Appendix II. Decisions on Recommendations (DORs) Matrix for First Consultation Round on *Technical Standards for Wireless Networks*

The following summarises the comments and recommendations received from stakeholders in December 2021on the *Consultative Document on Technical Standards for Wireless Networks (First Round).* The decisions made by the Telecommunications Authority of Trinidad and Tobago (the Authority) have been incorporated in the second round consultative document. The Authority wishes to express its thanks for all comments and recommendations received from the following stakeholders:

i. Digicel Trinidad and Tobago Limited (Digicel)
ii. Telecommunications Services of Trinidad and Tobago (TSTT)

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
1	3.2.2.3 Earthquakes	Digicel	Mention is made of a 7 on the Richter scale but impact from earthquakes is also determined based on the depth and location of the fault. Magnitude alone is not a good indicator of the impact that an earthquake would have on infrastructure.	The Authority should give consideration to other factors which will affect the impact of earthquakes and not just magnitude	The Authority welcomes Digicel's comment regarding the consideration of other factors that will affect the impact of earthquakes. The Telecommunications Industry Association (TIA) standard: ANSI/TIA 222, Structural Standard for Antenna Supporting Structures and Antennas, states the ways towers shall be designed and

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
					constructed depending on the earthquake load, which is calculated using tower structure and seismic-based variables. Considering that the TIA ANSI/TIA 222 standard employs both structural and seismic variables, the Authority proposes that radiocommunications towers comply with the TIA ANSI/TIA 222, solely. Former mandatory standard 26: "Radiocommunications towers shall withstand earthquakes up to a magnitude of 7 on the Richter scale." has been removed.
2	3.3.1 Technical Standards for Public Mobile Access Networks (31) Public mobile access networks shall have the functionality to prioritise voice	Digicel	Handsets usually have standard known emergency short numbers, for example, 999, 911 and 221. If there are other emergency numbers outside of those already defined on the handset, it would be prudent for the Authority to list the emergency numbers requiring priority so operators can make the necessary adjustments.	Digicel recommends that the Authority provide a list of emergency numbers for Trinidad and Tobago, which are to be prioritized in this manner so that operators can implement accordingly.	The Authority agrees with Digicel's recommendation and to include telephone numbers for emergency response services in mandatory standard 26, formerly mandatory standard 31. Accordingly, mandatory standard 26 has been amended to reflect this, as follows:

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
	calls to emergency services over normal voice calls.				"(26) Public mobile access networks shall have the capability to prioritise voice calls to emergency services over normal voice calls. The telephone numbers which shall be prioritised include 990 (Fire Service), 999 (Police Service), 811 (Ambulance Service), and 911 and 112 (transferred to 999 for foreign travellers)."
3	3.3.2.1 Network Congestion (33) Public mobile transport networks shall be engineered to handle a minimum of 120% of the access traffic capacity of an RBS site.	Digicel	As networks evolve, the backhaul transport networks have evolved to converge services not only mobile traffic. The Authority should consider this as a link can handle 120% of the RBS traffic but still become congested due to other service sharing capacity.	Digicel recommends that the Authority amend this section to include mobile and other traffic types sharing a transmission link.	The Authority acknowledges that other types of services, along with mobile traffic, share the capacity of a transport network. This standard will apply to transport networks and not specifically mobile transport networks. Based on further feedback and research, it is noted that the International Telecommunication Union (ITU) recommends that, to ensure access to services during a major event such as a natural disaster or its aftermath, packet transport

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
					networks are to be engineered to handle a maximum of 85% of the access traffic capacity of a radio base station (RBS) site. Mandatory standard 28, formerly mandatory standard 33, has been amended to reflect RF transport networks and the ITU's recommendation, as follows: "(28) Public RF transport networks shall be engineered to handle a maximum of 85% of the access traffic capacity of an RBS site (ITU, E.811, 2017)."
4	3.3.3 Technical Standards for Public Mobile Core Networks (35) Public mobile core networks shall be engineered for a	Digicel	Is the stipulation "40%" for voice service, data service or voice and data services? For a 1+1 route or network node 40% is a reasonable request but today we have networks built with N+1, N+2 and so on. Has the Authority looked at this scenario	Digicel recommends that a breakdown of capacity rules should be provided by the Authoirty as the 40% rule is not applicable for the N+x scenario given.	The Authority welcomes Digicel's comment and acknowledges that core networks have evolved to provide both data and voice services. The peak traffic utilisation percentage is for voice and data services. At times, the network may become congested due to an unexpected increase in the number

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
	peak traffic utilisation of 40%.		and can it propose what is the engineered requirements?		of consumers utilising the network. To ensure that services remain accessible to consumers during the high utilisation of the network, the ITU recommends that packet data traffic utilisation on the core network be equal to or < 85%. This is relevant to networks that have N+X route scenarios. For networks that have 1+1 route scenarios, traffic utilisation on the core network shall be equal to or < 40%. Accordingly, mandatory standard 30, formerly mandatory standard 35, has been amended to reflect this, as follows: "(30) Public mobile core networks with 1+1 redundancy levels shall be engineered for a maximum peak packet data traffic utilisation of 40%. Public mobile core networks with N+X (X is equal to multiples of (1) redundancy levels shall be

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
					engineered for a maximum peak packet data traffic utilisation of 85% (ITU, E.811, 2017)." The definition of packet data traffic utilisation: "**Packet data traffic utilisation**: The ratio of the cumulative utilised packet data resource elements (REs) on the e-NodeBs and EPC to the available packet data resources (ITU, E.811, 2017)" has been included in section 1.10 of the document.
5	3.3.3 Technical Standards for Public Mobile Core Networks (36) Public mobile core networks shall be engineered with redundancy and high availability of 99.999%.	Digicel	Is the 99.999% for the network as a whole or services or nodes? We assume that the Authority is seeking to speak to service availability here rather than a network node availability, which are two distinct things.	The Authority is asked to stipulate what the 99.999% is referring to exactly.	The Authority informs Digicel that the availability value of 99.999% refers to service availability. Accordingly, mandatory standard 31, formerly mandatory standard 36, has been amended to reflect this, as follows: "(31) Public mobile core networks shall be engineered to ensure service availability of 99.999%."

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
6	3.3.5 Technical Standards for Structures Used to House Communications Equipment (45) Outdoor cabinets that do not have backup power generators shall have backup power batteries, fuel cell technology or solar panels capable of supporting full equipment load for a minimum period of six hours.	Digicel	Digicel considers that six hours is reasonable for new systems but there can be situations where vendors are not able to provide a full load guarantee for six hours for the life of the battery system. This is true for all battery systems as capacity ratings are derated by cycles.	The Authority should consider the cycle life and chemistry of the battery that manufacturers are producing today. Stipulated ratings should be similar to those provided by today's technologies. We ask that the Authority provide guidelines to take into considerations this fact about battery life, namely that capacity ratings are derated by cycles.	The Authority welcomes Digicel's comment and acknowledges that battery capacity derates during its life cycle. To reduce the chance of standby power batteries being depleted before the six-hour period, operators should purchase batteries that are capable of guaranteeing a bit more than six hours and carry out preventive maintenance of the batteries to ensure that the standard is met.
7	General	TSTT	Telecommunications Services of Trinidad and Tobago Limited ("TSTT") appreciates that the Telecommunications Authority of Trinidad and Tobago ("the Authority") has given	The Authority should consider that the development of any technical standards should be part of a coordinated national effort involving	The technical standards are meant to mitigate the effects of natural and man-made disasters on wireless communications networks. This document was developed as a coordinated effort, through a

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
			stakeholders the opportunity to comment on these matters. It should be noted that TSTT's comments on this document do not preclude TSTT from making further comments in the future. While TSTT commends the Authority's efforts to attempt to mitigate the effects of natural and man-made disasters on wireless networks by the development of " technical standards", it should be noted that efforts to mitigate the effects of natural disasters must be part of a coordinated national effort involving many national agencies like the ODPM, NEOC various Ministries and utility companies like WASA and T&TEC. It is pointless to develop such technical standards without input from key national agencies, for example T&TEC. In any serious natural disaster electricity	multiple national stakeholders like the ODPM, NEOC and other public utilities like WASA and T&TEC, and should form part of a national response plan and not developed in isolation.	Technical Working Group (TWG), comprising the Authority, concessionaires and licensees, which included WASA and T&TEC. TSTT is asked to note that the Office of Disaster Preparedness and Management (ODPM) and the Tobago Emergency Management Agency (TEMA) partnered with the Authority to prepare a *National Emergency Communications Plan* (NECP). The purpose of the NECP is to review the existing emergency telecommunications and information and communications technology (ICT) systems in Trinidad and Tobago and articulate key steps for upgrading the emergency response machinery. It outlines emergency/disaster telecommunications and ICT systems, the roles and responsibilities of responder agencies, and the resultant

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
			supply would be likely affected the most and is probably the most important utility as without electricity it does not matter if a wireless network is "up" if customers cannot plug in devices or access the services because of a lack of electricity. The Government of Trinidad and Tobago has developed a crisis response plan involving many agencies and perhaps the Authority should consider that its efforts in this regard should be part of such a national response plan and not developed in isolation.		synergies. (TATT National Emergency Communications Plan, 2021). The Authority's documents – *Technical Standards for Public Fixed Telecommunications Networks* and *Technical Standards for Wireless Networks (in effect)*and the NECP were not developed in isolation. The NECP requires that telecommunications service providers, subscription television networks and free-to-air radio television broadcasters upgrade their facilities so they are resilient to natural and man-made disasters, at a minimum, to conform with the *Technical Standards for Public Fixed Telecommunications Networks* and *Technical Standards for Wireless Networks* documents.

8	General	TSTT	TSTT expresses grave concern that, despite the discussions and agreement of the Technical Working Group formed to discuss the standards outlined in this document, the Authority has not clearly identified that these standards will not be applied retroactively to networks that have already been constructed and in operation in accordance with the technical standards deemed appropriate by concessionaires and licensees and in conformity with accepted international standards. Further, while the Authority outlines certain provisions in statute and regulations that empower it to establish technical standards, the Authority is silent on how these provisions will be enforced. Should the Authority insist on requiring that these standards be implemented	The Authority to provide adequate and detailed responses to the following questions:	The technical standards apply to networks that have already been constructed and operate in accordance with accepted international standards. The Authority will work with operators to prescribe a suitable timeframe for the implementation of these technical standards into existing networks. New wireless networks or new facilities within an existing wireless network are required to be built in conformance with these standards. To reflect this in the document, the following statement has been included in section 3.1: "Technical standards to mitigate the effects of natural and man-made disasters on these network facilities would apply to networks that have already been constructed and are in operation. A suitable timeframe for the implementation of the standards into existing networks will be prescribed in consultation with the operators. New wireless networks

			retroactively, the following questions are raised: 1. How does the Authority intend to gather the necessary data to verify that some of the proposed standards' finer details have been implemented? 2. Who will be responsible for funding the investigations? Who will pay for any proposed changes after they have been identified?	1. How does the Authority intend to gather the necessary data to verify that some of the proposed standards' finer details have been implemented? 2. Who will be responsible for funding the investigations? Who will pay for any proposed changes after they have been identified?	or new facilities within an existing wireless network are required to conform with these standards at the time of implementation." 1. The Authority intends to conduct audits from time to time, to check compliance with these technical standards. The Authority will determine the appropriate methodologies to verify compliance with the technical standards. 2. The Authority will finance the audits, to check for compliance with the technical standards. It is the responsibility of the concessionaires and licensees to finance any modifications required to their networks and facilities, to ensure

					adherence to these technical standards.
			3. Is the Authority aware of the associated increase in retail prices to customers that will be required to balance this unanticipated capital outlay and does the Authority expect the market to absorb such a considerable cost? Additionally, how will these standards be applied to new constructions/ builds?	3. Is the Authority aware of the associated increase in retail prices to customers that will be required to balance this unanticipated capital outlay and does the Authority expect the market to absorb such a considerable cost?	3. The Authority acknowledges that wireless networks owned by concessionaires are required to meet international standards and, therefore, it may be premature to claim that required modifications to the networks, if any, would involve any unplanned capital expense, causing an effect on the retail prices. However, should the cost of implementing these technical standards be significant, consideration will be given to implementing the standards within a reasonable timeframe, so that the market does not have to absorb a considerable cost.

			4. Will the Authority attempt to establish a pre-construction approval process? If that is the case, what is the nature of this process? How will the Authority ensure that this additional administrative step does not impede network expansion by allowing projects to stagnate without the Authority's approval?	4. Will the Authority attempt to establish a pre-construction approval process? If that is the case, what is the nature of this process? How will the Authority ensure that this additional bureaucratic step does not impede network expansion by allowing projects to stagnate without the Authority's approval?	4. The Authority will not conduct any pre-construction approval of any builds. However, the Authority will monitor compliance with technical standards via visual inspection, information requests, and tests and measurements, depending upon the nature of the standards.
			5. Is the Authority entrusted with the power to approve civil works under the law? As far as TSTT is aware it is the Ministry of Works and Transport Construction Division that has developed Structural Design Guidelines for Trinidad and Tobago.	5. Is the Authority entrusted with the power to approve civil works under the law?	5. The standards in this document regarding the construction of buildings refer to the building codes adopted for use in Trinidad and Tobago. To demonstrate compliance, concessionaires and licensees will be required to provide the Authority with evidence that the necessary approvals relating to builds

					have been obtained from the Ministry of Works and Transport's Construction Division.
9	General	TSTT	The Authority's document does not include a section with References.	The Authority to include a section with the references.	The Authority has included in the document a section with references.
10	1.7 Review Cycle	TSTT	Due to the nature of the document, it will be prudent for Licensees and Concessionaires to have an opportunity to make recommendations for the periodic review of the document. Notwithstanding the periodic review, this document should include a review timeframe of every three (3) to five (5) years.	Licensees and Concessionaires to have an opportunity to make recommendations for the periodic review of the document. A review timeframe of every three (3) to five (5) years should be included in this document.	Consistent with the Authority's procedures for consultation, in which all documents should be reviewed within a suitable timeframe, the Authority agrees to review this document every four years. Section 1.7 of the document was revised to indicate this.
11	1.8 Consultation Process	TSTT	The Authority refers to the "*Procedures for Consultation in the Telecommunications Sector of Trinidad and Tobago (version 2.0, 2010)*" rather than the most recent version available on its website dated January 2021.	Could the Authority indicate why the 2010 version of the Procedures for Consultation was utilized rather than the January 2021 version?	The Authority acknowledges that the latest version of the *Procedures for Consultation in the Telecommunications Sector of Trinidad and Tobago* was not referenced in this document, and has amended the reference title, as follows: *Procedures for*

			Could the Authority clarify why this version was used?		*Consultation in the Telecommunications Sector of Trinidad and Tobago (version 7.0, 2021).*

12	1.9 Other Relevant Documents	TSTT	The Authority refers to the "*Authorisation Framework for the Telecommunications and Broadcasting Sectors of Trinidad and Tobago (in effect)*", could the Authority advise what does "in effect" mean in the context of the regulatory instruments? In the context of comments that follow, TSTT suggests that the "ITU, K.112", "ITU, L.70" and, "Motorola R56" documents be included in the list of "Other Relevant Documents".	The Authority to state what "in effect" means in the context of the regulatory instruments. The "ITU, K.112", "ITU, L.70) and, "Motorola R56" documents should be considered for inclusion in the list of "Other Relevant Documents".	In the context of regulatory instruments, the term "in effect" means the current version of the regulatory instrument that has been approved and published on the Authority's website. The publications listed in section 1.9 are documents authored by the Authority that support the need for these standards. The documents cited throughout this document, such as *ITU, K.112, ITU, L.70 and Motorola R56,* are those from which information was sourced and are identified in the References section of the document.
13	1.10 Definitions	TSTT	The Authority cites zoning criteria from other jurisdictions, the US (Department of Labour) and the UK (Health and Safety Executive) specifically. These frameworks are not legally binding in Trinidad and Tobago.	The Authority should either: 1. Replace citations to foreign frameworks with domestic, legally established zoning or safety frameworks that	Class 1 Division 1 or Division 2 hazardous locations and Zone 0, Zone 1 and Zone 2 hazardous zones are internationally recognised classifications that have been adopted by the Ministry of Energy

			Indeed, these frameworks also do not directly correlate between each other. Consequently, the ad hoc approach of applying these standards will create uncertainty as to which standard will apply at a given time and in any given situation These frameworks are also supported by administrative systems local to their context. There is no evidence that those supportive administrative exist in Trinidad and Tobago. Consequently, it is not immediately apparent which local authority can adjudicate on the evaluation of an area as meeting these frameworks. Indeed, the document circulated by the Authority provides no clarity on which administrative body will declare any zone in accordance with the contradictory standards proposed by the Authority. This establishes a framework where.	provide equivalent cover;	and Energy Industries and are therefore relevant to the industrial environment of Trinidad and Tobago. For the purpose of consistency regarding the use of a common source, the Authority has revised the definitions of the hazardous locations and zones in section 1.10 of the document, with citations from the Underwriters Laboratories (UL). The UL is an internationally recognised safety certification body. The revisions of the definitions are as follows: "Class 1, Division 1 Location: An industrial location in which ignitable concentrations of flammable gases, vapours or liquids: 1. can exist under normal operating conditions; 2. may exist frequently because of repair or maintenance

			the Authority will be using its own discretion in matters which are outside the core competence of the Authority. This is inappropriate and creates a situation that the most basic activities in ensuring compliance – the definition of whether a location is in a zone or not - will be subject to challenge. This creates more uncertainty in the administrative framework. That uncertainty means it will be impossible to predict planning or operational costs associated with a given site. Is there an equivalent legally established zoning or safety framework in force in Trinidad and Tobago today? If not, the appropriate agency should be identified by the Authority, and that agency should confirm in writing that it:	2. Replace citations with standards or definitions recognized by an international standards body; or 3. Detail in this document the administrative steps to be undertaken by the Authority, and the legal justification for same, to replicate the administrative frameworks that exist in these foreign jurisdictions. 4. Where the Authority has no legal authorization to	operations or leakage; or 3. may exist because of equipment breakdown that simultaneously causes the equipment to become a source of release (UL, 2022).” ”Class 1, Division 2 Location: An industrial location: 1. in which volatile flammable liquids or flammable gases or vapours exist, but are normally confined within closed containers; 2. in which ignitable concentrations of gases, vapours or liquids are normally prevented by

			(a) agrees to the zoning standards proposed as legal, and undertakes to regularize any inconsistencies between the two; (b) has identified any legislative changes are required to implement this proposal; and (c) establishes a service level agreement with the marketplace with respect to responsiveness in relation to requests in relation to zoning matters in this regard. In this way, concessionaires and licensees are aware of the administrative framework the Authority is asking to be adopted.	provide administrative coverage, the appropriate agency should be identified by the Authority, and that agency should confirm in writing that: (a) agrees to the zoning standards proposed as legal, and undertakes to regularize any inconsistencies between the two; (b) has identified any legislative changes are required to implement this proposal; and establishes a service level agreement with the marketplace with respect to responsiveness in relation to requests in relation to zoning matters in this regard.	positive mechanical ventilation; or 3. adjacent to a Class I, Division 1 location where ignitable concentrations might be occasionally communicated (UL, 2022)." "Zone 0 Environment: An industrial space in which ignitable concentrations of flammable gases, flammable liquid-produced vapours, or combustible liquid-produced vapours are present continuously or for long periods of time under normal operating conditions (UL, 2022)." "Zone 1 Environment: An industrial space in which ignitable concentrations of flammable gases,

					flammable liquid-produced vapours, or combustible liquid-produced vapours are likely to exist under normal operating conditions (UL, 2022)." "Zone 2 Environment**:** An industrial space in whichignitable concentrations of flammable gases, flammable liquid-produced vapours, or combustible liquid-produced vapours are not likely to exist under normal operating conditions (UL, 2022)."
14	1.11 Compliance Notation .	TSTT	The Authority should clarify what is the next step in this process upon completion of the consultation's two rounds. To be clear: the Authority should identify if the intention is to convert this framework into	The Authority should clarify whether the next step in this process is the reduction of these policy directions into Regulations.	The purpose of this consultation is to establish standards as prescribed in the Act. The Authority intends to determine mutually agreeable and reasonable standards that balance the communications needs of the public

			Regulations that are legally binding and thus enforceable. This issue has been raised in the consultation on other matters. Where this has not been addressed, all of these matters remain unimplemented and unenforceable. Without confirmation of that step, it should be noted that a framework such as this, even consulted upon, is not a law. Consequently, it becomes questionable whether any operator may be compelled to undertake a "mandatory" requirement. This issue becomes relevant when discussing section 3.2.3 of the subject document.		after the occurrence of a disaster, and the normal operational activities of wireless network operators. In this regard, it is hoped the need for enforcement via means of litigation will be mitigated. However, the Authority advises that enforcement can be pursued if the provisions of the Act, the regulations and the terms of the concessions are breached. If the Authority deems that regulations are required to ensure compliance with these standards, the Authority will pursue.
15	2.1 Natural Disasters	TSTT	In forested areas, heavy rains saturate the soil, causing trees to fall on and damage aerial cable	Heavy rainfall should be considered as a separate issue.	When heavy rainfall saturates soil on slopes, the soil becomes heavy and landslides may result. This can

			infrastructure. As a result, there are outages. TSTT suggests that this be considered as a separate issue.		cause trees to fall and damage aerial cable infrastructure. In wireless networks, aerial cables may be used in redundant networks and the cables need to be protected against falling trees due to landslides. To reduce the chance of such damage occurring, a new discretionary standard 4 has been included in section 3.2.3.1. of the document. Discretionary standard 4 is as follows: "(4) As far as practicable, telecommunications cables that are routed through areas with heavily vegetated and sloped lands should be buried in underground ducts."
16	2.2 Man-Made Disasters	TSTT	At shared pole locations, stray electrical current from power lines enters aerial communication lines, causing the cables to be burnt and damaged. This results in outages. TSTT suggests that this be considered as a separate issue.	Stray electrical current should be considered as a separate issue.	The Authority acknowledges that aerial communications cables may become damaged due to a fault in the electrical distribution system. However, the required distance between T&TEC's overhead lines and telecommunications cables is determined by T&TEC and must be followed based on the terms of the

					contract. Therefore, given that the obligation to adhere to T&TEC's defined distance already exists, a technical standard would not be required from the Authority.
17	3 Technical Standards for Wireless Networks	TSTT	The Authority is advised that TSTT's wireless network is in conformity with accepted international standards pursuant to Section 45 (1) of the Telecommunications Act Chap. 47:31 (the "Act"). TSTT recognizes the citations from Section 45 (2) of the Act which empowers the Authority to identify, adopt, or establish preferred technical standards, but these standards and recommendations must be specific, definable, measurable targets or indicators that the implementing bodies must follow. It appears that certain standards allow the evaluating officer to use their judgment in	In all instances, the Authority should include defined metrics to which concessionaires or licensees should adhere, so that evaluations are transparent and unbiased.	The Authority agrees with TSTT that adopted or established technical standards must be specific, definable, measurable targets or indicators that the implementing bodies must follow. To clarify, the technical standards relative to disasters or the like have been identified by the Authority under section 3 of this consultation document. These standards provide specific, definable and measurable targets to be complied with by network owners. The standards remove the subjectivity element of an evaluation officer's judgement. In conducting an audit, the Authority's evaluation officer will use a clearly defined methodology to verify compliance, via visual inspections, tests and

			deciding a concessionaire's or licensee's conformance, which is impractical and unworkable as it introduces the prospect of lengthy challenges that will delay the implementation of infrastructure projects. This reaffirms TSTT's earlier request for clarity on the next steps in relation to this framework document. If these policy frameworks are to be reduced to Regulations, the specificity discussed would be essential for the law-making exercise.	The Authority should clarify whether the next step is the reduction of this framework to Regulations.	measurements, or requests for information, based on the nature of each technical standard. After this consultative document is revised in accordance with the Authority's consultation procedures, it is then finalised and published. If the Authority deems that regulations are required to ensure compliance with these standards, the Authority will pursue.
18	3 Technical Standards for Wireless Networks	TSTT	Although these standards are based around Disaster Management, there is no consideration for temporary restoration immediately after a disaster without strict adherence to design standards.	The Authority to consider the immediate requirements in a Post Disaster Needs Assessment and integrate provisional solutions as a key component of restoration of service.	The Authority appreciates TSTT's concern regarding the temporary restoration of communications immediately after a disaster. However, emergency communications in relation to disaster recovery is dealt with by the service providers' *Business*

					Continuity Plans (BCP), which is discussed in sections 5.3 and 6.5 of the Authority's *Consultative Document on the National Emergency Communications Plan (Second Round)*, dated January 2022, and the standard operating procedures that will be developed to ensure stakeholders, including operators, are provided with step-by-step instructions, to ensure optimal efficiency and communication, quality output and consistency throughout the entire response phase.
19	3.2.1.1.1 Buildings and 3.2.1.1.2 Rooftop Radio Base Station	TSTT	TSTT seeks clarification as to whether there is no local, Trinidad and Tobago Bureau of Standards ("TTBS") approved Earthing Standards for buildings, that necessitates a "mandatory" standard that references a guideline proposed by a private, foreign firm Motorola.	In all instances, mandatory standards should be in accordance with TTBS, TTEI, MOWT definitions where such exist.	The Authority appreciates TSTT's concern over the electrical wiring and grounding of buildings that are used to house electrical equipment, and acknowledges that the wiring and grounding of buildings must conform with the *Trinidad and Tobago Electrical Wiring Code - Part 1: Low Voltage Installations* of the Trinidad and Tobago Bureau of Standards (TTBS).

			While TSTT acknowledges that Motorola's R56 standard is a robust standard that encompasses a variety of international standard bodies (eg ANSI, IEEE, TIA, EIA, Bellcore etc), it is still not the output of an international standards body. In comparison, the Ministry of Works and Transport's (MOWT's) standard conforms to the ASCE (American Society of Civil Engineers), and TSTT recognizes that both the R56 and ASCE conform to the ANSI standard to some extent. However, it must be recalled that as an arm of the State, the Authority should, when considering standards that overlap with existing standards in operation in the country, take due care to ensure that what it is proposing does not cause conflict. Accordingly, it is not recommended that the Authority veer from what is approved by the TTBS, the Trinidad and Tobago		The purpose of section 3.2.1.1.1, however, is to establish standards that mitigate the effects of lightning strikes on equipment housed in communications sites that are buildings. The titles of sections 3.2.1 and 3.2.1.1.1 have been amended to reflect this, as follows: "3.2.1 Technical Standards for Equipment Housed at Communications Sites" "3.2.1.1.1 Communications Equipment Housed in Buildings" The Authority conducted an analysis relative to any local standards specific to the grounding of communications equipment and noted that there were established standards for the grounding of low voltage and high voltage installations. Although the TTBS standard had a section on grounding of electrical apparatus, the standard

			Electrical Inspectorate (TTEI), and MOWT among others by referencing Motorola's standard in its entirety. TSTT would agree that the Motorola standard be discretionary and/ or strongly recommended, while the mandatory standard would be those required by the laws of Trinidad and Tobago, as recommended by the TTBS, TTEI, MOWT or pursuant to the standard established by an equivalent State entity of another jurisdiction or international standards body.		is generic and not specific to communications equipment. The grounding of communications equipment should be in accordance with the best practice standards adopted in the communications industry. The Motorola R56 *Standards and Guidelines for Communication Sites* was recognised by the TWG as a guide commonly employed throughout the radiocommunications industry in Trinidad and Tobago, meeting the purpose for which it is being proffered as guidance in this document. More specifically, its widespread and accepted use in the communications sector is clearly indicative of its viability, providing industry accepted guidance. Chapter 5 of the Motorola R56 document provides detailed standards specific to communications equipment.

					Mandatory standard 1 and its title have been amended, as follows: "Mandatory Standard to Mitigate the Effects of Lightning Strikes on Communications Equipment operated by Concessionaires and Licensees that are Housed in Buildings." "(1) The electrical grounding of communications equipment that is housed in buildings shall comply with, at a minimum or better, the internal grounding standards stated in chapter 5 of the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005)." The Motorola R56 document encompasses various standards from a variety of internationally recognised standards bodies such as ANSI, IEEE, TIA, EIA and Bellcore. This confirms that the Motorola R56 document is
				Alternatively, mandatory standards should cite standards of similarly situated State entities or international standards bodies.	

					sufficiently robust to guide stakeholders, as it is internationally recognised in the communications industry. Section 3.2.1.1.2. deals with the grounding of a roof top RBS. Standards for the grounding of roof top RBS mast structures and the grounding of roof top RBS communications equipment should comply with best practice standards adopted throughout the communications industry, such as those found in sections 4.9 and 5.9 of the Motorola's R56 document, respectively. A new mandatory standard 2 has been included to reflect this, as follows: "(2) Electrical grounding of rooftop RBS mast and equipment shall comply with, at a minimum or better, the grounding standards in

					sections 4.9 and 5.9 of the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005)..” The former mandatory standard 19, “The top of the lightning rod installed on the antenna mast shall be, at a minimum, 30 centimetres above the antennas of the rooftop RBS (ITU, K.112, 2019)”, has been moved to 3.2.1.1.2 and is now mandatory standard 3.
20	3.2.1.2 Bush Fires	TSTT	TSTT recommends that Mandatory Standard (4) should be reviewed for a number of practical reasons. First, “fireproof” is a significantly higher threshold to maintain that “fire retardant”, and given the context of the discussion whether the material of construction is fireproof or not is not as relevant as the ability of the equipment	Mandatory Standard (4) should be changed to state that “Outdoor cabinets used to house communications equipment shall be constructed to ensure fire-resistance.”	The Authority welcomes TSTT’s comments and agrees that outdoor cabinets used to house communications equipment shall be constructed to be fire-retardant. On further consideration of this standard, it was also noted that ITU recommends that fire-retardant materials be used in constructing outside facilities, to mitigate the effects of bush fires.

			within the outdoor cabinet to continue to operate. To be clear, the cabinets TSTT deploys are made of material which is fireproof. TSTT's challenge is whether this requirement addresses the ill that the Authority seeks to address. Second, building off of the context of the issue the Authority seeks to address, the Authority should consider, as an example, that cabinets which house active equipment include design elements (such as vents) to facilitate the maintenance of appropriate operating conditions within the cabinet. Without such elements, the cabinets are not fit for purpose. These vents however become the weaknesses to the fireproofing of the cabinet, as the vents are also the source from which fires may enter the cabinet. Depending on the		Mandatory standard 4 has been amended, as follows: "Outdoor cabinets used to house communications equipment shall be constructed using fire-retardant materials (ITU, L92, 2012).".”

			nature and duration of the fire the cabinet can offer some limited protection, however, although the cabinet will not burn the electronics will not be able to withstand prolonged heat based on the nature of the fire. Systems have been developed to mitigate this occurrence, but the effectiveness is not 100%. Accordingly, while the material remains fireproof, the cabinet itself is classed as "fire resistant". This is only one facet of design realities which goes beyond the material of construction of the cabinet. Given that Mandatory Standards (5) and (6) effectively creates a barrier between potential bush fires and the equipment (indeed, firebreaks are specifically mentioned in the discretionary standards), this provides sufficient support to support the		

			fire-resistance of the cabinet and its supporting infrastructure. Accordingly, TSTT recommends that the focus of the requirement be changed from the fireproof nature of the material in which the cabinet is built, but the cumulative fire resistant nature of the cabinet and its surrounding infrastructure.		
21	3.2.1.2 Bush Fires	TSTT	TSTT further recommends the review Discretionary Standard (4). TSTT notes that the Authority has not defined a source or precedent in determining the proposed radius of the firebreak. Consequently it may leave one to suggest that the 10m distance is arbitrary. TSTT would like to highlight the practicality of a 10m radius firebreak around the outdoor	TSTT recommends a review Discretionary Standard (4) with respect of the width of the proposed firebreak requirement - from 10m radius to 10m diameter. In all instances, TSTT insists that the Authority provide citation of sources from which these standards or requirements are derived, from reputable, bona fide	TSTT is asked to note that the firebreaks referred to in this document are those surrounding buildings or enclosed sites that house communications equipment or outdoor cabinets, and not individual cabinets. Discretionary standard 1, formerly discretionary standard 3, has been amended to reflect this, as follows: "(1) Where practicable, particularly in rural areas which are prone to bush fires, firebreaks should be constructed outside and around the

			cabinet. This would mean that for every cabinet, the operator/ licensee would be required to undertake the acquisition of between 314 and 400 square metres in real estate. In many instances, there is not that space surrounding the location of the cabinet without also encroaching on the lands of third parties. It is recommended that the radius of the firebreak be reduced from 10m to 5m, unless provided for by cited standards provided by MOWT, TTBS or other relevant civil construction national or international standards bodies	international or national standards bodies in the spheres of, but not limited to, civil engineering, electrical engineering and distribution	perimeter of sites that house communications equipment." The TWG recommended the firebreak surrounding a site to be 10 metres; however, based on further research of practices adopted in other jurisdictions, the Authority has agreed to review the width of a firebreak, which will vary in accordance with the type of firebreak. Discretionary standard 2, formerly discretionary standard 4, has been amended, as follows: "(2) The width of the firebreak should be appropriate for the type of firebreak implemented, as follows: (a) For ploughed firebreaks, the minimum width of the firebreak should be one metre (USDA, National Resources Conservation Services 2006).".

					(b) For mowed or bladed firebreaks, the minimum width of the firebreak should be two metres (USDA, National Resources Conservation Services 2006)."
22	3.2.1.3 Hurricanes	TSTT	Mandatory Standard (7) states that "*Buildings that house communications equipment shall comply with internationally recognised building codes adopted in Trinidad and Tobago.*" As the arm of the State establishing this mandatory requirement, this vague reference is not adequate to give guidance to concessionaires or licensees. TSTT expects the Authority to undertake the necessary due diligences to compile the relevant building codes, recognized in Trinidad and Tobago, to which it refers.	Mandatory Standard (7): The Authority to advise what the internationally recognized building codes adopted in Trinidad and Tobago are.	The Authority recognises that the building industry in Trinidad and Tobago and the relevant approving agency, which is the Construction Division of the Ministry of Works and Transport (MOWT), uses internationally recognised building codes to approve the various aspects of structures to be constructed. The building codes used by the MOWT are different depending upon the type of structure; therefore, the MOWT does not use one particular building code. Mandatory standard 6 has been amended to reflect this, as follows: "(6) Buildings that house communications equipment shall

			In that regard, TSTT requests that the Authority advises what those internationally recognized building codes adopted in Trinidad and Tobago are. In this regard TSTT also notes that standards for the Ministry of Works have adopted Hurricane Category 3 for structures in Trinidad and Tobago. The Authority should advise on what basis and professional opinion it would seek to exceed so significantly the standards of the Ministry of Works and Transport.		comply with the relevant building codes adopted for use in Trinidad and Tobago." Furthermore, the Authority is aware that the standards adopted by the MOWT in relation to resilience against hurricanes are international standards that are relevant to our environment. The Authority considers the resilience that critical elements of national infrastructure, such as telecommunications network facilities, require to mitigate the effects of hurricanes. The Authority is satisfied that the building codes used by the MOWT are suitable for the telecommunications industry and will refer to the codes adopted by the MOWT. The resilience of outdoor cabinets against hurricanes is affected by the nature of its anchoring to the ground. By applying rigid anchors

					into concrete foundation, outdoor cabinets would be able to withstand natural disasters, such as hurricanes. Standards relating to the rigid anchoring of outdoor cabinets are found in chapter 9 of the Motorola R56 document. Mandatory standard 7 has been amended to reflect the adoption of these standards, as follows: "(7) The anchoring of outdoor cabinets that house communications equipment shall, at a minimum, comply with the standards related to the anchoring of cabinets in section 9 of the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005) ." Mandatory standard 12 relates to reducing the damage caused by external objects to outdoor cabinets. The impact of external objects on outdoor cabinets may be caused by objects being blown around due to hurricanes or strong winds. This

					standard therefore has been moved from section 3.2.1.4. to section 3.2.1.3 and is now labelled mandatory standard 9.
23	3.2.1.4 Earthquakes	TSTT	Mandatory Standard (10) has the same failing identified above for Mandatory Standard (7): the Authority should be responsible to compile the relevant building codes, recognized in Trinidad and Tobago, to which it refers. Mandatory Standard (11) states that "*Outdoor cabinets that house communications equipment shall be able to withstand, at a minimum, earthquakes of a magnitude of 7 on the Richter scale*." However, TSTT believes that magnitude 7 is quite high and not practicable given the national experience and the design and	Mandatory Standard (10) The Authority to advise what the internationally recognized building codes adopted in Trinidad and Tobago are. Mandatory Standard (11) should be changed to state that "Outdoor cabinets that house communications equipment shall be able to withstand, at a minimum, earthquakes of a <u>magnitude of 4</u> on the Richter scale."	The Authority recognises that the building codes used in Trinidad and Tobago are internationally recognised codes used to approve the various aspects involved in the construction of buildings. The building codes used by the MOWT are different depending upon the type of structure; therefore, the MOWT does not use one particular building code. Mandatory standard 10has been amended to reflect this, as follows: "(10) Buildings that house communications equipment shall comply with the relevant building codes adopted for use in Trinidad and Tobago."

			construction of all other infrastructure. Indeed, the Authority has not provided any statistics, data or analysis to justify why magnitude 7 was determined as appropriate. Considering the national history in this context, and considering general construction norms in Trinidad and Tobago, TSTT is of the view that this should be no greater than magnitude 4. Indeed, it would be more practical to replace some items, than to expect a return on investment from the additional cost associated with constructions to withstand magnitude 7 for all TSTT's cabinets. The Authority should, in determining the appropriate requirement, consider the likelihood vs severity/ impact, ad present a summary of such	Construction above that requirement for buildings should be at the discretion and commercial imperative of operators.	There are no national codes or standards that state the magnitude of an earthquake that outdoor equipment cabinet should be able to withstand. Proper anchoring of outdoor cabinets to concrete foundations should mitigate the effects of earthquakes on outdoor cabinets. Standards that consider the effects of seismic activity on communications equipment cabinets are stated in the Motorola R56 document. A new mandatory standard 11 has been included to reflect the adoption of these Motorola R56 seismic consideration standards, as follows: "(11) The anchoring of outdoor cabinets that house communications equipment shall, at a minimum, comply with the seismic consideration standards in section 9 of the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005)."

			findings. Otherwise, the standard seems arbitrary.		
24	3.2.1.5 Floods	TSTT	Mandatory Standards (13) to (15), the Authority takes a myopic view that the only solution to mitigate the impact of flooding is to raise the level of the structure above "known floodwater levels." However, most of the country's pertinent flood related issues are not around 'known' floodwater levels in known areas so prone to flooding. Issues generally arise from activities which cause flooding in unexpected places e.g. the Greenvale incident of the recent past. Given this trend, construction above "known" floodwater height is not the only solution. TSTT strongly recommends that the Authority changes Mandatory	Mandatory Standards (13) to (15) to be changed to Discretionary Standards.	The Authority disagrees with TSTT that mandatory standards (12) to (14), formerly mandatory standards 13 to 15, be changed to Discretionary Standards. There are areas throughout Trinidad and Tobago that experience flooding every year and information on flood water levels within the flood prone areas is available to be considered during the planning or designing of structures. Maps indicating flood prone areas throughout Trinidad and Tobago can be found on the ODPM and Tobago Emergency Management Agency websites. Building above known floodwater levels reduces the chance of structures being damaged by floods and therefore, to reduce the effects of flooding,

			Standards (13) to (15) to Discretionary Standards.		measures should be mandatory in areas prone to flooding. In the example provided by TSTT, that would be a case of an area not prone to flooding, and therefore this mandatory standard will not apply.
25	3.2.1.6 Mud Volcanoes	TSTT	Mandatory Standard (16) states that *"If practicable…* ". As a result, this should be a discretionary standard.	Mandatory Standard (16) to be changed to a discretionary standard.	The Authority agrees with TSTT that mandatory standard 16, "As far as practicable, structures that are used to house communications equipment shall not be located within close proximity of a mud volcano", should be changed to a discretionary standard. Mandatory standard 16 is now the new discretionary standard 3.
26	3.2.2.1 Lightning Strikes	TSTT	With respect to Mandatory Standard (18) TSTT's comments to 3.2.1.1 apply: The Authority should limit the definition of any mandatory standard to references by outputs of national and international	Mandatory Standard (18) should limit its references to outputs of national and international standards bodies.	TSTT is asked to note that the Motorola R56 Standards and Guidelines for Communication Sites(Motorola 2005) comprises a variety of standards set by international standards bodies such as ANSI, IEEE, TIA, EIA and Bellcore.

			standards bodies. References to the Motorola R56 document should be included only in discretionary standards or recommendations.		This confirms that the Motorola R56 standards and guidelines are sufficiently robust to guide stakeholders, as it is internationally recognised in the radiocommunications industry. Further, the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005) was recognised by the members of the TWG as a commonly employed guidance throughout the radiocommunications industry of Trinidad and Tobago, meeting the purpose for which it is being proffered as guidance in this document. More specifically, its widespread and accepted use in the radiocommunications sector is clearly indicative of its viability to provide industry-accepted guidance. The Authority conducted an analysis in Trinidad and Tobago relative to any local standards specific to grounding of towers and

					noted that no local standards exist. Former mandatory standard 18 is now mandatory standard 16. In addition to the grounding of the tower, a new mandatory standard 17 was included to adopt a standard related to the mounting of lightning rods on towers, which further mitigates the effects of lightning on equipment installed on a tower. The new mandatory standard 17 is as follows: "(17) Lightning rods that are installed on radiocommunications towers shall comply with the standards in section 2.12.2.5 of the Motorola R56 Standards and Guidelines for Communication Sites (Motorola 2005)."
27	3.2.2.2 Hurricanes	TSTT	TSTT seeks clarification on the source of its recommendations to establish Hurricane Category 4 as the standard to which towers are constructed in Trinidad and	Mandatory Standard (21) should be changed to state that "Radiocommunications towers shall withstand	On further review of mandatory standard 21, the Authority noted that the category of hurricane considered by the MOWT in its approval of the design of towers is

			Tobago in Mandatory Standard (21). This standard seems to be at odds with the MoWT standard of requiring builds to withstand Category 3. Without citation of advice to support this shift, the Authority risks the charge of, at best, inconsistency with the civil engineering authorities in Trinidad and Tobago or, at worst, arbitrary decision-making Unless the Authority can provide citation or professional advice, supported by comparative cost considerations, TSTT strongly recommends that Mandatory Standard (21) be changed to state that "Radiocommunications towers shall withstand hurricanes up to Category 3.", in line with the local standard from the Ministry of Works.	hurricanes up to Category 3.", in line with the local standard from the Ministry of Works.	relative to our environment, and that the adopted compliance standards should take into account the resilience that critical national infrastructure elements, such as radiocommunications towers, require to mitigate the effects of hurricanes. Former mandatory standard 21: "Radiocommunications towers shall withstand hurricanes up to Category 4", has been removed. Prior to the construction of a tower, planning permission must be granted by the Town and Country Planning Division (TCPD), and approval may be required from agencies, such as the MOWT, and the relevant municipal/regional corporation, and the Tobago House of Assembly for towers located in Tobago. To reflect this, the following statement has been included in section 3.2.2.2.

					"N.b: For all planned radiocommunications tower builds, planning permission must be granted by the Town and Country Planning Division (TCPD) and approval may be required from the Ministry of Works and Transport (MOWT) and the relevant municipal/regional corporation and, for towers in Tobago, the Tobago House of Assembly."
28	3.2.2.2 Hurricanes	TSTT	Mandatory Standard (24) states that "*Trees that are in close proximity of a radiocommunication tower shall be kept trimmed <u>if practicable</u>…*". As a result, it should be a discretionary standard.	Mandatory Standard (24) to be changed to a discretionary standard.	The Authority disagrees with TSTT that mandatory standard 21, formerly mandatory standard 24, should be changed to a discretionary standard. During a hurricane, branches on trees located near to a tower may be broken and come into contact with towers, causing damage to the tower and associated mounted equipment. Therefore, it is necessary to keep the space around a tower free of branches.The term "if practicable" has been removed from mandatory standard 21, and

					the standard has been revised, as follows: "(21) Trees that are in close proximity to a radiocommunications tower or overhanging the perimeter of a radiocommunications site shall be kept trimmed."
29	3.2.2.3 Earthquakes	TSTT	Mandatory Standard (26) states that "*Radiocommunications towers shall withstand earthquakes up to a magnitude of 7 on the Richter scale.*" However, as stated prior, TSTT is of the view that the threshold of magnitude 7 is quite high and not practicable given TSTT's experience, and the design and construction of all other infrastructure in the country. Considering the national history in this context, and considering general construction norms in Trinidad and Tobago, TSTT is of	Mandatory Standard (26) should be changed to state that "Radiocommunications towers shall withstand earthquakes up to a magnitude of 4 on the Richter scale."	On review of mandatory standard 26, the Authority noted that the magnitude of earthquake that is considered by the MOWT in the design approval of towers is relative to our environment and that the adopted compliance standards provide the type of resilience that critical national infrastructures, such as radiocommunications towers, require to mitigate the effects of earthquakes. Former mandatory standard 26: "Radiocommunications towers shall withstand earthquakes up to a magnitude of 7 on the Richter scale." has been removed.

			the view that this should be no greater than category 4. Indeed, it would be more practical to replace some items, than to expect a return on investment from the additional cost associated with constructions to withstand magnitude 7 for all TSTT's towers. The Authority should, in determining the appropriate requirement, consider the likelihood vs severity/ impact, ad present a summary of such findings. Otherwise, the standard seems arbitrary.		Prior to the construction of a tower, planning permission must be granted by the TCPD, and approval may be required from agencies, such as the MOWT and the relevant municipal/regional corporation, and the Tobago House of Assembly for towers located in Tobago
30	3.2.3 Technical Standards for Transport Networks	TSTT	TSTT queries the legitimacy of this section in a document that treats with wireless networks, as in each subsection's case, the Authority seems to equate wired transport systems with public telecommunications wired transport systems.	The Authority should consider deletion of this section as it is inappropriate in fact and law to equate private wired telecommunications networks with public wired	The Authority agrees with TSTT that private wired transport networks are not subject to these technical standards in section 3.2.3.3. However, "transport networks", as used in this document, refers to the portion of a public telecommunications network

			Given that the standard of care for public telecommunications far exceeds the requirements for private telecommunications systems, TSTT queries the legitimacy of the Authority seeking to regulate the operations of private networks – something which is *ultra vires* its powers as established by the Act. The Authority is reminded that despite being a spectrum management authority, the Authority's oversight of private sector use of spectrum does not allow the Authority the discretion to advise, recommend or direct operators of private telecommunications networks on how to use their wired network elements and property once there is no evidence of spurious emissions causing detected interference.	telecommunications networks with respect to: ○ Standard of care and quality of operation required; and ○ The Authority's legal authority to regulate one, and not the other. Consequently, where this section seeks to provide regulations for wired private networks, this section is u*ltra vires* the Authority's powers and is evidence of illegal regulatory over-reach.	that is between the core and the access network, and for broadcasting, between the broadcasting studio and the transmitter, which is commonly known as a studio-to-transmitter link (STL). For clarity, the following definition reflecting this was added to section 1.10. "Transport Network: In the context of this document, this refers to the portion of a public telecommunications network that is between the core and the access network and for broadcasting, between the broadcasting studio and the transmitter, which is commonly known as a studio-to-transmitter link (STL)."

			The Act is clear: The Authority does not have oversight over the operations of wired private telecommunications networks.		
31	3.2.3 Technical Standards for Transport Networks	TSTT	It is noted that throughout this section the Authority cites its "Technical Standards for Public Fixed Telecommunications Networks" with the reference "in effect". While TSTT acknowledges that the Authority completed two rounds of consultation on the cited document, that document is not enforceable in law, as it has not undergone the necessary procedural steps to be converted from a framework outlining the Authority's preferences in its internal operations to an affirmative obligation that binds private parties – i.e. concessionaires – to undertake any action which constrains their	The Authority must remove all references from the subject document that its framework document "Technical Standards for Public Fixed Telecommunications Networks" is in effect.	The Authority disagrees with TSTT that references to *Technical Standards for Public Fixed Telecommunications Networks (in effect)* should be removed from the document. The technical standards proposed in sections 3.2.3.1 and 3.2.3.2 are identical to other standards already stated in the *Technical Standards for Public Fixed Telecommunications Networks (in effect)* . The purpose of referencing *Technical Standards for Public Fixed Telecommunications Networks* and highlighting particular sections is to direct readers to where the standards can

			constitutional right to the enjoyment of property. This matter was raised prior, and during the consultation on that document, and was inadequately addressed by the Authority (which quizzically cited another document that was unenforceable as its justification). It is hoped that the Authority reconsiders the facts before it and adjusts its modus operandi going forward. While S.18(1)(d) of the Act provides for the Authority establishing technical standards and S.45(2) provides for the Authority adopting "*preferred technical standards*", the adoption of these standards does not equate to the imposition of those standards on concessionaires and licensees without adherence to established law-making procedures. It could not have been the intention of	The Authority to acknowledge that any standard it proposes should be reduced to subsidiary legislative instruments, such as draft Regulations, which are subject to further consultation in accordance with the Authority's own consultation procedures.	be found instead of re-writing the standards. In the context of regulatory instruments, the term "in effect" means the current version of the regulatory instrument that has been approved and published on the Authority's website. The purpose of this consultation is to establish standards as prescribed in the Act. Once standards are approved and published, and are thereby in effect at the Authority, they are expected to be implemented by the industry. The Authority advises that enforcement can be pursued where the provisions of the Act, the regulations and the terms of

			lawmakers that the Authority would undertake any of its powers without adhering to the general due process that pertains to the establishment of laws and standards in Trinidad and Tobago. That process includes the reduction of the standards into subsidiary legislative instruments, which are thereafter Gazetted. The Authority's own Consultation Procedures recognizes this necessary step where, it requires the Authority to undertake an additional round of consultation when outcomes of a finalized Framework are reduced to draft Regulations. These draft Regulations are, according to the Authority's procedures, only forwarded to the line Ministry after it has published the DoRs pursuant to that consultation of the draft Regulations. The Ministry then sends the draft		concessions are breached. If the Authority deems that regulations are required to ensure compliance with these standards, the Authority will pursue.

			regulations (and, in this case standards) for onward approval by the Cabinet. Only when the draft Regulations are approved by the Cabinet (possibly pursuant to consultation with the National Standards Body, the TTBS) and subsequently Gazetted are the Regulations in force, subject to a debate on the negative resolution in Parliament within a specified period of the publication. Only then can a standard be deemed to be "in force". There is no evidence on the Authority's website that it has undertaken any consultation on the draft Regulations codifying its framework for Technical Standards for Public Fixed Networks. If no such draft Regulations have been published, the process to ratify its framework has not been begun.	The Authority to acknowledge that the subject document "Technical Standards for Wireless Networks" must be subject to the process of lawmaking, which includes, at a minimum, the reduction into Regulations, and the passage of same through appropriate authorizations.	

			Further, there is no evidence of there being any Telecommunications Regulations or standards being Gazetted since 2015. Accordingly, the Authority's framework document "Technical Standards for Public Fixed Telecommunications Networks" is NOT in effect. Accordingly: (i) all such references should be removed from the subject document; and (ii) the Authority must acknowledge in the DoRs to this round of consultation that the full process for ratification of the subject document is the reduction into draft Regulations, consultation on those draft Regulations prior to forwarding to the Authority's line		

			Ministry for onward proper lawmaking.		
32	3.2.3.3 Mud Volcanoes	TSTT	Mandatory Standard (30) states that *"If practicable…"*. As a result, this should be a discretionary standard.	Mandatory Standard (30) to be changed to a discretionary standard.	The Authority agrees with TSTT that mandatory standard 30: "As far as practicable, pole routes that support telecommunications aerial cables shall not be run in the proximity of mud volcanoes". should be changed to a discretionary standard. Former mandatory standard 30 is now discretionary standard 5 and has been amended, as follows: "(5) As far as practicable, pole routes that support telecommunications aerial cables should not be run in the proximity of mud volcanoes."
33	3.3.1 Technical Standards for Public Mobile Access Networks	TSTT	TSTT notes that through "Mandatory Standards" (31) and (32), the Authority seeks to direct how public telecommunications operators provision capacity for priority on their networks. First,	Mandatory Standards (31) and (32) are to be deleted as they attempt to apply powers that are *ultra vires* the Authority's authority under the Act.	The Authority disagrees with TSTT's recommendation and will retain mandatory standards 26 and 27, formerly mandatory standards 31 and 32. The Authority is mandated, pursuant to section 3(b)

			these are not standards, but an attempt at creating a regulatory obligation not enshrined in the Concession. TSTT notes that the Act does not provide the Authority with the power to do so. While the Act empowers the Authority to: - regulate physical interconnection between competitive telecommunications concessionaires; - regulate the access to telecommunications facilities such as wires, ducts, and poles; and - access the physical facilities of a network in a time of national emergency. The Act does not provide the Authority with the power to regulate intangible telecommunications resources, such as bandwidth or channels.		of the Act, to establish conditions for "the facilitation of the orderly development of a telecommunications system that serves to safeguard, enrich and strengthen the national, social, cultural and economic well-being of the society". Of importance is the need to ensure that telecommunication networks are sufficiently robust to withstand any breakdowns and yet continue to provide services. Thus, technical standards established pursuant to section 45(2) of the Act, which states, "Notwithstanding subsection (1), the Authority may identify, adopt or establish preferred technical standards", serve to enhance the robustness of wireless networks, and boost redundancy within key aspects of wireless networks. Moreover, in its efforts to establish conditions that would safeguard

			Without such explicit enabling powers, the Authority cannot require any concessionaire to utilize its resources in a way that is not in line with the requirements of the Concession. Without the Authority defining any enabling legislative provision that provides for the Authority to dictate the use of a concessionaire's intangible resources - such as bandwidth, channels and capacity - how an operator prioritizes the use of its resources is not subject to regulation by the Authority. These requirements are *ultra vires* the Authority's powers according to the Act, and should thus be deleted.		telecommunications systems, the Authority considers the establishment of technical standards relative to public mobile access networks to be crucial to strengthening these systems. The Authority acknowledges that bandwidth, channels and capacity are intangible resources. However, they are a by-product of physical telecommunications equipment and can be controlled in accordance with requisite needs.
34	3.3.2.1 Network Congestion	TSTT	Mandatory Standards (33) & (34) seeks to demand that transport networks are engineered to handle 120% of the installed traffic capacity in an RBS. First,	Without clear citation, Mandatory Requirements (33) & (34) are patently unreasonable and should be deleted.	The Authority acknowledges that transport networks should be engineered to handle the maximum capacity that RBSs are engineered to operate at. To ensure user

			this is not a technical standard, but instead the Authority seeking to establish an obligation which is not enshrined in the Concession. From a practical standpoint, the requirement is, other than unlawful, patently absurd. If an RBS should operate at 85% of its installed capacity, the Authority has not justified why transport network resources should be used to justify carriage of 120% of that installed capacity – a transport characteristic that will never be maintained even in a state of natural or manmade disaster. Thus, this rationale seems counterintuitive. The Authority provides no citation of where this demand arises from. Accordingly, questions arise: - Is there an international standard demanding this? - Are there research papers upon which this depends?	Without an estimate of the cost implication of this proposal, this requirement is not proportional or reasonable The Authority would be wholly irresponsible to propose a mandatory requirement that is both unreasonable and not proportional, compounded by its lack of citation.	telecommunication service during a major event, ITU recommends that RF traffic channel utilisation of an RBS should be equal to or < 85%. Therefore, RF transport networks should be engineered to handle up to 85% of the installed traffic capacity of an RBS. Mandatory standard 28, formerly mandatory standard 33, has been amended to reflect this, as follows: "(28) Public RF transport networks shall be engineered to handle a maximum of 85% of the access traffic capacity of an RBS site (ITU, E.811, 2017)." Further consideration of mandatory standard 34 revealed that ITU recommends that emergency traffic on networks (voice, video or data) have priority over ordinary traffic. This is achieved using various network priority and congestion

			-Why 120%, and not 110% or 150%? Is 120% arbitrary? In the absence of such clarification, this requirement does not meet the reasonable criteria of good law. This reinforces TSTT's earlier question: is the intention for this framework to be reduced to Regulations?		control mechanisms (ITU Y.1271 2014). Mandatory standard 29, formerly mandatory standard 34, has been amended, as follows: "(29) Public RF transport networks shall have the capability to prioritise emergency voice, video or data traffic above ordinary traffic."
35	3.3.2.3 Destruction by Vehicles	TSTT	Due to the nature of the issue and Licensees' and Concessionaires' inability to prevent it from occurring TSTT suggests that the Authority undertakes a public awareness program to inform the nation about the repercussions of destroying aerial fibre optic cables used in a transport network or studio transmitter link. TSTT welcomes the Authority's support in conducting the	The Authority to conduct a public awareness program to inform the nation about the dangers of destroying aerial fiber optic cables used in a transportation network or a studio transmitter link.	The Authority welcomes TSTT's suggestion that it conduct a public awareness programme to inform the population about the dangers of destroying aerial fibre optic cables and proposes to implement this programme in collaboration with key players in the telecommunications and broadcasting sectors. The Authority has commenced a Cable theft public education campaign which has been shared and commented on by both telecommunications and

			necessary outreach, as was done in the past.		broadcasting concessionaires at a recent industry meeting for that purpose.
36	3.3.2.4 Unauthorised Burning of Debris	TSTT	Because of the nature of the problem and Licensees' and Concessionaires' inability to prevent it, TSTT recommends that the Authority implements a public awareness campaign to educate the nation about the dangers of the burning of debris or rubbish on roadsides. TSTT welcomes the Authority's support in conducting the necessary outreach, as was done in the past.	The Authority to conduct a public awareness program to inform the nation about the repercussions of the burning of debris or rubbish on roadsides.	The Authority welcomes TSTT's idea that it conduct a public awareness program to inform the nation about the dangers of destroying aerial fiber optic cables and proposes to implement this programme in collaboration with key players in the telecommunications and broadcasting sectors. We will seek to also implement a campaign on the impact of burning of debris and other related matters.
37	3.3.3 Technical Standards for Public Mobile Core Networks	TSTT	In Mandatory Standard (35), the Authority seeks to require that Core Network utilization should be 40% at peak. The Authority provides no citation of where this demand arises from. Questions about the reasonableness of this requirement arise:	The proposal Mandatory Standard (35) is a bad fit for the technology-neutral environment in which operators function in the domestic regulatory environment.	The Authority notes that ITU recommends that, to ensure users satisfaction during a major event, such as a natural disaster or its aftermath, packet data traffic utilisation on the core network should be equal or < 85%. This is relevant to networks that have N+X

			- Is there an international standard demanding this? - Are there research papers upon which this depends? - Why 40%, and not 70% or 85? Is 40% arbitrary? Whereas TSTT may recognize the metric from legacy TDM telecommunications networks' redundant designs, given the advent of cloud computing and distributed virtual resource allocation, this absolute requirement is archaic and unjustifiable. This is all the more troubling and inappropriate in the technology-neutral environment in which the Authority established in its Policy Frameworks of 2005 onward. Further, the Authority has not provided any further analysis on the expected cost implication of maintaining this archaic metric in an environment of shrinking	With the advent of cloud computing and distributed virtual resource allocation, this absolute requirement is even more archaic and unjustifiable. The Authority should withdraw this proposal and revert to the industry with contemporary standards that are appropriate for the evolution of network management techniques in use by the industry for the last decade.	route scenarios. For networks that have 1+1 route scenarios, traffic utilisation on the core network shall be equal to or < 40%. Mandatory standard 30, formerly mandatory standard 35, has been amended to reflect this, as follows: "(30) Public mobile core networks with 1+1 redundancy levels shall be engineered for a maximum peak packet data traffic utilisation of 40%. Public mobile core networks with N+X (X is equal to multiples of 1) redundancy levels shall be engineered for a maximum peak packet data traffic utilisation of 85% (ITU, E.811 2017)".

			margins, necessitating increased operational efficiencies. Indeed, this proposal will have an impact of increasing interconnection, customer and wholesale rates as the cost of maintaining 60% unused capacity would have to be recovered from some source. Further, the Authority has to clarify how this will be measured and validated. In the absence of such clarification, this requirement does not meet the reasonable criteria of good law. This reinforces TSTT's earlier question: is the intention for this framework to be reduced to Regulations?		
38	3.3.3 Technical Standards for	TSTT	TSTT requests that the Authority defines what is meant by	The Authority should define what is meant by	Mandatory standard 31, formally mandatory standard 36, has been

	Public Mobile Core Networks		"redundancy" in Mandatory Standard (36).	"redundancy" in Mandatory Standard (36).	amended to exclude the word "redundancy", as follows: "(31) Public mobile core networks shall be engineered to ensure service availability of 99.999%."
39	3.3.4 Technical Standards for Radiocommunications Towers	TSTT	The Authority cites the Town and Country Planning Division's "*Planning Policy for Public Mobile Telecommunication Services (2007)*", however, the Authority is advised to utilize documents that have been formally adopted.	The Authority is advised to utilize documents that have been formally adopted.	The *Planning Policy for Public Mobile Telecommunication Services (2007)* is a published document of the TCPD and can be found on the DevelopTT website. According to the TCPD's policy, tower construction requires consent or approvals from the Trinidad and Tobago Civil Aviation Authority (TTCAA), depending on the location of the tower in relation to aerodromes. The TTCAA has adopted standards and procedures *from the International Civil Aviation Organization (ICAO) Annex 14 to the Convention on International Civil Aviation standards and recommended practices, volumes 1 & 2*, with

					respect to the construction of towers that are located in restricted radiuses around aerodromes.
40	3.3.4 Technical Standards for Radiocommunications Towers	TSTT	TSTT notes significant lack of clarity with respect to Mandatory Standard (39). First TSTT, would like the Authority to identify what is deemed to be "in proximity" of aerodomes. This clarity would be gained through the identification of a distance from a key boundary, or distance from a prominent feature in the aerodrome. While it is recognized that the TCPD land use guidelines referenced discusses the varying radiuses and the lighting and markings necessary surrounding an aerodome, the Authority's language is particularly vague with respect to the applicability of this particular standard. By being more precise in the radius	The Authority to advise with respect to Mandatory Standard (39): - The precise meaning of "in proximity" to aerodomes; and - The source of the height limitation proposed.	The term "in proximity", as was used in technical standards 38 and 39, refers to the radiuses from aerodromes which the height of structures must adhere to specifications stated in ICAO's Annex 14 document. The radiuses vary according to the type of aerodrome. For airports, the restricted radius is 15 kilometres and towers height specifications for towers located within this radius are stated in chapter 6 of ICAO's Annex 14 document, volume 1. For heliports, the restricted radius is 3.5 kilometres and tower height specifications for towers located within this radius are stated in chapter 6 of ICAO's Annex 14 document, volume 2.

			of interest, operators would be able to adequately correlate between the existing requirements of TCPD and the proposed obligation of the Authority. Second, TSTT seeks confirmation as to whether the height identified was sourced from some other planning document developed by any State agency, or recognized national or international bodies. To be clear: the explanation preceding the definition of standards, talks in detail about other technical matters being defined, the Authority was not explicit of the source of the height limitation (in imperial feet not metric). TSTT requests that the Authority states where the source of the height limitation originates from.		Mandatory standard 32, formerly mandatory standard 37, has been amended to reflect this, as follows: "(32) The height of radiocommunications towers located within a height restriction radius of an aerodrome shall comply with tower height specifications adopted by the Trinidad and Tobago Civil Aviation Authority, which are stated in the International Civil Aviation Organization (ICAO) Annex 14, as follows: (a) The height of radiocommunications towers located within a radius of 15 kilometres from an airport shall comply with the specifications stated in chapter 4 of the International Civil Aviation Organization (ICAO) Annex 14, volume 1. (b) The height of radiocommunications

					towers located within a radius of 3.5 kilometres from a heliport/helideck shall comply with the specifications stated in chapter 4 of the International Civil Aviation Organization (ICAO) Annex 14, volume 2." Mandatory standard 33, formerly mandatory standard 38, has been amended, as follows: "(33) Radiocommunications towers shall comply with the finishing and marking specifications stated in chapter 6 of the International Civil Aviation Organization (ICAO) Annex 14, volume 1." All tower builds located within the restricted radius around aerodromes must be approved by the TTCAA. The TTCAA must also be notified of the construction of towers that are located outside of the restricted

					radiuses which are higher than 100 metres. The following statement indicating the required approval and notification in relation to the TTCAA regarding tower builds has been included in section 3.3.4.: "Note: All radiocommunications tower builds carried out within the restricted radius around an aerodrome are subject to approval by the TTCAA. The TTCAA is to also be notified of radiocommunications tower builds outside of the restricted radiuses around an aerodrome that exceed 110 metres in height."
41	3.3.5 Technical Standards for Structures Used to House Communications Equipment	TSTT	TSTT is perplexed why buildings that do not house active communications equipment would be required to deploy the stand-by power facilities and batteries proposed. TSTT suggests that the Authority is seeking to encourage this	The Authority to amend Mandatory Standard (40) to state that "Buildings that house active communications equipment shall be equipped with stand-by power facilities and batteries".	The Authority welcomes TSTT's recommendation and acknowledges that buildings which do not house active communications equipment should not be required to have standby power facilities and batteries.

			obligation only on buildings which house active telecommunications equipment. If not, and the expectation that all buildings are so outfitted, the Authority should explain why such an unnecessary expense is proposed. If TSTT's assumption is correct, then Mandatory Standard (40) should be amended to state that "Buildings that house <u>active</u> communications equipment shall be equipped with stand-by power facilities and batteries".		Mandatory standard 34, formerly mandatory standard 40, has been amended to reflect this, as follows: "(34) Buildings that house active communications equipment shall be equipped with standby power facilities."
42	3.3.5 Technical Standards for Structures Used to House Communications Equipment	TSTT	In this section TATT seeks to establish regulatory obligations which are neither technical nor within TATT's regulatory remit to dictate. Where TATT does express a legitimate technical requirement, TATT provides no citation to the legitimacy of the	TATT to limit its attempts at direction to only those matters that are under its authority as provided by the Act.	The Authority is mandated, pursuant to section 3(b) of the Act, to establish conditions for "the facilitation of the orderly development of a telecommunications system that serves to safeguard, enrich and strengthen the national, social,

			proposal, or provides no rationale to aid in evaluating the reasonableness of the proposal. Mandatory Standard 41(b) TATT has not identified the justification for the periods for which stand-by power facilities are to be maintained. - How did TATT determine that two days' fuel supply in "core urban sites" is appropriate and not an over-estimation that is unwieldly, onerous and impractical? Please provide citation. - How did TATT determine that seven days' fuel supply in "selected important rural sites" is appropriate and not an over-estimation that is unwieldly, onerous and impractical? Please provide citation. - If TATT can provide no citation or reference from which these periods were	Mandatory Standard 41(b) TATT to provide citations and justifications for: - The two day period for back up supply in "core urban sites" - The seven day period for back up supply in	cultural and economic well-being of the society". Of importance, is the need to ensure that telecommunications networks, are sufficiently robust to withstand breakdowns and yet continue to provide services. Thus, technical standards that apply to structures that house communications equipment are integral for resiliency and redundancy in telecommunications systems to safeguard against the effects of a natural or man-made disaster. The standby power supply operating periods suggested in the document are based on the operating environment in Trinidad and Tobago and the region, in relation to prolonged power outages that may occur due to natural or man-made disasters. TSTT is also reminded that these timeframes were discussed and agreed to by representatives of the operators who

			derived, are the periods arbitrary? - Who determines which sites are "core urban" or "selected important rural"? - As the definition of the sites to which this applies is overly broad, this requirement could apply to RBS's. Has TATT done any cost-impact assessment of the cost it would take to maintain this obligation in all RBS's across the country? If TATT seeks to defend this requirement, a regulatory obligation that is not enshrined in the Concession, TATT should at least respond with citations, as requested above, or its cost estimate for the implementation of this requirement. TATT must be aware that by increasing the cost of operations, associated rates – interconnection,	"selected important rural sites" - If no citation can be provides, TATT to concede its proposed timeframes are arbitrary.	attended the TWG meetings. TSTT is also advised that the Authority has received a letter from Infolink Services Limited, which provides switching and clearinghouse financial services to the banking sector in Trinidad and Tobago. In this letter, Infolink referred to the power outages that occurred in December 2021 and February 2022 (the island-wide 12-hour power outage), and stated "In both instances, two major national service providers, T&TEC and TSTT, were unable to provide the quality services required to support the payments business and resulted in many of the networks' customers, both retail and corporate, being unable to conduct business for several hours…… The micro and small businesses were significantly impacted, as they are the least able to afford built-in redundancy within their infrastructure…….As the country embarks on digital transformation……the availability

			wholesale and retail – are also likely to increase, as such TATT could not be making these demands unreasonably without the associated research and impact assessment completed. Mandatory Standards 42 & 46 While TSTT agrees that securing one's equipment, as well as the shelter which houses it, is important for the maintained operations of a public telecommunications network, TATT's directing of this requirement is outside of the scope of matters under its discretion according to the Act. TSTT does welcome TATT's acknowledgment that the securing of equipment and facilities are essential, and that any action that compromises the security of equipment should be soundly resisted.		and reliability of telecommunication services is a key pillar to effect such changes". These standards are meant to mitigate the effects of such prolonged power outages. Power outages due to severe natural disasters can be reasonably expected to have a duration of at least 24 hours. Two different standby power supply run times are stated for urban core sites and rural sites, with the time for the rural sites being longer. This is because during the aftermath of a natural disaster, access to rural areas may take more time, as well as be impassable, and longer back up power supply time may be required to keep telecommunications sites operating until maintenance can be carried out and power restored. All sites requiring standby power facilities in rural and urban areas are

			Mandatory Standard 45 TSTT notes that the definition of "outdoor cabinet" is without limitation and thus would include cabinets that house passive equipment. TATT has provided no rationale for: - why outdoor cabinets which house passive equipment exclusively should be required to have backup power generators; and - The citation from which the back-up power supply period of six (6) hours was derived. Was this another arbitrary time standard? - Is this six (6) hour period contrary to the period is Mandatory Standard 41 (b)? If not, please provide the cost-impact assessment of the implementation of this proposal. Mandatory Standard 47	TATT to advise on the proposed process to define "core urban" and "selected important rural" sites.	now referred to as key sites in the document. Mandatory standard 35, formerly mandatory standard 41, has been amended to reflect this, as follows: "(35) Standby power facilities shall have the following features: (a) Automatic load transfer (b) Capability of supporting full equipment and building ancillary service loads for a period of two days without refuelling for key urban sites, and one week for key rural sites. Note: The word key is used in the sense that this site supports other sites in the network." Despite the cost of installing and maintaining standby power facilities at RBS sites, it is a common practice throughout the telecommunications industry, as indicated by the TWG. This is based on the fact that service availability

			First, TATT has not defined what a "controlled site" means. Accordingly, it is impossible to qualify or quantify accurately the impact of this proposal. Further, TATT has no authority under the Act to define the mechanisms a concessionaire or licensee uses to secure its equipment, facilities or sites. Accordingly, TATT has no authority to mandate any single mechanism or, as provided in the subject document, a combination of mechanisms to secure a site, facility or equipment.	TATT to provide a cost-impact assessment of the implementation of this proposal across the RBS's of the country. Mandatory Standards (42) & (46) TATT should delete as this requirement is outside its remit according to the Act. TATT is not a specialist in security services and thus is not in a statutory position to direct.	is a high priority in this sector. In the Authority's opinion, such a cost-impact assessment is not required. The Authority disagrees with TSTT's recommendation and will retain mandatory standards 36 and 40, formerly mandatory standards 42 and 46. These standards treat with the resilience of telecommunications and free-to-air (FTA) broadcasting infrastructure, against sabotage/theft. The technical standard forms part of the Authority's mandate to ensure that telecommunications networks are implemented in a way to safeguard the social well-being of the nation, in accordance with section 3 (b) of the Act. The Authority agrees with TSTT that only cabinets that house active equipment should have standby power. Mandatory standard 39,

				Mandatory Standard (45) TATT to clarify why cabinets which house passive equipment would be required to have back-up power generators. TATT to provide the citation for the definition of the six (6) hour period. TATT to clarify whether Mandatory Standard 41(b) or Mandatory Standard (45) has precedence.	formerly mandatory standard 45, has been amended, as follows: "(39) Outdoor cabinets that house active electronics but do not have standby power generators shall have standby power batteries, fuel cell technology or solar panels capable of supporting full equipment load for a minimum period of six hours." The six-hour standby power supply operating periods suggested in mandatory standard 39 is based on the operating environment in Trinidad and Tobago in relation to power outages, as discussed and agreed upon by the TWG. Mandatory standard 35 (b), formerly mandatory standard 41 (b), is for buildings, while mandatory standard 39, formerly mandatory standard 45, is for outside cabinets that are not equipped with standby generators.

				TATT to provide cost-impact assessment of the implementation of this proposal	Notwithstanding the cost of both installing and maintaining standby power facilities at RBS sites, it is a common practice throughout the telecommunications industry. This is based on the fact that service availability is a high priority in this sector. Mandatory standard 38, formerly mandatory standard 44, has been amended, as follows: "(38) Outdoor cabinets used to house RBS equipment shall be wired to accommodate standby power that would support full equipment and building ancillary service loads and charge standby power batteries." It is a common practice throughout the telecommunications and broadcasting industry that

					maintenance of standby power supplies is carried out during extended power outages. This involves the refuelling of power generators and the installation of mobile generators to charge batteries and keep key aspects of a site operational. The following statement that reflects this best practice of standby power supply maintenance during extended power outages has been included in section 3.3.5: "Note: During power outages that last longer than the run time of standby power supply systems, relevant standby generators are to be refuelled and mobile generators are to be deployed at sites that operate with backup batteries only." The Authority has included in section 1.10 the following definition: "Controlled Site: In the context of this document, a controlled site refers to a site where

				Mandatory Standard (47) TATT to define "controlled site." Otherwise, TATT to delete as this requirement is outside its remit according to the Act. TATT is not a specialist in security services and thus is not in a statutory position to direct.	communications equipment is housed and entrance to the site is controlled by the owner or occupant of the site." The Authority disagrees with TSTT's recommendation and will retain mandatory standard 41, formerly mandatory standard 47, since the standard treats with the resilience of telecommunications and FTA broadcasting infrastructure against sabotage/theft. The technical standard forms part of the Authority's mandate to ensure that telecommunications networks are implemented in a way to safeguard the social well-being of the nation, in accordance with section 3 (b) of the Act.
43	3.3.6 Technical Standards for Radiocommunications Equipment Located in	TSTT	This section highlights the concern raised with respect to section 1.10.	Mandatory standard (48) should be deleted	The Authority disagrees with TSTT's recommendation and will retain mandatory standard 42, formerly mandatory standard 48.

	Industrial Environments		In mandatory standard (48) the Authority superimposes two differing zoning criteria as equivalent. However, a review of the references criteria, these frameworks use distinct methods of definition which are not the same. Consequently, a location deemed Class 1, Division 1 may not meet the same conditions to be determined Zone 0. This creates uncertainty as to when these particular mandatory requirements will be applied. Consider a licensee (called Party A) deeming that an area, which otherwise may be classified Zone 0 in the UK, is not to be so treated and operates ignoring the possible classification. Who is the appropriate agency to correct them? Surely not the Authority as it is not empowered in statute to determine such classification.		Division 1 and Division 2 are subsets of Class 1 type hazardous location. Zone 0, Zone 1 and Zone 2 are hazardous environment conditions that could exist within Class 1 locations or on their own. Each class of hazardous location and hazardous environment is individually referred to in the standard using the word “or”. The Class 1 Division 1 or Division 2; and Zone 0, Zone 1 or Zone 2 hazardous classifications are international classifications that have been adopted by the Ministry of Energy and Energy Industries of Trinidad and Tobago. Wireless network operators provide service to companies within the oil and gas industry and the radiocommunications equipment utilised needs to be designed to withstand the effects of an industrial accident.

			The scenario can get more complicated: If another licensee (called Party B) complains about the lack of adherence by Party A, due to Party B's deeming of the environment to meet the criteria for Class 1, Division 2, to whom do they complain? Which agency validates the actual classification of the area? Who is responsible if there is an accident? The Authority is, despite its best efforts, creating a bigger problem by trying to determine matters outside its scope of expertise. In this regard, there should be collaboration with the Ministry of Energy, the Office of Disaster Preparedness and Management, the Ministry of National Security, TCPD and the TTBS to determine the appropriate administrative framework to facilitate proper, practical mores of operational management before seeking to		Mandatory standard 42, formerly mandatory standard 48, has been amended to include the term "Zone 2", as follows: "(42) Radiocommunications equipment located in industrial spaces that are classified as Class 1, Division 1 or Division 2 locations or Zone 0, Zone 1 or Zone 2 environments shall comply with standards that mitigate the effects of hazards present within these types of locations or environments."

			take the steps it is proposing in this document. To that end, mandatory standard (48) should be deleted until the necessary frameworks are developed with the appropriate administrative agencies defined, to facilitate the management and enforcement of its proposal.		
44	4 Redundancy in Transport Networks of Public Mobile Telecommunications and Broadband Wireless Access Networks	TSTT	Mandatory Standards 49 & 50 The Authority has no legal mandate to direct parties on how to manage their resources, via the deployment of spares in their network, or the manner in which such spares – if procured – are stored. To be clear, TSTT does object to the standard engineering practice proposed. TSTT objects to the Authority seeking to apply powers that are not conferred upon it by the Act.	Mandatory Standards 49 & 50 should be either: (i) Deleted; or Converted to discretionary standards or general statements of advice.	The Authority disagrees with TSTT that mandatory standards 43 and 44, formerly mandatory standards 49 and 50, should be deleted or converted to discretionary standards. The intention of mandatory standards 43 and 44 is not to direct operators on how to manage their resources but to minimise the length of time of the disruption of service if a microwave link became inoperable due to a natural or man-made disaster.

					Minimising the length of time of the disruption of a telecommunications service promotes the interest of the consumer regarding the quality of service being provided to consumers. Therefore, it is envisioned that mandatory standards 43 and 44 establish standards that would safeguard and strengthen the telecommunications systems, to promote resiliency and redundancy for the provision of services in Trinidad and Tobago.
45	4 Redundancy in Transport Networks of Public Mobile Telecommunications and Broadband Wireless Access Networks	TSTT	The Authority has no mandate or authority in law to direct concessionaires or licensees on the engineering choices they make to implement their networks. The application of ring, star or other topologies is at the discretion of the operator based on a number of factors, including costs. Neither the Act nor the Concession provides the	The Authority should delete Discretionary Standards (5) and (6) as: - The Authority is outside of its regulatory remit to seek to impinge or curtail the discretion of operators in designing their network topologies. - The Authority is outside its regulatory remit and irresponsible to create	The Authority disagrees with TSTT's recommendation and will retain discretionary standards 6 and 7, formerly discretionary standards 5 and 6. Implementing a ring topology within a transport network will create two diverse paths on which the network could be operated if a path was to become inoperable due to a natural or man-made disaster. The capability of switching to a redundant path would minimise the length of time of the

			Authority with the discretion to interfere, impinge or curtail the absolute discretion of the concessionaire on how it will use its resources in the way deemed most efficient to it. Consequently, both Discretionary Standards (5) and (6) are inappropriate and are evidence of significant regulatory over-reach by the Authority. Further, that the Authority would recommend or express any opinion on the civil construction modality of implementing a preferred network topology demonstrates an entity which is not at all familiar with its responsibilities and authorities. The Authority should be aware of the significant cost involved in undertaking underground ducting. That the process is very disruptive and thus involves significant planning with local authorities goes without saying.	distortionary effects with respect to the civil construction modality associated with a network topology. In both cases the Authority's recommendations are without citation and are arbitrary.	disruption of service, thus promoting the interest of the consumer regarding the quality of service being provided. Based on discussions amongst the TWG members who drafted this document, which included representatives from telecommunications network operators, it was noted that the implementation of a ring topology as a form of redundancy in transport networks is best practice. Although the use of a ring topology to provide redundancy within transport network is best practice, the standards that refer to the use of a ring topology are discretionary and do not impinge on or curtail the discretion of operators in designing their respective networks. In this vein, with regard to urban areas, where the use of a wired transport network is more efficient due to the high density of customer locations, the chance of low-hanging aerial

			Has the Authority undertaken any cost-impact assessment before recommending the proposals in Discretionary Standard (5)? Without such, even the recommendation is irresponsible and can have a deleterious and distortionary impact on the marketplace (as it relates to gaining planning approval from necessary bodies – creating an entrenched bias that is unfounded by due diligence and is thus arbitrary). In summary: The Authority is outside of its regulatory remit to seek to impinge or curtail the discretion of operators in designing their network topologies. Further, the Authority is outside its regulatory remit and irresponsible to create distortionary effects with respect to the civil construction modality associated with a network topology. In both cases, the		cables being damaged by vehicles is high. Thus, the running of cables in underground ducts is recommended. The Authority acknowledges that the cost involved in underground ducting can be significant and the process requires careful consideration and planning, especially in relation to smaller concessionaires. As such, the Authority considers that this standard should be maintained as discretionary, thereby detailing the minimum requirements for these types of networks whilst taking into consideration the financial constraints that may exist. Hence, the standards that refer to the deployment of a ring topology are discretionary. The option to utilise point-to-point links through rural locations would reduce the cost to operators in implementing the required network infrastructure.

			Authority made these recommendations WITHOUT citation. In light of the above, Discretionary Standards (5) and (6) should both be deleted. Instead, to enforce the objective of seeking redundancy, it is sufficient to dictate the TECHNICAL STANDARD of network uptime alone. It should be at the discretion of the engineers of the concessionaire/ licensees (with actual experience in the field) to determine the mechanism by which the technical standard is maintained.		
46	5 Redundancy in Broadcast Systems	TSTT	The Authority is acting beyond its remit to require operational obligations of broadcasters that are not enshrined in the Act, the Concession and Licence of operation and the Broadcast Code. These are the only	The Authority to review all mandatory standards in this section and ensure that they are lawful.	The Authority clarifies that it can, pursuant to section 45(2) of the Act, identify, adopt or establish preferred technical standards for dissemination to its concessionaires and licensees which include FTA broadcasters. Where preferred

			instruments by law that can be used to regulate the operations of a broadcast concessionaire. In that context, the mandatory standards proposed in this section should be reviewed.		technical standards are identified, adopted or established, these standards will apply to the respective target audience, as directed by the Authority. Further, the Authority clarifies that the standards set out pursuant to section 45(2) of the Act are not demarcated in its application. These standards relate not only to telecommunications concessionaires or licensees but to all concessionaires and licensees, where applicable. The purpose of this document is to establish technical standards that enhance the robustness of wireless networks and boost redundancy within key aspects of wireless networks. FTA broadcasters operate wireless equipment in their STLs and at the transmitter and, therefore, FTA broadcasting facilities should also be referred to in this document. Implementing redundancy in the operations of FTA broadcasters

					would minimise the service downtime experienced at both the studio and the transmitter. The Authority thus considers it suitable to establish these mandatory standards to mitigate the effects of disasters that may damage broadcasting equipment.
47	5.1 Studio-to-Transmitter Links	TSTT	Mandatory Standard (51)- This standard seeks to make obligations on broadcasters which are not included in the concession of operation. Further, there is no requirement in, and cannot be a legitimate requirement of, any licence to oblige the licensee to: a) Acquire another licence; or b) establish a redundant wired facility. Accordingly, both aspects of this requirement are unlawful, and worse, not justified by any presented cost-impact	Delete Mandatory Standard 51.	The Authority disagrees with TSTT's recommendation and will retain mandatory standard 45, formerly mandatory standard 51. The use of a point-to-point STL is a best practice within the FTA broadcasting sector in Trinidad and Tobago. The setting up of a redundant point-to point STL does not require the acquisition of another radiocommunications licence. The only requirements for a redundant point-to-point STL are standby transmit and receive equipment and antennas. Mandatory standards 45 (a) and 45(b), formerly mandatory standards 51(a) and 51(b), have

			assessment, or citation of precedent. Consequently, in conjunction with being unlawful, this attempted extra-concession obligation is unreasonable and unjustifiable. This obligation is not reasonable enough to be established in law by Regulation. This should be deleted. Mandatory Standard (53)- The Authority should define what a "reasonable timeframe" means – at least at the outer limit - as the shorter the timeframe, the greater the cost for such activity. Until such is clarified, this obligation is not precise enough to be established in law by Regulation. Mandatory Standard (55)- The Authority to define what are the specifications for "suitable antennas".		been amended to reflect this, as follows: "(45) Redundant transport networks in STLs shall be deployed, as follows: (a) For transmitter sites that are located outside of the same urban area as the broadcasting studio, a standby point-to-point STL or spare equipment shall be utilised. (b) For transmitter sites that are located within the same urban area as the broadcasting studio, a redundant fibre optic STL, or a standby point-to-point STL or spare equipment shall be utilised." The use of a fibre optic STL provides a more efficient path between the studio and the transmitter, as well as a more robust link in the event of a hurricane. Technical standard 45 (b), however, gives broadcasters the option to utilise either spare STL equipment or an optical fibre link and therefore

					does not require broadcasters to purchase both. Having spare STL equipment is a best practice within the broadcasting industry and therefore implementing a standby STL should be at no additional cost. The use of fibre optic STLs is not common throughout the FTA broadcasting industry in Trinidad and Tobago; however, a broadcaster who can afford the cost of deploying a fibre optic STL may do so, due to its efficiency.
				Mandatory Standard 53 should be amended to define clearly what "reasonable timeframe" means.	The timeframe to restore service would vary due to sub-timeframes, such as the period between localising the failure, technical delay and fault correction time (ITU, E.800, 1994), as well as the delay in accessing the site where the fault has occurred. For example, if restoration is required at the receive end of an STL, and the time taken in transit to the receiver is delayed due

					to difficulty in accessing the receive site, the restoration process would be delayed. The time required to restore an STL, therefore, cannot be a defined period.
				The Authority to define what are the specifications for "suitable antennas".	Depending on the desired coverage area, an antenna capable of providing enough gain to generate the required FTA broadcasting signal strength has to be connected to the output of the transmitter. There are different types of FTA broadcasters (national, major territorial and minor territorial) operating in Trinidad and Tobago, and the coverage areas required by the various broadcasters differ. The specifications for broadcasting antennas will vary in accordance with their low-powered transmitter design and, therefore, the Authority cannot indicate antenna parameters, minimum or otherwise. However, antennas must be able to provide the required coverage that is in accordance with the

					concessionaire's obligation. Mandatory standard 49, formerly mandatory 55, has been amended to reflect this, as follows: "(49) Suitable antennas that are designed to provide the required coverage from the secondary transmitter, in accordance with concessionaire's obligations, shall be stored at the broadcasting studio."
48	5.2 Transmitters	TSTT	Mandatory Standards (56) and (57)- These obligations can be onerous to maintain indefinitely. Notwithstanding, they are an extra-concession obligation and thus unenforceable, they are further unreasonable as they propose an open-ended cost to be maintained. These obligations are not reasonable enough to be established in law by Regulation.	Delete Mandatory Standards 56 and 57.	FTA broadcasting and STL equipment, if damaged during a natural disaster, needs to be replaced within a short period. Storing spare equipment at the relevant site will minimise the disruption in services, which is crucial during the aftermath of a natural disaster. These recommendations were made by a representative of the Trinidad & Tobago Publishers & Broadcasters Association (TTPBA), who was a member of the TWG.

					In some instances when an FTA broadcasting transmitter becomes damaged during a natural disaster, the access roads to the transmitter site may become inaccessible, and the time taken to clear the roads will vary depending on the extent of the obstruction. The FTA broadcast can still be transmitted from a secondary site during the period taken to clear the roads and repair the primary transmitter, although coverage would be limited. The capability to keep the public aware of activities in the immediate aftermath of a natural disaster greatly outweighs the cost of implementing and maintaining a secondary site inclusive of a low-powered transmitter and antenna. There is no obligation that a secondary broadcasting site shall be in operational state during normal circumstances.