PREFEITURA MUNICIPAL DE TERESINA / PI

# Teresina Enhancing Municipal Governance and Quality of Life Project

## Programa Lagoas do Norte – FASE II

**EXECUTIVE SUMMARY**

**NOVEMBER 2014**

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**CREDITS**

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# EXECUTIVE SUMMARY

## Introduction

The second phase of the Teresina Enhancing Municipal Governance and Quality of Life Project, coordinated by the Secretary of Planning (SEMPLAN) of the Municipality of Teresina, aims at giving continuity and optimizing the investments made in the first phase. It proposes investments totalizing R$ 360 million reais, applied in an interval of five years to support social, economic and housing actions – as well as projects that focus on infrastructure and on urban and environmental renovation – aiming at the sustainable development of the Lagoas do Norte region of the city. Its objectives are:

(i) To modernize and ameliorate the administrative capacity of the Municipality of Teresina in the financial, urban, environmental areas, as well as in providing basic services and in economic development; and

(ii) To improve the quality of life of the population living in the area covered by the Teresina Enhancing Municipal Governance and Quality of Life Project, focusing in areas 2 and 3, but performing interventions in areas 1 and 4. The second phase of this project is structured in three components:

| COMPONENT | INVESTMENT AMOUNT US$ 1.00 |
|---|---|
| Component 1 – Municipal Management Modernization, City Development and Project Management | **15,897,742** |
| Component 2 – Integrated Urban-Environmental Development in the Lagoas do Norte region | **153,849,24** |
| Component 3 – Social and Economic Development in the Lagoas do Norte region | **6,644,444** |
| **Total** | **176,391,433** |

The areas covered by the Program are in the images bellow:

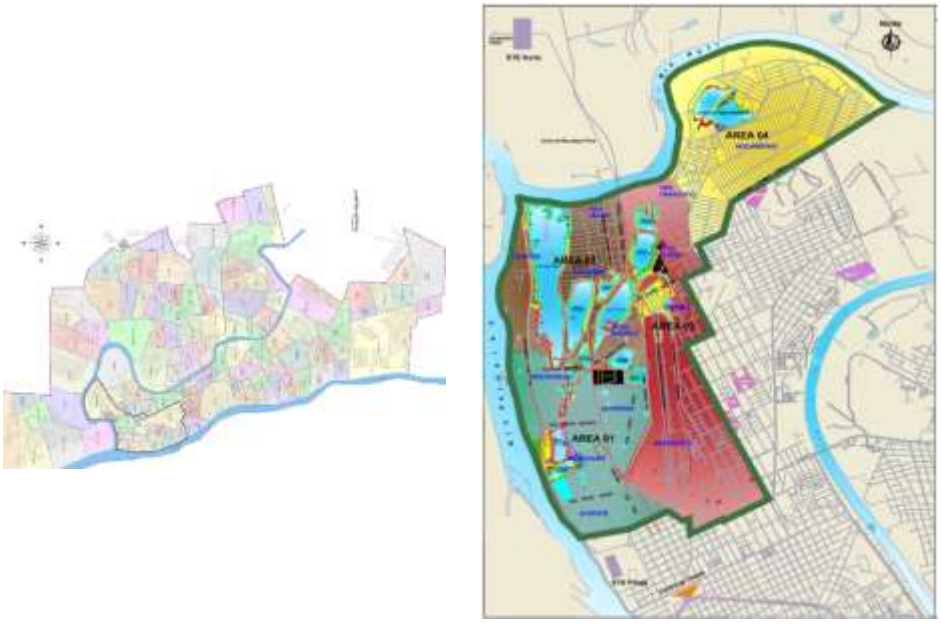

*Image 1 – The Coverage area of Lagoas do Norte Program*.

## Results of the first phase

The results of the first phase of the Lagoas do Norte Project (LNP), which is inn conclusion (2015), are:

- **Reduction in the risk of flooding:** Protecting the local population against floods in the urbanized areas.
- **Environmental improve:** partial depollution of Cabrinha and Lourival ponds, recovery and construction of green areas;
- **Well-being of the population:** Improvement of the self-esteem of the population and optimistic perspectives regarding the future;
- **Leisure areas:** An implemented linear park has become a post-card in the city;
- **Culture areas:** Renovation of *Boi* Theater with resources from the project and now it is part of the cultural circuit of the city. The theater is being used to performances from the National circuit.
- **Road mobility**: Improvement on traffic flow and implementation of bike lanes;
- **Valorization of real state** located in the Lagoas do Norte region;
- **Opening of small businesses** and dissipation of business interest in the area**;**
- **Acquisition of new financial resources** from the Federal government to new (investments in the city in the areas of sanitation and urban mobility. This acquisition derives from the Master Plan of Urban Drainage of Teresina *(PDDUr*) and from the Master Plan of Urban Transportation and Mobility (*PDTU*);
- **Institutional improvement in the administrative structure of the Municipality,** especially in the Secretaries of Planning and of Finance, with improvement in management and increase of municipal revenues.

## Lessons learned

Among the lessons learned in the first part of the Project are:

- The improvement in the institutional capacity of the Municipal of Teresina on what regards themes such as:
    - urban and environmental renovation,
    - agrarian regularization
    - involuntary resettlement of families has enabled, among other factors, the Municipality's access to financing subsidies offered by the Federal Government to projects of sanitation, improvements in the road system, macro drainage and housing programs managed by bank *Caixa Econômica Federal* (such as the *Minha Casa Minha Vida* program).
- The improvement of the institutional capacity, the participation of the community and the interventions of the Project have allowed the augmentation of the level of environmental consciousness in urban areas as well as the level of importance of the ponds as public areas with functions that help control the outflow during the period of high discharge.
- Interventions of high complexity, of multidisciplinary aspect, and with a strong inter-relation between themselves need the detailing of projects in a compound manner. During the performance of the first phase, the major problems faced related to hiring basic and constructive design/project without the required articulation. The issue asked for additional efforts from the local team and from the Bank finally overcame successfully during the construction phase.
- The building design should be planned, predicting the inter-relation between the interventions. The supervision of the construction sites must contain professionals from different areas, including the environmental and the social.
- The results on the environment/hydric resources of some interventions – as the sewage system – are presented in a longer term than the results of the conclusion of the building process. They depend on the degree of adhesion, on the adequate system operation and on the environment's capacity of depuration.

- The permanent implementation of a Socio-environmental Unit of Project (*UPS*) has permitted the adoption of many socio-environmental actions in the area; the proximity to the local community and its participation/supervision of the building of interventions by the Follow-up Project Forum.
- The participation of the community, both in the detailing and building phase, has guaranteed a higher quality and a better response to the interventions.
- In the conception of urbanism and landscape design/project, it is important to try to promote compatible economic activities that can allow the acquisition of resources to the self-management of the linear parks in the future.
- Projects of this kind – renovation of degraded urban area – promote many benefits to the population, among which there are the improvement of its self-esteem, accessibility to good quality essential public services, increase feeling of safety; stimulation of local economy; insertion of people in the formal labor market; and the valorization of their real state.

## Characterization of the current condition of the region of interference of the project

The Lagoas do Norte region, located in the confluence of the Poti and the Parnaíba River presents a context of great environmental vulnerability, considering its lacustrine plain configuration, with an extensive flat area susceptible to flooding, having been altered by hydraulic interventions in the past 40 years – with the construction of dams, interconnection system and system of level control.

The rainy season provokes a considerable elevation in the level of the water of both Parnaíba River and Poti River, especially during April, when torrential rain is very usual. This elevation results in the outflowing of banks and, consequently, floods the plain formed in the confluence of both rivers. This is a natural phenomenon, inherent to many other regions located in the river main course. In the Lagoas do Norte region, however, disorganized urban occupation has disrupted natural processes, with negative effects in the quality of life of the population.

Among the different problems occurring in the Lagoas do Norte region, which are generated by the disorganized and inadequate occupation of the soil, are the following:

- partial or total land reclamation in ponds in order to allow housing constructions in these areas;
- occupation with houses on the dam in the Poti River and in the Parnaíba River;
- occupation of areas located under the periodic inundation level of rivers and ponds;
- the rudimentary exploitation of fluvial clay and clay-stones to the production of bricks and handcrafted goods amplifies the area of the ponds and creates a series of open-pits and depressions, some of which are connected to the existing ponds;
- occupation of areas of permanent preservation;
- planning of public roads without taking into consideration the topography and the seasonality of the inundation of rivers, gorges and ponds;
- use of rivers to tourism and leisure under inadequate conditions etc.

The first effort from the Municipal Government to face the problematic of the Lagoas do Norte region occurred in the implementation of the Lagoas do Norte Project. The LNP I, financed by the World Bank, and approved in October 2008, under the amount of US$ 44.47 million and now is in the final phase.

Therefore, LNP II will provide continuity to the interventions performed in the Lagoas do Norte region by the aforementioned plan, also by using subsidies provided by the World Bank.

## Description of the LNP II project

The current conception of the project reflects an updating/review of the original conception, elaborated in 2006. It has been conceived on the experience obtained in phase one, on the lessons learned and

considering the analysis of the initially predicted alternatives to the interventions. This update/review has counted with the intense participation of the Municipality of Teresina and the UGP, of the company hired to develop the basic design/project and constructive design/project, of the hired consultants and of the Word Bank team.

The development of these studies has allowed the elaboration and detailing of the following components:

- **Component 1 –** Municipal Management Modernization, City Development and Project Management. The subcomponents are:
    - Institutional Development of the Municipality of Teresina;
    - Elaboration of Studies, Master Plans and Strategic Projects to the city and meeting all the requirements of the complementary programs of PGAS;
    - Project management.

- **Component 2** - Integrated Urban-Environmental Development in the Lagoas do Norte region. This component will perform physical interventions to ameliorate urban basic service delivery and the environmental conditions in the area covered by the Project. The subcomponents are:
    - Local renovation – urbanism and landscape design/project;
    - Sanitation, drainage and road system infrastructures;
    - Engineering and architecture designs/projects and supervision of construction sites.

- **Component 3 -** Social and Economic Development in the Lagoas do Norte region. This component will finance the interventions complementary to the ones in Component 2, including:
    - Strengthening of community associations and of other community groups in order to improve the access of eligible families to social programs, daycare, basic health care, education etc.;
    - Activities of environmental and sanitation/hygiene education in the region.
    - Programs that help generate local jobs and income;
    - Renovation/enlargement and construction of public facilities (community health centers, schools etc.) as integrating part of the enhancement interventions of Component 2;
    - Activities to the mobilization and to the participation of the community in the construction of interventions.

## Beneficiaries and Socio-environmental safeguards

The beneficiary population is differentiated by objectives: i) in Component 1 - the inhabitants of Teresina (830,000 people) - because it refers to the structuring of Municipal management, preparation and designs/projects for regional development. ii) in Components 2 and 3 - the inhabitants of pond areas such as Pantanal, do Mazerine, Jacaré, Piçarreira, dos Oleiros, Cerâmica Poty, dos Cachorros (areas 2 and 3) and also Mocambinho Pond - around 67,000 people who shall receive the interventions and improvements of the LNP II).

In the LNP II the interventions already planned are the following:

- Urban and environmental renovation, which will now count on a macro drainage integrated network.
- Improvement of the road system (emphasizing the duplication of Boa Esperança Avenue);
- Urbanization of the margins of ponds with the implementation of parks;
- Implementation of a sewage system and the renovation and enlargement of the Pirajá Sewage Treatment Plant (*ETE*);

- Amelioration of the supply system.

The LNP II also plans a resettlement to salubrious locations of about 2,180 families that have occupied areas susceptible to flooding, areas of environmental preservation, public buildings and other insalubrious areas.

Area covered by the LNP I

Areas contemplated by the LNP II

**Area 1 - Canal do Padre Eduardo**

| Neighborhoods | Population 2010 | Area ha |
|---|---|---|
| Acarapé | 3,018 | 44.90 |
| Matadouro | 5,530 | 84.00 |
| Alvorada | 5,387 | 53.20 |
| São Joaquim | 10,558 | 11.32 |
| **Total área 1** | **24.493** | **193,42** |

**Area 2 - Lagoa dos Oleiros / São Joaquim**

| Neighborhoods | Population 2010 | Area ha |
|---|---|---|
| Nova Brasília | 6,780 | 71.69 |
| Poti Velho | 3,730 | 38.23 |
| Mafrense | 6,492 | 73.01 |
| Olarias | 1,561 | 101.02 |
| **Total area 2** | **18,563** | **283.95** |

**Area 3 - Alto Alegre / Aeroporto**

| Neighborhoods | Population 2010 | Area ha |
|---|---|---|
| Aeroporto | 7,567 | 236.41 |
| Itaperu | 2,166 | 30.64 |
| Alto Alegre | 5,389 | 86.42 |
| **Total area 3** | **15,122** | **353.47** |

| Neighborhoods | Population 2010 | Area ha |
|---|---|---|
| São Francisco | 5,453 | 39.48 |
| Mocambinho | 28,385 | 327.70 |
| **Total area 4** | **33,838** | **367.18** |
| **General Total** | **92,016** | **1,198.02** |

*Image 2 - Neighborhoods and respective population contemplated by the Teresina Enhancing Municipal Governance and Quality of Life Project in its two phases*

The image below presents the second phase of physical interventions of the Teresina Enhancing Municipal Governance and Quality of Life Project.

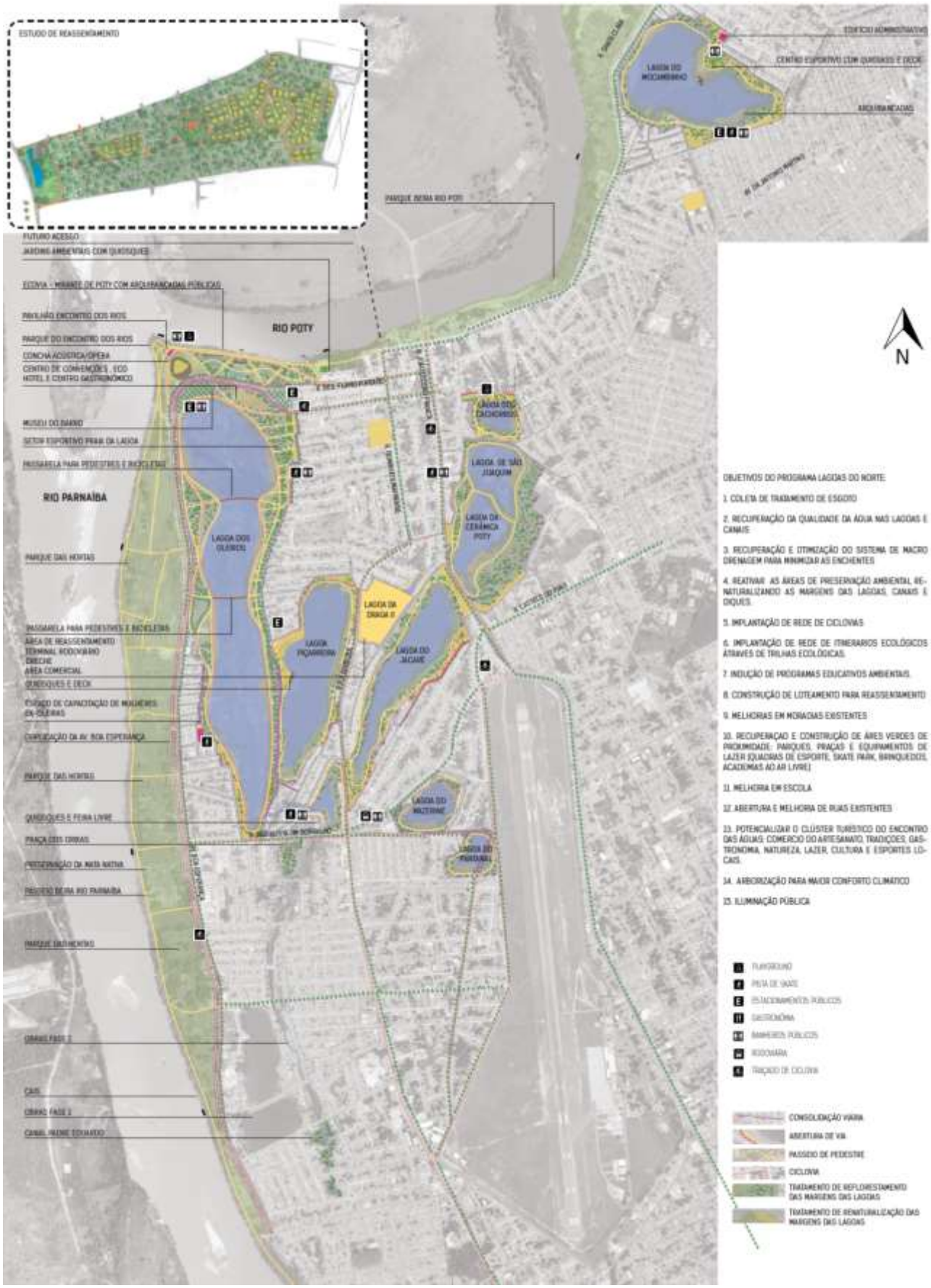


*Image 3 – Interventions in the second phase of the LNP*

## Legal and Institutional Framework

The main regulatory issues are related to: environmental licensing for the works and / or physical interventions; granting of water harvesting and discharge of effluents treated at Parnaíba River.

The Program design on its 1st Stage, with operations planned for all areas (1, 2, 3 and 4) received Preliminary License - LP by SEMAR. Specific environmental licensing for each intervention was issued by SEMAR or SEMAM. Some of Installation License (LI) are still valid and comprise areas 1, 2, 3 and 4.

| **Environmental Licenses Issued** | | |
|---|---|---|
| **By SEMAR/PI (State Agency)** | | |
| **Activity** | **Type** | **Valid until** |
| PLN (entire program) | PRELIMINARY | 12/ABR/2014 |
| Sewage Collection System – Areas 1, 2, 3 e 4 | INSTALLATION | 30/SEP/2016 |
| Linear Park - Areas 1, 2, 3 e 4 | INSTALLATION | 18/DEC/2015 |
| Macrodrainage System - Areas 1, 2, 3 e 4 | INSTALLATION | 18/DEC/2015 |
| **by SEMAM (Municipal Agency)** | | |
| **Activity** | **Type** | **Valid until** |
| Road widening of St. Rua Rui Barbosa (section St. Uiraúna and St. Radialista Jim Borralho) | INSTALLATION | 22/NOV/2014 |
| Water Supply System and improving and strengthening PLN supply chains. | INSTALLATION | 08/NOV/2014 |

| | |
|---|---|
| | To be renewed |
| | In renewal process |

The sensitive alterations promoted an update and reviewed the conception of the Project for areas 2 and 3 of the Lagoas do Norte region. Therefore, the Municipality of Teresina must submit this Conception to the appreciation of the State Environmental Department in order to obtain the renovation of the LP, as well as the basic designs/projects referring to the sewage and macro drainage systems.

In addition, the need to grant the pumping of water from the Parnaíba River to Oleiros Pond must be analyzed, because of its insignificant size and because it would need the approval of the institution responsible for the concession of use.

In any manner, the environmental licensing system for the interventions will obey the following hierarchy:

- The General Conception of the Project – Second Phase, based on this EAS, must be submitted to the renovation of previous licensing by SEMAR (State of environmental licensing);
- The works of macro drainage and of sewage infrastructure (such as the renovation and adjustment of the Pirajá Sewage Treatment Plant) must be licensed (renovation of the existing licenses) issued by SEMAR, which may require a specific environmental study.
- Urban interventions – designs/projects for involuntary resettlement, road system intervention and community and social facilities will be submitted to local licensing, which require a specific environmental study.

## Environmental and Social Evaluation

The environmental and social evaluation intended by the Municipality of Teresina in the preparation phase of the LNP II complies the World Bank – BIRD requirements. It aims at ensuring that the solutions presented possess direct relation to the effort to solve the actual problems of its area of contemplation. Information about the environmental consequences of the designs/projects must give especial attention, in a manner these consequences may be properly prevented in all the phases of the project: before and after the financing decisions are made.

The design of the 2nd phase are not prepared yet, it has only the conceptual projects. Therefore, EAS adopted an alternative procedure: it will perform an evaluation of the interventions and of the proposed alternatives, based on the current legislation and on their possible impacts on socio-environmental strategic attributes. In order to fulfill the aforementioned objective it will define a criterion and a procedure that will permit the environmental and social evaluation of the subprojects in the phase of the implementation of the Teresina Enhancing Municipal Governance and Quality of Life Project.

In this manner, more than the traditional evaluation of environmental impacts of isolated enterprises, it aims at achieving a degree of analysis that integrates the environmental dimension in the process of decision-making, considering especially the World Bank's Safeguard Policy to category A. This classification is justified by the nature of the proposed actions and by the proximity of the interventions to environmentally protected areas and to areas of cultural heritage preservation. Some of Word Bank's safeguards activated by the Project are: Operational Policy 4.01 - Environmental Assessment; Operational Policy 4.04 - Natural Habitats; Operational Policy 4.12 - Involuntary Resettlement and Operational Policy 4.37 - Safety of Dams.

## Analysis of Technological Alternatives and Alternatives of Location

The conception of the LNP I and the environmental and social evaluation intended at the time of the preparation of the first phase of the Project (2006) considered the interventions of macro drainage, water supply, sewage, urbanism – landscape design/project and road system to all four areas of contemplation.

Now, at the preparation 2nd phase, EAS analyzed the alternatives of the interventions that changed the conception. The following alternatives were:

**Macro drainage**: In 2014, Tucci and Souza, in a study entitled "Inundation Control and the Maintenance of the levels of the Lagoas do Norte region: Hydrologic and hydraulic simulations of the flooding scenarios", have revaluated the macro drainage global system and the Lagoas do Norte region. In it they simulated scenarios along the years in which interventions will be made.

The studies developed by these authors aim at simulating and projecting a 25-year risk of flooding conditions in the ponds of the system that flow into Oleiros Pond. In this system many scenarios were studied, which permitted the authors to obtain the maximum inundation levels to the return time referred in the ponds, considering the operational pumping rule in Oleiros Pond with levels of 53.5, 54.0 and 55.0 meters.

The maintenance of the 55.0m level in Oleiros Pond is the most convenient operational scenario, because it minimizes the expropriation conditions due to flooding and because it allows the level of water to be maximized in the beginning of the dry season. The study has also verified the scenario for a 50-year outflow during the period of high discharge, showing that the impacts are limited and therefore ensuring both the objective and the results of the flooding control.

Aside from the scenarios studied predicting flooding situations, some scenarios that considered the possibility of drought were also analyzed – considering the maintenance of permanent levels.

To some Ponds, the maintenance of the levels is almost permanent, of about 95%, whose levels allow a great part of the pond to be maintained, as it is the case of the following ponds: Acarapé II, Piçareiras, Pantanal and Mazerine. Cachorros and Cerâmica ponds do not maintain their levels, but, if the rule is changed by using floodgates, it is possible to increase the time of high water levels, making them stable for a great part of the year. The rule is quite simple, it would only be necessary to close the discharge pipe that connects the ponds from May to October. In Jacaré Pond and in São Joaquim Pond there is a limited action, as the levels of transference are quite high and it is not possible to be increased due to flooding risks. In the case of Acarapé I Pond and in the channel used for navigation, the discharge pipes must be closed from May to October.

Two additional alternatives have been analyzed to Oleiros Pond:

1. Maintenance of levels at 54.0 meters with the operation of water available in the system of the ponds. This alternative represents a pond area of 311,000 $m^2$. The area projected to Oleiros Pond if 405,659 $m^2$. Therefore, there will be some days during the year in which the pond will be lacking around 95,000 $m^2$ of water;
2. Maintenance of levels at 55.0 meters: to meet this demand it is necessary to pump water for Parnaíba River to complete the necessary volume to keep the level at the aforementioned rate.

The Municipality of Teresina has decided to use the alternative of maintaining the level at 55.0 meters, and thus, the pumping of water from Parnaíba River is required when such level is not achieved. This decision is fundamentally based on the urban – landscape design/project conception, due to the function proposed to the environmentally recovered ponds, including the implementation of a tourism cluster in the Northern part of the pond along with Parque Encontro das Águas. In addition to that, it is possible to verify that the flow rates required to the maintenance of the levels in Oleiros Pond can be considered insignificant (maximum of 30.3 l/s to a minimum flow rate of 261,100 l/s from Parnaiba River).

**Sewage System - Pirajá Sewage Treatment Plant**: The preliminary conception of sewage system in areas 1, 2, 3 and 4, which are part of the original project, intended to:

- Implement collector and elevator networks in area 1 and a redirection of the fluids to the Pirajá Sewage Treatment Plant;
- Renovation of the Pirajá Sewage Treatment Plant to support the effluents of area 1;
- Areas 2, 3 and 4 would be drained and their effluents redirected, through an outfall, to a sewage treatment plant to be built outside of the area covered by the project – more precisely in a site located at the right margin of Parnaíba River, about 7 km after its confluence with Poti River.

As AGESPISA is implementing a Water Treatment Plant (ETA) in an area near the downstream originally destined to the Northern Sewage Treatment Plant – which would require an enlargement of the outfall of areas 2, 3 and 4 to the downstream of the Water Treatment Plant under construction, another alternative to the final destination of sewage were analyzed. This alternative revealed itself the enlargement of the existing Pirajá Sewage Treatment Plant and after the analysis of this new possibility it was verified that:

- The choice of the Pirajá Sewage Treatment Plant (renovation and enlargement) eliminates the construction of an outfall of long extension or of big diameter.

- The transposition of sewage to a new Sewage Treatment Plant (located at the right side of Poti River) would require the outfall to cross the Mariano Gaioso C. Branco Bridge, whose structure would probably need some sort of reinforcement to sustain the new heavy load.
- The construction of a new Sewage Treatment Plant would need the expropriation of the land;
- The cost of electricity, when considering the sewage pumping, is much higher in the case of the construction of a new Sewage Treatment Plant; and
- The cost of maintenance and operation are smaller to the operating Pirajá Sewage Treatment Plant, when compared to the construction of a new Sewage Treatment Plant, considering the significant increase in expenses with personal;
- The Pirajá Sewage Treatment Plant is located in an urban area with consolidated occupation, and a new Sewage Treatment Plant would require environmental changes, with extra costs on measures of environmental control;
- The study of self-depuration of Parnaíba River (Tucci, 2014) proves the depuration capacity of the river to the new flow rates resulting from the enlargement of the Pirajá Sewage Treatment Plant, without compromising the construction of the Water Treatment Plant.

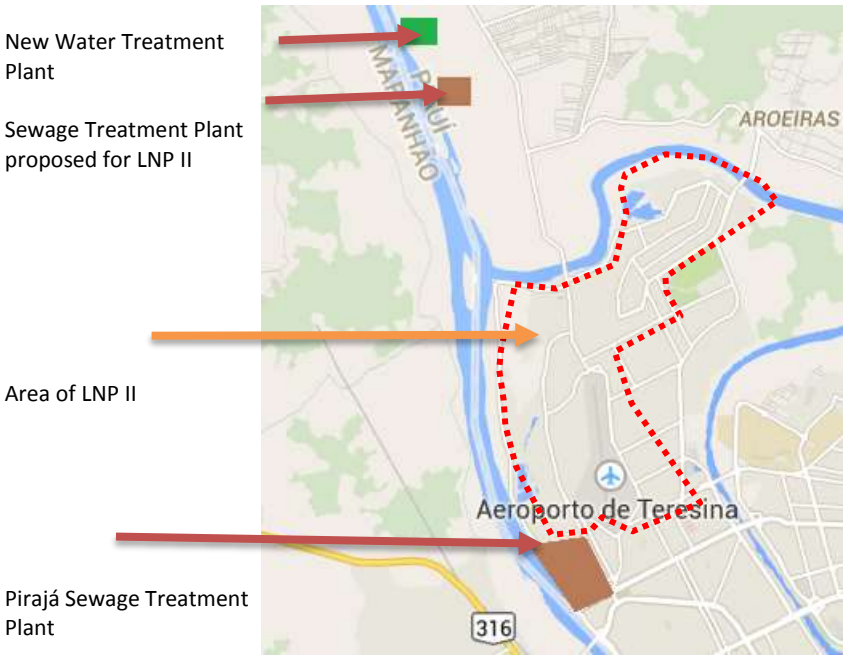


*Image 4 – Locational alternatives between the Pirajá Sewage Treatment Plant and the construction of a new Sewage Treatment Plant to LNP II*

So in this sense an alternative was adopted to conduct the sewage from areas 2, 3 and 4 to the Pirajá Sewage Treatment Plant - as can be verified in image number 17 above – and its current enlargement to a secondary treatment of a flow rate of 340 l/s and, in twenty years, to support a flow rate of 420 l/s.

**Urban and landscape interventions in the margins of ponds** (areas of permanent preservation): two distinct scenarios were analyzed:

- Renovation of the areas of permanent preservation of ponds with a lane of 30 maters of width from the maximum normal level established in the Study of Maximum and Minimum Levels of Ponds, adding a 10 meter lane to the implementation of sanitation infrastructure, access by road etc. A Linear Park has been proposed to be implemented in this 40-meter lane.
- Renovation of the areas of permanent preservation considering a urban drawing that permits the eventual building of permanent housing structures in these protected areas. This would be made in accordance with the criteria presented in the CONAMA Resolution n. 396/2006. Thus,

they would be constructed respecting the conception of 'landscape windows', trying to minimize the need for resettlement without compromising the urban-environmental concept.

The first scenario would comprehend the need to full relocation of around 1,214 real state, with 65 partial removals. In the second scenario, this relocation will be of 763 real estate and around 131 partially removed (back side of the lot).

The second scenario presents itself as the most adequate manner, especially when the significant reduction in the amount of real estate removal from areas of permanent preservation is considered.

## Methodological procedures adopted to the environmental and social evaluation

The approach used to evaluate the results originates in one applicable adaptation to the present study on the "Methodology Pressure-State-Response" (PER), adopted by countries members of the Organization for Economic Co-operation and Development (OECD) in the definition of public policies of preservation and of promotion of development. This approach lines itself with the methodologies used to a strategic environmental evaluation, in which the goal is to evaluate not only the enterprises, but also, and most importantly, the procedures, the programs and the policies.

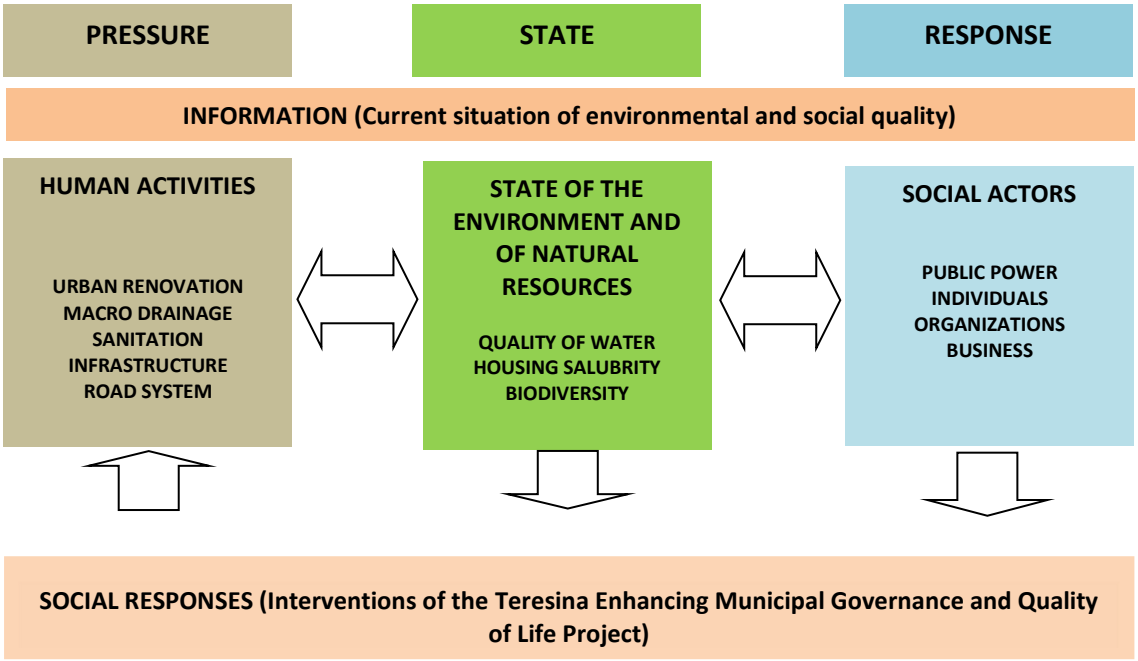


*Image 5 – Pressure-State-Response methodology adopted to perform an environmental evaluation*

The proposed environmental evaluation constitutes an analysis of the designs/projects and of the interventions, aiming at introducing the environmental dimension in the process of decision making, making it as important as the economic and social dimensions. In this manner, it contributes to the establishment of a perspective in which potential environmental impacts must be considered a key factor to the building of a design/project and not a mere accessory aspect. Thus, the integration of the environment in the decision making process in an essential pre-requirement to walk in the way towards sustainable development.

Table 1 presents the results in terms of environmental and social impacts in the phases of implementation and of operation of the interventions, as well as the main mitigating measures.

*Table 1 – EVALUATION OF ENVIRONMENTAL IMPACT ON STRATEGYC ENVIRONMENTAL ATTRIBUTES IN THE PHASES OF IMPLEMENTATION AND OF OPERATION*

| INTERVENTIONS | POTENTIAL SIGNIFICATIVE IMPACTS ON STRATEGIC ATTRIBUTES IMPLEMENTATION PHASE | | | MITIGATING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| **WATER SUPPLY SYSTEM** | | | | |
| Reinforcement in the supply system in order to support the interventions being made in the North Zone | There is none | Inconveniences inherent to Works of this typology: eventual blockage of roads, increase of dust, noise, generation of refuse mining areas, interference with public networks, accidents etc. | Temporary population discredit to the system | Social Communication Plan<br><br>Environmental Building Manual (*MAC*) |
| **SEWAGE SYSTEM** | | | | |
| Sewage collecting system in Areas 1, 2 and 3 | There is none | Inconveniences inherent to Works of this typology: eventual blockage of roads, increase of dust, noise, generation of refuse mining areas, interference with public networks, accidents etc. | Population discredit to the system<br><br>Maintenance of diseases patterns of hydric transportation | Environmental and Sanitary Education Program.<br>Environmental Building Manual (*MAC*)<br>Proceed the connections after the conclusion of the Works of Pirajá Sewage Treatment Plant |
| Adjustment and enlargement of Pirajá Sewage Treatment Plant | There is none | Temporary reduction in the quality of the water of the Parnaíba River;<br>Production of odor and alteration of the aesthetical conditions of the landscape;<br>Reduction of heath condition of urban areas. | Disaffection with the LNP;<br>Elaboration of a specific Environmental License with the production of Environmental Study;<br>Doubts regarding the collection of water and regarding the downstream;<br>Increase of health problems. | Monitor the use of water originating from the Parnaíba River;<br>Improve operation management;<br>Implement outfall to the diffusion of effluents;<br>Social Communication Plan. |

| INTERVENTIONS | POTENTIAL SIGNIFICATIVE IMPACTS ON STRATEGIC ATTRIBUTES IMPLEMENTATION PHASE | | | MITIGATING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| **MACRO DRAINAGE** | | | | |
| Macro drainage in areas 2 and 3 | There is none | Decrease of biodiversity;<br>Temporary reduction in the quality of the water of the ponds; | Permanent escape from habitats;<br>Temporary drought in the ponds with the return of irregular occupations;<br>Community's dissatisfaction with the Project and with the Municipality of Teresina. | Rescue of fauna;<br>Social Communication<br>Plan (with a previous notice of events) that include a Claim System;<br>Monitoring of the quality of pond water |
| | | Inadequate disposal of waste originated from cleaning products, consequently causing soil and hydric pollution | Hydric contamination of downstream areas because of the refuse mining areas | Environmental licensing of refuse mining areas –apply environmental control measures to avoid pollution; ; |
| | | Production of odor | Temporary event | Improve operation management |
| | | Temporary outflows caused by the lack of control of the pumping system;<br>Reduction of health condition of urban areas | Discredit to the Program of Alert of Events;<br>Flooding with losses of lives and material damage;<br>Increase of health problems; | Plan of Alert of Critical Events;<br>Train the employees of the Municipality of Teresina to operate the system<br>Social Communication<br>Plan. |
| **INTERVENTION IN THE ROAD SYSTEM** | | | | |
| Improvement and enlargement of the current system, with the inclusion of bike lanes | There is none | Temporary interruption of traffic;<br>Reduction of Urban Mobility | Commitment of the sectors of commerce and service-providing with effects on the economy | Social Communication<br>Plan. |
| Duplication of Boa Esperança Avenue | There is none | Resettlement of families and business compensation;<br>Structural pressure on the dam. | Commitment of commerce and of service-providing sector with effects on the economy;<br>Menace to the structure of the dam | Specific environmental study<br>Social Communication<br>Plan.<br>Resettlement and Compensation Plan<br>Safety Panel before the construction starts; |

| INTERVENTIONS | POTENTIAL SIGNIFICATIVE IMPACTS ON STRATEGIC ATTRIBUTES IMPLEMENTATION PHASE | | | MITIGATING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| Implementation of roundabout | There is none | Partial land reclamation of Jacaré Pond and Cerâmica Poty Pond;<br>Loss of biodiversity | Loss of soil stability in reclaimed plots; | Geotechnical study of the rearranged area.<br>Previous rescue of the fauna |
| **URBAN AND ENVIRONMENTAL RENOVATION** | | | | |
| Urban and environmental renovation of areas 1 (partial), 2 and 3. | There is none | Resettlement of families and business compensation;<br>Partial land reclamation of Oleiros Pond;<br>Loss of biodiversity. | Commitment of commerce and of service-providing sector with effects on the economy;<br>Loss of soil stability in reclaimed plots;<br>Permanent escape from habitats. | Resettlement and Compensation Plan;<br>Geotechnical study of the rearranged area at Oleiros Pond;<br>Rescue of fauna |
| **SOCIAL AND COMMUNITY FACILITIES** | | | | |
| Building and renovation of Basic Units of Health | There is none | Reduction of Health condition of urban areas | Increase of health problems | Social Communication Plan that include a Claim System; |
| Renovation of schools and of sports courts | There is none | Temporary interruption of activity. | Temporary event; | Implement the Environmental Building Manual (*MAC*) in the construction sites |
| Open-air fair | There is none | Temporary interruption of activity. | Temporary event; | Implement the Environmental Building Manual (*MAC*) in the construction sites |
| Renovation of São Joaquim market | There is none | Temporary interruption of activity. | Temporary event; | Implement the Environmental Building Manual (*MAC*) in the construction sites |
| Building of the Commercial Center of handcrafted goods | There is none | Temporary interruption of activity. | Temporary event; | Implement the Environmental Building Manual (*MAC*) in the construction sites |
| "Encontro dos Rios"Cultural Center | There is none | Temporary interruption of activity. | Temporary event; | Implement the Environmental Building Manual (*MAC*) in the construction sites |
| **RESETTLEMENT ACTIONS** | | | | |
| Implementation of **Area A** (Oleiros Pond) in order to meet the demand of resettlements; | There is none | Resettlement of families and business compensation; | Commitment of commerce and of service-providing sector with effects on the economy; | Resettlement and Compensation Plan |

| INTERVENTIONS | POTENTIAL SIGNIFICATIVE IMPACTS ON STRATEGIC ATTRIBUTES IMPLEMENTATION PHASE | | | MITIGATING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| | | Partial land reclamation of Oleiros Pond; | Loss of soil stability in reclaimed plots; | Geotechnical study of the rearranged area at Oleiros Pond; |
| Topographic remodeling of the site and implementation of **Area B** (on Draga II Pond) in order to meet the demand of resettlements; | There is none | Resettlement of families and business compensation;<br><br>Partial land reclamation of Draga Pond; | Commitment of commerce and of service-providing sector with effects on the economy;<br><br>Loss of soil stability in reclaimed plots; | Resettlement and Compensation Plan;<br><br>Consult Brazilian Aeronautics about possible interferences<br><br>Geotechnical study of the rearranged area at Draga Pond; |
| Implementation of **Area C** (distant 3 km from the region of the ponds) in order to meet the demand of resettlements; | There is none | Resettlement of families and business compensation;<br><br>Area susceptible to temporary flooding (water table) | Commitment of commerce and of service-providing sector with effects on the economy;<br><br>Compromise the quality of constructions | Resettlement and Compensation Plan;<br>Drainage system;<br>Evaluate geotechnical stability of the site |

| INTERVENTIONS | SIGNIFICANT IMPACTS ON STRATEGIC ATTRIBUTES OPERATION PHASE | | | POTENTIALIZING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| **WATER SUPPLY SYSTEM** | | | | |
| Reinforcement in the supply system in order to support the interventions being made in the North Zone | Increase of urban health | Increase In the consumption and eventual waste of water | Reduction of diseases transmitted by the water;<br><br>Increase of population's self-esteem. | Environmental and Sanitary Education Program |
| **SEWAGE SYSTEM** | | | | |
| Sewage collecting system in Areas 1, 2 and 3 | Increase of urban health<br><br>Increase in the quality of water from the Parnaíba River and from the Ponds | There is none | Increase of population's self-esteem. | Environmental and Sanitary education Program |
| Adjustment and enlargement of Pirajá Sewage Treatment Plant | Increase of urban health<br><br>Increase in the quality of water from the Parnaíba River | | Reduction of diseases transmitted by the water;<br><br>Increase of population's self-esteem. | Environmental and Sanitary education Program |
| **MACRO DRAINAGE** | | | | |
| Macro drainage in areas 2 and 3 | Improvements in the environmental, aesthetical and landscape conditions of the space;<br>Reduction of risks of flooding;<br>Improvement in the protection of Areas of Permanent Preservation. | There is none | Recovery from insalubrious environmental conditions;<br>Increase of the feeling of safety;<br>Opportunities for open-air leisure;<br>Generation of income by the stimulation of local economy;<br>Recovery of biodiversity. | It does not apply; |
| **INTERVENTION IN THE ROAD SYSTEM** | | | | |
| Improvement and enlargement of the current system, with the inclusion of bike lanes | Improvements in urban mobility. | Increase in the number of vehicles;<br>Increase of air pollution;<br>Pressure to the occupation of | Increase of accessibility with pressure regarding occupation. | Implement vertical and horizontal elements of road signalization |
| Duplication of Boa Esperança Avenue | | | | |

| INTERVENTIONS | SIGNIFICANT IMPACTS ON STRATEGIC ATTRIBUTES OPERATION PHASE | | | POTENTIALIZING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| Implementation of roundabout | | fringes areas | | |
| **URBAN AND ENVIRONMENTAL RENOVATION** | | | | |
| Urban and environmental renovation of areas 1 (partial), 2 and 3. | Improvements in environmental and urban conditions;<br><br>Improvements in the aesthetical and landscape conditions of the urban space;<br><br>Protection of Areas of Permanent Preservation and return to biodiversity. | There is none | Recovery from insalubrious environmental conditions;<br><br>Increase of the feeling of safety;<br>Opportunities for open-air leisure;<br>Generation of income by the stimulation of local economy;<br>Valorization of real state. | It does not apply; |
| **SOCIAL AND COMMUNITY FACILITIES** | | | | |
| Building and renovation of Basic Units of Health | Improvements in health care services provided to the population. | Generation of biomedical waste. | Healthy population; | Implement the Program of Management of Biomedical Waste (*PGRSS)*; |
| Renovation of schools and of sports courts | Improvements in educational levels. | It does not apply; | Educated population; | It does not apply; |
| Open-air fair<br>Renovation of São Joaquim market | Development of commercial activities and of activities in the service-providing sector; | | Opportunities to generate Jobs and income. | Program to support the generation of Jobs and Income; |
| Building of the Commercial Center of handcrafted goods<br>"Encontro dos Rios" Cultural Center | Valorization of cultural activities, meeting the operational safeguards; | | It does not apply; | Meets World Bank's Safeguards; |
| **RESETTLEMENT ACTIONS** | | | | |
| Implementation of **area A** (Oleiros Pond) in order to meet the demand of resettlements; | Improvements in housing conditions;<br>Valorization of real state; | It does not apply; | It does not apply; | Environmental and Sanitary education Program<br>Incentives to economic |

| INTERVENTIONS | SIGNIFICANT IMPACTS ON STRATEGIC ATTRIBUTES OPERATION PHASE | | | POTENTIALIZING MEASURE |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | CUMULATIVE EFFECTS | |
| Topographic remodeling of the site and implementation of **area B** (on Draga II Pond) in order to meet the demand of resettlements;<br><br>Implementation of **area C** (distant 3 km from the region of the ponds) in order to meet the demand of resettlements; | Creation of new opportunities of business and of leisure. | | | development;<br>Strengthening of community bonds by supporting community associations. |

As it was expected, the great part of negative impacts occurs in the implementation phase of the engineering designs for infrastructure systems – such as sanitation, macro drainage, road system and urban renovation. The table has shown how these negative impacts are temporary and inherent to the typologies of the works proposed in the project.

Adequate criteria of conception and of design can minimize significantly the possibility of occurrence of the aforementioned interferences.

The interventions, however, will generate a considerable resettlement of families. These families are currently living in areas of risk, in areas of environmental preservation and near the construction sites.

The greatest amount of positive impacts will only be verified in the operation phase of these same systems, as well as the implementation of Components 2 and 3 of the Project, which will act upon improvements in the generation of income, in the professionalization of small businesses and in the amelioration of municipal organizations involved in the implementation of the Project.

The interventions will alter the social and environmental conditions in all the Area of Direct Influence, but they will also produce positive effects and produce benefits to the entire city.

## Evaluation regarding the Environmental and Social Safeguards

The legal and institutional guidelines used to the environmental evaluation of the Project Components have included, aside from the current environmental legislation, the Operational Policy Safeguards of the World Bank. The following policies have been extremely relevant to the project presented in this report: OP 4.01 Environmental Assessment; OP 4.04 Natural Habitats; OP 4.11 Physical Cultural Resources; OP 4.12 Involuntary Resettlement. The issue regarding the safety of dams in the Parnaíba River and in the Poti River has been contemplated by safeguard OP 4.37, which englobes the Safety of Dams.

- **OP 4.01 - Environmental Assessment**: The Project has been the object of a Report of Environmental Evaluation, obeying the guidelines of the Bank to a project classified as A category. The Project contemplates interventions related to (i) local urban and environmental renovation and (ii) action to promote social and institutional development. The mitigating measures of the negative impacts have been included in a Social and Environmental Management Plan (*PGAS*), which contains the associated costs, as well as the responsibilities and the chronogram of implementation of the Project.

  Among the objectives of the LNP II, as well as the conception of its different components, there are interventions proposed aiming at improving urban conditions, sanitation, macro drainage, the road system and permitting urban renovation, which will result in a significant amelioration in the quality of life of the population.

- **OP 4.04 - Natural Habitats**: As the LNP includes interventions in important ecosystems – the ponds and their areas of permanent preservation, which are protected by law – this safeguard has shown itself very important for the fulfilment of the objectives of the project. This safeguard takes into consideration the actions of revitalization of affected environments, fundamentally the ponds that are extremely polluted nowadays. Areas surrounding the ponds – areas of permanent preservation – will be emptied, an action that will allow the remodeling of this environment and the protection of aquatic life. The recovery will be made through interventions of macro drainage, in which there will be the stabilization of the environment of the ponds, with the maintenance of a permanent reflecting pool. There will no longer be occurrences of floods, which destroy the area during the rainy season, and linear parks will be implemented.

The Plan of Environmental and Social Management (*PGAS*) contemplates all the necessary actions to allow the work in the ponds which measures such as the rescuing of fauna, cleansing and other procedures that may be complementary to its environmental recovery.

- **OP 4.12 - Involuntary Resettlement**: The interventions of macro drainage, sanitation and even the withdrawal of the population from areas susceptible to flooding will affect 1,730 real estate and will require the resettlement of 2,180 families. This without taking into consideration the compensations. These resettlements will be needed especially to the interventions of macro drainage and of recovery of areas of permanent preservation. Eventually there will be the need to relocate people in order to permit the renovations in the road system. The biggest work in this area will be the duplication of Boa Esperança Avenue, which will require both the resettlement of families and business compensation.

  There will be no resettlements in the first year of the Project, because it is the time when the design/project planning will take place along with the development of the Plan of Involuntary Resettlement. The resettlement of these families and business had tries to minimize the amount of necessary dislocations, preserving the existing social, cultural and economic network and ensuring essential services to urban quality of life in the relocation areas. A plan for involuntary resettlement has been prepared by the developers of this LNP, and approved by the Bank, in order to ensure these requirements. It will serve as guideline to resettlement design/project planning to be construction as part of the Project.

- **OP 4.11 - Physical Cultural Resources**: No interferences have been detected in archaeological sites in the activities and interventions proposed in the Project. There is, however, a rich cultural activity in the community, which is connected to afro-Brazilian ceremonies that demand the construction of an adequate place for memory and for worship. The cultural tradition of handicraft, both general and the one produced with clay, will also be protected.

- **OP 4.37 - Safety of Dams**: The duplication of Boa Esperança Avenue and the area destined to be a tourism cluster make it important to have especial care about the safety of the existing dam. Therefore, in this sense, it will be necessary to consider a panel of safety before the building starts and during the construction. Aside from the implementation of the Linear Park other mid-term measures are recommended, such as (i) adequate the proposals of the road system to the Plan of Mobility and Transportation, the law of sidewalks and the law of urban occupation of the municipality, in a manner that it becomes illegal to occupy the areas in the margins of the dam.

## Global Evaluation

In a global perspective, based on the environmental and social evaluation intended in the project, it is considered that the investments presented in the LNP II, if implemented adequately, will be capable of fulfilling its main objectives: (i) To modernize and ameliorate the administrative capacity of the Municipality of Teresina in the financial, urban, environmental areas, as well as in providing basic services and in economic development; and (ii) To improve the quality of life of the population living in the area covered by the Teresina Enhancing Municipal Governance and Quality of Life Project.

It is also understood that the interventions proposed shall promote extensive urban and environmental renovation in the region, with significant reflexes in the social and economic areas of the Lagoas do Norte region and of the Municipality of Teresina.

## Social and Environmental Management Plan

The Social and Environmental Management Plan contemplates the requirements established in the Safeguard Operational Policies of the World Bank. It is fundamentally related to the environmental

evaluation unified in the RAAS, as well as to the demands established by the State Secretary of Environment and Hydric Resources (SEMAR) and by the Municipal Secretary of Environment (SEMAM), especially on what regards the environmental licensing of the constructions proposed in the Lagoas do Norte Project II.

The Social and Environmental Management Plan englobes programs of socio-environmental character and of institutional strengthening, that aim both at mitigating the possible negative impacts identified in the RAA and at maximizing the positive effects of the interventions of the project by actions of control and of monitoring.

The programs are presented with a description of their objectives and the main activities to be developed during the Teresina Enhancing Municipal Governance and Quality of Life Project. The degree of detailing of these objectives depend on the depth of the analysis of possible solutions to each one of the actions proposed in the project. It is important to recall that some programs are already considered as components of LNP II. The following table presents the programs contemplated by the Social and Environmental Management Plan (SEMP).

*Table 2– Program, content, cost and entity responsible for the Social and Environmental Management Plan*

| N$^{O.}$ | PROGRAMS | CONTENT | COST (US$) | RESPONSIBLE |
|---|---|---|---|---|
| 1 | **Socio-environmental Project Management** | Under the supervision of the Social and Environmental Management Plan. | Inserted in the PMU (Program Management Unit) costs | PMU / SEU (Social and Environmental Unit) |
| 2 | **Procedures of management and socio-environmental supervision along the Program Cycle** | Environmental evaluation of projects/designs, promotion of public consultations and control of the issuing of environmental licenses. | Inserted in the management cost of the Program - PMU | PMU/SEU |
| 3 | **Program of mitigating and compensatory measures** | Controls the impact of the constructions and of the interventions, especially of the duplication of Boa Esperança Avenue, the Boa Esperança Dam and the System of Sewage Treatment Plants. | To be inserted in the scheduled interventions | PMU/SEU, SEMA E SEMAR |
| 4 | **Institutional strengthening of environmental management**; | Implementation of the activities and facilities proposed in the formation of the new environmental entity of the municipality. | 50,000.00 | PMU and Municipality of Teresina |
| 5 | **Environmental monitoring of the quality of water** | Evaluate the quality of the water of the ponds and;<br>Evaluate the quality of the water from the river to the downstream of the Sewage Treatment Plant | 100,000.00 | PMU |
| 6 | **Fauna Rescue** | Performed before the beginning of the operations of pond cleansing in areas 2 and 3; | 150,000.00 | SEMAM / PMU and Consulting company |
| 7 | **Environmental Building Manual (*MAC*)** | Supervision of construction sites<br>Procedures of construction control to be adopted by the construction companies | Inserted in the construction costs | PMU and contractors |
| 8 | **Social Communication** | Publicize the constructions to the local population and to the community of Teresina;<br>Activities with the participation of the community. | 100,000.00 | PMU and Consulting company |

| Nº. | PROGRAMS | CONTENT | COST (US$) | RESPONSIBLE |
|---|---|---|---|---|
| 9 | **Environmental and Sanitary education** | Support in the resettlement and in the control of constructions on what regards environmental and sanitary education. Activities of environmental education to the appropriation of the parks and improvement of self-esteem caused by the knowledge of the habitat (fauna and flora). | 320,000.00 | PMU and Consulting company |
| 10 | **Resettlement and Compensation of families and businesses** | Resettlement of families that live in the construction site, in areas of permanent preservation, in areas of environmental and social risk or in the dam area. | 58,632,489.00 | PMU/SEU |
| 11 | **Contingency and reduction of risks** | Alert plan to eventual flooding and/or outflows of the Poti and of the Parnaíba River | 170,000.00 | PMU, Consulting company e Civil Defense service |
| 12 | **Management of biomedical waste** | Adequate collection, treatment and final destination to solid residues originated in Basic Units of Health Care. | 20,000.00 | PMU, Municipal Secretary of Health |

### Socio-environmental Project Management

The Program establishes the structure and the functions of environmental management of the LNP II, which involve:

- Coordination of Environmental and Social Management (Environmental supervision), performed by a specialist allocated at the UGP, who will be responsible for the coordination of socio-environmental actions of the Project but who will still be subordinated to the Executive Coordination of the UGP.
- Environmental supervision of construction sites, performed by hired specialist(s) from the supervising company, who will be responsible for surveillance, for accompanying the progress of the construction, for orienting environmental measures related to the Environmental Building Manual (MAC) and for the mitigating measures specified in the environmental licenses, in this proposal of management and in the other programs of the SEMP.
- Environmental Planning of Construction sites. The environmental planning actions of the constructions are responsibility of the constructing companies, which must follow the Environmental Building Manual (MAC) and implement the mitigating measures specified in the environmental licenses and in Construction Bid Notice.

### Procedures of management and socio-environmental supervision along the Program Cycle

During the implementation of the Program, the UGP must adopt different socio-environmental procedures for each component involving the following phases:

- Detailing of studies and designs/projects, involving: (i) Environmental evaluation of designs/projects; (ii) mitigating measures and specific environmental management plans; (iii) procedures for publicizing the constructions and for promoting public consultation.
- Environmental license – procedures of grant of environmental license to the interventions.
- Bidding process, with the insertion of environmental criteria in the bid, as well as when hiring the construction companies.
- Building – Physical interventions, with the description of the activities of environmental planning and of environmental supervision of construction sites.

### Program of mitigating and compensatory measures

This program aims at specifying all the attenuating measures derived from the environmental evaluation, to measure and evaluate the costs of the required actions that target the insertion of the environmental dimension of the interventions already planned. The potentiating measures of positive impacts are also included in this program, in a manner that they can multiply the beneficial effects of the interventions.

### Institutional strengthening of environmental management

The objective of this program is to promote the institutional development of the municipal entity responsible for environmental management, where, through a seminar, actions for institutional, technical and administrative strengthening were developed. These actions would be implemented by the Municipality of Teresina. On what regards the LNP II, the most structuring and urgent interventions have been selected.

### Environmental monitoring of the quality of water

The program for water monitoring aims at evaluating the condition of the water of the ponds and of the Parnaíba River to assess the benefits provided by the component of Sewage System proposed in this Project. This assessment is made though an analysis of the water quality parameters to permit a future analysis of this water. It also aims at identifying operational problems of the hydric collections affected by the enterprise.

### Fauna Rescue

This program aims at accompanying the suppression of vegetation and pond cleansing in order to rescue animals when necessary. The rescue of fauna will occur prior to pond cleansing. As a rule, the rescue programs prioritize species that present difficulties of dislocation, due to biological characteristics or due to injuries. The rescuing process also englobes isolated individuals. The most commonly recued animals are reptiles, amphibians, small birds and arboreal mammals.

### Environmental Building Manual (MAC)

The Environmental Building Manual (MAC) id directed to the efficiency and efficacy of the LNP II constructions. Therefore, it focuses on the reduction of damage on the environment that would result from the implementation of the interventions. It also focuses on a more effective management of construction materials, avoiding waste. The manual also provides guidelines for a better quality of life in the construction sites. This initiative reduces the occurrence of accidents, which, consequently, represent a reduction on the costs of management.

### Social Communication

The program of social communication (PCS) defends that communication is absolutely fundamental to clarify and educate the population about the importance of the enterprises and of the alterations in their physical and social spaces – with strong implications in their quality of life. The actions of the LNP demand especial procedures on what regards the communication between the Municipality of Teresina and the local population. These procedures have at least two basic directions: the first is related to information, to systematically providing explanations to the community and to the creation of channels of communication between them and the contractor. The second direction, on the other hand, refers to the consolidation of adequate forms of coexistence of the community and the contractor.

### Environmental and Sanitary Education

The Environmental and Sanitary education program of the LNP II will give continuity to the work that started in the first phase of the LNP. This program was a successful factor in the communication with the community; it also ensured that the BIRD environmental requirements, as well as the requirements of the Brazilian legislation, were met. Environmental and sanitary education is directed to the most affected population and to lindeiros neighborhoods. Its main goal is to transform environmental concern in a practical action, based on the problems experienced by the local population in their everyday lives.

### Involuntary Resettlement and Compensation Program

Considering that the enterprises and constant studies of the LNP II, to be financed by the World Bank, are not yet in their preparation phase, with a detailed and complete conception, an initial study was conducted in order to assess the real state potentially located in areas of risk, of permanent preservation or in the proximities of interventions. In this preliminary evaluation it has been estimated that 1,730 real state will be affected, which will result in the relocation/resettlement of 2,180 families.

So in this sense, the Involuntary Settlement and Compensation Plan was elaborated by considering the need to adopt expropriation procedures, plans for resettlement and for compensation – meeting the requirements of World Bank's safeguards. This plan presents the principles and guidelines to be adopted in the planning and implementation of actions of involuntary resettlement of families.

### Contingency and reduction of risks

The LNP II acts upon the environmental recovery of the Lagoas do Norte region through sewage collection and treatment, evaluation, control of internal flooding and maintenance of safety in the dam system. To the successful operation of this program the implementation of a flooding alert monitoring system has been planned, in order to mitigate the effects of flooding superior to what has been calculated to the Lagoas do Norte region of the city of Teresina.

### Management of biomedical waste

The LNP II proposes the renovation of existing Basic Units of Health, as well as the construction of new ones. On what regards the management of biomedical waste, the UGP must reach an agreement with the Municipal Secretary of Health in order to elaborate and implement Plans of Management of Biomedical Waste (PGRSS) to the units supported by the Project. These plans will attend the current legislation (CONAMA Resolution n. 358/2005 and ANVISA Manual of Management of Biomedical Waste/2006).

## Public Consultation

The Municipality of Teresina and the PMU of the Program promoted meetings with local community to present and discuss the planned interventions, as preparation for PLN/ phase 2.

A Public Consultation happened on November4, with previous disclosure of ESA/EMPS to population, in compliance with the Operational Policies. The following documents were prepared and provided:

- Executive Summary of Environmental and Social Assessment
- Environmental and Social Assessment and Management Framework for Environmental and Social Program
- Conceptual Framework of Resettlement and Compensation Policy

Disclosure (with the possibility of "download") was performed by web-site of the city of Teresina, from October 23, 2014 until today (http://www.teresina.pi.gov.br/).

The City promoted social mobilization with invitations to State and Local Public Agencies, Neighborhood Associations (about 100 associations), NGOs, etc., to promote the Public Consultation.

On November 4, 2014, by the morning, a meeting showed EAS/EMPS to North Ponds Forum, which represents the communities that lives in Areas 1, 2, 3 and 4. At night the Public Hearing was held at 19:00 p.m. at Boi Theater, with the following dynamics:

- Opening with presentation of the goals of consultation, information disclosure and access of documents produced.
- Introducing the concept of the program and its components;
- Disclosure of environmental and social studies, and its main conclusions of ESA/ESMP;
- Reading of the written questions submitted by the audience, exhibitors and respective explanation for debate;
- Word was open to the audience for questions, placements, claims and debate;
- Closing.

The organization team collected the attendance list, recorded all Public Consultation and wrote the “Aide-memoire”. It was demonstrated a very efficient mobilization by the team because 180 people attended the event.

In general, both meeting and consultation, the audience was very favorable to the Program and its components. The environment was harmonic and integrated and the issues raised had the purpose of clarification, suggestions, etc. The discussions were very interesting, with intense audience participation and "satisfaction" with the answers.

The report record Public Consultation minutes and attendance list as well, integrates Annex 6 of EAS.