



## Wireline Engineering Method & Procedure

### OSP Handbook General Guidelines

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<b>Purpose</b>	This document references best and updated practices from the Basic Outside Plant Engineering (BOPE) Handbook. This document is intended to be a general guideline and will reference additional supporting documentation.
<b>Personnel Effected</b>	This method affects all Verizon Wireline Outside Plant Engineering including VzT, VzB and XO.
<b>Effective Date</b>	This document is effective upon receipt.
<b>Superseded Documents</b>	Outside Plant Handbook MCI 046 302 3802 – Sec Section 1
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Wireline Engineering Support

## OSP Handbook General Guidelines

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### Regulatory Compliance

Not Applicable

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### Related Documents

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### Related Training

[OSP Handbook Aerial Plant](#)  
[OSP Handbook Buried and Underground \(UG\) Plant](#)  
[OSP Handbook Right-Of-Way/ Permitting](#)  
[OSP Handbook Splicing Preparations](#)  
[OSP Handbook Cable/Equipment/Material Specifications](#)  
[OSP Handbook Safety Regulations](#)  
[OSP Handbook Subaqueous Plant / Bridge and Fixed Structure Attachments](#)  
[OSP Handbook Invoicing](#)  
[OSP Handbook Project Design and As-Built Procedures](#)



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## **1.0 Verizon Employee Compliance**

### **1.1 Verizon Code of Conduct and Company Policy Compliance**

All Verizon employees are required to understand and adhere to the Verizon Code of Conduct and all Company policies.

The Code of Conduct and Company policies are in place to govern the conduct of employees and the conduct between employees, customers, competitors and the numerous business providers, including suppliers, vendors, contractors and agents.

Employees may never violate the Verizon Code of Conduct or any Company policy.

### **1.2 Customer Proprietary Network Information (CPNI) Compliance Policy**

The CPNI policy describes and governs the permissible uses and disclosures of Customer Proprietary Network Information (CPNI).

The policy is applicable to customers of all Verizon Wireline organizations, consumer, small business, medium business, large business, government and online accounts. The policy governs activities where CPNI data is used internally, provided to a Customer, shared among affiliates or disclosed to a third party.

It is each employee's responsibility to understand and comply with the CPNI policy along with the Verizon Code of Conduct and all other Company policies.

## 2.0 Background

Engineering design should provide for the development of the most economically feasible and efficiently constructed route and should include the following criteria:

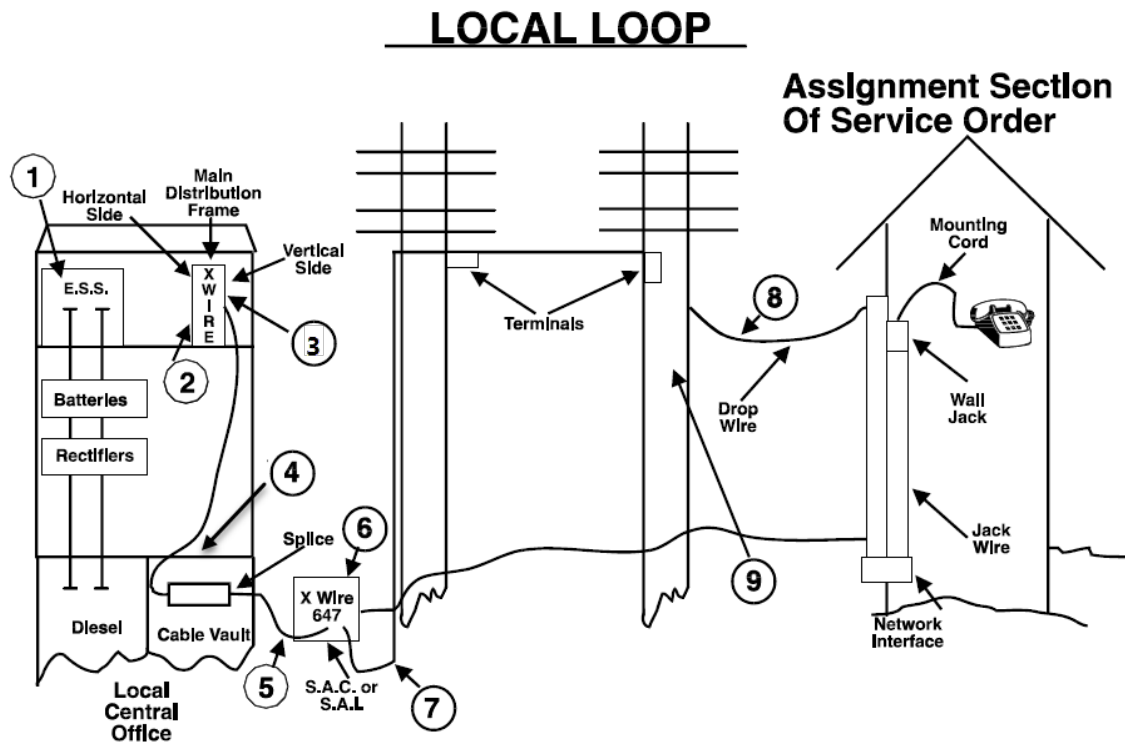
- Safety and security of Verizon cable and facilities
- Maintenance and restoration considerations
- Workman safety
- Public welfare and safety
- Environmental safety

Ease of construction, maintenance, facility security and cost dictate the methods of construction, listed in no particular order:

- Underground (UG) construction (leased or existing conduit)
- UG construction (New)
- Aerial construction
- Submarine construction

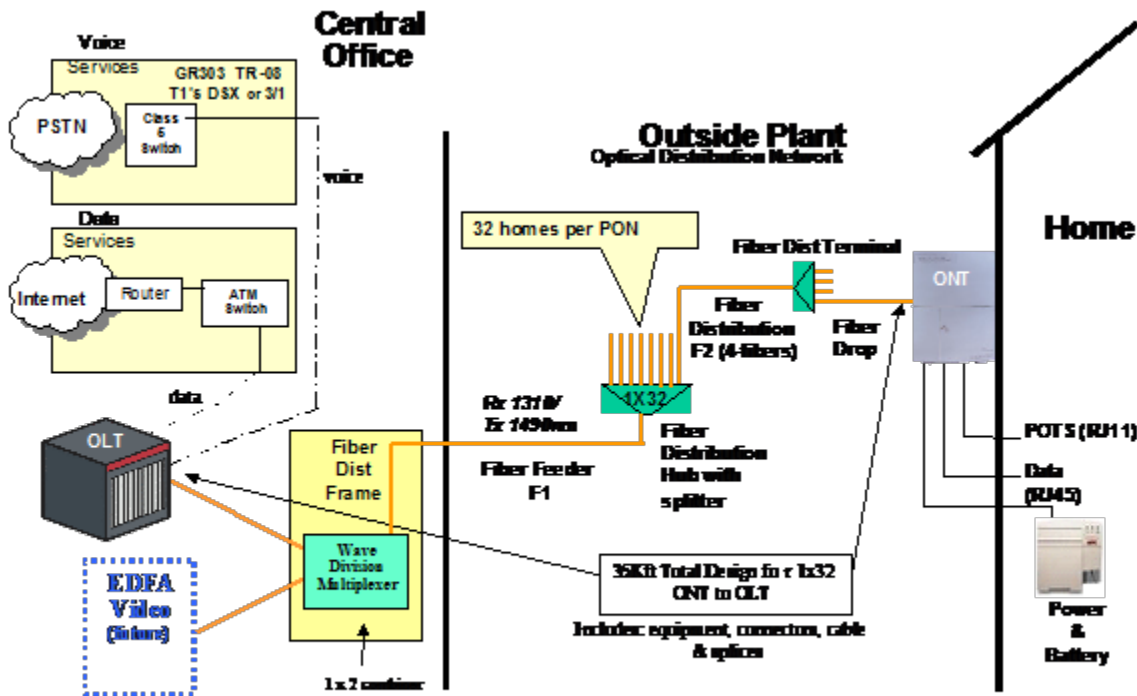
Let's begin by reviewing the design of the local loop. In the local loop the cable originates at the Central Office (CO), HUB, C-RAN or POP (going forward a CO refers to HUB, C-RAN or POP) and ends at the customer premises.

**Example: Local Loop Copper**



1. Switch
2. Horizontal MDF
3. Vertical MDF
4. Cable Vault
5. Feeder Cable
6. Serving Area Interface/Cross Box
7. Riser Cable
8. Drop Wire
9. Pole

## Example: Local Loop Fiber



**Figure 1 Fiber to the Premises**

### 2.1 The Central Office (CO)

The CO houses the various types of equipment that connect, or switch, one customer's telephone services to other customers. The CO can also be the originating and or connecting point for data and video services.

- The CO can handle this switching function on a local and/or nationwide scale.
- Toll or interoffice cables are used to connect CO's to each other.

### 2.2 The Main Distribution Frame (MDF) Fiber Distribution Bay (FDB)

Cable is spliced to the CO terminals located on the MDF or FDB

- The MDF allows each customer to have access to the communication network

- Office equipment carries specific cables transmitting communication mediums through the feeder and distribution network to the end customer.

## **2.3 Cable Vault (CV)**

Outside Plant Engineers (OSPE) become involved with work operations requiring splicing from the MDF to cables that leave the CO. This splicing operation occurs in an area within the CO referred to as a CV.

- Generally in a room located beneath the MDF

## **2.4 Underground (UG) Construction**

From the cable vault cables are usually routed to the community by way of conduit (at least 1 section), pole line, risers and direct buried cable.

- The conduit is generally connected to a configuration of manholes (MH) or hand holes (HH). This type of carrying plant provides a means to place cable underground.

## **2.5 Cable Routes**

- As the cable continues into the community it may travel in various ways
- Beneath the ground in conduit/sub-duct
- Beneath the ground directly buried in the earth
- Routed up a pole and attached to poles as risers and aerial cable
- Routed down poles as dip cables back to the UG
- Attached to a building or series of buildings or structures

## **2.6 Building Cable**

On its way to service the customer cable may pass through or placed inside buildings. This cable is referred to as building cable.

## **2.7 Submarine Cable**

Another means for cable to travel is submarine



- This is more than 300' of cable that is placed under a navigable body of water (per accounting rules)

## 2.8 Means for Providing Service

Now that our cables have left the CO and been distributed throughout the community and have been spliced together, we use a terminal to connect our customers to the Central Office Equipment (COE). In some cases there is a Serving Area Interface (SAI) or Cross Box (X-BOX) at a strategic point between the CO and the customer for copper designs. The section of plant between the CO and the SAI or X-BOX is called F1 or feeder. The section between the SAI or X-BOX and the terminal is called F2 or distribution.

Optical Distribution Network (ODN): Connects the Optical Network Terminals (ONTs) to the Optical Line Terminal (OLT) and provides the optical paths over which they communicate. Feeder or F1 fibers carry optical signals from the OLT into the loop. Each feeder fiber strand is connected to an optical splitter located in a Fiber Distribution Hub (FDH). In centralized split architecture, the splitter divides the signal into 32 or 16 output ports. A distribution or F2 fiber can be connected to each output port. These fibers are then distributed throughout the distribution network through the use of Fiber Distribution Terminals (FDTs). Upon a service order request, a fiber drop is then placed between a FDT and the location where it is terminated in an ONT. The ODN contains only passive components. Additionally, pass-thru capacity and Express Port Modules (EPMs) at the FDH provides the ability to bypass the splitter in the FDH and directly jumper feeder to distribution fibers to support the provisioning of non-PON services.

Depending on the service type, the Engineer can decide to feed the customer directly without accessing a distribution point where feasible utilizing copper or fiber.

The transmission quality and characteristics of the fiber optic cable are degraded if the cable is subjected to excessive loop lengths, excessive pulling tensions and excessively short bend radii. All Engineering designs should be made in a manner that avoids such circumstances.

The number of splices in a transmission section should be controlled to reduce transmission loss. The combination of cable length, connectors and number of splices make up the insertion (dB) loss of the loop. Additionally, in the Passive Optical Network (PON), splitters will add to the overall loss.

- Terminals are most frequently used with aerial, buried and building cable
- The final connection to the customer's or subscriber's location is through service wire, drop wire or drop. Either can be placed aerial, buried or in conduit.

## 2.9 Where Does The OSPE Fit In...

There are connecting links that provide communication services:

- Between the customer and CO
- Between CO's themselves

These links don't just happen. They must be designed and constructed. OSPE designs facilities to meet strategic and known or estimated customer demand.

Engineering Work Orders (EWOs) tell the construction/ assignment forces what and where work is to be done. The EWO provides all the necessary information through the use of standard symbols, drawings and work notes.

EWO's are triggered by customer requests or Service Orders (SO), prepositioning, safety, obligatory requirements, maintenance and removals. When a customer calls for service to a particular address and no facilities are available a EWO is required to design plant to be constructed and then installed for that customer.

## 2.10 Service Order Flow

When customers require service they place a service order (SO). If facilities are not available that service order is routed systematically to the OSPE for design consideration. There are multiple systems and groups that review and groom a SO in its life cycle. A good working relationship between these departments is imperative in order to attain a smooth flow of the SO and ensure customer satisfaction.

The role of the OSPE expands on a daily basis.

New technology requires interaction with additional groups and systems in order to provide service to the customer.

## 2.11 Site Clean-Up

When the construction of communication plant is complete, inspection of work the work site is a required step in the process. All work sites will be restored to as near original undisturbed condition as possible in accordance with state, city and municipality laws.

## 3.0 Acronyms

A list of acronyms and their associated definitions can be found on the VzKnowledge website located here: <https://knowledge.verizon.com/vzknowledge/glossary.portal>