

## APPENDIX C

### PERFORMANCE INDICATOR SHEETS

**SPONSORED CONCESSION OF PUBLIC SERVICES OF OPERATION, MAINTENANCE AND PERFORMANCE OF THE INVESTMENTS NECESSARY FOR THE EXPLORATION OF THE ROAD SYSTEM OF THE RODOANEL NORTE LOT**

Indicator	1.1	Compliance Indicator for the Periodic Update of the Pavement Management System (ICASGP)		
Frequency	Monthly		Data Source	Pavement Management System (SGP)
Composition	Updates to the indicators for the special conservation of the pavement are carried out according to the measurement intervals of each one.			

## Description

The CONCESSIONAIRE shall carry out the tests / verifications / surveys in the field to collect data regarding the special conservation of the pavement, according to the definitions and periodicity contained in ANNEX 6<sup>1</sup>.

After conducting a full field survey of the special conditions of the pavement, the CONCESSIONAIRE must update all the data collected (referring to surface conditions, comfort, deformability, safety, noise) in the SGP. These data must present a gap between the collection in the field and the update in the SGP of, at the most, 45 days (observing the exceptions foreseen in ANNEX 3).

Indicator formula:	Performance tracks	
	Binary Indicator	Score
Not applicable	Whether the CONCESSIONAIRE complied with all the SGP indicator updates provided for in the period.	1
	In cases of total or partial non-compliance with the planned updates.	0

## Observations and comments

(1) The CONCESSIONAIRE must carry out a integral survey of the conditions for the special conservation of the pavement throughout the road, and must obey, for each one:

- **Control of deflectometric conditions (or deformability):**

Is taken once a year. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 1 year after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data related to the deflectometric tests performed, with a maximum lag between the survey in the field and the delivery / update of the data up to 45 days. From the delivery of this data to ARTESP, another year will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the end of the CONTRACT. For the ROAD SYSTEM, the surveys will start to be carried out

according to the ANNEX 3 guidelines.

- **Control of surface conditions:**

Held once a semester, in the first 20 years of the CONTRACT and, once a quarter, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 6 months after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the surface conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another 6 months will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 3 months. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

- **Control of comfort conditions:**

Held once a semester, in the first 20 years of the CONTRACT and, once a quarter, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 6 months after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the comfort conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another 6 months will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 3 months. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

- **Control of safety conditions (laser scanning and grip tester):**

Held once a year, for the first 20 years of the CONTRACT and, once a semester, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 1 year after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the comfort conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another year will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 6 months. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

- **Control of noise conditions when rolling:**

Held once a year. The data collection and delivery period should be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 1 year after the date that marks the beginning of the commercial operation of

the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the noise conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another year will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the end of the CONTRACT. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

Although the INDICATOR has a monthly periodicity, the verification of the SGP update will occur shortly after the programmed period for the survey of the special conditions of the pavement, delivery and update of the data (considering a maximum delay of 45 days of collection in the field). Therefore, the ICASGP score will be calculated in the programmed period and will be valid for subsequent months until the next programmed data collection period. In case of non-updating of the data foreseen for the period, the score for the INDICATOR will be zero and will remain for each subsequent month as zero until the next period of data collection foreseen.

For the purpose of monitoring and determining the INDICATOR, in the first months after the start of the Second Monitoring Phase (preceding the delivery of the first Pavement Monitoring Report) the ICASGP score will be 1, until the first survey of the special conditions of the pavement planned updates.

Indicator	1.2	Pavement comfort condition indicator (ICCP)		
Frequency	Monthly		Data Source	On-site survey / SGP / Report delivered by CONCESSIONAIRE
Composition	IRI (International Roughness Index) or IQ (Irregularity Qoefficient) values for the segments.			

## Description

The rolling comfort conditions will be determined by measuring irregularities in accordance with the procedures described in ANNEX 6 - Description and Standards of Services and the specifications of the Current Road Rules<sup>1</sup> and / or that followed them

The value to be considered will be the average of the Irregularity measurement values in the homogeneous segment of a maximum of 1km (one kilometer). Individual measurement values that are very different from the average should be treated as specified in ANNEX 6 - Minimum parameters required.

For verification, the road will be divided longitudinally into homogeneous segments of a maximum of 1 km (one kilometer) according to the description and details established in ANNEX 6. The segment will be considered “compliant” if it meets the criteria established in the column “Segment is compliant if”. Likewise, the segment will be considered “non-compliant” if it does not meet this same criterion.

Indicator formula:	Performance tracks	Score	Evaluation method - According to ANNEX 6		
			Year	Track type <sup>1</sup>	Segment is compliant if:
$\frac{\text{No. of compliant segments}}{\text{Total number of segments considered in the Lot for evaluation}} \times 100$	ICCP $\geq$ 95%	1	Up to the 10th year *	SP, SPAs, SPIs and Marginal Lanes - Paved	IRI $\leq$ 2.69 m / km or IQ $\leq$ 35 counts / km
				SP, SPAs, SPIs and Marginal Lanes - On land / primary coating	IRI $\leq$ 6 m / km or IQ $\leq$ 78 counts / km
	90% $\leq$ ICCP < 95%	0.8	From the 11th year	SP, SPAs, SPIs and Marginal Lanes - Paved	IRI $\leq$ 2.46 m / km or IQ $\leq$ 32 counts / km
				SP, SPAs, SPIs and Marginal Lanes - On land / primary coating	IRI $\leq$ 6 m / km or IQ $\leq$ 78 counts / km
	85% $\leq$ ICCP < 90%	0.6	Throughout the Concession	Branches and Devices - Paved	IRI $\leq$ 3.46 m / km or IQ $\leq$ 45 counts / km
				Branches and Devices - On land / primary coating	IRI $\leq$ 6 m / km or IQ $\leq$ 78 counts / km

<sup>1</sup>Marginals where the practiced speed is lower than that required for the measurement of the IRI should be excluded from the measurement of the indicator.

80% ≤ ICCP < 85%	0.4
ICCP < 80%	0

#### Observations and comments

For the ROAD SYSTEM, after the completion of the implementation of all investments and services included in the INITIAL PROGRAM until the first intervention programmed in the system, the segment will be according to whether  $IRI \leq 3.46$  m / km or  $IQ \leq 45$  counts / km. After the first intervention programmed in the ROAD SYSTEM, the IRI parameter must be considered according to the year in question.

After conducting the surveys, the CONCESSIONAIRE must update all results in the SGP and deliver to the ARTESP, by the 5th working day of the month, the Pavement Monitoring Report, considering a maximum lag between the survey in the field and the delivery / data update up to 45 days, as described in ANNEX 6. The INDICATOR may be analyzed, as described above in this form, from the Report delivered by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification carried out by the CONCESSIONAIRE. The Report must be sufficient for the calculation of this INDICATOR.

As described in ANNEX 6, the full survey of the comfort conditions of the pavement must occur on the entire road at least once a semester, in the first 20 years of the CONTRACT, and once a quarter, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 6 months after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the surface conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another 6 months will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 3 months.

For the purpose of monitoring and determining the INDICATOR, as it has a monthly periodicity, in the first months after the beginning of the Second Monitoring Phase of the PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines), which precede the first scheduled survey of the comfort conditions of the pavement in the period, the values considered for the measurements of the ICCP will be those presented in the "INITIAL PROGRAM Completion Report (Pavement)".

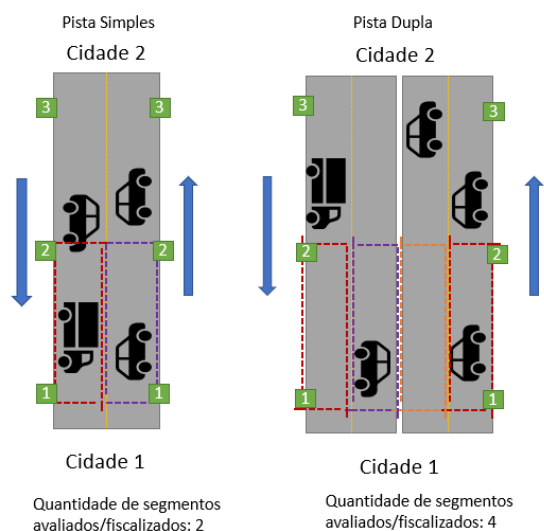
If the CONCESSIONAIRE feels the need to carry out other surveys in the field in addition to those already required and planned, in order to try to improve its score in the INDICATOR, for example, it can perform them in the segments where they are necessary, provided that it informs ARTESP about the procedure, to update the SGP with the new data collected and to send the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the maximum period for the data lag (45 days, subject to the exceptions provided for in ANNEX 3). Any parameter updates will be considered only in evaluations of periods after the data delivery, that is, previously calculated INDICATORS will not be changed.

The 'Total number of segments considered in the Lot for evaluation' will, by definition, be the total number of homogeneous segments considered valid by the ARTESP

technical team in the scope of the analysis of the Periodic Monitoring Reports of the pavement and of the SGP updates and projections. The segment will not be considered in this total when, for a fair reason and recognized by the Agency's technicians, it has been dismissed\* from the survey (example: segment actually under construction when field surveys are carried out).

Eventually, if there are data from previous surveys valid for the dismissed segment, the values for the last valid survey should be considered.

**Illustrative** figure to exemplify the delimitation of the segment to be evaluated / inspected for calculating the ICCP between km 1 and 2 of a road:



1: Specific road rules, according to ANNEX 6, without prejudice to those that came after them:

- DNER PRO-159/85 - Restoration Project for Flexible and Semi-Rigid Pavements, chapters referring to the procedures for assessing irregularities.
- DNER PRO-164/94 - Calibration and Control of Pavement Surface Irregularity Measuring Systems (Integrating Systems IPR / USP and Maysmeter). The calibration stretches must be approved by ARTESP.
- DNER ES-173/86 - Level and Sight Method for Calibration of Response Type Irregularity Metering Systems.



- DNER PRO-182/94 - Measurement of Pavement Surface Irregularities with Integrating Systems IPR / USP and Maysmeter.

Rodoanel Norte - parcerias@sp.gov.br - Christine Munhoz - Subsecretaria de Parcerias - 8/15/2022 6:49:17 PM - 201.55.53.80



Indicator	1.3	Pavement Safety Conditions Indicator (ICSP)		
Frequency	Monthly		Data Source	On-site survey / SGP / Report delivered by CONCESSIONAIRE
Composition	Macrotexture (HS *) and Friction Coefficient (VRD ** or GN *** and IFI ****) values of the segments.			

## Description

To determine the safety conditions of the pavement, methods and equipment for measuring texture and slip resistance will be used, as specified in ANNEX 6 - Description and Standards of Services.

The value to be considered for each condition analyzed will be the average of the measurement values in the kilometer.

For measurement, the road will be divided longitudinally into segments of 1km (one kilometer), according to the description and details established in ANNEX 6 - Minimum parameters required. The segment will be considered “compliant” if it meets the criteria established in the column “Segment is compliant if”. Likewise, the segment will be considered “non-compliant” if it does not meet this same criterion.

Indicator formula:	Performance tracks	Score	Evaluation method - According to ANNEX 6
			Segment is compliant if:
$\frac{\text{No. of compliant segments}}{\text{Total number of segments considered in the Lot for evaluation}} \times 100$	ICSP $\geq$ 95%	1	<ul style="list-style-type: none"> <li>0.6mm &lt; HS &lt; 1.2mm</li> <li>Skid resistance value measured by British Pendulum test = VRD &gt; 55 or Skid resistance value measured by Grip Tester equipment = GN &gt; 0.42</li> <li>IFI <math>\geq</math> 0.22 for new road works</li> <li>IFI <math>\geq</math> 0.15 for restored pavements</li> </ul> <p>All conditions must be met for the segment to be considered compliant.</p> <p>Note: for the segments in which the VRD, GN and IFI indexes are not measured (considering that the verification of these indexes is sample), only the HS index criterion will be considered.</p>
	90% $\leq$ ICSP < 95%	0.8	
	85% $\leq$ ICSP < 90%	0.6	
	80% $\leq$ ICSP < 85%	0.4	
	ICSP < 80%	0	

## Observations and comments

\* HS: Sand Height, measured with surface scanning equipment (laser) and / or Sand Spot Test.

\*\* VRD: Skid resistance value measured by British Pendulum test.

\*\*\* GN: Skid resistance value measured by Grip Tester equipment.

\*\*\*\* IFI: International Friction Index.

After conducting the surveys, the CONCESSIONAIRE must update all results in the SGP and deliver to the ARTESP, by the 5th working day of the month, the Pavement Monitoring Report, considering a maximum lag between the survey in the field and the delivery / data update up to 45 days, as described in ANNEX 6. The INDICATOR may be analyzed, as described above in this form, from the Report delivered by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification carried out by the CONCESSIONAIRE. The Report must be sufficient for the calculation of this INDICATOR.

As described in ANNEX 6, the full survey of the safety conditions of the pavement must occur on the entire road at least once a year, in the first 20 years of the CONTRACT, and once a semester, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 1 year after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the comfort conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another year will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 6 months. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

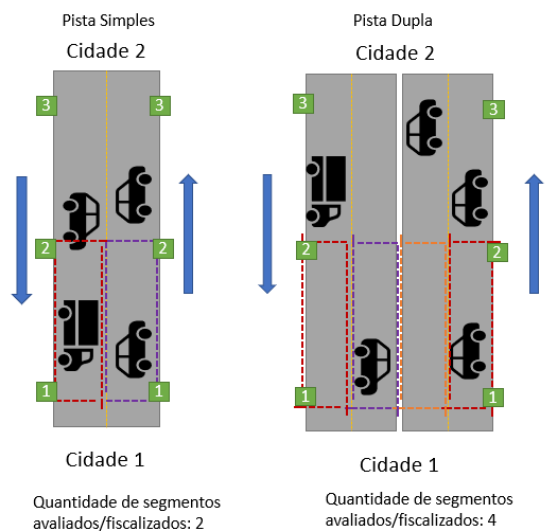
For the purpose of monitoring and calculating the INDICATOR, as it has a monthly periodicity, in the first months after the beginning of the Second Monitoring Phase of the Performance Indicators (according to the ANNEX 3 guidelines), and preceding the first scheduled survey of the safety conditions of the pavement in the period, the values considered for the measurements of the ICSP will be those presented in the "IP Completion Report (Pavement)", for the ROAD SYSTEM.

If the CONCESSIONAIRE feels the need to carry out other surveys in the field in addition to those already required and planned, in order to try to improve its score in the INDICATOR, for example, it may perform them in the segments where they are necessary, provided that it informs ARTESP on the procedure, to update the SGP with the new data collected and to send the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the maximum deadline for the data lag (45 days, observing the exceptions provided for in ANNEX 3). Eventual parameter updates will be considered only in evaluations of periods after the delivery of the data, that is, previously calculated indicators will not be changed.

The 'Total number of segments considered in the Lot for evaluation' will, by definition, be the total number of homogeneous segments considered valid by the ARTESP technical team in the scope of the analysis of the reports of the periodic monitoring of the pavement and of the updates and projections of the SGP. The segment will not be considered in this total when, for a fair reason and recognized by the Agency's technicians, it has been dispensed \* from the survey (example: segment actually under construction when field surveys are carried out).

Eventually, if there are data from previous surveys valid for the dismissed segment, the values for the last valid survey should be considered.

**Illustrative** figure to exemplify the delimitation of the segment to be evaluated / inspected for calculating the ICSP between km 1 and 2 of a road:



Indicator	1.4	Pavement Surface Conditions Indicator (ICSPP)		
Frequency	Monthly		Data Source	On-site survey / SGP / Report delivered by CONCESSIONAIRE
Composition	Calculated values of GGI * / PCI ** / URCI *** for the segments.			

## Description

For the determination of the surface conditions of the pavement, methods and equipment will be used in compliance with the procedures described in ANNEX 6 - Description and Standards of Services and the specifications of the Current Road Rules 1. and / or that come to succeed them.

The value to be considered for each condition analyzed will be the average of the measurement values in the kilometer.

For verification, the road (including the shoulder) will be divided longitudinally into segments of 1km (one kilometer) according to the description and details set out in ANNEX 6 - Minimum parameters required. The segment will be considered “compliant” if it meets the criteria established in the column “Segment is compliant if”.

Likewise, the segment will be considered “non-compliant” if it does not meet this same criterion.

Indicator formula:	Performance tracks	Score	Evaluation method - According to ANNEX 6	
			Pavement type	Segment is compliant if:
$\frac{\text{No. of compliant segments}}{\text{Total number of segments considered in the Lot for evaluation}} \times 100$	ICSPP $\geq$ 95%	1	Flexible and semi-rigid pavements ****	GGI $\leq$ 30 *****
	90% $\leq$ ICSPP < 95%	0.8		
	85% $\leq$ ICSPP < 90%	0.6	Portland Cement Concrete Paving	PCI $\geq$ 75 *****
	80% $\leq$ ICSPP < 85%	0.4		
	ICSPP < 80%	0	Dirt roads or primary coating	URCI $\geq$ 75

## Observations and comments

\* GGI: Global Severity Index.

\*\* PCI: Pavement Condition Index.

\*\*\* URCI: Unsurfaced Road Condition Index.

\*\*\*\* For the Existing System, after the completion of the implementation of all investments and services included in the PII until the first intervention programmed in the system, the segment will be in accordance with  $GGI \leq 40$ . After the first programmed intervention in the existing system, the GGI parameter  $\leq 30$  must be considered.

\*\*\*\*\* After the completion of the works of the first special conservation cycle, the pavement, including shoulders and safety strips, must present  $GGI \leq 5$  in the case of asphalt pavements,  $PCI \geq 75$  in the case of Portland Cement Concrete pavements.

After conducting the surveys, the CONCESSIONAIRE must update all results in the SGP and deliver to the ARTESP, by the 5th working day of the month, the Pavement Monitoring Report, considering a maximum lag between the survey in the field and the delivery / data update up to 45 days, as described in ANNEX 6. The INDICATOR may be analyzed, as described above in this form, from the Report delivered by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification carried out by the CONCESSIONAIRE. The Report must be sufficient for the calculation of this INDICATOR.

As described in ANNEX 6, the full survey of the surface conditions of the pavement must occur at least once a semester, in the first 20 years of the CONTRACT, and once a quarter, from the 21st year onwards. The data collection and delivery period must be counted from the date that marks the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines). Therefore, 6 months after the date that marks the beginning of the commercial operation of the GANTRIES, the CONCESSIONAIRE must submit to ARTESP all data relating to the surface conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP, another 6 months will be counted, this being the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of the CONTRACT. From the 21st year onwards, the period between data submissions should be 3 months. For the ROAD SYSTEM, the surveys will start to be carried out according to the ANNEX 3 guidelines.

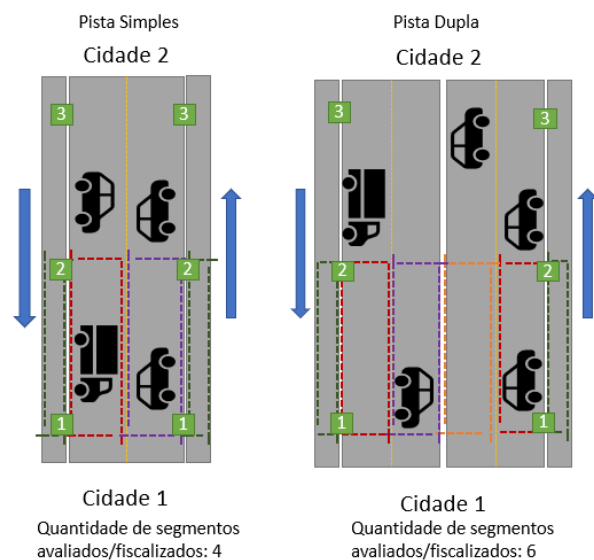
For the purpose of monitoring and calculating the INDICATOR, as it has a monthly periodicity, in the first months after the beginning of the Second Monitoring Phase of the PERFORMANCE INDICATORS (according to the ANNEX 3 guidelines), and preceding the first scheduled survey of the surface conditions of the pavement in the period, the values considered for the measurements of the ICSP will be those presented in the "IP Completion Report (Pavement)" for the ROAD SYSTEM.

If the CONCESSIONAIRE feels the need to carry out other surveys in the field in addition to those already required and planned, in order to try to improve its score in the INDICATOR, for example, it can perform them in the segments where they are necessary, provided that it informs ARTESP about the procedure, to update the SGP with the new data collected and to send the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the maximum period for the data lag (45 days, subject to the exceptions provided for in ANNEX 3). Eventual parameter updates will be considered only in evaluations of periods after the delivery of the data, that is, previously calculated indicators will not be changed.

The 'Total number of segments considered in the Lot for evaluation' will, by definition, be the total number of homogeneous segments considered valid by the ARTESP technical team in the scope of the analysis of the reports of the periodic monitoring of the pavement and of the updates and projections of the SGP. The segment will not be considered in this total when, for a fair reason and recognized by the Agency's technicians, it has been dismissed\* from the survey (example: segment actually under construction when field surveys are carried out).

Eventually, if there are data from previous surveys valid for the dismissed segment, the values for the last valid survey should be considered.

**Illustrative** figure to exemplify the delimitation of the segment to be evaluated / inspected for the calculation of the ICSPP between km 1 and 2 of a road:



1: Specific road rules, according to ANNEX 6, item 3.2, without prejudice to those that follow them:

- DNIT 006/2003-PRO - "Objective assessment of the surface of flexible and semi-rigid pavements".
- DNIT 062/2004-PRO - "Rigid Pavement - Objective Evaluation".
- DNIT 007/2003-PRO - "Survey to assess the surface condition of a homogeneous subset of flexible and semi-rigid pavement roads for pavement management and studies and projects".
- Rigid Pavement Manual - DNIT 2005 for Portland cement concrete pavements of Tolls, Scales, Special Works of Art, Tracks, Shoulders, Accesses and Margins.
- USDA TM 5-626 / 1995 - "Unsurfaced Road Maintenance Management" for dirt roads or primary coating within the boundaries of the RIGHT-OF-WAY of the system's highways



Indicator	2.1.	Winch Service Arrival Time Indicator (ITCSG)		
Frequency	Monthly		Data Source	MITS System - B.I / Local or Remote Verification
Composition	All times of arrival of the winch service to the place of service in the month.			

## Description

All arrival times referring to the calls made by the Winch service in the month are ascertained as follows:

1. The events foreseen in the TENDER NOTICE and in the Technical Specifications will be purged;
2. The remaining events of the month will be sorted by service time in an increasing way;
3. From the previously ordered group, a subgroup, called subgroup 01, will be separated, containing the 90% shorter arrival times;
4. Then, the analysis of subgroup 01 should be performed, counting all occurrences that exceed 30 minutes. These occurrences will be called Surpluses;
5. Check the proportion of Surpluses in relation to the total number of services performed, as detailed below:

Formula	Performance tracks	Score
$\frac{\text{Surplus Quantity}}{\text{Total number of winch calls made in the month}} \times 100$	ITCSG = 0%	1
	0% < ITCSG ≤ 0.5%	0.5
	0.5% < ITCSG ≤ 1%	0.4
	1% < ITCSG ≤ 3%	0.3
	ITCSG > 3% >	0

## Observations and comments

For each registered single call, the start date and time, which corresponds to the activation of the service by the user, and the service time, which corresponds to the time of arrival of the vehicle for service to the user, must be accounted for at a minimum. From the Telecommunications and Monitoring / Geopositioning Systems integrated between OCC, users, operational vehicles and ARTESP, it will be possible to open calls by users (and share their location, if the application is used to activate services), the mobilization of the vehicle by the OCC and monitoring of the vehicle path by all parties (ARTESP, OCC and user - if the call was opened by the application). For calls that have been opened by other means, the same data related to the service must be registered and accounted for by the OCC. All data must be shared in real time with ARTESP according to the ANNEX 5 guidelines.

In order to calculate the INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the



extract of all registered calls and with a deadline between 00:00:00 hrs on the first day of the month and 23 : 59: 59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.  
The CONCESSIONAIRE must also send to ARTESP, by the 5th (fifth) working day of the month following the one analyzed, a report containing the same data related to the times of the services performed in the month. This report may be used by the ARTESP Team for verification.

Indicator	2.2	Mechanical Relief Service Arrival Time Indicator (ITCSM)		
Frequency	Monthly		Data Source	MITS System - B.I / Local or Remote Verification
Composition	All times of arrival of the Mechanical Relief service to the place of service in the month.			

## Description

All arrival times referring to the services performed by the Mechanical Relief service in the month are ascertained as follows:

1. The events foreseen in the REQUEST FOR BIDS and in the Technical Specifications will be purged;
2. The remaining events of the month will be sorted by service time in an crescent way;
3. From the previously ordered group, a subgroup, called subgroup 01, will be separated, containing the 90% shorter arrival times;
4. Then, the analysis of subgroup 01 should be performed, counting all occurrences that exceed 30 minutes. These occurrences will be called Surpluses.
5. Check the proportion of Surpluses in relation to the total number of services performed, as detailed below:

Formula	Performance tracks	Score
$\frac{\text{Surplus Quantity}}{\text{Number of Mechanical Relif services performed in the month}} \times 100$	ITCSM = 0%	1
	$0\% < \text{ITCSM} \leq 0.5\%$	0.5
	$0.5\% < \text{ITCSM} \leq 1\%$	0.4
	$1\% < \text{ITCSM} \leq 3\%$	0.3
	$\text{ITCSM} > 3\%$	0

## Observations and comments

For each registered single call, the start date and time, which corresponds to the activation of the service by the user, and the service time, which corresponds to the time of arrival of the vehicle to attend to the USER, must be mandatorily counted. From the Telecommunications and Monitoring / Geopositioning Systems integrated between OCC, USERS, operational vehicles and ARTESP, it will be possible to open calls by users (and share their location, if the application is used to activate the services), the mobilization of the vehicle by the OCC and monitoring of the vehicle path by all parties (ARTESP, OCC and user - if the call was opened by the application). For calls that have been opened by other means, the same data related to the service must be registered and accounted for by the OCC. All data must be shared in real time with ARTESP according to the ANNEX 5 guidelines.

In order to calculate the INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all registered calls and with a deadline between 00:00:00 hrs on the first day of the month and 23:59:59 hrs on the last day of the month. This report may be

supplemented by data obtained through local or remote inspection activities, when available.

The CONCESSIONAIRE must also send to ARTESP, by the 5th (fifth) working day of the month following the one analyzed, a report containing the same data related to the times of the services performed in the month. This report may be used by the ARTESP Team for verification.

Indicator	2.3	Pre-Hospital Care Arrival Time Indicator (ITCSAPH)		
Frequency	Monthly		Data Source	MITS System - B.I / Local or Remote Verification
Composition	All times of arrival of the Pre-Hospital Service to the place of service in the month.			

## Description

All arrival times referring to the visits made by the Pre-Hospital Service (PHC) in the month are ascertained as follows:

1. The events foreseen in the REQUEST FOR BIDS and in the Technical Specifications will be purged;
2. The remaining events of the month will be sorted by service time in an increasing way;
3. From the previously ordered group, a subgroup, called subgroup 01, will be separated, containing the 90% shorter arrival times;
4. Then, the analysis of subgroup 01 should be performed, counting all occurrences that exceed 10 minutes. These occurrences will be called Surpluses.
5. Check the proportion of Surpluses in relation to the total number of services performed, as detailed below:

Formula	Performance range	Score
$\frac{\text{Surplus Quantity}}{\text{Total number of APH visits performed in the month}} \times 100$	ITCSAPH = 0%	1
	0% < ITCSAPH ≤ 0.5%	0.5
	0.5% < ITCSAPH ≤ 1%	0.4
	1% < ITCSAPH ≤ 3%	0.3
	ITCSAPH > 3% >	0

## Observations and comments

For each registered single call, the start date and time, which corresponds to the activation of the service by the user, and the service time, which corresponds to the time of arrival of the vehicle for service to the user, must be accounted for at a minimum. From the Telecommunications and Monitoring / Geopositioning Systems integrated between OCC, users, operational vehicles and ARTESP, it will be possible to open calls by users (and share their location, if the application is used to activate services), the mobilization of the vehicle by the OCC and monitoring of the vehicle path by all parties (ARTESP, OCC and user - if the call was opened by the application). For calls that have been opened by other means, the same data related to the service must be registered and accounted for by the OCC. All data must be shared in real time with ARTESP according to the ANNEX 5 guidelines.

In order to calculate the INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all registered calls and with a deadline between 00:00:00 hrs on the first day of the month and 23:59:59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

The CONCESSIONAIRE must also send to ARTESP, by the 5th (fifth) working day of the month following the one analyzed, a report containing the same data related to the times of the services performed in the month. This report may be used by the ARTESP Team for verification.

Indicator	3.1	Socioenvironmental Indicator: Recovery from Environmental non-compliance (SAI)	
Frequency	Monthly	Data Source	Local verification
Composition	Recoveries performed for Environmental non-compliance in the month.		

## Description

It is observed the timely recovery of environmental non-compliance that occurred in the month, such as, for example: non-compliance of constructions, environment, among others, as described in ANNEX 6. The verification of such INDICATOR is done *in loco* throughout the route.

Formula:	Performance range	Score
$\frac{\text{No. of recoveries performed in the month}}{\text{Qty. of environmental non-conformities scheduled for execution}} \times 100$ <p>(*) The term "environmental non-compliance scheduled for execution in the month" includes all those originally scheduled for the month (maturity), <u>plus those accumulated</u> due to possible delays or non-compliance with deadlines established for previous months.</p>	SAI $\geq$ 70%	1
	60% $\leq$ SAI < 70%	0.75
	50% $\leq$ SAI < 60%	0.5
	SAI < 50%	0

## Observations and comments

For the verification of this INDICATOR, monthly *on-site* checks will be carried out by the Support Teams and / or by ARTESP technicians, in each and every segment of the extension granted. Non-compliance will be identified from the visits, and forwarded to the CONCESSIONAIRE and ARTESP. The deadline for resolving each identified environmental non-compliance will be established in the ARTESP Environmental Performance Assessment (EPA) document, with a maximum period of 15 days or another period agreed between the parties, according to the guidelines established in ANNEX 6. The conditions to determine the conclusion of the treatment of non-compliance involve the sending of evidences of repair by the CONCESSIONAIRE to ARTESP and / or other forms established by ARTESP, such as local visits if deemed necessary. For ISA calculation, in the second week of the month following the month analyzed, the descriptions set out in this sheet will be followed. Specifically for the calculation of the Socio-Environmental Indicator, non-compliance identified as In Recovery (ER and CV) will be considered as Recovered Executed. However, if they return to the status of Not Recovered in other periods, they will be included in the formula denominator.

Examples of Environmental non-compliance, according to the ARTESP Environmental Performance Assessment (EPA) document:

- Non-compliance of works (examples: noise, atmospheric emissions, constructions signaling, erosion, slipping, silting and liquid effluents);
- Non-compliance of the environment (examples: silting, erosion, landslides, absence of vegetation cover and soil contamination);

- Conservation non-compliance (examples: outbreaks of ants, termites and pests in general in the RIGHT-OF-WAY);
- Non-compliance of improper waste deposit in the RIGHT-OF-WAY;
- Non-compliance of inadequate management of milled material;
- Non-compliance with herbicide application.



Indicator	4.1.	Weighing System Operationality Indicator (IOSP)		
Frequency	Monthly		Data Source	Electronic systems - Telemetry system / Local or remote verification
Composition	Hours in which all equipment in the Precision Weighing System remained operational and total hours forecast in the month.			

## Description

The operation of the Precision Weighing System is measured by accounting for the hours of availability, in a given month, of the elements / equipment that make up the Precision Weighing System, according to the description and specifications in ANNEX 5. In cases where the request for the deactivation of some equipment is accepted, the hours that the equipment was deactivated will not be counted in the calculation base, from the moment of the request for deactivation by the CONCESSIONAIRE. In order to calculate the INDICATOR, the period of operation comprises the expected full time of operation in the month, regardless of the presence of the GRANTING POWER Agent at the inspection post (PGF).

Formula	Performance tracks	Score
$\frac{\text{Total number of hours the equipment was operational}}{\text{Total number of expected hours of operation in the month}} \times 100$	IOSP $\geq$ 98%	1
	IOSP $<$ 98%	0

## Observations and comments

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all the equipment that make up the Precision Weighing System, data that must be made available to ARTESP in real time according to the guidelines of the ANNEX 5. The operation of each module of the system, as well as its composition and specifications, must follow the description in ANNEX 5.

For the INDICATOR calculation, in the second week of the month following the month analyzed, a report containing the extract of the entire operation of the Weighing System will be extracted from ARTESP systems between 00:00:00 hrs on the 1st day of the month and 23:59: 59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

Operational equipment is defined, for the purposes of calculating this INDICATOR, the full and simultaneous attendance of all the functional requirements established for that, according to the specifications of ANNEX 5.

Indicator	5.1	Routine Conservation Programs Compliance Indicator (ICPCR)		
Frequency	Monthly		Data Source	Local verification / SIGECON
Composition	Formed by 7 Routine Conservation Indexes that comprises the following programs: Pavement, Right-of-Way, Drainage, Road Containment Devices, Structures, Buildings and Patios and Lighting.			

#### Description - Pavement Routine Conservation Index (ICRP)

The CONCESSIONAIRE must comply with all activities described in ANNEX 6, "Pavement" program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered a "non-compliance" for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a "non-compliance", even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the "non-compliance", within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the "non-compliance" found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered "compliant" if it meets the criteria established in the column "The segment is compliant if". Likewise, the segment will be considered "non-compliant" if it does not meet this same criterion. Furthermore, if, in addition to being considered "non-compliant", the segment reaches the criterion established in the column "an aggravating factor will be applied if", a unit will be deducted from the "total of compliant segments" (formula numerator).

Formula: Pavement Routine Conservation Index (ICRP)	Performance tracks	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRP $\geq$ 99%	1	No. of non-compliance by segment $< 3$	No. of non-compliance per segment $\geq 6$
	98% $\leq$ ICRP $<$ 99%	0.8		
	97% $\leq$ ICRP $<$ 98%	0.6		
	96% $\leq$ ICRP $<$ 97%	0.4		
	ICRP $<$ 96%	0		

**Description - Right-of-Way Routine Conservation Index (ICRFD)**

The CONCESSIONAIRE must carry out all the activities described in ANNEX 6, "Right-of-Way" program, in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a "non-compliance" for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a "non-compliance", even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the "non-compliance", within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the "non-compliance" found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered "compliant" if it meets the criteria established in the column "The segment is compliant if". Likewise, the segment will be considered "non-compliant" if it does not meet this same criterion. Furthermore, if, in addition to being considered "non-compliant", the segment reaches the criterion established in the column "an aggravating factor will be applied if", a unit will be deducted from the "total of compliant segments" (formula numerator).

Formula: Right-of-Way Routine Conservation Index (ICRFD)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRFD $\geq$ 99%	1	No. of non-compliance by segment $< 4$	No. of non-compliance per segment $\geq 8$
	98% $\leq$ ICRFD $<$ 99%	0.8		
	97% $\leq$ ICRFD $<$ 98%	0.6		
	96% $\leq$ ICRFD $<$ 97%	0.4		
	ICRFD $<$ 96%	0		

**Description - Drainage Routine Conservation Index (ICRD)**

The CONCESSIONAIRE must carry out all the activities described in ANNEX 6, "Drainage" program, in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a "non-compliance" for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a "non-compliance", even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the "non-compliance", within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the "non-compliance" found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered "compliant" if it meets the criteria established in the column "The segment is compliant if". Likewise, the segment will be considered "non-compliant" if it does not meet this same criterion. Furthermore, if, in addition to being considered "non-compliant", the segment reaches the criterion established in the column "an aggravating factor will be applied if", a unit will be deducted from the "total of compliant segments" (formula numerator).

Formula: Drainage Routine Conservation Index (ICRD)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRD $\geq$ 99%	1	Number of non-compliance by segment < 3	No. of non-compliance per segment $\geq$ 5
	98% $\leq$ ICRD < 99%	0.8		
	97% $\leq$ ICRD < 98%	0.6		
	96% $\leq$ ICRD < 97%	0.4		
	ICRD < 96%	0		

**Description - Routine Conservation Index of Road Containment Devices (ICRDCV)**

The CONCESSIONAIRE must carry out all the activities described in ANNEX 6, program "Road containment devices", in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a "non-compliance" for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a "non-compliance", even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the "non-compliance", within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the "non-compliance" found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered "compliant" if it meets the criteria established in the column "The segment is compliant if". Likewise, the segment will be considered "non-compliant" if it does not meet this same criterion. Furthermore, if, in addition to being considered "non-compliant", the segment reaches the criterion established in the column "an aggravating factor will be applied if", a unit will be deducted from the "total of compliant segments" (formula numerator).

Formula: Routine Conservation Index of Road Containment Devices (ICRDCV)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRDCV $\geq$ 99%	1	No. of non-conformities per segment = 0	No. of non-conformities per segment $\geq$ 2
	98% $\leq$ ICRDCV < 99%	0.8		
	97% $\leq$ ICRDCV < 98%	0.6		
	96% $\leq$ ICRDCV < 97%	0.4		
	ICRDCV < 96%	0		

**Description - Routine Conservation Index of Structures (ICRE)**

The CONCESSIONAIRE must comply with all the activities described in ANNEX 6, program "Structures" and Technical Specification of ARTESP ET-00.000.000-0-C21 / 002, in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a "non-compliance" for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a "non-compliance", even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the "non-compliance", within or outside the period established in the corresponding item. The

entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the “non-compliance” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered “compliant” if it meets the criteria established in the column “The segment is compliant if”. Likewise, the segment will be considered “non-compliant” if it does not meet this same criterion. Furthermore, if, in addition to being considered “non-compliant”, the segment reaches the criterion established in the column “an aggravating factor will be applied if”, a unit will be deducted from the “total of compliant segments” (formula numerator).

Formula: Routine Conservation Index of Structures (ICRE)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRE $\geq$ 99%	1	No. of non-conformities by segment $< 2$	No. of non-conformities per segment $\geq 3$
	98% $\leq$ ICRE $<$ 99%	0.8		
	97% $\leq$ ICRE $<$ 98%	0.6		
	96% $\leq$ ICRE $<$ 97%	0.4		
	ICRE $<$ 96%	0		

#### Description - Buildings and Patios Routine Conservation Index (ICRPP)

The CONCESSIONAIRE must carry out all the activities described in ANNEX 6, “Drainage” program, in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a “non-compliance” for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a “non-compliance”, even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the “non-compliance”, within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the “non-compliance” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field.



In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered “compliant” if it meets the criteria established in the column “The segment is compliant if”. Likewise, the segment will be considered “non-compliant” if it does not meet this same criterion. Furthermore, if, in addition to being considered “non-compliant”, the segment reaches the criterion established in the column “an aggravating factor will be applied if”, a unit will be deducted from the “total of compliant segments” (formula numerator).

Formula: Routine Conservation Index for Buildings and Patios (ICRPP)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRPP $\geq$ 99%	1	No. of non-conformities by segment < 5	No. of non-conformities per segment $\geq$ 10
	98% $\leq$ ICRPP < 99%	0.8		
	97% $\leq$ ICRPP < 98%	0.6		
	96% $\leq$ ICRPP < 97%	0.4		
	ICRPP < 96%	0		

#### Description - Lighting Routine Conservation Index (ICRI)

The CONCESSIONAIRE must carry out all the activities described in ANNEX 6, “Lighting” program, in order to guarantee the quality and conservation of the asset. Any lack of service with any of these activities will be considered a “non-compliance” for the purposes of calculating the ICRP. It is worth mentioning that the mere finding of a “non-compliance”, even though it is a programmable item, will be sufficient to account for the calculation of this index, regardless of regularization / correction / repair of the “non-compliance”, within or outside the period established in the corresponding item. The entire route granted, as well as the other areas and structures within the RIGHT-OF-WAY, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The information collected in these checks will be verified monthly.

For the purpose of allocating the “non-compliance” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the mileposts, and transversely by the RIGHT-OF-WAY. Findings in the central areas, where they exist, will be allocated in the follow-up corresponding to the inspector's finding in the field. In the eventual situation in which a stretch starts or ends between two mileposts, but not exactly in them, the stretch that composes the segment in question will have an extension of less than 1 km.

The segment will be considered “compliant” if it meets the criteria established in the column “The segment is compliant if”. Likewise, the segment will be considered “non-



compliant” if it does not meet this same criterion. Furthermore, if, in addition to being considered “non-compliant”, the segment reaches the criterion established in the column “an aggravating factor will be applied if”, a unit will be deducted from the “total of compliant segments” (formula numerator).

Formula: Lighting Routine Conservation Index (ICRI)	Performance range	Score	Forms of assessment	
			The segment is compliant if	An aggravating factor will be applied if
$\frac{\text{Number of compliant segments}}{\text{Total number of inspected segments}} \times 100$	ICRI ≥ 99%	1	No. of non-conformities per segment = 0	No. of non-conformities per segment ≥ 2
	98% ≤ ICRI < 99%	0.8		
	97% ≤ ICRI < 98%	0.6		
	96% ≤ ICRI < 97%	0.4		
	ICRI < 96%	0		

Formula: Routine Conservation Programs Compliance Indicator (ICPCR)

$$\begin{aligned}
 \text{Final Score}_{ICPCR} = & (\text{Weight}_{ICRP} \times \text{Performance Score}_{ICRP}) + (\text{Weight}_{ICRFD} \times \text{Performance Score}_{ICRFD}) + (\text{Weight}_{ICRD} \times \text{Performance Score}_{ICRD}) \\
 & + (\text{Weight}_{ICRDCV} \times \text{Performance Score}_{ICRDCV}) + (\text{Weight}_{ICRE} \times \text{Performance Score}_{ICRE}) \\
 & + (\text{Weight}_{ICRPP} \times \text{Performance Score}_{ICRPP}) + (\text{Weight}_{ICRI} \times \text{Performance Score}_{ICRI})
 \end{aligned}$$

For purposes of calculating the ICPCR, the indexes have the following weights:

- $\text{Weight}_{ICRP} = 0,45$
- $\text{Weight}_{ICRFD} = 0,20$
- $\text{Weight}_{ICRD} = 0,10$
- $\text{Weight}_{ICRDCV} = 0,05$
- $\text{Weight}_{ICRE} = 0,05$
- $\text{Weight}_{ICRPP} = 0,05$
- $\text{Weight}_{ICRI} = 0,10$

#### Observations and comments

For the verification of this INDICATOR, local checks may be carried out by ARTESP Support Companies and / or technicians in all segments of the extension granted, in both directions, as well as the other areas and structures within the RIGHT-OF-WAY. Non-compliances refer to lack of service with any activity related to the indicated programs, as described in ANNEX 6 and sub-items. In this case, the verification of non-conformity during the checks is counted in each index, even though it is a programmable item, regardless of the repair / correction time that is established in ANNEX 6.

Each distinct non-conformity found during the checks must be evidenced with photos and, then, all will be stored and managed through the Integrated System of Digital Management of Conservation Functions (SIGECON)

To calculate the INDICATOR, in the second week of the month following the month analyzed, a report from SIGECON will be extracted by ARTESP containing the extract of all non-conformities registered in each analysis segment between 00:00:00 h on the 1st day of the month and 23:59:59 h on the last day of the month. The extracted report must be sufficient for the calculation of the indexes and the indicator, as detailed in this form. This report may be supplemented by data obtained through local or remote inspection activities, when available. The Support Companies will send ARTESP a report with the results of the field checks for the calculation of the INDICATOR.

For cases of non-compliant segments that have the number of distinct non-conformities identified in the surveys carried out in the month, equal to or greater than the value indicated in the column “An aggravating factor will be applied if” for each index evaluated, there will be a deduction of one unit for each segment in the total of compliant segments. If, for example, at the end of the analysis it was found that in a universe of 100 segments, 90 of them are compliant and 10 are non-compliant, 3 of them with the number of non-compliances equal to the largest stipulated in the column “An aggravating factor will be incurred if”, the number of compliant segments that should be considered for calculation is 87.

#### Notes

- (1) The term "distinct non-conformities" characterizes all those non-conformities that are not identical, that is, of different nature and location. As an example, in this definition, the same hole verified 2 (two) times in the same segment, cannot be counted twice for the purposes of measuring the INDICATOR. However, if the same segment has two distinct holes, both must be counted.
- (2) The indexes provided for in this INDICATOR will only be considered valid when, at least, 35 (thirty-five) segments of the road have been inspected. If a given index is considered invalid, its weight must be redistributed among the others, maintaining the proportionality originally foreseen.

Indicator	6.1	Intervention Delay Time Indicator (ITAFI)		
Frequency	Monthly		Data Source	PISR / Report delivered by the CONCESSIONAIRE
Composition	Composed of Delay Time Indexes due to Interventions, by homogeneous segment.			

**Description: Time Delay Index due to Interventions (by homogeneous segment) (ITAFIPI)**

The travel time of vehicles in homogeneous segments should be measured through the use of technologies (systems, cameras, wifi, among others) that allow the measurement of this data. It will be used to calculate and verify the characteristic delay time caused by the set of interventions within the stretch. This information must be sent in the form of a monthly report prepared by the CONCESSIONAIRE and will be compared with the estimates provided for in the Road System Intervention Plan (PISR), delivered by the CONCESSIONAIRE to ARTESP, according to the guidelines in ANNEX 5. A performance score will be established for each segment and, subsequently, an average of the scores of the segments will be made with interventions for the final INDICATOR, as described below. The technology chosen by the CONCESSIONAIRE to measure interventions in time must be auditable and previously validated by ARTESP.

Description: Time Delay Index due to Interventions (by homogeneous segment) (ITAFIPI)		Performance tracks	Score
<i>Delay predicted in the PISR / Delay measured in the field</i>  (*) The delay of the INDICATOR corresponds to the arithmetic average, during the period of interventions in the homogeneous segment, of the delays in one hour. (**) If interventions are observed within a homogeneous segment that were not observed in the PISR, the score for the homogeneous segment will automatically be zero.		ITAFIPI $\geq$ 95%	1
		90% $\leq$ ITAFIPI < 95%	0.8
		85% $\leq$ ITAFIPI < 90%	0.6
		80% $\leq$ ITAFIPI < 85%	0.4
		ITAFIPI < 80%	0

## Formula: Intervention Delay Indicator (ITAFI)

$$Final\ Score_{ITAFI} = \frac{\sum_n Scores\ ITAFIPI}{n}$$

Where:

n = Number of homogeneous segments under road intervention.

## Observations and comments

The segment with similar physical and operational characteristics in its extension is defined as a homogeneous segment, which must be defined by the CONCESSIONAIRE and approved by ARTESP.

For each homogeneous segment, the CONCESSIONAIRE must use a technology (cameras, wifi, systems, among others) at specific points before and after, to be determined by the CONCESSIONAIRE and approved by ARTESP, which are able to measure the average travel time within the homogeneous segment.

The travel time of the vehicles traveling the stretch must be counted and these data must be stored in a database to check the delay time and compare with the estimated in the PISR. This database must be made available to ARTESP.

To calculate the INDICATOR, by the 5th business day of the month following the month analyzed, ARTESP must receive from the CONCESSIONAIRE a report containing the extract of all the travel times recorded by the cameras on the stretch, between 00:00:00 hrs of the 1st day of the month and 23:59:59 hrs on the last day of the month. The report must compile the data for each homogeneous segment and generate enough information for the calculation of this INDICATOR as detailed in this sheet. The report delivered by the CONCESSIONAIRE may be supplemented by data obtained through local or remote inspection activities, when available.

The technical analysis of whether or not the PISR plan is in charge of the ARTESP technical team. If there is no intervention governed by a PISR in the month of analysis, the INDICATOR will be maximum in the period.

## General notes:

(1) Works and interventions that are the subject of intervention plans - PISR:

Operation stop and follow on simple tracks;

Partial or total interdiction of traffic lanes and works within the RIGHT-OF-WAY that affect the service level.

(2) The hours during which there was interference in the exclusive operation by PMRv must be purged.

Indicator	7.1	Vertical Signaling Integrity and Conservation Indicator (IICSV)		
Frequency	Monthly		Data Source	Local verification / license plate registration
Composition	Availability of the vertical signs provided under conditions suitable for the operation of the roads granted.			

## Description

It will be verified by means of visual inspection and / or retroreflectance measurement, carried out in the field, the conservation status of the vertical signaling in all roads in relation to the total number of plates registered in the system according to the updated registration (number of plates unavailable). Plates in the granted section that do not comply with current technical specifications, standards and manuals, as detailed in ANNEX 6 and, program "Signaling and Auxiliary Devices", will be considered as unavailable plates in the month granted. Any non-compliance with any of these specifications / activities will be considered as a "non-compliance" and unavailability of the signaling for the purpose of calculating the IICSV. It should be noted that the mere finding during field checks of a "non-compliance" will be sufficient to account for the availability of plaques in the calculation of this INDICATOR, regardless of regularization / correction / repair of the "non-conformity", within or outside the period established in the corresponding item. For the composition of this INDICATOR, all types of vertical, regulatory, warning, educational, institutional and indication signs will be considered, as well as auxiliary devices such as danger and alignment markers.

Formula:	Performance tracks	Score
$IICSV = \frac{\text{Number of plates available throughout the month}}{\text{Total qty. of system boards}} \times 100$ <p>= Total qty. system boards – No. of boards unavailable throughout the month</p>	IICSV ≥ 99%	1
	97% ≤ IICSV < 99%	0.8
	95% ≤ IICSV < 97%	0.6
	93% ≤ IICSV < 95%	0.4
	IICSV < 93%	0

\* If the CONCESSIONAIRE does not send the updated registration, according to guidelines established by ARTESP, the score in the INDICATOR will be 0.

#### Observations and comments

The CONCESSIONAIRE must comply with all routine conservation programs for vertical signaling and auxiliary signaling devices as described in ANNEX 6, in order to guarantee the quality and conservation of the asset in addition to being in compliance with technical specifications, standards, manuals, current notices for the section. Failure to comply with any of these standards characterizes the unavailability of signaling for the purpose of calculating the IICSV, regardless of the repair / correction time that is established for each item in ANNEX 6.

The entire route granted, in both directions, will be routinely evaluated by the Support Teams and / or by ARTESP technicians. The Support Companies will send ARTESP a report with the results of the field checks, for the calculation of the INDICATOR. The information collected in these checks will be verified monthly (*in the second week of the month following the month analyzed*), determining the sum of unavailable plates, and later the number of plates available throughout the month will be compared with the number of plates registered in the entire road system. The surveys will take place during the month of analysis.

It will be considered that the registration is updated when 100% of the plates existing in the ROAD SYSTEM are registered, after the expiration of the period established for its implantation. Until approval by the Agency of the Integrated Digital System for Road Inventory Registration - SIR, the total number of plates in the system will be verified through a list generated from the retroreflectance report of the vertical signal, which must be updated and sent monthly (until the third business day of the month following the month analyzed) to the DOP/GSS.



Indicator	7.2	Horizontal Signaling Integrity and Conservation Indicator (IICSH)	
Frequency	Monthly	Data Source	Local verification
Composition	Availability of the planned horizontal signage under conditions suitable for the operation of the granted roads.		

Description
<p>It will be verified by means of visual inspection and / or retro-reflective measurement, carried out in the field, the integrity of the horizontal signage considering aspects such as existence, accuracy, cleanliness and visibility of the paint and tacks, as described in ANNEX 6, "Signaling and Auxiliary Devices" program. Any lack of service with any of these activities will be considered a "non-compliance" for the purposes of calculating the IICSH. It should be noted that the mere finding during field checks of a "non compliance" will be sufficient to account for the conformity of the segments in the calculation of this INDICATOR, regardless of regularization / correction / repair of the "non compliance", within or outside the established deadline without corresponding item. For this INDICATOR, the availability of the analysis of the horizontal signaling and tacks will be considered in the entire road divided into segments of 1 km (one kilometer), delimited longitudinally by the mileposts. The segment will be considered compliant if it does not have any "non-compliant" related to horizontal signaling and tacks.</p>

Formula:	Performance tracks	Score
$IICSH = \frac{\text{Number of compliant segments in the month}}{\text{Total qty. of inspected segments} - \text{No. of "non-compliant" segments in the month}} \times 100$	IICSH $\geq$ 97%	1
	95% $\leq$ IICSH < 97%	0.8
	93% $\leq$ IICSH < 95%	0.6
	90% $\leq$ IICSH < 93%	0.4
	IICSH < 90%	0
Observations and comments		

The CONCESSIONAIRE must comply with all routine conservation programs for horizontal signage and tacks as described in ANNEX 6, in order to guarantee the quality and conservation of the asset. Failure to comply with any of the standards that may cause problems in the horizontal signaling of the road will be considered "non-compliances" for the purpose of calculating the IICSH, regardless of the repair / correction time that is established for each item in ANNEX 6. The entire route granted, in both directions, will be routinely evaluated by the Support Teams and/ or by ARTESP technicians. The Support Companies will send ARTESP a report with the results of

the field checks, for the calculation of the INDICATOR. The information collected in these checks will be verified monthly (in the second week of the month following the month analyzed). The surveys will take place during the month of analysis.

The roads will be divided into segments of 1 km (one kilometer), delimited longitudinally between milestones. It will be considered a non-compliant segment that has any “non-compliance” related to horizontal signage or tacks in the month under analysis, resulting in the deduction of one unit in the total of compliant segments (numerator of the formula).

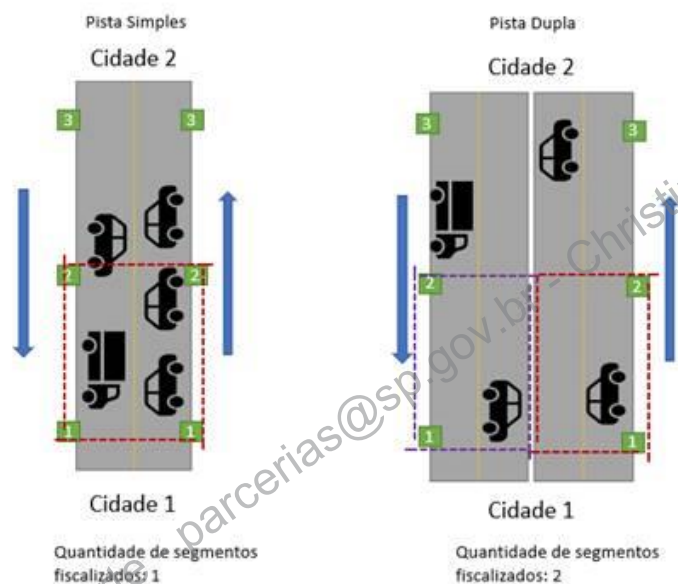
The number of segments will be calculated according to the formula below:

$$\text{Total qty. of inspected segments} = (1 \times \text{single lane extension} (*)) + (2 \times \text{double lane extension}) + \text{number of marginal lane segments (**)}$$

(\*) For the calculation of the total number of segments inspected above, a multi-lane lane is considered as a single lane road.

(\*\*) Marginal lanes are local transit routes that allow vehicles to travel parallel to the highway without having to enter it. Here, the presence of the marginal road in the segment will be considered, regardless of whether they are present on one side or both, and the directions.

**Illustrative** figure to exemplify the delimitation of the segment to be evaluated / inspected for calculating the IICSH between km 1 and 2 of a road:



**Note:** For the INDICATOR to be valid, at least 60% (sixty percent) of the ROAD SYSTEM segments must have been inspected. If not, the weight of the INDICATOR in question must be redistributed among the others, maintaining the proper proportionality.

Indicator	8.1	Fixed VMP Operability Indicator (IOPMV)		
Frequency	Monthly		Data Source	Electronic systems - Telemetry system / Local or remote verification
Composition	Hours in which all fixed VMP equipment in the Granted Road System remained operational and total hours forecast in the month.			

#### Description

The Operability of the Fixed Variable Message Panels System (VMP) is verified through the percentage of hours in which the equipment was operational in a given month, as described in ANNEX 5. In cases where the equipment deactivation request is accepted, the hours when the equipment was deactivated will not be counted in the calculation basis, from the moment of the deactivation request by the CONCESSIONAIRE until the moment foreseen for the equipment reactivation, in the terms of that request. In addition, the time in which (i) the equipment is inoperative and (ii) for which a sanctioning administrative process has been initiated by means of a notification to the CONCESSIONAIRE shall not be considered in the calculation basis.

Formula: PMV Operability Indicator (IOPMV)	Performance tracks	
	Binary Index	Score
$\frac{\text{Total number of hours the equipment was operational}}{\text{Total number of expected hours of operation in the month}} \times 100$	IOPMV $\geq$ 97%	1
	IOPMV < 97%	0

#### Observations and comments

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all the VMPs equipment installed in the road system, data that must be made available to ARTESP in real time according to the ANNEX 5 guidelines.

For the INDICATOR calculation, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all equipment functioning between 00:00:00 h on the 1st day of the month and 23:59:59 h on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

As it is not possible to identify all equipment failure events in the month, the value calculated for the INDICATOR represents a better case (or maximum value), that is, it is possible to show that the operability was not higher than the value represented by the INDICATOR.

Operational equipment is defined, for the purposes of calculating this INDICATOR, the full and simultaneous attendance of all the functional requirements established for

fixed VMP in the item corresponding to this type of equipment in ANNEX 5.

Indicator	8.2	CFTV Operability Indicator (IOCFTV)			
Frequency	Monthly		Data Source	Electronic systems - Telemetry system / Local or remote verification	
Composition	Hours when all the CFTV equipment of the ROAD SYSTEM remained operational and total hours foreseen in the month.				

#### Description

The operability of the CFTV System is verified through the percentage of hours in which the CFTV equipment was operational in a given month, as described in ANNEX 5. In cases where the equipment deactivation request is accepted, the hours that the equipment was deactivated will not be counted in the calculation basis, from the moment of the deactivation request by the CONCESSIONAIRE until the moment foreseen for reactivating the equipment, under said request. In addition, the time in which (i) the equipment is inoperative and (ii) for which a sanctioning administrative process has been initiated by means of a notification to the CONCESSIONAIRE shall not be considered in the calculation basis.

Formula: CFTV Operability Indicator (IOCFTV)	Performance tracks	
	Binary Index	Score
$\frac{\text{Total number of hours the equipment was operational}}{\text{Total number of expected hours of operation in the month}} \times 100$	IOCFTV $\geq$ 97%	1
	IOCFTV < 97%	0

#### Observations and comments

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all the CFTV equipment installed in the road system, which data must be made available to ARTESP in real time according to the ANNEX 5 guidelines.

For the INDICATOR calculation, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all equipment functioning between 00:00:00 hrs on the 1st day of the month and 23:59:59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

As it is not possible to identify all equipment failure events in the month, the value calculated for the INDICATOR represents a better case (or maximum value), that is, it is possible to show that the operability was not higher than the value represented by the INDICATOR.

Operational equipment is defined, for the purposes of calculating this INDICATOR, the full and simultaneous attendance of all functional requirements established for CFTV in the item corresponding to this type of equipment in ANNEX 5.

Indicator	8.3	Availability Compliance Indicator of the User Communication System via Wireless Data Network (ICDRD)		
Frequency	Monthly		Data Source	Electronic systems - Telemetry system / Local or remote verification
Composition	Hours in the month in which the User Communication System via Wireless Data Network proved to be in accordance with the contractual requirement of availability greater than or equal to 90%.			

## Description

The availability of the Communication System with the User via Wireless Data Network is verified every 01 (one) minute, by means of the percentage of Wireless Access Points that became operational, as described in ANNEX 5. In cases where the request for deactivation of the equipment is accepted, the equipment will not be considered in the availability calculations of the period corresponding to the deactivation, considering the period from the request for deactivation by the CONCESSIONAIRE until the moment foreseen for the reactivation of the equipment, under the terms of that request. In addition, the time in which (i) the equipment is inoperative and (ii) for which a sanctioning administrative process has been initiated by means of a notification to the CONCESSIONAIRE shall not be considered in the calculation basis.

From the availability data of each minute, the availability compliance is verified through the percentage of hours in which the System remained with availability greater than or equal to 90% (ninety percent).

Formula: Availability Compliance Indicator of the User Communication System with the Wireless Network (ICDRD)	Performance tracks	
	Binary Index	Score
$\frac{\sum \text{Hours in which the System remained with availability greater than or equal to 90\%}}{\sum \text{Expected valid hours for the month}}$	ICDRD $\geq$ 99.5%	1
	ICDRD < 99.5%	0

## Observations and comments

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all Wireless Access Points installed in the road system, data that must be made available to ARTESP in real time according to the guidelines of the ANNEX 5.

For the INDICATOR calculation, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all equipment functioning between 00:00:00 hrs on the 1st day of the month and 23:59:59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

As it is not possible to identify all equipment failure events in the month, the value calculated for the INDICATOR represents a better case (or maximum value), that is, it is possible to show that the operability was not higher than the value represented by the INDICATOR.

Operational equipment is defined, for the purposes of calculating this index, the full and simultaneous attendance of all the functional requirements established for the Access Point of the User Communication System via Wireless Data Network in the item corresponding to this type of equipment in ANNEX 5.



Indicator	8.4	Traffic Sensor Operationality Indicator - SAT (IOSAT)			
Frequency	Monthly			Data Source	Electronic systems - Telemetry system / Local or remote verification
Composition	Hours in which all SAT equipment in the Granted Road System remained operational and total hours forecast in the month.				

## Description

The operationality of the Traffic Sensing System is verified through the percentage of hours in which the SAT equipment were operational in a given month, as described in ANNEX 5. In cases where the equipment deactivation request is accepted, the hours that the equipment was deactivated will not be counted in the calculation basis, from the moment of the deactivation request by the CONCESSIONAIRE until the moment foreseen for reactivating the equipment, under said request. In addition, the time in which (i) the equipment is inoperative and (ii) for which a sanctioning administrative process has been initiated by means of a notification to the CONCESSIONAIRE shall not be considered in the calculation basis.

Formula: Traffic Sensor Data Availability Indicator - SAT (IOSAT)	Performance tracks	
	Binary Index	Score
$\frac{\text{Total number of hours the equipment was operational}}{\text{Total number of expected hours of operation in the month}} \times 100$	IOSAT $\geq$ 97%	1
	IOSAT < 97%	0

## Observations and comments

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all the traffic sensors - SAT installed in the road system, data that must be made available to ARTESP in real time according to the ANNEX 5 guidelines.

For the INDICATOR calculation, in the second week of the month following the month analyzed, a report will be extracted from ARTESP's systems containing the extract of all equipment functioning between 00:00:00 h on the 1st day of the month and 23:59:59 h on the last day of the month. This report may be supplemented by data obtained through local or remote inspection activities, when available.

As it is not possible to identify all equipment failure events in the month, the value calculated for the INDICATOR represents a better case (or maximum value), that is, it is possible to show that the operationality was not higher than the value represented by the INDICATOR.

Operational equipment is defined, for the purposes of calculating this INDICATOR, the simultaneous attendance of all functional requirements established for SAT in the item corresponding to this type of equipment in ANNEX 5.