

**VILLAGE OF DOWNERS GROVE**  
**REPORT FOR THE VILLAGE COUNCIL WORKSHOP**  
**NOVEMBER 24, 2009 AGENDA**

| SUBJECT:  | TYPE:  | SUBMITTED BY:  |
|---|--|--|
| Special Use for a Telecommunications Tower at Downers Grove South High School | Resolution<br>✓ Ordinance<br>Motion<br>Discussion Only | Tom Dabareiner, AICP<br>Community Development Director |

**SYNOPSIS**

A Special Use Ordinance has been prepared to permit the construction of a telecommunications tower in an R-1 residential zoning district at 6401 Springside Avenue, commonly known as Downers Grove South High School.

**STRATEGIC PLAN ALIGNMENT**

The Five Year Plan and Goals for 2008-2013 identified *Preservation of the Residential and Neighborhood Character*. Supporting this goal are the objectives *Tolerance of Neighborhood Private Redevelopment* and *Continuing Reinvestment in the Neighborhoods*.

**FISCAL IMPACT**

N/A.

**RECOMMENDATION**

Approval on the December 1, 2009 active agenda.

**BACKGROUND**

The petitioner is requesting approval of a special use pursuant to Section 28.502(t) of the Zoning Ordinance to allow the construction of a new telecommunications tower and equipment pad at the Downers Grove South High School football field. The parcel is zoned R-1, Single Family Residential, and a telecommunications tower is a permitted special use in the R-1 zoning district. If the applicant was able to find an existing structure in the target search area upon which to locate their antenna, they would be required to locate upon that structure.

The use and operation of telecommunication towers are also regulated by the Federal Communications Commission (FCC) and Federal Aviation Administration (FAA). The Village is preempted from factoring in environmental issues with regard to the placement of telecommunication towers per Section 704(a) of the Federal Telecommunications Act of 1996. The Act includes the following language which expressly preempts the Village from regulating telecommunication towers based on radiofrequency emissions:

*No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's [Federal Communication Commission] regulations concerning such emissions.*

The petitioner has provided information (attached to Staff Report, RF Study dated November 12, 2007) describing how the proposal complies with the Municipal Code, and the Radiofrequency (RF) Emissions regulations.

The proposed telecommunications tower will be 86.5 feet tall with the top of the antenna array extending to 90 feet above grade. The pole will be approximately four feet wide at the base and taper to the top. The telecommunications pole will replace an existing 80-foot tall light standard. The new tower will include an antenna array centered at 86.5 feet and the top of the football field lights at 78 feet. The tower is designed to hold only T-Mobile's antenna and will not support additional telecommunication providers.

The tower's equipment cabinets will be located underneath the existing west bleachers. Coaxial cables running from the equipment to the tower will be underground. The perimeter of the ancillary and accessory facilities will be secured with a six-foot chain link fence and be accessible from underneath the west side of the bleachers. An existing four-foot chain link fence surrounds the football field and track while a larger six-foot chain link fence surrounds the entire football field complex. T-Mobile access to the site will be via a gate within the six-foot fence along Springside Avenue.

A telecommunication tower must comply with Section 28.1307 of the Zoning Ordinance and the rules and regulations of the Federal Communications Commission (FCC) and Federal Aviation Administration (FAA). The petitioner has provided a Radiofrequency (RF) Emissions Compliance Report prepared by a professional engineer which indicates compliance with FCC requirements and a Market Value Study prepared by a certified real estate appraiser which finds the tower and equipment will have no negative impact on the value of surrounding properties. The proposed telecommunication tower facility meets all zoning requirements and fully complies with the bulk regulations as shown in the table below:

| Zoning Requirements          | Required      | Provided |
|------------------------------|---------------|----------|
| North Setback                | 40'           | 845'     |
| East Setback                 | 10'           | 365'     |
| South Setback                | 20'           | 210'     |
| West Setback                 | 40'           | 72'      |
| Tower Height                 | 90' (Max.)    | 90'      |
| Separation from other towers | 1,500' (Min.) | 5,700'   |

The goals of Section 28.1307 include minimizing the number of towers in the community while providing opportunities for telecommunication providers to provide coverage in areas with an identified coverage gap, locating towers in non-residentially zoned areas and encouraging the location of antenna on existing tower sites.

T-Mobile has identified a coverage gap in the area through the completion of a drive test where a T-Mobile employee drives the area measuring signal strength. The gap runs north south from Maple Avenue to Concord Drive and east west from Dunham Road to Woodward Avenue and Belmont Road. The underserved area is entirely residential in nature with a very limited amount of commercially zoned properties along the western and northern fringes of the coverage gap.

Based on coverage maps and information provided by T-Mobile, the location of a new telecommunication tower at Downers Grove High School is the only feasible location for T-Mobile to service the overall

coverage gap and their coverage objective. Existing antenna sites were examined and determined to be infeasible by various factors. Based on staff's recommendations, T-Mobile examined the Maple Avenue Water Tank site twice. There are no existing non-residentially zoned properties within the identified coverage gap that are feasible alternatives to the proposed tower location. Additionally, there are no commercial structures in this area whose height would allow for an antenna placement. The area within T-Mobile's coverage objective is almost exclusively residentially zoned. Staff believes T-Mobile has examined and exhausted all possible alternatives to the proposed Downers Grove South High School site.

T-Mobile held a neighborhood meeting in May 2008, but no individuals attended. Throughout the process staff spoke with various residents. Concerns were expressed over the tower height, design, structural stability and the impact of the tower on the adjacent townhouses and property values. Three residents spoke against the proposed tower at the Plan Commission's November 2, 2009 meeting. These residents were concerned about the safety of the equipment and tower and the perceived negative value that the tower may inflict on neighboring residential properties.

Staff believes the special use standards for approval (Section 28.1902 of the Zoning Ordinance) have been met. The proposed tower complies with the DB regulations, is a desirable use and will contribute to the general welfare of the community. The development will not be detrimental to the health, safety, morals, general welfare or property values. The requested special use is listed as an allowable special use in Section 28.502(t) of the Zoning Ordinance. Staff also believes the goals of Section 28.1307 of the Zoning Ordinance have been met.

The Plan Commission considered this petition at their November 2, 2009 meeting and recommended approval of the petition by a 5:1 vote. The lone dissenting member was concerned about the proximity of the equipment and tower to sporting events and believed the credibility of the completed studies would have been better served by having an outside consultant complete the reviews. The member believed standards A, B, and C of Section 28.1902 were not met. Staff concurs with the Plan Commission's positive recommendation.

**ATTACHMENTS**

Aerial Map

Ordinance

Staff Report with attachments dated November 2, 2009

Minutes of the November 2, 2009 Plan Commission Hearing

Resident submittals from the November 2, 2009 Plan Commission Hearing

Petitioner's additional submittal from the November 2, 2009 Plan Commission Hearing

**ORDINANCE NO. \_\_\_\_\_**

**AN ORDINANCE AUTHORIZING A SPECIAL USE  
TO PERMIT A TELECOMMUNICATION TOWER FOR THE PROPERTY  
LOCATED AT 6401 SPRINGSIDE AVENUE**

WHEREAS, the following described property, to wit:

That part of the North Half of Section 19, Township 38 North, Range 11 East of the Third Principal Meridian, DuPage County, Illinois, described as follows: Beginning at a point where the center line of Dunham Road intersects with the center line of 63<sup>rd</sup> Street, as platted and recorded; thence North 89 degrees 52 minutes West along the center line of 63<sup>rd</sup> Street, a distance of 1435.94 feet to an angle point in the road; thence South 89 degrees 21 minutes West along the center line of said 63<sup>rd</sup> Street, a distance of 396.75 feet; thence South 0 degrees 2 minutes East, a distance of 1146.84 feet; thence North 90 degrees 0 minutes East, a distance of 1831.99 feet to a point on the center line of Dunham Road; thence North 0 degrees 0 minutes East along the center line of said Dunham Road, a distance of 1148.00 feet to the place of beginning except that portion previously dedicated for public roads, in DuPage County, Illinois.

Commonly known as 6401 Springside Avenue, Downers Grove, IL  
(PINS 09-19-101-002, 09-19-200-003)

(hereinafter referred to as the "Property") is presently zoned in the "*R-1, Single Family Residential District*" under the Comprehensive Zoning Ordinance of the Village of Downers Grove; and

WHEREAS, the owner of the Property has filed with the Plan Commission, a written petition conforming to the requirements of the Zoning Ordinance, requesting that a Special Use per Section 28-502(t) of the Zoning Ordinance be granted to allow a telecommunications tower within a residential zoning district; and,

WHEREAS, such petition was referred to the Plan Commission of the Village of Downers Grove, and said Plan Commission has given the required public notice, has conducted a public hearing respecting said petition on November 2, 2009 and has made its findings and recommendations, all in accordance with the statutes of the State of Illinois and the ordinances of the Village of Downers Grove; and,

WHEREAS, the Village Council finds that the evidence presented in support of said petition, as stated in the aforesaid findings and recommendations of the Plan Commission, is such as to establish the following:

1. The proposed use at that particular location requested is necessary or desirable to provide a service or a facility which is in the interest of public convenience and will contribute to the general welfare of the neighborhood or community.
2. The proposed use will not, under the circumstances of the particular case, be detrimental to the health, safety, morals, or general welfare of persons residing or working in the vicinity or injurious to property values or improvements in the vicinity.
3. The proposed use will comply with the regulations specified in this Zoning Ordinance for the district in which the proposed use is to be located.
4. The proposed use is one of the special uses specifically listed for the district in which it is to

be located and, if approved with restrictions as set forth in this ordinance, will comply with the provisions of the Downers Grove Zoning Ordinance regulating this Special Use.

NOW, THEREFORE, BE IT ORDAINED by the Council of the Village of Downers Grove, in DuPage County, Illinois, as follows:

SECTION 1. That Special Use of the Property is hereby granted to allow a telecommunications tower within a residential zoning district.

SECTION 2. This approval is subject to the following conditions:

1. The Special Use shall substantially conform to the preliminary engineering plans prepared by Fullerton Engineering Consultants, dated March 14, 2008 except as such plans may be modified to conform to Village Codes and Ordinances.
2. The petitioner shall install a fence or barrier on top of the existing equipment fence to ensure that access to the equipment can not be obtained by going through the bleachers above.
3. Before the issuance of any building permits, the applicant shall submit an engineer's cost estimate in the amount sufficient to fund any costs incurred by the Village due to Owner's failure to comply with all codes, ordinances, rules and regulations of the Municipal Code including any removal or restoration work that the Village must perform itself or have completed as a consequence of the Owner's failure to comply with all provisions of the Municipal Code. Following the approval of such cost estimate, the applicant shall establish a "Security Fund" in that amount with the Village, in the form of an unconditional letter of credit, surety bond or other instrument. The letter of credit, surety bond or other instrument shall (i) provide that it shall not be canceled without prior notice to the Village; and (ii) not require the consent of any other person other than the proper Village official prior to the collection by the Village of any amounts covered by said letter of credit, surety bond or other instrument. The Security Fund shall be continuously maintained in accordance with the Zoning Ordinance, Section 28.1307, at Owner's sole cost and expense.

SECTION 3. The above conditions are hereby made part of the terms under which the Special Use to allow a telecommunications tower within a residential zoning district is hereby granted. Violation of any or all of such conditions shall be deemed a violation of the Village of Downers Grove Zoning Ordinance, the penalty for which may include, but is not limited to, a fine and or revocation of the Special Use granted herein.

SECTION 4. That all ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

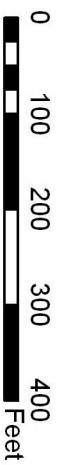
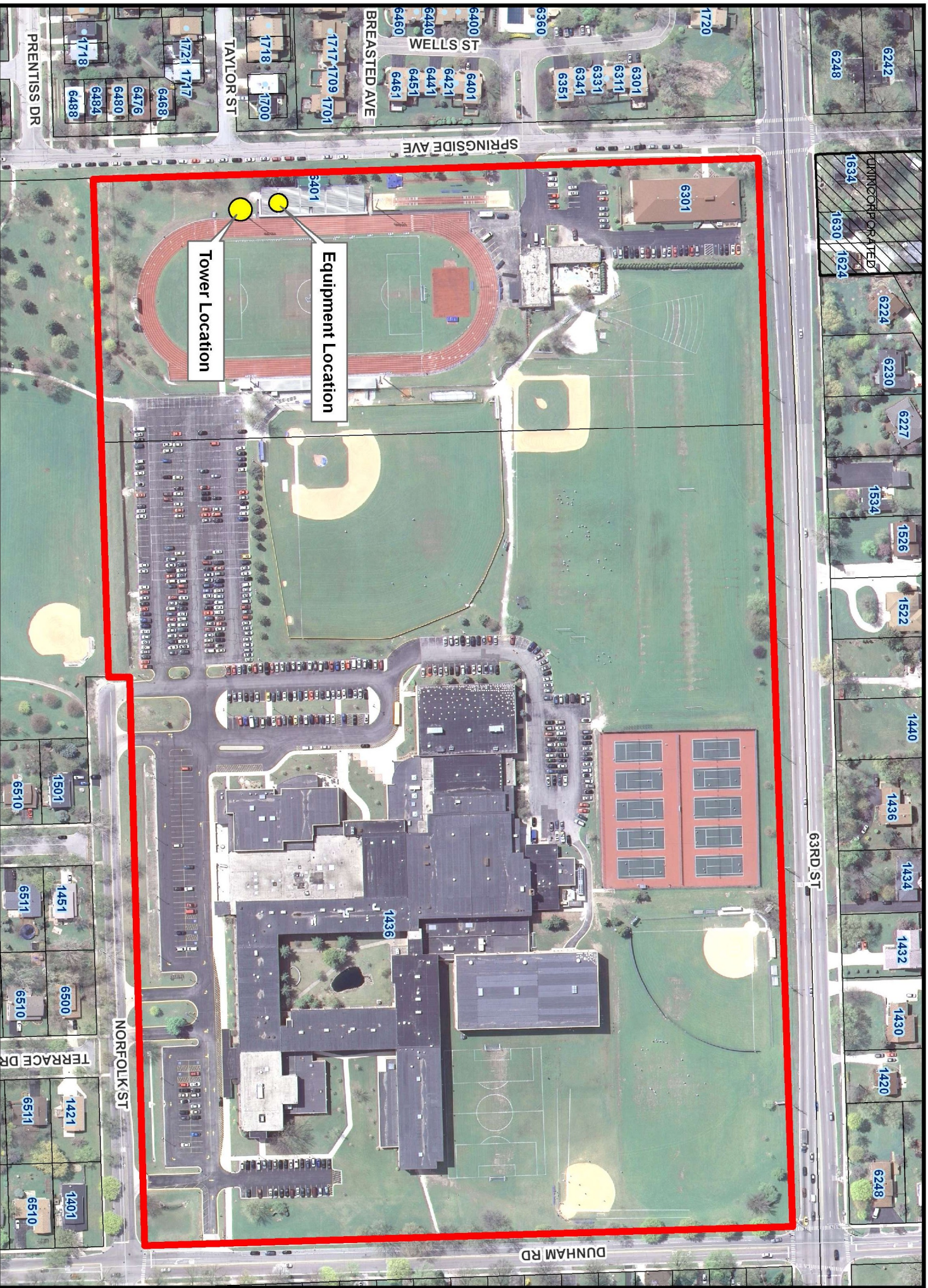
\_\_\_\_\_  
Mayor

Passed:

Published:

Attest: \_\_\_\_\_

Village Clerk



# 6401 Springside Avenue Location Map





**VILLAGE OF DOWNERS GROVE  
REPORT FOR THE PLAN COMMISSION  
NOVEMBER 2, 2009 AGENDA**

| <b>SUBJECT:</b>                    | <b>TYPE:</b>  | <b>SUBMITTED BY:</b>           |
|------------------------------------|---|--------------------------------|
| PC-10-09<br>6401 Springside Street | Special Use for a telecommunications tower in a residential zoning district | Stan Popovich, AICP<br>Planner |

**REQUEST**

The petitioner is requesting approval of a Special Use to allow a telecommunications tower within a residential zoning district.

**NOTICE**

The application has been filed in conformance with applicable procedural and public notice requirements.

**GENERAL INFORMATION**

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**OWNER:** Community High School District 99  
6301 Springside Avenue  
Downers Grove, IL 60516

**APPLICANT:** Mark Layne (Agent)  
T-Mobile Central LLC  
777 Army Trail Road  
Addison, IL 60101

**PROPERTY INFORMATION**

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**EXISTING ZONING:** R-1, Single Family Residential  
**EXISTING LAND USE:** Educational (Downers Grove South High School)  
**PROPERTY SIZE:** 43.9 acres (1,912,110 square feet)  
**PINS:** 09-19-101-002 and 09-19-200-003

**SURROUNDING ZONING AND LAND USES**

|               | <b>ZONING</b>  | <b>FUTURE LAND USE</b>                |
|---------------|--|---------------------------------------|
| <b>North:</b> | R-1 and R-3, Single Family Residential<br>R-4, Single Family Residential (DuPage County) | Residential 0-6 DU/Acre               |
| <b>South:</b> | R-3, Single Family Residential   | Residential 0-6 DU/Acre<br>Open Space |
| <b>East:</b>  | R-3, Single Family Residential   | Residential 0-6 DU/Acre               |
| <b>West:</b>  | R-3, Single Family Residential   | Residential 0-6 DU/Acre               |

## **ANALYSIS**

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### **SUBMITTALS**

This report is based on the following documents, which are on file with the Department of Community Development:

1. Application/Petition for Public Hearing
2. Project Summary
3. Project Data
4. Plat of Survey
5. Engineering and Site Plans
6. Coverage Maps
7. RF Emissions Compliance Report
8. Market Value Analysis
9. Maple Avenue Water Tank Engineering Report

### **PROJECT DESCRIPTION**

The petitioner is requesting a Special Use to construct a single-user telecommunications tower at the Downers Grove South High School football field. The same request was submitted to staff in April 2008 and withdrawn in July 2008. The petitioner resubmitted this proposal in March 2009 and at their request the petition was continued to November 2009. The property is zoned R-1 Single Family Residential. A Special Use is required for the location of a telecommunication tower in a residential district.

The proposed telecommunications tower will be 86.5 feet tall with the top of the antenna array extending to 90 feet above grade. The pole will be approximately four feet wide at the base and taper to the top. The telecommunications pole will replace an existing 80-foot tall light standard. The new tower will include an antenna array centered at 86.5 feet and the top of the football field lights at 78 feet.

The 43.9 acre school parcel contains Downers Grove South High School, an administration building, parking lots and multiple athletic fields. The football field runs north and south along Springside Avenue with bleachers on both the west and east side of the field. There are four existing 80-foot tall light standards located immediately north and south of both sets of bleachers. The proposed tower will replace the existing southwest light standard.

The ancillary and accessory facilities, including three equipment cabinets, will be located underneath the existing west bleachers. Coaxial cables running from the equipment to the tower will be underground. The perimeter of the ancillary and accessory facilities will be secured with a six-foot chain link fence and be accessible from underneath the bleachers. The construction of the bleachers does not allow access to equipment cabinets from above. Staff is recommending T-Mobile construct an enclosure above the equipment to ensure that no one can access the equipment from above.

An existing four-foot chain link fence surrounds the football field and track while a larger six-foot chain link fence surrounds the entire football field complex. T-Mobile access to the site will be via a gate within the six-foot fence along Springside Avenue.

Staff has not recommended any landscape screening immediately around the equipment or the tower. There are existing shade and evergreen trees running along the east side of Springside Avenue adjacent to the bleachers and proposed tower location which provide screening. Additionally, the tower will be located in a grassy area similar to the other existing light standards. The equipment will be located beneath the existing bleachers in a fenced area.



**COMPLIANCE WITH FUTURE LAND USE PLAN**

The Future Land Use Plan designates the site as Residential at a density of 0-6 dwelling units per acre. Staff believes the proposed telecommunication tower will not impact the land use characteristics of the school parcel and is consistent with the intent of the Zoning Ordinance. The goals of the Zoning Ordinance include minimizing the number of towers throughout the community. The presented evidence identifies that there are no existing towers or non-residentially zoned properties which are available for T-Mobile to serve the identified coverage gap.

**COMPLIANCE WITH ZONING ORDINANCE**

The property is zoned R-1, Single Family Residential. The proposed use, a telecommunications tower, is a permitted Special Use in this zoning district. Telecommunication towers must comply with Section 28.1307 of the Zoning Ordinance. The petition complies with all the bulk requirements, including separation distances from existing towers, setbacks, and fencing. The petitioner has provided detailed information in his narrative letter describing how the proposal complies with this section of the Municipal Code. The proposal meets the bulk requirements as shown in the table below.

| Zoning Requirements          | Required      | Provided |
|------------------------------|---------------|----------|
| North Setback                | 40'           | 845'     |
| East Setback                 | 10'           | 365'     |
| South Setback                | 20'           | 210'     |
| West Setback                 | 40'           | 72'      |
| Tower Height                 | 90' (Max.)    | 90'      |
| Separation from other towers | 1,500' (Min.) | 5,700'   |

The proposed telecommunications tower meets the bulk requirements of the Zoning Ordinance, and staff believes the tower complies with the goals of Section 28.1307. The goals of Section 28.1307 include minimizing the number of towers in the community while providing opportunities for telecommunication providers to provide coverage in areas with an identified coverage gap, locating towers in non-residentially zoned areas and encouraging the location of antenna on existing tower sites.

T-Mobile has identified a coverage gap in this area of the Village. The gap runs north south from Maple Avenue to Concord Drive and east west from Dunham Road to Woodward Avenue and Belmont Road. T-Mobile has stated their coverage objective is to provide service to those underserved areas south of 63<sup>rd</sup> Street between Dunham Road and Woodward Avenue. The underserved area is entirely residential in nature with a very limited amount of commercially zoned properties along the western and northern fringes of the coverage gap.

Based on the overall coverage gap, there are six potential locations for this tower. Four of the sites, Maple Hill Swim Club, Darien-Woodridge Fire Department Station No. 2, Maple and Sherman Park, and the Downers Grove South High School site are within the identified coverage gap. Only the preferred Downers Grove South High School site is within T-Mobile's coverage objective. The swim club and park locations are permitted only at 75 feet in height and are too far from the center of the coverage gap to be effective at this height. The Darien-Woodridge Fire Department was not interested in entering into a lease agreement with T-Mobile.

The two remaining sites are located outside of the coverage gap. Memorial Park was identified as a potential site but is too close to the existing Gilbert Park tower location. The Downers Grove Maple Avenue Water Tank is outside of the coverage gap but was suggested by staff as an alternative site in May 2008 and again in March 2009. In the summer of 2008, T-Mobile pursued a lease on the water tank

but lease terms, specifically the lease amount, were unacceptable to T-Mobile and the lease was never signed. After reviewing T-Mobile's Special Use submittal in March 2009, staff again requested T-Mobile pursue the Maple Avenue water tank to address the coverage gap. In the summer of 2009, T-Mobile engineers examined the water tank and found that the tank could not support T-Mobile antennas at the necessary height to provide coverage into the identified gap without modifications to the tank occurring. According to T-Mobile engineers, modifications to the conduit running through the water tank would have to be undertaken to provide T-Mobile the necessary space to run coaxial cables from the antennas on the tank to the support facilities on the ground. This modification would require changes to the water tank and would have the potential to temporarily disrupt water service in this part of the Village. During the recent Long Range Financial Planning process, water service was deemed a core service of the Village. Staff does not believe modifying the water tank to provide the opportunity for telecommunication antennas on top of the water tank is consistent with the Village's core services or long range objectives.

Furthermore, in the summer of 2009, T-Mobile conducted a drive test to clarify the previously identified coverage gap. In 2008, computer generated coverage maps identified the same gap but showed the most significant gap was south of Maple Avenue, north of 63<sup>rd</sup> Street, west of Dunham Road and east of Belmont Road. The area south of 63<sup>rd</sup> Street was deemed to have a gap, but not as significant as north of 63<sup>rd</sup> Street. A drive test conducted during the summer of 2009, determined that the coverage gap south of 63<sup>rd</sup> Street was similar to the gap north of 63<sup>rd</sup> Street. As proposed, the Downers Grove South High School site is near the gap's center and is located within T-Mobile's coverage objective.

Based on coverage maps and information provided by T-Mobile, the location of a new telecommunication tower at Downers Grove High School is the only feasible location for T-Mobile to service the overall coverage gap and their coverage objective. Existing antenna sites were examined and determined to be infeasible by various factors. Based on staff's recommendations, T-Mobile examined the Maple Avenue Water Tank site twice. There are no existing non-residentially zoned properties within the identified coverage gap that are feasible alternatives to the proposed tower location. Additionally, there are no commercial structures in this area whose height would allow for an antenna placement. The area within T-Mobile's coverage objective is almost exclusively residentially zoned. Staff believes T-Mobile has examined and exhausted all possible alternatives to the proposed Downers Grove South High School site. Based on the presented evidence, staff believes the proposal complies with the goals of the Zoning Ordinance.

#### **ENGINEERING/PUBLIC IMPROVEMENTS**

There are no proposed engineering or public improvements associated with this petition. Community High School District 99 will grant T-Mobile an access and utility easement across their property for the right to maintain and operate the T-Mobile equipment. Access to the pole and equipment will be through an existing gate along Springside Avenue. The applicant anticipates one to two maintenance site visits per month. T-Mobile technicians typically arrive via a car, pick-up or van.

#### **PUBLIC SAFETY REQUIREMENTS**

The Fire Prevention Division of the Fire Department has reviewed the proposed plans and has not noted any safety concerns. The tower will be designed to meet industry standards and include a lightning rod.

#### **NEIGHBORHOOD COMMENT**

Staff received some public comments based on the April 2008 submission. At that time, staff spoke with three residents who were notified of the Public Hearing. Each of these residents asked questions pertaining to the design and height of the tower. Staff explained that the proposed 86.5-foot tower would replace an existing 80-foot tall tower. The top of T-Mobile's antenna's would be 90 feet above grade

with the football field lights 78 feet above grade. Two of the residents expressed no concerns regarding the proposed tower. The third resident expressed concerns regarding the overall height, the safety of the tower during storms, the intensity of the football field lights, and the impact of the tower on property values.

After the petitioner's initial submittal in April 2008, the petitioner held a neighborhood meeting on May 27, 2008 but no residents attended. When the petitioner withdrew the application in June 2008, staff mailed letters to the surrounding neighbors to inform them of the withdrawal.

The petitioner submitted the Downers Grove South High School tower proposal again in March 2009 and was scheduled to appear before the Plan Commission in May 2009. Per T-Mobile's request, the petition was continued to July 6, 2009. Prior to the July Plan Commission meeting, the petitioner requested a further continuance to November to allow T-Mobile to gather additional supporting information for their Special Use request. After this request, staff sent notices to the property owners within 250 feet of the proposed project informing them of this continuance. Prior to the November Plan Commission meeting, a public hearing notice was published in the *Downers Grove Reporter* and mailed to the property owners within 250 feet of the proposed project. During this time, staff spoke to one resident concerning this petition. The resident was concerned about the safety of the tower during significant wind storms and the overall impact of the tower on the surrounding townhomes.

#### **FINDINGS OF FACT**

Staff believes the proposal complies with the regulations and requirements for telecommunication towers as noted in Section 28.1307 of the Zoning Ordinance and the Special Use standards for approval in Section 28.1902. Staff believes T-Mobile has examined all possible alternative locations and determined that they are not feasible for the gap T-Mobile is attempting to service. T-Mobile has exhausted all other options. Based on T-Mobile's evidence and alternative site examinations, staff believes there are no other feasible tower locations or available structures that would provide substantially the same coverage.

In addition to the general provisions for telecommunication towers within Section 28.1307, subsection 28.1307(1) of the Zoning Ordinance restricts the location of telecommunication towers in residential districts. Specifically, the tower may be permitted in a residential district if one of the following is established:

- (1) There are no sites within non-residential districts which will accomplish substantially the same coverage and that the proposed residential site is absolutely necessary, from a technical perspective.
- (2) Because of unique circumstances, such as but not limited to the location of the property and proximity of residential structures, the proposed telecommunications tower will have no significant adverse impact on existing or reasonably anticipated residential uses or property values in the area of the proposed tower.

Staff believes there are no sites within non-residential districts which could accomplish substantially the same coverage. Based on the petitioner's evidence and staff's review of the six alternative locations, none of the alternative locations are feasible for a variety of reasons, as noted above.

Staff believes all Special Use approval standards per Section 28.1902 have been met. The proposed telecommunications tower is necessary to provide improved cellular service in this section of the Village. The drive test identifies a large coverage gap in this area of the Village that can not be served by any of the alternative sites identified by T-Mobile and the Village. The most viable alternative site, the Maple Avenue Water Tank, would require tank modifications for T-Mobile to locate on the tank and service this coverage gap. Staff believes the potential disruption of a core service due to the required tank

modifications outweigh the benefits of improved telecommunication coverage. Staff believes the proposed tower would contribute to the general welfare of the neighborhood by providing additional wireless communication capacity. Staff believes standard 28.1902(a) has been met.

A market value assessment was completed which states the tower will not have a negative impact on the value of surrounding properties. The proposed tower will not be detrimental to the health, safety, morals, or general welfare of the surrounding neighborhoods. The petitioner has provided information describing how the proposal complies with the Radiofrequency (RF) Emissions rules and regulations of the FCC. Staff believes standard 28.1902(b) has been met.

It should be noted, the use and operation of telecommunication towers are regulated by the Federal Communications Commission (FCC) and Federal Aviation Administration (FAA). The Village is preempted from factoring in environmental issues with regard to the placement of telecommunication towers per Section 704(a) of the Federal Telecommunications Act of 1996. The act includes the following language which expressly rules out the Village from regulating telecommunication towers based on radiofrequency emissions:

***No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's [Federal Communication Commission] regulations concerning such emissions.***

Staff believes standard 28.1902(c) has also been met. The proposal complies with the bulk regulations of the Zoning Ordinance and meets the goals of Section 28.1307 for telecommunication towers. The tower is the only available location within both the coverage gap and coverage objective areas. Standard 28.1902(d) notes the Special Use shall be specifically listed in the district. According to Section 28.502(t) of the Zoning Ordinance, telecommunication towers are a permitted Special Use in residential districts.

***Section 28.1902 Standards for Approval of Special Uses***

*The Village Council may authorize a special use by ordinance provided that the proposed Special Use is consistent and in substantial compliance with all Village Council policies and land use plans, including but not limited to the Comprehensive Plan, the Future Land Use Plan and Master Plans and the evidence presented is such as to establish the following:*

- (a) That the proposed use at that particular location requested is necessary or desirable to provide a service or a facility which is in the interest of public convenience and will contribute to the general welfare of the neighborhood or community.*
- (b) That such use will not, under the circumstances of the particular case, be detrimental to the health, safety, morals, or general welfare of persons residing or working in the vicinity or injurious to property values or improvements in the vicinity.*
- (c) That the proposed use will comply with the regulations specified in this Zoning Ordinance for the district in which the proposed use is to be located or will comply with any variation(s) authorized pursuant to Section 28-1802.*
- (d) That it is one of the special uses specifically listed for the district in which it is to be located.*

## RECOMMENDATIONS

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Staff believes the proposed Special Use is consistent with the Village's telecommunication tower goals and Special Use Standards for Approval per Sections 28.1307 and 28.1902 of the Zoning Ordinance. As such, staff recommends that the Plan Commission forward a positive recommendation to the Village Council regarding the proposed Special Use.

1. The Special Use shall substantially conform to the preliminary engineering plans prepared by Fullerton Engineering Consultants, dated March 14, 2008 except as such plans may be modified to conform to Village Codes and Ordinances.
2. The petitioner shall install a fence or barrier on top of the existing equipment fence to ensure that access to the equipment can not be obtained by going through the bleachers above.
3. Before the issuance of any building permits, the applicant shall submit an engineer's cost estimate in the amount sufficient to fund any costs incurred by the Village due to Owner's failure to comply with all codes, ordinances, rules and regulations of the Municipal Code including any removal or restoration work that the Village must perform itself or have completed as a consequence of the Owner's failure to comply with all provisions of the Municipal Code. Following the approval of such cost estimate, the applicant shall establish a "Security Fund" in that amount with the Village, in the form of an unconditional letter of credit, surety bond or other instrument. The letter of credit, surety bond or other instrument shall (i) provide that it shall not be canceled without prior notice to the Village; and (ii) not require the consent of any other person other than the proper Village official prior to the collection by the Village of any amounts covered by said letter of credit, surety bond or other instrument. The Security Fund shall be continuously maintained in accordance with the Zoning Ordinance, Section 28.1307, at Owner's sole cost and expense.

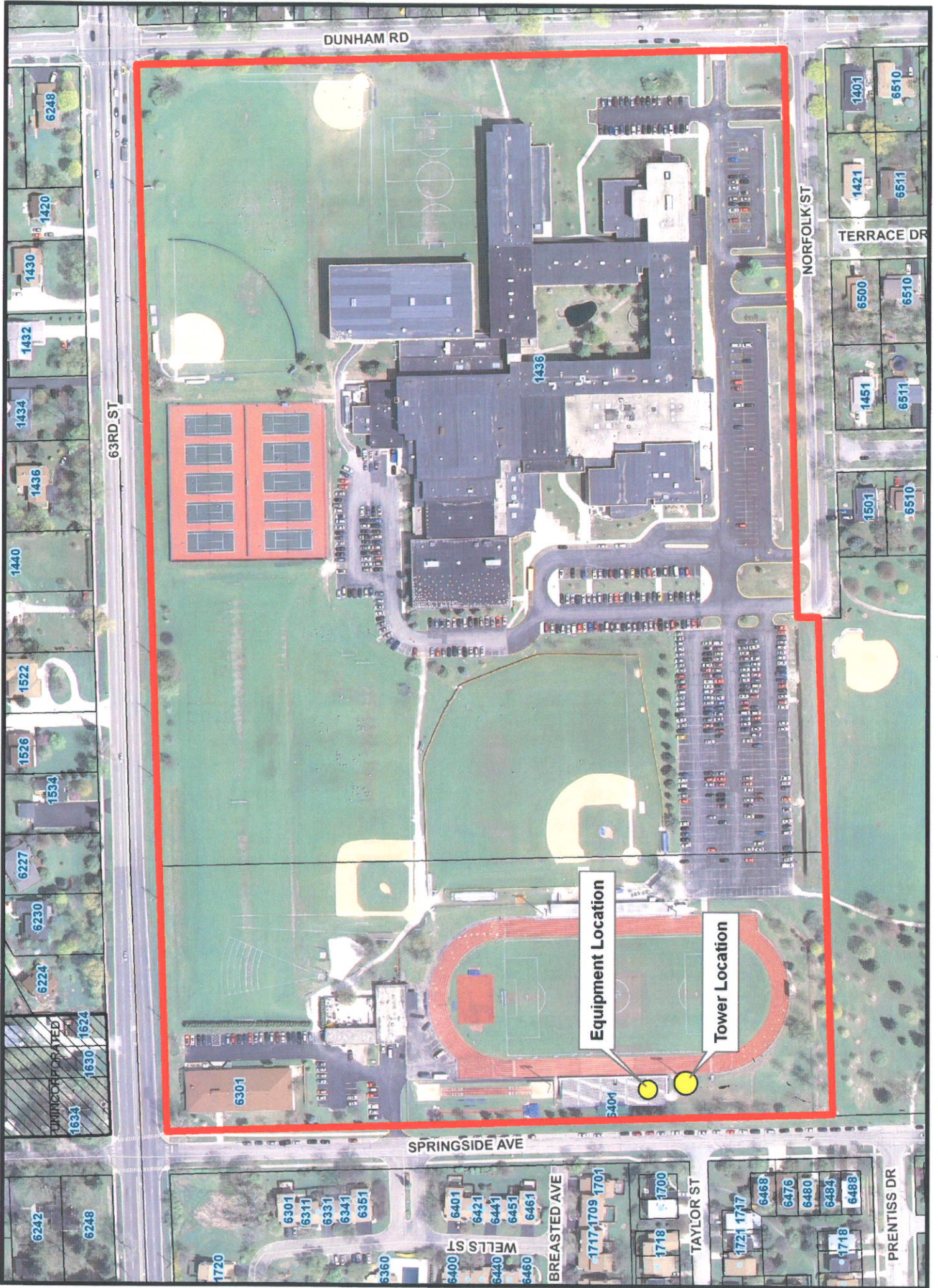
Staff Report Approved By:

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Tom Dabareiner, AICP  
Director of Community Development

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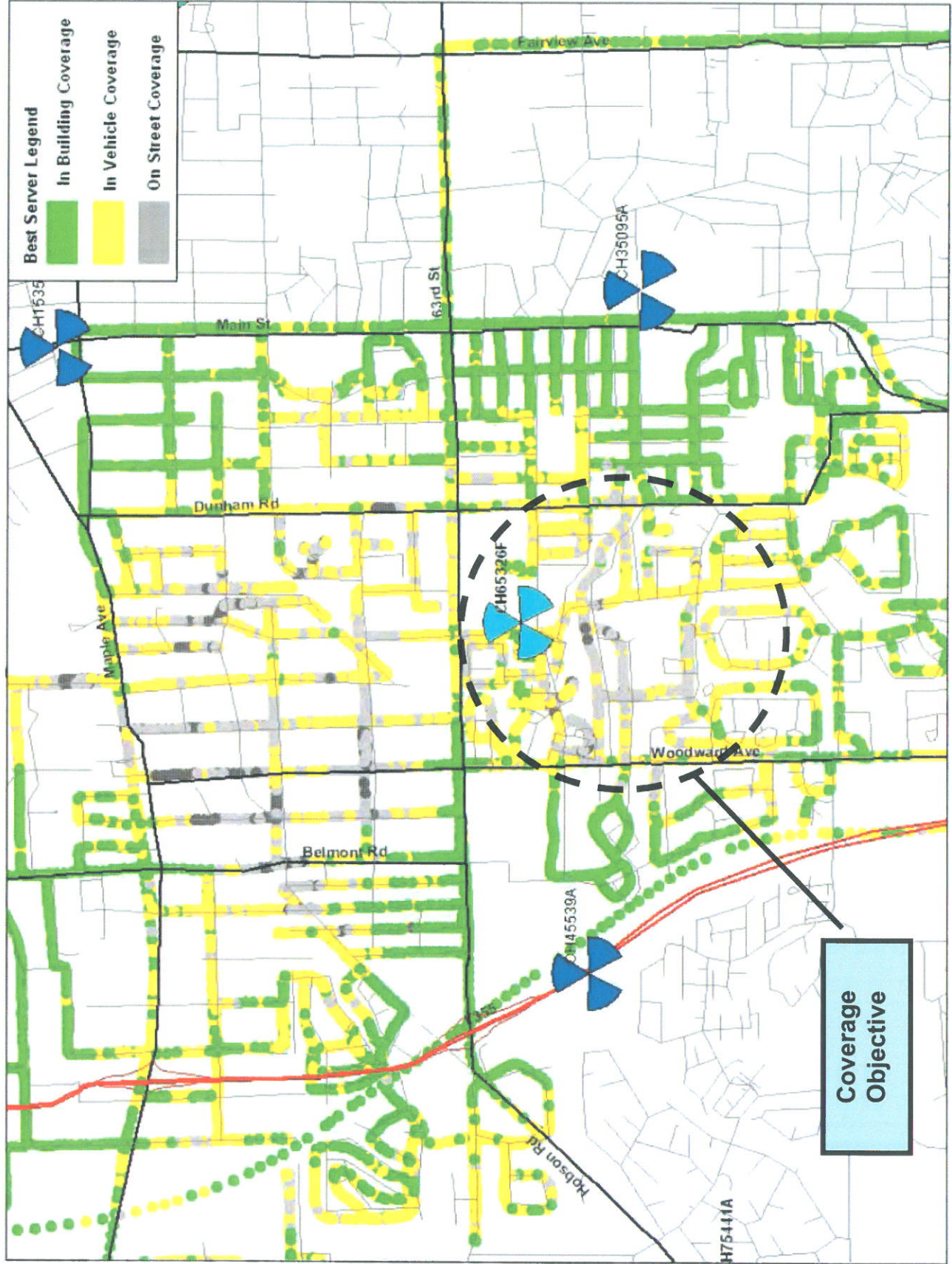
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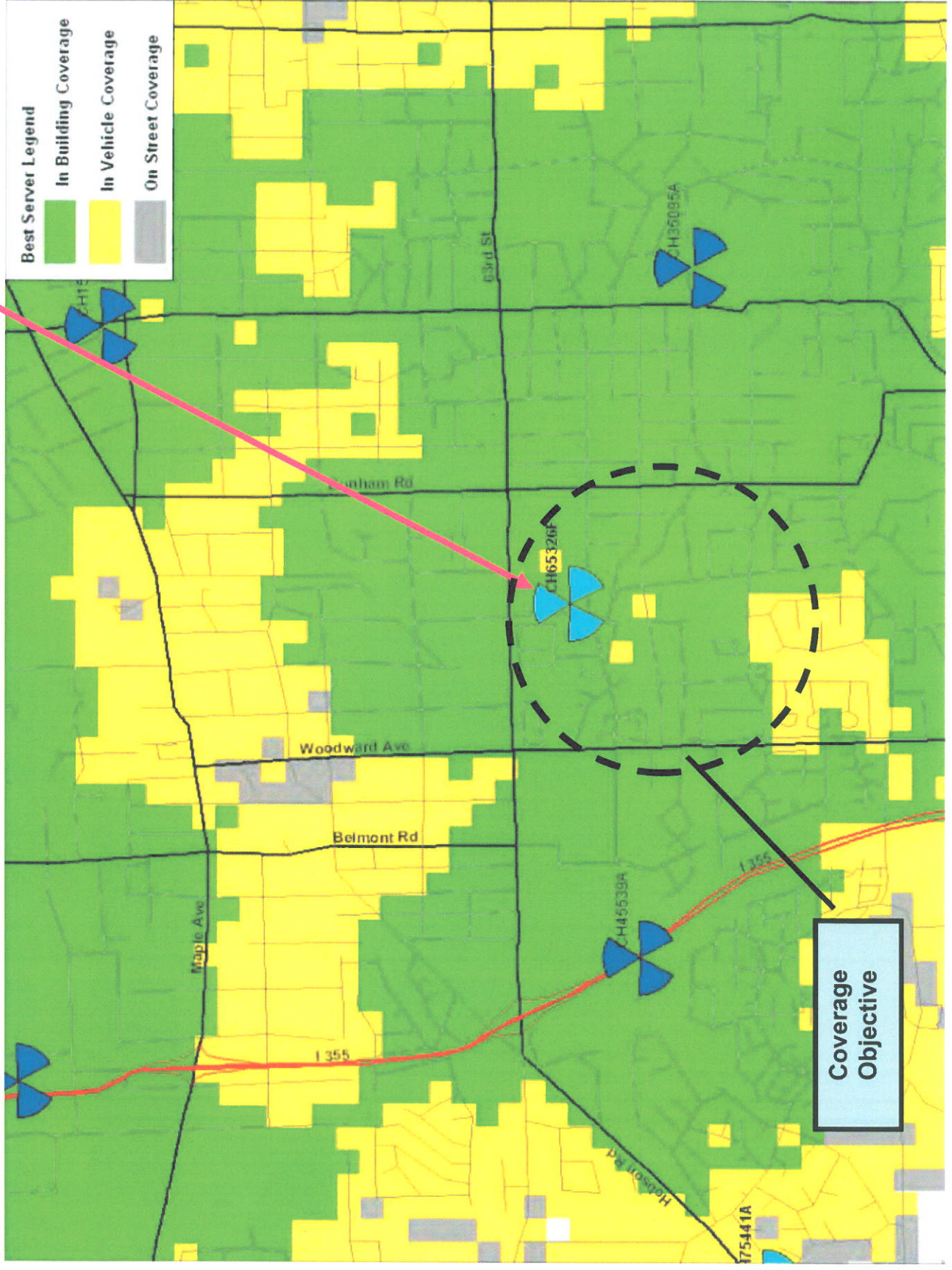
# 6401 Springside Avenue Location Map



# Drive Test Data Without CH65326F

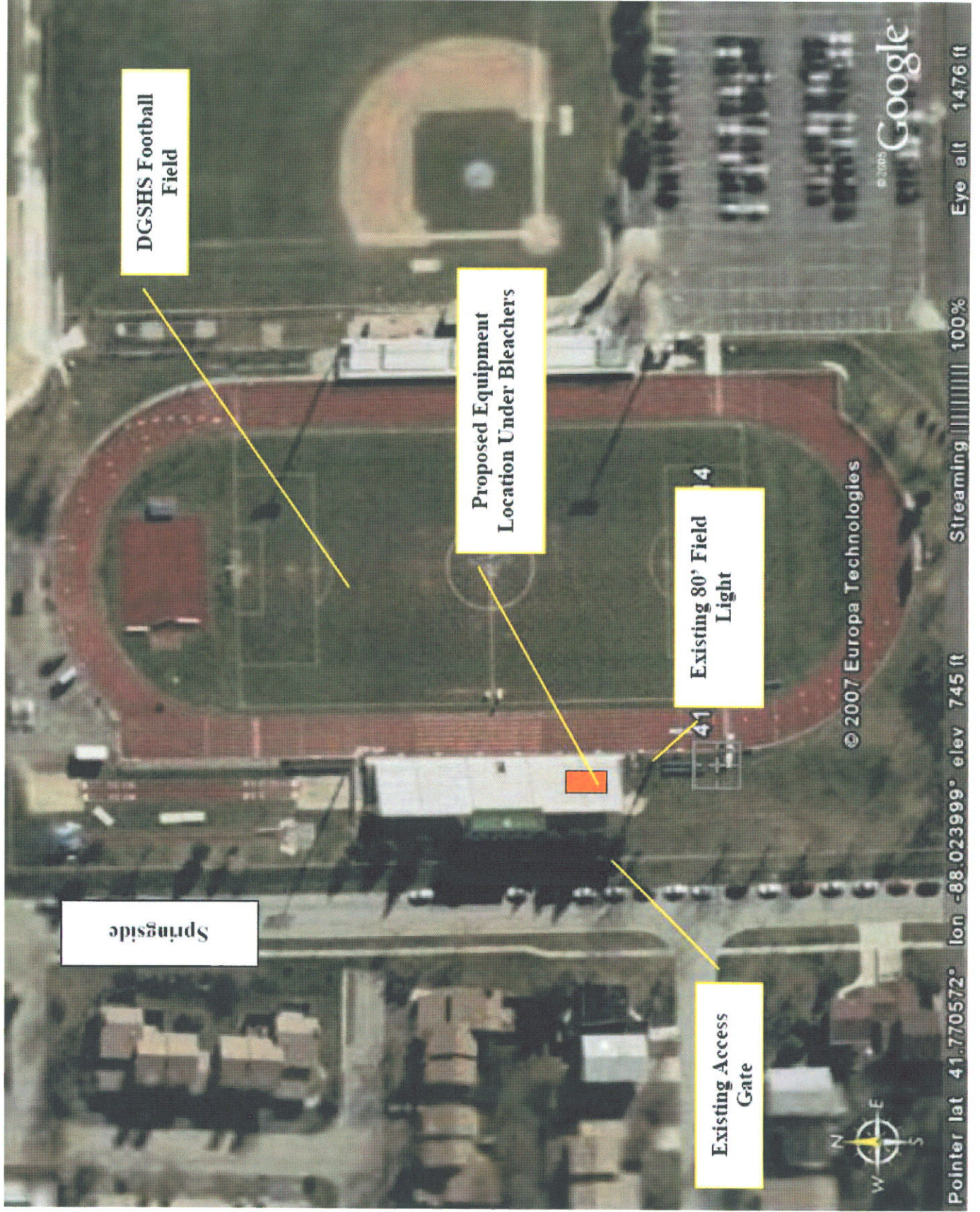


# Predicted Coverage With CH65326F





# Aerial View/Site Plan



••T••Mobile•



**Fullerton**  
Engineering Consultants

9700 West Higgins Rd., Rosemont, IL 60018



Site Location



Before

Looking South



After

CH65-326F DGS High School Replacement  
1860 63rd Street  
Downers Grove, IL 60516

## STATEMENT IN SUPPORT OF APPLICATION (Rev. 09/16/09)

### **The Application:**

T-Mobile Central, LLC, doing business as T-Mobile ("T-Mobile"), respectfully requests the Village of Downers Grove grant a special use permit and any and all other necessary waivers and approvals (the "Petition") for the installation of a wireless telecommunication facility (the "Proposed Facility") in Downers Grove, Illinois, located at the Downers Grove South High School athletic stadium (the "Site").

### **General Background:**

T-Mobile has acquired licenses from the Federal Communications Commission ("FCC") to provide Personal Communications Services ("PCS") throughout the United States. These licenses include DuPage County and the remainder of the Chicago metropolitan region, and is part of an integrated nationwide network of coverage.

The Telecommunication Facility which T-Mobile proposes to construct on the Site is necessary in order to provide PCS services to your community, including traditional cellular services such as wireless telephone service and new services not available under some traditional analog cellular systems, such as paging, wireless internet connections and wireless data transmission. T-Mobile's PCS technology operates at various radio frequency ("RF") bands between approximately 1850 and 1990 megahertz and utilizes a digital (rather than analog) wireless voice and data transmission system. This technology does not interfere with radio, television or other communications signals. The regulation of all matters pertaining to signal interference are within the sole jurisdiction of the FCC, and T-Mobile's broadcast emissions are in full compliance with all FCC regulations.

Like traditional cellular phone systems, PCS operates on a "grid" system, whereby adjacent overlapping "cells" mesh to form a seamless wireless network. A Proposed Facility needs to be of a sufficient height to furnish coverage to the surrounding area, and at the same time positioned such that it interconnects with T-Mobile's existing surrounding antenna placements or nodes. The Proposed Facility cannot be located too close to an existing node, however, which would result in signal overlap, audio clutter, and poor call quality.

By way of analogy, a wireless network is like an underground lawn sprinkler system wherein the antenna placements or network nodes are equivalent to sprinkler heads. Like a sprinkler system, each node covers a certain radius. In designing a sprinkler system, if the sprinkler heads are too far apart, those areas in between don't get watered. Conversely, if the heads are too close together, there is overlap, resulting in oversaturation of certain areas. Ideally, the heads are placed at a distance where the spray pattern from one head just touches the spray patterns of the adjacent heads, thereby providing even, consistent coverage.

Per the foregoing, the technical criteria for establishing cell sites are very exacting as to both the height and location of the Proposed Facility. Because of the frequency at which T-Mobile broadcasts, T-Mobile's network requires more numerous and closely spaced Facilities than might be necessary for other wireless carriers who broadcast in different portions of the radio spectrum. Returning to the sprinkler analogy, T-Mobile's network is like the aforescribed

sprinkler system, but with poor water pressure, thereby requiring a greater density of sprinkler heads or nodes to obtain required coverage. Within the Chicago MTA, for example, T-Mobile's Facilities are typically located approximately 1 to 1.5 miles apart, with less spacing in densely populated areas, more in rural areas where there are typically fewer obstructions and greater permitted tower heights.

When searching for a suitable antenna location, T-Mobile's first priority is to locate existing wireless and/or antenna towers proximate to the target coverage area upon which T-Mobile could collocate their antennas and equipment. In the event no such existing telecommunications towers exist within or near the target coverage area, the next initiative is to locate any existing structure of height such as a building rooftop, light pole, church steeple, utility tower, or other facility sufficient to elevate the antennas to an effective operating height. Failing the foregoing, the last resort is to construct a new communications tower.

### **Site Necessity:**

Based on a drive test data where technicians physically drive the streets of a neighborhood to take actual measurements of existing signal propagation, T-Mobile's RF engineers have identified a significant gap in coverage generally situated south of 63<sup>rd</sup> Street, slightly north of 68<sup>th</sup> Street, west of Dunham Rd., and east of Belmont Ave., and having a target coverage radius of approximately ½ mile. Accompanying this application is a map showing the results of the drive testing which predict unreliable in-building coverage if T-Mobile has no Telecommunication Facility within the target coverage area.

The target location was "scrubbed" for existing towers and/or structures which might be suitable for achieving an effective operating height. The area is almost entirely low density, single family residential in character with some single story commercial development at the intersections of 63<sup>rd</sup> St. and Belmont Avenue. No existing communications towers or tall buildings or other structures were identified within the target coverage area.

In searching the area, the existing athletic field light poles at Downers Grove South High School were the tallest existing structures within the target coverage area and the only available option to provide coverage into the area. Although located at the northern fringe of the target coverage area, it was determined the poles were located close enough to project sufficient signal into the coverage gap, while at the same time allowing T-Mobile to adapt existing aerial infrastructure to which the surrounding community is already visually accustomed.

### **The Proposal:**

Pursuant to the Downers Grove Zoning Ordinance ("Zoning Ordinance"), T-Mobile respectfully requests approval for its special use application and any other zoning relief necessary for the Proposed Facility as detailed below and in the accompanying materials. Said request is made under §§28.1307 and §§28.1902 of the Downers Grove Zoning Ordinance, and per direction provided by the Downers Grove Community Development Department. The Petition further endeavors to comply with the intent of the Downers Grove Zoning Ordinance as it relates to wireless communications infrastructure improvements.

The Proposed Facility is designed to satisfy the public need for seamless wireless coverage in the Downers Grove community, as well as to remedy wireless communications coverage deficiencies in the target location. Specifically, T-Mobile's wireless network suffers gaps in reliable coverage in the vicinity of the Site, resulting in blocked and dropped calls by mobile phone users and other customers.

Accompanying the Petition is a map of T-Mobile's adjoining sites depicting current site spacing which appears optimal in the northern and southern portions of the community, but less so south of 55<sup>th</sup> and north of 63<sup>rd</sup>. Another map is included which depicts T-Mobile's prediction of substantially improved coverage to the target area subsequent to the installation of the Proposed Facility.

The existing DGS HS field light poles are roughly 80' in height at present. T-Mobile initially explored installing their antennas on the existing pole below the current lighting array. It was determined, however, that the existing poles were not structurally sufficient to support both the field lights and T-Mobile's equipment. As such, the current proposal is to replace the pole south of the home (west) bleachers with a new 86.5' monopole structurally capable of supporting both T-Mobile's antennas and the athletic field lights. In that the higher T-Mobile's antennas are elevated, the farther the signal footprint propagates, T-Mobile elected to design the replacement pole at the maximum height allowed for a single-carrier structure per Downers Grove code for an R-1 Zoning District. At this height, T-Mobile will be able to send signal into the aforescribed target objective without negatively impacting the performance of the school's field lighting design.

Under the current proposal, T-Mobile's antennas would be located at the top of the pole above the school's lights (see accompanying photo simulation), with the tops of the antennas extending to 90'. The additional 6.5' in structure height will be essentially "invisible" to casual observation and therefore less visually obtrusive to the neighborhood than a new freestanding communications tower.

Up to three radio equipment cabinets necessary to operate the antennas will be located on a 7' x 13' concrete pad inside a 10' x 26' fenced area beneath the south end of the home (west) bleachers. Given existing fencing, foliage, and the bleachers' framework, the equipment will be essentially invisible from public view.

The proposed height of the Telecommunication Facility is the minimum functional height given the geographic area it needs to serve as affected by the rolling local terrain, tree cover and other physical factors. Any reductions in the height of T-Mobile's antennae are forecasted to result in gaps in T-Mobile's coverage, and would also increase the prospects for adding additional sites in the future.

The Proposed Facility will be unstaffed and, upon completion, will require only infrequent maintenance visits (approximately one or two times a month) by a service technician utilizing a car, pick-up or van. Access to the Proposed Facility is intended to be furnished via an existing gate in the stadium fence off of Springside Avenue. The site is entirely self-monitored by computers which connect directly to a central office and which alert personnel to equipment malfunction or breach of security. T-Mobile's equipment will be contained within the leased parcel. Hence, the facility will not have any material impact on traffic, parking or storm water control. Moreover, no material noise, glare, smoke, debris, traffic flow or any other nuisance will be generated by the Proposed Facility.

In general, PCS technology does not interfere with any other forms of communication. To the contrary, PCS technology provides vital communications in emergency situations and will be commonly used by local residents and emergency personnel to protect the general public's health, safety and welfare.

The proposed facility will be designed and constructed to meet applicable governmental and industry safety standards. Specifically, T-Mobile will comply with all FCC and FAA rules governing construction requirements, technical standards, interference protection, power and height limitations, and radio frequency standards. In addition, T-Mobile will comply with all applicable FAA rules pertaining to site location. Any and all RF emissions are subject to the exclusive jurisdiction of the FCC.

T-Mobile hereby specifically states that its Petition for a Special Use Permit satisfies any and all applicable criteria under the Downers Grove Ordinance as follows:

**Special Use Criteria:**

According to Village code:

*The Village Council may authorize a special use by ordinance provided that the proposed Special Use is consistent and in substantial compliance with all Village Council policies and land use plans, including but not limited to the Comprehensive Plan, the Future Land Use Plan and Master Plans and the evidence presented is such as to establish the following:*

- (a) That the proposed use at that particular location requested is necessary or desirable to provide a service or a facility which is in the interest of public convenience and will contribute to the general welfare of the neighborhood or community.*

**Wireless is a rapidly growing industry currently experiencing is unprecedented demand for new wireless services and expanded features from both mobile and in-home wireless subscribers. Early mobile phones were installed permanently in vehicles and used exclusively for voice communication as a convenience while traveling, prompting wireless carriers to build their first wave of infrastructure along major roadways in order to satisfy demand from subscribers traveling by vehicle. The next evolution in technology provided portability, allowing the PCS device to be utilized anywhere sufficient signal strength existed, and causing wireless providers to expand their networks beyond the interstate highway system and heavily traveled major thoroughfares into commercial locations and densely populated residential areas. Currently, wireless devices are increasingly used by in-home subscribers in lieu of land-line telephones, as well as for a host of other features never anticipated by early network designers such as text messaging, photo sharing, internet access, and streaming audio and video, all of which require additional bandwidth.**

**The need for the Proposed Facility is based on customer demand for T-Mobile service in the designated target area, which is essentially of a low density, single family character. As subscriber demand continues to grow and the typical user profile evolves away from business and travel voice usage toward a more expansive and technologically consumptive "pedestrian" morphology, wireless providers such as T-Mobile are being forced to find creative methods of increasing signal strength in heretofore off limits**

**locations, such as the residential neighborhood comprising the proposed Site. Without the Site, T-Mobile cannot guarantee reliable, robust service to the Downers Grove community.**

*(b) That such use will not, under the circumstances of the particular case, be detrimental to the health, safety, morals, or general welfare of persons residing or working in the vicinity or injurious to property values or improvements in the vicinity.*

**The Proposed Facility will not be detrimental to or endanger the public health, safety, morals, or general welfare. On the contrary, wireless communication technology has become a vital component of our overall safety infrastructure and is used to promote efficient and effective personal, business, and governmental communications. Consider the following:**

- **As of 2007, there were over 243 million wireless subscribers in the US representing 81% of US households.**
- **Approximately 13% of all US households have abandoned land line phones in favor of wireless phones exclusively, and that number is estimated to be closer to 30% and growing among younger subscribers.**
- **50% of all 9-1-1 calls made each day are made by wireless phone.**
- **“Enhanced 9-1-1” allows emergency dispatchers to locate distressed callers on a GPS grid system.**
- **Due to privacy concerns, municipal emergency service personnel rely on wireless phones for all sensitive intra-departmental communications in order to supplement their proprietary two-way radio systems.**

**Wireless services have become established and accepted as an integral part of the nation's communications infrastructure, and not unlike electric, water, and other public utilities, serve to promote the public health, safety, morals, and general welfare. What's more, Telecommunications Facilities of the sort proposed by T-Mobile have become commonplace in all manner of urban, suburban, exurban and rural locales, and already exist in a variety of sizes, types and locations throughout Downers Grove.**

**Finally, the Federal Communications Commission (“FCC”) controls and regulates the operation of all telecommunications equipment and devices in the US. In accordance with Section 704(a) of the Federal Telecommunications Act of 1996, the FCC likewise maintains sole jurisdiction and authority over any health and environmental effects of radio frequency emissions from personal wireless facilities, especially as such concerns relate to approval criteria for locating said facilities. Specifically stated, “No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.”**

**In compliance with their FCC license, the antennas and equipment T-Mobile proposes to install at this site will conform to all FCC regulations concerning such emissions, as verified by an independent engineering study, a copy of which is included with this application. Routine visits to the site will be made to ensure that the system continues to operate properly. The frequency at which T-Mobile operates will not interfere with any police, fire, or emergency communications.**

*(c) That the proposed use will comply with the regulations specified in this Zoning Ordinance for the district in which the proposed use is to be located or will comply with any variation(s) authorized pursuant to Section 28-1802.*

**This proposal is made in accordance with the zoning regulations that pertain to the R-1 Zoning District as well as those enumerated under §§28.1307 pertaining to telecommunications towers. It is the petitioner's intention to substantially comply with all applicable state, federal, and local laws including regulations specified for this District.**

*(d) That it is one of the special uses specifically listed for the district in which it is to be located.*

**According to §§28.501, communications towers are an Allowed Special Use in the R-1 District under the Downers Grove Ordinance.**

**Telecommunications Tower Standards:**

In addition to the previously discussed Special Use Standards, T-Mobile likewise wishes to address specific elements of Section 28.1307 of the Downers Grove Zoning Ordinance as they pertain to communications towers.

In terms of the general requirements of this subsection, the petitioner has provided below, elsewhere in this document, or to planning staff in documentation accompanying this application; the following supplemental information and/or stipulations:

- An inventory and map of other existing and proposed T-Mobile antenna installations within, or proximate to, the Village of Downers Grove.
- Construction drawings inclusive of (i) a scaled site plan; (ii) plat of survey; (iii) fencing details; (v) elevations showing antenna slots for two providers; (vi) shelter details, (vii) legal description.
- A zoning map of the proposed location.
- A discussion of alternative structures, if any, researched within target coverage area.
- A discussion of the necessity for this site and the type of technology proposed to be employed.
- That the backhaul network (T-1 line) for this site will be provided by ATT.
- That all design work and structural calculations will be performed by licensed professional engineers.



In addition to the above, the petitioner wishes to specifically address §§28.1307(j) which discusses the availability of suitable alternate structures and locations, and §§28.1307(1) which discusses restrictions on towers located in residential districts.

*§§28.1307(j) Availability of Suitable Existing Telecommunications Towers, Other Structures, or Alternative Technology. No new telecommunications tower shall be permitted unless the applicant demonstrates that no existing telecommunications tower, structure or alternative technology that does not require the use of a new telecommunications tower or structures can accommodate the applicant's proposed antenna. Such demonstration shall consist of evidence or information which establishes any of the following:*

*(1) No existing telecommunications towers or structures are located within the geographic area which meet applicant's engineering requirements.*

**T-Mobile has provided maps showing existing sites in relation to the target search area. There are no existing alternate structures within the geographic area T-Mobile is attempting to service, nor and communications towers within the statutory 1,500 foot separation radius prescribed by the Ordinance.**

*(2) Existing telecommunications towers or structures are not of sufficient telecommunications tower height to meet applicant's engineering requirements.*

**As stated above, there are no existing structures inside the target search area suitable for collocation.**

*(3) Existing telecommunications towers or structures do not have sufficient structural strength to support applicant's proposed antenna and related equipment.*

**T-Mobile's preference would have been to mount their antennas directly to the existing light pole at the athletic field, thereby eliminating the need for a replacement structure. The existing light poles were not of sufficient structural integrity, however, making it necessary to propose replacing the existing pole with one of sufficient strength. In order to maintain the optimal height of the field lighting array, the existing pole height was increased by an insignificant amount to provide mounting room for T-Mobile's antennas above the field lighting array.**

*(4) The applicant's proposed antenna would cause electromagnetic interference with the antenna on the existing telecommunications towers or structures, or the antenna on the existing telecommunications towers or structures would cause interference with the applicant's proposed antenna.*

**Not applicable.**

*(5) The fees, costs, or contractual provisions required by the owner in order to share an existing telecommunications tower or structure or to adapt an existing telecommunications tower or structure for sharing are unreasonable. Costs exceeding new telecommunications tower development are presumed to be unreasonable.*

**As noted above, there were no other viable alternatives within the target coverage area to consider for collocation.**

*(6) The applicant demonstrates that there are other limiting factors that render existing telecommunications towers and structures unsuitable.*

**As no other existing telecommunications towers or structures exist in the target location, this requirement is not applicable.**

*(7) The applicant demonstrates that an alternative technology that does not require the use of telecommunications towers or structures is unsuitable. Costs of alternative technology that exceed new telecommunications tower or antenna development shall not be presumed to render the technology unsuitable.*

**Given T-Mobile's network architecture, there is currently no cost effective alternate technology that would resolve the coverage issues in this location.**

This subsection appears to require a petitioner to provide evidence establishing any *one* of the seven stated criteria. It is the assertion of T-Mobile that the proposed site at Downers South High School meets *all* of the applicable requirements of this subsection.

What's more, this subsection pertains to the construction of "new" telecommunications towers. While the proposed light pole at Downers South will indeed be "new," it is in effect a replacement of an existing structure with one of comparable height for reasons of structural insufficiency. Viewed in this light, T-Mobile's proposal is not an addition of new aerial infrastructure which the Ordinance intends to discourage, but the modification of existing infrastructure in keeping with the spirit of the Ordinance.

*§§28.1307(l) Location in Residential Districts Restricted. Location of telecommunications towers in residential districts is to be discouraged. To that end, and in addition to other provisions of this Section, no telecommunications tower shall be permitted in a residential district unless one of the following is established:*

*(1) There are no sites within non-residential districts which will accomplish substantially the same coverage and that the proposed residential site is absolutely necessary, from a technical perspective.*

**The target area T-Mobile is attempting to serve is entirely residential in nature. There are no existing structures of height that could adequately service the neighborhood in question.**

*(2) Because of unique circumstances, such as but not limited to the location of the property and proximity of residential structures, the proposed telecommunications tower will have no significant adverse impact on existing or reasonably anticipated residential uses or property values in the area of the proposed tower.*

**The selection of the field light pole at Downers Grove HS is ideal in that it is an existing structure of height which the surrounding community is already accustomed to seeing. The proposed addition to the pole is minimal in terms of additional height, and the antenna platform is no larger than the existing lighting array. As such, the replacement of the existing light pole with a like structure will have no adverse impact on uses or property values in the area. T-Mobile has commissioned an independent study by David Kunkel, MAI, affirming there would be no adverse impact from the proposed installation on area property values.**

It is the petitioner's assertion that the proposed facility will not only be of great benefit to the community in terms of improved wireless service, but is evident of a strong cooperative effort between public and private sectors, and a positive step toward bringing new non-tax-based revenue sources to the school district.

Thank you for your time and consideration of this matter.

**DAVID  
A.  
KUNKEL & ASSOCIATES, INC.**

REAL ESTATE APPRAISERS AND CONSULTANTS

1440 Maple Avenue, Suite 4B  
Lisle, Illinois 60532

Phone: (630) 729-1000 / Fax: (630) 929-9785  
E-Mail: [mainoffice@kunkelassociates.com](mailto:mainoffice@kunkelassociates.com)

October 16, 2007

Mr. Mark Layne  
T-Mobile  
8550 W. Bryn Mawr Ave., Suite 100  
Chicago, Illinois 60631

Re: Proposed Communications Equipment Site #CH65-326F  
Downers Grove South H.S.; 1860 63<sup>rd</sup> Street, Downers Grove, Illinois (File #7092508)

Dear Mr. Layne:

Pursuant to your request, I have completed an inspection and review of the above captioned location, relative to the potential impact, if any, on the Market Value of surrounding properties by the installation of communications equipment on the site.

The proposed equipment is to consist of a 90-foot light pole replacement, situated on a leased site ("the site") measuring 28.0 x 10.0 feet, located adjacent to and on the west side of the football field situated at the above high school facility. The monopole will be designed as a light pole, providing lighting to the football field, but will include antennas at the top. The lights will be at a height of 80 feet. The site will be located under the existing bleachers along the west side of the football field, almost directly across from the intersection of Taylor Street and Springside Avenue. This type of installation can be found at a number of other metropolitan area high school facilities, including Westmont, Hoffman Estates, Conant and Schaumburg high schools.

The immediate area is dominated by the high school and its supporting facilities, including several out-buildings, a baseball field,  $\pm$ 10 tennis courts, parking areas and the main school building. The athletic fields along the west portion of the larger property, including the football field, are currently improved with numerous light poles for night use.

The area surrounding the high school facilities consists primarily of residential property uses, consisting of a mixture of detached and attached single family homes. The majority of detached homes in the immediate vicinity are situated on 1/4 to 1/2 acre lots. Streets in the immediate area are mostly 2-lane, secondary streets, with 63<sup>rd</sup> Street being a 4-lane primary artery through the area. Springside Avenue runs south from 63<sup>rd</sup> Street, and along the west side of the school property, serving as a primary arterial street for the neighborhood to the west of the school.

Research of the Multiple Listing Service of Northern Illinois (MLSNI) indicates a moderately active market for single family homes in the immediate area. In a geographic area having a 1/2

Mr. Mark Layne  
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mile radius around the subject site there have been 17 closed transactions of detached single family homes over the past year, with prices ranging from \$277,000 to \$1,425,000, averaging just over \$510,000. There are 4 additional properties that are currently pending sale, with asking prices of \$379,000, \$410,000, \$469,900 and \$1,295,000. There are 21 homes currently on the market with an average asking price of nearly \$450,000. Attached housing is also a prevalent housing style in the immediate area, with 38 closed transactions over this same time period. These prices ranged from \$190,000 to \$300,000, averaging just over \$235,000. Currently, there are 18 active listings of this property type, with an average list price of just over \$245,000. Observation from the street reveals overall maintenance levels appearing to be average to good.

As noted above, the proposed equipment consists of a 90-foot light pole replacement, situated on a leased site ("the site") measuring 28.0 x 10.0 feet, located under the existing bleachers and adjacent on the west side of the football field situated at the above high school facility. The monopole will be designed as a light pole, providing lighting to the football field, but will include antennas at the top. The lights will be at a height of 80 feet. The equipment typically associated with this type of facility will be located on the ground level, within the leased site under the bleachers. The site will be surrounded by 6-foot chain link fencing.

As you are aware, I have extensive experience in evaluating the effect on surrounding properties of communications monopole/equipment sites of this type, summarized as follows:

For your general information, I am the owner and president of the real estate appraisal/consulting firm shown on the above letterhead. I have been directly involved in the valuation and analysis of real estate of all types since 1981. I hold the MAI designation from the Appraisal Institute, am licensed with the State of Illinois as a Certified General Appraiser, and additionally am a licensed real estate broker in Illinois, holding the commercial brokerage designation of CCIM. A more detailed summary of my educational and professional background, as well as my experience in the real estate valuation/consultation field, is attached.

Specifically with regard to the type of situation you have called upon me to address, my firm has been involved in a number of consultation assignments specific to this issue over the past 10 to 12 years. All of these assignments have been in the Chicago metropolitan area, including the communities of Aurora, Barrington, Barrington Hills, Buffalo Grove, Chicago, Glencoe, Homewood, Lincolnshire, Kenilworth, Maple Park, Midlothian, North Barrington, Oak Forest, Streamwood, Vernon Hills, Westmont, Willow Springs and Winnetka. These locations have involved a variety of neighborhood types, including residential, commercial, industrial, and farmland. The work we have performed in each case has varied, ranging from providing written studies on specific sites, to giving presentations at Village hearings and/or testifying in court for litigation matters relating to this property type.

In the process of completing these assignments, the request specifically made of us in each case has been to determine what effect, if any, a communications equipment site may have on the

Mr. Mark Layne  
T-Mobile  
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value of surrounding and/or nearby properties. Of significant importance to these consultation assignments is the following: We are not paid, nor do we accept assignments in which a specific position on this issue is advocated. Our sole impetus is to be entirely objective, providing sound reasoning for our conclusions, and based upon the actions and reactions of the buying and selling real estate market.

In each of these situations our basic plan of analysis has been twofold. First, we have researched property sales, including all details of the transactions and the physical characteristics of the properties involved, in order to ascertain if any difference in actual sale prices could be detected due to location near or in view of a communications equipment site. The basic premise of this analysis type is founded in the principles of real estate valuation commonly accepted and utilized by all courts of law, governmental bodies, and major banks. This premise is that of the direct comparison of physical and locational characteristics of properties that have sold, resulting in a determination of the market reaction, if any, to various factors relative to those properties, and expressed in dollars.

The second aspect of our analysis plan has been to interview and consult with other real estate professionals, specifically those directly involved in the marketing and sale of properties, to discover their opinions of this same issue, relative to their daily professional lives in dealing directly with buyers and sellers of real estate.

As we have completed these assignments, we have determined essentially three categories of potential impact and concern exist. These categories are as follows:

- 1) *Environmental* - The potential for pollution of the air, surface, and/or sub-surface.
- 2) *Health* - The potential impact on nearby inhabitants and/or property users.
- 3) *View* - The potential impact on nearby inhabitants and/or property users.

In the process of completing the aforementioned consultation assignments, we have completed the above two step analysis plan on 40 to 50 locations involving wireless communications facilities; several of which we have analyzed during separate time periods. As mentioned above, these locations involved a variety of property types (residential, commercial, etc.), however approximately 35 to 40 of these were residential in character. Although every situation has the potential for unique variables, our experiences with those locations analyzed have repeatedly resulted in the following 5 points of finding:

- 1) To our knowledge there is no evidence to suggest that any environmental or health issues arise as a result of communications equipment sites.
- 2) To our knowledge there is no supported perception, within the general buying and selling real estate populace, suggesting any environmental or health issues arise as a result of communications equipment sites.

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- 3) We have found no ascertainable difference in property values as a result of this specific locational characteristic.
- 4) Other real estate professionals have repeatedly reiterated there is a lack of market evidence supporting an ascertainable difference in property values as a result of this specific locational characteristic.
- 5) Changes in market values, specifically appreciation, are not restrained as a result of this specific locational characteristic.

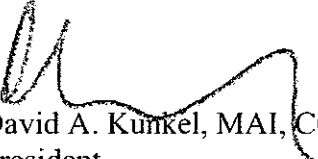
It is important to note that any situation of this type must be evaluated on its own merits, and within the context of the specific site and its environs. The location in question is in an area of primarily residential property uses, but is dominated by the high school and its related facilities. As with most developed areas, the immediate location includes multiple protrusions into the sky, including existing light poles around the athletic fields, telephone poles, power lines, etc. The proposed equipment at ground level will be near the base of the tower, surrounded by a fence and under an existing set of bleachers. This results in communications equipment that will be marginally noticeable to the eye by passing vehicles or pedestrians in relationship to the existing landscape, and results in a site location that is superior to many others in the area for this type of use.

It is therefore my opinion, based on review of the proposed plans, inspection of the site, as well as our experience with this factor in other locations, that the proposed communications equipment will not have any negative impact on the use, enjoyment, or value of surrounding properties. Additionally, it is my opinion that no substantial or undue adverse effect upon adjacent property, the character of the area, or other matters affecting the public health, safety, and general welfare will occur.

If I can be of further service please contact me.

Sincerely,

*DAVID A. KUNKEL & ASSOCIATES, INC.*

  
David A. Kunkel, MAI, CCIM  
President

Attachment

## QUALIFICATION SUMMARY - DAVID A. KUNKEL, MAI, CCIM

### EDUCATION

Bachelor of Arts, Metropolitan State University, St. Paul, Minnesota

Successfully completed the following courses/examinations sponsored by the American Institute of Real Estate Appraisers: "1A-1" Real Estate Appraisal Principles (03/81); "1A-2" Basic Valuation Procedures (05/81); "1B-1" Capitalization Theory Techniques, Part I (09/81); "1B-2" Capitalization Theory and Techniques, Part 2 (03/83); "1B-3" Capitalization Theory and Techniques, Part 3 (11/81); "2-1" Case Studies in Real Estate Valuation (12/84); "2-2" Valuation Analysis and Report Writing (11/85); "2-3" Standards of Professional Practice (03/84); "8-2" Residential Valuation (09/83); MAI Comprehensive Examination (02/89).

Successfully challenged the following examinations sponsored by the Society of Real Estate Appraisers: "101" An Introduction to Appraising Real Property (11/88); "102" Applied Residential Property Valuation (11/88); "201" Principles of Income Property Appraising (11/88); "202" Applied Income Property Valuation (11/88).

Successfully challenged the following examinations sponsored by the National Association of Independent Fee Appraisers: Residential Member Examination (12/87); Senior Member Examination (10/88).

Attend numerous real estate and appraisal-related educational programs on an on-going basis.

### PROFESSIONAL AFFILIATIONS

MAI Designation #8128, Appraisal Institute

Certified General Real Estate Appraiser -- IL#553.000198

CCIM Designation #11909, CCIM Institute of the National Association of Realtors

Licensed Real Estate Broker -- IL#075.0085008

Member: DeKalb Area Association of Realtors

Member: Realtor Association of West/South Suburban Chicagoland

Member: Illinois Association of Realtors

Member: Illinois Coalition of Appraisal Professionals (ICAP)

Member: Multiple Listing Service of Northern Illinois, Inc.

Member: National Association of Realtors

Member: Northern Illinois Commercial Association of Realtors

Lifetime Member: National Eagle Scout Association (NESA)

Member of the following Chambers of Commerce: Aurora, Joliet, Lisle, Naperville, Wheaton

### PROFESSIONAL EXPERIENCE

- 08/87 to present - President, *DAVID A. KUNKEL & ASSOCIATES, INC.*
- 12/85 to 08/87 - Vice President, The Appraisal Company
- 04/84 to 12/85 - Managing Partner, Kunkel & Wnek Realty Consultants
- 03/83 to 04/84 - Sole proprietor, David A. Kunkel & Associates
- 08/82 to 03/83 - Appraiser, Illinois Central Gulf Railroad, Real Estate Dept.
- 01/81 to 08/82 - Staff Appraiser, Joseph A. Renzi & Associates, Inc.



QUALIFICATION SUMMARY - DAVID A. KUNKEL, MAI, CCIM - (continued)

Experienced in the preparation of appraisals for sale, acquisition, leasing, tax assessment, insurance, condemnation and mortgage lending purposes of all property types, including appraisals in the states of Alabama, Delaware, Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, Ohio, Tennessee and Wisconsin.

Qualified as an expert witness in the Circuit Courts of Cook, DuPage and Lake Counties in Illinois, as well as the United States Bankruptcy Court for the Northern District of Illinois.

Qualified as an expert witness before the Property Tax Appeal Board for the State of Illinois, as well as in the Counties of Cook, DuPage and Lake.

Testified before various planning and zoning commissions in the City of Chicago and surrounding suburban areas.

Appraiser Qualifications Board (AQB) Certified USPAP Instructor.

Approved course instructor for The Appraisal Institute.

Real Estate Faculty Member; Elgin Community College and Triton College.

Guest speaker at various Real Estate related seminars and business meetings.

Member of the 1993 Urban Valuation Delegation to Latvia and Russia sponsored by People to People International.

COMMITTEE PARTICIPATION - APPRAISAL INSTITUTE

Have served on various committees with the Appraisal Institute, including: RM Admissions; MAI/RM Candidate Guidance; Legislative and State Activities; Public Relations/External Affairs; Ethics & Counseling (Region III); Political Affairs; International Relations; MAI (General) Admissions; Media Resource.

ASSIGNMENTS COMPLETED

Typical assignments have included:

|                                |                              |
|--------------------------------|------------------------------|
| Alley vacations                | Office buildings             |
| Apartments                     | Planned unit developments    |
| Banks                          | Recreational facilities      |
| Car washes                     | Restaurants                  |
| Churches                       | Schools                      |
| Commercial buildings           | Service stations             |
| Condominiums and co-operatives | Single-family residences     |
| Easements                      | Shopping centers             |
| Industrial buildings           | Transportation right-of-ways |
| Lodging facilities             | Unimproved land sites        |
| Mortuary buildings             | Utility easements            |

# RF EMISSIONS COMPLIANCE REPORT

## T-Mobile

Site: CH65326F - DGS High School Replc.  
1860 63rd Street  
Downers Grove, IL  
11/12/2007

### Report Status:

**T-Mobile Is Under 5% Threshold**

Prepared By:

**SiteSafe, Inc.**

Engineering Statement in Re:  
Electromagnetic Energy Analysis  
T-Mobile  
Downers Grove, IL

Upon penalty of perjury, I, Klaus Bender, state:

That I am registered as a Professional Engineer in the Commonwealth of Virginia; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am a contractor to Sitesafe, Inc. in Arlington, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by T-Mobile (See attached Site Summary and Carrier documents), and that T-Mobile's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "CH65326F - DGS High School Replc." ("the site"); and

That T-Mobile proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by T-Mobile and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of T-Mobile's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed T-Mobile operation is no more than 0.251% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

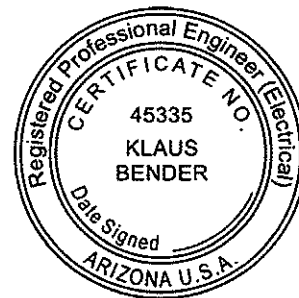
That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that T-Mobile's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Date: November 13, 2007



Klaus Bender, P.E.  
Registered Professional Engineer  
State of Arizona Certificate No. 45335

**T-Mobile**  
**CH65326F - DGS High School Replc.**  
**Site Summary**

| <b>Carrier</b>             | <b>Area Maximum Percentage MPE</b> |
|----------------------------|------------------------------------|
| T-Mobile                   | 0.251 %                            |
| <b>Composite Site MPE:</b> | 0.251 %                            |

**T-Mobile  
CH65326F - DGS High School Replc.  
Carrier Summary**

Frequency: 1930 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 2.51442  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.25144 %

| Antenna Make | Model         | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis   |                | Area  |                |
|--------------|---------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
|              |               |               |                            |             | Max Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Percent of MPE | Max Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Percent of MPE |
| Andrew       | TMBX-6517-R2M | 90            | 0                          | 2500        | 2.054156  | 0.205416       | 2.288848  | 0.228885       |
| Andrew       | TMBX-6517-R2M | 90            | 120                        | 2500        | 2.054156  | 0.205416       | 2.288848  | 0.228885       |
| Andrew       | TMBX-6517-R2M | 90            | 240                        | 2500        | 2.054156  | 0.205416       | 2.288848  | 0.228885       |

**T-Mobile**  
**CH65326F - DGS High School Replc.**  
**Andrew:TMBX-6517-R2M Antenna Worksheet (0 Sector)**

Maximum Permissible Exposure (MPE): 1000  
 ERP (Watts): 2500      Height (feet): 90      Frequency (MHz): 1930      Downtilt (Degrees): 0.0

| Depression Angle (degrees) | Relative dB | Relative Gain | Slant Distance (meters) | Dist From Structure (meters) | Power Density (μW/cm <sup>2</sup> ) | Percent of MPE | Times Below MPE |
|----------------------------|-------------|---------------|-------------------------|------------------------------|-------------------------------------|----------------|-----------------|
| 0.1                        | -2.12       | 0.6138        | 14571.50                | 14571.48                     | 0.000393                            | 0.000039       | 2547081         |
| 1.0                        | -0.50       | 0.8913        | 1457.22                 | 1457.00                      | 0.039257                            | 0.003926       | 25473           |
| 2.0                        | 0.00        | 1.0000        | 728.72                  | 728.28                       | 0.156979                            | 0.015698       | 6370            |
| 3.0                        | -0.90       | 0.8128        | 485.94                  | 485.27                       | 0.353023                            | 0.035302       | 2832            |
| 4.0                        | -3.30       | 0.4677        | 364.58                  | 363.70                       | 0.627151                            | 0.062715       | 1594            |
| 5.0                        | -8.00       | 0.1585        | 291.80                  | 290.69                       | 0.979027                            | 0.097903       | 1021            |
| 6.0                        | -18.20      | 0.0151        | 243.30                  | 241.97                       | 1.408225                            | 0.140822       | 710             |
| 7.0                        | -24.70      | 0.0034        | 208.68                  | 207.13                       | 1.914220                            | 0.191422       | 522             |
| 8.0                        | -15.40      | 0.0288        | 182.74                  | 180.96                       | 2.054156                            | 0.205416       | 486             |
| 9.0                        | -16.00      | 0.0251        | 162.57                  | 160.57                       | 1.543013                            | 0.154301       | 648             |
| 10.0                       | -20.90      | 0.0081        | 146.46                  | 144.23                       | 0.686764                            | 0.068676       | 1456            |
| 12.0                       | -23.60      | 0.0044        | 122.32                  | 119.65                       | 0.197848                            | 0.019785       | 5054            |
| 14.0                       | -26.80      | 0.0021        | 105.13                  | 102.00                       | 0.235175                            | 0.023518       | 4252            |
| 16.0                       | -26.30      | 0.0023        | 92.27                   | 88.69                        | 0.077841                            | 0.007784       | 12846           |
| 18.0                       | -30.80      | 0.0008        | 82.30                   | 78.27                        | 0.227427                            | 0.022743       | 4397            |
| 20.0                       | -22.30      | 0.0059        | 74.36                   | 69.87                        | 0.277809                            | 0.027781       | 3599            |
| 22.0                       | -18.40      | 0.0145        | 67.89                   | 62.95                        | 0.332735                            | 0.033273       | 3005            |
| 24.0                       | -24.40      | 0.0036        | 62.53                   | 57.12                        | 0.391123                            | 0.039112       | 2556            |
| 26.0                       | -30.30      | 0.0009        | 58.01                   | 52.14                        | 0.453000                            | 0.045300       | 2207            |
| 28.0                       | -32.20      | 0.0006        | 54.17                   | 47.83                        | 0.357878                            | 0.035788       | 2794            |
| 30.0                       | -31.20      | 0.0008        | 50.86                   | 44.05                        | 0.086813                            | 0.008681       | 11519           |
| 32.0                       | -27.20      | 0.0019        | 47.99                   | 40.70                        | 0.097076                            | 0.009708       | 10301           |
| 34.0                       | -39.90      | 0.0001        | 45.48                   | 37.70                        | 0.107611                            | 0.010761       | 9292            |
| 36.0                       | -31.50      | 0.0007        | 43.27                   | 35.00                        | 0.118208                            | 0.011821       | 8459            |
| 38.0                       | -32.40      | 0.0006        | 41.31                   | 32.55                        | 0.071870                            | 0.007187       | 13913           |
| 40.0                       | -37.00      | 0.0002        | 39.57                   | 30.31                        | 0.071406                            | 0.007141       | 14004           |
| 42.0                       | -32.60      | 0.0005        | 38.01                   | 28.25                        | 0.248255                            | 0.024825       | 4028            |
| 44.0                       | -36.10      | 0.0002        | 36.61                   | 26.34                        | 0.568532                            | 0.056853       | 1758            |
| 46.0                       | -24.90      | 0.0032        | 35.35                   | 24.56                        | 0.618688                            | 0.061869       | 1616            |
| 48.0                       | -21.40      | 0.0072        | 34.22                   | 22.90                        | 0.656552                            | 0.065655       | 1523            |
| 50.0                       | -21.90      | 0.0065        | 33.20                   | 21.34                        | 0.692782                            | 0.069278       | 1443            |
| 52.0                       | -25.70      | 0.0027        | 32.27                   | 19.87                        | 0.727983                            | 0.072798       | 1373            |
| 54.0                       | -34.40      | 0.0004        | 31.44                   | 18.48                        | 0.761009                            | 0.076101       | 1314            |
| 56.0                       | -40.00      | 0.0001        | 30.68                   | 17.15                        | 0.502952                            | 0.050295       | 1988            |
| 58.0                       | -40.00      | 0.0001        | 29.99                   | 15.89                        | 0.154655                            | 0.015466       | 6465            |
| 60.0                       | -40.00      | 0.0001        | 29.37                   | 14.68                        | 0.043438                            | 0.004344       | 23021           |
| 62.0                       | -37.70      | 0.0002        | 28.80                   | 13.52                        | 0.046757                            | 0.004676       | 21387           |
| 64.0                       | -35.00      | 0.0003        | 28.30                   | 12.40                        | 0.047979                            | 0.004798       | 20842           |
| 66.0                       | -34.80      | 0.0003        | 27.84                   | 11.32                        | 0.049149                            | 0.004915       | 20346           |
| 68.0                       | -37.30      | 0.0002        | 27.43                   | 10.28                        | 0.050203                            | 0.005020       | 19919           |
| 70.0                       | -40.00      | 0.0001        | 27.06                   | 9.26                         | 0.051137                            | 0.005114       | 19555           |
| 72.0                       | -40.00      | 0.0001        | 26.74                   | 8.26                         | 0.046597                            | 0.004660       | 21460           |
| 74.0                       | -37.10      | 0.0002        | 26.46                   | 7.29                         | 0.053719                            | 0.005372       | 18615           |
| 76.0                       | -35.30      | 0.0003        | 26.21                   | 6.34                         | 0.054286                            | 0.005429       | 18420           |
| 78.0                       | -35.50      | 0.0003        | 26.00                   | 5.41                         | 0.054720                            | 0.005472       | 18274           |
| 80.0                       | -35.40      | 0.0003        | 25.82                   | 4.48                         | 0.055021                            | 0.005502       | 18174           |
| 82.0                       | -35.90      | 0.0003        | 25.68                   | 3.57                         | 0.055188                            | 0.005519       | 18119           |
| 84.0                       | -36.4       | 0.0002        | 25.57                   | 2.67                         | 0.052872                            | 0.005287       | 18913           |
| 86.0                       | -37.8       | 0.0002        | 25.49                   | 1.78                         | 0.046322                            | 0.004632       | 21587           |
| 88.0                       | -38.2       | 0.0002        | 25.45                   | 0.89                         | 0.03793                             | 0.003793       | 26364           |
| 90.0                       | -38.2       | 0.0002        | 25.43                   | 0                            | 0.027828                            | 0.002783       | 35935           |

**T-Mobile**  
**CH65326F - DGS High School Replc.**  
**Andrew:TMBX-6517-R2M Antenna Worksheet (120 Sector)**

Maximum Permissible Exposure (MPE):

1000

ERP (Watts): 2500      Height (feet): 90      Frequency (MHz): 1930      Downtilt (Degrees): 0.0

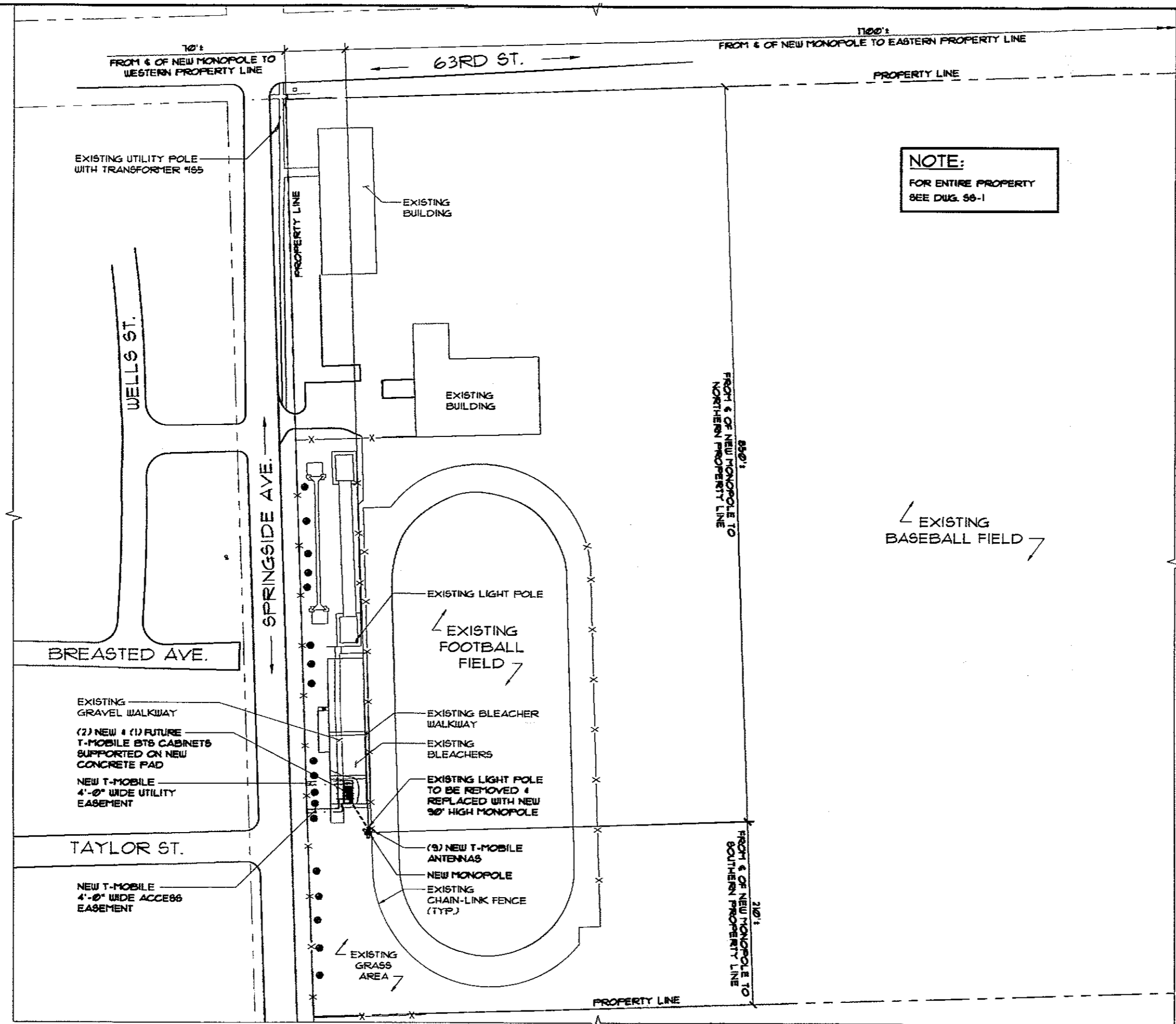
| Depression Angle (degrees) | Relative dB | Relative Gain | Slant Distance (meters) | Dist From Structure (meters) | Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Percent of MPE | Times Below MPE |
|----------------------------|-------------|---------------|-------------------------|------------------------------|---|----------------|-----------------|
| 0.1                        | -2.12       | 0.6138        | 14571.50                | 14571.48                     | 0.000393                                    | 0.000039       | 2547081         |
| 1.0                        | -0.50       | 0.8913        | 1457.22                 | 1457.00                      | 0.039257                                    | 0.003926       | 25473           |
| 2.0                        | 0.00        | 1.0000        | 728.72                  | 728.28                       | 0.156979                                    | 0.015698       | 6370            |
| 3.0                        | -0.90       | 0.8128        | 485.94                  | 485.27                       | 0.353023                                    | 0.035302       | 2832            |
| 4.0                        | -3.30       | 0.4677        | 364.58                  | 363.70                       | 0.627151                                    | 0.062715       | 1594            |
| 5.0                        | -8.00       | 0.1585        | 291.80                  | 290.69                       | 0.979027                                    | 0.097903       | 1021            |
| 6.0                        | -18.20      | 0.0151        | 243.30                  | 241.97                       | 1.408225                                    | 0.140822       | 710             |
| 7.0                        | -24.70      | 0.0034        | 208.68                  | 207.13                       | 1.914220                                    | 0.191422       | 522             |
| 8.0                        | -15.40      | 0.0288        | 182.74                  | 180.96                       | 2.054156                                    | 0.205416       | 486             |
| 9.0                        | -16.00      | 0.0251        | 162.57                  | 160.57                       | 1.543013                                    | 0.154301       | 648             |
| 10.0                       | -20.90      | 0.0081        | 146.46                  | 144.23                       | 0.686764                                    | 0.068676       | 1456            |
| 12.0                       | -23.60      | 0.0044        | 122.32                  | 119.65                       | 0.197596                                    | 0.019760       | 5060            |
| 14.0                       | -26.80      | 0.0021        | 105.13                  | 102.00                       | 0.235175                                    | 0.023518       | 4252            |
| 16.0                       | -26.30      | 0.0023        | 92.27                   | 88.69                        | 0.077841                                    | 0.007784       | 12846           |
| 18.0                       | -30.80      | 0.0008        | 82.30                   | 78.27                        | 0.227427                                    | 0.022743       | 4397            |
| 20.0                       | -22.30      | 0.0059        | 74.36                   | 69.87                        | 0.277102                                    | 0.027710       | 3608            |
| 22.0                       | -18.40      | 0.0145        | 67.89                   | 62.95                        | 0.332735                                    | 0.033273       | 3005            |
| 24.0                       | -24.40      | 0.0036        | 62.53                   | 57.12                        | 0.389631                                    | 0.038963       | 2566            |
| 26.0                       | -30.30      | 0.0009        | 58.01                   | 52.14                        | 0.453000                                    | 0.045300       | 2207            |
| 28.0                       | -32.20      | 0.0006        | 54.17                   | 47.83                        | 0.357878                                    | 0.035788       | 2794            |
| 30.0                       | -31.20      | 0.0008        | 50.86                   | 44.05                        | 0.086261                                    | 0.008626       | 11592           |
| 32.0                       | -27.20      | 0.0019        | 47.99                   | 40.70                        | 0.097076                                    | 0.009708       | 10301           |
| 34.0                       | -39.90      | 0.0001        | 45.48                   | 37.70                        | 0.107611                                    | 0.010761       | 9292            |
| 36.0                       | -31.50      | 0.0007        | 43.27                   | 35.00                        | 0.118208                                    | 0.011821       | 8459            |
| 38.0                       | -32.40      | 0.0006        | 41.31                   | 32.55                        | 0.071870                                    | 0.007187       | 13913           |
| 40.0                       | -37.00      | 0.0002        | 39.57                   | 30.31                        | 0.071406                                    | 0.007141       | 14004           |
| 42.0                       | -32.60      | 0.0005        | 38.01                   | 28.25                        | 0.248255                                    | 0.024825       | 4028            |
| 44.0                       | -36.10      | 0.0002        | 36.61                   | 26.34                        | 0.563483                                    | 0.056348       | 1774            |
| 46.0                       | -24.90      | 0.0032        | 35.35                   | 24.56                        | 0.613975                                    | 0.061398       | 1628            |
| 48.0                       | -21.40      | 0.0072        | 34.22                   | 22.90                        | 0.656552                                    | 0.065655       | 1523            |
| 50.0                       | -21.90      | 0.0065        | 33.20                   | 21.34                        | 0.692782                                    | 0.069278       | 1443            |
| 52.0                       | -25.70      | 0.0027        | 32.27                   | 19.87                        | 0.727983                                    | 0.072798       | 1373            |
| 54.0                       | -34.40      | 0.0004        | 31.44                   | 18.48                        | 0.761009                                    | 0.076101       | 1314            |
| 56.0                       | -40.00      | 0.0001        | 30.68                   | 17.15                        | 0.502952                                    | 0.050295       | 1988            |
| 58.0                       | -40.00      | 0.0001        | 29.99                   | 15.89                        | 0.153087                                    | 0.015309       | 6532            |
| 60.0                       | -40.00      | 0.0001        | 29.37                   | 14.68                        | 0.043438                                    | 0.004344       | 23021           |
| 62.0                       | -37.70      | 0.0002        | 28.80                   | 13.52                        | 0.046282                                    | 0.004628       | 21606           |
| 64.0                       | -35.00      | 0.0003        | 28.30                   | 12.40                        | 0.047492                                    | 0.004749       | 21056           |
| 66.0                       | -34.80      | 0.0003        | 27.84                   | 11.32                        | 0.048588                                    | 0.004859       | 20581           |
| 68.0                       | -37.30      | 0.0002        | 27.43                   | 10.28                        | 0.050203                                    | 0.005020       | 19919           |
| 70.0                       | -40.00      | 0.0001        | 27.06                   | 9.26                         | 0.050489                                    | 0.005049       | 19806           |
| 72.0                       | -40.00      | 0.0001        | 26.74                   | 8.26                         | 0.046597                                    | 0.004660       | 21460           |
| 74.0                       | -37.10      | 0.0002        | 26.46                   | 7.29                         | 0.053719                                    | 0.005372       | 18615           |
| 76.0                       | -35.30      | 0.0003        | 26.21                   | 6.34                         | 0.053462                                    | 0.005346       | 18704           |
| 78.0                       | -35.50      | 0.0003        | 26.00                   | 5.41                         | 0.053890                                    | 0.005389       | 18556           |
| 80.0                       | -35.40      | 0.0003        | 25.82                   | 4.48                         | 0.055021                                    | 0.005502       | 18174           |
| 82.0                       | -35.90      | 0.0003        | 25.68                   | 3.57                         | 0.055188                                    | 0.005519       | 18119           |
| 84.0                       | -36.4       | 0.0002        | 25.57                   | 2.67                         | 0.052872                                    | 0.005287       | 18913           |
| 86.0                       | -37.8       | 0.0002        | 25.49                   | 1.78                         | 0.046322                                    | 0.004632       | 21587           |
| 88.0                       | -38.2       | 0.0002        | 25.45                   | 0.89                         | 0.037402                                    | 0.00374        | 26736           |
| 90.0                       | -38.2       | 0.0002        | 25.43                   | 0                            | 0.027828                                    | 0.002783       | 35935           |



**T-Mobile**  
**CH65326F - DGS High School Replc.**  
**Andrew:TMBX-6517-R2M Antenna Worksheet (240 Sector)**

Maximum Permissible Exposure (MPE): 1000  
 ERP (Watts): 2500      Height (feet): 90      Frequency (MHz): 1930      Downtilt (Degrees): 0.0

| Depression Angle (degrees) | Relative dB | Relative Gain | Slant Distance (meters) | Dist From Structure (meters) | Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Percent of MPE | Times Below MPE |
|----------------------------|-------------|---------------|-------------------------|------------------------------|---|----------------|-----------------|
| 0.1                        | -2.12       | 0.6138        | 14571.50                | 14571.48                     | 0.000393                                    | 0.000039       | 2547081         |
| 1.0                        | -0.50       | 0.8913        | 1457.22                 | 1457.00                      | 0.039257                                    | 0.003926       | 25473           |
| 2.0                        | 0.00        | 1.0000        | 728.72                  | 728.28                       | 0.156979                                    | 0.015698       | 6370            |
| 3.0                        | -0.90       | 0.8128        | 485.94                  | 485.27                       | 0.353023                                    | 0.035302       | 2832            |
| 4.0                        | -3.30       | 0.4677        | 364.58                  | 363.70                       | 0.627151                                    | 0.062715       | 1594            |
| 5.0                        | -8.00       | 0.1585        | 291.80                  | 290.69                       | 0.979027                                    | 0.097903       | 1021            |
| 6.0                        | -18.20      | 0.0151        | 243.30                  | 241.97                       | 1.408225                                    | 0.140822       | 710             |
| 7.0                        | -24.70      | 0.0034        | 208.68                  | 207.13                       | 1.914220                                    | 0.191422       | 522             |
| 8.0                        | -15.40      | 0.0288        | 182.74                  | 180.96                       | 2.054156                                    | 0.205416       | 486             |
| 9.0                        | -16.00      | 0.0251        | 162.57                  | 160.57                       | 1.541048                                    | 0.154105       | 648             |
| 10.0                       | -20.90      | 0.0081        | 146.46                  | 144.23                       | 0.685889                                    | 0.068589       | 1457            |
| 12.0                       | -23.60      | 0.0044        | 122.32                  | 119.65                       | 0.197848                                    | 0.019785       | 5054            |
| 14.0                       | -26.80      | 0.0021        | 105.13                  | 102.00                       | 0.234576                                    | 0.023458       | 4263            |
| 16.0                       | -26.30      | 0.0023        | 92.27                   | 88.69                        | 0.077643                                    | 0.007764       | 12879           |
| 18.0                       | -30.80      | 0.0008        | 82.30                   | 78.27                        | 0.226848                                    | 0.022685       | 4408            |
| 20.0                       | -22.30      | 0.0059        | 74.36                   | 69.87                        | 0.277809                                    | 0.027781       | 3599            |
| 22.0                       | -18.40      | 0.0145        | 67.89                   | 62.95                        | 0.331465                                    | 0.033147       | 3016            |
| 24.0                       | -24.40      | 0.0036        | 62.53                   | 57.12                        | 0.391123                                    | 0.039112       | 2556            |
| 26.0                       | -30.30      | 0.0009        | 58.01                   | 52.14                        | 0.450697                                    | 0.045070       | 2218            |
| 28.0                       | -32.20      | 0.0006        | 54.17                   | 47.83                        | 0.356059                                    | 0.035606       | 2808            |
| 30.0                       | -31.20      | 0.0008        | 50.86                   | 44.05                        | 0.086813                                    | 0.008681       | 11519           |
| 32.0                       | -27.20      | 0.0019        | 47.99                   | 40.70                        | 0.096460                                    | 0.009646       | 10367           |
| 34.0                       | -39.90      | 0.0001        | 45.48                   | 37.70                        | 0.106927                                    | 0.010693       | 9352            |
| 36.0                       | -31.50      | 0.0007        | 43.27                   | 35.00                        | 0.117457                                    | 0.011746       | 8513            |
| 38.0                       | -32.40      | 0.0006        | 41.31                   | 32.55                        | 0.071323                                    | 0.007132       | 14020           |
| 40.0                       | -37.00      | 0.0002        | 39.57                   | 30.31                        | 0.070863                                    | 0.007086       | 14111           |
| 42.0                       | -32.60      | 0.0005        | 38.01                   | 28.25                        | 0.246364                                    | 0.024636       | 4059            |
| 44.0                       | -36.10      | 0.0002        | 36.61                   | 26.34                        | 0.568532                                    | 0.056853       | 1758            |
| 46.0                       | -24.90      | 0.0032        | 35.35                   | 24.56                        | 0.618688                                    | 0.061869       | 1616            |
| 48.0                       | -21.40      | 0.0072        | 34.22                   | 22.90                        | 0.649893                                    | 0.064989       | 1538            |
| 50.0                       | -21.90      | 0.0065        | 33.20                   | 21.34                        | 0.685755                                    | 0.068576       | 1458            |
| 52.0                       | -25.70      | 0.0027        | 32.27                   | 19.87                        | 0.720599                                    | 0.072060       | 1387            |
| 54.0                       | -34.40      | 0.0004        | 31.44                   | 18.48                        | 0.754251                                    | 0.075425       | 1325            |
| 56.0                       | -40.00      | 0.0001        | 30.68                   | 17.15                        | 0.497851                                    | 0.049785       | 2008            |
| 58.0                       | -40.00      | 0.0001        | 29.99                   | 15.89                        | 0.154655                                    | 0.015466       | 6465            |
| 60.0                       | -40.00      | 0.0001        | 29.37                   | 14.68                        | 0.042998                                    | 0.004300       | 23257           |
| 62.0                       | -37.70      | 0.0002        | 28.80                   | 13.52                        | 0.046757                                    | 0.004676       | 21387           |
| 64.0                       | -35.00      | 0.0003        | 28.30                   | 12.40                        | 0.047979                                    | 0.004798       | 20842           |
| 66.0                       | -34.80      | 0.0003        | 27.84                   | 11.32                        | 0.049149                                    | 0.004915       | 20346           |
| 68.0                       | -37.30      | 0.0002        | 27.43                   | 10.28                        | 0.049630                                    | 0.004963       | 20148           |
| 70.0                       | -40.00      | 0.0001        | 27.06                   | 9.26                         | 0.051137                                    | 0.005114       | 19555           |
| 72.0                       | -40.00      | 0.0001        | 26.74                   | 8.26                         | 0.045890                                    | 0.004589       | 21791           |
| 74.0                       | -37.10      | 0.0002        | 26.46                   | 7.29                         | 0.052904                                    | 0.005290       | 18902           |
| 76.0                       | -35.30      | 0.0003        | 26.21                   | 6.34                         | 0.054286                                    | 0.005429       | 18420           |
| 78.0                       | -35.50      | 0.0003        | 26.00                   | 5.41                         | 0.054720                                    | 0.005472       | 18274           |
| 80.0                       | -35.40      | 0.0003        | 25.82                   | 4.48                         | 0.054186                                    | 0.005419       | 18454           |
| 82.0                       | -35.90      | 0.0003        | 25.68                   | 3.57                         | 0.054282                                    | 0.005428       | 18422           |
| 84.0                       | -36.4       | 0.0002        | 25.57                   | 2.67                         | 0.052004                                    | 0.0052         | 19229           |
| 86.0                       | -37.8       | 0.0002        | 25.49                   | 1.78                         | 0.045561                                    | 0.004556       | 21948           |
| 88.0                       | -38.2       | 0.0002        | 25.45                   | 0.89                         | 0.03793                                     | 0.003793       | 26364           |
| 90.0                       | -38.2       | 0.0002        | 25.43                   | 0                            | 0.027405                                    | 0.002741       | 36489           |



**SITE PLAN**  
SCALE: 1"=120'-0"

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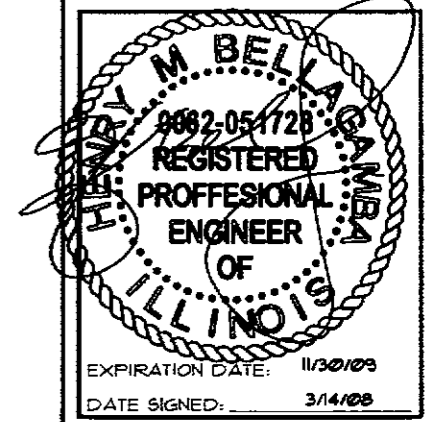
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**Fullerton**  
Engineering Consultants

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CHECKED BY: AG  
APPROVED BY: HMB

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|---------|---------------------|
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| 9/24/07 | PERMIT/CONSTRUCTION |
| 3/14/08 | REVISION            |



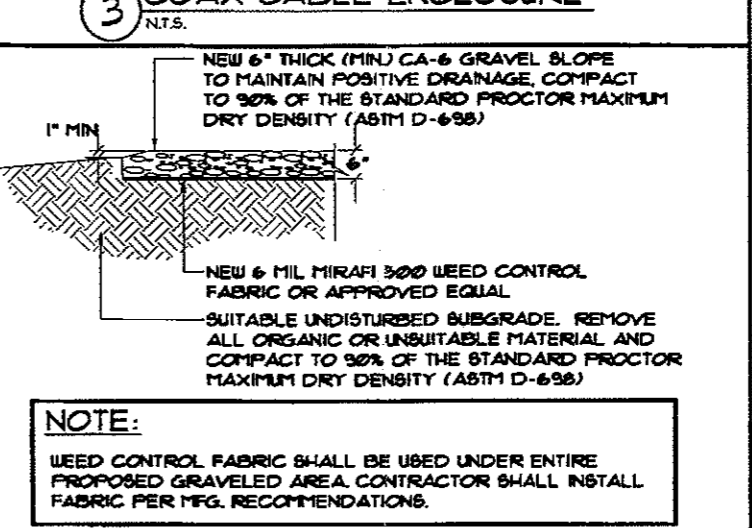
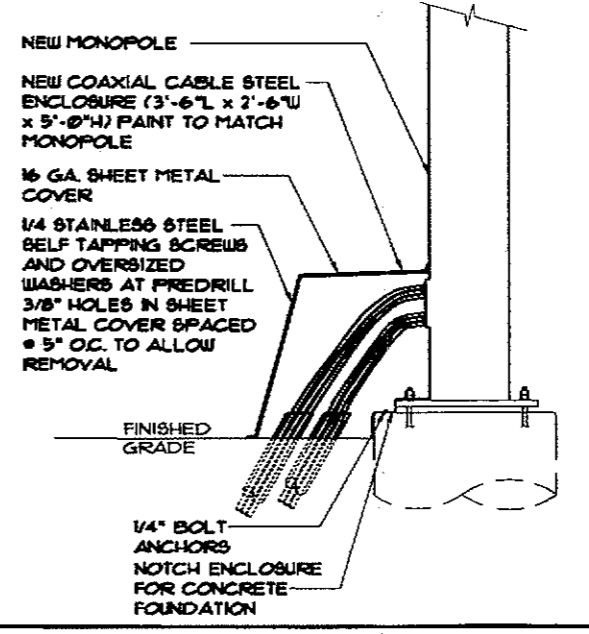
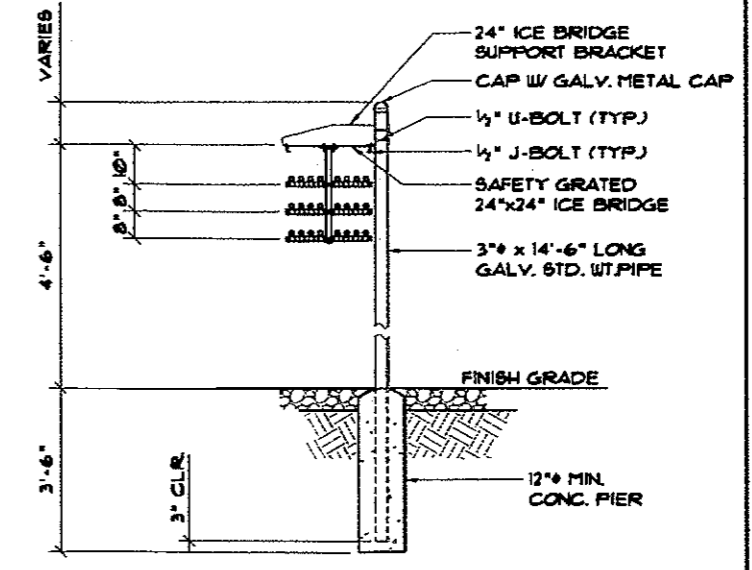
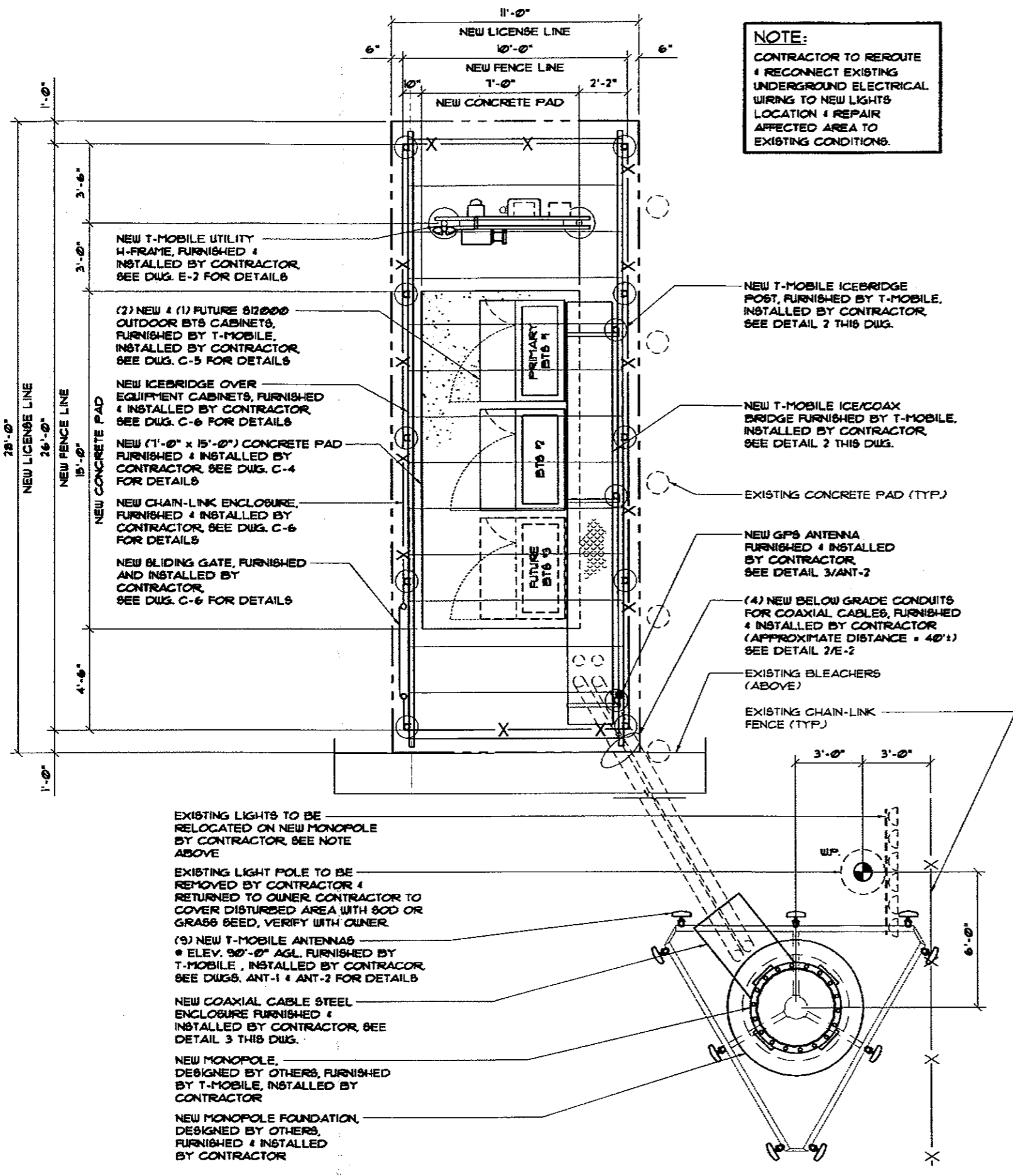
SITE NAME  
**DGS HIGH SCHOOL**

SITE NUMBER  
**CH65-326F**

SITE ADDRESS  
**6309 S. SPRINGSIDE  
DOWNERS GROVE, IL 60516**

SHEET TITLE  
**SITE PLAN**

SHEET NUMBER  
**C-1**



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| 3/14/08 | REVISION            |

**PROFESSIONAL ENGINEER OF ILLINOIS**

0082-051728  
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

EXPIRATION DATE: 11/30/09  
DATE SIGNED: 3/14/08

SITE NAME  
**DGS HIGH SCHOOL**

SITE NUMBER  
**CH65-326F**

SITE ADDRESS  
**6309 S. SPRINGSIDE  
DOWNERS GROVE, IL 60516**

SHEET TITLE  
**ENLARGED  
SITE PLAN &  
DETAILS**

SHEET NUMBER  
**C-2**

**GENERAL NOTES:**

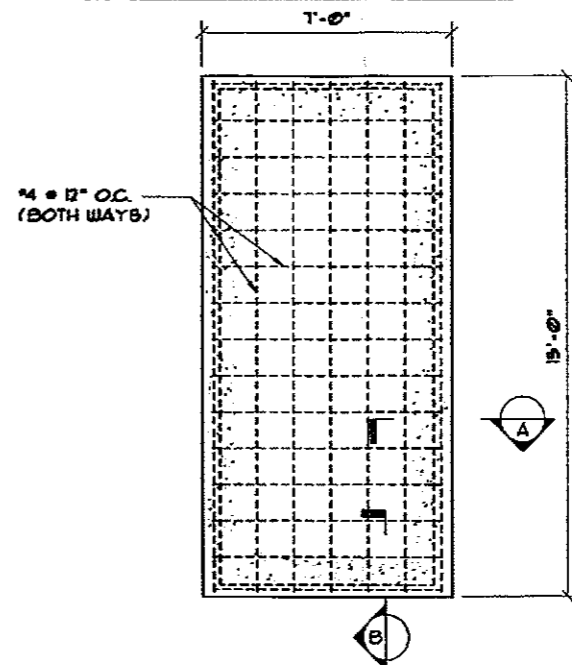
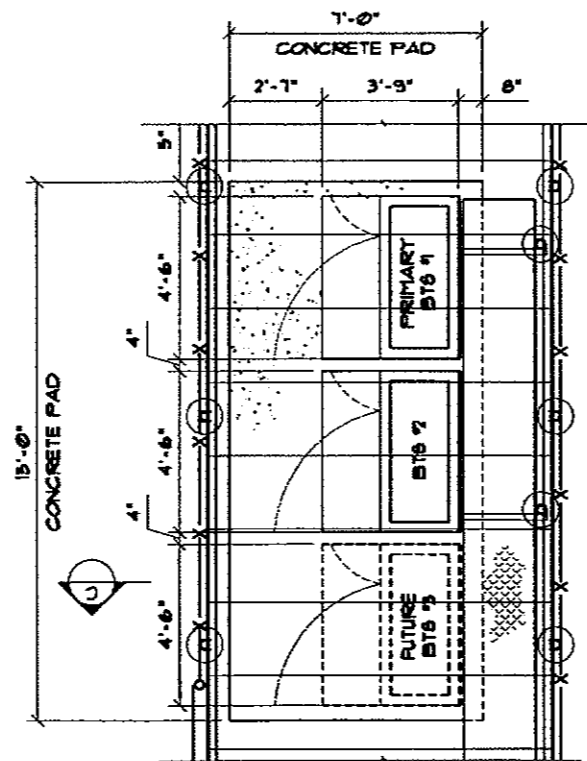
- DESIGN AND CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE IBC, INTERNATIONAL BUILDING CODE, 2000 EDITION, ACI 318, AND ALL OTHER APPLICABLE STATE AND LOCAL CODES, ORDINANCES, AND REGULATIONS.
- THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH CONSTRUCTION.
- DO NOT SCALE DRAWINGS.
- REFER TO SITE PLAN FOR ACCURATE ORIENTATION.
- SUBMIT ONE SET/PA AND TWO PRINTS OF ALL STRUCTURAL SHOP DRAWINGS. MARKED UP SET/PA SHALL BE RETURNED.
- DESIGN LOADS ARE:  
SLAB LIVE LOAD: 200 PSF  
DEAD LOAD FOR BTS CABINET : 1,322 LB  
BTS CABINET SIZE: 15.2"x25.6"x53.2" (HxDxW)  
WITH PLINTH: 85.2"x45.6"x53.2" (HxDxW)
- MINIMUM ALLOWABLE SOIL BEARING CAPACITY: 1000 PSF

**CONCRETE NOTES:**

- MEET OR EXCEED THE FOLLOWING CODES AND STANDARDS (LATEST EDITION):  
CEMENT \_\_\_\_\_ ASTM C 150, TYPE I  
DESIGN \_\_\_\_\_ ACI 318 AND 308  
CONSTRUCTION \_\_\_\_\_ ACI 301  
DETAILING \_\_\_\_\_ CRSI MANUAL OF STANDARD PRACTICE  
USE CLASS "B" FOR SPLICES UNLESS NOTED  
REINF. STEEL \_\_\_\_\_ ASTM A 615 GRADE 60, DEFORMED  
MIXING \_\_\_\_\_ ASTM C 94, READY MIX CONCRETE  
AIR ENTRAINMENT \_\_\_\_\_ ACI 318 AND ASTM C-260  
AGGREGATE \_\_\_\_\_ ASTM C 33
- CONCRETE STRENGTH AT 28 DAYS SHALL BE 4000 PSI MINIMUM.
- DO NOT FIELD BEND OR WELD TO GRADE 60 REINFORCING STEEL.
- PROVIDE AIR ENTRAINED CONCRETE WITH AIR CONTENT OF 5% TO 7% FOR ALL CONCRETE EXPOSED TO EARTH OR WEATHER.
- MAXIMUM AGGREGATE SIZE: 3/4" FOR FOOTINGS, WALLS, BEAMS, SLABS.
- DO NOT USE IN ADMIXTURE, WATER OR OTHER CONSTITUENTS OF CONCRETE WHICH HAS CALCIUM CHLORIDE.
- MINIMUM COVER FOR REINFORCEMENT STEEL UNLESS INCREASED COVER NECESSARY TO MEET FIRE RATING INDICATED:  
CAST AGAINST AND EXPOSED TO EARTH \_\_\_\_\_ 3"  
EXPOSED TO EARTH AND WEATHER #1 TO #6 BARS \_\_\_\_\_ 2"  
EXPOSED TO EARTH AND WEATHER #8 AND SMALLER \_\_\_\_\_ 1 1/2"  
INTERIOR EXPOSURE, BEAMS AND COLUMNS \_\_\_\_\_ 1 1/2"  
INTERIOR EXPOSURE, SLABS, WALLS AND JOISTS \_\_\_\_\_ 1 1/4"
- SLAB SURFACE FLATNESS MAXIMUM TOLERANCE SHALL BE 0.2" OVER 16". CHECK FLOOR LEVEL ALONG THE THREE AXIS: DEPTH, WIDTH & DIAGONAL.

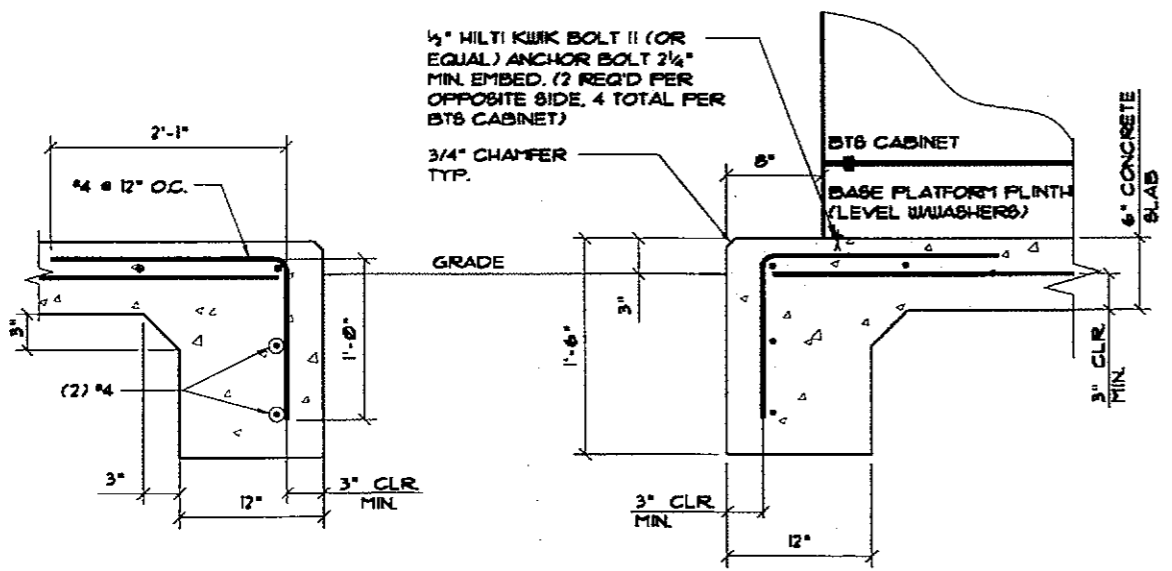
**NOTES:**

- FOR PLATFORM ORIENTATION AND LOCATION WITHIN T-MOBILE LEASE AREA REFER TO DWG. C-1 AND C-2
- THE DESIGN OF PLATFORM AND LAYOUT SHOWN ON THIS DRAWING ARE BASED ON NORTEL 512000 OUTDOOR CABINET.

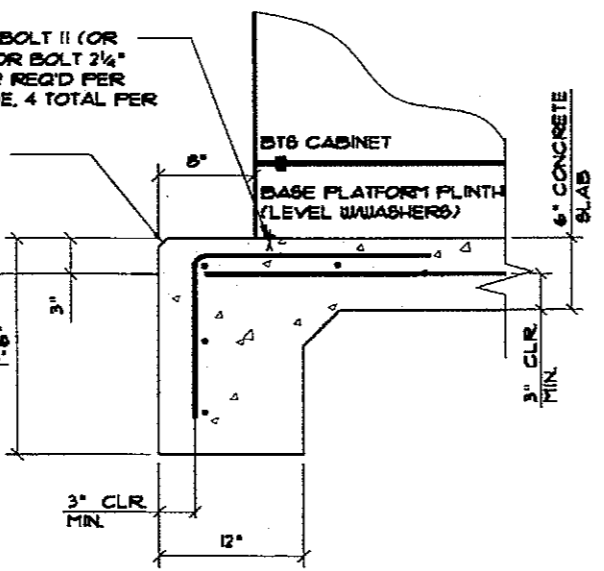


1 EQUIPMENT LAYOUT  
SCALE: 3/16" = 1'-0"

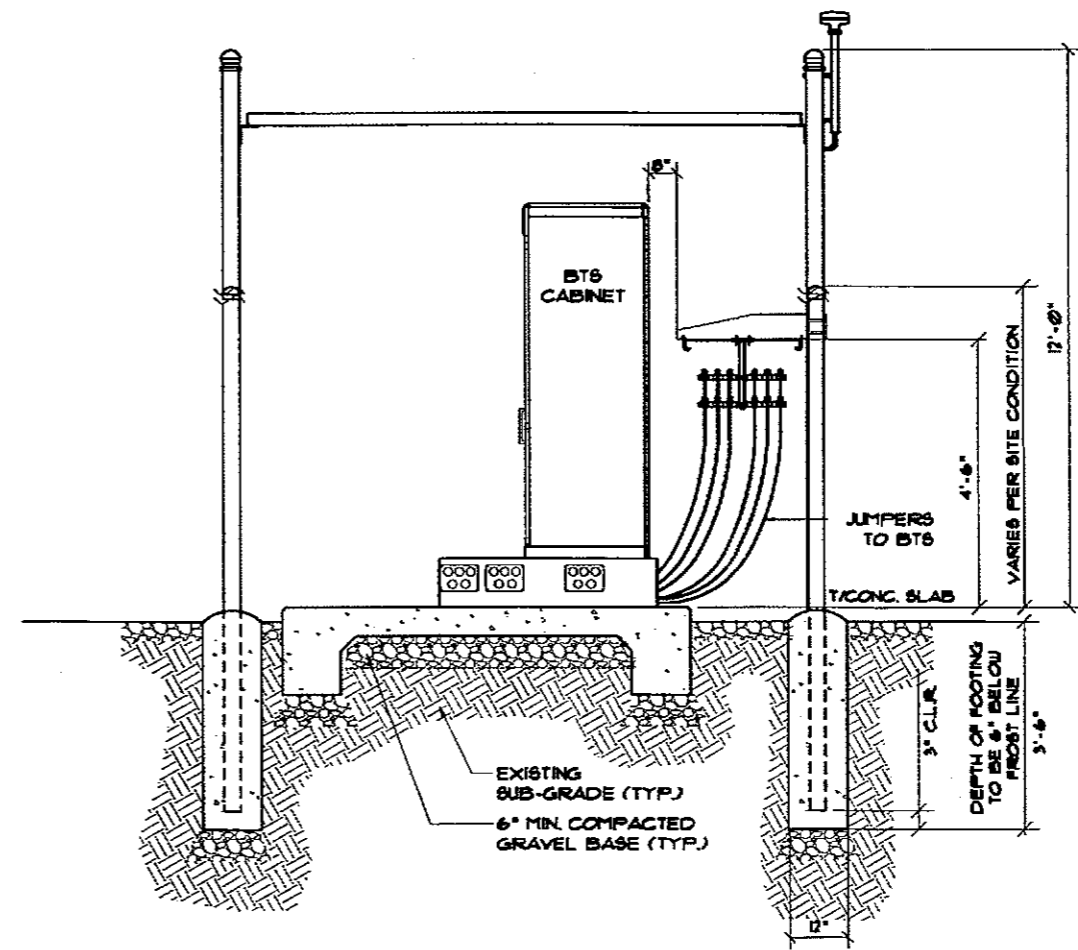
2 CONCRETE PAD PLAN VIEW  
SCALE: 3/16" = 1'-0"



3 SECTION - "A"  
SCALE: 3/4" = 1'-0"



4 SECTION - "B"  
SCALE: 3/4" = 1'-0"



5 SECTION - "C"  
NTS

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CHECKED BY: AG  
APPROVED BY: HMB

| DATE    | REVISIONS           |
|---------|---------------------|
| 3/10/07 | 90% REVIEW          |
| 3/24/07 | PERMIT/CONSTRUCTION |
| 3/14/08 | REVISION            |

**MARY M. BELLA**  
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS  
0882-051728  
EXPIRATION DATE: 11/30/09  
DATE SIGNED: 3/14/08

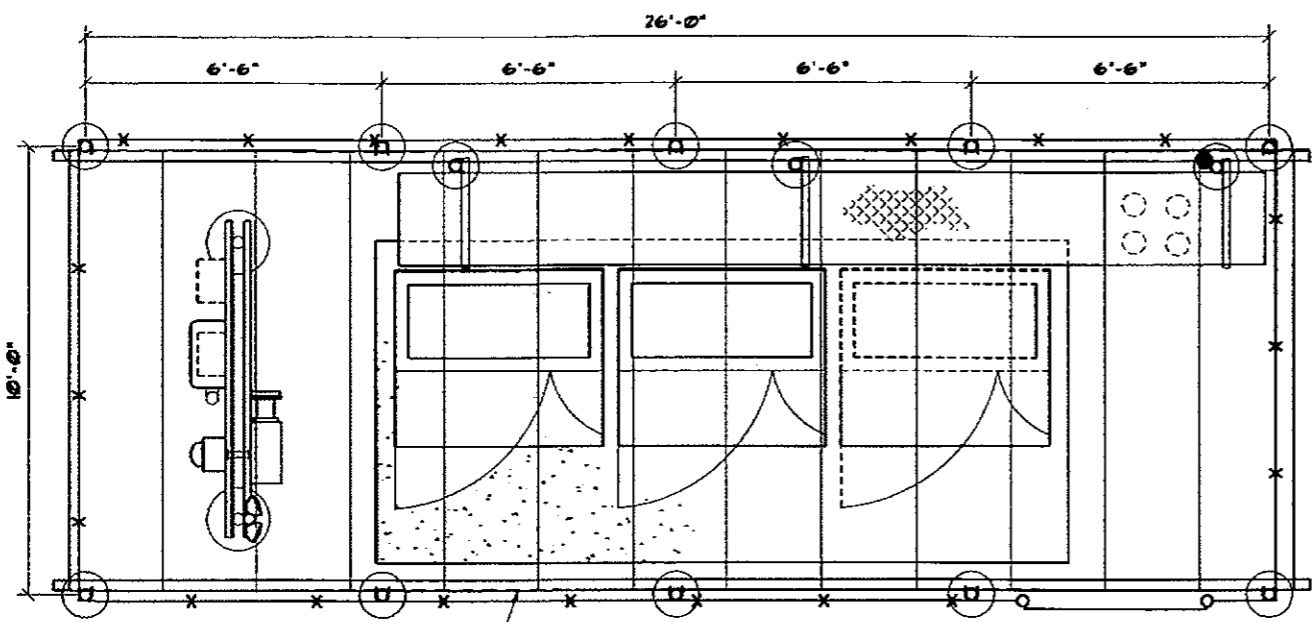
SITE NAME  
DGS HIGH SCHOOL

SITE NUMBER  
CH65-326F

SITE ADDRESS  
6303 S. SPRINGSIDE  
DOWNERS GROVE, IL 60516

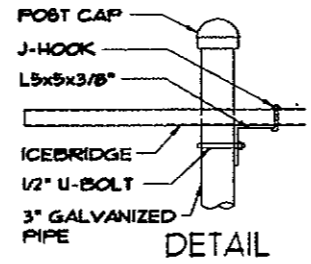
SHEET TITLE  
EQUIPMENT PAD  
DETAILS & NOTES

SHEET NUMBER  
C-4

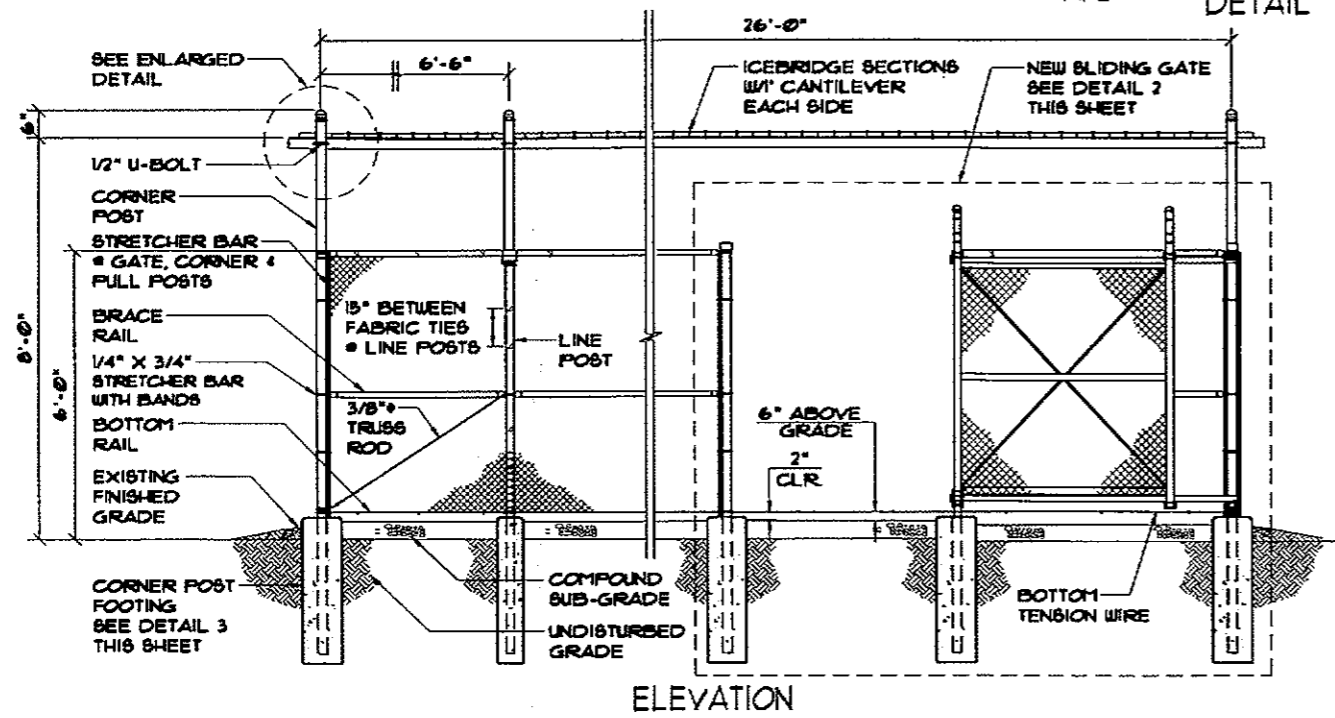


PLAN

**NOTES:**  
 1) ALL MATERIALS SHALL BE GALVANIZED, COLD-GALV ALL CUT ENDS.  
 2) CONNECT ICEBRIDGE TO ANGLE WITH J-BOLT CONNECTIONS.

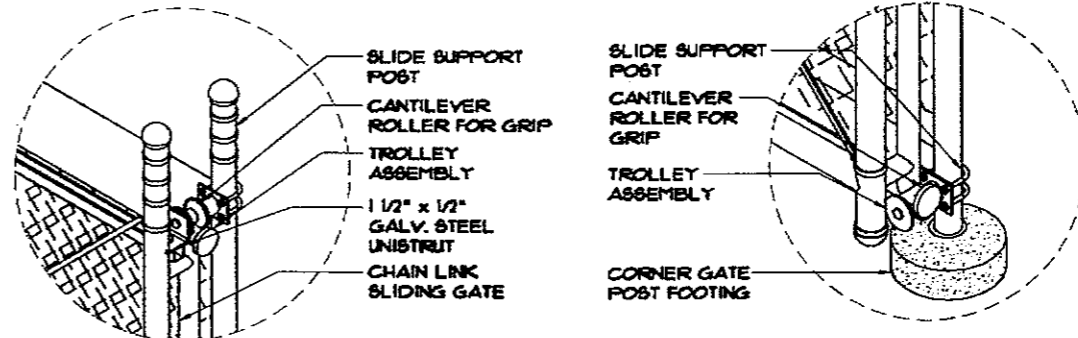
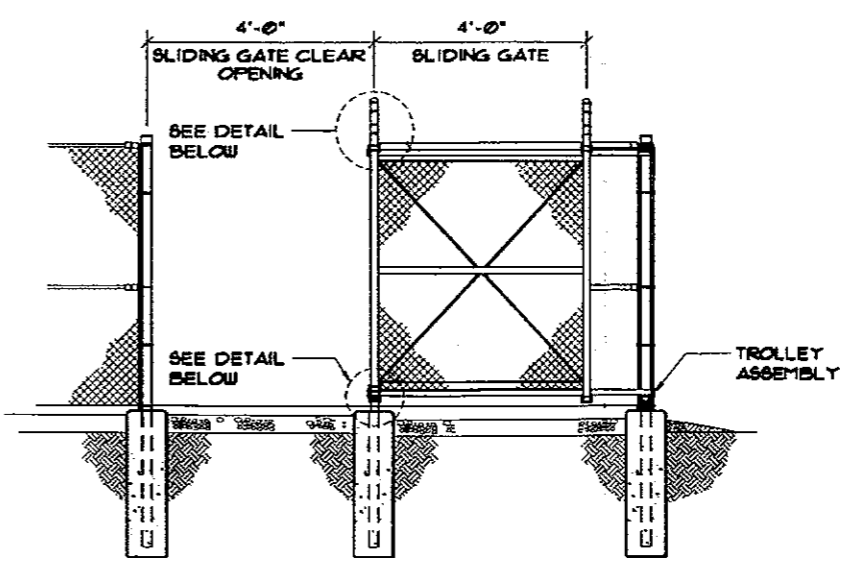


DETAIL

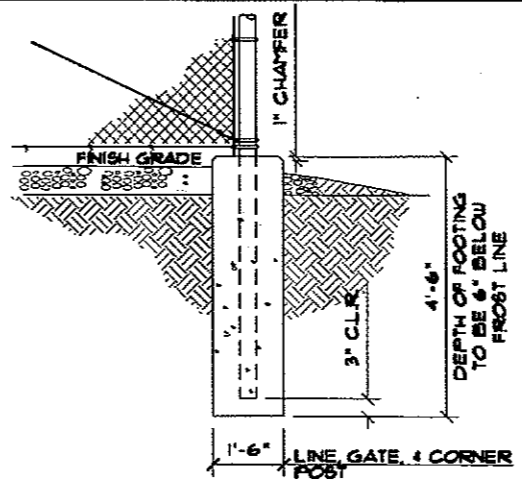


ELEVATION

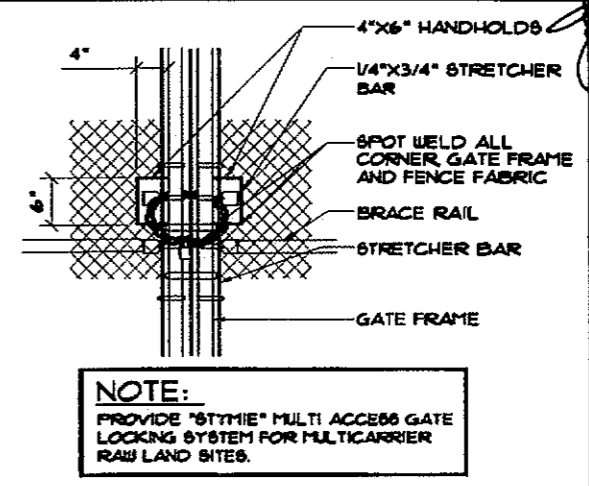
1 ICEBRIDGE SUPPORT OVER EQUIPMENT PLATFORM N.T.S.



2 NEW SLIDING GATE DETAIL SCALE: N.T.S.



3 LINE POST & CORNER POSTS FOOTING DETAIL N.T.S.



4 CHAIN LINK FENCE LOCK DETAIL N.T.S.

**FENCING NOTES:**

- (INSTALL FENCING PER ASTM F-567, SWING GATES PER ASTM F-300)
- ALL FENCING AND RELATED ASSEMBLIES SHALL BE HOT DIP GALVANIZED ZINC FINISH: FABRIC - ASTM A332-84, FRAME WORK - ASTM F669-81.
  - GATE POST: 3" STD. PIPE SCH. 40 FOR GATE WIDTHS UP THRU 6'-0" OR 12'-0" FOR DOUBLE SWING GATE.
  - END, CORNER & FULL POST: 3" STD. PIPE SCH. 40  
 LINE POST: 2 3/8" O.D. PIPE 16 GA.

- GATE FRAME: 1 1/2" STD. PIPE SCH. 40 FOR GATE WIDTHS UP THRU 6'-0" OR 12'-0" FOR DOUBLE SWING GATE. GATE FRAME TO BE WELDED BEFORE GALVANIZING OR ASSEMBLY.
- TOP RAIL & BRACE RAIL: 1 5/8" O.D. PIPE, 11 GA.
- FABRIC: 9 GA. CORE WIRE SIZE, 2" MESH, CONFORMING TO ASTM A-392.
- TIE WIRE: 11 GA. 12" O.C. SPACING @ POST/GATES, 24" O.C. AT RAILS / TENSION WIRE.
- TENSION WIRE: 7 GA. GALVANIZED STEEL OR ALUMINUM COATED COIL SPRING WIRE.

- STRETCHER BAR: 3/16" x 3/4" - FULL HEIGHT OF FABRIC, SPACE TENSION BANDS 5" O.C. FOR FULL HEIGHT OF FENCE.
- GATE LATCH: 1 3/8" O.D. PLUNGER ROD W/ MUSHROOM TYPE CATCH AND COMBINATION LOCK.
- PROVIDE A CORNER POST WHERE THE FENCE CHANGES IN DIRECTION, HORIZONTALLY OR VERTICALLY, BY MORE THAN 30 DEGREES.
- ALL CONCRETE FOOTINGS SHALL BE 2500 PSI CONCRETE.

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PREPARED BY: AG  
 CHECKED BY: AG  
 APPROVED BY: HMB

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| 3/10/07 | 90% REVIEW          |
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| 3/14/08 | REVISION            |

**STYME M. BELLA**  
 0062-051728  
 REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS  
 EXPIRATION DATE: 11/30/09  
 DATE SIGNED: 3/14/08

SITE NAME  
**DGS HIGH SCHOOL**  
 SITE NUMBER  
**CH65-326F**  
 SITE ADDRESS  
 6309 S. SPRINGSIDE  
 DOWNERS GROVE, IL 60516

SHEET TITLE  
**FENCE DETAILS & NOTES**

SHEET NUMBER  
**C-6**

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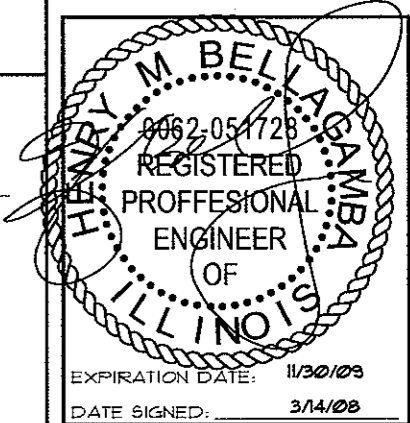
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SITE NAME  
**DGS HIGH SCHOOL**

SITE NUMBER  
**CH65-326F**

SITE ADDRESS  
**6309 S. SPRINGSIDE  
DOWNERS GROVE, IL 60256**

SHEET TITLE  
**SITE ELEVATIONS**

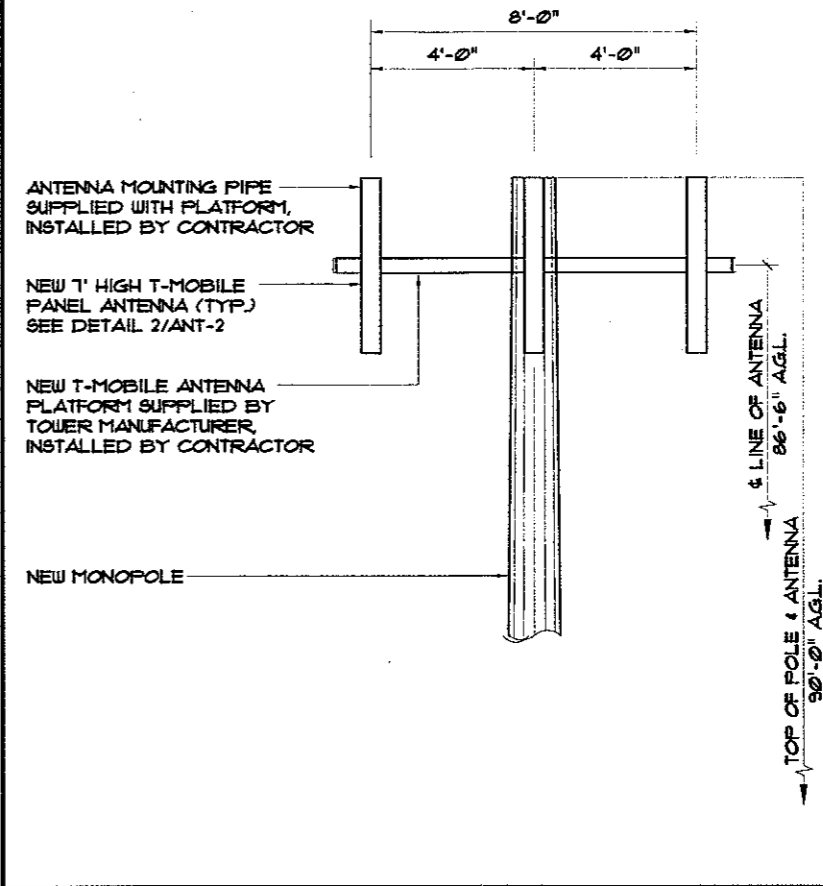
SHEET NUMBER  
**ANT-1**

### ANTENNA NOTES:

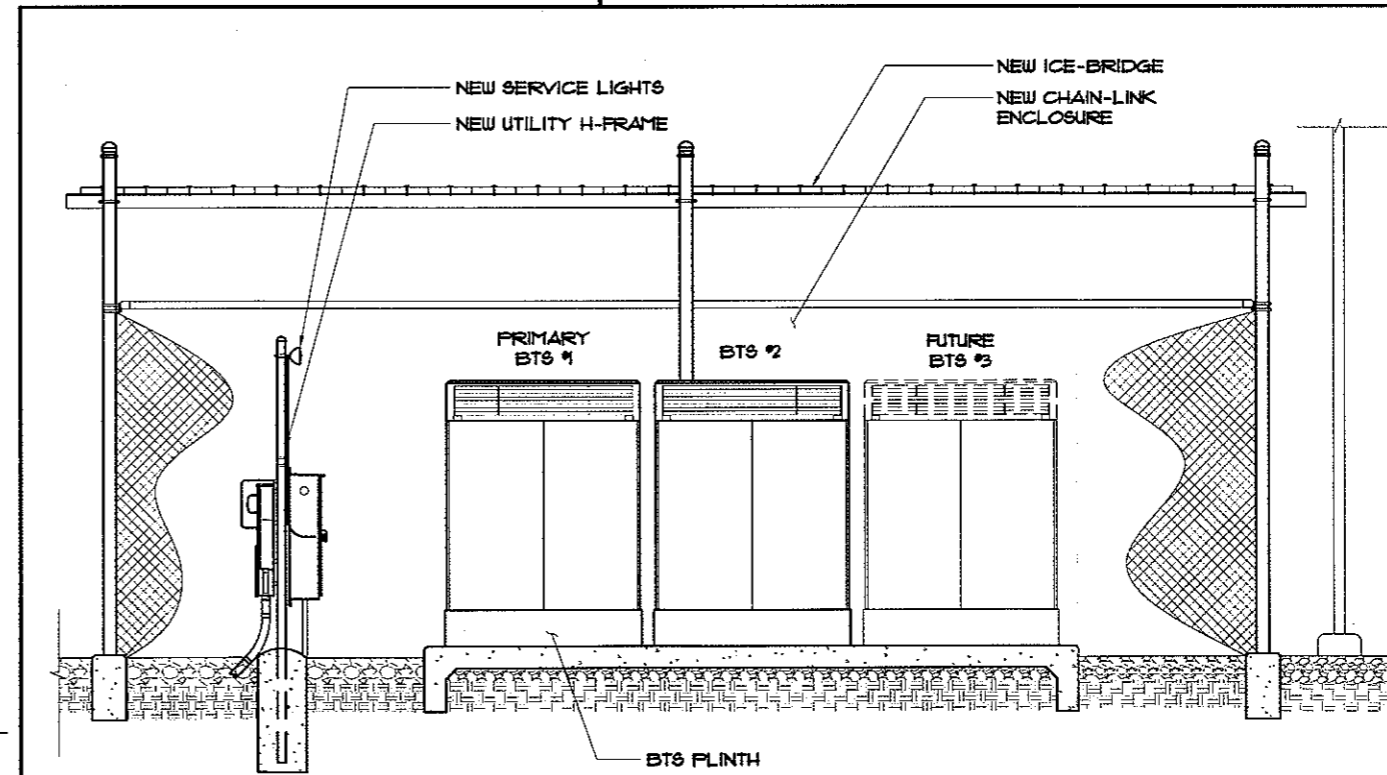
- 1- THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNA SHALL BE ADJUSTED TO MEET SYSTEM REQUIREMENTS.
- 2- CONTRACTOR SHALL VERIFY HEIGHT OF ANTENNA WITH T-MOBILE PROJECT MANAGER.
- 3- ALL ANTENNA AZIMUTH TO BE FROM TRUE NORTH.

### STRUCTURAL NOTES:

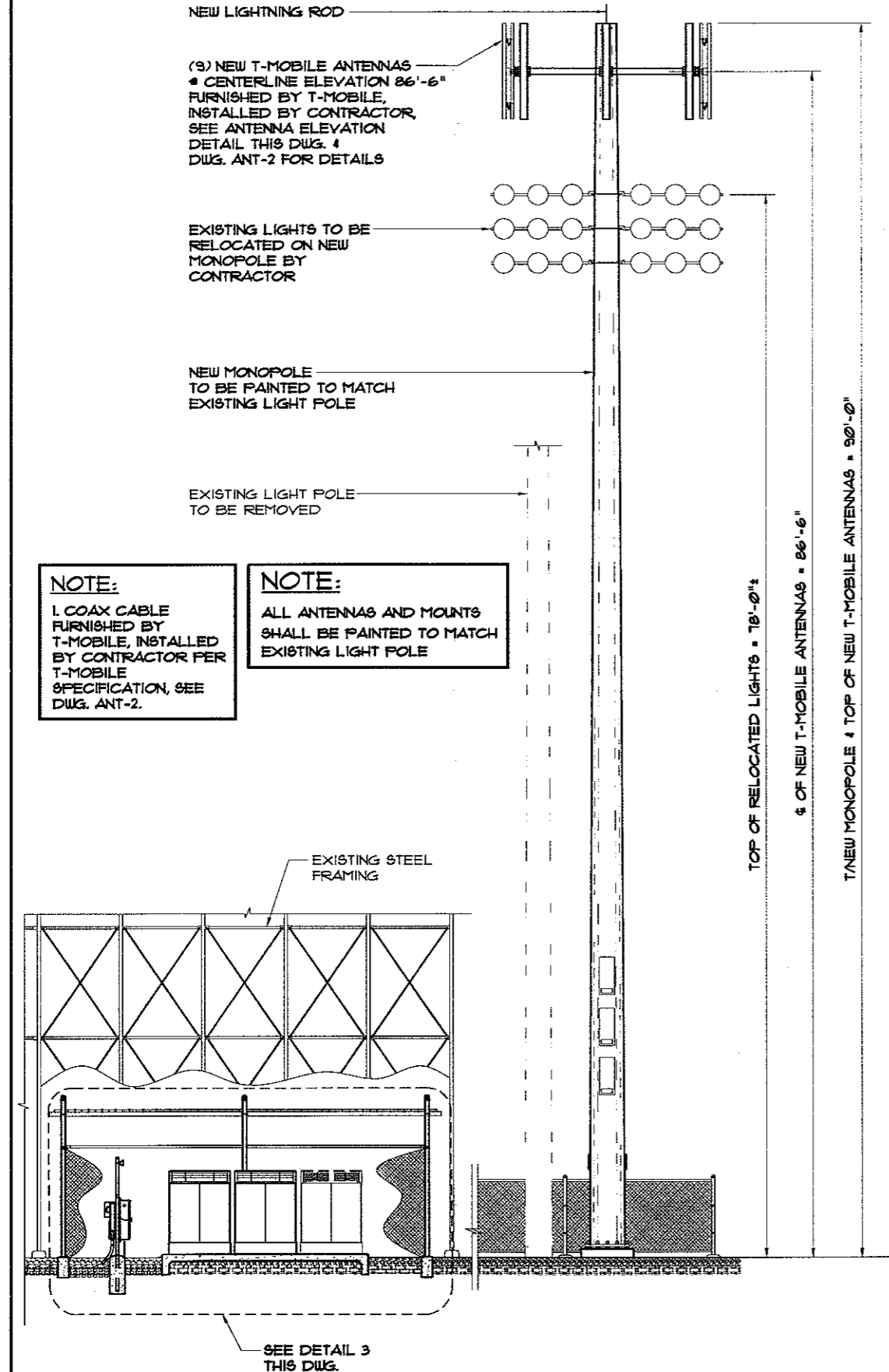
- 1- STRUCTURAL CALCULATION PREPARED BY OTHERS, CONTRACTOR TO VERIFY WITH T-MOBILE PROJECT MANAGER TO OBTAIN A COPY.
- 2- CONTRACTOR TO REFER TO TOWER STRUCTURAL CALCULATIONS FOR ADDITIONAL LOADS. NO ERECTION OR MODIFICATION OF TOWER SHALL BE MADE WITHOUT APPROVAL OF STRUCTURAL ENGINEER.



② ELEVATION DETAIL  
N.T.S.



③ TYPICAL ENLARGED ELEVATION  
N.T.S.



① SITE ELEVATION  
N.T.S.

**NOTE:**  
1. COAX CABLE FURNISHED BY T-MOBILE, INSTALLED BY CONTRACTOR PER T-MOBILE SPECIFICATION, SEE DWG. ANT-2.

**NOTE:**  
ALL ANTENNAS AND MOUNTS SHALL BE PAINTED TO MATCH EXISTING LIGHT POLE

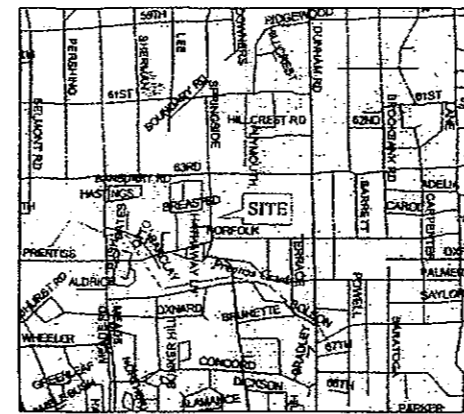
SEE DETAIL 3 THIS DWG.

**T-Mobile**

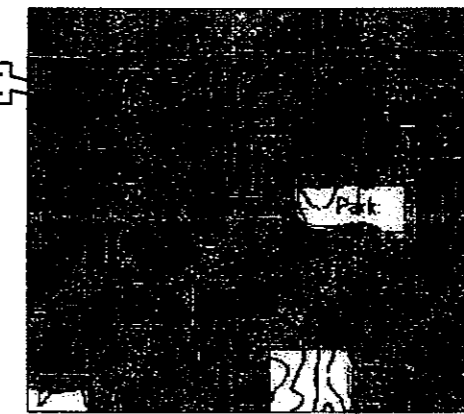
8550 W. Bryn Mawr Ave.  
Suite 100  
Chicago, Illinois 60631  
OFFICE: (773) 444-5400  
FAX: (773) 444-5500



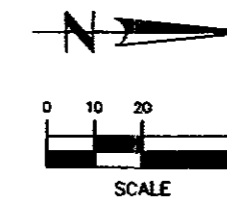
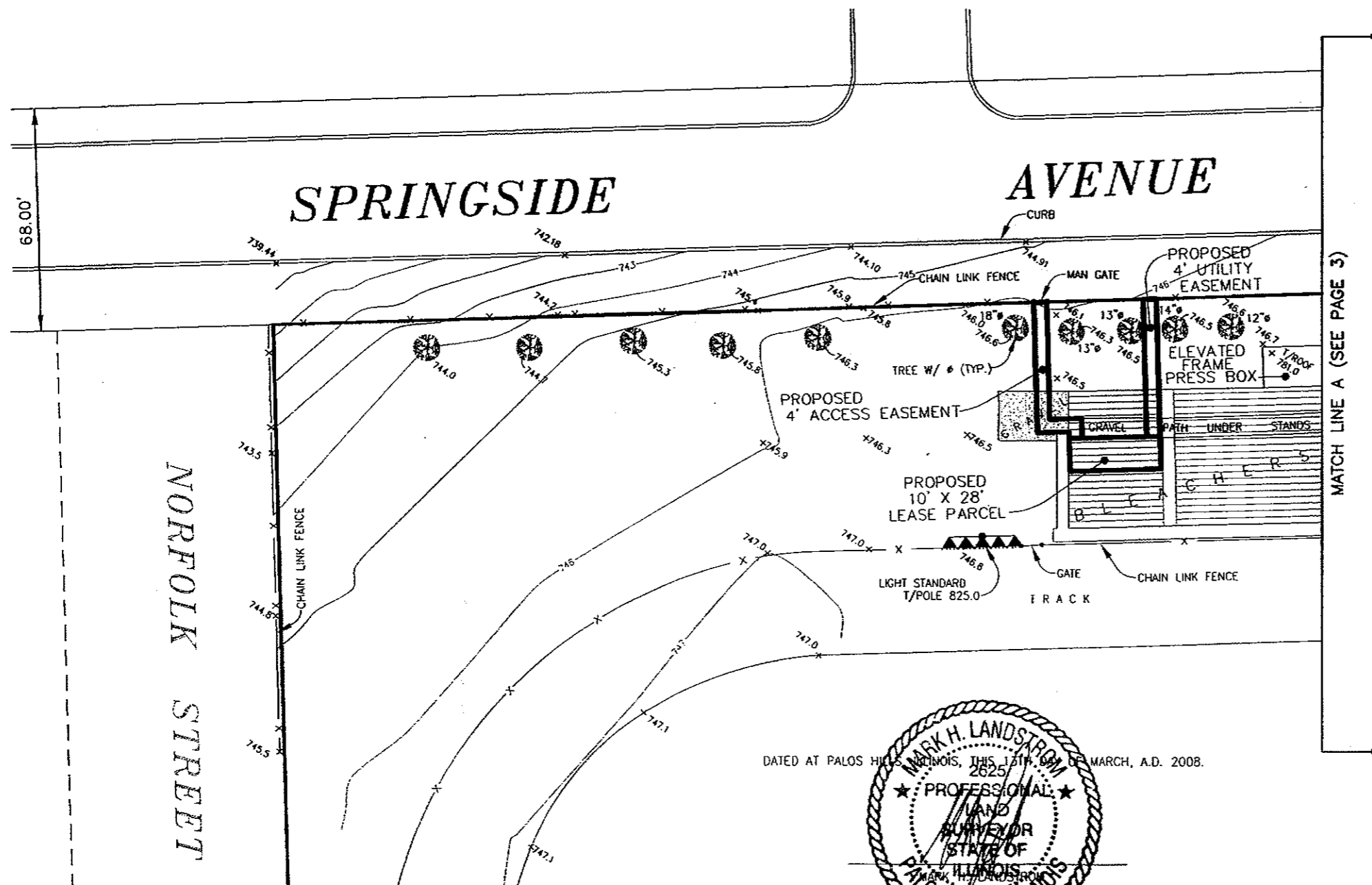
Fullerton Engineering Consultants  
9700 W. HIGGINS ROAD  
SUITE 800  
ROSEMONT, IL 60018  
TEL: (847) 292-0200  
FAX: (847) 292-0206



**LOCATION MAP**



**WHEATON QUAD MAP**



DATED AT PALOS HILLS, ILLINOIS, THIS 14TH DAY OF MARCH, A.D. 2008.



LICENSE RENEWAL DATE: NOVEMBER 30, 2008

| NO. | DATE    | DESCRIPTION       |
|-----|---------|-------------------|
| 3   | 3/13/08 | ATTORNEY COMMENTS |
| 2   | 9/20/07 | SITE SURVEY       |
| 1   | 8/28/07 | PRELIMINARY       |

**LANDMARK**

ENGINEERING CORPORATION  
DESIGN FIRM REGISTRATION NO. 104-000079  
7808 WEST 103RD STREET  
PALOS HILLS, ILLINOIS 60465-1529  
Phone (708) 589-3737  
PROJECT No. 07-08-068

**SITE # CH65-326F  
DGS HIGH SCHOOL**

6309 S. SPRINGSIDE  
DOWNERS GROVE, IL  
DUPAGE COUNTY

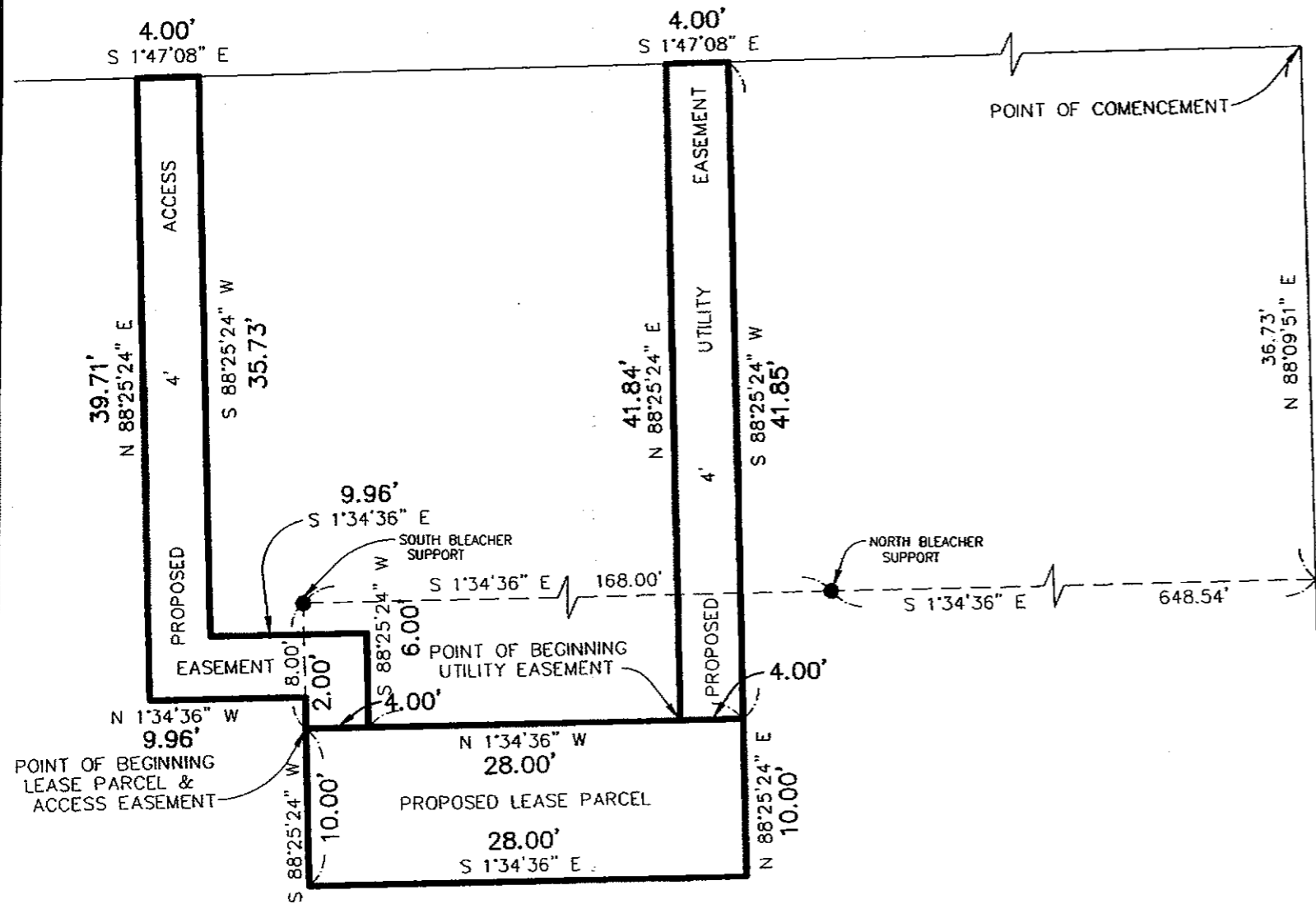
SHEET TITLE

**SITE SURVEY**

SHEET NUMBER

**SS 2 OF 5**

# SPRINGSIDE AVENUE



# 63RD STREET

## PROPOSED LEASE PARCEL

THAT PART OF THE EAST HALF OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 38 NORTH, RANGE 11 EAST OF THE THIRD PRINCIPAL MERIDIAN, DESCRIBED AS FOLLOWS: COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SPRINGSIDE AVENUE AND THE SOUTH LINE OF 63RD STREET; THENCE NORTH 88 DEGREES 9 MINUTES 51 SECONDS EAST, ALONG SAID SOUTH LINE, 36.73 FEET TO A POINT ON THE NORTHERLY EXTENSION OF THE CENTER LINE OF TWO I-BEAM SUPPORTS FOR THE WEST SIDE OF A METAL BLEACHER; THENCE SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID EXTENSION, 648.54 FEET TO THE CENTER OF THE NORTH SUPPORT OF SAID BLEACHER; THENCE CONTINUING SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID CENTER LINE, 168.00 FEET TO THE CENTER OF THE SOUTH SUPPORT OF SAID BLEACHER; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST, PERPENDICULAR TO THE LAST DESCRIBED COURSE, 8.00 FEET TO A POINT OF BEGINNING; THENCE NORTH 1 DEGREE 34 MINUTES 36 SECONDS WEST 28.00 FEET; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST 10.00 FEET; THENCE SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST 28.00 FEET; THENCE SOUTH 88 DEGREES 25 MINUTES 24 SECONDS WEST 10.00 FEET TO THE POINT OF BEGINNING; ALL IN DUPAGE COUNTY, ILLINOIS, AND CONTAINING 280 SQUARE FEET THEREIN.

## PROPOSED ACCESS EASEMENT

THAT PART OF THE EAST HALF OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 38 NORTH, RANGE 11 EAST OF THE THIRD PRINCIPAL MERIDIAN, DESCRIBED AS FOLLOWS: COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SPRINGSIDE AVENUE AND THE SOUTH LINE OF 63RD STREET; THENCE NORTH 88 DEGREES 9 MINUTES 51 SECONDS EAST, ALONG SAID SOUTH LINE, 36.73 FEET TO A POINT ON THE NORTHERLY EXTENSION OF THE CENTER LINE OF TWO I-BEAM SUPPORTS FOR THE WEST SIDE OF A METAL BLEACHER; THENCE SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID EXTENSION, 648.54 FEET TO THE CENTER OF THE NORTH SUPPORT OF SAID BLEACHER; THENCE CONTINUING SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID CENTER LINE, 168.00 FEET TO THE CENTER OF THE SOUTH SUPPORT OF SAID BLEACHER; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST, PERPENDICULAR TO THE LAST DESCRIBED COURSE, 8.00 FEET TO A POINT OF BEGINNING; THENCE NORTH 1 DEGREE 34 MINUTES 36 SECONDS WEST 4.00 FEET; THENCE SOUTH 88 DEGREES 25 MINUTES 24 SECONDS EAST 9.96 FEET; THENCE SOUTH 88 DEGREES 25 MINUTES 24 SECONDS WEST 35.73 FEET TO SAID EAST LINE OF SPRINGSIDE AVENUE; THENCE SOUTH 1 DEGREE 47 MINUTES 8 SECONDS EAST, ALONG SAID EAST LINE 4.00 FEET; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST 39.71 FEET; THENCE NORTH 1 DEGREE 34 MINUTES 36 SECONDS WEST 9.96 FEET; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST 2.00 FEET TO THE POINT OF BEGINNING; ALL IN DUPAGE COUNTY, ILLINOIS, AND CONTAINING 207 SQUARE FEET THEREIN.

## PROPOSED UTILITY EASEMENT

THAT PART OF THE EAST HALF OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 38 NORTH, RANGE 11 EAST OF THE THIRD PRINCIPAL MERIDIAN, DESCRIBED AS FOLLOWS: COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SPRINGSIDE AVENUE AND THE SOUTH LINE OF 63RD STREET; THENCE NORTH 88 DEGREES 9 MINUTES 51 SECONDS EAST, ALONG SAID SOUTH LINE, 36.73 FEET TO A POINT ON THE NORTHERLY EXTENSION OF THE CENTER LINE OF TWO I-BEAM SUPPORTS FOR THE WEST SIDE OF A METAL BLEACHER; THENCE SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID EXTENSION, 648.54 FEET TO THE CENTER OF THE NORTH SUPPORT OF SAID BLEACHER; THENCE CONTINUING SOUTH 1 DEGREE 34 MINUTES 36 SECONDS EAST, ALONG SAID CENTER LINE, 168.00 FEET TO THE CENTER OF THE SOUTH SUPPORT OF SAID BLEACHER; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST, PERPENDICULAR TO THE LAST DESCRIBED COURSE, 8.00 FEET; THENCE NORTH 1 DEGREE 34 MINUTES 36 SECONDS WEST 24.00 FEET TO A POINT OF BEGINNING; THENCE CONTINUING NORTH 1 DEGREE 34 MINUTES 36 SECONDS WEST 4.00 FEET; THENCE SOUTH 88 DEGREES 25 MINUTES 24 SECONDS WEST 41.85 FEET TO SAID EAST LINE OF SPRINGSIDE AVENUE; THENCE SOUTH 1 DEGREE 47 MINUTES 8 SECONDS EAST, ALONG SAID EAST LINE 4.00 FEET; THENCE NORTH 88 DEGREES 25 MINUTES 24 SECONDS EAST 41.84 FEET TO THE POINT OF BEGINNING; ALL IN DUPAGE COUNTY, ILLINOIS, AND CONTAINING 167 SQUARE FEET THEREIN.



8550 W. Bryn Mawr Ave.  
Suite 100  
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OFFICE: (773) 444-5400  
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Fullerton Engineering Consultants  
9700 W. HIGGINS ROAD  
SUITE 800  
ROSEMONT, IL 60018  
TEL: (847) 292-0200  
FAX: (847) 292-0206

| NO. | DATE    | DESCRIPTION       |
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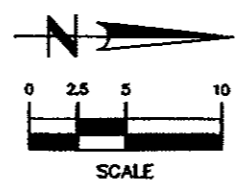
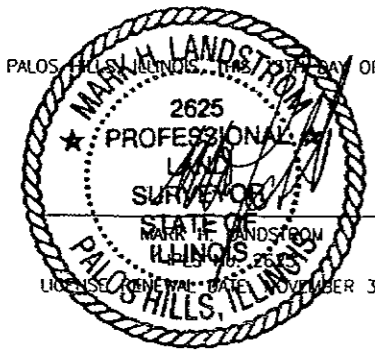
**LANDMARK**  
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DESIGN FIRM REGISTRATION NO. 184-00078  
7808 WEST 103RD STREET  
PALOS HILLS, ILLINOIS 60465-1529  
Phone (708) 590-3737  
PROJECT No. 07-08-068

**SITE # CH65-326F**  
**DGS HIGH SCHOOL**  
6309 S. SPRINGSIDE  
DOWNERS GROVE, IL  
DUPAGE COUNTY

SHEET TITLE  
**SITE SURVEY**

SHEET NUMBER  
**SS 5 OF 5**

DATED AT PALOS HILLS, ILLINOIS, THIS 17TH DAY OF MARCH, A.D. 2008.





DRAFT

VILLAGE OF DOWNERS GROVE  
PLAN COMMISSION MEETING  
PUBLIC HEARING

NOVEMBER 2, 2009, 7:00 P.M.

Chairman Jirik called the November 2, 2009 meeting of the Plan Commission to order at 7:00 p.m. and asked for a roll call:

**PRESENT:** Chairman Jirik, Mr. Beggs, Mr. Matejczyk, Mrs. Rabatah, Mr. Waechtler  
Mr. Webster

**ABSENT:** Mr. Cozzo, Mrs. Hamernick, Mr. Quirk

**STAFF PRESENT:** Community Development Dir. Tom Dabareiner; Planners Stan Popovich and Damir Latinovic

**VISITORS:** Robert Cynown, 2701 Wisconsin Ave.; Patty Patenaude, 2701 Wisconsin Ave.; Jim Russ, Attorney, 4915 Main Street; Kathy Strohm, 1700 Taylor St.; Mike McDermott, 1801 Whidden Ave.; Bill Gill, 2333 Wisconsin Ave.; Dean Bapes, 6476 Saratoga Ave.; Charles Lukas, 4840 Washington; George Nicholaou 4845 Highland, Jill Martin, 6505 Wells; Sanjay Jaisingani, 8550 W. Brynmar, Chicago, Illinois; David Brammer, 1711 Brookwood;; Greg Bedalov, Downers Grove EDC, 2001 Butterfield; Marge Earl, 4720 Florence; Laura Crawford; Martin Tully, 4808 Cornell Ave; Mark Layne, 777 Army Trail Road, Addison, Illinois.

Chairman Jirik led the Plan Commissioners in the recital of the Pledge of Allegiance.

**OCTOBER 5, 2009 MEETING MINUTES - MR. WEBSTER MADE A MOTION TO APPROVE THE MINUTES AS PREPARED, SECONDED BY MR. MATEJCZYK. MOTION CARRIED BY VOICE VOTE OF 6-0.**

An explanation of the meeting's protocol followed.

**PC-10-09** A petition seeking a Special Use approval for a telecommunications tower located on the east side of Springside Avenue, approximately 730 feet south of 63<sup>rd</sup> Street, commonly known as 6401 Springside Avenue, Downers Grove, IL (PIN's 09-19-101-002, 09-19-200-003); Mark Layne, Agent for T-Mobile Central LLC, Petitioner; Community High School District 99, Owner.

Chairman Jirik swore in those individuals who would be speaking on PC-10-09.

Village Planner, Mr. Popovich reviewed the Special Use request for a telecommunications tower on the 78-acre parcel known as the Downers Grove South High School football field located in the northwest corner of the property. The four existing light poles on the property are 80 feet tall. At the southwest corner of the football field, the petitioner, T-Mobile, is requesting to install a tower with the equipment cabinets located under the west bleachers. The single-user tower is proposed to

## DRAFT

be 90 feet tall to the top of the antenna array with the pole being 86.5 feet tall. The existing light pole will be removed and replaced with a four-foot wide tower at the base. The tallest row of the football lights will be approximately 78 feet tall. Details of the equipment cabinets and the surrounding security fences followed. Staff is recommending an enclosure above the equipment cabinet in order to keep out individuals.

T-Mobile is being granted a four-foot wide access easement from the school district. Photos followed. Staff is not recommending landscaping along the tower base since it is similar to other light standards and existing screening is located along Springside to screen the base.

Per staff, the Future Land Use Map calls for the site to be residential with 0-6 dwelling units per acre. Staff does not feel there will be any impacts on the land use character of the school nor the surrounding neighborhood and believes the proposal is consistent with the zoning ordinance's intent. While the goal of the zoning ordinance is to reduce the number of cell towers in the village, currently there are no existing towers or non-residentially zoned properties available in the area. Staff believes the proposal meets the village's bulk regulations and details can be found in the petitioner's submittal.

Continuing, Mr. Popovich confirmed the petitioner has met the standards of Section 28.1307 of the Zoning Ordinance, Telecommunication Towers. He explained the petitioner's coverage goal is to address the communication gap south of 63<sup>rd</sup> Street between Woodward and Dunham Avenues and from 63<sup>rd</sup> and Concord. Six locations were considered by the petitioner with staff suggesting T-Mobile use the Maple Avenue water tank in 2008; however, the petitioner declined due to the lease terms not working out. In 2009, staff again suggested the Maple Avenue water tank but T-Mobile felt the tank could not support the antennas at the height and coverage they were seeking. Staff believed modifying the water tank did not meet the village's core services. Other coverage considerations were explained and staff believed that the petitioner exhausted all feasible alternatives to the South High School site and believed the proposal met the goals of the zoning ordinance and special use standards

According to Fire Prevention, there are no issues with the site. However, neighbors did express concern about the tower's height, security, safety, and the impact of property values. A neighborhood meeting was held by T-Mobile in April 2008 with no residents attending. Proper steps were taken to notice the residents of this meeting.

Mr. Popovich reviewed each of the four (4) special use standards, noting that all of them were met. He asked that the Plan Commission forward a positive recommendation to the Village Council.

Questions followed on the location of the coax cable and whether it was considered to be placed outside of the tower. Voltage of the equipment was also raised, since it was close to the bleachers. Asked why the petition was a single-user tower, staff reported the petitioner requested a single user and it could not have additional users on the tower. A multiple-user tower would have to return for a special use request. Mr. Popovich could not confirm whether the petitioner would have a monopoly in the area.

Mr. Beggs raised concern on whether the proposal would affect any future improvements to the high school's football field, wherein Mr. Popovich stated it would be up to the school but he did not see any real opportunity to expand. Mr. Beggs further inquired about the details of the coverage

## DRAFT

objectives and coverage gaps of the drive test provided by T-Mobile. Additional questions asked included what gates would be used to access the equipment, i.e., the two gates closest to the equipment and located on Springside Avenue.

On behalf of the petitioner, Mr. Mark Layne, contract agent for T-Mobile, reviewed the drive test study which confirmed two coverage gaps, one of which was located south of 63<sup>rd</sup> Street (the one under discussion) and one gap north of 63<sup>rd</sup> Street. He further explained T-Mobile's intent was to seek out existing structures of height in the area and to install the antennas directly onto the existing light standard and co-locate on the existing pole but the light standards lacked sufficient structural integrity to mount the antennas.

Mr. Layne explained the lease between District 99 and T-Mobile specifies the design shown in the drawings submitted to the Plan Commission. Information was also available from Saber Towers, which addresses strength capacity and wind load. He believed the proposal was a positive for the Village because it meets the spirit of the ordinance, it provides wireless communication for the community, and is a source for non-tax based revenue for School District 99.

Mr. Matejczyk voiced concern about the voltage wherein Mr. Layne stated that the power is the standard residential service with 200 amps and is located underground. Furthermore, Mr. Matejczyk stated there was no information regarding structural calculations. In response, Mr. Layne explained because no original light standard drawings existed, T-Mobile decided to design a new structure to hold both the antenna and the lighting. The drawings within the packet are conceptual. The final designs will be submitted for a building permit and will include all structural drawings. Mr. Layne provided the commission with the Sabre Towers structural information.

Asked if School District 99 was aware of the timeline, Mr. Layne stated there were limitations as to when construction could occur. If approved, he expects construction would start in January with no interruption to school activities. Asked if the lease was conditioned upon any approvals received, Mr. Layne confirmed positively. Mr. Webster questioned the protection above the equipment, wherein Mr. Layne stated T-Mobile was considering a series of ice bridges to place above the equipment. Per another question, he was not aware of any fires started in the equipment nor an antenna breaking apart. Maintenance of the equipment is approximately once a month and during off hours.

Asked if the petitioner was comfortable with a limitation in the form of a single-user with a height not to exceed 90 feet, Mr. Layne stated it would have to be discussed with the school district if T-Mobile was going to construct something taller than discussed. Chairman Jirik reiterated to the petitioner that any form of dispensation by the Plan Commission is usually very specific.

Chairman Jirik opened up the meeting to public comment.

Mr. Dean Bapes, 6476 Saratoga Avenue, stated his next-door neighbor secured a petition and received over 90 names objecting this proposal. He discussed the resident notification process and the fact that many times the residents feel they do not have a voice because petitions are already decided upon. Mr. Bapes voiced concern that the tower will impact home values and impose health effects upon the community. He noted only the school district and T-Mobile will benefit from the proposal. He hoped the commission would consider the residents of the community.

## DRAFT

Ms. Jill Martin, 6505 Wells, conveyed concern about setting a precedent with the single-user tower eventually becoming a multi-use tower and whether additional types of equipment would follow. While the FCC pre-empts health issues, Ms. Martin understood that the FCC did not pre-empt people's perceptions of the health issues. Regarding property values, she posed the question of whether any of the commissioners would want to live near a power generator or cell towers knowing the health issues possibly associated with it.

Ms. Kathy Strohm, 1700 Taylor, inquired why T-Mobile could not extend one of the existing standards at the nearby Meadowbrook Mall versus the proposed location. She too, had concerns about the equipment voltage. Mr. Popovich stated it was a matter of proximity to another tower near Interstate 355. Also, height restrictions were an issue since it was non-residential zoning district and separation distance had to exist between the residential area and the tower.

No further comments followed. Public comment was closed by the chairman.

Chairman Jirik asked if the petitioner had further comments. Mr. Layne reiterated the positives of the proposal and called attention to the property value study that was enclosed in the commissioners' packets which reflected no impact. Mrs. Rabatah, in reviewing the three current towers and seeing the proposed tower will fit within the triangle, she queried what radius the new tower would serve and questioned Mr. Layne if T-Mobile considered retrofitting those three existing towers to increase the coverage radius. Mr. Layne responded that the T-Mobile's signal does not travel very far due to the density of the area. Additional questions followed on how T-Mobile would address the northern coverage gap.

Mr. Sanjay Jaisingani, 8550 W. Brynmar, Chicago, Illinois, engineer for the project, explained that the distance covered by the tower depends upon the height and terrain and the power which goes into the antenna. Coverage levels were explained along with frequency rates.

Regarding future sites to consider, Mr. Waechtler, encouraged the petitioner to look at industrial sites. Furthermore, the commissioners discussed the source of the charts and their accuracy, the location of the equipment being near the high school, and relying on the professionals who have done the work. Mr. Matejczyk noted the technology of T-Mobile was low and he expected that more tower requests would be forthcoming to this commission. Per a question regarding customer complaints and lack of coverage, Mr. Jaisingani added that customer complaint monitoring takes place on a daily basis because it is relevant to the coverage. He confirmed with Mr. Waechtler that complaints have been received for the area of discussion. Asked if the coverage area is affected by the number of calls, Mr. Jaisingani stated in certain technologies it is; however with T-Mobile it is not affected by the volume of calls. However, if the area is maximized out, then the service cannot be accessed. Mr. Matejczyk suggested increasing the safety factor in the structural process.

The chairman noted, for the record, staff's assessment relative to Section 28.1902. He stated staff was thorough in addressing the topic and agreed with staff's opinion that the standards have been met. Additionally, recalling the discussion with Mr. Bapes, he did direct Mr. Bapes to have a discussion with District 99 and also noted that any traffic issues should be addressed to Village's the Traffic & Parking Commission. The chairman confirmed the FCC pre-emption was explained; however, the chairman thought it was important to verify post-construction that compliance with the frequency measurements have been achieved to assure compliance with the FCC. He stated that

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any future application of any matter, is judged solely on its sole merits and proceedings, and the commission provides no prejudice for or against any application by any applicant whatsoever.

Chairman Jirik also stated that the commission did discuss a condition about limiting the tower to a single user and 90 feet. Given the sensitive location, he agreed it was important for the commission to pay attention to the structural design/engineering due to the safety of the students, including any inspections used, to validate that the construction has been performed flawlessly and the construction has achieved the intent of the structural design.

**WITH RESPECT TO FILE PC-10-09, MR. MATEJCZYK MADE A MOTION THAT THE PLAN COMMISSION FORWARD A POSITIVE RECOMMENDATION TO THE VILLAGE COUNCIL REGARDING THE PROPOSED SPECIAL USE PROPOSED BY THE PETITIONER, SUBJECT TO THE THREE (3) CONDITIONS NOTED ON PAGE 7 OF STAFF'S REPORT:**

- 1. THE SPECIAL USE SHALL SUBSTANTIALLY CONFORM TO THE PRELIMINARY ENGINEERING PLANS PREPARED BY FULLERTON ENGINEERING CONSULTANTS, DATED MARCH 14, 2008 EXCEPT AS SUCH PLANS MAY BE MODIFIED TO CONFORM TO VILLAGE CODES AND ORDINANCES;**
- 2. THE PETITIONER SHALL INSTALL A FENCE OR BARRIER ON TOP OF THE EXISTING EQUIPMENT FENCE TO ENSURE THAT ACCESS TO THE EQUIPMENT CAN NOT BE OBTAINED BY GOING THROUGH THE BLEACHERS ABOVE; AND**
- 3. BEFORE THE ISSUANCE OF ANY BUILDING PERMITS, THE APPLICANT SHALL SUBMIT AN ENGINEER S COST ESTIMATE IN THE AMOUNT SUFFICIENT TO FUND ANY COSTS INCURRED BY THE VILLAGE DUE TO OWNER S FAILURE TO COMPLY WITH ALL CODES, ORDINANCES, RULES AND REGULATIONS OF THE MUNICIPAL CODE INCLUDING ANY REMOVAL OR RESTORATION WORK THAT THE VILLAGE MUST PERFORM ITSELF OR HAVE COMPLETED AS A CONSEQUENCE OF THE OWNER S FAILURE TO COMPLY WITH ALL PROVISIONS OF THE MUNICIPAL CODE. FOLLOWING THE APPROVAL OF SUCH COST ESTIMATE, THE APPLICANT SHALL ESTABLISH A SECURITY FUND IN THAT AMOUNT WITH THE VILLAGE, IN THE FORM OF AN UNCONDITIONAL LETTER OF CREDIT, SURETY BOND OR OTHER INSTRUMENT. THE LETTER OF CREDIT, SURETY BOND OR OTHER INSTRUMENT SHALL (I) PROVIDE THAT IT SHALL NOT BE CANCELED WITHOUT PRIOR NOTICE TO THE VILLAGE; AND (II) NOT REQUIRE THE CONSENT OF ANY OTHER PERSON OTHER THAN THE PROPER VILLAGE OFFICIAL PRIOR TO THE COLLECTION BY THE VILLAGE OF ANY AMOUNTS COVERED BY SAID LETTER OF CREDIT, SURETY BOND OR OTHER INSTRUMENT. THE SECURITY FUND SHALL BE CONTINUOUSLY MAINTAINED IN ACCORDANCE WITH THE ZONING ORDINANCE, SECTION 28.1307, AT OWNER'S SOLE COST AND EXPENSE.**

**SECONDED BY MR. WEBSTER.**

## DRAFT

While he disagreed with Mr. Matejczyk's comments about leaving out specific verbiage as to equipment construction in the motion, Mr. Waechtler stated the chairman's comments were appropriate and thought more specific construction verbiage should be included in the motion due to the equipment being built underneath bleachers where students would be sitting. Mr. Waechtler was satisfied that the chairman's above comments would be clearly stated.

### **ROLL CALL:**

**AYE: MR. MATEJCZYK, MR. WEBSTER, MR. BEGGS, MRS. RABATAH, CHAIRMAN JIRIK**

**NAY: MR. WAECHTLER**

### **MOTION CARRIED. VOTE: 5-1**

Mr. Waechtler explained he voted Nay because the two previous approvals for T-Mobile towers were installed in somewhat residential areas but the towers were in remote areas and not under bleacher stands. There was a safety concern about the equipment being near students, sport students, and sporting events. For credibility purposes, he suggested that outside consultants provide the studies. Under Section 28.1908 he believed Items A, B and C were not appropriate.

Chairman Jirik explained the next steps in the petition review process for the attendees.

(The commission took a break at approximately 9:05 p.m. and reconvened at about 9:15 p.m.)

**PC-19-09** A petition seeking an Amendment to Chapter 28 of the Municipal Code – Zoning Ordinance Section 28.1500 Signs to amend the original monument sign regulations as they relate to shopping centers and automobile dealerships; Downers Grove Economic Development Corporation, Petitioner.

Chairman Jirik swore in those individuals who would be speaking on PC-19-09.

Director of Community Development, Tom Dabareiner, explained that the Downers Grove Economic Development Corporation ("DGEDC") is requesting a text amendment to Article 15 of the Zoning Ordinance pertaining to signage. Specifically, the DGEDC would like to permit free-standing signs that are 15 feet tall and 60 square feet on lots with a minimum frontage of 260 feet with a minimum of two-and-one-half acres. Also, the maximum square feet would be 300. Staff has reviewed the request and is recommending against it because there has not been much direction from the Village Council to aggressively change the ordinance and was remaining "open" to logical changes. However, staff feels a gap does exist in the sign ordinance where larger, single-use properties could benefit from various types of signage, because they have similar characteristics as shopping centers, such as multiple access points, larger setbacks, etc.

Staff feels that the height can improve visibility and allow for some improvements to traffic safety along major arterial road corridors. However, there are some concerns that the request may be contrary to the goals of the original sign ordinance amendment, i.e., clutter, as well as possibly being too broad. Examples of the proposed amendment as compared to current compliant signage in the B-3 District, were depicted on the overhead to provide a sense of proportion to the commissioners and audience. Director Dabareiner then presented various depictions of signage for

## **Petition against the Building of a Telecommunication Tower**

Dear neighbors,

Whether you have heard or not, the Village of Downers Grove plans to build a telecommunication tower on the corner of Springside Avenue and Norfolk Street alongside the Downers Grove South football stadium.

While it may bring technological advantages to the community, the negatives greatly outweigh the advantages. It will lower the esthetics of our neighborhood and lower real estate values. Most importantly, this tower will inflict great negative health effects to the people of our community. We must unite as a neighborhood community and sign a petition that refutes the building of the tower.

According to scientific studies, telecommunication tower emitted electromagnetic radiation causes the following health hazards:

- **3 TIMES HIGHER CANCER SUSCEPTIBILITY!!!**
- Cell membrane permeability
- Fatigue
- Cataracts
- Loss of mental concentration
- Headaches and uneasiness
- Embryo disruption leading to miscarriages
- Suppressed immune function
- Lower sperm counts
- Sleep disorders
- Increase in seizures
- Brain tumors

I ask out of the kindness of your hearts to sign this petition in order to protect the health of our children and to reduce the risks of suffering from one of the mentioned health hazards. This petition will be presented to the board at the Village Hall meeting concerning the erection of the telecommunication tower in our neighborhood. Protection of citizens' health and property rights should be foremost in the responsibilities of local government and they should find a more appropriate location near an industrial area.

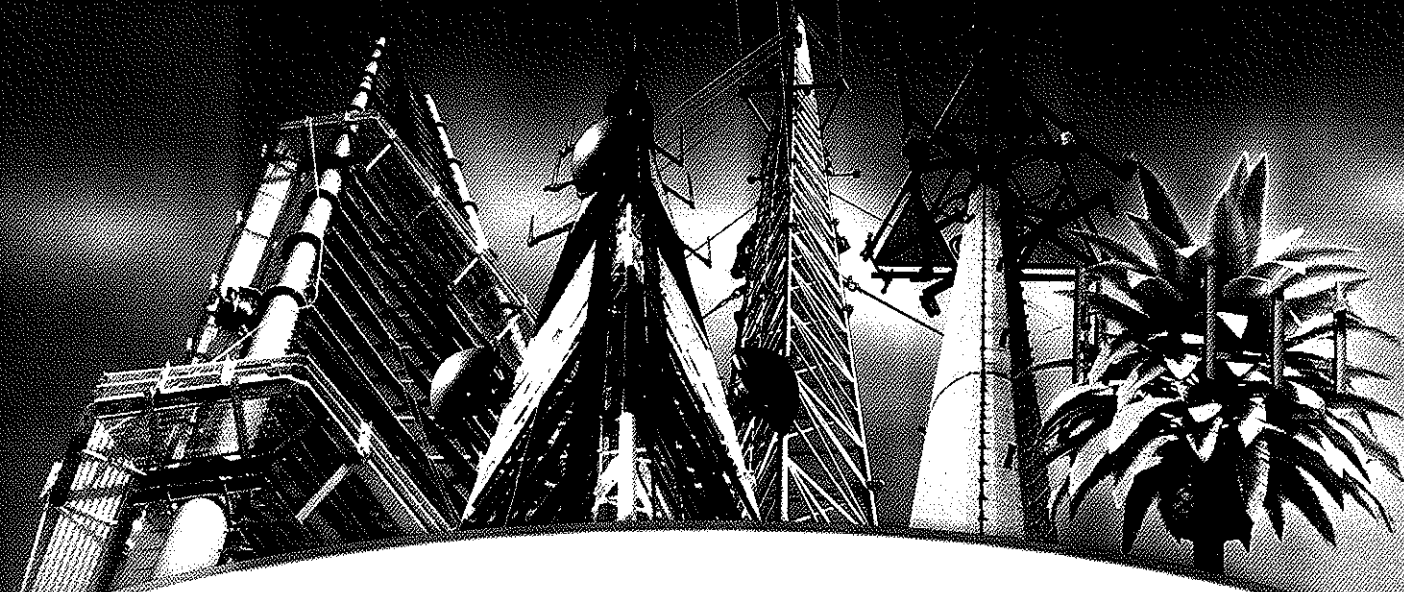
The Public Hearing regarding this issue will be held on November 2<sup>nd</sup> at 7 P.M. at the Village Hall Council Chambers. Please be in attendance and show your support against the building of this tower.

| Name                      | Address             | Signature         |
|---------------------------|---------------------|-------------------|
| ARTURAS SIMULIS           | 6468 Springside Ave | Arturas           |
| Nick Felbinger            | 6485 Nash St.       | Nick Felbinger    |
| ALDONA STRASIMWIENE       | 6437 LOOMIES AVE    | Aldona            |
| VILIMAS STRASIMVYS        | 6437 LOOMIES AVE    | Vilimas           |
| ASTA VERKE LIENE          | 1830 Prentiss Dr.   | Asta Verke Liene  |
| Kathy Strahm              | 1700 Taylor St.     | Kathy Strahm      |
| RICK STINAT               | 1701 BREASTED AVE   | Rick Stinat       |
| Mary Nessinger            | 6480 Springside     | Mary Nessinger    |
| GINA VAUSTROM             | 6485 Springside     | Gina Vaustrom     |
| Elena Seleson             | 1739 PRENTISS DR    | Elena Seleson     |
| JILL TOLentino            | 6473 HATHAWAY LN    | Jill Tolentino    |
| Susan Newton              | 6465 HATHAWAY LN    | Susan Newton      |
| JAY PETERS                | 1725 TAYLOR ST      | Jay Peters        |
| LYDIA HAN                 | 1721 TAYLOR ST      | Lydia Han         |
| RAMONDA BALCUNYTE         | 1718 TAYLOR ST      | Ramonda           |
| ANA MARIA PELNAR          | 6458 HATHAWAY       | Ana Maria Pelnar  |
| Dominique V. Vukobratovic | 6467 Nash St        | Dominique         |
| Beth Phillips             | 6443 Nash St        | Beth Phillips     |
| John Basco                | 1823 Breasted Ave   | John Basco        |
| ARTURAS AUDIEJAITIS       | 6456 Nash street    | Arturas           |
| Vina Dilg                 | 1587 Grand          | Vina Dilg         |
| Nichole Mender            | 6480 NASH           | Nichole Mender    |
| Patricia Jundt            | 6484 Nash           | Patricia Jundt    |
| HAROLD L. Jundt           | 6484 Nash           | Harold Jundt      |
| Tony Glowicki             | 1743 PRENTISS DR    | Tony Glowicki     |
| MONICA CHAPLIN            | 6500 WELLS ST.      | Monica P. Chaplin |
| Ura Reid                  | 1723 Brookwood      | Ura S. Reid       |
| Barbara Ovesen            | 6513 Wells St.      | Barbara Ovesen    |
| KRZYSZTOF STACIOW         | 1703 BROOKWOOD DR   | Krzysztof Staciow |
| David R. Brammer          | 1711 Brookwood Dr.  | David R. Brammer  |
| ANITA GULTA               | 1735 BROOKWOOD DR.  | Anita Gulta       |
| Bridget Fenley            | 1747 Brookwood Dr   | Bridget Fenley    |
| Michael J. Martel         | 1767 Brookwood Dr   | Michael J. Martel |
| Vitalii Masko             | 6513 Hathaway Lane  | Vitalii Masko     |
| GINAS POCIUS              | 6505 HATHAWAY DR    | Ginas Pocius      |
| Jenny Juv. Juv. Juv.      | 1722 Prentiss       | Jenny Juv.        |
| Nick DAKOF                | 1701 Breasted Ave   | Nick Dakof        |
| Anno Braunhi              | 1717 Breasted Ave   | Anno Braunhi      |
| LISA TRMCHETT             | 1757 BREASTED AVE   | Lisa Trmchett     |
| Jennifer Allison          | 1769 Breasted       | Jennifer Allison  |
| AL Rahman                 | 1827 Breasted Ave   | Al Rahman         |
| SUDEEP SENGH.             | 6418 PRIDEHAM ST.   | Sudeep Sengh.     |
| Plamen KALOYANOV          | 6412 PRIDEHAM ST.   | Plamen KALOYANOV  |
| Chris Aleksyrd            | 6560 Prideham St    | Chris Aleksyrd    |



| Name                 | Address              | Signature            |
|----------------------|----------------------|----------------------|
| Eric Brown           | 6348 Prideham St.    | Eric Brown           |
| Kelsey Flavin        | 6342 Prideham st.    | Kelsey Flavin        |
| Paul Meardon         | 1824 Whidden St.     | Paul Meardon         |
| J. CARROSO           | 1816 W. Whidden Ave. | J. Carroso           |
| May Batema           | 1804 Whidden Ave     | May Batema           |
| Anthony Babb         | 1712 Whidden Ave.    | Anthony Babb         |
| Chantal Andy Fokkers | 1760 Whidden A       | Chantal              |
| RAJESH DAVID         | 1752 WHIDDEN AVE     | Rajesh               |
| LINDY DEFRICO        | 1720 W Whidden ave   | Lindy DeFrigo        |
| CARA BICHMANN-BYTE   | 6801 WELLS STREET    | Cara Bichmann        |
| Willie Kirkwood      | 6311 WELLS STREET    | Willie Kirkwood      |
| Kathy Donelaz        | 6357 Wells Street    | Kathy Donelaz        |
| BOBWARD MILES        | 6400 WELLS STREET    | Bobward Miles        |
| RUTH MARQUEZ         | 1733 WHIDDEN ST.     | Ruth Marquez         |
| DAVID SPADLING       | 6311 HATHAWAY LN     | David Spadling       |
| Kathie Vaccarella    | 6341 Hathaway Ln     | Kathie Vaccarella    |
| ZINAIDA RUDASHEVSKY  | 6371 HATHAWAY LN.    | Zinaida Rudashevsky  |
| ABRAM RUDASHEVSKY    | 6371 HATHAWAY LN.    | Abram Rudashevsky    |
| Michael R. McDermott | 1801 Whidden Ave.    | Michael R. McDermott |
| J. MATTA             | 1805 WHIDDEN AVE.    | J. Matta             |
| G. Foster            | 1809 Whidden Ave.    | G. Foster            |
| KATHY CAREW          | 6367 Prideham        | Kathy Carew          |
| Cecelia Arniuk       | 6401 Prideham        | Cecelia Arniuk       |
| Kathleen Etrabach    | 1808 Breasted Ave    | Kathleen Etrabach    |
| KATHIE LONG          | 1766 Breasted Ave    | Kathie Long          |
| Brend Kandrak        | 1770 Breasted Ave    | Brend Kandrak        |
| Carol Silvestri      | 1754 BREASTED AVE    | Carol Silvestri      |
| GERALD MOSCATO       | 1746 BREASTED AVE    | Gerald Moscato       |
| MARK GURGUS          | 1742 BREASTED AVE    | Mark Gurgus          |
| ALDONA BARANAVSKAS   | 1712 TAYLOR ST.      | Aldona Baranavskas   |
| DEAN BAPES           | 6426 SPRINGSIDE      | Dean Bapes           |
| MARILYN BAPES        | 6426 SPRINGSIDE      | Marilyn Bapes        |
| JIL MARTIN           | 6305 WELLS           | Jil Martin           |

# Sabre Towers



***T-MOBILE***

***Permit Pkg with Foundation***

***DGS High School, IL***

***Sabre Job Number 09-05086***

***REVISED STAMPED PERMIT DRAWINGS***

***YOUR SABRE***

***REPRESENTATIVE IS***

***Jim Gibson***

***1-800-369-6690 EXT. 11482***



2101 Murray Street • P.O. Box 658 • Sioux City, Iowa 51102 USA

Phone: (712) 258-6690 • Fax: (712) 258-8250

[www.SabreTowersandPoles.com](http://www.SabreTowersandPoles.com)



**Structural Design Report**  
 90' Monopole  
 located at: DGS High School, IL  
 Site Number: CH65-326F

prepared for: T-MOBILE  
 by: Sabre Towers & Poles™

Job Number: 09-05086  
 Revision A  
 May 22, 2008

Monopole Profile..... 1

Foundation Design Summary..... 2

Pole Calculation..... C1-C5

Foundation Calculations..... A1-A7

Monopole by HAC

Foundation by KJT

Approved by KJT

LICENSED STRUCTURAL ENGINEER  
 KEITH J. TINDALL  
 081-000014  
 SIOUX CITY  
 IOWA  
 STATE OF ILLINOIS  
 license expires 11-30-08

| POLE SPECIFICATIONS |                  |
|---------------------|------------------|
| POLE HEIGHT         | 89.00 FEET       |
| TAPER               | .1250 IN/FT      |
| POLE SHAPE          | 16 SIDED POLYGON |
| ORIENTATION         | FLAT-FLAT        |

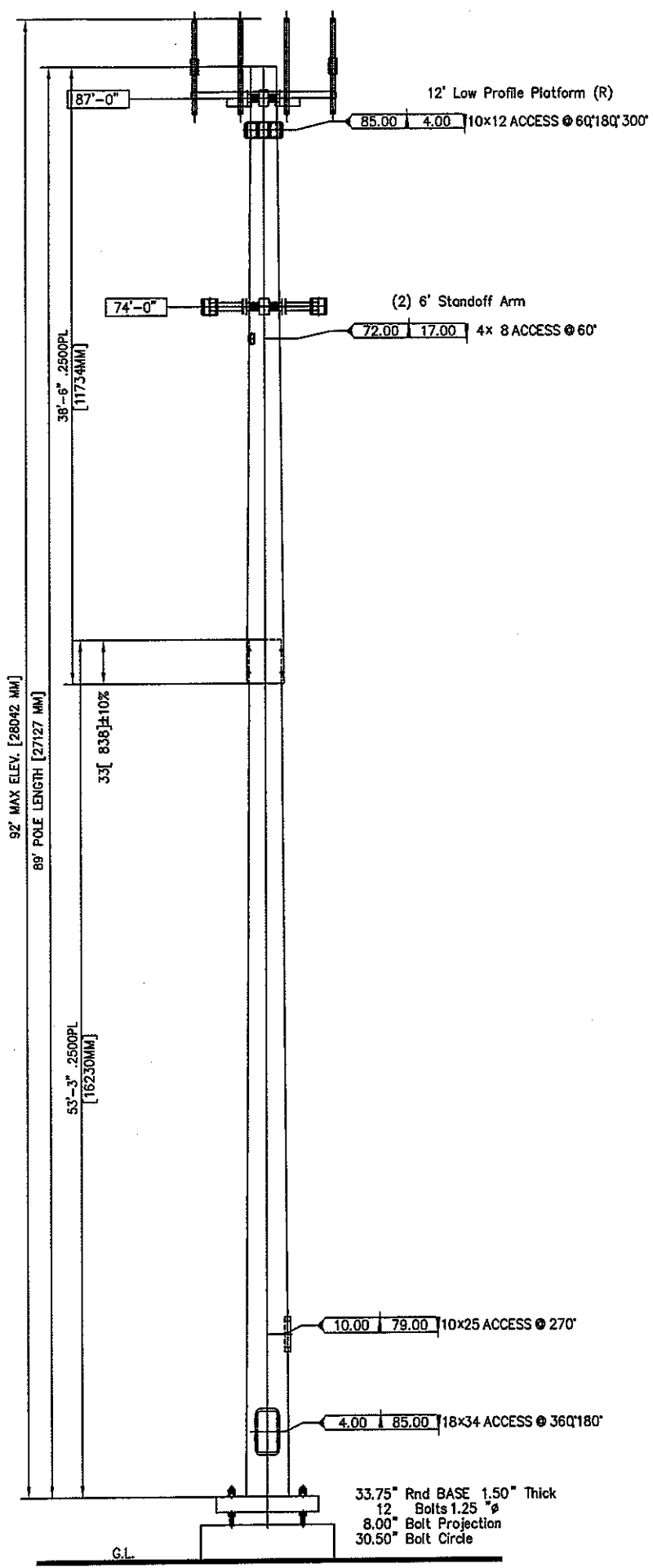
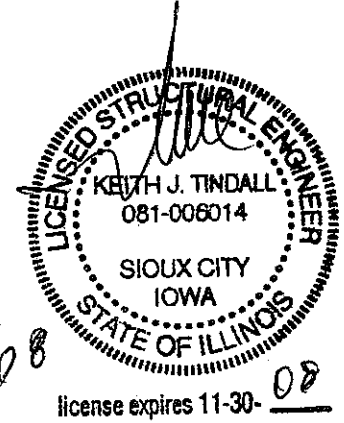
| Lev | Qty   | Elev ft. | Future | DESCRIPTION                  |
|-----|-------|----------|--------|------------------------------|
| 1   | 1     | 87.00    | F      | 12' Low Profile Platform (R) |
| 12  | 89.00 | F        |        | TMBX-6517-R2M                |
| 6   | 89.00 | F        |        | TMA                          |
| 2   | 2     | 74.00    | F      | 6' Standoff Arm              |
| 6   | 74.00 | F        |        | 2' STADIUM LIGHTS            |

| Load Case DESCRIPTION | Wind (mph) | OLF Vert | Rad. Ice | Factors Gust | Factors Cf | Wind (psf) |
|-----------------------|------------|----------|----------|--------------|------------|------------|
| 1) Max Wind           | 75.0       | 1.00     |          | 1.69         | .72        | 24.3       |
| 2) Max Wind Load x.75 | 64.9       | 1.00     | .50      | 1.69         | .72        | 18.2       |
| 3) Everyday Operating | 50.0       | 1.00     |          | 1.69         | .72        | 10.8       |

| Load Case DESCRIPTION | Res. Axial (kips) | Base Shear (kips) | React Mom (ft-k) | Disp DEFL. (ft) | @Top SWAY (deg) |
|-----------------------|-------------------|-------------------|------------------|-----------------|-----------------|
| 1) Max Wind           | 8.6               | 6.1               | 400              | 3.6             | 3.76            |
| 2) Max Wind Load x.75 | 10.5              | 5.0               | 335              | 3.1             | 3.19            |
| 3) Everyday Operating | 8.5               | 2.7               | 178              | 1.6             | 1.67            |

| Sec           | LENGTH (ft) | Flat-Flat TOPØ | Flat-Flat BOTØ | THICK (in) | WEIGHT (lbs) | STEEL SPEC | FINISH     |
|---------------|-------------|----------------|----------------|------------|--------------|------------|------------|
| 1             | 38.50       | 16.00          | 20.81          | .2500      | 2300         | A572-65    | Galv/Paint |
| 2             | 53.25       | 19.97          | 26.63          | .2500      | 4500         | A572-65    | Galv/Paint |
| TOTAL         |             |                |                |            | 6800         |            |            |
| ABolt Cluster | BoltØ       | HoleØ          |                |            |              |            |            |
| AB            | 63.00       | 1.25           | 1.500          |            | 400          | A449-81    | Galv-18"   |

- 1) FULL HEIGHT STEP BOLTS
- 2) ANTENNA FEED LINES RUN INSIDE POLE
- 3) THE MONOPOLE WAS DESIGNED IN ACCORDANCE WITH EIA/TIA-222-F.



**T-MOBILE**

DGS High School, IL  
CH65-326F

90.00 MONOPOLE

**Sabre**  
Towers & Poles

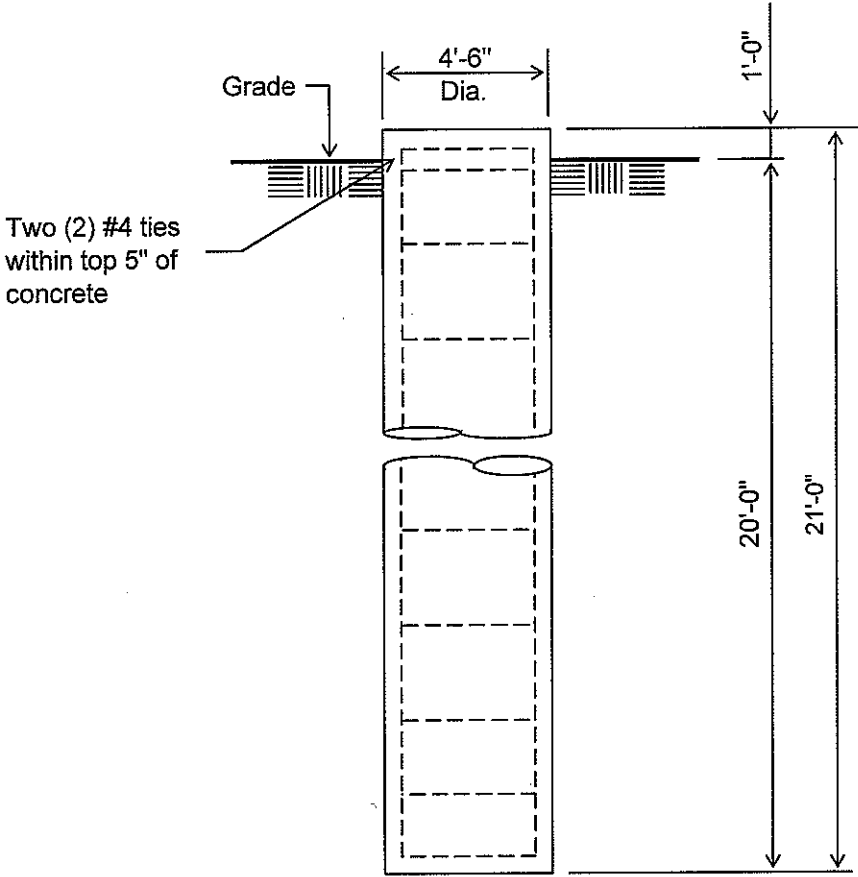
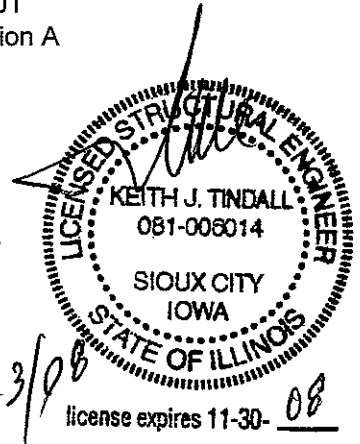
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|            |          |                   |             |      |
|------------|----------|-------------------|-------------|------|
| DATE       | 09-05086 | SIZE              | DRAWING NO. | REV  |
|            | 22May08  | A                 | 09-05086-PE | A    |
| DRAWN BY   | -        | REFERENCE DRAWING | SCALE       | PAGE |
| CHECKED BY | HAC      |                   | N.T.S.      | 1    |



**Customer: T-MOBILE**  
**Site: DGS High School, IL CH65-326F**

90' Monopole at  
 75 mph Wind + 0.5 in. Ice per ANSI/TIA/EIA-222-F-1996.  
 Antenna Loading per Page 1



**Notes:**

- 1). Concrete shall have a minimum 28-day compressive strength of 4000 PSI, in accordance with ACI 318-05.
- 2). Rebars to conform to ASTM specification A615 Grade 60.
- 3). All rebar to have a minimum of 3" concrete cover.
- 4). All exposed concrete corners to be chamfered 3/4".
- 5). The foundation design is based on the geotechnical report by Geocon project no. 4-83031, dated: 5/1/08.
- 6). See the geotechnical report for drilled pier installation requirements, if specified.

**ELEVATION VIEW**  
 (12.37 Cu. Yds. each)  
 (1 REQUIRED)

| Rebar Schedule per Pier |  |
|-------------------------|--|
| Pier                    | (20) #7 vertical rebar w/#4 ties, two within top 5" of pier then 12" C/C |

**SABRE COMMUNICATIONS CORP**  
 2101 Murray Street  
 Sioux City, IA 51101

JOB: 09-05086  
**T-MOBILE**  
**DGS High School, IL**

22-May-08 15:49  
 Ph 712.258.6690  
 Fx 712.258.8250

TOP DIAMETER 16.00 in. [ 16.31 in. Point-Point]  
 BOTTOM DIAMETER 26.63 in. [ 27.15 in. Point-Point]  
 POLE HEIGHT 89.00 ft. 16 SIDED FLAT ORIENTATION  
 BASE HEIGHT 1.00 ft. ABOVE GROUND  
 E-MODULUS 29000 ksi [ 12000 ksi SHEAR MODULUS]

**APPURTENANCES**

| ATTACH POINTS: | NO. | X,ft  | Qty | Description                  | Status        |
|----------------|-----|-------|-----|------------------------------|---------------|
|                | 1   | 87.00 | 1   | 12' Low Profile Platform (R) | Future Appurt |
|                | 2   | 74.00 | 2   | 6' Standoff Arm              | Future Appurt |

| Pole Section | Bottom X,ft. | Thick in. | Connect Type | LAP in. | Taper in/ft | Length ft. | Weight lbs | Steel Spec | Pole Finish |
|--------------|--------------|-----------|--------------|---------|-------------|------------|------------|------------|-------------|
| 1            | 38.50        | .25000    | SLIP-JNT     | 33.     | .1250       | 38.50      | 1892       | A572-65    | GALV/PAINT  |
| 2            | 89.00        | .25000    | C-WELD       |         | .1250       | 53.25      | 3322       | A572-65    | GALV/PAINT  |

**SECTION PROPERTIES**

| X,ft  | UP,ft | D,in  | T,in  | Area in <sup>2</sup> | Iz in <sup>4</sup> | IxIy in <sup>4</sup> | SxSy in <sup>3</sup> | w/t   | d/t   | F <sub>y</sub> (ksi) |          |
|-------|-------|-------|-------|----------------------|--------------------|----------------------|----------------------|-------|-------|----------------------|----------|
| 89.00 | .00   | 16.00 | .2500 | 12.53                | 786                | 393                  | 48.2                 | 10.74 | 64.0  | 65.00                | TOP      |
| 87.00 | 2.00  | 16.25 | .2500 | 12.73                | 826                | 413                  | 49.9                 | 10.94 | 65.0  | 65.00                | P01      |
| 82.00 | 7.00  | 16.88 | .2500 | 13.23                | 926                | 463                  | 53.8                 | 11.44 | 67.5  | 65.00                |          |
| 77.00 | 12.00 | 17.50 | .2500 | 13.72                | 1034               | 517                  | 58.0                 | 11.93 | 70.0  | 65.00                | P02      |
| 74.00 | 15.00 | 17.88 | .2500 | 14.02                | 1104               | 552                  | 60.6                 | 12.23 | 71.5  | 65.00                |          |
| 69.00 | 20.00 | 18.50 | .2500 | 14.52                | 1224               | 612                  | 64.9                 | 12.73 | 74.0  | 65.00                |          |
| 64.00 | 25.00 | 19.13 | .2500 | 15.02                | 1356               | 678                  | 69.5                 | 13.23 | 76.5  | 65.00                |          |
| 59.00 | 30.00 | 19.75 | .2500 | 15.52                | 1494               | 747                  | 74.2                 | 13.72 | 79.0  | 65.00                |          |
| 54.00 | 35.00 | 20.38 | .2500 | 16.01                | 1644               | 822                  | 79.1                 | 14.22 | 81.5  | 65.00                |          |
| 53.25 | 35.75 | 20.47 | .2500 | 16.09                | 1666               | 833                  | 79.8                 | 14.30 | 81.9  | 65.00                | Slip-B01 |
| 50.50 | 38.50 | 20.31 | .2500 | 15.96                | 1628               | 814                  | 78.6                 | 14.17 | 81.3  | 65.00                | Slip-T02 |
| 45.50 | 43.50 | 20.94 | .2500 | 16.46                | 1784               | 892                  | 83.6                 | 14.67 | 83.8  | 65.00                |          |
| 40.50 | 48.50 | 21.56 | .2500 | 16.96                | 1952               | 976                  | 88.8                 | 15.17 | 86.3  | 65.00                |          |
| 35.50 | 53.50 | 22.19 | .2500 | 17.45                | 2128               | 1064                 | 94.1                 | 15.66 | 88.8  | 65.00                |          |
| 30.50 | 58.50 | 22.81 | .2500 | 17.95                | 2316               | 1158                 | 99.6                 | 16.16 | 91.3  | 65.00                |          |
| 25.50 | 63.50 | 23.44 | .2500 | 18.45                | 2514               | 1257                 | 105.2                | 16.66 | 93.8  | 65.00                |          |
| 20.50 | 68.50 | 24.06 | .2500 | 18.95                | 2720               | 1360                 | 110.9                | 17.16 | 96.3  | 65.00                |          |
| 15.50 | 73.50 | 24.69 | .2500 | 19.44                | 2942               | 1471                 | 116.9                | 17.65 | 98.8  | 65.00                |          |
| 10.50 | 78.50 | 25.31 | .2500 | 19.94                | 3172               | 1586                 | 122.9                | 18.15 | 101.3 | 65.00                |          |
| 5.50  | 83.50 | 25.94 | .2500 | 20.44                | 3416               | 1708                 | 129.2                | 18.65 | 103.8 | 65.00                |          |
| .50   | 88.50 | 26.56 | .2500 | 20.94                | 3672               | 1836                 | 135.6                | 19.15 | 106.3 | 65.00                |          |
| .00   | 89.00 | 26.63 | .2500 | 20.99                | 3698               | 1849                 | 136.2                | 19.20 | 106.5 | 65.00                | BASE     |

SABRE COMMUNICATIONS CORP  
 2101 Murray Street  
 Sioux City, IA 51101

JOB: 09-05086  
**T-MOBILE**  
**DGS High School, IL**

22-May-08 15:49  
 Ph 712.258.6690  
 Fx 712.258.8250

**CASE - 1: Max Wind** **TIA/EIA-222-F**

|                  |         |                  |                    |
|------------------|---------|------------------|--------------------|
| VERTICAL OLF     | 1.00    | WIND SPEED       | 75.0 mph 120.7 kph |
| ICE COVER        | .00 in  | GUST FACTOR      | 1.69               |
| STRESS REDUCTION | .60     | EXPOSURE COEFF.  | .2857              |
| STRESS AMPLIFY   | 1.33    | Cf               | .720               |
| BASE ABOVE Grd   | 1.00 ft | REFERENCE HEIGHT | 33.0 ft            |
|                  |         | PRESSURE @Ref.Ht | 24.3 psf 1165.Pa   |

**APPURTENANCE LOADS**

| # | Qty | Description                  | Center  | WEIGHT | AREA | Tx-CABLE |     | WIND | FORCES |      | MOM. |
|---|-----|------------------------------|---------|--------|------|----------|-----|------|--------|------|------|
|   |     |                              | Line    | each   | each | Type     | Qty |      | #/Ft   | Psf  |      |
|   |     |                              | Elev-Ft | Lbs    | Ft^2 |          |     |      | Kips   | Kips | Ft-K |
| 1 | 1   | 12' Low Profile Platform (R) | 87.0    | 1239   | 70.6 |          |     | 32.1 | 2.27   | -1.2 | -.6  |
|   | 12  | TMBX-6517-R2M                | 89.0    | 17     |      | 1 5/8"   | 12  | 1.04 | 32.4   | -1.3 |      |
|   | 6   | TMA                          | 89.0    | 5      |      | None     | 1   | .00  | 32.4   | .0   |      |
| 2 | 2   | 6' Standoff Arm              | 74.0    | 102    | 3.0  |          |     | 30.7 | .18    | -.2  | .0   |
|   | 6   | 2' STADIUM LIGHTS            | 74.0    | 25     | 2.8  | 1/2"     | 6   | .40  | 30.8   | .52  | -.3  |

**RESULTS**

| ELEV. | POLE  | WIND | --- FORCES, kips --- |        |       |        | ---MOMENTS, ft-kips--- |       |       | STRESS ALLOW |      |  |
|-------|-------|------|----------------------|--------|-------|--------|------------------------|-------|-------|--------------|------|--|
| X, ft | X, ft | psf  | ShearX               | ShearY | Axiaz | BendX  | BendY                  | TorqZ | ksi   | ksi          | CSR  |  |
| 90.00 | 89.00 | 23.3 | .0                   | .0     | .0    | .0     | .0                     | .0    | .01   | 51.87        | .000 |  |
| 88.00 | 87.00 | 23.2 | .0                   | 2.6    | -2.6  | -.6    | .0                     | .0    | .50   | 51.87        | .010 |  |
| 83.00 | 82.00 | 22.8 | .0                   | 2.8    | -2.8  | -13.6  | .0                     | .0    | 3.20  | 51.87        | .062 |  |
| 78.00 | 77.00 | 22.4 | .0                   | 2.9    | -3.0  | -27.4  | .0                     | .0    | 5.79  | 51.87        | .112 |  |
| 75.00 | 74.00 | 22.2 | .0                   | 3.8    | -3.7  | -36.1  | .0                     | .0    | 7.30  | 51.87        | .141 |  |
| 70.00 | 69.00 | 21.7 | .0                   | 4.0    | -4.0  | -55.0  | .0                     | .0    | 10.26 | 51.87        | .198 |  |
| 65.00 | 64.00 | 21.3 | .0                   | 4.1    | -4.2  | -74.8  | .0                     | .0    | 12.94 | 51.87        | .250 |  |
| 60.00 | 59.00 | 20.8 | .0                   | 4.3    | -4.5  | -95.4  | .0                     | .0    | 15.43 | 51.87        | .298 |  |
| 55.00 | 54.00 | 20.3 | .0                   | 4.4    | -4.7  | -116.9 | .0                     | .0    | 17.69 | 51.87        | .341 |  |
| 54.25 | 53.25 | 20.2 | .0                   | 4.5    | -4.9  | -120.3 | .0                     | .0    | 18.04 | 51.87        | .348 |  |
| 51.50 | 50.50 | 19.9 | .0                   | 4.6    | -5.2  | -132.5 | .0                     | .0    | 20.17 | 51.87        | .389 |  |
| 46.50 | 45.50 | 19.3 | .0                   | 4.8    | -5.6  | -155.5 | .0                     | .0    | 22.25 | 51.87        | .429 |  |
| 41.50 | 40.50 | 18.7 | .0                   | 4.9    | -5.9  | -179.3 | .0                     | .0    | 24.13 | 51.87        | .465 |  |
| 36.50 | 35.50 | 18.0 | .0                   | 5.1    | -6.2  | -204.0 | .0                     | .0    | 25.89 | 51.87        | .499 |  |
| 31.50 | 30.50 | 17.5 | .0                   | 5.2    | -6.6  | -229.3 | .0                     | .0    | 27.48 | 51.87        | .530 |  |
| 26.50 | 25.50 | 17.5 | .0                   | 5.4    | -6.9  | -255.4 | .0                     | .0    | 28.95 | 51.87        | .558 |  |
| 21.50 | 20.50 | 17.5 | .0                   | 5.5    | -7.2  | -282.3 | .0                     | .0    | 30.36 | 51.87        | .585 |  |
| 16.50 | 15.50 | 17.5 | .0                   | 5.7    | -7.6  | -309.9 | .0                     | .0    | 31.60 | 51.87        | .609 |  |
| 11.50 | 10.50 | 17.5 | .0                   | 5.8    | -8.0  | -338.3 | .0                     | .0    | 32.79 | 51.87        | .632 |  |
| 6.50  | 5.50  | 17.5 | .0                   | 6.0    | -8.4  | -367.4 | .0                     | .0    | 33.89 | 51.87        | .653 |  |
| 1.50  | .50   | 17.5 | .0                   | 6.1    | -8.6  | -397.3 | .0                     | .0    | 34.90 | 51.87        | .673 |  |
| 1.00  | .00   | 17.5 | .0                   | 6.1    | -8.6  | 400.3  | .0                     | .0    | 34.99 | 51.87        | .675 |  |

**DISPLACEMENTS**

| ELEV  | -----DEFLECTION feet----- |      |      |              | -----ROTATION, degrees----- |     |     |           |
|-------|---------------------------|------|------|--------------|-----------------------------|-----|-----|-----------|
| X, ft | X                         | Y    | Z    | XY-Result    | X                           | Y   | Z   | XY-Result |
| 89.00 | .00                       | 3.64 | -.09 | 3.64< 4.09%> | -3.76                       | .00 | .00 | 3.76      |

**CASE - 2: Max Wind Load x.75**

**TIA/EIA-222-F**

|                  |         |                  |                    |
|------------------|---------|------------------|--------------------|
| VERTICAL OLF     | 1.00    | WIND SPEED       | 64.9 mph 104.4 kph |
| ICE COVER        | .50 in  | GUST FACTOR      | 1.69               |
| STRESS REDUCTION | .60     | EXPOSURE COEFF.  | .2857              |
| STRESS AMPLIFY   | 1.33    | Cf               | .720               |
| BASE ABOVE Grd   | 1.00 ft | REFERENCE HEIGHT | 33.0 ft            |
|                  |         | PRESSURE @Ref.Ht | 18.2 psf 872.Pa    |

**APPURTENANCE LOADS**

| # | Qty | Description                  | Center Line Elev-Ft | WEIGHT each Lbs | AREA each Ft^2 | Tx-CABLE |          | WIND Psf | FORCES     |           | MOM. Lg-X Ft-K |
|---|-----|------------------------------|---------------------|-----------------|----------------|----------|----------|----------|------------|-----------|----------------|
|   |     |                              |                     |                 |                | Type     | Qty #/Ft |          | Tra-Y Kips | Ax-Z Kips |                |
| 1 | 1   | 12' Low Profile Platform (R) | 87.0                | 1363            | 80.7           |          |          | 24.1     | 1.94       | -1.4      | -0.5           |
|   | 12  | TMBX-6517-R2M                | 89.0                | 43              |                | 1 5/8"   | 12 1.04  | 24.3     |            | -1.6      |                |
|   | 6   | TMA                          | 89.0                | 15              |                | None     | 1 .00    | 24.3     |            | -0.1      |                |
| 2 | 2   | 6' Standoff Arm              | 74.0                | 112             | 3.3            |          |          | 23.0     | .15        | -0.2      | 0.0            |
|   | 6   | 2' STADIUM LIGHTS            | 74.0                | 64              | 3.2            | 1/2"     | 6 .40    | 23.0     | .44        | -0.6      |                |

**RESULTS**

| ELEV. X, ft | POLE X, ft | WIND psf | --- FORCES, kips --- |        |       |        | --- MOMENTS, ft-kips --- |       |       | --- STRESS ALLOW --- |      |  |
|-------------|------------|----------|----------------------|--------|-------|--------|--------------------------|-------|-------|----------------------|------|--|
|             |            |          | ShearX               | ShearY | Axiaz | BendX  | BendY                    | TorqZ | ksi   | ksi                  | CSR  |  |
| 90.00       | 89.00      | 17.5     | .0                   | .0     | -0.1  | .0     | .0                       | .0    | .01   | 51.87                | .000 |  |
| 88.00       | 87.00      | 17.4     | .0                   | 2.2    | -3.2  | -.5    | .0                       | .0    | .49   | 51.87                | .009 |  |
| 83.00       | 82.00      | 17.1     | .0                   | 2.4    | -3.5  | -11.7  | .0                       | .0    | 2.84  | 51.87                | .055 |  |
| 78.00       | 77.00      | 16.8     | .0                   | 2.5    | -3.7  | -23.6  | .0                       | .0    | 5.08  | 51.87                | .098 |  |
| 75.00       | 74.00      | 16.6     | .0                   | 3.2    | -4.7  | -31.1  | .0                       | .0    | 6.40  | 51.87                | .123 |  |
| 70.00       | 69.00      | 16.3     | .0                   | 3.4    | -5.0  | -47.3  | .0                       | .0    | 8.94  | 51.87                | .172 |  |
| 65.00       | 64.00      | 15.9     | .0                   | 3.5    | -5.3  | -64.2  | .0                       | .0    | 11.23 | 51.87                | .217 |  |
| 60.00       | 59.00      | 15.6     | .0                   | 3.7    | -5.7  | -81.8  | .0                       | .0    | 13.35 | 51.87                | .257 |  |
| 55.00       | 54.00      | 15.2     | .0                   | 3.7    | -5.9  | -100.1 | .0                       | .0    | 15.26 | 51.87                | .294 |  |
| 54.25       | 53.25      | 15.1     | .0                   | 3.8    | -6.1  | -102.8 | .0                       | .0    | 15.54 | 51.87                | .300 |  |
| 51.50       | 50.50      | 14.9     | .0                   | 3.9    | -6.5  | -113.3 | .0                       | .0    | 17.37 | 51.87                | .335 |  |
| 46.50       | 45.50      | 14.5     | .0                   | 4.0    | -6.9  | -132.7 | .0                       | .0    | 19.11 | 51.87                | .368 |  |
| 41.50       | 40.50      | 14.0     | .0                   | 4.1    | -7.3  | -152.8 | .0                       | .0    | 20.68 | 51.87                | .399 |  |
| 36.50       | 35.50      | 13.5     | .0                   | 4.2    | -7.7  | -173.4 | .0                       | .0    | 22.14 | 51.87                | .427 |  |
| 31.50       | 30.50      | 13.1     | .0                   | 4.4    | -8.1  | -194.6 | .0                       | .0    | 23.45 | 51.87                | .452 |  |
| 26.50       | 25.50      | 13.1     | .0                   | 4.5    | -8.5  | -216.3 | .0                       | .0    | 24.67 | 51.87                | .476 |  |
| 21.50       | 20.50      | 13.1     | .0                   | 4.6    | -8.9  | -238.7 | .0                       | .0    | 25.81 | 51.87                | .498 |  |
| 16.50       | 15.50      | 13.1     | .0                   | 4.7    | -9.3  | -261.6 | .0                       | .0    | 26.82 | 51.87                | .517 |  |
| 11.50       | 10.50      | 13.1     | .0                   | 4.8    | -9.8  | -284.9 | .0                       | .0    | 27.78 | 51.87                | .536 |  |
| 6.50        | 5.50       | 13.1     | .0                   | 4.9    | -10.2 | -308.9 | .0                       | .0    | 28.65 | 51.87                | .552 |  |
| 1.50        | .50        | 13.1     | .0                   | 5.0    | -10.5 | -333.3 | .0                       | .0    | 29.44 | 51.87                | .568 |  |
| 1.00        | .00        | 13.1     | .0                   | 5.0    | -10.5 | 335.8  | .0                       | .0    | 29.52 | 51.87                | .569 |  |

**DISPLACEMENTS**

| ELEV X, ft | --- DEFLECTION feet --- |      |      |                | --- ROTATION, degrees --- |     |     |           |
|------------|-------------------------|------|------|----------------|---------------------------|-----|-----|-----------|
|            | X                       | Y    | Z    | XY-Result      | X                         | Y   | Z   | XY-Result |
| 89.00      | .00                     | 3.08 | -.07 | 3.08 < 3.46% > | -3.19                     | .00 | .00 | 3.19      |



CASE - 3: Everyday Operating

TIA/EIA-222-F

|                  |         |                  |          |          |
|------------------|---------|------------------|----------|----------|
| VERTICAL OLF     | 1.00    | WIND SPEED       | 50.0 mph | 80.5 kph |
| ICE COVER        | .00 in  | GUST FACTOR      | 1.69     |          |
| STRESS REDUCTION | .60     | EXPOSURE COEFF.  | .2857    |          |
| STRESS AMPLIFY   | 1.33    | Cf               | .720     |          |
| BASE ABOVE Grd   | 1.00 ft | REFERENCE HEIGHT | 33.0 ft  |          |
|                  |         | PRESSURE @Ref.Ht | 10.8 psf | 518.Pa   |

APPURTENANCE LOADS

| # | Qty | Description                  | Center Line Elev-Ft | WEIGHT each Lbs | AREA each Ft^2 | Tx-CABLE Type | Qty #/Ft | WIND Psf | FORCES Tra-Y Kips | AX-Z Kips | MOM. Lg-X Ft-K |
|---|-----|------------------------------|---------------------|-----------------|----------------|---------------|----------|----------|-------------------|-----------|----------------|
| 1 | 1   | 12' Low Profile Platform (R) | 87.0                | 1239            | 70.6           |               |          | 14.3     | 1.01              | -1.2      | -.3            |
|   | 12  | TMBX-6517-R2M                | 89.0                | 17              |                | 1 5/8"        | 12 1.04  | 14.4     |                   | -1.3      |                |
|   | 6   | TMA                          | 89.0                | 5               |                | None          | 1 .00    | 14.4     |                   | .0        |                |
| 2 | 2   | 6' Standoff Arm              | 74.0                | 102             | 3.0            |               |          | 13.6     | .08               | -.2       | .0             |
|   | 6   | 2' STADIUM LIGHTS            | 74.0                | 25              | 2.8            | 1/2"          | 6 .40    | 13.7     | .23               | -.3       |                |

RESULTS

| ELEV. | POLE  | WIND | --- FORCES, kips --- |        |        |        | --- MOMENTS, ft-kips --- |       |       | STRESS ALLOW |           |  |
|-------|-------|------|----------------------|--------|--------|--------|--------------------------|-------|-------|--------------|-----------|--|
| X, ft | X, ft | psf  | ShearX               | ShearY | AxialZ | BendX  | BendY                    | TorqZ | ksi   | ksi          | CSR       |  |
| 90.00 | 89.00 | 10.4 | .0                   | .0     | .0     | .0     | .0                       | .0    | .00   | 51.87        | .000      |  |
| 88.00 | 87.00 | 10.3 | .0                   | 1.2    | -2.7   | -.3    | .0                       | .0    | .32   | 51.87        | .006      |  |
| 83.00 | 82.00 | 10.1 | .0                   | 1.2    | -3.0   | -6.0   | .0                       | .0    | 1.55  | 51.87        | .030      |  |
| 78.00 | 77.00 | 10.0 | .0                   | 1.3    | -3.1   | -12.2  | .0                       | .0    | 2.71  | 51.87        | .052      |  |
| 75.00 | 74.00 | 9.8  | .0                   | 1.7    | -3.9   | -16.1  | .0                       | .0    | 3.40  | 51.87        | .066      |  |
| 70.00 | 69.00 | 9.7  | .0                   | 1.8    | -4.1   | -24.5  | .0                       | .0    | 4.73  | 51.87        | .091      |  |
| 65.00 | 64.00 | 9.5  | .0                   | 1.8    | -4.4   | -33.3  | .0                       | .0    | 5.92  | 51.87        | .114      |  |
| 60.00 | 59.00 | 9.2  | .0                   | 1.9    | -4.6   | -42.5  | .0                       | .0    | 7.04  | 51.87        | .136      |  |
| 55.00 | 54.00 | 9.0  | .0                   | 2.0    | -4.8   | -52.0  | .0                       | .0    | 8.04  | 51.87        | .155      |  |
| 54.25 | 53.25 | 9.0  | .0                   | 2.0    | -5.0   | -53.5  | .0                       | .0    | 8.20  | 51.87        | .158      |  |
| 51.50 | 50.50 | 8.8  | .0                   | 2.0    | -5.3   | -59.0  | .0                       | .0    | 9.16  | 51.87        | .177      |  |
| 46.50 | 45.50 | 8.6  | .0                   | 2.1    | -5.7   | -69.2  | .0                       | .0    | 10.09 | 51.87        | .195      |  |
| 41.50 | 40.50 | 8.3  | .0                   | 2.2    | -6.0   | -79.8  | .0                       | .0    | 10.93 | 51.87        | .211      |  |
| 36.50 | 35.50 | 8.0  | .0                   | 2.3    | -6.3   | -90.8  | .0                       | .0    | 11.72 | 51.87        | .226      |  |
| 31.50 | 30.50 | 7.8  | .0                   | 2.3    | -6.6   | -102.0 | .0                       | .0    | 12.43 | 51.87        | .240      |  |
| 26.50 | 25.50 | 7.8  | .0                   | 2.4    | -6.9   | -113.6 | .0                       | .0    | 13.08 | 51.87        | .252      |  |
| 21.50 | 20.50 | 7.8  | .0                   | 2.5    | -7.2   | -125.6 | .0                       | .0    | 13.72 | 51.87        | .264      |  |
| 16.50 | 15.50 | 7.8  | .0                   | 2.5    | -7.6   | -137.8 | .0                       | .0    | 14.27 | 51.87        | .275      |  |
| 11.50 | 10.50 | 7.8  | .0                   | 2.6    | -7.9   | -150.4 | .0                       | .0    | 14.80 | 51.87        | .285      |  |
| 6.50  | 5.50  | 7.8  | .0                   | 2.7    | -8.3   | -163.4 | .0                       | .0    | 15.30 | 51.87        | .295      |  |
| 1.50  | .50   | 7.8  | .0                   | 2.7    | -8.5   | -176.7 | .0                       | .0    | 15.74 | 51.87        | .303      |  |
| 1.00  | .00   | 7.8  | .0                   | 2.7    | -8.5   | 178.0  | .0                       | .0    | 15.78 | 51.87        | .304 BASE |  |

DISPLACEMENTS

| ELEV  | DEFLECTION feet |      |      |              | ROTATION, degrees |     |     |           | Microw |
|-------|-----------------|------|------|--------------|-------------------|-----|-----|-----------|--------|
| X, ft | X               | Y    | Z    | XY-Result    | X                 | Y   | Z   | XY-Result | Allow  |
| 89.00 | .00             | 1.62 | -.02 | 1.62< 1.82%> | -1.67             | .00 | .00 | 1.67      |        |

**SABRE COMMUNICATIONS CORP**  
 2101 Murray Street  
 Sioux City, IA 51101

JOB: 09-05086

**T-MOBILE**

**DGS High School, IL**

22-May-08 15:49  
 Ph 712.258.6690  
 Fx 712.258.8250

SHAPE: 16 SIDED POLYGON with FLAT-FLAT ORIENTATION  
 BOLTS: EVENLY SPACED BOLTS 7.89 in. ON CENTER  
 LOCATE:

**POLE DATA**

|            |             |         |              |               |      |
|------------|-------------|---------|--------------|---------------|------|
| DIAMETER = | 26.63 in.   | BASE    | AXIAL FORCE= | -8.6 kips     | Vert |
| PLATE =    | .2500 in.   | ACTIONS | SHEAR X =    | 6.1 kips      | Long |
| TAPER =    | .1250 in/ft |         | SHEAR Y =    | .0 kips       | Tran |
| POLE Fy =  | 65.00 ksi   |         | X-AXIS MOM = | 283.0 ft-kips | Tran |
|            |             |         | Y-AXIS MOM = | 283.0 ft-kips | Long |
|            |             |         | Z-AXIS MOM = | .0 ft-kips    | Vert |

**DESIGN CASE = 1 Max Wind**

Design: ANY Orientation Reactions at 45.00 deg to X-AXIS

**BOLT LOADS**

|       |                         |   |            |            |
|-------|-------------------------|---|------------|------------|
|       | AXIAL - COMPRESSION     | = | 53.21 kips |            |
|       | AXIAL - TENSION         | = | 51.78 kips |            |
|       | SHEAR                   | = | .50 kips   |            |
| AXIAL | STRESS                  | = | 43.36 ksi  |            |
| SHEAR | STRESS                  | = | .56 ksi    |            |
| YIELD | STRENGTH Fy             | = | 81.00 ksi  |            |
| ULT.  | STRENGTH Fu             | = | 105.00 ksi | CSR        |
| ALLOW | STRESS Ft [ .33 x 1.33] | = | 46.08 ksi  | .941 EIA-F |
|       | GROSS AREA REQUIRED     | = | 1.15 in^2  |            |
|       | GROSS AREA FURNISHED    | = | 1.23 in^2  |            |
|       | ROOT AREA FURNISHED     | = | .91 in^2   |            |

**A449 ::: ANCHOR BOLT DESIGN USED**

|                    |                        |       |
|--------------------|------------------------|-------|
| 12 Bolts on a      | 30.500 in. Bolt Circle | SHIP  |
| 1.250 in. Diameter | 52.00 in. Embedded     | (lbs) |
| 8.00 in. Exposed   | 63.00 in. Total Length | 357   |

**CONCRETE - Fc= 4000 psi**

ANCHOR BOLTS are STRAIGHT w\ UPLIFT NUT

**BASE PLATE**

[Bend Model: 1/4 Circ ]  
 YIELD STRENGTH = 60.0 ksi  
 BEND LINE WIDTH = 21.2 in.  
 PLATE MOMENT = 270.0 in-k  
 THICKNESS REQD = 1.264 in.  
 BENDING STRESS = 34.0 ksi  
 ALLOWABLE STRESS = 47.9 ksi  
 [Fy x .60 x 1.33]

**BASE PLATE USED**

|                       |       |
|-----------------------|-------|
| 1.50 in. THICK        | SHIP  |
| 33.75 in. ROUND       | (lbs) |
| 13.25 in. CENTER HOLE | 306   |

**LOAD CASE SUMMARY**

| LC | FORCES-(kips) |        |        | MOMENTS-(ft-k) |        |      | ABolt-Str |       | Plate-Str |       | Code  |
|----|---------------|--------|--------|----------------|--------|------|-----------|-------|-----------|-------|-------|
|    | Axial         | ShearX | ShearY | X-axis         | Y-axis | TorQ | CSR       | Allow | Actual    | Allow |       |
| 1  | 8.6           | 6.1    | .0     | 400            | 0      | 0    | .941      | 46.08 | 33.98     | 47.88 | EIA-F |
| 2  | 10.5          | 5.0    | .0     | 335            | 0      | 0    | .795      | 46.08 | 28.71     | 47.88 | EIA-F |
| 3  | 8.5           | 2.7    | .0     | 178            | 0      | 0    | .425      | 46.08 | 15.38     | 47.88 | EIA-F |

LPILE Plus for Windows, Version 5.0 (5.0.33)  
Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method  
(c) 1985-2007 by Ensoft, Inc.  
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This program is licensed to:

Keith Tindall  
Sabre Communications Corp

Path to file locations: C:\Progra~1\Ensoft\LpileP5\  
Name of input data file: 0905086P.lpd  
Name of output file: 0905086P.lpo  
Name of plot output file: 0905086P.lpp  
Name of runtime file: 0905086P.lpr

Time and Date of Analysis

Date: May 22, 2008 Time: 16:11: 0

Problem Title

90' Monopole T-MOBILE DGS High School, IL (09-05086) 5-22-08 KJT

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:

- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 300
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+03 in

Printing Options:

- Only summary tables of pile-head deflection, maximum bending moment,

and maximum shear force are to be printed in output file.

---

Pile Structural Properties and Geometry

---

Pile Length = 252.00 in  
 Depth of ground surface below top of pile = 12.00 in  
 Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

| Point | Depth<br>X<br>in | Pile<br>Diameter<br>in | Moment of<br>Inertia<br>in**4 | Pile<br>Area<br>Sq.in | Modulus of<br>Elasticity<br>lbs/Sq.in |
|-------|------------------|------------------------|-------------------------------|-----------------------|---------------------------------------|
| 1     | 0.0000           | 54.00000000            | 417392.8000                   | 2290.2000             | 3604997.                              |
| 2     | 252.0000         | 54.00000000            | 417392.8000                   | 2290.2000             | 3604997.                              |

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

---

Soil and Rock Layering Information

---

The soil profile is modelled using 3 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970  
 Distance from top of pile to top of layer = 12.000 in  
 Distance from top of pile to bottom of layer = 48.000 in

Layer 2 is stiff clay without free water  
 Distance from top of pile to top of layer = 48.000 in  
 Distance from top of pile to bottom of layer = 168.000 in

Layer 3 is stiff clay without free water  
 Distance from top of pile to top of layer = 168.000 in  
 Distance from top of pile to bottom of layer = 492.000 in

(Depth of lowest layer extends 240.00 in below pile tip)

---

Effective unit weight of soil vs. Depth

---

Distribution of effective unit weight of soil with depth is defined using 6 points

| Point<br>No. | Depth X<br>in | Eff. Unit weight<br>lbs/in**3 |
|--------------|---------------|-------------------------------|
| 1            | 12.00         | .06660                        |
| 2            | 48.00         | .06660                        |
| 3            | 48.00         | .06940                        |
| 4            | 168.00        | .06940                        |
| 5            | 168.00        | .07230                        |
| 6            | 492.00        | .07230                        |

---

Shear strength of soils

Distribution of shear strength parameters with depth  
defined using 6 points

| Point No. | Depth X<br>in | Cohesion c<br>lbs/in**2 | Angle of Friction<br>Deg. | E50 or<br>k <sub>rm</sub> | RQD<br>% |
|-----------|---------------|-------------------------|---------------------------|---------------------------|----------|
| 1         | 12.000        | .10000                  | .00                       | .10000                    | .0       |
| 2         | 48.000        | .10000                  | .00                       | .10000                    | .0       |
| 3         | 48.000        | 13.89000                | .00                       | .00700                    | .0       |
| 4         | 168.000       | 13.89000                | .00                       | .00700                    | .0       |
| 5         | 168.000       | 20.83000                | .00                       | .00500                    | .0       |
| 6         | 492.000       | 20.83000                | .00                       | .00500                    | .0       |

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k<sub>rm</sub> are reported only for weak rock strata.

#### Loading Type

Static loading criteria was used for computation of p-y curves

#### Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)  
 Shear force at pile head = 6057.000 lbs  
 Bending moment at pile head = 4803000.000 in-lbs  
 Axial load at pile head = 8568.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

#### Computations of Ultimate Moment Capacity and Nonlinear Bending Stiffness

Number of pile sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 54.0000 In

Material Properties:

Compressive Strength of Concrete = 4.000 Kip/In\*\*2  
 Yield Stress of Reinforcement = 60. Kip/In\*\*2

Modulus of Elasticity of Reinforcement = 29000. Kip/In\*\*2  
 Number of Reinforcing Bars = 20  
 Area of Single Bar = .60000 In\*\*2  
 Number of Rows of Reinforcing Bars = 11  
 Cover Thickness (edge to bar center) = 3.938 In

Unfactored Axial Squash Load Capacity = 8465.95 Kip

Distribution and Area of Steel Reinforcement

| Row Number | Area of Reinforcement In**2 | Distance to Centroidal Axis In |
|------------|-----------------------------|--------------------------------|
| 1          | .600000                     | 23.0625                        |
| 2          | 1.200000                    | 21.9337                        |
| 3          | 1.200000                    | 18.6580                        |
| 4          | 1.200000                    | 13.5558                        |
| 5          | 1.200000                    | 7.1267                         |
| 6          | 1.200000                    | .0000                          |
| 7          | 1.200000                    | -7.1267                        |
| 8          | 1.200000                    | -13.5558                       |
| 9          | 1.200000                    | -18.6580                       |
| 10         | 1.200000                    | -21.9337                       |
| 11         | .600000                     | -23.0625                       |

Axial Thrust Force = 8568.00 lbs

| Bending Max. Steel Moment Stress in-lbs psi | Bending Stiffness lb-in2 | Bending Curvature rad/in | Maximum Strain in/in | Neutral Axis Position inches | Max. Concrete Stress psi |            |
|---|--------------------------|--------------------------|----------------------|------------------------------|--------------------------|------------|
| 1606851.700.40838                           | 1.606851E+12             | .00000100                | .00002809            | 28.08951330                  | 99.77150944              |            |
| 7885199.40439                               | 1.577040E+12             | .00000500                | .00013649            | 27.29890966                  | 470.67164                |            |
| 3387.40439                                  | 8.761332E+11             | .00000900                | .00010720            | 11.91102934                  | 364.76821                |            |
| 9957.53382                                  | 7885199.40735            | 6.065538E+11             | .00001300            | .00015283                    | 11.75637960              | 513.51269  |
| 14441.40735                                 | 7885199.40735            | 4.638352E+11             | .00001700            | .00019890                    | 11.69998884              | 659.93481  |
| 18912.71795                                 | 7885199.40735            | 3.754857E+11             | .00002100            | .00024552                    | 11.69156885              | 804.31368  |
| 23367.89701                                 | 7885199.40735            | 3.154080E+11             | .00002500            | .00029188                    | 11.67514086              | 943.95821  |
| 27830.83531                                 | 7885199.40735            | 2.719034E+11             | .00002900            | .00033846                    | 11.67114973              | 1080.43047 |
| 32287.12549                                 | 7885199.40735            | 2.389454E+11             | .00003300            | .00038528                    | 11.67526960              | 1213.68947 |
| 36736.57940                                 | 8228028.97150            | 2.223791E+11             | .00003700            | .00043235                    | 11.68508005              | 1343.69528 |
| 41178.97150                                 | 9085963.15844            | 2.216089E+11             | .00004100            | .00047966                    | 11.69903612              | 1470.39714 |
| 45614.15844                                 | 9924988.07693            | 2.205553E+11             | .00004500            | .00052650                    | 11.69998884              | 1591.81493 |
| 50063.07693                                 | 10754583.12822           | 2.194813E+11             | .00004900            | .00057330                    | 11.69998884              | 1709.18738 |
| 54513.12822                                 | 11639854.56517           | 2.196199E+11             | .00005300            | .00062057                    | 11.70884657              | 1823.78416 |
| 58949.56517                                 | 12300040.00000           | 2.157902E+11             | .00005700            | .00066690                    | 11.69998884              | 1932.11734 |
| 60000.00000                                 | 12868182.00000           | 2.109538E+11             | .00006100            | .00071100                    | 11.65570021              | 2031.44873 |
| 60000.00000                                 | 13225329.00000           | 2.034666E+11             | .00006500            | .00074965                    | 11.53313398              | 2115.16270 |

0905086P.lpo

|             |           |              |           |           |             |            |
|-------------|-----------|--------------|-----------|-----------|-------------|------------|
| 60000.00000 | 13580867. | 1.968242E+11 | .00006900 | .00078845 | 11.42678976 | 2196.53514 |
| 60000.00000 | 13862938. | 1.899033E+11 | .00007300 | .00082547 | 11.30780268 | 2271.53287 |
| 60000.00000 | 14077753. | 1.828280E+11 | .00007700 | .00086085 | 11.17982912 | 2340.78391 |
| 60000.00000 | 14291395. | 1.764370E+11 | .00008100 | .00089633 | 11.06581163 | 2408.05176 |
| 60000.00000 | 14503885. | 1.706339E+11 | .00008500 | .00093192 | 10.96381903 | 2473.32178 |
| 60000.00000 | 14714611. | 1.653327E+11 | .00008900 | .00096761 | 10.87202311 | 2536.53855 |
| 60000.00000 | 14920355. | 1.604339E+11 | .00009300 | .00100440 | 10.80000257 | 2599.47280 |
| 60000.00000 | 14961042. | 1.542375E+11 | .00009700 | .00103715 | 10.69229364 | 2653.15953 |
| 60000.00000 | 15073751. | 1.492451E+11 | .00010100 | .00106877 | 10.58188105 | 2703.11600 |
| 60000.00000 | 15783153. | 1.204821E+11 | .00013100 | .00130256 | 9.94322348  | 3018.61739 |
| 60000.00000 | 16171679. | 1.004452E+11 | .00016100 | .00152575 | 9.47669935  | 3231.25438 |
| 60000.00000 | 16505027. | 8.641375E+10 | .00019100 | .00174213 | 9.12110281  | 3355.59663 |
| 60000.00000 | 16656068. | 7.536682E+10 | .00022100 | .00195737 | 8.85686445  | 3399.86119 |
| 60000.00000 | 16739758. | 6.669227E+10 | .00025100 | .00215087 | 8.56922007  | 3396.74638 |
| 60000.00000 | 16812369. | 5.983050E+10 | .00028100 | .00234936 | 8.36072874  | 3377.30976 |
| 60000.00000 | 16877454. | 5.426834E+10 | .00031100 | .00255193 | 8.20556402  | 3399.69585 |
| 60000.00000 | 16877454. | 4.949400E+10 | .00034100 | .00276210 | 8.09999228  | 3367.81731 |
| 60000.00000 | 16913985. | 4.559026E+10 | .00037100 | .00300510 | 8.09999228  | 3398.91390 |
| 60000.00000 | 17016051. | 4.243404E+10 | .00040100 | .00321653 | 8.02127695  | 3377.93338 |
| 60000.00000 | 17016051. | 3.948040E+10 | .00043100 | .00340391 | 7.89770651  | 3356.49835 |
| 60000.00000 | 17016051. | 3.691117E+10 | .00046100 | .00359257 | 7.79298449  | 3379.73694 |
| 60000.00000 | 17016051. | 3.465591E+10 | .00049100 | .00378256 | 7.70378923  | 3394.40431 |
| 60000.00000 | 17016051. | 3.266037E+10 | .00052100 | .00397399 | 7.62762308  | 3399.96593 |

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 16913.21878  
In-Kip

-----  
 Computed Values of Load Distribution and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head boundary conditions are Shear and Moment (BC Type 1)  
 Specified shear force at pile head = 6057.000 lbs  
 Specified moment at pile head = 4803000.000 in-lbs  
 Specified axial load at pile head = 8568.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Output Verification:

Computed forces and moments are within specified convergence limits.

-----  
 Summary of Pile Response(s)  
 -----

Definition of Symbols for Pile-Head Loading Conditions:

|                                    |  |
|------------------------------------|--|
| Type 1 = Shear and Moment,         | y = pile-head displacmt in                 |
| Type 2 = Shear and Slope,          | M = Pile-head Moment lbs-in                |
| Type 3 = Shear and Rot. Stiffness, | V = Pile-head Shear Force lbs              |
| Type 4 = Deflection and Moment,    | S = Pile-head Slope, radians               |
| Type 5 = Deflection and Slope,     | R = Rot. Stiffness of Pile-head in-lbs/rad |

| Load Type | Pile-Head Condition 1 | Pile-Head Condition 2 | Axial Load lbs | Pile-Head Deflection in | Maximum Moment in-lbs | Maximum Shear lbs |
|-----------|-----------------------|-----------------------|----------------|-------------------------|-----------------------|-------------------|
| 1         | V= 6057.000           | M= 4.80E+06           | 8568.0000      | .0548502                | 5135582.              | -47789.8244       |

The analysis ended normally.



UBC 1806.8.2.1 & IBC 1805.7.2.1

$$d = A/2 * (1 + (1 + (4.36 * h/A))^{0.5})$$

Monopole

|  |        |
|--|--------|
| Moment (ft-k)  | 400.25 |
| Shear (k)  | 6.1    |
| Caisson Diameter, b (ft)                             | 4.5    |
| Caisson Height Above Ground (ft)                     | 1      |
| Caisson Height Below Ground (ft)                     | 17     |
| Lateral soil pressure per foot (lb/ft <sup>3</sup> ) | 200    |
| Applied lateral force, P (lbs)                       | 6057   |
| Dist. from ground to application of P, h (ft)        | 67.08  |
| A = 2.34 * P / (S1 * b)                              | 2.78   |
| Min. Depth of Embedment Required, d (ft)             | 15.71  |