

Summary:

High level Engineering work > Feasibility > Build path

Pre-Engineering work > Logical and Physical Network Designs > Construction and Material costs

Full-Engineering work > Permits > insurance

Logical Network Design > optical distance > wireless > IP addressing > Gateway > Service Billing

Construction costs > Build costs > Accounting > Financing > Cash Flow

As-Built Engineering work > Future Build/Expansion > Locates > Break/Fix

1) Political Support

- a. Decision Makers
 - i. Due Diligence
- b. Technical Advisors
 - i. Competing technologies
 1. Satellite
 - a. Low Earth Orbit (LEO)
 - b. Geostationary
 2. Terrestrial Wireless
 3. Fibre
- c. Benefits
 - i. Economic
 1. Local employment
 2. Local businesses
 - a. Internet Service Provider
 - b. Voice
 - c. Video
 3. Access to information and resources
 - ii. Social
 1. Education
 2. Health
 3. Safety
- d. Define need
 - i. Use case(s)
 - ii. Funding Sources
 1. Grant Funds
 2. Loans (Bank, Private)
 3. Community Investment
 4. Competing priorities
 - a. Water
 - b. Housing

- e. Costs
 - i. Short – Build
 - 1. Break/Fix
 - 2. Replacement
 - ii. Long – Business
 - 1. Operations and Maintenance
 - 2. Future Costs
 - a. Replace fibre at end of life
 - i. Direct buried fibre
 - ii. Buried fibre in conduit
 - iii. Aerial fibre
 - iv. Underwater fibre
 - v. Surface laid fibre
 - b. Break/fix
 - i. Access
 - ii. Cost estimate
 - iii. Contacts
 - iv. contractors
 - f. Joint Ventures
 - i. Roles and Responsibilities
 - ii. Capability/Qualifications
 - iii. Insurance, deliverables (as built), warranty
 - iv. Terms of Agreement(s), payment(s)
 - v. Reporting Requirements
 - vi. Memorandum of Understanding (MOU)
 - vii. Non-Disclosure Agreement (NDA)
- 2) Technical Analysis
- a. Evidence based decision making
- 3) Feasibility Study
- a. How big is the problem?
 - i. How to solve the problem.
 - b. Environmental
 - i. Land
 - ii. Water
 - iii. Machinery (oil/fuel spill)
 - iv. cleanup
 - c. Build Path
 - d. Build Methods
 - i. Trench
 - e. Build Permissions
 - i. Highways
 - ii. Winter Roads
 - iii. Water
 - iv. Aerial

- v. Traditional Lands
 - f. Materials
 - i. Quality
 - 1. Fibre
 - 2. Conduit
 - 3. Small parts
 - ii. Quantity
 - 1. +20%
 - g. Analysis
 - i. Environmental impact analysis
 - ii. SWOT
 - iii. PEST
 - iv. Diamond-E
 - h. Class 'D' Budget (20%)
 - i. Request For Information (RFI)
 - ii. Inflation (~2%)
 - iii. Value of Money (half every 17 years)
- 4) Design
- a. Request for Information (RFI)
 - b. Request for Qualification (RFQ)
 - c. Technical
 - i. Fibre infrastructure
 - 1. Installation method
 - 2. materials
 - ii. Wireless infrastructure
 - 1. Radios
 - 2. towers
 - iii. Logical network design
 - 1. How does the data move?
 - iv. Technical network design
 - 1. Router, Switches,
 - d. Legal
 - i. Ownership of the infrastructure
 - 1. Liability
 - 2. Insurance
 - 3. Repair and Maintenance
 - ii. Business structure
 - 1. "Call before you dig"
 - 2. Phone Numbers(s)
 - iii. Construction Contracts
 - iv. Service agreements
 - v. Reporting to stakeholders
 - e. Financial
 - i. Cash flow

- ii. Build costs
 - iii. Maintenance costs
 - iv. Operation costs
 - v. Break/Fix
 - vi. Audits
 - vii. Bank Accounts
 - viii. Public Funds (Grants / Loans)
 - ix. Private Funds (Investors / Loans)
- 5) Pre-Engineering work for permits
 - a. Right-Of-Way (ROW)
 - b. Build description
 - i. List Primary Concerns
 - 1. Wet Bog
 - 2. ROW encroaching tree line
 - 3. Rock surface or just below surface
 - 4. Culvert crossings
 - 5. Water way crossings
 - ii. Risk Mitigation considerations
 - 1. Deviate from build path
 - 2. Change installation method
 - a. Trench
 - b. Plow
 - c. Aerial
 - d. Weighted conduit
 - e. Directional drill
 - f. Direct bury
 - iii. Environmental factors
 - 1. Blasting
 - iv. Financial factors
 - 1. Why build method selected
 - 2. Request for Quote
 - a. Vendor selection
 - b. Reporting requirements
- 6) Request For Quote(s)
 - a. Construction
 - b. Materials
 - c. Class 'A' Budget (2%)
- 7) Insurance
 - a. Liability
 - b. Construction insurance/bond
 - c. Material Insurance (theft/fire)
- 8) Permits (what permits needed)
 - a. ROW
 - i. Highway (Province)

- ii. Winter roads
 - iii. Hydro cuts
 - iv. Community
 - v. Terms and Conditions
- 9) Full Engineering Drawings for construction
- 10) Build/Project Description, with the proposed method(s) of placement
 - a. Construction agreement
 - i. Conditions of build (location, date, time)
 - 1. Contractor and sub-contractor
 - ii. Safety
 - 1. Weather
 - 2. Insurance
 - iii. Restoration
 - iv. Notifications
 - v. Documentation
 - 1. Build plans onsite
 - 2. Build permits onsite
 - vi. Deliverables
- 11) Name(s) of Construction Company installing the Fibre
 - a. Contract(s)
 - i. Ownership of - all - installed materials
 - ii. Payment Schedule
 - 1. Holdback
 - b. References
 - i. Background check(s)
 - ii. Past Construction
 - iii. Experience
 - c. Safety
 - i. Certified
 - ii. Traffic
 - iii. Environment
 - d. Proof of insurance
 - e. Warranty
 - f. Licenses
 - g. Deliverables
 - i. As-built drawings (CAD, PDF, and hard-copy)
 - ii. Progress Reports
 - iii. Pictures
 - h. Plan 'B', Plan 'C', Plan 'D'
 - i. Weather delay
 - 1. Option/Costs to extend insurance coverage
 - 2. Option/Costs to extend permits
 - ii. Contractor folds/bankrupt
 - 1. Bond

- i. Local contacts
 - i. Project manager / Technical
 - ii. Storage / Staging / Forest Fire
 - iii. Security (fenced yard) / Cameras / Guards
 - iv. Forklift / equipment
- 12) Deliverables from construction company(s)
 - a. Built as defined in permitting/design
 - b. Inspections
 - c. Performance Reports (OTDR)
 - d. Accurate As-Built Drawings (CAD, PDF, Hardcopy)
- 13) Permit(s) to install fibre
 - a. Terms and Conditions
 - b. Signatures
- 14) Interconnection details with third-party fibre
 - a. Fibre Specifications
 - b. Technical Requirements
 - c. Service Agreement(s)
 - d. Transit Agreement(s)
 - e. Optics Specifications
 - i. Future Inspection / testing
 - f. Permission/Authorization(s) for Cross Connect
 - i. Who is handing the cross-connection
 - ii. Facility Access Permissions
 - g. Safety Training
- 15) Meet-me location details from third-party
 - a. GPS locations
 - b. Make-ready work/costs
- 16) Liability insurance
 - a. During construction
 - b. After Construction
- 17) Future
 - a. Monitoring / Testing / Inspections
 - b. Replacement at End Of Life
 - c. Break/Fix
 - d. Contracts/Contacts