
VII.

NOVA LIMA



ETH Studio Basel
Contemporary City Institute
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Christian Mueller Inderbitzin

Autumn Semester 2013

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VII.

NOVA LIMA

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THE SHAPE OF THINGS TO COME

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Contemporary City Institute
Roy Gehrig, Rosanna May

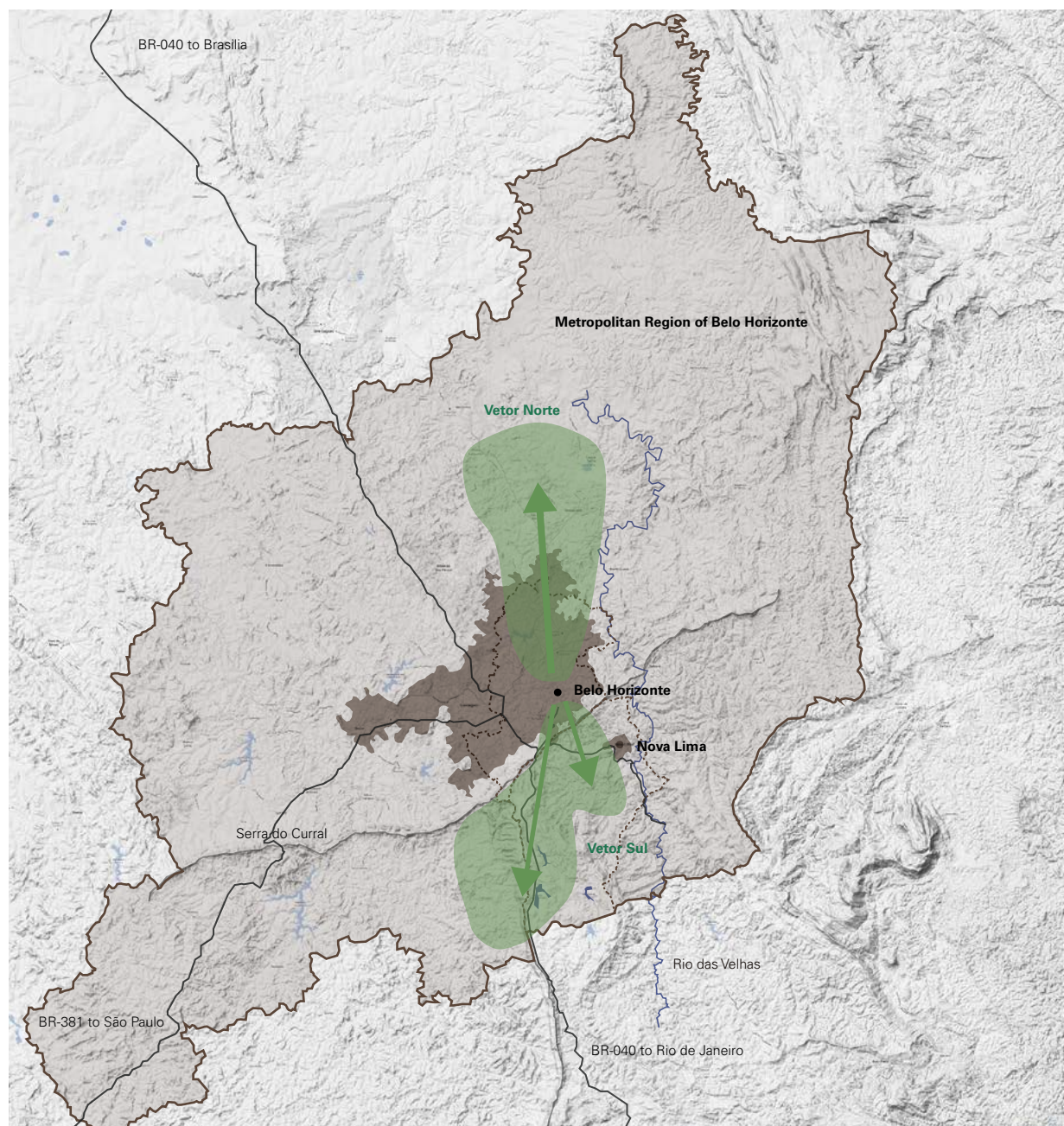
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LOCALISING NOVA LIMA

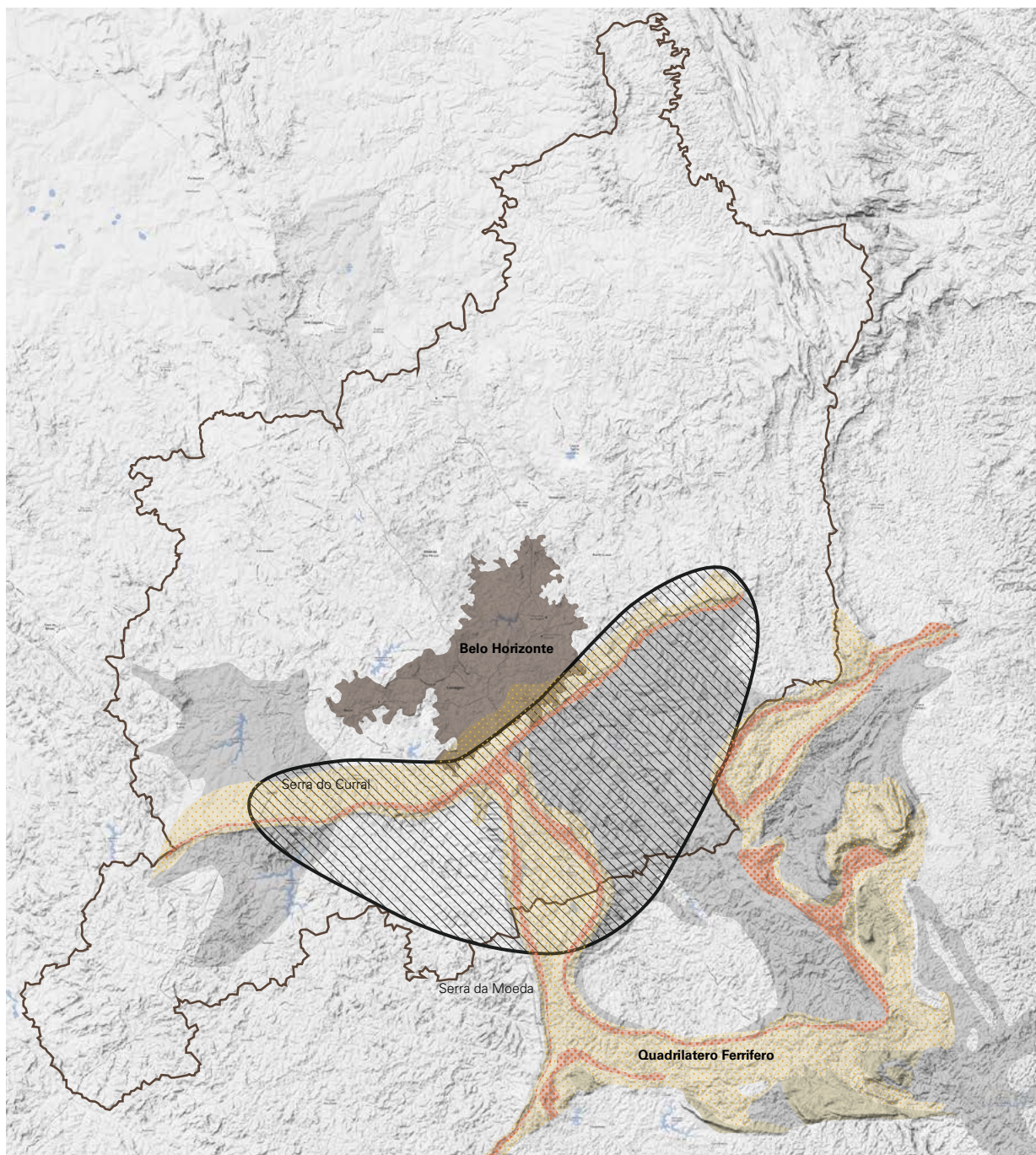
Nova Lima is a sovereign municipality in the Metropolitan region of Belo Horizonte. The city expansion into to directions, the Vetur Norte and the Vetur Sul. The north expansion is characterized by support of the public sector which is opposed to the rich and privately developed south expansion. Nova Lima is naturally separated from Belo Horizonte by the Serra do Curral, an iconic ridge also being the boundary between the two municipalities. However with the conquering of the hill the expansion to the south has reached Nova Lima which is now part of the Metropolitan Region of Belo Horizonte.



Real Estate Eldorado

Unlike Belo Horizonte the Municipality of Nova Lima has only a loose set of building laws, which has led to a number of interesting urbanistic developments by private investors and constructors. The real-estate is entirely dominated by the market and the built is a realisation of a mindset.



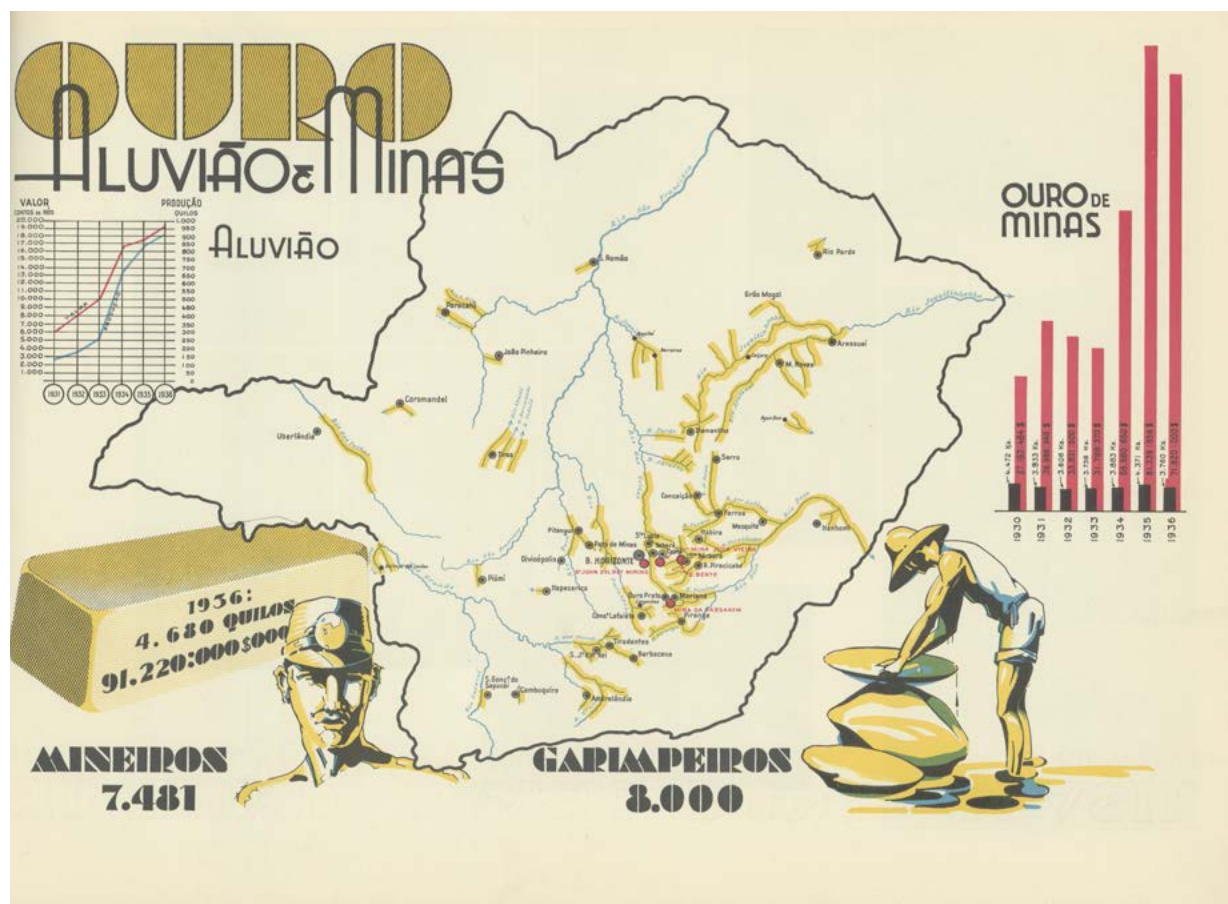


On the Intersection of Urban Periphery and the Iron Quadrangle

Nova Lima falls into the confines of the Quadrilatero Ferrifero, a geographical quadrangle of immensely rich iron ore deposits. Belo Horizonte's expansion and the large-scale mining occupy the same territory which has resulted in several conflicts that will be investigated.

The Silent Presence of Mining

Mining is a business with a huge impact on its surrounding environment. This influence used to be overlooked as most mines were remote and inaccessible. However, the city's expansion and the urban embracing of the mines exposes possible conflicts.

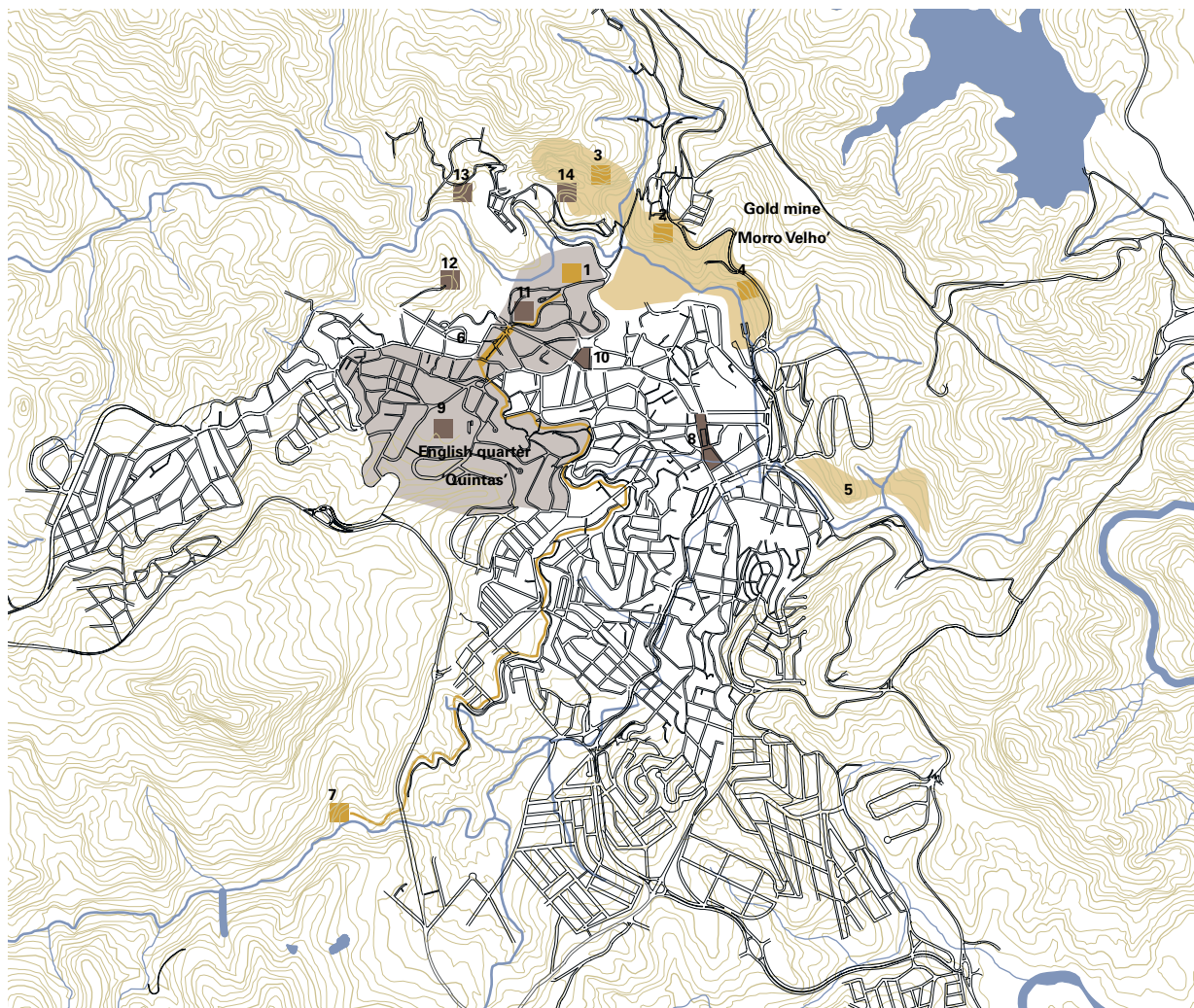


Gold Mining: Settling Inland Brazil

Minas Gerais was the location of the first gold rush in the world. Exploration parties were sent out in the late 17th century by the Portuguese colonialists to conquer the land in order to find gold. When finally gold was discovered thousands of settlers, even from the home country of Portugal, were attracted by the promise of wealth. Minas Gerais, previously unknown territory was on the rise to play an important part in Brazil's colonial history. The settling of the entire region originates in the gold rush and founds large part of its identity on this history.

Projection Plane of Colonial Greed

Brazil was named after the 'Paul Brasil', a reddish wood which was the first colonial export product to Europe. The naming of Minas Gerais followed the same symptomatic attitude towards the land: Minas Gerais stands for mines and general (woods).

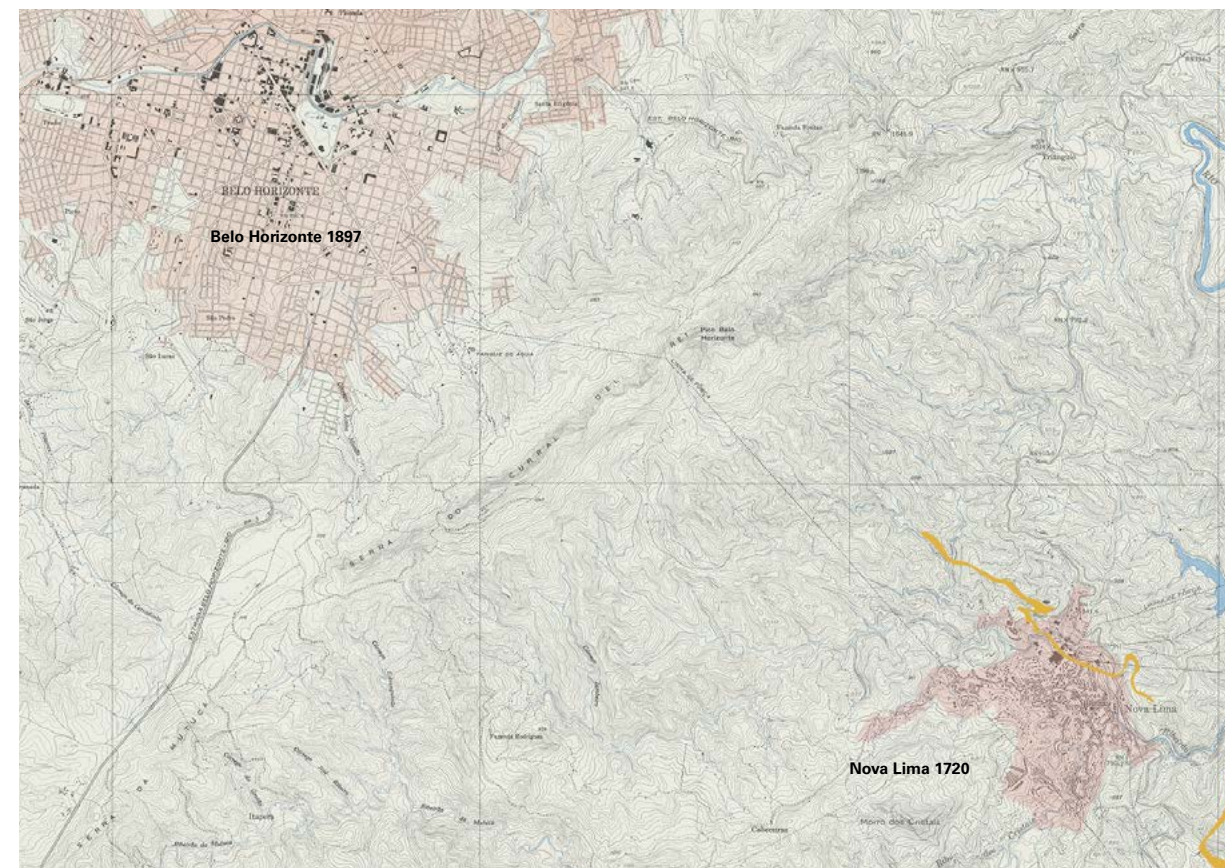


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- | | | | |
|-----------------|------------------------|---------------------------|---------------------|
| 1 Casa Grande | 5 Arsenic dam | 9 English club | 13 English hospital |
| 2 Mina Grande | 6 Bicamente aqueduct | 10 Praça do Mineiro | 14 English cemetery |
| 3 Mina Velha | 7 Machina dos Cristais | 11 Anglican church | |
| 4 Train station | 8 Praça Bernadinho | 12 Superintendent's house | |

The British Colonialisation

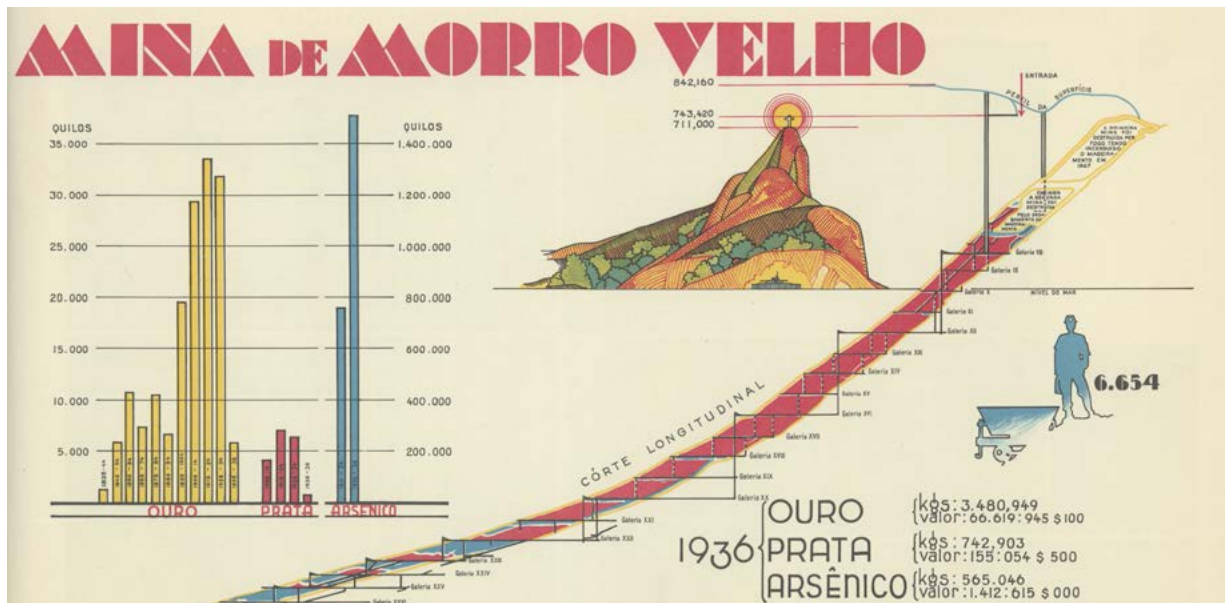
The gold mining is the reason for Nova Lima's existence and the British company St. John d'el Rey is responsible for most of its construction. Nova Lima is in essence a company town with the mine its heart. Approximately 150 British people used to live in Nova Lima for 6 years at a time. The British segregated themselves from the Brazilians with their own churches, cemeteries, clubs and hospitals. These institutions still exist and have been opened to the community with the departure of the British in 1958.



Company Town and the New Capital

When Belo Horizonte was inaugurated in 1897, Nova Lima was far away from the city. The antagonism between the new capital and the colonial town remained until the 1980s when Nova Lima was incorporated into the Metropolitan Region. Gold mining in the City of Nova Lima stopped in 2004 and moved to other municipalities in the region.



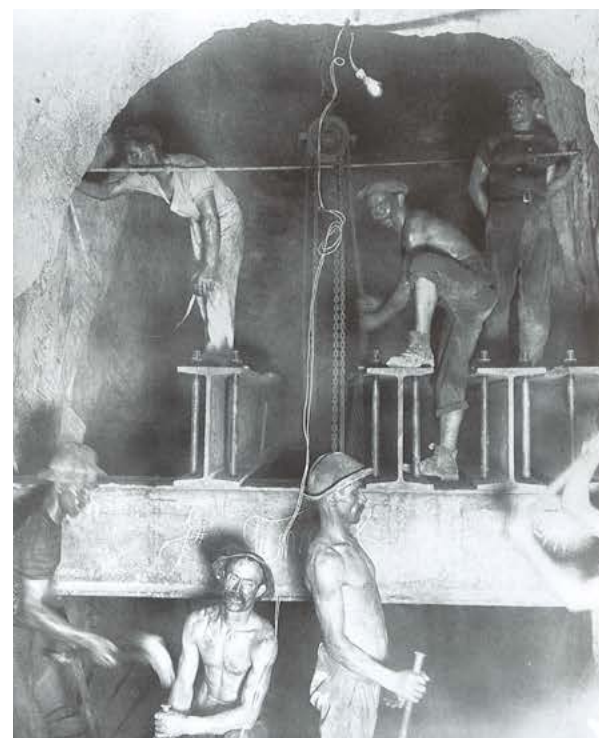


Machina dos Cristais, pump station



Bicamente aqueduct, water supply for the mine

Mine shaft of the Morro Velho mine



The World's Largest Gold Mine

Gold occurs in vertical veins and is mined underground in a mycelium of shafts. With British knowledge and capital the Mina da Morro Velho became the deepest and most productive gold mine in the world. It was expanded continuously since its opening in 1835 and is up to 3000 meters deep, until its closure in 2004 it was the oldest operating mine. Although underground, a mine of this size requires a large amount of overground infrastructure that are more significant than the mine itself.

The Mineiros

The work in the mine is physically hard and often causes health problems. The mineiro is still a symbolic figure for Nova Lima, as the society's identity is strongly linked to the mining. In earlier days 90% of the population were directly or indirectly employed by the mining company.



Lagoa das Codornas, artificial lake and dam

Taking Possession of the Land

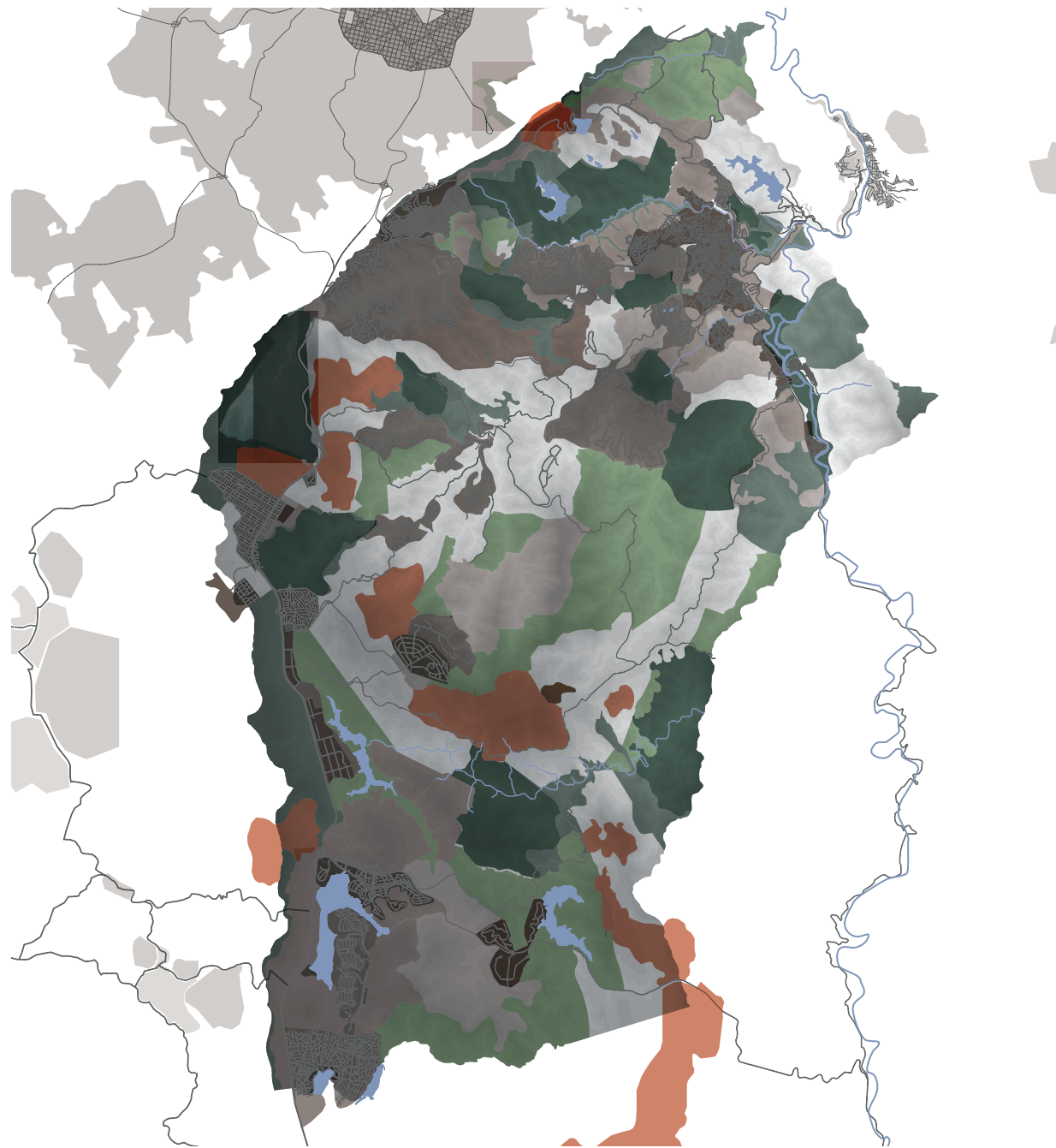
The St. John d'el Rey company and the superintendent John Chalmers constructed an water network across the municipality with the purpose of operating the mine. The electrical dams provided electricity and the canals supplied the mine with the required water.



TERRITORIAL INVENTORY

In the territory of the Municipality of Nova Lima the nature, the urbanisation and the mining can be identified as the three predominant land uses. Their origins differ with the natural conditions being the basis for the other forces. The urbanisation process is highly influenced by the proximity to Belo Horizonte and the mining depends on the occurrence of iron ore deposits.





0 2km 5km
1:200,000
 Nature
 Urbanised area
 Iron ore mine

Patchwork Landscape

The allocation of the land uses in the territory presents a scattered landscape. The uses are split up into several disconnected islands. The highways and the town of Nova Lima are the only visible structuring elements.



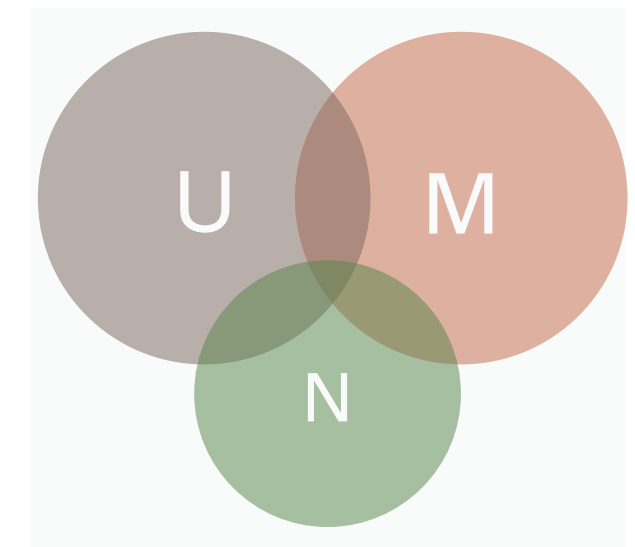
Nature



Urbanisation



Mining

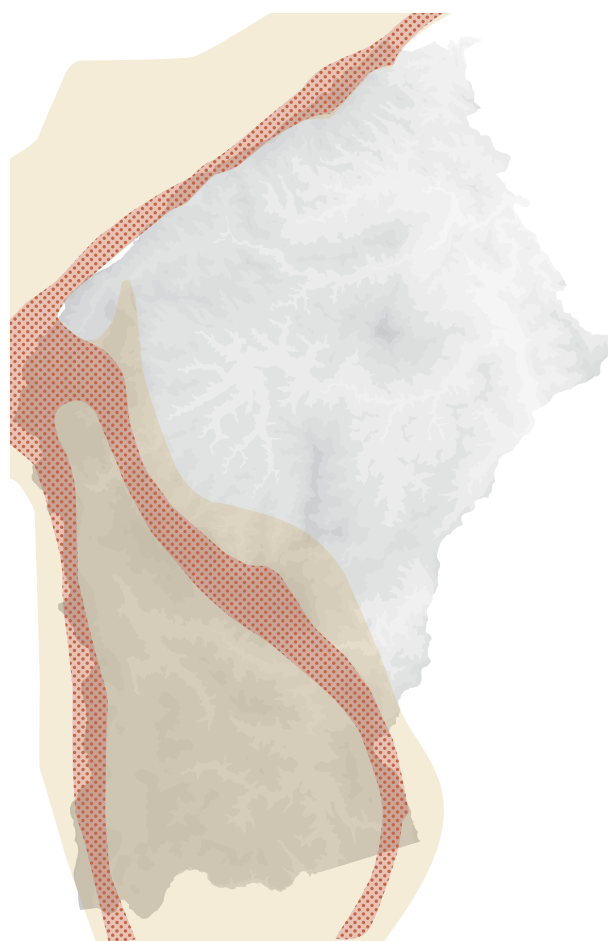


Nature, Urbanisation and Mining

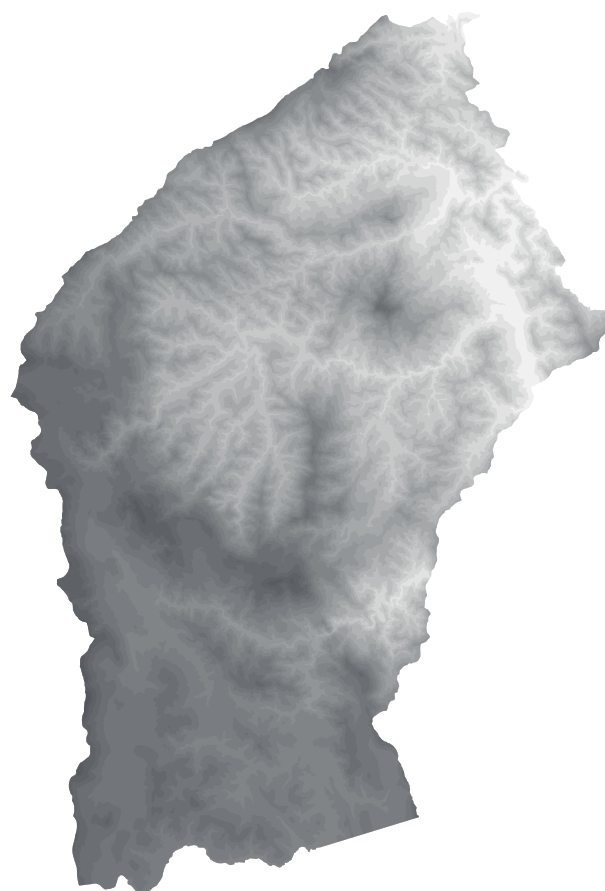
Urbanisation and Mining are the driving forces in the territorial development. The natural conditions are the basis for these developments, but it only acts in a passive role depending on the urbanisation and the mining.

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Geology
 Banded iron formation Minas Supergroup

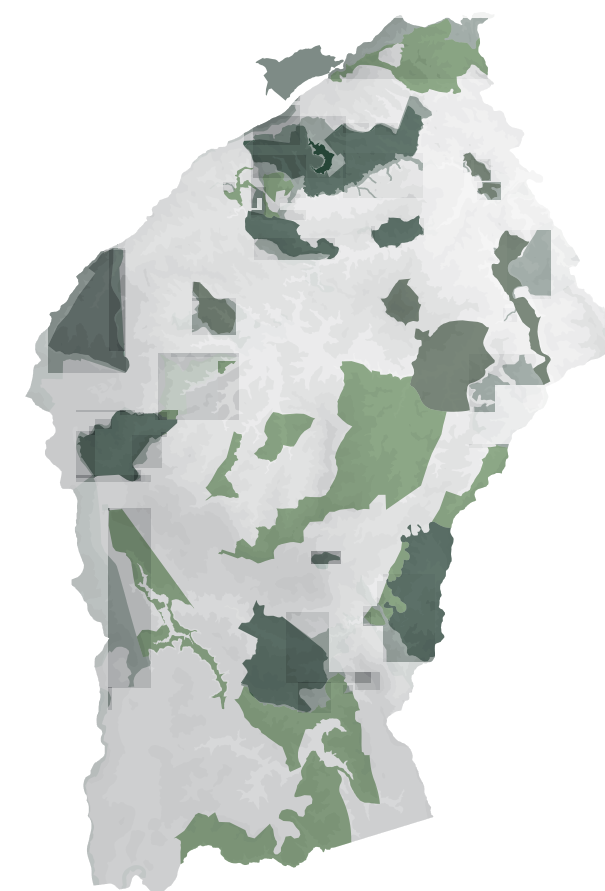


Topography



Water

Rio das Velhas



Vegetation
 Protected nature Area of sustainable use

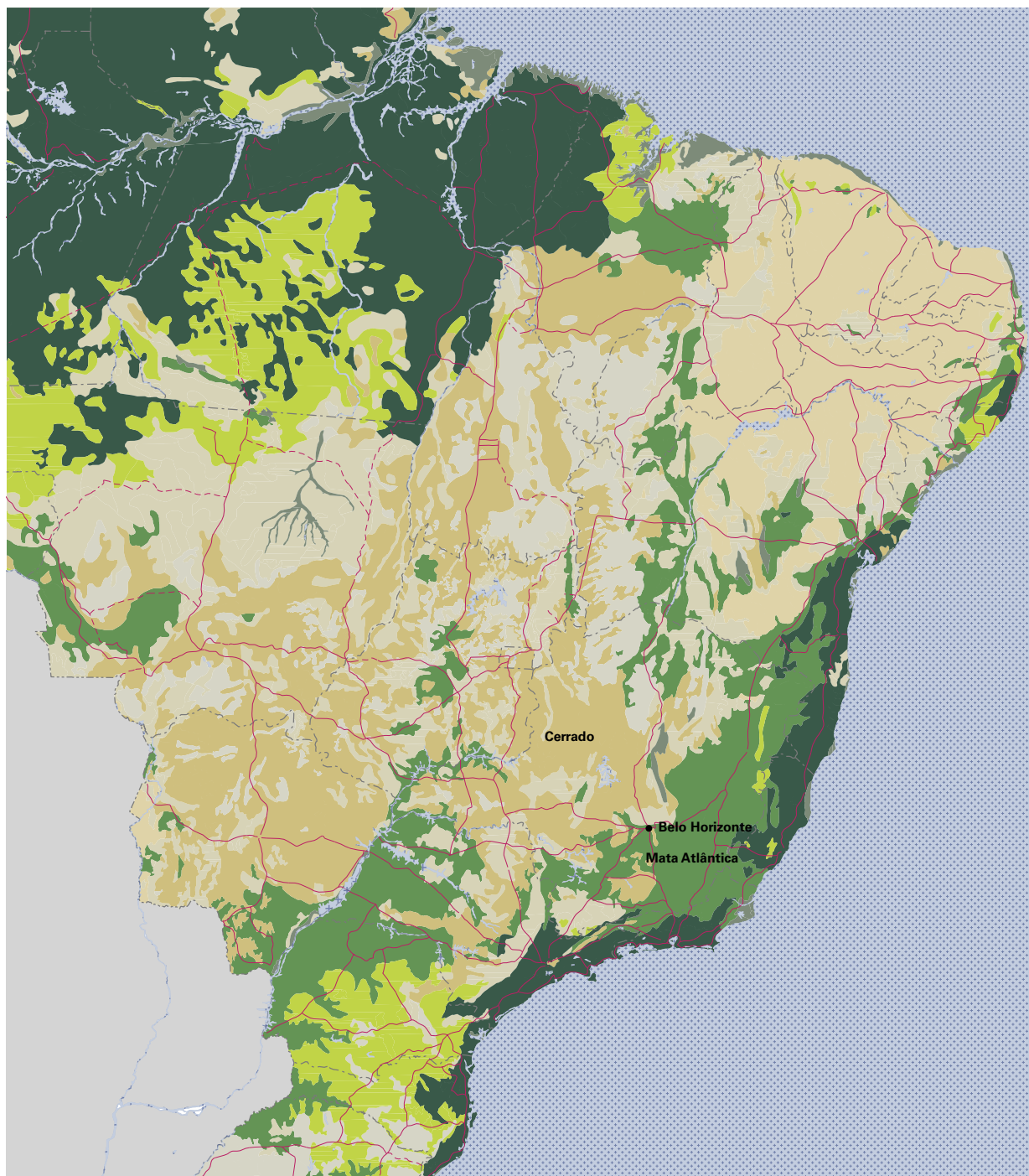
Natural Conditions

The literal foundation of the mining are the geological conditions enabling a profitable extraction of the deposits. Another asset, yet not as monetarily measurable, is the topography that creates stunning views. Numerous springs origin on the bald hills and flow through the forested valleys into the river Rio das Velhas.



The Mineral Veins - Latency of Form

The iron and gold ore deposits occur in the form of veins which are formed by magmatic processes in permeable geological conditions. The metals are also deposited in layers on the rocks.



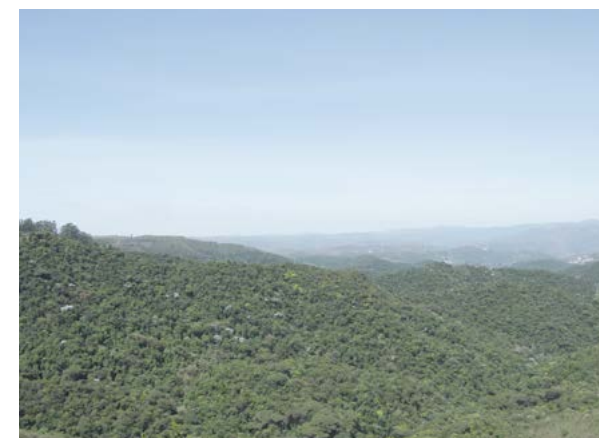
Cerrado

The Cerrado is the Brazilian Savannah and has been the main area of agricultural ambitions. Through the introduction of non-native species and artificial watering, only few original pieces of the Cerrado remain.



Soft Soil Causes Erosion

The typical red soil of Minas Gerais is very soft. This condition in combination with the inclined topography causes the problem erosion on different levels.



Mata Atlântica

The Atlantic Rainforest is the native coastal woodland and a hub of biodiversity. It spans over a large range of altitude and latitude and is more diverse than the rainforest in the Amazonas region.



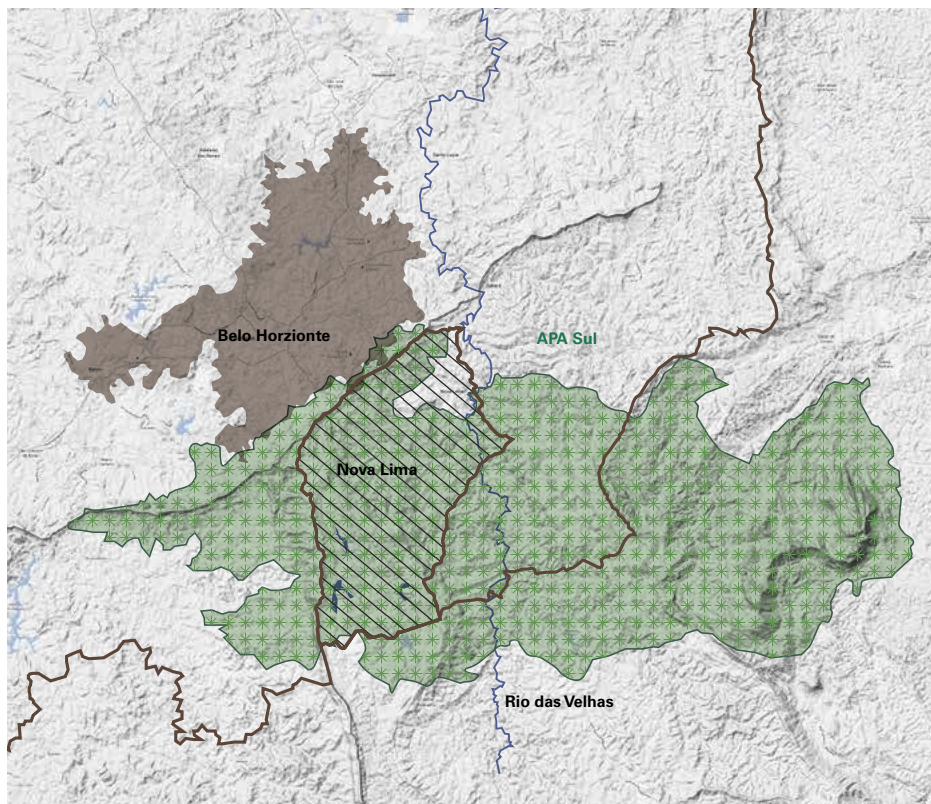
Smooth Ridges

Due to the composition of the ground the incredibly steep ridges are smoothly shaped. The ridges itself are bald with only little vegetation, but the streams in the bottom of the valley feed the forest.

Between Cerrado and Mata Atlântica

Belo Horizonte is located in a very fragile natural environment, the transitional zone of the Cerrado and the Mata Atlântica. The importance of these shrinking natures makes most of the area a zone of environmental protection.





Belo Horizonte's Water Supply

The entire South of Belo Horizonte is a large environmental protection zone, as 70% of Belo Horizonte's water is drawn from this area. The countless streams originate in the hills and finally join the river Rio das Velhas where the water is extracted.



Streams in the Valleys

The small streams that originate in the bald hills are the backbone of the ecosystem. They connect the entire region in this large water system.



Private Reserve of Natural Heritage

A RPPN, a 'Reserva Particular do Patrimônio Natural' is along with a public zone of nature protection the main means to protect the environment and to preserve the ecosystem.



Rio das Velhas as Water Supply

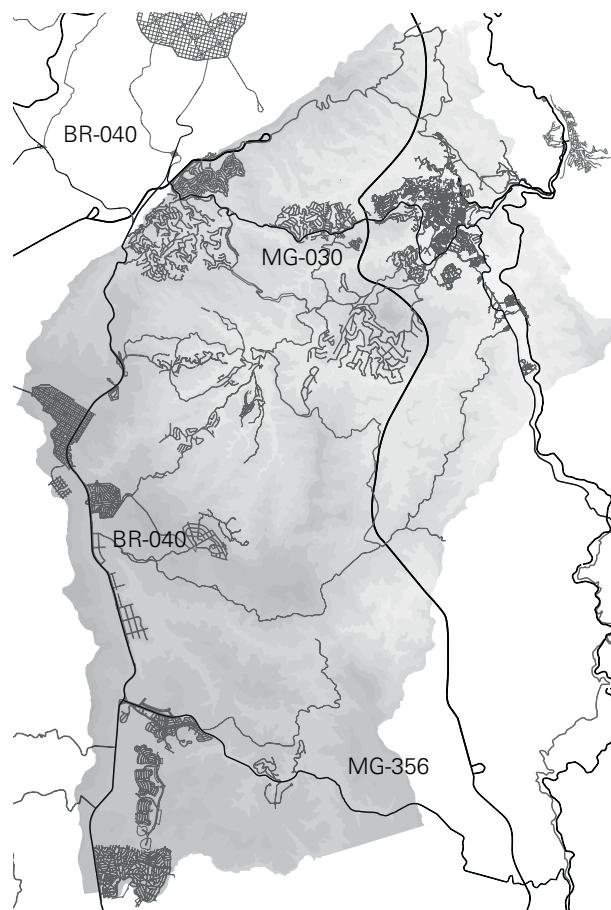
The Rio das Velhas is a vital element of the region. Due to the alluvial gold the first settlements were founded in the gold rush along its shores. As a water supply it remains a crucial element up to this day.



Artificial Lakes

A number of artificial lakes that were built for different reasons occur in and around Belo Horizonte. With the topographical conditions of a valley, the construction of a dam is sufficient for the making of a lake.





Infrastructure



Residential



Commerce



Industry

Urbanisation

Nova Lima stretches over more than 30 kilometres in its north-south direction, but the required time to cross it is in this case more relevant than distance itself. The urbanisation of the municipality is closely linked to the emergence of the car. The federal highway BR 040 and the state highway MG 030 function as urban condensators with a corridor of extensive urbanisation around them. Proximity to one of these roads means linkage to Belo Horizonte.



Industry

In Jardim de Canadá construction businesses and machinery companies form an industrial cluster. Their existence depends on the mining companies as well as the urban expansion.



Infrastructure

Although the urban expansion reaches 30km to the South, the city can be reached by car within 30 minutes. Traffic on the highways is fluent but collapses in Belvedere, the needleeye to Belo Horizonte.



Commerce

Grocery stores for everyday shopping for the condominiums' residents are clustered along the highway and in Jardim de Canadá. Since prices in these stores are unaffordable for local population, there exists a parallel service structure.



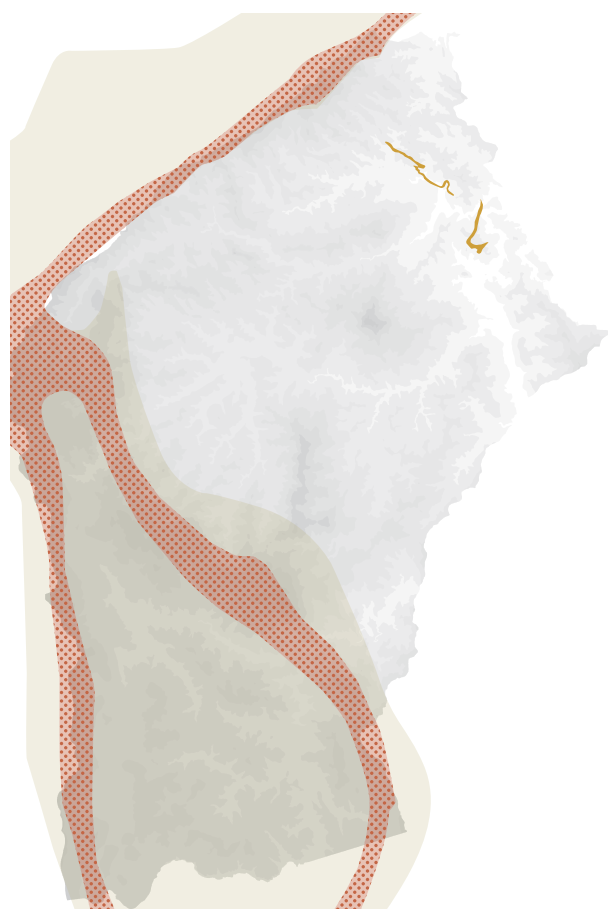
Residential

Due to their natural beauty, the hills in Nova Lima are the preferred location for the Brazilian version of the 'american dream'. The ongoing developments in real-estate are exclusively for the upper-class striving to get out of the city.



Dependency on the Highway

Beyond the federal highway the accessibility decreases quickly. Low maintenance of roads and the challenging topography limit urban expansion oriented to Belo Horizonte to the big roads BR-040 and MG-030.



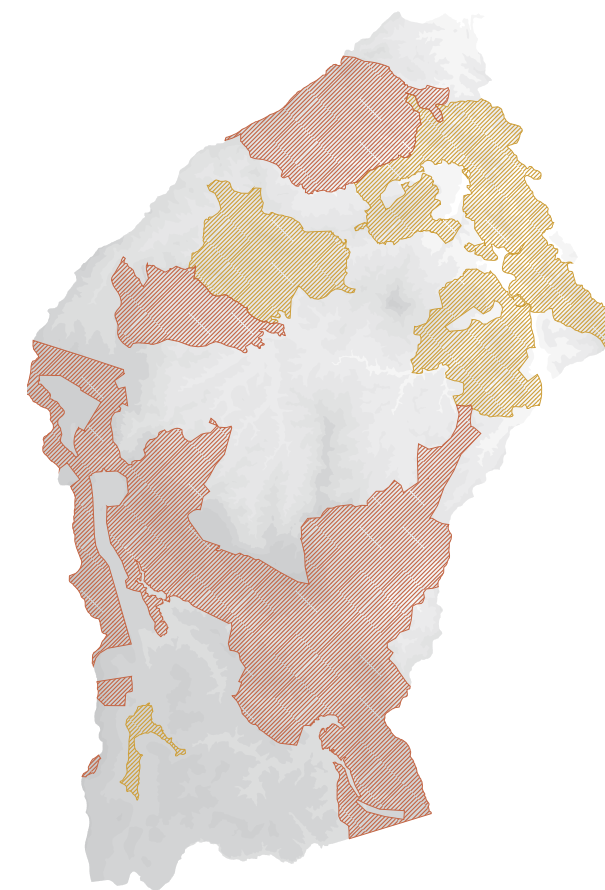
Geological condition
 Banded iron formation Minas Supergroup



Iron ore mines



Gold mines

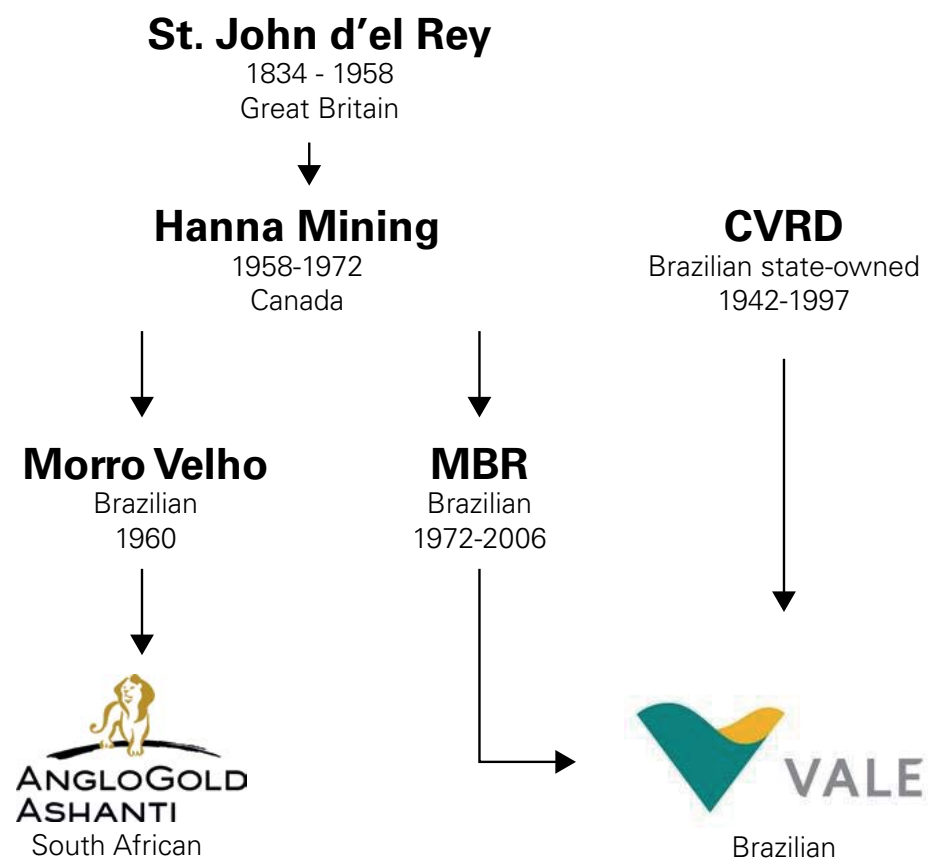


Property
 Vale AngloGold Ashanti

Mining Territory

In the course of their operations in Nova Lima, the St. John d'el Rey company bought large stretches of land, finally owning 65% of the municipality. When the company was sold, the property was divided among the two subsequent companies MBR (today Vale) and Morro Velho (today Anglo Gold Ashanti). They are still the largest landowners in the municipality and own most of the land that is attractive for real-estate.





Territory under Abstract Rule

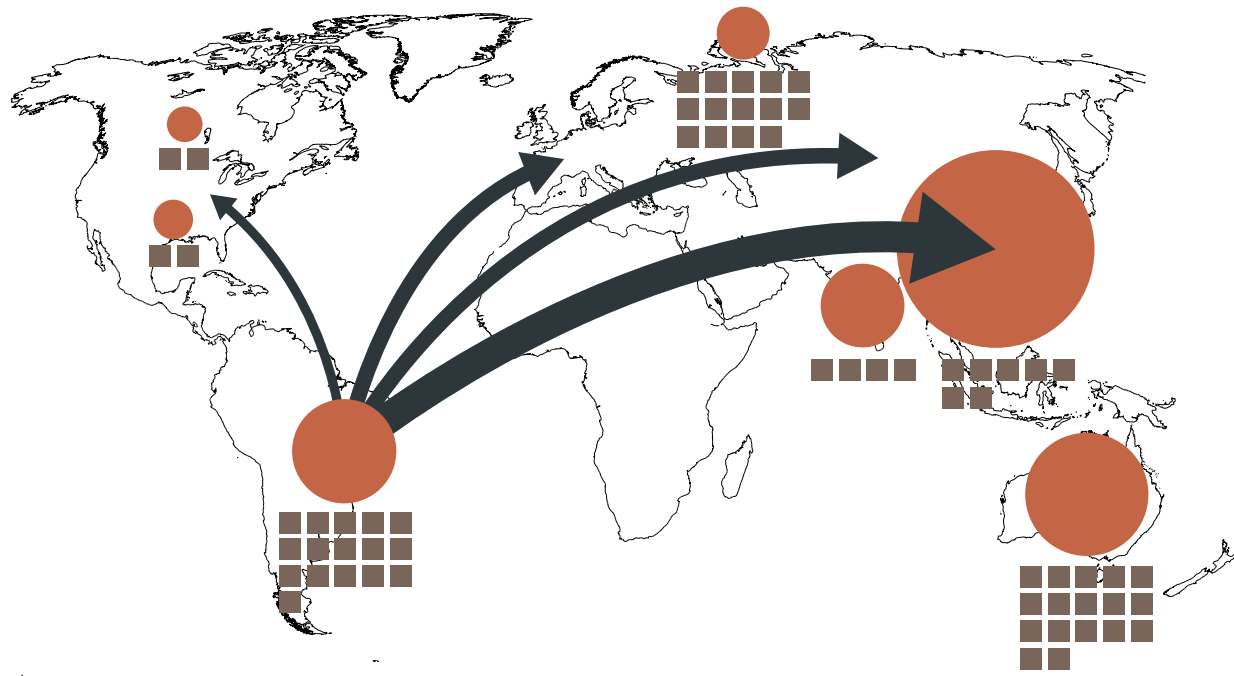
Nova Lima has always been under the influence of mining companies. It is particularly problematic that these companies are either foreign or too large to care for the region other than on an economic basis.



An Urban Fallow on Hold

The climax of gold mining in Nova Lima is over but there is still gold left. A project for a redevelopment of the mining site was commissioned, but will not be realised. Depending on the variation of the gold price in the future, it might be profitable to reopen the mine. The site will therefore remain a fallow.

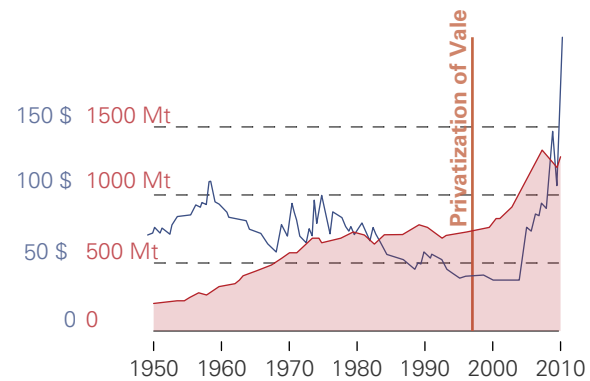




- ➔ Brazilian exports
- Production
- 1 Gigaton iron ore reserves

Global Business

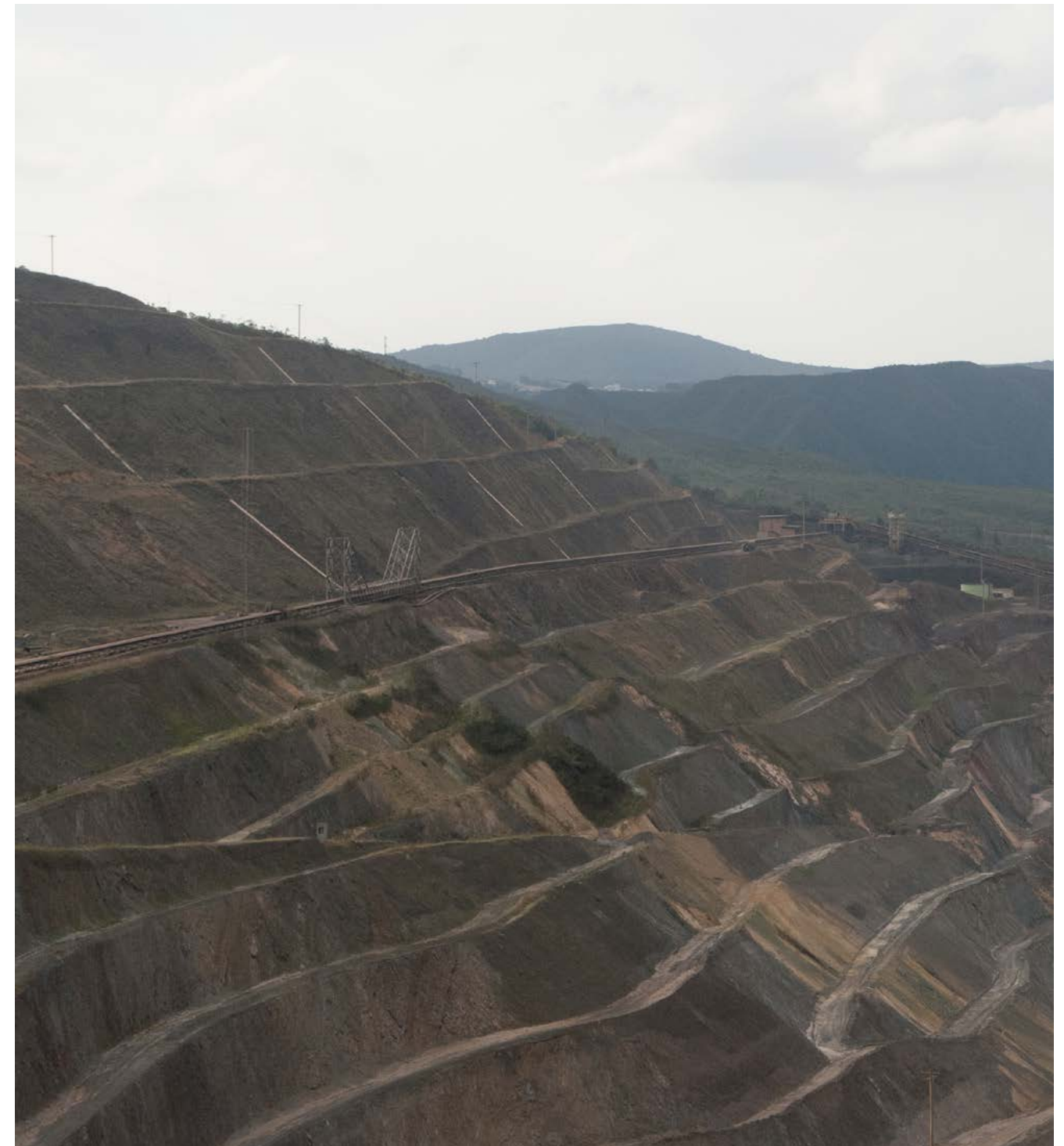
85% of Brazil's iron ore is exported, most of it to China, which is not only the largest producer, but also the largest consumer.



- Demand in megatons per year
- Price in \$ per ton

Global Demand

The demand for iron ore has constantly risen during the postwar years, and since the 2000s demand and prices have exploded due to the Chinese boom. The privatisation of Vale happend at a time when mining was the least profitable.



Incisions on the Landscape

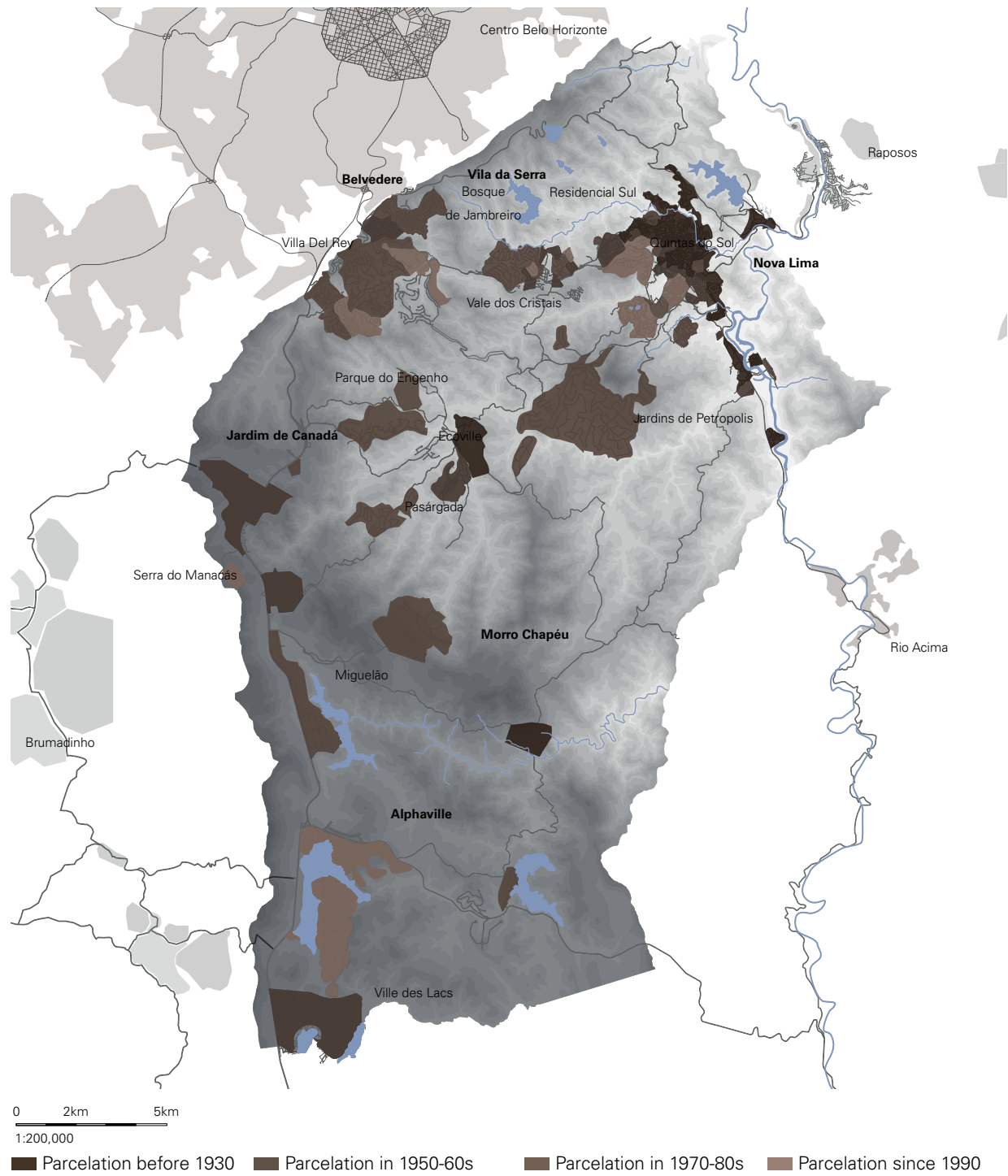
The pits of the mines are confined to a small area. In the production process the geology of the ground is presented and transformed into this sloped form.



MECHANISMS OF URBANISATION

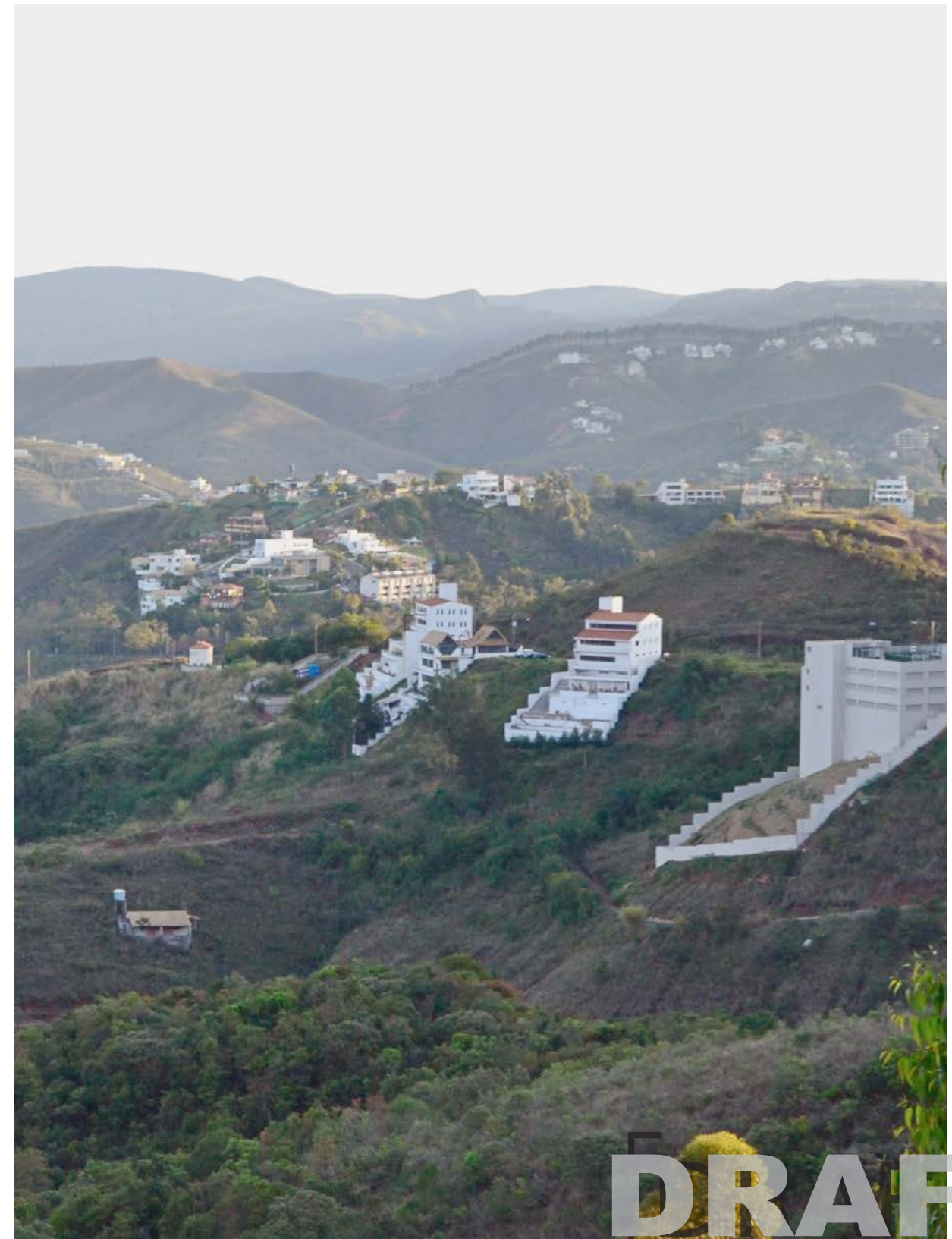
Located in the southern periphery of the Metropolitan Region of Belo Horizonte as part of the Votorantim Sul, one can discover a variety of different types of urbanisation. They range from the historic gold mining town of Nova Lima to scattered condominiums or high-rises on the edge of Belo Horizonte. Each type is shaped by a different driving force, a mechanism, that leads to the resulting development.



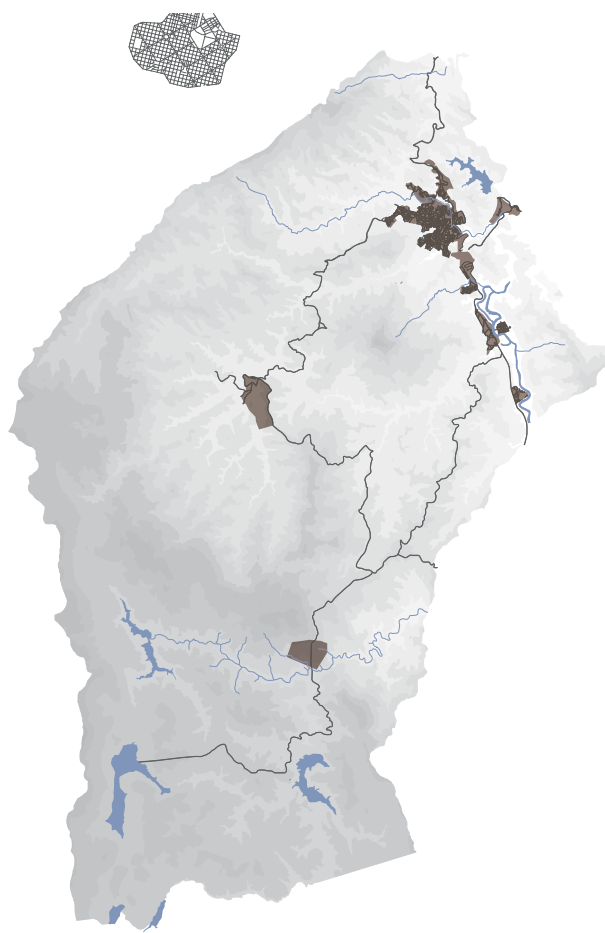


Peripheral Expansion

Over time, the occupation of Nova Lima has passed through different periods of peripheral expansion with the settlements of each period featuring different characteristics. Infrastructure, especially road construction, plays a crucial role in the urbanisation of the hinterland and still remains important for future developments.

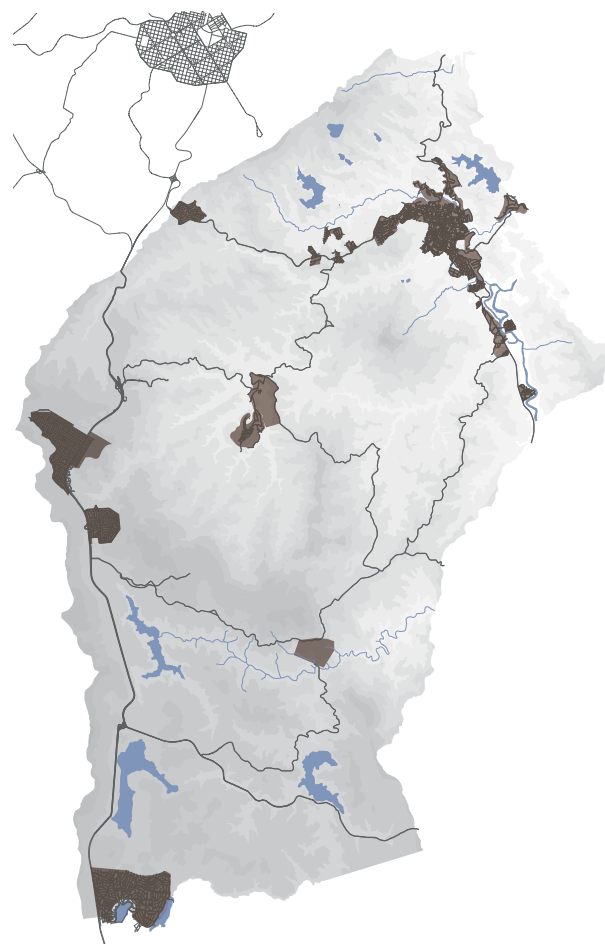


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Until 1930: Dichotomy

Nova Lima's origin lies in the gold mining, whereas Belo Horizonte is founded as the new capital of Minas Gerais in 1897. These different roots along with the natural border Serra do Curral result in a disconnection of the two cities until the 1930s. Before that, Nova Lima has been connected to Ouro Preto and Sabara along the river Rio das Velhas and Belo Horizonte.



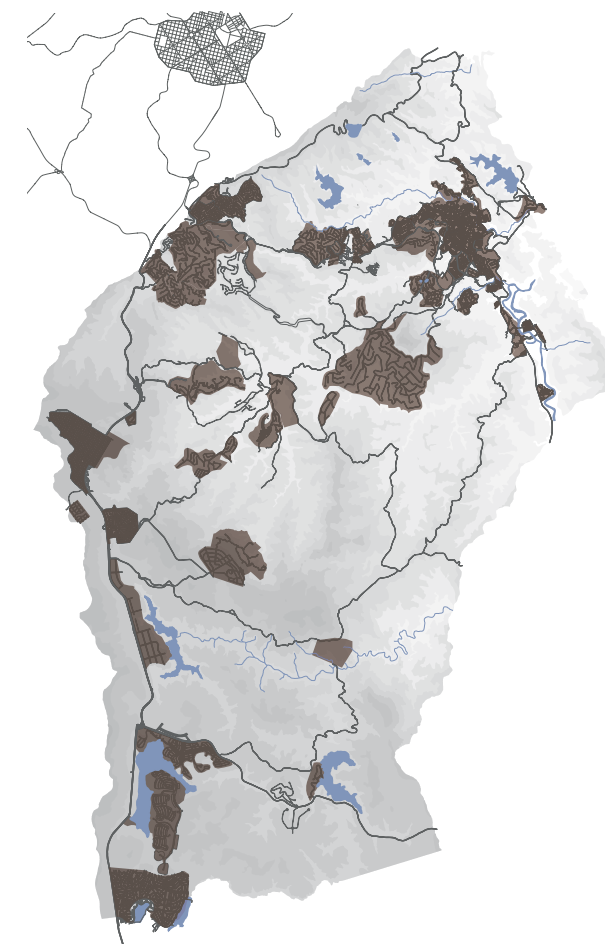
1950-60: Weekend Houses

The increase of mobility with the introduction of cars requires an extension of the road network. Peripheral areas such as Nova Lima are now easily accessible. The scenic nature invites citizens to spend their leisure time there and the first peripheral settlements of weekend houses emerge. Private investors parcelate and develop the land and sell the lots separately.



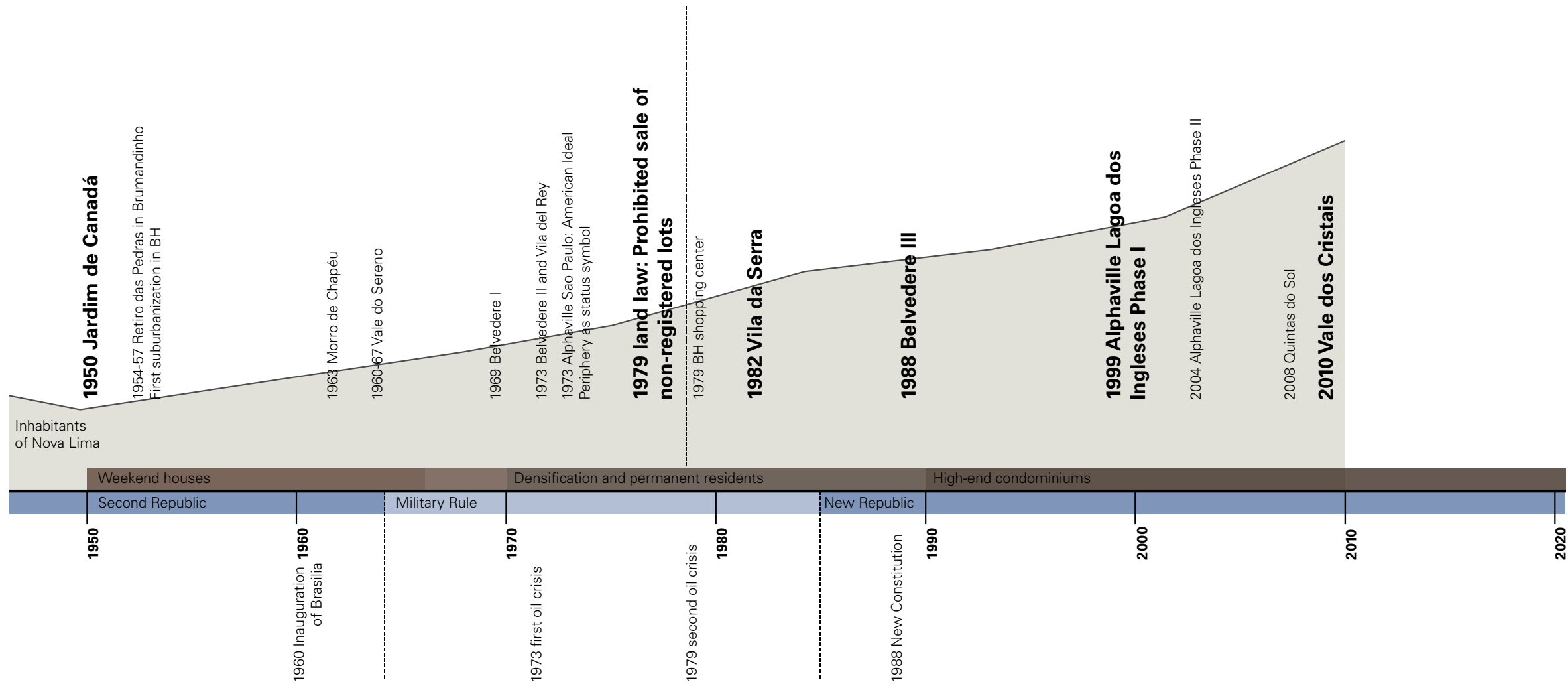
1970-80: Densification

In this period the parcelation of properties increases enormously. The previous only temporarily inhabited weekend houses are slowly transformed into condominiums with permanent residents. The increased and partially uncontrolled parcelation slows down with the legislation of the land law in 1979. However, the majority of the peripheral settlements can be dated back to this period.



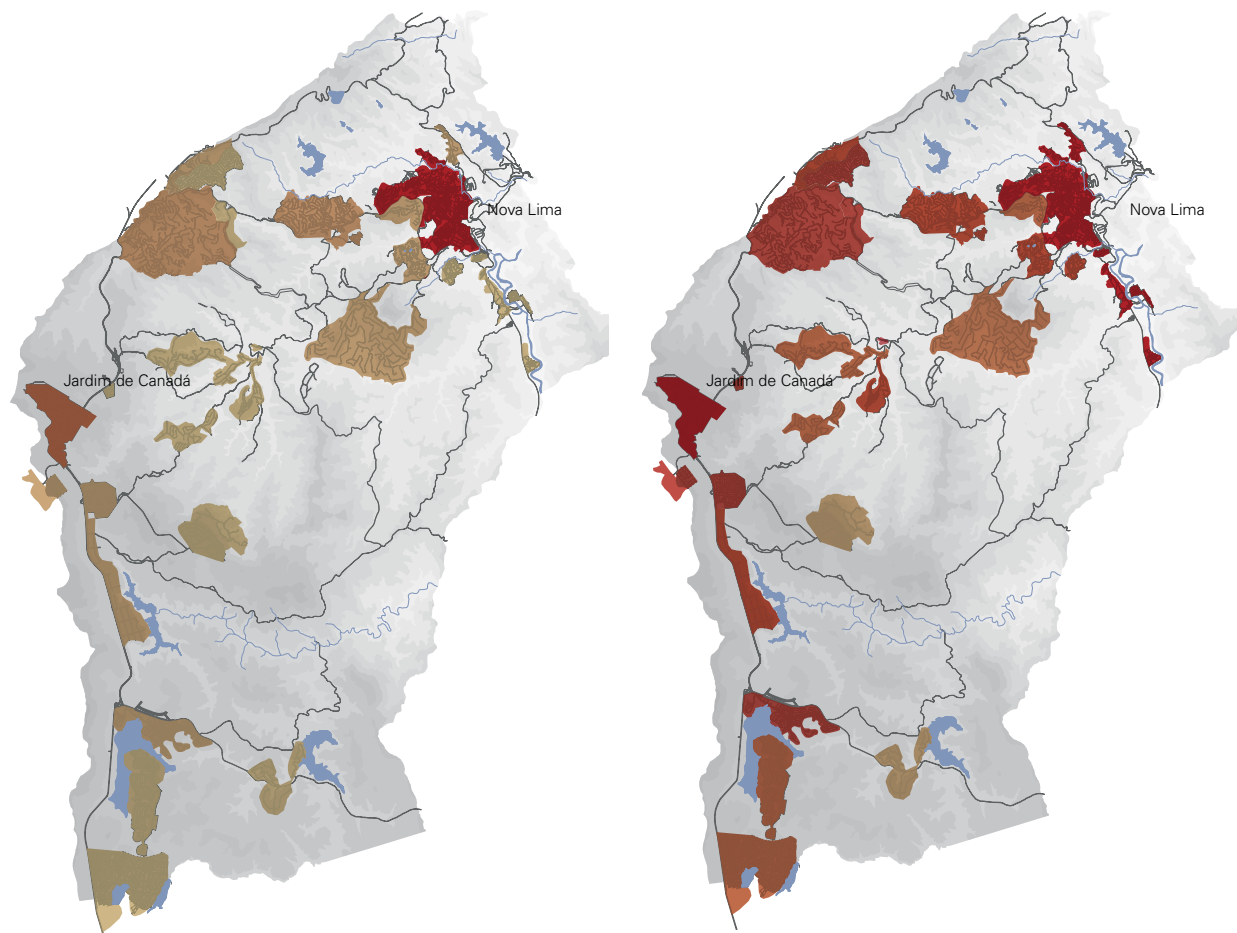
Since 1990: High-End Condominiums

The standard of the converted weekend house condominiums varies, from mixed to high-end. With the land law new parcelations are hindered and therefore only large-scale projects pay off. This goes along with an increasingly high standard of condominiums, rendering the projects very valuable. However, many unoccupied lots remain, leaving space for more residents.



Chronology of Urban Expansion

The increase of the inhabitants of Nova Lima starts around 1950. Taking into account that still more than half of Nova Lima's population lives in the historic city, one is left with a general population growth over time.



- > 1,000 Inhabitants
- 1,000 - 3,000 Inhabitants
- 7,000 - 10,000 Inhabitants
- 40,000-50,000 Inhabitants

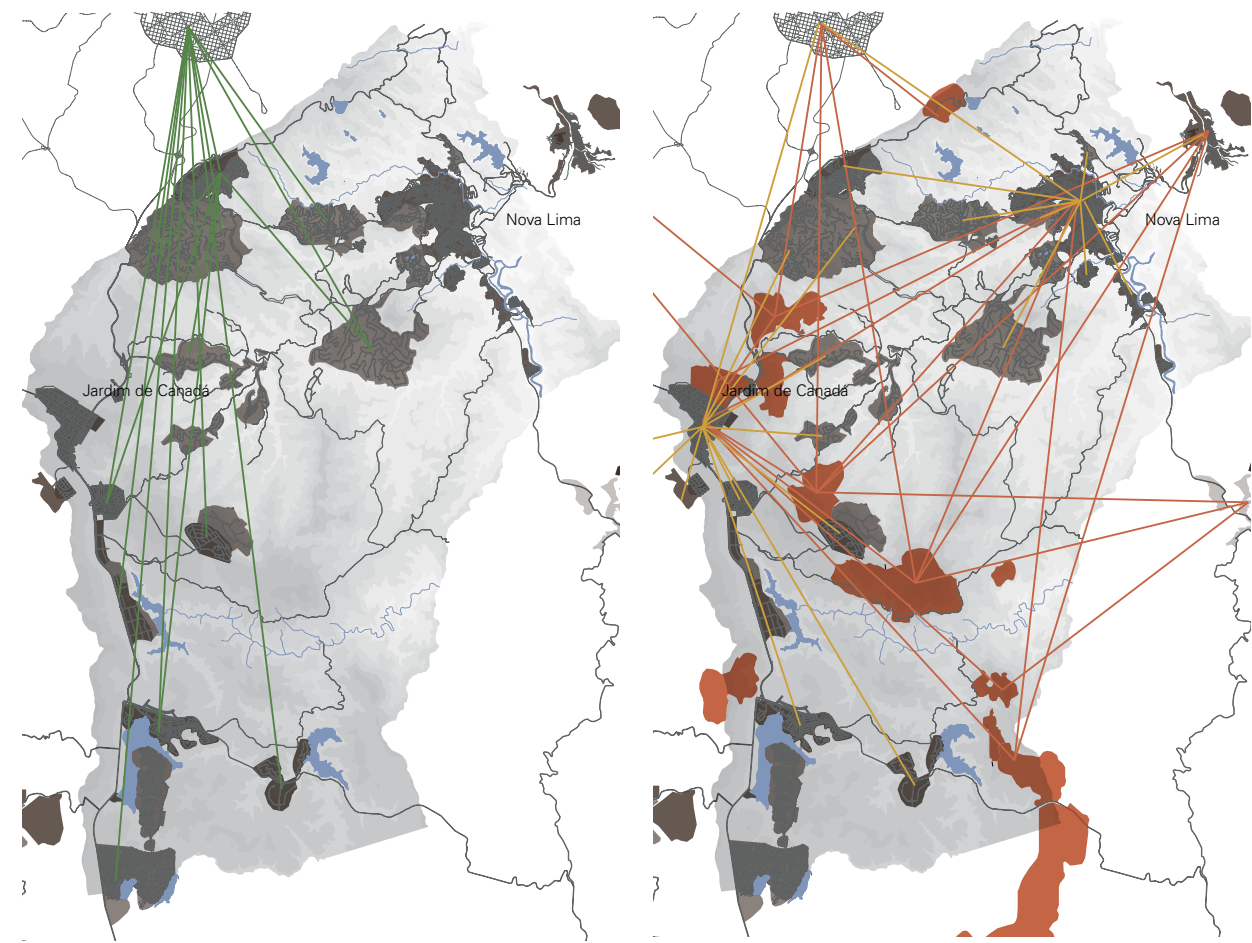
Dual Concentration

The allocation of inhabitants clearly shows a concentration of people in the historic city and Jardim de Canadá. 50,000 out of 80,000 of the entire municipality still live in the historic city. This suggests different types of urbanity between these hotspots and the rest of the municipality.

- 40-50%
- 50-60%
- 60-70%
- 70-80%
- 80-90%
- 90-100%

Permanence of Occupation

The transformation of weekend house settlements to condominiums goes along with a higher percentage of permanent residents. However not all settlements have undergone the same process, some differences still exist. The proximity to a highway appears to support permanent occupation.



— Commuters from condominiums

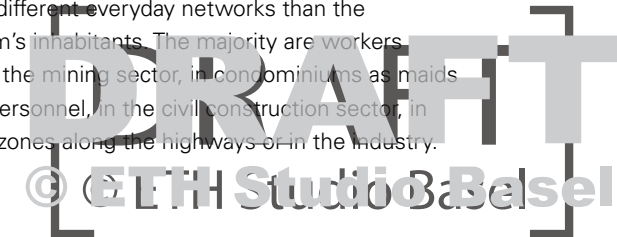
— Commuting Vale employees
— Commuting employees in condominiums

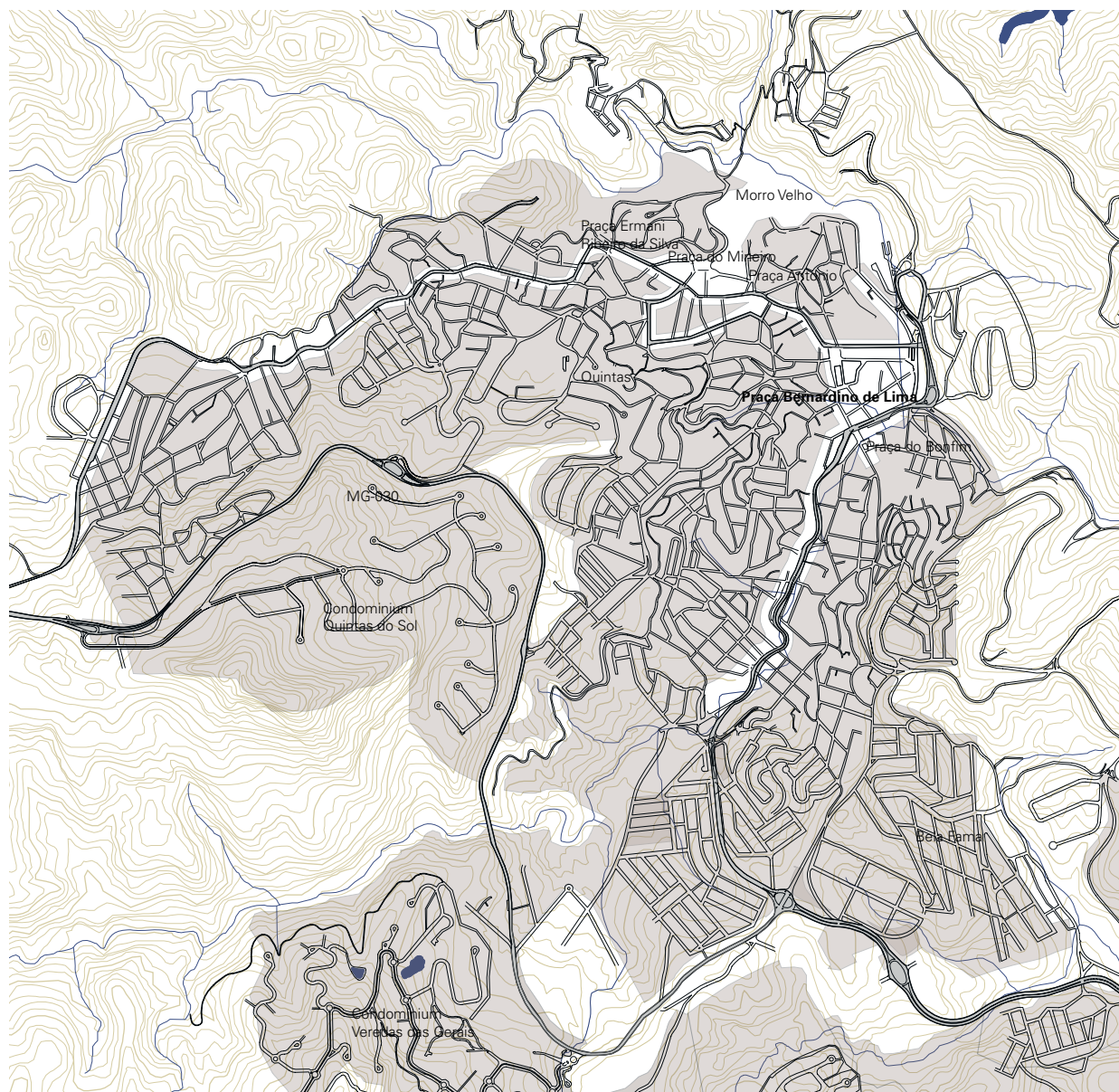
Orientation towards the Centre

The condominium's inhabitants orient their live towards Belo Horizonte. As they tend to be rich, they have access to extensive mobility through cars. The majority work either in Vila da Serra or in the city core. Social contacts, and urban lifestyle are being enjoyed in the centre as well. The condominiums on the other hand provide the excess of space, quietness, access to nature and security. Urbanity is not asked for in the periphery of Nova Lima.

Staying in Nova Lima

Nova Lima and Jardim de Canadá clearly vary from the other settlements in the municipality. Their inhabitants also display different everyday networks than the condominium's inhabitants. The majority are workers employed in the mining sector, in condominiums as maids or security personnel, in the civil construction sector, in commercial zones along the highways or in the industry.

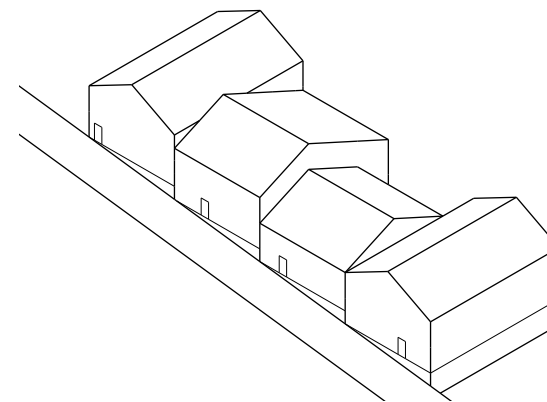
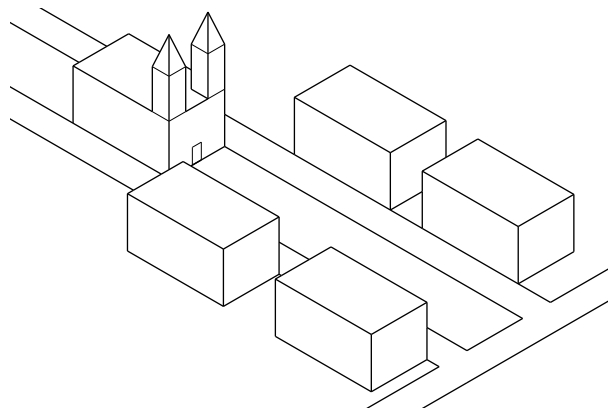




Workers' Home: Nova Lima

Nova Lima's origin lies in the gold mining. This sector is not active anymore but the city's entire past and identity can be traced back to it. The gold mining remnants such as infrastructure or social institutions are still there, some more evident than others. As Nova Lima is almost 300 years old, its structure is organically grown. Within the municipality it is also the only settlement deserving the title city as it offers a certain kind of urbanity with genuine public squares. Historically, Nova Lima has always been a worker's town and this has not changed until today. When the gold mining disappeared, many employees switched to the iron ore mining. Today, industry as well as several commercial zones in the city provide additional employment.



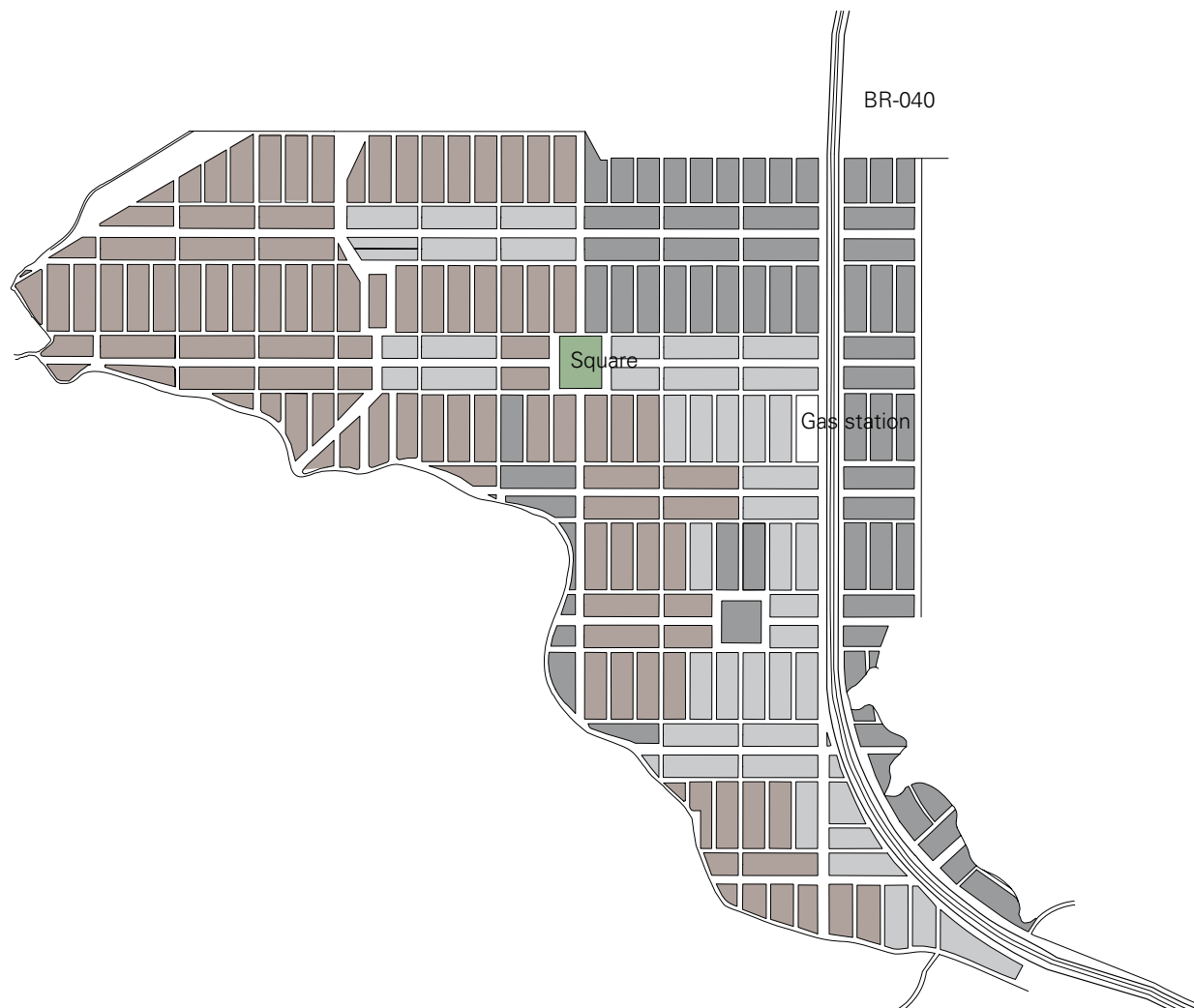


Public Square

The Praça Bernardino de Lima in the heart of Nova Lima is the most important public square in the city. It is a meeting point with public institutions adjacent to it: The administration of the Municipality of Nova Lima, the theatre and the Miner's Syndicate along with commerces seaming the streets.

Town Houses

The typical steep roads are lined with small-scale town houses with only two to three floors. Built side-to-side, they occupy the entire lot, with the exception of occasional backyards. The town house does not provide special precautions regarding security, and a variation of the type accommodates commercial areas on the ground floor.



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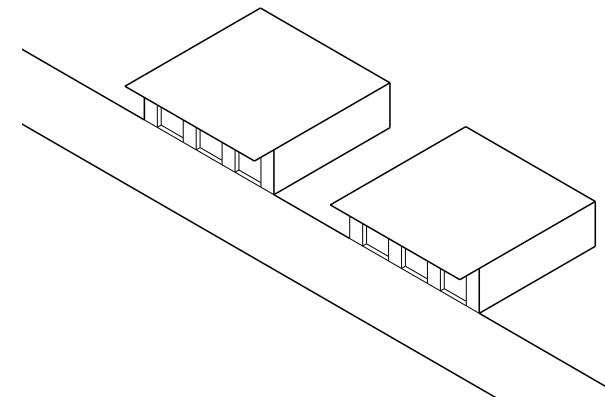
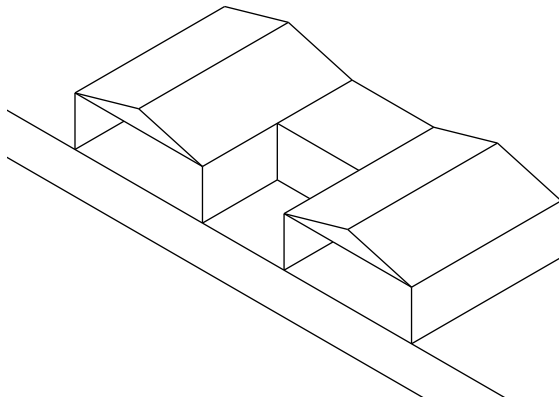
■ Industrial area ■ Commercial area ■ Residential area

Service Node: Jardim de Canadá

The Hanna Mining Group, a descendent company of St. John D’el Rey, with roots in Canada, founded Jardim de Canada in the 1950s as a company town. But the plan did not deliver the expected results and the project develop its own life. As the residential did not work out, commercial and industrial zones were introduced, with concentration along the highway BR-040 around the gas station. And some lots, regardless of their use, still remain empty up to this day.

Nowadays, Jardim de Canadá features a high density of residents. Unlike the majority of the settlements in Nova Lima, Jardim de Canadá is a diverse place with residential, commercial and industrial areas. There is a variety of standards within these different standards, from low to high-end. The customers of the elevated standards live in the condominium, the lower services are consumed by local residents. Jardim de Canadá therefore plays an important part as a service node within the region.





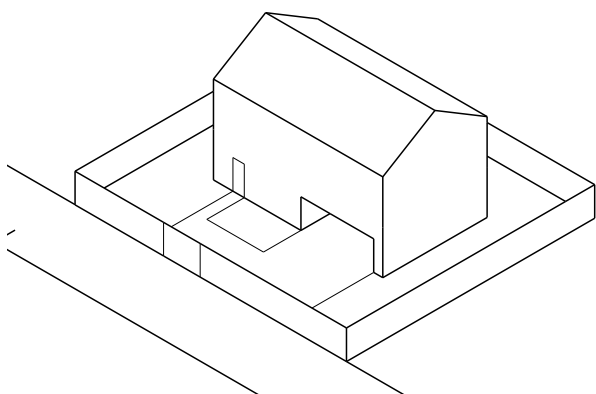
Functional Shed

The industrial zones are located in the north-eastern corner and on the eastern side of the BR-040, such as the factory of the civil construction as well as various international companies. The factories are highly functional buildings, mainly constructed with steel, and adjacent to the street to provide better access for the trucks.

Transit Commerce

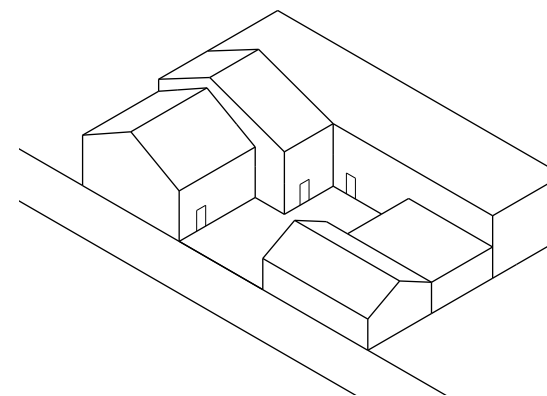
The commercial buildings feature the same functionality as the industrial buildings, but on a different scale. The single-story shops with large windows advertise the product or service. The standard of the buildings are not correlated with the standard they offer, so even a high-end wine store can have a leaking roof.





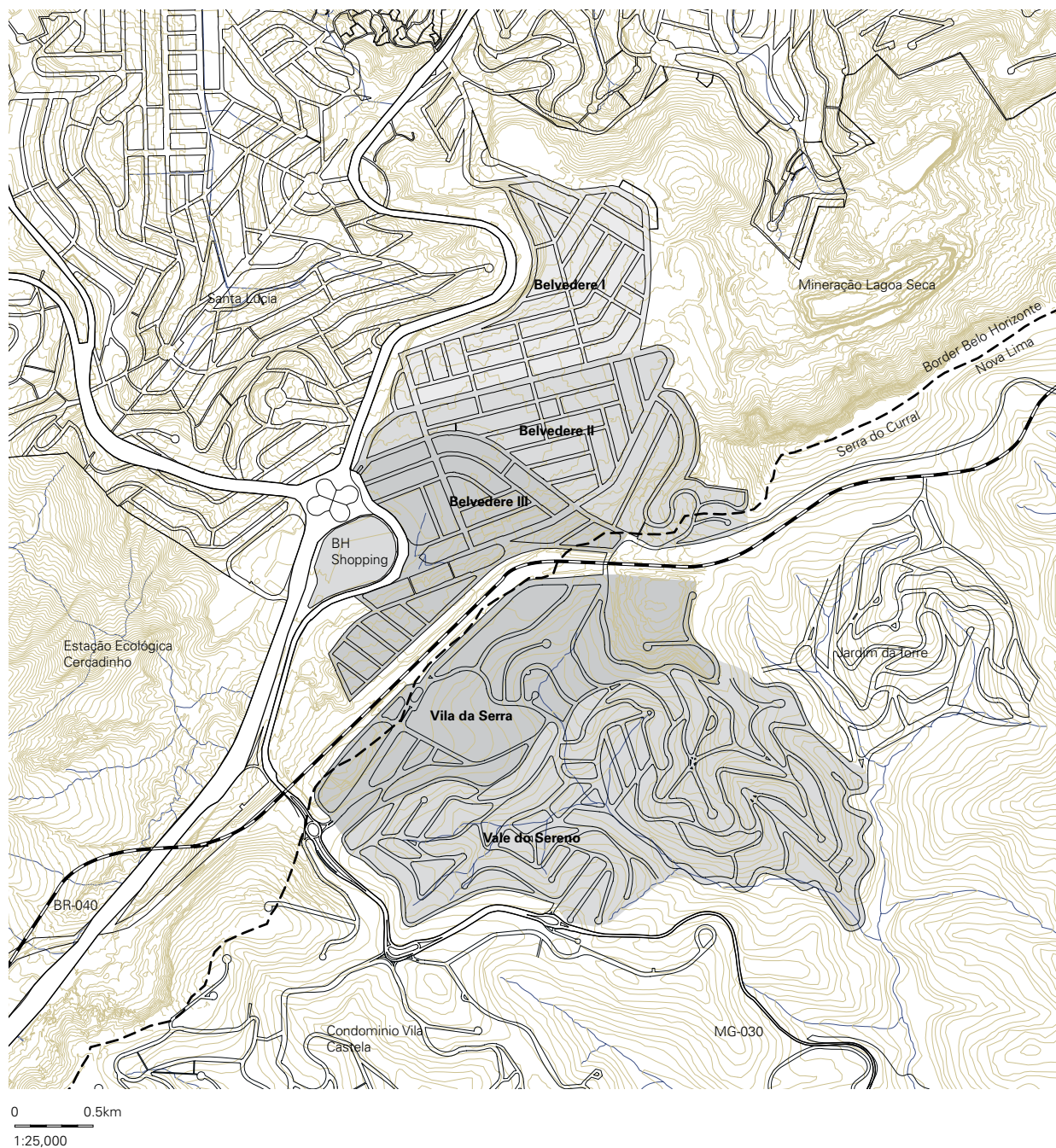
Single Houses

The formal developments in Jardim de Canadá follow the standard type of a single family house around Belo Horizonte. Each residential unit occupies the centre of a lot. The ground floor garage, a small front garden and a fence surrounding the lot complete the type.



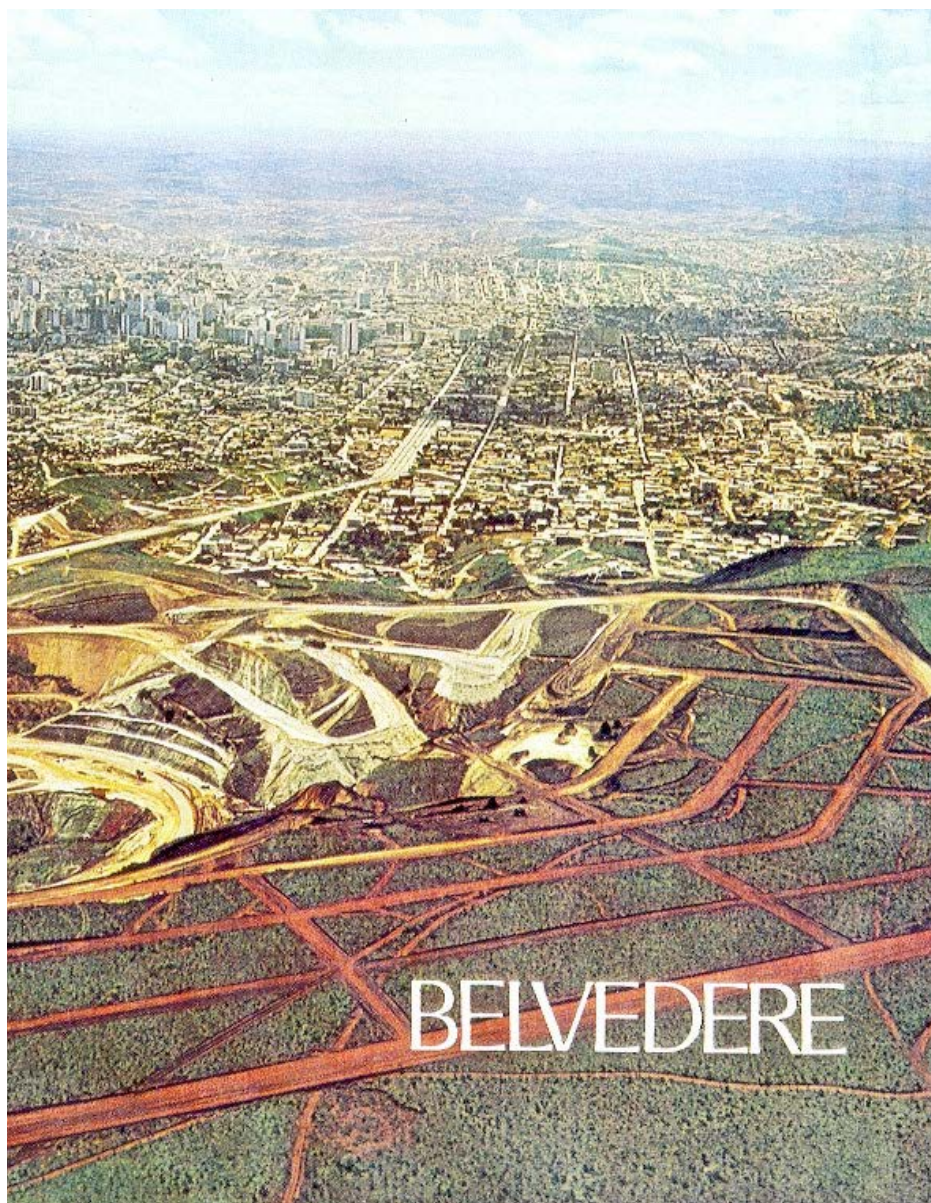
Informal Occupation

Characteristic for the informal areas is the occupation of one single lot with up to four different buildings. The standard, compared with favelas, is relatively high and follows certain rules: If the owner fails to claim back his property within five years, the occupants can claim it as their own if they are able to prove the duration of occupancy.



Spread Across the Border: Belvedere and Vila da Serra

The natural limit to Belo Horizonte's southern expansion is the ridge Serra do Curral. The rich south expansion, the Vetor Sul, slowly approached the ridge and reached its anticline with the construction of Belvedere in 1969. Starting low-rise, the demand for this area remained high and led to the high-rise district of Belvedere III in 1988. BH Shopping, Belo Horizonte's first shopping centre also acted as a catalyst. The desire for high-end apartments do not remain within municipal borders and Vila da Serra, just across the border in Nova Lima, has recently undergone a similar development. Whereas Belvedere is mainly residential, Vila da Serra has a high percentage of commercial areas.



A New District from the Drawing Table

The development of Belvedere I and II was laid out on the drawing table. The insensitive treatment of topography is characteristic for the urban expansion in the Vetor Sul. This advertisement photography from 1971 displays the view over Belo Horizonte, the main selling argument for this new district.



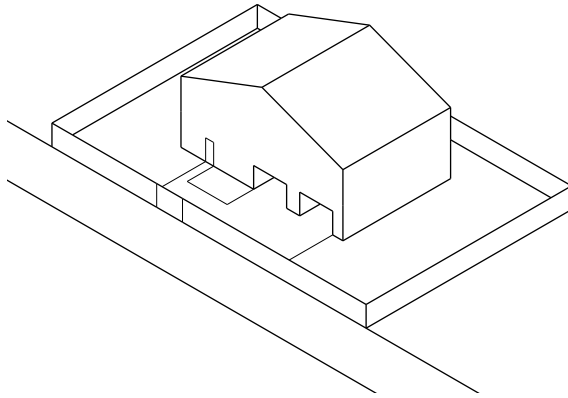
Belvedere

The predominant type of building in Belvedere is the apartment tower. With the construction that started in 1988, the appearance of the towers were built in different times and thus offer a varied street space. The street itself is often lined with trees and sidewalks provides a certain urban quality.



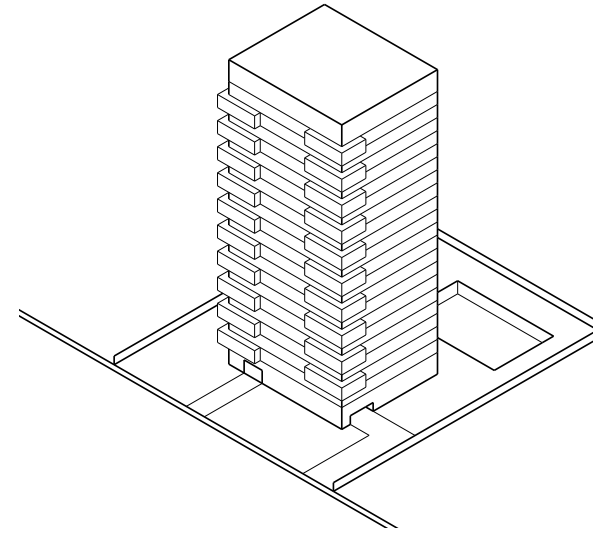
Vila da Serra

In contrast to Belvedere, the claim for architectural quality appears to have totally vanished in Vila da Serra. The entire district was constructed in the last 10 to 15 years with the result of a uniform appearance. The streets are seamed with windowless walls instead of trees.



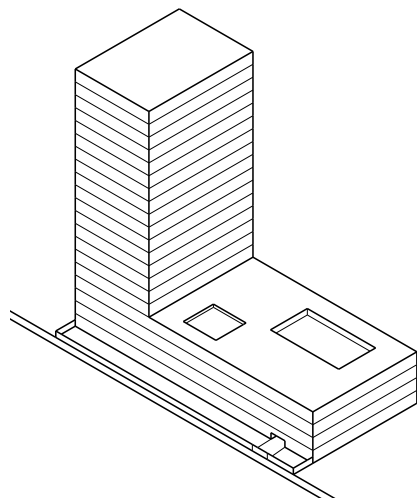
Single Houses in Belvedere I + II

Each residential unit occupies one lot with a maximum of three floors. The ground floor garage, a small front garden and the fence around the lot complete this prototype of a house. It appears all over the Metropolitan Region of Belo Horizonte in different variations. The Belvedere version is comparably generous.



Apartment Tower in Belvedere III

The high demand for residential property in Belvedere result in a higher density: The apartments are piled. A concierge guards the entrance providing the requested security, cars are parked underground or on the street. The buildings, despite being skyscrapers, offer a certain claim for architectural quality.



Resort Tower in Vila da Serra

Across the border, Belvedere's apartment tower is transformed into a joystick typology. The allocation of functions is distributed in a much more pragmatic way: The fourstoried-box fills the entire lot, containing parking and the shared facilities such as pool and gym. The apartments outgrow the box, overlooking the leisure landscape.

Investor

Investments in land and planning,
Marketing and
Rate of return

Architect

Development of architectural
Project, submission of
Building permission.

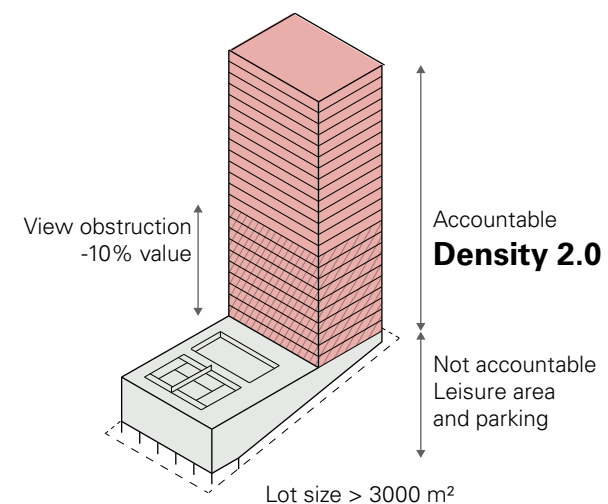
Constructor

Simplification of the project
Reduction of costs and
Architectural language



The Token Architect

The architects' role in the construction process of a high-value building is merely to pass the legal requirements. After having achieved this, the project is handed over to a constructor replacing many parts of the project with standardized solutions to maximise profitability.



Vertical Density - Horizontal Redundance

In the calculation of density only the apartments are counted, the parking and leisure substructures are left out. Economically and in terms of functionality this substructure is very practical, but from an urbanistic point of view they form barricades and increase anonymity.

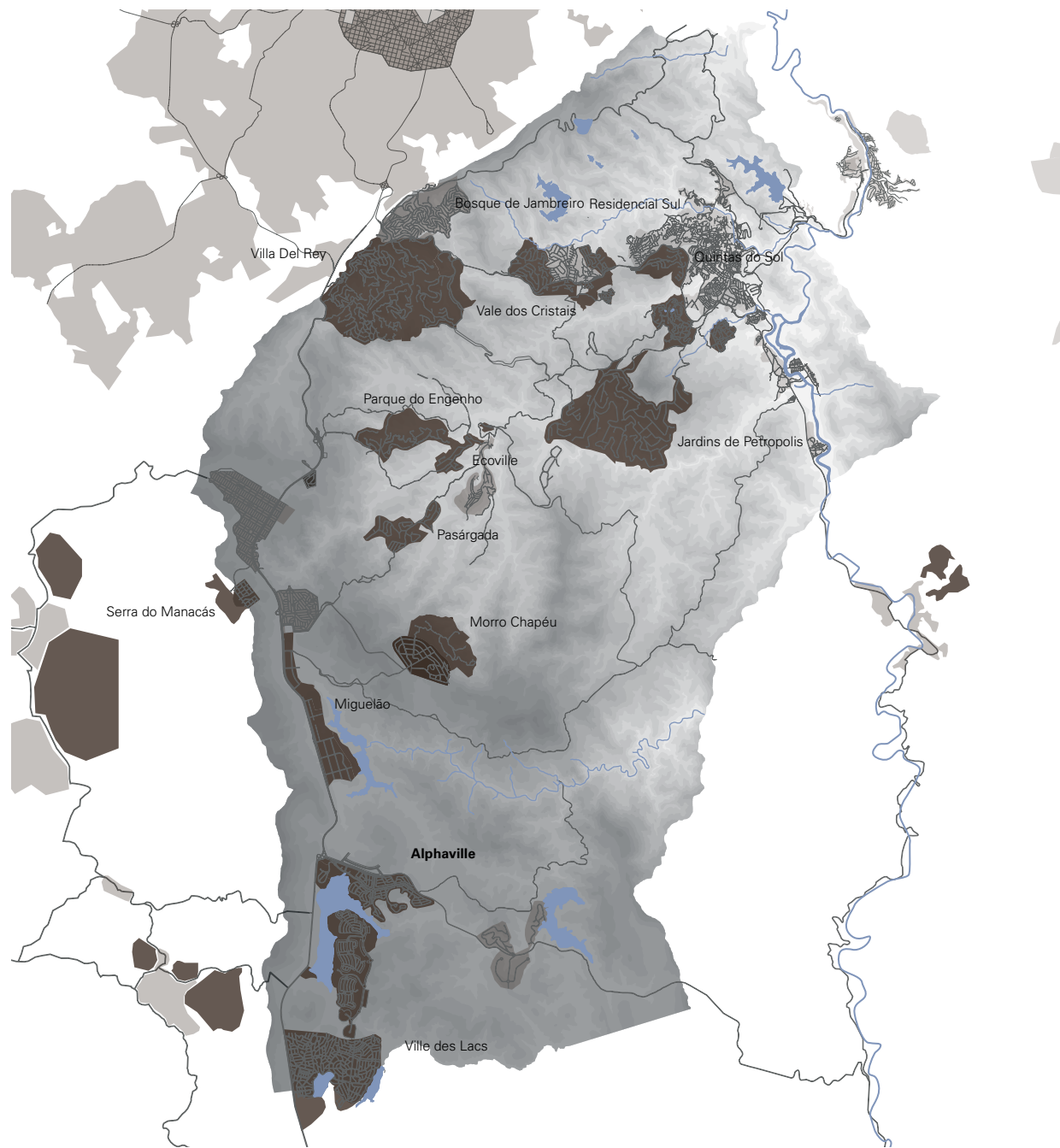


Junkspace Urbanity

The total lack of any affiliation between the buildings leads to the incidental but deliberate creation of junkspaces without any possibility of a formal use. In Nova Lima these areas are wilfully ignored for the benefit of additional tax income.

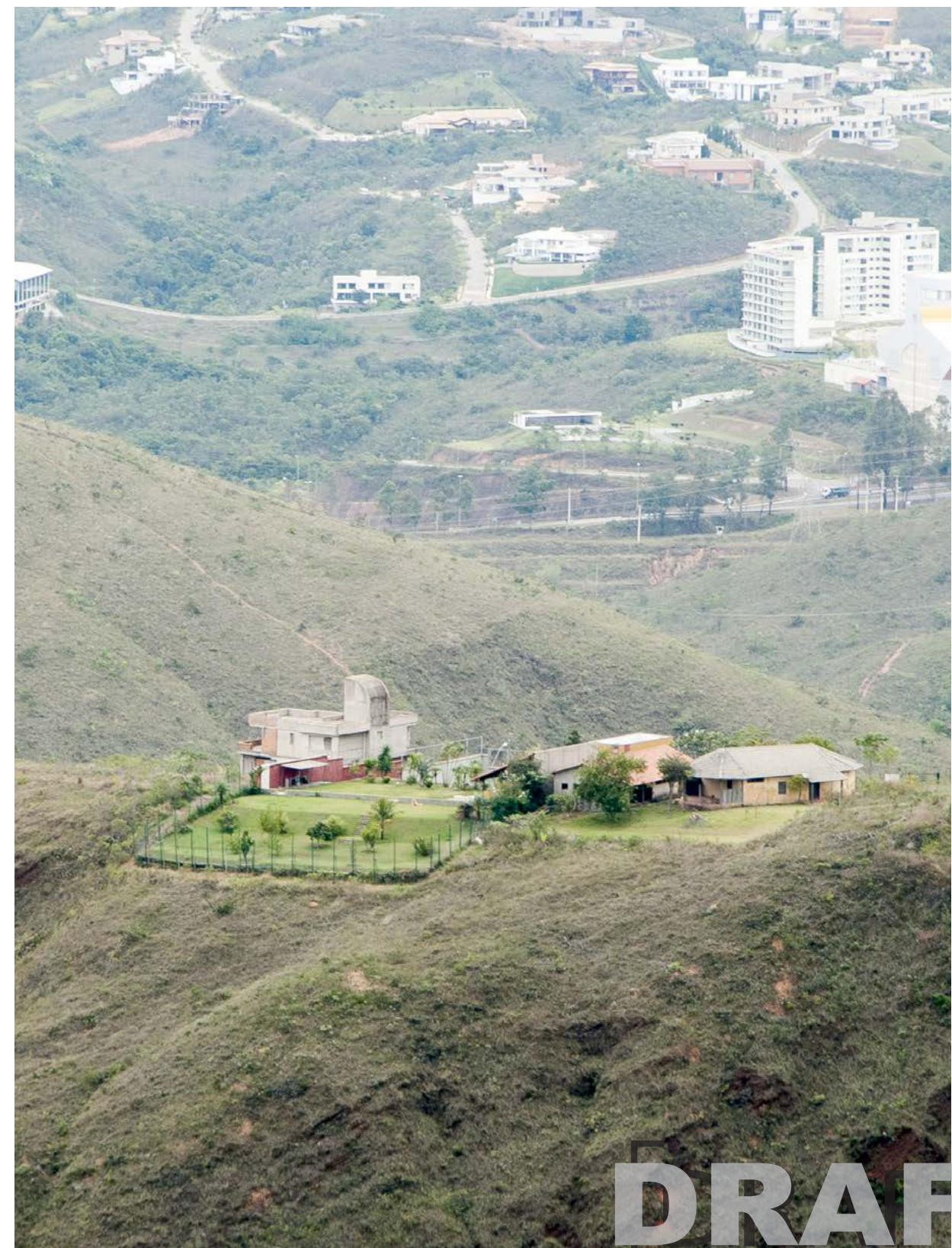






Scattered Condominiums: Alphaville

Many condominiums are scattered across Nova Lima, differing in size, shape and background: Previous weekend house settlements or recent profitable high-end real-estate projects. Despite their differences they are all gated, peripheral, expensive and illegal. Their density is low, and many lots remain unoccupied remaining an investment for years. The proximity to nature and a stunning view are integral parts of this lifestyle, resulting in an a for condominiums characterisitc occupation of the top of the ridge.



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0 0.2km 0.5km
1:30,000

- | | |
|-------------------|--------------|
| 1 Nautical Club | 4 Townhouses |
| 2 Mercure Hotel | 5 Yacht Club |
| 3 Business School | |

Alphaville

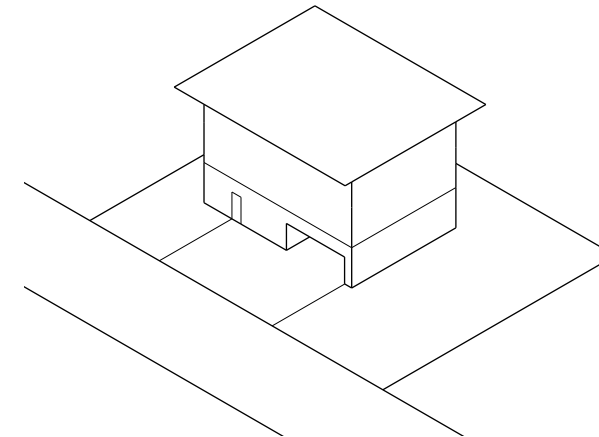
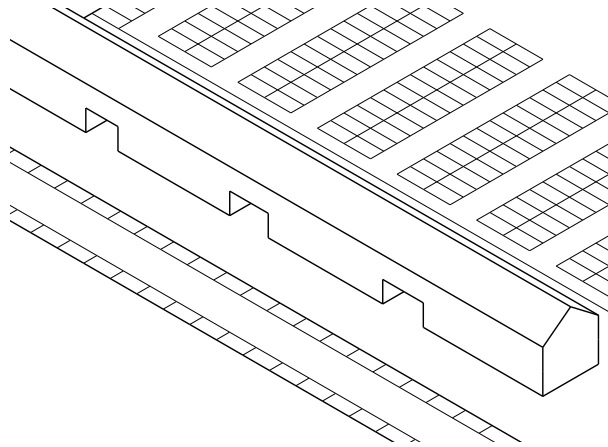
The Lagoa dos Ingleses, an artificial lake from the gold mining, is the heart of this condominium. In 1998, a private investor collaborated with the brand Alphaville. The infrastructure was first installed and the construction of houses started in 2000. The second phase, Alphaville II started in 2004. The lake itself is still property of AngloGold Ashanti and only the yacht and nautical club have the permission of accessibility.



Several Condominiums Around a Lake

The structure works as follows: The administration and the mall are the central areas and the residential areas are split up into several more or less independent condominiums as well as the business school and the hotel.





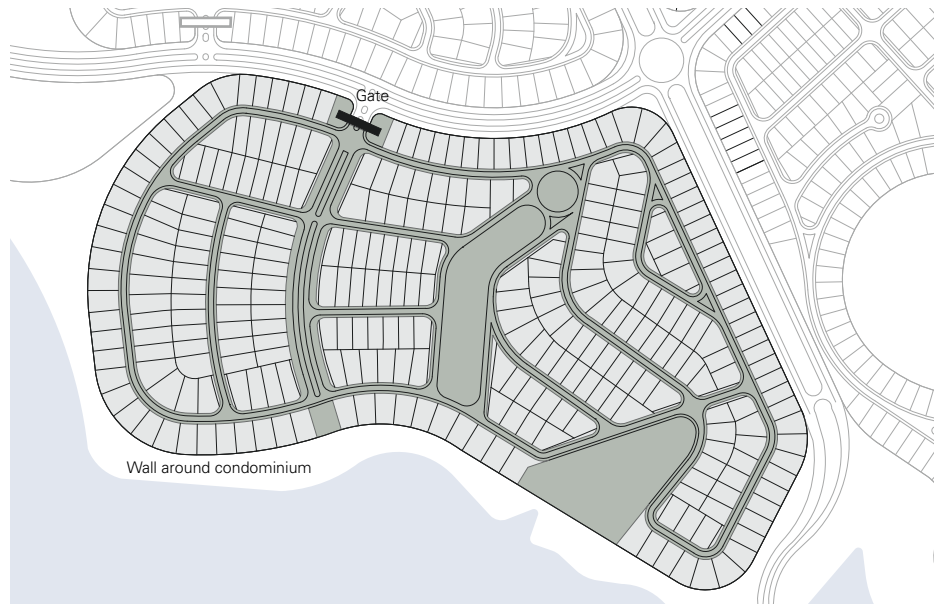
New Urbanism Mall

The entrance zone of Alphaville consists of a mall and an administration complex. The idea of a public urban space is the inspiration for this area. However, one experiences zero urbanity, as it is a highly privatized and protected space. The design by the American SWA group, who laid out the scheme for the entire Alphaville, has the appearance of an american version of the Toscana.

Luxurious Single House

Each condominium is gated and protected with a wall. This variation of the standard single house type therefore misses the surrounding fence. The standards are above average and exhibit individualism with special features such as a pools.



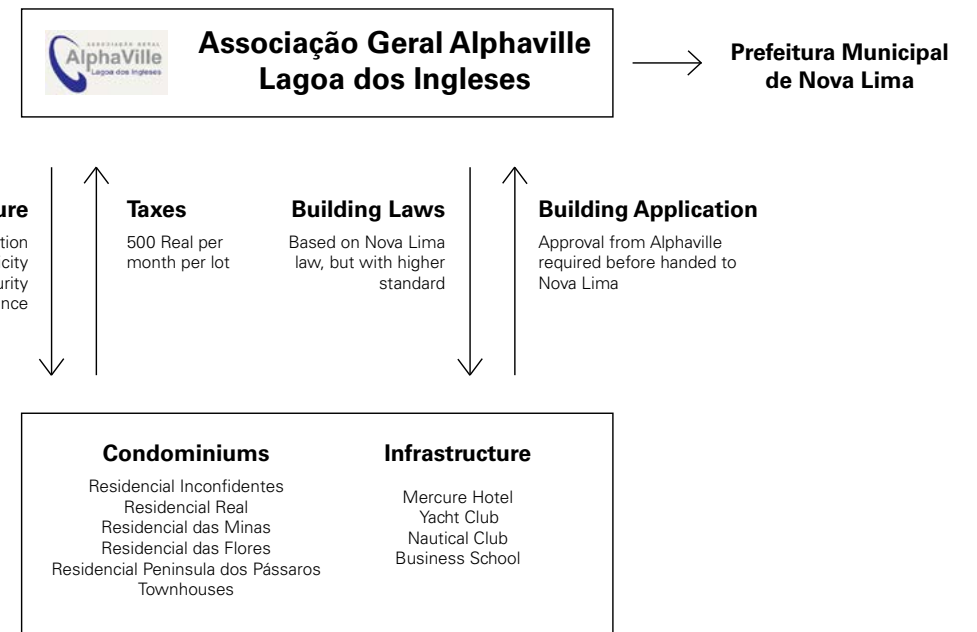


■ Gated public property ■ Gated private property



Illegally Gated Public Space

When a new condominium is parcelated, around 35 percent of the area such as streets and common spaces go into the municipalities' hand and therefore have to be publicly accessible. This law makes a gated community illegal, but in practice the condominium maintains the communal areas and closes them.



The Condominiums Take over Municipal Duties

The association Alphaville developed the entire condominium. As they constructed the infrastructure such as streets, water supply and sewage and electricity, they require taxes for this service. Included are also the security services, the bus line to Belo Horizonte and the maintenance of shared facilities. Regarding the building application, the documents need to be approved by Alphaville before handing them over to the municipality. But in reality they cannot disapprove of a project. The Alphaville therefore takes a role in between the residents and the municipality.





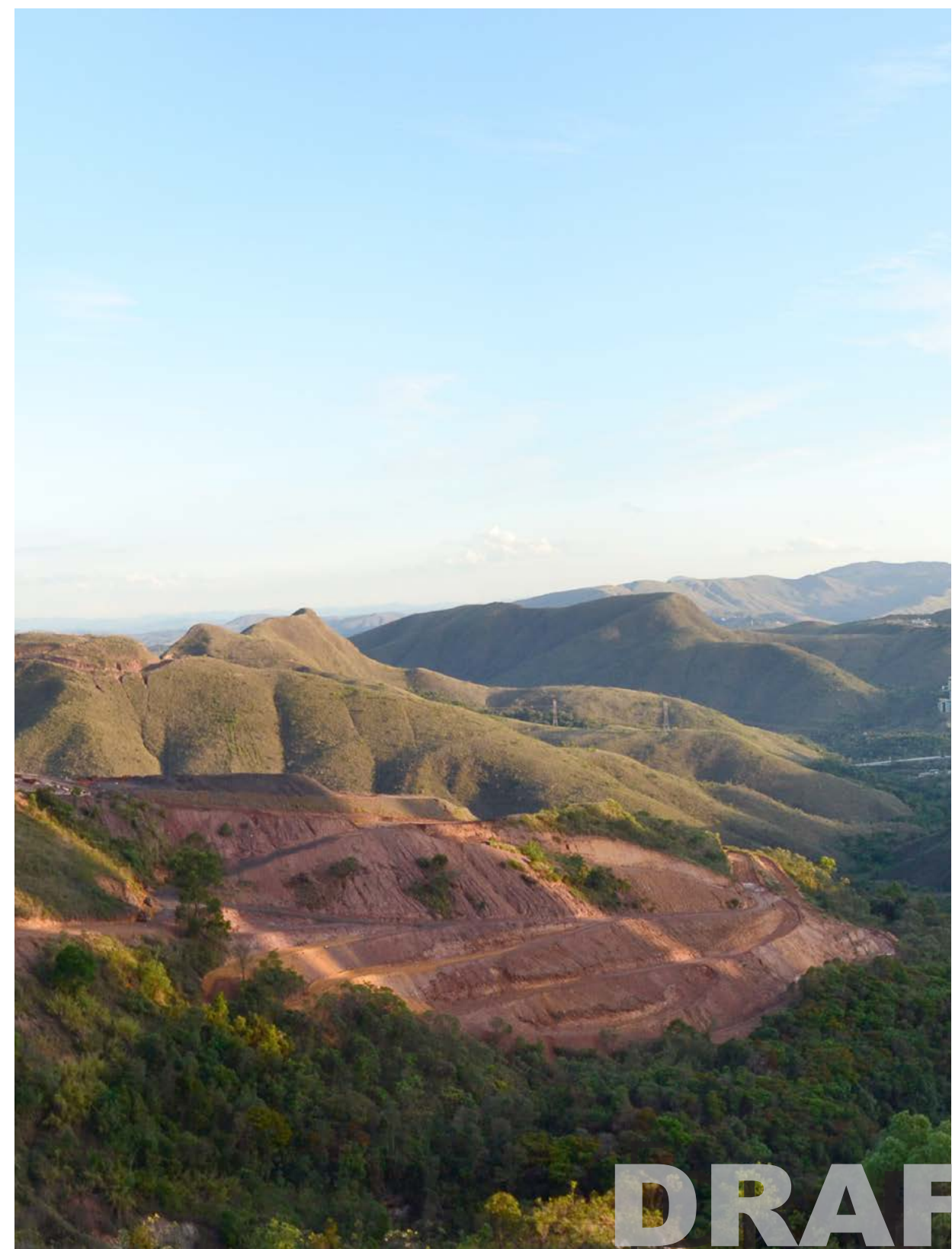
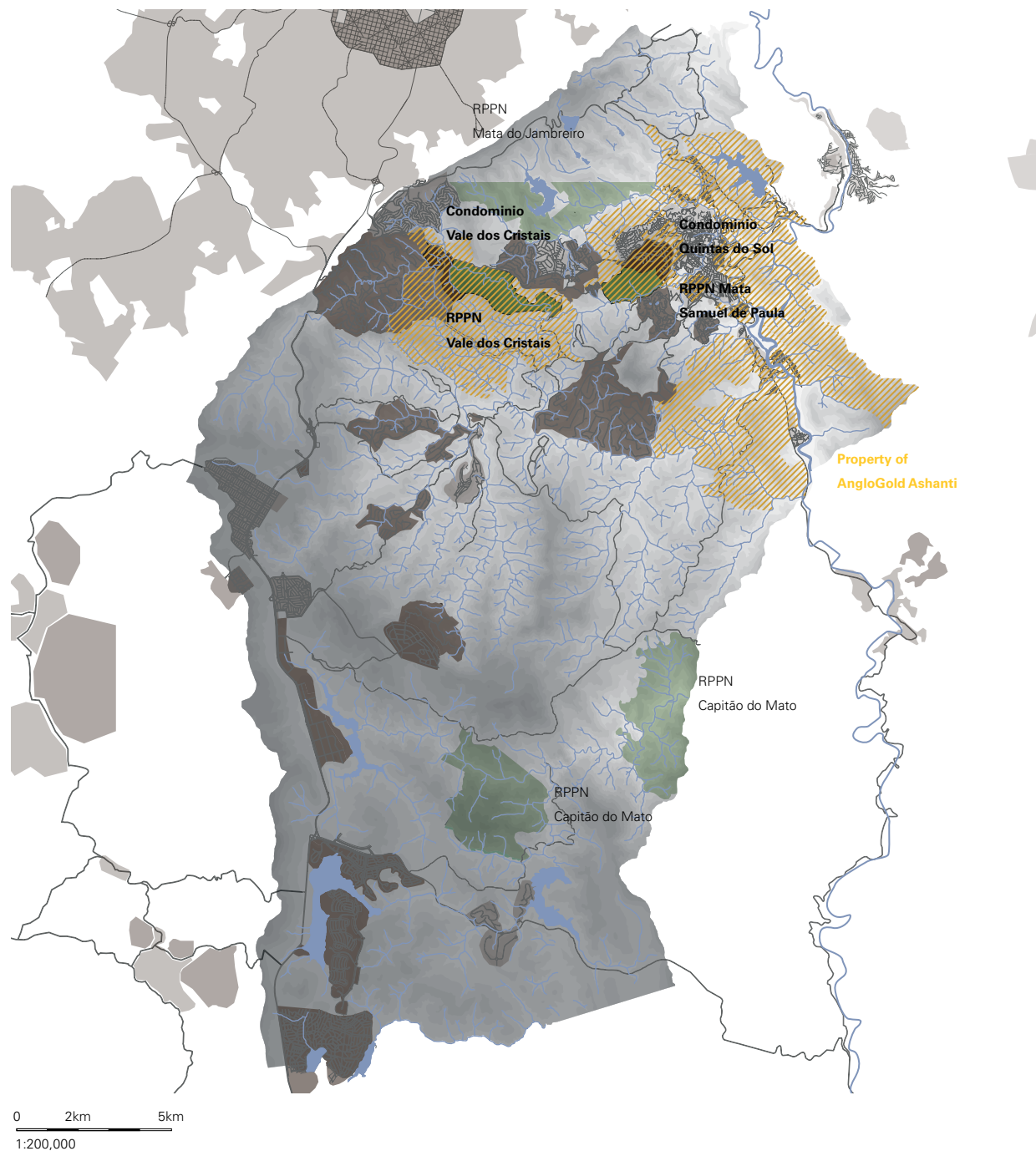
Vila da Serra



Condominium Villa del Rey

Contrasting Ways of Occupation

Different ways of how the territory can be occupied illustrate the variety of settlements occurring in Nova Lima. They are in close proximity, as the two pictures were taken on the same spot but looking into opposite directions.



Enforced Compensation of Environmental Impact

The most recently built condominiums are all large-scale projects. The process of developing the land requires drastic measures such as the clearing of the site. As most of the settlements are peripheral and not connected, the construction of a house also requires large infrastructural measures. This environmental impact is often overlooked, but has been focused on in the recent past. The condominiums Vale dos Cristais and Quintas do Sol come along with a private nature heritage area, a RPPN, as compensation for its environmental impact.



Gold Mining



Gold Mining
Extraction of gold in the Mina do Morro Velho and other mines in the region.



Sulfuric Acid
A byproduct of the gold production is processed into sulfuric acid which serves as raw material for fertilizer.



Energy
Hydroelectric dams of the Complex of Rio de Peixe are still used for electricity production.



Real Estate
Land in property of the company without mining interest is developed for real-estate projects.

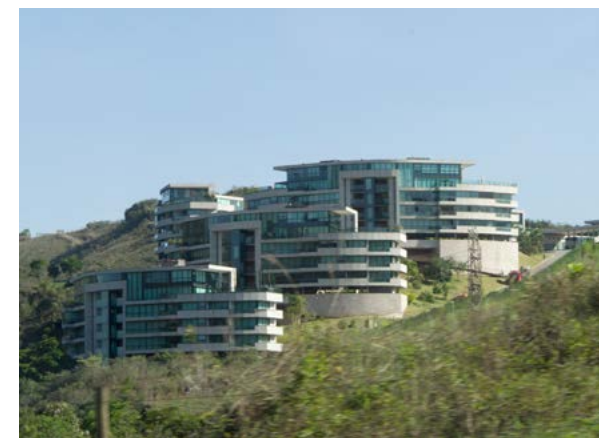
Mining Company Turns to Real-Estate

Vale dos Cristais and Quintas do Sol are both in the property of AngloGold Ashanti and developed in collaboration with Odebrecht Realizações Imobiliárias. This land is not useable for mining and displays the diversification of AngloGold Ashanti after the gold mining branch diminished in Nova Lima.



Vale dos Cristais

The condominium and the RPPN are located right next to each other along the highway MG-030. The legal approval has been made for both together.



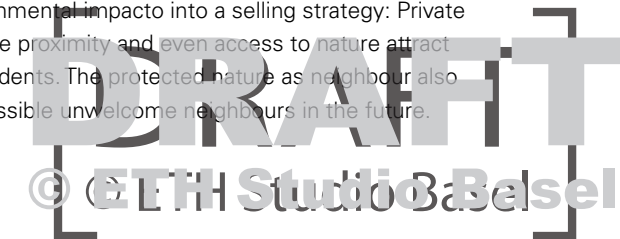
The Condominium on Display

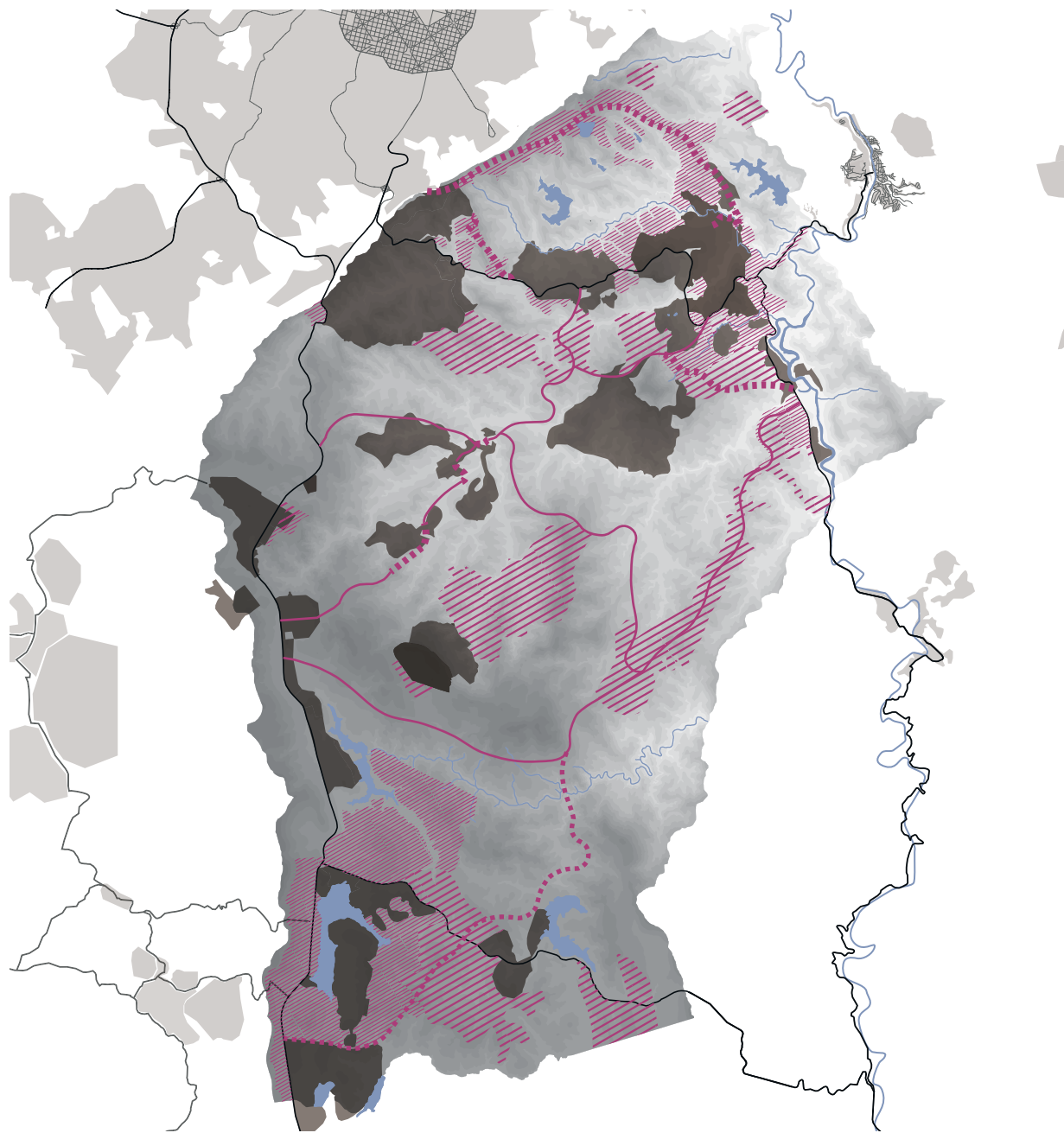
Similar to Alphaville, the representative entrance is spectacularly designed. The scattered and privately constructed lots lie hidden behind the hill.



Nature Sells

The real-estate company turns the enforced compensation of its environmental impact into a selling strategy: Private and exclusive proximity and even access to nature attract wealthy residents. The protected nature as neighbour also prevents possible unwelcome neighbours in the future.





0 2km 5km
1:200,000

Undeveloped residential
 Zone for urban growth
 Road improvement
 Road construction

Disposition of Urban Growth

In 2007, the Municipality of Nova Lima introduced their plan for the future, the Plano Diretor. This plan identifies large undeveloped areas as residential zones or as zones for urban growth. It also introduces an expansive infrastructure policy: Improvement of roads and construction of highways across the municipality. As the proximity to a highway acts as an urban condenser, this road expansion will develop even the remotest area of Nova Lima, endangering the leftover nature.

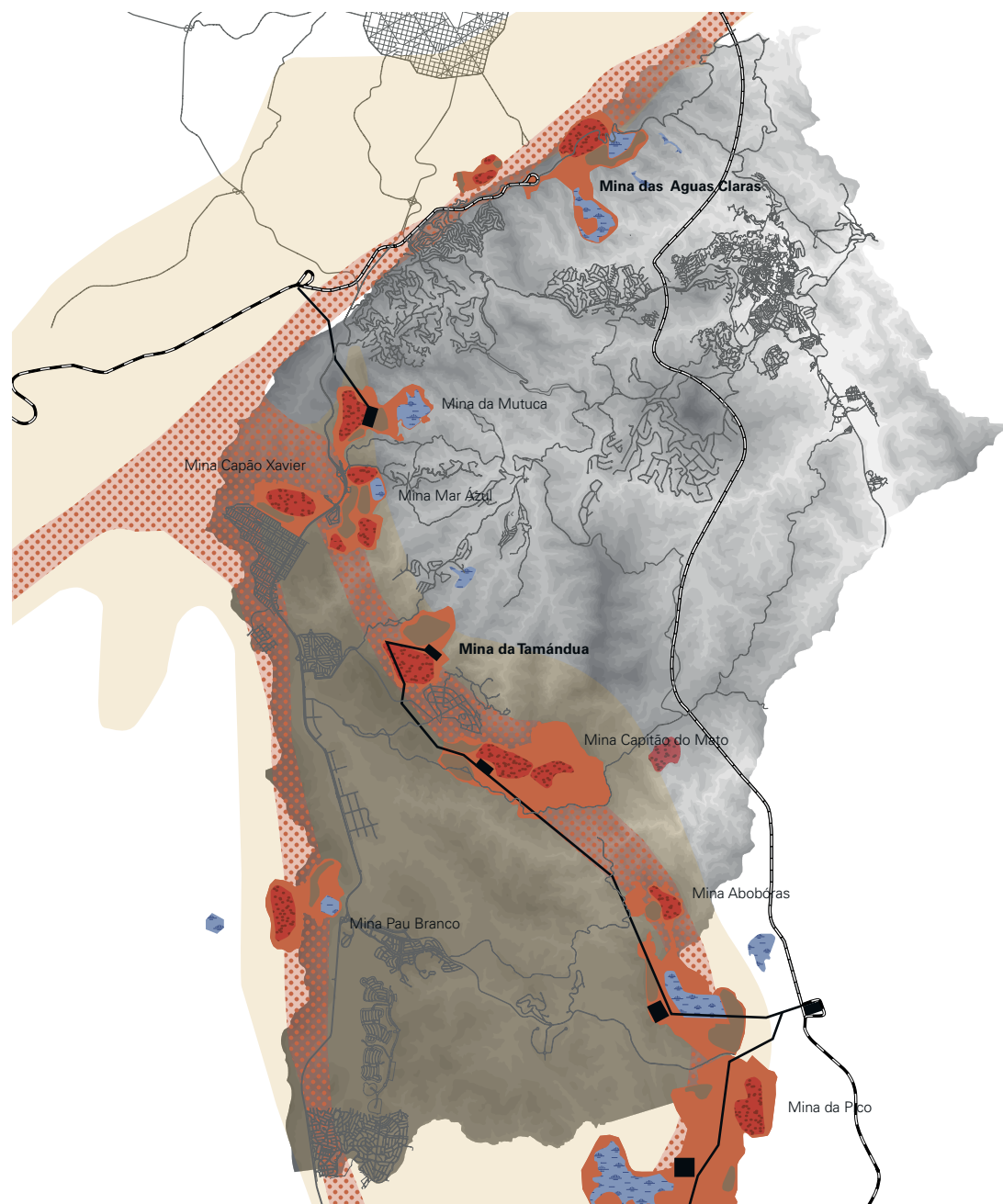


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MECHANISMS OF MINING

In iron ore mining every process manifests itself specifically the landscape it operates in. With the large-scale land ownership and the fact that all but one mine belong to Vale, it was possible to create a network of mines that are connected in a first layer to a production unit and in a second layer to the global markets. By satisfying the global demand for iron (steel), this process reveals locally the structure of the ground we walk on and exposes its riches in a fascinating way. Sadly, these local incisions create a series of problems that conflict with the residential occupation of the territory and the efforts of environmental protection.





0 2km 5km
1:200,000

- Area of the mine
- Iron ore deposits
- Mine pit
- Tailing pond
- Overburden pile
- Conveyor belt

Network of Mines and its Infrastructures

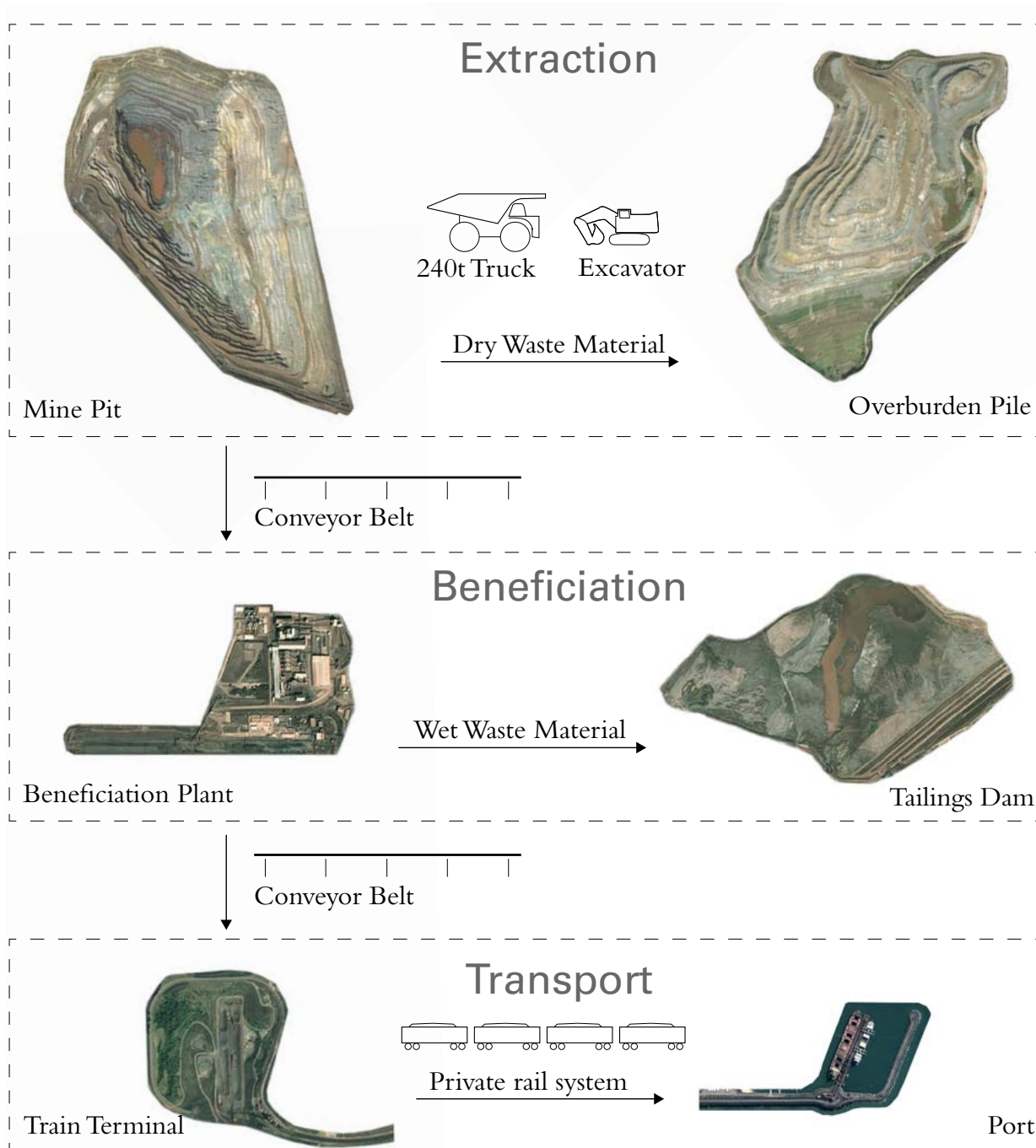
Iron ore is mined in open-pit mining and is closely connected to the geological conditions. A mine is placed only where it is the most profitable, a pit can reach dimensions of 1.5 kilometres in diameter and 200 metres in depth or even more. With the establishment of a mine a series of legal requirements appear as well as a costly installation of infrastructures to exploit the ore.



A Contoured Landscape

For every ton of ore that is extracted, 0.8 tons of overburden without any economic use are accumulated. In this paradoxical process pits and piles are created next to each other and contoured in the typical sloped form that is conditioned by the softness of the soil. The production of this landscape is subject mainly to productivity and, to a lesser extent, to influence of civilization.





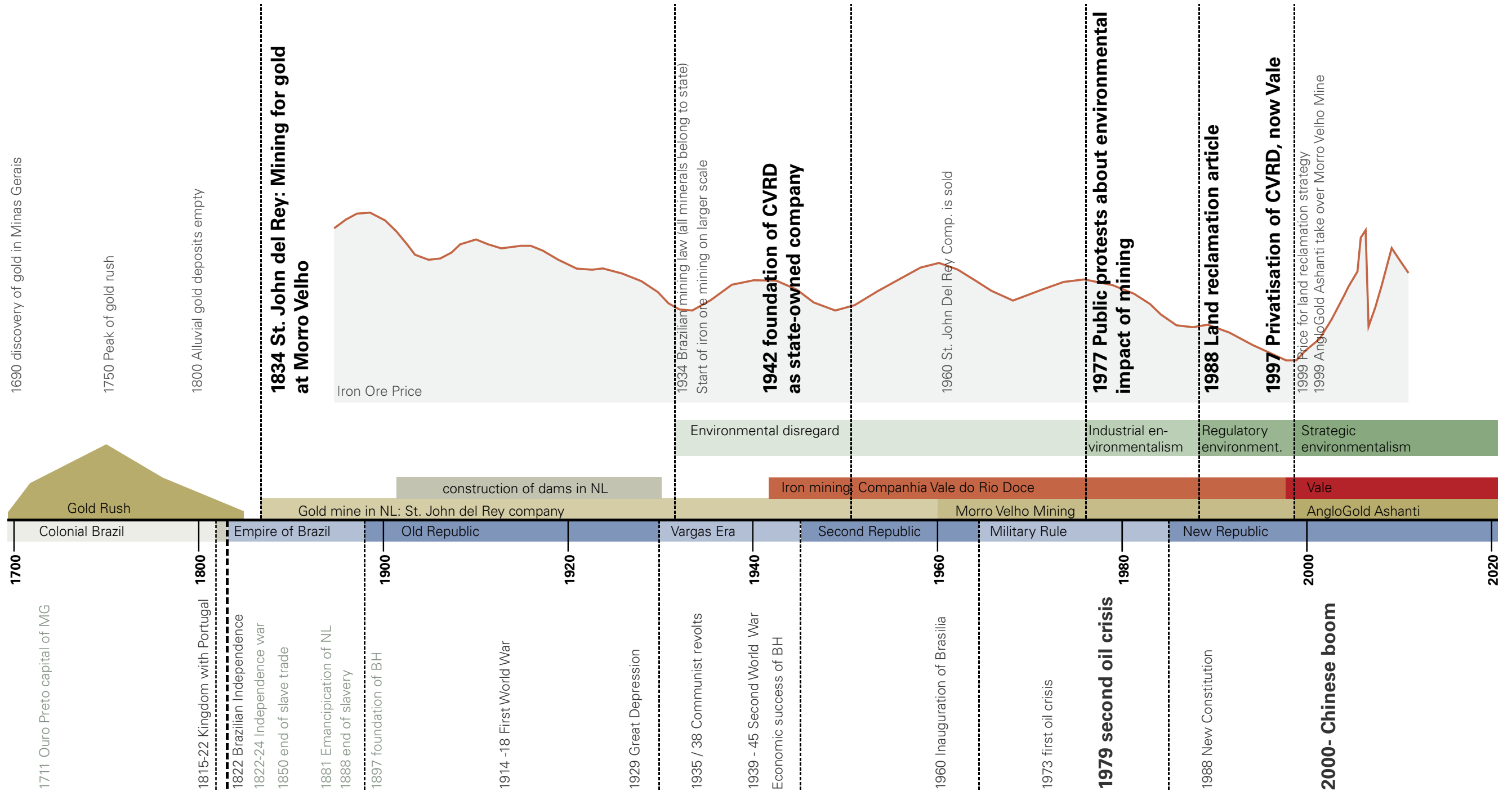
The Production Chain

The iron ore in Nova Lima is very soft and can be dug out by an excavator. The crude ore undergoes dry mechanical and wet chemical filtering during which a slurry of waste material is produced. This byproduct is pumped into a tailings dam. The refined ore is loaded on trains, shipped to a port and exported into the world.

A Levelled Landscape

In the beneficiation process water is used to separate fine particles from the ore. That slurry is conducted into a valley that is blocked by a dam where the solid parts can settle and thus the water evaporate. The contour of the valley is overwritten by a plain. The structure of the filled-up ground is unnaturally homogenous with a concentration of naturally occurring heavy metals and silicates.

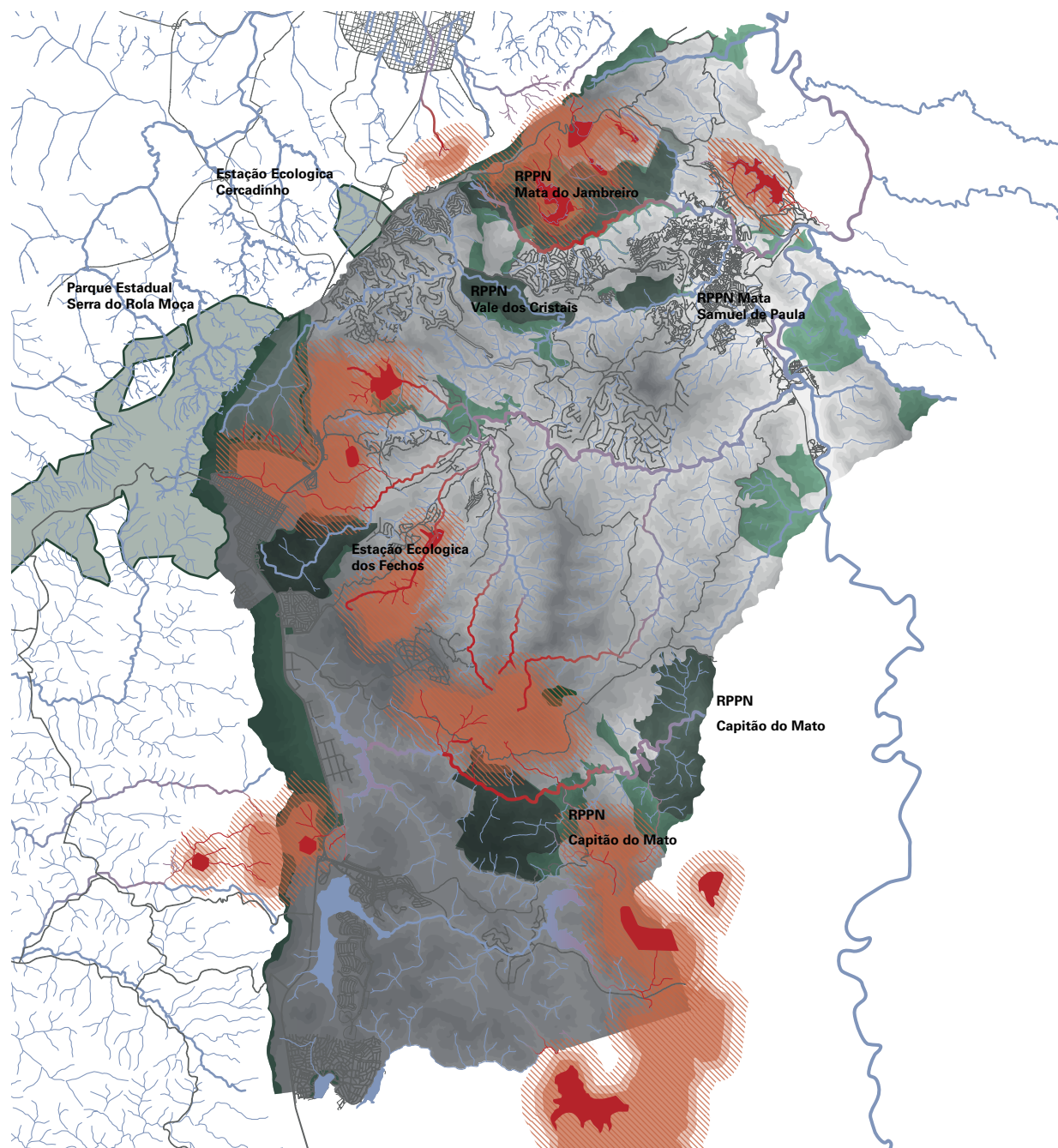




Reactionary Business

The exploration of iron ore provides one of the most important raw material. As the ore is on the bottom of the supply chain it is under enormous cost pressure and relies totally on the overall economic conditions and investments on the world markets.





Environmental Impact and Forms of Compensation

Mining in Nova Lima is quite old and laws for the impact on the social and natural environment have not been installed until recently. The greatest concern must be to keep the wetlands system intact. In order to do so, the RPPN (Reserva Particular do Patrimonio Natural - Private Reserve of Natural Heritage) is a requirement for every project that causes damage. They are the territorial manifestations of environmental concern.

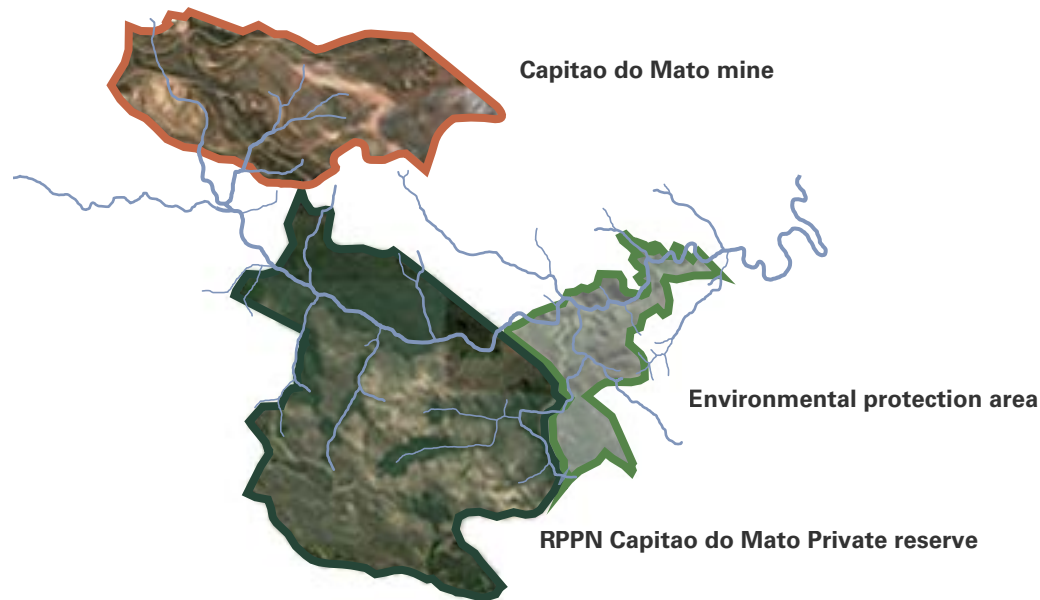
Environmental Appendixes of Mines

In contrast to the mine which is by nature temporary, the RPPN is conceived as a perpetual object and will remain there as a witness after the mine is gone.



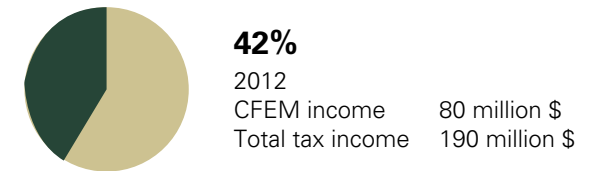
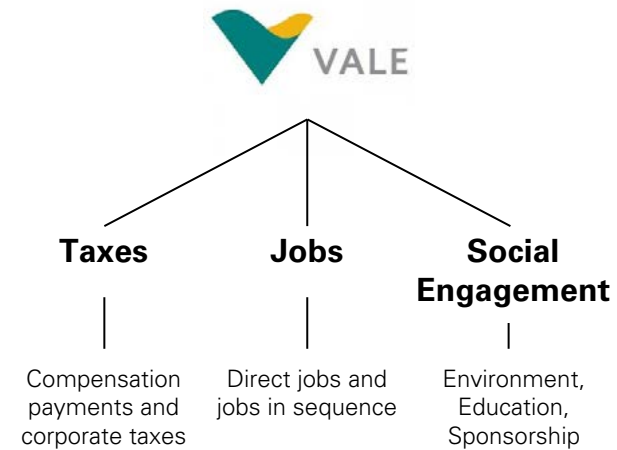
Polluted Water

Acid water, eutrophication, concentrations of heavy metals and excessive alluvion from erosive material are the greatest concerns that lower water quality.



The Ecosystem's Kidneys

The RPPN mitigates the issues involved with mining and it has to be located in the same water system and is about three times the size of the impact. As all streams will eventually flow into the Rio das Velhas it is important to have a cleaning mechanism before the water becomes part of Belo Horizonte's water supply.

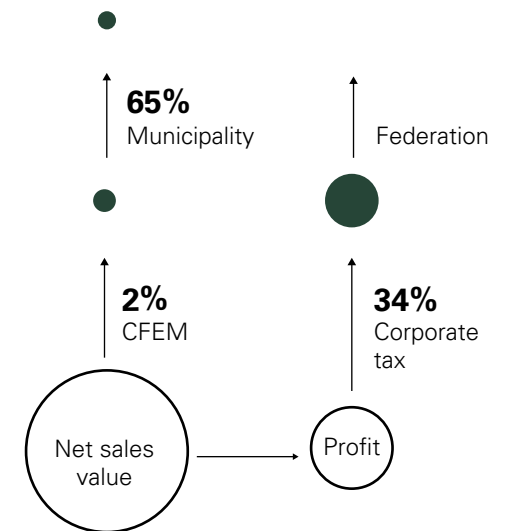


A Twisted Dialectic

Vale is portraying itself as a big benefactor of the region. They employ 2700 people, which in turn creates service and supply jobs in consequence, but they only pay minimum wage. Even though they pay taxes and spend money on social issues, the negative side of their business shows that it is not enough.

Corporate Propaganda

In the age of strategic environmentalism, and stakeholder's interests, the image of sustainability is more important than acting in a sustainable way. Vale spends more money on advertising than on projects.

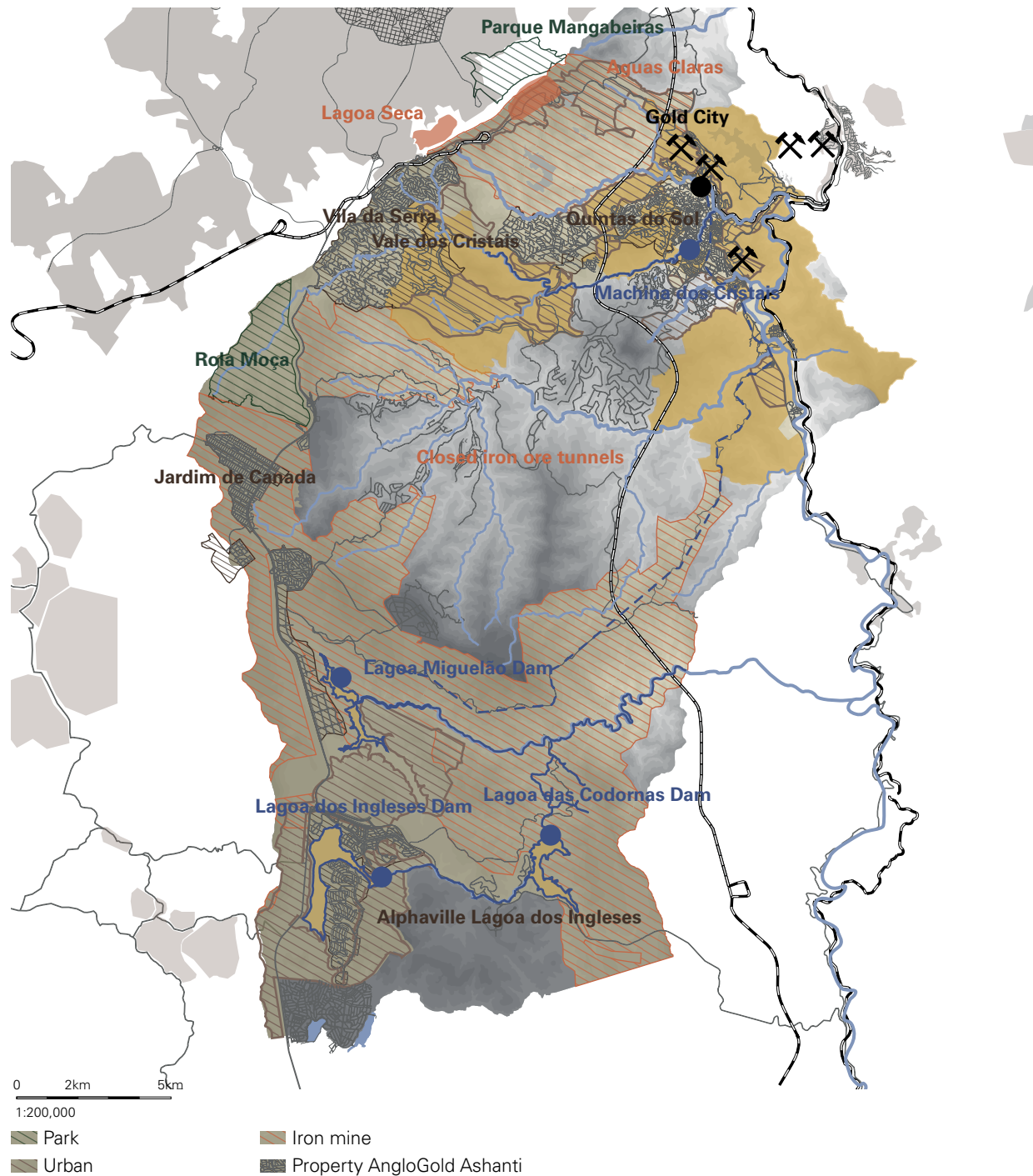


A Bargain Hunt on Everybody's Cost

Several taxes apply to mining, the most important is the CFEM (Financial Compensation for Exploration of Minerals) which charges 2% on the sales. In relation to other mining countries this rate is far below what it usually is, considering that it is no longer a state-owned, but a multinational corporation that enriches itself on the resources, the tax is a bargain.

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Post-Mining Landscape

Even though mining is thriving, it has a long history in the region. Over the last 40 years certain mining sites and infrastructures have undergone transformations as their very specific purpose is no longer relevant. This includes railroads, artificial lakes, buildings and even the pit of a mine. They all have defined or reshaped an area to such an extent that only a limited range of possible future uses is thinkable anymore.



Interrupted Space

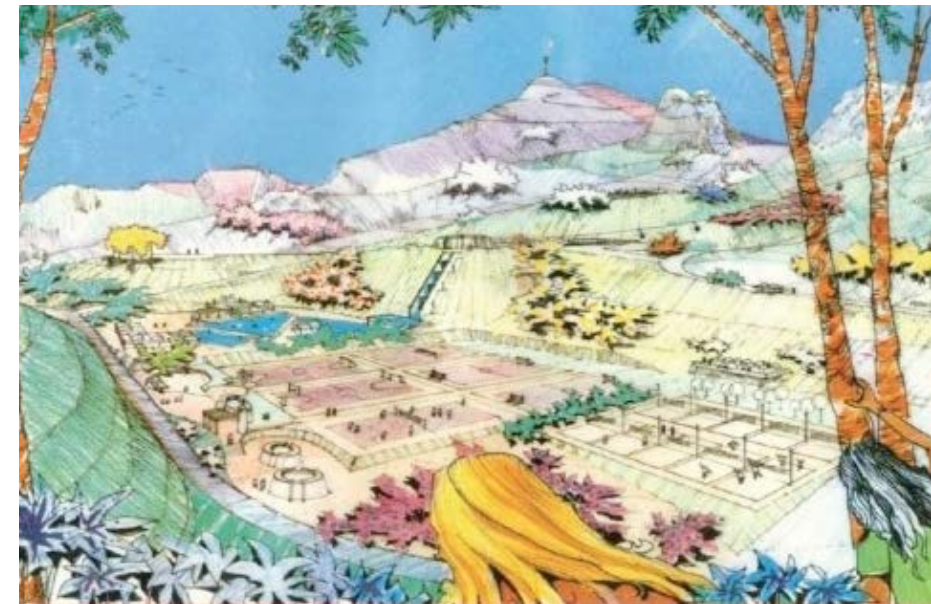
Running along the boundary of Nova Lima and Belo Horizonte this iron ore train line has been a fixed element that has divided the land. Now that it is defunct it still remains a border for the two divergent sides of the tracks.





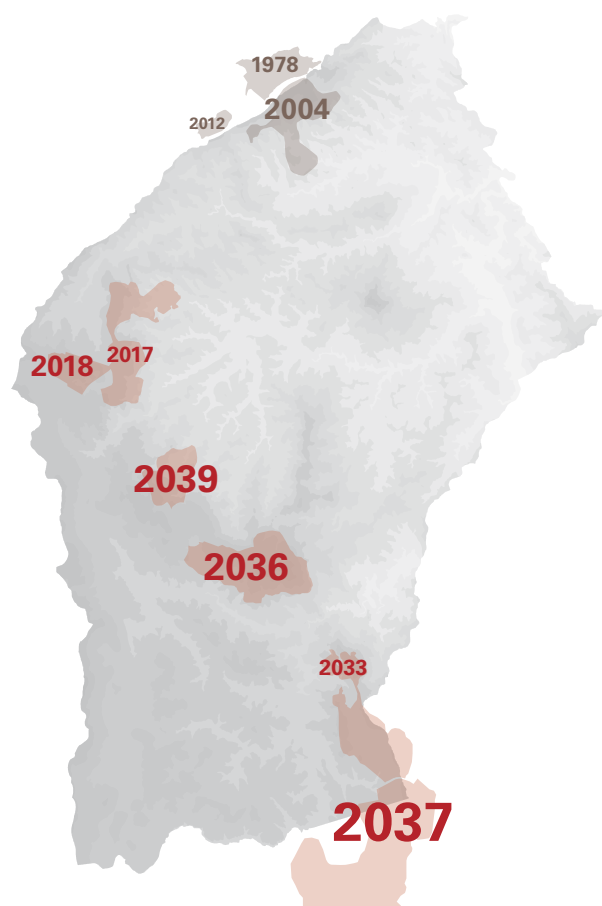
Parque Mangabeira's Second Nature

The "Parque dos Mangabeiras" used to be a mine that was closed in the late 1960s and was transformed into a public park. Revegetation of a mine can be successful ecologically, but also aesthetically. However it has to be remembered that a restoration is not possible and what we see here is a Second Nature, that is not native.



The Talents of Roberto Burle-Marx

The specificity of the site and the ingeniousness of Roberto Burle-Marx have been crucial in this great enrichment of Belo Horizonte's quality of life, but for the same reasons this project can not be a general scheme of what may become of post-mine land.



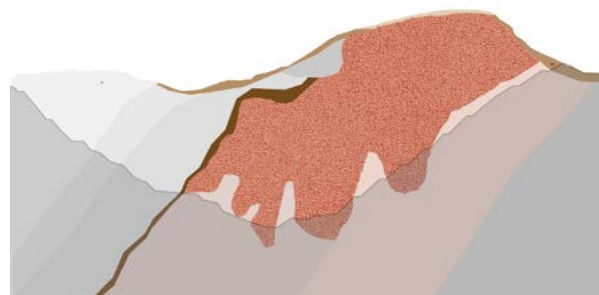
Closure Plan of a Region

While two of the iron ore mines in Nova Lima have already been shut down, all the other mines are expected to follow within the next 5 to 25 years starting from the northernmost mine. With the mines a part of the municipality's history leaves but at the same time it opens up new potentials.



A Lake, a Solution

Filling up the crater with water is an evident solution as the water will come up naturally. As seen in examples from Gold mining re-use, a lake can be an asset for an area under development.



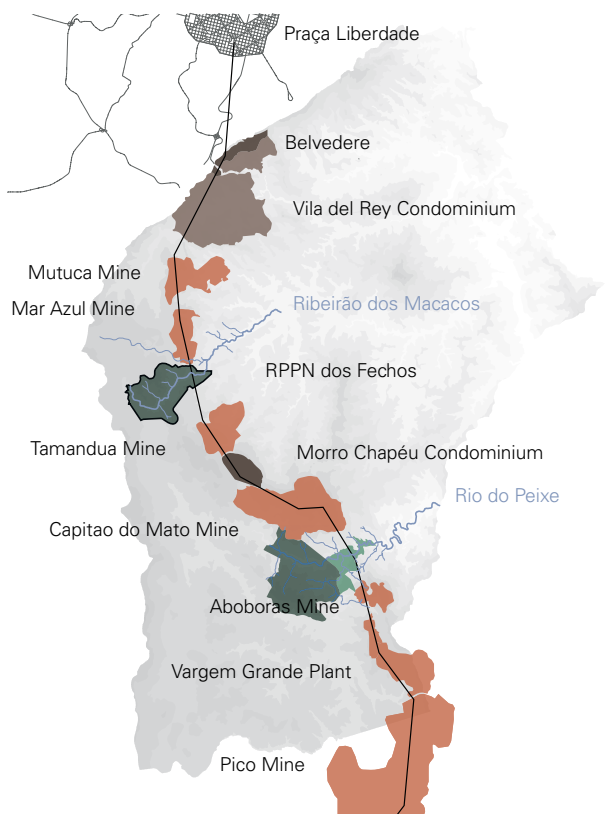
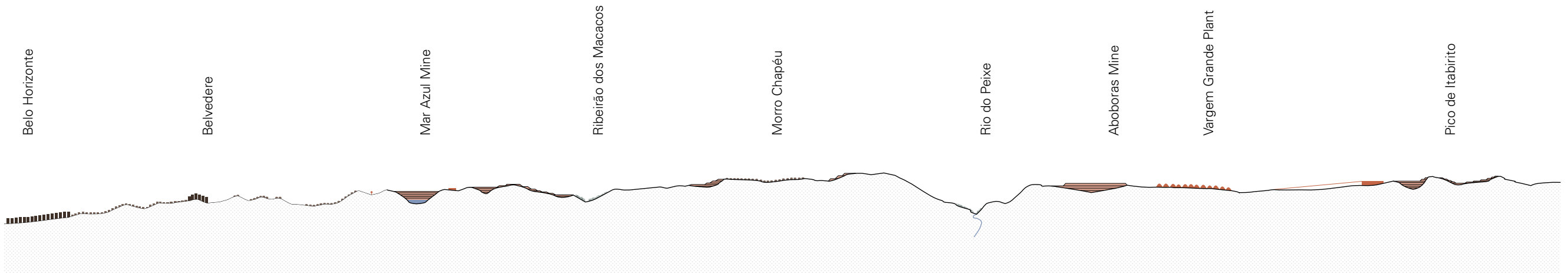
Mina das Águas Cláras

The Mina das Águas Cláras is the first mine of this size to be closed in Brazil. It is viewed with big interest as a benchmark for future closure plans.



Liability and Threat

Tailing dams are not only a liability after mining, since the possibilities for an alternative use are limited, they are also a threat during operation. Tailings dams have broken in the past, which, for instance, have contaminated the water system in Macacos.



Landscape in Array

Most of Nova Lima is very scatteredly urbanized. But due to their tie to geological conditions, the mines are aligned along the ridge and create a landscape of successive mines, nature reserves and condominiums that may be transformed in the future.

Landscape of Industrial Composition

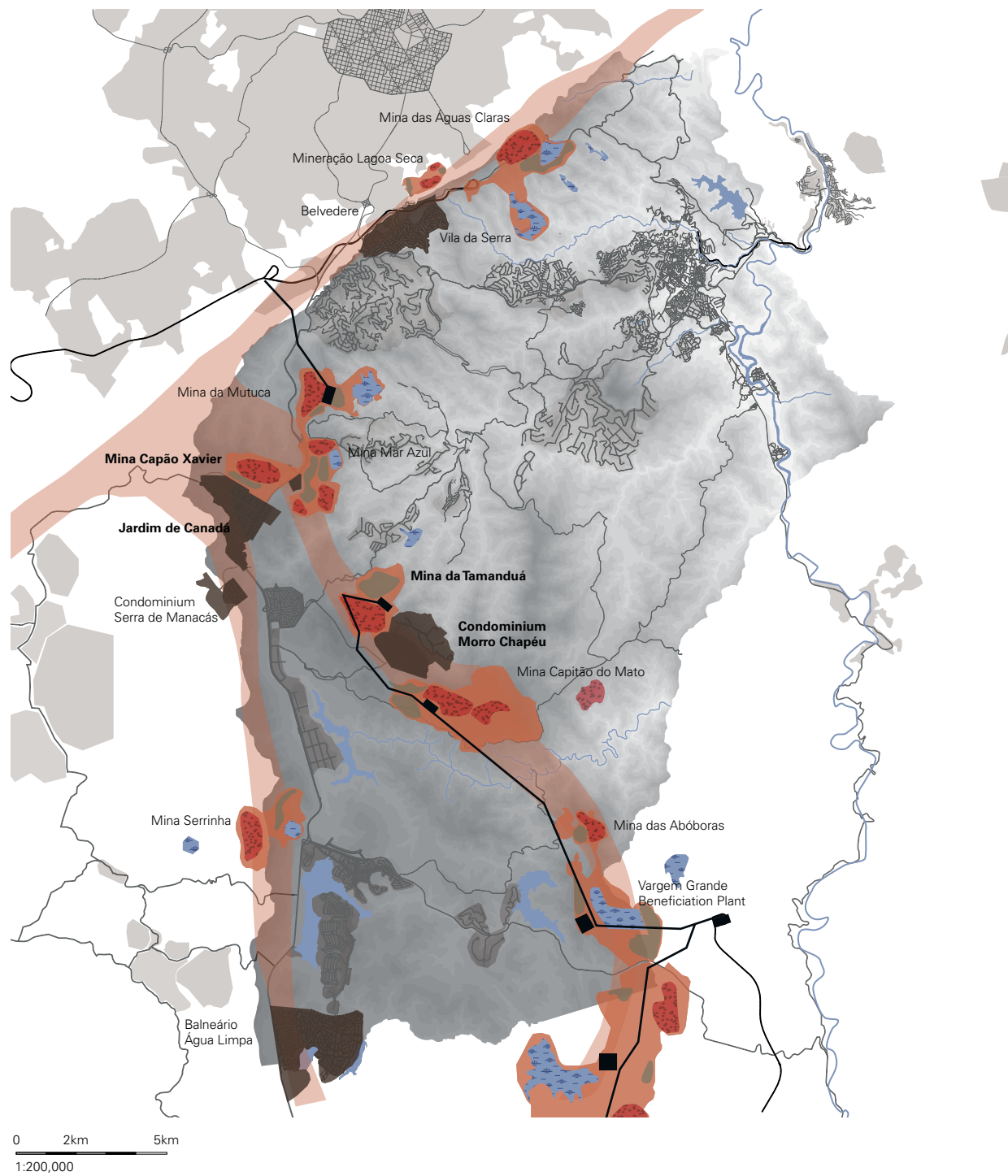
The iron ore mining occupies the ridge, but only in few places it is not concealed. The infrastructures of gold mining, iron ore mining and urban expansion form a composition of the mining landscape.



CORRELATIONS

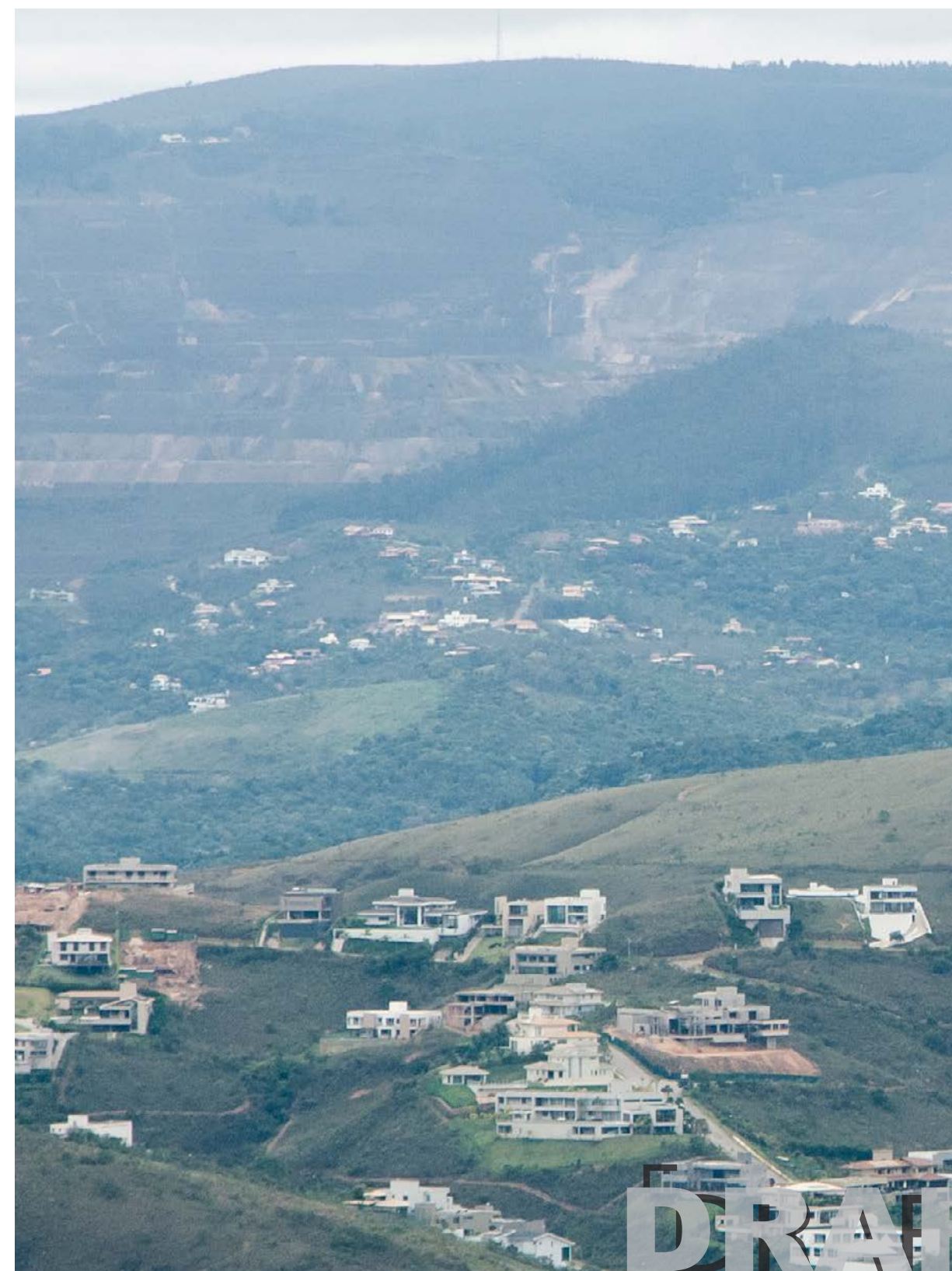
Nova Lima's specificity is the location on the intersection of the Metropolitan Region of Belo Horizonte with the Quadrilátero Ferrífero. The interests of these two regions clash in various ways. The large-scale iron ore mining as well as the peripheral expansion of Belo Horizonte developed in parallel in the second half of the 20th century. The resulting territorial conflicts mainly root in the chronology. Who was first? The growth of both forces accumulate the proximity, putting more pressure on both. However, in terms of accessibility and privatization both forces have established similar strategies for avoiding unwanted visitors.



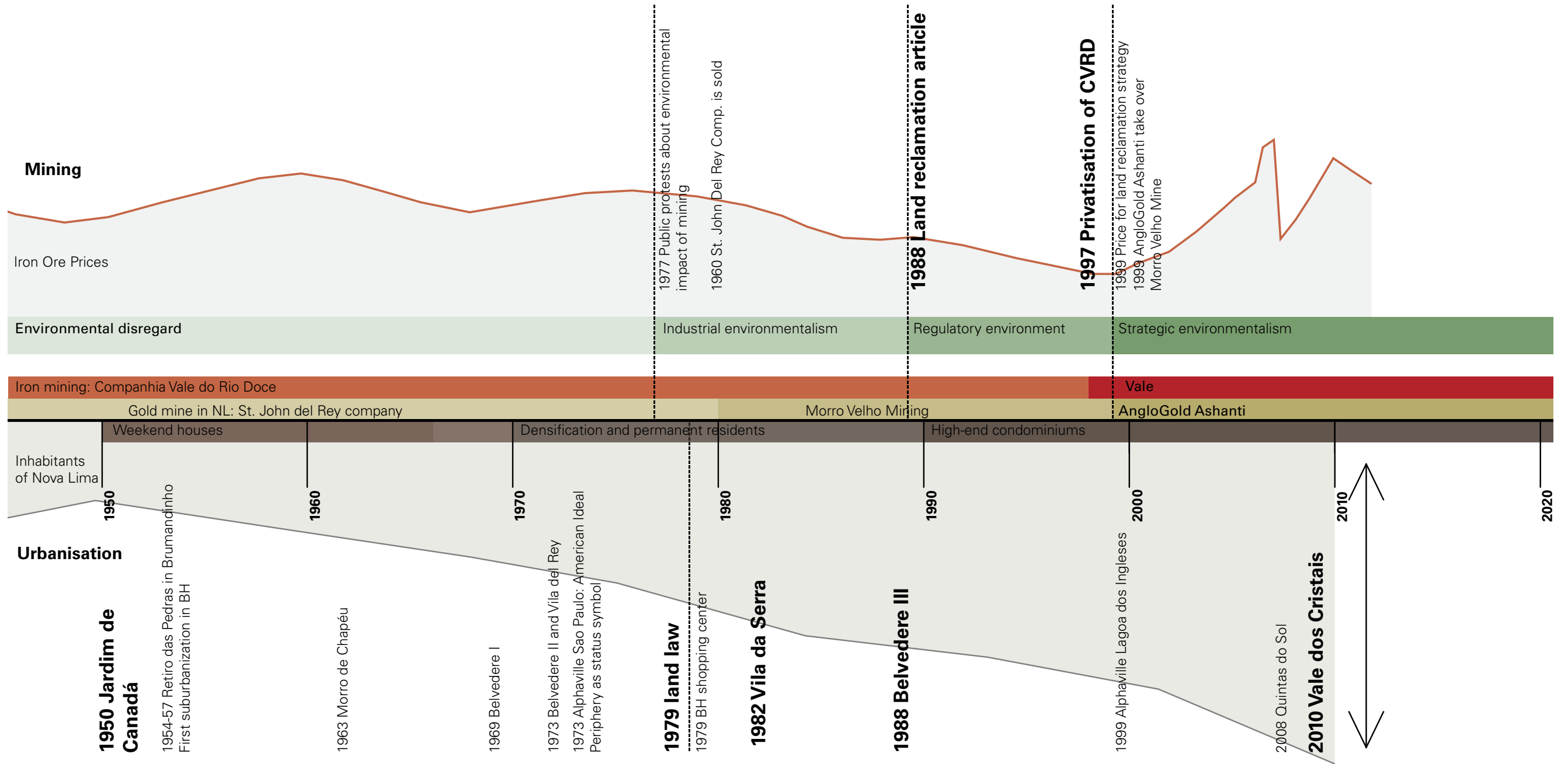


Proximity of Urbanisation and Mining

The ridges consisting of banded-iron formations are the main area of the clash of these interests between urbanisation and mines. The stunning view from the ridges attracts residents and the high concentration of iron ore promises high revenues to mining companies. These problematic neighbours developed several strategies to deal or in other cases to enforce their interests.

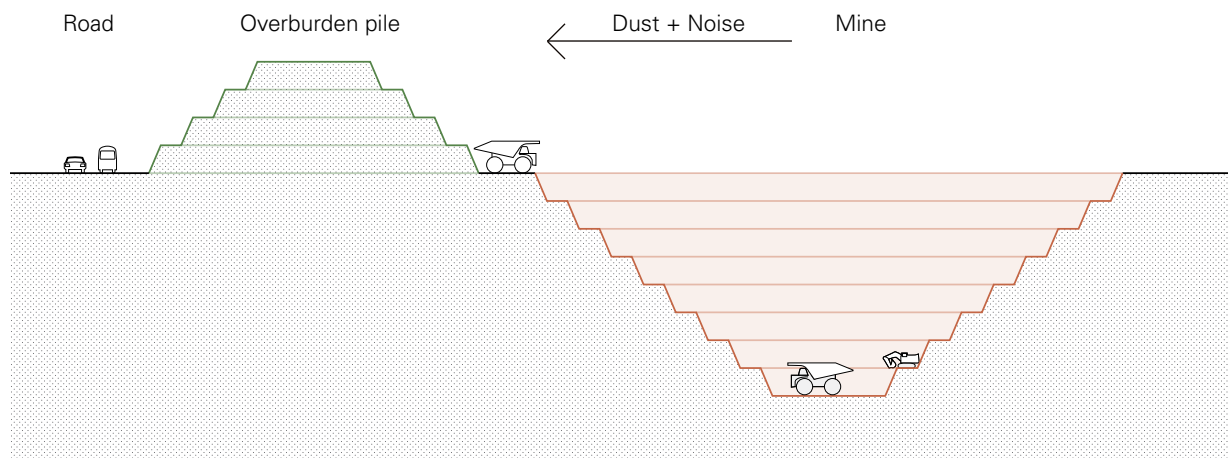
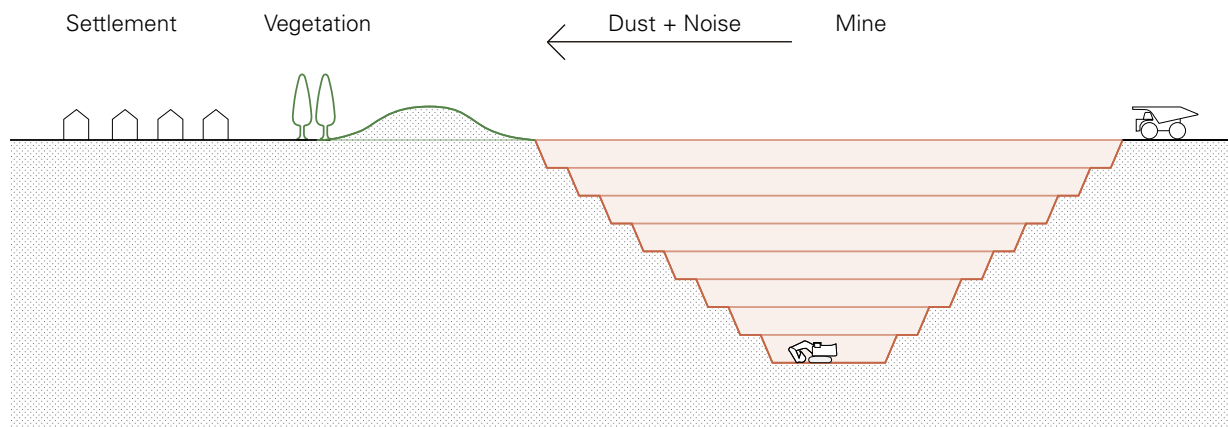


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Parallel Growth of Urbanisation and Iron Ore Mining

In the second half of the 20th century, both the urbanisation and the iron ore mining have expanded. The increase of industrial production after the second world war goes along with a higher mobility that pushed both phenomenons forward.



View Obstruction

The major disturbance of iron ore mining are noise and dust. The strategies of minimizing this impact are the planting of trees or, if more space is available, the placing of a dumping area on the edge of a mine adjacent to a road or a settlement. Another advantage of these measurements is the obstruction of the view to passers-by.



Territorial Manifestation of Borders

The mining companies are very careful to operate their mines with as little attention as possible. Their activities therefore mainly take place in hidden locations. The borders are however more visible and sometimes extremely unnatural.





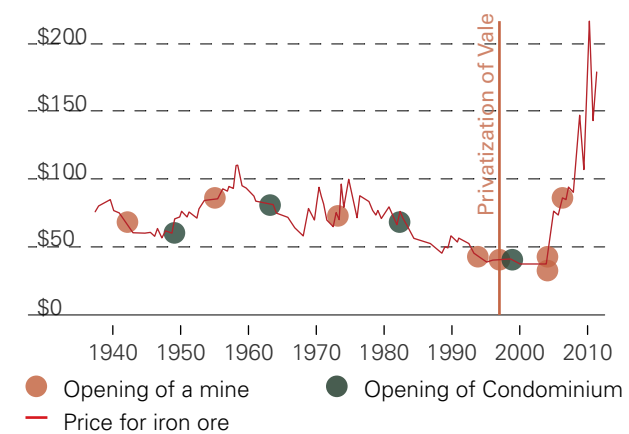
Fight for the land

The Jardim de Canada is located right next to the large-scale Mina Xavier Capão. This close proximity illustrates the fight for land. As this settlement is rather low-end, the mining has more power. On the northern edge the mine already bit off parts of the settlement, the area across the highway is the compensation area for the 'lost' land.



Hiding Behind the Trees

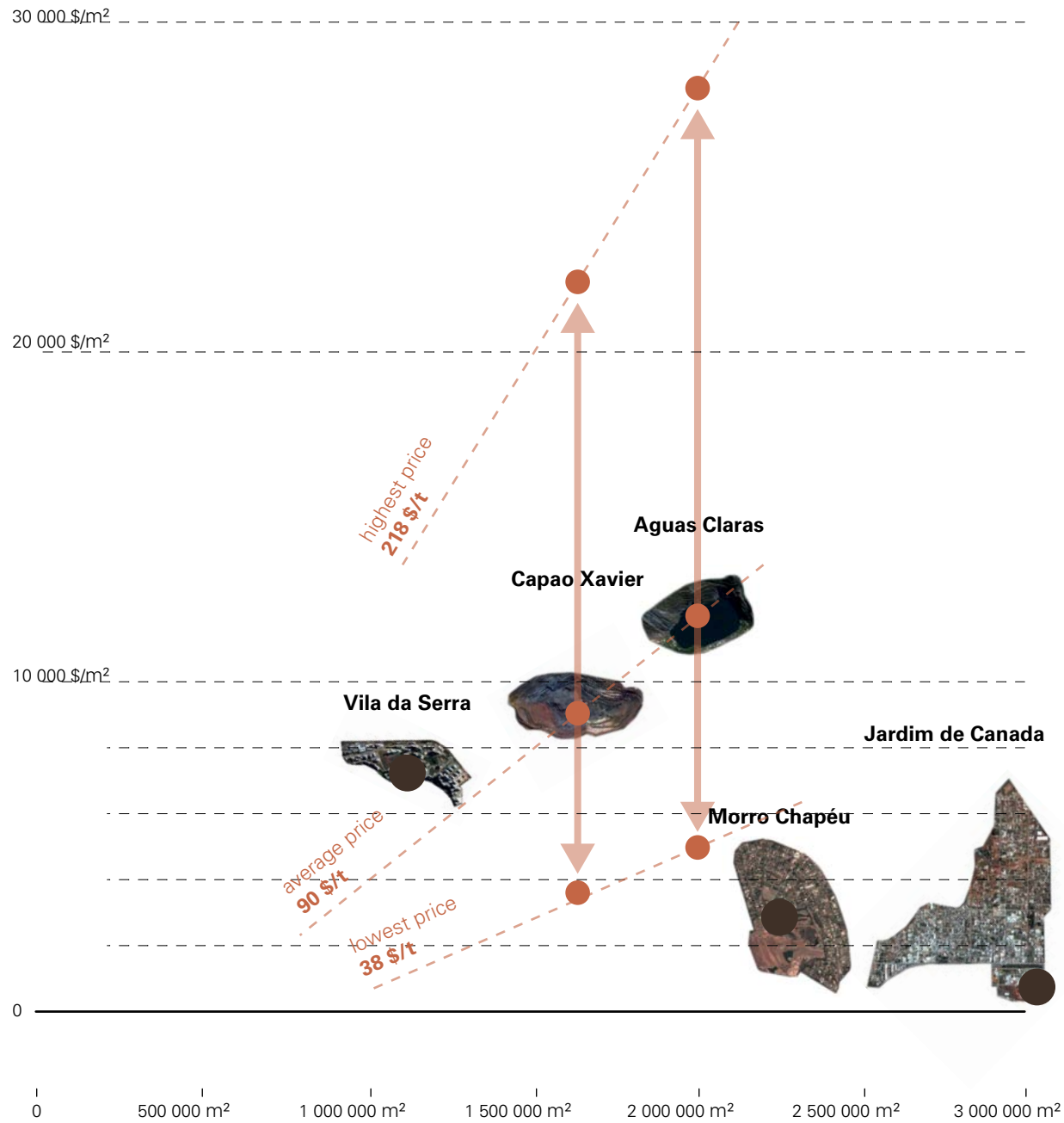
The mining activities are well protected from the public eye. Due to topographical conditions, in Jardim de Canada the strategical planting of vegetation to obstruct the view functions only to a certain degree. However, the open pit itself, the place of extraction still remains hidden.



Mining Boom in Urbanised Territory

Albeit its long history in the region, the majority of the mines were opened in the recent past. The privatisation of Vale and the rise of prices has increased the mining companies' power.





Fluctuation of Value

The fight for land in the two case studies Morro Chapéu and Jardim de Canadá raise the question of the higher profitability of settlements or mines. Relatively cheap areas such as Jardim de Canadá are less profitable than mining. Expensive neighbourhoods like Vila da Serra on the other hand have a higher value than the average iron ore price. Depending on the global demand shaping the price, more mines will be opened in the future.



Golf Course as a Mutual Benefit

The golf course at the entrance of the condominium used to be a mine. After the ore has gone, the whole was filled in and the reclaimed land given to the community who decided to extend the existing small golf course.



Vale Road Maintenance

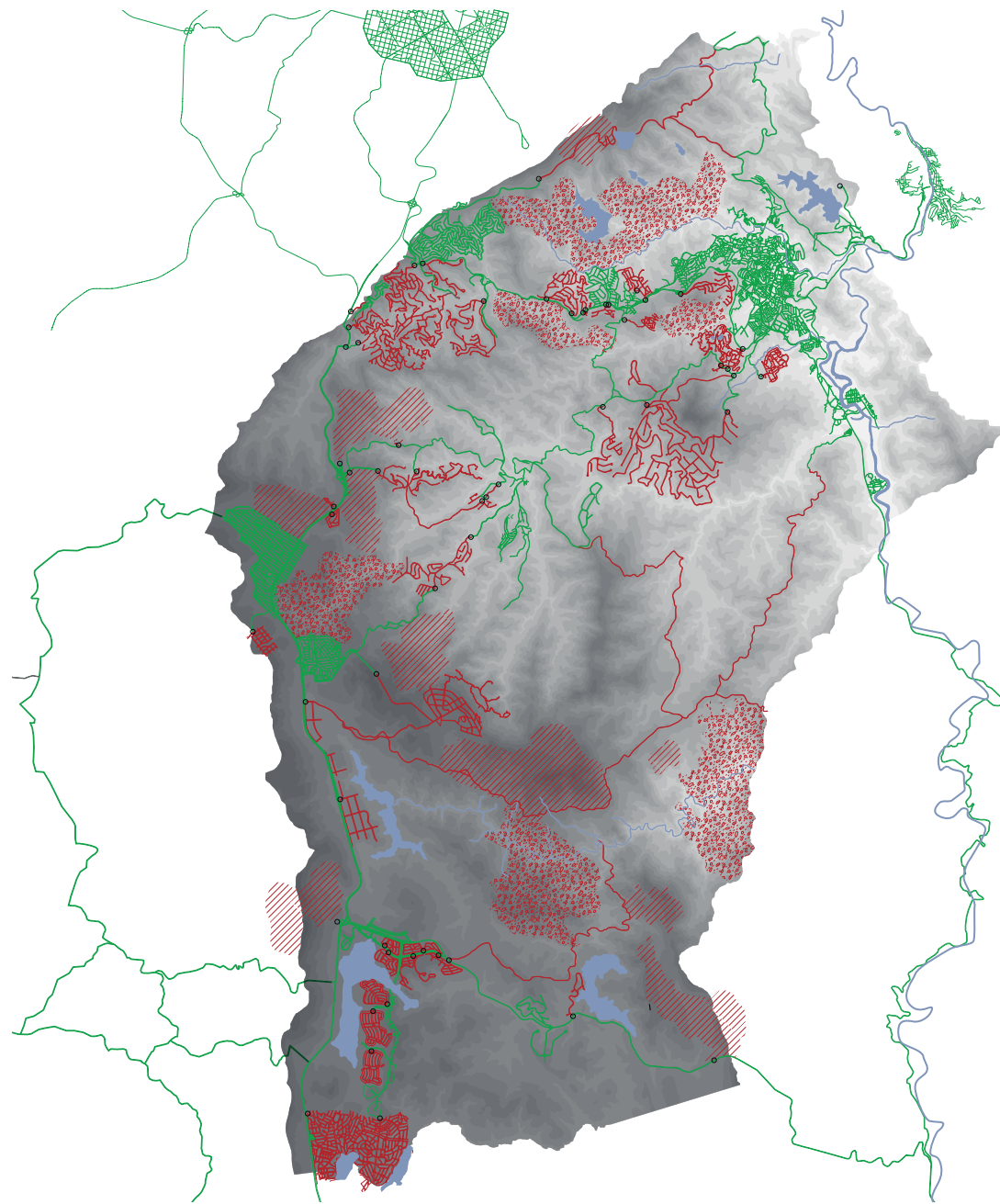
The access road to the Morro Chapéu is property of Vale. As an attempt of friendliness, Vale maintains the road, providing free access to the condominium.



Trade-Offs

The residents of the condominium are often disturbed by the mining activities, despite Vale trying to minimise the impact. The conciliating mechanism of trade-offs improve the friendliness.





0 2km 5km
1:200,000

— Publicly accessible roads // Inaccessible mines ○ Gates
— Inaccessible roads ••• Inaccessible nature

Inaccessibility of Condominiums, Mines and Nature

Brazilian society is very concerned about security. A concierge is standard in any large building regardless of its use. This closing of private property manifests itself in the emergence of gates, walls and fences all over the territory. This approach covers all types of land use: The Gated condominiums, from sight hidden mines and inaccessible private nature heritages.



Entrance to Vale's administrative complex



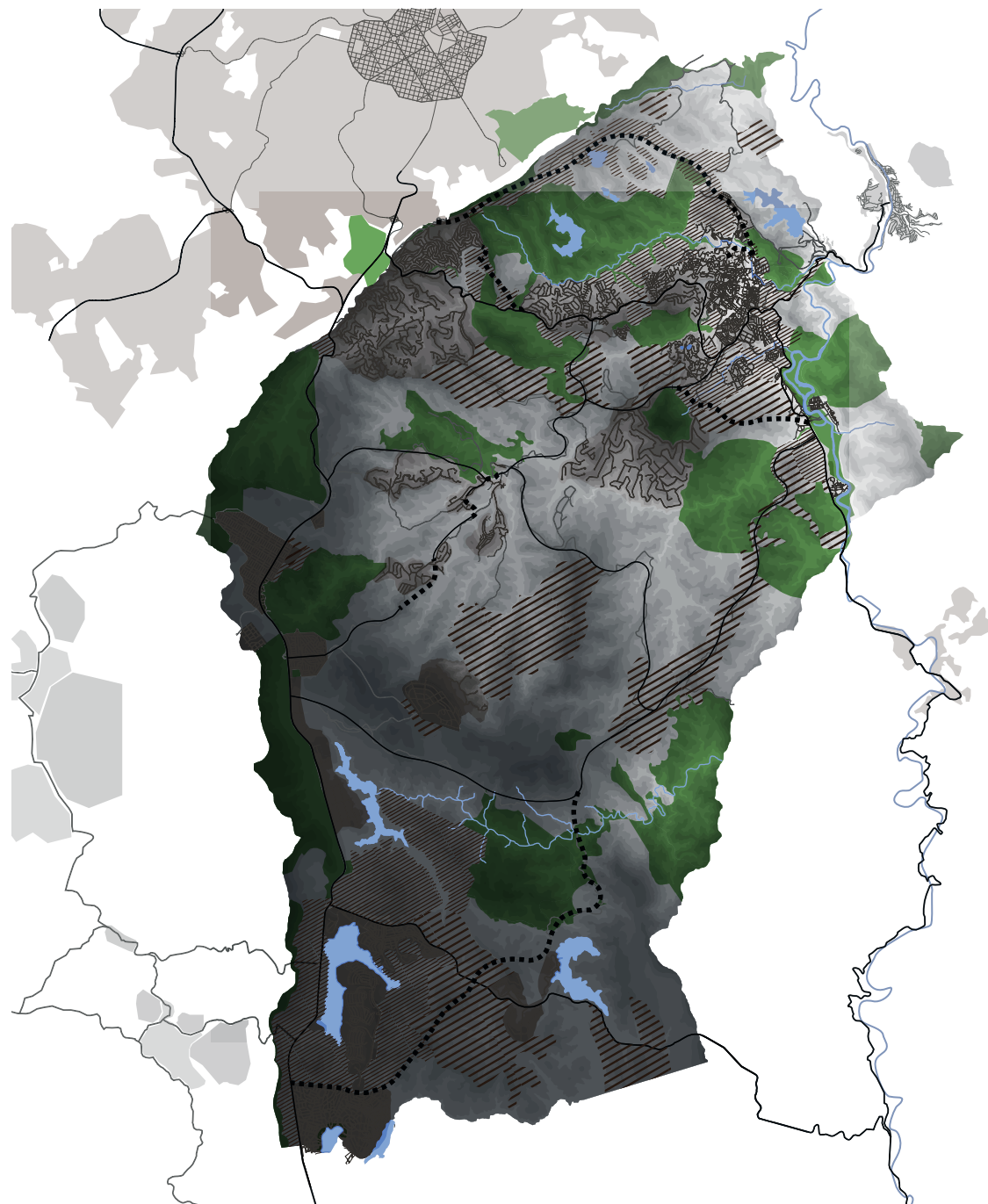
Gate at Morro Chapéu

DRAFT
© ETH Studio Babel

THE SHAPE OF THINGS TO COME

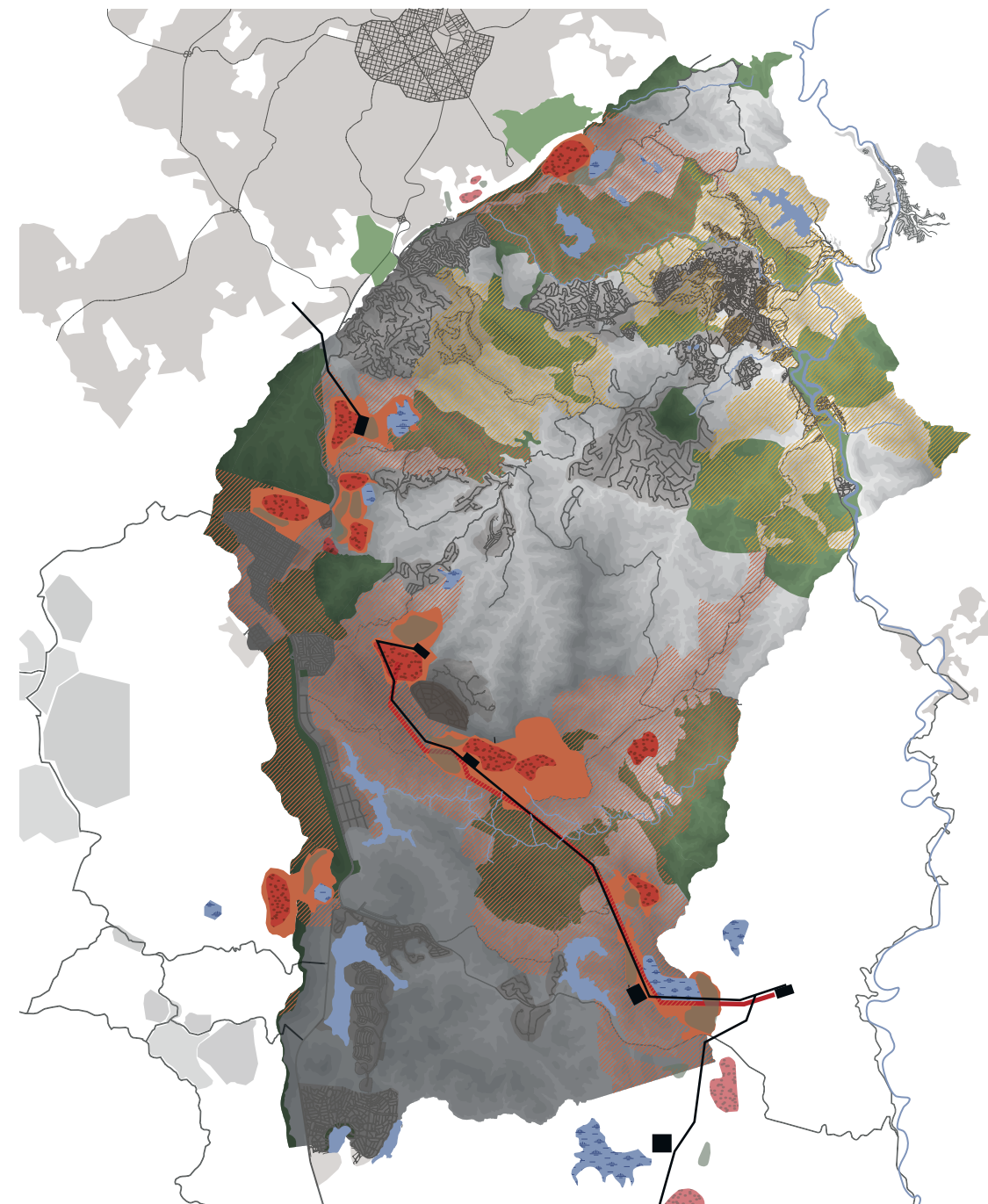
With the understanding of the mechanisms it is possible to locate and correlate all the elements in Nova Lima to each other. This complete allocation of the land does however not result in a scenic correlation. Settlements, nature reserves and the mines are islands of their own with limited or no accessibility. Whereas the urban development tends to expand, the mining is expected to move to less conflictuous areas. With the potential departure, a continuous landscape of production along the iron ore deposits on the ridges may be opened up.





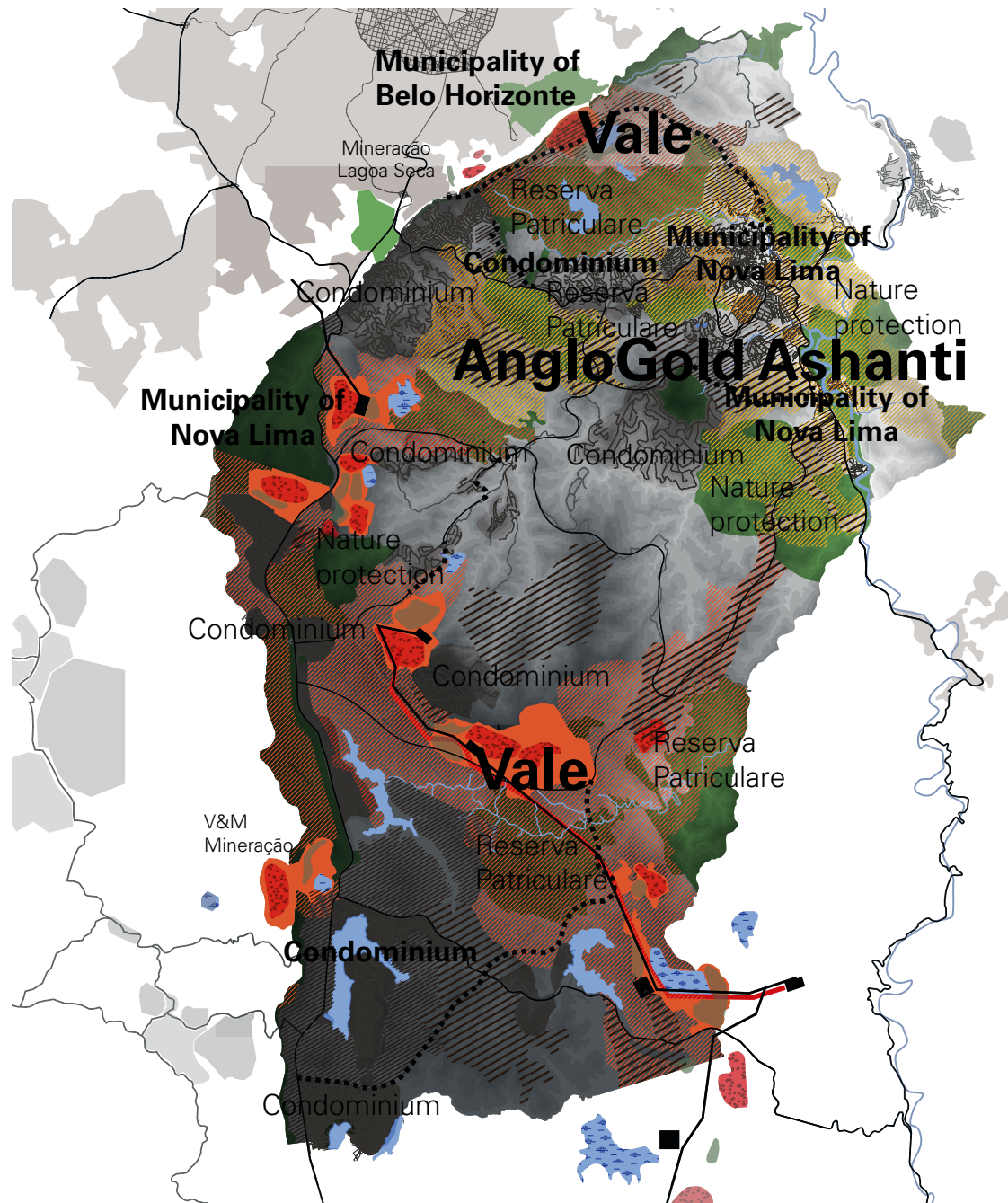
Urbanisation and Nature

The seemingly apparent correlation of the nature reserves and settlements is a deception. On the contrary, the majority of the areas are not accessible and are instead orientated centrifugally towards Belo Horizonte.



Mining and Nature

The monopoly of land property is the cause for the scattered settlements and natural reserves. They were located where it wouldn't disturb the landscape of mining, the only continuous space in Nova Lima



Power of the Actors

Vale and Anglo Gold are the dominant actors in the way they structure the land. The urban actors can only try to arrange themselves on the small scale. The counterpart is the environmental legislation, but the decisive power on the territorial scale remains with the mining companies.



Dynamic and Inert Territory

Certain locations in Nova Lima are set to remain in place while the fate of others is more open for the foreseeable future. Nature preserves are set for eternity, settlements are likely to be transformed, but not replaced altogether. As the mining may fade over the next 30 years, it will open up a new space that could be a more continuous space than the islands of today.



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IMAGE CREDITS

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P. 11: ETH Kartensammlung

P. 12,top: Atlas IBGE (1950), ETH Kartensammlung
P. 12,Bottom left and right: Uma Janela para o passado

P. 13, top left and right: Uma Janela para o passado
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