The central premise of USER-CENTERED DESIGN is that the best designed products and services result from understanding the needs of the people who will use them —Design Council
1.0. RESEARCH CONCLUSIONS

2.0. URBAN CONCEPT

3.0. ARCHITECTURAL PROGRAM

4.0. BUILDING TECHNOLOGY

5.0. CLIMATE DESIGN

6.0. DESIGN IMPRESSIONS
1.0. RESEARCH CONCLUSIONS
A CITY OF CONTRADICTIONS
WHAT'S BEING BUILT NOW?

-1- Urbano model - office building, AEDES architectural studio, completed 05/2013

-2- Red apple - residential building, AEDES architectural studio, completed 05/2013

-3- Hotel Sense - hotel building architect Lazzarini Pickering, completed 11/2013
Last century a period of poverty and housing shortage

Refugees have taken residence

poor quality buildings and a lack of communal spaces.
QUALITY OF THE BUILDINGS

DEMOLISHED BUILDINGS

POTENTIALLY DANGEROUS BUILDINGS
QUALITY OF THE BUILDINGS

ABANDONED PROPERTIES

PEOPLE MOVING OUT
QUALITY OF THE BUILDINGS

POOR MAINTENANCE AND OBVIOUS NEGLECTION
How do *policy goals* and *dweller’s preferences* overlap?
How this can be used as base to define a *strategy for redevelopment* of a neglected *city centre* neighbourhood?

**RESEARCH SUB-QUESTION**

- What are the living preferences of the city centre dweller?
  What are people’s motivations behind choosing to live in the city centre?

- How does the Housing Market in Sofia answer to the needs and lifestyle of the people?

- What are the municipality of Sofia’s plans for the city centre?
• Big part of the existing housing stock is in a bad condition
• 60% of the housing stock is considered “old”
• Half of the people in Sofia live in mass housing blocks
• Constant slow increase in the demand for dwellings
• Stable sale and rental prices
• Intensified competition on the building market has improved the quality of the housing
• Potential home-buyers are focused on better living conditions
PEOPLE'S LIVING PREFERENCES

• Pedestrian and bicycle friendly neighbourhood
• Solution to the parking problem
• More sun, air and greenery
• Large main living area
• Working space
• Long-term and short-term storage
• Space for utility tasks
• Balance between high daylight penetration and privacy
• Big private outdoor space
• Energy efficiency
MUNICIPALITY POLICY GOALS

- Freedom for new constructions in the area
- Encourage private initiatives

Current lack of municipality goals

“We don’t have any particular idea about the area, we’re totally uninterested. Therefore I encourage all private initiatives. The redevelopment of the neighbourhood is in the hands of its owners.”
• Shaping Good Places
• Housing for a Diverse City
• From Street to Front Door
• Dwelling Space Standards
• Home as a Place of Retreat
• Sustainability
• Site details
• Outdoor spaces
• Occupants
• Space Requirements and Relationships
• Design Objectives
• Lifestyle
• Environmental Sustainability
2.0. URBAN CONCEPT
LOCATION OF THE NEIGHBOURHOOD IN SOFIA

SITE LOCATION

CITY CENTRE
VISUAL CONNECTIONS OF THE AREA

THE BOULEVARD
VISUAL CONNECTIONS OF THE AREA
VISUAL CONNECTIONS OF THE AREA

THE COMMERCIAL PLINTH
VISUAL CONNECTIONS OF THE AREA

THE SCHOOL

67 ул. „Ляпота“
София, Sofia град
Street View - авг. 2012
BUILDINGS TO BE PRESERVED
RAISED DECK - LOCATION

elevator
stairs
toilet
REFERENCE ATMOSPHERE

The High Line, New York
current $\text{FSI} = 0.76$

- chaotic building development of single family units
- small private outdoor spaces
- low density living

project $\text{FSI} = 3.12$

- perimeter block development
- big semi-private courtyard
- good social interaction between the people

- perimeter block development
- voids creating different views and connections
- big semi-public courtyard
- big private outdoor spaces in the voids
- good social interaction between the people
THE STORY OF A DWELLER
THE STORY OF ALEX

ALEX KLENOVA

- Lives in Sofia
- Owns one of the houses of the researched neighbourhood and has been living there for the past 26 years
- A Doctor
- Has 3 children and 2 grandchildren
- Has an average monthly income
- Enjoys cultural entertainment - opera, theater, ballet
- Currently lives alone
HER FRONT DOOR
HER BALCONY
“I can’t rely on the municipality to arrange separate trash bins in close proximity to my home therefore I would appreciate if it can be facilitated by my residential building. It would make it so much easier.”

“I have a really big terrace now where I have all my plants and enough space to relax. This is something I would also want to have in my future dwelling so I can move all my beloved plants there, drink my coffee in the morning and relax under the sun.”
3.0. ARCHITECTURAL PROGRAM
CURRENT SITUATION

- empty plot
- empty building
- single family house
- apartment building
- auxiliary building

Silhouette street view -2-

Silhouette street view -1-
1st STEP - DEMOLITION

good location in the centre of the city
nice view to the mountain from south

noisy and busy boulevard which separates the city in two parts
no green space
not enough parking space
too many small plots
Enough parking places for the residents
Enough parking places for residents and guests

Commercial plinth preserving the existing atmosphere of the neighbourhood
Promotion of slow traffic - pedestrian & bicycle friendly raised deck zone
Semi-private courtyard adding “sun, air and greenery”

Promotion of communal way of living - collective spaces in the semi private GREEN courtyard
CLOSED RESIDENTIAL BLOCK

Closed residential block with voids creating big private outdoor spaces

Parts of the volume are pushed in to create a "shifting" effect
GROUND LEVEL

- 120 parking places
- shops
- entrance space
- bike storage
- technical room

Parking spaces
Bicycle storage spaces
UNDERGROUND LEVEL

- 162 parking places
- Garbage shafts
- Domestic waste system for easy recycling
- Rainwater storage & harvest
- Parking spaces
- Extra storage space
- Garbage space
- Storage space
- Rainwater storage
- Technical room
FORTH RESIDENTIAL LEVEL

dwellings
entrance space
private outdoor space
ROOF LEVEL

elevator shafts
photovoltaic panels
contact collectors
BUILDING BLOCKS

BLOCK TYPE -1-

BLOCK TYPE -2-

BLOCK TYPE -3-

BLOCK TYPE -4-

BLOCK TYPE -5-

BLOCK TYPE -6-
28 DWELLING TYPES

type 1- 53m²
do double orientation

type 2- 64m²
do double orientation

type 3- 118m²
do double orientation

type 4- 90m²
do double orientation

type 5- 104m²
do double orientation

type 6- 125m²
do double orientation

type 7- 107m²
do double orientation

type 8- 83m²
do double orientation

type 9- 86m²
do double orientation

type 10- 84m²
do double orientation

type 11- 86m²
do double orientation

type 12- 102m²
do double orientation

type 13- 63m²
do double orientation

type 14- 84m²
do double orientation

type 15- 122m²
do double orientation

type 16- 86m²
triple orientation

type 17- 85m²
triple orientation

type 18- 130m²
triple orientation

type 19- 112m²
triple orientation

type 20- 142m²
triple orientation

type 21- 108m²
triple orientation

type 22- 64m²
triple orientation

type 23- 97m²
triple orientation

type 24- 108m²
triple orientation

type 25- 123m²
triple orientation

type 26- 53m²
triple orientation

type 27- 107m²
triple orientation
BLOCK #1 - apartment layout features

Large main living area
BLOCK #1 - apartment layout features

- Large main living area
- Double height spaces

FIRST LEVEL

SECOND LEVEL
BLOCK #1 - apartment layout features

- Large main living area
- Double height spaces
- Separate working space
BLOCK #1 - apartment layout features

Large main living area
Double height spaces
Separate working space
Storage & utility space
BLOCK #2 - apartment layout

FIRST LEVEL

SECOND LEVEL

1. = 90m²
2. = 104m²
3. = 64m²
4. = 86m²
5. = 64m²
6. = 108m²
Two bedrooms
Storage and laundry space
Open main living space
Big private outdoor space
TYPES OF OUTDOOR SPACES

**Type 1:**
shared between 4 apartments

**Type 2:**
shared between 4 apartments

**Type 3:**
shared between 3 apartments

**Type 4:**
shared between 3 apartments

- Large main living area
- Double height spaces
- Separate working space
- Storage & utility space
- Extra big outdoor space
CHOICE OF THE MATERIALS

vertical oak cladding for the residential levels
*oak is a common wood type in Bulgaria

horizontal oak cladding white-wash colored for the "inside corner"

granite stone for the commercial plinth level
*locally produced
FACADES

semi-public
green buffer zone
private outdoor space
private space
SEMI PUBLIC COURTYARD

Visible connections:
- Top right
- Bottom right
- Bottom left
- Top left

Pedestrian connections:
- Top right
- Bottom right
- Bottom left
- Top left
COURTYARD LAYOUT OPTION
5 small scale pavilions accommodating different functions

day-care centre
cafe
meeting space for the residents
sport facilities etc
COLLECTIVE SPACES - PAVILIONS
4.0. BUILDING TECHNOLOGY
CONSTRUCTION OF THE BUILDING
CONSTRUCTION OF THE BUILDING
CONSTRUCTION OF THE BUILDING
CONSTRUCTION OF THE BUILDING
# Choice of Construction Materials

<table>
<thead>
<tr>
<th></th>
<th>Hidden Environmental Cost</th>
<th>Size</th>
<th>Fire Safety</th>
<th>Thermal Mass</th>
<th>Thermal Conductivity (lower is better)</th>
<th>Construction Speed</th>
<th>Weight</th>
<th>Moisture Protection</th>
<th>Maintenance</th>
<th>General Practice (for Sofia BG)</th>
<th>Additional Comments</th>
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<tbody>
<tr>
<td><strong>Concrete In Situ</strong></td>
<td>- -</td>
<td>- -</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>- -</td>
<td>- -</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>No preparation time required</td>
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<tr>
<td><strong>Precast Concrete</strong></td>
<td>- -</td>
<td>0</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td><strong>Steel</strong></td>
<td>- -</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Acoustic, hydroscopic and thermal qualities</td>
</tr>
<tr>
<td><strong>Timber</strong></td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>O</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

FLOOR PANELS
Fixed floor layout elements:
main concrete core
columns
beams
floors
vertical shafts
### Sound insulation regulations for residential buildings

<table>
<thead>
<tr>
<th></th>
<th>$R_w$ (dB)</th>
<th>$L_{nw}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$&gt;$ or $=$</td>
<td>$&lt;$ or $=$</td>
</tr>
<tr>
<td>1. Floor</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td>2. Walls (between dwellings)</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>3. Walls (interior)</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

### Floor panel detail (Lignatur floor panel system)

- Wood chipboard 28mm
- Isover EP2, 20mm
- LKE 200 with fill 90kg/m²

- $R_w$ 61dB
- $L_{nw}$ 52dB
- Total weight: 155 kg/m²

### Walls detail (wooden stud wall system)

#### *dwellings separating wall*

- Plasterboard 12.5mm
- Void
- Plywood 18mm
- $R_w$ 74dB

#### *interior wall*

- Plasterboard 12.5mm
- Insulation
- Plywood 12mm
- $R_w$ 40dB
5.0. CLIMATE DESIGN
### ОСНОВНИ ДАННИ ЗА НАХОДИЩАТА НА МИНЕРАЛНИ ВОДИ

#### А. НАХОДИЩА В СКАЛНАТА ПОДЛОЖКА НА СОФИЙСКИЯ ГРАБЕН

<table>
<thead>
<tr>
<th>Код</th>
<th>Геол. индекс</th>
<th>Име на находището</th>
<th>Дебит, л/с</th>
<th>Температура, °С</th>
<th>Минерализация, г/л</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1</td>
<td>T1</td>
<td>Доброславци</td>
<td>0.40</td>
<td>39 – 40</td>
<td>1.36</td>
</tr>
<tr>
<td>A.2</td>
<td>T1-2</td>
<td>София – Обичай</td>
<td>4.50</td>
<td>32</td>
<td>1.00 – 1.30</td>
</tr>
<tr>
<td>A.3</td>
<td>T1-2</td>
<td>Казаново – Райно поле (дълбоко)</td>
<td>13.00</td>
<td>81</td>
<td>0.83 – 0.88</td>
</tr>
<tr>
<td>A.4</td>
<td>T1</td>
<td>Требич</td>
<td>0.50</td>
<td>51</td>
<td>3.84</td>
</tr>
<tr>
<td>A.5</td>
<td>T2</td>
<td>Илинци</td>
<td>0.30</td>
<td>47</td>
<td>4.14 – 4.60</td>
</tr>
<tr>
<td>A.6</td>
<td>J3</td>
<td>Костинброд</td>
<td>80.00</td>
<td>25 – 31</td>
<td>0.52</td>
</tr>
</tbody>
</table>

#### B. НАХОДИЩА В СЕДИМЕНТНАТА ПОКРИВКА НА СОФИЙСКИЯ ГРАБЕН

<table>
<thead>
<tr>
<th>Код</th>
<th>Геол. индекс</th>
<th>Име на находището</th>
<th>Дебит, л/с</th>
<th>Температура, °С</th>
<th>Минерализация, г/л</th>
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</thead>
<tbody>
<tr>
<td>B.1</td>
<td>N1</td>
<td>Мрамор</td>
<td>1.56</td>
<td>43</td>
<td>3.52</td>
</tr>
<tr>
<td>B.2</td>
<td>N1</td>
<td>Нови искър</td>
<td>1.25</td>
<td>36 – 40</td>
<td>3.38</td>
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<tr>
<td>B.3</td>
<td>N1</td>
<td>Гниляне</td>
<td>0.80</td>
<td>40</td>
<td>3.17</td>
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<tr>
<td>B.4</td>
<td>N1</td>
<td>Световръчене</td>
<td>5.00</td>
<td>45</td>
<td>1.19</td>
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<tr>
<td>B.5</td>
<td>N1</td>
<td>Чепинци</td>
<td>5.14</td>
<td>50</td>
<td>3.38</td>
</tr>
<tr>
<td>B.6</td>
<td>N1</td>
<td>Горни боевод</td>
<td>1.14</td>
<td>44</td>
<td>1.33</td>
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<tr>
<td>B.7</td>
<td>N1</td>
<td>Долни боевод (долно)</td>
<td>0.90</td>
<td>49</td>
<td>3.28</td>
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<tr>
<td>B.8</td>
<td>N1</td>
<td>Казаново – Райно поле (плитко)</td>
<td>5.60</td>
<td>36 – 65</td>
<td>0.27 – 0.79</td>
</tr>
</tbody>
</table>

#### C. НАХОДИЩА В ОГРАДНИТЕ СКАЛНИ МАСИВИ

<table>
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<th>Код</th>
<th>Геол. индекс</th>
<th>Име на находището</th>
<th>Дебит, л/с</th>
<th>Температура, °С</th>
<th>Минерализация, г/л</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1</td>
<td>T2-3</td>
<td>София – Панчарево</td>
<td>14.70</td>
<td>39 – 49</td>
<td>0.39 – 0.50</td>
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<tr>
<td>C.2</td>
<td>K2</td>
<td>София – Железница</td>
<td>9.50</td>
<td>22 – 32</td>
<td>0.26 – 0.34</td>
</tr>
</tbody>
</table>
MINERAL WATER SPRING

1,3 km

construction site

hot mineral spring
Using the floor heating system as a floor cooling in the summer
Local mechanical ventilation of the individual homes
2.4 people per household

224 kw/h/per month per household

2688 kw/h/year per household

1318 kwh/m² solar irradiation in Sofia

18% efficiency monocrystalline PV cells

= 237 kwh/year every 1m² PV cell

144 apartments = 1600m² PV cells [roof surface 5000m²]

- heating: 50%
- preheating water: 23%
- lighting and small el tools: 10%
- cooling (fridge): 8%
- cooking: 4%
- others: 5%

= 11 m² PV cells per household
GREY WATER MANAGEMENT

Diagram showing a green courtyard with rainwater harvesting. The diagram includes rainwater tanks, pumps, and water storage areas for use in various applications such as toilet flushing and washing.
6.0. WHAT IF ALEX GETS A NEW HOME?
HER CURRENT ROUTE
THE NEW ROUTE
WHEN SHE GETS OFF THE METRO
A WALK ON THE RAISED DECK
APPROACHING THE ENTRANCE
p5 presentation
29 | 01 | 2015

design mentor: Robert Nottrot
BT mentor: Ype Cuperus
research mentor: Andre Mulder
external examiner: Daan Vitner

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