



SPI PROCESS Nº 021.00000891/2024-87
INTERNATIONAL COMPETITION No. 02/2024
PPP LOTE ALTO TIETÊ

EXHIBIT III.D – PERFORMANCE INDICATORS AND DEDUCTION CALCULATION RULE

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1. INTRODUCTION

- 1.1. The PERFORMANCE INDICATORS aim to ensure the appropriate level of SERVICE to PASSENGERS and evaluate the results related to the operation and maintenance of the SERVICE, ensuring that the CONCESSIONAIRE will minimally maintain the level of service provided by CPTM at the beginning of the CONCESSION, in addition to promoting a continuous improvement in performance throughout the CONCESSION TERM.
- 1.2. The PERFORMANCE INDICATORS will be evaluated jointly by ARTESP and the CONCESSIONAIRE and may be reviewed and changed within the scope of the ORDINARY REVIEWS or, if the applicable conditions are met, the EXTRAORDINARY REVIEWS.
- 1.3. Each of the PERFORMANCE INDICATORS will be measured by the INDEPENDENT VERIFIER, who will evaluate the performance of the CONCESSIONAIRE and issue reports to ARTESP, the GRANTING AUTHORITY and the CONCESSIONAIRE.
- 1.4. The calculation of the PERFORMANCE INDICATORS and, when applicable, the respective indexes, will be carried out according to the rules and periodicity established in the PERFORMANCE INDICATOR SHEETS.
- 1.5. All calculations presented in this EXHIBIT must be carried out considering only two decimal places, except when there is another criterion expressly provided, and the ABNT standard for rounding must be followed.

2. PERFORMANCE INDICATORS

- 2.1. The performance of the CONCESSIONAIRE will be measured taking into account the rules established in this EXHIBIT, as well as aspects considered essential such as operation, maintenance and safety, by complying with the conditions described in the AGREEMENT and its EXHIBITS, especially in EXHIBITS II.E, III.A and IX.
- 2.2. To monitor the performance of the CONCESSIONAIRE during the operation, 7 (seven) PERFORMANCE INDICATORS are considered, as follows:
 - IMT – Average Interval between Trains;
 - UTS – Service Uptime;
 - MRO – Rolling Stock Availability;

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- EST – Station Availability;
- ISP – Passenger Claims Index;
- OSI – Overall User Satisfaction Index;
- FC – Reliability Factor.

2.3. Each PERFORMANCE INDICATOR has one of two possible polarities:

- i. Polarity 1 - The higher the measured value, the better the performance: UTS, MRO, EST, OSI and FC;
- ii. Polarity 2 – The lower the measured value, the better the performance: IMT and ISP.

2.4. The obtaining of information and the respective calculation method must follow guidelines detailed in item 5 of this EXHIBIT.

2.5. All PERFORMANCE INDICATORS are calculated in two stages: (i) obtaining the measured value, given the nature of the characteristic of the operation to be monitored and (ii) converting the measured value into an index with a value equal to or greater than 0 (zero) and less than or equal to 1 (one).

2.5.1. For the first stage, each PERFORMANCE INDICATOR has a different methodology, as explained in the item 11 of this EXHIBIT.

2.5.2. For the second step, the method is unified, and considers 3 (three) reference values:

- Scheduled Value or Target ("REF"): Reference value considered as standard for full operation;
- Operational Limit 1 or Yellow Limit ("LO1"): Limit value between full operation and the range of service degradation;
- Operational Limit 2 or Red Limit ("LO2"): Limit value between the range of service degradation and the unacceptable range of service;

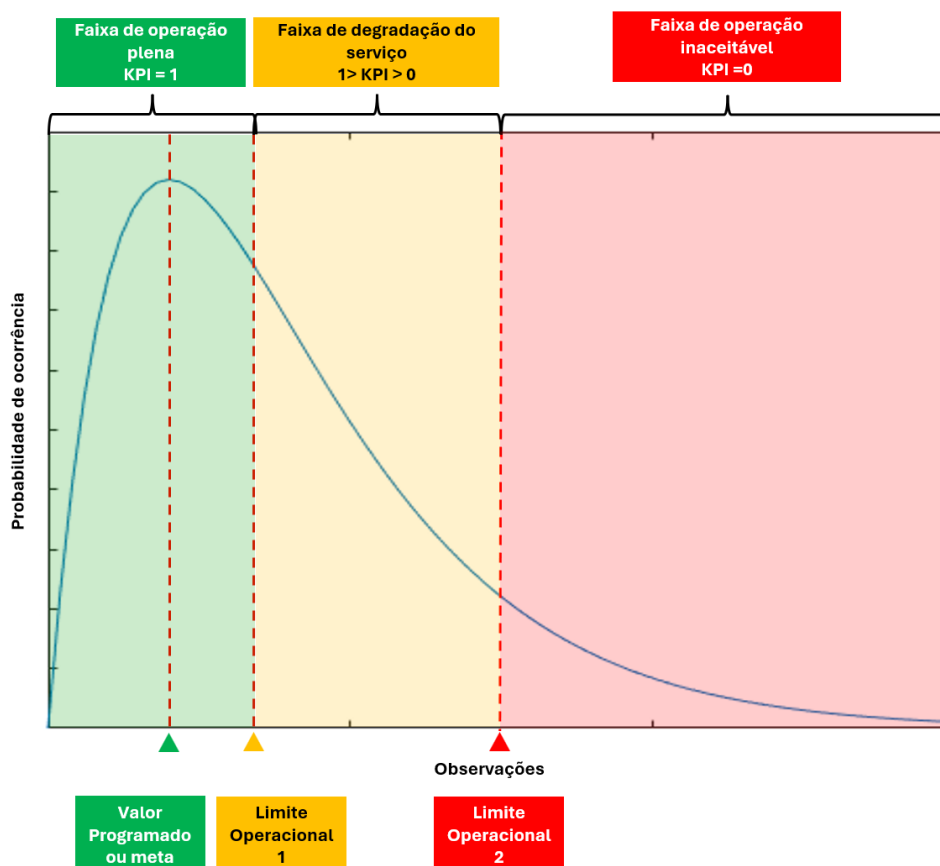
2.5.2.1. For PERFORMANCE INDICATORS with Polarity 1, REF is higher than the Yellow Threshold, which is higher than the Red Threshold.

2.5.2.2. For PERFORMANCE INDICATORS with Polarity 2, REF is lower than the Yellow Threshold, which is lower than the Red Threshold.

2.5.2.3. As can be seen in Figure 1 below, the indexes will be classified as follows:

- a) Values between Operational Limit 1 and Operational Limit 2 make up the service degradation range, an interval where the index varies between 0 (zero) and 1 (one).
- b) Values equal to or greater than Operational Limit 1 make up the full operating range and will result in an index equal to 1 (one).
- c) Values equal to or less than Operational Limit 2 make up the unacceptable operating range and will result in an index equal to 0 (zero).

Figure 1 – Example of reference values and operating limits – Indicator with polarity 2



2.6. The REF values are unique for each PERFORMANCE INDICATOR and may vary depending on the monitoring phase, as presented in the item 11.

3. QUALITY OF SERVICE INDICATOR (QSI)

- 3.1. The QSI is based on the metrics and standards established in the TENDER PROTOCOL, the CONTRACT and its EXHIBITS, and comprises the verification of the quality of the services provided by the CONCESSIONAIRE.
- 3.2. The QSI is composed of the results of the PERFORMANCE INDICATORS measured in the period considered.
- 3.3. For each monthly QSI measurement, a document will be generated by the INDEPENDENT VERIFIER that expresses the result of the inspection carried out in that period ("QSI Calculation Report").
- 3.4. The QSI will correspond to the multiplication of the Data Reliability Factor ("FC") by the sum, weighted by the different weights, of the value of each of the applicable PERFORMANCE INDICATORS measured according to the periodicity defined for each of them, according to the following formula:

$$QSI = FC * [(IMT * 0,30) + (UTS * 0,20) + (MRO * 0,20) + (EST * 0,15) + (ISP * 0,15)]$$

Where:

- *FC = Multiplicative Data Reliability Factor;*
 - *IMT = Average Interval between Trains;*
 - *UTS = Service Uptime;*
 - *MRO = Rolling Stock Reliability Indicator;*
 - *EST = Availability of Equipment at the Stations;*
 - *ISP = Passenger Claims Index.*
- 3.5. The OSI will be measured every six months, under the terms of item 12, and may affect the QSI, as provided for in paragraph 12.23.
 - 3.6. In every month a value for the QSI will be calculated (*QSI_n*). The amount considered for the purposes of the deductions of the PECUNIARY CONSIDERATION will be calculated by the

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arithmetic average of the last three months (moving average), according to the formula below, where n is the current month of measurement:

$$QSI_n = (QSI_{(n-1)} + QSI_{(n-2)} + QSI_{(n-3)})/3$$

- 3.7. The calculation of the QSI will be continuous and independent of the monitoring phase in which the CONCESSION is. Thus, in the initial months of a new monitoring phase, except for the first monitoring phase, the results of the last three months will be considered, combining the applicable months of the current phase with the applicable months of the previous phase.

4. CALCULATION OF PERFORMANCE INDICATORS

- 4.1. The calculation periods will consist of the interval from the first to the last day of the respective calendar month.
- 4.2. Each PERFORMANCE INDICATOR and, where applicable, each corresponding index, is directly linked to the terms and requirements described in the AGREEMENT and the EXHIBITS.
- 4.3. In the item 11, the PERFORMANCE INDICATOR SHEETS are arranged, where they are arranged, for example, (i) their composition and source of information, (ii) periodicity, (iii) formulas and (iv) reference values.
- 4.4. The scope of the inspection activities will be to verify compliance with the PERFORMANCE INDICATORS presented in the table expressed in item 2, in accordance with the rules set forth in this EXHIBIT.
- 4.5. The PERFORMANCE INDICATORS established in this EXHIBIT must be complied with and will be measured considering their service throughout the period of operation of the LINES, every day of the week, including Saturdays, Sundays and holidays.
- 4.6. If, for any reason, it is not possible to assess a PERFORMANCE INDICATOR or index, for reasons attributable to the CONCESSIONAIRE, as detailed in this EXHIBIT, a score of 0 (zero) will be assigned to the respective PERFORMANCE INDICATOR in the month of calculation.
- 4.7. If the measurement of the PERFORMANCE INDICATOR or Index (a) is not possible due to reasons attributable to the GRANTING AUTHORITY and (b) cannot be carried out extemporaneously, its respective weight, as provided for in item 3.4, will be redistributed proportionally to the other PERFORMANCE INDICATORS or Indexes.

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4.7.1. The impossibility of measuring a PERFORMANCE INDICATOR or index for reasons attributable to the GRANTING AUTHORITY will be proven by means of a proper administrative proceeding.

4.8. The value of the PECUNIARY CONSIDERATION will be calculated considering the value attributed to the QSI, under the terms established in EXHIBIT IX.

5. MEASUREMENT MANUAL

5.1. The INDEPENDENT VERIFIER shall prepare and submit the MEASUREMENT MANUAL of the PERFORMANCE INDICATORS to the CONCESSIONAIRE, ARTESP and the GRANTING AUTHORITY within one (1) month after the beginning of the PRE-OPERATIONAL PHASE.

5.2. The measurement manual must include, in detail, the sources of information, the processes for obtaining information, the procedures to be adopted to carry out the measurements, the calculation methodology, the form of presentation of the measurement results, among other pertinent information.

5.3. The CONCESSIONAIRE and ARTESP may, within one (1) month after the end of the period indicated in item 5.1, forward their considerations and suggestions regarding the measurement manual, without prejudice to the possibility of requesting meetings with the INDEPENDENT VERIFIER and the other parties to discuss the material.

5.4. The INDEPENDENT VERIFIER shall generate, within ten (10) days of the end of the period indicated in the sub-item above, a version of the measurement manual considering the weightings eventually shared by the CONCESSIONAIRE and ARTESP.

5.5. After the issuance of the version of the MEASUREMENT MANUAL referred to in item 5.4, ARTESP will have a period of 10 (ten) days to express its non-objection to the document. If there is no manifestation within this period, the manual will come into force automatically, without prejudice to the possibility of adjustments in future versions.

5.6. The measurement manual should be updated whenever necessary, such as when operating new systems, operational updates, among others.

5.7. The INDEPENDENT VERIFIER shall calculate the results of each of the PERFORMANCE INDICATORS according to the content of the MEASUREMENT MANUAL.

6. SOURCES OF INFORMATION AND DATA VERIFICATION

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- 6.1. The PERFORMANCE INDICATORS will be measured through the Computerized Operation Management System (SIGO) and the Computerized Maintenance Management System (CMMS), as described in EXHIBIT II.C.
- 6.2. The calculations must consider the daily transmission of data to the CMMS or SIGO, in order to compose the PERFORMANCE INDICATORS on a monthly basis, and the CONCESSIONAIRE is responsible for providing sufficient technology and resources to obtain the data, which must be approved by the INDEPENDENT VERIFIER.
- 6.3. The operational data on the scheduled offer will be extracted from the SEAT OFFER PLAN prepared by the CONCESSIONAIRE.
- 6.4. The MANAGEMENT SYSTEMS must be available to monitor maintenance events and those related to the operation, as well as be integrated with the communication network of the telecommunications system until the end of the OPERATIONAL TRANSITION period, subject to the penalties set forth in EXHIBIT V.
- 6.5. If the MANAGEMENT SYSTEMS are not available for the calculation of the PERFORMANCE INDICATORS within the period provided for in EXHIBIT II.C, provided that ARTESP's non-objection is obtained, the CONCESSIONAIRE may obtain and carry out the calculation based on consultations with the following sources, as applicable:
 - i. Monthly Inspection Reports of Stations and Trains;
 - ii. Existing systems such as Supervisory Systems (SCAP and SCADA);
 - iii. Records of Maintenance and Operation Management Systems;
 - iv. Information extracted from the Operational Journal;
 - v. Records of Complaints from the SERVICES.
- 6.5.1. This condition will only be admitted if the INDEPENDENT VERIFIER attests to the sufficiency of the data for the calculation of the PERFORMANCE INDICATORS, and must receive the non-objection of ARTESP, after a reasoned statement by the CONCESSIONAIRE, justifying the delay and a new date for the availability of the corresponding systems, without prejudice to the application of penalties provided for in EXHIBIT V.

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- 6.6. PERFORMANCE INDICATORS whose data cannot be extracted from the CMMS and SIGO, if they are not made available and certified by the INDEPENDENT VERIFIER after the start of the ASSISTED OPERATION, will have 0 (zero) as a result.

7. EVALUATION OF RESULTS AND PENALTIES

- 7.1. Within seven (7) days from the end of each month from the beginning of the COMMERCIAL OPERATION, the INDEPENDENT VERIFIER shall produce and share with the CONCESSIONAIRE and ARTESP the PERFORMANCE REPORT, which shall present the result of the measurement of the PERFORMANCE INDICATORS and the QSI in the analysis period, including the calculation memories, in addition to the data and evidence that support this result.

- 7.1.1. The PARTIES may express their views within seven (7) days on the content of the PERFORMANCE REPORT, by sending a substantiated notification to the INDEPENDENT VERIFIER.

- 7.1.2. The INDEPENDENT VERIFIER shall produce the final version of the PERFORMANCE REPORT, considering the weightings of ARTESP and the CONCESSIONAIRE, within ten (15) days of the end of the period referred to in the item 7.1, or until they have manifested themselves, whichever comes first.

- 7.1.3. ARTESP shall issue its final opinion on the result of the PERFORMANCE INDICATORS and QSI, with the appropriate justifications, within five (5) days of the deadline referred to in the item 7.1.2.

- 7.1.3.1. In the absence of a statement from ARTESP within the period referred to in sub-item above, the results contained in the final version of the PERFORMANCE REPORT referred to in item 7.1.2, without prejudice to a subsequent decision by ARTESP on the subject, pursuant to item 7.3.

- 7.2. The CONCESSIONAIRE may resort to the mechanisms described in CHAPTER XXIV of the AGREEMENT if, for any reason, it disagrees with the result issued by the INDEPENDENT VERIFIER or ARTESP, under the terms of the item above.

- 7.3. The result of the QSI contained in the final PERFORMANCE REPORT, or in the opinion of ARTESP, as the case may be, will be valid and, therefore, will be considered in the calculation of the PECUNIARY CONSIDERATION, from the publication of said report and until (a) a decision is issued through the mechanisms described in CHAPTER XXIV of the CONTRACT with a new result, or (b) a new QSI is calculated and defined in accordance with the procedures described in this EXHIBIT.

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- 7.3.1. The QSI result mentioned in the previous item will be applicable to the entire reference calendar month for the calculation of the PECUNIARY CONSIDERATION, that is, regardless of the day on which the result is issued, its effects will extend to all days of the respective month.
- 7.4. The CONCESSIONAIRE will be subject to penalties, under the terms of infractions 92 to 94 of EXHIBIT V, in case of not reaching the minimum performance level, understood as the materialization of any of the following hypotheses:
- i. A score of 0.0 is assigned to a given PERFORMANCE INDICATOR in 3 (three) sequential months;
 - ii. A score of 0.0 is assigned in a given PERFORMANCE INDICATOR for 6 (six) months, even if not consecutive, during the last 12 (twelve) months;
 - iii. In any month that a score of 0.0 is assigned to more than 50% (fifty percent) of the PERFORMANCE INDICATORS, in any of the SERVICES;
 - iv. There is a postponement of the registration of failures of occurrences of any nature, compromising the calculations of the PERFORMANCE INDICATORS.
- 7.5. ARTESP shall inform, under the terms of EXHIBIT IX, the DEPOSITARY BANK of the amount of the PECUNIARY CONSIDERATION considering the QSI in force, including with regard to any necessary adjustments as a result of changes in the value of the QSI due to reformed results.

8. MONITORING PHASES

- 8.1. The calculation of the PERFORMANCE INDICATORS is divided into monitoring phases, which have different characteristics for the operation.
- 8.2. For each monitoring phase, parameters will be defined for each PERFORMANCE INDICATOR that must follow the methodology proposed in the PERFORMANCE INDICATOR SHEETS presented in item 11 of this EXHIBIT.
- 8.3. The monthly measurement of the QSI will be carried out as established in the MEASUREMENT MANUAL, based on the information from the data sources in force and provided by the information systems assumed and subsequently updated or implemented by the CONCESSIONAIRE, under the terms of the CONTRACT, to be measured by the INDEPENDENT VERIFIER.

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- 8.4. The CONCESSIONAIRE is responsible for providing the inputs for the INDEPENDENT VERIFIER to calculate the PERFORMANCE INDICATORS and for monitoring the operation.
- 8.5. When the CONCESSIONAIRE carries out mandatory interventions with potential impact on the results of the PERFORMANCE INDICATORS, it shall, four (4) months in advance, notify the INDEPENDENT VERIFIER, informing which intervention it will perform and which will make such service unfeasible and the period during which the respective impacts are expected.
- 8.6. The INDEPENDENT VERIFIER shall, within one (1) month, certify whether the CONCESSIONAIRE's argument is relevant and justified, given the nature of the interference, and indicate which PERFORMANCE INDICATORS will be affected, during the period indicated by the CONCESSIONAIRE.
- 8.6.1. Once the interference in the PERFORMANCE INDICATORS is proven, it must be calculated considering the guidelines of the MEASUREMENT MANUAL, disregarding, during the period indicated by the CONCESSIONAIRE, the data referring to the locations affected by the interventions, which will not be computed in the parameters used to calculate the indicators.
- 8.6.2. The CONCESSIONAIRE must plan so that the impact of the works on the IMT indicator is minimized in PEAK PERIODS, as provided for in EXHIBIT III.A.
- 8.6.3. The notification must include the planning of the intervention, evidencing the efforts to limit the impacts on the LINES or the AIRPORT EXPRESS.
- 8.6.4. The CONCESSIONAIRE shall publicize at least one (1) month in advance the interventions that affect the normality of the AIRPORT LINES or EXPRESS, especially in the affected sections/stations, through public communication channels, such as panels and displays in the stations, announcements in the audio system, websites and mobile applications, social media, temporary signage and other available means.
- 8.7. First Phase of Monitoring**
- 8.7.1. The First Monitoring Phase will begin on the start date of the PRE-OPERATIONAL PHASE and will end with the conclusion of the PRE-OPERATIONAL PHASE and will have the purpose of measuring the performance of CPTM, aiming at the definition of the BENCHMARK PERFORMANCE INDICATORS.

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- 8.7.1.1. The BENCHMARK PERFORMANCE INDICATORS will be composed of the same PERFORMANCE INDICATORS that must be observed by the CONCESSIONAIRE during the CONCESSION.
- 8.7.1.2. The BENCHMARK PERFORMANCE INDICATORS will be measured according to the methodology, reference values and operational limits described for each PERFORMANCE INDICATOR in item 11 of this EXHIBIT.
- 8.7.1.3. The BENCHMARK PERFORMANCE INDICATORS are the values considered for the measurement of the performance of the First Monitoring Phase operation, which serve as a parameter for the following monitoring phases.
- 8.7.1.4. The goals that must be observed by the CONCESSIONAIRE and that will constitute the BENCHMARK PERFORMANCE INDICATORS will be defined, for each PERFORMANCE INDICATOR, as the median of the monthly results obtained during the measurements carried out in the PRE-OPERATIONAL PHASE, being certain that for its definition, at least 8 (eight) monthly measurements of each PERFORMANCE INDICATOR must be carried out.
- 8.7.2. The monthly measurement of the QSI will be carried out based on information from the current data sources and provided by the information systems used by CPTM, to be measured by the INDEPENDENT VERIFIER, as established in the MEASUREMENT MANUAL.
- 8.7.3. ARTESP, the CONCESSIONAIRE and the GRANTING AUTHORITY may accompany the INDEPENDENT VERIFIER during the measurements and measurements, as long as they do not interfere in its procedures, calculations and assessments.
- 8.7.4. The INDEPENDENT VERIFIER shall send to ARTESP and the CONCESSIONAIRE the technical report indicating the BENCHMARK PERFORMANCE INDICATORS within thirty (30) days of the conclusion of the PRE-OPERATIONAL PHASE.
- 8.7.5. ARTESP and the CONCESSIONAIRE, within fifteen (15) days after receipt of the technical report mentioned in the previous item, shall submit any divergences or requests for clarification to the INDEPENDENT VERIFIER, who shall submit its response and consolidated report within fifteen (15) days, submitting it for final approval by ARTESP.

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8.7.6. ARTESP shall issue the non-objection or present the final version of the results of the BENCHMARK PERFORMANCE INDICATORS, in a fundamental report, within fifteen (15) days of the presentation of the consolidated report referred to in item 8.7.4.

8.7.6.1. In the absence of a statement by ARTESP within the period referred to in the sub-item above, the results contained in the version contained in the final report referred to in item 8.7.4.

8.7.6.2. In case of disagreement, the CONCESSIONAIRE may resort to the mechanisms provided for in CHAPTER XXIV of the AGREEMENT.

8.7.6.3. Any divergences, doubts or questions about the REFERENTIAL PERFORMANCE INDICATORS will not prevent their use in the Second Monitoring Phase until there is a binding decision that rechanges their content.

8.8. Second Phase of Monitoring

8.8.1. It will begin on the first day of the calendar from the following month to the beginning of the ASSISTED OPERATION STAGE and will cease with the end of the ASSISTED OPERATION STAGE.

8.8.2. At this stage, the QSI results will not impact PAYMENT NOTIFICATIONS and PECUNIARY CONSIDERATION.

8.8.3. The results of the PERFORMANCE INDICATORS obtained will be compared with the respective BENCHMARK PERFORMANCE INDICATORS.

8.8.3.1. If the result of a PERFORMANCE INDICATOR is better than the same BENCHMARK PERFORMANCE INDICATOR, the score of the respective indicator will be 1 (one).

8.8.3.2. If the result of a PERFORMANCE INDICATOR is worse than the same BENCHMARK PERFORMANCE INDICATOR, the measured result is maintained.

8.8.4. The closure of the ASSISTED OPERATION STAGE will take place under the terms of EXHIBIT III.B.

8.9. Third Follow-up Phase

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- 8.9.1. It will begin on the first day of the month following the conclusion of the ASSISTED OPERATION STAGE, extending for six (6) years or until the SUBSTANTIAL CONCLUSION or FULL CONCLUSION of the INVESTMENT PACKAGES provided for until the 96th (ninety-sixth) month of the CONTRACT, pursuant to EXHIBIT IX.A, whichever occurs first.
- 8.9.2. At this stage, the QSI results will impact the PAYMENT NOTIFICATIONS and the PECUNIARY CONSIDERATION.
- 8.9.3. The results of the PERFORMANCE INDICATORS obtained will be compared with the respective BENCHMARK PERFORMANCE INDICATORS.
 - 8.9.3.1. If the result of a PERFORMANCE INDICATOR is better than the same BENCHMARK PERFORMANCE INDICATOR, the score of the respective indicator will be 1 (one).
 - 8.9.3.2. If the result of a PERFORMANCE INDICATOR is worse than the same BENCHMARK PERFORMANCE INDICATOR, the measured result is maintained.

8.10. Fourth Follow-up Phase

- 8.10.1. It will begin on the first day of the calendar month following the conclusion of the Third Monitoring Phase and will end when the CONTRACT is terminated, and the CONCESSIONAIRE's performance will be evaluated under the terms of item 11, maintaining the impact on PAYMENT NOTIFICATIONS and PECUNIARY CONSIDERATION.

9. NORMAL OPERATION

- 9.1. NORMAL OPERATION is a basic concept under the terms of this EXHIBIT defined as the state of operation of the passenger transport railway operation in which all activities take place in accordance with the pre-established conditions for efficiency, safety and comfort and, therefore, meeting the following conditions:
 - i. The operation takes place without the need for stops outside the platform, even if it is short;
 - ii. The operation takes place without speed reductions of more than 10% of the operational speed established per section of the road (evaluated from urgent occurrences and Level A and Level B failures);

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- iii. The operation takes place without failures or urgent occurrences that paralyze or impair the operation, through interruptions or speed restriction (evaluated from urgent occurrences and Level A and Level B failures); and
 - iv. In the event of temporary interruptions of the PERMANENT TRACK or the platforms, only when restricted to those previously planned and communicated to ARTESP, as well as communicated to USERS through devices available at stations, websites, applications and other electronic means, under the terms of EXHIBIT III.A.
- 9.2. Any interval between (a) an unplanned interruption, motivated by the CONCESSIONAIRE or, in any way, under its responsibility, and (b) the release of the stretch or interruption, will not be considered in the accounting of the NORMAL OPERATION time.
- 9.3. The NORMAL OPERATION time may be less than or equal to the scheduled operating time, defined according to the operational guidelines of EXHIBIT III.A.

10. MULTIPLICATIVE DATA RELIABILITY FACTOR (FC)

- 10.1. The RELIABILITY FACTOR aims to measure the reliability of the data obtained for the calculations of the PERFORMANCE INDICATORS provided by the CONCESSIONAIRE.
- 10.2. The RELIABILITY FACTOR will be calculated monthly, and may vary from 0 (zero) to 1 (one), with 2 (two) decimal places, according to the following formula:

$$FC = \frac{(N - N_{NOK} + 1)}{(N + COP + 1)}$$

Where:

- *N is the number of inspection or audit visits in the month, at the discretion of ARTESP, with visits to stations and trains in service being added;*
- *NNOK is the number of visits where it is found that:*
 - a. The train in operation did not meet the criteria for Regular Train; and/or
 - b. The station in operation did not meet the criteria for Regular Station; and/or

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- c. There is or was an occurrence that contributed to the loss of the condition of Regular Train or Regular Station and that was not recorded in the maintenance management data provided by the CONCESSIONAIRE as an Urgent Occurrence; and/or
 - d. The SEAT OFFER PLAN is not complied with or has undergone temporary changes without prior notice to ARTESP; and/or
 - e. Unreported Notable Incidents occur, as defined in EXHIBIT III.A.
- *COP is the number of visits where it is found that there was an occurrence classified as COPESE, that is, with compromised operational safety, without ARTESP having been communicated, whether the occurrence is recorded in the maintenance management data provided by the CONCESSIONAIRE or not. In this situation, ARTESP will assess the situation and take the necessary and sufficient measures to safeguard the physical integrity of the PASSENGERS, employees, equipment and facilities according to the procedures of the Implementing Standard – Permanent Commission for Safety in Operating Systems – COPESE.*
 - *For each visit that results in N_{NOK} , the CONCESSIONAIRE will be allowed to request a new visit from ARTESP in order to verify the correction of the irregularities pointed out, provided that they occur within the same month. It should be noted that satisfactory visits do not cancel visits with N_{NOK} results and the calculation procedure for the RELIABILITY FACTOR will not be changed.*

10.3. The INDEPENDENT VERIFIER must establish a routine of technical visits in the CONCESSION AREA in order to comply, at least, with the following requirements:

- There will be at least 3 (three) stations visited per month;
- All stations must be visited at least once annually;
- All trains in service must be visited at least once every six months.

10.4. Technical visits must be made during business hours, with the stations in operation and the trains in service. The INDEPENDENT VERIFIER does not need to inform the CONCESSIONAIRE of the schedule of visits, but the latter may accompany him, and the CONCESSIONAIRE is also able to monitor the visits on site.

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10.4.1. ARTESP must monitor the results of the visits through the reports produced by the INDEPENDENT VERIFIER.

10.5. A REGULAR TRAIN is defined as one that does not have an open urgent occurrence that prevents its safe movement, that does not interfere with the circulation of other trains, does not degrade the comfort of the PASSENGER and that does not have irregularities in general that may affect the image of the service. Symptoms related to equipment, controls and instruments must be reported by the drivers to the CCO, which in turn will provide a monthly report detailed for each train, in order to enable the identification of the related symptoms. It will not be considered REGULAR TRAIN if it presents any of the symptoms in the list of examples below:

- Opens doors with a speed of more than 3 km/h;
- It opens doors unduly;
- Door leaf does not lock;
- Door leaves do not open or close;
- One or more door leaves without light and/or audible signal of imminent closure;
- Malfunction of the speed control system;
- Inoperative controls;
- Inoperative instruments;
- Burning smell;
- Fire or smoke;
- Abnormal noises under the box;
- Abnormalities that prevent access to the train controls;
- Broken or scratched windows, when they pose risks to PASSENGERS;
- Broken windshield, when the damage is within the sweep area of the wiper blade or with a risk to the integrity of the drivers;

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- Inoperative Public Hearing Equipment;
- Inoperative Earth-Train Radio Communication Equipment;
- Failures in couplings that prevent coupling and uncoupling with another train;
- Damaged intermediate couplings;
- Failures in the loading of the brake pipe;
- Failures in the application and brake relief;
- Electrical supply failures;
- Failures in the application and removal of emergency brake and parking brake;
- More than a dead compressor or air leaks under the box;
- Two or more emergency lights off in the same car;
- Traction abnormalities such as jerks under braking or acceleration;
- Unavailability of the traction system in more than one car;
- Low propulsion due to abnormality of the train's traction system;
- Exceed a speed of 25 km/h in manual mode;
- No traction in any control mode;
- Severe callus on wheel sets (it is a significant wear on the wheel, caused by sliding, slipping or ovalization of the wheel, the consequences of which impact the comfort of the PASSENGERS and safety requirements);
- Abnormal shakes and noises;
- Inoperative car air conditioning or ventilation;

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- Lack of a fire extinguisher, extinguisher discharged, expired, unsealed or that presents any other aspect that implies non-compliance with current legislation;
- Unavailability of the fire detection system;
- Internal or external graffiti;
- Vandalism;
- Lack of benches, trim panels or handrails;
- Number of banks intended for preferential use lower than that required by law;
- Benches intended for preferential use with paint in disagreement with current standards and lack of signage;
- More than 10% of the area of a car with damaged or loose flooring;
- More than 10% of the area of a car with the lighting off;
- Protrusions or finishing failures that offer a risk of accident with PASSENGERS;
- Marked deterioration of the finishing and painting aspects of dashboards, seats and consoles.

10.6. A REGULAR STATION is defined as one that does not have urgent occurrences open that prevent the entry of PASSENGERS and full driving to boarding the trains and that allow their safe exit at the end of their trip. Thus, all systems, equipment and facilities of the station must offer minimum operating conditions according to their intended function, in addition to not presenting any irregularities that may affect the image of the service provided. It will not be considered a REGULAR STATION, if it presents any of the conditions below:

- Lighting of any of the station's sectors in accordance with the technical standard of ABNT NBR 8995. Sectors of the station are understood as:
 - Accesses, entrances and corridors of the station;
 - Fixed stairs (each fixed staircase is a sector);
 - Escalators (each escalator in operation is a sector);

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- Elevators (each elevator in operation is a sector);
- Mezzanines (each mezzanine of the station is a sector);
- Bathroom;
- Platform tip (platform area confined between the start/end of the platform and the access point to the first two doors of the train);
- Platform core (confined area between the two platform tip areas).
- Lack or inoperability of mandatory equipment for People with Special Needs that have not been informed to and authorized by ARTESP;
- More than one escalator stopped due to failure or scheduled maintenance, discounting the stairs in general overhaul;
- Inoperable fire suppression system components, such as:
 - Fire alarm detection monitoring systems (SDAI);
 - Lack of a fire extinguisher, extinguisher discharged, expired,
 - without sealing or presenting any other aspect that implies non-compliance with current legislation;
 - Lack of properly constituted fire brigade at stations
 - Lack of identification in the equipment for carrying out mandatory inspections;
 - Lack or inoperability of the pumps that are part of the fire fighting system;
- Passenger circulation areas with irregularities, offering risk of accidents, such as:
 - Temporary obstacles and blockages not signaled;
 - Tiles, signs or loose floors, without adequate signage and without a correction plan duly informed to ARTESP;

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- More than one inoperative ticket collection (lockout) device simultaneously for stations with up to 15 lockouts. More than 2 blocks down simultaneously for stations with 16 to 19 blocks. More than 10% of lockouts inoperative simultaneously for stations with more than 20 lockouts;
- With occurrences in the pump system that may cause overflow in wells of any nature or lack of water at the station;
- The following occurrences of a civil conservation nature will be admitted, provided that at least 75% of the occurrences comply with the respective release deadlines:

Table 1 – Scope and deadline for the release of occurrences related to REGULAR SEASON

Occurrence	Scope	Release Deadline
Hydraulic installations and equipment	Washbasins, toilets, urinals, drains, gutters, taps, valves and pipes with leaks or clogs and leaks, in areas of public access and/or use	24 hours
Doors, gates, gates, turnstiles and turnstiles	Damaged elements	48 hours
Furnishings	Banks, lightweight, ashtrays and damaged stretcher holder	48 hours
Floors	Damaged floors, steps, worktops and grilles	48 hours
Handrails and Guardrails	Damaged elements	24 hours
Coatings	Damaged wall and ceiling coverings	48 hours
Visual Communication	Structure, support, painting of damaged signs, boundary strips (street vendors, boarding queue, platform edge and wheelchair) and damaged luminous landmarks	72 hours
Graffiti, except for graffiti with vexatious content, which must be removed within 24 hours, regardless of location	In equipment or facilities located in public areas of access, circulation or permanence of PASSENGERS.	72 hours

10.7. The RELIABILITY FACTOR applies to IMT, UTS, MRO, EST and ISP, as the case may be, throughout the CONCESSION.

10.8. The RELIABILITY FACTOR used in the QSI formula is calculated as the average of the last 3 (three) months measured (moving average).

10.9. Thus, the quarterly consolidation does not exempt the CONCESSIONAIRE from carrying out routine monitoring of its activities and sending the results and itemized reports related to the results of the PERFORMANCE INDICATORS on a monthly basis, until the 15th (fifteenth) day of the month following the month analyzed.

11. PERFORMANCE INDICATOR SHEETS

11.1. Average Interval Between Trains (IMT)

Methodology

- 11.1.1. The Average Interval between Trains (IMT) aims to measure the regularity and interval between trains on the platforms (*headway*) by station, considering the specificities of each of the LINES and the AIRPORT EXPRESS. The IMT will be measured monthly, considering daily operation data, based on reports and hourly tables of the CCO.
- 11.1.2. The measurement will take place at the stations at the ends of the LINES or AIRPORT EXPRESS, as well as at intermediate stations depending on the line, as detailed below.
- 11.1.3. The interval between trains shall be measured considering as a single reference for all stations, under the terms of the MEASUREMENT MANUAL, the time between, together:
 - i. (a) the closing of all the doors of the train and (b) the departure of said train at the respective station; and
 - ii. in relation to the subsequent train arriving at the same station (a) the closing of all doors and (b) the departure of said train at the respective station.
- 11.1.3.1. For the measurement of the interval of trips of LINE 11 and LINE 12 that occur immediately after a trip of the AIRPORT EXPRESS, during the PEAK PERIOD, the time between, together:
 - i. (a) the closing of all the doors of the train and (b) the departure of the train at the respective station, discounting the REF established for the section where the station is located.
- 11.1.4. The measurement of the monthly IMT begins with the calculation of the Average Daily Interval (IMD), through the arithmetic average of the measurements of the intervals between trains to the stations and in each of the LINES or AIRPORT EXPRESS, considering the PEAK PERIOD and VALLEY PERIOD, and, when applicable, the respective *operational loops*. The interval will be measured in seconds, and the calculations will be carried out with 2 (two) decimal places.

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11.1.5. The IMD will not discard periods, nor will it use sampling, considering the entire period of daily commercial operation.

11.1.6. The IMD for each station (IMD-x) considered in the measurement will be calculated according to the following formula:

$$IMD(x)_d^{(l,p,t)} = \frac{\sum_1^N IE_d^{(l,p,t)}}{N}$$

Being:

- *IMD = Average daily interval between trains at station x, on line l, for day d, on section t and period p;*
- *IE = the interval between trains measured at station x, on line l, for day d, on section t and in period p;*
- *N = the number of measurements carried out at station x during period p;*
- *d = day of the month to be measured, which can be i) business day, ii) Saturday or iii) Sunday or holiday;*
- *l = LINE to be evaluated;*
- *t = excerpt to be evaluated;*
- *p = evaluation period, which can be the VALLEY PERIOD or the PEAK PERIOD.*

11.1.7. For each combination of LINES, day, stretch and period, the IMD is calculated as the arithmetic mean of the stations measured (IMDx averages).

11.1.8. The monthly IMT indicator is calculated, for each AIRPORT LINE or EXPRESS, segment and period, according to the following formula, with rounding to 4 (four) decimal places:

$$IMT_n^{(l,p,t,d)} = \frac{\sum_1^D IMD_d^{(l,p,t)}}{D}$$

Being:

- *IMT = the average interval between trains in the month measured n, for the section t in period p;*

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- *IMD = the average interval between trains on the measured day d, for the section t in period p;*
- *D = total days of i) working days, ii) Saturdays or iii) Sundays and holidays, considered in month n;*
- *n = month to be measured;*
- *d = day of the month, which can be i) business day, ii) Saturday or iii) Sunday or holiday;*
- *l = line to be evaluated;*
- *t = excerpt to be evaluated;*
- *p = evaluation period, which can be VALLEY PERIOD or PEAK PERIOD.*

11.1.9. The indicator will be applied to the LINES and to the AIRPORT EXPRESS for the PEAK PERIOD and the VALLEY PERIOD in all Monitoring Phases.

11.1.10. Future stations and expansions will only be evaluated by this PERFORMANCE INDICATOR after one calendar year has elapsed since the start of their COMMERCIAL OPERATION.

11.1.11. The IMT must be measured at the stations defined in the MEASUREMENT MANUAL.

Index calculation

11.1.12. The index of the IMT indicator has Polarity 2.

11.1.13. As set forth in EXHIBIT III.A, the parameters established as REF in these indices must be reassessed by ARTESP annually, in order to verify whether the limits and parameters established are compatible with the observed loading.

11.1.14. The value of the IMT indicator is estimated for each AIRPORT LINE or EXPRESS and for each stretch, considering PEAK PERIODS and VALLEY PERIODS, according to the following formula:

$$IMT^{(l,p,t,d)} = \frac{LO1 - IMT_n^{(l,p,t)}}{LO1 - LO2}, \text{ for } Operational\ Limit\ 1 \leq IMT_n^{(l,p,t,d)} \leq Operational\ Limit\ 2$$

$$IMT^{(l,p,t,d)} = 1.0 \text{ for } \leq IMT_n^{(l,p,t,d)} \leq Operational\ Limit\ 1$$

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$$IMT^{(l,p,t,d)} = 0.0 \text{ for } \geq IMT_n^{(l,p,t,d)} \text{ Operational Limit 2}$$

11.1.14.1. Operational Limit 1 is equal to the REF value established for the interval between trains on the line and in the section under analysis plus 1 (one) time the acceptable deviation for the maintenance of full operation.

11.1.14.2. Operational Limit 2 is equal to the REF value established for the interval between trains on the line and in the section under analysis plus 1 (one) time the acceptable deviation for the maintenance of the operation and 1 (one) time the acceptable deviation in the system degradation range.

11.1.15. For LINES that have more than 1 (one) stretch, the value of the partial indexes $IMT^{l,peak}$ and $IMT^{l,valley}$ will be obtained by the arithmetic mean:

$$IMT^{l,peak} = \frac{IMT^{l,peak,t1} + IMT^{l,peak,t2}}{2} \text{ e } IMT^{l,vale} = \frac{IMT^{l,valley,t1} + IMT^{l,valley,t2}}{2}$$

11.1.16. For the LINES that have only 1 (one) stretch and for the AIRPORT EXPRESS, the values of the partial indexes $IMT^{l,peak}$ and $IMT^{l,valley}$ will be equal to the values of the stretch itself.

11.1.17. The final index for each LINE or AIRPORT EXPRESS will be calculated by means of a weighting between the indicators of PEAK PERIOD and VALLEY PERIOD, in the following terms: IMT^l

$$IMT^l = 0,6 * IMT^{l,peak} + 0,4 * IMT^{l,valley}$$

11.1.18. The final index calculated monthly will have its score established by the weighted average by the number of transported passengers, according to the following formula: IMT

$$IMT = \frac{IMT^{L11} \cdot PAX^{L11} + IMT^{L12} \cdot PAX^{L12} + IMT^{L13} \cdot PAX^{L13} + IMT^{exp} \cdot PAX^{exp}}{PAX^{L11} + PAX^{L12} + PAX^{L13} + PAX^{exp}}$$

Where:

- PAX^{L11} is the total number of transported passengers on LINE 11;
- PAX^{L12} is the total number of transported passengers on LINE 12;
- PAX^{L13} is the total number of transported passengers on LINE 13;

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- PAX^{exp} is the total number of transported passengers on the AIRPORT EXPRESS.

11.1.19. The goals established for this PERFORMANCE INDICATOR will follow the following values:

- From the beginning of the COMMERCIAL OPERATION PHASE, to the end of the Third Monitoring Phase, in PEAK PERIODS.

Table 2 – Goals evaluated by line or service up to the Third Follow-up Phase (in seconds)

Service	Stretch	Period	Day type	Scheduled Value (REF)	Bypass – Full Operation (LO1-REF)	Bypass – Degraded operation (LO2-REF)
Line 11	Luz - Guaianases	Peak	Working day	210	30	60
Line 11	Luz - Guaianases	Valley	Working day	330	30	60
Line 11	Guaianases - Estudantes	Peak	Working day	420	30	60
Line 11	Guaianases - Estudantes	Valley	Working day	660	30	60
Line 11	Luz - Guaianases	Peak	Saturday	330	30	60
Line 11	Luz - Guaianases	Valley	Saturday	660	30	60
Line 11	Guaianases - Estudantes	All day	Saturday	660	30	60
Line 11	Luz - Estudantes	All day	Sundays and Holidays	1800	30	60
Line 12	Brás - Itaquaquecetuba	Peak	Working day	300	60	90
Line 12	Brás - Itaquaquecetuba	Valley	Working day	480	60	90
Line 12	Itaquaquecetuba - Calmon Viana	Peak	Working day	600	60	90
Line 12	Itaquaquecetuba - Calmon Viana	Valley	Working day	480	60	90
Line 12	Brás - Calmon Viana	Peak	Saturday	480	60	90
Line 12	Brás - Calmon Viana	Valley	Saturday	480	60	90
Line 12	Brás - Calmon Viana	All day	Sundays and Holidays	1800	60	90
Line 13	Eng. Goulart - Guarulhos Airport	Peak	Working day	900	30	60

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Service	Stretch	Period	Day type	Scheduled Value (REF)	Bypass – Full Operation (LO1-REF)	Bypass – Degraded operation (LO2-REF)
Line 13	Eng. Goulart - Guarulhos Airport	Valley	Working day	900	30	60
Line 13	Eng. Goulart - Guarulhos Airport	Peak	Saturday	900	30	60
Line 13	Eng. Goulart - Guarulhos Airport	Valley	Saturday	900	30	60
Line 13	Eng. Goulart - Guarulhos Airport	All day	Sundays and Holidays	1200	30	60
Airport Express	Barra Funda - Guarulhos Airport	All day	Working day	3600	30	60
Airport Express	Barra Funda - Guarulhos Airport	All day	Saturday	3600	30	60
Airport Express	Barra Funda - Guarulhos Airport	All day	Sunday	3600	30	60

- ii. From the beginning of the Fourth Monitoring Phase, until the contractual term, in PEAK PERIODS:

Table 3 – Goals evaluated by line or service and stretch in the Fourth Monitoring Phase (in seconds)

Service	Stretch	Period	Day type	Scheduled Value (REF)	Bypass – Full Operation (LO1-REF)	Bypass – Degraded operation (LO2-REF)
Line 11	Barra Funda - Suzano	Peak	Working day	180	22,5	45
Line 11	Barra Funda - Suzano	Valley	Working day	270	22,5	45
Line 11	Suzano - Cezar de Souza	Peak	Working day	360	22,5	45
Line 11	Suzano - Cezar de Souza	Valley	Working day	540	22,5	45
Line 11	Barra Funda – Suzano	Peak	Saturday	270	22,5	45
Line 11	Barra Funda - Suzano	Valley	Saturday	540	22,5	45
Line 11	Suzano - Cezar de Souza	All day	Saturday	540	22,5	45
Line 11	Suzano - Cezar de Souza	All day	Sundays and Holidays	900	22,5	45

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Service	Stretch	Period	Day type	Scheduled Value (REF)	Bypass – Full Operation (LO1-REF)	Bypass – Degraded operation (LO2-REF)
Line 12	Brás - Itaquaue cetuba	Peak	Working day	195	30	60
Line 12	Brás - Itaquaue cetuba	Valley	Working day	480	30	60
Line 12	Itaquaue cetuba-Suzano	Peak	Working day	480	30	60
Line 12	Itaquaue cetuba-Suzano	Valley	Working day	480	30	60
Line 12	Brás - Suzano	Peak	Saturday	480	30	60
Line 12	Brás - Suzano	Valley	Saturday	480	30	60
Line 12	Brás - Suzano	All day	Sundays and Holidays	900	30	60
Line 13	Gabriela Mistral-Bonsucesso	Peak	Working day	600	22,5	45
Line 13	Gabriela Mistral-Bonsucesso	Valley	Working day	900	22,5	45
Line 13	Gabriela Mistral-Bonsucesso	Peak	Saturday	900	22,5	45
Line 13	Gabriela Mistral-Bonsucesso	Valley	Saturday	900	22,5	45
Line 13	Gabriela Mistral-Bonsucesso	All day	Sundays and Holidays	1200	22,5	45
Airport Express	Barra Funda - Guarulhos Airport	Peak	Working day	3600	22,5	45
Airport Express	Barra Funda - Guarulhos Airport	Valley	Working day	1800	22,5	45
Airport Express	Barra Funda - Guarulhos Airport	All day	Saturday	1800	22,5	45
Airport Express	Barra Funda - Guarulhos Airport	All day	Sundays and Holidays	1800	22,5	45

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- iii. From the beginning of the COMMERCIAL OPERATION PHASE, until the contractual term, the goal established for the VALLEY PERIOD, as defined in EXHIBIT III.A:
 - a) For all services of LINE 11 and LINE 12 it is equal to 15 (fifteen) minutes;
 - b) For LINE 13 it is equal to 20 (twenty) minutes.
- iv. For the AIRPORT EXPRESS, the goal established for the VALLEY PERIOD:
 - a) is equal to 60 (sixty) minutes from the beginning of the COMMERCIAL OPERATION PHASE to the conclusion of the Third Monitoring Phase;
 - b) is equal to 30 minutes from the beginning of the Fourth Monitoring Phase, until the contractual term.

11.2. Service Uptime (UTS)

Methodology

- 11.2.1. The purpose of the UTS is to monitor the availability and quality of the operation, gauging the frequency and duration of occurrences that impact the NORMAL OPERATION of each of the services granted.
- 11.2.2. The UTS indicator will be measured monthly based on SICOM data until the implementation of the CMMS, when it will be measured by this system.
- 11.2.3. For all SERVICES, this PERFORMANCE INDICATOR will be calculated daily by means of a ratio between the actual time of NORMAL OPERATION and the total time of scheduled operation, evaluated for each month, being calculated with 4 (four) decimal places.
- 11.2.4. The actual NORMAL OPERATION time can be obtained as the total scheduled time minus the time during which anomalies are recorded. That is, the beginning and end of each anomaly in the operation that results in an operation not classified as NORMAL OPERATION is recorded and such time is deducted from the total scheduled.

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11.2.5. When multiple anomalies occur simultaneously in different locations, the period to be deducted from the uptime is calculated based on the overlap of the anomaly times. The duration of concomitant incidents is not added; instead, the continuous interval from the beginning of the first anomaly to the end of the last one within the same period is considered.

11.2.6. The indicator will be evaluated for different periods of the operation:

For PEAK PERIODS:

$$UTSP = \frac{TON_{peak}}{TO_{peak}}$$

For VALLEY PERIODS:

$$UTSV = \frac{TON_{valley}}{TO_{valley}}$$

Where:

- TON = total NORMAL OPERATION time, in minutes;
- TO = total operating time, in minutes, between 04:00 and 00:00.

11.2.7. For the LINES and the AIRPORT EXPRESS SERVICE, the arithmetic average of the indices obtained daily, on all days in the month in question, with rounding to four decimal places, called MPEAK and MVALLEY, referring to the PEAK PERIOD and VALLEY PERIOD, respectively, whose resulting values must be used to obtain UTS, according to the equations below:

$$M_{peak} = \frac{\sum_{ui}^{uf} UTS_u^p}{du}$$

Where:

- ui = first business day;
- uf = last business day of the month in question;
- du = number of working days in the month in question.

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$$M_{valley} = \frac{\sum_{di}^{df} UTS_d^v}{dv}$$

Where:

- di = first day in the month in question;
- df = last day in the month in question;
- dv = number of days in the month.

Index calculation

11.2.8. The index of the UTS indicator has Polarity 1.

11.2.9. The indicator will be applied to all SERVICES, calculated monthly, with the following goals:

LINE SERVICE(S) and AIRPORT EXPRESS SERVICE (Exp)

11.2.10. Applies to each of the SERVICES for PEAK PERIODS:

$$UTS_{Peak}^S = \frac{100 * M_{pico} - LO1}{LO2 - LO1}, \text{ for Operating Limit } 2 \leq \text{Operating Limit } 1M_{peak}$$

$$UTS_{Peak}^S = 0.0 \text{ for } \leq \text{Operational Limit } 2M_{peak}$$

$$UTS_{Peak}^S = 1.0 \text{ for } \geq \text{Operational Limit } 1M_{peak}$$

11.2.11. Applies to each of the SERVICES for VALLEY PERIODS:

$$UTS_{Valley}^S = \frac{100 * M_{vale} - LO1}{LO2 - LO1}, \text{ for Operating Limit } 2 \leq \text{Operating Limit } 1M_{valley}$$

$$UTS_{Valley}^S = 0.0 \text{ for } \leq \text{Operational Limit } 2M_{VALLEY}$$

$$UTS_{Valley}^S = 1.0 \text{ for } \geq \text{Operational Limit } 1M_{VALLEY}$$

11.2.12. The calculation of the partial indicator for each of the SERVICES is given by:

$$UTS^S = (+)0,6 * UTS_{Peak}^S + 0,4 * UTS_{VALLEY}^S$$

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11.2.13. The UTS indicator score will be calculated by means of the average among the intermediate indicators, as follows:

$$UTS = \frac{UTS^{L11} + UTS^{L12} + UTS^{L13} + UTS^{exp}}{4}$$

11.2.14. The goals established for this PERFORMANCE INDICATOR will follow the following values:

- i. From the beginning of the COMMERCIAL OPERATION PHASE, to the end of the Third Monitoring Phase.

Table 4 – Goals evaluated by line or service up to the Third Follow-up Phase

Service	Period	Scheduled Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	Peak	100%	98%	96%
Line 11	Valley	100%	97%	95%
Line 12	Peak	100%	98%	96%
Line 12	Valley	100%	97%	95%
Line 13	Peak	100%	98%	96%
Line 13	Valley	100%	97%	95%
Airport Express	Peak	100%	98%	96%
Airport Express	Valley	100%	97%	95%

- ii. From the beginning of the Fourth Monitoring Phase, until the contractual term:

Table 5 – Targets evaluated by line or service and stretch in the Fourth Monitoring Phase

Service	Period	Scheduled Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	Peak	100%	98%	96%
Line 11	Valley	100%	97%	95%
Line 12	Peak	100%	98%	96%
Line 12	Valley	100%	97%	95%

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Service	Period	Scheduled Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 13	Peak	100%	98%	96%
Line 13	Valley	100%	97%	95%
Airport Express	Peak	100%	98%	96%
Airport Express	Valley	100%	97%	95%

11.3. Undercarriage Reliability Indicator (MRO)

Methodology

- 11.3.1. The purpose of the MRO is to monitor the reliability of the ROLLING STOCK on a monthly basis based on SICOM data, obtained from the mileage performed by the ROLLING STOCK without the registration of OCCURRENCES or opening of FAILURES.
- 11.3.2. The reliability of the ROLLING STOCK is defined by the MKBF (*Mean Kilometer Between Failures*) parameter, that is, the average mileage that a car travels on a train between FAILURES, which cause OCCURRENCES in the operation, to be stratified by level.
- 11.3.3. This indicator applies to all fleets, except for the 8000 Series until the end of the term of the PPP contract entered into between CTRENS and CPTM (Contract number 8764083011, of 10/06/2021), and CTRENS is responsible for the preventive and corrective maintenance of such fleet until 2030, under the terms of said contract.
 - 11.3.3.1. If the contract is terminated early, the 8000 Series will be evaluated within six (6) months by the MRO indicator.
 - 11.3.3.2. After the end of the contract, the series will be part of the calculation of the MRO indicator, provided that the trains are returned with all maintenance up to date, to be evaluated by the INDEPENDENT VERIFIER.
- 11.3.4. The MKBF values are segmented by type of OCCURRENCES, stratified into the levels of failures A, B and C, which are described in the following table:

Table 6 – Classification of levels

Level	Basic Description
Level A	When a commercial train, scheduled for commercial circulation and is in commercial operation, is incapable of moving itself in the sense of operation, paralyzing or impairing the operation due to insufficient performance or safety risk.

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Level	Basic Description
Level B	Failures in the systems that compromise the safety and comfort of the train during the transport of passengers, such as brake failures, ATC / ATO / CBTC, ground-train radio, headlight, horn, door system and air conditioning system, as long as they are not characterized as a LEVEL A failure, will be considered as a LEVEL B failure regardless of the time of delay.
Level C	When the commercial train, in commercial operation or maneuvering for commercial operation or maneuvering in the train washer, does not present the condition of REGULAR TRAIN due to a failure that is not characterized as a LEVEL A failure or LEVEL B failure. In commercial operation or maneuver for commercial operation or maneuver in the train washer, there is any signaling (<i>displays</i> or lamps or audible alarms, etc.) on the fault panel or on the cabin monitor or other equipment, accusing a failure and it is not verified by the maintenance team.
Doesn't Fail	A Non-Fault event is considered to be an event caused by factors external to the TEU. Examples of Non Fault are: vandalism; accident whose cause is not attributed to the fault; lightning strike; flood; improper operational performance; failures reported and not verified by maintenance; open faults with the train out of commercial operation. These failures should also be recorded for the maintenance of the history.

- 11.3.5. MKBF values are equivalent to quarterly moving averages. For each operational fleet, the MKBF is calculated from the sum of the accumulated mileage traveled in the last three (3) months of all trains in the fleet, divided by the total number of failures per level A, B or C of the same measurement period, according to the following equation:

$$MKBF_n^f = \sum_{3-m}^m \frac{K^f}{F_n}$$

Where:

- K^f = accumulated mileage of the operating fleet in the last 3 months;
- f = operational fleet;
- F = total failures accumulated by the operational fleet in the last 3 months;
- n = fault level A, B or C;
- m = last month completed, i.e. the month for which the indicator is calculated.

- 11.3.6. The values are calculated by SICOM, or by the CMMS, after its full implementation, as detailed below: $MKBF_n^f$

11.3.6.1. During the measurement by SICOM, the values of are obtained as follows: $MKBF_n^f$

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- i. SICOM records, in number, the total number of failures (incidents) that occurred per car and per month;
- ii. a technical team to be organized by the CONCESSIONAIRE stratifies the failures by level A, B or C;
- iii. the intermediate indicator for each level is calculated according to Operational Limit 1 and Operational Limit 2, both defined by series;
- iv. The indicator comprises the average of the intermediate indicators.

11.3.6.2. During the measurement by the CMMS, the values of are obtained as follows: $MKBF_n^f$

- i. the CMMS calculates, in number, the total number of failures (incidents) that occurred per car and per month;
- ii. the CMMS stratifies failures by level A, B or C;
- iii. the intermediate indicator for each level is calculated according to Operational Limit 1 and Operational Limit 2, both defined by series;
- iv. The indicator comprises the average of the intermediate indicators.

Index calculation

11.3.7. The index of the MRO indicator has Polarity 1.

11.3.8. For each level A, B and C, the partial index of each operational fleet is obtained, as follows: MRO_n^f

$$MRO_n^f = \frac{(MKBF_n^f - LO1)}{LO1 - LO2}, \text{ for } \leq \leq \text{Operational Limit 2 } MKBF_n^f \text{ Operational Limit 1}$$

$$MRO_n^f = 1.0 \text{ for } \geq MKBF_n^f \text{ Operational Limit 1}$$

$$MRO_n^f = 0.0 \text{ for } \leq MKBF_n^f \text{ Operational Limit 2}$$

11.3.9. The index of each operational fleet is calculated as the arithmetic average of the other intermediate indicators: MRO^f

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$$MRO^f = \frac{MRO_A^f + MRO_B^f + MRO_C^f}{3}$$

11.3.10. The final MRO is calculated monthly, based on the partial MRO values of each operational fleet, weighted by the number of trains in each fleet:

$$MRO = \frac{\sum_f (MRO^f \cdot NT^f)}{\sum_f NT^f}$$

Where:

- NT^f = number of operational trains in fleet f .

Monitoring phases

11.3.11. The following tables present the REF values for the measurement of the MRO PERFORMANCE INDICATOR.

11.3.12. In all monitoring phases, the values of the operational limits will be the same, varying only according to the age of the fleet evaluated.

11.3.13. The REF value is based on the situation where no failures occur in any train in the evaluated fleet.

11.3.14. Operational Limits 1 for each fleet are indicated in the table below.

11.3.15. Operational Limits 2 are considered to be 80% of the values of Operational Limits 1 for level A failures (MKBFA) and 85% of the values of Operational Limits 1 for level B and level C failures (MKBFB and MKBFC).

Table 7 – Operational Limits 1 of MKBF values by level, fleet and fleet age:

Fleet Age	1 to 10 years			11 to 20 years			20 years or older		
Fleet (Series)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)
2500	1.100.000	11.000	7.200	1.100.000	9.625	5.750	1.100.000	8.250	4.300
7000	800.000	8.500	5.600	800.000	7.300	4.600	800.000	5.400	4.400
8000	800.000	8.500	5.600	800.000	7.300	4.600	800.000	5.400	4.400
8500	1.100.000	11.000	7.200	1.100.000	9.625	5.750	1.100.000	8.250	4.300

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Fleet Age	1 to 10 years			11 to 20 years			20 years or older		
Fleet (Series)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)
9000	650.000	6.000	4.000	650.000	5.000	3.500	650.000	2.500	4.500

Table 8 – Operational limits 2 of MKBF values by level, fleet and fleet age:

Fleet Age	1 to 10 years			11 to 20 years			20 years or older		
Fleet (Series)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)	MKBFA (km)	MKBFB (km)	MKBFC (km)
2500	880.000	9.350	6.120	880.000	8.181	4.888	880.000	7.013	3.655
7000	640.000	7.225	4.760	640.000	6.205	3.910	640.000	4.590	3.740
8000	640.000	7.225	4.760	640.000	6.205	3.910	640.000	4.590	3.740
8500	880.000	9.350	6.120	880.000	8.181	4.888	880.000	7.013	3.655
9000	520.000	5.100	3.400	520.000	4.250	2.975	520.000	2.125	3.825

11.4. Availability of Equipment at Stations (EST)

Methodology

- 11.4.1. The EST aims to monitor the availability of equipment installed in the stations, as well as to establish minimum standards of operability, measured on a monthly basis and through SICOM data.
- 11.4.2. The EST indicator will be calculated monthly, and may vary from 0 (zero) to 1 (one), with 2 decimal places and rounding according to ABNT standard.
- 11.4.3. A fault opening shall be recorded if the escalator, elevators or blocks were out of operation, including the time at which such an event occurred.
- 11.4.4. When the maintenance is restored and when it receives the notice of the cancellation of the failure, the operation must record the time when this fact occurred.
- 11.4.5. This information will be recorded in the CMMS, after the start of its operation, for the purpose of calculating parameters E1, E2 and E3.
- 11.4.6. Such records will be processed in this way until the SCADA system is in place and can automatically transfer this data to the CMMS.

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- 11.4.7. Failures that prevents the flow of passengers when caused by the reading and validating equipment of the ticketing system and their communication with the control and monitoring device/equipment will not be computed.
- 11.4.8. All other failures related to the blocks will be considered in the calculation of the indicator.
- 11.4.9. The $DISP_{EST}$ parameter will be calculated monthly for the average of the subsystems considered E1, E2 and E3, and may vary from 0 (zero) to 100 (one hundred), with 2 (two) decimal places, according to the following formula:

$$DISP_{EST} = \frac{DISP_{E1} + DISP_{E2} + DISP_{E3}}{3}$$

- 11.4.10. To compose the availability for each subsystem, the following generic formula will be used: $DISP_{En}$

$$DISP_E = \frac{QHD * d - i}{QHD * d} * 100$$

Being:

- *QHD = reference parameter resulting from multiplying the quantity of equipment installed in all stations by the respective operational period in hour, on the day, and some equipment may operate at different times;*
- *d = number of days in the calendar month;*
- *i = number of unavailable hours in the month, i.e., the actual variable resulting from the sum of unavailable hours of the equipment of all stations in operation, during the commercial period.*

- 11.4.11. The Tables referring to equipment E1, E2 and E3, as detailed below, shall, under the terms of the MEASUREMENT MANUAL:
- i. be completed by the CONCESSIONAIRE, attested by the INDEPENDENT VERIFIER and obtained the non-objections by ARTESP;
 - ii. be updated according to the quantities of new equipment that come into operation at any time;

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- iii. be updated monthly in the face of new conditions that imply the number of operational hours per day;
- iv. contain all the itemized equipment for all stations.

E1- Escalators

11.4.12. The number of equipment is the total number of escalators in all stations of the SERVICE in question.

11.4.13. The number of hours expected for the equipment to be operational must be indicated in the Standard Table in the month in question, as follows:

Table 9 – Example of standard table – E1

Item	Season	Escalator Identification	Number of hours per day of operation planned	Note.:
1	Guaianases	N01	20	
2	Guaianases	S01	21	
3	Brás	N01		
Sum of hours of all escalators expected to operate in a day (QHD)			QHD	

E2- Elevator

11.4.14. The number of equipment is the total number of elevators in all the stations of the SERVICE in question.

11.4.15. The number of hours expected for the equipment to be operational must be indicated in the Standard Table in the following month:

Table 10 – Example of a standard table – E2

Item	Season	Elevator identification	Number of hours per day of operation planned	Note.:
1	Jardim Romano	N01	20	
2	Jardim Romano	S01	22	
3	Itaquaquecetuba			
Sum of hours of all elevators expected to operate in a day (QHD)			QHD	

E3 - Blocking

11.4.16. The number of equipment is the total number of blocks existing in all stations of the SERVICE in question.

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11.4.17. The mechanical locking unit is composed of the ratchet or tripod or head, cabinet or metal box, counter and miscellaneous.

11.4.18. The validator that is also part of the blocking unit, for the purpose of calculating this indicator, is composed of a QR-code reader, ticket or cards, or any other that may be made available by the GRANTING AUTHORITY.

11.4.19. A locking unit is considered to be a set involving a mechanical lock with its validators or readers.

11.4.20. The number of hours expected for the blocking units to be operational must be indicated in the following Standard Table:

Table 11 – Example of a standard table – E3

Item	Season	Number of locking units	Number of hours per day of operation planned	Number of hours	Note.:
1	Engenheiro Goulart	10	20	200	
2	Guarulhos-Cecap	15	21	315	
3	Airport-Guarulhos	20	21	420	
....					
Sum of hours of all units of blocks expected to operate in a day (QHD)				QHD	

Index calculation

11.4.21. The index of the EST indicator has Polarity 1.

11.4.22. The EST indicator will be calculated monthly using the following formula:

$$EST = \frac{DISP_{EST} - LO2}{LO1 - LO2}, \text{ for } Operational\ Limit\ 2 \leq DISP_{EST}^S \leq Operating\ Limit\ 1$$

Being:

- $EST = 1.0$ for $\geq DISP_{EST} Operational\ Limit\ 1$
- $EST = 0.0$ for $\leq DISP_{EST} Operational\ Limit\ 2$

11.4.23. For each of the SERVICES, the PERFORMANCE INDICATOR will also be considered with a score of 0 (zero) when Operational Limit 2 of each of the three parameters of the indicator is violated for 3 (three) consecutive days or 5 (five) alternate days and with

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partial duration in the same month, that is, the minimum availability is not reached for E1, E2 or E3, according to the deadlines described and the values in the following table.

Table 12 – Station Subsystems and their respective limits

ID	System	Scheduled Value (REF)	Operational Limit 2 (LO2) - 1st to 8th grade	Operational Limit 2 (LO2) – from the 9th grade
E1	Escalator	100,00%	94,00%	97,00%
E2	Elevators	100,00%	92,00%	95,00%
E3	Blocks	100,00%	97,90%	98,90%
Average Value		100,00%	94,63%	96,97%

11.4.24. The goals established for this PERFORMANCE INDICATOR will follow the following values:

- i. From the beginning of the COMMERCIAL OPERATION PHASE, to the end of the Third Monitoring Phase, in PEAK PERIODS.

Table 13 – Goals evaluated by line or service up to the Third Monitoring Phase

Service	Scheduled Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	100%	98,97%	94,63%
Line 12	100%	98,97%	94,63%
Line 13	100%	98,97%	94,63%
Airport Express	100%	98,97%	94,63%

- ii. From the beginning of the Fourth Monitoring Phase, until the contractual term

Table 14 – Targets assessed by line or service in the Fourth Monitoring Phase

Service	Scheduled Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	100%	98,97%	96,97%
Line 12	100%	98,97%	96,97%
Line 13	100%	98,97%	96,97%
Airport Express	100%	98,97%	96,97%

11.5. Passenger Claims Index (ISP)

Methodology

- 11.5.1. The ISP aims to monitor the level of operational safety taking into account sudden, unwanted or intentional occurrences, with monthly measurement through SICOM data and through COPESE reports.
- 11.5.2. The ISP establishes the relationship between the number of claims with PASSENGERS and the total monthly entries of TRANSPORTED PASSENGERS, for each of the SERVICES.
- 11.5.3. All claims that cause injuries or abrasions to PASSENGERS must be considered, in any unpaid area of the station that is part of the CONCESSION AREA and paid area of the CONCESSION AREA.
- 11.5.3.1. Exceptions apply (a) to suicides, which will not be considered claims, (b) to accidents with employees or PASSENGERS in a state of intoxication or under the effects of narcotics, or (c) if caused by sudden illness, provided that such situations are duly proven, in compliance with the relevant legislation.
- 11.5.4. The number of transported passengers in the service (PT) is expressed in millions of passengers, and is calculated by dividing the monthly number of transported passengers in the service by one (1) million, resulting in a value with two decimal places and rounded according to ABNT.
- 11.5.5. Next, the arithmetic average of the last 6 months (AL) is calculated, whose value obtained should be used to calculate the ISP value, according to the following equations for each of the SERVICES:

$$AL^S = \frac{\sum_{7-m}^m \frac{TS^S}{PT^S}}{6}$$

Being:

- S = SERVICE offered;
- m = last month completed, i.e. the month for which the indicator is calculated;
- TS = total monthly number of claims in the SERVICE
- PT = total monthly TRANSPORTED PASSENGERS in the SERVICE (in millions of passengers).

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- 11.5.6. For measurements with a history of less than 6 (six) months, the average calculated by the number of months in which measurements are available is considered.

Index calculation

- 11.5.7. The index of the ISP indicator has Polarity 2.
- 11.5.8. This PERFORMANCE INDICATOR will be measured according to the zero-vision goals, that is, REF value equal to 0 (zero) claims, with operational limits varying for each SERVICE:

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$$ISP^S = \frac{LO1 - AL^S}{LO1 - LO2}, \text{ for Operating Limit } 1 \leq \leq \text{Operating Limit } 2AL^S$$

$$ISP^S = 0.0 \text{ for } \geq \text{Operational Limit } 2AL^S$$

$$ISP^S = 1.0 \text{ for } \leq \text{Operational Limit } AL^S 1$$

- 11.5.9. The ISPL13 partial index considers the total number of transported passengers and the number of claims of LINE 13-Jade (L13) and AIRPORT EXPRESS SERVICE together.

- 11.5.10. The ISP index score will be calculated by means of the average between the intermediate indexes, that is:

$$ISP = \frac{ISP^{L11} + ISP^{L12} + ISP^{L13,exp}}{3}$$

Monitoring phases

- 11.5.11. The goals established for this PERFORMANCE INDICATOR will follow the following values:

- i. From the beginning of the COMMERCIAL OPERATION PHASE, to the end of the Third Monitoring Phase.

Table 15 – Reference value by line or service, stretch and period until the Third Monitoring Phase

Service	Target Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	0	1,5	3,5

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Service	Target Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 12	0	1,5	3,5
Line 13	0	1,5	3,5
Airport Express	0	1,5	3,5

- ii. From the beginning of the Fourth Monitoring Phase, until the contractual term:

Table 16 – Goals and stations evaluated by line or service and stretch from the 9th grade onwards

Service	Target Value (REF)	Operational Limit 1 (LO1)	Operational Limit 2 (LO2)
Line 11	0	1,2	3
Line 12	0	1,2	3
Line 13	0	1,2	3
Airport Express	0	1,2	3

12. OVERALL USER SATISFACTION INDICATOR (GIS)

- 12.1. The CONCESSIONAIRE shall implement a Service Quality Survey to monitor the degree of user satisfaction by evaluating the following parameters: (i) speed; (ii) comfort; (iii) reliability; (iv) safety against accidents; (v) public security; (vi) passenger service; (vii) passenger information; (viii) accessibility; and (ix) others that may be indicated by ARTESP.
- 12.2. The service quality survey must be carried out by an external, independent, reputable and renowned company in the market, without any corporate relationship with the CONCESSIONAIRE or companies that are part of its economic group.
- 12.3. The CONCESSIONAIRE will present to ARTESP a triple list of companies with the description, scope, content, survey questionnaire and deadlines to be respected in the generation of the various attributes expressed in this item.
- 12.4. ARTESP will select the company to carry out the survey, among those mentioned in the triple list of companies proposed by the CONCESSIONAIRE.

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- 12.5. The CONCESSIONAIRE will be responsible for hiring the company responsible for the service quality survey and for all expenses involved.
- 12.6. The research report should include as many products and EXHIBIT as necessary so that the content can be understood in depth.
- 12.7. ARTESP may attend, or appoint a representative, randomly and without prior notice, at any place where the research is carried out, for due follow-up.
- 12.8. The service quality survey will be carried out every six months, in April and October.
- 12.9. The Survey Reports must be delivered by the selected company in July and January, directly to ARTESP and the CONCESSIONAIRE, which will have a period of 30 days to review them and point out any corrections.
- 12.9.1. At the end of the 30-day period expressed in the item above, the Research Reports must be sent to the INDEPENDENT VERIFIER for issuance of its final version, within 15 days.
- 12.9.2. The PARTIES may refer controversies or disagreements related to the research reports to the COEXISTENCE COMMITTEE, which will address such points under the terms of the AGREEMENT.
- 12.10. The survey will be carried out with a minimum sample of 1,000 people surveyed, ensuring a minimum confidence level of 95% and a margin of error of 2% for each SERVICE, and it is necessary to observe for each station the relevance of the samples in relation to the volume of passengers.
- 12.11. The model and profile of the questionnaire will be the same used in the evaluation of the service of the other CPTM lines, to maintain the comparability of the information and preserve the historical evolution of the survey of the degree of satisfaction of the PASSENGER already carried out in the metropolitan train system of São Paulo.
- 12.12. The research methodology to be adopted includes a qualitative data collection stage, carried out annually, which will guide the quantitative research. This data collection must be carried out by the same institution approved to carry out the service quality survey.
- 12.13. The service quality survey will be carried out with the PASSENGERS at the time of the trip.

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12.14.Data collection should include a representative sample of the universe of demand and proportional to the movement at different times.

12.15.In the questionnaires, all the attributes of the service already mentioned and their requirements will be addressed, following the same model already used in the service quality survey to measure the degree of satisfaction of PASSENGERS, carried out by CPTM.

12.16.The evaluation begins with the PASSENGER reflecting on the requirements of the service and ends with his opinion on the general attribute related. Then, the general attributes are prioritized according to the importance given by the PASSENGER, during their trip, to each one of them.

12.17.To evaluate the attributes and requirements, the 5-point Likert scale will be used, with variations ranging from "very bad" to "excellent", as indicated in the following table:

Table 17 – Likert scale

Concept	Terrible	Bad	Regular	Good	Excellent
Qualification	1	2	3	4	5

12.18.ARTESP may determine the use of current collection instruments, similar to those used in the CPTM, in order to keep the survey updated and adequate to the changes in the needs of PASSENGERS and the compatibility in carrying out the surveys within the scope of other operators.

12.19.The following are the attributes and referential variables:

Table 18 – Attributes Passenger Satisfaction Survey

1. GENERAL ATTRIBUTES	2. SATISFACTION INDICATORS IAI _n		3. SATISFACTION INDEX IAA _i
1. SPEED	Number of trains waiting to board	IAI ₁	$IAA1 = \frac{\sum_{n=1}^6 IAI_n}{6}$
	Opening time of train doors for boarding and disembarking	IAI ₂	
	Time spent transferring or transferring between lines	IAI ₃	
	Time spent waiting for the train on the platform	IAI ₄	
	Time spent overcoming blockades	IAI ₅	
	Time spent traveling inside the train	IAI ₆	
2. COMFORT	Conditions of embarkation and disembarkation	IAI ₇	$IAA2 = \frac{\sum_{n=7}^{19} IAI_n}{13}$
	External lighting of station accesses	IAI ₈	
	Indoor lighting of the stations	IAI ₉	
	Lighting of public toilets and availability of boxes and urinals	IAI ₁₀	

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1. GENERAL ATTRIBUTES	2. SATISFACTION INDICATORS IAI_n		3. SATISFACTION INDEX IAA_i
	Cleaning of the stations	IAI_{11}	
	Cleaning the trains	IAI_{12}	
	Cleaning and sanitization of public toilets	IAI_{13}	
	Number of people on the platforms	IAI_{14}	
	Number of people on the trains	IAI_{15}	
	Train noise during the journey	IAI_{16}	
	Train bumps and brakes during the journey	IAI_{17}	
	Ventilation of the stations	IAI_{18}	
	Ventilation/air conditioning of trains	IAI_{19}	
3. RELIABILITY	Agility/speed to get the train up and running in case of downtime	IAI_{20}	$IAA3 = \frac{\sum_{n=20}^{n=25} IAI_n}{6}$
	Elevator operation	IAI_{21}	
	Operation of escalators	IAI_{22}	
	Number of ticket offices, in operation	IAI_{23}	
	Number of blocks available to enter or exit the Stations	IAI_{24}	
	Number of train stops between stations during the journey	IAI_{25}	
4. ACCIDENT SAFETY	Concessionaire action to avoid accidents on trains (derailment, fire)	IAI_{26}	$IAA4 = \frac{\sum_{n=26}^{n=35} IAI_n}{10}$
	Concessionaire action to avoid accidents on escalators and elevators	IAI_{27}	
	Concessionaire's action to avoid accidents on fixed stairs	IAI_{28}	
	Concessionaire's action to prevent accidents at entry and exit blockades	IAI_{29}	
	Concessionaire's action to avoid accidents at the doors (of trains)	IAI_{30}	
	Concessionaire action to avoid accidents in the gaps between the train and the platform	IAI_{31}	
	Existence of safety equipment for emergency situations (hydrants, fire extinguishers, etc.)	IAI_{32}	
	Control by the concessionaire of the number of passengers on the platforms to avoid accidents	IAI_{33}	
	Action by the concessionaire on the platforms to avoid accidents when boarding and disembarking trains	IAI_{34}	
	Performance of the concessionaire when there are problems on the trains (emptying train, warnings on the loudspeakers, guidance on how people should act)	IAI_{35}	
5. PUBLIC SECURITY	Concessionaire's action to prevent robberies/thefts inside the trains	IAI_{36}	$IAA5 = \frac{\sum_{n=36}^{n=43} IAI_n}{8}$
	Concessionaire's action to prevent robberies/thefts at stations	IAI_{37}	
	Public safety monitoring in the accesses/corridors to get to or from the stations	IAI_{38}	
	Concessionaire action to avoid aggression/bodily injury to the passenger	IAI_{39}	
	Concessionaire action to prevent turmoil by groups of football fans and/or gangs	IAI_{40}	
	Concessionaire's action to avoid beggars and street vendors on trains and stations	IAI_{41}	

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1. GENERAL ATTRIBUTES	2. SATISFACTION INDICATORS IAI_n	3. SATISFACTION INDEX IAA_i
	Concessionaire action to prevent sexual harassment/sexual embarrassment	IAI_{42}
	Action by the concessionaire to ensure the presence and number of security agents sufficient to maintain order and safety of the PASSENGERS	IAI_{43}
6. SERVICE	Performance of employees who are at the blockades/turnstiles	IAI_{44}
	Performance of employees who stay on the platforms to assist in boarding and disembarking	IAI_{45}
	Performance of security agents	IAI_{46}
	Employee's performance in first aid passenger care	IAI_{47}
	Presence of employees at the stations to help passengers with their needs	IAI_{48}
	Performance of train drivers	IAI_{49}
7. INFORMATION	Understanding the signs/posters	IAI_{50}
	Ease of information about integrated systems and surroundings	IAI_{51}
	Sound messages inside trains about abnormalities/problems	IAI_{52}
	Sound messages and posters at stations about abnormalities/problems	IAI_{53}
	Sound quality of the messages at the stations	IAI_{54}
	Sound quality of messages on trains	IAI_{55}
	Number of messages given on the speakers	IAI_{56}
	Number of passenger guidance posters	IAI_{57}
	Number of signs/posters to orient yourself in the Metro railway system.	IAI_{58}
	Information on accident risks	IAI_{59}
	Effect of the guidance posters for the use of the systems on PASSENGER behavior	IAI_{60}
	Effect of sound messages on the guidelines for the use of systems on the behavior of PASSENGERS	IAI_{61}
8. ACCESSIBILITY	Availability of equipment to facilitate the movement of priority passengers	IAI_{62}
	Adapted facilities and equipment at the station for people with disabilities	IAI_{63}
	Performance of employees in the adequate service given to priority passengers	IAI_{64}
	Ease of boarding in the area intended for priority passengers	IAI_{65}
	Number of seats/space on trains for priority passengers	IAI_{66}
	Ease of use of the system by people with disabilities or mobility difficulties and by people with visual impairments orienting themselves by the tactile floor signage (blue floor)	IAI_{67}

$$IAA6 = \frac{\sum_{n=44}^{n=49} IAI_n}{6}$$

$$IAA7 = \frac{\sum_{n=50}^{n=61} IAI_n}{12}$$

$$IAA8 = \frac{\sum_{n=62}^{n=67} IAI_n}{6}$$

12.20.The data treatment to evaluate the attributes and requirements results in proportions for each point of the scale that make it possible to generate several indexes, which are:

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- i. Survey Indicators Evaluation Index (IAI_i) – expresses the level of satisfaction in relation to the items and attributes surveyed within a range of 0 to +100. This index is the result of the sum of the positive proportions (Excellent and Good);
- ii. Evaluation index of the eight general attributes of the survey (IAA_i) – expresses the level of satisfaction in relation to the eight general attributes within a range of 0 to +100, follows the formulas in Table 2 with the arithmetic means of the indicators by attribute group;
- iii. Prioritization of attributes by PASSENGERS from 1st to 8th place (P_i) – this factor assigns the relative weight that corresponds to each of the eight general attributes of the survey; and
- iv. Overall PASSENGER Satisfaction Index (OSI) – expresses the degree of approval in relation to the general quality of the SERVICES. It is the result of weighing general attributes such as: comfort, speed, etc., by the degree of importance that the PASSENGER attributes to each one of them.

12.21. The OSI will be calculated according to the tables below:

Table 19 - Evaluation of the General Satisfaction Index

Attributes	Attribute Rating Index (2)	Prioritization of attributes by PASSENGERS from 1st to 8th place (3)	General PASSENGER Satisfaction Index (4)
Quickness	IAA1	P1 = 0.10	$IGS = \sum_{i=1}^8 IAA_i \cdot P_i$
Comfort	IAA2	P2 = 0.20	
Reliability	IAA3	P3 = 0.20	
Safety against accidents	IAA4	P4 = 0.10	
Public Safety	IAA3	P5 = 0.15	
PASSENGER service	IAA6	P6 = 0.10	

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Attributes	Attribute Rating Index (2)	Prioritization of attributes by PASSENGERS from 1st to 8th place (3)	General PASSENGER Satisfaction Index (4)
PASSENGER information	IAA7	P7 = 0,10	
Accessibility	IAA8	P8 = 0,05	

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Table 20 - Evaluation of the General Satisfaction Index AIRPORT EXPRESS SERVICE

	Attribute Rating Index (2)	Prioritization of attributes by PASSENGERS from 1st to 8th place (3)	General PASSENGER Satisfaction Index (4)
Quickness	IAA1	P1 = 0,10	$OSIEXP = \sum_{i=1}^8 IAA_i \cdot P_i$
Comfort	IAA2	P2 = 0,25	
Reliability	IAA3	P3 = 0,20	
Safety against accidents	IAA4	P4 = 0,10	
Public Safety	IAA3	P5 = 0,10	
PASSENGER service	IAA6	P6 = 0,10	
PASSENGER information	IAA7	P7 = 0,10	
Accessibility	IAA8	P8 = 0,05	

12.22. The research report should present comparisons with previous research, recommendations and conclusions, in addition to indicating revisions or adjustments in the research methodology and new items, in order to bring more information and contributions to ARTESP.

12.22.1. The research should also have a results report with a version to be made public, in a format to be agreed with ARTESP.

12.23. The OSI will impact the final value attributed to the QSI under the terms of the table below, functioning as a bonus factor by multiplying the nominal value of the QSI calculated under the terms of item 3.

12.23.1. The impact of the OSI on the measurement of the QSI will occur from the PAYMENT NOTIFICATION subsequent to the issuance of the final version of the Research Report by the INDEPENDENT VERIFIER and will be valid until the result of the new research is disclosed.

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12.23.2. If the multiplication expressed in the item above results in QSI with a nominal value greater than 1, the QSI will be considered equal to 1.

Table 21 – Bonus Calculation

Indicator Result (equal to or greater than)	Bonus (% not cumulative on the final value of the QSI)
4,00	105%
4,25	110%
4,50	115%
4,75	120%
5,00	130%