REFERENCE BUSINESS PLAN – BLOCK 3

PROJECT FOR REGIONALIZED CONCESSION OF WATER SUPPLY AND SANITATION SERVICES IN THE MUNICIPALITIES OF RIO DE JANEIRO STATE CURRENTLY SERVED BY CEDAE

SUMMARY

1. PRESENTATION

1 PRESENTATION

This document was prepared based on information provided by employees and collaborators from Cedae, BNDES, municipal governments and Rio de Janeiro State Government, in addition to primary and secondary sources of information gathered by **CONSORTIUM FATOR/CONCREMAT/VGP - RIO DE JANEIRO SANITATION**. Such information was considered truthful; therefore, the Consortium does not undertake any liability for the accuracy of the information from reports and/or other documents provided by the sources consulted.

The figures presented in this report may undergo updates and/or monetary corrections, leading to potential future changes in the information and projections presented herein.

2. INTRODUCTION

2 INTRODUCTION

This Report presents the project for the Regionalized Concessions of the water supply[1] and sanitation services[2] of all the municipalities in the state of Rio de Janeiro currently served by CEDAE, and, for municipalities served by large production systems in the Metropolitan Region of Rio de Janeiro, the concession of water supply will only be of the system called *"downstream"*, which covers the water distribution systems to end users from CEDAE's water macro meters, in addition to the sewage system.

Such delegations will be granted to private companies directly by the State of Rio de Janeiro, through public bidding and from a delegation originally received from the holders of the sanitation service. Water production in the municipalities where the private contractor will operate *downstream* will continue to be the responsibility of CEDAE. This Company will be responsible for the abstraction and treatment of raw water and the delivery of treated water at appropriate standards and quality levels. The relationship between CEDAE and the concessionaire will be governed by an Interdependence Agreement to be entered into between the parties, which will establish the water purchase price and the governance of the operation.

In all 35 municipalities to be granted, the commercial management of water and sanitation services will be the responsibility of the private contractor, except in those locations where this commercial management is already performed by some other concessionaire.

2.1 Territorial Characterization and Municipalities Served in the Project - Block 3

The study covers the economic and financial assessment of the water supply and sanitation systems of the urban areas of the 35 municipalities in which Cedae operates at least the water supply main system, including the districts of the municipalities, i.e., regardless of the concessionaire operating the system, except for the sanitation systems already under concession for private contractors in the following locations: Macaé, Rio das Ostras, São João do Meriti, Saquarema and the AP5 of the city of Rio de Janeiro, besides the sanitation system of the city of Maricá, which will be operated by its own municipality government. The following results refer to the municipalities and districts of the municipalities of Block 3.

[1] Consisting of the services, infrastructure and facilities necessary for the public supply of drinking water, from abstraction to household connections and their measurement instruments.
[2] Consisting of the services, infrastructure and operational facilities for collection, transportation, treatment and final disposal of sewage, from the household connections to their final disposal into the environment, for a period of 35 (thirty-five) years.

Table 1: lists the municipalities of the study and includes the current contractor for each type of service and Figure 1 displays the spatial location of each municipality.

It is also worth mentioning that Saquarema's water supply system is restricted to the Jaconé neighborhood, since the rest of the municipality is also operated by a private concessionaire.

The Business Plan was based on the geographic separation by block, showing greater technical-operational feasibility, given that in some cases the operation of water and sanitation services can sometimes be limited to this geographic area. It is worth mentioning that CEDAE will continue to produce and treat water and sell to the respective concessionaire in the following municipalities: Rio de Janeiro; Nova Iguaçu; Duque de Caxias; São João de Meriti; Belford Roxo; Nilópolis; Mesquita; Itaguaí; Queimados; Seropédica; Japeri; Paracambi and Maricá, until the implementation of the new water production system.

The areas operated by CEDAE were divided into four blocks, with the municipalities in block 3 listed in the table below:

Table 1: List of Water and Sewage System Providers

No.	Municipality	Contractor	Contractor's acronym	Type of service	GE019 - Where it provides water supply	GE020 - Where it provides sanitation services
1	Itaguaí	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
2	Paracambi	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
3	Pinheiral	Companhia Estadual de Águas e Esgotos	CEDAE	Water	Municipal Main Region	Does not serve
4	Piraí	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Both	Municipal Main Region
5	Rio Claro	Companhia Estadual de Águas e Esgotos	CEDAE	Water	Both	Does not serve
6	Rio de Janeiro	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region except AP5
7	Seropédica	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region

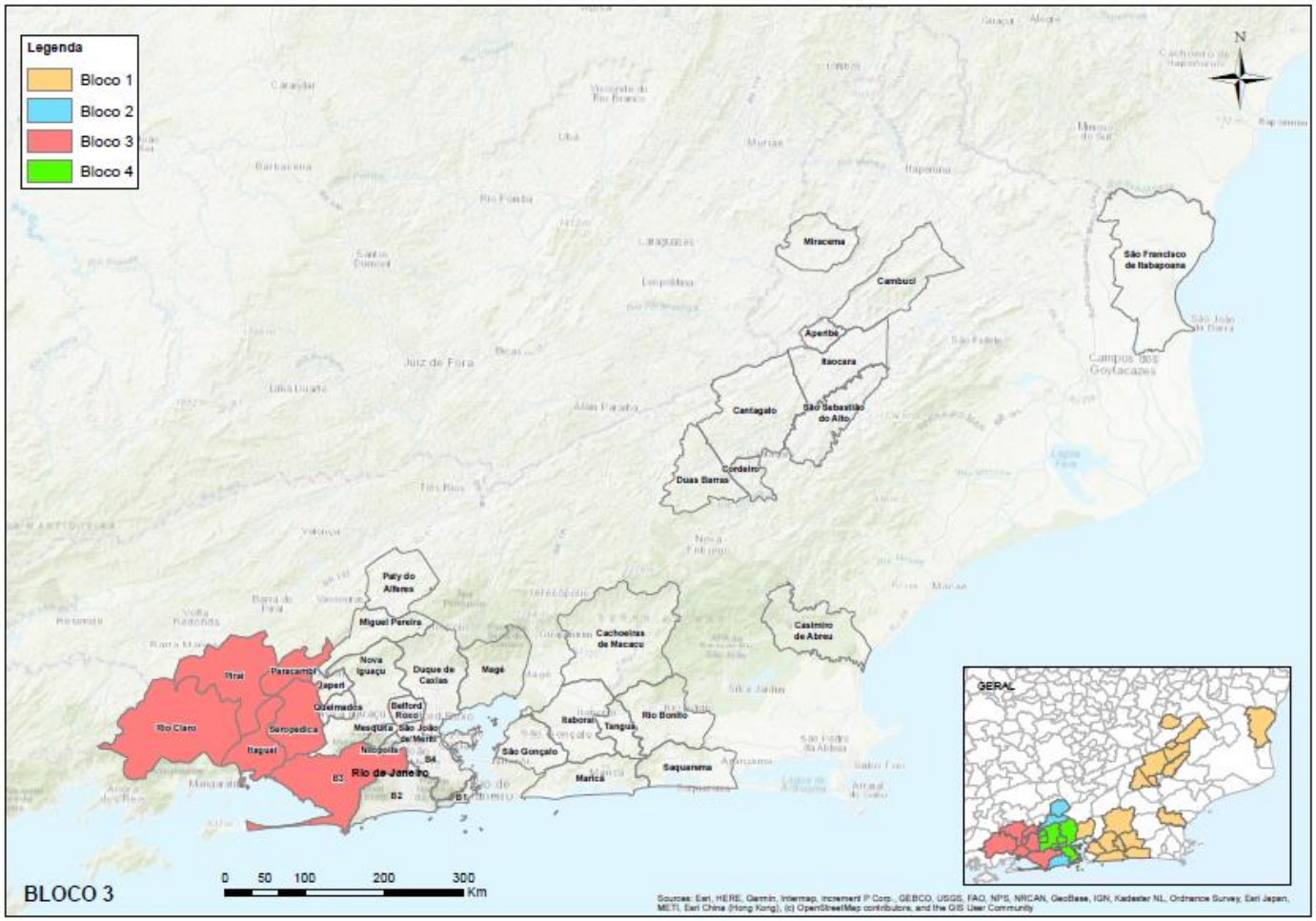
Source: SNIS, 2016 adapted by the Consortium

Shaded: Sanitation Systems granted to private contractors

Note: According to the SNIS classification, the service locations are classified into 03 types: (1: Municipal Main Region; 2: Locations; 3: Both):

- MUNICIPAL MAIN REGION: when the contractor provides services only to the main region of the municipality and does not provide services to locations other than the main region;
- LOCALITIES: when the contractor does not provide services to the municipality's main region, but it provides services to other locations, which do not include the main region;
- BOTH: when it serves both the main region and other locations.

Figure 1: Location of the municipalities and respective operational management of CEDAE



The city of Rio de Janeiro was divided into Regions, as shown in the table below. Region 3 was included in Block 3:

Table 2: Division of Regions of the City of Rio de Janeiro

Regions	Neighborhoods
Region 1	Botafogo, Catete, Copacabana, Centro (partial), Cosme Velho, Flamengo, Gávea, Glória, Humaitá, Ipanema, Jardim Botânico, Lagoa, Laranjeiras, Leblon, Leme, Rocinha, São Conrado, Urca, Vidigal
Region 2	Anil, Barra da Tijuca, Camorim, Cidade de Deus, Curicica, Freguesia (Jacarepaguá), Gardânia Azul, Grumari, Itanhangá, Jacarepaguá, Jardim Sulacap, Joá, Pechincha, Praça Seca (partial), Realengo, Recreio dos Bandeirantes, Tanque, Taquara, Vargem Grande, Vargem Pequena.
Region 3	Bangu, Barra de Guaratiba, Campo dos Afonsos, Campo Grande, Cosmos, Deodoro, Gericinó, Guaratiba, Inhoaíba, Jardim Sulacap, Magalhães Bastos, Paciência, Padre Miguel, Pedra de Guaratiba, Realengo, Santa Cruz, Santíssimo, Senador Camará, Senador Vasconcelos, Sepetiba, Vila Kennedy, Vila Militar
Region 4	Abolition, Acari, Água Santa, Alto da Boa Vista, Anchieta, Andaraí, Bancários, Barros Filho, Benfica, Bento Ribeiro, Bonsucesso, Brás de Pina, Cachambi, Cacuia, Caju, Campinho, Cascadura, Catumbi, Cavalcanti, Centro (Partial), Cidade Nova, Cidade Universitária, Cocotá, Coelho Neto, Colégio, Complexo do Alemão, Cordovil, Costa Barros, Del Castilho, Enchanted,

Regions	Neighborhoods
	Engenheiro Leal, Engenho da Rainha, Engenho de Dentro, Engenho Novo, Estácio, Freguesia (Island), Galeão, Gamboa, Grajaú, Guadalupe, Higienópolis, Honório Gurgel, Inhaúma, Irajá, Jacaré, Jacarezinho, Jardim América, Jardim Carioca, Jardim Guanabara, Lapa, Lins de Vasconcelos, Madureira, Mangueira, Manguinhos, Maracanã, Marechal Hermes, Maria da Graça, Méier, Moneró, Olaria, Osvaldo Cruz, Paquetá, Parada de Lucas, Parque Anchieta, Parque Colúmbia, Pavuna, Penha, Penha Circular, Piedade, Pilares, Pitangueiras, Portuguesa, Praça da Bandeira, Praça Seca (partial), Praia da Bandeira, Quintino Bocaiúva, Ramos, Riachuelo, Ribeira, Ricardo de Albuquerque, Rio Comprido, Rocha, Rocha Miranda, Sampaio, Santa Teresa, Santo Cristo, São Cristóvão, São Francisco Xavier, Saúde, Tauá, Tijuca, Todos os Santos, Tomás Coelho, Turiaçú, Vasco da Gama, Vaz Lobo, Vicente de Carvalho, Vigário Geral, Vila da Penha, Vila Isabel, Vila Kosmos, Vila Valqueire, Vista Alegre, Zumbi, Ilha do Governador

The following is information on the geographical characterization, which includes information on territorial extension and population (total, served with the water service and served with the sanitation service).

Table 3: Territorial Extension and Population Served

Caracterização Geográfica Bloco 3 - 2020	
População Total	2.152.432
População Atendida SAS	1.687.897
População Atendida SES	130.698

Source: GIS and Cedae

The table below presents the main water courses of each municipality, which serve the water supply system, not including any anomalies in the supply, as long as the criteria for water loss reduction and per capita water consumption are met and they are able to receive treated sewage.

Table 4: Water Catchments and Rivers

Município	Bacias Hidrográficas	Rios
Mangaratiba	RH I - Baia da Ilha Grande	Rio Cantagalo
	RH II - Guandu	Rio Grande, Rio Ingaíba, Rio Saí
Angra dos Reis	RH I - Baia da Ilha Grande	Rios Grataú e do Frade, Rio Bracuí, Rio Ariró, Rio do Meio, Rio Jacuecanga e Rio Jacareí
Itaguaí	RH II - Guandu	Rio Mazomba, Rio da Guarda
Eng. P. de Frontin	RH II - Guandu	Rio Macaco, Rio São José
Rio Claro	RH II - Guandu	Rio Piraí
	RH III - Médio Paraíba do Sul	Rio Paraíba do Sul
Paracambi	RH II - Guandu	Córrego dos Macacos, Rio Santana
Seropédica	RH II - Guandu	Rio Piranema, Rio Piloto, Valão da Areia
Rio de Janeiro Lote IV	RH II - Guandu	Rio do Portinho, Rio Cação, Canal Guandu, Canal São Francisco, Rio Guandu do Sapé

2.2 Executive summary

The Business Plan presented herein is a reference, not binding on the future concession. Potential bidders should carry out their own studies and estimates in order to participate in the bidding process and may not claim that the estimates contained herein have not been achieved as a basis for contract rebalancing claims.

This document contains the following topics:

Opening of (i) Revenue, including Default, (ii) Investment; (iii) Operating Costs; (iv) Taxation; (v) Financing Structure.

Table 5: Units

The number of water and sewage units projected for the end of the plans is presented below:

Municipalities	Water Unit (End of Plan)	Sewage Unit (End of Plan)	Water + Sewage Unit (End of Plan)
Piraí	13.914	12.357	26.271
Rio Claro	8.093	6.802	14.895
Itaguaí	55.665	51.513	108.178
Paracambi	21.362	19.420	40.782
Pinheiral	12.648	11.498	24.146
Rio de Janeiro Região 3	572.355	-	572.355
Seropédica	37.391	34.658	72.639

Table 6: Main Results

The main indicators and financial figures of the Block are presented below:

R$ thousands except when indicated otherwise	Block 3
Investments	2.632.207
Water and Sanitation Revenue	42.176.716
EBITDA	12.379.145
Water sale price by CEDAE (R$/m³)	1,70 (until year 4) and 1,63 (afterwards)

3. PROJECTIONS AND PREMISES - BLOCK 3

3 PROJECTIONS AND PREMISES - BLOCK 3

3.1 Revenue

The revenues generated from the provision of water supply and sewage collection and treatment services were taken into account.

In order to assess the sanitation service revenue, the same water tariff table was applied on the volume of sewage to be served.

The current average tariff in each municipality for each type of consumption (social, residential, industrial, commercial and public tariff) and the *per capita* consumption, hydrometration and served population values were taken into account in order to calculate the tariff revenue. For sanitation, an accession rate of 80% was employed.

Based on the studies carried out by the technical team, it was considered that the private partner would achieve a hydrometric index of 100% by the 5th year of Concession.

Table 7: Average Water and Sanitation Tariffs by Typology

	Water (R$/m³)				
Municipality	Social Tariff	Residential	Commercial	Industrial	Public
Itaguai	3,07	4,89	13,51	22,62	9,55
Paracambi	0,00	4,36	11,66	22,37	10,13
Pinheiral	0,00	4,34	13,62	20,11	9,09
Pirai	0,00	4,40	15,61	19,20	9,63
Rio Claro	0,00	4,25	10,15	20,18	9,21
Rio de Janeiro - Região 3	3,26	5,02	16,03	23,40	11,41
Seropédica	3,07	6,32	14,89	21,64	10,65

It is worth mentioning that the engineering team has adopted the premise of water consumption of 180 l/inhab/day in Rio de Janeiro (capital), 150 l/inhab/day in the other municipalities, 260 l/inhab/day in the irregular areas of the municipality of Rio de Janeiro. It is worth mentioning that the analysis was based on the current per capita informed by CEDAE and it was considered that within 10 years the project per capita of the presented premises will be achieved. These estimates were considered for the following reasons: projected loss reduction, greater commercial control, alignment with the per capita already used by CEDAE in its projections, among others.

Similarly, the target for the total water loss index in distribution is 25%, to be achieved in 10 years.

The following is a table with information on the current per capita consumption and loss index in the municipalities of Block 3, which should be linearly reduced to the mentioned project values.

Table 8: Current per capita and loss index

Municipality	Current Per Capita (l/inhab/day)	Current Losses
Itaguaí	187	26%
Pinheiral	167	50%
Paracambi	193	25%
Piraí	196	50%
Rio Claro	189	30%
Rio de Janeiro Região 3	146	39%
Seropedica	188	27%

Among the main levers for revenue growth in the first ten years, the main *driver* is the increase in the supply index.

For the sake of caution and due to the difficulty in establishing a *driver* to project accessory revenues, the same were not taken into account.

Rio de Janeiro is the municipality that is the most relevant in terms of revenue throughout all blocks.

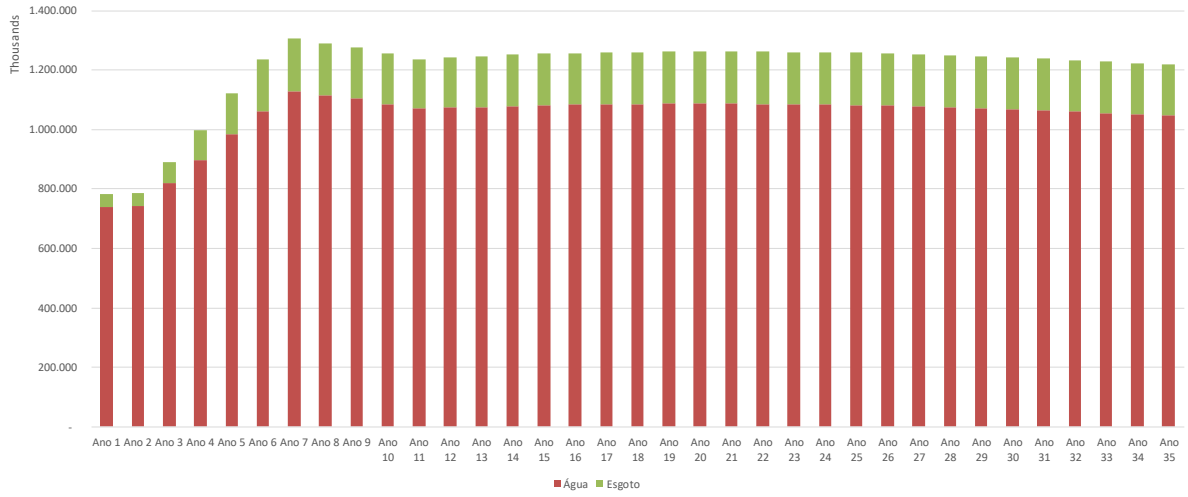
Table 9: Water and sewage revenue - Block 3

Receita (R$)	1	2	3	4	5	10	20	30	35
Água	737.983.345	742.296.141	820.445.255	896.332.121	985.097.321	1.086.016.879	1.088.110.733	1.069.261.068	1.047.904.099
Esgoto	45.087.780	45.648.075	70.763.760	101.781.348	136.614.806	170.041.181	175.643.720	173.622.023	169.958.345
Total	783.071.126	787.944.217	891.209.015	998.113.469	1.121.712.127	1.256.058.060	1.263.754.453	1.242.883.090	1.217.862.444

The graph below presents the annual water and sewage tariff revenue[3]:

[3] Irregular areas are present only in the municipality of Rio de Janeiro

Graph 1: Revenue - Block 3



3.1.1 Default

The initial projected default value considered the history of CEDAE in each municipality and was incorporated into the model to differentiate between invoiced and collected revenue.

Since practice demonstrates that the private partner has better ability to mitigate default, due to more effective commercial management, the economic and financial modeling considered a reduction of default to 10% by the 15th year of the Concession, established jointly with BNDES on the basis of *peers'* default[4].

The default values of 2018, per municipality of Block 3 are presented below:

Table 10: Default

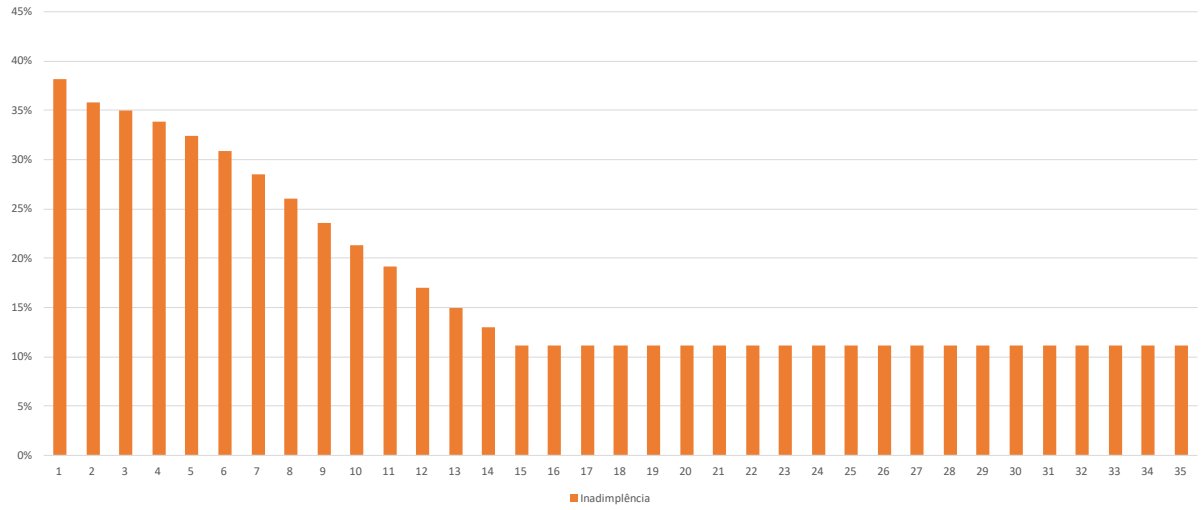
Municipality	Default
Piraí	24,7%
Pinheiral	23,7%
Rio Claro	23,1%
Itaguaí	33,5%
Paracambi	37,9%
Rio de Janeiro	18,5%

[4] Analyzing the default of state-owned companies (SABESP, COPASA, SANUPAR) and the main private sanitation companies (GS Inima, BRK, Águas do Brasil, AEGEA), as well as the historical difficulty of billing for sanitation in the downtown area, the assumption of 10% was adopted.

Municipality	Default
Seropédica	71,8%

Below is a graph with the expected curve of default reduction of the block, until it reaches 10% in year 15:

Graph 2: Evolution of Default



3.2 Investment

The investments needed to achieve the universalization targets of water supply and sanitation services were estimated as presented in the tables below, whose evolution is linear. It is worth mentioning that the municipalities of Eng. Paulo de Frontin, Itaguaí, Paracambi, Piraí, Rio Claro and Seropédica, located in the Guandu River basin, have the target of reaching the universalization of water supply and sanitation in only 5 years, in order to ensure the quality of the water from the main source of water supply of the MR of RJ.

These projections and the methodology used in the investment estimates are detailed below.

Table 11: Service Targets - Water (%)

Municipality	Year 5	Year 8	Year 10	Year 12
Itaguaí	99,0			

Paracambi	99,0			
Piraí	96,1	97,4	98,2	
Rio Claro	99,0			
Rio de Janeiro Região 3	99,0			
Seropédica	97,3	99,0		

Table 12: Service Targets - Sewage (%)

Municipality	Year 5	Year 10	Year 12
Itaguaí	90		
Paracambi	90		
Piraí	90		
Rio Claro	90		
Rio de Janeiro Região 3 (*)			
Seropédica	90		

(*) Sanitation system already under concession

3.2.1 Investment Valuation Premises

3.2.1.1 Calculation Basis

The following reference spreadsheets were adopted to calculate the costs of engineering works and services:

- Bulletin EMOP - Empresa de Obras Públicas do Estado do Rio de Janeiro, base December/2019;
- SINAPI-RJ - Dec/19, exceptionally in the absence of any EMOP unit cost;
- CEDAE benchmark quotes.

For the Indirect Benefits and Expenses (IBE), the value of 24% was used, an average value admitted by the Federal Audit Court - TCU for basic sanitation works.

3.2.1.2 Parametric Costs and Cost Curves

Two methodologies were used for the preparation of the Capex: parametric cost calculation and cost curve elaboration.

The parametric costs were used for the following works: water distribution and sewage collection networks, water and sewage connections, internal household connections, replacement of hydrometers, deep wells, pipelines and discharge lines and operation in irregular areas.

Cost curves were drawn up for the following works: raw water abstraction, water and sewage treatment plants, water and sewage lifting stations and for water reservoirs.

3.2.1.3 Reinvestment

For reinvestment, which represents the disbursement with replacement of capital already invested, the following percentages were adopted in relation to assets, whether existing or to be built, which were established jointly with CEDAE:

Equipment except PRODUCER SYSTEM: 5% a year

PRODUCER SYSTEM equipment: 2% a year

Telemetry and automation: 5% per year

3.2.1.4 Other Investments

For automation and telemetry, it was considered the cost equivalent to 5% of the CAPEX of civil works and related equipment (abstractions, treatment stations and lifting stations and reservoirs) and for studies and designs the value equivalent to 5% of the total cost of the work, which includes geotechnics and topographic registration services.

For expropriations, the unit cost of the land was obtained through internet research.

3.2.2 Projection of Investments

The Tables Table 13: Investment Water - Block 3 and Table 14: Investment Sanitation - Block 3 present the investment projections for the 35 (thirty-five) years of concession of Block 3, with the opening of the projections by investment sector (water, sanitation and production systems) and details of each structure for the highlighted sectors.

Table 13: Investment Water - Block 3

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Abstraction (k R$)	0	0	27	27	27	27	27	0	0	0	0	0	0	0	0	0	0	0
Water Lifts (k R$)	0	0	3.342	3.342	3.342	3.342	4.586	1.103	1.103	0	0	0	0	0	0	0	0	0
Water Pipelines (k R$)	0	8.097	2.665	39.164	61.246	61.055	28.797	6.423	4.241	0	0	0	0	0	0	0	0	0
WTP (k R$)	0	2.073	2.854	2.854	2.854	2.782	2.782	2.073	2.073	2.073	2.073	2.073	2.073	0	0	0	0	0
Reservoir (k R$)	0	4.709	14.316	16.614	25.274	25.099	26.180	17.459	14.640	5.581	5.581	0	0	157	157	157	126	126
Distribution Network (k R$)	0	19.758	60.146	61.700	63.254	59.547	28.703	21.711	21.809	19.122	12.885	12.926	12.966	11.555	11.555	6.350	6.350	6.350
Water Connections (k R$)	0	1.240	2.718	2.779	2.839	2.551	1.458	1.466	1.475	1.078	692	694	695	640	640	323	323	323
Hydrometers (k R$)	0	7.520	7.520	7.520	7.520	7.520	8.088	8.765	8.793	8.821	8.688	8.756	9.436	9.468	9.314	9.005	9.073	9.755
Systems, Designs, Customer Service (k R$)	0	28.918	31.611	33.786	35.783	35.583	32.735	30.542	30.156	28.940	28.628	28.073	28.075	586	585	329	328	329
Environmental (k R$)	0	0	906	1.160	1.193	1.181	1.029	81	75	65	46	46	46	40	40	24	24	24
Reinvestments (k R$)	0	0	0	0	0	0	0	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208
Total Water (k R$)	0	72.315	126.105	168.946	203.332	198.687	134.385	92.831	87.573	68.888	61.801	55.776	56.499	25.654	25.499	19.396	19.432	20.115

Year	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Abstraction (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Lifts (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Pipelines (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WTP (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reservoir (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Distribution Network (k R$)	6.350	6.350	1.858	1.858	1.858	1.858	1.858	665	665	665	665	665	187	187	187	187	0
Water Connections (k R$)	323	323	74	74	74	74	74	27	27	27	27	27	7	7	7	7	7
Hydrometers (k R$)	9.761	9.607	9.153	9.221	9.903	9.909	9.756	9.187	9.255	9.937	9.943	9.789	9.199	9.267	9.949	9.956	9.801
Systems, Designs, Customer Service (k R$)	316	316	91	91	90	91	91	31	32	32	32	33	9	9	9	9	0
Environmental (k R$)	24	24	8	8	8	8	8	3	3	3	3	3	1	1	1	1	0
Reinvestments (k R$)	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208	3.208
Total Water (k R$)	19.982	19.828	14.392	14.460	15.141	15.148	14.995	13.121	13.190	13.872	13.878	13.725	12.611	12.679	13.361	13.368	13.016

Note: The total investment in the non-urbanized irregular areas of the MRJ is considered in the water capex

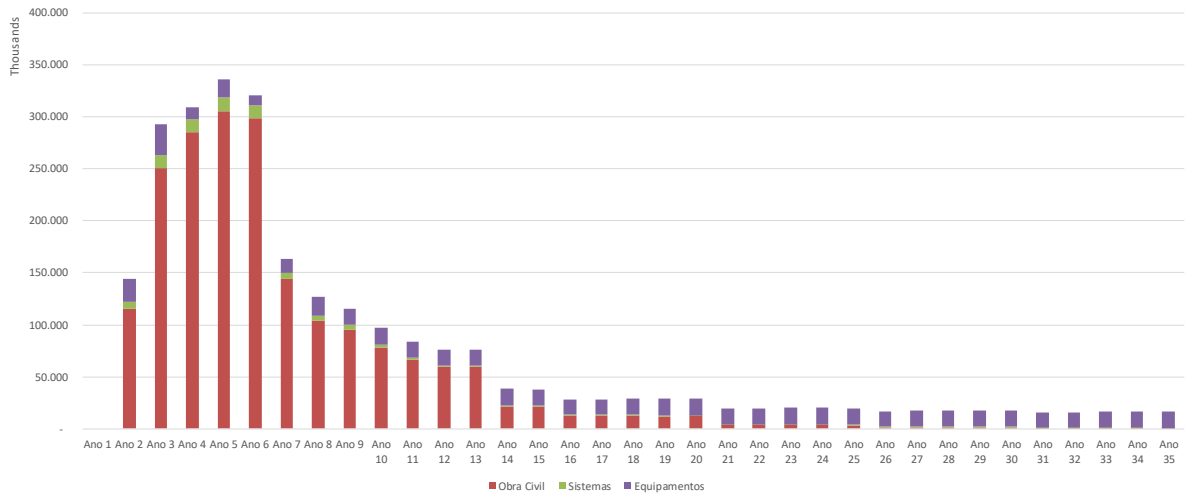
Table 14: Investment Sanitation - Block 3

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Dry Weather Collector (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewage Connection (k R$)	0	2.447	32.578	34.017	35.457	35.780	6.803	6.916	7.003	7.115	5.742	5.824	5.890	3.080	3.076	1.900	1.897	1.897
Ligação intradomiciliar (Mil R$)	0	1.704	2.858	2.912	2.966	2.974	1.799	1.800	1.801	1.803	1.748	1.749	1.750	102	102	54	54	54
Connection Network (k R$)	0	6.215	73.095	69.082	68.854	68.854	11.347	11.347	11.347	11.346	8.625	8.625	8.625	5.914	5.914	3.667	3.667	3.667
Sewage Lifts (k R$)	0	11.032	9	703	1.718	1.319	3.778	5.379	1.543	0	0	0	0	0	0	0	0	0
Discharge Lines (k R$)	0	2.741	0	59	278	286	675	3.349	567	0	0	0	0	0	0	0	0	0
STP (k R$)	0	42.465	48.919	25.984	16.869	7.092	2.870	511	1.657	3.974	1.657	0	0	0	0	0	0	0
Systems, Designs, Customer Service (k R$)	0	4.855	9.109	7.038	6.110	5.331	1.178	1.196	986	1.064	677	511	512	375	376	236	236	236
Environmental (k R$)	0	0	280	638	623	588	358	74	59	59	43	40	40	24	24	14	14	14
Reinvestments (k R$)	0	0	0	0	0	0	0	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138
Total Sewage (k R$)	0	71.459	166.848	140.433	132.875	122.224	28.808	33.710	28.101	28.499	21.630	19.887	19.955	12.633	12.630	9.009	9.006	9.006

Year	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Dry Weather Collector (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewage Connection (k R$)	1.894	1.905	721	733	730	723	727	272	285	276	276	269	83	76	73	76	73
Ligação intradomiciliar (Mil R$)	54	54	12	12	12	12	12	4	4	4	4	4	1	1	1	1	1
Connection Network (k R$)	3.667	3.667	1.388	1.388	1.388	1.388	973	529	529	529	529	517	204	204	204	204	204
Sewage Lifts (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Discharge Lines (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STP (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Systems, Designs, Customer Service (k R$)	236	236	96	95	97	95	74	36	36	36	36	36	14	16	16	16	16
Environmental (k R$)	14	14	5	5	5	5	4	2	2	2	2	2	1	0	0	0	0
Reinvestments (k R$)	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138	3.138
Total Sewage (k R$)	9.003	9.014	5.360	5.371	5.370	5.361	4.928	3.981	3.994	3.985	3.985	3.966	3.441	3.435	3.432	3.435	3.432

The graphs below present the annual investments in water and sanitation:

Graph 3: Investment - Block 3



3.3 Operating Costs

3.3.1 Operating Cost Assessment Premises

Significant operating expenses are human resources, electric power, chemical products and sludge transportation, in addition to others such as maintenance of civil works, equipment and miscellaneous.

3.3.1.1 Chemicals

The following consumptions of chemicals were admitted, information received from CEDAE, as summarized in the table below.

Table 15: Water and sewage chemicals

Chemicals - Water	
Aluminum Sulfate	40 mg/L
Lime	20 mg/L
Chlorine	3 mg/L
Sludge polymer	5 kg/ton. sludge
Fluosilicic acid	1 mg/L

Chemicals - Sewage	
Chlorine	8 mg/L
Sludge polymer	5 kg/ton. sludge

3.3.1.2 Energy (kW)

The average unit tariff was provided by CADE, considering that the cost of demand is included in consumption, at the value of 0,98 R$/kWh

- Annual consumption: $Consumo\ médio\ x\ 24h\ x\ 365\ dias$

3.3.1.3 Human Resources

Operational Cost spreadsheets were prepared for the economic model of Concession of sanitation services of CEDAE, except for the Producer System composed by the Guandu, Lajes, Acari and Imunana-Laranjal Systems.

The average unit cost of labor updated to Dec/2019 is R$123.265,00[5]/employee, regardless of position or type of employment (own or outsourced), to be in force from year 1.

As far as productivity is concerned, a rate of 643 units[6]/employee was proposed, based on the productivity of the Sanepar (Paraná) and Copasa (Minas Gerais) concessionaires, which have a size compatible with CEDAE, regardless of position or employment link.

3.3.1.4 Sludge transportation

The sludge generated in the WTPs and STPs will be transported to the nearest licensed outlet. The average distance considered for transportation is 40 (forty) kilometers.

The estimated sludge production volume for the water and sewage treatment plant are as follows:

- WTP sludge: $\frac{Q_{m^3}}{ano} x \frac{1}{10.000} t/ano$
- Activated sludge with drying bed: 95 g/inhab.day;

[5] SNIS (Copasa and Sanepar)
[6] SNIS

- Centrifuge activated sludge: 127 g/inhab.day
- UASB + Filter with drying bed: 27 g/inhab.day;

The unit cost of sludge transport and disposal are as follows, updated to Dec/2019:

- Transport cost: 3,97 R$/ton*km (EMOP base);
- Disposal cost: 71,03 R$/ton. (CEDAE basis)

3.3.1.5 Maintenance of Civil Works and Equipment

For the maintenance cost, the parameter of 136,00 R$/connection for the municipality of Rio de Janeiro and 28,60 R$/connection for the other municipalities was used, based on CEDAE's balance sheet and CEDAE recommendations.

3.3.1.6 Miscellaneous

The main costs considered as miscellaneous are: concession fees, rentals and machinery, equipment and vehicles, real estate rentals, insurance costs, advertising and publicity, communication and data transmission, advertisements and notices, laboratory services, graphic services, bank fees, mobility (vehicles), materials (administrative and cleaning), permits, licensing, etc.

The rate used is 56,49 R$/connection (CEDAE base).

3.3.1.7 Performance Guarantee Costs

There are performance guarantee costs that represent the costs associated with hiring construction, operation insurances, System Works and System Operation, Maintenance and Conservation Performance Guarantees.

A cost of 2.0% in relation to the value of the policy, calculated on the basis of practices in similar contracts, was used to measure these values.

3.3.1.8 Water Purchase Costs

It is projected that in some municipalities, as specified above, the Concessionaire will purchase water that will be produced by CEDAE, at a price of R$1.70/$m^3$ for the first 4 years and R$ 1,63 m^3 afterwards.

3.3.1.9 AGENERSA and INEA Fees

Expenses with the AGENERSA (Rio de Janeiro State Energy and Basic Sanitation Regulatory Agency) and INEA (State Environment Institute) fees were projected, estimated at 0.5% and 0.25% of revenues, net of PIS and Cofins taxes, respectively.

3.3.1.10 Contingency

Contingency costs were inserted as a form of protection against small fluctuations in the main items of the Concessionaire's operating costs. For this purpose, a value of 0.5% was provided for on operating costs (Treatment Materials, Energy, Personnel, Maintenance, Other Operating Costs, Water Purchase from CEDAE, Surety-bond and Insurance).

3.3.2 Cost Projection

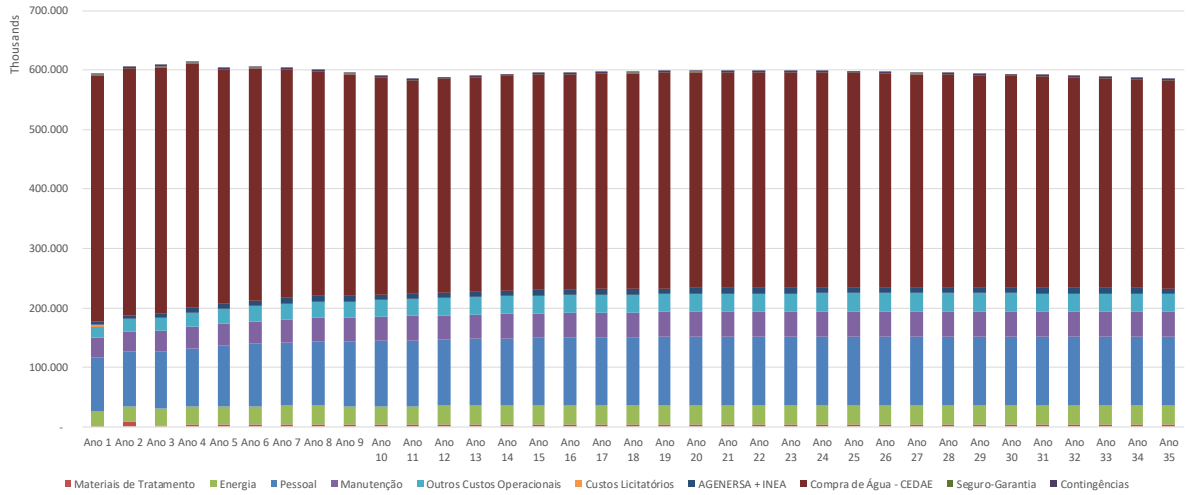
The estimated annual operating cost figures are presented, with details of the main items.

Table 16: Operating Cost

Custo Operacional (R$)	1	2	3	4	5	10	20	30	35
Materiais de Tratamento	1.209.000	8.809.000	3.094.000	3.259.000	3.295.000	3.472.000	3.626.000	3.638.000	3.613.000
Energia	24.265.000	24.754.000	27.942.000	30.865.000	31.150.000	31.401.000	32.888.000	32.868.000	32.389.000
Pessoal	91.079.000	92.285.000	95.242.000	98.267.000	101.366.000	110.056.000	114.786.000	115.084.000	115.106.000
Manutenção	33.592.000	34.031.000	35.077.000	36.142.000	37.228.000	40.346.000	42.037.000	42.135.000	42.142.000
Outros Custos Operacionais	19.074.000	21.351.000	22.552.000	23.790.000	25.072.000	28.582.000	30.879.000	31.042.000	31.027.000
Custos Licitatórios	2.704.655	-	-	-	-	-	-	-	-
AGENERSA e INEA	5.711.209	5.830.804	6.549.599	7.301.741	8.158.323	9.070.671	9.050.514	8.883.079	8.760.701
Compra de Água - CEDAE	414.157.542	415.631.506	414.984.329	412.234.956	394.311.794	364.622.403	363.827.418	357.098.300	349.893.348
Seguro-Garantia	658.052	658.052	658.052	658.052	658.052	387.474	103.556	42.477	658.052
Contingências	2.934.624	3.002.049	3.012.198	3.040.531	2.979.855	2.908.785	2.955.186	2.923.990	2.888.593
Seguros	2.890.169	2.890.169	2.890.169	2.890.169	2.890.169	2.890.169	2.890.169	2.890.169	2.890.169
Total	598.275.250	609.242.580	612.001.347	618.448.448	607.109.193	593.736.501	603.042.843	596.605.014	589.367.862

The graph below shows annual water and sewage costs:

Graph 4: Operating Cost - Block 3



3.4 Working Capital

The average payment and receipt terms adopted for the project were considered 30 days for costs and revenues as practiced in the Sanitation market.

3.5 Taxation

3.5.1 Tax Immunity

In September 2015, CEDAE filed a Civil Action before the Brazilian Supreme Court, claiming recognition of the reciprocal tax immunity provided for in art. 150, item VI, paragraph 'a' of the Federal Constitution, as well as the right to the refund of the amounts paid by way of federal taxes in the five years preceding the action, and also of those paid during the course of the action.

In 2017 the decision was challenged by appeals from the Federal Government and CEDAE. CEDAE saved, since 2018, only on Corporate Income Tax and due to the change from the non-cumulative regime to the cumulative regime of PIS/COFINS taxes, around R$ 476.7 million (R$ 165.9 million of Corporate Income Tax and R$ 310.8 million of PIS/COFINS taxes), considering the amounts paid by the Company in 2017.

Finally, it is clarified that immunity has not been considered in this business plan since a private contractor will not be entitled to such tax benefit.

3.5.2 Taxation on Revenue

The regulatory framework establishes that COFINS (Social Security Financing Contribution), PIS (Social Integration Program) and ISS (Services Tax) taxes are levied on the revenues of the Company or of the Specific Purpose Entity.

According to Supplementary Law No. 7/1970, private legal entities are PIS taxpayers, and the calculation of such contribution is based on the revenues earned in accordance with Law No. 9718/98 and at different rates according to the revenue profile as provided for by Law No. 10673/2002.

COFINS, likewise PIS, is currently governed by Law No. 9718/98, which establishes that all legal entities and their equivalents in relation to income tax legislation are CONFINS taxpayers, and its calculation is based on revenues and differentiated rates, in accordance with the terms of the rule that regulates the tax.

In the case of these projects, the SPE is subject to the payment of PIS and COFINS at the rates of 1.65% and 7.60% respectively, over its revenues.

The ISS, substitute of the ISSQN (Tax on Services of Any Nature), is a competence of the municipalities and Federal District and is levied on the provision of services, having as taxable event the list of services set out in Law No. 11.438/1997, and is governed by Complementary Law 116/2003.

Environmental sanitation services, including purification, treatment, sewerage and similar services, as well as water treatment and purification services are not subject to ISS, as described in Message No. 362 of 31 July 2003, which explains the reasons for the Veto on the application:

> *The application of the tax on environmental sanitation services, including purification, treatment, sewerage and the like, as well as on water treatment and purification services, does not serve the public interest. Taxation could undermine the government's objective of universal access to such basic services. The disincentive that taxation would bring to the sector would have as a long-term consequence an increase in expenses in serving the population affected by the lack of access to basic sanitation and treated water. In addition, Bill no. 161 - Complementary expressly revoked art. 11 of Decree-Law no. 406, of December 31, 1968, as amended by Complementary Law no. 22, of December 9, 1974. Thus, the hydraulic and civil construction works hired by the Federal, States, Federal District, Municipalities Governments, independent agencies and concessionaires, previously exempt from the tax, would be taxed, impacting the Government expenses with investments.*
>
> *Therefore, the taxation of these services does not serve public interest, and the veto of items 7.14 and 7.15, included in the List of Services of this Complementary Bill, is recommended. As a result, for reasons of legislative technique, clauses X and XI of art. 3 of the Bill should also be vetoed.*

The Concessionaire is subject to payment of ISS on services not related to the activity of water supply and sanitation.

Table 17: Taxation on Revenue

TAXATION ON REVENUE	
Tax	**Rate (%)**
ISS	0,00%
COFINS	7,60%
PIS	1,65%

3.5.3 Taxation on Profit

The SPE shall also pay tax over the Project Profit - Corporate Income Tax (IRPJ) and Social Contribution on Net Profit (CSLL).

For the calculation of Corporate Income Tax, the economic-financial modeling used the tax return in the Regime of Real Profit calculated annually, under the terms of the current federal legislation, in compliance with art. 14 of Federal Law No. 9718/1998, which requires legal entities whose total gross revenue, in the previous calendar year, is higher than R$ 78.000,000.00 (seventy-eight million BRL), or R$ 6,500,000.00 (six million five hundred thousand BRL), multiplied by the number of months of activity in the previous calendar year, when less than 12 (twelve) months (limit established by Federal Law no. 10,637/2002) to declare Income Tax on the basis of Real Profit.

On Income before tax (LAIR), Corporate Income Tax is levied at a rate of 15% when the real profit portion is lower than the amount resulting from the multiplication of R$ 20,000.00 (twenty thousand BRL), by the number of months of the respective calculation period. However, when the results of the SPE point to a value higher than this amount, the legislation provides for an additional 10% to be charged on the excess value. However, due to the divergences between real and nominal model projections, which make it impossible to effectively absorb the benefits of differentiating rates according to the minimum level, highlighted by the fact that this level represents little on the annual result of the project, the choice was to mitigate possible inconsistencies by establishing the rate of 25% for Corporate Income Tax.

The payment of Social Contribution on Net Profit-CSLL is regulated by Federal Law No. 7689/1988, which establishes it with the same rules for calculating Corporate Income Tax, having its calculation basis defined in the provisions of Federal Law No. 10684/2003, which determines the application of a rate of 9% on companies using the Real Profit tax return system.

Table 18: Taxation on Profit

TAXATION ON PROFIT	
Tax	**Rate (%)**
IR	25,00%
CSLL	9,00%
TOTAL	**34,00%**

3.6 Financing Structure

Since the projects have the potential to use Third Party Capital resources, it is necessary to have a financial structure based mainly on loans that match the debt cash flow with the Project cash flow, in order to provide an adequate debt service [7]coverage ratio.

Thus, this item includes studies and considerations about the Bridge and Long-Term Financing structure, in which disbursements with investments are financed.

The credit lines taken into account are those usually practiced by financial agents and there is no commitment from these agents to guarantee this credit structure for the concession.

3.6.1 Bridge Financing

The Bridge Financing (short-term loan) may be obtained from a private financial institution that should provide the resources to cover part of the investment expenditure.

For the purposes of economic and financial modeling, we considered obtaining Bridge Financing with a term of one year, with a grace period for amortization for the same period.

The amount foreseen for the bridge loan has been estimated at 70% of the value to be invested in the first two years of the Concession. The interest on the short-term loan is charged on the outstanding balance owed to the financial institution, and is established at the CDI rate + 4%, an amount considered appropriate by the Economics Department of Banco Fator in view of the practice by the banks offering short-term credit, and is paid monthly.

In addition, interest expenses included the payment of Structuring Charges and Commissions in the amount of 0.5% of the amount raised, an amount considered appropriate by the Economics Department of Banco Fator, for projects of this size, and the payment of

[7] The Debt Service Coverage Ratio (DSCR) is calculated by dividing operating cash generation by debt service, based on information recorded in the Financial Statements, in a given period.

IOF (Tax on Credit Operations, Foreign Exchange and Insurance) expenses on the amount raised.

The repayment system considered for the short-term loan was the *bullet*, whose grace period is equal to the term of the loan and settlement occurs via a single tranche, with the first *tranche* of the long-term loan as *funding*.

3.6.2 Long Term Financing

The Long-Term Financing represents the main instrument of funding of the SPE, providing the financial leverage necessary for the bridge financing *swap*, thus allowing the reduction of financial expenses of the Project, and is obtained from public or private financial institutions.

It was considered obtaining a Long-Term Financing from a private institution in the *Project Finance* modality, with a term of 12 years (as from the start of the financing - second year of Concession).

Together with the financial institution, the Concessionaire shall raise the amount equivalent to 70% of the investments. For the preliminary analysis, the leverage of the investments of the first two years of concession was considered.

The interest on the long-term loan is charged on the outstanding balance with the financial institution, and is established at the IPCA rate + 9%, as practiced in the capital market for incentive papers (incentive debentures) with similar risk, according to the Economics Department of Banco Fator, and its payment occurs monthly.

In addition, interest expenses included the payment of Structuring Charges and Commissions in the amount of 0.5% of the amount raised, and the payment of IOF (Tax on Credit Operations, Foreign Exchange and Insurance) expenses on the amount raised. The amortization system used in the financial modeling of the long-term loan was the SAC (Constant Amortization System).

The re-leveraging aims at exactly aligning the projection with the premise of a capital structure stipulated in 60% of equity and 40% of debt. The premise of raising funds from third parties with public banks (25% with BNDES and 25% with CEF) and market issues (50%) reflects a trend already evidenced by private companies in the sector of sanitation of diversification of their debt sources.

3.6.3 *Covenants*

The following *covenants* were considered for the projected financing:

(i) DSCR (Debt Service Coverage Ratio): is characterized by the ability to pay the Concession debt and is calculated through the generation of operating cash net

of taxes divided by the debt service of the company (installments to be amortized for a given period). The *benchmark* used is that the DSCR could not be less than 1.3;

(ii) NE / Asset: is determined by dividing Net Equity by Assets. The *benchmark* used was that the percentage shall not be lower than 20%;

(iii) Net Debt / EBITDA: estimated by dividing net debt (calculated by subtracting gross debt from cash and cash equivalents) by EBITDA (*earning before interest taxes depreciation and amortization*). The *benchmark* used is that net debt should be not greater than three times the EBITDA.

3.6.4 *Tax Shield*

Considering that the Concessionaire's financial expenses are deductible from the Corporate Income Tax and Social Contribution on Net Profit tax bases, the addition of leverage to the Project reduces the expense with Income Tax, generating benefits for the Project.

In the finance, we call this tax benefit *Tax Shield*, which is calculated as the difference between the Tax on Not Leveraged Project Result (Project) and the Tax on Leveraged Project Result (Leveraged).

The *Tax Shield* was incorporated into the Project in the preparation of the Financial Statements (Income Statement, Leveraged Cash Flow and Balance Sheet) in order to incorporate the tax benefits of interest expenses into the project, matching the Tax on Not Leveraged Project Result (Project) with the Tax on Leveraged Project Result (Leveraged)e, thus reflecting all aspects arising from the leverage of the Project.

4. ATTACHMENTS

4 ATTACHMENTS

4.1 Active Water Units Projections

Economias Ativas - Água	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	7.405	7.600	7.936	8.280	8.630	8.960	9.296	9.639	9.987	10.342	10.651	10.965	11.283	11.433	11.584	11.699	11.815	11.931
Pirai	8.342	8.584	8.865	9.147	9.431	9.711	9.992	10.276	10.561	10.849	11.088	11.328	11.571	11.766	11.961	12.140	12.318	12.497
Rio Claro	5.416	5.536	5.888	6.250	6.621	6.971	7.078	7.185	7.292	7.399	7.473	7.548	7.623	7.697	7.772	7.818	7.865	7.911
Itaguai	40.722	41.707	44.149	46.659	49.236	51.606	52.451	53.296	54.140	54.985	55.515	56.044	56.574	57.103	57.633	57.879	58.124	58.370
Paracambi	14.022	14.289	15.549	16.846	18.179	19.460	19.710	19.961	20.211	20.462	20.617	20.773	20.928	21.084	21.239	21.332	21.425	21.518
Rio de Janeiro - Bloco III	504.310	510.341	519.478	528.687	537.968	545.499	553.082	560.714	568.399	572.828	575.400	577.973	580.545	583.117	585.689	586.715	587.739	588.765
Seropedica	20.176	20.733	23.672	26.735	29.923	33.052	33.676	34.299	34.922	35.545	35.949	36.354	36.758	37.162	37.566	37.780	37.994	38.208
Total	600.393	608.790	625.537	642.604	659.988	675.259	685.285	695.370	705.512	712.410	716.693	720.985	725.282	729.362	733.444	735.363	737.280	739.200

Economias Ativas - Água	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	12.046	12.162	12.228	12.295	12.362	12.428	12.495	12.525	12.556	12.586	12.617	12.647	12.647	12.648	12.648	12.648	12.648
Pirai	12.675	12.853	12.967	13.081	13.195	13.310	13.424	13.492	13.561	13.630	13.698	13.767	13.796	13.826	13.855	13.884	13.914
Rio Claro	7.958	8.004	8.028	8.051	8.075	8.098	8.122	8.126	8.131	8.136	8.141	8.145	8.135	8.124	8.114	8.103	8.093
Itaguai	58.616	58.861	58.877	58.892	58.908	58.924	58.939	58.777	58.614	58.452	58.289	58.127	57.834	57.542	57.249	56.957	56.665
Paracambi	21.610	21.703	21.729	21.754	21.780	21.805	21.831	21.805	21.779	21.753	21.727	21.701	21.633	21.565	21.498	21.430	21.362
Rio de Janeiro - Bloco III	589.791	590.816	590.581	590.346	590.111	589.876	589.641	588.345	587.050	585.754	584.459	583.163	581.002	578.840	576.678	574.517	572.355
Seropedica	38.422	38.636	38.701	38.765	38.829	38.893	38.958	38.905	38.852	38.799	38.746	38.693	38.550	38.408	38.266	38.123	37.981
Total	741.118	743.035	743.111	743.184	743.260	743.334	743.410	741.975	740.543	739.110	737.677	736.243	733.597	730.953	728.308	725.662	723.018

4.2 Active Sewage Units Projections

Economias Ativas - Esgoto	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	-	-	772	1.583	2.433	3.311	4.223	5.169	6.148	7.161	8.168	9.200	10.257	10.394	10.531	10.636	10.741	10.846
Pirai	3.518	3.620	4.848	6.137	7.488	8.894	9.112	9.330	9.547	9.765	9.938	10.110	10.283	10.456	10.628	10.787	10.945	11.103
Rio Claro	-	-	1.388	2.833	4.333	5.864	5.951	6.037	6.124	6.211	6.273	6.334	6.396	6.457	6.519	6.558	6.597	6.636
Itaguai	19.356	19.824	26.247	32.945	39.917	46.915	47.683	48.451	49.219	49.987	50.468	50.949	51.431	51.912	52.394	52.617	52.840	53.064
Paracambi	14.027	14.294	15.132	15.991	16.871	17.691	17.918	18.146	18.374	18.602	18.743	18.884	19.026	19.167	19.308	19.393	19.477	19.562
Rio de Janeiro - Bloco III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seropedica	11.740	12.064	16.295	20.730	25.370	30.048	30.614	31.181	31.747	32.314	32.681	33.049	33.416	33.783	34.151	34.345	34.540	34.735
Total	48.641	49.802	64.682	80.219	96.412	112.723	115.501	118.314	121.159	124.040	126.271	128.526	130.809	132.169	133.531	134.336	135.140	135.946

Economias Ativas - Esgoto	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	10.951	11.056	11.117	11.177	11.238	11.299	11.359	11.387	11.414	11.442	11.470	11.498	11.498	11.498	11.498	11.498	11.498
Pirai	11.261	11.419	11.520	11.621	11.722	11.823	11.924	11.985	12.046	12.106	12.167	12.228	12.254	12.280	12.306	12.332	12.357
Rio Claro	6.675	6.714	6.734	6.755	6.775	6.796	6.816	6.821	6.826	6.831	6.836	6.841	6.833	6.825	6.818	6.810	6.802
Itaguai	53.287	53.510	53.524	53.539	53.553	53.567	53.581	53.434	53.286	53.138	52.990	52.843	52.577	52.311	52.045	51.779	51.513
Paracambi	19.646	19.730	19.753	19.777	19.800	19.823	19.846	19.823	19.799	19.776	19.752	19.728	19.667	19.605	19.543	19.482	19.420
Rio de Janeiro - Bloco III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seropedica	34.929	35.124	35.182	35.241	35.299	35.358	35.416	35.368	35.320	35.272	35.223	35.175	35.046	34.916	34.787	34.658	34.658
Total	136.749	137.553	137.830	138.110	138.387	138.666	138.942	138.818	138.691	138.565	138.438	138.313	137.875	137.435	136.997	136.559	136.248

4.3 Water Revenue Projection

Receita - Água (R$ mil)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	5.652	5.712	5.933	6.155	6.378	6.595	6.855	6.934	7.058	7.178	7.273	7.465	7.660	7.740	7.820	7.886	7.951	8.017
Pirai	8.089	8.195	8.404	8.506	8.687	8.755	8.847	8.709	8.621	8.523	8.382	8.516	8.651	8.750	8.850	8.945	9.039	9.134
Rio Claro	4.568	4.599	4.717	4.851	5.003	5.088	5.007	4.904	4.833	4.729	4.641	4.676	4.711	4.746	4.781	4.804	4.827	4.849
Itaguai	43.558	44.157	54.175	64.564	74.361	85.017	92.498	91.046	89.627	88.166	86.309	86.742	87.174	87.607	88.040	88.164	88.289	88.414
Paracambi	9.672	9.726	12.210	14.830	17.664	20.466	22.144	21.543	21.183	20.014	20.112	20.209	20.307	20.405	20.502	20.563	20.623	20.684
Rio de Janeiro - Bloco III	645.000	648.132	702.019	751.623	813.192	858.967	907.880	897.020	891.648	876.162	863.675	865.551	867.427	869.303	871.179	871.542	871.904	872.266
Seropedica	21.445	21.775	32.987	45.802	59.811	75.194	85.220	83.968	82.373	81.244	79.701	80.270	80.838	81.406	81.974	82.237	82.500	82.762
Total	737.983	742.296	820.445	896.332	985.097	1.060.081	1.128.452	1.114.125	1.105.342	1.086.017	1.070.093	1.073.430	1.076.768	1.079.958	1.083.147	1.084.140	1.085.133	1.086.125

Receita - Água (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	8.082	8.147	8.185	8.223	8.261	8.299	8.337	8.354	8.371	8.388	8.405	8.421	8.420	8.418	8.416	8.415	8.413
Pirai	9.228	9.323	9.379	9.435	9.492	9.548	9.604	9.635	9.666	9.697	9.728	9.760	9.768	9.777	9.786	9.795	9.804
Rio Claro	4.872	4.894	4.906	4.917	4.929	4.940	4.952	4.953	4.954	4.956	4.957	4.959	4.952	4.944	4.937	4.930	4.923
Itaguai	88.539	88.663	88.535	88.407	88.279	88.150	88.022	87.691	87.358	87.027	86.695	86.364	85.878	85.393	84.907	84.421	83.936
Paracambi	20.744	20.804	20.813	20.822	20.832	20.841	20.850	20.817	20.785	20.752	20.720	20.687	20.619	20.550	20.481	20.413	20.344
Rio de Janeiro - Bloco III	872.629	872.991	871.986	870.980	869.975	868.970	867.964	865.692	863.420	861.148	858.876	856.605	853.229	849.854	846.480	843.104	839.730
Seropedica	83.025	83.287	83.305	83.323	83.341	83.359	83.377	83.195	83.013	82.830	82.647	82.466	82.124	81.782	81.440	81.097	80.755
Total	1.087.118	1.088.111	1.087.110	1.086.108	1.085.108	1.084.108	1.083.106	1.080.337	1.077.567	1.074.798	1.072.029	1.069.261	1.064.990	1.060.718	1.056.447	1.052.176	1.047.904

4.4 Sewage Revenue Projection

Receita - Esgoto (R$ mil)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	-	-	565	1.127	1.686	2.238	2.803	3.347	3.910	4.473	5.020	5.638	6.267	6.333	6.399	6.452	6.505	6.559
Pirai	2.280	2.311	3.708	5.010	6.254	7.444	7.264	7.119	7.017	6.906	6.762	6.841	6.920	6.998	7.077	7.153	7.228	7.304
Rio Claro	-	-	1.113	2.176	3.208	4.193	4.083	3.997	3.938	3.851	3.779	3.807	3.834	3.862	3.890	3.908	3.927	3.945
Itaguai	20.653	20.937	31.601	44.834	59.460	76.241	75.496	74.312	73.155	71.963	70.448	70.803	71.157	71.511	71.865	71.967	72.069	72.171
Paracambi	9.676	9.730	11.685	13.876	16.188	18.399	18.117	17.626	17.331	16.375	16.455	16.535	16.615	16.695	16.775	16.824	16.874	16.923
Rio de Janeiro - Bloco III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seropedica	12.478	12.670	22.092	34.758	49.819	67.337	69.726	68.702	67.396	66.473	65.210	65.675	66.140	66.605	67.070	67.285	67.500	67.714
Total	45.088	45.648	70.764	101.781	136.615	175.851	177.489	175.102	172.747	170.041	167.674	169.298	170.933	172.004	173.076	173.589	174.103	174.616

Receita - Esgoto (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	6.612	6.666	6.697	6.728	6.759	6.790	6.821	6.835	6.849	6.863	6.876	6.890	6.889	6.887	6.886	6.885	6.883
Pirai	7.379	7.454	7.499	7.544	7.589	7.633	7.678	7.703	7.728	7.752	7.777	7.802	7.809	7.816	7.822	7.829	7.836
Rio Claro	3.964	3.982	3.992	4.001	4.011	4.021	4.031	4.032	4.034	4.036	4.038	4.039	4.034	4.029	4.024	4.019	4.014
Itaguai	72.274	72.375	72.270	72.166	72.061	71.955	71.851	71.579	71.308	71.036	70.765	70.494	70.096	69.699	69.302	68.904	68.507
Paracambi	16.972	17.021	17.029	17.037	17.044	17.052	17.059	17.033	17.006	16.979	16.953	16.926	16.870	16.814	16.758	16.702	16.645
Rio de Janeiro - Bloco III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seropedica	67.929	68.144	68.158	68.174	68.188	68.203	68.218	68.068	67.920	67.770	67.620	67.472	67.192	66.912	66.632	66.352	66.072
Total	175.130	175.644	175.646	175.649	175.652	175.655	175.657	175.250	174.844	174.436	174.030	173.622	172.890	172.158	171.424	170.691	169.958

4.5 Default Projection

Inadimplência (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	23%	22%	21%	20%	19%	18%	17%	16%	15%	15%	14%	13%	12%	11%	10%	10%	10%	10%
Pirai	24%	23%	22%	21%	20%	19%	18%	17%	16%	15%	14%	13%	12%	11%	10%	10%	10%	10%
Rio Claro	22%	21%	20%	20%	19%	18%	17%	16%	15%	14%	13%	13%	12%	11%	10%	10%	10%	10%
Itaguai	32%	30%	29%	27%	26%	24%	23%	21%	19%	18%	16%	15%	13%	12%	10%	10%	10%	10%
Paracambi	36%	34%	32%	30%	29%	27%	25%	23%	21%	19%	17%	16%	14%	12%	10%	10%	10%	10%
Rio de Janeiro - Bloco III	25%	24%	23%	22%	21%	20%	19%	17%	16%	15%	14%	13%	12%	11%	10%	10%	10%	10%
Seropedica	68%	64%	59%	55%	51%	47%	43%	39%	35%	31%	26%	22%	18%	14%	10%	10%	10%	10%

Inadimplência (%)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Pirai	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Rio Claro	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Itaguai	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Paracambi	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Rio de Janeiro - Bloco III	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Seropedica	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

4.6 Water and Sanitation Investment Projection

Investimento (R$ mil)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pinheiral	-	6.060	9.311	11.915	15.999	11.998	9.765	9.439	9.587	9.738	9.385	9.522	9.647	2.896	2.897	2.405	2.398	2.416
Pirai	-	8.010	22.704	22.119	18.488	17.037	6.610	5.376	5.385	5.334	4.545	4.588	4.604	4.161	4.156	3.962	3.991	3.992
Rio Claro	-	12.065	14.804	11.230	11.599	11.465	2.463	1.690	1.685	1.575	1.274	1.260	1.283	1.284	1.288	1.023	1.006	1.036
Itaguai	-	32.586	99.295	80.332	72.028	71.234	20.994	18.531	14.964	14.198	9.945	9.899	10.023	9.398	9.404	5.539	5.496	5.621
Paracambi	-	11.155	10.348	15.844	22.485	18.516	8.812	4.340	3.779	3.318	2.656	2.583	2.675	2.212	2.215	1.769	1.693	1.788
Rio de Janeiro - Bloco III	-	49.537	62.349	98.436	125.537	123.951	100.155	68.091	64.622	48.091	46.122	40.326	40.502	11.007	10.828	9.069	9.409	9.588
Seropedica	-	24.361	74.142	69.503	70.071	66.710	14.394	19.074	15.652	15.133	9.504	7.485	7.720	7.329	7.341	4.638	4.445	4.680
Total	-	143.774	292.953	309.379	336.207	320.911	163.193	126.541	115.674	97.387	83.431	75.663	76.454	38.287	38.129	28.405	28.438	29.121

Investimento (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pinheiral	2.261	2.259	1.571	1.599	1.617	1.595	1.601	1.080	1.104	1.122	1.104	1.103	665	686	704	686	686
Pirai	3.987	3.994	2.953	2.984	2.992	2.981	2.984	2.244	2.282	2.281	2.276	2.273	1.667	1.692	1.694	1.692	1.493
Rio Claro	1.031	1.038	808	800	823	824	822	637	627	650	651	640	579	565	591	593	594
Itaguai	5.623	5.632	2.464	2.414	2.543	2.544	2.496	2.259	2.213	2.338	2.344	2.349	2.259	2.213	2.338	2.344	2.349
Paracambi	1.795	1.796	1.314	1.241	1.333	1.340	1.292	1.140	1.066	1.162	1.165	1.169	1.140	1.066	1.162	1.165	1.169
Rio de Janeiro - Bloco III	9.595	9.416	8.093	8.435	8.612	8.619	8.441	8.093	8.435	8.612	8.619	8.441	8.093	8.435	8.612	8.619	8.441
Seropedica	4.693	4.707	2.549	2.358	2.591	2.606	2.287	1.649	1.457	1.692	1.704	1.716	1.649	1.457	1.692	1.704	1.716
Total	28.985	28.842	19.752	19.831	20.511	20.509	19.923	17.102	17.184	17.857	17.863	17.691	16.052	16.114	16.793	16.803	16.448

4.7 Non-exhaustive Reference List of Assets

Lista de Ativos do Bloco 3		
Município	**Unidade**	**Local**
Engenheiro Paulo de Frontin	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Morro Azul (Nova)
Engenheiro Paulo de Frontin	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Rio Santana - Sistema Sede
Engenheiro Paulo de Frontin	ESTAÇÃO DE TRATAMENTO DE ÁGUA	ETA Morro Azul
Engenheiro Paulo de Frontin	ESTAÇÃO DE TRATAMENTO DE ÁGUA	ETA Palmas - Sistema Sede
Engenheiro Paulo de Frontin	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	EEAB Morro Azul
Engenheiro Paulo de Frontin	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	EEAB Palmas - Sistema Sede
Engenheiro Paulo de Frontin	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EEAT Morro Azul
Engenheiro Paulo de Frontin	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EEAT Palmas - Sistema Sede
Engenheiro Paulo de Frontin	RESERVATÓRIO	Reservatório - Sistema Sede
Itaguaí	ADUTORA DE ÁGUA TRATADA	Adutora Ribeirão das Lages 1 e 2
Itaguaí	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	MAZOMBA
Itaguaí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Booster Chaperó
Itaguaí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	E.E. 26 de Dezembro
Paracambi	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Booster Paracambi
Paracambi	RESERVATÓRIO	RESERVATÓRIO PARACAMBI
Pinheiral	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação de Pinheiral - Rio Paraíba do Sul
Pinheiral	ESTAÇÃO DE TRATAMENTO DE ÁGUA	ETA Pinheiral
Pinheiral	RESERVATÓRIO	Reservatório Planalto do Sol
Pinheiral	RESERVATÓRIO	Reservatório Pinheiral (principal)
Piraí	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Capt rosa Machado
Piraí	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Caot Varjão Piraí
Piraí	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação santanesia Piraí
Piraí	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Piraí - Sede - Represa Ribeirão das Lajes
Piraí	ESTAÇÃO DE TRATAMENTO DE ÁGUA	Eta santanesia Piraí
Piraí	ESTAÇÃO DE TRATAMENTO DE ÁGUA	Eta arrozal Piraí
Piraí	ESTAÇÃO DE TRATAMENTO DE ÁGUA	Eta Varjão Piraí
Piraí	ESTAÇÃO DE TRATAMENTO DE ÁGUA	ETA Piraí - Sede
Piraí	ESTAÇÃO DE TRATAMENTO DE ESGOTO	Ete pirai i
Piraí	ESTAÇÃO DE TRATAMENTO DE ESGOTO	Ete Piraí II
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	Eeab Varjão Piraí
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	EEAB Bicame - Sede Piraí
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Eeat rosa Machado
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Eeat santanesia Piraí
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Boister pedreira
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Boostra Trapiche
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Eeat arrozal Piraí
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Booster Jaqueira
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Booster rua A, Morro Sarole
Piraí	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EEAT Piraí Sede
Piraí	ESTAÇÃO ELEVATÓRIA DE ESGOTO	Eee bruto Piraí I
Piraí	ESTAÇÃO ELEVATÓRIA DE ESGOTO	Eee bruto Piraí
Piraí	RESERVATÓRIO	Reservatório arrozal Piraí
Piraí	RESERVATÓRIO	Reserv Varjão Piraí
Piraí	RESERVATÓRIO	Reservatório Chapadão do Asilo
Piraí	RESERVATÓRIO	Reservatório Capelinha (Principal)
Piraí	RESERVATÓRIO	Reservatório Morro do Cruzeiro
Piraí	RESERVATÓRIO	Reservatório Morro do Sarole
Rio Claro	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Rio Pirai - Rio Claro
Rio Claro	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Rio Parado - Lidice
Rio Claro	ESTAÇÃO DE TRATAMENTO DE ÁGUA	ETA RIO CLARO
Rio Claro	ESTAÇÃO DE TRATAMENTO DE ÁGUA	Lidice ETA
Rio Claro	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	EEAB RIO CLARO SEDE
Rio Claro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EEAT - Rio Claro Sede
Rio Claro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EEAT Lídice
Rio Claro	RESERVATÓRIO	Reservatório de fibra
Rio Claro	RESERVATÓRIO	RES-500 m3
Rio Claro	RESERVATÓRIO	RES-240 Lidice
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	eat barra de Guaratiba
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	eat vilar carioca
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	eat victor konder
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	eat tangará
Rio de Janeiro	RESERVATÓRIO	Reservatório de Bangu
Rio de Janeiro	RESERVATÓRIO	Mirante
Rio de Janeiro	RESERVATÓRIO	vilar carioca
Rio de Janeiro	RESERVATÓRIO	victor konder
Rio de Janeiro	RESERVATÓRIO	moriçaba
Seropédica	ADUTORA DE ÁGUA TRATADA	ETA Ribeirão das Lages
Seropédica	RESERVATÓRIO	Reservatório Boa Fé
Seropédica	RESERVATÓRIO	Reservatório Piranema