REAL PROPERTY AND TOWER SITE LEASE BY AND BETWEEN
THE CITY OF LEE'S SUMMIT AND AT&T WIRELESS SERVICES INC.

This Lease is made this 11th day of November 2001, by and between the City of Lee's Summit, Missouri, a municipal corporation, ("Lessor") and, AT&T Wireless PCS, LLC by and through its manager AT&T Wireless Services Inc., a Delaware corporation., d/b/a/ AT&T Wireless its successors and assigns, ("Lessee").

WITNESSETH THAT:

WHEREAS, Lessor is the owner in fee simple of a parcel of land located in the City of Lee's Summit, Jackson County, State of Missouri, legally described on the attached Exhibit A ("Property"); and

WHEREAS, a water tower, including an equipment shelter area and antenna mounts, (collectively "Tower Facilities") is located on the Property; and

WHEREAS, Lessor desires to lease to Lessee, and Lessee desires to lease from Lessor, a portion of the Property and Tower Facilities (collectively "Leased Premises") for the purpose of constructing, installing, maintaining, operating, and removing, at its expense, a directional antenna, connecting cables, support structures and related site equipment for communication facilities ("Site Equipment").

NOW THEREFORE, the parties hereto agree as follows.

1. DEMISE AND USE OF PROPERTY

Lessee agrees to lease from Lessor, and Lessor agrees to lease to Lessee, the following property (collectively "Leased Premises"):

a) a non-exclusive easement of reasonable access to the Tower Facility across the Property located in the City of Lee's Summit, Jackson County, State of Missouri, more particularly described in legal description attached and incorporated herein as Exhibit A. For the purposes of this Lease Agreement, reasonable access shall be access between 7:00 A.M. and 3:30 P.M. Monday through Friday, except on City Holidays as designated in Section 2-2 of the Lee's Summit Code of Ordinances. Such access shall be granted upon 1-hour notice to the Lee's Summit Water Utilities Department. Lessor shall grant reasonable access at all other times to the Leased Premises in the event of emergencies, in its sole discretion. In the event of an emergency, Lessee shall call Lee's Summit Water Utilities at 816-969-7407. Lessee shall provide Lessor with a list of Lessee's agents and employees authorized to access the equipment located on the Leased Premises. Lessor shall not be responsible for monitoring access to Lessee's equipment.

b) the right to construct, install, operate, maintain and remove the Site Equipment on the Tower Facility more particularly described in the site plan attached and incorporated herein as Exhibit B. This right shall be exercised in accordance with the plans and specifications for the Site Equipment attached and incorporated herein as Exhibit C, and all other provisions of this Lease Agreement.

2. TERM

The Initial Term of this Lease Agreement shall be for five (5) years commencing on the date ("Commencement Date") the Lessor signs this Lease Agreement. This Lease Agreement shall be automatically renewed for three (3) additional terms, (each a "Renewal Term") of five years each, unless the Lessee provides the Lessor written notice of intention not to renew not less than 90 days prior to the expiration of the Initial Term or any Renewal Term; and/or Lessee is in default as provided in Paragraph 20 of this Lease Agreement; and/or this Lease Agreement is terminated as provided in Paragraph 28.

3. FEE

On the date of the execution of this Lease Agreement, Lessee shall remit the sum of $15,555.00 to Lessor as a one-time only fee for the use of public property.

4. RENT

Lessee agrees to pay the Lessor, for the Leased Premises, rents paid annually in advance beginning on the Commencement Date and on each anniversary of it. The annual rent for the first year of the initial term of this Lease shall be $19,910.40. Thereafter, the rent due hereunder will be increased on each anniversary of the Commencement Date to an amount equal to the amount of the annual installment of rent payable during the preceding year increased by an amount equal to the change in the CPI-KCMSA during such year. "CPI" means the Consumer Price Index-Kansas City Metropolitan Statistical Area Averages for Urban Wage Earners and Clerical Workers (1982-84=100) published by the United States Department of Labor, Bureau of Labor Statistics (or a reasonably equivalent index if such index is discontinued). In no event will the amount of the annual installment of rent due under this lease following such adjustment be less than the amount of such installment during the preceding 12-month period. In no event will the amount of the annual installment of rent due under this Lease Agreement following such adjustments be less than the amount of such installment during the preceding 12-month period.

All annual rent installments are to be paid at Lee's Summit City Hall, 207 SW Market, P.O. Box 1600, Lee's Summit, Missouri 64063, or at such other place as Lessor may designate from time to time. Any rental payment paid beyond thirty (30) days in default shall have interest thereon at the highest non-usurious rate permitted by law.

5. ACCESS TO LEASED PREMISES AND SITE EQUIPMENT

Lessee agrees to provide prior written notice to the City of the date and time that all work

pursuant to this Agreement will occur, along with a list of the names, addresses, and social security numbers of all contractors, subcontractors, and agents or employees of contractors or subcontractors, who will be performing work on behalf of Lessee pursuant to this Agreement. Lessee agrees that all contractors, subcontractors, and agents or employees of contractors or subcontractors, engaged by Lessee to perform work on behalf of Lessee pursuant to this Agreement will execute a consent to the City authorizing the City to perform a criminal background check on each contractor, subcontractor, agent or employee performing work.

6. CONSTRUCTION STANDARDS AND PERMIT REQUIREMENTS

Lessee shall, at its own cost, construct, install, operate and maintain the Site Equipment upon the Leased Premises. Lessee's construction and installation of Site Equipment shall be done according to plans and specifications approved by the Lessor and attached in Exhibit C. The Lessee may, at its expense, make such improvements on the Tower Facilities as are necessary for the operation of a transmission site for wireless voice and data communication in accordance with the plans and specifications in Exhibit C. Construction shall be completed within 60 days from execution of this Lease Agreement. Lessor, in its sole discretion, may authorize a written extension of this 60-day construction period

Lessee shall obtain all necessary permits, permission, sanctions, and approvals necessary to construct, install, operate, and maintain the Site Equipment. Lessee shall construct, install, operate, and maintain the Site Equipment in accordance with site standards, state statutes, ordinances, rules and regulations now in effect or that thereafter may be issued by the Federal Communications Commission or any other governing body. In the event that any alteration of the Property, Tower Facility, or Site Equipment is required to fulfill the covenants of this paragraph, it shall be done in accordance the alteration procedures of Paragraph 13 of this Lease Agreement. Any damage done to the Property or Tower Facility during the construction, installation, maintenance, operation and/or removal of the Site Equipment shall be repaired or replaced within ten (10) days at Lessee's expense and to Lessor's sole satisfaction. In addition, if the City experiences an interruption of existing City services relating to the City's use of the Property or Tower Facility as a result of actions or omissions of the Lessee under this Lease Agreement, Lessee agrees to timely rectify any such interruption and pay all reasonable costs associated with the loss, repair and/or restoration of said city services.

7. REMOVAL OF SITE EQUIPMENT

Lessee may remove all personal property and trade fixtures of Lessee upon the expiration or termination of this Lease Agreement. Lessee shall remove the Site Equipment from the Leased Premises within 30 days of the date of termination or expiration, and shall repair any damage to the Leased Premises caused by construction, installation, operation, maintenance or removal of the Site equipment. Any property that is not removed within 30 days of the date of termination or expiration of this Lease Agreement shall become property of the Lessor.

8. LIENS OR ENCUMBRANCES

The Lessee shall not suffer the Property, Tower Facilities, or any construction or improvements thereon to become subject to any lien, charge, or encumbrance whatsoever, and shall indemnify the Lessor against all such liens, charges, and encumbrances; it being expressly agreed that the Lessee shall have no authority, express or implied, to create any lien, charge, or encumbrance upon the Leased Premises.

9. ASSIGNMENTS

The Lessee may assign this Lease Agreement to affiliates and subsidiaries with notice to the Lessor and Lessee may assign this Lease to third parties only with written approval from the Lessor. Such approval may not be unreasonably withheld. However, if Lessee assigns this Lease Agreement to a third party, the Lessor has an option, within Lessor's sole discretion, to renegotiate the terms of this Lease with the assignee. The Lessor reserves the right to lease antenna space on the Tower Facility to third parties consistent with the rights of the Lessee pursuant to this Lease Agreement.

10. INSURANCE

Lessee agrees to maintain at its expense at all times during this Lease Agreement, commercial general liability insurance, naming Lessor as an additional insured, in an amount not less than $2,000,000.00 each occurrence bodily injury and/or property damage, $2,000,000.00 personal and or advertising injury limit, $2,000,000.00 products and completed operations aggregate, $2,000,000.00 general aggregate, and $50,000.00 Fire Damage Legal Liability, with Lessor named as additional insured on Lessee's general liability policy, written by an insurer licensed to do business in the State of Missouri. Lessee shall furnish to Lessor prior to any occupancy or work, a certificate of insurance confirming the above minimum limits. All policies of insurance shall provide for at least thirty (30) days prior written notice of cancellation or any changes of insurer to Lessor.

The Lessee, at Lessee's own expense, is to insure or self-insure any Antenna Equipment at the leased location. The Lessor is not responsible for any loss or damage to the Antenna Equipment, regardless of the cause for such loss. The Lessee hereby waives their, or their insurers, right of subrogation against the Lessor for any loss of the Lessee's Antenna Equipment.

In the event Lessee shall fail to procure insurance required under this Lease and fail to maintain the same in force continuously during the term, Lessor shall be entitled to procure the same and Lessee shall immediately reimburse Lessor for such premium expense.

11. INTERFERENCE AND STRUCTURAL COMPATABILITY

Lessee agrees that the construction, installation, maintenance, operation and/or removal of the Site Equipment shall not interfere with any other communication systems currently in operation on the Tower Facility or Property, nor interfere with the City's use, or anticipated use,

of the Tower Facility or Property. If Lessee's Site Equipment causes interference, Lessee shall take all measures reasonably necessary to correct and eliminate the interference. If the interference cannot be eliminated within 72 hours, Lessee shall immediately cease operating the Site Equipment until the interference has been eliminated. If the interference cannot be eliminated within 30 days, Lessor may terminate this Lease.

Before approving the placement of the Site Equipment, Lessor may require, at the Lessee's expense, any information that will insure that Lessee's use will not interfere with rights in the Property and Tower Facility retained by the Lessor or any prior lessee. Such information may include, but is not limited to, a certified interference study to indicate whether the proposed use will interfere with any existing communication facilities, a transition plan approved by the Lessor for continued operation of existing facilities during construction, installation or maintenance of Lessee's Site Equipment, an engineering study indicating that the Tower Facility can structurally support the Site Equipment, or a safety study certified by an industrial hygienist or other equally qualified inspector to ensure that access to the Tower Facility is at all times in compliance with any applicable safety standards. Any interference test required by the Lessor shall include frequencies provided by the Lessor, for its own exclusive anticipated use, as if they were existing uses.

Lessor agrees that antennas, related site equipment and/or frequencies, installed by other lessee's after the installation of Lessee's Site Equipment, shall not interfere with the operation of Lessee. In the event any such interference occurs, the Lessor shall have the responsibility to coordinate the termination of the interference within 72 hours. If such interference is not terminated within 72 hours, and Lessee is unable to continue its operation, Lessee shall have the right, in addition to any other rights that it may have at law or in equity, to bring action to enjoin such interference or to terminate this Lease immediately upon notice to Lessor. Lessor shall not be responsible for any interruption in Lessee's service associated with the operation and maintenance of the Site Equipment, except as provided in this Lease Agreement.

12. MAINTENANCE AND REPAIRS

The Lessee shall have the sole responsibility to keep the Site Equipment, and any other structure, appurtenance or landscaping required to meet the covenants established by this Lease Agreement, in good condition through consistent maintenance and repair. "Good Condition" shall mean that the Site Equipment, and any other structure or appurtenance shall remain in as good condition as when initially constructed and installed, normal wear and tear excepted and casualty loss excepted. All required landscaping shall be maintained in proper repair and kept free of refuse and debris at all times. Lessee's maintenance shall be exercised consistent with the interference provisions of Paragraph 11 of this Lease Agreement. In the event that Lessee's maintenance involves alteration of the Site Equipment, the alteration shall be exercised consistent with the interference provisions of Paragraph 11 of this Lease Agreement and the alteration provisions of Paragraph 13 of this Lease Agreement.

Lessor, at all times during the term of this Lease Agreement, reserves the right to take any action it deems necessary to maintain, alter or improve the Property and Tower Facility. In

the event that Lessor or any other lessee undertakes maintenance of the Property, Tower Facility, or other communication facilities, Lessee shall take reasonable measures to protect the Site Equipment.

13. ALTERATIONS

The Lessee shall not make any alteration in the external elevation or architectural design of the Tower Facility or the Property, or injure or remove any of the principal structural supports thereof without the consent in writing of the Lessor. Lessor may require plans and specifications or other information consistent with the interference provisions of Paragraph 11 of this Lease Agreement, for any alteration of the Site Equipment deviating from the plans and specifications included in Exhibit C.

14. NEW STRUCTURES

Without prior written approval of Lessor, the Lessee shall not construct or permit to be constructed on the Property any new structures, or make or permit to be made any additions to the Tower Facilities, except in accordance with plan and specifications previously approved by the Lessor.

15. UTILITIES

Lessee shall have the right to install utilities, at Lessee's expense, and to improve the present utilities on the Leased Premises as shown on the site plan of Exhibit B. Lessee shall, at its expense, separately meter charges for consumption of electricity and other utilities associated with its use of the Leased Premises, and shall timely pay all costs associated therewith.

16. UNLAWFUL USE

The Lessee shall not make or suffer any use or occupancy of the Leased Premises contrary to any law or ordinance now or hereafter in force.

17. TITLE AND QUIET POSSESSION

Lessor warrants that it is the owner of the Leased Premises; that it has the right to enter into this Lease Agreement; that the person signing this Lease Agreement has the authority to sign; and, that Lessee is entitled to access to the Leased Premises and to the quiet possession of the Leased Premises consistent with the terms and conditions of this Lease Agreement throughout the initial term and each renewal term unless Lessee is in default as provided in Section 20 of this Lease Agreement. Lessee agrees to quit and deliver possession of the Leased Premises to Lessor or Lessor's assigns, successors or agents, when this Lease Agreement terminates by termination, expiration, default or forfeiture, and Lessee agrees that the Leased Premises shall be in substantially the same order and in as good condition as received, normal wear and use and damage caused by casualty excepted.

18. INDEMNIFICATION

The Lessee shall indemnify, defend, become responsible for and forever hold harmless the Lessor, and its officers, contractors, and employees from and against all suits, actions, reasonable attorney fees, costs, claims, of any character brought because of bodily injury or death received or sustained, or loss or damage received or sustained, by any person, persons, or property arising out of or resulting from any negligent act, error, or omission, or intentional misconduct of the Lessee or its contractors, or employees on the Property pursuant to this Lease Agreement. The indemnity required thereunder shall not be limited by reason of the specifications of any particular insurance coverage in Section 10 of this Lease Agreement.

The Lessee shall indemnify the Lessor against all costs and expenses, including reasonable attorney fees incurred in discharging the Leased Premises from any charge, lien, or encumbrance, or in obtaining possession after default of the Lessee or the termination of this Lease Agreement.

19. HAZARDOUS SUBSTANCES

Lessor represents that it has no knowledge of any substance, chemical or waste (collectively "substance") on the Leased Premises that is identified as hazardous, toxic or dangerous in any applicable federal, state or local law or regulation. Lessee shall not introduce or use any such substance on the Leased Premises in violation of any applicable law.

20. DEFAULT

Failure on the part of Lessee to pay rent within 30 days after same shall become due and rent is not paid within 10 days after notice to Lessee of nonpayment of rent, or failure of Lessee to promptly and faithfully keep and perform every covenant, condition and obligation of this Lease, other than payment of rent, on the part of Lessee to be kept and performed for more than twenty (20) days after notice of such default shall have been given to Lessee, shall, at the option of Lessor, cause the forfeiture of this Lease, without, however, releasing Lessee from liability, as hereinafter provided, and if such default shall not be corrected within the applicable period aforesaid, possession of the Leased Premises shall be delivered to Lessor. Thereupon Lessor shall be entitled to and may take immediate possession of the Leased Premises, any other notice or demand being hereby waived. If a default, other than non-payment of rent, is not cured within a 20 day period, this Lease may not be terminated if the Lessee substantially commences action to cure the default within such 20 day period and proceeds with due diligence to fully cure the default within a mutually agreed upon period of time. At time of transfer of possession of the Leased Premises, the Site Equipment placed on the Tower Facility pursuant to the rights and obligations of this Lease shall remain on the Leased Premises as property of the Lessor.

21. MORTGAGE

This Lease Agreement does not create an interest in the Leased Premises for the Lessee. The Lessee may not use the Leased Premises in any manner as collateral security for a mortgage

or lien lease of any kind. However, Lessee may, upon notice to Landlord, mortgage or grant a Security interest in this Lease Agreement and the Site Equipment, to any such mortgagees or holders of security interests including their successors or assigns, (hereinafter collectively referred to as "Mortgagees") provided Mortgagees execute an express written assumption of all responsibilities of the Lessee under this Lease, including annual rental fees. In the event Lessee mortgages or grants a security interest in this Lease Agreement and Site Equipment, Lessor shall execute such consent to leasehold financing as may reasonably be required by Mortgagees. Lessor agrees to notify Lessee and Lessee's Mortgages simultaneously of any default by Lessee and to give Mortgagees the same right to cure any default by Lessee except that the cure period for any Mortgagee shall not be less than ten (10) days after receipt of the default notice. Failure to faithfully keep this provision shall be considered default pursuant to the Default paragraph above.

22. AMENDMENT

Oral agreements in conflict with any of the terms of this Lease Agreement shall be without force and effect. All amendments to this Lease Agreement shall be in writing executed by the parties or their respective successors in interest.

23. FRANCHISE REQUIREMENT

Lessor and Lessee agree that this Lease Agreement shall not be considered, construed or deemed in anyway a telecommunication franchise agreement for use of public property within the City of Lee's Summit, Missouri.

24. PARTIAL INVALIDITY

If any terms or conditions of this Lease Agreement or the application thereof to any person or event shall to any extent be invalid and unenforceable, the remainder of this Lease Agreement in the application of such term, covenant or condition to persons or events other than those to which it is held invalid or unenforceable shall not be affected and each term, covenant and condition of this Lease shall be valid and be enforced to the fullest extent permitted by law.

25. SERVICE OF NOTICE

All notices, demands and communications as provided herein shall be in writing and shall be served by registered or certified United States mail, return receipt requested to the following address or to such other address(es) as Lessor and Lessee may advise each other in writing pursuant to this Paragraph.

LESSOR: City Administrator
City of Lee's Summit
207 SW Market
Lee's Summit, MO 64063

LESSEE: AT&T Wireless Services
ATTN: System Development Manager
10920 Ambassador Drive, Suite 200
Kansas City, Missouri 64153

With a copy to:

AT&T Wireless
ATTN: Property Management
5959 Corporate Suite 2500
Houston, Texas 77036

AT&T Wireless
ATTN: Legal Department
15 East Rudland Avenue
Paramus, New Jersey 07652

26. MISCELLANEOUS

(a) This Lease Agreement applies to and binds the heirs, successors, executors, administrators and assigns of the Lessor and Lessee.

(b) This Lease Agreement is governed by the laws of the state of Missouri.

27. HOLDING OVER

In the event Lessee continues to occupy the Leased Premises after the last day of the term herein created, or after the last day of any extension of said term, and the Lessor elects to accept rent thereafter, a tenancy from month to month only shall be created and not for any longer period.

28. TERMINATION

This Lease Agreement may be terminated by:

a) the Lessee or Lessor, after the initial term of this Lease, upon giving 90 (ninety) days prior written notice of the intent to terminate to the Lessor. Upon termination, all prepaid rent shall be retained by Lessor;

b) the Lessor, if Lessor determines that use of the Leased Premises by Lessee is a threat to health, safety or welfare or violates applicable laws or ordinances.

c) the Lessor, in accordance with the Default provisions of this Lease Agreement.

d) the Lessee, in accordance with the Casualty provisions of this Lease Agreement.

e) the Lessor or Lessee, in accordance with the Interference provisions of this Lease Agreement.

29. ENTIRE AGREEMENT

This Lease Agreement (including the Exhibits) constitutes the entire agreement between the parties and supersedes all prior written and verbal agreements, representations, promises or understandings between the parties.

IN WITNESS WHEREOF, the parties hereto have executed this Lease on the date first written above.

Lessor: CITY OF LEE'S SUMMIT, MISSOURI

Karen R. Messerli, Mayor

Approved as to form:

Name, Title Jon Kirke, Asst. City Atty.
Lee's Summit Law Department

Lessee: AT&T WIRELESS SERVICES INC.

By

Title System Development Manager.

STATE OF MISSOURI)
)ss
COUNTY OF JACKSON)

On this 14th day of November, 2001, before me, a Notary Public in and for the State of Missouri, personally appeared Karen R. Messerli, known to me to be Mayor of the City of Lee's Summit, the municipality that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said municipality for the uses and

purposes therein mentioned, and on oath stated that she was authorized to execute said instrument on behalf of said municipality.

WITNESS my hand and the official seal affixed the day and year first written above.

Julie C. Pryor
Notary Public

" NOTARY SEAL "
Julie C. Pryor, Notary Public
Jackson County, State of Missouri
My Commission Expires 4/9/2004

STATE OF MISSOURI)
)ss
COUNTY OF PLATTE)

On this 12th day of November, 2001, before me, a Notary Public in and for the State of Missouri, personally appeared Ronald J. Ripper, known to me to be the System Development Manager of AT&T Wireless Services Inc. the corporation that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument on behalf of said corporation.

WITNESS my hand and the official seal affixed the day and year first written above.

Victor B. Peters
Notary Public

NOTARY PUBLIC NOTARY VICTOR B PETERS SEAL STATE OF MISSOURI

VICTOR B PETERS
NOTARY PUBLIC - STATE OF MISSOURI
PLATTE COUNTY
MY COMMISSION EXP NOV. 11,2003

REAL PROPERTY AND ANTENNA SITE LEASE
BY AND BETWEEN THE CITY OF LEE'S SUMMIT AND AT&T WIRELESS SERVICES INC.

EXHIBITS

Exhibit A - Legal Description - Property

Exhibit B - Equipment Structure Site Plan

Exhibit C - Plans and Specifications

EXHIBIT A – LEGAL DESCRIPTION – PROPERTY

All that part of the southwest quarter of Section 10, Township 47, North, Range 31, West, in the City of Lee's Summit, Jackson County, Missouri, described as follows: Beginning at the intersection of the south line of said quarter section with the east right of way line of Missouri State Highway Route "RA" (Also known as Ranson Road) said point being south 87'46'58" east a distance of 43.54 feet from the southwest corner of said quarter section: thence north 1'16'27" east along the east right of way of said highway a distance of 260.18 feet; thence north 2'16'27" east along said east right of way line of said highway a distance of 209.79 feet; thence south 87'46'58" east a distance of 466.0 feet; thence south 1'43'01" west a distance of 466.95 feet to a point on the south line of said quarter section; thence north 87'46'56" west along the south line of said quarter section a distance of 466.00 feet to the point of beginning.

EXHIBIT B – EQUIPMENT STRUCTURE SITE PLAN

EXHIBIT C – PLANS AND SPECIFICATIONS

September 19, 2001

TO: Shelley Kneuvean, Assistant City Administrator

FROM: Bob McKay, Director of Planning and Development

SUBJECT: AT&T Co-Location on Ranson Road Elevated Storage Tank

This written memo will serve notice that the above mentioned wireless antennae co-location for AT&T on the Ranson Road elevated storage tank has been approved and may proceed to City Council. Attached is a copy of their plan and a letter from Water Utilities with their comments.

CITY OF LEE'S SUMMIT
WATER UTILITIES DEPARTMENT
LEE'S SUMMIT, MO 64063

September 17, 2001

John Halpin
Engineering Manager
Black & Veatch Telecommunications
11401 Lamar Ave
Overland Park, KS 66211

Re: Scherer Road Elevated Storage Tank
Ranson Road Elevated Storage Tank
Wireless Antenna Installation

Dear Mr. Halpin:

The Water Utilities Department, Engineering Services Division has completed review of the Plans for both Scherer Road and the Ranson Road locations. The plans are hereby approved with the following conditions:

Ranson Road Tank

1. As discussed, the restoration of the paint coating system on the top of the tank is critical. Please provide the specification for the coating system as well as a submittal before any construction begins. Keep in mind that the temperature, humidity and dew point is very critical for the coatings to be applied. It will be monitored very carefully. The paint shall match the color of the existing paint.
2. Please provide a schedule of work.

Scherer Road Tank:

1. These plans were approved Aug 7, 2001.
2. No work can be performed until the tower has had final acceptance by the City. We will notify you at that time.
3. Please provide a schedule of work

General Notes:

1. Codes Administration can provide the permits required. Their number is 816-969-7308 It is understood that you have submitted request for building permits for both sites.
2. The lease agreement for Scherer has been through City Council, however, the building permit cannot be executed until payment is received.
3. The lease agreement for Ranson will go to City Council upon receipt of this approval. As stated above, before building permits are issued payment must be received. You may contact Shelley Kneuvean at 816-969-7354 for further questions.
4. You will need to notify Water Utilities Operations Dept. 24 hours prior to any work starting for site access. Continual Coordination with the Operations Dept is critical, as they will be sharing the space and need continued access to their eqpt. Their Number is 816-969-7606.
5. Inspection of both sites will be performed by Bartlett & West Engineers and will be the responsibility of AT&T to pay Bartlett & West directly. You may contact Greg Dekat at 1-888-200-6464.

6. As a reminder, we require as-built record drawings on 24" x 36" mylar following the completion of the project

Feel free to contact me at 816/969-7623 should you have any questions.

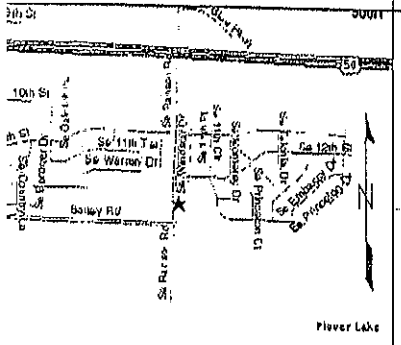
Sincerely,

Jim Ross
Staff Engineer

cc: Tom Scannell, Planning & Development
Gargar Hagedorn, Public Works
Mike Weisenborn, Public Works Inspections
Battalion Chief Eden, Fire
Shelley Kneuvean; Admin

B01015EE RD

AREA MAP



DRIVING DIRECTIONS

	DIRECTIONS FROM KCI	MILES
1.	START OUT GOING SOUTH ON INTERNATIONAL CIR BY TURNING RIGHT	0.7
2.	STAY STRAIGHT TO GO ONTO E P COOKINGHAM DR.	0.1
3.	E P COOKINGHAM DR BECOMES E P COOKINGHAM DR.	1.6
4.	TAKE THE I-29 SOUTH/US-71 SOUTH RAMP TOWARDS KANSAS CITY	0.3
5.	MERGE ONTO I-29 S/US-71 S	13.0
6.	I-29 S/US-71 S BECOMES I-29 S/I-35 S/US-71 S.	4.0
7.	TAKE I-35 S/US-71 S TOWARDS (I-70 EAST)/(I-70 WEST).	0.1
8.	MERGE ONTO I-35 S/US-71 S.	0.2
9.	I-35 S/US-71 S BECOMES I-35 S/US-24 W/US-71 S.	0.0
10.	TAKE THE US-40 EAST/US-71 SOUTH EXIT	0.2
11.	MERGE ONTO US-71 S	1.5
12.	STAY STRAIGHT TO GO ONTO I-70 E.	11.6
13.	TAKE THE I-470 SOUTH/MO-291 SOUTH EXIT	0.5
14.	MERGE ONTO I-470 S/MO-291 S.	6.0
15.	TAKE THE MO-291 SOUTH EXIT	0.2
16.	MERGE ONTO MO-291 S.	3.2
17.	TURN LEFT ONTO SE OLDHAM PKWY.	0.1
18.	TAKE THE US-50 EAST RAMP TOWARDS SEDALIA.	0.1
19.	MERGE ONTO US-50 E.	1.1
20.	TURN RIGHT ONTO SE RANSON RD.	0.4

APPLICABLE CODES

LOCAL BUILDING CODE-LATEST EDITION

NATIONAL ELECTRICAL CODE-LATEST EDITION

UNIFORM MECHANICAL CODE-LATEST EDITION

NATIONAL FIRE PROTECTION ASSOCIATION-LATEST EDITION

OCCUPATIONAL SAFETY AND HEALTH STANDARDS (OSHA)

APPLICABLE AMENDMENTS TO STANDARD CODES ADOPTED AND ISSUED BY THE LOCAL JURISDICTION

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SYMBOLS

SECTION NUMBER

DRAWING NUMBER ON WHICH SECTION OR DETAIL APPEARS. (-) INDICATES REFERENCED FROM SAME DRAWING

DETAIL NUMBER

DRAWING NUMBER ON WHICH SECTION OR DETAIL APPEARS. (-) INDICATES REFERENCED FROM SAME DRAWING

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

STATE OF MISSOURI
LISA K. TERRY
NUMBER E-25118
REGISTERED PROFESSIONAL ENGINEER

AT&T Wireless Services

SITE INFORMATION

PROJECT DATA:
FACILITY OCC.:
LEASE AREA
EQUIPMENT ENCLOSURE:
ZONING:

LESSEE:
AT&T WIRELESS SERVICES
10920 AMBASSADOR DRIVE
SUITE 240
KANSAS CITY, MO. 64153

PROJECT ADDRESS:
1251 SE RANSON ROAD
LEE'S SUMMIT, MISSOURI 64063

PROP. OWNER & LESSOR:
CITY OF LEE'S SUMMIT
207 SW MARKET STREET
LEE'S SUMMIT, MISSOURI 64063

OCCUPANCY:
THIS FACILITY IS AN UNOCCUPIED PCS WIRELESS COMMUNICATION FACILITY.

PROJECT INFORMATION

SITE TYPE:
CO-LOCATE

SUPPORT STRUCTURE:
WATER TOWER

SHELTER TYPE:
FIBREBOND

ANTENNA TYPE:
SECTORIZED/PANELS

ANTENNA CENTER LINE:
193'-0" ⚠

TOWER HEIGHT:
182'-6"

GROUND ELEVATION
1044.27' AMSL

LATITUDE:
38° 53' 44.48"

LONGITUDE:
94° 20' 21.13"

APPROVALS

VAUGHN MOSELEY	AT&T RF	4/9/01 DATE
HAROLD GEORGE	AT&T	4/9/01 DATE
NANCY FULKS	AT&T	4/9/01 DATE
TOWER OWNER	COMPANY	DATE
PROPERTY OWNER/ OWNERS REP/LESSOR		DATE

DRAWING INDEX

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LEGAL DESCRIPTION

PARENT DESCRIPTION

THAT PART OF THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 47, NORTH, RANGE 31, WEST, IN THE CITY OF LEE'S SUMMIT, JACKSON COUNTY, MISSOURI, DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE SOUTH LINE OF SAID QUARTER SECTION WITH THE EAST RIGHT OF WAY LINE OF MISSOURI STATE HIGHWAY ROUTE "RA" (ALSO KNOWN AS RANSON ROAD) SAID POINT BEING SOUTH 87°46'58" EAST A DISTANCE OF 43.54 FEET FROM THE SOUTHWEST CORNER OF SAID QUARTER SECTION; THENCE NORTH 1°16'27" EAST ALONG SAID EAST RIGHT-OF-WAY OF SAID HIGHWAY A DISTANCE OF 418 FEET; THENCE NORTH 2°16'27" EAST ALONG SAID EAST RIGHT-OF-WAY LINE OF SAID HIGHWAY A DISTANCE OF 209.78 FEET; THENCE SOUTH 87°46'58" EAST A DISTANCE OF 466.00 FEET; THENCE SOUTH 1°43'01" WEST A DISTANCE OF 466.95 FEET TO A POINT ON THE SOUTH LINE OF SAID QUARTER SECTION; THENCE NORTH 87°46'58" WEST ALONG THE SOUTH LINE OF SAID QUARTER SECTION A DISTANCE OF 466.00 FEET TO THE POINT OF BEGINNING.

AT&T Wireless Services

RECEIVED
SEP 12 2001
PLANNING AND DEVELOPMENT

AT&T SITE NO:
20136

RECEIVED
SEP 12 2001
CITY OF LEE'S SUMMIT
CODES ADMINISTRATION

AT&T SITE NO.:
20136

AT&T SITE NAME.:
RANSON RD W/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: ARS

CHECKED BY: JS

APPROVED BY:

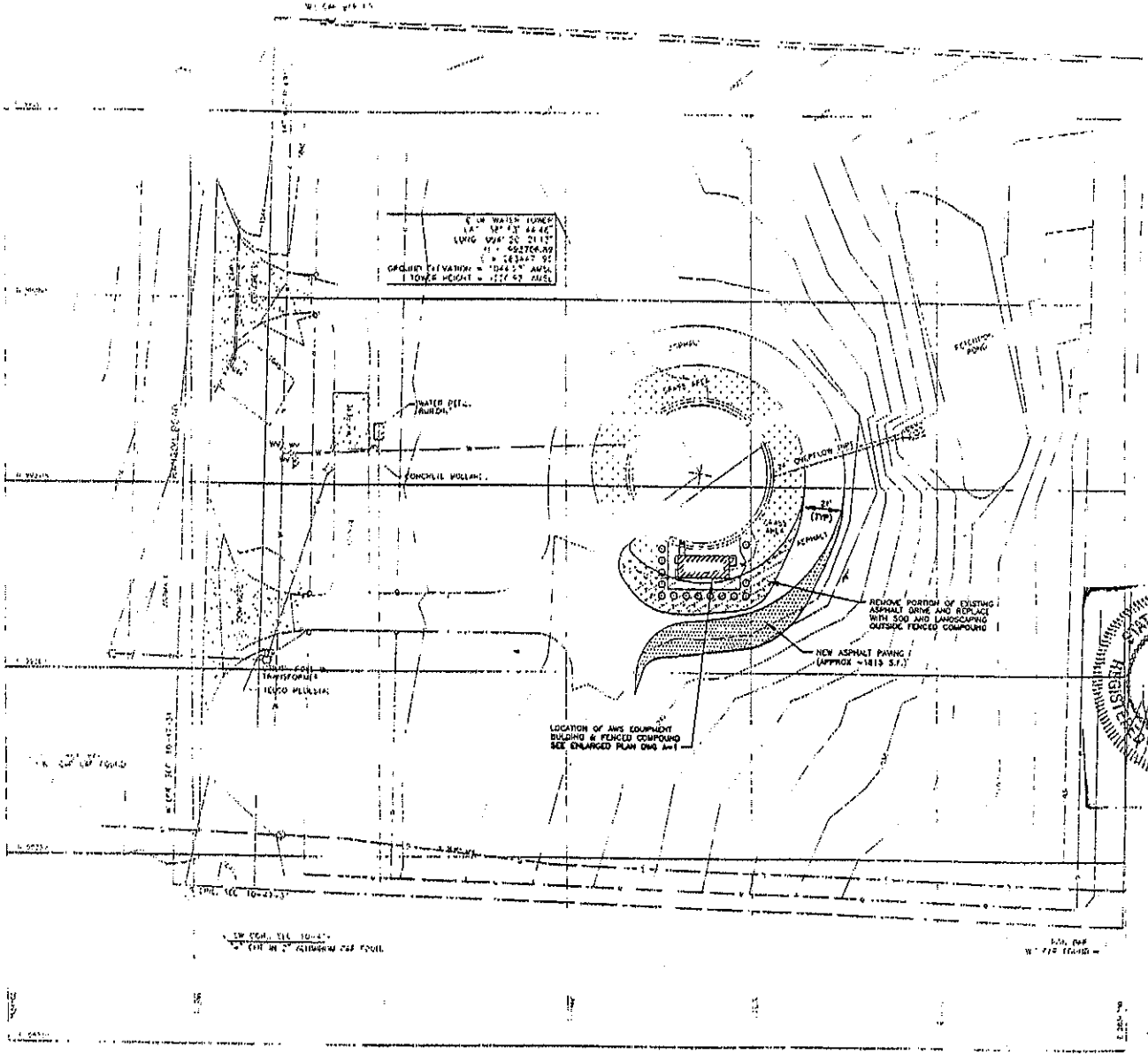
REVISIONS:

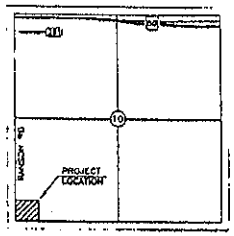
NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	01/31/01	GENERAL REVISIONS
2	04/06/01	OWNER REVIEW
3	04/13/01	CONSTRUCTION ISSUE
4	06/22/01	GENERAL REVISIONS
5	08/13/01	INDEX REVISION

DRAWING TITLE:
COVER SHEET

DRAWING NO.:
CS-1

FILENAME: 20136CS-1.DWG | DRAWING: 1 OF 10




 291
PROJECT LOCATION
RANSON RD

VICINITY MAP
SEC. 10-47-33
NOT TO SCALE

LEGEND

- SUBJECT PROPERTY LINE
- RIGHT-OF-WAY LINE
- SECTION LINE
- EDGE OF WATER
- MONUMENT FOUND
- BENCHMARK
- OVERHEAD UTILITY LINE
- UTILITY POLE
- LIGHT POLE
- ELECTRIC METER
- SANITARY SEWER LINE
- SANITARY SEWER MANHOLE
- WATER LINE
- WATER VALVE
- FIRE HYDRANT
- TELEPHONE PEDESTAL
- CHAINLINK FENCE
- WOOD FENCE
- GATE POST

STATE OF MISSOURI
LISA K. TERRY
NUMBER E-25118
REGISTERED PROFESSIONAL ENGINEER

BENCHMARK

RAILROAD SPIKE IN SOUTHEAST FACE OF UTILITY POLE ON WEST SIDE OF RANSON ROAD, ACROSS FROM SOUTH DRIVE OF TOWER SITE

ELEVATION= 1048.00

AWS LEASE DESCRIPTION

TO BE PROVIDED BY AWS UPON COMPLETION OF SURVEY

40' 20' 0 60' 120'
1"=60'

SITE LOCATION PLAN

1

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.:
20136

AT&T SITE NAME:
RANSON RD W/TANK

SITE ADDRESS:
1251 SE RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: LG
CHECKED BY: JS
APPROVED BY:

REVISIONS:

NO:	DATE:	DESCRIPTION:
A	08/10/00	ZONING EXHIBIT
B	08/22/00	ZONING EXHIBIT
0	12/07/00	CONSTRUCTION ISSUE
1	04/13/01	CONSTRUCTION ISSUE
4	08/22/01	GENERAL REVISIONS

DRAWING TITLE:
SITE LOCATION PLAN

DRAWING NO.:
CS-2

FILENAME: 20136CS-2.dwg | DRAWING: 2 OF 19

ANTENNA KEY

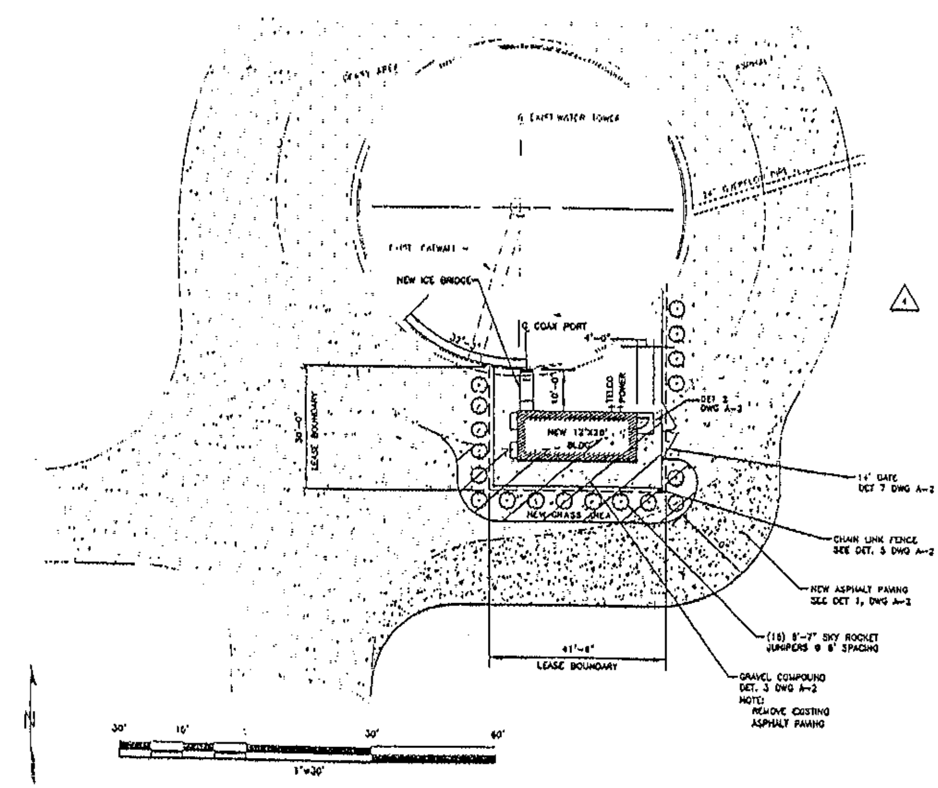
COAX COLOR CODE	BEAM WIDTH	ANTENNA TYPE	ANTENNA VENDOR	AZIMUTH	ELECTRICAL DOWNTILT	MECHANICAL DOWNTILT	HEIGHT TO THE CL OF ANTENNA FROM GROUND LEVEL	CO-AXIAL FEEDER SIZE	CO-AXIAL FEEDER LENGTH
1 RED BAND	-	DB979H90T2E-M	DECIBEL	60	2°	0°	193'-0"	1 5/8"	240'-0"
2 RED BAND	-	DB979H90T2E-M	DECIBEL	60	2°	0°	193'-0"	1 5/8"	240'-0"
3 RED BAND	-	DB979H90T2E-M	DECIBEL	60	2°	0°	193'-0"	1 5/8"	240'-0"
1 BLUE BAND	-	DB979H90T2E-M	DECIBEL	180	2°	0°	193'-0"	1 5/8"	240'-0"
2 BLUE BAND	-	DB979H90T2E-M	DECIBEL	180	2°	0°	193'-0"	1 5/8"	240'-0"
3 BLUE BAND	-	DB979H90T2E-M	DECIBEL	180	2°	0°	193'-0"	1 5/8"	240'-0"
1 GREEN BAND	-	DB979H90T2E-M	DECIBEL	300	2°	0°	193'-0"	1 5/8"	240'-0"
2 GREEN BAND	-	DB979H90T2E-M	DECIBEL	300	2°	0°	193'-0"	1 5/8"	240'-0"
3 GREEN BAND	-	DB979H90T2E-M	DECIBEL	300	2°	0°	193'-0"	1 5/8"	240'-0"

NOTES:
ALL COAX SHALL BE COLOR CODED AT THREE (3) PLACES EACH; AT ANTENNA, EXTERIOR OF SHELTER, AND THE INTERIOR OF SHELTER.
COLOR BANDS DENOTES TRANSMIT
FOR LOCATION OF PORTS, FROM OUTSIDE BLDG, SEE DETAIL 4 DWG E-2.
COAXIAL FEEDER LENGTHS INDICATED ABOVE ARE APPROXIMATE. CONTRACTOR TO VERIFY ACTUAL LENGTH BEFORE ORDERING.
THE PREFERRED ANTENNA SEPARATION IS 5'-0", HOWEVER, BECAUSE OF THE CIRCUMFERENCE OF THE EXISTING HANDRAIL, THE 5'-0" SEPARATION MAY NOT BE OBTAINABLE. CONTACT AT&T PRIOR TO INSTALLATION, IF THE SEPARATION IS LESS THAN 5'-0".

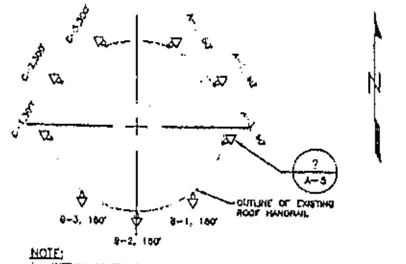
EQUIPMENT

EQUIPMENT FURNISHED AND/OR INSTALLED BY:

DESCRIPTION	FURNISHED	INSTALLED
EQUIPMENT SHELTER	AWS	VENDOR
ANTENNA	AWS	ANTENNA CONTRACTOR
COAX	AWS	ANTENNA CONTRACTOR
G.P.S. AND TEST MOBILE SYSTEM	AWS	ANTENNA CONTRACTOR

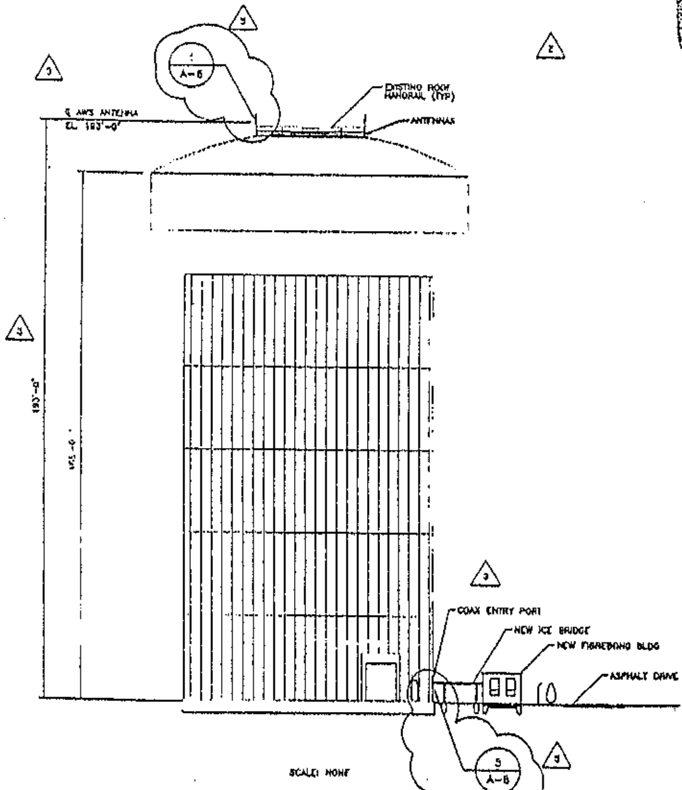


SITE PLAN 2



NOTE:
1. ANTENNA CONTRACTOR SHALL FURNISH & INSTALL "VTS" ANTENNA HANDRAIL MOUNTS

ANTENNA LAYOUT
SCALE: NONE



TOWER ELEVATION 1

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.: 20136

AT&T SITE NAME.: RANSON RD W/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: LG
CHECKED BY: JS
APPROVED BY:

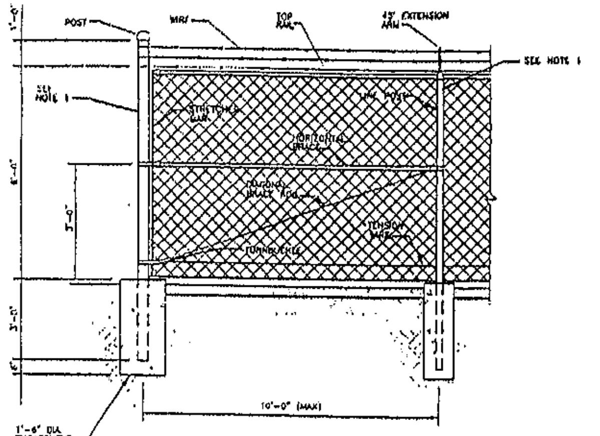
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	01/31/01	GENERAL REVISIONS
2	03/29/01	OWNER REVIEW
3	04/12/01	CONSTRUCTION ISSUE
4	06/22/01	GENERAL REVISIONS
5	08/12/01	GENERAL REVISIONS

DRAWING TITLE: SITE PLAN & ELEVATION

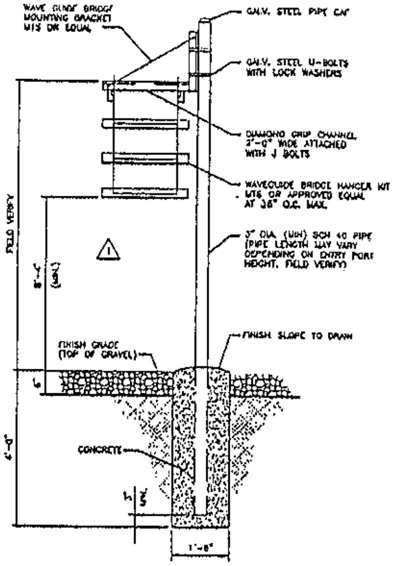
DRAWING NO.: A-1

FILENAME: 20136A-1.dwg DRAWING 3 OF 19



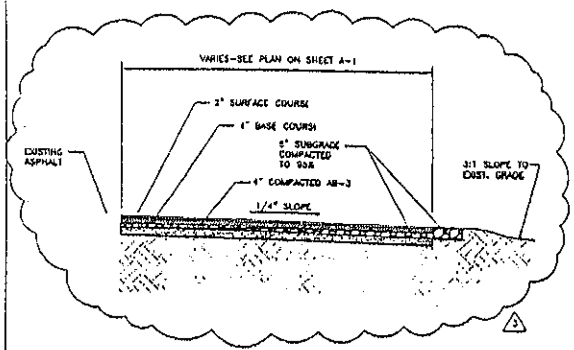
NOTES:
1. ALL POSTS SHALL BE COMMERCIAL GRADE, GALVANIZED STEEL POSTS.
2. FABRIC SHALL BE EITHER GALVANIZED RESIDENTIAL OR GALVANIZED COMMERCIAL GRADE.

TYPICAL CORNER POST DETAIL | 6

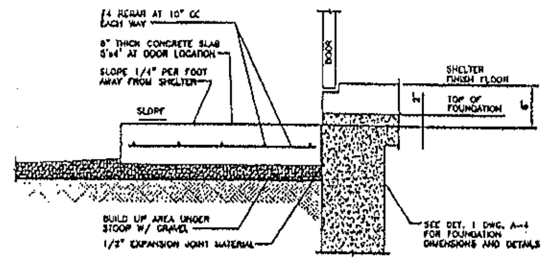


FURNISHED AND INSTALLED BY GENERAL CONTRACTOR

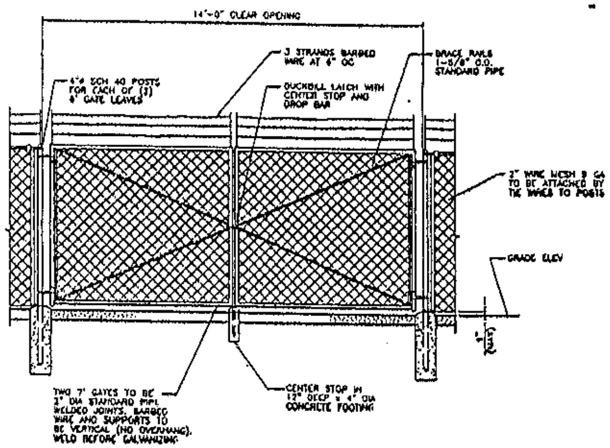
WAVEGUIDE BRIDGE DETAIL | 4



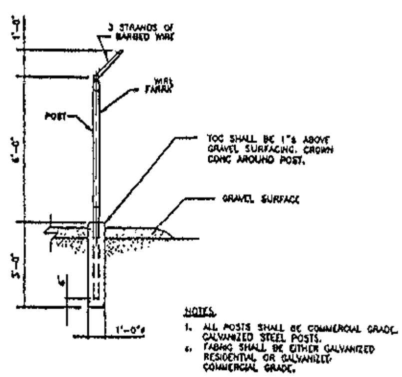
ASPHALT PAVING DETAIL | 1



STOOP DETAIL | 2

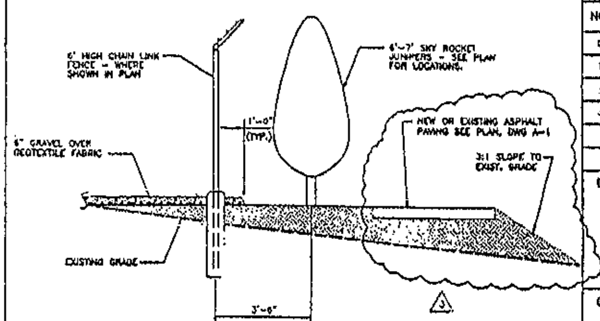


TYPICAL DUAL GATE DETAIL | 7



NOTES:
1. ALL POSTS SHALL BE COMMERCIAL GRADE, GALVANIZED STEEL POSTS.
2. FABRIC SHALL BE EITHER GALVANIZED RESIDENTIAL OR GALVANIZED COMMERCIAL GRADE.

TYPICAL FENCE POST DETAIL | 5



COMPOUND SECTION | 3

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.: 20136

AT&T SITE NAME: RANSON RD W/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: REI
CHECKED BY: JS
APPROVED BY:

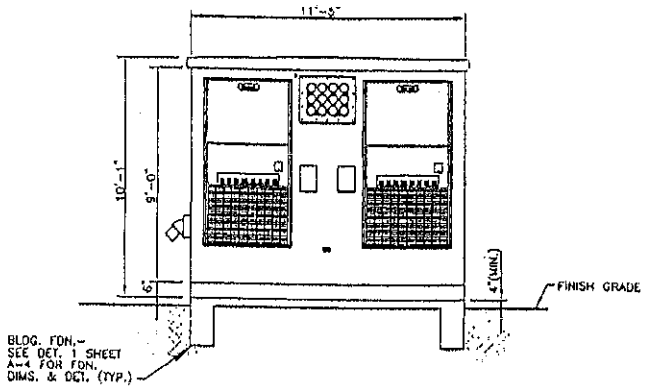
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	04/05/01	OWNER REVIEW
.	04/12/01	CONSTRUCTION ISSUE
3	06/22/01	GENERAL REVISIONS

DRAWING TITLE:
DETAIL SHEET

DRAWING NO.: A-2

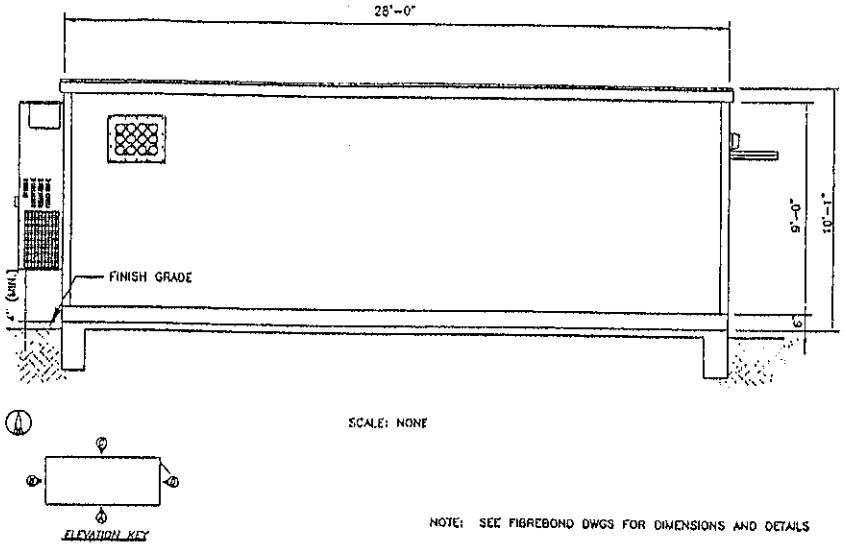
FILENAME: 20136A-2.dwg | DRAWING: 4 OF 19



SCALE: NONE

NOTE: SEE FIBREBOND DWGS FOR DIMENSIONS AND DETAILS

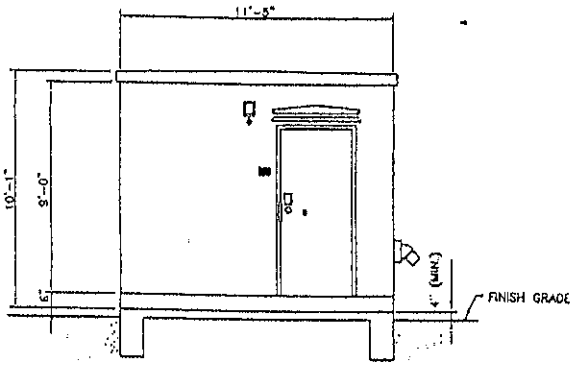
EXTERIOR ELEVATION B | 3



SCALE: NONE

NOTE: SEE FIBREBOND DWGS FOR DIMENSIONS AND DETAILS

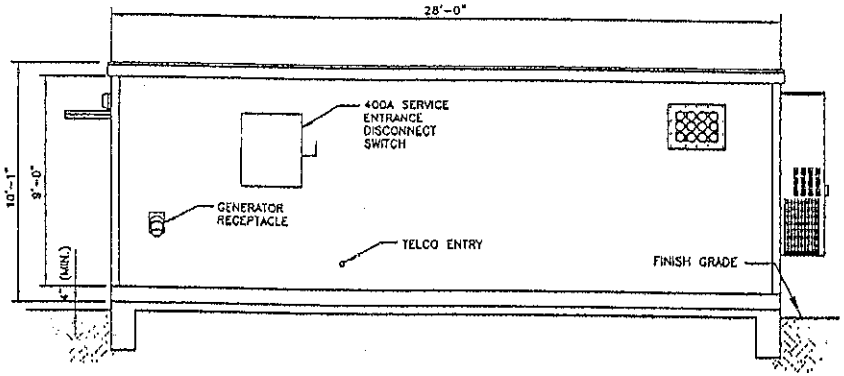
EXTERIOR ELEVATION A | 1



SCALE: NONE

NOTE: SEE FIBREBOND DWGS FOR DIMENSIONS AND DETAILS

EXTERIOR ELEVATION D | 4



SCALE: NONE

NOTE: SEE FIBREBOND DWGS FOR DIMENSIONS AND DETAILS

EXTERIOR ELEVATION C | 2

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.:
20136

AT&T SITE NAME.:
RANSON RD w/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY:	SAG
CHECKED BY:	JS
APPROVED BY:	

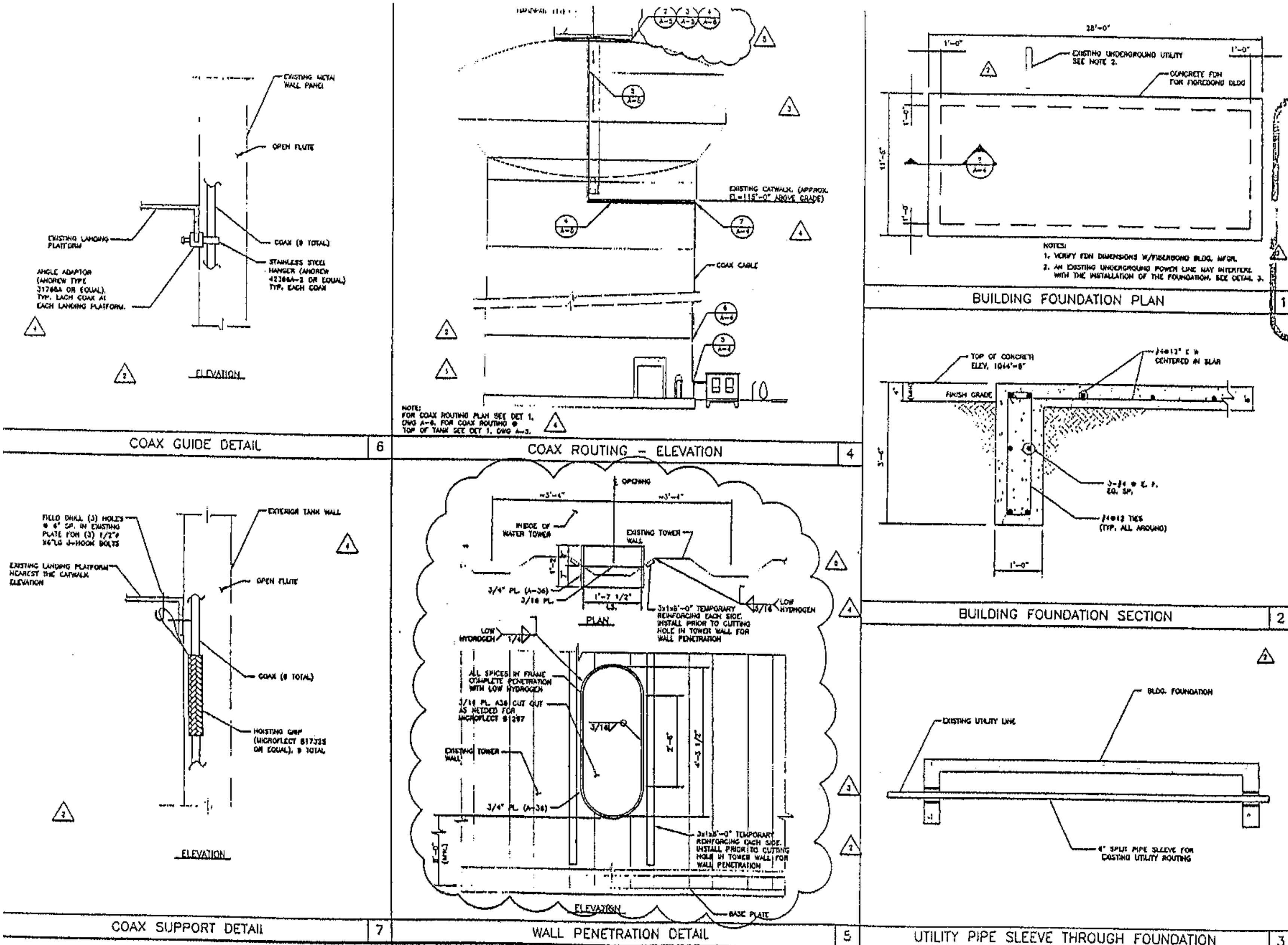
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	04/12/01	CONSTRUCTION ISSUE
2	06/22/01	GENERAL REVISIONS

DRAWING TITLE:
SHELTER ELEVATIONS

DRAWING NO.:
A-3

FILENAME: 20136A-3.DWG | DRAWING 3 OF 10



BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

STATE OF MISSOURI
LISA KERRY
NUMBER
E-25116
REGISTERED PROFESSIONAL ENGINEER

AT&T Wireless Services

AT&T SITE NO.: 20136

AT&T SITE NAME.: RANSON RD W/ TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: REL
CHECKED BY: JS
APPROVED BY:

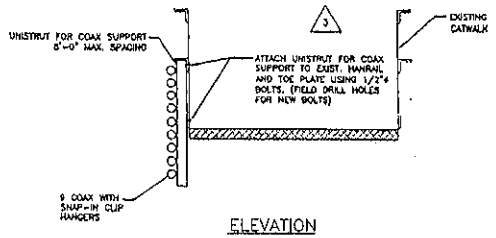
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	01/31/01	GENERAL REVISIONS
2	03/29/01	OWNER REVIEW
3	04/12/01	CONSTRUCTION ISSUE
4	06/22/01	GENERAL REVISIONS
5	08/17/01	WALL PENETRATION DETAIL

DRAWING TITLE: DETAIL SHEET

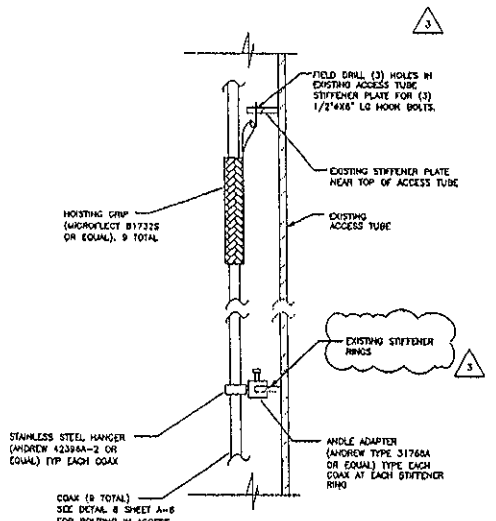
DRAWING NO.: A-4

FILENAME: 20136A-5.dwg DRAWING: 6 OF 15



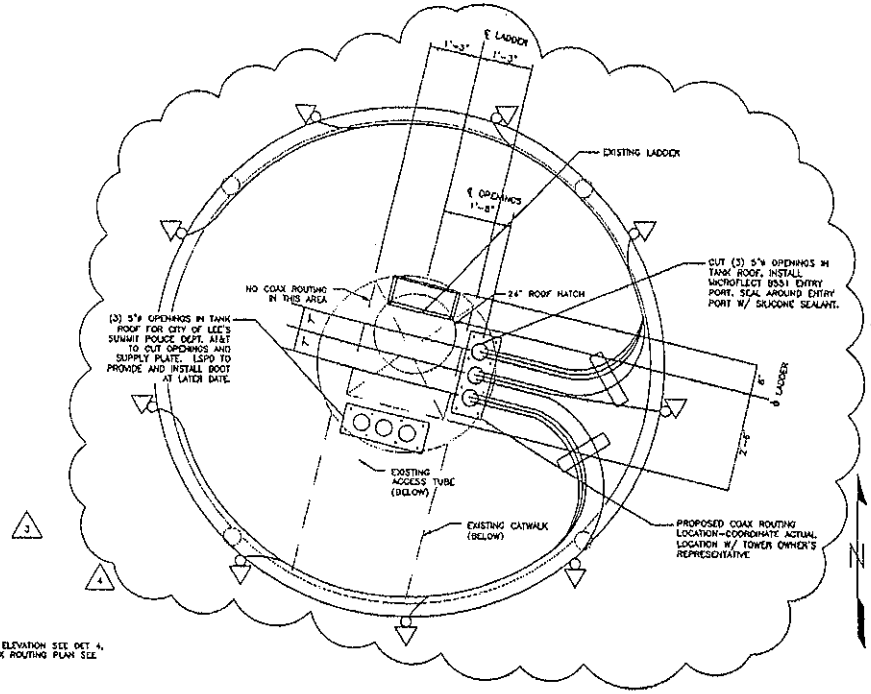
ELEVATION

COAX SUPPORT ON CATWALK DETAIL | 4



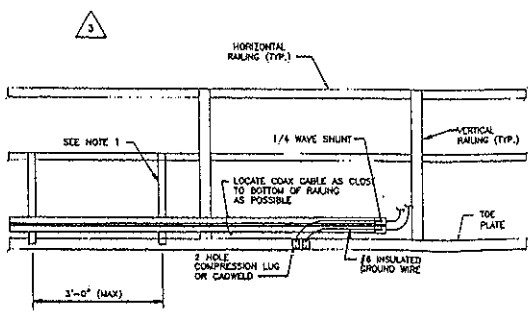
ELEVATION

COAX GUIDE/SUPPORT INSIDE ACCESS TUBE | 5



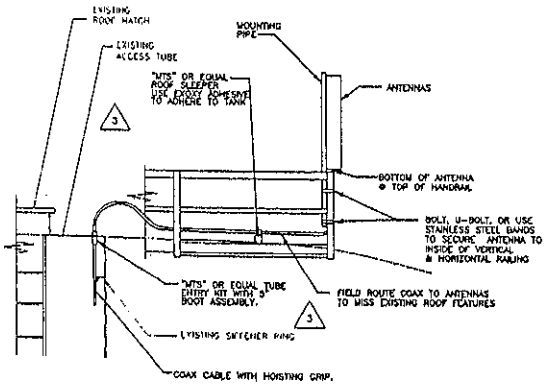
NOTE:
FOR COAX ROUTING ELEVATION SEE DET. 4, DWG A-4. FOR COAX ROUTING PLAN SEE DET. 1, DWG A-8.

COAX ROUTING AT TOP OF TANK | 1



NOTE:
1. BOLT, U-BOLT, OR USE STAINLESS STEEL BAND TO SECURE UNISTRUT TO RAILING AND TOE PLATE.

COAX CABLE - HANDRAIL MOUNTING DETAIL | 3



ROOF MOUNTED COAX & ANTENNA HANDRAIL MOUNT | 2

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

STATE OF MISSOURI
JERRY
NUMBER E-25410
REGISTERED PROFESSIONAL ENGINEER

AT&T Wireless Services

AT&T SITE NO.:
20136

AT&T SITE NAME.:
RANSON Rd w/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

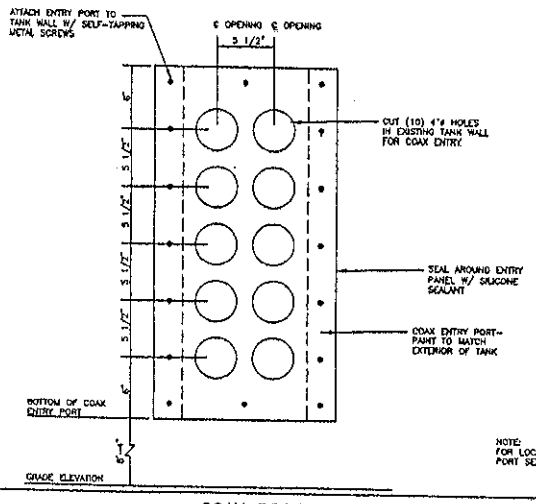
DRAWN BY: REL
CHECKED BY: JS
APPROVED BY:
REVISIONS:

NO:	DATE:	DESCRIPTION:
1	04/05/01	OWNER REVIEW
2	04/12/01	CONSTRUCTION ISSUE
3	08/22/01	GENERAL REVISIONS
4	09/12/01	GENERAL REVISIONS

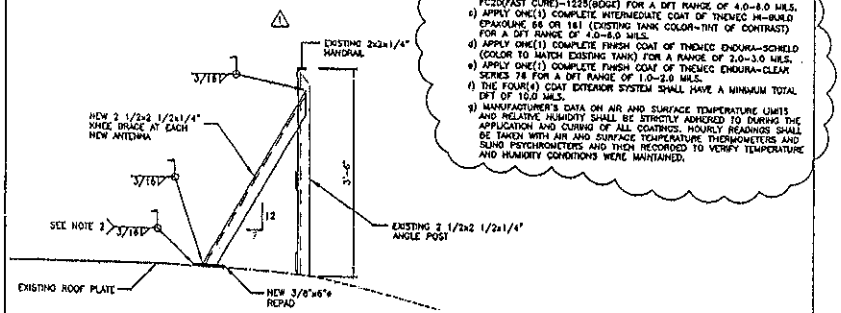
DRAWING TITLE:
DETAIL SHEET

DRAWING NO.:
A-5

FILENAME: 20136A-6.dwg | DRAWING: 7 OF 10

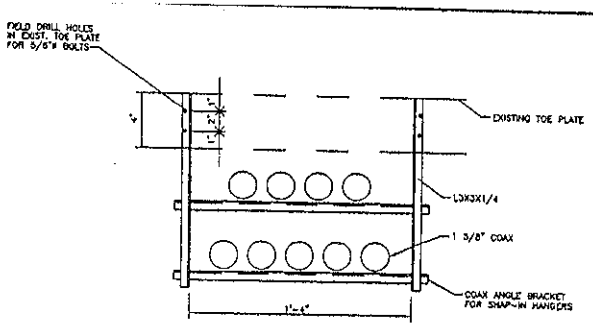


COAX PORT OPENING DETAIL | 3

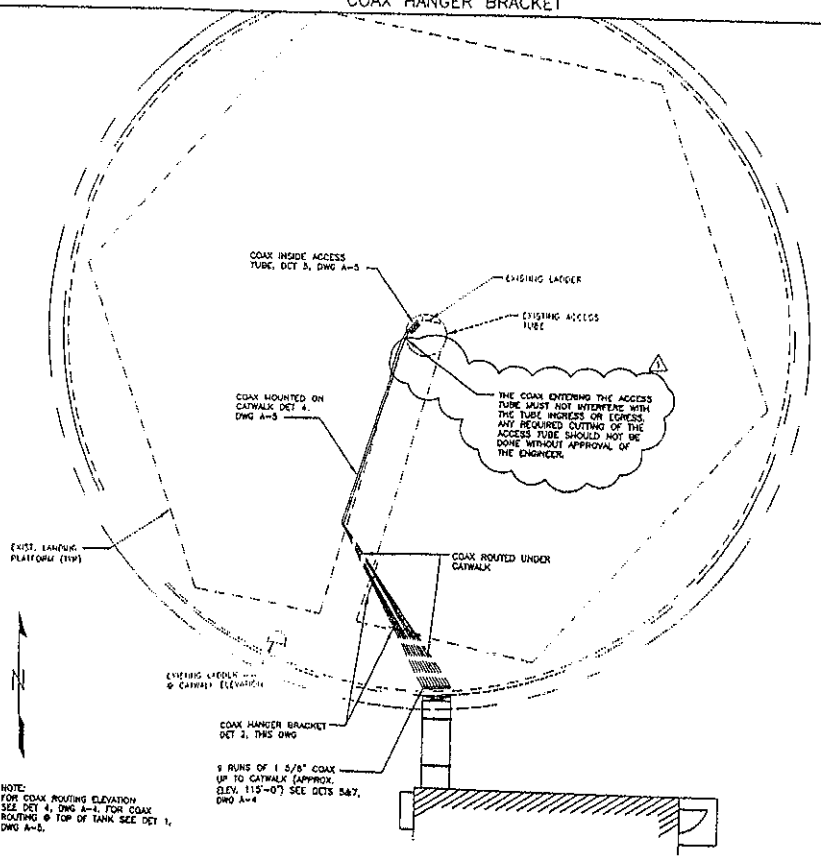


NOTES:
1. NEW BRACING TO BE ORIENTATED RADIAL TO TANK.
2. ALL WELDING ON THE TANK SHALL BE PERFORMED BY QUALIFIED WELDERS AND ACCORDING TO WELDING PROCEDURES. QUALIFICATION OF WELDERS AND WELDING PROCEDURES SHALL BE IN ACCORDANCE WITH AWWA D100 AND SECTION IX OF ASME. WELDING INSPECTION AS A MINIMUM SHALL BE VISUAL WITH SPECIAL CARE GIVEN TO OBSERVATION OF POSSIBLE UNDERCUT OF ORIGINAL TANK MATERIAL AT ATTACHMENT WELDS.
3. ALL NEW STRUCTURAL STEEL, AS WELL AS ANY EXISTING EXTERIOR STEEL SURFACE WHICH IS DAMAGED DURING CONSTRUCTION OR WELDING, SHALL BE PAINTED AS FOLLOWS:
   a) ALL SURFACES SHALL BE CLEANED AND PREPARED PER THE PAINT MANUFACTURER'S RECOMMENDATION.
   b) APPLY ONE(1) SPOT COAT OF THEVEC POTA-POX 20 PR FC20(FAST CURE)-1225(BRIDGE) FOR A DFT RANGE OF 4.0-8.0 MILS.
   c) APPLY ONE(1) COMPLETE INTERMEDIATE COAT OF THEVEC 141-BUILD EPAXOLINE 66 OR 161 (EXISTING TANK COLOR-TINT OF CONTRAST) FOR A DFT RANGE OF 4.0-8.0 MILS.
   d) APPLY ONE(1) COMPLETE FINISH COAT OF THEVEC ENDURA-SCHIELD (COLOR TO MATCH EXISTING TANK) FOR A RANGE OF 2.0-3.0 MILS.
   e) APPLY ONE(1) COMPLETE FINISH COAT OF THEVEC ENDURA-CLEAR SERIES 78 FOR A DFT RANGE OF 1.0-2.0 MILS.
   f) THE FOUR(4) COAT EXTERIOR SYSTEM SHALL HAVE A MINIMUM TOTAL DFT OF 10.0 MILS.
   g) MANUFACTURER'S DATA ON AIR AND SURFACE TEMPERATURE LIMITS AND RELATIVE HUMIDITY SHALL BE STRICTLY ADHERED TO DURING THE APPLICATION AND CURING OF ALL COATINGS. HOURLY READINGS SHALL BE TAKEN WITH AIR AND SURFACE TEMPERATURE THERMOMETERS AND SLING PSYCHROMETERS AND THOSE RECORDED TO VERIFY TEMPERATURE AND HUMIDITY CONDITIONS WERE MAINTAINED.

HANDRAIL BRACING DETAIL | 4



COAX HANGER BRACKET | 2



NOTE:
FOR COAX ROUTING ELEVATION SEE DET 4, DWG A-4. FOR COAX ROUTING @ TOP OF TANK SEE DET 1, DWG A-5.

COAX ROUTING - PLAN | 1

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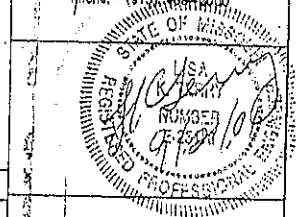
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000



AT&T Wireless Services

AT&T SITE NO.:
20136

AT&T SITE NAME.:
RANSON RD W/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

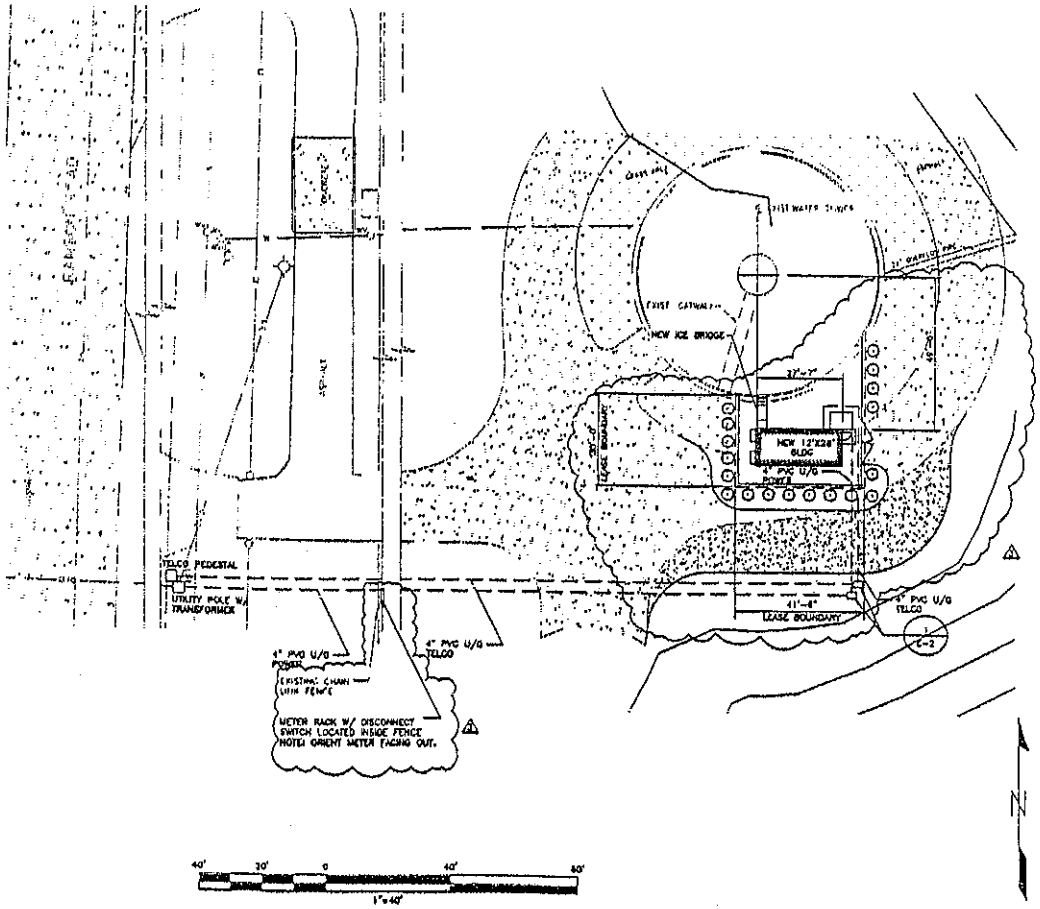
DRAWN BY: REL
CHECKED BY: JS
APPROVED BY:
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	06/22/01	CONSTRUCTION ISSUE
1	09/12/01	HANDRAIL REVISION
2	09/12/01	GENERAL REVISION

DRAWING TITLE:
DETAIL SHEET

DRAWING NO.:
A-6

FILENAME: 20136A-6.dwg | DRAWING: 8 OF 19



SITE UTILITIES ROUTING PLAN | 4

CONDUIT RUN ABOVEGROUND

CONDUIT RUN UNDERGROUND

GROUNDING CONDUCTOR ABOVE GROUND

GROUNDING CONDUCTOR UNDER GROUND

GND BUS OR COND — GND COND — GROUND CONNECTION (COMPRESSION OR EXOTHERMIC AS REQUIRED)

GROUND ROD

TEST WELL

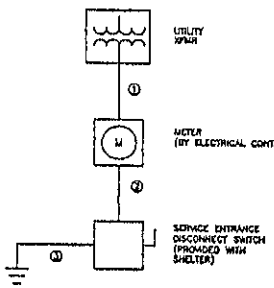
TRANSFORMER

DISCONNECT SWITCH

GROUND

METER

ELECTRICAL SYMBOLS LEGEND | 1



ONE-LINE DIAGRAM | 2

NO.	FROM	TO	CONFIGURATION
①	TRANSFORMER	WATT-HOUR METER	4#4/0, 1#3 GND, 4" PVC
②	WATT-HOUR METER	SERVICE ENTRANCE DISCONNECT SWITCH	3#4/0, 1#3 GND, 4" PVC
③	SERVICE ENTRANCE DISCONNECT SWITCH	GROUND LOOP	1#1/0, 3/4" PVC

CIRCUIT SCHEDULE | 3

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20136

AT&T SITE NAME.:
RANSON RD W/TANK

SITE ADDRESS:
1251 SE RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: TRJ
CHECKED BY: JS
APPROVED BY:

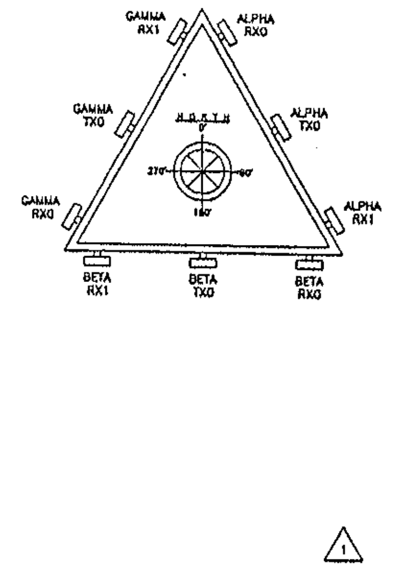
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/06/00	CONSTRUCTION ISSUE
1	01/31/01	GENERAL REVISIONS
2	04/12/01	CONSTRUCTION ISSUE
3	06/22/01	GENERAL REVISIONS

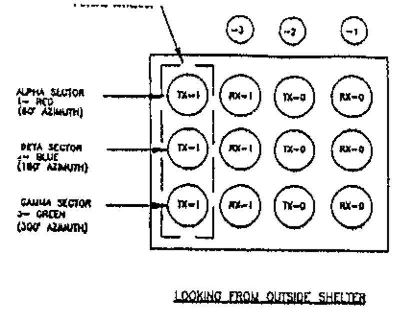
DRAWING TITLE:
ELECTRICAL - GENERAL

DRAWING NO.:
E-1

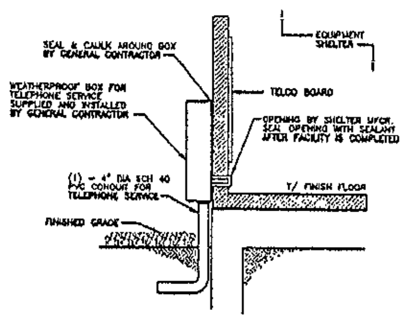
FILENAME: 20136E-1.DWG | DRAWING: 8 OF 10



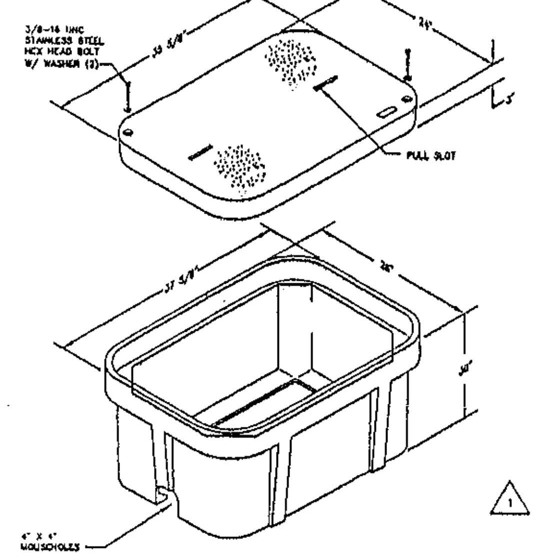
ANTENNA IDENTIFICATION 5



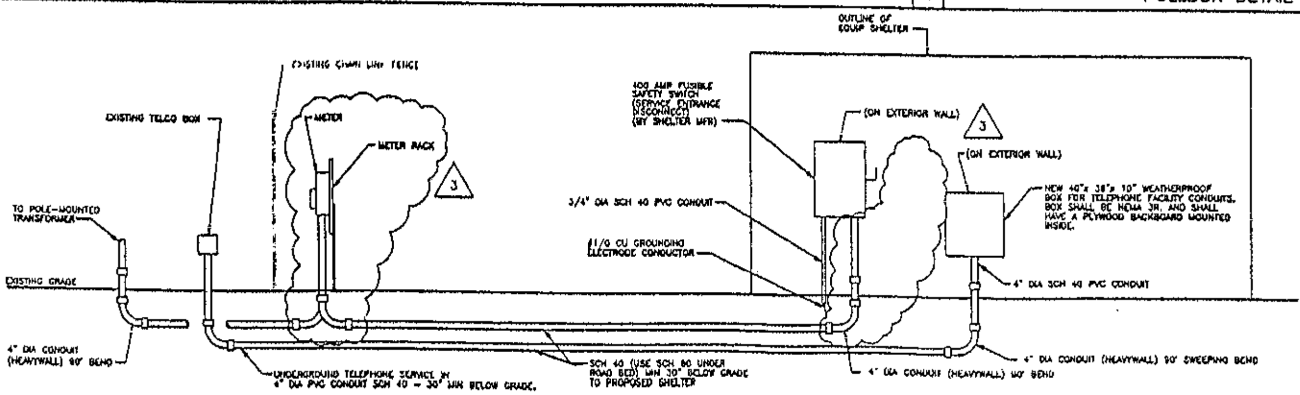
EQUIPMENT SHELTER COAX ENTRY PORT 3



TELEPHONE SERVICE ENTRANCE 4



PULLBOX DETAIL 1



ELECTRICAL RISER DIAGRAM 2

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11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.: 20136

AT&T SITE NAME: Ranson Rd w/Tank

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: REL

CHECKED BY: JS

APPROVED BY:

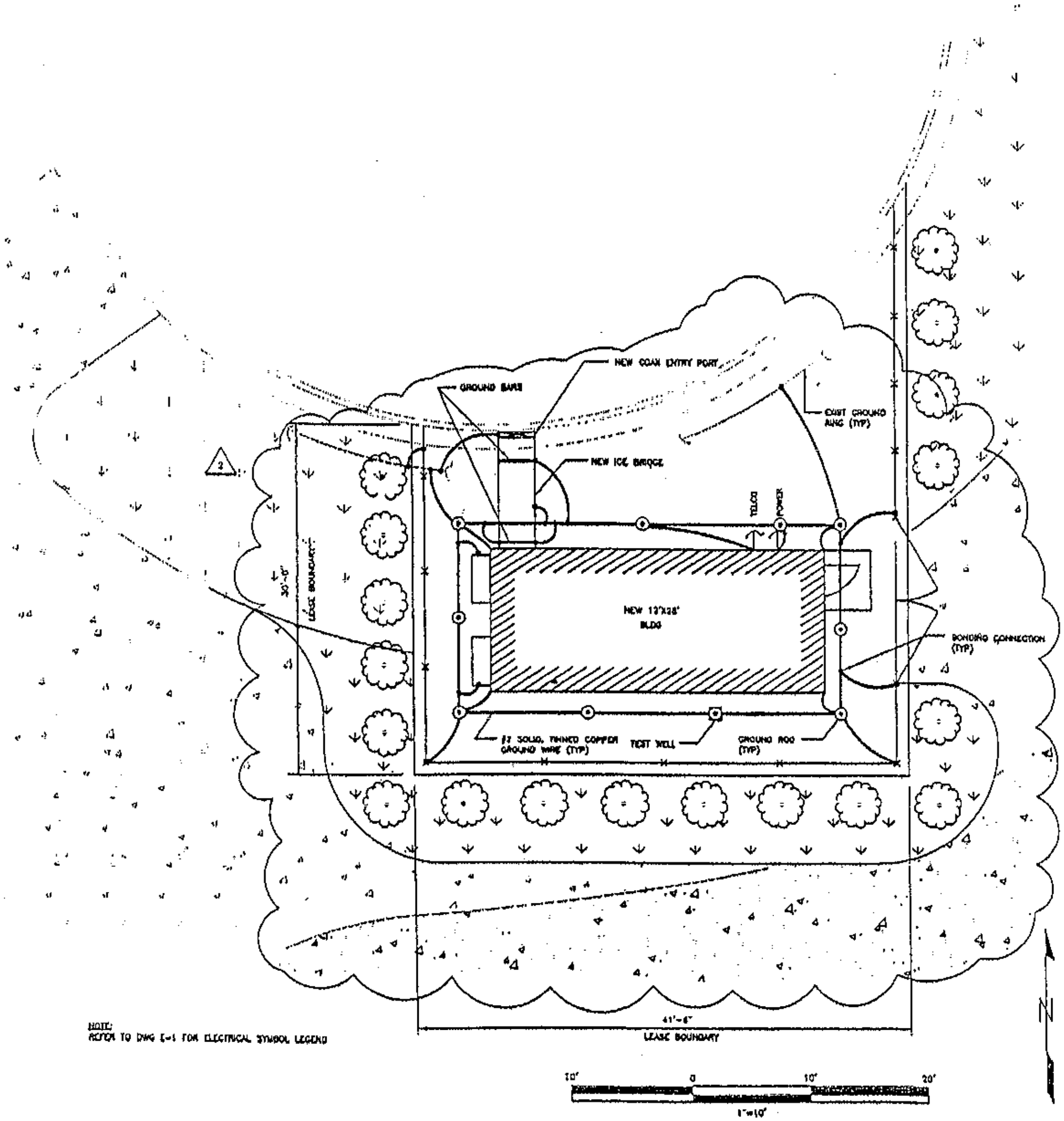
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	01/31/01	GENERAL REVISIONS
2	04/12/01	CONSTRUCTION ISSUE
3	06/22/01	GENERAL REVISIONS

DRAWING TITLE:
ELECTRICAL – DETAILS

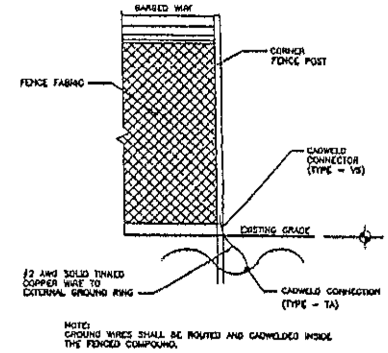
DRAWING NO.: E–2

FILENAME: 20136E-2.DWG



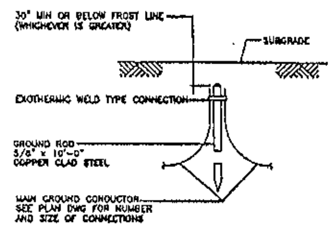
NOTE:
REFER TO DWG E-1 FOR ELECTRICAL SYMBOL LEGEND

SITE GROUNDING PLAN 4

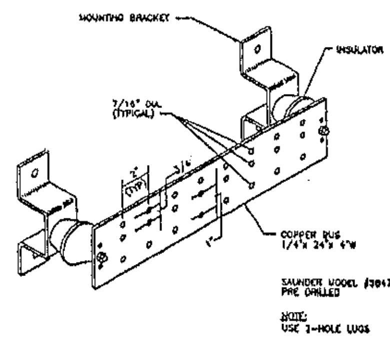


NOTE:
GROUND WIRES SHALL BE ROUTED AND CADWELDED INSIDE THE FENCED COMPOUND.

FENCE POST GROUNDING DETAIL 1



GROUND ROD 2



NOTE:
USE 2-HOLE LUGS

GROUND BAR 3

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11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

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AT&T SITE NAME.: RANSON RD W/ TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: TRJ
CHECKED BY: JS
APPROVED BY:

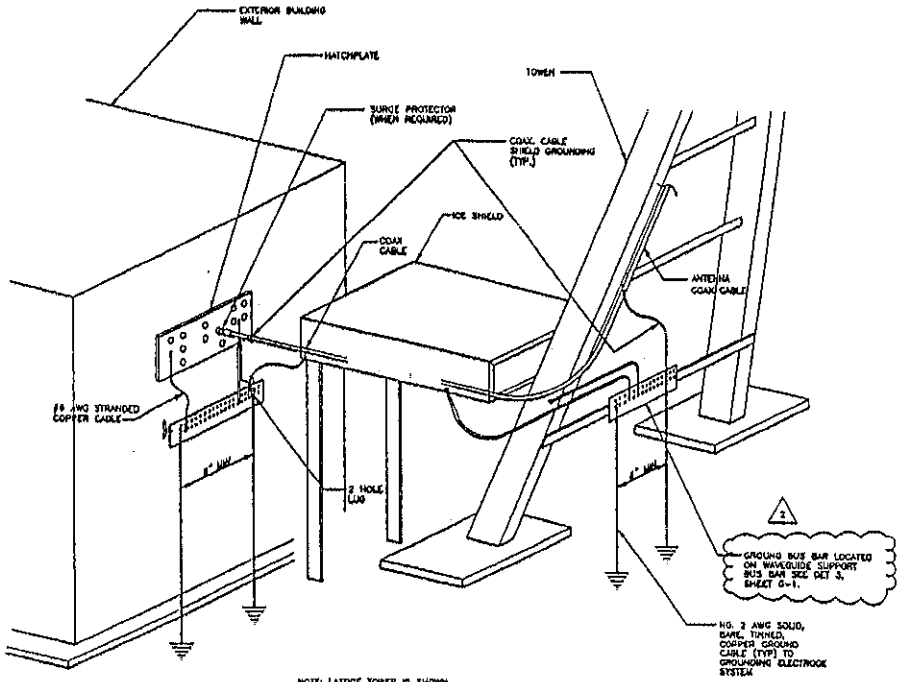
REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	04/12/01	CONSTRUCTION ISSUE
2	08/22/01	GENERAL REVISIONS

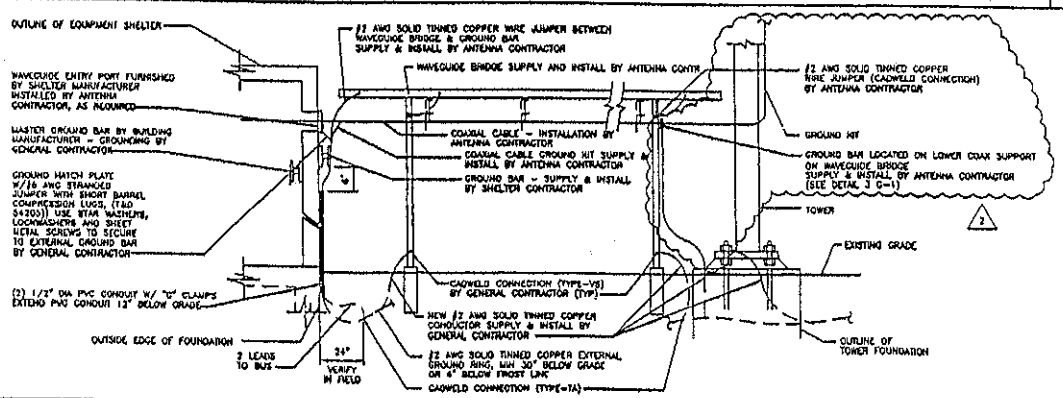
DRAWING TITLE:
GROUNDING - PLAN & DETAILS

DRAWING NO.: G-1

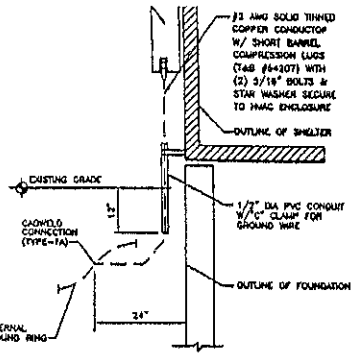
FILENAME: 20136G-1.DWG | DRAWING: 10 OF 16



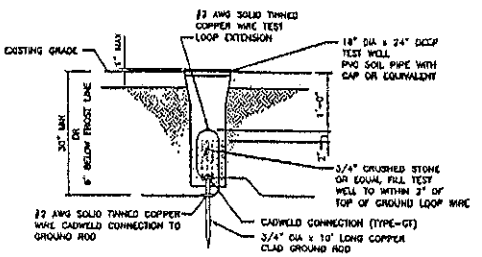
COAX SHIELD GROUNDING AT TOWER & HATCHPLATE | 5



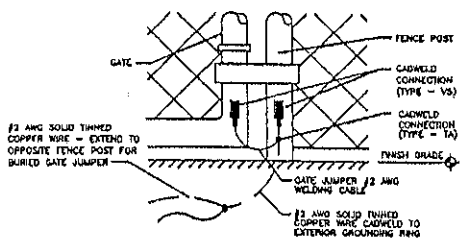
ANTENNA CABLE AND WAVEGUIDE BRIDGE GROUNDING DIAGRAM ELEVATION | 6



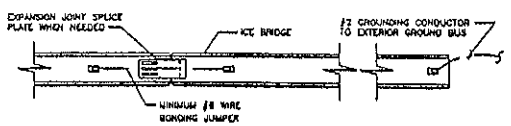
HVAC GROUNDING DETAIL | 1



TEST WELL | 2



GATE GROUND STRAP DETAIL | 3



ICE BRIDGE GROUNDING | 4

BLACK & VEATCH
Black & Veatch Telecommunications, Inc.
11401 LAMAR AVENUE
OVERLAND PARK, KS 66211
Phone: (913) 458-2000

AT&T Wireless Services

AT&T SITE NO.:
20136

AT&T SITE NAME:
RANSON RD (OLATHE)

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEE'S SUMMIT, MISSOURI

DRAWN BY: REL
CHECKED BY: JS
APPROVED BY:

REVISIONS:

NO:	DATE:	DESCRIPTION:
0	12/07/00	CONSTRUCTION ISSUE
1	04/12/01	CONSTRUCTION ISSUE
2	06/22/01	GENERAL REVISIONS

DRAWING TITLE:
GROUNDING - DETAILS

DRAWING NO.:
G-2

FILENAME: 20136G-2.DWG | DRAWING: 12 OF 19

PART 1 GENERAL

1.1 CONFLICTS

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.

B. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OF THING CONCERNING WHICH SUCH BIDDER MIGHT HAVE FULLY INFORMED HIMSELF PRIOR TO THE BIDDING.

C. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE JOBSITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE GENERAL CONSTRUCTION, PROPOSED MECHANICAL AND ELECTRICAL INSTALLATION, DEMOLITION, AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION.

D. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OF OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

E. THE CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING, AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.

F. CONTRACTOR SHALL NOTIFY PROJECT MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS 'EXISTING' WHICH ARE NOT FOUND TO BE IN THE FIELD.

G. EXISTING STRUCTURES HAVE BEEN CHECKED FOR EQUIPMENT LOADING AS NOTED ON THE PLANS. ANY CHANGES OR ADDITIONAL EQUIPMENT PROPOSALS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER OR AUTHORIZED REPRESENTATIVE BEFORE ANY CHANGES OR ADDITIONS ARE MADE BY THE CONTRACTOR OR ANYONE. HE IS TO OBTAIN WRITTEN PERMISSION FROM THE OWNER OR AUTHORIZED REPRESENTATIVE.

1.2 CONTRACTS AND WARRANTIES

A. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.

1.3 STORAGE

A. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

1.4 CLEAN-UP

A. THE CONTRACTOR SHALL AT ALL TIMES KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY HIS EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK, HE SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL HIS TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE HIS WORK CLEAN AND READY FOR USE.

B. EXTERIOR: VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.

1. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.

2. IF NECESSARY TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.

C. INTERIOR: VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS/FLOOR/CEILING.

1. REMOVE ALL TRACES OF SPLASHED MATERIAL FROM ADJACENT SURFACES.

D. CONTRACTOR SHALL WASH AND WAX WITH ANTI-STATIC WAX, AND BUFF FLOOR PRIOR TO FINAL ACCEPTANCE.

1.5 CHANGE ORDER PROCEDURE

A. CHANGE ORDERS MAY BE INITIATED BY THE OWNER AND/OR THE CONTRACTOR INVOLVED. THE CONTRACTOR, UPON VERBAL REQUEST FROM THE OWNER SHALL PREPARE A WRITTEN PROPOSAL DESCRIBING THE CHANGE IN WORK OR MATERIALS, ANY CHANGES IN THE CONTRACT AMOUNT AND PRESENT TO THE OWNER FOR APPROVAL. SUBMIT REQUESTS FOR SUBSTITUTIONS IN THE FORM AND IN ACCORDANCE WITH PROCEDURES REQUIRED FOR CHANGE ORDER PROPOSALS. ANY CHANGES IN SCOPE OF WORK WITHOUT A WRITTEN CHANGE ORDER AS DESCRIBED AND APPROVED BY THE OWNER SHALL PLACE FULL RESPONSIBILITY OF THE ACTIONS ON THE CONTRACTOR.

A. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

B. THE DESIGN, SPECIFICATIONS, PERFORMANCE AND LOCATION OF ALL RADIO EQUIPMENT AND RELATED ELECTRICAL ITEMS WITHIN THE RADIO EQUIPMENT ROOM ARE BY THE RADIO EQUIPMENT VENDOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT AND ANY OTHER RELATED PORTIONS OF THE WORK.

1.7 SHOP DRAWINGS

A. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.

B. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

1.8 PRODUCTS AND SUBSTITUTIONS

A. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION, IN EACH REQUEST IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.

B. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

1.9 QUALITY ASSURANCE

A. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS. THESE SHALL INCLUDE BUT NOT BE LIMITED TO THE LATEST VERSION OF THE FOLLOWING:

ANSI/EIA-222-F
UNIFORM BUILDING CODE (UBC)
BUILDING OFFICIALS AND CODE ADMINISTRATORS (BOCA)
NATIONAL ELECTRICAL CODE (NEC) WITH LOCAL AMENDMENTS
UNDERWRITER LABORATORIES APPROVED ELECTRICAL PRODUCTS
AMERICAL INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
LIFE SAFETY CODE NFPA-101
NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS (NFPA)

B. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

1.10 ADMINISTRATION

A. BEFORE THE COMMENCEMENT OF ANY WORK. THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.

B. SUBMIT A BAR CHART TYPE PROGRESS SCHEDULE NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY ON ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.

C. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE (THOUGH NOT LIMITED TO) THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).

D. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL CELLULAR SERVICE BE ARRANGED.

E. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS, SAFETY SHOES, DUST AND EYE PROTECTION AT ALL TIMES.

F. PROVIDE DAILY UPDATES ON SITE PROGRESS, WHETHER VERBAL OR WRITTEN TO THE OWNER. SCHEDULE WEEKLY ON-SITE PROGRESS MEETINGS WITH OWNER'S REPRESENTATIVE.

G. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.

H. NOTIFY THE OWNER OR OWNER'S CONSTRUCTION REPRESENTATIVE NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS AND SHELTER PLACEMENTS.

A. CONTRACTOR SHALL AT HIS OWN EXPENSE CARRY AND MAINTAIN FOR THE DURATION OF THE PROJECT ALL INSURANCE AS REQUIRED AND LISTED AND SHALL NOT COMMENCE WITH HIS WORK UNTIL HE HAS PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER.

B. THE OWNER SHALL BE NAMED AS ADDITIONAL INSURED ON ALL POLICIES.

C. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

1.12 WARRANTY

A. IN ADDITION TO THE WARRANTY ON ALL CONSTRUCTION COVERED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL REPAIR ALL DAMAGE OF SURROUNDING PROPERTY CAUSED BY CONSTRUCTION.

DIVISION 13 - SPECIAL CONSTRUCTION

13100 ANTENNA INSTALLATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. ANTENNAS AND HARDWARE ARE FURNISHED BY OWNER.

B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND OWNER SPECIFICATIONS.

C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

D. INSTALL FURNISHED GALVANIZED STEEL WAVEGUIDE LADDER.

E. SUPPLY AND INSTALL INSULATED GROUND BAR(S) ON WAVEGUIDE TRANSITION BOX (QUANTITY AS REQUIRED).

F. SUPPLY AND INSTALL GROUNDING STRAP KITS WITH LONG BARREL COMPRESSION LUGS (ANDREW 223700TBD OR APPROVED EQUAL) AS REQUIRED BEFORE ENTERING THE EQUIPMENT ROOM AND EVERY 200'-0" OC OF EACH FEEDLINE RUN TO INSULATED GROUND BAR.

G. PERFORM SWEEP TEST OF INSTALLED COAX IN ACCORDANCE WITH OWNER'S STANDARDS.

2.2 RELATED WORK

A. FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

1. FLASHING OF OPENING INTO OUTSIDE WALLS.

2. SEALING AND CAULKING ALL OPENINGS.

3. PAINTING.

4. CUTTING AND PATCHING.

2.3 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH UL LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE, INSTALL IN CONFORMANCE WITH UL STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

1. EIA - ELECTRONIC INDUSTRIES ASSOCIATION RS-22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. FAA - FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460-1H, OBSTRUCTION MARKING AND LIGHTING.

3. FCC - FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

4. AISC - AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.

5. NEC - NATIONAL ELECTRICAL CODE FOR TOWER LIGHTING KITS.

6. UL - UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.

7. IN ALL CASES, PART 77 OR THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

8. LIFE SAFETY CODE NFPA - 101.

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20136

AT&T SITE NAME:
RANSON RD W/TANK

SITE ADDRESS:
1251 S.E. RANSON ROAD
LEES SUMMIT, MISSOURI

DRAWN BY:

CHECKED BY:

APPROVED BY:

REVISIONS:

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0	12/05/00	CONSTRUCTION ISSUE
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DRAWING NO.:
SP-1

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SECTION 02200 SITE WORK

PART 1 GENERAL

CLEARING, GRUBBING STRIPPING, EROSION CONTROL SURVEY, LAYOUT, SUBGRADE PREPARATION AND FINISH GRADING AS REQUIRED BY THE DRAWINGS.

1.2 REFERENCES.

A. MODT (MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST VERSION). KDOT (STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION (LATEST VERSION).

B. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS).

C. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION).

1.3 INSPECTION AND TESTING:

A. FIELD TESTING OF EARTHWORK AND COMPACTION SHALL BE PERFORMED BY CONTRACTOR'S INDEPENDENT TESTING LAB, APPROVED BY AT&T, IF REQUIRED BY PERMITTING.

B. ALL WORK SHALL BE INSPECTED AND RELEASED BY THE CONSTRUCTION MANAGER WHO SHALL CARRY OUT THE GENERAL INSPECTION OF THE WORK WITH SPECIFIC CONCERN TO PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REQUEST TIMELY INSPECTIONS PRIOR TO PROCEEDING WITH FURTHER WORK THAT WOULD MAKE PARTS OF WORK INACCESSIBLE OR DIFFICULT TO INSPECT.

1.4 SITE MAINTENANCE AND PROTECTION:

A. PROVIDE ALL NECESSARY JOB SITE MAINTENANCE FROM COMMENCEMENT OF WORK UNTIL COMPLETION OF THE SUBCONTRACT.

B. AVOID DAMAGE TO THE SITE AND TO EXISTING FACILITIES, STRUCTURES, TREES, AND SHRUBS DESIGNATED TO REMAIN. TAKE PROTECTIVE MEASURES TO PREVENT EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR REMOVAL FROM BEING DAMAGED BY THE WORK.

C. KEEP SITE FREE OF ALL PONDING WATER.

D. PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH DIVISION 600 OF KDOT AND DIVISION 800 OF MODT.

E. PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNALS AND SIMILAR DEVICES NECESSARY TO PROTECT LIFE AND PROPERTY DURING THE ENTIRE PERIOD OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.

F. EXISTING UTILITIES: DO NOT INTERRUPT EXISTING UTILITIES SERVING FACILITIES OCCUPIED BY THE OWNER OR OTHERS, EXCEPT WHEN PERMITTED IN WRITING BY THE OWNER AND THEN ONLY AFTER ACCEPTABLE TEMPORARY UTILITY SERVICES HAVE BEEN PROVIDED.

1. PROVIDE A MINIMUM 48 HOURS NOTICE TO THE OWNER AND RECEIVE WRITTEN NOTICE TO PROCEED BEFORE INTERRUPTING ANY UTILITY.

PART 2 PRODUCTS

2.1 SUITABLE BACKFILL: EXCAVATED INORGANIC MATERIAL COHESIVE AND COHESIONLESS MATERIALS INCLUDING GRAVEL, SAND, INORGANIC LEAN CLAY, GRAVEL SILT, GRAVEL CLAY, SAND CLAY, SAND SILT, OR SILT CLAY MATERIAL FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL OR FILL MATERIAL AS DETERMINED BY CONSTRUCTION MANAGER.

2.2 NONPOROUS GRANULAR EMBANKMENT AND BACKFILL: COARSE AGGREGATE MEETING THE REQUIREMENTS OF KDOT DIVISION 800, MODT DIVISION 600.

2.3 POROUS GRANULAR EMBANKMENT AND BACKFILL: COARSE AGGREGATE MEETING REQUIREMENTS OF KDOT DIVISION 800, MODT DIVISION 600, GRADATION CA-16.

2.4 SELECT STRUCTURAL FILL: GRANULAR FILL MATERIAL MEETING THE REQUIREMENTS OF KDOT 207.3C, MODT 206.4.9 FOR USE AROUND AND UNDER STRUCTURES WHERE STRUCTURAL FILL MATERIALS ARE REQUIRED.

2.5 GRANULAR BEDDING AND TRENCH BACKFILL: WELL-GRADED SAND (SE OR SW-SM) MEETING THE GRADATION REQUIREMENTS OF KDOT DIVISION 800, MODT DIVISION 600.

2.6 COARSE AGGREGATE FOR ACCESS ROAD SUBBASE COURSE SHALL CONFORM TO KDOT DIVISION 1100, MODT DIVISION 300.

2.7 UNSUITABLE MATERIALS: HIGH AND MODERATELY PLASTIC SILTS AND CLAYS, MATERIAL CONTAINING REFUSE, FROZEN LUMPS, DEMOLISHED BITUMINOUS MATERIAL, VEGETATIVE MATTER, WOOD, STONES IN EXCESS OF 3 INCHES IN ANY DIMENSION, AND DEBRIS AS DETERMINED BY THE CONSTRUCTION MANAGER. TYPICALLY THESE WILL BE SOILS CLASSIFIED AS PT, MH, CH, OH, ML AND OL.

2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR APPROVED EQUAL.

2.9 PLASTIC MARKING TAPE: SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES, 6 INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004 INCH. TAPE SHALL HAVE MINIMUM STRENGTH OF 1500 PSI IN BOTH DIRECTIONS AND MANUFACTURED WITH INTEGRAL WIRES, FOIL BACKING OR OTHER MEANS TO ENABLE DETECTION BY A METAL DETECTOR WHEN BURIED UP TO 3 FEET DEEP. THE METALLIC CORE OF THE TAPE SHALL BE ENCASED IN A PROTECTIVE JACKET OR PROVIDED WITH OTHER MEANS TO PROTECT IT FROM CORROSION. TAPE COLOR SHALL BE RED FOR ELECTRIC UTILITIES AND ORANGE FOR TELECOMMUNICATION UTILITIES.

PART 3 - EXECUTION

3.1 GENERAL:

A. BEFORE STARTING GENERAL SITE PREPARATION ACTIVITIES, INSTALL EROSION AND SEDIMENT CONTROL MEASURES. THE WORK AREA SHALL BE CONSTRUCTED AND MAINTAINED IN SUCH CONDITION THAT IN THE EVENT OF RAIN THE WORK WILL BE WELL DRAINED AT ALL TIMES.

B. BEFORE ALL SURVEY, LAYOUT, STAKING, AND MARKING TO ESTABLISH AND MAINTAIN ALL LINES, GRADES, ELEVATIONS AND BENCHMARKS NEEDED FOR EXECUTION OF THE WORK.

C. CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF THE SITE. REMOVE TREES, BRUSH, STUMPS, RUBBISH AND OTHER DEBRIS AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE SITE AREA TO BE CLEARED AND GRUBBED.

1. REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, AND OTHER DEBRIS, BRUSH, AND REFUSE EMBEDDED IN OR PROTRUDING THROUGH THE GROUND SURFACE. RAKE, DISK OR PLOW THE AREA TO A DEPTH OF NO LESS THAN 6 INCHES, AND REMOVE TO A DEPTH OF 12 INCHES ALL ROOTS AND OTHER DEBRIS THEREBY EXPOSED.

2. REMOVE TOPSOIL MATERIAL COMPLETELY FROM THE SURFACE UNTIL THE SOIL NO LONGER MEETS THE DEFINITION OF TOPSOIL. AVOID MIXING TOPSOIL WITH SUBSOIL OR OTHER UNDESIRABLE MATERIALS.

3. EXCEPT WHERE EXCAVATION TO GREATER DEPTH IS INDICATED, FILL DEPRESSIONS RESULTING FROM CLEARING, GRUBBING AND DEMOLITION WORK COMPLETELY WITH SUITABLE FILL.

D. REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING WILL NOT BE PERMITTED.

E. PRIOR TO EXCAVATING, THOROUGHLY EXAMINE THE AREA TO BE EXCAVATED AND/OR TRENCHED TO VERIFY THE LOCATIONS OF FEATURES INDICATED ON THE DRAWINGS AND TO ASCERTAIN THE EXISTENCE AND LOCATION OF ANY STRUCTURE, UNDERGROUND STRUCTURE, OR OTHER ITEM NOT SHOWN THAT MIGHT INTERFERE WITH THE NEW CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER OF ANY OBSTRUCTIONS THAT WILL PREVENT ACCONPLISHMENT OF THE WORK AS INDICATED ON THE DRAWINGS.

F. SEPARATE AND STOCK PILE ALL EXCAVATED MATERIALS SUITABLE FOR BACKFILL. ALL EXCESS EXCAVATED AND UNSUITABLE MATERIALS SHALL BE DISPOSED OF OFF-SITE.

3.2 STRUCTURAL EXCAVATION:

A. FOUNDATION EXCAVATIONS SHALL BE CUT TO FIRM MATERIAL AND SHALL BE FREE OF ALL LOOSE AND WET MATERIALS. IF THE BOTTOM OF THE EXCAVATION IS NOT FIRM AND STABLE, EXCAVATE AN ADDITIONAL 12 INCHES. COMPACT AND FILL WITH 12 INCHES OF SELECT STRUCTURAL FILL.

B. AFTER EXCAVATION, THE EXPOSED SOILS SHALL BE INSPECTED AND TESTED AND ANY UNSUITABLE DEPOSITS REMOVED AS DIRECTED TO REACH SUITABLE BEARING SOIL. ALL OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH SELECT STRUCTURAL FILL OR WITH LEAN CONCRETE FILL TO THE ELEVATION OF BOTTOM OF FOOTING OR FOUNDATION AS INDICATED ON THE DRAWINGS.

C. PRIOR TO PLACEMENT OF CONCRETE FOUNDATION, THE SURFACE ON WHICH THE CONCRETE IS TO BE PLACED SHALL BE COMPACTED TO A MINIMUM OF 90% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557.

D. NO FOUNDATIONS OR STRUCTURES SHALL BE CONSTRUCTED UNTIL THE BASE MATERIALS HAVE BEEN INSPECTED BY AT&T WIRELESS SERVICES. NO CONCRETE SHALL BE POURED UNTIL THE FORMED STRUCTURE HAS BEEN INSPECTED AND APPROVED BY AT&T WIRELESS.

3.3 BACKFILL:

A. AS SOON AS PRACTICAL, AFTER COMPLETING CONSTRUCTION OF THE RELATED STRUCTURE, INCLUDING EXPIRATION OF THE SPECIFIED MINIMUM CURING PERIOD FOR CAST-IN-PLACE CONCRETE, BACKFILL THE EXCAVATION WITH APPROVED MATERIAL TO RESTORE THE REQUIRED FINISHED GRADE.

1. PRIOR TO PLACING BACKFILL AROUND STRUCTURES, ALL FORMS SHALL HAVE BEEN REMOVED AND THE EXCAVATION CLEANED OF ALL TRASH, DEBRIS, AND UNSUITABLE MATERIALS.

2. BACKFILL BY PLACING AND COMPACTING SUITABLE BACKFILL MATERIAL OR SELECT GRANULAR BACKFILL MATERIAL, WHEN REQUIRED IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8 INCHES LOOSE THICKNESS. WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED FOUR (4) INCHES IN LOOSE DEPTH.

3. WHENEVER THE DENSITY TESTING INDICATES THAT THE CONTRACTOR HAS NOT OBTAINED THE SPECIFIED DENSITY, THE SUCCEEDING LAYER SHALL NOT BE PLACED UNTIL THE SPECIFICATION REQUIREMENTS ARE MET UNLESS OTHERWISE AUTHORIZED BY THE GEO-TECHNICAL ENGINEER. THE CONTRACTOR SHALL TAKE WHATEVER APPROPRIATE ACTION IS NECESSARY, SUCH AS DISKING AND DRYING, ADDING WATER, OR INCREASING THE COMPACTIVE EFFORT.

B. THOROUGHLY COMPACT EACH LAYER OF BACKFILL TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.4 TRENCH EXCAVATION:

A. UTILITY TRENCHES SHALL BE EXCAVATED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE CONSTRUCTION MANAGER. PROVIDE SHORING, SHEETING AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.

B. EXTEND THE TRENCH WIDTH A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.

C. WHEN SOFT, YIELDING, OR OTHERWISE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, BACKFILL AT THE REQUIRED TRENCH TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE REQUIRED ELEVATION AND BACKFILL WITH GRANULAR BEDDING MATERIAL.

3.5 TRENCH BACKFILL:

A. PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND THE UTILITY REQUIREMENTS.

B. NOTIFY THE CONSTRUCTION MANAGER 24 HOURS IN ADVANCE OF BACKFILLING.

C. CONDUCT UTILITY CHECK TESTS BEFORE BACKFILLING. BACKFILL AND COMPACT TRENCH BEFORE ACCEPTANCE TESTING.

D. PLACE GRANULAR TRENCH BACKFILL UNIFORMLY ON BOTH SIDES OF THE CONDUITS IN 6-INCH UNCOMPACTED LIFTS UNTIL 12 INCHES OVER THE CONDUITS. SOLIDLY RAM AND TAMP BACKFILL INTO SPACES AROUND CONDUITS.

E. PROTECT CONDUIT FROM LATERAL MOVEMENT, DAMAGE FROM IMPACT, OR UNBALANCED LOADING.

F. ABOVE THE CONDUIT EMBEDMENT ZONE, PLACE AND COMPACT SATISFACTORY BACKFILL MATERIAL IN NINE INCH MAXIMUM LOOSE THICKNESS LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.

G. COMPACT FINAL TRENCH BACKFILL TO A DENSITY EQUAL TO OR GREATER THAN THAT OF THE EXISTING UNDISTURBED MATERIAL IMMEDIATELY ADJACENT TO THE TRENCH BUT NO LESS THAN A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.6 AGGREGATE ACCESS ROAD:

A. CLEAR, GRUB, STRIP AND EXCAVATE FOR THE ACCESS ROAD TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. SCARIFY TO A DEPTH OF 6 INCHES AND PROOF-ROLL ALL HOLES, RUTS, SOFT PLACES AND OTHER DEFECTS SHALL BE CORRECTED.

B. THE ENTIRE SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 1557.

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C. AFTER PREPARATION OF THE SUBGRADE IS COMPLETE THE GEOTEXTILE FABRIC (MIRAFI 500X) SHALL BE INSTALLED TO THE LIMITS INDICATED ON THE DRAWINGS BY ROLLING THE FABRIC OUT LONGITUDINALLY ALONG THE ROADWAY. THE FABRIC SHALL NOT BE DRAGGED ACROSS THE SUBGRADE. PLACE THE ENTIRE ROLL IN A SINGLE OPERATION, ROLLING THE MATERIAL OUT AS SMOOTHLY AS POSSIBLE.

1. OVERLAPS PARALLEL TO THE ROADWAY WILL BE PERMITTED AT THE CENTERLINE AND AT LOCATIONS BEYOND THE ROADWAY SURFACE WIDTH (I.E., WITHIN THE SHOULDER WIDTH) ONLY. NO LONGITUDINAL OVERLAPS SHALL BE LOCATED BETWEEN THE CENTERLINE AND THE SHOULDER. PARALLEL OVERLAPS SHALL BE A MINIMUM OF 3 FEET WIDE.

2. TRANSVERSE (PERPENDICULAR TO THE ROADWAY) OVERLAPS AT THE END OF A ROLL SHALL OVERLAP IN THE DIRECTION OF THE AGGREGATE PLACEMENT (PREVIOUS ROLL ON TOP) AND SHALL HAVE A MINIMUM LENGTH OF 3 FEET.

3. ALL OVERLAPS SHALL BE PINNED WITH STAPLES OR NAILS BETWEEN 10 AND 12 INCHES LONG TO INSURE POSITIONING DURING PLACEMENT OF AGGREGATE. PIN LONGITUDINAL SEAMS AT 25 FOOT CENTERS AND TRANSVERSE SEAMS EVERY 5 FEET ON CENTER.

D. THE AGGREGATE BASE AND SURFACE COURSES SHALL BE CONSTRUCTED IN LAYERS NOT MORE THAN 4 INCHES (COMPACTED) THICKNESS. AGGREGATE TO BE PLACED ON GEOTEXTILE FABRIC SHALL BE END-DUMPED ON THE FABRIC FROM THE FREE END OF THE FABRIC OR OVER PREVIOUSLY PLACED AGGREGATE. THE FIRST LIFT SHALL BE BLADED DOWN TO A THICKNESS OF 12 INCHES PRIOR TO COMPACTION. AT NO TIME SHALL EQUIPMENT, EITHER THE AGGREGATE OF GRADING THE AGGREGATE, BE PERMITTED ON THE ROADWAY WITH LESS THAN 8 INCHES OF MATERIAL COVERING THE FABRIC.

E. THE AGGREGATE SHALL BE IMMEDIATELY COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557 WITH A TAMPING ROLLER, OR WITH A PNEUMATIC-TIRED ROLLER, OR WITH A VIBRATORY MACHINE OR ANY COMBINATION OF THE ABOVE. THE TOP LAYER SHALL BE GIVEN A FINAL ROLLING WITH A THREE-WHEEL OR TANDEM ROLLER.

3.7 FINISH GRADING:

A. PERFORM ALL GRADING TO PROVIDE SMOOTH, EVEN SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE LIMITS OF CONSTRUCTION. GRADING SHALL BE COMPATIBLE WITH ALL SURROUNDING TOPOGRAPHY AND STRUCTURES.

B. UTILIZE SATISFACTORY FILL MATERIALS RESULTING FROM THE EXCAVATION WORK IN THE CONSTRUCTION OF FILLS, EMBANKMENTS AND FOR THE REPLACEMENT OF REMOVED UNSUITABLE MATERIALS.

C. ACHIEVE FINISHED GRADE BY PLACING A MINIMUM OF 4 INCHES OF CRUSHED STONE, KDOT DIVISION 1100, MDOT DIVISION 300 ON TOP OF SOIL STABILIZER FABRIC.

D. REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS USED DURING THE COURSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

3.8 ASPHALT PAVING ROADS:

A. DIVISION 600 – KDOT FLEXIBLE PAVEMENT.

B. SECTION 400 – MDOT ASPHALT CONCRETE PAVEMENT.

SECTION 03000 – CONCRETE WORK

PART 1 – GENERAL

1.1 SCOPE:

FORMWORK, REINFORCING STEEL, ACCESSORIES, CAST-IN PLACE CONCRETE, FINISHING, CURING, AND TESTING FOR STRUCTURAL CONCRETE FOUNDATIONS.

1.2 REFERENCES:

A. ACI (AMERICAN CONCRETE INSTITUTE),

1. ACI 301 SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
2. ACI 304 RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE.
3. ACI 305 RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING.
4. ACI 306 RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING.
5. ACI 308 STANDARD PRACTICE FOR CURING CONCRETE.
6. ACI 309 STANDARD PRACTICE FOR CONSOLIDATION OF CONCRETE.
7. ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
8. ACI-347 RECOMMENDED PRACTICE FOR CONCRETE FORMWORK.

B. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS).

THE APPLICABLE STANDARDS OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS ARE LISTED IN THE ACI STANDARDS AND ARE A PART OF THIS SPECIFICATION.

PART 2 – PRODUCTS

2.1 REINFORCEMENT MATERIALS:

A. REINFORCING BARS: ASTM A615, GRADE 60, NEW DEFORMED BILLET-STEEL BARS, PLAIN FINISH

B. FURNISH CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS AS REQUIRED FOR SUPPORT OF REINFORCING STEEL AND WIRE FABRIC.

2.2 CONCRETE MATERIALS:

A. PORTLAND CEMENT SHALL BE TYPE II, CONFORMING TO ASTM C-150.

B. AGGREGATES SHALL CONFORM TO ASTM C-33.

1. FINE AGGREGATE SHALL BE UNIFORMLY GRADED, CLEAN, SHARP, WASHED NATURAL, OR CRUSHED SAND, FREE FROM ORGANIC IMPURITIES.
2. COARSE AGGREGATE SHALL BE NATURAL WASHED GRAVEL OR WASHED CRUSHED ROCK HAVING HARD, STRONG, DURABLE PIECES, FREE FROM ADHERENT COATINGS.
3. MAXIMUM SIZES OF COARSE AGGREGATES SHALL BE 3/4 INCH IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C-33 GRADATION SIZE NO. 67.

C. WATER USED IN THE CONCRETE MIX SHALL BE POTABLE, CLEAN, AND FREE FROM OILS, ACIDS, SALTS, CHLORIDES, ALKALI, SUGAR, VEGETABLE OR OTHER INJURIOUS SUBSTANCES.

D. THE CONCRETE SHALL CONTAIN AN AIR-ENTRAINING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASMT C-260 AND ACI 212.1R AND A WATER-REDUCING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASTM C-494 AND ACI 212.1R. ADMIXTURES SHALL BE PURCHASED AND BATCHED IN LIQUID SOLUTION. THE USE OF CALCIUM CHLORIDE OR AN ADMIXTURE CONTAINING CALCIUM CHLORIDE IS PROHIBITED. ADMIXTURES SHALL BE OF THE SAME MANUFACTURER TO ASSURE COMPATIBILITY. ACCEPTABLE MANUFACTURERS ARE:

1. W.R. GRACE
2. SIKA CORP.
3. MASTER BUILDERS
4. EUCLID CHEMICAL CO.

E. CURING COMPOUNDS SHALL CONFORM TO ASTM C309, TYPE 1, 1D, CLASS A AND B, AND ASTM C171 AS APPLICABLE.

2.3 CONCRETE MIX.

A. PROPORTION CONCRETE MIX IN ACCORDANCE WITH THE REQUIREMENTS OF ACI 301. THE STRENGTH OF CONCRETE SHALL BE AS INDICATED ON THE DRAWINGS. WHERE STRENGTH IS NOT CLEARLY INDICATED, CONCRETE OF MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI SHALL BE USED.

B. THE CONCRETE MIX SHALL BE DESIGNED FOR A MAXIMUM SLUMP OF THREE INCHES AT THE POINT OF DISCHARGE. MIXES OF THE STIFFEST CONSISTENCY THAT CAN BE EFFICIENTLY PLACED SHALL BE USED.

C. ALL CONCRETE SHALL HAVE THREE (3) TO FIVE (5) PERCENT ENTRAINED AIR.

D. ALL STRUCTURAL CONCRETE SHALL CONTAIN A WATER-REDUCING AGENT.

PART 3 – EXECUTION

3.1 GENERAL:

A. CONSTRUCT AND ERECT FORMWORK IN ACCORDANCE WITH ACI 301 AND ACI 347.

B. COLD-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 306.

C. HOT-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 305.

3.2 INSERTS, EMBEDDED COMPONENTS AND OPENINGS

A. CONTRACTOR SHALL CHECK ALL CIVIL, ARCHITECTURAL, STRUCTURAL AN ELECTRICAL DRAWINGS FOR OPENINGS, SLEEVES, ANCHOR BOLTS, INSERTS AND OTHER ITEMS TO BE BUILT INTO THE CONCRETE WORK.

B. COORDINATE THE WORK OF OTHER SECTIONS IN FORMING AND SETTING OPENINGS, RECESSES, SLOTS, CHASES, ANCHORS, INSERTS AND OTHERS ITEMS TO BE EMBEDDED.

C. EMBEDDED ITEMS SHALL BE SET ACCURATELY IN LOCATION, ALIGNMENT, ELEVATION, AND PLUMBNESS. LOCATE AND MEASURE FROM ESTABLISHED SURVEYED REFERENCE BENCHMARKS.

D. EMBEDDED ITEMS SHALL BE ANCHORED INTO PLACE IN A MANNER TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT AND CONSOLIDATION. COMPONENTS FORMING A PART OF A COMPLETE ASSEMBLY SHALL BE ALIGNED BEFORE ANCHORING INTO PLACE. PROVIDE TEMPORARY BRACING, ANCHORAGE, AND TEMPLATES AS REQUIRED TO MAINTAIN THE SETTING AND ALIGNMENT.

3.3 REINFORCEMENT PLACEMENT:

A. PLACE REINFORCEMENT ACCORDING TO CHECKED AND RELEASED DRAWINGS AND IN ACCORDANCE WITH ACI 301 AND ACI 315.

B. ACCURATELY POSITION, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT FROM FORMWORK CONSTRUCTION OR CONCRETE PLACEMENT AND CONSTRUCTION SUPPORT REINFORCING ON METAL CHAIRS, RUNNERS, BOLSTERS, SPACERS AND HANGERS.

C. SPLICES OF REINFORCING BARS SHALL BE CLASS B UNLESS SHOWN OTHERWISE ON THE DRAWINGS. SPLICES SHALL BE STAGGERED. FULL DEVELOPMENT LENGTH SHALL BE PROVIDED ACROSS JOINTS.

D. LOCATE REINFORCING TO PROVIDE CONCRETE COVER AND SPACING SHOWN ON THE DRAWINGS. MINIMUM COVER SHALL BE AS REQUIRED BY ACI 318.

E. WELDING OF AND TO ANY REINFORCING MATERIALS INCLUDING TACK WELDING OF CROSSING BARS IS STRICTLY PROHIBITED.

3.4 CONCRETE PLACEMENT:

A. PRIOR TO PLACING CONCRETE, THE FORMS AND REINFORCEMENT SHALL BE THOROUGHLY INSPECTED. ALL WOOD CHIPS, DIRT, ETC., SHALL BE REMOVED; ALL TEMPORARY BRACING, TIES, AND CLEATS REMOVED; ALL OPENINGS FOR UTILITIES PROPERLY BOXED; ALL FORMS PROPERLY SECURED IN THEIR CORRECT POSITION AND MADE TIGHT. ALL REINFORCEMENT AND EMBEDDED ITEMS SHALL BE SECURED IN THEIR PROPER LOCATIONS. ALL OLD AND DRY CONCRETE AND DIRT SHALL BE CLEANED OFF AND ALL STANDING WATER AND OTHER FOREIGN MATTER REMOVED.

B. PLACING CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301 AND ACI 304 AND SHALL BE CARRIED OUT AT SUCH A RATE THAT THE CONCRETE PREVIOUSLY PLACED IS STILL PLASTIC AND INTEGRATED WITH THE FRESHLY PLACED CONCRETE. CONCRETING ONCE STARTED, SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL THE SECTION IS COMPLETED. NO COLD JOINTS SHALL BE ALLOWED.

C. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED AND COMPACTED BY VIBRATION SPADING, RODDING, OR FORKING DURING THE OPERATION OF PLACING AND DEPOSITING IN ACCORDANCE WITH ACI 309. THE CONCRETE SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT, EMBEDDED ITEMS, AND INTO CORNERS OF THE FORMS SO AS TO ELIMINATE ALL AIR AND STONE POCKETS.

3.5 FINISHING:

A. FINISHING OF FLOOR SLABS SHALL BE IN ACCORDANCE WITH ACI 302.1 SECTION 7.2 WITH A MINIMUM OF THREE TROWELINGS. THE SLAB FINISH TOLERANCE AS MEASURED IN ACCORDANCE WITH ASTM E 1155 SHALL HAVE AN OVERALL TEST OF NUMBER FOR FLATNESS, FF=20 AND FOR LEVEL, FL=15. THE MINIMUM LOCAL NUMBER FOR FLATNESS, FF=15 AND FOR LEVEL, FL=10.

B. SURFACES OF FLOOR SLABS SHALL RECEIVE TWO COATS OF A CLEAR SEALER/HARDENER.

C. ABOVE GRADE WALL SURFACES SHALL HAVE A SMOOTH FORM FINISH AS DEFINED IN CHAPTER 10 OF ACI 301.

3.6 CURING:

A. FRESHLY DEPOSITED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVELY HOT OR COLD TEMPERATURES AND SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD OF TIME NECESSARY FOR THE HYDRATION OF THE CEMENT AND PROPER HARDENING OF THE CONCRETE.

B. CURING SHALL IMMEDIATELY FOLLOW THE FINISH OPERATION. CONCRETE SHALL BE KEPT CONTINUOUSLY MOIST AT LEAST OVERNIGHT, IMMEDIATELY FOLLOWING THE INITIAL CURING. BEFORE THE CONCRETE HAS DRIED, ADDITIONAL CURING SHALL BE ACCOMPLISHED BY ONE OF THE FOLLOWING MATERIALS OR METHODS:

1. PONDING OR CONTINUOUS SPRINKLING.
2. ABSORPTIVE MAT OR FABRIC KEPT CONTINUOUSLY WET.
3. NON-ABSORPTIVE FILM (POLYETHYLENE) OVER A PREVIOUSLY SPRINKLED SURFACE.
4. SAND OR OTHER COVERING KEPT CONTINUOUSLY WET.
5. CONTINUOUS STEAM (NOT EXCEEDING 150F) OR VAPOR MIST BATH.
6. SPRAYED-ON CURING COMPOUND APPLIED IN TWO COATS, SPRAYED IN PERPENDICULAR DIRECTIONS.

C. THE FINAL CURING SHALL CONTINUE UNTIL THE CUMULATIVE NUMBER OF DAYS OF FRACTION THEREOF, NOT NECESSARILY CONSECUTIVE, DURING WHICH TEMPERATURE OF THE AIR IN CONTACT WITH CONCRETE IS ABOVE 50°F HAS TOTALED SEVEN (7) DAYS. CONCRETE SHALL NOT BE PERMITTED TO FREEZE DURING THE CURING PERIOD. RAPID DRYING AT THE END OF THE CURING PERIOD SHALL BE PREVENTED.

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SECTION 05120 STRUCTURAL STEEL

PART 1 GENERAL

1.1 SCOPE:

A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN (ASD).

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):
ASTM A36: STRUCTURAL STEEL
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
ASTM A325: HIGH-STRENGTH BOLTS FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: CARBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

C. AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE - STEEL

D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC):
SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS," AS ENDORSED BY AISC.

E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC-SP3: POWER TOOL CLEANING.
SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL AND ALKYD PAINT.

1.3 SUBMITTALS:

A. SUBMIT THE FOLLOWING FOR APPROVAL:

1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP OF STEEL ELEVATIONS.

B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL:

A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36.

B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B.

C. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT AND A HARDENED WASHER.

B. HIGH STRENGTH BOLTS SHALL CONFORM TO ASTM A325. ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFORMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH ASTM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING.

2.4 WELDING ELECTRODES:

A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING AWS A5.1 OR AWS A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

A. PRIMER SHALL BE A RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAIN SPECIFICATION NO. 11.

PART 3 EXECUTION

3.1 FABRICATION:

A. SHOP FABRICATE AND ASSEMBLE MATERIALS AS SPECIFIED HEREIN.

1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD SPECIFICATIONS, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.

2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.

3. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.

4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.

5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING WELDING OF UNITS, BEFORE START OF FINISHING OPERATION.

6. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE FREE FROM MARKINGS, BURRS, AND OTHER DEFECTS.

B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN.

1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325N BOLTS UNLESS NOTED OTHERWISE.

2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDED WORK.

4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.

5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC-ASD SPECIFICATION.

6. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.

3.2 PRIMING:

A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC- SP3, "POWER TOOL CLEANING."

C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE AS INCLUDED IN THE ASD MANUAL OF STEEL CONSTRUCTION.

D. STORING, THINNING, MIXING, HANDLING AND APPLICATION OF PAINT MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE. MANUFACTURER'S POT-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACES AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER, PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50° F, THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5° F ABOVE THE DEW POINT.

F. GENERALLY, ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCH-UP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTER, DRY SPRAY OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED-UP AND REPAIRED. THE TOUCH-UP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

3.3 INSTALLATION:

A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND OTHER IN-PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.

D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

E. ANY GAS CUTTING TORCHES MUST BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. PROVIDE TEMPORARY SHORING AND BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AN THE FINAL CONNECTIONS HAVE BEEN MADE.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN THE PERMANENT CONTACT, BEFORE ASSEMBLY.

I. INSTALL AND FULLY TENSION HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC, "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

END OF SECTION

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SECTION 16000 ELECTRICAL

PART 1 GENERAL

1.1 GENERAL CONDITIONS:

A. THE CONTRACTOR SHALL INSPECT THE SITE WHERE THIS WORK IS TO BE PERFORMED AND FULLY FAMILIARIZE HIMSELF WITH ALL CONDITIONS RELATED TO THIS PROJECT. SUBMITTAL OF BID INDICATED CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

B. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND LICENSES AND SHALL MAKE ALL DEPOSITS AND PAY ALL FEES REQUIRED FOR THE PERFORMANCE OF WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

D. CONTRACTOR SHALL PERFORM ALL VERIFICATION, OBSERVATIONS, TEST, AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ENGINEER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW FORM PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENTS SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. IEEE (INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)
3. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
4. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
5. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
6. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
7. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
8. UL (UNDERWRITERS LABORATORIES, INC.)

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL AND ASSOCIATED SERVICES REQUIRED TO COMPLETELY CONSTRUCT AND LEAVE READY FOR OPERATION SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREIN DESCRIBED.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER, CERTIFICATES OF FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. PROVIDE PROJECT MANAGER WITH ONE SET OF COMPLETE ELECTRICAL 'AS INSTALLED' DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROUTINGS AND CIRCUITS.

F. ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, ETC., SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION.

G. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

PART 2 PRODUCTS

2.1 GENERAL:

A. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE NEW, FREE FROM DEFECTS AND OF THE BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE. MATERIALS SHALL BE STORED OFF THE GROUND AND BE MAINTAINED IN A WEATHERPROOF AREA.

B. ALL MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.

D. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING SHORT CIRCUIT CURRENT RATING ADEQUATE FOR THE AVAILABLE SHORT CIRCUIT CURRENT, 10,000 AIC MINIMUM.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE HOT-DIP GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED, ZINC-COATED STEEL, PVC COATED FOR OUTDOOR APPLICATIONS.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION TYPE AND WATERTIGHT.
4. NON-METALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC, HEAVY-WALL RIGID WITH SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER. 90° VERTICAL ELBOWS, UNDERGROUND SHALL BE SCHEDULE 80 PVC.

B. WIRE AND CABLE:

1. WIRE AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN, 600 VOLT, SIZES AS INDICATED, #12 AWG MINIMUM.
2. NO. 10 AWG AND SMALLER CONDUCTORS SHALL BE SOLID AND NO. 8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, PRESSURE-TYPE CONNECTORS CONSTRUCTED OF HIGH-STRENGTH, NON-CORRODIBLE, TIN-PLATED COPPER DESIGNED TO FURNISH HIGH-PULLOUT STRENGTH AND HIGH CONDUCTIVITY JOINTS SHALL BE USED.
4. SUPPORT GRIPS SHALL BE SINGLE WEAVE, CLOSED MESH, HIGH-GRADE, NON-MAGNETIC, TIN-COATED BRONZE CAPABLE OF SUPPORTING TEN TIMES THE CABLE DEAD WEIGHT, HUBBELL KELLEMS OR APPROVED EQUAL.

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCKED WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE D CLASS 3110 OR APPROVED EQUAL.

D. GROUNDING:

1. GROUND CONDUCTOR SHALL BE #2 SOLID, TINNED COPPER, UNLESS NOTED OTHERWISE.
2. GROUND BUSES SHALL BE BARE ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS.
4. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS, CONNECTORS SHALL INCLUDE ALL CABLE TO CABLE SPLICES, TEE'S, AND ALL CABLE TO GROUND RODS. MOLDS, WELDING METAL, AND TOOLS SHALL BE BY CADWELD AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PROCEDURES. ALL EXOTHERMIC WELDS MUST HAVE A MINIMUM OF 6" BETWEEN WELDS.
5. 5/8" DIA. X 10'-0" LONG COPPER CLAD STEEL GROUND RODS @ 10'-0" (MIN) & 15'-0" (MAX) SPACING. ALL UNDERGROUND CONNECTIONS SHALL BE EXOTHERMIC WELD TYPE. ALL COMMUNICATION EQUIPMENT GROUNDING AND GROUND CONNECTIONS WILL BE THE SOLE RESPONSIBILITY OF THE EQUIPMENT GROUNDING CONTRACTOR TO INSTALL, TEST AND APPROVE.

C. SUPPORTING DEVICES:

1. CONDUIT OR EQUIPMENT SUPPORT CHANNEL SHALL BE GALVANIZED STEEL AND SHALL BE ADEQUATE FOR THE WEIGHT OF THE EQUIPMENT OR CONDUIT, INCLUDING WIRING, WHICH THEY CARRY. FASTENING HARDWARE SHALL BE CORROSION RESISTANT.

E. IDENTIFICATION:

1. IDENTIFICATION SHALL BE BY THE USE OF ENGRAVED PLASTIC LAMINATE NAMEPLATES, WHITE FACE WITH BLACK CORE LETTERS, SCREWED TO THE COVER OF THE EQUIPMENT. MINIMUM SIZE NAMEPLATE SHALL BE 1"x3" WITH 1/4" LETTERS. EMBOSSED PLASTIC TAPE LABELS ARE NOT ACCEPTABLE.
2. WIRE AND CABLE MARKERS SHALL BE PRINTED TAPE MARKERS ON SPLIT SLEEVE TYPE.

G. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.

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PART 3 EXECUTION

3.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE DONE BY EXPERIENCED MECHANICS OF THE PROPER TRADES.

B. ALL ELECTRICAL EQUIPMENT FURNISHED SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE

C. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS HEREIN SPECIFIED NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH NOMINAL SIZE SHALL BE USED.
2. PROVIDE RGS CONDUIT FOR ALL EXPOSED, EXTERIOR CONDUIT.
3. PROVIDE SCHEDULE 40 PVC CONDUIT BELOW GRADE, 1" MINIMUM, UNLESS NOTED OTHERWISE. ALL ELBOWS SHALL BE PVC COATED RGS. MINIMUM BURIAL DEPTH SHALL BE 24" CLEAR TO TOP OF CONDUIT, UNLESS NOTED OTHERWISE
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION IS NOT DESIRABLE FOR REASONS OF EQUIPMENT MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUIDTIGHT, PVC COATED FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS.
5. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORTS TO ALLOW FOR EXPANSION AND CONTRACTION.
6. A RUN OF CONDUIT BETWEEN BOXES OR FITTINGS SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER-BENDS INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE BOX OR FITTING. THE RADIUS OF BENDS SHALL NEVER BE SHORTER THAN THAT OF THE CORRESPONDING TRADE ELBOW
7. WHERE CONDUIT HAS TO BE CUT IN THE FIELD, IT SHALL BE CUT SQUARE WITH A PIPE CUTTER USING CUTTING KNIVES,
8. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF WIRE OR CABLE. CLEAR ALL BLOCKAGES AND REMOVE BURRS, DIRT, AND DEBRIS.
9. INSTALL PULL STRINGS IN ALL EMPTY CONDUITS. IDENTIFY PULL STRING AT EACH END WITH ITS DESTINATION.
10. PROVIDE INSULATED GROUNDING BUSHINGS FOR ALL CONDUITS STUBBED INTO EQUIPMENT ENCLOSURES OR STUBBED OUT FOR FUTURE USE BY OTHERS.
11. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
12. INSTALL 2" ORANGE DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUIT AND WIRE.
13. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
14. FOR SEALING CONDUITS, USE ONLY NON-THERMOPLASTIC COMPOUNDS SUCH AS J.M. DUXSEAL, OR AN APPROVED SUBSTITUTE. THE COMPOUND SHALL HAVE NO EFFECT ON RUBBER OR RUBBER-LIKE INSULATIONS, LEAD, ALUMINUM, OR FERROUS ALLOYS; IT SHALL BE INSOLUBLE IN WATER AND WITHSTAND MAXIMUM TEMPERATURE RANGES OF THE LOCALITY.

B. WIRE AND CABLE

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	240/120 VOLTS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUND	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAYS WITH PRESSURE-TYPE CONNECTORS.
3. PULLING LUBRICANTS SHALL BE SOAPSTONE POWDER, POWDERED TALC, OR A COMMERCIAL PULLING COMPOUND. NO SOAP SUDS, SOAP FLAKES, OIL, OR GREASE SHALL BE USED, AS THESE MAY BE HARMFUL TO CABLE INSULATION. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CABLE TO AVOID SCORING THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES, EQUIPMENT, ET, TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS, AND SHALL BE PROTECTED FROM MECHANICAL INJURY AND FROM MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUND AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEMS INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES. MINIMUM BENDING RADIUS SHALL BE 12 INCHES.
4. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
5. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
6. ALL GROUND CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC-WELDED CONNECTIONS SHALL BE APPROVED BY THE CONSTRUCTION INSPECTOR BEFORE BEING PERMANENTLY CONCEALED.
7. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE COPPER-BASED "NO-OX" OR APPROVED EQUAL
8. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED WITH ALL FEEDER AND BRANCH CIRCUITS.
9. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
10. DIRECT BURIED GROUND CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" BELOW FINAL GRADE, UNLESS NOTED OTHERWISE.
11. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSULATED OR INSTALL IN PVC CONDUIT.
12. DRIVE GROUND RODS UNTIL TOPS ARE 36 INCHES BELOW FINAL GRADE.
13. INSTALL ELECTRICAL GROUNDING AND BONDING SYSTEMS AS INDICATED. IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, NEC'S STANDARD OF INSTALLATION," AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS COMPLY WITH REQUIREMENTS.
14. INSTALL GROUND CABLES WHICH ENCIRCLE THE TOWER AND BUILDING AND ARE CONNECTED TO EACH DRIVEN GROUND ROD A MINIMUM OF 36 INCHES BELOW SURFACES OF SOIL OR 6" BELOW FROST LINE (WHICHEVER IS GREATER).
15. THE EXTERNAL GROUND RING (EGR) MUST BE PLACED ABOUT TWO FEET AND NO MORE THAN THREE FEET FROM THE EXTERIOR WALL OF THE BUILDING TO BE GROUNDED, COMPLETELY SURROUNDING IT. IT MUST ALSO BE PLACED 36 INCHES BELOW THE SURFACE OF THE SOIL, OR BELOW THE FROST LINE, AS MEASURED FROM THE TOP OF THE BURIED RODS AND CONNECTION WIRES. THE GROUNDING TRENCH WILL BE BACKFILLED WITH CLEAN DIRT COMPACTED TO 90% OF STANDARD PROCTOR DENSITY.
16. THE TOWER EGR MUST COMPLETELY SURROUND THE TOWER ABOUT TWO FEET BEYOND THE RADIUS OF THE TOWER. IT MUST BE BONDED TO THE TOWER AT ALL STEEL TOWER SUPPORTS AT THE CLOSEST POINT BETWEEN THE EGR AND SUPPORT TO MINIMIZE ELECTRICAL IMPEDANCE BETWEEN THE EGR AND TOWER. IT MUST ALSO BE BONDED TO ADJACENT BUILDING EGR AT THE CLOSEST POINT BETWEEN THE EGRS AND BETWEEN AT LEAST TWO OTHER POINTS BETWEEN EGRS TO MINIMIZE ELECTRICAL IMPEDANCE BETWEEN THE EGRS AND TO ENHANCE RELIABILITY. THE GROUNDING TRENCH WILL BE BACKFILLED WITH CLEAN DIRT.
17. COAXIAL CABLES SHALL HAVE, AS A MINIMUM 3 GROUND KITS INSTALLED. TWO AT THE TOWER GROUND BARS (TOP AND BOTTOM) AND ONE AT THE WAVEGUIDE ENTRY PORT (EXTERNAL).
18. ALL WAVEGUIDE AND COAXIAL CABLE SHIELDS THAT EXTEND FROM THE TOWER INTO THE BUILDING MUST BE GROUNDED BOTH AT THE TOWER AND AT THE ENTRANCE TO THE BUILDING.
19. APPROVED GROUND KITS, WHICH INCLUDE GROUNDING STRAPS, ARE USED FOR THE COAX CABLE. THE KITS AT THE TOP OF THE TOWER AND IN THE MIDDLE SECTIONS OF THE TOWER (IF THE TOWER IS OVER 200 FT.) ARE MECHANICALLY ATTACHED TO THE TOWER OR GROUND BAR IF OVER 200 FT. BY TWO HOLE LUGS. THE COAXIAL CABLE MUST BE GROUNDED AT THE BOTTOM OF THE TOWER ABOUT 6 IN. BEFORE THEY TURN TOWARD THE BUILDING. THE GROUNDING STRAPS NEAR THE TURN TOWARD THE FACILITY ARE MECHANICALLY ATTACHED TO A GROUND BAR WHICH IS CONNECTED TO THE EGR WITH NO. 2 AWG SOLID, TINNED, BARE COPPER WIRE BY TWO HOLE LUGS. DRIP LOOPS MUST BE USED ON THE COAX CABLE TO PREVENT WATER ON THE CABLE FROM ENTERING THE BUILDING. THE GROUND BAR IS CONNECTED WITH NO. 2 AWG SOLID, TINNED, BARE COPPER WIRE DIRECTLY TO THE EGR. THE COAX CABLE ARE CONNECTED TO THE GROUND BARS AT BOTH THE TOWER AND NEAR THE WAVEGUIDE ENTRANCE PORT OF THE BUILDING WITH APPROVED GROUND KITS. THE GROUND BARS ARE THEN CONNECTED TO THE EGR WITH NO. 2 AWG SOLID, TINNED, BARE COPPER WIRE. THE COAX CABLES MUST SCOPE FROM THE DRIP LOOP TOWARD THE BUILDING TO PREVENT WATER ON THE CABLE FROM ENTERING THE BUILDING THROUGH THE WAVEGUIDE PORT.

E. IDENTIFICATION:

1. ALL CABINETS, DISCONNECT SWITCHES, AND OTHER APPARATUS USED FOR OPERATION AND CONTROL OF CIRCUITS AND EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY IDENTIFIED BY MEANS OF ENGRAVED PLASTIC NAMEPLATES.

3.5 ACCEPTANCE TESTING:

A. GENERAL

1. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS, AND SUBMIT TEST REPORTS TO THE ENGINEER UPON COMPLETION OF TESTS.
2. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NONCOMPLYING ITEMS SHALL BE REMOVED FROM THE JOBSITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE OF SUCH NON-COMPLIANCE.

B. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE THEIR INSULATION TESTED AFTER INSTALLATION, BUT BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. INVESTIGATE ANY VALUES LESS THAN 50 MEGOHMS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE WIRES AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUND TEST TO MEASURE GROUND RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES & LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

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(6 OF 7)

DRAWING NO.:
SP-6

FILENAME: 20136sp-6.DWG | DRAWING: 18 OF 18

PART 1 TELECOMMUNICATIONS WIRING COMPONENTS
(COAXIAL ANTENNA CABLE)

1.1 GENERAL:

A. ALL MATERIALS, PRODUCTS OR PROCEDURES INCORPORATED INTO WORK SHALL BE NEW AND OF STANDARD COMMERCIAL QUALITY.

B. CERTAIN MATERIALS AND PRODUCTS WILL BE SUPPLIED BY THE OWNER (REFER TO PART 1 OF THE RFP CONTRACT FOR THE LIST OF OWNER EQUIPMENT, MATERIALS AND SUPPLIES FOR THESE ITEMS) THE FURNISHED CONTRACTOR IS RESPONSIBLE FOR PICK-UP AND DELIVERY TO SITE ALL OWNER FURNISHED MATERIALS.

C. ALL OTHER MATERIALS AND PRODUCTS SHOWN IN THE SPECIFICATION SKETCHES, DRAWINGS, GENERAL CONTRACT DOCUMENTS, ADDENDUM'S, AMENDMENTS AND/OR INSTRUCTION SHALL BE SUPPLIED BY THE CONTRACTOR.

1.2 MATERIALS:

A. ANTENNAS:

1. INSTALLATION OF ANTENNAS AND ASSOCIATED MOUNTING HARDWARE PER MANUFACTURER'S RECOMMENDED STANDARDS OF PRACTICE.

B. COAXIAL CABLE:

1. INSTALL COAXIAL CABLE AND TERMINATIONS BETWEEN ANTENNAS AND, PAD MOUNTED ELECTRONIC EQUIPMENT PER MANUFACTURER'S RECOMMENDED STANDARDS OF PRACTICE. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND ELECTRONIC EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE ONE (1) FOOT (.3048M) IN EXCESS OF EQUIPMENT LOCATION UNLESS OTHERWISE STATED.

1.3 ANTENNA AND COAXIAL CABLE GROUNDING:

A. THE OMNI OR DIRECTIONAL ANTENNA COAXIAL CABLES ARE TO HAVE A MINIMUM OF THREE (3) APPROVED GROUND KITS WITH GROUNDING STRAPS INSTALLED ON EACH CABLE. ALL GROUND KITS TO BUS BARS CONNECTIONS SHALL BE MADE USING TWO HOLE LUGS. GROUND KITS SHALL BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE WITHIN 6 INCHES OF CABLES CHANGE IN DIRECTION OR ENTRANCE INTO SHELTER OR WAVEGUIDE. ONE (1) KIT SHALL BE INSTALLED WITHIN 6 INCHES AT THE ANTENNA JUMPER CONNECTION WITH THE GROUND KIT CONNECTED TO THE TOWER ASSEMBLY WITH TWO HOLE LUG CONNECTIONS. ONE (1) KIT SHALL BE INSTALLED AT THE BASE OF THE TOWER JUST BEFORE THE COAXIAL CABLE RUNS HORIZONTALLY TO THE SHELTER. THE ICE BRIDGE SHALL BE SLOPED 1 PER 10 FOOT AWAY FROM SHELTER TO KEEP WATER FROM ENTERING SHELTER. ONE (1) KIT SHALL BE INSTALLED AT THE OUTSIDE OF THE EQUIPMENT BUILDING HATCH PLATE, WAVEGUIDE PORT. IF THE TOWER IS OVER 200 FEET TALL A GROUND BAR MUST BE INSTALLED ON THE MIDDLE OF THE TOWER AND AN ADDITIONAL GROUND KIT INSTALLED AT THIS POINT. THE GROUND BAR MUST THEN BE CONNECTED TO THE POLE TO ENSURE A POSITIVE GROUND. BUS BARS AT THE BASE OF TOWER AND ENTRANCE TO SHELTER SHALL BE EXOTHERMICALY GROUNDED TO EGR VIA #2 SOLID TINNED COPPER CONDUCTOR.

B. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH PROPER CONNECTOR/SPLICE WEATHERPROOFING KIT OR EQUAL

C. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS (NOT WITHIN BENDS) OF COAXIAL CABLE PRIOR TO ANY DOWNWARD SWEEPS.

1.4 COAXIAL CABLE IDENTIFICATION:

A. TO PROVIDE EASY IDENTIFICATION AND UNIFORM MARKING OF ANTENNA CABLING, THE FOLLOWING SHALL APPLY:

1. LOCATION: MARKINGS SHALL BE MADE BY USE OF 3 METER COLORED, 1 INCH WIDE TAPE AFFIXED AT FOUR PLACES (IF THE COAX RUN EXCEEDS 15 FEET, THEN STEP C APPLIES) ON THE COAX CABLE RUN AS FOLLOWS:

   a. FIRST LOCATION IS AT THE END OF THE COAX NEAREST THE ANTENNA (WHERE THE COAXIAL CABLE AND JUMPER ARE CONNECTED).

   b. SECOND, AT THE BASE OF THE TOWER STRUCTURE.

   c. THIRD, AT A POINT OUTSIDE THE EQUIPMENT BUILDING PRIOR TO ENTERING THE EQUIPMENT BUILDING.

   d. FOURTH, INSIDE THE EQUIPMENT BUILDING, AT A POINT ON THE COAXIAL CABLE, APPROXIMATELY 10 INCHES (254MM) FROM THE WAVEGUIDE ENTRY PORT.

B. COLOR CODE COAXIAL CABLES AS SHOWN ON PLANS. (WHEN APPLICABLE).

1.5 TESTING:

A. PROVIDE FOUR (4) COPIES OF THE ANTENNA AND COAX SWEEP TEST RESULTS TO AT&T. SWEEP TEST SHALL BE PERFORMED AS PER THE "AT&T TELECOM ANTENNA AND COAX FIELD TEST PROCEDURE".

END OF SECTION

END OF SPECIFICATION

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