>> BellSouth Requirements for Cell Site Operators and Carriers

INTRODUCTION

The BellSouth Requirements for Cell Site Operators and Carriers were developed first, to provide a guideline for proper equipment installation and maintenance for cell sites and second, to ensure consistency of procedures across all regions. Proper installation and maintenance of cell site equipment can reduce failure frequencies.

Installations at newly constructed sites must meet the specifications on the BellSouth Tower Site Installation checklist prior to BellSouth service activation. Installations at existing cell sites should be inspected to ensure adherence to BellSouth requirements. Improperly installed equipment should be corrected and/or upgraded as needed.

1.0 Cell Site Operator Requirements

The cell site operator is required to provide a safe and maintained entrance, parking, and exit for BellSouth vehicles. If the structure is located inside a secured area, the operator will agree to an access plan to ensure service quality.

1.1 H-Frame Structures

At some sites, the carrier(s) may use BellSouth-provided outside enclosures (rather than carrier-provided cabinets or inside building space) to house DS1 network interface devices. When the carrier elects to use a BellSouth-provided enclosure, the BellSouth designer and BellSouth Special Services Installation and Maintenance (SSI&M) group will advise the site operator during the initial site visit to provide H-Frame structures upon which one or more enclosures will be mounted. In addition, if the site will be served by a 199-type protector, the

operator must provide a NEMA 3R-rated enclosure mounted in accordance with specifications included below. Multiple carriers will not be housed in the same BellSouth-provided cabinet. The following is a list of requirements for H-Frame structures used to mount BellSouth-provided enclosures:

- The H-Frame structure must provide at least 60 inches of horizontal mounting space. However, more space may be required, depending on the number of carriers being served
- The top of the carrier-provided weatherproof enclosure (See 1.2 below) must be 66 inches above grade
- The H-Frame structure must be at least 3 feet from any fence

Notes:

1. The H-Frame is required for all outside enclosures. See Section 1.5 for Inside Building Locations
2. Weatherproof enclosures may be pedestal, pole, or wall-mounted, if mutually agreed upon by the cell site operator and/or carrier and BellSouth
3. See Section 1.3 below for Site Bonding & Grounding Requirements

1.2 Weatherproof Enclosures

Operator-provided weather-resistant closures – if used for entrance cable protection/termination – must:

- Meet a minimum of NEMA 3R rating
- Measure at least 3 feet W X 4 feet H X 8 inches D, and be sufficiently sized to house BellSouth's main termination equipment
- Be mounted on the H-Frame structure described above (See Section 1.1 notes for possible exceptions)
- Be equipped with a ground bar bonded to the enclosure (Ground bar specifications will be based on the forecasted number of circuits, etc.)

1.3 Grounding

The attachment to the power grounding system or tower/structure ring ground must be via a #6 AWG insulated copper ground wire provided by either the site operator or BellSouth Telecommunications Construction as a step on the EWO. In either case, the ground wire should be protected from damage and, in some cases, this may require operator-provided conduit. If an operator-provided NEMA 3R enclosure is used, the designer should specify that the operator equip the enclosure with a ground bar whereupon an operator-provided #6 ground wire is terminated from the ground point specified by the BellSouth Inductive Coordination and Electrical Protection Engineer (ICEP) and BellSouth designer. (Ground bar specifications will be based on the forecasted number of circuits, etc.) If a pedestal-type terminal is used for entrance cable protection, the BellSouth designer should request that the operator provide a #6 ground wire and coil sufficient slack wire in the vicinity of the proposed pedestal location. If the protectors will be located inside a building at the site, normal design procedures for in-building terminations of 189-type protectors should be followed.

1.4 Conduit Requirements

For underground entrance facilities, the site operator will provide conduit from the property line to BellSouth's cable termination/protector location.

The following are recommended specifications:

- One conduit to house the initial facility (Note: the customer is encouraged to place a second conduit for future fiber optic cable reinforcement)
- Conduit(s) will be at least 2 inch ID schedule 40 PVC (Conduit requirements greater than 2 inches will be specified by the designer during the initial site visit)
- Conduits placed below ground must be buried between 24 and 36 inches deep
- All bends in conduits will be electrical sweep bends with radii of at least 10X the conduit diameter
- Operator should seal, cap, mark, and turn-up conduits at both ends
- Operator to equip conduits with 200-lb test pull wire/twine installed end-to-end for verification and pulling purposes
- The conduit runs should have no more than a total of 180 degrees in bends between end points. In cases where additional bends are required, pull boxes and/or hand holes should be specified and sized as necessary

The BellSouth designer should specify conduit runs as necessary to accommodate buried service wire runs from the BellSouth feeder termination (i.e., 199 terminal, pedestal or in-building protector) to each carrier's Network Interface (NI) location. Note that the NI location may be at a BellSouth-provided enclosure, as discussed in Section 1.1, installed by BellSouth or at individual carriers equipment enclosures. These Network Terminating Wire (NTW) conduits should be Schedule 40 PVC sized according to need. Note, however, that recommending 2 inch conduit makes sense even for short runs since this may more easily accommodate future additions and changes of NTW.

1.5 Inside Building Locations

If an inside building location will be used for BellSouth feeder cable termination and protection, the following guidelines apply and are consistent with normal in-building terminals:

- **Backboard:** A plywood backboard of sufficient size to mount all required BellSouth equipment (Designer will provide size specifications, generally 4 feet x 4 feet x ¾ inches, or 4 feet x 8 feet x ¾ inches)
- **Ground Bar:** The building owner should provide a ground bar, mounted at the top or bottom of the backboard, to provide a single point ground for all telecom equipment at the backboard (Ground bar specifications will be based on the forecasted number of circuits, etc.)
- **Power:** As needed, the building owner should provide 120VAC, 20A, convenience outlet and/or a dedicated outlet for local powering needs if any (i.e. loopback devices, etc.)
- **Access:** If the building is located inside a secured area, the building owner must agree to an access plan for BellSouth maintenance and installation activities. This access plan is required to ensure that service quality can be maintained. One method used in many locations is daisy-chained locks

1.6 Roof-Top Sites

Normally, BellSouth places the demarcation point/network interface at the carrier's location. However, at some roof-top installations, BellSouth and the carrier may agree to place the NI at the last serving BellSouth terminal. Any wire beyond the point of demarcation is unregulated and therefore may be provided by the carrier's vendor of choice, including BellSouth. The carrier's conduit may be required and this should be specified by the designer. Generally, the carrier will need the building owner's approval to have the conduit placed.

Note:

1. Per Section 2.3 below, cable/wire placed on the customer's side of the point of demarcation should be shielded and bonded

2.0 Carrier Requirements / Recommendations

In addition to the requirements listed in Section 1, carriers must adhere to the requirements in this section in order to ensure continuous and effective service to their end users.

2.1 Loop Length Requirement

The following requirements apply to DS1 or DS3 services.

- DS1 services: The carrier's equipment must be placed within 655 feet of BellSouth's point of demarcation
- DS3 services: The carrier's equipment must be placed within 450 feet of BellSouth's point of demarcation

2.2 Grounding and Bonding Requirement

It is the carrier's responsibility to ensure that the site grounding system meets or exceeds the recommendations of ANSI T1.334-2002, "Electrical Protection of Communications Towers and Associated Structures". See Section 3.0 for requirements. The ICEP Engineer should explain the requirements outlined in the ANSI standard at the initial site meeting and provide follow-up clarification as needed.

2.3 Shielded Wire Recommendation

To ensure the highest possible level of service, BellSouth recommends that carriers use shielded wire, with the shield grounded on both ends, to connect carrier equipment to the BellSouth network interface. In addition, secondary protectors must be placed on both ends of the shielded wires.

BellSouth does not recommend using alternatives, such as unshielded wire in metallic conduit which is grounded on both ends, or the placement of a stranded #12 AWG coupled bonding conductor which is grounded on both ends and tie-wrapped to the unshielded wire at 12" intervals. The use of

such alternatives will be at the risk of the carrier. Further, if it is determined that a circuit failure occurred as the result of improper installation, BellSouth may bill the carrier for maintenance charges. For example, if noise induction is causing inadequate circuit performance and shielded wire would prevent this, BellSouth may contact the carrier and request placement of shielded wire. If no action is taken by the carrier, BellSouth may bill the carrier for maintenance resulting from this deviation.

2.4 Bonding and Grounding

The purpose of grounding a metallic cable shield or strength member is to limit voltages that may be present from external sources such as lightning or accidental power contact. A low impedance path to ground is especially critical in locations with tall tower or antenna structures since they are particularly susceptible to damage from lightning.

Each cell site location may have site-specific electrical protection or grounding requirements. The service reliability of circuits terminating at a cell site largely depends on the grounding system of the cell site and associated structure. The BellSouth designer, SSI&M group, and ICEP Engineer should work closely with carriers to resolve site ground system inadequacies. All locations should, at a minimum, comply with ANSI T1.334-2002, "Electrical Protection of Communications Towers and Associated Structures".

The following are bonding and grounding wire requirements:

- All grounding and bonding wires should be as short and straight as possible. Wires should be accessible for future visual inspections
- Sharp bends in grounding and bonding conductors should be avoided
- One splice is permitted in bond wires used for protector grounding, per the National Electrical Code Article 250.64(C), if an approved irreversible connector or exothermic welding process is used
- The splice must be tagged with a BellSouth ground wire tag. Only ground wires that are equal in size may be spliced
- Splices are NOT permitted in the #6 AWG wires used for bonding cable shields, strength members, or splice cases
- It is preferable to use a continuous length of wire for all grounds

Circuits that are installed in locations that are under construction (after a final inspection has been completed) may require a subsequent inspection to ensure that the bonding and grounding wires have not been disturbed.

Notes:

1. The BellSouth Tower Site Acceptance checklist must be signed by both BellSouth and the tower operator/carrier prior to activating service to a new cell site location. In the event that the tower operator or a member of the BellSouth team is unavailable for signature, acceptance may be so noted on the checklist in the appropriate approval space
2. The BellSouth ICEP Engineer can clarify these requirements at the initial site meeting and provide follow-up clarification as needed
3. At an outside enclosure, pedestal, or the building location, the protector, NCTE, cable shields, strength members, splice cases, etc. must all be bonded to the same location (ground bar) to minimize differences in potential between these network components
4. **OSHA 1910.268(s)(13) defines effectively grounded as:** Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the build-up of voltages which may result in undue hazard to connected equipment or to persons