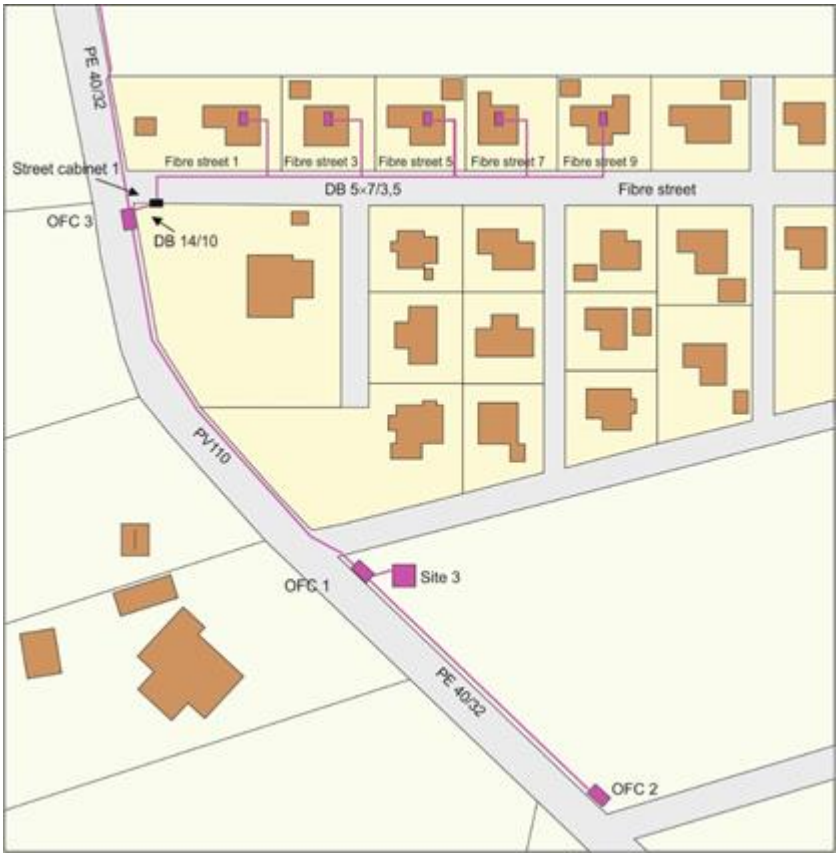
Instructions for Robust Fiber

Appendix 7 Fibre installation projects

Ver 1.6



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1. DESCRIPTION OF FIBRE INSTALLATION PROJECT

This appendix is a brief description of the elements included in a fibre installation project. The description does not follow a strict chronology, rather it should be viewed as a review of the various elements. The elements can be carried out wholly or partially by the client.

The planning work is normally carried out by the client (the prospective network owner) or a suitable planner appointed by the client. Planning, implementation and documentation are normally conducted by the selected contractor. The finished fibre installation is then transferred to an operating organisation which runs, maintains and manages the fibre installation.

In the event the installation is receiving public co-financing from the Swedish Agency for Economic and Regional Growth (xx) or the Swedish Board of Agriculture (SJV), consideration must be given to these authorities' requirements regarding the design of the passive infrastructure in accordance with:

The Swedish Agency for Economic and Regional Growth:
- Guidance for a successful broadband project
- Particular requirements for broadband expansion

The Swedish Board of Agriculture:
- Regulation SJVFS 2016:19, Chapter 6

1.1 Plan

1.1.1 Determine area

The network owner determines which area is to be planned. Choice of area is made on the basis of market, geographic and technical conditions.

Create a control area (Bevakningsområde) in the *Ledningskollen* service for the area you intend to plan for.

1.1.2 Check future plans

Coordination is conducted with affected land owners regarding future plans in the area in order to prevent collisions with other planned projects, e.g. house or road-building.

1.1.3 Investigate collocation

The potential for collocation with other pipe and cable owners (e.g. electricity, water and sewage, district heating) is investigated. This is done, for example, by creating a collaboration case (Samordningsärende) in the *Ledningskollen* service, or through routines for co-location at the local level

1.1.4 Prepare rough projection

A rough projection is produced including the number of potential customers, a proposed network structure to cover the area, suitable routing technique, excavation lengths and the material in which excavation is taking place. A sketch of the area (network overview) and a table containing estimated equipment amounts are attached to the rough projection. The rough projection is used e.g. as a basis for cost calculations. Create a project case

(Projekteringsärende) in the Ledningskollen service to get information about existing infrastructure on central parts of the network already. Information on existing infrastructure, for example, provides information for cost calculations, schedules and risk analysis

1.1.5 Investigate ground conditions

The ground conditions along planned excavation sections are investigated on site, in order to gain an understanding of the actual situation.

1.1.6 Conduct risk analysis

A risk analysis is conducted for constituent parts of the future fibre installation, in accordance with the PTSFS 2022:11 The Swedish Post and Telecom Agency's regulations and general advice on security in networks and services.

1.1.7 Apply for permit

Necessary permits **must** be obtained as soon as possible after the application is submitted and before commencing work on establishing the broadband installation.

1.1.8 Enter into land agreement

A land agreement is entered into with affected property owners in respect of the placement of nodes, optical fibre chambers and outdoor splice cabinets, as well as transfer routes for ducts.

1.1.9 Draw up work environment plan

A work environment plan is produced for the entire project. This must be carried out by the client or by the contractor that has assumed the client's responsibility.

1.1.9 Produce timetable

A rough timetable is produced in which main activities and the number of weeks for the project from start-up to finished network are specified.

1.1.10 Perform cost calculation

A cost calculation for the fibre installation is conducted, based on the results of the above stages.

1.1.11 Procure construction

A contractor is procured for the construction of the fibre installation. Detailed projection can be carried out by the client or be included in the contract. The choice of contract form is made (normally on the basis of one of the general conditions of contract drawn up by the Construction Contracts Committee, known as AB and ABT), which means:

- AB (General conditions of contract).
  The client is responsible for detailed projection and the contractor for execution, normally on a current account basis.
- ABT (General conditions of contract for design and construct contracts).
  The contractor is responsible for both detailed projection and execution, normally at a fixed price.

1.2 Project

1.2.1 Conduct detailed projection

The network owner or the selected contractor performs detailed projection on a location map, prepares an equipment list (volume calculation) and other work documents.
The installation **must** be projected and planned in detail per section.

1.2.2 Enter into land agreement

A land agreement is entered into with affected property owners in respect of the placement of nodes, optical fibre chambers and outdoor splice cabinets, as well as transfer routes for ducting pipes.

1.2.3 Apply for permits

Required permits are produced, including opening notification, start permit, TA plan (traffic arrangement plan) and permission from the Swedish Transport Administration regarding the placement of telecommunication lines. Necessary permits **must** be obtained as soon as possible after the application is submitted and before commencing work on establishing the broadband installation.

1.2.4 Select equipment

Equipment is selected for the project based on the volume calculation.

1.2.5 Select routing technique

Selection of the routing method(s) that is most suitable in the area.

1.3 Implement

1.3.1 Order equipment

Equipment for the project is ordered based on volume calculation and choice of equipment.

1.3.2 Protect cables with *Ledningskollen*

Although the Ledningskollen has been used in the planning and the design phase, cable indication case (ledningsanvisningsärende) must be created prior to each ground work as only the cable owner's response to the cable indication query is approved for ground work. No ground work can be commenced without a cable indication case being created, all answers and any conditions have been confirmed in the Ledningskollen and all answers (cable maps and physical marks (poles or color marking on ground) are at the workplace.
There may also be local procedures for cable indication queries in addition to Ledningskollen.

1.3.3 Establish on site

Permits applications are submitted to land owners regarding establishing e.g. workmen's shelters and equipment at indicated locations in the area.

1.3.4 Self monotoring

MINIMUM REQUIREMENTS:

- The installation of ducts is difficult to check why the contractor should carry out self-monitoring.

1.3.5 Excavate

The excavation work or equivalent is carried out according to the selected method.

1.3.6 Route ducting

Routing is performed for distribution points (nodes, optical fibre chambers and outdoor splice cabinets) and ducts.

1.3.7 Route main cable

Fibre optic cables are routed in ducting between nodes and optical fibre chambers, up to the outdoor splice cabinet or optical fibre chamber nearest the end customer.

1.3.8 Splice/terminate fibre optic cable

Fibre optic cables are spliced/branched in optical fibre chambers and outdoor splice cabinets. Fibre optic cables are terminated (made accessible via fibre connectors) in nodes.

1.3.9 Install fibre optic cable to end customer

A fibre optic cable is routed and spliced from the nearest distribution point for the final section in to the end customer. Connection points are installed, to which the end customer connects his equipment.

1.3.10 Measure fibres

Delivery measurement is performed on connected fibres.

1.3.11 Restore

Restoration is performed after earthworks, using e.g. gravel, grass or asphalt.

1.3.12 Measure position

Geographic position measurement is conducted for all newly established fibre installations. Survey files containing lists of items are presented on a location map.

1.3.13 Conduct checks

A controller appointed by the client performs ongoing checks of the installation work throughout the implementation period.

1.3.14 Inspect

Inspection of the fibre installation is performed to verify that the installation has been carried out in accordance with the contract documents, and to verify that all work and all documentation are complete.

1.3.15 Report as complete

The project is reported as complete to the client once final inspection is approved. The project is thereby transferred to the client.

1.4 Document

1.4.1 Document

Agreed documentation is produced and submitted to the client.

1.4.2 Update areas of interest in *Ledningskollen*

The information about the location of the fibre installation shall be converted into new or updated areas of interest in the *Ledningskollen*, so the cable owner will get cases in Ledningskollen regarding upcoming works near the new installation.

1.5 Operate

1.5.1 Transfer to operation

The finished fibre installation is transferred from the client to the selected operating organisation.

1.5.2 Operate and maintain

Following transfer, it is the responsibility of the operating organisation to operate and maintain the fibre installation.

1.5.3 Conduct service

Agreements regarding service measures within stipulated times are drawn up with the operating organisation and field personnel. Service must include the remedying of faults and the replacement of defective network components.

1.5.4 Handle planned measures

Ensure you have the resources and expertise to carry out planned replacement of network components as well as the connection/disconnection of end customers.

1.5.5 Handle supplementing

Supplementing of the fibre installation is handled in accordance with the applicable stages above.

1.5.6 Manage documentation

There must be an organisation for continually updating the documentation when changes are made.

1.5.7 Manage agreements

The network owner must ensure that agreements entered into are registered. This must be done in order to monitor agreement periods and warranty periods, as well as to initiate renewals and the signing of new agreements, if necessary.

1.5.8 Update risk analysis

The risk analysis must be updated annually or in the event of major changes in the installation.

1.5.9 Ledningskollen

The network owner must ensure that cases from the *Ledningskollen* are answered promptly and correctly and that information and settings are kept up to date.