Dane County Conditional Use Permit Application

Application Date	C.U.P Number
04/08/2016	DCPCUP-2016-02343
Public Hearing Date	
05/24/2016	

OWNER INFORMATION		AGENT INFORMATION	
OWNER NAME DALE L STENJEM	Phone with Area Code	AGENT NAME US CELLULAR C/O WIRELESS PLANNING LLC	Phone with Area Code (414) 308-2886
BILLING ADDRESS (Number, Street) 3012 STATE HIGHWAY 134		ADDRESS (Number, Street) N64 W12883 DAYLILY COURT	
(City, State, Zip) CAMBRIDGE, WI 53523		(City, State, Zip) Menomonee Falls, WI 53051	
E-MAIL ADDRESS		E-MAIL ADDRESS Toddanderson@wirelessplanning.com	

ADDRESS/LOCATION 1		ADDRESS/LOCATION 2		ADDRESS/LOCATION 3	
ADDRESS OR LOCATION OF CUP		**ADDRESS OR LOCATION OF CUP**		**ADDRESS OR LOCATION OF CUP**	
TOWNSHIP CHRISTIANA	SECTION 1	TOWNSHIP	SECTION	TOWNSHIP	SECTION
PARCEL NUMBERS INVOLVED		**PARCEL NUMBERS INVOLVED**		**PARCEL NUMBERS INVOLVED**	
0612-014-8515-0		---		---	

CUP DESCRIPTION

195' self-support tower

DANE COUNTY CODE OF ORDINANCE SECTION	ACRES
10.194	.23

DEED RESTRICTION REQUIRED?	Inspectors Initials
☐ Yes ☐ No Applicant Initials_____	AMA1

SIGNATURE:(Owner or Agent)

PRINT NAME:

DATE:

COMMENTS: LEASE AREA IS 10,000 SQFT

Form Version 01.00.03

Cambridge DF stealth

DANE COUNTY
PLANNING DEVELOPMENT

Conditional Use Application

Application Fee: $486 Mineral Extraction: $1136

Zoning Division
Room 116, City-County Building
210 Martin Luther King Jr. Blvd.
Madison, Wisconsin 53703-3342
Phone: (608) 266-4266
Fax: (608) 267-1540

Items required to be submitted with application:

- Written Legal Description of Conditional Use Permit boundaries
- Scaled drawing of the property showing existing/proposed buildings, setback requirements, driveway, parking area, outside storage areas, location/type of exterior lighting, any natural features, and proposed signs.
- Scaled map showing neighboring area land uses and zoning districts
- Written operations plan describing the items listed below (additional items needed for mineral extraction sites)
- Written statement on how the proposal meets the 6 standards of a Conditional Use

Owner	United States Cellular operating Company LLC	Agent	Todd Anderson
Address	5117 West Terrace Drive	Address	N64W12883 Daylily Court
Phone	Madison, WI 53578	Phone	Menomonee Falls, WI 53051
Email		Email	414-305-2886 Todd Anderson@wirelessplanning.com

Parcel numbers affected: 016/0642-014-8515-0 Town: Christiana Section: 1

Property Address: TBD Lagoon Drive

Existing/ Proposed Zoning District : A-4

- Type of Activity proposed: Construct A 195' Stlt-Support tower
- Hours of Operation - UN MANNED
- Number of employees - N/A
- Anticipated customers NA
- Outside storage - NONE
- Outdoor activities - NONE
- Outdoor lighting - Light on shelter
- Outside loudspeakers - NONE
- Proposed signs - only what is Required By FAA or FCC
- Trash removal - NA
- Six Standards of CUP (see back)

The statements provided are true and provide an accurate depiction of the proposed land use. I authorize that I am the owner or have permission to act on behalf of the owner of the property.

Submitted By: -Todd Anderson- Agent Date: 3/1/16

Six Standards of a Conditional Use Permit

Provide an explanation on how the proposed land use will meet all six standards.

1. The establishment, maintenance or operation of the conditional use will not be detrimental to or endanger the public health, safety, comfort or general welfare. The proposed tower will not endanger the Public health, Safety, comfort or general welfare. Tower was sited in a location we felt would be as far from Residents & still meet USCOL's coverage goals.

2. The uses, values and enjoyment of other property in the neighborhood for purposes already permitted shall be in no foreseeable manner substantially impaired or diminished by establishment, maintenance or operation of the conditional use. The tower should not substantially impair or diminish the area. The Tower will Improve Coverage in the area.

3. That the establishment of the conditional use will not impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district.
   The proposed tower will not.

4. That adequate utilities, access roads, drainage and other necessary site improvements have been or are being made. The proposed Tower will not change drainage and utilities are at Lagoon Drive.

5. Adequate measures have been or will be taken to provide ingress and egress so designed as to minimize traffic congestion in the public streets. The proposed ingress & Egress should work seeing as there is minimal traffic to the Site.

6. That the conditional use shall conform to all applicable regulations of the district in which it is located.
   The tower will conform to All Applicable Regulations.

LEASE PARCEL

A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 10,000 square feet (0.229 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet to the point of beginning; thence S87°-12'-38"W 100.00 feet; thence N02°-47'-22"W 100.00 feet; thence N87°-12'-38"E 100.00 feet; thence S02°-47'-22"E 100.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.

UTILITY AND INGRESS/EGRESS EASEMENT

A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 5,305 square feet (0.122 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet; thence S87°-12'-38"W 100.00 feet; thence N02°-47'-22"W 100.00 feet to the point of beginning; thence S87°-12'-38"W 4.88 feet; N56°-46'-36"W 7.77 feet; thence S87°-58'-42"W 54.10 feet; thence N49°-55'-54"W 36.32 feet to a point on the South Right of Way line of Lagoon Drive; thence N87°-12'-38"E 201.88 feet along said South Right of Way line of Lagoon Drive; S02°-47'-22"E 30.00 feet; thence S87°-12'-38"W 110.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.

10 FOOT WIDE UTILITY EASEMENT

A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 500 square feet (0.011 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet; thence N02°-47'-22"W 49.97 feet to the point of beginning; thence continue thence N02°-47'-22"W 50.03 feet; thence N87°-12'-38"E 10.00 feet; S02°-47'-22"E 50.03 feet; thence S87°-12'-38"W 10.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.

Wireless Planning, LLC

MEMO

To: Dane County

From: Todd Anderson

Date: 3/1/16

Re: CTIF Exhibit E –Stenjem Property

To whom it may concern,

United States Cellular Operating Company LLC (USCOC) is proposing to construct a 195' Self-Support tower off Lagoon Drive in the Town of Christiana, Dane County, Wisconsin. The propose tower is being constructed will improve coverage in the area and add capacity to the existing network.

USCOC's site of choice was to collocate on the existing water tower off S.T.H. 134 and we started working with the Village on a collocation. Part of the collocation process for USCOC is to run a structural analysis on all collocation to confirm the structure will be adequate to support the proposed loading. The structural came back showing the railing on the water tank would be at 330% of capacity with their equipment, I have attached the engineer's letter and sent the County a copy of the structural. This type of an upgrade would make cost prohibitive to modify the water tank so we expanded the search to other properties in the area. We worked on trying to stay in the immediate area to meet the needs of USCOC and to also keep the tower out of the direct view of any residents.

When USCOC was looking at possible collocations in the area there was a lite guyed tower located to the east of the proposed tower near the recycling center. This tower would not have been structurally capable of supporting USCC and has since been taken down.

USCOC will send the propagation maps directly to the 3rd party engineer once we are given the information and approval from the County to send them.

Please let me know if you have any questions.

Thank you,

Todd Anderson
Wireless Planning
414-308-2886

COMMUNICATION TOWER INFORMATION FORM (CTIF)

CONTACTS				
Property Owner's Name	Dale & Karen Stenjem			
Property Owner's Mailing Address	3012 S.T.H. 134 (Street)	Cambridge (City)	WI (State)	53523 (ZIP)
Property Owner's Phone Number	(608) 220-2232			
Agent's Name & Affiliation	Todd Anderson/ Agent for United States Cellular Operating Company LLC			
Agent's Relationship to Property Owner	Agent for USCOC			
Agent's Relationship to the Proposed Tower (e.g. wireless service provider, site acquisition firm, tower builder, etc.)	Site Acquisition Firm			
Agent's Mailing Address	N64W12883 Daylily Court (Street)	Menomonee Falls (City)	WI (State)	53051 (ZIP)
Agent's Phone Number	(414) 308-2886			

PROPOSED ACTION			
Current Zoning	A-4	CUP Acres	68
Proposed Zoning (only if rezoning)	N/A	Rezone Acres (if applicable)	N/A

Have the property owner and the agent/tower sponsor formally completed a binding letter of intent, option to lease, or lease? Please attach a letter from the property owner(s) consenting to the application.	(Yes)	No
	Circle One	
If applicable, does the lease area coincide with the proposed CUP area?	(Yes)	No
	Circle One	

LOCATION	
Town	Christiana
PLSS location (Township, Range, ¼ ¼ Section)	T. 6N, R. 12E, NW1/4 of the SE1/4 of Sec. 1
Parcel Number(s)	016/0612-014-8515-0
Street Address (or Proximity to Nearest Address)	TBD Lagoon Drive
Coordinates in Decimal Degrees (00.000000 Lat., - 00.000000 Long.)	43.014875 / -89.017672

Is the subject property located in the Height Limitation Zoning Overlay District (HLZO), roughly within three miles of the Dane County Regional Airport (check with Zoning staff)?	Yes	(No)
	Circle One	

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TOWER DETAILS							
Applicant's Intended Purpose of Tower (e.g. coverage, capacity, other). Explain.	Coverage and capacity in the Cambridge area. Ralph Evans was provided prop maps.						
Type of Tower (e.g. monopole, self-support lattice, guyed lattice, etc.)	Self-Support						
Above Ground Level (AGL) Height (ft.) (i.e. maximum design potential).	195'						
Base/Ground Elevation (ft.)	847'						
What is the "fall-down radius" (ft.) of the proposed tower?	70'						
Technology to be Initially Sited on the Proposed Tower (e.g. Cellular, PCS, Radio, Television, Microwave, etc.) [4]	Cellular						
Number & elevation (Feet AGL) of Antenna Arrays to be Accommodated	195' 1	185' 2	175' 3	165' 4	5	6	
Is the primary sponsor of this tower a wireless service provider or a tower builder?	Wireless Provider	If a wireless service provider, please include FCC license number.	KNKA612				
To the best of the applicant's knowledge, will this tower be lighted?	Yes (No) *Circle One*	If applicable, please explain in the box below to the greatest extent known in what manner the tower will be lighted.					
Lighting Configuration:							
Are there any mitigation measures being taken to minimize the visual impact of this tower? If so, explain. Attach an additional page if necessary. The selected location was done to make the tower as least intrusive as possible to the surrounding neighbors as we could and still meet USCOC's coverage goals for the area.							

PRELIMINARY INFORMATION ON OPTIONS FOR COLLOCATION [5]		
What search area radius was used to determine the location of the proposed tower?	1 mile	
Are there any existing towers or other potentially suitable structures in excess of 80 feet in height within a 1.5 mile radius? If yes, how many structures total are there? 1 structures. If yes, please attach map showing the location of these structures in proximity to the proposed tower.	(Yes) No *Circle One*	
Has the applicant examined each of the structures noted above to determine if an antenna array can or may be located on the structure?	(Yes) No *Circle One*	

[4] Note that this statement in itself does not necessarily preclude in the future the placement of alternative technologies on this structure.

[5] Note that more detailed information regarding options for collocation and addressing s. 10.194(2) of the Dane County Code of Ordinances is required in the *Written Statement*.

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Assign a number to each of the existing structures noted above and briefly explain in the spaces below why each one will not accommodate the proposed antenna array (e.g. structurally incapable, owner unwilling to enter into a lease, etc.). Attach additional pages if necessary.
1. Water Tank- A structural was completed and with the proposed USCOC equipment the railing failed at 330%. Structural has been submitted to the County.
2. When we first started looking for possible structures in the area there was a lite tower located to the east of the proposed tower and that tower has been taken down since.
3.
4.

SUBJECT PROPERTY AND SURROUNDING AREA

What is the current, primary use of the subject property (e.g. residential, agricultural, commercial, etc.)?	Agriculture
What are the current, primary uses of all properties adjacent to the subject property?	Agriculture Commercial Residential
What is the current zoning of all properties adjacent to the subject property?	A-3 C0-1 A-2 Residential

How far (in feet) is the proposed tower from the nearest structure on an adjacent property (not on subject property)? What is the current use of the structure?	960' Warehouse	
Are there any small, private airports within a 3-mile radius of the proposed tower? If yes, give the name(s) and distance(s) in the box below.	Yes	(No)
	Circle One	
Name(s) and Distances of Private Airports:		
If applicable, have the listed private airports within a 3-mile radius of the proposed tower been notified of the petition?	Yes	No
	Circle One	

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SWORN STATEMENT OF KEN DRAKE
IN SUPPORT OF NEW TOWER CONSTRUCTION PURSUANT TO WIS. STAT. §66.0404

DANE COUNTY)
) ss.
STATE OF WISCONSIN)

KEN DRAKE, being first duly sworn on oath, deposes and says that:

1. I am an adult resident of the State of Wisconsin and serve as RF Engineer at US Cellular.

2. My job duties include responsibility over the placement of the mobile service support structure being proposed at TBD Lagoon Drive, Cambridge, WI 53523 with a parcel ID number 016/0612-014-8515-0.

3. This sworn statement is made pursuant to Wis. Stat. §66.0404(2)(b)6.

4. The US Cellular proposal is being submitted because collocation within the search ring for the area covered by the proposal is infeasible as no existing structures are structurally adequate to support the proposed loading without significant modification costs which would make it no longer economically feasible to be utilized for collocation.

Subscribed and sworn to before me
this day of March 10th 2016

Notary Public, State of Wisconsin
My commission: Sept 18th 2018

BEN KRUG
NOTARY
PUBLIC
STATE OF WISCONSIN

Edge
Consulting Engineers, Inc.

624 Water Street
Prairie du Sac, WI 53578

608.644.1449 phone
608.644.1549 fax

November 24, 2015

U.S. Cellular – Madison
5117 West Terrace Drive
Madison, WI 53718
Contact: Mike Balistreri
Phone: (608) 212-3808

SUBJECT: **STRUCTURAL ANALYSIS ADDENDUM**
U.S. CELLULAR CO-LOCATION
CAMBRIDGE WT [782578]
CAMBRIDGE, WISCONSIN
EDGE PROJECT #13736

Mr. Balistreri:

As requested from the client, we have completed a revised analysis for the above described water tower. One loading scenario was considered in the analysis. The loading condition takes into account the existing tower loading along with the proposed loading. The primary charge from the previous analysis was the incorporation of the remote radios and surge arresters being mounted on the top railing. Our analysis was performed in accordance with AWWA D100-05. The analysis shows that the existing water tower **Is not structurally adequate** to support the proposed change in loading. Based on our calculations regarding the capacity required for the water tower to sustain the proposed loading, we have concluded a structural deficiency at the tower top railing.

Loading Condition - Results		
Tower Structure Elements	**Capacity Ratio (%)**	**Comment**
Critical Section (Axial Stress w/out Wind) Top of Bell (Approx. 28' A.G.L.)	85.1%	Adequate
Critical Section (Combination Stress w/ Wind) Top of Bell (Approx. 28' A.G.L.)	88.3%	Adequate
Tower Railing (Posts)	**330.0%**	**Not Adequate**
Anchor Bolts (Tension)	61.9%	Adequate
Sliding	53.2%	Adequate

Although the water tower superstructure passes under proposed loading, it will be at approximately 88% capacity at its critical section. Furthermore, the addition of the existing and proposed antennas exceeds a 10% net increase in moment.

If the proposed equipment installation is altered from that which was sized, this report shall be deemed obsolete and further analysis will be required. This report is written as an addendum to the previous structural analysis by Edge Consulting Engineers. All work pertaining to the previous analysis should be considered inherently linked to this addendum work.

ANALYSIS REFERENCES

- Tower & foundation drawings: CB&I Eng. File: 115066 dated 7/14/2000
- Structural analysis: Edge Eng. File: 11442 dated 11/17/2014
- Tower Inventory/Site Visit: Edge Eng. File: 11442 dated 10/29/2014

Refer to the attached Cambridge WT Construction Drawings created by Edge Consulting Engineers for all applicable plan work, notes, and details.

Please feel free to contact us if you have any questions or concerns.
Sincerely,
Edge Consulting Engineers, Inc.

Chris Kanne, E.I.T.
Structural Engineer

David C. Lyshek, P.E.
Professional Engineer

Attachments:

- Tower Calculations
- Wind Forces on Equipment/Railing
- RAM Output
- Antenna Layout

LIMITATIONS AND RESTRICTIONS

1. This report was prepared in accordance with generally accepted structural engineering practices common to the telecommunication industry and makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of the agreement between Engineer and Client. This report has not been prepared for uses or parties other than those specifically named, or for uses or applications other than those enumerated herein. The report may contain insufficient or inaccurate information for other purposes, applications, and/or other uses.
2. This report is intended for the use of the client, and cannot be utilized or relied upon by other parties without the written consent of Edge Consulting Engineers.
3. Edge consulting Engineers is not responsible for any, and all, tower/building modifications completed prior to, or hereafter, which Edge Consulting Engineers was not, or will not, be directly involved.
4. The conclusions and recommendations contained within this report are based upon the supplied and attained information as described within the report. If it is known, or becomes known, that any item(s) are in conflict with what is described within this document, this report should be considered void and Edge Consulting Engineers should be contacted immediately.
5. Edge Consulting Engineers disclaims all liability for any information, conclusion, or recommendation that is not expressly stated or represented within this report.
6. Edge Consulting Engineers shall not be liable for any incidental, consequential, indirect, special, or punitive damages arising out of any claim associated with the use of this report.
7. The scope of worked performed for this modification is limited to the items in which we were furnished complete and accurate information.
8. Accessories and appurtenances such as antenna mounts, feed line ladders, climbing ladders, lighting mounts, etc. were not analyzed as part of this work, and Edge Consulting Engineers, Inc. makes no claim as to their adequacy of their design or their installation.
9. This analysis was performed under the assumption that all water tower elements are in like new condition, free from rust and other deterioration. It is also assumed the tower was properly installed per construction documents, and that the tower and all associated appurtenances were originally designed and fabricated in accordance with all applicable codes and standards. Edge Consulting Engineers cannot account for, nor be held responsible, if tower elements are deteriorated, damaged, and/or missing.
10. This analysis provided by Edge Consulting Engineers, Inc. addresses the structural adequacy or deficiencies of the primary structural members. The evaluation of each bolt, plate connection detail, weld, etc. is outside the scope of this analysis.
11. This water tower analysis was performed based upon the antenna, feed line and other appurtenance loading and placement as described within this report. Any alterations to the described loading or placement will require re-analysis of the water tower, and the findings contained in this report are not valid.
12. The loading conditions utilized for this analysis is based on information provided by the client, and readily available manufacturer/vendor information (antenna and mount projected areas, weight and shape factors). However, if the described loading criteria and design assumptions within this report are not accurate, are altered, or changed in any form, this analysis shall be considered void and an additional analysis must be performed.
13. It is the responsibility of the client and the water tower owner to thoroughly review the existing and proposed loading, and bring any discrepancy to the attention of Edge Consulting Engineers.

Wind Load Calculation

Project Name - Cambridge WT (782670)
Cambridge, Wisconsin
Edge #13738

Edge
Consulting Engineers, Inc.

Completed By: DCK
Checked By: DCL

$P_w = q_z G C_f \geq 30 C_f$

Where:
P_w = Wind pressure applied to horizontal projected area (lb/sq ft)
G = Gust-effect factor (1.0)
C_f = Force coefficient
q_z = Velocity pressure (lb/sq ft)

$q_z = 0.00256 K_z I V^2$

Where:
K_z = Velocity pressure exposure coefficient — Exposure C
I = Wind importance factor (1.15)
V = Basic Wind Speed in mph: 90

Force Coefficient Table:

C_f	Type of Surface	C_f
	Flat	1.00
	Cylindrical or Conical with Apex Angle < 15°	0.60
	Double Curved or Conical with Apex Angle 15°	0.50

Velocity Pressure Exposure Coefficient Table:

K_z	Height	Exposure C	Exposure D
	0 to 50 ft (15.2 m)	1.09	1.27
	100 ft (30.5 m)	1.27	1.43
	150 ft (45.7 m)	1.38	1.54
	200 ft (61.0 m)	1.46	1.62
	250 ft (76.2 m)	1.53	1.68
	300 ft (91.4 m)	1.60	1.73
	350 ft (106.7 m)	1.65	1.78

Results:

2669.03

Element		Area (ft^2)	Z (ft)	K_z	q_z (lb/ft^2)	C_f	P_w (lb/ft^2)	P_w min (lb/ft^2)	p (klp)	Weight (lbs)	O.T.M (klp-ft)
Water Tower Sections											
Tank Top		1322.86	126.34	1.33	31.67	0.50	15.83	15.00	20.95		2648.11
Tank Bottom		351.10	107.05	1.28	30.65	0.60	18.39	18.00	6.46		691.30
Upper Knuckle		50.60	97.47	1.26	30.07	0.50	15.03	15.00	0.76		74.15
Shaft Top		455.00	71.10	1.17	27.80	0.60	16.68	18.00	8.73		620.70
Shaft Bottom		193.65	37.53	1.09	25.99	0.60	15.60	18.00	3.49		130.82
Lower Knuckle		13.28	27.31	1.09	25.99	0.50	13.00	15.00	0.20		5.43
Top Pedestal		111.03	22.06	1.09	25.99	0.60	15.60	18.00	2.00		44.09
Mid Pedestal		150.77	13.47	1.09	25.99	0.60	15.60	18.00	2.71		36.56
Bot Pedestal		190.78	4.86	1.09	25.99	0.60	15.60	18.00	3.43		15.69
Railing Sections & Misc.											
Top Rail Horizontal (Front)		2.375	147.00	1.37	32.75	1.00	32.75	30.00	0.08		11.43
Top Rail Horizontal (Back)		1.188	147.00	1.37	32.75	1.00	32.75	30.00	0.04		5.72
Middle Rail Horizontal (Front)		3.125	145.25	1.37	32.66	1.00	32.66	30.00	0.10		14.82
Middle Rail Horizontal (Back)		1.563	145.25	1.37	32.66	1.00	32.66	30.00	0.05		7.41
Kick Plate (Front)		5.000	143.50	1.37	32.57	1.00	32.57	30.00	0.16		23.37
Kick Plate (Back)		2.500	143.50	1.37	32.57	1.00	32.57	30.00	0.08		11.68
Existing Rail Posts		4.375	145.25	1.37	32.66	1.00	32.66	30.00	0.14		20.75
Existing Antennas & Mount Pipes											
(3) Powerwave P65-16-XL-M	(Existing)	18.000	148.17	1.38	32.81	1.00	32.81	30.00	0.59	132.00	87.51
(6) Jaybeam PCSA090-19-x	(Existing)	29.668	148.29	1.38	32.82	0.60	19.69	18.00	0.58	143.40	86.69
(6) CSS DBC-7CAP	(Existing)	3.065	148.29	1.38	32.82	1.00	32.82	30.00	0.10	48.00	14.92
(3) Mast Pipe - 8 ft 2" Std	(Existing)	14.250	147.50	1.37	32.78	0.60	19.67	18.00	0.28	263.52	41.34
(1) RFI BA4040-41-DIN	(Existing)	8.900	157.00	1.39	33.18	0.60	19.91	18.00	0.18	68.00	27.81
(1) Mast Pipe - 5 ft 2" Std	(Existing)	0.990	148.00	1.37	32.70	0.60	19.62	18.00	0.02	15.30	2.83
(1) 27 Dipole	(Existing)	4.604	157.00	1.39	33.18	0.60	19.91	18.00	0.09	40.00	14.39
(1) Mast Pipe - 5 ft 2" Std	(Existing)	0.990	148.00	1.37	32.70	0.60	19.62	18.00	0.02	15.30	2.83
(1) ODH8-8 (Pacific Wireless)	(Existing)	3.444	156.00	1.39	33.14	1.00	33.14	30.00	0.11	26.60	17.81
(1) Mast Pipe -10 ft 2" Std	(Existing)	1.979	147.00	1.37	32.75	0.60	19.65	18.00	0.04	36.60	5.72
(1) 6' Yagi	(Existing)	1.000	147.00	1.37	32.75	0.60	19.65	18.00	0.02	10.00	2.89
(1) 4' Omni	(Existing)	0.667	153.00	1.38	33.02	0.60	19.81	18.00	0.02	15.50	2.63
(1) Ubiquiti Rocket M2	(Existing)	0.140	155.00	1.39	33.10	1.00	33.10	30.00	0.00	1.10	0.72
(1) Mast Pipe -10 ft 2" Std	(Existing)	1.979	148.00	1.38	32.80	0.60	19.68	18.00	0.04	36.60	5.77
(1) 6' Omni	(Existing)	1.300	157.00	1.39	33.18	0.60	19.91	18.00	0.03	24.00	4.06
(1) Mast Pipe -10 ft 2" Std	(Existing)	1.979	148.50	1.38	32.83	0.60	19.70	18.00	0.04	36.60	5.79
(1) Dish 16'	(Existing)	1.396	148.00	1.38	32.80	1.00	32.80	30.00	0.05	25.00	6.78
(1) Dish 16'	(Existing)	1.396	145.25	1.37	32.66	1.00	32.66	30.00	0.05	25.00	6.62
(2) Beacon (Small)	(Existing)	0.250	145.25	1.37	32.66	1.00	32.66	30.00	0.01	50.00	1.19
Proposed Antennas & Mount Pipes											
(6) Kathrein 800 10765	(Proposed)	37.121	149.50	1.38	32.88	1.00	32.88	30.00	1.22	310.80	182.48
(3) KMW KASCTPR82006	(Proposed)	0.208	149.50	1.38	32.88	1.00	32.88	30.00	0.01	3.96	1.03
(6) Kaelus DBC0056F1W-1	(Proposed)	2.067	149.50	1.38	32.88	1.00	32.88	30.00	0.07	39.60	12.19
(6) Ericsson RRUs11	(Proposed)	20.931	149.50	1.38	32.88	1.00	32.88	30.00	0.69	459.00	102.89
(2) Raycap RUSDC-6627-PF-48	(Proposed)	5.408	149.50	1.38	32.88	1.00	32.88	30.00	0.18	40.00	26.58

Original Tower Overturning Moment = 4265.84 kip-ft

Existing Tower Overturning Moment = 4699.32 kip-ft — Percent Change = 10.16

Proposed Tower Overturning Moment = 5022.46 kip-ft — Percent Change = 17.74

Note: All Percent Changes taken in relation to the Original Tower Overturning Moment

Typically an increase less than 10% in overturning results in having little effect on the adequacy of the structure.

Critical Section Calculations

Project Name - Cambridge WT (782576)
Cambridge, Wisconsin
Edge #13738

Edge
Consulting Engineers, Inc.

Completed By: CCK
Checked By: DCL

Actual Stresses at the Critical Section (Top of Bell):

Height to the Critical Section =	27.96	ft	
Critical Section Thickness (t) =	0.6875	in	*The thickness was taken from Chicago Bridge & Iron plans
Shaft Height ($H_{S.U}$) =	805.752	in	
Outer Diameter of Critical Section (D_{cu}) =	121.375	in	
Inner Diameter of Critical Section (D_c) =	120	in	
Effective Radius (R_m) =	60.34375	in	
r =	42.67	in	
k =	2.00		
KL/r =	37.77		
t/R =	0.01139		
Water Weight =	3391800	lb	
Original Metal Weight =	222900	lb	*Includes Bell Weight
Bell Weight =	0	lb	*Assumed to be Zero
Total Proposed Equipment Weight =	1871.83	lb	
Total Proposed Weight Above the Critical Section =	3616372	lb	

Element	Area (ft^2)	Z_{cmod} (ft)	K_z	q_z (lb/ft^2)	C_f	P_w (lb/ft^2)	$P_{w\ min}$ (lb/ft^2)	p (k/sf)	$M_{Critical}$ (kip-ft)
Water Tower Sections									
Tank Top	1322.660	98.33	1.33	31.67	0.50	15.83	15.00	20.95	2060.48
Tank Bottom	351.100	79.09	1.29	30.65	0.60	18.39	18.00	6.46	510.74
Upper Knuckle	50.600	69.51	1.26	30.07	0.50	15.03	15.00	0.76	52.88
Shaft Top	455.000	43.14	1.17	27.60	0.60	16.56	18.00	8.73	376.61
Shaft Bottom	193.650	9.57	1.09	25.99	0.60	15.60	18.00	3.49	33.36
Lower Knuckle	13.260	-0.66	1.09	25.99	0.50	13.00	15.00	0.20	0.00
Bot Pedestal	190.760	-23.10	1.09	25.99	0.60	15.60	18.00	3.43	0.00
Railing Sections									
Existing Top Rail Horizontal (Front)	2.375	119.04	1.37	32.75	1.00	32.75	30.00	0.08	9.26
Top Rail Horizontal (Back)	1.188	119.04	1.37	32.75	1.00	32.75	30.00	0.04	4.63
Middle Rail Horizontal (Front)	3.125	117.29	1.37	32.66	1.00	32.66	30.00	0.10	11.97
Middle Rail Horizontal (Back)	1.563	117.29	1.37	32.66	1.00	32.66	30.00	0.05	5.99
Kick Plate (Front)	5.000	115.54	1.37	32.57	1.00	32.57	30.00	0.16	18.81
Kick Plate (Back)	2.500	115.54	1.37	32.57	1.00	32.57	30.00	0.08	9.41
Existing Rail Posts	4.375	117.29	1.37	32.66	1.00	32.66	30.00	0.14	16.76
Existing Antennas & Mount Pipes									
(3) Powerwave P65-16-XL-M (Existing)	18.000	120.21	1.38	32.81	1.00	32.81	30.00	0.59	71.00
(6) Jaybeam PCSA090-19-x (Existing)	29.668	120.33	1.38	32.82	0.60	19.69	18.00	0.58	70.34
(6) CSS DBC-7CAP (Existing)	3.065	120.33	1.38	32.82	1.00	32.82	30.00	0.10	12.11
(9) Mast Pipe - 8 ft 2" Std (Existing)	14.250	119.54	1.37	32.78	0.60	19.67	18.00	0.28	33.50
(1) RFI BA4040-41-D-N (Existing)	8.900	129.04	1.39	33.18	0.60	19.91	18.00	0.18	22.65
(1) Mast Pipe - 5 ft 2" Std (Existing)	0.990	118.04	1.37	32.70	0.60	19.62	18.00	0.02	2.29
(1) 20' Dipole (Existing)	4.604	129.04	1.39	33.18	0.60	19.91	18.00	0.09	11.83
(1) Mast Pipe - 5 ft 2" Std (Existing)	0.990	118.04	1.37	32.70	0.60	19.62	18.00	0.02	2.29
(1) ODH9-9 (Pacific Wireless) (Existing)	3.444	128.04	1.39	33.14	1.00	33.14	30.00	0.11	14.61
(1) Mast Pipe -10 ft 2" Std (Existing)	1.979	119.04	1.37	32.75	0.60	19.65	18.00	0.04	4.63
(1) 6' Yagi (Existing)	1.000	119.04	1.37	32.75	0.60	19.65	18.00	0.02	2.34
(1) 4' Omni (Existing)	0.667	125.04	1.38	33.02	0.60	19.81	18.00	0.02	2.15
(1) Ubiquiti Rocket M2 (Existing)	0.140	127.04	1.39	33.10	1.00	33.10	30.00	0.00	0.59
(1) Mast Pipe -10 ft 2" Std (Existing)	1.979	120.54	1.38	32.83	0.60	19.70	18.00	0.04	4.70
(1) Dish 16" (Existing)	1.396	120.04	1.38	32.80	1.00	32.80	30.00	0.05	5.50
(2) Beacon (Small) (Existing)	0.250	117.29	1.37	32.66	1.00	32.66	30.00	0.01	0.96
Proposed Antennas & Mount Pipes									
(6) Kathrein 800 10765 (Proposed)	37.121	121.54	1.38	32.88	1.00	32.88	30.00	1.22	148.35
(3) KMW KASCTFR82008 (Proposed)	0.209	121.54	1.38	32.88	1.00	32.88	30.00	0.01	0.83
(6) Kaelus DBC0056F1Vx-1 (Proposed)	2.067	121.54	1.38	32.88	1.00	32.88	30.00	0.07	8.26
(9) Ericsson RRUs11 (Proposed)	20.931	121.54	1.38	32.88	1.00	32.88	30.00	0.69	83.65
(2) Raycap RUSDC-6267-PF-48 (Proposed)	5.408	121.54	1.38	32.88	1.00	32.88	30.00	0.18	21.61

Proposed Tower Critical Moment =	3635.29	kip-ft	
Proposed Actual Axial Stress (f) =	13873.57	lb/in^2	
Proposed Actual Bending Stress (f) =	5546.69	lb/in^2	

Allowable Stresses at the Critical Section:

Material Class =	2		* Assumed Class 2 material (Fy > 34 ksi)
Allowable Compressive Stress (F) =	17019.25	lb/in^2	
C_c' =	129.63		
Reduction Factor (K_f) =	0.9576		
Allowable Axial Stress (F) =	16297.53	lb/in^2	
Allowable Bending Stress (F) =	17019.25	lb/in^2	

Stresses Due to Proposed Axial Load and Bending Moment Check:

Axial Stress w/out Wind Check =	0.851	< 1	OK
Combination Stress w/ Wind =	0.883	< 1	OK

Anchorage and Sliding Check

Project Name - Cambridge WT (782578)
Cambridge, Wisconsin
Edge #13736

Edge
Consulting Engineers, Inc.

Completed By: CCK
Checked By: DCL

Anchorage Check:

Number of Anchor Rods =	16		*Number of bolts taken from Chicago Bridge & Iron plans
Diameter of Anchor Rod =	2	in	*Bolt diameter taken from Chicago Bridge & Iron plans
Area of Anchor Rod =	3.14	in^2	
Diameter of the Anchor Circle =	24.75	ft	
Rod Yield Stress (F_y) =	36	ksi	
Rod Tensile Strength (F_u) =	58	ksi	
Original Metal Weight =	222900	lb	
Proposed Metal Weight =	224772	lb	
Proposed Tower Overturning Moment =	5022.46	kip-ft	*These values come from the wind load calculation sheet

Sliding Check:

μ =	0.45		*Steel-to-Concrete
Proposed Resisting Shear =	101.15	kip	
Proposed Base Shear =	53.60	kip	
Proposed Shear Ratio =	0.532		OK — No provisions for resisting shear are required

Anchor Bolt Capacity:

Shear Check:

Proposed Applied Shear per Rod ($V_{applied}$) =	3.36	kip/rod
Allowable Shear per Rod (R_v/Ω) =	36.4	kip/rod
Proposed Unity =	0.092	

Tension Check

$$T_{max} = \frac{4 \cdot M}{N_b \cdot D_{circle}} - \frac{0.6 \cdot w}{N_b}$$

Proposed Applied Tension per Rod (T_{max}) =	42.30	kip/rod
Proposed Allowable Tension per Rod (R_t/Ω) =	68.33	kip/rod
Proposed Unity =	0.619	

OK

Equations

Project Name - Cambridge WT (782678)
Cambridge, Wisconsin
Edge #13738

Edge
Consulting Engineers, Inc.

Completed By: CCK
Checked By: DCL

Critical Section Calculation Equations:

$$D_{In} = D_{Out} - 2t$$

t = Shaft Thickness

$$R_{eff} = \frac{D_{Out} - t}{2}$$

$$r = \frac{\sqrt{D_{Out}^2 + D_{In}^2}}{4}$$

$$\frac{KL}{r} = \frac{2 \cdot H_{Shaft}}{r}$$

H_{Shaft} = Shaft Height

Actual Stress Calculation Equations:

$$f_a = \frac{W_{top\_bell\_total}}{2 \cdot \pi \cdot R_{eff} \cdot t}$$

$W_{top\_bell\_total}$ = Total Weight Above the Critical Section

$$f_b = \frac{M_{top\_bell\_total}}{\pi \cdot R_{eff}^2 \cdot t}$$

$M_{top\_bell\_total}$ = Total Moment at the Critical Section

$$F_L = IF\left(\frac{t}{R_{eff}} \geq 0.0125, 18000\,psi, \left(6925 + 886000\left(\frac{t}{R_{eff}}\right)\right)psi\right)$$

$$C_c' = \sqrt{\frac{\pi^2 \cdot E}{F_L}}$$ (AWWA Eq. 3-10 p 26)

$$K_\phi = 1.0 : \left(\frac{KL}{r} \leq 25\right)$$

$$K_\phi = 0.5 \cdot \left(\frac{C_c'}{\frac{KL}{r}}\right)^2 : \left(\frac{KL}{r} \geq C_c'\right)$$ (AWWA Eq. 3-7, 3-8,3-9 p 26)

$$K_\phi = 1 - 0.5 \cdot \left(\frac{\frac{KL}{r}}{C_c'}\right)^2 : \left(25 \leq \frac{KL}{r} \leq C_c'\right)$$

$$F_a = F_L \cdot K_\phi$$ (AWWA Eq. 3-4 p 26)

$$F_b = F_L$$ (AWWA Eq. 3-5 p 26)

Axial Load & Bending Moment Stress Checks:

Axial Stress without Wind:

$$\frac{f_a}{F_a} \leq 1$$

Combination Stress with Wind:

$$\frac{f_a}{F_a \cdot 1.33} + \frac{f_b}{F_b \cdot 1.33} \leq 1$$

Equations

Project Name - Cambridge WT (782678)
Cambridge, Wisconsin
Edge #13736

Edge
Consulting Engineers, Inc.

Completed By: CCK
Checked By: DCL

Anchorage Check:

Metal Weight (W) = $W_{Conc}+W_{Soil}+W_{Anchors}$

Sliding Check:

Resisting Shear:

$$V_{resisting} = \mu \cdot W'$$

Base Shear: (Sum of the p values in the Wind Load Table)

Shear Check (AISC_ASD):

Applied Shear per Rod:

$$V_{actual} = \frac{V_{app.}}{N_b}$$

N_b = Number of Anchor Rods

Allowable Shear per Rod:

$$\frac{R_n}{\Omega} = \frac{0.4 \cdot F_u \cdot A_R}{2.0}$$

Unity of Shear:

$$Unity = \frac{V_{actual}}{\frac{R_n}{\Omega}}$$

Tension Check (AISC_ASD):

Applied Tension per Rod:

$$T_{actual} = \frac{4 \cdot M}{N_b \cdot D_{circle}} - \frac{0.6 \cdot W}{N_b}$$

M = Tower Overturning Moment at the Top of the Footing

Allowable Tension per Rod:

$$\frac{R_n}{\Omega} = \frac{0.75 \cdot F_u \cdot A_r}{2.0}$$

Unity of Tension:

$$Unity = \frac{T_{actual}}{\frac{R_n}{\Omega}}$$

Combined Shear and Tension Check (AISC_ASD):

$$OK\ if\ true \begin{cases} \frac{V_u}{\frac{R_n}{\Omega}} \le 0.2\ and\ \frac{T_u}{\frac{R_n}{\Omega}} \le 1 \\ \frac{V_u}{\frac{R_n}{\Omega}} \le 1\ and\ \frac{T_u}{\frac{R_n}{\Omega}} \le 0.2 \\ \frac{V_u}{\frac{R_n}{\Omega}} \le 1\ and\ \frac{T_u}{\frac{R_n}{\Omega}} \le 1\ plus\ \frac{V_u}{\frac{R_n}{\Omega}} + \frac{T_u}{\frac{R_n}{\Omega}} \le 1.3 \end{cases}$$

Water Tower Bearing Capacity Calculations:

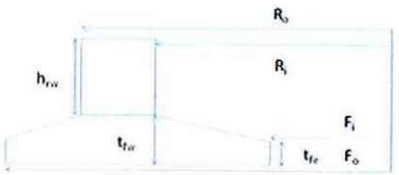
Project Name - Cambridge WT (782578)
Cambridge, Wisconsin
Edge #13736

Edge Consulting Engineers, Inc.

Completed By: CCK
Checked By: DCL

Foundation Dimensions & Soil Properties:

Inner Radius of Footing (F_i) =	1.75	ft
Outer Radius of Footing (F_o) =	20.00	ft
Ringwall Height Above Footing (h_{rw}) =	8.75	ft
Inner Radius of Ringwall (R_i) =	11.50	ft
Outer Radius of Ringwall (R_o) =	13.33	ft
Thickness of Footing at Edge (t_{fe}) =	0.83	ft
Thickness of Footing at Ringwall (t_{fw}) =	2.00	ft
Exposed Height (h_e) =	0.50	ft
Area of Foundation (A) =	1247.02	ft²
Section Modulus of Foundation (S) =	6282.82	ft³
γ_{soil} =	100.00	lb/ft³
$\gamma_{concrete,eff}$ =	44.00	lb/ft³
$\gamma_{concrete}$ =	144.00	lb/ft³



*Assumed
*Per ANSI/AWWA D100-05

Applied Loads:

Original Tank Weight =	222.90	kip
Proposed Tank Weight =	224.77	kip
Water Weight =	3391.60	kip
Total Foundation Concrete Weight =	137.82	kip
Snow Weight =	26.13	kip
Soil Weight Applied on Foundation =	972.12	kip
Total Original Net Loads on Foundation (P_{net}) =	3778.45	kip
Total Proposed Net Loads on Foundation (P_{net}') =	3780.32	kip
Total Original Ultimate Loads on Foundation (P_{max}) =	5063.79	kip
Total Proposed Ultimate Loads on Foundation (P_{max}') =	5065.66	kip
Total Proposed Ultimate Loads on Foundation less Water (P_{ult}') =	1674.06	kip
Original Moment Applied at the Top of Foundation (M) =	4265.84	kip-ft
Proposed Moment Applied at the Top of Foundation (M') =	5022.46	kip-ft
Original Shear Applied at the Top of Foundation (V) =	48.72	kip
Proposed Shear Applied at the Top of Foundation (V') =	53.80	kip
Original Moment Applied at the Base of Foundation (M) =	4789.63	kip-ft
Proposed Moment Applied at the Base of Foundation (M') =	5600.86	kip-ft

Bearing Check:

Limiting eccentricity (e) = 5.04 ft

$$q_{net} = \left(\frac{P_{net}}{A} + \frac{M}{S}\right)$$

e_{net} =	0.95	ft
e_{net}' =	1.11	ft
q_{net} =	3792.33	psf
q_{net}' =	3922.95	psf
Percentage Change in Bearing =	3.44	%
Required ultimate net bearing pressure =	11768.85	psf

With Wind Increase with Water

$$q_{stab} = \left(\frac{P_{net}}{A} + \frac{1.5M}{S}\right)$$

e_{stab}' =	1.66	ft	
q_{stab}' =	4374.41	psf	OK - Required Bearing Capacity for Lesser Wind Condition Controls

With Wind Increase without Water

e_{ult}' =	5.02	ft	
q_{ult}' =	1654.64	psf	OK - Required Bearing Capacity for Lesser Wind Condition Controls

Stability Check:

Original Minimum Restoring Moment =	30164.83	kip-ft
Original F.S. for Overturning =	6.30	
Proposed Restoring Moment without Water =	30202.27	kip-ft
Proposed F.S. for Overturning =	5.39	
Proposed Restoring Moment with Water =	98034.27	kip-ft
Proposed F.S. for Overturning =	17.50	

Antenna Wind Load Calculations

Project Name - Cambridge WT (782578)
Cambridge, Wisconsin
Edge #13738

Edge
Consulting Engineers, Inc.

Completed By: CSH
Checked By: KTS

Base Wind Pressure Calculation:

Elevation of Antennas (z) = 149.17 ft
Exposure Category = C
K_z = 1.38
V = 90 mph
I = 1.15

$$q_z = 0.00256 \cdot K_z \cdot V^2 \cdot I$$

q_z = 32.83 psf

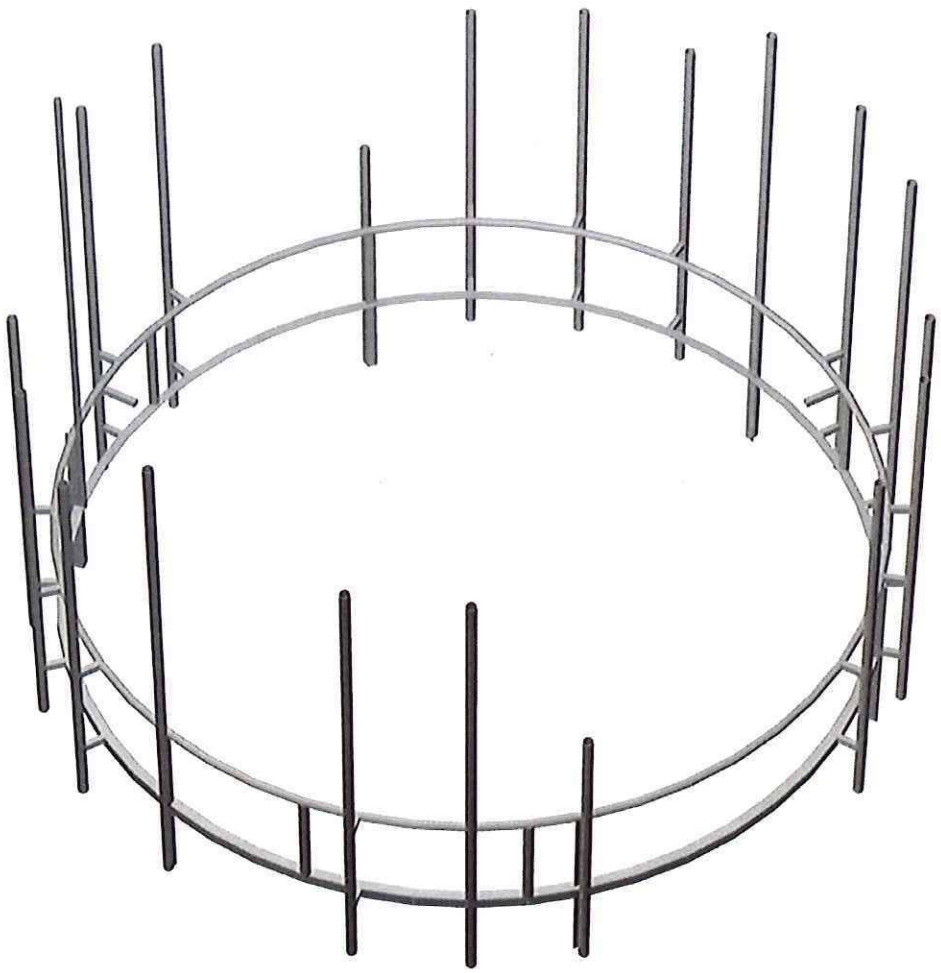
Wind Force/Weight Calculation:

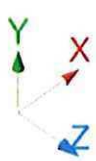
#	Appurtenance	Type	Normal Orientation	Position	Weight (P) lbs	Bracket lbs	Height (H) in	Width (W) in	Depth (D) in	Front (C_a)	Side (C_a)	EPA_{FM} ft^2	EPA_{SM} ft^2	Total Weight lbs
6	Kathrein 800 10765	Antenna	Front	1	58.40	13.00	95.00	11.80	6.00	1.00	1.00	7.87	4.00	71.40
3	Ericsson RRUs11 (Doubled-Up)	RRU	Front	2	102.00	N/A	19.70	17.00	14.40	1.00	1.00	2.33	1.97	102.00
3	Ericsson RRUs11	RRU	Front	3	51.00	N/A	19.70	17.00	7.20	1.00	1.00	2.33	0.99	51.00
2	Raycap RUSDC-6267-PF-48	Surge Arrestor	Front	4	20.00	N/A	20.60	18.90	5.60	1.00	1.00	2.704	0.83	20.00

Summation of Wind Force:

$$F = q_z \cdot C_f \cdot A$$

Antenna Designation	1	2	3	4
Normal Force on Antenna	258.3	76.4	76.4	68.8
Tangential Force on Antenna	131.3	64.7	32.3	27.2
Total Weight	71.4	102.0	51.0	20.0

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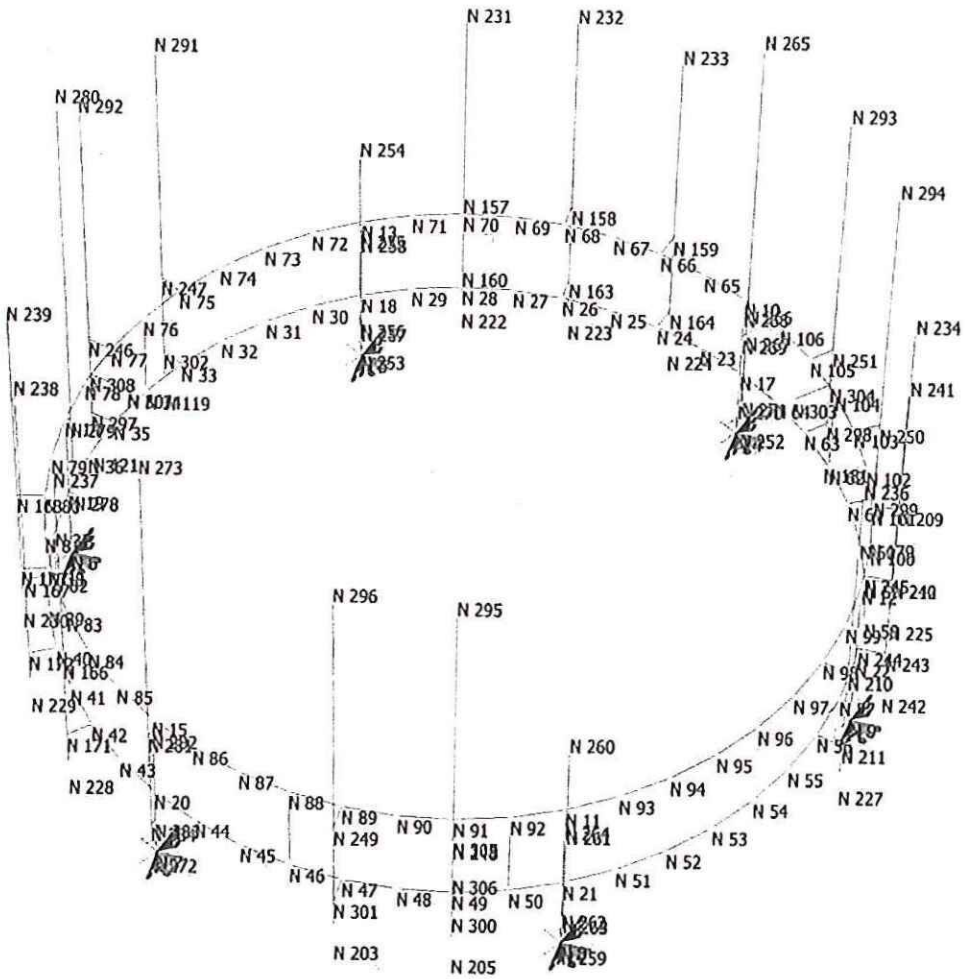
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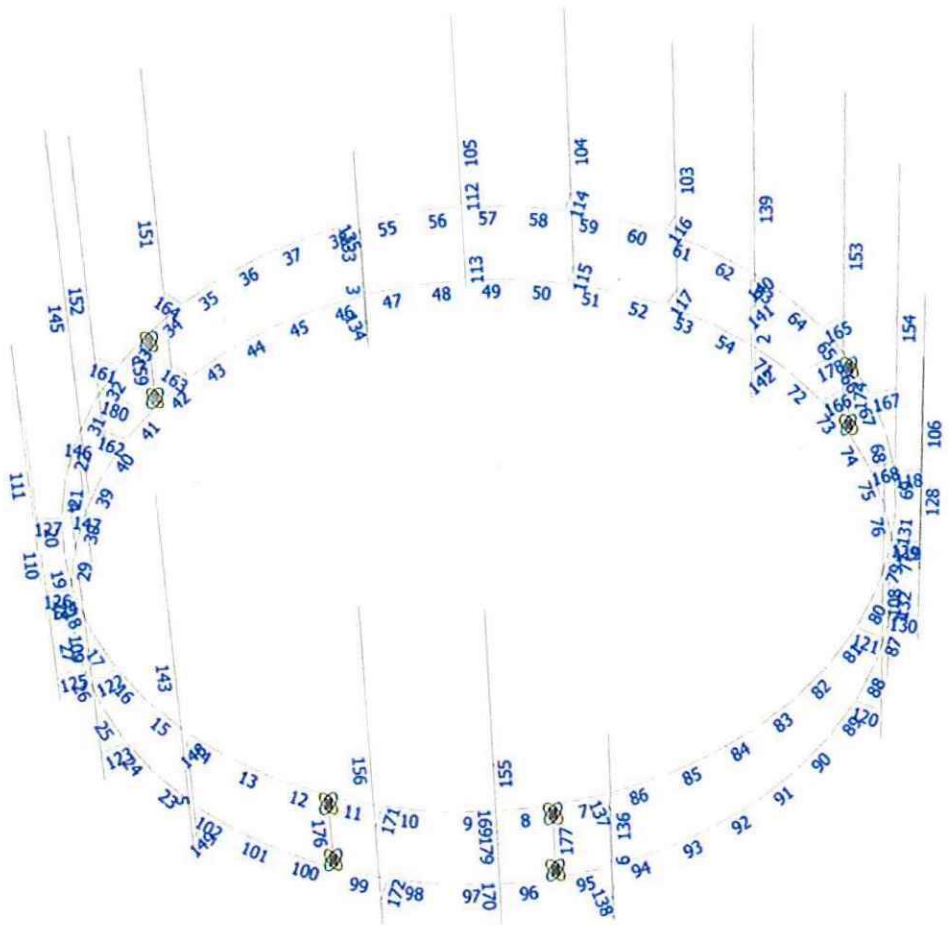

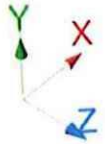
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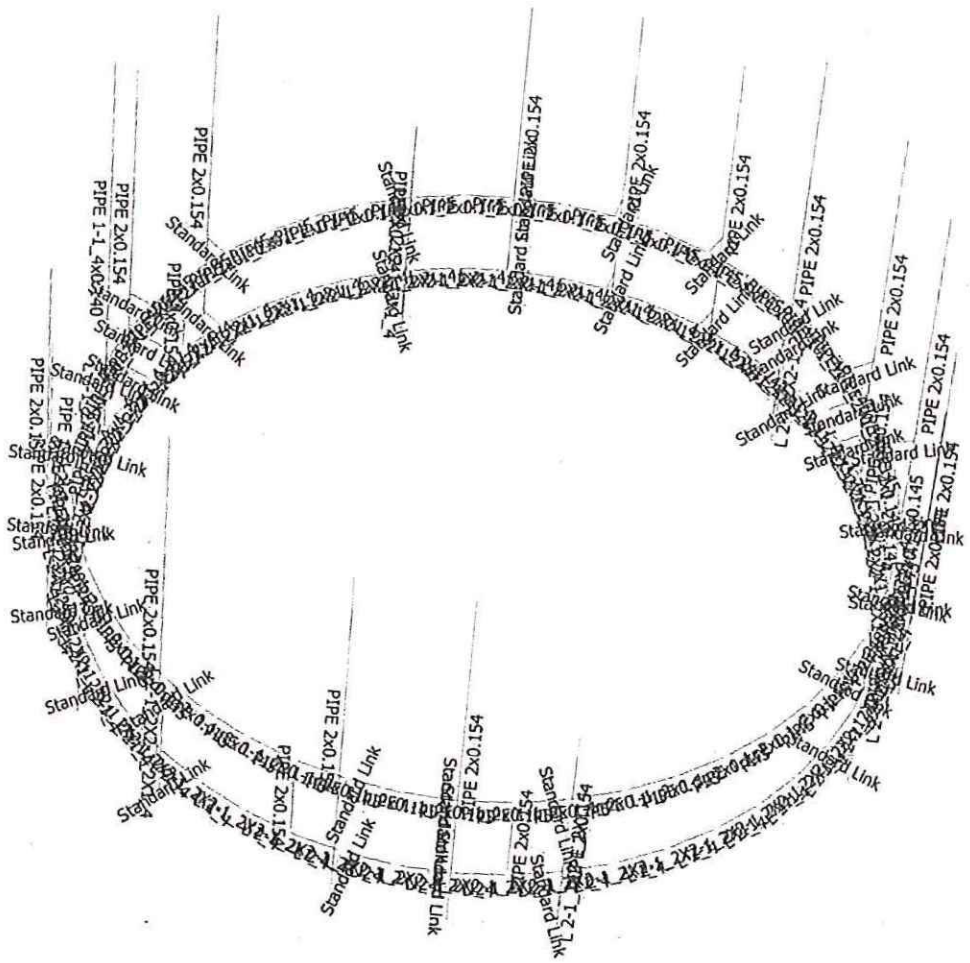
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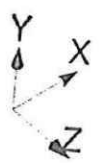
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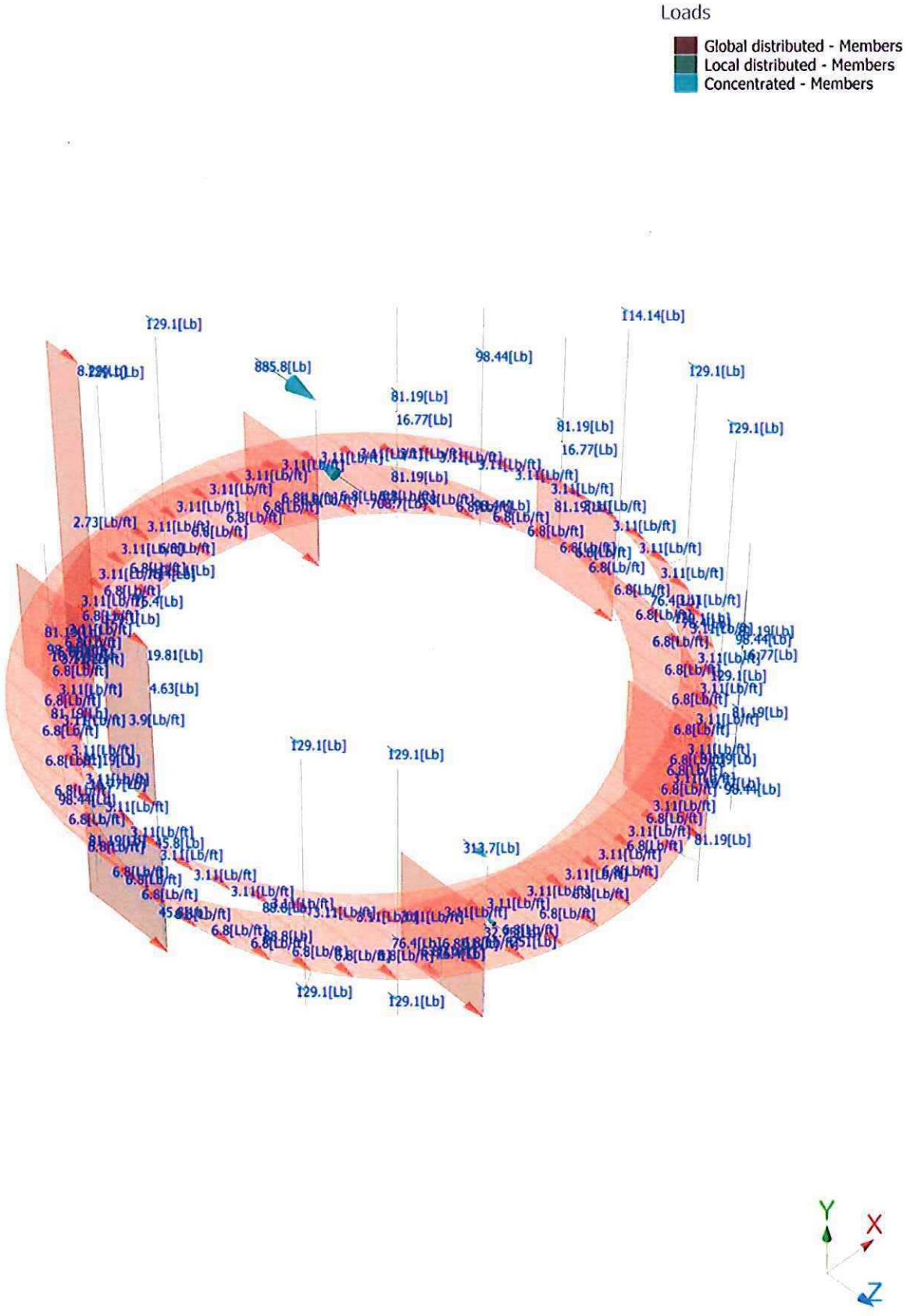
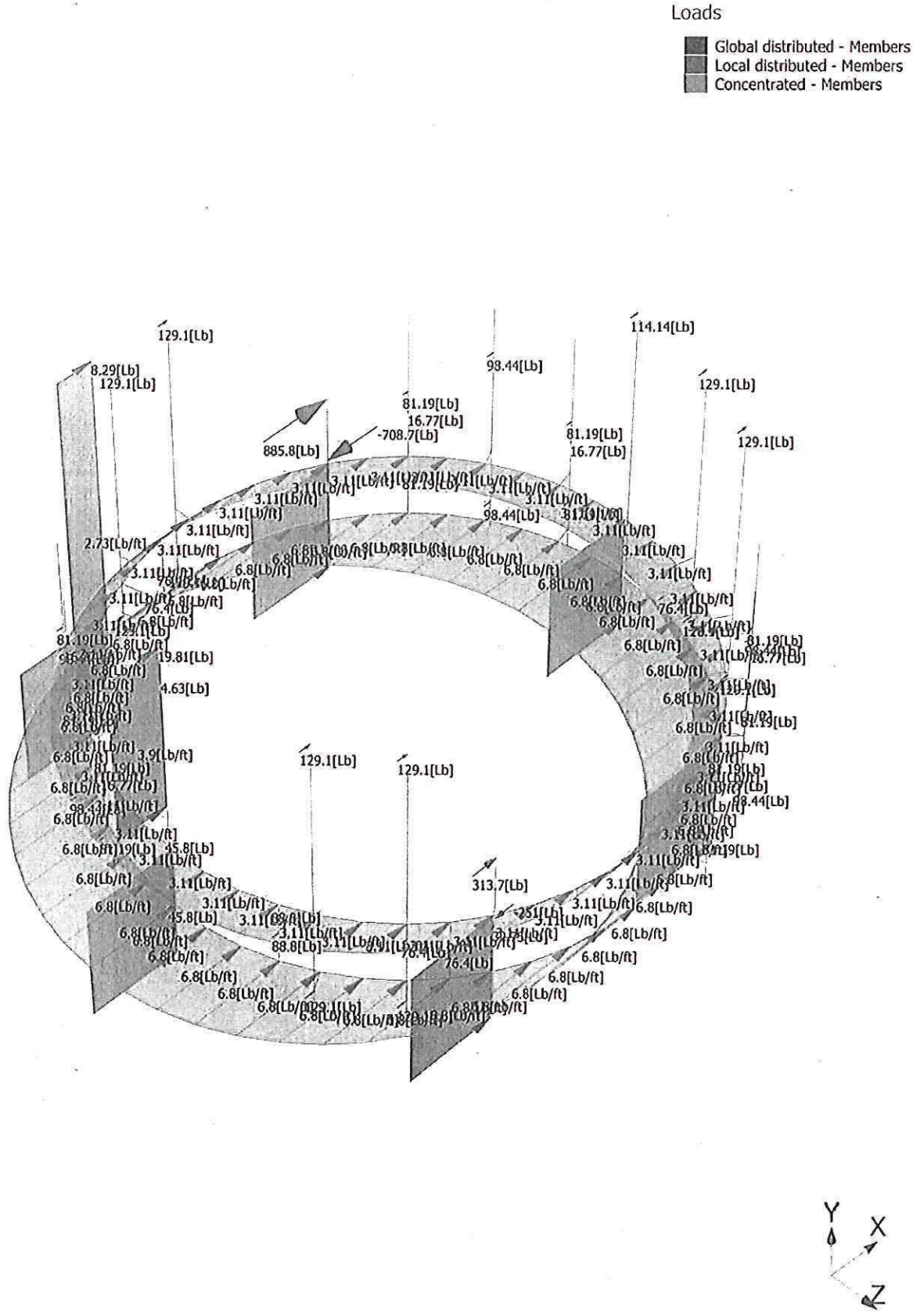
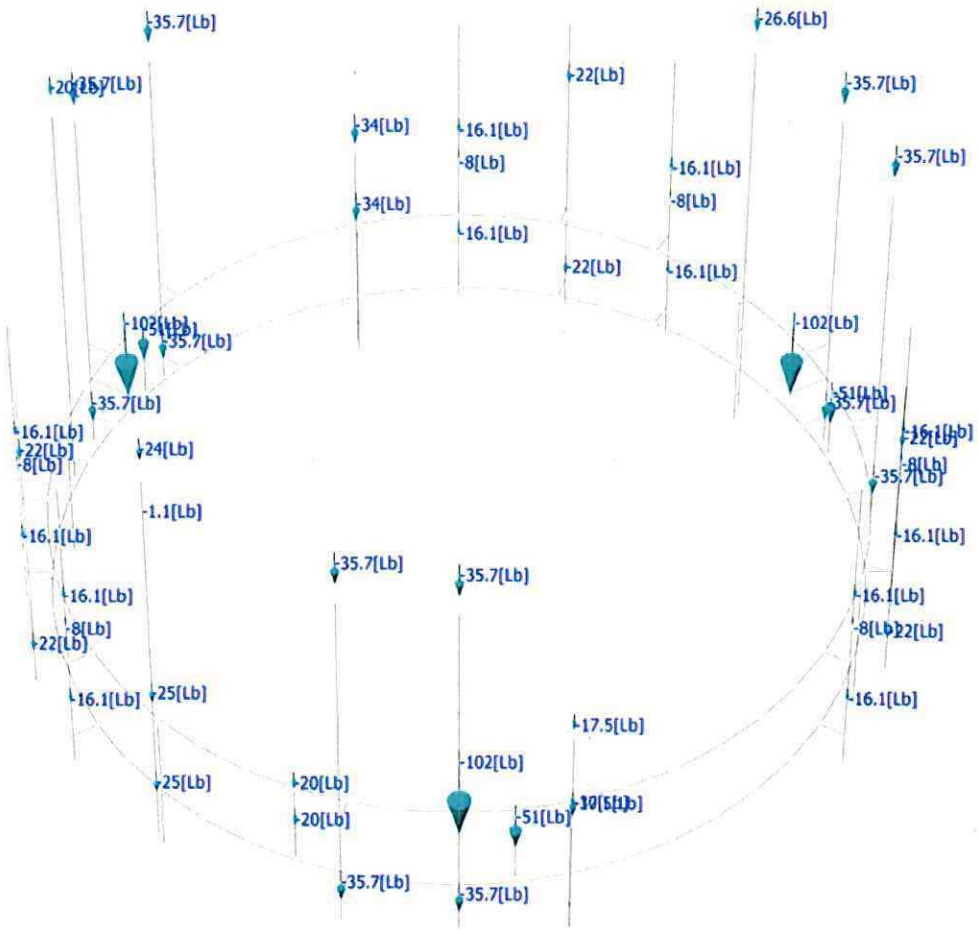

Loads
Global distributed - Members
Local distributed - Members
Concentrated - Members
129.1[Lb]
114.14[Lb]
98.44[Lb]
885.8[Lb]
81.19[Lb]
16.77[Lb]
2.73[Lb/ft]
3.11[Lb/ft]
6.8[Lb/ft]
19.81[Lb]
4.63[Lb]
3.9[Lb/ft]
313.7[Lb]
Y
X
Z


Loads
Global distributed - Members
Local distributed - Members
Concentrated - Members
129.1[Lb]
8.29[Lb]
114.14[Lb]
98.44[Lb]
81.19[Lb]
16.77[Lb]
-708.7[Lb]
885.8[Lb]
313.7[Lb]
3.11[Lb/ft]
6.8[Lb/ft]
Y
X
Z

Loads

Concentrated - Members



Edge

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Current Date: 11/20/2015 10:56 AM
Units system: English
File name: \\edgeex02\active_projects\13700\13736\Structural\2015-11-20 Railing Analysis\RAM\Cambridge WT_13736_Railing Evaluation_2015-11-20.etz\

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

D1=DL
D2=DL+WLx
D3=DL+0.866WLx+0.5WLz
D4=DL+0.707WLx+0.707WLz
D5=DL+0.5WLx+0.866WLz
D6=DL+WLz
D7=DL-0.5WLx+0.866WLz
D8=DL-0.707WLx+0.707WLz
D9=DL-0.866WLx+0.5WLz
D10=DL-WLx
D11=DL-0.866WLx-0.5WLz
D12=DL-0.707WLx-0.707WLz
D13=DL-0.5WLx-0.866WLz
D14=DL-WLz
D15=DL+0.5WLx-0.866WLz
D16=DL+0.707WLx-0.707WLz
D17=DL+0.866WLx-0.5WLz
D18=0.6DL+WLx
D19=0.6DL+0.866WLx+0.5WLz
D20=0.6DL+0.707WLx+0.707WLz
D21=0.6DL+0.5WLx+0.866WLz
D22=0.6DL+WLz
D23=0.6DL-0.5WLx+0.866WLz
D24=0.6DL-0.707WLx+0.707WLz
D25=0.6DL-0.866WLx+0.5WLz
D26=0.6DL-WLx
D27=0.6DL-0.866WLx-0.5WLz
D28=0.6DL-0.707WLx-0.707WLz
D29=0.6DL-0.5WLx-0.866WLz
D30=0.6DL-WLz
D31=0.6DL+0.5WLx-0.866WLz
D32=0.6DL+0.707WLx-0.707WLz
D33=0.6DL+0.866WLx-0.5WLz

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	L 2-1_2X2-1_2X1_4	1	D10 at 0.00%	3.30	N.G.	Eq. H1-1b
		2	D16 at 0.00%	2.71	N.G.	Eq. H1-1b
		3	D13 at 0.00%	2.82	N.G.	Eq. H1-1b
		4	D10 at 0.00%	2.53	N.G.	Eq. H1-1b
		5	D8 at 0.00%	2.62	N.G.	Eq. H1-1b
		6	D13 at 0.00%	1.95	N.G.	Eq. H1-1b
		23	D8 at 0.00%	1.59	N.G.	Eq. H1-1b
		24	D7 at 100.00%	0.65	OK	Eq. H1-1b
		25	D23 at 0.00%	0.71	OK	Eq. H1-1b
		26	D31 at 100.00%	0.72	OK	Eq. H1-1b
		27	D15 at 0.00%	0.85	OK	Eq. H1-1b
		28	D15 at 100.00%	0.81	OK	Eq. H1-1b
		29	D16 at 0.00%	0.83	OK	Eq. H1-1b

	30	D14 at 100.00%	1.33	N.G.	Eq. H1-1b
	39	D11 at 0.00%	1.09	N.G.	Eq. H1-1b
	40	D11 at 100.00%	0.52	OK	Eq. H1-1b
	41	D9 at 0.00%	0.38	OK	Eq. H1-1b
	42	D14 at 100.00%	0.40	OK	Eq. H1-1b
	43	D2 at 0.00%	1.03	N.G.	Eq. H1-1b
	44	D17 at 0.00%	0.55	OK	Eq. H1-1b
	45	D16 at 100.00%	0.61	OK	Eq. H1-1b
	46	D16 at 100.00%	1.44	N.G.	Eq. H1-1b
	47	D14 at 0.00%	1.60	N.G.	Eq. H1-1b
	48	D12 at 100.00%	0.81	OK	Eq. H1-1b
	49	D28 at 0.00%	1.02	N.G.	Eq. H1-1b
	50	D20 at 100.00%	0.91	OK	Eq. H1-1b
	51	D4 at 0.00%	1.10	N.G.	Eq. H1-1b
	52	D5 at 100.00%	0.99	OK	Eq. H1-1b
	53	D5 at 0.00%	0.93	OK	Eq. H1-1b
	54	D3 at 100.00%	1.80	N.G.	Eq. H1-1b
	71	D17 at 0.00%	1.84	N.G.	Eq. H1-1b
	72	D17 at 100.00%	0.82	OK	Eq. H1-1b
	73	D17 at 0.00%	0.61	OK	Eq. H1-1b
	74	D2 at 100.00%	0.75	OK	Eq. H1-1b
	75	D9 at 0.00%	0.68	OK	Eq. H1-1b
	76	D8 at 100.00%	0.83	OK	Eq. H1-1b
	77	D8 at 0.00%	0.63	OK	Eq. H1-1b
	87	D3 at 0.00%	0.96	OK	Eq. H1-1b
	88	D3 at 0.00%	0.47	OK	Eq. H1-1b
	89	D10 at 0.00%	0.86	OK	Eq. H1-1b
	90	D10 at 0.00%	0.56	OK	Eq. H1-1b
	91	D10 at 0.00%	0.26	OK	Eq. H1-1b
	92	D10 at 100.00%	0.35	OK	Eq. H1-1b
	93	D10 at 100.00%	0.72	OK	Eq. H1-1b
	94	D10 at 100.00%	1.14	N.G.	Eq. H1-1b
	95	D6 at 0.00%	0.97	OK	Eq. H1-1b
	96	D5 at 100.00%	0.51	OK	Eq. H1-1b
	97	D9 at 100.00%	0.58	OK	Eq. H1-1b
	98	D9 at 0.00%	0.58	OK	Eq. H1-1b
	99	D11 at 0.00%	0.95	OK	Eq. H1-1b
	100	D12 at 0.00%	0.62	OK	Eq. H1-1b
	101	D11 at 100.00%	0.76	OK	Eq. H1-1b
	102	D11 at 100.00%	1.63	N.G.	Eq. H1-1b
	132	D9 at 68.75%	0.93	OK	Eq. H1-1b
PIPE 1-1_2x0.145	7	D5 at 0.00%	0.56	OK	Eq. H1-1b
	8	D2 at 100.00%	0.96	OK	Eq. H1-1b
	9	D14 at 0.00%	0.86	OK	Eq. H1-1b
	10	D4 at 100.00%	0.71	OK	Eq. H1-1b
	11	D11 at 0.00%	1.16	N.G.	Eq. H1-1b
	12	D10 at 0.00%	0.62	OK	Eq. H1-1b
	13	D10 at 100.00%	0.51	OK	Eq. H1-1b
	14	D13 at 100.00%	0.81	OK	Eq. H1-1b
	15	D7 at 0.00%	0.78	OK	Eq. H1-1b
	16	D7 at 100.00%	0.48	OK	Eq. H1-1b
	17	D7 at 0.00%	0.88	OK	Eq. H1-1b
	18	D15 at 100.00%	0.88	OK	Eq. H1-1b
	19	D15 at 0.00%	0.92	OK	Eq. H1-1b
	20	D15 at 100.00%	0.99	OK	Eq. H1-1b
	21	D16 at 0.00%	0.70	OK	Eq. H1-1b
	22	D15 at 100.00%	0.72	OK	Eq. H1-1b
	31	D10 at 0.00%	0.60	OK	Eq. H1-1b
	32	D10 at 100.00%	0.82	OK	Eq. H1-1b
	33	D3 at 0.00%	0.86	OK	Eq. H1-1b
	34	D10 at 100.00%	0.77	OK	Eq. H1-1b
	35	D3 at 0.00%	1.10	N.G.	Eq. H1-1b

	36	D2 at 0.00%	0.62	OK	Eq. H1-1b
	37	D2 at 100.00%	0.59	OK	Eq. H1-1b
	38	D2 at 100.00%	**1.31**	**N.G.**	Eq. H1-1b
	55	D14 at 0.00%	0.94	OK	Eq. H1-1b
	56	D12 at 100.00%	0.83	OK	Eq. H1-1b
	57	D12 at 0.00%	1.04	N.G.	Eq. H1-1b
	58	D4 at 100.00%	1.16	N.G.	Eq. H1-1b
	59	D4 at 0.00%	1.08	N.G.	Eq. H1-1b
	60	D4 at 100.00%	1.28	N.G.	Eq. H1-1b
	61	D4 at 0.00%	0.72	OK	Eq. H1-1b
	62	D4 at 100.00%	0.95	OK	Eq. H1-1b
	63	D17 at 0.00%	0.77	OK	Eq. H1-1b
	64	D17 at 100.00%	0.99	OK	Eq. H1-1b
	65	D9 at 0.00%	0.95	OK	Eq. H1-1b
	66	D17 at 100.00%	0.97	OK	Eq. H1-1b
	67	D8 at 0.00%	0.95	OK	Eq. H1-1b
	68	D9 at 100.00%	0.81	OK	Eq. H1-1b
	69	D8 at 0.00%	0.78	OK	Eq. H1-1b
	79	D2 at 0.00%	0.52	OK	Eq. H1-1b
	80	D17 at 100.00%	0.34	OK	Eq. H1-1b
	81	D10 at 0.00%	0.85	OK	Eq. H1-1b
	82	D10 at 0.00%	0.60	OK	Eq. H1-1b
	83	D9 at 0.00%	0.54	OK	Eq. H1-1b
	84	D9 at 100.00%	0.59	OK	Eq. H1-1b
	85	D10 at 100.00%	0.61	OK	Eq. H1-1b
	86	D10 at 100.00%	0.97	OK	Eq. H1-1b
	131	D9 at 68.75%	0.71	OK	Eq. H1-1b
PIPE 1-1_4x0.140	**145**	D2 at 81.25%	**0.64**	**With warnings**	Eq. H1-1a
PIPE 2x0.154	**103**	D5 at 14.58%	1.04	N.G.	Eq. H1-1b
	104	D4 at 14.58%	1.12	N.G.	Eq. H1-1b
	105	D12 at 14.58%	1.12	N.G.	Eq. H1-1b
	106	D9 at 14.58%	0.86	OK	Eq. H1-1b
	108	D2 at 14.58%	0.60	OK	Eq. H1-1b
	109	D7 at 14.58%	0.69	OK	Eq. H1-1b
	110	D15 at 14.58%	0.84	OK	Eq. H1-1b
	111	D15 at 14.58%	0.98	OK	Eq. H1-1b
	128	D4 at 37.50%	0.36	OK	Eq. H1-1b
	133	D16 at 41.67%	**2.07**	**N.G.**	Eq. H1-1b
	136	D16 at 41.67%	0.74	OK	Eq. H1-1b
	139	D4 at 67.19%	0.88	OK	Eq. H1-1b
	143	D4 at 66.67%	0.31	OK	Eq. H1-1b
	151	D16 at 64.58%	0.86	OK	Eq. H1-1b
	152	D16 at 65.63%	0.87	OK	Eq. H1-1b
	153	D4 at 65.63%	0.87	OK	Eq. H1-1b
	154	D16 at 64.58%	0.86	OK	Eq. H1-1b
	155	D16 at 65.63%	0.87	OK	Eq. H1-1b
	156	D16 at 64.58%	0.86	OK	Eq. H1-1b
	159	D7 at 50.00%	0.05	OK	Eq. H1-1b
	174	D4 at 50.00%	0.05	OK	Eq. H1-1b
	176	D9 at 0.00%	0.21	OK	
	177	D8 at 0.00%	0.16	OK	
Standard Link	**112**	D12 at 0.00%	0.01	OK	
	113	D12 at 0.00%	0.01	OK	
	114	D4 at 0.00%	0.01	OK	
	115	D4 at 0.00%	0.01	OK	
	116	D5 at 0.00%	0.01	OK	
	117	D5 at 0.00%	0.01	OK	
	118	D9 at 0.00%	0.01	OK	
	119	D9 at 0.00%	0.01	OK	
	120	D2 at 0.00%	0.00	OK	

121	D2 at 0.00%	0.00	OK	
122	D7 at 0.00%	0.01	OK	
123	D7 at 0.00%	0.01	OK	
124	D15 at 0.00%	0.01	OK	
125	D15 at 0.00%	0.01	OK	
126	D15 at 0.00%	0.01	OK	
127	D16 at 0.00%	0.01	OK	
129	D9 at 0.00%	0.00	OK	
130	D9 at 0.00%	0.00	OK	
134	D2 at 0.00%	0.00	OK	
135	D3 at 0.00%	**0.01**	**OK**	
137	D3 at 0.00%	0.00	OK	
138	D10 at 0.00%	0.00	OK	
140	D14 at 0.00%	0.01	OK	
141	D10 at 0.00%	0.00	OK	
142	D14 at 0.00%	0.00	OK	
146	D9 at 0.00%	0.00	OK	
147	D9 at 0.00%	0.00	OK	
148	D14 at 0.00%	0.00	OK	
149	D11 at 0.00%	0.00	OK	
161	D10 at 0.00%	0.01	OK	
162	D10 at 0.00%	0.00	OK	
163	D2 at 0.00%	0.00	OK	
164	D2 at 0.00%	0.01	OK	
165	D16 at 0.00%	0.01	OK	
166	D17 at 0.00%	0.01	OK	
167	D8 at 0.00%	0.01	OK	
168	D9 at 0.00%	0.00	OK	
169	D3 at 0.00%	0.01	OK	
170	D4 at 0.00%	0.00	OK	
171	D12 at 0.00%	0.01	OK	
172	D11 at 0.00%	0.00	OK	
178	D14 at 100.00%	0.00	OK	Eq. H1-1b
179	D4 at 100.00%	0.00	OK	Eq. H1-1b
180	D2 at 100.00%	0.00	OK	Eq. H1-1b

Edge

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Current Date: 11/20/2015 10:57 AM
Units system: English
File name: \\edgeex02\active_projects\13700\13736\Structural\2015-11-20 Railing Analysis\RAM\Cambridge WT_13736_Railing Evaluation_2015-11-20.etz\

Steel Code Check

Report: Comprehensive

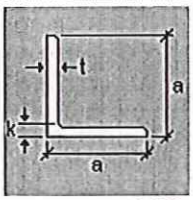
Members: Hot-rolled
Design code: AISC 360-2005 ASD

Member	:	**1**
Design status	:	**N.G.**

Section information

Section name: L 2-1_2X2-1_2X1_4 **(US)**

Dimensions



a	=	2.500	[in]	Flange length
k	=	0.500	[in]	Distance k
t	=	0.250	[in]	Thickness

Properties

Section properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	1.190	
Moment of Inertia (local axes) (I)	[in4]	0.692	0.692
Moment of Inertia (principal axes) (I')	[in4]	1.108	0.276
Bending constant for moments (principal axis) (J')	[in]	0.000	1.668
Radius of gyration (local axes) (r)	[in]	0.763	0.763
Radius of gyration (principal axes) (r')	[in]	0.965	0.482
Saint-Venant torsion constant. (J)	[in4]	0.026	
Section warping constant. (Cw)	[in6]	0.012	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-0.837	-0.011
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.387	0.387
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.975	0.975
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.633	0.304
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.633	0.304
Plastic section modulus (local axis) (Z)	[in3]	0.695	0.694
Plastic section modulus (principal axis) (Z')	[in3]	0.997	0.499
Polar radius of gyration. (ro)	[in]	1.360	
Area for shear (Aw)	[in2]	0.630	0.630
Torsional constant. (C)	[in3]	0.099	

Material : A36

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	36.00
Tensile strength (Fu):	[Kip/in2]	58.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11507.94

DESIGN CRITERIA

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	3.50

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
3.50	3.50

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
3.50	3.50	3.50	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway
Single angle connected through width	No
Planar element	No
Consider eccentricity	No
Shear load point of application	Gravity center

DESIGN CHECKS

AXIAL TENSION DESIGN ✓

Axial tension

Ratio : 0.01
Capacity : 25652.69 [Lb]
Demand : 361.30 [Lb]
Reference : Eq. Sec. D2
Ctrl Eq. : D31 at 43.75%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω)	[Lb]	25652.69	Eq. Sec. D2
Nominal axial tension capacity (P_n)	[Lb]	42840.00	Eq. D2-1

AXIAL COMPRESSION DESIGN ✓

Compression in the major axis 33

Ratio	:	0.00		
Capacity	:	0.00 [Lb]		
Demand	:	0.00 [Lb]	Ctrl Eq.	: --

Intermediate results	Unit	Value	Reference
Section classification			
Unstiffened element classification	--	N/A	
Stiffened element classification	--	N/A	

Compression in the minor axis 22

Ratio	:	0.06		
Capacity	:	14506.14 [Lb]	Reference	: Sec. E1
Demand	:	885.96 [Lb]	Ctrl Eq.	: D7 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Unstiffened element classification	--	Non slender	
Unstiffened element slenderness (λ)	--	10.00	
Unstiffened element limiting slenderness (λ_r)	--	12.77	
Stiffened element classification	--	Non slender	
Factored flexural buckling strength(P_{n22}/Ω)	[Lb]	14506.14	Sec. E1
Effective length factor (K_{22})	--	1.00	
Unbraced length (L_{22})	[ft]	3.50	
Effective slenderness ($(KL/r)_{22}$)	--	104.06	Eq. E5-3
Elastic critical buckling stress (F_{e22})	[Kip/in2]	26.43	Eq. E3-4
Reduction factor for slender unstiffened elements (Q_{s22})	--	1.00	
Effective area of the cross section based on the effective width (A...	[in2]	1.19	Eq. E3-2
Reduction factor for slender stiffened elements (Q_{a22})	--	1.00	
Full reduction factor for slender elements (Q_{22})	--	1.00	Sec. E7
Critical stress for flexural buckling (F_{cr22})	[Kip/in2]	20.36	Eq. E3-2
Nominal flexural buckling strength (P_{n22})	[Lb]	24225.26	Eq. E3-1

FLEXURAL DESIGN ✗

Bending about major axis, M33

Ratio	:	1.96		
Capacity	:	0.83 [Kip*ft]	Reference	: Sec. F1
Demand	:	1.63 [Kip*ft]	Ctrl Eq.	: D10 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Unstiffened element classification	--	Compact	
Unstiffened element slenderness (λ)	--	10.00	
Limiting slenderness for noncompact unstiffened element (λ_r)	--	25.83	
Limiting slenderness for compact unstiffened element (λ_p)	--	15.33	
Stiffened element classification	--	Compact	
Stiffened element slenderness (λ)	--	10.00	
Limiting slenderness for noncompact stiffened element (λ_r)	--	25.83	
Limiting slenderness for compact stiffened element (λ_p)	--	15.33	
Factored yielding strength(M_n/Ω)	[Kip*ft]	1.71	Sec. F1
Yield Moment (M_y)	[Kip*ft]	1.90	Sec. F10.1
Yielding (M_n)	[Kip*ft]	2.85	Eq. F10-1
Factored lateral-torsional buckling strength(M_n/Ω)	[Kip*ft]	1.71	Sec. F1
Lateral-torsional buckling modification factor (C_b)	--	2.46	Eq. F1-1

Elastic lateral-torsional buckling moment (Me)	[Kip*ft]	15.51	Eq. F10-5
Lateral-torsional buckling (Mn)	[Kip*ft]	2.85	Eq. F10-3
Factored yielding strength about a geometric axis(M_n/Ω)	[Kip*ft]	1.04	Sec. F1
Yield Moment (My)	[Kip*ft]	1.16	Sec. F10.1
Yielding (Mn)	[Kip*ft]	1.74	Eq. F10-1
Factored lateral-torsional buckling strength about a geometric axis(M_n/Ω)	[Kip*ft]	0.83	Sec. F1
Lateral-torsional buckling modification factor (Cb)	--	2.60	Eq. F1-1
Elastic lateral-torsional buckling moment (Me)	[Kip*ft]	10.45	Eq. F10-4a
Lateral-torsional buckling (Mn)	[Kip*ft]	1.39	Eq. F10-3

Bending about minor axis, M22

Ratio	: 1.48			
Capacity	: 0.83 [Kip*ft]	Reference	: Sec. F1	
Demand	: -1.23 [Kip*ft]	Ctrl Eq.	: D3 at 0.00%	

Intermediate results	Unit	Value	Reference
Section classification			
Unstiffened element classification	--	Compact	
Unstiffened element slenderness (λ)	--	10.00	
Limiting slenderness for noncompact unstiffened element (λ_r)	--	25.83	
Limiting slenderness for compact unstiffened element (λ_p)	--	15.33	
Stiffened element classification	--	Compact	
Stiffened element slenderness (λ)	--	10.00	
Limiting slenderness for noncompact stiffened element (λ_r)	--	25.83	
Limiting slenderness for compact stiffened element (λ_p)	--	15.33	
Factored yielding strength(M_n/Ω)	[Kip*ft]	0.82	Sec. F1
Yield Moment (My)	[Kip*ft]	0.91	Sec. F10.1
Yielding (Mn)	[Kip*ft]	1.37	Eq. F10-1
Factored yielding strength about a geometric axis(M_n/Ω)	[Kip*ft]	1.04	Sec. F1
Yield Moment (My)	[Kip*ft]	1.16	Sec. F10.1
Yielding (Mn)	[Kip*ft]	1.74	Eq. F10-1
Factored lateral-torsional buckling strength about a geometric axis(M_n/Ω)	[Kip*ft]	0.83	Sec. F1
Lateral-torsional buckling modification factor (Cb)	--	2.09	Eq. F1-1
Elastic lateral-torsional buckling moment (Me)	[Kip*ft]	10.45	Eq. F10-4a
Lateral-torsional buckling (Mn)	[Kip*ft]	1.39	Eq. F10-3

DESIGN FOR SHEAR ✓

Shear in major axis 33

Ratio	: 0.08			
Capacity	: 8148.50 [Lb]			
Demand	: -639.32 [Lb]	Ctrl Eq.	: D7 at 0.00%	

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω)	[Lb]	8148.50	
Web slenderness (λ_w)	--	10.00	Sec. G2
Shear area (Aw)	[in2]	0.63	
Web buckling coefficient (kv)	--	1.20	Sec. G7
Web buckling coefficient (Cv)	--	1.00	Sec. G4
Nominal shear strength (Vn)	[Lb]	13608.00	Eq. G2-1

Shear in minor axis 22

Ratio	: 0.14			
Capacity	: 8148.50 [Lb]			
Demand	: -1105.78 [Lb]	Ctrl Eq.	: D10 at 0.00%	

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω)	[Lb]	8148.50	
Web slenderness (λ_w)	--	10.00	Sec. G2
Shear area (A_w)	[in2]	0.63	
Web buckling coefficient (k_v)	--	1.20	Sec. G4
Web buckling coefficient (C_v)	--	1.00	Sec. G4
Nominal shear strength (V_n)	[Lb]	13608.00	Eq. G2-1

COMBINED ACTIONS DESIGN X

Combined flexure and axial compression

Ratio	: 1.61			
Ctrl Eq.	: D10 at 0.00%	Reference	: Eq. H1-1b	

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force	--	1.61	Eq. H1-1b
Required flexural strength about strong axis (M_{r33})	[Kip*ft]	1.94	
Available flexural strength about strong axis (M_{c33})	[Kip*ft]	1.71	Sec. F1
Required flexural strength about weak axis (M_{r22})	[Kip*ft]	-0.37	
Available flexural strength about weak axis (M_{c22})	[Kip*ft]	0.82	Sec. F1
Required axial compressive strength (P_r)	[Lb]	483.25	
Available axial compressive strength (P_c)	[Lb]	14506.14	Sec. E1

Combined flexure and axial tension

Ratio	: 1.59			
Ctrl Eq.	: D10 at 0.00%	Reference	: Eq. H1-1b	

Intermediate results	Unit	Value	Reference
Required flexural strength about strong axis (M_{r33})	[Kip*ft]	1.94	
Available flexural strength about strong axis (M_{c33})	[Kip*ft]	1.71	Sec. F1
Required flexural strength about weak axis (M_{r22})	[Kip*ft]	-0.37	
Available flexural strength about weak axis (M_{c22})	[Kip*ft]	0.82	Sec. F1
Required axial tensile strength (P_r)	[Lb]	0.00	
Available axial tensile strength (P_c)	[Lb]	25652.69	Eq. Sec. D2

Combined flexure and axial compression about local axis

Ratio	: 3.30			
Ctrl Eq.	: D10 at 0.00%	Reference	: Eq. H1-1b	

Intermediate results	Unit	Value	Reference
Required flexural strength about strong local axis (M_{r33})	[Kip*ft]	1.63	
Available flexural strength about strong local axis (M_{c33})	[Kip*ft]	0.83	Sec. F1
Required flexural strength about weak local axis (M_{r22})	[Kip*ft]	1.11	
Available flexural strength about weak local axis (M_{c22})	[Kip*ft]	0.83	Sec. F1
Required axial compressive strength (P_r)	[Lb]	483.25	
Available axial compressive strength (P_c)	[Lb]	14506.14	Sec. E1

Combined flexure and axial tension about local axis

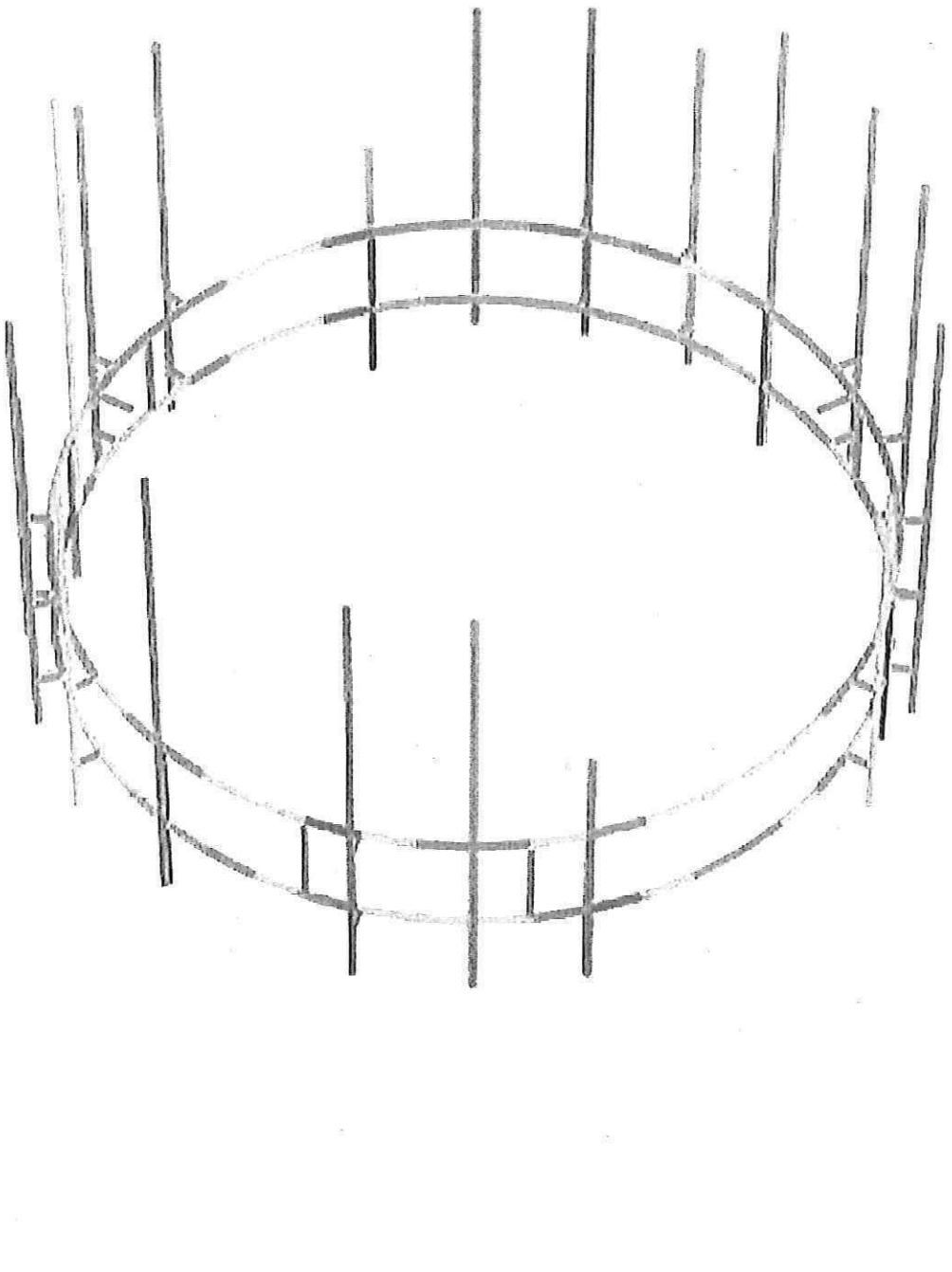
Ratio	:	3.29			
Ctrl Eq.	:	D10 at 0.00%	Reference	:	Eq. H1-1b

Intermediate results	Unit	Value	Reference
Required flexural strength about strong local axis (M_{r33})	[Kip*ft]	1.63	
Available flexural strength about strong local axis (M_{c33})	[Kip*ft]	0.83	Sec. F1
Required flexural strength about weak local axis (M_{r22})	[Kip*ft]	1.11	
Available flexural strength about weak local axis (M_{c22})	[Kip*ft]	0.83	Sec. F1
Required axial tensile strength (P_r)	[Lb]	0.00	
Available axial tensile strength (P_c)	[Lb]	25652.69	Eq. Sec. D2

Combined torsion and shear stresses

Ratio	:	0.51			
Ctrl Eq.	:	D10 at 0.00%	Reference	:	Eq. H3-8

Intermediate results	Unit	Value	Reference
Available shear stress for shear yielding(F_{nv}/Ω)	[Kip/in2]	12.93	Eq. H3-8
Shear stress due to flexure in strong axis (f_{vb3})	[Kip/in2]	0.66	McNulty Sec.2.3
Shear stress due to flexure in weak axis (f_{vb2})	[Kip/in2]	1.76	McNulty Sec.2.3
Shear stress due to torsion (f_{vt})	[Kip/in2]	4.22	DG9 T4.1
Total shear stress due to flexure and torsion (f_v)	[Kip/in2]	6.63	DG9 Sec. 4.6

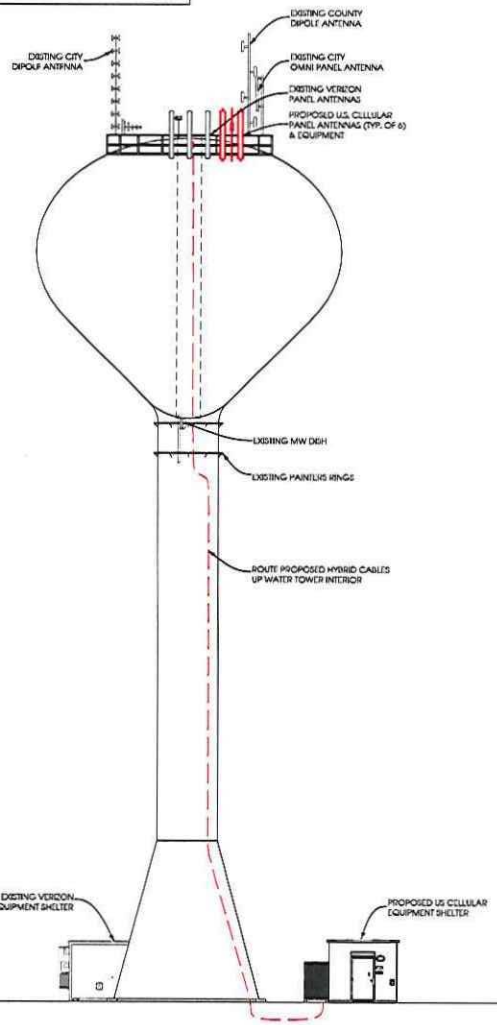

Stress ratio
AISC/AISI/NDS
3.30
2.94
2.57
2.20
1.84
1.47
1.10
0.73
0.37
3.485E-04
Y
X
Z

NOTES:

FOUNDATIONS SHOWN ARE TYPICAL AND DO NOT REPRESENT ACTUAL CONDITIONS

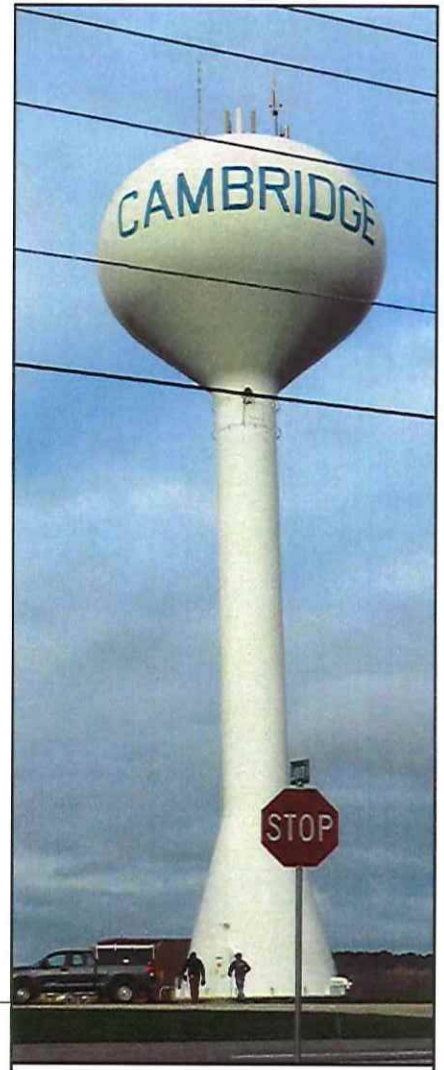
CONTRACTOR TO VERIFY HEIGHT AND DIRECTION OF ANTENNA WITH PROJECT MANAGER

ALL ANTENNA AZIMUTHS TO BE FROM TRUE NORTH

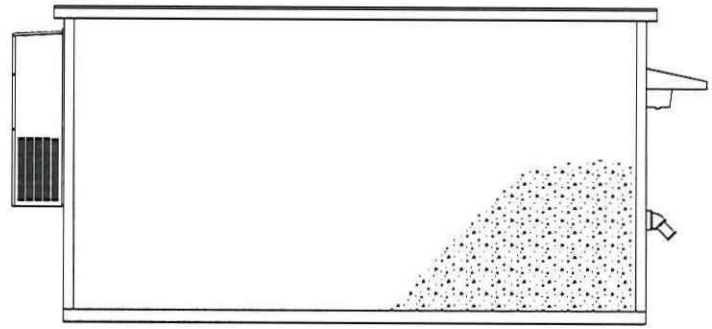


A / A-1 **TOWER PROFILE (SOUTH ELEVATION)**

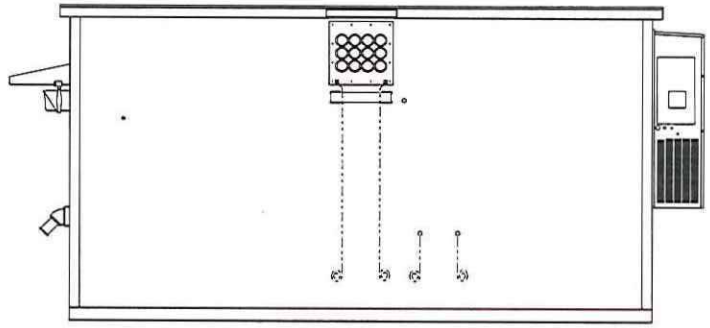
SCALE: 11" x 17" - 1" = 20'-0" 22" x 34" - 1" = 10'-0"



TOWER ELEVATION - LOOKING WEST -



NORTH ELEVATION



SOUTH ELEVATION

B / A-1 **U.S. CELLULAR EQUIPMENT SHELTER ELEVATIONS**

SCALE: 11" x 17" - 1/4" = 1' 22" x 34" - 1/2" = 1'

S-26

Edge Consulting Engineers, Inc.
534 Water Street
Prairie du Sac, WI 53578
608.643.4100 voice
608.643.5481 fax
www.edgeconsult.com

TOWER ELEVATION
CAMBRIDGE WT (#782578)
CAMBRIDGE, WISCONSIN

SHEET INDEX

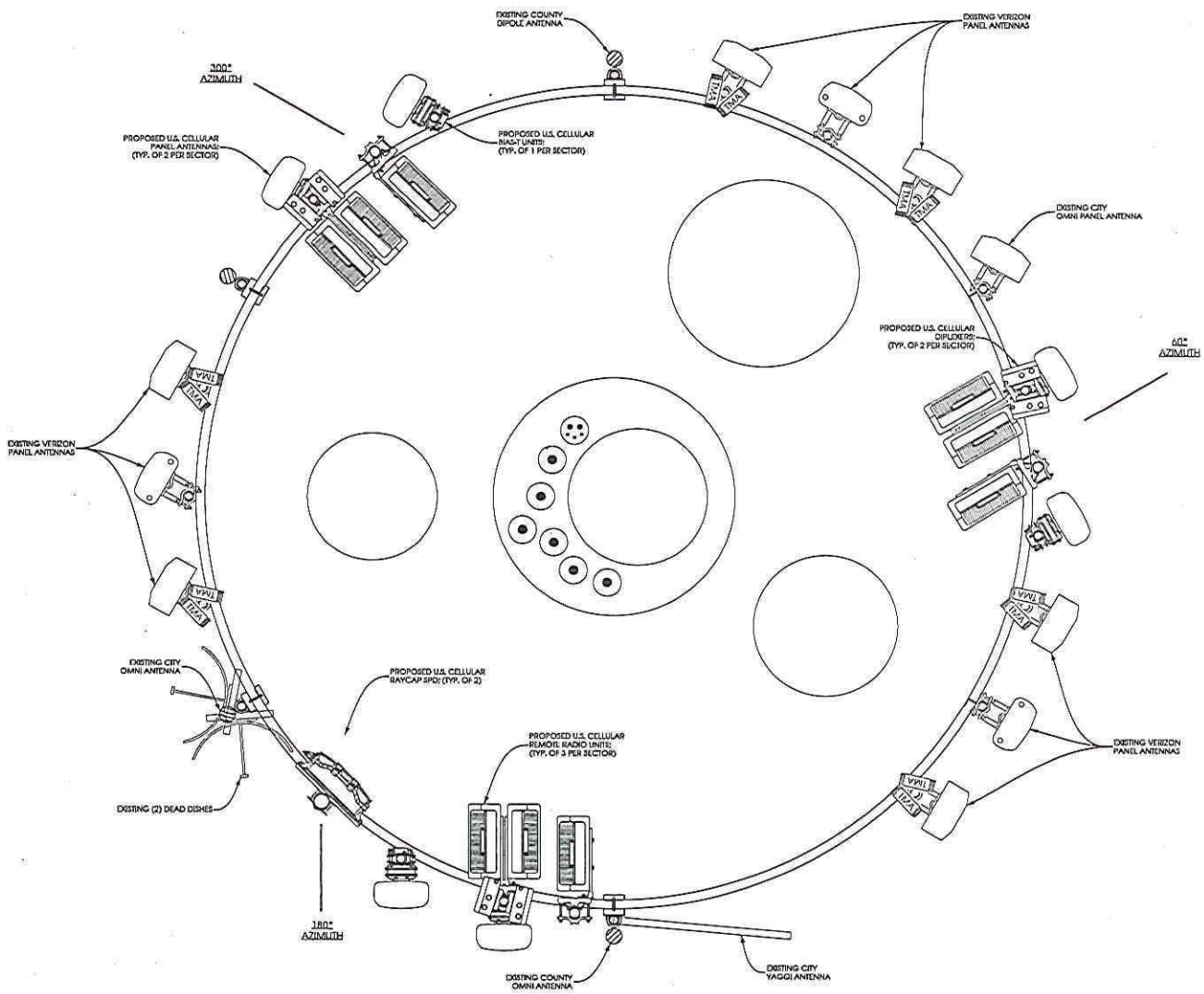
ISSUE DATE
ZONING DRAWINGS - 11/24/2014

REVISIONS

DRAWN BY:	JMK
CHECKED BY:	DCL
PLOT DATE:	11/24/2015
PROJECT #:	13736
FILE NAME:	A-1.dgn

SHEET NUMBER

A-1



D / A-2 **ANTENNA PLATFORM ASSIGNMENT**

SCALE: NTS

S-27

Edge
Consulting Engineers, Inc.
614 West Street
Fredonia, Wisconsin 53021
262.644.1449 voice
262.644.1454 fax
www.edgecei.com

ANTENNA LAYOUT

CAMBRIDGE WT [#782578]

CAMBRIDGE, WISCONSIN

SHEET TITLE

ISSUE DATE:
ZONING DRAWINGS - 11/24/2014
REVISIONS:
DRAWN BY: LMK
CHECKED BY: DCL
PLOT DATE: 11/24/2014
PROJECT #: 13734
FILE NAME: A-2.dwg

SHEET NUMBER

A-2

LEASE PARCEL

A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 10,000 square feet (0.229 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet to the point of beginning; thence S87°-12'-38"W 100.00 feet; thence N02°-47'-22"W 100.00 feet; thence N87°-12'-38"E 100.00 feet; thence S02°-47'-22"E 100.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.

UTILITY AND INGRESS/EGRESS EASEMENT

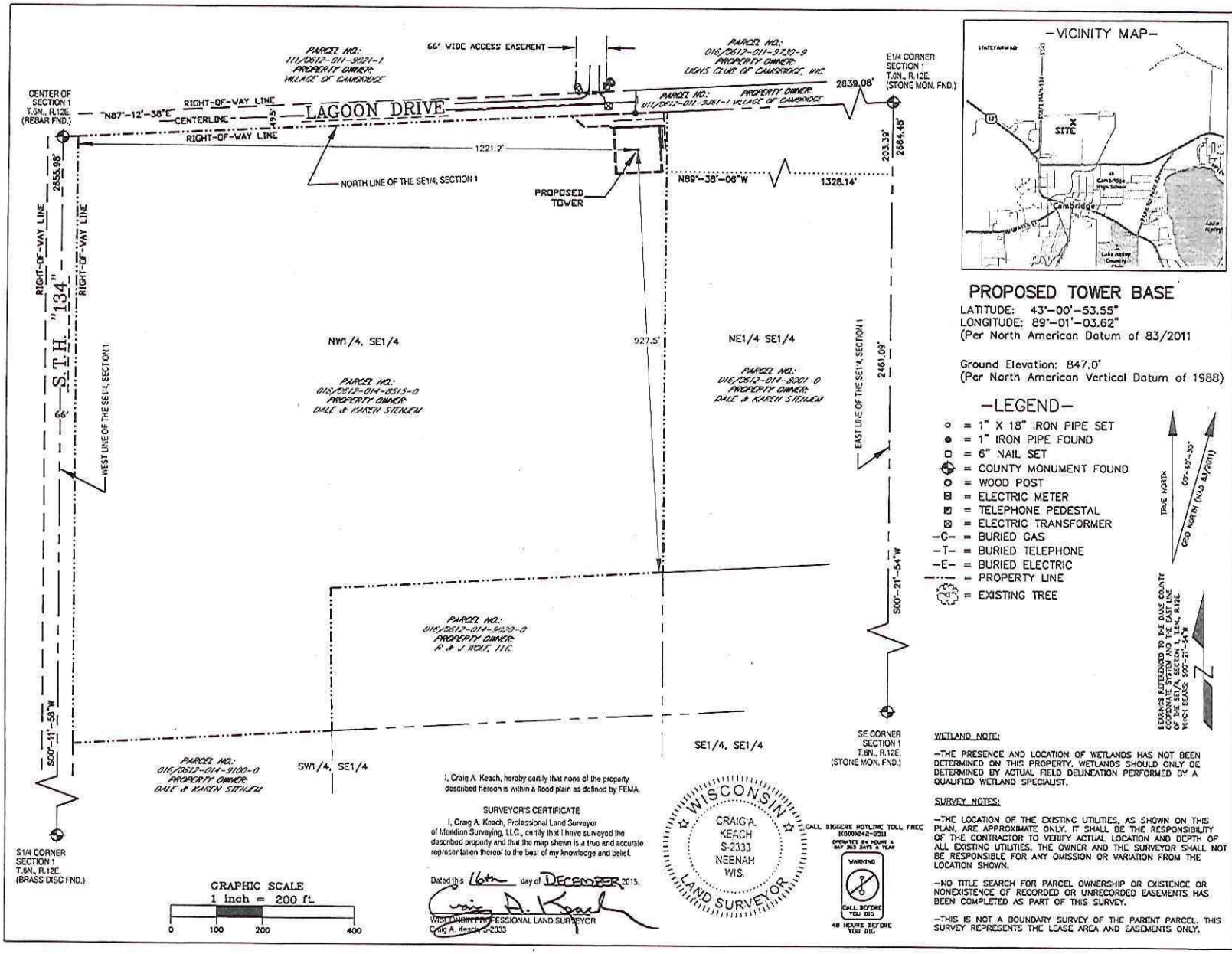
A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 5,305 square feet (0.122 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet; thence S87°-12'-38"W 100.00 feet; thence N02°-47'-22"W 100.00 feet to the point of beginning; thence S87°-12'-38"W 4.88 feet; N56°-46'-36"W 7.77 feet; thence S87°-58'-42"W 54.10 feet; thence N49°-55'-54"W 36.32 feet to a point on the South Right of Way line of Lagoon Drive; thence N87°-12'-38"E 201.88 feet along said South Right of Way line of Lagoon Drive; S02°-47'-22"E 30.00 feet; thence S87°-12'-38"W 110.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.

10 FOOT WIDE UTILITY EASEMENT

A part of the Northwest Quarter (NW1/4) of the Southeast Quarter (SE1/4) of Section One (1), Township Six (6) North, Range Twelve (12) East, Town of Christiana, Dane County, Wisconsin containing 500 square feet (0.011 acres) of land and being described by:

Commencing at the East Quarter Corner of said Section 1; thence S00°-21'-54"W 203.39 feet along the East line of the SE1/4 of said Section 1; thence N89°-38'-06"W 1328.14 feet; thence N02°-47'-22"W 49.97 feet to the point of beginning; thence continue thence N02°-47'-22"W 50.03 feet; thence N87°-12'-38"E 10.00 feet; S02°-47'-22"E 50.03 feet; thence S87°-12'-38"W 10.00 feet to the point of beginning, being subject to any and all easements and restrictions of record.



PROPOSED TOWER BASE

LATITUDE: 43°-00'-53.55"
LONGITUDE: 89°-01'-03.62"
(Per North American Datum of 83/2011

Ground Elevation: 847.0'
(Per North American Vertical Datum of 1988)

-LEGEND-

- ○ = 1" X 18" IRON PIPE SET
- ● = 1" IRON PIPE FOUND
- □ = 6" NAIL SET
- ⊕ = COUNTY MONUMENT FOUND
- ○ = WOOD POST
- ⊠ = ELECTRIC METER
- ⊠ = TELEPHONE PEDESTAL
- ⊠ = ELECTRIC TRANSFORMER
- -G- = BURIED GAS
- -T- = BURIED TELEPHONE
- -E- = BURIED ELECTRIC
- = PROPERTY LINE
- = EXISTING TREE

TRUE NORTH
09°-43'-35" EAST
GRID NORTH (NAD 83/2011)

BEARINGS REFERENCED TO THE DANE COUNTY COORDINATE SYSTEM AND THE EAST LINE OF THE SE1/4, SECTION 1, T.6N., R.12E. WHICH BEARS S00°-21'-54"W

I, Craig A. Keach, hereby certify that none of the property described hereon is within a flood plain as defined by FEMA.

SURVEYOR'S CERTIFICATE

I, Craig A. Keach, Professional Land Surveyor of Meridian Surveying, LLC., certify that I have surveyed the described property and that the map shown is a true and accurate representation thereof to the best of my knowledge and belief.

Dated this 16th day of DECEMBER 2015.

Craig A. Keach

WISCONSIN PROFESSIONAL LAND SURVEYOR
Craig A. Keach, S-2333

WISCONSIN
CRAIG A. KEACH
S-2333
NEENAH
WIS.
LAND SURVEYOR

CALL DIGGERS HOTLINE TOLL FREE 1(800)242-8511
OPERATES 24 HOURS A DAY 365 DAYS A YEAR

WARNING
CALL BEFORE YOU DIG
48 HOURS BEFORE YOU DIG

WETLAND NOTE:

-THE PRESENCE AND LOCATION OF WETLANDS HAS NOT BEEN DETERMINED ON THIS PROPERTY. WETLANDS SHOULD ONLY BE DETERMINED BY ACTUAL FIELD DELINEATION PERFORMED BY A QUALIFIED WETLAND SPECIALIST.

SURVEY NOTES:

-THE LOCATION OF THE EXISTING UTILITIES, AS SHOWN ON THIS PLAN, ARE APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATION FROM THE LOCATION SHOWN.

-NO TITLE SEARCH FOR PARCEL OWNERSHIP OR EXISTENCE OR NONEXISTENCE OF RECORDED OR UNRECORDED EASEMENTS HAS BEEN COMPLETED AS PART OF THIS SURVEY.

-THIS IS NOT A BOUNDARY SURVEY OF THE PARENT PARCEL. THIS SURVEY REPRESENTS THE LEASE AREA AND EASEMENTS ONLY.

SURVEYED FOR:

Edge
Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1549 fax
www.edgeconsult.com

SURVEYED FOR:

U.S. Cellular
8410 BRYN MAWR AVENUE
CHICAGO, IL 60631

MERIDIAN SURVEYING, LLC
N8774 Firelane 1
Menasha, WI 54952
Office: 920-993-0681
Fax: 920-273-6037

SITE NAME: CAMBRIDGE WT - STENJEM

SITE NUMBER: 782578

SITE ADDRESS: 3012 S.T.H. "134" CAMBRIDGE, WI 53523

PROPERTY OWNER:
DALE & KAREN STENJEM
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PARCEL NO.: 016/0612-014-8515-0

ZONED: A-3

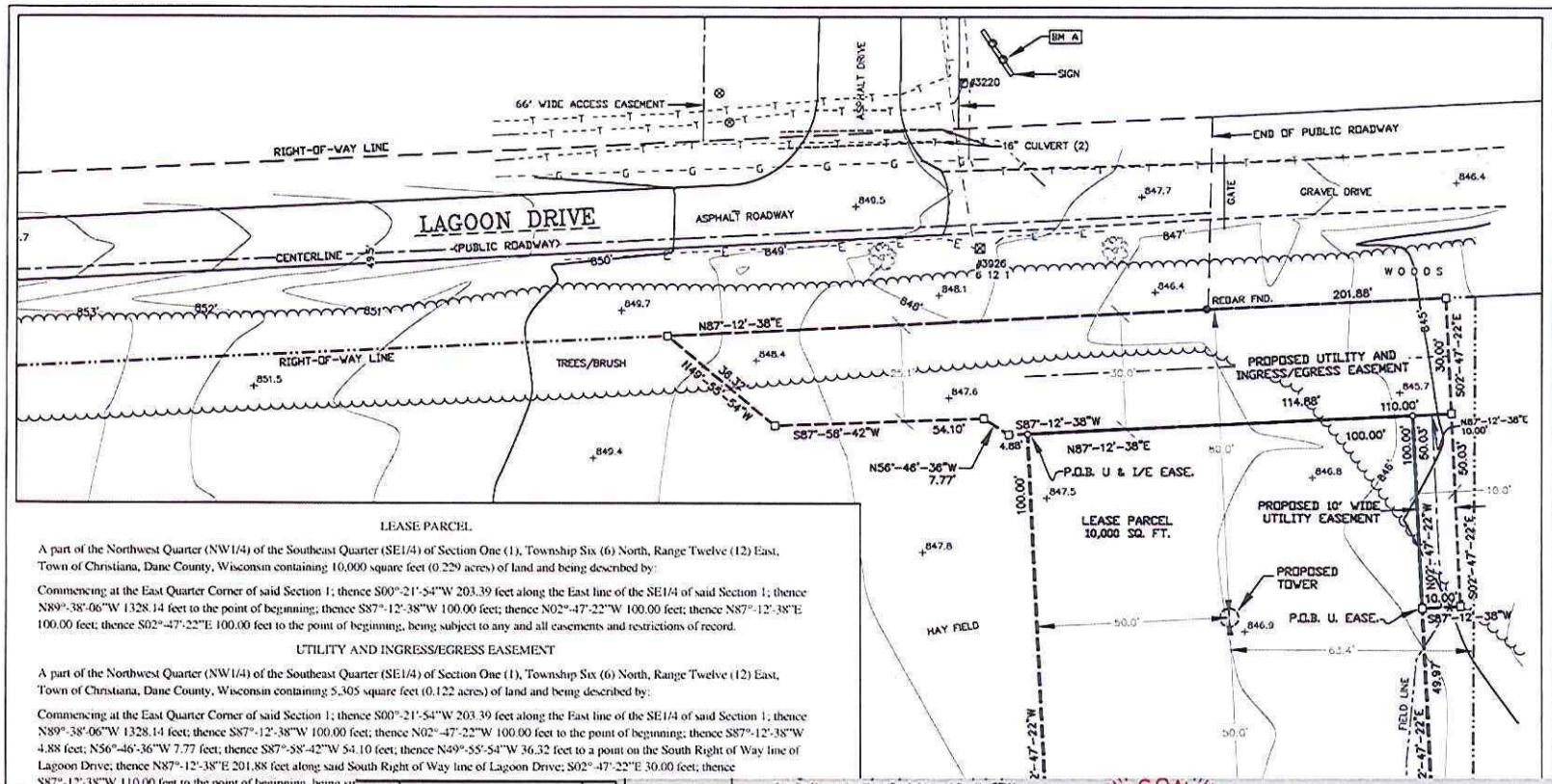
DEED: VOLUME 29198, PAGE 44
DOCUMENT NO.: 2655527

LEASE EXHIBIT
FOR
US CELLULAR

BEING A PART OF THE NW1/4 OF THE SE1/4, SECTION 1, T.6N., R.12E., TOWN OF CHRISTIANA, DANE COUNTY, WISCONSIN

NO.	DATE	DESCRIPTION	BY
2	12/15/15	Added Lease and Easements	J.D.
1	12/11/14	Preliminary Survey	J.D.

DRAWN BY: J.D. | FIELD WORK DATE: 12-8-14
CHECKED BY: C.A.K. | FIELD BOOK: M-31, PG. 69
JOB NO.: 8018-B1340 | SHEET 1 OF 2



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NTY MONUMENT FOUND
D POST
CTRIC METER
PHONE PEDESTAL
CTRIC TRANSFORMER
ED GAS
ED TELEPHONE
ED ELECTRIC
PERTY LINE
TING TREE

NO.	DATE	DESCRIPTION	BY
2	12/15/15	Added Lease and Easements	J.D.
1	12/11/14	Preliminary Survey	J.D.

DRAWN BY: J.D. FIELD WORK DATE: 12-8-14

described hereon is within a flood plain as defined by FEMA.

SURVEYOR'S CERTIFICATE

I, Craig A. Keach, Professional Land Surveyor of Meridian Surveying, LLC., certify that I have surveyed the described property and that the map shown is a true and accurate representation thereof to the best of my knowledge and belief.

Dated this 16th day of December 2015.

WISCONSIN PROFESSIONAL LAND SURVEYOR

WISCONSIN CRAIG A. KEACH S-2333 NEENAH WIS. LAND SURVEYOR

BENCHMARK INFORMATION

SITE BENCHMARK: (BM A)
SET 6" NAIL IN EASTERLY FACE OF 6"X6" WOOD POST FOR CAMBRIDGE LIONS CLUB SIGN; ±1' ABOVE GROUND LEVEL

= COU
= WOO
= ELEC
= TELE
= ELEC
-C- = BURI
-T- = BURI
-E- = BUR
= PRO
= EXIS

ELEVATION: 848.98'

JOB NO: 8018-B1340 SHEET 2 OF 2

SURVEYED FOR:

Edge
Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1549 fax
www.edgeconsult.com

SURVEYED FOR:

U.S. Cellular
8410 BRYN MAWR AVENUE
CHICAGO, IL 60631

MERIDIAN
SURVEYING, LLC
N8774 Firelane 1
Menasha, WI 54952
Office: 920-993-0881
Fax: 920-273-6037

SITE NAME: CAMBRIDGE WT - STENJEM

SITE NUMBER: 782578

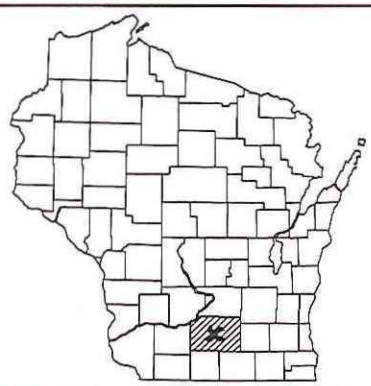
SITE ADDRESS:
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

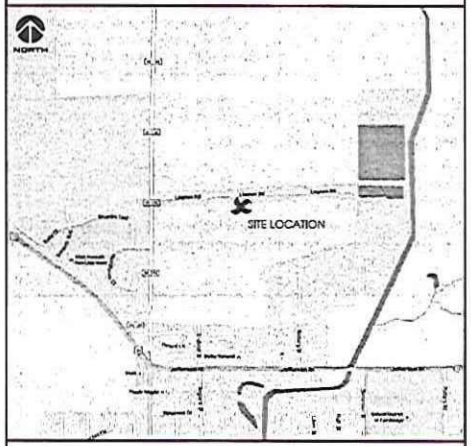
PROPERTY OWNER:
DALE & KAREN STENJEM
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PARCEL NO.: 016/0612-014-8515-0

ZONED: A-3

DEED: VOLUME 20108 PAGE 44





SITE LOCATION MAPS

U.S. Cellular

CAMBRIDGE STENJEM [#782578]
CAMBRIDGE, WISCONSIN
ZONING DRAWINGS
195' SELF-SUPPORT TOWER
NOVEMBER 2015

SHEET INDEX:

NO.:	PAGE TITLE:
T-1	TITLE SHEET
1-1	SITE SURVEY *
C-1	SITE PLAN
C-2	COMPOUND PLAN
A-1	TOWER ELEVATION

* PREPARED BY OTHERS

PROJECT DIRECTORY:

ENGINEERING COMPANY:
EDGE CONSULTING ENGINEERS, INC.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
CONTACT: DAVID LYSHEK
PHONE: 608.644.1449

CLIENT:
U.S. CELLULAR - MADISON
5117 WEST TERRACE DRIVE
MADISON, WI 53718
CONTACT: MIKE BALISTRERI
PHONE: 608.212.3808

SITE ACQUISITION:
WIRELESS PLANNING, LLC
N64W12883 DAYLILY COURT
MENOMONEE FALLS, WI 53051
CONTACT: TODD ANDERSON
PHONE: 414.306.2866

SURVEYOR:
MERIDIAN SURVEYING, LLC
N8774 FIRELANE 1
MENASHA, WI 54952
CONTACT: CRAIG KEACH
PHONE: 920.993.0881

PROJECT INFO:

SITE LOCATION:
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

SITE #: 782578

PROPERTY OWNER:
DALE & KAREN STENJEM
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

2C INFORMATION (NAD 1983/91)
TOWER BASE - (CENTER OF TOWER)
LAT:
LONG:
GROUND ELEVATION (NGVD 29):

PLSS INFORMATION:
PART OF NW1/4 OF THE SE1/4,
SECTION 1, T.6N., R.12E.,
TOWN OF CHRISTIANA,
DANE COUNTY
WISCONSIN

TAX NUMBER: 016/0612-014-8515-0

UTILITY INFORMATION

ELECTRIC SERVICE PROVIDER:	ALLIANT PHONE: 800.862.6222
TELEPHONE SERVICE PROVIDER:	VERIZON PHONE:

TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN, CALL DIGGER'S HOTLINE
TOLL FREE
1-800-242-8511
FAX A LOCATE 1-800-338-3860
WIS. STATUTE 182.0175 (1974) REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE.

ENGINEER SEAL:

PRELIMINARY - NOT FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN SET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION OTHER THAN THE EXCEPTIONS NOTED IN THE SHEET INDEX, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.

Signature: _____

Date: _____

Edge
Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 fax
608.644.1565 fax
www.edgeconsult.com

TITLE SHEET
CAMBRIDGE STENJEM [#782578]
CAMBRIDGE, WISCONSIN

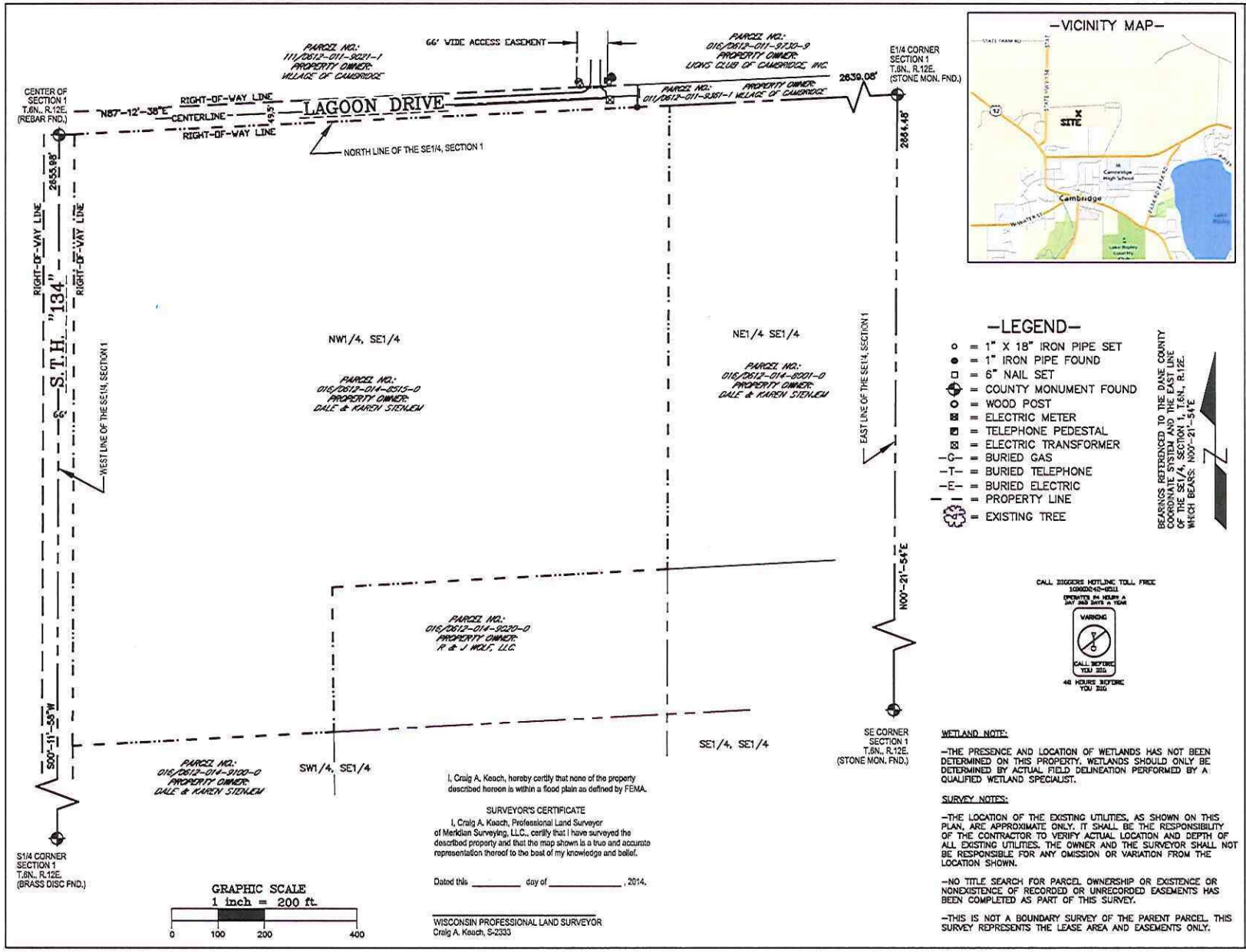
SHEET SIZE:

ISSUE DATE:
ZONING DRAWINGS - 11/25/2015

REVISIONS:

DRAWN BY:
LMK
CHECKED BY:
DCL
PLOT DATE:
11/25/2015
PROJECT #:
13668
FILE NAME:
t-1.dgn

SHEET NUMBER
T-1



I, Craig A. Keach, hereby certify that none of the property described hereon is within a flood plain as defined by FEMA.

SURVEYOR'S CERTIFICATE

I, Craig A. Keach, Professional Land Surveyor of Meridian Surveying, LLC., certify that I have surveyed the described property and that the map shown is a true and accurate representation thereof to the best of my knowledge and belief.

Dated this _____ day of _____, 2014.

_____
WISCONSIN PROFESSIONAL LAND SURVEYOR
Craig A. Keach, S-2333

-LEGEND-

- ○ = 1" X 18" IRON PIPE SET
- ● = 1" IRON PIPE FOUND
- □ = 6" NAIL SET
- ⊕ = COUNTY MONUMENT FOUND
- ○ = WOOD POST
- ⊠ = ELECTRIC METER
- ⊠ = TELEPHONE PEDESTAL
- ⊠ = ELECTRIC TRANSFORMER
- -G- = BURIED GAS
- -T- = BURIED TELEPHONE
- -E- = BURIED ELECTRIC
- = PROPERTY LINE
- = EXISTING TREE

BEARINGS REFERENCED TO THE DANE COUNTY COORDINATE SYSTEM AND THE EAST LINE OF THE SE1/4, SECTION 1, T.6N., R.12E. WHICH BEARS: N00°-21-54"E

CALL DIGGERS HOTLINE TOLL FREE
1(800)242-8511
OPERATES 24 HOURS A DAY 365 DAYS A YEAR

WETLAND NOTE:

-THE PRESENCE AND LOCATION OF WETLANDS HAS NOT BEEN DETERMINED ON THIS PROPERTY. WETLANDS SHOULD ONLY BE DETERMINED BY ACTUAL FIELD DELINEATION PERFORMED BY A QUALIFIED WETLAND SPECIALIST.

SURVEY NOTES:

-THE LOCATION OF THE EXISTING UTILITIES, AS SHOWN ON THIS PLAN, ARE APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATION FROM THE LOCATION SHOWN.

-NO TITLE SEARCH FOR PARCEL OWNERSHIP OR EXISTENCE OR NONEXISTENCE OF RECORDED OR UNRECORDED EASEMENTS HAS BEEN COMPLETED AS PART OF THIS SURVEY.

-THIS IS NOT A BOUNDARY SURVEY OF THE PARENT PARCEL. THIS SURVEY REPRESENTS THE LEASE AREA AND EASEMENTS ONLY.

SURVEYED FOR:

Edge
Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1549 fax
www.edgeconsult.com

SURVEYED FOR:

U.S. Cellular
8410 BRYN MAWR AVENUE
CHICAGO, IL 60631

MERIDIAN
SURVEYING, LLC
N8774 Fireiane 1
Menasha, WI 54952
Office: 920-993-0881
Fax: 920-273-6037

SITE NAME: CAMBRIDGE WT - STENJEM

SITE NUMBER: 782578

SITE ADDRESS:
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PROPERTY OWNER:
DALE & KAREN STENJEM
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PARCEL NO.: 016/0612-014-8515-0

ZONED: A-3

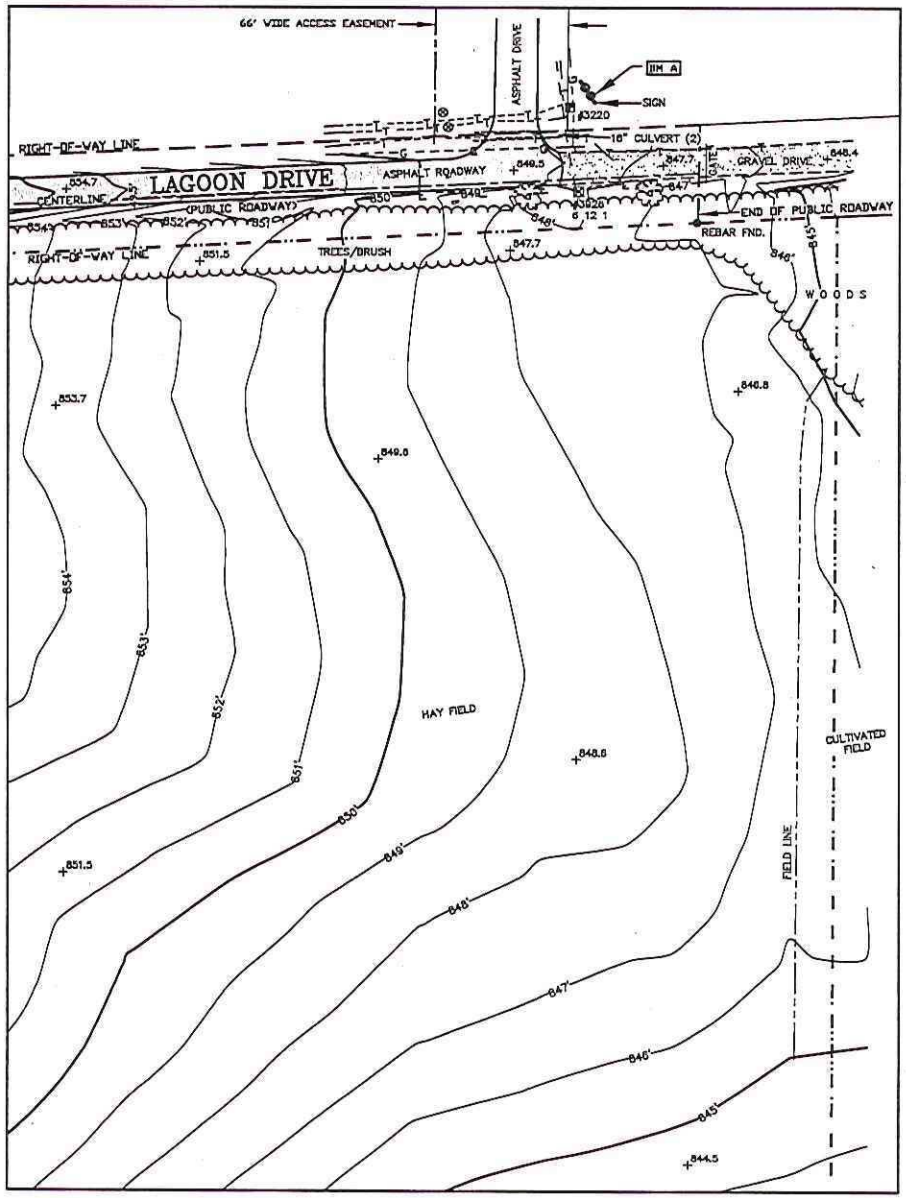
DEED: VOLUME 29198, PAGE 44
DOCUMENT NO.: 2655527

LEASE EXHIBIT
FOR
US CELLULAR

BEING A PART OF THE NW1/4 OF THE SE1/4, SECTION 1, T.6N., R.12E., TOWN OF CHRISTIANA, DANE COUNTY, WISCONSIN

NO.	DATE	DESCRIPTION	BY
1	12/11/14	Preliminary Survey	J.D.

DRAWN BY: J.D.	FIELD WORK DATE: 12-8-14
CHECKED BY: C.A.K.	FIELD BOOK: M-31, PG. 69
JOB NO.:8018-81340	SHEET 1 OF 3



BENCHMARK INFORMATION
SITE BENCHMARK: (BM A)
SET 6" NAIL IN EASTERLY FACE OF 6"X6" WOOD POST FOR CAMBRIDGE LIONS CLUB SIGN; ±1' ABOVE GROUND LEVEL
ELEVATION: 848.98'

–LEGEND–

- ○ = 1" X 18" IRON PIPE SET
- ● = 1" IRON PIPE FOUND
- □ = 6" NAIL SET
- ⊕ = COUNTY MONUMENT FOUND
- ○ = WOOD POST
- ▣ = ELECTRIC METER
- ◪ = TELEPHONE PEDESTAL
- ⊠ = ELECTRIC TRANSFORMER
- –G– = BURIED GAS
- –T– = BURIED TELEPHONE
- –E– = BURIED ELECTRIC
- = PROPERTY LINE
- = EXISTING TREE

I, Craig A. Keach, hereby certify that none of the property described hereon is within a flood plain as defined by FEMA.

SURVEYOR'S CERTIFICATE

I, Craig A. Keach, Professional Land Surveyor of Meridian Surveying, LLC., certify that I have surveyed the described property and that the map shown is a true and accurate representation thereof to the best of my knowledge and belief.

Dated this _____ day of _____, 2014.

WISCONSIN PROFESSIONAL LAND SURVEYOR
Craig A. Keach, S-2333

GRAPHIC SCALE
1 inch = 60 ft.
0 30 60 120

BEARINGS REFERENCED TO THE DANE COUNTY COORDINATE SYSTEM AND THE EAST LINE OF THE SE1/4, SECTION 1, T.6N., R.12E. WHICH BEARS: N00°-21'-54"E

SURVEYED FOR:
Edge
Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1549 fax
www.edgeconsult.com

SURVEYED FOR:
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CHICAGO, IL 60631

MERIDIAN
SURVEYING, LLC
N8774 Fireline 1
Menasha, WI 54952
Office: 920-993-0881
Fax: 920-273-6037

SITE NAME: CAMBRIDGE WT – STENJEM

SITE NUMBER: 782578

SITE ADDRESS: 3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PROPERTY OWNER:
DALE & KAREN STENJEM
3012 S.T.H. "134"
CAMBRIDGE, WI 53523

PARCEL NO.: 016/0612-014-8515-0

ZONED: A-3

DEED: VOLUME 29108, PAGE 44
DOCUMENT NO.: 2655527

LEASE EXHIBIT
FOR
US CELLULAR

BEING A PART OF THE NW1/4 OF THE SE1/4, SECTION 1, T.6N., R.12E., TOWN OF CHRISTIANA, DANE COUNTY, WISCONSIN

NO.	DATE	DESCRIPTION	BY
1	12/11/14	Preliminary Survey	J.D.

DRAWN BY: J.D.	FIELD WORK DATE: 12-8-14
CHECKED BY: C.A.K.	FIELD BOOK: M-31, PG. 69
JOB NO.:8018-B1340	SHEET 2 OF 3

AERIAL OVERVIEW OF SITE

PROPOSED COMPUND LOCATION (LOOKING EAST)

Edge
Consulting Engineers, Inc.
Eau Claire, WI 54703
715.839.0754
FAX 715.831.2106
www.edgeconsult.com

SITE PLAN

CAMBRIDGE STENJEM (#782578)

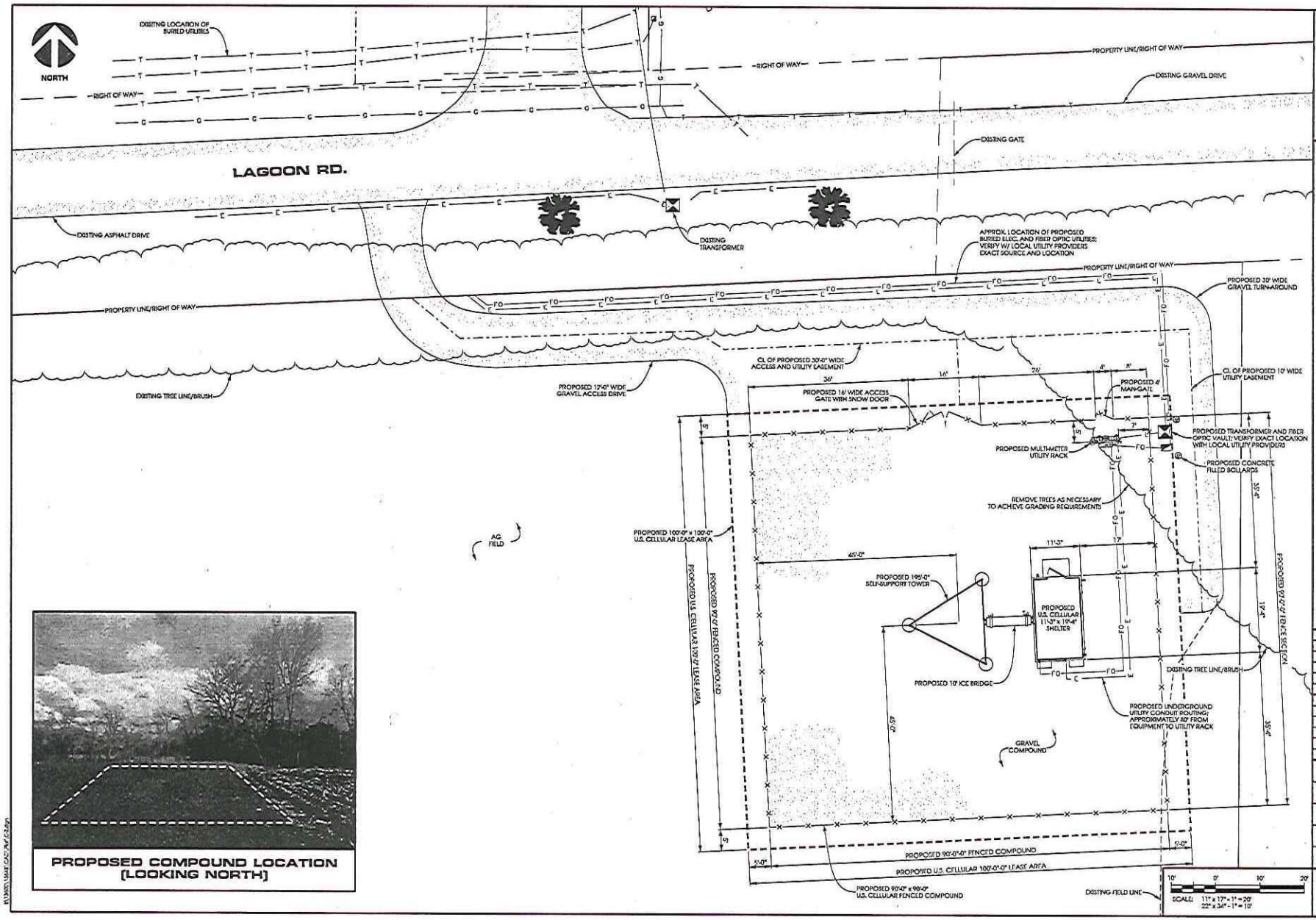
CAMBRIDGE, WISCONSIN

SHEET INDEX

ISSUE DATE:	
ZONING DRAWINGS - 11/25/2015	
REVISIONS:	
DRAWN BY:	UMK
CHECKED BY:	DCL
PLOT DATE:	11/25/2015
PROJECT #:	13668
FILE NAME:	Cvr.dgn

SHEET NUMBER: C-1

SCALE: 11" x 17" - 1" = 50'
22" x 34" - 1" = 25'



PROPOSED COMPOUND LOCATION [LOOKING NORTH]

Edge
Consulting Engineers, Inc.
434 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1543 fax
www.edgecei.com

COMPOUND PLAN

CAMBRIDGE STENJEM [#782578]

CAMBRIDGE, WISCONSIN

ISSUE DATE:
ZONING DRAWINGS - 11/25/2015

REVISIONS:

DRAWN BY:	LMK
CHECKED BY:	DCL
PLOT DATE:	11/25/2015
PROJECT #:	15048
FILE NAME:	C-2.dgn

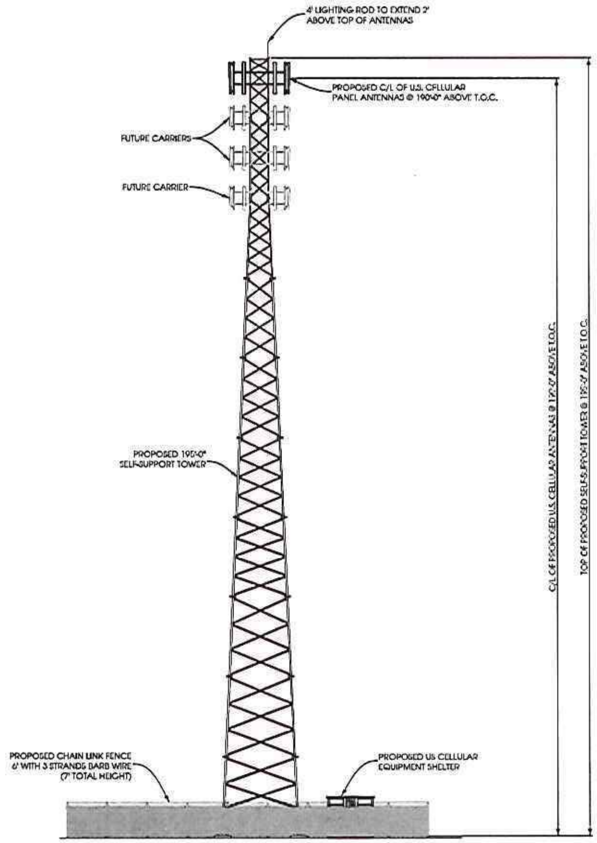
SHEET NUMBER: **C-2**

NOTES:

FOUNDATIONS SHOWN ARE TYPICAL AND DO NOT REPRESENT ACTUAL CONDITIONS

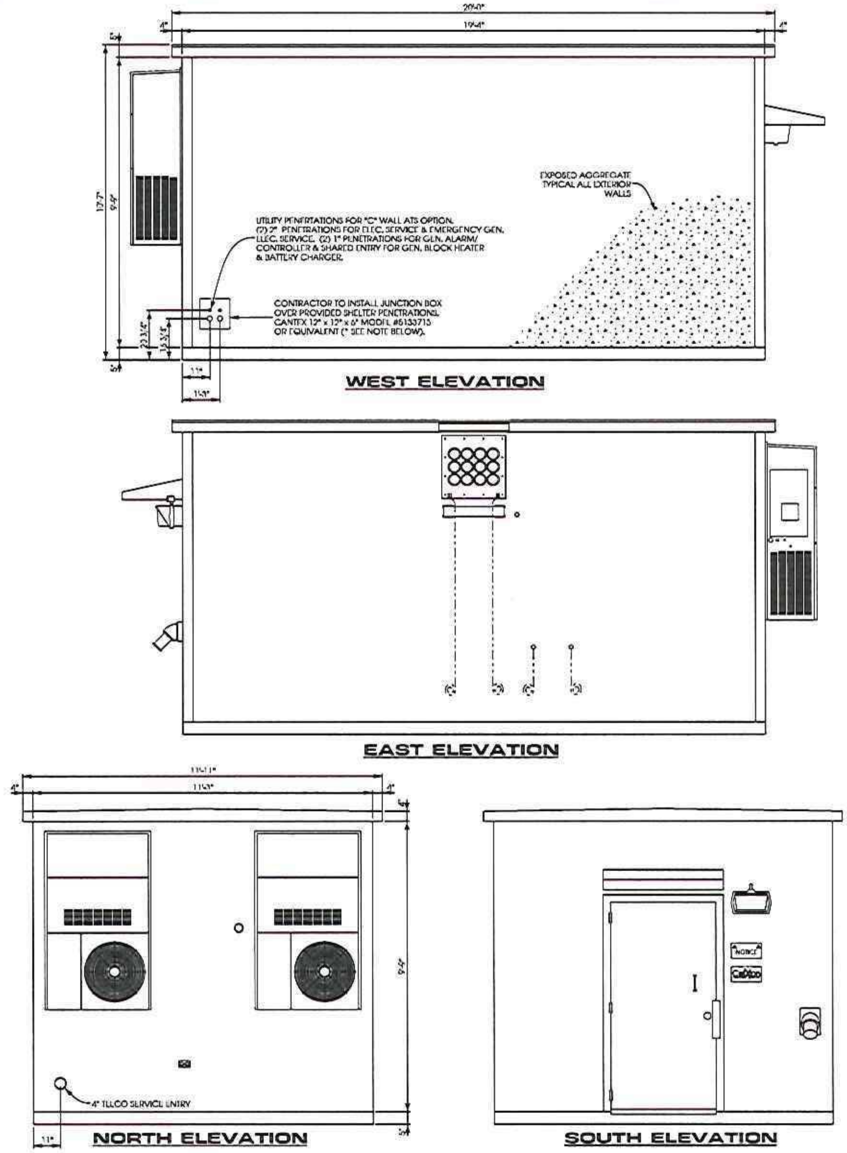
CONTRACTOR TO VERIFY HEIGHT AND DIRECTION OF ANTENNA WITH PROJECT MANAGER

ALL ANTENNA AZIMUTHS TO BE FROM TRUE NORTH



(A) TOWER PROFILE (SOUTH ELEVATION)

SCALE: 11" x 17" - 1" = 30'-0"
22" x 34" - 1" = 15'-0"



(B) EQUIPMENT SHELTER ELEVATIONS

SCALE: 11" x 17" - 1/4" = 1'-0"
22" x 34" - 1/2" = 1'-0"

Edge Consulting Engineers, Inc.
624 Water Street
Prairie du Sac, WI 53578
608.644.1449 voice
608.644.1549 fax
www.edgeconsult.com

TOWER ELEVATION
CAMBRIDGE STENJEM (#782578)
CAMBRIDGE, WISCONSIN

ISSUE DATE:	
ZONING DRAWINGS - 11/25/2015	
REVISIONS:	
DRAWN BY:	LMR
CHECKED BY:	DCL
PLOT DATE:	11/25/2015
PROJECT #:	13468
FILE NAME:	A-1.dgn
SHEET NUMBER:	A-1

RECEIPT

MADISON
MADISON
210 MARTIN LUTHER KING, JR. BLVD
CITY TREASURER OFFICE

Application: DCPCUP-2016-02343
Application Type: DaneCounty/Zoning/Conditional Use/NA
Address: 3012 STATE HIGHWAY 134, TOWN OF CHRISTIANA, WI 53523

Receipt No. 750092

Payment Method	Ref Number	Amount Paid	Payment Date	Cashier ID	Received	Comments
Check	1252	$3,000.00	04/08/2016	HJH3		

Owner Info.: DALE L STENJEM
3012 STATE HIGHWAY 134
CAMBRIDGE, WI 53523

Work Description: 195' cell tower proposed by US Cellular