

Installing Technology Today

The Budget:

It is the first thing every CEO is going to ask for right out of the gate. In order to get there, an assessment is recommended. The assessment provides the business plan for physical plant infrastructure. The assessment will include a budget cost to design and construct. This assessment will incorporate the three major questions - what do you want, when do you want it and how much is it.

Prior to this, a pre-assessment is a requirement. This typically involves a questionnaire and single meeting with each technology department.

The Pre-Assessment:

The technology department(s) should provide a list of equipment device types, current functionality and length of service expectations for all voice, data, wireless, video, security, intercom and any other communications systems. This information shall also include metro and wide area network connectivity. SEE SAMPLE QUESTIONS BELOW. These questions do not include all disciplines (security, electrical, audio visual etc.) but would be structured as such depending on requirements.

When is the assessment required to be provided-complete with breakdown of labor hours and cost? Provide a meeting and survey timeline schedule for all disciplines. Provide a report at the conclusion of the pre-assessment phase of the project.

Provide an organization chart with disciplines and contact requirements, including all building services - construction and facilities/operations and maintenance. Architects, engineers (MEP), contractors, consultants and technology personnel all become a part of the assessment process.

General construction issues:

Is there any other construction being planned and is it new or renovation?
If renovation- part or all of the structure? In order to do a site survey, if general construction work is planned, spaces requiring work need to be defined as part of renovation, addition or current spaces not scheduled for renovation.

What are the other project schedules and timelines?

What remediation will be involved- asbestos, abandoned cabling, lead, and any other plant systems and environmental issues?

Do you own the building or do you lease?

What is the projected life expectancy of the structure including expectations on future expansion?

If there is an expectation of re-use of physical plant, a full (room by room) survey should be conducted and documented and compared with owners'

documentation. To accept owner's documentation alone could expose a future requirement for additional changes to the scope of work and would need to be factored into the construction cost.

Below are typical (pre-assessment) questions to consider pertaining to the telecommunications/technology systems and infrastructure. Many of the questions will have a direct impact on the infrastructure design, while others are for information purposes only or to inspire thought. There are no single correct answers to any of the questions and it is expected that many individuals within the organization will have different opinions.

The questions are somewhat technical. It is acceptable if the answer to these questions is not known. The questions are included to ensure the subject matter is covered completely.

Finally, these assessment questions are not intended to be all of the questions necessary to build a design but merely an introduction to some of the issues associated with the design of this project on the telecommunications infrastructure and associated systems. It is the goal to ensure that the final design and ultimate execution of the project represent a product which is the sum of the input of all concerned parties and the best solution for the customer. It should be noted that some of the questions below include assumptions about cable quantities, routing, systems, etc. These assumptions are strictly for the purposes of a starting point in the design. The assumptions are not committed to and are subject to change. This questionnaire is one method of correcting the base assumptions.

It is expected that a timeframe and construction schedule be presented to CRG in order to properly gauge associated coordination issues within our organization. Inclusive of that would be the General Construction timeline and any other work planned.

Sample Survey Questions:

Voice Systems

- Provide copies of recent quarterly or annual maintenance invoices or other documentation showing system type, port configuration and maintenance costs for the: telephone (PBX or key system), intercom, paging, voice mail auto attendant and call accounting systems
- Provide copies of any templates or guidelines used to assign and administer class of service codes and account codes.
- Provide copies of recent local and long distance phone bills.
- Provide copy of recent Carrier's (Verizon, BellSouth) Customer Service Record (CSR).
- Provide copies of any recently conducted traffic studies.

- Provide copy of voice system implementation documentation (key sheets, floor plans, auto attendant tree diagram) and as built wiring diagrams.
- Provide copies of call accounting reports
- Provide copies of phone/intercom directory.
- Provide contact information for each site: Phone system administrator, Business Administrator.
- Provide a copy of disaster recovery plan or contingency plans for managing power disruption.
- Provide copies of telecommunications related sections from Standard Operating Procedure Manual and/or Official Use Guidelines.
- Provide copies of any existing documents that would indicate short & long range plans for voice systems.
- Provide copies of any recently conducted customer satisfaction surveys that would indicate if systems are meeting the needs of teachers, administrators, parents and students.
- Provide information on what specific new technologies the school administrators are interested in implementing. (e.g. Wireless, VoIP)
- Provide information on how voice, intercom, paging and clock systems are currently integrated.
- Provide information on how voice mail / auto attendant is used by administrators and teachers.
- Provide information on how incoming calls are processed and how outgoing calls are made and controlled.

Infrastructure

I Inter-building Cabling

- A. What is your requirement for campus inter-building cabling? (I.e. copper- twisted pair and coax, single mode fiber, multi-mode fiber).
- B. What is your requirement for conduits between buildings, if applicable?
- C. Future WAN connectivity if provided by carrier(s)
- D. If a private WAN fiber connectivity plan is being considered, along with the sharing of resources, will any other locations be included?

II. Incoming Service

- A. It has been assumed that all of the current incoming service requirements to feed the facilities will be provided in the MDF room. Is this correct? How many incoming service vendors (providers) can be expected?
- B. Do you want a second set of incoming service conduits at each site for the purposes of diversity and, are this something that is of interest to this facility? Is it something that you would be looking to

implement day one? Since there will be major renovation to parking lot and other “field” areas, this should be a consideration now.

III. MDF Room - In order to identify the usefulness of this space, it is necessary to understand what systems and equipment it will be expected to hold.

- A. Is this room expected to be occupied by personnel on a regular basis (i.e. it is someone’s office) or can it be considered a “lights out” space?
- B. What systems are expected to be located within this room? Here are some systems which would commonly be located in this room:
 - 1. Telephone switch or remote interface cabinets
 - 2. File servers, raid units, tape backups, etc
 - 3. Routers, concentrators, switches, etc.
 - 4. Infrastructure main distribution frame
 - 5. Air conditioning equipment
 - 6. UPS (uninterruptible power supply)
 - 7. Security system
 - 8. Telecommunications grounding and bonding infrastructure
- C. What is the quantity of the equipment so the room can be properly sized?
- D. In computer room spaces which are considered critical to the operation of a facility, it is often common to have redundant support systems (i.e., air conditioning units, UPS, etc.). Is this a requirement in this facility?
- E. Is UPS power required for this room? For what duration (i.e., 15-30 minutes)? Is emergency power required (the ability to operate the room beyond the UPS time in case of an extended power outage)?
- F. Is emergency lighting required in this room to allow for the orderly shut down of equipment in the case of a power failure?
- G. Is temperature monitoring and notification hardware required in this room?
- H. Are sprinkler systems currently located in the IDF closets and the MDF room, and would a pre-action system in the MDF room be considered.
- I. What type of security is required for this room (key lock, card reader, key pad, etc.)?
- J. We need to know all the technology spaces.

IV. Telecommunications Closets - These rooms provide the interface between the individual workstations and the backbone systems.

- A. It is expected that the termination of the voice and data cabling will take place in these closets. What other systems are to be located

in these rooms to ensure that they are properly sized? Some components may be:

1. Fire alarm system panels
 2. Security system panels
 3. CATV system
 4. Paging system
 5. Equipment concentrators and switches
 6. File servers and other network hardware
- B. The current closet spaces will need to be assessed for issues such as the electrical or other equipment sharing the same space with the telecommunications. The quantity of closets and their sizes are going to be dictated by the functions they are expected to perform in addition to technical guideline (i.e., cable length limitations). Are there any functions or particular departments or provisions for any particular floor which might necessitate and additional (or enlarged) closets?
- C. It is expected that the telecommunications (IDF) closets will contain equipment concentrators, hubs, switches or some other form of network hardware. Is it known what type will be planned for? Is there a preferred manufacturer? This will affect power requirements, space, air conditioning requirements, maintainability, etc.
- D. Are there any “special” spaces which require alternate connectivity solutions? Is it envisioned that the cabling for these spaces will be run back to the floor IDF closet for centralized management or to some other local equipment room adjacent to or co-located in the space being supported?
- E. Is it expected that the IDF closets will require air conditioning 24 hours a day, seven days a week?
- F. Will UPS or emergency power be required for the IDF closets?
- G. What type of termination hardware do you prefer for cable terminations (i.e., 110, BIX, Krone, etc.)?
- H. What manufacturers do you prefer, if any?
- I. Is a 15-year or more cable warranty a requirement for this project?
- J. Do you prefer to terminate data cables on patch panels or on the wall field?

V. Riser cabling

- A. It has been assumed that a multipair, category 3, riser cable is all that will be required for delivery of voice service from the MDF room to each IDF closet. Is this correct?
- B. It has been assumed that a multimode, fiber optic, riser cable is all that will be required. Is legacy 62.5 or laser optimized 50 micron a future

decision for delivery of data service from the MDF room to each IDF closet

- C. The voice and data cabling indicated above are all that is required from the MDF room to the IDF closets. Are there any other systems which have not been taken in account?
- D. Do the sites currently have a CATV coax distribution infrastructure and will that be a future consideration?
- E. Will rooftop provisions be required for a satellite and/or microwave dishes (current or future)?
- F. The conduit and sleeve riser system will need to support voice, data/LAN, CATV and spare conduits for future expansion.
- G. Are there any requirements for remote antennas and wireless systems?

VI. Workstation cabling

- A. Below are some areas and assumptions.

Auditorium/Lecture Halls

- Do you want to hard wire every seat or do you want to use wireless?
- What media presentation requirements are planned for?

Classrooms (for training environments)

- Do you want (1) data cable per student seat? Is this sufficient?
- Do you want a CATV station?
- Do you want additional ports for printer or peripheral equipment?
- Do you want projectors and speakers in the classrooms?
- Do you want to coil slack 6 feet in the raised floor (if applicable) for flexibility at each outlet?
- Do you want cables to be terminated in the raised floor box or do you want them to be terminated in the desk?
- Is it acceptable that all cables be homerun to the IDF closets?
- Will "in-classroom" hubs and cabling be utilized for classroom connectivity?
- Will Computer lab connectivity requirements be wired or wireless?
- What are the typical furniture arrangements in computer labs?

Hallways

- Do you want any house/emergency phones?

Elevator

- Do you require phone service?-(this is a code requirement)

Pay Phone Locations

- Current and future requirements?

Mechanical Rooms

- Do we need to provide LAN or outside lines for the BMS and where are they located?

Electrical Room

- Do you want a voice and/or data connectivity?

Security Room

- How many phones, modems, and LAN connections do you need?

Custodial Offices

- Do you want a voice and/or data connectivity?

Receiving Area

- How many phones, modems, and LAN connections do you need?

Lobby

- Do you want a data jack for future monitor or slot monitor display or video wall?

Lounges

- If used as a break room, do you need voice, data, and wireless connectivity?
- Do you want a CATV station?

Meeting/Conference Rooms

- What function does this room serve and what is your requirement for voice and data? Is 1 voice/2 data sufficient?
- Do you want a CATV station?

Library

- Identify areas where you need LAN connectivity? Do you want wireless?
- At study area, do you want data at each location?
- Is it correct to assume that students will be able to connect in the lounge area?
- Do you want wireless next to bookshelves by the end of the stack?
- Is 1 voice/2 data at librarian desk sufficient?

- Are “library look-up” workstations required?
- Do you want a CATV station at the casual area (s)?
- Projector screens and ceiling mounted projector connectivity with teacher control station requirements.

Office/Cubicles/Administrative workstations

- What is your requirement in the office area? Is 1 voice/2 data sufficient per desk?
- Do you want a CATV station? There may be several waiting rooms (CST), main office locations, nurse area who would require this connectivity.

Wireless Access Point Locations

- Will these locations be placed in hallways, classrooms etc?
 - Will these locations require power or be powered by low voltage technology?
- B. What cabling method is preferred to feed individual workstations (i.e., category 5E or 6, shielded, unshielded, fiber optic cable, wireless, etc.)? All data connectivity will be designed with a minimum of capabilities for Gigabit Ethernet.

There are a lot of options that are available as part of the design of the horizontal cable system. Some include: color coding of voice and data cabling and outlets, placing of bar code identification as part of workstation outlet tags (this allows for easier integration with office automation systems), allowing space for future cabling (i.e., fiber), etc. Are these or other variations of interest?

VII. Management and Operation

- A. Who maintains the current infrastructure (i.e., contractors, staff, determined on a case-by-case basis, etc.)?
- B. Who manages the electronics which are connected to the infrastructure (i.e., File servers, routers, concentrators, PBX, voicemail, etc.)?
- C. How are moves, additions and changes administered?
- D. Who do users call for support issues?
- E. Will guests be able to access the network with their laptops at locations other than offices and lecture halls? If so, where?
- F. How are security issues addressed pertaining to equipment?
- G. How are access issues addressed pertaining to technology areas (i.e., IDF closets)?

- H. Is this facility expected to be available 24 hours a day? If so, how is support provided after normal hours?
- I. Has outsourcing application development, support and maintenance been discussed?
- J. Current labeling scheme and modifications for administration and documentation will need to be addressed.
- K. Recommendations for a cabling infrastructure management database to be discussed.