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# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

**Date 31.07.2020**

**Reference N. 109001759-003-0000-E-1501**


PARACEL

**Pulp Mill, River Port, Transmission Line and Electrical Substation in Concepción – Paraguay**

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Distribution
PARACEL E
PÖYRY -

| Orig. | 15/07/20 – bvv | 15/07/20 – msh | 15/07/20 – hfw | 15/07/20 – hfw | For information |
|---|---|---|---|---|---|
| Rev. | Date/Author | Date/Verified | Date/Aproved | Date/Authorized | Observacion |
| a | 31/05/21 – bvv | 31/05/21 – cco | 31/05/21 – hfw | 31/05/21 – hfw | For information |
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# 1 INTRODUCTION

This document is an Environmental and Social Impact Assessment (ESIA) of the PARACEL pulp mill implementation, with a capacity of 1,5 million tons per year of bleached pulp, to be located in Concepción, Department of Concepción, Paraguay. This ESIA also considers the implementation of the river port, transmission line and electrical substation.

PARACEL was established by the independent entrepreneurs Copetrol (Paraguay) and Girindus Investments (Sweden).

Considering the global and regional trends of increasing value of products made from pulp, Copetrol Group, which is a leader in Paraguay in the import and commercial distribution of fuels, began the acquisition of land for afforestation and reforestation.

Girindus Investments is a group of entrepreneurs based in Sweden, with long experience in investments and development of pulp mill projects, such as dissolving pulp mills and sustainable forestry projects.

Together, these companies combined their expertise and founded PARACEL, to build a high-tech pulp mill, meeting most rigorous national and international socio-environmental and sustainability standards, as well as employing efficient logistics modes for the global market.

For the production of bleached pulp, PARACEL's mill will use *kraft* process - a technology widely known by pulp producers, as well as by engineering, equipment and consulting service providers, with additional advantages to obtain high brightness patterns and fiber quality perfection required by market, associated with energy self-sufficiency capacity and environmental benefits when compared to any production processes.

The process chosen to bleach the pulp was the ECF (*Elemental Chlorine Free*), which does not use elemental chlorine in its process stages, avoiding significant emissions of organochlorines to the effluent.

The pulp mill will also be a source of clean energy, by using forest biomass and wood liquor, which are renewable natural resources. For information, it will be co-generated 220 MW in case of bleached pulp, and considering the plant will consume about 120 MW and there will be a surplus of 100 MW for sale.

It should be noted that PARACEL pulp mill, despite being designed to produce 1,500,000 t/year, it will be capable in the future, to produce up to 1,800,000 t/year of bleached pulp as a result of greater overall plant efficiency, as well as higher equipment performance without the need to increase its constructed area or include new additional equipment. In addition, no modifications will be required to the main environmental control equipment, nor will there be any loss in performance, which can guarantee the same liquid effluent and atmospheric emissions considered in this Environmental Impact Study. Therefore, it can be said that in the event of an increase in pulp production to 1,800,000 t/year, there will be no changes in the environmental impacts identified and evaluated in this ESIA.

The ESIA has the following objectives:

a) Provide orientation to environmental licensing process before the Ministry of the Environment and Sustainable Development in Paraguay (MADES);

b) Provide technical guidance and subsidies to MADES in the industrial process of PARACEL;

c) To comply with Paraguay's Environmental Law;

d) Provide information to communities of the PARACEL neighborhood, in order to fully understand its impacts.

e) To meet international requirements (i.e., IFC Performance Standards 2012 - applicable EHS guidelines, and BAT – Best Available Techniques.

It is important to mention that the ESIA was submitted to MADES to get the government permit, and PARACEL has already received the Paraguayan authorizations to install a pulp mill, a river port, a transmission line and a substation according to **ANNEX I**.

The development and content of this ESIA is in accordance with the Constitution of the Republic of Paraguay (1992), articles 4$^{th}$ to 8$^{th}$, which determine the right to protection of human life and the to a healthy environment.

In addition to the constitutional determination, the guidelines established by Law 294/1993 and Decree 453/2013, which establish and regulate the process of environmental impact study, were also complied with, in addition to the analysis of other laws, decrees, resolutions, regulations and guidelines of the Ministry of the Environment and Sustainable Development - MADES.

It should be highlighted that the ESIA is in accordance with the Performance Standards (PS) of the IFC:

- IFC PS 1 on "Evaluation and management of environmental and social risks and impacts";
- IFC PS 2 on “Labor and working conditions”;
- IFC PS 3 on “Resource Efficiency and Pollution Prevention";
- IFC PS 4 on “Community Health and Safety”;
- IFC PS 5 on “Land Acquisition and Involuntary Resettlement”;
- IFC PS 6 on “Biodiversity Conservation and Sustainable Management of Living Natural resources”;
- IFC PS 7 regarding the Indigenous People;
- IFC PS 8 on Cultural Heritage.

The main objective of this ESIA is to declare the environmental viability of the PARACEL pulp mill, through the characterization of the project, the knowledge and analysis of the current situation of the areas that will suffer modifications due to its implementation and operation - the designated areas of influence, for the subsequent comparative study between the current situation and the future situation.

This analysis is carried out by identifying and evaluating the possible environmental impacts resulting from civil construction and the operation of PARACEL. This study considers the proposal of actions to mitigate impacts, in order to minimize and/or eliminate negative changes, and increase the benefits provided by the implementation of PARACEL pulp mill.

The structure of the ESIA is as follows:

- Volume I – Project Characterization
- Volume II – Baseline Conditions
  - Part I – Physic Environment
  - Part II – Biotic Environment
  - Part III – Socioeconomic Environment
- Volume III – Identification and Impact Study
- Volume IV – Complementary Studies

# 2 GENERAL INFORMATION

## 2.1 ESIA Object

The purpose is the implementation of a pulp mill, with a capacity of 1,500,000 t/year of bleached pulp, located in the municipality of Concepción, in the Department of Concepción. PARACEL pulp mill will also be a source of clean energy, by using forest biomass and wood liquor, which are renewable natural resources. It will be co-generated 220 MW, will consume about 120 MW and there will be a surplus of 100 MW for sale.

The production process of PARACEL pulp mill will consist of the following areas: Wood Yard; Cooking; Fiber Line; Drying; Evaporation; Recovery Boiler; Causticizing; Lime Kiln; Compressed Air; Turbogenerators; Biomass Boiler; Water Treatment Plant (WTP); Effluent Treatment Plant (ETP); Chlorine Dioxide Plant; and Oxygen Plant. In addition, the plant will require support infrastructure, consisting of road access, a river port, a system for raw water intake, an emissary pipeline for treated effluent disposal into the Paraguay River, and solid industrial waste treatment and disposal systems.

This ESIA also considers the implementation of the river port, transmission line and electrical substation.

## 2.2 Project Information

The main activity of the mill is the pulp production of PARACEL, which is expected to produce 1,500,000 tons per year of bleached pulp.

This mill will use eucalyptus hardwood as its basic raw material, in addition to various chemical inputs.

This mill will use the best available techniques (BAT), as well as the best practices of environmental management (BPEM).

It should be noted that, in connection with the environmental control systems, this mill will be able to treat environmental emissions (liquid effluent, air emission, solid waste) from a production of up to 1,800,000 tons per year of bleached pulp for paper.

The operation of the pulp mill will require the implementation of internal and external support infrastructure including access, river port, reception of raw materials, supplies, raw water intake, water treatment plant, effluent treatment plant and its correct disposal and solid industrial waste treatment and disposal systems.

## 2.3 Entrepreneur Identification

| | |
|---|---|
| Company name | PARACEL S.A. |
| Company registry data | 80106417-1 |
| Address | Facundo Machaín 6426 - Villa Aurelia – Asunción - Distrito Capital |
| ZIP CODE | 001419 |
| Contact person | Eng. Cyro Croce Launy |
| Telephone | +595 2153 7445 ext. 550 |
| Responsible of ESIA | Nicolas Antonio Godoy Rivarola |
| Legal Representative | Nils Grafstrom |

## 2.4 Identification of Responsible Company by the ESIA

| | |
|---|---|
| Company name | PÖYRY Tecnologia Ltda. |
| CNPJ (registry number) | 50.648.468/0001-65 |
| Address | Av. Alfredo Egídio de Souza Aranha, 100 – Bloco B – 5º Andar – Chácara Santo Antônio – São Paulo – SP |
| ZIP CODE | 04726-170 |
| Telephone | (+55 11) 3472-6955 |
| Legal Representative | Fábio Belotti da Fonseca<br>fabio.fonseca@poyry.com.br<br>(+55 11) 3472-6955 |
| Contact person or Technical Representative | Romualdo Hirata<br>romualdo.hirata@poyry.com.br<br>(+55 11) 3472-6955 |

## 2.5 Technical Personnel

The technical team prepared this study to request an Environmental Impact Statement (DIA, in Spanish) and provide the necessary information to evaluate the environmental study process and define the conditions necessary for PARACEL to implement and operate in accordance with the premises of sustainability.

**Pöyry Tecnologia Staff – ESIA**

- Chemical Engineer Romualdo Hirata
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- Chemical Engineer Celso Tomio Tsutsumi
  Technical Coordinator / Characterization / Preliminary Risk Analysis Study
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- Environment Engineer MSc. Rafael Lourenço Thomaz
  Complementary environmental studies
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- Chemical Engineer Cristina Maria Colella
  Environmental Diagnosis / Basic Programs of Environmental and Social Management System (SGAS) / Impact Study
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  CREA 5062655712 SP
- Isabela Alvarenga de Mattos Landim
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**Biotic Environment Team**

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- Patrick Inácio Pina – Fauna Specialist
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- Renato Augusto Martins – Fauna Specialist
  CRBio 82.226/01-D
- Thais Buzetti Barbosa – Ichthyofauna Specialist
  CRBio 109.228/01-D
- Gilce França Silva – Flora Specialist
  CRBio 054.274/01-D
- Daniela Chaves Guedes e Silva – Flora Specialist
  CRBio 039.796/01-D
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- Technician Josefa Oliveira dos Santos
  CRQ:04265303
- Maria Margarida Granate Sá e Mello Marques – Benthic Invertebrates
  CRBio: 30691/01-D
- Edson Wilmsen Ferreira – Planktonic and Benthic Communities
  CRQ: 04266157
- Aryadne Simões Rocha - Planktonic and Benthic Communities
  CRBio: 64313/01-D
- Bianca Reis Castaldi Tocci – Phytoplankton
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**Socioeconomic Environment Team**

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- Maria Mantinian – Communication Specialist
  Title Number 24477
- Fátima Enciso – Social Work Specialist
  Title Number B6519D
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- Frederic Gerard – Market Specialist
  Title Number B6519D
- Technician Ana Laura Segovia
- Technician Yrene Díaz Domínguez

- Technician Oscar Maidana Delvalle
- Technician María Elena Díaz Domínguez
- Local Consultant Fabiola Melgarejo
- Archeologist Manuel Bragayrac
- Victor Duarte López – GIS Specialist (Cartography)

**Impact Assessment**

- Chemical Engineer Cristina Maria Colella
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**Complementary Studies**

**Preliminary Risk Analysis Study**

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**Atmospheric Dispersion Study**

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**Water Dispersion Study**

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  CREA 5062655712 SP

**Self Depuration Study**

- Engineer Hélio Correia da Silva Jhunior

**Environment Reports**

**Noise Reports / Surface Water Report**

- Geologist Domingos Fernandes Pimenta Neto
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**Groundwater Report**

TECNOAMBIENTAL Team

**Air Quality Report**

- Engineer Leonardo de Salles
  CREA/MG 093653D

## 2.6 Technical Responsibility Record

The Technical Responsibility Record of all key members of the technical team responsible for preparing the ESIA is presented in **ANNEX II**.

## 2.7 Compliance with International Standards

This ESIA has been carried out by an experienced and internationally recognized consulting company, in accordance with the requirements determined by the law for the purpose of requesting the environmental impact study from the Ministry of the Environment and Sustainable Development (MADES). It is important to note that this ESIA, and in particular the management plans and programs that constitute it (Volume VI), also follow the guidelines stated for this matter in the 8 Performance Standards (PS) of the International Finance Corporation (IFC).

In accordance with the Performance Standard 1 (PS1), the ESIA presents a comprehensive evaluation that allowed the identification of the most relevant environmental and social impacts, risks and opportunities of the project, to analyze their significance, to define the measures of prevention, mitigation and compensation, or of enhancement when it is the case, and to establish the plans and programs to ensure their efficient implementation; among them, the Program of Prevention and Management of Contingencies. In the process, specific information has been generated for this project by surveying the physical and biotic environmental condition, and integrating the opinion of the communities in its area of influence through direct consultation with more than 300 people in the local communities, as well as other stakeholders.

All this work was carried out within the framework of the Environmental and Social Management System (SGAS in Spanish) being implemented by PARACEL, guided by its Environmental and Social Sustainability Policy, which guiding principles are below:

1. Full compliance with national legal frameworks and the international standards to which they adhere.
2. A proactive commitment to caring for the environment in its triple dimension - physical, biotic and anthropic - within the framework of sustainable development.
3. The adoption of the best industrial and forestry practices, the incorporation of the best available techniques and the practice of continuous improvement.
4. The preventive and permanent management of environmental and social impacts.
5. Monitoring the health and safety of its workers, equal opportunities and the promotion of non-discrimination by gender, religion, ethnicity, race, sexual orientation, social status or any other factor, within the framework of full respect for human rights.
6. The establishment of long-term relationships with local communities, social actors and other interest groups, characterized by seriousness, transparency and respect

The SGAS also provides the criteria for work and working conditions, all aligned with the PS2, through PARACEL's Human Talent Policy, with its guiding principles:

- To fully comply with national law and the international standards to which it adheres.
- Respect internationally recognized human rights.
- Ensure a work environment free of discrimination on the basis of race, religion, age, nationality, ethnic or social origin, sexual orientation, gender, marital status, pregnancy, disability or political affiliation.
- To encourage the hiring of people from the community in which we operate.
- To provide a safe and healthy working environment (both physically and psychologically). Complying with the legal requirements regarding occupational health and risk prevention.
- Avoiding abusive practices, such as: harassment; sexual harassment of any kind, harassment based on race, religion, age, nationality, ethnic or social origin, sexual orientation, gender, political affiliation or disability.
- Adopt adequate measures for the prevention, mitigation and, where appropriate, remediation of adverse impacts on human rights.
- Provide access to complaints mechanisms and act proactively to provide solutions to complaints.
- Reject the use of forced and child labor.
- Remunerate workers in a dignified manner, consistent with their responsibilities, skills and knowledge and in accordance with national laws.
- Guarantee the right to rest and, as far as possible, establish measures aimed at flexible working hours.
- Respect the right to freedom of association and collective bargaining.
- Establish the means to not negatively impact the traditional ways of life and work of indigenous communities in accordance with the provisions of the International Labor Organization (ILO) Convention 169 on Indigenous and Tribal Peoples.
- Eliminate stereotypes and prejudices, and establish practices of equality and equity in all processes of human talent.
- Contribute to the recruitment of vulnerable groups such as: people with disabilities, older adults, women, immigrants, people from indigenous communities, people with low academic education, among others.

The design of the pulp mill presented in Volume I of the ESIA follows the guidelines of the European Union reference document on Best Available Techniques (BAT) for the pulp industry (BREF 2010/75/EU - 2015), as well as those established by the World Bank's Environmental, Health and Safety Guidelines for the pulp and paper industry (EHS Guidelines - Pulp and Paper Mills - 2007). Consequently, the project incorporates the best technology and advanced management criteria with the objective of minimizing the consumption of water, fossil fuels and other chemical inputs, as well as minimizing the generation of waste, the emission of polluting gases and the discharge of effluents, in full compliance with the PS3. The production also plans to be supplied exclusively with wood from certified forests. As is usual in modern forestry projects on pulp-

production, carbon dioxide capture exceeds emission, thus showing a positive balance in terms of greenhouse gases (GHG) emissions.

The ESIA evaluates the impacts on the communities in the project's area of influence, based on a comprehensive diagnosis of the current social condition, identifies the necessary prevention, mitigation and compensation (or enhancement) measures, and proposes a comprehensive set of programs brought together in the Social Management Plan (SMP), including the Complaints, Claims and Concerns Management Program, in line with the PS4. Note that another of these programs refers to the protection and enhancement of cultural heritage, in accordance with the requirements of the PS8.

In response to the PS5, it should be noted that the PARACEL project, both in its industrial component and in its forestry component, does not occupy lands with population settlements, and does not require the physical or economic displacement of any person, family, group or community. It is developed on territory that has already been largely anthropized with cattle farming and its production, and does not occupy natural or protected areas, biosphere reserves, Ramsar areas, fragile ecosystems or any other area that is sensitive from a biotic point of view. Notwithstanding this, it proposes measures for the conservation and protection of existing native areas on its forest properties, and revegetation and management programs in already degraded areas, as a measure to compensate for diffuse impacts, all consistent with PS6.

Parallel to the preparation of the ESIA, PARACEL also initiated the process of *"Consultation and Free, Prior and Informed Consent"* with the indigenous peoples present in the area of influence, in compliance with Decree 1039/18, in line with ILO Convention 169, and in accordance with the provisions of the PS7.

# 3 KNOWING THE COMPANY

PARACEL is a Paraguayan project that arises from the innovative vision of the Zapag family. This vision, together with the experience of the Swedish group Girindus Investments, achieves the endorsement of other Paraguayan and foreign investors to carry out the largest productive industrial undertaking and the largest private investment in the history of Paraguay.

The impulse and strength of this combination of enthusiasm, experience and capital in PARACEL, allows nowadays to consolidate the project of installing, supplying and operating a world class pulp mill, under the highest standards of environmental and social sustainability, and with the capacity to satisfy the most demanding international markets.

# 4 PROJECT JUSTIFICATION

## 4.1 Technical and Environmental Justification

PARACEL pulp mill in Concepción will adopt *Kraft*[1] process, which is widely used to obtain bleached pulp all over the world. This technology is totally dominated not only by the pulp producing industries, but also by engineering, equipment and consulting companies. It also has additional advantages, such as the ability to obtain high standards

[1] *Kraft* pulp: Pulp produced by sulphate process

of whiteness and fiber quality required by the global pulp market, along with the ability to be energy self-sufficient.

As far as the environmental issue is concerned, the *kraft* process of pulp production, compared to others, such as the sulphite process, has a great advantage, since it allows the recovery of the chemicals used in the cooking of wood, through evaporation and the burning of liquor. In addition, cooking in the recovery boiler reduces the organic load for the treatment of liquid effluent.

The bleaching process adopted was the ECF (Elemental Chlorine Free), which does not use elemental chlorine in its internal stages, a fact that significantly reduces the emission of organochlorine compounds into the effluent.

In addition, in accordance with the most advanced standards in industries of this type, high technology equipment has been incorporated into the manufacturing process, the aim of which is to optimize the production process and reduce emissions into the environment (liquid, atmospheric and solid emissions), such as:

- Adoption of dry eucalyptus bark separation, instead of wet as is currently done, to reduce the contaminating load of the liquid effluent from this operation;
- Adoption of a continuous digestor for cooking (instead of batch digesters), which reduces the generation of condensable gases, organic load in the effluent, and emission of sulfur into the atmosphere;
- Use of a closed circuit purification that mitigate the generation of pollutant liquid load;
- Installation of a delignification unit (first bleaching phase) which will consist of using oxygen to separate the lignin from the fiber, with the aim of substantially reducing the organic load and color generated in the effluent;
- Purification of the contaminated condensate through the installation of a gas/liquid separation column, recovering the condensate and thus reducing the contaminating load of the liquid effluent;
- Installation of waste recovery and control systems in the production process;
- System for collecting and burning concentrated and diluted non-condensable gases;
- Installation of equipment to control atmospheric emissions, such as electrostatic precipitators and scrubbers to eliminate or minimize emissions;
- Installation of a highly efficient liquid effluent treatment and control system, such as activated sludge;
- Installation of a system for treated effluent disposal in the Paraguay River through land and underwater emissaries equipped with bottom diffusers that will ensure adequate dispersion of the treated effluent at the point of discharge;
- Installation of a system for the treatment and final disposal of solid industrial waste through composting and the dumping of industrial waste;
- Generation of clean and renewable electrical energy available to the network.

In addition, PARACEL became heavily involved with the adoption of Best Available Techniques (BAT) in order to reduce, control and monitor air emissions, liquid effluents and solid waste generated.

The chosen site presents a series of environmental factors, which combined favors its choice in comparison with the others. The selected site has the following characteristics that justify its choice:

- Water availability in the region (Paraguay River) for water supply;
- It has good conditions of dispersion in terms of minimum flow for the disposal of treated effluent from a pulp mill;
- Conditions for atmospheric dispersion are favorable.

**Dioxins and Furans**

The concern about the emission of dioxins and furans in liquid effluent from pulp mills arises from the use of elemental chlorine ($Cl_2$) in the bleaching process, which was widely used in the past. The following is a brief history of the evolution of the bleaching process.

The purpose of bleaching is to improve the quality of the pulp in relation to both the whiteness and the physical-mechanical strength of the fibers, in addition to reducing the discharge of liquid effluent and reducing capital investment and operating costs.

Historically, the bleaching process has been evolving from a single-stage treatment with hypochlorite ($ClO^-$), to multi-stage sequences, using mainly elemental chlorine ($Cl_2$), chlorine dioxide ($ClO_2$), oxygen ($O_2$), ozone ($O_3$) and hydrogen peroxide ($H_2O_2$) as oxidizing agents, and caustic soda (NaOH).

Chlorine, which is a relatively cheap and highly effective chemical for delignification, was widely used from about 1900 to the 1990s. Chlorine dioxide gradually came into use from the 1960s since it was observed that its use improved both the whiteness and the mechanical strength of the fibers. From the 1970s, the use of chlorine dioxide became more extensive.

Since the 1990s, the use of elemental chlorine ($Cl_2$) in bleaching started to decrease rapidly after it was discovered in 1985 that chlorine ($Cl_2$) reactions with lignin resulted in the generation of organochlorine compounds. The main concern in the use of chlorine was with respect to persistent (resistant to natural degradation) components such as dioxins and furans.

According to the Stockholm Conference, which is considered the main global reference for studies on persistent organic pollutants (POPs), which include organochlorine compounds, only polychlorinated dibenzo-p-dioxins (TCDD) and polychlorinated dibenzofurans (TCDF) have been identified as generated in the pulp process using chlorine ($Cl_2$). Of the 17 compounds of TCDD and TCDF congeners, only two congeners 2,3,7,8 TCDD and 2,3,7,8 TCDF were identified as potentially originating from the pulp production with elemental chlorine ($Cl_2$). Also according to Conference data, minimization of these congeners can be achieved by reducing the use of elemental chlorine ($Cl_2$), and increasing the use of chlorine dioxide ($ClO_2$).

Molecular chlorine reacts very quick with lignin, but only very slow with the precursors of dioxins and furans. If the amount of chlorine added to the pulp is limited so that only enough chlorine is available to participate in the initial chlorine-lignin reactions, there

will not be enough chlorine available to react with the dioxin and furan precursors and therefore no dioxins and furans will be formed. Researchers have found, for example, that reducing multiple active chlorine below 0.17 minimizes the formation of TCDDs and TCDFs (Barry et al. 1989 apud Tana, 2006).

On the other hand, chlorine dioxide does not react with dioxin and furan precursors to form chlorinated dioxins and furans under normal operating conditions in bleaching plants (Barry et al. 1989 apud Tana, 2006). Therefore, by replacing all elemental chlorine to chlorine dioxide, i.e., the bleaching process known as ECF (Elemental Chlorine Free), the formation of dioxins and furans is avoided. This has been well documented in bleached kraft mills in North America, Scandinavia and also in Australia.

It is important to point out that, in addition to the substitution of elemental Chlorine, the reduction of chlorinated organic substances in pulp mill effluent was achieved due to several measures in the process, such as: oxygen delignification before the bleaching stage, acid stage in the bleaching sequence, spill collection systems, efficient washing and condensate reuse.

It should be noted that all these measures have been incorporated into the PARACEL project. In the case of oxygen delignification, this stage is essential for the implementation of the ECF process, reducing the number of Kappa (an indicator of residual lignin content), with the consequent reduction of loads in the liquid effluents, the reduction of organochlorine loads, and the reduction of stages and chemical consumption in the bleaching.

The bleaching process adopted in the PARACEL project is the ECF (Elemental Chlorine Free), and the bleaching plant will consist of four stages: A/D-Eop-D-P (high temperature chlorine dioxide, alkaline extraction, chlorine dioxide and peroxide). This bleaching sequence, in addition to meet the final product specification (bleached pulp), reduces the production of organochlorine compounds (dioxins and furans) below the detection limits, with emphasis on the first stage (A/D) which has an important role in substantially reducing chlorine dioxide consumption.

According to the 2001 UNEP (United Nations Environment Programme) report, the replacement of elemental chlorine ($Cl_2$) to chlorine dioxide ($ClO_2$) in pulp bleaching (ECF process) drastically reduces the formation of 2,3,7,8-TCDD and 2,3,7,8-TCDF, with concentrations in liquid effluent below the detection limits, which is 10 pg/L. In addition, data published by NCASI (1998) in the United States, which were obtained from 20 bleaching plants in 14 kraft pulp mills using the ECF process, showed that: of a total of 119 data for 2,3,7,8-TCDD/TCDF, no sample showed the presence of 2,3,7,8-TCDD, i.e. all were below the detection limit except 2, which showed a level of 2,3,7,8-TCDD/TCDF of 11 and 18 pg/L. Therefore, in the last 20 years with the evolution of the pulp production process and mainly the bleaching process, these levels are expected to be much lower.

It is worth mentioning that in Brazil there are no pulp mills that have plans to monitor dioxins and furans in treated liquid effluent, as well as in the surface waters that receive their effluent. Furthermore, in the lasts process licensing of pulp mills in Brazil, no environmental agency required to monitor these parameters.

With respect to dioxins and furans potentially present in air emissions from pulp mills, data collected from Environment Canada (Uloth and van Heek 2002) indicate that emissions from recovery boilers were about 0.028 pg I-TEQ/$Nm^3$, on a dry basis, which is 1,000 times less than the recommended legal standards for a pulp mill in Tasmania.

It should be mentioned that in Brazil there are no pulp mills that have plans to monitor dioxins and furans in atmospheric emissions (chimney), as well as in the air quality of the neighborhood. Furthermore, in the lasts process licensing for pulp mills in Brazil, no environmental agency required the monitoring of these parameters.

Therefore, it can be stated that during the operation of PARACEL's pulp mill, the concentrations of organochlorines (dioxins and furans) in the liquid effluent and in atmospheric emissions will be below detection limits, and there is no technical or environmental justification for monitoring these parameters, both for liquid effluent and for atmospheric emission.

**Mercury**

Mercury is a metal obtained through the use sintering of sulphurs and other minerals. It is used in mineral extraction processes, in old chlorine-soda mills, as a catalyst in some chemical processes and in mercury oxide batteries.

The pulp mills do not use any type of raw material or chemical input that contains mercury in its composition.

The only likely sources of mercury (Hg) in the pulp mills would come from the use of caustic soda in the bleaching process and from the use of coal as a fuel in the power boiler.

The presence of mercury in caustic soda may be related to chlorine-soda production processes. There are three technologies by electrolysis that are used in the industrial production of chlorine-soda: mercury, diaphragm and membrane cells.

However, in the 2013 Minamata Convention on Mercury, an international treaty was established that aimed to protect human health and the environment from the adverse effects of mercury by setting a deadline of 2025 for chlorine-soda plants using the mercury-cell process to convert to other technologies. It is worth noting that the Convention, because of its scope, also included measures that seek to reduce anthropogenic emissions of mercury in general (emissions from human activities such as coal burning, small-scale gold mining and thermal oil and gas generation) and to increase control over the use of the metal in other productive activities. Both Brazil and Paraguay ratified the Minamata Convention to control mercury emissions.

Therefore, because the use of mercury in the chlorine-soda industries is in disuse, and also because Paraguay has ratified the Minamata treaty, PARACEL will not purchase soda from manufacturers that still use the mercury-cell process. Therefore, it can be said that there will be no source of mercury in PARACEL's liquid effluent.

The burning of coal, which generally contains mercury in its composition, would become a source of atmospheric emission of this element. However, PARACEL will not burn coal in its mill, but eucalyptus biomass and therefore, it can be stated that there will be no mercury emissions to the atmosphere.

Consequently, due to the fact that mercury is not included in its pulp production process or in the chemical inputs required for this purpose, there is no technical or environmental justification for monitoring this parameter in both liquid effluents and atmospheric emissions.

## 4.2 Economic Justification

The justification for implementing the project is based on the premise that the current market for pulp and paper is expanding abroad. This can be seen through the projects to increase various industries in the productive sector, with the consequent expansion of their forestry bases, with South America standing out in recent years, with new pulp mills in Brazil, Uruguay and Chile.

Paraguay, like Brazil, has a competitive advantage for the cultivation of renewable and sustainable forests. As such, Paraguay can become a future supplier for the world market of short-fiber pulp, with factors such as climate and good forest productivity, resulting in a very competitive cost.

**Market trends and consumption**

As an example, in Brazil, the pulp and paper sector has developed very competitively, showing growth in recent years, according to the data presented in the following graphics.

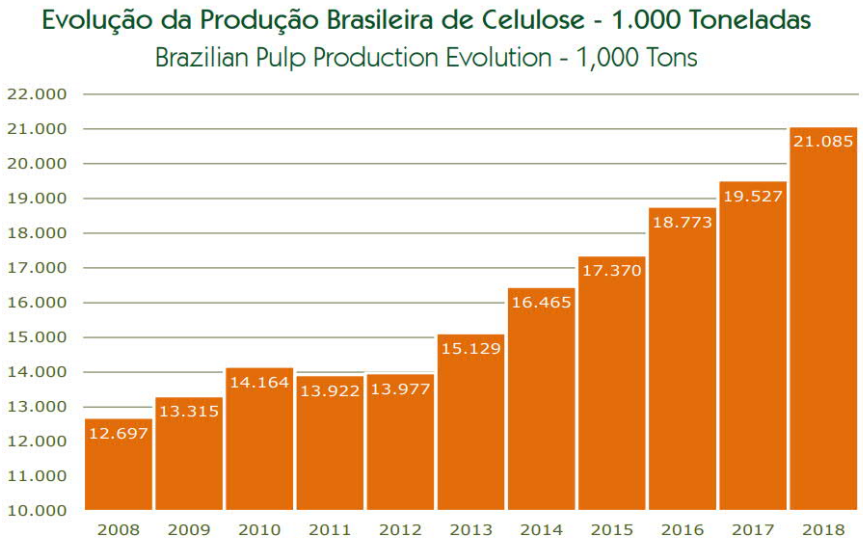


**Figure 1 – Evolution of Brazilian pulp production (x 1,000 t/year). Source: IBA, 2020.**

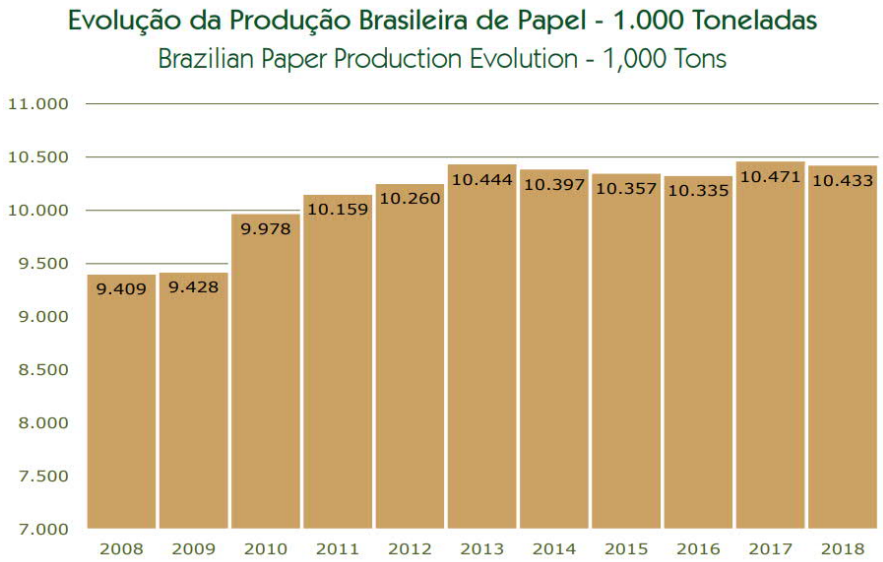


**Figure 2 – Evolution of Brazilian paper production (x 1,000 t/year). Source: IBA, 2020**

## 4.3 Social Justification

The implementation of the pulp mill will promote economic development and increase infrastructure in the region. Direct and indirect incomes and salaries will promote an increase in tax collection, which will allow the partnership of government and other agencies to increase investment in the development of social and economic programs. This process is called the multiplier effect and is based on economic theories.

The development of this project will benefit not only PARACEL, but also the region of the municipality of Concepción, the Department of Concepción and Paraguay.

The city of Concepción is the capital of the Department. About population, the projection to 2019 is 85,876 inhabitants and to 2020 is 87,215 inhabitants. Of these, 774 inhabitants belong to the indigenous population.

With regard to economic activity, the district is characterized by agricultural and livestock production, shops, employees of public institutions and industries. Among the main agricultural activities are the production of sugar cane, corn, sesame, pineapple and watermelon among others; among the livestock, cattle production in general and small livestock. Related to this last one, in the district there are important slaughterhouses, refrigerators and saddleries. In addition, the port of Concepción, which is the main port of the city with more commercial and people movement.

The total planned investment is about USD 2,2 billion for the implementation of the pulp mill. During the construction phase, PARACEL, its suppliers and employees will generate tax revenues at the municipal, departmental and national levels.

If possible, all production will be for export, directed to markets in Latin America, United States, Western Europe and Asia.

The expectation of job creation is in the following order:

– Jobs generated in the construction phase = 8,000 (at the peak of mill installation);

– Jobs generated in the operation phase = 1,200 employees.

## 4.4 No Project Alternative Analysis

The entire infrastructure needed to implement a pulp mill brings numerous socio-economic benefits to the region. Among these benefits are: direct and indirect job generation, service contracting, tax collection, among others.

With current high unemployment rates, the need for labor to build and assemble PARACEL's pulp mill sector will be a major factor in the generation of direct and indirect jobs. Thus, during the implementation period, thousands of employees will work in the construction of the project.

It is worth adding the influence of the work on tax collection, taking into account that priority will be given to the municipality of Concepción, for the acquisition of construction materials and services demanded.

There will be a strong impact on the local economy, boosting the industry and services sector. This process is called the multiplier effect and is based on economic theories to estimate the economic impact of the main initiatives.

There will be a strong addition of hundreds of permanent homes in new hotels and lodges in the region.

The economic development of Concepción will also have an impact on the industrial GDP.

There will be a significant increase in the municipal per capita values of health and education.

Therefore, the implementation of a new pulp mill in Concepción should change the GDP of the municipality, possibly reflecting positively also in the region and the Department.

The suitability of this project with government policies, plans and programs (in the planning and execution phases) shows that the company is in harmony with the government's intentions, favoring growth and promoting growth, in an organized and sustainable way.

The hypothesis of not carrying out the project will have an impact on the economic aspects in the municipality of Concepción since its construction will include a new vector in the economic process of the region.

In addition, the non- installation of the project will create the frustration of the expectation of development that is being created in the municipalities and the region.

Under operating conditions, the PARACEL pulp mill will be self-sufficient in power generation, this factor is important for it to be able to attract other companies to the site due to the greater availability of energy in the region.

As for the environmental impacts on the physical and biotic environment, the non-installation of the project will be reflected in the absence of direct environmental impacts resulting from construction and operation. This can be considered a positive factor in these environments, as they would tend to maintain their current qualities. However, PARACEL will implement the Environmental Management Plan to mitigate all impacts on the physical, biotic and socioeconomic environments.

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# 5 SITE LOCATION

This chapter presents the study of the alternative site location carried out to select the best location for the pulp mill, considering mainly the following aspects:

- The existence of a nearby area for the development of the forest plantations for wood supply to PARACEL pulp mill;
- The existence of suitable regional characteristics to allow the development of an economically viable project;
- Availability of water that allows the supply of raw water, as well as the discharge of treated liquid effluent;
- Topographical, geological and geotechnical conditions;
- Predominant wind direction;
- Environmental characteristics conducive to the project and in compliance with environmental law;
- Logistics;
- Economic characteristics (favorable market for pulp production and tax and government incentives).

## 5.1 Study Area

The region chosen for the study of alternatives established the location on the left bank of the Paraguay River in Concepción, Department of Concepción, Paraguay.

The site should also be close to the border with the state of Mato Grosso do Sul in Brazil, which has had the greatest evolution of eucalyptus planted area in that country in the last 10 years and shows the potential to supply wood to enable the start of industrial operations in the short term.

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**Figure 3 – Limits of study area**

The following figure shows the 4 alternative sites that have been assessed for the study: Site 1 - Zapatero Cue, Site 2 - Carayá Vuelta, Site 3 - Puerto Cooper y Site 4 - Itapucu-Mi.




**Figure 4 – Location of sites in the study area. Source: Google Earth, 2020**

## 5.2 Technical Description of the Assessed Sites

The following tables present the technical file of each site evaluated with its main information.

**Table 1 – Site 1 – Zapatero Cue**

| Site 1 – Zapatero Cue | |
|---|---|
| Location | Concepción |
| Area | ~1.200 ha |
| Access by road | 18 km (Route 3 and 5) |
| Distance from Concepción | ~20 km |
| Distance from Paraguay river | ~3 km |
| Electrical Energy Substation | ~50 km |
| Predominant wind | NW and S |
| Current land use | Pasture |
| Topography | Relatively flat |

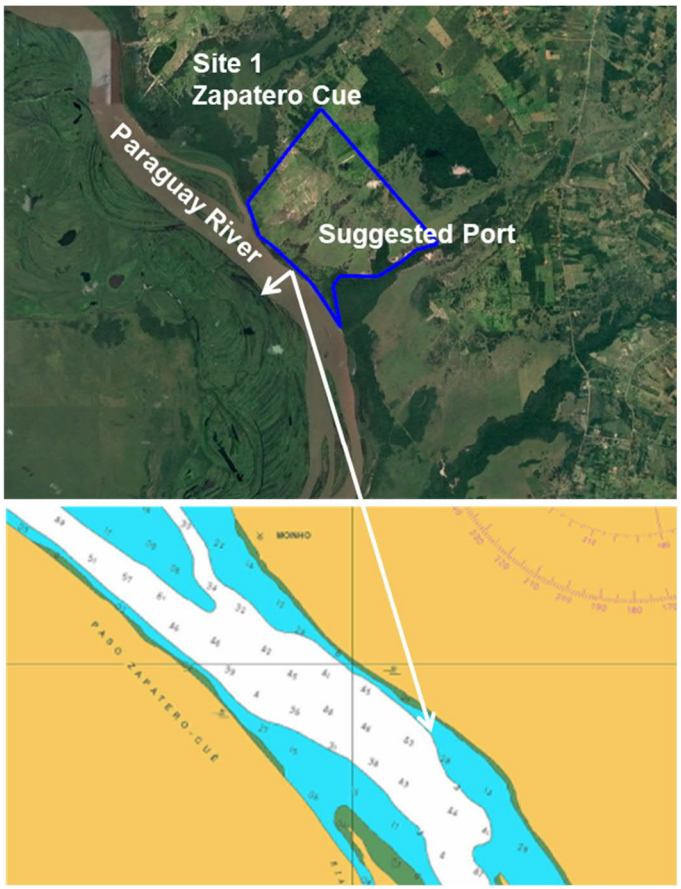


**Figure 5 – Location of Site 1 – Zapatero Cue**

**Table 2 – Site 2 – Carayá Vuelta**

| Site 2 – Carayá Vuelta | |
|---|---|
| Location | Concepción |
| Area | ~670 ha |
| Access by road | 24 km (Route 3 and 5) |
| Distance from Concepción | ~25 km |
| Distance from Paraguay river | ~3 km |
| Electrical Energy Substation | ~56 km |
| Predominant wind | NW and S |
| Current land use | Pasture |
| Topography | Relatively flat |

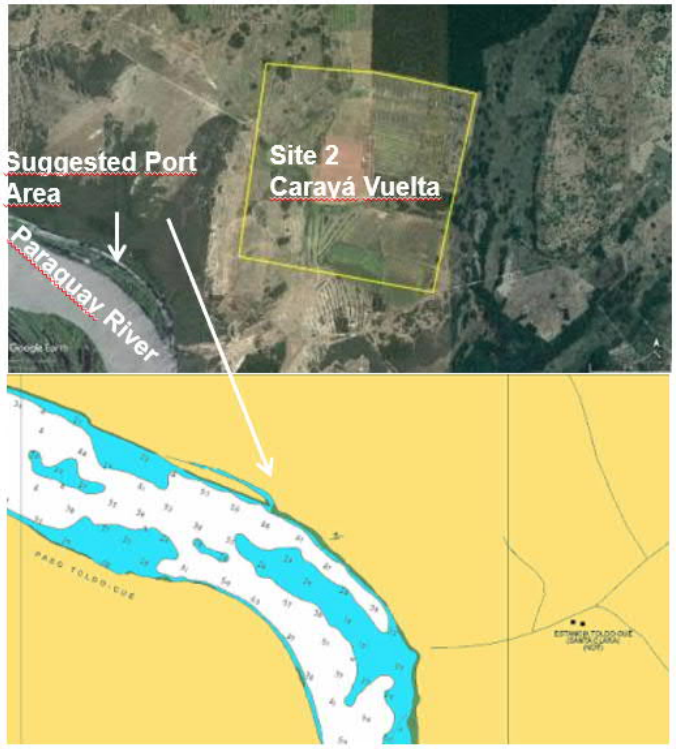


**Figure 6 – Location of Site 2 – Carayá Vuelta**

**Table 3 – Site 3 – Puerto Cooper**

| Site 3 – Puerto Cooper | |
|---|---|
| Location | Concepción |
| Area | ~680 ha |
| Access by road | 45,5 km (Route 3 and 5) |
| Distance from Concepción | ~50 km |
| Distance from Paraguay river | ~3 km |
| Electrical Energy Substation | ~80 km |
| Predominant wind | NW and S |
| Current land use | Pasture |
| Topography | Relatively flat |

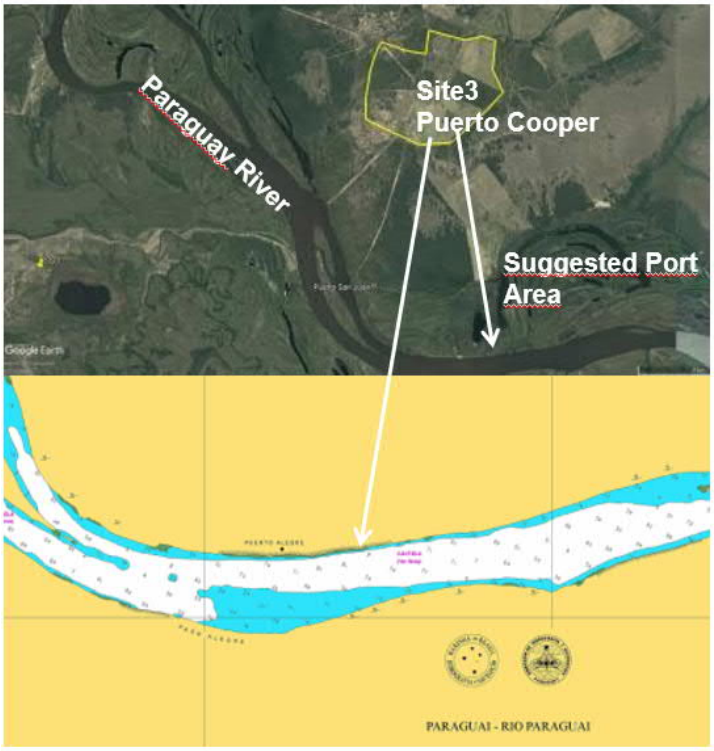


**Figure 7 – Location of Site 3 – Puerto Cooper**

**Table 4 – Site 4 – Itapucu-Mi**

| Sitio 4 – Itapucu-Mi | |
|---|---|
| Location | Concepción |
| Area | ~580 ha |
| Access by road | 98 km (Route 3 and 5) |
| Distance from Concepción | ~94 km |
| Distance from Paraguay river | ~2 km |
| Electrical Energy Substation | ~96 km |
| Predominant wind | NW and S |
| Current land use | Forest |
| Topography | Relatively Flat |

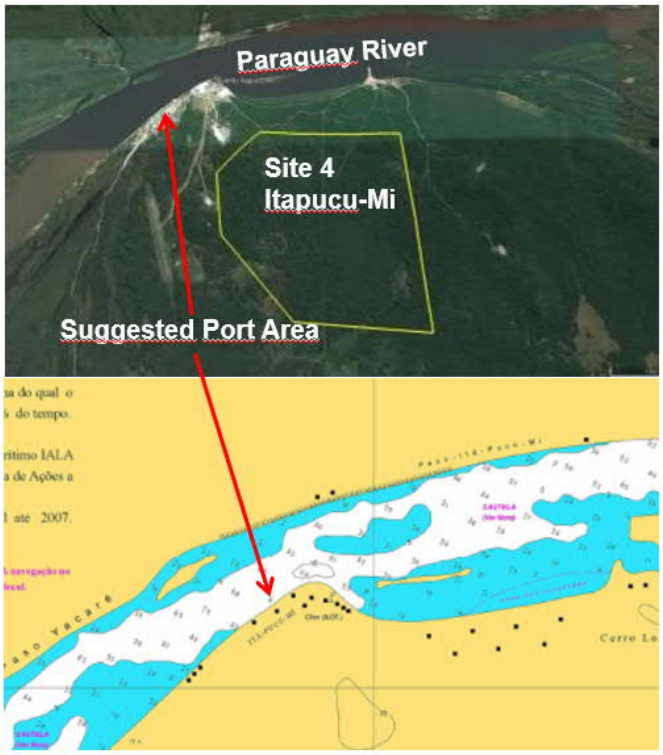


**Figure 8 – Location of Site 4 – Itapucu-Mi**

## 5.3 Assessment of environmental aspects

Among several key aspects for the definition and choice of the location of a pulp mill, environmental aspects are considered, aiming to mitigate environmental impacts.

Thus, an evaluation of the sites presented was carried out in relation to the following environmental aspects:

- Water resources;
- Predominant wind direction;
- Protected areas; and
- Indigenous communities.

### Water resources

All the sites studied are located on the banks of the Paraguay River. The Paraguay River rises in Sete Lagoas, in the Brazilian region of Diamantino, in Mato Grosso, near the city of Barra do Bugres, which is the end of its navigable course. It then runs south through the marshes of the Great Pantanal. In a short stretch, it forms the border with Bolivia, between La Gaiba Lagoon and Mandioré Lagoon. It then flows into the limits of Paraguay, bathing its capital city: Asunción and, after its estuary on the right bank of one of its branches: the Pilcomayo River, its course begins to be the border between Argentina and Paraguay, until it drains into the Paraná River in front of the Argentinean town of Cerrito Island.

In contrast to many of the large rivers in the Parana basin, no hydroelectric plant was built on the Paraguay River. The main tributaries of the Paraguay River in the Paraná region, such as the Apa River, the Aquidabán River and the Tebicuary River, descend rapidly from their origins to the lowlands; there they widen and slow down, going west. After heavy rains, these rivers sometimes flood the nearby plains.

From the data about the water level of Paraguay River, obtained in https://www.meteorologia.gov.py of monitoring station 2000086134 located in Concepción between 01/01/2000 and 01/01/2020 and using the key curve Q=547,43+583,57H-26,18H2 (Source: Dirección de Meteorología e Hidrología) obtained in the field survey, it was possible to calculate the average daily flow data.

Using these data, the minimum flow of 7 consecutive days during 10 years was calculated using the Weibull and Gumbel distribution as 1,093 $m^3/s$ and the average flow of the Paraguay river in Concepción for the same period is 2,178 $m^3/s$. Therefore, it is possible to say that the Paraguay River in Concepción is able of supplying the water for the production process of PARACEL pulp mill.

**Predominant Wind Direction**

The wind intensities in all regions are very similar and can be classified as weak winds, between 1.4 and 3.2 m/s. The highest wind speeds were measured at Teniente Coronel Carmelo Peralta's station. Predominant wind directions are from the south, followed by northeast and east winds.

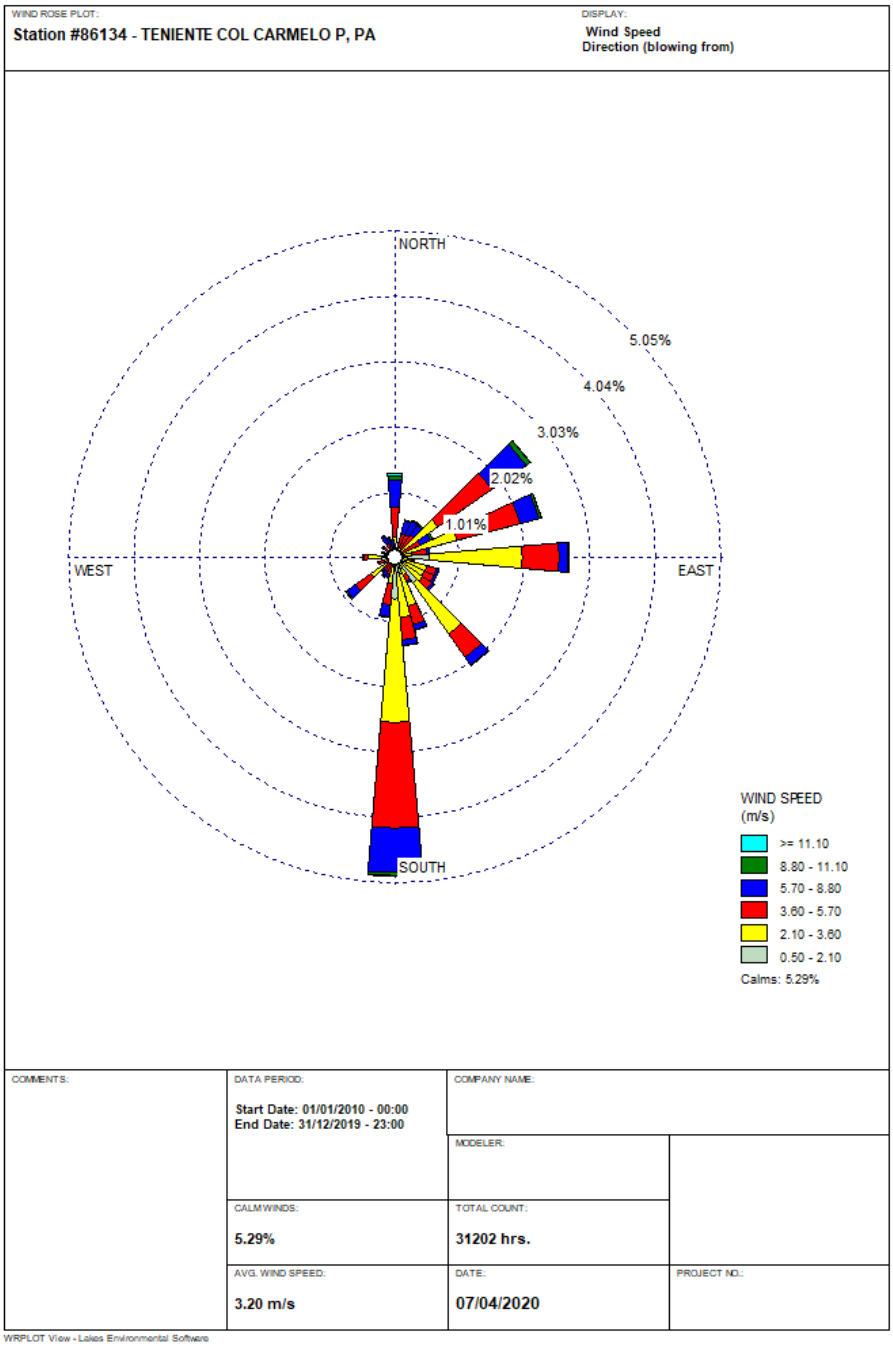


**Figure 9 – Wind rose in the region of Concepción**

## Protected Areas

The following figure shows the preserved areas near Concepción. It can be seen that these areas are mainly located in the north of the Department. There are none of the sites located in protected areas or national parks.

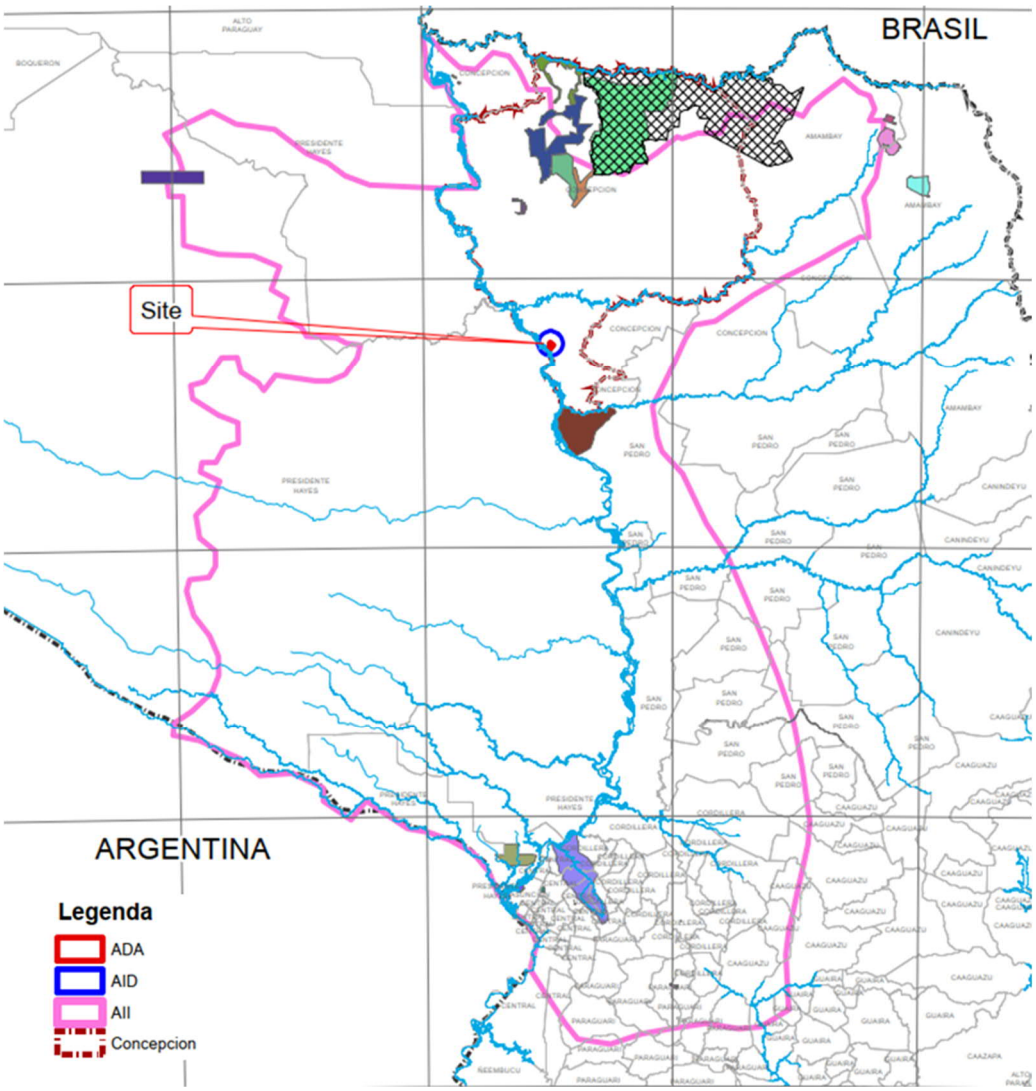


**Figure 10 – Preserved Areas. Source: SINASIP, 2020.**

## Indigenous Communities

In accordance to the III Censo Nacional de Población y Vivienda para Pueblos Indígenas 2012[2], in national level, the total indigenous population is 117,150, which is 1.8% of the total population (6,435,218) in the country. Fifty-two per cent live in the Eastern Region and 48 per cent in the Western Region. With the majority, 91.3% (103,396) live in rural areas and 8.7% (9,858) in urban areas.

In the Department of Concepción, 3.5 per cent (3,998) of the indigenous population is concentrated, divided according to language family and indigenous people; these include the Guaraní language family and people (3,495), which in turn are subdivided as follows: Guaraní occidental (3); Ava Guaraní (1); Mbya Guaraní (1234); Paí Tavytera (2.254) and Guaraní Ñamdéva (3). Lengua Masloy (469), corresponds to Toba Maskoy (22); Enlhet Norte (185); Enxet Sur (21); Sanapaná (61); Angaité (79) and Guaná (101). Mataco Mataguayo (4) that refers to Maká (4). Zamuco (9), divided in

[2] DGEEC. III Censo Nacional de Población y Viviendas para Pueblos Indígenas, 2012.

Ybytoso (8) and Tomáraho (1). Guaicuru (2), belongs to Qom (2). No indigenous (19), that refers to non-indigenous people that lives in communities.

Taking into account the areas linked to the project, the communities identified in the district of Concepción are presented below:

*Urban Zone*

In Redención there are a total of 150 families with approximately 700 people [3]. In accordance to DGEEC, in the national census (Censo Nacional de Población y Vivienda para pueblos indígenas del 2012), the community is composed by the following people: Enlhet Norte / Angaité / Sanapaná / Toba Maskoy / Enset Sur / Guaná / Ybytoso / Maká / Qom / Guaraní Occidental.

*Rural Zone*

Caleria Itakua family cluster in Angaité Village (13 - 8 men and 5 women), with 3 private and collective homes. Community Vy'a Renda Boquerón of the Mbya Guaraní People (235 - 123 men and 112 women), with 54 private and collective homes. Jeguahaty community of the Paí Tavytera people (145-75 men and 70 women), with 38 individual and collective housing units.

The project identified the following indigenous communities: Redención, Jeguahaty, Vy'a Renda, Takuarendyju, Takuarita, Sati - Pai Renda Chiru Poty, Guyra Ñe'engatu Amba, Mberyvo Jeguarymi, Yvyty Rovi Cerro Poi and Apyka Jegua.

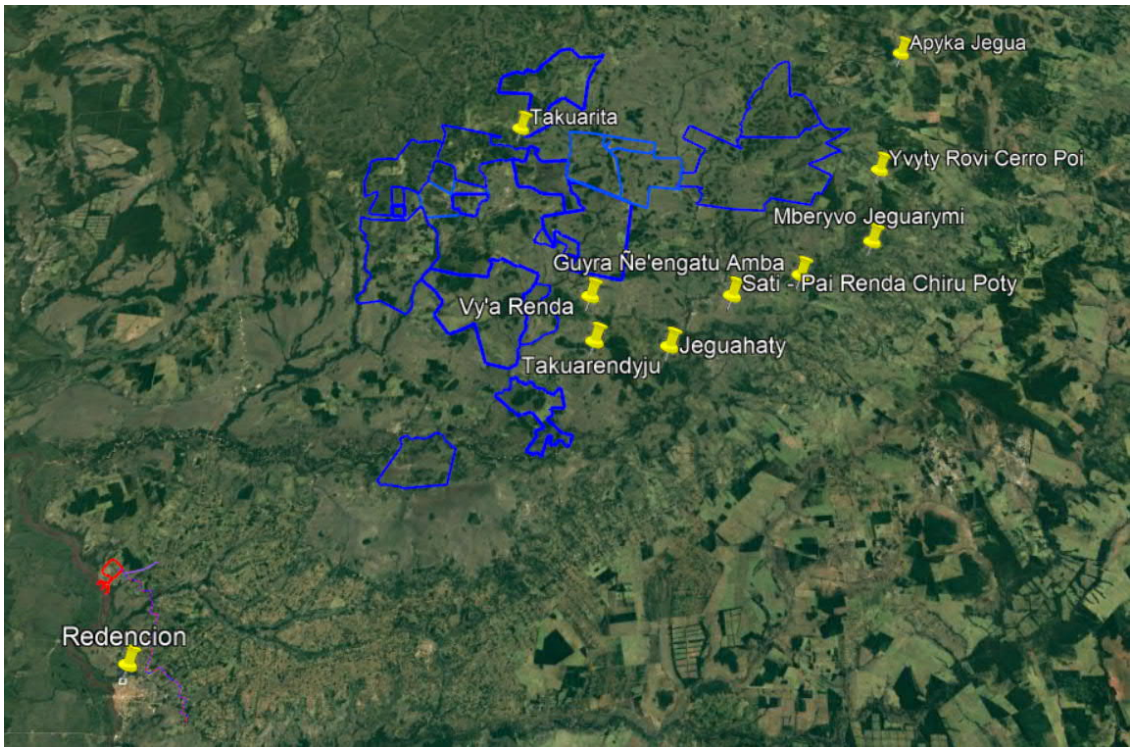


**Figure 11 – Location of the indigenous communities and PARACEL project (pulp mill in red, TL and mill access road in purple and farms in blue).**

[3] Report "Estudio sobre comunidades indígenas de los departamentos de Concepción y San Pedro. Área de influencia del proyecto de instalación de la industria de celulosa". Consultancy for PARACEL. Year 2020.

## 5.4 Assessment of infrastructure and logistics

About the site location for a pulp mill, the aspects of infrastructure available in the region, as well as logistics, especially the distance from plantation and protected forestry areas, are of fundamental importance.

### Infrastructure

The infrastructure required for the implementation of the pulp mill consists of water intake, discharge of treated effluent, transmission line, road access and river port for the outbound of pulp.

With respect to the water supply and treated effluent discharge, the distance from the mill to the Paraguay River is practically the same for all the sites evaluated. As for the transmission line, Villa Real de Concepción substation is closer to Site 1 and further away from Site 4.

Access by road consists of connecting the industrial plant to the main road (Route 3 or 5); it is shorter for Site 1 and longer for Site 4.

### Wood Transport

For the beginning of the operation of the pulp mill, wood will come from Paraguay, Brazil (Mato Grosso do Sul) and Argentina. Site 1 has a shorter distance to transport wood from these regions to the mill.

## 5.5 Final Assessment

The final evaluation for the selection of the PARACEL pulp mill considered environmental, infrastructure and logistical aspects. For each of the aspects considered, a qualitative evaluation was performed, with the criteria: "most favorable", "neutral" and "least favorable", as shown in the table below.

**Table 5 – Assessment of environment aspects**

| Site | Water resources | Predominant wind direction | Protected area | Indigenous communities | Infrastructure | Wood logistics |
|---|---|---|---|---|---|---|
| **Site 1 Zapatero Cue** | | | | | | |
| **Site 2 Carayá Vuelta** | | | | | | |
| **Site 3 Puerto Cooper** | | | | | | |
| **Site 4 Itapucu-Mi** | | | | | | |

Most favorable
Neutral
Least favorable

Regarding water resources, there is practically no difference between the sites evaluated, as they are all very close to Paraguay River, which has water available to

supply the pulp mill, in addition to receiving the treated liquid effluent from PARACEL mill.

Considering the wind direction, in all sites the predominant direction is the same and there are no nearby population groups that can be significantly impacted.

With respect to protected areas and indigenous communities, nothing was found in the region of the sites under study.

In terms of the infrastructure needed to implement the pulp mill (water supply, treated effluent discharge, power transmission line, road access and river port), Site 1 is the best option.

Regarding to the logistics of wood transport, Site 1 has a shorter distance from Brazil and Argentina.

Thus, the site chosen for the installation of PARACEL pulp mill was Site 1 - Zapatero Cue.

# 6 PROJECT CHARACTERIZATION

## 6.1 Pulp Mill

### 6.1.1 Activity

According to the National Classification of Economic Activities in Paraguay (CNAEP, *official acronym*), the project is classified as 1701 - Manufacture of wood pulp, paper and cardboard.

### 6.1.2 Location

The PARACEL pulp mill will be located in the municipality of Concepción, on the left bank of Paraguay River, about 15 km (in a straight line) from the city center.

The following figure shows the location of the mill.

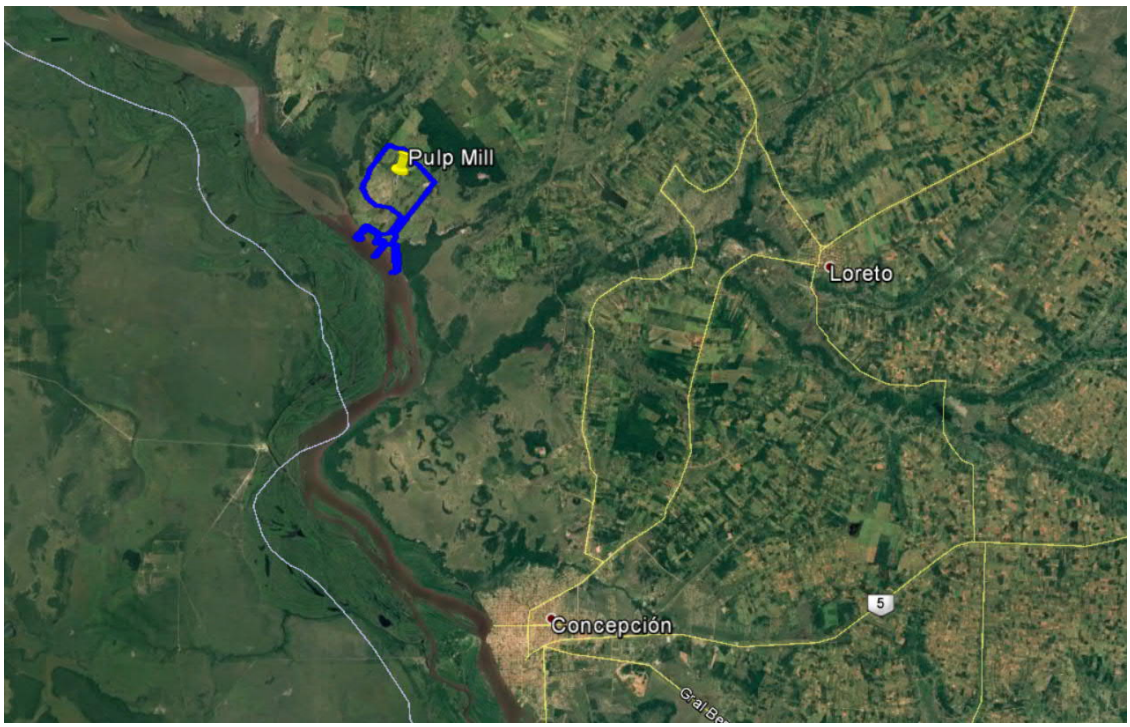


**Figure 12 – Location of PARACEL pulp mill. Source: Google Earth, 2021.**

### Land acquisition

Paracel's journey began with two companies, independent of each other, located on different continents, but sharing the same vision: to have a positive impact on society and to encourage an increase in demand for biodegradable products.

The Zapag group is a Paraguayan leader in the import and distribution of fuel. Always attentive to global and regional trends, the group saw an opportunity in the growth of products derived from pulp and decided to acquire land that was destined for forestation. The choice of these lands was made considering factors such as degraded land, soil suitability and good conditions for biological growth, logistics; and the possibility of providing work to thousands of people in the region.

Meanwhile, Girindus Investments is a group of companies based in Sweden, which has extensive experience in the research and development of the pulp business throughout its production chain: from sustainable forestation to producing pulp. In the search to expand the business in a competitive environment, Girindus was interested in participating in the development of a new project that met all criteria for a state-of-the art sustainable pulp mill.

In this way, the combination of the vision of Zapag group and Girindus led to the creation of Paracel, a company that aims to build a world-class pulp mill in the Concepción region of Paraguay, through compliance with the highest sustainability standards and one of the most efficient logistics for regional and global markets.

Therefore, Paracel project was born with already some forest lands acquired. After that Paracel acquired some plantations areas from a company named EUCATEC S.A. In total 20 estancias were acquired, being 19 for eucalyptus plantation and 1 for the pulp mill site.

### 6.1.3 Access

The access to PARACEL pulp mill from Concepción will be done through a main access, as shown in the following figure (line in red). There will be also a temporary access, to used mainly during construction phase (in green).

Temporary access already exists and is 5 km long, as shown in the figure below. It will only be used during the construction phase, while the definitive access is being built.




**Figure 13 – Location of the temporary access. Source: Google Earth, 2021.**

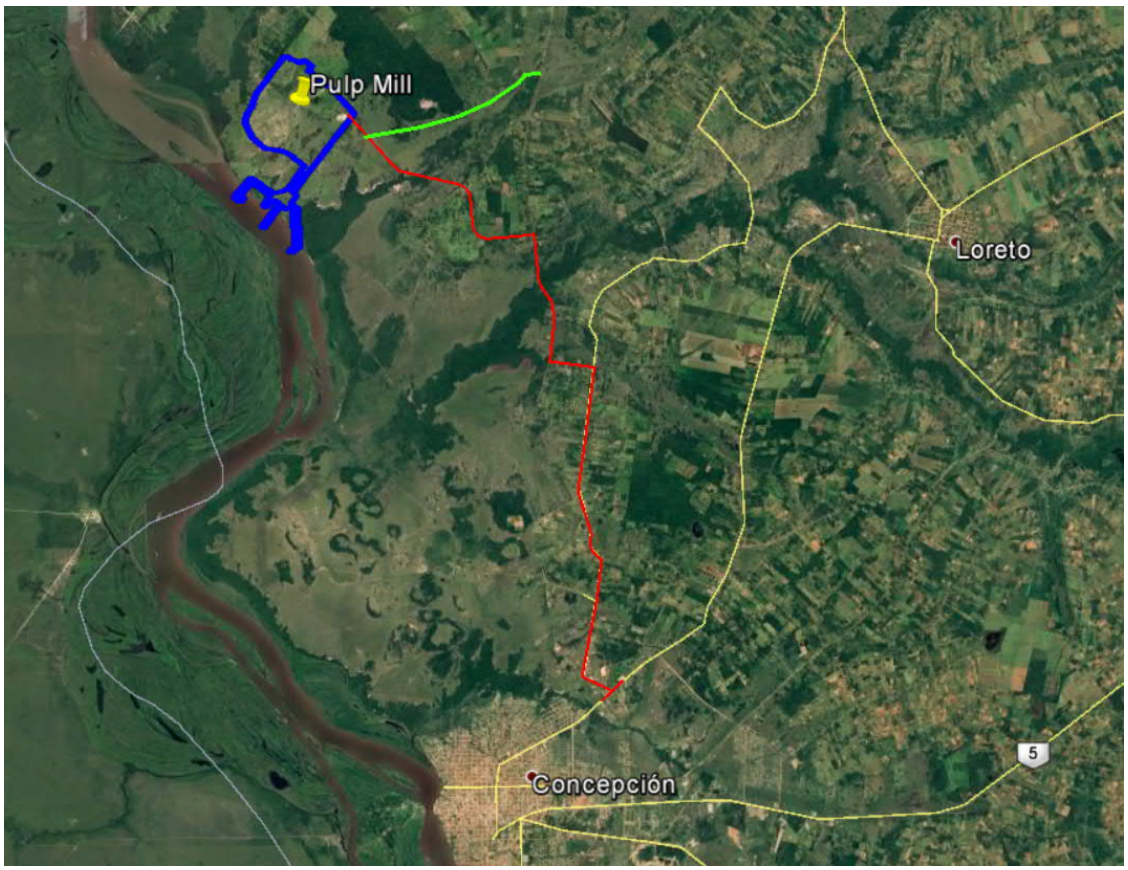


**Figure 14 – Access to PARACEL pulp mill. Source: Google Earth, 2021.**

### 6.1.4 General Layout

The general layout of PARACEL pulp mill is presented in **ANNEX III.**

### 6.1.5 Industrial Plant Areas

The projected areas for PARACEL Pulp mill are presented on the following table.

**Table 6 – Planned areas in the PARACEL pulp mill**

| Type of Area | Planned Area (m²) |
|---|---|
| Land area | 11.400.000 |
| Area of occupation | 3.150.000 |
| Constructed area | 201.110 |

Source: Pöyry Tecnologia (2020).

### 6.1.6 Operation and employees

The operational regime will be 24 hours a day, 7 days a week and 12 months a year. The effective production period will be approximately 354 days, considering the general annual maintenance stop for equipment.

The total labor force, considering own employees and third parties, necessary for the operation of the PARACEL pulp mill will be approximately 1,200 persons, including the transmission line maintenance operations.

The working hours of the employees in the industrial area will be carried out in 3 shifts of 8 hours each. In the administrative area, the working day will be 8 hours and will take place during business hours.

### 6.1.7 Security Personal at pulp mill

The corporate security mission consists in guaranteeing that all the people of Paracel and those that work for Paracel in its installations are taken care and protected in a safe environment. Likewise, it guarantees the security of all the installations and allows that all Paracel´s operations carry out freely. It provides effective operative support in the area of security to all the activities of the project.

Paracel´s security personnel will carry out its mission from the principle that the good security and the respect by the human rights are totally compatible, which will reflect, among other things, in the behavior of the security forces, the communications and the use of force.

The Corporate Security Management Manual of Paracel is part of the Environmental and Social Management System (SGAS – initials in Spanish). The number of security personnel is detailed on pages 67-70 (Vol HSES MS), as well as the training they will receive to do security with the appropriate and available equipment will be detailed later.

### 6.1.8 Production Capacity

The main activity of PARACEL pulp mill is the production of 1,500,000 t/year of bleached pulp.

### 6.1.9 Wood Supply

The process of forest transportation starts in farms (own or third parties) in which harvesting activity took place, and comprehends the transportation of logs from the plantation site to the point of delivery (PARACEL’s pulp plant in Concepción). It includes the steps of loading, transportation and unloading, for wood coming from properties owned by PARACEL as well as leased properties. The transportation is made by truck, which transits through public and private paved or unpaved roads.

For certified forests, the transportation activity must be carried out with observation of Chain of Custody requirements.

Improved access roads and a forest road network will be constructed in association with plantation development.

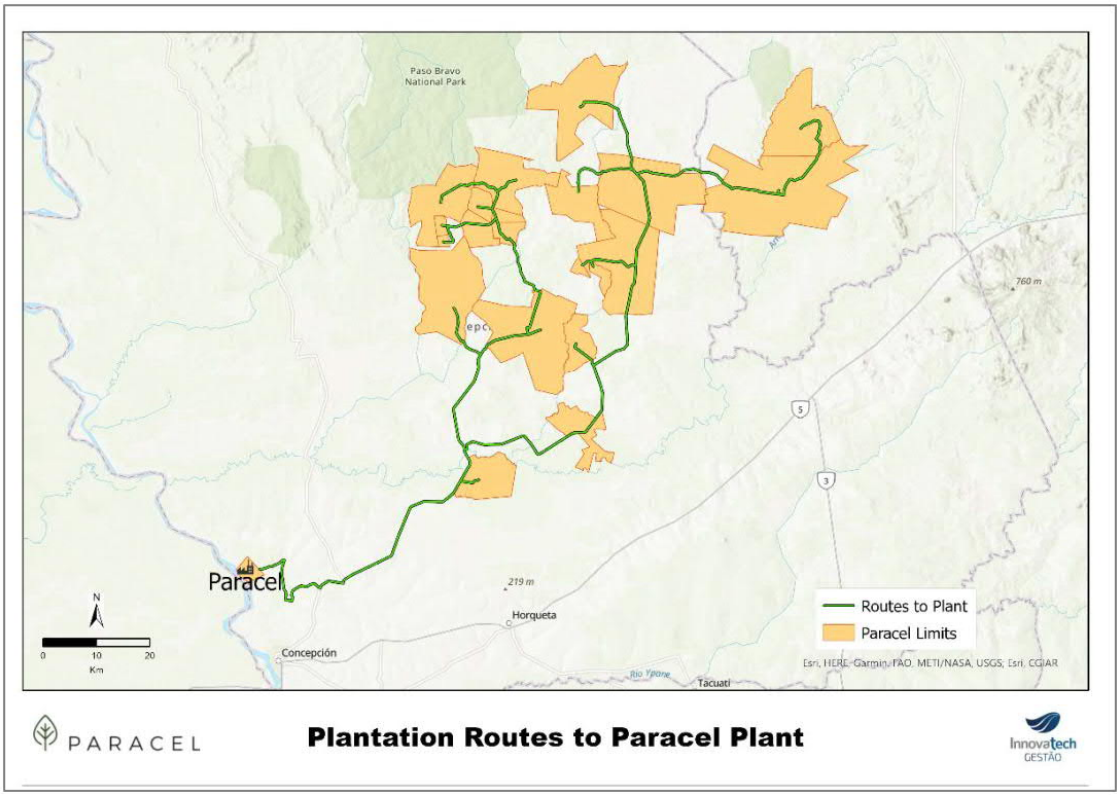


**Figure 15 – Transportation routes from own areas to pulp mill. Source: Innovatech, 2021**

Giving the 6-year period necessary for PARACEL's own forests to grow and start supplying the market, the early stages of the project will depend on wood bought from the market. This wood will be sourced from different producers in Brazil, Argentina and Paraguay, aiming to achieve a share of 70/30 of FSC certified forests and controlled wood sources.

PARACEL predicts the volume to be bought from the market as approximately 5.8 million m³ under bark/year in 2028, of which 4.0 MM m³ will come from Brazil, 1.2 MM m³ from Argentina and 0.6 MM m³ from Paraguay (PARACEL, 2021).

The logistics for wood bough from the market, from the source to the pulp mill site, will consider both road and river transportation for wood coming from Argentina, Paraguay and Brazil.

Wood bought from Brazil will be transported to pulp mill via two main transportation routes: 30% of the volume will be transported only by truck, entering Paraguay through the Brazilian municipality of Ponta Porã; and 70% will be transported by truck to the Brazilian municipality of Porto Murtinho and from there it will be transported through barge to PARACEL's mill, via Rio Paraguay.

Due to the legal limitations of trailer traffic in Paraguayan highways, road traffic in the country will only be made by semitrailer. Wood coming from Brazil will be transported by B-double trucks to the municipality of Ponta Porã. There, the load will be divided into two semitrailers that will continue the route to pulp mill.

The Figure below shows the preliminary transport routes from Brazilian wood sources to the pulp mill. For river transportation, the unloading will occur at the dock that gives access to PARACEL'S mill, located North of Concepción. The logistics planning is still under development.

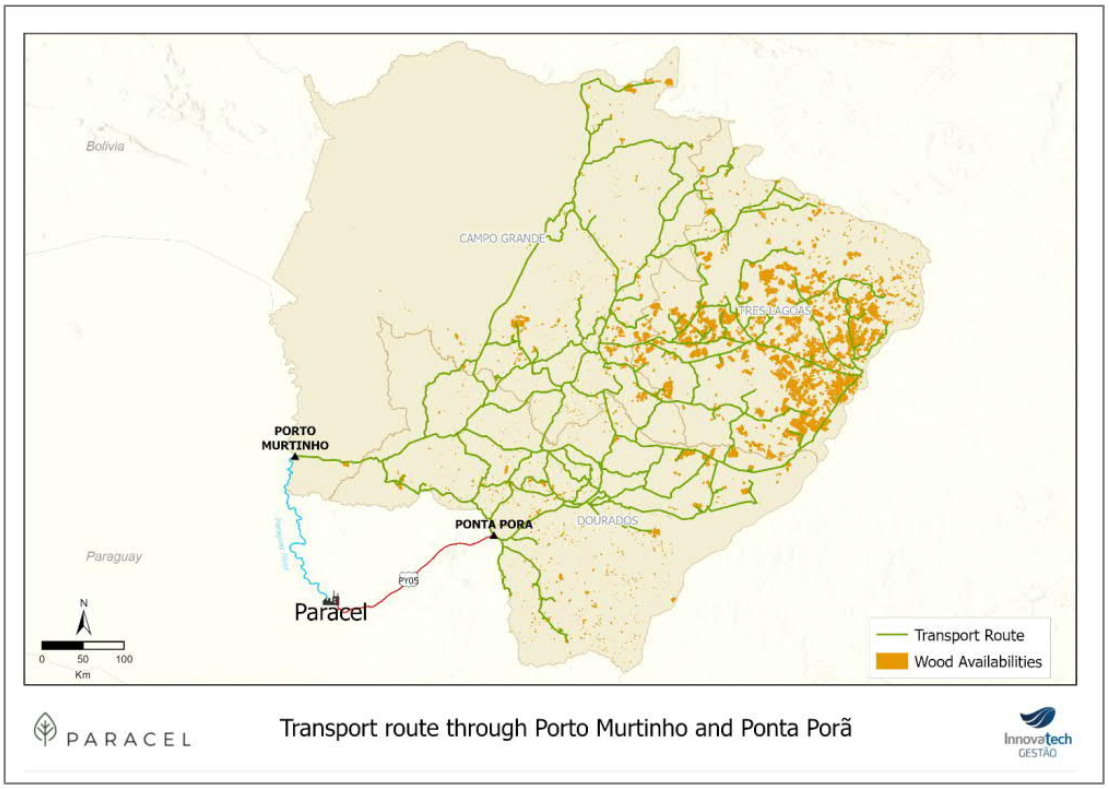


**Figure 16 – Transportation routes for wood coming from Brazil. Source: Innovatech, 2021.**

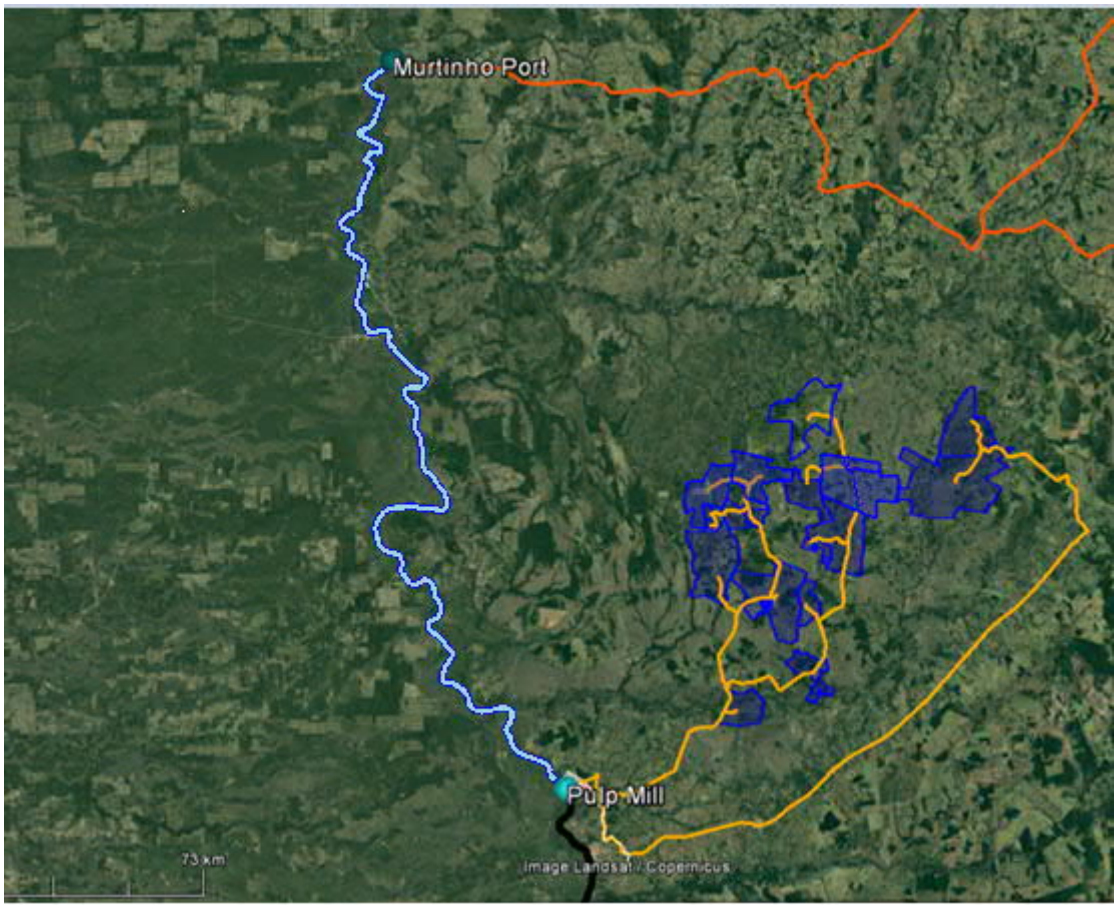


**Figure 17 – River transportation route (in light blue) from Murtinho Port to pulp mill, in Paraguay River, and road access (in orange Brazilian roads and light orange Paraguayan main roads from Paracel's farms to the pulp mill). Source: Google Earth, 2021.**

PARACEL expect that the number of truck trips per day in Brazil will go from 107 in 2023 to 205 in 2028 for both routes. The number of truck trips per day in Paraguay, from Ponta Porã to the PARACEL mill, is expected to go from 48 to 92 in the same period. Waterway transportation from Porto Murtinho to the pulp mill will require 2 trips a day in 2028.

It is important to mention that wood purchasing during the first years is from FSC certified or controlled plantations according "Contrato de Compraventa de Madera", **ANNEX IV**.

### 6.1.10 Description of raw materials, inputs and chemicals

In addition to wood, other inputs will be used, such as oxygen, sodium hydroxide, hydrogen peroxide, sulfuric acid, sodium bisulfite, chlorine dioxide, lime, aluminum sulfate, among others.

The following table indicates the estimated consumption of raw materials and inputs for the operation of the pulp mill. Following this table is information on risks, emergency procedures, and chemical product reactivity.

**Table 7 – Consumption of raw materials, inputs and utilities in the mill**

| Description | Unity | Consumption |
|---|---|---|
| **Raw Material** | | |
| Wood | $m^3$ s sc/year | 6,051,700 |
| **Chemicals** | | |
| Oxygen | t/ year | 47,300 |
| Sodium hydroxide | t/ year | 33,800 |
| Sulfuric acid | t/ year | 32,200 |
| Hydrogen peroxide | t/ year | 8,900 |
| Sodium Chlorate | t/ year | 30,000 |
| Sodium bisulfite | t/ year | 1,800 |
| Talc | t/ year | 1,800 |
| Lime | t/ year | 19,500 |
| Urea | t/ year | 2,300 |
| Phosphoric acid | t/ year | 800 |
| Sodium hypochlorite | t/ year | 400 |
| Aluminum sulphate | t/ year | 1,500 |
| Defoamer | t/ year | 400 |
| Polyelectrolyte | t/ year | 150 |
| **Fuel** | | |
| Fuel oil | t/ year | 69,000 |
| Diesel | t/ year | 800 |
| Liquefied Petrol Gas (LPG) | t/ year | 1,500 |

### 6.1.11 Description of the production process

#### 6.1.11.1 Brief process description

Logs without bark will be sent to the debarking and chipping lines, which will cut the wood to chips. The chips produced by the chippers will be stored in a pile and then transported to the cooking area.

The chips have controlled dimensions, which allow the penetration of chemicals during cooking, which facilitates the softening of the wood and the fibers decomposition, separating it from the lignin, producing the so-called brown pulp.

Consequently, the pulp is previously bleached, through a physic and chemical process, using oxygen as the main reagent. The aim is to reduce the consumption of chemical reagents in the bleaching process and generate less organic load for the effluent.

Bleaching is a purification process that aims to remove much of the undissolved residual lignin. The aim is to obtain a high degree of bright. For this, more selective chemical reagents and softer working conditions are used.

The bleached pulp then goes to the drying and packaging section, where the formation of the leaf occurs, to ensure greater homogeneity and avoid machine breakage or irregularities in the product. The pressing process aims to eliminate water by mechanical action, consolidate the position of the fibers and provide greater resistance so that the pulp passes through the drying process. When drying, the water is removed by evaporation (applying heat to the pulp sheet). After leaving the dryer, the pulp sheets are cut, weighed and packed into 250 kg bulks. The bulks are stacked in two groups of four, forming a 2 tonnes load.

**Chemical Recovery**

The *kraft* pulp mill has a system that allows the recovery of the chemicals used to obtain the pulp.

Recovery begins with the evaporation of the black liquor, increasing the dry solids content from 15% to approximately 80%.

After evaporation, the liquor is sent to incineration in the recovery boiler. In the boiler, the organic matter present in the liquor will be incinerated, leaving a smelt, formed by the inorganic compounds that will be sent to causticizing. In the causticizing, the green liquor will be clarified and the white liquor will be obtained later.

### 6.1.11.2 Detailed description of the process

The flow chart of the production process with the stages of pulp production is presented in the **ANNEX V.**

**Table 8 – Capacities by process area**

| Equipment | Unity | Capacity |
|---|---|---|
| Wood yard | $m^3$s sc/h | 3 x 400 |
| Cooking | ADt/day | 5,050 |
| Fiber line | ADt/day | 4,750 |
| Drying | ADtB/day | 2 x 2.500 |
| Evaporation | t $H_2O$/h | 1,800 |
| Recovery boiler | tSS/day | 7,200 |
| Causticizing | $m^3$ LB/day | 17,000 |
| Lime kiln | t lime/day | 2 x 700 |
| Compressed Air | $Nm^3$/h | (3+1) x 8,700 |

| Equipment | Unity | Capacity |
|---|---|---|
| Turbogenerators | MW | 2 x 130 |
| Biomass boiler | t/h | 75 |
| Water treatment plant (WTP) | m³/h | 6,700 |
| Effluent Treatment plant (EPT) | m³/h | 5,700 |
| Chlorine dioxide plant | t $ClO_2$/day | 55 |
| Oxygen plant | t/day | 140 |

#### 6.1.11.3 Logs Reception and Processing

The wood to be processed at the pulp mill is composed of six-meter-long eucalyptus logs, which will be debarked in the forests. The logs will be transported by road or waterway.




**Figure 18 – Eucalyptus woods being debarked in filed**

The log storage capacity for pup in the mill is equivalent to an average consumption of ten days. The logs will be stored in a paved inner yard near the receiving tables, with wood handling using mobile equipment such as wheel loaders or hydraulic cranes.

The forecast is that approximately 70% of the total logs will be fed directly to the tables without passing through the storage area.




**Figure 19 – Discharge of eucalyptus logs into the wood yard**

Three lines of wood chipping are being considered.

The feeder table will be followed by a belt and roller conveyor to remove residual bark and other contaminants, a log cleaning station and a metal detector to protect the chipper.

The receiving tables will be fed by cranes (mobile or stationary) or diesel loaders.



**Figure 20 – Wood chip pile**

The chip storage will be based on the FIFO (First In First Out) principle in the open, with automatic stacking and restart, and will consist of two circular stackers / reclaimers with a rotating moving screw removal system. The storage capacity will be 3 days.

The three chip lines will be installed after the storage piles. The surplus will be collected and recovered to use the fibres for pulp production, or optionally, used as biomass for

burning in the boiler. Accepted chips will be sent through a line of conveyor belts to the digestors.

The residual bark will be cut and sent together with the filtered residues (fine) to a covered biomass pile, with a storage capacity of two days, with automatic stacking and continuation. The mobile extractors will recover the biomass from the pile, which will then be sent to the biomass boiler.

Log cleaning water will be recovered and recirculated, although an amount of industrial water is needed to replace losses and maintain water quality. Solid waste contaminants in the wash water after it has been decanted into the water recovery system will be largely removed by a drag conveyor and discharged from the process.

#### 6.1.11.4 Fiber Line

**Cooking**

The objective of cooking is to separate the fibers and other components of the chips through a chemical reaction.



**Figure 21 – Cooking**

Cooking is a chemical alkaline process, since it uses the chemical reagents sodium hydroxide (NaOH) and sodium sulfide ($Na_2S$), the main components of the white cooking liquor, to promote the dissolution of the components that bind the fibers to each other, under favorable and optimized pressure and temperature conditions in the digester, which is a large vessel under pressure.

The chips from the wood preparation sector will be fed into a chip silo where they will be heated with steam, then discharged through a chip metering screw, mixed with white liquor and pumped into the upper separator of the digester.

After a suitable reaction time in the digester, the obtained pulp will be removed from the interior by the discharge line and washed with black liquor, to reduce the concentration of organic matter accompanying the pulp.

The light black liquor extracted from the digester during the cleaning process will be sent to the evaporation plant, to be submitted to instantaneous evaporation.

The pulp will be sent to the discharge tank and then to the brown stock washing and knot separation areas. The purified pulp will be washed and delignified with oxygen.

**Extraction of Lignin by Oxygen (Delignification)**

The lignin extraction process using oxygen is one of the prior stages before bleaching, which additional lignin separation takes place, by means of reactions of the pulp with an oxidant agent in an alkaline environment. The aim is to reduce the consumption of chemical reagents in the final stages of the bleaching process as much as possible, recover the maximum amount of alkali applied and mitigate the generation of organic load for the effluent.

**Bleaching**

Bleaching is a purification process that aims to remove elements that would prevent complete bleaching of the pulp, such as resins and much of the residual lignin not dissolved in previous operations.

The aim is to obtain ECF (elemental chlorine free) pulp with a high degree of whiteness (90% ISO) and stability, without prejudice its physical-mechanical characteristics. This high degree of whiteness is required in the process, and is achieved through the use of appropriate chemical reagents in several stages, each with specific operating conditions.

The bleaching plant will consist of four stages of medium consistency: A/D Eop D P (high-temperature chlorine dioxide, alkaline extraction, chlorine dioxide, and peroxide).

The bleached pulp will be sent to the storage towers, where it will be stored at a medium consistency and then fed to the drying machine.



**Figure 22 – Bleaching**

#### 6.1.11.5 Drying and Packing

From the bleached pulp storage tower, the pulp is mixed, homogenized, purified and its consistency is precisely regulated. It is then sent to two drying machines in which the fibre suspension in water is subjected to the dewatering process, forming the pulp sheets (plates). The two machines will operate in parallel to satisfy the total production of the PARACEL pulp mill.

The pulp dryer will be the type “floating sheet”, which dries the pulp while keeping it floating on a cushion of steam-heated air.

Then, the pulp sheet will be sent to a cooler, and the output will be taken out through a press and directed to the cutter, which will first cut the sheet in the longitudinal direction, and then in the transverse direction.

The sheets cut to the programmed size will be stored, pressed into packs, and covered for later identification. The packs will also be stacked and unified, following for the pulp warehouse.

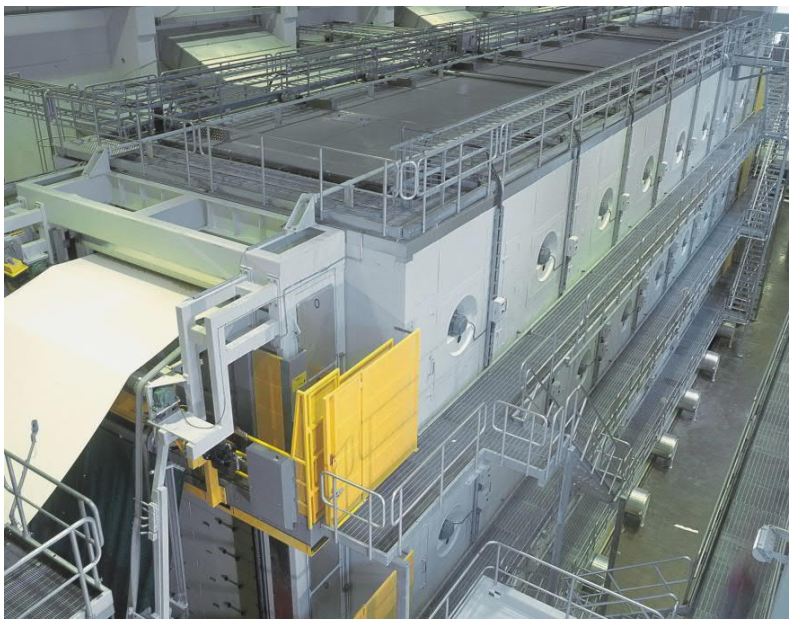

**Figure 23 – Drying**

### 6.1.11.6 Recovery

**Evaporation Plant**

The purpose of evaporation is to concentrate the black liquor from the cooking between initial concentration of 14.0 - 16.0% to final concentration of 80% solids.

The evaporation plant will be a multiple effect plant using low pressure steam. The final concentration of the liquor will be achieved in the various stages of the evaporators. The concentrated liquor produced will be stored for later burning in the recovery boiler.

The evaporation condensates will be segregated into different quality grades. Therefore, segregation is important to ensure sufficient quality in the condensates that will be used in other areas of the plant.

Condensate treatment and methanol rectifier plants will be integrated into the evaporation plant.

Contaminated condensate collected from the process will be treated in the condensate treatment and purification plant. The purified condensate will be used later in the process.

The gases from the extraction column of the condensate purification plant will be sent to the rectifier column for methanol extraction. The methanol produced will be used as an auxiliary fuel in the lime kiln or biomass boiler.



**Figure 24 – Evaporation Plant**

**Recovery boiler**

The purpose of the recovery boiler is:

- Recover chemicals used in cooking;
- Reduce sodium sulfate to sulfur;
- Generate steam using the energy resulting from the burning of organic materials extracted from the wood.

The boiler will be high efficiency, low odor type with a multilevel air system to burn liquor at 80%.

The steam generated at high pressure will be sent to the turbogenerators to produce electricity.

The combustion air will be introduced into the furnace on at least four levels, with forced circulation fans, to allow optimum control of combustion, reduction of NOx emissions and reduction of smelt.

The flue gases from the combustion will pass through an electrostatic precipitator, whose efficiency is expected to be over 99.7%. The precipitator's ash treatment system will be integrated into the recovery boiler or evaporation plant.

Concentrated and diluted non-condensable gases from the line will be incinerated in the recovery boiler.

Fuel oil will be used as initial fuel, to stabilize the production process and generating electricity.

**Causticizing**

In the causticizing, the green liquor from the recovery boiler will be transformed into white liquor, which will then be used to cook the wood. The green liquor is formed from the solubilization of the smelt formed in the recovery boiler.

This transformation is the reaction of sodium carbonate of the green liquor with lime (calcium oxide), obtaining sodium hydroxide and calcium carbonate, which will be separated by filtration.

Before coming into contact with the lime (calcium oxide and aggregates), the green liquor will be filtered to remove impurities (dregs). The dregs will be washed and filtered in a filter or centrifuge, specific equipment for this application.

Secondary condensate from the evaporation plant or warm water will be used to wash the dregs.

The lime residues (grits) will also be washed and, like the dregs, will be sent to the recycling center to generate soil correction, or even to an industrial landfill.

After the reaction of the green liquor with the lime, the white liquor will be obtained by filtering the mixture of sodium hydroxide (white liquor) and calcium carbonate (lime mud) through a pressurized disc filter.

The white liquor will be sent for cooking and the lime mud will be washed and dewatered in a vacuum disc filter before being sent to the lime kilns.

Secondary condensate from the evaporation plant or warm water will be used to dilute and wash the lime mud. The filtrate from the sludge filter will be pumped into the weak liquor tank.

The collection and recovery of all effluent from this area is planned, as well as the closing of the cooling water circuit.

**Lime kiln**

The purpose of calcination is to transform the calcium carbonate obtained from the causticizing into calcium oxide (CaO + inert) to be used in the reaction with the green liquor.

The calcination will take place in two parallel rotation kilns, lined internally with heat-resistant and insulating bricks and then heated by the combustion of fuel oil or another alternative fuel that can be used in the future (biomass gas).

**ANNEX VI** shows a general layout of the causticizing and lime kilns.

As an auxiliary fuel, the furnaces can burn methanol from condensate stripper.

The lime kilns will be equipped with an external dryer for the lime mud and coolers for the burnt/calcined lime.

Through an electrostatic precipitator, dust will be removed from the exhaust gases and can be returned to the lime kilns or disposed of (lime mud purge).

The flue gases will be sent to the chimney (common with the recovery boiler), from where they are released to atmosphere.



**Figure 25 – Lime Kilns**

### 6.1.11.7 Chemical handling, preparation and storage area (chemical plant)

The description of this area corresponds to differentiated systems to meet the requirements of chemical supply to the pulp mill. All chemical storage tanks shall have retention walls with a volume at least equivalent to the maximum storage volume.



**Figure 26 – Chemical Plant**

The area of chemical products will include:

– Discharge, handling and storage of sodium hydroxide;
– Discharge, handling and storage of sulphuric acid;
– Discharge, handling and storage of sodium bisulfite;
– Unloading, handling and storage of hydrogen peroxide;
– Unloading, handling and storage of sodium chlorate;
– Unloading, handling and storage of methanol;
– Plant for the production of chlorine dioxide;
– Plant for the production of oxygen;

## Storage volumes

The volumes of chemical storage tanks are presented in the following table.

**Table 9 – Chemical substances**

| Chemical substances | Volume ($m^3$) |
|---|---|
| Sodium hydroxide 50% | 2 x 750 |
| Sulfuric acid | 2 x 350 |
| Sodium bisulfite | 120 |
| Hydrogen peroxide | 600 |
| Sodium chlorate, solution | 510 |
| Methanol | 160 |
| Chlorine dioxide, 10 g/l | 2 x 830 |

## Description of chemical plant processes

### Handling and storage of sodium hydroxide

Sodium hydroxide 50% will be unloaded from trucks through centrifugal pumps and deposited in the storage tanks. Most of this solution will be transferred for use in the pulp liquor, lignin extraction (delignification) and bleaching system.

Other areas of the manufacturing process will also use sodium hydroxide, such as water treatment plant, boiler water treatment plant and effluent treatment plant.

### Handling and storage of sulphuric acid

The sulphuric acid (96% concentration) will be discharged from trucks by pumping and stored in a closed tank to prevent the entry of moisture. The sulfuric acid will be used in the chlorine dioxide generator, in the acidification of the pulp in the bleaching process, in the treatment of the boiler water and in the effluent treatment plant.

### Handling and storage of sodium bisulfite

The sodium bisulfite will be discharged and stored in a tank, and then sent to a storage tank. The sodium bisulfite will be used for bleaching.

### Handling and storage of hydrogen peroxide

The hydrogen peroxide will come to the pulp mill by truck, to be supplied in solution. From the storage tank, the product will be distributed for bleaching.

### Handling and storage of sodium chlorate

Sodium chlorate will be the main raw material for obtaining chlorine dioxide and will be transported in liquid form in trucks that will be unloaded by the pump and stored in a tank, from where the product will be sent to the chlorine dioxide production plant.

### Methanol handling and storage

The methanol will be transported to the pulp mill by truck and then unloaded by pump and stored in a tank. From the storage tank, the product will be sent to the chlorine dioxide production plant.

### Chlorine Dioxide Production Plant

Chlorine dioxide is produced by a process in which sodium chlorate reacts with a reducing agent (methanol) in an acidic environment and in a vacuum, the reaction of which is presented below. Sodium sulphate, obtained as a by-product of chlorine dioxide generation, will be used as a sodium and sulphur make-up in the pulp mill.

$$3\ NaClO_3 + 2\ H_2SO_4 + 1/2\ CH_3OH \rightarrow$$

$$3\ ClO_2 + 2\ H_2O + Na_3H(SO_4)_2 + x\ HCOOH + y\ CO_2 + z\ CH_3OH$$

The chlorine dioxide generator will be the main equipment in the process, which is a vessel (recipient usually made of titanium) where the sodium chlorate ($NaClO_3$) reacts to form $ClO_2$.

The generator will be designed to optimize the efficiency of the reaction, promote the growth of salt cake crystals, promote efficient gas-liquid separation and sufficient volume for easy control of the concentration of the reagents. It should be noted that the design of the components of this circuit aims to eliminate internal cleaning of the reactor.

The rate of evaporation of the water will be equal to the rate of water entering with the supply of chemicals and utilities to the generator. The partial pressure of the chlorine dioxide will be maintained at a safe level by partial vacuum and dilution with water vapor. Normally, the vacuum in the $ClO_2$ reaction is produced by a steam ejector.

The effluent water from the gas depurator will be transferred to the main absorption tower and consequently all the $ClO_2$ in the vent gases will be recovered and added to the chlorine dioxide solution.

The resulting chlorine dioxide gas from the generator will be cooled and absorbed in a tower, using cool water. The resulting product will be a strong, chlorine-free $ClO_2$ solution.

As the $ClO_2$ generator gas will not have any diluent gas like air or chlorine, the absorption efficiency will be high to reach concentrations above 10 g/l $ClO_2$.

The chlorine dioxide solution will be pumped into the storage tanks for use in the bleaching process.

Sodium sesquisulphate ($Na_3H(SO_4)_2$) crystals formed in the generator will be pumped for filtration to remove solids. The filter shall be equipped with a hot washing system. The sodium sesquisulphate will be discharged into a dissolution system where it will be neutralized and pumped to the plant.

### Oxygen Production Plant

Oxygen production will be carried out through a plant dedicated to execute lignin extraction (delignification), bleaching and white liquor oxidation.

Oxygen generation can be performed by purifying the atmospheric air through the Vacuum Swing Adsorber (VSA) process, through molecular filters.

At the beginning of the process, the atmospheric air will pass through a filtration system, where solid particles will be removed.

The air will then be sucked in and subjected to a vacuum regime, sufficient to allow the air to flow into the purification system.

The air purification system consists mainly of adsorbent vessels, which operate in cycles. By passing through a molecular sieve bed, the moisture, $CO_2$ and nitrogen from the air will be removed from the main stream.

The purified air, rich in oxygen, will leave the purification system and then go to the oxygen compressor, which will compress it to the conditions necessary for its use. The waste gas will be discharged to the atmosphere through the silencer.

## Product transport system

The transport of the main chemical products in liquid form will be done in bulk, using tank trucks.

It is worth mentioning that transport companies must have specific training for drivers and operators in traffic management, education and safety, in order to reduce the risks of accidents.

## Chemical Plant Operational Control and Safety System

### Safety and control equipment and protection structures

The chemical plant must have the following equipment and structures for storage, containment, control and safety:

- Chemical product unloading platforms, provided with containment systems through low walls;
- Storage of liquid products in metal tanks, made of carbon steel, stainless steel or fiberglass (the material will depend on the type of chemical to be stored);
- Concrete containment dikes for chemical storage tanks;
- Containment channels in the production areas and in the chemical products storage;
- Remotely operated process monitoring instruments (level, pressure, temperature, among others) to minimize the need for operators in the production or chemical storage area. Remote operation can be performed by dedicated remote control systems;
- With respect to chlorine dioxide, the following measures are foreseen:
  - ✓ Chlorine dioxide leak detection system;
  - ✓ Constant ventilation system for the tanks (with backup source);
  - ✓ Fixed foam system around the containment tank to prevent gas emission in case of leakage.
- Atmospheric Discharge Protection Systems, provided with grounding networks or lightning arresters;
- One of the points of attention regarding chemical products from PARACEL's pulp mills is the transfer system from the Chemical Plant to the using points, that will be done by pipe rack, which avoids manipulation by operators and minimizes the risk of accidents.

**Chemical Plant Fire Control System**

The chemical plant's internal network of hydrants will be distributed in the form of a ring that will be fed by the main network of hydrants.

The hydraulic and lubrication units, depending on the volume, can be protected by an automatic sprinkler system controlled by an activation valve and independent alarm. In addition, each hydraulic and lubrication unit will be installed within a containment dyke with a volume sufficient to maintain the full volume of oil in the unit.

Portable fire extinguishers will be installed where necessary in accordance with Fire Department requirements.

Fire Department regulations also require the installation of signs in the area reserved for fire extinguishers.

The methanol storage tank must have a protection system in accordance with FM Global standards. Flood protection systems will be installed for this tank and for all metal structures that may collapse in the event of a fire in the tank or other methanol handling equipment.

The sodium chlorate storage building will be protected by an automatic system with sprinklers controlled by an independently acting system and an alarm valve.

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**Chemical Plant Environmental Management System**

In general, the environmental management system proposed for PARACEL's Chemical Plant will have as its main guidelines the elements described below. It is worth mentioning that this system is commonly used in pulp mills around the world.

- The equipment will be designed to operate with the necessary efficiency to minimize the environmental impacts of the activities in the area;
- Installation of instrumentation to monitor and control the process;
- Implementation of an operational process control system through inspections with determined frequency, including the collection of samples and respective laboratory analysis;
- Characterization of process variables that are critical to the environment, to employee safety and to process safety;
- Maintenance management: characterization and registration of critical process equipment and instruments that require preventive/predictive maintenance, through maintenance programming of specific maintenance control software;
- Operation, maintenance and management teams with adequate training and technical skills to meet the requirements of the area;
- Structured system to identify and manage the environmental aspects and impacts and the hazards and risks of the unit, with the aim of implementing preventive actions to reduce risks and protect people and the environment;
- Implementation of an Emergency Action Plan structured to minimize the impacts of accidents, in case of emergencies;
- Structured system to analyze non-conformities and/or accidents and implement corrective actions to avoid recurrence.

### 6.1.11.8 Utilities

#### 6.1.11.8.1 Industrial Water Intake and Supply

The construction of a Water Treatment Plant (WTP) is planned to serve the consumption of the PARACEL pulp mill.

The water will be intake from the Paraguay River, through a surface intake system consisting of a channel and a grid.

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**Figure 27 – Example of surface water collection.**

It is important to note that the collection will be "wire operation" type, it means, no dam system will be built.

Four pumping systems of 2,350 m³/h each will be installed, with a total intake flow of 7,000 m³/h to supply the PARACEL pulp mill.

A 1,100 mm diameter raw water pipe will be installed.

The raw water, which arrives at the Water Treatment Plant, will be treated with aluminum sulfate, sodium hydroxide and sodium hypochlorite, the latter being used to promote the elimination of iron, in addition to oxidizing the organic matter present. After the coagulation process, polyelectrolyte will be added to promote flocculation.

Then, by gravity, the flocculated water will go to the solids removal unit, through a dissolved air flotation system or similar. The formed sludge will be periodically and automatically discharged into the central discharge channel. The collected sludge will be compacted and dewatered and then sent for final disposal.

By gravity, the clarified water will be conducted through channels to the gravity filters. After filtration, the treated water will be stored in the treated water tank that will supply the PARACEL pulp mill's various consumption points, including water for fire control and potable water. The total production capacity of treated water will be 6,700 m³/h. This value is valid for the production of 1,500,000 t/year, which corresponds to a specific consumption of 34.1 m³/t, however the pulp mill may reach a production of up to 1,800,000 t/year and in this scenario, consumption will reach 7,000 m³/h, with that, the specific consumption will be lower, of 29.7 m³/t. Thus, there will be no significant increase in impact.

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**Basic Dimensioning**

The basic dimensioning of the water intake system and the water treatment plant is presented below.

| | | |
|---|---|---|
| Water Intake | | |
| - Water resource | | Paraguay river |
| - Type of intake | | dripping |
| - Flow | $m^3/h$ | 7,000 |
| - Grid chamber | | Carbon steel bars |
| - Intake pumps | | |
| . Quantity | Unity | 04 (03 + 01) |
| . Capacity, each | $m^3/h$ | 2,350 |
| . Type | | Centrifuge |
| Pipeline | | 1,100 mm |
| | | |
| Water Treatment Plant | | |
| **- Capacity (treated water)** | $m^3/h$ | 6,700 |
| | | |
| **- Parshall Flume** | | |
| . Quantity | Unity | 01 |
| | | |
| **- Floating system** | | |
| . Quantity | Unity | 03 |
| . Type | | dissolved air flotation |
| . Application rate | $m^3/m^2.h$ | 27 |
| . Total area | $m^2$ | 248 |
| . Sludge pumps | | |
| .. Quantity | unity | 02 x 35 $m^3/h$ |
| .. Type | | Horizontal centrifuge |
| | | |
| **- Sand filters** | | |
| . Quantity | Unity | 8 |
| . Application rate | $m^3/m^2/h$ | 9.6 |
| . Total area | $m^2$ | 700 |

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| | | |
|---|---|---|
| **- Backwash system** | | |
| . Backwash Pumps | | |
| .. Quantity | Unity | 02 (01 + 01) |
| .. Capacity, each | $m^3/h$ | 900 |
| . Air Blowers | | |
| .. Quantity | Unity | 03 (02 + 01) |
| .. Capacity | $Nm^3/h$ | 2,000 |
| . Backwash water collection tank | | |
| .. Quantity | Unity | 01 |
| .. Volume | $m^3$ | 400 |
| . Pumps for recirculating backwash water (to entry on WTP) | | |
| .. Quantity | Unity | 02 (01 + 01) |
| .. Capacity | $m^3/h$ | 360 |
| **- Industrial water tank** | | |
| . Quantity | Unity | 01 |
| . Total volume | $m^3$ | 27,000 |
| . Retention time | H | 4 |
| **- Industrial water pumps** | | |
| . Quantity | Unity | 05 (04 + 01) |
| . Capacity | $m^3/h$ | 1 675 |
| . Type | | Horizontal centrifuge |
| **- Fire Pumps** | | |
| . Main Pump (electric) | | 600 $m^3/h$ |
| . Diesel Pump | | 600 $m^3/h$ |
| . Jockey Pump | | 60 $m^3/h$ |
| **- Sludge dewatering system** | | |
| . Solid load | tDS/day | 27 |
| . Density | | By gravity |
| . Dewater | | Mechanical, by centrifuges |

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**- Chemical Dosing Systems**

***Sodium hypochlorite storage and dosage***

| | |
|---|---|
| - Tank | 01 x 60 m³ |
| - Dosing Pumps | 02 (01 + 01) x 950 L/h |

***Storage and dosage of aluminum sulphate***

| | |
|---|---|
| - Tank | 02 x 65 m³ |
| - Dosing Pumps | 02 (01 + 01) x 950 L/h |

***Caustic soda storage and dosage***

| | |
|---|---|
| - Tank | 01 x 20 m³ |
| - Dosing Pumps | 02 (01 + 01) x 720 L/h |

***Preparation and dosage of polyelectrolytes (powder)***

| | |
|---|---|
| - Capacity | 01 system of 11 kg/h |

**Treated water quality**

The quality level of industrial treated water shall be in accordance with the following standards:

| **Parameter** | **Unit** | **Value** |
|---|---|---|
| - pH | -- | 6,0 to 8,0 |
| - Colour | PtCo APHA | < 5,0 |
| - Turbidity | NTU | < 1,0 |
| - Residual chlorine | mg/L | 0,5 – 1,0 |
| - Others | -- | Free of algae |

### 6.1.11.8.2 Boiler Feedwater Plant

The water to replace the non-returned live steam condensate losses from the process will be treated by reverse osmosis type demineralization with final polishing through mixed beds.

The replacement water will be pre-purified by filtration through sand filters, activated carbon filters and mechanical cartridge filters before passing through the permeate. The permeate waste will be used to replace the water sealing system.

The deaerator, storage tank and feed water pumps, as well as the steam condensate collection tank, will be installed in the recovery boiler building and serve both the recovery boiler and the power boiler.

The steam condensate collected from the departments will be pumped through mechanical filters into the boiler feedwater tank.

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The feed water pumps will be driven by an electric motor with a hydraulic variable speed drive. The backup pump will be powered by a steam turbine.

#### 6.1.11.8.3 Cooling towers

The cooling water system shall be in a closed circuit, and counterflow towers with an air extractor at the top are considered to serve the following pulp mill processes:

- Cooling tower for turbogenerator + utilities: turbogenerator condensers, biomass and recovery boilers, air conditioning system chillers, turbogenerators, causticizing and lime kiln, fiber line, chemical plant, cooking, drying, wood handling and compressed air system.
- Evaporation cooling tower: evaporation plant.



**Figure 28 – Cooling towers**

#### 6.1.11.8.4 Biomass boiler

The function of the biomass boiler will be to supplement the steam generated in the recovery boiler for energy generation, by using waste from the preparation of wood for cooking.

Waste from wood handling and brown pulp disposal will be mixed and stored in a covered biomass pile where it will be sent to the boiler silos.

The steam produced by the biomass boiler will be mixed with the steam from the recovery boiler and sent to the turbogenerators.

An electrostatic precipitator will be installed to control air emissions.

The biomass boiler can burn methanol as an auxiliary fuel, thus being a backup burning system for lime kilns.

Bottom ash from the boiler and the precipitator will be collected in dedicated silos for subsequent disposal.

The fuel oil will be used as a starting fuel, stabilizing the production process and eventually to oxidize non-condensable gases when they are diverted to the biomass boiler.

#### 6.1.11.8.5 Electricity Cogeneration (Turbogenerators)

The cogeneration system begin with the production of high-pressure steam by the recovery boiler and the biomass boiler.

The high-pressure steam will undergo expansion in the turbine blades and will be extracted at different pressure levels for use in the pulp manufacturing process.

Turbogenerators will have the purpose of transforming the thermal energy of the high-pressure steam into mechanical energy to activate the electrical energy generators.

The supply of steam to the turbogenerators will cover the operation, plus the contingency. The contingency is considered to absorb any variation in steam production in the recovery boiler due to variations in the solids contained in the liquor or even considering calorific value.

It is planned to install 2 turbogenerators for total generation of up to 220 MW, will consume about 120 MW, with a surplus of 100 MW to be exported to the grid.

**System control and monitoring measures (including protection of steam overpressure)**

Variations in steam consumption can still occur during normal pulp mill operation, with pressure control through turbines and control valves. The control and interlocking of the turbines will be carried out by means of a dedicated system, complemented by controls for the admission and extraction of steam from the turbines: pressure reduction and conditioning valves, exhaust valves and, in the latter case, safety and relief valves.

Operation monitoring covers the following components:

- indicating instruments;
- data logging instruments;
- position indicators;
- audible and visual alarm system.

The values presented by the instruments must be compared with the design values and the measuring instruments must be checked and calibrated at regular intervals.

In case of occurrence and detection of any abnormality, the maintenance team shall be informed so that corrective action can be taken.

**Fire prevention and control system**

Recovery boiler and biomass boiler

The boiler area will have dedicated fire prevention and control systems, which are described below.

The internal network of hydrants in the recovery boiler and biomass boiler will be distributed in the form of a ring that will be fed by the main network of fire extinguisher. The fire extinguisher will be installed at high levels in the recovery boiler building and the biomass boiler, considering a minimum action flow with adequate pressure.

Depending on the volume, the hydraulic and lubrication units can be protected by an automatic sprinkler system controlled by a separate system of activation valve and alarm. In addition, each hydraulic and lubrication unit will be installed within a containment dyke of sufficient volume to maintain the full volume of oil in the unit.

Portable fire extinguishers will be installed where needed in accordance with Fire Department regulations.

Fire Department regulations also require the installation of signs in the area reserved for fire extinguishers.

Turbogenerators

The internal network of fire extinguisher in the Turbogenerators area will be distributed in the form of a ring that will be served by the main fire extinguisher network. The hydraulic and lubrication units, depending on the volume, can be protected by an automatic sprinkler system controlled by an independent activation valve and alarm. In addition, each hydraulic and lubrication unit will be installed within a containment dyke with a volume sufficient to maintain the full volume of oil in the unit.

Sprinklers will be installed:

- In the region where the turbogenerator springs are located;
- In all areas where oil can flow or accumulate.

Portable fire extinguishers shall be installed in the necessary locations in accordance with the requirements of the Fire Department.

Fire Department regulations also require the installation of signs in the area reserved for fire extinguishers.

Possible fuel oil leakage points, such as flanges, threaded connections, etc., depending on the pressure, may be protected to prevent fires in the form of spray.

**Turbogenerator noise emission**

The Turbogenerators, which will be enclosed in a dedicated building, will be remotely operated and the control room will be located at a certain distance. In addition, operators, who eventually need access to the area, must use the appropriate Personal Protective Equipment.

**Steam and energy balance**

The following steam balance shows the steam generated for turbogenerators and other uses.

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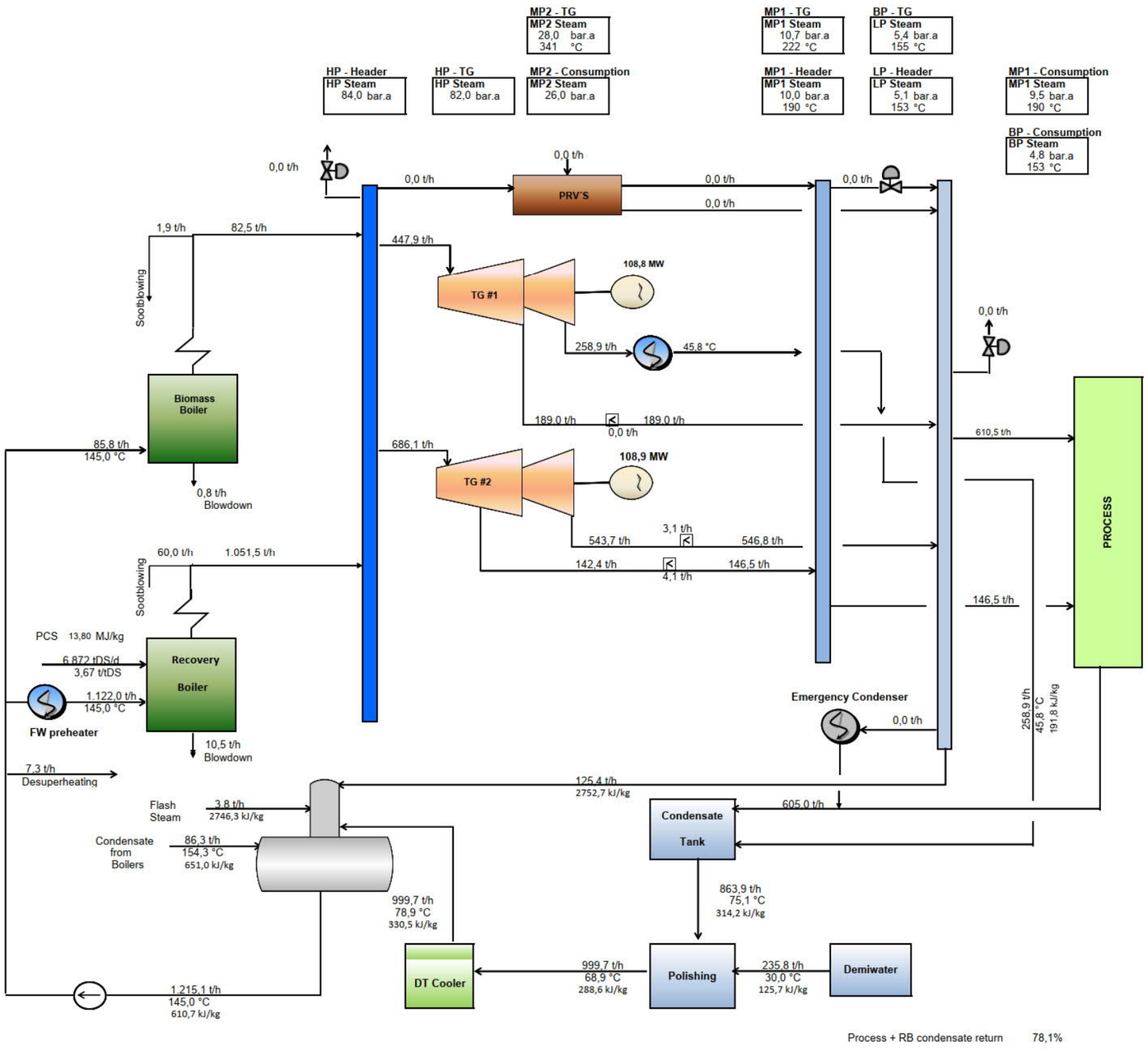


| STEAM BALANCE | | | | |
|---|---|---|---|---|
| CONSUMPTION | Steam, t/h | | | Cond., t/h |
| | MP2 | MP1 | LP | |
| Cooking | - | 58,2 | 27,7 | 30,6 |
| Delignification | - | 26,3 | 0,0 | 0,0 |
| Bleaching | - | 0,0 | 14,3 | 14,3 |
| Drying | - | 0,0 | 215,8 | 189,9 |
| Chlorine Dioxide plant | - | 2,6 | 11,2 | 0,0 |
| Evaporation | - | 11,0 | 261,6 | 255,3 |
| Causticizing/Lime kiln | - | 4,0 | 0,0 | 1,5 |
| Recovery Boiler | 0,0 | 36,8 | 58,6 | 54,1 |
| Sootblowing - RB+BB | 0,0 | 0,0 | - | 0,0 |
| FW preheating - RB | - | 0,0 | - | 0,0 |
| Biomass Boiler | - | 0,0 | 1,5 | 1,5 |
| Ash Cristallization | - | - | 12,7 | 12,7 |
| TG condenser | - | - | - | 258,9 |
| Miscellanea | - | 7,6 | 7,1 | 3,8 |
| Blow off + Aux. condenser | - | - | 0,0 | 0,0 |
| Deaerator | - | - | 125,4 | - |
| **Sub total** | 0,0 | 146,5 | 735,8 | 822,6 |
| **Total Consumption** | | | **1141,3** | |
| HP STEAM | | | 258,9 | |
| MP2 STEAM | | | 146,5 | |
| MP1 STEAM | | | 0,0 | |
| LP STEAM | | | 735,8 | |
| **GENERATION** | | | | |
| RECOVERY BOILER | | | 1051,5 | |
| DESUPERHEATING | | | 7,3 | |
| BIOMASS BOILER | | | 82,5 | |
| **Total generation** | | | **1141,3** | |

| SPECIFIC HEAT CONSUMPTION | | |
|---|---|---|
| CONSUMPTION | MP2 GJ/ADtB | MP1 GJ/ADtB |
| Cooking | 0,000 | 0,768 |
| Delignification | 0,000 | 0,376 |
| Bleaching | 0,000 | 0,000 |
| Drying | 0,000 | 0,000 |
| Chlorine Dioxide plant | 0,000 | 0,037 |
| Evaporation | 0,000 | 0,000 |
| Causticizing/Lime kiln | 0,000 | 0,028 |
| Recovery Boiler | 0,000 | 0,390 |
| Sootblowing - RB+BB | 0,000 | 0,000 |
| FW preheating - RB | 0,000 | 0,000 |
| Biomass Boiler | | |
| | | |
| Miscellanea | 0,000 | 0,100 |
| **Subtotal** | 0,000 | 1,699 |
| Blow off & condensador aux. | 0,000 | 0,000 |
| **Total** | | **8,914** |

| POWER BALANCE | | |
|---|---|---|
| DEMAND | MW | kWh/ADtB |
| Wood preparation | 7,7 | 39,1 |
| Cooking<br>Delignification &Bleaching | 26,1 | 133,2 |
| Drying | 35,8 | 182,4 |
| Evaporation | 4,9 | 25,0 |
| Causticizing &Lime kiln | 5,4 | 27,7 |
| Recovery Boiler | 14,9 | 76,1 |
| Water treatment plant | 1,2 | 6,4 |
| Biomass boiler | 1,5 | 7,7 |
| Demineralizing plant | 2,6 | 13,0 |
| Effluent treatment plant | 3,9 | 19,7 |
| Cooling Tower&Pumps | 5,9 | 30,2 |
| Turbogenerators | 0,5 | 2,5 |
| Compressors | 1,6 | 8,0 |
| Chiller for AC | 1,0 | 4,8 |
| Ash cristallization | 0,4 | 2,2 |
| Miscellanea | 0,8 | 4,0 |
| **Total - Pulp Mill** | **114,2** | **582,0** |
| Oxygen plant | 2,2 | 11,4 |
| Chlorine Dioxide plant | 1,3 | 6,9 |
| | | |
| **Total - Line 2** | **117,8** | 600,3 |
| **Total Demand** | **117,8** | **600,3** |
| **GENERATION** | **MW** | **kWh/ADtB** |
| TG1 | 108,9 | 554,9 |
| TG2 | 108,8 | 554,8 |
| **Total Generation** | **217,7** | **1109,7** |
| **Surplus to sell** | **99,9** | **509,4** |

PARACEL PÖYRY

**STEAM AND POWER BALANCE**

| OPERATING CONDITIONS | DESIGN | *Normal Operation* |
|---|---|---|
| ***Kraft Pulp*** | **Daily** | **Annual** |
| | **4.708 ADtB** | **1.500.000 ADtB** |

**Figure 29 – Steam and energy balance**

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#### 6.1.11.8.6 Fuel storage

Fuel will be used accordingly in the areas of recovery boilers, biomass boilers and lime kilns, on the following occasions:

- Pulp mill start up;
- Annual preventive maintenance of the pulp mill with the consequent start up;
- Temporary situations of operation.

The volume of fuel oil storage will be 3,000 m³, being heated and distributed to consumers at a temperature of 70 ºC.

**Fuel Storage Area Fire Control System**

For the fire control system in the fuel storage area, hydrants will be installed in appropriate locations to provide cooling to the tanks, in addition to foam lines to combat occasional spills from the tanks.

All the hydrants around the tanks will be equipped with accessories for the manual supply of foam and adjustable nozzles for the production of water mist.

Portable fire extinguishers will be installed where necessary in accordance with Fire Department regulations, including portable dry chemical and foam extinguishers, which will be installed near the fuel oil pumping and discharge station.

Where appropriate, tanks shall be equipped with a fixed internal foam dispersal system.

Fire Department regulations also require the installation of signs in the area reserved for fire extinguishers.

#### 6.1.11.8.7 Compressed air

Both the service air (pulp process) and the instrument air will be treated in a dryer to remove moisture, but there will be 2 separate air grids, one for the service (process) air and one for the instrument air.

The operating pressure shall be 7 bar (g), using an oil-free centrifugal compressor and an adsorption-type dryer.

#### 6.1.11.8.8 Ventilation and air conditioning

The electrical rooms and the control rooms will be equipped with a fan coil air conditioning system with a chilled water plant. The water for the chiller will come from the cooling tower pumped through a dedicated.

### 6.1.11.9 Administrative and operational support facilities

**Gatehouse**

The PARACEL pulp mill will have a gate to control the access of people and vehicles.

**Administrative Building**

The administrative building will consist of offices, bathrooms, cafeteria and clinic.

**Parking for cars and trucks**

PARACEL's pulp mill will have parking for employees and visitors. In addition, there will be parking for trucks.

**Weigh machine**

Two weighing machines will be installed to control the entry and exit of wood and inputs to the pulp mill.

**Storage**

Next to the administrative building there will be a warehouse to store general materials.

**Warehouse**

The warehouse will be used to maintain industrial equipment and there will be reinforced concrete floors, waterproofed by masonry walls to contain any spills.

### 6.1.11.10 Diversification / Future Expansions

#### 6.1.11.10.1 Second Pulp Line

PARACEL's project in Concepción already includes the installation of the second pulp line, whose capacity will be defined in the future.

#### 6.1.11.10.2 Sodium Chlorate Plant

Sodium chlorate, the main raw material for obtaining chlorine dioxide, will be produced in electrochemical cells from sodium chloride, and the hydrogen gas generated in this plant can be used as fuel in lime kilns.

Chlorate is formed through the electrolysis of brine using the following equation:

$$NaCl + 3\,H_2O + 6\,e^- \longrightarrow NaClO_3 + 3\,H_2$$

Actually, the reaction has intermediate stages. At first, the reaction products of the electrode, which will be chlorine and hydroxide, will form sodium hypochlorite (NaClO) and this will be converted to chlorate ($NaClO_3$). Most of the reaction will take place in the electrolytic cell, but a smaller part of the reaction will take place after the cell.

At the beginning of the process, it will be necessary to purify the salty solution, which can be treated by chemical precipitation. In cases where the sodium chlorate is generated in a closed circuit system (system where there is a large reuse of water and solutions in the process, with little generation of effluents), the brine (salty solution) is purified in an evaporator, where the water evaporates and the salt is crystallized.

During electrolysis, there is an increase in the temperature of the solution (also called electrolyte) contained in the cells, and an external cooling circuit will be necessary to control it. From the cells, the electrolyte will overflow into a gas separator and then into the reaction tank, where most of the remaining hypochlorite will be converted to chlorate.

After the reaction tank, the pH of the electrolyte will be corrected to prevent the chlorine from floating in the crystallizer. The flow will be divided into two parts, one of which will be fed directly to the crystallizer and the other will pass through the electrolysis filters after alkalization before entering the crystallizer, which will operate under vacuum. The chlorate will be removed from the bottom of the crystallizer and filtered. After filtration, the sodium chlorate will be sent to the silos to be dissolved in water for use in the chlorine dioxide plant.

The hydrogen gas formed in the reaction will contain traces of oxygen and chlorine. This gas will be washed in absorption towers to remove the chlorine, as hydrogen gas will be used as an auxiliary fuel in the lime kilns. The oxygen content of the hydrogen will be constantly monitored to keep it below dangerous concentrations. To prevent chlorine from being released into the atmosphere from the reaction tanks, fan systems and absorption towers will be installed.

For safety reasons, the hydrogen system will have to be inert with nitrogen after stops and before starting. A dedicated nitrogen system shall be installed and send nitrogen to the cells and different parts of the hydrogen system at any stop or start.

#### 6.1.11.10.3 Calcium Carbonate Plant

The production of calcium carbonate ($CaCO_3$) will be through the reaction between lime (CaO) and water ($H_2O$), generating lime milk [$Ca(OH)_2$].

Subsequently, in reactors called carbonators, the drain of lime exposed to the bubbling carbon dioxide ($CO_2$) from the exhaust gases of the lime kilns will react, forming the precipitated calcium carbonate in suspension.

#### 6.1.11.10.4 Sulphuric Acid Plant

The basic process of producing sulphuric acid consists of the following steps:

Solid elemental sulfur will be melted in a tank equipped with steam coils. The melted sulfur will be pumped to the sulfur filters and polished and then will be sent to the furnace.

The CNCG gases and the liquid sulphur will be completely oxidized with combustion air in the furnace to convert the Sulphur (S) contained in the feed into a flow of combustions gases (stream) containing sulphur dioxide ($SO_2$).

The flow gas stream, which contains $SO_2$, will be cooled in a steam-generating boiler downstream of the furnace.

The gas mixture, rich in $SO_2$, will be fed into the conversion reactor, where in a catalytic medium the oxidation reaction from $SO_2$ to $SO_3$ takes place. The reactor will be a fixed-bed full column, which uses a $V_2O_5$ catalyst for the oxidation reaction.

The reactor gas stream, now rich in $SO_3$, will be fed to the capacitor or absorption tower. This stage of the process will involve the reaction with water, either in the form of moisture (steam) from the flue gas or water (liquid) used as an absorption medium, with $SO_3$, forming sulphuric acid ($H_2SO_4$).

The outlet gases, with traces of $SO_2$ and $SO_3$, will be directed to the chemical depurator (scrubbers) for treatment with NaOH. This process with caustic soda makes the effluent gases free of pollutants and will be sent to the chimney, in accordance with environmental regulations.

#### 6.1.11.10.5 Biomass gasification plant

The wet biomass originated in the wood yard will be fed into a silo before the dryer.

This wet biomass will be dried with a hot air belt dryer. The hot air will be generated in indirect heat exchangers that can use heat from various sources.

The hot air will flow through the biomass layer on the perforated conveyor belt, resulting in the exchange of moisture from the biomass fuel to the drying air. Wet air

will be blown into the atmosphere and dry biomass with a suitable particle size and moisture content will be transported to the fuel silos of the gasifier.

In the gasification plant, a circulating fluidized bed air-blown gasifier will produce a gas with a low heating value. The gas contains mainly $H_2$, CO, $CH_4$, $CO_2$, $H_2O$ and some heavier hydrocarbons as combustible components. The calcium-based bed material, typically limestone, will be used in the circulating fluidized bed.

The gasifier will use hot air from the lime kiln. The gasification air will be introduced from the bottom of the gasifier that ensures proper distribution of air in the gasifier. A cyclone will be used to separate the entrained solids from the gas flow. Solids containing unreacted fuel coal and circulating bed material will be returned to the gasifier through a return pipe to maximize fuel conversion in the gasifier.

The hot fuel gas leaving the gasifier will be conducted to the lime kiln through a heat-resistant gas line and burned in the furnace of the multi-fuel lime kiln.

### 6.1.12 Environmental Control

#### 6.1.12.1 Liquid Effluent

##### 6.1.12.1.1 Generation sources

Basically, the sources of liquid effluent generation that will correspond to the activities of the pulp process and other support activities are the following:

- Effluents from the wood preparation area;
- Effluents from the cooking and brown pulp depuration area;
- Alkaline and acid filtrates;
- Drying machine effluents;
- Effluents from evaporation and recovery;
- Effluents from the causticizing and lime kiln area;
- Contaminated condensates;
- Sanitary effluents;
- Contaminated rainwater; and
- Miscellaneous (spills, leaks, cleaning of various areas, etc.).

##### 6.1.12.1.2 Spill control system

The spill collection and management system has been designed so that accidental discharges can be collected as close as possible to the source and recycled directly to their own process stage.

The main approaches are:

- Dam with retaining walls around tanks and equipment where there are black or white liquors and chemicals. In the event of an accidental leak or spill, the material will be collected and returned directly to the process;

- Tank systems and equipment that will allow excess liquor to be properly conducted when emptying is required for maintenance. Process liquor will be taken to a spill tank and returned directly to the process instead of being discharged to the effluent network;
- In areas with potential for spills, there will be interconnection of the floor channels with the pumping wells, from which the liquids will be returned to the process;
- Emergency lagoon in Effluent Treatment Plant, where the effluents can also be directed in the event of spills that have not been contained with the means previously provided;
- Appropriate instrumentation for on-line effluent monitoring, and a good monitoring system to help operators detect accidental discharges and take appropriate corrective action; and
- Training of operators, process managers and information systems, where environmental problems and accidental discharges require continuous attention.

**Digester and brown pulp line**

Accidental discharges from this area may have black liquor and fibers, and must be recovered.

A spill tank will be installed. The preferred point of return from this tank will be the dilution at the bottom of the discharge tank.

Whenever possible, overflows and drains from process equipment should be connected directly to the spill tank or, alternatively, to the feed tank before the equipment.

Any additional spills will be collected in floor channels and taken to a well, from where they will be pumped into the spill tank.

**Bleaching**

Overflows and spills in this area may contain fibers, filtrates and chemicals such as caustic soda, chlorine dioxide and sulphuric acid. Accidental fiber losses will be sent to the effluent treatment plant and separated in the primary treatment. The chemicals will be neutralized before being sent to the effluent treatment plant.

**Drying Machine**

Overflows and spills from this area contain fibers, but not a significant amount of dissolved elements. If not collected in the area, the fiber losses will be sent to the effluent treatment plant and separated in the primary treatment.

**Evaporation**

Accidental discharges from this area have a high black liquor content and must be recovered. The basic treatment is similar to that of the cooking area and the brown pulp line.

Spills from this area will be directed to the liquor spill tank, from where they will be sent to the liquor tank, with the proportional feeding. The liquor from the evaporation wash water will also be channeled to this tank, as well as any excess of contaminated condensate, in case of problems with condensate polishing.

The steam condensates from the second to last effect of the evaporator will be segregated and the condensate from the clean section of these effects will be recycled to some of the effects at the front end for internal extraction to produce condensate "A" to be used in the fibre line and in the causticizing area. Condensate "A" is a cleaner condensate, which allows it to be reused in the process.

The floor channels will be connected to a collection pit, from which the spills will be returned to the liquor spill tank. The tank will be installed inside a containment tank.

**Recovery boiler**

Accidental discharges or spills from this area have a high black liquor content and must be recovered. The basic treatment is similar to the cooking area and the brown pulp line.

Spills from the upper floors will be collected and sent to an unloading tank, and will go to the collection pit, which will also receive spills on the ground floor. These spills will be pumped into an overflow tank at the evaporation plant, where they will be recovered.

**Causticizing**

In this area, spills will be collected and sent to two collection wells, which have an agitation system, conductivity measurement and pumps. If the spill is within a certain conductivity range, it will be sent to the clarifier for recovery.

A lime mud recovery system is foreseen in case of unscheduled lime kiln stops. The temporary storage of the lime mud will be carried out in a paved place with walls, avoiding its loss.

**Other areas**

The chemical preparation area will be surrounded by retaining walls. In addition, the chemical tanks will also be contained by dikes. If there is a spill in the area, they will be sent to mixing tanks to adjust the pH and then sent to the effluent treatment plant.

Fuel oil storage will also be contained by retaining walls with a well. In the event of a spill, a pump will be installed to send the fuel to a tanker truck. Fuel oil heaters in process areas should have their own containment walls.

All process areas will have a spill system, gate system, and effluent conductivity. After a certain conductivity, the effluent is recovered in the process.

#### 6.1.12.1.3 Characteristics of the effluent before treatment

The quantitative and qualitative characteristics expected before treatment, which are the basis for sizing the effluent treatment plant, are shown in the table below.

The value of effluent is 5,700 m³/h for the production of 1,500,000 t/year, which corresponds to a specific generation of 29.0 m³/t, however the pulp mill may reach a production of up to 1,800. 000 t/year and in this scenario, generation will reach 6,000 m³/h, with that, the specific consumption will be lower, of 25.5 m³/t. Thus, there will be no significant increase in impact.

**Table 10 – Characteristics of the effluent before treatment**

| Standards | Unity | Value |
|---|---|---|
| Flow | $m^3/h$ | 5,700 |
| pH | - | 3.0 to 10.0 |
| Temperature | $^oC$ | 60 to 70 |
| BOD | kg/d | 84,000 |
| | mg/L | 600 |
| COD | kg/d | 193,000 |
| | mg/L | 1,400 |
| TSS | kg/d | 47,000 |
| | mg/L | 350 |
| Colour | kg/d | 96,000 |
| | mg/L | 750 |
| AOX | kg/d | 1,400 |
| | mg/L | 10 |
| $N_{total}$ | kg/d | 2,000 |
| | mg/L | 15 |
| $N_{ammoniacal}$ | kg/d | 700 |
| | mg/L | 5 |
| $P_{total}$ | kg/d | 700 |
| | mg/L | 5 |

#### 6.1.12.1.4 Effluent Treatment Plant (ETP)

The pulp mill industrial liquid effluent will be measured for flow, temperature, pH and conductivity and, depending on the results, diverted to emergency lagoon. The other part of the treatment system description is below.

Specific effluent

Effluent from the chlorine dioxide plant, ash leaching and boiler make-up water plant will also be segregated from the main lines, as they have no organic load, requiring only pH control before release. The specific neutralized effluent will be added to the other treated effluent in the treated effluent tank for disposal in the Paraguay River.

Sanitary effluent

Sanitary effluent generated at the mill will be collected from the sanitary effluent network and sent to the ETP directly for biological treatment.

**Summary of the Effluent Treatment System**

PARACEL's effluent treatment system will basically consist of three stages: solids removal, organic load removal and final polishing. The main units of this system are listed and described below.

The main stages of the effluent treatment process are:

– Screening;

– Primary clarifier;

– Emergency lagoon;

– Neutralization;

– Cooling;

– Activated sludge - aeration tank;

– Secondary clarifier;

– Tertiary treatment;

– Emissary pipeline.

The general lay out of Effluent Treatment Plant is presented in **ANNEX VII.**

Screening

Effluent will be directed by gravity to a screening system to remove coarse materials. This system will have 2 sets composed of a mechanized screen and a manual screen, which will be used when the mechanized screen was subjected to maintenance.

Primary clarifier

After passing through a grid system and flow measurement, the effluent will be sent to two primary clarifiers with a diameter of 68 m to reduce the amount of suspended solids. These clarifiers will be equipped with a scraper to remove sedimentary solids and surface foam. The settled solids and the slag will be removed by pumps that will be sent to the primary sludge dewatering system. The clarified effluent will be sent to the neutralization system.

Primary sludge dewatering system

The primary sludge dewatering system will have a total capacity of 42 tDS/day. Each assembly will consist of a mechanical drum type or gravity type table thickener and a screw type dewatering press. The expected final consistency of the dewatered sludge is between 35 - 45%.

Emergency lagoon

In addition to the systems for preventing and collecting leaks and spills in each department of the mill, there will be a set of emergency lagoon at the effluent treatment plant. The purpose of these lagoons will be to receive all effluent with characteristics that are out of specification. Once discharged into the emergency lagoon, these effluents will be sent at the inlet to the neutralization tank so that no disturbance to the biological treatment is created.

Its operation will be controlled by on-line monitoring of pH, temperature and conductivity. When levels over the acceptable range occur, the valves will be closed and the effluent diverted to the emergency lagoon.

The total volume will be approximately 70,000 m³ to receive the process effluents considered contaminated.

The lagoons will be constructed with a properly sealed bottom and sloped towards the drainage pumps.

Contaminated rain water

Rain water with the possibility of contamination will be sent to the contaminated rain water retention lagoon to avoid hydraulic overloading in the treatment plant due to high rainfall. Once discharged to the retention lagoon, the rain water will be treated and slowly diverted to the effluent treatment plant.

Effluent neutralization

The effluent clarified in the primary clarifiers will be sent to a neutralization tank. The purpose of this step will be to neutralize the effluent by adding caustic soda or sulfuric acid to maintain a pH between 6 and 8, making it suitable for biological treatment.

The neutralization tank will have a capacity of approximately 2,900 $m^3$ and will be equipped with mechanical agitators.

Effluent cooling

Because the neutralized effluent has a temperature considered high for biological treatment, the effluent must be cooled to a temperature that does not affect the performance of the biological treatment.

The effluent will be cooled through a cooling tower composed of six cells, which is sized for an inlet temperature of approximately 70°C and an outlet temperature of approximately 35°C.

Activated sludge

The biological treatment system adopted at PARACEL will be the activated sludge aerobic type. The activated sludge process is a proven technology and is commonly used in the pulp and paper industries worldwide.

The biological process requires sufficient concentrations of nitrogen and phosphorus in the effluent for optimum performance. The amounts required will be related to the amount of biodegradable organic matter, i.e. BOD (Biochemical Oxygen Demand) present in the untreated effluent.

Urea and phosphoric acid are considered sources of nitrogen and phosphorus and will be added, if necessary, before the effluent enters the selector tank. The amount required will depend on the amount present in the effluent (only the minimum amounts necessary should be added, to minimize discharges).

After dosing nutrients, the effluent will be sent to the selector tank, which will have a high oxygenation capacity and is intended to eliminate filamentous organisms. From this tank, the effluents will go to the aeration tank, where they will be submitted to the degradation of the organic matter present in a soluble and colloidal form through the activity of aerobic microorganisms. The injection of air into the system will be carried out through fine bubble diffusers that will be installed in the bottom of the aeration tank. These diffusers will supply the necessary oxygen for the development of bacteria and

will promote the mixing of the liquid mass contained in the aeration tank, keeping the mixture in suspension.

The aeration tank (including the selector) will have a total volume of approximately 160,000 $m^3$ and the diffusers will be fed by blowers with a total capacity of approximately 130,000 $Nm^3/h$, one of which will be reserved for maintenance.



**Figure 30 –Aeration tanks**

In the activated sludge process, the biological mass (sludge) to be physically separated from the liquid mass (clarified effluent) will be formed by three two clarifiers, each one with a diameter of 82 m.

The secondary (biological) sludge will be constantly removed from the bottom of the clarifiers by scrapers and directed by gravity to a sludge pit, from where it will be pumped to the selector tank, with its recirculation. The excess biological sludge will be sent to the secondary sludge dewatering system.

Secondary sludge dewatering system

The secondary sludge dewatering system will have an estimated total capacity of 30 tDS/day and will consist of mechanical type thickeners and centrifuges. The expected final consistency of the dewatered sludge is between 15 and 20%.

Tertiary treatment

After the biological treatment, the effluent will undergo a tertiary treatment to remove phosphorus, color and COD.

The tertiary treatment will be through a physical-chemical process with the application of aluminum sulfate and polymer in coagulation and flocculation tanks and then directed to the dissolved air flotation (DAF). The flotation system has the advantage of obtaining an approximately thickened sludge, which reaches a consistency of 2.0 to 3.0%. The tertiary sludge is supported by a dedicated dewatering system.

As an alternative to the physicochemical flotation system, tertiary treatment can be carried out by injecting ozone into the effluent. The ozone will be produced on site,

through electric discharge in oxygen. In this alternative, the effluent will pass through a sealed contact tank, which will be hermetically sealed, where the ozone will be introduced through fine diffusers. The off gas can be reused and injected into the biological treatment aeration tank. After passing through the contact chamber, the effluent will be sent to the biological filters to retain the suspended solids.

The treated effluent will be discharged through emissaries and diffusers into the Paraguay River. It should be noted that the point of discharge will be located above the point of raw water intake for PARACEL pulp mill .

Tertiary sludge dewatering system

The tertiary sludge from flotation, where a consistency of 2.0 to 3.0% is expected, will be sent to a homogenization tank equipped with a mechanical agitator. This tank will also receive the sludge from the decanters of the Water Treatment Plant (WTP). From the homogenization tank, the mixed sludge (tertiary + WTP) will be pumped to centrifuges, where it will reach a final consistency of about 15%. It is planned to add polymer to the centrifuge inlets to increase dewatering efficiency.

### 6.1.12.1.5 Basic Dimensioning - Main equipment

**Primary Clarifiers**

The sizing of the primary clarifiers mainly considers the surface application rate to which the effluent will be subjected, with the aim of optimizing the sedimentation of the solids. The rate used was 0.8 $m^3/m^2.h$.

$$A = \frac{Q}{rate}$$

whereas: A = area required for decanting, in $m^2$
Q = design flow rate = 5,700 $m^3/h$
Rate = surface application rate = 0.8 $m^3/m^2.h$

$A_{total}$ = 7,125 $m^2$

Taking into account that the decanting units can undergo maintenance during their operation, and that therefore one of the units may be out of service for a certain period, the construction of two clarifiers is planned. Therefore, the area of each of the decanters will be 3,562 $m^2$ , which will be circular, since the scraper and sludge collection system is more efficient. The diameter of each of the decanters will be:

$$D^2 = \frac{4\,A}{\pi} \longrightarrow$$ ***D = 67.3 m (calculated)*** ***D = 68 m (adopted)***

**Neutralization Tank**

The neutralization tank was sized according to the hydraulic retention time required for an optimized mixture, as well as the correct adjustment of the pH of the combined effluents.

$$V = Q \times RT$$

whereas: V = volume of the tank, in $m^3$
Q = Flow rate = 5,700 $m^3$/h = 95 $m^3$/min
RT = retention time = 30 min

V = 2,850 $m^3$ (calculated) --> ***V = 2,900 m³ (adopted)***

**Cooling tower**

$Cap = Q \times (T_{inlet} - T_{outlet})$

whereas: Cap = thermal capacity of the cooling tower, in Mcal/h
Q = design flow rate = 5,700 $m^3$/h
$T_{inlet}$ = 70 ºC
$T_{outlet}$ = 35 ºC

Cap = 199,500 Mcal/h (calculated) --> ***Cap = 200,000 Mcal/h (adopted)***

**Aeration tank**

The volume of the aeration tank is determined by the volumetric load, the concentration of volatile solids in the aeration tank, the ratio F/M (ratio between the amount of organic matter and microorganisms) and the hydraulic retention time.

**Volume of aeration tank**

$$V = \frac{OL}{VL}$$

whereas: VL = volumetric load = 0.525 kgBOD/$m^3$.day (adopted)
OL = organic load = 84,000 kgBOD/day
V = volume of aeration tank, in $m^3$

***V = 160,000 m³***

**Ratio F/M**

$$F/M = \frac{VL}{SSV}$$

whereas: SSV = Estimated concentration of volatile solids = 4.0 g/L

***F/M = 0.13 day $^{-1}$***

**Hydraulic retention time**

$$RT = \frac{V}{Q}$$

whereas: V = volume of aeration tank = 160,000 $m^3$
Q = Flow rate = 5,700 $m^3/h$
RT = hydraulic retention time, in hours

***RT = 28 h***

**Aeration System**

Oxygen requirement under process conditions

$Nec\ O_2 = Nec_{specific}\ O_2 \times CO_{removed}$

whereas: $Nec\ O_2$ = $O_2$ required for organic matter removal, in $kgO_2/day$
$Nec_{spec}\ O_2$ = specific required ratio = 1.8 $kgO_2/kgBOD_{removv}$
$CO_{remov}$ = organic load to be removed = 84,000 kgBOD/day x 0.94 = 78,960 kgBOD/day

***Nec $O_2$ = 1.8 x 78,960 = 142,128 $kgO_2/day$***

Oxygen requirement under standard conditions

To ensure that the aeration system generates the amount of oxygen calculated above, it is necessary to calculate the amount of oxygen under standard conditions (clean water, temperature = 20 ºC).

$$SOTR = \frac{Nec\ O_2}{\frac{\alpha\ (ß\ Cs_2 - C_0)\ \Theta^{(T-20)}}{Cs_1}}$$

whereas: $C_0$ = O2 concentration in the process = 2 $mgO_2/L$
$Cs_1$ = saturation concentration at 20 °C = 11.8 mg $O_2/L$
$Cs_2$ = saturation concentration at 35 °C = 8.7 mg $O_2/L$
ß = saturation coefficient = 0.97
α= aeration type and effluent quality coefficient = 0.60
T = effluent temperature = 35 °C
Θ= theta coefficient, temperature-dependent = 1.024

***SOTR = 301,345 $kgO_2/day$***

Air flow

$$Q = \frac{SOTR}{E \times kgO_2/m^3 \text{ air}}$$

where: Q = Air flow, in $m^3/h$
E = diffuser efficiency = 35% (typical value for fine bubble tube diffusers)
$kgO_2/m^3$ air = 0.2450

$Q = 146{,}426\ m^3/h$

Correction for NTP: ***Q = 129,792 $Nm^3/h$ (adopted= 130,000 $Nm^3/h$)***

Five blowers with a capacity of 32,500 $Nm^3/h$ will be installed, one of which will be reserved for maintenance.

**Secondary Clarifier**

The sizing of the secondary clarifier mainly considers the surface application rate to which the effluent will be subjected, with the aim of optimizing the sedimentation of the solids. The rate used was 0.55 $m^3/m^2.h$.

$$A = \frac{Q}{rate}$$

where: A = area required for decanting, in $m^2$
Q = design flow rate = 5,700 $m^3/h$
Rate = surface application rate = 0.55 $m^3/m^2.h$

$A_{total} = 10{,}364\ m^2$

Taking into account that the decanting units can undergo maintenance during their operation, and also, depending on the dimensions of these clarifiers (restriction in the construction methods), the construction of 2 (two) clarifiers is planned. Therefore, the area of each of the decanters will be 5,182 $m^2$, which will be circular, since the scraping and sludge collection system is more efficient.

The diameter of each of the decanters will be:

$$D^2 = \frac{4\,A}{\pi} \longrightarrow D = 81.2 \text{ m (calculated)} \rightarrow \textbf{\textit{D = 82 m (adopted)}}$$

**Tertiary treatment**

Coagulation / Flocculation

The tertiary treatment will use aluminum sulphate or even poly aluminum chloride (PAC) as a coagulant and as a flocculant, polymer.

The coagulation and flocculation tank was designed based on the hydraulic retention time required for optimized mixing.

$V = Q \times RT$

where: V = volume of the tank, in $m^3$
Q = flow = 5,700 $m^3/h$ = 95 $m^3/min$
RT = retention time = 10 min

V = 950 $m^3$ (calculated) --> ***V = 1,000 m³ (adopted)***

Flotation

The sizing of the floater mainly considers the surface application rate to which the effluent will be subjected, with the aim of optimizing the sedimentation of the solids. The rate used was 5 $m^3/m^2.h$.

$$A = \frac{Q}{rate}$$

where: A = area required for flotation, in $m^2$
Q = design flow rate = 5,700 $m^3/h$
Rate = surface application rate = 5 $m^3/m^2.h$

$A_{total}$ = 1,140 $m^2$

Taking into account that the flotation units can be maintained during operation, and also depending on the dimensions of these floaters (restriction in construction methods), the construction of 3 (three) equipment is planned. Therefore, the area of each one of the floater will be 380 $m^2$, which will be circular, since the scraping and sludge collection system is more efficient.

The diameter of each of the floater will be:

$$D^2 = \frac{4\,A}{\pi} \longrightarrow D = 22\ m$$

## Basic Dimensioning of the Effluent Treatment Plant (ETP)

The basic dimensioning of the Effluent Treatment Plant (ETP) is presented below.

Dimensioning Data

| | | |
|---|---|---|
| - Design flow | $m^3/h$ | 5.700 |
| - pH | - | 3-10 |
| - Temperature | ºC | 60-70 |
| - BOD | kgBOD/day | 84,000 |
| - Suspended solids | kgTSS/day | 47,000 |

Basic Dimensioning

## Primary Treatment

**- Manual and mechanical screening**

| | | |
|---|---|---|
| . Quantity | unit | 1 manual e 1 mechanical |
| . Unitary Capacity | $m^3/h$ | 5,700 |
| . Approach speed | m/s | 0.6 |
| . Spacing | mm | 50 |

**- Parshall flume**

| | | |
|---|---|---|
| . Quantity | unit | 01 |
| . Flow | $m^3/h$ | 5,700 |

**- Primary clarifier**

| | | |
|---|---|---|
| . Quantity | unit | 2 |
| . Total flow | $m^3/h$ | 5,700 |
| . Application rate | $m^3/m^2/h$ | 0.8 |
| . Total area needed | $m^2$ | 7,125 |
| . Unit diameter | m | 68 |

**- Primary sludge dewatering**

| | | |
|---|---|---|
| . Type of equipment | | drums |
| . Quantity | unit | 03 (2+1) |
| . Unit capacity | kgDS/day | 21,000 |

**- Primary Sludge dewater**

| | | |
|---|---|---|
| . Type of equipment | - | Dewatering Screw |
| . Quantity | unit | 03 (2+1) |
| . Unit capacity | kgDS/day | 21,000 |
| . Dry solids in the dewatered sludge | % | 35.0 – 45.0 |

**- Neutralization tank**

| | | |
|---|---|---|
| . Quantity | unit | 01 |
| . Flow | $m^3/h$ | 5,700 |
| . Retention time | min | 30 |

| | | |
|---|---|---|
| . Volume | $m^3$ | 2,900 |

**- Emergency lagoon**

| | | |
|---|---|---|
| . Quantity | unit | 01 |
| . Effluent flow | $m^3/h$ | 5,700 |
| . Retention time | h | 12 |
| . Volume | $m^3$ | 70,000 |
| . Useful height | m | 8 |
| . Material | | Compacted soil only, with HDPE membrane, concrete layer |

***. Emergency lagoon pumps***

| | | |
|---|---|---|
| .. Quantity | unit | 02 (1+1) |
| .. Unitary flow | $m^3/h$ | 500 |

**- Pumping station for cooling tower**

| | | |
|---|---|---|
| . Number of pumps | unit | 04 (3 + 1) |
| . Unitary flow | $m^3/h$ | 1,900 |

**- Cooling tower**

| | | |
|---|---|---|
| . Total flow of effluent | $m^3/h$ | 5,700 |
| . Number of cells | unit | 6 |
| . Inlet temperature | $^oC$ | 70 |
| . Outlet temperature | $^oC$ | 35 |
| . Wet bulb temperature | $^oC$ | 28 |

## Secondary Treatment

| | | |
|---|---|---|
| . Type | | Biological by activated sludge |

**- Selector tank**

| | | |
|---|---|---|
| . Retention time | h | 2.1 |
| . Volume | $m^3$ | 12,000 |

**- Aeration Tank**

| | | |
|---|---|---|
| . Adopted volume | $m^3$ | 148,000 |
| . Useful height | m | 8.0 |
| . Concentration of volatile solids | g/L | 4.0 |
| . F/M Ratio | $day^{-1}$ | 0.13 |

| | | |
|---|---|---|
| . Material | | excavated, waterproofed with membrane or concrete |
| ***. Air blowers*** | | |
| .. Quantity | unit | 05 (4+1) |
| .. Type | | centrifuge |
| .. Total capacity | $Nm^3/h$ | 130,000 |
| .. Unitary capacity | $Nm^3/h$ | 32,500 |
| **- Secondary clarifiers** | | |
| . Quantity | unit | 02 |
| . Total flow | $m^3/h$ | 5,700 |
| . Application rate | $m^3/m^2/h$ | 0,55 |
| . Total area needed | $m^2$ | 10.364 |
| . Unitary diameter | m | 82 |
| **- Secondary sludge pumping** | | |
| ***. Sludge return pumps*** | | |
| .. Total Quantity | unit | 04 (3+1) |
| .. Quantity per clarifier | unit | 1 |
| .. Type | | Horizontal centrifuge |
| .. Unit flow | $m^3/h$ | 1,900 |
| ***. Excess sludge pumps*** | | |
| .. Total Quantity | unit | 03 (2+1) |
| .. Type | | Horizontal centrifuge |
| .. Unitary flow | $m^3/h$ | 125 |
| **- Secondary Sludge Thickener** | | |
| . Type | | Mechanical thickener |
| . Quantity | unit | 03 (02+01) |
| . Total solids load | kgDS/day | 30,000 |
| . Unitary capacity | kgDS/day | 15,000 |
| **- Secondary sludge dewatering** | | |
| . Type of equipment | | Centrifuge |
| . Quantity | unit | 03 (02+01) |
| . Unit | kgDS/day | 15,000 |
| . Dry solids in dewatered sludge | % | 15.0 – 18.0 |

## Tertiary Treatment

| | | |
|---|---|---|
| . Flocculation Tank | | |
| . Quantity | unit | 04 |
| . Material | | Concrete |
| . Total volume | $m^3$ | 1,000 |
| | | |
| . Saturation Vessel | | |
| . Quantity | unit | 04 |
| . Type | | Tubular |
| . Material | | AISI 304L |
| . Application Rate | $m^3/m^2.h$ | 72 |
| | | |
| . Floater | | |
| . Quantity | unit | 04 |
| . Rate | $m^3/m^2.h$ | 5 |
| . Diameter | m | 22 |
| | | |
| . Recirculation Pumps | | |
| . Quantity | unit | 06 (04+02) |
| . Unit capacity | $m^3/h$ | 850 |
| | | |
| . Tertiary sludge tank | | |
| .. Quantity | Unit | 01 |
| .. Capacity | $m^3$ | 250 |
| .. Material | | Concrete |
| | | |
| . Tertiary Sludge Pumps | | |
| . Quantity | unit | 02 (01 + 01) |
| . Capacity | $m^3/h$ | 250 |

## Chemical Dosing System

**- Storage and dosage of sulphuric acid**

***. Storage tank***

| | | |
|---|---|---|
| .. Quantity x Capacity | unit x $m^3$ | 01 x 15 |

***. Dosing pumps***

| | | |
|---|---|---|
| .. Quantity x Flow | unit | 03 (2+1) x 190 |
| **- Antifoaming storage and dosage** | | |
| **. *Storage tank*** | | |
| .. Quantity x capacity | unit x m³ | 02 x 1.0 |
| **. *Dosage pumps*** | | |
| .. Quantity x Flow | unit x L/h | 03 (2+1) x 18 |
| | | |
| **- Storage and dosage of urea** | | |
| **. *Preparation and Storage Tank*** | | |
| .. Quantity x Capacity | unit x m³ | 01 x 60 |
| **. *Dosing pumps*** | | |
| .. Quantity x Flow | unit x L/h | 02 (1+1) x 500 |
| **- Phosphoric acid storage and dosage** | | |
| **. *Storage tank*** | | |
| .. Quantity x capacity | unit x m³ | 02 x 1.0 |
| **. *Dosing pumps*** | | |
| .. Quantity x Flow | unit x L/h | 02 (1+1) x 30 |
| **- Polymer storage and dosing** | | |
| . Quantity | unit | 01 |
| . Capacity | kg/day | 210 |
| . Type | | polymer powder |
| . Polymer concentration (liquid) | % | 0,3 |
| **. *Polymer dosing pumps*** | | |
| .. Quantity x Flow | unit x L/h | 02 (1+1) x 300 |
| | | |
| **- Parshall flume (outlet channel)** | | |
| . Quantity | unit | 01 |
| . Flow | $m^3/h$ | 5,700 |

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#### 6.1.12.1.6 Characteristics of the treated effluents

The characteristics expected for treated effluents are presented in the following table.

The value of effluent is 5,700 m³/h for the production of 1,500,000 t/year, which corresponds to a specific generation of 29.0 m³/t, however the pulp mill may reach a production of up to 1,800.000 t/year and in this scenario, generation will reach 6,000 m³/h, with that, the specific consumption will be lower, of 25.5 m³/t. Thus, there will be no significant increase in impact.

**Table 11 – Expected emissions from treated effluents**

| Standards | Unit | Value | Legal parameters Res. 222/02 | BAT Reference Document IED 2010/75/EU (2015) | IFC EHS Guidelines (2010) * |
|---|---|---|---|---|---|
| Flow | $m^3/h$ | 5,700 | - | - | - |
| | $m^3/t$ | 29.0 | - | 25 - 50 | 50 |
| pH | - | 6.0 to 8.0 | 5 - 9 | - | 6 - 9 |
| Temperature | ºC | ≤ 40 | <40 | - | - |
| BOD | mg/L | 25 | 50 | - | - |
| | kg/day | 3,200 | - | - | - |
| | kg/t | 0.7 | - | - | 1.0 |
| COD | mg/L | 150 | 150 | - | - |
| | kg/day | 20,500 | - | - | - |
| | kg/t | 4.3 | - | 7 – 20 | 20 |
| Suspended solids | mg/L | 40 | - | - | - |
| | kg/day | 5,500 | - | - | - |
| | kg/t | 1.2 | - | 0.3 – 1.5 | 1.5 |
| Colour | mg/L | 250 | - | - | - |
| | kg/day | 34,200 | - | - | - |
| | kg/t | 7.3 | - | - | - |
| AOX | mg/L | 3 | - | - | - |
| | kg/day | 400 | - | - | - |
| | kg/t | 0.08 | - | 0 – 0.2 | 0.25 |
| $N_{total}$ | mg/L | 7 | 40 | - | - |
| | kg/day | 960 | - | - | - |
| | kg/t | 0.20 | - | 0.05 – 0.25 | 0.20 |
| $N_{ammoniacal}$ | mg/L | 2 | - | - | - |
| | kg/day | 300 | - | - | - |

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| Standards | Unit | Value | Legal parameters Res. 222/02 | BAT Reference Document IED 2010/75/EU (2015) | IFC EHS Guidelines (2010) * |
|---|---|---|---|---|---|
| | kg/t | 0.06 | - | - | - |
| $P_{total}$ | mg/L | 1 | 4 | - | - |
| | kg/day | 150 | - | - | - |
| | kg/t | 0.03 | - | 0.01 – 0.03 | 0.03 |

*Effluent guidelines for pulp and paper facilities – bleached kraft pulp, integrated – Annex b

#### 6.1.12.1.7 Monitoring

PARACEL effluent flows will be individually monitored through flow sensors as a method of monitoring and operational control. Important parameters for monitoring the treatment process of the liquid effluents will be monitored taking into account the specifications of the technology suppliers, in order to comply with the appropriate environmental parameters for the discharge.

The effluent treatment plant's monitoring and sampling system is described in detail in the specific environmental management program, which sets out the parameters, sample collection points, and frequency of analysis.

#### 6.1.12.1.8 Effluent Final Disposal

The treated effluent will be discharged into the Paraguay River through an underwater emissary pipeline.

The emissary pipeline is intended to discharge treated effluent into the Paraguay River in a controlled and safe manner through underwater discharge under conditions that prevent the formation of foam and promote more efficient dispersion in the water body.

The complete system consists of: (a) treated effluent well; (b) an emissary of treated effluent to the margin of the Paraguay River, at the point of discharge; (c) control valves; (d) drainage pipes in the river bed; (e) vertical diffuser pipes ("risers") with holes for underwater release and dispersion in Paraguay river waters.

The underwater pipes will consist of 3 parallel HDPE (High Density Polyethylene) lines in the river bed. In certain places that favor a better dispersion in the river waters and the homogenization of the mixture, there will be vertical steel pipes ("risers"), which will conduct the treated effluent from the buried pipes approximately 50 cm above the river bed.

At the end of each "riser", there will be a 90° curve towards the horizontal. At the end of this curve, a special check valve will be installed, which will allow the discharge of effluent jets in an optimized way, as well as prevent the entry of sand and dirty particulates into the system.

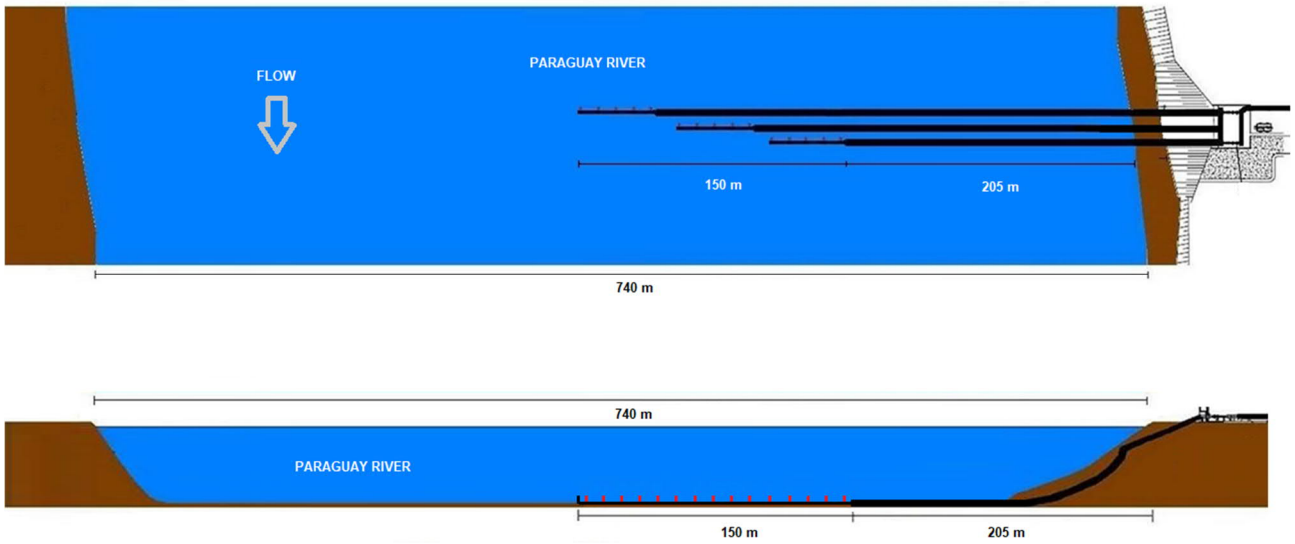



**Figure 31 – Illustration of the discharge system**




**Figure 32 – Effluents emissary pipeline**

### 6.1.12.2 Rainwater drainage

The rainwater that falls in the process areas, since they have the greatest potential for contamination, will be sent along with the effluents to the PARACEL Effluent Treatment Plant (ETP).

Rainwater falls on the roof areas, streets, etc. as well as the log storage yard, as they have less potential for contamination, will be sent to rainwater lagoons, which will receive pH and conductivity measurements to avoid hydraulic overload in the ETP due to high precipitation. In these lagoons, if pH and/or conductivity parameters are outside acceptable standards, these waters will be sent to the plant's ETP. Otherwise, they will

be sent for disposal to the river, which will be done through the treated effluent drainage. It is important to note that this rainwater will be added to the treated effluent after the effluent measurement and sampling point.

#### 6.1.12.3 Air emissions

##### 6.1.12.3.1 Emission sources

The main air emission sources of PARACEL pulp mill arisen from the following equipment:

- Recovery boiler;
- Lime Kiln; and
- Biomass boiler.

##### 6.1.12.3.2 Main control parameters

The main control parameters related to significant air emissions from a pulp mill are:

- Particulate Material;
- TRS (total reduced sulfur);
- SOx (Sulphur oxides);
- NOx (Nitrogen oxides); and
- CO (Carbon monoxide).

##### 6.1.12.3.3 Technologies to minimize, control and monitor air emissions

The mitigation, control and monitoring of air emissions will be based on the technologies already established and used with great success, which are listed below:

- Use of low odor recovery boiler;
- High dry solids content of up to 80% in the liquor burned in the recovery boiler, which minimizes SOx emissions;
- Use of high efficiency electrostatic precipitators for the recovery boiler, biomass boiler and lime kilns;
- Collection of concentrated non-condensable gases (CNCG) from the digester and evaporation, and their incineration in the recovery boiler or biomass boiler (protected flame incineration);
- Extensive collection of diluted non-condensable gases (DNCG) from the digester, brown pulp line, evaporation, with treatment in the recovery boiler;
- Treatment of gases from the dissolving tank in the recovery boiler;
- Efficient cleaning of relief gases from bleaching plant;
- Real-time gas monitoring systems and control system, rapid identification and correction of operational disturbances.

#### 6.1.12.3.4 Technologies for controlling emissions of air pollutants

**Recovery boiler**

The recovery boiler will be equipped with a high efficiency electrostatic precipitator to remove particulate material, which will be collected and transported to the mixing tank.

This type of equipment to control air emissions from recovery boilers is used worldwide.

The electrostatic precipitator will promote the removal of solid or liquid micro-particles, charged by flue gases, through the use of static electricity.

The removal process is based on the ionization (localized concentration of electric charges) of these particles, induced by a powerful electric field, through the action of the so-called "corona effect". This effect consists of the release of electrons from the positive electrode to the gas adjacent to it, thus reaching the charged particles, causing a displacement to the other electrode (or plate) that works as a collector. This creates a layer of dust in this collector.

The powder layer is compacted and held together with the electrodes by the forces of the electric field. When this layer becomes sufficiently thick and agglomerated, it is subjected to mechanical action, which causes it to fall to the bottom of the precipitator, and is removed dry by a drag conveyor.

The electrostatic capture process is highly efficient, allowing the removal of extremely fine particles.

Due to the high resistivity of the gaseous media, the potential difference to be applied between the electrodes must be high, which explains the high voltage verified in this equipment.

The precipitator to be used will have independent chambers, which will work together, in parallel. In this way, it is possible to eliminate occasionally one of the operation chambers, to provide maintenance and not to affect significantly the general efficiency of the control installation, since the system is already designed to support events of this nature.

As an integral part of the equipment, an automatic operation management and control system will be installed, based on the use of instrumentation coupled to microprocessors. Its function will be to maintain the operating conditions of the precipitator in the ideal operating ranges.

**Lime kilns**

For air pollution control, lime kilns shall be equipped with high efficiency electrostatic precipitators to remove particulate matter from the flue gases. This material will be returned to the lime kilns. The description of the precipitator control is similar to the description of the recovery boiler.

**Biomass boiler**

Due to the legal requirements regarding the emission of particles in the flue gases, the best alternative for cleaning the gases generated in the combustion by the biomass boiler will be high efficiency electrostatic precipitators to remove the particulate material.

**Non-condensable gas collection and incineration system**

The high concentration non-condensable gases generated in the evaporation plant will be incinerated in the recovery boiler. If burning in the recovery boiler is not possible, these gases will be incinerated in the biomass boiler (back-up equipment 1) and, if this is not possible, they will be incinerated in a flare.

Low concentration non-condensable gases collected from various sources in the process areas of the fibre line and evaporation plant will be conditioned before being introduced as secondary air to the recovery boiler or biomass boiler (back-up equipment 1).

The diluted gases from the recovery boiler dissolving tank shall be cooled in a scrubber, reheated and introduced as tertiary air to the recovery boiler.

Ventilation gases from the lime fire extinguisher, causticizing equipment, storage tanks and causticizing equipment will be collected, cooled in a heat exchanger to remove moisture and sent, via a fan, as combustion air to the lime kilns.

#### 6.1.12.3.5 Low NOx Emissions Technology

Regarding technologies to low NOx emissions, note that PARACEL's project does not commit with USEPA BAT, but with EU BAT reference document (BREF 2010/75/EU – 2015).

SNCR implementation is not mandatory by EU BREF; furthermore, it is only one of the 7 (seven) suggested measures to reduce NOx emissions, of which the PARACEL project already incorporates the other 6 (six), which consist of the best available techniques (BAT) and are presented below.

- Recovery boiler:
  - Implementation of the multilevel air system;
  - Dry solids content above 80% in black liquor;
  - Control of $O_2$ content and concentration of CO during combustion;
  - Air/fuel rate control;
  - Control of nitrogen content in black liquor.
- Lime kilns:
  - Use of fuel oil;
  - Optimized combustion;
  - Low NOx burners.
- Biomass boiler:
  - Combustion optimization;
  - Control of excess air;
  - Air/fuel ratio control.

As a consequence, NOx emissions are within the EU BREF range and AERMOD (shown in Volume IV – Complementary Studies) results showed that all air quality standards stablished in the law will be met at all times and places. SNCR involves the use of ammonia, with consequent environmental implications. For this reason, SNCR was not considered in mill design.

#### 6.1.12.3.6 Qualitative and quantitative emission characteristics

The main sources of atmospheric emissions and their respective values related to the operation of the PARACEL pulp mill are presented in the following tables.

The atmospheric emissions are compared to EU BAT Industrial Emissions Directive 2010/75/EU, 2015 for Recovery Boiler, Lime Kilns and Biomass Boiler. The emissions are also compared to IFC EHS Guidelines, 2010 for Recovery Boiler + Lime Kilns, which only establishes references to specific emissions (kg/t).

It is important to highlight that there is no limits of atmospheric emission in Paraguayan legislation.

**Table 12 – Expected atmospheric emissions - Recovery boiler (flow and concentration values corrected to 8% $O_2$, dry basis)**

| Parameter | unit | Expected value | EU BAT 2010/75/EU (2015) |
|---|---|---|---|
| **Flow rate** | $Nm^3/s$ | 365 | - |
| **Temperature** | $^oC$ | 140 | - |
| **Particulate Material** | $mg/Nm^3$ | 22 | 9 – 22 [1] |
| | g/s | 8.0 | - |
| | kg/t | 0.15 | 0.02 – 0.20 |
| **TRS (as $H_2S$)** | $mg/Nm^3$ | 5 | 1 – 9 [2] |
| | g/s | 1.8 | - |
| | kg/t | 0.03 | - |
| **SOx (as $SO_2$)** | $mg/Nm^3$ | 45 | 9 – 43 [2] |
| | g/s | 16.4 | - |
| | kg/t | 0.3 | - |
| **TRS + SOx (as S)** | kg/t | 0.18 | 0.03 – 0.13 [1] |
| **NOx (as $NO_2$)** | $mg/Nm^3$ | 175 | 104 - 173 |
| | g/s | 63.9 | - |
| | kg/t | 1.1 | 1.0 – 1.7 |
| **CO** | $mg/Nm^3$ | 300 | - |
| | g/s | 109.5 | - |
| | kg/t | 2.0 | - |
| **Moisture** | % | 23.7 | - |
| **Velocity** | m/s | 20 | - |
| **Chimney height** | m | 140 | - |
| **Chimney diameter** | m | 5.64 | - |

[1] Annual average

[2] Daily average

**Table 13 – Expected atmospheric emissions - Lime kilns (flow and concentration values corrected to 8% $O_2$, dry basis)**

| Parameter | Unit | Expected value | | EU BAT 2010/75/EU (2015) |
|---|---|---|---|---|
| | | Lime kiln 1 | Lime kiln 2 | |
| **Flow rate** | $Nm^3/s$ | 27 | 27 | - |
| **Temperature** | $^oC$ | 300 | 300 | - |
| **Particulate Material** | $mg/Nm^3$ | 22 | 22 | 9 – 22 [1] |
| | g/s | 0.6 | 0.6 | - |
| | kg/t | 0.010 | 0.010 | 0.005 – 0.020 |
| **TRS (as $H_2S$)** | $mg/Nm^3$ | 10 | 10 | 1 – 9 [2] |
| | g/s | 0.3 | 0.3 | - |
| | kg/t | 0.005 | 0.005 | - |
| **$SO_x$ (as $SO_2$)** | $mg/Nm^3$ | 100 | 100 | 48 – 104 [3] |
| | g/s | 2.7 | 2.7 | - |
| | kg/t | 0.05 | 0.05 | - |
| **TRS + SOx (as S)** | kg/t | 0.030 | 0.030 | 0.055 – 0.120 [1] |
| **NOx (as $NO_2$)** | $mg/Nm^3$ | 400 | 400 | 87 – 303 [3] |
| | g/s | 10.8 | 10.8 | - |
| | kg/t | 0.20 | 0.20 | 0.10 – 0.35 [3] |
| **CO** | $mg/Nm^3$ | 150 | 150 | - |
| | g/s | 4.1 | 4.1 | - |
| | kg/t | 0.08 | 0.08 | - |
| **Moisture** | % | 23.0 | 23.0 | - |
| **Velocity** | m/s | 20 | 20 | - |
| **Chimney height** | m | 140 | 140 | - |
| **Chimney diameter** | m | 2.02 | 2.02 | - |

[1] Annual average

[2] Daily average

[3] Annual average. Considering methanol burning in the Lime Kilns

**Table 14 – Expected air emissions - Biomass boiler (flow and concentration values corrected to 8% $O_2$, dry basis)**

| Parameter | Unit | Expected Value | EU BAT 2010/75/EU (2015) |
|---|---|---|---|
| **Flow rate** | $Nm^3/s$ | 38 | - |
| **Temperature** | $^oC$ | 155 | - |
| **Particulate Material** | $mg/Nm^3$ | 50 | 1 – 260 [1] |
| | g/s | 1.9 | - |
| | kg/t | 0.03 | - |
| **$SO_x$ (as $SO_2$)** | $mg/Nm^3$ | 150 | 30 – 67 [1] |
| | g/s | 5.7 | - |
| | kg/t | 0.1 | - |
| **NOx (as $NO_2$)** | $mg/Nm^3$ | 320 | 113 – 286 [1] |
| | g/s | 12.2 | - |
| | kg/t | 0.22 | - |
| **CO** | $mg/Nm^3$ | 300 | 4 – 130 [1] |
| | g/s | 11.4 | - |
| | kg/t | 0.21 | - |
| **Moisture** | % | 24.0 | - |
| **Velocity** | m/s | 20.0 | - |
| **Chimney height** | m | 140 | - |
| **Chimney diameter** | m | 1.90 | - |

[1] Daily average

**Table 15 – Expected air emissions – Recovery Boiler + Lime Kilns – Comparison to IFC EHS Guidelines**

| Parameter | unit | Recovery Boiler | Lime kiln 1 | Lime kiln 2 | Recovery Boiler + Lime Kiln 1 + Lime Kiln 2 | IFC EHS Guidelines (2010) |
|---|---|---|---|---|---|---|
| **Particulate Material** | kg/t | 0.15 | 0.01 | 0.01 | 0.17 | 0.50 |
| **TRS (as S)** | kg/t | 0.03 | 0.01 | 0.01 | 0.04 | 0.20 |
| **SOx (as S)** | kg/t | 0.1 | 0.03 | 0.03 | 0.16 | 0.40 |
| **NOx (as $NO_2$)** | kg/t | 1.1 | 0.2 | 0.2 | 1.5 | 1.5 |
| **CO** | kg/t | 2.0 | 0.08 | 0.08 | 2.16 | - |

The emissions from the recovery boiler, the lime kilns and the biomass boiler will be carried out through individual and independent pipes until the emission to the atmosphere. These independent pipes will be wrapped in a single concrete body, i.e. a chimney with a height of 140 m, suitable for atmospheric dispersion.

#### 6.1.12.3.7 Monitoring

The gas monitoring system has real-time control to quickly identify and correct any operational disturbances.

As an integral part of the supervision, an automatic management and control system of the operation will be installed, based on the use of microprocessor-coupled integration. Its function will be to maintain the operation conditions of the electrostatic precipitators in the ideal operation ranges.

For the continuous monitoring (on line) of the atmospheric emissions, automatic meters of gas flow, temperature, pressure, moisture, excess of oxygen, TRS, NOx, SOx and CO will be provided.

To monitor the thermal oxidation efficiency of Concentrated Non-Condensable Gases - CNCG and Dissolved Non-Condensable Gases - DNCG, the project contemplates the installation of TRS analyzers that will continuously sample the combustion gases from each of the equipment responsible for thermal oxidation.

More details of the monitoring are presented specifically in the specific environmental basic program.

#### 6.1.12.3.8 Greenhouse gas emissions (GHG)

PARACEL will adopt the Kraft pulp production process based on Best Available Techniques (BAT), which will allow the reduction, control and monitoring of greenhouse gas emissions.

PARACEL will adopt a cleaner energy matrix in its production process, based on the use of renewable fuels, such as bark or wood chips and black liquor, for the production of steam and, subsequently, the generation of electricity, significantly reducing the consumption of fossil fuels ( non-renewable) and, consequently, greenhouse gas (GHG) emissions. In other words, PARACEL will have the concept of minimum equivalent

$CO_2$ emissions (greenhouse gases - GHG), producing pulp with the minimum emission of carbon. Furthermore, under normal operating conditions, the plant will be self-sufficient in electricity generation and will also produce surplus electricity (from renewable sources) that will be available for sale.

The raw material, eucalyptus wood, will come from planted forests, which provide the capture of atmospheric $CO_2$ through the process of photosynthesis. In this process, $CO_2$ is "stored" in the forest biomass.

Solid waste management at PARACEL's pulp mill will prioritize the destination of waste for recycling, incineration and soil correction production, minimizing waste disposal in landfills. This is important, since the decomposition of solid waste in the landfills produces methane gas ($CH_4$), which has a global warming potential (GWP) of approximately 21 times greater than carbon dioxide ($CO_2$).

In addition, PARACEL will adopt waterway to transport pulp production. Inland waterway transport is known to have lower greenhouse gas emissions per tons of product transported compared to road transport. Thus, greenhouse gas emissions will be minimized by the use of this mode.

Once the production of the pulp mill has stabilized (after the Learning Curve), PARACEL will quantify its greenhouse gas emissions and publish the Inventory of greenhouse gases. In a next step, the company will calculate the Carbon Footprint of the pulp produced in the mill.

Nowadays, climate change attributed to the effects of anthropogenic-originated greenhouse gases (GHG), currently represents the greatest environmental, social, and economic threat on the planet. The accumulated level of GHGs in the atmosphere is constantly growing with population and economic activities. If measures are not taken today, it will be increasingly difficult and costly for countries to adapt themselves to the effects of climate change in the present and in the future.

Taking urgent measures to combat climate change and its effects is one of the current sustainable development objectives of the United Nations. In that way, the knowledge of the individual contribution of GHG to climate change through the quantification of emissions, which is known as “carbon footprint”, is important to apply measures that reduce it and thus combat climate change.

From the above mentioned, a growing number of social, business, and political groups are becoming increasingly interested and convinced about the importance of incorporating in their activities measures, which aim to a sustainable development. Thus, GHG emissions quantification and reduction has become a common pattern for companies and institutions as an essential part of their corporate social and environmental responsibility programs.

According to the latest GHG Inventory of Paraguay (2015), the Agriculture and Livestock sector is responsible for the 59.89% of total emissions (27,132 Kt $CO_2$eq), land use, land use change and forestry for the 30.72% (15,755 Kt $CO_2$eq), and for IPPU (industry processes, product use), 1.82% is reported (931 Kt $CO_2$ eq).

PARACEL is committed to managing and developing its business with the highest international standards of environmental, social and economic sustainability. There is an awareness that this is not only achieved by providing products that satisfy customers, but that production must be done by operating in a socially friendly way, without endangering the environment.

Thus, Master Environmental Engineer Claudia Gómez and Forest Engineer Lourdes González Soria, performed greenhouse gases emissions and capture balance report for PARACEL project, including forestry and industrial component.

The Forestry component considered the following emissions sources:

- Planting and maintenance of clonal plantations of E. *urograndis*: consumption of fossil fuels and application of nitrogen fertilizers;
- Harvesting and debarking: use of fossil fuels by harvesters;
- Forwarding: consumption of fossil fuels for wood cargo;
- Trucking: use of fossil fuels to transport the debarked wood to the industrial plant.

The Industrial component considered the following emissions sources:

- Biomass boiler: boiler that uses bark remains, undersized chips and fine chips discarded from the process, where they are burned to generate steam, which is used to produce electrical energy, in the turbogenerators;
- Recovery boiler: steam boiler and chemical reactor of the recovery system of the kraft process, where the black liquor is burned at high temperature generating steam and later energy in the turbogenerators;
- Lime kilns: equipment used to convert the by-product calcium carbonate into calcium oxide reusable in the kraft process;
- Mobile machinery that uses fossil fuels: internal transport of raw materials, products and waste;
- Treatment of solid and liquid waste: emissions from the treatment of solid waste and effluents;
- Transportation of pulp: dry pulp will be transported by river to the overseas port of Uruguay;
- Electricity generation: since the company projects the generation of its own electric energy through turbogenerators supplied with steam from biomass and recovery boilers, the emissions corresponding to the use of electric energy are included in scope 1. This energy cogeneration will have a surplus that will be exported to the national electricity grid; therefore, the emissions corresponding to the export of this surplus will be estimated.

The fundamental formula for estimating the amount of GHG emissions can be expressed as the multiplication of the activity data (AD) by the emission factor (EF), as follows:

**Emissions GHG = AD x EF**

In the case of fossil fuels, its equivalent in energy used (in gigajoules, GJ) is considered as activity data, this energy is calculated from the amount of heat, a value that depends on each type of fuel.

Apart from carbon dioxide ($CO_2$), other greenhouse gases such as methane ($CH_4$) and nitrous oxide ($N_2O$) are also emitted during the burning of fuels. Each of these gases has a different emission factor depending on the type of fuel.

Additionally, for gases different from $CO_2$, global warming potential (GWP) values are used. In the case of the forestry component, apart from the use of fossil fuels, another

source of $N_2O$ emission is the application of synthetic fertilizers. Therefore, the activity data corresponded to the dose, amount of application and nitrogen content of the fertilizers to be applied. With this data the amount of $N_2O$ that will be emitted, and its equivalent in $CO_2$, was calculated.

The term emission is also used to sequestration/capture, since by convention the capture of carbon or $CO_2$ is understood as negative emissions, and is calculated according to expression above.

The estimation of carbon sequestration satisfies a very simple rule. In the case of forest plantations, as well as in forests, the level of activity corresponds to the area (hectares) of the species (or forest type) that exists in a year, and the emission factor corresponds to the capture rate (measured in $tCO_2\ ha^{-1}\ year^{-1}$) of each surface unit.

The annual plantation area, of the company's plantation plan, was assumed as the activity data component; and the capture rate ($tCO_2\ ha^{-1}\ year^{-1}$), which constitutes the emission factor component, was estimated.

**Industrial component**

The sources of GHG emissions corresponding to the industrial sector by combustion of fossil fuels are:

- Biomass boiler: although this equipment will be fueled by biomass (waste from wood handling and the removal of brown pulp), fuel oil will be used as starting fuel, to stabilize the production process and eventually to oxidize non-condensable gases when deviated to the biomass boiler;
- Recovery boiler: in the same way, although the main fuel for this equipment is of biogenic origin (black liquor), the fuel oil will also be used as initial fuel, and for stabilizing the production process;
- Lime kiln: at first time it will use fuel oil to achieve the necessary temperature (biomass gasification is projected);
- Internal transport of materials and waste: diesel and / or LPG will be used.

Industrial operations will include the fossil fuel consumption in the operations and encompass the following yearly fuel consumption, according to the EIA report (2020) and the GHG balance report:

- Fuel oil = 69,000 tonnes.year-1 resulting in 220,110 tonnes CO2.year-1;
- Diesel oil = 800 tonnes.year-1 resulting in 2,552 tonnes CO2.year-1;
- Diesel oil for transportation = 18,216 tonnes.year-1 resulting in 58,109 tonnes CO2.year-1;
- LPG = 1,500 tonnes.year-1 resulting in 3,850 tonnes CO2.year-1;
- Total fossil emissions = 284,621 tonnes CO2.year-1;
- Total fossil emissions including waste water treatment[1] = 285,474 tonnes CO2e.year-1;

[1] GHG balance report indicates 853.45 tonnes $CO_2e.year^{-1}$

The Paracel plant will use biomass residues and renewable biomass as fuel for many of its industrial operations. That is a major contribution to reduce the footprint of its products and to mitigate the GHG emissions from pulp production as is commonly implemented by the pulp and paper industry. Heat and power will be produced using residues from the process. According to the GHG balance report, heat and then power will be produced from biomass residues and black liquor resulting in biogenic GHG emissions of approximately 4.47 Mtonne CO2e.year-1.

The lime recovery process (CaO production) will also release CO2 from biogenic origin resulting in 220,625 tonne CO2e.year-1. Therefore, total emissions from biogenic sources in the industrial operations would result in 4.7 Mtonne CO2e.year-1.

In summary, industrial operations plus transport of the product would account for the following emissions under steady state operational conditions:

- Scope 1 emissions: 285,621 tonnes CO2e.year-1;
- Biogenic emissions due to industrial processes: 4.7 Mtonne CO2e.year-1; and
- Biogenic emissions associated to the harvested wood products4: 0.6 Mtonne CO2e.year-1

**Forestry component**

As we can see in Figure below, there is an evolution of emissions from afforestation for each year of plantation plan, caused by the variation in the amount of fuel (diesel) that will be used each year. This is due to the fact that the plantations are carried out progressively year after year until reaching the 130 thousand hectares required to supply the demand for eucalyptus wood to the pulp mill, and while this required surface is reached, the raw material is imported, which it means longer trips (more fossil fuel consumption). However, in fact, the total plantation area will be 190 thousand hectares.

Therefore, the forestry component, due to silviculture, harvesting, debarking, forwarding, and transport activities, 114,825 $tCO_2eq$ will be emitted annually. This value corresponds to the self-sufficient stage of the company in terms of provision of debarked wood, that is, from the moment when raw material is no longer imported.

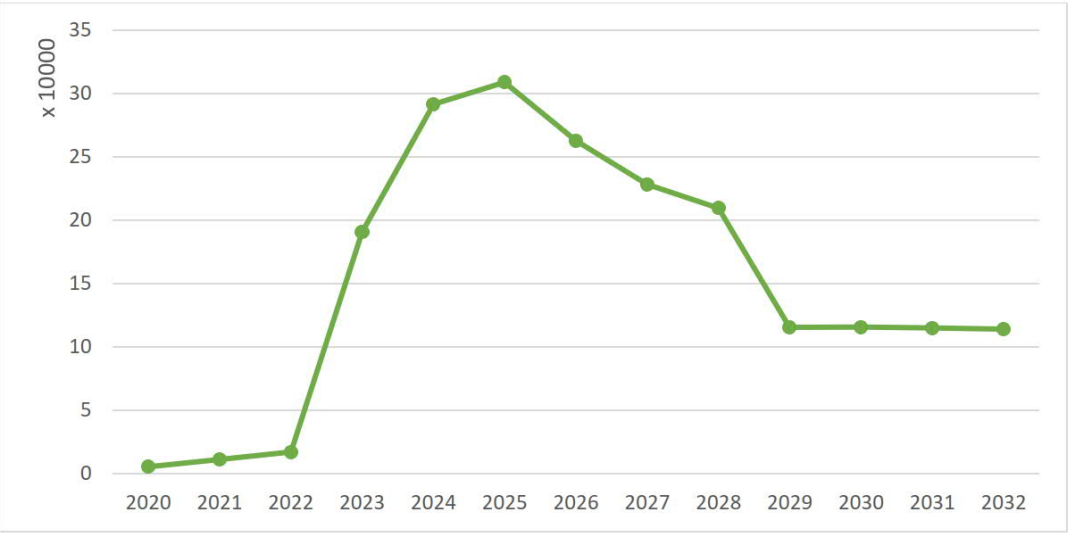


**Figure 33 – Evolution of GHG emission (total $tCO_2eq$/year).**

**Table 16 – Forestry component GHG emissions**

| Source of GHG emission | GHG emissions ($tCO_2eq$) | |
|---|---|---|
| | Annual average* | $kgCO_2$/ADt |
| Synthetic fertilizer application | 3,793 | 2.53 |
| Acidity correction | 781 | 0.52 |
| Forestry | 13,321 | 8.88 |
| Harvesting | 13,873 | 9.25 |
| Forwarding | 6,148 | 4.10 |
| Trucking | 76,123 | 50.75 |
| **TOTAL** | **114,825** | **76.60** |

The steady state operation of the whole production activity will start from 2029 on when it is forecasted that the whole project area will be occupied and the production regime will be stable in time. According to the GHG balance report (based on information from the Paracel's Forestry Department) the emissions due to diesel consumption related to forestry management will be approximately 114,825 tonne CO2e.year-1. This value does not account for emissions from fertilizers (N2O and CO2) and therefore, may be an underestimation:

- Scope 1 emissions: 114,825 tonnes CO2e.year-1;
- Biogenic removals due to forest growth (should compensate the harvested trees): 5.3 Mtonne CO2e.year-1;

As for the biomass, the forestry activity will reach a balance between removals and emissions after all the area is planted. While the former will create a carbon stock proportional to the planted area, the latter will deplete this same carbon stock due to harvesting that will be either transferred to the product (and then emitted back in the atmosphere within a limited timeframe) or emitted due to its use as fuel source for the industrial operations. This carbon balance will lead to a neutral condition neither representing net emissions nor net removals. The carbon stock established in the plantation process is estimated5 to be approximately 56.58 Mtonne CO2. This is an asset of Paracel that must be protected across the years. Nevertheless, due to the non-permanence nature of the removals associated to the harvested wood products and the forest, they cannot compensate for the fossil emissions under current international guidelines.

**Summary of scope 1 and biogenic annual emissions and removals and carbon stocks**

The steady state operation of the whole production activity will start from 2029 on when it is forecasted that the whole project area will be occupied and the production regime will be stable in time. The total annual emissions and removals calculated according to the international guidelines mentioned in this report are:

- Scope 1 emissions: 400,446 tonnes CO2e.year-1;
- Biogenic net removals equivalent to the net emissions from harvested trees converted in pulp: 5.3 Mtonne CO2e.year-1;
- Carbon stocks from forests after the stabilization of the operations6: 56.58 Mtonne CO2

**Carbon footprint of the pulp produced by Paracel**

The limited carbon footprint cradle to grave of the pulp produced by Paracel will be expressed by the following value:

CFPpulp= 0.27 (tonne CO2e).(tonne pulp)-1

This value still requires incorporation of some upstream emissions (scope 3 categories 1 to 8) and some of the downstream emissions (scope 3 categories 9 to 15) that were not available at this point. However, their impact on the final value will be limited and the result above may be a first representation of the CFP.

The value obtained above may be substantially reduced in case biomass is used in the kiln furnace instead of fuel oil. That would eliminate emissions of fuel oil that are estimated to be 220,110 tonnes CO2.year-1. The new value of the CFP would be equal to:

CFPpulp= 0.12 (tonne CO2e).(tonne pulp)-1

It's estimated that the additional plantation area required to supply biomass to the kiln on a 6 years rotation period would be approximately 5,000 ha.

### 6.1.12.3.9 Evaluation of the Impact of Acid Rain

Acid rain refers to acid precipitation in the form of acid rain, snow or mist, depending on the region and, in these cases, the consequence is that it can affect the chemistry of the soil and water, as well as the cycles of plant and animal life (EPA, 2011).

Rain is considered acidic when it has a pH below 5.3. Precipitations in industrial regions of Europe and the United States have a pH around 3.0. In South America, the lowest pH values for rainwater are close to 4.7 (BRAGA et al, 2005).

It is important to note that, due to the environmental conditions themselves, that is, in regions not contaminated by anthropogenic emissions, the water vapor present in the atmosphere reacts with various atmospheric gases, such as carbon dioxide ($CO_2$). Therefore, the water vapor becomes slightly acidic, with values close to 5 or 6 due to the formation of carbonic acid ($H_2CO_3$).

$$CO_2\ (g) + H_2O \rightarrow H_2CO_3\ (aq)$$

On the other hand, in anthropized regions, water vapor in the atmosphere can also react with chemicals that have been introduced into the atmosphere, mainly by $NO_X$ and $SO_X$ emissions, thus increasing their acidity.

The formation of acid rain occurs through the reaction of sulfur dioxide ($SO_2$) and nitrogen oxides (NO and $NO_2$) with oxygen present in atmospheric air and in water vapor, respectively forming sulfuric acid ($H_2SO_4$) and nitric acid ($HNO_3$), as shown in the following reactions:

$$SO_2 + ½\ O_2 + H_2O \rightarrow H_2SO_4$$

$$NO + NO_2 + O_2 + H_2O \rightarrow 2\ HNO_3$$

It is important to note that the formation of acid rain occurs preferably due to the presence of strong oxidizing agents in the atmosphere, such as hydroxyl ($OH^-$) and hydroperoxide ($HO_2^-$) radicals, hydrogen peroxide ($H_2O_2$) and ozone ($O_3$) (BRENA, 2009).

Sulfuric acid formation reactions originate in the presence of hydroxyl radicals ($OH^-$) because it is a highly reactive molecule. The reaction of $SO_2$ and $OH^-$ produces acid sulphite ions.

$$SO_2 + OH^- \rightarrow HSO_3^-$$

The acid sulphite ion is extremely unstable, and therefore undergoes immediate oxidation forming acid sulfate ($HSO_4^-$), causing an acid sulfate mist.

The $NO_X$ nitrogen oxides (NO, $NO_2$ and $N_2O_5$) participate in a series of reactions that produce nitric acid. These reactions can occur both with the presence of solar radiation and at night (ANDRADE and SARNO, 1990).

Predominant reaction during the day: $NO \xrightarrow{O_3} NO_2 \xrightarrow[OH]{h\upsilon} HNO_3$

Predominant reaction during the night: $N_2O_5 \xrightarrow{H_2O} HNO_3$

Acid rain causes impacts on the environment, such as the acidification of lakes and rivers, thus affecting the animals and vegetables that live in the aquatic biome, as well as having adverse impacts on forests, especially trees located at high altitude, in more sensitive forest soils and greatly favors the increased corrosivity of the atmosphere, accelerating the decomposition of construction materials, buildings and equipment exposed to air.

In the regions contaminated by anthropogenic emissions, the main parameters of atmospheric emissions that are precursors to acid rain formation are: $SO_X$ (sulfur oxides); $NO_X$ (nitrogen oxides); and CO (carbon monoxide). It should be noted that the mere presence of these pollutants does not allow to affirm that there will be acid rain formation, since the presence of strong oxidizing agents in the atmosphere, such as hydroxyl ($OH^-$) and hydroperoxide ($HO_2^-$) radicals, is also necessary. hydrogen peroxide ($H_2O_2$) or ozone ($O_3$).

These pollutants are generated and emitted in pulp mills through atmospheric emission sources: recovery boiler; lime kiln; and biomass boiler.

In relation to the recovery boiler, these pollutants are generated by the burning of black liquor.

In the case of the lime kiln, the emissions of these pollutants are generated by the combustion of fuel oil, natural gas or biomass gas.

In the biomass boiler, the emissions of these pollutants are generated by the combustion of biomass.

It is important to note that the recovery boiler, lime kilns and biomass boiler at the PARACEL plant are designed on the basis of the best available techniques (BAT) worldwide, which minimizes generation of pollutants precursors to the formation of acid rain. This technology is presented below for each emission source.

For the recovery boiler:

The most effective way to reduce TRS and SOx emissions from pulp mills is related to the concentration of black liquor in order to produce a black liquor with a higher content of dry solids (> 80%). This makes the liquor burning conditions in the furnace much more suitable and TRS and SOx emissions are minimized.

In addition, TRS and SOx emissions in the recovery boiler will also be minimized with the following operational controls:

- Maintaining higher temperatures and high content of dry solids in black liquor. Therefore, higher amounts of sodium (Na) will vaporize, absorbing SO2 and forming $Na_2SO_4$, thus reducing SOx emissions;
- Adequate ratio of sulfur/sodium (S/Na) in liquor;
- Supply of excess air, temperature and distribution of combustion air;
- Maintaining the load in the furnace at optimum operating levels.

As for the NOx emissions in the recovery boiler, these will be generated and will be minimized mainly through the implementation of a multi-level air system.

The air fed into the recovery boilers is generally carried out on three levels. The function of the injection of this air is to promote an oxidation environment so that its burning is complete and consequently promote the combustion of all the organic matter present in the black liquor, in addition to also promoting a reducing environment (in an environment where there is oxygen deficiency), with the recovery of inorganics present in the liquor, being recovered through the smelt, giving rise to green liquor. With this, through the injection of air at various levels, there is the possibility of providing an optimal reduction and oxidation environment. The way the air is fed into the boiler has an effect on the behavior of the combustion gases inside the boiler (FERREIRA, CARDOSO and PARK, 2008).

Furthermore, the NOx emissions in the recovery boiler will be minimized mainly through optimized combustion control through the following factors:

- Dry solids content above 80% in black liquor;
- $O_2$ control during combustion;
- Carbon monoxide (CO) concentration;
- Air/fuel ratio;
- Nitrogen content in black liquor.

In the case of lime kilns, the main measures are presented as follow:

TRS and SOx emissions are directly related to the sulfur content in the fuel, as well as the quality of the lime mud. Thus, the use of fuels with low sulfur levels is a key element to minimize these emissions.

From an operational point of view, TRS and SOx emissions will be minimized through optimized combustion, based on an efficient control system that includes: the air/fuel ratio; temperature; residence time; excess oxygen content and good air/fuel mixture.

The minimization of NOx emissions in lime kilns will occur mainly from the following factors:

- Type of fuel to use. If the fuel chosen is fuel oil, the NOx emissions are lower compared to other fuels, such as natural gas or biomass gas;
- Optimized combustion and operational control of lime kilns, through the following factors: good mixture of fuel and air; control of excess air; lime mud shape and position and temperature profile; lime mud flow control; oven speed, fuel rate, and inlet rate;
- Low $NO_X$ burners: this technology allows to reduce the temperature of the flame and thus reduce thermal $NO_X$.

As for the biomass boiler, SOx emissions will depend on the fuel to be used. In the case of the use of biomass, SOx emissions are minimal because eucalyptus wood has low sulfur content.

NOX formation in the biomass boiler essentially depends on three parameters: temperature, oxygen supply and nitrogen content in the fuel. Thus, the main measures planned for NOx reduction include:

- Optimization of the burner operation;
- Control of excess air;
- Control of the air/fuel ratio.

In the case of the PARACEL pulp mill, these measures have been adopted and are summarized below, by emission source.

Regarding the PARACEL recovery boiler:

Reduction/minimization of TRS and SOx:

- Burning of concentrated black liquor (> 80% dry solids);
- Maintenance of higher temperatures and high content of dry solids in black liquor;
- Control of the adequate rate of sulfur/sodium (S/Na) in the liquor;
- Control of excess air, temperature and combustion air distribution;
- Maintaining the load in the furnace at optimum operating levels.

Reduction/minimization of NOx:

- Implementation of the multilevel air system;
- Dry solids content above 80% in black liquor;
- Control of $O_2$ content and concentration of carbon monoxide (CO) during combustion;
- Air/fuel rate control;
- Control of nitrogen content in black liquor.

Regarding the PARACEL lime kilns:

Reduction/minimization of TRS and SOx:

- Use of fuel oil with low sulfur content, whenever possible;

– Optimized combustion.

Reduction/minimization of NOx:

– Use of fuel oil;
– Optimized combustion;
– Low NOx burners.

Regarding the PARACEL biomass boiler:

Reduction/minimization of SOx:

– SOx emissions will be minimal because eucalyptus wood has low sulfur content.

Reduction/minimization of NOx:

– Combustion optimization;
– Control of excess air;
– Air/fuel ratio control.

These measures will be adopted by PARACEL, and consist of the best available techniques, they will be responsible for low concentrations of TRS, SOx, NOx and CO emissions that will be within or very close to the BAT reference values as presented in this ESIA.

Another important point that deserves to be highlighted are the results of the air quality concentrations obtained through the Atmospheric Dispersion Study, whose maximum concentration values are below the air quality limits established by current legislation (Resolution 259/15) for parameters $NO_2$ and $SO_2$, as well as for $PM_{10}$ and CO as presented in this ESIA. This allows to affirm that PARACEL's atmospheric emissions will not cause formation of acid rain. For this reason, acid rain was not considered in the impact evaluation of this ESIA.

Also note that in Brazil and Uruguay there are some operating pulp mills located very close to urban centers, and in none of these mills there are reports of damage to health and materials and / or environmental problems caused by acid rain in the region.

#### 6.1.12.4 Solid Waste

##### 6.1.12.4.1 Generation sources

The operation of the PARACEL pulp mill will generate industrial and non-industrial solid waste.

**Industrial Solid Waste**

The industrial solid waste generated by the pulp process will come from the wood handling, causticizing, boiler, and water and effluent treatment plant areas.

The following main waste is included in this category:

– Waste from wood preparation;
– Dregs, grits and lime mud;
– Ash from the biomass boiler;
– Primary, secondary and tertiary sludge from the effluent treatment plant; and
– Sludge from the water treatment plant.

The volumes of industrial waste considered for sizing are shown in the table below.

**Table 17 – Industrial solid waste generated during mill operation**

| Solid waste | Generation source | Expected value ($m^3$/year) |
|---|---|---|
| Wood waste + sand | Wood yard | 32 000 |
| *Dregs* | Causticizing | 25 000 |
| *Grits* | Causticizing | 10 000 |
| Lime mud | Lime kiln | 38 000 |
| Ashes + sand | Biomass boiler | 20 000 |
| Primary sludge | ETP | 43 000 |
| Biological sludge (organic) | ETP | 70 000 |
| Tertiary sludge | ETP | 87 000 |
| Sludge | WTP | 15 000 |
| **TOTAL** | - | **340 000** |

**No Industrial solid waste**

Non-industrial solid waste will be generated in administrative and operational support activities such as offices, cafeteria and maintenance workshops.

The following primary waste is included in this category:

– Metal
– Paper or cardboard
– Plastic
– Glass
– Recyclable and non-recyclable organics
– Waste from health services
– Materials contaminated with oil and grease
– Used lubricating oil
– Fluorescent lamps and batteries

The volumes of non-industrial waste are shown in the table below.

**Table 18 – No industrial solid waste generated during mill operation**

| Solid Waste | Generation Source | Expected value ($m^3$/year) |
|---|---|---|
| Metal | General | 140 |
| Paper or cardboard | General | 30 |
| Plastic | General | 25 |
| Glass | General | 5.0 |
| Recyclable and non-recyclable organics | General | 270 |
| Waste from health services | Ambulatorio | 2.0 |
| Oil contaminated | Maintenance facilities | 75 |
| Used lubricating oil | Maintenance facilities | 35 |
| Fluorescent lamps and batteries | General | 1.5 |

#### 6.1.12.4.2 Solid waste management system

The management of solid waste generated in the operation of PARACEL's pulp mill will include the best practices, in accordance with Law n. 3,956/2009 and Decree n. 7,391/ 2017 (Integral Management of Solid Waste in the Republic of Paraguay), among which are:

- Adoption of minimization measures;
- Segregation (selective or separate collection);
- Collection, storage and transport in accordance with the law;
- Treatment or processing and use, until final disposal in sanitary (organic) or industrial landfill.

#### 6.1.12.4.3 Waste classification

According to Decree 7,391/2017, solid waste in Paraguay is grouped and classified into categories: municipal solid waste, special handling waste (non-hazardous), and hazardous waste.

- Urban solid waste: that generated in each room, housing unit or similar.
- Special handling waste (non-hazardous): industrial waste, waste from agricultural, fishing, forestry and livestock activities, transport services, civil construction and others.

– Hazardous waste: provided for in Law 567/1995, which has explosive, flammable, oxidizing, toxic, infectious, radioactive, corrosive, etc., characteristics that may cause risks to human or environmental health.

Regarding to waste from PARACEL pulp mill, it will be classified as non-hazardous and hazardous, as presented in the tables below.

**Table 19 – Industrial solid waste classification**

| Waste | Classification |
|---|---|
| Wood waste + sand | Not hazardous |
| *Dregs* | Not hazardous |
| *Grits* | Not hazardous |
| Lime mud | Not hazardous |
| Ashes + sand | Not hazardous |
| ETP sludge (primary, secondary and tertiary) | Not hazardous |
| WTP sludge | Not hazardous |

**Table 20 – No industrial solid waste classification**

| Waste | Classification |
|---|---|
| Metal | Not dangerous |
| Paper or cardboard | Not dangerous |
| Plastic | Not dangerous |
| Glass | Not dangerous |
| Recyclable and non-recyclable organics | Not dangerous |
| Waste from health services | Dangerous |
| Oil contaminated | Dangerous |
| Used lubricating oil | Dangerous |
| Fluorescent lamps and batteries | Dangerous |

#### 6.1.12.4.4 Segregation and Conditioning of Solid Waste

The pulp mill's waste management system will have selective or separate collection, which consists of separating waste so that it can be recycled later.

The containers and bins in the offices and operational areas will have the following colors, based on Resolution S.G. 548/96 of the Ministry of Health and Public Welfare, as presented in the table below.

**Table 21 – Colors of containers at offices and operational areas**

| Solid wastes | Color |
|---|---|
| Metal | **Yellow** |
| Paper or cardboard | **Blue** |
| Plastic | **Red** |
| Glass | **Green** |
| Hazardous waste | **Orange** |
| General non-recyclable waste | **Gray** |
| Health Service | **White** |
| Wood | **Black** |
| Organic | **Brown** |

In accordance with Decree 7,391/2017, the containers and recipients used for the temporary storage of solid waste will have the following requirements:

- Reusable;
- Properly located and covered;
- Capacity to store the volume of solid waste generated, taking into account the frequency of collection;
- Built with waterproof materials and with the necessary strength for their intended use;
- Identification regarding use and types of solid waste.

Waste from health services (mainly sharps) must be segregated and conditioned in containers or recipients, in accordance with Law 3361/2007.

#### 6.1.12.4.5 Solid Waste Temporary Storage Site

Non-industrial waste (non-hazardous and hazardous) will be temporarily stored in a facility until it is sent for treatment procedures specific to each type of waste.

The storage facility for non-hazardous waste will be an open, fenced, signposted yard with a compacted floor.

The storage area for hazardous waste will be a warehouse covered with metal tiles, closed at the sides, with natural ventilation, marked and with a concrete floor.

The rainwater that falls on the yard and on the roof of the storage facility (not contaminated) will be conveyed to the plant's rainwater drainage system via drainage channels to the Paraguay River.

#### 6.1.12.4.6 Treatment and Final Disposal

Solid waste will be destined for treatment or final disposal, as presented in the table below.

**Table 22 – Treatment or final disposal**

| Waste | Treatment or final disposal |
|---|---|
| Wood waste + sand | Production of compost (forest application) or burning in PARACEL's biomass boiler or industrial landfill |
| Dregs | Production of soil acidity corrector (forestry application) or PARACEL industrial landfill |
| Grits | Production of soil acidity corrector (forestry application) or PARACEL industrial landfill |
| Lime mud | Production of soil acidity corrector (forestry application) or PARACEL industrial landfill |
| Ashes + sand | Production of soil acidity corrector (forestry application) or PARACEL industrial landfill |
| Primary sludge ETP | Production of compost (forest application) or burning in the biomass boiler or recycling or industrial landfill PARACEL |
| Biological sludge ETP | Production of compost (forest application) or burning in PARACEL's biomass boiler or industrial landfill |
| Tertiary sludge ETP | PARACEL Industrial Landfill |
| WTP sludge | PARACEL Industrial Landfill |
| Metal | Recycling |
| Paper or cardboard | Recycling |
| Plastic | Recycling |
| Glass | Recycling |
| Recyclable and non-recyclable organics | PARACEL sanitary landfill (organic) |
| Waste from health services | Decontamination and sanitary landfill (external) |
| Oil contaminated | Incineration or co-processing |
| Used lubricating oil | Recycling |
| Fluorescent lamps and batteries | Decontamination and recycling (external) |

#### 6.1.12.4.7 Composting Plant

A composting plant will be installed at the pulp mill to treat organic (non-hazardous) industrial waste generated at the effluent treatment plant (primary and biological sludge) and in the wood yard (wood waste).

Composting has been practiced since ancient history and can be defined as an exothermic aerobic bio-oxidation of a heterogeneous organic substrate, in a solid state, characterized by the production of $CO_2$, water, release of mineral substances and formation of stable organic matter (PROSAB, 1999).

In practice, this means that, from organic waste, the process transforms these residues into compost, which is an agricultural input, easy to handle and free of pathogenic microorganisms (PROSAB, 1999).

The biodegradable organic components undergo successive stages of transformation under the action of various groups of microorganisms, resulting in a highly complex biochemical process (PROSAB, 1999).

Being a biological process, the most important factors influencing the degradation of organic matter are aeration, nutrients and moisture. Temperature is also an important factor, especially with respect to the speed of the biodegradation process and the elimination of pathogens, but is the result of biological activity. Nutrients, mainly carbon and nitrogen, are essential for bacterial growth. Carbon is the main source of energy and nitrogen is necessary for cell synthesis (PROSAB, 1999).

The composting process has the following main objectives:

- Recycle properly, through an efficient composting system, the waste generated and likely to be used;
- Systematize and homogenize the return of the nutrients contained in the waste to the forest plantations, making fertilizations with the compost produced;
- Improve the nutritional status and physical parameters of the soil by adding organic matter;
- Promote the partial replacement of fertilizers and chemical correctives used, with environmental and economic gains;
- Ensure the proper disposal of waste generated by industry in accordance with technical standards and environmental law in force.

The use of this type of waste in the composting process to produce compost is a sustainable alternative for waste disposal, aligned with the concepts of circular economy and best available practices. From an environmental point of view there is a reduction in the generation of waste, and from an economic point of view, less agricultural inputs are used with the use of compost.

**Design Criteria**

An area of 20 hectares (200,000 m²) is planned for the installation of the composting plant and the soil acidity corrector production plant.

Some criteria were established for the selection of the composting plant area, based on SEAM Resolution 282/2004. The criteria adopted are presented in the table below.

**Table 23 – Criteria for selection of the composting plant area**

| Criteria | Values |
|---|---|
| Distance from water courses, flood areas, springs and wetlands | More than 200 meters, distance measured from the maximum flood level |
| Distances from environmental and cultural protection areas | 1,000 meters |
| Depth of groundwater | With base waterproofing through compacted clay layer the distance from the groundwater to the base of more than 3.0 meters and the waterproofing layer must have a permeability coefficient of 1 x $10^{-6}$ cm or less. |

| Criteria | Values |
|---|---|
| Distance from nearest housing, water supply wells, education and health centers | 500 meters |

**Composting plant description**

The design of the composting plant will include the following elements:

- Soil waterproofing system
- Storm water drainage system
- Groundwater monitoring system

The description of the project elements is presented below.

**Soil Protection System**

The waterproofing of the floors of the open yards and the warehouse will be with a layer of compacted clay (permeability coefficient of 1 x $10^{-6}$ cm or less) and must be more than 3.0 meters away from the groundwater level.

**Rainwater Drainage System**

Contaminated Rainwater

Rainwater falling over the open yards will be directed by gravity to a lagoon or tank, where it will be pumped to the Effluent Treatment Plant.

Uncontaminated Rainwater

Rainwater falling on the roofs of the storage (non-contaminated) will be led to the rainwater drainage system of the pulp mill, through natural drainage in the ground or through drainage channels up to the Paraguay river.

**Groundwater monitoring system**

The groundwater monitoring system will include several monitoring wells in the area surrounding the composting plant.

**Description of Compost Production**

The waste generated in the effluent treatment (primary and biological sludge) and in the wood yard (wood waste) will be transported to the composting plant, where they will be temporarily stored in open yards (waterproofed floor with a clay layer) or sent directly to the process.

The wood waste will undergo a chipping process to reduce the size of the waste and optimize the composting process.

The waste will be mixed in the open composting yard (waterproof floor with clay layer), where the rows will be formed through a loader.

The composting process (bio-stabilization phase + maturation phase) will last 120 days. At the end of this process, the compost will be ready, but with irregular granulometry. In this way, it will be sent to the beneficiary for evaluation.

During the composting process, windrows will be turned (to provide aeration) and process controls will be carried out (temperature, moisture, pH and C/N ratio). In addition, water irrigation will be carried out to maintain the moisture of the material when necessary.

The compost produced will be transported to a warehouse, where it will undergo mechanical processing, consisting of rotary sieving, to standardize its granulometry.

The finished compost will be transported to its final destination using trucks.

The following figure shows the flow chart of compost production.

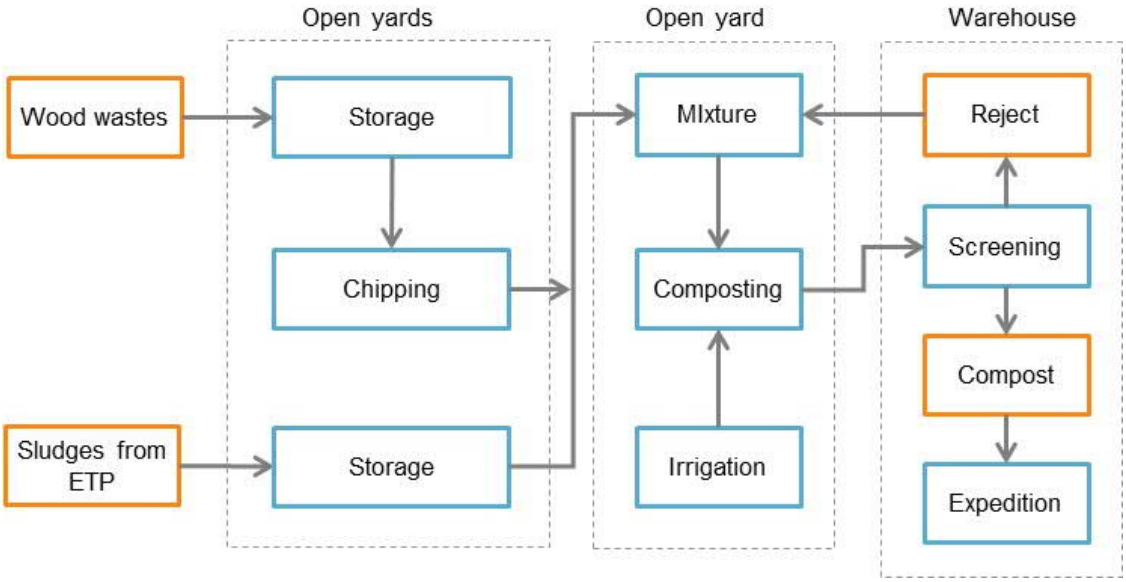



**Figure 34 – Flowchart of compost production**

### 6.1.12.4.8 Sludge incineration in biomass boiler

An alternative to the composting process, which can be used by PARACEL, is the burning of primary and biological sludge together with biomass in the biomass boiler (designed for this purpose).

Currently, several companies in the pulp and paper sector have used the biomass boiler to burn primary and biological sludge from the ETP, instead of its destination for composting or industrial landfill, such as Klabin, Suzano, Eldorado, Veracel, Cenibra, CMPC and Arauco.

The use of these wastes as fuel in the biomass boiler, for the generation of steam and electric energy, is a sustainable energy matrix alternative. From an environmental point of view, there is a reduction in the generation of waste, and from an economic point of view, less biomass is used due to the use of sludge.

### 6.1.12.4.9 Soil Acidity Corrector Production Plant

The pulp mill will be equipped with a plant to produce a soil acidity corrector, to treat the inorganic (non-hazardous) industrial waste generated in the causticizing (dregs, grits and lime mud) and in the biomass boiler (ash).

The production of the soil acidity corrector consists of drying the waste (dregs, grits, lime mud and ashes) and making a balanced mixture.

Depending on their composition, lime mud and ashes can be used individually as soil acidity correctors.

Lime mud and the mixture of dregs and grits are alkaline, basically carbonate by-products, which have a high concentration of nutrients such as calcium and magnesium and have a high capacity for neutralization.

The ash, despite the low capacity of neutralization, has a concentration of macronutrients such as phosphorus, potassium, calcium and magnesium that enrich the acidity corrector of the soil. These nutrients are important for the development of the plantation.

**Design Criteria**

An area of 20 hectares (200,000 m²) is planned for the construction of the soil acidity corrector production plant and the composting plant.

Some criteria were established for the selection of the area of the corrector production plant, based on SEAM Resolution N. 282/2004. The criteria adopted are presented in the following table.

**Table 24 – Criteria for selecting the area of the corrective production plant**

| Criteria | Value |
|---|---|
| Distance from water courses, flood areas, springs and wetlands | Greater than 200 meters, distance measured from the maximum flood level |
| Distances from environmental and cultural protection areas | 1,000 meters |
| Depth of groundwater | With base waterproofing through plastic membranes the distance from the water table to the base is more than 1.5 meters. |
| Distance from nearest housing, water supply wells, education and health centers | With base waterproofing through compacted clay layer the distance from the groundwater level to the base of more than 3.0 meters and the waterproofing layer must have a permeability coefficient of 1 x $10^{-6}$ cm or less. |

**Description of the Acidity Corrector Production Plant**

The design of the corrector production plant will include the following elements:

- Soil waterproofing system
- Storm water drainage system
- Groundwater monitoring system

The description of the project elements is presented below.

**Soil protection system**

The soil of the open patios and two greenhouses will be covered with a layer of compacted clay (permeability coefficient of 1 x $10^{-6}$ cm or less) and must be more than 3.0 meters away from the groundwater.

The impermeabilization of the warehouse floor will be made of concrete.

**Rainwater drainage system**

Contaminated rainwater

Rainwater falling on the open yards will be directed by gravity to a lagoon or tank, where it will be pumped to the wastewater treatment plant.

Non-Contaminated Rainwater

The rainwater that falls on the roofs of the warehouses and greenhouses (non-contaminated) will be led to the rainwater drainage system of the pulp mill, through natural drainage in the ground or by means of drainage channels up to the Paraguay river.

**Groundwater monitoring system**

The groundwater monitoring system will include several monitoring wells in the area surrounding the corrective production plant.

**Acidity Corrector Production Description**

The waste generated in the pulp production process (dregs, grits, lime mud and ashes) will be transported to the soil acidity corrector production plant, where they will be temporarily stored in open yards or sent directly to the drying process.

Wet waste (dregs, grits and lime mud) will undergo the natural drying process to reduce the moisture content. This drying process will take place in agricultural greenhouses.

After drying, the dry residues can be sent directly to the agricultural crop or to produce the soil acidity corrector.

The dry residues, including boiler ashes, are mixed in ideal proportions, constituting the soil acidity corrector which is then screened to standardize its granulometry. This whole process will take place in a warehouse.

The ready acidity corrector will be temporarily stored or loaded onto trucks. On leaving the plant, these trucks will be weighed and the corrector will be transported to its final destination.

The following figure shows the flow chart of the production of soil acidity corrector.

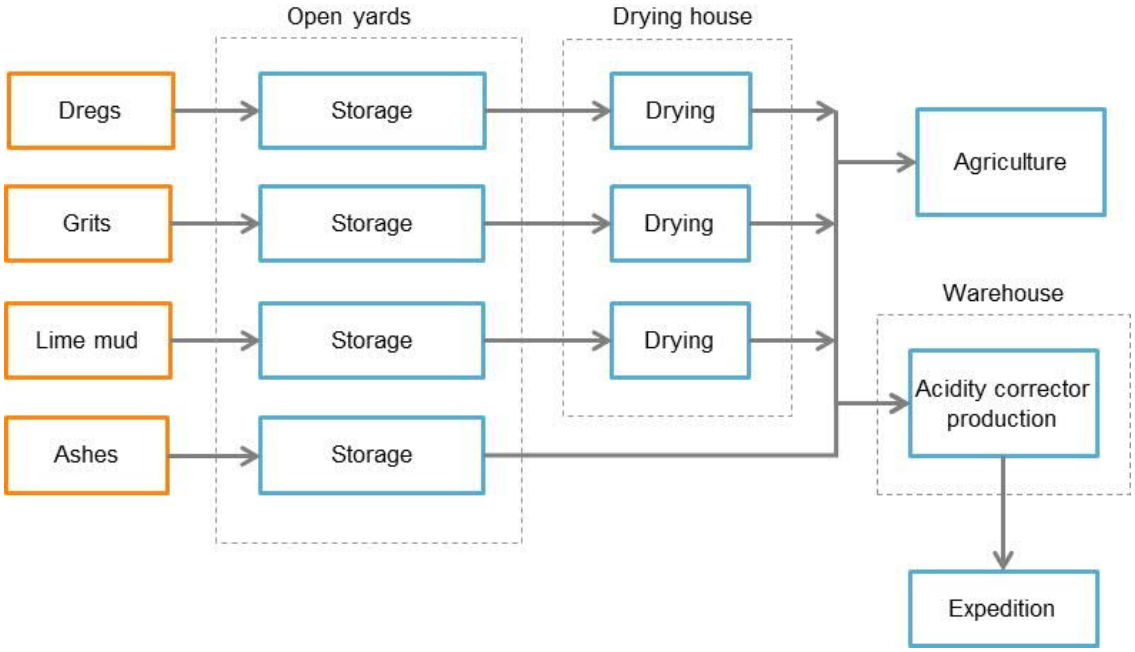



**Figure 35 – Flowchart of acidity corrector production.**

### 6.1.12.4.10 Industrial landfill

An industrial landfill will be installed at the pulp mill for the final disposal of industrial (non-hazardous) waste generated in the production process, which cannot be used for the proposed treatments (composting and production of soil acidity corrector).

**Design Criteria**

The industrial landfill will be used in the operation of the pulp mill and will have a capacity of 640,000 m³.

Several criteria were established for the selection of the industrial landfill project area, in accordance with SEAM Resolution 282/2004. The criteria adopted are presented in the table below.

**Table 25 – Criteria for selection of industrial landfill area**

| Criteria | | Value |
|---|---|---|
| Distance from water courses, flood areas, springs and wetlands | | Greater than 200 meters, distance measured from maximum flood elevation |
| Distance from urban areas | Less than 5,000 inhabitants | 500 - 2,000 meters from the urban perimeter |
| | 5,000 to 15,000 inhabitants | 2,000 - 5,000 meters from the urban perimeter |
| | More than 50,000 inhabitants | 5,000 - 10,000 meters from the urban perimeter |
| Distance from roads | National | 100 meters from the domain strip |
| | Departmental | 50 meters from the domain strip |

| Criteria | | Value |
|---|---|---|
| | Municipal | 20 meters from the domain strip |
| Airports | International | 3,000 meters |
| | National | 1,000 meters |
| Distances from environmental and cultural protection areas | | 1,000 meters |
| Groundwater depth | | The distance from the groundwater level to the base may not be less than 1.5 meters, for landfills with base waterproofing through plastic membranes |
| Distance from the nearest house, from water supply wells, educational centers and health centers | | 500 meters |

## Industrial landfill description

The industrial landfill project will include the following elements, in accordance with Decree n. 7,391/2017 and the best available practices:

- Soil protection system
- Leak detection system
- Leachate handling and pumping system
- Gas handling system
- Rainwater drainage system
- Groundwater monitoring system

### Soil protection system

In order to protect the soil and groundwater, the landfill will have waterproofing of the base and slopes through a layer of compacted clay soil (50 cm) and a double membrane of High Density Polyethylene (HDPE), with a thickness of 1 mm. In addition, the distance from the groundwater to the base will be more than 1.5 meters, in accordance with Decree n. 7,391/2017.

The soil permeability coefficient must be at least very low (permeability between $10^{-5}$ and $10^{-7}$ cm/s), in order to reduce the possibility of groundwater pollution.

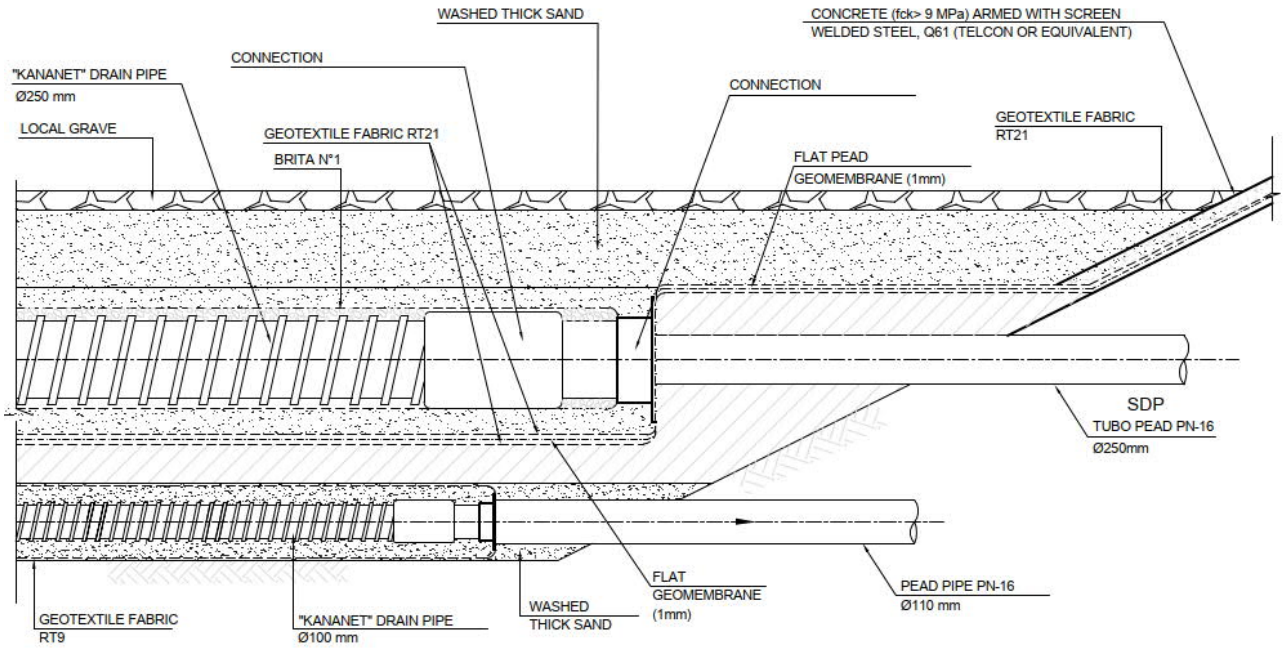



**Figure 36 – Bottom and Drainage Waterproofing System (typical design)**

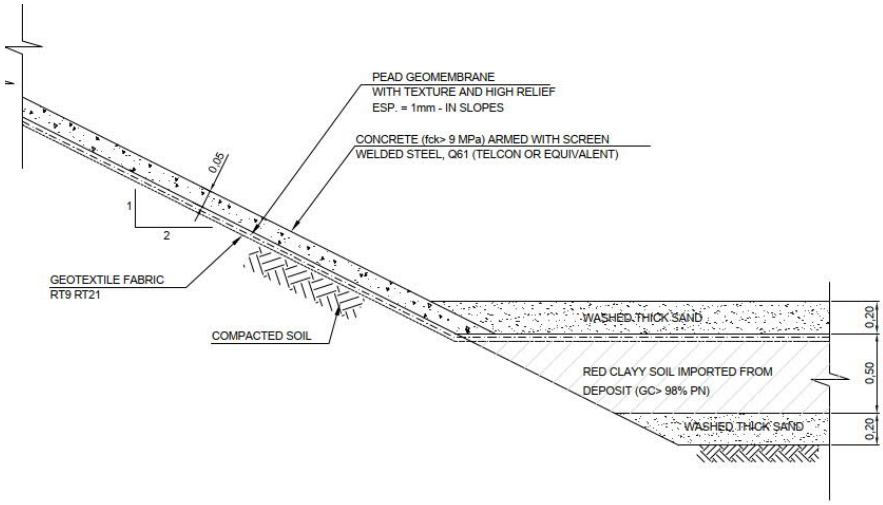



**Figure 37 – Slope waterproofing system (typical design)**

### Leak detection system

A leak detection system, consisting of HDPE pipes, will be installed below the base waterproofing between the membranes and connected to a monitoring well.

Leakage control will occur through visual verification of the monitoring well, which must always be dry. On the contrary, leaks are occurring through the HDPE membrane.

### Leachate handling and pumping system

Above the base sealed, drainage pipes, of the Kananet type (diameter of 250 mm or similar), will be installed to collect the leachate generated in the decomposition of the waste. The drainage pipes will be protected by a geotextile blanket. In addition, there will be vertical perforated pipes in concrete, also to collect the leachate generated.

The leachate collected in the pipes will be directed by gravity to the pumping tank, where it will be sent to the wastewater treatment plant.

**Gas handling system**

The gas drainage pipes, of the Kananet type (100 mm diameter or similar), will be connected in the leachate drainage pipes and will rise through the slopes to the surface, where the release of the gases will occur.

This system has the function of dispersing the gases formed in the biodegradation of the waste into the atmosphere, minimizing the risks of accumulation of these gases in the mass of waste (creating gas pockets).

**Rainwater drainage system**

The rainwater drainage system will include half-round channels that will carry water to the mill drainage system.

**Groundwater monitoring system**

The groundwater monitoring system will comprise several monitoring wells to be installed in the area surrounding the industrial landfill.

### 6.1.12.4.11 Sanitary landfill (Organic)

A sanitary landfill (organic) will be installed at the pulp mill for the final disposal of the waste generated in the refectory, in the bathrooms and non-recyclable.

**Project criteria**

The sanitary landfill (organic) will have a useful life to comply with the construction phase and the first two years of operation of the pulp mill. The capacity will be 20,000 m³, with 6,800 m³ for the construction period and 13,200 m³ for operation. After the first two years of operation, it will be possible to build another sanitary landfill or to divert this waste to another final disposal site.

Several criteria were established for the selection of the sanitary landfill (organic) project area, in accordance with SEAM Resolution 282/2004. The criteria adopted are presented in the table below.

**Table 26 – Criteria for selection of the sanitary landfill (organic) project area**

| Criteria | | Value |
|---|---|---|
| Distance from water courses, flood areas, springs and wetlands | | Greater than 200 meters, distance measured from the maximum flood level |
| Distance from urban areas | 500 - 2,000 meters from the urban perimeter | 500 - 2,000 meters from the urban perimeter |
| | 2,000 - 5,000 meters from the urban perimeter | 2,000 - 5,000 meters from the urban perimeter |
| | 5,000 - 10,000 meters from the urban perimeter | 5,000 - 10,000 meters from the urban perimeter |

| Criteria | | Value |
|---|---|---|
| Distance from roads | 100 meters from the domain strip | 100 meters from the domain strip |
| | 50 meters from the domain strip | 50 meters from the domain strip |
| | 20 meters from the domain strip | 20 meters from the domain strip |
| Airports | 3,000 meters | 3,000 meters |
| | 1,000 meters | 1,000 meters |
| Distance from cultural and environment protected areas | | 1,000 meters |
| Depth of groundwater | | The distance from the groundwater (phreatic) to the base may not be less than 1.5 meters, for sanitary landfills with waterproofing of the base through plastic membranes |
| Distance from nearest housing, water supply wells, education and health centers | | 500 meters |

**Description of Sanitary Landfill**

The landfill project will include the following elements, in accordance with Decree 7,391/2017 and the best available practices:

- Soil waterproofing system
- Leak detection system
- Leachate handling and pumping system
- Gas handling system
- Storm water drainage system
- Groundwater monitoring system

**Soil protection system**

In order to protect the soil and groundwater, the landfill will have waterproofing of the base and slopes through a layer of compacted clay soil (50 cm) and a double membrane of High Density Polyethylene (HDPE), with a thickness of 1mm. In addition, the distance from the groundwater (phreatic) to the base will be more than 1.5 meters, according to Decree 7,391/2017.

The soil permeability coefficient must be at least very low infiltration (permeability between $10^{-5}$ and $10^{-7}$ cm/s), in order to reduce the possibility of groundwater pollution.

**Leak detection system**

A leak detection system, consisting of HDPE pipes, will be installed below the base waterproofing between the membranes and connected to a monitoring well.

Leakage control will occur through visual verification of the monitoring well, which must always be dry. Otherwise, leaks could have occurred from the HDPE membrane.

**Leachate handling and pumping system**

Above the ground protection, drainage pipes of the Kananet type (250 mm diameter or similar) will be installed to collect the leachate generated in the decomposition of the waste. The drainage pipes will be protected by a geotextile blanket. In addition, there will be vertical perforated pipes in concrete, also to collect the leachate generated.

The leachate collected in the pipes will be directed by gravity to the pumping tank, where it will be sent to the wastewater treatment plant.

**Gas handling system**

The gas drainage pipes, of the Kananet type (100 mm diameter or similar), will be connected to the leachate drainage pipes and will rise through the slope to the surface, where the release of the gases will occur.

This system has the function of dispersing the gases formed in the biodegradation of the waste into the atmosphere, minimizing the risks of accumulation of these gases in the mass of waste (creating gas pockets).

**Rainwater drainage system**

The storm water drainage system will include half-round channels that will carry water to the mill drainage system.

**Groundwater monitoring system**

The groundwater monitoring system will comprise several monitoring wells to be installed in the area surrounding the sanitary landfill.

### 6.1.12.5 Noise

The generation of noise during the operation of the project will be due to the activities of the industrial process.

PARACEL will employ noise treatment systems and protective measures for its employees and third parties in industry, which are based on environmental law and technical standards, such as Law 1,100/1997 on the prevention of noise pollution and IFC Guidelines.

The main noise generating areas and their respective maximum levels (sound pressure) are shown in the following table:

**Table 27 – Main places of noise generation**

| Area | Noise dB(A) |
|---|---|
| Wood Handling | 115 |
| Cooking and Fiber Line | 110 |
| Drying | 105 |
| Chemical preparation | 100 |

| Area | Noise dB(A) |
|---|---|
| Chlorine Dioxide Plant | 100 |
| Oxygen Plant | 105 |
| Evaporation | 110 |
| Recovery boiler | 110 |
| Causticizing and Lime Kiln | 110 |
| Biomass boiler | 105 |
| Turbines | 85 |
| Cooling towers | 110 |
| Water treatment | 95 |
| *Equipment* | |
| Control valves | 75 |
| Electric motor | 78 |
| Ventilation process | 75 |
| Air compressors, pumps, drive units | 80 |
| Safety valves and starter valves | 85 |
| Safety valve outputs | 110 |

Source: PARACEL Study of noise intensity, 2020.

The sound pressure will be attenuated by:

- Construction of buildings and facilities designed with adequate acoustics, such as control rooms, offices and other facilities for individual and collective use;
- Use of appropriate materials during the construction of facilities;
- Facilities provided with vibration and shock isolators, with flexible joints;
- Acquisition of machines and equipment with low noise levels;
- Installation of equipment in suitable locations;
- Acoustic enclosure for equipment with a high sound pressure level;
- Installation of silencers, attenuators, sound energy absorbers.

In addition, PARACEL will have health and safety programs as a way to control and/or minimize the exposure of its employees and partners to industrial noise.

### 6.1.13 Description of Construction Activities

#### 6.1.13.1 Construction Sites

Construction sites will be installed next to each process area, consisting of a warehouse for the storage of construction materials, equipment, pipes, and an equipment assembly area, as well as administration and personnel control facilities.

In addition, the activities required to implement the PARACEL pulp mill will be described below, such as: vegetation removal, earthmoving activities, land protection during construction, foundation and civil works, roads and paving, concrete plant and general services center.

In a typical construction site, offices, dressing rooms, warehouses, storage area for manufactured parts and equipment and workshops will be installed. In areas where common buildings will be installed, there will be underground water supply and sanitary effluent collection networks. The areas are proposed and may vary depending on each contractor's specific activity.

The offices will have a reception area, meeting rooms, an administration room, an area for technicians, a pantry, bathrooms, and an archive.

The dressing room will consist of sinks, toilets, showers, and closets.

The workshop will have a waterproof area for washing parts with a channel that leads to a water and oil separation box.

The warehouse will have a door and a covered area for unloading, receiving and dispatching, an office, a small parts warehouse, an electrical equipment warehouse: panels, scrap containers and bathrooms.

The storage areas for manufactured parts and equipment will be sized according to the activity and size of each contractor.

#### 6.1.13.2 Removal of vegetation

To implement the project, it will be necessary to remove existing vegetation in the area of the site as a whole. The environmental characterization of the local vegetation is presented in the volume of the biotic environment diagnosis.

#### 6.1.13.3 Activities of earthwork (site preparation)

In earthmoving activities, earthmoving of approximately 8,000,000 $m^3$ is forecast, with a balance between cutting and planned sanitary landfill, with the aim of minimizing the areas needed for disposal and borrowing of material from sites outside the company's land.

It should be noted that there will be borrowing and disposal areas, which will be defined and authorized prior to project construction.

The top layer of soil removed can be reused as a substrate for any area that receives landscape treatment.

Rainwater will be conducted on the surface, through an appropriate drop, to the natural drainage system of the land.

The equipment that will be used during earthmoving and infrastructure will include bulldozers, wheel loaders, excavators, water trucks, dump trucks and trailers, among others.

#### 6.1.13.4 Ground protection during construction

The construction project includes preventive measures to minimize erosion by avoiding transporting sediments to the surrounding waterways. Earth-moving activities will be planned preferably in non-rainy periods, in order to reduce the possibility of erosion due to soil susceptibility.

Some of the measures to be adopted during the construction of the project include the construction of temporary drainage structures to prevent the water bodies from flooding, structures to contain material, minimizing the exposure time of areas without vegetation cover and friable characteristics, environmental monitoring and supervision of the works.

#### 6.1.13.5 Foundation and civil works

The buildings will have a prefabricated concrete structure and a concrete slab cover. The internal walls will be made of concrete block masonry and the external enclosures of concrete block masonry and metal sheets, and the floors in industrial areas will be made of concrete.

The infrastructure of the underground systems will include: electricity, telephone and optical cable distribution networks.

#### 6.1.13.6 Access and pavement

The internal roads will be paved with asphalt and will have concrete guides and gutters. Uncontaminated rainwater will be collected superficially through the storm drains and conducted through the rainwater network to the water body. Rainwater will be conducted from the roofs to the underground network through pipes.

Roads destined for the construction sites will receive temporary gravel paving and a drainage system in trenches.

#### 6.1.13.7 Concrete Plant

For civil works, the installation of a concrete plant is planned.

Up to 7 concrete plants are planned during the construction phase, with a total capacity of 265 $m^3$/h, basically consisting of an area for the storage, weighing and loading of aggregates (sand and gravel) and a cement silo and scale.

This area will be used basically for preparing concrete and washing trucks and concrete equipment.

It should be noted that the concrete mixing process takes place inside the concrete mixer truck, and not in the area of the Concrete Plant itself, which actually functions only as a place to store and load materials.

The area for washing the concrete mixer trucks and equipment will be waterproofed with appropriate devices that include sedimentation chambers and water/oil separation chambers, without the risk of contaminating the soil and surface and ground water. The

solid waste generated consists basically of the concrete embedded in the nozzle and funnel after loading, which is removed during the concrete mixer washing operation. The washing effluent from the trucks and concrete mixer equipment can be reused to prepare the concrete.

#### 6.1.13.8 Center of General Services (temporary buildings)

##### 6.1.13.8.1 Canteen

The cafeterias will have the capacity to serve approximately 8,000 meals per day.

The facilities consist of an industrial kitchen, butcher shop, bakery and preparation areas, reception dock, pantry, refrigerators and freezers, laundry areas and cafeterias for the preparation and supply of up to 8,000 meals.

Externally there will be an area for a gas plant, a transformer to supply power to the complex and an elevated water tank.

In the kitchen, the facilities will serve the points of consumption of cold, heat and gas.

For the ventilation of the kitchen, it will be considered the insufflation of filtered air, coming from equipment of the type "air washers", installed outside the kitchen, distributing the air through a network of ducts and grilles. The purpose of this device is to supply the exhaust air from the hoods, in addition to establishing comfort conditions compatible with kitchen activities.

The cafeteria and food preparation areas, such as the butcher's, salad and vegetable preparation areas and areas related to the administration and control of the kitchen will be served by air conditioning and ventilation.

##### 6.1.13.8.2 Social Centre

The social center building will consist of an area for shops, bathrooms, TV rooms, cafeteria with kitchen area, pantry, laundry and game tables and automatic banks and telephone in the covered outdoor area.

##### 6.1.13.8.3 Construction offices

The construction office building will consist of blocks with offices, meeting room, auditorium, pantry, cafeteria, male and female bathrooms, a warehouse and air conditioning room.

##### 6.1.13.8.4 Ambulatory, emergency and occupational safety brigade

The brigade area will consist of a service room, material/equipment room, restrooms and locker rooms and pantry.

The clinic will consist of an emergency room with advanced life support.

The occupational safety area will consist of a common room for technicians, a meeting room, a room for the safety engineer, a warehouse for safety and sanitary equipment and materials.

A covered ambulance area will be located between the brigade area and the clinic.

##### 6.1.13.8.5 Construction site entrance

The staff goal area will have reception, security area, luggage storage and individual protection equipment for visitors, integration room, cafeteria and restrooms.

The truck yard will consist of a vehicle control room and a bathroom.

The truck driver support area will have restrooms.

#### 6.1.13.8.6 Water supply

The main uses of water during the construction of the PARACEL pulp mill are: sanitary purposes, concrete preparation and various uses.

The water supply for the work will be obtained from the Paraguay River or artesian well. The raw water will undergo conventional treatment consisting of coagulation and flocculation processes using aluminum sulfate, caustic soda and polyelectrolyte, followed by decantation, filtration and chlorination, which will be carried out at a compact plant. The filtered water must be chlorinated, followed by storage in a tank, for subsequent distribution to users. In principle, this system should provide a flow of the order of 150 $m^3/h$, which should serve the maximum population of 8,000 employees (peak during work) and also for the preparation of concrete.

The authorization for the use of this water is included in the environmental license of the industrial project and does not require any additional permits to those already obtained. In case of drilling new wells, they should be declared to the Ministry of the Environment and Sustainable Development (MADES) at the time of the annual renewal of the factory's environmental license.

The quality required for the water will comply with the parameters established in Annex III of Law 1,614/2000 - Law of the Regulatory Framework and Tariff of the Potable Water and Sanitary Sewerage Service.

#### 6.1.13.8.7 Electricity supply

The electrical energy required is estimated at 7 MW for the construction phase of the mill and will be supplied through generators until the high voltage transmission line is completed. These generators will supply the offices, bathrooms, cafeteria, and other facilities, as well as the pumps of the temporary effluent treatment system.

At the peak of the works, four 1,250 kVA diesel generators will be installed. The estimated diesel consumption for each generator is 30 liters/hour during 12 hours of operation, for a total of 1,500 liters per day, which will be supplied by the storage tank with a capacity of less than 15,000 liters and also supplied by trucks.

The generators and their respective diesel tanks will be installed on a waterproofed area, protected by metal trays, preventing any spillage from contaminating the soil.

### 6.1.14 Environmental control system

#### 6.1.14.1 Liquid Effluents

At the beginning of the work, the liquid waste from the chemical toilets will be removed by trucks, transported and disposed of by accredited companies in authorized landfills. Once the installation of the worksite is completed, the chemical toilets will be deactivated and returned to the company that made the lease.

After construction of the infrastructure, the sanitary effluents generated will be collected and treated in an internal treatment system consisting of a flow meter, aerated lagoon and polishing lagoon, and then sent to the Paraguay River.

This system is a biological treatment, which works with microorganisms that will degrade the organic matter present in the wastewater (expressed in terms of BOD - Biochemical Oxygen Demand) through an aerobic process.

The choice of this system is due to the fact that this type of treatment has a good performance in terms of BOD removal, besides being a robust system, capable of withstanding the variations in load and flow to which the system will be subject (due to variations in the contingent peaks of employees that will be working on the job).

After measuring the flow, the sanitary effluents will pass through the aerated lagoon, which is equipped with mechanical surface aerators. The aerators, in addition to providing the necessary oxygen for the development of microbiology, are also responsible for maintaining the mixture in the lagoon, that is, keeping the biological sludge in suspension, a fundamental condition for the good performance of the process.

The next stage of the treatment is the polishing lagoon. The purpose of this unit is to eliminate the biological sludge formed in the aeration lagoon by decanting. The decanted sludge is mineralized at the bottom of the lagoon, which significantly reduces its volume.

After passing through the polishing lagoon, the effluent passes through a Parshall flume to measure the flow and is then discharged into the receiving body.

The treated effluents must comply with the emission standards for the parameters established by SEAM Resolution 222/2002 (National Territory Water Quality Standards). In summary, the main parameters that must be followed and that are applicable to this type of effluent (sanitary sewerage) are presented in the table below

**Table 28 – Standards applicable to treated effluents**

| Parameter | Unit | Value |
|---|---|---|
| Flow | $m^3/h$ | 70 |
| pH | - | 5,0 a 9,0 |
| Temperature | ºC | <40 |
| Sedimented solids | ml/l | < 1,0 |
| BOD | mg/l | < 50 |
| COD | mg/l | <150 |

### 6.1.14.2 Rainwater drainage

The drainage system will consist of two different networks, one to drain areas with the possibility of contamination and the other for areas where there is no possibility of contamination.

The drainage of areas where there is a possibility of contamination will consist of rainwater drains, manholes and pipes that will receive drainage from the streets outside the production islands and route these waters to the monitoring wells. After measurement, if not contaminated, these waters will be released to the nearest receiving bodies; in case of contamination, they will be sent to the effluent treatment system.

For the drainage of areas where there is no possibility of contamination, such as construction sites, administrative areas, and finished product storage areas, collection networks are planned that consist of trenches for unpaved streets and for paved streets, storm drains, manholes, and pipes that will receive these waters and dump them into the receiving bodies that surround these areas.

Water disposal will meet standards with respect to their standards and maximum velocities.

#### 6.1.14.3 Atmospheric emission

During the construction of the PARACEL pulp mill, dust may be generated, mainly in the initial phase of construction, with emphasis on earthmoving activities, vehicle movement, machinery and equipment operation, movement and transport of materials (such as sand and gravel), etc.

To minimize dust generation, new internal and worksite circulation routes will be humidified during the execution of services. In addition, trucks transporting soil, rocks and all powdery material must have their loads covered, preventing the emission of particles and dust.

#### 6.1.14.4 Solid Waste

**Generation Sources**

During the construction phase of the PARACEL pulp mill, solid waste will be generated, as shown in the table below.

**Table 29 – Solid waste generated during construction phase**

| Waste | Estimated volume |
|---|---|
| Debris (block, reinforced concrete waste, brick) | 2,600 m³/month |
| Wood | |
| Metal | 125 t/month |
| Paper or cardboard | 10 t/month |
| Plastic | 15 t/month |
| Rubber / rims | 30 pcs/month |
| Glasses | 2 t/month |
| Recyclable and non-recyclable organic | 280 m³/month |
| Fluorescent lamps | 0.5 t/month |
| Batteries | 10 kg/month |
| Waste from health services | 200 kg/month |
| Oil contaminated | 5 m³/month |
| Used lubricating oil | 3.5 m³/month |
| Packaging and waste paint, varnish and solvents | 3 m³/month |

**Solid waste management system**

The management of solid waste generated in the construction of PARACEL pulp mill will include best practices, in accordance with Law 3,956/2009 and Decree 7,391/2017 (Integral Management of Solid Waste in the Republic of Paraguay), among which are:

- Adoption of mitigation measures
- Segregation (selective or separate collection)
- Collection, storage and transport in accordance with the law
- Treatment or processing and use, until final disposal in sanitary (organic) or industrial landfill.

**Classification of Waste**

According to Decree 7,391/2017, solid waste in Paraguay is grouped and classified into the following categories: municipal solid waste, special handling waste (non-hazardous), and hazardous waste.

With regard to construction waste, it will be classified as non-hazardous and hazardous, as presented in the tables below.

**Table 30 – Solid waste classification of civil works and construction**

| Waste | Classification |
|---|---|
| Debris (block, reinforced concrete waste, brick) | Not dangerous |
| Wood | Not dangerous |

| Waste | Classification |
|---|---|
| Metal | Not dangerous |
| Paper or cardboard | Not dangerous |
| Plastic | Not dangerous |
| Rubber / rims | Not dangerous |
| Glasses | Not dangerous |
| Recyclable and non-recyclable organic | Not dangerous |
| Fluorescent lamps | Dangerous |
| Batteries | Dangerous |
| Waste from health services | Dangerous |
| Oil contaminated | Dangerous |
| Used lubricating oil | Dangerous |
| Packaging and waste paint, varnish and solvents | Non-hazardous and Dangerous |

**Segregation and Conditioning of Solid Waste**

The construction waste management system will have selective or separate collection, which consists of the separation of waste, so that it can be recycled later.

The containers and bins will have the following colors, based on Resolution S.G. 548/96 of the Ministry of Health and Public Welfare, as presented in the table below.

**Table 31 – Colors of recipients and containers**

| Waste | Color |
|---|---|
| Metal | Yellow |
| Paper or cardboard | Blue |
| Plastic | Red |
| Glass | Green |
| Hazardous waste | Orange |
| General non-recyclable waste | Grey |
| Health Service | White |
| Wood | Black |
| Organic | **Brown** |

In accordance with Decree 7,391/2017, the containers and recipients used for the temporary storage of solid waste will have the following requirements:

- Reusable
- Properly located and covered
- Capacity to store the volume of solid waste generated, taking into account the frequency of collection
- Built with waterproof materials and with the necessary strength for their intended use
- Identification regarding use and types of solid waste

Waste from health services (mainly drilling and cutting) must be segregated and conditioned in containers or recipients, in accordance with Law 3361/2007.

**Temporary Solid Waste Storage Plant**

Construction waste (non-hazardous and hazardous) will be temporarily stored in a central storage facility until it is sent for treatment.

The storage facility for non-hazardous waste will be an open, fenced, signposted yard with a compacted floor.

The storage area for hazardous waste will be a warehouse covered with metal tiles, closed at the sides, with natural ventilation, marked and with a concrete floor.

Stormwater falling on the yard and on the storage roof (not contaminated) will be conveyed to the plant's storm drainage system through drainage channels.

The temporary storage plant will be managed by a company specialized in this type of service, which will be responsible for the reception, temporary storage and destination of all the waste generated in the construction of the plant.

All the companies contracted for the construction will be responsible for the collection, segregation, conditioning and transport of the waste generated for the temporary storage plant.

The solid waste generated in the common areas and in the accommodation will also be collected, segregated, conditioned and transported to the temporary storage plant. The collection of this waste will be carried out by a company specialized in this service.

### 6.1.14.5 Treatment and final disposal

The solid waste will be destined for treatment or final disposal, as presented in the table below.

**Table 32 – Treatment or final disposal of construction waste**

| Waste | Treatment or final disposal |
|---|---|
| Debris (block, reinforced concrete waste, brick) | Recycling, PARACEL debris landfill or postponement area |
| Wood | Energy recovery or PARACEL debris landfill |
| Metal | Recycling |
| Paper or cardboard | Recycling |

| Waste | Treatment or final disposal |
|---|---|
| Plastic | Recycling |
| Rubber / rims | Recycling |
| Glasses | Recycling |
| Organic and non-recyclable | PARACEL sanitary landfill (organic) |
| Fluorescent lamps | Decontamination and recycling (external) |
| Batteries | Decontamination and recycling (external) |
| Waste from health services | Decontamination and sanitary landfill (external) |
| Oil contaminated | Incineration or co-processing |
| Used lubricating oil | Recycling |
| Packaging and waste paint, varnish and solvents | Recycling or sanitary landfill (external) |

#### 6.1.14.5.1 Debris landfill

A debris landfill will be installed at the pulp mill for the final disposal of construction waste (block, reinforced concrete, brick and wood waste).

An alternative for the disposal of debris is the disposal area, together with the excavated soil.

**Design criteria**

The debris disposal site will be used in the construction of the pulp mill and will have a capacity of 75,000 m³.

Only rubble (block, concrete, brick) and wood, which are classified as non-hazardous, can be sent to the landfill.

Several criteria were established for the selection of the debris landfill project area, based on SEAM Resolution 282/2004. The criteria adopted are presented in the table below.

**Table 33 – Criteria for selection of the debris disposal project area**

| Criteria | Value |
|---|---|
| Distance from water courses, flood areas, springs and wetlands | Greater than 200 meters, distance measured from the maximum flood level |
| Distances from environmental and cultural protection areas | 1,000 meters |
| Distance from nearest housing, water supply wells, education and health centers | 500 meters |

**Description of the Debris Disposal Site**

The debris disposal site will be located in an area that takes advantage of the natural slope of the land and will have a 1:2 (V:H) slope at the bottom. The bottom of the landfill will have compacted soil.

**Rainwater Drainage System**

The internal rainwater drainage system of the landfill will include drainage pipes in the slopes. The inlet of the drainage pipes will be protected by a geotextile blanket.

The external stormwater drainage system will comprise half-round channels that will carry water to the mill drainage system.

**Groundwater Monitoring System**

The groundwater monitoring system will comprise several monitoring wells that will be installed in the area surrounding.

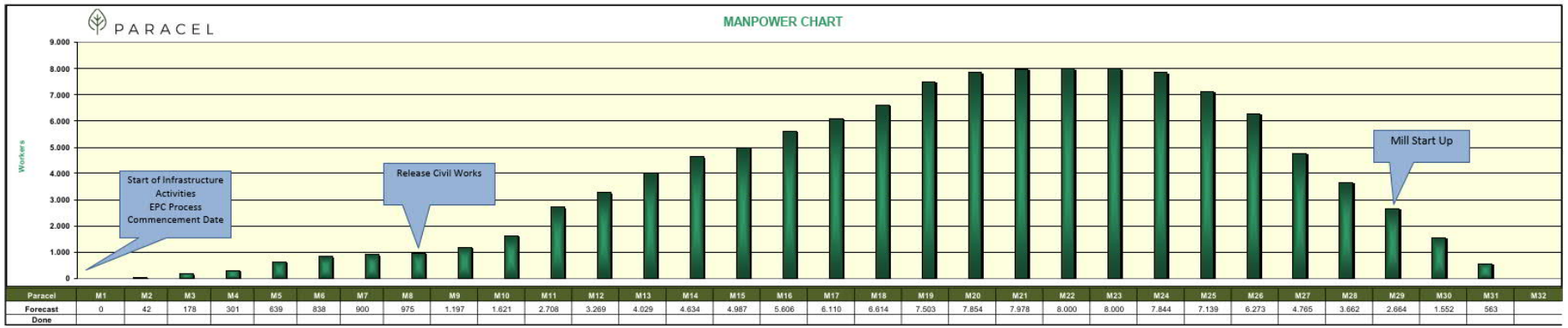
### 6.1.14.6 Noise

In the construction of the PARACEL pulp mill, noise will be generated by the movement of vehicles and the operation of machinery and equipment.

### 6.1.15 Man power

The workforce required to establish the PARACEL pulp mill is estimated at approximately 8,000 workers during the peak construction and assembly period.

The labor required for the construction and assembly of the project will be recruited preferably in Concepción and the region.




| Paracel | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 | M13 | M14 | M15 | M16 | M17 | M18 | M19 | M20 | M21 | M22 | M23 | M24 | M25 | M26 | M27 | M28 | M29 | M30 | M31 | M32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast | 0 | 42 | 178 | 301 | 639 | 838 | 900 | 975 | 1.197 | 1.621 | 2.708 | 3.269 | 4.029 | 4.634 | 4.987 | 5.606 | 6.110 | 6.614 | 7.503 | 7.854 | 7.978 | 8.000 | 8.000 | 7.844 | 7.139 | 6.273 | 4.765 | 3.662 | 2.664 | 1.552 | 563 | |
| Done | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Figure 38 – Manpower demand in the construction phase**

### 6.1.16 Accommodation for workers

Workers will be accommodated in up to 6 (six) lodgings, to be built in Concepción and Loreto during the construction phase of the PARACEL pulp mill.

The location of these accommodations that will be built is shown in the following figure.




**Figure 39 – Camps location (CAMP 1, 3, 6, 7, 9 and 11)**

Camps 1, 6, 7, 9 and 11 will have the following structure.

- Car and bus parking
- Guardhouse, Security office, entrance
- Lodge operator facility / Administrative office
- Medical center and First aid
- Restaurant and kitchen
- Social center / Recreation area
- Gymnastics equipment in open space
- Sports track
- Football field
- Utilities
    - Substation, electrical room, power generator
    - Garbage
    - Sewage treatment plant

- Water treatment plant
- Tower
- Drinking water reservoir
- Restaurant water reservoir

– Ecumenical room

– Lodges

Camp C3 will have a smaller structure, composed by a parking, administrative office, security office, lodge operator facility, social center, recreation area, utilities (garbage, electrical room, power generation and drinking fountain and hot water feed point), 7 lodges.

The following table presents camps capacity and building area.

**Table 34 – Camps capacity and building area**

| Camp identification | Camp Capacity of workers | Camp Building area ($m^2$) |
|---|---|---|
| Camp 1 | 2.352 | 48.826 |
| Camp 3 | 224 | 4.500 |
| Camp 6 | 1.344 | 14.200 |
| Camp 7 | 896 | 7.200 |
| Camp 9 | 1.288 | 7.500 |
| Camp 11 | 1.176 | 7.200 |

Camps layout with legend are presented in **ANNEX X** of this document.

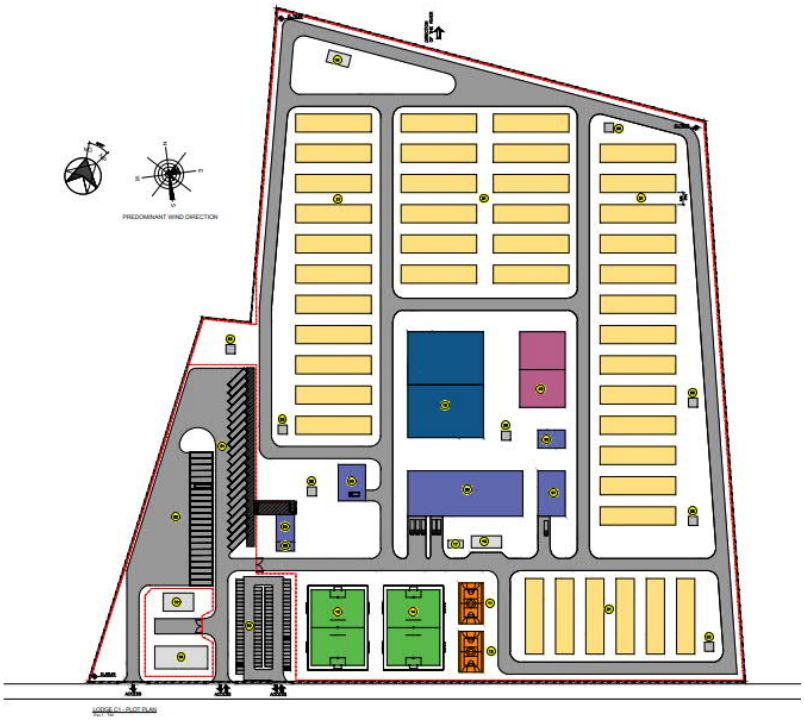


**Figure 40 – Layout Camp C1**

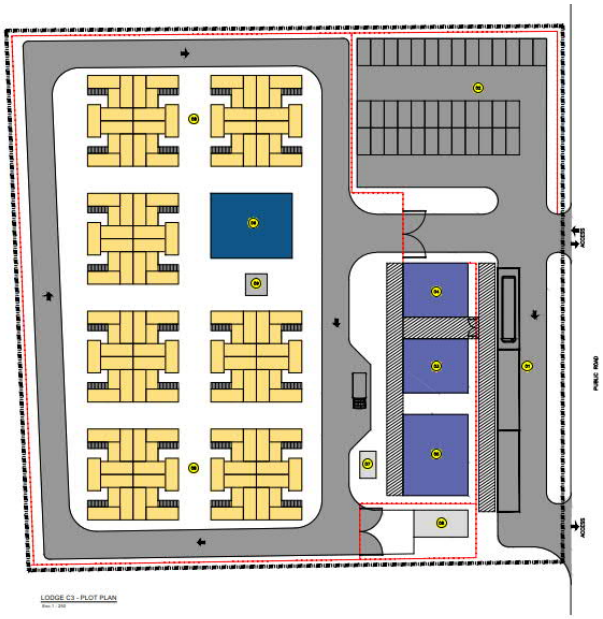


**Figure 41 – Layout Camp C3**



**Figure 42 – Layout Camp C6**

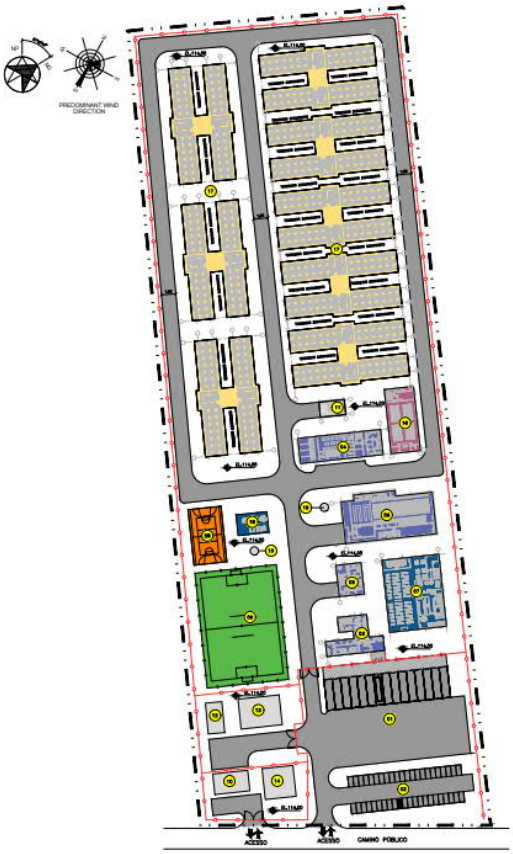


**Figure 43 – Layout Camp C7**

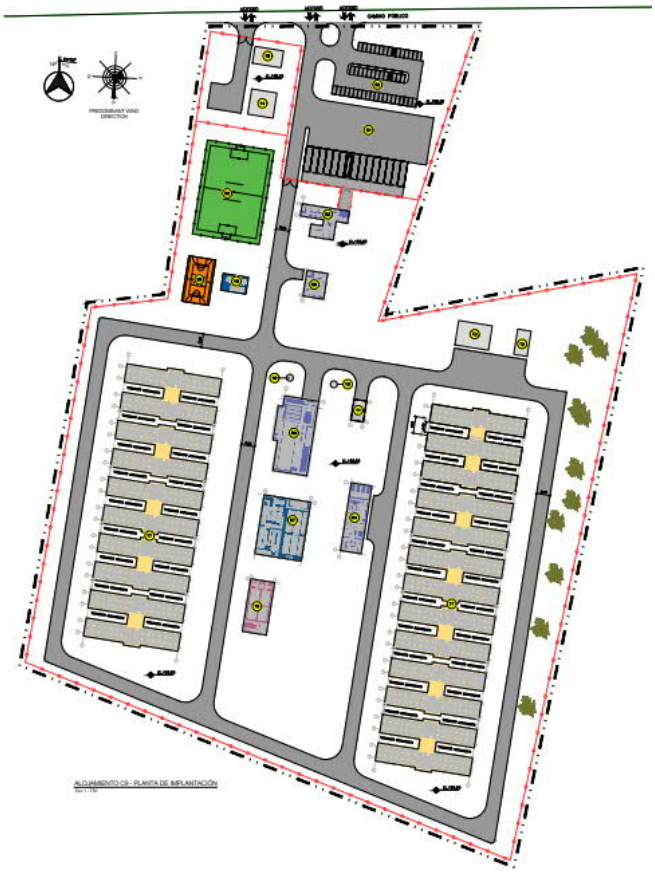


**Figure 44 – Layout Camp C9**



**Figure 45 – Layout Camp C11**

### 6.1.17 Demobilization

Once the works are completed and according to the contract established with the owners, the facilities will be dismantled and the place where they are with the same characteristics as before their installation will be restored.

The soil will be unpacked and the grass cover will be implanted according to the landscape design.

### 6.1.18 Investment

The total investment foreseen for the project will be in the order of USD 2.2 billion.

### 6.1.19 Construction schedule

The expected period for the construction of the PARACEL pulp mill is 28 months, as shown in the figure below.

**PARACEL PROJECT**
**IMPLANTATION TIME SCHEDULE**

| ID | ATIVIDADES |
|---|---|
| 1 | 1 - IMPLANTATION TIME SCHEDULE |
| 2 | 1.1 - PROJECT MAIN MILESTONES |
| 3 | 1.1.1 - START UP - FIRST COOKING |
| 4 | 1.2 - MILL INFRASTRUCTURE CONSTRUCTION |
| 5 | 1.2.1 - EARTHMOVING INCLUDING IMPROVEMENTS IN EXISTING ACCESS |
| 6 | 1.2.2 - UNDERGROUND SYSTEM, INTERNAL ROADS ANS PAVING |
| 7 | 1.2.3 - ACCESS ROADS (DEFINITIVE) |
| 8 | 1.3 - TEMPORARY FACILITIES BUILDINGS AND UTILITIES FOR CONSTRUCTION |
| 9 | 1.3.1 - TEMPORARY OFFICES AND PERSONNEL ROOMS |
| 10 | 1.3.2 - TEMPORARY KITCHEN AND DINNING HALL |
| 11 | 1.3.3 - TEMPORARY AMBULATORY AND SOCIAL AREA |
| 12 | 1.3.4 - TEMPORARY GATES AND FENCES |
| 13 | 1.3.5 - ARTESIAN WELL |
| 14 | 1.3.6 - WATER TREATMENT COMPACT UNIT |
| 15 | 1.3.7 - SANITARY SEWER TREATMENT SYSTEM |
| 16 | 1.3.8 - TEMPORARY POWER DISTRIBUTION |
| 17 | 1.4 - PIPE-RACK - CONSTRUCTION |
| 18 | 1.5 - PIPE-RACK - COMISSIONING AND TESTS |
| 19 | 1.6 - MILLWIDE CONTROL SYSTEM (DCS) - CONSTRUCTION |
| 20 | 1.7 - MILLWIDE CONTROL SYSTEM (DCS) - COMISSIONING AND TESTS |
| 21 | 1.8 - UTILITIES (COMPRESSES AIR, COOLING WATER AND CHILLED WATER SYSTEMS) - CONSTRUCTION |
| 22 | 1.9 - UTILITIES (COMPRESSES AIR, COOLING WATER AND CHILLED WATER SYSTEMS) - COMISSIONING AND TESTS |
| 23 | 1.10 - PROCESS AREAS |
| 24 | 1.10.1 - WOOD YARD - CONSTRUCTION |
| 25 | 1.10.2 - WOOD YARD - COMISSIONING AND TESTS |
| 26 | 1.10.3 - BIOMASS TO BIOMASS BOILER |
| 27 | 1.10.4 - CHIPS FOR PILE |
| 28 | 1.10.5 - FIBER LINE - CONSTRUCTION |
| 29 | 1.10.6 - FIBER LINE - COMISSIONING AND TESTS |
| 30 | 1.10.7 - FIRST COOKING |
| 31 | 1.10.8 - LIQUOR TO EVAPORATION PLANT |
| 32 | 1.10.9 - PULP TO DRYING MACHINE |
| 33 | 1.10.10 - DRYING MACHINE - CONSTRUCTION |
| 34 | 1.10.11 - FIRST DRYING MACHINE - CONSTRUCTION |
| 35 | 1.10.12 - FIRST DRYING MACHINE - COMISSIONING AND TESTS |
| 36 | 1.10.13 - SECOND DRYING MACHINE |
| 37 | 1.11 - CHEMICAL PLANT - CONSTRUCTION |
| 38 | 1.12 - CHEMICAL PLANT - COMISSIONING AND TESTS |
| 39 | 1.13 - RECOVERY SYSTEM AREAS |
| 40 | 1.13.1 - EVAPORATION - CONSTRUCTION |
| 41 | 1.13.2 - EVAPORATION - COMISSIONING AND TESTS |
| 42 | 1.13.3 - RECOVERY BOILER - CONSTRUCTION |
| 43 | 1.13.4 - RECOVERY BOILER - COMISSIONING AND TESTS |
| 44 | 1.13.5 - CONTINUOUS STEAM PRODUCTION WITH BLACK LIQUOR |
| 45 | 1.13.6 - CAUSTICIZING AND LIME KILN - CONSTRUCTION |
| 46 | 1.13.7 - CAUSTICIZING AND LIME KILN - COMISSIONING AND TESTS |
| 47 | 1.13.8 - LIME MUD PRODUCTION |
| 48 | 1.14 - STEAM AND POWER AREAS |
| 49 | 1.14.1 - BIOMASS BOILER - CONSTRUCTION |
| 50 | 1.14.2 - BIOMASS BOILER - COMISSIONING AND TESTS |
| 51 | 1.14.3 - STEAM FROM BIOMASS BOILER WITH FUEL OIL |
| 52 | 1.14.4 - STEAM FROM BIOMASS BOILER WITH BIOMASS |
| 53 | 1.14.5 - TURBOGENERATORS - CONSTRUCTION |
| 54 | 1.14.6 - TURBOGENERATORS - COMISSIONING AND TESTS |
| 55 | 1.14.7 - FIRST TURBOGENERATOR |
| 56 | 1.14.8 - SECOND TURBOGENERATOR |
| 57 | 1.15 - WATER SUPPLY AREAS |
| 58 | 1.15.1 - RAW WATER INTAKE - CONSTRUCTION |
| 59 | 1.15.2 - RAW WATER INTAKE - COMISSIONING AND TESTS |
| 60 | 1.15.3 - WATER TREATMENT PLANT - CONSTRUCTION |
| 61 | 1.15.4 - WATER TREATMENT PLANT - COMISSIONING AND TESTS |
| 62 | 1.15.5 - BOILER FEEDWATER - CONSTRUCTION |
| 63 | 1.15.6 - BOILER FEEDWATER - COMISSIONING AND TESTS |
| 64 | 1.15.7 - DEMINERALIZED WATER AVAILABLE FOR BOILERS |
| 65 | 1.16 - EFFLUENT TREATMENT PLANT - CONSTRUCTION |
| 66 | 1.17 - EFFLUENT TREATMENT PLANT - COMISSIONING AND TESTS |

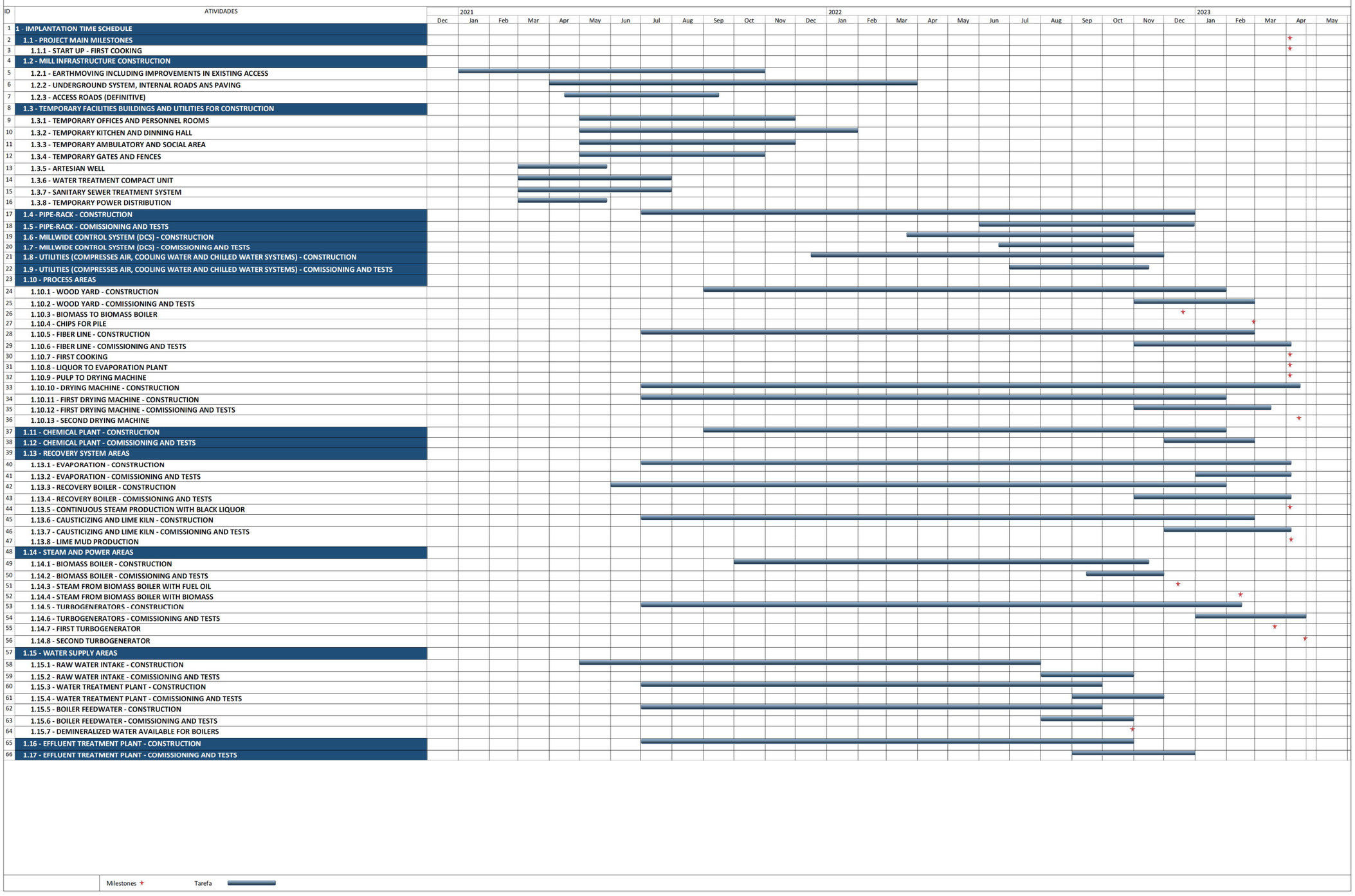



**Figure 46 – Construction schedule**

## 6.2 Transmission Line and Substation

### 6.2.1 Transmission Line

The transmission line RoW will be 5 meters for the cable side and 1.5 meters for the other side, resulting in a lane of 6.5 meters.

#### 6.2.1.1 General Description

The project consists of the construction, assembly and commissioning of the 220 kV Transmission Line, whose section will be found between the Concepción Substation Villa Real and the PARACEL Substation, with an approximate length of 33 km, which is presented in the following figure. The project with all the transmission line trenches can be found in **ANNEX VIII**.

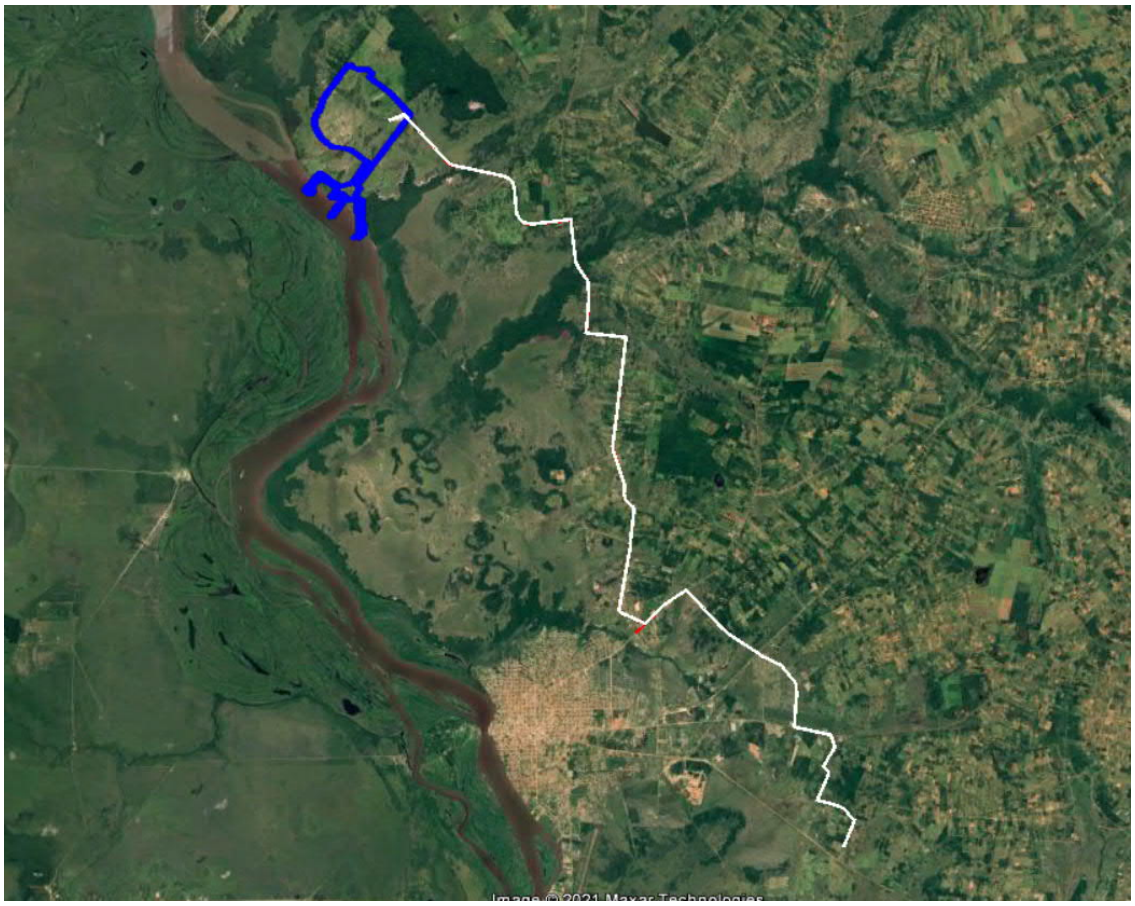


**Figure 47 – Complete route, from Villa Real Electrical Substation to Paracel Electrical Substation**

The transmission line will present the electrical characteristics according table as follows.

**Table 35 – Electrical characteristics of Transmission Line**

| Description | Specification |
|---|---|
| Nominal tension | 220 kV |

confidential



| Description | Specification |
|---|---|
| Frequency | 50 Hz |
| Quantity of circuits | 1 (one) conductor per phase |
| Conductor | ACAR 950 MCM, AI 18 AI 19, one conductor per phase |
| Guard cable | C. G. OPGW, 24 fibers, single mode type, $d_{max}$ = 14 mm |
| Insulator string | Polymeric rubber type insulators for both suspension chains and for anchoring, with ball-and-joint type coupling |

The transmission line will be an urban type towers, because this type of installation of the transmission line in an area that has already been altered by man causing less impact in native areas.

All Paraguayan energy concessionaire (ANDE) requirements regarding the recommended safety distances have been met.

**Right of Way (RoW)**

The transmission line RoW will be 5 meters for the cable side and 1.5 meters for the other side, resulting in a lane of 6.5 meters, according to the figure bellow.

It is important to highlight that there will not be any displacement due to the transmission line implementation since it will follow the RoW of the existing roads and it will not cross any private property. The following map shows the land use of the transmission line.

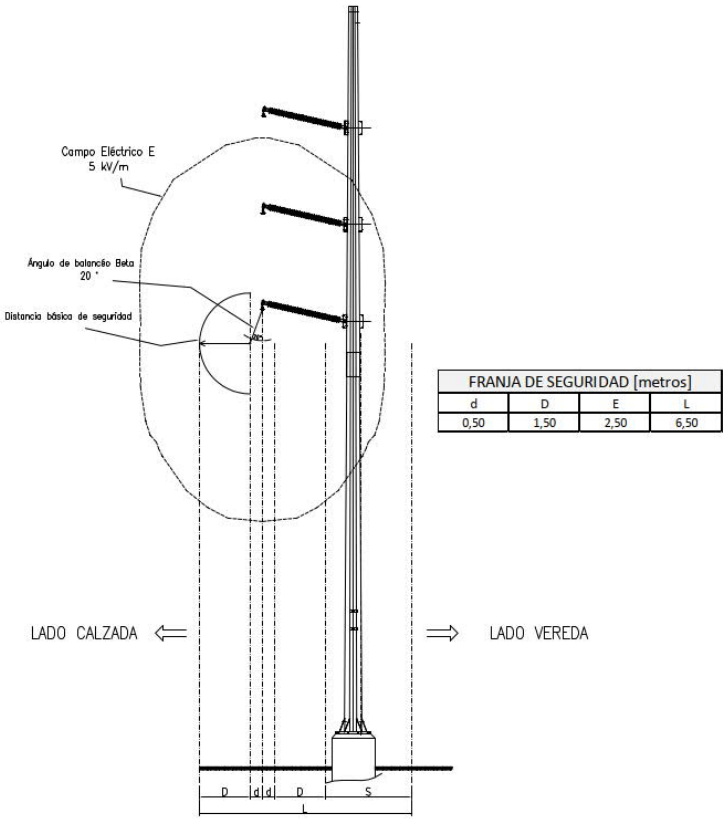



**Figure 48 – Type of towers**

confidential

**Figure 49 – Land Use in Transmission Line Right of Way**

confidential

Rio Paraguay

Concepcion

CONCEPCION

CAMP 1

CAMP 11

CAMP 3

CAMP 7

CAMP 6

CAMP 9

7.400.000

7.400.000

confidential

**LOCATION MAP**




**LEGEND**

- Accommodations (Camps)
- Capitals
- Transmission line
- Hydrography
- Main Roads
- Secondary Roads
- DAA - Directly Affected Area
- ADI - Area of Direct Influence
- CIH Rio Pilcomayo and Aquidaban
- South America

**Land Use of ADI**

- Wetland
- Hydrography
- Built Area
- Vegetation

GRAPHIC SCALE:
0 0,75 1,5 3 km

DATUM SIRGAS 2000
PROJECTION: UTM

DATA SOURCE:

- DGEEC, 2012 (General Directorate of Statistics, Surveys and Censuses).

PARACEL PÖYRY

**ENVIRONMENTAL IMPACT STUDY**

**CIH8 Aquidaban and CIH18 Rio Pilcomayo**

**LAND USE OF ADI**

| SCALE: | DATE: |
|---|---|
| 1:60.000 | 28/05/2021 |

| DRAFT N°: | PAGE: | FORMAT: |
|---|---|---|

| TECHNICAL RESP.: | SIG.: | REV. |
|---|---|---|
| Romualdo Hirata | | 0 |

### 6.2.1.2 Transmission Line Construction

The towers will be assembled with munck trucks similar to the photo below, the cables will be laid by launching a guide cable so that each conductor can be launched using appropriate equipment for installing overhead cables with controlled tension as shown in the image below.



**Figure 49 – Example of assembly of the towers**



**Figure 50 – Cable tensioning equipment and line next substation**

#### 6.2.1.2.1 Construction sites

The construction sites will be mobile with containers along the entire route of the work as well as the transport of the components of the towers to the installation site, facilitating the execution of the works and generating the least possible impact.

#### 6.2.1.2.2 Man Power

The workforce required to establish the transmission line is estimated at approximately 42 workers during the peak construction and assembly period, according to the following histogram.

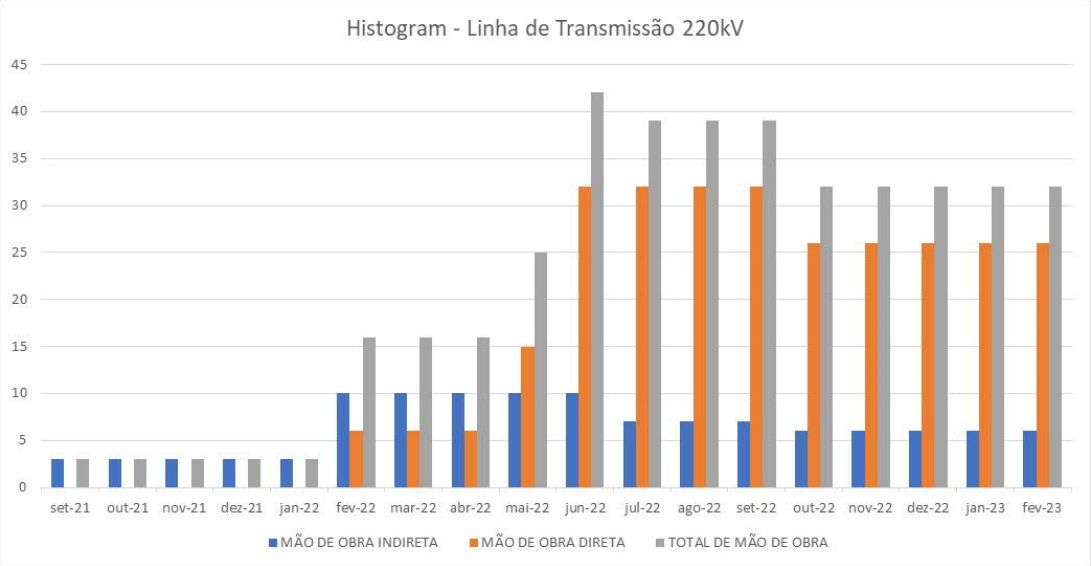



**Figure 51 – Man Power Histogram**

#### 6.2.1.2.3 Construction Schedule – Transmission Line

The expected period for the construction of the transmission line is 18 months, as shown in the figure below.

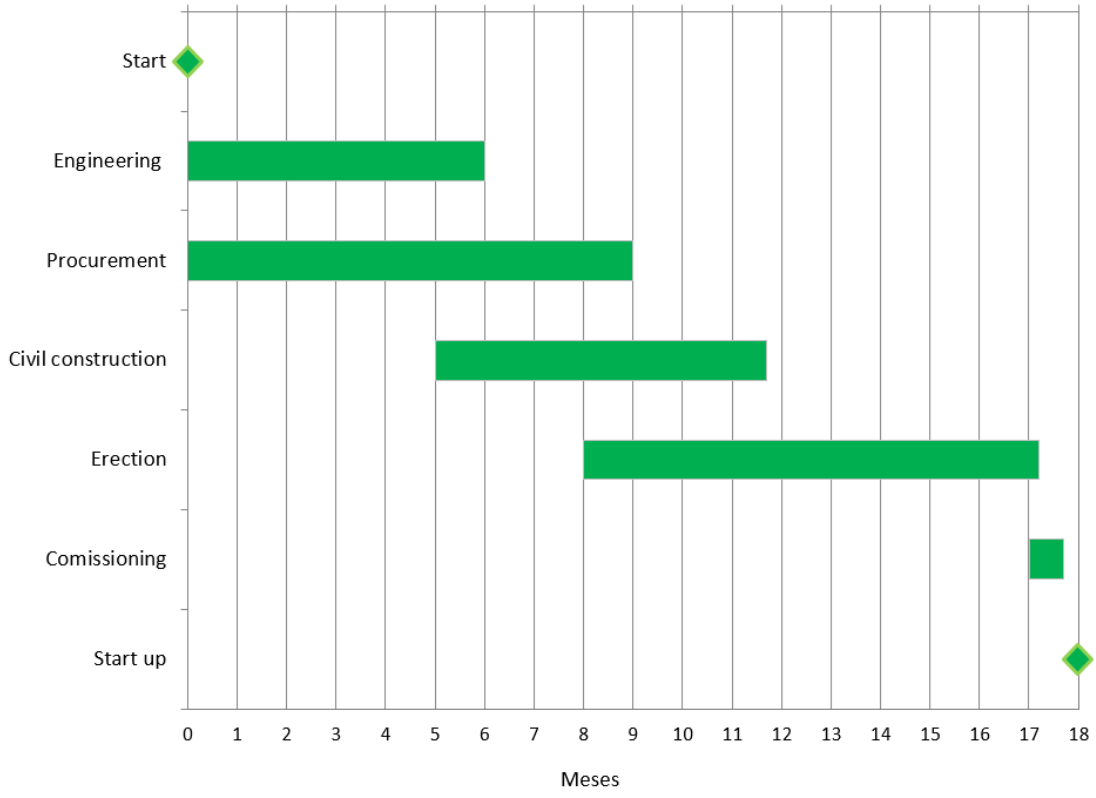



**Figure 52 – Construction Schedule – Transmission Line**

#### 6.2.1.2.4 Safety

In relation to general safety rules (working at heights), PARACEL will ask all its suppliers to follow the HSE (Safety, Health and Environment - attached document) notebook prepared exclusively for the PARACEL Project.

In addition to complying with Paraguay legislation, it is also based on Brazilian standards, such as NR 35 and NR10. Regulatory Standard 35, or just NR 35, establishes the minimum protection requirements for work at heights, involving planning, organization and execution. NR-10 establishes the minimum requirements and conditions for professionals who directly or indirectly interact in electrical installations and services with electricity. This standard aims to implement control measures and preventive systems in order to ensure the safety and health of workers.

### 6.2.2 Electrical Substation

The installed power in the substation will be 280 MVA (sum of the 2 transformers). It must be remembered that the plant operating in regime will generate a surplus of energy that will feed into the national grid, but will demand energy from the grid during startups and stops.

**Electrical characteristics:**

- Transformers: 2 x 140/170 MVA
- Capacitor: 9 MVAr (estimated, since it depends on the study of harmonics)
- Others: 5x (52) 3500 A - 220 kV / 18x (89) 2000 A - 220 kV / 4x Current Transformer / 6x Potential
- Transformer / 3x 34.5 kV cubicle / 1x Auxiliary Transformer 45 kVA

## 6.3 River Port

The river port of the pulp mill will be a terminal-type construction on the left bank of the Paraguay River, built as an elevated platform on a structure composed of: an operating platform, an access bridge for vehicles and people, and a shed structure for the pulp transport area. All the structures will be made of reinforced concrete and the loading roof will be made of a metal structure. It will be implemented from the shore through the sustainable methodology of the Cantitraveller type with prefabricated elements.

The port will move the following loads:

- Pulp transport by river barges at an average rate of 1,500,000 t/year;
- Reception of logs with volumes varying between 2 and 5 million m³ s sc/year;
- Reception of inputs for the pulp mill (liquid or bulk) up to 450,000 t/year.

The boats that will operate in the port will be the current models in circulation in the fluvial section of the Paraguay River with the format of convoys according to the official conditions of navigation. The typical pulp convoy will consist of barges) with a unit capacity of up to 2,500 tonnes each.

The boats for wood and inputs will be suitable for each of the operations/products and will be regulated by the navigation conditions.

No dredging actions will be required for the approach channel, the evolution basin and the anchorage area of the vessels (barges and pusher craft). For platform or access bridge construction services, bottom forming services may occasionally be required at the site of underwater structures.

The selection of the positioning of the river port was defined according to the format of the pulp mill area and the morphological characteristics of the Paraguay river, shown in the following figure.

The selected point is characterized by having natural draft conditions for boats (pulp barges) without the need for deepening actions or maintenance of dredging, and preserves the conditions of regular distance from the navigation channel, in accordance with the premises and institutional regulations.

The train anchorage areas are located upstream of the river port for empty trains awaiting cargo and downstream for loaded trains awaiting final train formation.

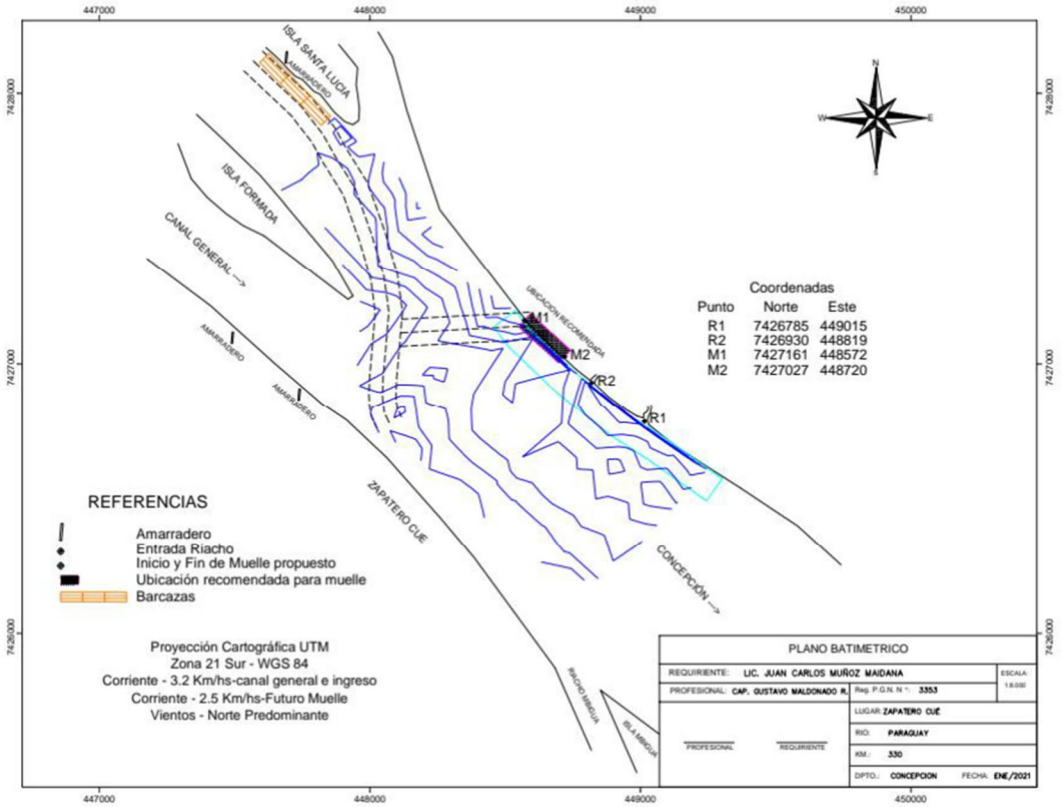



**Figure 53 – Location for the port**

The pulp waterway route to Nueva Palmira is presented in the picture below.

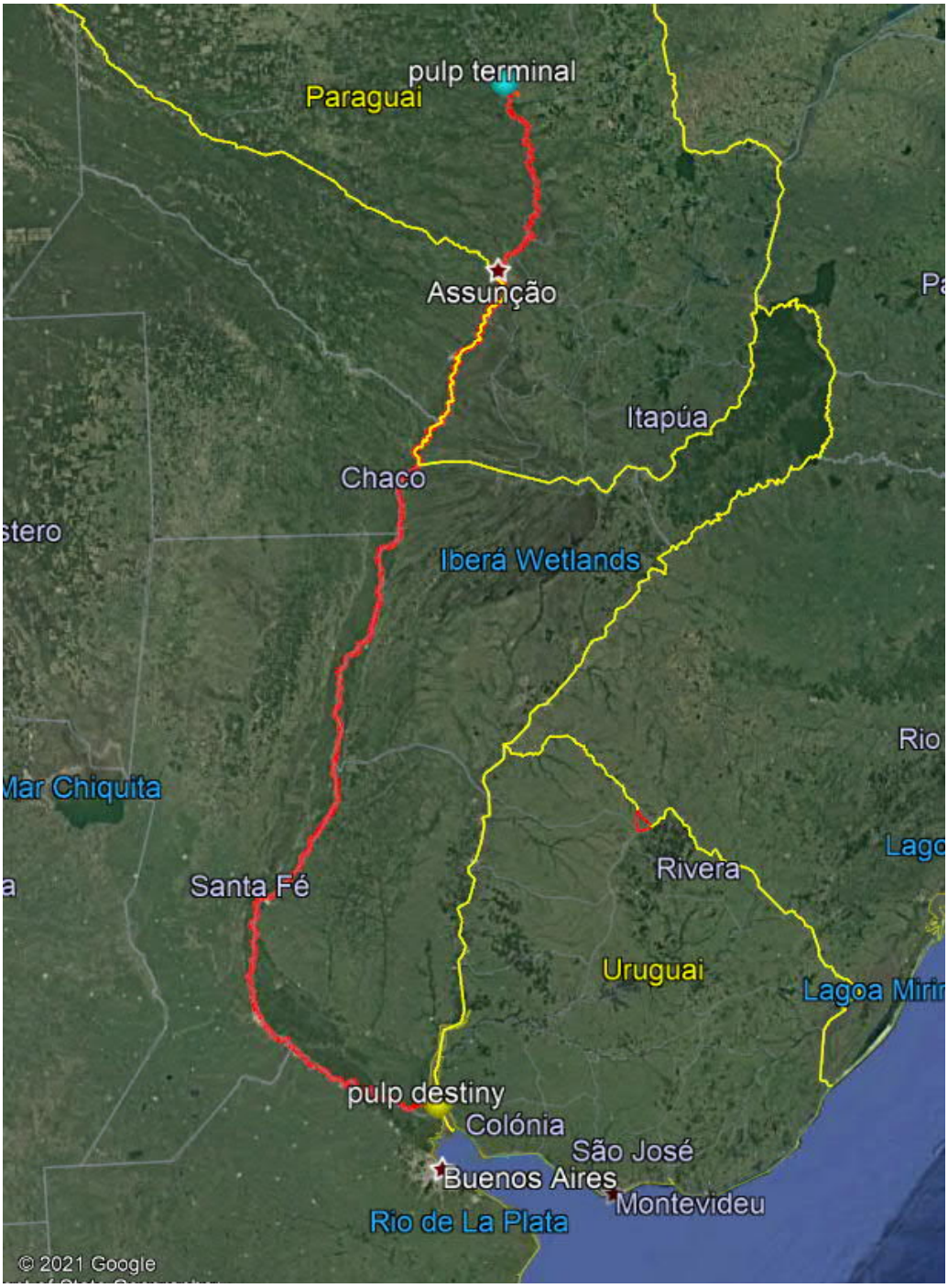



**Figure 54 – Pulp waterway route**

## Facilities Description

### AWT

The AWT (All Weather Terminal) will be completely developed in metallic structure, therefore, the covering, the closings and the beams will be metallic. The 56 t capacity crane support columns will be made of precast concrete.

**Support Building**

This building will have a conventional concrete structure, structural masonry, precast slab and metal roof. The support building will have house bathrooms, meeting rooms and control rooms.

**Mooring Points**

The design includes tie-down points, main protection points and protection points of the AWT roof columns. It is planned to use metal jacketed perforated inclined piles filled with reinforced concrete and their respective blocks, which consist of a precast bark element for the second subsequent concreting step.

**Barge Pier**

The barge dock will have reinforced concrete platform. Its structure will be made of perforated metal-clad piles filled with reinforced concrete, beams and precast slabs in solidarity with the reinforced concrete in situ.

**Access Bridge**

As well as the pier, the access bridge will be made up of wide reinforced concrete structure. Its structure will be made of perforated metal-clad piles filled with reinforced concrete, beams and precast slabs in solidarity with the reinforced concrete in situ.

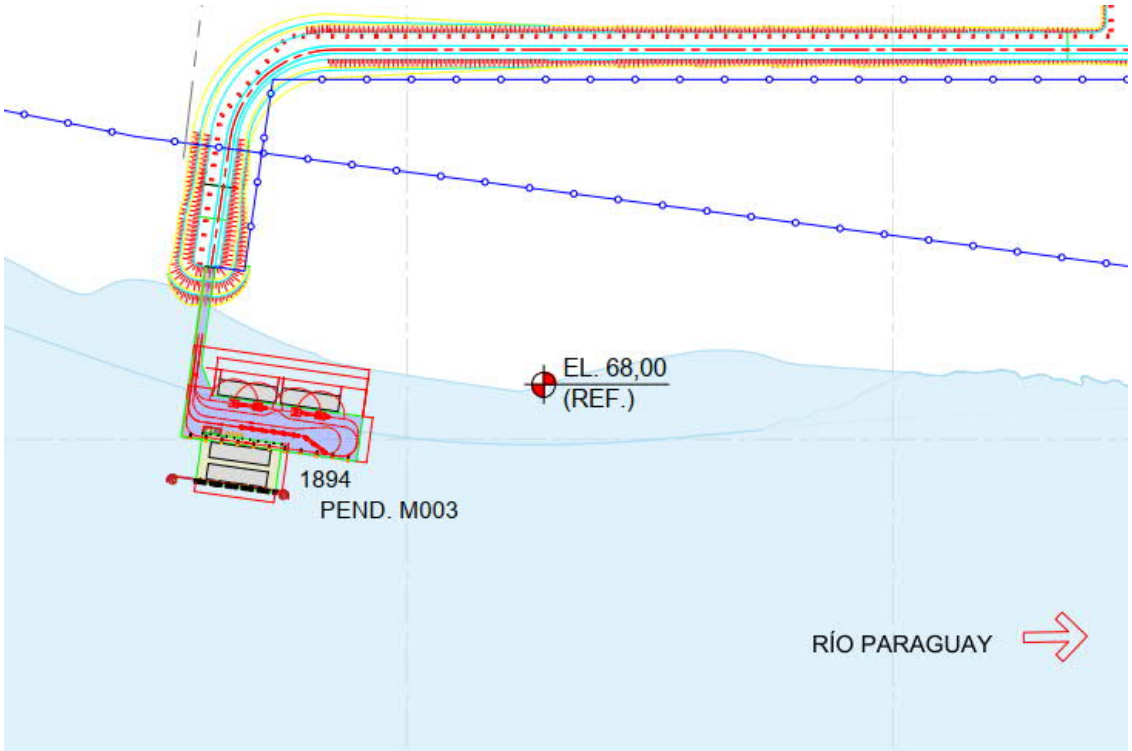



**Figure 55 – River Port**

# 7 LEGAL AND INSTITUTIONAL MATTERS

## 7.1 Historic Background

The Environmental and Social Impact Assessment (ESIA) are based on Article 1 to 4 of Law 294/13, which establishes that an Environmental Impact Study is mandatory. The impact evaluation investigates the changes in the environment caused by works and/or human activities that have a positive or negative, direct or indirect consequence, affecting life in general, biodiversity, the quality or a significant quantity of natural or environmental resources and their use, welfare, health, personal safety, habits and customs, cultural heritage, legitimate livelihoods.

The ESIA aim to help and instruct the process of applying for an environmental license to implement a Pulp and Paper Production Unit, owned by PARACEL, to be located in the municipality of Concepción, Department of Concepción.

The ESIA also has the scope of providing technical grants for the MADES in the analysis of this document. Thus, the ESIA is a strategic planning and environmental management tool for both MADES and PARACEL, operating in the planning and operation stages of the project.

Man's interest in the environment and the issue surrounding it is a matter that goes back many centuries. However, in the second half of the last century, a special global emphasis has been placed on the issue of environment and development, and it is in this way that the main global, regional and national forums have inevitably turned their attention to seeking appropriate responses and effective solutions, with the aim of "ensuring sustainable human progress and survival".

Thus, in 1948, the Constituent Congress of the International Union for the Conservation of Nature, IUCN, was held in Fountainebleau, France, after an international conference of UNESCO.

In 1968, the General Assembly of the United Nations convened a world conference and, as a precedent to this, a meeting of experts was scheduled in Switzerland, which concluded that the quality of life and also life itself was deteriorating in the Third World. These experts formed the so-called Club of Rome, which was originally composed of a multidisciplinary group of economists, politicians and scientists, under the leadership of Dennis Meadows.

The Club of Rome produced a study that caused a great sensation at the time and awoke planetary concern to relate the scarcity of natural resources to the intense exploitation of nature.

The document called "The Limits to Growth" (1972) integrated variables into a global analysis model, presenting conclusions that the environment was threatened by the progressive increase in demand and increase in world population directly related to the decrease in the supply of natural resources (non-renewable resources).

In short, this publication indicates that the decrease in supply is directly related to environmental pollution.

Later, in 1972, the United Nations Conference on Environment and Development met in Stockholm, resulting in the publication of the United Nations Environment Programme. The 1972 Stockholm Declaration on the Human Environment supported the Founex Report, and at the same time affirmed the possibility of planning social and economic development without causing irreversible damage to the environment.

Later, in 1987, the Report of the World Commission on the Environment - Our Common Future - presented long-term considerations and strategies for achieving sustainable development and environmental protection. It cannot fail to refer to the Earth Summit (1992, in Brazil) in which the integral and independent nature of the planet was proclaimed and recognized, and which offered a very promising outcome called The Rio Commitments.

These are the main environmental events that consolidated International Environmental Law, which was incorporated by various countries, the same thing happening in Paraguay which assimilated the principles of general application in the discipline of environmental law.

## 7.2 Principles of Environmental Law

It is necessary to mention the main bases of environmental law in Paraguay. In other words, it will be about the fundamental bases that have created the environmental normative framework and consequently the Science of Environmental Law in Paraguay, which are the guides for the interpretation and application of the laws for the PARACEL project.

When referring to principles, these precedents in Environmental Law are considered to be the normative, legislative, jurisprudential and administrative bases themselves. The initial documents exposing the Principles of Environmental Law are: the Stockholm Declaration on the Human Environment of 1972; the World Charter for Nature of the General Assembly of the United Nations of 1982 and the Rio Declaration on Environment and Development of 1992.

In the field of Environmental Law the principles constitute an interpretative, informing and guiding instrumental force more powerful than in any other field or science.

Principle of Sustainable Development: Jurists have called it "the principle of principles" of Environmental Law today: the dominant paradigm in the field of Environmental Law is structured on this principle, which is inserted in the basic universal norms, or its cogens at an international level, and which has been constitutionalized in most of the constitutional orders of the world and without doubt in the constitutional order in Paraguay. This principle is the result of a synthesis between environmental conservation and economic development which pressured and polarized policies and the interpretation of environmental norms from their very origin. It assumes an integration of these two interests or purposes, at a higher level of human, socio-cultural and legal projection. It must be stated that sustainable development constitutes a principle, since one of its characteristics is that it is formulated as an axiom.

The principle of sustainable development has been deeply influenced by the weight of international negotiations and environmental policy formulation through consensus.

The Brundtland Report (1987) states that: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is clear that this formulation responds to an anthropocentric perspective, although it synthesizes and integrates environmental conservation and economic activity in decision-making processes.

Solidarity: This principle is based on the Modern State, which considers the environmental legal good located in the social sphere; that is, the necessary coordination of interests and legal spheres is imposed, coordination in accordance with the Objectives

of Sustainable Development (ODS). The principle of solidarity has projections in a long spectrum, as it is combined in an intergenerational and intragenerational dimension.

From the first perspective, the rights and duties of compensation for the sacrifices that arise for specific groups or individuals from the effective application of environmental protection, and from the second perspective, the rights and duties of safeguarding the capacity of future generations to obtain from other species and from natural resources, sufficient means for the maintenance of the human project in the balance of ecosystems.

The principle of solidarity is implicit in the principle of sustainable development and in the cooperation of government and society. It is present in the Johannesburg Declaration - Point 17: States committing themselves to sustainable development show that they are aware of how important solidarity between people and cooperation between society are.

Prevention: Principle related especially to environmental protection policies. This principle is fundamental when there is a potential for non-redress of environmental damage resulting from activities with environmental risk to third parties. For example, there may be irreversible environmental damage such as extinction of species, radioactivity, destruction of flora, desertification of rural areas, etc. when Prevention is not used to avoid environmental damage. Environmental impact study is a mechanism to implement this principle.

Precaution: also called the precautionary principle (Rio Declaration, Principle 15), it is stated that "in order to protect the environment, States should apply the precautionary approach according to their capabilities. That is, in cases of serious danger or irreversible damage, the absence of scientific knowledge and certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation". Nor can the absence of certainty be invoked as a justification for the development of an activity, the impact and effect of which on the environment is not sufficiently known.

This principle also brings others that are derived from it, such as the principle of a high level of protection or the principle of "stand still" (no degradation), which impose, as a maximum and respectively, the preference for the adoption of the highest possible level of protection provided by environmental measures and the commitment not to lower or reverse these levels of protection in projects that generate impacts.

Liability (polluter-pays): Principle 13 of the Rio Declaration proclaims "the duty of States to develop national law concerning liability and compensation for victims of pollution and other environmental damage". To this criterion, effectiveness is an objective of Environmental Law declared by Principle 11 of the Rio Declaration, which proclaims "the duty of States to enact effective laws on the environment". Also called user-payer, it brings the characteristic of retribution for the use of non-renewable natural resources, for example, the use of water resources to supply the industrial unit of pulp.

Cooperation: this principle has the great objective of "establishing a new and equitable global partnership by creating new levels of cooperation between States, key sectors of societies and individuals". It is most explicit in Principle 7, which establishes the duty of States to cooperate to conserve, protect and restore the health and integrity of the ecosystem.

Common but differentiated responsibilities: The Rio Declaration states "Since they have contributed in varying degrees to the degradation of the global environment, States have common but differentiated responsibilities. Developed countries recognize their responsibility in the international pursuit of sustainable development, in view of the

pressures on their societies from the environment and the technologies and financial resources at their disposal". The Climate Change Treaty (UNFCCC) is an example of common but differentiated responsibility.

## 7.3 Legal Considerations

PARACEL recognizes the environmental laws and regulations that govern its planning and activity, so it will be respectful of compliance with the legal aspects of environmental protection, human health and land use regulation.

Paraguay created by means of Law 1,561/2000 the National System of the Environment integrated by a group of public entities of the national, departmental and district governments with environmental competence.

Article 1. The purpose of this law is to create and regulate the operation of the agencies responsible for the elaboration, standardization, coordination, execution and control of the national environmental policy and management.

These regulations also created the National Council for the Environment (CONAM), which has the following functions:

a) to define, monitor and evaluate national environmental policy;

b) to propose norms, criteria, guidelines and standards in the matters submitted to its consideration by the Secretariat of the Environment;

c) cooperate with the Executive Secretary of the Secretariat for the compliance with this law and its regulations; and

d) the others that correspond to it in accordance with the law.

Paraguay has a National Environmental Policy (PAN).

The national environmental Policy (PAN, in Spanish) brings together the set of objectives, principles, criteria and general guidelines for the protection of the environment and society, in order to guarantee sustainability for current and future generations, as established in the legal framework.

It is based on the following foundations:

- The environment is a common heritage of society; on its quality depend the life and development possibilities of the communities of Paraguay;
- The sustainability of the country's development is strongly linked to the use and adequate management of its natural resources and to sustainable production, improvement of the quality of life of the population, achievement of equity and full participation in socioeconomic development;
- The preservation, conservation and recovery of the natural and cultural heritage are crucial for the sustainability and improvement of the quality of life of the communities. Socio-economic development needs environmental sustainability;
- Environmental and cultural issues of a regional or transboundary nature are a priority. Regional integration initiatives based on sustainable management, conservation of shared ecosystems and recognition of cultural identities will be promoted.

The principles of PAN are the following:

- Sustainability: present generations are responsible for environmental protection and should ensure the appropriate use and enjoyment of the natural heritage that will be passed on to future generations;
- Precaution: where there are threats of serious or irreversible damage, lack of information or scientific certainty should not be used as a reason for postponing effective action;
- Integrity is understood as the need to agree on sectoral policies and to adjust the national, departmental and municipal legal framework, making the regulations that provide greater protection to the environment prevail;
- Graduality: is assumed as the capacity of continuous adaptation and improvement;
- Responsibility: the person who has caused damage to the environment must repair the damage and restore the affected conditions;
- Subsidiarity: environmental management will be organized in such a way as to achieve the maximum social protagonism in decision making, efficiency in the use of resources and in obtaining results, guaranteeing that decision making is as close as possible to the citizen.

The National Environmental Policy has as its general objective:

- To preserve and adapt the use of Paraguay's natural and cultural heritage to guarantee the sustainability of development, the equitable distribution of its benefits, environmental justice and the quality of life of the present and future population.

The National Environmental Policy has the following specific objectives:

- To generate conditions for the well-being and improvement of the quality of life of people, preventing the degradation of habitats;
- Prevent environmental deterioration, restore degraded ecosystems, recover and improve the quality of natural and cultural heritage resources, mitigate and compensate for environmental impacts on the population and ecosystems;
- Apply the precautionary principle in the face of environmental risks that could affect human health;
- Optimize the use of natural resources in production processes;
- To promote and articulate projects for the conservation and sustainable use of water, air, soil and biodiversity resources;
- Make the economy dynamic by gradually reconverting production processes, introducing the principles of sustainability in the production and service sectors and promoting pollution prevention;
- Promote the increase of efficiency in the productive processes through the sustainable use of soil, water, energy and other inputs, encouraging their reuse, recovery and recycling with the adoption of good environmental management practices;

- To promote the rights and human development of indigenous peoples, in a way that is compatible with the conservation of biodiversity in their territories and to harmonize traditional life systems with their current socio-cultural needs.
- To promote and coordinate public policies for the sustainable use of environmental opportunities in accordance with social demand, equity and justice;
- To actively involve citizens in decision making and environmental management;
- Strengthen environmental institutions at all levels, especially at the departmental and municipal levels, in an orderly and decentralized process, to achieve their full integration into the National Environmental System (SISNAM);
- To promote coordination and stimulate intersectoral alliances;
- To promote compensation and access to justice when, due to environmental restrictions for the common benefit, the heritage of individuals is affected;
- To update environmental law in order to develop efficient management instruments;
- To follow up and make effective international conventions, agreements and treaties;
- Disseminate environmental information, facilitate and encourage the formation of public awareness about the conservation and sustainable use of natural resources.

## 7.4 Environmental Law

### Paraguay National Constitution – 1992

The Constitution, which has been in force since 1992, contains provisions relating to the environment. The most significant provisions and their most relevant content related to the PARACEL Project are indicated below:

> "Article 6: Of the Quality of Life
>
> The quality of life shall be promoted by the State through plans and policies that recognize conditioning factors, such as extreme poverty and the impediments of disability or of age.
>
> The State shall also promote research on the factors of population and their links with socioeconomic development, with the preservation of the environment and with the quality of life of the inhabitants.
>
> Article 7: Of the Right to a Healthy Environment Everyone has the right to live in a healthy and ecologically balanced environment.
>
> The preservation, the conservation the re-composition and the improvement of the environment, as well as its conciliation with the complete [integral] human development, constitute priority objectives of social interest.

> These purposes orient the legislation and the pertinent governmental policy.
>
> Article 8: Of Environmental Protection The law will regulate the activities susceptible of producing [an] environmental alteration. In the same way, it may restrict or prohibit those activities that it qualifies as dangerous."

What happens is that the State, through MADES, establishes the process of environmental licensing to protect diffuse rights such as ensuring the protection of the environment. The ESIA is the appropriate instrument to investigate environmental factors and the alterations suffered by the natural (physical, biotic) and socioeconomic (landscape ecology, socioeconomic dynamics, employment generation, etc.) environment.

The process of impact evaluation guarantees the preservation of the environment and social and economic development. The change in the quality of life and environmental condition in the project's area of influence is evaluated by the Independent Consultancy and approved by MADES' technical team.

The impact of changes in the quality of life must be evaluated, as the interest of the population in the PARACEL project's Area of Influence is protected.

With respect to the right to a healthy environment, it is clear that Paraguayan citizens have the right to live in an ecologically balanced environment.

The preservation, conservation, compensation and improvement of the natural environment is a priority for developing countries (e.g. Paraguay).

The environmental licensing process before MADES aims at reconciling economic development with environmental protection. This becomes the principle of sustainable development.

For this reason, article 8 of the National Constitution of Paraguay establishes that the law will regulate the activities that can produce environmental impacts (alteration, transformation or modification of the environment).

**Law 1,561/2000 – National Environmental System, The National Environmental Council and the Secretariat of the Environment.**

The secretariat is an autarkic, autonomous entity with legal personality under public law, its own assets and indefinite duration (Article 7). The national environmental policy is formulated and executed and its control is the responsibility of the secretariat.

Thus, considering those legal competences, this entity has authority and is responsible for applying the following laws:

Law 294/1993 - Environmental Impact Study (modified by Law 345/1994 and regulatory decree and all those legal provisions (laws, decrees, international agreements, ordinances, resolutions and regulations affecting the environment).

**Law n. 6,123/2018 - elevates the Secretariat of the Environment to the rank of Ministry and changes its name to the Ministry of the Environment and Sustainable Development**

It should be reported that the national environmental system was recently altered, changing SEAM to the Ministry of Environment and Sustainable Development.

In other words, the environmental law whose text has been passed in this work mentions SEAM. For reasons of accuracy and loyalty to the original text, the term "SEAM" was not changed to "MADES", preserving the faithful text as originally published in the Official Press.

> Art. 1. The Secretariat of the Environment, which depends on the Presidency of the Republic, shall be promoted to the rank of Ministry and shall be called the Ministry of the Environment and Sustainable Development. It shall have the objective of designing, establishing, supervising, controlling and evaluating the National Environmental Policy, in order to comply with the constitutional precepts that guarantee national development based on the right to a healthy environment and environmental protection.
>
> The Ministry of the Environment and Sustainable Development shall be governed by the provisions of Law n. 1561/00 "WHICH CREATES THE NATIONAL SYSTEM OF THE ENVIRONMENT, THE NATIONAL COUNCIL OF THE ENVIRONMENT AND THE SECRETARIAT OF THE ENVIRONMENT", in the relevant part which are not repealed and do not contravene the provisions of this Law.
>
> (PARAGUAY, 2018)

**Law n. 294/1993, Environmental Impact Study**

As it was said, this law declares the Environmental Impact Study (section 1) mandatory when an activity or undertaking may generate an environmental impact. Environmental impact is legally defined as *"any modification of the environment brought about by human works or activities which have a positive direct or indirect effect on life in general, on biodiversity, on the quality or significant quantity of natural or environmental resources and their exploitation, on well-being, on health, on personal safety, on habits and customs, on the cultural heritage or on legitimate livelihoods".*

Article 78 declares:

> Article 7: An Environmental Impact Study shall be required for the following works projects or public or private activities:
>
> (…)
>
> s) Any other work or activity that due to its size or intensity is likely to cause environmental impacts.

Thus, it is clear that pulp production is included among the activities to be presented in the Environmental Impact Study.

Therefore, this ESIA plays the role of meeting the environmental impact study law. Below is the resolution that regulates the presentation of the preliminary environmental impact study, as well as the complementary studies necessary for the complete evaluation of the impacts resulting from the pulp mill.

**The Administrative Procedure for Obtaining an Environmental Licensing**

Based on Law 294/1993 and its regulatory decree, PARACEL must follow the requirements of the environmental authority (MADES) to develop the EIA/RIMA, following the standards and minimum levels established for the diagnosis and technical studies of the project.

Thus, PARACEL must communicate to the environmental authority the interest to develop the activity. The Basic Environmental Questionnaire, the Location Certificate issued by the Municipality of the jurisdiction and a declaration of interest from the departmental government in the project are sent.

The authority will decide on the need to carry out an ESIA, within a maximum period of 30 (thirty) working days, to be counted from the fulfillment of all the requirements requested by the authority for the study of the Basic Environmental Form.

In order to comply with the legal and technical requirements, in this case PARACEL will present the ESIA and the technical studies to evaluate and guarantee that the expected environmental impacts will not generate environmental damage.

This ESIA complies with the requirements of Article 3 of Law 294/1993 (the minimum content of all Environmental Impact Studies) and with Decrees 453/2013 and 954/2013.

Decree 954/2013 states that:

- The person responsible for a work or activity subject to the environmental impact study procedure must have the technical advice of a consultant registered with the SEAM;
- The person responsible for the work or activity will be responsible for the content and veracity of the documents submitted to SEAM;
- In turn, the person responsible for the work or activity and the consultant will be responsible for the implementation of the work or activity and its strict compliance with the environmental rules, regulations and resolutions in force and related to the type of work or activity in question. (Art. 5°);
- The proponent shall designate a person responsible for the correct implementation of the environmental management plan who may be the consultant who prepared the project under study or another consultant registered with the Secretariat of the Environment. (Art. 6).

After the study, PARACEL will send the file to the environmental authority. The environmental authority must formulate the Environmental Impact Statement (DIA) within a maximum period of 90 business days (the period is computed from the last modification and / or complementation presented by the owner of the study, which will determine the conditions that must be established for adequate protection of the environment).

It is repeated that the Environmental Impact Statement is a necessary requirement for the following procedures related to PARACEL:

- Obtaining credits and guarantees;
- Obtaining authorizations from other public bodies; and
- Obtaining subsidies and tax exemptions.

RIMA will be available to the public for review and consultation for a period of 10 (ten) working days at the General Directorate for the Control of Environmental Quality and Natural Resources (DGCCARN), in accordance with article 6, paragraph a) of Decree 453/2013:

> a) The DGCCARN shall make the environmental impact report available to the public for a period of ten working days on its website, at its headquarters and in any other place it deems appropriate, and shall communicate this fact through publication for three consecutive days in two newspapers with large circulation and through a nationwide radio station (...)

RIMA should be widely disseminated in affected areas. To this end, the owner of the undertaking must submit a sufficient number of copies of RIMA to the municipal government, departmental government and the DGCCARN for public consideration. The person in charge of the study must add to them sufficient proof of compliance with this article.

The DGCCARN may call a meeting or public hearing to hear the community's position. The modalities in which the hearings shall be held shall be established by the DGCCARN through specific rules (article 6, d), of Decree 453/13).

It should be clarified that the licensing process will generate a single environmental permit. In other words, it is a single environmental license with conditions that change according to the stages of the project.

The DGCCARN "will issue the environmental impact statement within a maximum period of ninety calendar days" in accordance with article 6, paragraph e) of Decree 453/13.

The aforementioned decree states that the "Environmental Impact Statement (EIS) will be issued in accordance with the provisions of Article 10 of Law 294/13. Its validity will coincide, in principle, with the duration of the work or activity" (Section 8, subsection a) of Decree 453/13).

This means that the environmental license (DIA) will have its own environmental conditions according to the planning, construction and operation phases of the pulp mill.

Therefore, the environmental license process will have the same environmental permit reissued according to the evolution of the project.

**Law 836/80 – Sanitation Code**

When it comes to the issues of environmental sanitation, soil contamination and pollution, and surface or groundwater, the Health Code must be addressed. The Environmental Impact Study deals with the impacts related to water, air and soil quality.

The main objective is to limit the actions of the venture with respect to the following:

> Article 66: It is forbidden any action that deteriorates the natural environment, diminishing its quality and turning it into a risk for health.
>
> Article 67: The Ministry shall determine the tolerance limits for the emission or discharge of pollutants in the

> atmosphere, water and soil and shall establish the rules that the labor, industrial, commercial and transportation activities must follow in order to preserve the environment from deterioration.
>
> Article 68: The Ministry shall promote programs aimed at the prevention and control of environmental pollution and contamination and shall provide measures for its preservation, having to carry out periodic controls of the environment to detect any element that causes or may cause deterioration of the atmosphere, soil, water and food.

With respect to waters, SEAM Resolution 222/2002 (which establishes the standard of water quality in the national territory) is related to the aforementioned Sanitary Code. Waters are specified in "Class 1" to "Class 4".

The PARACEL project will use the Paraguay River (Class 2) as a source of supply for the works, as well as in the industrial operation of pulp mill. Therefore, they follow the parameters and limits established by article 3 of Resolution 222/2002.

**Law 1.183/1985, Civil Code.**

The main legal provision applicable to this project concerns the harmful use of property and pollution.

> Article 2000 - The proprietor is bound, in the exercise of his right, especially in industrial exploitation works, to abstain from any excess to the detriment of the property of the neighbors. In particular, smoke or soot emissions, harmful and disturbing emanations, noises, vibrations with a harmful effect and exceeding the limits of tolerance due to the local use, the situation and the nature of the buildings are prohibited. The owner, tenant or usufructuary of a property has the right to prevent that the bad use of the neighboring property can harm the security, the peace and the health of the inhabitants.
>
> Depending on the circumstances of the case, the judge may order the cessation of such nuisances and the compensation of damages, even if administrative authorization is required.
>
> (PARAGUAY, Civil Code - 1985)

It is clear that PARACEL must employ mitigation measures to avoid contamination of the Paraguay River.

Law 716/1996 establishes the Ecological Crime and protects the environment against anyone who orders, or through his power authorizes, activity that threatens the balance of the economic system, the support of natural resources or the quality of life. It refers in its articles 7 and 8 to the pollution of the atmosphere and water resources respectively.

The ESIA complies with the legal requirements and principles of Environmental Law, especially the Precautionary Principle.

**Resolution 50/06 – National Water Resources Management**

By which the regulations for the management of the water resources of Paraguay are established in accordance with Article 25 of Law 1,561/00, which creates the National System of the Environment, the National Council of the Environment and the Ministry of the Environment.

Article 1 - Violations of the rules for the rational use of surface and underground water resources:

- Non-compliance with Article 1898 of the Paraguayan Civil Code and its amendments;
- The failure to: Law 350/94, Law 1195/86, Law 177/69, Law 4/92, Law 836/80, the Rural Code, Law 1248, Law 1614/00, SEAM Res. 222/02, Law 389/73, Law 433/73. In the criminal field, Articles 197 and 200 of the Criminal Code, criminalization of water pollution and alteration, illegal processing of waste and Law 716; and
- The failure to comply with laws 422/73, 42/90, 112/91, 232/93, 251/93 and all the provisions of Law N. 294/93 also constitute infringements for the preservation of water resources.

**Law 3,239/2007 – Paraguay Water Resources**

The purpose of this law is to regulate the sustainable and integral management of all waters and the territories that produce them, regardless of their location, physical state, or their natural occurrence within Paraguayan territory (article 1).

Article 3°- The integral and sustainable management of Paraguay's water resources shall be governed by the following Principles:

a) Water, whether surface or underground, is the public property of the State and its ownership is inalienable and imprescriptible.

b) Access to water for the satisfaction of basic needs is a human right and must be guaranteed by the State, in adequate quantity and quality

c) Water resources have multiple uses and functions and this characteristic must be adequately addressed, respecting the hydrological cycle and always favoring, in the first place, the use for consumption by the human population.

d) The river basin is the basic unit for water resources management

e) Water is a natural good that conditions the survival of all living beings and the ecosystems that shelter them.

f) Water resources are a finite and vulnerable good.

g) Water resources have a social, environmental and economic value.

h) Water resources management should be carried out within the framework of sustainable development, and should be decentralized, participatory and gender-sensitive.

i) The Paraguayan State possesses the non-transferable and non-delegable function of property and guardianship of national water resources.

Priority will be given to the use and development of surface and groundwater resources for human consumption. Other uses and developments shall be prioritized as follows (Article 18):

> (…)
>
> d) Use and exploitation for energy generation.
>
> e) Use and exploitation for industrial activities.
>
> (...)

It is important to observe the location of the project on the margins adjacent to the water courses. In this specific case, it was defined by law that a water source protection zone 100 (one hundred) meters wide on both banks must be protected, in which the use of the soil and the activities carried out there will be conditioned, according to what is established by environmental legal regulations. The protection zone shall not include the public use zone and shall be adjacent to it.

National Law 3,239/2007 defines in Article 28 the following:

> Article 28: Prior to its execution, all works or activities related to the use of water resources shall be submitted to the Environmental Impact Study procedure provided for by Law n. 294/93 "Environmental Impact Study" and its regulations. Excepted from this obligation are the uses related to the exercise of the right provided for in Article 15 of the present Law.

PARACEL has complied with the law and regulations concerning environmental impact study: Law 294/1993 (art. 7) defines which of the works and activities require Environmental Impact Study.

Thus, in the same way the law of water resources also establishes rules to obtain permits for the use of water resources.

It is not unknown that in the present project PARACEL will be the holder of a water use permit in precarious title, although not the domain or any other property right over the same. Thus, it is understood that the permit is revocable, so that its suspension or revocation will not give rise to any compensation when there is a justified cause.

As from this Law, the use of Water Resources or their channels is prohibited without a permit or a Concession granted by the Water Resources Authority.

PARACEL will be aware of the fact that prior to the granting of the Environmental Impact Statement by MADES, the Water Resources authority will issue a certificate of water resources availability.

This certificate of availability is a proof to guarantee that the priority uses will not be damaged. Therefore, PARACEL will subsequently obtain the permit to manage water resources in its production process.

It is also relevant to observe the law that deals with the protection of forests that protect watercourses.

Therefore, it is necessary to evaluate the technical and legal conditions of the site: location of the project, type of vegetation on the margin of the Paraguay River, need to implement access or infrastructure etc.

The institution that regulates and defines the level of protection to the forests is the National Forest Institute - INFONA, but this is evaluated jointly with the General Direction of Control of the Environmental Quality and Natural Resources (DGCCARN) in the structure of the Ministry of the Environment.

**Law n. 4,241/2010 - Restoration of Protective Forests of Watercourses within the National Territory**

This law is regulated by Decree 9824/12, which establishes the necessary guidelines for compliance with the aforementioned law, and regulates aspects related to the width of forests that protect watercourses, as well as the establishment of a Programme for the Restoration of Forests that Protect Watercourses for those properties whose surface contains watercourses that do not have the minimum width of protective forests.

> Article 5. Establish the minimum parameters to be restored according to the width of the waterway and the particularities of the area of influence of these, which constitute the basis for planning the waterway protective forest areas for the Eastern Region, according to the following table:

| Channel Width | Minimum width of protective forest on each border (m) |
|---|---|
| More than or equal to 100 m | 100 |
| 50 to 90 m | 60 |
| 20 to 49 m | 40 |
| 5 to 19 m | 30 |
| 1.5 to 4.9 m | 20 |
| Less than 1.5 m | 10 |
| Water fountain | Minimum 30 m to be preserved |

With respect to the management of forests and native vegetation it will be necessary to evaluate before the Ministry (MADES) the fulfillment of retribution of environmental services or substitution by a project of compensation and new plantations of the native vegetation.

**Resolution SEAM 222/2002 – States the standard of quality of the waters in the national territory is established**

This resolution establishes the classification of the waters of the national territory according to the use made of them; and in turn, it establishes the quality standards for each of the types of water. Article 1 establishes the classification of the waters of the national territory. Articles 2, 3, 4 and 5 establish the limits and/or conditions for waters of class 1, 2, 3 and 4 respectively.

Article 6 establishes the quality parameters for waters intended for recreational use. While Article 7 establishes the limits of effluent quality to be discharged into water

bodies. Article 7 establishes that effluents from any polluting source may only be directly or indirectly discharged into bodies of water in accordance with the conditions, standards and criteria established in the classification of the water body.

In the case of PARACEL, it is necessary to comply with the effluent emission parameters, which are established in Resolution SEAM 222/2002.

> Art. 8 The dissolution of industrial effluent with unpolluted water is not permitted.
>
> (…)
>
> Art. 15 In class I waters, the discharge of domestic and industrial waste water as well as of any potentially toxic substance will not be tolerated.

Considering that the Paraguay River is a Class 2 water body, therefore, the standards defined by these regulations must be complied with..

> Art. 1: They are classified, according to their predominant uses, in 4 classes of the National Territory.
>
> (…)
>
> Class 2 – Water destination:
>
> (a) For domestic supply after conventional treatment
>
> (b) For the protection of aquatic communities
>
> c) For primary contact recreation (water skiing, swimming)
>
> (d) Irrigation of vegetables that are consumed raw, fruits that grow in the soil and are grafted raw without removal of the film.
>
> (e) Natural and/or intensive breeding (aquaculture) of species intended for human consumption.

Thus, Resolution 222/2002 establishes the legal limits for this river classification.

> Art. 3° For Class 2 waters, the same limits are established under Class 1 conditions, with the exception of the following conditions:
>
> a) No artificial coloring shall be permitted unless it is removed by conventional coagulation, sedimentation and filtration
>
> b) Coliforms for primary contact recreation use shall be complied with Art. 6 of this resolution. For other uses, the limit of 1000 coliforms per 100 ml shall not be exceeded by 80 % or more of at least 5 samples per month,
>
> c) Colour: up to 75 Pt/l
>
> d) Turbidity: up to 100 UNT
>
> e) BOD 5d 20° C up to 5 mg/l

f) OD, in any sample: not less than 5 mg/l $O_2$

g) Total Phosphorus or Total Nitrogen: respectively up to 0,05 mg/l and 0,6 mg/l

**Resolution SEAM 255/06 – Establishing the Classification of Waters of the Republic of Paraguay**

This Resolution states, in a preventive manner, the classification of all waters in Paraguay in Class 2, in accordance with the provisions of SEAM Resolution 222/02.

This is due to the need to anticipate more effective preventive instruments and more efficient mitigating or compensatory measures, in order to reduce environmental risks and prevent water quality degradation.

**Resolution SEAM 770/14**

"Establishing standards and procedures for management systems and treatment of industrial liquid effluents mandatory for industrial complexes".

The purpose of this Resolution is to establish the rules governing the operation of industrial liquid effluent management and treatment systems, compliance with which is mandatory for industries.

These provisions are included in the provisions of Law 3239/2007 on Paraguay's Water Resources.

The resolution states:

> ANNEX 1 - RULES AND PROCEDURES FOR INDUSTRIAL LIQUID HANDLING SYSTEMS
>
> The "Standards and Procedures for Industrial Liquid Treatment Systems" aims to prevent, mitigate and minimize environmental impacts that may occur from the discharge of untreated industrial effluents and that may contaminate receiving bodies, such as water and soil. These will be mandatory for commercial and industrial developments located within river basins.
>
> An industrial process is understood to be any activity, procedure, development or operation of conservation, repair, or transformation in its form, essence, quality or quantity of a raw material or material for obtaining a final product by using industrial methods.
>
> (…)
>
> For industrial projects, the presentation of environmental studies, whether these are EIAs or DEs (...)

PARACEL is included in Resolution 770/2014, since the pulp mill has a treatment system for industrial liquids and complies with law and environmental standards in force which is applied for final disposal in the Paraguay River. In addition, the pulp mill will use the reuse of water resources, which reinforces Resolution 770/2014.

**Law 3,956/09 – Integral Solid Waste Management in the Republic of Paraguay**

The purpose of these regulations is to establish and apply a legal regime for the generation and responsible management of solid waste, whose regulatory content and practical usefulness should lead to the reduction of such waste to a minimum and avoid situations of risk to human health and environmental quality (article 1).

Municipalities and their relationship with Solid Waste:

> Article 9.- Municipal Competence. The municipalities are responsible for environmental protection and cooperation with environmental sanitation, especially with regard to urban and domestic cleaning services, including all phases of integrated solid waste management.
>
> Article 23.- Recycling. The solid residues, whose characteristics allow it, shall be used by means of its use or reincorporation to the productive process as secondary matter, without representing risks to the health and the environment.

It should be noted that the following are considered as "recovery systems": recycling, recovery, reduction, composting and others that the technology develops and is authorized by the competent authorities.

> Article 4.- Classification. Solid waste will be classified according to its origin and composition, in accordance with the technical criteria established in this Law and its regulations.

Article 8 decree 7,391/2017 (law regulation):

> Art. 8 - Classification of Solid Waste
>
> The Authority of Application will group and subclassify the hazardous, solid urban and special management waste in categories, with the purpose of preparing the corresponding inventories, and guide the decision making based on risk criteria and management.

The decree classifies the waste in:

> l. Municipal solid waste, as defined in Article 4, and
>
> II. Special handling wastes considered as non-hazardous, including the following
>
> a) Waste from health services, generated by establishments that carry out medical-care activities for human or animal populations, research centers, development or experimentation in the area of pharmacology and health, with the exception of biological-infectious waste, as defined in Law 3361107 on Waste generated in Health and Related Establishments.

b) Industrial waste: that generated in production processes and industrial and commercial facilities, not assimilated to solid urban waste and not included in Law 567/95

(c) Those generated by agricultural, fishing, forestry and livestock activities, including waste from inputs used in those activities.

d) Those generated by transport services, as a result of the activities carried out in transport terminals such as ports, airports, customs terminals, bus and railway terminals.

e) Civil construction waste, generated in the construction, maintenance, alteration, repair and demolition of civil engineering works in general, including waste resulting from the preparation and excavation of land for civil engineering works

f) Technological waste from the computer industry, manufacturers of electronic products or motor vehicles and others which, at the end of their useful life, require specific handling

(g) Dehydrated sludge or sludge from the treatment of waste water

h) Used tires, furniture, large-volume household goods, plastics and other slowly degrading materials

i) Those from industrial, chemical, biological, production or research laboratories

j) Mining and hydrocarbon waste: generated in the activity of exploration, extraction or benefit of minerals.

k) The others that are determined by Decree of the Executive Power or by the Authority of Application in agreement with the governments and municipalities, which thus agree to facilitate their comprehensive management.

III. Hazardous wastes provided for in Law 567/95 and its regulations

PARACEL and Solid Waste matters:

Article 3.- Principles. This Law is based on the following principles:

a) a) Principle of Co-responsibility. The generator of waste or the cause of any current or future degrading effect on the environment is responsible, together with the relevant authorities, for the cost of preventive or corrective recomposition actions.

Article 13.- Rights of individuals. In the process of solid waste management, the following will be considered as people's rights

a. access to temporary or final solid waste deposits, structured in accordance with the provisions of this Law and its regulations;

b. obtaining computerized data from the Ministry of Public Health and Social Welfare, the Secretariat of the Environment and the Technical Secretariat for Planning and Development, especially in relation to carrying out the stages in solid waste management; and,

c. the protection of health and the environment from risks or damage that may occur during all stages of solid waste management.

Article 14 - Duties of individuals. In the process of solid waste management, the following will be considered as people's duties

a) pay, in a timely manner, the services provided by the municipality, cancel the penalties and other charges applied by the mentioned agency;

b) comply with the standards and technical recommendations that have been established by the competent authorities;

c) store solid waste and residues subject to sanitary and environmental regulations, to avoid damage to third parties and to facilitate their collection, as established in this Law and its regulations.

Article 15 - Minimization. The generator shall adopt measures to minimize solid waste, through technologically viable production processes, subject to the determination of the competent authority and the provisions of this Law and its regulations. The municipal authorities and the generators shall agree on the elaboration of projects and development of programs of minimization of the same, in the conditions and within the term determined by the competent environmental and sanitary authority.

Article 17.- Initial provision. The generation of the solid waste implies obligations in the generator; therefore, it must make the previous storage in containers adapted to its volume, handling and particular characteristics, in order to avoid its dispersion.

Article 18.- Of the containers. The containers and recipients used for the temporary storage of the solid residues must fulfill the following minimum requirements:

a. Be reusable;

b. Be properly located and covered;

c. Have the capacity to store the volume of solid waste generated, taking into account the frequency of collection;

d. Be hermetically sealed;

e. Be built with waterproof materials and with the necessary resistance for the use to which they are destined;

f. To have an adequate sanitary maintenance;

g. To Have the identification related to the use and types of solid waste; and

h. Any other that the municipality considers, according to the technical criteria existing in the Local Plan for Solid Waste.

**Law 1,100/1997 - Prevention of noise pollution.**

That law sets the maximum permissible noise levels. For PARACEL's pulp mill, the limits are those of Article 9 and 10.

| **Scope** | **Night 20:00 to 07:00** | **Day 07:00 to 20:00 14:00 to 19:00** | **Day (Occasional peak) 07:00 to 12:00** |
|---|---|---|---|
| | **Measured in decibels "A". Db(a) 20 to 40** | | |
| Residential areas of specific use, public spaces: recreation areas, parks, squares and public roads. | 45 | 60 | 80 |
| Mixed areas, transition zones, urban centers, specific programs, service zones and public buildings | 55 | 70 | 85 |
| Industrial area | 60 | 75 | 90 |

Source: Law 1.100/1997

Occasional peaks refer to discontinuous noises and sounds that exceed the permitted levels in the corresponding area and that occasionally occur during the day, with a maximum of twenty peaks per hour. This noise and sound level will only be permitted during the following hours: from 7.00 to 12.00 and from 14.00 to 19.00.

The maximum levels may not be exceeded within any neighboring property or on the public highway. Measurements are taken with an automatic recording device, calibrated and sealed by the municipalities, using the "A" compensation scale and in an impulse

response, with the observer preferably located in front of an open side of the affected property or on the public highway.

The device must be at least 1.2 meters away from any obstacle and covered, in order to avoid the potential wind effect.

**Resolution 259/15 – States the permissible air quality parameters (according to Law 5,211/14 Air Quality)**

PARACEL must be vigilant for industrial emission controls.

Although Paraguay has no standards for industrial air emissions, PARACEL must comply with air quality parameter.

That is, the levels of industrial gas emissions must be controlled according to the criteria established in these regulations.

It is not permitted for emissions to the environment to generate odors or aromas that may cause discomfort, or for solvents and other chemical products to be released that are harmful or injurious to human health (Article 1).

| Parameters | Annual Average | Average in 24h | Average in 8h | Average in 1h |
|---|---|---|---|---|
| $PM_{2,5}$ | *15 µg/m³* | *30 µg/m³* | | |
| $PM_{10}$ | | *150 µg/m³* | | |
| $O_3$ | | | *120 µg/m³* | |
| $NO_2$ | *40 µg/m³* | | | *200 µg/m³* |
| $SO_2$ | | *20 µg/m³* | | |
| CO | | | *10 µg/m³* | |

Therefore, PARACEL shall use the best available technologies and best environmental practices. Thus, collection and absorption devices will be adopted to prevent the dispersion of pollutants in the atmosphere, which will be purified before their final disposal.

It was not possible to find specific regulations for the Municipality of Concepción, but it is understood that it is necessary to comply with air quality regulations in order to establish a legal standard for PARACEL. In addition, it should be noted that the PARACEL project is based on international standards.

**Law n. 3,966/2010 – Municipal Organizational Law**

Article 12 - Duties:

In the field of planning, urbanism and territorial ordering:

a) The planning of the municipality, through the Sustainable Development Plan of the Municipality and the Urban and Territorial Planning Plan

Environment issues:

a) The preservation, conservation, recomposition and enhancement of significant natural resources

b) The regulation and supervision of standards and patterns that guarantee the environmental quality of the municipality; and,

c) The control of the compliance with national environmental regulations, prior agreement with the competent national authorities.

d) The normative conditions established by the Municipal Development Plan according to the federal law are made explicit.

e) In this study and research no specific Municipal Organic Law of the municipality of Concepción was found.

f) But it is relevant to mention that the next topic covers the Municipal Development Plan of Concepción (Period 2016-2021).

**Municipal Development Plan of Concepción (2016 - 2021)**

On the website of the Information and Resources Center for Development - CIRD, it is possible to locate the Municipal Development Plan of Concepción mentioned. This document was elaborated from the coordination between authorities and officials of the Departmental and National Governments, with the support of volunteer citizens.

Article 177 of the National Constitution states: "The national development plans shall be indicative for the private sector and mandatory for the public sector".

Thus, there is a context for Sustainable Development Plan of the Municipality that is provided for in Article 225 of the Municipal Organic Law (according to national law n. 3966/2010). This plan must be understood as an instrument of government for local transformation, in a manner consistent with the National Development Plan.

The Municipal Development Plan of Concepción (PDM in Spanish) is a perfectible, dynamic plan that will be updated and improved according to the decisions taken by the Municipal Development Council (formed on June 9, 2016, composed of 29 people).

The PDM points out relevant information that should be evaluated by the PARACEL entrepreneur, especially indicating the population numbers (men and women), educational institutions (urban and rural), health and police establishments, as well as the municipal diagnosis under the social, economic and environmental axes.

Thus, the PDM allows for a diagnosis of Strengths, Opportunities, Weaknesses and Threats in the social, economic and environmental axes.

The Municipal Development objectives include strategies on all three axes:

- social;
- economic; and,
- environment friendly.

The PDM is based on National Constitution, National Development Plan, Law n. 3966/2010 (Municipal Organizational Law) and other legal matters.

However, this document is indicative for private entrepreneurs, PARACEL must comply with the Municipal Development Plan of Concepción, as well as employ the best environmental practices and best available technologies, and all environmental regulations relevant to the preservation, conservation, recomposition and improvement

of natural resources. It must also comply with the law that governs the standards and patterns that guarantee the environmental quality of the municipality of Concepción.

The entrepreneur is subject to the Municipal Development Plan and the Organic Law of Concepción. The relationship between PARACEL and the Municipality of Concepción must be subject to the norms on construction and installations, independently of the requirements of the Environmental Impact Study.

This project is subject to all planning and land use regulations of the municipality of Concepción.

**Indigenous Protection Regulations**

Article 177 of the National Constitution states that "National development plans shall be indicative for the private sector and mandatory for the public sector".

The National Development Plan (PND) was approved by Executive Decree n. 2794/2014, to be applied as a guide in the various tasks that fall under the jurisdiction of the public administration. Based on the aforementioned regulations, the Technical Secretariat for Planning approved a Guide for the elaboration of a Municipal Development Plan that the Municipality of Concepción has respected.

In this context, the Sustainable Development Plan of Concepción (PDM) provided for in Article 225 of Law 3,966/10 "Organic Municipal", shall be interpreted as an instrument of government for change of local reality, in a manner consistent with the vision and objectives of the National Development Plan; since it forms part of a national planning system, by constitutional provision it is governed by the basic guidelines of the same, although nothing prevents it from being strengthened and complemented with other elements that are compatible.

The Constitution of Paraguay (1992) recognizes indigenous peoples and defines them as "groups of culture prior to the formation and organization of the Paraguayan State" (art. 62).

Thus, the Constitution guarantees to indigenous peoples (art. 63) the application of their systems of political, social, economic, cultural and religious organization, as well as their voluntary submission to their customary rules for the regulation of internal coexistence, provided that they do not infringe upon fundamental rights.

Paraguay has adopted national and international standards to protect the fundamental rights of indigenous individuals and communities and provides a framework for the needs and requirements of the administration in the area of access to justice.

In an international, more macro perspective, it is important to cite the main instruments:

- ILO Convention 169; ratified by Law 234/1993;
- United Nations Declaration on the Rights of Indigenous Peoples (2007);
- International Convention on the Elimination of All Forms of Racial Discrimination; in force under law 2,128/2003;
- OAS Declaration on the Rights of Indigenous Peoples (2016).

The same is true at the national level through special laws on indigenous communities. They are as follows:

- Law 904/1981 "Statute of the Indigenous Communities" (modified and extended by Law 919/1996 in articles 30, 31, 62, 63 Inc. d, and 71);
- Law 1,286/2000 "Code of Criminal Procedure", Title VI, articles 432 to 448;
- Law 1,863/2002 "Establishing the Agrarian Statute";
- Act 3231/2007, establishing the General Directorate for Indigenous School Education;
- Law 4,251/2010 "Law on Languages";
- Law 5,469/2015 "On Indigenous Health".

The most important aspect to be considered in this ESIA and for the whole operation of PARACEL is that the indigenous peoples are recognized as groups of culture prior to the formation and organization of the Paraguayan State.

Thus, the Constitution of Paraguay guarantees the right to preserve and develop their ethnic identity and especially to preserve it in their habitat. This means that systems of cultural, social, economic, political and religious organization prevail over systems and jurisdictions legally created by non-indigenous people.

With regard to land ownership, the Magna Carta guarantees sufficient extension and quality to develop their particular way of life.

PARACEL must observe that the removal or relocation of their habitat is prohibited without the express consent of the indigenous peoples and communities. Article 63 states: "The right of indigenous peoples to preserve and develop their ethnic identity in their respective habitat is recognized and guaranteed. They also have the right to freely apply their systems of political, social, economic, cultural and religious organization, as well as to voluntarily submit to their customary rules for the regulation of internal coexistence, provided that they do not violate the fundamental rights established in this Constitution. In jurisdictional disputes, indigenous customary law shall be taken into account".

Therefore, PARACEL must consider indigenous protection in its decision-making, as well as assess the social and environmental impacts that may eventually occur in indigenous communities or peoples, guaranteeing their protection and participation.

## 7.5 Compatibility with Plans and Programs in the Area of Influence

Private projects that are characterized by their size or nature of their industrial process, usually intensive users of natural resources can affect the social, environmental and economic aspects of the region of influence.

For this reason, it is necessary to evaluate the consequences of the planning, installation and operation of the PARACEL project in the region, and mainly the synergetic effects of this private project with government initiatives and those of other entrepreneurs in that region of Concepción.

The generation of environmental impacts is evaluated in this Environmental Impact Study so that appropriate mitigation measures are applied to the negative impacts, and also that appropriate measures are applied to strengthen the impacts and their positive consequences in the region.

Thus, it is necessary to describe and understand the Government Plans and Programs in planning and execution in the vicinity of the project, to understand if there is synergy

between PARACEL and other projects. In addition, the extent of the synergy effects on the population, the economy and the natural and anthropic environment of the area of influence must be considered.

Therefore, the essential substance of this chapter is to present, describe and evaluate the government plans and programs being implemented and planned for the PARACEL project's region of influence. The interaction of government plans and programs with private projects can create a series of social, economic and environmental changes in the project's area of influence. The most relevant plans and programs are analyzed at the end of this ESIA, to the evaluation of environmental impacts.

The most relevant consultation is how these plans and programs can generate impacts from the PARACEL project, and what are the synergistic effects between them.

### 7.5.1 Government plans in the area of influence

According to the Cumulative Impact Analysis study, planned and ongoing undertakings have been identified in the project's Area of Direct Influence. These were also complemented with other projects known through official institutions of the National Government such as the Ministry of Industry and Commerce (MIC in Spanish), the Ministry of Environment and Sustainable Development (MADES in Spanish), the Ministry of Governmental Projects and Communications (MOPC in Spanish), the DNCP or the Municipality, and their websites. Other actions were mentioned by communities during the interviews carried out.

The following is a summary of the scope of these, and their level of information at the time of preparing this report:

**PLANNED PROJECTS**

- **Project "Sanitation sewage system and wastewater treatment plant for the city of Horqueta"**

The project is promoted by the MOPC of Paraguay and is financed by the Inter-American Development Bank (IDB). It provides for the construction of a sanitary sewerage system for the urban area of the city of Horqueta, which is 50 km from the city of Concepción. The project also includes the construction of a wastewater treatment plant, which will be located on the northern edge of the city on a municipal property of approximately 10 hectares, and will discharge the treated wastewater into the Caré stream, also known as Espajín. There is a document called "Relatorio de Impacto Ambiental (RIMA)[4]".

- **Project "Environmental improvement of the sanitary sewage system of Concepción - ESSAP S.A."**

The project is being executed and managed by Empresa de Servicios Sanitarios del Paraguay (ESSAP S.A.), the only company holding a concession for drinking water and sewerage services in the country, which has been operating in the city of Concepción

[4] Environmental Report (Relatorio de Impacto ambiental RIMA): This is an executive summary of the preliminary environmental impact study submitted to the MADES in the environmental impact study process, under Law 294/93 on Environmental Impact Study. It is a public document.

since the late 1970s. ESSAP provides sewerage services to some 3,881 connections, which means that some 19,405 people have access to collect and dispose of their wastewater through a sewerage network of 48,020 meters of pipes and discharge into the Paraguay River without prior treatment. This sewerage coverage is equivalent to 43% of the population with drinking water coverage and 23% of the city's total population.

The RIMA document of the project is also available. This report indicates that the Municipality of Concepción has planned the construction of a wastewater treatment plant, and that it is being managed with ESSAP through inter-institutional agreements signed by both institutions and the Government of the Department of Concepción.

- **Project "Improvement of local roads in Concepción"**

According to the data collected in the characterization of the social baseline, the MOPC is promoting a project to improve the roads in the department of Concepción planned for the period 2020-2025, which includes the improvement of the Loreto - Paso Barreto section, equivalent to 37 km.

In addition, there are other sections of the District of Loreto to be maintained and improved, according to data available on the website of the DNCP. Specifically, in 2019, works have been awarded for sections near Loreto.

The reference data are those found in the specifications, which include general information on the scope of the project and some environmental considerations.

- **Project "Improvement of physical connectivity in the department of San Pedro - Punta Riel - Belén section"**

It is part of the improvement project of San Pedro - Belén - Concepción, and aims to improve the possibility of the section San Pedro del Ycuamandiyú (Junction Route PY11) - Piri Pucu - Potrero Naranjo - Punta Riel - Belén, Belén - Concepción (Old route of National Route 5) and the access to the Ybapovó Port. According to the project's RIMA, the works will be financed by the Mercosur Convergence Fund (Fondo de Convergencia del Mercosur – FOCEM in Spanish), and the bidding process for the works is in progress, so the works could start during the year 2020.

Road improvement works are planned, including asphalt layer, in the section between the towns of Punta Riel and Belén. In addition, the document mentions that these improvements would reach the junction with Route PY05.

- **Project “Habilitation and Maintenance of the Pozo Colorado - Concepción Section”**

The project, also promoted by the MOPC, aims to rehabilitate 146 km of the Pozo Colorado - Concepción section, to recover its project service levels through the outsourcing of services, which will develop civil works, such as the rehabilitation and maintenance of the paved road. Although it is being executed only in the urban area of

the city of Concepción, it is considered relevant because of the possible cumulative impacts that could occur on existing infrastructure (roads).

The project's RIMA is available. The work will be financed by the Latin American Development Bank (Banco de Desarrollo de América Latina, CAF in Spanish), and work has begun at the end of 2019.

- **Improvement of the electrical system of Concepción (Section SE Horqueta - SE Concepción)**

Although there are no further documentary data, it is known that the improvement will be made on the existing power lines and safety strip. It is considered, taking into account the possible cumulative impacts on public services.

- **Improvement of the dredging of the Paraguay - Paraná Waterway**

According to the data from the social characterization, MOPC performs maintenance dredging in the Paraguay River, as well as in the Apa River.

In addition, according to data from the MOPC and the Technical Secretariat for Planning, a major project for dredging the waterway is being promoted under private initiative, within the framework of the Public-Private Partnership Law (Law 5,102/13 "On the Promotion of Investment in Public Infrastructure and the Expansion and Improvement of Goods and Services in Charge of the State".

**ONGOING PROJECTS**

- **Projects "Drinking Water System and Complementary Activities of ESSAP in the City of Concepción" and "Improvement of the Potable Water System for Regional Development in the Republic of Paraguay - ESSAP S.A Ciudad de Concepción”**

ESSAP is the largest provider of drinking water services in the city of Concepción. The Drinking Water System has 7,992 users or connections, supplying around 39,960 people. It has been in operation since the 1970s.

The "Improvement" project was jointly promoted by ESSAP S.A. and the MOPC of Paraguay, and was supported by non-reimbursable financial cooperation from the Japan International Cooperation Agency (JICA). It was executed and completed in mid-2013, and consisted of modernizing and expanding the drinking water treatment plant of ESSAP's existing drinking water system in Concepción. It is currently in operation.

The source of supply for the entire Water System is the Paraguay River, and the catchment is located approximately 15 km downstream of the property where the PARACEL Industrial Plant will be installed, so it is considered a relevant project to be considered, especially for issues related to potential uncertainties that may occur in relation to "water use".

RIMA of the project is available.

- **Project "Frigorífico Concepción"**

Frigorífico Concepción S.A., is an industrial company that operates since 1977 and in the last years it has become an important industrial refrigeration park, investing in state-of-the-art technology and in human resources with wide experience in the field, in addition to the strict controls that are required in the industry, to comply with the highest demands of the international markets.

Its main activity is the production of meat and by-products of bovine origin, to later commercialize them mainly in the international markets and, in smaller scale, in the internal market. They have an integrated production chain that starts with the breeding, rearing and fattening of cattle, with advanced technology and high quality genetics, which are then transported to the meat processing industry for slaughter and deboning, in addition to the animals purchased from producers.

On the MADES website, only the RIMA of the sanitary landfill linked to the enterprise was accessible, but general data was gathered in the interviews with the relevant actors, as well as from the company's website.

- **Project "JBS - Belén"**

It is a refrigeration project that was mentioned in interviews with local actors, especially in the area of the city of Belen where the venture is being developed. It stands out that it is one of the main industries in the area, after the Concepción meat packing plant [5].

The project is operational since 2017. Although, there were no major data from the plant located in Belén, according to the RIMA of the industrial plant located in Asunción, of the same firm, there are about 400 employees hired directly [6].

[5] https://www.lanacion.com.py/2017/01/03/jbs-paraguay-frigorifico-belen-recibio-la-habilitacion-rusia/

[6] http://seam.gov.py/sites/default/files/users/control/jbs_b.tablada_rocio.pdf

# ANNEX I

# PARAGUAYAN AUTHORIZATIONS TO INSTALL A PULP MILL, A RIVER PORT, A TRANSMISSION LINE AND A SUBSTATION

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**DECLARACIÓN DGCCARN N° 1129 / 2020**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLÁS GODOY., CON REGISTRO CTCA N° I-850, CORRESPONDIENTE A LA ACTIVIDAD DENOMINADA "LINEA DE TRANSMISIÓN SUBESTACIÓN ZAPATERO CUE - SUBESTACIÓN CONCEPCIÓN", CUYO PROPONENTE ES LA FIRMA PARACEL S.A., SEÑOR BLAS ZAPAG, REPRESENTANTE LEGAL, A SER DESARROLLADO EN EL DISTRITO DE CONCEPCIÓN, DEPARTAMENTO DE CONCEPCIÓN".**



Asunción, 08 de octubre del 2.020.

**VISTO: El Estudio de Impacto Ambiental** presentado al **MADES bajo Exp. SIAM DGCCARN N° 4304/2020, de fecha 22/07/2.020,** presentado al Ministerio del Ambiente y Desarrollo Sostenible, por el Consultor Ambiental **Ing. Nicolás Godoy., con registro CTCA N° I-850,** correspondiente a la actividad denominada **"LINEA DE TRANSMISIÓN SUBESTACIÓN ZAPATERO CUE - SUBESTACIÓN CONCEPCIÓN",** cuyo proponente es **la Firma PARACEL S.A., Señor BLAS ZAPAG, Representante Legal,** a ser desarrollado en **el Distrito de Concepción, Departamento de Concepción.----------**

**CONSIDERANDO**: **Que,** el Proyecto fue evaluado por la **Técnica Evaluadora Ing. Jazmín Gamarra**, quien Dictamina a favor de la aprobación del Proyecto, según **Dictamen N° 81964/2020, de fecha 30/09/2.020**; que el mismo fue revisado y verificado, por la Directora Adjunta de Evaluación de Impacto Ambiental, **Ing. Amb. Blanca Beatriz Barrios,** quien recomienda su aprobación.----------

**CONSIDERANDO: Que,** el responsable del proyecto ha identificado los impactos ambientales negativos generados como consecuencia de la realización de la mencionada actividad y ha establecido las medidas ambientales necesarias, conforme la actividad que se desarrolla.----------

**Que,** el presente proyecto se ha ajustado al Artículo 4° Inc. a) del Decreto 453/13, dando cumplimiento al procedimiento estipulado y publicándose debidamente a través de medios de comunicación como así también en la página web del Ministerio del Ambiente y Desarrollo Sostenible comunicado esto a través del **Memorándum N° 790/2020, de fecha 29 de setiembre del 2.020** y que no se han presentado observaciones fundadas una vez cumplidos los plazos.----------

**Que,** el proyecto consiste en la construcción, montaje y puesta en funcionamiento de la Línea de Transmisión Aérea Simple Terna de 220 kV, cuyo tramo se encontrará comprendido entre la Subestación Concepción y la Subestación Estancia Zapatero Cue, presentando una longitud aproximada de 25 km. La ejecución e implementación de dicha obra, responde a la necesidad de la Instalación de una Planta de Celulosa por parte de la Firma Paracel, para que de esta forma la ANDE pueda atender con mayor eficiencia la demanda. La LAT queda como propiedad de PARACEL, pero su mantenimiento estará a cargo de la ANDE. La expansión requerida en la subestación Villa Real la paga PARACEL, pero queda luego como propiedad de ANDE.-

**Que, el Departamento de Sustancias Químicas, según Dictamen SIAM N° 60043/2020, de fecha 11/08/2020,** manifiesta cuanto sigue: recomienda dar un estricto cumplimiento al Plan de Gestión Ambiental Propuesto y cumplir con lo estipulado en el Convenio de Estocolmo.----------

**Que, según Dictamen SIAM N° 64552/2020, de fecha 19/08/2020, la Dirección de Servicios Ambientales** informa que: Deberá presentar cronograma de adquisición de servicios ambientales conforme a la Resolución 81/19.----------

**Que,** el proponente ha dado cumplimiento a lo solicitado por la Dirección de Servicios Ambientales, **adjuntado el cronograma de adquisición de servicios ambientales,** en concordancia con lo establecido en la Ley N° 3001/2006 de Valoración y Retribución de los Servicios Ambientales, el Decreto N° 11202/2013 que reglamenta el art. 11 de la Ley N° 3001/2006 y las Resoluciones MADES N° 81/19 y la Resolución MADES N° 153/2020, que actualiza el mecanismo de adquisición de servicios ambientales, **cuyo valor estimado de servicios ambientales a adquirir asciende a la suma de 67.500 USD, (dólares estadounidenses sesenta y siete mil quinientos), equivalente al 1% del valor estimado de la inversión de la obra.**----------

**Que,** el responsable del proyecto ha manifestado bajo Declaración Jurada la veracidad de las informaciones presentadas en **el Estudio de Impacto Ambiental**, así como toda la documentación que se adjunta al mismo.----------

**Que,** la **Ley N° 6123/18 "Que eleva al rango de Ministerio a la Secretaría del Ambiente y pasa a denominarse Ministerio del Ambiente y Desarrollo Sostenible",** se regirá por las disposiciones de la **Ley N° 1561/00** "Que crea el Sistema Nacional del Ambiente, el Consejo Nacional del Ambiente y la Secretaría del Ambiente", que le confiere el carácter de Autoridad de Aplicación de la Ley N° 294/93 de "Evaluación de Impacto Ambiental" y su Decreto Reglamentario 453/13 y su modificación y ampliación el Decreto N° 954/13.----------

**Que,** el Art.4, del Decreto 954/13 faculta a la Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales (DGCCARN), a entender en la evaluación de los Estudio de Impacto Ambiental y consecuentes autorizaciones, control y gestión de la calidad ambiental, por consiguiente:

**EL DIRECTOR GENERAL DE LA DIRECCIÓN GENERAL DE CONTROL DE LA CALIDAD AMBIENTAL Y DE LOS RECURSOS NATURALES**

**DECLARA:**

DUPLICADO
9218

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**DECLARACIÓN DGCCARN N° 1129 / 2020**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLÁS GODOY., CON REGISTRO CTCA N° I-850, CORRESPONDIENTE A LA ACTIVIDAD DENOMINADA "LINEA DE TRANSMISIÓN SUBESTACIÓN ZAPATERO CUE - SUBESTACIÓN CONCEPCIÓN", CUYO PROPONENTE ES LA FIRMA PARACEL S.A., SEÑOR BLAS ZAPAG, REPRESENTANTE LEGAL, A SER DESARROLLADO EN EL DISTRITO DE CONCEPCIÓN, DEPARTAMENTO DE CONCEPCIÓN".**



**Art. 1°** **Aprobar el Estudio de Impacto Ambiental** del mencionado Proyecto, sin perjuicio de exigir al proponente una nueva evaluación en caso de modificaciones significativas del proyecto, de ocurrencia de efectos no previstos, de ampliaciones posteriores o de potenciaciones de los efectos negativos por cualquier causa subsecuente.----------

**Art. 2°** **Conceder la Declaración de Impacto Ambiental** al mencionado proyecto condicionado al estricto cumplimiento del Plan de Gestión Ambiental del Estudio de Impacto Ambiental que incluye Medidas de Mitigación y Plan de Monitoreo; y cualquier otra medida tendiente a minimizar el impacto sobre el medio ambiente (agua, aire, suelo y el medio biótico).----------

**Art. 3°** **El proponente** es el responsable de dar cumplimiento a la **Ley Orgánica Municipal 3966/10, Ley N° 3001/06 de Valoración y Retribución de los Servicios Ambientales, Resolución N° 81/19, Resolución N° 153/20, Ley N° 1100/97, Ley N° 5211/14 de la Calidad dela Aire, Ley N° 716/96 que Sanciona Delitos contra el Medio Ambiente y demás disposiciones legales de protección ambiental que rigen la materia.**----------

**Art. 4°** **El Responsable** deberá designar una persona encargada de la realización de Auditoría Ambiental de Cumplimiento de Plan de Gestión Ambiental quien podrá ser un Consultor o una Empresa Consultora registrada en el CTCA, debiendo presentar a la SEAM informe de Auditoría de Cumplimiento **cada 1 (UNO) año, a partir de la Firma de la presente Declaración,** de acuerdo a procedimientos establecidos en la Resolución SEAM N° 201/15 y su modificación la Resolución SEAM N° 221/15, debiendo dar estricto cumplimiento a lo manifestado por el Departamento de Sustancias Químicas, mencionadas en el considerando de la presente Declaración.----------

**Art. 5°** **La presente DIA** no autoriza la realización de obras o actividades que no se adecuen a las normas de ordenamiento urbano y territorial municipales así como tampoco exime de responsabilidad civil a los responsables de obras o actividades en caso de que las mismas causen daños a terceros.----------

**Art. 6°** **La presente DIA** es un requisito previo ineludible para obtención de autorizaciones de otros organismos públicos, en virtud a lo estipulado en el Art. 12° de la Ley N° 294/93 "De Evaluación de Impacto Ambiental". ----------

**Art. 7°** **El proponente** deberá presentar en la próxima auditoría ambiental el certificado de compra de servicios ambientales.

**Art. 8°** En caso que como consecuencia de una fiscalización se detecte: 1) la falta de DIA en los casos en que fuera obligatoria ; 2) incumplimientos al plan de gestión ambiental 3) modificaciones significativas respecto del proyecto evaluado; 4) la ocurrencia de efectos no previstos; 5)la ampliación de la obra o la actividad respecto del proyecto evaluado; o, 6) haya potenciación de los efectos negativos por cualquier causa subsecuente, el Ministerio del Ambiente y Desarrollo Sostenible podrá disponer una nueva evaluación de impacto ambiental, un ajuste al Plan de Gestión Ambiental y/o la suspensión de la obra o la actividad; ello sin perjuicio del inicio de los procedimientos sancionatorios, administrativos o penales, que pudieran corresponder.----------

**Art. 9°** **El EIA del Proyecto y la Declaración del Impacto Ambiental** deberán estar en el lugar de ejecución del proyecto, a fin de presentar los mismos a cualquier representante de Instituciones oficiales con competencia en el tema ambiental en el momento que lo requieran.----------

**Art. 10°** **La presente Declaración** se encuentra redactada en la **Hoja de Seguridad N° 9218 (Nueve Mil Doscientos Dieciocho) y Hoja de Seguridad N° 9219 (Nueve Mil Doscientos Diecinueve), debiendo permanecer en el lugar donde se desarrolla el proyecto una copia autenticada de la misma.**----------

**Art. 11°** **Comunicar a** quien corresponda, cumplido archivar.----------

**Abog. Diego Lezcano Galeano, Director General**
**Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales**

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9219

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**DECLARACIÓN DGCCARN N° 1163 / 2020.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "SUBESTACION ZAPATERO CUE", ELABORADO POR EL CONSULTOR AMBIENTAL NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA N° I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOS BLAS ENRIQUE ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON FINCA N° 9891, 5657, PADRON N° 5452, UBICADA EN EL DISTRITO DE CONCEPCIÓN, DEPARTAMENTO DE CONCEPCIÓN."**



**Asunción, 19 de Octubre de 2020.**

**VISTO: El Estudio de Impacto Ambiental** con su correspondiente **Relatorio de Impacto Ambiental, Expediente SIAM DGCCARN N° 4295/2020, de fecha 22/07/2020,** presentado al Ministerio del Ambiente y Desarrollo Sostenible por el **Consultor Ambiental Nicolás Antonio Godoy Rivarola con Reg. CTCA N° I-850,** correspondiente al **Proyecto "SUBESTACION ZAPATERO CUE",** cuyo proponente es la **Firma Paracel S.A,** y su representante legal es el **Señor Blas Enrique Zapag,** que se desarrolla en la propiedad identificada con **Finca N° 9891, 5657, Padrón N° 5452,** ubicada en el Distrito de Concepción, Departamento de Concepción.----------

**CONSIDERANDO: Que,** el Proyecto fue evaluado por la **Técnica Evaluadora Ing. Agr. Ma. José Alderete Gayoso,** quien Dictamina a favor de la aprobación del Proyecto, **según Dictamen Técnico N° 81984/2020 de fecha 30/09/2020**; que el mismo fue revisado y verificado, por la Directora de Evaluación de Impacto Ambiental **Lic. Amb. Carolina Pedrozo de Arrúa**, quien recomienda su aprobación.----------

**Que,** el responsable del proyecto ha identificado los impactos ambientales negativos generados como consecuencia de la realización de la mencionada actividad y ha establecido las medidas ambientales necesarias, conforme la actividad que se desarrolla.----------

**Que,** el presente proyecto se ha ajustado al Artículo 4° Inc. a) del Decreto 453/13, dando cumplimiento al procedimiento estipulado y publicándose debidamente a través de medios de comunicación como así también en la página web del Ministerio del Ambiente y Desarrollo Sostenible comunicado esto a través del **Memorándum N° 760/20, de fecha 18 de septiembre de 2020** y que no se han presentado observaciones fundadas una vez cumplidos los plazos.----------

**Que,** el emprendimiento cuenta con una **superficie total de 1.215 ha.**----------

**Que,** la actividad denominada **"Subestación Zapatero Cue"**, se desarrollara en el Distrito de Concepción, esto debido a que la firma quiere instalar una **Fábrica de Celulosa en la zona de Zapatero Cue**, por lo cual se requerirá de una Subestación eléctrica.----------

**Que,** el emprendimiento cuenta con las siguientes características eléctricas: **Transformadores: 2 x 140 / 170 MVA Capacitor: 9 MVAr (estimado, ya que depende del estudio de armónicos) Otros: 5x (52) 3500 A - 220 kV / 18x (89) 2000 A - 220 kV / 4x Current Transformer / 6x Potencial Transformer / 3x 34,5 kV cubicle / 1x Auxiliary Transformer 45 kVA. Potencia instalada de base en la subestación: 280 MVA (sumatoria de los 2 transformadores).** Las distancias eléctricas mínimas y de seguridad serán conforme a las recomendaciones de la Publicación IEC 60071 y las del Comité No. 23 de la CIGRE presentadas en la revista ELECTRA N° 19.----------

**Que,** la Subestación cuenta con un **patio de maniobras en 45 kV.** Los transformadores de potencia están montados sobre un **sistema de confinamiento de aceites**, que, **en casos de derrames, éstos serán transportados hasta un colector principal**, construido de hormigón armado y mampostería **donde permanecerán confinados hasta su disposición final.** Además se dispone de **sistemas cortafuegos entre los transformadores** que evitarían que en casos de incendios el fuego se propague.----------

**Que,** el proyecto cuenta con **Dictamen SIAM N° 59783/2020 de fecha 11/08/2020,** por parte del **Departamento de Sustancias Químicas,** en el cual, recomienda dar un estricto cumplimiento del Plan de Gestión Ambiental, mantener el perímetro de la Subestación en óptimas condiciones, señalizar correctamente y dar cumplimiento al Convenio de Estocolmo.----------

**Que,** el proyecto cuenta con **Dictamen SIAM N° 65015/2020 de fecha 30/08/2020,** por parte de la **Dirección de Geomática,** en el cual se verifica que; **no se observa** cambio de uso en el marco de la Ley N° 2524/04 y sus ampliaciones y la Ley N° 6256/18; que prohíbe las actividades de transformación y conversión de bosques de la Región Oriental. **No se encuentra** dentro de áreas silvestres protegidas. **No afecta** comunidades indígenas. **Según Propuesta presentado por el Consultor la Superficie a ser utilizada como Área del Proyecto es de 6,5 Ha, Superficie la cual fue verificada en la Dirección de Geomática como Área Directa del Proyecto. La Superficie Total de la Propiedad es de 1.519,70 Ha.**-------

**Que, la Firma Paracel S.A.** se compromete a adquirir los **Certificados de Servicios Ambientales** en lo que sea aplicable a la obra conforme la **Ley 3001/2006 de Valoración y Retribución de Servicios Ambientales tras la concesión de la licencia ambiental solicitada, en un plazo de 6 meses de emitida la D.I.A.**----------

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**DECLARACIÓN DGCCARN Nº 1163 / 2020.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "SUBESTACION ZAPATERO CUE", ELABORADO POR EL CONSULTOR AMBIENTAL NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOS BLAS ENRIQUE ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON FINCA Nº 9891, 5657, PADRON Nº 5452, UBICADA EN EL DISTRITO DE CONCEPCIÓN, DEPARTAMENTO DE CONCEPCIÓN."**



**Que,** el proyecto cuenta con Análisis de la **Dirección de Servicios Ambientales según Dictamen Nº 78740/2020 de fecha 25/09/2020,** señalando: **El proyecto se encuentra dentro de la Resolución 81/19, en el Anexo I.**----------
**Que,** el responsable del proyecto **ha manifestado bajo Declaración Jurada la veracidad de las informaciones presentadas** en **el Estudio de Impacto Ambiental**, así como toda la documentación que se adjunta al mismo.----------
**Que**, la Ley Nº 1.561/00 "Que crea el Sistema Nacional del Ambiente, el Consejo Nacional del Ambiente y la Secretaría del Ambiente", le confiere el carácter de Autoridad de Aplicación de la Ley Nº 294/93 de "Evaluación de Impacto Ambiental" y su Decreto Reglamentario 453/13 y su modificación y ampliación 954/13.----------
**Que**, La Ley Nº 6123/18 "Que eleva al rango de Ministerio a la Secretaría del Ambiente y pasa a denominarse Ministerio del Ambiente y Desarrollo Sostenible".----------
**Que**, el Art 5 inc. Art 6 inc. e) del Decreto 453/13 y su modificación Nº 954/13, faculta a la Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales (DGCCARN), a entender en la evaluación de los Estudios Ambientales y consecuentes autorizaciones, control y gestión de la calidad ambiental, por consiguiente:

**LA DIRECCIÓN GENERAL DE CONTROL DE LA CALIDAD AMBIENTAL Y DE LOS RECURSOS NATURALES**
**DECLARA**

**Art. 1º** **Aprobar el Estudio de Impacto Ambiental** del mencionado Proyecto, sin perjuicio de exigir al proponente una nueva evaluación en caso de modificaciones significativas del proyecto, de ocurrencia de efectos no previstos, de ampliaciones posteriores o de potenciaciones de los efectos negativos por cualquier causa subsecuente.----------

**Art. 2º** **Conceder la Declaración de Impacto Ambiental** al mencionado proyecto condicionado al estricto cumplimiento del Plan de Gestión Ambiental del Estudio de Impacto Ambiental que incluye Medidas de Mitigación y Plan de Monitoreo; y cualquier otra medida tendiente a minimizar el impacto sobre el medio ambiente (agua, aire, suelo y el medio biótico).----------

**Art. 3º** **El proponente** es el responsable de dar cumplimiento a la **Ley Orgánica Municipal Nº 3966/10, Ordenanzas que regulan dicha actividad, Ley 836/80 Código Sanitario, Decreto Nº 14390/92 Que aprueba el Reglamento General Técnico de Seguridad, Higiene y Medicina del Trabajo, La Ley Nº 3956/09 De Gestión Integral de los Residuos Sólidos en la República del Paraguay, Ley Nº 3239/07 de Recursos Hídricos del Paraguay, Ley Nº 5211/14 Del Aire, la Resolución Nº 750/02 del tratamiento y disposición final de los residuos sólidos, la Resolución SEAM Nº 255/06 "Por la cual se establece la clasificación de las Aguas superficiales de la República del Paraguay", la Resolución SEAM Nº 50/06 "Por la cual se establecen las normativas para la gestión de los Recursos Hídricos del Paraguay", la Resolución SEAM Nº 222/02 "Por la cual se establece el padrón de calidad de las aguas en el territorio Nacional", Resolución Nº 770/14, Ley Nº 716/96 Que Sanciona Delitos Contra el Medio Ambiente y demás disposiciones legales de protección ambiental que rige la materia.**----------

**Art. 4º** **El Responsable** deberá designar una persona encargada de la realización de Auditoría Ambiental de Cumplimiento de Plan de Gestión Ambiental quien podrá ser un Consultor o una Empresa Consultora registrada en el CTCA, debiendo presentar a la SEAM informe de Auditoría de Cumplimiento de acuerdo a procedimientos establecidos en la Resolución SEAM Nº 201/15 y su modificación la Resolución SEAM Nº 221/15, **cada 1 (UNO) año, a partir de la firma de la presente Declaración, condicionada a presentar en un plazo de 6 meses, contrato de adquisición de servicios ambientales.**----------

**Art. 5º** **El Responsable deberá adquirir y registrar la compra de servicios ambientales en la Dirección de Servicios Ambientales en el plazo de 6 meses contados a partir de la firma de la presente Declaración.**----------

**Art. 6º** **La presente DIA** no autoriza la realización de obras o actividades que no se adecuen a las normas de ordenamiento urbano y territorial municipales, así como tampoco exime de responsabilidad civil a los responsables de obras o actividades en caso de que las mismas causen daños a terceros. **La presente NO autoriza ninguna actividad de transformación o conversión de superficies con cobertura boscosa en la Región Oriental de Conformidad a la Ley Nº 6256/18.**----------

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**DECLARACIÓN DGCCARN Nº 1163 / 2020.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "SUBESTACION ZAPATERO CUE", ELABORADO POR EL CONSULTOR AMBIENTAL NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOS BLAS ENRIQUE ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON FINCA Nº 9891, 5657, PADRON Nº 5452, UBICADA EN EL DISTRITO DE CONCEPCIÓN, DEPARTAMENTO DE CONCEPCIÓN."**



**Art. 7°** **La presente DIA** es un requisito previo ineludible para obtención de autorizaciones de otros organismos públicos, en virtud a lo estipulado en el Art. 12° de la Ley N° 294/93 "De Evaluación de Impacto Ambiental". ----------

**Art. 8°** **En caso que** como consecuencia de una fiscalización se detecte: 1) la falta de DIA en los casos en que fuera obligatoria; 2) incumplimientos al plan de gestión ambiental 3) modificaciones significativas respecto del proyecto evaluado; 4) la ocurrencia de efectos no previstos; 5)la ampliación de la obra o la actividad respecto del proyecto evaluado; o, 6) haya potenciación de los efectos negativos por cualquier causa subsecuente, el Ministerio del Ambiente y Desarrollo Sostenible podrá disponer una nueva evaluación de impacto ambiental, un ajuste al Plan de Gestión Ambiental y/o la suspensión de la obra o la actividad; ello sin perjuicio del inicio de los procedimientos sancionatorios, administrativos o penales, que pudieran corresponder.----------

**Art. 9°** **El EIA del Proyecto y la Declaración del Impacto Ambiental** deberán estar en el lugar de ejecución del proyecto, a fin de presentar los mismos a cualquier representante de Instituciones oficiales con competencia en el tema ambiental en el momento que lo requieran.----------

**Art. 10°** **La presente Declaración** se encuentra redactada en la **Hoja de Seguridad N° 9596 (Nueve Mil Quinientos Noventa y Seis), Hoja de Seguridad N° 9597 (Nueve Mil Quinientos Noventa y Siete) y Hoja de Seguridad N° 9598 (Nueve Mil Quinientos Noventa y Ocho), debiendo permanecer en el lugar donde se desarrolla el proyecto una copia autenticada de la misma.**----------

**Art. 11°** **Comunicar a** quien corresponda, cumplido archivar.----------

**Abog. Diego Lezcano Galeano, Director General**
**Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales**

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**DECLARACIÓN DGCCARN Nº 118 / 2021.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "FABRICA DE CELULOSA Y PUERTO", ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOR BLAS ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON LAS FINCAS N° 9891, 5657, PADRÓN N° 5452, UBICADA EN EL DISTRITO DE CONCEPCION, DEPARTAMENTO DE CONCEPCION."**



**Asunción, 17 de Febrero de 2021.**

**VISTO**: **El Estudio de Impacto Ambiental** con su correspondiente **Relatorio de Impacto Ambiental, Expediente SIAM DGCCARN Nº 4282/2020, de fecha 22/07/2020,** presentado al Ministerio del Ambiente y Desarrollo Sostenible por el **Consultor Ambiental Ing. Nicolas Antonio Godoy Rivarola con Reg. CTCA Nº I-850,** correspondiente al **Proyecto "FABRICA DE CELULOSA Y PUERTO",** cuyo proponente es la **Firma Paracel S.A.,** y su representante legal es el **Señor Blas Zapag,** que se desarrolla en la propiedad identificada con las **Fincas Nº 9891, 5657, Padrón Nº 5452,** ubicada en el Distrito de Concepción, Departamento de Concepción.----------

**CONSIDERANDO**: **Que,** el Proyecto fue evaluado por el **Equipo Técnico Multidisciplinario conformado para el Análisis y Evaluación del Proyecto según Resolución 01/2021 de fecha 06 de enero de 2021. Que el Equipo está conformado por: Abg. Diego Lezcano** (Director General), Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales; **Lic. Amb. Carolina Pedrozo de Arrúa** (Directora) y **Ing. Amb. Blanca Barrios de Zacarías** (Directora adjunta), Dirección de Evaluación de Impacto Ambiental; **Ing. Agr. Ma. José Alderete Gayoso, Ing. Agr. Claudia Berdejo Bareiro, Ing. Agr. María Auxiliadora Espinoza Roth, Ing. Amb. Leticia Villaverde Alderete, Ing. Ftal. Miguel Sánchez Caballero y Lic. Geol. Daniel García Segredo** (Técnicos Evaluadores), **Lic. Gilda Cañete Monzón (Directora),** Dirección de Control de la Calidad Ambiental; **Lic. Alberto Recalde Sánchez** (Jefe Dpto. de Sustancias Químicas), **Ing. Qco. Ovidio Espínola Pérez** (Técnico del Dpto. de Sustancias Químicas); **Ing. Amb. Cynthia Arguello Cáceres** (Jefe Dpto. de Residuos Sólidos Urbanos); **Lic. Biol. Darío Mandelburguer González** (Director General), Dirección General de Protección y Conservación de la Biodiversidad; **Lic. Biol. Paul Frederick Bauer** (Director de Vida Silvestre), **Lic. Estela Gómez Mareco** (Directora de Pesca y Acuicultura); **Ing. Agr. David Fariña Gómez** (Director General), Dirección General de Protección y Conservación de los Recursos Hídricos; **Ing. Agr. José Silvero Arce** (Director de Hidrología e Hidrogeología); **Ing. Civil Gilda Torres Ferreira** (Directora General), Dirección General del Aire; **Ing. Qco. Federico Shoeder Rodríguez** (Director de Normalización del Aire); **Abg. Catherine Alonso Riquelme** (Directora), Dirección de Servicios Ambientales; **Ing. Agr. Ulises Lovera Gaona** (Director) Dirección de Cambio Climático, quienes Dictaminan a favor de la aprobación del Proyecto y recomiendan su aprobación, **según Dictamen Técnico N° 11310/2021de fecha 12/02/2.021.**----------

**Que,** el responsable del proyecto ha identificado los impactos ambientales negativos generados como consecuencia de la realización de la mencionada actividad y ha establecido las medidas ambientales necesarias, conforme la actividad que se desarrolla.----------

**Que,** el presente proyecto se ha ajustado al Artículo 4° Inc. a) del Decreto 453/13, dando cumplimiento al procedimiento estipulado y publicándose debidamente a través de medios de comunicación como así también en la página web del Ministerio del Ambiente y Desarrollo Sostenible comunicado esto a través del **Memorándum Nº 003/21, de fecha 07 de enero de 2021** y que no se han presentado observaciones fundadas una vez cumplidos los plazos.----------

**Que,** el emprendimiento consiste en la **construcción y puesta en funcionamiento de una fábrica de celulosa**, con una **capacidad de producción de 1.500.000 de toneladas por año de celulosa blanqueada para papel o 900.000 toneladas por año de fabricación de celulosa soluble, y la construcción y operación de un Puerto.**----------

**Que,** el proyecto contempla las siguientes áreas: **patio de madera; cocción; línea de fibra; secado; evaporación; caldera de recuperación; caustificación; horno de cal; aire comprimido; turbogeneradores; caldera de biomasa; planta de tratamiento de agua (PTA); planta de tratamiento de efluentes (PTE); planta de dióxido de cloro; y planta de oxígeno.**----------

**Que,** el proyecto contará con un **área de manipulación, preparación y almacenamiento de productos químicos (planta química),** e incluirá: **descarga, manipulación y almacenamiento de hidróxido de sodio; descarga, manipulación y almacenamiento de ácido sulfúrico; descarga, manipulación y almacenamiento de bisulfito de sodio; descarga, manipulación y almacenamiento de peróxido de hidrógeno; descarga, manipulación y almacenamiento de clorato de sodio; descarga, manipulación y almacenamiento de metanol; planta para la producción de dióxido de cloro; planta**

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**DECLARACIÓN DGCCARN Nº 118 / 2021.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "FABRICA DE CELULOSA Y PUERTO", ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOR BLAS ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON LAS FINCAS Nº 9891, 5657, PADRÓN Nº 5452, UBICADA EN EL DISTRITO DE CONCEPCION, DEPARTAMENTO DE CONCEPCION."**



**para producción de oxígeno.** El transporte de los principales productos químicos en forma líquida se realizará a granel, utilizando camiones tanque.----------

**Que,** el proyecto contempla una infraestructura de apoyo, consistente en: **un acceso por carretera, un puerto fluvial, un sistema de obtención de agua bruta, un emisario para la descarga de efluentes líquidos tratados en el río Paraguay y sistemas de tratamiento y eliminación de los residuos industriales sólidos.**----------

**Que,** el proyecto contempla **instalaciones de apoyo administrativo y operativo**: **portería, edificio administrativo, estacionamiento para vehículos y camiones, báscula:** se instalarán dos básculas de pesaje para controlar la entrada y salida de madera e insumos para la fábrica, almacén, y taller que se utilizará para mantenimiento del equipo de la fábrica.----

**Que,** el proyecto establece que utilizara como **materia prima básica 6 millones de metros cúbicos de madera de eucalipto por año y diversos insumos químicos como: oxígeno, hidróxido de sodio, ácido sulfúrico, peróxido de hidrogeno, clorato de sodio, bisulfito de sodio, talco, cal, urea, ácido fosfórico, hipoclorito de sodio, sulfato de aluminio, antiespumante, polielectrolito. Combustibles: aceite combustible, diesel, GLP.**----------

**Que,** para producción de celulosa, ya sea celulosa para papel como la celulosa soluble **será aplicado el proceso Kraft1**.-----

**Que,** el proceso a ser utilizado **para blanquear la celulosa es el ECF** (Elemental Chlorine Free - libre del elemento cloro, en inglés), no emplea el cloro elemental en sus etapas de proceso, evitando emisión significativa de organoclorados para el efluente.----------

**Que,** en la fábrica de celulosa **serán cogenerados 220 MW** en caso de optar por la producción de celulosa blanqueada, considerando que **la planta consumirá cerca de 120 MW y habrá un excedente de 100 MW** para venta en la red; o en caso que sea elegido el proceso de celulosa soluble, **serán cogenerados 240 MW y la planta consumirá acerca de 110 MW de energía eléctrica, existiendo un excedente de 130 MW** para exportar a la red.----------

**Que,** la fábrica de celulosa también utilizara como fuente de energía la **quema de biomasa forestal y del licor de la madera.**----------

**Que,** el proyecto contempla: **almacenamiento de chips:** que se realizará a cielo abierto, con apilamiento y reanudación automáticos, y consistirá en dos pilas apiladoras/recuperadoras circulares con sistema de extracción de tornillo móvil giratorio. La capacidad de almacenamiento será de 3 días. Las tres líneas de tamizado de chips se instalarán después de las pilas del almacenamiento. Los excedentes se colectarán y recuperarán para usar las fibras para la producción de celulosa, u opcionalmente, se utilizarán como biomasa para quemar en la caldera. Los chips de madera aceptados se enviarán a través de una línea de cintas transportadoras hasta los digestores. **La corteza residual se cortará** y se enviará junto con los residuos de tamizado (fino) a una pila de biomasa cubierta, con una capacidad de almacenamiento de dos días, con apilamiento y continuación automáticos. **Los extractores móviles** recuperarán la biomasa de la pila, que luego se enviará a la caldera de biomasa. El agua de limpieza de troncos será recuperada y recirculada, aunque se necesita una cantidad de agua industrial para reemplazar las pérdidas y mantener la calidad del agua. **Los residuos sólidos contaminantes del agua de lavado** después de decantar en el sistema de recuperación de agua serán eliminados en gran medida por un transportador de arrastre y descartados del proceso. **Cocción:** la cocción es un proceso químico alcalino, ya que utiliza los reactivos químicos **hidróxido de sodio (NaOH) y sulfuro de sodio (Na2S)**, los principales componentes del licor blanco de cocción. **Extracción de lignina por el oxígeno**: el proceso de extracción de lignina con empleo de oxígeno es una de las etapas delanteras al blanqueo, por medio de la cual se produce una separación adicional lignina, a través de las reacciones de la pulpa con un agente oxidante en un medio alcalino. **El blanqueo** es un proceso de purificación que tiene como objetivo eliminar elementos que evitarían el blanqueo completo de la celulosa, como las resinas y gran parte de la lignina residual no disuelta en operaciones anteriores. El objetivo es obtener celulosa ECF (libre de cloro elemental) con un alto grado de blancura (90% ISO) y estabilidad.----------

**Que,** la planta de blanqueo **constará de cuatro etapas con una consistencia media**: A/D Eop D P (dióxido de cloro a alta temperatura, extracción alcalina, dióxido de cloro y peróxido). La pulpa blanqueada se enviará a las torres de almacenamiento, donde se almacenará con una consistencia media y luego se alimentará a la máquina de secado. **Secadora y empacadora** Desde la torre de almacenamiento de pulpa blanqueada, se mezclará, se homogeneizará, se purificará y su consistencia se regulará con precisión. Luego se enviará a **dos máquinas de secado** en las cuales la suspensión de fibra en agua se someterá al **proceso de deshidratación**, formando la hoja (placas). Las **láminas cortadas** al tamaño programado

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serán almacenadas, presionadas en fardos, y cubiertas para posterior identificación. **Los fardos también se apilarán y unificarán**, siguiendo para el almacén de celulosa.----------

**Que,** el emprendimiento contempla la **incorporación de Equipamientos de Alta Tecnología en el proceso de fabricación** como: adopción de **separación cortezas de eucalipto en seco**, reduciendo la carga contaminante de los efluentes líquidos. Adopción de un **digestor continuo para la cocción** reduciendo la generación de gases condensados, la carga orgánica en el efluente y la emisión de azufre a la atmósfera. **Empleo de circuito cerrado de purificación** que minimiza la generación de carga contaminante líquida. **Instalación de una unidad de deslignificación** (primera fase de blanqueo) que emplea oxígeno para separar la lignina de la fibra de celulosa, reduciendo sustancialmente la carga orgánica y color generados al efluente. **Purificación del condensado contaminado** con la instalación de una columna de separación de gas/líquido, recuperando el condensado y así reduciendo la carga contaminante del efluente líquido. **Instalación de sistemas de recuperación y control de desperdicios** en el proceso de producción. **Sistema para recoger y quemar gases concentrados y diluidos no condensables**. Instalación de **equipos para controlar las emisiones atmosféricas**, tales como precipitadores electrostáticos y depuradores para eliminar o minimizar las emisiones. Instalación de un **sistema de tratamiento y control de efluentes líquidos de alta eficiencia,** como lodo activado. Instalación de un **sistema para la eliminación de efluentes tratados** en el río Paraguay a través de **emisarios terrestres y submarinos equipados con difusores de fondo que asegurarán la dispersión adecuada de los efluentes tratados en el punto de descarga**. Instalación de **un sistema de tratamiento y disposición final de residuos sólidos industriales** a través de compostaje y vertedero de residuos industriales.----------

**Que,** el emprendimiento contará con **caldera de recuperación**: el propósito de la caldera de recuperación es recuperar los productos químicos utilizados en la cocción; Reducir el sulfato de sodio a sulfuro; Generar vapor utilizando la energía resultante de la quema de la materia orgánica extraída de la madera. **La caldera será del tipo de alta eficiencia y bajo olor con un sistema de aire multinivel para quemar licor al 80%.** El vapor generado a alta presión se enviará a los turbogeneradores para generar electricidad. El aire de combustión se introducirá en el horno, al menos en cuatro niveles, con ventiladores de circulación forzada, para permitir un control óptimo de la combustión, reducción de la emisión de NOx y reducción del fundido. **Los gases de escape de la combustión pasarán a través de un precipitador electrostático, cuya eficiencia esperada será superior al 99,7%.** El sistema de tratamiento de cenizas del precipitador se integrará en la caldera de recuperación o en la planta de evaporación. Los gases no condensables concentrados y diluidos de la línea se incinerarán en la caldera de recuperación. Aceite combustible se utilizará como combustible inicial, estabilizando el proceso de producción y generando electricidad. **En la caustificación**, el licor verde de la caldera de recuperación se transformará en licor blanco, que posteriormente se utilizará para cocinar la madera. **El licor verde se forma a partir de la solubilización de la masa fundida formada en la caldera de recuperación.** Esa transformación es la reacción de carbonato de sodio del licor verde con cal (óxido de calcio), obteniendo hidróxido de sodio y carbonato de calcio, que se separarán por filtración. Antes de entrar en contacto con la cal (óxido de calcio y agregados), el licor verde se filtrará para eliminar las impurezas (dregs). Los dregs se lavarán y filtrarán en un filtro o centrífuga, equipo específico para esta aplicación. **Se usará condensado secundario de la planta de evaporación** o agua tibia para lavar los dregs. Los residuos de cal (grits) también se lavarán y, al igual que los dregs, se enviarán al centro de reciclaje para generar la corrección del suelo, o incluso a un vertedero industrial.----------

**Que,** el emprendimiento contará con **hornos de cal**: el propósito de la calcinación es transformar el carbonato de calcio obtenido de la caustificación en óxido de calcio (CaO + inerte) para usar en la reacción con el licor verde. **La calcinación** se realizará en dos hornos rotativos en paralelo, revestidos internamente con ladrillos refractarios y aislantes y calentados por la combustión de fuel oil u otro combustible alternativo que puede usarse en el futuro (gas de biomasa). Los hornos de cal estarán equipados con un secador externo para el lodo de cal y refrigeradores para la cal quemada. A través de un **precipitador electrostático**, el polvo se eliminará de los gases de escape y puede volver a los hornos de cal o desecharse (purga de lodo de cal). Los gases de escape se enviarán a la chimenea (común con la caldera de recuperación), desde donde se liberan a la atmósfera.----------

**Que,** el proyecto contempla el **Sistema de Control y Seguridad Operacional de Planta Química**, contara con los siguientes equipos y estructuras: plataformas de descarga de productos químicos, provistas de sistemas de contención a través de espinas o paredes bajas; almacenamiento de productos líquidos en tanques metálicos, hechos de acero al carbono,

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acero inoxidable o fibra de vidrio (el material dependerá del tipo de químico a almacenar); diques de contención de hormigón para tanques de almacenamiento de productos químicos; canales de contención en las áreas de producción y en el stock de productos químicos; **Instrumentos de monitoreo de procesos (nivel, presión, temperatura, entre otros) operados de forma remota**, para minimizar la necesidad de operadores en el área de producción o almacenamiento de productos químicos. **Con respecto al dióxido de cloro, se prevén las siguientes medidas**: Sistema de detección de fugas de dióxido de cloro; Sistema de ventilación constante para los tanques (con fuente redundante); Sistema fijo de espuma alrededor del dique de contención para evitar emanación de gases en caso de fugas. Sistemas de protección de descargas atmosféricas (conocidos como SPDA), provistos de redes de puesta a tierra o pararrayos; **el sistema de transferencia de la planta química a los puntos de uso se llevará a cabo mediante tuberías aéreas a través de un puente de tubería** (conocido como Pipe Rack), que evita la manipulación por los operadores y minimiza el riesgo de accidentes.----------

**Que,** el proyecto cuenta con **sistema de control de incendios de la planta química**: la red interna de hidrantes de la planta química se distribuirá en forma de anillo que será alimentado por la red principal de hidrantes. Las unidades hidráulicas y de lubricación, según el volumen, pueden protegerse mediante un sistema de sprinklers automáticos controlado por una válvula de activación y alarma independiente. Además, **cada unidad hidráulica y de lubricación se instalará dentro de un dique de contención con un volumen suficiente para mantener todo el volumen de aceite en la unidad**. Los extintores portátiles se instalarán en los lugares necesarios de acuerdo con los requisitos del departamento de bomberos. Las regulaciones del Departamento de Bomberos también requieren la instalación de letreros en el área reservada para extintores de incendios. **El tanque de almacenamiento de metanol tendrá un sistema de protección de acuerdo con los estándares FM Global. Se instalarán sistemas de protección contra inundaciones para este tanque** y para todas las estructuras metálicas que pueden colapsarse en caso de incendio en el tanque u otro equipo de manejo de metanol. **El edificio de almacenamiento de clorato de sodio estará protegido por un sistema automático con sprinklers controlados por un sistema de acción independiente y una válvula de alarma.**----------

**Que,** el proyecto prevé la construcción de una **Planta de Tratamiento de Aguas (PTA)**, para atender el consumo de la fábrica. El agua se capturará desde el río Paraguay, a través de un sistema de captación de superficie que consiste en un canal y una rejilla. La captación será del tipo "operación a hilo de agua", no se construirá un sistema de represas. **Se instalarán cuatro sistemas bombeo de 2.350 m³/h cada una, con un flujo de admisión total de 7.000 m³/h** para abastecer la fábrica. Se instalará una **tubería de agua cruda de 1.100 mm de diámetro**. El agua cruda, que llega a la planta de tratamiento de aguas, será tratada con sulfato de aluminio, hidróxido de sodio e hipoclorito de sodio, este último utilizado para promover la eliminación de hierro, además de oxidar la materia orgánica presente. Después del proceso de coagulación, se agregará polielectrolito para promover la floculación. Luego, por gravedad, el agua floculada irá a la unidad de eliminación de sólidos, a través de un sistema de flotación por aire disuelto o similar. El lodo formado se descargará periódica y automáticamente en el canal de descarga central. **El lodo recolectado será compactado y deshidratado** y luego enviado para su disposición final. Por gravedad, el agua clarificada se conducirá a través de canales hasta los filtros de gravedad. **Después de la filtración, el agua tratada se almacenará en el depósito de agua tratada** que abastecerá los diversos puntos de consumo de la fábrica, incluida el agua para el control de incendios y el agua potable. **La capacidad total de producción de agua tratada será de 6.700 m³/h.**----------

**Que,** el proyecto contará con una **Planta de Tratamiento de Efluentes en tres etapas**, las principales etapas del proceso de tratamiento de efluentes son: **Cámara de Rejas; Clarificador primario; Pileta de emergencia; Neutralización; Enfriamiento; Lodos activados - tanque de aireación; Clarificador secundario; Sistema de desagüe de lodos secundarios; Tratamiento terciario; Emisario**. Los efluentes de la planta de dióxido de cloro, la lixiviación de cenizas y la planta de agua de make-up de la caldera **también se segregarán de las líneas principales**, ya que no tienen carga orgánica, ya que solo requieren control de pH antes de su liberación. **Los efluentes neutralizados específicos se agregarán a los otros efluentes depurados, en el tanque de efluentes depurados, para ser eliminados en el río Paraguay**. Los efluentes sanitarios generados en la planta serán recolectados en la red de efluentes sanitarios y enviadas al PTE, directamente para tratamiento biológico. **El agua de lluvia que cae en las áreas de proceso, ya que tienen el mayor potencial de contaminación, se enviará junto con los efluentes a la Planta de Tratamiento de Efluentes (PTE)**. Los flujos de

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efluentes de PARACEL serán monitoreados individualmente a través de medidores de flujo como medio de monitoreo y control operativo. **El efluente tratado se descargará en el río Paraguay** a través de un emisario subacuático. **El sistema completo consiste en: un pozo de efluente tratado; emisario de efluentes purificados hasta la margen del río Paraguay, en el punto de descarga; válvulas de control; tuberías de desagüe en el lecho del río; tubos difusores verticales ("risers") con orificios para lanzamiento subacuático y dispersión en las aguas del río.----------**
**Que,** el emprendimiento contará con **Depuración de Agua para Calderas**: el agua para reponer las pérdidas de condensado de vapor vivo no retornado del proceso será depurada por medio de la **desmineralización del tipo de ósmosis inversa** con pulido final a través de lechos mixtos. **La pre-depuración del agua** de reposición se realizará mediante filtración a través de **filtros de arena, filtros de carbón activado y filtros de cartucho mecánico antes de pasar por el permeado**. Los desechos del permeado se usarán para reemplazar el sistema de sellado del agua. **Torres de enfriamiento:** el sistema de agua de enfriamiento estará en un circuito cerrado, y se considera que las torres de contracorriente con un extractor de aire en la parte superior sirven a los siguientes procesos de la fábrica: torre de los turbogeneradores, condensadores de los turbogeneradores, calderas de recuperación y biomasa, enfriadores de sistemas de aire acondicionado, turbogeneradores, caustificación y horno de cal, línea de fibra, planta química, cocción, secado, manipulación de madera y sistema de aire comprimido. Torre de evaporación: evaporación.----------
**Que,** el proyecto contará con **caldera de biomasa**: para complementar el vapor generado en la caldera de recuperación para la generación de energía, mediante el uso de residuos de la preparación de madera para cocción. Los desechos del manejo de la madera y la eliminación de la pulpa marrón se mezclarán y almacenarán en una pila de biomasa cubierta donde se enviarán a los silos de la caldera. El vapor producido por la caldera de biomasa se mezclará con el vapor de la caldera de recuperación y se enviará a los turbogeneradores. **Se instalará un precipitador electrostático** para controlar las emisiones atmosféricas. **La caldera de biomasa puede quemar metanol como combustible auxiliar**, siendo así un sistema de quema de reserva para hornos de cal. Las cenizas de fondo de la caldera y del precipitador se recolectarán en silos dedicados para su disposición final posterior. **El fuel oil se utilizará como combustible de partida, para estabilizar el proceso de producción y eventualmente para oxidar gases no condensables** cuando se desvían a la caldera de biomasa. **Cogeneración de electricidad (turbogeneradores):** los turbogeneradores tendrán el propósito de transformar la energía térmica del vapor a alta presión en energía mecánica para activar los generadores de energía eléctrica. **Está previsto instalar 2 turbogeneradores para la generación total de hasta 220 MW.----------**
**Que,** el proyecto contempla el **almacenamiento de combustible**: se utilizará combustible en las áreas de calderas de recuperación, calderas de biomasa y hornos de cal, durante las siguientes ocasiones: **Arranque la fábrica de celulosa; Parada general de la fábrica de celulosa** (manutención preventiva anual) con el consiguiente arranque; Situaciones momentáneas de operación. El volumen de **almacenamiento de combustible será de 3.000 m³**, siendo calentado y distribuido a los consumidores a una temperatura de 70 °C. Contará con sistema de prevención contra incendios. ----------
**Que,** el proyecto contará con un **Puerto Fluvial:** con una construcción de **tipo terminal en la margen izquierda del río Paraguay,** construido como una plataforma elevada sobre una estructura compuesta por: **una plataforma de operación, un puente de acceso para vehículos y personas, y una estructura de cobertizo para el área de transporte de celulosa. Sus instalaciones:** AWT El AWT (All Weather Terminal) **tendrá un área de aproximadamente 4.600 m².** Edificio de apoyo y sala de bombas. Puntos de amarre el diseño incluye **12 (doce) puntos de amarre, 2 (dos) puntos de protección principal y 11 (once) puntos de protección de las columnas de techo** del AWT. Muelle de barcazas tendrá una **plataforma de hormigón armado de 133 m x 32 m de ancho, con un área de 4.256 m².----------**
**Que,** el puerto moverá las siguientes cargas: **el transporte de celulosa por barcazas fluviales a una tasa media de 1.500.000 t/año; recepción de madera en troncos con volúmenes que varían entre 2 y 5 millones de m³ s sc/año; recepción de insumos para la fábrica de celulosa (líquidos o granel) hasta 450.000 t/año.----------**
**Que,** el proyecto contempla las **principales fuentes de emisiones atmosféricas** de la fábrica de celulosa se generarán a partir de los siguientes equipos: **Caldera de recuperación; Hornos de cal; y Caldera de biomasa.** Tecnologías para minimizar, controlar y monitorear las emisiones al aire: uso de **caldera de recuperación de bajo olor**; **alto contenido de sólidos secos de hasta 80% en el licor quemado** en la caldera de recuperación, lo que minimiza las emisiones de SOx; **uso**

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**de precipitadores electrostáticos de alta eficiencia** para la caldera de recuperación, **caldera de biomasa y hornos de cal**; **recolección de gases concentrados no condensables** (GNCC) del digestor y la evaporación, y su **incineración en la caldera de recuperación o caldera de biomasa** (incineración de llama protegida); amplia **recolección de gases no condensables diluidos** (GNCD) del digestor, **línea de pulpa marrón, evaporación, con tratamiento en la caldera de recuperación**; **tratamiento de gases del tanque de disolución** en la propia caldera de recuperación; **limpieza eficiente de los gases de alivio de la planta de blanqueo**; y **sistemas de monitoreo de gase** y sistema de control en tiempo real, identificación y corrección rápida de perturbaciones operacionales. **Sistema de recolección e incineración de gases no condensables:** los gases no condensables de alta concentración generados en la planta de evaporación serán incinerados en la caldera de recuperación. **En caso de imposibilidad de quemar en la caldera de recuperación, estos gases se incinerarán en la caldera de biomasa (equipo de reserva 1) y, si esto no es posible, se incinerarán en un quemador tipo antorcha**. El sistema de monitoreo de gas **tiene control en tiempo real para identificar y corregir rápidamente alguna perturbación en operación**. Como parte integral de la supervisión, **se instalará un sistema automático de gestión y control de la operación, basado en el uso de integración acoplada a microprocesadores.** Su función será mantener las condiciones de operación de los precipitadores electrostáticos en los rangos ideales de operación. Para el monitoreo continuo ("on line") de las emisiones atmosféricas, **se proporcionarán medidores automáticos de flujo de gas, temperatura, presión, humedad, exceso de oxígeno, TRS, NOx, SOx y CO**. Para monitorear la eficiencia de oxidación térmica de los Gases no Condensables Concentrados - GNCC y Gases no Condensables Disueltos - GNCD, **el proyecto contempla la instalación de analizadores del TRS que muestrearán continuamente los gases de combustión de cada uno de los equipos responsables de la oxidación térmica. Una vez estabilizada la producción de la unidad industrial (después de la curva de aprendizaje - Learning Curve), PARACEL cuantificará la emisiones de gases de efecto invernadero y publicará el Inventario de gases de efecto invernadero.** En un próximo paso, **la compañía calculará la Huella de carbono (Carbon Footprint) de la celulosa producida en esa fábrica.**----------

**Que,** el proyecto cuenta con **Sistema de Gestión de los Residuos Sólidos:** los residuos sólidos industriales generados por el proceso de producción de celulosa **provendrán de las áreas de manejo de madera, caustificación, calderas y plantas de tratamiento de aguas y efluentes**. En esta categoría, se incluyen los siguientes residuos principales: **residuos de la preparación de madera; dregs, grits y barro de cal; ceniza de la caldera de biomasa; lodos primarios, secundarios y terciarios de la planta de tratamiento de efluentes; y lodos de la planta de tratamiento de las aguas**. Los residuos sólidos no industriales son generados en las actividades administrativas y operacionales de apoyo tales como, **oficinas, cafetería y talleres de mantenimiento**. Los siguientes residuos principales están incluidos en esta categoría: **metal, papel o cartón, plástico, vidrio, orgánicos reciclables y no reciclables, residuo de los servicios de salud, materiales contaminados con aceite y grasas, aceite lubricante usado, lámparas fluorescentes y baterías. El sistema de gestión de residuos de la fábrica de celulosa tendrá recolección selectiva o separada, que consiste en la separación de residuos, para que puedan ser reciclados luego**. Los residuos no industriales (no peligrosos y peligrosos) serán almacenados transitoriamente en un local hasta su envío para procedimientos de tratamiento específicos a cada tipo de residuo. El local de almacenamiento de los residuos no peligrosos será un patio abierto, cercado, señalizado y con piso de suelo compactado. El local de almacenamiento de los residuos peligrosos será un almacén cubierto con teja metálica, cerrado lateralmente, con ventilación natural, señalizada y con piso de concreto. Los residuos sólidos serán destinados para tratamiento o disposición final de la siguiente forma: **Residuos de madera + arena:** Producción de compost (aplicación forestal) o quema en la caldera de biomasa o vertedero industrial de PARACEL. **Dregs:** producción de corrector de acidez del suelo (aplicación forestal) o vertedero industrial de PARACEL. **Grits:** producción de corrector de acidez del suelo (aplicación forestal) o vertedero industrial de PARACEL. **Barro de cal:** producción de corrector de acidez del suelo (aplicación forestal) o vertedero industrial de PARACEL. **Cenizas + arena:** producción de corrector de acidez del suelo (aplicación forestal) o vertedero industrial de PARACEL. **Lodo primario PTE:** producción de compost (aplicación forestal) o quema en la caldera de biomasa o reciclaje o vertedero industrial de PARACEL. **Lodo biológico PTE:** producción de compost (aplicación forestal) o quema en la caldera de biomasa o vertedero industrial de PARACEL. **Lodo terciario PTE:** vertedero industrial de PARACEL. **Lodo PTA:** vertedero industrial de PARACEL. **Metal, papel o cartón, plástico, vidrio:** Reciclaje.

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**Orgánicos reciclables y no reciclables:** vertedero sanitario (orgánico) de PARACEL. **Residuo de los servicios de salud:** descontaminación y vertedero sanitario (externo). **Contaminado con aceite:** incineración o coprocesamiento. **Aceite lubricante usado:** reciclaje.----------

**Que,** el proyecto contempla **instalar una planta de compostaje**, para tratamiento de los residuos industriales orgánicos (**no peligrosos**), generados en la estación de tratamiento de efluentes (**lodo primario y biológico**) y en el patio de madera (**residuos de madera**). Así también, **se instalará una planta de producción de corrector de acidez del suelo**, para tratamiento de los residuos industriales inorgánicos (**no peligrosos**), generados en la caustificación (**dregs, grits y barro de cal**) y en la caldera de biomasa (**cenizas**).----------

**Que, el proyecto contará con un vertedero industrial para disposición final de los residuos industriales (no peligrosos)** generados en el proceso de producción, que no pueden ser utilizados los tratamientos propuestos (**compostaje y producción de corrector de acidez del suelo**). El vertedero industrial será **utilizado en la operación de la fábrica de celulosa y tendrá capacidad de 640.000 m³.** Comprenderá los siguientes elementos: **sistema de impermeabilización del suelo, sistema de detección de fugas, sistema de manejo y bombeo de lixiviados, sistema de manejo de gases, sistema de drenaje de aguas pluviales, sistema de monitoreo de las aguas subterráneas**. Así también, **se instalará un vertedero sanitario (orgánico)** para disposición final de los residuos generados en el refectorio, en los baños y no reciclables.----------

**Que,** la gestión de los residuos sólidos generados en la construcción de la fábrica comprenderá las siguientes prácticas: adopción de medidas de **minimización, segregación** (recolección selectiva o separada), **recolección, almacenamiento y transporte de acuerdo con la legislación, tratamiento o procesamiento y aprovechamiento, hasta la disposición final en vertedero sanitario (orgánico) o industrial.**----------

**Que,** el proyecto en **fase de** construcción contempla que las actividades de movimiento de tierras, pronostica un movimiento de tierra de **aproximadamente 8.000.000 m³**, con un equilibrio entre el corte y el vertedero sanitario previsto, con el objetivo de minimizar las áreas necesarias para la eliminación y el préstamo de material en sitios externos de la tierra de la empresa.----------

**Que,** el proponente ha presentado el **Cronograma de Adquisición de Servicios Ambientales** y se ha comprometido a adquirir los certificados de servicios ambientales conforme la normativa legal vigente **Ley Nº 3001/06, su Decreto Nº 11.202/13 y la Resolución Nº 153/20 Por el cual se establece el Mecanismo de adquisición de Certificados de Servicios Ambientales** aplicable en el plazo de 30 meses según disponibilidad en el mercado.----------

**Que,** la propiedad cuenta con una **Superficie Total de 1.515,4 ha (100%),** y de acuerdo a los usos se plantea la siguiente distribución: **Bosque 120,9 Ha (8%), Campo Natural con Vegetación 1062,8 Ha (70,1%), Fábrica de Celulosa 250,0 Ha (16,5%), Puerto 0,6 Ha (0,0%), Zona de Protección de Cauce 81,1 Ha (5,4%).**----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección de Geomática, según Dictamen SIAM Nº 100196/2020 de fecha 18/11/2020,** en el cual se verifica que el proyecto: **Cumple** con el bosque de protección hídrica, en el marco de la Ley Nº 422/73, Ley Nº 4241/10 y reglamentaciones. **No se observa** cambio de uso en el marco de la Ley Nº 2524/04 y sus ampliaciones y la Ley Nº 6256/18; que prohíbe las actividades de transformación y conversión de bosques de la Región Oriental. **No afecta** a áreas silvestres protegidas. **No afecta** a comunidades indígenas. Según imágenes satelitales se pueden observar ciertas partes de **área boscosa o vegetación en el área declarada como fábrica de Celulosa**. Según cartografía digital **se visualiza cauce hídrico que linda por la propiedad y se plantea la protección del mismo**. Se declara área boscosa **de 120,9 has.**----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección General del Aire, según Dictamen SIAM Nº 64560/2020 de fecha 14/08/2020,** en el cual se menciona que **el proyecto deberá cumplir desde el momento de la puesta en marcha la actividad planteada y estará sujeta a mayores exigencias** en otros puntos dependiendo de lo que vayan surgiendo en proceso de emisiones generados y no previsto en este estudio: **Deberán implementar un Plan de manejo y monitoreo de material particulado y gases de la generación de toda la actividad** que realizará la empresa y deberá **contemplar un Plan de seguridad ocupacional** de los operarios de la planta y un **Plan de Responsabilidad Social** en relación a la población aledaña a la actividad. **Deberá instalar medidores de calidad del aire en tiempo real y reportar el monitoreo de los gases y materiales particulados emitidos** por la actividad. Los sensores, **deberán ser**

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**colocados en los diversos puntos del proceso, para la medición de la calidad del aire, conteniendo los datos de las fuentes emisoras** incluyendo las coordenadas de las fuentes, las tasas de emisión, la temperatura de la salida de los contaminantes y la velocidad de la salida de los contaminantes, meteorológicos debe contener la presión, la dirección y la velocidad del viento, la temperatura del aire, la precipitación y la radiación solar, la energía cinética turbulenta y las razones para mezclar el vapor de agua, la lluvia y el agua. Además **debe cumplir con Estándares de calidad del aire establecidos por la Resolución SEAM N° 259/15**. El monitoreo de calidad del aire, durante la fase ejecución de proyecto en construcción y de operación de la fábrica y presentar al MADES a la DGA mensualmente. **Para la etapa de construcción deberá presentar el monitoreo sobre las medidas tomadas para atenuar la generación del material particulado y para la fase de operación deberán cumplir con el informe de los Parámetros de calidad del aire MP, TRS, SOx, NOx, CO, Flujo N, Temperatura, Humedad, Contenido de oxígeno %, Flujo en condiciones reales.** Estas mediciones deberán permitir el control de la pluma de nivel con los parámetros permitidos y regulados, para que no afecte a las comunidades, aledañas y a la vez deben medir los compuestos Orgánicos Volátiles. **Los parámetros medidos en el monitoreo de la calidad del aire son: Partículas Totales Suspendidas (PTS); Partículas Inhalables (PM10); Partículas Respirables (PM2,5); Óxidos de Nitrógeno (NOx); Dióxido de Azufre (SO2); Compuestos Reducidos de Azufre (TRS); Sulfuro de hidrógeno (H2S); Monóxido de Carbono (CO); Ozono (O3); Dioxinas y Furanos; Mercurio.** Deberá declarar que tipo de medidas de mitigación utiliza a la salida del Caldera/Horno; el tipo de Horno que utiliza, y si cuenta con sistemas como ser lavado de gases o filtro manga, se solicita se presente planos y corte del horno. También deberán informar sobre el tipo de combustibles a ser utilizados, si es a leña por ejemplo u otro, deberá presentar análisis químico porcentual del combustible a ser utilizado por cada lote a ser procesado para la caldera. La altura y flujo del aire caliente en el proceso. **Así mismo deberá contar con un monitoreo de la salida de las chimeneas en función de las emisiones que generan el mismo como ser MP, TRS, SOx, NOx, CO, Flujo N, Temperatura, Humedad, Contenido de oxígeno % , Flujo en condiciones reales.** Estas mediciones deberán permitir una la pluma de control para que no afecte a las comunidades. **Los 15 receptores, que mencionan que tendrán alrededor de la futura fábrica de celulosa deberán informar al MADES una vez que se instalen y una vez puesta en marcha la actividad**, a la vez en el momento de las compras de los equipos, deberán ser de precisión y con calibración los medidores; y deberán reportar el resultado del monitoreo del aire semanalmente y dependiendo de la circunstancia deberá tener una conexión con el MADES directa de las emisiones diarias, estos equipos medidores deben estar calibrados por empresas certificadas para la calibración y deberán informar al MADES. Por otra parte los puntos de muestreo de las emisiones atmosféricas estarán en la chimenea de cada una de las respectivas tuberías que instalarán un sistema automático de gestión y el control de operaciones, estará basado en el uso de la integración acoplada a microprocesadores, según el estudio, y deben ampliarlos puntos de muestreos atmosféricas para Planta de tratamiento de la pasta de celulosa, y el de la planta de tratamiento de efluentes, así como para el Tratamiento de los residuos sólidos provenientes de la actividad. **Además deberán tener una Hoja de cálculo de la vigilancia de las emisiones atmosféricas, para todos estos puntos señalados, y se deberán ajustar en el Programa de Monitoreo de Calidad del Aire.** Deberá presentar una carta compromiso de la Empresa a realizar el monitoreo de emisiones. Deberá presentar las medidas correctivas para atenuar de emisiones durante el proceso de producción y un Manual de Operación Mantenimiento de la planta que contemple las tareas preventivas, predictivas y correctivas en lo que compete a emisiones gaseosas y material particulado.----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección General de Protección y Conservación de los Recursos Hídricos, según Dictamen SIAM N° 82290/2020 de fecha 05/10/2020,** en el cual se solicita que la **empresa se comprometa a cumplir lo establecido con su estudio ambiental y también a las consideraciones emitidas** más adelante.----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección de Pesca y Acuicultura, según Dictamen SIAM N° 85023/2020 de fecha 08/10/2020,** en el cual se solicita tener en cuenta el marco legal vigente el proyecto y deberá: Contemplar la **Ley N° 3556/08 "De Pesca y Acuicultura" Art. 1° inciso b)** proteger la biodiversidad íctica y los procesos ecológicos, asegurando un ambiente acuático sano y seguro. **Mencionar las medidas de mitigación en caso de alteración de la calidad del agua por generación de efluentes, a fin de proteger la fauna íctica.** Considerar el aspecto social y sus

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medidas de mitigación, teniendo en cuenta la exportación pesquera y que el río es de libre usufructo y navegación pudiendo practicarse la pesca comercial, deportiva y/o subsistencia. **Coordinar las actividades de usufructo del curso hídrico.** En caso que exista un grupo de pescadores asociados cercanos a la obra, presentar plan de Coordinación de actividades.----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección General de Protección y Conservación de la Biodiversidad - Dirección de Vida Silvestre, según Dictamen SIAM N° 11310/2021 de fecha 05/02/2021,** por medio del cual se menciona que, las medidas de prevención, mitigación y compensación de los proyectos de esta envergadura, deberán contemplar cuanto sigue: **Previo al inicio de la etapa de ejecución** de la obra se deben **realizar unas verificaciones en el terreno a fin de descartar la existencia de nidos, cuevas y guaridas, de manera a evitar accidentes con animales silvestres, daños a huevos, crías o los individuos adultos de los que éstas dependen**. Queda igualmente prohibida toda forma de caza que destruya o cause daños al hábitat de las especies (Art. 42 Ley 96/92 De Vida Silvestre). **En la etapa de ejecución del proyecto** como por ejemplo la extracción de suelo y/o excavaciones, no deberán quedar abandonadas para que no representen un peligro para la fauna, esto en el caso de quedar atrapados en las excavaciones (considerando que en el informe se menciona que las áreas a ser intervenidas son sitios utilizados por algunas especies para desplazarse). **En la etapa de operación** reforestación con especies nativas como efecto de compensación para los desmontes del bosque ribereño. **Se debe prever la recomposición del material vegetal afectado** por el proyecto a fin de no afectar la biología de las especies asociadas a la flora nativa (polinizadores, aves migratorias, etc.) Considerando que en los relevamientos de datos realizados por la consultora responsable, se identificaron especies protegidas de fauna y flora silvestre, **se deberán establecer los siguientes Programas**: **1. Educación ambiental:** que incluya capacitaciones a los obreros sobre la importancia de cuidar la biodiversidad y dar a conocer las legislaciones que prohíben la caza y apropiación de animales silvestres; así como la flora silvestre. Asimismo, la implementación de señalizaciones con carteles advirtiendo la presencia de animales silvestres y flora protegida. **2. Programa de monitoreo permanente tanto de la flora y de la fauna local** a fin conocer la ecología de las especies y su adaptabilidad a las modificaciones del hábitat; como también la determinación de impactos a largo plazo no previstos en el momento de la ejecución del proyecto; para lo cual se deberá comunicar a la Autoridad de Aplicación de la Ley 96/92 De Vida Silvestre a fin de que la misma otorgue el permiso correspondiente. Los ruidos generados por las maquinarias ahuyentarán a los animales silvestres obligándolos a modificar su zona de desplazamiento diario, se recomienda regular los horarios de trabajo para evitar impactos para ambas etapas del proyecto, construcción y operación. Cumplir a cabalidad con lo establecido en el Plan de Gestión Ambiental presentado en el proyecto de EIA y lo establecido en la Ley N° 96/92 De Vida Silvestre.----------

**Que,** el proyecto fue objeto de verificación por parte del **Departamento de Sustancias Químicas, según Dictamen SIAM N° 101356/2020 de fecha 26/11/2020,** en el cual recomienda proseguir con los trámites administrativos, condicionados a presentar en la próxima auditoria lo siguiente: Presentar plano de prevención contra incendios aprobado por la municipalidad local, en formato JPG o PDF, e informe técnico otorgado por el cuerpo de bomberos voluntarios de la ciudad. Describir el Sistema de suministro de Energía Eléctrica, en caso de poseer transformador completar el **Anexo N° 2 de la Resolución N° 1.190/08** indicando su potencia, marca, año de fabricación, coordenadas de ubicación, fotografía de la placa, presentar resultados de análisis del aceite dieléctrico de no contener PCB; atendiendo el Convenio de Estocolmo. En caso de que este contaminado con PCB presentar un plan de gestión de retiro del transformador, almacenamiento transitorio, tratamiento y disposición final, considerando los plazos establecidos por el Convenio de Estocolmo. Presentar contrato o facturas que avalen la prestación de todos los servicios tercerizados (recolección, trasporte, tratamiento y disposición final de los residuos sólidos comunes, peligrosos y efluentes generados), la empresa debe contar con DIA expedida por el MADES.----------

**Que,** el proyecto fue objeto de verificación por parte del **Departamento de Residuos Sólidos Urbanos, según Memorándum DCCA N° 14/2021 de fecha 02/02/2021** en el cual se menciona que luego de la evaluación del proyecto y teniendo en cuenta que el mismo contempla la instalación de su propio vertedero, para la ubicación **deberá dar estricto cumplimiento a la Resolución N° 282/04, por la cual se establecen los criterios de selección de sitio para relleno sanitario.----------**

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**Que,** el proyecto fue objeto de verificación por parte de la **Dirección de Servicios Ambientales, según Dictamen SIAM N° 108119/2020 de fecha 14/12/2020,** en el cual **no se ponen reparos sobre el cronograma presentado** por parte del consultor. Se deja constancia que **deberá presentar a la DGCCARN el registro de transacción compra-venta emitido por la Dirección de Servicios Ambientales** a fin de que esta proceda con los trámites de evaluación de los Informes de Auditoria de Cumplimiento de Plan de Gestión Ambiental.----------

**Que,** el proyecto fue objeto de verificación por parte de la **Dirección Nacional de Cambio Climático, según Memorándum DNCC N° 101/21 de fecha 10 de febrero de 2021,** en el cual se menciona que, el país ha ratificado mediante la Ley N° 251/93, Que Aprueba el Convenio sobre "Cambio Climático" adoptado durante la Conferencia de las Naciones Unidas sobre Medio Ambiente y Desarrollo, la Cumbre para la Tierra, Celebrada en la Ciudad de Rio de Janeiro, Brasil., en donde en su **Artículo 4** expresa **Todas las partes, teniendo en cuenta sus responsabilidades comunes pero diferenciadas y el carácter específico de sus prioridades nacionales y regionales de desarrollo, de sus objetivos y de sus circunstancias, deberán: a) elaborar, actualizar periódicamente, publicar y facilitar a la Conferencia de las Parte, de conformidad con el Artículo 12, inventarios nacionales de las emisiones antropógenas por las fuentes y de la absorción por los sumideros de todos los gases de efecto invernadero no controlados por el protocolo de Montreal, utilizando metodologías comparables que habrán de ser acordadas por la conferencia de las partes.**----------

**Que,** el responsable del proyecto **ha manifestado bajo Declaración Jurada la veracidad de las informaciones presentadas** en **el Estudio de Impacto Ambiental**, así como toda la documentación que se adjunta al mismo.----------

**Que**, la Ley N° 1.561/00 "Que crea el Sistema Nacional del Ambiente, el Consejo Nacional del Ambiente y la Secretaría del Ambiente", le confiere el carácter de Autoridad de Aplicación de la Ley N° 294/93 de "Evaluación de Impacto Ambiental" y su Decreto Reglamentario 453/13 y su modificación y ampliación 954/13.----------

**Que**, La Ley N° 6123/18 "Que eleva al rango de Ministerio a la Secretaría del Ambiente y pasa a denominarse Ministerio del Ambiente y Desarrollo Sostenible".----------

**Que**, el Art 5 inc. Art 6 inc. e) del Decreto 453/13 y su modificación N° 954/13, faculta a la Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales (DGCCARN), a entender en la evaluación de los Estudios Ambientales y consecuentes autorizaciones, control y gestión de la calidad ambiental, por consiguiente:

**LA DIRECCIÓN GENERAL DE CONTROL DE LA CALIDAD AMBIENTAL Y DE LOS RECURSOS NATURALES**
**DECLARA**

**Art. 1°** **Aprobar el Estudio de Impacto Ambiental** del mencionado Proyecto, sin perjuicio de exigir al proponente una nueva evaluación en caso de modificaciones significativas del proyecto, de ocurrencia de efectos no previstos, de ampliaciones posteriores o de potenciaciones de los efectos negativos por cualquier causa subsecuente.----------

**Art. 2°** **Conceder la Declaración de Impacto Ambiental** al mencionado proyecto condicionado al estricto cumplimiento del Plan de Gestión Ambiental del Estudio de Impacto Ambiental que incluye Medidas de Mitigación y Plan de Monitoreo; y cualquier otra medida tendiente a minimizar el impacto sobre el medio ambiente (agua, aire, suelo y el medio biótico).----------

**Art. 3°** **El proponente deberá dar cumplimiento a las disposiciones establecidas en la Ley Orgánica Municipal N° 3966/10, Ordenanzas que regulan dicha actividad, Ley 836/80 Código Sanitario, Decreto N° 14390/92 Que aprueba el Reglamento General Técnico de Seguridad, Higiene y Medicina del Trabajo, La Ley N° 3956/09 De Gestión Integral de los Residuos Sólidos en la República del Paraguay y Resoluciones Reglamentarias, Ley N° 3239/07 de Recursos Hídricos del Paraguay y Resoluciones Reglamentarias, Ley N° 5211/14 Del Aire, Ley N° 6390/2020 Que regula la emisión de ruidos, Ley N° 3556/08 De Pesca y Acuicultura y Resoluciones Reglamentarias, Ley N° 96/92 De Vida Silvestre y Resoluciones Reglamentarias, Ley N° 422/73 Forestal y Normativas INFONA, Ley N° 3001/06 De Valoración y Retribución de Servicios Ambientales y su Decreto N° 11.202/13 y la Resolución N° 153/20 Por el cual se establece el Mecanismo de adquisición de**

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**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "FABRICA DE CELULOSA Y PUERTO", ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA N° I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOR BLAS ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON LAS FINCAS N° 9891, 5657, PADRÓN N° 5452, UBICADA EN EL DISTRITO DE CONCEPCION, DEPARTAMENTO DE CONCEPCION."**



**Certificados de Servicios Ambientales, Ley N° 6676/20 Que prohíbe las actividades de transformación y conversión de superficies con cobertura de bosques en la Región Oriental, Ley N° 716/96 Que Sanciona Delitos Contra el Medio Ambiente y demás disposiciones legales de protección ambiental que rige la materia.----------**

**Art. 4°** **El Responsable deberá** en cumplimiento de **mandatos emanados en la Ley N° 5.211/14 "De Calidad de Aire",** durante la fase de ejecución del proyecto en la e**tapa de construcción se deberá presentar informe respecto a las medidas de mitigación tomadas con el objetivo de atenuar la generación de material particulado** como de emisión de contaminantes del aire si los hubiera.----------

**Art. 5°** **El Responsable deberá implementar el Plan de Gestión de Material Particulado y Gases Contaminantes del Aire**, en cumplimiento de la Ley N° 5.211/14 "De Calidad de Aire". **El monitoreo de dichos efluentes atmosféricos se realizará *on line* a través de sensores y ubicados en etapas y lugares del proceso a ser definidos por el equipo técnico de la Dirección General del Aire (DGA) del MADES y del Proyecto PARACEL S.A.**, y plasmado en un manual operativo de control de emisiones atmosféricas que estará sujeto a revisión y ajuste cuando las circunstancias presentadas así lo requieran. Así mismo s**e definirá los contaminantes que deberán ser objeto de dicho monitoreo**. Además, **se definirá el monitoreo de emisiones *off line* de parámetros y periodicidad a ser definido en el manual operativo correspondiente**. Dichos sensores realizarán las mediciones de las emisiones en tiempo real y el MADES podrá acceder a dichos datos a través de un enlace o dirección IP facilitada por el equipo técnico del Proyecto, a fin de verificar cuando lo considere el control de las emisiones en forma aleatoria. **Los datos de emisiones contaminantes del aire deberán también estar acompañados de datos del caudal de emisión** (velocidad del flujo, volumen y temperatura) **y de datos meteorológicos como ser temperatura ambiente, presión, velocidad y dirección de viento, humedad ambiente, entre otros**. Deberá contar con un simulador de dispersión informatizado de contaminantes atmosféricos y realizar ensayos periódicos con los datos suministrados por el monitoreo correspondientes. **Los métodos analíticos por el cual se realizarán las mediciones se definirán en el correspondiente manual a ser desarrollado por los equipos técnicos de la DGA y PARACEL S.A.,** antes mencionado. Los responsables del Proyecto PARACEL S.A., **deberá presentar en forma anual informe sobre la cantidad de contaminantes atmosféricos emitidos que se definirá en el manual correspondiente.----------**

**Art. 6°** **El Responsable deberá instalar Estaciones de Monitoreo de Calidad de Aire con métodos de medición acreditados y certificados,** en dichos centros urbanos o comunidades por lo menos **12 meses antes de la puesta en marcha de la planta con objeto de tener la línea de base del estado del aire**, y poder evaluar la incidencia del Proyecto en ejecución sobre la calidad del aire. Los parámetros que deben cumplirse son los establecidos en la **Resolución N°259/15** "Por la cual se establecen Parámetros Permisibles de Calidad de Aire" y cumplir con la **Resolución N° 488/17** "Por la cual se establecen requisitos para considerar como oficiales los datos obtenidos en mediciones o monitoreo de calidad de aire por instituciones diferentes a la SEAM". Así como los sensores de emisiones de efluentes atmosféricos instalados en la planta, estas estaciones deberán transmitir los datos y se **deberá proveer al MADES el enlace o dirección IP a fin de tener acceso a los datos de medición. Los sensores, deberán ser colocados en los diversos puntos del proceso, para la medición de la calidad del aire, conteniendo los datos de las fuentes de las emisoras incluyen las coordenadas de las fuentes, las tasas de emisión, la temperatura de la salida de los contaminantes y la velocidad de la salida de los contaminantes, meteorológicos debe contener la presión, la dirección y la velocidad del viento, la temperatura del aire, la precipitación y la radiación solar, la energía cinética turbulenta y las razones para mezclar el vapor de agua, la lluvia y el agua. ----------**

**Art. 7°** **Todos los equipos y sensores de medición de contaminantes del aire deberán contar con su correspondiente manual de aseguramiento de calidad**, con objeto de asegurar la sensibilidad, integridad y fiabilidad de los datos que son obtenidos en la medición.----------

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**Art. 8°** **El monitoreo de calidad del aire, deberá realizarse durante la fase ejecución de proyecto en construcción y de operación de la fábrica y presentar al MADES a la DGA mensualmente.** Para la construcción deberá presentar el **monitoreo sobre las medidas tomadas para atenuar la generación del material particulado** y para la fase de operación **deberán cumplir con el informe de los Parámetros de calidad del aire MP, TRS, SOx, NOx, CO, Flujo N, Temperatura, Humedad, Contenido de oxígeno %, Flujo en condiciones reales**. Estas mediciones deberán permitir el control de la pluma de nivel con los parámetros permitidos y regulados, para que no afecte a las comunidades, aledañas y a la vez **deben medir los compuestos Orgánicos Volátiles**. Los parámetros medidos en el monitoreo de la calidad del aire son**: Partículas Totales Suspendidas (PTS); Partículas Inhalables (PM10); Partículas Respirables (PM2,5); Óxidos de Nitrógeno (NOx); Dióxido de Azufre (SO2); Compuestos Reducidos de Azufre (TRS); Sulfuro de hidrógeno (H2S); Monóxido de Carbono (CO); Ozono (O3); Dioxinas y Furanos; Mercurio**. Deberá declarar que tipo de **medidas de mitigación utiliza a la salida del Caldera/Horno; el tipo de Horno que utiliza, y si cuenta con sistemas como ser lavado de gases o filtro manga, se solicita se presente planos y corte del horno.** También deberán informar sobre el tipo de combustibles a ser utilizados, si es a leña por ejemplo u otro, **deberá presentar análisis químico porcentual del combustible a ser utilizado por cada lote a ser procesado para la caldera**. La altura y flujo del aire caliente en el proceso.-------

**Art. 9°** **Deberá contar con un monitoreo de la salida de las chimeneas en función de las emisiones que generan**, el mismo como ser MP, TRS, SOx, NOx, CO, Flujo N, Temperatura, Humedad, Contenido de oxígeno % , Flujo en condiciones reales. Estas mediciones deberán permitir una la pluma de control para que no afecte a las comunidades. **Los 15 receptores, que tendrán alrededor de la futura fábrica de celulosa deberán informar al MADES una vez que se instalen y una vez puesta en marcha la actividad**, a la vez en el momento de las compras de los equipos, deberán ser de precisión y con calibración los medidores; y deberán reportar el resultado del monitoreo del aire semanalmente y dependiendo de la circunstancia deberá tener una conexión con el MADES directa de las emisiones diarias, estos equipos medidores deben estar calibrados por empresas certificadas para la calibración y deberán informar al MADES. **Todos los equipos y sensores de medición de contaminantes del aire deberán contar con su correspondiente manual de aseguramiento de calidad, con objeto de asegurar la sensibilidad, integridad y fiabilidad de los datos que son obtenidos en la medición.**----------

**Art. 10°** **Los puntos de muestreo de las emisiones atmosféricas estarán en la chimenea de cada una de las respectivas tuberías que instalarán un sistema automático de gestión y el control de operaciones**, estará basado en el uso de la integración acoplada a microprocesadores, según el estudio, y deberán ampliar los puntos de muestreos atmosféricas para Planta de tratamiento de la pasta de celulosa, y la planta de tratamiento de efluentes, así como para el Tratamiento de los residuos sólidos provenientes de la actividad. **Deberá tener una Hoja de cálculo de la vigilancia de las emisiones atmosféricas, para todos estos puntos señalados**, y se deberán ajustar en el Programa de Monitoreo de Calidad del Aire. Deberá presentar una carta compromiso de la Empresa a realizar el monitoreo de emisiones. **Deberá presentar las medidas correctivas para atenuar de emisiones durante el proceso de producción y un Manual de Operación Mantenimiento de la planta** que contemple las tareas preventivas, predictivas y correctivas en lo que compete a emisiones gaseosas y material particulado. ----------

**Art. 11°** **El Responsable deberá mencionar la implementación de sistemas de control de verificación de la calidad y cantidad del efluente tratado, antes del vertimiento, así como la medición del caudal y calidad del cuerpo receptor. Deberá prever la construcción de un laboratorio de calidad** totalmente equipado y con expertos en análisis de agua, en el predio de la planta industrial, **para el control estricto y constante de la Planta de Tratamiento de Efluentes Industriales y la realización de mediciones de caudal del cuerpo receptor**, así como la calidad del mismo, en forma permanente, considerando la distancia en que se encontraría la industria.----------

**Art. 12°** **El proponente deberá en el marco de la Ley Nº 3556/08 "De Pesca y Acuicultura" realizar**: 1) **Monitoreo semestral de la calidad del agua hasta un radio de 2 km de la zona de descarga de efluente**; 2) Realizar un **estudio histológico en peces para descartar la acumulación de substancias potencialmente perjudiciales**. Se sugiere la especie ***Iheringichthys labrosus*** por ser una especie ubicua (Saizar,C et al. 2010). 3) Realizar un **estudio**

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**de la densidad poblacional de los peces existentes en la zona de influencia** el cual deberá estar concluido previo al inicio de la etapa de operación.----------

**Art. 13° El proponente deberá presentar plano de prevención contra incendios aprobado por la municipalidad local, en formato JPG o PDF, e informe técnico otorgado por el cuerpo de bomberos voluntarios de la ciudad. Describir el Sistema de suministro de Energía Eléctrica,** en caso de poseer transformador completar el **Anexo N° 2 de la Resolución N° 1.190/08** indicando su potencia, marca, año de fabricación, coordenadas de ubicación, fotografía de la placa, presentar resultados de análisis del aceite dieléctrico de no contener PCB; atendiendo el Convenio de Estocolmo.----------

**Art. 14° El proponente deberá presentar contrato o facturas que avalen la prestación de todos los servicios tercerizados** (recolección, trasporte, tratamiento y disposición final de los residuos sólidos comunes, peligrosos y efluentes generados), la empresa debe contar con DIA expedida por el MADES. Cualquier intervención en el cauce del río que interrumpa en la navegabilidad y áreas terrestres cerca del río deberá de tener los permisos correspondientes de las principales autoridades. Evitar durante las construcciones contaminar las aguas superficiales y subterráneas.----------

**Art. 15°El proponente deberá monitorear la calidad de las aguas superficiales y subterráneas en la fase de construcción**, dichos monitoreos deberán de ser presentados en forma anual al MADES, la frecuencia de realización de los muestreos deberá ser forma trimestral. Deberá considerar que el movimiento de maquinarias, equipos y personas en las áreas de maniobras, generarían pérdida de vegetación, y reducir al mínimo las alteraciones en los diversos ecosistemas por las actividades efectuadas. Capacitación permanente a los trabajadores sobre el cuidado del ambiente.----------

**Art. 16°El proponente deberá presentar evidencias fotográficas y/o planillas de capacitación**. Evitar el almacenamiento de material orgánico por largos periodos que permitan su descomposición, en los campamentos instalados durante la construcción. **Prohibido todo tipo de quemas a cielo abierto**. En caso de que a la fecha hayan realizado perforación de pozos o se decida perforar pozos, deberán comunicar al MADES. **Durante la construcción deberán de prever la instalación de freatimetros y/o pozos de monitoreo de agua subterránea en la zona de emplazamiento industrial, zona de acumulación de residuos y en la futura zona de la pileta de tratamiento de efluentes industriales, PTEI**. Cualquier intervención en el cauce del río que interrumpa en la navegabilidad y áreas terrestres cerca del río **deberá de tener los permisos correspondientes de las principales autoridades**. Se Solicita presentar cronograma del mismo y los permisos oficializados.----------

**Art. 17° El proponente deberá implementar sistemas de control de verificación de la calidad y cantidad del efluente tratado, conforme lo establece el Padrón de Calidad de las aguas, Resolución Nº 222/02**, antes del vertimiento, así como la **medición del caudal y calidad de agua del cuerpo receptor,** para lo cual es necesario la adquisición e **instalación de equipos multiparamétricos fijos, con capacidad de adquirir datos a tiempo real y ubicados en el punto de vertido al cauce receptor y que los datos medidos se trasmitan ON LINE a los servidores del MADES**, a fin de contar con información de primera mano sobre las variaciones en los valores de parámetros fisicoquímicos como mínimo CE: **Conductividad Eléctrica, OD: Oxígeno Disuelto, pH, Potencial Redox y Temperatura del efluente, Temperatura del Agua y nivel hidrométrico del cuerpo receptor. Así también prever el monitoreo y toma de muestras diarias para determinar en el laboratorio DQO: Demanda Química de Oxígeno, DBO: Demanda Biológica de Oxígeno, ST: Sólidos Totales, SDT: Sólidos Disueltos Totales, SST: Sólidos Suspendidos Totales, NT: Nitrógeno Total AT: Alcalinidad Total, AGV: Ácidos Grasos Volátiles,** y remitir a la DGPCRH informes trimestrales de los resultados analíticos, tanto del efluente como del cuerpo receptor en el punto de lanzamiento y agua abajo. Prever la construcción de un **laboratorio de calidad totalmente equipado y con expertos en análisis de calidad de agua, en el predio de la planta industrial, para el control estricto y constante del funcionamiento de la Planta de Tratamiento de Efluentes Industriales y la realización de mediciones de nivel de agua con sensores automáticos de nivel hidrométrico y de caudal del cuerpo receptor**, considerando la distancia en que se encontraría la industria. **Se deberán instalar pozos de monitoreo en**

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**la zona industrial, áreas de tratamiento de efluentes así como del depósito de combustible**, en los cuales se deberá monitorear y en la zona industrial y de tratamiento de residuo sólido y liquido la presencia de hidrocarburo, otros elementos contaminantes como nitratos, nitritos o metales a fin de monitorear presencia de lixiviados y comparar el grado de alteración de la calidad del agua en función a las normas paraguayas para agua potable. Para su diseño estos pozos de monitoreo deberán estar adecuadas a la Resolución 2155/05 "Por la cual se establecen las especificaciones técnicas de construcción de pozos tubulares destinados a la captación de aguas subterráneas". En relación a la actividad portuaria. **Prever la realización de trabajos de batimetría como mínimo cada cuatro años o antes, en el caso de estiaje prolongado según comportamiento del rio y previa a cualquier intervención o proyecto relacionado con la navegabilidad del rio**, a fin de identificar necesidades de dragado permitido solo para el lecho arenoso y **establecer sistema de medición automática del nivel hidrométrico y a tiempo real, con transmisión ON LINE al MADES.**----------

**Art. 18° El proponente deberá evitar durante las construcciones contaminar las aguas superficiales y subterráneas.** Monitorear la calidad de las aguas superficiales y subterráneas en la fase de construcción, dichos monitoreos deberán ser presentados en forma anual al MADES, se propone la realización de muestreos en forma trimestral. Considerar que el movimiento de maquinarias, equipos y personas en las áreas de maniobras, generarían pérdida de vegetación, se solicita la mayor precaución. **Se deberá reducir al mínimo las alteraciones en los diversos ecosistemas por las actividades efectuadas.** Capacitación permanente a los trabajadores sobre el cuidado del ambiente. Presentar evidencias fotográficas y/o planillas de capacitación. **Evitar el almacenamiento de material orgánico por largos periodos que permitan su descomposición, en los campamentos instalados durante la construcción**. Prohibido todo tipo de quemas a cielo abierto. En caso de que se decida perforar pozos, deberán comunicar al MADES. **Cualquier intervención en el cauce del río que interrumpa en la navegabilidad y áreas terrestres cerca del río deberá de tener los permisos correspondientes** de las principales autoridades. Se solicita presentar cronograma del mismo y los permisos oficializados. ----------

**Art. 19° El responsable deberá realizar levantamientos geológicos, estudio hidrológico e hidrogeológico, específicos del área destinado para la disposición final de residuos,** el mismo deberá proceder a la **determinación de coeficiente de permeabilidad del suelo, la composición del suelo** (fracción arcillosa, limosa o arenosa estimándolos en porcentajes), **la profundidad de la napa freática, movimientos y flujos, pendiente del terreno, calidad de agua subterráneas.** El profesional responsable de la elaboración de estos estudios, deberá emitir sus conclusiones y recomendaciones técnicas, al momento de la construcción de las zanjas o trincheras.----------

**Art. 20°El proponente deberá establecer un sistema de impermeabilización del suelo y asegurar la estabilidad estructural y estanqueidad hidráulica de los sitios de disposición final de residuos,** la impermeabilización de la base y de los terraplenes podrá ser con una **capa de suelo arcilloso de 50 cm de espesor** compactado a valores de **conductividad hidráulica en el rango de 10-5 – 10-7 cm/s, doble membrana de 2000 micrones de espesor de polietileno de alta densidad (PEAD)** con estructura intermedia de canalización y drenaje para detección temprana de eventuales fugas, todo protegido mecánicamente en la parte superior por una carpeta de hormigón de 5 cm de espesor.----------

**Art. 21° El proponente deberá establecer un sistema de detección de fugas,** sistema de manejo y bombeo de lixiviados, además del monitoreo del drenaje entre membranas, implementar un sistema de pozos perimetrales a cada vertedero para el muestreo y sistema de monitoreo de aguas subterráneas para el monitoreo de la calidad del agua subterránea del sitio, deberá contar con sistema de drenaje de aguas pluviales.----------

**Art. 22° El proponente deberá establecer un sistema de manejo de gases, medidores en tiempo real y reportar el monitoreo de los gases como ser metano (CH), óxidos de nitrógeno (NO2), monóxido de carbono (CO), dióxido de azufre (SO2).** Los sensores, deberán ser colocados en los diversos puntos de relleno sanitario, para la medición de la calidad del aire, las mismas deberán permitir la pluma de control para que no afecte a las comunidades.----------

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**DECLARACIÓN DGCCARN Nº 118 / 2021.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "FABRICA DE CELULOSA Y PUERTO", ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOR BLAS ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON LAS FINCAS N° 9891, 5657, PADRÓN N° 5452, UBICADA EN EL DISTRITO DE CONCEPCION, DEPARTAMENTO DE CONCEPCION."**



**Art. 23° El proponente deberá establecer un sistema de seguridad y salud ocupacional y contar con plan de control de vectores y alimañas.**----------

**Art. 24°El proponente deberá dar estricto cumplimiento a lo tipificado en el Artº 102 del Decreto reglamentario Nº 7391/2017,** Por la cual se reglamenta la Ley N° 3956/2009. Gestión Integral de Residuos Sólidos del Paraguay.-

**Art. 25° El proponente deberá presentar informe anual de emisiones y absorciones de gases de efecto invernadero** con sus medidas de mitigación, tanto en etapa de construcción como operativa, utilizando la metodología indicada por el MADES. Asimismo, deberá demostrar el origen de la materia prima (reforestación propia o adquiridos), con la debida documentación emitida por el INFONA.----------

**Art. 26°El proponente deberá cumplir con las siguientes medidas de mitigación de gases de efecto invernadero (GEI),** previendo las siguientes medidas o acciones de contingencia respecto a: 1. Asegurar la provisión de biomasa certificada del exterior (países extranjeros), en los primeros años de funcionamiento, y luego de acuerdo a la gradualidad mínima establecida para los años siguientes, h**asta llegar a la meta de adquisición del 80% de volumen procesado de madera/celulosa a partir de las propias plantaciones forestales (tope de 150.000 ha de superficie)**, 2. Gestionar **validación de los estándares y certificaciones** a obtener del Consejo de Manejo Forestal (FSC), ante los órganos nacionales de competencia conforme al Artículo 16 de la reglamentación de la Ley N° 4056/15, 3. Dar cumplimiento al **programa de Recomposición de Bosque Nativo en la ribera del río Paraguay, conforme a la Ley N° 4241/10,** a los efectos de aumentar la superficie de sumideros de GEI, 4. Cerciorar un mecanismo jurídico en el marco de la Ley N° 3009/06, para **la efectiva provisión de la energía eléctrica excedente (100 de los 200MW generados) a la ANDE y las poblaciones circundantes del Dpto. de Concepción**; considerando que si esto no se asegura, finalmente la generación de energía eléctrica se daría a partir de la quema improductiva de biomasa forestal, que libera gases de efecto invernadero y material particulado a la atmosfera, contribuyendo al calentamiento global y deterioro de la calidad del aire y 5. Contemplar **planes de contingencia para evitar fugas de SF6** a partir de disyuntores eléctricos.----------

**Art. 27°El proponente deberá proveer información de manera oportuna, para los reportes y compromisos climáticos nacionales de la República del Paraguay** (Ej: estudios técnicos de carbono-neutralidad, participación en mercados voluntarios de carbono, modificaciones en el cambio de uso o planes de gestión forestal etc.).----------

**Art. 28° El proponente deberá proveer información al MADES relacionadas a la afectación de poblaciones indígenas u otras vulnerables a los efectos adversos del Cambio Climático,** en el área de intervención.----------

**Art. 29° El Responsable** deberá designar una persona encargada de la realización de Auditoría Ambiental de Cumplimiento de Plan de Gestión Ambiental quien podrá ser un Consultor o una Empresa Consultora registrada en el CTCA, debiendo presentar a la SEAM informe de Auditoría de Cumplimiento de acuerdo a procedimientos establecidos en la Resolución SEAM N° 201/15 y su modificación la Resolución SEAM N° 221/15, **cada 1 (UNO) año, a partir de la firma de la presente Declaración.**----------

**Art. 30° La presente DIA** no autoriza la realización de obras o actividades que no se adecuen a las normas de ordenamiento urbano y territorial municipales así como tampoco exime de responsabilidad civil a los responsables de obras o actividades en caso de que las mismas causen daños a terceros.----------

**Art. 31° La presente DIA** es un requisito previo ineludible para obtención de autorizaciones de otros organismos públicos, en virtud a lo estipulado en el Art. 12° de la Ley N° 294/93 "De Evaluación de Impacto Ambiental". ----------

**Art. 32° En caso que** como consecuencia de una fiscalización se detecte: 1) la falta de DIA en los casos en que fuera obligatoria; 2) incumplimientos al plan de gestión ambiental 3) modificaciones significativas respecto del proyecto evaluado; 4) la ocurrencia de efectos no previstos; 5)la ampliación de la obra o la actividad respecto del proyecto evaluado; o, 6) haya potenciación de los efectos negativos por cualquier causa subsecuente, el Ministerio del Ambiente y Desarrollo Sostenible podrá disponer una nueva evaluación de impacto ambiental, un ajuste al Plan de Gestión Ambiental y/o la suspensión de la obra o la actividad; ello sin perjuicio del inicio de los procedimientos sancionatorios, administrativos o penales, que pudieran corresponder.----------

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**DECLARACIÓN DGCCARN Nº 118 / 2021.**

**"POR LA CUAL SE APRUEBA EL ESTUDIO DE IMPACTO AMBIENTAL CON SU CORRESPONDIENTE RELATORIO DE IMPACTO AMBIENTAL DEL PROYECTO "FABRICA DE CELULOSA Y PUERTO", ELABORADO POR EL CONSULTOR AMBIENTAL ING. NICOLAS ANTONIO GODOY RIVAROLA CON REG. CTCA Nº I-850, CUYO PROPONENTE ES LA FIRMA PARACEL S.A., Y SU REPRESENTANTE LEGAL ES EL SEÑOR BLAS ZAPAG, DESARROLLADO EN LA PROPIEDAD IDENTIFICADA CON LAS FINCAS N° 9891, 5657, PADRÓN N° 5452, UBICADA EN EL DISTRITO DE CONCEPCION, DEPARTAMENTO DE CONCEPCION."**



**Art. 33º El EIA del Proyecto y la Declaración del Impacto Ambiental** deberán estar en el lugar de ejecución del proyecto, a fin de presentar los mismos a cualquier representante de Instituciones oficiales con competencia en el tema ambiental en el momento que lo requieran.----------

**Art. 34º La presente Declaración** se encuentra redactada en la **Hoja de Seguridad N° 14851 (Catorce Mil Ochocientos Cincuenta y Uno), Hoja de Seguridad N° 14852 (Catorce Mil Ochocientos Cincuenta y Dos), Hoja de Seguridad N° 14853 (Catorce Mil Ochocientos Cincuenta y Tres), Hoja de Seguridad N° 14854 (Catorce Mil Ochocientos Cincuenta y Cuatro), Hoja de Seguridad N° 14855 (Catorce Mil Ochocientos Cincuenta y Cinco), Hoja de Seguridad N° 14856 (Catorce Mil Ochocientos Cincuenta y Seis), Hoja de Seguridad N° 14857 (Catorce Mil Ochocientos Cincuenta y Siete), Hoja de Seguridad N° 14858 (Catorce Mil Ochocientos Cincuenta y Ocho), Hoja de Seguridad N° 14859 (Catorce Mil Ochocientos Cincuenta y Nueve), Hoja de Seguridad N° 14860 (Catorce Mil Ochocientos Sesenta), Hoja de Seguridad N° 14861 (Catorce Mil Ochocientos Sesenta y Uno), Hoja de Seguridad N° 14862 (Catorce Mil Ochocientos Sesenta y Dos), Hoja de Seguridad N° 14863 (Catorce Mil Ochocientos Sesenta y Tres), Hoja de Seguridad N° 14864 (Catorce Mil Ochocientos Sesenta y Cuatro), Hoja de Seguridad N° 14865 (Catorce Mil Ochocientos Sesenta y Cinco) y Hoja de Seguridad N° 14866 (Catorce Mil Ochocientos Sesenta y Seis), debiendo permanecer en el lugar donde se desarrolla el proyecto una copia autenticada de la misma.----------**

**Art. 35º Comunicar a** quien corresponda, cumplido archivar.----------

**Abog. Diego Lezcano Galeano, Director General**
**Dirección General de Control de la Calidad Ambiental y de los Recursos Naturales**

14866
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# ANNEX II

# TECHNICAL RESPONSIBILITY RECORD

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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
**28027230200235488**

**1. Responsável Técnico**

**ROMUALDO HIRATA**

Título Profissional: **Engenheiro Industrial - Química**

RNP: **2609666578**

Registro: **0600332092-SP**

Empresa Contratada: **POYRY TECNOLOGIA LTDA**

Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA**

CPF/CNPJ:

Endereço: **Rua FACUNDO MACHAIN**

N°: **6426**

Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN**

Bairro:

Cidade:

UF:

CEP:

Contrato: **TAP PROP. X379494**

Celebrado em: **30/08/2019**

Vinculada à Art n°:

Valor: R$ **2.263.800,00**

Tipo de Contratante: **Pessoa Jurídica Estrangeira**

Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**

N°: **100**

Complemento: **BLOCO B - 5º ANDAR**

Bairro: **VILA CRUZEIRO**

Cidade: **São Paulo**

UF: **SP**

CEP: **04726-170**

Data de Início: **30/08/2019**

Previsão de Término: **15/08/2020**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assistência 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ **de** _____ **de** _____

**Local** **data**

**ROMUALDO HIRATA - CPF: 451.014.698-15**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

**- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo *Nosso Número*.**

**- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br**

**- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.**

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Valor ART R$ **226,50** Registrada em: **27/02/2020** Valor Pago R$ **226,50** Nosso Numero: **28027230200235488** Versão do sistema

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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
28027230200402394

**Equipe-vinculada à 28027230200235488**

**1. Responsável Técnico**

**CELSO TOMIO TSUTSUMI**

Título Profissional: **Engenheiro de Produção - Química**

RNP: **2602080349**

Registro: **5060443241-SP**

Empresa Contratada: **POYRY TECNOLOGIA LTDA**

Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA** CPF/CNPJ:

Endereço: **Rua FACUNDO MACHAIN** N°: **6426**

Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN** Bairro:

Cidade: UF: CEP:

Contrato: **TAP PROP. X379494** Celebrado em: **30/08/2019** Vinculada à Art n°:

Valor: R$ **2.263.800,00** Tipo de Contratante: **Pessoa Jurídica Estrangeira**

Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA** N°: **100**

Complemento: **BLOCO B - 5º ANDAR** Bairro: **VILA CRUZEIRO**

Cidade: **São Paulo** UF: **SP** CEP: **04726-170**

Data de Início: **30/08/2019**

Previsão de Término: **15/08/2020**

Coordenadas Geográficas:

Finalidade: **Ambiental** Código:

CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assistência 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ ____ de _____ de _____
Local data

**CELSO TOMIO TSUTSUMI - CPF: 144.253.188-62**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

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**- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br**

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Valor ART R$ **88,78** Registrada em: **02/04/2020** Valor Pago R$ **88,78** Nosso Numero: **28027230200402394** Versão do sistema

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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
**28027230200402606**

**Equipe-vinculada à 28027230200235488**

**1. Responsável Técnico**

**CRISTINA MARIA COLELLA**
Título Profissional: **Engenheira Química**
RNP: **2604914697**
Registro: **5061787977-SP**
Empresa Contratada: **POYRY TECNOLOGIA LTDA**
Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA** CPF/CNPJ:
Endereço: **Rua FACUNDO MACHAIN** N°: **6426**
Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN** Bairro:
Cidade: UF: CEP:
Contrato: **TAP PROP. X379494** Celebrado em: **30/08/2019** Vinculada à Art n°:
Valor: R$ **2.263.800,00** Tipo de Contratante: **Pessoa Jurídica Estrangeira**
Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA** N°: **100**
Complemento: **BLOCO B - 5º ANDAR** Bairro: **VILA CRUZEIRO**
Cidade: **São Paulo** UF: **SP** CEP: **04726-170**
Data de Início: **30/08/2019**
Previsão de Término: **15/08/2020**
Coordenadas Geográficas:
Finalidade: **Ambiental** Código:
CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assessoria 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ ____ **de** _____ **de** _____
**Local** **data**

**CRISTINA MARIA COLELLA - CPF: 222.265.668-05**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

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**- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.**

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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
28027230200402891

**Equipe-vinculada à 28027230200235488**

**1. Responsável Técnico**

**KAREN HARUMY FREITAS**
Título Profissional: **Engenheira Química**
RNP: **2609603428**
Registro: **5063578289-SP**
Empresa Contratada: **POYRY TECNOLOGIA LTDA**
Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA** CPF/CNPJ:
Endereço: **Rua FACUNDO MACHAIN** N°: **6426**
Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN** Bairro:
Cidade: UF: CEP:
Contrato: **TAP PROP. X379494** Celebrado em: **30/08/2019** Vinculada à Art n°:
Valor: R$ **2.263.800,00** Tipo de Contratante: **Pessoa Jurídica Estrangeira**
Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA** N°: **100**
Complemento: **BLOCO B - 5º ANDAR** Bairro: **VILA CRUZEIRO**
Cidade: **São Paulo** UF: **SP** CEP: **04726-170**
Data de Início: **30/08/2019**
Previsão de Término: **15/08/2020**
Coordenadas Geográficas:
Finalidade: **Ambiental** Código:
CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assistência 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ ____ **de** _____ **de** _____
**Local** **data**

**KAREN HARUMY FREITAS - CPF: 369.902.978-67**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

**- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo *Nosso Número*.**

**- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br**

**- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.**

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Valor ART R$ **88,78** Registrada em: **02/04/2020** Valor Pago R$ **88,78** Nosso Numero: **28027230200402891** Versão do sistema
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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
28027230200403005

**Equipe-vinculada à 28027230200235488**

**1. Responsável Técnico**

**RAFAEL LOURENCO THOMAZ FAVERY**
Título Profissional: **Engenheiro Ambiental, Engenheiro de Segurança do Trabalho**
RNP: **2605484297**
Registro: **5062655712-SP**
Empresa Contratada: **POYRY TECNOLOGIA LTDA**
Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA** CPF/CNPJ:
Endereço: **Rua FACUNDO MACHAIN** N°: **6426**
Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN** Bairro:
Cidade: UF: CEP:
Contrato: **TAP PROP. X379494** Celebrado em: **30/08/2019** Vinculada à Art n°:
Valor: R$ **2.263.800,00** Tipo de Contratante: **Pessoa Jurídica Estrangeira**
Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA** N°: **100**
Complemento: **BLOCO B - 5º ANDAR** Bairro: **VILA CRUZEIRO**
Cidade: **São Paulo** UF: **SP** CEP: **04726-170**
Data de Início: **30/08/2019**
Previsão de Término: **15/08/2020**
Coordenadas Geográficas:
Finalidade: **Ambiental** Código:
CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assistência 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ ____ **de** _____ **de** _____
**Local** **data**

**RAFAEL LOURENCO THOMAZ FAVERY - CPF: 307.270.208-03**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

**- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo *Nosso Número*.**

**- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br**

**- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.**

www.creasp.org.br
Tel: 0800 17 18 11
E-mail: acessar link Fale Conosco do site acima

CREA-SP

Valor ART R$ **88,78** Registrada em: **02/04/2020** Valor Pago R$ **88,78** Nosso Numero: **28027230200403005** Versão do sistema
**Impresso em: 08/04/2020 15:59:29**

confidential

confidential



**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Estado de São Paulo**

CREA-SP

**ART de Obra ou Serviço**
28027230200402757

**Equipe-vinculada à 28027230200235488**

**1. Responsável Técnico**

**DOMINGOS FERNANDES PIMENTA NETO**
Título Profissional: **Geólogo**
RNP: **2108756477**
Registro: **5063844549-SP**
Empresa Contratada: **POYRY TECNOLOGIA LTDA**
Registro: **1203388-SP**

**2. Dados do Contrato**

Contratante: **PARACEL SA** CPF/CNPJ:
Endereço: **Rua FACUNDO MACHAIN** N°: **6426**
Complemento: **ESQ. CAPITAN RAMON GARCIA, ASUNCIÓN** Bairro:
Cidade: UF: CEP:
Contrato: **TAP PROP. X379494** Celebrado em: **30/08/2019** Vinculada à Art n°:
Valor: R$ **2.263.800,00** Tipo de Contratante: **Pessoa Jurídica Estrangeira**
Ação Institucional:

**3. Dados da Obra Serviço**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA** N°: **100**
Complemento: **BLOCO B - 5º ANDAR** Bairro: **VILA CRUZEIRO**
Cidade: **São Paulo** UF: **SP** CEP: **04726-170**
Data de Início: **30/08/2019**
Previsão de Término: **15/08/2020**
Coordenadas Geográficas:
Finalidade: **Ambiental** Código:
CPF/CNPJ:

**4. Atividade Técnica**

| | | | Quantidade | Unidade |
|---|---|---|---|---|
| **Assistência 1** | **Estudo** | **Estudo Ambiental** | **1,00000** | **unidade** |

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

**5. Observações**

**PROJ. 109001759-003 - SERVIÇOS APOIO NA OBTENÇÃO DE LICENÇA AMBIENTAL PARA A INSTALAÇÃO DE PLANTA DE CELULOSE DA PARACEL NO PARAGUAI.**

**6. Declarações**

**Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.**

**7. Entidade de Classe**

**0-NÃO DESTINADA**

**8. Assinaturas**

**Declaro serem verdadeiras as informações acima**

_____ ____ **de** _____ **de** _____
**Local** **data**

**DOMINGOS FERNANDES PIMENTA NETO - CPF: 009.941.254-37**

**PARACEL SA - CPF/CNPJ:**

**9. Informações**

**- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo *Nosso Número*.**

**- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br**

**- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.**

www.creasp.org.br
Tel: 0800 17 18 11
E-mail: acessar link Fale Conosco do site acima

CREA-SP

Valor ART R$ **88,78** Registrada em: **02/04/2020** Valor Pago R$ **88,78** Nosso Numero: **28027230200402757** Versão do sistema
**Impresso em: 08/04/2020 15:57:24**

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**Anotação de Responsabilidade Técnica - ART**
**Lei nº 6.496, de 7 de dezembro de 1977**
**Conselho Regional de Engenharia e Agronomia do Rio Grande do Sul**

CREA-RS

**ART Número**
**10770972**

**Tipo:** PRESTAÇÃO DE SERVIÇO **Participação Técnica:** INDIVIDUAL/PRINCIPAL
**Convênio:** NÃO É CONVÊNIO **Motivo:** NORMAL

**Contratado**

**Carteira:** RS122364 **Profissional:** JONAS DA COSTA CARVALHO **E-mail:** jonascc@yahoo.com.br
**RNP:** 2201386064 **Título:** Meteorologista
**Empresa:** NENHUMA EMPRESA **Nr.Reg.:**

**Contratante**

**Nome:** PÖYRY TECNOLOGIA LTDA **E-mail:**
**Endereço:** AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA 100 BLOCO B 5O ANDAR **Telefone:** 11 3472-6904 **CPF/CNPJ:** 50648468000165
**Cidade:** SÃO PAULO **Bairro.:** VILA CRUZEIRO **CEP:** 4726170 **UF:** SP

**Identificação da Obra/Serviço**

**Proprietário:** JONAS DA COSTA CARVALHO
**Endereço da Obra/Serviço:** AVENIDA JUCA BATISTA 9000 1189 **CPF/CNPJ:** 57246688072
**Cidade:** PORTO ALEGRE **Bairro:** BELÉM NOVO **CEP:** **UF:** RS
**Finalidade:** AMBIENTAL **Vlr Contrato(R$):** 39.450,00 **Honorários(R$):**
**Data Início:** 04/09/2019 **Prev.Fim:** 31/12/2020 **Ent.Classe:**

| Atividade Técnica | Descrição da Obra/Serviço | Quantidade | Unid. |
|---|---|---|---|
| Consultoria | ESTUDO METEOR E CLIMATOL PARA FABRICA DA PARACEL NO PARAGUAI | | |
| Consultoria | ESTUDO DISPERSÃO ATMOS. PARA FABRICA DA PARACEL NO PARAGUAI | | |

**ART registrada (paga) no CREA-RS em 29/05/2020**

| Local e Data | Declaro serem verdadeiras as informações acima | De acordo |
|---|---|---|
| PORTO ALEGRE 29/05/20 | JONAS DA COSTA CARVALHO | PÖYRY TECNOLOGIA LTDA |
| | Profissional | Contratante |

**A AUTENTICIDADE DESTA ART PODERÁ SER CONFIRMADA NO SITE DO CREA-RS, LINK CIDADÃO - ART CONSULTA**

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**Serviço Público Federal**

**CONSELHO FEDERAL/CRBIO - CONSELHO REGIONAL DE BIOLOGIA**

# ANOTAÇÃO DE RESPONSABILIDADE TÉCNICA - ART

1-ART Nº: **2019/07923**

## CONTRATADO

| | | | |
|---|---|---|---|
| 2.Nome: EDUARDO MARTINS | | 3.Registro no CRBio: 026063/01-D | |
| 4.CPF: 054.413.458-37 | 5.E-mail: ecosconsultoria@uol.com.br | | 6.Tel: (11)9903-2123 |
| 7.End.: MAZZEI 51 | | 8.Compl.: SALA 02 | |
| 9.Bairro: VILA MAZZEI | 10.Cidade: SÃO PAULO | 11.UF: SP | 12.CEP: 02310-001 |

## CONTRATANTE

| | | |
|---|---|---|
| 13.Nome: POYRY TECNOLOGIA LTDA | | |
| 14.Registro Profissional: | 15.CPF / CGC / CNPJ: 50.648.468/0001-65 | |
| 16.End.: AVENIDA ALFREDO EGIDIO DE SOUZA ARANHA 100 | | |
| 17.Compl.: | 18.Bairro: VILA CRUZEIRO | 19.Cidade: SAO PAULO |
| 20.UF: SP / 21.CEP: 04726-170 | 22.E-mail/Site: romualdo.hirata@poyry.com | |

## DADOS DA ATIVIDADE PROFISSIONAL

23.Natureza : 1. Prestação de serviço
Atividade(s) Realizada(s) : Execução de estudos, projetos de pesquisa e/ou serviços; Realização de consultorias/assessorias técnicas; Coordenação/orientação de estudos/projetos de pesquisa e/ou outros;

24.Identificação : COORDENADOR DOS DIAGNÓSTICOS DE FLORA E FAUNA SILVESTRE TERRESTRE E AQUÁTICA PARA ESTUDO DE IMPACTO AMBIENTAL - BACIA DO RIO PARAGUAI NA CIDADE DE CONCEPCÍON - PARAGUAI

| | |
|---|---|
| 25.Município de Realização do Trabalho: PONTA PORA | 26.UF: MS |
| 27.Forma de participação: EQUIPE | 28.Perfil da equipe: BIÓLOGOS |
| 29.Área do Conhecimento: Botânica; Ecologia; Zoologia; | 30.Campo de Atuação: Meio Ambiente |

31.Descrição sumária : COORDENAÇÃO TÉCNICA, CARACTERIZAÇÃO DA FLORA E FAUNA SILVESTRE NA ÁREA DE INFLUENCIA DO EMPREENDIMENTO, COM ESTUDOS DO MEIO BIÓTICO PARA EIA/RIMA, PLANO DE TRABALHO PARA MANEJO DE FAUNA SILVESTRE IN SITU, CARACTERIZAÇÃO DO IMPACTO E MEDIDAS DE MITIGAÇÃO, ELABORAÇÃO DE PROGRAMAS AMBIENTAIS DE FLORA E FAUNA.

| | | | |
|---|---|---|---|
| 32.Valor: R$ 0,00 | 33.Total de horas: 800 | 34.Início: OUT/2019 | 35.Término: OUT/2020 |

## 36. ASSINATURAS

**Declaro serem verdadeiras as informações acima**

| | |
|---|---|
| Data: | Data: |
| Assinatura do Profissional | Assinatura e Carimbo do Contratante |

## 37. LOGO DO CRBio

CRBio-01

## 38. SOLICITAÇÃO DE BAIXA POR CONCLUSÃO

Declaramos a conclusão do trabalho anotado na presente ART, razão pela qual solicitamos a devida BAIXA junto aos arquivos desse CRBio.

| | | |
|---|---|---|
| Data: / / | Assinatura do Profissional | |
| Data: / / | Assinatura e Carimbo do Contratante | |

## 39. SOLICITAÇÃO DE BAIXA POR DISTRATO

| | |
|---|---|
| Data: / / | Assinatura do Profissional |
| Data: / / | Assinatura e Carimbo do Contratante |

**CERTIFICAÇÃO DIGITAL DE DOCUMENTOS**

**NÚMERO DE CONTROLE: 2802.4057.4998.5939**

OBS: A autenticidade deste documento deverá ser verificada no endereço eletrônico www.crbio01.org.br



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## Recibo do Pagador

Nome do Pagador/CPF/CNPJ:

EDUARDO MARTINS Registro : 026063 CPF : 054.413.458-37
AV MAZZEI 51 SALA 02 VILA MAZZEI
02310-001 SÃO PAULO SP

BANCO DO BRASIL | 001-9 | 00190.00009 02803.894803 00041.607177 1 80520000004823

| | | | | | | |
|---|---|---|---|---|---|---|
| Local de Pagamento: PAGAVEL EM QUALQUER AGENCIA BANCARIA | | | | | | Vencimento: 24.10.2019 |
| Nome do Beneficiário/CNPJ/CPF: CONSELHO REGIONAL DE BIOLOGIA DA 1ª REGIAO - CNPJ: 02.366.047/0001-07<br>RUA MANOEL DA NÓBREGA,595 CONJUNTO 122 - PARAÍSO - 04001-083 - SAO PAULO - SP | | | | | | Agência/Código do Beneficiário: 1897-X / 85.111-6 |
| Data do Documento: 09.10.2019 | Número do Documento: 026063 | | Espécie Doc: DS | Aceite: N | Data do Processamento: 09.10.2019 | Nosso Número: 28038948000041607 |
| Uso do Banco | Carteira: 17/086 | Espécie Moeda: R$ | Quantidade | | Valor | (=) Valor do Documento: R$ 48,23 |

Instruções ( Texto de responsabilidade do beneficiário )

190066 TAXA ART- Eletrônica 48,23

O PAGAMENTO DESTE NÃO QUITA DÉBITOS ANTERIORES.

BANCO: NAO RECEBER APOS O VENCIMENTO

(-) Desconto/Abatimento
(-) Outras Deduções
(+) Mora/Multa
(+) Outros Acrécimos
(=) Valor Cobrado

Autenticação Mecânica

BANCO DO BRASIL | 001-9 | 00190.00009 02803.894803 00041.607177 1 80520000004823

| | | | | | | |
|---|---|---|---|---|---|---|
| Local de Pagamento: PAGAVEL EM QUALQUER AGENCIA BANCARIA | | | | | | Vencimento: 24.10.2019 |
| Nome do Beneficiário/CNPJ/CPF: CONSELHO REGIONAL DE BIOLOGIA DA 1ª REGIAO - CNPJ: 02.366.047/0001-07<br>RUA MANOEL DA NÓBREGA,595 CONJUNTO 122 - PARAÍSO - 04001-083 - SAO PAULO - SP | | | | | | Agência/Código do Beneficiário: 1897-X / 85.111-6 |
| Data do Documento: 09.10.2019 | Número do Documento: 026063 | | Espécie Doc: DS | Aceite: N | Data do Processamento: 09.10.2019 | Nosso Número: 28038948000041607 |
| Uso do Banco | Carteira: 17/086 | Espécie Moeda: R$ | Quantidade | | Valor | (=) Valor do Documento: R$ 48,23 |

Instruções - Texto de responsabilidade do beneficiário

190066 TAXA ART- Eletrônica 48,23

O PAGAMENTO DESTE NÃO QUITA DÉBITOS ANTERIORES.

BANCO: NAO RECEBER APOS O VENCIMENTO

(-) Desconto/Abatimento
(-) Outras Deduções
(+) Mora/Multa
(+) Outros Acrécimos
(=) Valor Cobrado

Nome do Pagador/CPF/CNPJ: ART Nº 2019/07923
EDUARDO MARTINS Registro : 026063 CPF : 054.413.458-37
AV MAZZEI 51 SALA 02 VILA MAZZEI
02310-001 SÃO PAULO SP

Autenticação Mecânica

Ficha de Compensação


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## Comprovante de pagamento

**Banco Itaú - Comprovante de Pagamento**
**Títulos Outros Bancos**

Identificação no extrato: **art poyry paraguai**

**Dados da conta debitada:**

Nome: **CARLA FERREIRA MARTINS**
Agência: **4099** Conta: **00902-1**

**Dados do pagamento:**

Código de barras: **00190.00009 02803.894803 00041.607177 1 80520000004823**
Instituição Emissora: **001 - BANCO DO BRASIL SA**

Dados do Beneficiário
Nome: **CONSELHO REGIONAL DE BIOLOGIA . 1. REGIA**
Razão Social: **CONSELHO REGIONAL DE BIOLOGIA . 1. REGIAO . SP.MT.**
CPF/CNPJ: **02.366.047/0001-07**

Dados do Pagador
Nome: **EDUARDO MARTINS**
CPF/CNPJ: **054.413.458-37**

Dados do Pagador efetivo
Nome: **CARLA FERREIRA MARTINS**
CPF/CNPJ: **185.059.628-00**

Data de vencimento: **24/10/2019**
Data do pagamento: **09/10/2019**

Valor do documento: **R$ 48,23**
Desconto: **R$ 0,00**
Juros/Mora: **R$ 0,00**
Multa: **R$ 0,00**
Total de encargos: **R$ 0,00**

Valor a pagar: **R$ 48,23**

Identificação no comprovante: **art poyry paraguai**
Pagamento feito em espécie: **Não**

**Pagamento efetuado em 09/10/2019 às 10:54:59h via Internet, CTRL 08570.**

**Autenticação:**
ABF037C2B63677243FAE7266898F8291FBB4C079

Consultas, informações e serviços transacionais, acesse itaupersonnalite.com.br ou ligue 3003 7377 (capitais e regiões metropolitanas) ou 0800 724 7377 (demais localidades), todos os dias, 24 horas por dia ou fale com seu gerente. Reclamações, cancelamentos e informações gerais, ligue para o SAC: 0800 722 7377, todos os dias, 24 horas por dia. Se não ficar satisfeito com a solução apresentada, de posse do protocolo, contate a Ouvidoria: 0800 570 0011, em dias úteis, das 9h às 18h. Deficiente auditivo/fala: 0800 722 1722, todos os dias, 24 horas por dia. Ou entre em contato agora mesmo através do Fale conosco, no site do Itaú.

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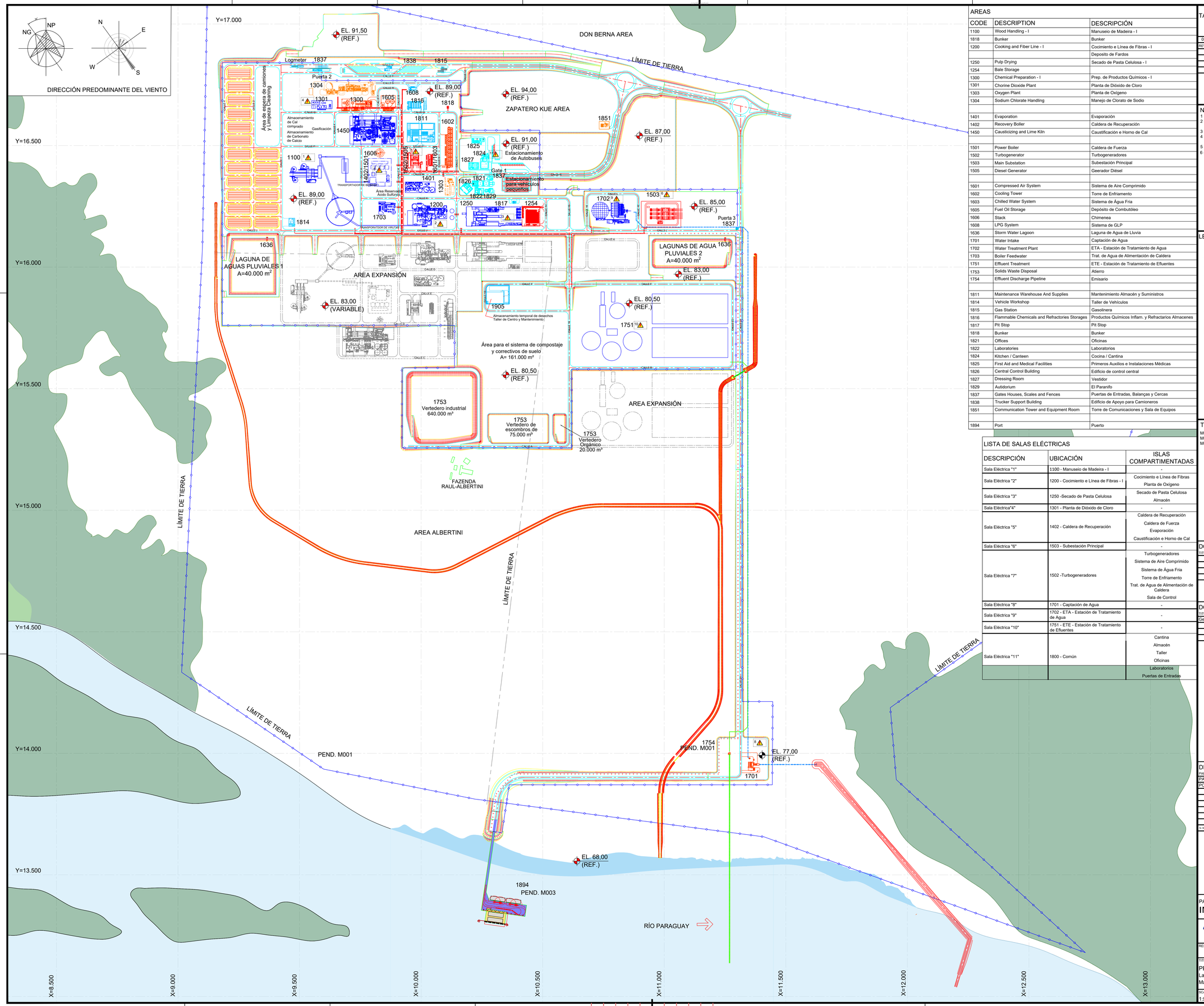
# ANNEX III

# PULP MILL – GENERAL LAY OUT




## AREAS

| CODE | DESCRIPTION | DESCRIPCIÓN |
|---|---|---|
| 1100 | Wood Handling - I | Manuseio de Madeira - I |
| 1818 | Bunker | Bunker |
| 1200 | Cooking and Fiber Line - I | Cocimiento e Línea de Fibras - I |
| | | Deposito de Fardos |
| 1250 | Pulp Drying | Secado de Pasta Celulosa - I |
| 1254 | Bale Storage | |
| 1300 | Chemical Preparation - I | Prep. de Productos Químicos - I |
| 1301 | Chorine Dioxide Plant | Planta de Dióxido de Cloro |
| 1303 | Oxygen Plant | Planta de Oxígeno |
| 1304 | Sodium Chlorate Handling | Manejo de Clorato de Sodio |
| | | |
| 1401 | Evaporation | Evaporación |
| 1402 | Recovery Boiler | Caldera de Recuperación |
| 1450 | Causticizing and Lime Kiln | Caustificación e Horno de Cal |
| | | |
| 1501 | Power Boiler | Caldera de Fuerza |
| 1502 | Turbogenerator | Turbogeneradores |
| 1503 | Main Substation | Subestación Principal |
| 1505 | Diesel Generator | Geerador Diésel |
| | | |
| 1601 | Compressed Air System | Sistema de Aire Comprimido |
| 1602 | Cooling Tower | Torre de Enfriamento |
| 1603 | Chilled Water System | Sistema de Água Fria |
| 1605 | Fuel Oil Storage | Depósito de Combutóleo |
| 1606 | Stack | Chimenea |
| 1608 | LPG System | Sistema de GLP |
| 1636 | Storm Water Lagoon | Laguna de Agua de Lluvia |
| 1701 | Water Intake | Captación de Agua |
| 1702 | Water Treatment Plant | ETA - Estación de Tratamiento de Agua |
| 1703 | Boiler Feedwater | Trat. de Agua de Alimentación de Caldera |
| 1751 | Effluent Treatment | ETE - Estación de Tratamiento de Efluentes |
| 1753 | Solids Waste Disposal | Atierro |
| 1754 | Effluent Discharge Pipeline | Emisario |
| | | |
| 1811 | Maintenance Warehouse And Supplies | Mantenimiento Almacén y Suministros |
| 1814 | Vehicle Workshop | Taller de Vehículos |
| 1815 | Gas Station | Gasolinera |
| 1816 | Flammable Chemicals and Refractories Storages | Productos Químicos Inflam. y Refractarios Almacenes |
| 1817 | Pit Stop | Pit Stop |
| 1818 | Bunker | Bunker |
| 1821 | Offices | Oficinas |
| 1822 | Laboratories | Laboratorios |
| 1824 | Kitchen / Canteen | Cocina / Cantina |
| 1825 | First Aid and Medical Facilities | Primeros Auxilios e Instalaciones Médicas |
| 1826 | Central Control Building | Edificio de control central |
| 1827 | Dressing Room | Vestidor |
| 1829 | Autidorium | El Paranifo |
| 1837 | Gates Houses, Scales and Fences | Puertas de Entradas, Balanças y Cercas |
| 1838 | Trucker Support Building | Edificio de Apoyo para Camioneros |
| 1851 | Communication Tower and Equipment Room | Torre de Comunicaciones y Sala de Equipos |
| | | |
| 1894 | Port | Puerto |

## LISTA DE SALAS ELÉCTRICAS

| DESCRIPCIÓN | UBICACIÓN | ISLAS COMPARTIMENTADAS |
|---|---|---|
| Sala Eléctrica "1" | 1100 - Manuseio de Madeira - I | - |
| Sala Eléctrica "2" | 1200 - Cocimiento e Línea de Fibras - I | Cocimiento e Línea de Fibras<br>Planta de Oxígeno |
| Sala Eléctrica "3" | 1250 -Secado de Pasta Celulosa | Secado de Pasta Celulosa<br>Almacén |
| Sala Eléctrica"4" | 1301 - Planta de Dióxido de Cloro | - |
| Sala Eléctrica "5" | 1402 - Caldera de Recuperación | Caldera de Recuperación<br>Caldera de Fuerza<br>Evaporación<br>Caustificación e Horno de Cal |
| Sala Eléctrica "6" | 1503 - Subestación Principal | - |
| Sala Eléctrica "7" | 1502 -Turbogeneradores | Turbogeneradores<br>Sistema de Aire Comprimido<br>Sistema de Água Fria<br>Torre de Enfriamento<br>Trat. de Agua de Alimentación de Caldera<br>Sala de Control |
| Sala Eléctrica "8" | 1701 - Captación de Agua | - |
| Sala Eléctrica "9" | 1702 - ETA - Estación de Tratamiento de Agua | - |
| Sala Eléctrica "10" | 1751 - ETE - Estación de Tratamiento de Efluentes | - |
| Sala Eléctrica "11" | 1800 - Común | Cantina<br>Almacén<br>Taller<br>Oficinas<br>Laboratorios<br>Puertas de Entradas |

## TABLA DE REVISIONES

CÓDIGO:
PR -PRELIMINAR
PA -PARA APROBACIÓN
PI -PARA INFORMACIÓN
PC -PARA COTIZACIÓN
CO -PARA COMENTARIOS
LE -LIBERADOS PARA CONSTRUCCIÓN
LD -LIBERADOS PARA DETALLAR
CC -COMO CONSTRUIDO
CA -CANCELADO

| REV. | FECHA | PROY. | VERIF. | APROB. | AUTOR. | CÓDIGO | DESCRIPCIÓN |
|---|---|---|---|---|---|---|---|
| 0 | 09/04/21 | ikz | awg | dhy | gkf | PI | PARA INFORMACIÓN |

## NOTAS:

1 - TODAS LAS COORDENADAS EN METROS (m).
2 - EL SISTEMA DE COORDINACIÓN UTILIZADO ES WGS 84, OBTENIDO DEL SOFTWARE GOOGLE EARTH.
3 - ESTUDIO PRELIMINAR DE DISEÑO, ORGANIZACIÓN DEL PROCESO ISLA EN CURSO.
4 - ELEVACIONES INDICADAS PARA REFERENCIA ÚNICAMENTE, CONFIRMACIÓN DE ENCUESTA Y ESTUDIO DE LA TIERRA EN MOVIMIENTO POR IMPLEMENTACIÓN.
5 - ACCESO TEMPORAL PARA RECIBIR TORMS EN BARCAZA PARA PESAJE EN PUERTA 2.
6 - LOS LÍMITES DEL PREDIO SE DEFINIERON USANDO GOOGLE EARTH. SERÁ PRECISO CONFIRMAR LOS LÍMITES POR RELEVAMIENTO TOPOGRÁFICO.

## LEYENDA:

- CALLES
- CERCA TEMPORAL
- LÍMITES DE TERRENO Y CERCA DEFINITIVA
- TOMA DE AGUA
- TOMA DE AGUA (SUBTERRÁNEO)
- DESCARGA DE EFLUENTES
- EDIFICIO SIN PROCESO
- AREA DE EXPANSIÓN
- BOP
- SOBRE LA CERCA
- PIPE RACK (BOP)
- PIPE WAY (BOP)
- SALA ELÉCTRICA

## TEMA PENDIENTE:

M001 - ENVÍO DEL EMISARIO.
M002 - REENVÍO DEL CANAL PERIMETRAL.
M003 - POSICIÓN DEL PUERTO DE MAR.

## DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|
| | | |

## DOCUMENTOS DE REFERENCIA

| TÍTULO | NÚMERO |
|---|---|
| General Mill Site Layout - Master Plan - General Layout | 109001759-001-1000-M05-0001 |

## DISTRIBUCIÓN

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PROYECTO PARACEL
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# ANNEX IV

# WOOD PURCHASING CONTRACT

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# CONTRATO DE COMPRAVENTA DE MADERA CON DESTINO CONVENIDO EN PUERTO

Este CONTRATO DE COMPRAVENTA DE MADERA CON DESTINO CONVENIDO EN PUERTO, es celebrado en [fecha], (el **"Contrato"**), entre, por una parte, PARACEL S.A., una sociedad debidamente constituida y válidamente existente conforme a las leyes de la República de Paraguay con RUC Nro. [*] (el **"COMPRADOR"** o **"Paracel"**), representada en este acto por [*] en su carácter de [*], y por la otra parte, [nombre de la empresa proveedora de madera], una sociedad debidamente constituida y válidamente existente conforme a las leyes de [país] RUC Nro. [*] (el **"VENDEDOR"**), representada en este acto por [*] en su carácter de [*], y el Sr. [*] en calidad de garante solidario (el "**Garante"**).

En adelante, el Comprador y Vendedor en lo sucesivo serán referidos cada uno individualmente como una "**Parte**" y en su conjunto como las "**Partes**".

## CONSIDERANDOS

A. Paracel, una sociedad constituida y válidamente existente conforme con las leyes de Paraguay, pretende construir y operar, en la región de Concepción, Paraguay, una fábrica de celulosa "*greenfield*" de última generación, con una capacidad de producción anual esperada de, por lo menos, 1,5 millones de toneladas métricas de celulosa kraft de eucalipto blanqueada (BEKP) (la "**Planta**").

B. Paracel, como tomadora y/o emisora, y determinados prestamistas, celebrarán uno o más contratos, con el objetivo de financiar la construcción de la Planta (el "**Financiamiento**").

C. El VENDEDOR es una empresa dedicada, entre otras actividades, a la producción y comercialización de troncos de árboles de eucalipto y es propietario del/de los Inmueble/s listados en el Anexo B, y en el presente instrumento manifiesta su cumplimiento de toda la normativa y obligaciones ambientales aplicables, incluido el origen y la gestión forestal de la Madera.

D. Las Partes desean celebrar este Contrato para la venta de Madera por parte del VENDEDOR al COMPRADOR.

E. Las Partes llegaron a un acuerdo sobre las condiciones de compraventa de Madera.

Como resultado de estas consideraciones, el COMPRADOR y el VENDEDOR pactan lo siguiente:

## CLÁUSULAS

### 1. DEFINICIONES; INTERPRETACIÓN



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## 1.1 Definiciones

Los siguientes términos en mayúsculas tendrán los significados que se les atribuyen en cada caso.

"**Año de Suministro**" tiene el significado atribuido en la Cláusula 4.1.

"**Contrato**" tiene el significado atribuido en la introducción del presente Contrato.

"**Costo de Sustitución de Contrato"** significa la suma de (a) los costos totales en los que haya incurrido (o vaya a incurrir) el COMPRADOR en relación con la preparación, la revisión, la negociación, la ejecución, la traducción, el registro y la notarización de cualquier contrato de compraventa de madera entregada en sustitución, *más* (b) el Diferencial del Precio de Madera.

"**Cantidad Mínima de Suministro Mensual**" tiene el significado que se le atribuye en la Cláusula 4.3.

"**Cantidad de Suministro Mensual Nominal**" tiene el significado que se le atribuye en la Cláusula 4.2.

**"Certificación FSC"** tiene el significado que se le atribuye en la Cláusula 3.5.

"**Cierre Financiero**" significa el cumplimiento por parte de Paracel de todas las condiciones requeridas por los financistas en el marco de la Financiamiento de la deuda para que se produzca la financiación inicial.

"**Confirmación de Orden de Compra**" tiene el significado que se le atribuye en la Cláusula 6.2.

**"Costo de Sustitución de Madera"** significa la suma del costo incurrido por el COMPRADOR resultante de la adquisición de cantidades iguales al Déficit de Madera o Madera No Conforme, según corresponda, de terceros, *más* el costo agregado de cualquier Madera adicional adquirida por el COMPRADOR de terceros, como resultado de una entrega de Madera no conforme con su correspondiente Confirmación de Orden de Compra.

**"Costo Logístico Adicional"** significa el costo adicional al incurrido en los costos asociados a la gestión de mercancías dentro de la cadena logística de la Madera, iniciando desde el embarque del Vendedor en origen hasta la entrega del producto al Comparador en Puerto de Villeta.

**"Cronograma de Entregas"** tiene el significado que se le atribuye en la Cláusula 4.6.

"**Daños Directos**" significa cualquier Pérdida incurrida por una Parte como resultado directo de un incumplimiento, pero excluyendo cualquier Pérdida indirecta , por una Parte, tales como lucro cesante, pérdida de contratos, compensación de daños bajo cualquier acuerdo que no sea este Contrato, pérdida de buena voluntad o cualquier otra Pérdida o daño indirecto.



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**"DAP"** significa *Delivered at Place* o Entregada en Lugar, conforme a la definición relevante de los Incoterms 2020.

**"Déficit de Madera"** significa, en cualquier fecha de determinación, el resultado (si fuera positivo) de restar (a) la Cantidad Mínima de Suministro Mensual del Mes de Suministro en el que cae dicha fecha de determinación *menos* (b) el volumen agregado de las Confirmaciones de Orden de Compra que corresponden a dicho Mes de Suministro.

**"Diferencial del Precio de Madera"** significa el resultado de multiplicar: (a) el resultado (si fuese positivo) de restar (i) el precio por metro cúbico acordado con un nuevo vendedor de madera, *menos* (ii) el Precio por Metro Cúbico (ajustado conforme a la Cláusula ● (●)), *por* (b) la cantidad de Déficit de Madera.

**"Disposiciones Ambientales"** significan (i) las disposiciones ambientales y sociales que sean aplicables al VENDEDOR de conformidad con la Ley Aplicable y que tengan relación con la plantación, cosecha, transporte y compraventa de madera, y demás actividades previstas bajo el presente Contrato; (ii) las disposiciones ambientales incluidas en todos los instrumentos ambientales, incluyendo, sin limitación, las Licencias Ambientales, aplicables al Proyecto de Paracel; y (iii) los Principios de Ecuador y las Normas de Desempeño de la IFC.

**"DRSF"** o "**Derecho Real de Superficie Forestal**" tiene el significado que se le atribuye en la Cláusula 10.2."**Especificaciones**" tiene el significado que se le atribuye en la Cláusula 3.1.

"**Entrega Tardía**" tiene el significado otorgado en la Cláusula 7.2 (a).

"**Evento de Fuerza Mayor**" significa cualquier acontecimiento no previsible que impida el cumplimiento por la Parte respectiva de cualquiera de sus obligaciones en virtud del presente Contrato y que se derive o sea atribuible a actos, acontecimientos, omisiones o accidentes que escapen del control razonable de la Parte respectiva, incluyendo, sin limitación, una inclemencia meteorológica anormal (i.e. por encima del promedio histórico de los últimos 20 años), inundación, tormenta, incendio, explosión, hundimiento, daño estructural, u otra catástrofe física natural, restricción de cuarentena o toque de queda impuesta por el gobierno paraguayo, escasez general o restricciones en el uso de agua, combustible, energía o materias primas, restricciones monetarias, prohibiciones o restricciones a la exportación o importación, guerra, riesgo de guerra, operaciones militares, insurrección, disturbios, desórdenes públicos, conflictos laborales no previsibles y sin culpa de la Parte respectiva, acción terrorista, y/o conmoción civil. Las Partes acuerdan que cualquier incumplimiento de un subcontratista del VENDEDOR no implica un Evento de Fuerza Mayor.

**"Fecha de Inicio de Compra"** significa la fecha en la que la Planta se encuentra lista para su puesta en marcha, según sea comunicado por el COMPRADOR.

"**Fecha de Terminación**" tiene el significado que se le atribuye en la Sección 13.1 (a).

"**Financiamiento**" tiene el significado que se le atribuye en los considerandos del Contrato.

**"FSC"** significa el *Forest Stewardship Council*.



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"**Garante**" significa [persona o entidad en calidad de garante solidario].

"**Gravamen**" significa cualquier reclamación, cargo, gasto, hipoteca, prenda, garantía, opción, opción de venta, usufructo, embargo, servidumbre, expropiación, retención, derecho de prioridad, derecho de preferencia, derecho de primera opción, derecho a nuda propiedad u otros derechos de terceros o garantías de cualquier tipo o un acuerdo, arreglo u obligación para crear o constituir cualquiera de los anteriores.

"**INCOTERMS**" significan los términos comerciales internacionales publicados por la Cámara de Comercio Internacional, actualizados de vez en cuando. A los efectos de este Contrato, los "INCOTERMS" publicados en 2020.

**"Inmueble"** o **"Inmuebles"** significa las propiedades inmuebles y demarcaciones dentro de las mismas según se detalla en el Anexo B de este Contrato.

**"IPC"** significa el índice de precios al consumidor que refleja la inflación interanual según sea publicado por el Banco Central del Paraguay en sus informes de inflación mensual, o cualquier índice que lo suceda. A efectos de determinar el IPC aplicable para el presente Contrato, se tomará en cuenta la inflación interanual publicada por el Banco Central del Paraguay en el mes que se corresponda con el aniversario de la fecha de la firma del presente Contrato (12 meses contados a partir de la fecha de la firma del Contrato).

"**IVA**" significa Impuesto al Valor Agregado.

"**Listas Internacionales de Sanciones**" significa las listas de sanciones emitidas por la *Office of Foreign Assets Control* (OFAC) del Departamento del Tesoro de los Estados Unidos, el Reino Unido de Gran Bretaña e Irlanda del Norte, las Naciones Unidas y la Unión Europea.

**"Ley Aplicable"** significan las leyes vigentes en la República del Paraguay, incluyendo la constitución nacional, tratados internacionales, leyes, decretos, resoluciones, cualquier otra normativa vigente y las Disposiciones Ambientales.

**"Madera"** significa la madera sin corteza a ser vendida por el VENDEDOR al COMPRADOR, que deberá cumplir con las Especificaciones establecidas en el Anexo A.

**"Madera No Conforme"** tiene el significado que se le atribuye en la Cláusula 3.2.

**"Mes de Suministro"** tiene el significado que se le atribuye en la Cláusula 4.2.

**"Normas de Desempeño de la IFC"** significa las Normas de Desempeño sobre Sostenibilidad Ambiental y Social emitidas y publicadas por la Corporación Financiera Internacional (*International Finance Corporation* – IFC) y las directrices ambientales que puedan ser relevantes en relación al presente Contrato.

"**Notificación**" tiene el significado que se le atribuye en la Cláusula 14.9 (a).

"**Notificación de Recisión**" tiene el significado que se le atribuye en la Cláusula 13.2.



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"**Orden de Compra**" tiene el significado que se le atribuye en la Cláusula 6.1.

"**Parte**" significa el COMPRADOR o el VENDEDOR referidos individual e indistintamente.

"**Partes**" significan el COMPRADOR y el VENDEDOR referidos conjuntamente.

**"Pérdida"** o **"Pérdidas"** significa todas las pérdidas, responsabilidades, costos (incluidos los honorarios legales, notariales y de expertos, peritos y consultores), cargos, gastos, daños, multas, sanciones, reclamaciones y demandas.

"**Penalización por Entrega Tardía**" tiene el significado que se le atribuye en la Cláusula 7.2 (b).

"**Planta**" tiene el significado que se le atribuye en los Considerandos del Contrato.

"**Práctica Corrupta**" significa ofrecer, dar, recibir o solicitar, directa o indirectamente, cualquier cosa de valor para influir indebidamente en las acciones de la otra Parte. .

**"Precio de Compra"** significa la cantidad resultante de multiplicar (a) el Volumen de Compra *por* (b) el Precio por Metro Cúbico.

"**Precio por Metro Cúbico**" tiene el significado que se le atribuye en la Cláusula 8.1.

**"Prestamistas"** significa las entidades nacionales, extranjeras o multilaterales que proveen créditos, garantías u otro tipo de financiamiento o facilidad crediticia al COMPRADOR en relación al Financiamiento.

**"Principios de Ecuador"** significa aquellos principios y estándares (incluyendo el preámbulo, materiales incorporados por referencia y anexos al mismo) denominados *Equator Principles 4*, de fecha 18 de noviembre de 2020, que han sido voluntariamente adoptados por ciertos bancos y otras entidades financieras, y tal y como ello se informa en la página web http://www.equator-principles.com, tal y como los mismos estén actualizados en la fecha de cada Confirmación de Orden de Compra.

**"Puerto del Comprador"** significa el puerto de propiedad de Paracel ubicado sobre el Río Paraguay, 12 kilómetros al norte de la ciudad de Concepción, Paraguay, sobre el margen derecho del Río Paraguay, navegando en dirección al norte.

**"Puerto de Villeta"** significa el puerto de propiedad de [●] ubicado sobre el Río Paraguay, a [●] kilómetros al ● de la ciudad de [●], Paraguay, sobre el margen ● del Río Paraguay, navegando en dirección al norte.

**"Suministro Anual"** tiene el significado atribuido en la Cláusula 4.1.

**"Suministro Mensual Nominal"** tiene el significado que se le atribuye en la Cláusula 4.2.



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"**Transferencia Bancaria**" significa los pagos realizados por cualquiera de las Partes en virtud al Contrato realizados por el sistema de pagos del Paraguay (SIPAP) a las cuentas bancarias determinada en la Cláusula 8.4. (b) y 8.4. (c).

"**USD**" o "**Dólares**" significa la moneda de curso legal en los Estados Unidos de América.

**"Vigencia**" tiene el significado que se le atribuye en la Cláusula 13.1 (a).

**"Volumen de Compra"** significa la cantidad de Madera indicada en la Confirmación de Orden de Compra.

### 1.2 Interpretación

Los títulos (ambos en las Cláusulas de este Contrato y en el texto de los Anexos y Apéndices) se han incluido sólo para facilitar la comprensión del Contrato y no determinarán o afectarán al significado o interpretación de cualquier disposición de este Contrato.

Los Anexos y Apéndices forman parte de este Contrato y tendrán la misma vigencia y efectividad que si hubieran sido expresamente incluidos en el cuerpo de este Contrato. Cualquier referencia a este Contrato hará también referencia a los Anexos.

## 2. COMPRAVENTA DE MADERA

### 2.1 Compromiso de compra y venta de Madera

Sujeto a los términos y condiciones de este Contrato, el COMPRADOR acepta comprar la Madera proveída por el VENDEDOR, y el VENDEDOR, a su vez, acepta y se compromete a vender la Madera al COMPRADOR, entregando la Madera en el Puerto de Villeta.

### 2.2 Plantaciones

El VENDEDOR suministrará Madera de los Inmuebles. Sin perjuicio de lo anterior, si durante cualquier periodo de suministro, la Madera disponible para ser suministrada de los Inmuebles es menor que el volumen de Madera solicitada en la Orden de Compra relevante, el VENDEDOR podrá suministrar Madera de una propiedad que no sea un Inmueble, en cuyo caso aplicará un descuento a la factura correspondiente a dicho Mes de Suministro igual el importe de cualquier Costo Logístico Adicional.

## 3. ESPECIFICACIONES

### 3.1 Madera acorde a las Especificaciones



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La Madera a ser adquirida por el COMPRADOR cumplirá las especificaciones establecidas en el Anexo A (las **"Especificaciones"**), siendo condición imprescindible para la aceptación de su entrega su adecuación a dichas Especificaciones, a excepción del caso previsto en la Cláusula 3.5 (*Rechazo de Madera No Conforme*).

**3.2 Madera no conforme con las Especificaciones**

Si, durante cualquier período de suministro, el COMPRADOR concluye que la Madera entregada o a ser entregada no cumple con las Especificaciones (la **"Madera No Conforme"),** el VENDEDOR reconoce y acepta que el COMPRADOR podrá, a su exclusiva opción:

(a) rechazar la Madera No Conforme, eximiéndose de pagar el Precio por Metro Cúbico y otro costo relacionado a la cantidad de Madera No Conforme; o

(b) retener la Madera No Conforme y aplicar un descuento igual al [70% (setenta por ciento)] del valor de la Confirmación de Orden de Compra correspondiente a la Madera No Conforme.

**3.3 Rechazo de Madera No Conforme**

Si el COMPRADOR notifica al VENDEDOR que ejercerá el derecho establecido en la Cláusula 3.2(a), el VENDEDOR reconoce y acepta que, a opción del COMPRADOR, el COMPRADOR podrá:

(a) aceptar sustituciones a la Madera No Conforme según sea ofrecida por el VENDEDOR;

(b) contratar los servicios de un tercero para retirar y tomar posesión de la Madera No Conforme (a costa y cargo del VENDEDOR); o

(c) solicitar que el VENDEDOR tome a su cargo el retiro y tome posesión de la Madera No Conforme

El VENDEDOR será responsable de toda pérdida o daño sobre la Madera No Conforme desde el momento de la notificación del derecho establecido en la Cláusula 3.3 (Madera no conforme con las Especificaciones).

**3.4 Madera en sustitución**

En caso que el COMPRADOR comunique al VENDEDOR su decisión de aceptar Madera en sustitución en conformidad a la Cláusula 3.3(a) (*Rechazo de Madera No Conforme*), el



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VENDEDOR deberá presentar al COMPRADOR el plazo máximo para la entrega de dicha Madera en sustitución, el cual no podrá exceder de 15 (quince) días corridos, contados desde la fecha de la comunicación del COMPRADOR.

En caso que la Madera en sustitución ofrecida por el VENDEDOR en base a la Cláusula 3.3(a) a su vez sea considerada como Madera No Conforme, será de aplicación lo dispuesto en la Cláusula 3.2.

### 3.5 Certificación FSC

En relación a la certificación de la Madera, las Partes acuerdan que el VENDEDOR adoptará todas las prácticas y medidas necesarias para obtener la certificación emitida por el *Forest Stewardship Council* (en adelante, el "**FSC**") para toda la Madera a ser entregada, de acuerdo con las normas del FSC (en adelante, la "**Certificación FSC**").

## 4. CANTIDAD Y CRONOGRAMA DE ENTREGA

### 4.1 Suministro Anual

Sujeto al acaecimiento de la Fecha de Inicio de Compra, el VENDEDOR suministrará al COMPRADOR y el COMPRADOR adquirirá las cantidades anuales de Madera establecidas en el Anexo C (*Cantidades y Cronograma de Entregas*) para cada uno de los años establecidos en dicho anexo (cada año, un "**Año de Suministro**") o la cantidad anual prorrateada para cualquier año incompleto que pueda ocurrir desde la Fecha de Inicio de Compra hasta la Fecha de Vencimiento (el "**Suministro Anual**").

### 4.2 Suministro Mensual Nominal

Para cada Año de Suministro, la cantidad nominal que el COMPRADOR debe comprar y que el VENDEDOR debe suministrar en cada mes (un "**Mes de Suministro**") es la cantidad expresada en metros cúbicos junto a cada Mes de Suministro en el Anexo C (*Cantidades y Cronograma de Entregas*) (el "**Suministro Mensual Nominal**").

### 4.3 Cantidad Mínima de Suministro Mensual

La cantidad mensual mínima que el VENDEDOR debe poner a disposición del COMPRADOR para su compra es el noventa por ciento (90%) del Suministro Mensual Nominal (la "**Cantidad Mínima de Suministro Mensual**").

### 4.4 Cantidad Máxima de Suministro Mensual



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La cantidad mensual máxima que el VENDEDOR debe poner a disposición del COMPRADOR para su compra es el ciento diez por ciento (110%) del Suministro Mensual Nominal (la "**Cantidad Máxima de Suministro Mensual**").

### 4.5 Cronograma

Las Partes acuerdan ajustarse al cronograma anual de entregas establecido en el Anexo C, a efectos de las emisiones de las Órdenes de Compra y Confirmaciones de Orden de Compra relevantes (en adelante, el "**Cronograma de Entregas**").

### 4.6 Incumplimiento de las cantidades de suministro

(a) Si, durante cualquier Mes de Suministro, como resultado de la inspección establecida en la Cláusula 8.6 (*Derecho de inspección*), el volumen de Madera suministrado por el VENDEDOR sea inferior a la Cantidad Mínima de Suministro Mensual para el Mes de Suministro correspondiente, produciéndose un Déficit de Madera, el VENDEDOR reconoce y acepta que el COMPRADOR puede, a su exclusiva opción:

(i) comprar Madera de terceros en una cantidad igual al Déficit de Madera. Si el COMPRADOR notifica al VENDEDOR que ejercerá este derecho, tendrá derecho al descuento establecido en la Cláusula 8.3 (*Facturación*); o

(ii) requerir al VENDEDOR la entrega de Madera en una cantidad igual al Déficit de Madera durante el Mes de Suministro siguiente. Si Paracel notifica que ejercerá este derecho, las Partes reconocen y aceptan que la Cantidad Máxima de Suministro Mensual no aplicará a ninguna Orden de Compra para el Mes de Suministro correspondiente.

(b) Si, durante cualquier Mes de Suministro, una entrega de Madera por parte del VENDEDOR no cumple con su correspondiente Confirmación de Orden de Compra debido a discrepancias entre el volumen efectivamente entregado y el Volumen de Compra, el COMPRADOR podrá remediar dicho incumplimiento comprando Madera de terceros. Si el COMPRADOR notifica al VENDEDOR que ejercerá este derecho, el VENDEDOR reconoce y acepta que el COMPRADOR tendrá derecho al descuento establecido en la Cláusula 8.3 (*Facturación*).

## 5. ACTIVIDADES FORESTALES ANTERIORES A LA ENTREGA DE MADERA

### 5.1 Cumplimiento de Ley Aplicable y las Disposiciones Ambientales



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El VENDEDOR deberá cumplir con toda la legislación vigente y concerniente a las actividades ambientales y forestales relacionadas al manejo, cosecha, venta y transporte de Madera hasta el Puerto de Villeta, observando estrictamente además las prácticas recomendadas por el FSC, la Ley Aplicable y las Disposiciones Ambientales, incluyendo sin limitación, aquellas relacionadas al manejo de plantaciones y cadena de custodia.

### 5.2 Responsabilidad del VENDEDOR

(a) El COMPRADOR no será responsable de ninguna actividad en el/los Inmueble/s donde se encuentra la Madera en pie que será cosechada, cargada, transportada y entregada por el VENDEDOR.

(b) El VENDEDOR mantendrá indemne al COMPRADOR de cualquier reclamo, demanda o intimación recibida de terceros en relación a actividades realizadas en el/los Inmueble/s.

(c) A menos que las Partes acuerden expresamente lo contrario, todos los costos, derechos, patentes comerciales y municipales, permisos, habilitaciones, licencias, tasas, impuestos y seguros relacionados con la actividad forestal y comercial del VENDEDOR, así como la venta de la Madera al COMPRADOR, correrán exclusivamente a cargo del VENDEDOR.

## 6. PROCESO DE COMPRAVENTA DE MADERA

### 6.1 Orden de Compra

El COMPRADOR emitirá una orden de compra para cada solicitud de entrega de Madera (en adelante, la "**Orden de Compra**"), indicando al VENDEDOR lo siguiente:

(a) el volumen de Madera solicitado para el Mes de Suministro inmediatamente siguiente al Mes de Suministro en el que se realiza la Orden de Compra; y

(b) otras indicaciones que puedan ser realizadas por el COMPRADOR de conformidad con el Contrato, por ejemplo: especies, edades, fechas de cosecha, entre otros.

La Orden de Compra será enviada al VENDEDOR dentro de los plazos contenidos en el Cronograma de Entregas (*Anexo C*).

### 6.2 Confirmación de Orden de Compra



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Dentro de 10 (diez) días corridos, contados a partir de la recepción de la Orden de Compra, el VENDEDOR confirmará la orden de compra emitiendo una confirmación por escrito (la **"Confirmación de Orden de Compra"**) que contendrá lo siguiente:

(a) el volumen de Madera a ser entregado;

(b) descripción técnica del perímetro de el/los Inmueble/s de donde se cosechó la Madera, con mapa y memoria descriptiva, acompañando los documentos pertinentes;

(c) la fecha en la cual la Madera estará lista para ser transportada desde el/los Inmueble/s; y

(d) la fecha aproximada en la cual la Madera será entregada en el Puerto de Villeta.

Con relación a las Cláusulas 6.2(c) y 6.2(d), el VENDEDOR deberá también mencionar a partir de qué momento la Madera estará lista para ser inspeccionada.

En caso que el VENDEDOR no remitiera la Confirmación de Orden de Compra en el plazo previsto en esta Cláusula, se producirá un Déficit de Madera y será de aplicación lo previsto en la Cláusula 4.6.

## 7. ENTREGA, TRANSFERENCIA DE PROPIEDAD Y RIESGO

### 7.1 Entrega

(a) Cada entrega realizada por el VENDEDOR se realizará DAP en el Puerto de Villeta, Villeta, Paraguay, según los INCOTERMS 2020, y tal y como se especifica en la Confirmación de Orden de Compra aplicable.

(b) A menos que las Partes acuerden expresamente lo contrario, todos los costos de transporte, derechos, permisos, habilitaciones, licencias, guías de traslado, tasas, impuestos, fletes y seguros relacionados con el transporte de la Madera hasta el Puerto de Villeta correrán exclusivamente a cargo del VENDEDOR.

### 7.2 Entrega tardía

(a) Con respecto a toda Confirmación de Orden de Compra, cualquier cantidad de Madera que se entregue en una fecha posterior a quince (15) días corridos de la fecha estimada para la descarga de la Madera en el Puerto de Villeta, indicada en



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la respectiva Confirmación de Orden de Compra, será considerada como una entrega tardía (una **"Entrega Tardía"**).

(b) Si, durante cualquier Mes de Suministro, se produce una Entrega Tardía, el VENDEDOR reconoce y acepta que el COMPRADOR puede, a su exclusiva opción:

(i) comprar madera, en una cantidad igual al volumen de madera afectada por la entrega tardía, de terceros proveedores de madera. Si el COMPRADOR notifica al VENDEDOR que ejercerá este derecho, el COMPRADOR tendrá derecho al descuento establecido en la Cláusula 8.3 (*Facturación*); o

(ii) aplicar al VENDEDOR una penalización equivalente al dos por ciento (2%) del importe total de la Confirmación de Orden de Compra afectada por la Entrega Tardía (la **"Penalización por Entrega Tardía"**).

### 7.3 Transferencia de Propiedad y Riesgo

Sin perjuicio de lo establecido en la Cláusula 10.2 (*Derecho Real sobre Superficie Forestal*), la propiedad sobre la Madera, así como el riesgo de pérdida o daño a la Madera, será transferida al COMPRADOR de conformidad con los INCOTERMS indicados en la Cláusula 7.1(a) (*Entrega*) de este Contrato.

## 8. PRECIO DE COMPRA, IMPUESTOS, FACTURACION, PAGOS, INTERESES POR MORA, DERECHO DE INSPECCIÓN, PREVALENCIA DE MEDICIONES

### 8.1 Precio por Metro Cúbico

Las Partes definen el precio de compra de la Madera de la siguiente manera; el COMPRADOR se compromete a pagar al VENDEDOR [●] USD (US$ [●]) por metro cúbico de Madera entregada de acuerdo con los términos de este Contrato y sujeto a la medición y verificación final del COMPRADOR (el **"Precio por Metro Cúbico"**).

### 8.2 Impuestos

El Precio por Metro Cúbico de indicado en la Cláusula 8.1 (*Precio por Metro Cúbico*) incluye el IVA y cualquier otra tasa o impuesto aplicable. El VENDEDOR será exclusivamente responsable del pago de cualquier tipo de tasa, impuesto, tarifa, contribución o canon aplicable a los pagos realizados en virtud de esta Cláusula 8.

### 8.3 Facturación



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Dentro de los diez (10) días corridos siguientes a la finalización de cada Mes de Suministro, el VENDEDOR emitirá una factura en la que se indicará el volumen de Madera entregado por el VENDEDOR, sujeto a confirmación del COMPRADOR, los números de Orden de Compra atendidos, la fecha y el lugar de entrega, el Precio de Compra, un descuento igual al Costo de Sustitución de Madera aplicable o la Penalización por Entrega Tardía, y cualquier otro dato que Paracel pueda razonablemente requerir de tanto en tanto.

**8.4 Pagos**

(a) Todos los pagos realizados por cualquiera de las Partes en virtud del presente Contrato se realizarán en USD. Cualquier pago del COMPRADOR al VENDEDOR con respecto a cualquier factura será pagadero en un plazo de sesenta (60) días corridos a partir de la fecha de la factura.

(b) Todos los pagos del COMPRADOR al VENDEDOR se realizarán a través de una transferencia bancaria electrónica través del sistema de pagos de Paraguay (SIPAP) a la siguiente cuenta bancaria: [insertar detalles de la cuenta bancaria del VENDEDOR] o a otra cuenta del VENDEDOR que éste indique de tanto en tanto. El VENDEDOR reconoce que los comprobantes de transferencia de fondos emitidos por el banco del COMPRADOR serán suficiente prueba de pago.

(c) Todos los pagos del VENDEDOR al COMPRADOR se realizarán a través de una transferencia bancaria electrónica través del sistema de pagos de Paraguay (SIPAP) a la siguiente cuenta bancaria: [insertar detalles de la cuenta bancaria del COMPRADOR] o a otra cuenta del COMPRADOR que éste indique de tanto en tanto. El VENDEDOR reconoce que los comprobantes de transferencia de fondos emitidos por el banco del COMPRADOR serán suficiente prueba de pago.

**8.5 Interés por mora**

Si una de las Partes no paga cualquier cantidad no disputada que deba pagar en virtud del presente Contrato, la otra Parte tendrá derecho a cobrar intereses sobre la cantidad en mora desde la fecha de vencimiento del pago hasta la fecha del pago efectivo, a un interés anual del dos por ciento (2%).

**8.6 Derecho de inspección**

Con relación a cualquier Orden de Compra y previo a la aceptación de su entrega, el COMPRADOR tendrá derecho a inspeccionar la Madera para verificar, el cumplimiento de las obligaciones del VENDEDOR bajo el Contrato incluyendo, sin limitación, las



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Especificaciones, volumen, peso, Orden de Compra y la Confirmación de Orden de Compra, a su exclusiva satisfacción, en cualquiera de las siguientes etapas de la entrega de Madera:

(a) en cualquiera de los Inmuebles, antes de realizada la cosecha de la Madera o su embarque para transporte;

(b) en el Puerto de Villeta; o

(c) en el Puerto del Comprador.

La inspección establecida en esta Cláusula podrá ser realizada por representantes del COMPRADOR o por terceros designados por el COMPRADOR, según sea notificado al VENDEDOR de tanto en tanto. A dicho fin, el VENDEDOR otorgará al COMPRADOR y a los Prestamistas (incluyendo representantes y asesores externos) pleno acceso y tomará todas las acciones que sean necesarias para otorgar al COMPRADOR y a los Prestamistas acceso a los predios identificados en esta Cláusula 8.6.

### 8.7 Prevalencia de mediciones

Las mediciones y verificaciones realizadas por el COMPRADOR en ejercicio de su derecho de inspección para determinar el cumplimiento de las obligaciones del VENDEDOR prevalecerán en todos los casos.

## 9. DECLARACIONES

El VENDEDOR declara y garantiza en la fecha del presente Contrato y en cada aniversario de este Contrato y al momento de la emisión de cada Confirmación de Orden de Compra que:

(a) es una [sociedad] debidamente constituida y válidamente existente y al día de acuerdo con las leyes del [país] y está autorizada para realizar negocios jurídicos comerciales;

(b) posee todas las autorizaciones y poderes: (i) para mantener sus activos; (ii) conducir sus negocios como lo hace actualmente; y (iii) celebrar y cumplir con sus obligaciones conforme a los términos del presente Contrato;

(c) este Contrato está (i) debidamente autorizado y celebrado por el VENDEDOR y constituye una obligación válida y vinculante del VENDEDOR, exigible de



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acuerdo con sus términos, y (ii) constituye la obligación legal, válida y vinculante del VENDEDOR de acuerdo con la legislación aplicable;

(d) ni su celebración y la formalización de este Contrato, ni el cumplimiento de sus términos: (i) violan cualquier ley o licencia aplicable; (ii) dan lugar a una violación, constituyen incumplimiento o requieren cualquier consentimiento en virtud de cualquier otro instrumento del que el VENDEDOR sea parte y por el que esté vinculado; (iii) resulta en la creación o imposición de (o en la obligación de crear o imponer) cualquier gravamen sobre cualquier propiedad del VENDEDOR; o (iv) violen los términos de sus actos societarios;

(e) tiene título eficaz, legal y válido del/de los Inmueble/s de origen de Madera plantadas en esta fecha y ninguna otra persona tiene derechos actuales, futuros y de ningún tipo sobre el/los Inmueble/s o sobre la Madera que, si se ejercen, podrían resultar en una reducción de la Madera disponible para la venta al COMPRADOR según los términos de este Contrato o una restricción del acceso del COMPRADOR al/a los Inmueble/s;

(f) obtuvo y mantiene todas las licencias y autorizaciones requeridas por la Ley Aplicable para conducir sus negocios en cada Inmueble y todas las solicitudes necesarias para la renovación de dichas licencias y autorizaciones han sido debida y oportunamente presentadas a las autoridades competentes;

(g) los árboles de eucaliptos plantados (o por plantar) en cada Inmueble producirán las cantidades establecidas en el Anexo C y la Madera que se cosechará del/de los Inmueble/s cumplirá con las Especificaciones;

(h) ni la VENDEDORA o cualquier Persona actuando en su nombre (i) ha cometido o realizado una Práctica Corrupta o (ii) se halla incluida en cualquier Lista Internacional de Sanciones;

(i) tiene bienes y recursos suficientes y la celebración del presente Contrato no afectará su solvencia para satisfacer cualesquiera demandas y pagar cualesquier montos, sentencias, créditos y obligaciones constituidas y/o propuestos en su contra, y que puedan afectar este Contrato y/o el/los Inmueble/s, aunque sea indirectamente;

(j) (i) posee la posesión legítima y pacífica del/de los Inmueble/s y es el legítimo propietario y tenedor de la Madera, y también de todos los derechos inherentes al/a los Inmueble/s y a la Madera, que están totalmente libres y desvinculadas de Gravámenes de cualquier tipo; (ii) salvaguardados los contratos listados en el



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Anexo D (*Contratos Inmobiliarios*), no forma parte de ningún contrato, acuerdo, opción de compra, garantía o compromiso que represente obligaciones o derechos del VENDEDOR o de terceros en relación con el/los inmueble/s y/o Madera; y (iii) desconoce las restricciones o limitaciones de cualquier naturaleza para el desarrollo y expansión de las actividades y/o explotación del/de los inmueble/s y de la Madera, incluidos, entre otros, la no competencia, la exclusividad y los derechos de disponer o vender, de cualquier forma, incluso involucrando preferencia u opción, en relación con el/los Inmueble/s o la Madera;

(k) no existe controversia en curso que involucre al VENDEDOR o que sea inminente, incluyendo, sin limitación, de carácter civil, penal, tributario, laboral, regulatorio-minería o ambiental que afecte (i) al/a los inmueble/s o las Cantidades establecidas en Anexos B y C; o (ii) el derecho del VENDEDOR a tener y disfrutar plenamente del/de los inmueble/s o Madera;

(l) no hay ninguna demanda en curso que involucre al VENDEDOR que pueda restringir la compra, cosecha, transporte y entrega de Madera por el COMPRADOR;

(m) (i) cumple con todas las leyes aplicables (incluidos los convenios y acuerdos laborales internacionales) relacionados con sus empleados y proveedores de servicios/externalizados, incluso con respecto a las remuneraciones, el tiempo de trabajo, la salud, la seguridad y el pago de impuestos; (ii) no emplea ni contrata a menores o niños en violación de las leyes aplicables; (iii) no utiliza mano de obra esclava en condiciones similares a la esclavitud;

(n) no (i) vendió, transfirió, prometió vender o trasladó Madera; y/o (ii) proporcionó cualquier garantía a favor de terceros que afecte a la Madera, incluidos los créditos y derechos a ella inherentes;

(o) preserva la Madera, de acuerdo con las mejores prácticas y Ley Aplicable;

(p) la Madera no está sujeta a ninguna protección especial, y no está ubicada en un área de conservación ambiental, área de frontera, áreas declaradas como tierras indígenas o de cualquier otra comunidad tradicional;

(q) no existen restricciones ambientales, tales como contaminaciones, daños, contingencias y/o pasivos ambientales relacionadas con el/los Inmueble/s y/o Madera;



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(r) el/los Inmueble/s y la Madera no están sujetas a conflictos de área con proyectos mineros;

(s) no existe ninguna restricción legal (cualquier ley o autorización) aplicable, en todo o en parte, a la Madera, o una restricción de carácter físico en el/los Inmueble/s que pueda prohibir o impedir el corte, recogida y/o transporte, en todo o en parte, de la Madera;

(t) cumple con todas las Disposiciones Ambientales aplicables; (ii) presentó todos los informes, declaraciones e informaciones ambientales sobre el inmueble y la plantación del bosque; (iii) no usó, almacenó o liberó productos o desechos peligrosos al medio ambiente, violando las normas aplicables a la materia; (iv) no es necesaria ninguna adaptación, adición o alteración de las condiciones actuales del/de los Inmueble/s o de la Madera para cumplir con las Disposiciones Ambientales; y (v) el/los Inmueble/s y la Madera están libres y exentos de cualesquiera pasivos ambientales;

(u) no tiene madera proveniente de árboles modificados genéticamente;

(v) adopta y siempre ha adoptado las mejores prácticas de la silvicultura en relación con la Madera;

(w) no hay evidencia de infracciones, citaciones o sanciones impuestas por cualquier persona en relación con el/los Inmueble/s y/o Madera que puedan depreciarlos, afectarlos o impedir su pleno disfrute, incluidos procedimientos administrativos o investigaciones civiles o delitos ambientales que involucren la Madera;

(x) no existen conflictos agrarios de cualquier naturaleza en el/los Inmueble/s donde se encuentra la madera en pie, no hay ninguna demanda sobre la tierra;

(y) el/los Inmueble/s donde se implantará o implantó el bosque de eucaliptos es/son privados, de tenencia justa, de buena fe, pacíficas y a justo título;

(z) la Madera a ser vendida al COMPRADOR no forma parte y por ende no se encuentra sujeta a un área de conservación obligatoria establecida como reserva legal de bosques naturales bajo la Ley No. 422/73 "Forestal" y sus modificaciones, de zonas de protección forestal, áreas de conservación, parques nacionales o procede de cualquier territorio no autorizado por las Disposiciones Ambientales y la Ley Aplicable.



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## 10. OBLIGACIONES

### 10.1 Notificaciones

(a) El VENDEDOR entregará al COMPRADOR, dentro de 48 (cuarenta y ocho) horas después de su recepción, copias de todas las notificaciones que puedan afectar cualquier Inmueble (inclusive el acceso del COMPRADOR o de terceros al/a los Inmueble/es) o la Madera (incluso su cosecha), así como cualesquier informes elaborados por sus abogados, describiendo el hecho, la acción, y las medidas tomadas o a ser tomadas.

(b) En relación a la verificación de la Madera establecida en la Cláusula 8.6 (*Derecho de Inspección*), con al menos 24 (veinticuatro) horas de antelación, el COMPRADOR notificará al VENDEDOR sobre la identidad de los Prestamistas (incluyendo menciones sobre sus representantes según sea el caso) que soliciten realizar una verificación de Madera, toda vez que dicha revelación no incumpla obligaciones de confidencialidad o sea impracticable.

### 10.2 Derecho Real de Superficie Forestal

En garantía del cumplimiento de sus obligaciones emergentes del presente Contrato, las Partes acuerdan será de aplicación lo siguiente:

(a) Dentro de los [sesenta (60)] días de la fecha de firma de este Contrato, el VENDEDOR otorgará a favor del COMPRADOR o tomará todas las acciones correspondientes para el otorgamiento a favor del COMPRADOR, según corresponda, de un derecho real sobre superficie forestal, en conformidad con y bajo los términos de la Ley No. 4890/2013 y cualquier otra ley o norma similar que la modifique o reemplace en el futuro, en garantía de la Madera a ser entregada al COMPRADOR, el cual deberá ser otorgado por contrato privado sustancialmente en los términos del modelo adjunto al Contrato como Anexo F y deberá ser debidamente inscrito en la sección correspondiente de la Dirección General de los Registros Públicos y cualquier otro registro requerido por Ley Aplicable (el "**Derecho Real de Superficie Forestal**" o "**DRSF**").

(b) Al momento de la constitución del DRSF, deberá ser claramente dispuesto a favor del COMPRADOR el derecho autónomo, separado e independiente sobre la Madera del derecho de propiedad del inmueble sobre el cual se constituye el DRSF y que limite la facultad del propietario de utilizar, por sí o por otro, las plantaciones o masas arbóreas, que forman parte de la Madera a ser entregada, resultantes de la



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actividad forestal existente o a ser implementada en el inmueble afectado o de disponer de las mismas.

(c) El DRSF deberá ser constituido por un plazo mayor o igual al periodo de vigencia del presente Contrato. Las plantaciones sujetas al DRSF deberán estar debidamente cercadas y/o señalizadas a tal efecto, a satisfacción del COMPRADOR.

(d) Todos los costos de escrituración y otros costos relacionados a la constitución del DRSF (incluyendo sin limitaciones, mensuras, pericias, honorarios, tasas, impuestos, costos de cercado y otros) correrán a cargo del VENDEDOR.

(e) El DRSF será otorgado de tanto en tanto, según sea requerido por el COMPRADOR y para garantizar adecuadamente la Madera a ser entregada bajo el presente Contrato.

(f) Las Partes podrán acordar modificar DRSF de tanto en tanto para reflejar adecuadamente los volúmenes de Madera a ser entregados bajo el Contrato (en caso que mayores volúmenes sean acordados o que la cobertura actual del DRSF sea inapropiada para garantizar los volúmenes de Madera a ser entregada), dejando debido registro de cada modificación en la sección correspondiente de la Dirección General de los Registros Públicos.

(g) La constitución del DRSF y en particular, su escritura de constitución, no contendrá condiciones que impacten negativamente o restrinjan el libre acceso al inmueble sobre el que se ha constituido el DRSF por el COMPRADOR o los Prestamistas. Quedará prohibida la constitución de cualquier DRSF sobre los Inmuebles.

**10.3 Gravámenes**

El VENDEDOR tomará todas las medidas para garantizar que la Madera que se venderá esté libre de Gravámenes.

**10.4 Caución y/o Garantía Por Incidente Oculto o Futuro**

En caso de cualquier incumplimiento de las Disposiciones Ambientales y la Ley Aplicable que resulte en o pueda tener como resultado el embargo o restricciones a la libre disposición y transporte de la Madera, a discreción del COMPRADOR y mediante notificación dirigida al VENDEDOR, sin perjuicio de las demás conminaciones contractuales, el VENDEDOR deberá prestar toda caución, seguro, fianza o pago en garantía que sea requerido según las



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circunstancias, a fin de permitir la libre disposición y circulación de la Madera, reconociendo a todos los efectos al COMPRADOR como comprador de buena fe.

**10.5 Prácticas de Cultivo**

El VENDEDOR se compromete a respetar las Disposiciones Ambientales y a aplicar las mejores prácticas de silvicultura para (i) asegurar el desarrollo y mantenimiento adecuado de la Madera y (ii) tomar cualesquiera medidas necesarias, de manera oportuna y eficaz, para prevenir y/o remediar cualquier acto, hecho, omisión, procedimiento o proceso del que tenga conocimiento y que pueda afectar de alguna manera la Madera (inclusive, entre otros, incendios forestales y plagas), así como informar inmediatamente por escrito al COMPRADOR sobre y realizar las acciones de mitigación relacionadas a cualquier acto, hecho, omisión, trámite o proceso que corresponda a la ocurrencia de un acto ilícito, aunque pendiente de contradictorio, amplia defensa y resultado del debido proceso legal administrativo o judicial, siendo plenamente responsable de los daños que resulten del incumplimiento de cualquier obligación en este sentido, así como su reparación.

**10.6 Servidumbres y Licencias**

El VENDEDOR estará exclusivamente a cargo de obtener y mantener, hasta la Fecha de Terminación, todas las servidumbres, derechos de paso y licencias necesarias para la cosecha y entrega de la Madera.

**10.7 Mantenimiento de carreteras**

El VENDEDOR estará exclusivamente a cargo de mantener todas las carreteras y caminos dentro del/de los Inmueble/s adecuados para los equipos de recogida y transporte para la entrega de la Madera en el lugar indicado en el Contrato.

**10.8 Laboral**

(a) La gestión y custodia del/de los Inmueble/s será totalmente realizada por el VENDEDOR o terceros contratados por él, con total responsabilidad e independencia técnico/operativa y sin ninguna injerencia del COMPRADOR, ni ningún tipo de subordinación, relación y/o asociación entre el COMPRADOR y los empleados y/o subcontratados del VENDEDOR.

(b) El VENDEDOR reconoce que es el único contratante de todas y cada una de las personas designadas para mantener los bosques y otras actividades relacionadas. El VENDEDOR cumplirá toda la legislación aplicable a los trabajos contratados en el/los Inmueble/s, eximiendo al COMPRADOR de cualesquier responsabilidades y



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asumiendo con exclusividad todas las consecuencias por eventuales incumplimientos de las referidas disposiciones legales.

(c) El VENDEDOR indemnizará al COMPRADOR, en los términos del Contrato, por cualesquier reclamos presentados por sus contratados o subcontratados, es suficiente para ello que el COMPRADOR realice el pago de las condenas, tasas o acuerdos para resolver la disputa.

### 10.9 Contratos Inmobiliarios

Si fuera aplicable, el VENDEDOR deberá cumplir con todas las obligaciones derivadas de los contratos listados en el Anexo D (*Contratos Inmobiliarios*) para no causar su rescisión o terminación anticipada y reintegración de la propiedad del/de los Inmueble/s por parte del arrendador o socio, según corresponda, incluyendo, pero no limitado a, el pago de remuneración e impuestos sobre los Inmueble/es. El VENDEDOR deberá notificar al COMPRADOR cuando registre una mora mayor a un mes en el cumplimiento de sus obligaciones.

### 10.10 Garante Solidario

El Garante también es parte del presente Contrato, y está obligado solidariamente a todas las obligaciones y responsabilidades aquí pactadas por el VENDEDOR en este Contrato. Además, el Garante responde ilimitadamente, renunciando a cualquier beneficio de excusión que se alegue, ya sea como parte, o como fiador, por su responsabilidad solidaria expresa, también se obliga conjuntamente con el VENDEDOR, a resarcir al COMPRADOR por eventuales perjuicios causados al COMPRADOR, a terceros y al poder público, si resultan del incumplimiento del VENDEDOR, incluso, asumiendo, junto con éste, la legitimidad pasiva de casual acción de derecho de regreso indemnizatorio, si es necesaria.

### 10.11 Seguros

El VENDEDOR estará obligado a contratar los siguientes seguros: [●].

## 11. INDEMNIZACIÓN

Cada Parte será responsable de indemnizar y mantener a la otra Parte indemne contra cualesquiera Pérdidas, daños, perjuicios, responsabilidades, indemnizaciones, procesos, costos, honorarios de abogados y gastos de cualquier naturaleza mantenidos o incurridos por la otra Parte, que surjan de o en relación con:



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(a) cualquier equivocación, falsedad, inexactitud o no conformidad de cualquier declaración o garantía hecha por el VENDEDOR en este Contrato;

(b) cualquier violación, total o parcial, de cualquier disposición de este Contrato y/o Ley Aplicable;

(c) cualquier acto u omisión, dolosa o culposa, de una Parte y/o de sus empleados, agentes, contratados o subcontratados; o

(d) terminación sin causa de este Contrato por una de las Partes;

La indemnización debida cubrirá y por tanto se incrementará, de forma acumulativa, por (i) la corrección monetaria del monto de las Pérdidas, desde la fecha de su ocurrencia hasta la fecha del efectivo pago de la indemnización, en un 100% (cien por ciento) de la variación positiva del IPC; y (ii) cualesquiera impuestos, recargos, gastos y/o costos incurridos por la Parte indemnizable a modo de condición para recibir la respectiva indemnización, siendo el incremento del monto (*gross-up*) debido de forma que la Parte indemnizable retorne a la misma situación como si las Pérdidas no hubiesen ocurrido, de modo que reciba, neto, el monto total de las Pérdidas.

## 12. FUERZA MAYOR

### 12.1 Evento de Fuerza Mayor

Siempre que la condición sea permanente y no pueda subsanarse, ninguna de las Partes será responsable del retraso o incumplimiento de cualquiera de sus obligaciones en este Contrato causado por un Evento de Fuerza Mayor, de conformidad con el artículo 426 del Código Civil paraguayo. Sin perjuicio de lo anterior, las obligaciones que las Partes se vean impedidas de cumplir, quedarán suspendidas mientras dure el Evento de Fuerza Mayor, y las Partes se comprometen a reanudar sus respectivos cumplimientos tan pronto como cese el Evento de Fuerza Mayor.

### 12.2 Notificación de Evento de Fuerza Mayor

La Parte cuyo incumplimiento se derive de un Evento de Fuerza Mayor, de conformidad con el artículo 426 del Código Civil paraguayo, notificará sin demora a la otra Parte, por escrito, sobre la naturaleza del evento y la duración estimada y, si corresponde, la cantidad del Inmueble/s, toneladas, la confirmación de orden de compra específica y, en consecuencia, la Madera afectada por tal Evento de Fuerza Mayor, y hará todo lo posible para minimizar la duración y las consecuencias del incumplimiento o retraso en la entrega o aceptación de la Madera como resultado de eventos de fuerza mayor, a menos que la



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condición sea permanente y no pueda subsanarse. La Parte cuyo incumplimiento resulte de un Evento de Fuerza Mayor informará inmediatamente a la Parte contraria del momento en que ya no se vea afectada.

### 12.3 Negociaciones con Terceros

La Parte que no pueda obtener el cumplimiento de la otra por un Evento de Fuerza Mayor podrá negociar libremente con terceros, siempre que no actúe de manera incompatible con sus obligaciones en virtud del presente Contrato.

### 12.4 Terminación anticipada de este Contrato

Este Contrato puede ser rescindido, por cualquiera de las Partes, según los términos de la Cláusula 12.2, si el Evento de Fuerza Mayor persiste durante al menos 6 (seis) meses en forma consecutiva o 12 (doce) meses en forma no consecutiva.

## 13. VIGENCIA DEL CONTRATO, TERMINACIÓN ANTICIPADA

### 13.1 Vigencia del Contrato

(a) Este Contrato entrará en vigor en la fecha de su firma. La obligación de compraventa de la Madera por las Partes comienza en la Fecha de Inicio de Compra y termina en la fecha que constituye el aniversario de dicha fecha ("**Fecha de Terminación**"), salvo terminación anticipada conforme a los términos de este Contrato ("**Vigencia**").

(b) La Vigencia puede ser modificada mediante adenda por escrito, firmada por las Partes.

Mientras que la deuda adeudada bajo el Financiamiento no haya sido pagada en su totalidad, este Contrato solo podrá ser terminado antes de la Fecha de Terminación – salvo terminación anticipada de conformidad con la Cláusula 13.2 - mediando consentimiento previo y escrito de los Prestamistas.

### 13.2 Terminación anticipada

Independientemente de la Vigencia acordada en la Cláusula 13.1 (a), cualquiera de las Partes, según corresponda, tendrá derecho a terminar este Contrato en cualquier momento, con efecto inmediato, mediante notificación por escrito ("**Notificación de Terminación**") enviada a la otra Parte, sujeto a las siguientes disposiciones:



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(a) Por el VENDEDOR, solo en el caso de que el COMPRADOR no pague ningún monto adeudado y no disputado por 3 (tres) cuotas consecutivas;

(b) Por el COMPRADOR, sin perjuicio de los derechos del COMPRADOR, si el VENDEDOR entrega Madera en una cantidad inferior al Volumen de Compra durante dos (2) Meses de Suministro consecutivos o tres (3) Meses de Suministro en un periodo de doce (12) meses;

(c) Por el COMPRADOR, sin perjuicio de los derechos del COMPRADOR, si el VENDEDOR entrega Madera No Conforme durante dos (2) Meses de Suministro consecutivos o tres (3) Meses de Suministro en un periodo de doce (12) meses;

(d) Por el COMPRADOR, sin perjuicio de los derechos del COMPRADOR, si el VENDEDOR incumple con la Cantidad Mínima de Suministro Mensual durante dos (2) Meses de Suministro consecutivos o tres (3) Meses de Suministro en un periodo de doce (12) meses;

(e) Por el COMPRADOR, sin perjuicio de los derechos del COMPRADOR, si el VENDEDOR incurre en Entregas Tardías durante dos (2) Meses de Suministro consecutivos o tres (3) Meses de Suministro en un periodo de doce (12) meses;

(f) Por el COMPRADOR, en el caso que el VENDEDOR no constituya el DRSF de conformidad con la Cláusula 10.2;

(g) Por el COMPRADOR, si el VENDEDOR no obtiene la certificación otorgada por el FSC de la Madera, dentro del plazo máximo de 180 días después de la firma de este Contrato;

(h) Si la otra Parte, por acción u omisión, comete un incumplimiento sustancial del presente Contrato (distinto a los incumplimientos mencionados en los párrafos (a), (b), (c), (d), (e), (f) o (g) de esta Cláusula 13.2) que no es susceptible de solución o remedios o que, si fuera susceptible de solución o remedio, sigue sin ser solucionado o remediado después de que la Parte que termina el contrato haya notificado a la otra Parte de dicho incumplimiento especificando un período razonable, que no exceda de treinta (30) días corridos, en el que la otra Parte está obligada a solucionar dicho(s) incumplimiento(s); o



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(i) Por cualquiera de las Partes, en caso de liquidación, disolución, solicitud de concurso voluntario de acreedores, solicitud de quiebra no resuelto dentro de los plazos legales, o declaración de quiebra de la Parte contraria; o

(j) Por cualesquiera de las Partes, en el caso y permanencia de un Evento de Fuerza Mayor en los términos del Contrato;

(k) Por el COMPRADOR, si cualquier declaración o garantía hecha por el VENDEDOR resulte ser incorrecta o engañosa en cualquier aspecto material cuando se hizo o se consideró hecha;

(l) Si el Cierre Financiero para la construcción de la fábrica no ocurriera antes del 31 de diciembre de 2021; o

(m) alguna de las Partes está incluida en una Lista de Sanciones Internacionalmente Reconocidas o comete, participa o está involucrada en (o autoriza o permite que cualquier otra Persona que actúe en su nombre cometa, participe o esté involucrada en) cualquier Práctica Corrupta con respecto a cualquier transacción contemplada en este Contrato.

**13.3 Obligaciones en caso de Terminación**

Tras la terminación de este Contrato:

(a) El COMPRADOR tendrá derecho a recibir la entrega de cualquier cantidad de Madera sujeta a una Confirmación de Orden de Compra emitida;

(b) El VENDEDOR reembolsará al COMPRADOR, sin duplicación, los Daños Directos y cualquier pago o gasto incurrido en relación con cualquier Costo de Sustitución de Madera;

(c) Sólo en el caso que la terminación sea imputable al COMPRADOR, éste será responsable, sin duplicación, de los Daños Directos sufridos por el VENDEDOR, siempre que dicha responsabilidad no supere el importe total de cualquier factura pendiente emitida por el VENDEDOR de conformidad con el presente Contrato;

(d) Sólo en el caso que la terminación sea imputable al VENDEDOR, éste será responsable, sin duplicación, de los Daños Directos y del Costo de Sustitución de Contrato;



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(e) Ninguna de las Partes será responsable de ninguna Pérdida incurrida por la otra Parte en caso de terminación de este Contrato que resulte de las circunstancias previstas en la Cláusula 12.4 *(Terminación anticipada de este Contrato*), siempre que, de forma acumulativa: (i) todas las medidas necesarias para subsanar el Evento de Fuerza Mayor se hayan tomado de manera oportuna y efectiva; y (ii) se haya cumplido la obligación prevista en la Cláusula 12.2;

(f) El COMPRADOR no será responsable de ninguna Pérdida en la que incurra el VENDEDOR en caso de terminación de este Contrato como resultado de la aplicación de la Cláusula 13.2(l).

(g) Cada Parte pagará todos los montos adeudados a la otra Parte conforme a los términos del presente Contrato dentro de los 30 (treinta) días corridos posteriores a la recepción de la Notificación de Terminación; siempre que el Costo de Sustitución de Contrato facturado por el COMPRADOR bajo la Cláusula 13.3(b) se pague dentro del plazo establecido en esta Cláusula 13.3 (g), independientemente de si la Parte incumplidora haya impugnado (i) la ocurrencia del evento de incumplimiento informado en la Notificación de Terminación y/o (ii) los montos facturados; y

La Cláusula 8 (*Precio de Compra, impuestos, facturación, pagos, intereses por mora, derecho de inspección, prevalencia de mediciones*) y esta Cláusula 13.3 (*Obligaciones en caso de Terminación*) sobrevivirán a la terminación de este Contrato.

### 13.4 Derechos de las Partes en la Terminación

La terminación de este Contrato por cualquier motivo no afectará los derechos de las Partes adquiridos antes de la fecha de terminación.

## 14. CONDICIONES GENERALES

### 14.1 Conocimiento sobre el derecho de Prestamistas; Cooperación con los Prestamistas

(a) El VENDEDOR reconoce que el COMPRADOR podrá ceder o de cualquier forma asignar sus derechos bajo este Contrato a favor de los Prestamistas según los términos del Financiamiento, lo cual el VENDEDOR acepta. El VENDEDOR reconoce que los Prestamistas no tienen la obligación de satisfacer ninguna de las obligaciones del COMPRADOR en virtud de este instrumento de acuerdo con el Financiamiento.



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(b) Sin que ello implique costo alguno para el COMPRADOR, el VENDEDOR cooperará, de tiempo en tiempo, con el COMPRADOR y los Prestamistas bajo el Financiamiento, incluyendo (i) entregando y comprometiéndose a entregar estados financieros auditados y no auditados, (ii) suscribiendo acuerdos directos aceptables a los Prestamistas bajo el Financiamiento, en cada caso, a solicitud del COMPRADOR.

**14.2 Confidencialidad**

El VENDEDOR mantendrá la confidencialidad y no revelará a ninguna persona ninguna información relacionada con el COMPRADOR, Paracel, know-how, la tecnología y los procedimientos de Paracel, y cualquier otra información confidencial proporcionada por o en nombre del COMPRADOR en virtud o en relación con este Contrato (obtenida por el VENDEDOR antes o después de la fecha de este Contrato).

**14.3 Acuerdo Completo**

Este Contrato contiene todos los convenios entre las Partes en relación con el objeto de este Contrato en la fecha actual, y reemplaza cualquier acuerdo previo escrito u oral entre las Partes en relación con los asuntos tratados en este Contrato.

**14.4 Tolerancia y Renuncia**

La tolerancia del incumplimiento, incluso si alguna de las Partes lo repite, de las disposiciones contenidas en este Contrato, no será interpretado por la otra Parte como una renuncia o novación.

**14.5 Anticorrupción - *Compliance***

Las partes declaran que están al tanto, conocen y comprender los términos de las leyes anticorrupción paraguayas o de cualesquiera otras jurisdicciones aplicables en relación con el objeto de este Contrato, comprometiéndose a abstenerse de cualquier actividad que constituya una violación de las disposiciones legales anticorrupción. Las partes declaran además que el Contrato y sus prácticas están de acuerdo con las leyes contra el financiamiento del terrorismo y el lavado de dinero.

**14.6 Protección de Datos Personales**

Las partes declaran tener conocimiento al respecto de *Due Diligence Documental*, pudiendo contratar a terceros prestadores de servicios para auditar previamente el estado legal del/de los inmueble/s, de sus propietarios y dueños, incluyendo la búsqueda de



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informaciones a través de certificados de organismos públicos, y puede almacenar una base de datos de las conclusiones de estas auditorías.

**14.7 Efecto Vinculante; Cesión**

(a) Este Contrato es vinculante y revertirá en beneficio de las Partes y sus cesionarios autorizados.

(b) Cualquier cesión o transferencia de este Contrato o de los derechos derivados del mismo que se lleve a cabo sin el consentimiento de la otra Parte será nula y sin efecto; entendiéndose que el COMPRADOR podrá ceder este Contrato a una subsidiaria, afiliada o los Prestamistas bajo los términos del Financiamiento.

**14.8 Modificación del Contrato**

Todas las modificaciones, consentimientos, adendas o renuncias de cualquier disposición de este Contrato serán efectivas solo si se firma una adenda por escrito y firmada por las Partes.

**14.9 Costos**

Cada Parte correrá con todos los costos que haya incurrido como consecuencia de la preparación, negociación y firma del presente Contrato.

**14.10 Comunicaciones**

(a) Cualquier notificación u otra comunicación relacionada a este Contrato (cada uno, una "**Notificación**") se entregará en manos, correo electrónico, o carta certificada, en las siguientes direcciones:

Si es para el COMPRADOR:



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PARACEL S.A.
[dirección]
A la atención de: [●]
Correo electrónico: [●]
Teléfono: [●]

Con copia a:

Dirección: [●]
A la atención de: Fabiano da Rocha Stein
Correo electrónico: fabiano.stein@paracel.com.py
Teléfono móvil: +55 11 93758 0483

Si es para el VENDEDOR:

[VENDEDOR]
[dirección]
A la atención de: [●]
Correo electrónico: [●]
Teléfono: [●]

(b) La Notificación tendrá efecto una vez recibida y se considerará recibida: (i) al momento de la entrega, si se entrega en manos, por carta certificada o portador; o (ii) en el momento de la transmisión en un formato legible, si se envía por correo electrónico.

## 15. NULIDAD

Si se determina que alguna disposición de este Contrato es ilegal, nula o inaplicable, en todo o en parte, la disposición se aplicará con cualquier exclusión o modificación necesaria para que la disposición sea legal, válida y aplicable y tenga efecto en la intención comercial de las Partes.

## 16. LEY APLICABLE Y RESOLUCIÓN DE DISPUTAS

(a) La interpretación y ejecución de este Contrato, y todos los asuntos relacionados, se regirán por las leyes de la República del Paraguay.

(b) Las Partes harán todo lo posible para resolver cualquier controversia de manera amistosa, mediante negociaciones directas realizadas de buena fe.



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(c) En caso de que las Partes no logren llegar a un acuerdo sobre una eventual disputa o controversia, las Partes acuerdan someter dicha disputa o controversia que surja de este Contrato o tenga relación con el mismo, con su interpretación, validez o invalidez, a un proceso de arbitraje ante el Centro de Arbitraje y Mediación Paraguay (en adelante, el "CAMP") de la Cámara Nacional de Comercio y Servicios de Paraguay. El procedimiento se llevará a cabo en las instalaciones del CAMP o en otras instalaciones mediando acuerdo de parte, de acuerdo con el reglamento de arbitraje del CAMP, ante un tribunal arbitral conformado por tres (3) árbitros designados de la lista del Cuerpo Arbitral del CAMP, que decidirá conforme a derecho, siendo el laudo definitivo y vinculante para las Partes. Se aplicará el reglamento respectivo y demás disposiciones que regule dicho procedimiento al momento de ser requerido, declarando las partes conocer y aceptar los vigentes, incluso en orden a su régimen de gastos y costas, considerándolos parte integrante del presente Contrato. El término costos incluye los honorarios de los abogados. El procedimiento arbitral, el laudo y, en general, el procedimiento arbitral, serán confidenciales.

## 17. FIRMA ELECTRÓNICA

Conforme a la legislación aplicable, las Partes expresamente acuerdan usar y reconocer como válidos para los propósitos de este Contrato, todos y cada uno de los medios de prueba de consentimiento de los términos aquí pactados en formato electrónico. El consentimiento de las Partes de los términos de este instrumento en cualquiera de las formas acordadas anteriormente será suficiente para vincular completamente a las Partes y para la validez y aplicabilidad de este Contrato como título extrajudicial.

## 18. FORMAN PARTE INTEGRANTE DEL PRESENTE INSTRUMENTO LOS SIGUIENTES ANEXOS:

Anexo A – Especificaciones
Anexo B – Lista del/de los Inmueble/s
Anexo C – Cantidades y Cronograma de Entrega
Anexo D – Contratos Inmobiliarios
Anexo E – Programación de Anticipos Financieros
Anexo F – Contrato de Derecho Real de Superficie Forestal

Y, en muestra de conformidad y aceptación de los términos de este Contrato, las partes firman el presente Contrato en 3 (tres) ejemplares de igual tenor y a un mismo efecto.

[ciudad], [fecha]



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[Página de Firmas a Continuación]



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Página de Firmas del Contrato de Compraventa de Madera en Pie celebrado el día y año mencionados a continuación.

**PARACEL S.A.**

Por:
Nombre:
Cargo:

[VENDEDOR]

Por:
Nombre:
Cargo:

[GARANTE]

Por:
Nombre:
Cargo:



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**ANEXO A**
**ESPECIFICACIONES**

| | |
|---|---|
| Especies de madera | Eucalyptus grandis, urophylla e híbridos; globulus; dunnii |
| Densidad básica de la madera | 480 ± 20 kg/m³sc |
| Contenido de humedad de la madera | 35 ± 5% |
| Tiempo después del corte (TPC) | 90 a 120 días |
| Longitud de los troncos | Máximo 7,2 metros; Mínimo 3,0 metros; Promedio 6,0 metros |
| Diámetro de los troncos | Máximo 45 cm; Mínimo 4,0 cm |
| Cantidad de corteza adherida al tronco | Máximo el 3% del volumen |
| Edad | 6 a 12 años |

- **Contaminación**: los troncos no pueden contener carbón (área dañada por incendio forestal o incendio en el apilado), cancro, hollín, plásticos, caucho, piedras o metal.

- La madera debe ser certificada por el sistema FSC (Forest Stewardship Council).

**Importante:** Este documento contiene las especificaciones corrientes de madera para la producción de celulosa en la planta de Paracel. Algunas especificaciones pueden ser modificadas a criterio del COMPRADOR y, si ello ocurriere, serán comunicadas por escrito al VENDEDOR.

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**ANEXO B**
**INMUEBLE/S**

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# ANEXO C
# CANTIDADES Y CRONOGRAMA DE ENTREGA

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# ANEXO D
# CONTRATOS INMOBILIARIOS

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# ANEXO E
# PROGRAMACIÓN DE ANTICIPOS FINANCIEROS

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# ANEXO F
# CONTRATO DE DERECHO REAL DE SUPERFICIE FORESTAL

Este CONTRATO DE CONSTITUCION DE DERECHO REAL DE SUPERFICIE FORESTAL, es celebrado en [fecha], (el **"Contrato de DRSF"**), entre, por una parte, PARACEL S.A., una sociedad debidamente constituida y válidamente existente conforme a las leyes de la República de Paraguay, con Registro Único del Contribuyente Nº 80106417-1, con domicilio en la calle Facundo Machaín Nº 6462, representada en este acto por su director y apoderado, el señor Nils Erik Gunnarsson Grafström, con cédula de identidad paraguaya N° 7.718.427, (el **"Superficiario"** o **"Paracel"**), y por la otra parte, [VENDEDOR], una sociedad debidamente constituida y válidamente existente conforme a las leyes de [país]**,** con Registro Único del Contribuyente Nº [•], con domicilio en [•], representada en este acto por [•], con cédula de identidad [origen] N° [•] (el **"Constituyente"**).

En adelante, el Superficiario y el Constituyente en lo sucesivo serán referidos cada uno individualmente como una "**Parte**" y en su conjunto como las "**Partes**".

## CONSIDERANDOS

A. El Superficiario y el Constituyente celebraron un Contrato de Compraventa de Madera con Destino Convenido en Puerto en fecha [fecha] (en adelante, el "**Contrato de Compraventa**").

B. Paracel, una sociedad constituida y válidamente existente conforme con las leyes de Paraguay, pretende construir y operar, en la región de Concepción, Paraguay, una fábrica de celulosa "*greenfield*" de última generación, con una capacidad de producción anual esperada de aproximadamente 1,5 millones de toneladas métricas al año de celulosa kraft de eucalipto blanqueada (BEKP) (la "**Planta**").

C. El Constituyente es una empresa dedicada, entre otras actividades, a la producción y comercialización de troncos de árboles de eucalipto y es propietario del/de los Inmueble/s listados en el Anexo B del Contrato de Compraventa.

D. Las Partes desean celebrar este Contrato de DRSF para la constitución del Derecho Real de Superficie Forestal ("**DRSF**") a favor del Superficiario en el marco del Contrato de Compraventa.

E. Las Partes llegaron a un acuerdo sobre las condiciones de la constitución del DRSF.

## CLÁUSULAS

### 1. Objeto

El Constituyente acepta otorgar y constituir a favor del Superficiario el derecho real de superficie forestal, regido bajo la Ley No. 4890/2013, de la República de Paraguay, bajo las cláusulas especialmente establecidas en este Contrato de DRSF y en el marco del Contrato de Compraventa.

### 2. Inmueble

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El Constituyente acuerda gravar con derecho real de superficie forestal a favor del Superficiario, y este acepta, el inmueble individualizado con la Matricula Nº [•], con Padrón [•] del Distrito de [•] con todo lo plantado, con una superficie aproximada de [•] (en adelante, el "**Inmueble**").

## 3. Precio

El precio del DRSF se halla incluido en y cubierto por el Precio de Compra (como se define en el Contrato de Compraventa).

## 4. Plazo

El plazo del DRSF constituido a favor del Superficiario será de [igual plazo que el Contrato de Compraventa] y el Contrato de DRSF entrará en vigor a partir de la fecha de la firma del presente Contrato de DRSF.

## 5. Garantías del Constituyente

El Constituyente manifiesta y garantiza:

(a) Que el Constituyente tiene todas las autorizaciones estatutarias para gravar el Inmueble, incluyendo, pero sin limitarse a, [●].

(b) Que el Inmueble está libre de cualquier gravamen y de restricciones de dominio, y que no hay litigios, ni amenazas de haberlos en el futuro, que pudieran afectar los derechos de posesión y dominio del Superficiario.

(c) Que tiene la libre disponibilidad de sus bienes (incluida la del Inmueble) y que no ha celebrado con terceros sobre el Inmueble acto de disposición o administración alguno.

(d) Que el Inmueble se encuentra libre de locatarios, sublocatarios o cualquier ocupante precario o invasores.

(e) Que el Inmueble se encuentra libre de cualquier gravamen y/o derechos de usufructo, uso, servidumbres o cualquier otro derecho real que pudiera impedir o dificultar su libre disponibilidad o posesión.

(f) Que el Inmueble cuenta con licencia ambiental, así como de otras autorizaciones municipales, gobernaciones o de Autoridad Administrativa del Estado que sean necesarias para la explotación del Inmueble.

(g) Que no tiene conocimiento de reclamo alguno respecto del Inmueble que tuvieran o pudieran iniciar el INDERT, INDI, MADES, INSTITUTO FORESTAL NACIONAL, u otra entidad gubernamental o autárquica, o que hubiesen iniciado terceros en relación al mismo, o que hubiera un riesgo inminente de que ello ocurra.

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(h) Que se encuentra al día en el cumplimiento de las obligaciones tributarias que implica la propiedad del Inmueble y, en caso de no estarlo, queda obligada de manera inmediata a la regularización de las obligaciones pendientes hasta la formalización de la pertinente escritura pública de constitución de DRSF.

(i) Que el Inmueble no es objeto de títulos superpuestos y que la legalidad del título de propiedad en virtud del cual se celebra este Contrato de DRSF no se encuentra impugnado ni con riesgo de serlo.

(j) Que no hay conflictos de límites ni reclamo de propietarios de los inmuebles linderos respecto de la ubicación, forma, linderos o superficie del Inmueble, ni riesgo inminente de haberlos.

(k) Que el Superficiario gozará del libre acceso al Inmueble para su verificación, explotación y demás usos relacionados al objeto del presente Contrato de DRSF.

(l) Que el Superficiario cumplirá con todas las disposiciones del Contrato de Compraventa respecto del uso del Inmueble.

## 6. Notificaciones

Cualquier notificación u otra comunicación relacionada a este Contrato de DRSF se entregará en manos, correo electrónico, o carta certificada, en las siguientes direcciones:

(a) Si es para el Superficiario:

PARACEL S.A.
[dirección]
A la atención de: [●]
Correo electrónico: [●]
Teléfono: [●]

Con copia a:
Dirección: [*dirección en Paraguay*]
A la atención de: Fabiano da Rocha Stein
Correo electrónico: fabiano.stein@paracel.com.py
Teléfono móvil: +55 11 93758 0483

(b) Si es para el Constituyente:

[Constituyente]
[dirección]
A la atención de: [●]
Correo electrónico: [●]

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Teléfono: [●]

La Notificación tendrá efecto una vez recibida y se considerará recibida: (i) al momento de la entrega, si se entrega en manos, por carta certificada o portador; o (ii) en el momento de la transmisión en un formato legible, si se envía por correo electrónico.

## 7. Terminación

En conformidad con la Cláusula 13.2 (a) (*Terminación Anticipada*), el Constituyente tendrá derecho a terminar el presente Contrato cuando el Superficiario registre una mora mayor a 4 (cuatro) meses consecutivos del pago establecido en el Contrato de Compraventa y los mismos no estén sujetos a cualquier disputa.

## 8. Ley Aplicable y Resolución de Disputas

(a) La interpretación y ejecución de este Contrato, y todos los asuntos relacionados, se regirán por las leyes de la República del Paraguay.

(b) Las Partes harán todo lo posible para resolver cualquier controversia de manera amistosa, mediante negociaciones directas realizadas de buena fe.

(c) En caso de que las Partes no logren llegar a un acuerdo sobre una eventual disputa o controversia, las Partes acuerdan someter dicha disputa o controversia que surja de este Contrato o tenga relación con el mismo, con su interpretación, validez o invalidez, a un proceso de arbitraje ante el Centro de Arbitraje y Mediación Paraguay (en adelante, el "CAMP") de la Cámara Nacional de Comercio y Servicios de Paraguay. El procedimiento se llevará a cabo en las instalaciones del CAMP o en otras instalaciones mediando acuerdo de parte, de acuerdo con el reglamento de arbitraje del CAMP, ante un tribunal arbitral conformado por tres (3) árbitros designados de la lista del Cuerpo Arbitral del CAMP, que decidirá conforme a derecho, siendo el laudo definitivo y vinculante para las Partes. Se aplicará el reglamento respectivo y demás disposiciones que regule dicho procedimiento al momento de ser requerido, declarando las partes conocer y aceptar los vigentes, incluso en orden a su régimen de gastos y costas, considerándolos parte integrante del presente Contrato de DRSF. El término costos incluye los honorarios de los abogados. El procedimiento arbitral, el laudo y, en general, el procedimiento arbitral, serán confidenciales.

En prueba de conformidad y aceptación, suscriben las Partes tres (3) ejemplares de un mismo tenor y efecto, en los lugares indicados junto a cada firma.

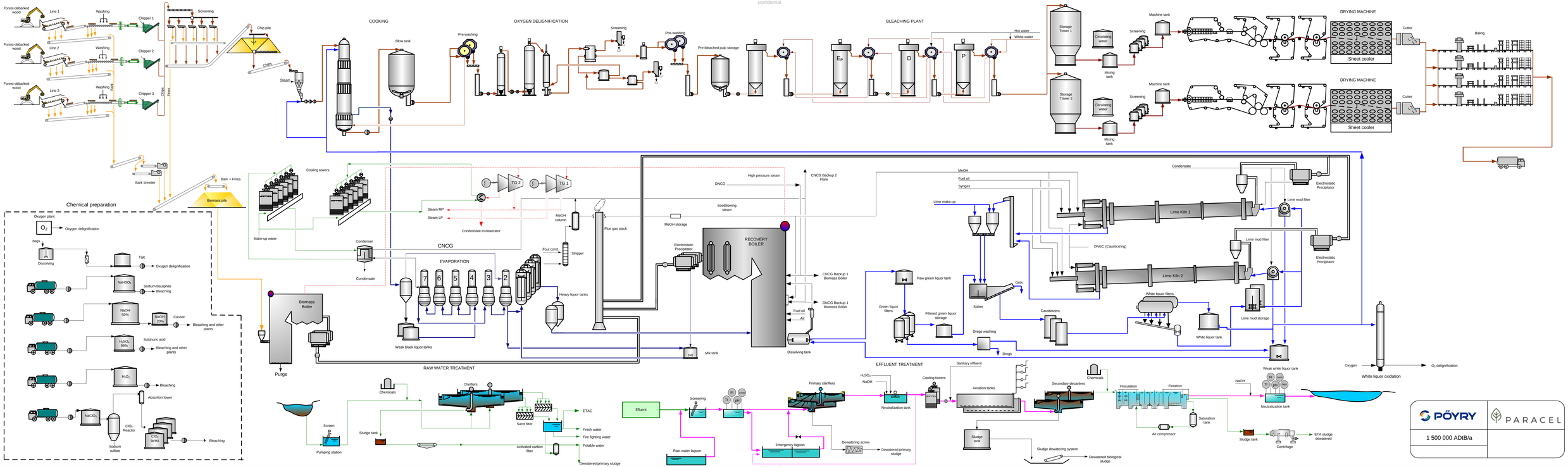
confidential

**[FIRMAS]**

# ANNEX V

# GENERAL PROCESS FLOWSHEET

confidential

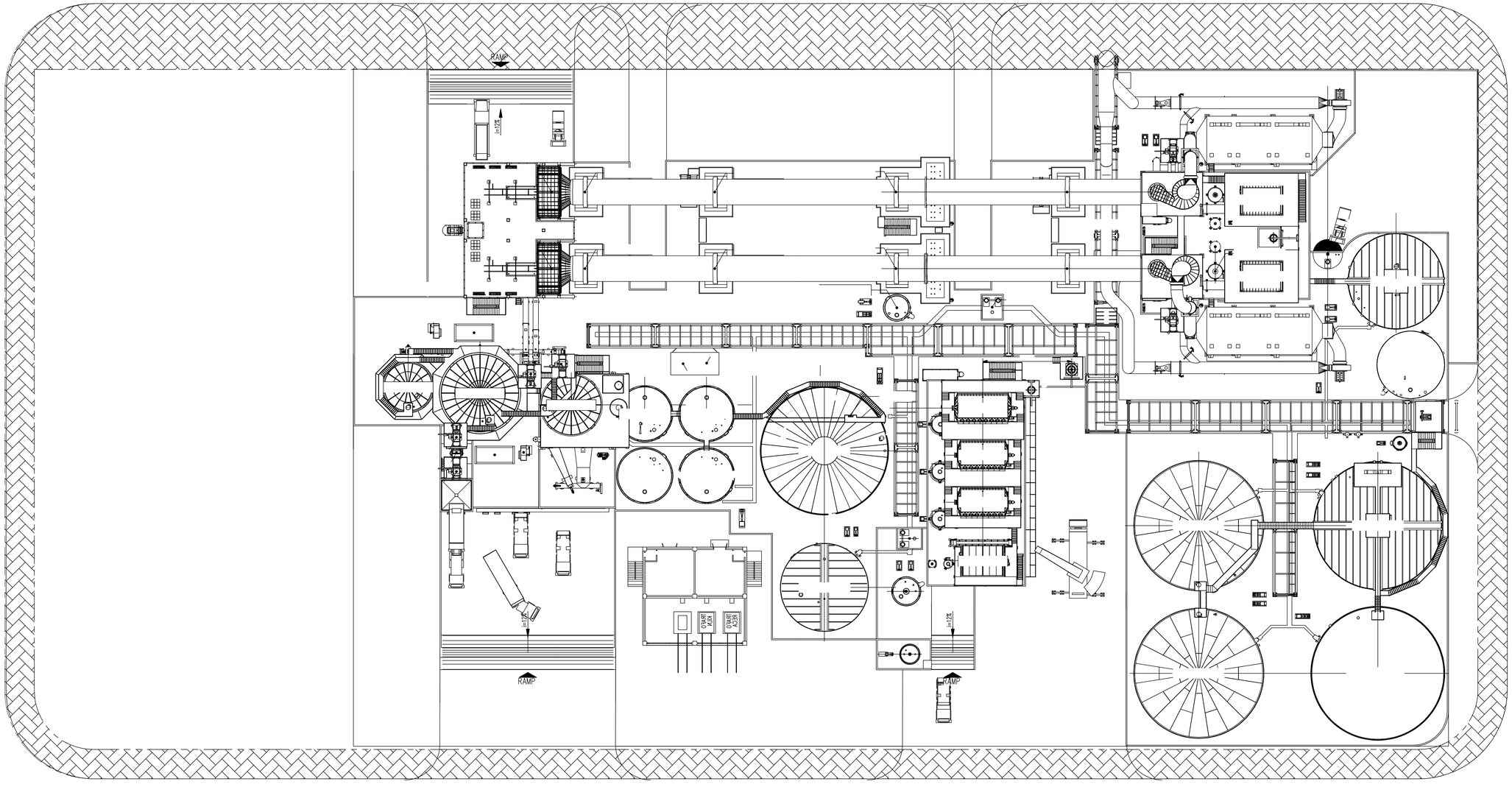



| | |
|---|---|
| PÖYRY / PARACEL | |
| 1 500 000 ADtB/a | |
| | |

# ANNEX VI

# CAUSTICIZING AND LIME KILN – GENERAL LAY OUT

confidential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KAMP
KAMP
OTWÓR KLIN
OTWÓR KLIN
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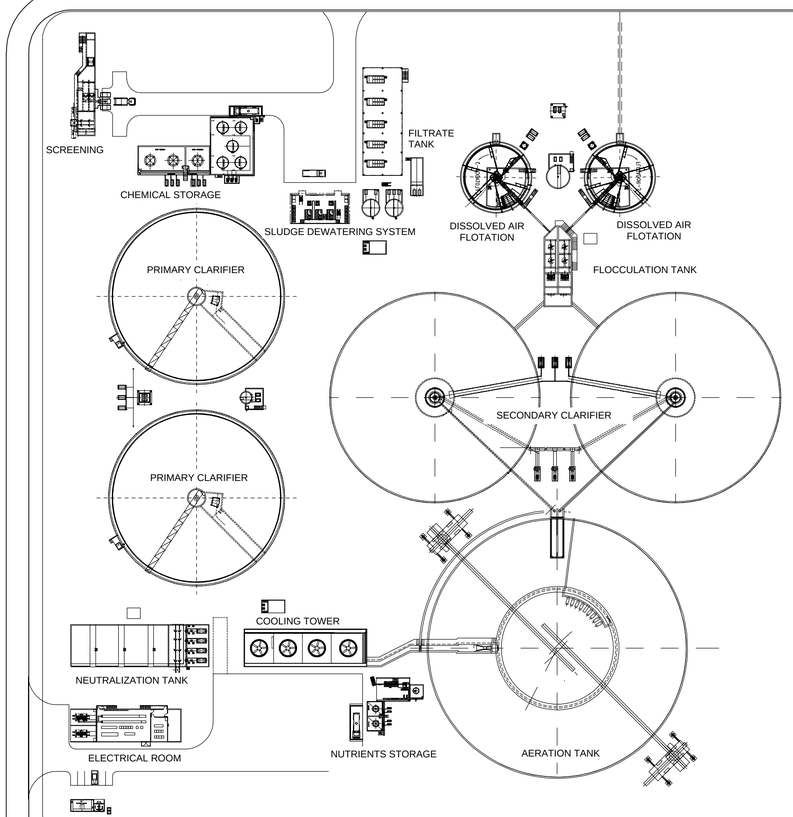
+1.00
+1.00

# ANNEX VII

# EFFLUENT TREATMENT PLANT – GENERAL LAY OUT

confidential




EMERGENCY LAGOON

TABELA DE REVISÕES

CÓDIGO DA FINALIDADE:
PR -PRELIMINAR
PA -PARA APROVAÇÃO
PI -PARA INFORMAÇÃO
PC -PARA COTAÇÃO
CO -PARA COMENTÁRIOS
LE -LIBERADO PARA EXECUÇÃO
LD -LIBERADO PARA DETALHAMENTO
CC -CONFORME CONSTRUÍDO
CA -CANCELADO

| REV. | DATA | PROJ. | VERIF. | APROV. | AUTOR. | FINALID. | DESCRIÇÃO |
|---|---|---|---|---|---|---|---|
| 0 | | | | | | | |

NOTAS

PENDÊNCIAS

DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|

DOCUMENTOS DE REFERÊNCIA

| TÍTULO | NÚMERO |
|---|---|

DISTRIBUIÇÃO

| PARA | REVISÃO 0 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|

c: CÓPIA/IMPRESSÃO/PLOTAGEM (PAPEL) E: ARQ. ELETRÔNICO

PÖYRY PARACEL

RESP./TÍTULO/Nº CREA | Nº DO CLIENTE | REV.

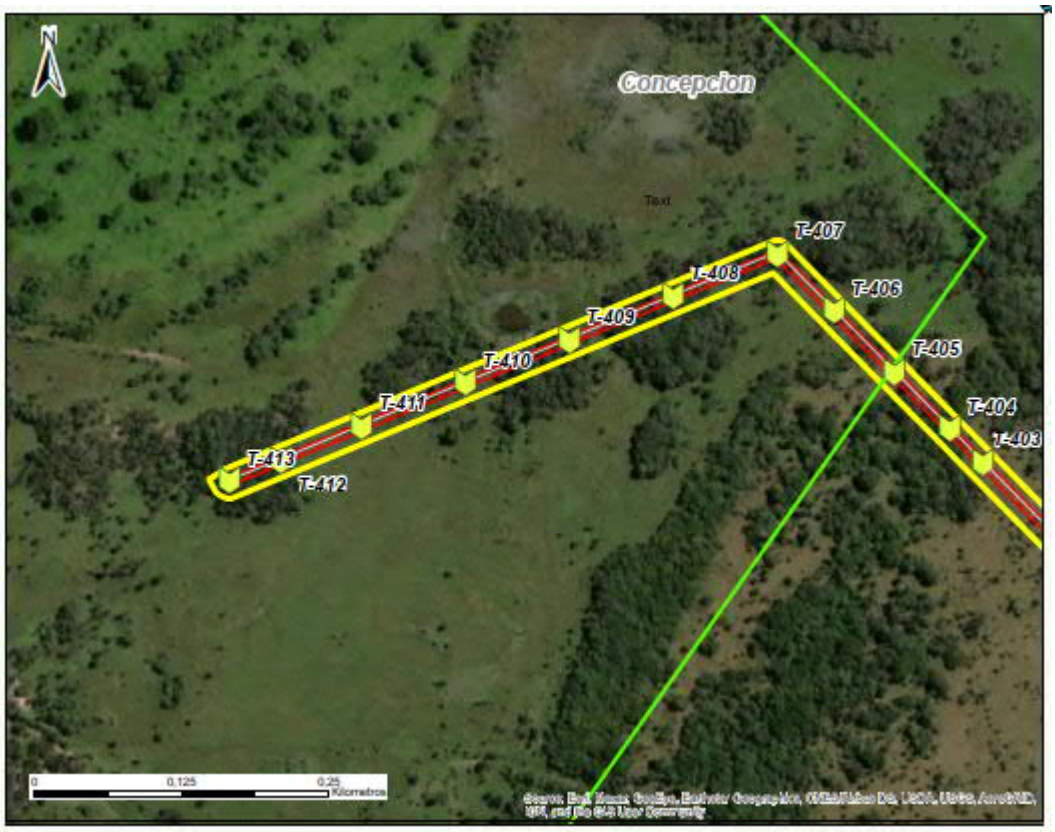
TÍTULO
EFFLUENT TREATMENT PLANT
GENERAL LAYOUT

| ESCALA | UNIDADE | PROJEÇÃO | Nº PÖYRY | REV. |
|---|---|---|---|---|
| S/E | | | | 0 |

0

confidential

# ANNEX VIII
# TRANSMISSION LINE TRENCHES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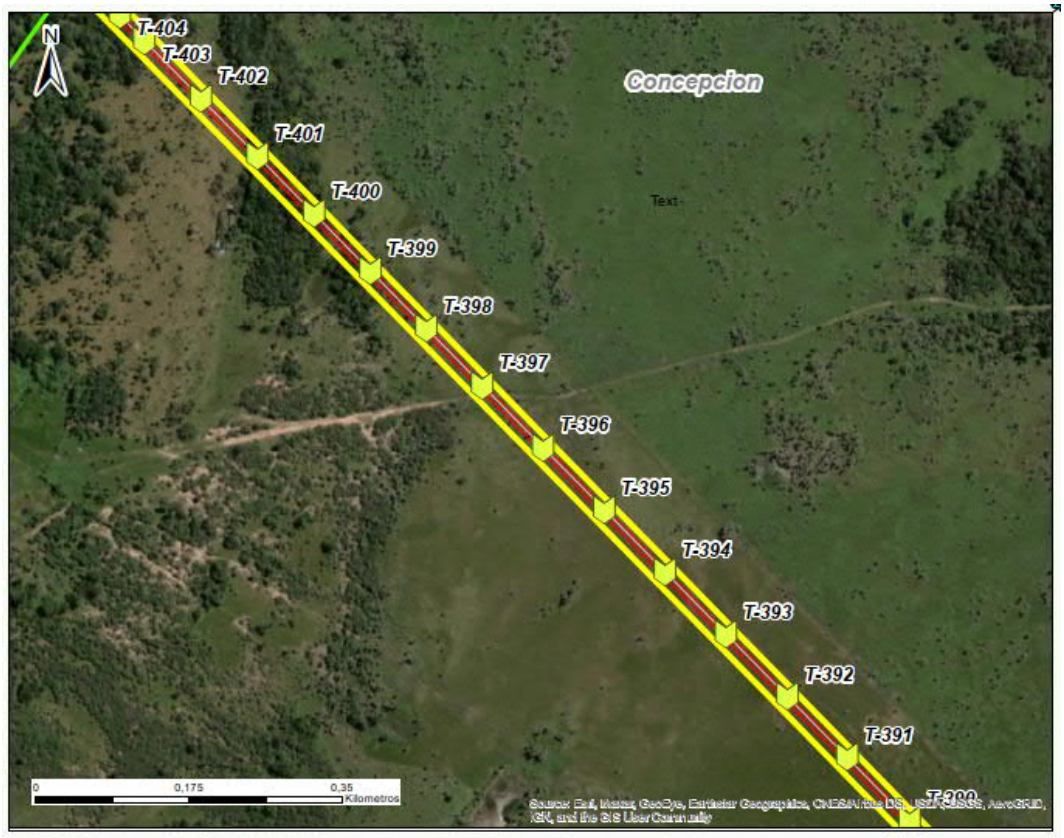
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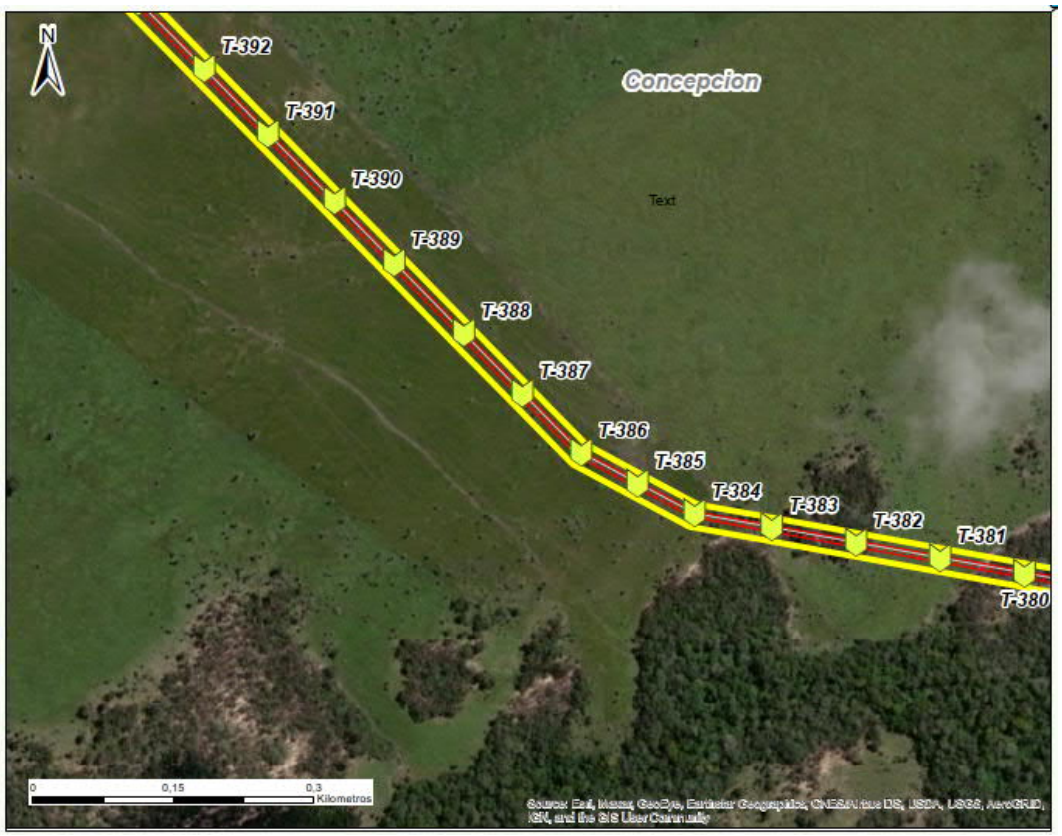
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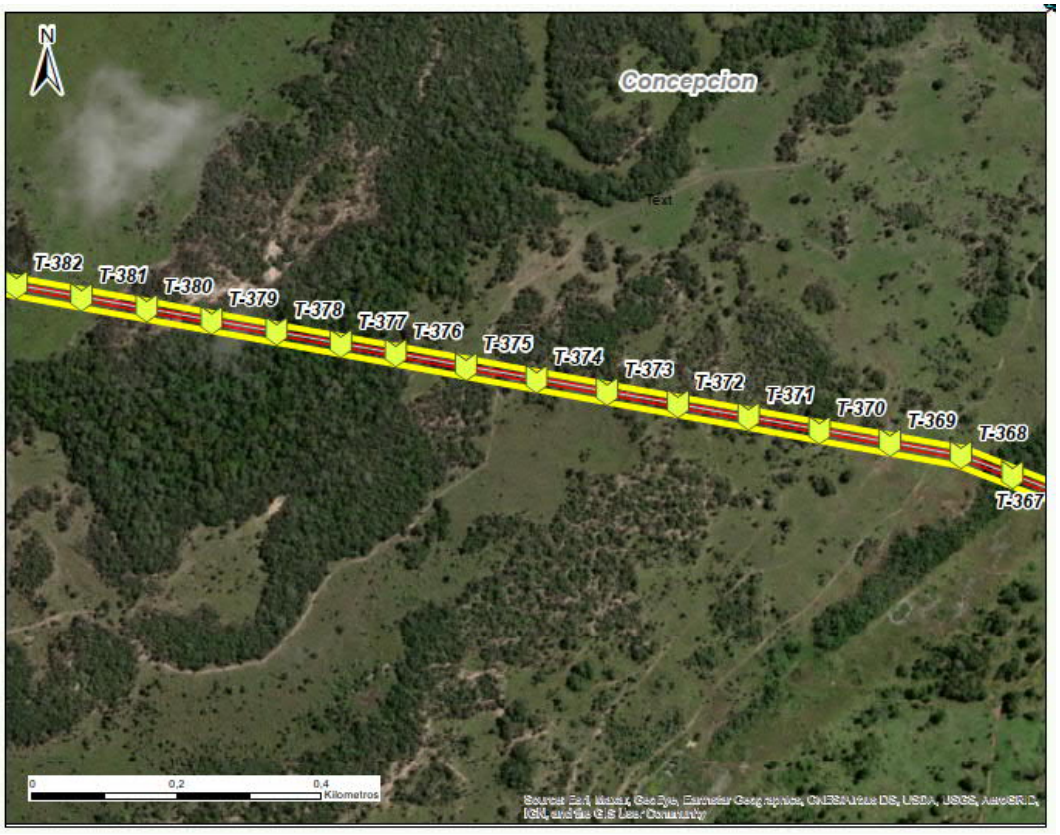
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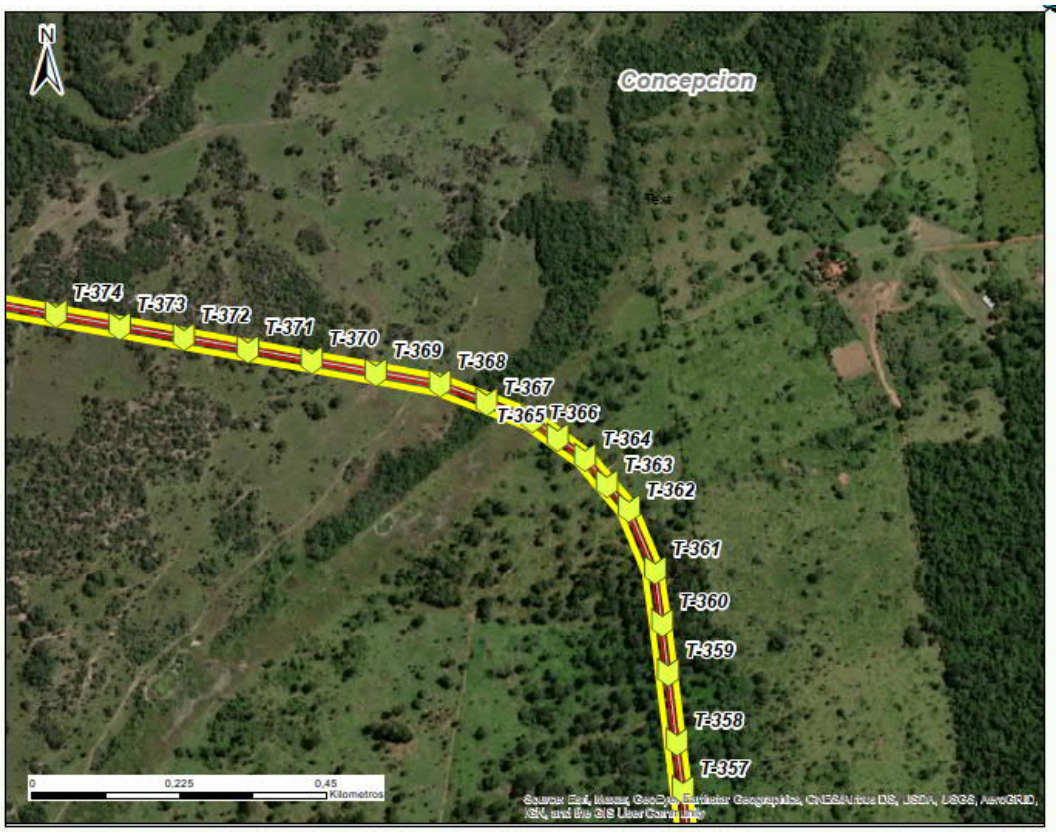
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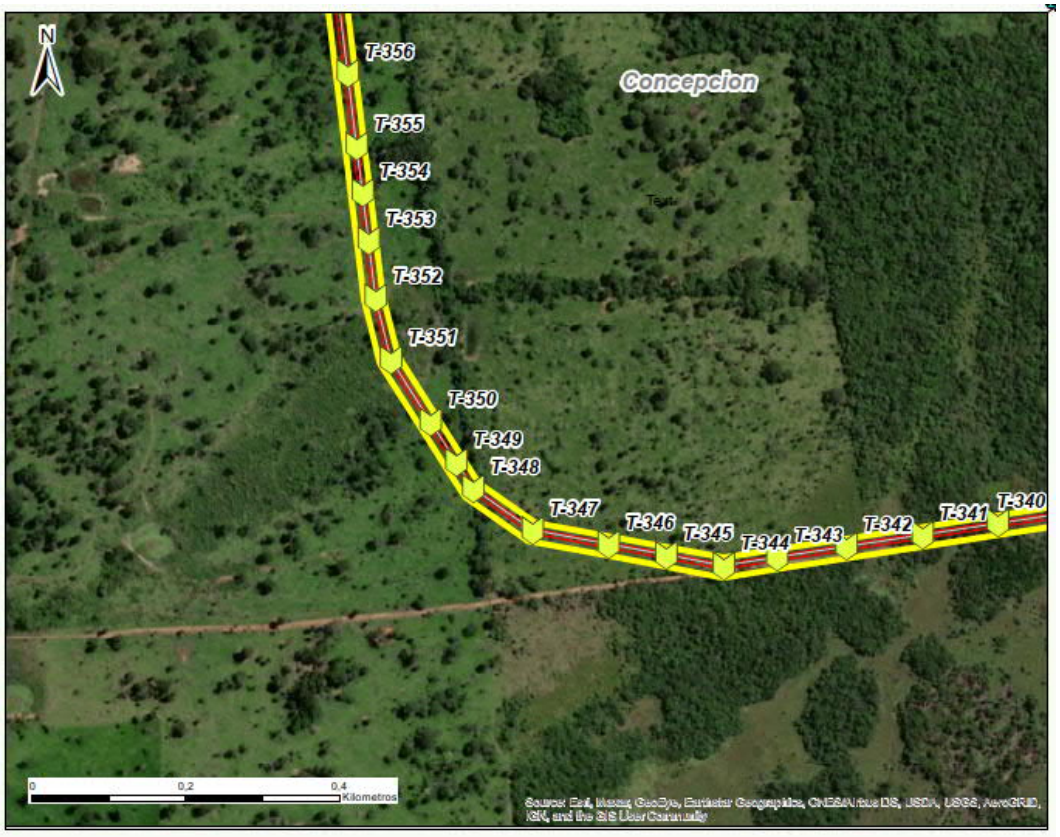
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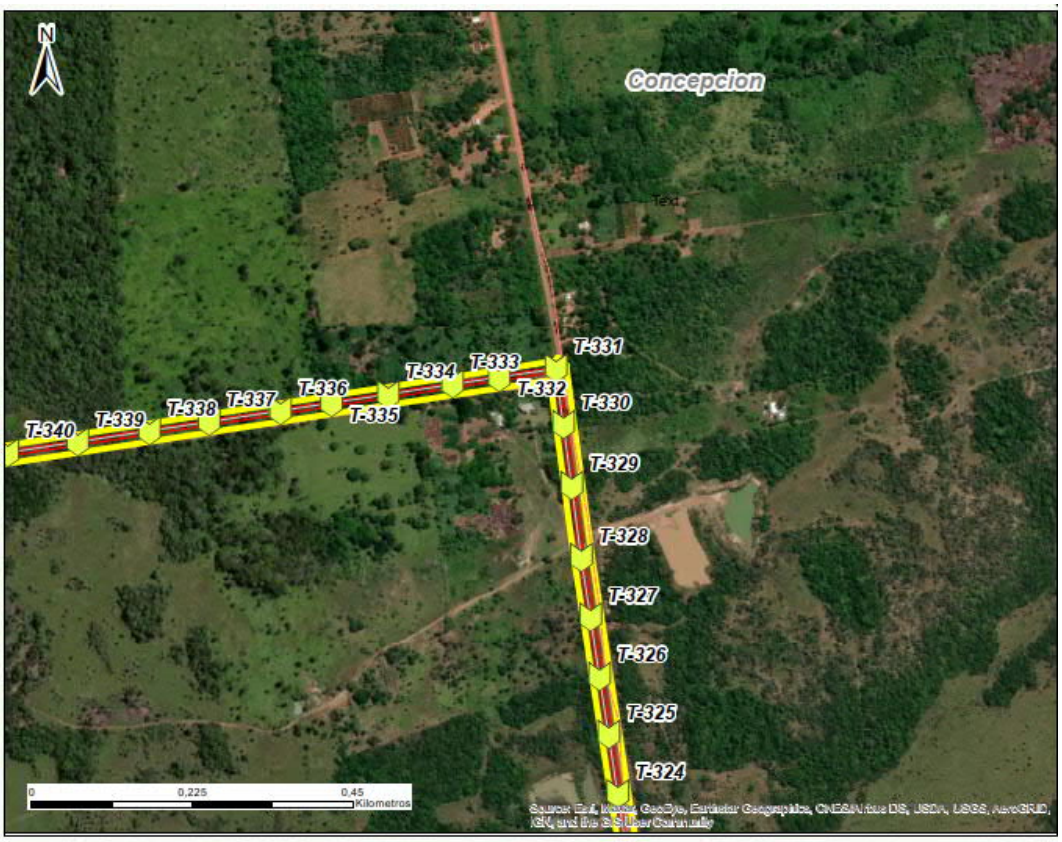
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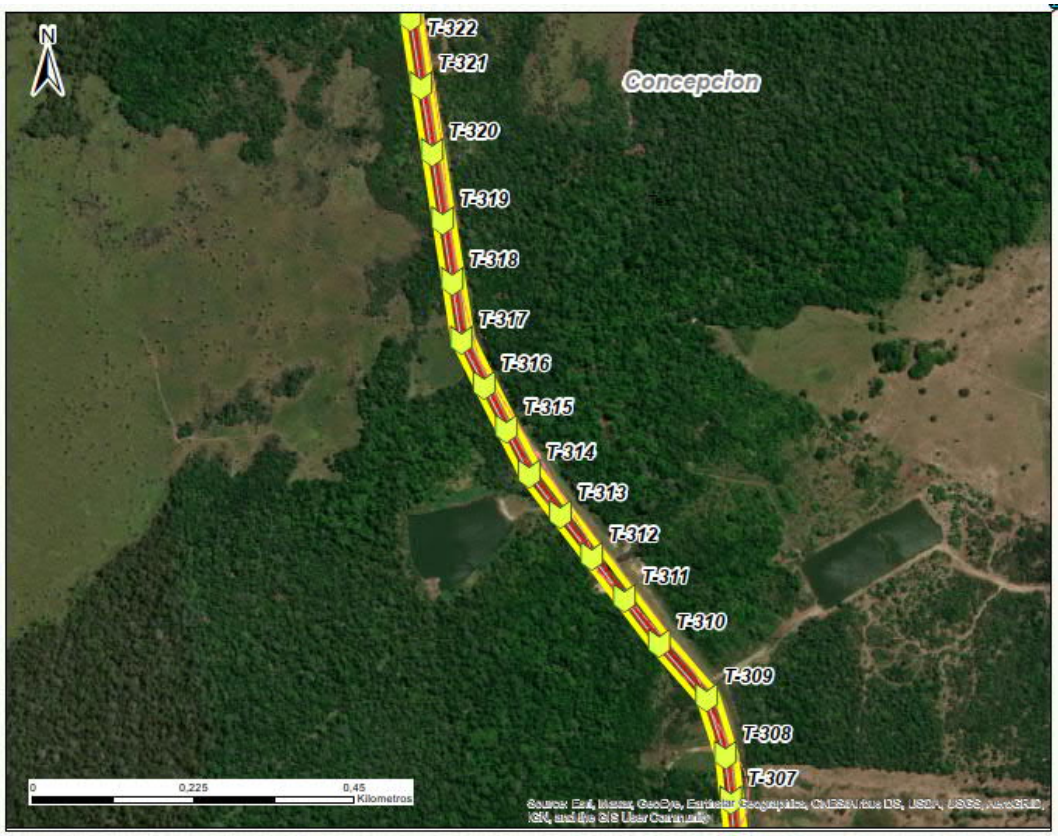
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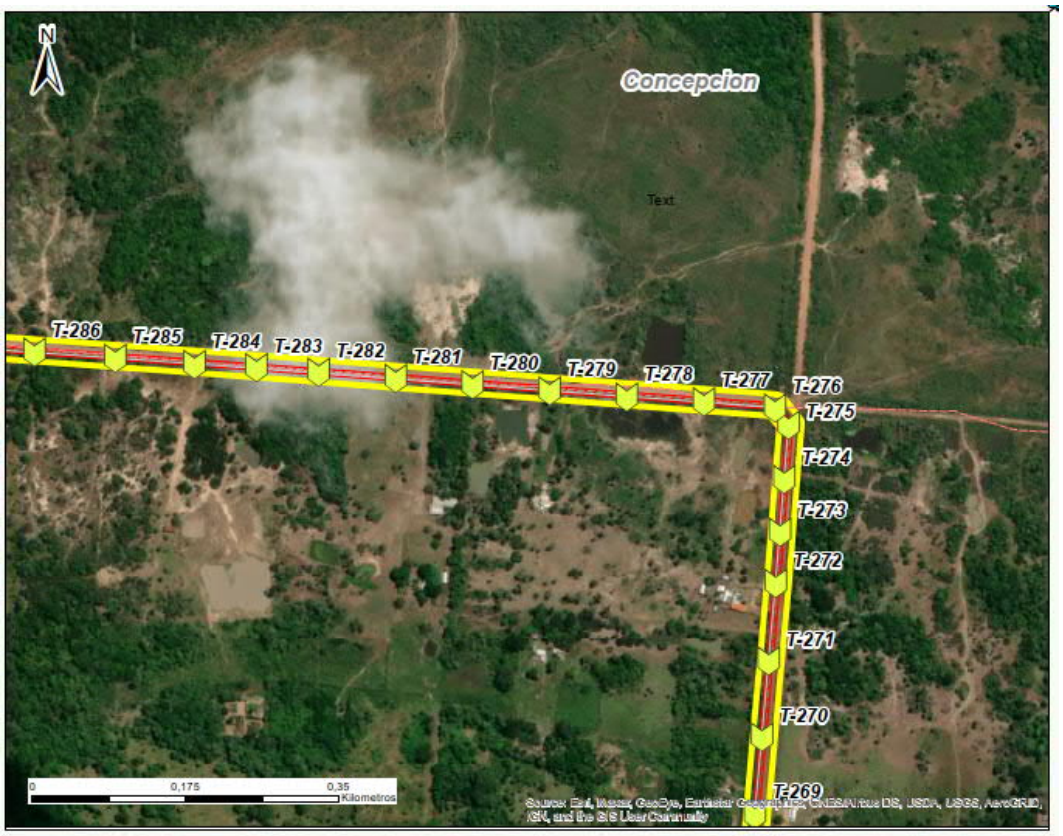
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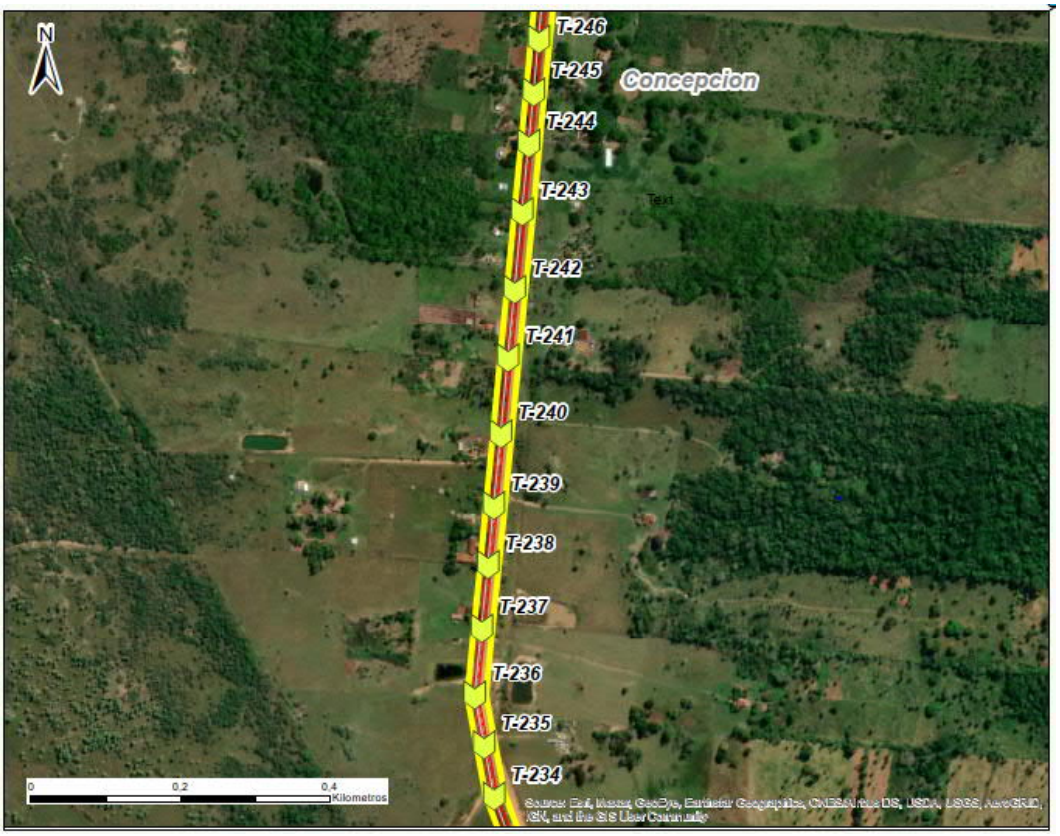
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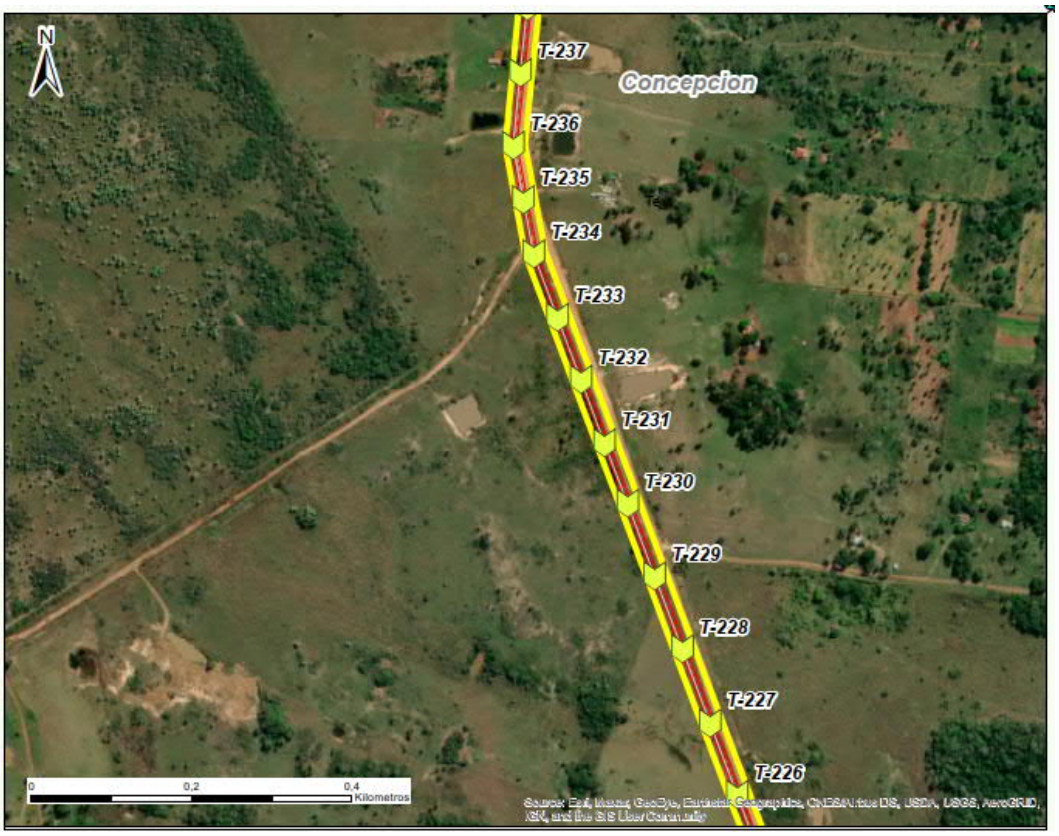
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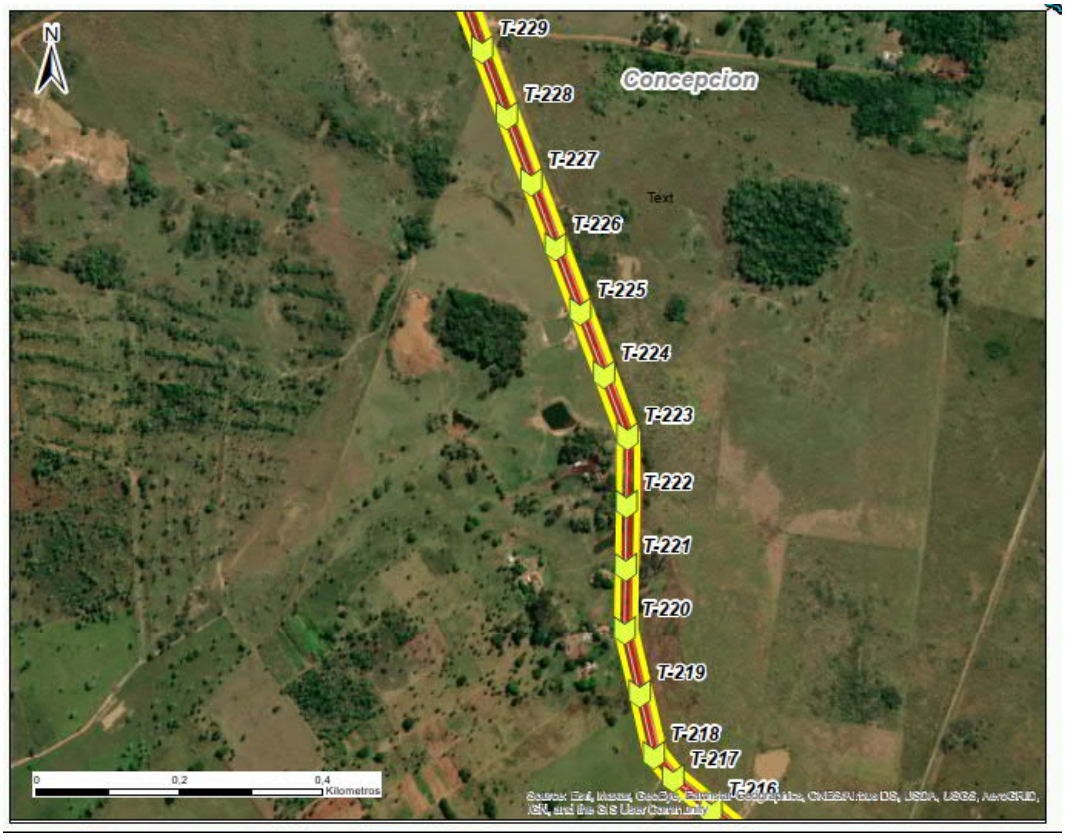
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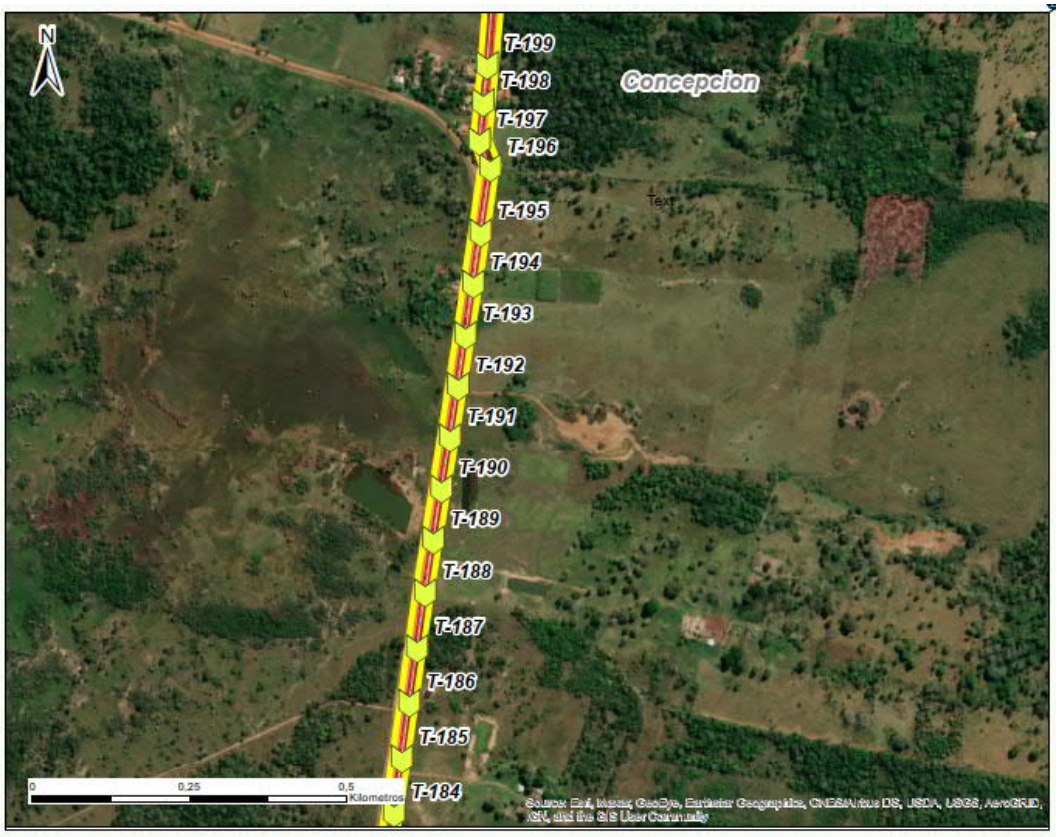
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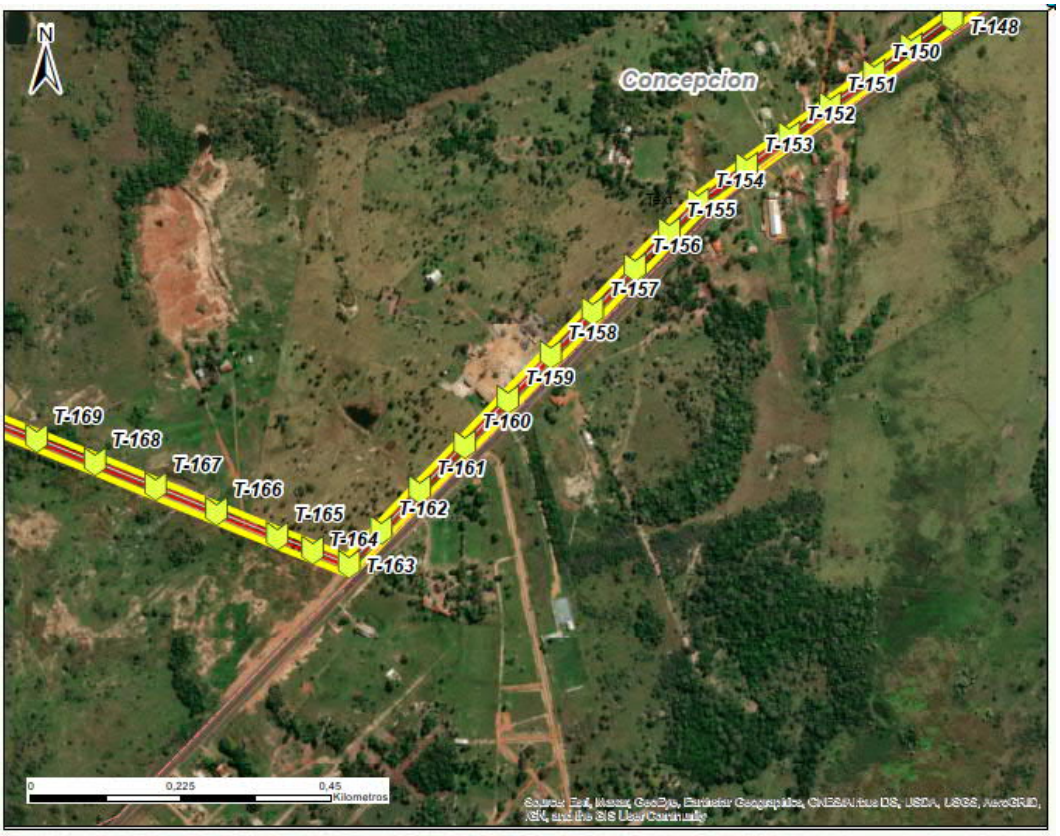
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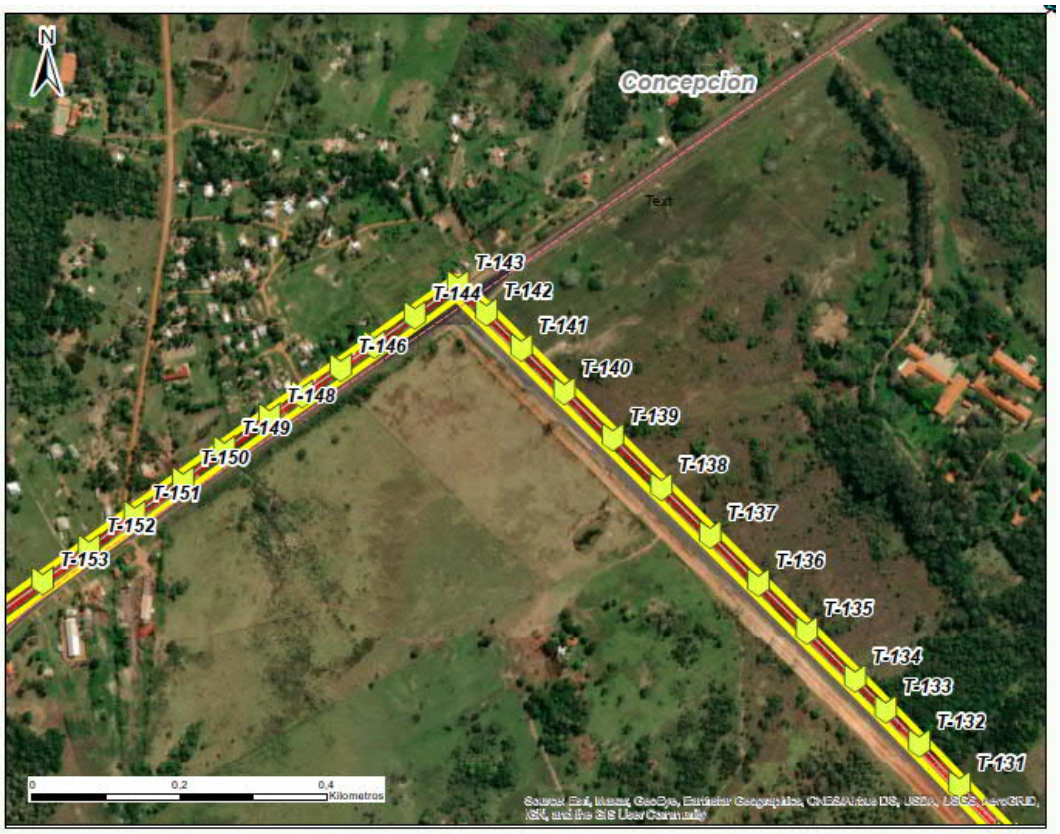
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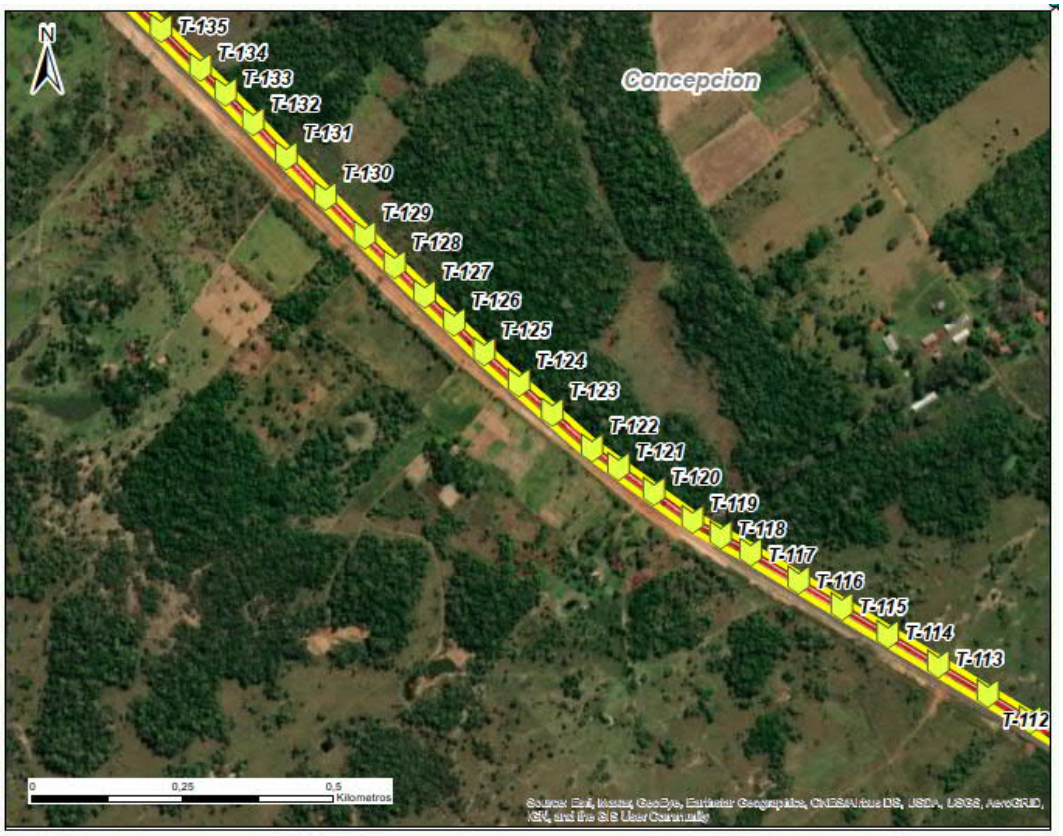
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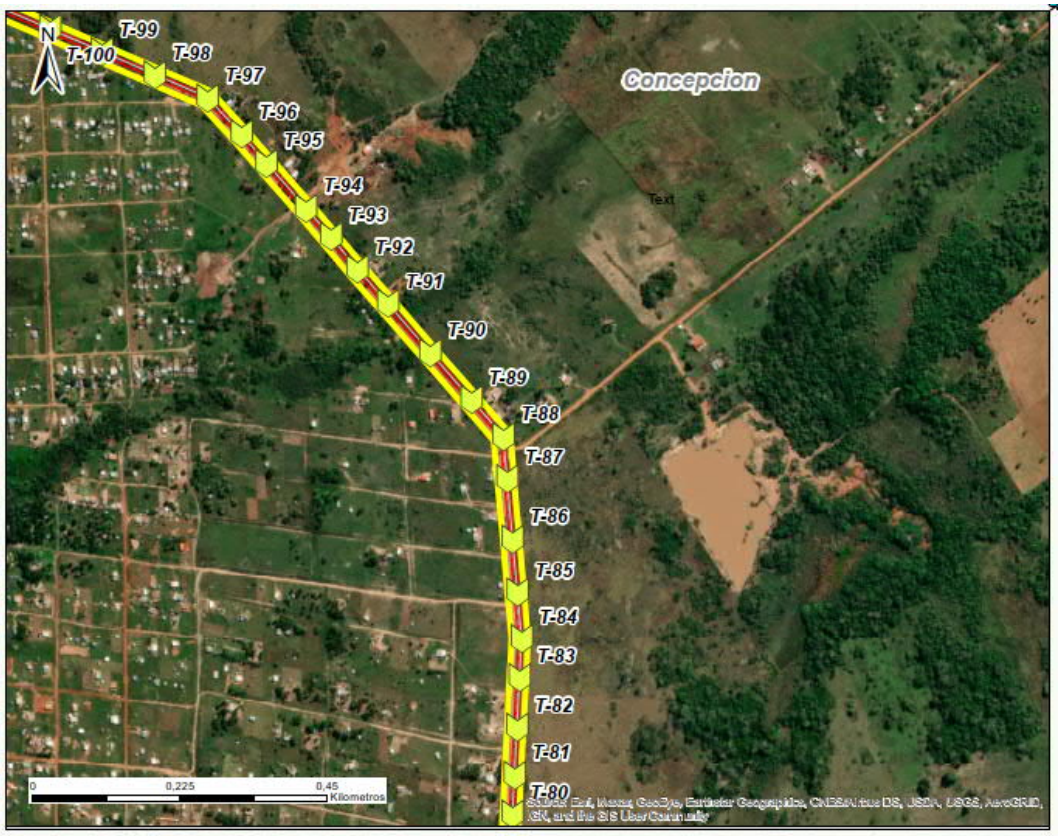
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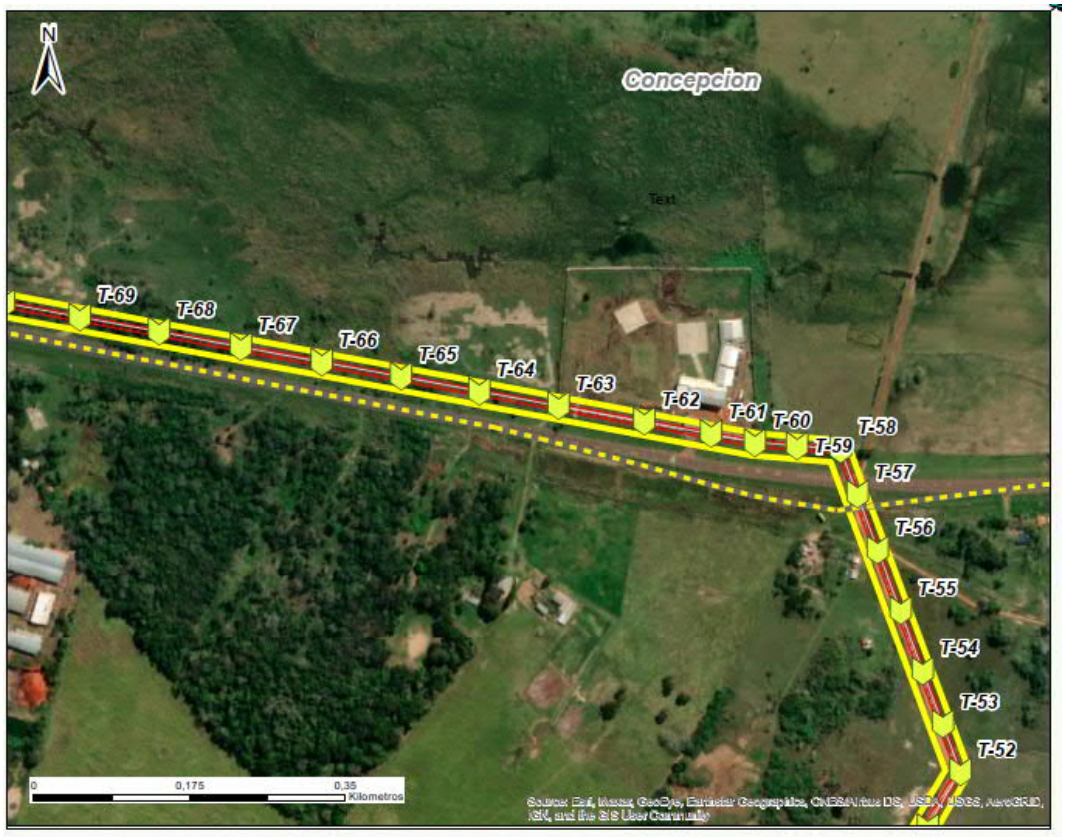
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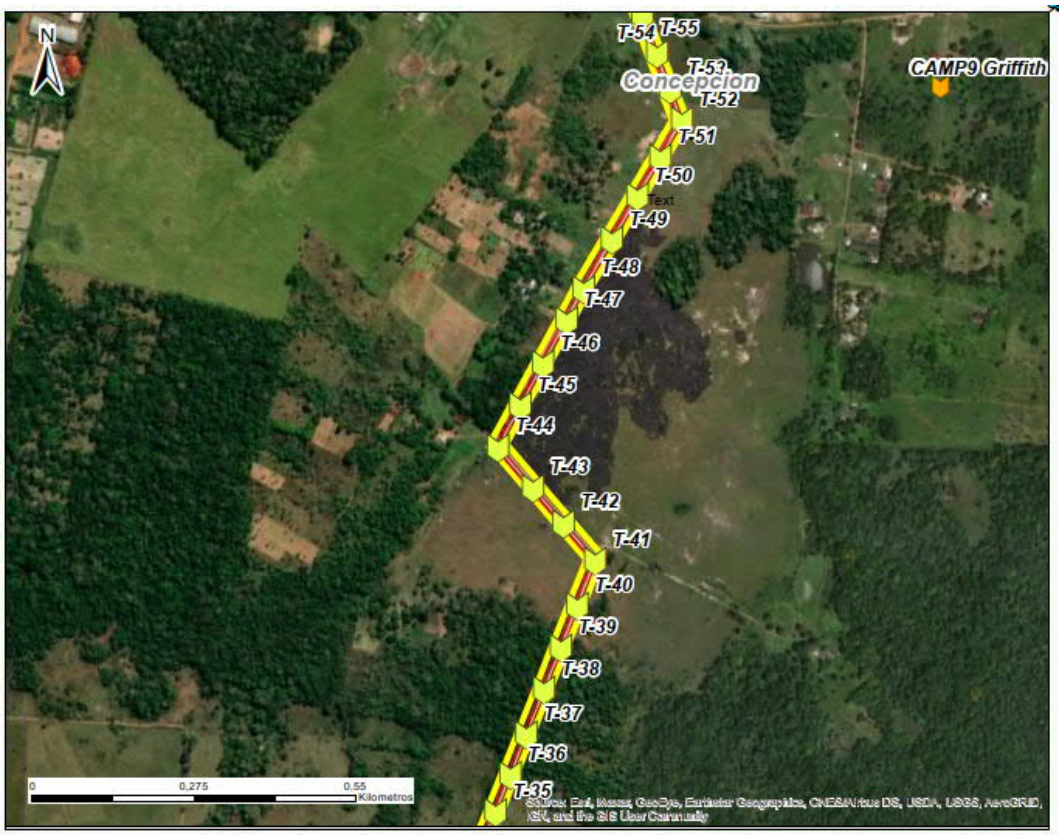
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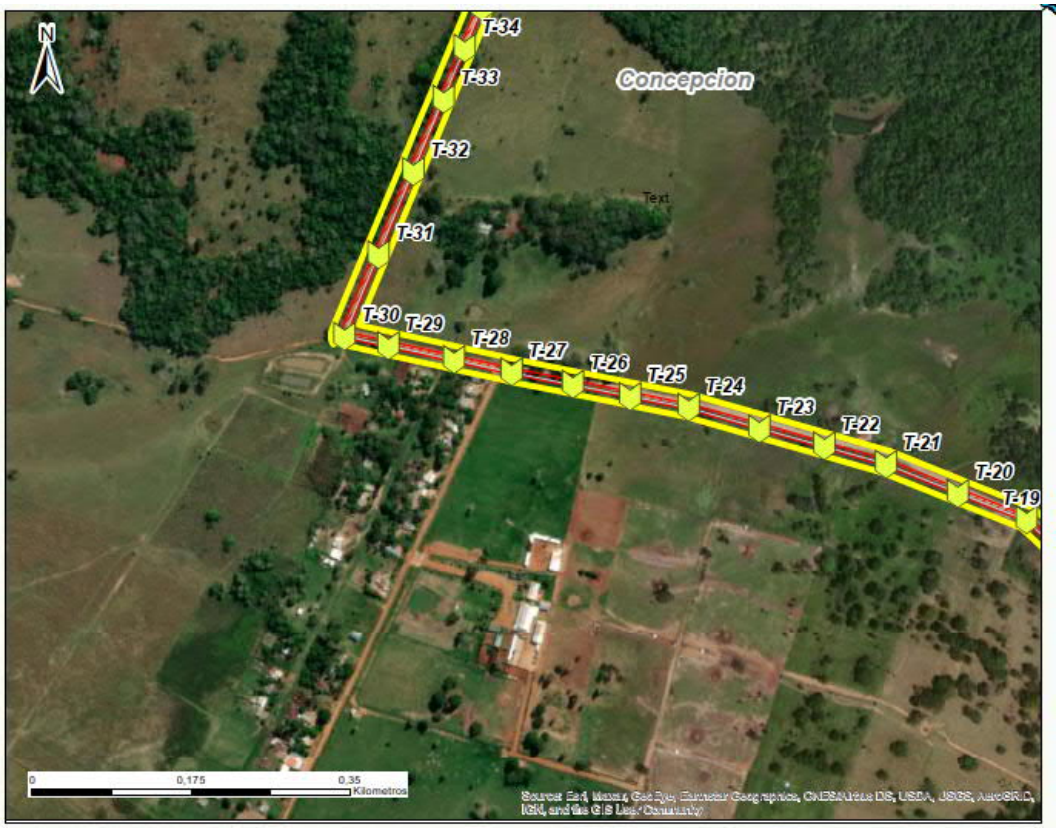
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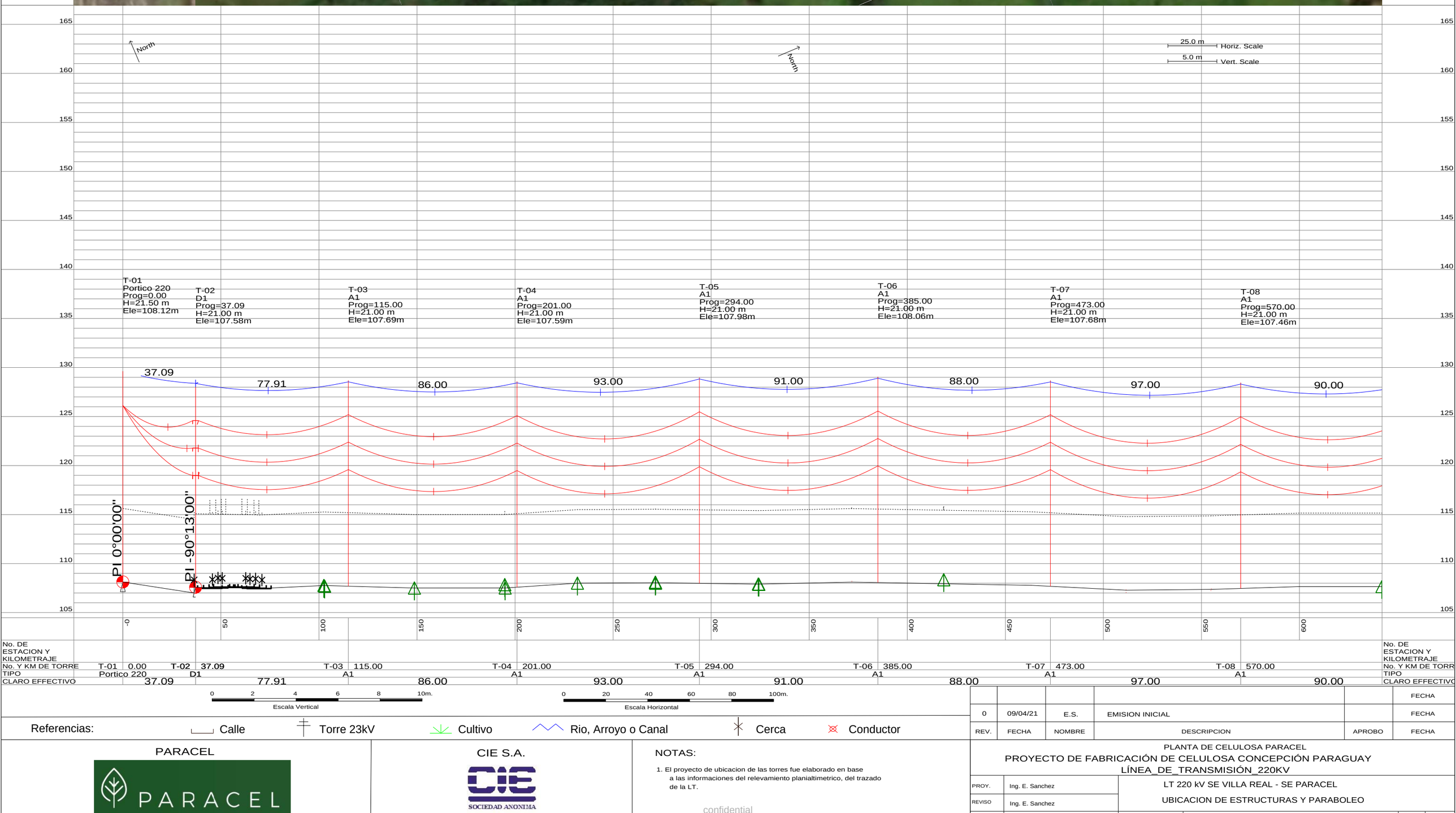
PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

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PLANTA DE CELULOSA PARACEL

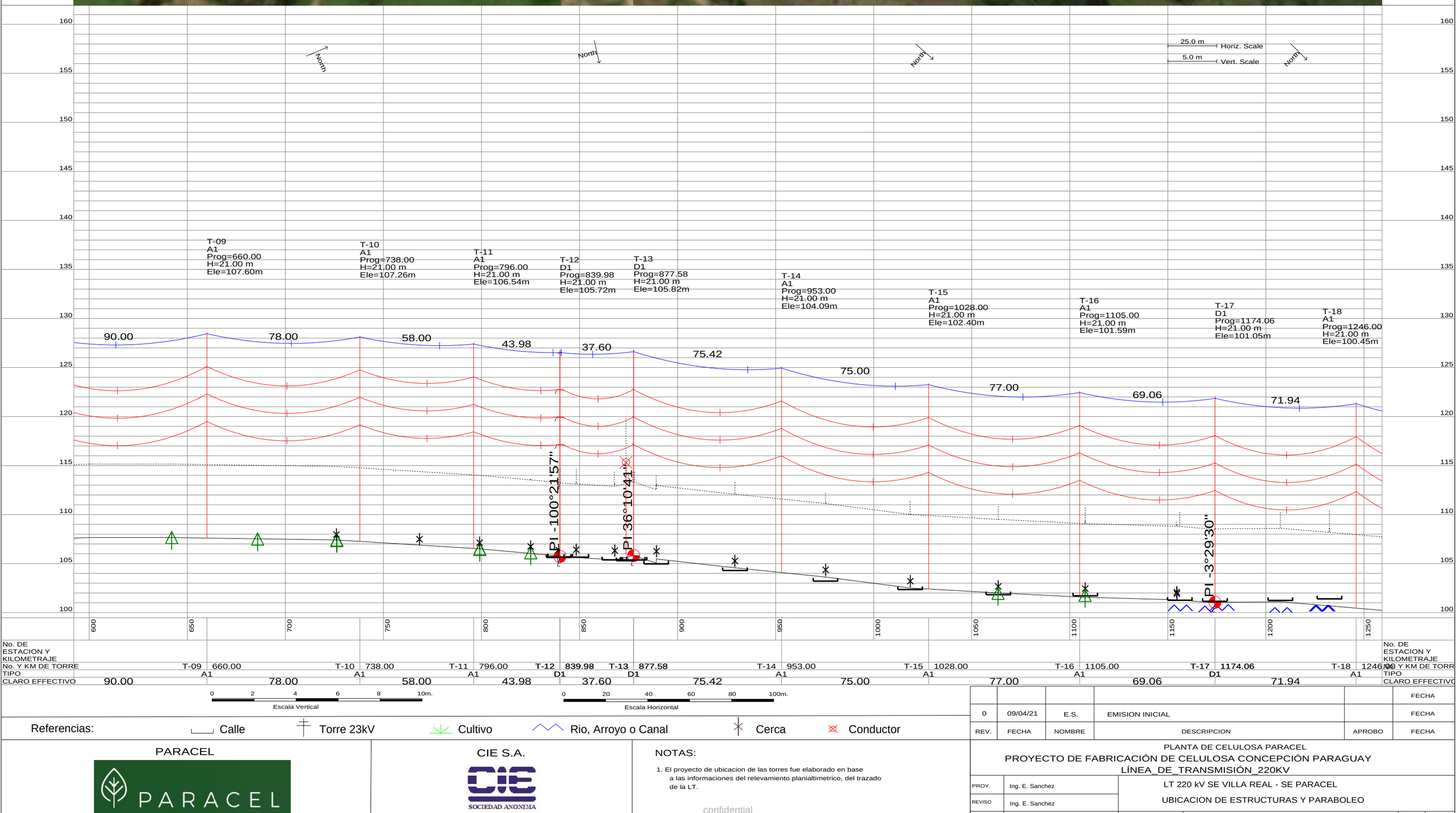
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-1 Rev. 0 Hj. 01 |

PLS-CADD Drawing




| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-09 | 660.00 | T-10 | 738.00 | T-11 | 796.00 | T-12 | 839.98 | T-13 | 877.58 | T-14 | 953.00 | T-15 | 1028.00 | T-16 | 1105.00 | T-17 | 1174.06 | T-18 | 1246.00 | No. Y KM DE TORRE |
| TIPO | A1 | | A1 | | A1 | | D1 | | D1 | | A1 | | A1 | | A1 | | D1 | | A1 | | TIPO |
| CLARO EFFECTIVO | 90.00 | | 78.00 | | 58.00 | | 43.98 | | 37.60 | | 75.42 | | 75.00 | | 77.00 | | 69.06 | | 71.94 | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

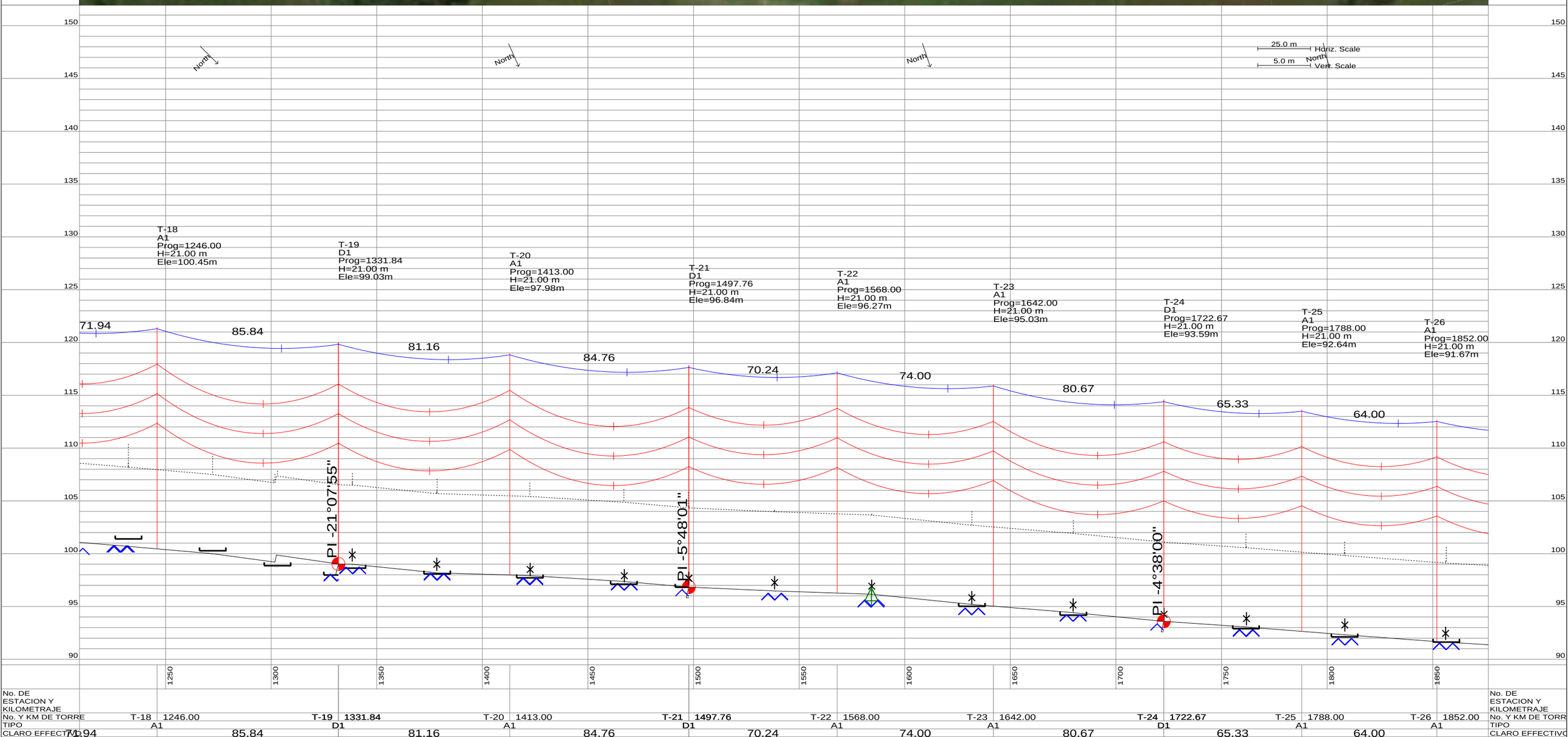
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-2 | Rev. 0 | Hj. 02 |

PLS-CADD Drawing




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | T-18 | 1246.00 | T-19 | 1331.84 | T-20 | 1413.00 | T-21 | 1497.76 | T-22 | 1568.00 | T-23 | 1642.00 | T-24 | 1722.67 | T-25 | 1788.00 | T-26 | 1852.00 | No. DE ESTACION Y KILOMETRAJE |
| TIPO | A1 | | D1 | | A1 | | D1 | | A1 | | A1 | | D1 | | A1 | | A1 | | TIPO |
| CLARO EFECTIVO | 71.94 | 85.84 | | 81.16 | | 84.76 | | 70.24 | | 74.00 | | 80.67 | | 65.33 | | 64.00 | | | CLARO EFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

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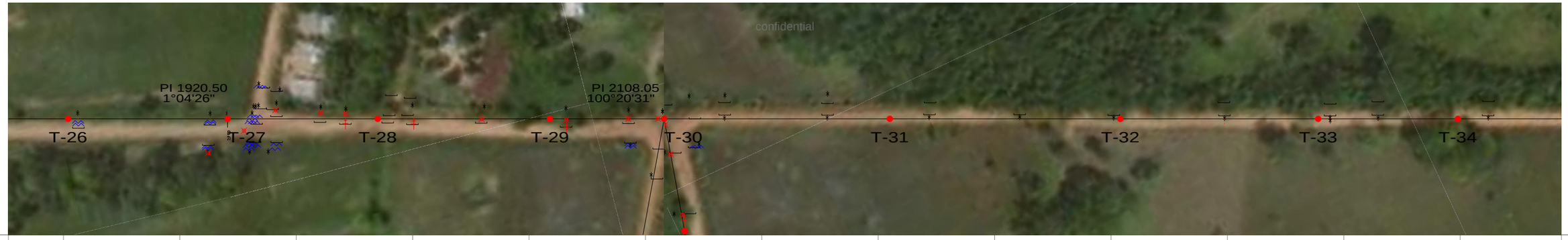
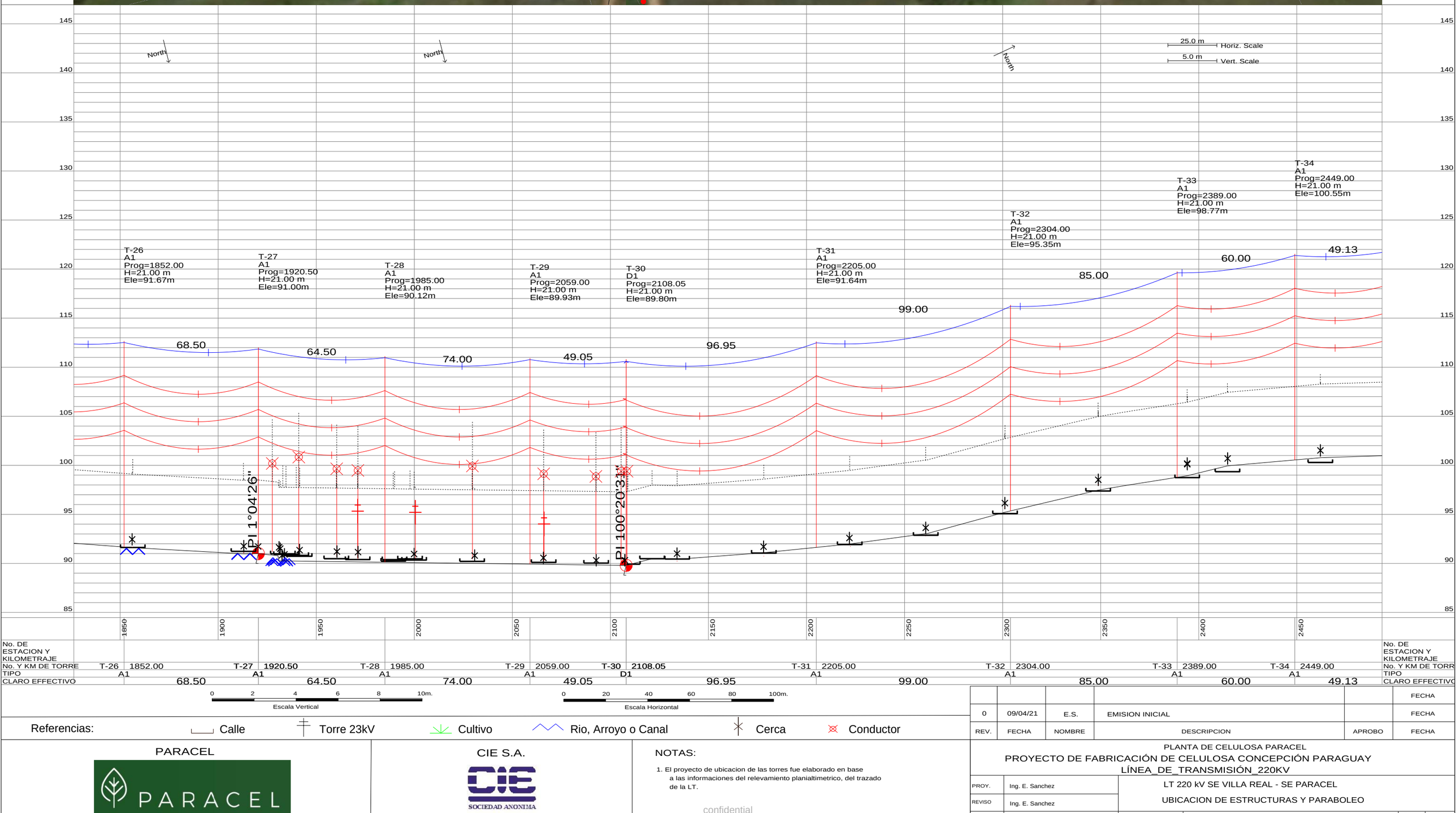
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-3 | Rev. 0 | Hj. 03 |




| No. DE ESTACION Y KILOMETRAJE | | T-26 | 1852.00 | T-27 | 1920.50 | T-28 | 1985.00 | T-29 | 2059.00 | T-30 | 2108.05 | T-31 | 2205.00 | T-32 | 2304.00 | T-33 | 2389.00 | T-34 | 2449.00 | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | | | | | | | | | | | | | | | | | | | | No. Y KM DE TORRE |
| TIPO | | A1 | | A1 | | A1 | | A1 | | D1 | | A1 | | A1 | | A1 | | A1 | | TIPO |
| CLARO EFFECTIVO | | | 68.50 | | 64.50 | | 74.00 | | 49.05 | | 96.95 | | 99.00 | | 85.00 | | 60.00 | | 49.13 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

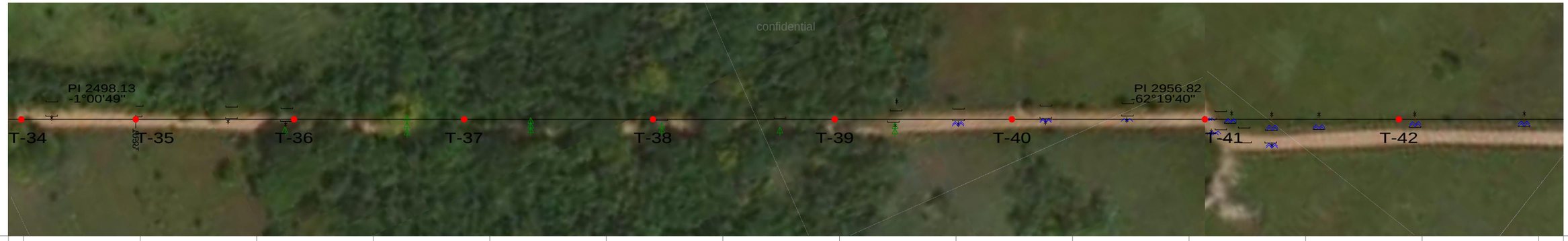
NOTAS:

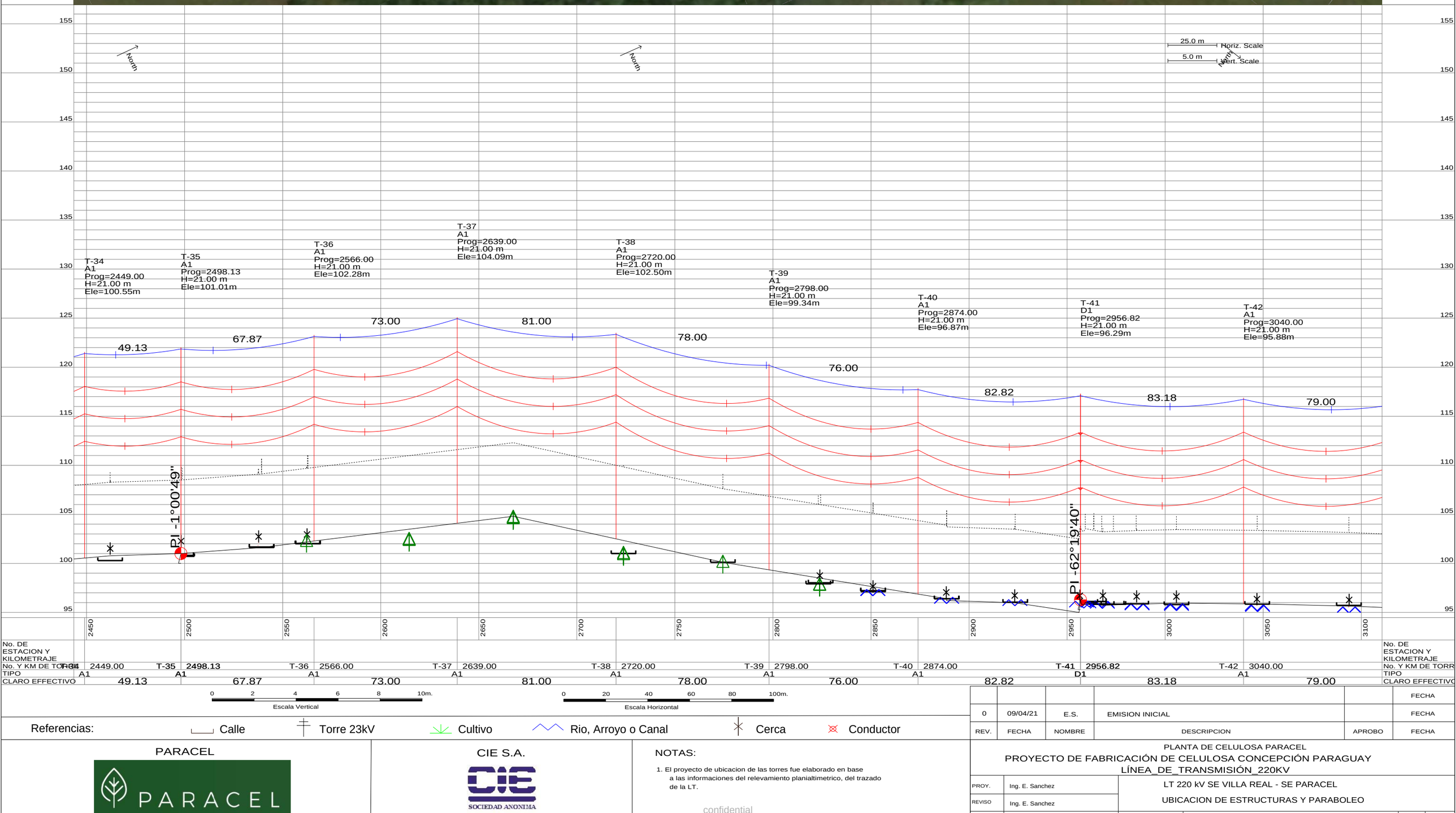
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-4 Rev. 0 Hj. 04 |




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

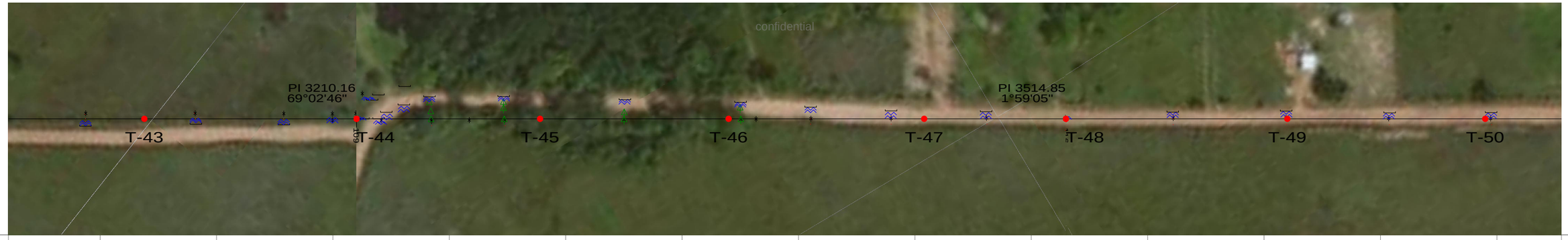
confidential

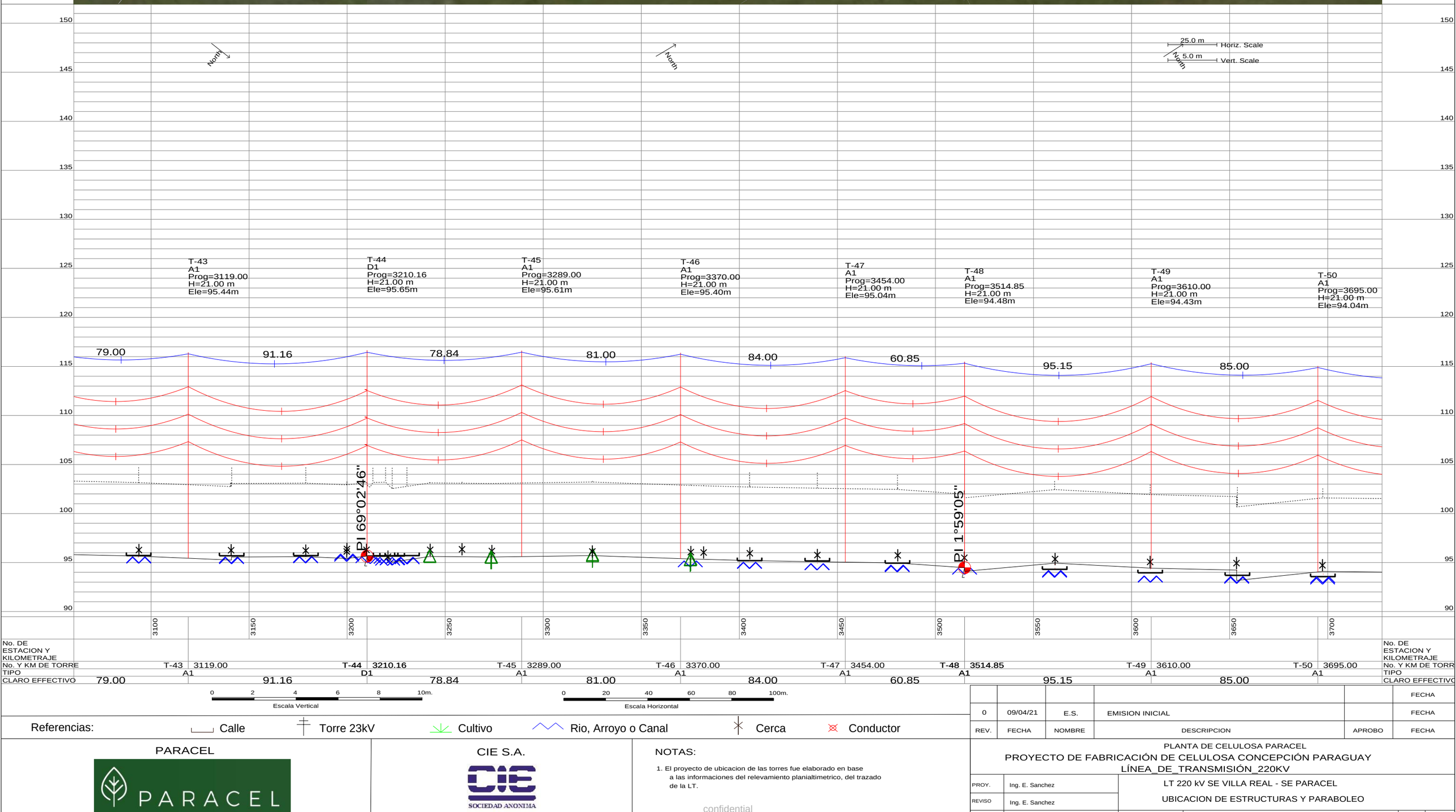
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

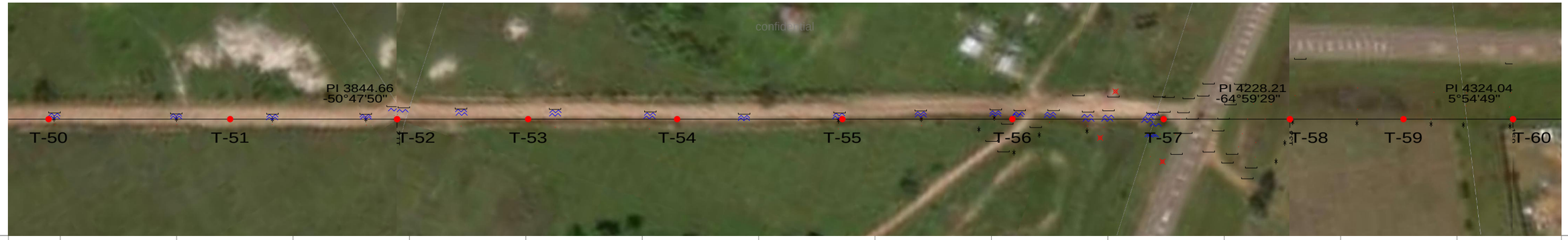
| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-5 Rev. 0 Hj. 05 |

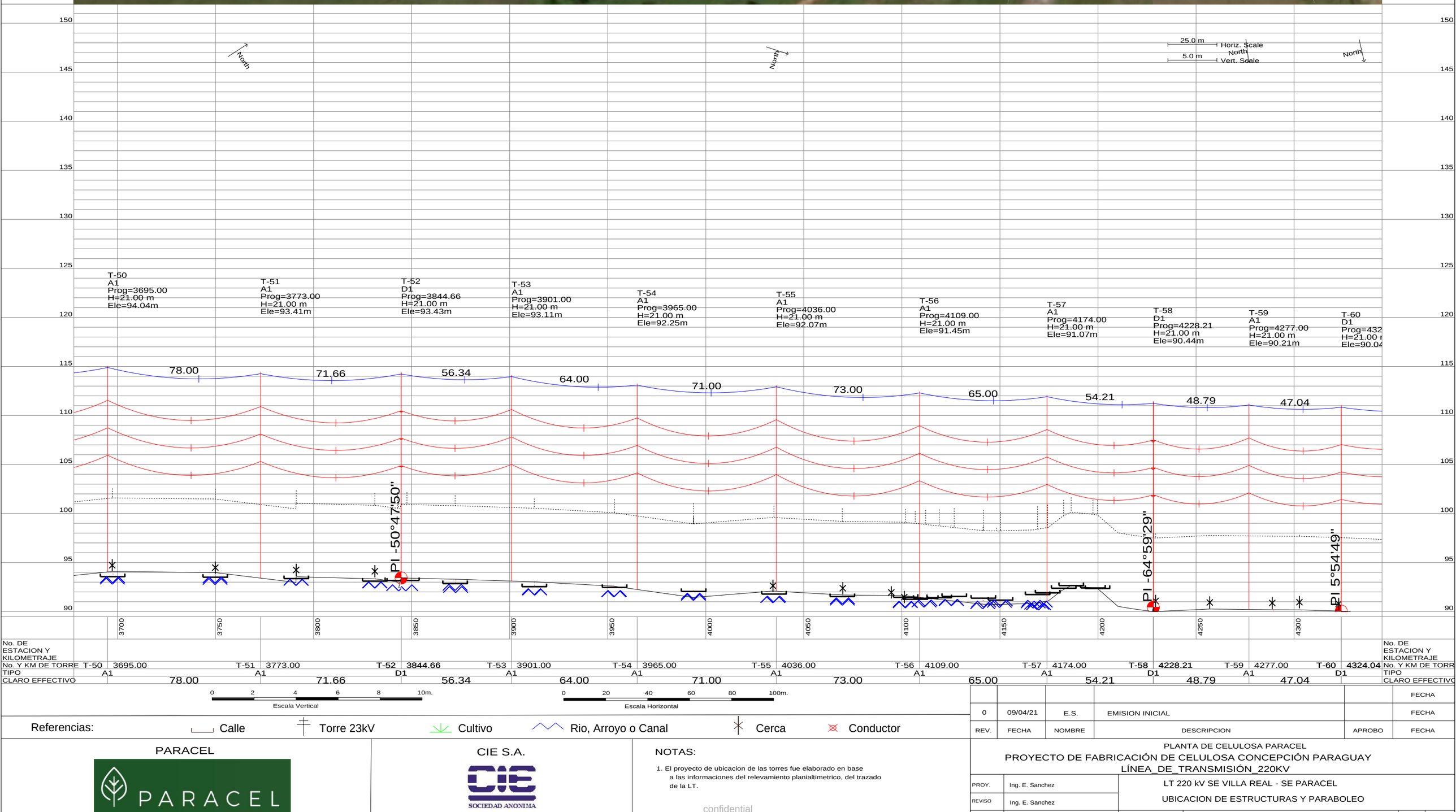



| No. DE ESTACION Y KILOMETRAJE | | |

confidential




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

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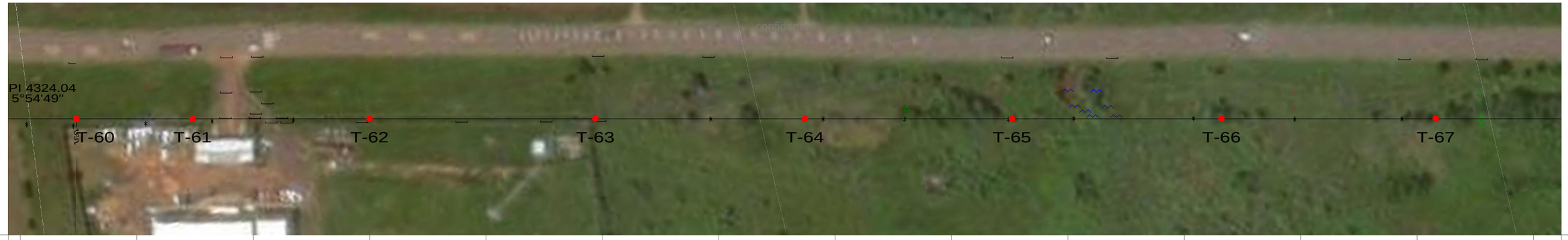
| | | | | | |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |

PLANTA DE CELULOSA PARACEL

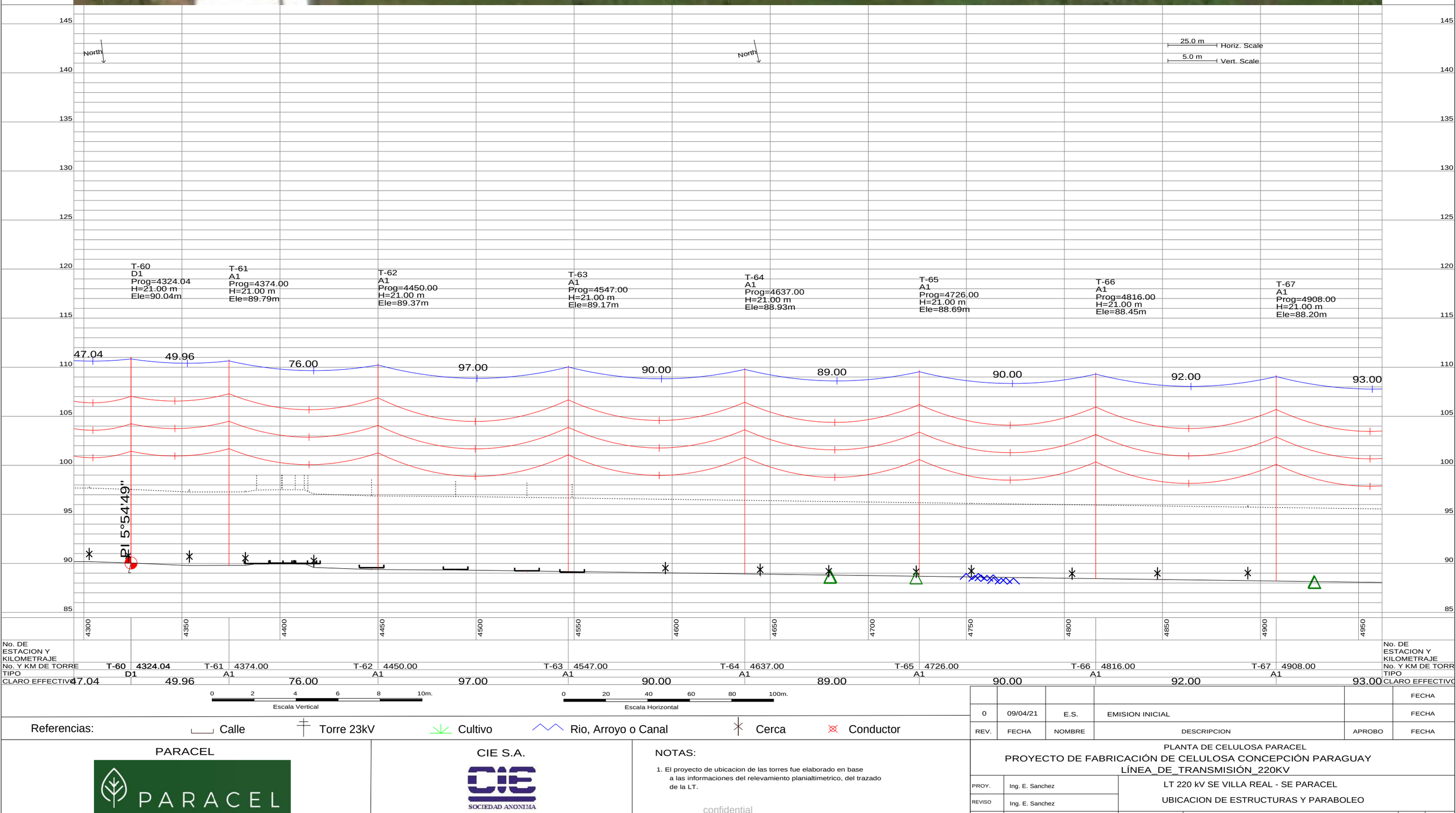
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-7 | Rev. 0 | Hj. 07 |




confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

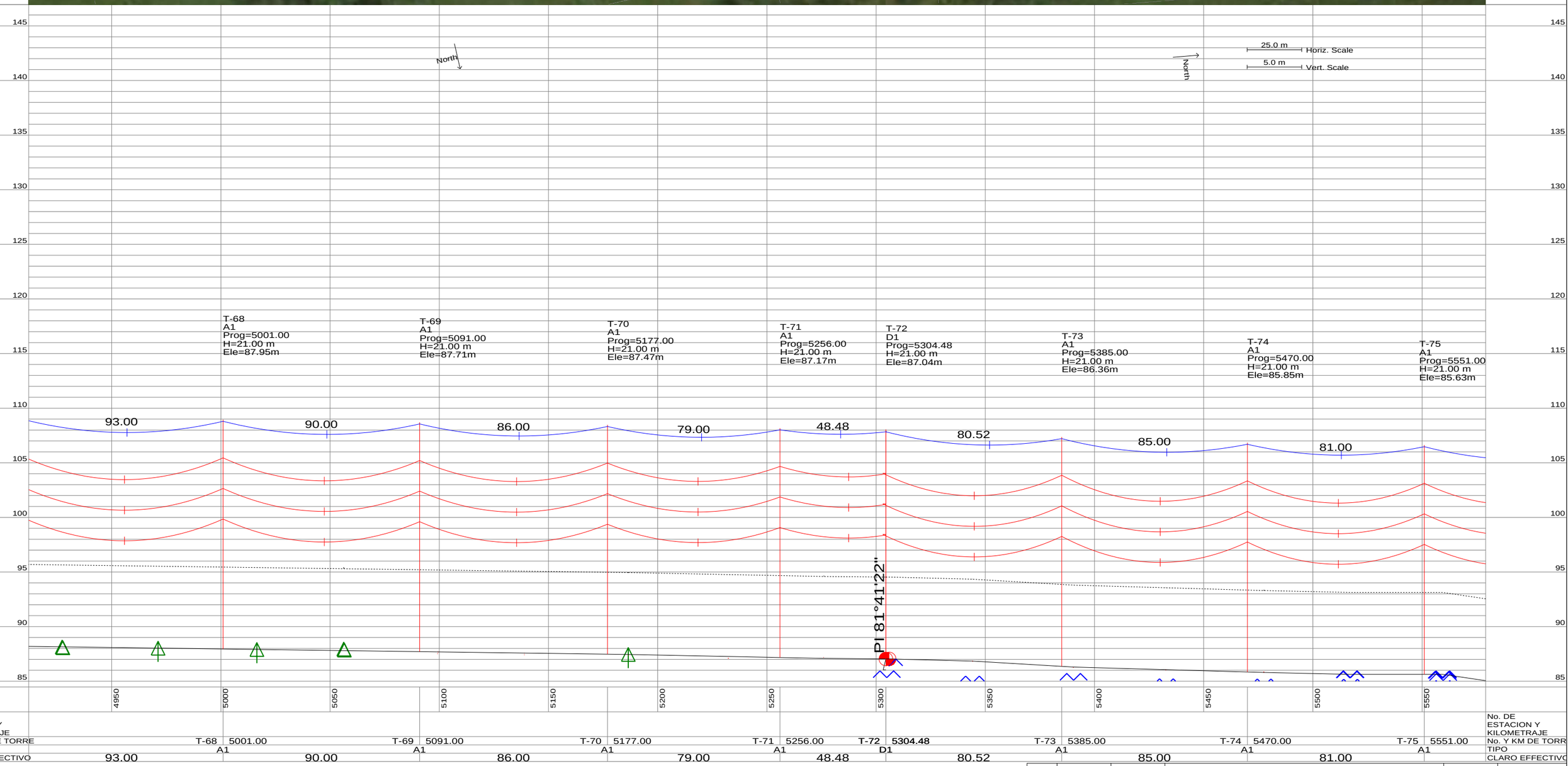
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-8 Rev. 0 Hj. 08 |

PLS-CADD Drawing




| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-68 | 5001.00 | T-69 | 5091.00 | T-70 | 5177.00 | T-71 | 5256.00 | T-72 | 5304.48 | T-73 | 5385.00 | T-74 | 5470.00 | T-75 | 5551.00 | No. Y KM DE TORRE |
| TIPO | | A1 | | A1 | | A1 | | A1 | | D1 | | A1 | | A1 | | A1 | TIPO |
| CLARO EFFECTIVO | 93.00 | | 90.00 | | 86.00 | | 79.00 | | 48.48 | | 80.52 | | 85.00 | | 81.00 | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
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| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

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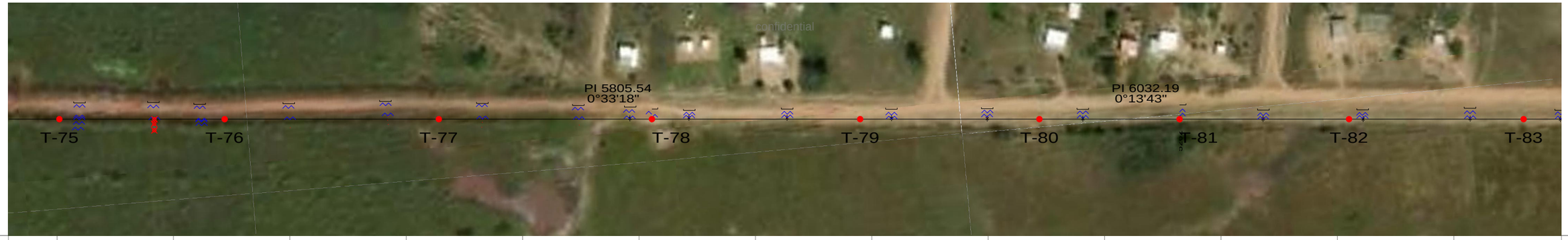
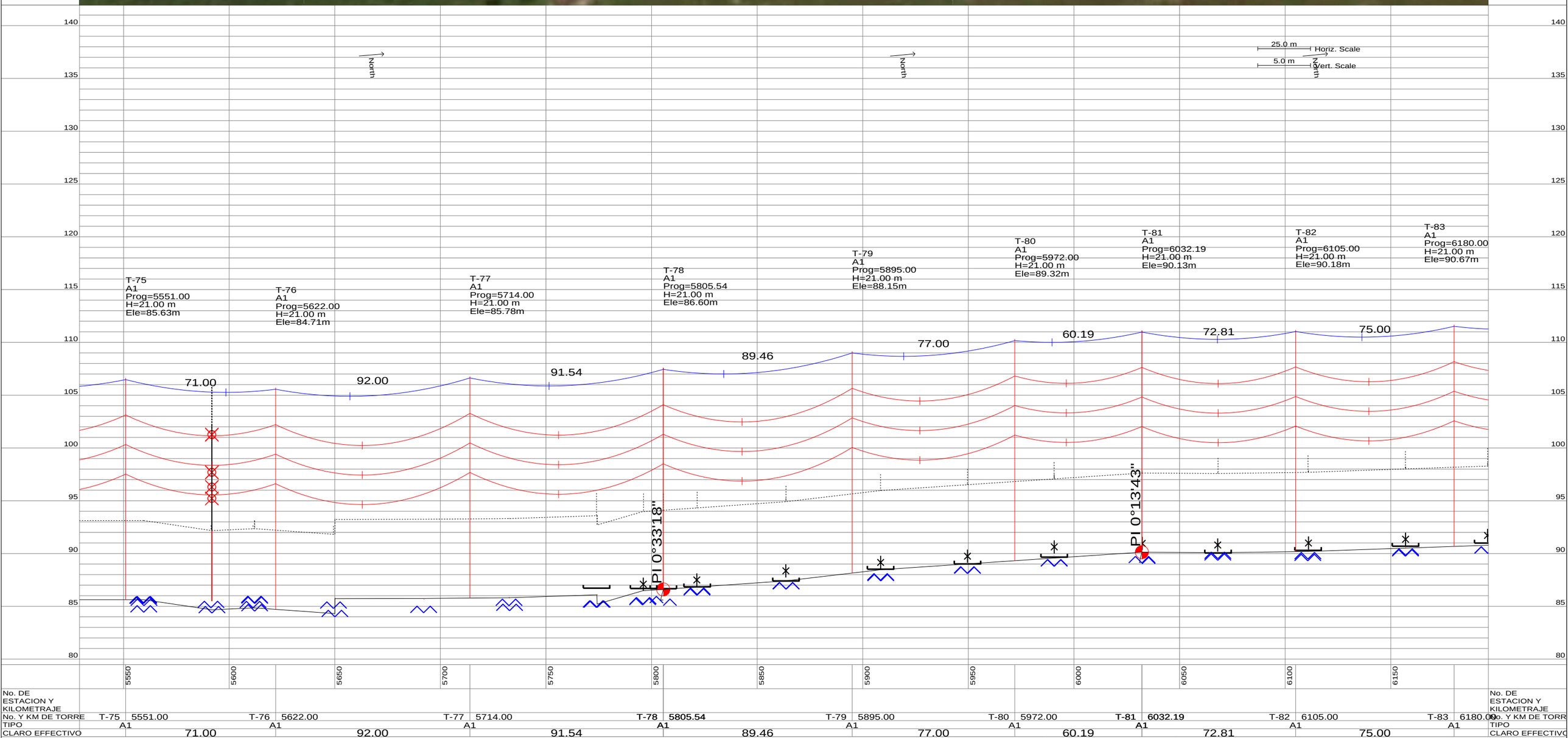
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

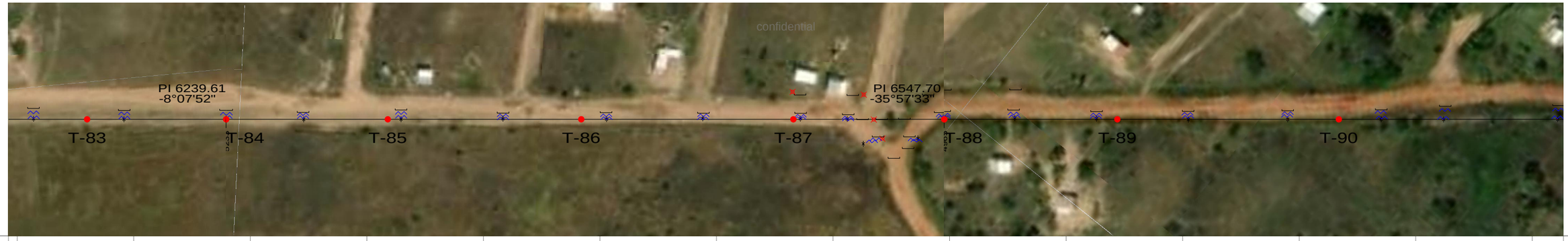
| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-9 Rev. 0 Hj. 09 |

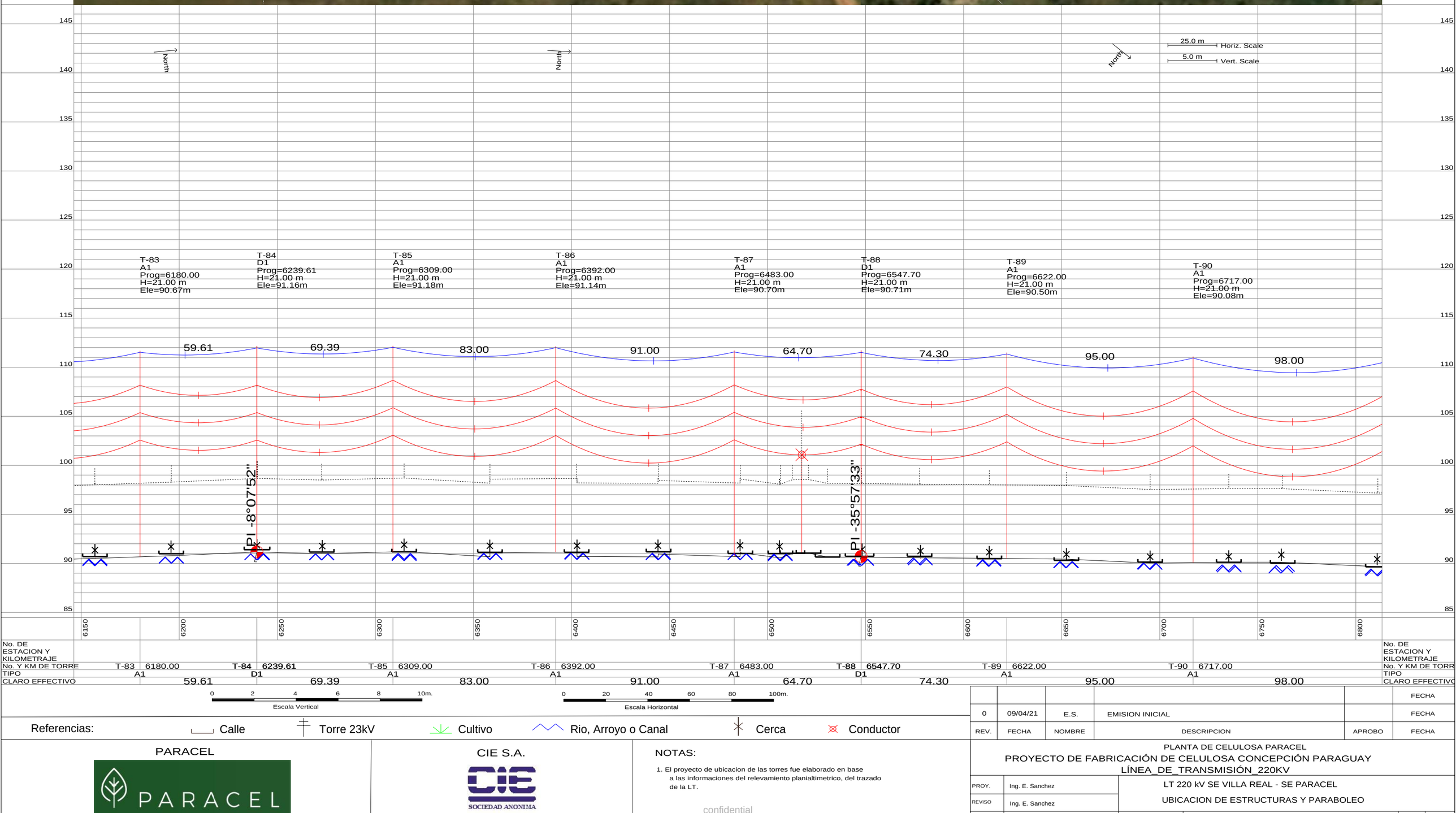
PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | | |




| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-83 | 6180.00 | **T-84** | **6239.61** | T-85 | 6309.00 | T-86 | 6392.00 | T-87 | 6483.00 | **T-88** | **6547.70** | T-89 | 6622.00 | T-90 | 6717.00 | No. Y KM DE TORR |
| TIPO | A1 | | D1 | | A1 | | A1 | | A1 | | D1 | | A1 | | A1 | | TIPO |
| CLARO EFFECTIVO | | 59.61 | | 69.39 | | 83.00 | | 91.00 | | 64.70 | | 74.30 | | 95.00 | | 98.00 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

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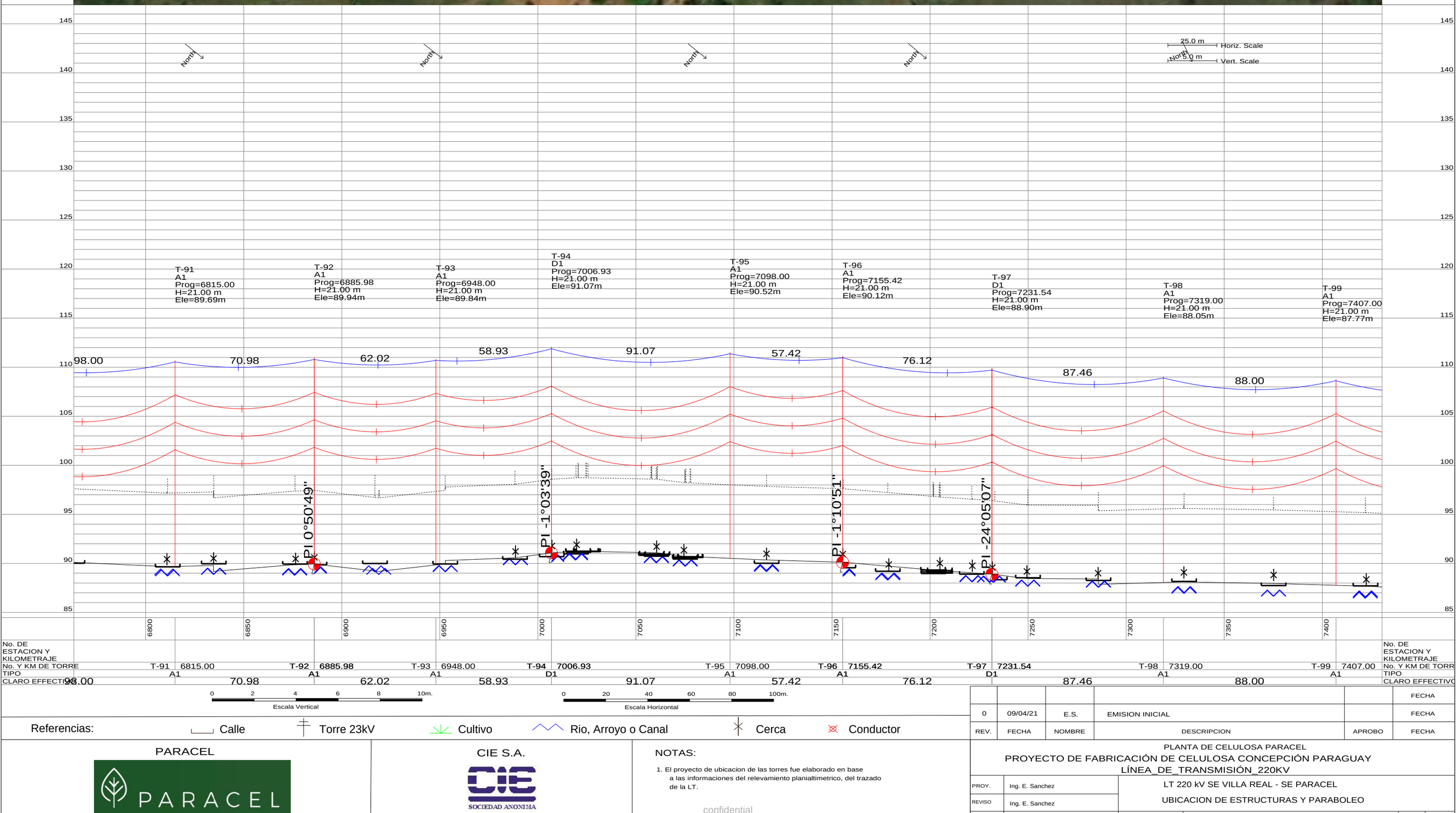
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-11 Rev. 0 Hj. 011 |




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

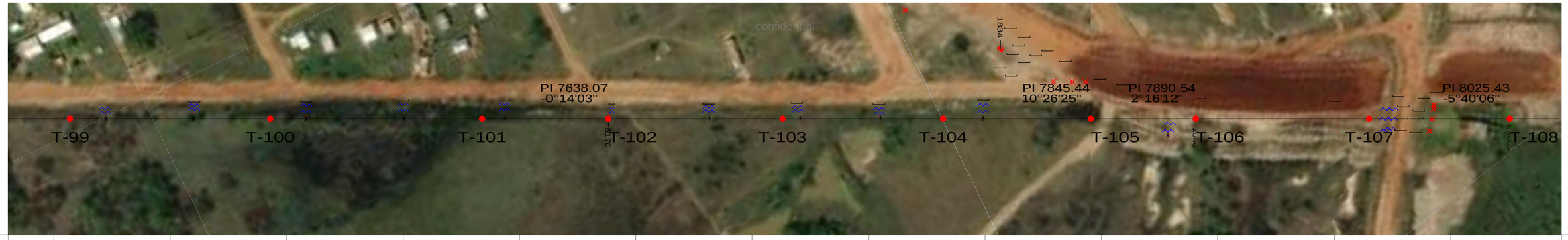
confidential

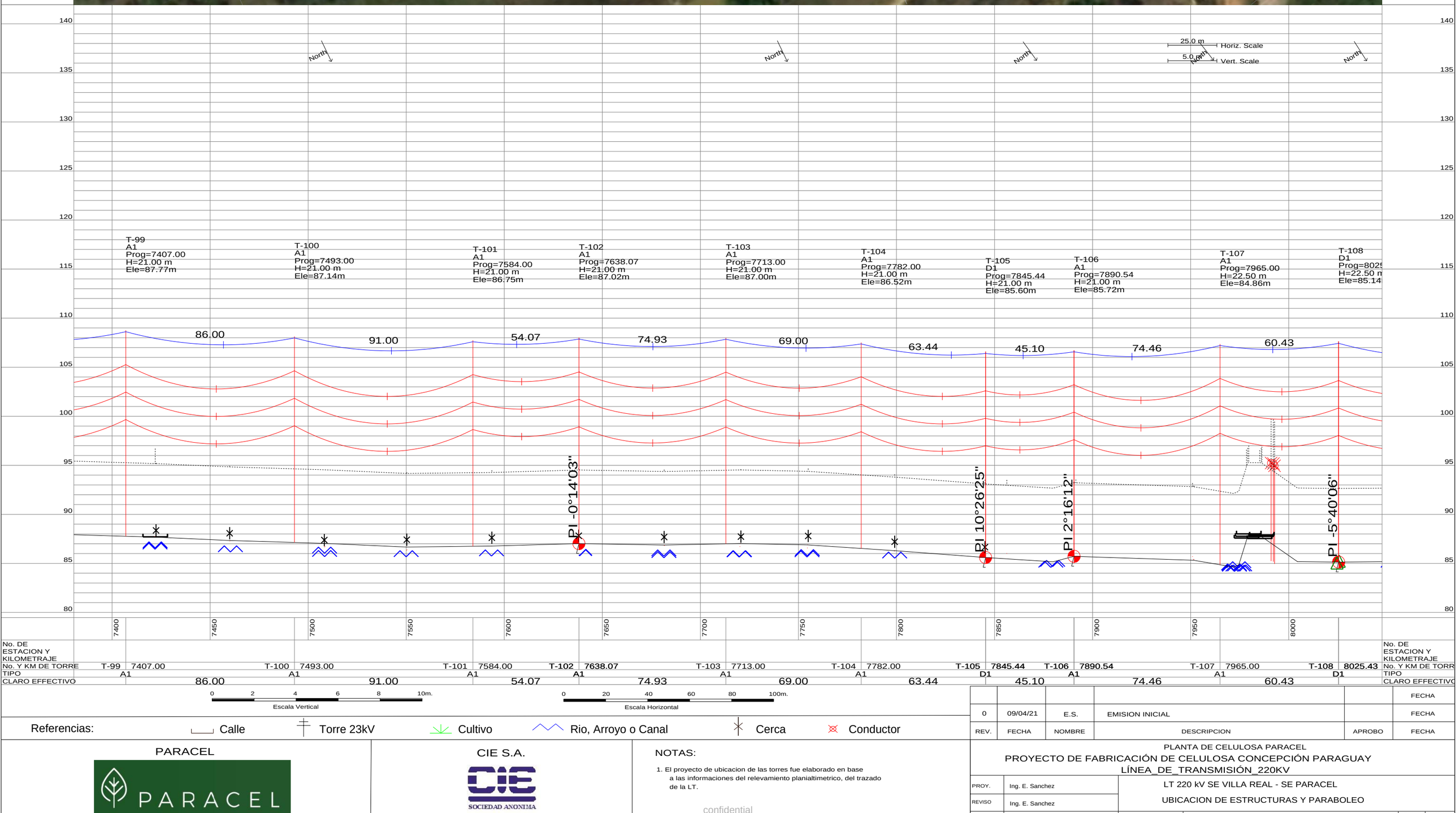
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-12 Rev. 0 Hj. 012 |




| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

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SOCIEDAD ANONIMA

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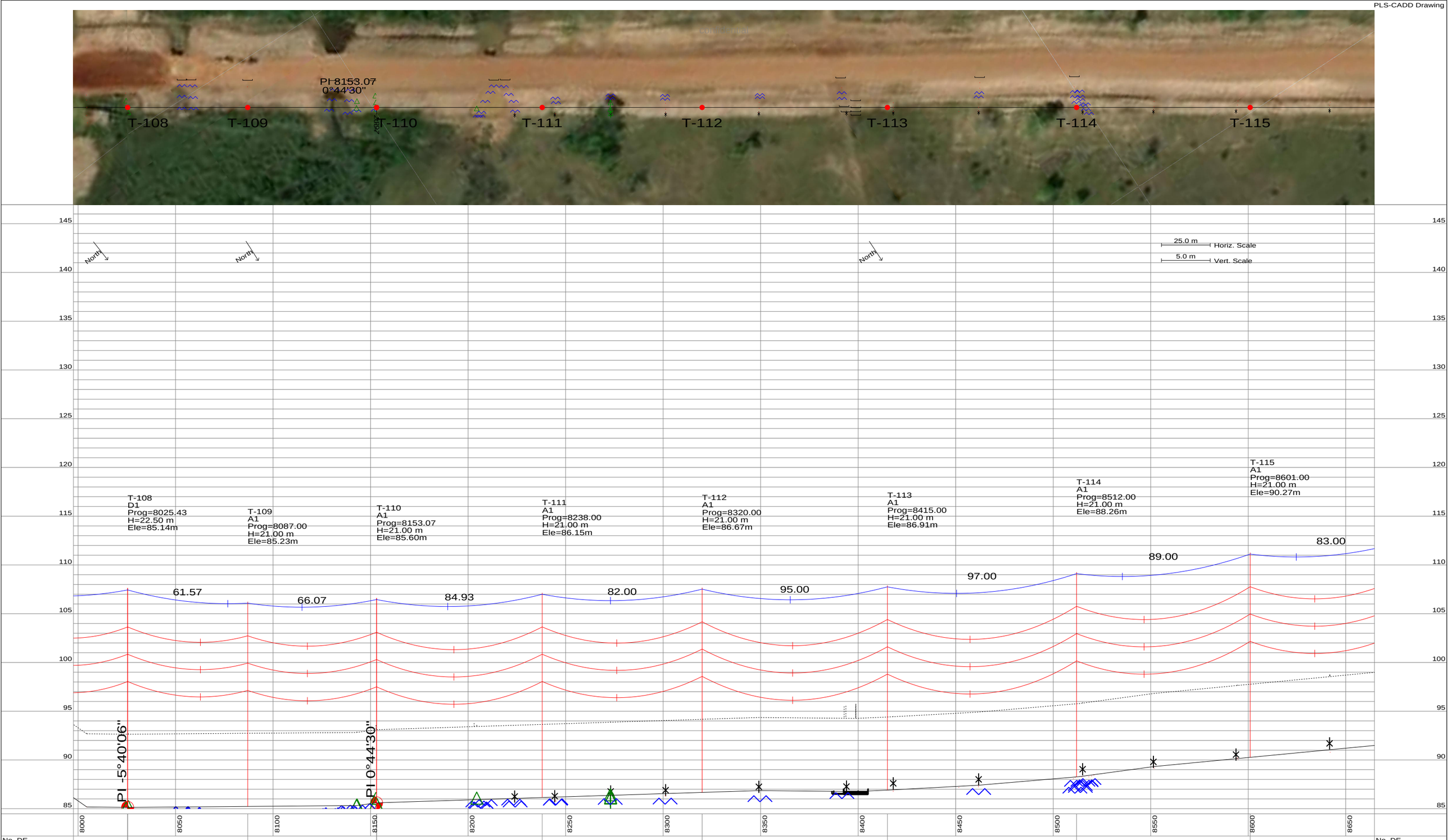
PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-13 Rev. 0 Hj. 013 |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

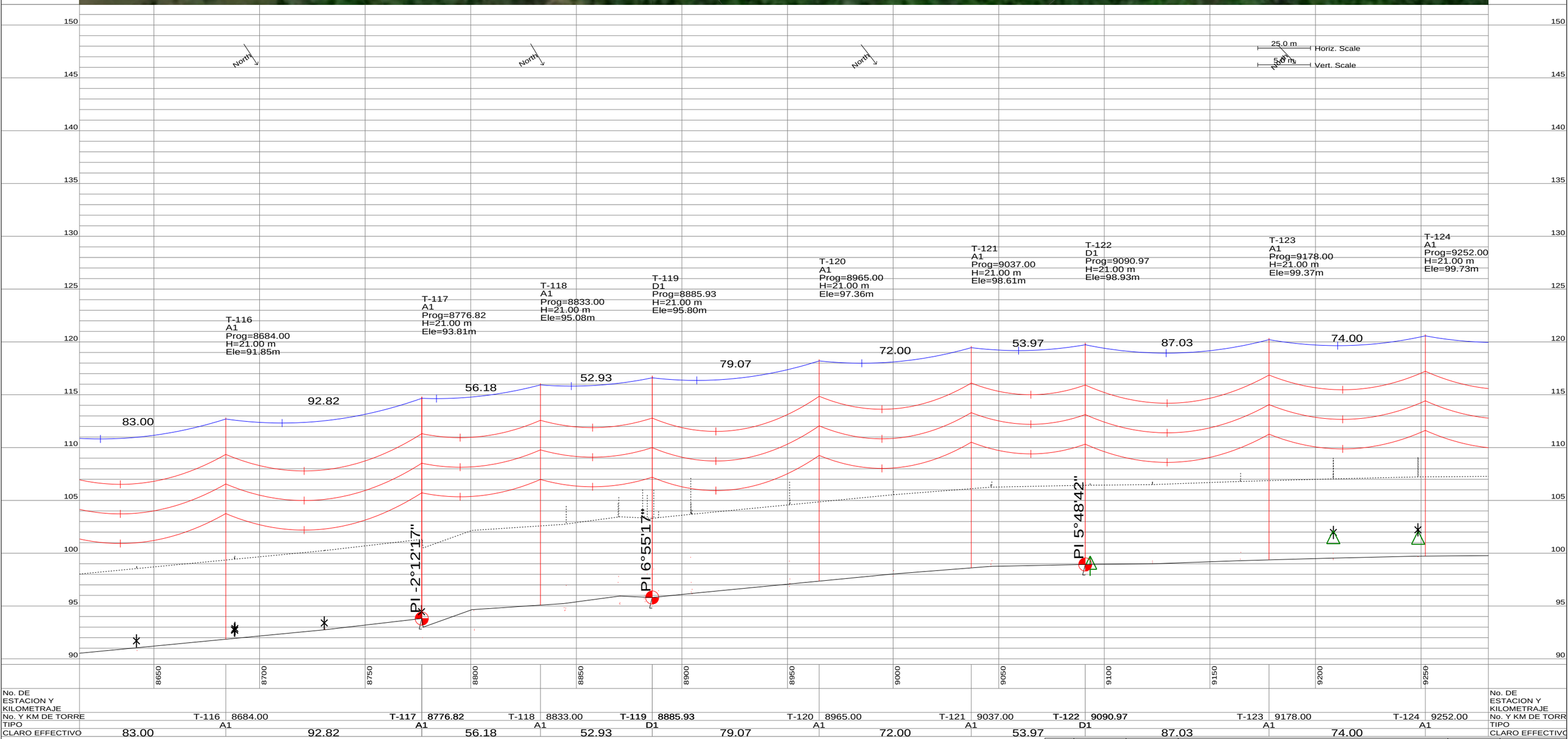
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 1010-1507-M-S-0002-14 Rev. 0 Hj. 014 |

PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | | T-116 | 8684.00 | | | T-117 | 8776.82 | | | T-118 | 8833.00 | | | T-119 | 8885.93 | | | T-120 | 8965.00 | | | T-121 | 9037.00 | | | T-122 | 9090.97 | | | T-123 | 9178.00 | | | T-124 | 9252.00 | No. Y KM DE TORR |
| TIPO | | A1 | | | | A1 | | | | A1 | | | | D1 | | | | A1 | | | | A1 | | | | D1 | | | | A1 | | | | A1 | | TIPO |
| CLARO EFFECTIVO | 83.00 | | 92.82 | | | | 56.18 | | | A1 | 52.93 | | | D1 | 79.07 | | | A1 | 72.00 | | | A1 | 53.97 | | | D1 | 87.03 | | | A1 | 74.00 | | | A1 | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

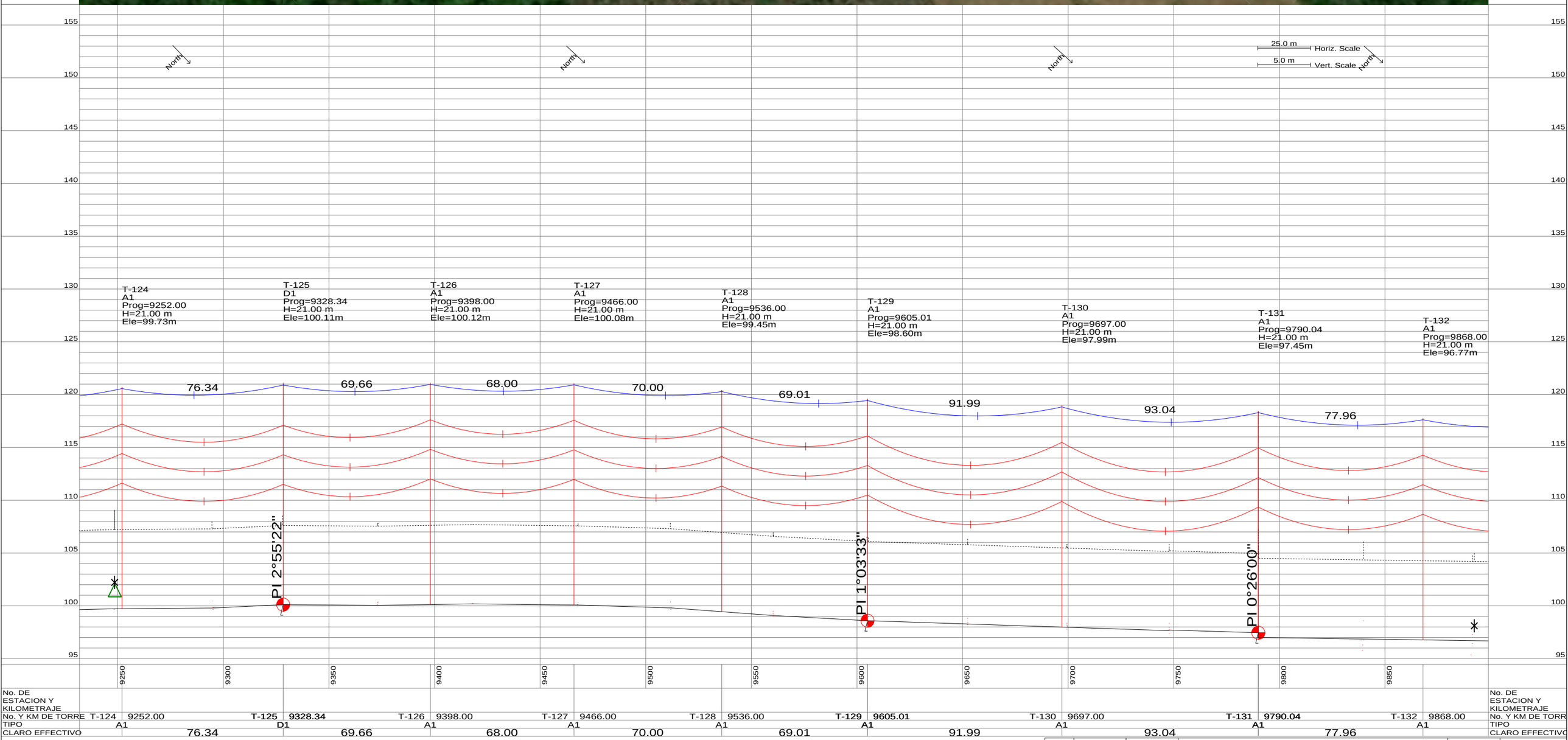
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-15 Rev. 0 Hj. 015 |

PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | T-124 | 9252.00 | | T-125 | 9328.34 | | T-126 | 9398.00 | | T-127 | 9466.00 | | T-128 | 9536.00 | | T-129 | 9605.01 | | T-130 | 9697.00 | | T-131 | 9790.04 | | T-132 | 9868.00 | No. Y KM DE TORRE |
| TIPO | | A1 | | | D1 | | | A1 | | | A1 | | | A1 | | | A1 | | | A1 | | | A1 | | | A1 | TIPO |
| CLARO EFFECTIVO | | | 76.34 | | | 69.66 | | | 68.00 | | | 70.00 | | | 69.01 | | | 91.99 | | | 93.04 | | | 77.96 | | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| | | | | | |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

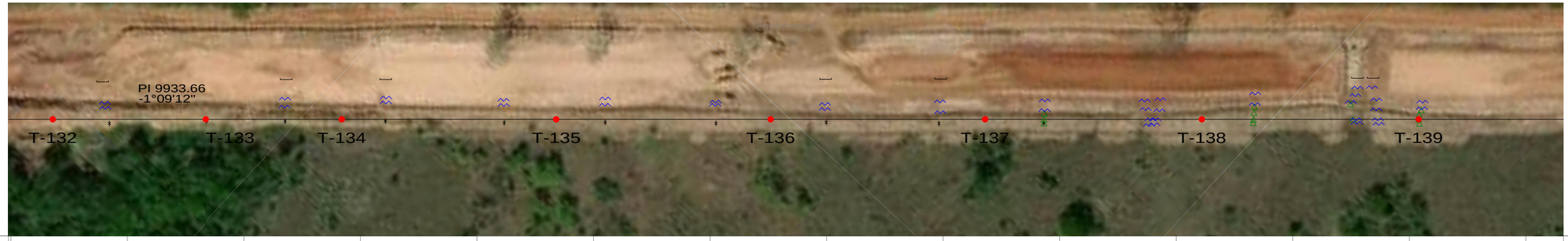
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

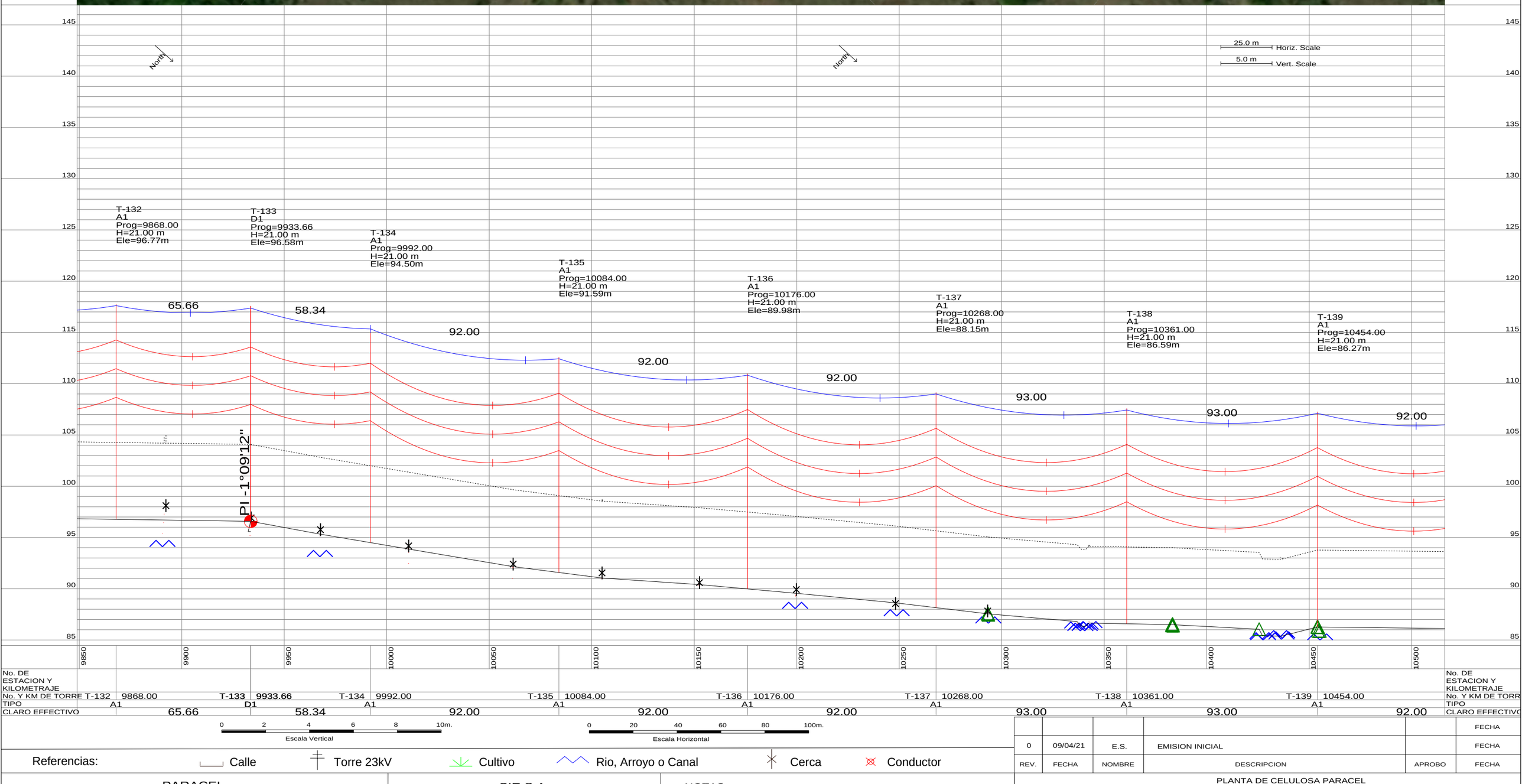
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-16 | Rev. 0 | Hj. 016 |

PLS-CADD Drawing




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-132 9868.00 | T-133 9933.66 | T-134 9992.00 | T-135 10084.00 | T-136 10176.00 | T-137 10268.00 | T-138 10361.00 | T-139 10454.00 | No. Y KM DE TORR |
| TIPO | A1 | D1 | A1 | A1 | A1 | A1 | A1 | A1 | TIPO |
| CLARO EFFECTIVO | 65.66 | 58.34 | 92.00 | 92.00 | 92.00 | 93.00 | 93.00 | 92.00 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

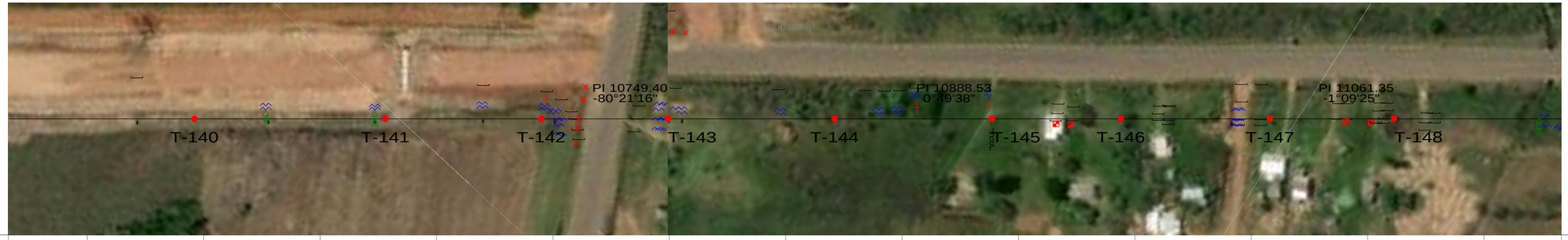
PLANTA DE CELULOSA PARACEL

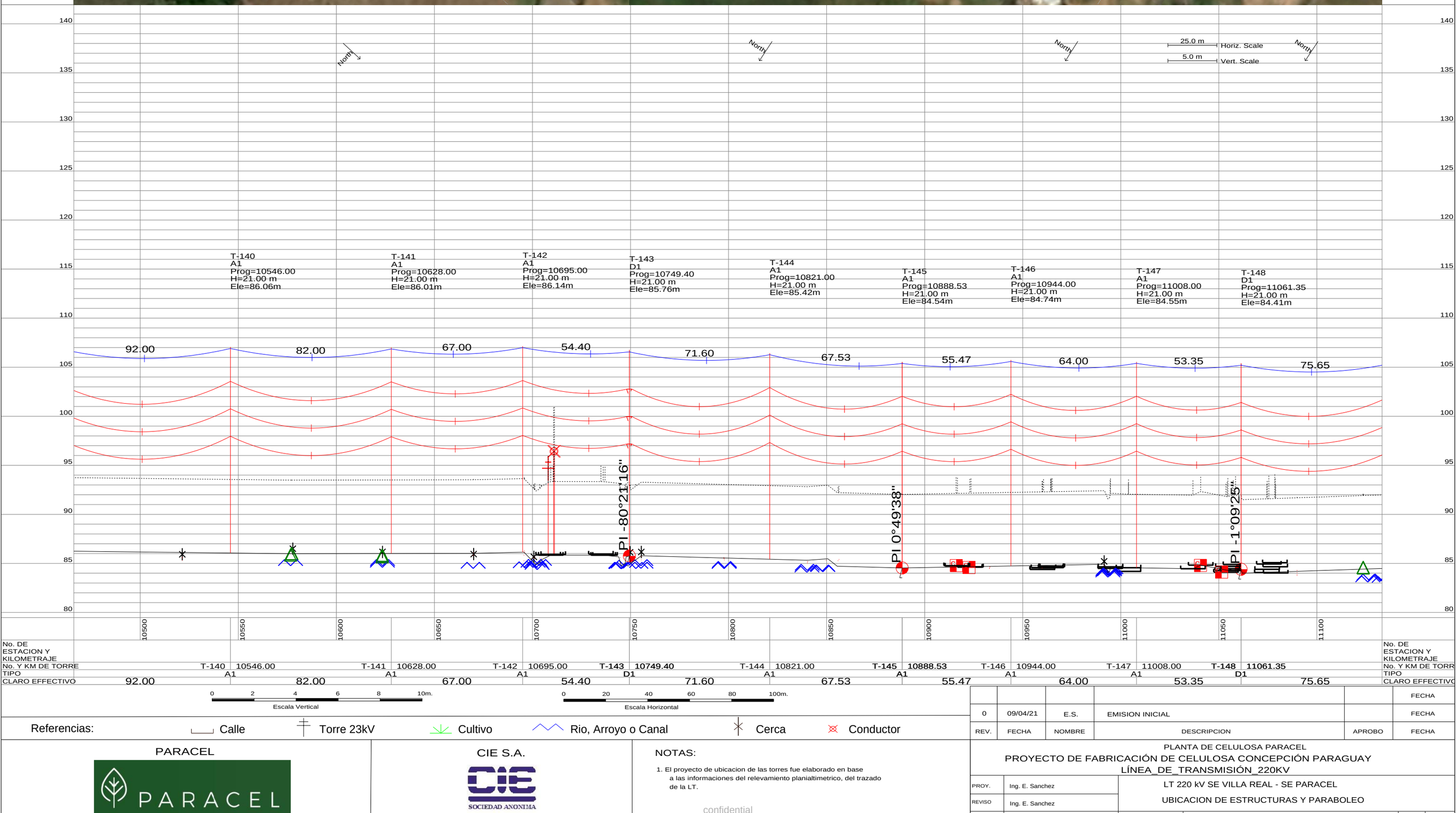
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-17 | Rev. 0 | Hj. 017 |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

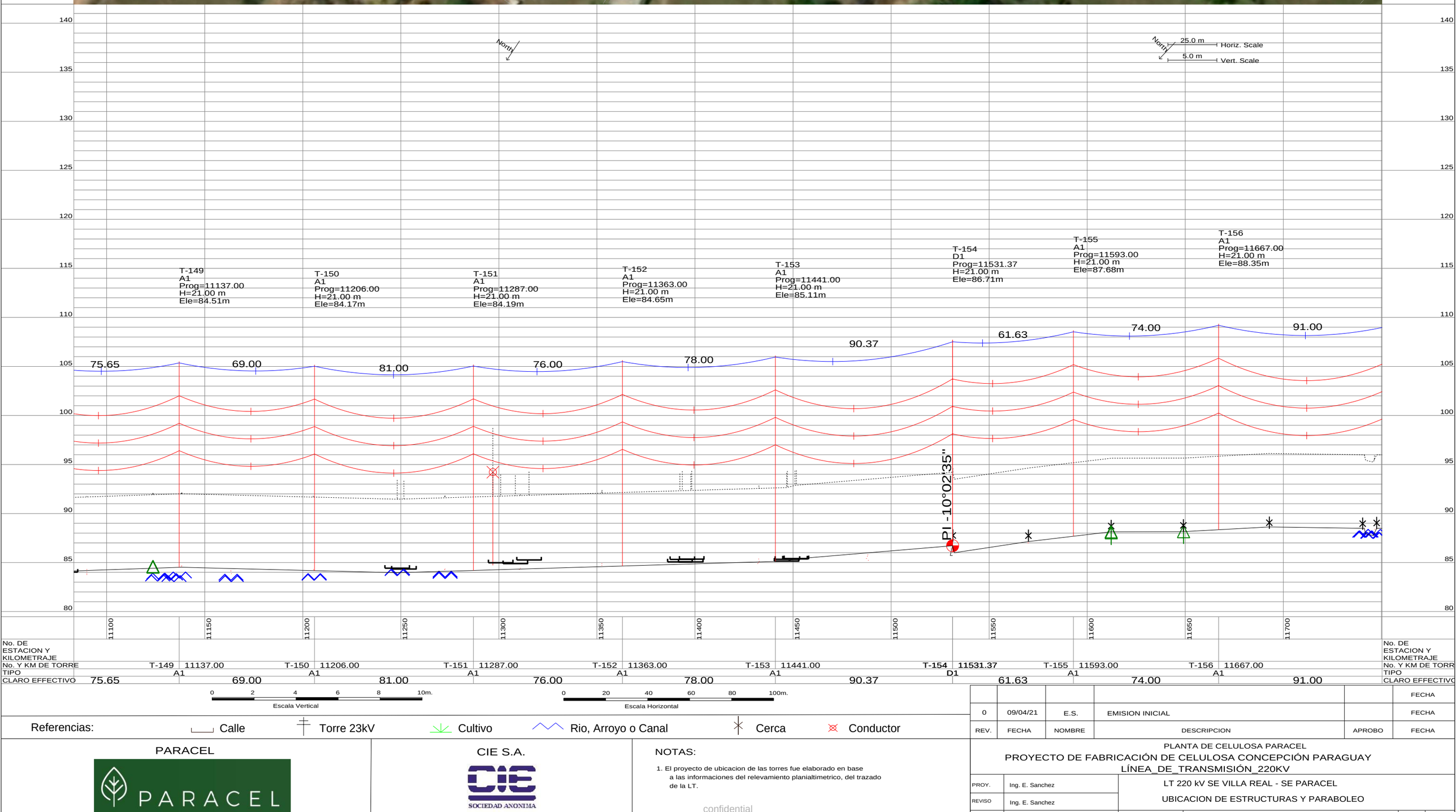
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-18 Rev. 0 Hj. 018 |




confidential




| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | T-149 | 11137.00 | | T-150 | 11206.00 | | T-151 | 11287.00 | | T-152 | 11363.00 | | T-153 | 11441.00 | | T-154 | 11531.37 | | T-155 | 11593.00 | | T-156 | 11667.00 | | | No. Y KM DE TORRE |
| TIPO | | A1 | | | A1 | | | A1 | | | A1 | | | A1 | | | D1 | | | A1 | | | A1 | | | TIPO |
| CLARO EFFECTIVO | 75.65 | | | 69.00 | | | 81.00 | | | 76.00 | | | 78.00 | | | 90.37 | | | 61.63 | | | 74.00 | | | 91.00 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

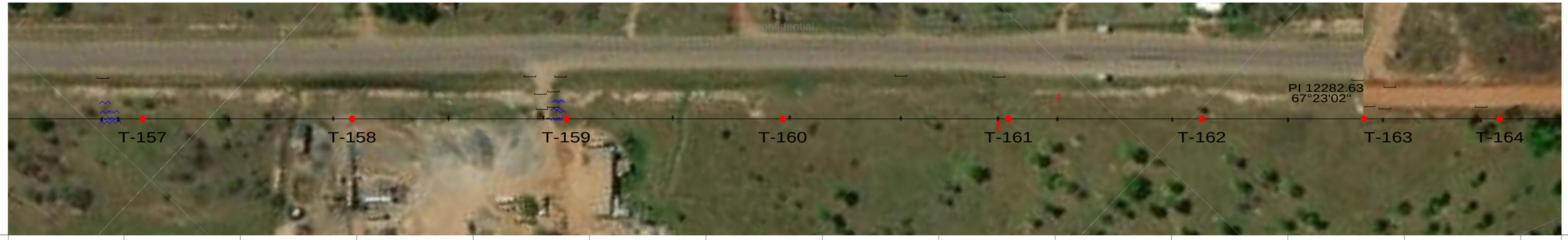
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

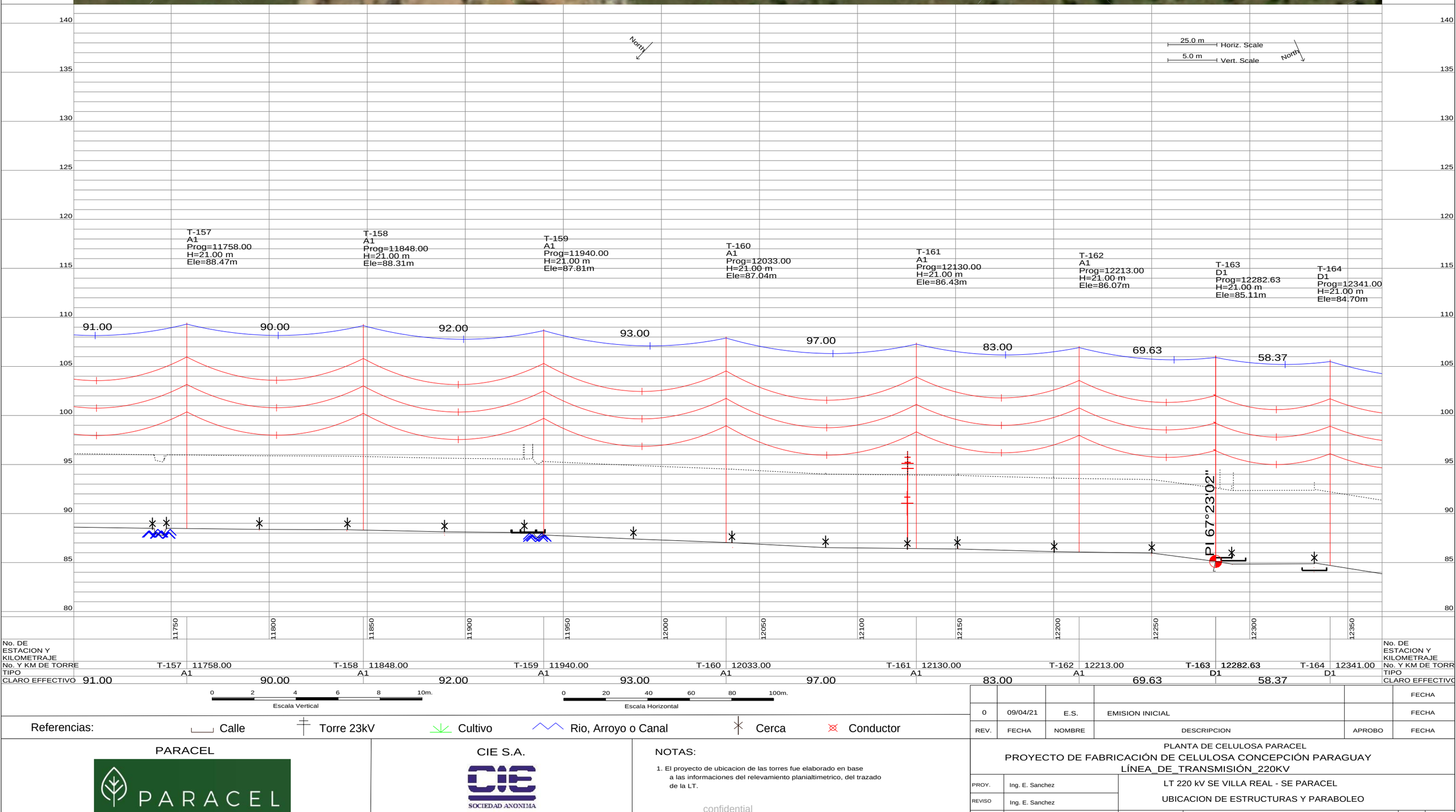
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-19 Rev. 0 Hj. 019 |

confidential

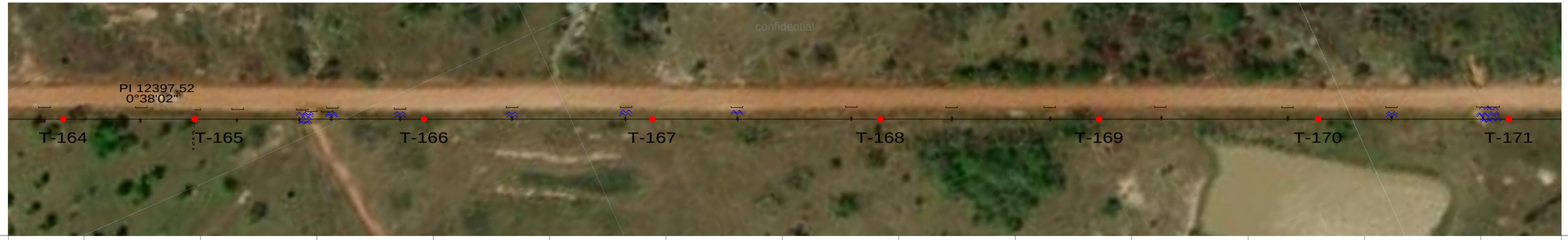


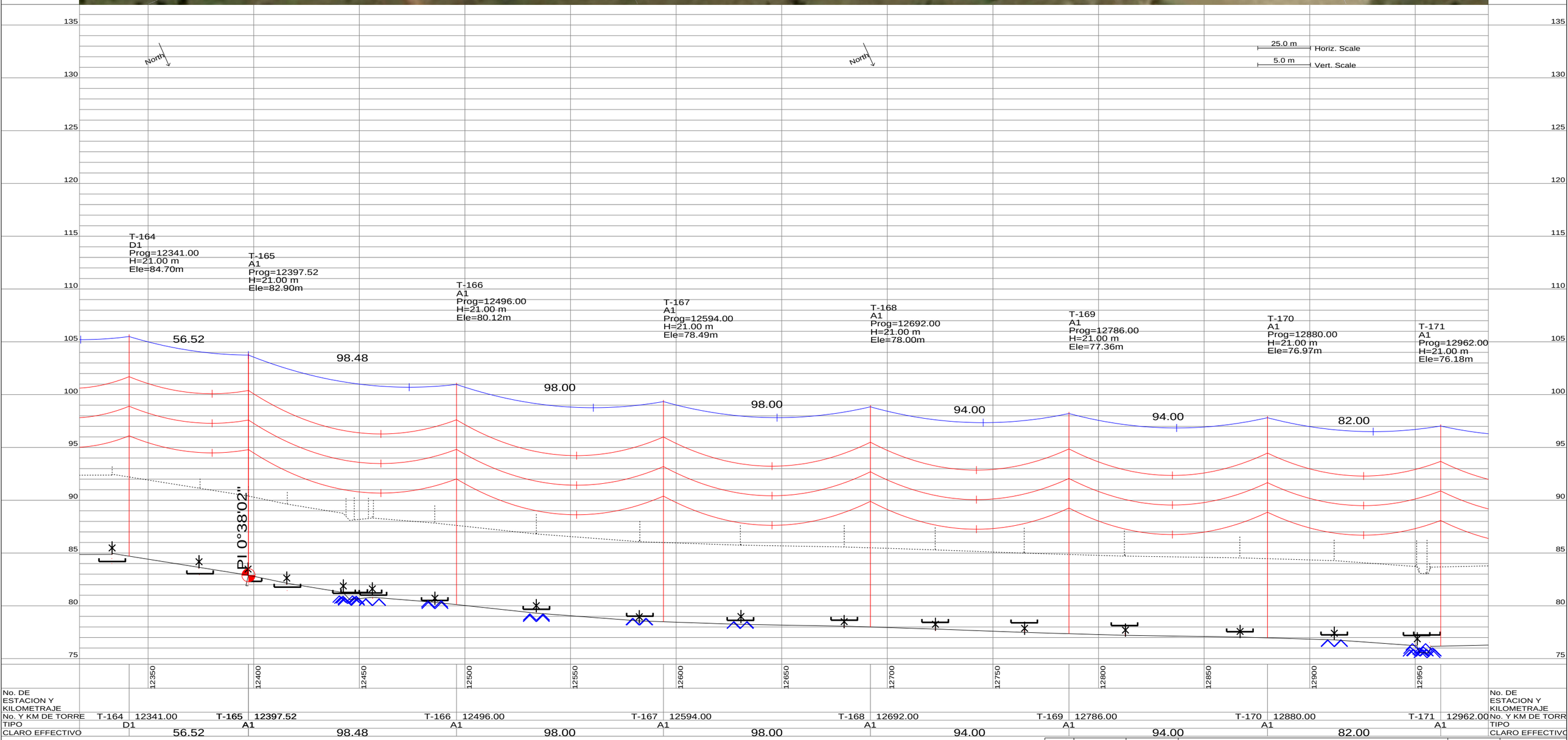




| No. DE ESTACION Y KILOMETRAJE | | |

PLS-CADD Drawing

confidential




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-164 12341.00 | T-165 12397.52 | T-166 12496.00 | T-167 12594.00 | T-168 12692.00 | T-169 12786.00 | T-170 12880.00 | T-171 12962.00 | No. Y KM DE TORRE |
| TIPO | D1 | A1 | A1 | A1 | A1 | A1 | A1 | A1 | TIPO |
| CLARO EFFECTIVO | 56.52 | 98.48 | 98.00 | 98.00 | 94.00 | 94.00 | 82.00 | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

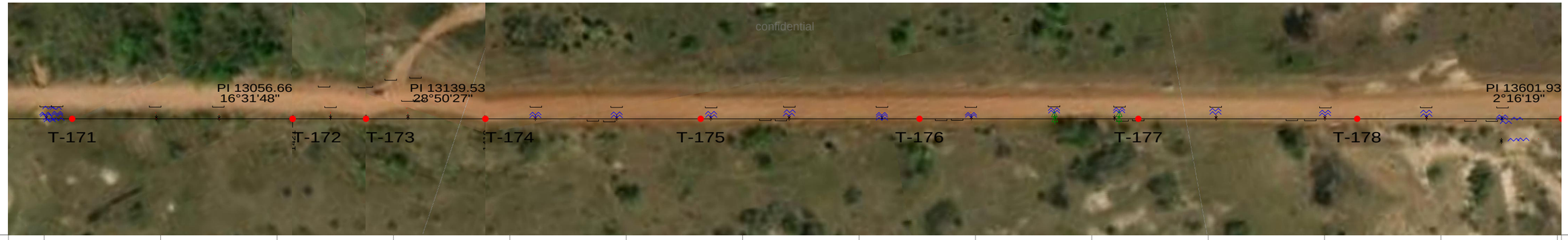
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

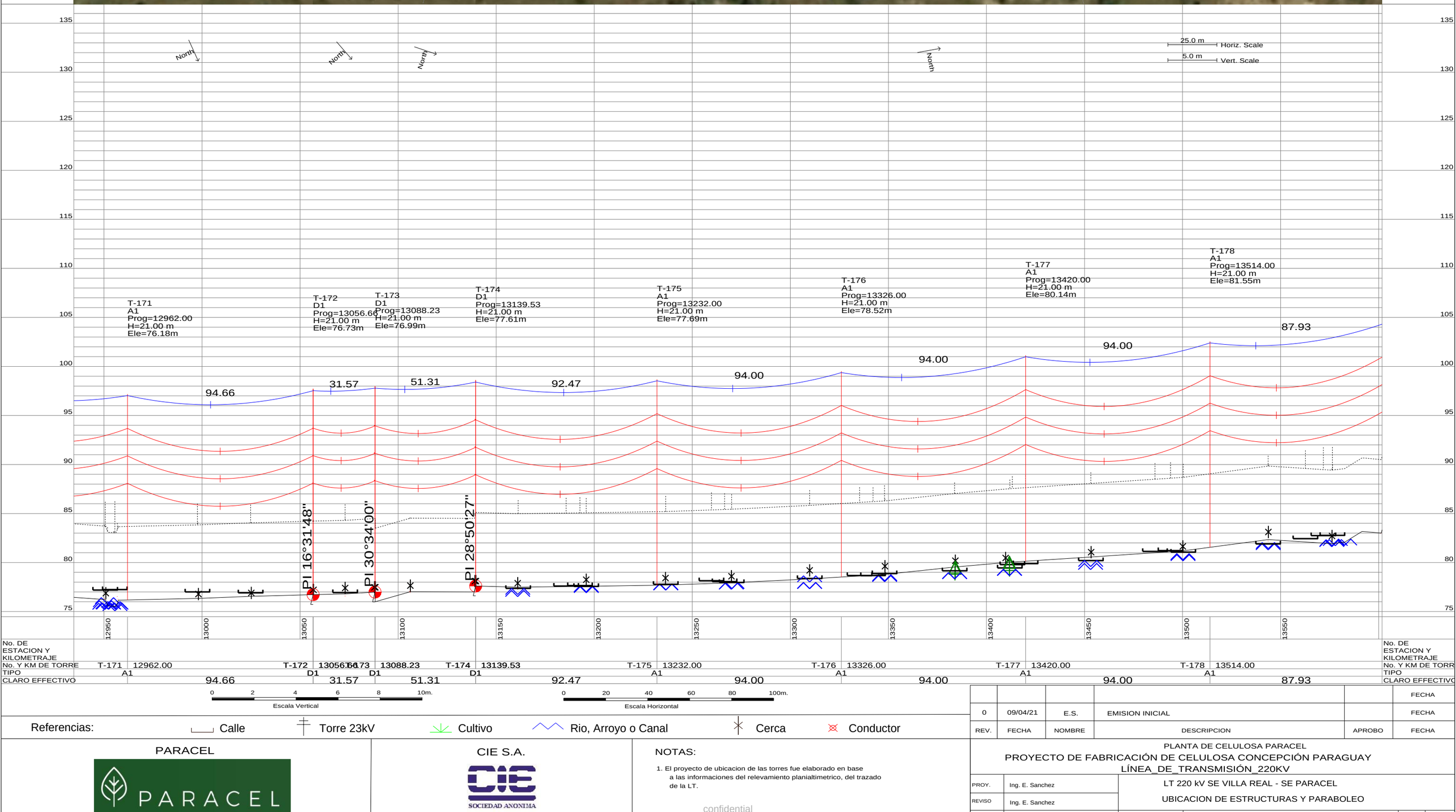
confidential

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-21 Rev. 0 Hj. 021 |




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

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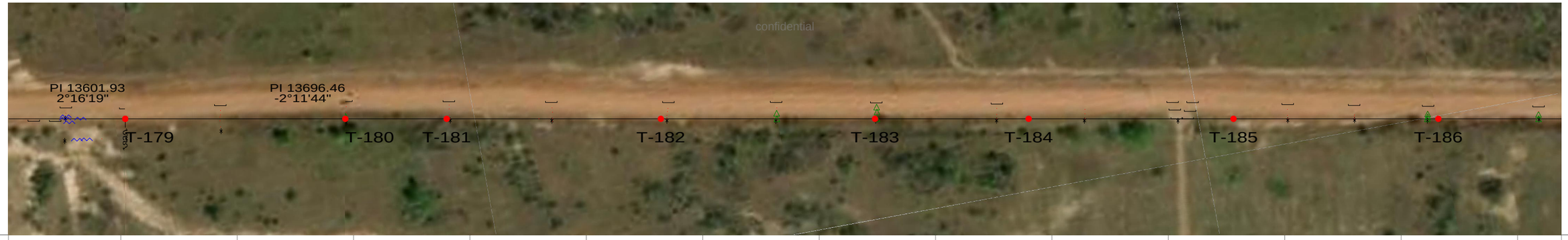
confidential

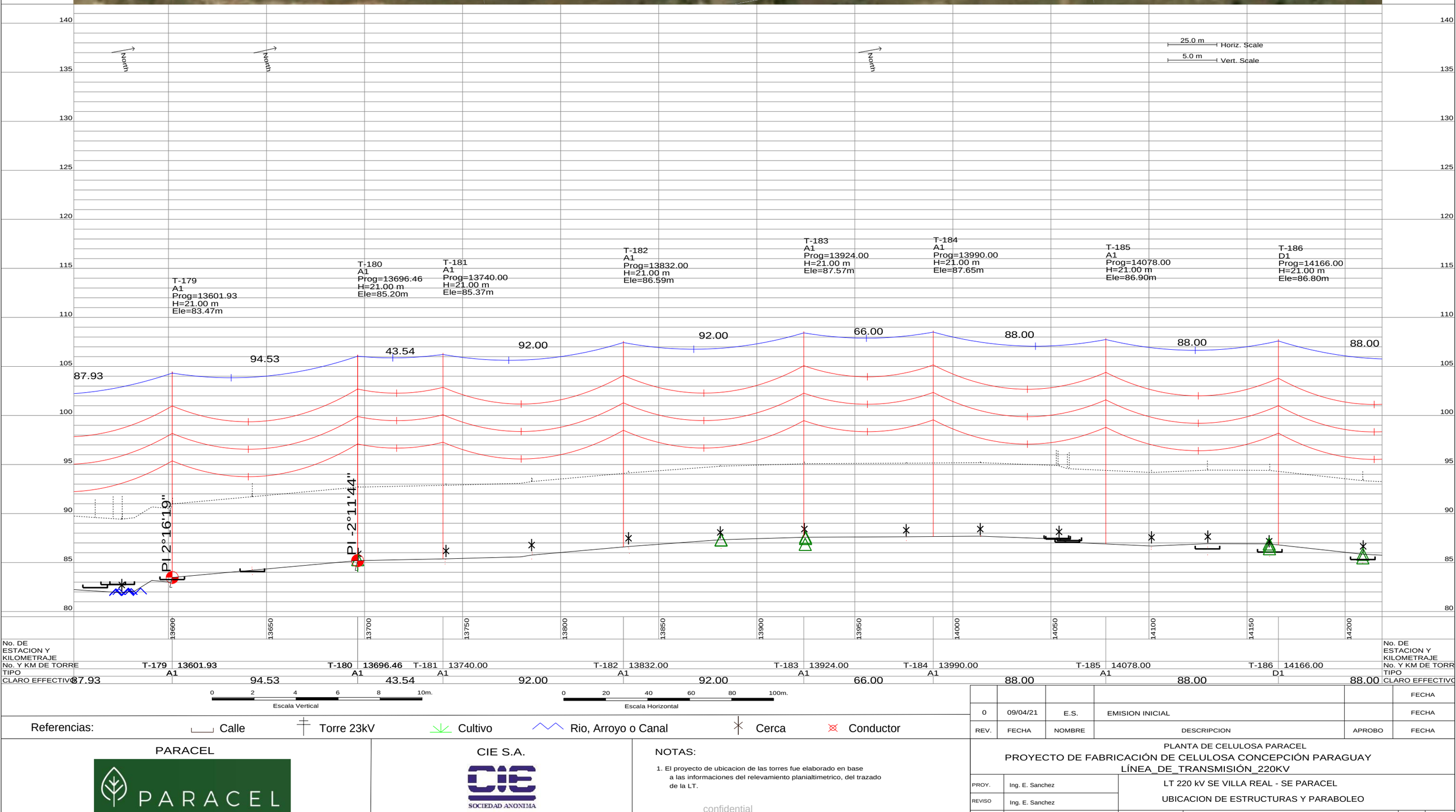
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

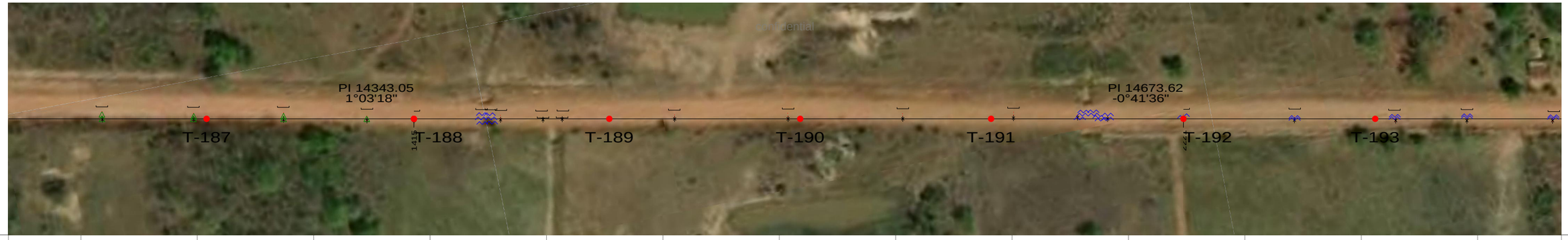
| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-22 Rev. 0 Hj. 022 |


confidential
PI 13601.93
2°16'19"
PI 13696.46
-2°11'44"
T-179
T-180
T-181
T-182
T-183
T-184
T-185
T-186

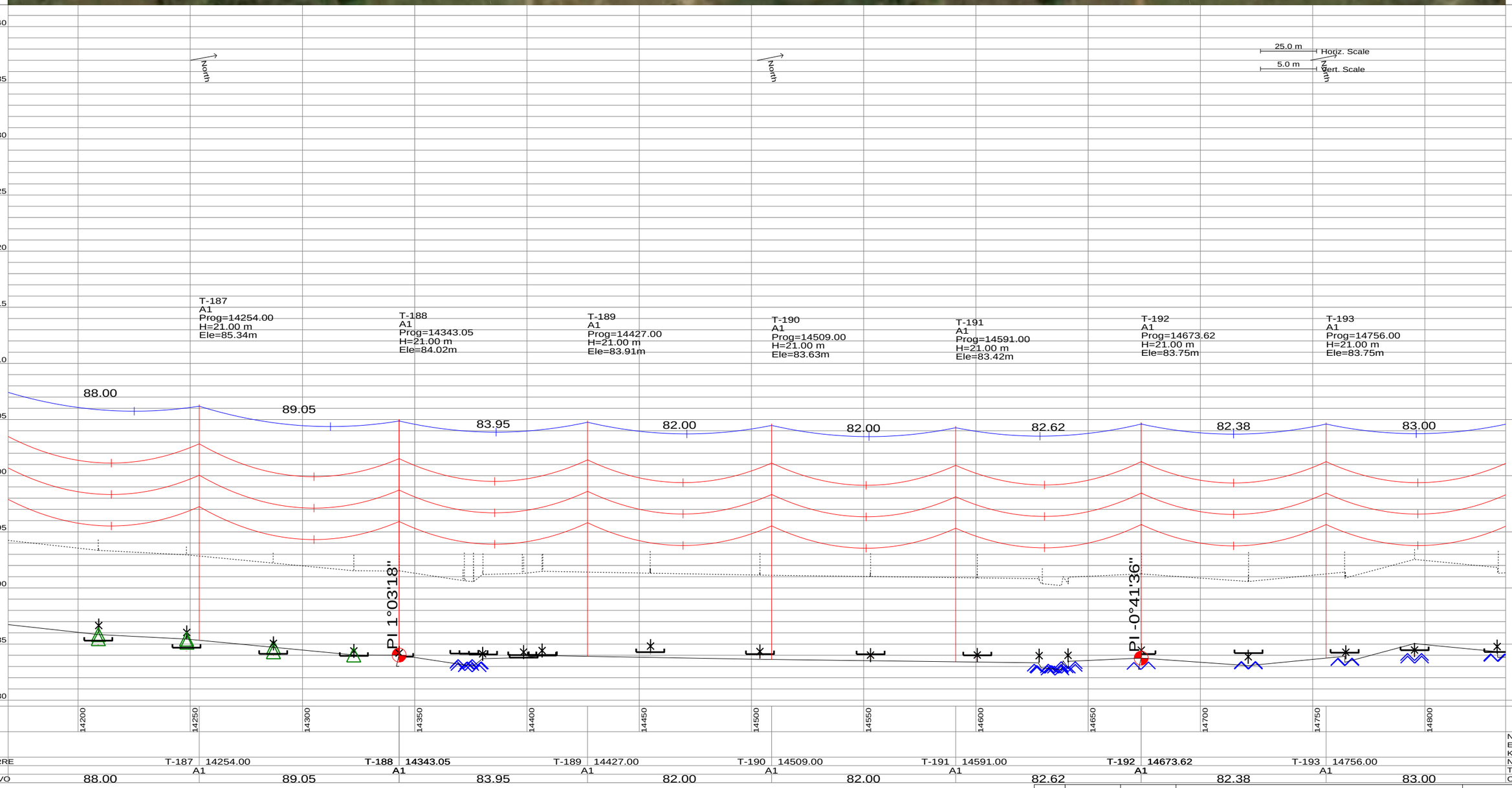

North
North
North
25.0 m
Horiz. Scale
5.0 m
Vert. Scale
T-179
A1
Prog=13601.93
H=21.00 m
Ele=83.47m
T-180
A1
Prog=13696.46
H=21.00 m
Ele=85.20m
T-181
A1
Prog=13740.00
H=21.00 m
Ele=85.37m
T-182
A1
Prog=13832.00
H=21.00 m
Ele=86.59m
T-183
A1
Prog=13924.00
H=21.00 m
Ele=87.57m
T-184
A1
Prog=13990.00
H=21.00 m
Ele=87.65m
T-185
A1
Prog=14078.00
H=21.00 m
Ele=86.90m
T-186
D1
Prog=14166.00
H=21.00 m
Ele=86.80m
87.93
94.53
43.54
92.00
92.00
66.00
88.00
88.00
88.00
PI 2°16'19"
PI -2°11'44"
140
135
130
125
120
115
110
105
100
95
90
85
80
13600
13650
13700
13750
13800
13850
13900
13950
14000
14050
14100
14150
14200

| | | |

PLS-CADD Drawing




confidential




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-187 14254.00 | T-188 14343.05 | T-189 14427.00 | T-190 14509.00 | T-191 14591.00 | T-192 14673.62 | T-193 14756.00 | No. Y KM DE TORRE |
| TIPO | A1 | A1 | A1 | A1 | A1 | A1 | A1 | TIPO |
| CLARO EFFECTIVO | 88.00 | 89.05 | 83.95 | 82.00 | 82.00 | 82.62 | 82.38 | 83.00 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

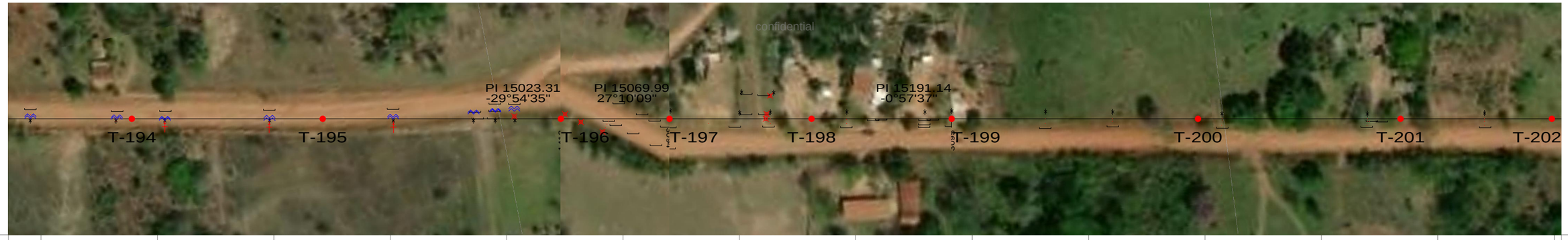
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

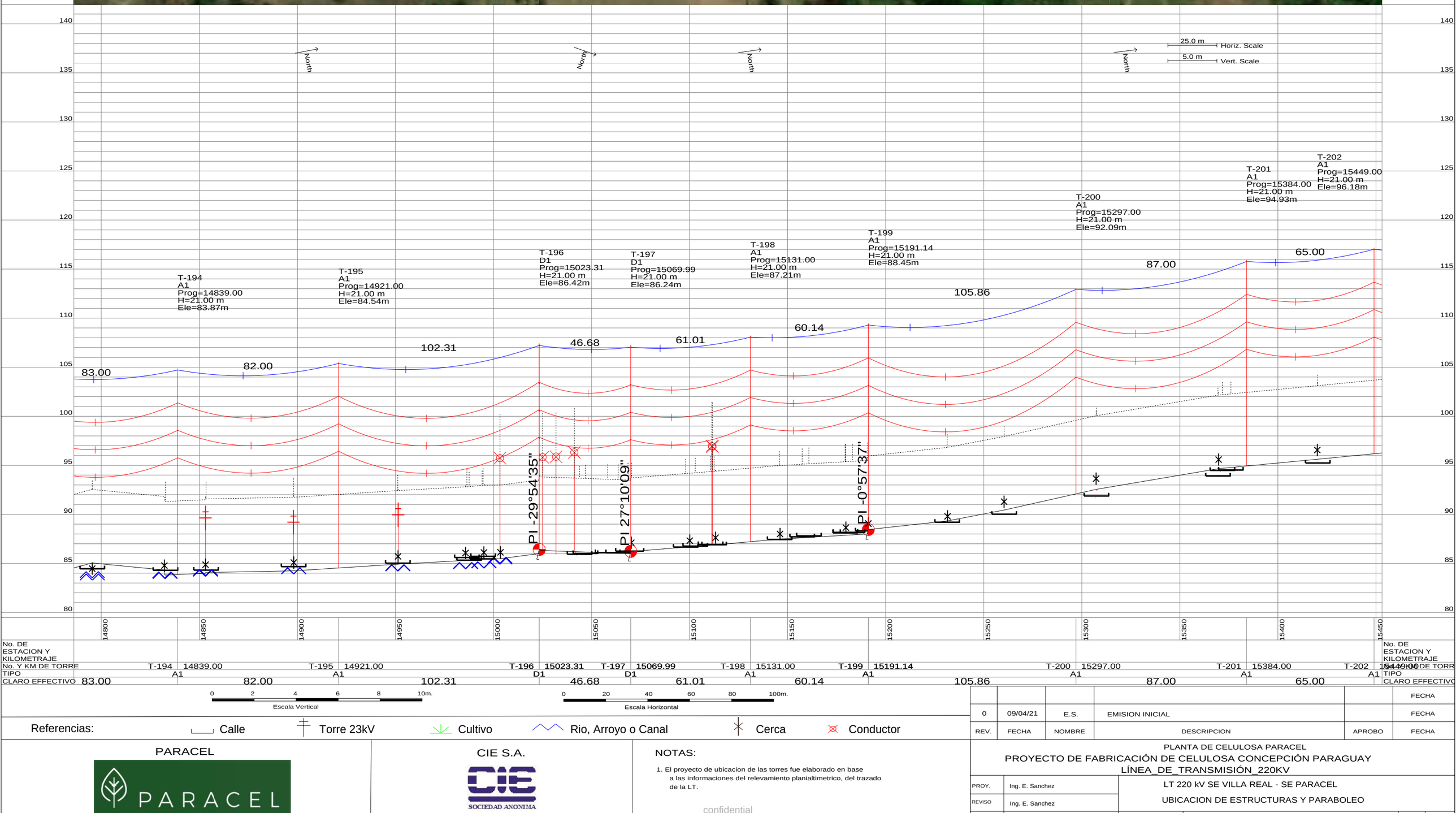
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-24 | Rev. 0 | Hj. 024 |

PLS-CADD Drawing

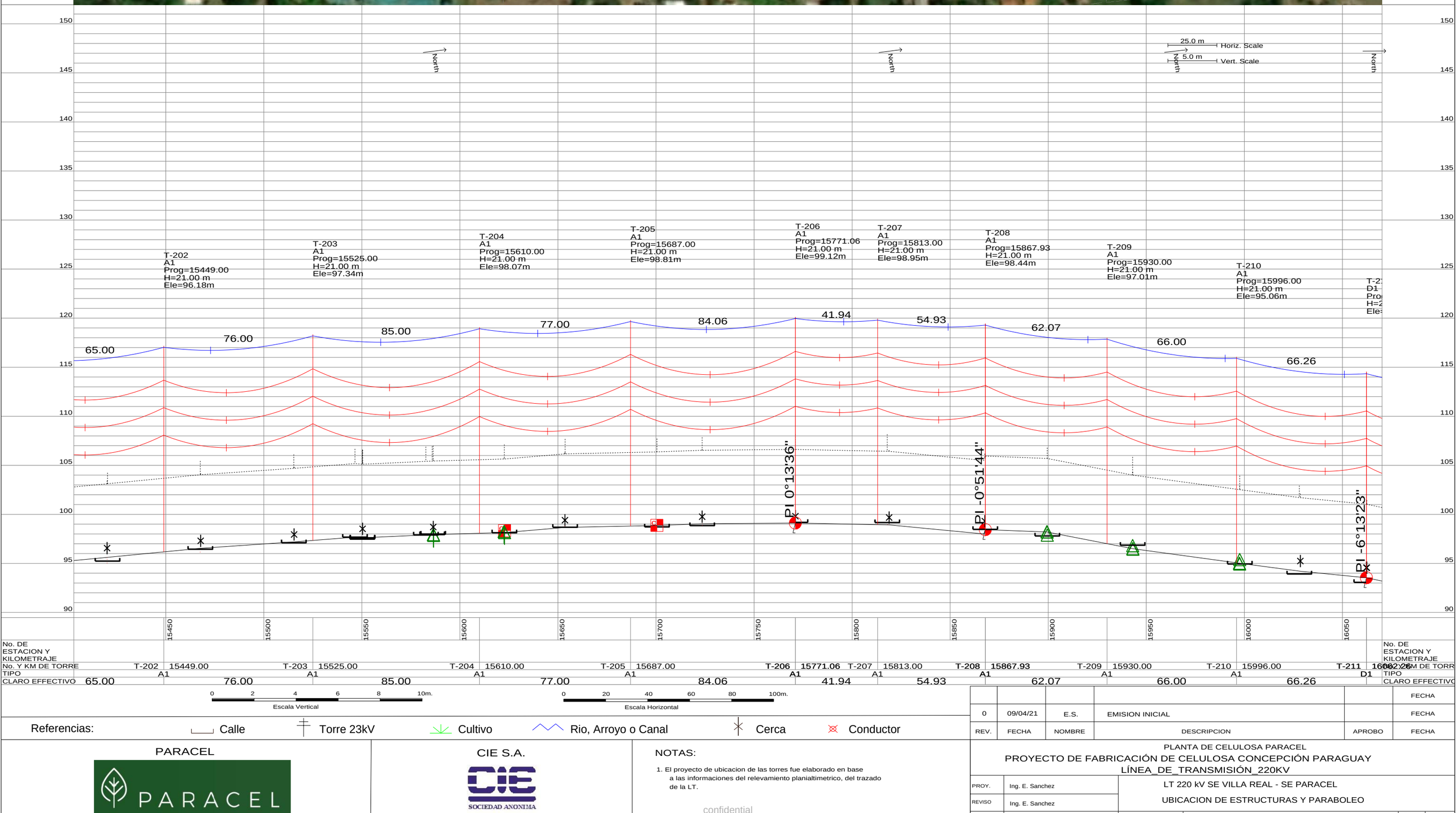



| | | |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

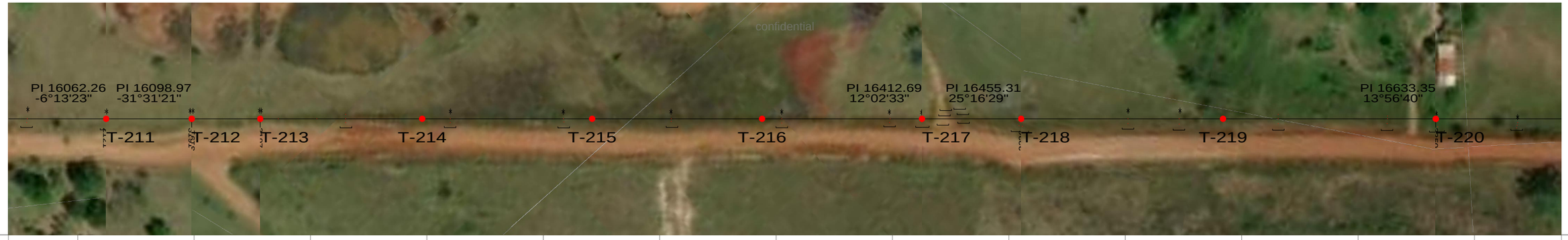
NOTAS:

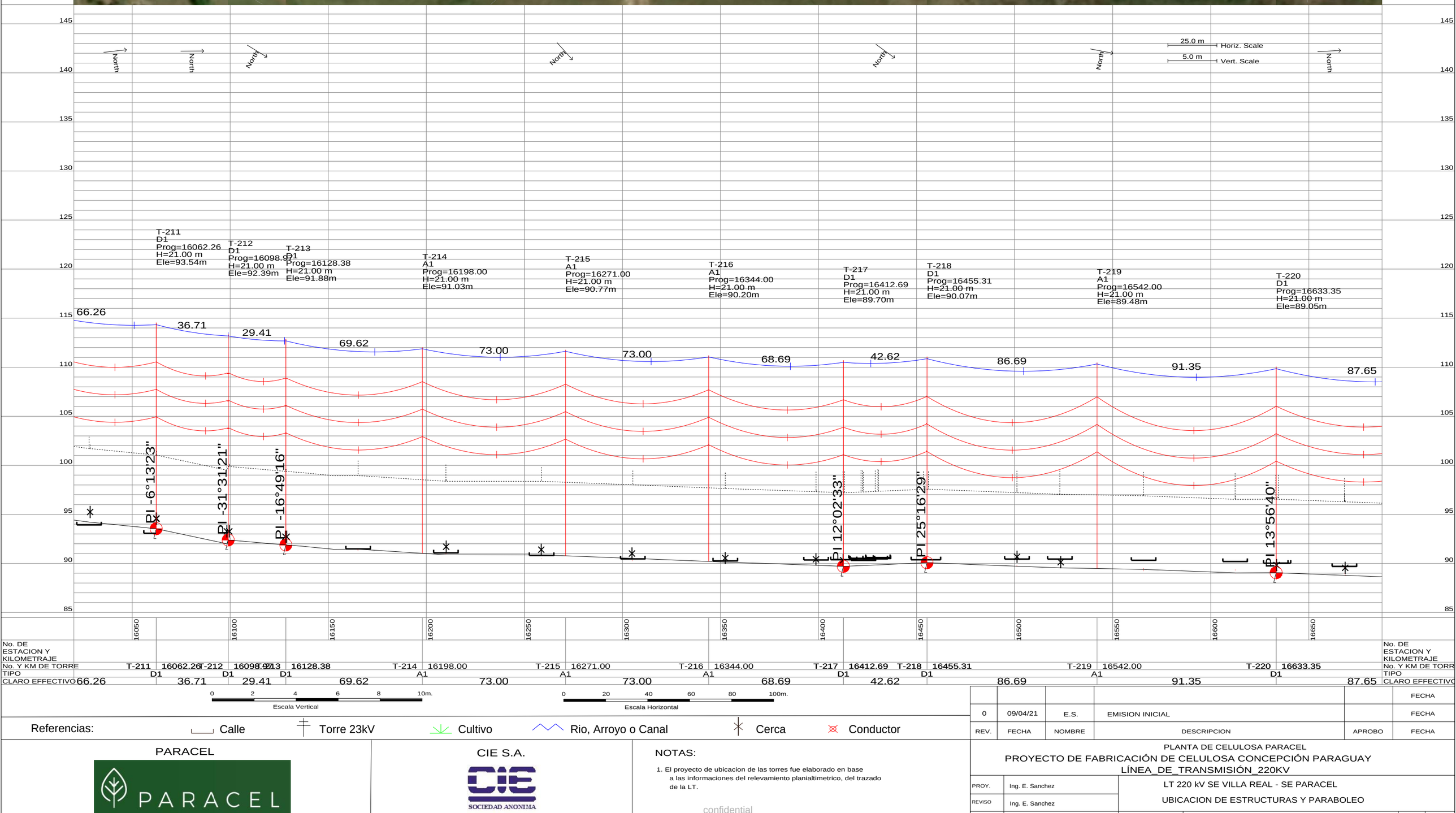
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-26 Rev. 0 Hj. 026 |




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

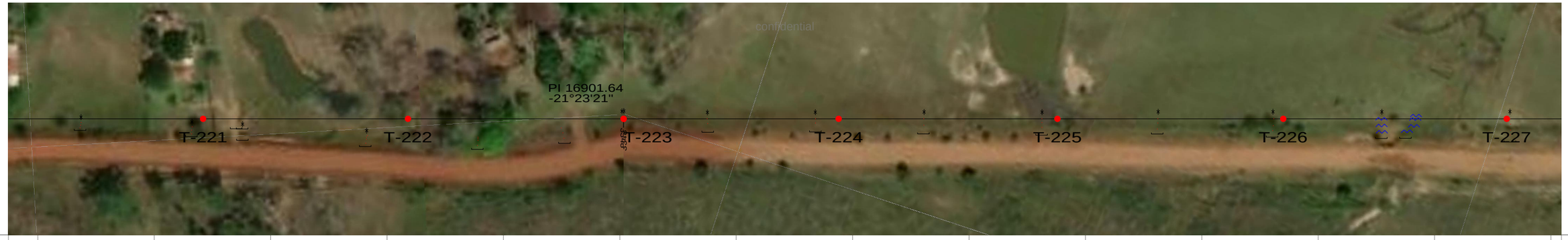
PLANTA DE CELULOSA PARACEL

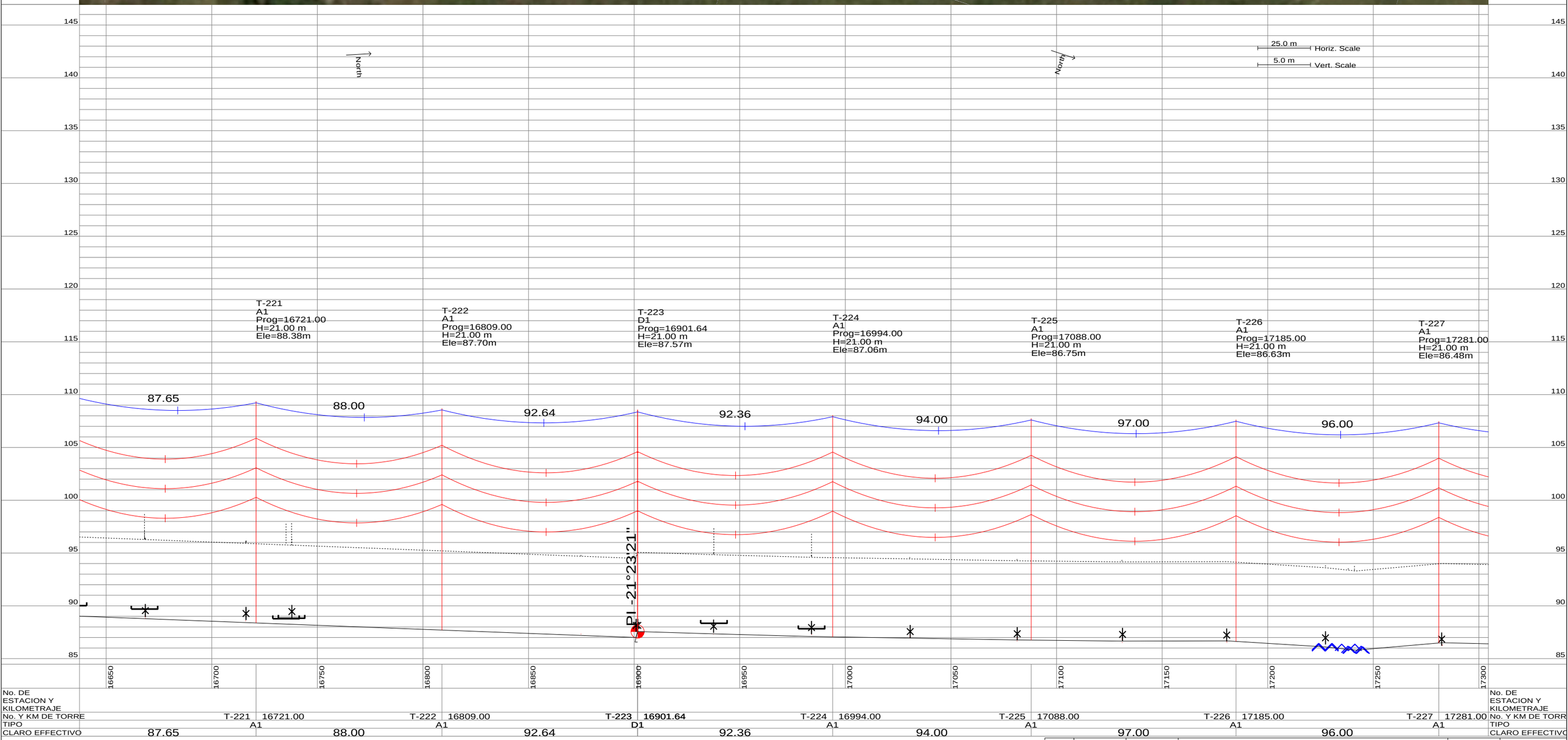
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-27 Rev. 0 Hj. 027 |

PLS-CADD Drawing




| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

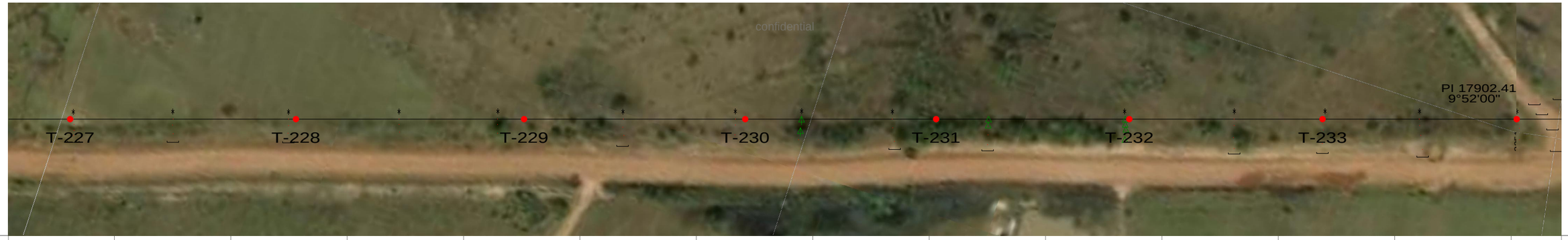
PLANTA DE CELULOSA PARACEL

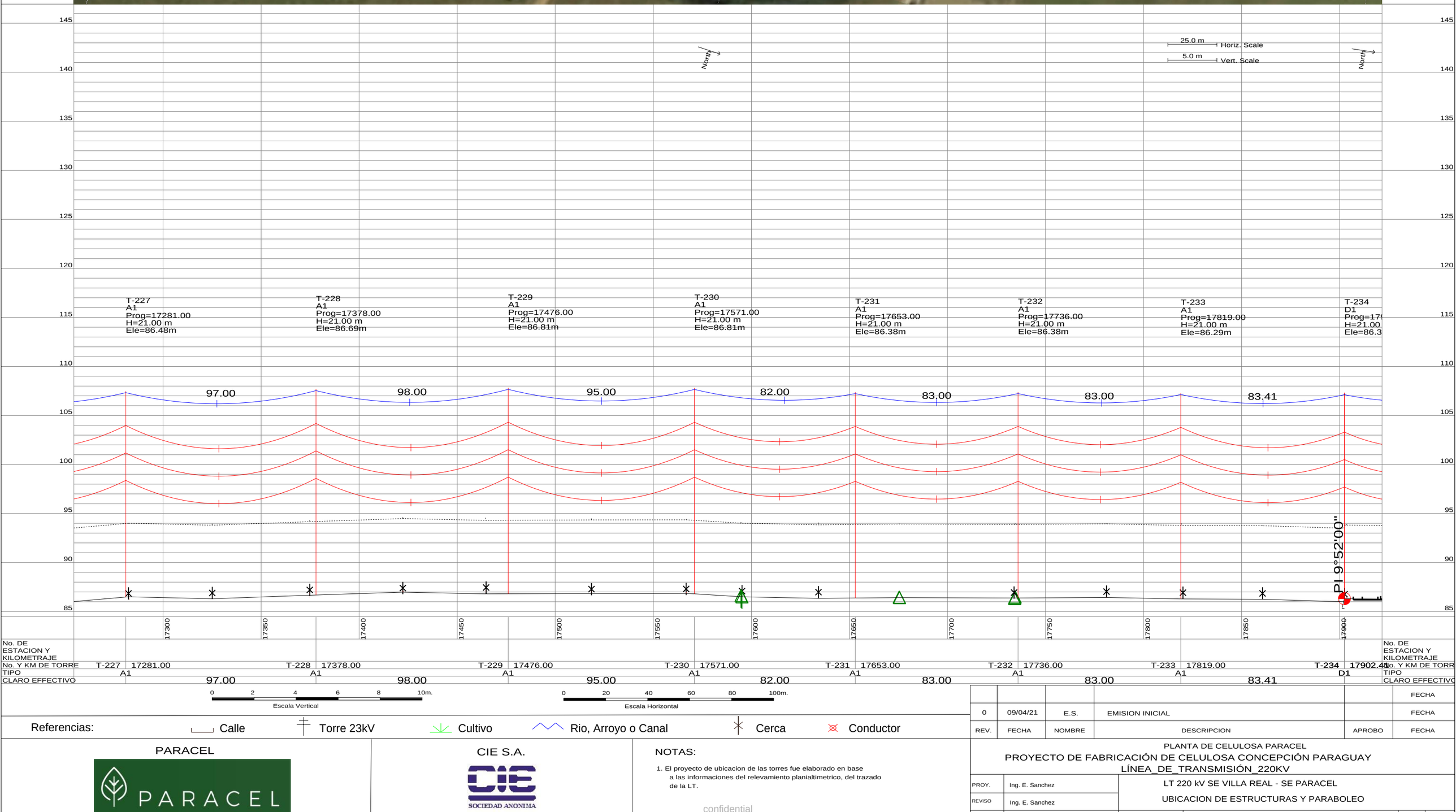
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 |

1010-1507-M-S-0002-28 | Rev. 0 | Hj. 028




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

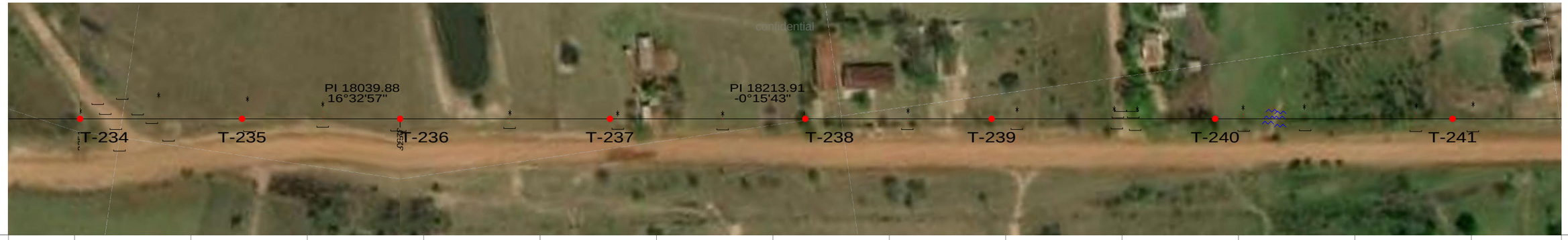
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

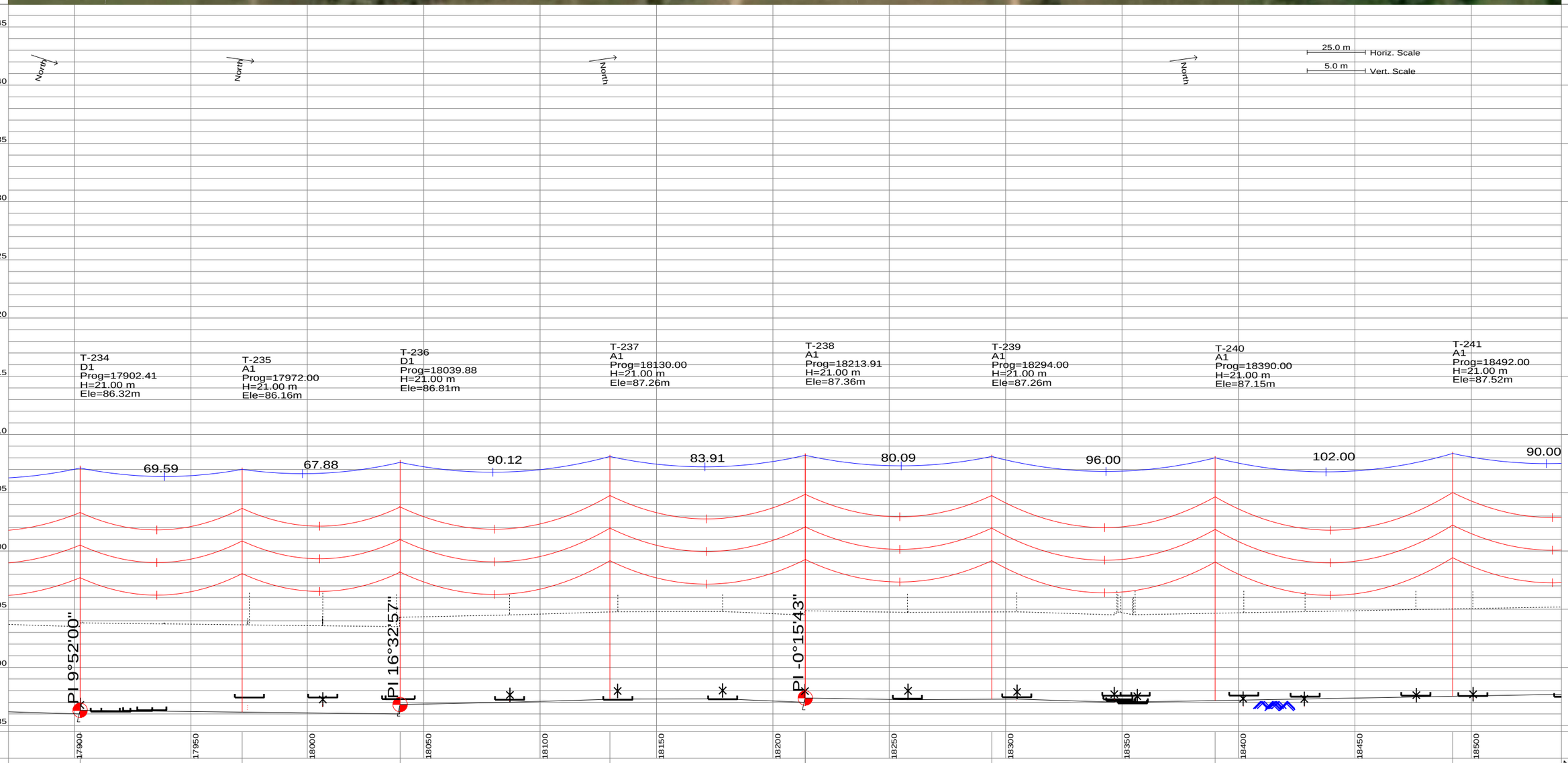
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-29 Rev. 0 Hj. 029 |

confidential




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | |
| No. Y KM DE TORRE | T-234 17902.41 | T-235 17972.00 | T-236 18039.88 | T-237 18130.00 | T-238 18213.91 |
| TIPO | D1 | A1 | D1 | A1 | A1 |
| CLARO EFFECTIVO | 69.59 | 67.88 | 90.12 | 83.91 | 80.09 |

| | | | | |
|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | |
| No. Y KM DE TORRE | T-239 18294.00 | T-240 18390.00 | T-241 18492.00 | |
| TIPO | A1 | A1 | A1 | |
| CLARO EFFECTIVO | 96.00 | 102.00 | 90.00 | |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

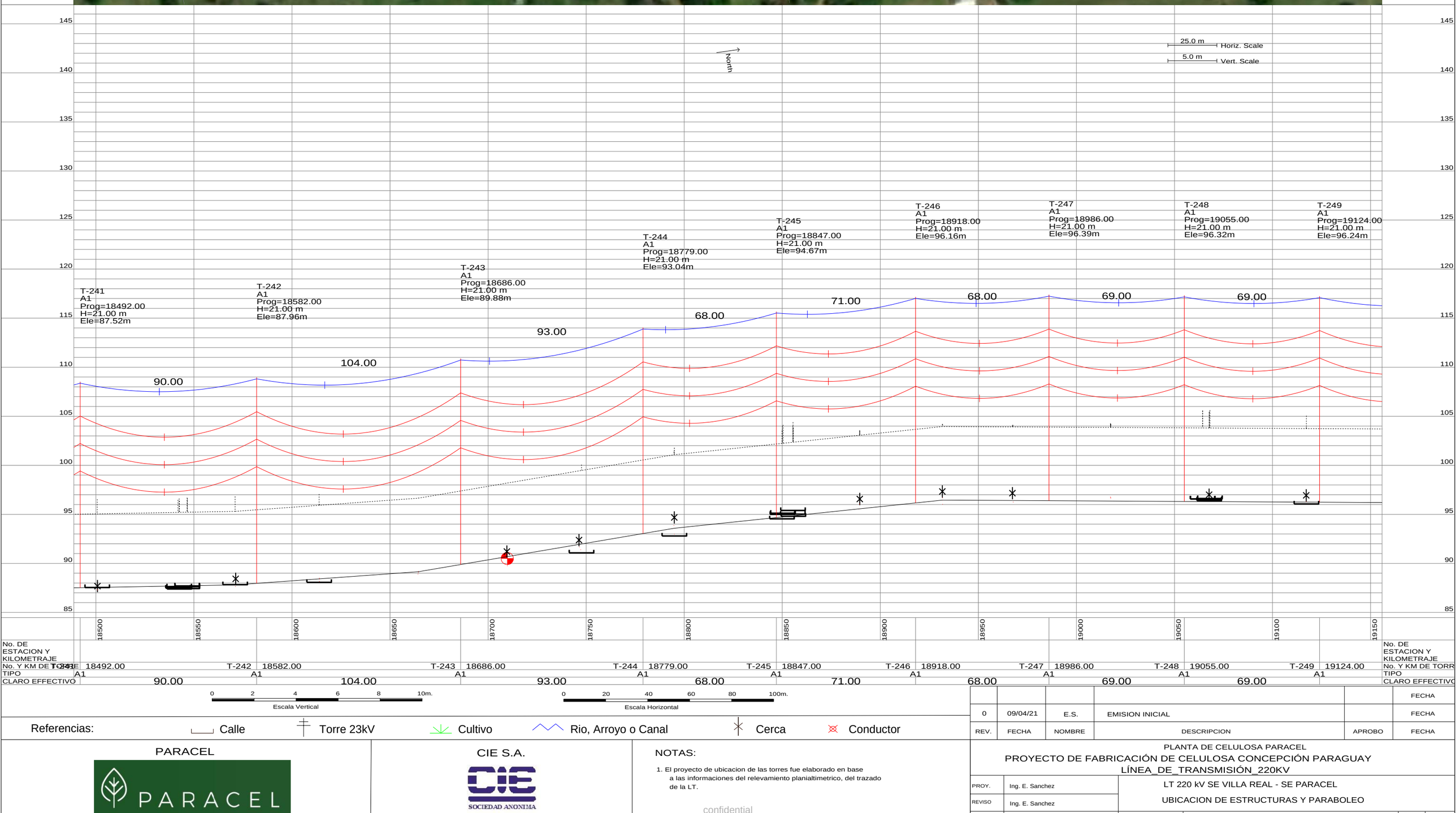
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-30 | Rev. 0 | Hj. 030 |

PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | T-241 | T-242 | T-243 | T-244 | T-245 | T-246 | T-247 | T-248 | T-249 |
|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | 18492.00 | 18582.00 | 18686.00 | 18779.00 | 18847.00 | 18918.00 | 18986.00 | 19055.00 | 19124.00 |
| TIPO | A1 | A1 | A1 | A1 | A1 | A1 | A1 | A1 | A1 |
| CLARO EFFECTIVO | 90.00 | 104.00 | 93.00 | 68.00 | 71.00 | 68.00 | 69.00 | 69.00 | |

Escala Vertical: 0 2 4 6 8 10m.

Escala Horizontal: 0 20 40 60 80 100m.

Referencias: Calle; Torre 23kV; Cultivo; Rio, Arroyo o Canal; Cerca; Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

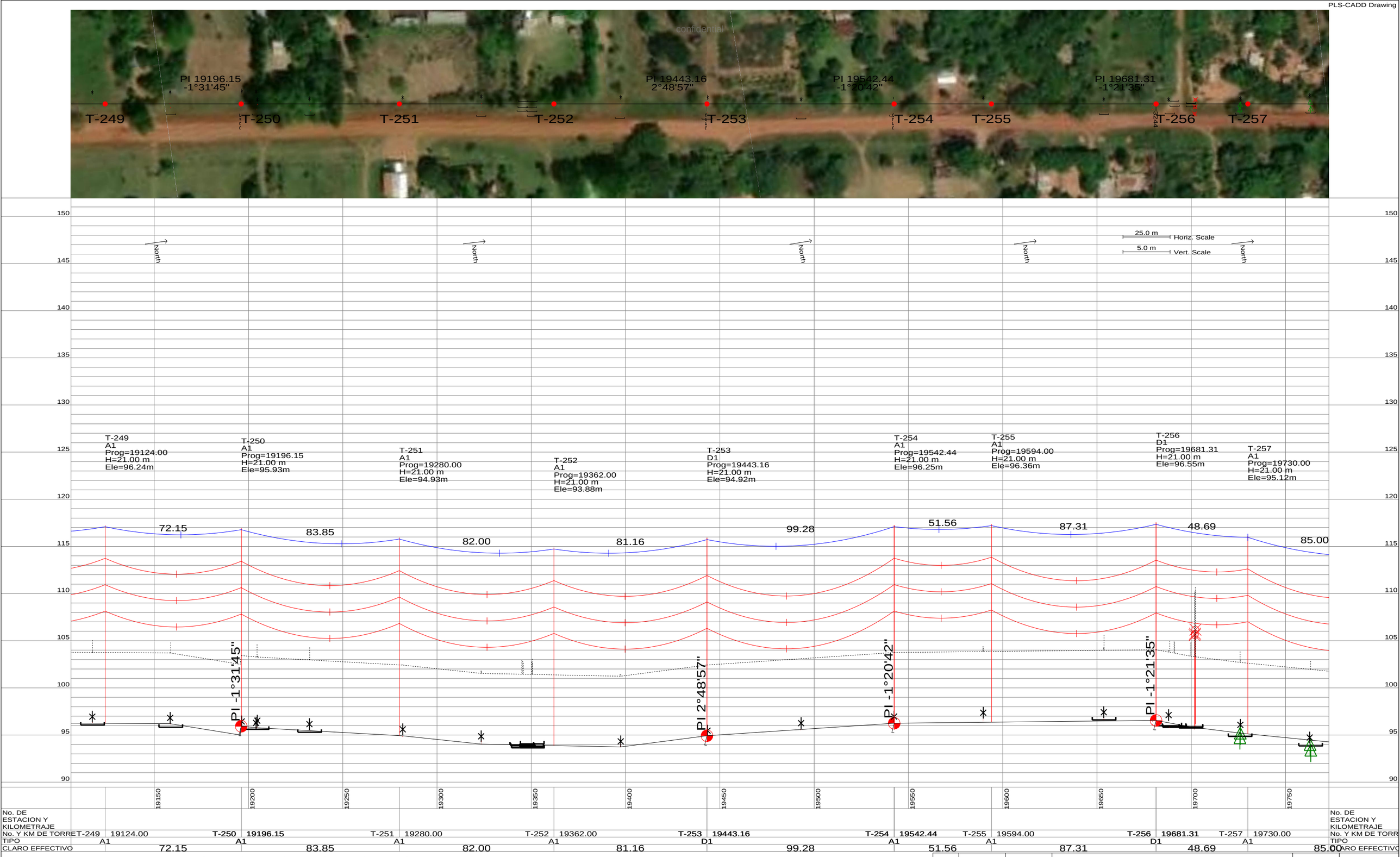
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-31 Rev. 0 Hj. 031 |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

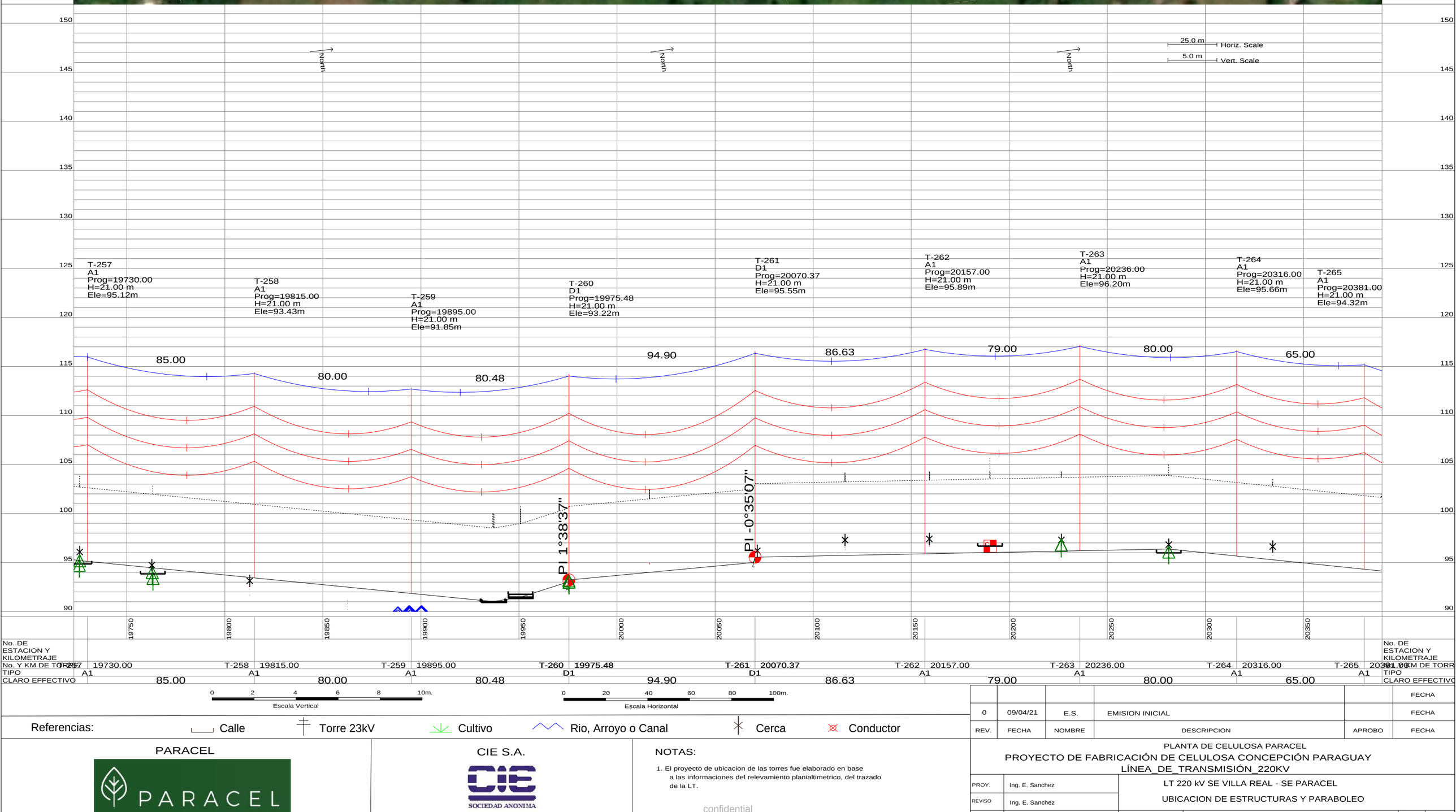
LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 1010-1507-M-S-0002-32 Rev. 0 Hj. 032 |

PLS-CADD Drawing

confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

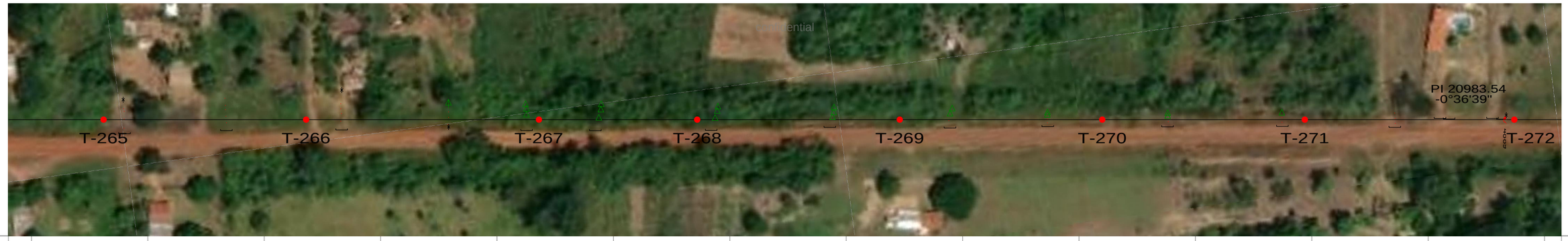
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

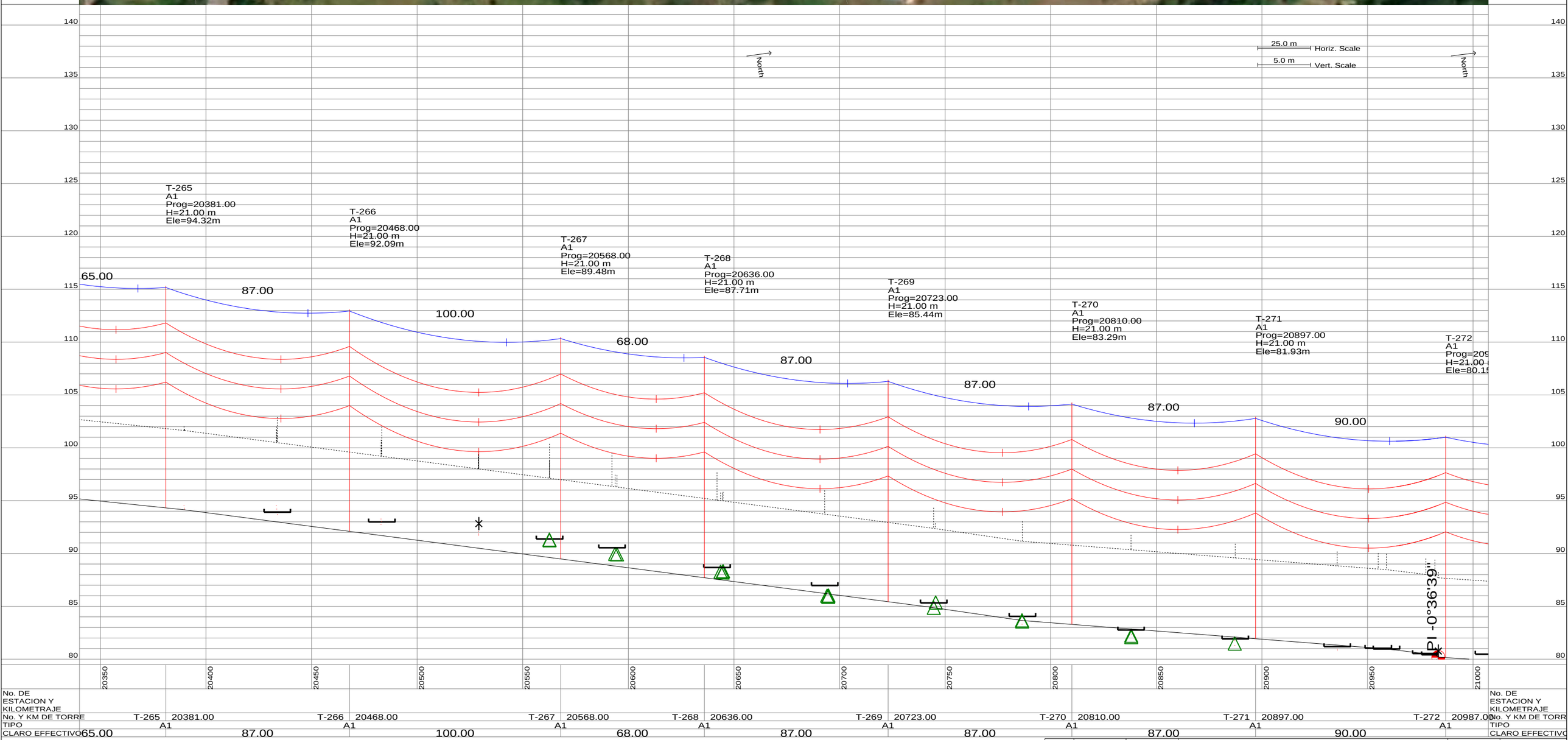
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-33 Rev. 0 Hj. 033 |

PLS-CADD Drawing

confidential




| No. DE ESTACION Y KILOMETRAJE | T-265 | T-266 | T-267 | T-268 | T-269 | T-270 | T-271 | T-272 |
|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | 20381.00 | 20468.00 | 20568.00 | 20636.00 | 20723.00 | 20810.00 | 20897.00 | 20987.00 |
| TIPO | A1 | A1 | A1 | A1 | A1 | A1 | A1 | A1 |
| CLARO EFFECTIVO | 65.00 | 87.00 | 100.00 | 68.00 | 87.00 | 87.00 | 87.00 | 90.00 |

Escala Vertical: 0 2 4 6 8 10m.

Escala Horizontal: 0 20 40 60 80 100m.

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

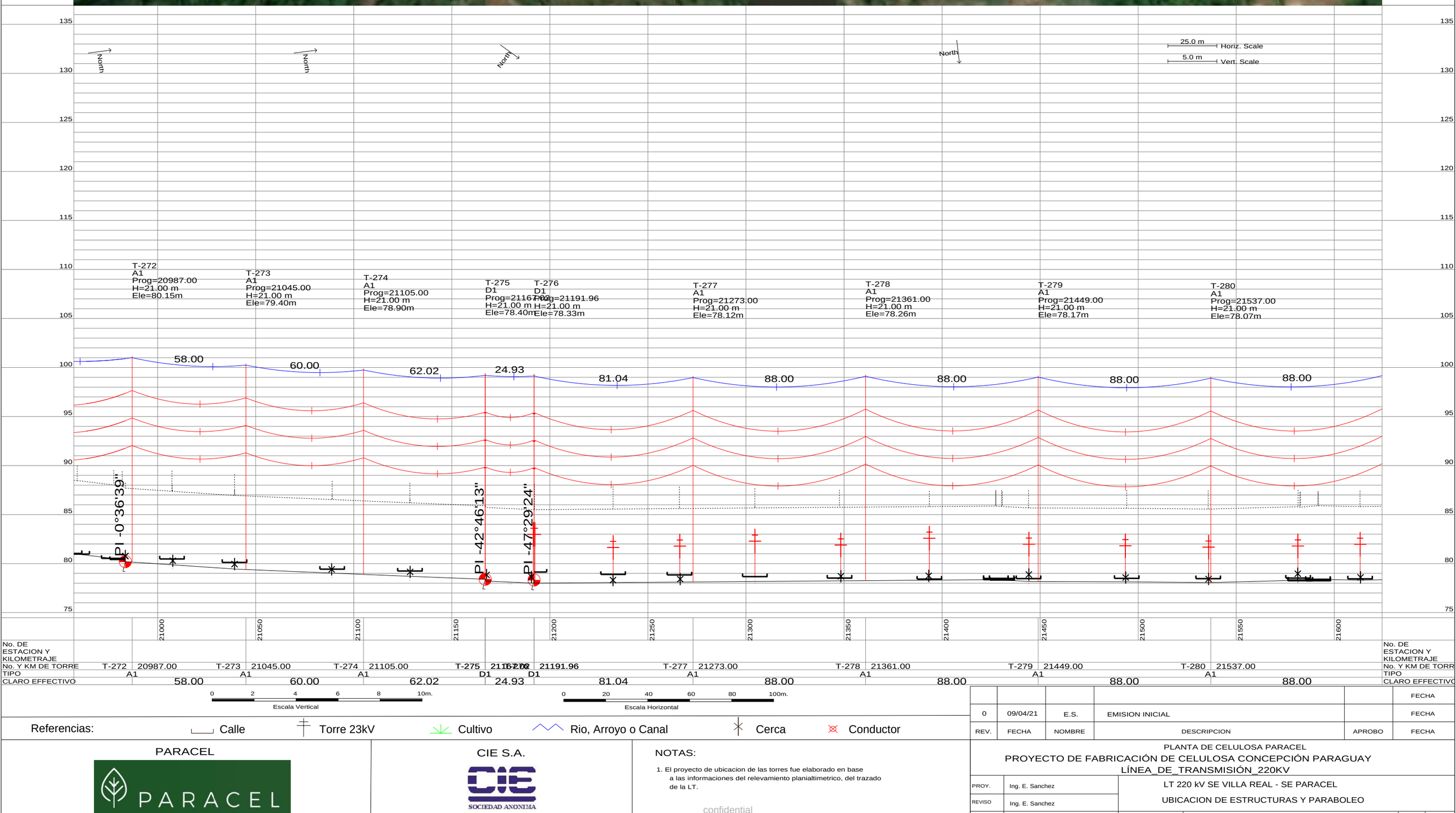
PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-34 Rev. 0 Hj. 034 |




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

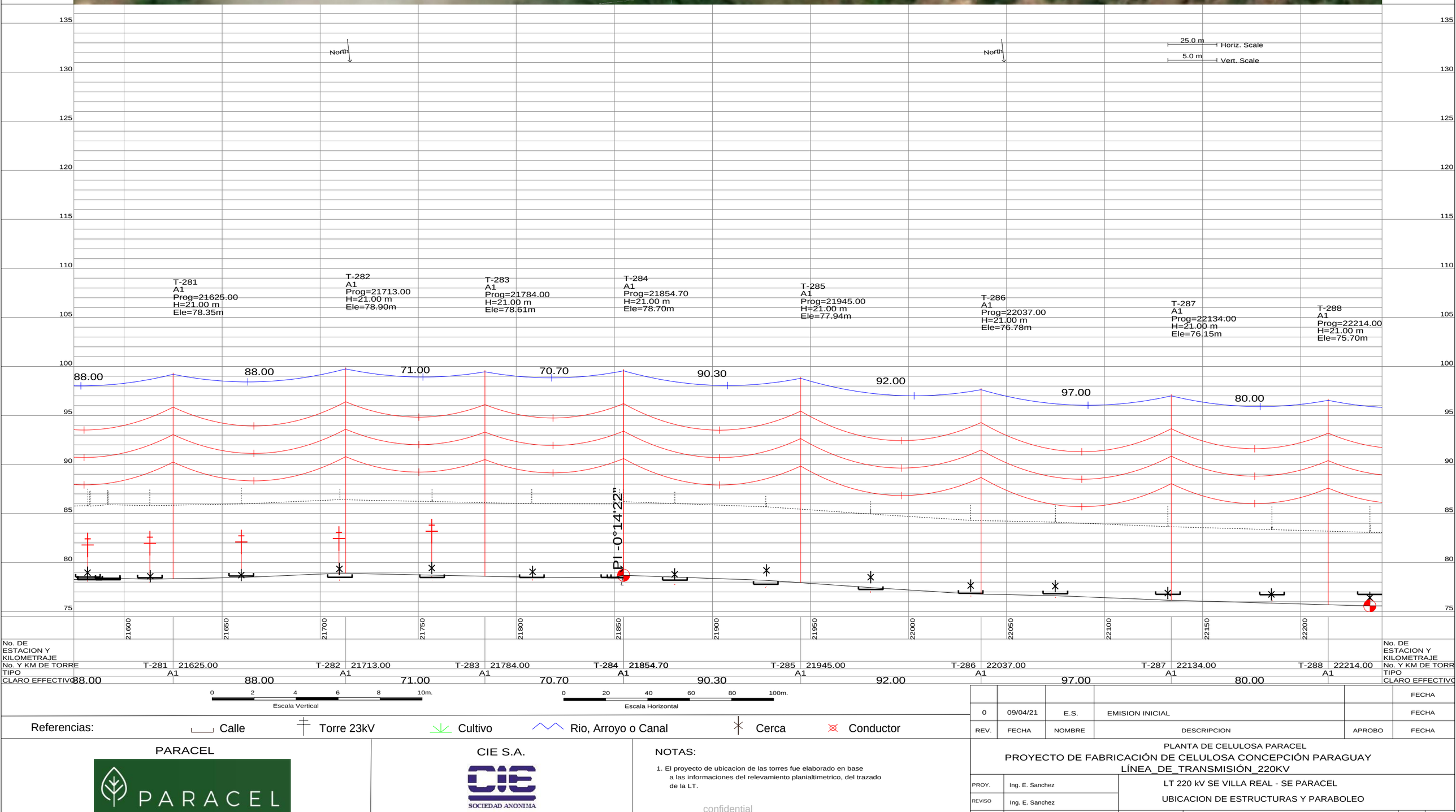
PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 |

1010-1507-M-S-0002-35 | Rev. 0 | Hj. 035

PLS-CADD Drawing




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

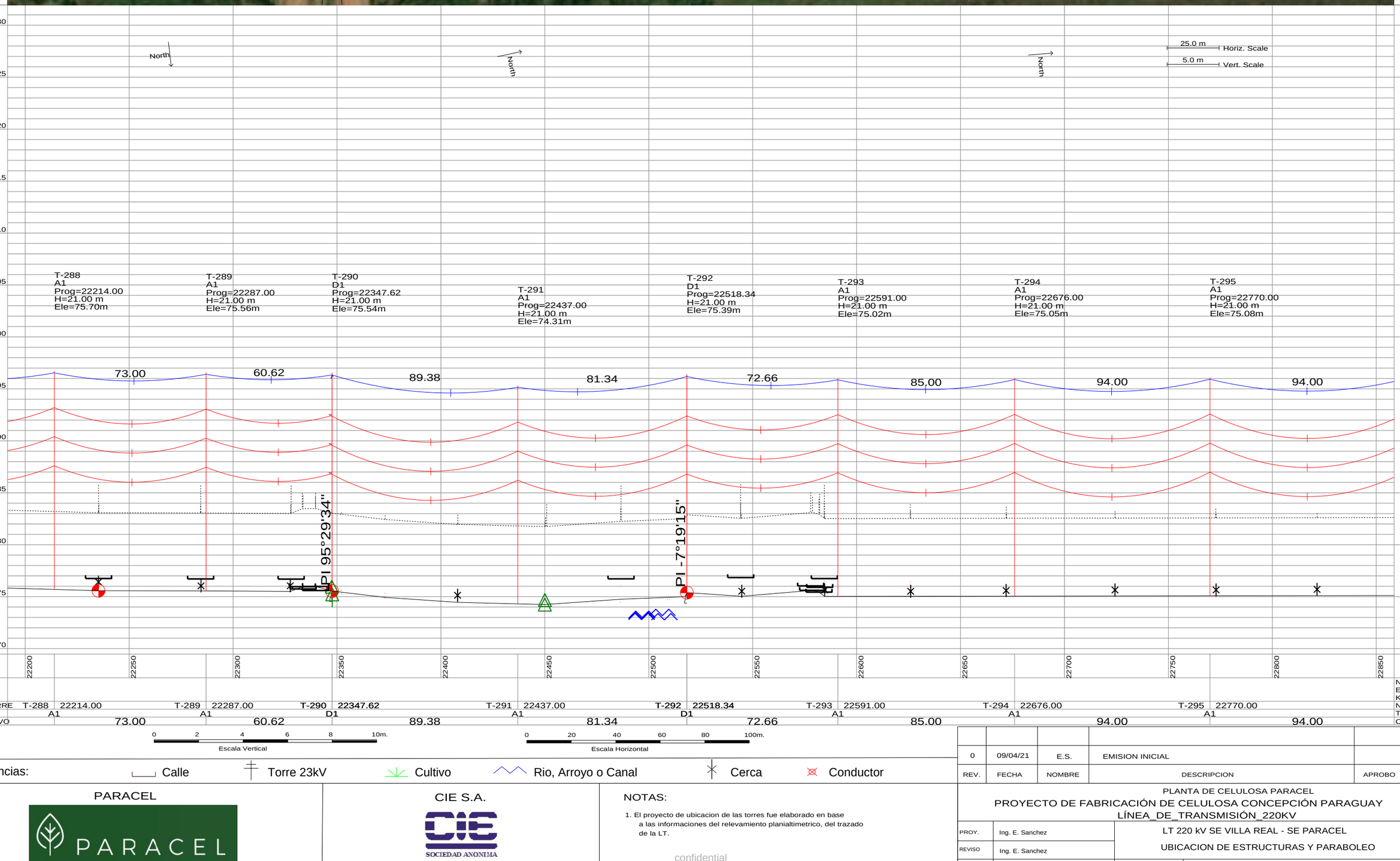
LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 |

1010-1507-M-S-0002-36 | Rev. 0 | Hj. 036

confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

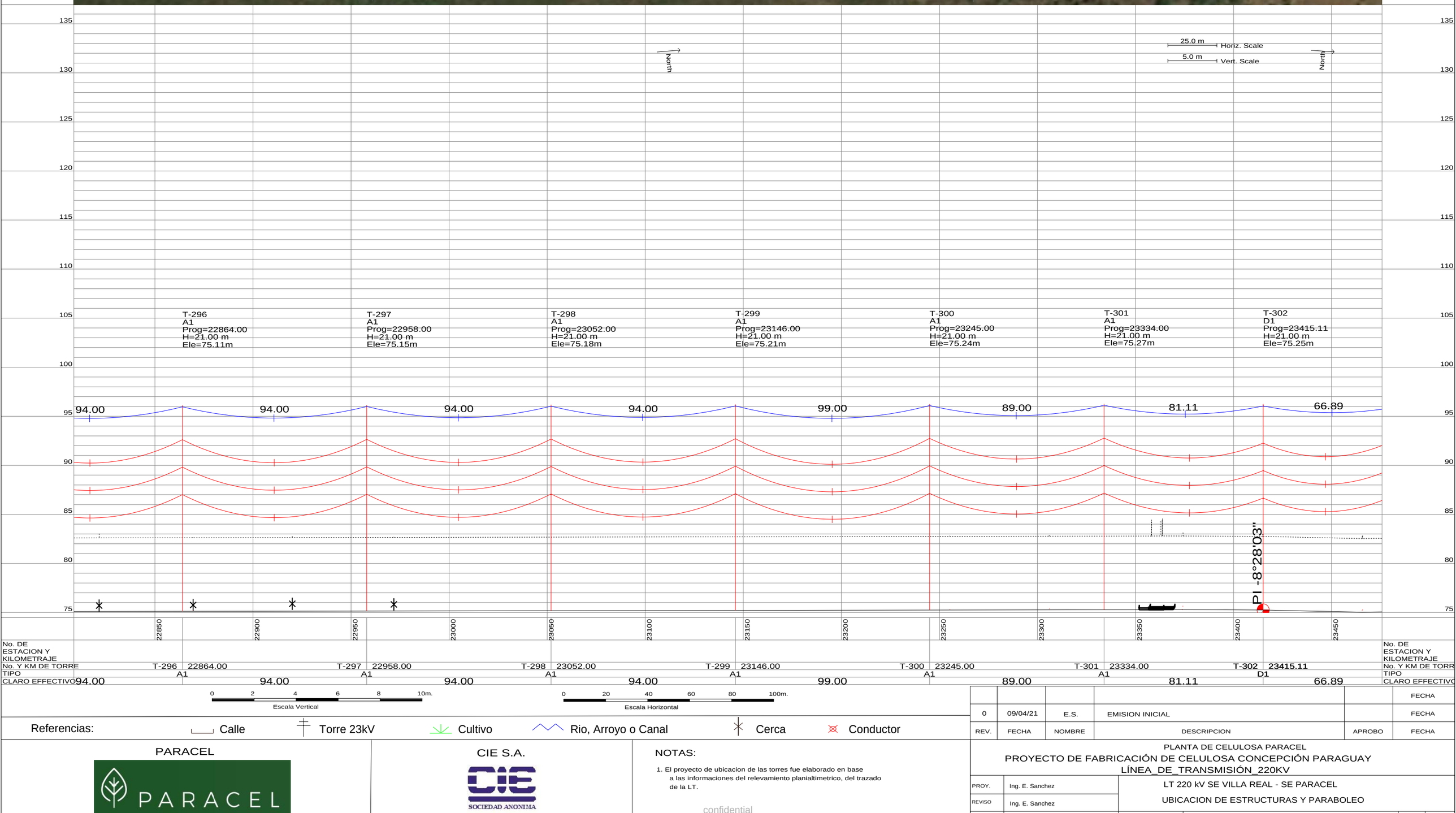
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-37 Rev. 0 Hj. 037 |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

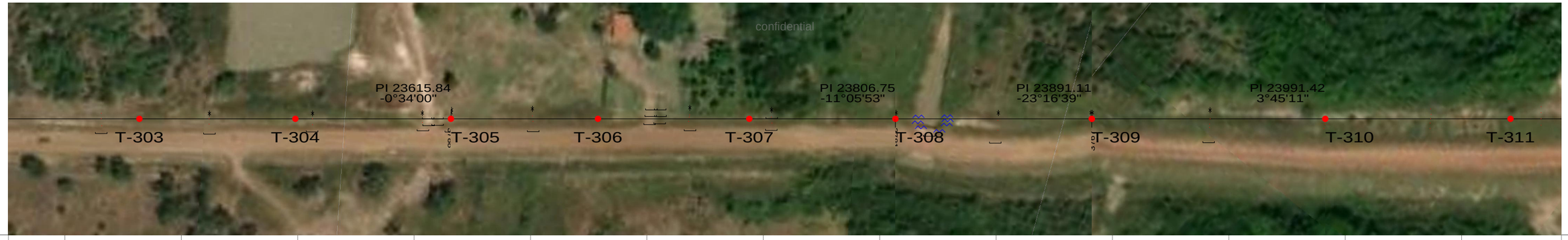
PLANTA DE CELULOSA PARACEL

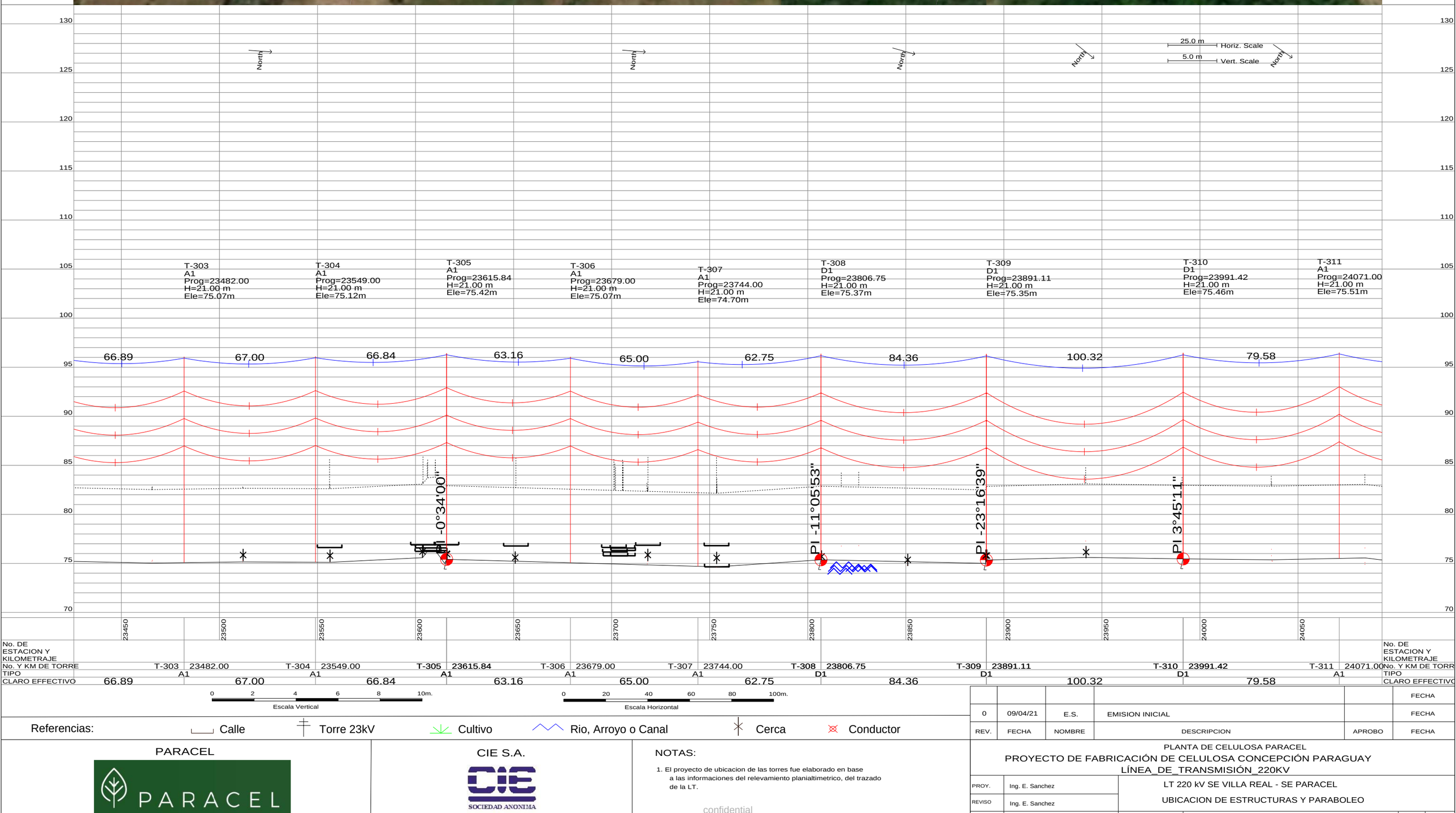
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-38 Rev. 0 Hj. 038 |

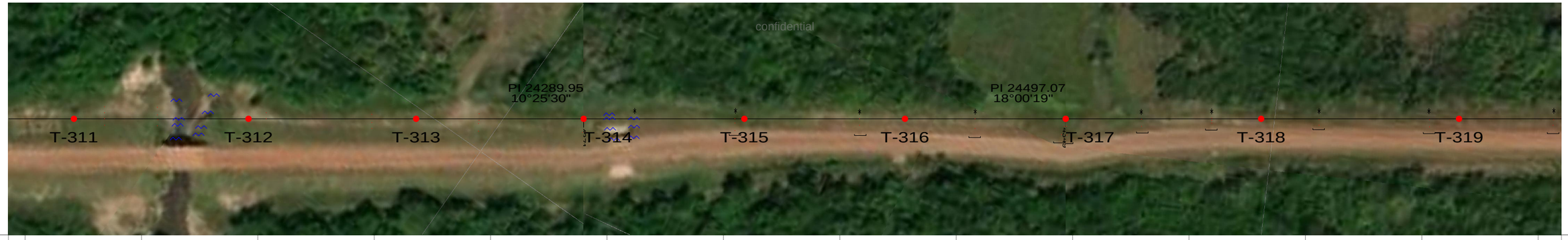
confidential

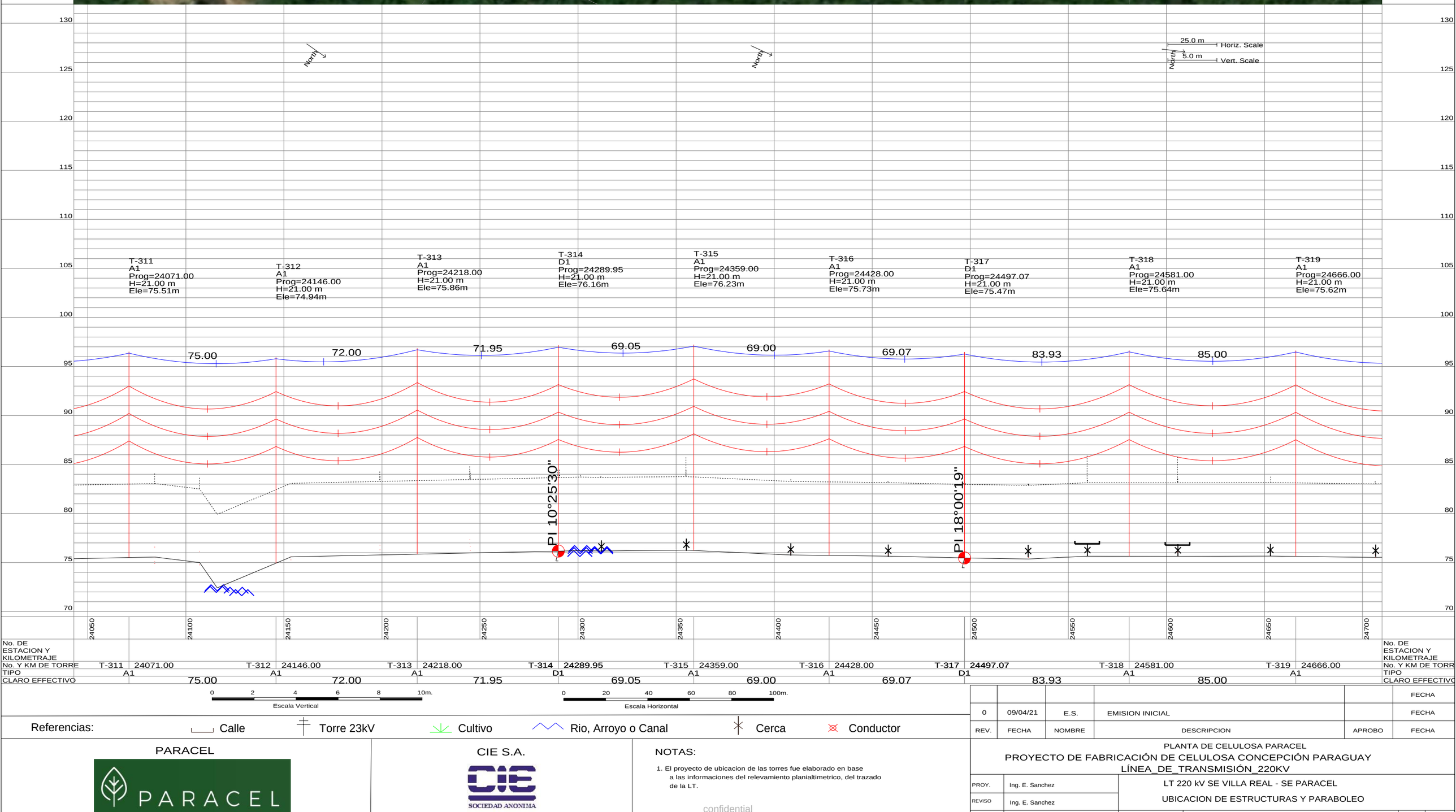



| No. DE ESTACION Y KILOMETRAJE | | |

PLS-CADD Drawing




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

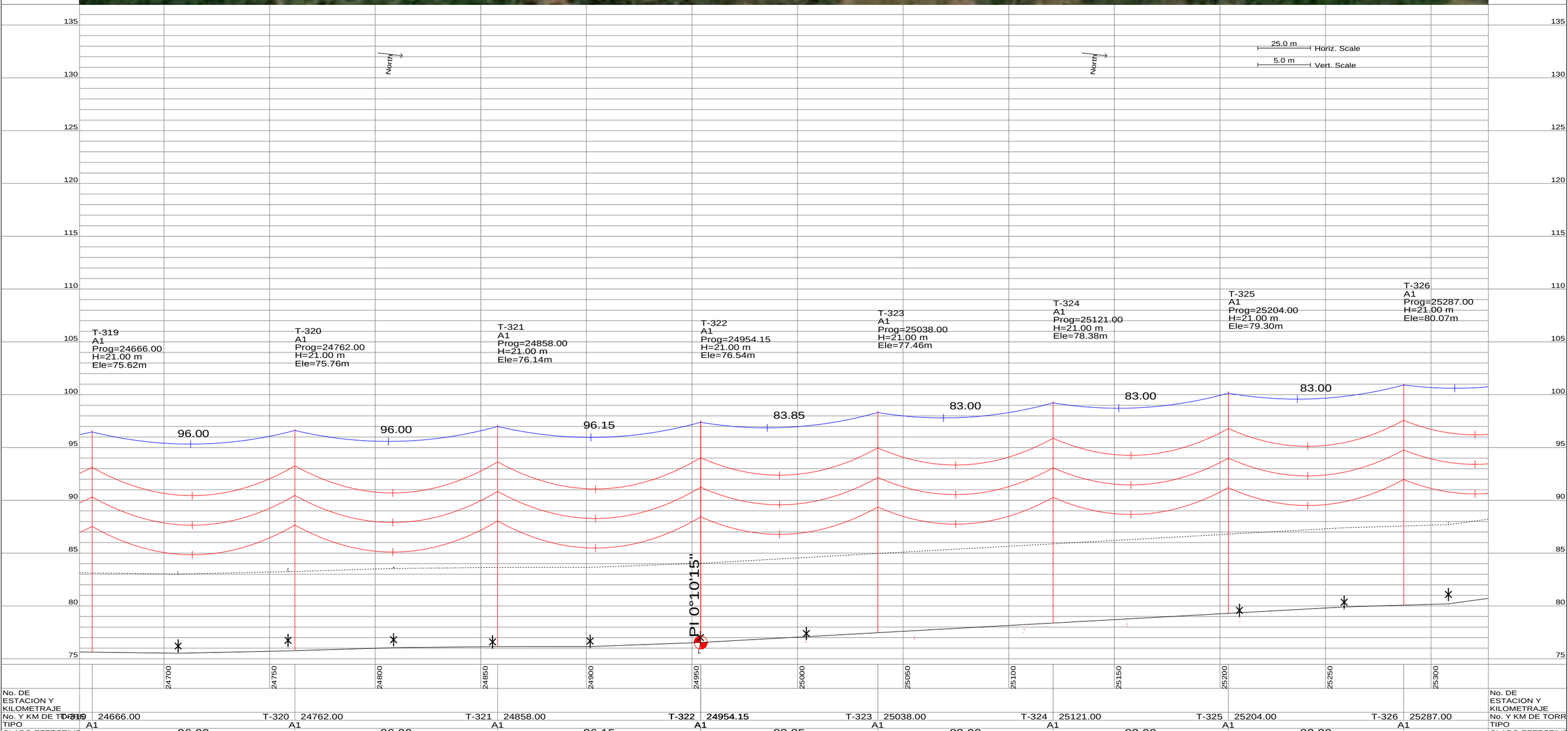
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-40 Rev. 0 Hj. 040 |




| No. DE ESTACION Y KILOMETRAJE | T-319 | 24666.00 | T-320 | 24762.00 | T-321 | 24858.00 | T-322 | 24954.15 | T-323 | 25038.00 | T-324 | 25121.00 | T-325 | 25204.00 | T-326 | 25287.00 | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | | | | | | | | | | | | | | | | | No. Y KM DE TORRE |
| TIPO | | A1 | | A1 | | A1 | | A1 | | A1 | | A1 | | A1 | | A1 | TIPO |
| CLARO EFFECTIVO | | 96.00 | | 96.00 | | 96.15 | | 83.85 | | 83.00 | | 83.00 | | 83.00 | | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

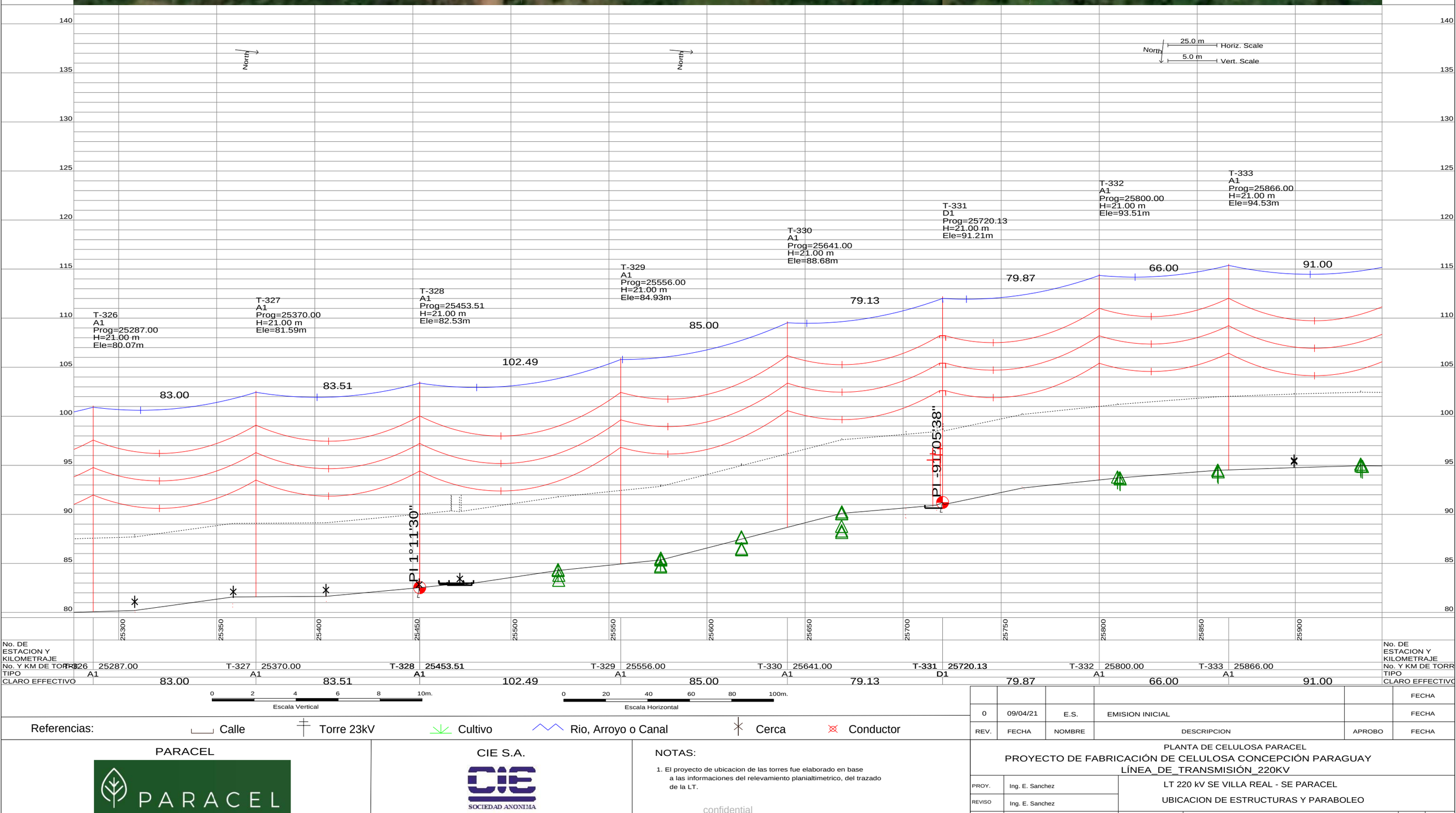
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-41 Rev. 0 Hj. 041 |

confidential




| | | | | | |
|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | T-326 | 25287.00 | T-327 | 25370.00 | T-328 | 25453.51 | T-329 | 25556.00 | T-330 | 25641.00 | T-331 | 25720.13 | T-332 | 25800.00 | T-333 | 25866.00 | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | | | | | | | | | | | | | | | | | No. Y KM DE TORRE |
| TIPO | A1 | | A1 | | A1 | | A1 | | A1 | | D1 | | A1 | | A1 | | TIPO |
| CLARO EFFECTIVO | | 83.00 | | 83.51 | | 102.49 | | 85.00 | | 79.13 | | 79.87 | | 66.00 | | 91.00 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

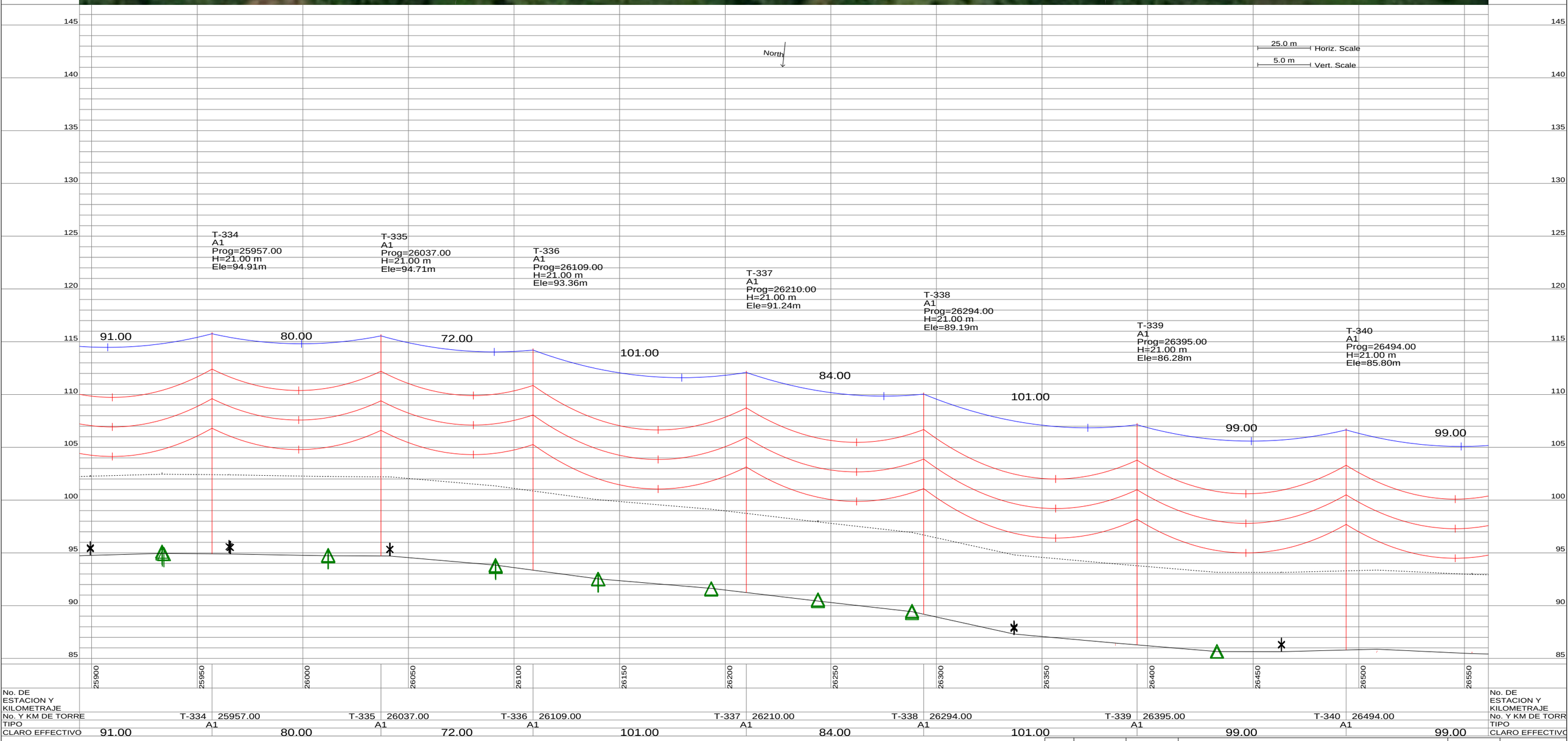
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-42 Rev. 0 Hj. 042 |

confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

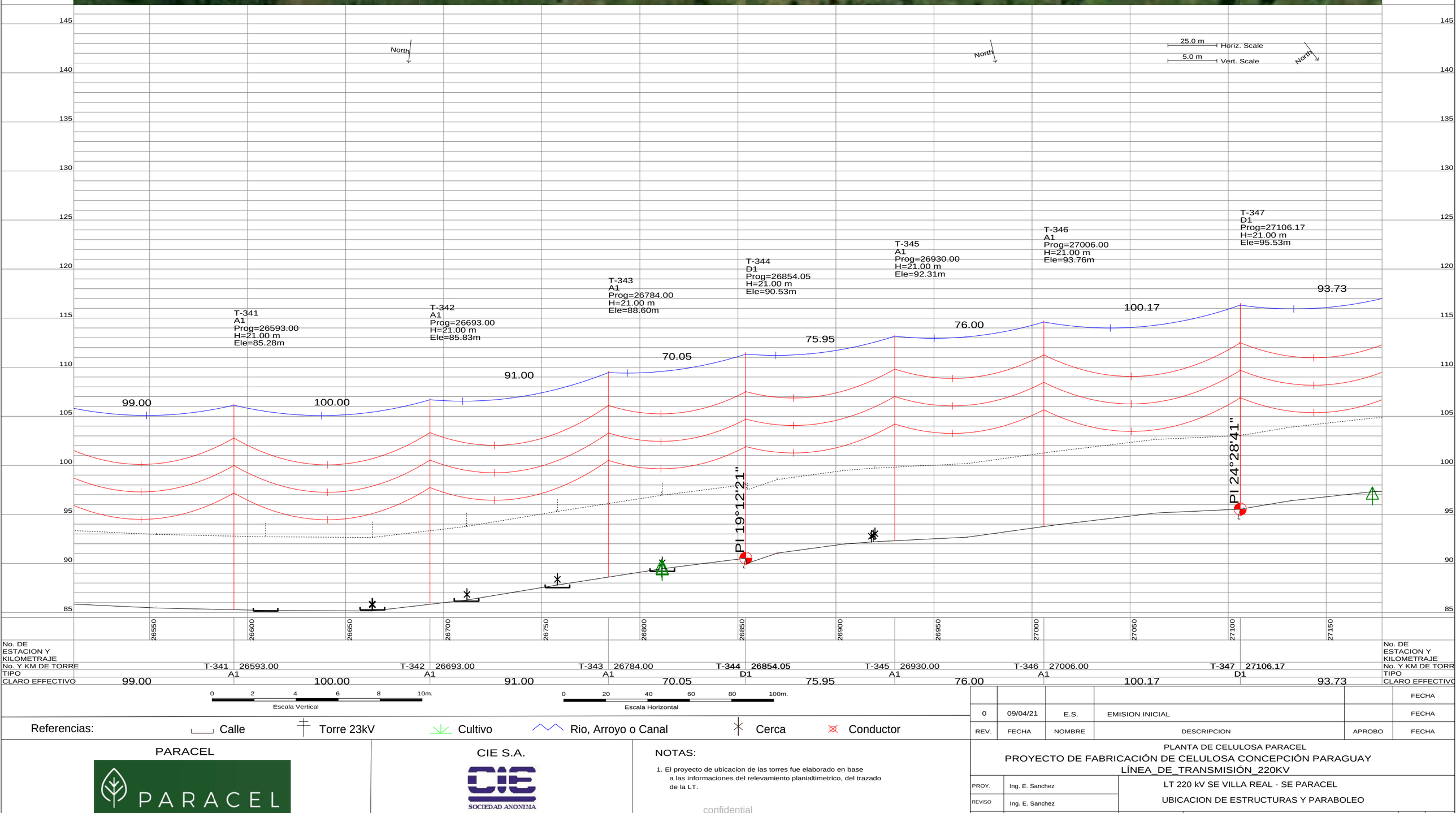
| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-43 Rev. 0 Hj. 043 |

confidential




| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
| No. Y KM DE TORRE | T-341 | 26593.00 | T-342 | 26693.00 | T-343 | 26784.00 | **T-344** | **26854.05** | T-345 | 26930.00 | T-346 | 27006.00 | **T-347** | **27106.17** | No. Y KM DE TORRE |
| TIPO | | A1 | | A1 | | A1 | | D1 | | A1 | | A1 | | D1 | TIPO |
| CLARO EFFECTIVO | 99.00 | | 100.00 | | 91.00 | | 70.05 | | 75.95 | | 76.00 | | 100.17 | | 93.73 | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

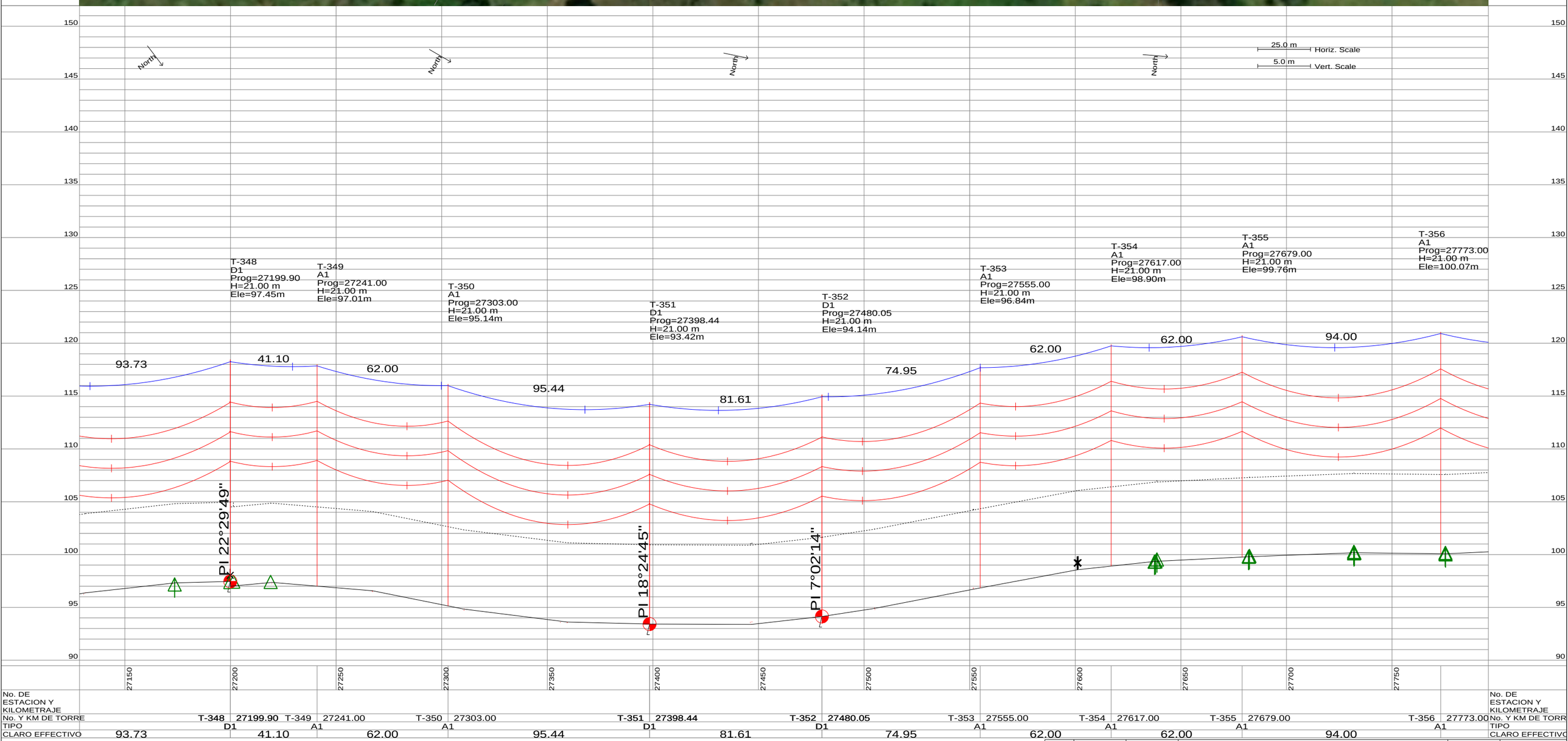
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-44 Rev. 0 Hj. 044 |




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

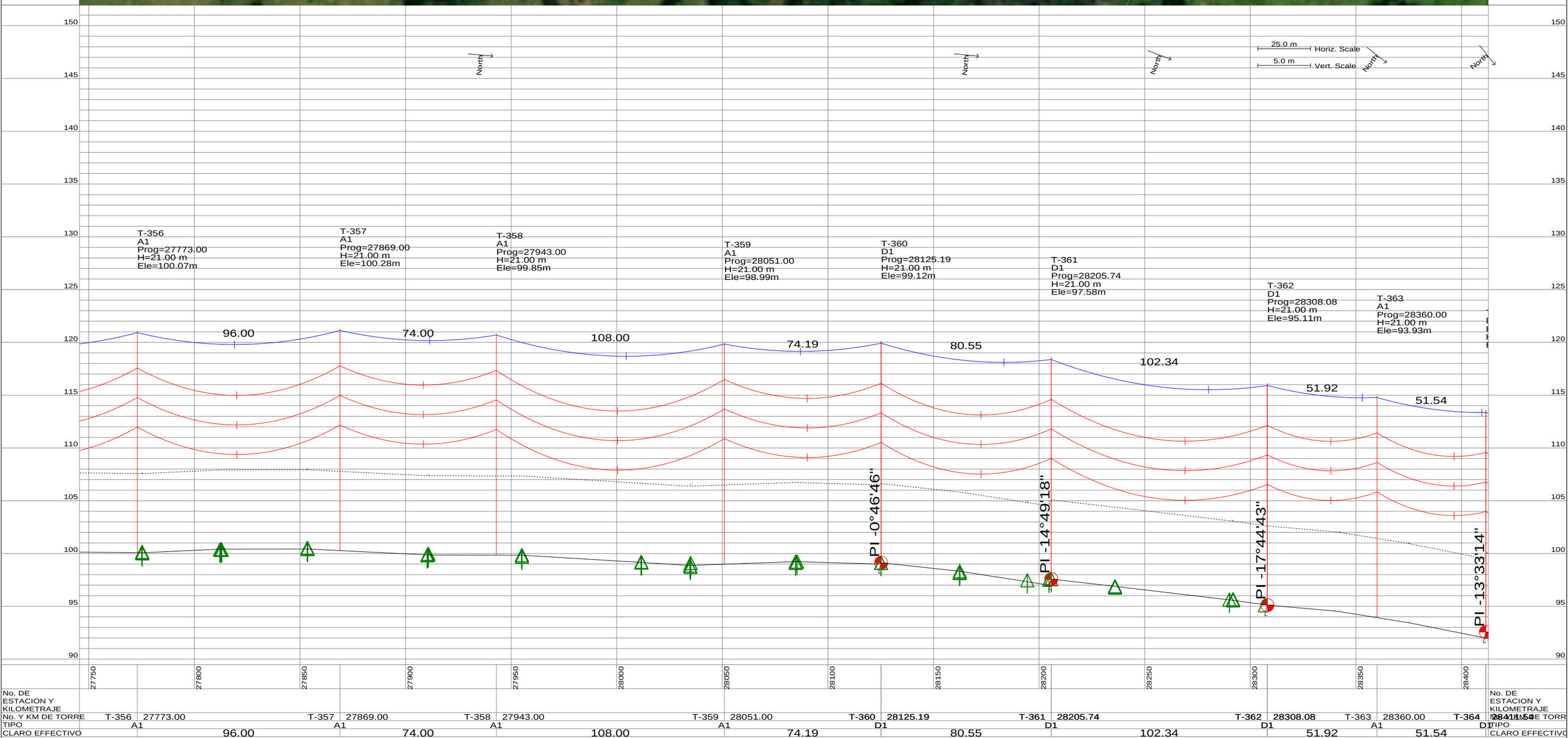
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-45 Rev. 0 Hj. 045 |

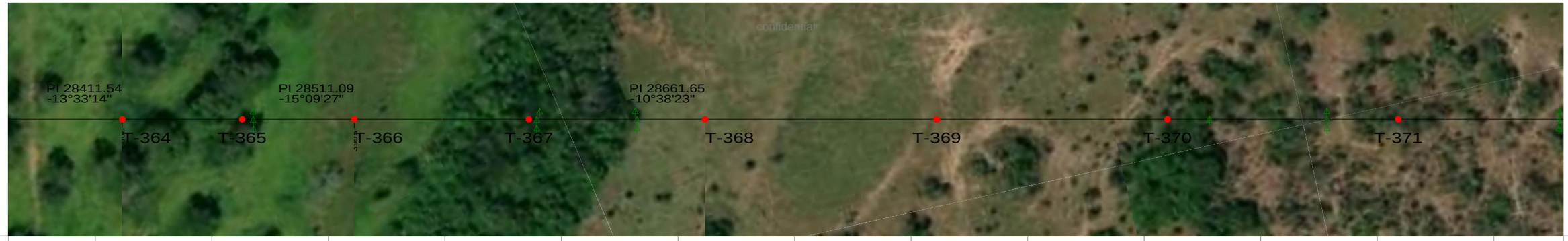
confidential

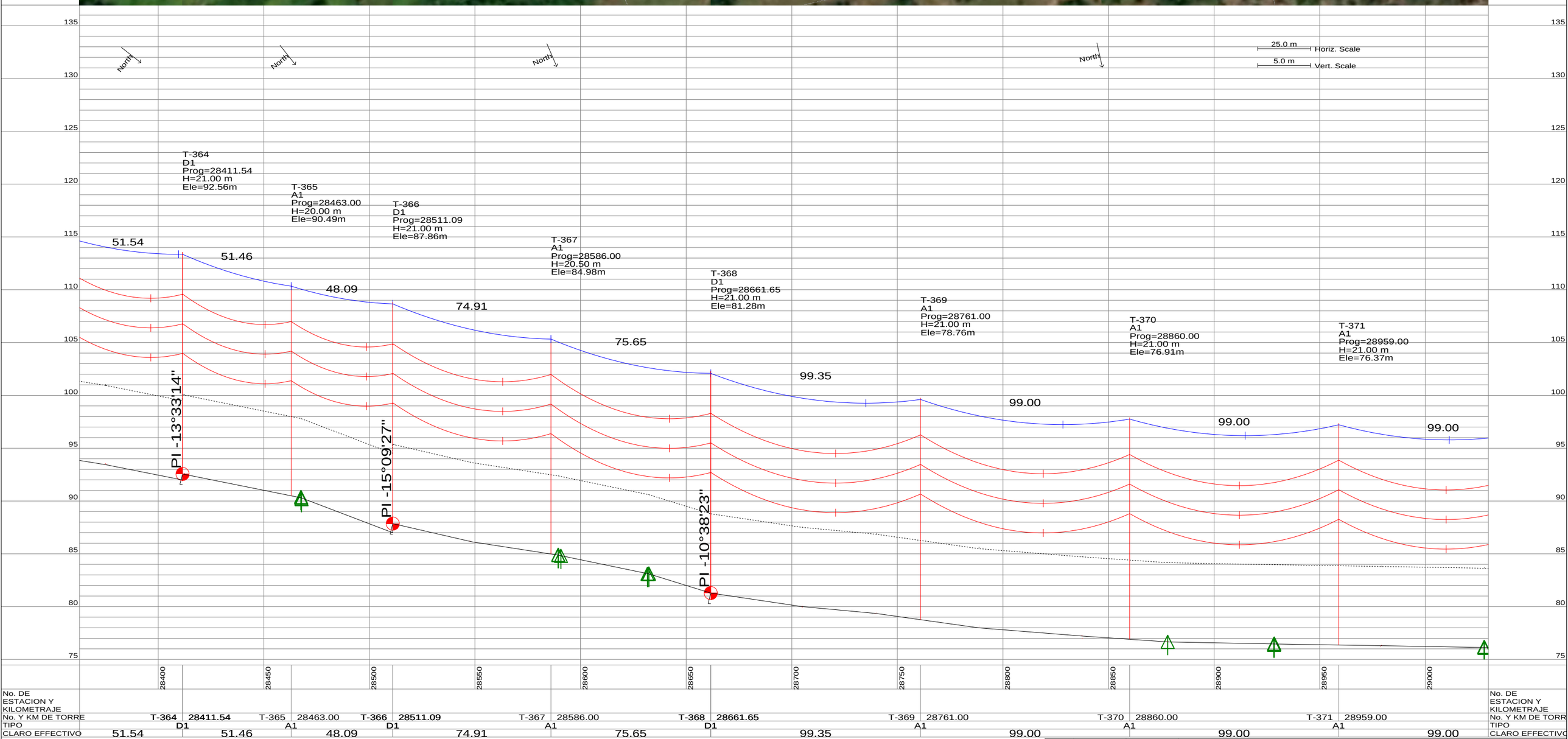



| No. DE ESTACION Y KILOMETRAJE | | |

PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | T-364 | 28411.54 | | T-365 | 28463.00 | | T-366 | 28511.09 | | T-367 | 28586.00 | | T-368 | 28661.65 | | T-369 | 28761.00 | | T-370 | 28860.00 | | T-371 | 28959.00 | | No. Y KM DE TORRE |
| TIPO | | D1 | | | A1 | | | D1 | | | A1 | | | D1 | | | A1 | | | A1 | | | A1 | | TIPO |
| CLARO EFECTIVO | 51.54 | | | 51.46 | | | 48.09 | | | 74.91 | | | 75.65 | | | 99.35 | | | 99.00 | | | 99.00 | | | CLARO EFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

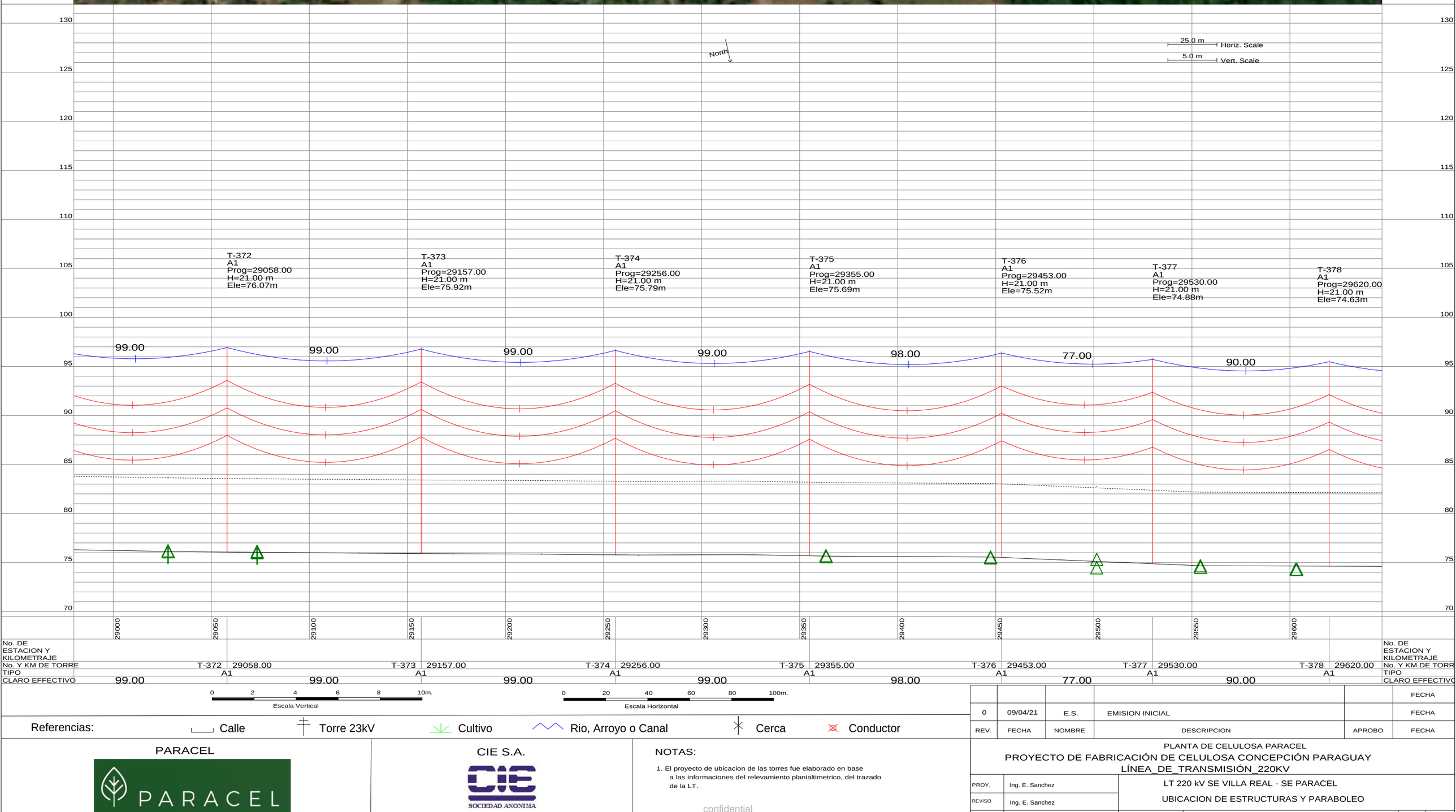
confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-47 | Rev. 0 | Hj. 047 |

PLS-CADD Drawing




| No. DE ESTACION Y KILOMETRAJE | | | | | | | | | | | | | | No. DE ESTACION Y KILOMETRAJE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Y KM DE TORRE | T-372 | 29058.00 | T-373 | 29157.00 | T-374 | 29256.00 | T-375 | 29355.00 | T-376 | 29453.00 | T-377 | 29530.00 | T-378 | 29620.00 | No. Y KM DE TORRE |
| TIPO | | A1 | | A1 | | A1 | | A1 | | A1 | | A1 | | A1 | TIPO |
| CLARO EFFECTIVO | 99.00 | | 99.00 | | 99.00 | | 99.00 | | 98.00 | | 77.00 | | 90.00 | | CLARO EFFECTIVO |

0 2 4 6 8 10m.
Escala Vertical

0 20 40 60 80 100m.
Escala Horizontal

Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.
SOCIEDAD ANONIMA

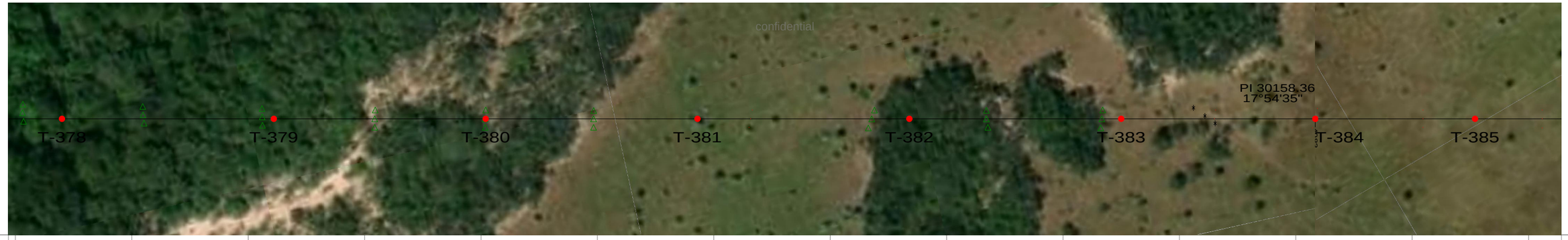
NOTAS:

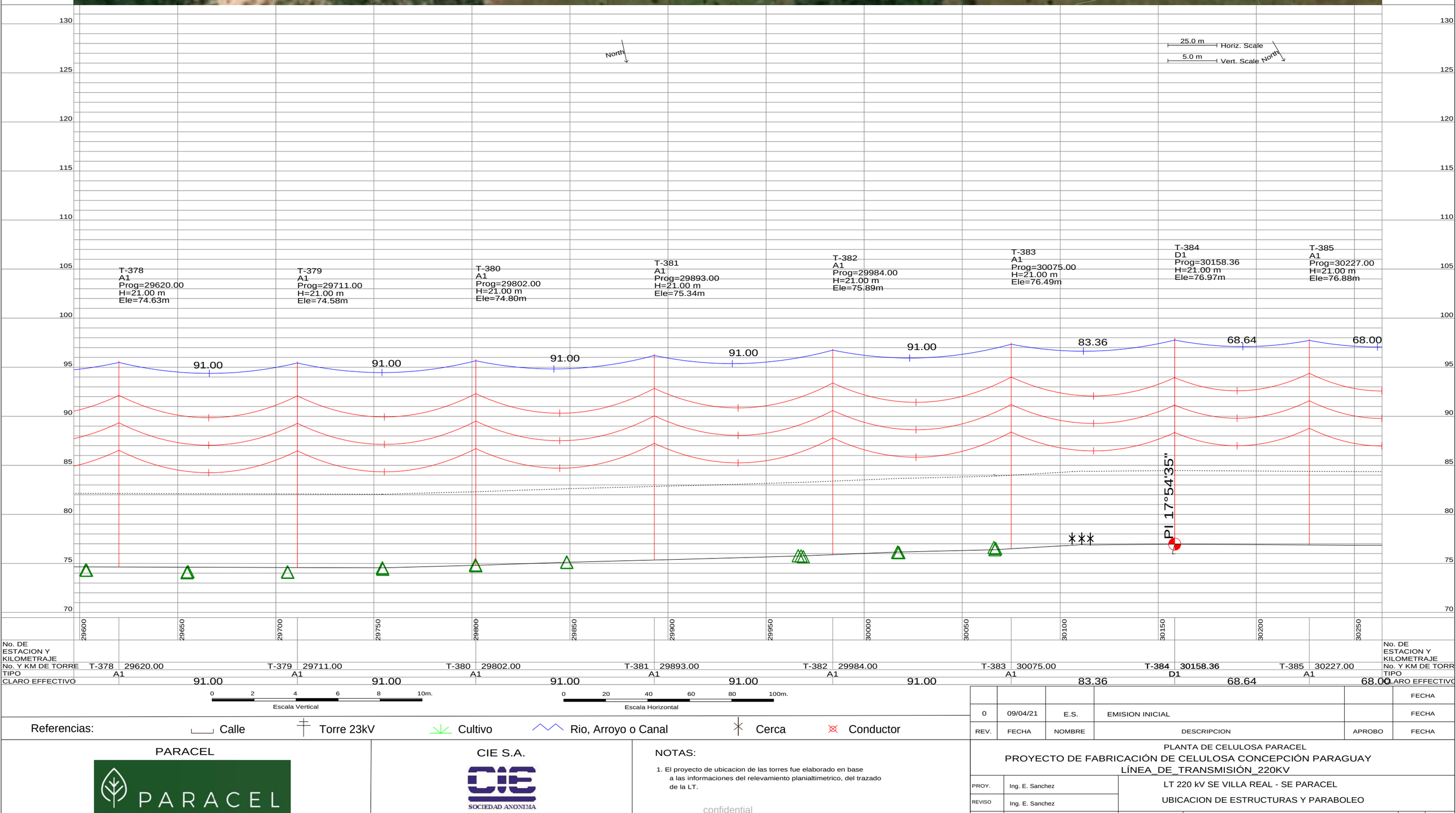
1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-48 Rev. 0 Hj. 048 |




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

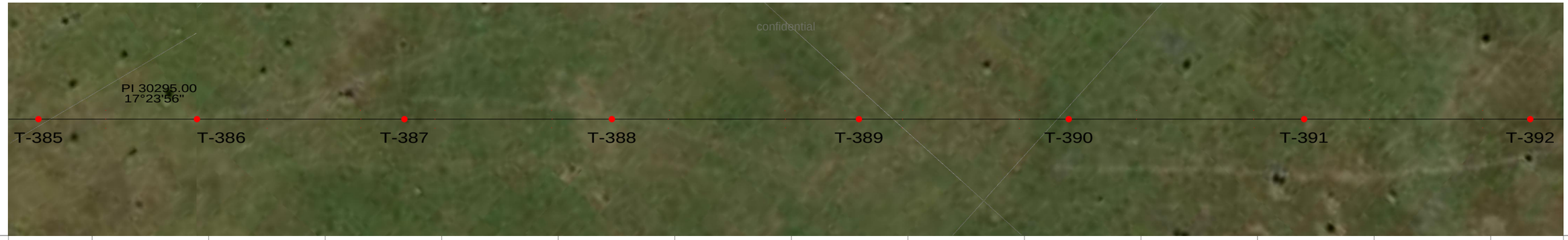
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

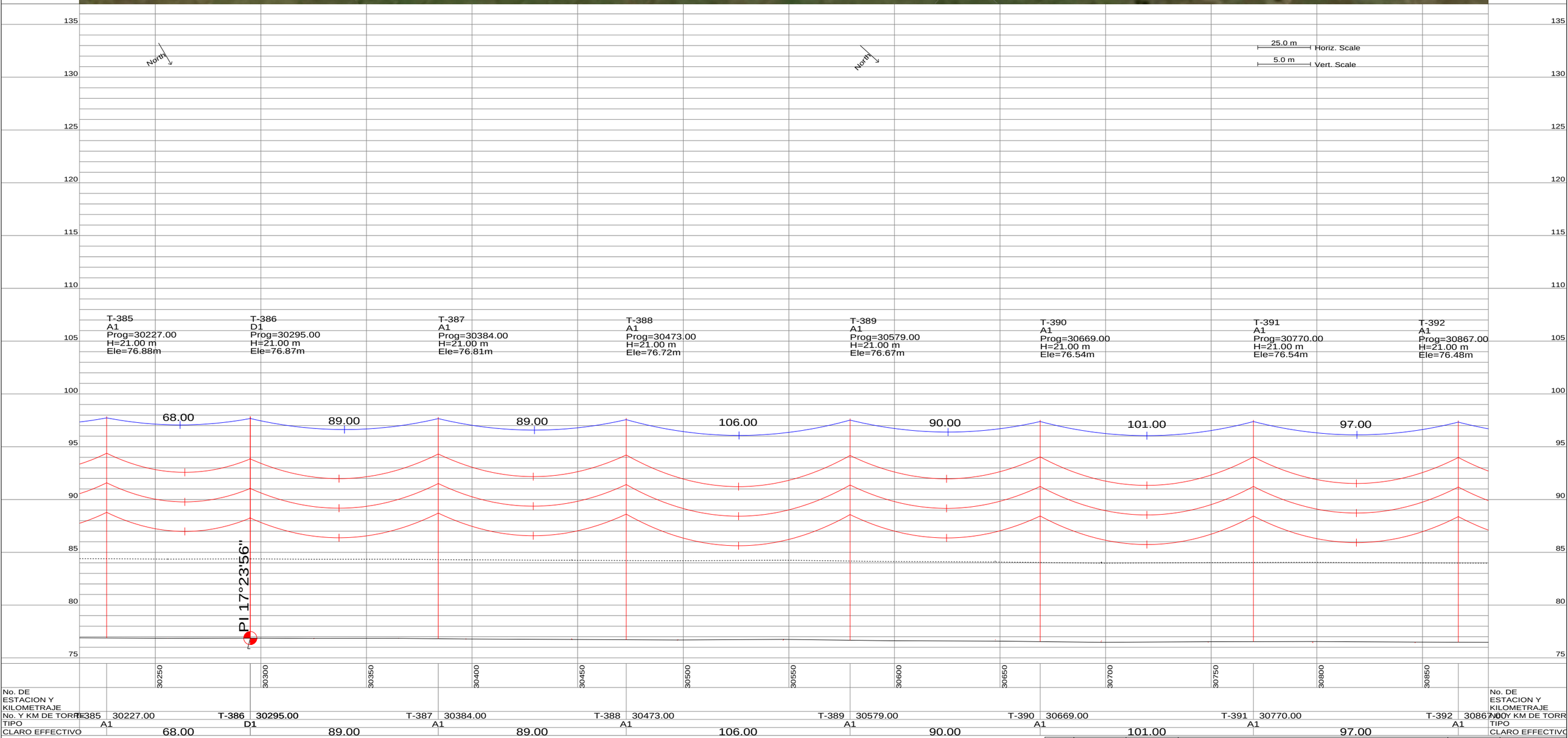
LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-49 Rev. 0 Hj. 049 |

PLS-CADD Drawing

confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

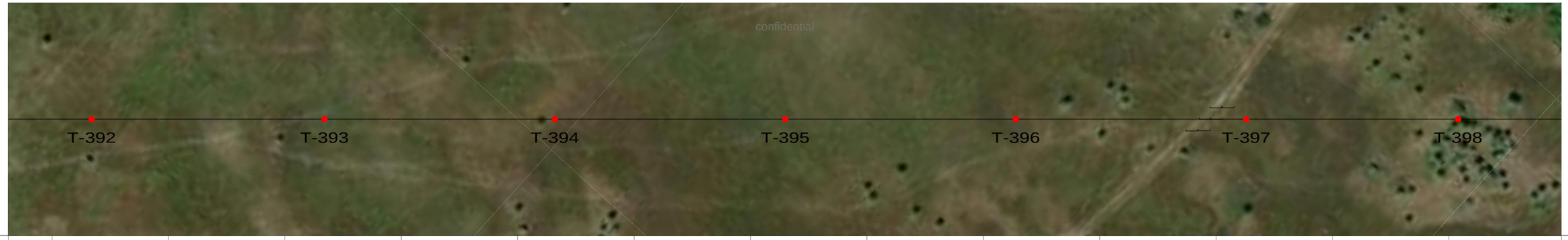
PLANTA DE CELULOSA PARACEL

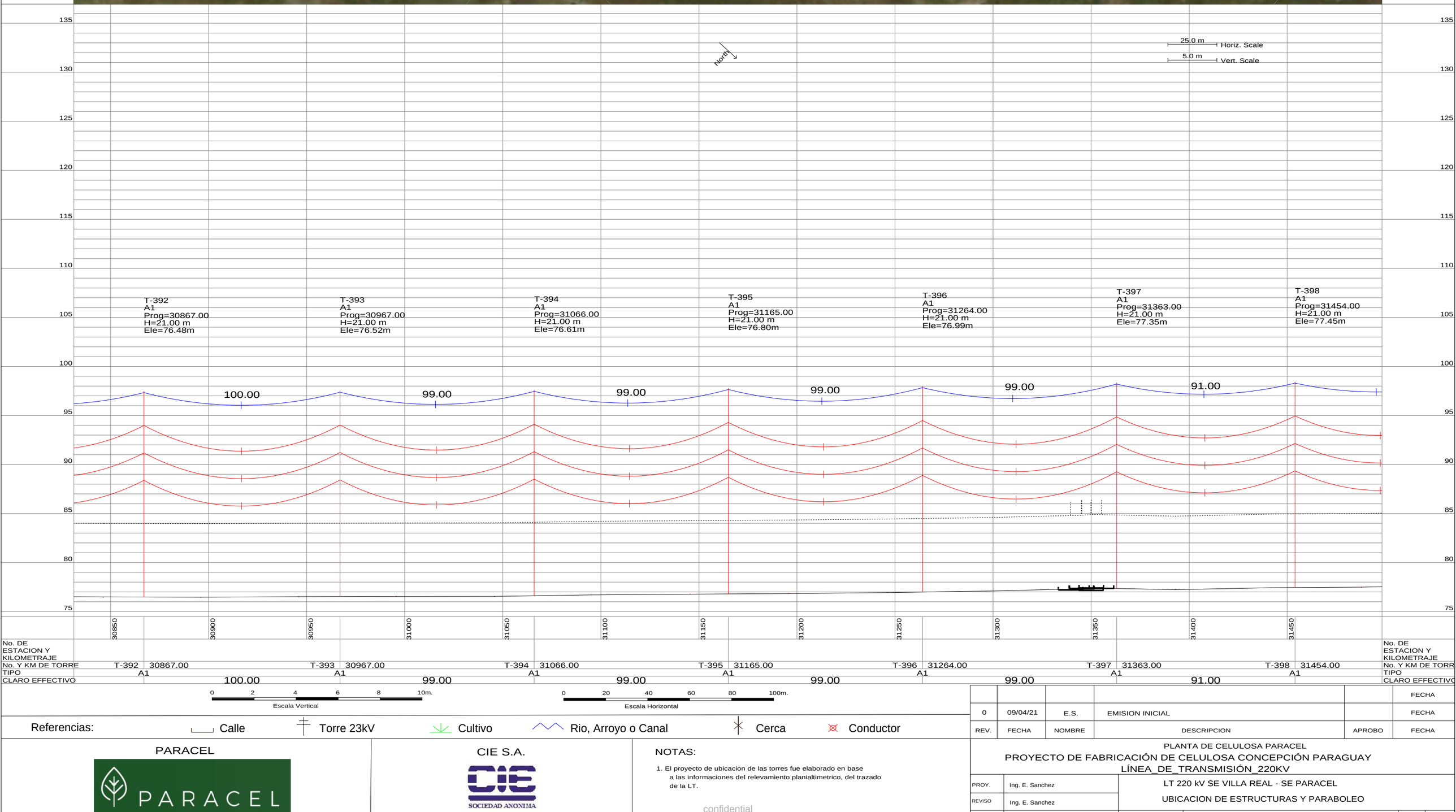
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-50 Rev. 0 Hj. 050 |

PLS-CADD Drawing




Referencias: Calle · Torre 23kV · Cultivo · Rio, Arroyo o Canal · Cerca · Conductor

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL

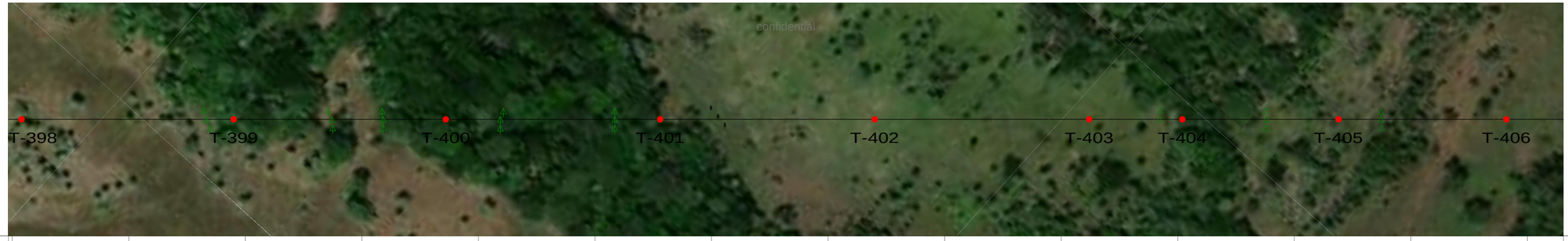
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

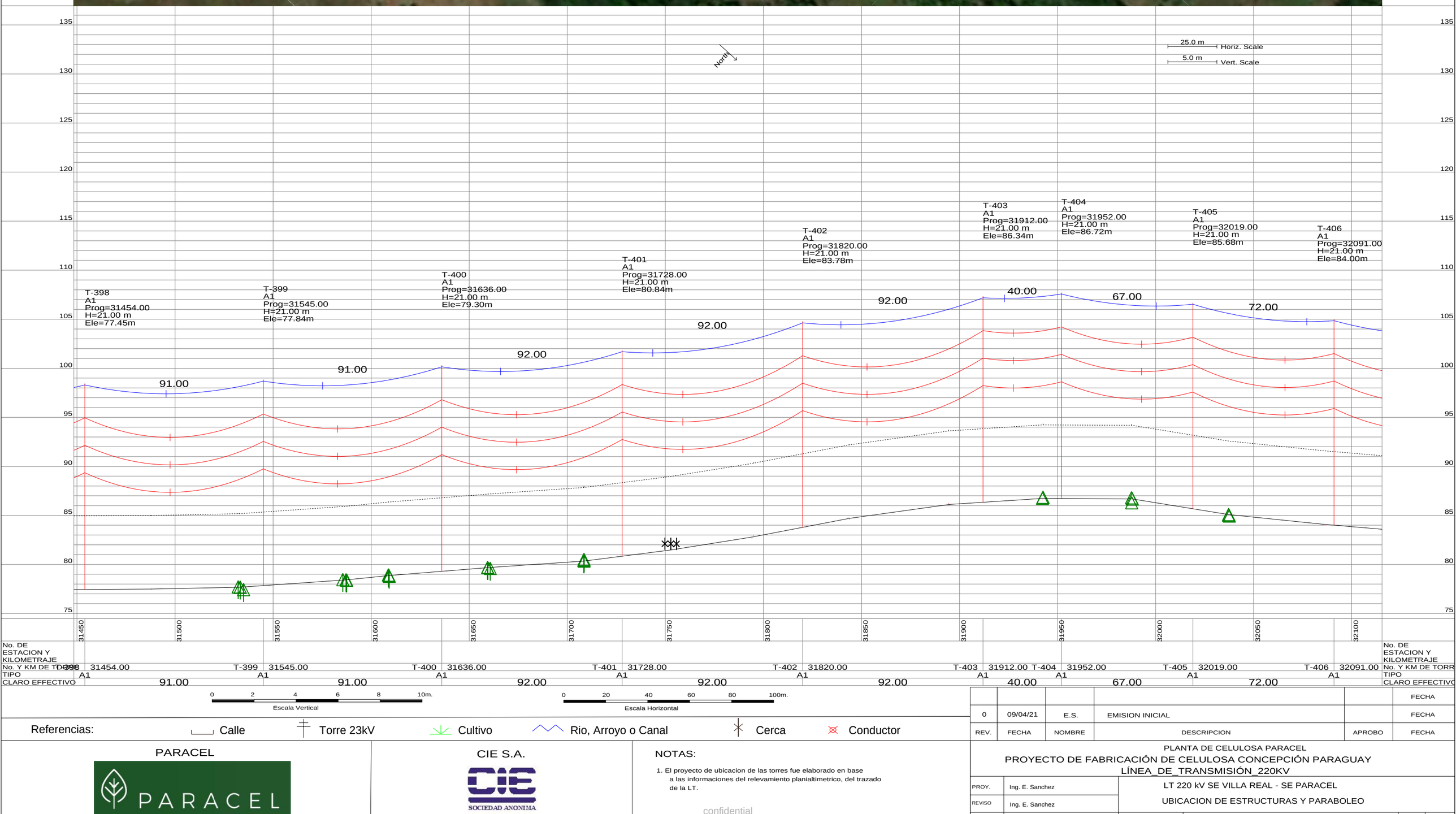
LÍNEA_DE_TRANSMISIÓN_220KV

| | | |
|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO |
| APROBO | Ing. O. Lopez | 09/04/21 — 1010-1507-M-S-0002-51 — Rev. 0 — Hj. 051 |

PLS-CADD Drawing

confidential




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PLANTA DE CELULOSA PARACEL

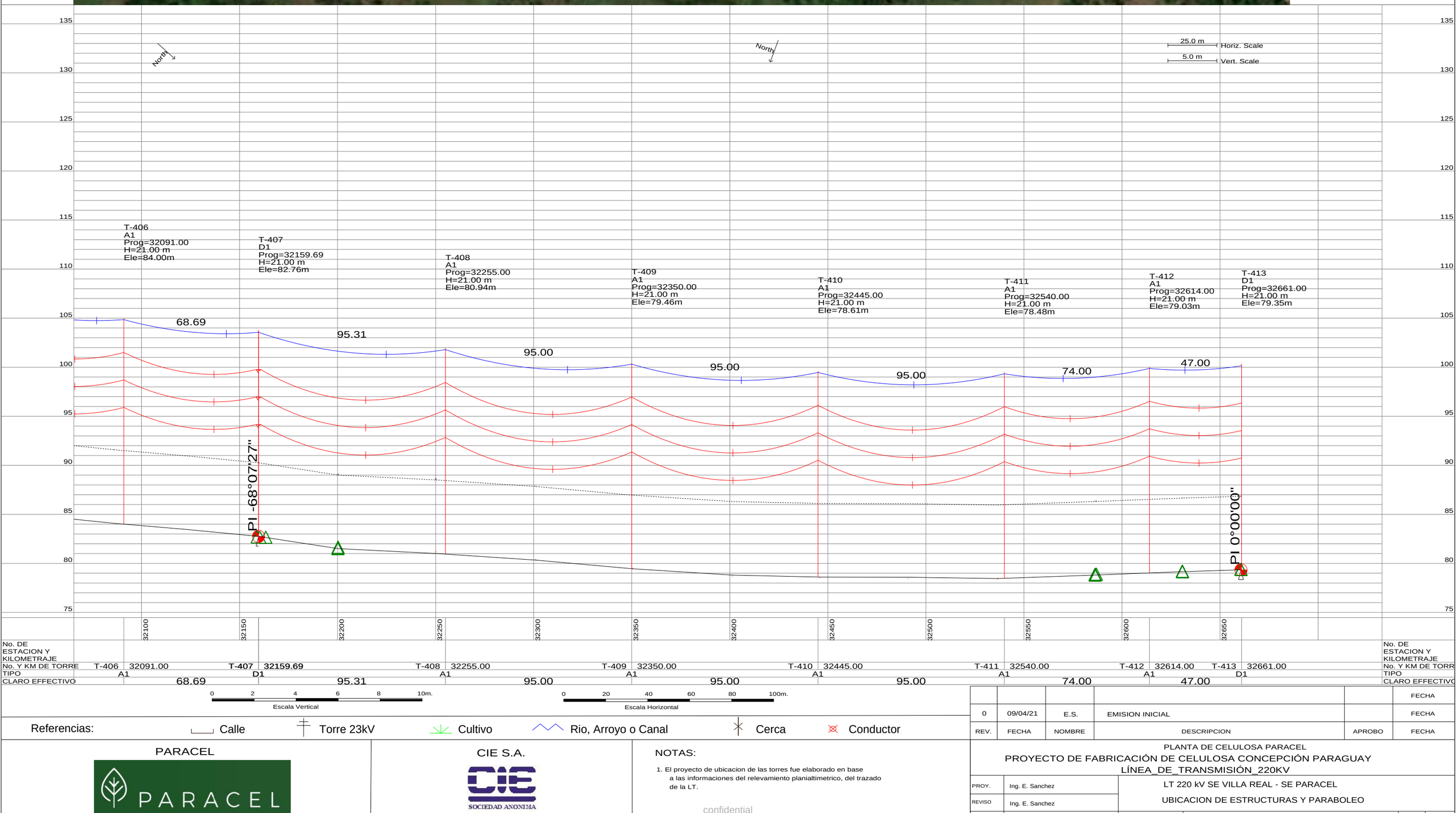
PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | | | |
|---|---|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | | | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | | | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-52 | Rev. 0 | Hj. 052 |

PLS-CADD Drawing




Referencias: Calle | Torre 23kV | Cultivo | Rio, Arroyo o Canal | Cerca | Conductor

| REV. | FECHA | NOMBRE | DESCRIPCION | APROBO | FECHA |
|---|---|---|---|---|---|
| | | | | | FECHA |
| 0 | 09/04/21 | E.S. | EMISION INICIAL | | FECHA |

PARACEL

CIE S.A.

SOCIEDAD ANONIMA

NOTAS:

1. El proyecto de ubicacion de las torres fue elaborado en base a las informaciones del relevamiento planialtimetrico, del trazado de la LT.

confidential

PLANTA DE CELULOSA PARACEL

PROYECTO DE FABRICACIÓN DE CELULOSA CONCEPCIÓN PARAGUAY

LÍNEA_DE_TRANSMISIÓN_220KV

| | | | |
|---|---|---|---|
| PROY. | Ing. E. Sanchez | LT 220 kV SE VILLA REAL - SE PARACEL | |
| REVISO | Ing. E. Sanchez | UBICACION DE ESTRUCTURAS Y PARABOLEO | |
| APROBO | Ing. O. Lopez | 09/04/21 | 1010-1507-M-S-0002-53 Rev. 0 Hj. 053 |

# ANNEX IX
# THEMATIC MAPS

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# MAPA DE AREA DE INFLUENCIA INDIRECTA

## CUADRO JURIDICO LEGAL

| | |
|---|---|
| PROYECTO: | **FABRICA DE CELULOSA BLANQUEADA PARA PAPEL, CELULOSA SOLUBLE Y PUERTO MULTIMODAL** |
| PROPONENTE: | **PARACEL S.A.** |
| FINCA N°: | 9891-5657 |
| PADRON N°: | 5452 |
| DISTRITO: | Concepción |
| DEPARTAMENTO: | Concepción |

**SUPERFICIE DEL PROYECTO: 1.515,4 Has**

## FUENTE TEMATICA

DNEEC 2012

SERVICIO NACIONAL DE CATASTRO IGM
SENSOR IMAGEN SATELITAL SENTINEL JYM
FECHA : MAYO 2020
FECHA DE ELABORACION: JUNIO 2020
RESPONSABLE : EL CONSULTOR
ELIPSOIDE: SISTEMA GEODESICO MUNDIAL
DATUM : UNIVERSAL TRANSVERSAL MERCATOR

440000 442000 444000 446000 448000 450000 452000 454000 456000

7434000 7432000 7430000 7428000 7426000 7424000 7422000

PUENTE
DESPENSA MALDONADO
IGLESIA FILADELFIA
COMISARIA LAGUNA PLAZA
IGLESIA 8 DE DICIEMBRE
TANQUE DE AGUA
GALPON
TINGLADO
PORTON
DESPENSA JUNIOR
DESPENSA IGNACIA
DESPENSA EL CHAVO
ALMACEN ORTIZ
ANTENAS
CANCHA
DESPENSA SAN CAYETANO
ESTANCIA SANTA CLARA
SIMBRA CANTADEADO
CANCHA HIPICA
CEMENTERIO
IGLESIA EVANGELICA
DESPENSA
TANQUE DE AGUA SENASA
ALMACEN
CENTRO DE SALUD
DEPENSA
IGLESIA
ESCUELA SAN ANTONIO
CAPILLA VIRGEN DE CAACUPE
DEPOSITO
CAPILLA SAN RAMON
ESCUELA SAN RAMON
TANQUE DE AGUA
DESPENSA ACOSTA
PORTON CANTADEADO
DESPENSA BENITEZ
PORTON CANTADEADO
PUENTE
PORTON

N W E S

### REFERENCIA

- Caminos
- Cauce
- Poligono de la Propiedad
- Area de Influencia indirecta de 1.000 mts.
- Servicios Varios
- Centro Educativo
- Iglesias.
- Hospitales

### CORDENADAS UTM

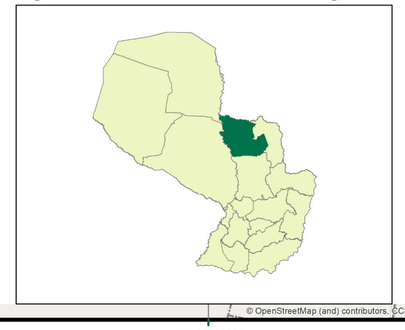
| Nº | ESTE | NORTE |
|---|---|---|
| 1 | 447.862 | 7.428.371 |
| 2 | 450.702 | 7.431.922 |

Escala 1:10.000

0 2.000 4.000 metros

Proyección Universal Transversal de Mercator
Cuadrícula Geográfica
Elipsoide Sistema Geodésico WGS 84

### Ubicación
### Departamento de Concepción



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# PLANO PROYECTO

## CUADRO JURIDICO LEGAL

| | |
|---|---|
| PROYECTO: | **FABRICA DE CELULOSA BLANQUEADA PARA PAPEL, CELULOSA SOLUBLE Y PUERTO MULTIMODAL** |
| PROPONENTE: | **PARACEL S.A.** |
| FINCA N°: | 9891-5657 |
| PADRON N°: | 5452 |
| DISTRITO: | Concepción |
| DEPARTAMENTO: | Concepción |

**SUPERFICIE DEL PROYECTO: 1.515,4 Has**

## FUENTE TEMATICA

DNEEC 2012

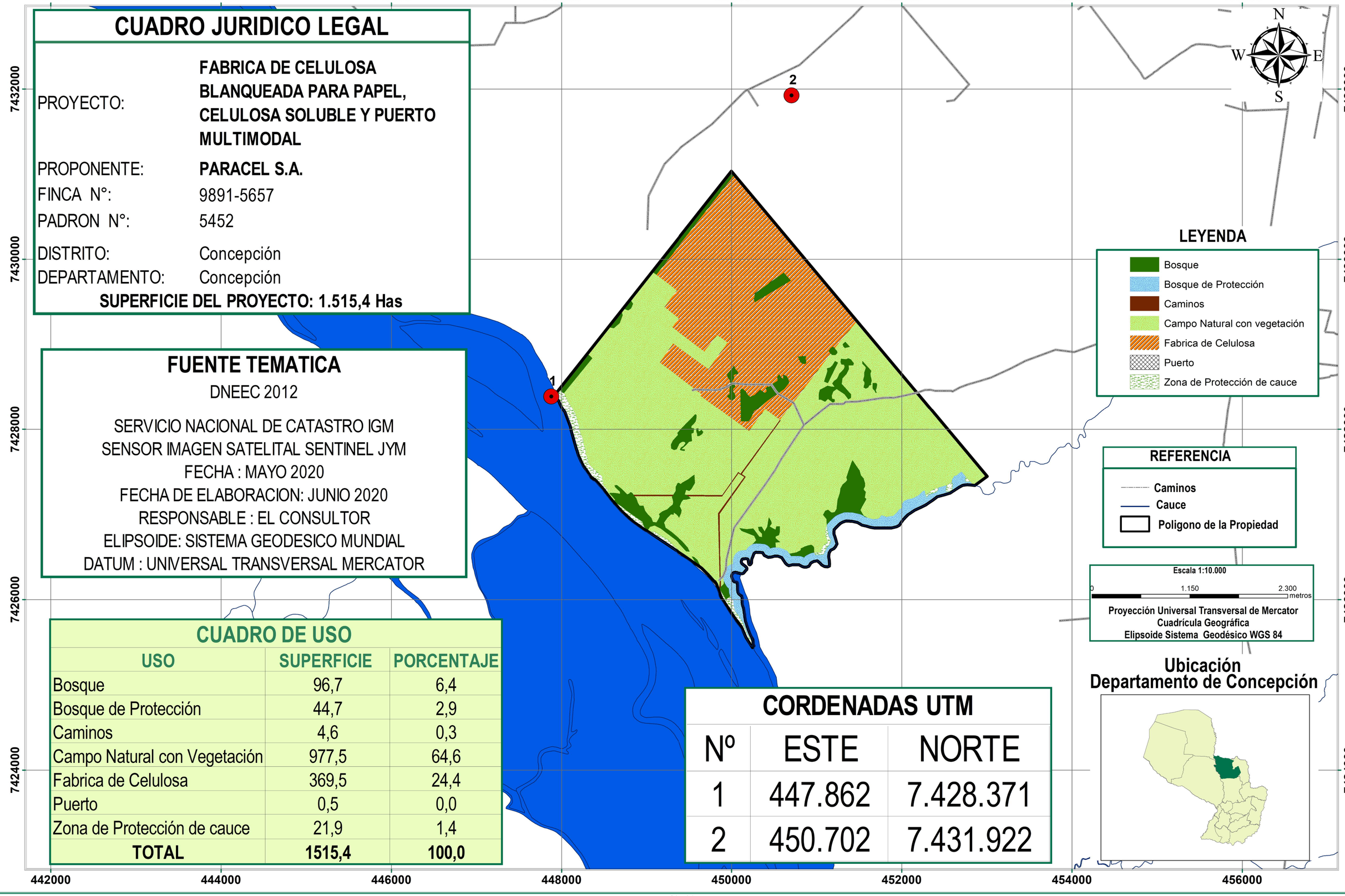
SERVICIO NACIONAL DE CATASTRO IGM
SENSOR IMAGEN SATELITAL SENTINEL JYM
FECHA : MAYO 2020
FECHA DE ELABORACION: JUNIO 2020
RESPONSABLE : EL CONSULTOR
ELIPSOIDE: SISTEMA GEODESICO MUNDIAL
DATUM : UNIVERSAL TRANSVERSAL MERCATOR

## CUADRO DE USO

| USO | SUPERFICIE | PORCENTAJE |
|---|---|---|
| Bosque | 96,7 | 6,4 |
| Bosque de Protección | 44,7 | 2,9 |
| Caminos | 4,6 | 0,3 |
| Campo Natural con Vegetación | 977,5 | 64,6 |
| Fabrica de Celulosa | 369,5 | 24,4 |
| Puerto | 0,5 | 0,0 |
| Zona de Protección de cauce | 21,9 | 1,4 |
| **TOTAL** | **1515,4** | **100,0** |

## CORDENADAS UTM

| Nº | ESTE | NORTE |
|---|---|---|
| 1 | 447.862 | 7.428.371 |
| 2 | 450.702 | 7.431.922 |

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# IMAGEN SATELITAL ACTUALIZADA

## CUADRO JURIDICO LEGAL

| | |
|---|---|
| PROYECTO: | **FABRICA DE CELULOSA BLANQUEADA PARA PAPEL, CELULOSA SOLUBLE Y PUERTO MULTIMODAL** |
| PROPONENTE: | **PARACEL S.A.** |
| FINCA N°: | 9891-5657 |
| PADRON N°: | 5452 |
| DISTRITO: | Concepción |
| DEPARTAMENTO: | Concepción |

**SUPERFICIE DEL PROYECTO: 1.515,4 Has**

## FUENTE TEMATICA

DNEEC 2012

SERVICIO NACIONAL DE CATASTRO IGM
SENSOR IMAGEN SATELITAL SENTINEL JYM
FECHA : MAYO 2020
FECHA DE ELABORACION: JUNIO 2020
RESPONSABLE : EL CONSULTOR
ELIPSOIDE: SISTEMA GEODESICO MUNDIAL
DATUM : UNIVERSAL TRANSVERSAL MERCATOR

444000 446000 448000 450000 452000 454000 456000

7432000 7430000 7428000 7426000 7424000

N W E S

1 2

Escala 1:10.000

0 1.600 3.200 metros

Proyección Universal Transversal de Mercator
Cuadrícula Geográfica
Elipsoide Sistema Geodésico WGS 84

## REFERENCIA

- Caminos
- Cauce
- Poligono de la Propiedad

## CORDENADAS UTM

| Nº | ESTE | NORTE |
|---|---|---|
| 1 | 447.862 | 7.428.371 |
| 2 | 450.702 | 7.431.922 |

**Ubicación**
**Departamento de Concepción**



confidential

# ANNEX X
# CAMPS LAYOUT




LODGE C1 - PLOT PLAN

Esc.1 : 750

| PARKING LOT/ BUS STOP/ ROADS | | | |
|---|---|---|---|
| | AREA/ BUILDING | m2 | SIZE (m) |
| 01 | BUS STOP (BOARDING/ UNBOARDING) – 20 BUS SPACES | 2687,50 | 21,50x125,00 |
| 02 | BUS PARKING LOT – 22 BUS PARKING SPOTS | 4045,00 | 32,00/56,00x 88,00 |
| 03 | CARS PARKING LOT – 91 CARS PARKING SPOTS | 2466,00 | 36,00x68,50 |
| **SERVICE AREAS (AREAS FOR ADMINISTRATION/ OPERATION USE)** | | | |
| | AREA/ BUILDING | m2 | SIZE (m) |
| 04 | ENTRANCE/ GATEHOUSE (RECEPTION, RESTROOM ETC.) | 216,00 | 18,00x12,00 |
| 05 | SECURITY OFFICE | 72,00 | 6,00x12,00 |
| 06 | ADMINISTRATIVE OFFICE | 216,00 | 18,00x12,00 |
| 07 | LODGE OPERATOR FACILITY (HOUSEKEEPING OFFICE, HOUSEKEEPING OPERATIONAL AREAS, HOUSEKEEPING MAINTENANCE/ WAREHOUSE AREA/ LAUNDRY INDEPENDENT STRUCTURE. | 540,00 | 18,00x30,00 |
| 08 | FIRST AID AND MEDICAL FACILITY | 432,00 | 18,00x24,00 |
| 09 | CANTEEN+INDUSTRIAL KITCHEN/COOKING (CANTEEN = SEATS, DISHES WASHING FOR 2300 PERSONS = C1/ SUPPORT AREAS AND INDUSTRIAL KITCHEN FOR 3450 PERSON = C1 + C2) | 2280,00 | 76,00x30,00 |

| SOCIAL CENTER / RECREATION AREA | | | |
|---|---|---|---|
| | AREA/ BUILDING | m2 | SIZE (m) |
| 10 | SOCIAL CENTER/ RECREATION AREA FOR C1B (AUDITORIUM FOR MOVIE, GAME AREA, EGAME CENTER, TV AREA, GYM) | 3500,00 | 50,00x70,00 |
| **SPORTS COURT** | | | |
| | AREA/ BUILDING | m2 | SIZE (m) |
| 11 | SPORTS COURT 1 | 432,00 | 16,00x27,00 |
| 12 | SPORTS COURT 2 | 432,00 | 16,00x27,00 |

| SOCCER FIELD | | | |
|---|---|---|---|
| | AREA/ BUILDING | m2 | SIZE (m) |
| 13 | SOCCER FIELD | 1750,00 | 35,00x50,00 |
| 14 | SOCCER FIELD | 1750,00 | 35,00x50,00 |
| **UTILITIES** | | | |
| | AREA/ BUILDING | m2 | SIZE (m) |
| 15 | SUBSTATION/ ELECTRICAL ROOM/ POWER GENERATOR | 525,00 | 15,00x35,00 |
| 16 | UTILITIES FOR KITCHEN (GAS, BOILER ETC) | 160,00 | 20,00x8,00 |
| 17 | GARBAGE | 50,00 | 10,00x5,00 |
| 18 | SEWAGE TREATMENT PLANT (ETE) | 120,00 | 15,00x8,00 |
| 19 | WATER TREATMENT PLANT (ETA) | 240,00 | 20,00x12,00 |

| ECUMENICAL AREA | | | |
|---|---|---|---|
| | AREA/ BUILDING | m2 | SIZE (m) |
| 20 | ECUMENICAL HALL | 1500,00 | 30,00x50,00 |
| **LODGES** | | | |
| | AREA/ BUILDING | m2 | SIZE (m) |
| 21 | C1 – 42 UN. MEN LODGES (2352 MEN): EACH LODGE: – 56 PERSON (MODEL A– 2 PERSON PER BEDROOM WITH AREA 12,25m2 – 3,50mx3,50m)= 28 BEDROOMS = 343m2 – COLLECTIVER RESTROOMS/ SHOWERS AREA (1 TOILET/ LAVATORY/SHOWER TO 10 PERSONS) = 6UN. = 36m2 – SELF SERVICE LAUNDRY AREA (1 WASHING TANK = CLOTHES LINES TO 10 PERSON) =6 UN. = 24m2 – 2 EXTERNAL CIRCULATION = 1,80m WIDTH = 201,60m2 | 604,20m2 x 42un= 25376,40 | 57,00x10,60 (EACH LODGE)= 604,20 |
| **SUPPORT AREAS** | | | |
| | AREA/ BUILDING | m2 | SIZE (m) |
| 22 | SUPPORT AREA: DRINKING FOUNTAIN/ HOT WATER FEED POINT (CHIMARRÃO) | 36,00m2 | 6,00x6,00 |

## REVISION TABLE

CODE:
PR - PRELIMINARY
PA -FOR APPROVAL
PI -FOR INFORMATION
PC -FOR QUOTATION
CO -FOR COMMENTS
LE -RELEASED FOR CONSTRUCTION
LD -RELEASED FOR DETAILING
CC -AS BUILT
CA -CANCELED

| REV. | DATE | PROJ. | VERIF. | APPROV. | AUTHOR. | CODE | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 0 | 16/10/20 | gqv | gou | ittfin | dzn | CO | FOR COMMENTS |
| a | 19/11/20 | gqv | gou | ittfin | dzn | PC | FOR QUOTATION |

## NOTES:

1 - LEVEL MEASURES AND QUOTAS IN METERS, UNLESS OTHERWISE INDICATED.

2 - PROJECT PREMISES:

- SPORTS COURT AND SOCCER FIELD ORIENTATION TO AVOID DAMPING IN THE PERSONS: THE LONGITUDINAL AXIS (SPORTS COURT/ SOCCER FIELD LONGEST SIDE) IN TRUE NORTH / TRUE SOUTH LINE.
- SEWAGE TREATMENT PLANT (ETE) AND WATER TREATMENT PLANT LOCATION TO FACILITATE THE WATER INTAKE AND EFFLUENTS EMISSION AND TO CONSIDER WIND DIRECTION TO AVOID BAD SMELL IN THE SITE; LOCATED NEXT RIVER WAY.
- ENERGY INPUT CUBICLE AND DIESEL GENERATOR LOCATION CLOSE TO THE PUBLIC ROAD AND EXCLUSIVE ACCESS TO THE CONCESSIONAIRE (ANDE) TO FACILITATE THE ENERGY ARRIVAL AND MEASUREMENT.
- FIRST AID AND MEDICAL FACILITY LOCATION NEXT TO THE MAIN ENTRANCE OF SITE TO FACILITATE AMBULANCE ACCESS / EXIT.

## LEGEND:

SITE LIMIT (C1=14ha)

FENCE

CANOPY – BUILDING/ BUS STOP CONNECTION

## PENDENT ITEM:

## CONSULTED DOCUMENTS

| TITLE | NUMBER | REV. |
|---|---|---|
| | | |

## REFERENCE DOCUMENTS

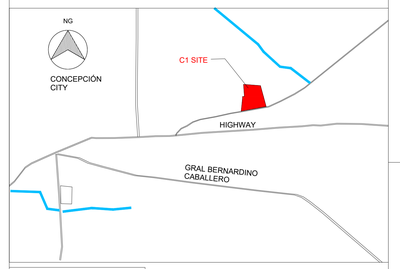
| TITLE | NUMBER |
|---|---|
| | |

## DISTRIBUTION

REVISION

| TO | 0 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|
| PARACEL | E | E | | | | | |
| PÖYRY | E | E | | | | | |

N- PRINT / PLOT (HARD COPY) E- ELETRONIC FILE




FOR QUOTATION

LOCATION PLAN
WITHOUT SCALE

PÖYRY

PARACEL PROJECT
Site infrastructure
Concepción - Paraguay

PARACEL

| PROYECTO: FÁBRICA DE CELULOSA - PARACEL S.A. | | | |
|---|---|---|---|
| PLANOS PREVENCIÓN CONTRA INCENDIOS | | | |
| UBICACIÓN: | Zapatero Cué - Distrito de Concepción | | |
| PROPIETARIO: | PARACEL S.A. | | |
| DOMICILIO: | Facundo Machaín 6426 – Asunción, Paraguay | | |
| PROFESIONAL: | | PAT. PROF. N°: | |
| DOMICILIO: | | SUP DEL TERR.: | |
| CTA. CTE. CTRAL.: | | SUP CONST.: | |

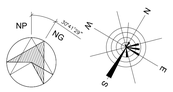
PROPIETARIO PROFESIONAL

RESP./TITLE/CREA NUMBER | CUSTOMER NUMBER | REV.

TITLE

PARACEL PROJECT - SITE INFRASTRUCTURE
1907 - OFFSITE - TEMPORARY LODGE C1
PLOT PLAN

| SCALE | UNIT | PROJECTION | PÖYRY NUMBER | REV. |
|---|---|---|---|---|
| IND. | m | | 109002364-001-1907-L03-0001 | a |




PREDOMINANT WIND DIRECTION




ALOJAMIENTO C6 - PLANTA DE IMPLANTACIÓN

Esc.1 : 750

| APARCAMIENTO/ PARADA DE AUTOBÚS/ VÍAS | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 01 ESTACIONAMIENTO DE AUTOBUSES (EMBARQUE/ DESEMBARQUE) – 15 ESPACIOS PARA AUTOBUSES | 2400,00 | 40,00x60,00 |
| 02 APARCAMIENTO DE AUTOS – 42 PLAZAS DE APARCAMIENTO DE AUTOS | 1750,00 | 35,00x50,00 |
| **ÁREAS DE SERVICIO (ÁREAS DE ADMINISTRACIÓN/ USO DE LA OPERACIÓN)** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 03 CASETA DE VIGILANCIA/ OFICINA DE SEGURIDAD/ ENTRADA – TORNIQUETES | 330,70 | DOC. 1907–L03–0016 |
| 04 OPERADOR DEL ALBERGUE INSTALACIÓN/ ADM. OFFICE | 490,45 | DOC. 1907–L03–0015 |
| 05 CENTRO MÉDICO Y DE PRIMEROS AUXILIOS | 185,45 | DOC. 1907–L03–0008 |
| 06 COMEDOR (ASIENTOS, LAVADO DE VAJILLA PARA 1200 PERSONAS)+COCINA (PREPARACIÓN FINAL) | 949,40 | DOC. 1907–L03–0012 |

| CENTRO SOCIAL / ÁREA DE RECREO | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 CENTRO SOCIAL/ÁREA DE RECREO | 966,00 | DOC. 1907–L03–0013 |
| 18 EQUIPOS DE GIMNASIA EN LOCAL ABIERTO | 150,00 | 10,00x15,00 |
| **PISTA DEPORTIVA** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 08 PISTA DEPORTIVA | 432,00 | 16,00x27,00 |
| **CAMPO DE FÚTBOL** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 09 CAMPO DE FÚTBOL | 3937,50 | 52,50x75,00 |

| UTILIDADES | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 10 SUBESTACIÓN/ SALA ELÉCTRICA/ GENERADOR DE ENERGIA | APROX. 170,00(A DEFINIR) | NOTA 3 |
| 11 BASURA | 90,20 | DOC. 1907–L03–0022 |
| 12 PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES (ETE) | APROX. 120,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 13 PLANTA DE TRATAMIENTO DE AGUA (ETA) | APROX. 240,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 14 TORRE TI | APROX. 225,00(A DEFINIR) | NOTA 4 |
| 15 RESERVORIO DE AGUA POTABLE 1 | CAPACIDAD= 90 m³ | APROX. DIAM.: 4,00m |
| 19 RESERVORIO DE AGUA POTABLE 2 –COMEDOR | CAPACIDAD= 40 m³ | APROX. DIAM.: 4,00m |

| ÁREA ECUMÉNICA | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 16 SALA ECUMÉNICA | 443,05 | DOC. 1907–L03–0014 |
| **ALOJAMIENTO** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 17 C2 – 24 UN. ALOJAMIENTO MASC. (1344 HOMBRES): CADA SALA: – 56 PERSONAS (MODELO A– 2 PERSONAS/CUARTO)= 28 DORMITORIOS – ZONA DE BAÑOS Y DUCHAS COLECTIVAS (1 BAÑO/LAVABO/DUCHA PARA 10 PERSONAS) = 6UN. – ZONA DE LAVANDERÍA DE AUTOSERVICIO (1 CUBA DE LAVADO PARA 8 PERSONAS = 7 UN + ZONA CUBIERTA Y DESCUBIERTA PARA LOS TENDEDEROS – 2 CIRCULACIONES EXTERNAS = 1,80m DE ANCHO | 1300,70 (2 BDG CONECTADO) | DOC. 1907–L03–0002 |

| PROYECTO: FÁBRICA DE CELULOSA - PARACEL S.A. | | | |
|---|---|---|---|
| PLANOS PREVENCIÓN CONTRA INCENDIOS | | | |
| UBICACIÓN: | Zapatero Cué - Distrito de Concepción | | |
| PROPIETARIO: | PARACEL S.A. | | |
| DOMICILIO: | Facundo Machaín 6426 – Asunción, Paraguay | | |
| PROFESIONAL: | | PAT. PROF. N°: | |
| DOMICILIO: | | SUP DEL TERR.: | |
| CTA. CTE. CTRAL.: | | SUP CONST.: | |
| PROPIETARIO | | PROFESIONAL | |

## TABLA DE REVISIÓN

ND - NIVEL DE DOCUMENTO:
A - PRELIMINAR
B -PARA INFORMACIÓN
C -PARA APROBACIÓN
D -APROBADO
E -PARA COTIZACIÓN
F - LIBERADO PARA LA COMPRA
G - LIBERADO PARA CONSTRUCCIÓN
H - LIBERADO PARA EJECUCCIÓN
I - CERTIFICADO
J - CANCELADO
K - COMO COMPRADO
L - COMO CONSTRUIDO

| REV. | DATA | PROY | INSPEC. | APROB. | AUTOR. | FINALID. | DESCRIPCIÓN |
|---|---|---|---|---|---|---|---|
| 0 | 29/03/21 | gpr | gpu | ittfn | dzn | PC | PARA COTIZACIÓN |

## NOTAS

1 - MEDIDAS DE NIVEL Y COTAS EN METROS, SALVO INDICACIÓN CONTRARIA.

2 - PREMISAS DEL PROYECTO:

- UBICACIÓN DEL CUBÍCULO DE ENTRADA DE ENERGÍA Y DEL GENERADOR DIESEL CERCA DE LA VÍA PÚBLICA Y ACCESO EXCLUSIVO AL CONCESIONARIO (ANDE) PARA FACILITAR LA LLEGADA Y MEDICIÓN DE ENERGÍA.
- UBICACIÓN DE LA SALA ECUMÉNICA LEJOS DE LAS ZONAS RUIDOSAS ASEGURANDO UN SILENCIO REVERENTE.
- ACERAS CUBIERTAS QUE CONECTAN LA PARADA DE AUTOBUSES/ EL APARCAMIENTO Y LOS EDIFICIOS PRINCIPALES Y ALOJAMIENTOS.
- UBICACIÓN DE LAS INSTALACIONES MÉDICAS Y DE PRIMEROS AUXILIOS JUNTO A LA ENTRADA PRINCIPAL, PARA FACILITAR EL ACCESO/SALIDA DE LAS AMBULANCIAS.

3 - SALA ELÉCTRICA (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEDOR DE EQUIPOS ELÉCTRICOS.

4 - TORRE DE TI - ESTRUCTURA DE ACERO Y CONTENEDOR PARA SOPORTE A LA OPERACIÓN (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE TI.

LÍMITE DEL TERRENO (C6=8,67ha)

CERCADO

MARQUESINA — EDIFICIO/ CONEXIÓN CON LA PARADA DE AUTOBÚS

## PENDENCIAS

## DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|

## DOCUMENTOS DE REFERENCIA

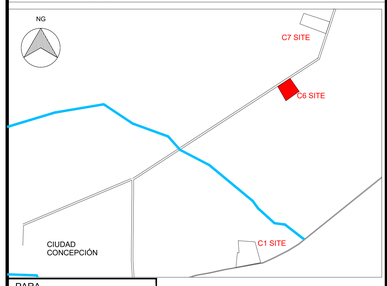
| TÍTULO | NÚMERO |
|---|---|

## DISTRIBUCIÓN

REVISÃO

| PARA | 0 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| PARACEL | E | | | | | | |
| PÖYRY | E | | | | | | |

e: COPIADO / IMPRESIÓN / PLOTEO (PAPEL) E: ARQ. ELECTRÓNICO




PARA
COTIZACIÓN

AUTOPISTA

PLANTA CLAVE
SIN ESCALA

PARACEL

PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA
CONCEPCIÓN, PARAGUAY

PÖYRY

| RESP./TITULO/N° ENTIDAD CLASSE | TIPO DOC. | N° DEL PROVEEDOR | REV. |
|---|---|---|---|
| | | 1010-1907-L-S-0028 | 0 |

TÍTULO

PARACEL PROYECTO - SITE INFRAESTRUCTURA
1907 - OFFSITE - ALOJAMIENTO PROVISIONAL C6
PLANTA DE IMPLANTACIÓN

| ESCALA | UNIDAD | PROYECTO | N° PARACEL | REV. |
|---|---|---|---|---|
| IND. | m | | 109002364-001-1907-L03-0026 | 0 |

0




ALOJAMIENTO C7 - PLANTA DE IMPLANTACIÓN

Esc.1 : 750

| APARCAMIENTO/ PARADA DE AUTOBÚS/ VIAS | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 ESTACIONAMIENTO DE AUTOBUSES (EMBARQUE/ DESEMBARQUE) – 15 ESPACIOS PARA AUTOBUSES | 2400,00 | 40,00x60,00 |
| 02 APARCAMIENTO DE AUTOS – 37 PLAZAS DE APARCAMIENTO DE AUTOS | 1425,00 | 25,00x57,00 |
| **ÁREAS DE SERVICIO (ÁREAS DE ADMINISTRACIÓN/ USO DE LA OPERACIÓN)** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 03 CASETA DE VIGILANCIA/ OFICINA DE SEGURIDAD/ ENTRADA – TORNIQUETES | 330,70 | DOC. 1907–L03–0016 |
| 04 OPERADOR DEL ALBERGUE INSTALACIÓN/ ADM. OFFICE | 490,45 | DOC. 1907–L03–0015 |
| 05 CENTRO MÉDICO Y DE PRIMEROS AUXILIOS | 185,45 | DOC. 1907–L03–0008 |
| 06 COMEDOR (ASIENTOS, LAVADO DE VAJILLA PARA 1200 PERSONAS)+COCINA (PREPARACIÓN FINAL) | 949,40 | DOC. 1907–L03–0012 |

| CENTRO SOCIAL / ÁREA DE RECREO | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 CENTRO SOCIAL/ÁREA DE RECREO | 966,00 | DOC. 1907–L03–0013 |
| 18 EQUIPOS DE GIMNASIA EN LOCAL ABIERTO | 150,00 | 10,00x15,00 |
| **PISTA DEPORTIVA** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 08 PISTA DEPORTIVA | 432,00 | 16,00x27,00 |
| **CAMPO DE FÚTBOL** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 09 CAMPO DE FÚTBOL | 3937,50 | 52,50x75,00 |

| UTILIDADES | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 10 SUBESTACIÓN/ SALA ELÉCTRICA/ GENERADOR DE ENERGÍA | APROX. 170,00(A DEFINIR) | NOTA 3 |
| 11 BASURA | 90,20 | DOC. 1907–L03–0022 |
| 12 PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES (ETE) | APROX. 120,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 13 PLANTA DE TRATAMIENTO DE AGUA (ETA) | APROX. 240,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 14 TORRE TI | APROX. 225,00(A DEFINIR) | NOTA 4 |
| 15 RESERVORIO DE AGUA POTABLE 1 | CAPACIDAD= 90 m³ | APROX. DIAM.: 4,00m |
| 19 RESERVORIO DE AGUA POTABLE 2 –COMEDOR | CAPACIDAD= 40 m³ | APROX. DIAM.: 4,00m |

| ÁREA ECUMÉNICA | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 16 SALA ECUMÉNICA | 443,05 | DOC. 1907–L03–0014 |
| **ALOJAMIENTO** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 17 C2 – 16 UN. ALOJAMIENTO MASC. (896 HOMBRES) CADA SALA: – 56 PERSONAS (MODELO A– 2 PERSONAS/CUARTO)= 28 DORMITORIOS – ZONA DE BAÑOS Y DUCHAS COLECTIVAS (1 BAÑO/LAVABO/DUCHA PARA 10 PERSONAS) = 6UN. – ZONA DE LAVANDERÍA DE AUTOSERVICIO (1 CUBA DE LAVADO PARA 8 PERSONAS = 7 UN + ZONA CUBIERTA Y DESCUBIERTA PARA LOS TENDEDEROS – 2 CIRCULACIONES EXTERNAS = 1,80m DE ANCHO | 1300,70 (2 BDG CONECTADO) | DOC. 1907–L03–0002 |

| PROYECTO: FÁBRICA DE CELULOSA - PARACEL S.A. | | | |
|---|---|---|---|
| PLANOS PREVENCIÓN CONTRA INCENDIOS | | | |
| UBICACIÓN: | Zapatero Cué - Distrito de Concepción | | |
| PROPIETARIO: | PARACEL S.A. | | |
| DOMICILIO: | Facundo Machaín 6426 – Asunción, Paraguay | | |
| PROFESIONAL: | | PAT. PROF. N°: | |
| DOMICILIO: | | SUP DEL TERR.: | |
| CTA. CTE. CTRAL.: | | SUP CONST.: | |
| PROPIETARIO | | PROFESIONAL | |

## TABLA DE REVISIÓN

ND - NIVEL DE DOCUMENTO:
A - PRELIMINAR
B -PARA INFORMACIÓN
C -PARA APROBACIÓN
D -APROBADO
E -PARA COTIZACIÓN
F - LIBERADO PARA LA COMPRA
G - LIBERADO PARA CONSTRUCCIÓN
H - LIBERADO PARA EJECUCCIÓN
I - CERTIFICADO
J - CANCELADO
K - COMO COMPRADO
L - COMO CONSTRUIDO

| REV. | DATA | PROY | INSPEC. | APROB. | AUTOR. | FINALID. | DESCRIPCIÓN |
|---|---|---|---|---|---|---|---|
| 0 | 26/03/21 | gov | gou | ittfn | dzn | PC | PARA COTIZACIÓN |

## NOTAS

1 - MEDIDAS DE NIVEL Y COTAS EN METROS, SALVO INDICACIÓN CONTRARIA.

2 - PREMISAS DEL PROYECTO:

- UBICACIÓN DEL CUBÍCULO DE ENTRADA DE ENERGÍA Y DEL GENERADOR DIESEL CERCA DE LA VÍA PÚBLICA Y ACCESO EXCLUSIVO AL CONCESIONARIO (ANDE) PARA FACILITAR LA LLEGADA Y MEDICIÓN DE ENERGÍA.
- UBICACIÓN DE LA SALA ECUMÉNICA LEJOS DE LAS ZONAS RUIDOSAS ASEGURANDO UN SILENCIO REVERENTE.
- ACERAS CUBIERTAS QUE CONECTAN LA PARADA DE AUTOBUSES/ EL APARCAMIENTO Y LOS EDIFICIOS PRINCIPALES Y ALOJAMIENTOS.
- UBICACIÓN DE LAS INSTALACIONES MÉDICAS Y DE PRIMEROS AUXILIOS JUNTO A LA ENTRADA PRINCIPAL, PARA FACILITAR EL ACCESO/SALIDA DE LAS AMBULANCIAS.

3 - SALA ELÉCTRICA (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEDOR DE EQUIPOS ELÉCTRICOS.

4 - TORRE DE TI - ESTRUCTURA DE ACERO Y CONTENEDOR PARA SOPORTE A LA OPERACIÓN (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE TI.

LÍMITE DEL TERRENO (C7=5,65ha)

CERCADO

MARQUESINA – EDIFICIO/ CONEXIÓN CON LA PARADA DE AUTOBÚS

## PENDENCIAS

## DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|

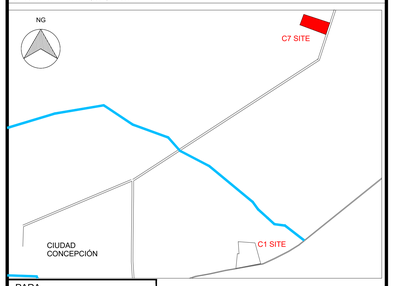
## DOCUMENTOS DE REFERENCIA

| TÍTULO | NÚMERO |
|---|---|

## DISTRIBUCIÓN

| PARA | REVISÃO 0 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| PARACEL | E | | | | | | |
| PÖYRY | E | | | | | | |

H: COPIADO / IMPRESIÓN / PLOTEO (PAPEL) E: ARQ. ELECTRÓNICO




PARA COTIZACIÓN

AUTOPISTA

PLANTA CLAVE
SIN ESCALA

PARACEL

**PLANTA DE CELULOSA PARACEL**
PROYECTO DE FABRICACIÓN DE CELULOSA
CONCEPCIÓN, PARAGUAY

PÖYRY

| RESP./TÍTULO/N° ENTIDAD CLASSE | TIPO DOC. | N° DEL PROVEEDOR | REV. |
|---|---|---|---|
| | | 1010-1907-L-S-0027 | 0 |

TÍTULO
PARACEL PROYECTO - SITE INFRAESTRUCTURA
1907 - OFFSITE - ALOJAMIENTO PROVISIONAL C7
PLANTA DE IMPLANTACIÓN

| ESCALA | UNIDAD | PROYECTO | N° PARACEL | REV. |
|---|---|---|---|---|
| IND. | m | | 109002364-001-1907-L03-0025 | 0 |

0




ALOJAMIENTO C11 - PLANTA DE IMPLANTACIÓN

Esc.1 : 750

| APARCAMIENTO/ PARADA DE AUTOBÚS/ VIAS | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 ESTACIONAMIENTO DE AUTOBUSES (EMBARQUE/ DESEMBARQUE) – 15 ESPACIOS PARA AUTOBUSES | 2400,00 | 40,00x60,00 |
| 02 APARCAMIENTO DE AUTOS – 37 PLAZAS DE APARCAMIENTO DE AUTOS | 1425,00 | 25,00x57,00 |
| **ÁREAS DE SERVICIO (ÁREAS DE ADMINISTRACIÓN/ USO DE LA OPERACIÓN)** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 01 CASETA DE VIGILANCIA/ OFICINA DE SEGURIDAD/ ENTRADA – TORNIQUETES | 330,70 | DOC. 1907-L03-0016 |
| 04 OPERADOR DEL ALBERGUE INSTALACIÓN/ ADM. OFFICE | 490,45 | DOC. 1907-L03-0015 |
| 16 CENTRO MÉDICO Y DE PRIMEROS AUXILIOS | 185,45 | DOC. 1907-L03-0008 |
| 04 COMEDOR (ASIENTOS, LAVADO DE VAJILLA PARA 1200 PERSONAS)+COCINA (PREPARACIÓN FINAL) | 949,40 | DOC. 1907-L03-0012 |

| CENTRO SOCIAL / ÁREA DE RECREO | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 CENTRO SOCIAL/AREA DE RECREO | 966,00 | DOC. 1907-L03-0013 |
| 18 EQUIPOS DE GIMNASIA EN LOCAL ABIERTO | 150,00 | 10,00x15,00 |
| **PISTA DEPORTIVA** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 08 PISTA DEPORTIVA | 432,00 | 16,00x27,00 |
| **CAMPO DE FÚTBOL** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 09 CAMPO DE FÚTBOL | 3937,50 | 52,50x75,00 |

| UTILIDADES | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 19 SUBESTACIÓN/ SALA ELÉCTRICA/ GENERADOR DE ENERGÍA | APROX. 170,00(A DEFINIR) | NOTA 3 |
| 11 BASURA | 90,20 | DOC. 1907-L03-0022 |
| 12 PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES (ETE) | APROX. 120,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 13 PLANTA DE TRATAMIENTO DE AGUA (ETA) | APROX. 240,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 14 TORRE TI | APROX. 225,00(A DEFINIR) | NOTA 4 |
| 15 RESERVORIO DE AGUA POTABLE 1 | CAPACIDAD= 90 m³ | APROX. DIAM.: 4,00m |
| 19 RESERVORIO DE AGUA POTABLE 2 –COMEDOR | CAPACIDAD= 40 m³ | APROX. DIAM.: 4,00m |

| ÁREA ECUMÉNICA | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 16 SALA ECUMÉNICA | 443,05 | DOC. 1907-L03-0014 |
| **ALOJAMIENTO** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 17 C2 – 21 UN. ALOJAMIENTO MASC. (1176 HOMBRES): CADA SALA:<br>– 56 PERSONAS (MODELO A– 2 PERSONAS/CUARTO)= 28 DORMITORIOS<br>– ZONA DE BAÑOS Y DUCHAS COLECTIVAS (1 BAÑO/LAVABO/DUCHA PARA 10 PERSONAS) = 6UN.<br>– ZONA DE LAVANDERIA DE AUTOSERVICIO (1 CUBA DE LAVADO PARA 8 PERSONAS = 7 UN + ZONA CUBIERTA Y DESCUBIERTA PARA LOS TENDEDEROS<br>– 2 CIRCULACIONES EXTERNAS = 1,80m DE ANCHO | 1300,70 (2 BDC CONECTADO) Y 1965,90 (3 BDC CONECTADO) | DOC. 1907-L03-0002 |

| PROYECTO: FÁBRICA DE CELULOSA - PARACEL S.A. | | | |
|---|---|---|---|
| PLANOS PREVENCIÓN CONTRA INCENDIOS | | | |
| UBICACIÓN: | Zapatero Cué - Distrito de Concepción | | |
| PROPIETARIO: | PARACEL S.A. | | |
| DOMICILIO: | Facundo Machaín 6426 – Asunción, Paraguay | | |
| PROFESIONAL: | | PAT. PROF. N°: | |
| DOMICILIO: | | SUP DEL TERR.: | |
| CTA. CTE. CTRAL.: | | SUP CONST.: | |
| PROPIETARIO | | PROFESIONAL | |

## TABLA DE REVISIÓN

ND - NIVEL DE DOCUMENTO:
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B -PARA INFORMACIÓN
C -PARA APROBACIÓN
D -APROBADO
E -PARA COTIZACIÓN
F - LIBERADO PARA LA COMPRA
G - LIBERADO PARA CONSTRUCCIÓN
H - LIBERADO PARA EJECUCCIÓN
I - CERTIFICADO
J - CANCELADO
K - COMO COMPRADO
L - COMO CONSTRUIDO

| REV. | DATA | PROY | INSPEC. | APROB. | AUTOR. | FINALID. | DESCRIPCIÓN |
|---|---|---|---|---|---|---|---|
| 0 | 23/03/21 | gqv | gou | ittfin | dzn | PC | PARA COTIZACIÓN |
| A | 25/03/21 | gqv | gou | ittfin | dzn | PC | PARA COTIZACIÓN |

## NOTAS

1 - MEDIDAS DE NIVEL Y COTAS EN METROS, SALVO INDICACIÓN CONTRARIA.

2 - PREMISAS DEL PROYECTO:

- ORIENTACIÓN DE LA PISTA DEPORTIVA Y DEL CAMPO DE FÚTBOL PARA EVITAR LA AMORTIGUACIÓN EN LAS PERSONAS; EL EJE LONGITUDINAL (LADO MÁS LARGO DE LA PISTA DEPORTIVA/CAMPO DE FÚTBOL) EN LA LÍNEA NORTE / SUR VERDADERA.
- UBICACIÓN DE LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES (ETE) Y DE LA PLANTA DE TRATAMIENTO DE AGUA PARA FACILITAR LA TOMA DE AGUA Y LA EMISIÓN DE EFLUENTES Y TENER EN CUENTA LA DIRECCIÓN DEL VIENTO PARA EVITAR LOS MALOS OLORES; UBICADA JUNTO AL CAMINO DEL RIO.
- UBICACIÓN DEL CUBÍCULO DE ENTRADA DE ENERGÍA Y DEL GENERADOR DIESEL CERCA DE LA VÍA PÚBLICA Y ACCESO EXCLUSIVO AL CONCESIONARIO (ANDE) PARA FACILITAR LA LLEGADA Y MEDICIÓN DE ENERGÍA.
- UBICACIÓN DE LA SALA ECUMÉNICA LEJOS DE LAS ZONAS RUIDOSAS ASEGURANDO UN SILENCIO REVERENTE.
- ACERAS CUBIERTAS QUE CONECTAN LA PARADA DE AUTOBUSES / EL APARCAMIENTO Y LOS EDIFICIOS PRINCIPALES Y ALOJAMIENTOS.
- UBICACIÓN DE LAS INSTALACIONES MÉDICAS Y DE PRIMEROS AUXILIOS JUNTO A LA ENTRADA PRINCIPAL, PARA FACILITAR EL ACCESO/SALIDA DE LAS AMBULANCIAS.

3 - SALA ELÉCTRICA (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE EQUIPOS ELÉCTRICOS.

4 - TORRE DE TI - ESTRUCTURA DE ACERO Y CONTENEDOR PARA SOPORTE A LA OPERACIÓN (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE TI.

LÍMITE DEL TERRENO (C11=19,05ha)

CERCADO

MARQUESINA — EDIFICIO/ CONEXIÓN CON LA PARADA DE AUTOBÚS

## PENDENCIAS

## DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|
| | | |

## DOCUMENTOS DE REFERENCIA

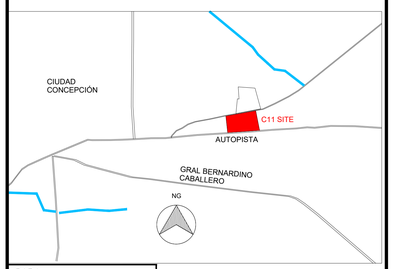
| TÍTULO | NÚMERO |
|---|---|
| | |

## DISTRIBUCIÓN

REVISÃO

| PARA | 0 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| PARACEL | E | E | | | | | |
| PÖYRY | E | E | | | | | |

R: COPIADO / IMPRESIÓN / PLOTEO (PAPEL) E: ARQ. ELECTRÓNICO




PARA
COTIZACIÓN

PLANTA CLAVE
SIN ESCALA

PARACEL

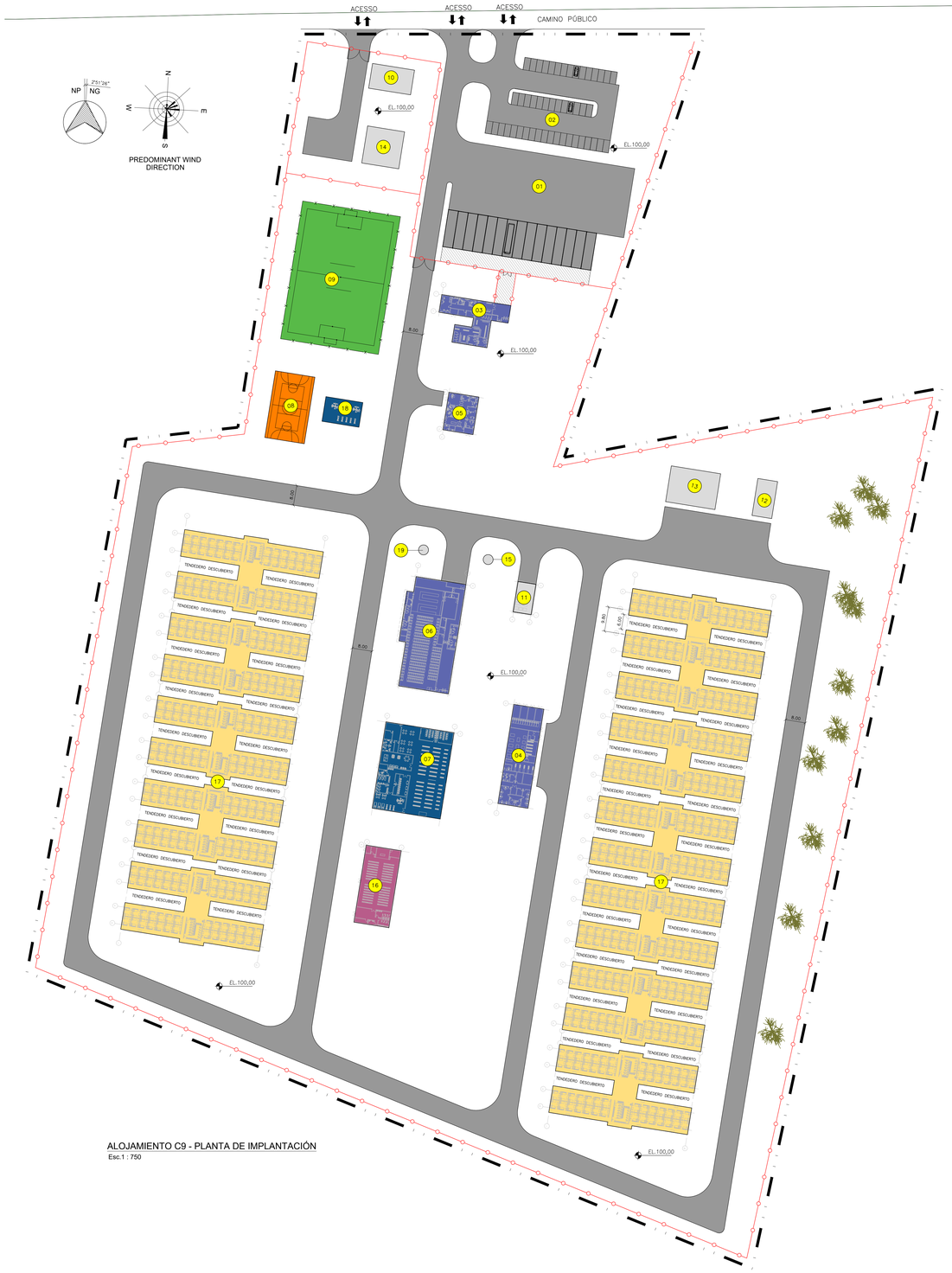
PLANTA DE CELULOSA PARACEL
PROYECTO DE FABRICACIÓN DE CELULOSA
CONCEPCIÓN, PARAGUAY

PÖYRY

| RESP./TÍTULO/N° ENTIDAD CLASSE | TIPO DOC. | N° DEL PROVEEDOR | REV. |
|---|---|---|---|
| | | 1010-1907-L-S-0026 | A |

TÍTULO
PARACEL PROYECTO - SITE INFRAESTRUCTURA
1907 - OFFSITE - ALOJAMIENTO PROVISIONAL C11
PLANTA DE IMPLANTACIÓN

| ESCALA | UNIDAD | PROYECTO | N° PARACEL | REV. |
|---|---|---|---|---|
| IND. | m | | 109002364-001-1907-L03-0024 | A |




ALOJAMIENTO C9 - PLANTA DE IMPLANTACIÓN
Esc.1 : 750

| APARCAMIENTO/ PARADA DE AUTOBÚS/ VÍAS | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 01 ESTACIONAMIENTO DE AUTOBUSES (EMBARQUE/ DESEMBARQUE) 15 ESPACIOS PARA AUTOBUSES | 2400,00 | 40,00x60,00 |
| 02 APARCAMIENTO DE AUTOS – 48 PLAZAS DE APARCAMIENTO DE AUTOS | 1750,00 | 35,00x50,00 |
| **ÁREAS DE SERVICIO (ÁREAS DE ADMINISTRACIÓN/ USO DE LA OPERACIÓN)** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 03 CASETA DE VIGILANCIA/ OFICINA DE SEGURIDAD/ ENTRADA – TORNIQUETES | 330,70 | DOC. 1907–L03–0016 |
| 04 OPERADOR DEL ALBERGUE INSTALACIÓN/ ADM. OFFICE | 490,45 | DOC. 1907–L03–0015 |
| 05 CENTRO MÉDICO Y DE PRIMEROS AUXILIOS | 185,45 | DOC. 1907–L03–0008 |
| 06 COMEDOR (ASIENTOS, LAVADO DE VAJILLA PARA 1200 PERSONAS)+COCINA (PREPARACIÓN FINAL) | 949,40 | DOC. 1907–L03–0012 |

| CENTRO SOCIAL / ÁREA DE RECREO | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 07 CENTRO SOCIAL/ÁREA DE RECREO | 966,00 | DOC. 1907–L03–0013 |
| 18 EQUIPOS DE GIMNASIA EN LOCAL ABIERTO | 150,00 | 10,00x15,00 |
| **PISTA DEPORTIVA** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 08 PISTA DEPORTIVA | 432,00 | 16,00x27,00 |
| **CAMPO DE FÚTBOL** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 09 CAMPO DE FÚTBOL | 3937,50 | 52,50x75,00 |

| UTILIDADES | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 10 SUBESTACIÓN/ SALA ELÉCTRICA/ GENERADOR DE ENERGÍA | APROX. 170,00(A DEFINIR) | NOTA 3 |
| 11 BASURA | 90,20 | DOC. 1907–L03–0022 |
| 12 PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES (ETE) | APROX. 120,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 13 PLANTA DE TRATAMIENTO DE AGUA (ETA) | APROX. 240,00 (A DEFINIR) | A DEFINIR POR LA EMPRESA CONSTRUCTORA |
| 14 TORRE TI | APROX. 225,00(A DEFINIR) | NOTA 4 |
| 15 RESERVORIO DE AGUA POTABLE 1 | CAPACIDAD= 90 m³ | APROX. DIAM.: 4,00m |
| 19 RESERVORIO DE AGUA POTABLE 2 –COMEDOR | CAPACIDAD= 40 m³ | APROX. DIAM.: 4,00m |

| ÁREA ECUMÉNICA | | |
|---|---|---|
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 16 SALA ECUMÉNICA | 443,05 | DOC. 1907–L03–0014 |
| **ALOJAMIENTO** | | |
| ÁREA/ EDIFICIO | m2 | TAMAÑO (m) |
| 17 C2 – 23 UN. ALOJAMIENTO MASC. (1288 HOMBRES): CADA SALA: – 56 PERSONAS (MODELO A– 2 PERSONAS/CUARTO)= 28 DORMITORIOS – ZONA DE BAÑOS Y DUCHAS COLECTIVAS (1 BAÑO/LAVABO/DUCHA PARA 10 PERSONAS) = 6UN. – ZONA DE LAVANDERÍA DE AUTOSERVICIO (1 CUBA DE LAVADO PARA 8 PERSONAS = 7 UN + ZONA CUBIERTA Y DESCUBIERTA PARA LOS TENDEDEROS – 2 CIRCULACIONES EXTERNAS = 1,80m DE ANCHO | 1300,70 (2 BDG CONECTADO) Y 1965,90 (3 BDG CONECTADO) | DOC. 1907–L03–0002 |

| PROYECTO: FÁBRICA DE CELULOSA - PARACEL S.A. | | | |
|---|---|---|---|
| PLANOS PREVENCIÓN CONTRA INCENDIOS | | | |
| UBICACIÓN: | Zapatero Cué - Distrito de Concepción | | |
| PROPIETARIO: | PARACEL S.A. | | |
| DOMICILIO: | Facundo Machaín 6426 – Asunción, Paraguay | | |
| PROFESIONAL: | | PAT. PROF. N°: | |
| DOMICILIO: | | SUP DEL TERR.: | |
| CTA. CTE. CTRAL.: | | SUP CONST.: | |
| PROPIETARIO | | PROFESIONAL | |

## TABLA DE REVISIÓN

ND - NIVEL DE DOCUMENTO:
A - PRELIMINAR
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F - LIBERADO PARA LA COMPRA
G - LIBERADO PARA CONSTRUCCIÓN
H - LIBERADO PARA EJECUCCIÓN
I - CERTIFICADO
J - CANCELADO
K - COMO COMPRADO
L - COMO CONSTRUIDO

| REV. | DATA | PROY | INSPEC. | APROB. | AUTOR. | FINALID. | DESCRIPCIÓN |
|---|---|---|---|---|---|---|---|
| 0 | 31/03/21 | gov | gou | ittfn | dm | PC | PARA COTIZACIÓN |

## NOTAS

1 - MEDIDAS DE NIVEL Y COTAS EN METROS, SALVO INDICACIÓN CONTRARIA.

2 - PREMISAS DEL PROYECTO:

- UBICACIÓN DEL CUBÍCULO DE ENTRADA DE ENERGÍA Y DEL GENERADOR DIESEL CERCA DE LA VÍA PÚBLICA Y ACCESO EXCLUSIVO AL CONCESIONARIO (ANDE) PARA FACILITAR LA LLEGADA Y MEDICIÓN DE ENERGÍA.
- UBICACIÓN DE LA SALA ECUMÉNICA LEJOS DE LAS ZONAS RUIDOSAS ASEGURANDO UN SILENCIO REVERENTE.
- ACERAS CUBIERTAS QUE CONECTAN LA PARADA DE AUTOBUSES/ EL APARCAMIENTO Y LOS EDIFICIOS PRINCIPALES Y ALOJAMIENTOS.
- UBICACIÓN DE LAS INSTALACIONES MÉDICAS Y DE PRIMEROS AUXILIOS JUNTO A LA ENTRADA PRINCIPAL, PARA FACILITAR EL ACCESO/SALIDA DE LAS AMBULANCIAS.

3 - SALA ELÉCTRICA (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE EQUIPOS ELÉCTRICOS.

4 - TORRE DE TI - ESTRUCTURA DE ACERO Y CONTENEDOR PARA SOPORTE A LA OPERACIÓN (PROYECTO/CONSTRUCCIÓN) ESTARÁ EN EL ALCANCE DEL PROVEEDOR DE TI.

LÍMITE DEL TERRENO (C9=11,20ha)
CERCADO
MARQUESINA — EDIFICIO/ CONEXIÓN CON LA PARADA DE AUTOBÚS

## PENDENCIAS

## DOCUMENTOS CONSULTADOS

| TÍTULO | NÚMERO | REV. |
|---|---|---|

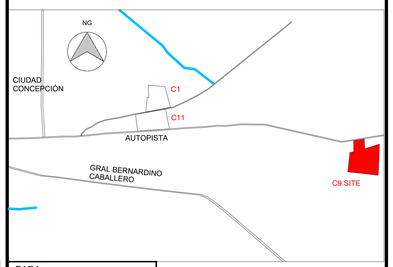
## DOCUMENTOS DE REFERENCIA

| TÍTULO | NÚMERO |
|---|---|

## DISTRIBUCIÓN

| PARA | REVISÃO 0 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| PARACEL | E | | | | | | |
| PÖYRY | E | | | | | | |

R: COPIADO / IMPRESIÓN / PLOTEO (PAPEL) E: ARQ. ELECTRÓNICO




PARA COTIZACIÓN

AUTOPISTA — PLANTA CLAVE — SIN ESCALA

PARACEL — PLANTA DE CELULOSA PARACEL — PROYECTO DE FABRICACIÓN DE CELULOSA — CONCEPCIÓN, PARAGUAY — PÖYRY

| RESP./TITULON° ENTIDAD CLASSE | TIPO DOC. | N° DEL PROVEEDOR | REV. |
|---|---|---|---|
| | | 1010-1907-L-S-0029 | 0 |

TÍTULO
PARACEL PROYECTO - SITE INFRAESTRUCTURA
1907 - OFFSITE - ALOJAMIENTO PROVISIONAL C9
PLANTA DE IMPLANTACIÓN

| ESCALA | UNIDAD | PROYECTO | N° PARACEL | REV. |
|---|---|---|---|---|
| IND. | m | | 109002364-001-1907-L03-0027 | 0 |