewater being emptied into the rivers have taken their toll; subsequently, the Ishmi and its tributaries, Lana and Tirana, are gravely polluted. The ecological state of the Tirana River is a testament to the city's history, demonstrating the effects of rapid urbanization, poor waste management, and unregulated dumping in Tirana over decades. This project looks to explore nature-based solutions to engage the community in improving river water quality in the city of Tirana. As a main feature of the project site, the Tirana River is the focus of the proposed intervention.

Analysis

To analyze the severity of water quality in the Tirana River, as well as identify pollution sources and causes, a range of methods were employed. Some of the methods involved reflection and analysis of current projects at the project site, literary research, a visit to the site coupled with interviews of Tirana residents, and meetings with project professionals in Tirana. A SWOT analysis, problem tree, stakeholder analysis, and various mind maps helped the project team organize the findings and abate the collected information to define the project focus.

The deterioration of the Tirana River is the result of a sharp increase in population that resulted in unregulated urbanization, thus the construction of many informal settlements, the persistent discharge of untreated residential and industrial

waste, as well as an engrained habit of waste dumping near and in the river. The findings indicate that pollution levels in the Tirana River exceed European Union standards (Lushaj, 2007). The construction of the first wastewater treatment plant in Tirana was initiated in 2010 through the Greater Tirana Sewerage System Improvement Project, which aims to introduce wastewater treatment to all residents and expand the proposed sewer system even further (JICA, n.d.). However, according to project professionals in Tirana, the actual percentage of buildings in Tirana served by municipal waste treatment services is unclear due to the number of informal settlements. Currently, it is estimated that only 70% of the population is served by formalized waste collection services (European Environment Agency, 2021).

It was concluded that top-down project development, a lack of waste management services and regulations, and the practice of illegal dumping are the most significant threats posing the Tirana River. The project team seeks to develop an intervention that answers the following research question and accompanying sub-questions:

1. How can the Tirana River transition towards becoming a long-term clean water resource?

1.1. What cleanup processes can alleviate the existing pollution in the river?

1.2. How could public education support the implementation of a formal waste management system?

To answer the research questions we narrowed down the scope of our project including the location, the reach of an education program, and the design. As new developments in Tirana focus on the Northern Boulevard and sites along the Tirana River, the working team decided on an idea to clean the Tirana River by placing a pilot cleaning site at the intersection of the river and the Northern Boulevard. Through an education campaign, the team wants to directly address the residents of Tirana to accelerate a legislative change and inform and empower the residents as well as connect the community.



Figure 28 Solid Waste Pollution in Tirana River

Source: Authors



Figure 29 Informal Settlements Along the River Bank

Source: Authors

Case Studies and Interviews

The concept development was based on the evaluation of case studies with similar localities, challenges, or models. This includes campaigns like Water Watchers from Canada, Mi Parque from Chile, or the Kiel Climate Week from Germany. This also includes research projects like Aquafarm from the Netherlands, Ohneganos from Canada, and the Education center H²OPE in Hong Kong.

A project of particular importance is the SHUKALB Association of Water Supply and Sewerage in Albania. SHUKALB works together with schools and universities to raise awareness and educate about water and has achieved the implementation of institutionalized national training and certification for staff of water utilities. Of these organizations, interviews were set up with Mike Balkwill, Campaign Manager of Water Watchers, and Lotte Dietz, VanWaarde Consultant for Aquafarm, who gave their professional opinions on educational campaigns and nature-based solutions.

Intervention

As an intervention, an open-space concept with natural filtration ponds, along with an education campaign including an information center located at the intersection of the Tirana River and the Northern Boulevard, was proposed. The site was chosen due to its central location and good connectivity.

The current condition of the river banks makes a suitable environment for the proposal. The river bank is surrounded by informal settlements with an uncertain volume of household waste being disposed of into the river. Due to its condition of irregular infrastructure, any improvement in the short or medium term will be significant.

Because of the development plans for this area in the Grimshaw proposal, the river banks are dedicated to green and open spaces. However, the new development considers the displacement of all informal settlements along the river bank, facing social conflict and community resistance. To avoid public conflict over displacement, a currently unconstructed open space was chosen for the pilot project. This area can hold multiple filtering ponds in a 400 square meter space and can clean up to 2.3 liters per second. There is additional space for 10,000 square meters of public green space as well as an 80 square meter information center. Altogether, the team believes this place can host 300 people a day.

Concept Development

The concept uses a sequence of ponds, with various organisms that process particular nutrients, to filter the water. Upstream will be a solid waste catchment net to prevent plas-

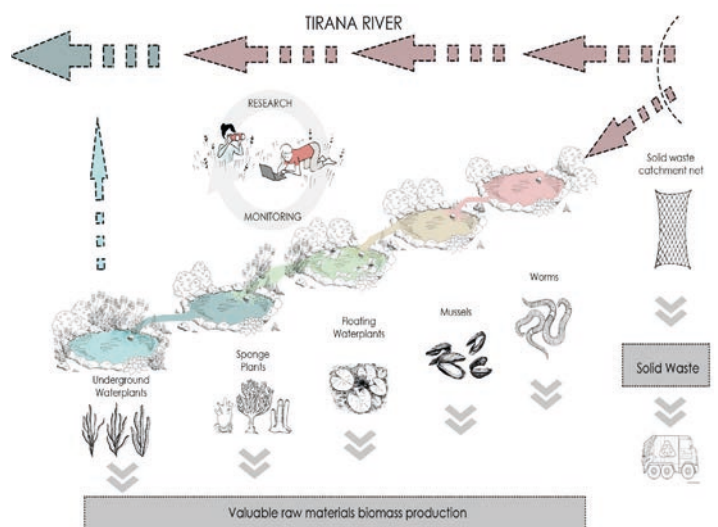


Figure 30 Proposed Concept: Filtration Ponds as Nature-Based Solution

Source: Authors

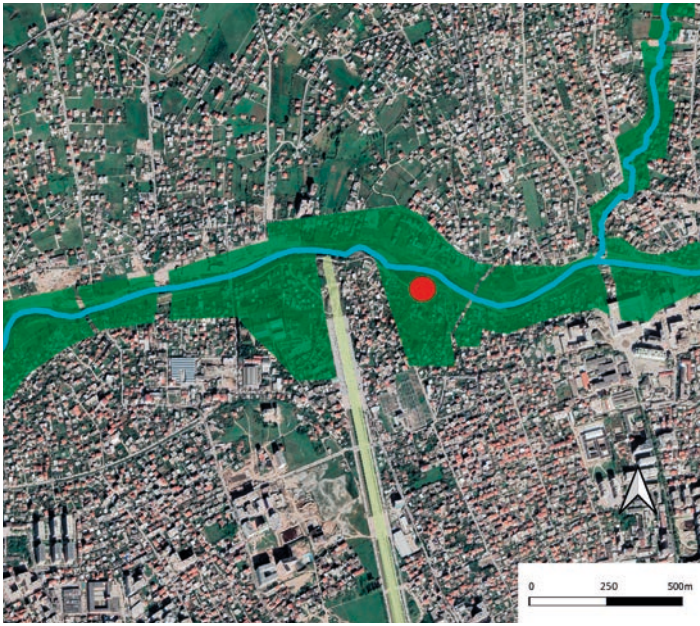


Figure 31 Project Site Location

Source: Authors



Figure 32 Concept Design of Filtration Ponds and Landscaping

Source: Authors

tics and large elements that may block or contaminate the system. A percent of the river water will be gravity fed from the river to the first pond, which holds five different Aquafarm tested and approved organisms. The list of organisms should be considered according to the types of river pollutants.

Regular testing of each pond can ensure water quality. After the last ponds, the water will be returned to the river, improving its overall quality. These ponds will be part of an open public landscape where all visitors can understand and experience the process and see the change in quality firsthand. As a by-product, valuable raw material will be extracted. As the system can only filter a small percentage of the water flow, more ponds are needed to strongly improve the quality. Therefore, in phase 2, the filtration system is expanded. The group mapped all open, green, and unconstructed areas concerning the Tirana River and the informal settlements, lead-

ing to eight further spots for an expansion.

Educational Program

This pilot project of water filtration will be accompanied by an educational program. It uses the open filtration system as an accessible education tool and the park and information center can be the focal point of school field trips, and workshops for community groups as well as public visitors and tourists. The goal here is to educate the public and supply a qualitative space for community organization and communication. Education and engagement are key for long-term results on pollution conflicts. The community has to become aware of the repercussions of polluting the water and also to learn about alternatives to prevent this from happening.

As this new park will have mainly an educational and research approach, we believe this project should be led by a University in Tirana, like the Polytechnic University, together with a community group or organization like SHUKALB. This new partnership will develop the program, the target, and the approach of the campaign along with the research goals, the monitoring, and the quality control. Communication strategies like posters, flyers, concerts, or radio advertisement can be considered to reach the community. For a successful campaign, it is necessary to meet the community and hear their interests and concerns. Another important approach should be with schools, which can supply many young visitors through externally funded field trips. The organization will then arrange scheduled tours but can also welcome residents, locals, and tourists into the education center.

Implementation Plan

To reach the final goal of a clean River, the project development has been divided into two approaches: the educational campaign and construction of the park's information center. Funding plans and stakeholder communication strategies are set to get the project started. For the education campaign, suitable partners and staff must be identified, marketing has to be created, and the community has to be engaged. For the park with the filtration ponds, as well as information center construction, the design and construction phases have to be considered. A special marketing plan for the opening day could be very useful for these both to come together for the workshop and site visits that are the anticipated output of the campaign. A community participation process should be considered in the design phase to help allocate any potential issues and to ensure community involvement.

To monitor the success of the education campaign, a look at the numbers of visitors in the park, the participants of the workshops, the amount of research that is conducted with the collected data, and the number of media publications will

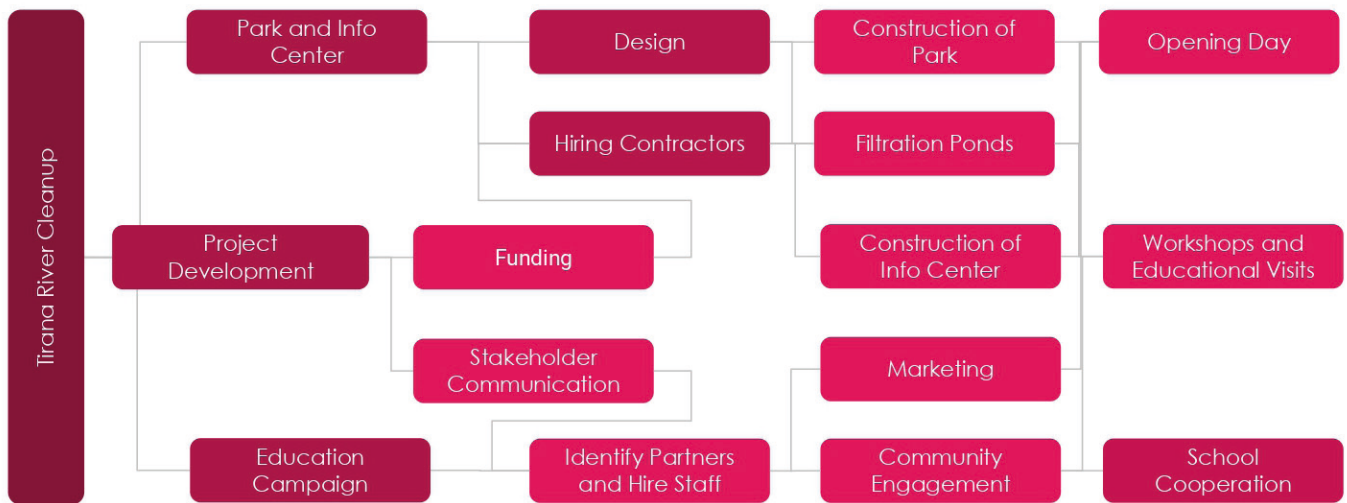


Figure 33 Project Implementation Plan

Source: Authors

be monitored and recorded. This could be performed by staff members at the information center. To monitor and evaluate the filtration ponds, an ongoing water testing process will analyze the water quality and the amount and type of pollutants remaining, as well as the amount of biomass production. This could be conducted through a university research program.

Project Considerations

To finance the project, a joint public-non-profit investment is considered, which most likely involves an international donation from financial entities such as GIZ, World Bank, or Council of Europe. These international entities support innovative projects in developing countries with a sustainable approach, so funding is plausible. Ownership of the program must be kept by partnering institutions and/or community organization(s) to prevent privatization since profit can easily disturb the final goal of the project.

The project will need the support of the municipality to assign land and protect the area designated for the project since the land value will increase after development. A nature-based solution is more sensitive to pollutants like heavy metals, which are not permitted to enter the system. Therefore, constant controlling and monitoring are necessary and adaptation measures have to be considered.

Results / Conclusion

For the successful urban development of the Tirana River, a collective vision of a connected and empowered community is essential. Through education, the Tirana residents can enjoy the surroundings of a clean and safe river. However, the river will only become a long-term clean water resource with the assistance of the municipality in creating comprehensive

waste management, wastewater service, and regulations. A fundamental and systemic change in the waste management system of the city is needed.

The proposed educational campaign aims to empower the public, connect the community to demand changes, and communicate with the authorities using scientific resources. This is a small-scale intervention with many positive externalities: more green areas for community spaces, blue infrastructure to reduce the heat-island effect, and an increase of biodiversity and land value. It is also a low-cost/low-maintenance filtration system, easy to be replicated in the country. Water filtration through nature-based solutions can alleviate the existing pollution in the river; however, preventing pollution from the point source is the most effective way to alleviate existing and future contamination in the city. This proposal combines a water cleaning system with a positive social impact..



Figure 34 Photo Rendering of the Project Area with Filtration Ponds

Source: Authors

MATERIAL

Tirana - Closing Circles

GROUP 04

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Introduction and Methodology

After the collapse of the Communist regime in 1996, Tirana experienced a huge wave of migration to the city. Together with the absence of sufficient urban planning laws, many informal settlements in and around Tirana emerged (Dode, 2014). The area around the project site is characterized by informal structures which grew mainly in the years before 2012. The informal structures observed in the project area differ greatly in size and structural quality. While some buildings are constructed with low-quality materials, most of them were built from mud bricks, clay, lime or concrete (Papa, D., Dobjani E., 2022).

To identify the main problems and formulate an appropriate research question, qualitative and quantitative analysis tools were used such as site visits, interviews, SWOT analysis, and mapping analysis. The analysis process was divided into five phases to identify the main problems within the chosen scope. After the main problems were identified, the team developed an articulate toolbox as a methodology on how to process construction demolition waste and implement it into the new construction. This toolbox was then applied to the residential buildings on the project site in the form of a model project and its environmental impact was analyzed.

Analysis

In Phase 1, a problem analysis of Tirana was used to define the main problems and challenges within the city and choose a REAP Scope, defining the outcome for the further processes of the project. Here, analysis mapping tools were used, as well as literary research and scenario planning on climate change impacts. The main overall problems we identified were the lack of sufficient urban development, which resulted in the growth of informal settlements, and a lack of infrastructure, creating the problems of illegal waste disposal within the project area. According to the Climate Risk Country Profile of Albania, climate change leads to an increased risk of flooding, heat island effects, and drought periods (World Bank, 2021). This poses a huge threat in combination with

the political situation in Tirana, consisting of corruption, a lack of transparency, and top-down approaches. To decide on a REAP Scope most affected by the problems identified above, a mind mapping tool was used to connect the different problems and threats to the four REAP Scopes. 'Materials' was chosen since both main problems of illegally dumped waste, as well as the lack of resilient designs to adapt to the threats of climate change, were connected to this scope.

Phase 2 consisted of a site potential analysis which aimed to identify the potential of the 'materials' scope in the project area. Various qualitative methods were used, such as a stakeholder analysis, participation analysis, site visits, map analysis, a SWOT analysis of the existing project site as well as the Tirana 2030 Development Plan and interviews with residents. The main strengths and opportunities identified in developing the project area were the implementation of infrastructure and formal design and increasing the living standards for residents. For threats and weaknesses, the loss of identity within the neighborhood was a main issue because of mismatched urban designs, illegally dumped waste polluting the riverside, the lack of resilient urban designs, and gradually intensifying problems such as the increase of illegal construction and demolition waste (CDW) were identified (Nadaždi, A., Naunovic, Z., & Ivanisevic, N., 2022). A scope analysis was conducted in Phase 3. The goal was to identify the main problems and opportunities within the 'materials' scope. Here, a Sankey diagram was used as a quantitative analysis, followed by several qualitative analyses such as a mapping analysis and literary research. The main outcomes of the analysis were the increase of CDW due to the demolition of large areas in the Tirana 2030 plan, as well as the lack of quality green spaces, and vulnerability to heavy rainfall and flooding of the project area. Additionally, the material flow was analyzed by looking at traditional materials and building typologies within the area (Simaku, 2017). The sub-scopes of 'waste,' as well as the connections to material flow and urban ecology will be the main sub-scopes considered in the intervention phase.

The aim of the analysis in Phase 4 was identifying the core problems and potentials within the sub-scopes and formulating objectives to solve identified threats. A problem

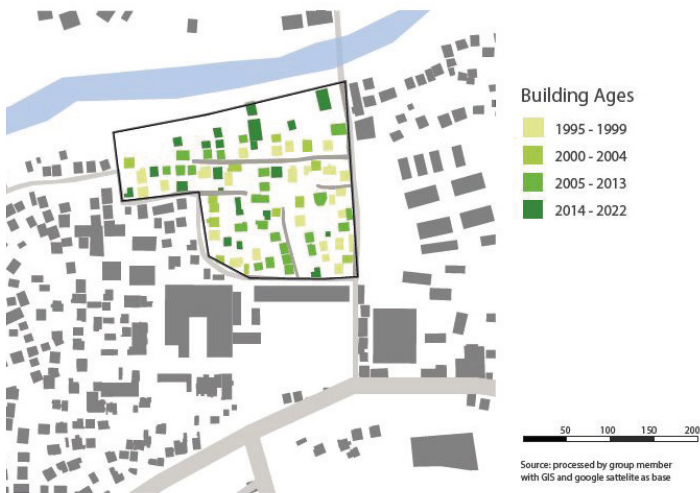


Figure 35 Inventory Analysis - Average Age of Buildings

Source: Authors, Google Satellite (2022), Google Street View (2016), M.A. Heinrich (2019)

and objective tree were used as a qualitative tool for the in-depth analysis. The main problem identified was the increase of construction waste (Nadaždi, A., Naunovic, Z., & Ivanisevic, N., 2022) as well as the potential loss of identity and the vulnerability to climate change (World Bank Climate Change Knowledge Portal, 2021). The Tirana 2030 development area was identified as the most vulnerable area affected by these problems within the project area. The main objectives for an intervention concept within this area are: the reuse of CDW, the resiliency against climate change effects, and gaining identity and confidence.

The outcome of the analysis resulted in the formulation of research questions in Phase 5 that will guide the project team through the intervention and concept phase. One overall research question and two sub-research questions were raised:

1. To what extent can CDW (construction demolition waste) of informal settlements be reused and integrated in the Tirana riverside development?

1.1 How can Tirana implement a climate resilient, circular urban development using traditional materials while aiming to maintain their identity?

1.2 How can a model project of informal settlements focusing on circular flow of material be used as the base of climate resilience designs to engage the public?

Concept Development

While analyzing the site conditions, the site walks and mapping analyses suggested that approximately 900 – 1,000 buildings would be demolished to make way for the new Northern Boulevard and the buildings in the Grimshaw master plan. The team conducted a site walk where locals in the area were interviewed and asked about the conditions of being relocated or affected by the new construction. One

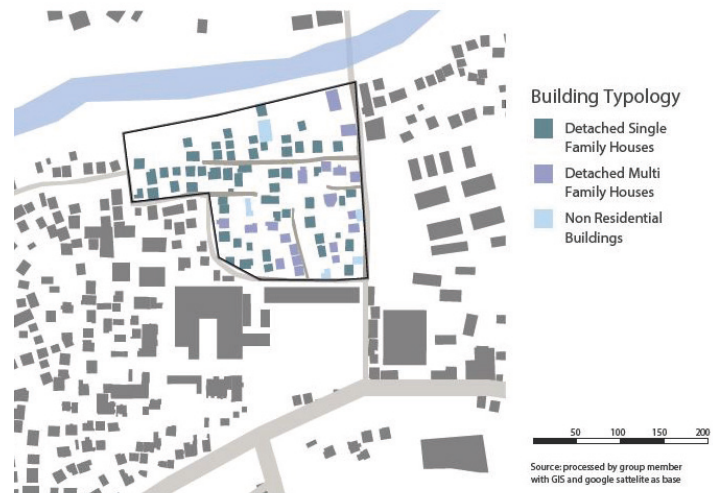


Figure 36 Inventory Analysis - Building Typology

Source: Authors, Google Satellite (2022), Google Street View (2016), M.A. Heinrich (2019)

bar owner shared that part of his home was demolished to make way for the main boulevard, but the part of the building that remained has been refurbished into a café with building materials he found along the road. This inspired the team to think about how locals are using their own CDW such as furniture, concrete, and adobe tiles to help keep the identity of the place they were raised in, instead of simply tossing the old materials along the river. After speaking with local officials about the status of the CDW because of the demolition from the new construction, the team discovered that the new buildings will not recycle or reuse any of the material on site. The experts interviewed from the municipality stated that the quality of materials from all the building was much too low to be separated and reimplemented in the new designs (H. Hysenbegasi, O. Bushi, 2022). The team therefore investigated the typology of buildings and the materials that were used.



Figure 37 Site plan and conceptual design

Source: Authors, Google Maps (2022)

TOOL BOX

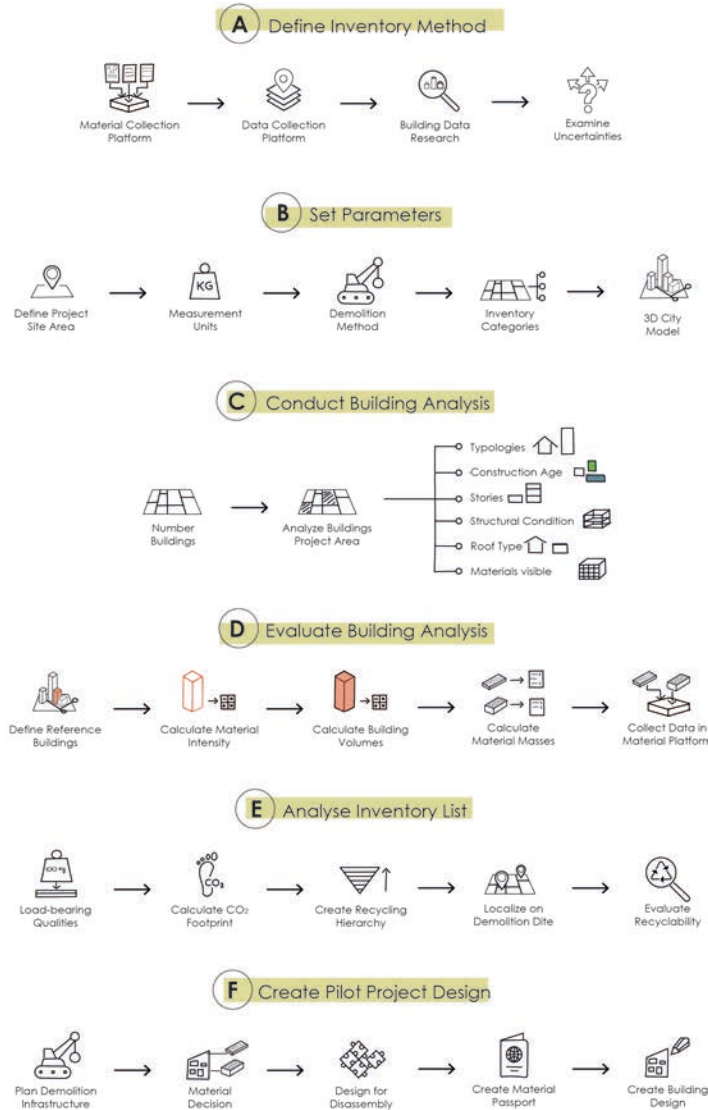


Figure 38 Tool Box Methodology for CDW

Source: Authors

One of the most crucial components to the team's concept development was the introduction of the toolbox to be used as a guideline on how to methodically track CDW and potentially re-use the material for new construction. The first step was to define an inventory method by establishing a material and data collection platform to have all the parameters of the material in a standardized list. The next step was to set parameters by defining the project site area, investigate the planned demolition method, and develop an inventory of the different site materials.

During the site walk along the river, the most common materials found were wood, insulation, glass panels, tiles, mud bricks, adobe bricks, concrete, and other miscellaneous construction waste. It seemed most of the trash had in some form or another been a part of a building construction process. The third step in the toolbox was to conduct a building analysis from the area. In order to be able to classify

the materials, the team researched the building typology, date of initial construction, number of stories, roof type, visible building materials, and the overall condition of the structure. However, since the entire construction demolition area is approximately 148 hectares, a smaller sample of the housing units was analyzed in detail to represent the site area as a whole when determining the ready available CDW materials for possible recyclability. Through site observations and Google Earth imagery, it became apparent that approximately 80% of buildings were detached single story, single family homes followed by detached multi-family homes. Moreover, a majority of the houses had flat unfinished roofs for the sociocultural aspect of expanding the home as the family grows. The fourth step was to evaluate the building analysis through calculation of material density, concrete building volumes, material masses, and inputting the data in material data collection platform. The findings concluded that some of the most used materials were solid and hollow brick for the exterior walls, concrete for floor slabs and foundation, reinforced concrete beams and columns for the framework, and wood for roof framework and cabinetry. The material intensity was calculated as to have an approximation of the amount of construction mass per material in the entirety of the site. The most abundant material found on site was lightweight concrete, followed by hollowed and solid brick.

Next, an analysis of the inventory list was done as to calculate the load bearing qualities of the material, calculate the approximated carbon footprint, establish the material purity for available reuse, create a recycling hierarchy, and most importantly to evaluate the recyclability of the material. However, in the most important segment achieving characteristics of a circular economy, there come the biggest limitations in this particular project. To accurately determine the quality of existing materials and of the structural integrity of the newly recycled material, an internal vetting process must take place. This vetting process does not currently exist in the context of Tirana. Therefore, the team assumed re-used materials in the new design concept would have been vetted and approved by local authorities declaring them safe to use. The team then analyzed the elements of a material, life expectancy, mass, and production emissions in detail for four of the most common found materials: concrete, brick, wood, and glass. The materials were then ranked on the waste pyramid as a method of showing the most effective and practical ways of either reusing, recycling, or disposing of the material after demolition waste. Taking for example concrete, the best case scenario for this instance would be recycling since it has to be broken apart and processed for reuse. With a recycling potential of up to 216 kilograms of carbon equivalent per square meter, broken down concrete aggregate can be added into newly poured cement up to a certain extent without comprising structural integrity.

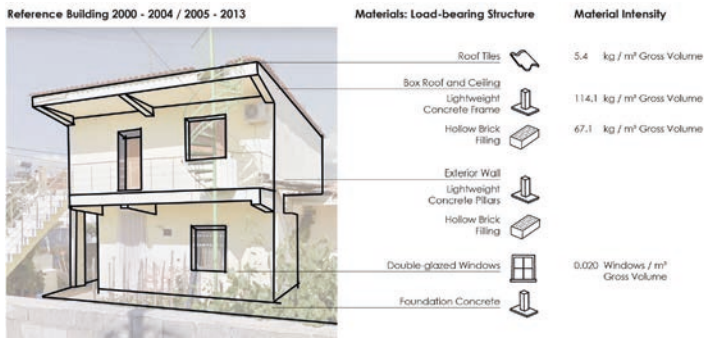


Figure 39 Material Intensity for Reference Building

Source: Google Street View (2016), Das Holz der Fichte-Eigenschaften und Verwendung-LWF Wissen 80. (n.d.), Nelskamp Dachziegel | Dachziegelwerke Nelskamp-heinze.de. | Grafische Bauteileingabe. (n.d.), SIMAKU, G. (2014). Albania National Building Typology, Energy Performance and Saving Potential, Academia

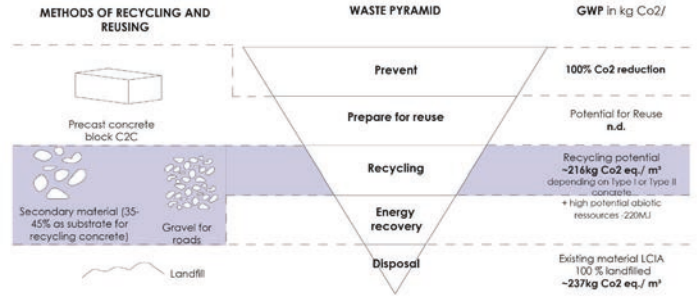


Figure 40 Inventory List - Concrete

Source: Authors, ÖKOBAUDAT Im BBSR

Finally, the last step of the tool box applied these methods in a model project design. This includes deciding which material use would be most efficient, designing for disassembly, creating material passports, and implementing all the steps in a new building. The model design of a multi-family detached home is a combination of new and recycled construction materials. Lightweight concrete with a maximum of 45% substituted recycled concrete will be used in floor slabs between stories while reinforced concrete would be used in the foundation and columns. Recycled perforated brick is used for the inner and outer walls without the need of load bearing qualities, which means more can be used without worrying about compromising the structural integrity of the building. Reused glass panels can be used for outer windows in conjunction with new window glass on the inner side of the wall in the form of a double paned window to maximize the insulation potential. Finally, soft wood can be recycled into fiber board as insulation for the outer and inner walls.

Results / Conclusion

To what extent can CDW (construction demolition waste) of informal settlements be reused and integrated in the Tirana riverside development? After detailed analysis of previous projects and current technological advances for the recyclability of construction materials, our team estimates the model project could possibly incorporate concrete, hollow and solid brick, glass, and wood as reused or recycled materials. When comparing the existing conditions to the proposed urban layout of the Grimshaw plan, it became apparent that the scale, layout, and context were completely different to what it was before the new Northern Boulevard. Therefore, the design intent was to break apart one proposed block of multiple high rise buildings and design a block with buildings with similar forms, size, and number of stories to help maintain the identity of the previous buildings at a more

residential and human scale. These buildings would be a variation of multi-family detached homes with the recycled CDW incorporated in the new design. Although it will appear as a stark contrast to the proposed building more than ten times the size of the detached family homes, it is imperative that the team's model designs are recognizably different so the public may see that it's possible to use construction waste into new buildings without compromising safety and aesthetics.

However, one of the main reasons as to why reuse of CDW is not currently being implemented not for the lack of supply, but the lack of demand. This can be addressed through targeted educational programs to train the current workforce on how to build with recycled materials and be trained in the deconstruction, vetting, and evaluation process so local companies would be more inclined to take a step towards circular economy practices in an attempt to "close the circles" of material lifespans.

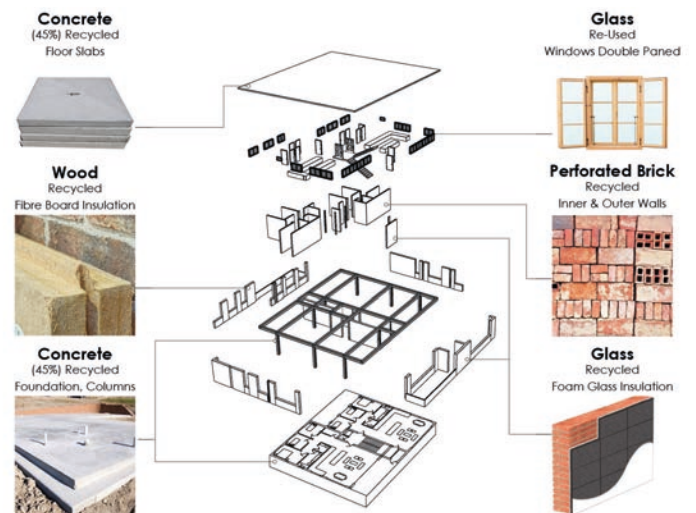


Figure 41 Inventory List - Model Home Materiality

Source: Authors, ÖKOBAUDAT Im BBSR

WASTE

GROUP 05

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TiraNatura: Returning Waste to the Cycle

Analysis

With regards to waste in Tirana, it can be stated that the waste collection services presently only serve 70% of the population. (European Environment Agency, 2021) Also, the recycling rate is notably low at only 10 %. As a result, waste management in Tirana is marked by the use of landfills and illegal dumping. (United Nations, 2018)

The process of waste management and differentiation at the source in Tirana is carried out by the company EcoTirana, founded in June 2016 with an initial capital of one million euros, whose partners are 51 percent the Municipality of Tirana and 49 percent the Italian company "AGSM" Holding Albania". The contract was signed for a period of 25 years and was supposed to solve the waste problem in Tirana by giving the company "Eco Tirana" the exclusive right for the cleaning service of the city. However, after a span of four years, the initiative failed to produce the anticipated outcomes. (Faktoje, N. 2020) Therefore, it is apparent that despite the existence of waste management plans and designated individuals in Tirana, a viable solution to the waste issue has yet to be identified.

tified.

Through the examination of Figure 42 and the personal observations of the authors, it has been determined that the Northern Boulevard of Tirana presents a challenge for waste collection vehicles, as the roads are too narrow and unpaved. Additionally, the limited number and inadequate placement of trash containers, totaling only 8 in the selected area, has resulted in indiscriminate dumping of waste in open areas.

Looking at the composition of waste, the waste mainly consists of food waste with 44%, plastic waste with 18%, and paper waste with 16%. This suggests that the current waste categorization is primarily comprised of organic and recyclable materials. Nonetheless, it should be noted that these figures may no longer be accurate, as the data is based on information from 2009, due to the scarcity of recent data available. (Alcani, M., Dorri, A., Hoxha, A., 2010).

Following a problem analysis, it was determined that one of the primary challenges facing the project site in Tirana is the issue of illegal dumping of household waste. As a result, the main research question and its two corresponding sub-questions are as follows:

Waste Analysis

- Containers
- 200 Meter Range
- Waste Dumping Spots
- Informal Flea Market

Road Network Analysis

(width represented by thickness)

- 200 Meter Range
- Waste Dumping Spots
- Informal Flea Market

Figure 42 Status Quo of the Northern Boulevard in Tirana in Terms of Waste Disposal and Management

Source: Map created by authors using (Google Maps, 2023), (OpenStreetMap, 2023)

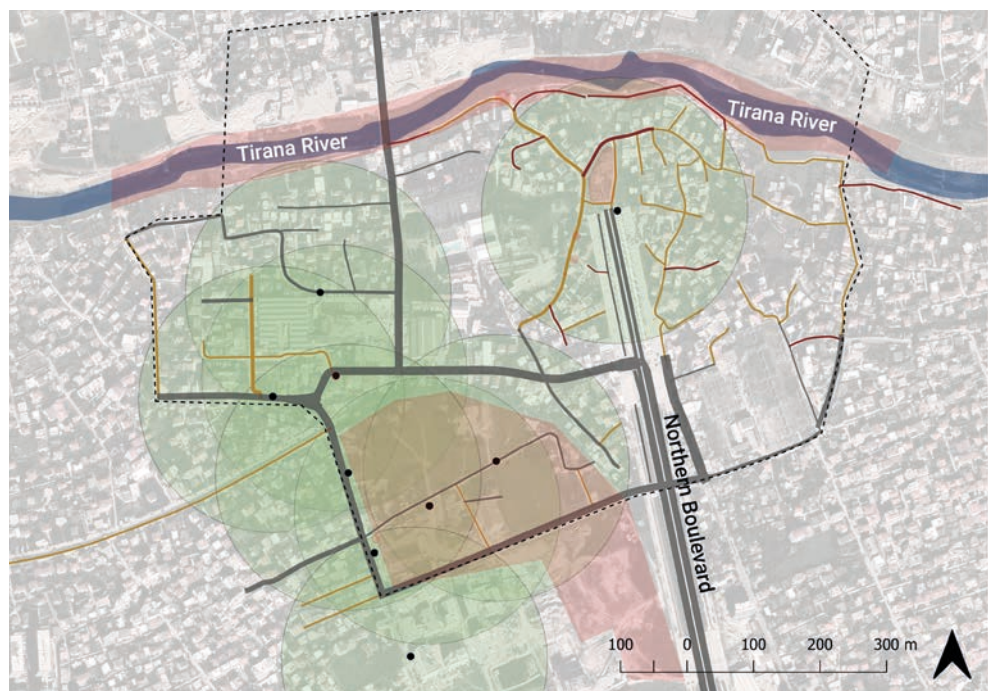




Figure 43 Concept Visualization of TiraNatura

Source: Image created by authors using DALL.E Artificial Intelligence (OpenAI, 2023)

1. What measures could be incorporated to prevent domestic waste dumping in both the Tirana River and Northern Boulevard of Tirana?

1.1 How can citizen awareness be raised through the maintenance of public space in relation to waste?

1.2 How can waste be used as a useful resource in the Northern Boulevard of Tirana?

Concept Development

Based on our analysis and research, a problem tree has been created with the main problem identified as illegal waste dumping. The three primary reasons for this issue are:

1. Insufficient public awareness
2. Inadequate waste collection system and infrastructure with limited accessibility for citizens
3. Undeveloped open spaces

The authors continued with the concept development by examining the problems in the context of the research question. Three case studies from around the world, dealing with similar challenges, were analyzed and ideas were derived from these studies to shape the basic principles of the intervention concept.

Additionally, two expert interviews were conducted to gain a deeper understanding of the context from different perspectives and to answer the research questions. These expert interviews supported the key intervention ideas, including increasing awareness and creating a long-term waste cycle. After careful consideration of the case studies, expert interviews, and analysis, the authors defined the principles and framework of the intervention. To achieve sustainable short-term and long-term solutions for the waste challenge, three main principles have been established for the intervention concept: reduce, reuse, and recycle.

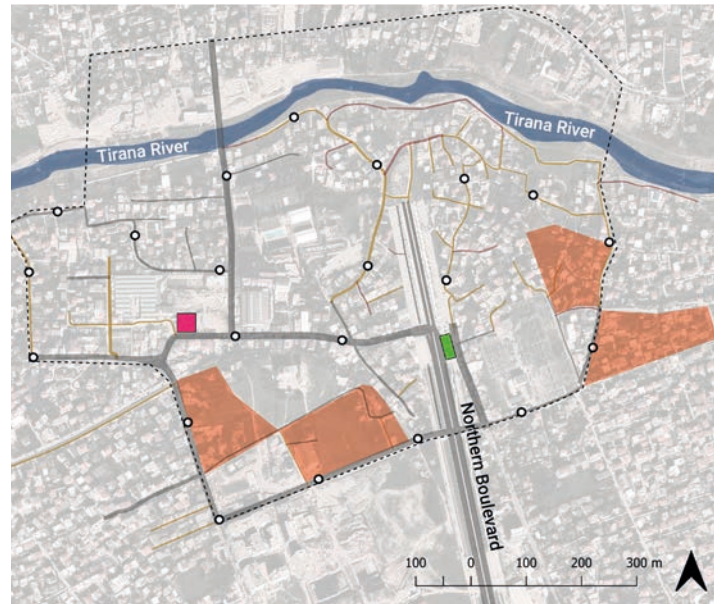


Figure 44 Map of Strategy 1 & TiraNatura

Source: Map created by authors using (Google Maps, 2023), (OpenStreetMap, 2023)

Proposals

- Containers
- Res./Educational Zone
- Recycling Facility
- TiraNatura

Road Network

- Paved
- Not Paved
- Not Paved + Bad Conditions for Bikers

- Reducing waste levels is a crucial contribution to solving the waste problem and can be achieved through raising community awareness (Minelgaité & Liobikienė, 2019).
- Reusing waste can be improved through the creation of workshops or promotion of the existing flea market in the area.
- Recycling waste can be achieved through education campaigns and workshops aimed at raising community awareness.

The first two principles (reduce and reuse) will be incorporated into Strategy 1 of the intervention. The recycle principle will be addressed through Strategy 2 of the intervention, which will be further detailed in the following section.



Figure 45 Farmers Market in TiraNatura (by authors using DALL.E)

Source: Image created by authors using DALL.E Artificial Intelligence (OpenAI, 2023)



Figure 46 Urban Gardening Area in TiraNatura
Created by authors using DALL·E (OpenAI, 2023)

Strategy 1

The first strategy is a multi-pronged proposal that consists of educational workshops, farmers' markets, flea market, and urban gardening practices. The objectives of the project are to educate the public about the importance of reducing waste, to promote sustainable waste management practices, and to encourage environmentally friendly behaviors.

The educational workshops will be designed to provide information about waste reduction, reuse, and recycling, especially for groups of children since the children are seen as the backbone of the educational part of the project. For this reason, professionals will be sent to nearby schools to familiarize the children with the topic. In the long term, engagement with the curriculum about the waste topic will be proposed (Centre for Science and Environment, n.d).

The farmers' market will be designed to showcase sustainable waste management practices, such as composting, as well as to provide a space for local farmers to sell their produce. The markets will be a platform for people to learn about reducing food waste and supporting local agriculture. The flea market will promote the reuse and the revaluation of the products.

Finally, the urban gardening exhibitions will demonstrate the use of urban green spaces for waste management and food production. The exhibitions will also highlight the many benefits of urban gardening, including increased access to fresh produce, reduced domestic waste, and improved air quality. Hence, this strategy is expected to contribute to the development of a more sustainable and environmentally-friendly society by raising public awareness about waste management and promoting sustainable practices. Through the combination of educational workshops, farmers' markets, and urban gardening exhibitions, the strategy will provide participants with the knowledge, skills, and inspiration needed to reduce waste and live more sustainably.



Figure 47 Map of Strategy 2 With Bike Routes
Source: Map created by authors using (Google Maps, 2023), (OpenStreetMap, 2023)

Waste Analysis

- Containers
- 200 Meter Range
- Waste Dumping Spots
- Informal Flea Market

Road Network

- Paved
- Not Paved
- Not Paved + Bad Conditions for Bikers

Strategy 2

The second strategy consists of the implementation of a pilot project to establish a sustainable waste management system in Tirana. The aim is to ensure the proper sorting and recycling of waste, reducing the amount of waste that ends up in landfills.

To achieve this, the authors suggest placing an adequate number of waste containers at strategic locations near residential areas, offering incentives for proper waste disposal, and educating residents on recycling. For proper sorting, three container units will be placed for recyclable, organic, and residual waste, and will also function as media for promoting recycling awareness campaigns, publicizing the activities offered to the community in TiraNatura, and advertising partner stakeholders involved in offering incentives in exchange for collected waste (El-Geneidy et al., 2014).

The waste will be transported to the transfer station by non-motorized cargo bikes on a defined route. Two bicycle routes are defined to cover the project site, and the transfer station's location is chosen based on its proximity to the route. The proposal includes the use of electric bicycles if economically viable and fundraising permits (González-Torre & Adenso-Díaz, 2005).

The proposed plan aims to reduce landfill disposal, promote recycling awareness campaigns, and encourage individuals to make small contributions through proper waste separation and disposal. However, the authors acknowledge that the proposed process can be executed and evaluated as a pilot project in the short term, with a one-year trial period in a limited region along the Northern Boulevard of Tirana, aiming to establish a connection with the community in TiraNatura



Figure 48 Suggestion for Waste Collection Points

Source: Image created by authors using DALL·E Artificial Intelligence (OpenAI, 2023) (Pexels, 2023)

and promote recycling awareness. The authors argue that the establishment of the recycling facility is the ideal long-term solution. The proposed process then could potentially serve as a waste management model for other regions with similar characteristics.

Results / Conclusion

In the study, the aim was to provide an appropriate and sustainable waste management approach in the Tirana Northern Boulevard area. In this context, detailed analyzes were carried out throughout the study. First of all, the current situation of the region was evaluated in many aspects - energy, water, materials, mobility- and it was determined that the priority problem was the inadequacy of waste management and uncontrolled waste dumping. For the analysis of the situation, the current waste management status quo was evaluated and a SWOT analysis was created. The reasons that were the source of the problem, which also led the team to the solution, were analyzed with the problem tree, while stakeholder and participation analyses were carried out to identify the authorities in charge. At the end of the analysis, the research questions of the project, which were explained in detail above, were determined.

In order to find the answers to the research questions, various case studies from around the world were examined and how solutions were produced in these examples was evaluated. Afterward, 2 Albanian experts who both know Tirana and have technical expertise in waste management were interviewed and their opinions were taken to find solutions to the research questions. As a result, the 2-stage waste management strategy explained in detail above was developed, and the feasibility, the log frame analysis, and monitoring/evaluation methods of these strategies were determined.

As a result of the study, it was seen that the biggest step to be taken should be to ensure the active participation of all stake-



Figure 49 Map of Strategy 2 with Container Ranges

Source: Map created by authors using (Google Maps, 2023), (OpenStreetMap, 2023)

Waste Analysis	Road Network
● Containers	— Paved
--- 200 Meter Range	— Not Paved
■ Waste Dumping Spots	— Not Paved + Bad Conditions for Bikers
■ Informal Flea Market	

holders in the process. It is important for the legal authorities to implement the existing regulations, to increase the awareness and knowledge of the public, and to include educational institutions, NGOs, and private companies that will invest in the recycling sector. The healthiest waste management strategy should be in the form of creating community awareness, starting with the smallest individuals and households. The infrastructure for this can be built with education and the right investments.

The primary purpose of the project proposal is to raise awareness of children through education and to ensure that children transfer information to their families. With TiraNatura to be established for adults, incentives will be provided both to raise awareness with workshops and to ensure waste separation and disposal. In addition, a sufficient number of garbage containers will be placed to prevent informal waste dumping.

Although in the short term the separated wastes will be sold to recycling facilities operating outside the province of Tirana, it is aimed to establish a recycling and compost facility in the region in the long term.

In summary, the project aims to manage waste correctly and prevent illegal practices in the short term. It is clear that there are some limitations to the long-term goals. In order to overcome these limitations, it is important that all stakeholders fulfill their responsibilities. This proposed study for Tirana Northern Boulevard covers a limited area and is a pilot project. Monitoring and evaluating the achievements of the study have significant importance for disseminating such studies in Tirana. As a matter of fact, it is hoped that the public will demand such practices to become more widespread with the increase in the awareness of the people within the scope of the studies.

MOBILITY

Tirana - Many Roads Lead to the Nexus

GROUP 06

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Introduction

The issue of mobility in informal areas in Tirana, Albania is a complex problem that affects the daily lives of many residents. These areas, often referred to as “unplanned settlements,” are characterized by a lack of proper infrastructure and transportation options, making it difficult for residents to move around and access essential services. This can lead to social isolation and a lack of economic opportunities, as well as increased environmental degradation and health risks. Addressing the issue of mobility in informal areas in Tirana will require a multifaceted approach that considers the needs of residents, the availability of resources, and the potential impact on the environment.

Analysis

The problem of a poor mobility network in and around informal settlements and the new Northern Boulevard in Tirana is a major concern that affects the daily lives of many residents in this area. The effects of this problem include lack of bus connections, a lack of a sense of belonging among residents, few cyclists, limited parking options, poor accessibility for emergency services, and a lower presence of businesses in these areas. These issues can contribute to social isolation, reduced economic opportunities, and increased health risks for residents.

The lack of proper infrastructure and transportation options in informal settlements can also lead to environmental degradation and increased congestion in the surrounding areas. Overall, addressing the problem of a poor mobility network in and around informal settlements is crucial for improving the quality of life for residents and the overall well-being of the city. The concept development plan further helped for addressing this problem.

The working group analyzed the issue of mobility in informal areas in Tirana and proposed a solution that involves merging

these areas with formal areas through the use of urban acupuncture practices. Urban acupuncture is a method of urban design that uses small-scale interventions to create a positive change in a community. In this case, the group proposed some potential urban acupuncture practices which include:

1. Creating new entry points: By creating new entry points into informal settlements, residents can more easily move between the informal and formal areas, improving mobility and access to essential services.
2. Encouraging active transportation: By creating bike lanes and pedestrian walkways in informal settlements, residents have more options for getting around, which can improve their health and reduce congestion.
3. Providing more parking options: By creating more parking options in informal settlements, residents can more easily access businesses and services, which can improve the local economy.
4. Improving emergency services accessibility: By making sure emergency services are easily reachable in informal settlements, residents can have peace of mind knowing they can get help in case of an emergency.
5. Supporting local businesses: By providing resources and support to local businesses in informal settlements, residents can benefit from more job opportunities and a stronger local economy.

Additionally, by using urban acupuncture practices, the interventions would be cost-effective, easily replicable and would have a positive impact on the community. Overall, the group’s analysis suggests that urban acupuncture practices can be an effective solution to the issue of mobility in informal areas in Tirana. It is important to involve community members and stakeholders in the planning and implementation of these interventions to ensure they are tailored to the specific needs of the area and are accepted by the community.

Concept Development

In the intervention area, the right side of the new boulevard was chosen as the focus due to its higher concentration of informal settlements and its significant connectivity and mobility issues. This area was not well connected to the boulevard and the surrounding neighborhood, making it a priority for improvement. The intervention, which was based on the principles of urban acupuncture (Lastra & Pojani, 2018), had a main focus on three areas: streets, intersections, and open green spaces. The aim was to address the problems and enhance the overall quality of life in the area by making this spot better connected to the boulevard with the extension of the streets.

By dividing the intervention into streets between the boulevard and other neighborhoods, intersections between main streets, and open green spaces in internal neighborhood spaces, the effectiveness and impact of the intervention can be studied and evaluated in a more comprehensive manner. This categorization can also help to identify best practices and potential areas for improvement in the implementation of the urban acupuncture intervention.

By removing walls and sharing gardens, the intervention aimed to foster a sense of community. Safe crossings and pop-up bike lanes improved the accessibility and safety of the area for pedestrians and cyclists. Street art and safe pedestrian areas encourage people to spend more time in the area, while potted plants and low-cost urban furniture improved the overall aesthetic of the area. The creation of cafes, restaurants, bars ,and shops encouraged economic activity and helped to animate the streets. All these practices work together to create a more balanced and harmonious urban environment that better meets the needs of the community (Figure 50).

1. The main idea is formed by the concentration of the three aspects: According to the first proposed street improvements, the neighborhood's connection to the Boulevard and the city will be improved. Three main streets are picked in this instance to provide better access to the neighborhood (Figure 51). Three zones are proposed to accommodate up to 300 cars in multiple levels of green parking, generate electricity using photovoltaic (PV) technology, and serve as a green urban monument with their distinctive living greenery, community involvement, and recycling. Such low-cost parking spaces can address the neighborhood's mobility problems and many other problems at the same time (Figure 52).



Figure 50 Urban Acupuncture Zone

Source: Project Map created by the authors

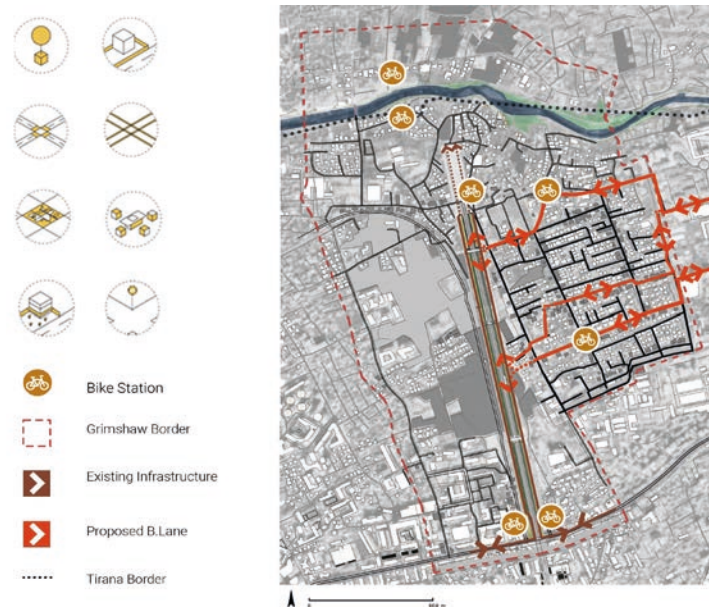


Figure 51 Bicycle Lanes in Streets

Source: Project Map created by the authors



Figure 52 Green Parking Project

Source: Stouhi, 2019

Currently, there is only one point of connection between the boulevard and the entire network of informal settlements. This will be increased to four points, as depicted in Figure 51. Although the street width does not allow for more space for pedestrians and bicycles, it is proposed that one-way streets be converted so that traffic flow is smoother with the same widths, and the addition of two new pop-up bicycle lanes. This way, we can reap the benefits of the acupuncture idea with minimum deconstruction, in a short period of time, and at low cost. The comparison between the existing and proposed changes to the streets is illustrated in Figure 53.



Figure 53 Street Sections

Source: Project Map created by the authors

The bicycle lanes will then be connected to those of the boulevard and ultimately to the rest of the city. The intervention also suggests safe parking zones where shared bikes and urban racks can be rented (Figure 53).

2. Second, the intersection (Figure 54) between main streets is a vital component of urban planning and has a significant impact on the overall character and community of a city. The proposed intervention aims to create a solution that not only aligns with the regulations but also benefits all parties involved, including the community and building owners. The intervention utilizes the principles of tactical design and urban acupuncture practices which focus on making small, targeted interventions to achieve a desired outcome (Lastra & Pojani, 2018). This allows for a more customized and nuanced approach to urban planning, taking into account the unique needs and context of each area.

The removal of walls and the sharing of gardens at intersections is expected to foster a sense of community, leading to increased profit for both the community and building owners. Additionally, the intervention considers parking issues by proposing the use of big general parking

near the boulevard for visitors and time-based charges for informal parking to resolve the parking problem. The proposed intervention at the intersection between the main streets seeks to create a more liveable and better city for everyone by creating pedestrian safe zones and urban spaces for everyone as well as potted green. The practice is done by the community itself or the residents will be actively part of all the changes happening in the neighborhood, fostering a sense of community and addressing the challenges of urban planning in a comprehensive and equitable manner (Figure 55).



Figure 54 Intersections

Source: Created by the authors



Figure 55 Intersections

Source: Created by the authors

3. The third aspect of the intervention in the neighborhood aimed to revitalize open green spaces, particularly an almost abandoned green zone which has the potential to serve as a connector between two distinct parts of the neighborhood, making it a crucial aspect of the community's infrastructure. The intervention sought to transform the park into a functional and valuable space that could be utilized by the community

for various purposes. This could include creating walking paths, installing benches and picnic tables, adding play areas for children, planting trees and flowers, and making other improvements to the park's infrastructure. The goal was to create a space that would be accessible and appealing to residents, encouraging them to spend time in the park and engage with their neighbors.

By improving the park, the intervention aimed to foster a sense of community among residents, promoting social interaction and connection. A well-maintained park can also help to improve the quality of life for residents by providing a place to relax, exercise, and spend time with family and friends. Additionally, a well-utilized park can also increase property values, making it a beneficial investment for the neighborhood (Figure 56).



Figure 56 Open Green Area

Source: Created by the authors

Conclusion

The Tirana Boulevard and River Development project has significant potential for improving the livelihoods of the people of Tirana and promoting a sustainable environment. However, ensuring the success of the project requires the inclusion of all communities, particularly those from poor and informal neighborhoods. Unfortunately, current plans for the boulevard do not specifically address these areas. Rather than demolishing these neighborhoods, it is crucial to focus on improving them, as they too have the potential to contribute to the success of the project.

By removing the barriers between informal areas and the boulevard, and constructing new pathways, residents will have increased interaction with the currently unoccupied and quiet boulevard. Additionally, implementing temporary

interventions in the informal areas can foster a sense of attachment among the residents, leading to their increased participation in the future development of the boulevard and river project.

The revitalization of an informal neighborhood can have significant long-term positive impacts on society as well as can benefit the boulevard and river development project. These short-term interventions are aimed at improving the living conditions of the residents, while also creating opportunities for economic growth and community development. It is also crucial to involve locals in the entire project, as it creates a sense of connection to the place and helps to build a more sustainable future.

The potential opportunities are enormous. Enhancing mobility in the informal areas and establishing new streets will not only improve mobility for the project but will also positively impact other urban indicators such as energy, water, waste, and materials. Working together, these aspects can facilitate the successful implementation of sustainable urban development in the new Northern Boulevard area.

However, addressing the potential risks and challenges associated with such a project is equally important. Stakeholders' buy-in is critical, as it ensures that all parties involved have a shared understanding of the project's goals and objectives. Competing interests can also pose a significant challenge, requiring careful negotiation and collaboration to reach mutually beneficial outcomes. Regulatory issues can also arise, and navigating the legal landscape requires expertise and experience.

Despite the potential risks and challenges, it is essential to push forward with revitalizing informal neighborhoods. By taking a holistic approach that includes short-term interventions, community involvement, and addressing potential risks, we can create a better future for everyone.

CONCLUSION

REAP Projects

RESULT

Palak Pandya

To summarize, the students from Resource Efficiency in Architecture and Planning (REAP) chose one of the scopes from energy, material, waste, water and mobility to investigate and analyze the new Northern Boulevard area of Tirana and propose an intervention for the possible improvement in the area of development. The students from REAP visited Tirana for one week and took part in different site visits, interviewed local people living in the area of development, attended different workshops organized by Faculty of Architecture and Urbanism (FAU), attended guest lectures by local authorities from Municipality of Tirana, and finally presented six unique interventions for the study area.

The energy group proposed an intervention to support new development with solar energy mix by installing PV panels and solar thermal installations on the rooftops of all the buildings. This intervention will reduce the usage of the fossil fuels for electricity production and will produce energy locally for the new Northern Boulevard area.

The group with the scope of water proposed an intervention with three categories. The first is a water-related intervention which includes infiltration trenches, permeable pavement and swales, and detention and retention ponds to address the issue of over-exploitation of groundwater. Another intervention category includes public participation and design-related categories which will help to engage different community sectors with a variety of activities to participate in and clarify the design needs for the final drafts. This aims to improve the community engagement and make the development feel like it belongs to the community.

One of the groups suggested an intervention to clean the Tirana River with an open-space concept using natural filtration. They also proposed to make an educational campaign to teach people of all ages about the harmful effects of the pollution and waste ending up in to the river.

Another group dealing with the material scope chose to address the issue of construction demolition waste. They proposed an intervention for reusing and recycling building material from the present construction of informal settlements for the new development and construction plans. This includes strategies like designing for disassembly, creating material passports and deciding on material efficiency use in the design phase.

The waste group proposed an intervention in two strategies: first, to make people aware about waste problems and how they can avoid them at the point of origin, meaning their own house. This includes planning different educational workshops to educate them on reducing, reusing, and recycling waste. They also included workshops for designing a farmer's market, an urban gardening exhibition, and flea market to showcase different sustainable practices and to promote local products. The second strategy consists of implementing waste management systems by properly sorting the waste at the point of origin, transport, and disposal. This whole proposal will address the issue of waste disposal in the Tirana River and reduce landfill disposals.

Lastly, the group focusing on mobility selected a particular area for the intervention of the new Northern Boulevard area and proposed to increase the mobility by connecting their project site to the boulevard and the surrounding neighborhood. The intervention of this working group is based on the principle of urban acupuncture with three main specific areas: streets, intersections and open green spaces which aims to improve the quality of life in that particular area.

Each of the working groups has shown innovative project proposals for the development of the new Northern Boulevard area. Their analyses also take into account the financial feasibility of their corresponding projects. However, each of the interventions includes public participation in one way or another, which shows community engagement is necessary for achieving sustainable urban development.



Picture taken by the authors

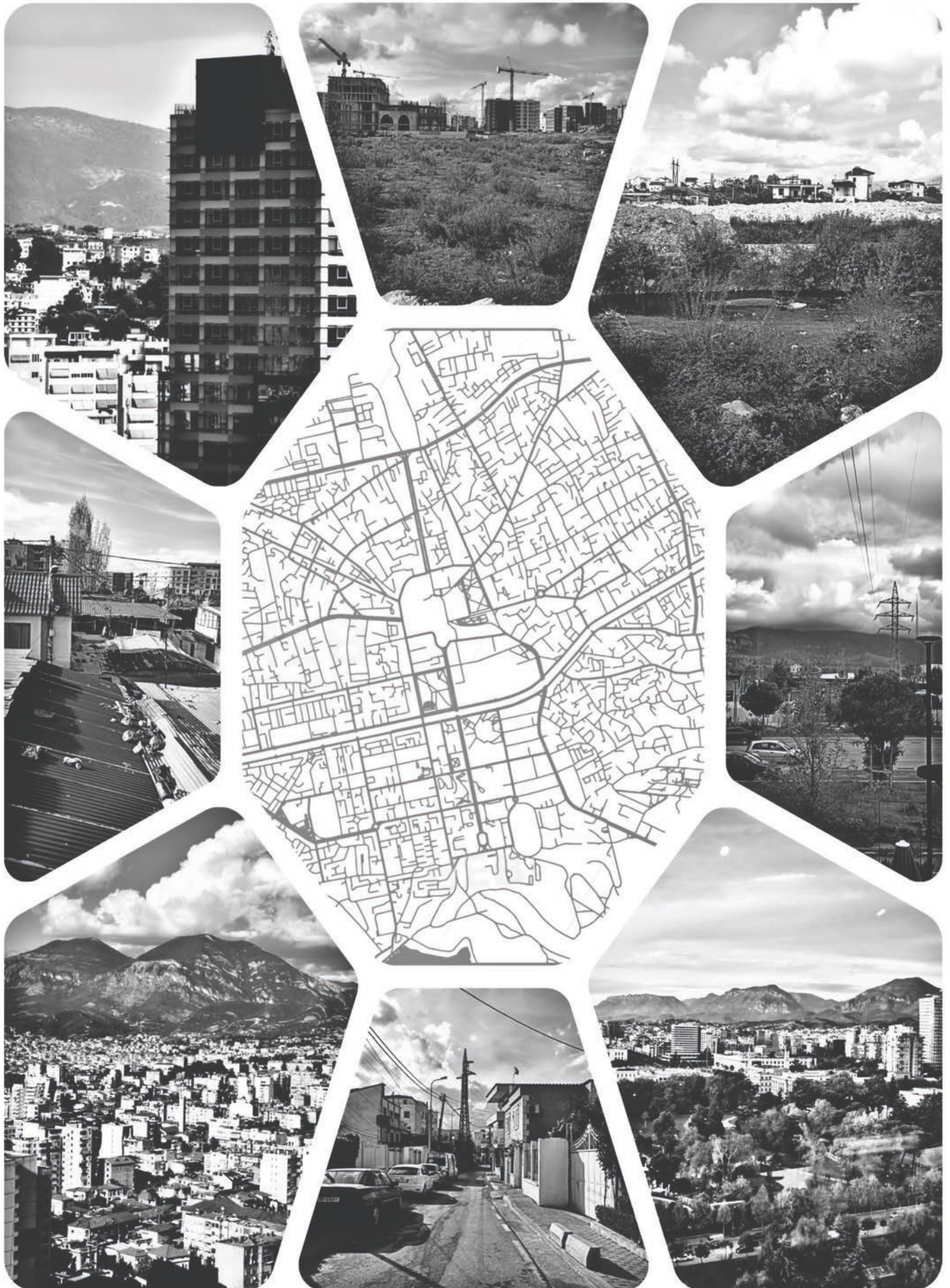


Figure 57 Project Site Impressions

FAU SCOPES



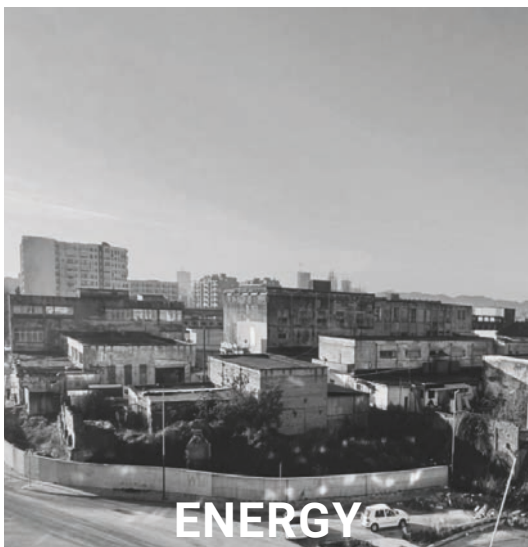
Picture taken by author



Picture taken by author



Picture taken by author



Picture taken by author



Picture taken by author

URBAN REGENERATION

FAU SCOPES

Elda Hida

An Explanation of “Urban Regeneration” as a Topic

Tirana is facing a strong renewal of its urban DNA, so much so that every urban and architectural component is fluid and is undergoing transformation, almost in an unstoppable way. (A. Vokshi, 2022) Tirana was a small city with only 17,000 inhabitants when it was declared the capital of Albania in 1920. Immediately after this development, Tirana started to experience a continuous increase in population (Pojani, 2010).

The rapid demographic growth after years of dictatorship increased extraordinarily the outer band of the periphery. This meant the number of residents moving to the suburbs tripled. Agricultural lands or free territories around the city were replaced with buildings that were unplanned by a regulatory office and, in most cases, illegal or without architectural projects. These new settlements found accommodation in two main manners:

- Informal constructions in state agricultural territories or private properties that were nationalized in the communist era.
- With new low-cost buildings, built with permission in new residential quarters without a regulatory plan of the city, with abusive partial plans orientated towards to the high-density residential construction.

These forms of construction are chaotic and do not respect the minimum insolation conditions, air ventilation, or offer municipal services (Vokshi, Nepravishta, 2014). Informality presents a risk of transforming and urbanizing former agricultural land, as it is characterized by unlawful settlement on land, lack of basic services and infrastructure mobility. The current approach of the national government to these settlements is the process of legalization by investing in infrastructure through land capitalization and, thus, supporting rapid urbanization. The goal is to welcome the growing population through the development of a skilled center with the necessary services and to define limits for extension and urban growth (Sustainable Urban Mobility Plan for the Municipality of Tirana, 2020).

Four elements are necessary for the action orientation of design:

- The marginality element of the suburban areas in relation to the historical center should not detract from the cultural activities, the services, and the connection with the urban tissue of the city.
- The identity element of suburban areas for creating reports

with the rest of the city. This would automatically require a connection to the public transport system direct and articulated with the entire city.

- The multifunctional element is based on the mixing of different social and cultural functions together with forms and spatial configurations within the same area. The strict application of the zoning monofunctional mostly timed out the territory from the continuing variety of urban city life.
- The element of integral participation of citizens in the vision of the future city. This citizen participation will increase the quality of urban development according to the requirement of residents in relation to the city and the needs of the area (Vokshi, Nepravishta, 2014).

This planning does not tend to reject everything that is built to rebuild it again. It plans to transform degraded spaces or objects simultaneously proposing missing services, recreational space, new urban centers, and energy and environmental sustainable treatment of buildings. Quality projects involved in areas that need to be cured must generate new forms of urban tissue while retaining the DNA of the existing city and without creating genetic modification problems (Vokshi, Nepravishta, 2014).

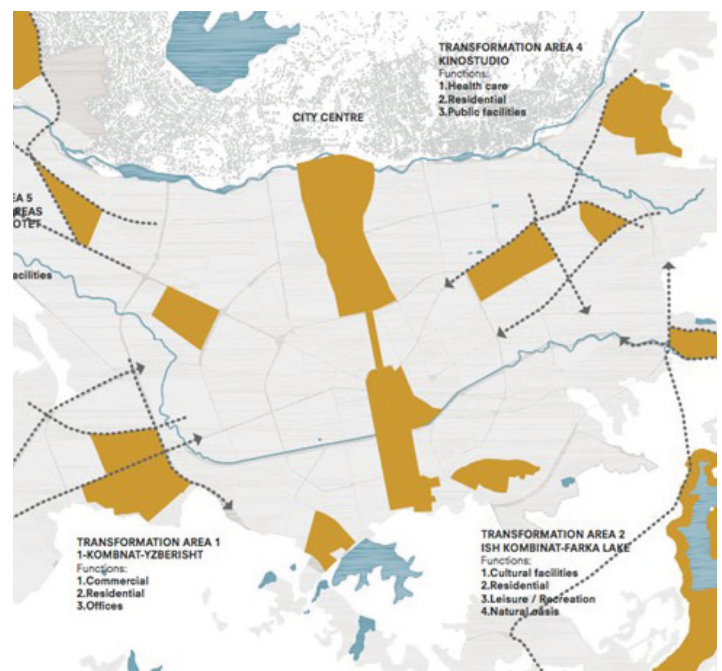


Figure 58 Transformation Areas in Tirana

Source: (TR 030, 2016)

ENERGY

FAU SCOPES

Helena Klefti

An Explanation of “Energy” as a Topic

Tirana, the capital of Albania, has been making efforts to increase the use of renewable energy sources in recent years. While the city still relies heavily on fossil fuels, there are a number of initiatives underway to shift towards cleaner, more sustainable energy sources. One example of this is the installation of solar panels on public buildings in the city. In 2020, the Municipality of Tirana installed a 12 kWp solar photovoltaic system on the roof of the City Hall, which is expected to generate around 15,000 kWh of electricity per year. This is a small but important step towards reducing the city's carbon footprint and increasing the use of renewable energy.

In addition to public buildings, there are also a number of private companies and individuals in Tirana who have installed solar panels on their rooftops. These systems are connected to the grid, allowing them to generate electricity for personal use while also feeding excess energy back into the city's power supply. As for the general consumption of energy in a multifunctional building, there are several ways to reduce energy use and increase efficiency. Some strategies include:

- **Lighting:** switching to energy-efficient LED lighting can significantly reduce energy consumption. Motion sensors can also be installed to ensure lights are only on when needed.
- **HVAC systems:** heating, ventilation, and air conditioning (HVAC) systems can be a major source of energy consumption in buildings. Regular maintenance and upgrades to more energy-efficient systems can help reduce energy use.
- **Insulation:** proper insulation of walls, roofs, and windows can help reduce energy loss and improve the efficiency of HVAC systems.
- **Renewable energy:** as mentioned earlier, installing solar panels on the rooftop of a building can generate renewable energy and reduce the reliance on traditional power sources.
- **Energy monitoring:** regular monitoring of energy use can help identify areas where energy consumption can be reduced and increase efficiency.

By implementing these strategies, multifunctional buildings in Tirana can reduce their energy consumption and contribute to a more sustainable and environmentally friendly city.

Implementation of Solar Panels

Solar panels can be an effective way to increase energy efficiency in Tirana by providing a clean and renewable source of electricity. As the capital city of Albania, Tirana has a signifi-

cant energy demand, and solar panels can help reduce the reliance on traditional power sources and minimize the carbon footprint of the city. One of the main benefits of solar panels is that they produce electricity without emitting greenhouse gases. This means that they can help reduce the carbon footprint of buildings and contribute to a more sustainable and environmentally friendly city. In addition, solar panels can provide a reliable source of electricity in areas with limited access to traditional power sources.

However, the efficiency of solar panels can be affected by several factors, including the amount of sunlight available, the angle and orientation of the panels, and the temperature of the panels. In order to maximize the efficiency of solar panels in Tirana, it is important to carefully consider the placement and installation of the panels. This may involve conducting a site analysis to determine the optimal orientation and angle for the panels, as well as implementing shading and ventilation systems to keep the panels cool.

In addition to solar panels, there are other strategies that can be implemented to increase energy efficiency in Tirana. These may include improving insulation, upgrading HVAC systems and installing energy-efficient lighting. By taking a comprehensive approach to energy efficiency, Tirana can reduce its energy demand and minimize its impact on the environment.



Figure 59 Use of Solar Panels to Improve Energy Efficiency

Source: <https://panelesi.al/>

WATER REUSE

An Explanation of “Water Reuse” as a Topic

FAU SCOPES

Alesia Zeneli

Ana Rrushi

Rejda Kokona

Resources are valuable raw materials that need to be used effectively in order to ensure their long-term availability. Globally, people are using three times more resources than available on the planet. Therefore, it is essential to manage resources used to meet the needs of Tirana’s population over the long term. Resources include water and raw materials, that currently might go to waste. This theme also supports the concept of a circular economy, whereby items are not produced, then used, and disposed of, but instead are reused, remanufactured, and its component parts are brought back into the economy as raw materials.

One of the objectives of the sustainability plan for the city of Tirana is to reduce water losses, manage non-revenue water losses to ensure that water resources are used effectively, and reduce waste to landfill and increase waste recycling, improve the use of resources by recycling a larger proportion of waste, and creating a process for reusing rather than disposing of unused items.

In Tirana, there is little experience in rainwater harvesting, since the availability of freshwater resources hasn’t been a problem yet. Rainwater harvesting is an old technique but increasing in use because of the natural rainwater quality and to reduce the treated water consumption

The municipal water company UKT provides a stable and steadily improving water supply and wastewater disposal service for Tirana. Planned investments in wastewater treatment and water supply will help to reduce the discharge of untreated sewage into water courses and to make progress towards a consistent water supply to the whole of Tirana. Key water-related challenges include:

- The consumption of water per capita per day and per unit of GDP is high, compared to international benchmarks.
- There is a high percentage of water losses as a result of non-revenue water consumption.
- Further policies on drinking water pre-treatment could be introduced.
- Resilience to floods could be further improved through drainage facilities development.
- Business and community resilience to floods could be encouraged through awareness campaigns.

Therefore, water recycling in Tirana is an issue that has not been affected much, but according to the plans, it aims to be one of the main elements for a sustainable city.



Figure 60 Tirana River

PUBLIC SPACE

An Explanation of “Public Space” as a Topic

FAU SCOPES

Albi Berdellima

Fioralba Gega

Sara Bregu

Tirana now has the “European Youth Capital 2022” title. After several months of unremitting work and efforts of young people from the National Youth Congress, youth CSO, and the Municipality of Tirana, they managed to fulfill their purpose. This title enables our city to be encouraged for successive developments.

The projects in this brochure are an example of some small neighborhood squares that have turned into landmarks in Tirana. The conclusion had been reached that public space is one of the most important elements that represent a healthy and balanced city. The new Northern Boulevard has a relatively close distance to the city center, which makes it easily accessible for all city residents.

After successive analyses, by observing people’s behavior in public spaces, the working team manage to find out how the designed space is used in reality to find out how to intervene to increase the interactions between the residents and to enable people’s well-being and health.

The main goal is to make use of free spaces as well as improve existing ones by creating a sense of security in these public spaces by evaluating how safe people feel in the space during different periods of the day, the suitability of the physical condition, and the maintenance of space. The task as designers is to give meaning to every space, no matter how small or big it is; no matter how insignificant it seems, it can make a big difference in the lifestyle of some people. This is the main reason why the students of this team wanted to propose some public squares in the project area, to multiply the number of public spaces and their functions.

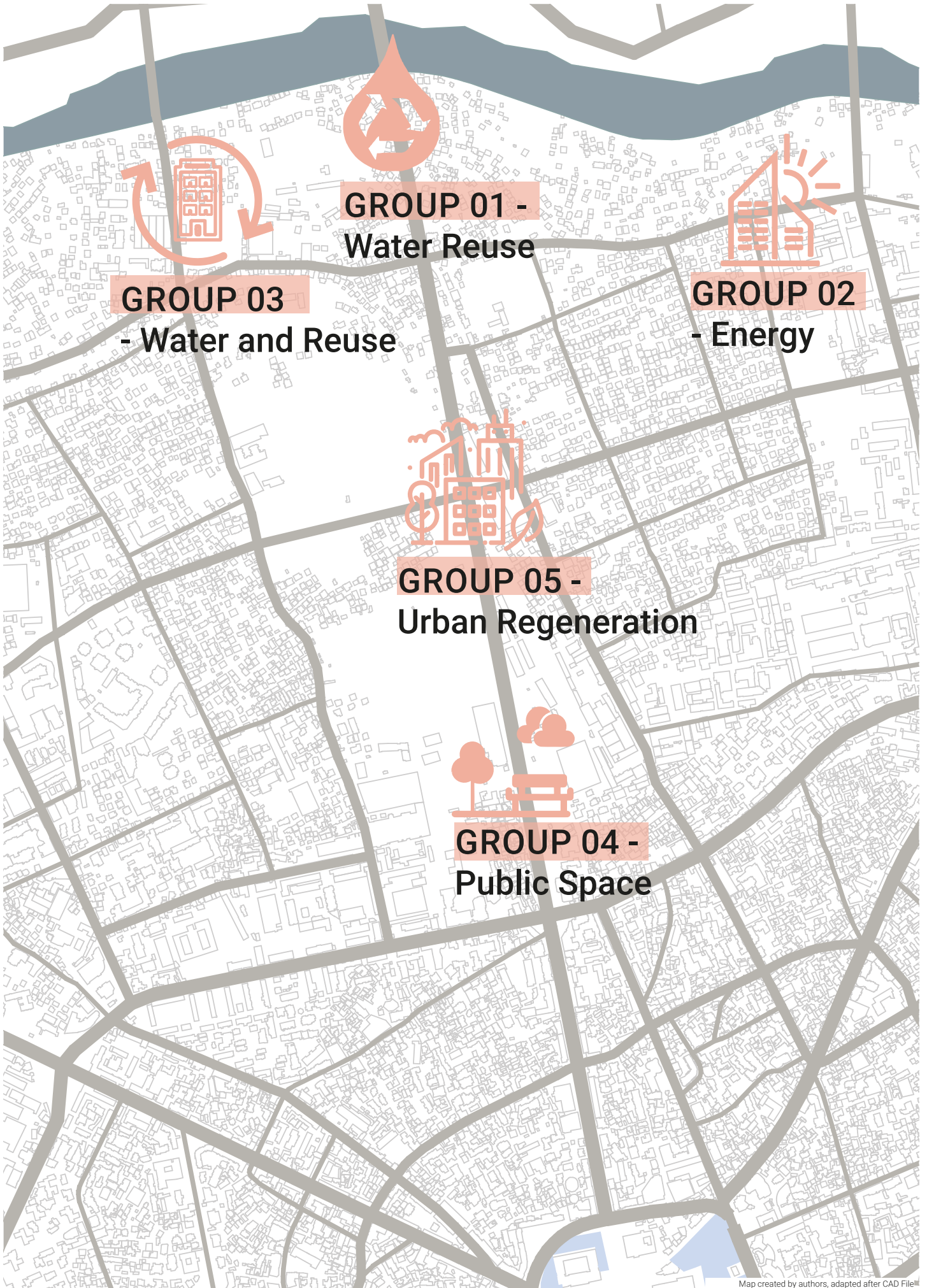
Public spaces are an important benefit to communities. They provide many opportunities for people to come together and interact with each other. If public spaces are effective, they can create a social place for everyone to participate in society. So, in the project site, the main focus is not only on large public spaces but also on public spaces in the neighborhood which are left aside. The potential of these public spaces in the neighborhood has not been sufficiently explored. Each proposed residential block has its own space where residents can stay, relax, and walk with their children. We created a project proposal for many small urban spaces to turn them into points of reference. One of the objectives of this study is

to clarify the importance of public spaces in a neighborhood of Tirana and to propose some small-scale interventions that would revitalize this neighborhood. This research examines how small public spaces in the public space and urban landscape can cause transformation and how informal community-driven concepts will catalyze a neighborhood in need of revitalization.



Figure 61 New Northern Boulevard

Source: taken by authors



**GROUP 01 -
Water Reuse**

**GROUP 03
- Water and Reuse**

**GROUP 02
- Energy**

**GROUP 05 -
Urban Regeneration**

**GROUP 04 -
Public Space**

FAU Interventions Locations

54

Group 01 - Water Reuse



Group 02 - Energy

58



62

Group 03 - Water & Reuse



Group 04 - Public Space

70

74

Group 05 - Urban Regeneration



WATER REUSE

GROUP 01

Rejda Kokona
Ana Rrushi
Alesia Zeneli

A Brief Site Analysis

Introduction

The area under study is located north of the new boulevard near the Tirana River. To reach the territory of the area by public transportation, it is possible through two lines, Line 12 (former Dinamo plant) and student city line (Jordan Misja). Line 12 passes inside the territory of study where there are three station points. The other line is parallel with the new boulevard (Jordan Misja street), stopping at the last station and following the road on foot. Such an area on the outside of Tirana is located 14 minutes away by car and 38 minutes on foot from the city center. To cross the river in the area, there is a bridge which connects the end of the new boulevard with the Paskuqan area. To orientate oneself easier with the area, the former Dinamo plant is a reference point. With the construction of the new boulevard, access to the area by car, foot, or bicycles was added.

There are bicycle, taxi and pedestrian lanes for pedestrian traffic in the territory according to standards of convenience. An important point is also the flow of movement. Since the boulevard has been made as a meeting point between citizens during rush hours, there is the greatest flow. In regards traffic, it is created at the junctions where the boulevard crosses with other roads. Secondly, near the bridge and on the road followed by Urbani.

The area is located very close to Lake Paskucan and this increases the possibilities of developing public spaces. The points of confusion are near the end of the boulevard as there are many streets that pass and connect the built-up objects and it is not clear the orientation of the river or how you can approach it due to poor infrastructure. According to them, the area is a quiet, relaxing and easily accessible to important points of Tirana. The new Northern Boulevard in recent years is the point of gathering as a public space. The exits to the new boulevard are important points which are accessed by secondary roads in the area. Since it is a developing area, there are points of confusion where the direction of passing or the visibility of the river of Tirana is not clear.



Figure 62 Perspective Journey Map

Source: Authors

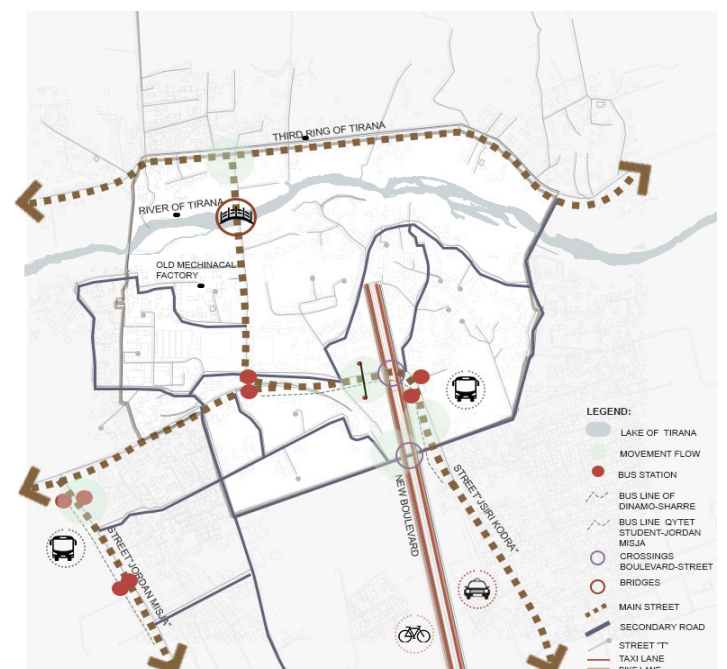


Figure 63 Mobility Analysis

Source: Authors

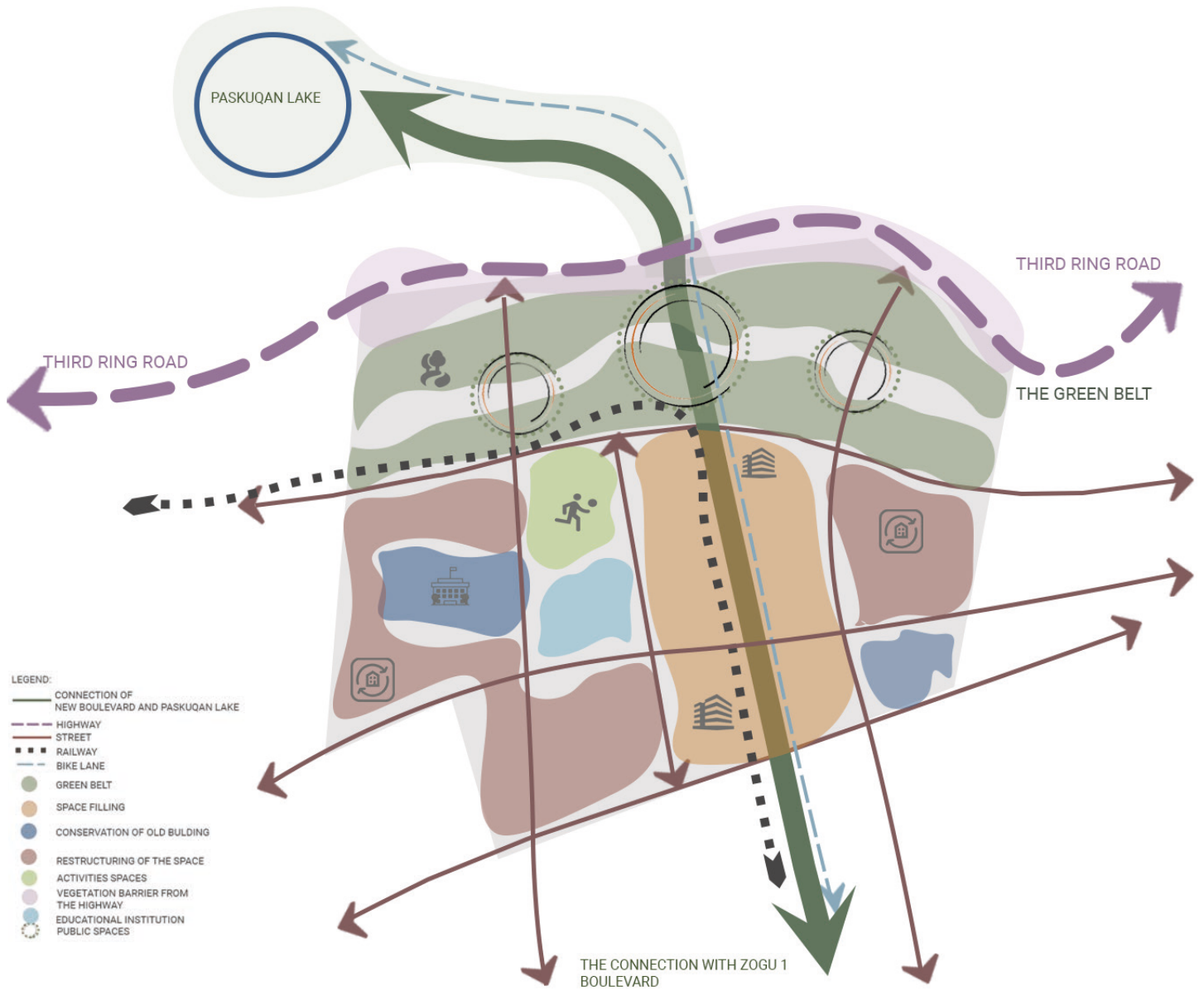


Figure 64 Strategic Plan



Figure 65 The Tirana River and Urban Infrastructure

The Tirana River

The river shoreline is polluted from the waste of people. It is missing greenery and it is not an inviting area, in spite of being a potentially beautiful landscape.

Urban Fabric

By building randomly, and without applying the required distances, an impossible space for the eye and a sense of confusion is created in the area of study. There is a lack of vacant and green spaces.

Infrastructure

The existing road network is weak. It creates pollution and security problems. It is missing necessary road signs and light in darker hours of the day.

Objectives and Strategies

- Transformation of land through the addition of public spaces and the restructuring of the space by giving importance to the context of the area.
- Improvement of the road infrastructure and the new use of public transportation such as railway transportation.
- Conservation of the former industrial objects by giving them a new function. River water through the proposed new center.
- Reconstruction of facilities.
- Addition of green spaces.
- Infrastructure improvement.
- Regeneration of the industrial building (former mechanical factory).
- Development of the area around the river, creation of a park.
- Contouring the river line.

Infrastructure & Land Use

Infrastructure was one of the problems found during the analysis, so a quadratic road system that improves circulation in between the neighborhood, as well as incorporating public green spaces, was created.

With the new infrastructure proposal comes the new mobility plan that includes adding more bus stops for a better and safer accessibility in the area.

Land use is mainly based on the Tirana General Local Plan for 2030, with its suggestion of more public spaces, natural land, and a new industrial area eliminating the dangerous power plant that is currently in the area. The plan integrates small parks that invite the community to the park of the river along with the recreation areas along the bridges.

New Water Treatment Facility

The team's proposal for the regeneration of the former mechanical facility is to reuse its actual building and add more land to its function by creating a water treatment facility.

Because of the location of the facility, which is very close to the river shore, the team thought water induction could be made through underground pipes and the treatment is done to create drinkable tap water for the community.

This is done in order to create a more circular metabolism to the neighborhood, in addition to the proposed strategy. Water reservoirs will be added in the new area of the facility to preserve fresh water and distribute it to the residential buildings.

Water goes through a circle of steps, like coagulation, sedimentation, filtration, disinfection and corrosion control until it reaches the reservoirs which will hold the water needed for the consumption of the whole boulevard area.



Figure 66 New Water Treatment Facility



Figure 67 Road Network

Source: Authors

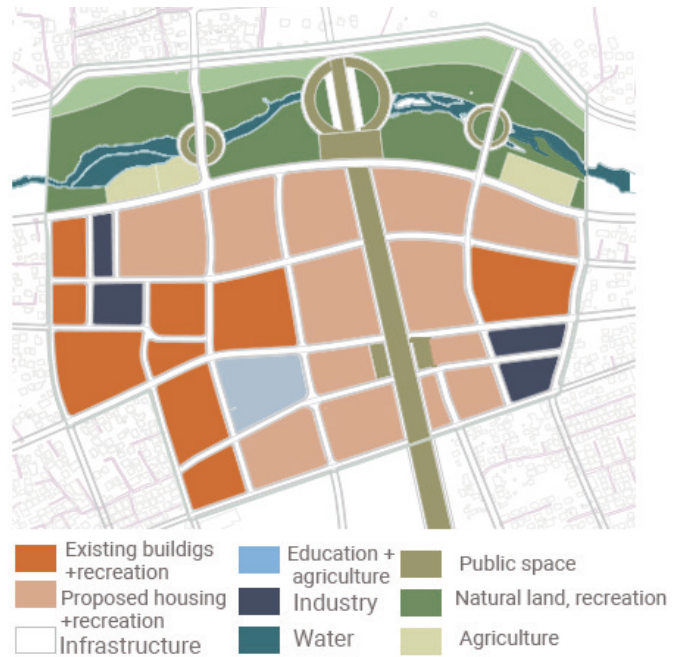


Figure 68 Land Use

Source: Authors



Figure 69 Water Reuse

Source: Authors

ENERGY

GROUP 02

Dorian Rexhmati

Endrion Elezi

Kejdi Hoxha

Helena Klefti

The Bazaar Galleries: Development Proposal for the Old Industrial Site

Historical Introduction

Industrial buildings in Tirana, Albania have a long and varied history. During the Communist era, which lasted from 1945 to 1991, these buildings were mainly used for manufacturing and processing food, as well as for other industrial production. During the transition period of the 1990s, when Albania opened up to the global economy, these buildings were used for a variety of new purposes, such as small-scale manufacturing, warehouses, and office space.

Today, industrial buildings in Tirana are used for a wide range of activities, including agriculture, manufacturing, food processing, and storage. In recent years, some of these industrial buildings have been converted into residential units and other commercial spaces, such as restaurants and cafes. This has allowed these buildings to remain in use and contribute to the city's economy, while also preserving their historic character. In addition, some of these buildings have been designated as cultural heritage sites and have become attractions for tourists and locals alike.

Industrial buildings in Tirana, Albania can be repurposed and adapted for new functions, providing a unique opportunity to revitalize underutilized spaces while preserving the city's architectural heritage.

Here are some adaptive architecture and new function proposals for industrial buildings in Tirana:

- **Mixed-Use Developments:** Industrial buildings can be transformed into mixed-use developments, combining residential, commercial, and office spaces. This will help to revitalize the building and provide a diverse range of functions and amenities within the same space.
- **Cultural Centers:** Industrial buildings can be adapted into cultural centers, offering spaces for exhibitions, concerts, and other cultural events. This will help to revitalize the building and provide a new cultural hub for the city.
- **Co-Working Spaces:** Industrial buildings can be transformed into co-working spaces, providing a flexible and affordable

working environment for entrepreneurs, freelancers, and start-ups. This will help to foster innovation and support the city's business community.

- **Community Centers:** Industrial buildings can be adapted into community centers, offering spaces for social and educational activities, as well as health and wellness services. This will help to create a vibrant and supportive community within the city.
- **Retail and Food Halls:** Industrial buildings can be transformed into retail and food halls, offering a diverse range of shopping and dining options. This will help to revitalize the building and provide a new shopping and dining destination for the city.

By adapting industrial buildings for new functions, Tirana can revitalize underutilized spaces, preserve its architectural heritage, and create new opportunities for the city's residents and visitors.

The city of Tirana in Albania has the potential to become a major economic driver in the country. One way to help achieve this is to revitalize old industry buildings into giant bazaar



Figure 70 Site Location and Position

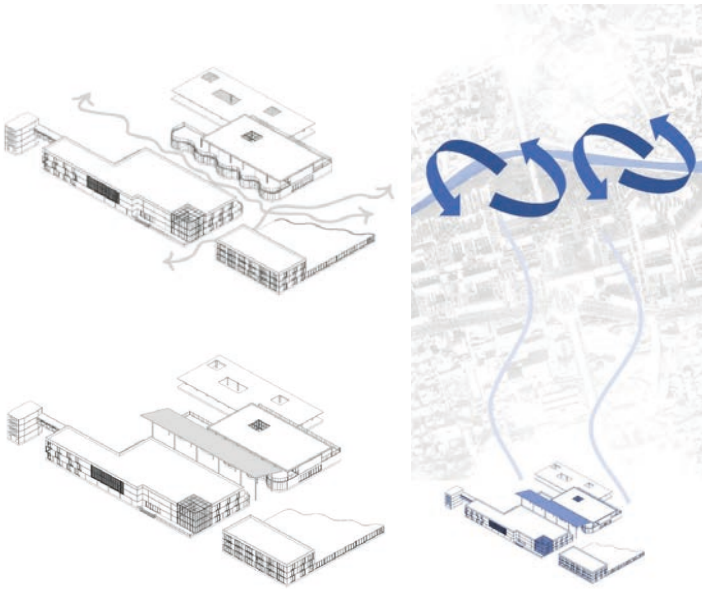


Figure 71 Graphic Interpretation of the Tri-dimensional Building

Source: Authors

structures. This would create a bustling marketplace that is both aesthetically pleasing and commercially viable. The bazaars would offer a range of goods and services, creating jobs and bringing in more money for the city. This could also help to bring more tourists to Tirana, further boosting the city's economy. Additionally, the bazaars could be used to showcase local art and culture, helping to promote the unique and vibrant culture of Albania.

By focusing on these revitalization efforts, Tirana could be transformed into a vibrant economic hub in Albania, which is already being transformed into a multi-functional complex that showcases the history of textile manufacturing while also providing modern amenities.

Building A, the main building, will have a showroom and store, manufacturing rooms for production, a cafeteria, and a school for young people interested in learning about traditional textile production methods. Building B, positioned on the north side, will feature showrooms, a restaurant, a bar and lounge area. Building C, positioned on the east side, will serve as a gallery and exposition space to showcase the old manufacturing techniques, as well as house the administration offices.

This type of adaptive reuse is becoming increasingly popular as it helps to preserve the history and cultural heritage of a building while also providing new and useful functions to the community.

Reuse Concept

Adaptive Architecture Concept

The Adaptive Architecture project in Tirana involves transforming an industrial building into a bazaar. This would bring several benefits to the city, such as increasing public access to goods and services, providing jobs for local people, and creating new sources of revenue. The bazaar could be

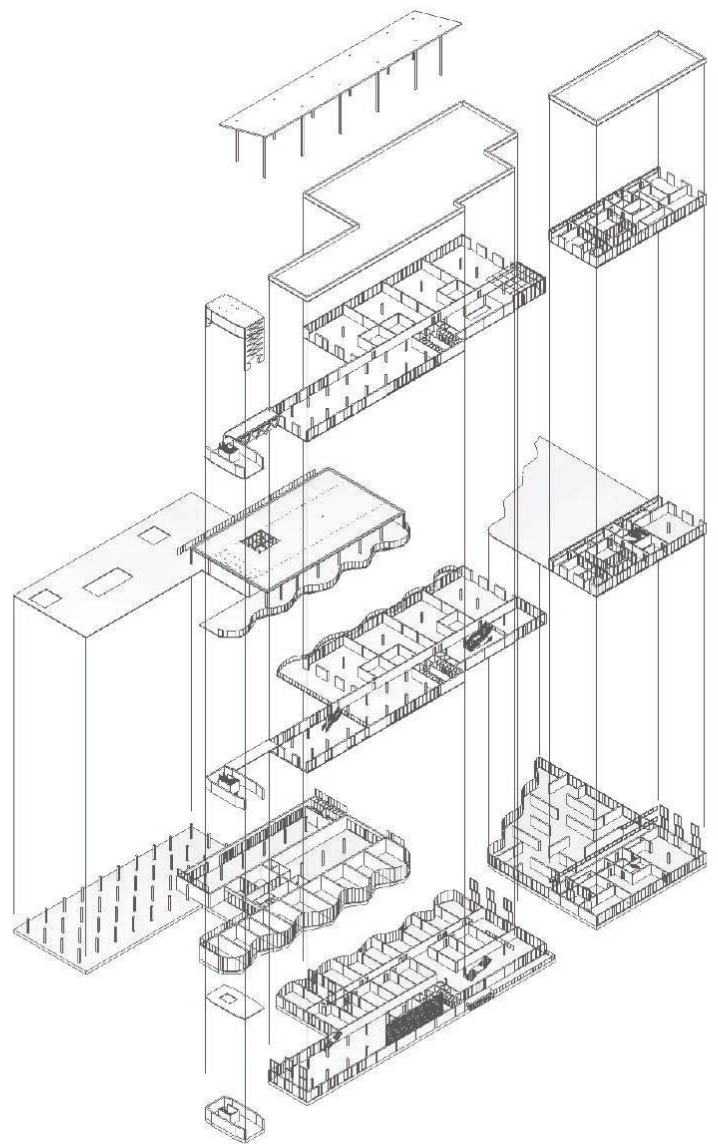


Figure 72 3D Layer Diagram

Source: Authors



Figure 73 Project Landscape and Floor Plan

Source: Authors

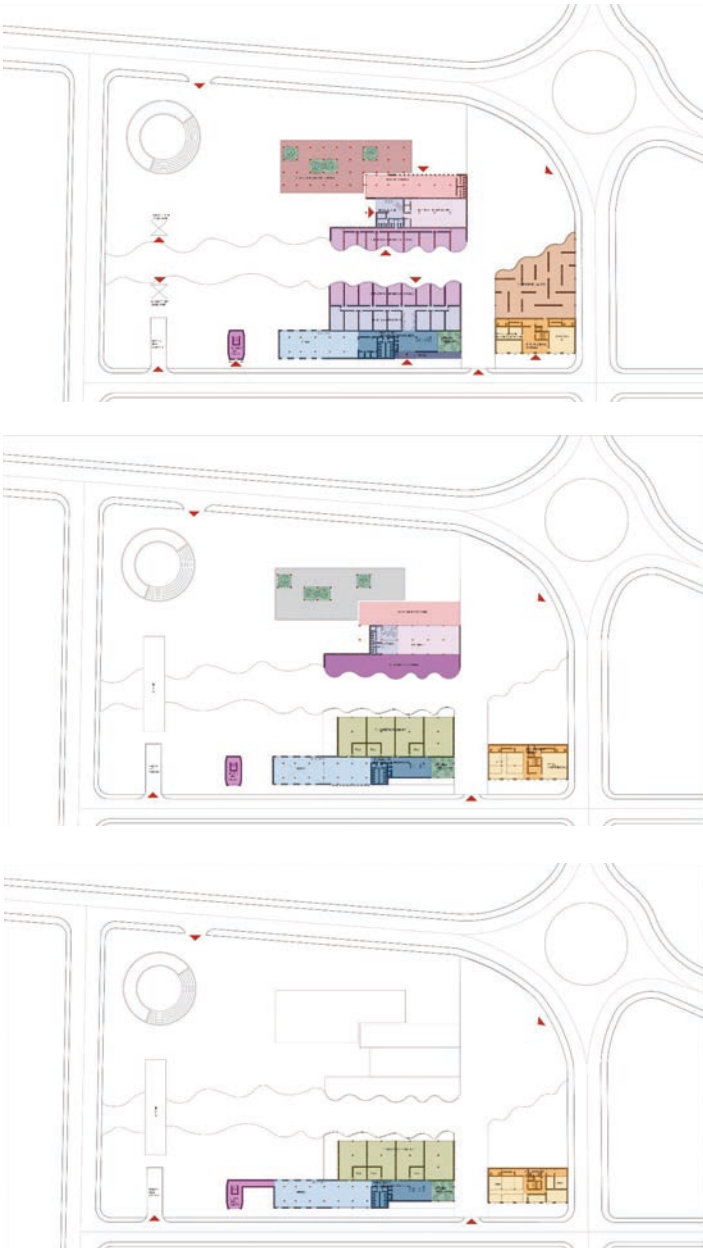


Figure 74 Project Layout

Source: Authors

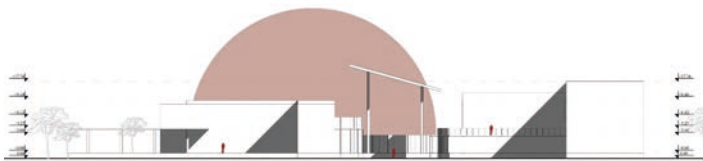


Figure 75 Main Facade of Proposed Intervention

Source: Authors



Figure 76 Final 3D Visualization of Project

Source: Authors

powered by renewable energy sources such as solar or wind power, further contributing to sustainability efforts in the city.

The functions of this adaptive architecture project's bazaar include retail shops selling food items, clothing, electronics and other consumer goods, services like financial advice and health care, educational programs, cultural events, recreational activities like movies or music performances; cafés and restaurants, art galleries or museums displaying local artwork, co-working spaces, and more.

The general profits of the bazaar would come from a combination of sources, such as rent paid by tenants to occupy shops or spaces in the building, fees for services provided, ticket sales events held at the bazaar, and taxes collected on goods sold there.

Energy Concept

A Cost-Effective Example

- **Solar Energy:** Tirana can promote the use of solar energy through the installation of solar panels on rooftops and in other suitable locations. This will help to reduce the city's reliance on traditional sources of energy and lower its carbon footprint.
- **Wind Energy:** The city can also explore the potential for wind energy by developing wind farms in the surrounding areas. This will provide a clean, renewable source of energy and help to reduce greenhouse gas emissions.
- **Biomass Energy:** Tirana can promote the use of biomass energy, such as wood chips and agricultural waste, to generate heat and electricity. This will help to reduce the city's dependence on fossil fuels and provide a source of renewable energy.
- **Geothermal Energy:** Tirana can also investigate the potential for using geothermal energy to heat buildings and provide hot water. This will reduce the city's reliance on traditional sources of energy and provide a clean, renewable source of energy.
- **Hydro Energy:** Tirana can also explore the potential for using hydro energy, such as small-scale hydro power plants, to generate electricity. This will provide a clean, renewable source of energy and help to reduce the city's dependence on fossil fuels.

Incorporating renewable resources into Tirana's energy mix will not only help to reduce the city's carbon footprint, but also provide a more resilient and sustainable energy system.

Adaptive Architecture as a Cost-Effective Example

The revitalization of a traditional bazaar in Tirana, incorporating the preservation and revival of the traditional textile production of "Xhubleta," can provide a unique opportunity to promote the city's cultural heritage and create a new tourist attraction.

Here are some ideas for incorporating “Xhubleta” into the revitalized bazaar:

- “Xhubleta Museum”: A museum dedicated to the history and production of “ Xhubleta “ can be established within the bazaar. This will provide visitors with a unique insight into the cultural significance of Xhubleta and its role in Albanian society.
- Xhubleta Workshops: Workshops can be established within the bazaar to teach visitors about the traditional production of “ Xhubleta.” This will provide a hands-on experience for visitors and promote the traditional skills and techniques associated with Xhubleta production.
- Xhubleta Marketplace: A marketplace dedicated to the sale of Xhubleta can be established within the bazaar. This will provide visitors with the opportunity to purchase authentic Xhubleta products and support local artisans.
- Xhubleta Cultural Festival: A cultural festival dedicated to Xhubleta can be established within the bazaar. This will provide a platform for the celebration of Xhubleta and its cultural significance, attracting visitors from both within and outside of Albania.

Conclusion

By incorporating the preservation and revival of Xhubleta into the revitalized bazaar, Tirana can create a new tourist attraction that promotes the city's cultural heritage and supports local artisans.

Activities that support the city's cultural heritage include:

- Galleries to attract tourists .
- Manufacturing schools to not forget the tradition.
- A complex of building where each of them works individually for a common purpose.
- An amusement park for family entertainment.
- A convention center for events and seminars.
- An open-air performing arts center.
- A co-working space for freelancers and entrepreneurs.
- A community center for public outreach and education.
- A museum for preserving and displaying historical artifacts.
- A sports complex for recreation and physical activities.
- A library for learning, research, and knowledge.



Figure 77 Final 3D Visualization

BUILDING REUSE & WATERFRONT REGENERATION

GROUP 03

Bardha Krasniqi
Klea Dautaj
Shpat Mulliqi
Roaldo Hoti

Industrial Assembly Enterprise

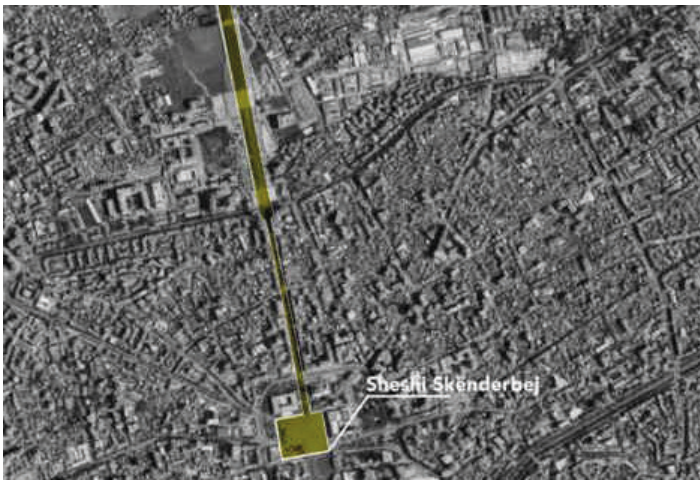


Figure 78 Area of Study

Source: Authors

Introduction

In the aftermath of the war, Albania underwent a period of recovery under communism, during which industrial zones began to emerge in major urban centers. Initially, these zones were situated on the outskirts of cities, but gradually evolved into industrial cities that revolved around factories and production facilities. Multiple neighborhoods were established in conjunction with the development of these industrial centers, with residential buildings being constructed to house the workers employed therein. As a result, there arose a need for services to support these communities.

The creation of the first neighborhoods was aimed at reducing employee transportation costs, as exemplified by this enterprise. The study area, situated in the northern part of Tirana near the Tirana River, was designated as the Industrial Assembly Enterprise during the communist era.

The Industrial Assembly Enterprise is the building that embodies the area's distinctive identity. Based on the current state of the building, it is evident that the construction and covering components remain largely intact.

Enterprise operating under the Ministry of Construction specialized in carrying out assembly work for industrial projects. Founded in 1963, the company is head-quartered in Tirana, with construction sites and sectors located nearby. Its main areas of focus include the assembly of technological equipment and machinery, the construction of lines and pipelines, and electrical installations in various industrial sectors such as metallurgy, energy, mining, and chemicals.

In addition, the enterprise includes a mechanical base that is responsible for the production of equipment and machinery used in construction mechanization, as well as the complete production of construction materials. Among the various types of buildings within the enterprise is a one-story industrial structure featuring a lightweight covering and walls made of materials such as Eternite or sheet metal. This type of construction is typically utilized in cold production facilities that do not require thermal insulation, and is characterized by lightweight fencing made of corrugated sheets of eternite or sheet metal that provide protection from wind and rain.

The building utilizes light construction with medium spans, and can be designed with or without crane-bridges and at varying heights. Such constructions are often utilized in production facilities requiring ample clearance height. The building is illuminated through the use of side windows situated on both sides of the walls. Natural ventilation is not a defining feature of the structure. The production process involves the movement of heavy weights across the floor.

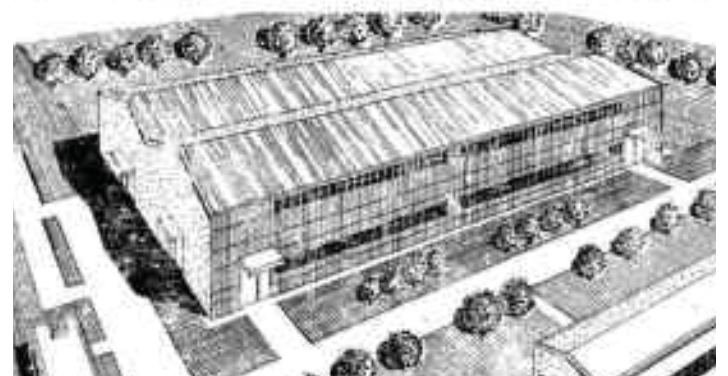


Figure 79 Side View of the Assembly Area

Source: Authors

The building is on the flat terrain with a slope of 5%. It can be constructed with prefabricated elements up to 90%. It can be designed to include one or more spaces, with space L measuring 15 meters for the column pitch, 6.4 meters for the column height, Hk measuring 8 meter, and the crane console height measuring 5.4 meters. The foundation is made in the form of b/a plinths with dimensions of Pa=220x150 centimetres and Pn=250x180 centimetres.

The building's columns are made using prefabricated b/a sections, with ka measuring 50x35 centimetres and kn measuring 60x35 centimetres. The cover is composed of parish rafters built from concrete and metal. Cover and the walls are made cold from corrugated eternite sheets placed on metal procons type Z. Windows are constructed with metal panels measuring 300x180 centimetres and 300x120 centimetres, forming a belt along the borders of the two procons. Lateral and central water drainage through the use of sheet metal gutters with a 1% slope in the longitudinal direction.

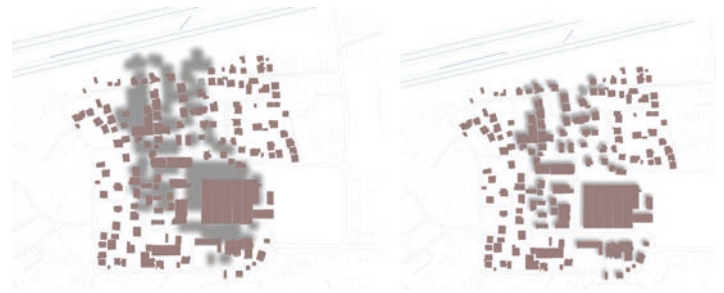


Figure 80 The Highest Amount of Shading in Summer vs. the Lowest Amount of Shading in Winter

Source: Authors

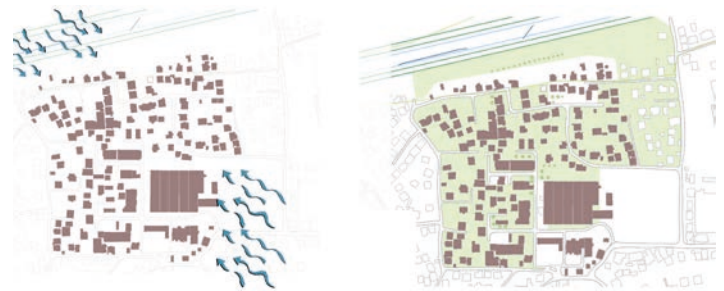


Figure 81 Wind and Greenery Analysis

Source: Authors

Environmental Analysis

Tirana experiences 254 sunny days per year. In the study area near the Tirana River, the existing buildings are primarily one or two stories high. As a result, the shadows they cast on the square are negligible, particularly during the longer summer days. The shadows only affect the immediate surrounding area.

In Tirana, the wind blows from north-west to south-east direction. From these sides of the horizon, the wind blows with medium and light intensity.

Based on this analysis, it appears that the wind blows from the direction of the river towards the houses in the area. Since the area has buildings with low height, the wind penetrates the area without hitting them. But considering its intensity, the wind is not problematic for the development of buildings.

The area predominantly comprises herbaceous plants and shrubs, which are mainly found in the courtyards of one-story buildings and near the river. In addition, various types of trees can be seen, including fruit-bearing trees like oranges, lemons, and apples, as well as magnolia and laurel trees.

The industrial buildings in the area have been re-purposed as residential buildings by the local residents. A unique typology has emerged in their adaptation, with one instance involving the construction of a two-story villa within the existing building's volume without touching its perimeter.

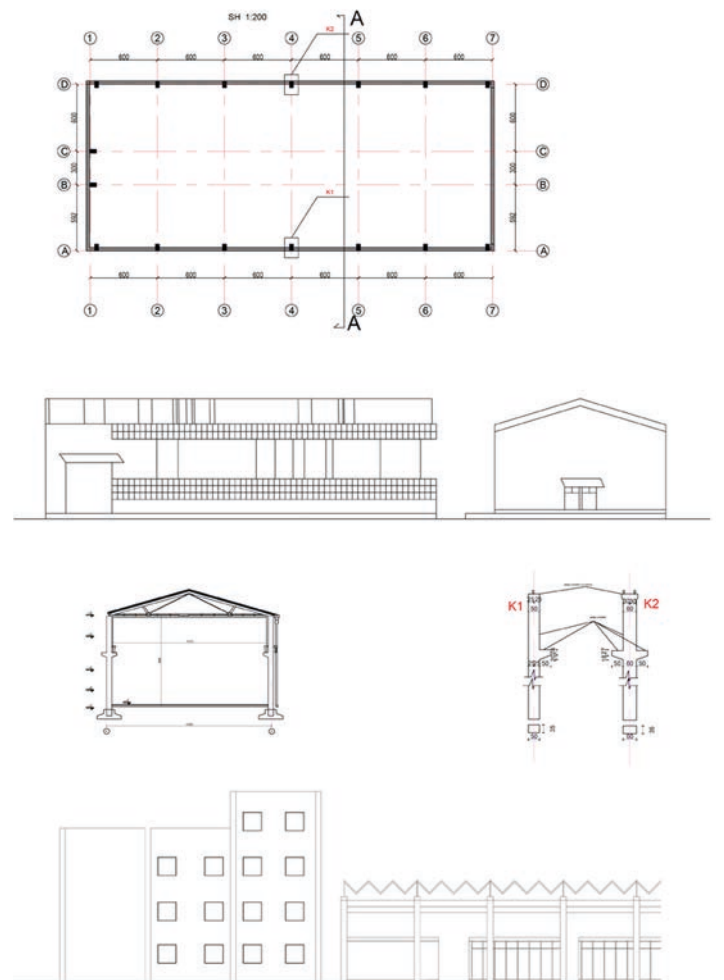


Figure 82 Side Views and Sections of the Assembly Considered

Source: Authors

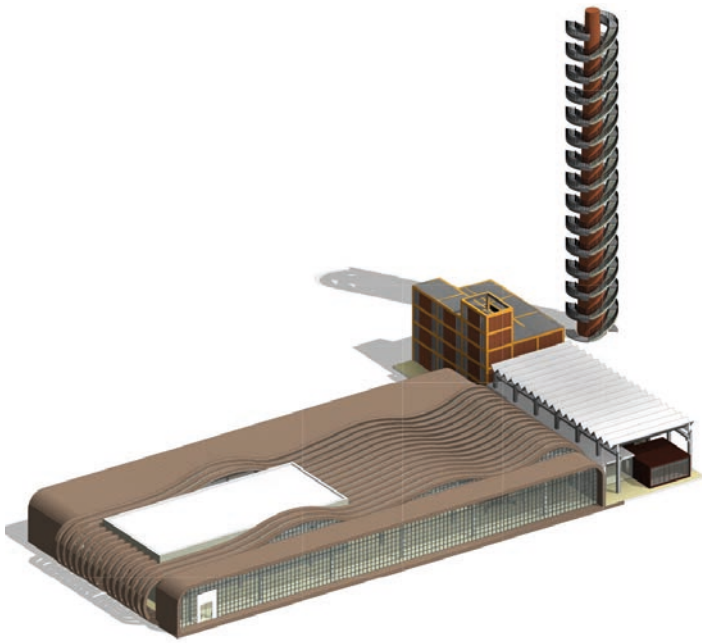


Figure 83 Axonometric View of the Proposed Assembly

Source: Authors

Proposed Industrial Assembly

The plan for urban and architectural regeneration of the former industrial production plant involves connecting the existing structures with new ones. However, the current spaces are limited in size and cannot accommodate new functions for the community. The area consists of various buildings in different forms and typologies, including some in very poor condition.

Building 1 is a closed hall with prefabricated columns and roof that has been adapted for residential use, while retaining its original structural system.

Building 2 features saw-shaped columns and a flat roof without surrounding walls, and currently houses two small, informal residences for two families. The shed at the end of the building has deteriorated, but the rest of the structure is in good condition.

Building 3, a 4-story office building during the plant's operation, has been converted into informal residential spaces and presents potential for intervention while preserving its monolithic construction system and surrounding walls.

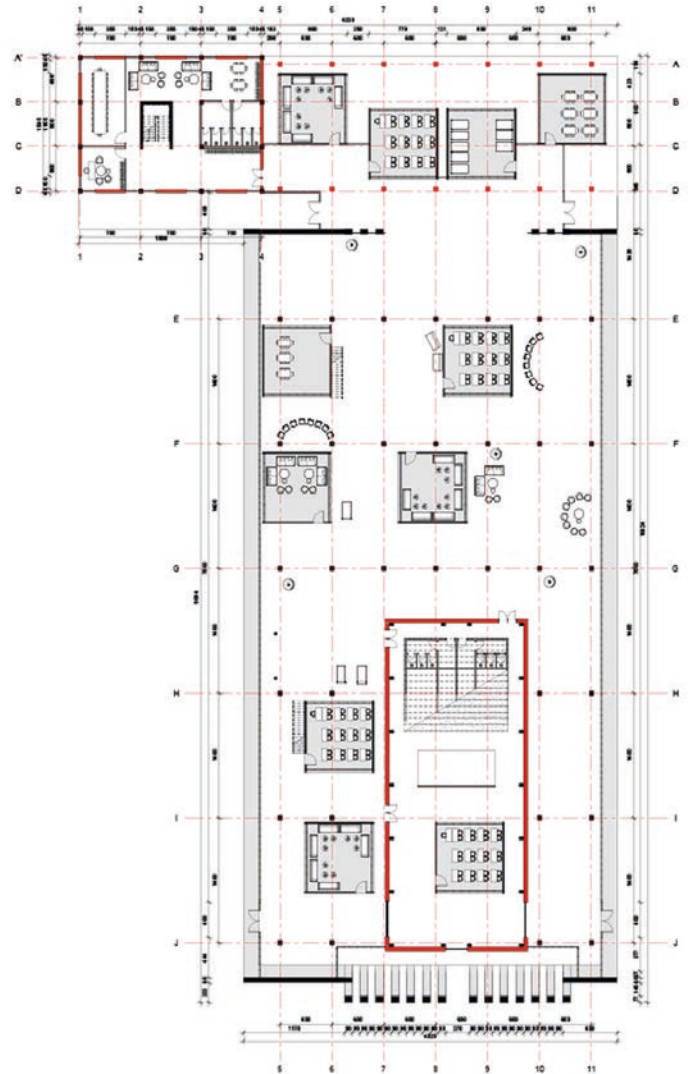


Figure 84 First Floor Plan of the Proposed Assembly

Source: Authors

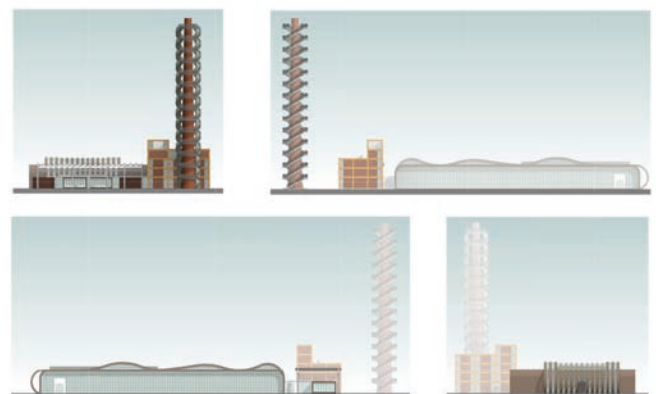
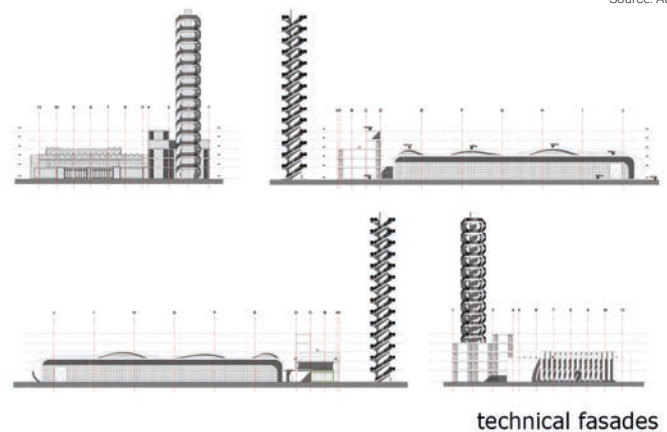


Figure 85 Side Views of the Proposed Assembly

Source: Authors

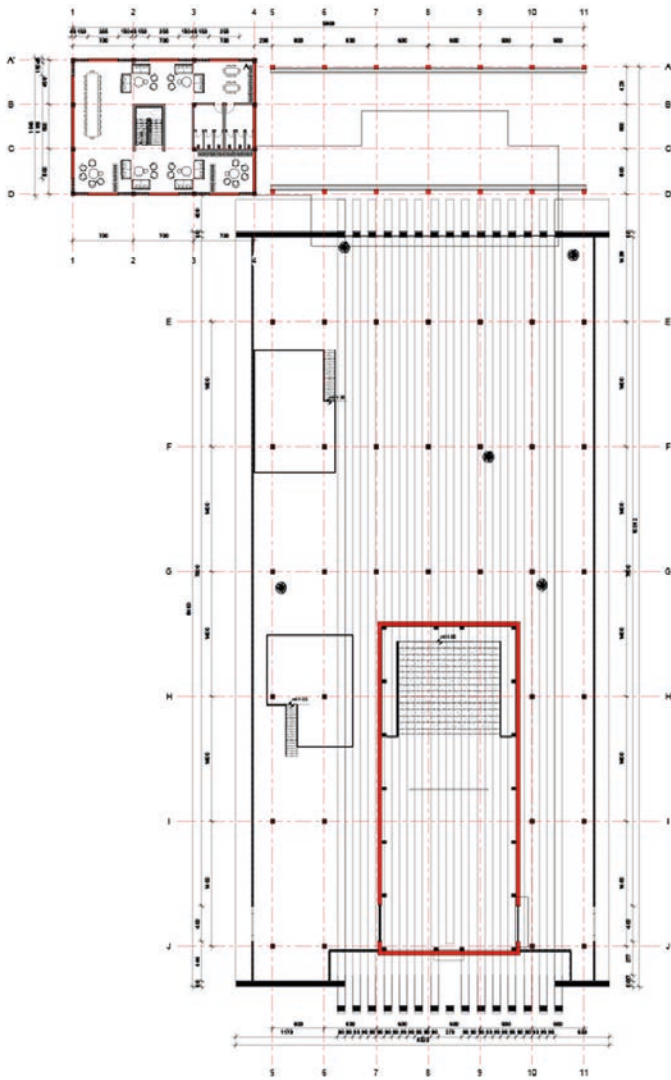


Figure 86 Second Floor Plan of the Proposed Assembly

Source: Authors

Structure 4 of the ensemble of existing buildings is the chimney of the factory, built with bricks. This chimney is abandoned today and serves as a reminder of the former factory.

The new proposal is based on the concept of having an unified space along with many functions of the building for the community use, including youth center with many separated areas under the same roof, areas which can accommodate classrooms for different purposes. The entire building is composed so that the common area is within comfortable environmental conditions throughout the year.

The design of the new structure features wooden elements that create an interesting exterior with curved lines that contrast with the existing structures and clearly differentiate the old from the new. Glass is also used in the upper part of the wooden structure to allow natural light and ventilation, as well as in the windows on both sides of the new structure. The entire structure rests on concrete columns and beams placed in proportion to the existing structure.

The interior of the structure has been designed using the concept of boxes, each with a unique function and color-coded for easy differentiation.

The exterior chimney of the building, which serves as a reminder of the industrial past, has been transformed into a memory monument. To reinforce this concept, two metallic staircases have been added to provide access to the top of the chimney, creating an observation point for the entire area.

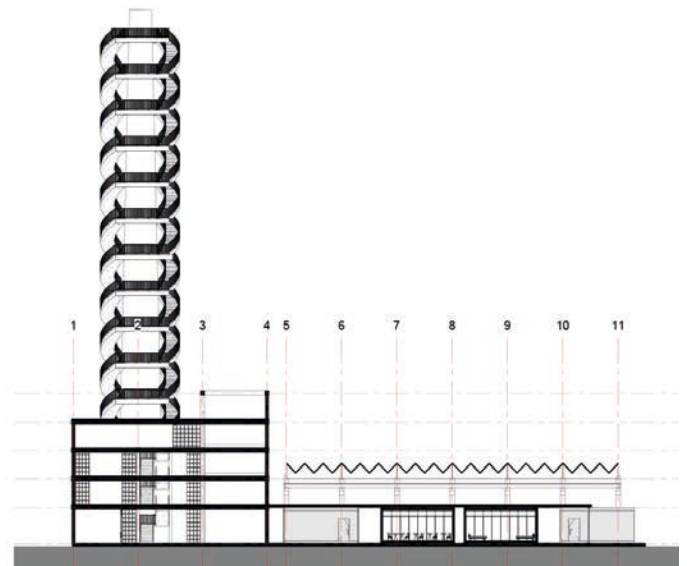
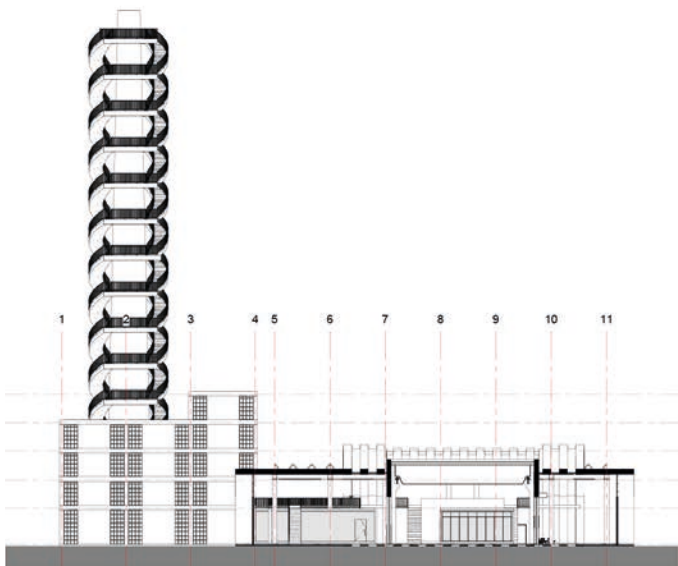


Figure 87 Sections of the Proposed Assembly

Source: Authors

ARCHITECTURAL SCALE CONCEPT

The first approach towards generating the concept is taken whilst preserving what remains of the cultural collective. Now being used as coverage mainly for residential use from the inhabitants, the now ex-communist factory facilities take a multi-informal role, being part of a network on a larger scale.

The architectural structures chosen for the concept include a cooling chimney (oxhak ftohje), two former factory buildings, and another building. The goal is to revitalize and expand the existing residential module into a more diverse and functional space.

The physical structures serve to connect different semi-outdoor and indoor areas within the larger space. The proposed design incorporates various functions, including cultural and educational spaces, as well as recreational areas, distributed throughout the new mega facility. Elevated spaces within the structure provide a stunning viewpoint of the surrounding area, which is in line with the respectful approach to the Grimshaw Plan for this region of Tirana.

The cooling chimney, reaching the highest point in the zone is now transformed into a belvedere towards the city, achieved through metallic scissor stairs anchored to its body. A grid proportional to the factory one connects physically the settlements.

Lastly, an architectural skin has been created to envelop the unified settlements. This skin consists of either curtain walls or prefabricated elements that take on a periodic, wavy shape to allow light to permeate throughout the informal compound. The materials used for this skin are sourced from the local area to maintain the cultural identity of the space.

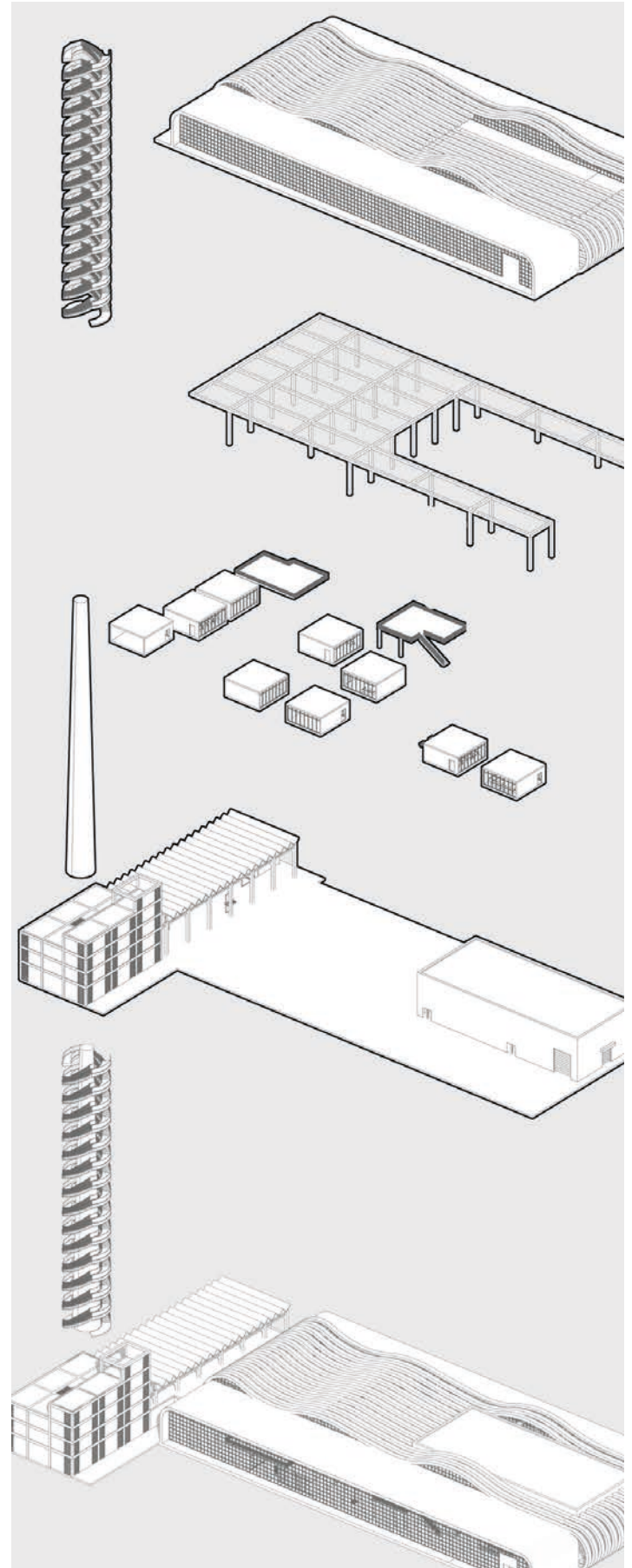


Figure 88 Layers of the Proposed Intervention

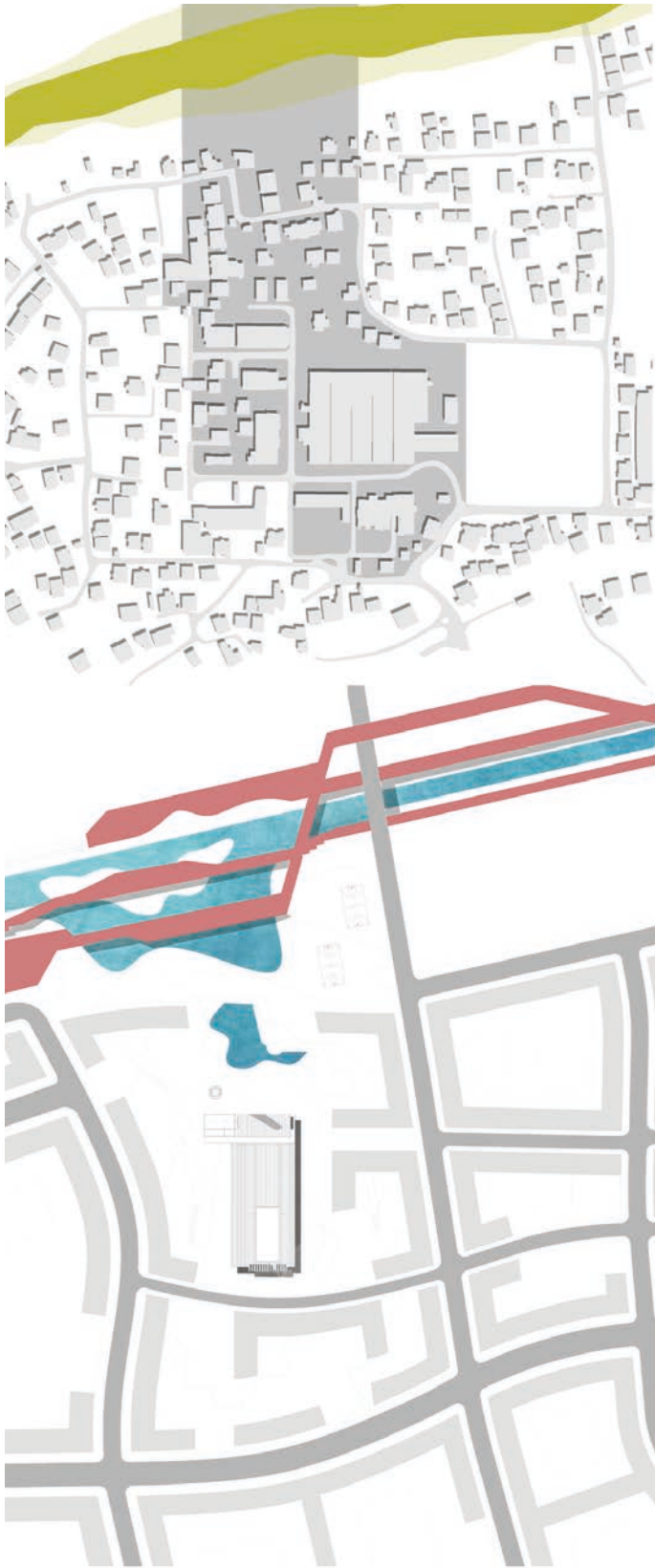


Figure 89 Urban Scale Concept

Source: Authors

URBAN SCALE CONCEPT

The approach towards the zone at a large scale involves a focus on organization. The area is cleared of its temporary and scattered vernacular architectural structures, creating a range of possibilities. Certain former factory buildings, which hold significant cultural heritage value, are preserved and later rehabilitated to serve new functions.

To connect the area organically to the main axis, the new Northern Boulevard, an oriental street grid is designed with respect to The Grimshaw Architects. Neighborhoods are divided using the *quartiere* method of urban planning, maintaining an equal level of intensity. Public spaces are given special attention, as are the corridors that interconnect these semi-public spaces.

One of the primary goals of the urban-scale intervention is the rehabilitation of the Tirana River in a more natural way. This is achieved by creating flexible meeting points between the river and the neighborhood, generating new, high-quality public spaces that fit more naturally within the context of the area. A series of architectural accessories are positioned near the river and its small islands to further enhance the space.

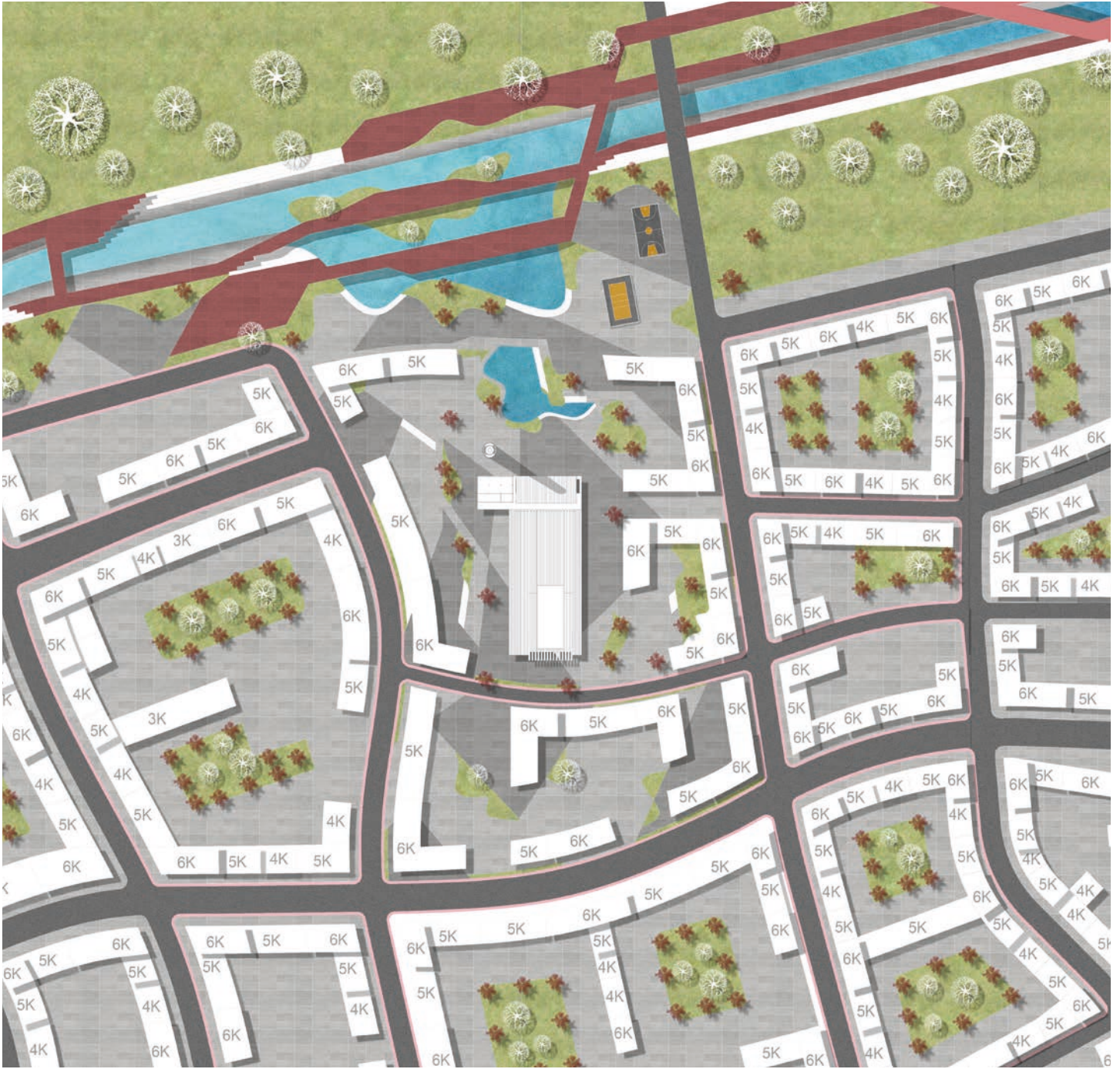


Figure 90 The Proposed Master Plan

Source: Authors

Conclusion

The proposed master plan for the study area offers a fresh perspective, building on Grimshaw's planned master plan. The new proposal emphasizes a direct relationship with the water element, specifically the Tirana River, and aims to regenerate this important urban feature.

By revitalizing the river and its bed, the plan creates dynamic promenades that offer direct access to the water and the surrounding green elements, resulting in pleasant public spaces for users to enjoy. Water basins are also incorporated into the specific area under study, serving as both a visual and soothing element.

Stairs are strategically placed near the river and throughout the study area, providing dynamic accessibility. The use of varied paving textures creates a unique visual effect. Additionally, the plan includes the creation of sports grounds and fields to encourage residents and users to lead healthy, active lifestyles.

PUBLIC SPACE

A Brief Site Analysis

GROUP 04

Albi Berdellima

Fioralba Gega

Sara Bregu

Introduction and Methodology

The new Northern Boulevard starts from the former Train Station in Tirana, at the end of Zogu i Parë Boulevard. This area was once undeveloped, completely abandoned, and considered a dirty part of the city. Now, the new project will connect the city with the Lana River Park and the Great Ring of Tirana. According to Tirana's strategy, the division of the city into several main and secondary centers will help the densification process through smart land use and the distribution of functions. The new Northern Boulevard is now one of the five main centers of Polycentric Tirana.

This project is part of a general vision for the transformation of the capital center and its philosophy, functioning, and improving the relationship between public parties and private entities, to enable the improvement of living conditions and the physical and geographical relationship between housing, work, institutions, culture, and recreation. Based on the multi-critical analyses carried out, functional problems have been identified, such as unused empty spaces, a lack of recreational areas, both paved and green, and sub-optimal infrastructure connections.

Considering the population growth in the area, there are few residential housing and service options available to provide necessary conditions for everyday life. The team concludes that the new area presents great potential for urban retraining through a new approach to urban development, including new institutional spaces, services, cultural, social, and recreational amenities.

For the first time in Tirana, the development of a certain area begins with the construction of a boulevard, followed by the construction of new residential or business buildings. In this case, proposals have been made for the first part of the boulevard up to the train station, which is a key point in an area of 42 hectares. The plan involves the construction of a new neighborhood in Tirana, a completely modern area where every building respects the required space, the archi-

tecture of the city, and the percentage of green spaces. This is a significant departure from what has happened in Tirana over the past two decades. The plan also prioritizes the regeneration of existing spaces where institutional or residential buildings of importance will be preserved. A proper infrastructure is also planned to facilitate practical and fast connection of the areas.

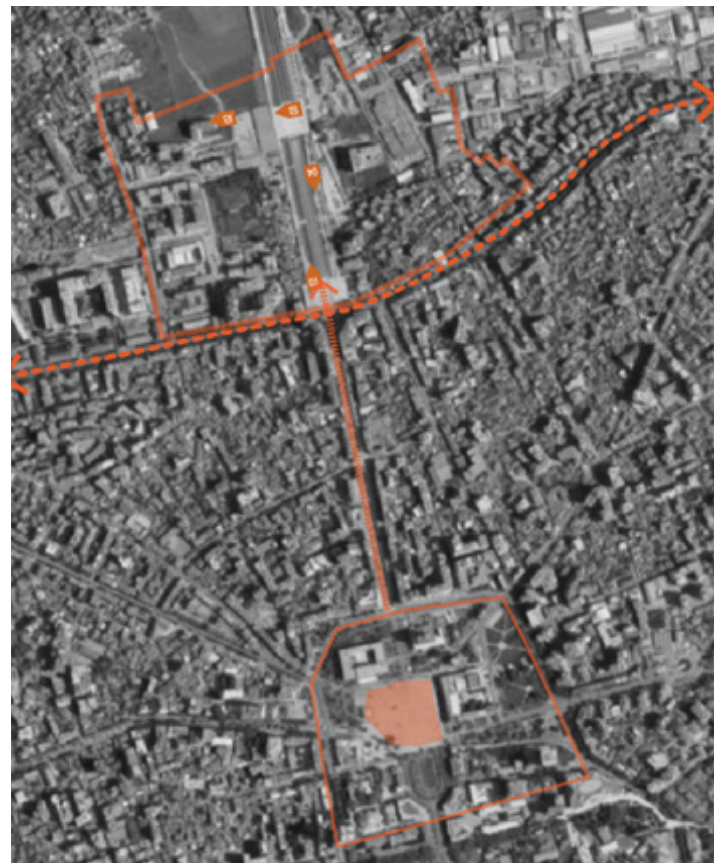


Figure 92 Site Position

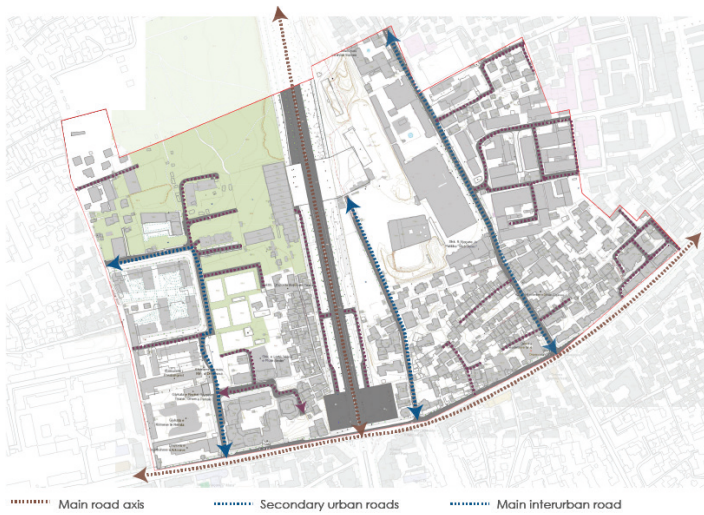


Figure 93 Infrastructure Analysis

Source: Authors

The achievement of this objective will lead to a reconceptualization of the city's urban structure, with the addition of five new attractive areas for citizens and foreign visitors and an increase of about 20% in investments in these new poles.

Economic Value

Economic value is the main focus for the area under study. Even with the proposed interventions in different categories, economic benefits will always result. Economic aspects must receive primary attention in any intervention considered.

Social Value

This category is one of the most important issues that the residents of the area encounter on a daily basis. The improvement of the quality of life is the most important aspect, which comes as a result of economic growth, social interaction between residents, the exchange of different cultures, and the avoidance of different forms of discrimination.

Environmental Value

The improvement of economic values in the area will draw special attention to the environment, beginning with avoiding pollution of the territory. It is also intended to use industrial premises.

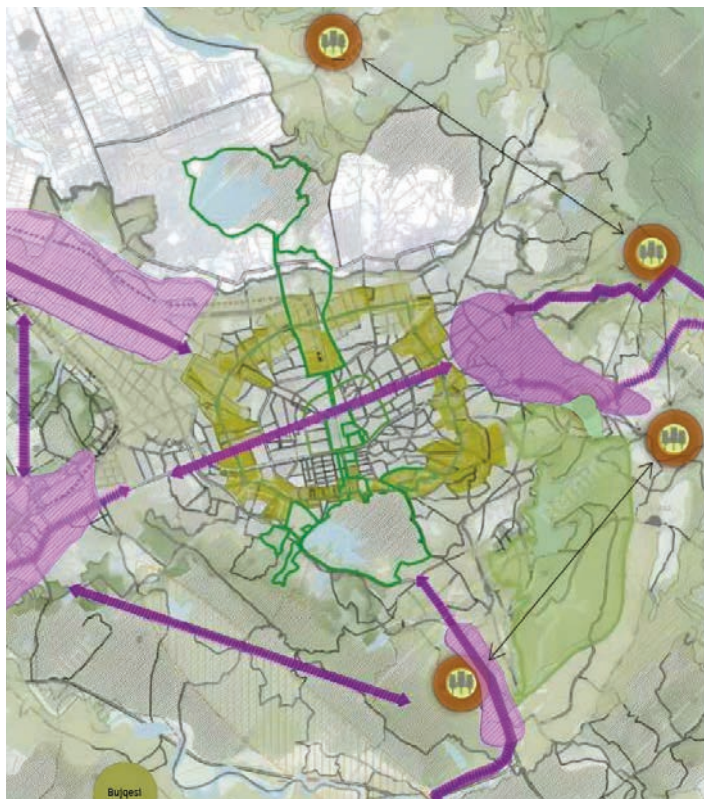


Figure 94 Strategic Plan at the City Level

Source: Authors

Strategic Plan at the Area Level

Urban revitalization aims to harmonize infrastructure and public services while promoting economic development in Polycentric Tirana. The organization of Tirana into several main and secondary centers will serve to promote work and densification through intelligent land use and function analysis. Five urban epicenters, including Kinostudio, Kombinati, Farkë-Cytet Studenti, Bulevardi i Ri, and Lapraka, are the poles of the government to be established to overcome the duality of the center and promote balanced attention throughout the city.

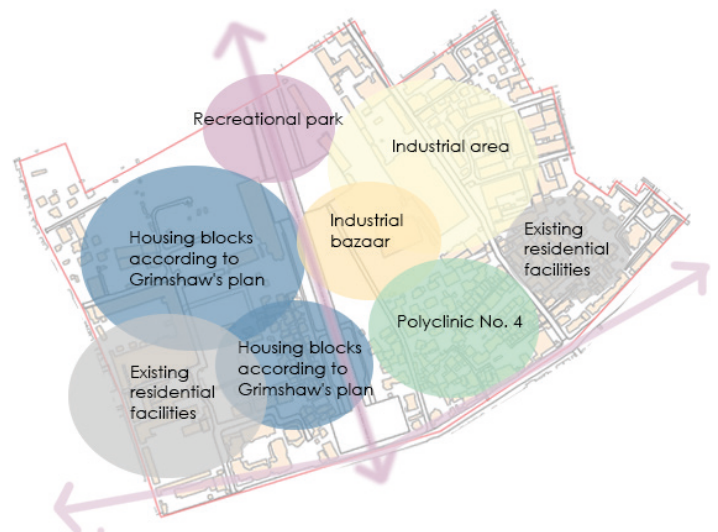


Figure 95 Strategic Plan at the Area Level

Source: Authors

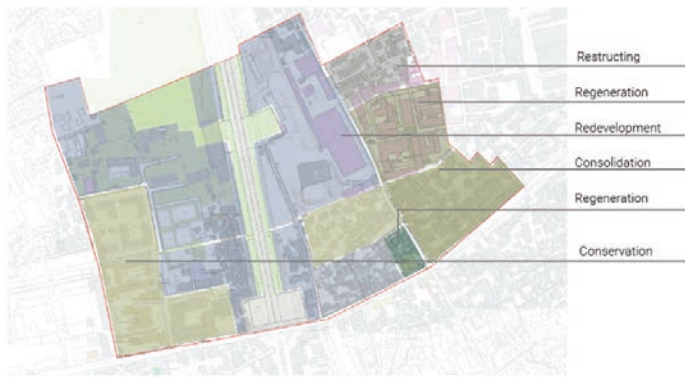


Figure 96 Proposed Scenario

Source: Authors

Economic aspect	the creation of new economic poles increasing the circulation of people in the area (domestic and foreign)
Urban Regeneration	identification of hearths and buildings important for the area proposal of new functions creation of a functional road system and parking spaces
Housing	settlement of residents in designated residential areas the addition of residential areas, densifying the current construction areas

Proposed Infrastructure



Figure 97 Infrastructure Analysis

Source: Authors

This scenario focuses on creating sustainable communities and achieving housing, mixed-use, and regenerative objectives. To achieve social sustainability, regeneration should not only be along the main road but also include wider service provision. Inclusion and integration can help solve urban problems, leading to positive economic, physical, social, and environmental conditions.

Recreational spaces are an excellent opportunity for relaxation, meditation, entertainment, and meeting the community's needs. These spaces should be located in the area's center, making them easily accessible to everyone. Additionally, these spaces dedicated to recreation will serve as an opportunity for residents to interact with each other.

New housing blocks are seen as an investment in the area that will increase its level by directly influencing the economy. This will also bring investment opportunities, which the area needs. The addition of residential blocks will enable housing with a good road system, and organized parking places, addressing problems observed throughout the area. Furthermore, the use of innovative, ecological materials will ensure these residential blocks meet the highest possible living standards

Master Plan

Conservation

Aims to develop or re-evaluate development indicators and transform the existing urban structure.

Regeneration

It aims to re-evaluate and renew an existing urban structure, which does not change the category of land use.

Redevelopment

Aims to develop or re-evaluate development indicators and transform the existing urban structure urban structure.

Restructing

Aims at revitalizing the existing typologies, preserving the existing character and stimulating economic development in the territory.

Consolidation

Process of densification and urban filling of the structural unit Tr/564, or a part of it, preserving the character, function, development and construction indicators with those of the properties with which it borders.



Figure 98 Master Plan

Source: Authors



Figure 99 Proposed Master Plan

Source: Authors

URBAN REGENERATION

GROUP 05

Adela Qorri

Elda Hida

Ornela Mema

More Than Just Buildings

Introduction to the Site

During the period of post-communist transition, the city of Tirana has undergone drastic transformations and interventions in the urban organization of the city. These transformations consist of informal settlements both in suburbs and in the urban center, phenomena that led to the occupation of public and private lands causing urban chaos and growth without vision or perspective. In 2004, the first international competition for urban improvement of the city was held, which was a starting point for many others during the following years. One of the outputs of these competitions was the study of New Boulevard of Tirana and the River of Tirana by Grimshaw Architects in 2015-2019. This study has already produced a master plan with public and residential buildings that simultaneously respect the connection of the New Boulevard with the existing one and with the natural presence of the Tirana River. It also has established some rules and standards which must be followed by developers who want to intervene in the area.

The area under study is located in one of the main highlighted parts of this masterplan. The boundaries of the site on the New Northern Boulevard are limited to the former Train Station in the south, Jordan Misja street in the west, Filip Jano street in the north, and Pal Hasi street in the east. During the last years, the west wing of this area has been under the influence of new undergoing constructions in accordance with the plan, which are gradually upgrading the appearance and urban values of the area.

Urban and Historical Analysis

The area under study has an urban character and is composed of three main parts.

The Boulevard Axis, which traverses the area along its entire length and plays the role of the main distributor of the movement. Around it are resting and recreative areas decorated with vegetation which are constantly used by residents and

visitors of the area. These users mainly belong to the third age group and also young families with children.

The residence area, predominantly in the east, which consists of a low building from one to a maximum of five floors established closely to each other. The beginning of these buildings were categorized by the presence of the Train Station, warehouses (Ish-Frigoriferi, n.d.), and the workplaces that it offered. Up until 1992-1994, unlike the east the west area closed to the railway which served as a drawback, the area remained unutilized. Later with the creation of the livestock market, the first traces of the construction in west wing began with low residential buildings which have remained almost the same up until today. In 2005 the first multi-story residential complex was constructed in the north-west but was considered unsuccessful due to the investment difficulties in the other parts of the area and was not expanded. During the years 1999-2015, a series of events like migration and the destruction of the railway contributed to further occupation and densification of the area. With the construction of the New Boulevard in 2018, some of these buildings were demolished without compensation, while others are in legalization process and waiting expropriations which will come from the developments in the area.

The area of unused lands in the west, former agricultural lands, have lost their function of cultivating vegetables and seeds. Now the majority of them are idle and slightly contaminated with urban residue.

Mobility

The existing infrastructure is generally weak. The road hierarchy is structured by the Northern Boulevard, secondary urban roads, local roads, and paths. The boulevard is rich in urban elements and has thought out spatial organization for vehicles, parking spaces, and pedestrians resting areas. The majority of the main roads are paved and with vegetation on the sides and but not in good condition. Local roads, which dominate the area, are commonly unpaved with narrow side

walks or without any sidewalks. The area is easily accessible through the Boulevard, Jordan Misja street, Siri Kodra street, and some of the local roads like Petrela street, but mobility is more difficult because of the conditions of the roads and the urban pattern of the area.

Regarding to public transportation, it's composed of six lines respectively:

- GREENLINE_UNAZA
- L1. KODRA DIELLIT2-SELITE-ISH.STACIONI TRENIT-ALLIAS
- L12._ UZINA_DINAMO-SHARRE
- L13._TIRANA E RE
- L2._TEG-_SAUKU_VJETER-KOPSHTI_ZOOLG-JIK-ISH-TRENI
- L9._QYTETI_STUDENTI-JORDAN_MISJA

Lines "Qyteti Studenti" and "Uniza Dinamo" pass along and inside the area, while all the other lines pass through "Reshit Petrela" street and are accessible through the new boulevard.

Intervention in the Area

- Consolidation of the Boulevard and improvement of existing the urban structure.
- Restructuring of the road network based on existing roads and proposals from the Grimshaw Plan.
- Preservation of multi story buildings in north-west part of the area and those that are currently in construction process.
- Regeneration of existing residential areas in regular quarters with public spaces and specific areas.
- Redevelopment of the residential buildings alongside the new roads in east and west wing.

- Redevelopment of the buildings along the east side of the Boulevard and creating of an economic pole in the area.
- Regeneration of existing residential buildings with the possibility of redevelopment in the future.
- Creation of a primary urban road, according to the Grimshaw Plan, (Tirana's Forth Ring) which will pass through areas at transverse length.
- Creation of the main square in the area above the intersection of The Fourth Ring with the new Northern Boulevard.
- Regeneration of idle areas into a linear park with vegetation and spaces for different age groups.

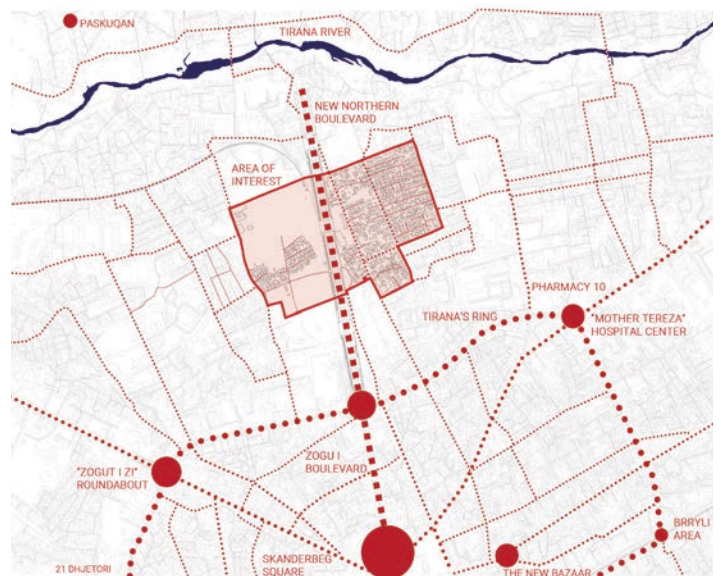


Figure 100 Accessibility of the Project Site

Source: Authors

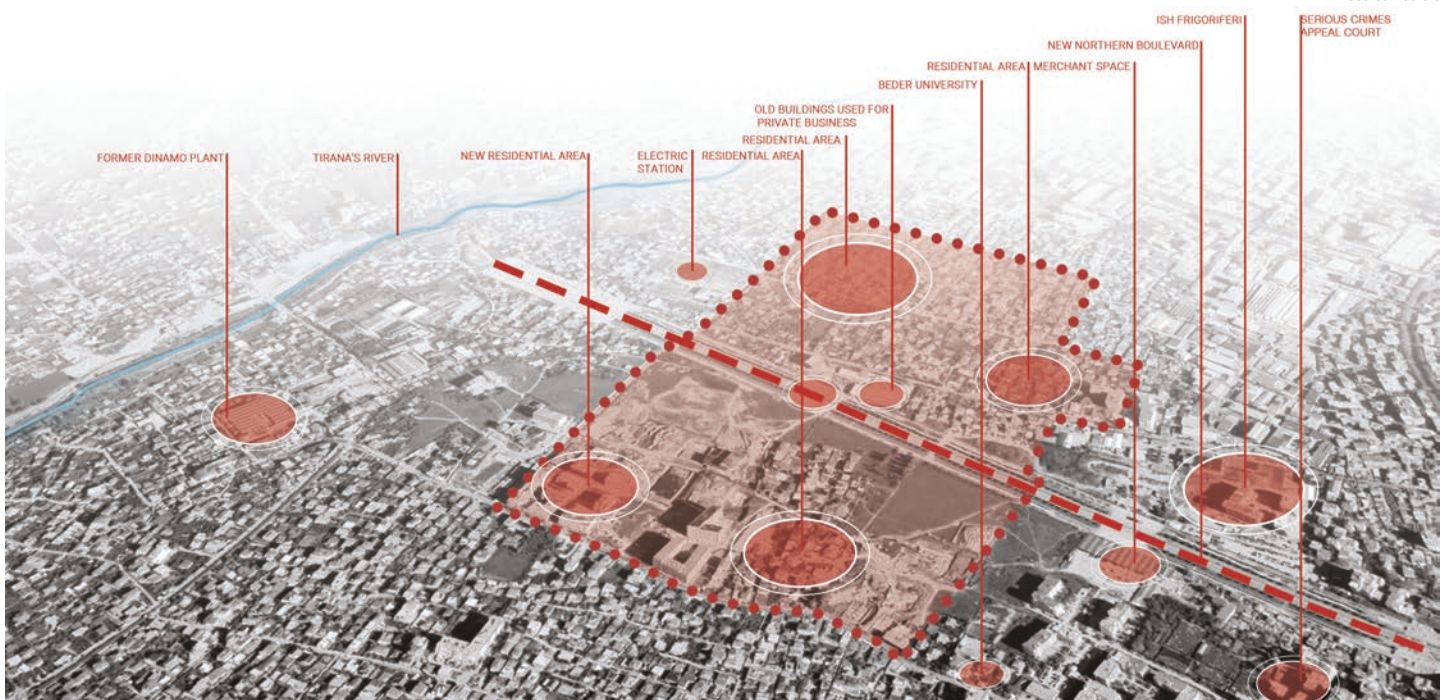


Figure 101 Landmarks Near the Project Site

Source: Authors



Figure 102 Proposed Interventions

Source: Authors

Objectives

General Objectives

Achieving Social Cohesion and Sustainability- Harmonization between communities and increase of quality of the area and establishing a sense of security.

Diversity of Activities- Creation of dedicated spaces for specific activities and age groups.

Creation of a Sustainable Residential Area- Through redevelopment and regeneration of existing structures.

Economic Growth- Through new facilities and structures.

Specific Objectives

Redevelopment and regeneration of informal settlements into new residential complexes with public spaces accordingly to the urban standards, improving life quality and comfort of habitants, aesthetic appearance, and increasing cooperation.

Insertion the functions in the area with multi-use buildings and creating an absent economic pole .

Creation of green public spaces within the blocks and in the unutilized areas and designed for a getaway feeling from the daily routine.

Restructuring of urban infrastructure into a quadratic grid therefore creating an ease of movement and access.

Enrichment with urban elements like sidewalks, bicycle lanes, external lighting, trash cans, etc. Addition of greenery alongside the urban elements to prevent "heat islands".

Creation of a central square which would serve as a landmark and activity space.

Strategy

Typology

The existing multi story buildings will not be touched, attention will be focused on the informal settlements which are proposed to be redeveloped and upgraded. These new objects will be placed on the edge of the new roads and will simultaneously serve several uses. With the development comes the possibility of demographic growth, and will be necessary for the area to be able to fulfill the requirements in education and health in the future.

Infrastructure Grid

The new grid will have a new hierarchy adding a new primary urban road (Tirana's Fourth Ring) and restructuring all the secondary and local roads with flexible road patterns that can accommodate all types of transport for a more sustainable movement. These roads will be from 14 meters to 30 meters. The purpose of the grid is to provide good linkage and mobility in the area and enable traffic flow to provide environmental comfort for pedestrians and cyclist. Private parking will be provided in underground building blocks for residents only, while public parking will be established under-ground the main square.

Vegetation

The most significant greenery addition in the area will be the linear park, which besides functioning as "lungs " by cleaning the air, will also provide new spaces for social-cultural activities. Besides the park a series of public squares will be built within the new residential blocks, thus creating several urban pockets for relaxation and passing the time.

Also, high vegetation will be present alongside the new roads to shield from air pollution and heat.



Figure 103 Proposal Typology

Source: Authors

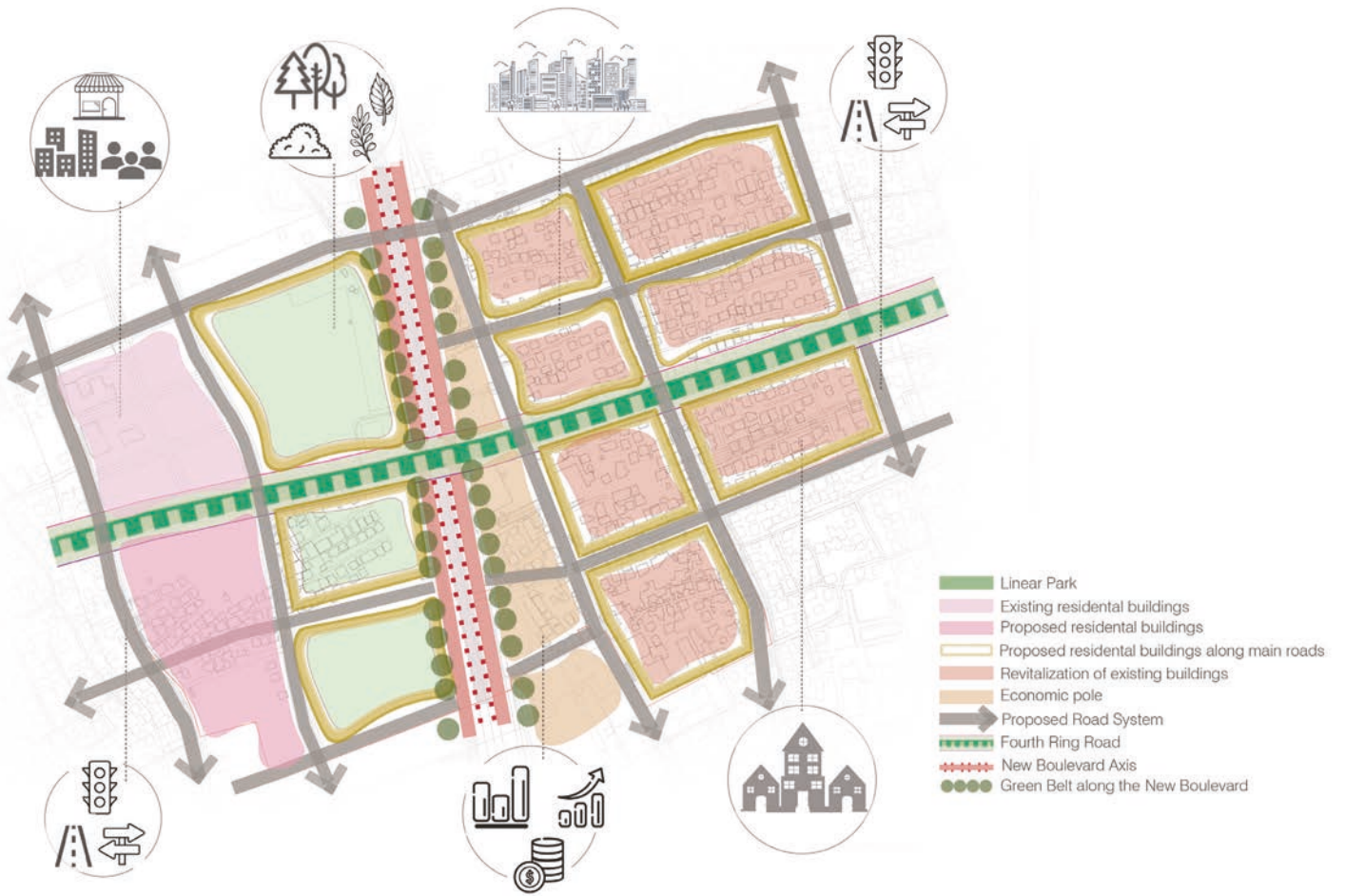


Figure 104 Strategic Plan of Proposal

Source: Authors



Figure 105 Proposed Masterplan

Source: Authors

CONCLUSION

FAU Projects

RESULT

Fioralba Gega

Sara Bregu

Helena Klefti

The new Northern Boulevard starts from the former train station in Tirana, at the end of Zogu i Parë Boulevard. This area was once undeveloped, completely abandoned, and considered a dirty part of the city. Now, the new project will connect the city with the Lana River Park and the Great Ring of Tirana. According to Tirana's strategy, it is envisaged that the division of the city into several main and secondary centers will help the densification process through smart land use and distribution of functions. The new Northern Boulevard is now one of the 5 main centers of polycentric Tirana.

This project is part of a general vision for the transformation of the capital center and its philosophy of improving the relationship between the public and private sectors to enhance the quality of life. It aims to improve the physical and geographical relationship between housing, work, institutions, culture, and recreation.

For the first time in Tirana, a certain area's development begins with the construction of a boulevard, followed by new buildings, whether residential or business. The plan aims to create a modern neighborhood in Tirana that adheres to the required space, city architecture, and green space percentage. This approach differs greatly from what has happened in the past two decades in Tirana. The regeneration of existing spaces, and preserving institutional or residential buildings, is also a priority. The plan includes proper infrastructure to connect areas in a practical and fast manner.

Infrastructure was identified as one of the issues during the analysis, and a quadratic road system that improves circulation in the neighborhood while incorporating public green spaces was proposed. The new infrastructure proposal includes a mobility plan that aims to add more bus stops for better and safer accessibility in the area. Land use is primarily based on the Tirana General Local Plan for 2030, which suggests more public spaces, natural land, and a new industrial area that will replace the dangerous power plant currently in the area. This plan integrates small parks that invite the community to the river park and recreation areas along the bridges.

To achieve social sustainability, regeneration efforts must extend beyond the main road to encompass a broader range of services. Inclusive and integrated approaches will help ad-

dress urban issues, benefiting the economic, physical, social, and environmental conditions. Creating recreational spaces provides an excellent opportunity for relaxation, meditation, entertainment, and meeting the needs of the community. These areas will be located at the center of the neighborhood to ensure easy access for everyone.

In conclusion, the Adaptive Architecture project in Tirana has been highly successful in transforming an old industrial complex into one of the city's most attractive areas. The project has created numerous job opportunities for local residents and provided a wide range of goods and services for the community. It has also increased the city's sustainability by introducing renewable energy sources. The bazaar has become an essential element of Tirana's culture and is expected to have a long-lasting positive impact on the community.

Through the adaptive architecture project of Tirana, the former industrial complex is now transformed into one of the most attractive areas of the city. It has been equipped with renewable energy sources that are utilized to power the boulevard and river development area, while also significantly reducing the country's reliance on imported electricity. This adaptive architecture project is now a model for sustainable development that will continue to benefit Albania in the future.



Picture taken by the authors

JOINT CONCLUSION

Conclusions for Two Weeks of Workshops and Exchange Between Universities

RESULT

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In today's world, rapid urbanization, climate change, and increased demand for natural resources are posing significant challenges to urban systems and populations worldwide. To address these challenges, there is a growing need for integrated and sustainable urban development concepts. This approach emphasizes the integration of social, economic, and environmental dimensions to achieve sustainable development. To succeed in this approach, innovative, contextually appropriate, climate-responsive, and resource-efficient planning strategies are necessary, which can be further strengthened by participatory approaches. The benefits of integrated and sustainable urban development concepts are manifold, including improved quality of life, reduced environmental impacts, increased resilience to climate change, and enhanced economic opportunities. Thus, it is imperative to prioritize this approach to ensure a sustainable and livable future for cities and their residents.

The Resource Efficiency in Architecture and Planning (REAP) program at HafenCity University Hamburg and the Master Program in Architecture and Urbanism at the Faculty of Architecture and Urbanism (FAU), Polytechnic University of Tirana (UPT) collaborated to facilitate knowledge exchange for students. This provided insights into the unique challenges of implementing resource-efficient, climate responsive, and environmentally sound planning and public engagement in diverse cultural, geographical, socio-economic, and path-dependent urban contexts. The exchange program focused on the challenges faced by Tirana in the post-socialist era, including informal development and settlements, with particular attention paid to the development of "Resource Efficient Planning in Tirana". The program focused on the North Boulevard area and the development of the Tirana River waterfront in the northern part of the city. Although the new Boulevard has been partially completed, it is crucial to consider integration and regeneration strategies instead of expropriation or displacement for any future development in the area. The regeneration of the Tirana river waterfront remains largely unexplored, with little progress made toward this objective. This presents an opportunity for further research and development in this area.

To facilitate collaboration and achieve the aforementioned objective, students from both master programs participated in a two-week workshop, with one week held in Tirana and another in Hamburg. This collaborative effort was designed with an international and interdisciplinary approach, aiming to support

the growth of young researchers while fostering an exchange of research methods, approaches, and planning techniques between universities, staff, and students. As a culmination of this effort for the winter semester 2022/23, this joint publication was created to showcase the perspectives, visions, and final proposals of students from both the MSc. REAP of HCU and Master in Architecture and Urbanism of FAU, UPT.

The two workshop weeks provided an opportunity for participants to delve into planning and design practices and sustainable urban development through selected case studies in Tirana and Hamburg. In Tirana, lectures covered various topics related to urban planning, including the city's history, future development plans, human mobility, migration, informality, industrial heritage regeneration, and circular economy principles. In Hamburg, students explored sustainable urban water management, with a focus on the benefits of implementing blue-green infrastructure and decentralized stormwater management. They were also introduced to climate-responsive architecture and planning for international-style buildings and neighborhoods, participatory planning, the connected city concept, decentralized energy production through wastewater, sustainable mobility concepts, and mixed land-use development. Field visits, on-site interviews, and observations were also conducted both in Tirana and Hamburg. Students from both universities analyzed and discussed their findings based on resource efficiency and participative processes. The REAP master students worked in 6 groups with different thematic focuses on energy, mobility, water, participatory planning, material, and waste. The students further developed their concepts through literature review, desk analysis, and expert interviews. master students of FAU, UPT worked in 6 groups with different topics focuses on designing research for public spaces, reuse, upgrade, and urban regeneration. At FAU, students employed various research methods such as desk research (utilizing literature and official planning strategies), site visits with exploratory analyses of the environment, and observational and questionnaire-based research among residents, trying to give solutions through design. Specifically, in their interventions along the Tirana River waterfront, they seek to reintegrate it into the surrounding area and transform it into an attractive asset. By incorporating the river throughout the territory, there is potential to enhance the area by using it as a natural element.

Each group devised resource-efficient concepts that address the impact of climate change while emphasizing the creation of people-friendly and human-scaled spaces to enhance the overall quality of life on the project site in Tirana. The REAP students' concepts for improving the Northern Boulevard area and Tirana river included various interventions such as exploring renewable energy production with PV modules, restoring and retaining the river banks through water-sensitive urban design and community participation, tackling river pollution with nature-based solutions and education strategies, improving material circularity through recycling and reuse of construction waste, tackling illegal waste dumping through community awareness and improved waste collection practices, and enhancing mobility with urban acupuncture. The proposed interventions were aimed at improving the sustainability, resilience, and livability of the area while considering local needs, values, and traditions. Detailed implementation and stakeholder involvement plans were developed, and potential risks and threats were addressed to ensure the long-term realization of the concepts. FAU students' concepts for developing the Northern Boulevard area and Tirana River were proposed at three distinct scales: urban development strategies for sustainable development of the historic Boulevard extension and urban design strategies on a larger and medium scale, and building strategies on a building scale. Urban planning strategies for the extension of the northern Boulevard of Tirana, and the surrounding areas, aimed to give an answer to the former informal development and enhance the connectivity between the new areas and the city, as well as with the natural elements such as the river and lake. These strategies tried to confront and address new concepts like eco-neighborhoods, urban heat islands, recycling, renewable energies, alternative mobility, and social cohesion. On the building and urban design scale, the strategies were strictly connected with the reuse and valorization of industrial heritage and other significant building stock, materials, energy efficiency, and livable neighborhood. Public spaces are very important for services and activities, but with a special role in social cohesion and reliance. Particularly, in the urban design scale different proposals are utilized, with a particular focus on materials, renewable energy, and eco-friendly design. In all the FAU groups' strategies, Tirana River, as a natural area (but polluted), was seen as having a potential for future development but with urgent strategies for its cleaning and re-naturalization, with the aim to include activities and recreation.

The exchange project between HCU and FAU brought together students who developed varying concepts for future urban development, each reflecting their one expertise and interests but also the distinct expertise and approaches of their master studies and their respective instructors. While the concepts differ in their focuses and goals, there is no evidence of contradictory ideas. Sustainability, efficiency, recycling, reuse, renewable energy, and water management are all emphasized as essential elements for future development toward a more sustainable

future. The exchange project provided a platform for knowledge sharing and the development of new strategies, creating opportunities to explore and implement innovative solutions for urban development.

The challenging topics required the students to apply their interdisciplinary knowledge and skills, collaborate with each other, and consider different stakeholders and communities, as well as the local needs and traditions. Despite the promising interventions, students identified several challenges and limitations to their successful implementation. These may include the lack of political will and support, limited financial resources, resistance from the community or stakeholders, and potential unforeseen environmental or socio-economic impacts. Through both the intensive learning and exchange during the workshop weeks, as well as the individual group work, the students learned that sustainable urban development and transformation should not only focus on enhancing the physical environment but also requires deliberate urban planning, active stakeholder engagement, and enabling community education and participation. Involving the citizens in all stages of planning and implementation of urban redevelopment concepts is key to securing the pathways to livable, resource-efficient, and climate-adapted futures in cities. In addition, the students learned the importance of promoting interdisciplinary and transdisciplinary research and knowledge exchange to generate innovative and feasible interventions that can address complex urban challenges. By bringing together diverse perspectives and expertise, solutions can be developed that are holistic and consider the needs and values of different stakeholders. To further promote this type of collaboration and towards more sustainable urban development for the new Northern Boulevard area and Tirana River, it is recommended to establish or strengthen a network of universities, experts, and practitioners to share experiences and best practices in sustainable urban development and engage in joint research and building activities. This will enable the transfer of knowledge and experience and enhance the quality and feasibility of proposed interventions.

Overall, this collaborative academic project provided an opportunity for students and lecturers to explore novel contexts, understand their unique challenges and opportunities, and develop individual approaches to facilitate sustainable urban development.

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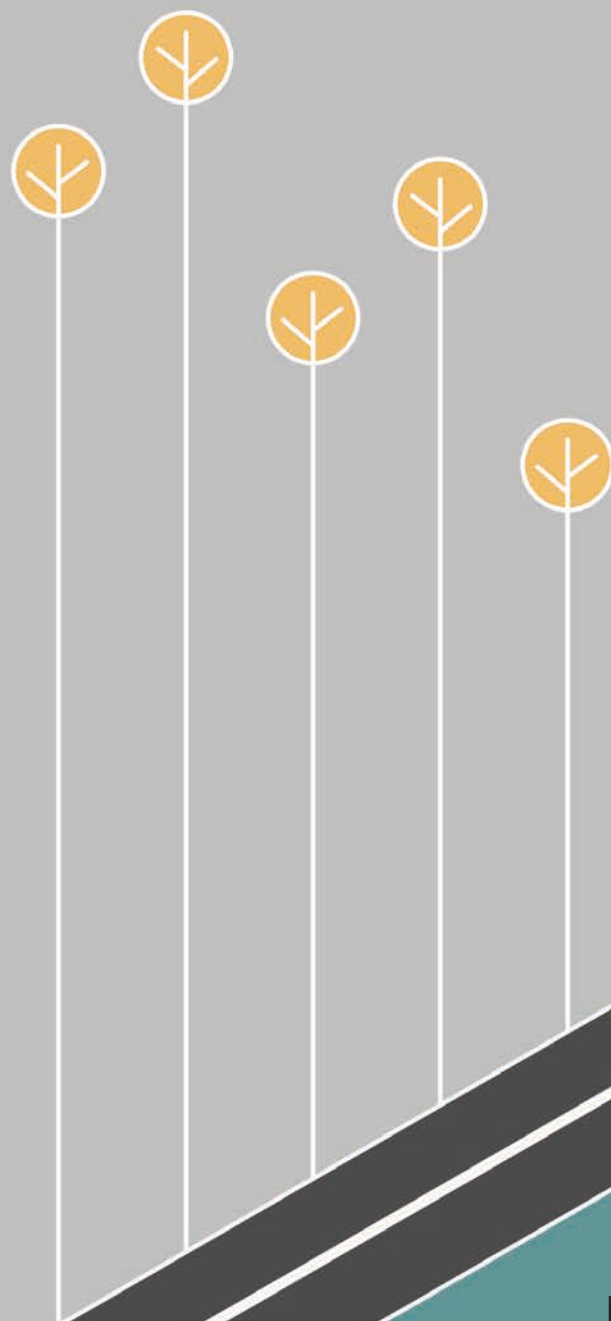
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