

## From a Non-Integrated Territory to a Metropolitan Park The West Area of Santa Fe (Argentina)

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### ABSTRACT

This paper presents and describes the city of Santa Fe (Argentina) and specially the west area characterized by the dominant presence of water. The evolution of that city establishes a constant battle to "gain ground" to the river invading many times its valley of flood and requiring works of infrastructure to contain its attempts to recover it. It is possible to recognize a contradiction -due to vulnerability- between crisis (risk) and opportunity (environmental sustainability). Explained this proposition and the terrible events happened in 2003 and 2007, it's necessary to think in the integration of water containment to the landscape thought in cultural terms. Once this basic question has been submitted, and after reviewing the available project background, it is proposed to think and Project the integration to the city of this sector (served as a reservoir for excess rainwater) and its characterization as a metropolitan park district proposing the strategies to be considered.

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Keywords: Santa Fe (Argentina) / Urban Reserve / Vulnerable Area

### 1. Introduction

This paper presents and describes the city of Santa Fe facing its recognition for the International Workshop on Urban Planning and Community Development to be held in Jakarta from September 18 to 23, 2017.

It has been based on contributions of publications and web pages (listed in the bibliography), outlining the situation of a territory characterized by the dominant presence of water courses of different hierarchy (belonging to the Paraná river system) in which a urban settlement have been installed.

The evolution of that city establishes a constant battle to "gain ground" to the river

invading many times its valley of flood and requiring works of infrastructure to contain its attempts to recover it.

This situation marks the character of the city and its inhabitants, who take advantage of the benefits of being in their margins (water availability, port commerce, recreation) and, paradoxically, live their ever threatening presence, directly for the lower income sectors (total losses in flooded dwellings during events) but indirectly for all (connectivity problems, mitigation costs, economic losses).

It is possible to point out a kind of contradiction, which is important as a starting point for analyzing the case and, above all, addressing any urban intervention in any of these areas committed to vulnerability: the

crisis (risk) and the opportunity (environmental sustainability) that derives, ultimately, in improving the quality of life. Explained this proposition leads to think that these terrible moments (and there have been several events) should lead to overcoming, to the integration of works of water containment to the landscape thought in cultural terms.

Once this basic question has been raised, and after reviewing the available project background –each with a different level of development-. It is proposed to think and project, as a superior instance, the integration into the city of a sector characterized by its degraded edge conditions relegated to a important, but assistant, function (such as serving as a reservoir for excess rainwater) and its characterization as a metropolitan park district proposing the strategies to be considered for this.

## 2. Material and Methods

Methodology is a mixed, which comprises a complex and profound understanding of the situation and the relationship between the problem, the people involved, by government and the contributions of the academy.

The viability of this research lies in bibliography review from secondary sources, own of the authors, with perceptions guided by news tracking and background that render it possible to rely on methodologic and scientific tools.

On the other hand, it has also been important for the development of research, inquiries in national government agencies, provincial organisms, town halls (Urban Plans, Ordinances, statistical data, database, etc.) from local records of interventions already performed.

## 3. Literature Review

### 3.1. Argentina: Environmental Characterization

The territory of the Argentine Republic “is located in the southern and western

hemispheres, constituting the southernmost portion of the southern hemisphere”[1]

It displays great variety of landscapes, some of them shares with neighbors countries. This diversity is due to its geological and morphological history offering all kinds of relief, its development in latitude and altitude has almost all the climates and for historical, political and economic reasons it presents a marked inequality in the distribution of the population and in the level of economic development. [2]

### 3.2. Santa Fe: River Coastal City [3]

The city of Santa Fe de la Vera Cruz, capital of the Province of Santa Fe, is head of the department of La Capital and is located in the central-eastern sector of the Argentine Republic, on the banks of the Salado River and the Laguna Setúbal (Fig. 1), both tributaries of the Paraná River.



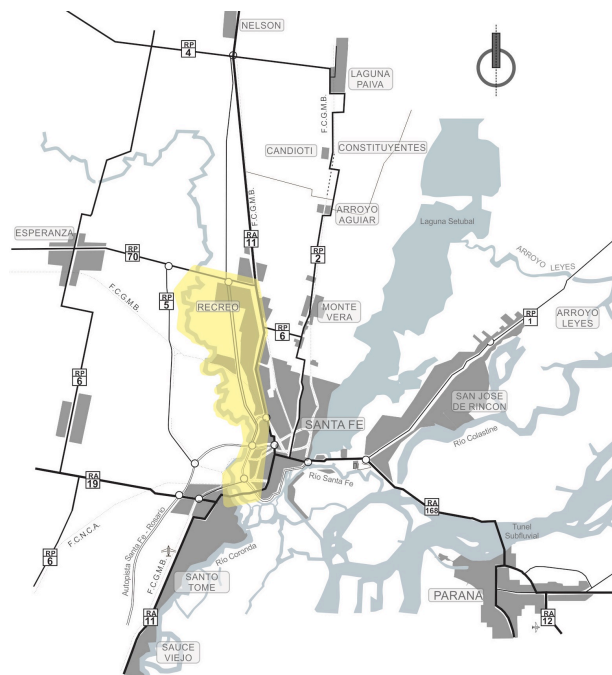
Source: Lucas Diego Baroni, año 2017  
Figure 1: Aerial image. East edge of the city of Santa Fe.

The limits are mainly fluvial (Fig. 2): to the east and the west the mentioned River Paraná and River Salado respectively; to the north, limits with the city of Recreo; and to the South, it includes the territory between the Santa Fe River and its confluence with the Salado River and the adjacent islands to the Paraná.

A feature to be highlighted in relation to the territorial jurisdiction of the Municipality - 25,800 hectares-, due to geographical features, about 65% of its surface area constitutes practically unsuitable land for urbanizations or

traditional constructions, being in good part formed by rivers, lagoons and bathed.

501,116 Inhabitants, of whom 495,897 - almost 99% - constitute urban population.



Source: Own elaboration 2017

Figure 2: Plan of the Great Santa Fe.

It belongs to the geographical region called Pampas plain and to the Litoral area, so it presents an availability of natural resources that allows it to integrate strongly to the economic-productive processes of the country.

### 3.2.1. Population

The National Census of Population, Households and Housing 2010 establishes a total of 391,231 habitants, having recorded a growth rate of 5.86% in the intercensal period 2001-2010 for the capital municipality, growth almost identical to that of the previous intercensal period 1991 -2001. However, several of the municipalities of the conglomerate indicate a sustained intercensal increase that ranges from 10 to almost 35%.

Considering the aforementioned phenomenon of conurbation that the city heads, the Great Santa Fe Agglomerate (Santa Fe -La Guardia and Colastiné inclusive-, Santo Tomé, Sauce Viejo, Recreo, Arroyo Leyes, San José del Rincón and Monte Vera) would consist of

The population with unsatisfied basic needs detected in the mentioned localities by the 2010 Census adds up to 44,632 people (157,158 households), affecting approximately 8.9% of the total population of these localities. This situation shows a considerable improvement with respect to 2001, year in which this percentage reached 14.03% even though it referred to a condition prior to the crisis post 2001. These values have been increasing in the years after the 2010 Census, registering in the second half of 2016 proportions of 29.3% Of the population in terms of poverty and 6.2% in indigence in the first half of 2009[4].

### 3.2.2. Urbanization and infrastructures

The city, founded by Spanish conqueror Juan de Garay in 1573, begins its development from the location associated with the commercial port that defines its initial location. Then extended according to the conformation in continuous checkerboard, hierarchized by the sequence of round boulevards. The tissue in its morphology, however, shows the particularities of the newly cities [5]: morphological-type heterogeneity, presence of segregated fragments, high incidence of economic infrastructures, processes of reconversion of obsolete large land uses and incipient processes of suburban expansion. The works related to the water defense are conditioning factors of this expansion that has been accelerated by public housing built after the two major catastrophic events of 2003 and 2007. The infrastructure support in terms of routes and highways is materialized in a vast network that guarantees the connection of the city with the rest of the cities of the province and the country. The National Route Highway No. 168 is the connection between the two metropolitan poles, saving the distance of 25 km between Santa Fe and Paraná. It is the link with Mesopotamia Argentina and is a vital route in the east-west commercial route (intersection of the central bi-oceanic axis) and north-south Mercosur.

### 3.2.3. Educational facilities

Three universities operate in the city, two of which are public and free and open access. A feature to highlight as a strength of the city is the presence of research centers of the most prestigious in the country, both in number and as researchers and programs, dependent on the Council for Scientific and Technical Research (CONICET). The university top level, the city registers in 2015, a total of 44,716 students in their different degree careers. Of these students, the National University of the Litoral brings together 86.5% of the total students, 7.5% the Catholic University of Santa Fe and the remaining 6.0% is the National Technological University-FRSF. These facilities define a role of the city linked to cultural and educational activities of the highest level that position it as a scientific and technological pole capable of providing services for the state and private productive sector and affect its economic base.

### 3.2.4. Economic Aspects

Santa Fe and its area originally had their production of wealth to the exploitation of livestock, agricultural and forestry activities in the surrounding land. Then refrigeration industry and food manufacturing was added. From 1960, the second stage of import substitution industrialization, which implies - as well as in the rest of the country - a redefinition of the economic and social structure that structurally impacts urban centers. At the same time, in the area of immediate influence (hinterland) the activity is developed for domestic market and for Mercosur. There is also a green fruit-growing belt, apiculture activities, poultry, grain crops and livestock. On the other hand, in many of the populated centers near the central city there are important industrial activities that sell their production in the country and abroad. That's the case of the industrial park of Sauce Viejo that constituted a substantial pole of industrial development. Beyond the big business firms, Santa Fe and its region is characterized by the prevalence of an entrepreneurial fabric with strong presence of small and medium enterprises. A feature that can not be omitted with regard to activities in the city is that, in addition to being an

important financial center - evidenced in the presence of numerous banking entities - and a site of considerable development of commercial activity, as political-administrative capital. The province has a strong development of the public sector in all its levels that guarantees a basic level of administrative and control activities. This results in a statewide income that is a significant advantage in times of economic recession, setting a floor of economic flow for consumption that the private sector is not always in a position to guarantee. Within this economic space that can be described as a poly-nuclear with a bedside in the Santa Fe agglomeration, the city, in addition to its administrative role, is the most important center of the area as a provider of commercial services, medical assistance, education, financial services and banking

## 4. Results and Discussion

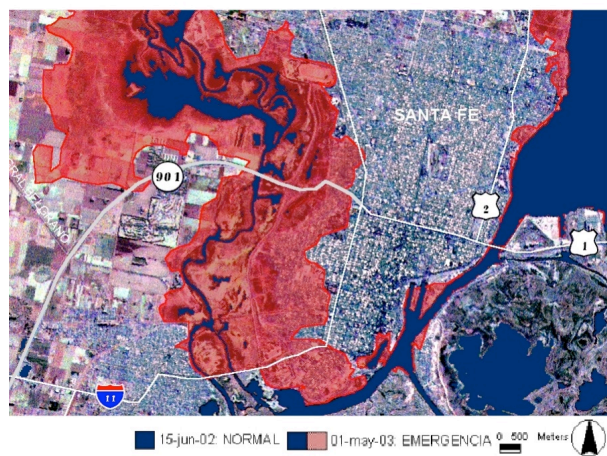
### 4.1. Gain ground to the river overcome a crisis situation

In summary Santa Fe is located in the coastal zone to the Paraná River that belongs to the River Plate Basin. Its regional environment is located in an area furrowed by numerous rivers of different magnitude and relevance within the Paraná-Paraguay system. The territorial scope extends through the Alluvial Valley of Paraná which is a sedimentary basin of great longitudinal extension with a variable width between 15 and 30 km, which includes not only the main channel of the river, but also smaller courses, islands and lagoons, emerging in periods of low and normal waters.

Santa Fe is an extensive plain that makes difficult to drain, with the corresponding formation of lagoons, streams and bathed. The soils are heterogeneous and the vegetation covers are the spinal in the continental area and the forest in gallery in the insular area and the fluvial border. This area is recognized as the valley occupied by periodic floods and includes several islands and banks, with courses and interior lagoons, developing the so-called coastal bank on the Santa Fe side (axis of Provincial Route No. 1). The margin is low, and therefore floodable in periods of high

water.

At the confluence of the Paraná and Salado rivers it's founded Santa Fe, in front of its neighbor Paraná and its respective agglomerations in an area of strong territorial dynamics, where more than fifty per cent of the territory is covered by water. The Rio Salado has represented for the collective imagination of the society a kind of urban back since Santa Fe, from its foundation, was related mainly with the Paraná River. Indeed, the Spanish settlers arrived here by the Great River and constituted the city - during a good part of the colonial period - in a port obliged for those who navigate it. The western boundary of the district coincides with the Salado channel. This is a shallow watercourse in which floods overflowing occupying what is known as wetland of the Salado. However, and because of different social, political and economic processes, a significant amount of the population with low resources has ended up using these lands to live. Over time, the city was sheltered from the floodwaters of both rivers through a system of defenses built by stages, as allowed by economic ups and downs and policy changes.



Source: CONAE-Comisión Nacional de Actividades Espaciales

Figure 3: Comparison of surface water coverage between June 2002 and May 2003

This system consists of an embankment parallel to the channel of the river, solved next to an important roadwork. In turn, you have equipment that allows evacuating rainwater

accumulated outside the embankments. When the ring of defense had not yet closed, an extraordinary flood of the Rio Salado (2003) (Fig. 3) occurs, causing a catastrophic flood. The magnitude of the event reached very eloquent figures: 130 thousand affected, more than 50 thousand evacuees, 37 thousand homes affected, damage in infrastructure works, productive areas, etc. And the worst: loss of human lives.

The most affected urban area was Santa Fe although the situation was equally serious for other districts (Santo Tome, Recreo and Montevera) simultaneously affecting areas that had not suffered before. This fact allowed us to identify two key problems to understand why an extraordinary flood could drastically affect the sector. The provincial route 70 and the Rosario-Santa Fe highway officiated as a double "dam" since their respective bridges saved only the main channel and their embankments contained the water that overflowed to the wetland area

#### 4.2. Edge West

The western boundary of the city of Santa Fe, adjacent to the Salado river run, is characterized by significant complexity. It has a large area belonging to the valley of flood of the river, which gives account of its evident conditions of waterlogging.

It is an area that has a strategic location and a metropolitan connection road and entrance to the city (Avenida Circunvalación Oeste), which is also constituted as a water defense infrastructure. The road takes center stage, in that it positions the territory as "strategic", due to its territorial and urban connectivity conditions.

To the complexity due to natural characteristics of the land, with large tracts of vacancies, it is incorporated the presence of diverse uses like sprawl and degraded residences.

The northwest boundary has the presence of the newly created Municipal Domain Industrial Park, the Regional Producers Market and projects of public and private interest to generate a new logistics area along with the

expansion of the industrial area. These recent interventions have acted as a trigger, to start looking at the sector with development intentions.

The spatial and social segregation of the sector is clear and once again accounts for the threats that characterize it. A population and urban environment impoverishing, with degraded spaces have protagonism in the called "west edge". It's characterized by precarious and improvised residential settlements with irregularities in land occupation; environmental deterioration due to concentration of trash, holes of brick production; urban environments with service infrastructure deficits.

In Urban Regulations have been defined Zones of Water Security (ZSH) where agricultural and recreational uses are admitted, and Districts of water reservoirs (DHR) next to pumping stations where all types of urbanization use are prohibited. Its objective is to mitigate the irrigation water generated by both the rains and the flood of the river. In general terms, the zoning of the sector, taking into account the intentions of municipal governments, regarding the profile and development of the sector through different land uses. Being the predominant activities: Residential, Rural, Recreation, Industry and Logistics. In this way, it is possible to identify the characteristics, in terms of infrastructure, equipment and territorial strategies, which denote the potential of the sector.

### 4.3. The opportunity: The metropolitan park district on the west edge

From an event such critical (flood 2003 and 2007) infrastructure improvements were decided: a) to increase the light of the mentioned bridges and b) to complete the northern section of the ring of defense. This reduced the water risk and at the same time improved the accessibility, being able to affirm that the area affected by the works has gone from being a stage of crisis to being clearly an opportunity. However, there are still no clear definitions in terms of planning or territorial planning, a series of project proposals are recognized that show different

alternatives, but without contradictions, for the area.

*4.3.1. Linear Park of Salado River. CLEFA PRIZE 2014. Authors: Robín Hendrie, Mariela Mercke y Yanina Uriarte; Collaborators: Mirta Soijet, Miguel Rodríguez, Graciela Mantovani, Belén Pennisi y Emilia Mosso. [6]*

Given the extension and complexity of the area, the proposal defines a broad and flexible perimeter as the scope of application of a series of tools and instruments that address in an integral way all its problems. This integrality is understood in a broad sense and in terms of sustainability: environmental, economic, social, etc. of the proposal (Fig. 4), while the definition of an action district facilitates, on the one hand, the definition of jurisdictional responsibilities and, on the other hand. The global approach to its problems being the key variable for the delimitation of the area has to do with its water vulnerability (defined by the level lines and drainage basins).



Source: <http://www.plataformaarquitectura.cl>  
Figure 4: The proposal "Linear Park of Salado River"

Another central variable is accessibility because, due to its edge condition, it constitutes a new entrance front for the city and the circumvallatory ring road must pick up the different links and connections of multiple access roads. And, finally, the management of the ground defining its suitability for urban use and the special treatment of those extensions nearby and strongly related to the river. The latter justifies the use of the term "park" to refer to its high scenic value and its potential

for recreational use. This proposal proposes a necessary consideration of the problems both at the urban and metropolitan scale and its integral view demands the attention of the different manifestations that in terms of social exclusion express the same. As it was said, the west border has housed those sectors of the population who have difficulty accessing the formal land market and consequently have good service conditions but are the most exposed to water risk.

#### *4.3.2. Urban management and normative framework. Projects.*

##### *4.3.2.1. Provincial level*

In addition to its historic political and administrative function, the role of the city is enhanced by identifying itself as the seat of one of the five nodes established by the Provincial Strategic Plan [7] in force, based on a new form of territorial organization based on regionalization, which includes decentralization, planning, citizen participation and concertation. Its design assumes five regions that are recognized taking into account the particularities of their corresponding realities and incorporate urban nodes in the main cities, as cores of articulation, concentration, distribution and redistribution of capacities, information and resources. The Plan is structured according to three strategic lines and its corresponding sets of programs - four each one - which in turn contain provincial projects and regional projects, according to their nature and scope. The Santa Fe Node, in Region 3, presents (from the central sector of the province, covering the departments of San Justo, south of San Javier, Garav. Las Colonias, La Capital and part of San Jerónimo) 36 regional projects, some of them already mentioned and of highly positive impact for the city, framed in the different programs transversal to the whole Plan. They are in Line 1 called Integrated Territory.

The Program Connected and Accessible Santa fe with the following projects:

- Port reconversion of Santa Fe.
- Conversion to motorways of the main road corridors.
- New road connection Santa Fe-Santo Tome.

- Reactivation of the flow of cargo at the Sauce Viejo Airport.

The Program Environmental Quality includes two projects:

- the Island and Delta Management Plan (oriented to the environmental ordering of the territory through the Comprehensive Strategic Plan for Conservation and Sustainable Use in the Paraná Delta - in the framework of agreements between Buenos Aires, Entre Ríos and Santa Fe) and
- the Environmental Care Plan.

Within the Networks for Territorial Development Program, Line III, Development Economics, the planning of the metropolitan area is contemplated in one of its projects: Consolidation of the Greater Santa Fe Metropolitan Area.

##### *4.3.2.1. At the municipal level*

The area in charge of land management in the Municipality of Santa Fe is the Department of Urban Planning, depending of the Municipal Executive Department.

The city government is now proposing to take its actions framed in the new management mode that installs the Santa Fe City Development Plan under the premise of citizen participation and the collective construction of state policies. This mechanism was put into practice in cases such as participatory consultation involving citizens in the discussion of Urban Plan guidelines and the implementation of participatory budgeting, a tool aimed at carrying out works - proposed by the actors involved - to solve specific problems or to develop activities of community interest (sports centers, health centers, neighborhood value).

Since 2010, the city of Santa Fe has a new Regulation of Urban Planning (ROU), which divided the city into eight districts, seeking to regulate through this decentralization the population dynamics of each sector, with the main objective of update the Management and adapt its operation to the current demands.

### 4.3.3. *Municipal management and development policies.*

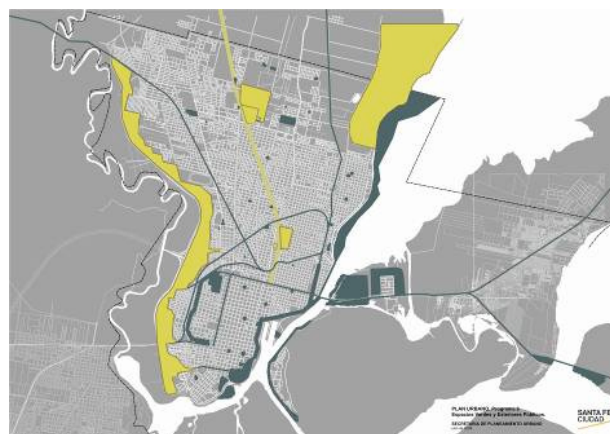
#### 4.3.3.1. *Integral urban program* [8]

The Integral Urban Program is an intervention mechanism in the territory, designed by the Government of the City of Santa Fe, where the different levels of the State, community organizations and neighbors are articulated, in order to improve the human development indices, social and urban development of the most neglected neighborhoods.

It includes urbanization, dominical regularization, housing, streets, pavement, drainage, potable water, sewage, electric service, street lighting, forestation, squares and walks. In addition, it incorporates a new area of participation: the "citizen encounters", which are periodic meetings where neighbors and institutions analyze the proposed projects, agree with the government on intervention priorities and jointly evaluate the progress of the work.

#### 4.3.3.2. *Urban plan: Program Description P7 Green Spaces and Free Spaces.*

The municipal territory has a large area of free land: many are flooded (wetlands, islands), others are urban vacancies in process of having a new function (Parque Federal, Caleta Sur, railway stations and corridors) (Fig. 5).



Source: *Municipalidad de la ciudad de Santa Fe*  
Figure 5: *Reference map of the cordons of green areas defined for Santa Fe, URBAN PLAN Santa Fe City 2008-2009*

Considering the free lands owned by the State, it is possible to integrate a system of public and semi-public green spaces that allows to expand the current situation insufficient, to contribute to the environmental stabilization generating absorbent surfaces and to strengthen the articulation with the fluvial environments by means of the generation of riverside parks. The program also aims at reclassifying the traditional public space given by the avenues and streets, parks and squares, esplanades, improving equipment (forestation, lighting, signals, furniture, etc.).

#### 4.3.3.3. *West urban natural reserve.*

Led by the International Cooperation, Investments and Foreign Trade Agency of the Municipality of Santa Fe, its partners are FFEM, UNL, University of Rennes II, Metropolis of Rennes.

In the city of Santa Fe, from July 31 to August 3, the III National Congress of Environmental Science and Technology "Argentina y Ambiente 2017" took place, organized by the Argentine Society of Environmental Science and Technology and the Litoral National University called "Environment and sustainable development from a multidisciplinary perspective". The meeting was aimed at students, researchers, academics and professionals from different areas, convening sectors of education, productive and governmental, being an opportunity to show the progress made in environmental matters at local, national and international level. Among the thematic areas developed were: environmental assessment and monitoring, instruments and management systems, education to mitigate environmental problems, teacher training, society and environmental and ecological economics, politics and environmental law, conservation and degradation of resources, technologies and treatment processes for the elimination of pollutants, energy efficiency, sustainable development, territorial ordering of the urban environment and climate change. The congress was a more than favorable area to disseminate the scope of the Urban Natural Reserve Project carried out by the Government of the City of Santa Fe and the French Fund for the Global



Environment (FFEM) within the framework of international cooperation agreements between Argentina and France.

The future Urban Natural Reserve comprises 140 hectares of reservoirs that will function as a protected natural area, including a nursery site, community gardens and a Flood Memorial. The project fulfills several objectives: to protect the environment, to conserve native flora and fauna, to organize urban growth, to educate on resilience and coexistence with our rivers and to improve the living conditions of the neighbors of the area, favoring for example the reconversion informal collectors of waste. [9]

The project of the Western Natural Reserve covers a total of 250 hectares, from the area of Villa Oculita to the height of the Hippodrome, representing a size fifteen times bigger than the traditional Park of the South of the City. The first stage approved by the French Fund for the Global Environment covers from Iturraspe street to Gorostiaga street, with an approximate area of 100 hectares (Fig. 6).



Source: *Municipalidad de la ciudad de Santa Fe*  
Figure 6: *Area of Intervention, Western Nature Reserve*

#### 4.3.3.4. West coast road

Consists of the layout of an urban closure street, which orders the growth and avoids new settlements in areas of water risk. This new Costanera will also be a means of communication to connect and integrate from north to south to the different neighborhoods in the west of the city. In turn, many families are guaranteed access to essential services such as light, drinking water and housing.

#### 4.3.3.4. Living place

It is the construction of houses for the relocation of families residing in areas of water risk and the improvement of the quality of life (Fig. 7).



Source: *Municipalidad de la ciudad de Santa Fe*  
Figure 7: *Collective housing project in the West Natural Reserve*

In that sense, while progressing in different aspects of the integral project of the Reserve, we work simultaneously with funds from the Government of the Nation in an Integral Urban Program for the adjacent neighborhoods, which includes infrastructure works and services such as drainage, pavement, public lighting, housing and green spaces, with an investment of more than \$ 100 million.

Thus, last April the opening of bidding envelopes was made for the construction of 2 buildings of 3 floors high, with collective houses (30 units in total), which will be located on Iturraspe Street between Gaboto and the Costanera de la Reserva, in neighborhood Barranquitas, in the west access of the city. The work is part of the National Habitat Plan, with an investment of \$ 32 million and an execution term of 12 months. They are 2 and 3 bedroom homes, of excellent quality materials, for people who lived in areas of water risk and did not have access to a decent housing. Some of the prototypes are specially adapted for people with disabilities.

This housing project is clearly inscribed in the policies developed by the local government with the aim of building a city that is more prepared and orderly, better integrated and inclusive.

## 5. Conclusion

### *Strategies for intervention*

The work is based in the idea of recognize the needs and the projective antecedents of the sector in order to contemplate an integrate the new uses of these lands, in order to take advantage of its strategic position in the city and the region.

In the development some initiatives of the different levels of governments and academic teams were exposed, however the fragmentation in the management matter is a current topic of debate. And we are part of it because we think in the future development of Santa Fe.

The truth is that the area deserves to continue receiving proposals for which a series of strategies for its integral treatment can be decant.

### *1. About the water vulnerability (inland and outward)*

a) establish criteria for the occupation of the area of wetlands that have not been defended:

- Natural reserve: valorization of flora and fauna
- Productive activities: qualification that contemplates the floods of the river.
- Recreational activities: qualification that contemplates the floods of the river.

b) establish a criterion for the occupation of the area of wetlands that if it has been defended:

- qualification of reservoirs.
- cultural activities.

### *2. About accessibility.*

a) Metropolitan: reactivation of the FFCC (Rafaela - Esperanza - Santa Fe), intercity transport lines

b) Urban: west-east connectivity

c) Fragment: recognition of small centralities for multimodal exchange (stations): FFCC - buses - cars - bicycles

### *3. About the order of land use and division*

a) establish criteria for division and possible uses:

- Logistics - industrial
- Recreational (cultural - sports)

- Housing (public - private)
- Land bank (without lot)
- Waste treatment set densities for residential use

To expose these strategies is a way to constitute the kick start to empower and qualify the sector. Conscious that in an area of these characteristics, planning is necessary, it is expected that the next decade, we can see this sector integrated to the city from a park for all and its inhabitants integrated to the city from live in a decent environment and recognized for its condition

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