



## Boavista District BIP/ZIPs characterization

Analysis of the deviation found on Municipal BIP/ZIPs answers, when compared to all enquiries:

The issues of most concern to respondents in municipal (housing) districts are:

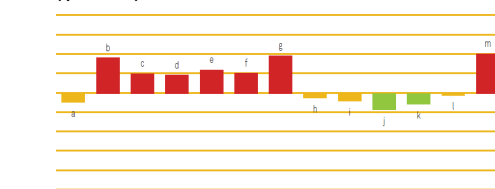
- b) public transport**
- c) facilities**
- d) security**
- e) urban hygiene**
- f) green areas**
- g) local trade**
- m) conflicts with neighbours**

It should be noted that in this enquiry, despite being of considerable worry, theme "a) degradation of the buildings, is still significantly less of a priority here than the city average.

Universe: 551 responses – 53% of the total number (279 responses from the Ameixoeira BIP/ZIP alone).

All themes have significant expression and are in rather similar terms to the average response. It is noted that this overall average is determined by over 50% of surveyed residents belonging to these neighbourhoods.

**Classification to: Importance of the proposed topics, a) to m)? (question 3)**



total Average	2,640	1,632	1,676	1,772	1,778	1,612	1,650	2,562	2,476	2,388	2,407	2,322	1,518
Municipal Average	2,345	1,998	2,077	1,957	2,019	2,019	2,038	2,519	2,393	2,218	2,284	2,301	1,927

**Selection of: 3 topics that most concern the respondents, a) to m)? (question 4)**



total Average	11,646%	7,988%	5,326%	14,116%	9,881%	3,850%	2,631%	9,015%	11,325%	5,935%	3,465%	2,117%	1,765%
Municipal Average	7,664%	12,044%	5,353%	15,633%	10,401%	2,494%	3,224%	8,326%	8,698%	4,562%	4,196%	2,494%	2,555%

Deviation = Municipal answers Index - Total enquiries Index

## #0 - The Boavista District

Situated on the western outskirts of Lisbon and surrounded by the Monsanto Forest, the Boavista District was built by the Municipality in the 40s, with a view to rehousing families from the shanty towns.

Subject to successive phases of rehousing, its current population is estimated at around 5,000 inhabitants; 1,559 houses, 41 of which have already been bought by the families; of the rest, 510 in the older 'alvenaria' area.

In 2011 the district was classified as a Priority Intervention District (BIP), due to economic, social, environmental and urban deficits, integrated in the Priority Intervention Districts Map on the Lisbon Master Plan.

Newer dwellings

Alvenaria dwellings

## Participation of the population and partners

This whole process has been organized with the **Junta de Freguesia de Benfica** (locally elected Council) and **ARMABB** (Residents Association of the Boavista District).

**GABIP-Boavista** was set up (Support Office for the Priority Intervention District of Boavista) in order to ensure permanent coordination between the various sectors.

GABIP-Boavista gathers all services of the municipality, Gebalis and EPAL which are involved in the programme, and is complemented by an Executive Committee which ensures coordination with the Local Council and the Residents Association, and also an Extended Committee with the presence of all programme partner organizations.

The **Executive Committee** ensures the regular and objective flow of information for all stakeholders and the monitoring of Programme operations.

The **Extended Committee** is for reflection and systematic review of the development of the Programme, and may submit concrete proposals concerning its implementation.

# The Boavista Eco-District Action Plan

eco-bairro  
**BOAVISTA**  Ambiente +  
um modelo integrado de inovação sustentável



## The Eco-District Boavista Environment+ Action Plan

ERDF grant of 2,5m€ and total investment of 4,4m€:

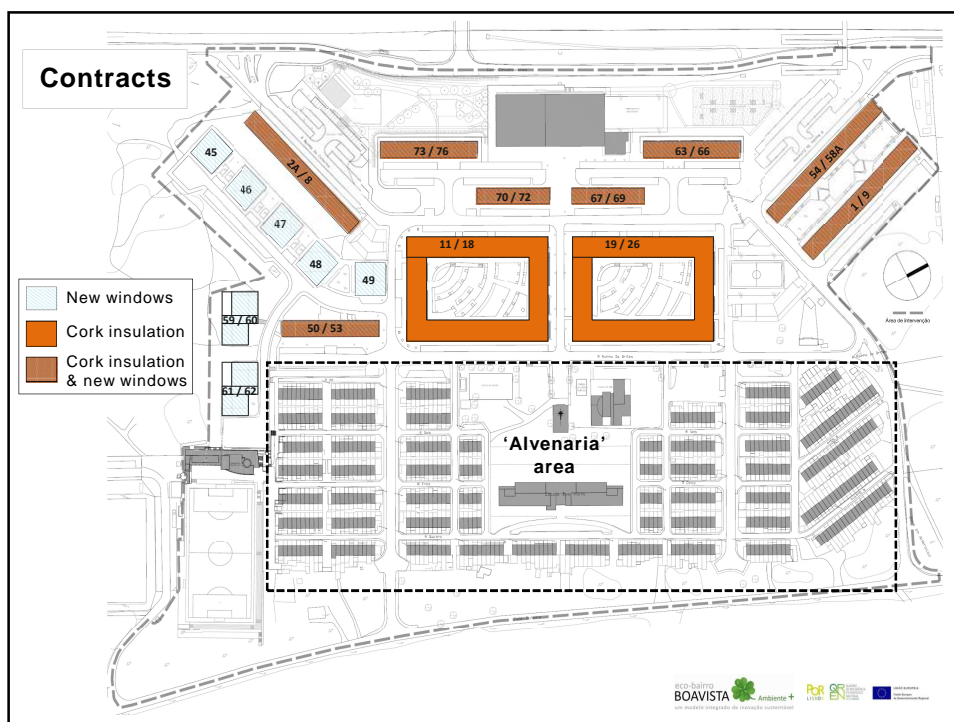
	Investment areas distribution:	components/contracts (63):	investment:	%
#1	Residential buildings renewal, improvement of environmental efficiency	1.29, 1.30, 1.31, 1.32, 1.33, 1.34, 1.35, 1.37, 1.39.1, 1.39.2 and 1.41	2.401.535,04 €	55%
#2	Building of new Community Equipment	1.1, 1.3, 1.5, 1.6, 1.7, 1.9.1, 1.9.2, 1.9.3, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.18, 1.21, 1.22 and 1.23	955.878,82 €	22%
#3	Renewable Energy installations	1.2, 1.8.1, 1.8.2, 1.19, 1.20, 1.43.1, 1.43.2 and 1.43.3	372.574,97 €	8%
#4	'Net-Verde' district free WIFI	1.24	32.500,00 €	1%
#5	Energy and Environmental education and monitoring	1.17.4, 1.25 and 12.4	80.580,00 €	2%
#6	Participation and Media	1.16, 1.17.1, 12.1.1, 12.1.2, 12.1.3, 12.2 and 12.3	71.725,50 €	2%
#7	Recreational and Sporting Activities	1.17.2, 1.17.3, 1.26, 1.27.1, 1.27.2, 1.28.1 and 1.28.2	87.000,00 €	2%
#8	'Alvenaria' renewal: urban and architectural projects	1.4.1, 1.4.2, 1.4.3, 1.4.4, 1.4.5 and 1.43.3	226.350,00 €	5%
#9	Project coordination, management and monitoring	12.5 and 12.6	162.000,00 €	4%
			<b>4.390.144,33 €</b>	

# #1

## Residential buildings renewal

Improvement of environmental performance. All studies, project design and testing were supported by E-Nova and LNEC. All completed works:

- a) - Coating and complete ecological insulation of façades: lots 11/18.
- b) - Coating and complete ecological insulation of façades: lots 19/26.
- c) - Efficient windows: lots 1/9, 2A, 8, 45/49, 54/58A, and 59A/62D.
- d) - Coating and ecological insulation of blind gables: lots 1, 9, 2A, 8, 50, 53, 54, 58A, 63, 66, 67, 69, 70, 72, 73 and 76.
- e) - Efficient windows: lots 50/53, 63/66, 67/69, 70/72 and 73/76.



## Improvement of buildings' environmental efficiency

Even in the more recent flats, one of the more common of the inhabitants' complaints includes **cold, humidity** and **flooding**, and evidence of cracks/fissures in the façades of these buildings has been confirmed.

As a response to these problems, support was requested from Lisboa E-Nova (Municipal Energy and Environment Agency) and LNEC (National Civil Engineering Laboratory).

The proposed solutions were the application of an **outer layer of cork insulation** with a non-cement mortar which, in addition to **solving the afore-mentioned issues**, would allow for an **improvement of the efficiency of the façades**, and **reduce future maintenance costs**.

In one of the buildings, several tests to the system have taken place in order to guarantee quality and the best investment choice.

After a public competition to select the contractor, **more than 20.000m<sup>2</sup> of this ecological solution were applied**.

A second proposal consisted of the replacement of the previously inefficient windows by more than **3,000 (4,000m<sup>2</sup>) new eco-efficient windows with regulated ventilation**.



### Coating and ecological insulation of façades

ETIC System final cost of 38€/m2  
(Buildings 11/18 and 19/26: > 400 houses)



### Coating and ecological insulation of façades

ETIC System final cost of 38€/m2  
(Buildings 11/18 and 19/26: > 400 houses)



### Efficient window with regulated ventilation

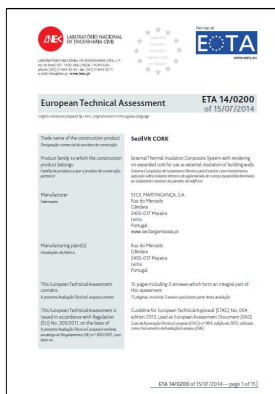
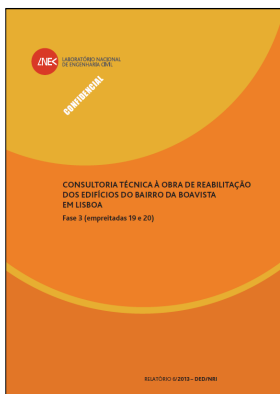
1.2x1.1m window (all works): 258€  
 Ventilation unit: 40€  
 (>3,000 new windows and >4,000m<sup>2</sup>)



### International certification and opportunities for technological exportation

Todo o processo de contratação e selecção da tecnologia foi apoiado pelo LNEC (vide relatórios) de modo a promover o desenvolvimento e a certificação de tecnologias ecológicas, apoiadas na característica experimental da intervenção, de modo a permitir a sua replicação e exportação.

A tecnologia de revestimento ecológico com cortiça e argamassa não cimentícia seleccionada foi entretanto **homologada pelo LNEC (DH 931) em Setembro de 2013 e pela ETA (ETA 14/0200) em Julho de 2014.**



# #2

## New Community Equipment:

- Eco-center (completed)
- BMX Track and Bike path (completed)
- Market support Infrastructure (completed)
- Urban Agricultural Plots (completed)
- Public areas and green spaces (completed)
- Public Lighting (completed)
- Municipal and local club Sport facilities renewal (completed)
- 'Pedibus' on-foot assisted circuit with safe stops at school, kindergarten, sports facilities and others. (procedure underway)





### BMX track and Cycle path



### Market support Infrastructure



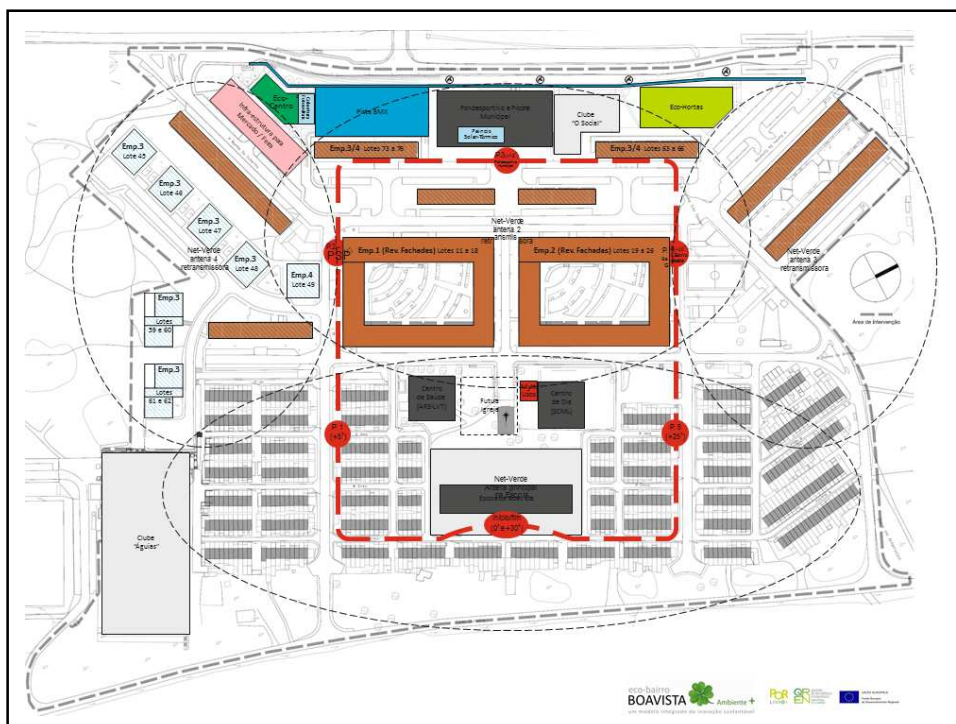
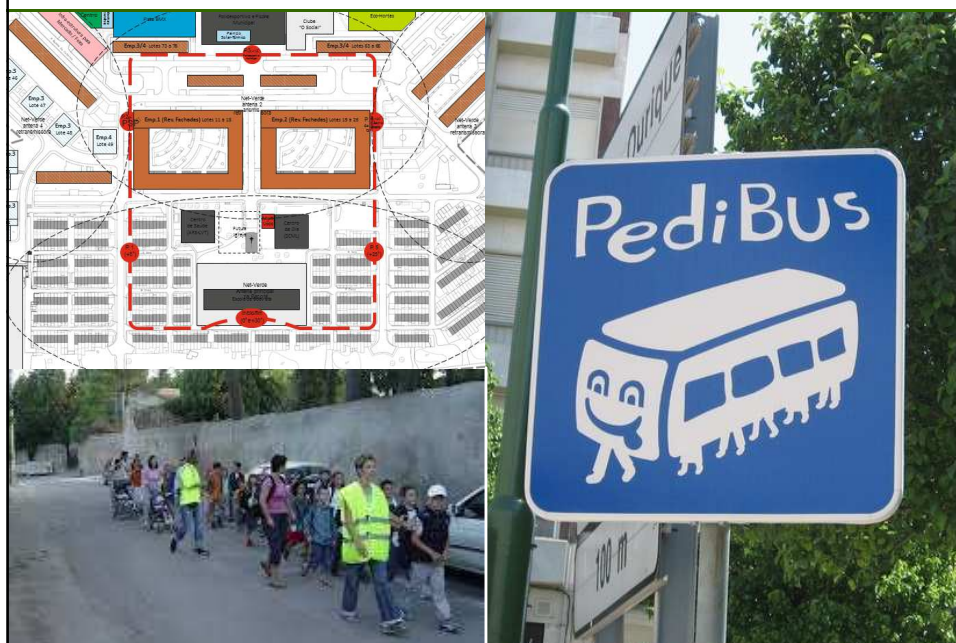
Urban Agricultural Plots



Public lighting in the 'Jardins de Pedra' (installation of 56 efficient lamps)



'PediBus' assisted pedestrian circuit in the District



BOAVISTA   
 Um trabalho integrado de mobilidade sustentável

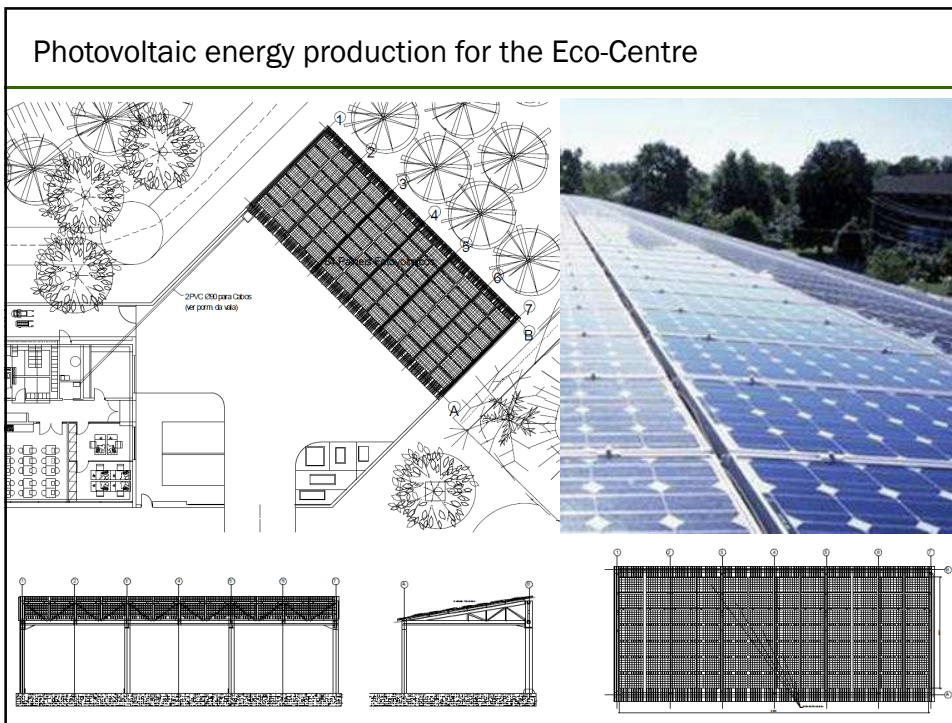
# #3

## Renewable Energy Facilities:

- Solar-thermal water heating for the swimming-pool and sports pavillion (completed)
- Photovoltaic energy production for the Eco-Centre (completed)
- Experimental / pedagogical Eolic Turbines Park (completed)

Solar-thermal water heating for the swimming-pool and sports pavillion



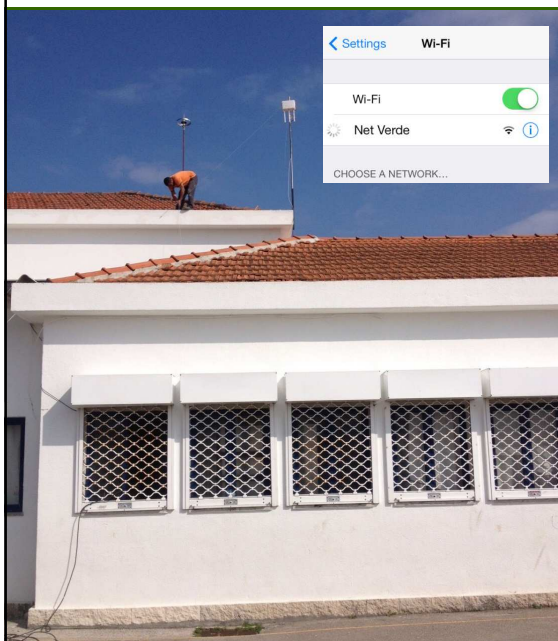


# #4

## 'Net Verde' free urban WIFI:

- Free wireless Internet access in the District (completed)

### 'Net Verde' (Green internet) - Free wireless Internet in the district



BOAVISTA AMBIENTE  
**Net Verde**  
Internet sem fios gratuita no Bairro da Boavista

#### Users

Boavista district municipal tenants, homeowners and school students.

#### How it works

All municipal tenants receive the network access login and monthly password with their rent receipt. Access will be given according to existing rent payment. On request, an annual specific login and password is given to homeowners and school students.

#### Potential

Permanent community survey tool for local management decision making.


# #5




## Energy and Environmental education and monitoring:




- Door-to-door distribution and presentation of especially designed 'Eco-Booklet' manual.
- Competition for saving and reduction of household consumptions.
- Monitoring study and reports on housing, facilities and urban energy consumptions before, during and after interventions.

## The 'Eco-Booklet' household consumption saving manual

### ECO-Caderneta ECO-Bairro Boavista Ambiente +



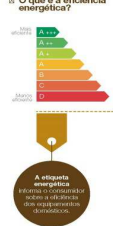




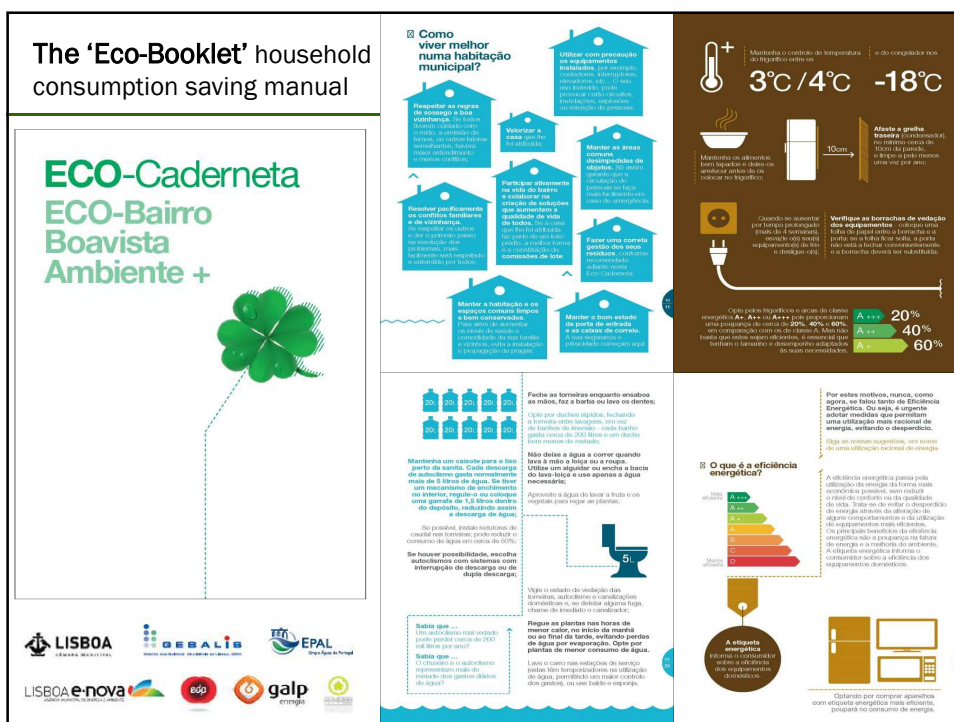
**Como viver melhor numa habitação municipal?**

- Respeitar as regras de temperatura da habitação.
- Manter a habitação e os espaços comuns limpos e bem conservados.
- Manter a habitação e os espaços comuns limpos e bem conservados.
- Manter o bom estado da porta de entrada da porta de entrada.

**Como é a eficiência energética?**



Atividade energética



15

## 'COOPETITION' programme

- Publication of the **Boavista Environment+ Eco-Booklet**.
- Training and hiring of local youth to raise awareness, monitor consumption and advise families in the district.
- Savings and reduction of household energy and water consumption competition amongst 100 families with awarding prizes (groceries vouchers up to 250€).



**ECO-Bairro Boavista Ambiente +**

**ECO-Caderneta**

Como pode poupar e contribuir para um ambiente melhor?

Coopetir

Contamos consigo!

Para mais informações dirija-se à ARMABB



facilitators' course




residents' presentation




competition awards

## 'COOPETITION' programme



monthly family consumption report and counseling



**Programa COOPETIR**

Desafio de poupança de água, eletricidade e gás natural

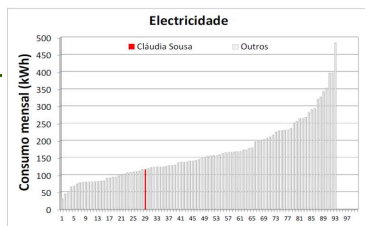
Monitor: Marco - Consumos de Setembro/2013

**Dica do Mês**

Esta mês, para o ajudar na sua poupança, oferecemos-lhe uma lâmpada eficiente. Esta consome cerca de 80% menos energia do que as tradicionais, para além de durar muito mais tempo. Mas atenção, esta lâmpada não deve ser colocada no lixo comum quando acabar. A página 32 da ECO-caderneta explica onde deve depositá-la. No próximo mês tentaremos ajudá-lo a poupar água.

Pense duas vezes antes de decidir qual o sistema de gás que vai usar na sua casa. Saiba que o gás canalizado é cerca de 20% mais barato do que o gás de garrafa? Sem falar no impacto ambiental associado ao transporte até chegar à sua casa...

Poupe na sua carteira, e no ambiente de todos!

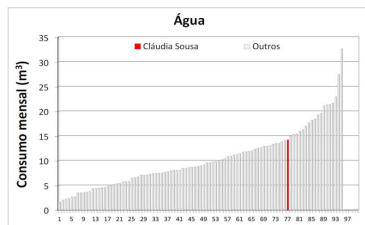


**Electricidade**

Consumo mensal (kWh)

Cláudia Sousa (red bar) vs Outros (grey bars)

Este mês ficou na 29ª posição da Coopetição (Dois, entre os participantes com menor consumo de electricidade)

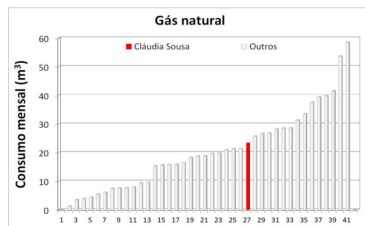


**Água**

Consumo mensal (m³)

Cláudia Sousa (red bar) vs Outros (grey bars)

Este mês ficou na 77ª posição da Coopetição (Dois, entre os participantes com menor consumo de)



**Gás natural**

Consumo mensal (m³)

Cláudia Sousa (red bar) vs Outros (grey bars)

Este mês ficou na 27ª posição da Coopetição (Dois, entre os participantes com consumo médio de)



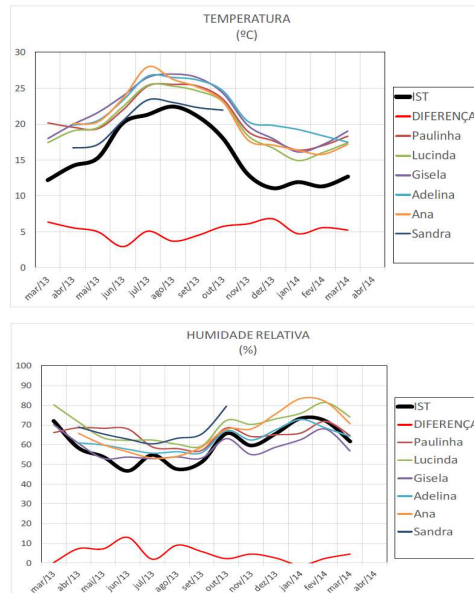
## Monitoring study and reports on housing comfort impact and energy consumptions before, during and after the interventions.

In March 2013 in 6 flats, Lisboa E-Nova installed equipment designed to continuously measure electricity consumption and environmental temperature and relative humidity.

The 6 flats were chosen according to varied typology and positioning, although the existence of a computer and internet connection to communicate results was a conditioning factor. It is important to note that of the 6 residents, Sandra's flat is on the ground floor and its walls had not undergone intervention by the ETIC system.

**These measurements aim to evaluate the impact of the ETIC system installation, and new windows which took place in the 2nd semester of 2013, on electricity consumption and interior comfort conditions.**

This graphics show the average monthly temperature and relative humidity readings collected, alongside the atmospheric temperature and relative humidity levels obtained from ILISBOAL8 weather station, located in the IST - Instituto Superior Técnico.



## #6

### Participation and Media:

- Specific Website and social networks.
- 3 specific district "Newsletters".
- Workshops with the population.
- Eco-Boavista publication / Project final report.
- Project public exhibition

## Participation and Media:

- Eco-District website and social networking.
- 3 Newsletters
- Workshops with the population.



Nota informativa da Câmara Municipal de Lisboa fevereiro 2012

eco-bairro  
**BOAVISTA**  Ambiente +  
um modelo integrado de inovação sustentável



## Boavista Eco-District Environment+ [website](#)



## #7

## Sport activities:

- Sports training and tournaments.
- Art and circus workshops.
- Summer camps program for all ages.
- BMX track construction and provision of equipment and monitoring.
- Improvement of School sports infrastructures in the District.

**BOAVISTA AMBIENTE+**  
**INSCRIÇÕES GRATUITAS**

OCEANÁRIO      CONSTRUÇÃO TURBINA ESCOLA      BTT

CHAPITÔ      DESPORTO      PÉS NA AREIA

TODAS AS ACTIVIDADES TERÃO LUGAR:  
NA ESCOLA ARQUITECTO RIBEIRO TELES  
NO POLIDESPORTIVO MUNICIPAL  
OU COM PARTIDA E CHEGADA NO BAIRRO.

INSCRIÇÕES ABERTAS - abertas aos residentes do Bairro da Boavista.  
NA ASSOCIAÇÃO DE MORADORES - ABIMAB - Rua Rainha D. Maria I, Loja 02, 1000-517 Lisboa  
NA JUNTA DE FREGUESIA DE BENFICA - Avenida Gomes Pereira nº11, 549-018 Lisboa

Para mais informação: [pub@boavista@fm-b Lisboa](mailto:pub@boavista@fm-b Lisboa)

## 'Chapitô', working with kids in the streets in Boavista district.

**Chapitô**  
**BAIRRO DA BOAVISTA**

No âmbito do Projeto "Eco - Bairro da Boavista Ambiente +" o Chapitô vai realizar ateliers de formação artística e circense destinado a jovens, crianças e seniores.  
Esta formação culminará em Dezembro com a apresentação final de um espetáculo onde serão demonstrados os conhecimentos e técnicas aprendidas.

**ATELIER DE CIRCO**  
- destinado a crianças dos 4 aos 12 anos  
Todas as 3ª feiras das 15h às 16:30h  
Ginásio da Escola Arq<sup>ta</sup> Gonçalo Ribeiro Teles

**TÉCNICAS CIRCENSES**  
- Destinado a jovens dos 12 aos 18 anos  
Todas as terças feiras das 11:30h às 13h  
pavilhão gimnodesportivo do Bairro da Boavista

**ATELIER DE FORMAÇÃO ARTÍSTICA**  
- destinado a Adultos com mais de 65 anos  
Todas as quintas feiras das 15h às 16:30h  
sala da Comissão de Moradores



BOAVISTA Ambiente+      Pólo de Inovação e Empreendedorismo      LISBOA



**ZUMBA**  
fitness

NA SEDE DA ARMABB  
**QUARTAS-FEIRAS ÀS 21H**

## DIVIRTA-SE E FIQUE EM FORMA

A festa dançante de condicionamento físico fácil de acompanhar, inspirada em danças com ritmos latinos que promove a queima de calorias. Sinta a música e solte-se.



## DANÇAS DE SALÃO

Vem divertir-te com as danças de salão num ambiente fantástico!

**QUARTAS-FEIRAS ÀS 20H**  
*Na Sede da ARMABB*








### Peddy-Paper



**BOAVISTA** Ambiente+  
um espaço integrado de inovação sustentável

### PEDDY PAPERS

(POR BENFICA)

**INSCREVE-TE!**  
(RETROCAS-ESG E ARMABB)

- 25 DE JANEIRO  
"MONSANTO AVENTURA"
- 22 DE FEVEREIRO  
"BENFICA DESPORTO"
- 29 DE MARÇO  
"BENFICA NA ESTRADA"
- 26 DE ABRIL  
"MOVE-TE BENFICA"

SÁBADOS ÀS 11H




### Traditional games



### Visit to the Oceanarium - 181 students from Boavista primary school



# #8

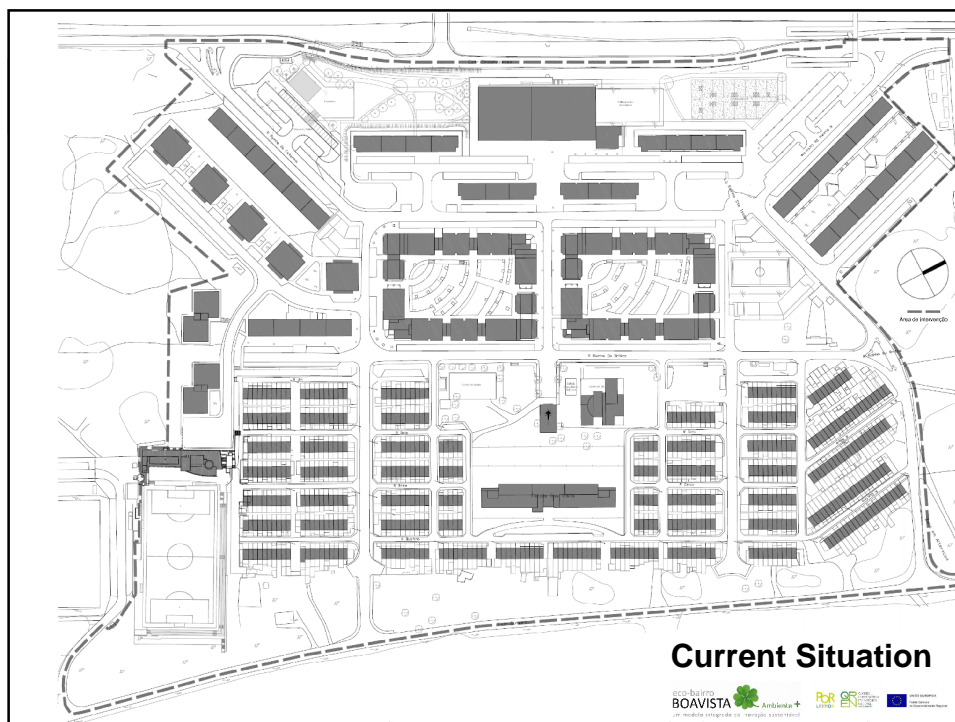
## 'Alvenaria' renewal:

Urban and architectural projects, all completed:

- Participatory definition of objectives, timing, Urban Operation and Resettlement Process phasing.
- Municipal Urban Plan for 'Alvenaria area'.
- Detailed building Project for the phase 0 of relocation – adaptation and updating of the existing project "EPUL JOVEM".
- Selection of architectural solution for the 'building module' by public tender for the 'Alvenaria area' - setting of the tender specifications through participative methodology by establishment an advisory council and jury for selection and recruitment of detailed Project.
- Detailed project of 'building module' to 'Alvenaria area' by the winner of the public tender, with technical monitoring of GABIP and Advisory Board.

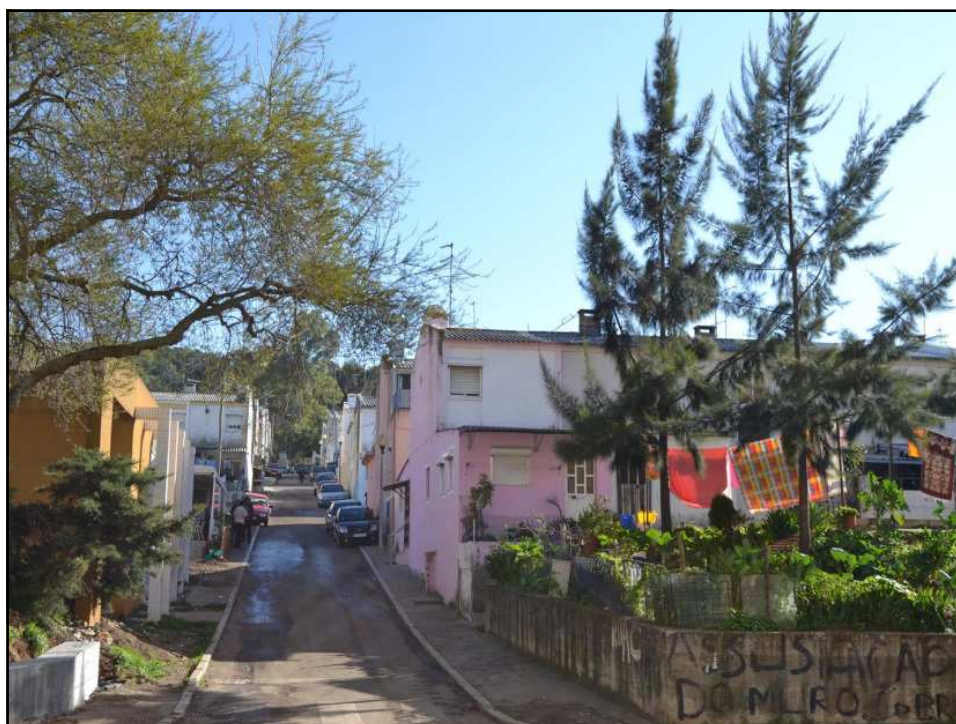
The more recent buildings, 'Alvenaria' and Monsanto





*Alvenaria*, the architectural competition – video by Rui Franco









## The 'Alvenaria' architectural solution

### Goals:

1. **Substitution of 510** degraded and critically undersized 'alvenaria' buildings;
2. Housing the same 350 families **in the same location**;
3. **Maintenance of the urban matrix**, road layout, population density and relationship with the Monsanto forest;
4. Allowing the beginning of **urban phased substitution in 2014**;
5. Avoiding economic and social **costs of temporary replacement**;
6. Implementing a **participative methodology** for the definition of urban and architectural projects;
7. Developing and enforcing the principles of energy and environment efficiency defined in the '**eco-district**' action plan;

## The 'Alvenaria' architectural solution

### Goals:

8. Developing and enforcing the principles of '**District 30**' (pedestrian priority) classification given to Boavista;
9. Developing and enforcing the principles of **post-'PER'** social housing (90s large scale housing programme), namely in responses to subjects such as:
  - a) exploration and maintenance costs control,
  - b) housing quality and comfort,
  - c) communal parts management,
  - d) accessibility for elderly and disabled,
  - e) neighbourly relations,
  - f) social and cultural integration,
  - g) house adaptability to family natural growth.

## The 'Alvenaria' architectural solution

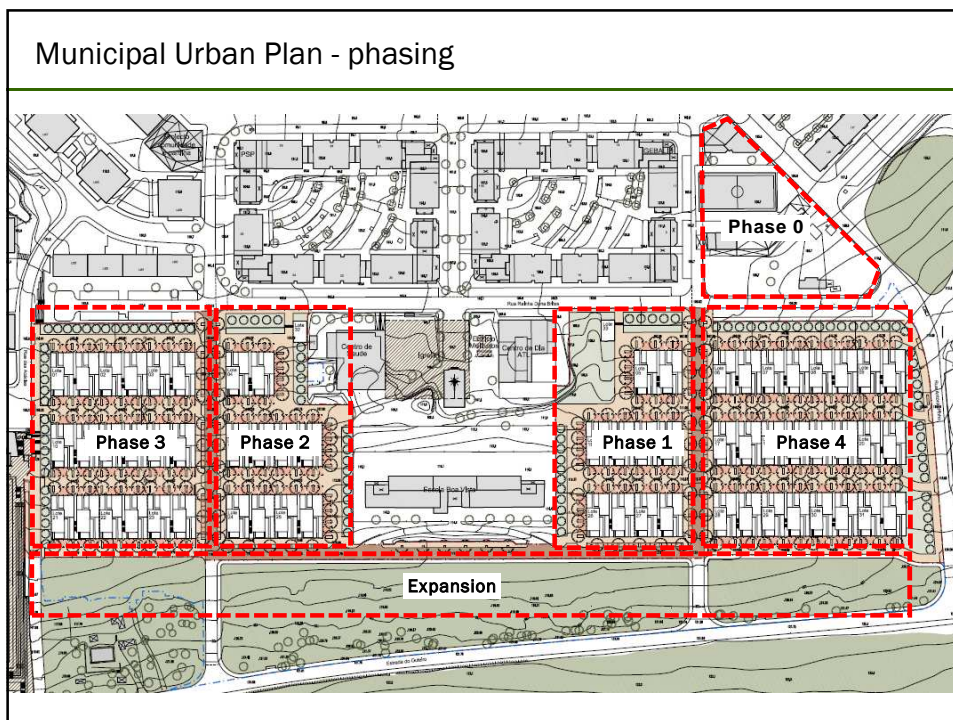
### Adopted methodology:

- Open public **competition**.
- The **jury was composed of representatives** of the **Municipality**, Order of **Architects**, **GEBALIS** (Municipal Social Housing Management Enterprise) and **Residents** Association.
- In appraisal of proposals, members of the Jury will take into account the views transmitted by members of the advisory board within their respective areas of expertise: **Order of Architects**, **FA-UTL** (Lisbon Faculty of Architecture), **GEBALIS**, **Lisboa E-Nova** (Municipal Energy and Environment Agency), **APISOLAR** (Solar Energy Industry Portuguese Association) and **EPAL** (Public Water Company).

## The 'Alvenaria' architectural solution

### Competition objectives:

- The public competition aims to **select the most appropriate solution** for new buildings to be constructed in the so-called 'alvenaria' in the Boavista district.
- Those who may compete are **Architects** - individually or in association - or Architecture Offices who meet the requirements specified in the Competition Programme.
- The jury will award a **prize of 5,000 € for each of the 5 best** classified.
- The **successful proponent will be awarded the development of all projects** required for the construction of the new buildings in accordance with the allotment project.
- The whole project development contract for the standard building will be made for the fixed amount of **75,000 €** and **500 €** for the technical assistance on the project adaptation for each of up to **46 buildings** to be built.



*The Alvenaria Renewal provisional budget:*

Total future investment of 41,5M€:

Planned works phasing		house units	m2	Estimated budget (VAT incl.)	reference
Phase 0	Transfer process costs of the 442 resident families	-	-	€ 100.000,00	estimate
	Rehabilitation of 114 empty house units for families transfer	114	-	€ 2.280.000,00	house units x 20.000€ + 6% VAT
	Urban infrastructures projects for phases 1, 2 and 3	-	-	€ 100.000,00	estimate
	Demolitions and urban infrastructures for phase 0	-	-	€ 432.444,87	5% construction costs
	Social housing construction of 2 buildings (ARIPA)	158	13.239	€ 8.648.897,45	513.60€ x m2 + 20% + 6% VAT
1st Phase Alvenarias (North)	Urban infrastructure and demolitions (160 house units / 141 families)	-	-	€ 1.356.249,14	15% construction costs
	Social housing construction of 12 building modules (ORANGE)	120	10.380	€ 6.781.245,70	513.60€ x m2 + 20% + 6% VAT
	Affordable housing private construction of 4 building modules (ORANGE)	40	3.460	€ 2.260.415,23	513.60€ x m2 + 20% + 6% VAT
2nd Phase Alvenarias (Center)	Urban infrastructure and demolitions (210 house units / 182 families)	-	-	€ 1.525.780,28	15% construction costs
	Social housing construction of 10 building modules (ORANGE)	100	8.650	€ 5.651.038,08	513.60€ x m2 + 20% + 6% VAT
	Affordable housing private construction of 8 building modules (ORANGE)	80	6.920	€ 4.520.830,46	513.60€ x m2 + 20% + 6% VAT
3rd Phase Alvenarias (South)	Urban infrastructure and demolitions (140 house units / 119 families)	-	-	€ 1.017.186,85	15% construction costs
	Social housing construction of 9 building modules (ORANGE)	90	7.785	€ 5.085.934,27	513.60€ x m2 + 20% + 6% VAT
	Affordable housing private construction of 3 building modules (ORANGE)	30	2.595	€ 1.695.311,42	513.60€ x m2 + 20% + 6% VAT
Totals:		732	53.029	€ 41.455.333,76	

### The 'Alvenaria' architectural solution

#### Main project features:

- The proposed projects should provide for the **construction of a controlled costs housing building (aprox. 513€/m2) containing 10 flats** with a total Gross Construction **Area between 731 and 859m2** - 3 T1 (52 and 65m2), 4 T2 (72 and 85m2), 3 T3 (91 and 105m2) e 1 T4 (105 and 114m2).
- The building should sit within the lot limits defined in the allotment project, **display up to 4 floors**, in order to make the existence of lifts unnecessary, and **should be attachable** on both sides in a sequence of equal buildings if another solution is not shown to be more advantageous.
- Within the area of the lot there must be provided **1 car parking space** per T1 and T2 flats and 2 spaces per T3 and T4. **Garages will not be accepted.**

### The 'Alvenaria' architectural solution

#### Main project features:

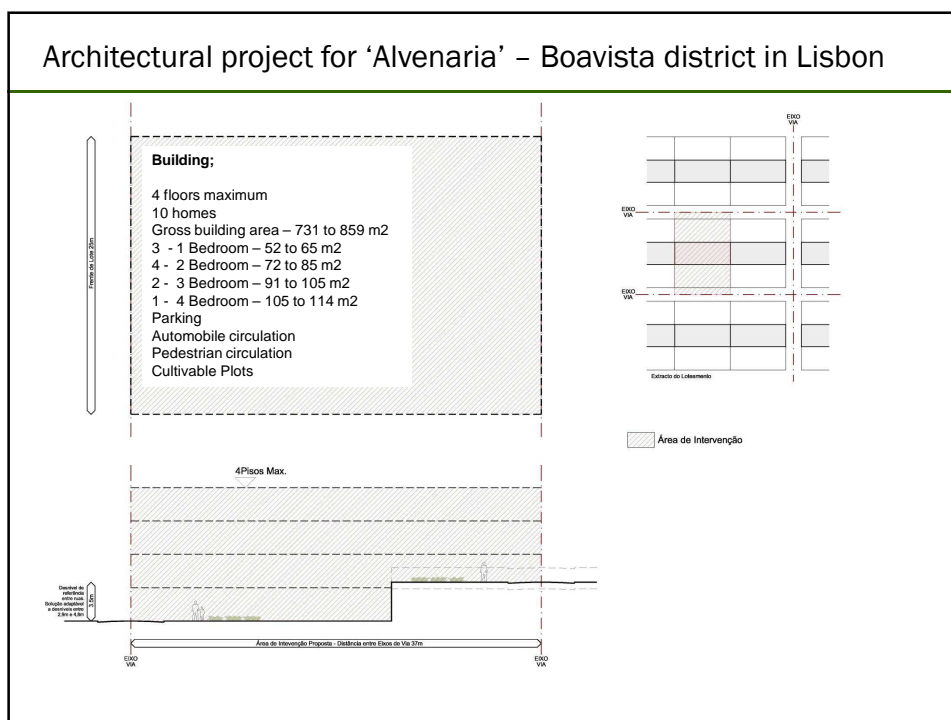
- Within the limits of the lot still provided for each flat, there must be included the **existence of a plot of arable land** together with adequate space for storage, preferably in the space adjacent to each flat.
- The building should include a technical room for, in particular, the **installation of a solar water heating collective solution**, with easy and direct access to the public road. A **storage solution for separate Municipal Solid Waste containers** should also be provided, made comfortable for residents and functional to municipal services.
- The **T1 and T2 flats should be equipped with universal accessibility** and have direct and horizontal access to the street. The **remaining flats should also have direct and exclusive access to the street**, in order to make the existence of shared areas of circulation unnecessary.

## The 'Alvenaria' architectural solution

### Main project features:

- The design of the building should be able to support the **typological evolution of the flats**, in order to accommodate natural growth of the family, within the original implantation area, without prejudice to the other requirements of the programme and to provide for **their architectural integration**.
- The buildings should present common areas **maintenance costs as low as possible** and **renovation ease of the flats' interiors**. Industrialized and modular solutions shall be privileged in order to enable **easy renovation of floors, kitchens and toilet facilities** as well as the flat's adaptation to use by the elderly or disabled.
- The lead architect undertakes to present constructive solutions with a maximum cost consistent with the values set for **controlled housing costs of less than 513.60€/m<sup>2</sup>** (2nd trimester 2013).

## Architectural project for 'Alvenaria' – Boavista district in Lisbon



## The 'Alvenaria' architectural solution competition

### 4 selection criteria:

#### 1 - Social criteria:

- a. Ability to integrate the inhabitants' expectations regarding the solution within the participatory methodology presented (0 to 10 points);
- b. Accessibility of the building and flats, especially for the elderly and disabled (0 to 10);
- c. Sizing and suitability of the cultivable plot solution presented (0 to 10);
- d. Feasibility of the typological evolution solutions for the flats presented (0 to 10).

#### 2 - Energy / Environmental criteria:

- a. Solution and construction technologies sustainability, according to their environmental impact (0 to 10);
- b. Energy efficiency of the building and flats (0 to 10);
- c. Usage of rain-water and re-usage of grey-water systems adequacy (0 to 10);
- d. Sizing and suitability of the proposed collective solar water heating system (0 to 10).

## The 'Alvenaria' architectural solution competition

### 4 selection criteria:

#### 3 - Economic criteria:

- a. Tectonic and architectural rationality of the solution presented (0 to 10);
- b. Guarantee of the construction cost estimate within the maximum value admitted (0 to 10);
- c. Communal parts (roofing, exterior walls, etc) maintenance costs according to construction systems adopted (0 to 10);
- d. Flats' interior renovation costs according to construction systems selected for flooring, kitchens and WCs (0 to 10).

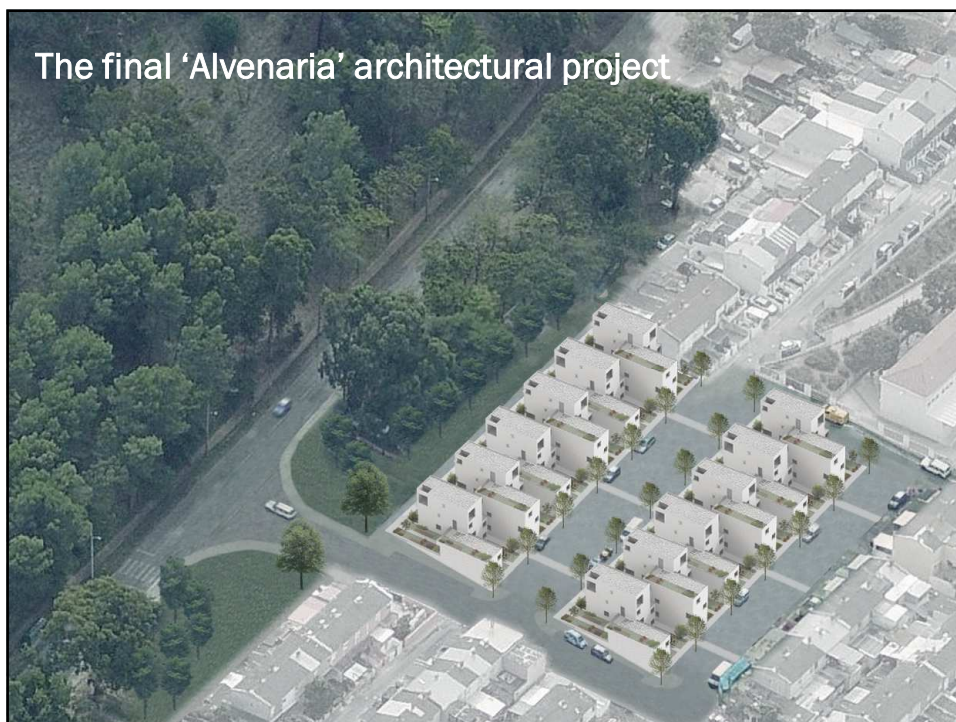
#### 4 - Architectural criteria:

- a. Architectural quality of the solution presented (0 to 10);
- b. Project adequacy to topography, phasing and other urban allotment characteristics (0 to 10 points);
- c. Bioclimatic solutions integration for ventilation and passive climatisation (0 to 10);
- d. Innovative character of the solutions presented (0 to 10).

# The final 'Alvenaria' Architectural Project

By: Architects Alexandre Dias, Bruno Silvestre, and Luís Spranger

The final 'Alvenaria' architectural project





## The Sustainability Factors



**Economic** - Despite the apparent complexity of the built form, the project is highly rationalised. The material palette is very concise and proposes to deploy a very well established set of construction techniques of practical and rapid execution. The choice of materials took into account construction costs as well as maintenance costs.



**Accessibility** - The project takes advantage of the existing topography of the site by setting out two distinct levels of access at street level, providing step-free access to 80% of the residential units. Innovative bathroom design was adopted in order to ensure full accessibility and flexibility in less constructed areas.



**Ecological** - The fragmented architectural form provides the residential units with multiple orientations, gaining natural light from all quadrants throughout the day, mitigating the levels of energy consumption. This will be assisted by solar panels for water heating. The high level of insulation will also contribute to reducing energy consumption and running costs.



**Social** - Through the symbiosis between built mass and open space, the project defines an array of small plazas where the allotments will be located. These spaces set a framework for social engagement and will consolidate the sense of community amongst the residents.



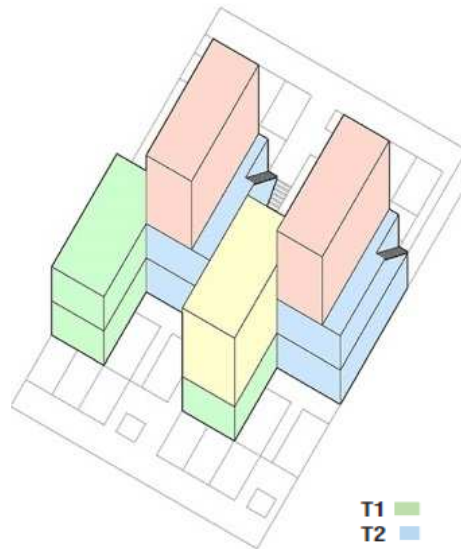
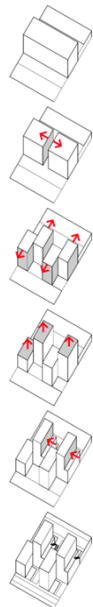
**Architectural** - At an urban level, the fragmented architectural form expresses a balance between the individuality of each volume and the collective of the city. On a domestic scale, the centrality and form of the main living space provides each unit with spatial flexibility, offering the possibility of accommodating a pre-planned and tenant affordable additional bedroom in order to meet long term suitability.

## Massing

Starting from the solid bar running the full width of the plot, we broke it in two halves, opening a gap in the middle of the plot for urban pedestrian passage. Each half is then further broken into halves, generating four volumes.

Each volume is shifted away and towards the street either side, with the staggered arrangement generating two small plazas on each side of the plot, along each street. Vertical adjustments are made to accommodate the required volume and areas creating a variety of roof levels amongst the four volumes.

Lastly, horizontal adjustments create the external access into the upper units, correcting the volumes and areas to meet the brief requirements.

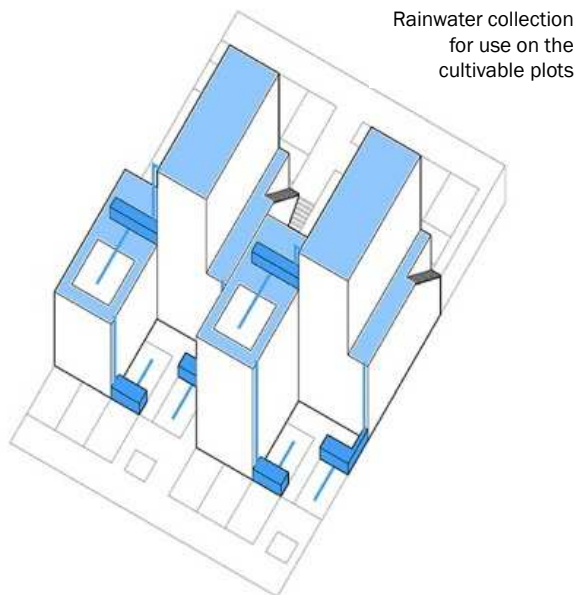


T1 ■  
 T2 ■  
 T3 ■  
 T4 ■

## Water

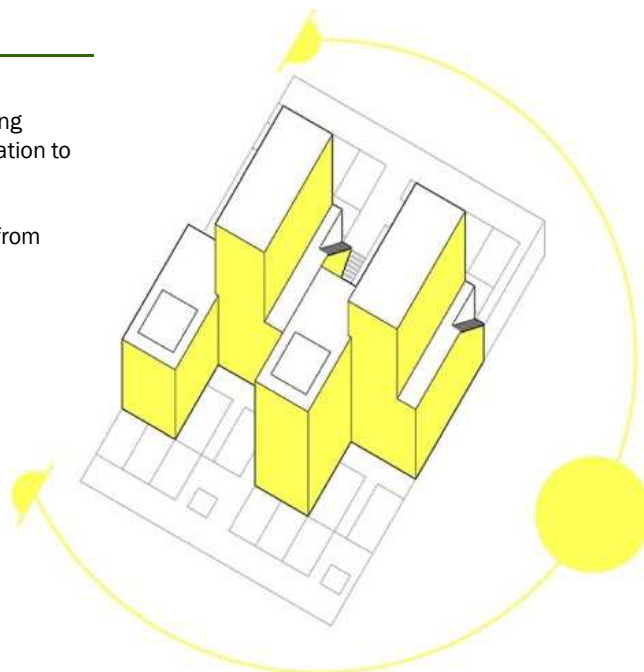
Rain water is collected from the roof surfaces and stored in individual water tanks located within each allotment.

These masonry elements are integrated in the design of boundaries and thresholds that define the territories of the public space of the street and communal outdoor space of the allotments.



## Insolation

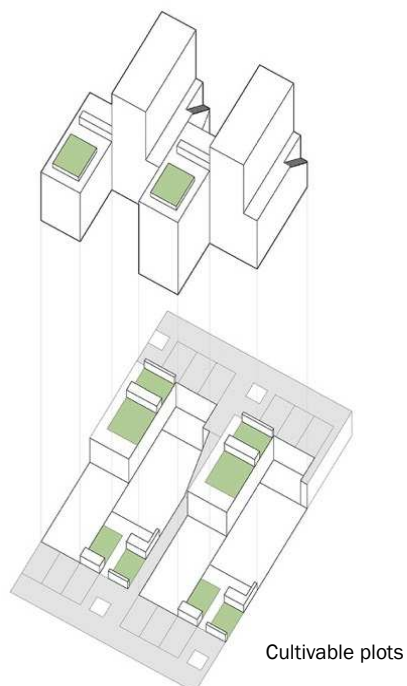
The fragmented massing allows for solar penetration to all units. All units have multiple aspects and orientation benefiting from good solar exposure.



## Allotments

Each residential unit will have direct access to an allotment. Resulting from the access and topographical strategy, 80% of the units will have their allotment acting as a front garden.

The two elevated 3-bedroom residences occupying the taller volumes will have their allotments on the adjacent flat roof of neighbouring units of the lower volumes. This strategy promotes usability whilst contributing to urban and social sustainability.



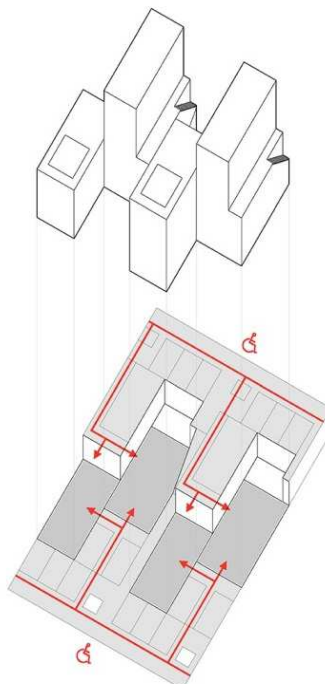
## Access

The project takes advantage of the existing topography in order to maximise level access into the residential units. Each plot has two levels of access, one from each street bounding each plot.

As a strategy, all seven single level units alongside the 4-bedroom unit are located at one of the street levels.

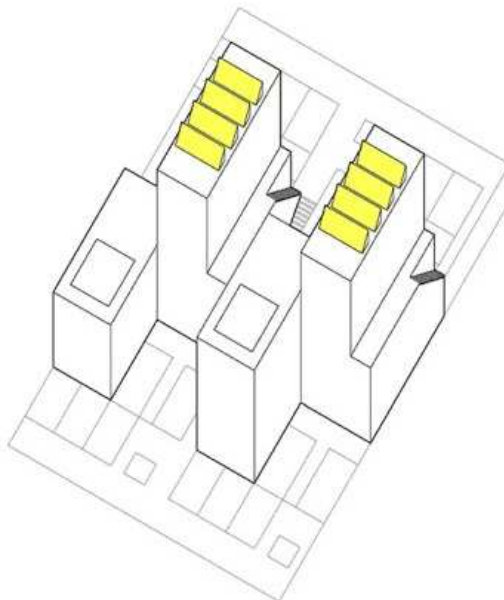
The three bedroom units are accessed via external steps and through a private elevated terrace.

This way, the project achieves 80% level access.

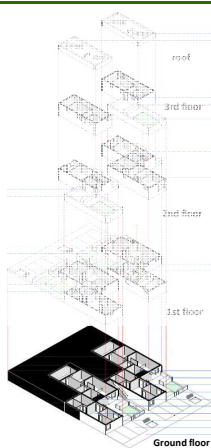


### Solar Panels

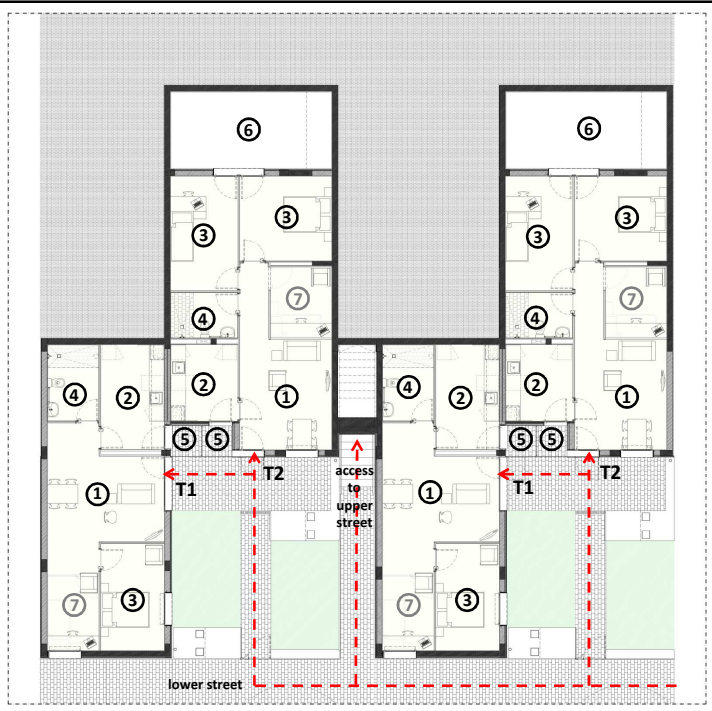
The taller volumes will be crowned by individual solar panels that will supply the hot water for each unit.

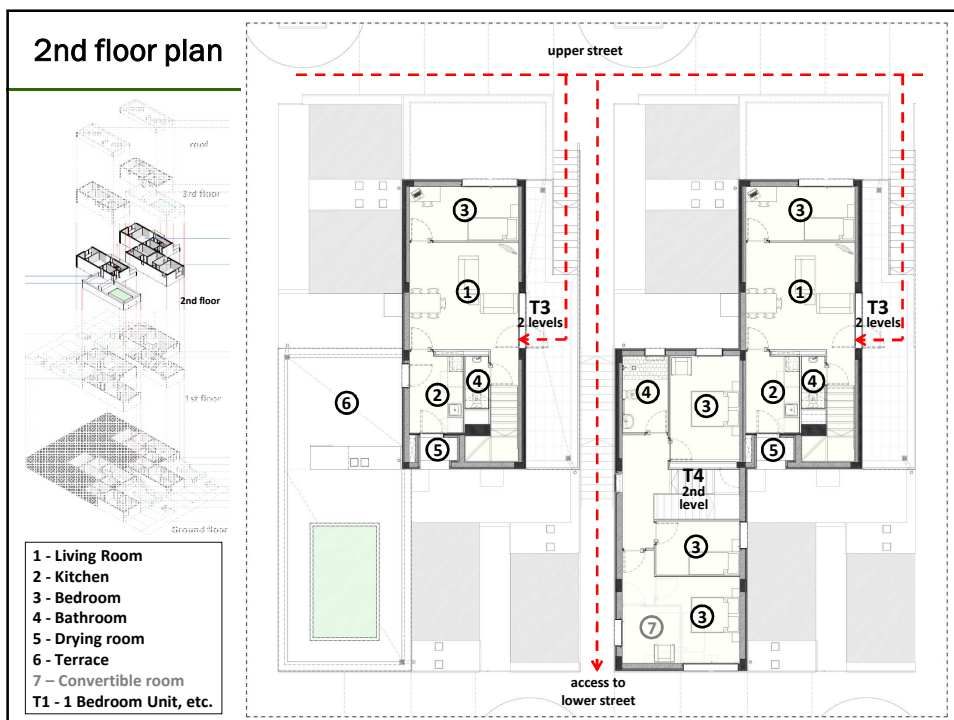
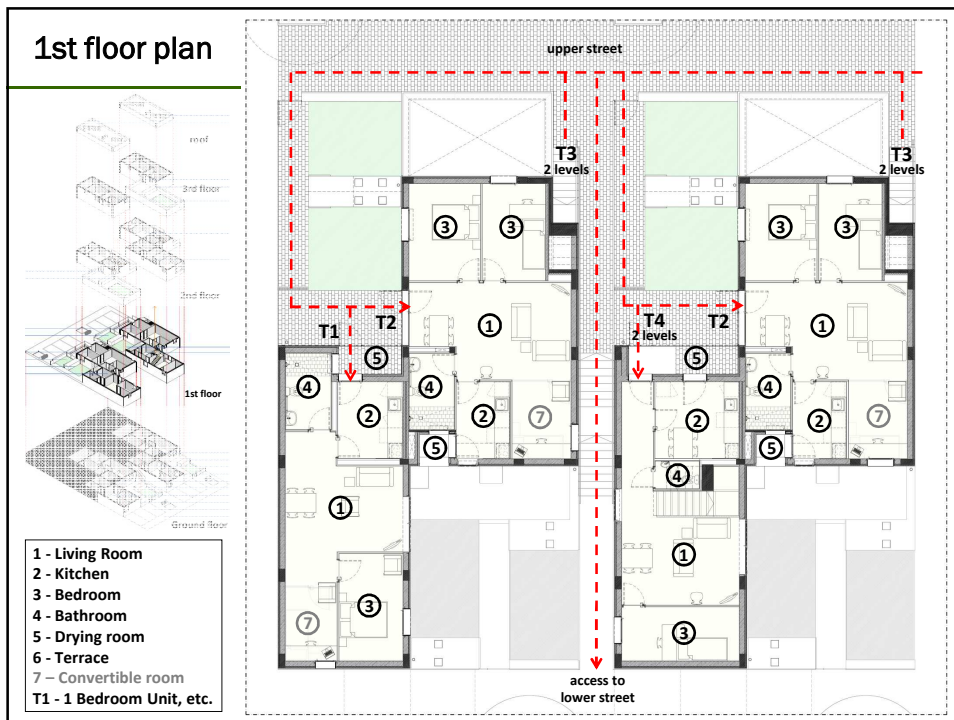


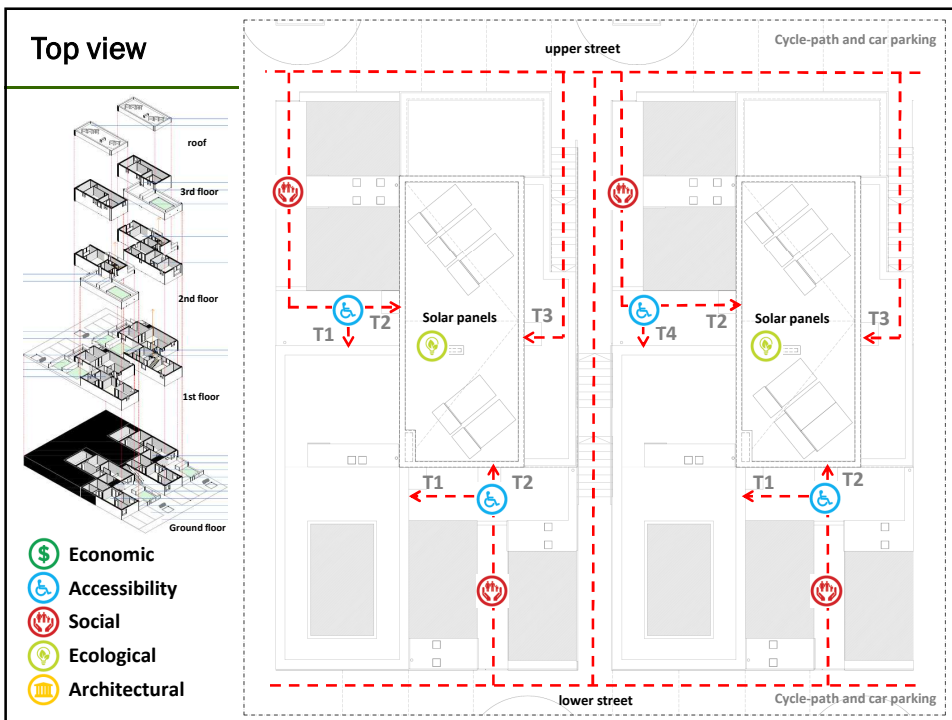
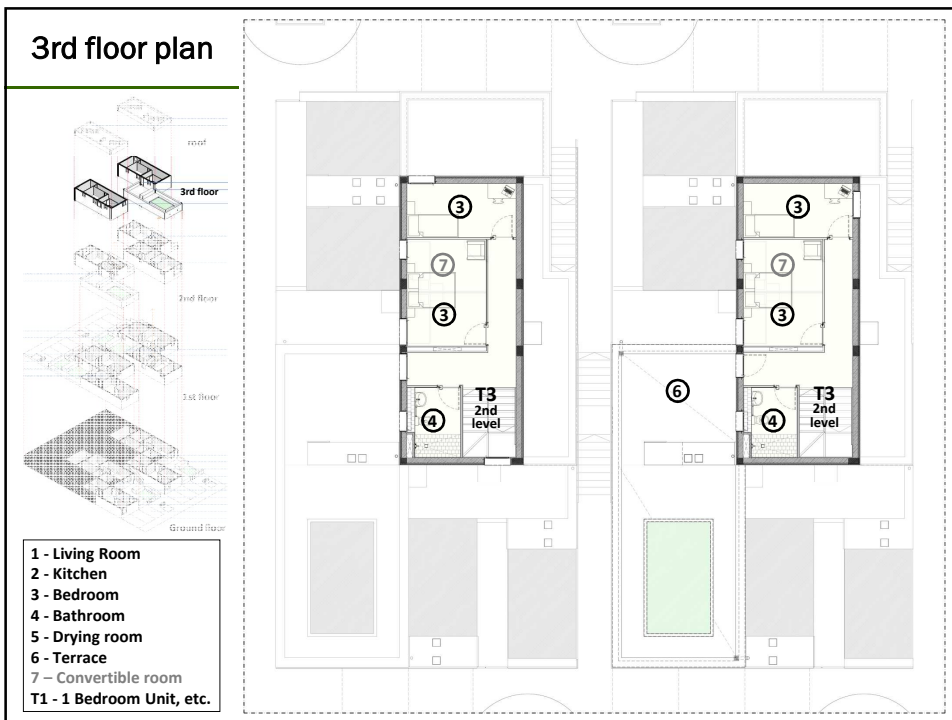
### Ground level

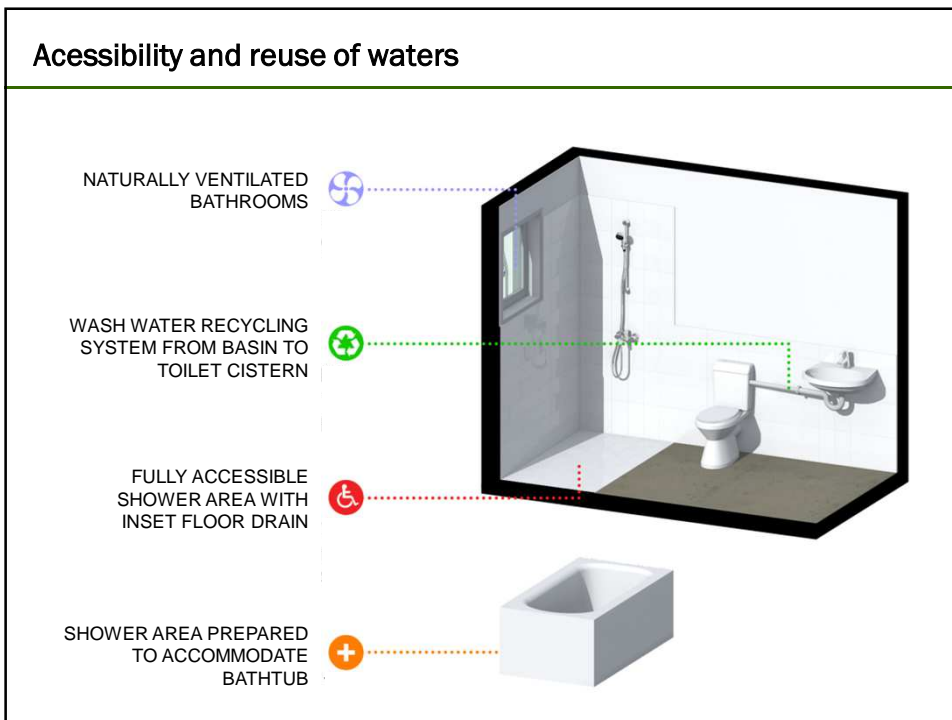
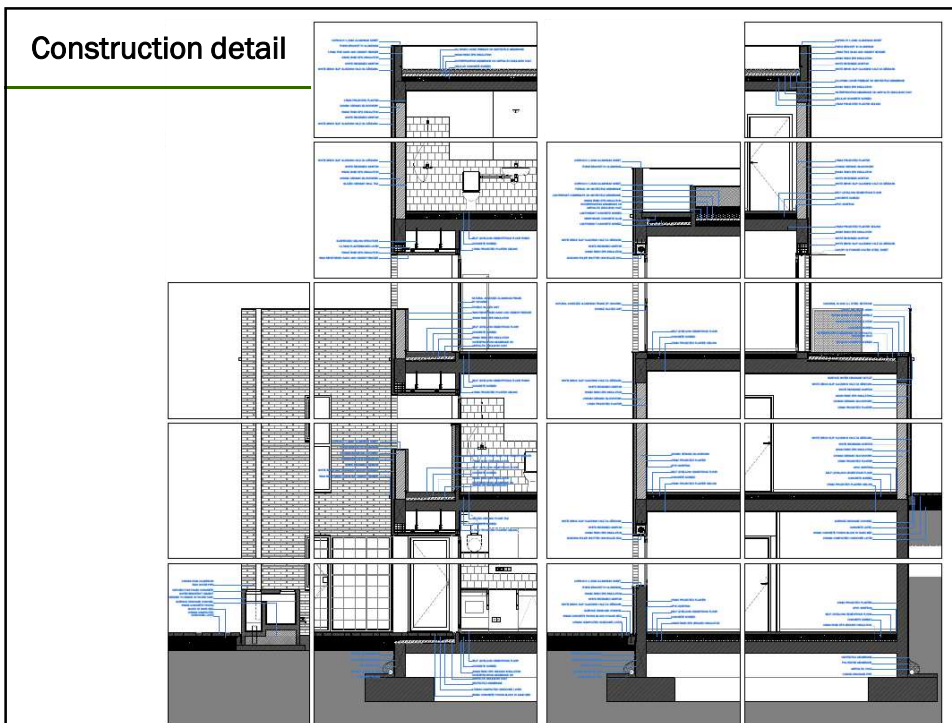


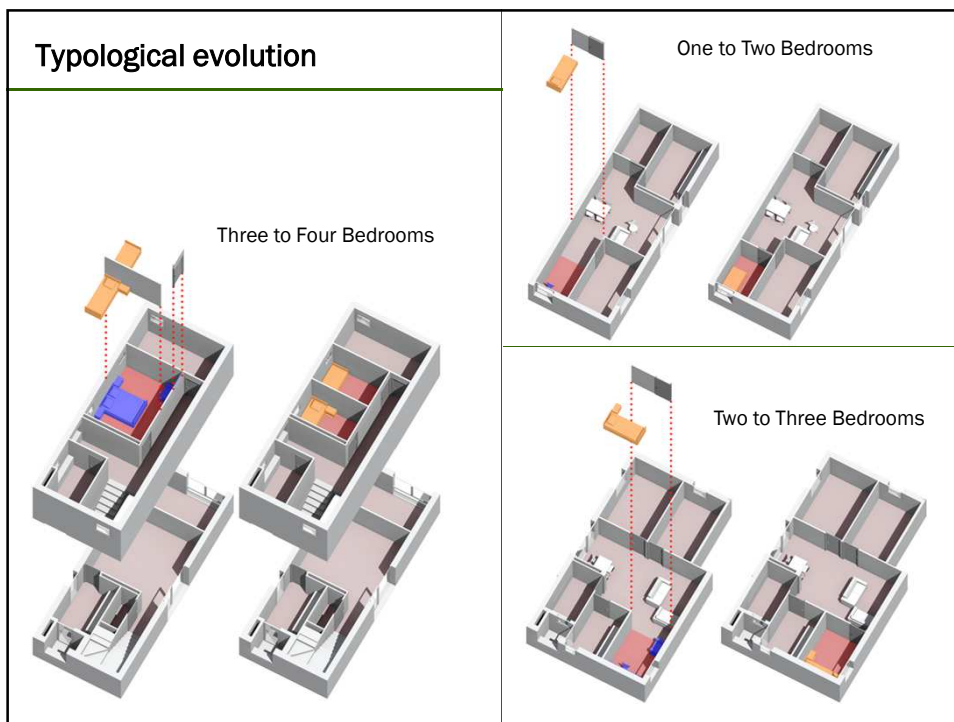
- 1 - Living Room
- 2 - Kitchen
- 3 - Bedroom
- 4 - Bathroom
- 5 - Drying room
- 6 - Terrace
- 7 - Convertible room
- T1 - 1 Bedroom Unit, etc.













## Reabilitação Urbana “Alvenarias” da Boavista – 1º Fase Construção:

*Demolições, infra-estrutura, espaço público e construção de 50 fracções habitacionais*

### Critérios de selecção para adjudicação da empreitada:

40% - Preço (até 20% abaixo de 4.113.241€)

25% - Demonstração do cumprimento do prazo de construção (16 meses)

35% - Performance adicional (acima das exigências do projecto): ETICS, caixilharias, impermeabilização, divisórias interiores, etc

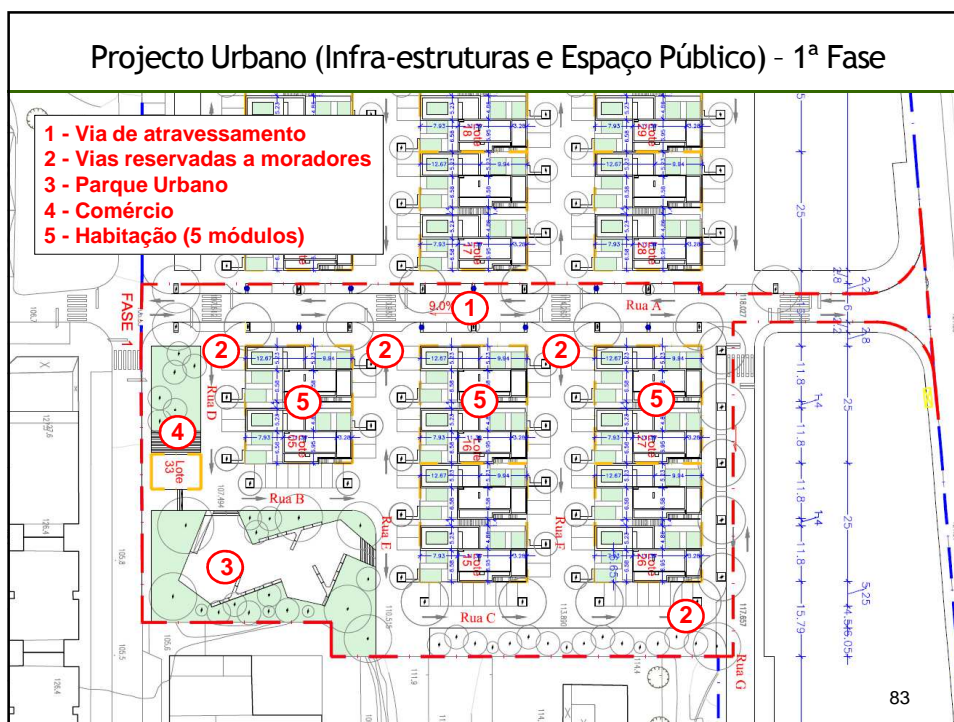
### Proposta vencedora:

		Cap. 1 - ESTALEIRO	300 000			
DEMOLIÇÕES E MOVIMENTAÇÃO DE TERRAS	% Estaleiro	25 573	0,7%	326 899	9%	
	Cap. 2 - TRABALHOS PREPARATÓRIOS E ACESSÓRIOS	749	0,0%	301 325	9%	
	Cap. 3 - DEMOLIÇÕES	249 610	6,5%			
	Cap. 4 - MOVIMENTOS DE TERRAS	50 967	1,3%			
INFRAESTRUTURAS E ESPAÇO PÚBLICO	% Estaleiro	76 999	2,0%	984 270	26%	
	Cap. 5 - ARRANJOS EXTERIORES	188 624	4,9%	907 270	26%	
	Cap. 12 - OBRAS DE URBANIZAÇÃO	718 646	18,7%			
HABITAÇÕES	% Estaleiro	197 427	5,1%	2 523 675	66%	
	Cap. 6 - ESTRUTURAS	511 109	13,3%	2 326 247	66%	
	Cap. 7 - CONSTRUÇÃO CIVIL	1 325 308	34,6%			
	Cap. 8 - INSTALAÇÕES E INFRAESTRUTURAS PREDIAIS	337 177	8,8%			
	Cap. 9 - PRODUÇÃO DE ÁGUA QUENTE SANITÁRIA	108 496	2,8%			
	Cap. 10 - MOBILIÁRIO E EQUIPAMENTO FIXO E MÓVEL	39 274	1,0%			
	Cap. 11 - DIVERSOS	4 884	0,1%			
TOTAL GERAL				3 834 843	100%	
TOTAL SEM ESTALEIRO				3 534 843		

## The Alvenaria Renewal – 1st phase Construction:

### Building construction cost per Module:

Module and House Units area and cost	nº	Area (m2)	%	construction cost
House Units with 1+1 Bedrooms	3	65	23,6%	39 741 €
House Units with 2+1 Bedrooms	4	75	36,5%	46 087 €
House Units with 3+1 Bedrooms	2	102	24,8%	62 467 €
House Units with 4+1 Bedrooms	1	121	14,6%	73 836 €
<b>TOTAL</b>	<b>10</b>	<b>824</b>		<b>504 735 €</b>
			<b>€/ m2</b>	<b>612 €</b>
			<b>Average Cost / House Unit</b>	<b>50 473 €</b>



### Projecto Urbano (Infra-estruturas e Espaço Público) - 1ª Fase

#### Sistema RSU - Ilhas inteligentes:

- Enquadramento urbano nas vias de atravessamento;
- Contentores enterrados;
- Acesso com chave electrónica para contagem por utilizador;
- Informação online de contagem (débito/crédito) aos utilizadores;
- Informação à Central para optimização de frota/recolha.



1 Fecho auxiliado por cilindros a Gás	4 Tambor de deposição
2 Batente plomérico fim de curso	5 Sinalética com ColorADD*
3 Fechadura automática	6 Porta comercial para utilizadores autorizados












## #9

### Lessons learned from the *Eco-District*

European 2020 strategy and finance opportunities alignment testing for future Sustainable Renewal of Buildings and Local Based Development Plans.

1. Local community participation methodology;
2. Effective satisfaction monitoring tools;
3. Innovative and sustainable social housing construction model for the 1,000 families of the 'Alvenarias' in Boavista and Padre Cruz districts;
4. Powerful innovative house renewal technologies and strategies to reduce energy consumptions to be replicated, escalated and exported:
  - a) Competitive cork based ecological national ETICS technology;
  - b) Competitive and efficient national window with ventilation technology;
  - c) Innovative and more efficient domestic and public solar water heating technologies;
  - d) Innovative 'Eco-Booklet & Coopetition' household consumption reduction program.

# #9

## Project Coordination and management



**Project Coordinator**  
Rui Franco,  
Architect



**Project Manager**  
Carla Cupido,  
Engineer



**Project Manager**  
Hugo Farizo,  
Manager



**Urban Project**  
Eduardo Cabido,  
Architect



**Project Assistant**  
Amália Luz,  
Administrator



**LISBOA**  
CÂMARA MUNICIPAL

eco-bairro  
**BOAVISTA**



Ambiente +



**GEBALIS**



**LISBOA e-nova**



**ZNEK**



**LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL**



**EPAL**



**BENFICA**



**ORDEN DOS ARQUITECTOS**

# BOAVISTA ECO-DISTRICT

Project presentation – November 2016

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