Honoring Commitments.....

VS Geospatial Technologies Pvt ltd

Services in Telecom Domain

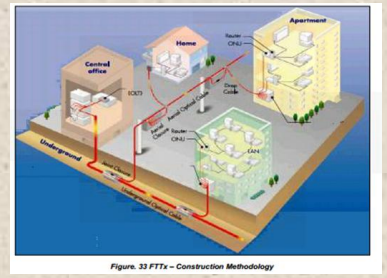
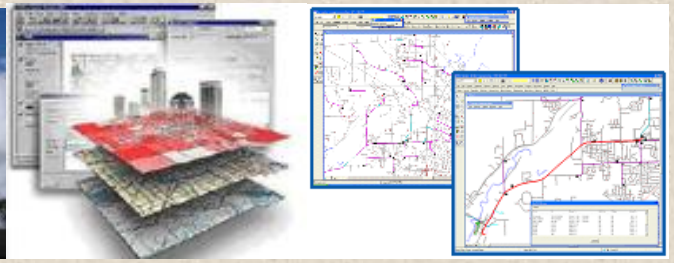


Figure. 33 FTTx – Construction Methodology



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1 About Us

VS engineering is an emerging GIS, Quality focused, Utility Mapping & Consultancy service provider committed to provide a cost effective and efficient solutions & Services to Customers across the Globe.

We have the professionals who are empowering this organization with their huge experiences of core competencies in providing Project consultancy services and Implementation in GIS, Remote Sensing & Telecom Projects, Network Engineer implementation, Utility Data Conversion and Migration, to offshore as well as onshore clients

Prior to establishing VS Engineering these professionals were associated with MNC's for a duration ranging from 6 to 14 years who were implementing the Projects in the Global Market these have got the chance to work with Reliance, TCS, RMSI, Infotech Enterprises in Indian Market) These were actively leading the GIS & Telecom division's, they have successfully executed many National as well as International projects across the globe on the cutting edge technologies.

VS also provide consultancy services starting from Project initiation, Work Shop Conducting, Carrying out POC (Proof of Concept), Project Execution & Project Implementation till the project closure taking all the risks and challenges into consideration. We strictly keep an eye over quality to ensure that there should be less iteration in terms of data delivery, which reduces the implementation cost of the Client. Organization structure, Capacity and available solution's and strength are the important constituents of our planning and execution.

Our team at VS is not Software/Application /Format/Source Dependent, Our vast experience helps us to provide integrated solution, support, quality and cost effective service to our end esteemed clients.

Our delivery mechanism is such that we remain neck to neck with customer's time zone and also works with the client in order to understand their requirements and expectations.

Honesty and Integrity are our top Priorities. Our Goal is to gain our customers trust and respect through a good standard of Ethics and Professionalism.

Our Vision We have the ambition and drive required to stay at the front line of the evolutionary chain and to create a unique identity and place in the Industry where we can deliver irreplaceable Solution and Services for our valuable partners.

2 VS Geospatial Technologies At past

VS Engineering & Geospatial Consultants is motivated & lead by the people who have got rich & vast experience in the field of GIS and Utility, Software Development & Engineering Project in (Telecom/Gas/Oil/Water/Power) field across the Globe.
During their tenure with the previous companies they have the chance of executing GIS and Network Engineer Implementation projects with some of the renowned companies of the world. Some of the companies whose projects they have managed from offshore as well as onshore are as under

1. Qatar Telecom
2. Thunderbay Telcom- Canada
3. Sasktel – Canada
4. Swiss Telcom- Switzer Land
5. MoC- Kuwait
6. Qatar Telecom- Doha
7. AT & T – USA
8. Telecfonica- SPAIN.
9. Telecordia Technologies
10. Qwest Telecom
11. Reliance Mumbai India
12. Tata Consultancy Services

During their project execution they have done the following tasks which are as under

- Conduction of Work Shop
- Rule base creation
- Training to the End User
- FDS Creation
- DMS Creation
- Network Engineer Configuration
- Data Conversion and Migration
- System Study and Work flow understanding
- Project Execution & Project Management
- Qa & Qc
- Online Work Order Updation & Implementation

3 Our Benefits / Why VS Geospatial Technologies?

- Sound experience in dealing with telecom data of various regions of the world
- Awareness and understanding of Any Source or Format
- Experience in working on Copper as well as Fiber
- Experience in FTTx (Planning and Design), OSP, ISP
- Young and Enthusiastic team
- A team of highly capable technical and functional experts
- All your technological needs under one roof
- Access to diversified pool of skilled professionals
- Client Satisfaction is one and only goal
- Flawless track record of delivering value of technology
- Ability to increase your resource base without hiring expensive manpower
- Process centric approach to project development
- Cross platform technical competence
- Great expertise across emerging and legacy technologies
- Highly tested project execution methodology ensures a low risk, predictable path to success
- Quick and reliable delivery mechanism - On Time on Budget Deliveries
- Significant cost advantage - Lowest cost structure
- India advantages
- Seamless communication... Transparent and guaranteed
- Daily and weekly working reporting as per your need.
- Years of experience
- Faster, effective, risk-free expansion of your technical needs in off-the-shelf manner
- Maximum advantage at minimal risk

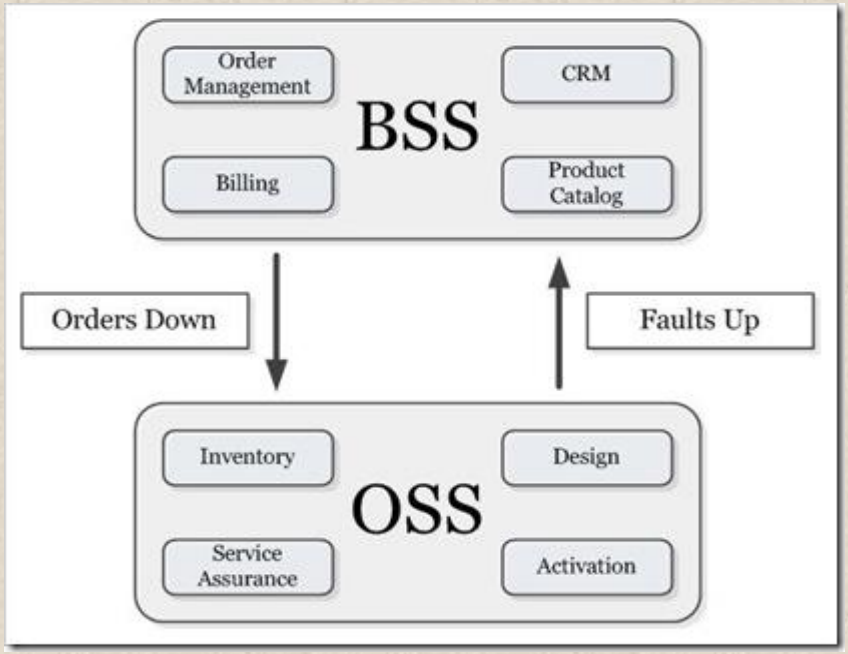
4 Telecom Services at VS

We offer the following services to our Esteemed Clients across globe in Telecom Sector

Services	Activity	Description of Services
Conversion & Migration	Rule Base Creation	Work Shop Conducting, for Requirement analysis , System Study, Data analysis, target System Requirement, Business Flow under
		Requirement Gathering
		Input analysis
		Creation of FDS
		Creation of DMS
		Defining Project execution Methodolgy
	System Configuration	Model mapping
		Field Mapping
		Database creation
		Domain Settings
		Defining classes
		Defining Categories
		Setting up Validation Rules, Symbology, Labelling
		Setting up Telco Rules
		Model Building for Equipments, Transmedia, Structure, Attachments,Splice
		Creating users and defining roles
		Work Order life cycle
		Template creation for plotting of layouts
Project Consultancy	Documentation	Technical Documentation
		Effort Estimation
		Creating Rule base manual for users
		Plotting of Layout plan as per the requirement
Training	Training	Software, GIS Concept, Telecom Concept training
		Project execution
Work Orders	Work Order Implementation	Work Order Implementation (Online as well as Offline)

5 Overview of OSS & BSS

Today, users consume data and take advantage of mobility, broadband and cloud services as never before. Their relatively newfound ability to get things done on the go makes their lives easier, and their needs are what matter most to operators.
Increasingly, consumers expect their operators to be able to answer questions quickly and anticipate their needs. Consumers want to determine when and where they use particular services, and to be charged accordingly.



OSS & BSS

So what makes a consumer choose and stay with a particular operator? Or, put another way, what does an operator need to do to make itself an attractive service provider and make a success of its business?
This is where OSS and BSS come in, and where consumer and operator needs meet. The beauty of OSS and BSS is that they are designed to ensure that users' demands are met in a way that automatically fulfills some of the most important goals that operators have.
For example, OSS and BSS enable users to make their own choices, be more in control of their spending and benefit from personalized services and subscriber plans.
Operators, meanwhile, benefit from a complete, end-to-end overview and real-time control of their customers, their networks, their services and the performance of their businesses. In this way, they can have the answers ready before the user even calls customer support, because today's consumers don't want to wait.
By offering their consumers exactly what they want, operators can build customer and brand loyalty, and attract new subscribers.
Similarly, systems designed to fulfill operator goals also benefit users. For example, systems that increase operational efficiency by optimizing and automating networks support the provision of seamless, hassle-free services for users.
In short, OSS and BSS help operators run their networks – and hence their businesses – in an optimal manner, while simultaneously creating a better user experience and meeting consumer needs.

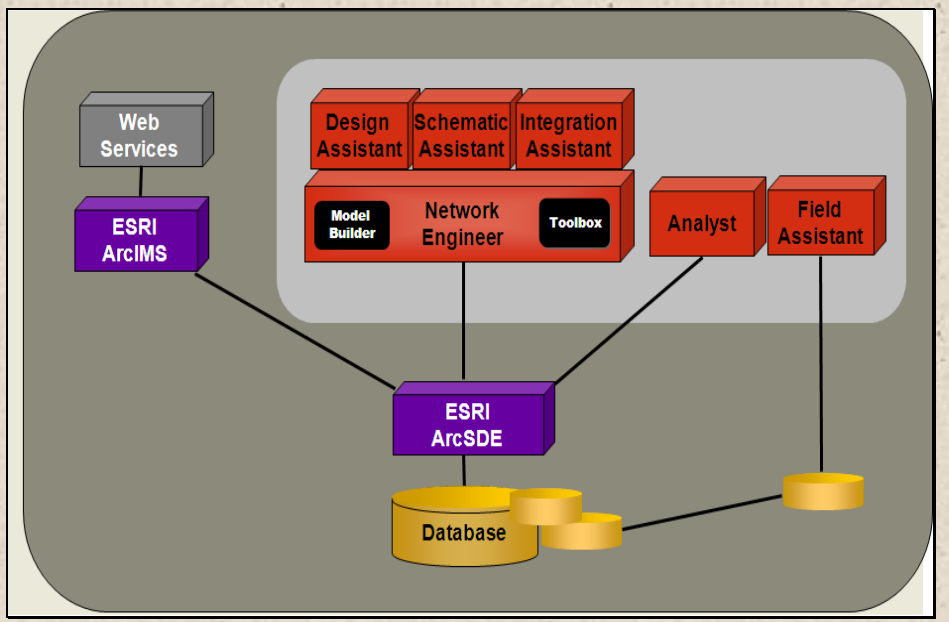
6 VS Capabilities in Telecom Sector

We are team of experts in the telecom sector who have 12 plus years of experiences in Implementation of Telecom Projects across globe We have done projects for some of the telecom companies across the Globe. The Data which we created or Converted/Migrated into the system served as the base for developing the OSS and BSS

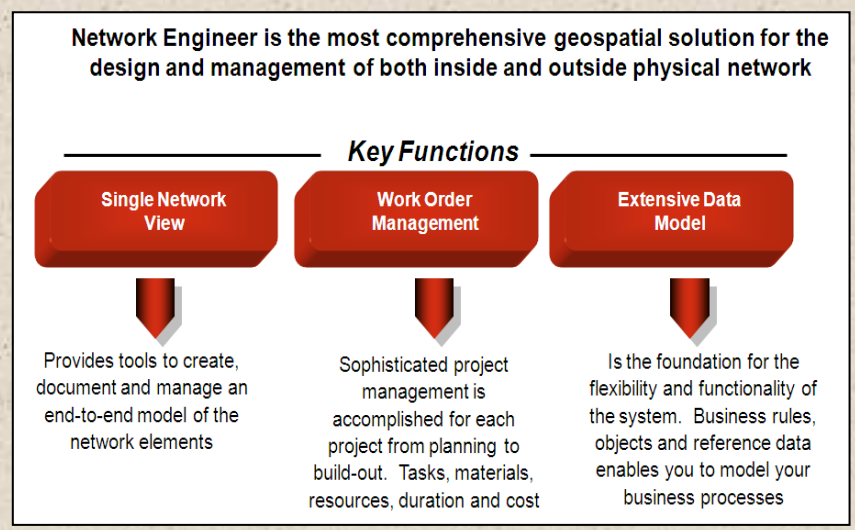
Following is the brief about the Platform used in different projects which served as a base for any OSS and BSS solution

6.1 Network Engineer

Network Engineer is a scalable, GIS-based network management system that helps you efficiently plan, design, maintain and document ongoing changes to your inside and outside plant facilities. So you can streamline work order management and accurately track all of your moving pieces, from cabling to equipment. VS is involved in carrying out the FTTH Role out (Design and Planning of FTTX Network) using the Network Engineer



Architecture of Network Engineer

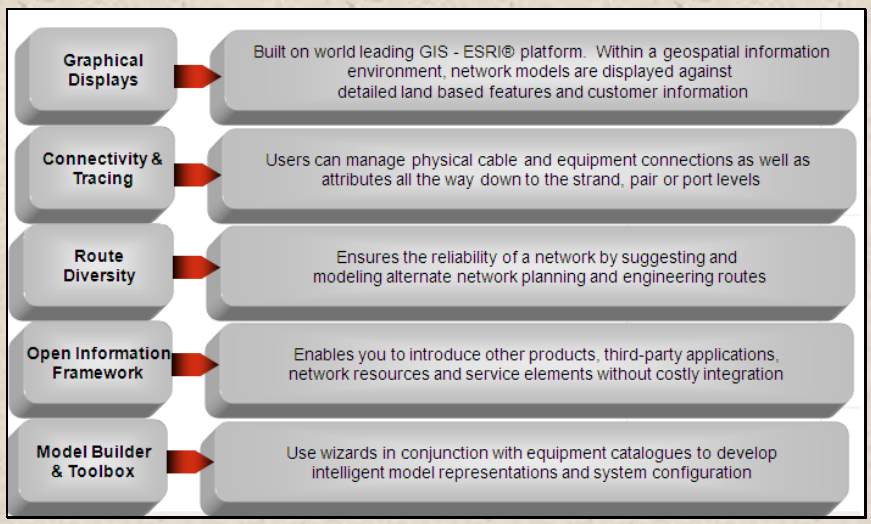


VS Geospatial Technologies Pvt. ltd

Built on the Esri® ArcGIS® platform, Network Engineer is built to handle any multivendor, multi technology infrastructure. The sophisticated geodatabase houses all physical network inventory and keeps track of both planned and as-built networks.

It overlays network layouts on top of the land base so planners can see equipment, demographics, and customer information in a single view

The Core team at VS does bring lot of this experience with them, as previously they were involved implementing of the same solution at various international and national client sites. They have got the experience of OSP and ISP data conversion, Migration, designing and planning experience with them.



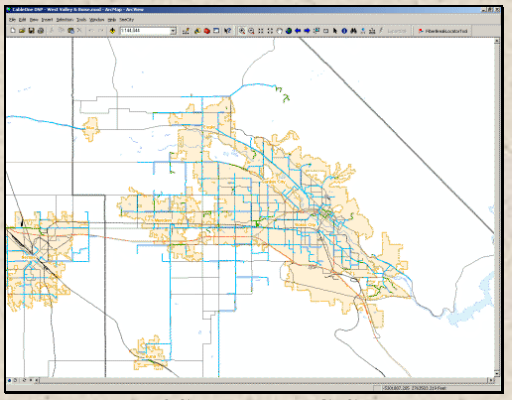
6.2 System Study and Rule Base Creation

- Rule Base Creation
  Rule base can be created based on the following inputs
  - ✓ System study
  - ✓ Work shop which may be conducted by VS Technical team and the client SME's
  - ✓ Business Flow
  - ✓ Expectation from the new system
- FDS Creation
  FDS(Functional Design Specification) document can be prepared or created based on the Rule base created, however this will also include more details as well as based on the document we can configure the target platform which may be Network Engineer
- DMS Creation

6.3 OSP DATA CONVERSION & MIGRATION

- System Configuration
  It includes
  - ✓ **Database Creation and Configuration**: Making the Client Data compatible to Target System
  - ✓ **Defining Classes& Categories** : Defining additional classes which are specific to the client to map the data into the target system
  - ✓ **Attribute value & Domain Definitions**: Maintain integrity of Client Data model in the Target System.
  - ✓ **Setting up Rules (Generic or Client Specific)** : These are additional to the target system to maintain the integrity of clients legacy data.
  - ✓ **Symbology**: To visualize the data in GIS system and on the field.
  - ✓ **Labeling** : To identify the features and the data linked to the feature
  - ✓ **Model Building**: Creation of Model of Network elements based on the data available in the client system to have its real representation in the target system.
  - ✓ **Model mapping** : Mapping the network elements available with client to the models created in the target system
  - ✓ **Field Mapping** : Mapping of Clients System Fields to the Target System fields
  - ✓ **Work Order life cycle: To** map the actual work order life cycle followed by the client in real environment.
  - ✓ **Creation of users and defining their roles** : To have a control on the data for different users based on the type of their activity
  - ✓ **Template creation for plotting of layouts**: To have the printouts which can be taken to the field survey/updates.

6.3.1 OSP CONVERSION & MIGRATION

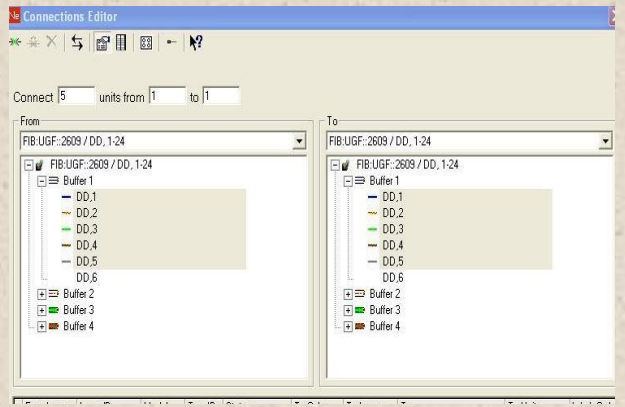


OSP Data in GIS

We do have an experience in conversion & Migration of Telco data which may be available or staying in different formats/sources.

- **Conversion from different Sources**
  With our past experience of handling different Telecom Projects we know that the telecom data exists in many different formats like AutoCAD files, Micro-station files, Pdf's, Xls or may be some database.
  To bring this data on a single platform we require its conversion in the target platform format.
- **Migration of Data into Target Platform**
  The converted data is then migrated into the target system keeping all the rules and database requirements into considerations

- **Connectivity(Simple & Ring Connectivity)**
  Connectivity brings life to the telecom data. The network is said live when its elements are connected to each other and a trace can run on it either Upstream or Downstream. This connectivity is created between Trans-media to trans-media, Equipment to Trans-media, vice versa.

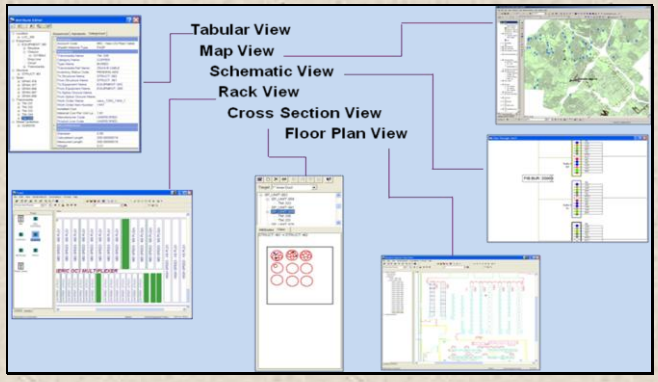


Connectivity

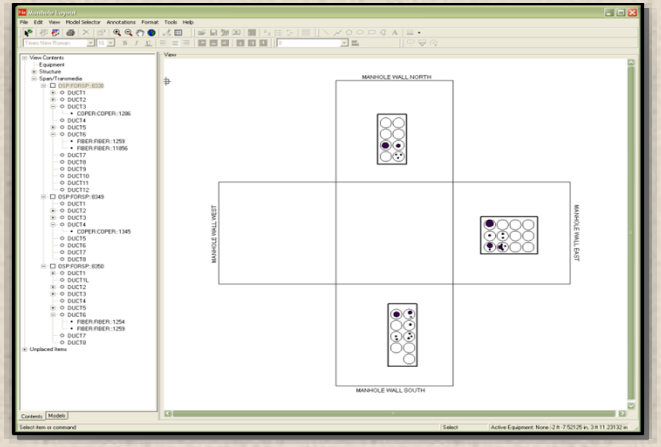
- **Ring Formation**
  Ring Network is a circular pattern of fiber optic cables typically localized to transmit data and information at very high speeds over a short distance within a specific region.

6.4 ISP Conversion & CREATION

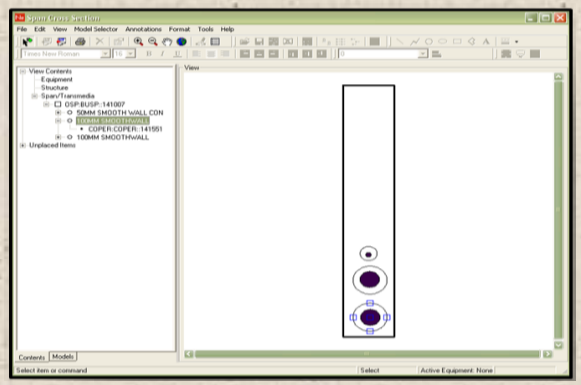
6.4.1 DETAIL VIEW CREATION



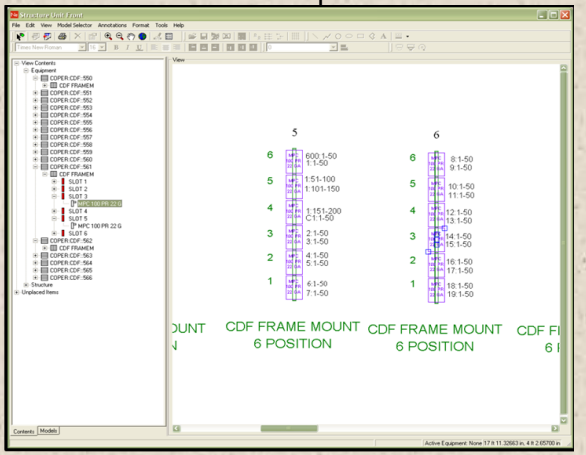
- All Views



- Manhole Layout Views
  Duct and trans-media Utilization shown on Manhole walls.



- Span Cross section view
  This View shows Duct Space Utilization in trench.



- CDF View (Central Office)
  ISP of CDF shows Rack, Chassis, Slot, Plug-in

6.5 Online Work Order Implementation

For any network, build, removal, or rearrangement, it provides time and material costing, bills of material, work task timing, sequencing and assignment, a way to record field notes, rights-of-way, acceptance criteria, approvals at various project stages, and as-built details of the completed work. VS Geospatial Technologies does have ample experience of implementing the work order online where Client does not have to do any work like conversion or migration. This can be done by giving any kind of connectivity to the server and allocation different users and passwords for the users required. Different Work order with different inventory statuses can be created and finalized in the final database server. Only Client does have to share his source data which may be "PDF" , XLS file, Job Order. The source data can be shared by the client, this way the security of the data can also be maintained.

- Planning Work Order
- Release to Construction
- Design Complete Work Order
- Design Work Order

6.6 VS in FTTx Planning & Design

The telecommunications has matured to offer network convergence and enable the revolution of consumer media device interaction. The ageing copper access infrastructure in residential and business locations is unable to meet the demand of increase in bandwidth for several applications. These demands can only be met by the deeper penetration of optical fiber in Access network and increasing deployment of Fiber to the Home (FTTH). As a result FTTH is the fast growing global broadband technology with significant deployments World-Wide

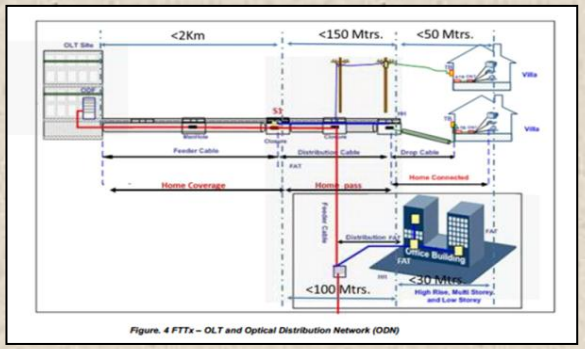


Figure. 4 FTTx – OLT and Optical Distribution Network (ODN)

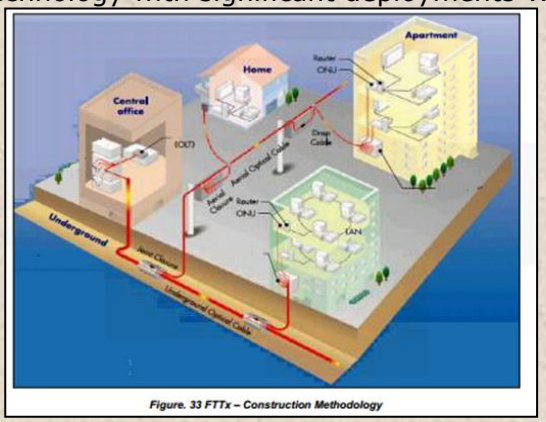
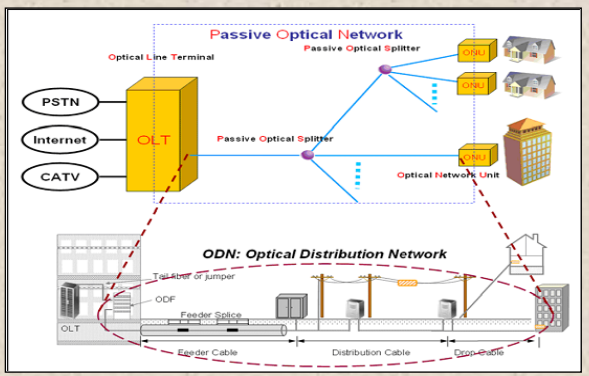


Figure. 33 FTTx – Construction Methodology

The development of single mode optical fiber, with its nearly unlimited bandwidth has unlocked the possibilities for massive deployment of long Haul and access fiber networks, resulting in three important changes.

- Huge Capacity increase
- Substantial cost reductions in equipment, operations and maintenance
- Significantly improved quality of service
- Unrestricted-Bandwidth, Distance and Coverage , Upgrade

VS Engineering is involved in projects in which it is responsible for designing the entire ODN for FTTx. (Fiber Network to the home). The Optical Distribution Network (ODN) design cover a comprehensive and customized network design, which includes capacity, resources etc. which helps Customer to design the FTTx network in a more economic and reliable way, we are also responsible for consistent and optimized designs of the FTTx Network for Client. It is ensuring that all the plans and designs are delivered in soft-file in the format specified by Client following the rules required to plan ODN in target platform.
Planning & designing of FTTx Network has been done in Network Engineer.
The Starts from the Enode B/OLT till the End Consumer level.



Validation of Planned Design: The Design is validated on the basis of KPI set by the client, like percentage of PON fill factor (>X%) and Customer Fill Factor(>Y%). If the KPI are not achieved in the design, it is again refined to achieve the target KPI.

The following are the sub processes carried by VS Engineering in order to create a ODN Plan for a unit area set by the client.

- Clustering of Building's based on Consumer Counts
- Splitter/Equipment Staging
- Feeder Ring Planning using Existing routes/Sites based on the consumers available and to be connected
- Distribution Routing for optimum utilization of network resources and technical feasibility
- Placement of Infrastructure & Telco Features based on the planning carried out in above steps
- Clustering of S1 & S2 Splitters based on the capacity of the equipment and consumers getting feed from them.
- Core Assignment Feeder & Distribution Plans
- Distribution & Drop Cable Consideration
- Feeder Path Diagram & Feeder Cable Consideration
- Preparation of BOQ and BOM
- Preparation of Splice Plan
- Calculation of KPI, PON fill factor, Customer fill factor.

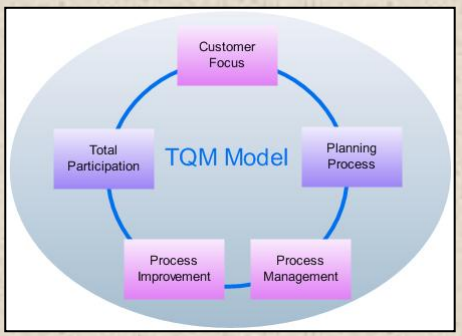
6.6.1 Deliverables

In General Following deliverables were created from the planned ODN in a FTTx Network

- **Plans**
  - CIVIL Plan
  - ODN Plan
- **Reports**
  - BOM\BOQ
    - ✓ BOQ is an itemized list of materials, parts, and labor (with their costs) required to construct, maintain, or repair a specific structure.
  - Splice Plan
    - ✓ This is actually port allocation report. It contains record of every utilized port or fiber in an ODN with a unique ID associated to it.

7 Our Approach

We follow TQM approach which is a comprehensive and structured approach to organizational management that achieves best quality of products and services through using effectively refinements in response to continuous feedback, and through using them effectively in order to deliver best value for the customer, while achieving long term objectives of the organization.
The roots of Total Quality Management (TQM) go back to the teachings of drucker, juran, deming, ishikawa, crosby, feigenbaum and countless other people that have studied, practiced, and tried to refine the process of organizational management. TQM is a collection of principles, techniques, processes, and best practices that over time have been proven effective. Most all world-class organizations exhibit the majority of behaviors that are typically identified with TQM.



7.1.1 Guideline for Total Quality Management

Total quality management transcends the product quality approach, involves everyone in the organization, and encompasses its every function: administration, communications, distribution, manufacturing, marketing, planning, training, etc. There are many guidelines of total quality management around to create the TQM diagrams. The general guideline of total quality management contain the following items.TQM is a customer focused approach

- It is companywide strategy and involves everyone in the organization
- Aims at satisfying the customer or delighting them
- Provides best quality product and satisfy them in a cost effective manner
- Fundamental changes in basic beliefs and practices
- Prevention of defects is the way and the target is zero defects
- Total quality management is methodical
- Provides meaningful measures of performance that guide the self-improvement efforts of everyone involved

7.1.2 Continual Improvement

VS Engineering & Geospatial Consultants arranges every month training by internal & External Experienced people to train their people on latest technologies, latest processes as well as latest opportunities.
These training are conducted on the basis of opportunities available in the market. It is a Continuous exercise to develop our teams to take any challenge. Seniors as well as juniors at VS Engineering sit neck to neck in order to share the knowledge.
We always prefer to do pilot methodology for execution of any project. We do not want to follow any methodology which will cause rework which becomes a unknown risk for project Our advantages are as under Generating Customer Value High Quality On Time Delivery Flexibility & Responsiveness Confidentiality and Data Security Competitive Pricing Team Coordination.

8 Our Location, Presence, Contacts

8.1 Location;-

We are situated at Delhi and our office location is at |O-8| A - 5| Dilshad Garden| New Delhi-110095|

8.2 Presence

VS engineering is having its presence in the global market (National and International Market) at INDIA,US, UK & Middle East as well, Currently our target is to extend it to Europe, Canada & China, to add some esteemed clients.

8.3 Contacts

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