



**KNOXVILLE/KNOX COUNTY METROPOLITAN PLANNING COMMISSION  
USE ON REVIEW REPORT**

▶ **FILE #:** 8-J-08-UR

**AGENDA ITEM #:** 81

**AGENDA DATE:** 8/14/2008

▶ **APPLICANT:** T-MOBILE SOUTH / US CELLULAR

**OWNER(S):** US CELLULAR

**TAX ID NUMBER:** 79 G B 012.04

**JURISDICTION:** County Commission District 6

▶ **LOCATION:** Southeast side of Schaad Rd., northeast of Tecoy Ln.

▶ **APPX. SIZE OF TRACT:** 6.12 acres

**SECTOR PLAN:** Northwest City

**GROWTH POLICY PLAN:** Urban Growth Area

**ACCESSIBILITY:** Access is via Schaad Rd., a minor arterial street with a 19' pavement width within a 50' right-of-way.

**UTILITIES:** Water Source: Knoxville Utilities Board

Sewer Source: Knoxville Utilities Board

**WATERSHED:** Grassy Creek

▶ **ZONING:** A (Agricultural)

▶ **EXISTING LAND USE:** Residence and vacant

▶ **PROPOSED USE:** Telecommunication tower extension (150' to 195')

**HISTORY OF ZONING:** In 2003, US Cellular was approved for a 150' telecommunications tower on this site (6-I-03-UR).

**SURROUNDING LAND USE AND ZONING:** North: Low density residential, Schaad Rd. & vacant land / A (Agricultural), RA (Low Density Residential) & RB (General Residential)

South: Low density residential & vacant land / RA (Low Density Residential)

East: Low density residential & vacant land / A (Agricultural)

West: Low density residential & vacant land / A (Agricultural)

**NEIGHBORHOOD CONTEXT:** The site is located in an area with a mix of rural to medium density residential development.

**STAFF RECOMMENDATION:**

▶ **APPROVE the development plan for a 45' extension on an existing 150' foot monopole telecommunications tower at this location, subject to 7 conditions:**

1. Maintaining the existing landscaping as shown on the previously approved landscape plan within six months of the tower becoming operational.
2. Since the FAA does not require any lighting for this facility, there shall be no lighting on the tower.
3. Installing a 6' high security fence around the tower and equipment area prior to the tower becoming operational.
4. At the time of the request for a building permit, posting a bond or other approved financial surety that would ensure the removal of the tower if it is abandoned.

CONFORMITY OF THE PROPOSAL TO ADOPTED PLANS

1. The Northwest City Sector Plan proposes low density residential uses and slope protection on this property. The proposed development is consistent with the Sector Plan.
2. The Wireless Communication Facilities Plan identifies the existing 150' and the proposed 195' monopole as "tall" monopoles. Under the guidelines for tower placement section of the Facility Plan, the proposed tower extension falls within the "Sensitive Area" category since it is proposed within 500' of a residence. However, the Plan takes a neutral position on tall monopoles located in rural/heavily wooded areas (see attached matrix). As previously stated, the tower will be setback approximately 207' from the nearest residential structure.

ESTIMATED TRAFFIC IMPACT: Not calculated.

ESTIMATED STUDENT YIELD: Not applicable.

MPC's approval or denial of this request is final, unless the action is appealed to the Knox County Board of Zoning Appeals. The date of the Knox County Board of Zoning Appeals hearing will depend on when the appeal application is filed. Appellants have 30 days to appeal an MPC decision in the County.

5. Meeting all applicable requirements of the Knox County Department of Engineering and Public Works.
6. Meeting all applicable requirements of the Knox County Zoning Ordinance.
7. Obtaining a setback variance from the Knox County Board of Zoning Appeals prior to development plan approval (215' to 207').

With the conditions noted above, this request meets all requirements for approval of a use on review.

#### **COMMENTS:**

This is a request for a 45' extension on an existing 50' monopole telecommunications tower to be located on a wooded, 15 acre tract located on the south side of Schaad Rd., approximately 0.5 miles northeast of Oak Ridge Highway. Access to the property is via Schaad Rd. The property is zoned A (Agricultural), and telecommunication towers are considered as a use on review in this district. According to the Knox County Zoning Ordinance as it relates to the modification of existing towers, it states that a tower may be modified or rebuilt to a taller height and not require an additional use-on-review as long as it does not exceed 30' over the tower's existing height (Art. 4 Sec. 4.92, 3). Since the applicant's are proposing to extend the tower 45', they are required to obtain an additional use on review.

The current proposal provides for a 207' setback between the existing tower and the nearest residence, which is located on the 15 acre tract. According to the setback requirements of the Knox County Zoning Ordinance, the tower must be setback from the nearest residence by 110% of the height of the tower which is 165' for a 150' tower and 215' for the 195' tower. Since the tower encroaches into the required setback, the applicant will be required to obtain a variance from the Knox County Board of Zoning Appeals prior to development plan approval. It should be noted that the impact on this residence will be minimal since this is an existing tower and the owner of the residence leased this area to U.S. Cellular/T-Mobile.

The visual impact on nearby residences will be minimal due to the fact that the site is heavily wooded and it has been in operation since 2003. The existing vegetation will provide a natural buffer between the tower and adjacent residences. The applicant will be required to reinstall a 6' high security fence and any landscaping that may be compromised during reconstruction. FAA does not require any lighting for the tower. The tower will support four telecommunications carrier antenna arrays. T-Mobile and U.S. Cellular will be the principal clients for the tower.

According to a statement submitted by the applicant, there are no other existing or acceptable structures within this area and that the proposed extension will improve cellular service in the area for both T-Mobile and U.S. Cellular customers (see attached letter from Lannie Greene).

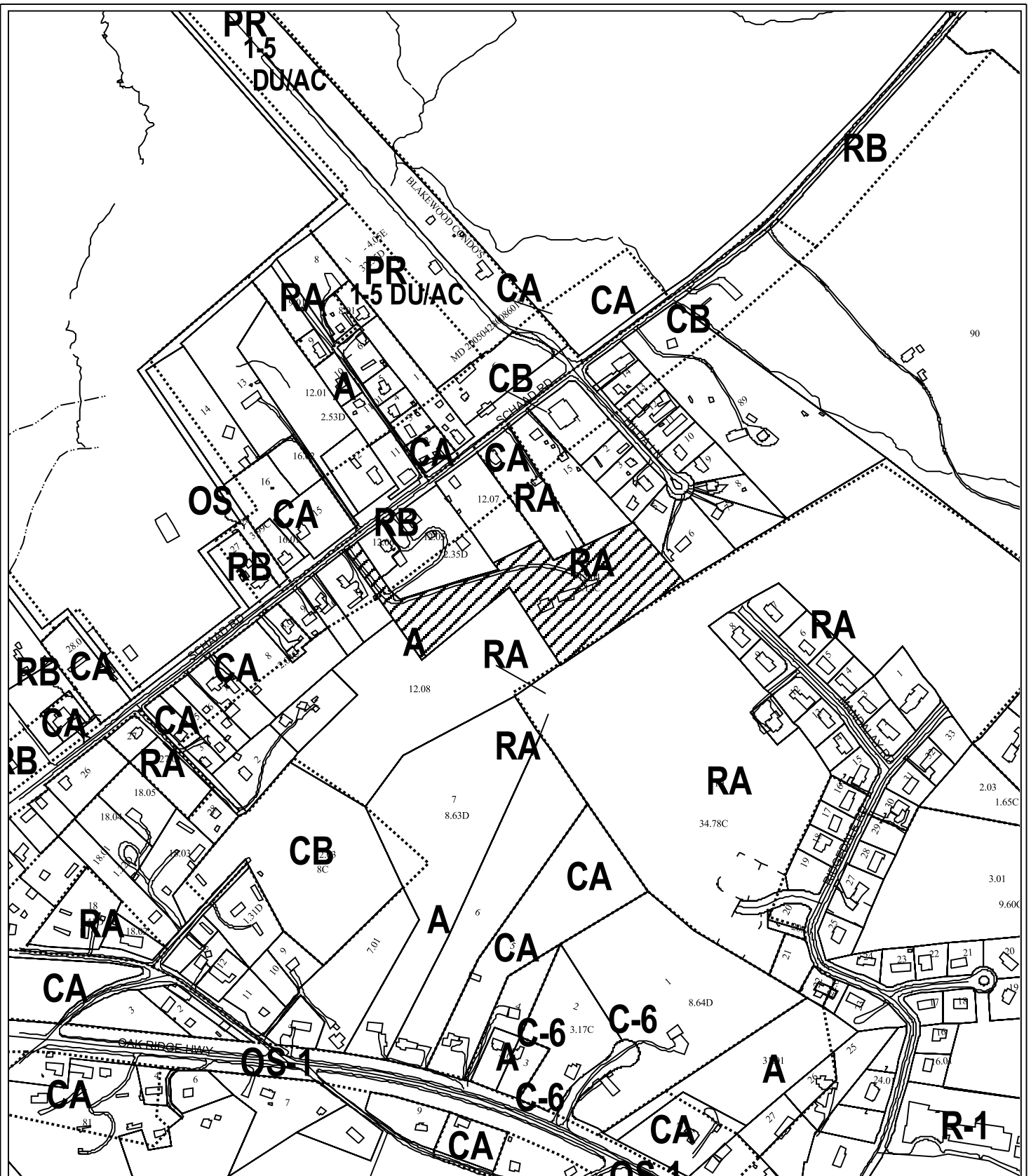
Attached to the staff report are several support documents, including a report from MPC's tower consultant, Mr. Larry E. Perry. Mr. Perry's report describes T-Mobile / U. S. Cellular Corporation's tower proposal and highlights his findings. Mr. Perry concludes that the 45' extension is technically justified by the materials submitted by the applicant (see attached report).

#### **EFFECT OF THE PROPOSAL ON THE SUBJECT PROPERTY, SURROUNDING PROPERTY AND THE COMMUNITY AS A WHOLE**

1. The proposed development will have minimal impact on local services since all utilities are in place to serve this development.
2. The tower, being located within a low density residential area, is required to be heavily screened. Since this 15 acre parcel is heavily wooded and provides a natural vegetative buffer between the existing lease area and nearby properties, the impact on nearby residences will be minimal. The impact on nearby properties will also be minimal since this is an existing telecommunication tower site and neighboring property owners are accustomed to a tower at this location.

#### **CONFORMITY OF THE PROPOSAL TO CRITERIA ESTABLISHED BY THE KNOXVILLE ZONING ORDINANCE**

1. With exception to the required setback variance, the proposed commercial telecommunications tower at this location meets the standards required in the A (Agricultural) zoning district.
2. The proposed commercial telecommunications tower is consistent with the general standards for uses permitted on review: The proposed development is consistent with the adopted plans and policies of the General Plan and Sector Plan. The use is in harmony with the general purpose and intent of the Zoning Ordinance. The use is compatible with the character of the neighborhood where it is proposed. Since this is a proposed extension on an existing tower, the use will not significantly injure the value of adjacent property. The use will not draw additional traffic through residential areas.



8-J-08-UR  
USE ON REVIEW



Telecommunication tower extension (150' to 195') in A (Agricultural)

Original Print Date: 07/21/08 Revised:  
Metropolitan Planning Commission \* City / County Building \* Knoxville, TN 37902

Petitioner: T-Mobile South / US Cellular

Map No: 79

Jurisdiction: County



# SITE DEVELOPMENT PLANS FOR T-MOBILE SOUTH, LLC

SITE #: 9KX0191A  
SITE NAME: MANDALY  
SITE ADDRESS: 13902 SCHADD RD  
KNOXVILLE, TENNESSEE 37914  
US CELLULAR SITE #: 223378

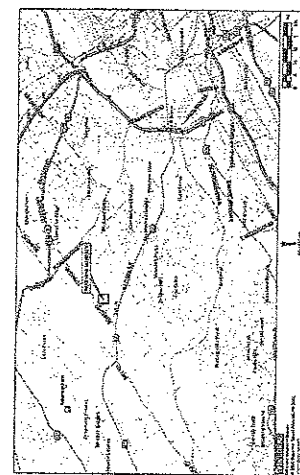
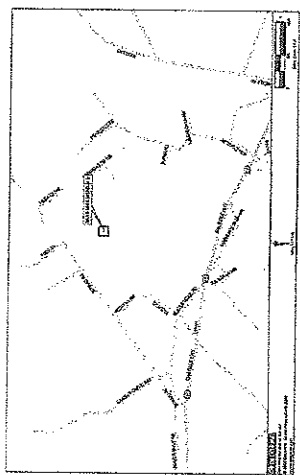
0796B012.04

**GENERAL NOTES:**

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE KNOX COUNTY REGULATIONS.
2. CONTRACTOR SHALL NOTIFY TENNESSEE ONE CALL/FAST J BUSINESS DAYS PRIOR TO START OF CONSTRUCTION TO VERIFY LOCATION OF ALL UTILITIES SHOWN OR NOT SHOWN.
3. ALL UTILITIES WITHIN ROADWAY SHALL BE BACKFILLED WITH STONE.
4. CONTRACTOR SHALL REPAIR AT HIS EXPENSE DAMAGE TO ANY EXISTING IMPROVEMENTS DURING CONSTRUCTION, SUCH AS, BUT NOT LIMITED TO, SIDEWALKS, PAVEMENT, STRIPPING, CURBS, ETC. REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL UNUSABLE MATERIALS FROM THE SITE.
6. CONTRACTOR SHALL COOPERATE WITH POWER COMPANY PROVIDING TEMPORARY SERVICE FOR CONSTRUCTION FACILITIES DURING CONSTRUCTION.
7. THE CONTRACTOR IS SPECIFICALLY CAUTIONED ABOUT THE LOCATION OF EXISTING UTILITIES SHOWN ON THIS DRAWING. THEY ARE BASED UPON RECORDS AND FIELD SURVEY COMPANIES, DEEDS, AND PLATS OF RECORD AND WHERE POSSIBLE, FIELD MEASUREMENTS. THIS INFORMATION IS NOT TO BE TAKEN EXACT OR COMPLETE.
8. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATION OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED IMPROVEMENTS.
9. THIS PROJECT WILL NOT REQUIRE WATER OR SEWER SERVICE.
10. CONTRACTOR SHALL REMOVE ANY DIRT OR MUD FROM TREES OF ANY CONSTRUCTION VEHICLES PRIOR TO LEAVING SITE.
11. REFER TO BUILDING/TOWER PLANS FOR PROPOSED DIMENSIONS AND OTHER SPECIFICS WHICH ARE NOT SHOWN.
12. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A PROPER TRAFFIC CONTROL PLAN FOR PUBLIC SAFETY ADJACENT TO CONSTRUCTION SITE. TRAFFIC CONTROL PLAN MUST BE IN ACCORDANCE WITH LATEST MUTCD EDITION.

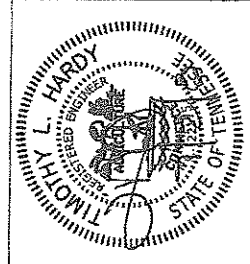
**Tennessee One Call System, Inc.**  
1-800-351-1111

**NOTICE TO CONTRACTORS**  
SHOULD ARTIFACTS ARCHAEOLOGICAL FEATURES OR HUMAN SKELETAL REMAINS BE ENCOUNTERED DURING PROJECT ACTIVITIES, STOP WORK IMMEDIATELY AND CONTACT THE T-MOBILE FIELD CONSTRUCTION MANAGER FOR INSTRUCTIONS.



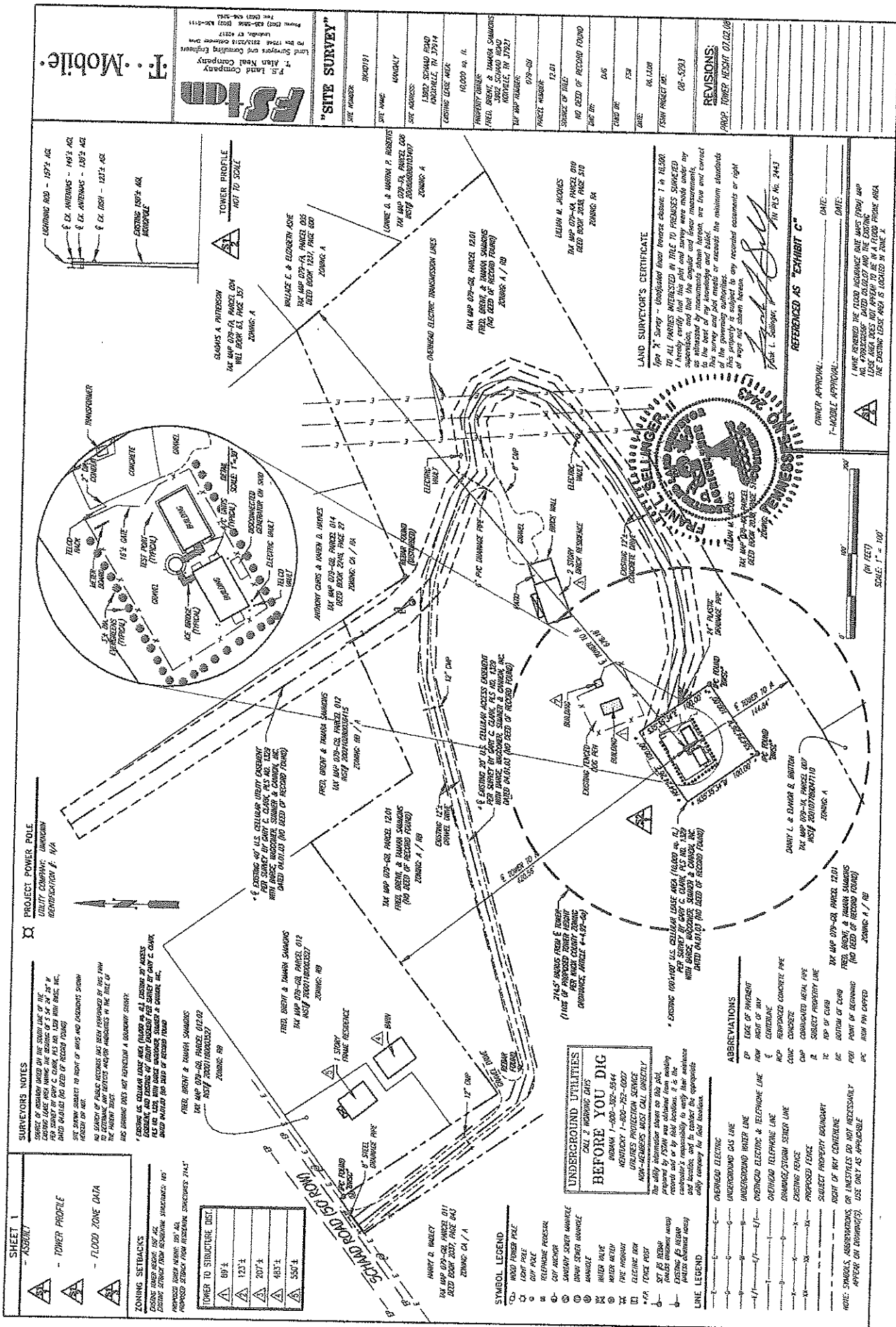
**DIRECTIONS:**  
FROM KNOXVILLE, GO I-40 EAST TO I-640 NORTH THE EXIT 1. GO LEFT FROM THE OFF RAMP ONTO WESTERN AVE FOR 4 MILES TO SCHADD RD AND TURN RIGHT. GO 0.5 MILES TO THE SITE ON THE RIGHT.

SIGNATURE AUTHORIZATIONS:	
RF ENGINEER APPROVAL:	DATE:
SIGNATURE _____	DATE: _____
CONSTRUCTION MANAGER APPROVAL:	DATE:
SIGNATURE _____	DATE: _____
SITE ACQUISITION AGENT APPROVAL:	DATE:
SIGNATURE _____	DATE: _____
LAND OWNER APPROVAL:	DATE:
SIGNATURE _____	DATE: _____
OPS APPROVAL:	DATE:
SIGNATURE _____	DATE: _____
ZONING/PERMITTING APPROVAL:	DATE:
SIGNATURE _____	DATE: _____



<b>TELEPHONE CO.:</b> BELLSOUTH PHONE: (800) 238-5507	<b>ELECTRIC CO.:</b> KNOXVILLE UTILITIES P.O. BOX 9507 KNOXVILLE, TN 37980-9017 CONTACT: CUSTOMER SERVICE PHONE: (865) 524-2811	<b>COORDINATES:</b> LATITUDE: 35° 59' 30.6" N LONGITUDE: 84° 02' 12.0" W GROUND ELEV: 1357 FT. AMSL	<b>PROPERTY ZONING:</b>	<b>REGISTERED PROFESSIONAL ENGINEER SEAL:</b>
<b>BUILDING PERMIT:</b> KNOX COUNTY	<b>LANDLORD INFO:</b> US CELLULAR 707 CONCORD RD KNOXVILLE, TN 37922 CONTACT: GERRY O'BRIEN PHONE: (773) 399-4283	<b>LESSEE:</b> <b>T-Mobile</b> T-MOBILE - NASHVILLE MARKET 3600 EZZEL ROAD, SUITE 815 NASHVILLE, TENNESSEE 37211 CONTACT: REAL ESTATE DEPARTMENT	<b>ENGINEER:</b> <b>HARDY ENGINEERING, INC.</b> 209 LINDEN STREET TRUSSVILLE, ALABAMA 35173 CONTACT: TIM HARDY PHONE: (205) 655-1427 MOBILE: (205) 222-7583	<b>INDEX:</b> T1 TITLE SHEET S1 SURVEY G1 COMPOUND LAYOUT C2 TOWER ELEVATION C3 ANTENNA & COAX GROUNDING DETAILS C3.1 COAX GROUNDING DETAIL C3.2 GROUND RISER DIAGRAM C4 EQUIPMENT ELEVATION C5 ELECTRICAL DETAILS C6 GROUNDING LAYOUT C7 ELECTRICAL LAYOUT C7.1 PANEL BOARD CALCULATIONS C8 EQUIPMENT & GENERATOR PAD DETAILS C9 WIRING DIAGRAM C10 UTILITY TRENCH DETAILS
<b>REV. DATE:</b> 1 7-02-08 1 7-02-08 1 7-02-08				

8-5-08-UR



**T-Mobile**  
F.S. Land Company  
Land Surveyors & Engineers Inc.  
1000 S. Main St.  
Franklin, TN 37068  
Phone: (615) 445-5555  
Fax: (615) 445-5555

**"SITE SURVEY"**  
SHEET NUMBER: 910701  
SHEET NAME: TOWER  
SITE ADDRESS: 1300 S. MAIN ST. AND HAVEN RD. BLDG. 200  
CITY: FRANKLIN, TN 37068  
COUNTY: DEKALB  
PROPERTY OWNER: T-MOBILE  
PROJECT NUMBER: 07-01-01  
DATE: 08-29-07  
BY: [Signature]

**LAND SURVEYOR'S CERTIFICATE**  
I, the undersigned, being a duly qualified and licensed Land Surveyor in the State of Tennessee, do hereby certify that the foregoing is a true and correct copy of the original survey and plat on file in my office, and that the same is a true and correct copy of the original survey and plat on file in my office, and that the same is a true and correct copy of the original survey and plat on file in my office.

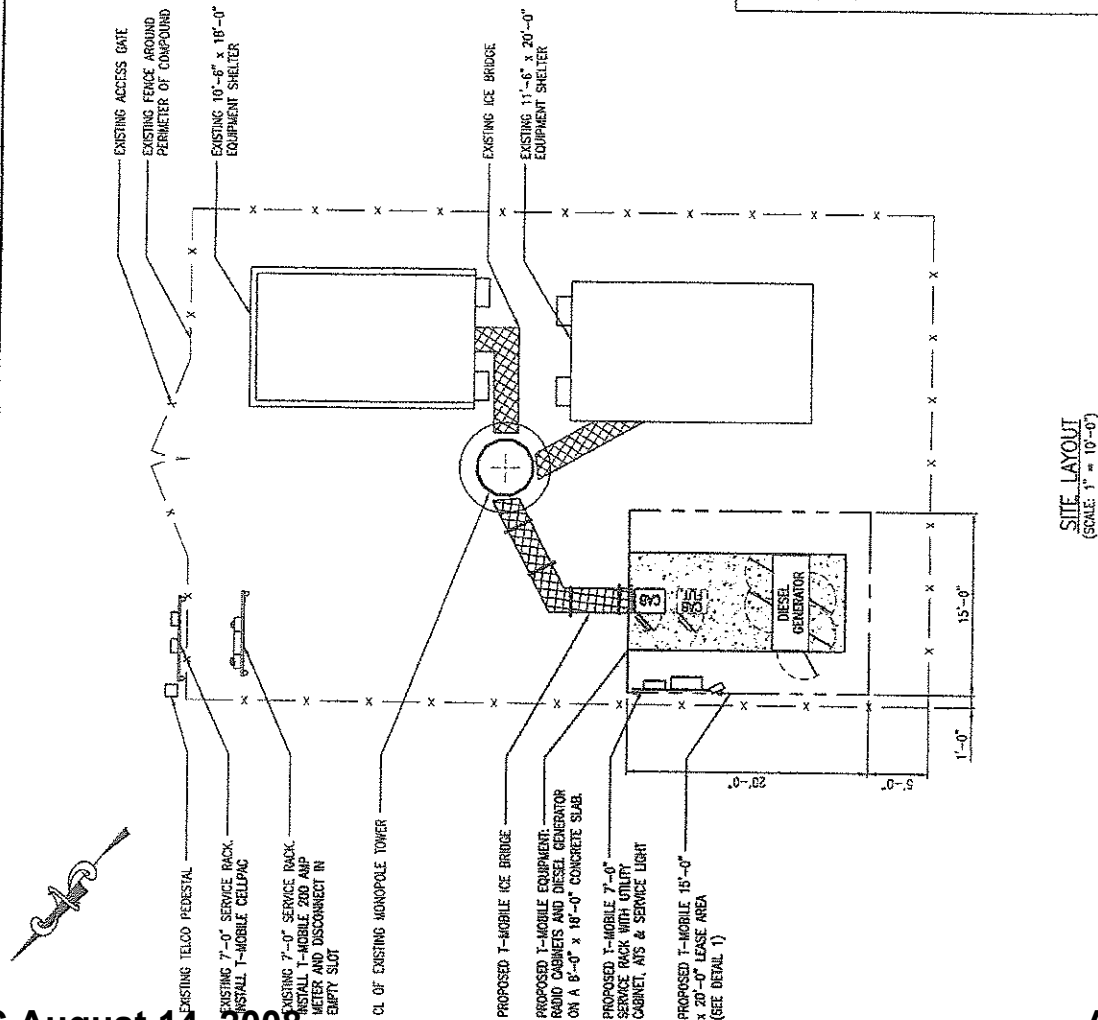
**REVISIONS:**  
DATE: 08-29-07  
BY: [Signature]

**OWNER APPROVAL:**  
DATE: \_\_\_\_\_  
BY: [Signature]

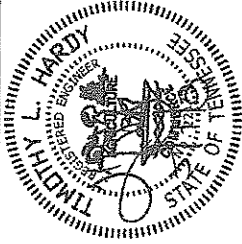
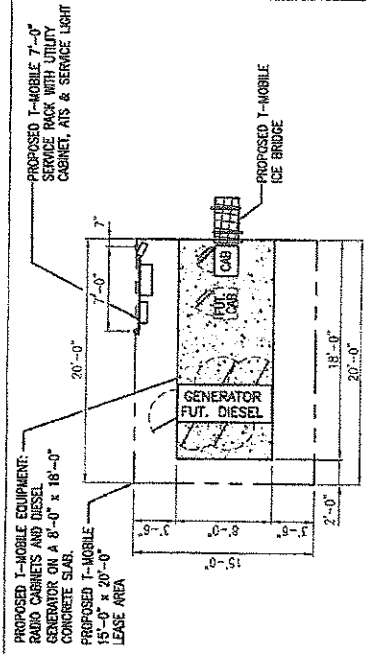
**SCALE: 1" = 100'**

**NOTES:**

- BOUNDARY AND EXISTING SITE FEATURES ARE BASED ON THE SURVEY. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THIS DRAWING.
- CONTRACTOR SHALL FURNISH ALL MATERIALS FOR 200 AMP SERVICE.
- GROUNDING OF ANTENNAS, MOUNTS, COAX, AND EQUIPMENT SHALL BE IN ACCORDANCE WITH T-MOBILE'S SPECIFICATIONS. COAX SHALL BE GROUNDED JUST BELOW ANTENNAS, AT MID-ELEVATION, AND AT BOTTOM OF TOWER.
- SITE TO BE RESTORED BACK TO LESSOR'S ORIGINAL SPECS.
- ANY MATERIALS STORED ON SITE SHALL BE STORED IN CLOSED OR COVERED CONTAINERS AND ALL EXCESS WASTE MATERIALS WILL BE PROPERLY DISPOSED OF DAILY AND ALL SOILS REMOVED FROM SITE.



**SITE LAYOUT**  
(SCALE: 1" = 10'-0")



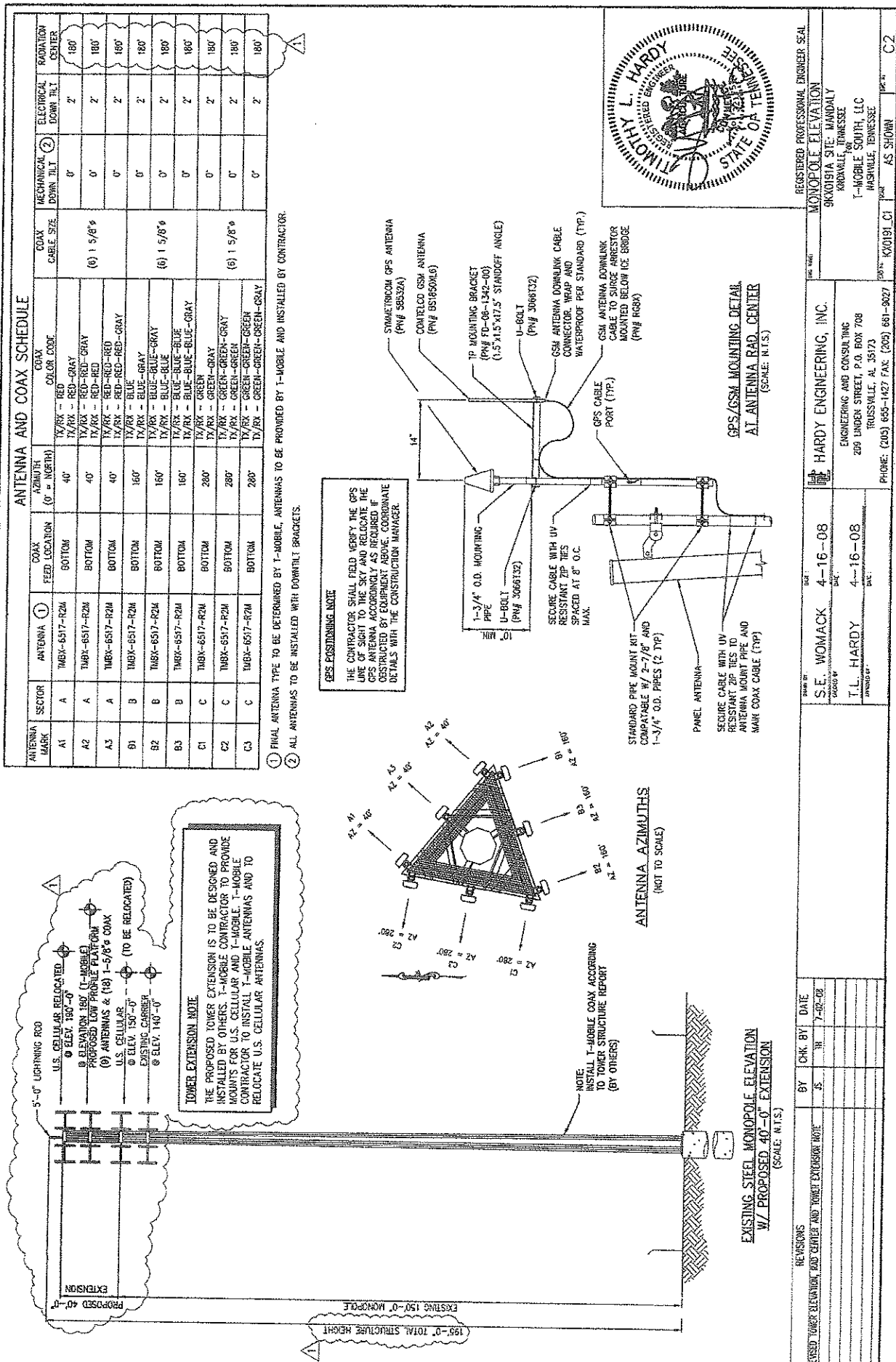
REGISTERED PROFESSIONAL ENGINEER SEAL  
**TIMOTHY L. HARDY**  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF TENNESSEE

PROJECT: KX0191A\_C1  
 DRAWING: KX0191A\_C1

**HARDY ENGINEERING, INC.**  
 ENGINEERING AND CONSULTING  
 209 LINDEN STREET, P.O. BOX 708  
 TRUSSVILLE, AL 35173  
 PHONE: (205) 655-1427 FAX: (205) 651-9927

DATE: 4-16-08  
 DRAWN BY: S.E. WOMACK  
 CHECKED BY: I.L. HARDY  
 PROJECT NO: 4-16-08

NO.	REVISIONS	BY	CHK. BY	DATE



NO.	REVISIONS	BY	CHK. BY	DATE
1	REVISED TOWER ELEVATION, RAD. CENTER AND TOWER EXTENSION NOTE	J.S.	W.H.	7-20-08

**DESIGNED BY:** S.E. WOMACK  
**DATE:** 4-16-08  
**SCALE:** N.T.S.  
**PROJECT:** T-MOBILE SOUTH, LLC  
**LOCATION:** KNOXVILLE, TENNESSEE  
**PHONE:** (205) 655-1427 FAX: (205) 681-9027  
**PROJECT NO.:** KX0191.C1  
**SCALE:** AS SHOWN  
**DATE:** 4-16-08  
**SCALE:** N.T.S.





July 7, 2008

Knoxville-Knox County  
Metropolitan Planning Commission  
400 Main Street, Suite 403  
City County Building  
Knoxville, TN 37902

RE: Proposed 45' Monopole Tower Extension @ 3902 Schaad Road  
(Tax Map 079 Parcel ~~12.01~~ 12.04)

EB 0796B-012.04

Dear Honorable Commission Members:

On behalf of T-Mobile and US Cellular, I respectfully submit this application for a Use on Review application to extend an existing 150 foot monopole tower to 195 feet. The structure will be extended forty feet and there will be a five foot lightening rod that will bring the overall height to 195 feet.

T-Mobile is building a new wireless network for the metropolitan Knoxville area. This new network will provide a new choice for wireless users in the Knoxville area and in northeast Tennessee. T-Mobile has already co-located or in the process of co-locating on several sites in Knox County and the City of Knoxville. In some cases T-Mobile has gone through the added expense of making significant modifications to make existing structures work. By approving this application a new T-Mobile wireless facility will not be needed in this area of Knox County.

The proposed extension will allow T-Mobile to co-locate and US Cellular to improve its existing coverage. The Knox County Standards for Telecommunications Facilities allows an extension of thirty feet with only an administrative review, however, in order to meet the coverage requirements a total of forty five is needed. Currently the existing monopole has a rad center of a 130 feet available for T-Mobile.

One hundred and thirty feet will not provide the coverage needed by T-Mobile and its customers. T-Mobile requires a rad center of 180 feet. US Cellular will add antennas to the 190 foot rad center to improve its coverage in this area of Knox County. Included with this application are coverage maps which show T-Mobile's before and after coverage with a rad center of 130 feet and a rad center at 180 feet. Additionally I have included with this application, the design certified by a Professional Engineer for the extension. The extension will not require lighting since it is still below 200 feet.

With the extension the tower setback is required to be 209 feet from a dwelling unit. The tower currently is setback 207 feet from a dwelling unit located northeast of the existing facility. Therefore a setback reduction of two feet is required.

With the exception of being within 207 feet of a dwelling unit, the proposed site meets the intent of the Knox County Ordinance and will meet all local, state, and federal requirements in its design, construction, and operation.

I submit the following Pursuant to the Facilities Plan adopted by the Metropolitan Planning Commission in 2002:

- (1) View Protection – The tower extension is proposed to be at a maximum height of 195' and will be a monopole design and will therefore have a minimal impact on surrounding properties. Due to the proposed height of 195' there will be no lighting on the structure.
- (2) Land Use Compatibility - The subject property is zoned A, Agricultural Zone, which allows for more intense uses than this proposed facility. This facility will be unmanned and will have no substantial increase of noise, air pollution, or traffic. Furthermore the proposed facility will not burden any county services.

Adjacent and surrounding properties are zoned A Agricultural Zone, RA, Low Density Residential Zone and CB, Business and Manufacturing. The existing facility is within a Sensitive Area and is discouraged because it is within 500 feet of a residence, however, this is an existing facility and T-Mobile can co-locate with the approval of the extension which is encouraged.

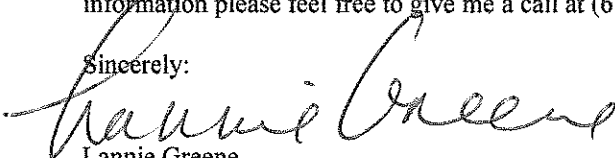
- (3) Design Compatibility –The facility design is a monopole tower and will not impact the existing uses of surrounding properties. These properties could be developed with more intense uses than this proposal. The existing structure is considered a Tall Monopole according to the Land Use/Wireless Facilities; the extension will not change this status. Monopoles are often considered the least obtrusive type of structure.

Included with this application package are the following items:

10 sets of site plans  
Coverage maps depicting before and after the proposed co-location

I appreciate your time in reviewing this application. If you require additional documentation or information please feel free to give me a call at (678) 920 – 1262.

Sincerely:



Lannie Greene  
Mitrix, Inc. for T-Mobile South

# WALKER ENGINEERING, INC.

8451 DUNWOODY PLACE  
NORTHRIDGE 400, BLDG. 8  
DUNWOODY, GA 30350

(770) 641-7306 FAX (770) 587-2196

CIVIL • STRUCTURAL

N 33° 59' 13.6" W 84° 20' 26.8"

Mr. Hamlet Hope  
Mittrix, Inc.  
3800 Ezell Rd., Suite 815  
Nashville, TN 37211

07/03/08  
Site ID: 9KX0191A  
Site: Mandalay

Sub: Structural Analysis of 190<sup>1</sup>-ft Sabre Monopole  
13902 Schadd Rd. Knoxville, TN 37914

Dear Mr. Hope:

Walker Engineering has performed a Level-Two finite element, P-Δ structural analysis of the above subject monopole in accordance with your Authorization for Services for the addition of the *T-Mobile* proposed antennas outlined below. This analysis consists of determining the forces on the monopole caused by the existing, proposed, and reserved loads. The existing, proposed, and reserved loads were provided by your office.

The subject monopole is a 150-foot, three-section, eighteen sided, tapered monopole, designed and manufactured by Sabre Communications, Inc. in 2003. The monopole manufacturer's drawing No.: 04-08200 Rev. A, dated 10/07/03, was provided by your office. The monopole geometry, section sizes, and foundation design loads were obtained from these data and are assumed to be accurate. The monopole has also been assumed to be in good condition and capable of supporting its full original design capacity.

*This analysis is based on reinforcing and extending the existing monopole to an elevation of 190-ft AGL, per Walker Engineering Inc. Job No.: 0806-0327Ext, Drawing No's.: S1 to S5, dated 07/03/08. If the monopole extension and reinforcing is not installed as designed, then this analysis is void and Walker Engineering should be contacted for resolution of any issues.*

Our analysis was performed in accordance with TIA/EIA-222-F for a 70 mph<sup>2</sup> base windload, and ASCE-7 windload with 3/4" radial ice, as specified by Mittrix, Inc.

<sup>1</sup> The original monopole design height is 150-ft. This structural analysis is based on an extension of the monopole to an elevation of 190-ft.

**Scope of Work:**

- 1 Reinforce the existing monopole base connection per Walker Engineering Job No.: 0806-0327Ext drawings S-1 to S-5 dated 07/03/08.
- 2 Extend the existing monopole per Walker Engineering Job No.: 0806-0327Ext drawings S-1 to S-5 dated 07/03/08.
- 3 Contractor shall verify overall condition and all dimensions of the monopole prior to fabrication.
- 4 Contractor to provide all labor and materials necessary to reinforce monopole.
- 5 All work shall be in accordance with federal, state and local requirements, including OSHA.

**Existing, reserved, and proposed loads include the following:**

- at 190 ft US Cellular: Three Panel Antennas on three T-Arm mounts, fed by three 1-5/8"Ø coax cables.
- at 180 ft ***T-Mobile (Proposed):*** Nine Andrew TMBX-6516-R2M panel antennas with six TMA's on three T-Arm mounts, fed by eighteen 1-5/8"Ø coax cables.
- at 134 ft Existing: Three Panel Antennas with six TMA's on three T-Arm mounts, fed by six 1-5/8"Ø coax cables.
- at 124 ft Existing: One 2-ft MW dish antenna on a dish mount, fed by one 1-5/8"Ø coax cable.

**Note:** This analysis *is based on* the existing, reserved, and proposed coax cables installed on the monopole per the *Cable Plan Drawing Sheet S-1, Walker Engineering analysis Job No. 0806-0327Ext, dated 07/03/08. Please notify the undersigned prior to altering the cable routing configuration or if the coax configuration is different than the above assumptions.* Placement of small cables for beacons, ground rods, etc. are not critical.

**Monopole Summary:**

This analysis shows that the stresses in the subject monopole are less than or equal to the allowable stresses with the existing, reserved, and proposed loads. Therefore; the analysis results show that the subject monopole *is in*

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<sup>2</sup> The minimum windspeed specified by EIA-222-F for Knox County, TN is 70 mph.

**conformance** with the requirements of the relevant standards for the existing, reserved, and proposed loading.

A copy of the analysis is enclosed. A summary of the controlling load cases is provided below:

<u>Monopole Section</u>	<u>Elevation</u>	<u>CSI<sup>3</sup></u>
Section 4 (Extension)	149 ft to 190 ft	0.74
Section 3 (Top)	96 ft to 149 ft	0.49
Section 2	47 ft to 96 ft	0.51
Section 1 (Bottom)	0 ft to 47 ft	0.49

#### Monopole Base Connection Summary:

This analysis shows that the monopole base plate is overstressed under existing and proposed loads without modification. Walker Engineering, Inc. has performed a **reinforcement design** for the base plate and is attached as Walker Job No.: 0806-0327Ext, Dwg. No.: S-1 to S-5, dated 07/03/08. After the monopole has been reinforced, the subject monopole is capable of supporting the existing, reserved, and proposed loads.

Base Plate	Bending Stress	0.98 <i>Reinf</i>
Anchor Bolts	Tension	0.74

#### Foundation Summary:

The existing + proposed foundation reactions at the base of the monopole are greater than the original foundation design loads. Walker Engineering, Inc. has performed an existing foundation evaluation according to the original foundation design drawings by Sabre Drawing No.: 04-08200, dated 10/07/03 and the Geotechnical Site Soils report by Terracon project No.: 18037311, dated 08/14/03. The results indicated that the existing monopole foundation *is considered adequate* to support the existing, reserved, and proposed loads.

As future loads are installed, the monopole should be re-evaluated on a case-by-case basis.

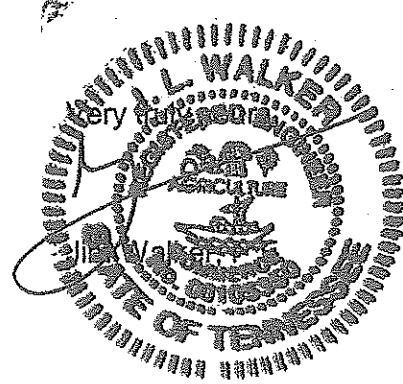
The analysis is based, in part, on the information provided to this office by Mittrix, Inc. If the existing conditions are different than the information in this report, Walker Engineering Inc. should be contacted for resolution of any issues.

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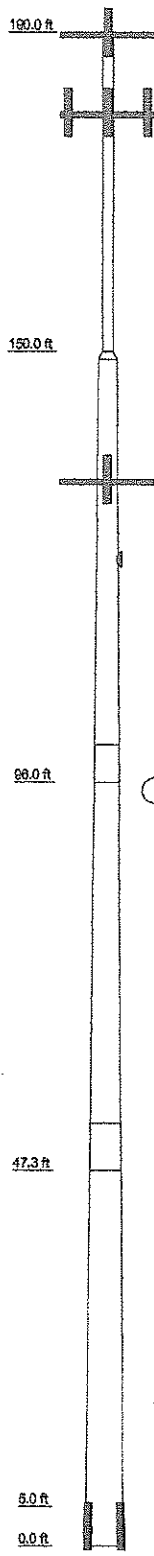
<sup>3</sup> "Combined Stress Index" Ratio of calculated loads verses total allowable loads; should be less than, or equal to, 1.05.

Walker Engineering Inc. appreciates the opportunity to be of service in this matter. Please do not hesitate to give me a call if you have any questions or comments.

*encl*



Section Length (ft)	1	2	3	4	5
Number of Sides	40.00	1.00	69.00	59.50	69.25
Thickness (in)	0.3750	0.3750	0.2500	0.3125	0.3750
Lap Splice (ft)	16.0000	16.0000	27.1300	36.3983	45.0629
Top Dia (in)	16.0000	16.0000	27.1300	36.3983	45.0629
Bot Dia (in)	16.0000	16.0000	27.1300	36.3983	45.0629
Grade	A500-42	A500-42	A500-42	A572-65	A572-65
Reinf Length (ft)					
Reinf Size					
Reinf Grade					
Clamp Size					
Clamp Grade					
Weight (K)	2.5	4.1	4.6	7.5	10.3



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
Panel Antenna (US Cellular)	190	(2) Proposed - TMA's (T-Mobile)	180
Panel Antenna (US Cellular)	190	(2) Proposed - TMA's (T-Mobile)	180
Panel Antenna (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Panel Antenna (Existing)	134
(3) Proposed - Andrew TMBX-8516-R2M panel antennas (T-Mobile)	180	Panel Antenna (Existing)	134
(3) Proposed - Andrew TMBX-8516-R2M panel antennas (T-Mobile)	180	(2) TMA's (Existing)	134
(3) Proposed - Andrew TMBX-8516-R2M panel antennas (T-Mobile)	180	(2) TMA's (Existing)	134
(3) Proposed - Andrew TMBX-8516-R2M panel antennas (T-Mobile)	180	(2) TMA's (Existing)	134
(2) Proposed - TMA's (T-Mobile)	180	T-Arm (Existing)	134
		T-Arm (Existing)	134
		T-Arm (Existing)	134
		2-ft MW Dish (Existing)	124

**SYMBOL LIST**

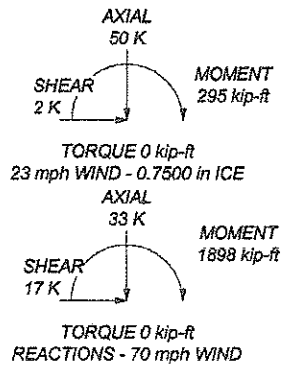
MARK	SIZE	MARK	SIZE
A	SR 1.75" Williams 6-Rod	D	12x1/2
B	A722-98 (Gr 150)	E	A572-50
C	8x1/2		

**MATERIAL STRENGTH**

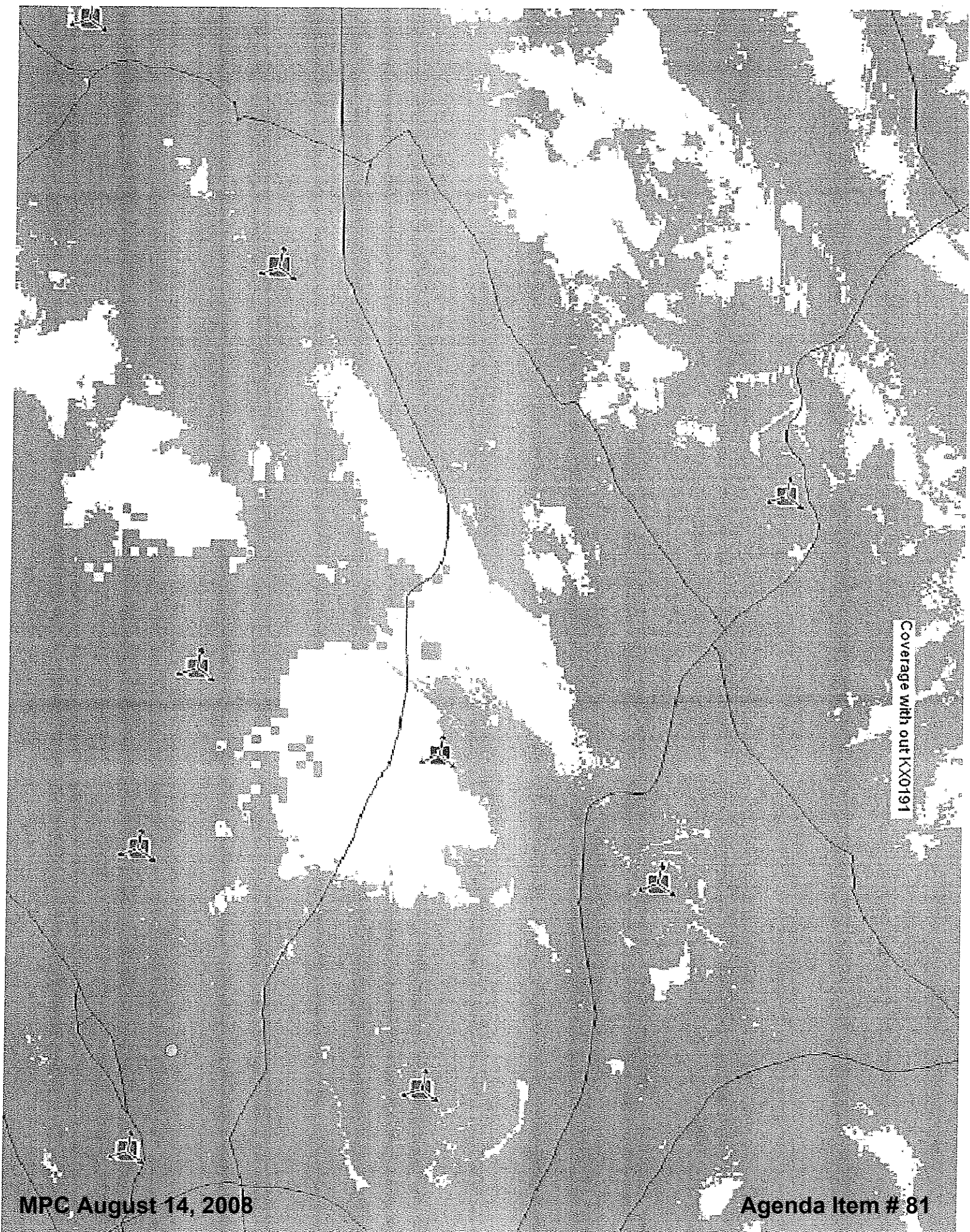
GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A722-98 (Gr 150)	90 ksi	150 ksi
A572-65	65 ksi	80 ksi	A572-50	50 ksi	65 ksi

**TOWER DESIGN NOTES**

1. Tower is located in Knox County, Tennessee.
2. Tower designed for a 70 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 23 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. Design of pole reinforcing is proprietary to Walker Engineering.

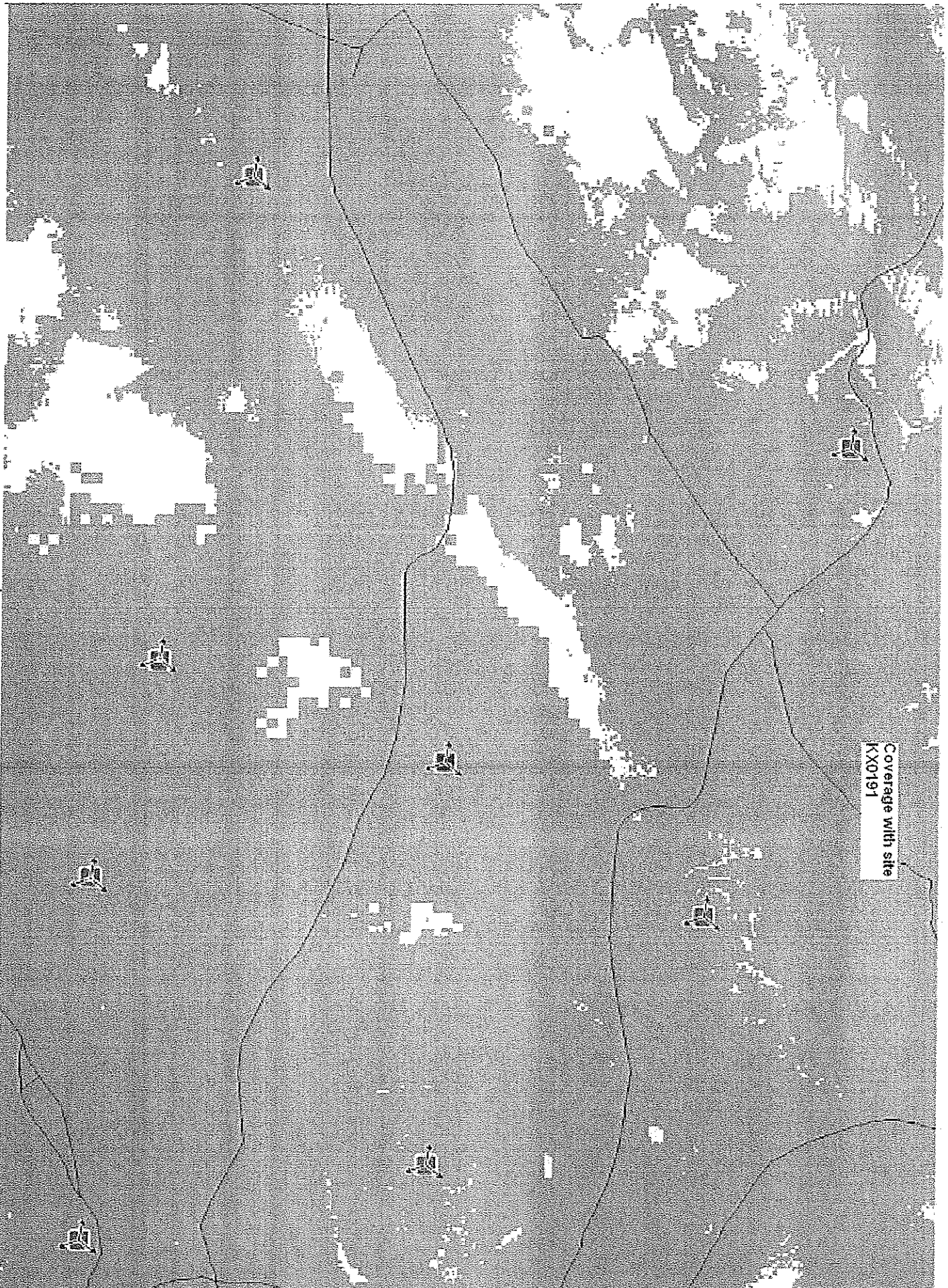


<p><b>Walker Engineering</b> 8451 Dunwoody Place, Bldg 8 Sandy Springs, Georgia Phone: (770)-641-7306 FAX: (770)-587-2196</p>	Job: <b>Mitrix279Ext 0806-327Ext</b>		
	Project: <b>Mandalay; 9KX0191A</b>		
	Client: Mitrix	Drawn by: cmm	App'd:
	Coda: TIA/EIA-222-F	Date: 07/03/08	Scale: NTS
Path:	Dwg No. E-1		

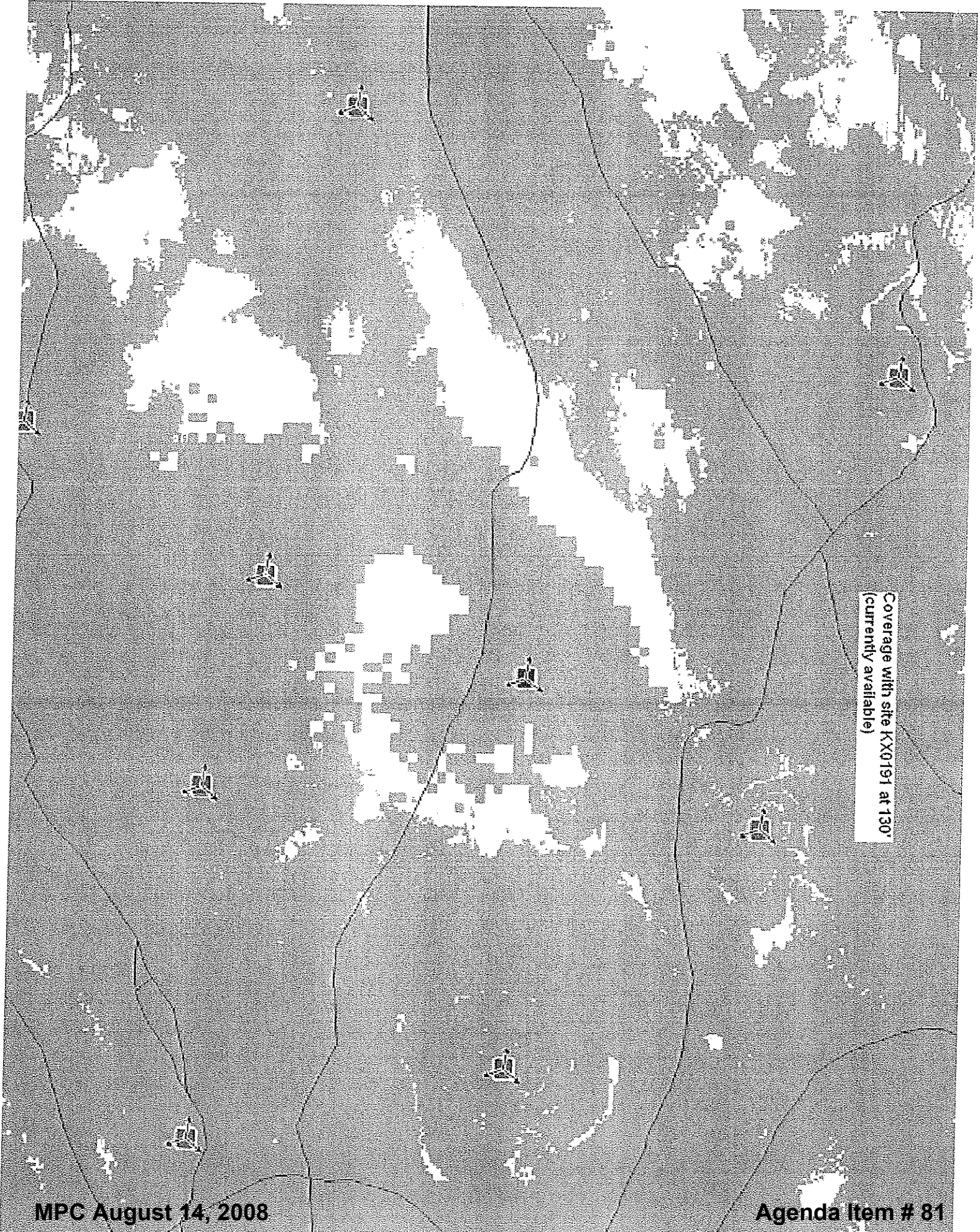


Coverage with out KXX0191





Coverage with site  
KX0191



Coverage with site KX0191 at 130'  
(currently available)

**EXHIBIT 7.  
LAND USE/WIRELESS FACILITIES MATRIX**

	Co-Location	Stealth Structure	Low Monopole Below 90'	Moderate Monopole 90'-150'	Tall Monopole 150'-199'	Lattice Tower	Guyed Tower
<b>Opportunity Areas</b>							
Industrial/Business Park							
Industrial Use							
Pre-approved Government-owned Property							
Urban Expressway Corridor							
Rural/Heavily Wooded							
Pasture							
Central Business District							
Office/Commercial Corridor							
Shopping Center							
<b>Sensitive Areas</b>							
Within 500' of a residence							
Rural Residential							
Non-residential Properties in a Residential Area (church, cemetery, library, etc.)							
Multi-family Residential							
On Hill Below Ridgeline							
<b>Avoidance Areas</b>							
Conservation Open Space							
Scenic Highway							
Public Park							
Ridge Top/Ridge Line							
Scenic Vista							
Historic District/Site							
Single-family Residential							
Vacant Residential Lot							

Encouraged       Neutral       Discouraged

8-J-08-UR

7/29/08

**T MOBILE**

**Telecommunications Tower Site Modification Review**

**USE ON REVIEW APPLICATION # 08-J-08-UR**

**CONSULTANT'S SUMMARY**

**Mandaly Site**

**Knox County**

**Location:** 13902 Shaad Road (North West Knox County)

**Proposed Tower Height:** 195 foot Monopole overall after 45 foot modification requested herein

**Address:** 13902 Shaad Road  
Knoxville, Tennessee

**District:** # 6th County **Tax ID:** 079GB01204

**Use:** Telecommunications antenna support structure

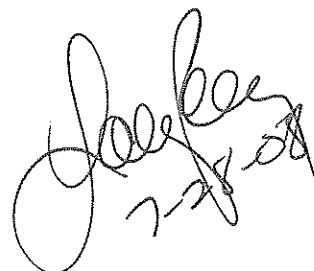
**Zoning:** A (Agricultural/Urban Growth)

**Variances and waivers:** A variance of 7 feet is required for this extension modification from the nearest residence.

**Need:** The applicant is T Mobile, a licensed PCS carrier by the Federal Communications Commission and possibly other users.

**Instant Proposal:** Construct a 45 foot extension to a preexisting monopole type support structure.

**Consultant's Recommendation:** The site and application meets the technical of the FCC, the requirements of the Ordinance and the spirit of the Facilities Plan. It is better to extend a preexisting structure than to add a new tower in the same vicinity.



Handwritten signature of Jacobus, dated 7-28-08.

**REPORT TO  
METROPOLITAN PLANNING COMMISSION**

for

Proposed Telecommunications Tower Site Extension  
Located at 13902 Shaad Road  
Knoxville, TN known as

**MANDALY SITE**

**T-MOBILE**

**UOR 8-J-08-UR**

**COMPLIANCE WITH**

**THE MPC TELECOMMUNICATIONS FACILITY ORDINANCE  
07/29/2008**

The proposed site for the applicant is an extension of an existing US Cellular monopole on Shaad Road. The supporting material from applicant has been reviewed for technical and Federal/State legal compliance As well as with the Knox County Wireless Communication Facilities Plan from 2002. This is an extension request of a previously approved tower site for the benefit of T Mobile in lieu of requesting a new tower.

**REQUESTED**

1. **Location.** The location is within the **County** of Knox limits in **District 6** and is located on **Tax Identification # 079GB01204**.

2. **Zoning.** A (Agricultural/Urban Growth)

3. **Tower height.** The requested height extension is 195 feet above ground level will support up to 2 additional telecommunications carrier antennas for a total of 4 users. Lighting will not be required on this structure.

4. **Variances.** The set back requirements in Article 4 of the Ordinance for Knox County for "A" sites are slightly short with the instant proposal. Section 4.92.02(2)(a) of the Knox County Zoning Ordinance requires a proposed tower to be more than 110% of the tower height (214 feet in this case) from a residential home. In the instant case the extension brings the tower site to within 207 feet of the nearest dwelling and thus a variance of 7 feet is required to meet the ordinance. The use of the land at this proposed site is permitted under section 5-5.22.03S.

5. **Site.** This application is for the construction of an extension of a preexisting 150 foot monopole type antenna support structure to located just off Shaad Road in Northwest Knox County.

6. **Use.** This antenna support structure will be used for telecommunications with the present state of the art communications technology using PCS and cellular communication sources. The applicant is T- Mobile Communications and there are 2 possible additional telecommunications users for the facility.

7. **Setbacks.** The setback requirements are that the facility must be 110% height of the tower from any dwelling unit or 214 feet in this case. (Art. 4 Section 4.92.02(2)(a). With the extension, the nearest residential house is 207 feet from the base of the structure and thus a variance is required for the additional 7 feet of setback.

8. **Height.** The proposed structure is for 195 feet.

## **EVALUATION**

The following is a list of items reviewed:

Zoning Ordinance for Knoxville Tennessee by Metropolitan Planning Commission---Telecommunication Facilities Section (as amended thru October 1, 2004)

Knox County Wireless Communications Facilities Plan dated 2002.

Check for other existing towers capable of supporting the load and elevation clearance requested by the applicant herein and within 1 mile radius of site.

Check for Antenna Support Structure stress analysis for co-location users' equipment support

Review support structure drawings and specifications with applicant

Review FAA lighting and marking requirements and proposals

Review FCC requirements regarding signal coverage, towers and lighting

Review applicant's justification for site in compliance with the FCC's requirements for telecommunication company providers compliance with required coverage for the use of the general public.

Review Site plan by applicant

Check Zoning

Check setbacks for building and antenna support structure

Check for compliance with Wireless Communication Facility Plan

Check proximity to other structures and district boundaries

Check nature of surrounding land uses

Check surrounding foliage and tree coverage

Check design of tower for esthetic changes

Check height requirements necessary for coverage

Check separation from other towers

Check frequencies proposed for possible interference to TV and radio reception in the immediate vicinity of the structure.

Check engineering analysis of existing structure to check integrity of structure.

## **DISCUSSION**

I visited the proposed tower site that is a part of this review and discussed the area with the applicant.

The request is for a 45 foot extension of a US Cellular tower for a total height above the ground of 195 feet of which US Cellular will use the top 25 feet and the additional usable lower 20 feet is for the use of T Mobile. US Cellular is relocating their antennas from 150 feet to 190 feet.

The proposed structure should not affect adjacent property as it is very wooded and does not constitute a safety hazard.

The proposed extensions a preferred way of allowing a new carrier, T Mobile, in to the area without the necessity of constructing a new tower in the same vicinity.

## **DISCUSSION RE FACILITIES PLAN**

*The Facilities plan is a guideline adopted by the MPC in 2002 for the placement and appearance of wireless communications facilities. The*

*following discussion is based on this application and how it relates to the Plan. The plan is an advisory plan and not a legal requirement.*

(1) **View Protection**--The structure (195 feet) coupled with no lighting requirements and located in a fairly isolated wooded area should present no problems as to view.

(2) **Land Use Compatibility**---The site is on a slightly wooded parcel of land on a ridge in North West Knox county. The structure and associated building/facilities would be compatible with the local land use and the surrounding area is wooded. The site will be unmanned and will have no impact on noise, traffic or air pollution. Adjacent land zoning is RA (low Density Residential) and the site is in a Sensitive Area with the existing tower within 500 feet of a residence. However, this issue was addressed in the original application several years ago for US Cellular who built the tower.

(3) **Design Compatibility**---The proposed landscaping and facility design would blend in with surrounding agricultural land usage and design. The modified structure will be a monopole type structure which are the least obtrusive type antenna support structures.

(A) **Opportunity Areas**---This proposed site is in an area zoned Agricultural/Urban Growth and is wooded and meets the requirements of an opportunity area although in a sensitive area due to the location of a residence in the area. It is unlikely to become a blighting influence on the surrounding area.

(B) **Sensitive Areas**---This site is in a sensitive area as it is isolated and surrounded by woods but is within 500 feet of a residence. However, this is a preexisting facility and will have no additional impact.

(C) **Avoidance Areas**---This location is not in an avoidance area.

## **SUMMARY**

(1) The proposed modified antenna support structure is a 195 foot monopole including antennas. There are no lighting requests for this structure nor are any required by the FAA.

(2) A review of the structure stress analysis on the proposed structure and specifications support the use of the monopole by two other potential users.

(3) The structure design meets or exceeds FCC and EIA requirements.

(4) The area surrounding the site is wooded and zoned Agricultural.

(5) There is no general use technology (such as satellite communications) that is available at the present time nor in the immediate future that would negate the need for the structure. However, should such a technology become available and the structure of no further use, the Ordinance at Article 4.92.03 requires it to be removed.



(6) The proposed equipment housing facility is an outdoor cabinet and will have no impact on the aesthetics of the adjacent land uses. The landscape plan indicates that the fenced area will be surrounded by wooded vegetation that is presently existing.

(7) The applicant has received authorization from the various governmental agencies, including the Federal Communications Commission, to provide communication service to the citizens of Knoxville, Tennessee.

(8) There are no other antenna support structures within 1 mile of the proposed site that are usable for the coverage required.

(9) There is an additional setback requirement for the modification site, but that is only 7 feet and should be granted as a variance waiver.

(10) The proposed site and structure will have no environmental impact within the federal guidelines.

(11) A variance to the Knox County Ordinance is required for this site for 7 feet from the distance to the nearest residential home.

(12) The nature of the development in the surrounding area is not such as to pose a potential hazard to the proposed tower or to create an undesirable environment for the proposed structure. However, the access road as proposed could pose possible safety issues for the construction of the site and possible access by emergency personnel should that be necessary.

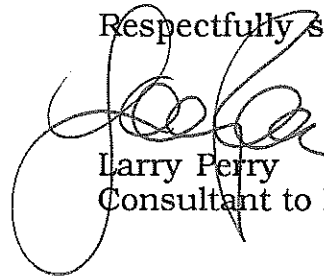
(13) Assuming that there are 4 carriers operating cellular or PCS transmitters/receivers at this site and all are operating at the same time, the radiation produced by the combination of all the users at the same time using the standards and protocols proposed and used by the carriers today, will be considerably below that established by the Federal Communications Commission and the EPA as creating any danger to humans or animals.

(14) There is a need for the structure in this area to provide for the wide spectrum wireless internet service and for other wireless voice and data services to be provided under government regulation by the various proposed carriers who plan to use the site.

**RECOMMENDATION**

In light of the analysis and review of documents, it is my professional opinion that the applicant meets all the technical and federal requirements and the Ordinance and the spirit of the Facilities Plan as discussed above and is required for the applicant to meet their coverage requirements for the County of Knox.

Respectfully submitted,



Larry Perry  
Consultant to MPC