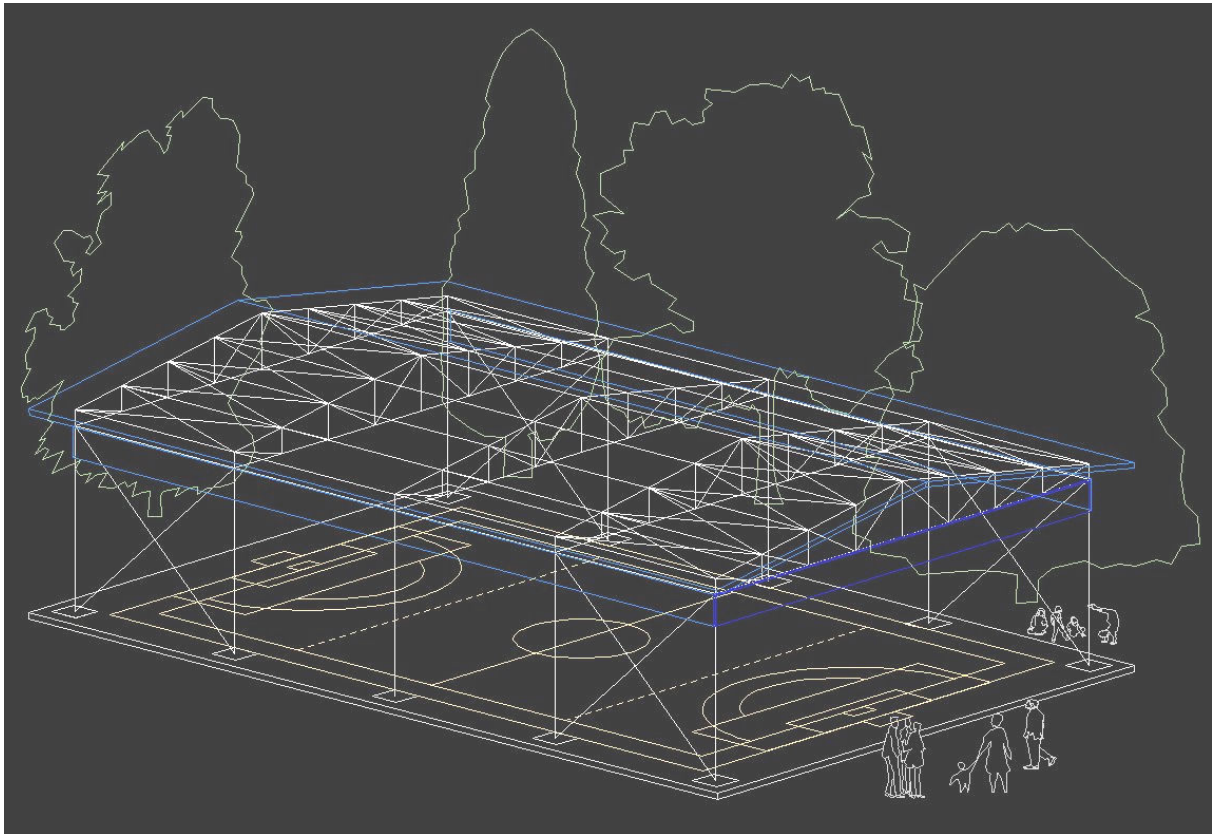


# Sport and Community Centre

## Casa do Caminho

*Brazil*

## Technical Report



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**Translator:**  
**Bart Bijen**



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## 1. Introduction

This report develops the main concepts expressed in the General Report, focusing more on the decision making and on the technical aspects behind the project of the Sport and Community Centre of Casa do Caminho.

The overall philosophy of the project can be summarised in a sentence of Joseph E. Stiglitz:

*“ Successful development transformation affects not only what we do, but also how we do it... in the end, successful development must come from within the country itself, and to accomplish this, it must have institutions and leadership to catalyse, absorb, and manage the process of change, and the changed society”.*

The sport and community centre is a charity project in a charity institution that operates in a developing country. This generates a series of delicate factors that have to be considered in the development of the project itself. The use of local expertise and workmanship is fundamental to generate skills and to improve the capacity of development. Brazil has very good resources in terms of social capital but there are still parts of the country in which skills are not present and have to be developed. The sport and community centre will be an example of good and ethical construction that will directly benefit the children, the orphanage as an institution and the local community. The centre will be a finished product built by a local private construction company. However there will still be opportunity for further improvement and personalisation, making the orphanage and the local community involved in the overall project, not just as future users. This will enhance the community's pride and self-esteem.

## 2. The Project

In June and July 2005 I joined the volunteer coordinator Tom Schrurs at the orphanage of Casa do Camino, Xerem to study the reality of the orphanage itself and evaluating the feasibility and all the technical aspects of a Sport and Community Centre at Casa do Caminho. It has been an incredible experience, a steep learning curve on how to deal with different cultures in a charity environment, making a fair and sustainable business. The driving factor was to see how much a positive and caring environment can improve even the more desperate conditions of the children. The main benefits this project can bring are not only related to the social and physical health of the orphans but also to the local community. These points have been analyzed in greater detail in the General Report ([www.casadocaminhobrasil.com](http://www.casadocaminhobrasil.com)).

In order to maximise its benefit, the centre has to be an open and flexible space, a building that can be easily adopted in an existing environment and its identity developed by the users. The setting of the project is unique, a plot of land within the complex of the orphanage, surrounded by hills covered by tropical forest. The environmental impact of this building has to be minimal, therefore communication with the surrounding nature, adaptability and flexibility are also important factors considered.

The plot of land on which the centre will be built has been proposed by the director of Casa do Caminho, Renato Pinto Campos. The area, trapezoidal with an average width of 25 meters and length of 45 meters, will give enough room for a building that can host inside a wide variety of sports and activities. The longer side of the site runs parallel to the main road making this location ideal for its accessibility during construction and during the future use of the facility, without disrupting the everyday activity of the orphanage.

The soil conditions are good overall and do not present particular anomalies that could bring special geotechnical measures.

Deciding upon the choice of building was quite straightforward. Portal frames will satisfy all the requirement of having a high, covered and flexible open space without any obstacle underneath. This would be ideal for practicing all kind of sports and community events.

Regarding the construction materials; I kept an open approach. Whilst the slab had to be of good quality concrete, the frame and the roof could be of different kind of materials: concrete, timber, steel. In order to carry on with this decision it was paramount to explore the area to look for a similar type of construction. The local school of Xerem had a recently built "Quadra de Esportes" by a local company called Sanebras. The job appeared structurally and aesthetically sound. It had well executed power floated concrete slab, with regular expansion joints, six braced steel portal frame carrying a roof made of corrugated steel sheets. Timber, even if the orphanage is located in the Tingua Atlantic Forest, it is not a common construction material, like concrete and brick. It would have been too expensive to find the people with the skills in timber construction since not present in the area at all. Concrete instead, while widely used in the local housing it is not the more efficient material for portal frame. Considering issues related to low building maintenance as well the choice for the superstructure was going towards steel then.



### 3. The Approach

The decision making had to follow a logical approach based upon the social, economical and natural environment in which the project is located. The reality of Brazil and the orphanage in Xerem has already been described in the General Report; this section will further explore this reality but in the context of the Sports Centre project.

After understanding the overall environment in which the project has to take place, I started to develop the approach on how the design could be carried out. My expected duties as the project manager of the Sport Centre in the beginning were to carry out the structural design of the complex, to procure the materials and the skilled labour and to supervise the construction carried on with the help of the local community and the volunteers of the Casa do Caminho.

The first weeks of my stay at Casa were spent in investigating the resources available such as local builders and engineers and contacting local contractors and construction materials providers. After interviewing a broad range of professionals involved in the construction sector we decided to choose a partner based on experience and reliability.

After understanding the reality of where the project takes place, it became clear how problematic it would have been managing this project in a shared responsibilities working environment. Buying and delivering construction materials, managing builders and machine suppliers would have lead to problems such as logistical delays, contractual responsibilities, conflicts and unpredictable expenses.

## 4. Analysis and Solution

Considering my role as the engineer appointed by the client, the director of the orphanage Renato Pinto Campos, I felt my responsibility to carry out the job in the most efficient and responsible way. I considered my duties to select which kind of building would be appropriate and how to reduce and control the problems in construction applied to this specific case.

Unfortunately, after exploring the rural area of Xerem and the Duque of Caxias, in which the orphanage Casa do Caminho is located, there is a general lack of construction skills even if materials, such reinforced concrete, have been used. The buildings are generally not structurally sound and the overall feeling is precariousness.

The best solution at this point appeared to be Sanebras ( <http://sanebraseng.com.br> ), designers and constructors of the sport and community centre for the local school of Xerem. Being steel fabricator as well, the company would give just one point of contact for the overall design and construction process.

To summarise these are the factors that brought us to choose Sanebras:

- One point of contact for the responsibility of the delivery of the overall project
- Reliability, it is a certified company
- Based in the local community
- Experience in similar construction
- Cheapest offer compared to the other analysed
- Presentation of a contract, a cost plan, specifications and time schedule.



Sport Centre of the local high school – Sanebras (<http://sanebraseng.com.br>)

## 5. Documents

The documents received from Sanebras include a contract, a cost plan, specifications and a construction schedule. These documents are preliminary since all of them are to be reviewed when the contract is signed and the construction due to start. We are not expecting major changes even if the cost of the project will increase slightly due to inflation.

A translation of all the documents can be found in the Appendices.

### Summary of the documents:

The overall project has a time span of three months.

#### **Month 1**

The first month will be spent in the architectural and structural design of the centre, production of construction drawings and to obtain the necessary permits to build.

#### **Month 2**

The construction is due to start after one month with the preparation of the ground and compacting the soil underneath where the building will be located. The foundations will be 10 pad foundation of 18 Mpa reinforced concrete. This phase will take approximately 15 days. Then will follow the erection of the main structure consisting of the 5 steel portal frames. In order to minimise the maintenance cost all steel will be of high resistance to atmospheric corrosion USI-SAC 300 and painted with PRIMER EPOXY.

#### **Month 3**

The construction will be finished by fixing the roofing system to the frames. The space will be covered by trapezoidal steel sheet overhanging less than one meter each side. The same type of steel sheets will be used to cover the upper part of the building laterally. This will protect the internal slab from direct sun light and from rain. The last construction task will be to build the slab. It is crucial that execution is done properly in order to give a lasting product of quality. The slab will be laid on visqueen sheet with a steel reinforcement of CA -60. The concrete poured will be of 25 Mpa of compression resistance with regular expansion joints. The slab will be then power floated in order to give to the surface a smooth finish and make it ready to be use for all the activities.

No allowance is done for landscaping, lateral cladding and rainwater pipe. This decision has been taken to save money and to let the Orphanage staff and the volunteers participate in making the building more personal. The contract that will be signed will cover instead all the construction tasks that need skilled labour and quality materials, in order to give a quality, low maintenance building.

#### **Costs**

The overall cost of the project is **\$ 165,956** equivalent to **€ 58.994 Euro**, depending on exchange rate. Payment will be done every 15 days with the first payment after 15 days of the beginning of the work. The contract will be considered closed when the final rate has been paid. All the transaction will take place from the Casa do Caminho Banco do Brasil current account, reported on the official website, to Sanebras current account.



# APPENDICES

Appendix A: Cost Plan Construction

**SANEBRÁS ENGENHARIA LTDA**

**Sport Centre Cost Plan - Covered Steel Structure measuring 17m x 24m**

item	Description	Unit	Quantity	Manpower unit cost	Material unit cost	Equipment Unit cost	Total unit cost	Total cost	Total Activity
<b>General Services</b>									
1	Administration of the job, including engineer, a forman, car and job plates	month	2,00	R\$ 6.400	R\$ 600	R\$ 1.000	R\$ 8.000	R\$ 16.000	
2	Detail architectural and structural project inclusive of structural calculations	vb	1,00	R\$ 3.000	-	-	R\$ 3.000	R\$ 3.000	R\$ 19.000
<b>Fundations</b>									
3	Manual preparation of the soil including cleaning and excavation of the first 300mm of soil and manual compction	M2	551,00	R\$ 4	-	-	R\$ 4	R\$ 2.204	
4	Manual excavation of soil for pad foundations	m3	48,00	R\$ 24	-	-	R\$ 24	R\$ 1.152	
5	Compaction of base layers of 20cm	m3	39,25	R\$ 15	-	-	R\$ 15	R\$ 589	
6	Manual load and mechanical unload of aggregate from truck with 6m3 capacity, employing two people for loading	m3	90,00	R\$ 6	-	R\$ 15	R\$ 21	R\$ 1.872	
7	Transport with truck of 6 m3 capacity having average speed of 30 Km/h	m3	90,00	-	-	R\$ 19	R\$ 19	R\$ 1.665	
8	Concrete 10Mpa including material and transportation	M3	1,75	R\$ 56	R\$ 70	R\$ 14	R\$ 140	R\$ 245	
9	Reinforced concrete 18Mpa including delivery and construction	M3	7,00	R\$ 171	R\$ 610	R\$ 90	R\$ 871	R\$ 6.097	R\$ 13.824
<b>Ground Slab</b>									
10	100mm thick mat in granular material	m2	459,00	R\$ 0	R\$ 4	R\$ 0	R\$ 5	R\$ 2.194	
11	Damp proof polythene membrane	m2	459,00	R\$ 0	R\$ 1	-	R\$ 1	R\$ 275	
12	Steel square mesh ca-60 type Telecon Q138	KG	1.110,78	R\$ 1	R\$ 5	-	R\$ 6	R\$ 6.420	
13	Concrete 25Mpa of resistance	M3	45,90	R\$ 42	R\$ 168	-	R\$ 210	R\$ 9.639	
14	Execution of the reinforced concrete slab	m2	459,00	R\$ 6	-	R\$ 2	R\$ 8	R\$ 3.672	R\$ 22.201
<b>Steel Structure</b>									
15	Steel structure designed by Sanebras. Epoxy paint and finish in polyurethane	vb	1,00	R\$ 13.800	R\$ 37.500	R\$ 11.500	R\$ 62.800	R\$ 62.800	R\$ 62.800
<b>Roof</b>									
16	Roof and lateral cover 1 meter deep in galvanised trapezoidal steel sheet	m2	624,00	R\$ 5	R\$ 26	-	R\$ 31	R\$ 19.344	
17	Steel ridgevent	m	28,20	R\$ 5	R\$ 35	-	R\$ 40	R\$ 1.128	R\$ 20.472
									<b>Sub Total</b>
									<b>VAT ( 20% ) :</b>
									<b>Total</b>
									<b>R\$ 165.956</b>



## Appendix B: Contract of Services Rendered for Construction of Covered Sport Court

No. \_\_\_\_\_ / 2006

### **CONTRACTOR: Community Rural house of Caminho**

ADDRESS: Estrada Rio de Areia no. 28 Xerém / Duque de Caxias / RJ-CEP:25070-235

CNPJ No: 28.459.667/0001-76

MUNICIPAL INSCRIPTION No:

TELEPHONE: +55 21 3777 3989

FAX:

E-mail: casadocaminho@gmail.com

### **CONTRACTED: SANEBRAS ENGENHARIA LTDA**

ADDRESS: Rua Paraopeba no201 Jd.Gramacho/Duque de Caxias/RJ-CEP:25051-290

CNPJ No: 48.174.973/0001-73

MUNICIPAL INSCRIPTION No: 80.236.360

TELEPHONE: +55 21 2671 5354

FAX: +55 21 2671 5976

E-mail: sanebras@sanebraseng.com.br

By the present particular instrument, the above designated have among themselves, correct and agreed, the present Contract, ruled by the following clauses and conditions:

### **FIRST CLAUSE: WORK**

Construction of Covered Sports Court.

### **SECOND CLAUSE: OBJECT**

The present Contract presents the services offered for the Construction of the Sports Court in Metallic Structure with external dimensions of 17 m x 27 m.as project of the CONTRACTED, in Xerém/Duque de Caxias/RJ.

### **THIRD CLAUSE: PRICE**

The CONTRACTOR will pay the value of R\$ 165,956,74 (one hundred and sixty five thousand, nine hundred and fifty six reais and seventy four cents) to the CONTRACTED for the execution of the services.

FIRST PARAGRAPH: In the prices are included all the inherent services to the object of the present Contract, as well as the expenses with social and labour charges, beneficial profits direct and indirect, taxes, welfare, fiscal and civil obligations, surcharges, tributes as necessary or obligatory insurances which vouch for you or third parties. Thus, all the responsibilities, obligations and administrative requirements, technical and financial of the present Contract, according to the norms and laws in vigour in the country, will be the responsibility of the CONTRACTED, in the way of being executed totally all the service contracted at present.

#### **FOURTH CLAUSE: CONDITIONS OF PAYMENT**

- 4.1 The measurements will be fortnightly, according to the evolution of the services, in the days 15 and 30 (31), with the term of payment of 15 (fifteen) days.
- 4.2 The payments will be realized in instalments, deposited in a current account or in cash.

#### **FIFTH CLAUSE: OBLIGATIONS OF THE CONTRACTOR**

- 5.1 Issue in the established conditions measurement reports authorizing the invoices of the CONTRACTED.
- 5.2 Provide place for the personnel to change clothes and take shower.
- 5.3 Provide place for safe keeping of materials, tools and equipments.

#### **SIXTH CLAUSE: OBLIGATIONS OF THE CONTRACTED**

- 6.1 Provide common and specialized labour for execution of the services and to operate the equipments.
- 6.2 Honour all pertinent determinations to the organization and the work given by the CONTRACTOR.
- 6.3 To Provide the payment of all surcharges, social duties and taxes. Exempting the CONTRACTOR of any responsibilities.
- 6.4 Obey to the integral timetable of work determined by the CONTRACTOR.
- 6.5 Provide transport and meals for its personnel.
- 6.6 Provide materials and protective equipments, for the safety of its personnel. Supervise and ensure the safety of its employees against any type of work accident, being obliged to comply with the safety norms recommended by the Ministry of Work, and respond to any indemnified action in case of death, total or partial incapacity and physical injury that occurred from any accidents.
- 6.7 Provide and transport necessary equipments, tools and materials necessary for the services.
- 6.8 Remove from the work, any of its employees, by means of simple solicitation made in that way by the CONTRACTOR, run by the CONTRACTED itself, all and any onus or duty due to such measure.
- 6.9 Guard of its belongings, no responsibility will be imputed to the CONTRACTOR, for eventual losses or damages of its equipments, tools, materials, etc.

6.10 It is impeded to the CONTRACTED to divulge to third parties data or information that are going to have access to the works and services here executed.

6.11 The CONTRACTED assumes full responsibility for the perfect realization of the services under its responsibility.

## **SEVENTH CLAUSE: GENERAL CONDITIONS**

7.1 The materials being utilized in the work can be provided directly by the CONTRACTOR and discounted from the final bill, by the face value of the respective fiscal notes.

7.2 At the end of the services, it will be issued by the CONTRACTOR the Measurement Report that liberates the last invoice to the CONTRACTED.

7.3 The receiving of the final bill implies ending and closing of the Contract, attesting automatically to the CONTRACTED, that nothing more has to be received and/or claimed from the CONTRACTOR, giving the most full, general, plain and irrevocable quittance and preserving the CONTRACTOR of any debts, reclamations and/or claims, inclusively in the future, relative to the present Contract, extending this obligations to the CLIENT.

7.4 Any concession of both parts, does not imply renewal of the present Contract.

7.5 In the case of rescission of the Contract, the CONTRACTOR is obliged to pay the CONTRACTED, for the services rendered till the moment of its withdrawal.

7.6 Charges for delay on payment: a fine of 2% (two per cent), besides interest and monetary correction of 4% (four per cent) per month pro rata by day of delay.

## **EIGHTH CLAUSE: RESCISSION AND TERMINATION**

The present Contract will be automatically rescinded or terminated, independently of any judicial or extrajudicial notification on the following hypotheses:

8.1 In the case of bankruptcy or insolvency of any of the parts.

8.2 If the CONTRACTED does not give compatible proceeding to the execution of the services.

8.3 If the CONTRACTED disobeys repeatedly the CONTRACTOR'S instructions or orders.

8.4 In the case of repeated delays of payment.

8.5 The CONTRACTED can at any moment rescind the present Contract, guaranteeing the payment of the services already realised.

## **NINTH CLAUSE: VALUE OF THE CONTRACT**

For fiscal effects, it is given to the present Contract the value of R\$ 150.836,74 (one hundred and fifty thousand, eight hundred and thirty six reais and seventy four cents).



**TENTH CLAUSE: FORUM**

It is elected the Forum of the City of Rio de Janeiro, State of Rio de Janeiro, to resolve any doubts belonging to the present Contract with express renunciation of any other, for more privileged than they have.

The loser must carry all judicial and extrajudicial expenses, lawyer's fees and contractual costs.

And because they are like this, together and combined, the parties sign the present contract in 02 (two) ways of equal content and form, in the present of the witnesses signed below.

Duque de Caxias, \_\_\_\_\_

\_\_\_\_\_  
COMUNIDADE RURAL CASA DO CAMINHO  
Ademir Botelho da Silva  
CPF:

\_\_\_\_\_  
SANEBRAS ENGENHARIA LTDA  
Ricardo de Araujo Farah  
CPF: 065.720.738 - 15

WITNESSES:

\_\_\_\_\_  
Name:  
CPF:

\_\_\_\_\_  
Name:  
CPF:



## Appendix C: Specifications

DT N° 119/2005  
Duque de Caxias/ Rio de Janeiro, 30 June, 2005

For:  
Orphanage CASA DO CAMINHO  
Rua Rio da Areia nº 28, Xerem  
DUQUE DE CAXIAS – RJ.

Contractor: Mr. Tom Schrurs

E.Mail: casadocaminho@gmail.com

REF: Sport and Community Centre

Dear Mr/Mrs,

Hereby we would like to present to you our revised construction proposal for the execution of a sport accomdation for the orphange mentioned above.

We underline our great interest in our colaboration with you in this effort as well as to dispose our expertise and experiance to you, to ensure the predifined quality.

We are to your disposal for any other necessary clarifications.

Yours truly,

SANEBRÁS ENGENHARIA LTDA.

ENGº MARCOS RODRIGO P. DE MAGALHÃES

***Construction Director***

## **A – TARGET**

The following commercial proposal is for the prices and conditions for a sport centre, covered by a metallic structure:

External dimensions: 17,00 x 27,00 meters

## **B – PETITION**

### **B.1 – Work Description**

• The construction specification by Sanebrás Engineering for Sport and Community facilities can be divided in the following characteristics:

- a) Reinforced concrete foundation.
- b) Reinforced concrete floor.
- c) Metal Structure.
- d) Roof and lateral cover of Metal roofing tiles.

- The metal structure will be made of USI-SAC 300 laminated profiles and trapezoidal steel sheets, which are highly atmospheric corrosion resistance. Usual dimensions will be used and will be accurately specified when contract is signed.
- The proposed construction of flat foundations with steel reinforced concrete has to be reviewed after the soundings tests of the land. In case of adjustment another type of foundations is required, the considered prices will have to be reviewed.
- The necessary joints for the construction both assembled and welded will be done in the fabric or at the construction site by qualified workman.
- The complete process will be executed following the national construction norms both in manufacturing and on the construction site.
- The foundations are reinforced concrete pad foundations, which are placed after inspecting the soil. When the latter has to be reconsidered the prices and construction proposal will need to be reviewed.
- The concrete slab will need to be poured on the steel frame in the right proportions to prevent cracking. The finishing layer needs to be power floated till the desired roughness is achieved.
- The roof and 1,0m high lateral covering will be executed in galvanized trapezoidal steel sheets. Water drainage including gutters and pipes of pluvial water descending are not part of this project.

## **B.2 - Component Elements**

- The construction activities will be executed by qualified staff, who are certified to work with high quality material offered in the market and execute the work following the specified measures.
- The metal structure will be supplied as pre-assembled parts, marked and organized in order to ensure the more appropriate unloading and course of services.

## **C - PRELIMINARIES**

C.1 – To start the activities, we will request you, the sign the "CONTRACT" and the relative "agreement" to deliver the defined project.

C.2 - Any alterations that are made after the beginning of the activities, will cause the revision of stated time schedule and cost plan.

## **D – PRIMARY SUBSTANCES**

The substances will be of first quality, which quality origins from the national traditional manufacturers. For the metal structure, the foreseen materials are in accordance with the following specifications:

D.1 - folded plates Profiles of USI SAC 300.

D.2 - Electrodes AWS-A 5.1, 5.5 and 5.17.

D.3 – Paints and Solvent in conformity with this proposal.

## **E - SURFACE TREATMENT**

The structures will receive the following surface treatment:

E.1 - Preliminary cleaning of all parts in order to eliminate barbs, welding slug and oily surface.

E.2 –A 25 to 30 microns thick dry film primer coating layer of PRIMER EPÓXI.

E.3 - E.4 – A 25 to 30 micro thick finishing layer of two Polyurethane coats of paint in the colour of choice of the customer.

## **F - ASSEMBLY**

F.1 - The assembly of the structures is done by staff with appropriate equipment and tools, in order to guarantee its perfect execution. This in accordance with previous projects, executed with proper techniques, norms and effective instructions.

F.2 –

It is the contractor's responsibility to support the contracted with a reserved place containing a bathroom and a storage place for our materials, tools and equipment and monitor these when the contracted left the building site. We further need a 100 Ampere three-phase energy connection at the building site.

## **G - REGISTER**

Sanebrás is responsible to build according to the competent Notation of Responsible Techniques (ART). They are further hold responsible to work by CREA standards. It contains guidelines for notations of the contracted services including management of expenditures and the deeds of the responsible technicians at the building site.

## **H - PERIOD of EXECUTION**

H.1 - 60 (sixty) working days.

## **I - TERMS OF PAYMENT**

payment is in 3 (three) parcels, namely:

I.1 - The first one, equivalent of 30% (thirty percent) of the total value in capacity of the act of the signature of contract.

I.2 - second, equivalent of 50% (fifty percent) of the total value, at the stated period of 30 (thirty) days after the beginning of the services.

I.3 - third, equivalent of 20% (twenty percent) of the total value, at the ending of services.

## **J - PRICE**

The prices for the execution of services in accordance with the cost plan and prices provided in annex, are:

R\$ 165,956,74 (one hundred and sixty five thousand, nine hundred and fifty six reais and seventy four cents)

## **K - VALIDITY of the PROPOSAL**

The proposal has a validity of 15 (fifteen) days.

## **L - READJUSTMENTS**

In case readjustments occur during execution (following the predefined agreements) and/or in the materials, the price offered in this proposal could be revised.

In agreement in \_\_\_\_/\_\_\_\_/\_\_\_\_

\_\_\_\_\_  
ORPHANAGE Casa do Caminho



## Appendix C: Construction Schedule

