REFERENCE BUSINESS PLAN – BLOCK 4

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 4

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 4.

[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: List of Water and Sanitation System Providers 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 4 listed in the table below:

Table 1: List of Water and Sanitation System Providers

No.	Municipality	Contractor	Contractor's acronym	Type of service	GE019 - Where it provides water supply	GE020 - Where it provides sanitation services
1	Belford Roxo	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
2	Duque de Caxias	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
3	Japeri	Companhia Estadual de Águas e Esgotos	CEDAE	Water	Municipal Main Region	Does not serve
4	Mesquita	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
5	Nilópolis	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
6	Nova Iguaçu	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
7	Queimados	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region
8	Rio de Janeiro	Companhia Estadual de Águas e Esgotos	CEDAE	Water and Sanitation	Municipal Main Region	Municipal Main Region except AP5
9	São João de Meriti	Companhia Estadual de Águas e Esgotos	CEDAE	Water	Municipal Main Region	Private

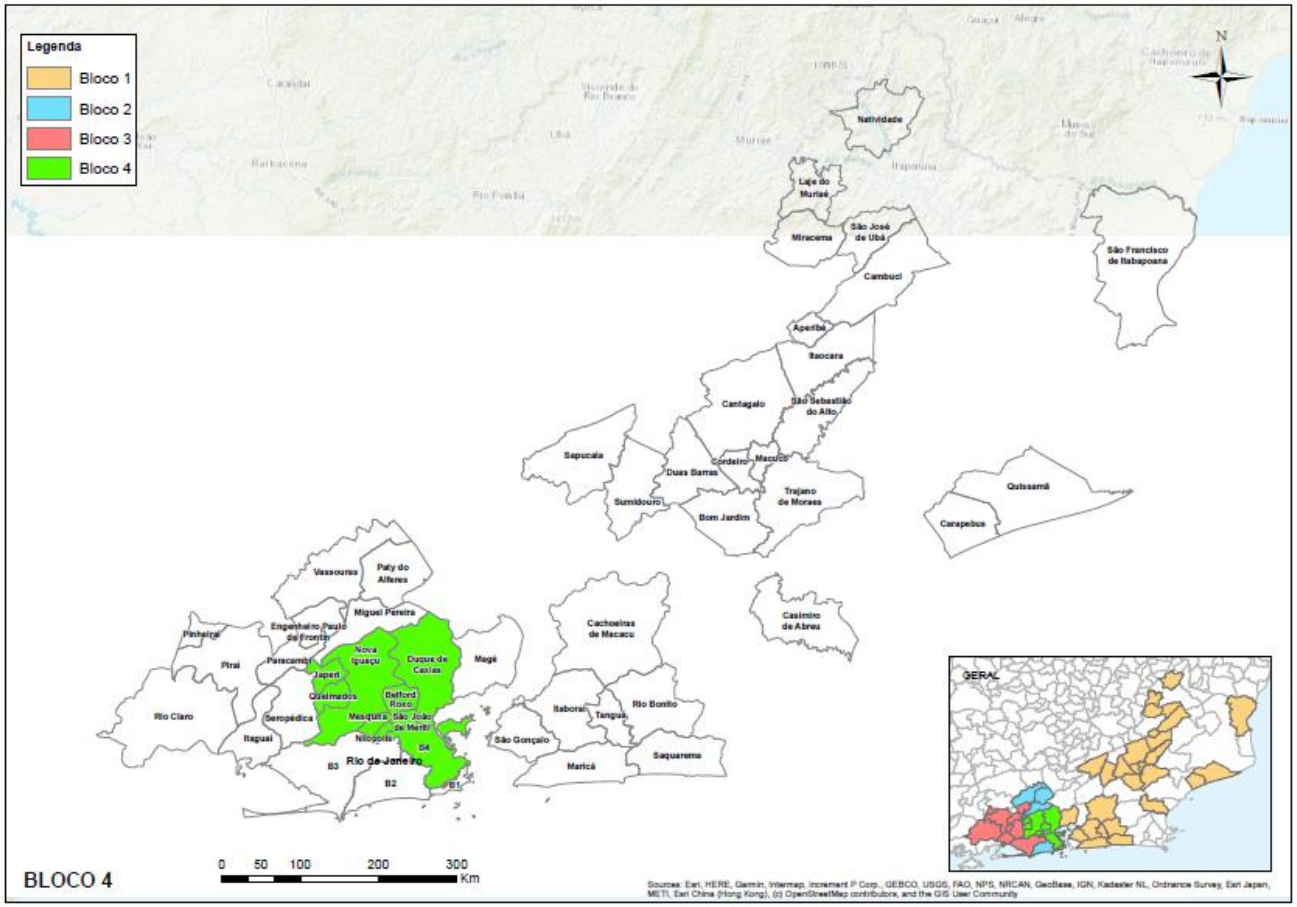
Source: SNIS, 2016 adapted by the Consortium

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 4 was included in Block 4:

Table 1: 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 sanition service).

Table 2: Territorial Extension and Population Served

Caracterização Geográfica Bloco 4 - 2020	
Extensão Territorial	2.257
População Total	7.008.803
População Atendida SAS	5.437.263
População Atendida SES	2.874.630

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 3: Water Catchments and Rivers

Município	Bacias Hidrográficas	Rios
Belford Roxo	RH V - Baia de Guanabara	Rio Outeiro, Rio Iguaçu-Sarapuí, Rio da Bota
Nova Iguaçu	RH V - Baia de Guanabara	Rio Sarapuí, Rio Acari
	RH II - Guandu	Rio São Pedro, Rio Guandu, Rio Ipiranga
Nilópolis	RH V - Baia de Guanabara	Rio do Pau
Duque de Caxias	RH V - Baia de Guanabara	Rio Pavuna-Meriti, Rio Iguaçu, Rio Estrela, Rio Inhomirim, Rio Saracuruna
S. João de Meriti	RH V - Baia de Guanabara	Canal Sarapuí, Rio Pavuna
Queimados	RH II - Guandu	Rio Poços, Rio Queimados
Japeri	RH II - Guandu	Rio D'Ouro, Rio São Pedro
Mesquita	RH V - Baia de Guanabara	Canal Sarapuí, Rio Dona Eugênia
Rio de Janeiro Bloco I	RH V - Baia de Guanabara	Rio Irajá, Rio das Pedras, Rio Faria, Rio Maracanã

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 4: 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)
Belford Roxo	207.529	188.662	396.191

Municipalities	Water Unit (End of Plan)	Sewage Unit (End of Plan)	Water + Sewage Unit (End of Plan)
Duque de Caxias	393.691	357.901	751.592
Japeri	45.942	41.766	87.708
Mesquita	68.899	62.636	131.535
Nilópolis	59.896	54.451	114.347
Nova Iguaçu	325.291	295.719	621.010
Queimados	66.247	60.224	126.471
Rio de Janeiro B1	995.856	905.324	1.901.180
São João de Meriti	172.317	0	172.317

Table 5: Main Results

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

R$ thousands except when indicated otherwise	Block 4
Investments	16.087.846
Water and Sanitation Revenue	171.374.309
EBITDA	54.950.065
Water sale price by CEDAE (R$/m³)	1,70 (until year 4) and 1,63 (afterwards)

3. PROJECTIONS AND PREMISES - BLOCK 4

3 PROJECTIONS AND PREMISES - BLOCK 4

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 6: Average Water and Sanitation Tariffs by Typology

	Water (R$/m³)				
Municipality	Social Tariff	Residential	Commercial	Industrial	Municipality
Belford Roxo	3,07	6,60	13,34	21,64	8,65
Duque de Caxias	2,80	4,42	14,51	17,05	9,19
Japeri	0,00	4,17	11,76	22,23	8,48
Mesquita	3,07	4,52	11,70	20,58	8,52
Nilópolis	3,07	4,53	12,43	18,85	7,96
Nova Iguaçu	3,07	5,63	13,95	21,58	8,75
Queimados	3,07	4,48	15,47	22,14	8,82
Rio de Janeiro	3,26	5,02	16,03	23,40	11,41
São Joao de Meriti	3,09	4,86	12,76	19,91	9,43

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 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 per capita consumption and loss index in the municipalities of Block 4, which should be linearly reduced to the mentioned project values.

Table 7: Per capita and loss index

Municipality	Current Per Capita	Current Losses
Belford Roxo	220	46%
Duque de Caxias	210	39%
Japeri	250	53%
Mesquita	370	48%
Nilópolis	225	38%
Novo Iguaçu	200	43%
Queimados	215	38%
Rio de Janeiro Região 4	177	37%
São João de Meriti	208	44%

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.

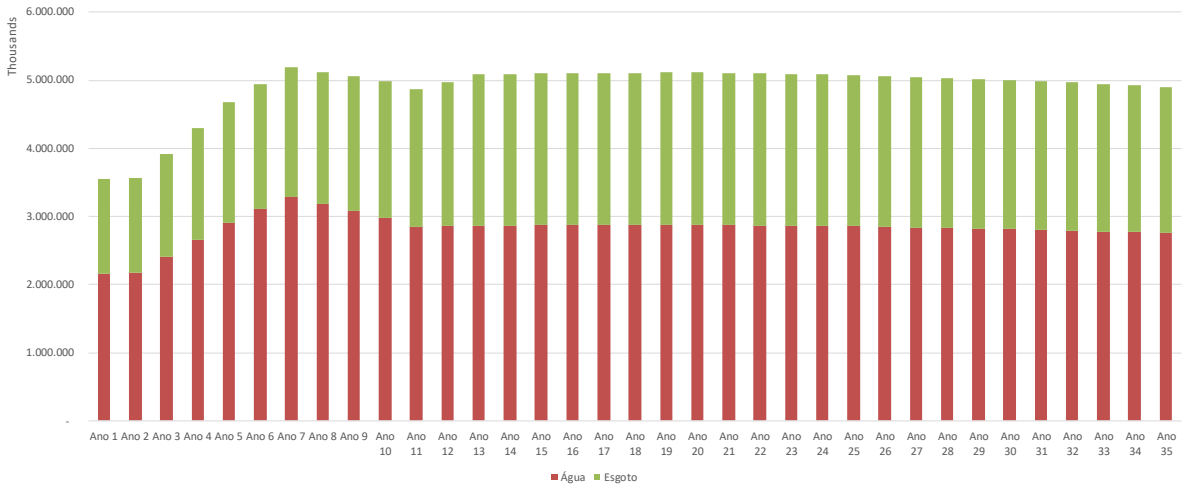
Rio de Janeiro is the municipality that is the most relevant in terms of revenue throughout all blocks.

Table 8: Water and sewage revenue - Block 4

Receita (R$)	1	2	3	4	5	10	20	30	35
Água	2.162.457.319	2.171.028.656	2.412.998.022	2.660.914.326	2.898.304.982	2.972.724.076	2.874.262.751	2.814.043.060	2.755.893.605
Esgoto	1.391.398.077	1.397.442.260	1.508.404.824	1.642.502.112	1.773.589.363	2.008.225.189	2.238.508.273	2.194.400.567	2.150.181.867
Total	3.553.855.396	3.568.470.917	3.921.402.846	4.303.416.437	4.671.894.345	4.980.949.265	5.112.771.024	5.008.443.627	4.906.075.472

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

Graph 1: Revenue - Block 4



3.1.1 Default

The 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 collection, 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 2019, per municipality of Block 4 are presented below:

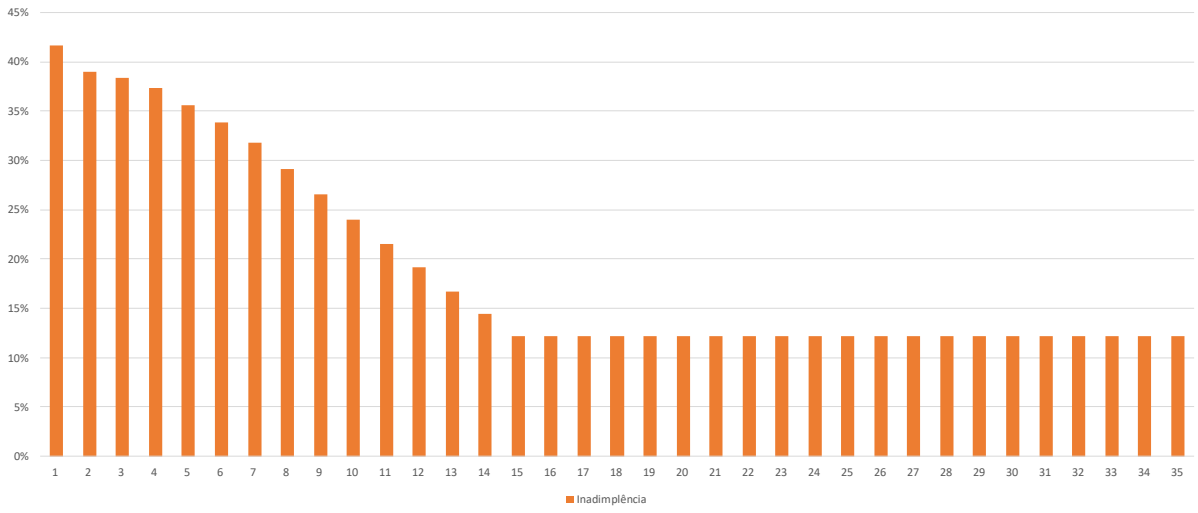
[3] Irregular areas are present only in the municipality of Rio de Janeiro
[4] Analyzing the default of state-owned companies (SABESP, COPASA, SANUPAR) and the main private sanitation companies (GS Inima, BRK, Águas do Brasil, AEGEA), as well as the historical difficulty of billing for sanitation in the downtown area, the assumption of 10% was adopted

Table 9: Default

Municipality	Default
Belford Roxo	74,8%
Duque de Caxias	46,5%
Japeri	63,4%
Mesquita	60,4%
Nilópolis	39,9%
Nova Iguaçu	64,4%
Queimados	54,4%
Rio de Janeiro	18,5%
São Joao de Meriti	62,3%

Below is a graph with the expected curve of default reduction of the block, until it reaches 12% 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 Japeri and Queimados, located in the Guandu River catchment, 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 10: Service Targets - Water (%)

Municipality	Year 5	Year 8	Year 10	Year 12
Belford Roxo	87,1	94,2	99,0	
Duque de Caxias	90,5	95,6	99,0	
Japeri	99,0			
Mesquita	97,5	98,4	99,0	
Nilópolis	98,1	98,6	99,0	
Nova Iguaçu	93,9	97,0	99,0	
Queimados	99,0			
Rio de Janeiro Região 4	97,3	99,0		
São João de Meriti	94,9	97,4	99,0	

Table 11: Service Targets - Sewage (%)

Municipality	Year 5	Year 10	Year 12
Belford Roxo	44	77	90
Duque de Caxias	90		
Japeri	48	78	90
Mesquita	33	74	90
Nilópolis	48	78	90
Nova Iguaçu	90		
Queimados	75	86	90
Rio de Janeiro Região 4	44	77	90
São João de Meriti (*)			

(*) 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: 5% a year

Telemetry and automation: 5% a 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

Tables 13 and 14 present the investment projections for the 35 (thirty-five) years of concession of Block 4, with the opening of the projections by investment sector (water, sanitation and production systems) and details of each structure for the highlighted sectors.

Table 12: Investment Water - Block 4

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Abstraction (k R$)	0	0	17	17	17	17	17	0	0	0	0	0	0	0	0	0	0	0
Water Lifts (k R$)	0	16.226	35.363	35.363	21.225	21.141	21.141	0	0	0	0	0	0	0	0	0	0	0
Water Pipelines (k R$)	0	81.852	91.322	223.750	232.157	245.933	127.872	75.152	14.366	0	0	0	0	0	0	0	0	0
WTP (k R$)	0	6.162	12.211	6.355	6.355	6.355	6.355	6.162	6.162	6.162	6.162	6.162	6.162	0	0	0	0	0
Reservoir (k R$)	0	0	34.127	42.737	51.880	53.157	73.856	41.074	33.030	21.037	19.239	4.053	4.053	4.053	3.518	3.518	0	0
Distribution Network (k R$)	0	48.417	116.758	118.464	120.164	108.135	92.900	81.573	82.418	74.216	59.319	24.460	24.458	24.460	24.458	11.479	11.480	11.479
Water Connections (k R$)	0	3.941	8.443	8.578	8.712	7.726	6.731	6.803	6.875	6.242	5.024	1.980	1.980	1.980	1.980	923	923	923
Hydrometers (k R$)	0	26.759	26.759	26.759	26.759	26.759	28.565	30.627	30.689	30.750	30.299	31.648	33.744	33.839	33.610	32.600	32.556	34.651
Systems, Designs, Customer Service (k R$)	0	84.461	95.431	102.931	103.871	103.962	99.225	93.245	89.455	87.356	86.432	83.115	83.111	1.570	1.570	925	572	571
Environmental (k R$)	0	0	2.701	5.028	5.140	5.164	4.578	1.333	963	740	622	120	120	120	120	35	35	35
Reinvestments (k R$)	0	0	0	0	0	0	0	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337
Total Water (k R$)	0	267.818	423.132	569.982	576.280	578.349	461.240	354.306	282.295	244.840	225.434	169.875	171.965	84.359	83.593	67.817	63.903	65.996

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$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Distribution Network (k R$)	11.479	11.479	2.806	2.806	2.806	2.806	2.806	156	156	156	156	156	0	0	0	0	0
Water Connections (k R$)	923	923	212	212	212	212	212	12	12	12	12	12	0	0	0	0	0
Hydrometers (k R$)	34.746	34.517	33.023	32.979	35.074	35.169	34.940	33.121	33.076	35.171	35.266	35.037	33.123	33.080	35.173	35.269	35.039
Systems, Designs, Customer Service (k R$)	574	573	141	141	141	142	141	5	5	5	6	5	0	0	0	0	0
Environmental (k R$)	35	35	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0
Reinvestments (k R$)	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337	18.337
Total Water (k R$)	66.094	65.864	54.526	54.482	56.577	56.673	56.443	51.631	51.586	53.681	53.777	53.547	51.460	51.417	53.510	53.606	53.376

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

Table 2: Investment Sanitation - Block 4

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Dry Weather Collector (k R$)	0	224.160	300.674	377.188	453.702	530.217	0	0	0	0	0	0	0	0	0	0	0	0
Sewage Connection (k R$)	0	20.222	60.406	61.790	55.247	50.255	211.431	215.493	219.558	223.632	217.349	219.926	222.507	19.001	18.993	8.980	8.977	8.977
Ligação intradomiciliar (Mil R$)	0	29.927	30.913	30.949	30.867	29.131	45.360	45.644	45.930	46.215	44.431	44.598	44.766	3.077	3.078	1.252	1.250	1.252
Connection Network (k R$)	0	100.269	247.331	232.031	149.494	178.970	301.872	301.879	301.872	301.872	300.072	300.065	300.065	24.029	24.022	11.523	11.516	11.523
Sewage Lifts (k R$)	0	20.349	6.146	6.146	5.494	34.992	73.684	29.498	0	0	0	0	0	0	0	0	0	0
Discharge Lines (k R$)	0	4.191	30	0	0	0	18.498	9.399	0	0	0	0	0	0	0	0	0	0
STP (k R$)	0	6.959	124.222	149.721	158.671	128.628	116.230	102.141	137.186	104.832	11.254	18.814	9.658	4.541	0	0	0	2.481
Systems, Designs, Customer Service (k R$)	0	7.230	18.563	19.389	15.803	17.637	26.096	26.058	25.872	23.540	14.674	15.399	14.514	1.657	1.202	578	578	813
Environmental (k R$)	0	0	2.748	3.501	3.330	3.311	4.172	1.513	1.517	1.435	1.142	1.151	1.139	69	69	24	22	32
Reinvestments (k R$)	0	0	0	0	0	0	0	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875
Total Sewage (k R$)	0	413.307	791.033	880.715	872.608	973.141	797.343	786.500	786.810	756.401	643.797	654.828	647.524	107.249	102.239	77.232	77.218	79.953

Year	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Dry Weather Collector (k R$)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewage Connection (k R$)	8.974	8.971	2.021	2.015	2.018	2.012	2.017	106	106	106	106	103	0	0	0	0	0
Ligação intradomiciliar (Mil R$)	1.252	1.252	34	34	34	34	34	2	2	2	2	2	0	0	0	0	0
Connection Network (k R$)	11.516	11.523	2.593	2.593	2.593	2.586	2.153	180	180	180	180	59	0	0	0	0	0
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$)	3.429	3.434	635	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Systems, Designs, Customer Service (k R$)	876	876	195	131	130	131	108	8	8	8	8	2	0	0	0	0	0
Environmental (k R$)	32	33	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0
Reinvestments (k R$)	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875	54.875
Total Sewage (k R$)	80.954	80.964	60.357	59.652	59.654	59.642	59.191	55.171	55.171	55.171	55.171	55.041	54.875	54.875	54.875	54.875	54.875

In the following locations it is provided for the construction of dry weather collectors, to be implemented within the first 05 years of the concession: Belford Roxo, Duque de Caxias, Mesquita, Nilópolis, Nova Iguaçu, Rio de Janeiro, Itaboraí and São Gonçalo and their respective districts.

For these locations, the proposal is to postpone the extension of the sanitation system (*delay*) for 5 years, maintaining only the inertial growth while the dry weather collector system is under implementation.

The dry weather solution to be adopted shall consider the regional particularities and shall be proposed by the Concessionaire, in order to establish the investments in agreement with the granting authority. A possible solution for the dry weather collector is to establish a structure for collecting (or intercepting) sewage in the stormwater galleries and in water courses that receive the sewage in natura, followed by screening of the coarse material and routing to the nearest sewage treatment plant, through existing or to be built sewer mains, lifting stations and discharge lines.

The sewage interception structures are sized to collect water flow in dry weather periods and when it rains any excess follows the normal course of the mains or watercourses.

The implementation of the dry weather collector system is planned in order to, in the short term, minimize the pollution of Guanabara Bay and its effluent bodies and to improve the balneability of the beaches.

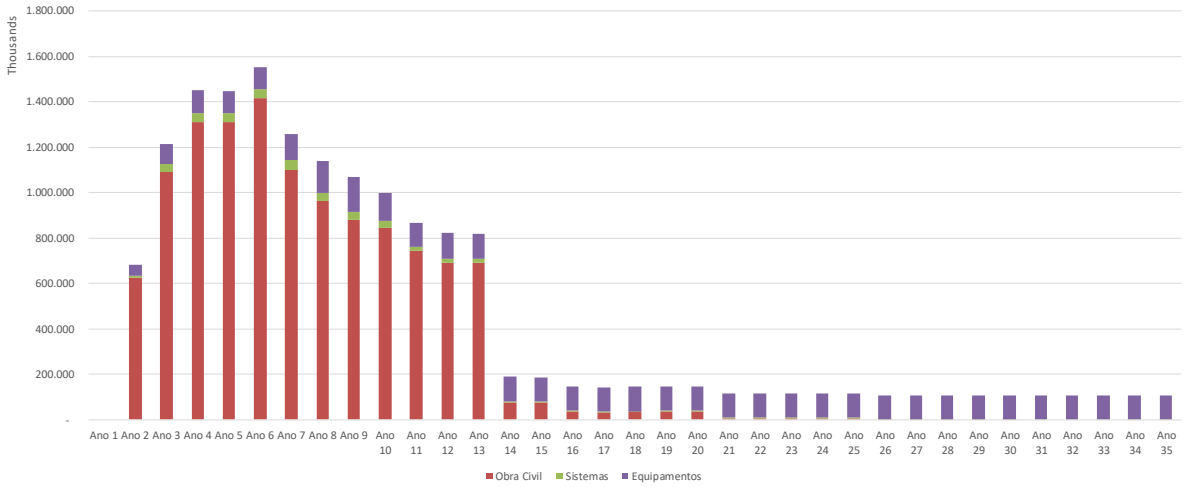
The site and the most suitable technical solution for the implementation of the dry weather collector structures should be the one resulting from the joint analysis of all the available information on the area reserved for this purpose.

The investments established for the municipalities of block 4, including the respective districts, for the performance of the dry weather collector works, are limited to the following:

Block 4 – Total – R$ 1.885,9 million.

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

Graph 2: Investment - Block 4



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 14: 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 CEDAE, 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:

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

- WTP sludge: $\frac{Q_{m^3}}{ano} x \frac{1}{10.000} t/ano$
- Activated sludge with drying bed: 95 g/inhab.day;
- 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$1.70/m³ for the first 4 years and R$ 1,63 m³ 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

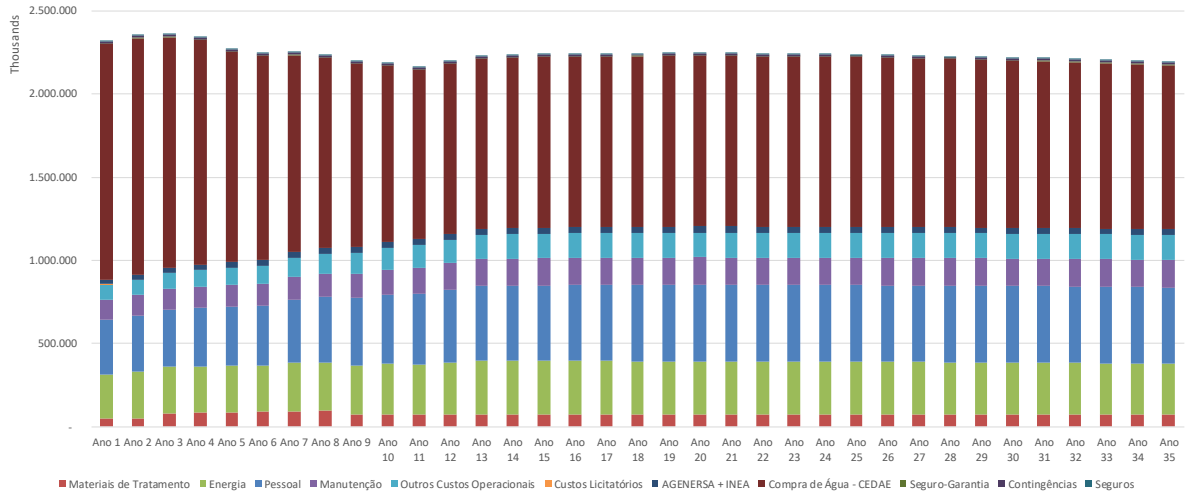
The estimated annual operating cost figures are presented in Table 15: Operating Cost, with details of the main items.

Table 15: Operating Cost

Custo Operacional (R$)	1	2	3	4	5	10	20	30	35
Materiais de Tratamento	48.862.000	51.665.000	81.218.000	85.356.000	87.289.000	75.896.000	74.011.000	72.792.000	71.949.000
Energia	265.391.000	283.233.000	281.784.000	278.826.000	279.319.000	302.161.000	320.486.000	313.692.000	307.204.000
Pessoal	330.696.000	334.818.000	342.316.000	349.914.000	357.377.000	416.360.000	458.506.000	459.176.000	459.176.000
Manutenção	120.222.000	121.713.000	124.364.000	127.043.000	129.684.000	150.428.000	165.244.000	165.468.000	165.468.000
Outros Custos Operacionais	90.219.000	94.798.000	97.757.000	100.772.000	103.694.000	129.974.000	149.452.000	149.803.000	149.715.000
Custos Licitatórios	2.704.655	-	-	-	-	-	-	-	-
AGENERSA e INEA	25.674.666	26.177.231	28.634.575	31.312.786	33.862.875	36.003.539	36.591.348	35.738.114	35.287.574
Compra de Água - CEDAE	1.417.624.278	1.420.580.942	1.385.490.527	1.352.289.039	1.262.456.539	1.060.702.182	1.027.162.997	1.005.825.142	985.105.219
Seguro-Garantia	4.021.962	4.021.962	4.021.962	4.021.962	4.021.962	2.823.243	595.221	269.423	4.021.962
Contingências	11.409.111	11.578.079	11.608.687	11.515.039	11.143.137	10.715.651	11.001.215	10.859.057	10.737.125
Seguro	4.785.863	4.785.863	4.785.863	4.785.863	4.785.863	4.785.863	4.785.863	4.785.863	4.785.863
Total	2.321.610.534	2.353.371.076	2.361.980.613	2.345.835.689	2.273.633.375	2.189.849.479	2.247.835.644	2.218.408.598	2.193.449.743

The graph below shows annual water and sewage costs:

Graph 3: Operating Cost - Block 4



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, we clarify that if CEDAE is privatized, and no longer meets the required criteria, it will no longer enjoy reciprocal immunity, as case law is unanimous in this sense, applying, thus, the rules of the regulatory framework for the sector.

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 3: 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 17: 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.

[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.

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 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 (*earnings 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 ANNEXES

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
Belford Roxo	141.016	143.205	149.849	156.628	163.540	170.004	176.571	183.239	190.010	196.884	203.099	204.469	205.839	207.210	208.580	209.272	209.963	210.655
Duque de Caxias	284.632	289.292	299.922	310.741	321.750	331.762	341.918	352.220	362.666	373.256	382.530	385.282	388.034	390.786	393.539	394.992	396.445	397.899
Japeri	26.261	26.755	29.753	32.840	36.019	39.203	39.793	40.383	40.974	41.564	42.022	42.480	42.938	43.396	43.853	44.164	44.475	44.785
Mesquita	61.513	62.288	63.260	64.236	65.217	65.986	66.759	67.535	68.315	69.098	69.640	69.972	70.304	70.637	70.969	71.089	71.210	71.330
Nilopolis	57.925	58.510	59.204	59.899	60.597	61.078	61.559	62.043	62.527	63.013	63.278	63.430	63.582	63.733	63.885	63.859	63.832	63.806
Novo Iguacu	267.010	270.545	277.163	283.860	290.637	296.533	302.488	308.502	314.575	320.706	325.708	327.401	329.094	330.787	332.480	333.232	333.983	334.735
Queimados	46.565	47.451	50.477	53.581	56.764	59.793	60.601	61.410	62.219	63.028	63.568	64.107	64.646	65.186	65.725	66.022	66.318	66.615
Rio de Janeiro - Bloco IV	877.464	887.956	903.852	919.877	936.025	949.129	962.321	975.602	988.972	996.679	1.001.154	1.005.630	1.010.105	1.014.581	1.019.056	1.020.839	1.022.624	1.024.408
Sao Joao de Meriti	159.074	160.623	163.627	166.659	169.719	172.155	174.608	177.077	179.563	182.065	183.930	184.270	184.610	184.951	185.291	185.122	184.953	184.784
Total	1.921.460	1.946.625	1.997.107	2.048.321	2.100.268	2.145.643	2.186.618	2.228.011	2.269.821	2.306.293	2.334.929	2.347.041	2.359.152	2.371.267	2.383.378	2.388.591	2.393.803	2.399.017

Economias Ativas - Água	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	211.347	212.039	212.170	212.300	212.430	212.561	212.691	212.359	212.026	211.694	211.361	211.029	210.329	209.629	208.929	208.229	207.529
Duque de Caxias	399.352	400.805	401.176	401.547	401.917	402.288	402.659	402.126	401.594	401.061	400.528	399.996	398.735	397.474	396.213	394.952	393.691
Japeri	45.096	45.406	45.571	45.736	45.900	46.065	46.230	46.259	46.288	46.318	46.347	46.376	46.289	46.203	46.116	46.029	45.942
Mesquita	71.450	71.571	71.520	71.469	71.419	71.368	71.317	71.129	70.940	70.752	70.563	70.375	70.080	69.785	69.490	69.194	68.899
Nilopolis	63.779	63.753	63.591	63.429	63.267	63.106	62.944	62.678	62.412	62.146	61.879	61.613	61.270	60.926	60.583	60.240	59.896
Nova Iguacu	335.487	336.238	336.127	336.016	335.905	335.793	335.682	334.902	334.122	333.342	332.562	331.782	330.484	329.186	327.888	326.589	325.291
Queimados	66.911	67.208	67.301	67.394	67.488	67.581	67.675	67.599	67.524	67.449	67.374	67.299	67.088	66.878	66.667	66.457	66.247
Rio de Janeiro - Bloco IV	1.026.192	1.027.976	1.027.568	1.027.159	1.026.750	1.026.341	1.025.932	1.023.678	1.021.424	1.019.170	1.016.916	1.014.662	1.010.901	1.007.140	1.003.378	999.617	995.856
Sao Joao de Meriti	184.616	184.447	183.900	183.354	182.807	182.260	181.713	180.879	180.045	179.211	178.377	177.543	176.498	175.453	174.407	173.362	172.317
Total	2.404.230	2.409.443	2.408.924	2.408.404	2.407.883	2.407.363	2.406.843	2.401.609	2.396.375	2.391.143	2.385.907	2.380.675	2.371.674	2.362.674	2.353.671	2.344.669	2.335.668

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
Belford Roxo	70.508	71.603	72.697	73.792	74.886	75.721	90.988	106.570	122.466	138.678	154.625	170.775	187.127	188.372	189.618	190.247	190.876	191.505
Duque de Caxias	54.248	54.785	56.091	57.412	57.964	58.317	97.969	138.614	180.253	222.886	265.504	308.795	352.758	355.260	357.762	359.084	360.405	361.726
Japeri	-	-	8.468	17.244	26.327	35.639	36.176	36.712	37.249	37.785	38.202	38.618	39.034	39.450	39.867	40.149	40.431	40.714
Mesquita	30.852	31.241	31.630	32.019	32.407	32.689	37.036	41.453	45.940	50.496	54.928	59.401	63.913	64.215	64.517	64.627	64.736	64.845
Nilopolis	12.817	12.946	13.076	13.205	13.335	13.416	19.622	25.902	32.255	38.682	45.025	51.398	57.801	57.939	58.077	58.054	58.029	58.005
Novo Iguacu	135.139	136.928	142.375	147.917	149.801	151.195	171.748	192.651	213.904	235.507	256.525	277.748	299.177	300.716	302.255	302.938	303.621	304.305
Queimados	23.366	23.810	31.122	38.686	46.502	54.357	55.092	55.828	56.563	57.298	57.789	58.279	58.769	59.260	59.750	60.020	60.289	60.559
Rio de Janeiro - Bloco IV	692.734	701.018	709.302	717.585	725.869	731.707	758.618	785.862	813.441	841.352	866.800	892.442	918.277	922.346	926.414	928.036	929.658	931.280
Sao Joao de Meriti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.019.664	1.032.331	1.064.761	1.097.860	1.127.091	1.153.041	1.267.249	1.383.592	1.502.071	1.622.684	1.739.398	1.857.456	1.976.856	1.987.558	1.998.260	2.003.155	2.008.045	2.012.939

Economias Ativas - Esgoto	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	192.134	192.763	192.881	193.000	193.118	193.237	193.355	193.053	192.751	192.449	192.147	191.844	191.208	190.572	189.935	189.299	188.662
Duque de Caxias	363.047	364.368	364.705	365.042	365.379	365.716	366.053	365.569	365.085	364.601	364.117	363.633	362.486	361.340	360.193	359.047	357.901
Japeri	40.996	41.278	41.428	41.578	41.728	41.877	42.027	42.054	42.080	42.107	42.133	42.160	42.081	42.002	41.923	41.845	41.766
Mesquita	64.955	65.064	65.018	64.972	64.926	64.880	64.834	64.663	64.491	64.320	64.149	63.977	63.709	63.441	63.172	62.904	62.636
Nilopolis	57.982	57.957	57.810	57.663	57.516	57.369	57.222	56.980	56.738	56.496	56.254	56.012	55.700	55.388	55.076	54.763	54.451
Nova Iguacu	304.988	305.671	305.570	305.469	305.368	305.267	305.165	304.456	303.747	303.038	302.329	301.620	300.440	299.260	298.080	296.899	295.719
Queimados	60.828	61.098	61.183	61.268	61.353	61.437	61.522	61.454	61.386	61.317	61.249	61.180	60.989	60.798	60.607	60.415	60.224
Rio de Janeiro - Bloco IV	932.902	934.524	934.152	933.781	933.409	933.037	932.666	930.616	928.567	926.518	924.469	922.420	919.001	915.581	912.162	908.743	905.324
Sao Joao de Meriti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.017.832	2.022.723	2.022.747	2.022.773	2.022.797	2.022.820	2.022.844	2.018.845	2.014.845	2.010.846	2.006.847	2.002.846	1.995.614	1.988.382	1.981.148	1.973.915	1.966.683

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
Belford Roxo	100.096	100.360	131.491	164.584	195.159	226.022	252.869	248.287	245.432	240.498	234.463	234.985	235.507	236.029	236.552	236.661	236.770	236.880
Duque de Caxias	122.204	122.842	160.243	200.859	236.309	273.025	306.674	292.362	286.910	282.743	275.724	276.590	277.457	278.323	279.190	279.522	279.854	280.186
Japeri	6.641	6.670	16.900	28.448	40.518	52.115	59.961	56.658	53.616	50.527	47.276	47.478	47.680	47.881	48.083	48.176	48.269	48.361
Mesquita	40.574	40.650	55.455	67.787	77.982	84.417	89.795	81.010	72.678	63.886	55.272	55.301	55.331	55.360	55.390	55.334	55.279	55.223
Nilopolis	57.487	57.482	58.210	57.819	57.547	57.634	56.644	54.179	51.823	49.144	46.688	46.637	46.585	46.533	46.482	46.364	46.246	46.129
Novo Iguacu	211.911	212.206	250.978	293.718	329.030	363.876	394.784	387.287	378.251	371.251	360.889	361.122	361.355	361.588	361.821	361.577	361.333	361.089
Queimados	24.932	25.120	36.413	46.935	57.765	69.296	77.045	74.407	71.395	68.777	65.969	66.227	66.486	66.745	67.003	67.119	67.234	67.349
Rio de Janeiro - Bloco IV	1.476.102	1.483.270	1.572.690	1.661.449	1.755.962	1.826.925	1.881.683	1.827.349	1.764.915	1.700.204	1.622.767	1.626.292	1.629.817	1.633.342	1.636.867	1.637.548	1.638.228	1.638.909
Sao Joao de Meriti	122.511	122.429	130.617	139.314	148.034	153.380	160.520	155.121	150.922	145.693	141.065	140.867	140.670	140.472	140.274	139.881	139.488	139.094
Total	2.162.457	2.171.029	2.412.998	2.660.914	2.898.305	3.106.691	3.279.974	3.176.660	3.075.941	2.972.724	2.850.113	2.855.499	2.860.887	2.866.274	2.871.662	2.872.182	2.872.701	2.873.221

Receita - Água (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	236.989	237.099	236.834	236.570	236.306	236.041	235.777	235.166	234.556	233.945	233.335	232.725	231.813	230.901	229.989	229.077	228.164
Duque de Caxias	280.518	280.851	280.693	280.536	280.379	280.222	280.065	279.453	278.840	278.228	277.616	277.004	275.993	274.982	273.971	272.960	271.948
Japeri	48.454	48.547	48.540	48.532	48.525	48.518	48.510	48.411	48.311	48.212	48.113	48.013	47.834	47.655	47.476	47.297	47.118
Mesquita	55.168	55.112	54.982	54.852	54.722	54.591	54.461	54.263	54.065	53.866	53.668	53.470	53.214	52.959	52.702	52.447	52.191
Nilopolis	46.012	45.895	45.721	45.548	45.375	45.202	45.029	44.807	44.584	44.362	44.140	43.917	43.655	43.392	43.130	42.867	42.605
Novo Iguacu	360.845	360.600	359.826	359.052	358.278	357.503	356.729	355.508	354.286	353.065	351.844	350.623	349.020	347.417	345.815	344.212	342.609
Queimados	67.465	67.581	67.564	67.548	67.532	67.516	67.500	67.362	67.224	67.086	66.948	66.810	66.566	66.322	66.078	65.834	65.589
Rio de Janeiro - Bloco IV	1.639.590	1.640.271	1.638.382	1.636.493	1.634.604	1.632.715	1.630.826	1.626.557	1.622.288	1.618.019	1.613.751	1.609.482	1.603.141	1.596.800	1.590.459	1.584.117	1.577.776
Sao Joao de Meriti	138.701	138.307	137.749	137.190	136.632	136.074	135.515	134.812	134.109	133.405	132.702	131.998	131.177	130.356	129.535	128.714	127.894
Total	2.873.742	2.874.263	2.870.292	2.866.321	2.862.353	2.858.382	2.854.412	2.846.339	2.838.264	2.830.190	2.822.117	2.814.043	2.802.413	2.790.784	2.779.154	2.767.524	2.755.894

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
Belford Roxo	50.048	50.180	62.260	75.940	87.935	99.185	117.275	129.961	142.368	152.458	160.652	176.635	192.688	193.115	193.542	193.632	193.721	193.811
Duque de Caxias	23.296	23.271	29.259	36.352	41.891	47.290	79.091	103.558	128.344	151.953	172.236	199.513	227.010	227.719	228.428	228.699	228.972	229.243
Japeri	-	-	4.528	14.366	28.795	46.395	49.059	46.357	43.868	41.340	38.681	38.846	39.011	39.175	39.341	39.416	39.492	39.568
Mesquita	20.350	20.388	26.865	32.987	38.007	41.187	44.835	44.752	43.987	42.019	39.236	42.252	45.271	45.295	45.319	45.274	45.228	45.183
Nilopolis	12.598	12.595	12.671	12.577	12.131	11.626	16.150	20.277	23.998	27.108	29.870	33.997	38.115	38.073	38.030	37.934	37.838	37.742
Novo Iguacu	107.252	107.401	126.740	150.649	167.470	183.470	201.737	217.665	231.483	245.362	255.809	275.719	295.654	295.845	296.035	295.836	295.636	295.436
Queimados	12.511	12.605	21.783	33.154	46.479	61.982	63.036	60.879	58.414	56.272	53.975	54.186	54.398	54.609	54.821	54.915	55.010	55.104
Rio de Janeiro - Bloco IV	1.165.344	1.171.002	1.224.300	1.286.478	1.350.882	1.348.490	1.335.033	1.324.762	1.306.495	1.291.714	1.264.494	1.298.922	1.333.487	1.336.371	1.339.255	1.339.812	1.340.369	1.340.926
Sao Joao de Meriti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.391.398	1.397.442	1.508.405	1.642.502	1.773.589	1.839.626	1.906.217	1.948.210	1.978.957	2.008.225	2.014.953	2.120.069	2.225.633	2.230.202	2.234.771	2.235.518	2.236.266	2.237.014

Receita - Esgoto (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	193.900	193.990	193.773	193.557	193.341	193.125	192.908	192.409	191.910	191.410	190.911	190.411	189.665	188.919	188.172	187.426	186.680
Duque de Caxias	229.515	229.787	229.658	229.530	229.401	229.273	229.144	228.643	228.142	227.641	227.140	226.639	225.812	224.985	224.158	223.331	222.503
Japeri	39.644	39.720	39.714	39.708	39.702	39.697	39.690	39.609	39.528	39.446	39.365	39.284	39.137	38.991	38.844	38.697	38.551
Mesquita	45.137	45.092	44.985	44.879	44.772	44.666	44.559	44.397	44.235	44.073	43.910	43.748	43.539	43.330	43.120	42.911	42.702
Nilopolis	37.646	37.550	37.408	37.267	37.125	36.983	36.842	36.660	36.478	36.296	36.114	35.933	35.718	35.503	35.288	35.073	34.858
Novo Iguacu	295.237	295.037	294.403	293.770	293.136	292.503	291.869	290.870	289.871	288.872	287.872	286.873	285.562	284.251	282.939	281.628	280.317
Queimados	55.199	55.294	55.280	55.267	55.254	55.241	55.227	55.114	55.002	54.889	54.776	54.663	54.463	54.263	54.064	53.864	53.664
Rio de Janeiro - Bloco IV	1.341.483	1.342.040	1.340.494	1.338.949	1.337.403	1.335.858	1.334.312	1.330.819	1.327.327	1.323.834	1.320.342	1.316.849	1.311.661	1.306.472	1.301.284	1.296.096	1.290.907
Sao Joao de Meriti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.237.761	2.238.508	2.235.717	2.232.925	2.230.135	2.227.344	2.224.551	2.218.522	2.212.491	2.206.460	2.200.430	2.194.401	2.185.556	2.176.713	2.167.869	2.159.026	2.150.182

4.5 Default Projection

Inadimplência (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Belford Roxo	71%	66%	62%	58%	54%	50%	45%	41%	37%	33%	29%	25%	20%	16%	12%	12%	12%	12%
Duque de Caxias	44%	42%	40%	37%	35%	33%	30%	28%	26%	24%	21%	19%	17%	14%	12%	12%	12%	12%
Japeri	60%	57%	53%	50%	46%	43%	39%	36%	33%	29%	26%	22%	19%	15%	12%	12%	12%	12%
Mesquita	57%	54%	51%	47%	44%	41%	38%	35%	31%	28%	25%	22%	18%	15%	12%	12%	12%	12%
Nilopolis	38%	36%	34%	32%	31%	29%	27%	25%	23%	21%	19%	18%	16%	14%	12%	12%	12%	12%
Novo Iguacu	61%	57%	54%	50%	47%	43%	40%	36%	33%	29%	26%	22%	19%	15%	12%	12%	12%	12%
Queimados	52%	49%	46%	43%	40%	37%	35%	32%	29%	26%	23%	20%	18%	15%	12%	12%	12%	12%
Rio de Janeiro - Bloco IV	20%	19%	18%	18%	17%	16%	16%	15%	14%	14%	13%	12%	11%	11%	10%	10%	10%	10%
Sao Joao de Meriti	59%	55%	52%	49%	45%	42%	38%	35%	32%	28%	25%	21%	18%	14%	11%	11%	11%	11%

Inadimplência (%)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Duque de Caxias	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Japeri	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Mesquita	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Nilopolis	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Nova Iguacu	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Queimados	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Rio de Janeiro - Bloco IV	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Sao Joao de Meriti	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%

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
Belford Roxo	-	36.544	71.742	94.528	123.039	129.707	148.989	148.028	128.162	117.839	99.087	86.281	87.204	17.202	17.223	12.680	12.422	15.600
Duque de Caxias	-	116.302	178.113	266.748	250.842	269.859	290.622	242.911	272.278	237.621	210.704	189.367	191.240	33.535	33.452	24.982	23.255	23.768
Japeri	-	16.943	68.146	76.988	92.051	81.866	15.809	10.313	8.855	7.699	11.697	18.880	11.743	6.465	6.475	5.027	4.802	5.071
Mesquita	-	14.803	29.485	32.296	37.304	81.379	73.182	67.092	24.834	24.720	23.553	22.266	22.386	5.676	5.677	4.056	4.113	4.129
Nilopolis	-	20.075	27.114	25.288	28.791	33.765	29.400	32.076	29.635	29.352	24.119	23.584	23.649	3.038	3.041	2.268	2.302	2.309
Nova Iguacu	-	130.282	156.199	228.174	201.833	221.535	178.771	243.882	223.044	215.946	143.012	136.785	137.372	20.954	20.962	15.461	15.483	15.716
Queimados	-	21.854	99.076	108.445	122.513	103.637	13.152	11.813	11.810	14.784	15.909	11.657	8.895	8.333	8.330	5.610	5.478	5.688
Rio de Janeiro - Bloco IV	-	318.355	557.509	589.866	562.704	611.535	487.144	370.316	358.503	343.338	332.285	331.815	332.843	92.245	86.509	71.435	69.733	70.046
Sao Joao de Meriti	-	5.967	26.781	28.364	29.811	18.207	21.514	14.375	11.984	9.942	8.865	4.068	4.157	4.160	4.163	3.530	3.533	3.622
Total	-	681.125	1.214.165	1.450.697	1.448.888	1.551.490	1.258.583	1.140.806	1.069.105	1.001.241	869.231	824.703	819.489	191.608	185.832	145.049	141.121	145.949

Investimento (R$ mil)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Belford Roxo	15.940	15.647	9.075	8.820	9.277	9.298	9.321	8.236	7.981	8.435	8.459	8.482	8.236	7.981	8.435	8.459	8.482
Duque de Caxias	23.792	23.821	18.379	18.233	18.742	18.773	18.801	14.167	14.023	14.535	14.563	14.588	13.981	13.838	14.349	14.377	14.405
Japeri	5.084	5.091	3.649	3.420	3.693	3.703	3.713	2.351	2.122	2.395	2.405	2.288	2.070	1.842	2.114	2.124	2.134
Mesquita	4.130	4.131	3.171	3.225	3.244	3.244	3.245	3.171	3.225	3.244	3.244	3.245	3.171	3.225	3.244	3.244	3.245
Nilopolis	2.310	2.310	2.268	2.302	2.309	2.310	2.310	2.268	2.302	2.309	2.310	2.310	2.268	2.302	2.309	2.310	2.310
Nova Iguacu	15.727	15.734	11.241	11.263	11.496	11.507	11.517	11.241	11.263	11.496	11.507	11.517	11.241	11.263	11.496	11.507	11.517
Queimados	5.682	5.703	3.387	3.261	3.462	3.457	3.013	2.355	2.231	2.430	2.437	2.444	2.355	2.231	2.430	2.437	2.444
Rio de Janeiro - Bloco IV	70.758	70.764	60.183	60.077	60.386	60.398	60.087	59.483	60.077	60.386	60.398	60.087	59.483	60.077	60.386	60.398	60.087
Sao Joao de Meriti	3.625	3.627	3.530	3.533	3.622	3.625	3.627	3.530	3.533	3.622	3.625	3.627	3.530	3.533	3.622	3.625	3.627
Total	147.048	146.828	114.883	114.134	116.231	116.315	115.634	106.802	106.757	108.852	108.948	108.588	106.335	106.292	108.385	108.481	108.251

4.7 Non-exhaustive Reference List of Assets

Lista de Ativos do Bloco 4		
Município	**Unidade**	**Local**
Belford Roxo	ESTAÇÃO DE TRATAMENTO DE ESGOTO	ETE SARAPUÍ
Belford Roxo	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	b graça
Belford Roxo	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	booster da baixada
Belford Roxo	ESTAÇÃO ELEVATÓRIA DE ESGOTO	EEEB HELIÓPOLIS 2
Belford Roxo	ESTAÇÃO ELEVATÓRIA DE ESGOTO	EEEB HELIÓPOLIS
Belford Roxo	RESERVATÓRIO	broxo
Belford Roxo	RESERVATÓRIO	graca
Duque de Caxias	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Mantiquira
Duque de Caxias	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Xerem
Duque de Caxias	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Taquara
Duque de Caxias	ESTAÇÃO DE TRATAMENTO DE ÁGUA	Eta taquara
Duque de Caxias	ESTAÇÃO ELEVATÓRIA DE ESGOTO	EEEB TIAO LANTERNEIRO
Duque de Caxias	RESERVATÓRIO	Reservatório Taquara
Duque de Caxias	RESERVATÓRIO	Reservatório Centenário
Duque de Caxias	RESERVATÓRIO	Reservatório 25 de Agosto
Duque de Caxias	RESERVATÓRIO	Reservatório Pq Fluminense
Japeri	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	BOOSTER ENG. PEDREIRA
Japeri	RESERVATÓRIO	RESERVATÓRIO ENG. PEDREIRA
Mesquita	ESTAÇÃO ELEVATÓRIA DE ÁGUA BRUTA	b Jk
Mesquita	ESTAÇÃO ELEVATÓRIA DE ESGOTO	EEEB STO ELIAS
Mesquita	RESERVATÓRIO	r2
Mesquita	RESERVATÓRIO	r jk
Nilópolis	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	b nilopolis
Nilópolis	RESERVATÓRIO	cabral
Nilópolis	RESERVATÓRIO	Nilopolis
Nova Iguaçu	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação do Tingua
Nova Iguaçu	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Rio Douro
Nova Iguaçu	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	Captação Sao Pedro
Nova Iguaçu	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Booster da Posse
Nova Iguaçu	RESERVATÓRIO	Sem título
Nova Iguaçu	RESERVATÓRIO	Brasília
Nova Iguaçu	RESERVATÓRIO	Jd Alvorada
Nova Iguaçu	RESERVATÓRIO	Posse
Queimados	RESERVATÓRIO	RESERVATÓRIO DE QUEIMADOS
Rio de Janeiro	ADUTORA DE ÁGUA TRATADA	Cx Transição de Urucuia
Rio de Janeiro	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	UT Afonso Vizeu
Rio de Janeiro	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	UT Caboclo
Rio de Janeiro	CAPTAÇÃO DE AGUA BRUTA SUPERFICIAL	UT Mendanha
Rio de Janeiro	ESTAÇÃO DE TRATAMENTO DE ESGOTO	ETE ALegria
Rio de Janeiro	ESTAÇÃO DE TRATAMENTO DE ESGOTO	ETE Pavuna
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EE Engenho de Dentro
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	Elevatoria Maracana
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EE Mendes De Morais
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	EE Guaicurus
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	canto da praia
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	vendinha
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	itapuca
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA	eat caminho do Veloso
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ESGOTO	E Lapa
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ESGOTO	E Paranapuam
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ESGOTO	E Zumbi
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ESGOTO	E Bicas
Rio de Janeiro	ESTAÇÃO ELEVATÓRIA DE ESGOTO	E Fundao
Rio de Janeiro	RESERVATÓRIO	Reservatório Mãe Dagua
Rio de Janeiro	RESERVATÓRIO	Reservatório Guarabu
Rio de Janeiro	RESERVATÓRIO	Reservatório Barão
Rio de Janeiro	RESERVATÓRIO	Reservatório Vila daPenha
Rio de Janeiro	RESERVATÓRIO	Reservatório de Quintino Presidente Dutra
Rio de Janeiro	RESERVATÓRIO	Res Anchieta
Rio de Janeiro	RESERVATÓRIO	Reserv Engenho de Dentro
Rio de Janeiro	RESERVATÓRIO	Cx Velha
Rio de Janeiro	RESERVATÓRIO	Reservatório do França
Rio de Janeiro	RESERVATÓRIO	mirante St cruz