SETTLEMENT PATTERNS IN THE EASTERN COAST OF MARACAIBO LAKE, VENEZUELA: EVALUATION OF EXISTING SETTLEMENTS AND MODEL FOR A LOW INCOME SECTOR OF EL MENITO NEW TOWN.

by
Humberto Jose Rodriguez Navas
B. Arch. Universidad del Zulia
Maracaibo-Venezuela
July 1979

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE Degree Of Master Of Science In Architecture Studies AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY
June 1983

Copyright © Humberto J. Rodriguez Navas 1983

The Author hereby grants to M.I.T. permission to reproduce and to distribute copies of this thesis document in whole or in part.

Signature of author
Humberto J. Rodriguez Navas, Department of Architecture, May 1983

Certified by
Horacio Caminos, Prof. of Architecture, Thesis Supervisor

Accepted by
N. John Habraken. Chairman, Departmental Committee on Graduate Students

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MAY 26 1983
SETTLEMENT PATTERNS IN THE EASTERN COAST OF MARACAIBO LAKE, VENEZUELA: EVALUATION OF EXISTING SETTLEMENTS AND MODEL FOR A LOW INCOME SECTOR OF EL MENITO NEW TOWN

by

HUMBERTO JOSE RODRIGUEZ NAVAS

Submitted to the Department of Architecture on May 6, 1983 in partial fulfillment of the requirements for the Degree of Master of Science in Architecture Studies at the Massachusetts Institute of Technology

ABSTRACT

This thesis is divided in two parts; The First part is the physical analysis of residential settlements in the Eastern Coast of Maracaibo Lake, Venezuela. The work is based on surveys, evaluations and comparisons of four identifiable housing systems of the area which are Old settlements, Oil Company Housing, Squatter Settlements and Public Housing. The physical environment of each of these is analysed in terms of land utilization/circulation efficiency and level of services. Based on the first part of the study a model is proposed for a residential area of El Menito New Town which is planned to be constructed in the surrounding area. The criterion followed to establish the layout for the model are explained/drawn as design guidelines. Finally, a comparative evaluation of the model and the analyzed residential settlements is made to show how the model achieves a consistent efficiency in land utilization/circulation efficiency.

Thesis Supervisor: Horacio Caminos Arq.
Title: Professor of Architecture, M.I.T.
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>CASE STUDIES:</td>
<td></td>
</tr>
<tr>
<td>1. Ambrosio, Cabimas</td>
<td>8</td>
</tr>
<tr>
<td>2. Las Cupulas, Cabimas</td>
<td>12</td>
</tr>
<tr>
<td>3. Las Morochas, Ciudad Ojeda</td>
<td>16</td>
</tr>
<tr>
<td>4. Valmore Rodriguez, Ciudad Ojeda</td>
<td>20</td>
</tr>
<tr>
<td>MODEL</td>
<td></td>
</tr>
<tr>
<td>Design Heuristics</td>
<td>23</td>
</tr>
<tr>
<td>Proposed Project</td>
<td>33</td>
</tr>
<tr>
<td>EVALUATIONS/CONCLUSIONS</td>
<td>38</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>43</td>
</tr>
<tr>
<td>NATIONAL/URBAN CONTEXTS</td>
<td>44</td>
</tr>
<tr>
<td>GLOSSARY</td>
<td>52</td>
</tr>
<tr>
<td>BIBLIOGRAPHY/EXPLANATORY NOTES</td>
<td>54</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS

I gratefully acknowledge the guidance of Professor Horacio Caminos during the two years of study.
I am also indebted to Reinhard Goethert for his assistance and encouragement, to the members of the class 82 and 83 in the program Urban Settlement Design in Developing Countries of the Department of Architecture of M.I.T. for their comments.

I appreciate the information and general support from: Ramon Cornieles, Director of Maraven S.A., Meyer Cohen, Director of New Developments of the Ministry of Urban Development of Venezuela. Also the assistance of members of El Menito New Town project team is acknowledged.

The economic support from Fundayacucho and CONICIT, Venezuela, is acknowledged.

The loving support and encouragement of my parents that goes beyond any mean of expression is sincerely acknowledged.

Finally, but by no means least, I acknowledge the moral support, comments, love and company of my wife Beatriz and my son Arturo. They gave special meaning to each day during my studies at M.I.T.
This thesis is concerned with the physical aspects of the uncontrolled development of urban areas in the Eastern Coast of Maracaibo Lake, Venezuela.

The urban settlements in the Eastern Coast of Maracaibo Lake were developed during the first three decades of the oil exploitation in Venezuela, between the years 1920 and 1950. Of the six major urban centers in the area only Santa Rita was a recognized settlement in the Venezuelan post-colonial period. These centers, like most cities in developing countries, are growing at a high rate eating land for residential use on their periphery.

Land use conflicts have resulted from the accelerating and continuous urban sprawl around the oil fields. The presence of the settlements has interfered with the oil extraction operations in an area whose contribution to the gross national product is 64%. The potential of hazards increase over time. Heat from steam pipes, oil leakages and risks of poisoning by fumes from wells have raised the concerns of the authorities who are searching for solutions to the problems. A micoregional planning study proposed the clearance of parts of the urbanized areas and the creation of a New Town -El Menito.

The purpose of this study is to evaluate the residential settlements in the area and to propose an improved model for El Menito New Town. The analysis of the case studies allows the identification of valuable features and raises key issues. The information obtained is used to develop a model that aims towards a more efficient layout in terms of land utilization and network efficiency.
The housing systems in the area of study are squatter settlements, public housing, oil company housing and private developments. Each of them have substantially contributed to the urbanization process. Four case studies located in the cities of Cabimas and Lagunillas have been analyzed.

There are three levels of analysis:
- Locality segment: a segment of 400 meters by 400 meters from each case study is shown to analyze the patterns of the layouts.
- Locality block: typical residential blocks are analyzed to show the land utilization pattern.
- Housing unit: a typical dwelling unit is presented to suggest the architectural patterns and building technology.

Ambrosio, Cabimas. (1900-1920):
Represents the traditional Spanish gridiron pattern found in the downtown areas of most cities in Venezuela.

Las Cupulas, Cabimas. (1936):
Oil company housing for high income employees. Its pattern and standards are representative of most oil company housing developments in Venezuela. Settlements of this kind are found in urban areas or adjacent to the oil fields.

Las Morochas, Ciudad Ojeda. (1965-1975):
Squatter settlements developed on blocks and strips of land defined by the oil infrastructure networks. It is an example of the urban sprawl over the oilfield by the informal sector.

Valmore Rodriguez, Ciudad Ojeda. (1973):
Public housing development with a semidetached housing scheme.
1 AMBROSIO, Cabimas

LOCATION: Ambrosio is located at the north of Cabimas. The locality is defined by natural features. Its boundaries are to the north a large swamp, the Maracaibo Lake to the east, low lands with dense vegetation to the south, and the Intercommunal highway to the east. The site of about 46 hectares is linked with the center of Cabimas by the main street of Ambrosio.

ORIGINS: Most of the present circulation system and blocks were laid out in first years of the oil exploitation. Previously, it was a small community of fishermen and farmers settled along the lake shore. The main street of Ambrosio provided access to an old water well located in the center of Cabimas. The large demand of labor generated by the early oil operations pushed the growth of this community. The dwellers made the street lay out according to the Spanish gridiron pattern of the colony. Detached houses were built on the back-to-back lofts of the blocks. Originally the blocks contained an average of ten lots, five lots on each long side to form the quintas - fifth parts. The formation of new household and the limitations for expansion of the settlement altered the original land subdivision pattern. The lots have been subdivided to allow the construction of new dwelling, increasing the density in the area.

LAND USE: The primary use in the community is residential. Scattered shops appear along the main street of Ambrosio. There are some corner shops in the front yards of some houses of the locality. A school functions in the locality.

LOCALITY SETTLEMENT: The segment is typical of most central areas of the cities in Venezuela. In Ambrosio the density is very low (54 person/Hectare, net density). It is a mixed income area. Most of the dwellings are owner occupied and contain 3-5 rooms. The original dwellings were built with wood and plaster covered wood wall, and the roofs. But the present houses are built with concrete and masonry. Water supply, electricity and sewage serve the locality of a standard level. Police and fire protection are adequate.
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES
- WATER SUPPLY
- SANITARY SEWAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES
- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:
**LOCALITY BLOCK LAND UTILIZATION**

**LOCALITY BLOCK LAND UTILIZATION DATA**

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total Area</th>
<th>Hectares</th>
<th>Density N/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>10</td>
<td>0.92</td>
<td>11</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>10</td>
<td>0.92</td>
<td>11</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>50</td>
<td>0.92</td>
<td>54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>0.27</td>
<td>29</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>0.65</td>
<td>71</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>0.92</td>
<td>100</td>
</tr>
</tbody>
</table>

**NETWORK EFFICIENCY**

- Network length (streets, walkways) = 210 m/Ha
- Areas served (total area) = 100

- LOTS
  - Average area, dimensions = 650 sqm

**LAND UTILIZATION DIAGRAMS**

- 1 Hectare
  - PERCENTAGES:
    - Streets/Walkways: 29
    - Playgrounds: -
    - Cluster Courts: -
    - Dwellings/Lots: 71
  - CIRCULATION EFFICIENCY:
    - Meter/Hectare: 210

- 16 Hectares
  - DENSITY
    - Persons/Hectare: 54
    - 80 Persons

- 1 Hectare
ELEVATION

KEY
LR Living Room
D Dining/Eating Area
BR Bedroom
K Kitchen/Cooking Area
T Toilet/Bathroom

TYPICAL DWELLING

1:200
Las Cupulas, Cabimas

LOCATION: Las cupulas is located close to the center of Cabimas, adjacent to the main oil port of the Eastern Coast of Maracaibo Lake. The settlement is isolated from the immediate urban context by drainage ditches and stockyards.

ORIGINS: This oil company housing development was built in the mid 1930's for high income employees. Most of the original dwellers were North American and British managers and technicians of the oil company. Currently the population is predominantly Venezuelan.

LAND USE: The main use of the locality is residential. Land use controls in Las Cupulas, and in many other oil company housing developments, are strictly enforced. Recreational and educational services are systematically located in the community according to the coverage.

LOCALITY SEGMENT: The segment is representative of the oil company housing in Venezuela. The net density is very low (56 person/hectare). One or two story single family houses were built on the 750 square meter lots. The layout was designed based on the vehicular circulation. The blocks have variable lengths generally between 150 meters and 300 meters. All utilities, fire protection, surveillance, educational, and recreational services are available and present very high standard.
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES
- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES
- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

SELECTED BLOCK
### Locality Block Land Utilization Data

<table>
<thead>
<tr>
<th>Areas</th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public (streets, walkways, open spaces)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Semi-Public (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Private (dwellings, shops, factories, lots)</td>
<td>1.2</td>
<td>90</td>
</tr>
<tr>
<td>Semi-Private (cluster courts)</td>
<td>1.13</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1.25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Densities

<table>
<thead>
<tr>
<th>Lots</th>
<th>Area (Hectares)</th>
<th>Density (N/Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1.25</td>
<td>11.2</td>
</tr>
<tr>
<td>14</td>
<td>1.25</td>
<td>11.2</td>
</tr>
<tr>
<td>70</td>
<td>1.25</td>
<td>56</td>
</tr>
</tbody>
</table>

### Network Efficiency

- Network length (streets, walkways) = 204 m/Ha
- Areas served (total area) = 1.25 Hectares

### Land Utilization Diagrams

- **1 Hectare**: Streets/Walkways = 20 Persons
- **16 Hectares**: Clusters/Courts = 10
- **1 Hectare**: Dwellings/Lots = 90

### Circulation Efficiency

- Meter/Hectare = 204

### Density

- Persons/Hectare = 56

---

**Average area, dimensions = 750 sqm**
3 LAS MOROCHAS, Ciudad Ojeda

LOCATION: The settlement is located in the north-east section of Ciudad Ojeda between Tamara-oilworkers' housing and the city central ring. The Intercommunal highway limits its south-west side and provides communication with the major urban centres of the region.

ORIGINS: Las Morochas has been spontaneously developed - barrio - on partially served land with road networks and electricity of the oil camps. Presently, major improvements of the infrastructure are made by the local government.

LAND USES: The dominant use is residential although small industries are growing along the Intercommunal highway and scattered in the barrio. There are no land use controls in this settlement, therefore it is very active in growth and land use changes.

LOCALITY SEGMENT: The density of the settlement is very low (48 person/hectare, net density). The population is mainly low and very low income. Communal, recreational and educational services are not available in the area. Pre-existent circulation networks allowed an organized land subdivision pattern. Upgrading of services is, therefore, possible in the barrio.
CASE STUDY: LAS MOROCHAS, CIUDAD OJEDA

LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>S &amp; H</th>
<th>ANTISEM</th>
<th>SMALL CONSTRUCTION</th>
<th>LARGE CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MASONRY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REED/WATTLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAND</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The chart shows (1) approximate percentages of each construction type within the total number of dwellings and (2) building groups that generally produce each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES

- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES

- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

LOCALLY SEGMENT PLAN

1:2500
LOCALITY BLOCK LAND UTILIZATION

LOCALITY BLOCK LAND UTILIZATION DATA

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total Number</th>
<th>Area Hectares</th>
<th>Density N/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>14</td>
<td>1.65</td>
<td>8.48</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>16</td>
<td>1.65</td>
<td>9.69</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>80</td>
<td>1.65</td>
<td>48</td>
</tr>
</tbody>
</table>

AREAS

<table>
<thead>
<tr>
<th></th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC</td>
<td>0.41</td>
<td>25</td>
</tr>
<tr>
<td>SEMI-PUBLIC</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE</td>
<td>1.24</td>
<td>75</td>
</tr>
<tr>
<td>SEMI-PRIVATE</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.65</td>
<td>100</td>
</tr>
</tbody>
</table>

NETWORK EFFICIENCY

Network length (streets, walkways) = 159 m/Ha
Areas served (total area)

LOTS
Average area, dimensions = 886 sqm

LAND UTILIZATION DIAGRAMS

PERCENTAGES

- Streets/Walkways: 25%
- Playgrounds: 0%
- Cluster Courts: 0%
- Dwellings/Lots: 75%

CIRCULATION EFFICIENCY

- Meter/Hectare: 159

DENSITY

Persons/Hectare: 48
KEY
LR Living Room
D Dining/Eating Area
BR Bedroom
K Kitchen/Cooking Area
T Toilet/Bathroom
L Laundry
C Closet
R Room (multi-use)

TYPICAL DWELLING

ELEVATION

PLAN

CASE STUDY: LAS MOROCHAS, CIUDAD OJEDA
4 VALMORE RODRIGUEZ, Ciudad Ojeda

LOCATION: Valmore Rodriguez is located to the west of Ciudad Ojeda on the outer peripheral ring. It occupies a long strip of land running northwest to south-east direction. The road Carretera N links the community with the city center, the nearby industrial area, and the main regional road, Lara-Zulia.

ORIGINS: It is an instant development made by the National Housing Agency - Banco Obrero, presently INAVI -. The development was named Valmore Rodriguez in memory of a democratic national leader who had promoted social and economic improvements for different parts of the country.

LAND USE: Schools, daycare centers, one health center and playgrounds complement this residential development. The commercial use is minimal because of the land use controls.

LOCALITY SEGMENT: The pattern of the layout is representative of the single family housing and site-and-services schemes of the National Institute of Housing. The pedestrian ways -veredas constitute the main circulation network serving the blocks. Roads serve larger areas around several blocks. Generally groups of four blocks are arranged in a cross-like fashion having a small open space at the center. These and larger spaces are poorly maintained and lack vegetation. The housing agency provided utilities at standard level. Originally, the houses were core units (kitchen, bathroom and living room) but they have been expanded by the dwellers adding two bedrooms. In some cases the asbestos roofs have been changed for slabs and fences have been built.
CASE STUDY: VALMORE RODRIGUEZ, CIUDAD OJEDA

LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shack</td>
<td></td>
</tr>
<tr>
<td>Mud/Wattle</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
</tr>
<tr>
<td>Machine Wood</td>
<td></td>
</tr>
<tr>
<td>Machine Concrete</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
</tr>
</tbody>
</table>

The chart shows (1) the approximate percentage of each construction type within the total number of dwellings and (2) the building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES

- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONES
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES

- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

SELECTED BLOCK

LOCALITY SEGMENT PLAN

1:2500
LOCALITY BLOCK LAND UTILIZATION

LOCALITY BLOCK LAND UTILIZATION DATA

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total Number</th>
<th>Area (Hectares)</th>
<th>Density (N/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>60</td>
<td>1.38</td>
<td>43</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>60</td>
<td>1.38</td>
<td>43</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>300</td>
<td>1.38</td>
<td>217</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways)</td>
<td>0.38</td>
<td>28</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>1.00</td>
<td>72</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.38</td>
<td>100</td>
</tr>
</tbody>
</table>

NETWORK EFFICIENCY
Network length (streets, walkways) = 349 m/Ha
Areas served (Total area) = 166 sqm

1 Hectare

DENSITY
Persons/Hectare = 217

16 Hectares

DENSITY
Persons/Hectare = 72

1 Hectare

PERSONS

20 Persons
CASE STUDY: VALMORE RODRIGUEZ, CIUDAD OJEDA

ELEVATION

PLAN

KEY

LR Living Room
D Dining/Eating Area
BR Bedroom
K Kitchen/Cooking Area
T Toilet/Bathroom

TYPICAL DWELLING

1:200
As the urbanization process continues within the oil fields of the Eastern Coast of Maracaibo Lake the residential developments are made disperse, piece-meal and inefficient in the use land and infrastructure. The authorities, concerned with the land use conflicts generated and the uncontrolled urbanization, have programmed the creation of El Menito New Town to concentrate and manage the urbanization process off conflicting areas. El Menito will be located 20 Km from Ciudad Ojeda on the regional highway Lara-Zulia and off the oil fields. The New Town will provide industrial employment, services and housing for at least 35,000 people at the 5th year of creation. From the Master Plan for the city a residential sector is taken to develop a model that accomplishes high efficiency in land utilization, circulation efficiency, and land subdivision. The proposed Model presents design policies to be considered by those realizing the projects for the residential areas.

The experience of the urban developments in the area is that of sub-utilization of land and infrastructure by low densities; inefficient maintenance and control over public land; and lack of controlled open spaces to support residential areas. Considering those experiences and the program for the chosen site the Model will be oriented to:

- Clarify the design process in order to highlight key decisions to determine the land use subdivision plans adjusted to the site conditions.

- Present the land utilization and circulation efficiency concepts through deliberate design as a way to improve the management of urban land. This has direct impact over construction and maintenance costs; and on the definition of users and institutions responsible for the control of the land.
### STAGE 1 TENTATIVE PROGRAM

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Venezuela</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITY</td>
<td>El Menito New Town (project)</td>
</tr>
<tr>
<td>PROJECT NAME</td>
<td></td>
</tr>
<tr>
<td>POPULATION</td>
<td>7,120</td>
</tr>
<tr>
<td>GROSS DENSITY</td>
<td>120 Persons/Hectare</td>
</tr>
<tr>
<td>TARGET INCOME GROUPS</td>
<td>Low, Moderately low, Middle</td>
</tr>
<tr>
<td>SITE GROSS AREA</td>
<td>58.5 Ha</td>
</tr>
<tr>
<td>SITE CONDITION</td>
<td>Normal</td>
</tr>
<tr>
<td>URBAN LAYOUT TYPE</td>
<td>Grid</td>
</tr>
<tr>
<td>TOTAL NUMBER OF LOTS</td>
<td>1424</td>
</tr>
<tr>
<td>LOT TYPES AND AREAS</td>
<td>K: 210 sq m; L: 190 sq m; M: 155 sq m; N-R: 125 sq m</td>
</tr>
<tr>
<td>NUMBER OF LOTS/CONDOMINIUM</td>
<td>20</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>Instant (3 year period)</td>
</tr>
<tr>
<td>LEVEL OF SERVICES</td>
<td>Standard</td>
</tr>
<tr>
<td>PROJECT COSTS</td>
<td>(no data available)</td>
</tr>
<tr>
<td>CURRENCY CONVERSION</td>
<td>US $ 1 = 9.00 Bs</td>
</tr>
<tr>
<td>DESIGNER</td>
<td>Thesis Proposal</td>
</tr>
<tr>
<td>LAND UTILIZATION (Ha - %)</td>
<td>7.67 13</td>
</tr>
<tr>
<td></td>
<td>10.5 18</td>
</tr>
<tr>
<td></td>
<td>40.33 69</td>
</tr>
<tr>
<td>UNIT CIRCULATION LENGTH</td>
<td>100 m/Ha</td>
</tr>
<tr>
<td>NUMBER OF SCHOOLS</td>
<td>4 Kindergarten; 2 Primary Schools; 1 High School</td>
</tr>
</tbody>
</table>
CONTENTS:
Approaches. Existing/Potential.
Accesses. Existing/Potential.
Transportation Existing/Potential.
Size: 58.5 Hectares.
Shape: See site plan.
Topography, contours, natural features, drainage: Flat, 5% slope, good drainage
Soil: Sand-clay. 0.5m organic material
Climate: Tropical
Boundaries: See site plan
Views: 
Flooding: 
Existing structures, easements, rights of way:
Land tenure: Private. MARAVEN S.A.
Governmental regulations (By-Laws).

OUTPUT:
WRITTEN FORM AND LAYOUT OF SITE PARAMETERS.
STAGE 4  MAIN URBAN CIRCULATION NETWORK AND ACCESSES AFFECTING THE SITE

DATA:
1: Output from previous stage 3.
   Size, shape.
   Boundaries.
   Accesses.
2: Additional information from stages 1 and 2.
   Site location.
   Land utilization pattern.
   Utility services.
   Centers of employment.
   Urban circulation network (existing and projected approaches/accesses; Radial and Circumferencial roads.
   Public transportation.
   Government regulations (By-Laws).
   Natural features.

ASSUMPTIONS:
   Establish priorities.

POLICIES:

OUTPUT:
   LAYOUT OF THE MAIN URBAN CIRCULATION AND ACCESSES AFFECTING THE SITE.
DATA:
1: Output from stage 4
   Main urban circulation.
   Accesses.
2: Additional data from stages 1, 2, and 3.
   Site plan.
   Topography: Lines of drainage, ridges, contours.
   Rights of way, By-Laws.
   Existing structures.

ASSUMPTIONS:
   Establish priorities:
   - Link Primary Site Circulation with main accesses to industrial area, and the accesses to adjacent residential areas.

POLICIES:
   - Serve the site with least length keeping a reasonable coverage range.
   - Primary Circulation connecting main accesses.
   - Primary Circulation on lines of drainage, ridges and rights of way.

OUTPUT:
   LAYOUT OF PRIMARY SITE CIRCULATION.
STAGE 6 AREAS OF MAJOR COMMERCIAL POTENTIAL/LAND VALUES

DATA:
1: Output from previous stage 5. Primary Site Circulation.
2: Additional data from stage 2. Public Transportation.
   Land utilization pattern in the urban context.

ASSUMPTIONS:
   Establish priorities.

POLICIES:
- High Commercial Potential/Land Values are located adjacent to the Primary Circulation/Public Transportation.
- Lower Commercial Potential/Land Values are located farther from the Primary Circulation/Public Transportation.

OUTPUT:
LAYOUT OF THE SITE WITH THE IDENTIFIED AREAS OF MAJOR COMMERCIAL POTENTIAL/LAND VALUES.

The Primary Circulation will carry the heaviest traffic flow in the site; Therefore the land located adjacent to it will have a high potential for social communication, commerce and other activities supported by group concentration.
DATA:
1: Output from previous stage 5
   Areas of Commercial Potential/
   Land Value Levels
2: Additional data from stages 2
   and 3.
   Topography: Ridges, contours.
   Rights of way
   By-Laws
   Context information: Land uses
   around the site
   Existing structures.

ASSUMPTIONS:
   Establish priorities.

POLICIES:
- Commercial use/Plazas: Plazas,
  Markets, Major Commercial areas
  should be located on higher value
  land.
- Recreation and Schools: Playgrounds
  and Schools should be located on
  lower value land.

OUTPUT:
SEMIPUBLIC/PRIVATE LAND LAYOUT
Layout of the site with the identified
areas for Schools, Playgrounds, Plazas,
Markets (Semi-public Land); Major Commercial
areas (Private Land).
STAGE 8 DIRECTIONS OF SECONDARY CIRCULATION

DATA:
1: Output from previous stage 7
- Areas for Schools, Playgrounds, Plazas, Markets (Semipublic Land)
- Major Commercial areas (Private Land)
2: Additional data from stages 1, 2, 3, 4 and 5
Primary Circulation
Topography
Rights of way, By-Laws
Boundaries
Existing structures

ASSUMPTIONS:
Establish priorities

POLICIES:
- Secondary circulation should be linking residential, semipublic, and private land with the Primary Circulation.
- The lines of circulation should serve a maximum area. The range of coverage determines the frequency of secondary streets.
- The lines of circulation should be adjusted to site constraints and topographic features.

OUTPUT:
LAYOUT WITH THE IDENTIFIED DIRECTIONS OF SECONDARY CIRCULATION.
DATA:
1: Output from previous stage 8.
   Direction of secondary circulation.
   Lot and Condominium width (model).
2: Additional data from stages 5 and 7.
   Areas for Schools, Playgrounds,
   Plazas, Markets (Semipublic land).
   Major Commercial areas (Private
   land).
   Primary Circulation.
   Topography.
   Rights of way, By-Laws.
   Boundaries.
   Drainage lines entering the site.
   Nearby discharge areas (streams,
   lakes, major storm drainage and
   sewage lines).

ASSUMPTIONS:
   Establish priorities.

POLICIES:
   - Sites with 10% slopes or less: Faci-
     litate storm drainage using natural
     slope.
   - Sites with 11% slopes or more: Mini-
     mize balance cut and fill; Minimize
     height of retaining walls; Minimize
     slope in courts.

OUTPUT:
   LAYOUT OF DRAINAGE LINES/TERRACES.
DATA:
1: Output from previous stage 9.
   Drainage lines and terrace plan.
2: Additional data from stages 1, 3, 6, 7, 8, and 9.
   Population.
   Number of lots.
   Views.
   Existing structures.
   Primary site circulation.
   Areas for Schools, Playgrounds, Markets (Semipublic land); Major Commercial areas (Private land).
   Direction of Secondary Circulation.

ASSUMPTIONS:
   Establish priorities:
   - Block layout adjusted by condominium layout.
   - Secondary streets adjusted by block layout, location of Private and Semipublic land, and Site Parameters.
   - Land subdivision matching Program and By-Laws.

POLICIES:
   - Adequate Land Utilization:
     Balance between percentages of Public land and Semiprivate/Private land.
   - Unit Circulation Length:
     Achieve acceptable ratios.

OUTPUT:
   COMPLETE PROJECT (Streets, Blocks, Condominiums, Lots and Land Utilization).
The proposed land subdivision plan shows in detail the distribution and sizes of Dwelling Lots, Schools, Plazas and Playgrounds. The regularized condominiums accept the different lot sizes established in the program. The Plaza becomes a central open space which reinforces an axis linking the main entrance to the site with the Community Center. The construction of the road network and infrastructure is simplified due to the regularity of the blocks and condominiums.
The proposed model minimizes public land, maximizes private land and assigns the necessary semi-public land in the appropriate locations. This highly efficient layout leads to the optimization of public expenditures in the maintenance and surveillance of public land.

The physical control over the open spaces of the residential areas is clear which increases the user's responsibility. As the plan shows there are no left over spaces with unclear definition of use, physical control and user responsible.
LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES

<table>
<thead>
<tr>
<th>Total</th>
<th>Area</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>118</td>
<td>3.9</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>118</td>
<td>3.9</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>590</td>
<td>3.9</td>
</tr>
</tbody>
</table>

AREAS

<table>
<thead>
<tr>
<th>Total</th>
<th>Area</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>0.59</td>
<td>15</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>0.6</td>
<td>15</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>2.76</td>
<td>70</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.9</td>
<td>-</td>
</tr>
</tbody>
</table>

NETWORK EFFICIENCY

Network length (streets, walkways) =
Areas served (total area) =

LOTS

Average area, dimensions = 155.9 m^2

CIRCULATION EFFICIENCY Meter/Hectare

DENSITY Persons/Hectare 149

PERCENTAGES Streets/Walkways 15

PLAYGROUNDS 15

Cluster Courts 16

Dwellings/Lots 69
EVALUATIONS/CONCLUSIONS

EVALUATIONS

The four case studies represent the main dwelling systems of the settlements in the Eastern Coast of Maracaibo Lake. In this section they are evaluated and compared with the proposed model for El Menito New Town. The graphics, numbers and comments provide a comparative view of the percentages of land utilization, network efficiency and densities.

CASE STUDIES:

- In all the case studies the layout lack of open spaces shared by defined groups of dwellings. The lots in Las Cupulas and Las Morochas are large enough to allow playing area for small children and parking space. Only Las Cupulas and Valmore Rodriguez are served with semi-public playing fields for youth.

- The lot dimensions in Ambrosio and Las Morochas are determined by the preestablished block dimensions. The situation is inverse in the other two cases in which the block width is restricted to the depths of two back-to-back lots. This last approach results in redundant lines of circulation when small lots are used.

- The lots are served by individual connections to public infrastructure networks which increases the charges for administration of services to the users.

- With exception of Valmore Rodriguez, the network efficiency is optimum.

PROPOSED MODEL:

- Semiprivate open spaces for playground, parking for residents, and green area are shared by defined groups of dwellings. These spaces are used, controlled and owned by the residents as condominium court, reducing the possibility of vandalism.

- The regular pattern of the condominiums allows different forms of land subdivision within it. The block dimensions are independent from the lots'. The lots must be arranged in function of the condominium.

- The connections to the public infrastructure networks are made per condominium, which minimize charges of administration.

- Network efficiency is maximum within the acceptable ranges and the public land is minimized. Therefore, the public investments in infrastructure, transportation, surveillance etc. can be optimized.
CASE STUDIES

1. AMBROSIO, Cabimas

- **PERCENTAGES**:
  - Streets/Walkways: 29%
  - Playgrounds: 0%
  - Cluster Courts: 10%
  - Dwellings/Lots: 71%

- **16 Hectares**

2. LAS CUPULAS, Cabimas

- **PERCENTAGES**:
  - Streets/Walkways: 25%
  - Playgrounds: 10%
  - Cluster Courts: 75%
  - Dwellings/Lots: 90%

- **16 Hectares**

3. LAS MOROCHAS, Ciudad Ojeda

- **PERCENTAGES**:
  - Streets/Walkways: 28%
  - Playgrounds: 16%
  - Cluster Courts: 72%
  - Dwellings/Lots: 69%

- **16 Hectares**

4. VALMORE RODRIGUEZ, C.O.

- **PERCENTAGES**:
  - Streets/Walkways: 15%
  - Playgrounds: 16%
  - Cluster Courts: 72%
  - Dwellings/Lots: 69%

- **16 Hectares**

**PROPOSED MODEL**

- **PERCENTAGES**:
  - Streets/Walkways: 15%
  - Playgrounds: 16%
  - Cluster Courts: 72%
  - Dwellings/Lots: 69%

- **1 Hectare**

**CIRCULATION EFFICIENCY**

- Meter/Hectare: 100

**DENSITY**

- Persons/Hectare: 20
CONCLUSIONS

The land utilization patterns of the settlements of the Eastern Coast of Maracaibo Lake are inefficient which causes negative social and economic effects. As the urbanization process continues the mistakes are repeated increasing the problems: Mismanagement of the urban land excessive development and maintenance costs; vandalism; lack of social participation and responsibility.

The need for efficient urban layouts is a critical issue in large scale urban developments, like the New Towns. Due to the magnitude of the investments and the difficulties in managing the urban land the design should be oriented to minimize the initial outlay and maximize socio-economic returns. In the design of efficient layouts, two principal components to be considered at the planning stage are land utilization and circulation, the basic characteristics of which are identified as follow:

**LAND UTILIZATION:**

The land utilization pattern proposed in the model introduces a coherent relationship between user's responsibility and physical control which is basic for an effective use of land.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>USER</th>
<th>RESPONSIBILITY AGENT</th>
<th>PHYSICAL CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>unlimited</td>
<td>public sector</td>
<td>minimum</td>
</tr>
<tr>
<td>SEMI-PUBLIC (schools, playgrounds, open spaces)</td>
<td>limited group of people</td>
<td>public sector/ user</td>
<td>partial/complete</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>group of owners</td>
<td>user</td>
<td>partial/complete</td>
</tr>
<tr>
<td>PRIVATE (dwellings lots)</td>
<td>owner/tenant</td>
<td>user</td>
<td>complete</td>
</tr>
</tbody>
</table>

**CIRCULATION:**

The Model presents higher circulation efficiency than the case studies in terms of circulation length per served area.

<table>
<thead>
<tr>
<th>LINES OF CIRCULATION (streets, walkways)</th>
<th>LINES OF ACCESS (dead-end streets or loops for pedestrians, vehicles or both)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-serve for through circulation and provide direct access to lots on their sides</td>
<td>-never serve for through circulation; serve only abutters by providing direct access to the lots on their sides</td>
</tr>
<tr>
<td>-unlimited number of users</td>
<td>-limited number of users</td>
</tr>
<tr>
<td>-on public land</td>
<td>-on semi-private/private land</td>
</tr>
<tr>
<td>-long and generally connected at both ends with different circulation lines</td>
<td>-short and generally connected of one or both ends to the same line of circulation</td>
</tr>
<tr>
<td></td>
<td>-limited to a maximum length of 100m for reasons of safety</td>
</tr>
</tbody>
</table>
NATIONAL CONTEXT, VENEZUELA

PRIMARY INFORMATION

Country: Venezuela
Capital: Caracas
Area: 912,050 sq.kms
Population: 14,300,000 (Estimates)
Urban Population: 75.5% (1975 Estimates)
Rural Population: 24.5% (1975 Estimates)
Population Growth: 3.1 per annum
Gross National Product per Capita: U.S.$ 2,240
Exports: U.S.$ 11.2 billion
Imports: 5.4 billion
Currency: Bolivar
Literacy: 80%
Religion: Roman Catholic
Language: Spanish
Government: Democratic
Major Cities:
  - Caracas (capital) 2,400,000
  - Maracaibo 900,000
  - Barquisimeto 300,000
  - Ciudad Guayana 200,000

GEOGRAPHY: Venezuela is located in northern South America. Its boundaries are the Caribbean sea to the north, Colombia to the west and south west, Brazil to the south and Guyana to the east. The Venezuelan coastline with the Carribean sea and the Atlantic ocean is 2,816 kilometers long.
Four geographic regions can be defined in Venezuela. They are the following: the Andes mountains in the northwest; the coastal zone which includes the Orinoco River Delta on the north; the plains or Llanos which extend from the mountains to the Orinoco River; and the Guayana highlands.

Venezuela is situated in the Torrid zone where temperature varies with the altitude. Two seasons can be defined: the rainy season, from May through November, and the dry season during the rest of the year.

HISTORY: Three different periods are defined in the history of Venezuela: colonial period, independence period, and the republic period.

Columbus discovered Venezuela in his third voyage in 1498 initiating the colonial period. The Spanish rulers introduced Roman Catholicism and founded many new towns. Five major administrative regions constituted the Capitania General de Venezuela (now the country of Venezuela). These regions were the following: the Province of Venezuela in the Central Region; the Province of Nueva Andalucia; the Province of Maracaibo in the Occident; the Province of Guayana in the southern Orinoco; and the Province of Margarita in the islands.

The major new towns founded by the Spanish in the colonial period are dated as follows: Coro, 1591; Barquisimeto, 1552; Valencia, 1555; Caracas, 1567; Maracaibo, 1568; and Gibraltar, 1591.

"Criollos", Venezuelan born Spanish, declared the independence from Spain in 1810. It was, however, in 1821 that independence was completed after years of war. Simon Bolivar was the military and political leader who guided the criollas towards independence.

In the 19th century, the republic period was characterized by periods of political instability, dictatorships and revolutionary turbulence. The early 20th century was characterized by strong military regimes. In 1946, a well known writer, Romulo Gallegos, candidate of the democratic party, Accion Democratica, won the presidential elections. But in 1948 the army ousted Gallegos and instituted a military junta. In 1952, this junta named Marco Perez Jimenez provisional president, but he soon became a dictator. In 1958 the army with the support of the civilian population ousted Perez Jimenez and called the political parties for a system of representative government which has been in effect until now.

Five consecutive Presidents have been elected:
1959-1963 Romulo Betancourt
1969-1973 Rafael Caldera.

POPULATION: Venezuela is one of the least densely populated countries in the Western hemisphere. The population is concentrated in the north, basically in the Andes Mountains and along the coastline. Only 4% of the total population lives in the south-west portion. The annual rate of population growth is 3.4%, one of the highest in the world. The population is rapidly changing from rural to urban areas. Almost 75% of the population lives in cities.
Three ethnic types have contributed to the composition of the Venezuelan people: Spanish, Indian and Negro. At the present time the population is nearly homogeneous, only a small fraction of Indians remain pure - about 40,000 persons.

GOVERNMENT: The system of government in Venezuela is of a federal and centralized form that guarantees freedom of religion, speech, business etc. National elections are held every five years for President, members of the Congress and the state legislatures. The President is elected for one term, and becomes member of the senate for life after his governmental period.

The executive, legislative, and judicial branches are separate. The President and his Ministers (Cabinet) make up the executive branch and basically hold the most important decision-making power of the country. The legislative branch is constituted by the Senate and the Congress. Judicial power is exercised by the Supreme Court of Justice and by other courts.

A decree of administrative regionalization was introduced in January, 1980, to decentralize the development of the country. Nine regions were defined and assigned to regional development corporations.

ECONOMY: The economics of Venezuela is mainly supported by two large areas: Exploitation of natural resources and Industry-agriculture.

Oil exploitation accounts for about 90% of Venezuela's foreign exchange earnings, over two thirds of the government revenue and for more of 30% of its G.N.P. In January 1976, the government nationalized the oil industry and implemented policies for the conservation of that natural resource. The production of oil was reduced from 3.7 million barrels per day (1970) to 2.3 million barrels after nationalization.

Venezuela's exports of oil to the United States represents about one half of its production. Iron and alluminium ore production constitute the major mining activities of the country. In order to increase revenues and diversify the economy the government has committed to the development of large still and alluminium mills in the Guayana Region.

The second area of the economics of Venezuela is agriculture and industries. Agriculture accounts for 6% of the G.N.P. and employs 20% of the total labor force. This area has failed to grow despite the heavy investments made by the government. Manufacture has been increasing at 12% per year. It contributes to the G.N.P. with 24% and employs 19% of the total labor force.

National Context Source:
Constantino Barroeta,
PUBLIC HOUSING ENVIRONMENTS:
Caracas, Venezuela
MIT Thesis, Cambridge, USA, 1979
URBAN CONTEXT, CABIMAS

LOCATION: Cabimas is located in an alluvial plain of the Maracaibo Lake basin in the Western part of Venezuela at an altitude of 5 meters; latitude 10° 22' north, longitude 71° 26' west.

CLIMATE: It is entirely within the tropical zone with temperatures ranging from 25°C to 35°C. The area presents two rain seasons which are alternated with two dry seasons. On May and October the rainfall reaches the higher levels while in January and June the lower levels. The average annual rainfall is 810 mm. The average annual relative humidity is 75%. Wide variations in the relative humidity occur between the daytime and nighttime due to alternative changes in the directions of the winds and the presence of the lake.

POPULATION: The estimated population of Cabimas in 1980 was 150,000 inhabitants. Before 1920 the area was almost unpopulated. From 1936 to 1941 the annual growth rate was -0.33%. From 1941 to 1950, the rate increased to 9.80%. By 1971, the estimated rate was 5.45%.

Ethnically the population is relatively homogenous. The race could be classified as white hispanic-mestizo (mixture of White and Indian). There are no ethnic groups identified with income levels. Caribian blacks and Asian Indians settled in the city in the 1920's to work in the oil companies, but they became integrated in the social and ethnic context.
GOVERNMENT: Cabimas is the second largest city in the state Zulia. The largest immediate administrative center is the state capital; Maracaibo. The Bolivar district is the political area to which Cabimas belongs, and whose capital is Santa Rita.

ECONOMY: Services and Industry are the main economic activities. Employment by agriculture only represents 2% of the total occupation. In 1972, services provided 23.46% of the employments; oil industry 9.39%, commerce 12.68%; and manufacturing 3.52%.

In 1971, 21.8% of the active population earned an annual average of U.S.$ 700; 27% above U.S.$ 700 and below U.S.$ 1,390; and 19% above U.S.$ 1,390 and below U.S.$ 2,090.

INCOME DISTRIBUTION: The area with the highest concentration of high income households (mostly oil workers) is located in the south quadrant of the inner ring, adjacent to the Central Business District. Lower income groups are located at the periphery. Middle and moderate income groups are distributed in different sections of the city, mostly in public housing and private development. The very low income groups, represented by squatter, occupy the periphery to the east and south.
URBAN CONTEXT, CIUDAD OJEDA

LOCATION: Ciudad Ojeda is on an alluvional plain at the east coast of Maracaibo Lake. The area is at an altitude of 7m. The latitude is 10°15' north and the longitude 71°15' west.

CLIMATE: The climate is tropical with temperatures ranging between 25°C and 35°C. The area presents two rainy seasons which are alternated with two dry seasons. In May and October the rainfall reaches the higher levels while in January and June the lower. The annual average rainfall is 992 mm. The average humidity is 75%. Variations in the relative humidity between the day and the nighttime due to change in the wind direction related to the presence of the Lake.

POPULATION: The estimated population of Ciudad Ojeda in 1980 was 130,000 inhabitants. Between 1950 and 1961 Ciudad Ojeda held an annual growth rate of 27.53%. The growth rate lowered to 4.17% between 1961 and 1971. Ethnically the population is homogeneous constituted by "mestizos" (Spanish-Indian).

ECONOMY: In 1972, the oil and related industries provided 27.25% of the employments in the city; services 12.77%; and construction 5.29%. Ciudad Ojeda is a growing economic center in the area. Financing, construction and manufacturing are becoming important contributors to its economy. Two main industrial centers have evolved on the Intercommunal highway and the road Carretera N.
INCOME DISTRIBUTION: Ciudad Ojeda has a high proportion of middle and middle-high income population due to the presence of large oil company housing developments. These developments are Tamare at the northwest of the city and Lagunillas to the South. Lagunillas is not considered to be within the city’s boundaries but it substantially contributes to its economy by consumption of goods and taxes.

The middle income groups are located in public housing and small private developments within the inner ring of the city, and to the east periphery. Squatters are located in two major areas: Las Morochas to the north and the new squatter settlements of the south section, located between Ciudad Ojeda and Lagunillas.

GOVERNMENT: The city is the capital of the newly created Lagunillas district which is the richest of the Eastern Coast of Maracaibo Lake. The political center on which the city depends is the state capital, Maracaibo.
Accesses: The pedestrian/vehicular linkages from/to the site or any adjoining or planned approaches (urban streets, limited access highways, public transportation systems, and other systems as: waterways, airlines, etc.) (U.S.D.P.)

Community: The people living in a particular place or region and usually linked by common interests; the area itself, any population cluster.

Development: Gradual advance or growth through progressive changes; a developed tract of land.

 Dwelling: The general, global designation of a building/shelter in which people live. A dwelling contains one or more ‘dwelling units’. (Merriam-Webster, 1971)

 Design: 1) The arrangement of elements that make up a work of art, a machine or other man-made object. 2) The process of selecting the means and controlling the elements, steps, and procedures for producing what will adequately satisfy a need. (Merriam-Webster, 1971)

 Dwelling density: The number of dwellings, dwelling units, people or families per unit hectare. Gross density is the number of an overall area (ex. including lots). Net density is the density of selected, discrete portions of an area (ex. including only lots).

 Dwelling developer: Three sectors are considered in the supply of housing: Public, Private, and Popular. Public sector is the marginal sector with limited access to the formal financial, administrative, legal, technical institutions involved in the provision of housing. The housing process (promotion, financing, construction, operation) is carried out by the Public sector generally for ‘self use’ and sometimes for profit. Private sector: The government or non-profit organizations involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Public sector for service (non-profit or subsidized). Private sector: The individuals, groups or societies who have access to the formal financial, administrative, legal, technical institutions in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Private sector generally for profit.

 Dwelling floors: The following number are considered:
 One: single story; generally associated with detached, semi-detached and row/group dwelling types.
 Two: double story; generally associated with detached, semi-detached and row/group dwelling types.
 Three or more: generally associated with walk-up and high-rise dwelling types.

 Dwelling location: Three sectors of the urban area are generally recognized:
 City center: the area located within a walking distance (50 to 500 m) of the commercial center of a city; relatively high residential densities.
 Inner ring: the area located between the urban periphery and the city center (5 to 50 km radius; relatively lower residential densities.
 Periphery: the area located between the rural areas and urban inner ring (5 or more km radius; relatively low residential densities.

 Dwelling physical state: A qualitative evaluation of the physical condition of the dwelling types:
 Room, apartment, house (the shanty unit is not evaluated).
 Bad: generally poor state of structural stability; water protection and maintenance.
 Fair: generally acceptable state of structural stability; weather protection and maintenance.
 Good: generally acceptable state of structural stability; weather protection and maintenance without dereliction.

 Dwelling unit: A self-contained unit in a dwelling for an individual, a family, or a group.

 Dwelling unit area: The dwelling unit area (m²) is the built-up, covered area of a dwelling unit.

 Dwelling unit cost: The initial amount of money paid for the dwelling unit or the present monetary equivalent for replacing the dwelling unit.

 Dwelling unit type: Four types of dwelling units are considered:
 A single space (room/area of room with or without bath, kitchen, etc.).
 A single room is associated with detached, semi-detached and row/group dwelling types.
 A small, crudely built. One shanty unit is a container with de facto security of tenure and an area on which it is built (open spaces) as well as the facilities available.
 A single or multiple (small, crudely built). One shanty unit is contained in a shelter and associated with other shelters or the use of the parcel of land on which they are built (open spaces).

 Dwelling type: The physical arrangement of the dwelling unit:
 Detached: individual dwelling unit, separated from others.
 Semi-detached: individual dwelling unit, separated from others.
 Row/group: individual dwelling units, separated from others.

 Dwelling utilization: The utilization indicates the type of use with respect to the nature of the inhabitants/families.
 Single: An individual or a family inhabiting a dwelling.
 Multiple: A group of individuals or families inhabiting a dwelling.

 Easement: Servitude: a right in respect of an object (as land owned or enjoyed) in respect of an object (land) subject to a specified use or enjoyment by another person or for the benefit of another thing. (Merriam-Webster, 1971)

 Efficiency: Capacity to produce desired results with a minimum expenditure of energy, time, money or materials.

 Flood: A rising and overflowing of a body of water that causes land not usually under water.

 Floodplain fringe: The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)

 Fumes: Noxious emissions that are usually odorous and sometimes noxious.

 Gas: A system for supplying natural gas, manufactured gas, or liquefied petroleum gas to the site and individual users. (U.S.D.P.)

 Grade: Profile of the center of a roadway, or the invert of a culvert or sewer. (Merriam-Webster, 1971)

 Grid block: The block determined by a convenient public circulation and not by dimensions of lots. In grid blocks some lots have indirect access to public streets. (U.S.D.P.)

 Existing structure: Something constructed or built on the site. (U.S.D.P.)

 Exploratory boring: Initial subsurface investigations (borings) are done on a grid superimposed on the area of interest and on areas included as limited or restricted/hazard in the initial survey. (U.S.D.P.)

 Exterior circulation/accessible (site planning): The existing and proposed circulation/system/accesses outside but affecting the site. These include limited access highways as well as providing access to the surrounding area. Exterior circulation/accesses are generally given conditions. (U.S.D.P.)

 Faucet (also tap): A fixture for drawing liquid from a pipe, cask, or other vessel. (Merriam-Webster, 1971)

 Financing: The process of raising or providing funds. (Merriam-Webster, 1971)

 Fire: Fire and combustible materials. (Merriam-Webster, 1971)

 Fire protection: Measures and practices for preventing or reducing injury and loss of life or property by fire. (Merriam-Webster, 1971)

 Fire hydrant: A water tap to which fire hoses are connected in order to fight fires. (U.S.D.P.)

 Flood: A rising and overflowing of a body of water that causes land not usually under water. (U.S.D.P.)

 Floodplain fringe: The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)

 Floodway fringe: The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)

 Floodway fringe: The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)
GRID LAYOUTS. The urban layouts with grid blocks. (U.S.D.P.)

GRIDIRON LAYOUTS. The urban layouts with gridiron blocks. (U.S.D.P.)

GOVERNMENT/MUNICIPAL REGULATIONS. In urban areas, the development of the physical environment is a process usually controlled by a government/municipality through the enforcement of the following regulations: Master Plan, Zoning Ordinance, Subdivision Regulations, Building Code. (U.S.D.P.)

HEAD. (Static). The height of water above any place or point of reference. Head in feet = (lb/eq. in. x 144)/Density in lb/ft³. For water at 68°F. (Defnls, 1972)

HIGH-RISE. Dwelling units grouped in five or more stories with stairs and lifts for vertical circulation. (U.S.D.P.)

HOT WIRE. Wire carrying voltage between itself and a ground. (RTC ST 45-7, 1953)

HYDRAULICS. That branch of science or engineering that deals with water or other fluid in motion. (Defnls, 1972)

ILLEGAL. That which is contrary to or violating a rule or regulation or something having the force of law. (Merriam-Webster, 1971)

INCOME. The amount (measured in money) of gains from capital or labor. The amount of such gain received by a family in a particular year may be used as an indicator of income groups. (U.S.D.P.)

INCOME GROUPS. A group of people or families within the same range of incomes. (U.S.D.P.)

INCIDENT (TAR). A special tax on the increased value of land, which is due to no labor/expenditure by the owner, but rather to natural causes such as the increased population, general progress of society, etc. (U.S.D.P.)

INFRASTRUCTURE. The underlying foundation or basic framework for utilities and services: streets, sewers, water network, storm drainage, electrical network.

INTERSECTION CIRCULATION NETWORK (SITE PLANNING). The pedestrian/vehicular circulation system inside the site to be developed based upon the existing circulation/accesses and land development requirements. (U.S.D.P.)

INTERVAL. A space of time for distance between the recurrence of similar conditions or states. (Merriam-Webster, 1971)

ILLUMINAT. (lm). (1,000 watts) A convenient manner of expressing large wattages. Kilowatt hours (kwh) measure the total quantity of energy consumed in a given time. The kilowatt hour is measured by the use of an average of 1 kilowatt of electrical energy for a period of 1 hour. (RTC ST 45-7, 1953)

LAWMAKER. A vertical pipe or shaft leading from the surface of the ground to a sewer, for admitting light for purposes of inspection. (U.S.D.P.)

LAND COST. Price: the amount of money given or set as the amount to be given as a consideration for the sale or a thing (the site). (Merriam-Webster, 1971)

LAND DEVELOPMENT COSTS. The costs of making raw land ready for development (including the preparation of utilities, services, access, etc.) (U.S.D.P.)

LAND LEASE. The renting of land for a term of years for an agreed sum; leases of land may run as long as 99 years. (U.S.D.P.)

LAND-MARKET VALUE. Refers to: 1) the present money equivalent to replace the land; 2) the present tax-burden value of the land; or 3) the present commercial market value of the land. (U.S.D.P.)

LAND OWNERSHIP. The exclusive right of control and possession of a parcel of land. (U.S.D.P.)

LAND SUBDIVISION. The division of the land in blocks, lots and laying out streets. (U.S.D.P.)

LAND TENANCY. The temporary building or use of holding a parcel of land of another. (U.S.D.P.)

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, physical controls and responsibility. PUBLIC (streets, walkways, open spaces): user -anyone/limited; physical controls -maximum; responsibility -public sector. SEMIPUBLIC (open spaces, playgrounds, schools): user -limited group of people; physical controls -general or partial; responsibility -owner or tenant. PRIVATE (dwelling, lots): user -owner or tenant or squatter; physical controls -complete; responsibility -owner or tenant. (U.S.D.P.)

LAND UTILIZATION PHYSICAL CONTROLS. The physical/ legal means or methods of directing, regulating, and coordinating the use and maintenance of land by the users/owners. (U.S.D.P.)

LAND UTILIZATION RESPONSIBILITY. The quality/state of being morally/legally responsible for the use and maintenance of land by the owners/users. (U.S.D.P.)

LATERAL. A collector pipe receiving sewage from building connection only. (U.S.D.P.)

LATERAL. A receptacle (as a pit in the earth or a water closet) for use in defecation and urination, or a room (as in a barracks or hospital) or enclosure (as in a culvert) containing such a receptacle. (Merriam-Webster, 1971)

LAYOUT. The plan or design or arrangement of something that is laid out. (Merriam-Webster, 1971)

LEVELS OF SERVICES. Two levels are considered: SERV-I: minimum probable peaks below the standard; SERV-II: are levies set up and established by using distinguishing characteristics, as in new, example or rule for the measure of quantity, weight extent, value or quality. (U.S.D.P.)

LIFT PUMP. A collection system component that forces sewage to a higher elevation to avoid deep pipe networks. (U.S.D.P.)

LOCALITY. A relatively self-contained residential area/community/neighbohood/settlement within an urban area which may contain one or more dwelling/land systems. (U.S.D.P.)

LOCALITY SEGMENT. A 400 x 400m area taken from and representing the residential character and layout of a locality. (U.S.D.P.)

LOCATION. Situation: the way in which something (the site) is placed in relation to its surroundings (the urban context). (Merriam-Webster, 1971)

LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

LOT CLUSTER. A group of lots (owned individually) around a semipublic common court (owned in condomi- num). (U.S.D.P.)

LOT COVERAGE. The ratio of building area to the total lot area. (U.S.D.P.)

LOT PROPORTION. The ratio of lot width to lot depth. (U.S.D.P.)

LUMINARIES. In highway lighting, a complete lighting device consisting of a light source, plus a gimble, reflector, reflector, housing and such support as is integral with the housing. (Defnls, 1972)

MANHOLE. An access hole sized for a man to enter, particularly in sewer and storm drainage pipe systems for cleaning, maintenance and inspection. (U.S.D.P.)

MATHEMATIC, (OF BASIC REFERENCE MODELS). A set of models of urban layout arranged in rows and columns. (Merriam-Webster, 1971)

MASTER PLAN. A comprehensive, long range plan intended to guide the growth and development of a city, town or region, expressing official contemplations on the course its transportation, housing and community facilities should take, and making proposals for industrial settlement, commerce, population distribution and other aspects of growth and development. (Abram, 1972)

MEANING. A word, phrase or signifier that stands for something else, and expresses a concept, idea or quality. (Merriam-Webster, 1971)

MEDIAN. A strip of land between two roads. (Merriam-Webster, 1971)

MEASUREMENT. A number or amount obtained by comparing with a standard. (Merriam-Webster, 1971)

METER. A unit of measurement of length, capacity or weight. (Merriam-Webster, 1971)

MILE. One thousand yards. (Merriam-Webster, 1971)

MILITARY, (OF URBAN LAYOUT). A representation of an urban residential area illustrating a circulation, land utilization, land subdivision, and utility network of a specific layout and lot. (U.S.D.P.)

NATURAL FEATURES. Features or records that have been produced by nature. (U.S.D.P.)

NATIONAL SOIL SURVEY. An international initiative for soil mapping. (U.S.D.P.)

NETWORK EFFICIENCY (LAYOUT EFFICIENCY). The ratio of the length of the network to the area(s) contained within, or tangent to it. (U.S.D.P.)

PLANNING. The establishment of goals, policies, and procedures for a social or economic unit, i.e. city. (U.S.D.P.)

PLUTOLOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

RESIDENTIAL AREA. An area containing the basic needs/requirements for daily life activities: housing, education, recreation, shopping, work. (U.S.D.P.)

SEMI-DETACHED DWELLING. Two dwelling units sharing a common wall (duplex). (U.S.D.P.)

SEPTIC TANK. A tank in which the organic solid matter of continuously flowing sewage is deposited and retained until it has been disintegrated by anaerobic bacteria. (Merriam-Webster, 1971)

SERIES CIRCUIT. A circuit in which the current is the same throughout the circuit. (Merriam-Webster, 1971)

SETTLEMENT. Occupation by settlers to establish a residence or colony. (U.S.D.P.)

UNIT. A determinate quantity adapted as a standard of measurement for other quantities of the same kind. (Merriam-Webster, 1971)

URBAN TRANSPORTATION. Means or conveyance of passenger or goods from one place to another along routes of circulation in a metropolitan context. (U.S.D.P.)

URBANIZATION. The quality or state of being or becoming urbanized, rather than natural or rural, underlying processes of development. (Merriam-Webster, 1971)

ZONING ORGANIZATION. The declassification of a city by ordinance into zones (areas/districts) and the establishment of regulations to govern the use of land and the location, bulk, height, shape, use, population density, and coverage of structures within each zone. (U.S.D.P.)
BIBLIOGRAPHY

Aristizabal, Nora. OPEN SPACES IN DWELLING ENVIRONMENTS.

Barroeta, Constantino. PUBLIC HOUSING ENVIRONMENTS.

Baldwin, J. GUIDE FOR SURVEY-EVALUATION OF URBAN DWELLING ENVIRONMENTS.
MIT Thesis, Cambridge, USA, 1974

Caminos, Horacio; Goethert, Reinhard. URBANIZATION PRIMER, MIT Press,
Cambridge, USA 1978

Kurusa; Doppert, Monika. LA CALLE ES LIBRE
Caracas, Venezuela, 1981

Maraven S.A. PROJECTO CIUDAD EL MENITO,
PLAN DE ACTIVIDADES.
Caracas, Venezuela 1981

Ministerio del Desarrollo Urbano.
PLAN DE ORDENACION TERRITORIAL DE LA COSTA ORIENTAL DEL LAGO DE MARACAIBO
Caracas, Venezuela, 1970