III. C.

Memorandum
Planning & Development Services Division

To: **Planning and Public Works Committee**

From: John Boyer, Senior Planner

Date: March 21, 2013

RE: **T.S.P. 41-2013 T-Mobile (731 Spirit 40 Park Drive):** A request to obtain approval to amend a Telecommunications Siting Permit to accommodate six (6) additional antennas as well as new ground equipment on an existing monopole tower within the "M3" Planned Industrial District of land located north of the intersection of Spirit 40 Park Drive and Chesterfield Airport Road (17V420146).

Summary

Aaron Adelman (applicant) has submitted a request for a Telecommunications Siting Permit (TSP) for the above referenced property (see Figure 1 for location of existing tower). The proposed TSP is to accommodate six (6) new antennas as well as associated new ground equipment for an existing site. The antennas are planned to be located on an existing antenna platform of the tower located 100 feet above surrounding grade. No antennas are planned for removal with this application (only additions). The additional ground equipment will be installed within the existing enclosure around the tower (see Figure 2 below for picture of existing site).

Figure 1: Location Map

Figure 2: Site Photo

History

The subject property is lot #3A of the Spirit 40 Park Lots 3 & 4 Boundary Adjustment subdivision and is zoned "M3" Planned Industrial District. The tower was approved by the City of Chesterfield in April of 2000 as a 100 foot tall monopole. In 2009, TSP 09-2009 was requested and approved for the replacement of three (3) antennas and associated ground equipment for an antenna upgrade.

Discussion

City Code requires that ground equipment be fenced to mitigate unauthorized access. The existing ground equipment is fenced and additionally screened from adjacent properties by an existing sight proof wall surrounding the site (see Figure 2).

City of Chesterfield Ordinance #2391, which governs telecommunications and facilities siting, permits applications for equipment upgrades to be submitted for sites that currently hold a Telecommunications Siting Permit (TSP) without the need for a public hearing. Staff has reviewed the

request by T-Mobile and has determined that the proposed addition of six (6) antennas as well as additional ground equipment to an existing and permitted site may amend the existing permit without the need for a public hearing.

Attached please find a copy of the statement of intent, construction plans, and site plan of the site.

Respectfully submitted,

John Boyer
Senior Planner

cc. Aimee Nassif, Planning & Development Services Director

SMJ International

City of Chesterfield
Planning & Development Division
690 Chesterfield Parkway West
Chesterfield, MO 63017-0760

March 13, 2013

STATEMENT OF INTENT

RE: T-Mobile's Proposed Antenna Upgrades at 471 North Woods Mill Road, Chesterfield, MO, 63017-3238
RE: T-Mobile's Proposed Antenna Upgrades at 731 Spirit 40 Park-A, Chesterfield, MO, 63005-1142

Dear Madam or Sir,

T-Mobile has leased space at the wireless communication site located at 471 North Woods Mill Road and 731 Spirit 40 Park-A. T-Mobile is in the process of upgrading their existing equipment with new technology to replace their existing obsolete technology. This is being done to support their 4G Network.

For 731 Spirit 40 Park Drive, T-Mobile currently has 3 antennas on their array at 100'. They propose to add 6 more antennas at the same height. No antennas are being removed.

For 471 North Woods Mill Road, T-Mobile currently has 3 antennas on their array at 90'. They propose to add 6 more antennas at the same height. No antennas are being removed.

Per the structural analysis conducted at each site, both structures are designed to accommodate the proposed load.

No additional cabinets or structures will be erected at the site. Any new equipment will be mounted to the pedestal next to the existing equipment cabinet.

T-Mobile's installation is a collocation upgrade and will not extend the height of the structure. T-Mobile will not be expanding the existing fenced compound. T-Mobile will not be adding any lighting to the tower.

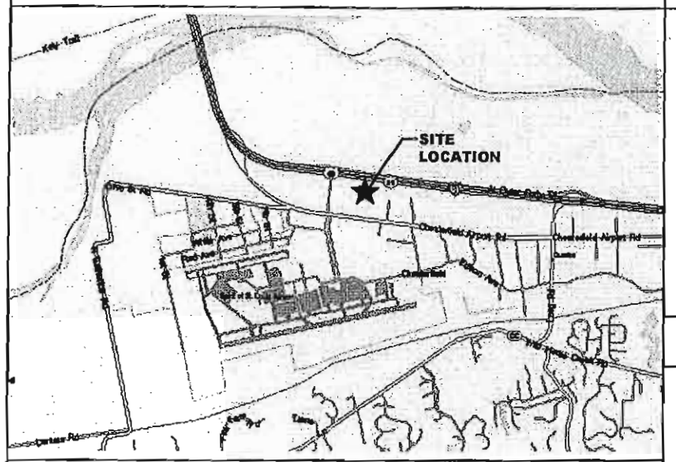
This installation will not change the existing use of the Wireless Communication Tower.

Respectfully,

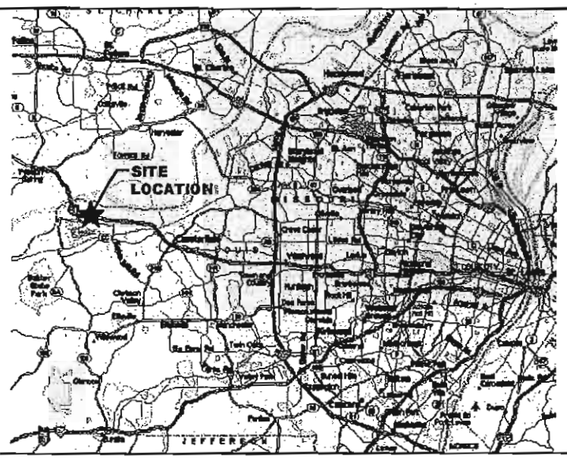
Aaron Adelman
SMJ International, LLC

49357 Pontiac Trail • Suite 206 • Wixom, Michigan 48393 • Phone (616) 745-4777 • Fax (888) 745-4719
691 Ouellette Avenue • Windsor, Ontario, Canada N9A 4J4 • Phone (519) 915-1349 • Fax (888) 745-4719

VICINITY MAP



AREA MAP



DRIVING DIRECTIONS

DRIVE TO DIRECTIONS AS FOLLOWS:

FROM T-MOBILE OFFICE AT PAGE AVENUE AND WESTPORT CENTER DRIVE.
TAKE PAGE AVENUE WEST (1.4) TO I-270 SOUTH.
TAKE I-270 SOUTH (4.1 MI) TO I-64/US-40 EXIT. 12.
TAKE I-64/US-40 WEST (9.4) TO CHESTERFIELD AIRPORT ROAD
KEEP STRAIGHT ONTO LONG ROAD (174 YDS)
TURN RIGHT (WEST) ONTO CHESTERFIELD AIRPORT ROAD (1.6 MI)
TURN RIGHT (NORTH) ONTO SPIRIT OF ST. LOUIS BLVD (0.3 MI)
TURN RIGHT (EAST) ONTO N. OUTER FORTY DRIVE (0.2 MI)
TURN RIGHT (SOUTH) ONTO LOCAL ROADS (0.2 MI)
ARRIVE AT SITE.

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE
2. INTERNATIONAL MECHANICAL CODE
3. ANSI/TIA-222 STRUCTURAL STANDARD
4. NFPA 780 – LIGHTNING PROTECTION CODE
5. UNIFORM PLUMBING CODE
6. NATIONAL ELECTRICAL CODE

PROJECT INFORMATION

PROJECT ADDRESS: 737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI 63005

STRUCTURAL INFORMATION:

LATITUDE:	38.67216882 N
LONGITUDE:	-90.6416901 W
TOWER HT:	100'-0" AGL
ANTENNA CL:	100'-0" AGL

APPLICANT: T-MOBILE
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MISSOURI 63146

CONSULTING TEAM

ENGINEER: SSC, INC.
721 EMERSON ROAD, SUITE 475
ST. LOUIS, MISSOURI 63141
PHONE: (314) 993-1010
FAX: (314) 993-1036

M.L. OWENS - LEAD ENGINEER

S.D. KEISLING - LEAD ELECTRICAL

F. GUY - LEAD DESIGNER

PROJECT MANAGER: CHUCK HALL
AMERICAN TOWER CORPORATION
PHONE: (314) 575-0000

APPROVALS

SSC	DATE
RF	DATE
CONSTRUTION	DATE
T-MOBILE	DATE
OPERATIONS	DATE
REAL ESTATE	DATE

EQUIPMENT

EQUIPMENT FURNISHED AND/OR INSTALLED BY:

DESCRIPTION	FURNISHED	INSTALLED
ANTENNAS	T-MOBILE	CONTRACTOR
FLEXI STACK EQUIPMENT	T-MOBILE	T-MOBILE
COAX HANGERS	CONTRACTOR	CONTRACTOR
CONNECTORS	T-MOBILE	CONTRACTOR
LDF4 ANTENNA JUMPERS	T-MOBILE	CONTRACTOR
HYBRID CABLE	T-MOBILE	CONTRACTOR
UPPER & LOWER COVP'S	T-MOBILE	CONTRACTOR
RRU'S	T-MOBILE	CONTRACTOR

DRAWING INDEX

SHEET NUMBER	TITLE DESCRIPTION	REVISION	RESPONSIBLE DISCIPLINE
T-1	TITLE SHEET	0	SC/E
A-1	SITE PLAN	0	SC
A-2	CONDUIT LAYOUT AND DETAILS	0	SC
A-3	EQUIPMENT ELEVATION	0	SC
A-4	TOWER ELEVATION AND ANTENNA PLAN	0	SC
A-5	ANTENNA, RRU & TMA CONFIGURATION KEYS	0	SC
A-6	NSN CONFIGURATION	0	SC
A-7	RRU CONNECTION DIAGRAM	0	SC
A-8	RET ACTUATOR NAMING AND DETAILS	0	SC
G-1	GROUNDING PLAN & ELEVATION	0	E
G-1	GROUNDING DETAILS	0	E
SP-1	SPECIFICATIONS (1 OF 3)	0	SC
SP-2	SPECIFICATIONS (2 OF 3)	0	E
SP-3	SPECIFICATIONS (3 OF 3)	0	E

STATE OF MISSOURI
MICHAEL L OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER

STATE OF MISSOURI
SHELTON KEISLING
NUMBER E-27323
PROFESSIONAL ENGINEER
1-15-13

1/16/13

T-Mobile® USA, INC.

LTE UPGRADE FOR EXISTING CELL SITE

SITE NAME:

SPIRIT 40 PARK

SITE NUMBER:

MO-06-205-A

ATC SITE NUMBER: 93161

RECEIVED
City of Chesterfield
FEB 19 2013
Department of Public Services

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MO 63146
PHONE: (314) 812-3600
FAX: (314) 812-3692

SSC
9900 West 109th Street, Suite 300
Overland Park, Kansas 66210
Phone: 913-438-7700 Fax: 913-438-7777

STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640

RESPONSIBLE ENGINEERS:		RESPONSIBLE DISCIPLINE:
KV KEVIN VANMASLE	E-21561 STRUCTURAL/CIVIL	SC
MLO MICHAEL L. OWENS	E-29058 STRUCTURAL/CIVIL	SC
REJ ROBERT E. JENSEN	PE-028974 STRUCTURAL/CIVIL	SC
SDK SHELTON D. KEISLING	E-27323 ELECTRICAL	E
TMS TERRANCE M. SUPER	E-19521 ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSK

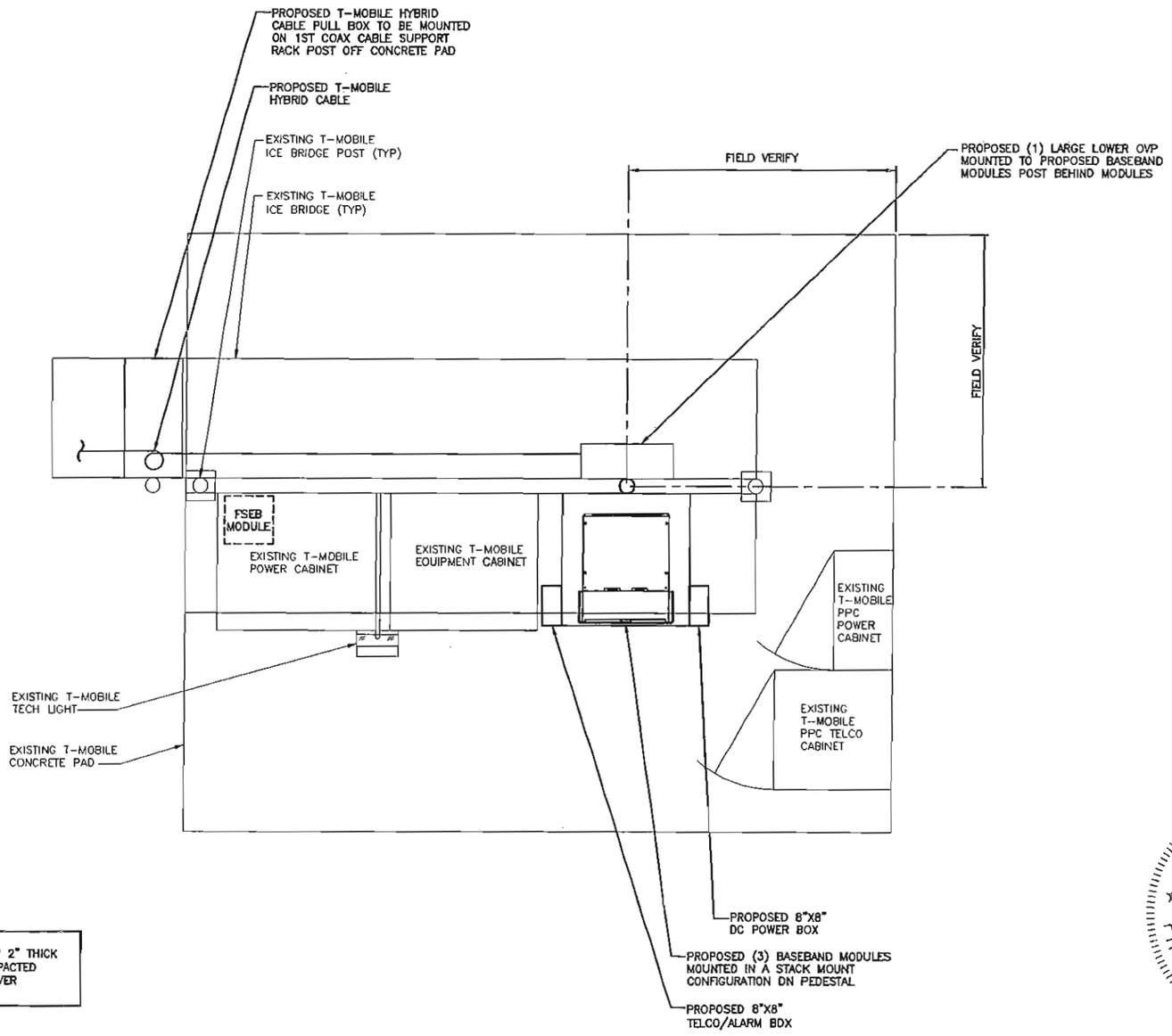
SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



NOTE:
REPAIR DISTURBED GRAVEL DURING CONSTRUCTION WITH 2" THICK CLEAN GRADE B CRUSHED STONE OVER 4" THICK COMPACTED MODOT TYPE 2A AGGREGATE BASE COURSE MATERIAL OVER GEO-TEXTILE FABRIC.

CALL BEFORE YOU DIG – DRILL – BLAST
1-800-344-7483
(TOLL FREE)
MISSOURI ONE CALL SYSTEM, INC.

THE UTILITIES AS SHOWN DN THIS SET OF DRAWINGS WERE DEVELOPED FROM THE INFORMATION AVAILABLE. THE INFORMATION PROVIDED IS NOT IMPLIED NOR INTENDED TO BE THE COMPLETE INVENTORY OF UTILITIES IN THIS AREA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES (WHETHER SHOWN DR NOT) AND PROTECT SAID UTILITIES FROM ANY DAMAGE CAUSED BY CONTRACTOR'S ACTIVITIES.

NOTE:
SEE SHEET A-2 CONDUIT LAYOUT FOR CONDUIT ROUTING DETAIL

SITE PLAN

1

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MO 63146
PHONE: (314) 812-3600
FAX: (314) 812-3692

SSC
9900 West 109th Street, Suite 300
Overland Park, Kansas 66210
Phone: 913-438-7700 Fax: 913-438-7777

STATE OF MISSOURI
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KV KEVIN VANHAELE	E-21561 STRUCTURAL/CIVIL	SC
MLO MICHAEL L. OWENS	E-29058 STRUCTURAL/CIVIL	SC
REJ ROBERT E. JENSEN	PE-028874 STRUCTURAL/CIVIL	SC
SDK SHELTON D. KEISLING	E-27323 ELECTRICAL	E
TAS TERRANCE M. SUPER	E-18521 ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/16/13

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
SITE PLAN

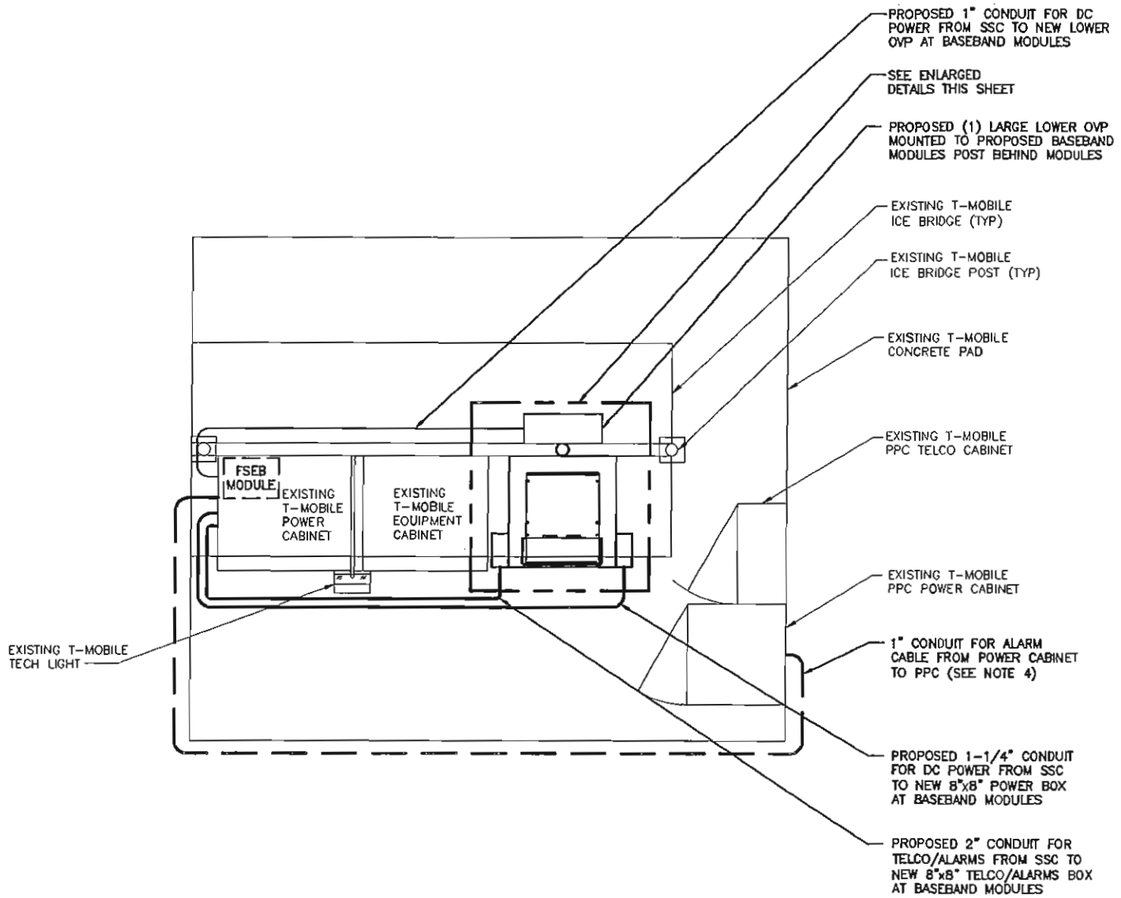
SHEET NUMBER
A-1

N

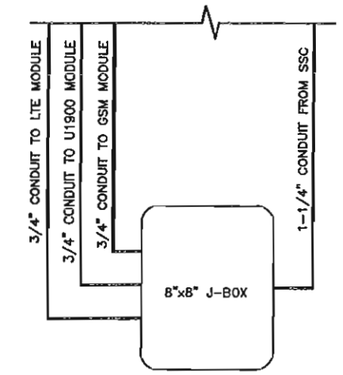
0' 6" 1' 2' 3'

NOTES:

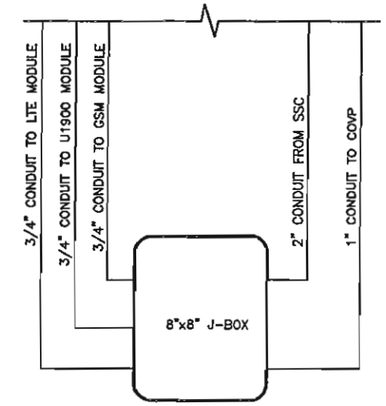
1. CONTRACTOR TO ROUTE ALL NEW CONDUIT ON ICE BRIDGE. ALL NEW CONDUIT TO BE ROUTED OFF OF PAD TO AVOID TRIP HAZARD.
2. ALL NEW & PROPOSED EQUIPMENT NOT TO EXCEED 7'-0".
3. VERIFY WITH T-MOBILE PRIOR TO CONSTRUCTION ON THE REMOVAL OF ANY CABINETS.
4. INSTALL CONDUIT ONLY IF AN EXISTING SPARE ALARM CONDUIT IS NOT AVAILABLE (FIELD VERIFY).



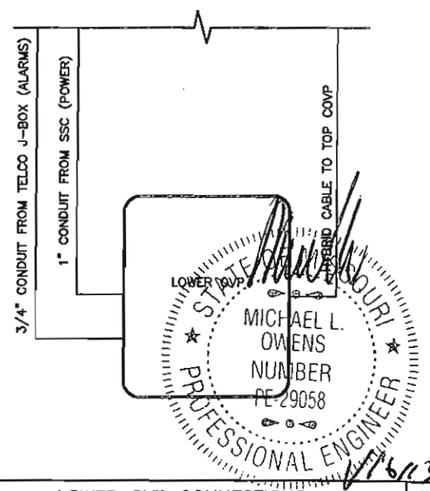
CONDUIT PLAN | 4



POWER J-BOX CONNECTIONS | 1



TELCO/ALARMS J-BOX CONNECTIONS | 2



LOWER OVP CONNECTIONS | 3

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MO 63146
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FAX: (314) 812-3692

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Overland Park, Kansas 66210
Phone: 913-438-7700 Fax: 913-438-7777

STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640

RESPONSIBLE ENGINEERS		RESPONSIBLE DISCIPLINE:	
KV	KEVIN VANMAELE	E-21551 STRUCTURAL/CIVIL	SC
MLO	MICHAEL L. OWENS	E-29058 STRUCTURAL/CIVIL	SC
REJ	ROBERT E. JENSEN	PE-028974 STRUCTURAL/CIVIL	SC
SDK	SHELTON D. KEISLING	E-27323 ELECTRICAL	E
TMS	TERRANCE M. SUPER	E-18521 ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

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0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

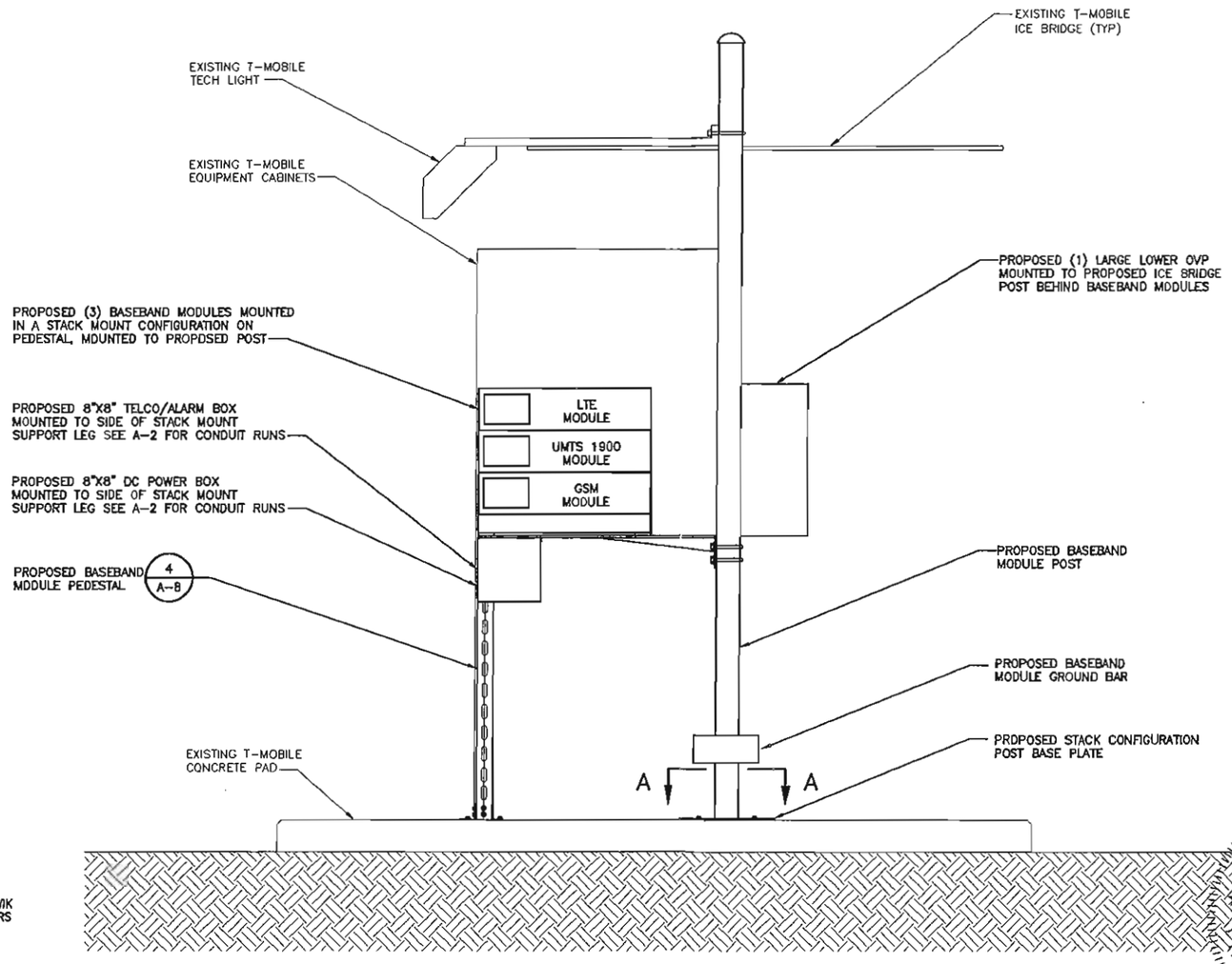
SITE NAME
SPIRIT 40 PARK

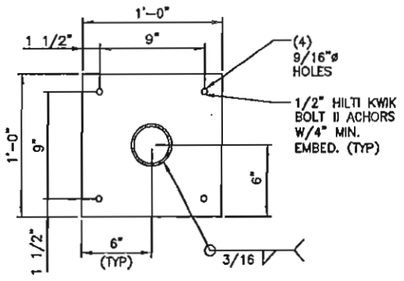
SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
CONDUIT LAYOUT AND DETAILS

SHEET NUMBER
A-2





VIEW A-A

NOTES:

1. SEE SHEET G-2 DETAIL 2 FOR EQUIPMENT GROUNDING
2. PPC CABINETS AND AAV CIENA EQUIPMENT NOT SHOWN FOR CLARITY

0' 4' 8' 16' 24'

EQUIPMENT ELEVATION

1

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MO 63146
PHONE: (314) 812-3600
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Overland Park, Kansas 66210
Phone: 913-438-7700 Fax: 913-438-7777

STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640

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KV KEVIN VANHAELE	E-21561	STRUCTURAL/CIVIL	SC
MLO MICHAEL L. OWENS	E-29058	STRUCTURAL/CIVIL	SC
REJ ROBERT E. JENSEN	PE-028974	STRUCTURAL/CIVIL	SC
SDK SHELTON D. KEISLING	E-27323	ELECTRICAL	E
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DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
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SUBMITTALS

NO.	DATE	DESCRIPTION	BY
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0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

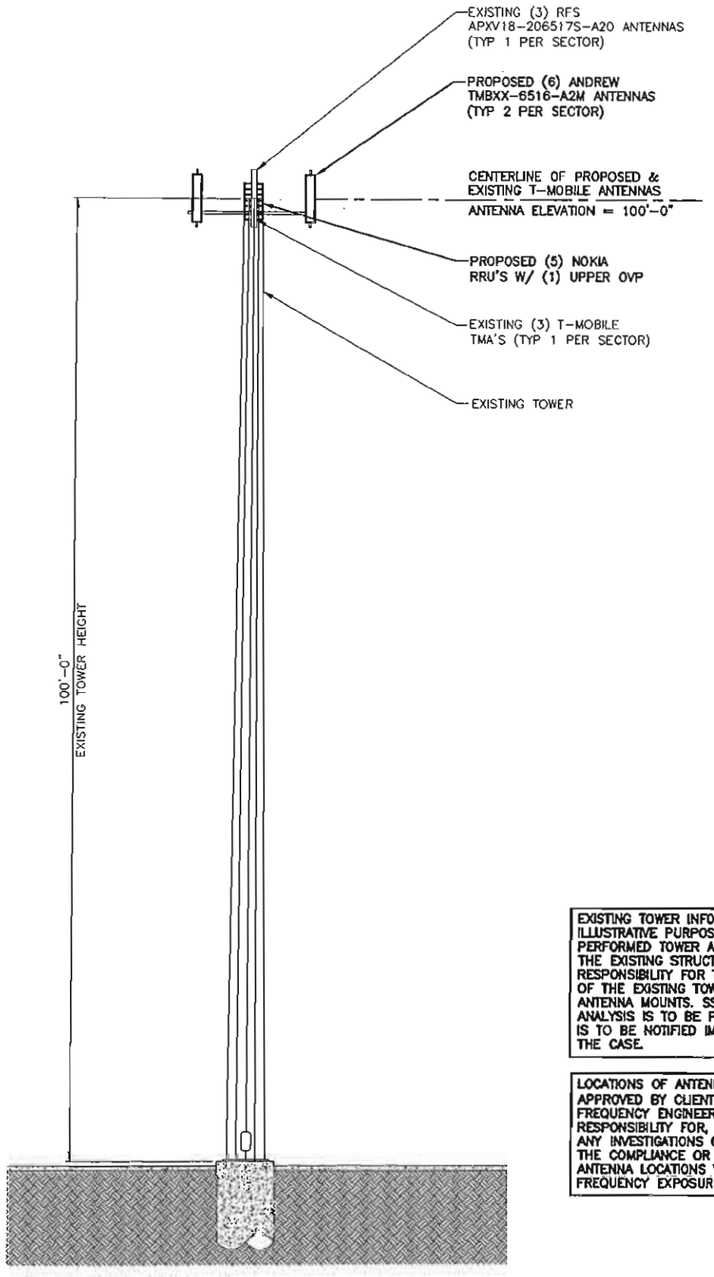
SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
EQUIPMENT ELEVATION

SHEET NUMBER
A-3

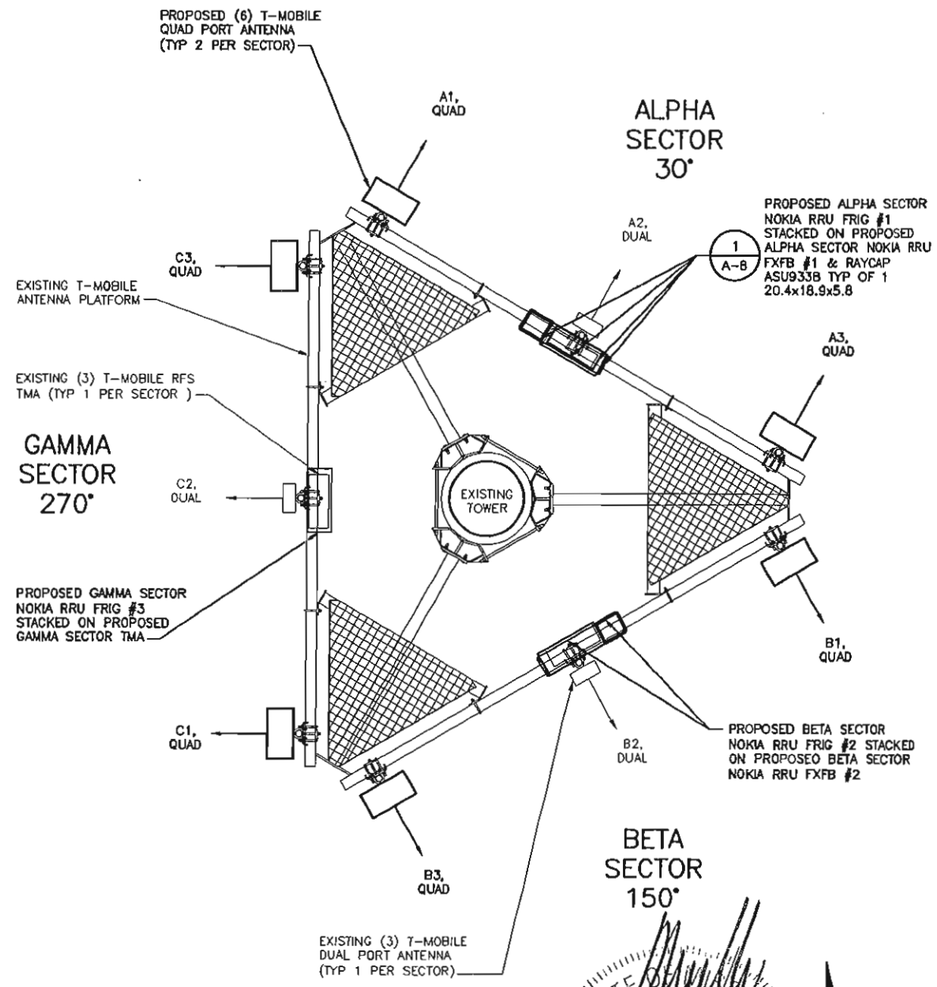
STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/16/13



TOWER ELEVATION | 2

EXISTING TOWER INFORMATION IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SSC HAS NOT PERFORMED TOWER ANALYSIS CALCULATIONS FOR THE EXISTING STRUCTURE AND TAKES NO RESPONSIBILITY FOR THE STRUCTURAL INTEGRITY OF THE EXISTING TOWER, TOWER FOUNDATION, OR ANTENNA MOUNTS. SSC ASSUMES A STRUCTURAL ANALYSIS IS TO BE PERFORMED BY OTHERS AND IS TO BE NOTIFIED IMMEDIATELY IF THIS IS NOT THE CASE.

LOCATIONS OF ANTENNAS AS SHOWN HAVE BEEN APPROVED BY CLIENT AND/OR CLIENT'S RADIO FREQUENCY ENGINEERS. SSC ASSUMES NO RESPONSIBILITY FOR, NOR HAS SSC PERFORMED ANY INVESTIGATIONS OR STUDIES CONCERNING, THE COMPLIANCE OR NONCOMPLIANCE OF SAID ANTENNA LOCATIONS WITH ANY FCC RADIO FREQUENCY EXPOSURE REGULATIONS.



SEE A-5 FOR ANTENNA CONFIGURATION

ANTENNA PLAN | 1

STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/16/13

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
ST. LOUIS, MO 63146
PHONE: (314) 812-3600
FAX: (314) 812-3692

SSC
9900 West 109th Street, Suite 300
Overland Park, Kansas 66210
Phone: 913-438-7700 Fax: 913-438-7777

STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640

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MLO MICHAEL L. OWENS	E-29058	STRUCTURAL/CIVIL	SC
REJ ROBERT E. JENSEN	PE-028974	STRUCTURAL/CIVIL	SC
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DESIGNER:	F. GUY
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LEAD CE/SE:	M.L. OWENS

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NO.	DATE	DESCRIPTION	BY
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0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
TOWER ELEVATIONS
AND ANTENNA PLAN

SHEET NUMBER
A-4

ANTENNA KEY AND COAXIAL CABLE SCHEDULE

ANTENNA MARK	MARK	STATUS	TECH	ANTENNA MODEL	ANTENNA VENDOR	EXISTING AZIMUTH TN	PROPOSED AZIMUTH TN	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	RADIATION CENTER	SECTOR	CONNECTOR	ANTENNA DIMENSIONS	TOTAL WEIGHT	HYBRID MODEL	HYBRID SIZE	HYBRID LENGTH	EXISTING COAX CABLE COUNT	FINAL HYBRID CABLE COUNT
A1	A	PROPOSED	LTE	TMBXX-6516-A2M	ANDREW	30°	30°	0	TBD	100'-0"	Tx1/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	LOW CAPACITY HCS	1.24"	150'		1
A2	A	EXISTING	UMTS AWS	APXV18-206517S-A20	RFS	30°	30°	0	2	100'-0"	Tx2/Rx	7/16 DIN	72"Hx6.8"Wx3"D	26.4 LBS.	--	--	--	2	
A3	A	PROPOSED	UMTS/GSM PCS	TMBXX-6516-A2M	ANDREW	30°	30°	0	2	100'-0"	Tx3/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	SHARED	SHARED	SHARED	2 UMU	SHARED
B1	B	PROPOSED	LTE	TMBXX-6516-A2M	ANDREW	150°	150°	0	TBD	100'-0"	Tx1/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	SHARED	SHARED	SHARED		SHARED
B2	B	EXISTING	UMTS AWS	APXV18-206517S-A20	RFS	150°	150°	0	2	100'-0"	Tx2/Rx	7/16 DIN	72"Hx6.8"Wx3"D	26.4 LBS.	--	--	--	2	
B3	B	PROPOSED	UMTS/GSM PCS	TMBXX-6516-A2M	ANDREW	150°	150°	0	2	100'-0"	Tx3/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	SHARED	SHARED	SHARED	2 UMU	SHARED
C1	C	PROPOSED	LTE	TMBXX-6516-A2M	ANDREW	270°	270°	0	TBD	100'-0"	Tx1/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	SHARED	SHARED	SHARED		SHARED
C2	C	EXISTING	UMTS AWS	APXV18-206517S-A20	RFS	270°	270°	0	1	100'-0"	Tx2/Rx	7/16 DIN	72"Hx6.8"Wx3"D	26.4 LBS.	--	--	--	2	
C3	C	PROPOSED	UMTS/GSM PCS	TMBXX-6516-A2M	ANDREW	270°	270°	0	1	100'-0"	Tx3/Rx	7/16 DIN	59.6"Hx12"Wx6.5"D	34.6 LBS.	SHARED	SHARED	SHARED	2 UMU	SHARED

TMA AND OVP SCHEDULE

EQUIPMENT	STATUS	PART NUMBER	VENDOR	QTY PER SECTOR	DIMENSIONS	WEIGHT	TOTAL
TMA	EXISTING	ATMAA1412D-1A20	RFS	1	12"Hx10"Wx4"D	13 LBS	3 AT ANTENNA LEVEL
RAYCAP/OVP	PROPOSED	ASU9338 (TYP OF 1)	-	-	-	-	1 UPPER & 1 LOWER
FRIG	PROPOSED	-	NOKIA	1	6.0"Hx16.4"Wx20"D	58 LBS	3 AT ANTENNA LEVEL
FXFB GSM-UMTS PCS	PROPOSED	-	NOKIA	-	5.25"Hx17.5"Wx22"D	55 LBS	2 AT ANTENNA LEVEL
FRIA AWS UMTS	EXISTING	-	NOKIA	1	5.25"Hx17.5"Wx22"D	55 LBS	3 AT EQUIPMENT LEVEL
ESMB GSM	PROPOSED	-	NOKIA	-	5.25"Hx17.5"Wx22"D	33 LBS	1 AT EQUIPMENT LEVEL
FSME UMTS	PROPOSED	-	NOKIA	-	5.25"Hx17.5"Wx22"D	50 LBS	2 AT EQUIPMENT LEVEL
FSMF LTE	PROPOSED	-	NOKIA	-	5.25"Hx17.5"Wx22"D	33 LBS	1 AT EQUIPMENT LEVEL

COAX BEND TABLE

TYPICAL CABLE SIZES	ANDREW CABLE TYPE NUMBER	MANUFACTURE'S MINIMUM BEND RADIUS	HANGER ANDREW CATALOG NUMBER	CABLE TO CABLE CLEAR SPACING	MAXIMUM VERTICAL HANGER SPACING	MAXIMUM HORIZONTAL HANGER SPACING
1/2"	LDF4-50A	5"	206706-1	1/2"	4'-0"	4'-0"
7/8"	LDF5-50A	10"	206706-2	1/2"	4'-0"	4'-0"
7/8"	AVA5-50	10"	206706-2	1/2"	4'-0"	4'-0"
1-1/4"	LDF6-50A	15"	206706-3	1/2"	4'-0"	4'-0"
1-5/8"	LDF7-50A	20"	206706-4	1/2"	4'-0"	4'-0"
1-5/8"	AVA7-50A	20"	206706-4	1/2"	4'-0"	4'-0"
1/2"	FSJ4-50B	1-1/4"	206706-1	1/2"	4'-0"	4'-0"

ANTENNA NOTES

1. ANTENNA CONTRACTOR SHALL INSURE THAT ALL ANTENNA MOUNTING PIPES ARE PLUMB.
2. COAXIAL FEEDER & FIBER LENGTHS INDICATED ARE APPROXIMATE.
3. ANTENNA COAXIAL FEEDERS & ANTENNA JUMPERS SHALL BE COLOR CODED PER T-MOBILE REQUIREMENTS.
4. LINES 5 & 6 TO HAVE TMA, MOUNTED ON PIPE BEHIND ANTENNA.
5. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM TMA'S MUST TERMINATE TO OPPOSITE POLARIZATIONS IN EACH SECTOR.
6. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING THE INSTALLATION OF COAXIAL CABLES, CONNECTORS, AND ANTENNAS.
7. MINIMUM BEND RADIUS:

   LDF4-50A (1/2" HARD LINE) = 5"
   FSJ4-50B (1/2" SUPER FLEX) = 1-1/4"
   AVA5-50A (7/8" HARD LINE) = 10"
   AVA7-50A (1-5/8" HARD LINE) = 15"
   LDF7-50A (1-5/8" HARD LINE) = 20"
8. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND FURNISH THE INFORMATION TO T-MOBILE.
9. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE.
10. ANTENNA CONTRACTOR SHALL PERFORM A "TAPE DROP" MEASUREMENT TO CONFIRM/VALIDATE ANTENNA CENTER LINE (ACL) HEIGHT. CONTRACTOR SHALL SUBMIT A COMPLETED HEIGHT VERIFICATION FORM TO THE CONSTRUCTION MANAGER.
11. ALL FIBER RUNS TO BE CONTAINED IN TWO COMMSCOPE HYBRID DC-FIBER CABLES FROM LOWER OVP'S TO UPPER OVP'S MODEL #RFF-12MM-606-21B-SPE (COLOR CODE COAX JUMPERS ONLY)

ANTENNA/FEEDER CABLE COLOR CODING CONVENTION

SECTOR	COLOR	ANTENNA	REFERENCE	FUNCTION
A	1 RED	A1	MAIN LTE	Tx1/Rx LTE MAIN
	2 RED	A1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	3 RED	A1	MAIN LTE	Tx1/Rx LTE MAIN
	4 RED	A1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	5 RED	A2	MAIN AWS/PCS	Tx1/Rx AWS/PCS MAIN
	6 RED	A2	SECONDARY AWS/PCS	Tx3/Rx AWS/PCS DIVERSITY
	7 RED	A3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	8 RED	A3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY
	9 RED	A3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	10 REO	A3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY
B	1 BLUE	B1	MAIN LTE	Tx1/Rx LTE MAIN
	2 BLUE	B1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	3 BLUE	B1	MAIN LTE	Tx1/Rx LTE MAIN
	4 BLUE	B1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	5 BLUE	B2	MAIN AWS/PCS	Tx1/Rx AWS/PCS MAIN
	6 BLUE	B2	SECONDARY AWS/PCS	Tx3/Rx AWS/PCS DIVERSITY
	7 BLUE	B3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	8 BLUE	B3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY
	9 BLUE	B3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	10 BLUE	B3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY
C	1 WHITE	C1	MAIN LTE	Tx1/Rx LTE MAIN
	2 WHITE	C1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	3 WHITE	C1	MAIN LTE	Tx1/Rx LTE MAIN
	4 WHITE	C1	SECONDARY LTE	Tx3/Rx LTE DIVERSITY
	5 WHITE	C2	MAIN AWS/PCS	Tx1/Rx AWS/PCS MAIN
	6 WHITE	C2	SECONDARY AWS/PCS	Tx3/Rx AWS/PCS DIVERSITY
	7 WHITE	C3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	8 WHITE	C3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY
	9 WHITE	C3	MAIN GSM/UMTS	Tx1/Rx GSM MAIN
	10 WHITE	C3	SECONDARY GSM/UMTS	Tx3/Rx GSM DIVERSITY

COAX CABLE IDENTIFICATION

CONTRACTOR MUST PROVIDE EASY IDENTIFICATION AND UNIFORM MARKING OF ANTENNA CABLING, PER THE FOLLOWING INSTRUCTIONS:

1. LOCATION: MARKINGS SHALL BE MADE USING COLOR TAPE W/2" – 3 LAYERS THICK CUT NOT TORN STRANDS OF COVERAGE AFFIXED AT THREE PLACES ON THE COAX CABLE RUN AND NOT BE CONCEALED IN TOWER NOR BE INSTALLED ON WEATHERPROOFING AS FOLLOWS:

ALL COLOR CODING AT THE BASE OF THE TOWER AND AT GROUND LEVEL SHALL ONLY BE 3/4" WIDE. USE 2" WIDE TAPE ONLY ON LINES UP HIGH ON THE TOWER.

FIRST – ON THE COAX AT THE CONNECTOR NEAREST THE ANTENNA (WHERE THE COAX AND JUMPER ARE CONNECTED).

SECOND – AT THE BASE OF THE TOWER STRUCTURE. (FOR TOWERS ONLY).

THIRD – AT A POINT OUTSIDE THE BTS. (JUST PRIOR TO MGB)

2. SECTOR IDENTIFICATION: NORMALLY A SITE WILL HAVE UP TO THREE SECTORS. SECTORS SHALL BE DESIGNATED IN A CLOCKWISE MANNER; THE SECTOR IS CLOSEST TO ZERO DEGREES (NORTH), THE BAND C FOLLOW CLOCKWISE IN SEQUENCE.

A SECTOR COAX WILL BE MARKED MAIN 1 AND DIVERSITY 1. NORMALLY SITES WILL INITIALLY GO ON THE AIR WITH AS FEW AS TWO ANTENNAS PER SECTOR AND AS THE SYSTEM GROWS, ADDITIONAL ANTENNAS WILL BE ADDED.

B SECTOR COAX WILL BE MARKED MAIN 2 AND DIVERSITY 2.

C SECTOR COAX WILL BE MARKED MAIN 3 AND DIVERSITY 3.

D SECTOR COAX WILL BE MARKED MAIN 4 AND DIVERSITY 4.

COLOR CODE AS FOLLOWS:
A SECTOR – RED
B SECTOR – BLUE
C SECTOR – WHITE
D SECTOR – YELLOW
UMTS LINES – BAND OF GREEN AFTER ORIGINAL COLOR CODING

MAIN WILL BE MARKED WITH ONE BAND OF TAPE. DIVERSITY WILL BE MARKED WITH TWO BANDS OF TAPE. EXTRA WILL BE MARKED WITH THREE BANDS OF TAPE.

3. OMNI IDENTIFICATION: FOR OMNI SITES, WHICH NORMALLY CONSIST OF THREE ANTENNA, IT IS SUGGESTED THAT THE ORIENTATION OF THE OBSERVER ALSO BE THAT OF LOOKING IN A NORTHERLY DIRECTION.

UMTS LINES – BAND OF GREEN AFTER ORIGINAL COLOR CODING.

STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
7/16/13

ANTENNA SPECIFICATIONS

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3200 COBB GALLERIA PARKWAY, SUITE 205
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STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640
RESPONSIBLE ENGINEERS: RESPONSIBLE DISCIPLINE:
KV KEVIN VANMAELE E-21561 STRUCTURAL/CIVIL SC
MLO MICHAEL L. OWENS E-29058 STRUCTURAL/CIVIL SC
REJ ROBERT E. JENSEN PE-028974 STRUCTURAL/CIVIL SC
SDK SHELTON D. KEISUNG E-27323 ELECTRICAL E
TMS TERRANCE M. SUPER E-18521 ELECTRICAL E

DESIGNER: F. GUY
LEAD EE: S.D. KEISUNG
LEAD CE/SE: M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

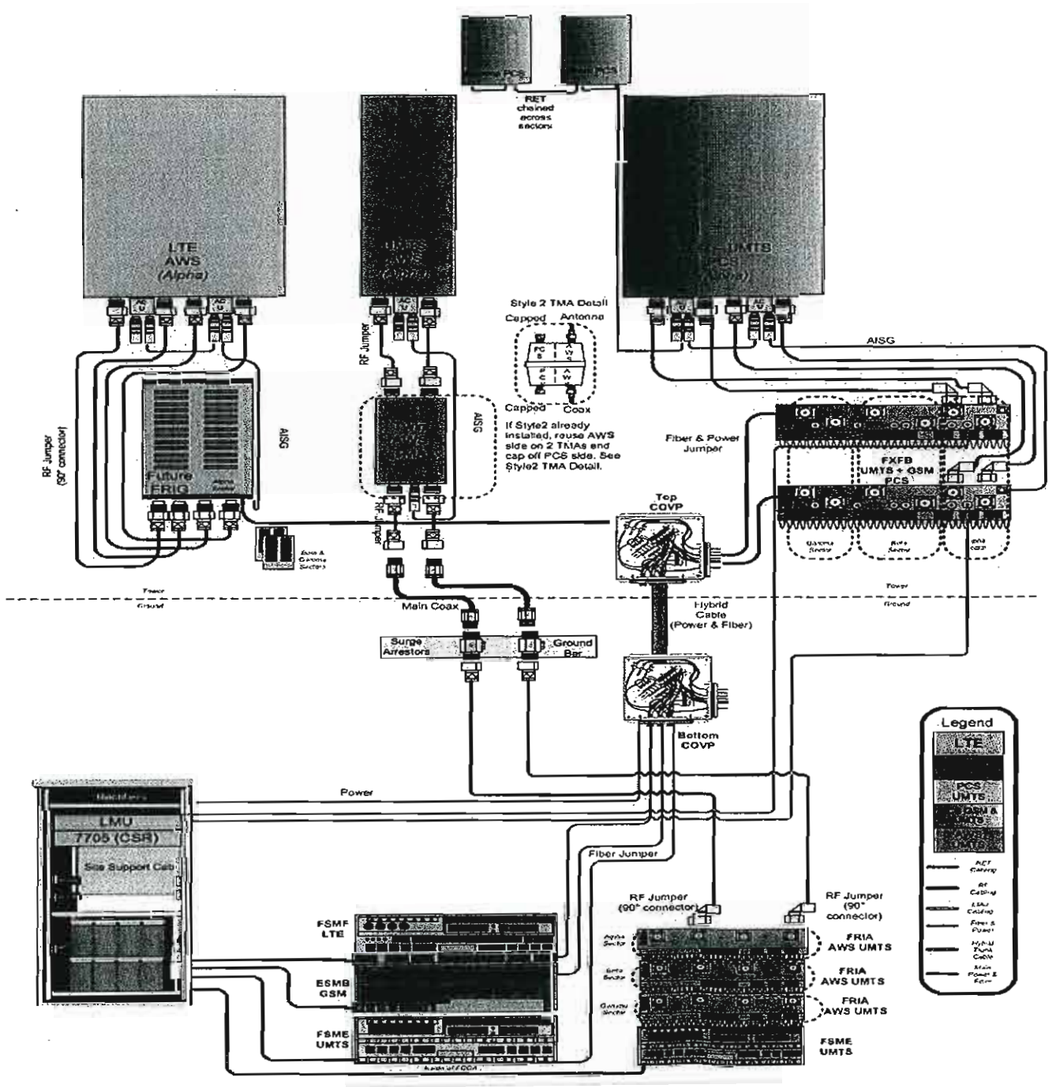
SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
ANTENNA, RRU & TMA CONFIGURATION KEYS

SHEET NUMBER
A-5

Drawing (1) Comments:

NSN Configuration 1A
Tower-Top RRU for Contiguous Spectrum Markets
(Antenna and cabling for only one sector shown)



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DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

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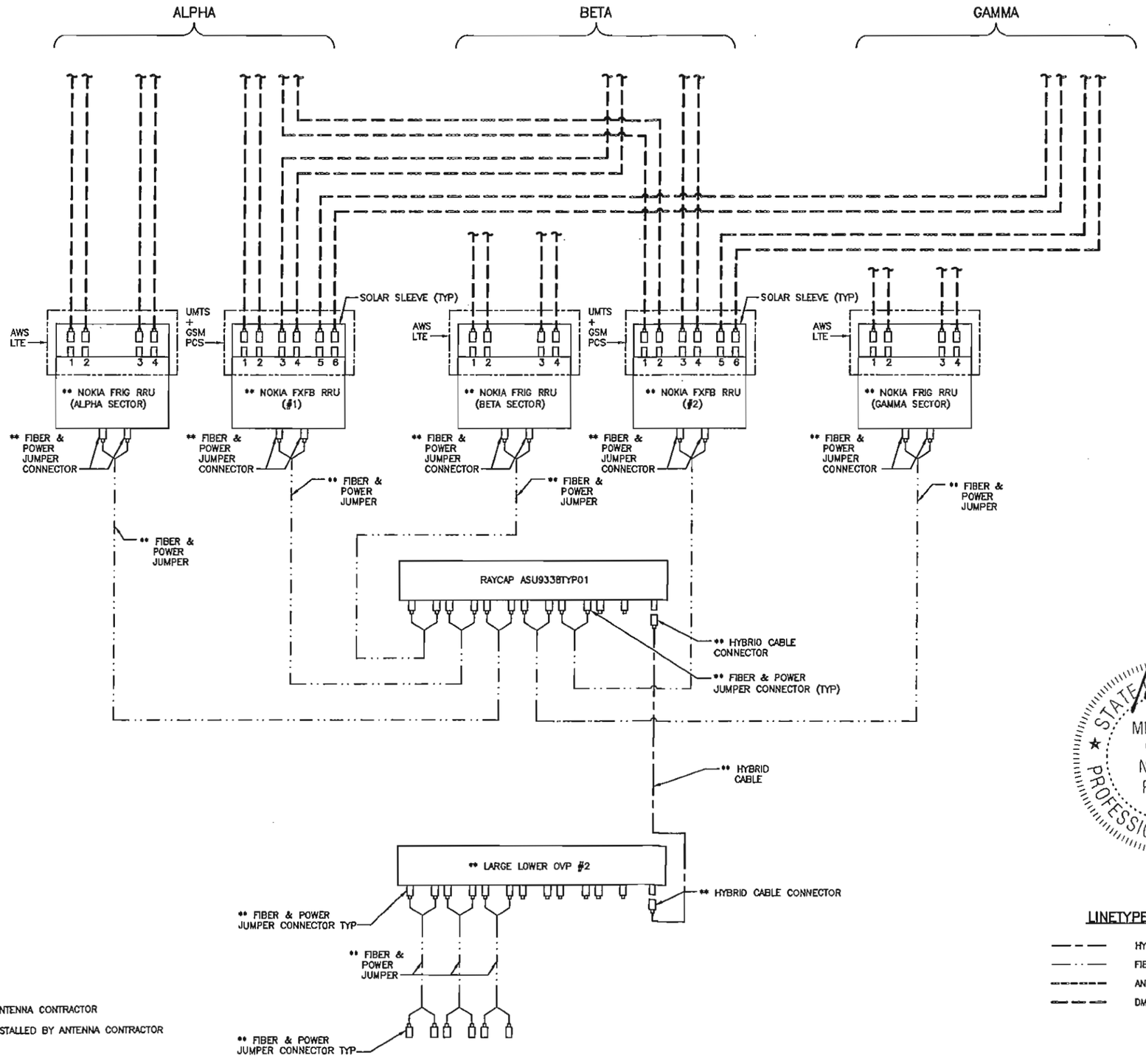
SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
NSN CONFIGURATION

SHEET NUMBER
A-6

STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/16/13



NOTES:

1. SUPERFLEX JUMPERS CAN BE SUBSTITUTED ONLY WITH THE PERMISSION OF THE T-MOBILE CONSTRUCTION MANAGER.
2. CONTRACTOR SHALL WEATHERPROOF CONNECTIONS AT THE ANTENNAS WITH SELF AMALGAMATING TAPE.

* FURNISHED AND INSTALLED BY ANTENNA CONTRACTOR

** FURNISHED BY T-MOBILE AND INSTALLED BY ANTENNA CONTRACTOR

LINETYPE LEGEND

- HYBRID CABLE
- FIBER & POWER JUMPER
- ANTENNA JUMPER
- DM-DMR ANTENNA JUMPER

RRU CONNECTION DIAGRAM

1

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TMS TERRANCE M. SUPER	E-18521 ELECTRICAL	E

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STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/16/13

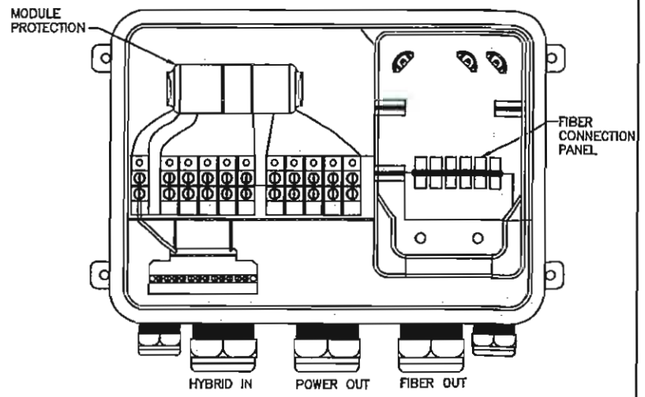
SITE NAME
SPIRIT 40 PARK

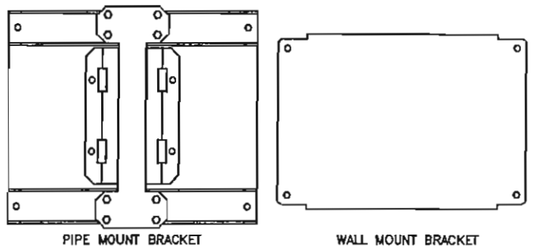
SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

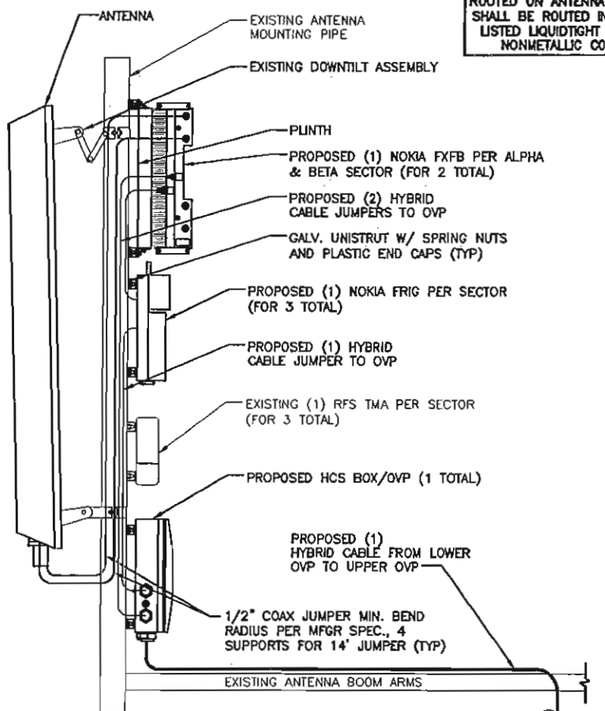
SHEET TITLE
RRU CONNECTION DIAGRAM

SHEET NUMBER
A-7

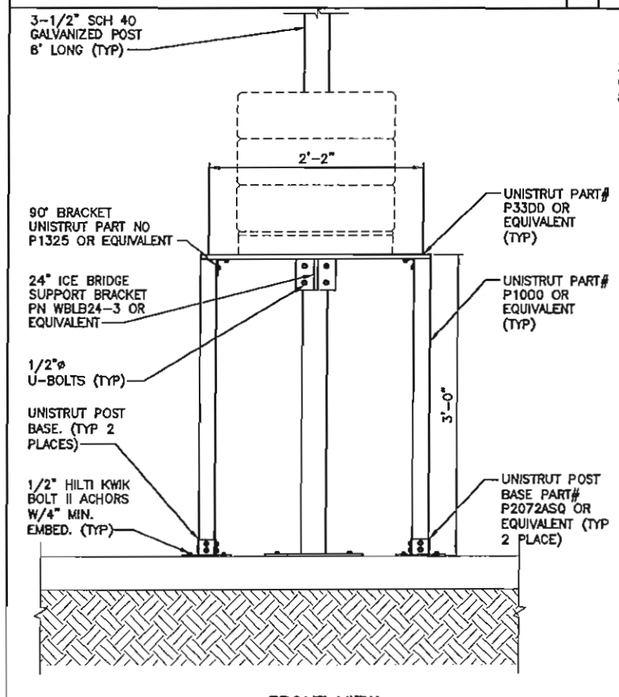




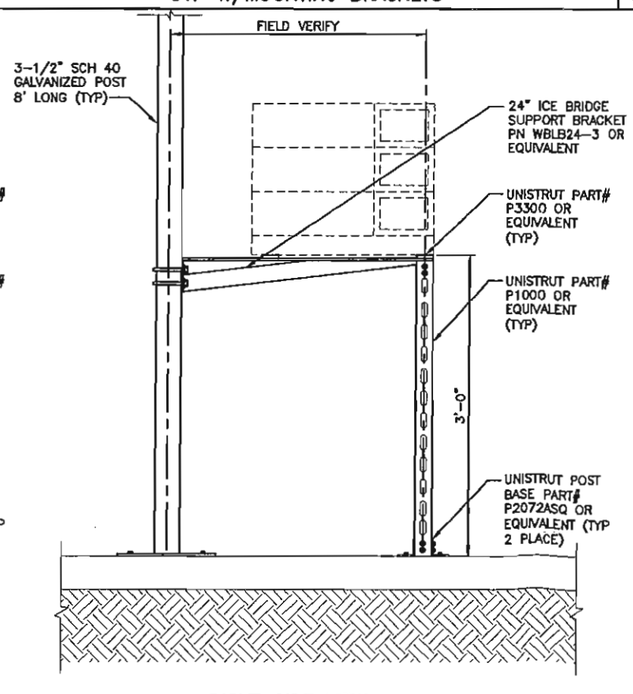
ALL FIBER & POWER CABLES ROUTED ON ANTENNA PLATFORM SHALL BE ROUTED IN 3/4" UL LISTED LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT



5 OVP W/MOUNTING BRACKETS 3



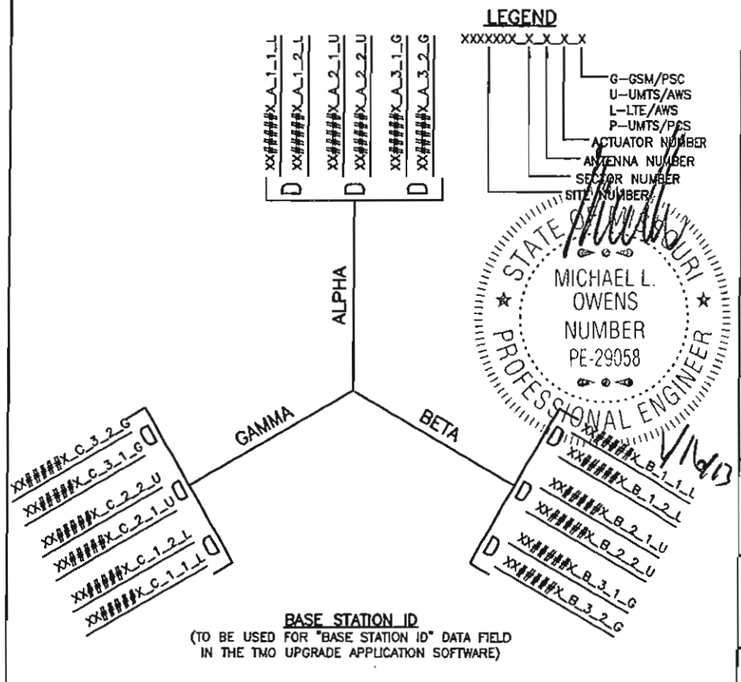
FRONT VIEW



RIGHT SIDE VIEW

BASEBAND MODULES PEDESTAL 4

TYPICAL RRU MOUNTING DETAIL 1



BASE STATION ID
(TO BE USED FOR "BASE STATION ID" DATA FIELD IN THE TMO UPGRADE APPLICATION SOFTWARE)

RET ACTUATOR NAMING CONVENTION 2

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DESIGNER:	F. GUY
LEAD EE:	S.D. KEISUNG
LEAD CE/SE:	M.L. OWENS

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STATE OF MISSOURI
MICHAEL L. OWENS
NUMBER PE-29058
PROFESSIONAL ENGINEER
1/15/13

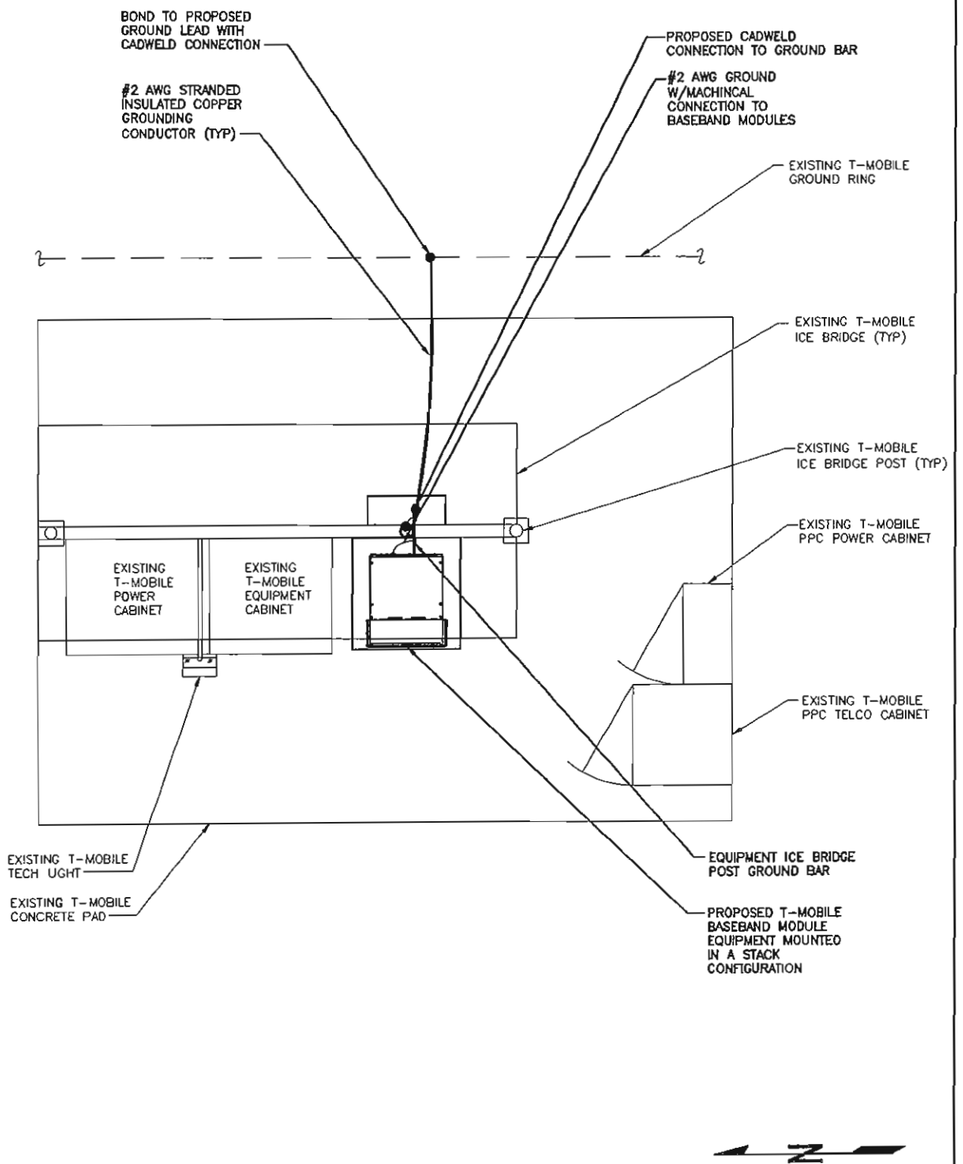
SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

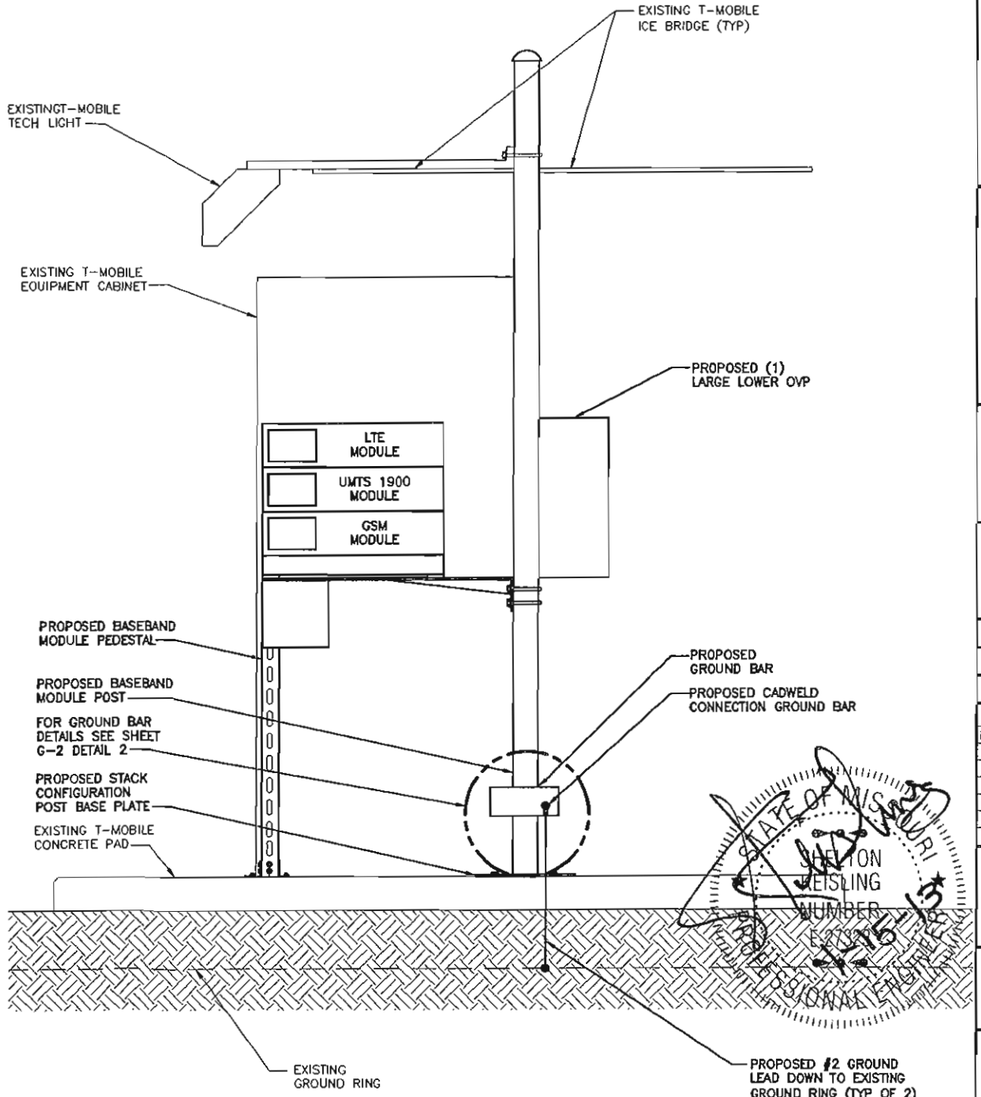
SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
RET ACTUATOR NAMING AND DETAILS

SHEET NUMBER
A-8



GROUNDING PLAN | 2



GROUNDING ELEVATION | 1

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REJ ROBERT E. JENSEN	PE-029974 STRUCTURAL/CIVIL	SC
SDK SHELTON D. KEISLING	E-27323 ELECTRICAL	E
TMS TERRANCE M. SUPER	E-16521 ELECTRICAL	E

DESIGNER: F. GUY
LEAD EE: S.D. KEISLING
LEAD CE/SE: M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
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0	01/15/13	ISSUED FOR CONSTRUCTION	DSK

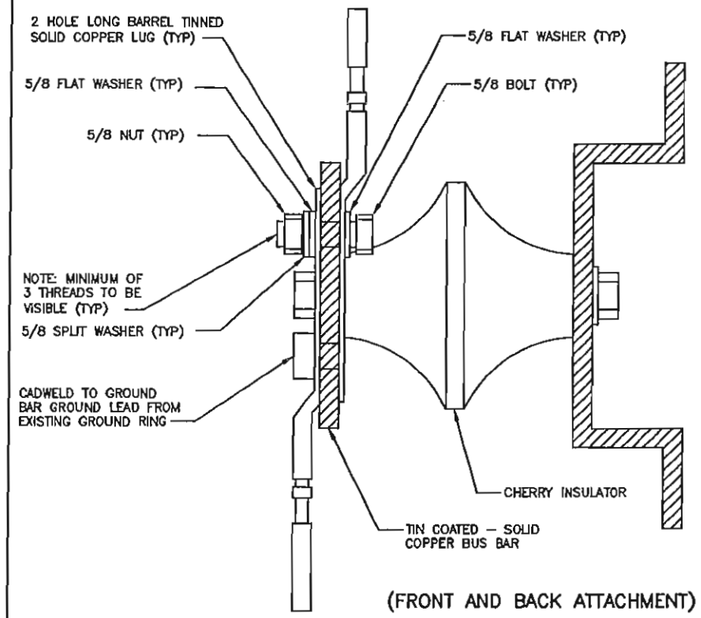
SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
GROUNDING PLAN & ELEVATION

SHEET NUMBER
G-1

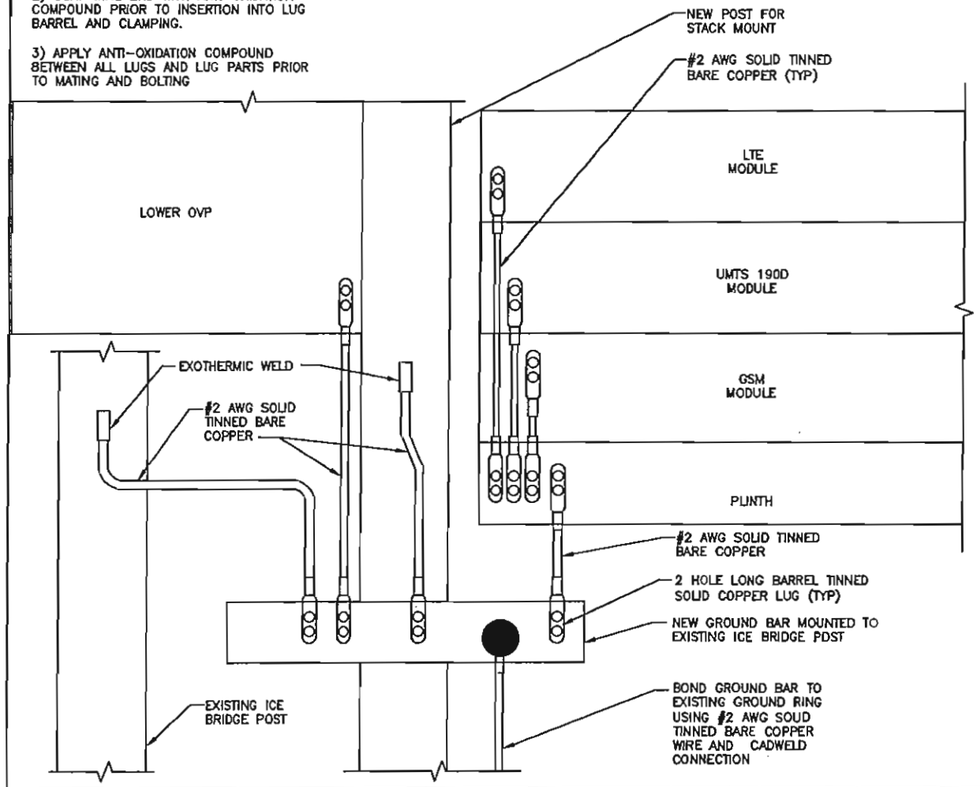


(FRONT AND BACK ATTACHMENT)

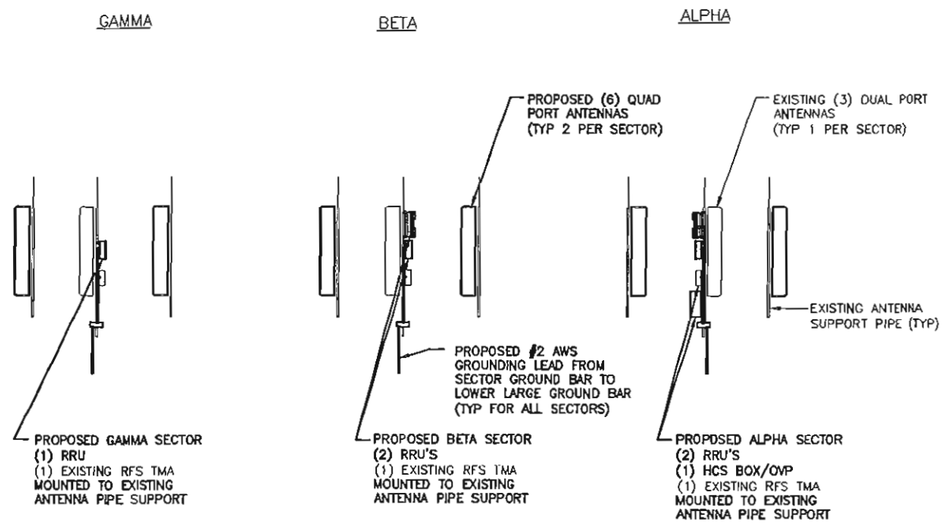
NOTES:
1) ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING SPLIT WASHERS.

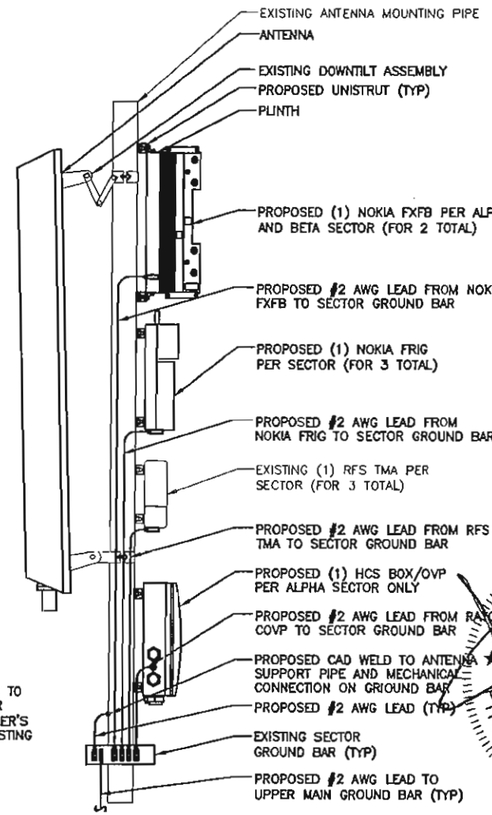
2) COAT WIRE END WITH ANTI-OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CLAMPING.

3) APPLY ANTI-OXIDATION COMPOUND BETWEEN ALL LUGS AND LUG PARTS PRIOR TO MATING AND BOLTING



BOTTOM EQUIPMENT GROUNDING DETAIL | 2





NOTE:

PROPOSED NEW RRU EQUIPMENT TO BE BONDED TO EXISTING SECTOR GROUND BARS PER MANUFACTURER'S RECOMMENDATIONS. IF NONE EXISTING ONE MUST BE INSTALLED PER RECOMMENDATIONS.

RRU EQUIPMENT GROUNDING DETAIL | 1

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
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STATE OF MISSOURI
CERTIFICATE OF AUTHORIZATION #001640

RESPONSIBLE ENGINEERS:		RESPONSIBLE DISCIPLINE:	
KV KEVIN VANHAELE	E-21561	STRUCTURAL/CIVIL	SC
MLO MICHAEL L OWENS	E-20058	STRUCTURAL/CIVIL	SC
REJ ROBERT E. JENSEN	PE-028874	STRUCTURAL/CIVIL	SC
SDK SHELTON D. KEISLING	E-27323	ELECTRICAL	E
TMS TERRANCE M. SUPER	E-18521	ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISUNG
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2

STATE OF MISSOURI
SHELTON KEISLING
NUMBER E-27323
1-15-13
PROFESSIONAL ENGINEER

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.

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.

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.

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.

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 OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

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.
5. -48 DC POWER COLOR CODE SHALL BE BLUE AND BLACK.

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. #10 AWG AND SMALLER CONDUCTORS SHALL BE SOLID AND #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. SYSTEM GROUNDING:

1. GROUNDING CONDUCTOR SHALL BE BARE, STRANDED, COPPER, SIZE AS INDICATED, EXCEPT ABOVE GROUND GROUNDING CONDUCTORS SHALL BE INSULATED.
2. GROUND BUSSES SHALL BE BARE ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. BUSS BARS SHALL BE TIN PLATED OR PAINTED GRAY AFTER CONNECTIONS HAVE BEEN COMPLETED.
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. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 3/4" x 10'-0".

E. 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.

STATE OF MISSOURI
SHELTON KEISLING
NUMBER E-27323
1-15-13
PROFESSIONAL ENGINEER

AMERICAN TOWER
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RESPONSIBLE ENGINEERS		RESPONSIBLE DISCIPLINE:	
KV	KEVIN VANHAELE	E-21561 STRUCTURAL/CIVIL	SC
MLO	MICHAEL L. OWENS	E-29056 STRUCTURAL/CIVIL	SC
REJ	ROBERT E. JENSEN	PE-028974 STRUCTURAL/CIVIL	SC
SDK	SHELTON D. KEISLING	E-27323 ELECTRICAL	E
TMS	TERRANCE M. SUPER	E-18521 ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
SPECIFICATIONS (2 OF 3)

SHEET NUMBER
SP-2

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 OR RGS CONDUIT BELOW GRADE, 1" MINIMUM, UNLESS NOTED OTHERWISE. ALL 90 DEGREE BENDS TO ABOVE GRADE SHALL BE 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. NO MORE THAN 3' SEALTIGHT FROM RGS
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 STRINGS 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.

B. WIRE AND CABLE:

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

DESCRIPTION	120/240V	208Y/120V	480Y/277V
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

1-A. DC -48 POWER COLOR CODE: BLUE & BLACK

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, ETC. 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.
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 IN ALL FEEDER AND BRANCH CIRCUITS
9. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS OR GROUNDING LUG IN ENCLOSURE.
10. DIRECT BURIED GROUND CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30" BELOW GRADE, UNLESS NOTED OTHERWISE.
11. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSULATED OR INSTALLED IN PVC CONDUIT.
12. INSTALL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
13. DRIVE GROUND RODS UNTIL TOPS ARE 30 INCHES BELOW FINAL GRADE.
14. GROUNDING CONDUCTOR TO EQUIPMENT GROUND LUGS:
    1) BOLTED TO EQUIPMENT HOUSING WITH STAINLESS STEEL BOLTS AND LOCK WASHERS.
    2) ALL EQUIPMENT TO BE GROUNDED SHALL BE FREE OF PAINT OR ANY OTHER MATERIAL COVERING BARE METAL AT THE POINT OF CONNECTION.

3.5 ACCEPTANCE TESTING:

1. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS, AND SUBMIT TEST REPORTS 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.

A. 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.

END OF SECTION

END OF SPECIFICATION

AMERICAN TOWER
3200 COBB GALLERIA PARKWAY, SUITE 205
ATLANTA, GEORGIA 30339
PHONE: (770) 308-1973

T-Mobile
2004 WESTPORT CENTER DRIVE
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SDK	SHELTON O. KEISLING	E-27323 ELECTRICAL	E
TMS	TERRANCE M. SUPER	E-18521 ELECTRICAL	E

DESIGNER:	F. GUY
LEAD EE:	S.D. KEISLING
LEAD CE/SE:	M.L. OWENS

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	01/10/13	ISSUED FOR REVIEW	FG
0	01/15/13	ISSUED FOR CONSTRUCTION	DSH

SITE NAME
SPIRIT 40 PARK

SITE NUMBER
MO-06-205-A

SITE ADDRESS
737 SPIRIT 40 PARK DRIVE
CHESTERFIELD, MISSOURI
63005

SHEET TITLE
SPECIFICATIONS (3 OF 3)

SHEET NUMBER
SP-3

APPENDIX A

Optional Checklist for Determination

Of Whether a Facility is Categorically Excluded

Filled out by Aaron Adelman of SMJ International 3/8

of SMJ International o/b/o T-Mobile

Optional Checklist for Local Government To Determine Whether a Facility is Categorically Excluded

Purpose: The FCC has determined that many wireless facilities are unlikely to cause human exposures in excess of RF exposure guidelines. Operators of those facilities are exempt from routinely having to determine their compliance. These facilities are termed "categorically excluded." Section 1.1307(b)(1) of the Commission's rules defines those categorically excluded facilities. This checklist will assist state and local government agencies in identifying those wireless facilities that are categorically excluded, and thus are highly unlikely to cause exposure in excess of the FCC's guidelines. Provision of the information identified on this checklist may also assist FCC staff in evaluating any inquiry regarding a facility's compliance with the RF exposure guidelines.

BACKGROUND INFORMATION

1. Facility Operator's Legal Name: T-Mobile
2. Facility Operator's Mailing Address: 2400 Westport Center Drive
3. Facility Operator's Contact Name/Title: Aaron Adelman, Authorized Agent
4. Facility Operator's Office Telephone: 616-916-3062
5. Facility Operator's Fax: 888-745-4719
6. Facility Name: Spirit 40 Park
7. Facility Address: 731 Spirit 40 Park Dr.
8. Facility City/Community: Chesterfield
9. Facility State and Zip Code: MO, 63005
10. Latitude: 38.67216882
11. Longitude: -90.6416901

continue →

Optional Local Government Checklist (page 2)

EVALUATION OF CATEGORICAL EXCLUSION

12. Licensed Radio Service (see attached Table 1): Cellular Radiotelephone Service
13. Structure Type (free-standing or building/roof-mounted): Free-standing
14. Antenna Type [omnidirectional or directional (includes sectored)]: Directional
15. Height above ground of the lowest point of the antenna (in meters): 96'
16. ☒ Check if all of the following are true:
    (a) This facility will be operated in the Multipoint Distribution Service, Paging and Radiotelephone Service, Cellular Radiotelephone Service, Narrowband or Broadband Personal Communieations Service, Private Land Mobile Radio Services Paging Operations, Private Land Mobile Radio Service Specialized Mobile Radio, Local Multipoint Distribution Service, or service regulated under Part 74, Subpart I (see question 12).
    (b) This facility will not be mounted on a building (see question 13).
    (c) The lowest point of the antenna will be at least 10 meters above the ground (see question 15).

If box 16 is checked, this facility is categorically excluded and is unlikely to cause exposure in excess of the FCC's guidelines. The remainder of the checklist need not be completed. If box 16 is not checked, continue to question 17.

17. Enter the power threshold for categorical exclusion for this service from the attached Table 1 in watts ERP or EIRP* (note: EIRP = (1.64) X ERP): _____
18. Enter the total number of channels if this will be an omnidirectional antenna, or the maximum number of channels in any sector if this will be a sectored antenna:
19. Enter the ERP or EIRP per channel (using the same units as in question 17): _____
20. Multiply answer 18 by answer 19: _____
21. Is the answer to question 20 less than or equal to the value from question 17 (yes or no)?

If the answer to question 21 is YES, this facility is categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines.

If the answer to question 21 is NO, this facility is not categorically excluded. Further investigation may be appropriate to verify whether the facility may cause exposure in excess of the FCC's guidelines.

*"ERP" means "effective radiated power" and "EIRP" means "effective isotropic radiated power

TABLE 1: TRANSMITTERS, FACILITIES AND OPERATIONS SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

Experimental Radio Services (part 5)	power > 100 W ERP (164 W EIRP)
Multipoint Distribution Service (subpart K of part 21)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1640 W EIRP building-mounted antennas: power > 1640 W EIRP
Paging and Radiotelephone Service (subpart E of part 22)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1000 W ERP (1640 W EIRP) building-mounted antennas: power > 1000 W ERP (1640 W EIRP)
Cellular Radiotelephone Service (subpart H of part 22)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP) building-mounted antennas: total power of all channels > 1000 W ERP (1640 W EIRP)

TABLE 1 (cont.)

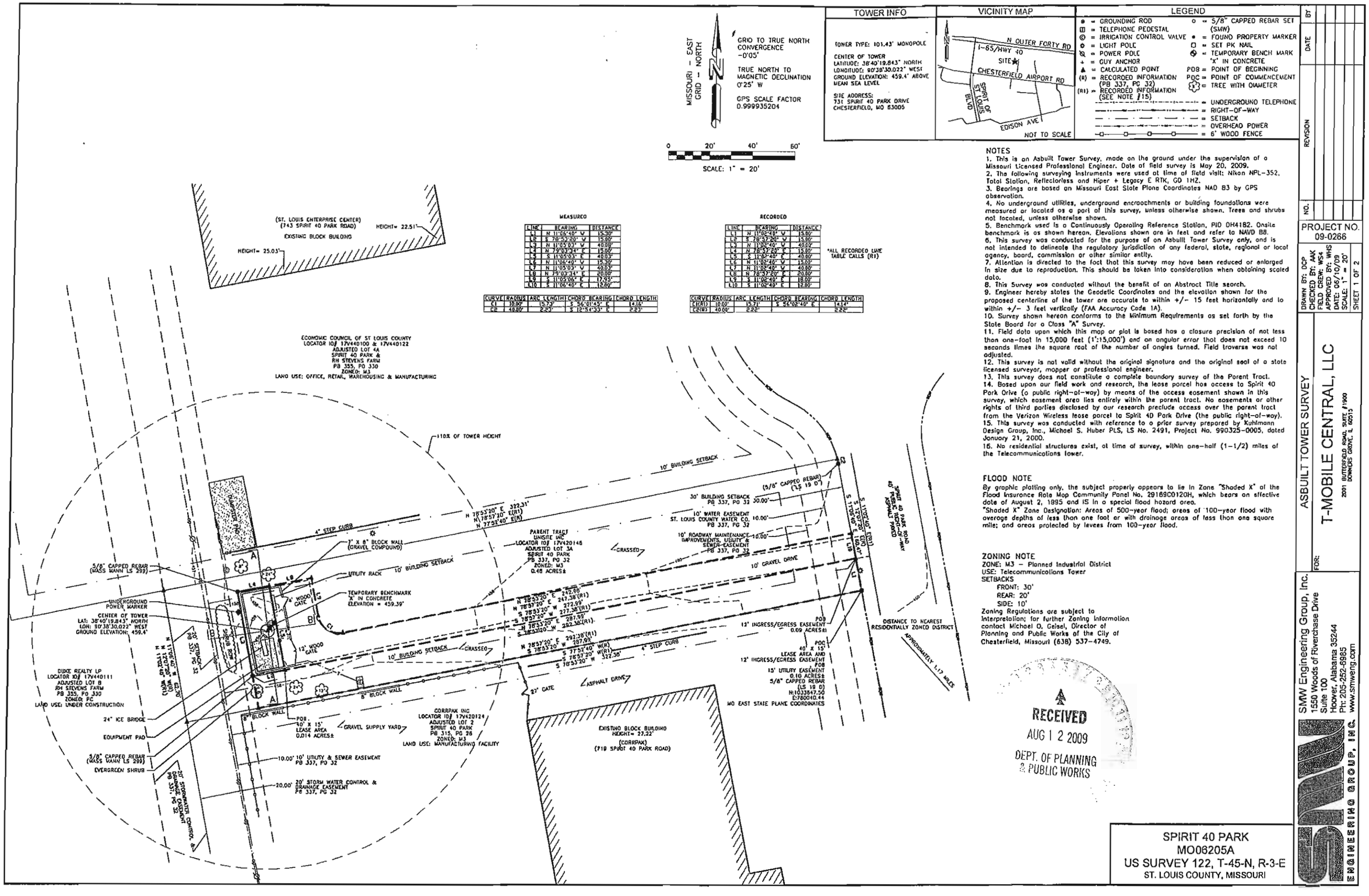
SERVICE (FCC RULE PART)	EVALUATION REQUIRED IF
Personal Communications Services (part 24)	(1) Narrowband PCS (subpart D): non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP) building-mounted antennas: total power of all channels > 1000 W ERP (1640 W EIRP) (2) Broadband PCS (subpart E): non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 2000 W ERP (3280 W EIRP) building-mounted antennas: total power of all channels > 2000 W ERP (3280 W EIRP)
Satellite Communications (part 25)	all included
General Wireless Communications Service (part 26)	total power of all channels > 1640 W EIRP
Wireless Communications Service (part 27)	total power of all channels > 1640 W EIRP
Radio Broadcast Services (part 73)	all included

TABLE 1 (cont.)

[illegible]	[illegible]
Experimental, auxiliary, and special broadcast and other program distributional services (part 74)	subparts A, G, L: power > 100 W ERP subpart I: non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1640 W EIRP building-mounted antennas: power > 1640 W EIRP
Stations in the Maritime Services (part 80)	ship earth stations only
Private Land Mobile Radio Services Paging Operations (part 90)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1000 W ERP (1640 W EIRP) building-mounted antennas: power > 1000 W ERP (1640 W EIRP)
Private Land Mobile Radio Services Specialized Mobile Radio (part 90)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP) building-mounted antennas: total power of all channels > 1000 W ERP (1640 W EIRP)

TABLE 1 (cont.)

[illegible]	[illegible]
Amateur Radio Service (part 97)	transmitter output power > levels specified in § 97.13(c)(1) of this chapter
Local Multipoint Distribution Service (subpart L of part 101)	non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1640 W EIRP building-mounted antennas: power > 1640 W EIRP LMDS licensees are required to attach a label to subscriber transceiver antennas that: (1) provides adequate notice regarding potential radiofrequency safety hazards, *e.g.*, information regarding the safe minimum separation distance required between users and transceiver antennas; and (2) references the applicable FCC-adopted limits for radiofrequency exposure specified in § 1.1310 of this chapter.



MEASURED

LINE	BEARING	DISTANCE
L1	N 11°56'40" W	15.30'
L2	S 78°53'20" W	15.00'
L3	N 11°05'03" W	40.03'
L4	N 79°03'34" E	15.00'
L5	S 11°05'03" E	40.03'
L6	N 11°06'40" W	15.30'
L7	N 11°05'03" W	40.03'
L8	N 79°03'34" E	20.00'
L9	S 11°05'06" E	17.55'
L10	S 11°06'40" E	12.80'

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1	10.00'	15.73'	S 56°01'45" E	14.16'
C2	40.00'	2.23'	S 12°54'33" E	2.23'

RECORDED

LINE	BEARING	DISTANCE
L1	N 11°02'48" W	15.80'
L2	S 78°57'20" W	15.00'
L3	N 11°02'40" W	40.00'
L4	N 78°57'20" E	15.00'
L5	S 11°02'40" E	40.00'
L6	N 11°02'40" W	15.00'
L7	N 11°02'40" W	40.00'
L8	N 78°57'20" E	20.00'
L9	S 11°02'40" E	18.00'
L10	S 11°02'40" E	12.80'

*ALL RECORDED LINE TABLE CALLS (R1)

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1(R1)	10.00'	15.71'	S 56°02'40" E	14.14'
C2(R1)	40.00'	2.22'		2.22'

TOWER INFO
TOWER TYPE: 101.43' MONOPOLE CENTER OF TOWER LATITUDE: 38°40'19.843" NORTH LONGITUDE: 90°38'30.022" WEST GROUND ELEVATION: 459.4' ABOVE MEAN SEA LEVEL SITE ADDRESS: 731 SPIRIT 40 PARK DRIVE CHESTERFIELD, MO 63005

VICINITY MAP

LEGEND

- ⊕ = GROUNDING ROD
- ▣ = TELEPHONE PEDESTAL
- ◎ = IRRIGATION CONTROL VALVE
- ✿ = LIGHT POLE
- ⊠ = POWER POLE
- ⏚ = GUY ANCHOR
- ▲ = CALCULATED POINT
- (R) = RECORDED INFORMATION (PB 337, PG 32)
- (R1) = RECORDED INFORMATION (SEE NOTE #15)
- o = 5/8" CAPPED REBAR SET (SMW)
- • = FOUND PROPERTY MARKER
- □ = SET PK NAIL
- ⊕ = TEMPORARY BENCH MARK "X" IN CONCRETE
- POB = POINT OF BEGINNING
- POC = POINT OF COMMENCEMENT
- ✿ = TREE WITH DIAMETER
- = UNDERGROUND TELEPHONE
- = RIGHT-OF-WAY
- = SETBACK
- = OVERHEAD POWER
- = 6' WOOD FENCE

NOTES

1. This is an Asbuilt Tower Survey, made on the ground under the supervision of a Missouri Licensed Professional Engineer. Date of field survey is May 20, 2009.
2. The following surveying instruments were used at time of field visit: Nikon NPL-352, Total Station, Reflectorless and Hiper + Legacy E RTK, GO 1H2.
3. Bearings are based on Missouri East State Plane Coordinates NAD 83 by GPS observation.
4. No underground utilities, underground encroachments or building foundations were measured or located as a part of this survey, unless otherwise shown. Trees and shrubs not located, unless otherwise shown.
5. Benchmark used is a Continuously Operating Reference Station, PID DH4182. Onsite benchmark is as shown hereon. Elevations shown are in feet and refer to NAVD 88.
6. This survey was conducted for the purpose of an Asbuilt Tower Survey only, and is not intended to delineate the regulatory jurisdiction of any federal, state, regional or local agency, board, commission or other similar entity.
7. Attention is directed to the fact that this survey may have been reduced or enlarged in size due to reproduction. This should be taken into consideration when obtaining scaled data.
8. This Survey was conducted without the benefit of an Abstract Title search.
9. Engineer hereby states the Geodetic Coordinates and the elevation shown for the proposed centerline of the tower are accurate to within +/- 15 feet horizontally and to within +/- 3 feet vertically (FAA Accuracy Code 1A).
10. Survey shown hereon conforms to the Minimum Requirements as set forth by the State Board for a Class "A" Survey.
11. Field data upon which this map or plat is based has a closure precision of not less than one-foot in 15,000 feet (1':15,000') and an angular error that does not exceed 10 seconds times the square root of the number of angles turned. Field traverse was not adjusted.
12. This survey is not valid without the original signature and the original seal of a state licensed surveyor, mapper or professional engineer.
13. This survey does not constitute a complete boundary survey of the Parent Tract.
14. Based upon our field work and research, the lease parcel has access to Spirit 40 Park Drive (a public right-of-way) by means of the access easement shown in this survey, which easement area lies entirely within the parent tract. No easements or other rights of third parties disclosed by our research preclude access over the parent tract from the Verizon Wireless lease parcel to Spirit 40 Park Drive (the public right-of-way).
15. This survey was conducted with reference to a prior survey prepared by Kuhlmann Design Group, Inc., Michael S. Huber PLS, LS No. 2491, Project No. 990325-0005, dated January 21, 2000.
16. No residential structures exist, at time of survey, within one-half (1-1/2) miles of the Telecommunications Tower.

FLOOD NOTE

By graphic plotting only, the subject property appears to lie in Zone "Shaded X" of the Flood Insurance Rate Map Community Panel No. 29189C0120H, which bears an effective date of August 2, 1995 and IS in a special flood hazard area.
"Shaded X" Zone Designation: Areas of 500-year flood; areas of 100-year flood with average depths of less than one foot or with drainage areas of less than one square mile; and areas protected by levees from 100-year flood.

ZONING NOTE

ZONE: M3 - Planned Industrial District
USE: Telecommunications Tower
SETBACKS
FRONT: 30'
REAR: 20'
SIDE: 10'
Zoning Regulations are subject to interpretation; for further Zoning information contact Michael O. Geisel, Director of Planning and Public Works of the City of Chesterfield, Missouri (636) 537-4749.

RECEIVED
AUG 12 2009
DEPT. OF PLANNING & PUBLIC WORKS

SPIRIT 40 PARK
MO06205A
US SURVEY 122, T-45-N, R-3-E
ST. LOUIS COUNTY, MISSOURI

NO.	REVISION	DATE	BY

PROJECT NO. 09-0266

DRAWN BY: DCP
CHECKED BY: AAK
FIELD CREW: WS4
APPROVED BY: WHS
DATE: 06/10/09
SCALE: 1" = 20'
SHEET 1 OF 2

ASBUILT TOWER SURVEY

FOR: T-MOBILE CENTRAL, LLC
2001 BUTTERFIELD ROAD, SUITE #1900
DOWNERS GROVE, IL 60515

SMW Engineering Group, Inc.
1550 Woods of Riverchase Drive
Suite 100
Hoover, Alabama 35244
Ph: 205-252-6985
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ENGINEERING GROUP, INC.