



Amendments

Robust Fiber
instructions Corrections
and additions

2023-06-01

Revision history:

In Amendments, only the last two revisions are displayed. If information about previous audits is needed, please contact Robust fiber support.

Date	Version	Revised by	Remarks
2023-06-01	1.5.1	Lars Björkman Technical Council, Robust Fiber	Addition of Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site. Consistency update of Main document and Appendix 4 Site and node (ver 1.5.1)
2023-03-01	1.5	Technical Council, Robust Fiber	Annual audit
2022-08-10	1.4.1	Technical Council, Robust Fiber	Revision of the annexes regarding the new Electronic Communications Act and new regulation for security: Main document Appendix 4 Site and nodes Sub-appendix 4.1 Robust sites for digital critical infrastructure protection Sub-appendix 6.1 Checklists, inspection Appendix 7 Fibre installation project
2022-03-01	1.4	Technical Council, Robust Fiber	Revision of appendix: Main document Appendix 2 Robust networks Sub-appendix 2.1 Robust networks, Attenuation calculation Appendix 3 Robust routing methods Appendix 4 Site och nod Sub-appendix 4.1 Robust sites for digital critical infrastructure protection Sub-appendix 6.1 Checklists, inspection Deleted attachments Sub-appendix 4.1.1 Robust site RSA template Sub-appendix 4.1.2 Robust site Routine and guidance_RSA
2021-09-01	1.3.3	Technical Council, Robust Fiber	Revision of appendix: Appendix 1 Terms and definitions Appendix 2 Robust networks Appendix 4 Robust sites and nodes
2021-05-07	1.3.2.2	Technical Council, Robust Fiber	Completion of Appendix 6 and Sub-Appendix 6.1 In accordance with PTS requirements in the inspection certificate.
01/03/2021	1.3.2 /1.3.2.1	a) Working group Robust Site b) Working group of inspectors	a) New Sub-appendix for Appendix 4 Robust Site & Nod. Sub-appendix 4.1 Robust Sites for digital critical infrastructure protection and two sub/sub appendix 4.1.1 Robust site RSA (excel) and 4.1.2 Routine and guidance for Risk and vulnerability analysis /RSA). b) Completion of Appendix 6 and Sub-Appendix 6.1 In accordance with SJV requirements in the inspection certificate. Introduced instructions for checking minimum requirements that cannot be checked visually. RF. Verified by inspection question to contractor and inspector.
17/08/2020	1.3.2	Technical Council, Robust Fiber	Amendments, supplements and corrections
25/11/2019	1.3.1	Technical Council, Robust Fiber	Amendments, supplements and corrections
01/04/2019	1.3	Technical Council, Robust Fiber	Amendments, supplements and corrections
10/04/2018	1.2	Technical Council, Robust Fiber	Supplements and corrections. Appendix 3
08/04/2018	1.2	Technical Council, Robust Fiber	Supplements and corrections.
03/04/2018	1.2	Technical Council, Robust Fiber	Amendments, supplements and corrections Appendix 4 Sites and nodes

01/04/2018	1.2	Technical Council, Robust Fiber	Amendments, supplements and corrections
15/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Correction of printing errors. Page breaks. Appendix 4
13/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Clarification of texts. Appendix 3
10/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Correction of printing errors. Page breaks. Appendix 2
22/02/2017	1.1	Jimmy Persson, Robust Fiber Lars Björkman, Robust Fiber	
01/07/2016	1.0	The project	Robust fibre installation

Applicable version for each document:

Appendix	Applicable version	Amended date
Main document	V1.5.1	2023-06-01
Appendix 1: Terms and definitions	V1.5	2023-03-01
Appendix 2: Robust networks	V1.5	2023-03-01
Sub-appendix 2.1 Robust networks, Attenuation calculation	V1.5	2023-03-01
Appendix 3: Robust routing methods	V1.5	2023-03-01
Appendix 4: Robust sites and nodes	V1.5.1	2023-06-01
Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site.	V1.5.1	2023-06-01
Appendix 5: Documentation	V1.5	2023-03-01
Appendix 6: Inspection	V1.5	2023-03-01
Sub-appendix 6.1: Checklists, inspection	V1.5	2023-03-01
Appendix 7: Fibre installation projects	V1.5	2023-03-01
Appendix 8: Ledningskollen	V1.5	2023-03-01

Amendments: Amendments of Instructions for Robust Fiber carried out 01/06/2023

Date 01/06/2023		
Document	Previous text	Addition or revised text
Main document	1.4 About the instructions	1.4 About the instructions Update with Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site.
Appendix 4: Robust sites and nodes	2.2.5.2 Auxiliary power systems MINIMUM REQUIREMENTS MINIMIKRAV Where there is a UPS with batteries, the site must have an externally accessible intake for connecting the auxiliary power unit (emergency power generator).	2.2.5.2 Auxiliary power systems MINIMUM REQUIREMENTS MINIMIKRAV Where there is a UPS with batteries, the site must have an externally accessible intake for connecting backup power units (backup generators) according to Subappendix 4.1 Instructions for connecting portable backup generator to a site.
Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site.		New Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site.

Amendments: Amendments of Instructions for Robust Fiber carried out 01/03/2023

Date 01/03/2023		
Document	Previous text	Addition or revised text
Main appendix	1.4 About the instructions Sub-appendix 2.2 Passive secure physical connection	1.4 About the instructions Sub-Annex 2.2 Passive secure physical connection transferred to Facilities with enhanced safety
Main appendix	1.4 About the instructions Bilaga 4.1: Robust sites for digital critical infrastructure protection	1.4 About the instructions Annex 4.1: Robust Site for Critical Digital Infrastructure Transferred to Facilities with Heightened Security
Main appendix	2.Responsibility for a fibre installation Being responsible for a fibre installation places considerable demands on the network owner and the organization that will plan, build and manage the plant. For a network owner, the Electronic Communications Act 2022:482 (LEK) applies if the network owner provides: Chapter 2 Notification of activities Section 1 Public electronic communications networks normally provided for remuneration or publicly available electronic communications services may be provided only upon notification to the regulatory authority.2 Kap Anmälan av verksamhet Below is a summary of the laws and regulations to which a network owner who provides electronic networks and services in accordance with LEK, must consider and relate to.	2.Responsibility for a fibre installation Being responsible for a fibre installation places considerable demands on the network owner and the organization that will plan, build and manage the plant. For a network owner, the Electronic Communications Act 2022:482 (LEK) applies if the network owner provides: Chapter 2 Notification of activities Section 1 Public electronic communications networks normally provided for remuneration or publicly available electronic communications services may be provided only upon notification to the regulatory authority.2 Kap Anmälan av verksamhet Below is a summary of the laws and regulations to which a network owner who provides electronic networks and services in accordance with LEK, must consider and relate to. The image is removed
Main appendix	2.1 Reliability For more information about requirements that apply to reliability for a fibre installation, please refer to the Swedish Post and Telecom Authority's regulations regarding requirements for reliability, PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services.	2.1 Reliability For more information about requirements that apply to reliability for a fibre installation, please refer to the Swedish Post and Telecom Authority's regulations and general advice on security of networks and services. regulations regarding requirements for reliability, PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations

		and general advice on security in networks and services.
Main appendix	3.1 General Laws, ordinances, statutes and regulations: <ul style="list-style-type: none"> • The Alarm Systems Act (1983:1097). • The Electronic Communications Act (2022:482) (LEK). • The Protection of Essential Facilities Act (2010:305) • The Work Environment Act (1977:1160) • The Swedish Work Environment Authority's provisions (AFS) • PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services 	3.1 General Governing laws, ordinances, statutes and regulations: <ul style="list-style-type: none"> • The Alarm Systems Act (1983:1097). • The Electronic Communications Act (2022:482) (LEK). • The Protection of Essential Facilities Act (2010:305) • The Work Environment Act (1977:1160) • The Swedish Work Environment Authority's provisions (AFS) • PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services
Main appendix	3.2 Networks For nodes, property networks or fibre outlets in apartment buildings, see "Robust property networks". An overview of cable routing according to the instructions EBR KJ 41:15, popularly known as the "Excavation bible"	3.2 Networks For nodes, property networks or fibre outlets in apartment buildings, see "Robust property networks". An overview of cable routing according to the instructions EBR KJ 41:21:15, popularly known as the "Excavation bible"
Main appendix	5 Reference dokument EBR KJ 41:09 Kabelförläggning max 14,5 KV (baseras på SS 424 14 37- 6)	5 Reference dockument EBR KJ 41:21:09 Kabelförläggning max 14,5 KV (based on baseras på SS 424 14 37- 6)
Appendix 2	2.1.1 Plan network structure Prior to commencing the work of routing ducts and fibre optic cables, a number of activities have to be performed.	2.1.1 Plan network structure Prior to commencing the work of routing ducts and fibre optic cables, a number of activities have to be performed. For further information see Appendix 7 Fiber Construction Projects.
Appendix 2	2.1.1 Plan network structure Before the work of planning the design of the network, a check must be carried out regarding any need for reinforcement measures for events that may deviate from the normal and that may involve serious disturbances in important societal functions. For facilities with requirements for enhanced security, Appendix 4 Robust site and node with sub-appendices and Sub-Appendix 2.2 Passive secure physical connection are used. Appendix 2.2 is a guide with requirements for how the physical protection for electronic communication is to be supplemented between sites and between site and user node to withstand serious disturbances. The requirements include both requirements for new construction and requirements for rebuilding an existing facility. Note. An existing facility must have undergone a risk and vulnerability analysis (RSA). An existing facility that is being upgraded will undergo a renewed RSA. Threat directories and RSA for Site and Node as well as Robust secure physical connection can be found under: https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur . Based on the above control, a rough design is carried out that	The paragraph is divided into two sections Network structure Before the work of planning the design of the network, a check must be carried out regarding any need for reinforcement measures for events that may deviate from the normal and that may involve serious disturbances in important societal functions. For facilities with requirements for enhanced security, Appendix 4 Robust site and node with sub-appendices and Sub-Appendix 2.2 Passive secure physical connection are used. Appendix 2.2 is a guide with requirements for how the physical protection for electronic communication is to be supplemented between sites and between site and user node to withstand serious disturbances. The requirements include both

	<p>contains the number of possible customers. A proposal is made for a network structure to cover the area, suitable installation technology, shaft lengths and the material in which the shaft takes place.</p> <p>Based on the network structure in the rough design, a detailed design is made that leads to a choice of size of optical cables and the number of splice units. Then select the type of cabinet or optical fibre chambers. Then, duct pipes must be selected to suit the optical cables selected for the system. It is recommended to plan some overcapacity for both fibre and ductwork.</p>	<p>requirements for new construction and requirements for rebuilding an existing facility.</p> <p>Based on the above control, a rough design is carried out that contains the number of possible customers. A proposal is made for a network structure to cover the area, suitable installation technology, shaft lengths and the material in which the shaft takes place.</p> <p>Based on the network structure in the rough design, a detailed design is made that leads to a choice of size of optical cables and the number of splice units. Then select the type of cabinet or optical fibre chambers. Then, duct pipes must be selected to suit the optical cables selected for the system. It is recommended to plan some overcapacity for both fibre and duct work.</p> <p>Network structure enhanced security</p> <p>For the completion of facilities with requirements for increased safety, the document Facilities with increased safety and function, Appendix 1, is used. Robust site for essential digital infrastructure and Appendix 2. Passive secure physical connection.</p> <p>Appendix 1. Robust site for socially important digital infrastructure is an instruction for how the physical protection of sites should be supplemented to be able to withstand serious disruptions. The requirements include requirements for new construction and for rebuilding existing facilities.</p> <p>Appendix 2. Passive secure physical connection constitutes an instruction with requirements for how the physical protection of electronic communications should be supplemented between sites and between site and user node in order to be able to withstand serious disturbances. The requirements include requirements for new construction and for rebuilding existing facilities.</p> <p>For the complete versions see: https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur/</p> <p>Note. An existing facility must have undergone a risk and vulnerability analysis (RSA). An existing facility that is being upgraded will undergo a renewed RSA. Threat directories and RSA for Site and Node as well as Robust secure physical connection can be found under: https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur.</p>
Appendix 2	<p>2.1.3 Permits</p> <p>Examples of permits include an opening permit, excavation permit, start permit and TA plan (traffic</p>	<p>2.1.3 Permits and land issues</p> <p>Examples of permits include an opening permit, excavation permit,</p>

	<p>arrangement plan). Different stakeholders may administer permits differently. There may be local regulations for the relevant landowner or road operator.</p> <p>List of the requisite permits that may be required in a project.</p> <ul style="list-style-type: none"> • General land permit from the local authority regarding the right to have cables in municipal land. • Cable location from landowner, e.g., local authority, Swedish Transport Administration or road operator. Regulates where the cable may be located. • Start permit (opening notification) from the landowner, e.g., local authority or road association. • Approved TA plan. For the Swedish Transport Administration see Permission for the placement of telecommunication lines. • Permission from the Swedish Transport Administration regarding the placement of telecommunication lines. The conditions for traffic and protective devices are obtained together with the decision on Permission for the placement of telecommunication lines. • Building consents. • Permits from pole route owners. • Consultation with the Country Administrative Board and/or the local authority regarding culture and the environment (watercourses, archaeological sites, alleys, unsuitable land, unique vegetation, cultural monuments). <p>MINIMUM REQUIREMENTS, PERMITS:</p> <ul style="list-style-type: none"> • Necessary permits must be obtained. • Land agreements must be drawn up between the network owner and affected landowners/road operators. • Local regulations must be complied with. 	<p>start permit and TA plan (traffic arrangement plan) —</p> <p>Different stakeholders may administer permits differently. There may be local regulations for the relevant landowner or road operator.</p> <p>Example list list of the requisite permits that may be required in a project.</p> <ul style="list-style-type: none"> ▪ General land permit from the local authority regarding the right to have cables in municipal land. ▪ Land agreements between the network owner and the landowners/plotowners. The agreement shall include the agreed cable position and, where applicable, where the connection of the house will take place. There are different types of land agreements, such as "markupplåtelseavtal, nyttjanderättsavtal, och ledningsrätt". ▪ Permits/decisions to dig from municipal and/or state road owners, ("Ledningstillstånd" Swedish Transport Administration) /track owners (railway)/ landowners, describing where to place new cables, restoration requirements and the duration of the installation work. ▪ In some cases, the above point may need to be supplemented with a start-up permit (opening notification) with landowners/road owners e.g. a municipality or a road association/community. ▪ Cable location from landowner, e.g., local authority, Swedish Transport Administration or road operator. Regulates where the cable may be located. • Co-location Agreement - Regulates the terms and conditions of co-location. • Approved TA plan according to the regulations of the road manager. (For the Swedish Transport Administration see Permission for the placement of telecommunication lines). • Permission from the Swedish Transport Administration regarding the placement of telecommunication lines. The conditions for traffic and protective devices are obtained together with the decision on Permission for the placement of telecommunication lines. For further information, see the Swedish Transport Administration's publication "Ledningsarbete inom det statliga vägområdet". • Building consents • Permits from pole route owners.
--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<ul style="list-style-type: none"> Cable indication queries are created in Ledningskollen (see Appendix 8 Ledningskollen) and any local procedures. 	<ul style="list-style-type: none"> Consultation with the County Administrative Board and/or the local authority regarding culture and the environment (watercourses, archaeological sites, alleys, unsuitable land, unique vegetation, cultural monuments). Consultation with the County Administrative Board if, outside areas with a detailed plan, buildings are to be erected, extensions made, other facilities carried out or other such measures are taken that may adversely affect traffic safety within a distance of twelve meters from a road area (Road Act 47§). <p>MINIMUM REQUIREMENTS, PERMITS AND AGREEMENTS:</p> <ul style="list-style-type: none"> Necessary permits must be obtained. Land agreements must be drawn up between the network owner and affected landowners/plot owners. The agreement shall include the agreed cable position and, where applicable, where the connection of houses will take place. Land agreements between the network owner and the road operator must be drawn up. The agreement shall include the agreed cable position. Local regulations must be complied with. Cable indication queries are created in Ledningskollen (see Appendix 8 Ledningskollen) and any local procedures.
Appendix 2	2.1 Preparations for routing of ducts and fibre optic cables	<p>New item</p> <p>2.1.6. Self-monitoring Located channeling is difficult to check why the contractor should carry out self-control.</p> <p>MINIMUM REQUIREMENT The contractor's quality plan must state how the contractor intends to carry out and document his own control. The inspection shall be carried out and documented per leg. Procedures for photo and self-checks must be checked with the customer before construction starts.</p>
Appendix 2	<p>2.2.3.1 Position measurement</p> <p>MINIMUM REQUIREMENTS, POSITION MEASUREMENT:</p> <ul style="list-style-type: none"> When drilling and pressing, the depth must be measured. 	<p>2.2.3.1 Position measurement</p> <p>MINIMUM REQUIREMENTS, POSITION MEASUREMENT:</p> <ul style="list-style-type: none"> When drilling and pressing, the depth must be measured in accordance with Annex 3.
Appendix 2	<p>2.2.3.2 Marking</p> <p>MINIMUM REQUIREMENTS, CABLE MARKING IN THE GROUND</p>	<p>2.2.3.2 Marking</p> <p>MINIMUM REQUIREMENTS, CABLE MARKING IN THE</p>

	<ul style="list-style-type: none"> The warning must be centred, at least 10 cm above the ducts. 	GROUND <ul style="list-style-type: none"> The marking should be centered approximately: at least 10 cm above the ducts
Appendix 2	2.3.1 Sealing of ducts MINIMUM REQUIREMENTS FOR SEALING OF DUCTS: <ul style="list-style-type: none"> The seals must be able to cope with a water column of at least 5 m.. 	2.3.1 Sealing of ducts MINIMUM REQUIREMENTS FOR SEALING OF DUCTS: The seals must be able to cope with a water column of at least 5 m (0,5 bar)..
Appendix 2	2.3.2 Underground routing Recommendations for underground routing: To avoid mistakes when splicing in optical fibre chambers and ground cabinets and to help with troubleshooting, cable from the A-side to the splice box should be marked with blue tape, cable from the splice box to the B-side should be marked with red tape and cable from the branch should be marked with green tape.	2.3.2 Underground routing Recommendations for underground routing: To avoid mistakes when splicing in optical fibre chambers and ground cabinets and to help with troubleshooting, cable from the A-side to the splice unit box should be marked with blue tape, cable from the splice unit box to the B-side should be marked with red tape and cable from the branch should be marked with green tape.
Appendix 2	2.3.2.2 Positioning of optical fibre chambers and cabinets MINIMUM REQUIREMENTS WHEN POSITIONING OUTDOOR GROUND CABINETS: <ul style="list-style-type: none"> Outdoor ground cabinets must be installed with the cabinet opening facing the street/road. 	2.3.2.2 Positioning of optical fibre chambers and cabinets MINIMUM REQUIREMENTS WHEN POSITIONING OUTDOOR GROUND CABINETS: <ul style="list-style-type: none"> Outdoor ground cabinets must, considering any risk of danger to persons during installation and servicing, be installed with the cabinet opening facing the street/road.
Appendix 2	2.3.2.6 Backfill masses MINIMUM REQUIREMENTS FOR FILLING MASSES <ul style="list-style-type: none"> Backfill surrounding when filling with stone, or other difficult ground A duct bed with a thickness of 0.1 m is laid under the duct. 	2.3.2.6 Backfill masses MINIKRAV PÅ FYLLNADSMASSOR <ul style="list-style-type: none"> Backfilling when existing masses at the bottom of the shaft do not meet the requirement for backfilling Backfill surrounding when filling with stone, or other difficult ground A duct bed with a thickness of 0.1 m is laid under the duct. A duct bed with backfilling material, and with a thickness of 0.1 m, calculated from the base of the shaft to the bottom of the lowest ducting pipe, shall be laid under the ducting pipe.
Appendix 2	2.3.4 The location of the intake of the duct in a building The position of the intake of the duct in a building (a property) is determined by the network owner in consultation with the property owner. The minimum requirements for connecting a villa are presented in the following points.	2.3.4 The location of the intake of the duct in a building A house refers to a villa or terraced house as an individual dwelling. For the connection of apartment buildings, residential, commercial premises, office premises see recommendation "Robusta fastighetsnät". The position of the intake of the duct in a house building (a property) is determined by the network owner in consultation with the house property owner. The minimum requirements for connecting a house villa are presented in the following points.
Appendix 2	2.3.4.1 Intake of duct above ground level in property Intake of ducts above ground level shall be determined by the	2.3.4.1 Intake of duct above ground level in property

	<p>network owner in consultation with the property owner. The basis for decisions is the network owners risk assessment and local regulations.</p> <p>MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS ABOVE GROUND LEVEL:</p> <ul style="list-style-type: none"> For introduction into the property, a hole must be drilled at an incline of at least 30°, with the highest point inside the property. Any search wire must be terminated at a screw or cable protection at the house shell. 	<p>Intake of ducts above ground level shall be determined by the network owner in consultation with the house property owner. The basis for decisions is the network owners risk assessment and local regulations.</p> <p>MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS ABOVE GROUND LEVEL:</p> <ul style="list-style-type: none"> For introduction into the property, For the cable insertion into the house, a hole must be drilled at an incline of at least 30°, with the highest point inside the house property. If search wire is used, it must be professionally attached and accessible according to the requirements of the network owner with maintaining insulation. Any search wire must be terminated at a screw or cable protection at the house shell.
Appendix 2	<p>2.3.4.2 Intake of duct below ground level</p> <p>Intake of ducts below ground level shall be determined by the network owner in consultation with the property owner. The basis for decisions is the network owners risk assessment and local regulations.</p> <p>MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCT BELOW GROUND LEVEL:</p> <ul style="list-style-type: none"> A hole must be drilled into the property at an incline of at least 30°, with the highest point inside the property. If the hole is drilled through the foundation's existing drainage protection, the protection must not be impaired, rather it must be reinstated. Any search wire must be terminated at a screw or cable protection at the house shell. 	<p>2.3.4.2 Intake of duct below ground level</p> <p>Intake of ducts below ground level shall be determined by the network owner in consultation with the house property owner. The basis for decisions is the network owners risk assessment and local regulations.</p> <p>MINIMIKRAV VID INTAG AV KANALISATION UNDER MARKNIVÅ:</p> <ul style="list-style-type: none"> A hole must be drilled into the house property at an incline of at least 30°, with the highest point inside the property. If the hole is drilled through the foundation's existing drainage protection, the protection must not be impaired, rather it must be reinstated. If search wire is used, it must be professionally attached and accessible according to the requirements of the network owner with maintaining insulation. Any search wire must be terminated at a screw or cable protection at the house shell.
Appendix 2	<p>2.3.5 Routing in lakes or watercourses</p> <p>MINIMUM REQUIREMENTS WHEN ROUTING IN LAKES OR WATERCOURSES:</p> <ul style="list-style-type: none"> Contact must also be made with the responsible authorities for the maritime traffic area in order to discuss the need for landmarking and information for the updating of nautical charts, both after laying and after removal/decommissioning. Requirements for position indication and delivery of digital data must also be established. When routing underwater cables, a loop must be located at both land attachments, ideally around the outside of a cement ring or equivalent, which then also has an anchoring function. 	<p>2.3.5 Routing in lakes and or watercourses</p> <p>MINIMUM REQUIREMENTS WHEN ROUTING IN LAKES AND OR WATERCOURSES:</p> <ul style="list-style-type: none"> Contact must also be made with the responsible authorities for the pilotage maritime traffic area in order to discuss the need for landmarking and information for the updating of nautical charts, both after laying and after removal/decommissioning. Requirements for position

	<ul style="list-style-type: none"> When crossing other ducts, such as water and sewage ducts, the duct/underwater cable must be routed under these. 	<p>indication and delivery of digital data must also be established..</p> <ul style="list-style-type: none"> When routing underwater cables, the cable must be secured from any tensile forces e.g. by making several turns/loops around a concrete filled drum/ring or similar at both landing points a loop must be located at both land attachments, ideally around the outside of a cement ring or equivalent, which then also has an anchoring function. When crossing other ducts, such as water and sewage ducts, the duct/underwater cable must be routed under these. If this is too difficult to implement, an alternative solution crossing agreement shall be drawn up with the relevant cable owner(s).
Appendix 2	<p>2.3.7 Installation at bridges MINIMUM REQUIREMENTS REGARDING INSTALLATION AT BRIDGES:</p> <ul style="list-style-type: none"> There must be a cable loop on at least one side of the bridge if the cable is a trunk fibre cable. Customer cables do not need to be looped. 	<p>2.3.7 Installation at bridges MINIMUM REQUIREMENTS REGARDING INSTALLATION FOR BRIDGE LAYING AT BRIDGES:</p> <ul style="list-style-type: none"> There must be a cable loop on at least one side of the bridge if the cable is a trunk fibre cable. Single customer cables usually do not need to be looped.
Appendix 2	<p>2.3.8 Routing in tunnels and culverts</p> <p>When routing in a tunnel, ducting in the form of ducts is not needed.</p> <p>As an alternative, fibre optic cables and ducts can be installed with a catenary or wire span.</p> <p>MINIMUM REQUIREMENTS FOR ROUTING IN A TUNNEL:</p> <ul style="list-style-type: none"> Material that is used must be classified for indoor use. Fibre optic cables or ducts must be placed on a cable ladder or clamped to the tunnel wall. Fibre optic cables or ducts must be secured with e.g., cable ties, in which case at least every third cable tie must be made of metal to prevent the cable falling down in the event of a fire. 	<p>2.3.8 Routing in tunnels and culverts</p> <p>When routing in a tunnel, ducting in the form of ducts is not needed.</p> <p>As an alternative, fibre optic cables and ducts can be installed with a catenary or wire span.</p> <p>MINIMUM REQUIREMENTS FOR ROUTING IN A TUNNEL:</p> <ul style="list-style-type: none"> Material that is used must be classified for indoor use. Fibre optic cables or ducts must be placed on a cable ladder or clamped to the tunnel wall alternative, fibre optic cables and ducts can be installed with a catenary or wire span. <p>Fibre optic cables or ducts must be secured with e.g., cable ties, in which case at least every third cable tie must be made of metal to prevent the cable falling down in the event of a fire.</p>
Appendix 2	<p>2.5 Cable management 2.5.1 General requirements MINIMUM REQUIREMENTS FOR HANDLING FIBRE OPTIC CABLE:</p> <ul style="list-style-type: none"> Loops must be placed at distribution points <i>where future groundworks can be anticipated</i>, for example by large trenches, roads and in the vicinity of urban areas where development can be expected to take place. Length and location of loops must be documented. 	<p>2.5 Cable management 2.5.1 General requirements MINIMUM REQUIREMENTS FOR HANDLING FIBRE OPTIC CABLE:</p> <ul style="list-style-type: none"> Loops must be placed at distribution points <i>where future groundworks can be anticipated</i>, for example by large trenches, roads and in the vicinity of urban areas where development can be expected to take place. Length and location of loops must be

		<p>documented.</p> <ul style="list-style-type: none"> • The laying of loops in the distribution points or optical fibre chambers shall be based on an assessment of future ground works, for example on larger groundworks, roads and in the vicinity of urban areas where settlements may take place. • Loops, placement, length and documentation should be done according to the recommendations of the network owner.
Appendix 2	<p>2.5.2 Routing fibre optic cable in optical fibre chambers and cabinets</p> <p>MINIMUM REQUIREMENTS WHEN ROUTING FIBRE OPTIC CABLE IN OPTICAL FIBRE CHAMBERS AND OUTDOOR SPLICE CABINETS:</p> <ul style="list-style-type: none"> • Loop must be placed in optical fibre chambers in order to facilitate future changes in the network, e.g., expanding, repairs, etc. 	<p>2.5.2 Routing fibre optic cable in optical fibre chambers and cabinets</p> <p>MINIMUM REQUIREMENTS WHEN ROUTING FIBRE OPTIC CABLE IN OPTICAL FIBRE CHAMBERS AND OUTDOOR SPLICE CABINETS:</p> <ul style="list-style-type: none"> • Loop must be placed in optical fibre chambers in order to facilitate future changes in the network, e.g., expanding, repairs, etc.
Appendix 2	<p>2.5.5 Splicing units</p> <p>The fibre optic cable's splice is protected in a splicing unit. Splicing units in the form of splice boxes or splice cabinets are selected according to the environment in which they are placed, the number of fibres to be spliced, as well as the cables and any microducts that are to be connected. Always following the manufacturer's instructions regarding temperature, pressure sealing, strain relief, cable twist, bend radii, splice holders, etc. Splice boxes are normally intended for direct routing in the ground or optical fibre chambers. Splice cabinets are available for installation outdoors in an outdoor splice cabinet and for installation in an indoor environment. A wall box for outdoor use is a splice cabinet and outdoor splice cabinet in one unit. A facade box is a box located on the facade of a building and used for splicing fibre optic cable for the building.</p> <p>MINIMUM REQUIREMENTS FOR SPLICING BOXES AND WALL BOXES:</p> <p>MINIMUM REQUIREMENTS FOR FACADE BOXES:</p> <p>MINIMUM REQUIREMENTS REGARDING SPLICING CABINETS:</p>	<p>2.5.5 Splicing units</p> <p>The fibre optic cable's splice is protected in a splicing unit. Splicing units in the form of splice boxes or splice cabinets are selected according to the environment in which they are placed, the number of fibres to be spliced, as well as the cables and any microducts that are to be connected. Always following the manufacturer's instructions regarding temperature, pressure sealing, strain relief, cable twist, bend radii, splice holders, etc. Splice boxes are normally intended for direct routing in the ground or optical fibre chambers. Splice cabinets are available for installation outdoors in an outdoor splice cabinet and for installation in an indoor environment. A wall box for outdoor use is a splice cabinet and outdoor splice cabinet in one unit. A facade box is a box located on the facade of a house building and used for splicing fibre optic cable for the house building. Splice units can also include intermediate pieces and connectors.</p> <p>MINIMUM REQUIREMENTS FOR SPLICING BOXES AND WALL BOXES:</p> <p>MINIMUM REQUIREMENTS FOR FACADE BOXES:</p> <p>MINIMUM REQUIREMENTS REGARDING SPLICING CABINETS:</p> <p>MINIMUM REQUIREMENTS FOR SPLICING UNITS</p> <ul style="list-style-type: none"> • Always follow the manufacturer's

		<p>instructions regarding temperature, pressure sealing, strain relief, cable twist, bend radii, splice holders, etc.</p> <ul style="list-style-type: none"> • Splice unit located below ground level shall meet at rating IP68. • Splice unit located above ground level, without additional enclosure, should meet at least IP54. • Splice unit located outdoors, without additional enclosure, should be UV resistant. • Splice unit placed accessible to the public should be in class at least IK 8 and be able to be locked. • Splice unit located above ground level with an IP rating lower than IP54, should be enclosed by external enclosure that meets at least a rating of IP34. • Ensure that the sealing of the splice unit is sufficient, for example regarding pests and water penetration, for the environment in which the splice unit is located. • Splice unit - Facade box placed accessible to the public should be at least class IK 7 and should not be able to be opened without tools. -
Appendix 2	<p>2.5.9 Termination in property</p> <p>For termination in apartment buildings, see the recommendation "Robust property networks". After a fibre optic cable has been routed into a property, a seal is installed between duct and fibre optic cable. Incoming fibre optic cables into buildings are terminated in a fibre outlet that should be located in the immediate vicinity of a cable intake in the wall or in a "broadband space" in order to create a flexible connection point. From the outlet, a connection cable that is robust and adapted for installation is routed into the household up to the active customer equipment.</p> <p>MINIMUM REQUIREMENTS FOR TERMINATION IN PROPERTY:</p> <ul style="list-style-type: none"> • An incoming cable entering a home must be terminated in a standalone fibre outlet. Standalone also means a unit/plate on which a switch is installed and there is a separate space for fibre on the unit/plate. 	<p>2.5.9 Termination in house property</p> <p>A house refers to a villa or terraced house as an individual dwelling. For the connection of apartment buildings, residential, commercial premises, office premises see recommendation "Robusta fastighetsnät".</p> <p>For termination in apartment buildings, see the recommendation "Robust property networks".</p> <p>After a fibre optic cable has been routed into a house property, a seal is installed between duct and fibre optic cable. Incoming fibre optic cables into houses buildings are terminated in a fibre outlet alternatively Facade box. Fiber outlet that should be located in the immediate vicinity of a cable intake in the wall or in a "broadband space" in order to create a flexible connection point. From the outlet, a connection cable that is robust and adapted for installation is routed into the household up to the active customer equipment.</p> <p>MINIMUM REQUIREMENTS FOR TERMINATION IN HOUSE PROPERTY:</p> <ul style="list-style-type: none"> • An incoming cable entering a house home must be terminated in a standalone fibre outlet alternatively Facade box. Standalone also means a unit/plate on which a switch is installed and there is a separate space for fibre on the unit/plate. • A separate CPE should be provided with the warning sign

		"Laser Warni
Appendix 2	<p>2.5.9.1 Fibre outlet</p> <p><i>The fibre outlet in a home is the property of the network owner. The fibre outlet should be designed so that the connector on a connected connection cable is not too visible and easily accessible (otherwise it is easy for e.g., small children to pull out the connector).</i></p> <p>A customer with the technical knowledge and a set of instructions should be able to disconnect and replace the patch cable without opening the fibre outlet. The patch cable should be in a robust version that is adapted for the purpose.</p> <p>MINIMUM REQUIREMENTS FOR FIBRE OUTLETS IN DETACHED/TERRACED PROPERTIES:</p> <ul style="list-style-type: none"> Fibre outlets in households must be marked with the symbol "Laser warning" in accordance with section 2.5.10 Optical radiation. 	<p>2.5.9.1 Fibre outlet</p> <p>The fibre outlet in a house home is the property of the network owner. The fibre outlet should be designed so that the connector on a connected connection cable is not too visible and easily accessible (otherwise it is easy for e.g., small children to pull out the connector).</p> <p>A customer with the technical knowledge and a set of instructions should be able to disconnect and replace the patch cable without opening the fibre outlet. The patch cable must should be in a robust version that is adapted for the purpose.</p> <p>MINIMUM REQUIREMENTS FOR FIBRE OUTLETS IN A HOUSE DETACHED/TERRACED PROPERTIES:</p> <p>Fibre outlets in houses holds must be marked with the symbol "Laser warning" in accordance with section 2.6.5 Fiber outlet 2-5-10 Optical radiation.</p>
Appendix 2	<p>2.5.10 Optical radiation</p> <p>Optical radiation is principally a safety issue for those who handle optical connectors and cabling. Do not look into connectors if these are connected to a laser. Laser radiation can damage vision. As the light is infrared and invisible, warning labels must be present by fibre outlets to call attention to and warn about these risks. The infrared radiation does not trigger a blink reflect, which would protect the eye.</p>	<p>2.5.10 Optical radiation</p> <p>Optical radiation is principally a safety issue for those who handle optical connectors and cabling. Do not look into connectors if these are connected to a laser. Laser radiation can damage vision. As the light may be is infrared and invisible, warning labels must be present by fibre outlets to call attention to and warn about these risks. The invisible light, infrared radiation does not trigger a blink reflect, which would protect the eye.</p>
Appendix 2	<p>2.5.12 Delivery measurement of passive fibre</p> <p>MINIMUM REQUIREMENTS IN RESPECT OF DELIVERY MEASUREMENT OF PASSIVE FIBRE:</p> <ul style="list-style-type: none"> Unidirectional OTDR measurement must be performed between the endpoints on all connections at 1310 nm and 1550 nm. OTDR measurement must be done according to the instrument manufacturer's instructions. The measuring instruments must be calibrated in accordance with the manufacturer's procedures. The measurement report must specify the measuring instrument, OTDR settings (measurement area, pulse, time and index of refraction (IoR)), as well as who has carried out the measurement. The measurement results from attenuation measurements and OTDR measurements must be saved in a generally legible file format, e.g., Excel, .pdf or. sor for OTDR. The limit values according to table 2.5.12.1 must not be exceeded. If the incoming optical fibre to a home is terminated in a fibre outlet, the fibre socket constitutes the end point of the connection. For termination in apartment buildings, see recommendation "Robusta fastighetsnät". 	<p>2.5.12 Delivery measurement of passive fibre</p> <p>MINIMUM REQUIREMENTS IN RESPECT OF DELIVERY MEASUREMENT OF PASSIVE FIBRE:</p> <ul style="list-style-type: none"> Unidirectional OTDR measurement must be performed between the endpoints on all connections at 1310 nm and 1550 nm. One-way OTDR measurement should also be performed where there is only one contacted end If the incoming optofiber to a house is terminated in a fiber outlet or in a facade box, it forms the end point of the connection. For termination in apartment buildings, see recommendation "Robusta fastighetsnät". OTDR measurement must be done according to the instrument manufacturer's instructions. The measuring instruments must be calibrated in accordance with

		<p>the manufacturer's procedures.</p> <ul style="list-style-type: none"> • The measurement report must specify the measuring instrument, OTDR settings (measurement area, pulse, time and index of refraction (IOR)), as well as who has carried out the measurement. • The measurement results from attenuation OTDR-measurements and OTDR measurements must be saved in a generally legible original file format, e.g., Excel, pdf or .sor/trc/.msor for OTDR. • The limit values according to table 2.5.12.1 must not be exceeded. • In OTDR measurement, the following shall: <ul style="list-style-type: none"> ○ the pulse width should always be as short as possible, however, the entire graph should always be able to be read without noise. ○ the measuring window is always set so that the entire curve is visible in the window, e.g. the distance is 3 km, the measurement window is set to the closest longer distance range. ○ Launch Cable is always used. The length should be adjusted taking into account the so-called "dead zone" in order to be able to measure the first contact. ○ correct time and date be must be set. <p>Note: If several cables to be spliced have different index of refraction, IOR, the network owner should specify the IOR to be used. Couple rights check should be carried out.</p>
Appendix 2	2.5.12.1 Measurement results and limit values for fibre in cables	<p>2.5.12.1 Measurement results and limit values for fibre in cables</p> <p>Maximum attenuation for mating connectors 0,5 dB introduced in the table</p>
Appendix 2	<p>2.6 Labelling</p> <p>MINIMUM REQUIREMENTS IN RESPECT OF LABELLING OF THE FIBRE INSTALLATION:</p> <ul style="list-style-type: none"> • All parts of the fibre installation must be labelled with unique designations and all labelling must be ageing and weather-resistant. This must be taken into consideration in particular when labelling outdoors. • Labelling must correspond with the documentation's designation. • Labelling must not be conducted using plain text for security reasons, e.g., "Arboga-Köping" or the 	<p>2.6 Labelling</p> <p>MINIMUM REQUIREMENTS IN RESPECT OF LABELLING OF THE FIBRE INSTALLATION:</p> <ul style="list-style-type: none"> • All parts of the fibre installation must be labelled with unique designations. • All labels must be adapted to existing environment. They must be age-resistant, UV resistant and be/exist in water for a long time.

	<p>customer's name.</p> <ul style="list-style-type: none"> Labelling must be UV-resistant, cope with lying in water for long periods and cope with various types of liquids, such as oils, benzene, alcoholic solvents, etc. The labelling must be scratch-proof. 	<p>They must also withstand different types of liquids such as oil, benzene, alcohol, solvents etc.</p> <ul style="list-style-type: none"> Labelling must correspond with the documentation's designation. Labelling must not contain plain text for security reasons, e.g., "Arboga-Köping" or the customer's name. Labelling must be UV resistant, cope with lying in water for long periods and cope with various types of liquids, such as oils, benzene, alcoholic solvents, etc. The labelling must be scratch-proof.
Appendix 2	<p>2.6.2 Labelling cables MINIMUM REQUIREMENTS IN RESPECT OF LABELLING OF CABLES:</p> <ul style="list-style-type: none"> Fibre optic cables must be labelled at both inputs and outputs in optical fibre chambers and cabinets, at transitions from e.g., mast to cable ladder, as well as on either side of wall bushings Labels must not accompany e.g., covers or front panels when these are removed. 	<p>2.6.2 Labelling cables MINIMUM REQUIREMENTS IN RESPECT OF LABELLING OF CABLES:</p> <ul style="list-style-type: none"> Fibre optic cables must be labelled at both inputs and outputs in optical fibre chambers and cabinets, at transitions from e.g., mast to cable ladder, as well as on either side of wall bushings Labels must not accompany e.g., covers or front panels when these are removed. <p>MINIMUM REQUIREMENTS FOR THE MARKING OF CABLE/BLOWN FIBRES FOR HOUSE: A cable/blown fiber to an individual user shall be identified via ducting color coding or by other agreed means.</p>
Appendix 2	<p>2.6.4 Splicing units MINIMUM REQUIREMENTS REGARDING LABELLING OF SPLICING UNITS:</p> <ul style="list-style-type: none"> On a splice cassette it must be clear which fibres / cables are in the cassette. The splicing unit must be labelled with "Warning: laser". 	<p>2.6.4 Splicing units MINIMUM REQUIREMENTS REGARDING LABELLING OF SPLICING UNITS:</p> <ul style="list-style-type: none"> On a splice cassette it must be clear which fibres / cables are in the cassette. The splicing unit must be labelled with "Warning: laser". Markings should not be included, for example, with covers or faceplates when they are removed. In the case of exposed fibre connectors, there should be a clear marking with "Warning for laser".
Appendix 2	<p>2.6.5 Fibre outlets MINIMUM REQUIREMENTS FOR LABELLING FIBRE OUTLETS, DETACHED/TERRACED HOUSE:</p> <ul style="list-style-type: none"> Fibre outlets in households must be labelled with the "Warning: laser" symbol. 	<p>2.6.5 Fibre outlets MINIMUM REQUIREMENTS FOR LABELLING FIBRE OUTLETS IN HOUSES, DETACHED/TERRACED HOUSE: Fibre outlets in houses holds must be labelled with the "Warning: laser" symbol.</p>
Appendix 3	<p>3.4 Permits and land issues Examples of the requisite permits and agreements that may be required in a project:</p> <ul style="list-style-type: none"> General land agreement with the local authority regarding the right to have cables in municipal land. Land agreements with private land owners. Govern the right to bury cables in the ground. Various types of 	<p>3.4 Permits and land issues Examples of the requisite permits and agreements that may be required in a project:</p> <ul style="list-style-type: none"> General land agreement with the local authority regarding the right to have cables in

	<p>land agreements occur, such as land lease agreements, usufruct agreements and utility easements.</p> <ul style="list-style-type: none"> • Permits/decisions regarding excavating from municipal and/or state road operators (Permission from the Swedish Transport Administration regarding the placement of telecommunication lines /track owners (railway)/land owners, which describe where new cables should be located, restoration requirements as well as the duration of the cable work. • In certain cases, these may need to be supplemented with a start permit (opening notification) from the land owner/road operator, e.g., a local authority or a road association/community. • Cable location from land owner, e.g., local authority, Swedish Transport Administration or road operator. Regulates where the cable is to be located. • Collocation agreement with another cable owner. Regulates the terms and conditions for collocation. • Approved TA plan. For the Swedish Transport Administration see Permission for the placement of telecommunication lines. • Permission from the Swedish Transport Administration regarding the placement of telecommunication lines. The conditions for traffic and protective devices are obtained together with the decision on Permission for the placement of telecommunication lines. • Consultation with the Country Administrative Board and/or the local authority regarding culture and the environment. • This applies for example at watercourses, archaeological sites, alleys, unsuitable land, unique vegetation, cultural monuments, nature reserves, etc. 	<p>municipal land.</p> <ul style="list-style-type: none"> • Land agreements between the network owner and the landowners/plot owners. The agreement shall include the agreed cable position and, where applicable, where the connection of the house will take place. There are different types of land agreements, such as "markupplåtelseavtal, nyttjanderättsavtal, och ledningsrätt". • Permits/decisions to dig from municipal and/or state road owners, ("Ledningstillstånd" Swedish Transport Administration) /track owners (railway)/ landowners, describing where to place new cables, restoration requirements and the duration of the installation work. • In some cases, the above may need to be supplemented with a start-up permit (opening notification) with landowners/road owners e.g. a municipality or a road association/community. • Co-location Agreement - Regulates the terms and conditions of co-location. • Approved TA plan according to the regulations of the road manager. For the Swedish Transport Administration see Permission for the placement of telecommunication lines. • Permission from the Swedish Transport Administration regarding the placement of telecommunication lines. The conditions for traffic and protective devices are obtained together with the decision on Permission for the placement of telecommunication lines. For further information, see the Swedish Transport Administration's publication "Ledningsarbete inom det statliga vägområdet". • Building consents • Permits from pole route owners. • Consultation with the Country Administrative Board and/or the local authority regarding culture and the environment (watercourses, archaeological sites, alleys, unsuitable land, unique vegetation, cultural monuments). • Consultation with the County Administrative Board if, outside areas with a detailed plan, buildings are to be erected, extensions made, other facilities carried out or other
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

		such measures are taken that may adversely affect traffic safety within a distance of twelve meters from a road area (Road Act 47§).
Appendix 3	3.5 TA plan A precondition for being able to carry out work on roads is that the road management authority has approved the TA plan. The Roads Act, which deals with public roads, construction and operation, states that measures may not be carried out within a road area without the permission of the road management authority.	3.5 TA plan A precondition for being able to carry out work on roads is that the road management authority has approved the TA plan. The Roads Act, which deals with public roads, construction and operation, states that measures may not be carried out within a road area without the permission of the road management authority.
Appendix 3	4.8 Directional drilling MINIMUM REQUIREMENTS FOR DIRECTIONAL DRILLING: <ul style="list-style-type: none"> Measurement must be conducted to ascertain position and depth. (X, Y and Z coordinates). 	4.8 Directional drilling MINIMUM REQUIREMENTS FOR DIRECTIONAL DRILLING: <ul style="list-style-type: none"> Measurement must be conducted to ascertain position and depth. (X and Y and Z coordinates). The depth of laying with a reasonable number of measuring points shall be indicated in a drilling protocol.
Appendix 3	4.9 Hammer drilling MINIMUM REQUIREMENTS FOR HAMMER DRILLING: <ul style="list-style-type: none"> Measurement must be conducted to ascertain position and depth. (X, Y and Z coordinates). 	4.9 Hammer drilling MINIMUM REQUIREMENTS FOR HAMMER DRILLING: <ul style="list-style-type: none"> Measurement must be conducted to ascertain position and depth. ((X and Y and Z coordinates). The depth of laying with a reasonable number of measuring points shall be indicated in a drilling protocol.
Appendix 4	1. Introduction The appendix begins with the classification of sites and nodes based on PTS Security Regulations PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services (PTS Security Regulation) and then goes through various requirements and recommendations that apply to a robust site and node.	2. Introduction The appendix begins with the classification of sites and nodes based on PTS Security Regulations PTSFS 2022:11 the Swedish Post and Telecom Agency's regulations and general advice on security in networks and services (PTS Security Regulation) and then goes through various requirements and recommendations that apply to a robust site and node.
Appendix 4	2.2 Establishing sites and nodes Below is a review of the areas with particular factors to take into consideration when establishing a new site or node. Before the work of planning the design of the site / node, a check must be carried out regarding any need for reinforcement measures for events that may deviate from the normal and that may involve serious disturbances in important societal functions. For facilities with requirements for enhanced security, Sub-Annex 4.1 "Robust site for socially important digital infrastructure" and Sub-Annex 2.2 Passive secure physical connection are used. Sub-appendix 4.1 "Robust site for socially important digital infrastructure" defines a number of security levels with complementary protection measures for Site and node with a focus on protection and functions for extended operating time in the event of serious disturbances. Note An existing facility must have undergone a risk and vulnerability analysis (RSA). An existing facility that is being upgraded will undergo a renewed RSA. Threat directories and RSA for Site and Node as well as Robust secure physical connection can be found under:	2.2 Establishing sites and nodes The chapter is divided into two sections. Factors to consider Here is a review of areas with special factors to consider when constructing a new site or node. Before the work of planning the design of the sites/node, a check shall be carried out for any need for reinforcement measures for events that may deviate from normal and that may involve serious disturbances in important societal functions. Factors to consider in enhanced safety För komplettering av anläggningar med krav på förstärkt säkerhet används dokumentet <i>Anläggningar med förhöjd säkerhet, Bilaga 1-Robust site för samhällsviktig digital infrastruktur</i> samt <i>Bilaga 2 Passiv säker fysisk förbindelse. Bilaga 1 Robust site för samhällsviktig digital infrastruktur</i> definierar ett antal säkerhetsnivåer med kompletterande åtgärder för Site och node med

	https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur .	<p>inriktning på skydd och funktioner för förlängd drifttid vid allvarliga störningar.</p> <p><i>Bilaga 2. Passiv säker fysisk förbindelse</i> utgör en anvisning med krav för hur det fysiska skyddet för elektronisk kommunikation ska kompletteras mellan siter och mellan site och användarnod för att kunna motstå allvarliga störningar. Kraven omfattar krav vid nybyggnation samt vid ombyggnad av fysiska anläggning.</p> <p>For the complete versions see: https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur/</p> <p>Note An existing facility must have undergone a risk and vulnerability analysis (RSA). An existing facility that is being upgraded will undergo a renewed RSA. Threat directories and RSA for Site and Node as well as Robust secure physical connection can be found under: https://www.ssnf.org/nat-i-varldsklass/robust-digital-infrastruktur.</p>
Appendix 4	<p>2.2.3.3 Utilise part of an existing building MINIMUM REQUIREMENTS WHEN USING EXISTING BUILDING:</p> <ul style="list-style-type: none"> Ensure that access to the space is guaranteed 24 hours a day. Ideally with a separate door from the outside. 	<p>2.2.3.3 Utilise part of an existing building MINIMUM REQUIREMENTS WHEN USING EXISTING BUILDING: Ensure that access to the space is guaranteed, <i>if possible</i>, 24 hours a day. Ideally with a separate door from the outside.</p>
Appendix 4	<p>2.2.4 Design of sites and nodes MINIMUM REQUIREMENTS FOR A SITE:</p> <ul style="list-style-type: none"> A site must be dimensioned in order to handle auxiliary power systems based on customer requirements and the site's function in the network. A site must be equipped with a climate system. A site must have a non-return valve in the floor drain (where present). The site must have automatic shut-off of water pipes present in the space. 	<p>2.2.4 Utformning av site och nod (nuvarande). MINIMIKRAV FÖR SITE:</p> <ul style="list-style-type: none"> A site must be dimensioned in order to handle auxiliary power systems based on customer requirements and the site's function in the network. A site must be equipped with a climate system. A site must have a non-return valve in the floor drain (where present). In Site located below ground level, electronics and sensitive equipment must be placed at least 20 cm above the floor A risk analysis shall be performed for a Site located below ground level and for the site with and retracted water-sewage and district heating pipes. Measures in the event of a confirmed risk may include, for example, moving the site, introducing automatic shutdown of water pipes, humidity sensors and instructions for shutting off water pipes
Appendix 5	<p>2.2 Scope Ducting drawing, building land Planning drawing and approval of duct routing</p>	<p>2.2 Scope Location Ducting drawing, building land</p>

	on private building land	Planning drawing and approval of duct routing on private building land
Appendix 5	<p>2.3.2.5 Ducting drawing, private building land</p> <p>MINIMUM REQUIREMENTS, DUCTING DRAWING</p> <ul style="list-style-type: none"> Ducting drawing must be produced, with agreed position for cable routing on private building land. <p>The drawing must show where on the plot the cable connects, where it is to be routed on the plot, and also show where connection to the building takes place. The drawing is created in consultation with the property owner. The drawing should be signed by both client (or contractor) and property owner at the time of planning. Drawings should also be produced in cases where the property owner is excavating on his own plot. The property owner must have his own specimen or a copy.</p> <p><i>See example at the end of the appendix</i></p>	<p>2.3.2.5 Location Ducting drawing, private building land</p> <p>MINIMUM REQUIREMENTS, LOCATION DUCTING DRAWING</p> <ul style="list-style-type: none"> Location Ducting drawing must be produced, with agreed position for cable routing on private building land. <p>The location drawing must show where on the plot the cable connects, where it is to be routed on the plot, and also show where connection to the house building takes place. The drawing is created in consultation with the plot property owner. The drawing should be signed by the network owner both client (or contractor) and plot property owner at the time of planning.</p> <p>In the event of significant changes in the actual cable position, the landowner shall be informed of the deviations.</p> <p>Drawings should also be produced in cases where the plot property owner is excavating on his own plot. The plot property owner must have his own specimen or a copy.</p>
Appendix 6	<p>3.1 Generally</p> <p>An inspection of a fibre installation is carried out to verify that the installation has been executed in accordance with the instructions for robust fibre installation, the contract documents and the client's instructions.</p>	<p>3.1 Generally</p> <p>An inspection of a fibre installation is carried out to verify that the installation has been executed in accordance with the instructions for robust fibre installation, the contract documents and the client's instructions.</p> <p>Addition</p> <p>If the inspection concerns a facility with additional requirements for increased safety in accordance with the Instructions Facilities with increased safety and function, the specified checklists of the instruction shall be used for checking completed completions.</p>
Sub-Appendix 6.1		<p>Sub-Annex 6.1 Final inspection checklist</p> <p>The checklist for final inspection has been adjusted for changed requirements in the instructions.</p>
Appendix 7	<p>1.3.4 In-house checks</p> <p>MINIMUM REQUIREMENTS:</p> <ul style="list-style-type: none"> In-house checks must be performed and documented for each part of the installation. 	<p>1.3.4 In-house checks</p> <p>MINIMUM REQUIREMENTS:</p> <p>In-house checks must be performed and documented for each part of the installation</p> <p>The installation of ducts is difficult to check why the contractor should carry out self-monitoring.</p>

Amendments: Amendments of Instructions for Robust Fiber carried out on 10/08/2022

Date 10/08/2022		
Document	Previous text	Addition or revised text
Main appendix Appendix 4 Sub-appendix 4.1 Sub-appendix 6.1 Appendix 7	Electronic Communications Act (2003:389) The Swedish Post and Telecom Agency's regulations on requirements for operational safety PTSFS 2015:2 and 2020:1	Revised text: Electronic Communications Act (2022:482) PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services