176th BOARD YEAR

LEGISLATIVE ITEMS RECEIVED FOR COMMITTEE REFERRAL

File No.	Rec/Ref:	To:	Title
176-O-025	05/26/21 06/03/21	LU	ORD: Amend The District Zoning Map Of The Waukesha County Shoreland And Floodland Protection Ordinance And The Waukesha County Zoning Code For The Town Of Oconomowoc By Conditionally Rezoning Certain Lands Located In Part Of The SW ¼ And The SE ¼ Of Section 13, T8N, R17E, Town Of Oconomowoc, Waukesha County, Wisconsin, From The FLP Farmland Preservation District To The A-3 Suburban Estate District With An Environmental Corridor Overlay (RZ73)
176-O-026	05/26/21 06/03/21	LU	ORD: Amend The District Zoning Map Of The Town Of Delafield Zoning Code By Rezoning Certain Lands Located In Part Of The NE ¼ Of Section 31, T7N, R18E, Town Of Delafield, Waukesha County, Wisconsin, From The A-1 Agricultural District To The A-2 Rural Home District (RZ82)
176-O-027	06/02/21 06/03/21	EX LU FI	ORD: Modify The 2021-2025 Capital Plan For The Creation Of Capital Project #202107 Ice Arena Condenser Replacements And Modify 2021 Capital Budget
176-O-028	06/02/21 06/03/21	LU FI	ORD: Authorize The Department Of Parks And Land Use, Community Development Fund, To Accept Home Investment Partnership (Home) Program – American Rescue Plan Grant Funding And Modify 2021 Budget
176-O-029	06/02/21 06/03/21	LU FI	ORD: Accept Additional Community Development Block Grant (CDBG) Program Funds For The 2021 Program Year And Modify The 2021 Budget
176-O-030	06/02/21 06/03/21	PW FI	ORD: Extend Waukesha County Public Works Director Temporary Authority To Suspend And Modify Waukesha County Transit Service Due To Ongoing, Lower Ridership After Covid-19 Pandemic
176-A-007	06/02/21 06/03/21	EX	APPT: Doug Bartmann to the Community Development Block Grant Board
176-A-008	06/02/21 06/03/21	EX	APPT: Joan Francoeur to the Community Development Block Grant Board
176-A-009	06/02/21 06/03/21	EX	APPT: Richard Verthein to the Community Development Block Grant Board
176-A-010	06/02/21 06/03/21	EX	APPT: Christina Italiano to the Community Development Block Grant Board
176-A-011	06/02/21 06/03/21	EX	APPT: Tom Farley to the Ethics Board
176-A-012	06/02/21 06/03/21	EX	APPT: Amanda Kojis to the Pauline Haas Public Library Board of Trustees
176-O-031	06/02/21 06/03/21	EX FI	Ord: Modify The Bridges Library System 2021 Budget To Accept Grant Funding To Expand Library Services To People Affected By Memory Loss And To Their Caregivers
176-O-032	06/02/21 06/03/21	JU	ORD: 7th Amendment To Lease Agreement With Verizon Wireless Personal Communications LP, D/B/A Verizon Wireless
176-O-033	06/02/21 06/03/21	JU FI	ORD: Modify The Waukesha County Sheriff's Department 2021 Budget To Accept The Coronavirus Emergency Supplemental Funding Program Grant From The State Of Wisconsin Department Of Justice And To Authorize Grant Expenditures

176th BOARD YEAR

LEGISLATIVE ITEMS RECEIVED FOR COMMITTEE REFERRAL

File No.	Rec/Ref:	To:	Title
176-O-034	06/02/21 06/03/21	HS FI	ORD: Modify The Department Of Health And Human Services 2021 Budget To Accept The Urban Black And Hispanic Grant Funding And Appropriate Additional Expenditures
176-O-035	06/02/21 06/03/21	HS HR FI	ORD: Create 2.00 Regular Full Time Principal Information Technology Professional Positions And Abolish 2.00 Regular Full Time Senior Information Technology Professional Positions In The Department Of Health And Human Services

AMEND THE DISTRICT ZONING MAP OF THE WAUKESHA COUNTY SHORELAND AND FLOODLAND PROTECTION ORDINANCE AND THE WAUKESHA COUNTY ZONING CODE FOR THE TOWN OF OCONOMOWOC BY CONDITIONALLY REZONING CERTAIN LANDS LOCATED IN PART OF THE SW ¼ AND THE SE ¼ OF SECTION 13, T8N, R17E, TOWN OF OCONOMOWOC, WAUKESHA COUNTY, WISCONSIN, FROM THE FLP FARMLAND PRESERVATION DISTRICT TO THE A-3 SUBURBAN ESTATE DISTRICT WITH AN ENVIRONMENTAL CORRIDOR OVERLAY (RZ73)

WHEREAS, after proper notice was given, a public hearing was held and the subject matter of this Ordinance was approved by the Oconomowoc Town Board on April 20, 2021; and

WHEREAS, the matter was referred to and considered by the Waukesha County Park and Planning Commission, which recommended approval and reported that recommendation to the Land Use, Parks and Environment Committee and the Waukesha County Board of Supervisors, as required by Sections 59.69 and 59.692, Wis. Stats.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Waukesha County Shoreland and Floodland Protection Ordinance adopted on June 23, 1970, for the Town of Oconomowoc, Waukesha County, Wisconsin, and the Waukesha County Zoning Code adopted by the Waukesha County Board of Supervisors, on February 26, 1959, are hereby amended to conditionally rezone certain lands located in part of the SW ¼ and the SE ¼ of Section 13, T8N, R17E, Town of Oconomowoc, Waukesha County, Wisconsin, from the FLP Farmland Preservation District to the A-3 Suburban Estate District with an Environmental Corridor Overlay, and more specifically described in the "Staff Report and Recommendation" and map on file in the office of the Waukesha County Department of Parks and Land Use and made a part of this Ordinance by reference RZ73, is hereby approved, subject to the following conditions:

1. There shall be a maximum of three (3) new residential lots in addition to the remnant parcel. The remnant parcel is not proposed to be rezoned.

2. The Waukesha County Development Plan Amendment to Suburban Residential Density I must be approved by the Waukesha County Board.

3. A Certified Survey Map, prepared by a Professional Land Surveyor in the State of Wisconsin, shall be prepared and approved by the Town of Oconomowoc Plan Commission, Town Board and Waukesha County Staff. The Certified Survey Map shall be in substantial accordance with the submitted concept plan (Exhibit A), with regard to lot size and layout and shall conform with all requirements of the Town of Oconomowoc Land Division Ordinance- Chapter 265.

4. A remnant parcel waiver must be obtained from the Town of Oconomowoc Plan Commission and Waukesha County Park and Planning Commission to authorize the remnant lands remaining in farmland preservation.

5. A Deed Restriction must be prepared and reviewed and approved by the Waukesha County Department of Parks and Land Use - Planning and Zoning Division Staff and recorded by the petitioners in the Waukesha County Register of Deeds Office stating that, pursuant to the Waukesha County Comprehensive Development Plan, no additional development right remains for the remnant lands that comprise the farm tracking unit. Said restriction must also state that the density restriction shall apply in perpetuity unless the Waukesha County Comprehensive Development Plan's Farmland Preservation designation for the property is amended in the future.

6. The development shall comply in all respects, with the Waukesha County Stormwater and Erosion Control Ordinance.

BE IT FURTHER ORDAINED that the Waukesha County Clerk shall file a certified copy of this Ordinance with the Town Clerk of Oconomowoc.

BE IT FURTHER ORDAINED that this Ordinance shall be in full force and effect upon passage, approval and publication.

COMMISSION ACTION

The Waukesha County Park and Planning Commission, after giving consideration to the subject matter of the Ordinance to amend the Waukesha County Shoreland and Floodland Protection Ordinance, hereby recommends **approval** of **(RZ73 Petereson)** in accordance with the attached "Staff Report and Recommendation".

PARK AND PLANNING COMMISSION **May 20, 2021**

William Mitchell (via Microsoft Teams)
William Mitchell, Chairperson

James Siepmann (via Microsoft Teams)
James Siepmann, Vice Chairperson

Robert Peregrine (via Microsoft Teams)
Robert Peregrine

Richard Morris (via Microsoft Teams)
Richard Morris

Thomas Michalski (via Microsoft Teams)
Thomas Michalski

William Groskopf(via Microsoft Teams)
William Groskopf

WAUKESHA COUNTY DEPARTMENT OF PARKS AND LAND USE
STAFF REPORT AND RECOMMENDATION
ZONING MAP AMENDMENT

DATE: May 20, 2021

FILE NO.: RZ73

OWNER: Cyrus Peterson
W343 N7303 North Pole Lane
Oconomowoc, WI 53066-1369

AGENT: Scott Peterson
W343 N7205 North Pole Lane
Oconomowoc, WI 53066

TAX KEY NO.: OCOT 0484.990.003

LOCATION:
The property is located in part of the SW ¼ and SE ¼ of Section 13, T8N, R17E, Town of Oconomowoc. More specifically, the property is located at W343 N7303 North Pole Lane, containing approximately 36 acres.

EXISTING LAND USE: Single-family residence, accessory buildings and agricultural farmland.

PROPOSED LAND USE: Divide off one (1) lot (2+ acres) to contain the existing home site and subdivide two (2) additional lots (2+ acres) for future home sites.

EXISTING ZONING: FLP Farmland Preservation District, FLC Farmland Conservancy District, C-1 Conservancy (wetland) Overlay District, Environmental Corridor Overlay District.

PROPOSED ZONING: A-3 Suburban Estate District (for lands to be subdivided only, no changes are proposed to the boundaries of the C-1 or EC Overlay Districts).

PUBLIC HEARING DATE: March 15, 2021

PUBLIC REACTION: None

TOWN PLAN COMMISSION AND TOWN BOARD ACTION:
On March 29, 2021, the Town of Oconomowoc Plan Commission recommended approval of the request subject to a number of conditions. The Town Board approved the request subject to the same conditions on April 20, 2021.

COMPLIANCE WITH THE COMPREHENSIVE DEVELOPMENT PLAN FOR WAUKESHA COUNTY AND THE TOWN OF OCONOMOWOC LAND USE PLAN:
The petitioner recently obtained approval for a plan change from the Farmland Preservation category to the Suburban 1 Density Residential category. The Town approved the related town plan amendment request on January 18, 2021. The proposed development of three (3) residential units on approximately 7.7 acres complies with the Town of Oconomowoc Land Use Plan and County Development Plan recommendations.

STAFF ANALYSIS:
The petitioner owns a 36-acre parcel at the north end of North Pole Lane. His residence is located on the west side of the parcel. A similar request was approved several years ago to create a new lot for a family member immediately to the southeast. The proposal is to rezone approximately 7.6 acres from the Farmland Preservation District to the A-3 Suburban Estate District to allow for the existing home to be split from the property and allow for two additional future lots on either side of the home. Much of the area to be re-classified and re-zoned is currently uncultivated and vegetated with grass. A small area of the farm field is requested to be removed from farmland preservation. The Environmental Corridor Overlay and the C-1 Conservancy (wetland) Overlay Districts will remain in place. A concept map of the proposed land division is attached as Exhibit A.

Most of the farmland within the area north of CTH K in the Town of Oconomowoc is planned and zoned for farmland preservation. This is a small farm property with a limited area in cultivation and is a challenging site to farm due to access issues (must drive equipment through Stonebank Highlands subdivision). Because the property has no density remaining, the only way to consider additional units is by amending the plan and rezoning the lands to a district with smaller minimum lot size requirements. A rezone to the A-3 Suburban Estate District in both the Waukesha County Shoreland and Floodland Protections Ordinance and Waukesha County Zoning Code would accommodate the proposed two-plus (2+) acre lots as long as the minimum average lot width of 175 feet is met and direct access to a public road is provided.

The Environmental Health Division has provided preliminary comments and have indicated that they believe the proposed lots will contain enough land outside of the Environmental Corridor to locate on-site septic systems. This will need to be verified through soil testing which will be required as part of any land division review.

The Land Resources Division did not express any concerns that development of the additional lots would lead to any adverse drainage concerns. It should also be noted that Form A groundwater determinations will need to be conducted on the proposed lots, prior to any land division approval. This is in order to ensure that any new residences will meet County groundwater separation requirements.

A Certified Survey Map (CSM) will need to be submitted to both Town and County for review and approval in order to propose any new lots. Access will be addressed through this review process. The Town Planner has indicted that the Town will require a northward extension of North Pole Lane to provide direct road access to all new lots proposed. In addition, all resources boundaries will need to be identified on the CSM, as well as soil tests for septic and groundwater noted above. Any County stormwater management requirements will also have to be complied with prior to approval of the CSM. Lastly, a remnant parcel waiver from both Town and County will be required to address the remnant acreage remaining in farmland preservation.

STAFF RECOMMENDATION:
The Planning and Zoning Division Staff recommends this request be **approved** subject to the following conditions:

1. There shall be a maximum of three (3) new residential lots in addition to the remnant parcel. The remnant parcel is not proposed to be rezoned.

2. The Waukesha County Development Plan Amendment to Suburban Residential Density I must be approved by the Waukesha County Board.

3. A Certified Survey Map, prepared by a Professional Land Surveyor in the State of Wisconsin, shall be prepared and approved by the Town of Oconomowoc Plan Commission, Town Board and Waukesha County Staff. The Certified Survey Map shall be in substantial accordance with the submitted concept plan (Exhibit A), with regard to lot size and layout and shall conform with all requirements of the Town of Oconomowoc Land Division Ordinance- Chapter 265.

4. A remnant parcel waiver must be obtained from the Town of Oconomowoc Plan Commission and Waukesha County Park and Planning Commission to authorize the remnant lands remaining in farmland preservation.

5. A Deed Restriction must be prepared and reviewed and approved by the Waukesha County Department of Parks and Land Use - Planning and Zoning Division Staff and recorded by the petitioners in the Waukesha County Register of Deeds Office stating that, pursuant to the Waukesha County Comprehensive Development Plan, no additional development right remains for the remnant lands that comprise the farm tracking unit. Said restriction must also state that the density restriction shall apply in perpetuity unless the Waukesha County Comprehensive Development Plan's Farmland Preservation designation for the property is amended in the future.

6. The development shall comply in all respects, with the Waukesha County Stormwater and Erosion Control Ordinance.

The zoning change is consistent with Town and County Comprehensive Development Plan recommendations. The rezoning of approximately 7.7 acres of land will allow the petitioner to split off the existing residence and accessory buildings and create two additional single family home sites, while not limiting the agricultural use of the remaining farmlands. A Deed Restriction will be recorded to disclose to future owners that there is no density credit remaining on the farm after the three lot CSM is approved. This will ensure that the vast majority of the land preserved on site remains in productive farmland or open space uses. This furthers the goals of the Farmland Preservation Plan to preserve the last remaining five square mile blocks of productive farmland within the County, adding to the economic base of Waukesha County and preserving the rural landscape.

Respectfully submitted,

Benjamin Greenberg

Ben Greenberg
Senior Planner

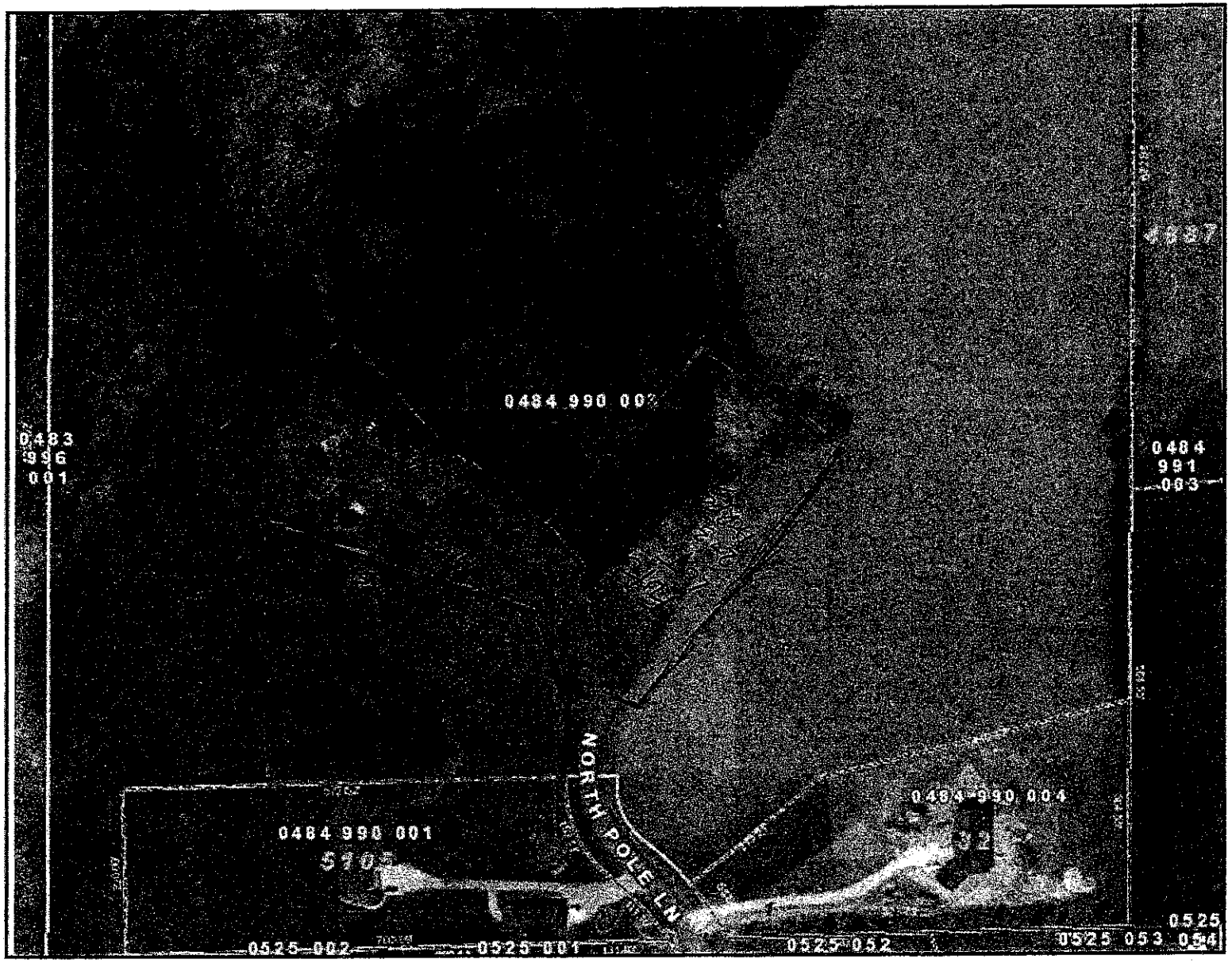
Attachments: Exhibit A: Concept Site Plan
Map

N:\PRKANDLU\Planning And Zoning\Rezones\Staff Reports\RZ73 Peterson Oct.Doc

LAND INFORMATION SYSTEMS DIVISION

Waukesha County GIS Map

EXHIBIT A



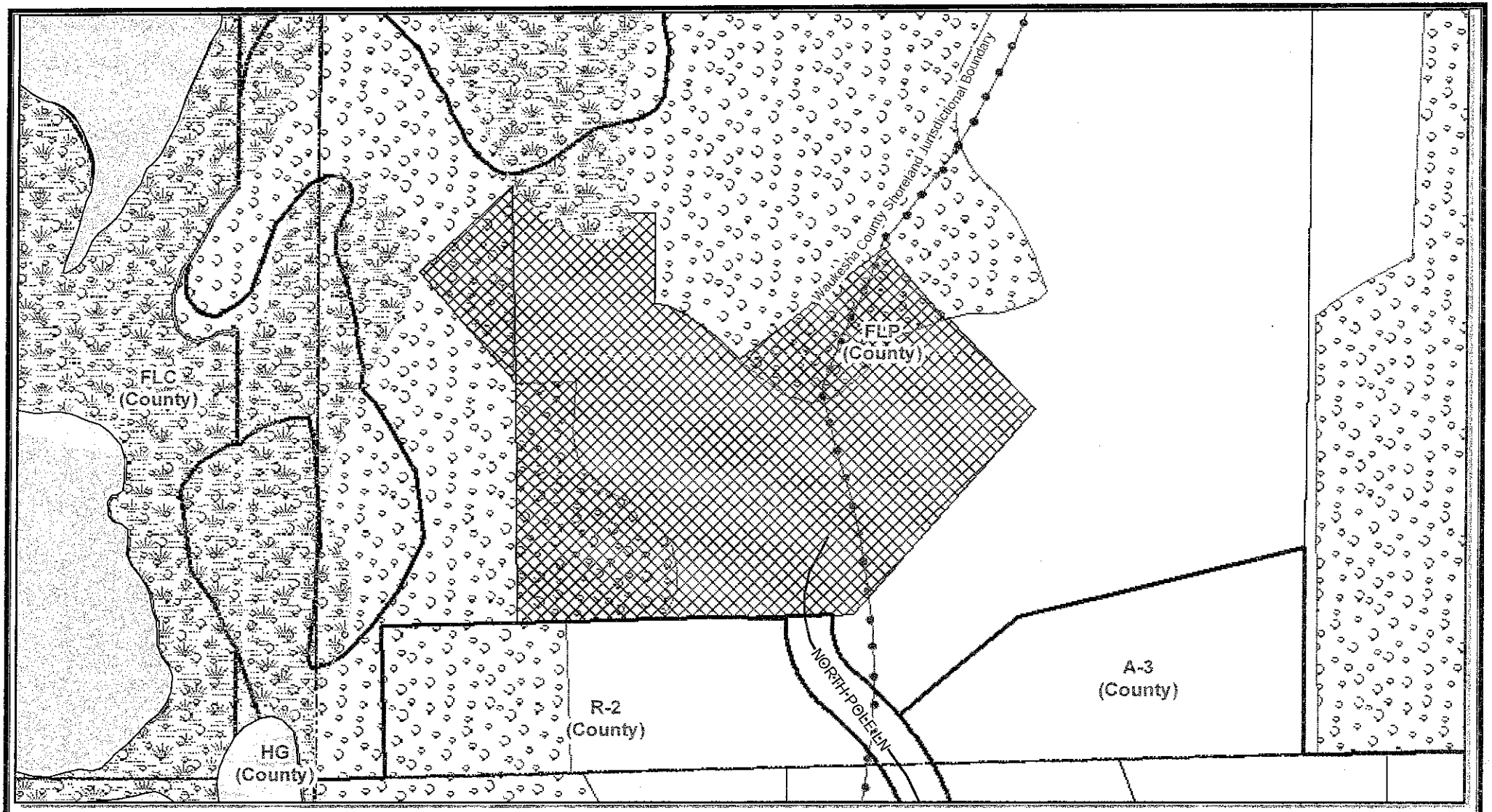
Legend

- Municipal Boundary_2K
- FacilitySites_2K_Labels
- Lots_2K
  - Lot
  - Outlot
  - Unit
- SimultaneousConveyance
  - Assessor Plat
  - CSM
  - Condominium
  - Subdivision
- Cartoline_2K
  - <all other values>
  - EA-Easement_Line
  - PL-DA
  - PL-Extended_Tie_line
  - PL-Meander_Line
  - PL-Note
  - PL-Tie
  - PL-Tie_Line
- Road Centerlines_2K
- Railroad_2K
- TaxParcel_2K
- Waterbodies_2K_Labels
- Waterlines_2K_Labels

0 200.00 Feet

Notes:

Printed: 11/5/2020



ZONING AMENDMENT

PART OF THE SE 1/4 OF SECTION 13,
TOWN OF OCONOMOWOC

COUNTY ZONING CHANGE FROM FLP FARMLAND PRESERVATION TO A-3 SUBURBAN ESTATE DISTRICT

Environmental Corridor Overlay

C-1 Conservancy Overlay

FILE.....RZ73

DATE OF PLAN COMMISSION.....5/20/21

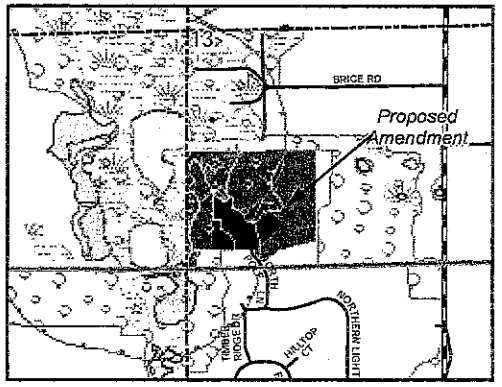
AREA OF CHANGE.....7.6 ACRES

TAX KEY NUMBER.....OCOT0484.990.003

1 inch = 200 feet

0 100 200 Feet

Prepared by the Waukesha County Department of Parks and Land Use



Referred on: 06/02/21 File Number: 176-O-025 Referred to: LU 8

AMEND THE DISTRICT ZONING MAP OF THE TOWN OF DELAFIELD ZONING CODE BY REZONING CERTAIN LANDS LOCATED IN PART OF THE NE ¼ OF SECTION 31, T7N, R18E, TOWN OF DELAFIELD, WAUKESHA COUNTY, WISCONSIN, FROM THE A-1 AGRICULTURAL DISTRICT TO THE A-2 RURAL HOME DISTRICT (RZ82)

WHEREAS, after proper notice was given, a public hearing was held and the subject matter of this Ordinance was approved by the Delafield Town Board on April 13, 2021; and

WHEREAS, the matter was referred to and considered by the Waukesha County Park and Planning Commission, which recommended approval and reported that recommendation to the Land Use, Parks and Environment Committee and the Waukesha County Board of Supervisors, as required by Section 60.62, Wis. Stats.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the District Zoning Map for the Town of Delafield Zoning Code, adopted by the Town of Delafield on July 20, 1998, is hereby amended to rezone from the A-1 Agricultural District to the A-2 Rural Home District, certain lands located in part of the NE ¼ of Section 31, T7N, R18E, Town of Delafield, Waukesha County, Wisconsin, and more specifically described in the "Staff Report and Recommendation" and map on file in the office of the Waukesha County Department of Parks and Land Use and made a part of this Ordinance by reference RZ82, is hereby approved.

BE IT FURTHER ORDAINED that the Waukesha County Clerk shall file a certified copy of this Ordinance with the Town Clerk of Delafield.

BE IT FURTHER ORDAINED that this Ordinance shall be in full force and effect upon passage, approval and publication.

Referred on: 06/03/21	File Number: 176-O-026	Referred to: LU

COMMISSION ACTION

The Waukesha County Park and Planning Commission after giving consideration to the subject matter of the Ordinance to amend the Town of Delafield Zoning Code hereby recommends **approval** of **RZ82 (Ernest)** in accordance with the attached "Staff Report and Recommendation".

PARK AND PLANNING COMMISSION **May 20, 2021**

William Mitchell (via Microsoft Teams)
William Mitchell, Chairperson

James Siepmann (via Microsoft Teams)
James Siepmann, Vice Chairperson

Robert Peregrine (via Microsoft Teams)
Robert Peregrine

Richard Morris (via Microsoft Teams)
Richard Morris

Thomas Michalski (via Microsoft Teams)
Thomas Michalski

William Groskopf (via Microsoft Teams)
William Groskopf

WAUKESHA COUNTY DEPARTMENT OF PARKS AND LAND USE
STAFF REPORT AND RECOMMENDATION
ZONING MAP AMENDMENT

DATE: May 20, 2021

FILE NO.: RZ82

TAX KEY NO.: DELT 0841.997.002

OWNER: Sharon Ernest
W334 S564 Cushing Park Road
Delafield, WI 53018-3025

LOCATION:
Lot 3, Certified Survey Map No. 6387, part of the NE ¼ of Section 31, T7N, R18E, Town of Delafield. More specifically, the property is located at W334 S564 Cushing Park Road, containing approximately 4 acres.

PRESENT ZONING CLASSIFICATION:
A-1 Agricultural District (Town).

PRESENT LAND USE:
Residential.

PROPOSED ZONING:
A-2 Rural Home District (Town).

PROPOSED LAND USE:
Residential.

PUBLIC HEARING DATE:
April 13, 2021

PUBLIC REACTION:
None.

TOWN PLAN COMMISSION:
On April 13, 2021, the Town Plan Commission unanimously recommended approval of the rezoning request.

TOWN BOARD ACTION
On April 13, 2021, the Town Board unanimously approved the rezoning request.

COMPLIANCE WITH THE WAUKESHA COUNTY DEVELOPMENT PLAN (CDP) AND THE TOWN OF DELAFIELD LAND USE PLAN:
The Waukesha County and Town of Delafield Comprehensive Development Plans designate this property as Suburban Density 1 Residential (1.5 to 2.9 acres per dwelling unit). The proposed use complies with both plans.

OTHER CONSIDERATIONS:
The petitioner is proposing to rezone the subject parcel from the A-1 Agricultural District to the A-2 Rural Home District to bring the parcel into a district that better matches the dimensions and proposed use of the existing parcel. The property is subject to the Town of Delafield Zoning Ordinance. The A-1 District requires

a 40 acre minimum lot size and 95% green space, whereas the A-2 District requires a minimum of three acres and 85% green space.

The property consists of a single family residence, accessory building and swimming pool. No improvements to the property are currently proposed. All existing structures will meet the setback and offset requirements of the A-2 Rural Home District. The parcel contains no mapped natural resources and slopes gradually from east to west. Surrounding uses include single family residential with various zoning districts, including A-1 Agricultural District, A-2 Rural Home District and R-1 Residential District.

Prior to 1998, the A-1 District only required a three acre minimum lot size. The parcel and many nearby it became substandard relative to lot area when the Town amended its zoning code in 1998 to increase the A-1 District minimum lot size to 40 acres. As noted in a review of a similar 2012 rezoning request on the adjacent property to the north, the Town, acting upon the advice of the Town Attorney, chose not to place the lots that were rendered substandard into a new zoning classification but instead left the decision to rezone to individual owners, if and when they were so inclined. The majority of the parcels in the immediate area are developed, so the need for additional rezoning in the area would likely be spurred by future proposals for building additions, new outbuildings or new hard surfaces.

The Town Engineer previously indicated that the remaining substandard parcels along Cushing Park Road in the vicinity would be candidates for rezoning to the A-2 District if other property owners come forward in the future. Therefore, Staff feels that the proposed single lot rezoning is another incremental rezone in an area that will likely continue to evolve into an A-2 neighborhood.

STAFF RECOMMENDATION

The proposed rezoning meets the purpose and intent of the County and Town Land Use Plans and the new zoning category better accommodates the existing parcel. The County Development Plan recommends that lands be zoned as used. Properties in this area are no longer in agricultural use and should be considered for rezoning to a more appropriate residential district in the future.

Respectfully submitted,

Rebekah Leto

Rebekah Leto
Senior Planner

Attachments: Town Ordinance No. 2021-03
Map

N:\PRKANDLU\Planning And Zoning\Rezones\Staff Reports\RZ82 Ernest Dlt.Docx

STATE OF WISCONSIN **TOWN OF DELAFIELD** **WAUKESHA COUNTY**

ORDINANCE NO. 2021-03

AN ORDINANCE TO AMEND THE ZONING MAP OF THE TOWN OF DELAFIELD FROM A-1 TO A-2 ON LANDS LOCATED IN THE NORTHWEST ¼ AND SOUTHWEST ¼ OF THE NORTHEAST ¼ OF SECTION 31, TOWN 7 NORTH RANGE 18 EAST, TOWN OF DELAFIELD, WAUKESHA COUNTY WISCONSIN (ERNEST PROPERTY)

The Town Board of Delafield, Waukesha County, Wisconsin, DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1: The Town of Delafield Zoning Map is hereby amended to change the zoning classification from A-1 to A-2 on the following described parcel of land:

Lot 3 of Certified Survey Map No. 6387, being a part of the Northwest ¼ and Southwest ¼ of the Northeast ¼ of Section 31, Town 7 North, Range 18 East, Town of Delafield, Waukesha County, Wisconsin.

SECTION 2: SEVERABILITY.

The several sections of this ordinance are declared to be severable. If any section or portion thereof shall be declared by a court of competent jurisdiction to be invalid, unlawful or unenforceable, such decision shall apply only to the specific section or portion thereof directly specified in the decision, and shall not affect the validity of any other provisions, sections or portions thereof of the ordinance. The remainder of the ordinance shall remain in full force and effect. Any other ordinances whose terms are in conflict with the provisions of this ordinance are hereby repealed as to those terms that conflict.

SECTION 3: EFFECTIVE DATE.

This ordinance shall take effect immediately upon passage by Waukesha County and posting or publication as provided by law.

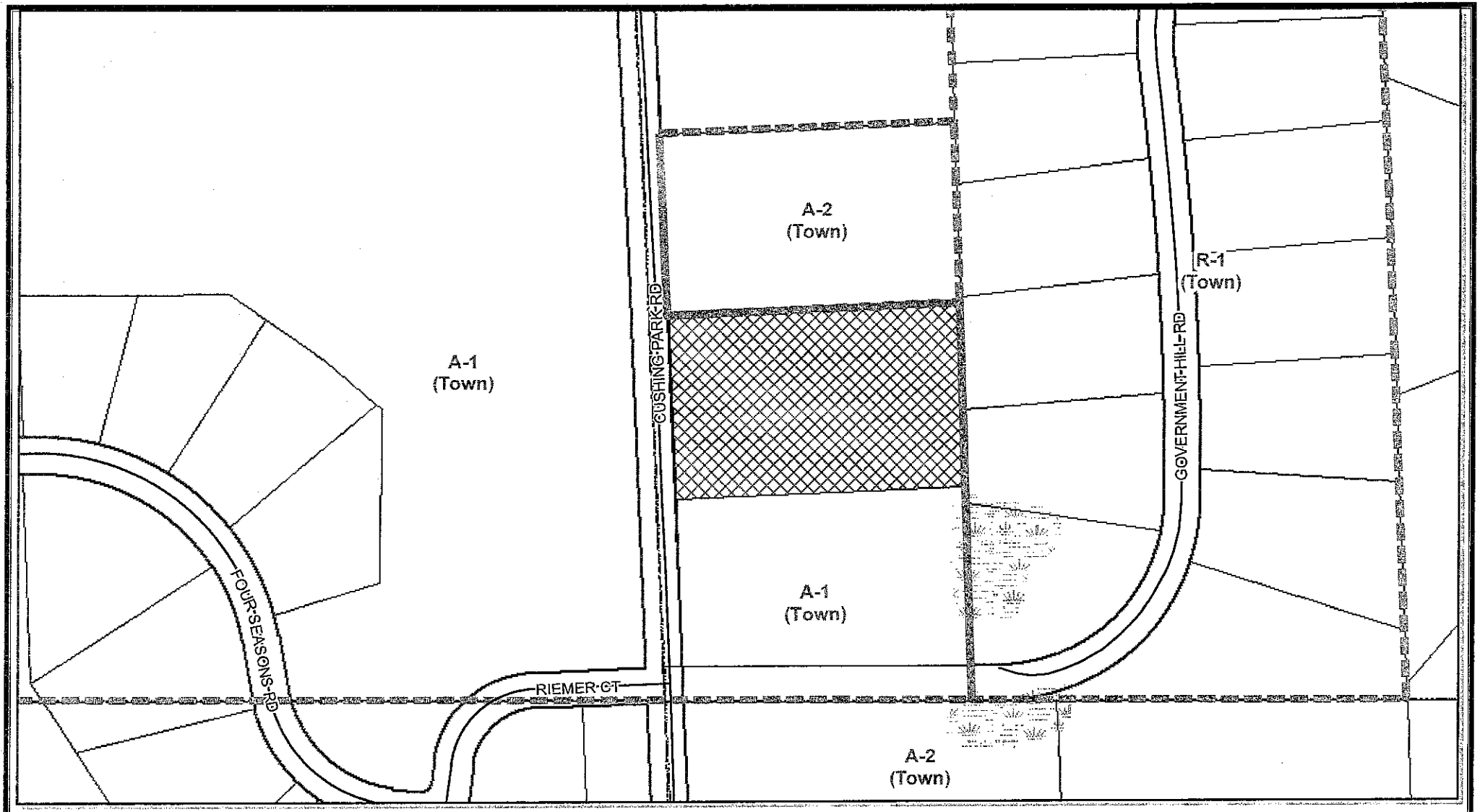
PASSED AND ADOPTED by the Town Board of the Town of Delafield, Waukesha County, Wisconsin this 13 day of ~~February~~ April, 2021.

TOWN OF DELAFIELD

Ron Troy, Town Chair

ATTEST:

Dan Green, Administrator/Clerk/Treasurer



ZONING AMENDMENT

PART OF THE NE 1/4 OF SECTION 31, TOWN OF DELAFIELD

TOWN ZONING CHANGE FROM A-1 AGRICULTURAL DISTRICT TO A-2 RURAL HOME DISTRICT

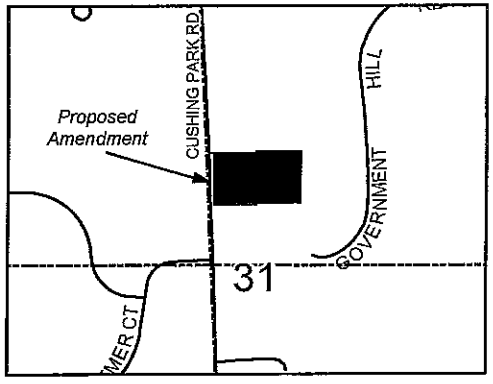
Wetlands Overlay

FILE.....RZ82
DATE OF PLAN COMMISSION.....5/20/21
AREA OF CHANGE.....4 ACRES
TAX KEY NUMBER.....DELT0841.997.002

1 in = 250 ft

Feet 0 125 250

Prepared by the Waukesha County Department of Parks and Land Use



Referred on: 06/03/21 File Number: 176-O-026 Referred to: LU 6

MODIFY THE 2021-2025 CAPITAL PLAN FOR THE CREATION OF CAPITAL PROJECT #202107 ICE ARENA CONDENSER REPLACEMENTS AND MODIFY 2021 CAPITAL BUDGET

WHEREAS, the evaporative condensers at Naga-Waukee and Eble Ice Arenas have surpassed the expected useful life; and

WHEREAS, the Naga-Waukee evaporative condenser is currently being repaired, the Eble evaporative condenser has failed and both units require replacement; and

WHEREAS, the evaporative condensers are critical to system operations in removing heat from the refrigerant and returning it to the refrigeration system; and

WHEREAS, until the unit at Eble Ice Arena is replaced, operations must be suspended; and

WHEREAS, the replacement of the unit at Naga-Waukee was scheduled for 2022 but is now recommended for replacement in 2021 due to recent repairs.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Waukesha County Adopted 2021-2025 Capital Plan be modified by creating capital project #202107 Ice Arena Evaporative Condenser Replacements.

BE IT FURTHER ORDAINED that the 2021 capital budget be modified to appropriate additional expenditures of $235,750 and increase use of Tarmann Parkland Acquisition Fund balance by $235,750 to purchase and install new ice arena evaporative condensers at the Eble and Naga-Waukee Ice arenas.

Referred on: 06/03/21	File Number: 176-O-027	Referred to: EX – LU – FI

Project Title:	Ice Arena Evaporative Condenser Replacements	**Project #:**	202107
Department:	Parks & Land Use	**Project Type:**	Mechanicals/Bldg Systems
Phase:	One-Year Project	**Sponsor:**	
Budget Action:	New	**Manager:**	Dale Shaver, PLU Director
Date:	May 26, 2021		

CAPITAL BUDGET SUMMARY

Year	2020	2021	2022	2023	2024	Total
Project Phase		Installation				Project
Expenditure Budget	$0	$235,750	$0	$0	$0	$235,750
Revenue Budget	$0	$235,750	$0	$0	$0	$235,750
Net Costs After Revenues Applied	$0	$0	$0	$0	$0	$0

COST DOCUMENTATION		**REVENUE**	
Installation			
Eble	$130,000	Tarmann Fund Balance	
Naga-Waukee	$75,000		
Contingency	$30,750		
Total Project Cost	$235,750	Total Revenue	$235,750
EXPENDITURE BUDGET	$235,750	**REVENUE BUDGET**	$235,750

Project Scope & Description

Eble: The existing refrigeration system was installed in 1988 with a total system life expectancy of 25 years. The direct refrigeration system consists of several components including two reciprocating compressors, two pumper drums (circulate the refrigerant through the floors), one low pressure receiver (stores the refrigerant between pumping cycles), a cooling tower system - evaporative type condenser (removes heat from refrigerant, cooling it down as it returns to the refrigeration system) and one waste heat recovery system (primarily uses heat generated during the refrigeration process for heating the soil beneath the rink floor to prevent frost and heave) and controls. On-going repair and replacement is done on system components. This project will have two phases: phase 1 includes recovery and storing of R-22 refrigerant from the system and conducting a pressure test on the ice floor piping to verify project scope. Phase 2 includes the removal and replacement of the existing evaporative condenser and replacement of an estimated 1,500 pounds of refrigerant (costs based on replacement of R-22) with an anticipated life of 20 years. Through this project the Department is evaluating the options of R-22 alternatives. Phase 1 is required immediately and is covered through Ice Arena fund operating expenses in the existing budget; this capital project addresses step 2.

Naga-Waukee: The existing refrigeration system was installed in 1995 with a total system life expectancy of 25 years. The indirect refrigeration system consists of several components including a chiller, two compressors, cooling tower system – evaporative condenser, and a waste heat recovery system. On-going repair and replacement is done on system components. This project will remove the existing, install and reconnect a new evaporative condensing unit to replace the aged unit which does not have projected life beyond the 25 years due to recent repair issues.

Overall:
To continue to manage the refrigeration systems to maximize the life of the equipment, the Department is currently updating the fixed asset inventory, condition analysis and preventative maintenance schedule previously updated in 2014. In addition, more research will be conducted regarding the Eble Ice Arena conversion of R-22 to a suitable replacement refrigerant in an effort to maintain the existing equipment and extend the useful life 10 or more years. Since this is a one-year project, funds for installation will not be spent until a standing committee of the County Board approves the bid process.

Locations:

Eble Ice Arena: 19400 W. Bluemound Rd, Brookfield, WI 53045
Naga-Waukee Ice Arena: 2699 Golf Road, Delafield, WI 53018

Analysis of Need

Eble: The existing refrigeration system was installed in 1988 with a total system life expectancy of 25 years. In 2018, the dehumidification unit was replaced and chiller plan repairs were completed. Through the annual fixed asset projects, the additional component replacements have been in process, which includes compressor work from 2019-2021. While the replacement of the condenser was not planned for this year, the condenser recently failed completely rendering the facility non-operational. About 30% of the contracted ice use is being shifted to Naga-Waukee Ice Arena during the repair period. Total revenue loss projected through August is $87,000.

Naga-Waukee: During routine maintenance inspection, there was an ammonia leak discovered from the discharge pipe for the existing evaporative condenser. While this leak is scheduled to be repaired, this is temporary to keep the facility operational, and the repair is not

Project Title:	Ice Arena Evaporative Condenser Replacements	Project #:	202107
Department:	Parks & Land Use	Project Type:	Mechanicals/Bldg Systems
Phase:	One-Year Project	Sponsor:	
Budget Action:	New	Manager:	Dale Shaver, PLU Director
Date:	May 26, 2021		

guaranteed and is not a long-term solution. Since the condenser has a projected life expectancy of 25 years (year 2020), we will proactively replace the condenser,

Alternatives

Eble:

1. Due to the phase out of R-22 (and all hydrochlorofluorocarbons), an alternative is to upgrade Eble to an ammonia industrial grade indirect system (same as Naga-Waukee). Costs for this are estimated between $1.5-2 million with an estimated life expectancy of 30 years.
2. Retrofit the compressors to replace R-22 with R-438A, a non-ozone depleting hydrofluorocarbon. More research is required to determine viability of this option and cost estimates.
3. Replace failed condenser section only. Cost estimates are $51,000 plus the cost to replace the system refrigerant, while continuing to monitor how other ice arenas effectively migrate to other refrigerant.

Naga-Waukee:

1. Complete the repair to the discharge pipe, budget for the replacement in 2022. In the event of failure, potential losses in revenue will be between $25,000 and $35,000 per month.

Ongoing Operating Costs

The proposed project does not change any current on-going operating costs.

Previous Action

None

FISCAL NOTE

MODIFY THE 2021-2025 CAPITAL PLAN FOR THE CREATION OF CAPITAL PROJECT #202107 ICE ARENA CONDENSER REPLACEMENTS AND MODIFY 2021 CAPITAL BUDGET

This ordinance modifies the 2021-2025 capital plan to create capital project #202107 – Ice Arena Condenser Replacements. Department management indicates that this project was not included in the proposed 2021-2025 capital plan due to the equipment failure at Eble Ice Arena being unexpected and the Naga-Waukee Ice Arena replacement being originally scheduled for 2022. Department management estimates the total cost of the replacements at $235,750, which consists of: $130,000 for replacement of the evaporative condenser and lost refrigerant at Eble Ice Arena, $75,000 for replacement of the evaporative condenser at Naga-Waukee Ice Arena, and $30,750 of project contingency.

This ordinance also modifies the capital budget to appropriate additional expenditures of $235,750 and increase the use of Tarmann Parkland Acquisition Fund balance by $235,750 to fund the replacements.

The equipment failure at Eble has rendered the facility non-operational, with about 30% of contracted ice use being shifted to Naga-Waukee Ice Arena. Department management estimate that the total revenue loss for the temporary closure at $87,000.

There is no direct tax levy impact as a result of this ordinance.

William Duckwitz

William Duckwitz
Budget Manager
5/27/2021
AJK JE# 2021-00003284

Referred on: 06/03/21	File Number: 176-O-027	Referred to: EX – LU – FI

AUTHORIZE THE DEPARTMENT OF PARKS AND LAND USE, COMMUNITY DEVELOPMENT FUND, TO ACCEPT HOME INVESTMENT PARTNERSHIP (HOME) PROGRAM – AMERICAN RESCUE PLAN GRANT FUNDING AND MODIFY 2021 BUDGET

WHEREAS, The U.S. Department of Housing and Urban Development (HUD) has provided $4.9 billion of federal funding to local governments through the March 11, 2021 American Rescue Plan Act of 2021 for a program to create affordable housing and services to assist individuals experiencing or at risk of experiencing homelessness; and

WHEREAS, Waukesha County is an eligible grantee for this program, based on population criteria set forth in the grant; and

WHEREAS, Waukesha County's allocation of these funds is $5,293,334; and

WHEREAS, permissible uses of the grant funding may be used for the development of non-congregate shelter units, supportive services, tenant-based rental assistance, and the development of affordable housing.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Community Development program administration is authorized to accept the 2021 HOME-American Rescue Plan Act (HOME-ARPA) program grant funding of $5,293,334.

BE IT FURTHER ORDAINED that the 2021 Community Development Fund budget be modified by appropriating operating expenditures of $5,283,334 and interdepartmental charges of $10,000 for the HOME-ARPA grant program, and increasing general government revenue by $5,293,334 to fund these expenditures.

Referred on: 06/03/21	File Number: 176-O-028	Referred to: LU – FI

FISCAL NOTE

AUTHORIZE THE DEPARTMENT OF PARKS AND LAND USE, COMMUNITY DEVELOPMENT FUND, TO ACCEPT HOME INVESTMENT PARTNERSHIP (HOME) PROGRAM – AMERICAN RESCUE PLAN GRANT FUNDING AND MODIFY 2021 BUDGET

This ordinance authorizes Parks and Land Use – Community Development Fund – HOME Investment Partnership program to accept and appropriate $5,293,334 of American Rescue Plan Act of 2021 funding to be used to create affordable housing and services to assist individuals experiencing or at risk of experiencing homelessness.

The 2021 Parks and Land Use Department Community Development HOME Investment Partnership program Adopted Budget included HUD funding of $1,447,991. The 2021 actual HOME Investment funding from HUD was $1,460,506 and the additional $12,515 was appropriated through Enrolled ordinance 175-0-87. This ordinance also modifies the 2021 budget to increase expenditures (and related general government revenue) by $5,293,334, including $5,283,334 of operating expenses and $10,000 of interdepartmental charges (estimated indirect cost recovery in 2021). Department management indicates that grant funds need to be spent by 2030, but anticipates using the funds over the course of three to four years. Department management plans to request carrying over unspent appropriations each year.

This ordinance results in no direct levy impact.

William Duckwitz

William Duckwitz
Budget Manager
06/2/2021
CLD JE#2021-00003700

Referred on: 06/03/21	File Number: 176-O-028	Referred to: LU – FI

ACCEPT ADDITIONAL COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) PROGRAM FUNDS FOR THE 2021 PROGRAM YEAR AND MODIFY THE 2021 BUDGET

WHEREAS, the U.S. Department of Housing and Urban Development (HUD) has qualified Waukesha County as an entitlement Urban County, and along with participating counties and municipalities is eligible to receive federal funding to provide benefits primarily to low and moderate income households as well as to meet specific community needs through the Community Development Block Grant (CDBG) and HOME Investment Partnership (HOME) programs; and

WHEREAS, Waukesha County, as the grantee, has been authorized by the Waukesha County Board of Supervisors to participate and accept funding; and

WHEREAS, the Parks and Land Use Department 2021 Adopted Budget includes HUD funding estimated at $1,464,022 for the CDBG program; and

WHEREAS, the Waukesha County Board approved the budgeted allocation for CDBG program funding through Enrolled Ordinance 175-O-28; and

WHEREAS, the Waukesha County Board approved an additional budget allocation for CDBG program funding of $13,826 for a total of $1,477,848 through Enrolled Ordinance 175-O-87; and

WHEREAS, due to an error in the HUD grant award allocation, Waukesha County's final 2021 grant award is $21,777 higher for CDBG at $1,499,625; and

WHEREAS, subgrantees, participating counties and municipalities will enter into subgrantee agreements with Waukesha County to use HUD funds mainly designated to benefit low and moderate income (at-risk) persons and specific needs of participating jurisdictions.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Community Development program administration is authorized to accept the additional 2021 HUD funding for the CDBG program of $21,777.

BE IT FURTHER ORDAINED that the 2021 Community Development program budget be modified by appropriating operating expenditures of $21,777 for the CDBG program and increasing general government revenues for the CDBG program by $21,777.

BE IT FURTHER ORDAINED that the Community Development program be authorized to execute agreements or appropriate amendments to existing subgrantee agreements which are deemed reasonable and appropriate by the County Executive and the Community Development Block Grant Board and the HOME Consortium Board.

Referred on: 06/03/21	File Number: 176-O-029	Referred to: LU – FI

FISCAL NOTE

ACCEPT ADDITIONAL COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) PROGRAM FUNDS FOR THE 2021 PROGRAM YEAR AND MODIFY THE 2021 BUDGET

This ordinance authorizes Park and Land Use-Community Development Fund – Community Development Block Grant (CDBG) program to accept and appropriate an additional $21,777 of U.S. Department of Housing and Urban Development (HUD) funding.

HUD's final adjusted 2021 allocation for the CDBG grant award is $1,499,625 which is $21,777 above the initial allocation. The initial 2021 HUD awarded allocation for the County's CDBG program was $1,477,848, which was $13,826 above the adopted budget. The $13,826 was appropriated through Enrolled ordinance 175-0-87.

The ordinance also authorizes subgrantee agreements necessary to cover allocations to be made by the County Executive, Community Development Block Grant Board and HOME Consortium Board for the increased funding.

This ordinance results in no direct tax levy impact.

William Duckwitz

William Duckwitz
Budget Manager
5/27/2021
CLD JE#2021-00003701

Referred on: 06/03/21	File Number: 176-O-029	Referred to: LU – FI

EXTEND WAUKESHA COUNTY PUBLIC WORKS DIRECTOR TEMPORARY AUTHORITY TO SUSPEND AND MODIFY WAUKESHA COUNTY TRANSIT SERVICE DUE TO ONGOING, LOWER RIDERSHIP AFTER COVID-19 PANDEMIC

WHEREAS, Waukesha County provides the funding for bus services to address the mass transit needs of employers and employees commuting in and between Waukesha County and its neighboring counties, and

WHEREAS, in December of 2019, a novel strain of the coronavirus now named Coronavirus Disease 2019 (COVID-19) was detected and has spread throughout many countries, including the United States, and

WHEREAS, on April 6, 2020, the County Executive of Waukesha County authorized a temporary suspension of specific commuter trips in response to drastically reduced ridership, and

WHEREAS, on July 28, 2020, the County Board of Supervisors passed Enrolled Ordinance 175-22 granting the Waukesha County Public Works Director temporary authority to suspend and modify transit services to maintain responsible use of resources in light of reduced ridership and to adhere to CDC recommendations for public transportation for the duration of the COVID-19 pandemic, for a period not to exceed twelve months, and

WHEREAS, the business community in the transit service areas of Waukesha and Milwaukee Counties are moving through the process to reopen safely, and

WHEREAS, Waukesha County Transit services continue to be closely monitored and continue to experience significant declines in ridership levels on specific services due the ongoing effects of the COVID-19 pandemic, resulting in sharp declines in farebox revenue, and

WHEREAS, the Waukesha County Department of Public Works strives to respond effectively and efficiently to transit ridership demand, and continued service flexibility is desirable as we rebound from the COVID-19 pandemic in order to use County funding, State funding and Federal funding responsibly.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the authorization of the Waukesha County Public Works Director to make temporary changes to transit level services in order to appropriately respond to the continuing effects of the COVID-19 pandemic and to maintain responsible use of resources is extended to December 31, 2021, or until sooner terminated by further action of the Board.

Referred on: 06/03/21	File Number: 176-O-030	Referred to: PW – FI

FISCAL NOTE

EXTEND WAUKESHA COUNTY PUBLIC WORKS DIRECTOR TEMPORARY AUTHORITY TO SUSPEND AND MODIFY WAUKESHA COUNTY TRANSIT SERVICE DUE TO ONGOING, LOWER RIDERSHIP AFTER COVID-19 PANDEMIC

This ordinance authorizes the Director of Public Works to continue making temporary changes to transit service levels in order to make responsible use of county, state, and federal funds in order to appropriately respond to the continuing effects of the pandemic (by adjusting the level of route operations, where appropriate) and to maintain responsible use of resources until December 31, 2021 or until terminated by further action of the County Board. The original temporary authority was granted through July.

This ordinance will effectively extend the authority granted in Enrolled Ordinance 175-22. All changes made by the Director of Public Works would need to be publicly posted for at least three business days before going into effect. The department would continue to report all temporary changes to the Public Works Committee.

According to the county's contracted transit system administrator, Waukesha Metro, Waukesha County Transit services continue to be closely monitored and continue to experience significant declines in ridership levels due to the ongoing effects of the pandemic (e.g., employees working from home), resulting in sharp declines in farebox revenue. When farebox revenues decline, fixed costs need to be covered with additional county funds. The county was allocated $6.2 million of federal funding (e.g., CARES Act), which can be used to make up for revenue losses and allow for the continuation of routes without adverse financial impacts to the county. (The 2021 budget already includes $360,000 of this federal funding to help mitigate the impact of the lower ridership during the pandemic.) However, there are instances where ridership declines are significant for particular routes and these funds could be used more productively. These revenues are multi-year funds, which can be used strategically to phase-in service levels as ridership returns, cover fluctuations in other transit funding sources, and adjust to changing transit needs.

Total ridership on routes being operated currently is estimated at 45% of pre-pandemic service levels. Waukesha Metro estimates that farebox revenues systemwide are $17,700 below budget per month on average, and operating fewer trips under this temporary authority is helping offset with lower costs. Ridership will be monitored this summer to determine when additional trips should be reinstated. Additional trips may be added back after Labor Day based on information provided from the Milwaukee County Transit System that businesses plan to begin transitioning employees back to downtown Milwaukee locations.

All route changes continue to be temporary and allow for the strategic use of federal funding, resulting in no ongoing tax levy impact.

William Duckwitz

William Duckwitz
Budget Manager

Referred on: 06/03/21	File Number: 176-O-030	Referred to: PW – FI

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Re-appointment of County Representative to the Community Development Block Grant Board

I am pleased to submit to the County Board for your consideration, the reappointment of Doug Bartmann to the Community Development Block Grant Board. His term will expire May 1, 2023.

Thank you.

PF:ha

cc: Meg Wartman
Dale Shaver
Kristin Silva

Referred on: 06/03/21	File Number: 176-A-007	Referred to: EX

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Appointment of County Representative to the Community Development Block Grant Board

I am pleased to submit to the County Board for your consideration, the re-appointment of Joan Francoeur to the Community Development Block Grant Board. Her term will expire May 1, 2023.

Thank you.

PF:ha

cc: Meg Wartman
Dale Shaver
Kristin Silva

Referred on: 06/02/21	File Number: 176-A-008	Referred to: EX

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Appointment of Citizen Member to the Waukesha County Community Development Block Grant Board

I am pleased to submit to the County Board for your consideration the appointment of Richard Verthein to the Community Development Block Grant (CDBG) Board, representing the business sector. He will replace Cathy Priem, whose term is ending in May.

Mr. Verthein is a Senior Vice President for Robert W. Baird & Co. Inc. in Waukesha. He has worked for Robert W. Baird & Co. since 2006, previously as a Registered Client Relationship Specialist. Mr. Verthein has a Bachelor of Science in Accounting and Finance from UW-Milwaukee.

Currently, Mr. Verthein serves on the Board of Directors for the Waukesha Noon Rotary Club, and is also on the Waukesha Rotary Club Charitable Foundation Board. He is the Board President of ACAP, the Adaptive Community Approach Program, a nonprofit serving adults with cognitive and physical disabilities.

Mr. Verthein's involvement in and connections to the community make him a great candidate for service on the CDBG Board.

Thank you for your swift consideration.

cc: Meg Wartman, County Clerk
Kristin Silva, Community Development Manager
Dale R. Shaver, Director of Parks and Land Use

Referred on: 06/03/21	File Number: 176-A-009	Referred to: EX

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Appointment of Citizen Member to the Waukesha County Community Development Block Grant Board

I am pleased to submit to the County Board for your consideration the appointment of Christina Italiano to the Community Development Block Grant (CDBG) Board. She will replace Lillie Wilson, whose term has ended.

Ms. Italiano is a WI Medicaid Finance Manager for Anthem, Inc. Previously, she was an Associate Dean for Finance and Administration for the Ascension Columbia College of Nursing. Ms. Italiano has a Master of Business Administration from Alverno College.

Ms. Italiano has been an active volunteer for Relay for Life events, and is a Wish Granter and Special Events Volunteer for Make-A-Wish Wisconsin. She served as Treasurer for Prospanica (f/k/a: National Society of Hispanic MBA's), and was a Board member for Susan G. Komen Wisconsin.

Ms. Italiano is an active member of the community, including acting as Concessions Chair for the local nonprofit swim team, and is a great candidate for service on the CDBG Board.

Thank you for your swift consideration.

cc: Meg Wartman, County Clerk
Kristin Silva, Community Development Manager
Dale R. Shaver, Director of Parks and Land Use

Referred on: 06/03/21	File Number: 176-A-010	Referred to: EX

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Reappointment of County Representative to the Waukesha County Ethics Board

I am pleased to submit to the County Board for your consideration, the reappointment of Mr. Tom Farley as an alternate to the Waukesha County Ethics Board. Mr. Farley has served on the Ethics Board for the past two years. Should Mr. Farley be reappointed to the Ethics Board, his term will expire in April of 2024.

PF:ha

cc: Meg Wartman
Erik Weidig

Referred on: 06/03/21	File Number: 176-A-011	Referred to: EX

WAUKESHA COUNTY

OFFICE OF THE COUNTY EXECUTIVE

MEMO:

DATE: June 2, 2021

TO: Chairman Paul Decker

FROM: Paul Farrow

RE: Appointment of Citizen Member to the Pauline Haas Public Library Board of Trustees

I am pleased to submit to the County Board for your consideration, the appointment of Ms. Amanda Kojis to the Pauline Haas Public Library Board of Trustees. Ms. Kojis is a resident of the Village of Merton and has a financial background, currently an employee of Morgan Stanley (Novak Wealth Management). Ms. Kojis' appointment would fulfill the vacancy due to the resignation of Chris Koenig who left the board. Ms. Kojis' term, if appointed, will expire in July of 2023.

PF:ha

cc: Meg Wartman
Karol Kennedy

Referred on: 06/03/21	File Number: 176-A-012	Referred to: EX

N67W28661 HAWTHORNE ROAD, HARTLAND, WI 53029
(414)793-8290 ▪ AMANDAKOJIS@GMAIL.COM

Amanda E. Kojis

Professional Experience

Morgan Stanley - Waukesha, WI
Financial Advisor, Novak Wealth Management - October 2020 - Present

- Develop and execute team marketing plan
- Build custom financial plans based on individual goals and comfort with risk and present them to clients

Edward Jones - Pewaukee, WI
Financial Advisor - May 2017 - October 2020

- Analyzed client needs and investment opportunities to recommend appropriate strategies
- Delivered seminars to clients and prospects for business development and educational purposes
- Developed new business by cold canvasing within the community

Amica Mutual Insurance Company – Waukesha, WI
Supervising Account Representative – March 2011 – May 2017

- Collaborated with management team to create systems for streamlining procedures, improving efficiency and achieving branch goals
- Cultivated and strengthened relationships with key policyholders
- Supervised and trained new Account Representatives

Senior Account Representative – October 2007 – March 2011

- Underwrote new accounts within set authority limits
- Assisted with hiring, training and mentoring new employees
- Increased core customer network by providing education on new products, offering complete solutions and maintaining regular communication with new and existing policyholders

Account Representative – November 2005 – October 2007

- Completed Integrity Selling coursework
- Built core customer network by providing sound advice and recognizing sales opportunities

Associate Account Representative – September 2003 – November 2005

- Maintain a thorough knowledge of all products and services available for policyholders
- Worked directly with Automobile, Homeowners, Marine and Personal Excess Liability policy holders and applicants to service active and sell new policies

Certifications

- Accredited Asset Management Specialist
- Chartered Property and Casualty Underwriter
- Certificate in General Insurance
- Associate in Personal Insurance

Education

Bachelor of Arts – *Economics* – University of Wisconsin - Milwaukee, Milwaukee, WI ▪ 2001

MODIFY THE BRIDGES LIBRARY SYSTEM 2021 BUDGET TO ACCEPT GRANT FUNDING TO EXPAND LIBRARY SERVICES TO PEOPLE AFFECTED BY MEMORY LOSS AND TO THEIR CAREGIVERS

WHEREAS, the Bridges Library System received notification from Bader Philanthropies that it has been awarded a $35,000 grant for the Library Memory Project to be received in two payments -- $25,000 in 2021 and $10,000 in 2022; and

WHEREAS, the 2021 budget for the Bridges Library System does not include this level of appropriation for this project; and

WHEREAS, the grant will be used to bring StoryCorps training to member libraries so they will have the resources and expertise to gather and share stories of those living with memory loss; and

WHEREAS, the Bridges Library System has received Bader sponsored grants for Library Memory Project purposes since 2017; and

WHEREAS, the proposed use of these grant funds has no direct impact on either the County General Tax Levy or the Special Library Tax Levy; and

WHEREAS, the Bridges Library System 2021 budget already contains $10,000 of Bader Philanthropies grant funding, so only an additional $15,000 of expenditure authority is needed.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Bridges Library System may accept $25,000 from Bader Philanthropies in 2021.

BE IT FURTHER ORDAINED that the Bridges Library System 2021 budget be modified by increasing the grant revenue by $15,000 and increasing operating expenses by $15,000 to cover the costs associated with this grant in 2021.

Referred on: 06/03/21	File Number: 176-O-031	Referred to: EX – FI

FISCAL NOTE

MODIFY THE BRIDGES LIBRARY SYSTEM 2021 BUDGET TO ACCEPT GRANT FUNDING TO EXPAND LIBRARY SERVICES TO PEOPLE AFFECTED BY MEMORY LOSS AND THEIR CAREGIVERS

This ordinance authorizes the Bridges Library System to accept $35,000 of Bader Philanthropies grant funding consisting of two payments of $25,000 for 2021 and $10,000 for 2022. The 2021 budget anticipated and already includes $10,000 of Bader Philanthropies grant funding and corresponding expenditure authority. This ordinance appropriates $15,000 in additional operating expenditures to purchase supplies and materials for training and programmatic purposes to assist those affected by memory loss, Alzheimer's disease, and other forms of dementia. The 2022 award of $10,000 will be included in the department's 2022 proposed budget.

This ordinance results in no direct impact to the county general tax levy or the special library tax levy.

William Duckwitz

William Duckwitz
Budget Manager
5/26/2021
AJK #2021-00003570

Referred on: 06/03/21	File Number: 176-O-031	Referred to: EX – FI

7TH AMENDMENT TO LEASE AGREEMENT WITH VERIZON WIRELESS
PERSONAL COMMUNICATIONS LP, D/B/A VERIZON WIRELESS

WHEREAS, Waukesha County owns a tower (the "Tower") located at the N46 W33480 C.T.H.R., Nashotah, Waukesha County, State of Wisconsin (the "Site"); and

WHEREAS, Verizon Wireless Personal Communications LP, d/b/a Verizon Wireless, ("Verizon") currently leases space on the Tower and at the Site for operation of a cellular communications facility and subleases space to AT&T Mobility Corporation ("AT&T") pursuant to a Lease Agreement dated February 14, 1997, as amended; and

WHEREAS, Verizon and AT&T desire to replace, modify or relocate various equipment, antennas and/or feedlines on the Tower in order to update aged equipment; and

WHEREAS, the County is willing to permit the upgrades, and otherwise amend the Lease with Verizon without requiring an increase in rent.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Seventh Amendment to Lease Agreement between the County and Verizon for use of the Tower and surrounding lands is hereby approved.

BE IT FURTHER ORDAINED that the Director of Emergency Preparedness or his designee is authorized to execute the Seventh Amendment to Lease Agreement and any other documents necessary to effectuate the intent thereof.

Referred on: 06/03/21	File Number: 176-O-032	Referred to: JU

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SEVENTH AMENDMENT TO LEASE AGREEMENT

THIS SEVENTH AMENDMENT TO LEASE AGREEMENT (the "Sixth Amendment") is made this _____day of _____, 2021, between Waukesha County, a Wisconsin municipal corporation ("Lessor") and Verizon Wireless Personal Communications LP d/b/a Verizon Wireless, successor in interest to PrimeCo Personal Communications Limited Partnership ("Lessee").

WHEREAS, there is now in full force and effect a Lease Agreement between Lessor and Lessee dated February 14, 1997, as amended by the Amendment To Lease Agreement dated October 12, 2001 (the "First Amendment"), the Second Amendment To Lease Agreement dated November 18, 2010, the Third Amendment to Site Lease Agreement dated July 10, 2015, the Fourth Amendment to Lease Agreement dated November 11, 2016, the Fifth Amendment to Lease Agreement dated April 18, 2017, and the Sixth Amendment to Lease dated September 28, 2018 (collectively, and together with this Seventh Amendment, the "Lease") that provides for the location, installation and operation of Lessee's communications equipment at the real property and on the tower ("Tower") owned by Lessor and located at N46 W33480 C.T.H.R., Nashotah, Wisconsin (the "Property"); and

WHEREAS, Section 4 of the Lease permits Lessee, with the consent of Lessor, to sublet all or any portion of the Site (as defined in the Lease). Such consent may be conditioned upon an agreement to allow Lessor to share in expected revenues from the sublet; and

WHEREAS, with the First Amendment, Lessor consented to Lessee's collocation or site license agreements ("SLAs") with New Cingular Wireless PSC, LLC (d/b/a AT&T Mobility Corporation) and VoiceStream PCS II Corporation ("VoiceStream" d/b/a "T-Mobile") at the Site on the terms set forth in the First Amendment; and

WHEREAS, pursuant to Section 5 of the Lease, Lessee is requesting Lessor's approval to allow Lessee and AT&T to make certain equipment modifications to the Tower; and

WHEREAS, Lessor and Lessee wish to amend the Lease to authorize these equipment modifications on the Tower on the terms and conditions set forth herein and to address additional matters in the Lease.

NOW THEREFORE, for good and valuable consideration including the mutual covenants and agreements hereinafter set forth, Lessor and Lessee agree as follows:

1. The recitals set forth above are incorporated herein by reference.

2. **Approval of Equipment Modifications**. Pursuant to Section 5 of the Lease, Lessor hereby approves the installation and operation by Lessee and AT&T of the modified equipment on the Tower as shown by the drawings and specifications attached hereto as Exhibits 7-A and Exhibit 7-B respectively and incorporated by reference. Said approval is contingent upon Lessee receiving all necessary permits and approvals from the appropriate governing bodies. A copy of any SLA amendment by and between Lessee and AT&T necessitated by this Seventh Amendment shall be provided to the Lessor for its

records following full execution of the documents. .

3. **Tower Structural Modifications**. As a further condition of the approval of the installation of additional equipment noted in Paragraph 2 above, Lessee and AT&T shall perform the Tower structural modifications identified in Exhibits 7-A and 7-B in order to offset additional Tower loading caused by the additional equipment. Lessee and AT&T shall be solely responsible for all costs and expenses to complete the Tower structural modifications. The Tower structural modifications shall become the property of Lessor and shall be considered part of the Tower immediately upon completion of the modifications. Following the installation of the additional equipment pursuant to Paragraph 2 above, and any structural modifications required hereby, a structural engineering study shall validate that the tower is not overstressed for a Class III tower as defined by ANSI/TIA-222-G.

4. Other than as specifically amended herein, all other terms and conditions of the Lease shall remain in full force and effect. Where there is conflict between the terms of the Lease and this Seventh Amendment, the terms of this Seventh Amendment shall control. Unless otherwise indicated or introduced in this Seventh Amendment, all defined terms referenced in this Seventh Amendment shall have the same meaning as those found in the Lease.

(Signatures continue on next page)

IN WITNESS WHEREOF, the parties hereto have executed in duplicate this Seventh Amendment effective as of the day and year first above written.

LESSOR:

WAUKESHA COUNTY, a Wisconsin municipal corporation

By:_____
Gary Bell
Director, Department of Emergency Preparedness

Date:_____

LESSEE:

VERIZON WIRELESS PERSONAL COMMUNICATIONS LP d/b/a Verizon Wireless

By:_____
Jacque Vallier
Executive Director-Network Field Engineering

Date:_____

SCOPE OF WORK

TOWER SCOPE

REMAIN/RELOCATE

	QTY.	EQUIPMENT	ACTION
ANTENNA(S)/EQUIP.	3	CDMA PANEL ANTENNA(S)	TO REMAIN
	3	RAYCAP SPD(S)	TO REMAIN
TRANSMISSION CABLE(S)	3	HYBRID CABLE(S)	TO REMAIN
	6	1-5/8" COAX	TO REMAIN

DECOMISSION

ANTENNA(S)/EQUIP	6	LTE PANEL ANTENNA(S)	TO BE REMOVED
	6	REMOTE RADIO(S)	TO BE REMOVED
	6	DIPLEXER(S)	TO BE REMOVED
TRANSMISSION CABLE(S)	6	1-5/8" LTE COAX	TO BE REMOVED

TO BE INSTALLED

ANTENNA(S)/EQUIP.	3	PANEL ANTENNA(S)	TO BE INSTALLED
	9	REMOTE RADIO(S)	TO BE INSTALLED

COMPOUND SCOPE

	QTY.	EQUIPMENT	ACTION
CABLE ROUTE:	-	ICE BRIDGE HANGERS	ADEQUATE - TO REMAIN
	-	SHELTER COAX PORT	ADEQUATE - TO REMAIN

SHELTER INTERIOR SCOPE

REMAIN/RELOCATE

EQUIPMENT:	3	RAYCAP SPD(S)	TO REMAIN

DECOMISSION

EQUIPMENT:	3	DIPLEXER(S)	TO BE REMOVED

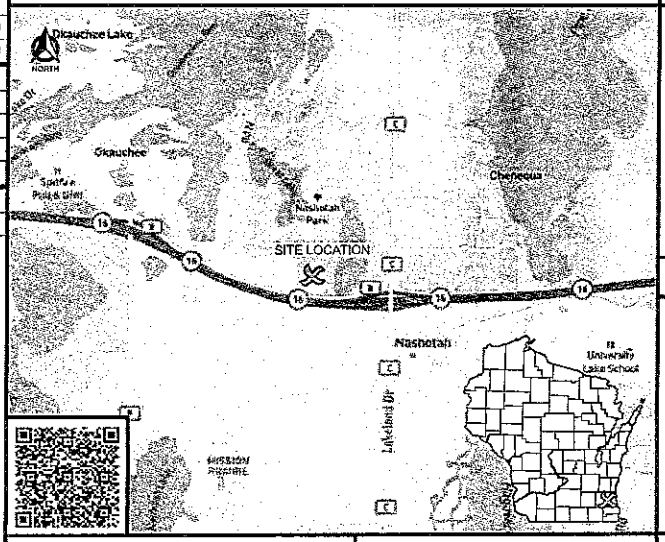
SPECIAL REQUIREMENTS

(1) ANTENNA MAST PIPE AND ATTACHMENT HARDWARE IS REQUIRED TO BE INSTALLED AT EACH SECTOR. (TYP. OF 3)

verizon

WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN
ANTENNA MOD DRAWINGS
200' SELF-SUPPORT TOWER (COLO)

SITE LOCATION MAP



DIRECTORY

CLIENT:
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1701 GOLF ROAD
TOWER 2, SUITE 400
ROLLING MEADOW, IL 6008
CONTACT: ALLEN WAITES
EMAIL: allen.waites@verizonwireless.com

ENGINEER:
EDGE CONSULTING ENGINEERS, INC.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
CONTACT: PAUL MOLITOR
PHONE: 608.644.1449

SITE ACQUISITION:
J&K & ASSOCIATES
CONTACT: CHRIS BARTON

PROJECT INFO

SITE LOCATION:
W33480 WISCONSIN AVE
NASHOTAH, WI 53058

SITE RE #: 20202185526

TOWER OWNER:
WAUKESHA COUNTY
515 WEST MORELAND BLVD.
WAUKESHA, WI 53188

SITE COORDINATES (PER PREVIOUS SURVEY):
LAT: 43°-06'-13.02"
LONG: 88°-24'-42.89"
GROUND ELEVATION (NAVD 88): 933.6'

SHEET INDEX

NO.:	SHEET TITLE
G-001	TITLE SHEET
C-101	SITE PLAN
C-102	ENLARGED SITE PLAN
A-101	SHELTER LAYOUT
T-001	EQUIPMENT SPECIFICATIONS
T-002	ANTENNA SPECIFICATIONS
T-201	SITE ELEVATION
T-301	ANTENNA AND EQUIPMENT LAYOUT
T-501	ANTENNA AND EQUIPMENT SUMMARY
T-502	PLUMBING DIAGRAM
T-503	CABLE DETAILS
T-504	CABLE ROUTING
T-505	EQUIPMENT MOUNT AND INSTALLATION DETAILS
T-901	SITE PHOTOS
E-501	GROUNDING DETAILS
ATTACHED	MOUNT ANALYSIS BY OTHERS *

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS/CONDITIONS ON SITE, IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PERFORMING ANY WORK OR BE RESPONSIBLE FOR THE SAME.

STRUCTURAL

TOWER ANALYSIS:
EDGE CONSULTING ENGINEERS, INC.
REPORT #: 28070
DATED: 01/13/2021
CONCLUSION: STRUCTURALLY ADEQUATE

MOUNT ANALYSIS:
PAUL J. FORD & COMPANY
REPORT #: 24320-0674.001.8196 Rev.1
DATED: 01/20/2021
CONCLUSION: PASS

SITE AUDIT:
NOT COMPLETED

CONTRACTOR TO REVIEW STRUCTURAL REPORT IN IT'S ENTIRETY. ANY DISCREPANCIES OR DISAGREEMENTS BETWEEN THE REPORT AND THESE PLANS SHOULD BE RESOLVED PRIOR TO CONSTRUCTION.

ONE CALL SYSTEMS INTERNATIONAL

TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN, CALL DIGGERS HOTLINE

TOLL FREE: 1-800-242-8511
FAX A LOCATE: 1-800-242-5811

WI STATUTE 182.0175 (1974) REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

ENGINEER SEAL:

WISCONSIN
DUSTIN A. BROOKS
47220-6
MADISON, WI
07-04-21
PROFESSIONAL ENGINEER

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: 03-04-21

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

TITLE SHEET
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:

INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	G-001

NOTES:

1. AERIAL IMAGERY FROM GOOGLE EARTH.
2. NORTH ARROW SHOWN AS APPROXIMATE.
3. SITE PHOTOS PROVIDED BY EDGE CONSULTING ENGINEERS, INC.
4. NO SURVEY AVAILABLE. SITE LAYOUT BASED ON FIELD MEASUREMENTS AND SITE PHOTOS.

20' 0 20' 40'
SCALE: 11" x 17" - 1" = 40'
22" x 34" - 1" = 20'

CONSULTANT:
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Consulting Engineers, Inc.
624 WATER STREET
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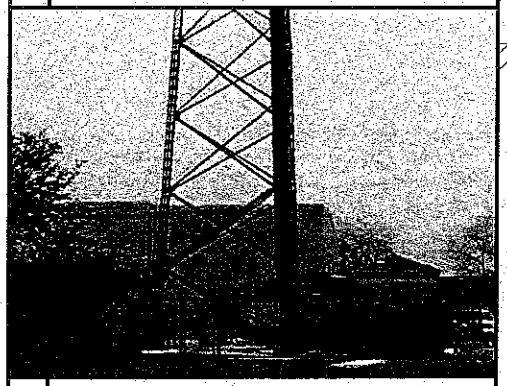
CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
dba VERIZON WIRELESS
1515 E. WOODFIELD ROAD
16TH FLOOR
SCHAUMBURG, IL 60173

SITE PLAN
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

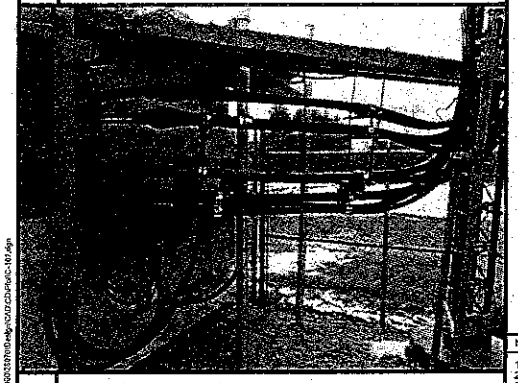
SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	2/26/21	REV. B
CV	6/04/21	REV. C

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	C-101

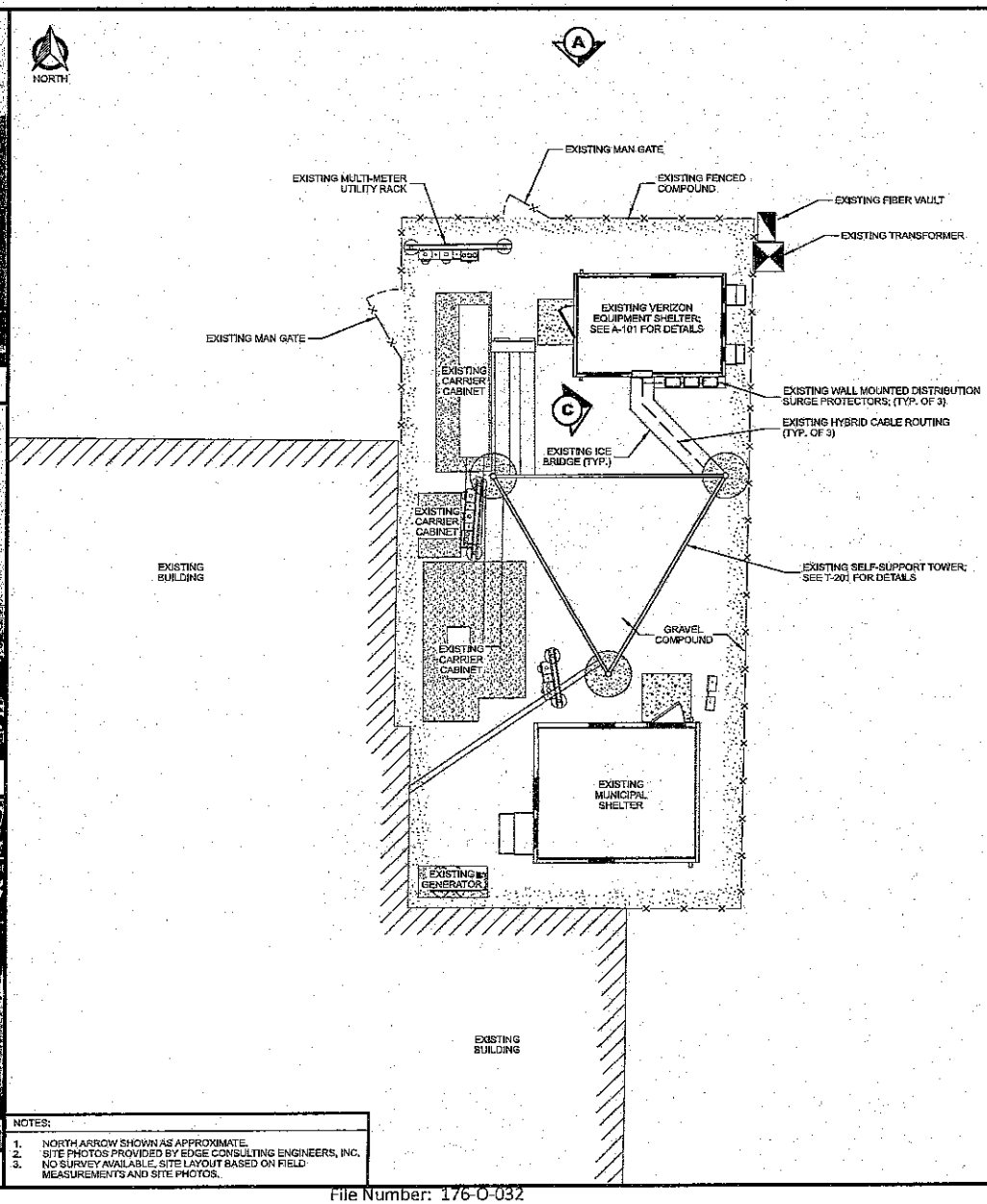
A COMPOUND OVERVIEW



B COMPOUND OVERVIEW



C ICE BRIDGE



NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. SITE PHOTOS PROVIDED BY EDGE CONSULTING ENGINEERS, INC.
3. NO SURVEY AVAILABLE, SITE LAYOUT BASED ON FIELD MEASUREMENTS AND SITE PHOTOS.

SCALE: 11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
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608.644.1549 FAX
www.edgeconsult.com

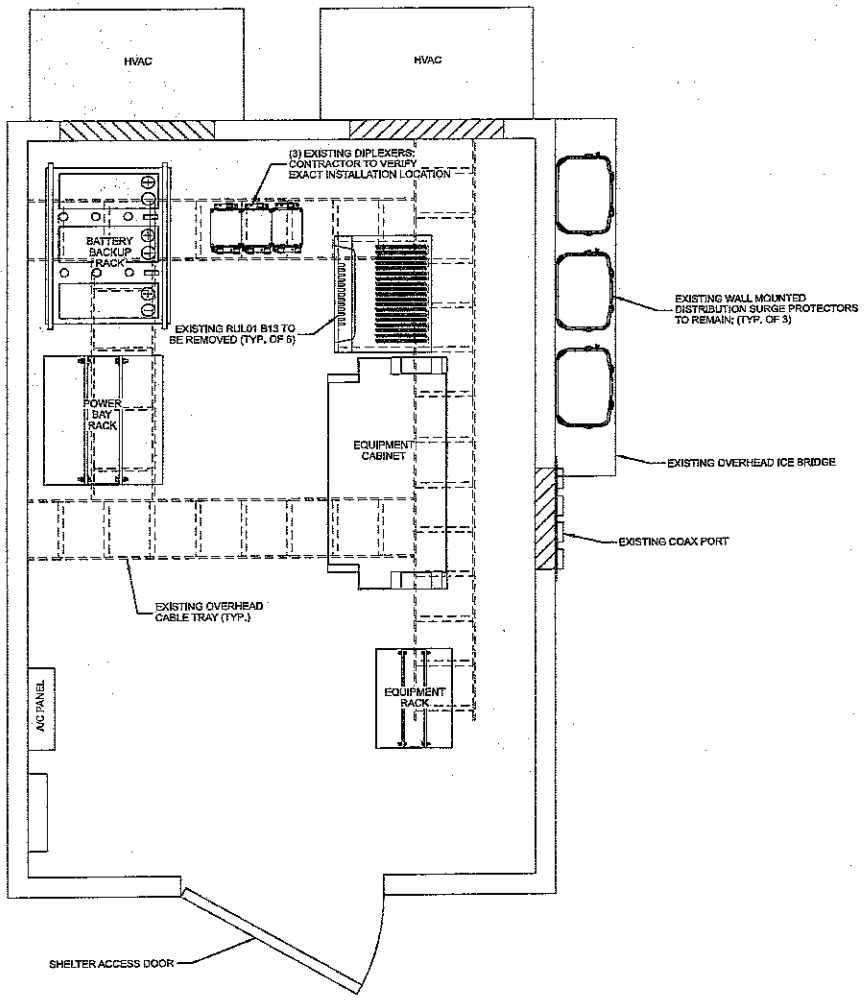
CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

ENLARGED SITE PLAN

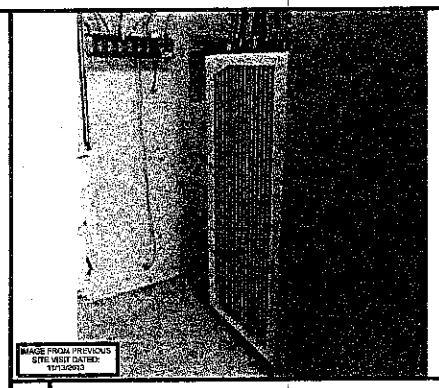
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE	DESCRIPTION:
CV	10/21/20	REV. A
CV	02/05/21	REV. B
CV	03/04/21	REV. 0

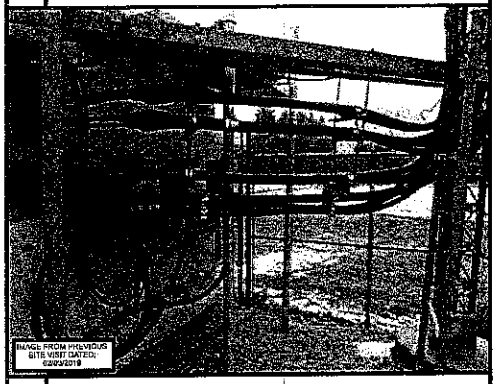
CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	C-102



A SHELTER INTERIOR LAYOUT
SCALE: 11" x 17" - 1/2" = 1'-0"
22" x 34" - 1" = 1'-0"



B EXISTING LTE EQUIPMENT CABINET



C EXISTING LOCATION OF RAYCAP SPD

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

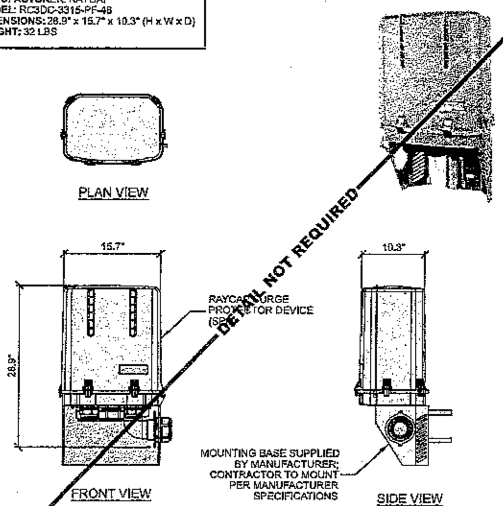
CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

SHELTER LAYOUT
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. C

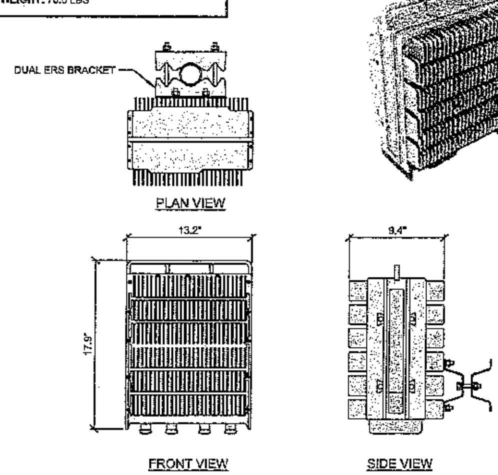
CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	A-101

MANUFACTURER: RAYCAP
MODEL: RC3DC-3315-PF-48
DIMENSIONS: 28.9" x 15.7" x 10.3" (H x W x D)
WEIGHT: 32 LBS



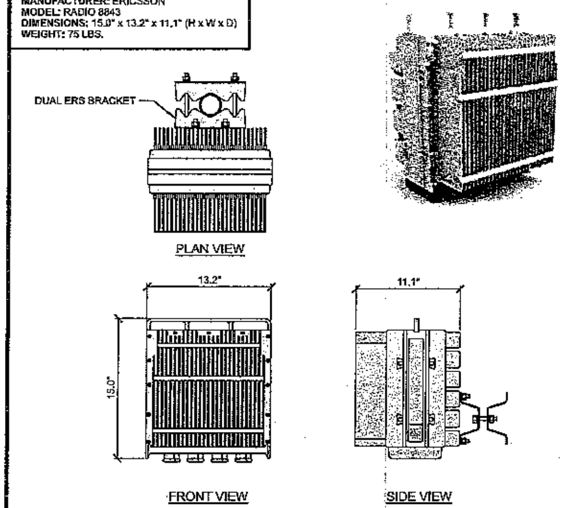
(A) RAYCAP SURGE PROTECTOR DEVICE (SPD)

MANUFACTURER: ERICSSON
MODEL: RADIO 4449
DIMENSIONS: 17.9" x 13.2" x 9.4" (H x W x D)
WEIGHT: 70.5 LBS



(B) ERICSSON RADIO 4449

MANUFACTURER: ERICSSON
MODEL: RADIO 8843
DIMENSIONS: 15.0" x 13.2" x 11.1" (H x W x D)
WEIGHT: 75 LBS.

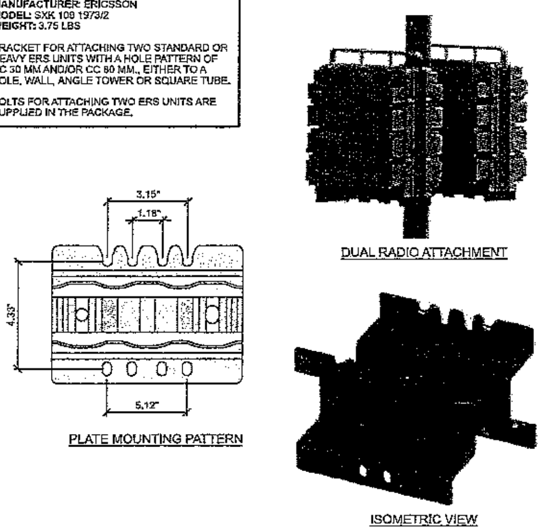


(C) ERICSSON RADIO 8843

MANUFACTURER: ERICSSON
MODEL: SXK 109 1973/2
WEIGHT: 3.75 LBS

BRACKET FOR ATTACHING TWO STANDARD OR HEAVY ERS UNITS WITH A HOLE PATTERN OF CC 30 MM AND/OR CC 80 MM., EITHER TO A POLE, WALL, ANGLE TOWER OR SQUARE TUBE.

BOLTS FOR ATTACHING TWO ERS UNITS ARE SUPPLIED IN THE PACKAGE.



(D) DUAL ERS BRACKET

THIS SPACE INTENTIONALLY LEFT BLANK

CONSULTANT:
Edge Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

EQUIPMENT SPECIFICATIONS
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:

INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/05/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-001

NHH-65C-R2B

6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Internal SET on low and high band allow remote RET control from the radio over the RF jumper cable
- Separate RS-485 RET input/output for low and high band
- One RET for low band and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1850	1850–1990	1920–2200	2300–2360
Gain, dBi	16.0	16.1	17.3	17.7	18.2	18.2
Beamwidth, Horizontal, degrees	65	62	74	66	62	59
Beamwidth, Vertical, degrees	9.0	7.9	5.6	5.2	4.9	4.5
Beam Tilt, degrees	0–11	0–11	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	21	18	19	20	22	18
Front-to-Back Ratio at 180°, dB	35	31	33	29	29	28
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	400	400	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1850	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	15.8	15.9	16.9	17.5	18.0	17.9
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.4	±0.4	±0.3	±0.6	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 15.5 3 ° | 15.9 11 ° | 15.5	0 ° | 15.6 3 °| 15.8 11 ° | 15.7	0 ° | 16.9 4 ° | 17.0 7 ° | 16.9	0 ° | 17.4 4 ° | 17.5 7 ° | 17.4	0 ° | 17.5 4 ° | 18.0 7 ° | 18.0	0 ° | 17.8 4 ° | 17.5 7 ° | 17.6
Beamwidth, Horizontal Tolerance, degrees	±7.2	±1.6	±3.3	±3.4	±6	±3.1
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.4	±0.3	±0.2	±0.2	±0.2
USLS, beampeak to 20° above beampeak, dB	15	14	17	16	17	15
Front-to-Back Total Power at 180° ± 30°, dB	26	24	28	25	25	24
CPR at Boresight, dB	18	26	20	25	20	17
CPR at Sector, dB	15	9	11	10	8	2

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper 'Time to Raise the Bar on BSAs'.

COMMSCOPE®

NHH-65C-R2B

Band	Multiband
Performance Note	Outdoor usage
Total Input Power, maximum	500 W @ 50 °C

Mechanical Specifications

RF Connector Quantity, total	6
RF Connector Quantity, low band	2
RF Connector Quantity, high band	4
RF Connector Interface	7-16 DIN Female
Color	Light gray
Grounding Type	RF connector body grounded to reflector and mounting bracket
Radiator Material	Copper | low loss circuit board
Radome Material	Fiberglass, UV-resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	393.0 N @ 150 km/h 88.5 lbf @ 150 km/h
Wind Loading, lateral	330.0 N @ 150 km/h 74.2 lbf @ 150 km/h
Wind Loading, maximum	757.0 N @ 150 km/h 170.2 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	2438.0 mm | 96.0 in
Width	301.0 mm | 11.9 in
Depth	180.0 mm | 7.1 in
Net Weight, without mounting kit	23.4 kg | 51.5 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 | Port 2
Internal RET	High band (1) | Low band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	13 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	2 female | 2 male

COMMSCOPE®

A ANTENNA SPECIFICATIONS

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
dba VERIZON WIRELESS
1515 E. WOODFIELD ROAD
16TH FLOOR
SCHAUMBURG, IL 60173

ANTENNA SPECIFICATIONS
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

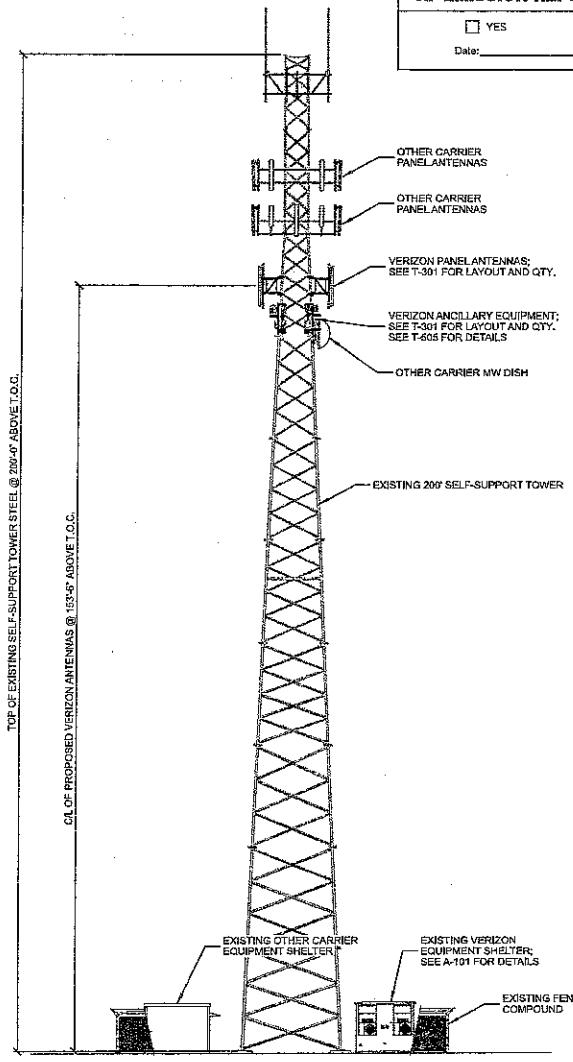
SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-002

RF EMISSION REPORT REQUIRED

☐ YES ☒ NO

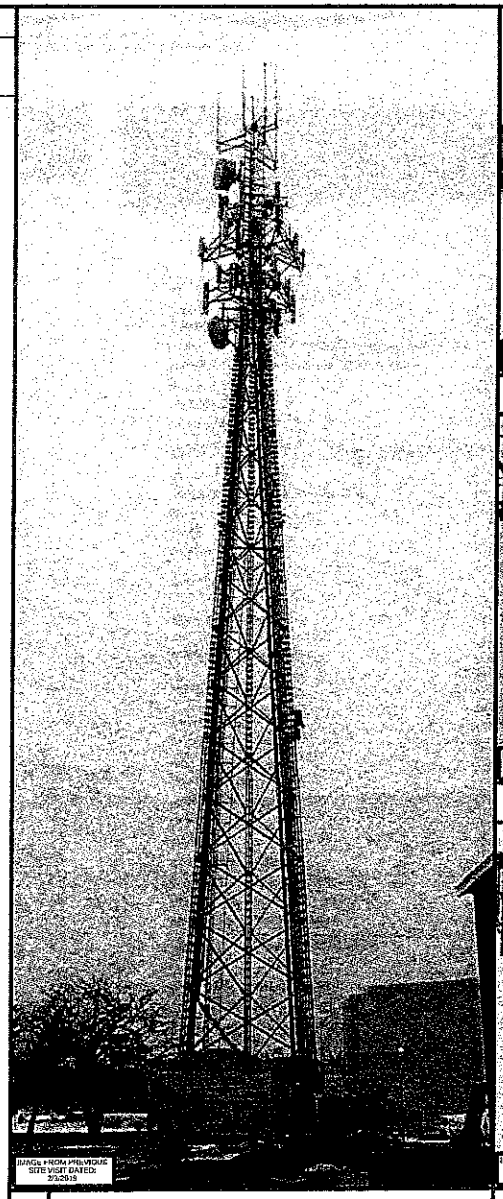
Date: _____



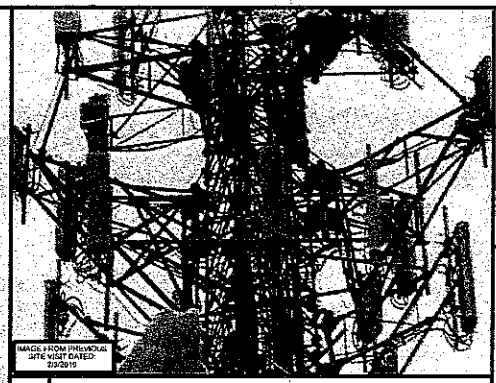
NOTES:

1. CONTRACTOR TO VERIFY HEIGHT AND DIRECTION OF ANTENNAS WITH PROJECT MANAGER AND FINAL RF DESIGN.
2. CONTRACTOR TO VERIFY LIGHTNING ROD EXTENDS 2' MIN. ABOVE ALL ANTENNAS & EQUIPMENT.
3. REFER TO STRUCTURAL REVIEW NOTE ON G-001.

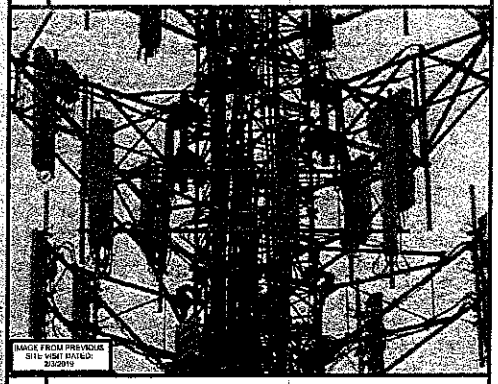
A SITE ELEVATION



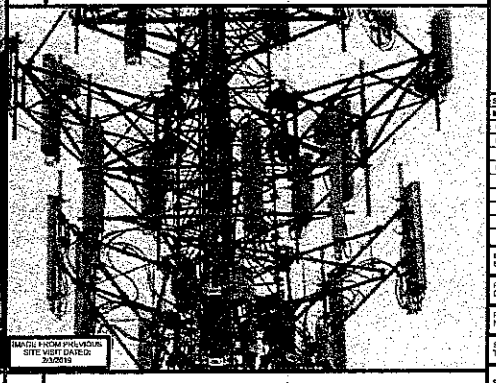
B EXISTING SITE ELEVATION



C VERIZON ALPHA SECTOR ANTENNAS



D VERIZON BETA SECTOR ANTENNAS



E VERIZON GAMMA SECTOR ANTENNAS

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.5449 VOICE
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CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
16TH FLOOR
SCHAUMBURG, IL 60173

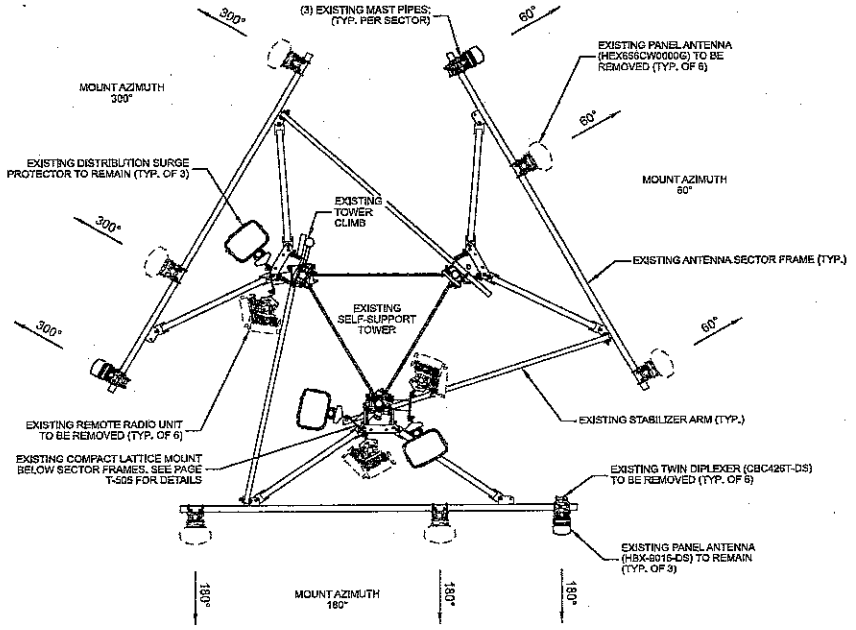
SITE ELEVATION
WAUKESHA SHERRIFFS (1133339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/05/21	REV. B
CV	03/04/21	REV. C
CHECKED BY	PCM	
PLOT DATE	3/4/2021	
PROJECT NUMBER	28070	
SET TYPE	FINAL	
SHEET NUMBER	T-201	

NORTH

LEGEND: (THIS SHEET)

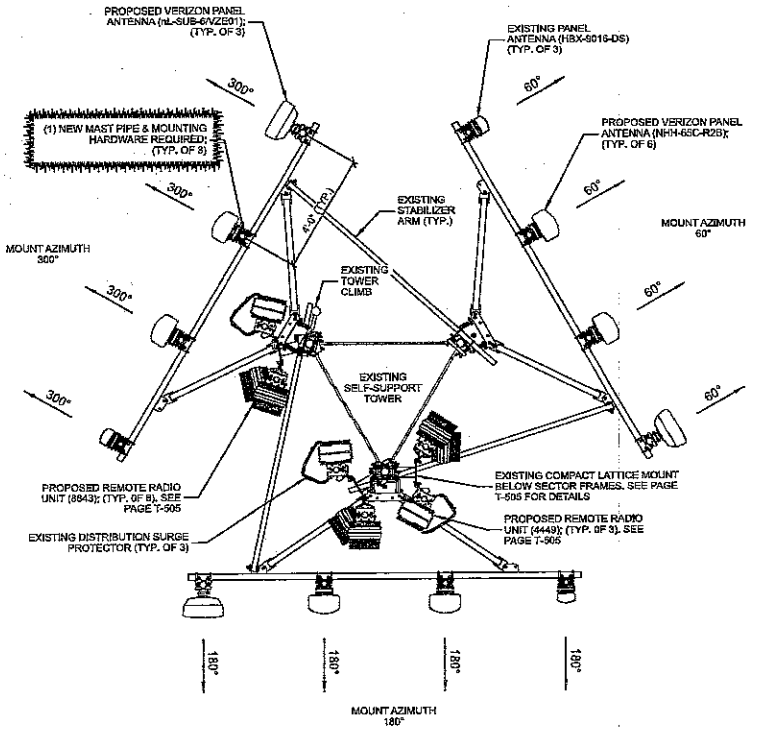
- EXISTING TO REMAIN
- EXISTING TO BE REMOVED



NOTE:
1. ALL ANTENNA AZIMUTHS TO BE FROM TRUE NORTH.

A EXISTING ANTENNA LAYOUT

NOTE:
3. ANTENNA LAYOUT IS SHOWN FOR CONVENIENCE ONLY. CONTRACTOR IS TO FOLLOW ANTENNA AND EQUIPMENT PLACEMENT IN ACCORDANCE WITH THE MOUNT ANALYSIS IDENTIFIED ON THE TITLE SHEET AND ATTACHED TO THE END OF THESE PLANS. EDGE CONSULTING ENGINEERS, INC. IS NOT RESPONSIBLE FOR ANY DISCREPANCIES BETWEEN THE MOUNT ANALYSIS AND THE INSTALLATION.



NOTES:
1. ALL ANTENNA AZIMUTHS TO BE FROM TRUE NORTH.
2. CONTRACTOR TO ROTATE ANTENNAS AS NECESSARY TO MATCH PROPOSED ANTENNA AZIMUTHS.

B PROPOSED ANTENNA LAYOUT

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
16TH FLOOR
SCHAUMBURG, IL 60173

ANTENNA AND EQUIPMENT LAYOUT

WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:

INIT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/05/21	REV. B
CV	03/04/21	REV. C

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-301

Antenna Summary

Added

700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	Quantity
LTE		LTE 5G	LTE	LTE							COMMSCOPE	NHH-65C-R2B	153.5	157.5	60(0001) 60(001) 180(0002) 180(0003) 300(0002) 300(003)	false	false	PHYSICAL	6
											TBD	4L-Sub6 Antenna	153.5	154.5	60(0001) 180(0002) 300(0003)	false	false	PHYSICAL	3

Removed

700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	Quantity
			LTE	LTE							AMPHENOL	HEX65BCW0000X-T02-2100-(-45)-WHITE (SID954)	153.5	156.5	60(01) 180(02) 300(03)	false	false	PHYSICAL	6

Retained

700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Centerline	Tip Height	Azimuth	RET	4xRx	Inst. Type	Quantity
		CDMA									ANDREW	HBX-6516DS-VTM	153.5	156.5	60(01) 180(02) 300(03)	false	false	PHYSICAL	3

Added: 3 Removed: 6 Retained: 3

A ANTENNA SUMMARY

Equipment Summary

Added

Equipment Type	Location	700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Cable Length	Cable Size	Install Type	Quantity
RRU	Tower	LTE											Ericsson	4449			PHYSICAL	3
RRU	Tower			LTE 5G	LTE	LTE							Ericsson	8843			PHYSICAL	6
RRU	Tower												Ericsson	V2C09			PHYSICAL	3

Removed

Equipment Type	Location	700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Cable Length	Cable Size	Install Type	Quantity
RRU	Tower			LTE 5G									Ericsson	RRUS32 B2			PHYSICAL	3
RRU	Tower				LTE	LTE							Ericsson	RRUS32 B66A			PHYSICAL	3
RRU	Tower	LTE											Ericsson	RUL01 B13			PHYSICAL	6
Coaxial Cables	Tower																PHYSICAL	6
Diplexer	Tower																PHYSICAL	6

Retained

Equipment Type	Location	700	850	1900	AWS	AWS3	28 GHz	31 GHz	39 GHz	CBRS	LAA	L-Sub	Make	Model	Cable Length	Cable Size	Install Type	Quantity
OVP Box	Tower												Raycap	3315			PHYSICAL	3
Hybrid Cable	Tower													6x12			PHYSICAL	3
Coaxial Cables	Tower																PHYSICAL	6
OVP Box	Similar												Raycap	3315			PHYSICAL	3

NOTE:
1. RF DESIGN DETAILED ON THIS SHEET PROVIDED BY VERIZON AND IS INCLUDED FOR CONVENIENCE ONLY. FINAL RF DESIGN TO BE VERIFIED WITH VERIZON PRIOR TO CONSTRUCTION. IF SIGNIFICANT CHANGES OR DISCREPANCIES ARE IDENTIFIED, CONTACT ENGINEER PRIOR TO INSTALLATION.

B EQUIPMENT SUMMARY

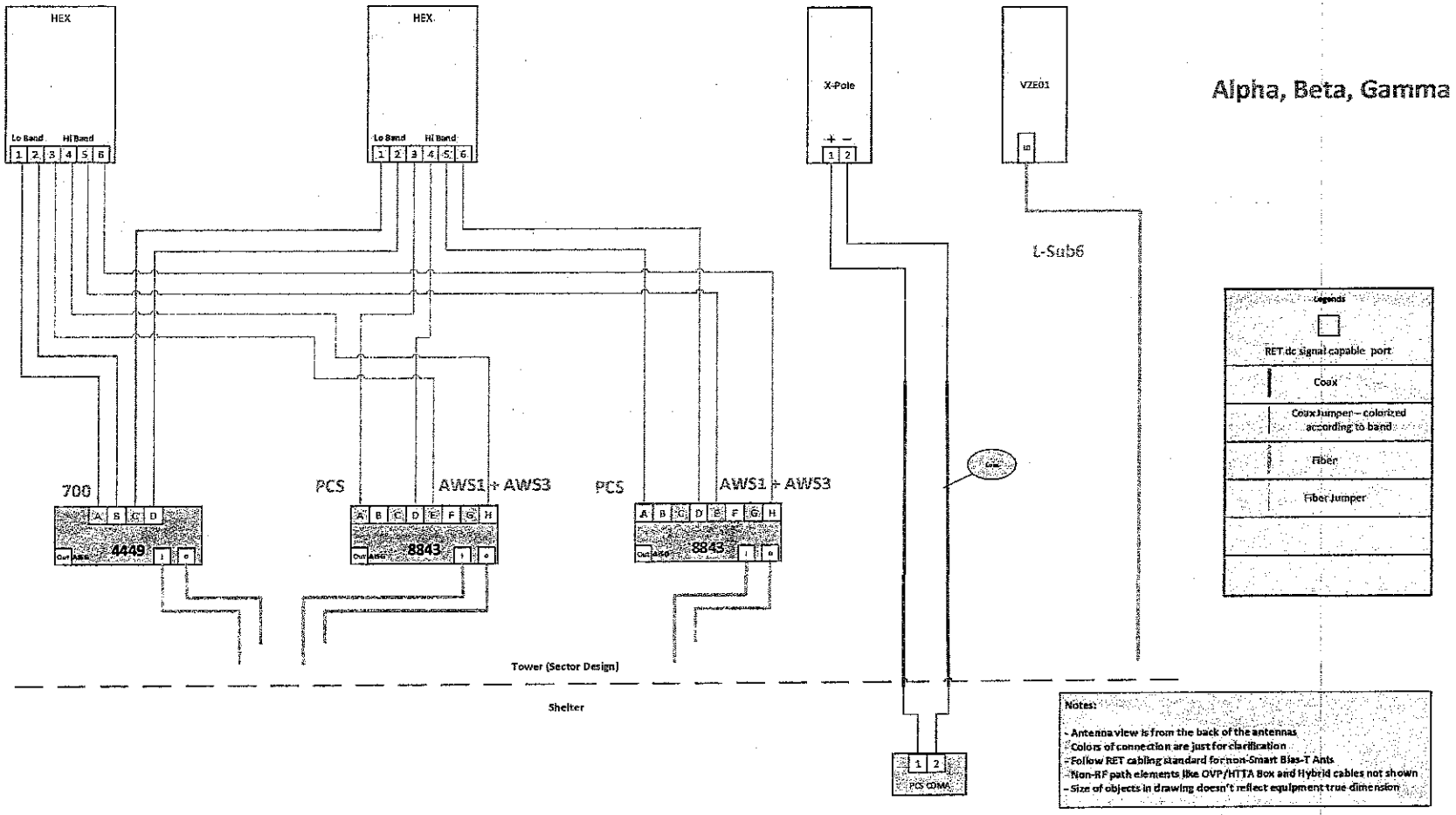
CONSULTANT:
Edge Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

ANTENNA AND EQUIPMENT SUMMARY
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/02/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	25070
SET TYPE	FINAL
SHEET NUMBER	T-501



NOTE:

1. RF DESIGN DETAILED ON THIS SHEET PROVIDED BY VERIZON AND IS INCLUDED FOR CONVENIENCE ONLY. FINAL RF DESIGN TO BE VERIFIED WITH VERIZON PRIOR TO CONSTRUCTION. IF SIGNIFICANT CHANGES OR DISCREPANCIES ARE IDENTIFIED, CONTACT ENGINEER PRIOR TO INSTALLATION.

A **PLUMBING DIAGRAM**

CONSULTANT:
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CLIENT:
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10TH FLOOR
SCHAUMBURG, IL 60173

PLUMBING DIAGRAM
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-502

HYBRID CABLE LENGTH

HYBRID CABLE LENGTH	
EXISTING HYBRID CABLE QUANTITY	3

EXISTING HYBRID CABLES TO REMAIN;
NO NEW HYBRIDS REQUIRED

JUMPER CABLE LENGTH CHECK	
IS THE DISTANCE FROM SURGE PROTECTOR TO RADIO UNIT LESS THAN 30'?	
ALPHA SECTOR	YES
BETA SECTOR	YES
GAMMA SECTOR	YES

NOTE:

1. IF CABLING LENGTH EXCEEDS MAXIMUM ALLOWED LENGTH CONTRACTOR SHALL CONTACT CLIENT AND ENGINEER TO RESOLVE PRIOR TO CONSTRUCTION.

(A) CABLE LENGTHS

Raycap Layout - Raycap Per Sector

POWER

3	[illegible]
2	[illegible]
1	[illegible]

6	700 RRU2/A2
5	[illegible]
4	[illegible]

FIBER

1	2	3	4	5	6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	8	9	10	11	12

(B) SURGE PROTECTOR LAYOUT

THIS SPACE INTENTIONALLY LEFT BLANK

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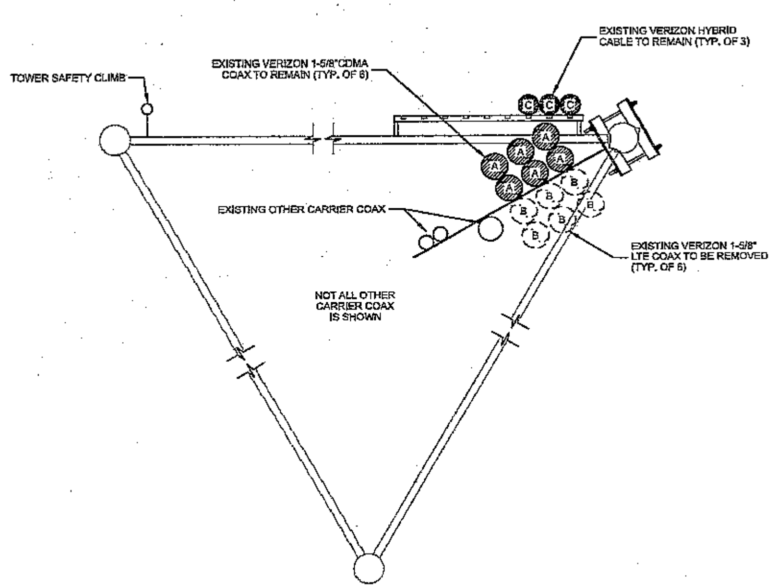
10TH FLOOR
SCHAUMBURG, IL 60173

CABLING DETAILS
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

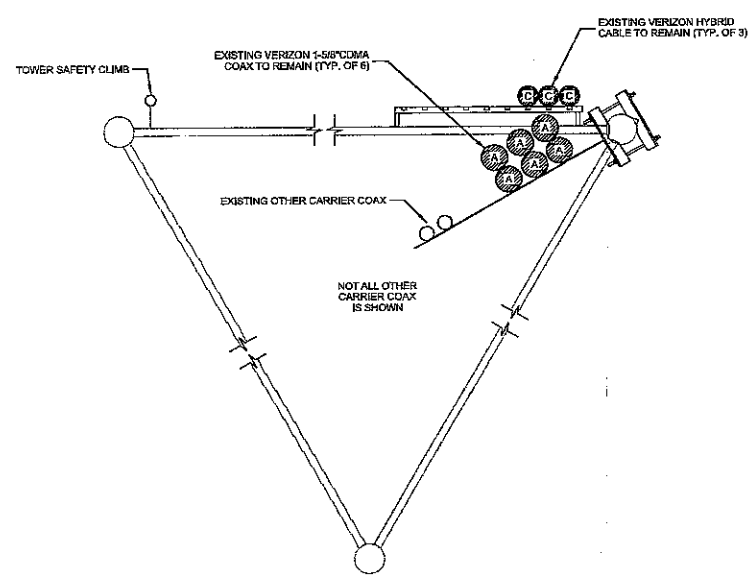
SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-503



A EXISTING TOWER CABLE LAYOUT

COAX SYMBOL	(#) SIZE	MOUNTING TYPE	CARRIER / OWNER	TECHNOLOGY
A	(6) 1-5/8"	SNAP-INS	VERIZON	CDMA
B	(6) 1-5/8"	SNAP-INS	VERIZON	LTE
C	(3) HYBRID	SNAP-INS	VERIZON	HYBRID



B PROPOSED TOWER CABLE LAYOUT

COAX SYMBOL	(#) SIZE	MOUNTING TYPE	CARRIER / OWNER	TECHNOLOGY
A	(6) 1-5/8"	SNAP-INS	VERIZON	CDMA
B				
C	(3) HYBRID	SNAP-INS	VERIZON	HYBRID

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www.edgeconsult.com

CLIENT: verizon
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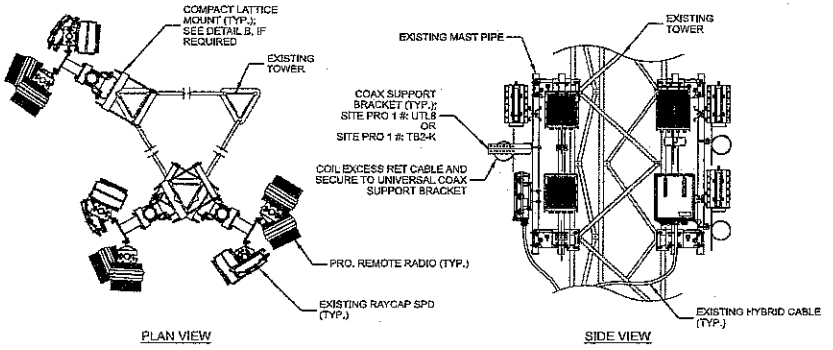
10TH FLOOR
SCHAUMBURG, IL 60173

CABLE ROUTING
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTALS:

INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

CHECKED BY: PCM
PLOT DATE: 3/4/2021
PROJECT NUMBER: 28070
SET TYPE: FINAL
SHEET NUMBER: T-504



NOTE:

1. THIS DETAIL IS A GENERAL SCHEMATIC. SEE ANTENNA CONFIG. FOR ACTUAL TOWER ORIENTATION AND EQUIPMENT QUANTITIES.
2. ROUTE CABLES ALONG ROUND MEMBERS ON TOWER STANDOFFS OR TRAP BOXES AND SNAP-IN HANGERS; SEE CABLE DETAILS SHEET.
3. ROUTE POWER AND FIBER CABLES FROM RAYCAP SPD TO REMOTE RADIOS IN 1-1/4" INNERDUCT (TYP, EACH SECTOR); CONTRACTOR TO INSTALL INNERDUCT SO THAT THE ENDS TERMINATE EITHER HORIZONTALLY OR DOWN TO PREVENT WATER INGRESS.
4. RAYCAP SPD AND REMOTE RADIOS MAY NOT BE INSTALLED ON TOWER LEGS THAT HAVE CLIMBER PEGS/SAFETY CLIMBS; CONTRACTOR TO INSTALL (2) MOUNTS ON A SINGLE LEG TO AVOID PEGS/SAFETY CLIMB AS NECESSARY.
5. PER TIA STANDARDS: FALL PROTECTION ANCHORAGES SHALL BE AVAILABLE AT A MAXIMUM SPACING OF FOUR (4) FEET OVER THE HEIGHT NOT EQUIPPED WITH A SAFETY CLIMB SYSTEM OR OVER THE LENGTH OF THE OBSTRUCTION TO THE CLIMBING FACILITY.

A ERICSSON RADIO EQUIPMENT LAYOUT SCHEMATIC

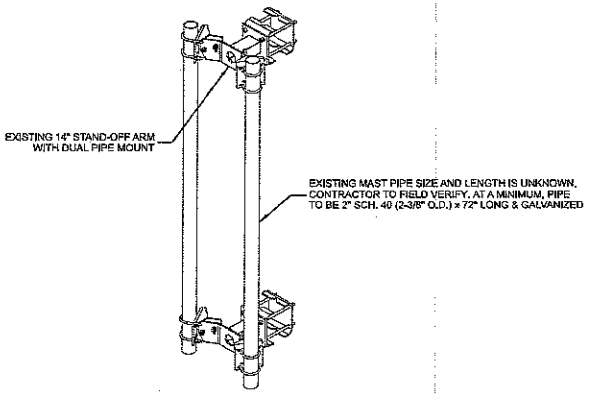
MANUFACTURER: SITE PRO 1
MODEL: CWT8 (LEG DIAMETER 1-1/2" TO 4-1/2" OR 3" ANGLE LEGS)
CWT8-LL (LEG DIAMETER 2-1/2" TO 10-3/4" OR 2" TO 8" ANGLE LEGS)

COMPACT LATTICE MOUNT

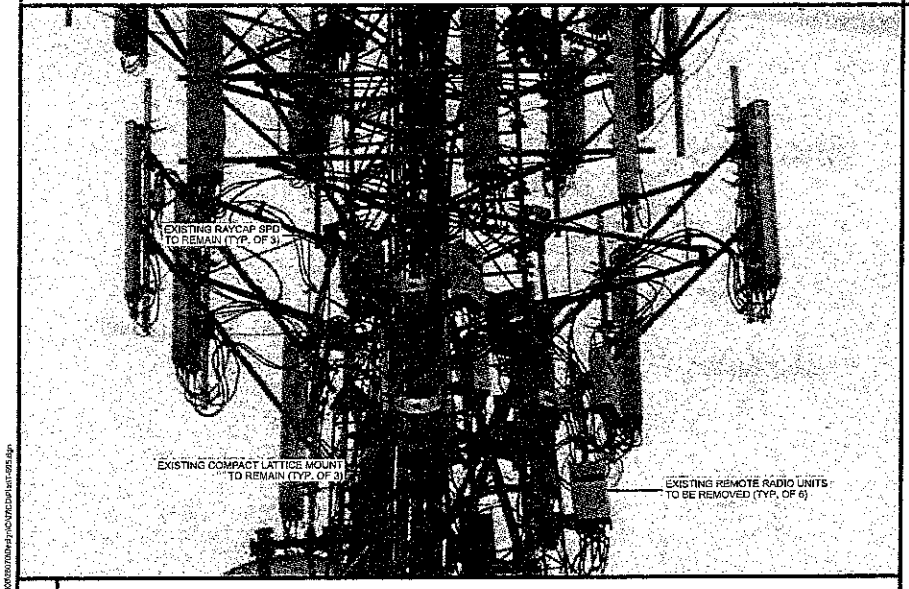
14-1/2" STANDOFF FROM POLE, 21-5/8" PIPE SEPARATION

ACCEPTS 2-3/8", 2-7/8", OR 3-1/2" O.D. PIPES

PURCHASE MAST PIPES SEPARATELY



B COMPACT LATTICE MOUNT (TYP.)



C PROPOSED RADIO EQUIPMENT LOCATION

THIS SPACE INTENTIONALLY LEFT BLANK

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
608.644.1549 FAX
www.edgeconsult.com

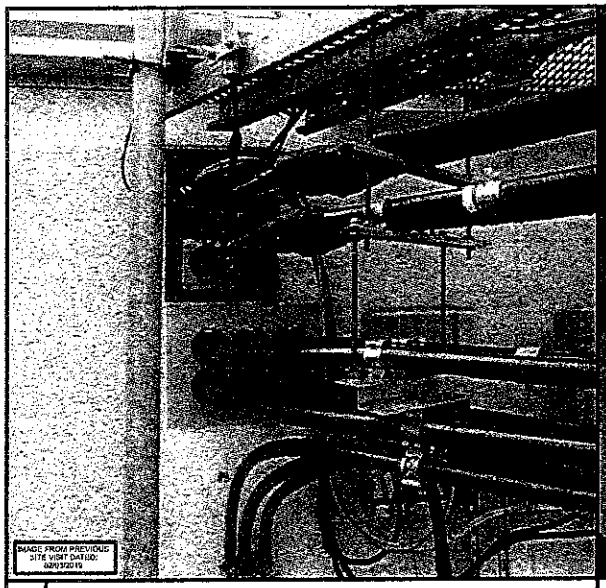
CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
dba VERIZON WIRELESS
1515 E. WOODFIELD ROAD
19TH FLOOR
SCHAUMBURG, IL 60173

EQUIPMENT MOUNT AND INSTALLATION DETAILS

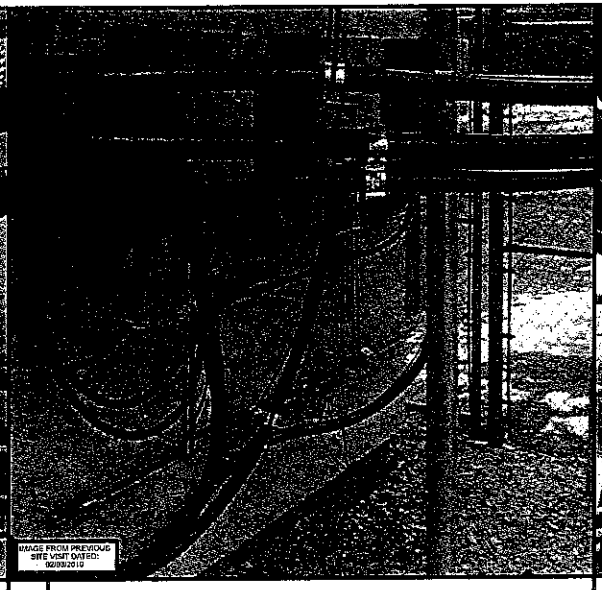
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/05/21	REV. B
CV	03/04/21	REV. 0

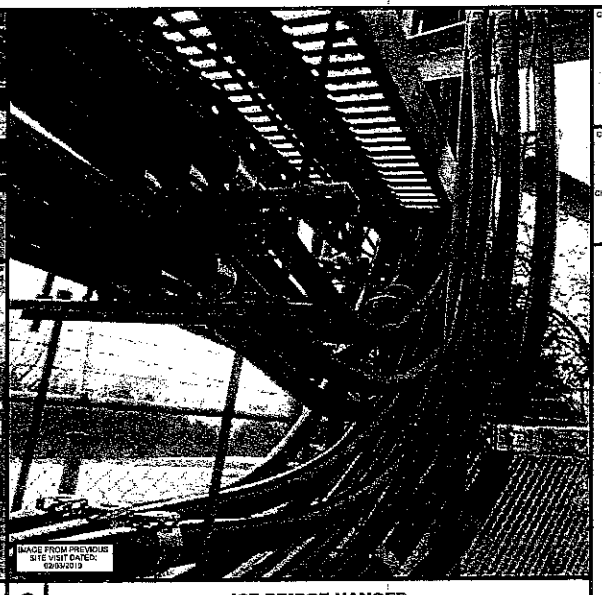
CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-505



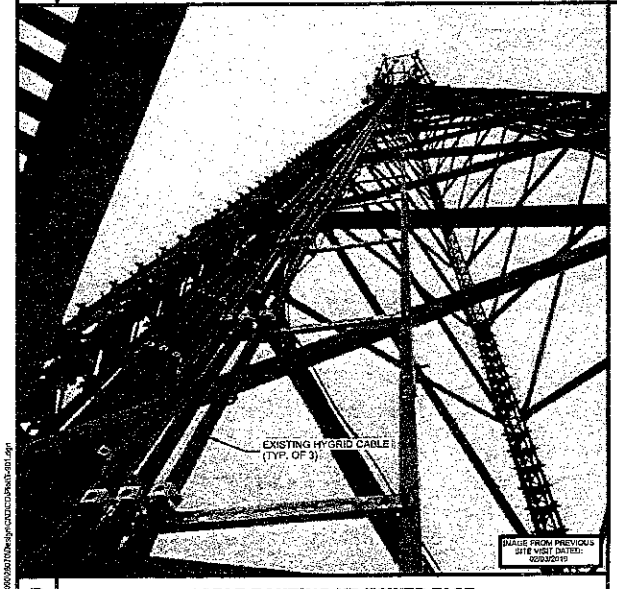
A SHELTER COAX PORT (SHELTER EXTERIOR)



B EXTERIOR SHELTER GROUND BAR



C ICE BRIDGE HANGER



D CABLE ROUTING UP TOWER FACE

THIS SPACE INTENTIONALLY LEFT BLANK

CONSULTANT:
Edge
Consulting Engineers, Inc.
624 WATER STREET
PRAIRIE DU SAC, WI 53578
608.644.1449 VOICE
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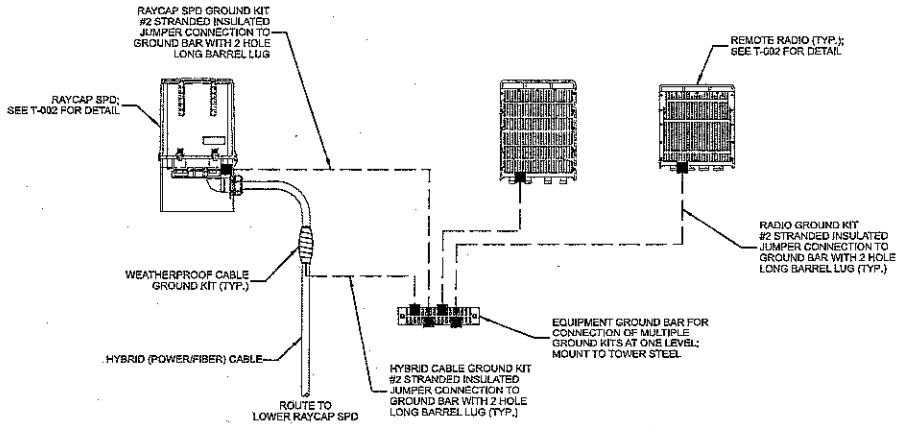
www.edgeconsult.com

CLIENT:
verizon
CHICAGO SMSA LIMITED PARTNERSHIP
d/b/a VERIZON WIRELESS
1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

SITE PHOTOS
WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	12/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. 0

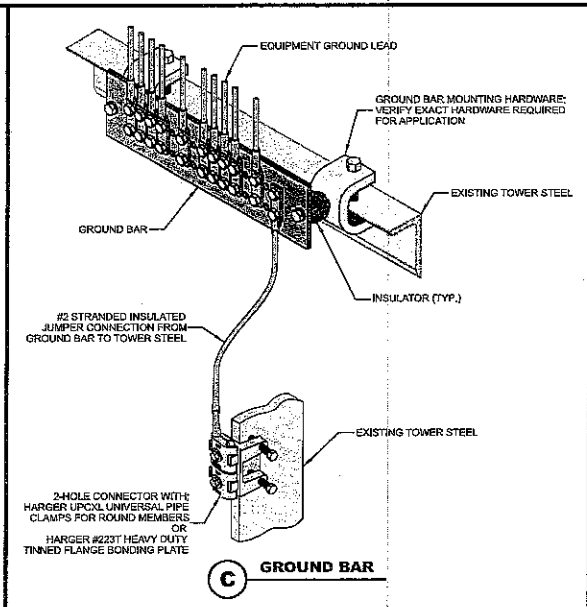
CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	T-901



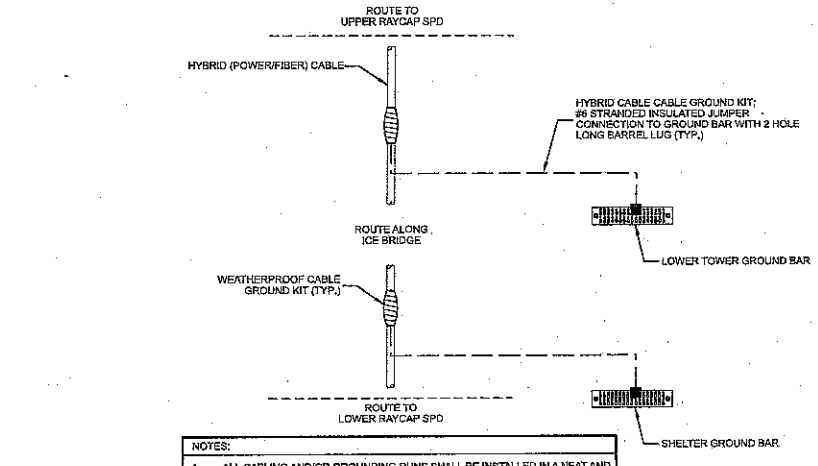
NOTES:

1. ALL CABLING AND/OR GROUNDING RUNS SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION AS DICTATED BY EXITING CONDITIONS.
2. CONTRACTOR SHALL INSTALL PER LATEST EDITION OF THE N.E.C.
3. SCHEMATIC DETAIL ONLY. REFER TO ANTENNA AND EQUIPMENT CONFIGURATION FOR EQUIPMENT QUANTITY AND LOCATION. CONTRACTOR TO VERIFY GROUND BAR CAPACITY AND DETERMINE IF NEW GROUND BAR REQUIRED PRIOR TO CONSTRUCTION.

A UPPER EQUIPMENT GROUNDING



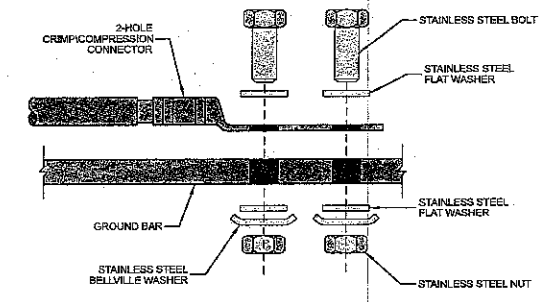
C GROUND BAR



NOTES:

1. ALL CABLING AND/OR GROUNDING RUNS SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION AS DICTATED BY EXITING CONDITIONS.
2. CONTRACTOR SHALL INSTALL PER LATEST EDITION OF THE N.E.C.
3. SCHEMATIC DETAIL ONLY. CONTRACTOR TO VERIFY GROUND BAR CAPACITY AND DETERMINE IF NEW GROUND BAR REQUIRED PRIOR TO CONSTRUCTION.

B LOWER CABLE GROUNDING



NOTES:

1. ALL OUTDOOR HARDWARE (BOLTS, SCREWS, NUTS, WASHERS) SHALL BE 18-8 STAINLESS STEEL TYPE GRADE. INDOORS, GRADE 5 STEEL HARDWARE MAY BE USED.
2. CHOOSE BOLT LENGTH TO ALLOW THE EXPOSURE OF AT LEAST TWO THREADS.
3. BACK TO BACK LUG CONNECTIONS ARE AN ACCEPTABLE PRACTICE WHEN BONDED TO A GROUND BAR OR STEEL OBJECTS.
4. AT CONNECTIONS MADE TO STEEL OR ANY OTHER DISSIMILAR METALS, A DRAGON TOOTH WASHER MEETING VZW PRACTICES SHALL BE USED BETWEEN THE CONNECTOR AND STEEL.
5. IF NOT USING DRAGON TOOTH WASHERS, THOROUGHLY REMOVE A SECTION OF PAINT OR COATING APPROXIMATELY THE SAME SIZE AS CONNECTOR. REMOVE THE PAINT FROM SURFACE USING A DREMEL TYPE TOOL.
6. USE AN APPROVED ANTI-OXIDATION COMPOUND ON ALL GROUNDING CONNECTIONS. A COPPER COSMOLINE GREASE BASED COMPOUND (NO OX-ID) SHALL BE USED ON ALL COPPER TO COPPER CONNECTIONS. A ZINC BASED (GREY COLORED) COMPOUND SHALL BE USED ON ALL COPPER TO STEEL CONNECTIONS.
7. WHEN BONDING TO A METALLIC OBJECT WHERE ACCESS IS LIMITED TO ONLY ONE SURFACE, DRILLING & TAPPING OR SELF DRILLING SCREWS ARE THE PREFERRED AND ACCEPTABLE MEANS OF CONNECTION. SHEET METAL SCREWS SHALL NOT BE USED.

D GROUNDING LUG

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1515 E. WOODFIELD ROAD
10TH FLOOR
SCHAUMBURG, IL 60173

GROUNDING DETAILS

WAUKESHA SHERRIFFS (113339)
NASHOTAH, WISCONSIN

SUBMITTAL:		
INT.	DATE:	DESCRIPTION:
CV	10/21/20	REV. A
CV	02/09/21	REV. B
CV	03/04/21	REV. C

CHECKED BY	PCM
PLOT DATE	3/4/2021
PROJECT NUMBER	28070
SET TYPE	FINAL
SHEET NUMBER	E-501

verizon

PAUL J. FORD & COMPANY

Paul J. Ford and Company
250 East Broad Street Suite 600
Columbus, OH 43215
(614) 221-6679
Rdorris@pauljford.com

Antenna Mount Analysis Report and PMI Requirements

Mount Analysis

SMART Tool Project #: 10018179

Paul J. Ford Project #: 24320-0674.001.8190 Rev 1

January 20, 2021

Site Information	*Site ID:*	*113339-VZW / WAUKESHA SHERRIFFS -- 698817*
	Site Name:	*WAUKESHA SHERRIFFS -- 698817*
	Carrier Name:	*Verizon Wireless*
	Address:	*W33480 Wisconsin Avenue Nashotah, Wisconsin 53058, Waukesha County*
	Latitude:	*43.103300°*
	Longitude:	*-88.411940°*
Structure Information	*Tower Type:*	*200-Ft Self Support*
	Mount Type:	*12.50-Ft Sector Frames*

FUZE ID # 16248108

Analysis Results

Sector Frames: **45.2% Pass**

******Contractor PMI Requirements:***
Included at the end of this MA report
Available & Submitted via portal at https://pmi.vzwsmart.com
Contractor - Please Review Specific Site PMI Requirements Upon Award
Requirements also Noted on Mount Modification Drawings
Requirements may also be Noted on A & E drawings

Report Prepared By: Rebekah M. Dorris, PE

D.S.

WISCONSIN
REBEKAH M. DORRIS
E-47595
COLUMBUS, OHIO
PROFESSIONAL ENGINEER

01/21/2021

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 20

Executive Summary:

The objective of this report is to determine the capacity of the antenna support mount at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

This analysis is inclusive of the mount structure only, and does not address the structural capacity of the supporting structure. This mounting frame was not analyzed as an anchor attachment point for fall protection. All climbing activities are required to have a fall protection plan completed by a competent person.

Sources of Information:

Document Type	Remarks
Radio Frequency Data Sheet (RFDS)	*Verizon RFDS, FUZE ID# 16248108, dated November 2, 2020*
Mount Specification	*Sabre, C10857111*
Construction Drawings (Previous Project)	*Edge, Project # 14734, dated September 13, 2017*

Analysis Criteria:

Codes and Standards:	ANSI/TIA-222-H	
Wind Parameters:	Basic Wind Speed (Ultimate 3-sec. Gust), V_{ULT}:	114 mph
	Ice Wind Speed (3-sec. Gust):	40 mph
	Design Ice Thickness:	1.50 in
	Risk Category:	III
	Exposure Category:	C
	Topographic Category:	1
	Topographic Feature Considered:	N/A
	Topographic Method:	N/A
	Ground Elevation Factor, K_e:	0.967
Seismic Parameters:	S_S:	0.074
	S_1:	0.048
Maintenance Parameters:	Wind Speed (3-sec. Gust):	30 mph
	Maintenance Live Load, Lv:	250 lbs.
	Maintenance Live Load, Lm:	500 lbs.
Analysis Software:	RISA-3D (V17.0.3)	

Final Loading Configuration:

The following equipment has been considered for the analysis of the mounts:

Mount Elevation (ft)	Equipment Elevation (ft)	Quantity	Manufacturer	Model	Status
153.5	153.5	6	Commscope	NHH-65C-R2B	Added
		3	Ericsson	VZE01	
		3	Ericsson	4449	
		6	Ericsson	8843	
		3	Andrew	HBX-9016DS-VTM	Retained
		3	Raycap	RxxDC-3315-PF-48	

Any proposed antennas not currently installed should be mounted such that the centerline of the antennas does not exceed 6 inches vertically from the center of the antenna mounts.

Standard Conditions:

1. All engineering services are performed on the basis that the information provided to Paul J. Ford and used in this analysis is current and correct. The existing equipment loading has been applied at locations determined from the supplied documentation. Any deviation from the loading locations specified in this report shall be communicated to Paul J. Ford to verify deviation will not adversely impact the analysis.

2. Mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications.

   Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping and reported in the Mount Mapping Report are assumed to be corrected and documented as part of the PMI process and are not considered in the mount analysis.

   The mount analysis and the mount mapping are not a condition assessment of the mount. Proper maintenance and condition assessments are still required post analysis.

3. For mount analyses completed from other data sources (including new replacement mounts) and not specifically mapped by PJF, the mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications.

4. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

5. The mount was checked up to, and including, the bolts that fasten it to the mount collar/attachment and threaded rod connections in collar members if applicable. Local deformation and interaction between the mount collar/attachment and the supporting tower structure are outside the scope of this analysis.

6. All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford is not responsible for the conclusion, opinions, and recommendations made by others based on the information supplied.

7. Structural Steel Grades have been assumed as follows, if applicable, unless otherwise noted in this analysis:
   - Solid Round, Plate — ASTM A572 (Gr. 50)
   - Pipe — ASTM A53 (Gr. B-35) and A500 Gr. C
   - Bolts — ASTM A325

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Paul J. Ford.

Analysis Results:

Component	Utilization %	Pass/Fail
Face Horizontals	*16.8%*	*Pass*
Standoff Members	*20.5%*	*Pass*
Tie Backs	*4.4%*	*Pass*
Bracing Members	*45.2%*	*Pass*
Mount Pipes	*29.5%*	*Pass*
Mount to Tower Connection	*9.9%*	*Pass*

Structure Rating – *(Controlling Utilization of all Components)*	45.2%

Recommendation:

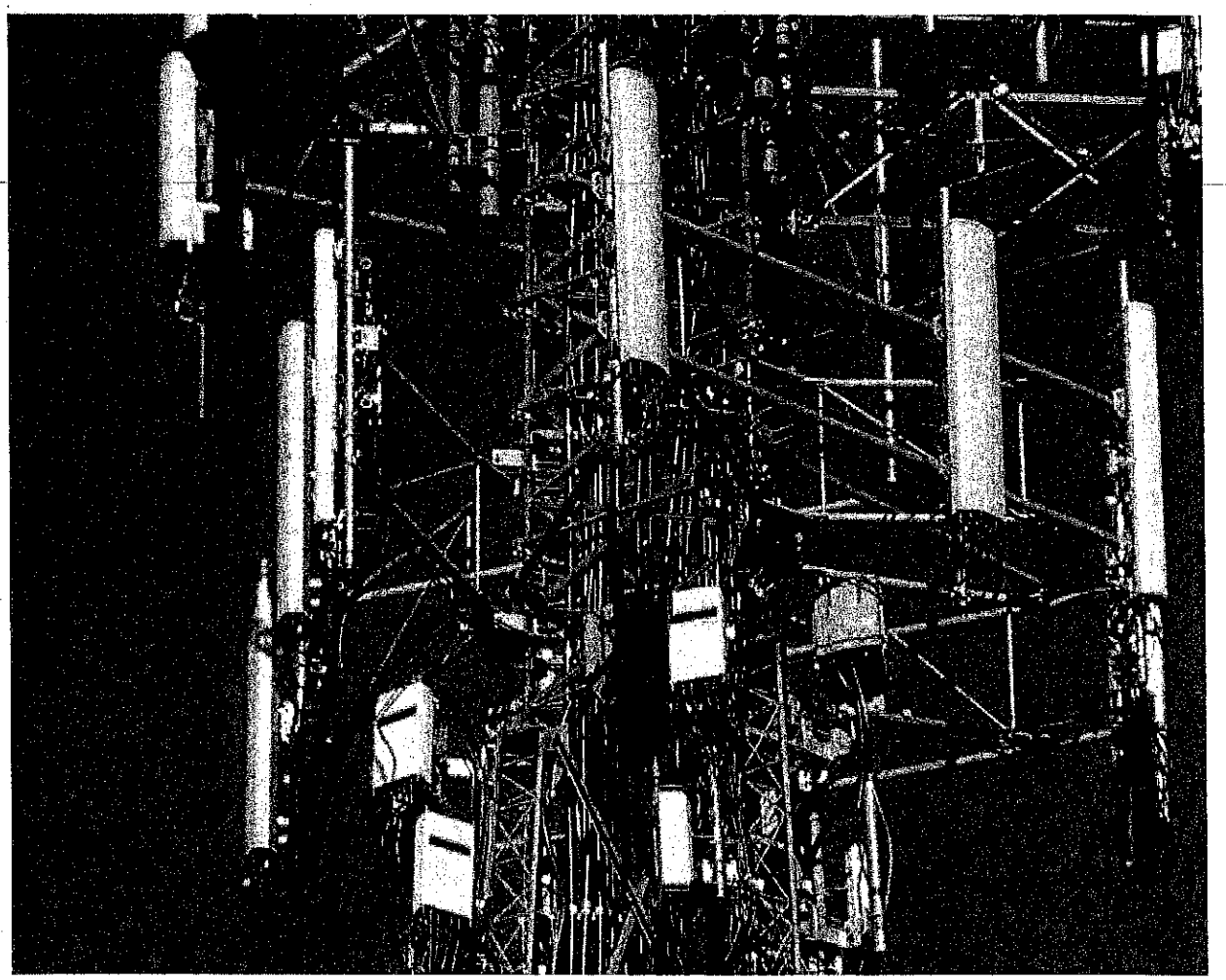
The existing mounts are **SUFFICIENT** for the final loading configuration and do not require modifications.

ANSI/ASSP rigging plan review services compliant with the requirements of ANSI/TIA 322 are available for a Construction Class IV site or other, if required. Separate review fees will apply.

Install (3) 8', P2 STD (2.375"x0.154") ASTM A53 (Gr. B-35) mount pipes for the proposed antennas, equidistant between the installed mount pipes. (6) VZWSMART-MSK1 crossover plates will be required for installation. Pipes shall be installed at the location shown per the placement diagram attached to this report. Vertical projection shall be the same as existing mount pipes.

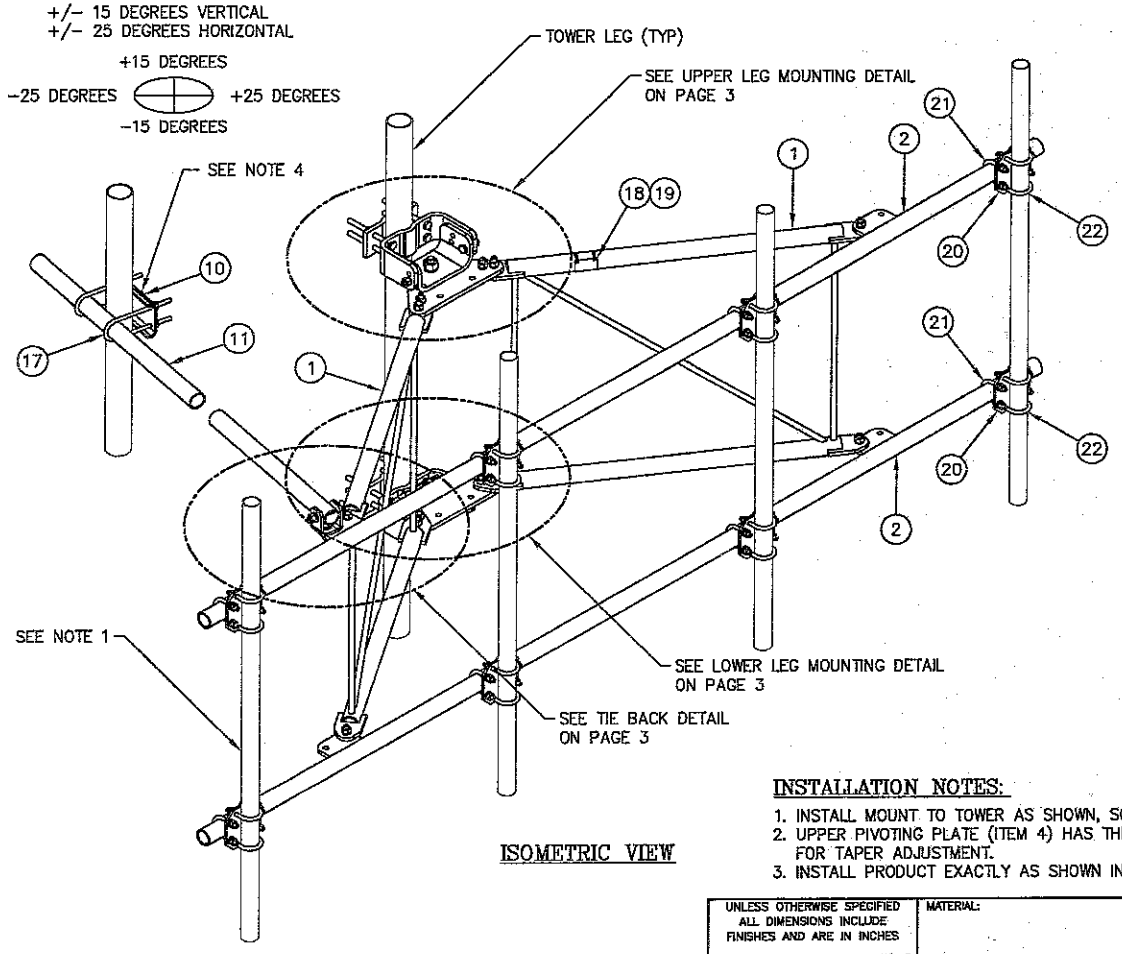
Attachments:

1. Mount Photos
2. Mount Manufacturer Drawings (for reference only)
3. Analysis Calculations
4. **Contractor Required Post Installation Inspection (PMI) Report Deliverables**
5. Antenna Placement Diagrams



TIEBACK ANGLE RANGE DETAIL

+/– 15 DEGREES VERTICAL
+/– 25 DEGREES HORIZONTAL



ISOMETRIC VIEW

C10857111C 12' HD V-BOOM ASSEMBLY W/TIEBACK

ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	CW01222	WELDMENT, STANDOFF ARM	126
2.	2	CW01223	WELDMENT, FACE PIPE	147
3.	2	CS03109	PLATE, ROTATING	34
4.	1	CS03110	PLATE, PIVOTING (UPPER)	16
5.	1	CS03111	PLATE, LEG CLAMP (UPPER)	17
6.	1	CS03112	PLATE, PIVOTING (LOWER)	14
7.	1	CS03113	PLATE, LEG CLAMP (LOWER)	17
8.	2	CS03114	PLATE, LEG CLAMP (BACK)	14
9.	1	CS00098	PLATE, TIE BACK SWIVEL	3
10.	1	CS03285	PLATE, TIE BACK CLAMP	4
11.	1	CS03333	PIPE, TIE BACK	38
12.	2	C40026073	BOLT ASSEMBLY, 1 ø X 3 A325	4
13.	8	C40140004	BOLT ASSEMBLY, 5/8 ø X 8 A307	13
14.	1	C40026033	BOLT ASSEMBLY, 5/8 ø X 4 1/2 A325	1
15.	12	C40026025	BOLT ASSEMBLY, 5/8 ø X 2 1/2 A325	6
16.	5	C40026024	BOLT ASSEMBLY, 5/8 ø X 2 1/4 A325	3
17.	2	C40034183	U-BOLT ASSEMBLY, 1/2 ø X 2 9/16 C-C	3
18.	1	Z30992001	MOUNT CLASSIFICATION TAG C10857001C	1
19.	2	C40062103	STAINLESS STEEL SELF-LOCKING CABLE TIE	1
20.	8	CS03116	CROSSOVER PLATE (2 3/8–2 7/8 PIPE)	34
21.	16	C40034139	U-BOLT ASSEMBLY, 1/2 ø X 2 15/16 C-C	13
22.	16	C40034140	U-BOLT ASSEMBLY, 1/2 ø X 3 7/16 C-C	14
			TOTAL WEIGHT	523

PACKAGING NOTE

CK00386 INCLUDES ITEMS 1, 3, 4, 5, 6, 7, 12 & 15 (8 QTY)
CK00387 INCLUDES ITEMS 2, 8, 9, 10, 11, 13, 14, 15 (4 QTY), 16, 17, 18 & 19

INSTALLATION NOTES:

1. INSTALL MOUNT TO TOWER AS SHOWN, SO THAT WELDED STANDOFF DIAGONAL IS SLOPING DOWNWARD FROM TOWER END TO FACE PIPE END.
2. UPPER PIVOTING PLATE (ITEM 4) HAS THREE HOLES ON EACH SIDE AND UPPER LEG CLAMP PLATE (ITEM 5) HAS TWO HOLES ON EACH SIDE FOR TAPER ADJUSTMENT.
3. INSTALL PRODUCT EXACTLY AS SHOWN IN DRAWING, WITH ALL BOLTS FACING UPWARDS.

NOTES:

1. 2 7/8" O.D. MOUNTING PIPES MUST BE PURCHASED SEPARATELY.
2. QUANTITIES SHOWN IN LISTS OF MATERIAL ARE FOR ONE (1) V-BOOM ONLY.
3. THIS V-BOOM WILL MOUNT TO THE FOLLOWING: 1 1/2"ø TO 5 9/16"ø ROUND LEG.
4. TIEBACK MUST BE CONNECTED TO A RIGID MEMBER THAT PROVIDES ADEQUATE SUPPORT WITHIN THE LIMITS NOTED ABOVE IN THE TIEBACK ANGLE RANGE DETAIL UNLESS APPROVED BY THE ENGINEER OF RECORD.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES
TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"
MATERIAL:
TOLERANCES DO NOT APPLY TO RAW MATERIAL

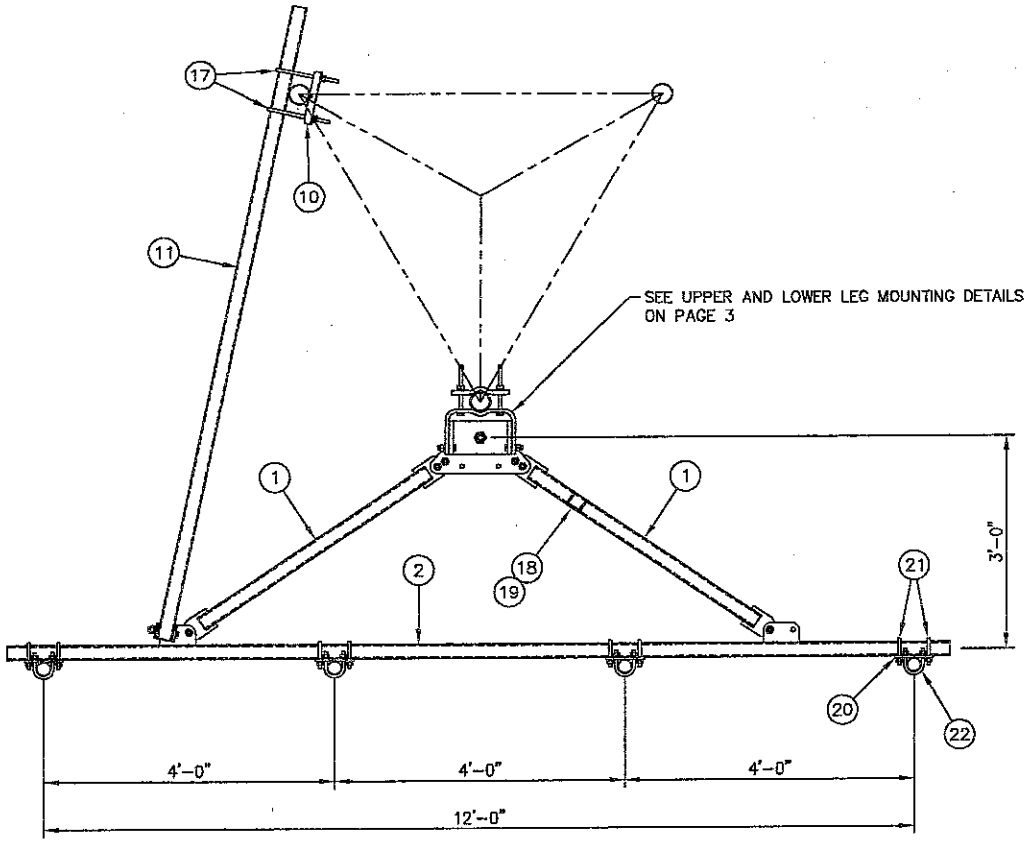
REV	DATE	DRW	CHK	DESCRIPTION
2	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES
1	02/15/16	KLE	EK	ADDED PACKAGING NOTE

Sabre Industries
Towers and Poles

12' HD V-BOOM ASSEMBLY W/TIEBACK (3' STANDOFF) W/CROSSOVER PLATE KITS (2 3/8–2 7/8)

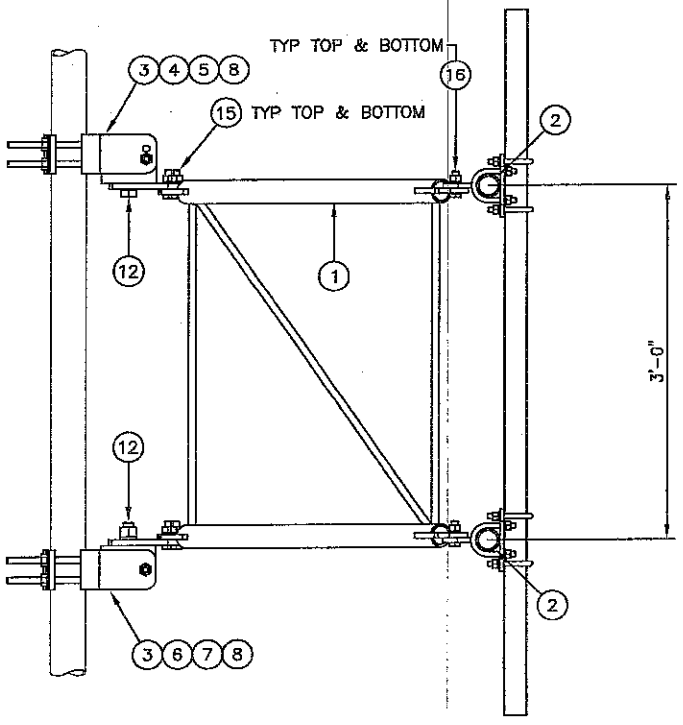
		SIZE	DRAWING NO.	REV
DATE	01/16/16	B	C10857111C	2
DRAWN BY	WRF			
CHECKED BY	EK	SCALE None	PAGE 1 OF 3	

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 25



MOUNTING OPTION

SHOWING MOUNTING PIPE PLACEMENTS



SIDE VIEW

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"

MATERIAL:

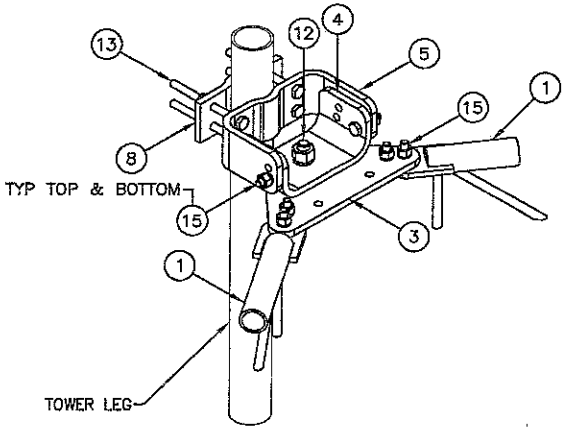
TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
2	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES
1	02/15/16	KLE	EK	ADDED PACKAGING NOTE

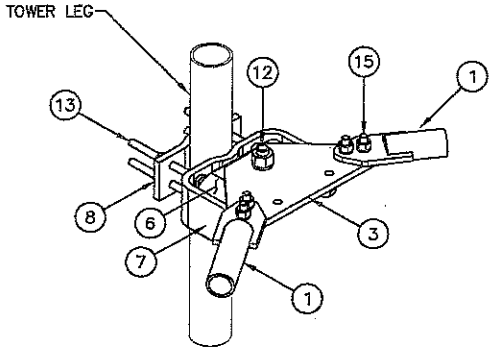
Sabre Industries
Towers and Poles

12' HD V-BOOM ASSEMBLY W/TIEBACK (3' STANDOFF) W/CROSSOVER PLATE KITS (2 3/8-2 7/8)

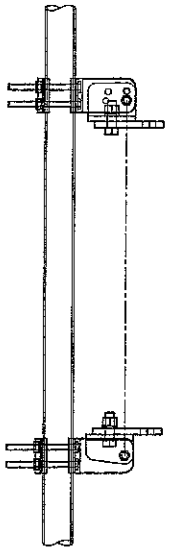
		SIZE	DRAWING NO.	REV
DATE	01/16/16	B	C10857111C	2
DRAWN BY	WRF		SCALE None	PAGE 2 OF 3
CHECKED BY	EK			



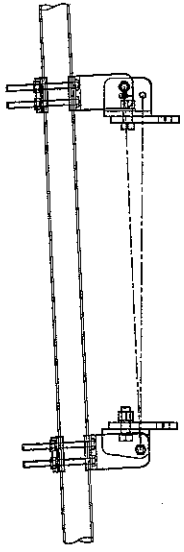
UPPER LEG MOUNTING DETAIL



LOWER LEG MOUNTING DETAIL



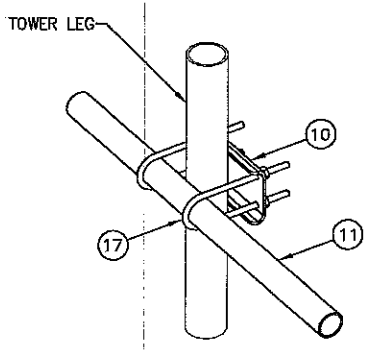
STRAIGHT
TOWER SECTION



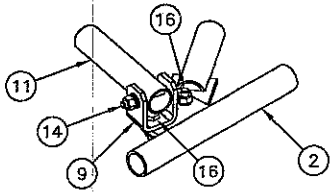
TAPERED
1'–9 IN 20' SLOPE

TAPERED
2' IN 20' SLOPE

--------PIVOTING OPTIONS--------



TIE BACK DETAIL
AT TOWER LEG



TIE BACK DETAIL
AT ANTENNA MOUNTING FRAME

REV	DATE	DRW	CHK	DESCRIPTION
2	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES
1	02/15/15	KLE	EK	ADDED PACKAGING NOTE

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES
TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:
TOLERANCES DO NOT APPLY TO RAW MATERIAL

Sabre Industries
Towers and Poles

12' HD V-BOOM ASSEMBLY W/TIEBACK
(3' STANDOFF)
W/CROSSOVER PLATE KITS (2 3/8-2 7/8)

DATE	01/16/16
DRAWN BY	WRF
CHECKED BY	EK

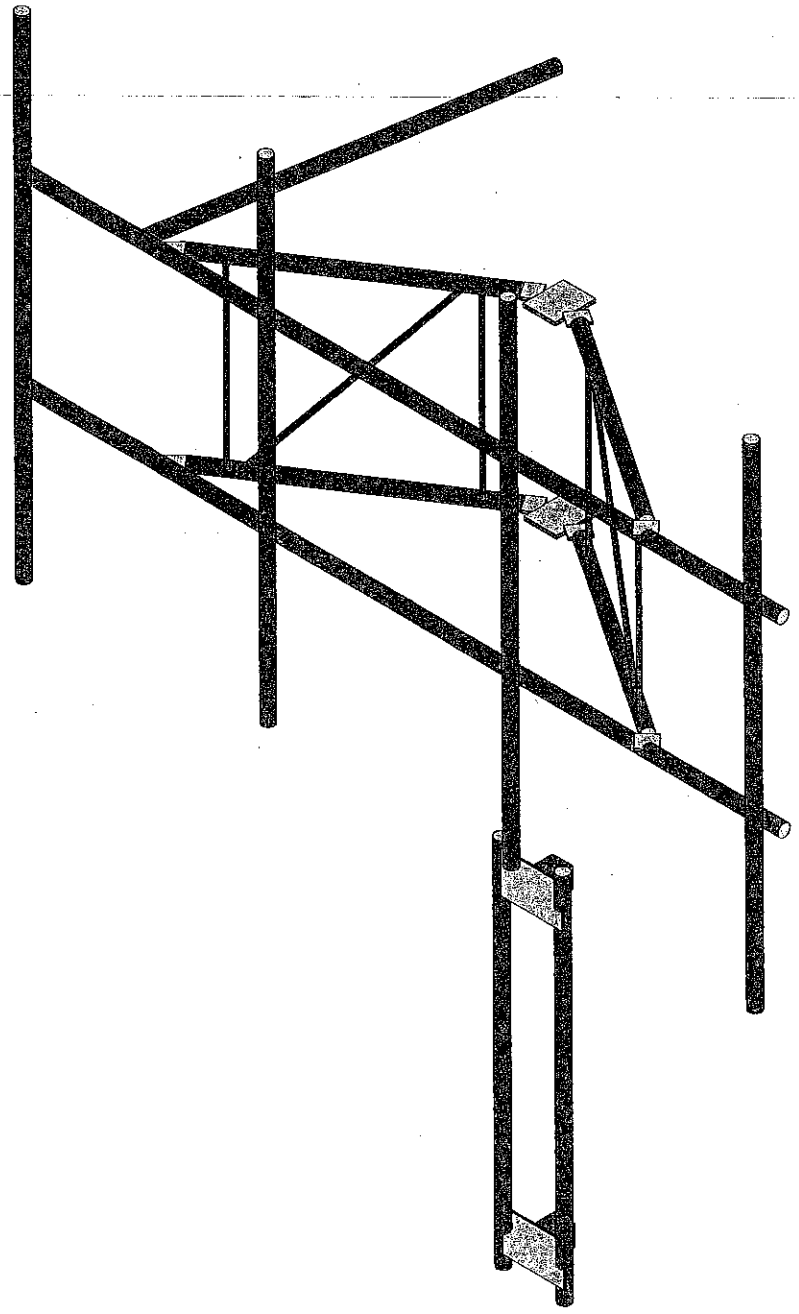
SIZE	DRAWING NO.	REV
B	C10857111C	2

SCALE	PAGE
None	3 OF 3

Referred on: 06/03/21

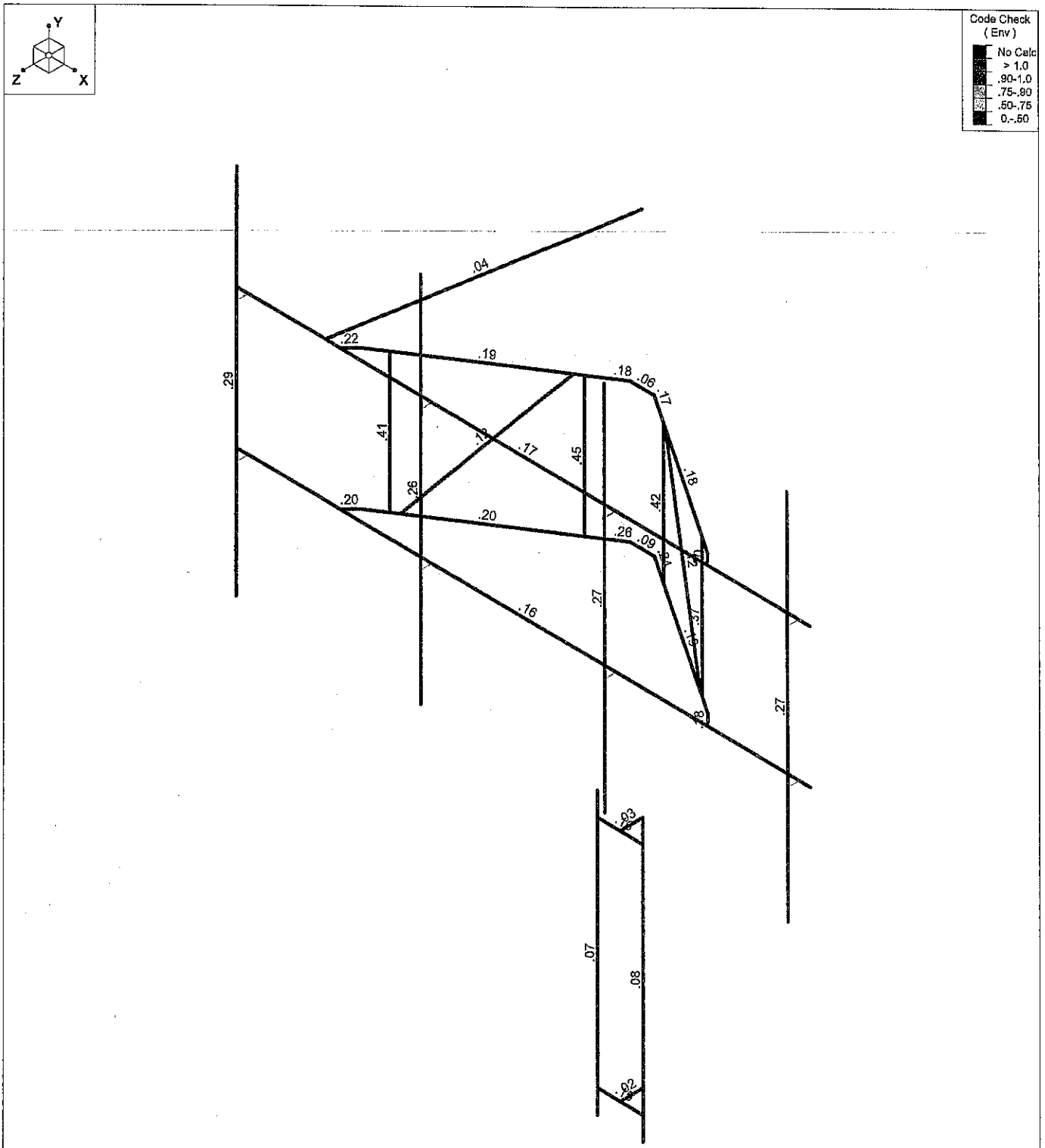
File Number: 176-O-032

Referred to: JU 27



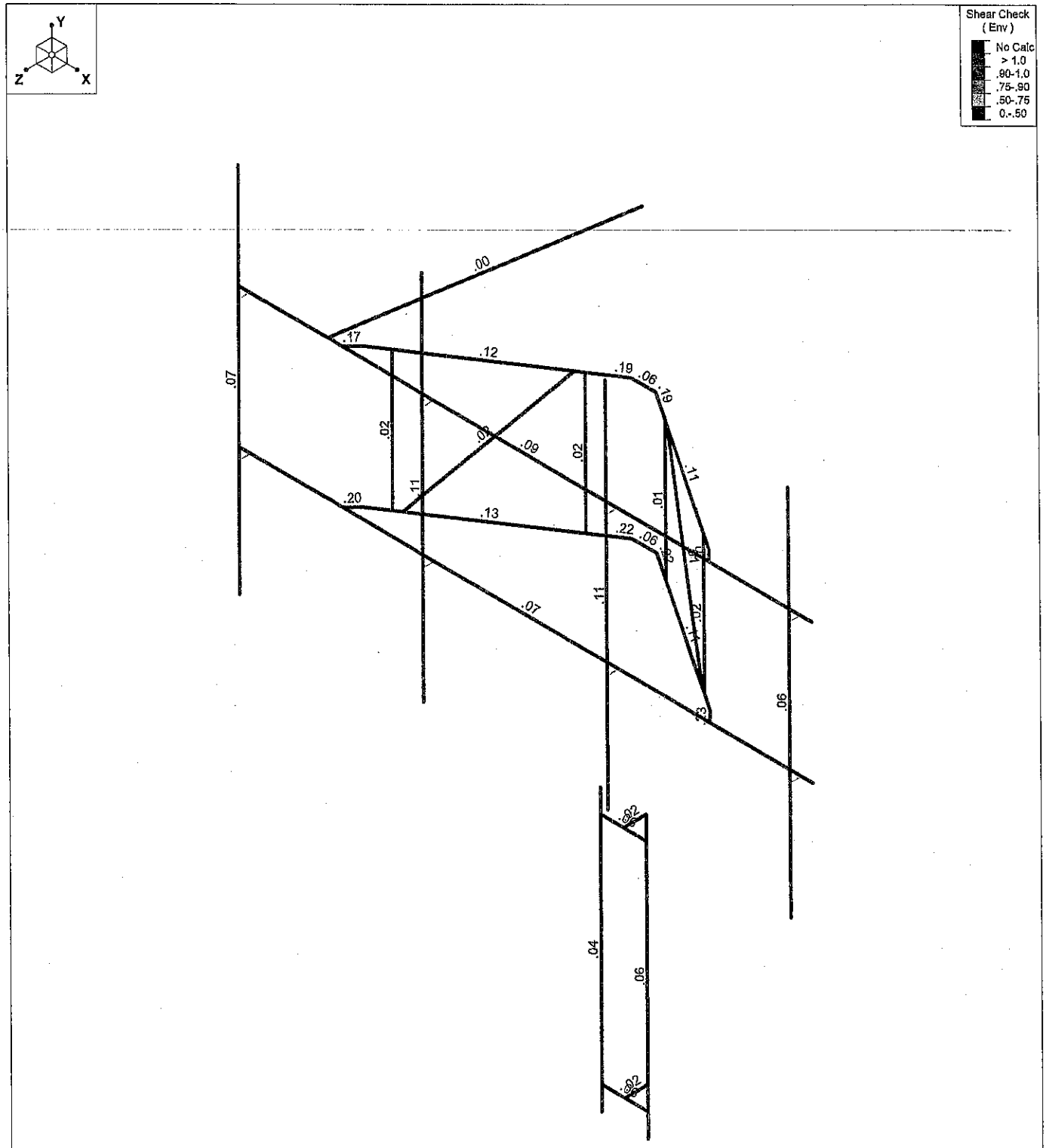
Envelope Only Solution

Paul J. Ford & Company	113339-VZW_MT_LOT_SectorA_H	SK - 1
RMD		Jan 20, 2021 at 6:53 PM
Project No. 10018179		113339-VZW_MT_LOT_A_H.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford & Company	113339-VZW_MT_LOT_SectorA_H	SK - 2
RMD		Jan 20, 2021 at 6:54 PM
Project No. 10018179		113339-VZW_MT_LOT_A_H.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

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RMD		Jan 20, 2021 at 6:54 PM
Project No. 10018179		113339-VZW_MT_LOT_A_H.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr. B (35 ksi)	29000	11154	.3	.65	.49	35	1.5	60	1.2
7	A500 Gr. C	29000	11154	.3	.65	.49	50	1.1	62	1.1

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M37	N63	N61A			HSS4X4X3	None	None	A500 Gr.46	Typical
2	M38	N64	N62A			HSS4X4X3	None	None	A500 Gr.46	Typical
3	M36	N62	N61			PIPE_2.0	None	None	A500 Gr. C	Typical
4	MP1A	N47	N46			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
5	MP2A	N41	N40			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
6	MP3A	N35	N34			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
7	MP4A	N29	N28			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
8	MP5A	N65	N66			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
9	MP6A	N67	N68			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
10	CBC1	N8	N10			PIPE_2.0X	None	None	A500 Gr. C	Typical
11	CBC2	N7	N9			PIPE_2.0X	None	None	A500 Gr. C	Typical
12	M32	N43A	N39A			PIPE_2.0X	None	None	A500 Gr. C	Typical
13	M33	N44A	N40A			PIPE_2.0X	None	None	A500 Gr. C	Typical
14	M34	N45A	N41A			PIPE_2.0X	None	None	A500 Gr. C	Typical
15	M35	N46A	N42A			PIPE_2.0X	None	None	A500 Gr. C	Typical
16	M17	N2	N43A		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
17	M18	N5	N44A		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
18	M19	N3	N45A		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
19	M20B	N6	N46A		90	PL1/2x3.688	None	None	A572 Gr.50	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
20	M28	N39A	N11		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
21	M29	N40A	N12		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
22	M30	N41A	N13		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
23	M31	N42A	N14		90	PL1/2x3.688	None	None	A572 Gr.50	Typical
24	M40	N69	N71			PL3/8x8	Beam	Wide Flange	A36 Gr.36	Typical
25	M41	N70	N72			PL3/8x8	Beam	Wide Flange	A36 Gr.36	Typical
26	F1	N2	N3		90	PL5/8x8	None	None	A572 Gr.50	Typical
27	F2	N5	N6		90	PL5/8x8	None	None	A572 Gr.50	Typical
28	M20	N24	N26			RIGID	None	None	RIGID	Typical
29	M20A	N30	N32			RIGID	None	None	RIGID	Typical
30	M21	N25	N27			RIGID	None	None	RIGID	Typical
31	M21A	N31	N33			RIGID	None	None	RIGID	Typical
32	M23	N36	N38			RIGID	None	None	RIGID	Typical
33	M24	N37	N39			RIGID	None	None	RIGID	Typical
34	M26	N42	N44			RIGID	None	None	RIGID	Typical
35	M27	N43	N45			RIGID	None	None	RIGID	Typical
36	M21B	N48	N47A			SR_0.75	None	None	A572 Gr.50	Typical
37	M22	N52	N51			SR_0.75	None	None	A572 Gr.50	Typical
38	M23A	N50	N49			SR_0.75	None	None	A572 Gr.50	Typical
39	M24A	N54	N53			SR_0.75	None	None	A572 Gr.50	Typical
40	M25	N57	N55			SR_0.75	None	None	A572 Gr.50	Typical
41	M26A	N58	N56			SR_0.75	None	None	A572 Gr.50	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M37						Yes	** NA **			None
2	M38						Yes	** NA **			None
3	M36		BenPIN				Yes	** NA **			None
4	MP1A						Yes	** NA **			None
5	MP2A						Yes	** NA **			None
6	MP3A						Yes	** NA **			None
7	MP4A						Yes	** NA **			None
8	MP5A						Yes	** NA **			None
9	MP6A						Yes	** NA **			None
10	CBC1						Yes	** NA **			None
11	CBC2						Yes	** NA **			None
12	M32						Yes	** NA **			None
13	M33						Yes	** NA **			None
14	M34						Yes	** NA **			None
15	M35						Yes	** NA **			None
16	M17	OOOOXO					Yes	** NA **			None
17	M18	OOOOXO					Yes	** NA **			None
18	M19	OOOOXO					Yes	** NA **			None
19	M20B	OOOOXO					Yes	** NA **			None
20	M28		BenPIN				Yes	** NA **			None
21	M29		BenPIN				Yes	** NA **			None
22	M30		BenPIN				Yes	** NA **			None
23	M31		BenPIN				Yes	** NA **			None
24	M40						Yes				None
25	M41						Yes				None
26	F1						Yes	** NA **			None
27	F2						Yes	** NA **			None
28	M20						Yes	** NA **			None
29	M20A						Yes	** NA **			None
30	M21						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
31	M21A						Yes	** NA **			None
32	M23						Yes	** NA **			None
33	M24						Yes	** NA **			None
34	M26						Yes	** NA **			None
35	M27						Yes	** NA **			None
36	M21B	BenPIN	BenPIN				Yes	** NA **			None
37	M22	BenPIN	BenPIN				Yes	** NA **			None
38	M23A	BenPIN	BenPIN				Yes	** NA **			None
39	M24A	BenPIN	BenPIN				Yes	** NA **			None
40	M25	BenPIN	BenPIN				Yes	** NA **			None
41	M26A	BenPIN	BenPIN				Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M37	HSS4X4X3	.5									Lateral
2	M38	HSS4X4X3	.5									Lateral
3	M36	PIPE_2.0	5.999									Lateral
4	MP1A	PIPE_2.0	8									Lateral
5	MP2A	PIPE_2.0	8									Lateral
6	MP3A	PIPE_2.0	8									Lateral
7	MP4A	PIPE_2.0	8									Lateral
8	MP5A	PIPE_2.0	6									Lateral
9	MP6A	PIPE_2.0	6									Lateral
10	CBC1	PIPE_2.0X	12.5									Lateral
11	CBC2	PIPE_2.0X	12.5									Lateral
12	M32	PIPE_2.0X	4									Lateral
13	M33	PIPE_2.0X	4									Lateral
14	M34	PIPE_2.0X	4									Lateral
15	M35	PIPE_2.0X	4									Lateral
16	M17	PL1/2x3.688	.25									Lateral
17	M18	PL1/2x3.688	.25									Lateral
18	M19	PL1/2x3.688	.25									Lateral
19	M20B	PL1/2x3.688	.25									Lateral
20	M28	PL1/2x3.688	.298									Lateral
21	M29	PL1/2x3.688	.298									Lateral
22	M30	PL1/2x3.688	.298									Lateral
23	M31	PL1/2x3.688	.298									Lateral
24	M40	PL3/8x8	1			Lbyy						Lateral
25	M41	PL3/8x8	1			Lbyy						Lateral
26	F1	PL5/8x8	.531									Lateral
27	F2	PL5/8x8	.531									Lateral
28	M21B	SR_0.75	3									Lateral
29	M22	SR_0.75	3									Lateral
30	M23A	SR_0.75	3									Lateral
31	M24A	SR_0.75	3									Lateral
32	M25	SR_0.75	4.045									Lateral
33	M26A	SR_0.75	4.045									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Antenna D	None					36			
2	Antenna Di	None					36			
3	Antenna Wo (0 Deg)	None					36			
4	Antenna Wo (30 Deg)	None					36			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
5	Antenna Wo (60 Deg)	None					36			
6	Antenna Wo (90 Deg)	None					36			
7	Antenna Wo (120 Deg)	None					36			
8	Antenna Wo (150 Deg)	None					36			
9	Antenna Wo (180 Deg)	None					36			
10	Antenna Wo (210 Deg)	None					36			
11	Antenna Wo (240 Deg)	None					36			
12	Antenna Wo (270 Deg)	None					36			
13	Antenna Wo (300 Deg)	None					36			
14	Antenna Wo (330 Deg)	None					36			
15	Antenna Wi (0 Deg)	None					36			
16	Antenna Wi (30 Deg)	None					36			
17	Antenna Wi (60 Deg)	None					36			
18	Antenna Wi (90 Deg)	None					36			
19	Antenna Wi (120 Deg)	None					36			
20	Antenna Wi (150 Deg)	None					36			
21	Antenna Wi (180 Deg)	None					36			
22	Antenna Wi (210 Deg)	None					36			
23	Antenna Wi (240 Deg)	None					36			
24	Antenna Wi (270 Deg)	None					36			
25	Antenna Wi (300 Deg)	None					36			
26	Antenna Wi (330 Deg)	None					36			
27	Antenna Wm (0 Deg)	None					36			
28	Antenna Wm (30 Deg)	None					36			
29	Antenna Wm (60 Deg)	None					36			
30	Antenna Wm (90 Deg)	None					36			
31	Antenna Wm (120 Deg)	None					36			
32	Antenna Wm (150 Deg)	None					36			
33	Antenna Wm (180 Deg)	None					36			
34	Antenna Wm (210 Deg)	None					36			
35	Antenna Wm (240 Deg)	None					36			
36	Antenna Wm (270 Deg)	None					36			
37	Antenna Wm (300 Deg)	None					36			
38	Antenna Wm (330 Deg)	None					36			
39	Structure D	None		-1						
40	Structure Di	None						33		
41	Structure Wo (0 Deg)	None						66		
42	Structure Wo (30 Deg)	None						66		
43	Structure Wo (60 Deg)	None						66		
44	Structure Wo (90 Deg)	None						66		
45	Structure Wo (120 Deg)	None						66		
46	Structure Wo (150 Deg)	None						66		
47	Structure Wo (180 Deg)	None						66		
48	Structure Wo (210 Deg)	None						66		
49	Structure Wo (240 Deg)	None						66		
50	Structure Wo (270 Deg)	None						66		
51	Structure Wo (300 Deg)	None						66		
52	Structure Wo (330 Deg)	None						66		
53	Structure Wi (0 Deg)	None						66		
54	Structure Wi (30 Deg)	None						66		
55	Structure Wi (60 Deg)	None						66		
56	Structure Wi (90 Deg)	None						66		
57	Structure Wi (120 Deg)	None						66		
58	Structure Wi (150 Deg)	None						66		
59	Structure Wi (180 Deg)	None						66		
60	Structure Wi (210 Deg)	None						66		
61	Structure Wi (240 Deg)	None						66		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
62	Structure Wi (270 Deg)	None						66		
63	Structure Wi (300 Deg)	None						66		
64	Structure Wi (330 Deg)	None						66		
65	Structure Wm (0 Deg)	None						66		
66	Structure Wm (30 Deg)	None						66		
67	Structure Wm (60 Deg)	None						66		
68	Structure Wm (90 Deg)	None						66		
69	Structure Wm (120 Deg)	None						66		
70	Structure Wm (150 Deg)	None						66		
71	Structure Wm (180 Deg)	None						66		
72	Structure Wm (210 Deg)	None						66		
73	Structure Wm (240 Deg)	None						66		
74	Structure Wm (270 Deg)	None						66		
75	Structure Wm (300 Deg)	None						66		
76	Structure Wm (330 Deg)	None						66		
77	Lm1	None					1			
78	Lm2	None					1			
79	Lv1	None					1			
80	Lv2	None					1			

Load Combinations

	Description	Solve	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D+1.0Wo (0 Deg)	Yes	Y		1	1.2	39	1.2	3	1	41	1												
2	1.2D+1.0Wo (30 Deg)	Yes	Y		1	1.2	39	1.2	4	1	42	1												
3	1.2D+1.0Wo (60 Deg)	Yes	Y		1	1.2	39	1.2	5	1	43	1												
4	1.2D+1.0Wo (90 Deg)	Yes	Y		1	1.2	39	1.2	6	1	44	1												
5	1.2D+1.0Wo (120 Deg)	Yes	Y		1	1.2	39	1.2	7	1	45	1												
6	1.2D+1.0Wo (150 Deg)	Yes	Y		1	1.2	39	1.2	8	1	46	1												
7	1.2D+1.0Wo (180 Deg)	Yes	Y		1	1.2	39	1.2	9	1	47	1												
8	1.2D+1.0Wo (210 Deg)	Yes	Y		1	1.2	39	1.2	10	1	48	1												
9	1.2D+1.0Wo (240 Deg)	Yes	Y		1	1.2	39	1.2	11	1	49	1												
10	1.2D+1.0Wo (270 Deg)	Yes	Y		1	1.2	39	1.2	12	1	50	1												
11	1.2D+1.0Wo (300 Deg)	Yes	Y		1	1.2	39	1.2	13	1	51	1												
12	1.2D+1.0Wo (330 Deg)	Yes	Y		1	1.2	39	1.2	14	1	52	1												
13	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	15	1	53	1								
14	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	16	1	54	1								
15	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	17	1	55	1								
16	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	18	1	56	1								
17	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	19	1	57	1								
18	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	20	1	58	1								
19	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	21	1	59	1								
20	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	22	1	60	1								
21	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	23	1	61	1								
22	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	24	1	62	1								
23	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	25	1	63	1								
24	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	39	1.2	2	1	40	1	26	1	64	1								
25	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	27	1	65	1										
26	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	28	1	66	1										
27	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	29	1	67	1										
28	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	30	1	68	1										
29	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	31	1	69	1										
30	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	32	1	70	1										
31	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	33	1	71	1										
32	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	34	1	72	1										
33	1.2D + 1.5Lm1 + 1.0W...	Yes	Y		1	1.2	39	1.2	77	1.5	35	1	73	1										

Load Combinations (Continued)

	Description	Solve P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
34	1.2D + 1.5Lm1 + 1.0W...	Yes	Y	1	1.2	39	1.2	77	1.5	36	1	74	1												
35	1.2D + 1.5Lm1 + 1.0W...	Yes	Y	1	1.2	39	1.2	77	1.5	37	1	75	1												
36	1.2D + 1.5Lm1 + 1.0W...	Yes	Y	1	1.2	39	1.2	77	1.5	38	1	76	1												
37	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	27	1	65	1												
38	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	28	1	66	1												
39	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	29	1	67	1												
40	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	30	1	68	1												
41	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	31	1	69	1												
42	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	32	1	70	1												
43	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	33	1	71	1												
44	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	34	1	72	1												
45	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	35	1	73	1												
46	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	36	1	74	1												
47	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	37	1	75	1												
48	1.2D + 1.5Lm2 + 1.0W...	Yes	Y	1	1.2	39	1.2	78	1.5	38	1	76	1												
49	1.2D + 1.5Lv1	Yes	Y	1	1.2	39	1.2	79	1.5																
50	1.2D + 1.5Lv2	Yes	Y	1	1.2	39	1.2	80	1.5																
51	1.4D	Yes	Y	1	1.4	39	1.4																		
52	Seismic Mass		Y	1	1	39	1																		
53	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX		SY	1	SZ	-1												
54	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	.5	SY	1	SZ	-.866												
55	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	.866	SY	1	SZ	-.5												
56	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	1	SY	1	SZ													
57	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	.866	SY	1	SZ	.5												
58	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	.5	SY	1	SZ	.866												
59	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX		SY	1	SZ	1												
60	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	-.5	SY	1	SZ	.866												
61	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	-.866	SY	1	SZ	.5												
62	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	-1	SY	1	SZ													
63	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	-.866	SY	1	SZ	-.5												
64	1.2D + 1.0Ev + 1.0Eh (...		Y	1	1.2	39	1.2	SX	-.5	SY	1	SZ	-.866												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	1660.192	34	1015.713	24	922.329	2	0	51	0	51	0	51
2		min	-1320.088	40	215.85	7	-2802.131	20	0	1	0	1	0	1
3	N4	max	1306.332	46	1586.822	19	2681.752	13	0	51	0	51	0	51
4		min	-1645.686	28	374.41	1	-296.171	7	0	1	0	1	0	1
5	N62	max	165.284	3	45.293	15	1063.793	9	0	51	0	51	0	51
6		min	-165.544	9	12.249	33	-1065.104	3	0	1	0	1	0	1
7	N61A	max	207.529	10	487.045	19	217.245	1	-.08	7	.236	10	.086	10
8		min	-214.011	4	159.542	1	-334.741	7	-.276	13	-.212	4	.008	4
9	N62A	max	137.024	10	477.301	13	241.414	1	-.071	1	.163	9	.085	16
10		min	-130.542	4	157.03	7	-123.918	7	-.224	19	-.187	3	.036	10
11	Totals:	max	1581.571	10	3580.168	20	2314.375	1						
12		min	-1581.571	4	1098.231	3	-2314.372	7						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M21B	SR 0.75	.452	.969	17	.016	0		9	2707.461	19880.37	.249	.249	1.136	H1-1a
2	M23A	SR 0.75	.422	.969	21	.014	0		3	2707.461	19880.37	.249	.249	1.136	H1-1a
3	M22	SR 0.75	.412	.969	14	.019	0		27	2707.461	19880.37	.249	.249	1.136	H1-1a
4	M24A	SR 0.75	.370	.969	24	.020	0		27	2707.461	19880.37	.249	.249	1.136	H1-1a
5	MP4A	PIPE 2.0	.295	2.5	33	.071	2.5		9	14916.096	32130	1.872	1.872	4.512	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
6	MP2A	PIPE_2.0	.265	2.5	7	.111	2.5		10	14916.096	32130	1.872	1.872	3.869	H1-1b
7	MP1A	PIPE_2.0	.265	2.5	42	.055	2.5		39	14916.096	32130	1.872	1.872	4.418	H1-1b
8	MP3A	PIPE_2.0	.263	2.5	7	.109	2.5		4	14916.096	32130	1.872	1.872	2.712	H1-1b
9	M18	PL1/2x3.6...	.257	.25	17	.217	0	y	27	80372.06	82980	.863	6.375	1.018	H1-1b
10	M20B	PL1/2x3.6...	.245	.25	24	.217	0	y	27	80372.06	82980	.863	6.375	1.044	H1-1b
11	M28	PL1/2x3.6...	.224	0	13	.172	.298	y	48	79288.252	82980	.863	6.375	1.667	H1-1b
12	M33	PIPE_2.0X	.205	3.333	29	.128	3.375		27	47368.187	63000	3.615	3.615	1.816	H1-1b
13	M30	PL1/2x3.6...	.203	0	48	.202	.298	y	26	79287.445	82980	.863	6.375	1.667	H1-1b
14	M29	PL1/2x3.6...	.197	0	29	.197	0	y	45	79288.252	82980	.863	6.375	1.667	H1-1b
15	M32	PIPE_2.0X	.192	.625	27	.124	.5		27	47368.187	63000	3.615	3.615	1.803	H1-1b
16	M35	PIPE_2.0X	.191	3.333	45	.114	3.375		47	47368.187	63000	3.615	3.615	1.816	H1-1b
17	M17	PL1/2x3.6...	.184	.25	26	.191	.25	y	27	80372.06	82980	.863	6.375	1.02	H1-1b
18	M31	PL1/2x3.6...	.183	0	45	.232	0	y	28	79287.445	82980	.863	6.375	1.667	H1-1b
19	M34	PIPE_2.0X	.177	.625	45	.111	.5		45	47368.187	63000	3.615	3.615	1.802	H1-1b
20	CBC2	PIPE_2.0X	.168	2.344	8	.093	1.953		11	8303.532	63000	3.615	3.615	2.902	H1-1b
21	M19	PL1/2x3.6...	.166	.25	48	.191	.25	y	27	80372.06	82980	.863	6.375	1.019	H1-1b
22	CBC1	PIPE_2.0X	.163	.521	34	.074	2.344		2	8303.532	63000	3.615	3.615	2.775	H1-1b
23	M40	PL3/8x8	.155	.5	9	.059	.5	y	13	50900.661	97200	.759	16.2	1.356	H1-1b
24	M41	PL3/8x8	.153	.5	2	.056	.5	y	7	50900.661	97200	.759	16.2	1.385	H1-1b
25	M25	SR 0.75	.124	2.023	16	.016	4.045		2	1489.133	19880.37	.249	.249	1.136	H1-1b
26	M26A	SR 0.75	.118	2.023	22	.014	4.045		6	1489.133	19880.37	.249	.249	1.136	H1-1b
27	F2	PL5/8x8	.086	.266	14	.064	.266	y	27	205400.848	225000	2.929	37.5	1.276	H1-1b
28	MP5A	PIPE_2.0	.083	3	1	.063	.5		4	20866.733	32130	1.872	1.872	2.047	H1-1b
29	MP6A	PIPE_2.0	.067	1.063	13	.040	.5		9	20866.733	32130	1.872	1.872	2.045	H1-1b
30	F1	PL5/8x8	.061	.266	20	.057	.266	y	29	205400.848	225000	2.929	37.5	1.276	H1-1b
31	M36	PIPE_2.0	.044	5.999	9	.003	5.999		22	24781.098	45900	2.674	2.674	1.136	H1-1b*
32	M37	HSS4X4X3	.027	.5	10	.023	.5	y	21	106704.591	106812	12.662	12.662	1.576	H1-1b
33	M38	HSS4X4X3	.022	.5	16	.024	.5	y	15	106704.591	106812	12.662	12.662	1.739	H1-1b

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number:	24320-0674.001.8190
Engineer:	RMD
Date:	1/20/2021
Site Name:	WAUKESHA SHERIFFS – 698817
Site Number:	113339
Client Project 1:	

Mount to Tower Connection Checks (Version v4.5 - Effective Date 11/3/2020)

Risa File Path:

Settings

☐ Apply Capacity Normalization Per Section 15.5

Code:	TIA-222-H
Check(s) Performed:	Bolts

Risa-3D Member Reactions

☑ Input Forces Manually

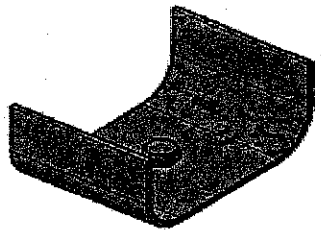
Analysis Load Case:	Envelope
Analysis Member/Node:	N4

	Shear (kip)	Moment (kip-ft)
Horizontal Direction:	1.646	0.000
Vertical Direction:	2.682	0.000
	Axial (kip)	**Torque (kip-ft)**
Axial Direction:	1.587	0.000

Note: Axial direction is the bolts longitudinal axis

Bolt Information

Type:	A325N	
Diameter:	1	in
Quantity:	1	



Orientation: Vertical

Analysis Results

9.9% Pass

Bolt Capacity 9.9%

Tension:	Applied Load: 1.59 kip Capacity: 53.01 kip	3.0%
Shear:	Applied Load: 3.15 kip Capacity: 31.81 kip	9.9%
Tension-Shear Interaction:	Applied Load: - Capacity: -	OK

Weld Capacity N/A

Notes:
1. Connection is considered pinned, as such no applied moment was considered.
2. Allowable capacity limit is 105%.
3. Calculations are in accordance with TIA-222-H and AISC 15th Ed.
4. Bolt tension reduction not required as tension and/or shear capacity is below 30%.

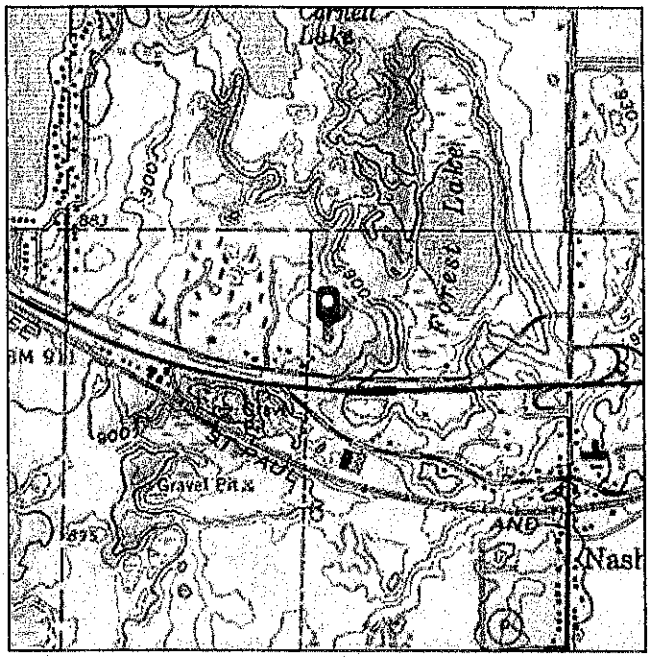
Referred on: 06/03/21 File Number: 176-O-032 Referred to: JO 39

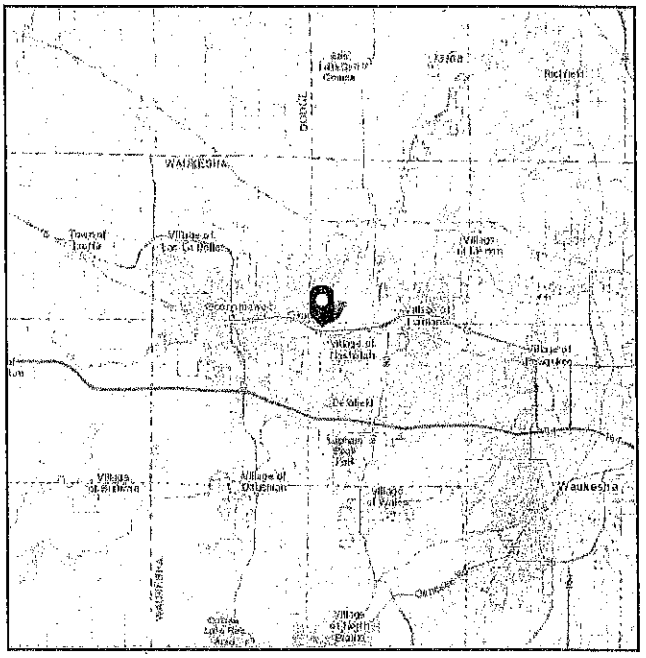
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: III
Soil Class: D - Default (see Section 11.4.3)

Elevation: 932.94 ft (NAVD 88)
Latitude: 43.103339
Longitude: -88.411944





Wind

Results:

Wind Speed:	114 Vmph
10-year MRI	73 Vmph
25-year MRI	80 Vmph
50-year MRI	85 Vmph
100-year MRI	91 Vmph
Data Source:	ASCE/SEI 7-16, Fig. 26.5-1C and Figs. CC.2-1–CC.2-4
Date Accessed:	Tue Nov 03 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 40

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

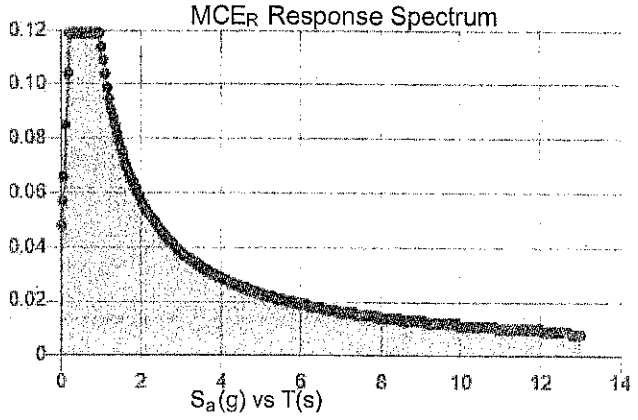
Seismic

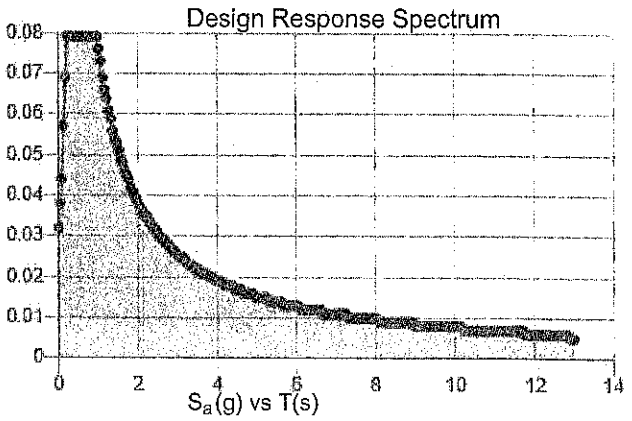
Site Soil Class: D - Default (see Section 11.4.3)

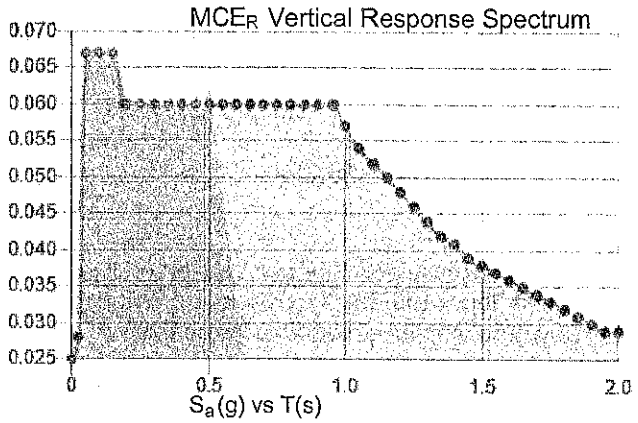
Results:

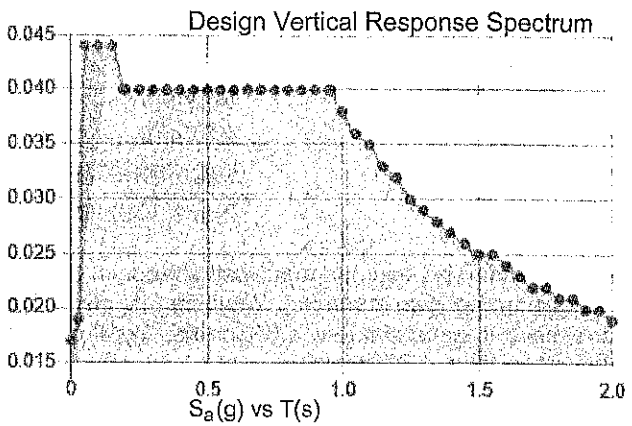
S_S :	0.074	S_{D1} :	0.076
S_1 :	0.048	T_L :	12
F_a :	1.6	PGA :	0.036
F_v :	2.4	PGA_M :	0.058
S_{MS} :	0.119	F_{PGA} :	1.6
S_{M1} :	0.114	I_e :	1.25
S_{DS} :	0.079	C_v :	0.7

Seismic Design Category B









Data Accessed: Tue Nov 03 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	-5 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Nov 03 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Mount Desktop – Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor – Passing Mount Analysis

Purpose – to provide Paul J. Ford the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the installation was completed in accordance with this Passing Mount Analysis.
- Contractor shall relay any data that can impact the performance of the mount, this includes safety issues.

Base Requirements:

- Any special photos outside of the standard requirements will be indicated on the passing MA
- Verification that loading is as communicated in the Passing Mount Analysis. NOTE If loading is different than what is conveyed contact Paul J. Ford immediately.
- Each photo should be time and date stamped
- Photos should be high resolution and submitted in a Zip File and should be organized in the file structure as depicted in Schedule A attached.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope.
- The photos in the file structure should be uploaded to ***https://pmi.vzwsmart.com*** as depicted on the drawings

Photo Requirements:

- *Base and "During Installation Photos"*
  - Base pictures include
    - Photo of Gate Signs showing the tower owner, site name, and number
    - Photo of carrier shelter showing the carrier site name and number if available
    - Photos of the galvanizing compound and/or paint used (if applicable), clearly showing the label and name
  - "During Installation Photos if provided - must be placed only in this folder
- *Photos taken at ground level*
  - Overall tower structure before and after installation of the equipment modifications
  - Photos of the appropriate mount before and after installation of the modifications; if the mounts are at different rad elevations, pictures must be provided for all elevations that the modifications were installed
- *Photos taken at Mount Elevation*
  - Photos showing each individual sector before and also after installation of equipment.
    - These photos should also certify that the placement and geometry of the equipment on the mount is as depicted on the sketch and table in the mount analysis

- Photos showing the safety climb wire rope above and below the mount prior to modification.
- Photos showing the climbing facility and safety climb if present.

Antenna & equipment placement and Geometry Confirmation:

- The contractor must certify that the antenna & equipment placement and geometry is in accordance with the antenna placement diagrams as included in this mount analysis.

☐ The contractor certifies that the photos support and the equipment on the mount is as depicted on the antenna placement diagrams as included in this mount analysis.

☐ The contractor notes that the equipment on the mount is not in accordance with the antenna placement diagrams and has accordingly marked up the diagrams or provided a diagram outlining the differences.

Certifying Individual: Company _____

Name _____

Signature _____

Special Instructions / Validation as required from the MA or any other information the contractor deems necessary to share that was identified:

Issue:

- Provide information on final equipment configuration (manufacturer, model #, quantity, and locations) on the mounts.
- Provide information on horizontal spacing and vertical projection of the mounting pipes.
- Provide information on tie-back location
- Install (3) 8', P2 STD (2.375"x0.154") ASTM A53 (Gr. B-35) mount pipes for the proposed antennas, equidistant between the installed mount pipes. (6) VZWSMART-MSK1 crossover plates will be required for installation. Pipes shall be installed at the location shown per the placement diagram attached to this report. Vertical projection shall be the same as existing mount pipes.

Response:

Schedule A – Photo & Document File Structure

- VzW Site Number / Name
  - Base & "During Installation" Photos
  - Pre-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
  - Post-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
    - Photos of climbing facility and safety climb – If Present
  - Certifications – Submission of this document including certifications
  - Specific Required Additional Photos

Sector: A

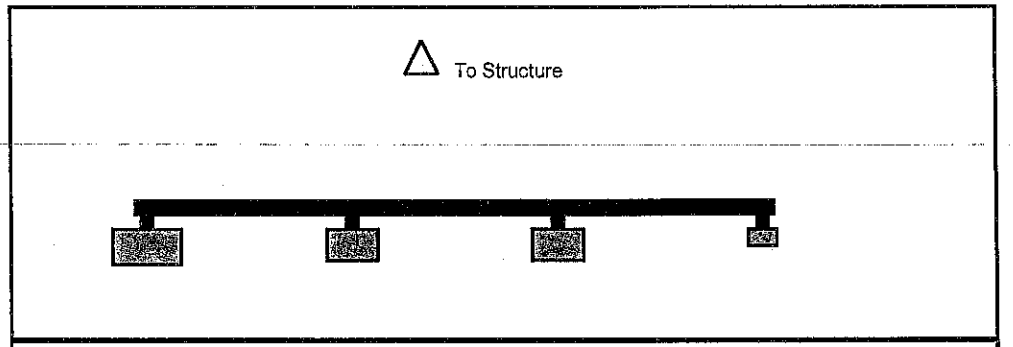
Structure Type: Self Support

Mount Elev: 153.50

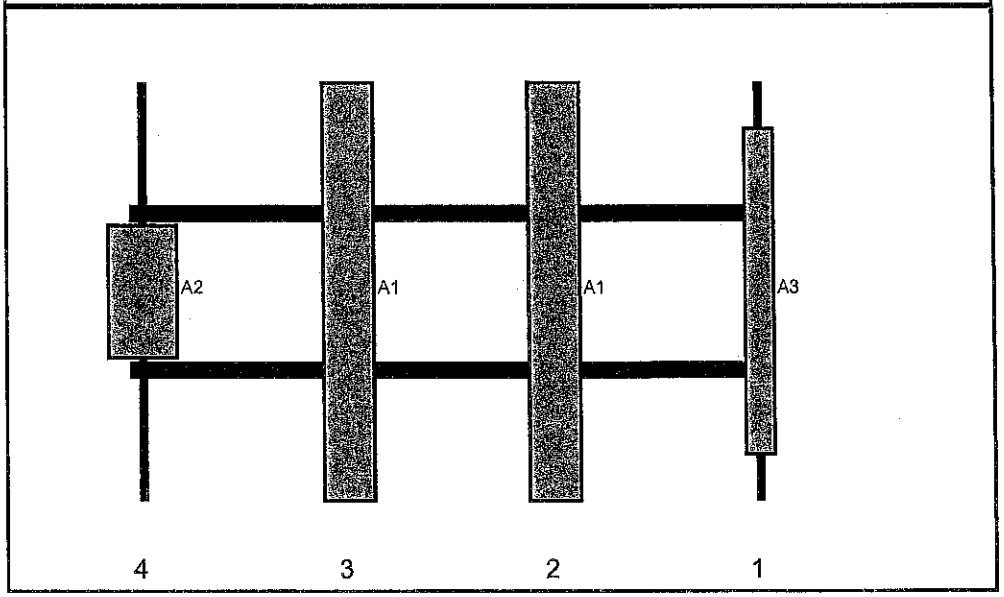
1/20/2021

PAUL J. FORD & COMPANY

Plan View



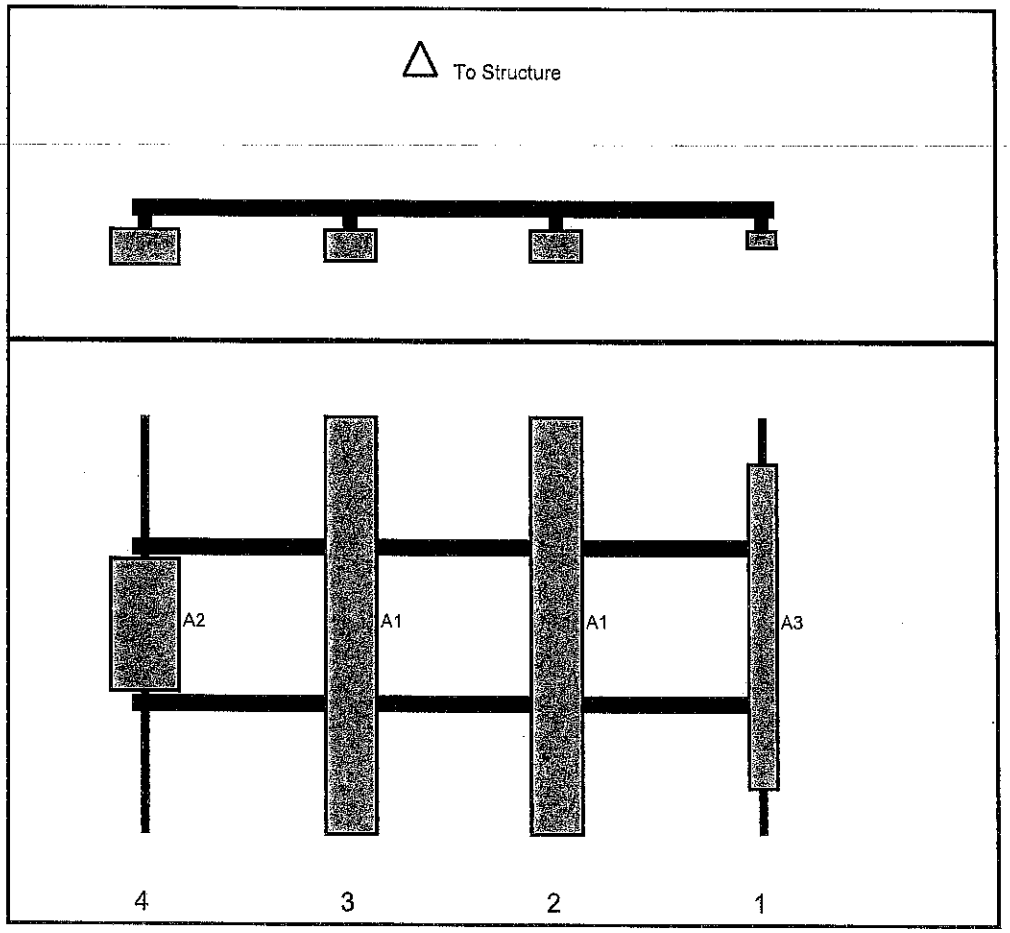
Front View
Looking at Structure



Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	HBX-9016DS-VTM	74.7	6.8	147	1	a	Front	48	0	Retained	
A1	NHH-65C-R2B	96	11.9	99	2	a	Front	48	0	Added	
A1	NHH-65C-R2B	96	11.9	51	3	a	Front	48	0	Added	
A2	VZE01	30.4	15.9	3	4	a	Front	48	0	Added	

Plan View

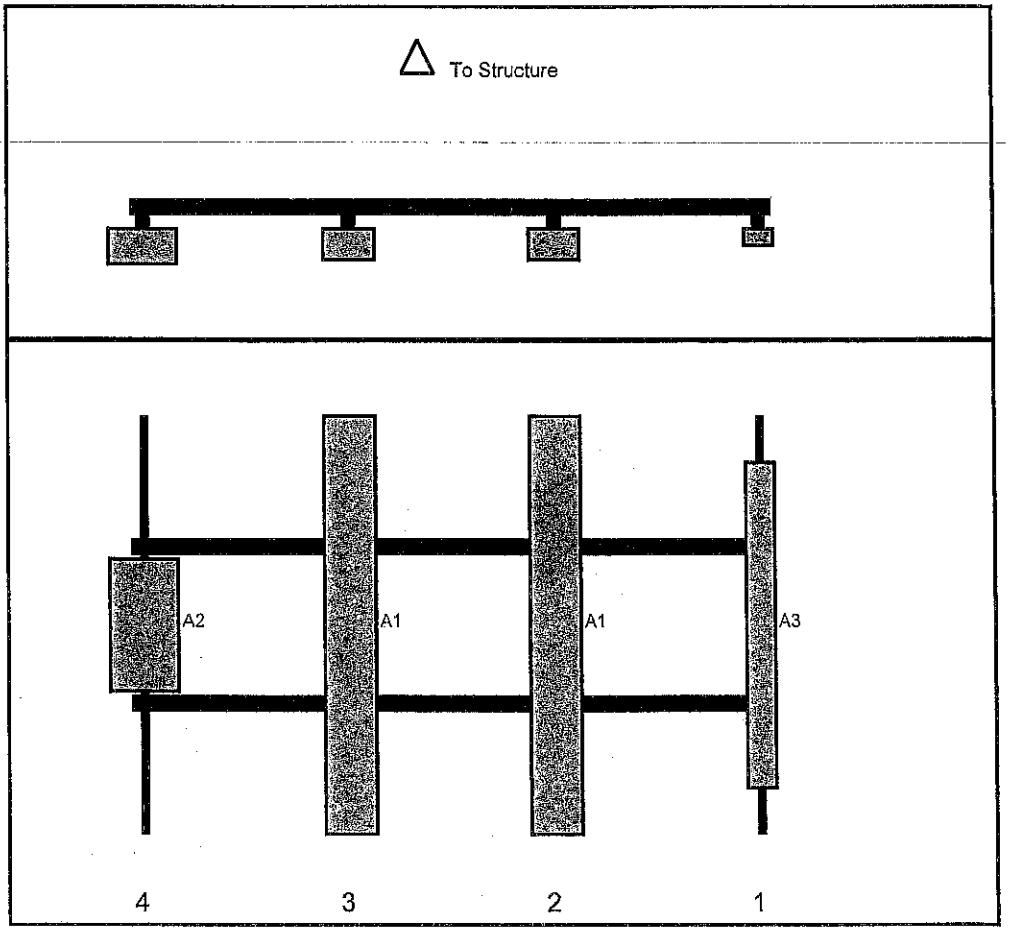
Front View
Looking at Structure



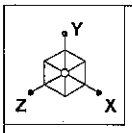
Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	HBX-9016DS-VTM	74.7	6.8	147	1	a	Front	48	0	Retained	
A1	NHH-65C-R2B	96	11.9	99	2	a	Front	48	0	Added	
A1	NHH-65C-R2B	96	11.9	51	3	a	Front	48	0	Added	
A2	VZE01	30.4	15.9	3	4	a	Front	48	0	Added	

Plan View

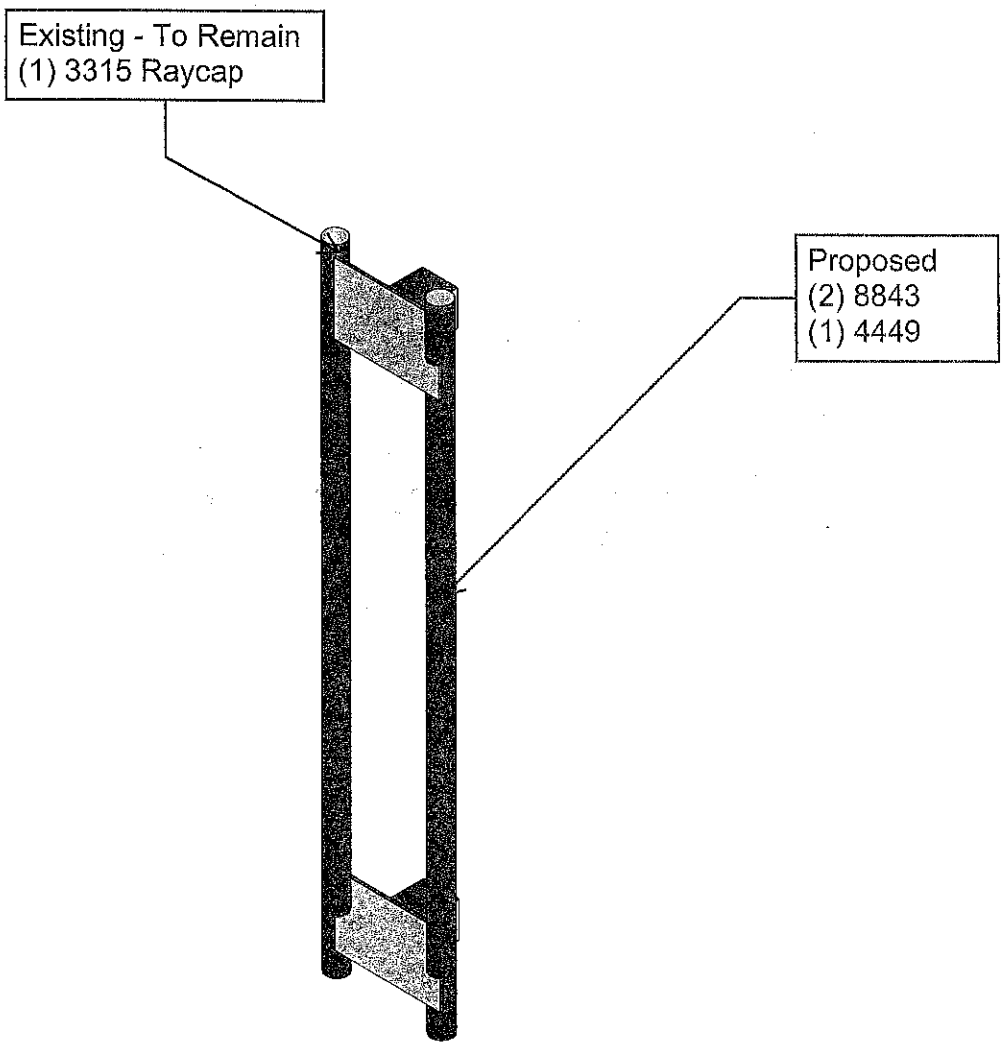
Front View
Looking at Structure



Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	HBX-9016DS-VTM	74.7	6.8	147	1	a	Front	48	0	Retained	
A1	NHH-65C-R2B	96	11.9	99	2	a	Front	48	0	Added	
A1	NHH-65C-R2B	96	11.9	51	3	a	Front	48	0	Added	
A2	VZE01	30.4	15.9	3	4	a	Front	48	0	Added	



Standoff located below the Sector Frame
(Typical Per Sector)



Envelope Only Solution

Paul J. Ford & Company	113339-VZW_MT_LOT_SectorA_H	SK - 4
RMD		Jan 20, 2021 at 6:54 PM
Project No. 10018179		113339-VZW_MT_LOT_A_H.r3d

PREPARED FOR:

verizon

STRUCTURAL ANALYSIS REPORT

200 FT SELF-SUPPORT TOWER
ANTENNA MODIFICATION DESIGN
WAUKESHA SHERIFFS (113339)
NASHOTAH, WISCONSIN

EDGE PROJECT NUMBER:
28070

JANUARY 13, 2021

Edge
Consulting Engineers, Inc.

624 Water Street
Prairie du Sac, Wisconsin 53578
608.644.1449 Phone
608.644.1549 Fax
www.edgeconsult.com

Reliable
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Exceeding Expectations

STRUCTURAL ANALYSIS REPORT

Project Information:	Waukesha Sheriffs Nashotah, WI 43.10362, -88.41193
Client:	Verizon Wireless 1515 E. Woodfield Road 10th Floor Schaumburg, IL 60173 Contact: Allen Waites
Client Project Number:	113339
Tower Owner:	Waukesha County 515 West Moreland Blvd. Waukesha, WI 53188
Consultant:	Edge Consulting Engineers 624 Water Street Prairie du Sac, WI 53578 Contact: Paul C. Molitor Phone: (608) 644-1449
Edge Project Number:	28070
Date:	January 13, 2021

Shaughn P. Dean, E.I.T.
Project Engineer

1/13/21
Date

WISCONSIN
KEVIN T. SCHARENBROCH 43951 WAUKESHA, WI
PROFESSIONAL ENGINEER

1/13/21

Kevin T. Scharenbroch, P.E.
Professional Engineer

1/13/21
Date

TABLE OF CONTENTS

FIGURES

APPENDICES

SECTION 1
EXECUTIVE SUMMARY

Site Name:	**Waukesha Sheriffs**
Site Location:	**Nashotah, Wisconsin**
Purpose:	**Antenna Mod Design**
Tower Type:	**200 ft. Self-Support Tower**

Per your request, we have completed a structural analysis for the above described tower pursuant to the ANSI/TIA-222-H standard (TIA-222). One loading scenario was considered in the analysis. The loading condition takes into account the existing tower loading along with the proposed loading. The loading condition is described in Section 3.2, with reference to the feedline placement diagram (Figure 1).

Our analysis was completed per the TIA-222 standard and is considered a comprehensive analysis.

The results of our analysis indicate that the existing tower **is structurally adequate** to support the loading referenced in Section 3.2. Refer to Section 3.5 for additional information regarding assumptions for this analysis.

Please refer to the report which follows this summary for further information. Feel free to contact us if you have any questions or concerns.

SECTION 2
INTRODUCTION

2.1 PURPOSE OF REPORT

Edge performed a structural analysis for the existing tower to determine whether the tower is structurally adequate to support the loading condition referenced in Section 3.2, pursuant to the TIA-222 standard. This assessment was completed using background information provided by the client and/or obtained in the field (where noted) and in conformance with current applicable codes, client directed protocols, and the judgment of the structural engineer.

2.2 SCOPE OF SERVICES

The scope of services for this project included a structural analysis and modeling of the tower structure and foundation systems in accordance with client supplied information. This type of analysis, under the TIA-222 standard, is considered to be a "comprehensive" analysis of the tower.

This report summarizes the structural analysis results.

SECTION 3
ANALYSIS

3.1 BACKGROUND INFORMATION

The subject tower is an existing PiRod U-20.0 x 200' self-support tower which was originally designed in February of 1997. It is our understanding that the tower geometry has been altered from the original design due to the structural analysis report/modification design completed by PiRod in 2001, Fullerton in 2015 and others unknown. We were provided the following information at the project outset:

1. Tower & foundation drawings: PiRod Eng. File: A-113309 dated 2/7/1997
2. Structural analysis/mod: Edge Eng. File: 14734 dated 8/23/2017
3. Structural analysis/mod.: PiRod Eng. File: A-113309 dated 8/21/2001 *
4. Structural analysis/mod.: Fullerton Eng. File: WI1094/ML12123D dated 7/23/2015 **
5. Tower modification inspection.: Edge Eng. File: 19773 dated 2/26/2019 **
6. Proposed antenna and feedline loading configuration
7. Geotechnical report: Ramaker Eng. File: 2720-96 dated 1/7/1997

The tower was originally designed under TIA/EIA-222-D with an 80 mph basic wind speed and 1/2" of radial ice.

* During the completed tower climb, it was observed that some galvanized bracing was installed on the tower. While on site, typical measurements were obtained on the installed members, but the entire modification was not inspected. From this observation, it was assumed that the modification identified above was completed as described within the report and/or drawings along with unknown modifications. See Section 3.5 for a list of the assumed modification.

** This modification design was verified to have been installed by Edge Consulting Engineers in a CIN report/tower modification inspection report dated 2/26/2019. It was generally found to conform to the required modifications detailed in the associated modification report.

3.2 LOADING CONDITION

The listed heights for panel antennas and microwave dishes are representative of the antenna centerline. For omni and dipole antennas the listed heights represent the base of the antenna.

The following loading condition was considered during this analysis:

Ant. Height	#	Manufacturer & Model #	Mounting Type	Technology / Notes	Feedline (#) Size	Owner	Status
200'	1	20' Dipole	Tight Mount	Dipole	(1) 1-5/8"	County	Existing
198'	1	20' Dipole	3' Standoff	Dipole	(1) 3/8"	County	Existing
195.5'	3	Celwave PD10017-1	6' Standoff	Omni	(2) 1-1/4", (1) 7/8", (2) 1/2"	County	Existing
195.5'	1	12" x 12" x 6" Junction Box	Leg Mount	Junction Box		County	Existing
185'	2	Ceragon FibreAir 1500HP/RFU-HP	Pipe Mount	ODU		County	Existing
184'	1	RFS DA6-W57BC	Pipe Mount	Dish	(2) Cat. 5	County	Existing
177'	6	Andrew TMBXX-6517-A2M	10' T-Frame	Panel		T-Mobile	Existing
177'	3	Nokia Siemens FRIG RRU	10' T-Frame	RRU	(1) Hybrid (6) 1-5/8" (1) 3/8"	T-Mobile	Existing
177'	2	Nokia Siemens FXFB RRU	10' T-Frame	RRU		T-Mobile	Existing
177'	1	Raycap RNSDC-7771-PF-48	10' T-Frame	SPD		T-Mobile	Existing
168'	1	Raycap DC6-48-60-18-8F	Leg Mount	SPD		AT&T	Existing
168'	*1*	*Raycap DC6-48-60-18-8F*	*Leg Mount*	*SPD*		*AT&T*	*Future*
167'	3	Andrew DBXLH-8585A-R2M	13' V-Frame	Panel	(12) 1-5/8" (2) 0.82" Power (1) 10mm Fiber	AT&T	Existing
167'	3	Andrew SBNH-1D6565A	13' V-Frame	Panel		AT&T	Existing
167'	3	Ericsson RRU-11	13' V-Frame	RRU		AT&T	Existing
167'	6	11" x 13.5" x 3.75" TMA	13' V-Frame	TMA		AT&T	Existing
167'	3	Andrew SBNHH-1D65C	13' V-Frame	Panel		AT&T	Existing
167'	*6*	*Andrew SBNHH-1D65C*	*13' V-Frame*	*Panel*		*AT&T*	*Future*
167'	*3*	*Ericsson RRU-12 + A-2*	*13' V-Frame*	*RRU*	*(2) 0.82" Power*	*AT&T*	*Future*
167'	*3*	*Ericsson RRUS-32 B30*	*13' V-Frame*	*RRU*		*AT&T*	*Future*
153.5'	6	Amphenol HEX656CW0000G	12' HD V-Frames	LTE	-	Verizon	Existing **(Remove Panels)**
153.5'	3	Andrew HBX-9016DS-VTM	12' HD V-Frames	CDMA	(6) 1-5/8"	Verizon	Existing
153.5'	**6**	**Andrew NHH-65C-R2B**	**12' HD V-Frames**	**LTE**	-	**Verizon**	**Proposed**
153.5'	**3**	**L-Sub6/VZE01**	**12' HD V-Frames**	**Antenna/RRU**	-	**Verizon**	**Proposed**
146.5'	6	Ericsson RRUS-32 B30	Lattice Mount	RRU	(3) Hybrid	Verizon	Existing **(Remove RRUs)**
146.5'	6	Ericsson RUL01	Lattice Mount	RRU		Verizon	Existing **(Remove RRUs)**
146.5'	3	Raycap RC3DC-3315-PF48	Lattice Mount	SPD		Verizon	Existing
146.5'	**3**	**Ericsson RRU-4449**	**Lattice Mount**	**RRU**	-	**Verizon**	**Proposed**
146.5'	**6**	**Ericsson RRU-8843**	**Lattice Mount**	**RRU**	-	**Verizon**	**Proposed**
144'	1	6 ft. Dish	Pipe Mount	Dish	(1) EW90	County	Existing

If the loading condition is altered from that analyzed, this report shall be deemed obsolete and further analysis will be required.

The feedline placement associated with the loading condition which was considered in this analysis is attached as Figure 1. The loading condition is further described in the Designed Appurtenance Loading table provided in Appendix A.

3.3 ANALYSIS CRITERIA

This analysis was performed in accordance with the TIA-222 standard. This site is located in Waukesha County, Wisconsin and used the following structural design criteria:

Wind Design Data	
Basic Wind Speed, V	114 mph
Basic Wind Speed (Service), V_s	60 mph
Structure Classification	III
Exposure Category	C
Topographic Category	1
Ground Elevation, z_s	930 Ft.

Ice Design Data	
Nominal Ice Thickness, t_i	1.5 in
Basic Wind Speed (with Ice), V_i	40 mph

These criteria were selected based on the location and use of the subject tower. For this analysis, Structure Class III was selected since the tower is primarily utilized for essential communication (Public Safety/E911) purposes. The client and/or tower owner **must** review these criteria for applicability and notify Edge Consulting if a different tower structure class, topographic category, or exposure criteria are warranted.

3.4 ANALYSIS METHOD

Structural analysis computations and modeling of the tower structure were performed using TNX Tower Version 8.0 software. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communications towers using the TIA-222-H or any previous TIA/EIA Standards back to RS-222 (1959). Steel design is checked using the referenced AISC Specifications. This program automatically generates nodes and elements for a subsequent finite element analysis (FEA) for standard tower types including self-support towers, guyed towers and monopoles. It allows entry of dishes, feedlines, discrete loads (loads from appurtenances) and user defined loads anywhere on the tower. TNX Tower uses wind effects from multiple directions and ice loads to develop pressure coefficients, wind pressures, ice loads and resulting forces on the tower per TIA-222 requirements.

The tower foundation system was also reviewed for the resulting applied forces due to the loading condition in Section 3.2. Items reviewed include checking the global overturning and shear of the foundation system. In addition, the anchor bolts and guy anchors (where applicable) were also reviewed for structural adequacy.

3.5 ASSUMPTIONS

For the purpose of this analysis, it has been assumed that the tower and foundation have been properly installed and maintained per the manufacturer's specifications and recommendations. Further limitations and restrictions have been provided in Section 5.

Because complete information was not readily available in the information provided, Edge Consulting Engineers made the following assumptions:

- The distance from the top of concrete to the bottom of the leveling nut is a maximum of 3 inches.
- The previously proposed tower modifications have been satisfactorily completed resulting in the following reinforcements:
    - Truss leg reinforcement with two (2)-1.5 inch rods per leg between the elevations of 0 feet and 40 feet.
    - Truss leg reinforcement with two (2)-1.25 inch rods per leg between the elevations of 60 feet and 80 feet.
    - Truss leg reinforcement with two (2)-1.25 inch rods per leg between the elevations of 100 feet and 140 feet.
    - Seven (7) -1.5 inch solid round bolt-on braces per face spaced between the elevations of 150 feet and 170 feet.
    - 1-1/4" solid rod horizontal members from 150 feet to 170 feet.
- The previously proposed and future loading AT&T loading included in the structural analysis by Fullerton was assumed to be reserved. In this analysis, the previously proposed loading is identified as "Reserved Future" and the future loading is identified as "Future"
- The original tower drawings do not specify the exact size of the horizontal member installed at an elevation of 95 feet. Based on site photos, it was assumed that the horizontal member is an L3-1/2 x 3-1/2 x 3/16 angle.
- Based on the structural analysis completed by Fullerton and the referenced Revised Geotechnical Report by G2 Consulting Group, LLC., Job # 142241R1 dated 11/5/2014, it was assumed that the soil that was compacted on top of the base pad after the installation of the combined pad and pier has a density of at least 100 pcf.

If it is determined that any of these additional assumptions are not accurate, this analysis is void and an additional analysis should be performed.

SECTION 4
RESULTS

4.1 TOWER STRUCTURE

The analysis results of the existing tower structure when considering the proposed loading condition indicate the tower structure **is structurally adequate**. Refer to Section 3.5 for additional information regarding assumptions for this analysis.

The results of the analysis are shown in the following table. The ratio listed for each tower element represents the capacity ratio calculated for the controlling member(s) for each element type.

Capacity - Results		
Tower Structure Elements	**Capacity Ratio (%)**	**Comment**
Legs 150'-170'	76.9%	Adequate
Diagonals **150'-170'**	**94.6%**	**Adequate**
Horizontals 150'-170'	30.7%	Adequate
Girts 150'-170'	59.8%	Adequate
Bolts 140'-150' (Diagonal Block Shear)	90.4%	Adequate

Diagrams of the tower's maximum deflection, tilt, and twist are provided in Appendix A.

4.2 TOWER FOUNDATIONS

The analysis results of the existing tower foundation when considering the proposed loading condition indicates the tower foundation system **is structurally adequate**. Refer to Section 3.5 for additional information regarding assumptions for this analysis.

Despite the overage present in the table below, the existing combined footing was evaluated for both overturning and bearing as per the soil properties indicated in the geotechnical report. From the loading condition stated in Section 3.2, It was determined that the foundation reactions are less than the allowable. Therefore, the combined footing **is considered structurally adequate**.

An additional foundation strength calculation was also completed. From this analysis it was determined that the foundation **meets** requirements per the current ACI specification.

The existing anchor bolts were evaluated for shear, tension, and concrete pullout as per the available information indicated in the foundation design documents. It was determined that the loading condition from Section 3.2 resulted in anchor bolt forces are less than the allowable design parameters. Therefore, the anchor bolts **are considered structurally adequate**.

Refer to Appendix A for support calculations.

The reactions from the original tower design were compared against those calculated for the loading condition mentioned in Section 3.2. The ratios of loading condition to original reactions were computed and are shown in the following table.

Tower Foundation Capacity Results					
Condition	**Axial (Kips)**	**Shear (Kips)**	**Moment (K-Ft)**	**Compression (Kips/Leg)**	**Uplift (Kips/Leg)**
Original	48.2	62.0	6208.4	374.5	342.4
Proposed	70.7	51.9	5903.7	364.4	316.8
Capacity Ratio	146.7%	83.8%	95.1%	97.3%	92.5%

The original design reactions have been multiplied by 1.35 per the TIA-222 standard. The percentages provided are only for reference. The results of the comprehensive structural analysis are based on the provided calculation.

4.3 RECOMMENDATIONS

The client and tower owner shall closely review this report including assumptions made, analysis criteria selected and loading conditions modeled. Any questions or discrepancies with these items shall be clarified with the engineer.

Edge recommends that qualified personnel assess the physical condition of the tower, in accordance with the guidelines and frequency provided in the TIA-222 standard.

SECTION 5
LIMITATIONS AND RESTRICTIONS

1. This report was prepared in accordance with generally accepted structural engineering practices common to the tower 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 modifications completed prior to, or hereafter, which Edge Consulting Engineers was not, or will not, be directly involved.
4. The model, conclusions, and recommendations contained within this report are based upon the supplied and attained information as described within the report and supplemented with historical information available to Edge Consulting Engineers. 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 analysis 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 tower elements are in like new condition, free from rust and other deterioration. Additionally, this analysis assumes that all installed modification designs were thoroughly reviewed and approved by the respective engineer of record and are they able to carry their intended design capacity. 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 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 tower, and the findings contained in this report are not valid.
11. 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.
12. It is the responsibility of the client and the tower owner to thoroughly review the existing and proposed loading, and bring any discrepancy to the attention of Edge Consulting Engineers.
13. Modification designs are to be based upon a rigorous or comprehensive analysis per the referenced TIA-222 standard. As such designs assume any suggested modifications are installed as recommended and are not intended to address temporary conditions on the tower as modifications are being performed. It is strongly recommended that the Installer of any tower modification thoroughly assess installation procedures and how temporary conditions present while modifications are being performed influence tower members. Installer is responsible for sequence of operation and any required temporary bracing or strengthening of tower during modification operations.
14. Site-specific loading or local building code requirements may be more stringent than the minimum loading requirements specified in the Standard. These and other unique loads or loading combination requirements are to be specified by the owner (in the procurement specifications).
15. Supplementary rime ice and in-cloud ice loadings (including thickness, density, escalation with height and corresponding wind speed) are to be included in the procurement specification when appropriate for a given site location.
16. The service loads and deformation limits specified in the Standard are the minimum requirements for communication structures. When more stringent requirements are required for a specific application, the serviceability limit state basic wind speed and, if required, the serviceability limit state design ice thickness; the deformation limitations (twist, sway and horizontal displacement) and the location/elevation where the deformation limitations apply are to be included in the procurement specification.

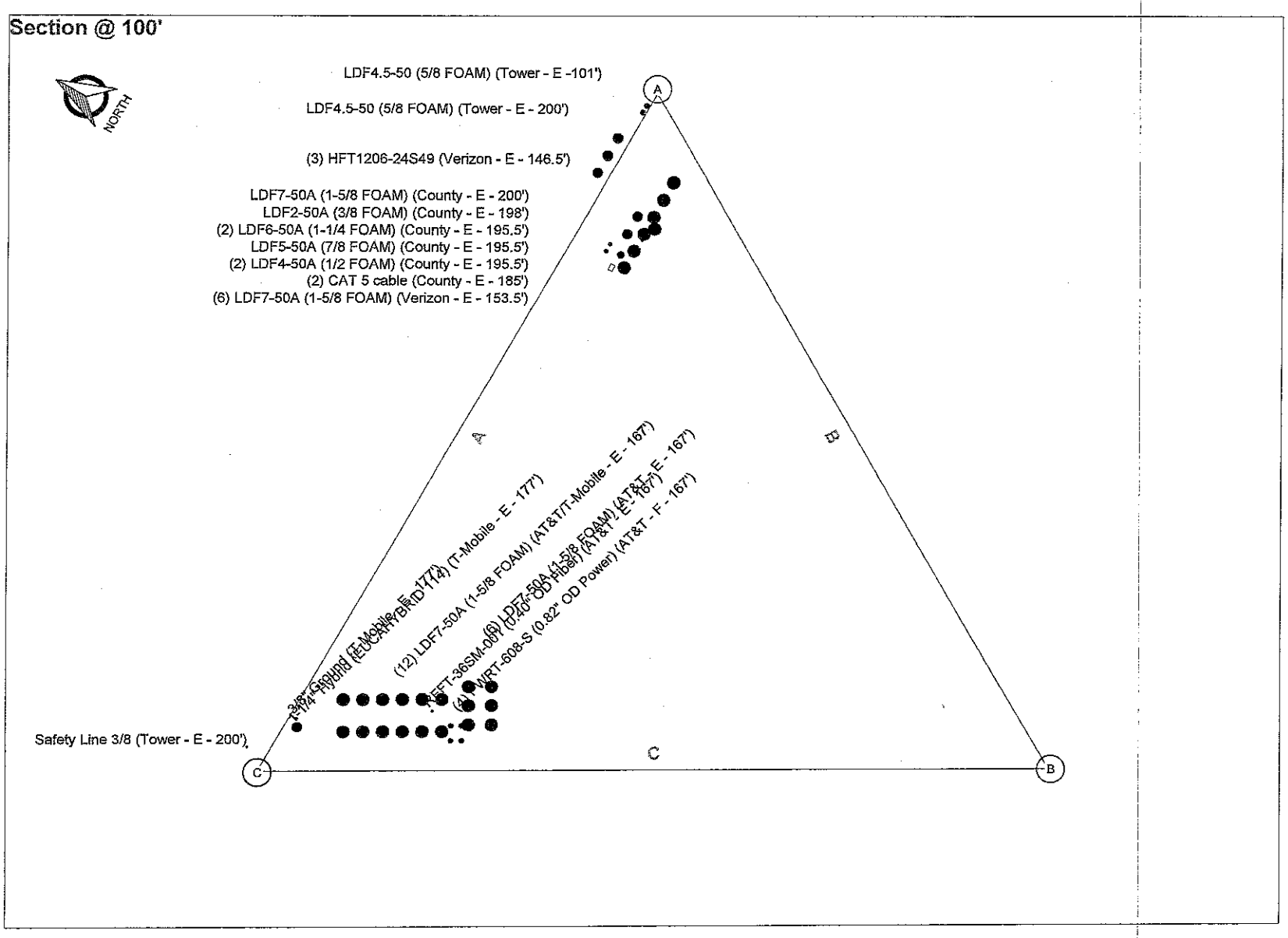
Figure 1

Feedline Placement Diagram

Feed Line Plan
100'

_____ Round _____ Flat _____ App In Face App Out Face Truss-Leg

Section @ 100'



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Project: *28070*			
Client: Verizon	Drawn by: kscharenbroch		App'd:
Code: TIA-222-H	Date: 01/13/21		Scale: NTS
Path:			Dwg No. E-7

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 63

Appendix A

Structural Calculations

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Legs		SR 1 1/2	SR 2	A	B	C	Pirod 105218		D	Pirod 105219	E	F
Leg Grade						A572-50						
Diagonals		SR 3/4	SR 7/8		L2 1/2x2 1/2x3/16		L3x3x3/16			L3x3x5/16		L3 1/2x3 1/2x5/16
Diagonal Grade							A36					
Top Girts			SR 7/8						N.A.			
Bottom Girts			SR 7/8						N.A.			
Horizontals			SR 3/4						N.A.			
Face Width (ft) 20	4		4.5	5	6	8	10	11	12	14	16	18
# Panels @ (ft)	4 @ 2.375	8 @ 2.41667	8 @ 2.35458						15 @ 10			
Weight (lb) 34307.9	436.2	851.1	2905.1	1127.5	2573.6	3072.7	1501.2	1578.0	4145.5	4390.1	5459.5	8168.4

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (Tower)	214	Sabre C10152012 (12' T-Boom - Angles) (ATI)	165
Flash Beacon Lighting (Tower)	200	Sabre C10152012 (12' T-Boom - Angles) (ATI)	165
20' Dipole (Edge Generic) (County)	200	Sabre C10857111 (12' HD V-Frame, No Pipes) (Verizon)	153.5
15'x2 1/2" Pipe Mount (Tower)	199	Sabre C10857111 (12' HD V-Frame, No Pipes) (Verizon)	153.5
Pirod 3' Side Mount Standoff (1) (County)	198	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
20' Dipole (Edge Generic) (County)	198	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
PD10017-1 (15' Omni) (County)	195.5	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
PD10017-1 (15' Omni) (County)	195.5	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
PD10017-1 (15' Omni) (County)	195.5	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
12" x 12" x 6" Junction Box (County)	195.5	NHH-65C-R2B w/ Mount Pipe (Verizon)	153.5
Pirod 6' Side Mount Standoff (1) (County)	195.5	HBX-9016DS-VTM w/ Mount Pipe (Verizon)	153.5
Pirod 6' Side Mount Standoff (1) (County)	195.5	HBX-9016DS-VTM w/ Mount Pipe (Verizon)	153.5
Pirod 6' Side Mount Standoff (1) (County)	195.5	HBX-9016DS-VTM w/ Mount Pipe (Verizon)	153.5
Ceragon FibreAir 1500HP/RFU-HP (County)	185	9'x2" Antenna Mount Pipe (Verizon)	153.5
Ceragon FibreAir 1500HP/RFU-HP (County)	185	9'x2" Antenna Mount Pipe (Verizon)	153.5
ODU Mount (County)	185	9'x2" Antenna Mount Pipe (Verizon)	153.5
7'x4" Pipe Mount (County)	184	Ericsson VZE01 (Preliminary) (Verizon)	153.5
DA6-W57BC w/ Shroud (County)	184	Ericsson VZE01 (Preliminary) (Verizon)	153.5
(2) TMBXX-6517-A2M w/ Mount Pipe (T-Mobile)	177	Ericsson VZE01 (Preliminary) (Verizon)	153.5
(2) TMBXX-6517-A2M w/ Mount Pipe (T-Mobile)	177	Sabre C10857111 (12' HD V-Frame, No Pipes) (Verizon)	153.5
(2) TMBXX-6517-A2M w/ Mount Pipe (T-Mobile)	177	Site Pro CWT8 (No Pipes) (Verizon)	146.5
Nokia Siemens FRIG RRU (T-Mobile)	177	Site Pro CWT8 (No Pipes) (Verizon)	146.5
Nokia Siemens FRIG RRU (T-Mobile)	177	Site Pro CWT8 (No Pipes) (Verizon)	146.5
Nokia Siemens FRIG RRU (T-Mobile)	177	Site Pro CWT8 (No Pipes) (Verizon)	146.5
Nokia Siemens FXFB RRU (T-Mobile)	177	Site Pro CWT8 (No Pipes) (Verizon)	146.5
Nokia Siemens FXFB RRU (T-Mobile)	177	6'x2" Antenna Mount Pipe (Verizon)	146.5
Raycap RNSDC-7771-PF-48 (Large COVP) (T-Mobile)	177	6'x2" Antenna Mount Pipe (Verizon)	146.5
PiROD 10' T-Frame (T-Mobile)	175.5	6'x2" Antenna Mount Pipe (Verizon)	146.5
PiROD 10' T-Frame (T-Mobile)	175.5	6'x2" Antenna Mount Pipe (Verizon)	146.5
PiROD 10' T-Frame (T-Mobile)	175.5	6'x2" Antenna Mount Pipe (Verizon)	146.5
Raycap DC6-48-60-18-8F (ATI)	168	6'x2" Antenna Mount Pipe (Verizon)	146.5
Raycap DC6-48-60-18-8F (ATI)	168	Raycap RC3DC-3315-PF48 (Verizon)	146.5
DBXLH-8585A-R2M w/ Mount Pipe (ATI)	167	Raycap RC3DC-3315-PF48 (Verizon)	146.5
DBXLH-8585A-R2M w/ Mount Pipe (ATI)	167	Raycap RC3DC-3315-PF48 (Verizon)	146.5
DBXLH-8585A-R2M w/ Mount Pipe (ATI)	167	Ericsson RRU-4449 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Ericsson RRU-4449 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Ericsson RRU-4449 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
10'x2 1/2" Pipe Mount (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
10'x2 1/2" Pipe Mount (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
10'x2 1/2" Pipe Mount (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Ericsson RRU-8843 (Verizon)	146.5
SBNHH-1D65C w/ Mount Pipe (ATI)	167	Site Pro CWT8 (No Pipes) (Verizon)	146.5
SBNH-1D6565A w/ Mount Pipe (ATI)	167	7'x4" Pipe Mount (County)	144
SBNH-1D6565A w/ Mount Pipe (ATI)	167	6' Dish w/ Radome (County)	144
SBNH-1D6565A w/ Mount Pipe (ATI)	167	Mid Beacon (w/ Small Ice Shield) (Tower)	101
Ericsson RRU-11 (ATI)	167	Mid Beacon (w/ Small Ice Shield) (Tower)	101
Ericsson RRU-11 (ATI)	167	Mid Beacon (w/ Small Ice Shield) (Tower)	101
Ericsson RRU-11 (ATI)	167	Secondary Horizontal Area (L3 1/2x3 1/2x3/16) (Tower)	95
(2) 11" x 13.5" x 3.75" TMA (ATI)	167	Secondary Horizontal Area (L3 1/2x3 1/2x3/16) (Tower)	95
(2) 11" x 13.5" x 3.75" TMA (ATI)	167	Secondary Horizontal Area (L3 1/2x3 1/2x3/16) (Tower)	95
(2) 11" x 13.5" x 3.75" TMA (ATI)	167	Small GPS (Tower)	15
Ericsson RRU-12 + A-2 (Piggy-Back) (ATI)	167		
Ericsson RRU-12 + A-2 (Piggy-Back) (ATI)	167		
Ericsson RRU-12 + A-2 (Piggy-Back) (ATI)	167		
Ericsson RRUS-32 B30 (ATI)	167		
Ericsson RRUS-32 B30 (ATI)	167		
Ericsson RRUS-32 B30 (ATI)	167		
Sabre C10152012 (12' T-Boom - Angles) (ATI)	165		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244	C	Pirod 105217 (2-1.25" MOD)
B	Pirod 105216 (2-1.25" MOD)	D	Pirod 105218 (2-1.25" MOD)

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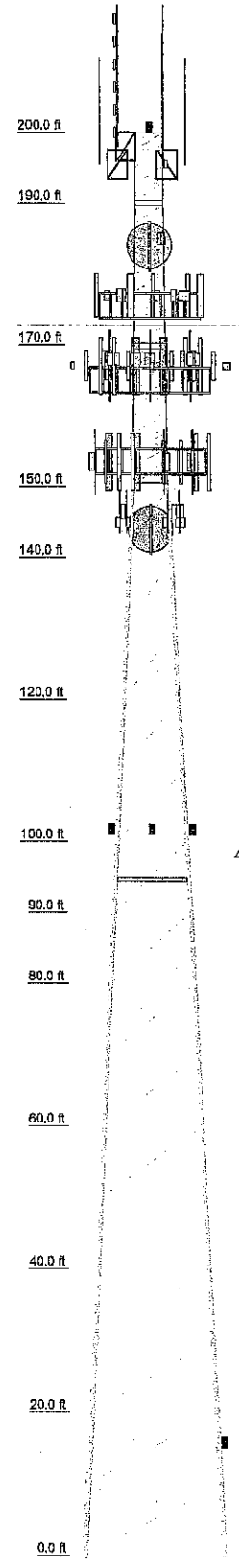
Project: *28070*			
Client: Verizon	Drawn by: kscharenbroch	App'd:	
Code: TIA-222-H	Date: 01/13/21	Scale: NTS	
Path:		Dwg No. E-1	

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 65



Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	F	E	Pirod 105219	D	Pirod 105218		C	B	A	SR 2	SR 1 1/2	
Leg Grade	A572-50											
Diagonals	L3 1/2x3 1/2x5/16		L3x3x5/16		L3x3x3/16			L2 1/2x2 1/2x3/16		SR 7/8	SR 3/4	
Diagonal Grade	A36											
Top Girts	N.A.							SR 7/8				
Bottom Girts	N.A.							SR 7/8				
Horizontals	N.A.							SR 3/4				
Face Width (ft)	20	18	16	14	12	11	10	8	6	4.5	4	
# Panels @ (ft)	15 @ 10									8 @ 2.36458	8 @ 2.41667	4 @ 2.375
Weight (lb)	34307.9	6168.4	5459.5	4390.1	4145.5	1878.5	1691.2	3072.7	2573.6	1127.5	2966.1	851.1	436.2

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244	D	Pirod 105218 (2-1.25" MOD)
B	Pirod 105216 (2-1.25" MOD)	E	Pirod 105219 (2-1.5" MOD)
C	Pirod 105217 (2-1.25" MOD)	F	Pirod 150220 (2-1.5" MOD)

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Waukesha County, Wisconsin.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 114 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Weld together tower sections have flange connections.
9. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
10. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
11. Welds are fabricated with ER-70S-6 electrodes.
12. TOWER RATING: 94.6%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 364418 lb
SHEAR: 34410 lb

UPLIFT: -316751 lb
SHEAR: 30504 lb

AXIAL 211975 lb
SHEAR 12603 lb *MOMENT 1579281 lb-ft*
TORQUE 8344 lb-ft
40 mph WIND - 1.5000 in ICE

AXIAL 70713 lb
SHEAR 51896 lb *MOMENT 5903674 lb-ft*
TORQUE 33959 lb-ft
REACTIONS - 114 mph WIND

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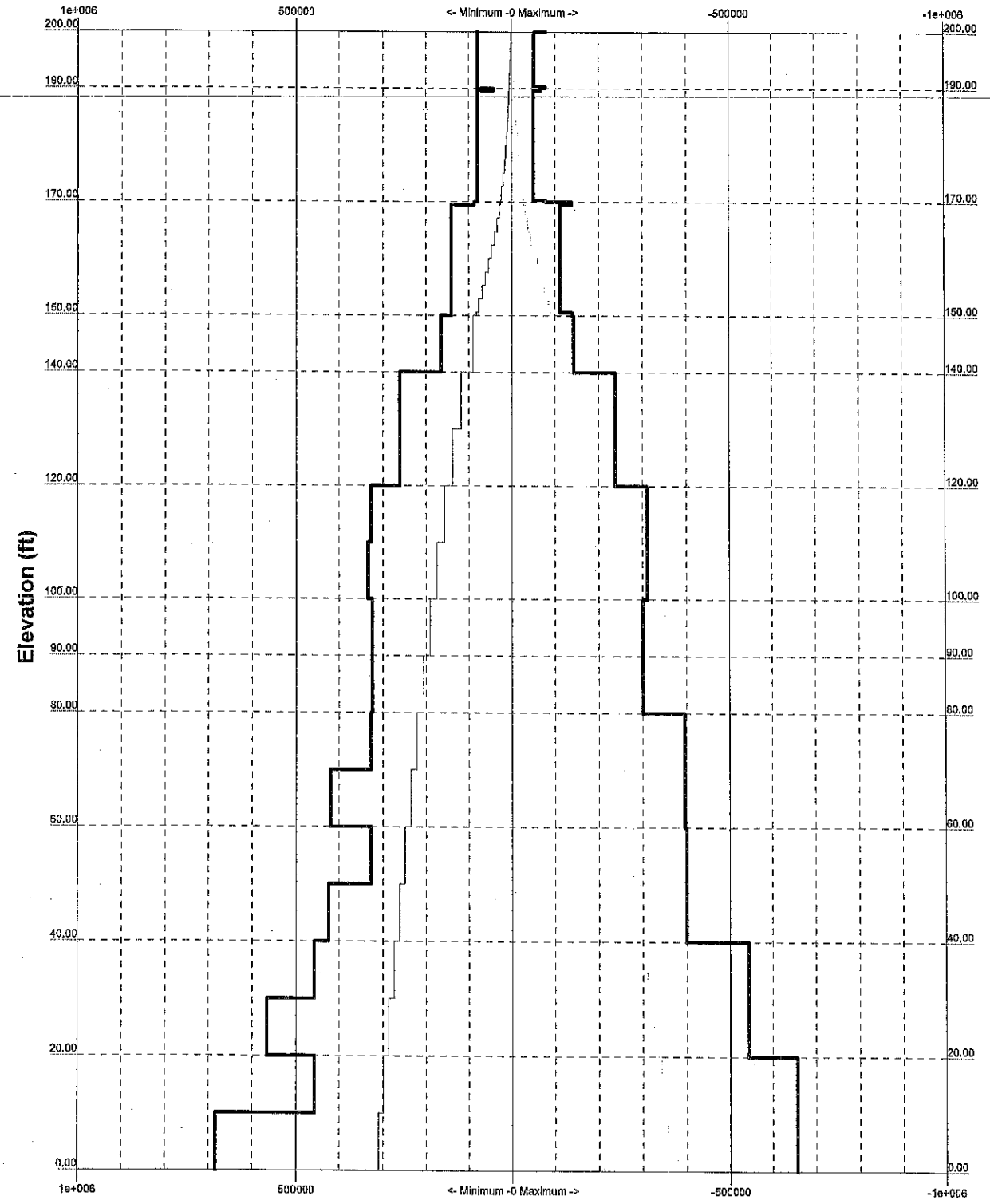
Project: 28070		
Client: Verizon	Drawn by: kscharenbroch	App'd:
Code: TIA-222-H	Date: 01/13/21	Scale: NTS
Path:		Dwg No. E-1

TIA-222-H - 114 mph/40 mph 1.5000 in Ice Exposure C

Leg Capacity ——— Leg Compression (lb)



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Project: *28070*			
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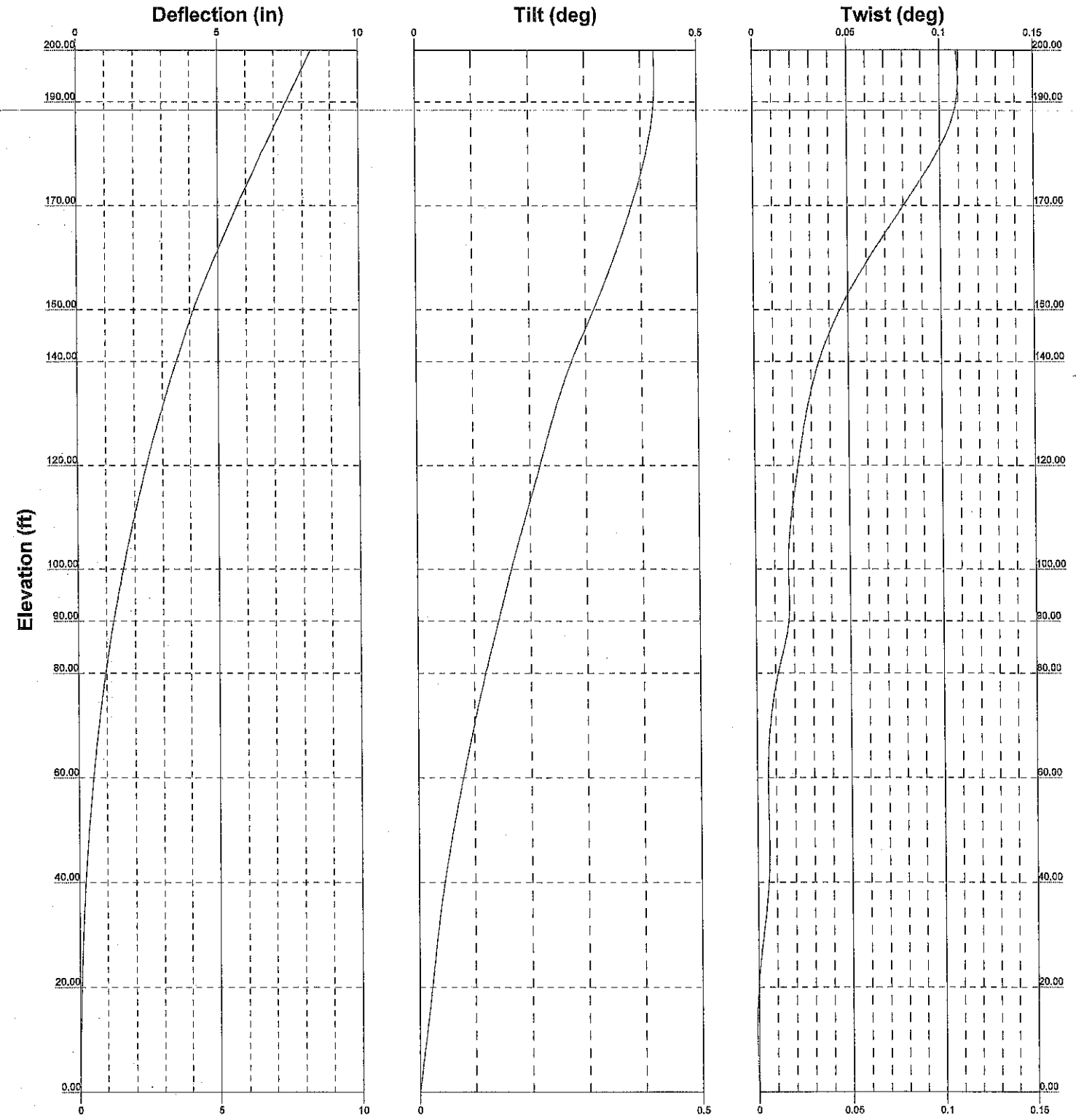
Code: TIA-222-H	Date: 01/13/21		Scale: NTS
Path: Referred to: JU 67			Dwg No. E-3

Referred on: 06/03/21 File Number: 126-Q-022

TIA-222-H - Service - 60 mph

Maximum Values



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Project: *28070*		
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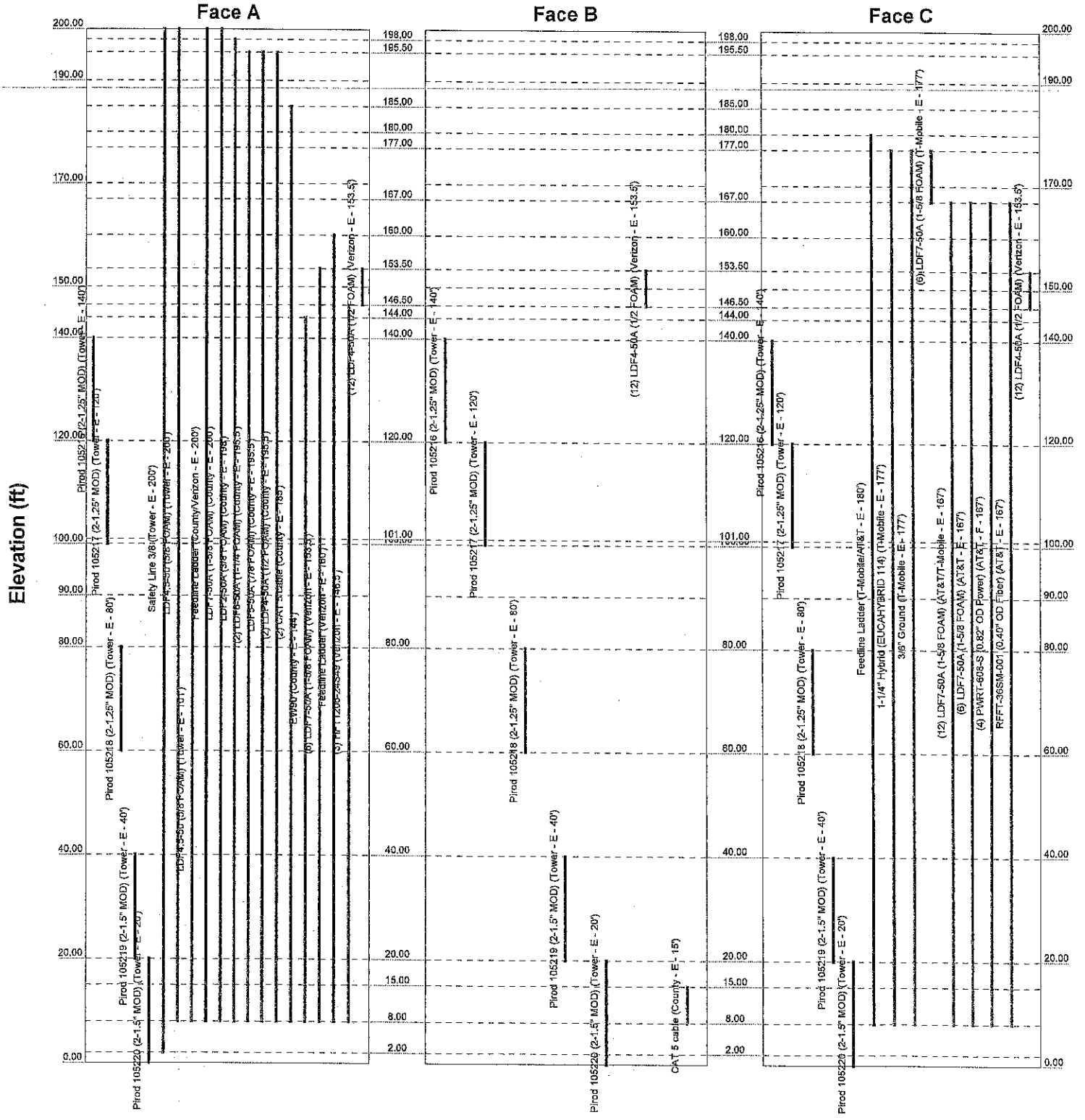
Code: TIA-222-H	Date: 01/13/21	Scale: NTS
Path:		Dwg No. E-5

Referred on: 06/03/21 File Number: 176-0-032 Referred to: JU 68

Feed Line Distribution Chart
0' - 200'

Round Flat App In Face App Out Face Truss Leg



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Project: *28070*			
Client: Verizon	Drawn by: kscharenbroch		App'd:
Code: TIA-222-H	Date: 01/13/21		Scale: NTS
Path:			Dwg No. E-7

Anchor Rod Calculations

Project Name - Waukesha Sheriffs (113339)
Nashotah, Wisconsin
Edge #28070

Edge Consulting Engineers, Inc.

Completed By: SD
Checked By: KTS

Anchor Rod Parameters:

Distance from TOC to Bottom of Leveling Nut (l_{ar}) =	3.00	in	*** Assumed
Consider Base Plate Grouted?	Yes	*	
Consider Grout to Resist Compression?	No		
Number of Rods (N_b) =	6		
Rod Diameter (d) =	1.25	in	
Rod Yield Stress (F_y) =	105	ksi	
Rod Tensile Strength (F_u) =	125	ksi	
Effective l_{ar}/d =	1.00		
Modulus of Elasticity (E) =	29,000	ksi	
Coarse Threads Per Inch (n) =	7.00		

* Grout assumed to be properly installed and have a minimum 7-day strength of 5,000psi and also be non-shrink and non-metallic.

$$d_{rt} = \left(d - \frac{0.9743}{n}\right) \left| \sqrt{0.75} \cdot d \ (if\ n\ isn't\ defined)\right.$$

Tensile Root Diameter of Rod (d_{rt}) =	1.11	in	
Gross Area of Rod (A_g) =	1.23	in^2	
Net Area of Rod(A_n) =	0.97	in^2	

Summary of Results		
Tension DCR	0.35	OK
Compression DCR	0.63	OK
Controlling DCR	**0.63**	**OK**

Design Loads

	Tension	Compression
Axial (k/leg) =	316.75	364.42
Shear (k/leg) =	30.504	34.41

	Tension	Compression
Applied Axial, P_u (k)	52.79	60.74
Applied Shear, V_u (k)	5.08	5.74
Applied Moment, M_u (k-in)	0.00	0.00

Design Capacities

Tension Strength Reduction Factor (ϕ_t) =	0.75		
Shear Strength Reduction Factor (ϕ_v) =	0.75		
Compression Strength Reduction Factor (ϕ_c) =	1		
Flexure Strength Reduction Factor (ϕ_{fy}) =	0.9		
Nominal Tension Strength ($\phi_t R_{nt}$) =	90.85	k	$\phi_t R_{nt} = \phi_t \cdot F_u \cdot A_n$
Nominal Compression Yield Strength ($\phi_c R_{nc}$) =	101.76	k	$\phi_c R_{nc} = \phi_c \cdot F_y \cdot A_n$
Nominal Shear Rupture Strength ($\phi_v R_{nv}$) =	57.52	k	$\phi_v R_{nv} = \phi_v \cdot 0.5 \cdot F_u \cdot A_g$
Nominal Shear Yield Strength ($\phi_c R_{nvc}$) =	30.53	k	$\phi_c R_{nvc} = \phi_c \cdot 0.6 \cdot F_y \cdot A_n \cdot 0.5$
Design Moment Capacity (ϕM_n) =	21.59	k-in	$\phi M_n = \phi_{fy} \cdot F_y \cdot Z_{root}$
Effective Length Factor, K =	1.2		
root diameter radius of gyration, r =	0.278	in	
Slenderness Ratio, KL/r =	12.96		
Elastic Buckling Stress (F_e) =	1703.2	ksi	$F_e = \frac{\pi^2 \cdot E}{\left(\frac{KL}{r}\right)^2}$
Elastic Buckling Limit =	78.3		
Critical Compression Strength (F_{cr}) =	102.33	ksi	$F_{cr} = \begin{cases} \frac{KL}{r} \le 4.71\sqrt{\frac{E}{F_y}}, & \left[0.658^{\frac{F_y}{F_e}}\right] F_y \\ \frac{KL}{r} > 4.71\sqrt{\frac{E}{F_y}}, & 0.877 \cdot F_e \end{cases}$
Nominal Buckling Strength ($\phi_c R_{nb}$) =	99.16	kip	$\phi_c R_{nb} = \phi_c \cdot F_{cr} \cdot A_n$

Combined Shear and Tension Check:

	TENSION	COMPRESSION
$l_{ar} \le 1(d)$	$\left[\frac{P_{ut}}{\phi_t R_{nt}}\right]^2 + \left[\frac{V_{ut}}{\phi_v R_{nv}}\right]^2 \le 1.0$	$\left[\frac{P_{uc}}{\phi_c R_{nc}}\right] + \left[\frac{V_{uc}}{\phi_c R_{nvc}}\right]^2 \le 1.0$
$1(d) < l_{ar} \le 4(d)$	$\left[\frac{P_{ut}}{\phi_t R_{nt}} + \frac{M_{ut}}{\phi M_n}\right]^2 + \left[\frac{V_{ut}}{\phi_v R_{nv}}\right]^2 \le 1.0$	$\left[\frac{P_{uc}}{\phi_c R_{nc}}\right] + \left[\frac{M_{uc}}{\phi M_n}\right] + \left[\frac{V_{uc}}{\phi_c R_{nvc}}\right]^2 \le 1.0$
$l_{ar} > 4(d)$	$\left[\frac{P_{ut}}{\phi_t R_{nt}} + \frac{M_{ut}}{\phi M_n}\right]^2 + \left[\frac{V_{ut}}{\phi_v R_{nv}}\right]^2 \le 1.0$	$\left[\frac{P_{uc}}{\phi_c R_{nb}}\right] + \left[\frac{M_{uc}}{\phi M_n}\right] + \left[\frac{V_{uc}}{\phi_c R_{nvc}}\right]^2 \le 1.0$

DCR (Tension) =	0.35	OK
DCR (Compression) =	0.63	OK
Controling DCR =	0.63	OK

Self-Support Foundation Calculations

Project Name - Waukesha Sheriffs - 698817 (113339)
Nashotah, Wisconsin
Edge #28070

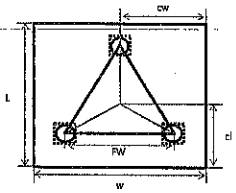
Edge
Consulting Engineers, Inc.

Completed By: SD
Checked By: KTS

Applied Loads:

Note: Loads Are Unfactored (Wind Loads are Strength Level)

	P (kip)	V (kip)	M (kip-ft)
Tower Dead Load (DL) =	58.9	0.0	17.0
Tower Ice Load (IL) =	141.3	0.0	108.2
Wind Load Without Ice (W_o) =	0.0	51.9	5883.3
Wind Load With Ice (W_i) =	0.0	12.5	1450.8



Foundation Dimensions & Soil Properties:

Pier Shape =	Round			
Tower Face Width (FW) =	20.00	ft		
Slab Length (L) =	28.00	ft		
Slab Width (W) =	28.00	ft		
Depth to Bottom of Foundation (h) =	6.00	ft		
Foundation Depth (d) =	3.50	ft		
Lengthwise Distance to Tower Center (cl) =	11.11	ft		
Width Distance to Tower Center (cw) =	14.00	ft		
Pier Width (D_{pier}) =	3.00	ft		
Pier Total Height (H_{pier}) =	3.00	ft		
Pier Height Above Ground Surface (H_p) =	0.50	ft		
Water Table Depth (d_{wt}) =	99	ft		*Per Geotech Report
Soil Weight (γ_{soil}) =	90	lb/ft³		
Submerged Soil Weight (γ'_{soil}) =	55	lb/ft³		
Soil Friction Angle (ϕ_{soil}) =	0	°		
Allowable Soil Bearing Capacity (q_a) =	4,000	lb/ft²	Net	
Concrete Weight (γ_c) =	150	lb/ft³		
Submerged Concrete Weight (γ'_c) =	87.6	lb/ft³		*Concrete below the water table
$d_{(sub)}$ =	0.0	ft		
$H_{pier(sub)}$ =	0.0	ft		

$$l = H_{pier} - H_p$$

Soil Wedge Length (l) = 2.50 ft

$$w_w = \tan \varphi_{soil} \cdot l$$

Soil Wedge Width (w_w) = 0.00 ft

Foundation Weights:

$$W_{Pad} = V_{pad} \cdot \gamma_{con} + V_{pad(sub)} \cdot \gamma'_{con}$$

Weight of Concrete Pad (W_{Pad}) = 411.6 kip

$$W_{Piers} = V_{piers} \cdot \gamma_{con} + V_{piers(sub)} \cdot \gamma'_{con}$$

Weight of Concrete Piers (W_{Piers}) = 9.5 kip

$$W_{soil} = V_{soil} \cdot \gamma_{soil} + V_{soil(sub)} \cdot \gamma'_{soil}$$

Weight of Soil (W_{soil}) = 171.6 kip

Load Combinations:

$S_1 = 1.0DL$
$S_2 = 1.0DL + 0.7IL$
$S_3 = 1.0DL + LF \cdot W_o$
$S_4 = 0.6DL + LF \cdot W_o$
$S_5 = 1.0DL + 0.7IL + 0.7W_i$
$S_6 = 0.6DL + 0.7IL + 0.7W_i$

LF = 0.6

Overturning Check:

$$M_A = M + V \cdot (h + H_p)$$

$$M_R = (P \cdot c) + \left(W_{concrete} \cdot \frac{L}{2}\right) + \left(W_{soil} \cdot \frac{L}{2}\right)$$

$$Ratio = \frac{M_A}{M_R}$$

	Ratio	Check
S1	0.00	OK
S2	0.01	OK
S3	0.42	OK
S4	0.70	OK
S5	0.12	OK
S6	0.18	OK

Bearing Check:

$$e = \frac{M_A}{P_{applied}}$$

$$If\ e \le \frac{w}{6} \quad q_{max} = \frac{P_{applied}}{A} \cdot \left(1 + \frac{6e}{w}\right)$$

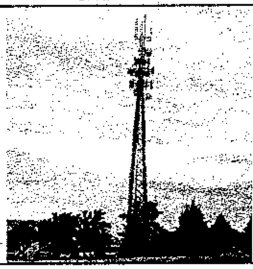
$$If\ e > \frac{w}{6} \quad q_{max} = \frac{P_{applied}}{A} \cdot \left(\frac{2}{1.5 - \frac{3e}{w}}\right)$$

$$Ratio = \frac{q_{max}}{q_a}$$

	Ratio	Check
S1	0.09	OK
S2	0.14	OK
S3	0.35	OK
S4	0.43	OK
S5	0.22	OK
S6	0.13	OK

*If Bearing is Net, Original Soil Pressure is Removed

SITE PHOTO



PROJECT :	LTE 4C/5C/5G NR
SITE # :	WI1094
FA # :	10083547
PTN # :	3352A0VKTD/3352A0VLC8/ 3352A0VL1K
PACE # :	MRCHI051734/MRCHI051753/ MRCHI051738
JURISDICTION :	NASHOTAH
SITE NAME :	NASHOTAH
ADDRESS :	N46 W33480 WISCONSIN AVE NASHOTAH, WI 53058

AT&T MOBILITY

PROJECT INFORMATION

SITE NAME:	NASHOTAH
COUNTY:	WAUKESHA COUNTY
ADDRESS:	N46 W33480 WISCONSIN AVE NASHOTAH, WI 53058
JURISDICTION:	NASHOTAH
SITE NUMBER:	WI1094
FA NUMBER:	10083547
PTN:	3352A0VKTD/3352A0VLC8/ 3352A0VL1K
PACE:	MRCHI051734/MRCHI051753/ MRCHI051738
LATITUDE:	43° 06' 12.985" N (43.1036070°)
LONGITUDE:	88° 24' 42.991" W (-88.4119420°)
TOWER OWNER:	VERIZON WIRELESS PERSONAL COMMUNICATIONS LP 180 WASHINGTON VALLEY ROAD BEDMINSTOR, NJ 07921
CONTACT:	VERIZON WIRELESS PERSONAL COMMUNICATIONS LP 180 WASHINGTON VALLEY ROAD BEDMINSTOR, NJ 07921
APPLICANT:	AT&T WIRELESS 930 NATIONAL PARKWAY SCHAUMBURG, IL 60173
AT&T PROJECT MANAGER:	DONCO KOCESKI EMAIL: DK1012@ATT.COM
AT&T CONSTRUCTION MANAGER:	CHRISTOPHER SCHLAX EMAIL: CS670S@ATT.COM

PROJECT CONSULTANTS

PROJECT MANAGEMENT:	SAC, A NOKIA COMPANY CONTACT: MILLIE PARKARA EMAIL: MILLIE.PARKARA@SACW.COM
SITE ACQUISITION:	SAC, A NOKIA COMPANY CONTACT: ADRIANNA MATUSZAK EMAIL: ADRIANNA.MATUSZAK@SACW.COM
ARCHITECT:	NESTOR POPOWYCH, A.I.A. SAC AE DESIGN GROUP, INC. 540 W. MADISON ST., 9TH FLOOR CHICAGO, ILLINOIS 60661 CONTACT: GREG PHASSOS PHONE: (312)-971-7884 EMAIL: GREG.PHASSOS@SACW.COM
CONSTRUCTION	SAC, A NOKIA COMPANY CONTACT: LUIS GONZALEZ EMAIL: LUIS.GONZALEZ@SACW.COM

SCOPE OF WORK

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ARCHITECT APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

- REMOVE (6) EXISTING AT&T UMTS (850/1900) TMAS. (2) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS)
- REPLUBM (3) EXISTING AT&T UMTS (850) TECHNOLOGY FROM POSITION 4 TO POSITION 1. (1) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS)

LTE 4C (FNET) SCOPE:
- REMOVE (3) EXISTING AT&T UMTS PANEL ANTENNAS. (1) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS)
- INSTALL (3) PROPOSED AT&T LTE 4C/5C PANEL ANTENNAS. (1) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS).
- INSTALL (3) PROPOSED AT&T LTE 4C (FNET) RRUS4478-B14, W/2ND FIBER. (1) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS).

LTE 5C (PCS) SCOPE:
- INSTALL (3) PROPOSED AT&T LTE 5C (PCS) RRUS4415-B25, W/2ND FIBER. (1) PER SECTOR IN POSITION 4. (TYP. OF 3 SECTORS).

5G NR (850) SCOPE:
- REMOVE (3) EXISTING AT&T LTE 1C/2C PANEL ANTENNAS. (1) PER SECTOR IN POSITION 2. (TYP. OF 3 SECTORS)
- INSTALL (3) PROPOSED AT&T LTE 1C/2C/5G NR PANEL ANTENNAS. (1) PER SECTOR IN POSITION 2. (TYP. OF 3 SECTORS).
- REMOVE (3) EXISTING AT&T LTE 1C (700) RRUS-11-B12. (1) PER SECTOR IN POSITION 2. (TYP. OF 3 SECTORS)
- INSTALL (3) PROPOSED AT&T LTE 1C/5G NR (700/850) RRUS4449-B5/12, W/2ND FIBER AND 2ND POWER. (1) PER SECTOR IN POSITION 2. (TYP. OF 3 SECTORS).

- REMOVE (1) EXISTING RAYCAP DC6-48-60-18-8F (SQUID)
- REMOVE (1) EXISTING RAYCAP DC6-48-60-0-8C (SQUID)
- INSTALL (2) PROPOSED RAYCAP DC9-48-60-24-8C (SQUIDS)
- INSTALL (2) PROPOSED 8 AWG DC TRUNK LINES.
- INSTALL (2) PROPOSED 24-PAIR FIBER TRUNKS LINES.
- REUSE (4) EXISTING 8 AWG DC TRUNKS LINES.
- REMOVE (1) EXISTING 12-PAIR FIBER TRUNK LINE.

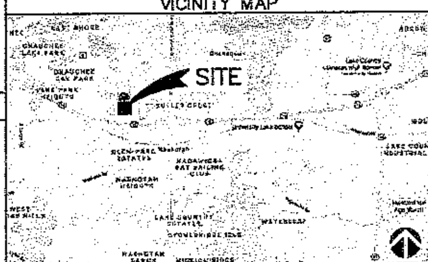
4TXRX SCOPE:
- SOFTWARE ONLY, NO TOWER WORK

LTE 4C (FNET) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (2) PROPOSED ALARM CABLES.
- REMOVE (1) EXISTING DC12-48-60-RM (GEN 1) IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

LTE 5C (PCS) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

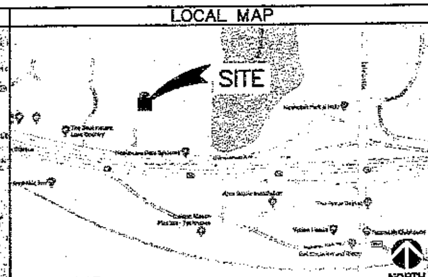
5G NR (850) GROUND SCOPE:
- INSTALL (6) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (1) PROPOSED 6630 BBU W/IDLe CABLE IN EXISTING FIF RACK.
- INSTALL (1) PROPOSED 15A BREAKER IN EXISTING POWER PLANT

VICINITY MAP



NOT TO SCALE

LOCAL MAP



NOT TO SCALE

DRIVING DIRECTIONS

DIRECTIONS FROM: GENERAL MITCHELL INTERNATIONAL AIRPORT.

CONTINUE TO WI-119 W. TAKE I-41/I-894 W, I-94 W AND WI-16 W TO COUNTY RD C/LAKELAND DR IN NASHOTAH. TAKE EXIT 179 FROM WI-16 W. TAKE E WISCONSIN AVE TO YOUR DESTINATION. TURN RIGHT ONTO COUNTY RD C/LAKELAND DR. TURN LEFT ONTO E WISCONSIN AVE. TURN RIGHT. TAKE ACCESS DRIVE TO SITE.

DRAWING INDEX

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN, CALL LOCAL STATE ONE CALL
TOLL FREE: 1-800-242-8511 OR www.diggershotline.com
WISCONSIN STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

CODE COMPLIANCE

- WISCONSIN UNIFORM DWELLING CODE (2015 IBC)
- WISCONSIN COMMERCIAL BUILDING CODE (2015 IBC)
- WISCONSIN ADMINISTRATIVE ELECTRICAL CODE (2017 NEC)
- ANSI/TIA-222-G STANDARDS FOR ANTENNA SUPPORTING STRUCTURES

REFERENCE MATERIALS

- THESE DRAWINGS ARE BASED AT&T SCOPING DOCUMENT DATED 05/20/2020
- REVISED RFDS PENDING. CONTRACTOR TO USE LATEST VERSION WITH CD'S PER SCOPE OF WORK.

SPECIAL NOTES

- ALL WORK SHALL BE INSTALLED IN CONFORMANCE WITH CURRENT AT&T CONSTRUCTION INSTALLATION GUIDE.
- EXISTING CONDITIONS WILL BE CHANGED & VERIFIED IN FIELD. IF SIGNIFICANT DEVIATIONS OR DETERIORATION ARE ENCOUNTERED AT THE TIME OF CONSTRUCTION, A REPAIR PERMIT WILL BE OBTAINED & CONTRACTOR SHALL NOTIFY ARCHITECT IMMEDIATELY.
- THESE DRAWINGS ARE FULL SIZE & SCALEABLE ON 11"X17" SHEET SIZE.
- STATEMENT THAT COMPLIANCE WITH THE ENERGY CODE IS NOT REQUIRED. -SCOPE OF WORK DOES NOT INVOLVE MODIFICATIONS TO EXTERIOR ENVELOPE OF BUILDING, HVAC SYSTEMS OR ELECTRICAL LIGHTING.

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ARCHITECT OR ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

AT&T 930 NATIONAL PARKWAY SCHAUMBURG, IL 60173

SAC A Nokia company 540 W. MADISON ST. 9TH FLOOR CHICAGO, IL 60661 www.sacw.com 312.466.4977

SAC AE DESIGN GROUP, INC. 540 W. MADISON ST. 9TH FLOOR CHICAGO, IL 60661

LTE 4C/5C/5G NR
10083547
NASHOTAH
N46 W33480 WISCONSIN AVE
NASHOTAH, WI 53058

REVISIONS			
REV.	DATE	DESCRIPTION	INITIALS
0	07/09/20	FOR CONSTRUCTION	NL
A	06/24/20	ISSUED FOR REVIEW	GB

NOT FOR CONSTRUCTION UNLESS LABELED AS FOR CONSTRUCTION

WISCONSIN NESTOR POPOWYCH A-3837 CHICAGO, IL ARCHITECT

DATE: 07/09/20

SHEET TITLE: TITLE SHEET

SHEET NUMBER: T1

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.

SAC File: C:\Users\...\10083547.AE203.LTE 4C.REV 0_200709.dwg 07/09/20 13:13

File Number: 176-0-032

Referred to: 30 72

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR/GM – SAC WIRELESS
   SUB-CONTRACTOR – PER TRADE
   OWNER – AT&T WIRELESS
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ARCHITECT PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ARCHITECT PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ARCHITECT PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ARCHITECT, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 93 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING

40. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
41. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
42. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
43. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
44. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
45. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
46. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
47. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00245.
48. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
49. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
50. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

51. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
52. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.

FIBER & POWER CABLE MOUNTING

53. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
54. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
55. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

56. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
57. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
58. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION.
59. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
60. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" OC.
61. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
62. CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
63. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
64. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

65. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
66. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
67. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
68. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
69. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
70. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
71. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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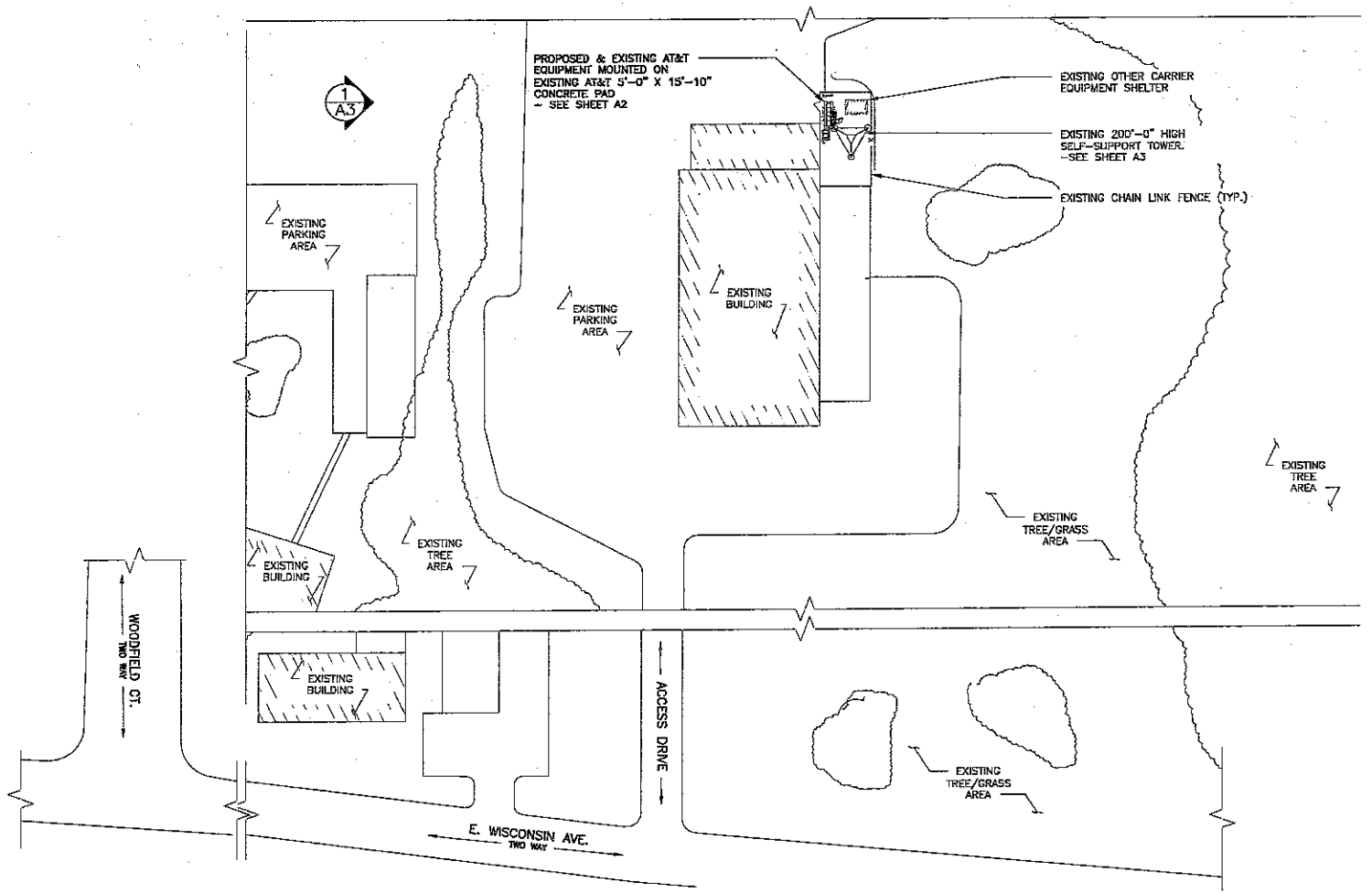
WISCONSIN
NESTOR
POPOWYCH
A-2837
CHICAGO, IL
DATE: 07/09/20
"I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY IMMEDIATE SUPERVISION AND I AM A DULY REGISTERED ARCHITECT UNDER THE LAWS OF THE STATE OF WISCONSIN"

SHEET TITLE: NOTES & SPECIFICATIONS

SHEET NUMBER: SP1

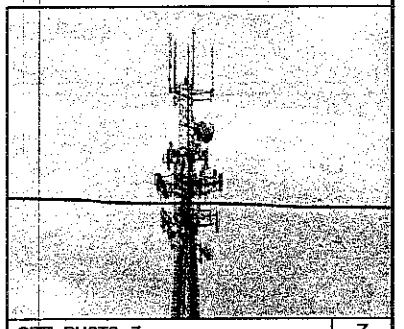


LATITUDE: 43° 06' 12.985" N
LONGITUDE: 88° 24' 42.991" W

NORTH

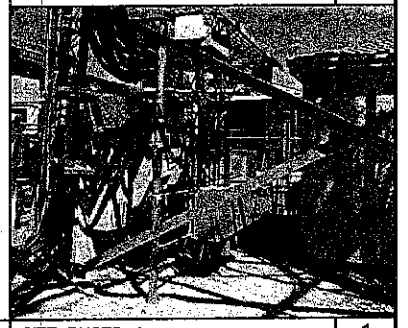
SCALE: 1/16" = 1'-0" (24x36)
1/32" = 1'-0" (11x17)

SITE PLAN 4



SITE PHOTO 3 3

SITE PHOTO 2 2



SITE PHOTO 1 1

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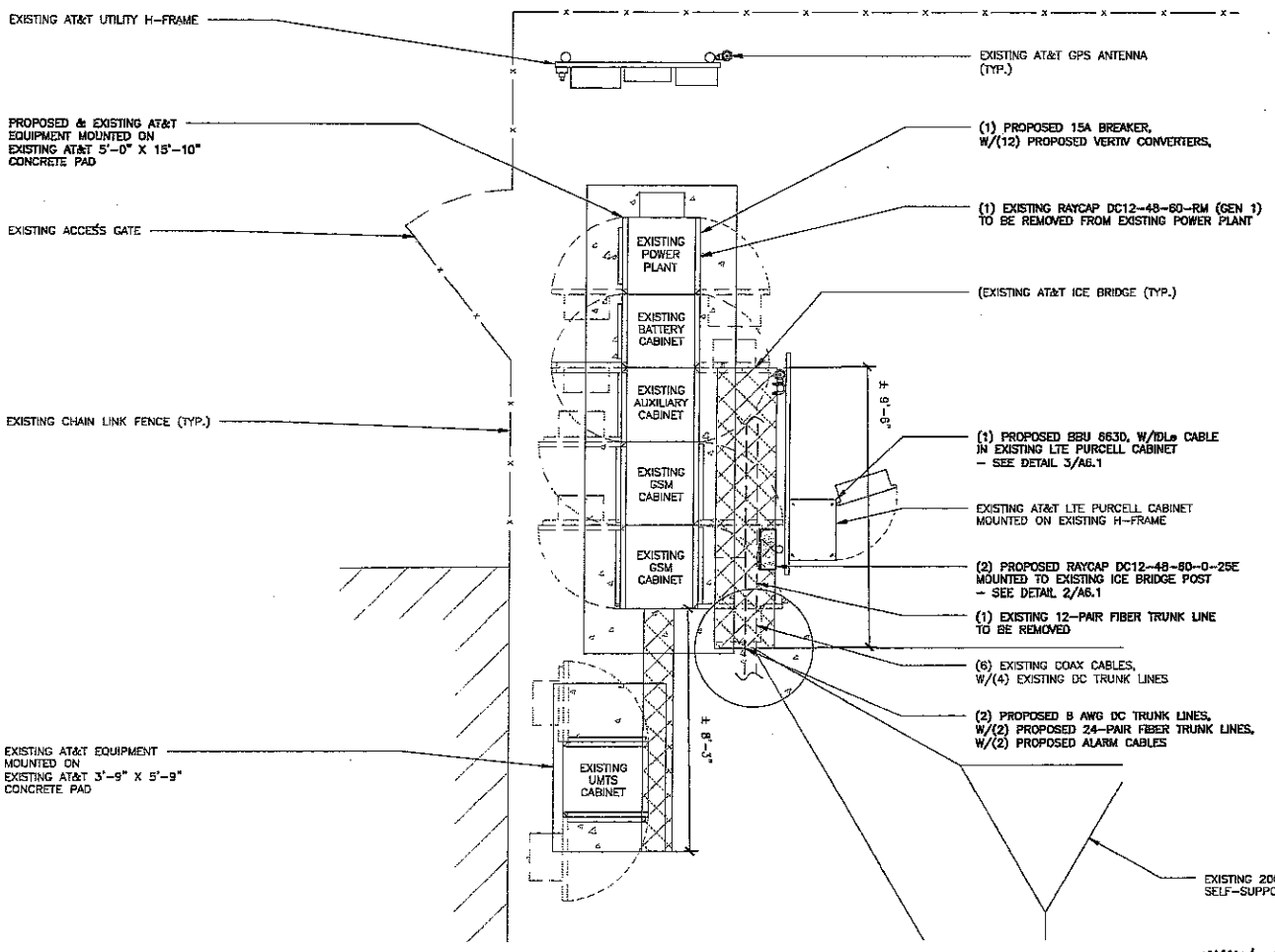
SHEET TITLE
SITE PLAN

SHEET NUMBER
A1



- INSTALL (2) PROPOSED 8 AWG DC TRUNK LINES.
- INSTALL (2) PROPOSED 24-PAIR FIBER TRUNKS LINES.
- REUSE (4) EXISTING 8 AWG DC TRUNKS LINES.
- REMOVE (1) EXISTING 12-PAIR FIBER TRUNK LINE.

LTE 4C (FNET) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (2) PROPOSED ALARM CABLES.
- REMOVE (1) EXISTING DC12-48-60-RM (GEN 1) IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

LTE 5C (PCS) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

5G NR (850) GROUND SCOPE:
- INSTALL (6) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (1) PROPOSED 6630 BBU W/IDLE CABLE IN EXISTING FIF RACK.
- INSTALL (1) PROPOSED 15A BREAKER IN EXISTING POWER PLANT.

LATITUDE: 43° 06' 12.985" N
LONGITUDE: 88° 24' 42.991" W

NORTH

EQUIPMENT PLAN

SCALE: 1/2" = 1'-0" (24x36) (OR) 1/4" = 1'-0" (11x17)

1

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WISCONSIN
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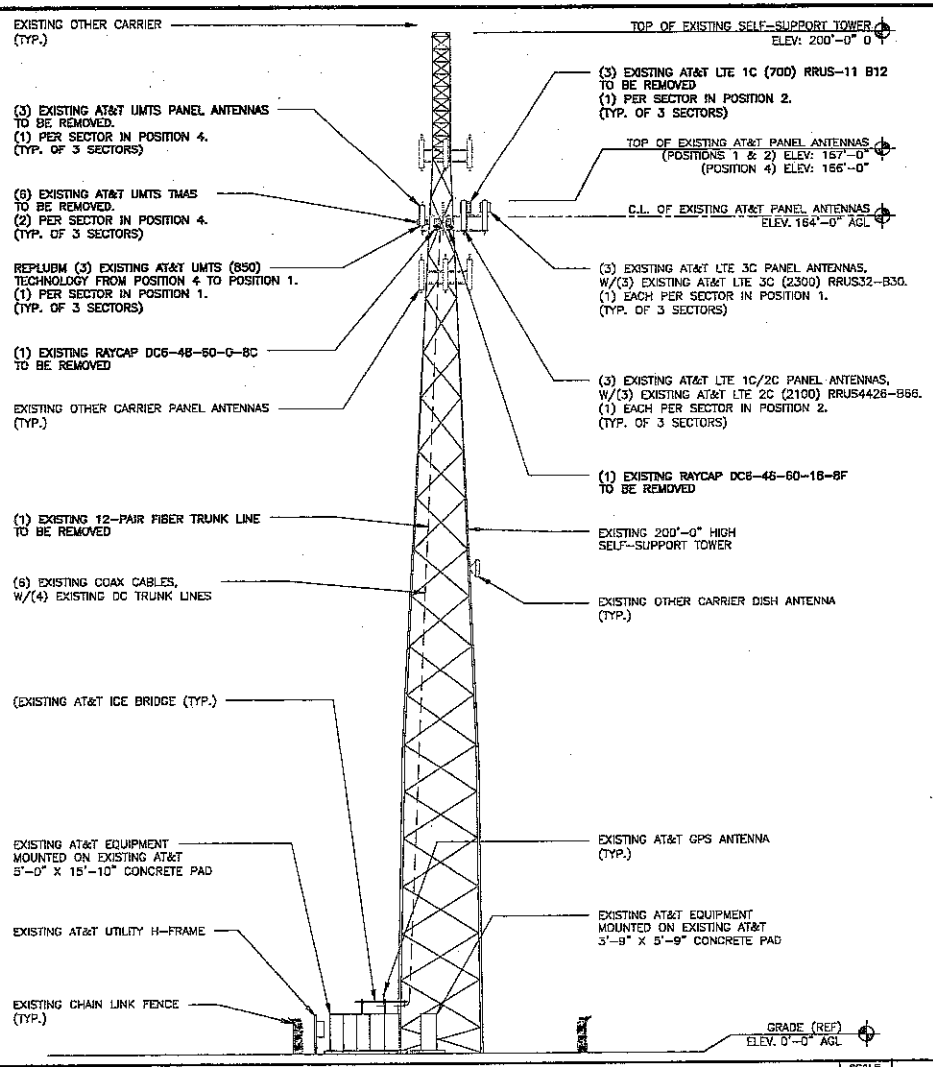
A-3837
CHICAGO, IL
DATE: 07/09/20
REGISTERED ARCHITECT
THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY REGISTERED ARCHITECT UNDER THE LAWS OF THE STATE OF WISCONSIN

SHEET TITLE
EQUIPMENT PLAN

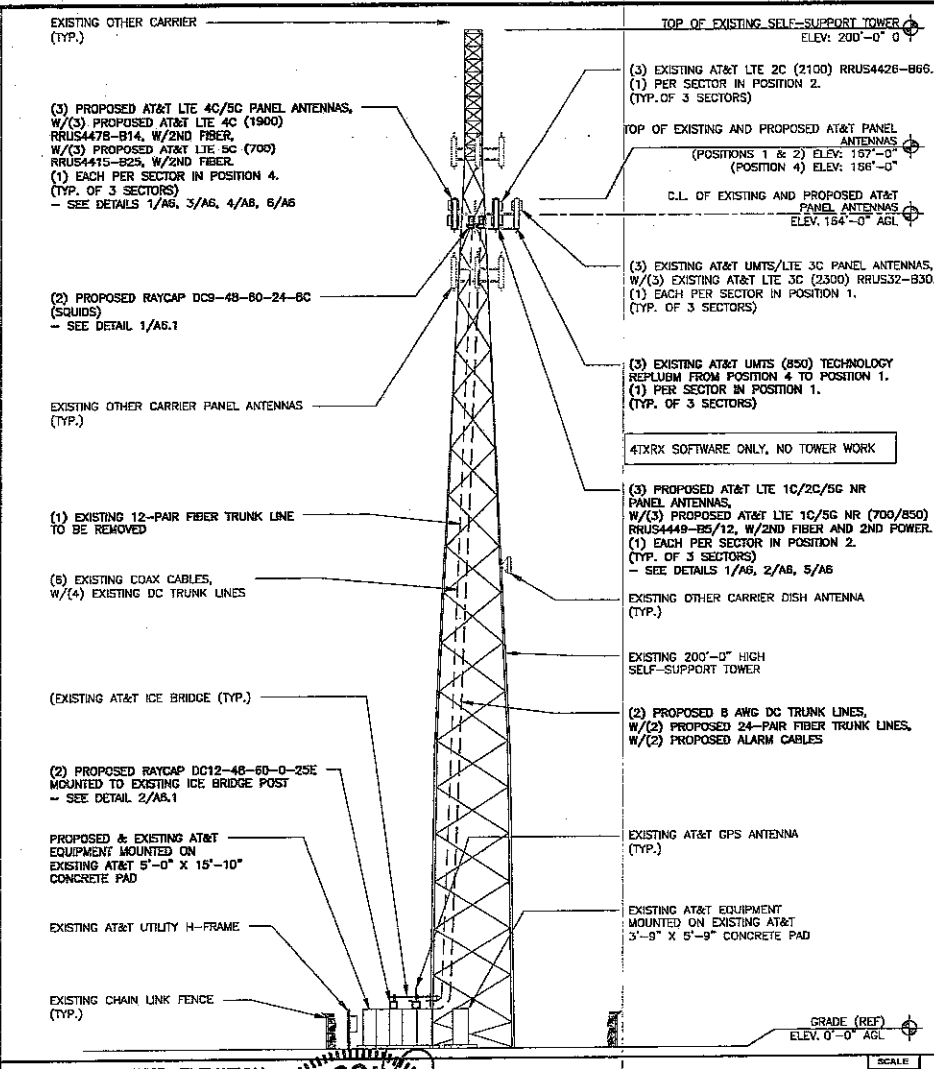
SHEET NUMBER
A2



EXISTING TOWER ELEVATION

SCALE N.T.S.

2



PROPOSED TOWER ELEVATION

SCALE N.T.S.

1

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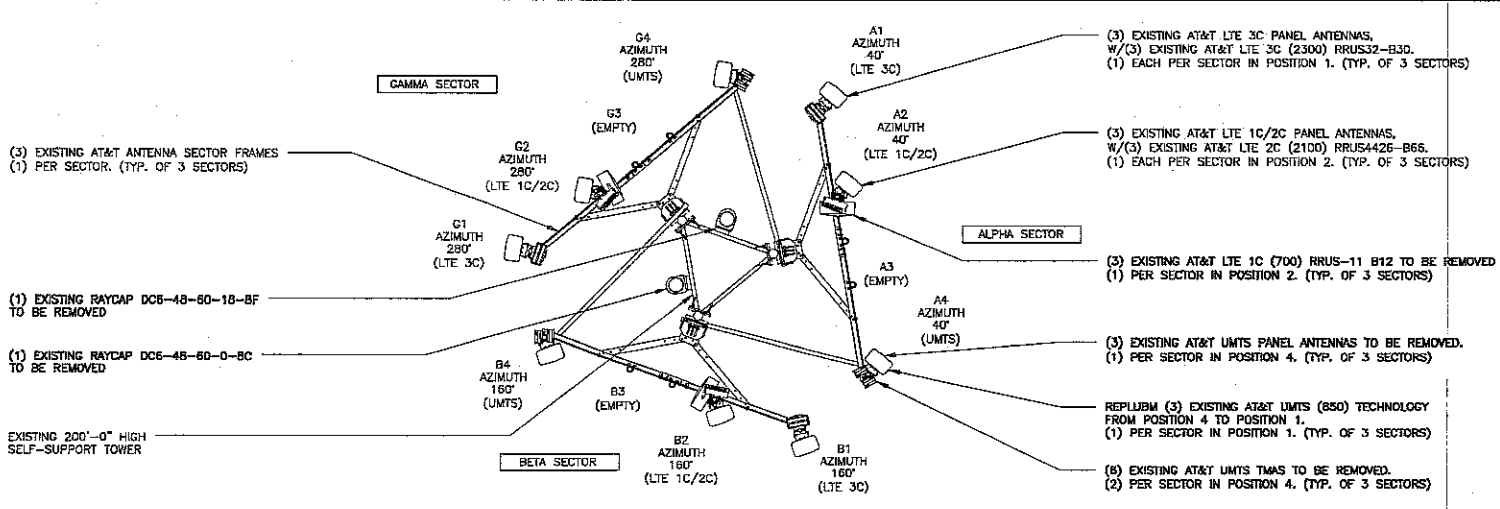
SHEET TITLE
TOWER ELEVATION

SHEET NUMBER
A3

Referred on: 06/03/21

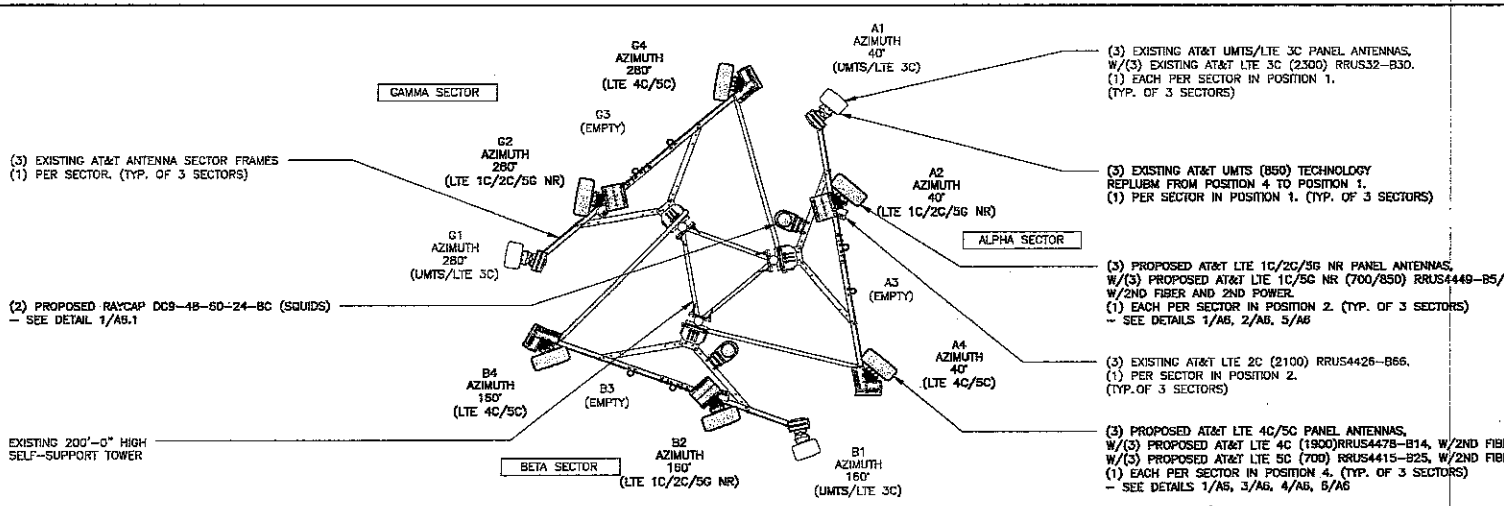
File Number: 176-O-052

Referred to: JU 78



EXISTING ANTENNA PLAN

SCALE: 1/2" = 1'-0" (24x36) (OR) 1/4" = 1'-0" (11x17) 2



PROPOSED ANTENNA PLAN

SCALE: 1/2" = 1'-0" (24x36) (OR) 1/4" = 1'-0" (11x17) 1

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SHEET TITLE: ANTENNA PLAN

SHEET NUMBER: A4

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.

1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNAS SHALL BE ADJUSTED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT SHADOWING AND TO MEET THE SYSTEM REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE ANTENNA WITH THE AT&T WIRELESS PROJECT MANAGER.
4. VERIFY TYPE AND SIZE OF TOWER LEG PRIOR TO ORDERING ANY ANTENNA MOUNT.
5. UNLESS NOTED OTHERWISE THE CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY.
6. ANTENNA AZIMUTHS ARE DEGREES OFF OF TRUE NORTH, BEARING CLOCKWISE, IN WHICH ANTENNA FACE IS DIRECTED. ALL ANTENNAS (AND SUPPORTING STRUCTURES AS PRACTICAL) SHALL BE ACCURATELY ORIENTED IN THE SPECIFIED DIRECTION.
7. CONTRACTOR SHALL VERIFY ALL RF INFORMATION PRIOR TO CONSTRUCTION.
8. SWEEP TEST SHALL BE PERFORMED BY GENERAL CONTRACTOR AND SUBMITTED TO AT&T WIRELESS CONSTRUCTION SPECIALIST. TEST SHALL BE PERFORMED PER AT&T WIRELESS STANDARDS.
9. CABLE LENGTHS WERE DETERMINED BASED ON THE DESIGN DRAWING. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
10. CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ARCHITECT APPROVED EQUAL).

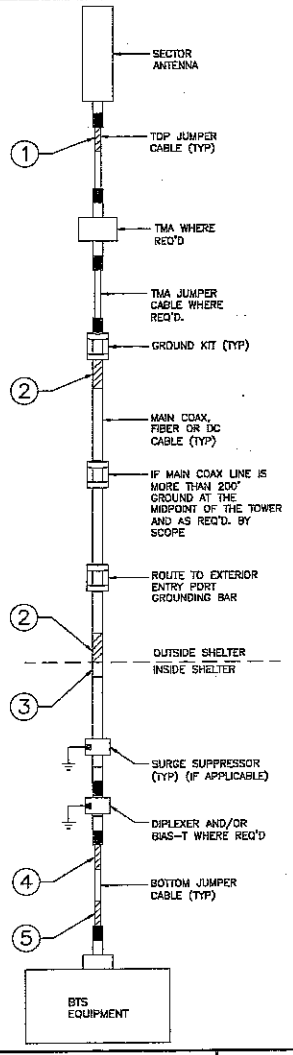
ANTENNA & CABLING NOTES | NO SCALE | 4

RF, DC, & COAX CABLE MARKING LOCATIONS TABLE	
NO	LOCATIONS
1	EACH TOP-JUMPER SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS.
2	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
3	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
4	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.
5	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.

CABLE MARKING DIAGRAM | NO SCALE | 5

1. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE.
2. THE STANDARD IS BASED ON EIGHT COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR CONTRACTOR ON SITE.
3. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE COLOR CHART".
4. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN TECHNOLOGIES IS ENCOUNTERED, THE CONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
5. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
6. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
7. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
8. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE NEW TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING NOTES | NO SCALE | 6



CABLE COLOR CODING DIAGRAM | NO SCALE | 3

NOT USED | NO SCALE | 2

NOT USED | NO SCALE | 1

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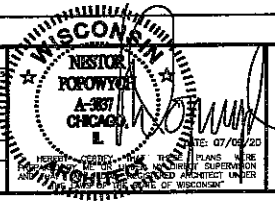


DATE: 07/09/20

SHEET TITLE
CABLE NOTES & COLOR CODING

SHEET NUMBER
A5

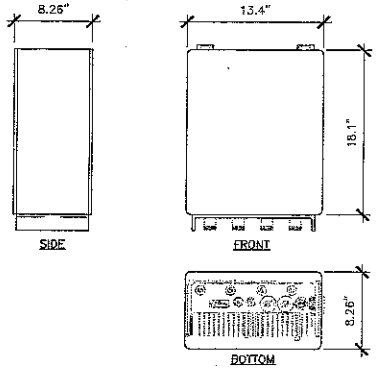
Referred on: 08/03/21 File Number: 176-O-032 Referred to: JU 78

ERICCSON RRUS 4478 B14

DIMENSIONS, HxWxD: 18.1"X13.4"x8.26"

WEIGHT, WITHOUT MOUNTING KIT: 27 kg (59.4 lbs)

STACKING OF RRH'S IS NOT PERMITTED.
NO PAINTING OF RRU'S IS ALLOWED.



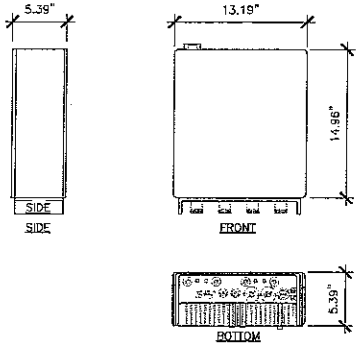
LTE 4C (1900) RRUS DETAIL | NOT TO SCALE | 6

ERICCSON RRUS 4415 B25

DIMENSIONS, HxWxD: 14.96"X13.19"x5.39"

WEIGHT, WITHOUT MOUNTING KIT: 21 kg (46 lbs)

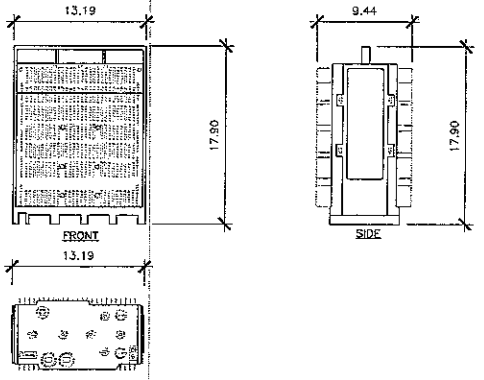
STACKING OF RRH'S IS NOT PERMITTED.
NO PAINTING OF RRU'S IS ALLOWED.



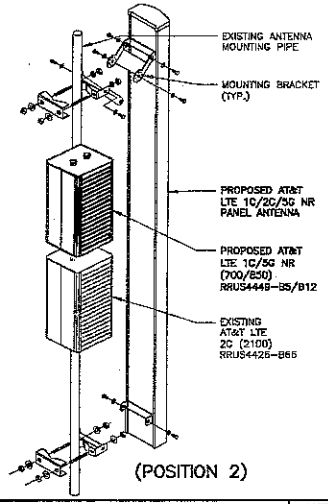
LTE 5C (700) RRUS DETAIL | NOT TO SCALE | 4

ERICSSON RRUS 4449 B5/B12
DIMENSIONS, HxWxD: 17.9"x13.19"x9.44"
INCL. HANDLES, FEET AND SUNSHIELD, W/O FAN UNIT.

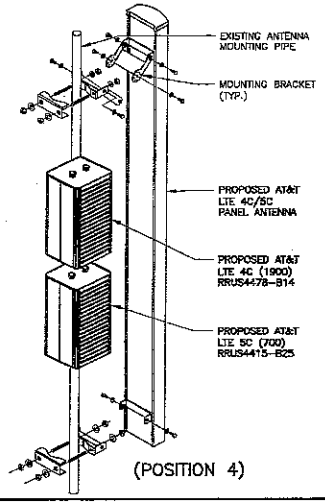
WEIGHT, WITHOUT MOUNTING KIT: 71 lbs (32.0 kg)



LTE 1C/5G NR (700/850) RRUS DETAIL | NOT TO SCALE | 2



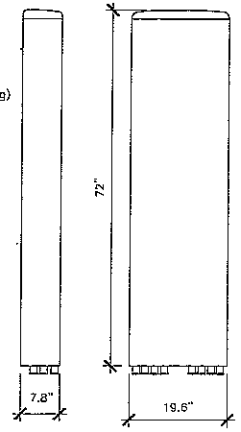
ANTENNA AND RRUSS MOUNTING DETAIL | NOT TO SCALE | 5



ANTENNA AND RRUSS MOUNTING DETAIL | NOT TO SCALE | 5

COMMSCOPE ANTENNAS NNH4-65B-R6H4

DIMENSIONS, HXWXD:	72"X19.6"X7.8"
SURVIVAL WIND SPEED:	>93 MPH
WEIGHT, WITHOUT MOUNTING:	83.5 LBS. (37.8 kg)
CONNECTOR:	8-PIN DIN FEMALE 8-PIN DIN MALE
CONNECTOR POSITION:	BOTTOM
MOUNTING POLE:	2.4-4.5 INCHES



LTE 1C/2C/3C/5G NR ANTENNA DETAIL | NOT TO SCALE | 1

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A	05/24/20	ISSUED FOR REVIEW	GB
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WISCONSIN
NESTOR J. POPOWYCH
A-3637
CHICAGO, IL
DATE: 07/09/20
I HEREBY CERTIFY THAT THIS PLANS, SPECIFICATIONS, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF WISCONSIN.

SHEET TITLE
ANTENNA, RRUSS AND MOUNTING DETAILS

SHEET NUMBER
A6

NOT USED

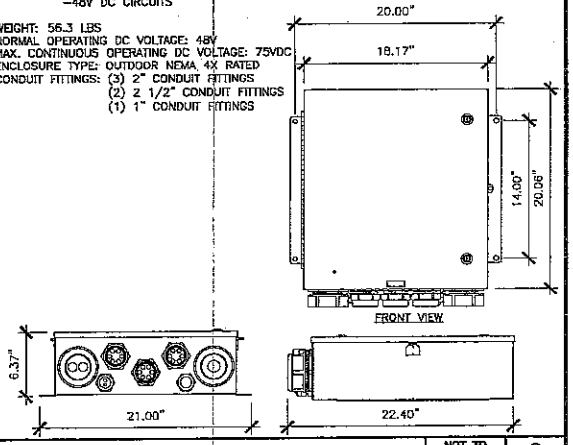
NOT TO SCALE | 6

NOT USED

NOT TO SCALE | 4

MANUFACTURER: RAYCAP
DESCRIPTION: OVERVOLTAGE PROTECTION AND POWER MANAGEMENT JUNCTION BOX
MODEL #: DC12-48-60-0-25E-SS
FEATURES: PROVIDES PROTECTION FOR 12 INDIVIDUALS -48V DC CIRCUITS

WEIGHT: 56.3 LBS
NORMAL OPERATING DC VOLTAGE: 48V
MAX. CONTINUOUS OPERATING DC VOLTAGE: 75VDC
ENCLOSURE TYPE: OUTDOOR NEMA 4X RATED
CONDUIT FITTINGS: (3) 2" CONDUIT FITTINGS
(2) 2 1/2" CONDUIT FITTINGS
(1) 1" CONDUIT FITTINGS



RAYCAP DC12-48-60-0-25 DETAIL

NOT TO SCALE | 2

NOT USED

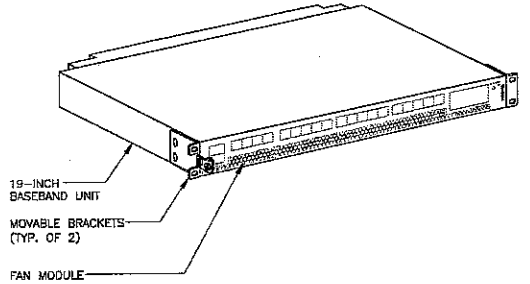
NOT TO SCALE | 5

ERICCSON BASEBAND UNIT 6630:

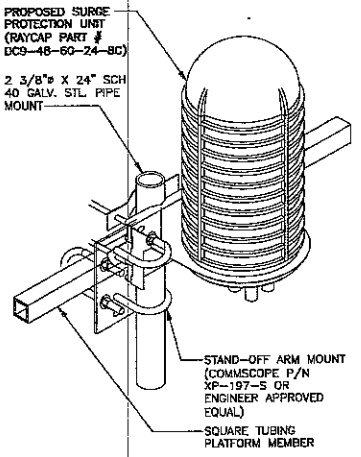
DIMENSIONS, HxWxD: 1.75"x19"x13.78" (1U)

TEMPERATURE: +41°F TO +122°F
HUMIDITY: 5% - 85%
POWER SUPPLY: -48 VDC

TOTAL WEIGHT: <14.33 LBS.



BBU 6630 DETAIL



RAYCAP DC9-48-60-24-8C DETAIL

NOT TO SCALE | 1

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NASHOTAH, WI 53058

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WISCONSIN
NESTOR POPOWYCH
E-237
CHICAGO, IL

DATE: 07/09/20

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SHEET TITLE: DETAILS

SHEET NUMBER: A6.1

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.

Referred on: 06/03/21

File Number: 176-C-052

Referred to: JO 80

PROPOSED ANTENNA CONFIGURATION AND CABLE SCHEDULE

SECTOR	POS	TECH	ANTENNA	ANTENNA ℄ HEIGHT	AZ	TMA/RRU	DC SURGE AND DISTRIBUTION	CABLE TYPE	CABLE LENGTH	DOWNTILTS
A	1	UMTS/LTE 3C	COMMSCOPE (X) SBNHH-1D65B	164' AGL	40°	(1) RRUS32-B30 (X)	(2) RAYCAP (X) DC9-48-60-24-8C	(2) COAX (XR) (2) DC TRUNK LINES (X) (1) FIBER TRUNK LINE (N)	210'	0
	2	LTE 1C/2C/ 5G NR	COMMSCOPE (N) NNH4-65B-R6H4		40°	(1) RRUS4449-B5/B12 (N) (1) RRUS4426-B66 (X)		(2) DC TRUNK LINES (X) FIBER TRUNK (SHARED W/A1)		0
	3	EMPTY								
	4	LTE 4C/5C	COMMSCOPE (N) NNH4-65B-R6H4		40°	(1) RRUS4478-B14 (N) (1) RRUS4415-B25 (N)		(2) DC TRUNK LINES (N) (1) FIBER TRUNK LINE (N)		0
B	1	UMTS/LTE 3C	COMMSCOPE (X) SBNHH-1D65B	164' AGL	160°	(1) RRUS32-B30 (X)		(2) COAX (XR) DC TRUNK (SHARED W/A1) FIBER TRUNK (SHARED W/A1)	210'	0
	2	LTE 1C/2C/ 5G NR	COMMSCOPE (N) NNH4-65B--R6H4		160°	(1) RRUS4449-B5/B12 (N) (1) RRUS4426-B66 (X)		DC TRUNK (SHARED W/A1) FIBER TRUNK (SHARED W/A1)		0
	3	EMPTY								
	4	LTE 4C/5C	COMMSCOPE (N) NNH4-65B--R6H4		160°	(1) RRUS4478-B14 (N) (1) RRUS4415-B25 (N)		DC TRUNK (SHARED W/A4) FIBER TRUNK (SHARED W/A4)		0
G	1	UMTS/LTE 3C	COMMSCOPE (X) SBNHH-1D65B	164' AGL	280°	(1) RRUS32-B30 (X)		(2) COAX (XR) DC TRUNK (SHARED W/A1) FIBER TRUNK (SHARED W/A1)	210'	0
	2	LTE 1C/2C/ 5G NR	COMMSCOPE (N) NNH4-65B-R6H4		280°	(1) RRUS4449-B5/B12 (N) (1) RRUS4426-B66 (X)		DC TRUNK (SHARED W/A1) FIBER TRUNK (SHARED W/A1)		0
	3	EMPTY								
	4	LTE 4C/5C	COMMSCOPE (N) NNH4-65B-R6H4		280°	(1) RRUS4478-B14 (N) (1) RRUS4415-B25 (N)		DC TRUNK (SHARED W/A4) FIBER TRUNK (SHARED W/A4)		0

* INCLUDES SAFETY FACTOR OF 20' FT. (10 FT. AT BOTH ENDS OF CABLE RUN). CONTRACTOR TO VERIFY RF DATA WITH AT&T WIRELESS CONSTRUCTION MANAGER AND/OR RF ARCHITECT PRIOR TO INSTALLATION

(N) = NEW
(X) = EXISTING
(XR) = EXISTING/RELOCATED
(E) = ELECTRICAL
(M) = MECHANICAL

ANTENNA & CABLE CONFIGURATION

NOT TO SCALE | 1

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WISCONSIN
NESTOR POPOWYCH
A-2837
CHICAGO, IL
DATE: 07/09/20
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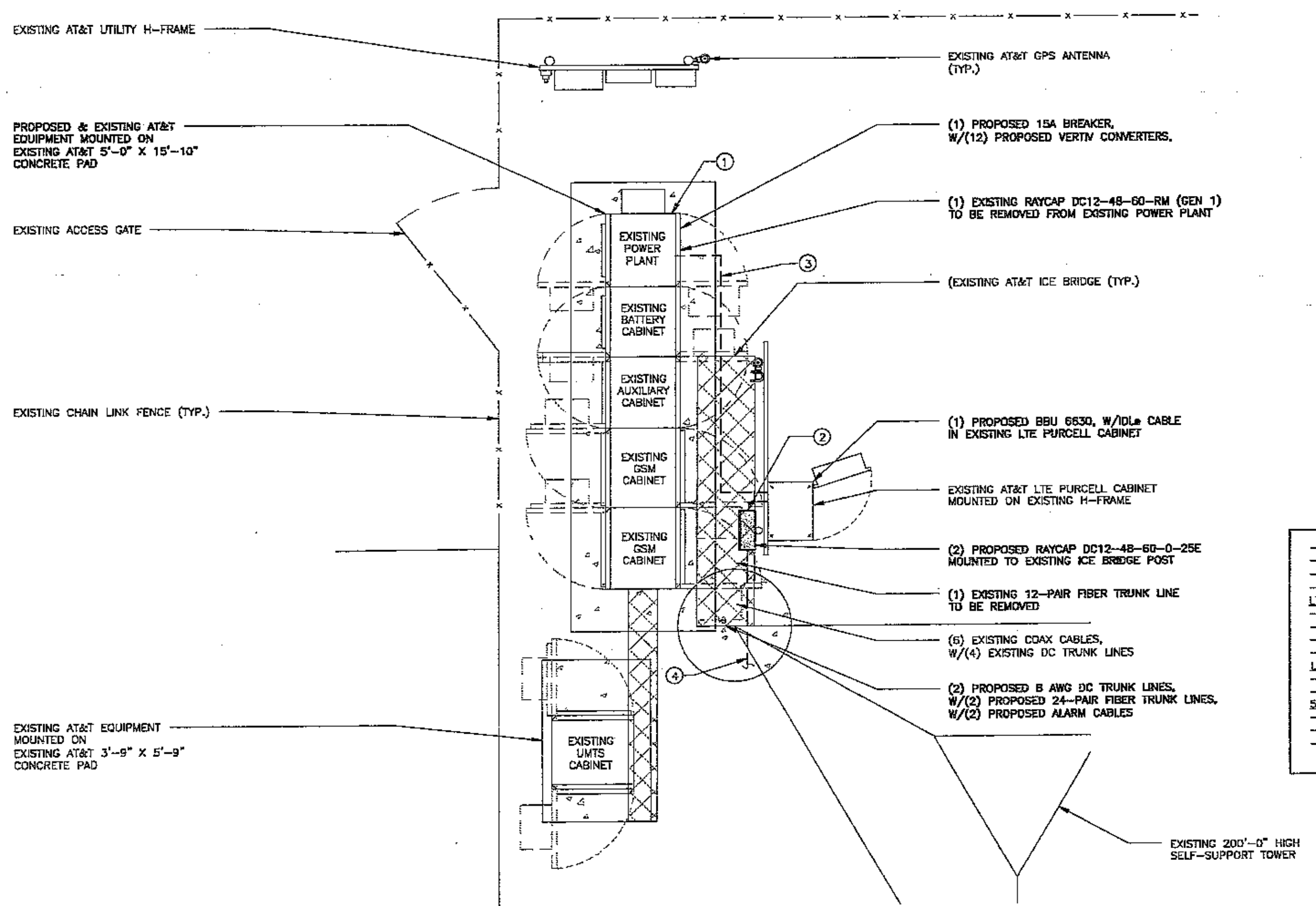
SHEET TITLE
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A7



LEGEND:

① PROVIDE (1) 15A DC CIRCUIT BREAKER PER RRUS UNIT INSIDE EXISTING -48V DC POWER PLANT. (TOTAL OF 1)

② NEW SURGE PROTECTION UNIT INSTALLED ON EXISTING ICE BRIDGE POST.

③ PROVIDE (2) SETS OF 8 AWG DC CONDUCTOR BUNDLE BETWEEN PROPOSED CIRCUIT BREAKER INSIDE EXISTING DC POWER PLANT AND NEW RAYCAP SURGE PROTECTION UNIT ON EXISTING ICE BRIDGE POST.

④ PROVIDE (2) SETS OF 8 AWG DC CONDUCTOR BUNDLE BETWEEN NEW SURGE PROTECTION UNIT ON EXISTING ICE BRIDGE POST AND NEW RAYCAP UNIT MOUNTED NEAR ANTENNA.

NOTES:

1. COORDINATE WITH CONSTRUCTION MANAGER FOR THE PROVISION OF DC CIRCUIT BREAKERS AND OTHER ANCILLARY ITEMS TO SUPPORT THE NEW EQUIPMENT.
2. PROPERLY BOND ALL EQUIPMENT AND CONDUCTIVE SURFACES TO EXISTING GROUND PER NEC AND AT&T STANDARDS.

- INSTALL (2) PROPOSED 8 AWG DC TRUNK LINES.
- INSTALL (2) PROPOSED 24-PAIR FIBER TRUNKS LINES.
- REUSE (4) EXISTING 8 AWG DC TRUNKS LINES.
- REMOVE (1) EXISTING 12-PAIR FIBER TRUNK LINE.

LTE 4C (FNET) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (2) PROPOSED ALARM CABLES.
- REMOVE (1) EXISTING DC12-48-60-RM (GEN 1) IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

LTE 5C (PCS) GROUND SCOPE:
- INSTALL (3) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT
- INSTALL (1) PROPOSED RAYCAP DC12-48-60-0-25E.

5G NR (850) GROUND SCOPE:
- INSTALL (6) PROPOSED VERTIV CONVERTERS IN EXISTING POWER PLANT.
- INSTALL (1) PROPOSED 6630 BBU, W/IDLE CABLE IN EXISTING FIF RACK.
- INSTALL (1) PROPOSED 15A BREAKER IN EXISTING POWER PLANT.

LATITUDE: 43° 05' 12.985" N
LONGITUDE: 88° 24' 42.991" W

NORTH

SCALE: 1/2" = 1'-0" (24x36) (OR) 1/4" = 1'-0" (11x17)

1

UTILITY PLAN

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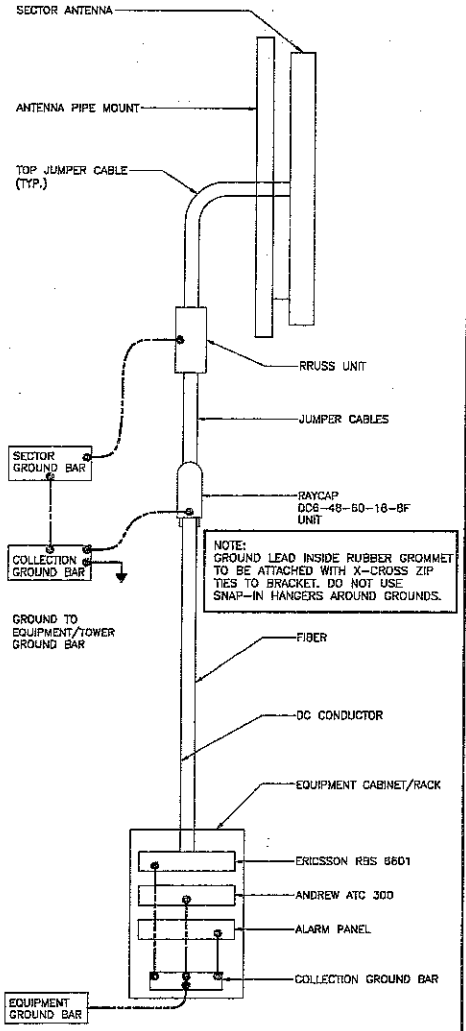
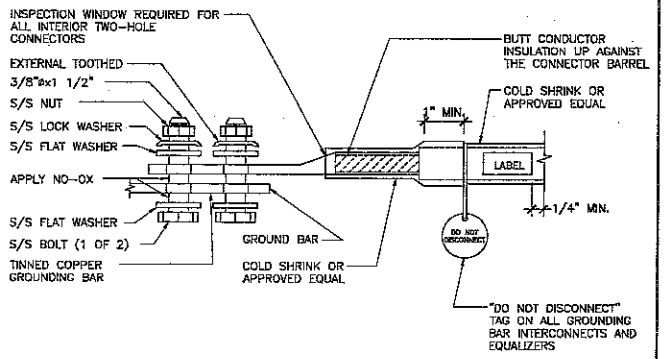
DATE: 07/09/20

SHEET TITLE: UTILITY PLAN

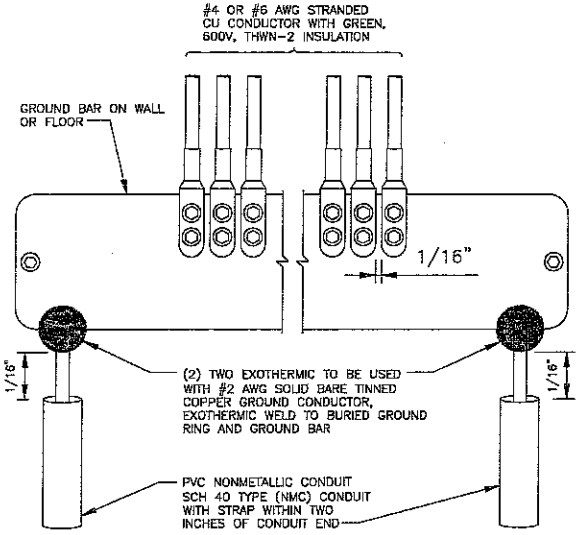
SHEET NUMBER: E1



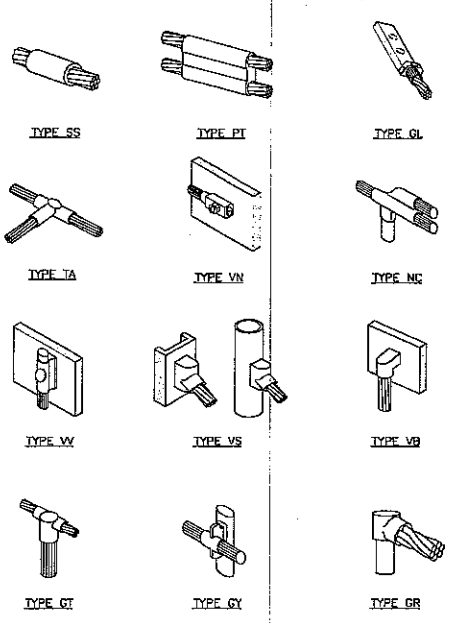
CABLE GROUNDING | NO SCALE | 4



EXTERIOR TWO HOLE LUG DETAIL | NO SCALE | 3



GROUND BAR DETAILS | NO SCALE | 2



CADWELD DETAILS | NO SCALE | 1

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NESTOR POPOWYCH
A-3637
CHICAGO, IL
DATE: 07/09/20
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SHEET TITLE: GROUNDING DETAILS

SHEET NUMBER: G1

SEMAAN
ENGINEERING SOLUTIONS

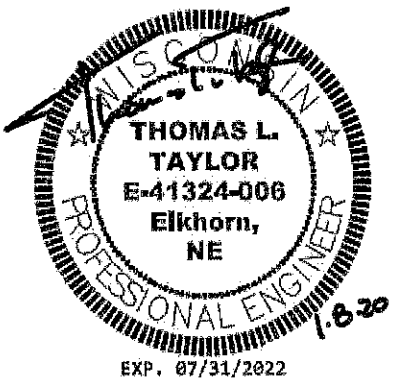
Structural Analysis Report

Prepared for:

KGI
805 Las Cimas Parkway
Building Three, Suite 370
Austin , TX 78746

ATTN: Mr. Wes Smith

Structure	:	200 ft Self Supported Tower
Site ID	:	Waukesha Sheriffs
Proposed Carrier	:	AT&T
Site Name	:	Nashotah
KGI Site Number	:	28227
Site Location	:	N46, W33 480 Wisconsin Avenue Nashotah, WI 43.1037, -88.4120
County	:	Waukesha
Date	:	January 8, 2021
Max Usage	:	99%
Result	:	Pass



EXP. 07/31/2022

Prepared By:
Jung Hyun Hong, E.I.T
Structural Engineer

Thomas Taylor

Digitally signed by Thomas Taylor
DN: cn=Thomas Taylor, o=Semaan Engineering Solutions 402-289-1888, ou=Location: Elkhorn, NE Reason: I am the author of this document, email=tomt@semaaneng.com, c=US
Date: 2021.01.08 13:34:24 -06'00'

SEMAAN
ENGINEERING SOLUTIONS

Table of Contents

SEMAAN
ENGINEERING SOLUTIONS

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 200 ft self supported tower to reflect the change in loading by AT&T.

Supporting Documents

Tower Drawings	PiRod Drawing #202293-B, dated January 18, 2001 HighTower Mapping, dated June 14, 2010
Foundation Drawing	PiRod Drawing #202293-B, dated January 18, 2001 G2 Foundation Investigations Project #142241, dated July 17, 2014 G2 Foundation Investigations Project #142241R1, dated November 5, 2014
Geotechnical Report	G2 Project #142241R1, dated November 5, 2014
Modifications	PiRod Assembly of Tie-Rod Drawing #150843, dated May 21, 2001 AWS Job #03029 R3 MOD, dated May 3, 2013 Fullerton Site ID: WI1094/ML12123D, dated July 23, 2015 Edge Project #14734, dated August 23, 2017
Post Modifications	KGI Post Modification Inspection Site #28227, dated May 3, 2019
Mount Analysis	EFI Global Mount Analysis Project #049.00463 – 2056066, dated December 15, 2020

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	93 mph (3-Second Gust) Vasd / 120 mph (3-Second Gust) Vult
Basic Wind Speed w/ Ice:	40 mph (3-Second Gust) w/ 3/4" radial ice concurrent
Code:	ANSI/TIA-222-G / 2015 IBC / Wisconsin Commercial Building Code
Structure Class:	III
Exposure Category:	C
Topographic Category:	1
Crest Height:	0 ft
Spectral Response:	$Ss = 0.09$, $S_1 = 0.05$
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact Semaan Engineering Solutions at 402-289-1888.

SEMAAN ENGINEERING SOLUTIONS

Existing and Reserved Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
200.0	210.0	1	20 ft Dipole	Leg	(1) 1 5/8"	Waukesha County
198.0	208.0	1	20 ft Dipole	(1) 3 ft Standoff	(1) 3/8"	
195.5	203.0	3	PD-10017-1 Omni	(3) 6 ft Sidearms	(2) 1 1/4"	
	195.5	1	12"x12"x6" Junction Box		(1) 7/8" (2) 1/2"	
185.0	185.0	2	FibeAir 1500 HP / RFU-HP	Pipe	-	
184.0	184.0	1	DA6-W57BC	Pipe	(2) CAT5	
180.0	180.0	3	AEHC AirScale MAA 64T64R 192AE B41 320W	(3) PV-SFA12-3-12-126 Sector Frames w/ (2) Stiff Arms	(5) 1 5/8" **Stacked 2/3** (2) 1.584" Hybrid	T-Mobile
		3	FFHH-65C-R3			
		2	HICAP Hybrid Breakout Box			
		3	RRH 4T4R B12/71 240W AHLOA			
		3	RRH 4T4R B25/66 480W AHFIG			
164.0	164.0	3	RRUS 32	(3) Sector Frames	(12) 1 5/8" **Stacked 3/3 and 2/2/2** (4) 0.77" DC Power	AT&T
153.5	153.5	12	BXA-70080/8CF	(3) HD Sector Frames	(12) 1 5/8" **Stacked 3/3 and 3/3** (3) 1 5/6" Hybrid	Verizon
		6	CBC721-DF-21-DCB			
		3	RC3DC-3315-PF-48			
		6	RRH 3JR52709AA 2X60			
		6	RRH4x30-4T4R-B13			
		3	RRH4x30-4T4R-B25			
		12	RRUS A2 Modules			
144.0	144.0	1	6 ft HP Dish	Pipe	(1) EW90	Waukesha County
15.0	15.0	1	GPS	Leg	(1) CAT5	Verizon

Equipment to be Removed

This loading **is not** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
164.0	164.0	3	DBXLH-8585A-R2M	-	(2) 0.39" Fiber	AT&T
		3	DBXLH-8585A			
		6	SBNHH-1D65C			
		3	RRUS 11			
		3	RRUS 12			
		3	RRUS A2			
		3	ATM192012B-0			
		3	1900e-F GMA			
		2	DC6-48-60-18			

SEMAAN ENGINEERING SOLUTIONS

Proposed Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
164.0	164.0	2	DC9-48-60-24-8C	Existing (3) Sector Frames	(2) 0.77" DC Power (2) 24-Pair Fiber	AT&T
		6	NNH4-65B-R6H4			
		3	Radio 4449			
		3	RRUS 4415 B25			
		3	RRUS 4426 B66			
		3	RRUS 4478			
		3	SBNHH-1D65B			

Install proposed coax anywhere on tower.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Legs	87%	Pass
Diagonals	99%	Pass
Horizontals	71%	Pass
Anchor Bolts	69%	Pass
Leg Bolts	80%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	6,482.8	78%
Axial (Kips)	60.7	50%
Shear (Kips)	57.6	28%
Reinf. Conc. Foundation Capacity	N/A	68%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection, Twist and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Twist (°)	Sway (Rotation) (°)
184.0	DA6-W57BC	Waukesha County	0.732	0.265	0.521
164.0	DC9-48-60-24-8C	AT&T	0.550	0.069	0.486
	NNH4-65B-R6H4				
	Radio 4449				
	RRUS 4415 B25				
	RRUS 4426 B66				
	RRUS 4478				
	SBNHH-1D65B				
144.0	6 ft HP Dish	Waukesha County	0.363	0.013	0.381

***Deflection, Twist and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

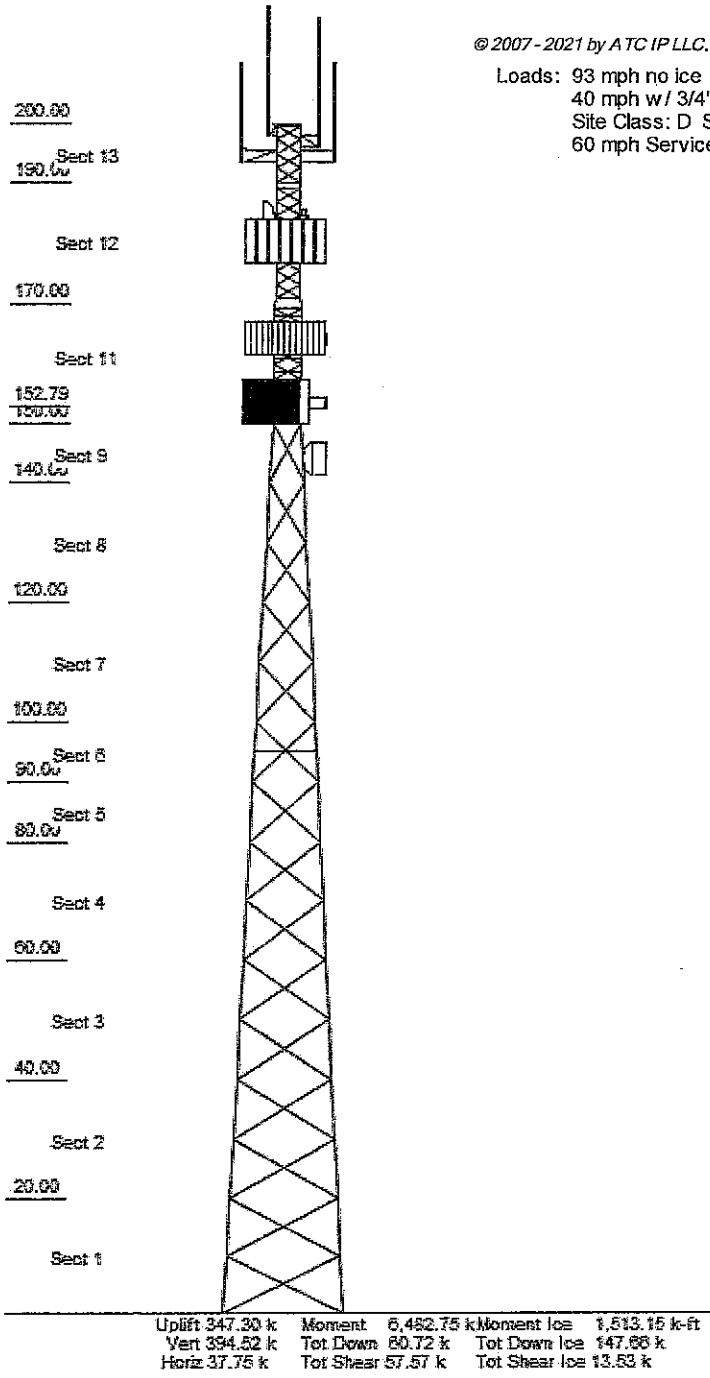
It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 91

Loads: 93 mph no ice
40 mph w/ 3/4" radial ice
Site Class: D Ss: 0.09 S1: 0.05
60 mph Serviceability



Uplift 347.30 k Moment 6,482.75 k Moment Ice 1,513.15 k-ft
Vert 394.52 k Tot Down 60.72 k Tot Down Ice 147.66 k
Horiz 37.75 k Tot Shear 57.57 k Tot Shear Ice 13.53 k

Job Information

Tower : Waukesha Sheriffs	Location : Nashotah, WI	
Code: ANSI/TIA-222-G	Shape : Triangle	Base Width : 20.00 ft
Client : KGI		Top Width : 4.00 ft

Sections Properties

Section	Leg Members		Diagonal Members	Horizontal Members
1	12B 50 ksi	12"BD 2.25"	SAE 36 ksi 3.5X3.5X0.3125	
2	12B 50 ksi	12"BD 2"	SAE 36 ksi 3.5X3.5X0.3125	
3	12B 50 ksi	12"BD 2"	SAE 36 ksi 3X3X0.3125	
4	12B 50 ksi	12"BD 1.75"	SAE 36 ksi 3X3X0.3125	
5 - 6	12B 50 ksi	12"BD 1.75"	SAE 36 ksi 3X3X0.1875	
7	12B 50 ksi	12"BD 1.5"	SAE 36 ksi 3X3X0.1875	
8 - 9	12B 50 ksi	12"BD 1.25"	SAE 36 ksi 2.5X2.5X0.1875	
10 - 11	SOL 50 ksi	2" SOLID	MOD 36 ksi 7/8"SR+L1.5x1/8	SOL 50 ksi 7/8" SOLID
12 - 13	SOL 50 ksi	1 1/2" SOLID	SOL 50 ksi 3/4" SOLID	SOL 50 ksi 7/8" SOLID

Discrete Appurtenance

Elev (ft)	Type	Qty	Description
200.00	Whip	1	20 ft Dipole
200.00		1	Large Beacon
199.00		1	LIGHT ROD W/EXT
198.00	Whip	1	20 ft Dipole
198.00	Straight Arm	1	3 ft Standoff
195.50	Whip	3	PD-10017-1 Omni
195.50	Straight Arm	3	6 ft Sidearm
195.50	Panel	1	12"x12"x6" Junction Box
185.00	Panel	2	FibeAir 1500 HP / RFU-HP
184.00	Dish	1	DA6-W57BC
180.00	Panel	2	HICAP Hybrid Breakout Box
180.00	Panel	3	RRH 4T4R B12/71 240W AHLOA
180.00	Panel	3	RRH 4T4R B25/66 480W AHFIG
180.00	Panel	3	FFHH-65C-R3
180.00	Panel	3	AEHC AirScale MAA 64T64R 192AE
180.00	Mounting Frame	3	PV-SFA12-3-12-126 w/ (2) Stiff
164.00	Panel	2	DC9-48-60-24-8C
164.00	Panel	3	RRUS 4415 B25
164.00	Panel	3	RRUS 4478
164.00	Panel	3	RRUS 4426 B66
164.00	Panel	3	Radio 4449
164.00	Panel	3	SBNHH-1D65B
164.00	Panel	6	NNH4-65B-R6H4
164.00	Panel	3	RRUS 32
164.00	Mounting Frame	3	Sector Frames
153.50	Panel	3	RC3DC-3315-PF-48
153.50	Panel	6	CBC721-DF-21-DCB
153.50	Panel	3	RRH4x30-4T4R-B25
153.50	Panel	6	RRH4x30-4T4R-B13
153.50	Panel	6	RRH 3JR52709AA 2X60
153.50	Panel	12	BXA-70080/8CF
153.50	Mounting Frame	3	HD Sector Frames
153.50	Panel	12	RRUS A2 Modules
144.00	Dish	1	6 ft HP Dish
100.50		3	Small Beacon
15.00		1	GPS

Linear Appurtenance

Elev (ft) From	To	Qty	Description
0.000	200.00	1	1 5/8" Coax
0.000	200.00	1	0.4" S.O.
0.000	198.00	1	3/8" Coax
0.000	195.50	1	7/8" Coax
0.000	195.50	2	1/2" Coax
0.000	195.50	2	1 1/4" Coax
0.000	184.00	2	CAT5
0.000	180.00	2	1.584" Hybrid Cable

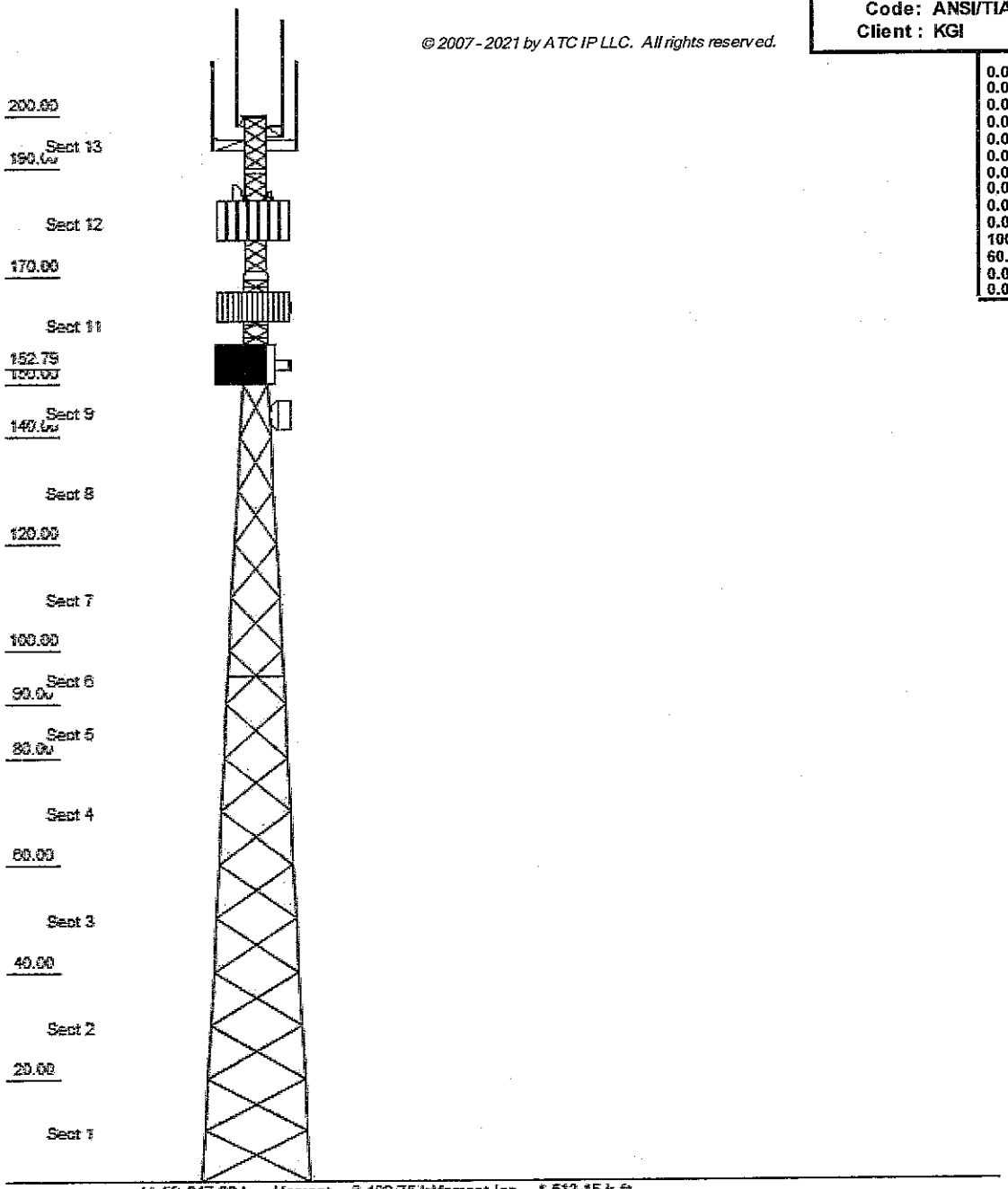
Job Information

Tower : Waukesha Sheriffs
Code: ANSI/TIA-222-G
Client : KGI

Location : Nashotah, WI
Shape : Triangle

Base Width : 20.00 ft
Top Width : 4.00 ft

0.000	180.00	5	1 5/8" Coax
0.000	164.00	2	24 Pair Fiber
0.000	164.00	12	1 5/8" Coax
0.000	164.00	2	0.77" DC Power
0.000	164.00	4	0.77" DC Power
0.000	153.50	1	W/G Ladder
0.000	153.50	3	1.56" Hybrid Cable
0.000	153.50	6	1 5/8" Coax
0.000	153.50	6	1 5/8" Coax
0.000	144.00	1	EW90
100.000	140.00	6	1 1/4" Round Bar
60.000	80.000	6	1 1/4" Round Bar
0.000	40.000	6	1 1/2" Round Bar
0.000	15.000	1	CAT5



Uplift 347.30 k Moment 6,482.75 k-ft Moment Ice 1,513.15 k-ft
Vert 394.52 k Tot Down 60.72 k Tot Down Ice 147.66 k
Horiz 37.75 k Tot Shear 57.57 k Tot Shear Ice 13.53 k

Site Number:	Waukesha Sheriffs	Code:	ANSI/TIA-222-G	
Site Name:	Nashotah, WI	Engineering Number:	REV04	1/8/2021 10:06:46 AM
Customer:	KGI			

Analysis Parameters

Location:	Waukesha County, WI		
Code:	ANSI/TIA-222-G	Height (ft):	200
Shape:	Triangle	Base Elevation (ft):	0.00
Tower Manufacturer:	PIROD	Bottom Face Width (ft):	20.00
Tower Type:	Self Support	Top Face Width (ft):	4.00

Ice & Wind Parameters

Structure Class:	II	Design Windspeed Without Ice:	93 mph
Exposure Category:	C	Design Windspeed With Ice:	40 mph
Topographic Catagory:	1	Operational Windspeed:	60 mph
Crest Height:	0.0 ft	Design Ice Thickness:	0.75 in

Seismic Parameters

Analysis Method:	Equivalent Modal Analysis & Equivalent Lateral Force Methods				
Site Class:	D - Stiff Soil				
Period Based on Rayleigh Method (sec):	1.26				
T_L(sec):	12	p:	1.3	C_S:	0.030
S_S:	0.086	S_1:	0.046	C_S, Max:	0.030
F_a:	1.600	F_V:	2.400	C_S, Min:	0.030
S_{ds}:	0.092	S_{d1}:	0.074		

Load Cases

1.2D + 1.6W Normal	93 mph Normal to Face with No Ice
1.2D + 1.6W 60 deg	93 mph 60 degree with No Ice
1.2D + 1.6W 90 deg	93 mph 90 degree with No Ice
0.9D + 1.6W Normal	93 mph Normal to Face with No Ice (Reduced DL)
0.9D + 1.6W 60 deg	93 mph 60 deg with No Ice (Reduced DL)
0.9D + 1.6W 90 deg	93 mph 90 deg with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi Normal	40 mph Normal with 0.75 in Radial Ice
1.2D + 1.0Di + 1.0Wi 60 deg	40 mph 60 degree with 0.75 in Radial Ice
1.2D + 1.0Di + 1.0Wi 90 deg	40 mph 90 degree with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E Normal	Seismic Normal
(1.2 + 0.2Sds) * DL + E 60 deg	Seismic 60 degree
(1.2 + 0.2Sds) * DL + E 90 deg	Seismic 90 degree
(0.9 - 0.2Sds) * DL + E Normal	Seismic (Reduced DL) Normal
(0.9 - 0.2Sds) * DL + E 60 deg	Seismic (Reduced DL) 60 degree
(0.9 - 0.2Sds) * DL + E 90 deg	Seismic (Reduced DL) 90 degree
1.0D + 1.0W Service Normal	Serviceability - 60 mph Wind Normal
1.0D + 1.0W Service 60 deg	Serviceability - 60 mph Wind 60 degree
1.0D + 1.0W Service 90 deg	Serviceability - 60 mph Wind 90 degree

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 93

Site Number: Waukesha Sheriffs | Code: ANSI/TIA-222-G |

Site Name: Nashotah, WI | Engineering Number: REV04 | 1/8/2021 10:06:46 AM

Customer: KGI

Tower Loading

Discrete Appurtenance Properties 1.2D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
200.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	2272.2	27.85	227	49
200.0	Large Beacon	1	50	2.4	0.0	0.0	0.0	1.00	1.00	0.5	45.0	27.58	90	72
199.0	LIGHT ROD W/EXT	1	65	4.0	0.0	0.0	0.0	1.00	1.00	6.5	980.2	27.72	151	94
198.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	2267.7	27.79	227	49
198.0	3 ft Standoff	1	40	2.6	3.0	0.0	0.0	1.00	1.00	0.0	0.0	27.50	98	58
195.5	12"x12"x6"	1	15	1.2	0.6	6.1	2.8	1.00	1.00	0.0	0.0	27.43	45	22
195.5	6 ft Sidearm	3	70	5.2	5.7	0.0	0.0	1.00	0.67	0.0	0.0	27.43	386	302
195.5	PD-10017-1 Omni	3	25	4.1	15.0	2.4	2.4	1.00	1.00	7.5	3494.1	27.65	466	108
185.0	FibeAir 1500 HP /	2	15	1.7	1.6	6.0	11.0	1.00	1.00	0.0	0.0	27.11	128	43
184.0	DA6-W57BC	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	27.08	1314	405
180.0	AEHC AirScale MAA	3	108	6.8	3.2	21.5	5.9	0.80	0.66	0.0	0.0	26.96	397	467
180.0	FFHH-65C-R3	3	128	21.1	8.0	25.2	9.3	0.80	0.72	0.0	0.0	26.96	1337	551
180.0	HICAP Hybrid	2	9	1.3	1.4	9.3	5.8	0.80	0.90	0.0	0.0	26.96	67	25
180.0	PV-SFA12-3-12-126	3	592	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	26.96	928	2557
180.0	RRH 4T4R B12/71	3	84	2.2	1.8	12.1	7.4	0.80	0.67	0.0	0.0	26.96	131	362
180.0	RRH 4T4R B25/66	3	71	2.8	2.3	12.1	5.2	0.80	0.67	0.0	0.0	26.96	163	305
164.0	DC9-48-60-24-8C	2	29	2.7	2.6	18.3	10.2	0.80	1.00	0.0	0.0	26.43	157	83
164.0	NNH4-65B-R6H4	6	84	12.3	6.0	19.6	7.8	0.80	0.73	0.0	0.0	26.43	1546	729
164.0	Radio 4449	3	70	1.6	1.3	13.2	9.3	0.80	0.67	0.0	0.0	26.43	95	302
164.0	RRUS 32	3	53	2.7	2.3	12.1	7.0	0.80	0.67	0.0	0.0	26.43	158	229
164.0	RRUS 4415 B25	3	46	1.6	1.3	13.2	5.4	0.80	0.67	0.0	0.0	26.43	95	199
164.0	RRUS 4426 B66	3	48	1.6	1.3	13.2	7.3	0.80	0.67	0.0	0.0	26.43	95	209
164.0	RRUS 4478	3	59	2.0	1.5	13.5	8.3	0.80	0.67	0.0	0.0	26.43	118	257
164.0	SBNHH-1D65B	3	41	8.2	6.1	11.9	7.1	0.80	0.83	0.0	0.0	26.43	587	175
164.0	Sector Frames	3	500	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	26.43	910	2160
153.5	BXA-70080/8CF	12	23	8.3	7.9	8.1	5.7	0.80	0.89	0.0	0.0	26.07	2511	397
153.5	CBC721-DF-21-DCB	6	4	0.4	0.6	6.0	1.6	0.80	0.67	0.0	0.0	26.07	51	38
153.5	HD Sector Frames	3	650	15.0	0.0	0.0	0.0	0.80	0.67	0.0	0.0	26.07	855	2808
153.5	RC3DC-3315-PF-48	3	32	3.8	2.4	15.7	10.3	0.80	0.84	0.0	0.0	26.07	271	138
153.5	RRH 3JR52709AA	6	55	3.4	3.0	10.6	5.8	0.80	0.67	0.0	0.0	26.07	383	475
153.5	RRH4x30-4T4R-B13	6	57	2.5	1.8	12.0	9.0	0.80	0.67	0.0	0.0	26.07	287	494
153.5	RRH4x30-4T4R-B25	3	51	2.5	1.8	12.0	7.2	0.80	0.67	0.0	0.0	26.07	143	220
153.5	RRUS A2 Modules	12	21	1.9	1.3	12.8	3.4	0.80	0.67	0.0	0.0	26.07	426	366
144.0	6 ft HP Dish	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	25.72	1248	405
100.5	Small Beacon	3	10	1.2	0.0	0.0	0.0	1.00	1.00	0.0	0.0	23.84	117	43
15.00	GPS	1	50	2.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	16.00	44	72
	Totals	117	10603	678.4										

Discrete Appurtenance Properties 0.9D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
200.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	2272.2	27.85	227	28
200.0	Large Beacon	1	50	2.4	0.0	0.0	0.0	1.00	1.00	0.5	45.0	27.58	90	41
199.0	LIGHT ROD W/EXT	1	65	4.0	0.0	0.0	0.0	1.00	1.00	6.5	980.2	27.72	151	53
198.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	2267.7	27.79	227	28
198.0	3 ft Standoff	1	40	2.6	3.0	0.0	0.0	1.00	1.00	0.0	0.0	27.50	98	32
195.5	12"x12"x6"	1	15	1.2	0.6	6.1	2.8	1.00	1.00	0.0	0.0	27.43	45	12
195.5	6 ft Sidearm	3	70	5.2	5.7	0.0	0.0	1.00	0.67	0.0	0.0	27.43	386	170
195.5	PD-10017-1 Omni	3	25	4.1	15.0	2.4	2.4	1.00	1.00	7.5	3494.1	27.65	466	61
185.0	FibeAir 1500 HP /	2	15	1.7	1.6	6.0	11.0	1.00	1.00	0.0	0.0	27.11	128	24
184.0	DA6-W57BC	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	27.08	1314	228

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 94

Site Number: Waukesha Sheriffs
Site Name: Nashotah, WI
Customer: KGI

Code: ANSI/TIA-222-G
Engineering Number: REV04

1/8/2021 10:06:46 AM

Tower Loading

180.0	AEHC AirScale MAA	3	108	6.8	3.2	21.5	5.9	0.80	0.66	0.0	0.0	26.96	397	262
180.0	FFHH-65C-R3	3	128	21.1	8.0	25.2	9.3	0.80	0.72	0.0	0.0	26.96	1337	310
180.0	HICAP Hybrid	2	9	1.3	1.4	9.3	5.8	0.80	0.90	0.0	0.0	26.96	67	14
180.0	PV-SFA12-3-12-126	3	592	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	26.96	928	1439
180.0	RRH 4T4R B12/71	3	84	2.2	1.8	12.1	7.4	0.80	0.67	0.0	0.0	26.96	131	204
180.0	RRH 4T4R B25/66	3	71	2.8	2.3	12.1	5.2	0.80	0.67	0.0	0.0	26.96	163	171
164.0	DC9-48-60-24-8C	2	29	2.7	2.6	18.3	10.2	0.80	1.00	0.0	0.0	26.43	157	46
164.0	NNH4-65B-R6H4	6	84	12.3	6.0	19.6	7.8	0.80	0.73	0.0	0.0	26.43	1546	410
164.0	Radio 4449	3	70	1.6	1.3	13.2	9.3	0.80	0.67	0.0	0.0	26.43	95	170
164.0	RRUS 32	3	53	2.7	2.3	12.1	7.0	0.80	0.67	0.0	0.0	26.43	158	129
164.0	RRUS 4415 B25	3	46	1.6	1.3	13.2	5.4	0.80	0.67	0.0	0.0	26.43	95	112
164.0	RRUS 4426 B66	3	48	1.6	1.3	13.2	7.3	0.80	0.67	0.0	0.0	26.43	95	118
164.0	RRUS 4478	3	59	2.0	1.5	13.5	8.3	0.80	0.67	0.0	0.0	26.43	118	144
164.0	SBNHH-1D65B	3	41	8.2	6.1	11.9	7.1	0.80	0.83	0.0	0.0	26.43	587	99
164.0	Sector Frames	3	500	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	26.43	910	1215
153.5	BXA-70080/8CF	12	23	8.3	7.9	8.1	5.7	0.80	0.89	0.0	0.0	26.07	2511	224
153.5	CBC721-DF-21-DCB	6	4	0.4	0.6	6.0	1.6	0.80	0.67	0.0	0.0	26.07	51	21
153.5	HD Sector Frames	3	650	15.0	0.0	0.0	0.0	0.80	0.67	0.0	0.0	26.07	855	1580
153.5	RC3DC-3315-PF-48	3	32	3.8	2.4	15.7	10.3	0.80	0.84	0.0	0.0	26.07	271	78
153.5	RRH 3JR52709AA	6	55	3.4	3.0	10.6	5.8	0.80	0.67	0.0	0.0	26.07	383	267
153.5	RRH4x30-4T4R-B13	6	57	2.5	1.8	12.0	9.0	0.80	0.67	0.0	0.0	26.07	287	278
153.5	RRH4x30-4T4R-B25	3	51	2.5	1.8	12.0	7.2	0.80	0.67	0.0	0.0	26.07	143	124
153.5	RRUS A2 Modules	12	21	1.9	1.3	12.8	3.4	0.80	0.67	0.0	0.0	26.07	426	206
144.0	6 ft HP Dish	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	25.72	1248	228
100.5	Small Beacon	3	10	1.2	0.0	0.0	0.0	1.00	1.00	0.0	0.0	23.84	117	24
15.00	GPS	1	50	2.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	16.00	44	41
	Totals	117	10603	678.4										

Discrete Appurtenance Properties 1.2D + 1.0Di + 1.0Wi

Elevation (ft)	Description	Qty	Ice Wt (lb)	Ice EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
200.0	20 ft Dipole	1	168	13.7	20.0	0.0	0.0	1.00	1.00	10.0	601.6	5.15	60	210
200.0	Large Beacon	1	140	6.7	0.0	0.0	0.0	1.00	1.00	0.5	14.5	5.10	29	179
199.0	LIGHT ROD W/EXT	1	190	10.1	0.0	0.0	0.0	1.00	1.00	6.5	287.4	5.13	44	244
198.0	20 ft Dipole	1	168	13.7	20.0	0.0	0.0	1.00	1.00	10.0	600.4	5.14	60	210
198.0	3 ft Standoff	1	122	8.8	3.0	0.0	0.0	1.00	1.00	0.0	0.0	5.09	38	156
195.5	12"x12"x6"	1	50	1.9	0.6	6.1	2.8	1.00	1.00	0.0	0.0	5.07	8	64
195.5	6 ft Sidearm	3	177	12.1	5.7	0.0	0.0	1.00	0.67	0.0	0.0	5.07	105	689
195.5	PD-10017-1 Omni	3	124	9.6	15.0	2.4	2.4	1.00	1.00	7.5	939.9	5.11	125	466
185.0	FibeAir 1500 HP /	2	62	2.6	1.6	6.0	11.0	1.00	1.00	0.0	0.0	5.02	23	156
184.0	DA6-W57BC	1	1063	39.2	6.0	0.0	0.0	1.00	1.00	0.0	0.0	5.01	167	1343
180.0	AEHC AirScale MAA	3	247	8.6	3.2	21.5	5.9	0.80	0.66	0.0	0.0	4.99	58	967
180.0	FFHH-65C-R3	3	543	24.6	8.0	25.2	9.3	0.80	0.72	0.0	0.0	4.99	180	2048
180.0	HICAP Hybrid	2	45	2.0	1.4	9.3	5.8	0.80	0.90	0.0	0.0	4.99	12	113
180.0	PV-SFA12-3-12-126	3	1223	34.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	4.99	250	4830
180.0	RRH 4T4R B12/71	3	146	3.3	1.8	12.1	7.4	0.80	0.67	0.0	0.0	4.99	22	587
180.0	RRH 4T4R B25/66	3	135	3.9	2.3	12.1	5.2	0.80	0.67	0.0	0.0	4.99	27	537
164.0	DC9-48-60-24-8C	2	156	3.9	2.6	18.3	10.2	0.80	1.00	0.0	0.0	4.89	26	387
164.0	NNH4-65B-R6H4	6	332	14.9	6.0	19.6	7.8	0.80	0.73	0.0	0.0	4.89	217	2514
164.0	Radio 4449	3	125	2.5	1.3	13.2	9.3	0.80	0.67	0.0	0.0	4.89	17	499
164.0	RRUS 32	3	125	3.9	2.3	12.1	7.0	0.80	0.67	0.0	0.0	4.89	26	486
164.0	RRUS 4415 B25	3	82	2.5	1.3	13.2	5.4	0.80	0.67	0.0	0.0	4.89	17	329
164.0	RRUS 4426 B66	3	73	3.0	1.3	13.2	7.3	0.80	0.67	0.0	0.0	4.89	20	298
164.0	RRUS 4478	3	121	3.0	1.5	13.5	8.3	0.80	0.67	0.0	0.0	4.89	20	478
164.0	SBNHH-1D65B	3	246	9.5	6.1	11.9	7.1	0.80	0.83	0.0	0.0	4.89	79	916

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 95

Tower Loading

164.0	Sector Frames	3	1027	34.7	0.0	0.0	0.0	0.75	0.75	0.0	0.0	4.89	243	4059
153.5	BXA-70080/8CF	12	182	11.4	7.9	8.1	5.7	0.80	0.89	0.0	0.0	4.82	398	2692
153.5	CBC721-DF-21-DCB	6	20	0.7	0.6	6.0	1.6	0.80	0.67	0.0	0.0	4.82	9	147
153.5	HD Sector Frames	3	1331	34.6	0.0	0.0	0.0	0.80	0.67	0.0	0.0	4.82	228	5261
153.5	RC3DC-3315-PF-48	3	139	5.1	2.4	15.7	10.3	0.80	0.84	0.0	0.0	4.82	42	523
153.5	RRH 3JR52709AA	6	133	4.7	3.0	10.6	5.8	0.80	0.67	0.0	0.0	4.82	62	1036
153.5	RRH4x30-4T4R-B13	6	139	2.8	1.8	12.0	9.0	0.80	0.67	0.0	0.0	4.82	37	1083
153.5	RRH4x30-4T4R-B25	3	125	2.8	1.8	12.0	7.2	0.80	0.67	0.0	0.0	4.82	18	485
153.5	RRUS A2 Modules	12	57	2.8	1.3	12.8	3.4	0.80	0.67	0.0	0.0	4.82	75	885
144.0	6 ft HP Dish	1	1038	39.1	6.0	0.0	0.0	1.00	1.00	0.0	0.0	4.76	158	1313
100.5	Small Beacon	3	23	2.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	4.41	32	91
15.00	GPS	1	183	4.7	0.0	0.0	0.0	1.00	1.00	0.0	0.0	2.96	12	232
	Totals	117	28307	1068.1										

Discrete Appurtenance Properties

1.0D + 1.0W Service

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
200.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	591.1	11.59	59	34
200.0	Large Beacon	1	50	2.4	0.0	0.0	0.0	1.00	1.00	0.5	11.7	11.48	23	50
199.0	LIGHT ROD W/EXT	1	65	4.0	0.0	0.0	0.0	1.00	1.00	6.5	255.0	11.54	39	65
198.0	20 ft Dipole	1	34	6.0	20.0	0.0	0.0	1.00	1.00	10.0	589.9	11.57	59	34
198.0	3 ft Standoff	1	40	2.6	3.0	0.0	0.0	1.00	1.00	0.0	0.0	11.45	26	40
195.5	12"x12"x6"	1	15	1.2	0.6	6.1	2.8	1.00	1.00	0.0	0.0	11.42	12	15
195.5	6 ft Sidearm	3	70	5.2	5.7	0.0	0.0	1.00	0.67	0.0	0.0	11.42	100	210
195.5	PD-10017-1 Omni	3	25	4.1	15.0	2.4	2.4	1.00	1.00	7.5	909.0	11.51	121	75
185.0	FibeAir 1500 HP /	2	15	1.7	1.6	6.0	11.0	1.00	1.00	0.0	0.0	11.29	33	30
184.0	DA6-W57BC	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	11.27	342	281
180.0	AEHC AirScale MAA	3	108	6.8	3.2	21.5	5.9	0.80	0.66	0.0	0.0	11.22	103	324
180.0	FFHH-65C-R3	3	128	21.1	8.0	25.2	9.3	0.80	0.72	0.0	0.0	11.22	348	383
180.0	HICAP Hybrid	2	9	1.3	1.4	9.3	5.8	0.80	0.90	0.0	0.0	11.22	17	18
180.0	PV-SFA12-3-12-126	3	592	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	11.22	241	1776
180.0	RRH 4T4R B12/71	3	84	2.2	1.8	12.1	7.4	0.80	0.67	0.0	0.0	11.22	34	251
180.0	RRH 4T4R B25/66	3	71	2.8	2.3	12.1	5.2	0.80	0.67	0.0	0.0	11.22	42	212
164.0	DC9-48-60-24-8C	2	29	2.7	2.6	18.3	10.2	0.80	1.00	0.0	0.0	11.00	41	57
164.0	NNH4-65B-R6H4	6	84	12.3	6.0	19.6	7.8	0.80	0.73	0.0	0.0	11.00	402	506
164.0	Radio 4449	3	70	1.6	1.3	13.2	9.3	0.80	0.67	0.0	0.0	11.00	25	210
164.0	RRUS 32	3	53	2.7	2.3	12.1	7.0	0.80	0.67	0.0	0.0	11.00	41	159
164.0	RRUS 4415 B25	3	46	1.6	1.3	13.2	5.4	0.80	0.67	0.0	0.0	11.00	25	138
164.0	RRUS 4426 B66	3	48	1.6	1.3	13.2	7.3	0.80	0.67	0.0	0.0	11.00	25	145
164.0	RRUS 4478	3	59	2.0	1.5	13.5	8.3	0.80	0.67	0.0	0.0	11.00	31	178
164.0	SBNHH-1D65B	3	41	8.2	6.1	11.9	7.1	0.80	0.83	0.0	0.0	11.00	153	122
164.0	Sector Frames	3	500	15.0	0.0	0.0	0.0	0.75	0.75	0.0	0.0	11.00	237	1500
153.5	BXA-70080/8CF	12	23	8.3	7.9	8.1	5.7	0.80	0.89	0.0	0.0	10.85	653	276
153.5	CBC721-DF-21-DCB	6	4	0.4	0.6	6.0	1.6	0.80	0.67	0.0	0.0	10.85	13	26
153.5	HD Sector Frames	3	650	15.0	0.0	0.0	0.0	0.80	0.67	0.0	0.0	10.85	222	1950
153.5	RC3DC-3315-PF-48	3	32	3.8	2.4	15.7	10.3	0.80	0.84	0.0	0.0	10.85	70	96
153.5	RRH 3JR52709AA	6	55	3.4	3.0	10.6	5.8	0.80	0.67	0.0	0.0	10.85	100	330
153.5	RRH4x30-4T4R-B13	6	57	2.5	1.8	12.0	9.0	0.80	0.67	0.0	0.0	10.85	75	343
153.5	RRH4x30-4T4R-B25	3	51	2.5	1.8	12.0	7.2	0.80	0.67	0.0	0.0	10.85	37	153
153.5	RRUS A2 Modules	12	21	1.9	1.3	12.8	3.4	0.80	0.67	0.0	0.0	10.85	111	254
144.0	6 ft HP Dish	1	281	35.7	6.0	0.0	0.0	1.00	1.00	0.0	0.0	10.71	325	281
100.5	Small Beacon	3	10	1.2	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.92	30	30
15.00	GPS	1	50	2.0	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.66	11	50

Tower Loading

Totals	117	10603	678.4

Tower Loading

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out Of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	200.0	0.4" S.O.	1	0.40	0.08	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	200.0	1 5/8" Coax	1	1.98	1.04	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	198.0	3/8" Coax	1	0.44	0.08	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	195.5	1 1/4" Coax	2	1.55	0.66	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	195.5	1/2" Coax	2	0.65	0.16	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	195.5	7/8" Coax	1	1.11	0.52	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	184.0	CAT5	2	0.36	0.06	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	180.0	1 5/8" Coax	5	1.98	1.04	1	Lin App	Block	0.00	N	1.00	1.00	0.00
0.00	180.0	1.584" Hybrid Cable	2	1.58	1.78	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	164.0	0.77" DC Power	4	0.77	0.60	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	164.0	0.77" DC Power	2	0.77	0.60	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	164.0	1 5/8" Coax	12	1.98	1.04	42	Lin App	Block	0.00	N	1.00	1.00	0.00
0.00	164.0	24 Pair Fiber	2	0.44	0.06	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	153.5	1 5/8" Coax	6	1.98	1.04	50	Lin App	Block	0.00	N	1.00	1.00	0.00
0.00	153.5	1 5/8" Coax	6	1.98	1.04	50	Lin App	Block	0.00	N	1.00	1.00	0.00
0.00	153.5	1.56" Hybrid Cable	3	1.56	1.78	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	153.5	W/G Ladder	1	3.00	6.00	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	144.0	EW90	1	1.32	0.32	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
100.0	140.0	1 1/4" Round Bar	6	1.25	4.18	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
60.00	80.00	1 1/4" Round Bar	6	1.25	4.18	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	40.00	1 1/2" Round Bar	6	1.50	6.01	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	15.00	CAT5	1	0.36	0.06	0	Lin App	Individual	0.00	N	1.00	1.00	0.00

Section Forces

LoadCase 1.2D + 1.6W Normal

93 mph Normal to Face with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw): 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	1.00	1.00	0.0	3.23	4.80	0.00	534	0	339	129	468
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	1.00	1.00	0.0	5.91	19.01	0.00	1102	0	625	513	1138
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	1.00	1.00	0.0	15.15	42.67	0.00	2769	0	1355	1230	2584
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	1.00	1.00	0.0	2.08	13.97	0.00	444	0	195	419	613
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	1.00	1.00	0.0	8.61	50.55	0.00	1710	0	770	1499	2269
8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	1.00	1.00	0.0	17.60	114.92	0.00	4063	0	1616	3271	4888
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	1.00	1.00	0.0	21.83	114.92	0.00	4674	0	1966	3158	5124
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	1.00	1.00	0.0	15.08	51.21	0.00	2563	0	1288	1387	2675
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	1.00	1.00	0.0	12.26	51.21	0.00	2311	0	1074	1355	2429
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	1.00	1.00	0.0	25.53	114.92	0.00	5851	0	2181	2872	5053
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	1.00	1.00	0.0	29.36	102.42	0.00	6163	0	2343	2423	4766
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	1.00	1.00	0.0	34.03	117.42	0.00	7490	0	2441	2448	4889
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	1.00	1.00	0.0	36.84	117.87	0.00	8321	0	2299	2125	4424
														47997	0			41321

LoadCase 1.2D + 1.6W 60 deg

93 mph 60 degree with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw): 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	0.80	1.00	0.0	3.23	4.80	0.00	534	0	339	129	468
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	0.80	1.00	0.0	5.91	19.01	0.00	1102	0	625	513	1138
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	0.80	1.00	0.0	13.31	42.67	0.00	2769	0	1190	1230	2419
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	0.80	1.00	0.0	1.81	13.97	0.00	444	0	170	419	588
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	0.80	1.00	0.0	7.66	50.55	0.00	1710	0	685	1499	2184
8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	0.80	1.00	0.0	15.56	114.92	0.00	4063	0	1429	3271	4701
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	0.80	1.00	0.0	19.13	114.92	0.00	4674	0	1723	3158	4882
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	0.80	1.00	0.0	13.02	51.21	0.00	2563	0	1112	1387	2499
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	0.80	1.00	0.0	10.73	51.21	0.00	2311	0	941	1355	2296
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	0.80	1.00	0.0	22.24	114.92	0.00	5851	0	1901	2872	4772
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	0.80	1.00	0.0	25.75	102.42	0.00	6163	0	2055	2423	4479
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	0.80	1.00	0.0	29.43	117.42	0.00	7490	0	2111	2448	4559
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	0.80	1.00	0.0	31.83	117.87	0.00	8321	0	1986	2125	4111
														47997	0			39095

LoadCase 1.2D + 1.6W 90 deg

93 mph 90 degree with No Ice

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw): 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	0.85	1.00	0.0	3.23	4.80	0.00	534	0	339	129	468
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	0.85	1.00	0.0	5.91	19.01	0.00	1102	0	625	513	1138
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	0.85	1.00	0.0	13.77	42.67	0.00	2769	0	1231	1230	2461
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	0.85	1.00	0.0	1.88	13.97	0.00	444	0	176	419	595
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	0.85	1.00	0.0	7.90	50.55	0.00	1710	0	706	1499	2206

Section Forces

8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	0.85	1.00	0.0	16.07	114.92	0.00	4063	0	1476	3271	4747
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	0.85	1.00	0.0	19.81	114.92	0.00	4674	0	1784	3158	4942
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	0.85	1.00	0.0	13.53	51.21	0.00	2563	0	1156	1387	2543
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	0.85	1.00	0.0	11.11	51.21	0.00	2311	0	974	1355	2329
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	0.85	1.00	0.0	23.07	114.92	0.00	5851	0	1971	2872	4843
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	0.85	1.00	0.0	26.65	102.42	0.00	6163	0	2127	2423	4551
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	0.85	1.00	0.0	30.58	117.42	0.00	7490	0	2193	2448	4641
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	0.85	1.00	0.0	33.08	117.87	0.00	8321	0	2064	2125	4190
														47997	0			39652

LoadCase 0.9D + 1.6W Normal — 93 mph Normal to Face with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw): 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	1.00	1.00	0.0	3.23	4.80	0.00	401	0	339	129	468
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	1.00	1.00	0.0	5.91	19.01	0.00	826	0	625	513	1138
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	1.00	1.00	0.0	15.15	42.67	0.00	2077	0	1355	1230	2584
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	1.00	1.00	0.0	2.08	13.97	0.00	333	0	195	419	613
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	1.00	1.00	0.0	8.61	50.55	0.00	1283	0	770	1499	2269
8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	1.00	1.00	0.0	17.60	114.92	0.00	3047	0	1616	3271	4888
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	1.00	1.00	0.0	21.83	114.92	0.00	3506	0	1966	3158	5124
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	1.00	1.00	0.0	15.08	51.21	0.00	1922	0	1288	1387	2675
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	1.00	1.00	0.0	12.26	51.21	0.00	1733	0	1074	1355	2429
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	1.00	1.00	0.0	25.53	114.92	0.00	4388	0	2181	2872	5053
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	1.00	1.00	0.0	29.36	102.42	0.00	4623	0	2343	2423	4766
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	1.00	1.00	0.0	34.03	117.42	0.00	5618	0	2441	2448	4889
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	1.00	1.00	0.0	36.84	117.87	0.00	6241	0	2299	2125	4424
														35998	0			41321

LoadCase 0.9D + 1.6W 60 deg — 93 mph 60 deg with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw): 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	0.80	1.00	0.0	3.23	4.80	0.00	401	0	339	129	468
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	0.80	1.00	0.0	5.91	19.01	0.00	826	0	625	513	1138
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	0.80	1.00	0.0	13.31	42.67	0.00	2077	0	1190	1230	2419
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	0.80	1.00	0.0	1.81	13.97	0.00	333	0	170	419	588
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	0.80	1.00	0.0	7.66	50.55	0.00	1283	0	685	1499	2184
8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	0.80	1.00	0.0	15.56	114.92	0.00	3047	0	1429	3271	4701
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	0.80	1.00	0.0	19.13	114.92	0.00	3506	0	1723	3158	4882
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	0.80	1.00	0.0	13.02	51.21	0.00	1922	0	1112	1387	2499
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	0.80	1.00	0.0	10.73	51.21	0.00	1733	0	941	1355	2296
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	0.80	1.00	0.0	22.24	114.92	0.00	4388	0	1901	2872	4772
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	0.80	1.00	0.0	25.75	102.42	0.00	4623	0	2055	2423	4479
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	0.80	1.00	0.0	29.43	117.42	0.00	5618	0	2111	2448	4559
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	0.80	1.00	0.0	31.83	117.87	0.00	6241	0	1986	2125	4111
														35998	0			39095

Site Number: Waukesha Sheriffs
Site Name: Nashotah, WI
Customer: KGI

Code: ANSI/TIA-222-G
Engineering Number: REV04

1/8/2021 10:06:46 AM

Section Forces

LoadCase 0.9D + 1.6W 90 deg

93 mph 90 deg with No Ice (Reduced DL)

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (s.)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)	
13	195.0	27.41	0.00	5.70	0.00	0.14	2.82	0.85	1.00	0.0	3.23	4.80	0.00	401	0	339	129	468	
12	180.0	26.96	0.00	10.45	0.00	0.12	2.89	0.85	1.00	0.0	5.91	19.01	0.00	826	0	625	513	1138	
11	161.3	26.34	9.23	10.20	0.00	0.23	2.49	0.85	1.00	0.0	13.77	42.67	0.00	2077	0	1231	1230	2461	
10	151.3	25.99	1.34	1.29	0.00	0.18	2.65	0.85	1.00	0.0	1.88	13.97	0.00	333	0	176	419	595	
9	145.0	25.76	4.76	7.81	0.00	0.21	2.55	0.85	1.00	0.0	7.90	50.55	0.00	1283	0	706	1499	2206	
8	130.0	25.17	10.18	15.63	0.00	0.17	2.68	0.85	1.00	0.0	16.07	114.92	0.00	3047	0	1476	3271	4747	
7	110.0	24.30	13.46	17.23	0.00	0.16	2.73	0.85	1.00	0.0	19.81	114.92	0.00	3506	0	1784	3158	4942	
6	95.00	23.56	10.31	9.42	0.00	0.18	2.66	0.85	1.00	0.0	13.53	51.21	0.00	1922	0	1156	1387	2543	
5	85.00	23.02	7.62	9.42	0.00	0.14	2.80	0.85	1.00	0.0	11.11	51.21	0.00	1733	0	974	1355	2329	
4	70.00	22.10	16.41	18.83	0.00	0.13	2.84	0.85	1.00	0.0	23.07	114.92	0.00	4388	0	1971	2872	4843	
3	50.00	20.59	18.03	22.04	0.00	0.13	2.85	0.85	1.00	0.0	26.65	102.42	0.00	4623	0	2127	2423	4551	
2	30.00	18.49	23.01	22.04	0.00	0.13	2.85	0.85	1.00	0.0	30.58	117.42	0.00	5618	0	2193	2448	4641	
1	10.00	16.00	25.05	23.64	0.00	0.12	2.87	0.85	1.00	0.0	33.08	117.87	0.00	6241	0	2064	2125	4190	
														35998	0			39652	

LoadCase 1.2D + 1.0Di + 1.0Wi Normal

40 mph Normal with 0.75 in Radial Ice

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 1.00

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (s.)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)	
13	195.0	5.07	0.00	26.34	20.64	0.60	1.81	1.00	1.00	1.8	19.51	4.80	16.57	1924	1390	152	45	197	
12	180.0	4.99	0.00	47.72	37.27	0.51	1.89	1.00	1.00	1.8	32.97	21.97	61.61	4433	3332	264	211	474	
11	161.3	4.87	9.23	43.25	33.05	0.59	1.81	1.00	1.00	1.8	41.10	51.62	87.43	6614	3845	308	299	607	
10	151.3	4.81	1.34	7.49	6.19	0.58	1.81	1.00	1.00	1.7	6.83	18.02	18.66	1327	883	51	83	130	**
9	145.0	4.76	4.76	20.24	12.43	0.40	2.06	1.00	1.00	1.7	17.67	65.04	67.83	5384	3673	147	424	526	**
8	130.0	4.66	10.18	41.13	25.50	0.33	2.21	1.00	1.00	1.7	35.28	143.59	172.04	12218	8155	308	1048	1276	**
7	110.0	4.50	13.46	43.71	26.48	0.29	2.31	1.00	1.00	1.7	39.56	143.12	169.19	13054	8380	349	1041	1391	
6	95.00	4.36	10.31	23.04	13.63	0.30	2.31	1.00	1.00	1.7	24.08	65.10	66.69	6761	4198	206	427	633	
5	85.00	4.26	7.62	23.30	13.88	0.25	2.43	1.00	1.00	1.6	21.26	64.95	65.95	6145	3834	187	431	618	
4	70.00	4.09	16.41	47.32	28.49	0.23	2.49	1.00	1.00	1.6	43.89	141.87	161.71	14146	8295	380	976	1356	
3	50.00	3.81	18.03	51.28	29.24	0.22	2.53	1.00	1.00	1.6	47.67	128.48	125.09	13751	7588	391	768	1159	
2	30.00	3.42	23.01	51.50	29.46	0.21	2.57	1.00	1.00	1.5	52.68	142.18	148.58	15710	8220	393	798	1191	
1	10.00	2.96	25.05	51.59	27.95	0.19	2.62	1.00	1.00	1.3	54.63	140.05	136.45	15769	7448	360	666	1026	
														117237	69240			10584	

** = Section Force Exceeds Solidity Ratio Criteria

LoadCase 1.2D + 1.0Di + 1.0Wi 60 deg

40 mph 60 degree with 0.75 in Radial Ice

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 1.00

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (s.)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)	
13	195.0	5.07	0.00	26.34	20.64	0.60	1.81	0.80	1.00	1.8	19.51	4.80	16.57	1924	1390	152	45	197	
12	180.0	4.99	0.00	47.72	37.27	0.51	1.89	0.80	1.00	1.8	32.97	21.97	61.61	4433	3332	264	211	474	
11	161.3	4.87	9.23	43.25	33.05	0.59	1.81	0.80	1.00	1.8	39.25	51.62	87.43	6614	3845	295	299	593	
10	151.3	4.81	1.34	7.49	6.19	0.58	1.81	0.80	1.00	1.7	6.56	18.02	18.66	1327	883	49	83	130	**
9	145.0	4.76	4.76	20.24	12.43	0.40	2.06	0.80	1.00	1.7	16.72	65.04	67.83	5384	3673	139	424	526	**

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 101

Section Forces

8	130.0	4.66	10.18	41.13	25.50	0.33	2.21	0.80	1.00	1.7	33.24	143.59	172.04	12218	8155	291	1048	1276	**
7	110.0	4.50	13.46	43.71	26.48	0.29	2.31	0.80	1.00	1.7	36.87	143.12	169.19	13054	8380	326	1041	1367	
6	95.00	4.36	10.31	23.04	13.63	0.30	2.31	0.80	1.00	1.7	22.02	65.10	66.69	6761	4198	188	427	616	
5	85.00	4.26	7.62	23.30	13.88	0.25	2.43	0.80	1.00	1.6	19.74	64.95	65.95	6145	3834	174	431	605	
4	70.00	4.09	16.41	47.32	28.49	0.23	2.49	0.80	1.00	1.6	40.61	141.87	161.71	14146	8295	352	976	1328	
3	50.00	3.81	18.03	51.28	29.24	0.22	2.53	0.80	1.00	1.6	44.07	128.48	125.09	13751	7588	361	768	1130	
2	30.00	3.42	23.01	51.50	29.46	0.21	2.57	0.80	1.00	1.5	48.08	142.18	148.58	15710	8220	359	798	1157	
1	10.00	2.96	25.05	51.59	27.95	0.19	2.62	0.80	1.00	1.3	49.62	140.05	136.45	15769	7448	327	666	993	
														117237	69240			10390	

** = Section Force Exceeds Solidity Ratio Criteria

LoadCase 1.2D + 1.0Di + 1.0Wi 90 deg — **40 mph 90 degree with 0.75 in Radial Ice**

Gust Response Factor (Gh): 0.85 Ice Dead Load Factor : 1.00 Ice Importance Factor : 1.00

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{lz} (in)	A_o (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)	
13	195.0	5.07	0.00	26.34	20.64	0.60	1.81	0.85	1.00	1.8	19.51	4.80	16.57	1924	1390	152	45	197	
12	180.0	4.99	0.00	47.72	37.27	0.51	1.89	0.85	1.00	1.8	32.97	21.97	61.61	4433	3332	264	211	474	
11	161.3	4.87	9.23	43.25	33.05	0.59	1.81	0.85	1.00	1.8	39.72	51.62	87.43	6614	3845	298	299	597	
10	151.3	4.81	1.34	7.49	6.19	0.58	1.81	0.85	1.00	1.7	6.63	18.02	18.66	1327	883	49	83	130	**
9	145.0	4.76	4.76	20.24	12.43	0.40	2.06	0.85	1.00	1.7	16.96	65.04	67.83	5384	3673	141	424	526	**
8	130.0	4.66	10.18	41.13	25.50	0.33	2.21	0.85	1.00	1.7	33.75	143.59	172.04	12218	8155	295	1048	1276	**
7	110.0	4.50	13.46	43.71	26.48	0.29	2.31	0.85	1.00	1.7	37.54	143.12	169.19	13054	8380	332	1041	1373	
6	95.00	4.36	10.31	23.04	13.63	0.30	2.31	0.85	1.00	1.7	22.54	65.10	66.69	6761	4198	192	427	620	
5	85.00	4.26	7.62	23.30	13.88	0.25	2.43	0.85	1.00	1.6	20.12	64.95	65.95	6145	3834	177	431	608	
4	70.00	4.09	16.41	47.32	28.49	0.23	2.49	0.85	1.00	1.6	41.43	141.87	161.71	14146	8295	359	976	1335	
3	50.00	3.81	18.03	51.28	29.24	0.22	2.53	0.85	1.00	1.6	44.97	128.48	125.09	13751	7588	369	768	1137	
2	30.00	3.42	23.01	51.50	29.46	0.21	2.57	0.85	1.00	1.5	49.23	142.18	148.58	15710	8220	367	798	1165	
1	10.00	2.96	25.05	51.59	27.95	0.19	2.62	0.85	1.00	1.3	50.87	140.05	136.45	15769	7448	335	666	1001	
														117237	69240			10439	

** = Section Force Exceeds Solidity Ratio Criteria

LoadCase 1.0D + 1.0W Service Normal — **Serviceability - 60 mph Wind Normal**

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{lz} (in)	A_o (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	11.41	0.00	5.70	0.00	0.14	2.82	1.00	1.00	0.0	3.23	4.80	0.00	445	0	88	34	122
12	180.0	11.22	0.00	10.45	0.00	0.12	2.89	1.00	1.00	0.0	5.91	19.01	0.00	918	0	163	133	296
11	161.3	10.97	9.23	10.20	0.00	0.23	2.49	1.00	1.00	0.0	15.15	42.67	0.00	2308	0	352	320	672
10	151.3	10.82	1.34	1.29	0.00	0.18	2.65	1.00	1.00	0.0	2.08	13.97	0.00	370	0	51	109	160
9	145.0	10.72	4.76	7.81	0.00	0.21	2.55	1.00	1.00	0.0	9.26	50.55	0.00	1425	0	215	390	606
8	130.0	10.48	10.18	15.63	0.00	0.17	2.68	1.00	1.00	0.0	19.09	114.92	0.00	3386	0	456	851	1307
7	110.0	10.12	13.46	17.23	0.00	0.16	2.73	1.00	1.00	0.0	23.26	114.92	0.00	3895	0	545	822	1367
6	95.00	9.81	10.31	9.42	0.00	0.18	2.66	1.00	1.00	0.0	15.68	51.21	0.00	2136	0	348	361	709
5	85.00	9.58	7.62	9.42	0.00	0.14	2.80	1.00	1.00	0.0	12.96	51.21	0.00	1926	0	295	352	648
4	70.00	9.20	16.41	18.83	0.00	0.13	2.84	1.00	1.00	0.0	27.06	114.92	0.00	4876	0	602	747	1349
3	50.00	8.57	18.03	22.04	0.00	0.13	2.85	1.00	1.00	0.0	27.30	102.42	0.00	5136	0	567	630	1197
2	30.00	7.69	23.01	22.04	0.00	0.13	2.85	1.00	1.00	0.0	32.08	117.42	0.00	6242	0	599	637	1235
1	10.00	6.66	25.05	23.64	0.00	0.12	2.87	1.00	1.00	0.0	34.73	117.87	0.00	6935	0	564	553	1117
														39998	0			10784

** = Section Force Exceeds Solidity Ratio Criteria

Section Forces

LoadCase 1.0D + 1.0W Service 60 deg

Serviceability - 60 mph Wind 60 degree

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{al} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	11.41	0.00	5.70	0.00	0.14	2.82	0.80	1.00	0.0	3.23	4.80	0.00	445	0	88	34	122
12	180.0	11.22	0.00	10.45	0.00	0.12	2.89	0.80	1.00	0.0	5.91	19.01	0.00	918	0	163	133	296
11	161.3	10.97	9.23	10.20	0.00	0.23	2.49	0.80	1.00	0.0	13.31	42.67	0.00	2308	0	309	320	629
10	151.3	10.82	1.34	1.29	0.00	0.18	2.65	0.80	1.00	0.0	1.81	13.97	0.00	370	0	44	109	153
9	145.0	10.72	4.76	7.81	0.00	0.21	2.55	0.80	1.00	0.0	8.31	50.55	0.00	1425	0	193	390	583
8	130.0	10.48	10.18	15.63	0.00	0.17	2.68	0.80	1.00	0.0	17.06	114.92	0.00	3386	0	408	851	1259
7	110.0	10.12	13.46	17.23	0.00	0.16	2.73	0.80	1.00	0.0	20.57	114.92	0.00	3895	0	482	822	1304
6	95.00	9.81	10.31	9.42	0.00	0.18	2.66	0.80	1.00	0.0	13.62	51.21	0.00	2136	0	303	361	663
5	85.00	9.58	7.62	9.42	0.00	0.14	2.80	0.80	1.00	0.0	11.43	51.21	0.00	1926	0	261	352	613
4	70.00	9.20	16.41	18.83	0.00	0.13	2.84	0.80	1.00	0.0	23.78	114.92	0.00	4876	0	529	747	1276
3	50.00	8.57	18.03	22.04	0.00	0.13	2.85	0.80	1.00	0.0	23.69	102.42	0.00	5136	0	492	630	1122
2	30.00	7.69	23.01	22.04	0.00	0.13	2.85	0.80	1.00	0.0	27.48	117.42	0.00	6242	0	513	637	1149
1	10.00	6.66	25.05	23.64	0.00	0.12	2.87	0.80	1.00	0.0	29.72	117.87	0.00	6935	0	482	553	1035
														39998	0			10205

** = Section Force Exceeds Solidity Ratio Criteria

LoadCase 1.0D + 1.0W Service 90 deg

Serviceability - 60 mph Wind 90 degree

Gust Response Factor (Gh): 0.85

Wind Importance Factor (Iw) : 1.00

Section	Elev. (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{al} (sf)	Wt. (lb)	Ice Wt. (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
13	195.0	11.41	0.00	5.70	0.00	0.14	2.82	0.85	1.00	0.0	3.23	4.80	0.00	445	0	88	34	122
12	180.0	11.22	0.00	10.45	0.00	0.12	2.89	0.85	1.00	0.0	5.91	19.01	0.00	918	0	163	133	296
11	161.3	10.97	9.23	10.20	0.00	0.23	2.49	0.85	1.00	0.0	13.77	42.67	0.00	2308	0	320	320	640
10	151.3	10.82	1.34	1.29	0.00	0.18	2.65	0.85	1.00	0.0	1.88	13.97	0.00	370	0	46	109	155
9	145.0	10.72	4.76	7.81	0.00	0.21	2.55	0.85	1.00	0.0	8.55	50.55	0.00	1425	0	199	390	589
8	130.0	10.48	10.18	15.63	0.00	0.17	2.68	0.85	1.00	0.0	17.57	114.92	0.00	3386	0	420	851	1271
7	110.0	10.12	13.46	17.23	0.00	0.16	2.73	0.85	1.00	0.0	21.24	114.92	0.00	3895	0	498	822	1319
6	95.00	9.81	10.31	9.42	0.00	0.18	2.66	0.85	1.00	0.0	14.14	51.21	0.00	2136	0	314	361	675
5	85.00	9.58	7.62	9.42	0.00	0.14	2.80	0.85	1.00	0.0	11.81	51.21	0.00	1926	0	269	352	622
4	70.00	9.20	16.41	18.83	0.00	0.13	2.84	0.85	1.00	0.0	24.60	114.92	0.00	4876	0	547	747	1294
3	50.00	8.57	18.03	22.04	0.00	0.13	2.85	0.85	1.00	0.0	24.59	102.42	0.00	5136	0	511	630	1141
2	30.00	7.69	23.01	22.04	0.00	0.13	2.85	0.85	1.00	0.0	28.63	117.42	0.00	6242	0	534	637	1171
1	10.00	6.66	25.05	23.64	0.00	0.12	2.87	0.85	1.00	0.0	30.97	117.87	0.00	6935	0	503	553	1056
														39998	0			10350

** = Section Force Exceeds Solidity Ratio Criteria

Equivalent Lateral Force Method

(Based on ASCE7-10 Chapters 11, 12 & 15)

Spectral Response Acceleration for Short Period (S_s):	0.09
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.05
Long-Period Transition Period (T_L - Seconds):	12
Importance Factor (I_e):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v:	2.40
Response Modification Coefficient (R):	3.00
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.09
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.07
Seismic Response Coefficient (C_s):	0.03
Upper Limit C_s:	0.03
Lower Limit C_s:	0.03
Period based on Rayleigh Method (sec):	1.26
Redundancy Factor (p):	1.30
Seismic Force Distribution Exponent (k):	1.38
Total Unfactored Dead Load:	50.60 k
Seismic Base Shear (E):	1.97 k

LoadCase (1.2 + 0.2Sds) * DL + E Seismic

Section	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
13	195.00	445	643,694	0.022	43	542
12	180.00	918	1,188,66	0.040	79	1,119
11	161.39	2,308	2,570,31	0.087	172	2,812
10	151.39	370	377,684	0.013	25	451
9	145.00	1,425	1,369,27	0.046	91	1,737
8	130.00	3,386	2,797,47	0.095	187	4,125
7	110.00	3,895	2,556,07	0.087	171	4,746
6	95.00	2,136	1,144,71	0.039	76	2,602
5	85.00	1,926	885,372	0.030	59	2,346
4	70.00	4,876	1,714,66	0.058	115	5,940
3	50.00	5,136	1,135,35	0.038	76	6,258
2	30.00	6,242	681,809	0.023	46	7,605
1	10.00	6,935	166,329	0.006	11	8,449
20 ft Dipole	200.00	34	50,908	0.002	3	41
Large Beacon	200.00	50	74,865	0.003	5	61
LIGHT ROD W/EXT	199.00	65	96,653	0.003	6	79
20 ft Dipole	198.00	34	50,207	0.002	3	41
3 ft Standoff	198.00	40	59,067	0.002	4	49
12"x12"x6" Junction Box	195.50	15	21,765	0.001	1	18
6 ft Sidearm	195.50	210	304,711	0.010	20	256
PD-10017-1 Omni	195.50	75	108,825	0.004	7	91
FibeAir 1500 HP / RFU-HP	185.00	30	40,337	0.001	3	37
DA6-W57BC	184.00	281	375,010	0.013	25	342
AEHC AirScale MAA 64T64R 192AE B41	180.00	324	419,478	0.014	28	395
FFHH-65C-R3	180.00	383	495,606	0.017	33	466

Equivalent Lateral Force Method

HICAP Hybrid Breakout Box	180.00	18	22,683	0.001	2	21
PV-SFA12-3-12-126 w/ (2) Stiff Arms	180.00	1,776	2,299,36	0.078	154	2,164
RRH 4T4R B12/71 240W AHLOA	180.00	251	325,406	0.011	22	306
RRH 4T4R B25/66 480W AHFIG	180.00	212	273,826	0.009	18	258
DC9-48-60-24-8C	164.00	57	65,356	0.002	4	70
NNH4-65B-R6H4	164.00	506	576,592	0.020	39	617
Radio 4449	164.00	210	239,108	0.008	16	256
RRUS 32	164.00	159	181,039	0.006	12	194
RRUS 4415 B25	164.00	138	157,128	0.005	10	168
RRUS 4426 B66	164.00	145	165,326	0.006	11	177
RRUS 4478	164.00	178	202,900	0.007	14	217
SBNHH-1D65B	164.00	122	138,683	0.005	9	148
Sector Frames	164.00	1,500	1,707,91	0.058	114	1,828
BXA-70080/8CF	153.50	276	286,834	0.010	19	336
CBC721-DF-21-DCB	153.50	26	27,436	0.001	2	32
HD Sector Frames	153.50	1,950	2,026,54	0.069	135	2,376
RC3DC-3315-PF-48	153.50	96	99,768	0.003	7	117
RRH 3JR52709AA 2X60	153.50	330	342,954	0.012	23	402
RRH4x30-4T4R-B13	153.50	343	356,672	0.012	24	418
RRH4x30-4T4R-B25	153.50	153	159,006	0.005	11	186
RRUS A2 Modules	153.50	254	263,887	0.009	18	309
6 ft HP Dish	144.00	281	267,387	0.009	18	342
Small Beacon	100.50	30	17,378	0.001	1	37
GPS	15.00	50	2,099	0.000	0	61
		50,600	29,534,157	1.000	1,973	61,649

LoadCase (0.9 - 0.2Sds) * DL + E — Seismic (Reduced DL)

Section	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
13	195.00	445	643,694	0.022	43	393
12	180.00	918	1,188,66	0.040	79	809
11	161.39	2,308	2,570,31	0.087	172	2,035
10	151.39	370	377,684	0.013	25	327
9	145.00	1,425	1,369,27	0.046	91	1,257
8	130.00	3,386	2,797,47	0.095	187	2,985
7	110.00	3,895	2,556,07	0.087	171	3,434
6	95.00	2,136	1,144,71	0.039	76	1,883
5	85.00	1,926	885,373	0.030	59	1,698
4	70.00	4,876	1,714,66	0.058	115	4,299
3	50.00	5,136	1,135,35	0.038	76	4,528
2	30.00	6,242	681,809	0.023	46	5,503
1	10.00	6,935	166,329	0.006	11	6,114
20 ft Dipole	200.00	34	50,908	0.002	3	30
Large Beacon	200.00	50	74,865	0.003	5	44
LIGHT ROD W/EXT	199.00	65	96,653	0.003	6	57
20 ft Dipole	198.00	34	50,207	0.002	3	30
3 ft Standoff	198.00	40	59,067	0.002	4	35
12"x12"x6" Junction Box	195.50	15	21,765	0.001	1	13
6 ft Sidearm	195.50	210	304,711	0.010	20	185
PD-10017-1 Omni	195.50	75	108,825	0.004	7	66
FibeAir 1500 HP / RFU-HP	185.00	30	40,337	0.001	3	26
DA6-W57BC	184.00	281	375,010	0.013	25	248
AEHC AirScale MAA 64T64R 192AE B41	180.00	324	419,478	0.014	28	286

Equivalent Lateral Force Method

FFHH-65C-R3	180.00	383	495,606	0.017	33	337
HICAP Hybrid Breakout Box	180.00	18	22,683	0.001	2	15
PV-SFA12-3-12-126 w/ (2) Stiff Arms	180.00	1,776	2,299,36	0.078	154	1,566
RRH 4T4R B12/71 240W AHLOA	180.00	251	325,406	0.011	22	222
RRH 4T4R B25/66 480W AHFIG	180.00	212	273,826	0.009	18	186
DC9-48-60-24-8C	164.00	57	65,356	0.002	4	51
NNH4-65B-R6H4	164.00	506	576,592	0.020	39	446
Radio 4449	164.00	210	239,108	0.008	16	185
RRUS 32	164.00	159	181,039	0.006	12	140
RRUS 4415 B25	164.00	138	157,128	0.005	10	122
RRUS 4426 B66	164.00	145	165,326	0.006	11	128
RRUS 4478	164.00	178	202,900	0.007	14	157
SBNHH-1D65B	164.00	122	138,683	0.005	9	107
Sector Frames	164.00	1,500	1,707,91	0.058	114	1,322
BXA-70080/8CF	153.50	276	286,834	0.010	19	243
CBC721-DF-21-DCB	153.50	26	27,436	0.001	2	23
HD Sector Frames	153.50	1,950	2,026,54	0.069	135	1,719
RC3DC-3315-PF-48	153.50	96	99,768	0.003	7	85
RRH 3JR52709AA 2X60	153.50	330	342,954	0.012	23	291
RRH4x30-4T4R-B13	153.50	343	356,672	0.012	24	303
RRH4x30-4T4R-B25	153.50	153	159,006	0.005	11	135
RRUS A2 Modules	153.50	254	263,887	0.009	18	224
6 ft HP Dish	144.00	281	267,387	0.009	18	248
Small Beacon	100.50	30	17,378	0.001	1	26
GPS	15.00	50	2,099	0.000	0	44
		50,600	29,534,157	1.000	1,973	44,612

Equivalent Modal Analysis Method

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period (S_s):	0.09
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.05
Importance Factor (I_e):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v:	2.40
Response Modification Coefficient (R):	3.00
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.09
Desing Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.07
Period Based on Rayleigh Method (sec):	1.26
Redundancy Factor (p):	1.30

LoadCase (1.2 + 0.2Sds) * DL + E — Seismic

Section	Height Above Base (ft)	Weight (lb)	a	b	c	S_{az}	Horizontal Force (lb)	Vertical Force (lb)
13	195.00	445	1.797	1.523	0.972	0.176	34	542
12	180.00	918	1.531	0.580	0.580	0.111	44	1,119
11	161.39	2,308	1.231	0.036	0.278	0.059	59	2,812
10	151.39	370	1.083	-0.079	0.177	0.043	7	451
9	145.00	1,425	0.993	-0.111	0.128	0.037	23	1,737
8	130.00	3,386	0.799	-0.112	0.053	0.029	42	4,125
7	110.00	3,895	0.572	-0.043	0.012	0.027	45	4,746
6	95.00	2,136	0.426	0.010	0.006	0.026	24	2,602
5	85.00	1,926	0.341	0.035	0.009	0.025	21	2,346
4	70.00	4,876	0.232	0.058	0.019	0.021	45	5,940
3	50.00	5,136	0.118	0.070	0.035	0.016	36	6,258
2	30.00	6,242	0.043	0.070	0.042	0.012	33	7,605
1	10.00	6,935	0.005	0.044	0.025	0.006	19	8,449
20 ft Dipole	200.00	34	1.890	1.980	1.140	0.203	3	41
Large Beacon	200.00	50	1.890	1.980	1.140	0.203	4	61
LIGHT ROD W/EXT	199.00	65	1.871	1.882	1.105	0.197	6	79
20 ft Dipole	198.00	34	1.852	1.787	1.070	0.192	3	41
3 ft Standoff	198.00	40	1.852	1.787	1.070	0.192	3	49
12"x12"x6" Junction Box	195.50	15	1.806	1.565	0.987	0.179	1	18
6 ft Sidearm	195.50	210	1.806	1.565	0.987	0.179	16	256
PD-10017-1 Omni	195.50	75	1.806	1.565	0.987	0.179	6	91
FibeAir 1500 HP / RFU-HP	185.00	30	1.617	0.832	0.694	0.130	2	37
DA6-W57BC	184.00	281	1.600	0.778	0.670	0.126	15	342
AEHC AirScale MAA 64T64R	180.00	324	1.531	0.580	0.580	0.111	16	395
FFHH-65C-R3	180.00	383	1.531	0.580	0.580	0.111	18	466
HICAP Hybrid Breakout Box	180.00	18	1.531	0.580	0.580	0.111	1	21
PV-SFA12-3-12-126 w/ (2) Stiff	180.00	1,776	1.531	0.580	0.580	0.111	85	2,164
RRH 4T4R B12/71 240W AHLOA	180.00	251	1.531	0.580	0.580	0.111	12	306
RRH 4T4R B25/66 480W AHFIG	180.00	212	1.531	0.580	0.580	0.111	10	258
DC9-48-60-24-8C	164.00	57	1.271	0.082	0.311	0.065	2	70
NNH4-65B-R6H4	164.00	506	1.271	0.082	0.311	0.065	14	617
Radio 4449	164.00	210	1.271	0.082	0.311	0.065	6	256
RRUS 32	164.00	159	1.271	0.082	0.311	0.065	4	194
RRUS 4415 B25	164.00	138	1.271	0.082	0.311	0.065	4	168
RRUS 4426 B66	164.00	145	1.271	0.082	0.311	0.065	4	177
RRUS 4478	164.00	178	1.271	0.082	0.311	0.065	5	217
SBNHH-1D65B	164.00	122	1.271	0.082	0.311	0.065	3	148
Sector Frames	164.00	1,500	1.271	0.082	0.311	0.065	42	1,828
BXA-70080/8CF	153.50	276	1.113	-0.062	0.195	0.046	6	336
CBC721-DF-21-DCB	153.50	26	1.113	-0.062	0.195	0.046	1	32

Equivalent Modal Analysis Method

HD Sector Frames	153.50	1,950	1.113	-0.062	0.195	0.046	39	2,376
RC3DC-3315-PF-48	153.50	96	1.113	-0.062	0.195	0.046	2	117
RRH 3JR52709AA 2X60	153.50	330	1.113	-0.062	0.195	0.046	7	402
RRH4x30-4T4R-B13	153.50	343	1.113	-0.062	0.195	0.046	7	418
RRH4x30-4T4R-B25	153.50	153	1.113	-0.062	0.195	0.046	3	186
RRUS A2 Modules	153.50	254	1.113	-0.062	0.195	0.046	5	309
6 ft HP Dish	144.00	281	0.980	-0.114	0.122	0.036	4	342
Small Beacon	100.50	30	0.477	-0.008	0.006	0.027	0	37
GPS	15.00	50	0.011	0.056	0.032	0.008	0	61
		50,600	58.157	21.461	20.188	4.055	792	61,649

LoadCase (0.9 - 0.2Sds) * DL + E — Seismic (Reduced DL)

Section	Height Above Base (ft)	Weight (lb)	a	b	c	S_{az}	Horizontal Force (lb)	Vertical Force (lb)
13	195.00	445	1.797	1.523	0.972	0.176	34	393
12	180.00	918	1.531	0.580	0.580	0.111	44	809
11	161.39	2,308	1.231	0.036	0.278	0.059	59	2,035
10	151.39	370	1.083	-0.079	0.177	0.043	7	327
9	145.00	1,425	0.993	-0.111	0.128	0.037	23	1,257
8	130.00	3,386	0.799	-0.112	0.053	0.029	42	2,985
7	110.00	3,895	0.572	-0.043	0.012	0.027	45	3,434
6	95.00	2,136	0.426	0.010	0.006	0.026	24	1,883
5	85.00	1,926	0.341	0.035	0.009	0.025	21	1,698
4	70.00	4,876	0.232	0.058	0.019	0.021	45	4,299
3	50.00	5,136	0.118	0.070	0.035	0.016	36	4,528
2	30.00	6,242	0.043	0.070	0.042	0.012	33	5,503
1	10.00	6,935	0.005	0.044	0.025	0.006	19	6,114
20 ft Dipole	200.00	34	1.890	1.980	1.140	0.203	3	30
Large Beacon	200.00	50	1.890	1.980	1.140	0.203	4	44
LIGHT ROD W/EXT	199.00	65	1.871	1.882	1.105	0.197	6	57
20 ft Dipole	198.00	34	1.852	1.787	1.070	0.192	3	30
3 ft Standoff	198.00	40	1.852	1.787	1.070	0.192	3	35
12"x12"x6" Junction Box	195.50	15	1.806	1.565	0.987	0.179	1	13
6 ft Sidearm	195.50	210	1.806	1.565	0.987	0.179	16	185
PD-10017-1 Omni	195.50	75	1.806	1.565	0.987	0.179	6	66
FibeAir 1500 HP / RFU-HP	185.00	30	1.617	0.832	0.694	0.130	2	26
DA6-W57BC	184.00	281	1.600	0.778	0.670	0.126	15	248
AEHC AirScale MAA 64T64R	180.00	324	1.531	0.580	0.580	0.111	16	286
FFHH-65C-R3	180.00	383	1.531	0.580	0.580	0.111	18	337
HICAP Hybrid Breakout Box	180.00	18	1.531	0.580	0.580	0.111	1	15
PV-SFA12-3-12-126 w/ (2) Stiff	180.00	1,776	1.531	0.580	0.580	0.111	85	1,566
RRH 4T4R B12/71 240W AHLOA	180.00	251	1.531	0.580	0.580	0.111	12	222
RRH 4T4R B25/66 480W AHFIG	180.00	212	1.531	0.580	0.580	0.111	10	186
DC9-48-60-24-8C	164.00	57	1.271	0.082	0.311	0.065	2	51
NNH4-65B-R6H4	164.00	506	1.271	0.082	0.311	0.065	14	446
Radio 4449	164.00	210	1.271	0.082	0.311	0.065	6	185
RRUS 32	164.00	159	1.271	0.082	0.311	0.065	4	140
RRUS 4415 B25	164.00	138	1.271	0.082	0.311	0.065	4	122
RRUS 4426 B66	164.00	145	1.271	0.082	0.311	0.065	4	128
RRUS 4478	164.00	178	1.271	0.082	0.311	0.065	5	157
SBNHH-1D65B	164.00	122	1.271	0.082	0.311	0.065	3	107
Sector Frames	164.00	1,500	1.271	0.082	0.311	0.065	42	1,322
BXA-70080/8CF	153.50	276	1.113	-0.062	0.195	0.046	6	243
CBC721-DF-21-DCB	153.50	26	1.113	-0.062	0.195	0.046	1	23
HD Sector Frames	153.50	1,950	1.113	-0.062	0.195	0.046	39	1,719
RC3DC-3315-PF-48	153.50	96	1.113	-0.062	0.195	0.046	2	85
RRH 3JR52709AA 2X60	153.50	330	1.113	-0.062	0.195	0.046	7	291
RRH4x30-4T4R-B13	153.50	343	1.113	-0.062	0.195	0.046	7	303
RRH4x30-4T4R-B25	153.50	153	1.113	-0.062	0.195	0.046	3	135
RRUS A2 Modules	153.50	254	1.113	-0.062	0.195	0.046	5	224
6 ft HP Dish	144.00	281	0.980	-0.114	0.122	0.036	4	248
Small Beacon	100.50	30	0.477	-0.008	0.006	0.027	0	26

Equivalent Modal Analysis Method

GPS	15.00	50	0.011	0.056	0.032	0.008	0	44
		50,600	58.157	21.461	20.188	4.055	792	44,612

Force/Stress Summary

Section: 1 U20-2.25" MOD Bot Elev (ft): 0.00 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2.25"	-385.95	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	696.30	0	0	0.00	0.00	55	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3.5X3.5X0.3125	-9.25	1.2D + 1.6W	21.91	48	48	48	183.0	36.0	14.11	1	1	49.70	43.50	65	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2.25"	341.18	0.9D + 1.6W 60	50	65	536.80	0	0	0.00	0.00	63	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3.5X3.5X0.3125	8.72	1.2D + 1.6W 90	36	58	54.17	1	1	49.70	37.52	23	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	321.19	0.9D + 1.6W 60	0.00	0	0	
Top Compression	363.71	1.2D + 1.6W	0.00	0		
Bot Tension	349.36	0.9D + 1.6W 60	0.00	0		
Bot Compression	395.08	1.2D + 1.6W	0.00	0		

Section: 2 U18-12B-2" MOD Bot Elev (ft): 20.00 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2"	-355.01	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	583.57	0	0	0.00	0.00	60	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3.5X3.5X0.3125	-9.25	1.2D + 1.6W 90	20.15	48	48	48	168.3	36.0	16.67	1	1	49.70	43.50	55	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2"	314.88	0.9D + 1.6W 60	50	65	424.10	0	0	0.00	0.00	74	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3.5X3.5X0.3125	8.74	1.2D + 1.6W 90	36	58	54.17	1	1	49.70	37.52	23	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	292.20	0.9D + 1.6W 60	0.00	0	0	
Top Compression	329.45	1.2D + 1.6W	0.00	0		
Bot Tension	321.19	0.9D + 1.6W 60	523.32	61	6	1 1/4 A325
Bot Compression	363.71	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 3 U16-2" Bot Elev (ft): 40.00 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2"	-320.20	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	399.90	0	0	0.00	0.00	80	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.3125	-8.70	1.2D + 1.6W 90	18.44	48	48	48	180.4	36.0	12.35	1	1	49.70	43.50	70	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 2"	285.87	0.9D + 1.6W 60	50	65	424.10	0	0	0.00	0.00	67	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.3125	8.27	0.9D + 1.6W 90	36	58	44.05	1	1	49.70	37.52	22	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	262.23	0.9D + 1.6W 60	0.00	0	0	
Top Compression	294.12	1.2D + 1.6W	0.00	0		
Bot Tension	292.20	0.9D + 1.6W 60	523.32	56	6	1 1/4 A325
Bot Compression	329.45	1.2D + 1.6W	0.00	0		

Section: 4 U14 MOD Bot Elev (ft): 60.00 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	-284.40	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	415.87	0	0	0.00	0.00	68	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.3125	-8.49	1.2D + 1.6W 90	16.80	48	48	48	164.3	36.0	14.89	1	1	31.81	34.80	56	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	255.14	0.9D + 1.6W 60	50	65	324.70	0	0	0.00	0.00	78	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.3125	7.97	1.2D + 1.6W 90	36	58	46.60	1	1	31.81	29.91	26	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	229.69	0.9D + 1.6W 60	0.00	0	0	
Top Compression	256.77	1.2D + 1.6W	0.00	0		
Bot Tension	262.23	0.9D + 1.6W 60	327.24	80	6	1 A325
Bot Compression	294.12	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 5 U12-1.75" Bot Elev (ft): 80.00 Height (ft): 10.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	-246.57	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	300.70	0	0	0.00	0.00	81	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	-8.14	1.2D + 1.6W 90	15.24	48	48	48	147.3	36.0	11.35	1	1	31.81	20.88	71	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	222.03	0.9D + 1.6W 60	50	65	324.70	0	0	0.00	0.00	68	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	7.65	1.2D + 1.6W 90	36	58	28.68	1	1	31.81	17.94	42	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	212.94	0.9D + 1.6W 60	0.00	0	0	
Top Compression	237.70	1.2D + 1.6W	0.00	0		
Bot Tension	229.69	0.9D + 1.6W 60	327.24	70	6	1 A325
Bot Compression	256.77	1.2D + 1.6W	0.00	0		

Section: 6 U12-1.75" Bot Elev (ft): 90.00 Height (ft): 10.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	-227.74	1.2D + 1.6W	10.02	50	50	50	0.0	0.0	300.70	0	0	0.00	0.00	75	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	-8.12	1.2D + 1.6W 90	14.50	48	48	48	140.2	36.0	12.53	1	1	31.81	20.88	64	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.75"	205.04	0.9D + 1.6W 60	50	65	324.70	0	0	0.00	0.00	63	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	7.72	1.2D + 1.6W 90	36	58	28.68	1	1	31.81	17.94	43	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	195.04	0.9D + 1.6W 60	0.00	0	0	
Top Compression	217.86	1.2D + 1.6W	0.00	0		
Bot Tension	212.94	0.9D + 1.6W 60	0.00	0		
Bot Compression	237.70	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 7 U10 MOD Bot Elev (ft): 100.0 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.5"	-206.37	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	333.54	0	0	0.00	0.00	61	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	-8.28	1.2D + 1.6W 90	13.79	48	48	48	133.3	36.0	13.85	1	1	31.81	20.88	59	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.5"	184.73	1.2D + 1.6W 60	50	65	238.60	0	0	0.00	0.00	77	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 3X3X0.1875	7.85	1.2D + 1.6W 90	36	58	28.68	1	1	31.81	17.94	43	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	156.31	0.9D + 1.6W 60	0.00	0	0	
Top Compression	175.32	1.2D + 1.6W	0.00	0		
Bot Tension	195.04	0.9D + 1.6W 60	327.24	60	6	1 A325
Bot Compression	217.86	1.2D + 1.6W	0.00	0		

Section: 8 U08-12B-MOD Bot Elev (ft): 120.0 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.25"	-161.92	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	263.88	0	0	0.00	0.00	61	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 2.5X2.5X0.1875	-9.09	1.2D + 1.6W 90	12.50	48	48	48	145.5	36.0	9.63	1	1	31.81	20.88	94	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.25"	144.68	1.2D + 1.6W 60	50	65	165.70	0	0	0.00	0.00	87	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 2.5X2.5X0.1875	9.62	1.2D + 1.6W 90	36	58	22.55	1	1	31.81	17.94	53	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	108.81	0.9D + 1.6W 60	0.00	0	0	
Top Compression	124.58	1.2D + 1.6W	0.00	0		
Bot Tension	156.31	0.9D + 1.6W 60	327.24	48	6	1 A325
Bot Compression	175.32	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 9 U06-1.25" Bot Elev (ft): 140.0 Height (ft): 10.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.25"	-104.96	1.2D + 1.6W	10.02	100	100	100	0.0	0.0	142.50	0	0	0.00	0.00	73	User Input
HORIZ	0.00		0.000	0	0	0	0.0	0.0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 2.5X2.5X0.1875	-11.53	1.2D + 1.6W	11.41	48	48	48	132.8	36.0	11.54	1	1	31.81	20.88	99	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG 12B - 12"BD 1.25"	91.35	1.2D + 1.6W 60	50	65	165.70	0	0	0.00	0.00	55	User Input
HORIZ	0.00		0	0	0.00	0	0	0.00	0.00	0	
DIAG SAE - 2.5X2.5X0.1875	10.24	0.9D + 1.6W 60	36	58	22.55	1	1	31.81	17.94	57	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	80.73	0.9D + 1.6W 60	0.00	0	0	
Top Compression	95.66	1.2D + 1.6W	0.00	0		
Bot Tension	108.81	0.9D + 1.6W 60	327.24	33	6	1 A325
Bot Compression	124.58	1.2D + 1.6W	0.00	0		

Section: 10 H-5.0 Bot Elev (ft): 150.0 Height (ft): 2.787

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 2" SOLID	-90.05	1.2D + 1.6W	2.04	100	100	100	48.9	50.0	118.70	0	0	0.00	0.00	76	Member X
HORIZ SOL - 7/8" SOLID	-1.63	1.2D + 1.6W	4.981	100	100	100	218.6	50.0	2.84	0	0	0.00	0.00	57	Member X
DIAG MOD - 7/8"SR+L1.5x1/	-7.14	1.2D + 1.6W 90	5.358	50	50	50	120.0	36.0	9.11	0	0	0.00	0.00	78	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 2" SOLID	80.62	1.2D + 1.6W 60	50	65	141.37	0	0	0.00	0.00	57	Member
HORIZ SOL - 7/8" SOLID	1.67	1.2D + 1.6W 60	50	65	27.06	0	0	0.00	0.00	6	Member
DIAG MOD - 7/8"SR+L1.5x1/	7.17	1.2D + 1.6W 90	36	58	19.44	0	0	0.00	0.00	36	Member

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	71.73	0.9D + 1.6W 60	0.00	0	0	
Top Compression	85.36	1.2D + 1.6W	0.00	0		
Bot Tension	80.73	0.9D + 1.6W 60	0.00	0		
Bot Compression	95.66	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 11 H-5.0 Bot Elev (ft): 152.7 Height (ft): 17.213

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 2" SOLID	-80.46	1.2D + 1.6W	2.34	100	100	100	56.2	50.0	112.25	0	0	0.00	0.00	71	Member X
HORIZ SOL - 7/8" SOLID	-2.38	1.2D + 1.6W 60	4.521	100	100	100	198.4	50.0	3.45	0	0	0.00	0.00	68	Member X
DIAG MOD - 7/8"SR+L1.5x1/	-4.64	1.2D + 1.6W 90	5.378	50	50	50	120.4	36.0	9.06	0	0	0.00	0.00	51	Member Z

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 2" SOLID	69.33	0.9D + 1.6W 60	50	65	141.37	0	0	0.00	0.00	49	Member
HORIZ SOL - 7/8" SOLID	2.54	1.2D + 1.6W	50	65	27.06	0	0	0.00	0.00	9	Member
DIAG MOD - 7/8"SR+L1.5x1/	4.48	1.2D + 1.6W 90	36	58	19.44	0	0	0.00	0.00	23	Member

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	28.47	0.9D + 1.6W 60	0.00	0	0	
Top Compression	35.69	1.2D + 1.6W	0.00	0		
Bot Tension	71.73	0.9D + 1.6W 60	0.00	0		
Bot Compression	85.36	1.2D + 1.6W	0.00	0		

Section: 12 H4.5-3/4"D Bot Elev (ft): 170.0 Height (ft): 20.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 1 1/2" SOLID	-32.72	1.2D + 1.6W	2.30	100	100	100	73.5	50.0	53.58	0	0	0.00	0.00	61	Member X
HORIZ SOL - 7/8" SOLID	-1.93	1.2D + 1.6W	4.481	100	100	100	196.6	50.0	3.51	0	0	0.00	0.00	54	Member X
DIAG SOL - 3/4" SOLID	-3.28	1.2D + 1.6W	5.010	50	50	50	144.3	50.0	4.80	0	0	0.00	0.00	68	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 1 1/2" SOLID	28.25	1.2D + 1.6W 60	50	65	79.52	0	0	0.00	0.00	35	Member
HORIZ SOL - 7/8" SOLID	1.66	1.2D + 1.6W 60	50	65	27.06	0	0	0.00	0.00	6	Member
DIAG SOL - 3/4" SOLID	3.23	1.2D + 1.6W 60	50	65	19.88	0	0	0.00	0.00	16	Member

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	3.27	0.9D + 1.6W	0.00	0	0	
Top Compression	7.43	1.2D + 1.6W	0.00	0		
Bot Tension	28.47	0.9D + 1.6W 60	0.00	0		
Bot Compression	35.69	1.2D + 1.6W	0.00	0		

Force/Stress Summary

Section: 13 V4.0-10FT Bot Elev (ft): 190.0 Height (ft): 10.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 1 1/2" SOLID	-6.59	1.2D + 1.6W	2.35	100	100	100	75.3	50.0	52.51	0	0	0.00	0.00	12	Member X
HORIZ SOL - 7/8" SOLID	-3.17	1.2D + 1.6W	4.000	100	100	100	175.5	50.0	4.41	0	0	0.00	0.00	71	Member X
DIAG SOL - 3/4" SOLID	-1.32	1.2D + 1.6W 60	4.641	50	50	50	133.7	50.0	5.59	0	0	0.00	0.00	23	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG SOL - 1 1/2" SOLID	3.23	1.2D + 1.6W	50	65	79.52	0	0	0.00	0.00	4	Member
HORIZ SOL - 7/8" SOLID	3.35	1.2D + 1.6W 60	50	65	27.06	0	0	0.00	0.00	12	Member
DIAG SOL - 3/4" SOLID	1.69	1.2D + 1.6W	50	65	19.88	0	0	0.00	0.00	8	Member

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	0.03	0.9D + 1.6W	0.00	0	0	
Top Compression	0.34	1.2D + 1.0Di +	0.00	0		
Bot Tension	3.27	0.9D + 1.6W	0.00	0		
Bot Compression	7.43	1.2D + 1.6W	0.00	0		

Support Forces Summary

Load Case	Node	FX (kip)	FY (kip)	FZ (kip)	(-) = Uplift (+) = Down
(0.9 - 0.2Sds) * DL + E 60 deg M1	1b	-0.14	-1.60	-0.08	
	1a	-1.53	22.08	0.91	
	1	0.02	22.08	-1.78	
(0.9 - 0.2Sds) * DL + E 60 deg M2	1b	0.56	8.27	0.32	
	1a	-1.19	17.15	0.69	
	1	0.01	17.15	-1.38	
(0.9 - 0.2Sds) * DL + E 90 deg M1	1b	0.01	0.51	0.00	
	1a	-1.95	27.86	1.14	
	1	0.02	14.19	-1.13	
(0.9 - 0.2Sds) * DL + E 90 deg M2	1b	0.61	8.90	0.35	
	1a	-1.35	19.47	0.79	
	1	0.01	14.19	-1.13	
(0.9 - 0.2Sds) * DL + E Normal M1	1b	0.41	6.29	0.26	
	1a	-0.41	6.29	0.26	
	1	0.00	29.97	-2.43	
(0.9 - 0.2Sds) * DL + E Normal M2	1b	0.76	11.13	0.45	
	1a	-0.76	11.13	0.45	
	1	0.00	20.29	-1.63	
(1.2 + 0.2Sds) * DL + E 60 deg M1	1b	0.23	3.78	0.13	
	1a	-1.91	27.52	1.12	
	1	0.02	27.52	-2.21	
(1.2 + 0.2Sds) * DL + E 60 deg M2	1b	0.93	13.67	0.54	
	1a	-1.56	22.57	0.91	
	1	0.01	22.57	-1.81	
(1.2 + 0.2Sds) * DL + E 90 deg M1	1b	0.39	5.90	0.21	
	1a	-2.32	33.31	1.35	
	1	0.02	19.60	-1.57	
(1.2 + 0.2Sds) * DL + E 90 deg M2	1b	0.98	14.31	0.56	
	1a	-1.73	24.90	1.00	
	1	0.01	19.60	-1.57	
(1.2 + 0.2Sds) * DL + E Normal M1	1b	0.78	11.69	0.47	
	1a	-0.78	11.69	0.47	
	1	0.00	35.43	-2.86	
(1.2 + 0.2Sds) * DL + E Normal M2	1b	1.14	16.55	0.66	
	1a	-1.14	16.55	0.66	
	1	0.00	25.72	-2.07	
0.9D + 1.6W 60 deg	1b	-29.56	-347.30	-16.93	
	1a	-16.93	196.05	7.89	
	1	-1.45	196.79	-18.63	
0.9D + 1.6W 90 deg	1b	-26.17	-300.72	-13.90	
	1a	-27.88	331.09	15.02	
	1	-1.86	15.17	-1.12	
0.9D + 1.6W Normal	1b	-13.97	-171.58	-10.00	
	1a	13.85	-171.52	-10.23	

	1	0.12	388.64	-37.35
1.0D + 1.0W Service 60 deg	1b	-6.84	-78.24	-3.92
	1a	-5.29	64.35	2.56
	1	-0.37	64.49	-5.86
1.0D + 1.0W Service 90 deg	1b	-5.95	-66.01	-3.14
	1a	-8.16	99.78	4.43
	1	-0.47	16.84	-1.28
1.0D + 1.0W Service Normal	1b	-2.80	-32.13	-2.09
	1a	2.76	-32.07	-2.15
	1	0.03	114.80	-10.77
1.2D + 1.0Di + 1.0Wi 60 deg	1b	-8.47	-37.33	-4.88
	1a	-2.70	92.54	1.09
	1	-0.38	92.46	-2.88
1.2D + 1.0Di + 1.0Wi 90 deg	1b	-7.62	-25.85	-4.13
	1a	-5.31	124.41	2.80
	1	-0.46	49.10	1.33
1.2D + 1.0Di + 1.0Wi Normal	1b	-4.66	5.41	-3.15
	1a	4.64	5.67	-3.18
	1	0.02	136.58	-7.21
1.2D + 1.6W 60 deg	1b	-29.24	-343.06	-16.75
	1a	-17.27	201.53	8.10
	1	-1.43	202.25	-19.02
1.2D + 1.6W 90 deg	1b	-25.84	-296.37	-13.72
	1a	-28.23	336.87	15.23
	1	-1.84	20.22	-1.51
1.2D + 1.6W Normal	1b	-13.66	-166.94	-9.80
	1a	13.53	-166.86	-10.02
	1	0.12	394.52	-37.75

Max Uplift:	347.30 (kip)	Moment:	6,482.75 (kip-ft)	1.2D + 1.6W Normal
Max Down:	394.52 (kip)	Total Down:	60.72 (kip)	
Max Shear:	37.75 (kip)	Total Shear:	57.57 (kip)	

Deflections and Rotations

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
40 mph 60 degree with 0.75 in Radial Ice	10.00	0.0044	0.0000	0.0262
	100.00	0.1463	0.0072	0.1812
	140.00	0.3204	0.0122	0.3331
	152.79	0.4025	0.0240	0.3738
	164.49	0.4853	0.0682	0.4364
	179.93	0.6124	0.2060	0.4620
	184.53	0.6492	0.2602	0.4726
	194.92	0.7357	0.3753	0.4332
	197.27	0.7548	0.3103	0.4005
	199.63	0.7744	0.1163	0.4549
	200.00	0.7767	0.4013	0.4818
40 mph 90 degree with 0.75 in Radial Ice	10.00	0.0041	0.0003	0.0251
	100.00	0.1461	0.0038	0.1822
	140.00	0.3226	0.0048	0.3266
	152.79	0.4026	0.0080	0.3740
	164.49	0.4853	0.0134	0.4329
	179.93	0.6122	0.0296	0.4562
	184.53	0.6487	0.0361	0.4659
	194.92	0.7349	-0.0410	0.3408
	197.27	0.7538	-0.0657	0.2867
	199.63	0.7707	0.0513	0.1893
	200.00	0.7750	0.0512	0.3985
40 mph Normal with 0.75 in Radial Ice	10.00	0.0035	-0.0006	0.0219
	100.00	0.1468	0.0060	0.1833
	140.00	0.3208	0.0094	0.3379
	152.79	0.4047	0.0127	0.3734
	164.49	0.4885	0.0235	0.4401
	179.93	0.6178	0.0561	0.4686
	184.53	0.6556	0.0690	0.4829
	194.92	0.7458	0.0923	0.6995
	197.27	0.7632	0.0244	0.6072
	199.63	0.7820	-0.0307	0.6626
	200.00	0.7914	0.0983	1.0063
93 mph 60 deg with No Ice (Reduced DL)	10.00	0.0086	0.0004	0.0747
	100.00	0.6144	0.0411	0.7678
	140.00	1.3513	0.0780	1.4161
	152.79	1.6988	0.2242	1.5618
	164.49	2.0452	0.8065	1.8119
	179.93	2.5672	2.6810	1.9748
	184.53	2.7179	3.4239	2.0296
	194.92	3.0671	5.0708	1.9989
	197.27	3.1448	5.2983	1.7257
	199.63	3.2235	1.5742	1.8897
	200.00	3.2338	5.4795	2.0192
93 mph 60 degree with No Ice	10.00	0.0085	0.0004	0.0746
	100.00	0.6161	0.0412	0.7705
	140.00	1.3562	0.0783	1.4224
	152.79	1.7052	0.2252	1.5694
	164.49	2.0533	0.8104	1.8213
	179.93	2.5782	2.6951	1.9854
	184.53	2.7296	3.4422	2.0407

	194.92	3.0807	5.0984	2.0107
	197.27	3.1588	5.3249	1.7357
	199.63	3.2379	1.5815	1.8985
	200.00	3.2483	5.5096	2.0295
93 mph 90 deg with No Ice (Reduced DL)	10.00	0.0079	0.0015	0.0728
	100.00	0.6158	0.0164	0.7690
	140.00	1.3595	0.0114	1.3929
	152.79	1.7022	0.0395	1.5688
	164.49	2.0477	0.0800	1.7982
	179.93	2.5696	0.2086	1.8739
	184.53	2.7193	0.2608	1.9012
	194.92	3.0677	-0.2220	1.4277
	197.27	3.1441	-0.2219	1.2093
	199.63	3.2150	0.4042	0.8619
	200.00	3.2310	0.4023	1.6680
93 mph 90 degree with No Ice	10.00	0.0079	0.0015	0.0727
	100.00	0.6175	0.0164	0.7718
	140.00	1.3645	0.0115	1.3990
	152.79	1.7087	0.0396	1.5764
	164.49	2.0558	0.0801	1.8074
	179.93	2.5806	0.2089	1.8834
	184.53	2.7311	0.2611	1.9110
	194.92	3.0813	-0.2219	1.4377
	197.27	3.1581	-0.2218	1.2190
	199.63	3.2294	0.4047	0.8706
	200.00	3.2455	0.4028	1.6779
93 mph Normal to Face with No Ice (Reduced DL)	10.00	0.0062	-0.0023	0.0683
	100.00	0.6297	0.0259	0.7862
	140.00	1.3848	0.0412	1.4492
	152.79	1.7405	0.0600	1.5967
	164.49	2.0958	0.1306	1.8538
	179.93	2.6342	0.3531	1.9515
	184.53	2.7906	0.4430	1.9860
	194.92	3.1588	0.6284	2.7833
	197.27	3.2309	0.1857	2.4640
	199.63	3.3070	0.0267	2.5874
	200.00	3.3450	0.7073	3.9386
93 mph Normal to Face with No Ice	10.00	0.0062	-0.0023	0.0683
	100.00	0.6316	0.0260	0.7889
	140.00	1.3894	0.0413	1.4556
	152.79	1.7469	0.0603	1.6039
	164.49	2.1038	0.1310	1.8630
	179.93	2.6451	0.3545	1.9609
	184.53	2.8022	0.4448	1.9957
	194.92	3.1722	0.6311	2.7932
	197.27	3.2446	0.1880	2.4736
	199.63	3.3211	0.0267	2.5973
	200.00	3.3593	0.7102	3.9488
Seismic (Reduced DL) 60 degree M1	10.00	0.0002	0.0000	0.0025
	100.00	0.0281	0.0010	0.0367
	140.00	0.0650	0.0017	0.0724
	152.79	0.0829	0.0019	0.0829
	164.49	0.1014	0.0018	0.0967
	179.93	0.1292	0.0015	0.0997
	184.53	0.1372	0.0015	0.1012
	194.92	0.1557	0.0015	0.1010
	197.27	0.1598	-0.0013	0.0995

	199.63	0.1639	0.0000	0.1013
	200.00	0.1646	0.0012	0.1016
Seismic (Reduced DL) 60 degree M2	10.00	0.0000	0.0000	0.0007
	100.00	0.0107	0.0004	0.0140
	140.00	0.0251	0.0007	0.0288
	152.79	0.0322	0.0007	0.0345
	164.49	0.0400	0.0007	0.0412
	179.93	0.0521	0.0006	0.0435
	184.53	0.0556	0.0007	0.0445
	194.92	0.0638	0.0007	0.0445
	197.27	0.0656	-0.0006	0.0435
	199.63	0.0674	0.0000	0.0447
	200.00	0.0677	0.0005	0.0448
Seismic (Reduced DL) 90 degree M1	10.00	0.0001	0.0000	0.0024
	100.00	0.0284	0.0006	0.0370
	140.00	0.0656	0.0010	0.0708
	152.79	0.0829	0.0011	0.0830
	164.49	0.1014	0.0010	0.0964
	179.93	0.1292	0.0009	0.0995
	184.53	0.1372	0.0009	0.1010
	194.92	0.1557	0.0008	0.1011
	197.27	0.1598	-0.0015	0.0996
	199.63	0.1639	0.0007	0.1013
	200.00	0.1646	0.0007	0.1016
Seismic (Reduced DL) 90 degree M2	10.00	0.0001	0.0000	0.0007
	100.00	0.0112	0.0002	0.0146
	140.00	0.0264	0.0004	0.0290
	152.79	0.0334	0.0004	0.0358
	164.49	0.0414	0.0004	0.0428
	179.93	0.0541	0.0004	0.0453
	184.53	0.0577	0.0005	0.0464
	194.92	0.0663	0.0005	0.0465
	197.27	0.0682	-0.0009	0.0454
	199.63	0.0700	0.0004	0.0467
	200.00	0.0704	0.0004	0.0469
Seismic (Reduced DL) Normal M1	10.00	0.0001	-0.0001	0.0023
	100.00	0.0285	0.0010	0.0371
	140.00	0.0644	0.0017	0.0732
	152.79	0.0829	0.0019	0.0819
	164.49	0.1013	0.0018	0.0967
	179.93	0.1292	0.0015	0.0994
	184.53	0.1372	0.0015	0.1009
	194.92	0.1557	0.0014	0.1011
	197.27	0.1598	0.0000	0.0994
	199.63	0.1639	-0.0012	0.1012
	200.00	0.1646	0.0012	0.1016
Seismic (Reduced DL) Normal M2	10.00	0.0001	0.0000	0.0008
	100.00	0.0112	0.0004	0.0147
	140.00	0.0254	0.0007	0.0307
	152.79	0.0334	0.0008	0.0357
	164.49	0.0414	0.0008	0.0430
	179.93	0.0541	0.0007	0.0451
	184.53	0.0577	0.0008	0.0463
	194.92	0.0663	0.0009	0.0466
	197.27	0.0682	0.0000	0.0453
	199.63	0.0700	-0.0007	0.0467
	200.00	0.0703	0.0007	0.0470

Seismic 60 degree M1	10.00	0.0001	0.0000	0.0023
	100.00	0.0283	0.0010	0.0369
	140.00	0.0654	0.0017	0.0725
	152.79	0.0832	0.0019	0.0835
	164.49	0.1018	0.0018	0.0971
	179.93	0.1298	0.0015	0.1003
	184.53	0.1378	0.0016	0.1017
	194.92	0.1564	0.0015	0.1015
	197.27	0.1606	-0.0013	0.1000
	199.63	0.1647	0.0000	0.1018
	200.00	0.1653	0.0012	0.1020
Seismic 60 degree M2	10.00	0.0001	0.0000	0.0005
	100.00	0.0107	0.0004	0.0141
	140.00	0.0253	0.0007	0.0288
	152.79	0.0324	0.0007	0.0349
	164.49	0.0401	0.0007	0.0414
	179.93	0.0523	0.0006	0.0438
	184.53	0.0558	0.0007	0.0447
	194.92	0.0640	0.0007	0.0446
	197.27	0.0659	-0.0006	0.0437
	199.63	0.0677	0.0000	0.0448
	200.00	0.0680	0.0005	0.0450
Seismic 90 degree M1	10.00	0.0001	0.0000	0.0023
	100.00	0.0285	0.0006	0.0371
	140.00	0.0661	0.0010	0.0708
	152.79	0.0833	0.0011	0.0834
	164.49	0.1018	0.0010	0.0969
	179.93	0.1298	0.0009	0.1001
	184.53	0.1378	0.0009	0.1016
	194.92	0.1564	0.0009	0.1016
	197.27	0.1605	-0.0015	0.1000
	199.63	0.1647	0.0007	0.1018
	200.00	0.1653	0.0007	0.1021
Seismic 90 degree M2	10.00	0.0001	0.0000	0.0006
	100.00	0.0113	0.0002	0.0147
	140.00	0.0267	0.0004	0.0289
	152.79	0.0335	0.0004	0.0363
	164.49	0.0416	0.0004	0.0430
	179.93	0.0543	0.0004	0.0456
	184.53	0.0579	0.0005	0.0466
	194.92	0.0665	0.0005	0.0467
	197.27	0.0684	-0.0009	0.0456
	199.63	0.0703	0.0004	0.0469
	200.00	0.0706	0.0004	0.0471
Seismic Normal M1	10.00	0.0001	-0.0001	0.0022
	100.00	0.0287	0.0010	0.0373
	140.00	0.0645	0.0017	0.0737
	152.79	0.0833	0.0019	0.0823
	164.49	0.1018	0.0018	0.0972
	179.93	0.1298	0.0015	0.0999
	184.53	0.1378	0.0015	0.1014
	194.92	0.1564	0.0015	0.1016
	197.27	0.1605	0.0000	0.0999
	199.63	0.1647	-0.0012	0.1017
	200.00	0.1653	0.0012	0.1021
Seismic Normal M2	10.00	0.0002	0.0000	0.0008
	100.00	0.0113	0.0004	0.0148

	140.00	0.0254	0.0007	0.0310
	152.79	0.0335	0.0008	0.0363
	164.49	0.0416	0.0008	0.0432
	179.93	0.0543	0.0007	0.0453
	184.53	0.0579	0.0008	0.0465
	194.92	0.0665	0.0009	0.0467
	197.27	0.0684	0.0000	0.0455
	199.63	0.0703	-0.0007	0.0469
	200.00	0.0706	0.0007	0.0472
Serviceability - 60 mph Wind 60 degree	10.00	0.0021	0.0000	0.0192
	100.00	0.1610	0.0075	0.2015
	140.00	0.3550	0.0126	0.3711
	152.79	0.4459	0.0243	0.4091
	164.49	0.5366	0.0693	0.4738
	179.93	0.6732	0.2097	0.4949
	184.53	0.7126	0.2649	0.5040
	194.92	0.8044	0.3834	0.4611
	197.27	0.8245	0.3330	0.4303
	199.63	0.8450	0.1081	0.4703
	200.00	0.8478	0.4113	0.5033
Serviceability - 60 mph Wind 90 degree	10.00	0.0019	0.0004	0.0187
	100.00	0.1619	0.0041	0.2022
	140.00	0.3578	0.0049	0.3651
	152.79	0.4469	0.0081	0.4117
	164.49	0.5377	0.0124	0.4714
	179.93	0.6747	0.0252	0.4907
	184.53	0.7140	0.0303	0.4988
	194.92	0.8054	-0.0433	0.3758
	197.27	0.8255	-0.0582	0.3201
	199.63	0.8439	0.0425	0.2257
	200.00	0.8483	0.0423	0.4332
Serviceability - 60 mph Wind Normal	10.00	0.0015	-0.0006	0.0176
	100.00	0.1657	0.0064	0.2066
	140.00	0.3632	0.0098	0.3806
	152.79	0.4568	0.0124	0.4179
	164.49	0.5499	0.0215	0.4857
	179.93	0.6910	0.0485	0.5111
	184.53	0.7320	0.0593	0.5213
	194.92	0.8286	0.0788	0.7283
	197.27	0.8479	0.0189	0.6454
	199.63	0.8675	-0.0260	0.6787
	200.00	0.8774	0.0845	1.0279

CCIplate

Project Information	
BU #	Waukesha Sheriffs
Site Name	Nashotah
Order #	REV04

Tower Information	
Tower Type	Self Support
TIA-222 Rev	G

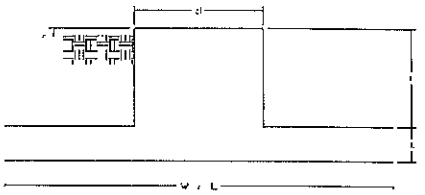
☐ Load Z Normalization

Applied Loads	Comp.	Uplift
Axial (k)	394.52	347.30
Shear (k)	37.75	29.56

Anchor Rod Data		
Quantity:	6	
Diameter (in):	1.25	
Material Grade:	A687	Fy=105 ksi Fu=150 ksi
Grout Considered:	Yes	Grout Considered
l_{ar} (in):	0	Bending Interaction Not Considered
Eta Factor, η:	0.55	
Thread Type:	N-Included	
Configuration:	Symmetrical	

Anchor Rod Results		
Axial, Pu_t (kips)	57.88	
Shear, Vu (kips)	4.93	
Moment, Mu (kip-in)	-	
Axial Cap., φPn_t (kips)	96.90	
Shear Cap., ϕVn (kips)	-	
Moment Cap., ϕMn (kip-in)	-	
Stress Rating	69.0%	Pass

Site Name:	Nashotah
Site Number:	Waukesha Sheriffs
Engineering Number:	REV04
Engineer:	JHH
Date:	01/08/21
Tower Type:	SST w/3 Legs



Design Loads (Factored) - Analysis per TIA-222-G Standards

Design / Analysis / Mapping:	Analysis			
Compression/Leg:	394.5	k	Concrete Strength (f'_c):	3000 psi
Uplift/Leg:	347.3	k	Pad Tension Steel Depth:	38.00 in
Total Shear:	57.6	k	ϕ_{Shear}:	0.75
Moment:	6482.8	k-ft	$\phi_{Flexure\ /\ Tension}$:	0.90
Tower + Appurtenance Weight:	60.7	k	$\phi_{Compression}$:	0.65
Depth to Base of Foundation (l + t - h):	6.00	ft	β:	0.85
Diameter of Pier (d):	3.00	ft	Bottom Pad Rebar Size #:	9
Height of Pier above Ground (h):	0.50		# of Bottom Pad Rebar:	58
Width of Pad (W):	28.00	ft	Pad Bottom Steel Area:	58.00 in^2
Length of Pad (L):	28.00	ft	Pad Steel F_y:	60000 psi
Thickness of Pad (t):	3.50	ft	Top Pad Rebar Size #:	9
Tower Leg Center to Center:	20.00	ft	# of Top Pad Rebar:	58
Number of Tower Legs:	3.0	(1 if MP or GT)	Pad Top Steel Area:	58.00 in^2
Tower Center from Mat Center:	2.89	ft	Pier Rebar Size #:	8
Depth Below Ground Surface to Water Table:	99.00	ft	Pier Steel Area (Single Bar):	0.79 in^2
Unit Weight of Concrete:	150.0	pcf	# of Pier Rebar:	15
Unit Weight of Soil Above Water Table:	115.0	pcf	Pier Steel F_y:	60000 psi
Unit Weight of Water:	62.4	pcf	Pier Cage Diameter:	28.0 in
Unit Weight of Soil Below Water Table:	50.0	pcf	Rebar Strain Limit:	0.008
Friction Angle of Uplift:	15.0	Degrees	Steel Elastic Modulus:	29000 ksi
Ultimate Coefficient of Shear Friction:	0.40		Tie Rebar Size #:	4
Ultimate Compressive Bearing Pressure:	9000.0	psf	Tie Steel Area (Single Bar):	0.20 in^2
Ultimate Passive Pressure on Pad Face:	0.0	psf	Tie Spacing:	8 in
$\phi_{Soil\ and\ Concrete\ Weight}$:	0.9		Tie Steel F_y:	60000 psi
ϕ_{Soil}:	0.75			

Overturning Moment Usage

Design OTM:	7032.2	k-ft
OTM Resistance:	8974.6	k-ft
Design OTM / OTM Resistance:	0.78	Result: OK

Soil Bearing Pressure Usage

Net Bearing Pressure:	3353	psf
Factored Nominal Bearing Pressure:	6750	psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.50	Result: OK
Load Direction Controling Design Bearing Pressure:	Diagonal to Pad Edge	

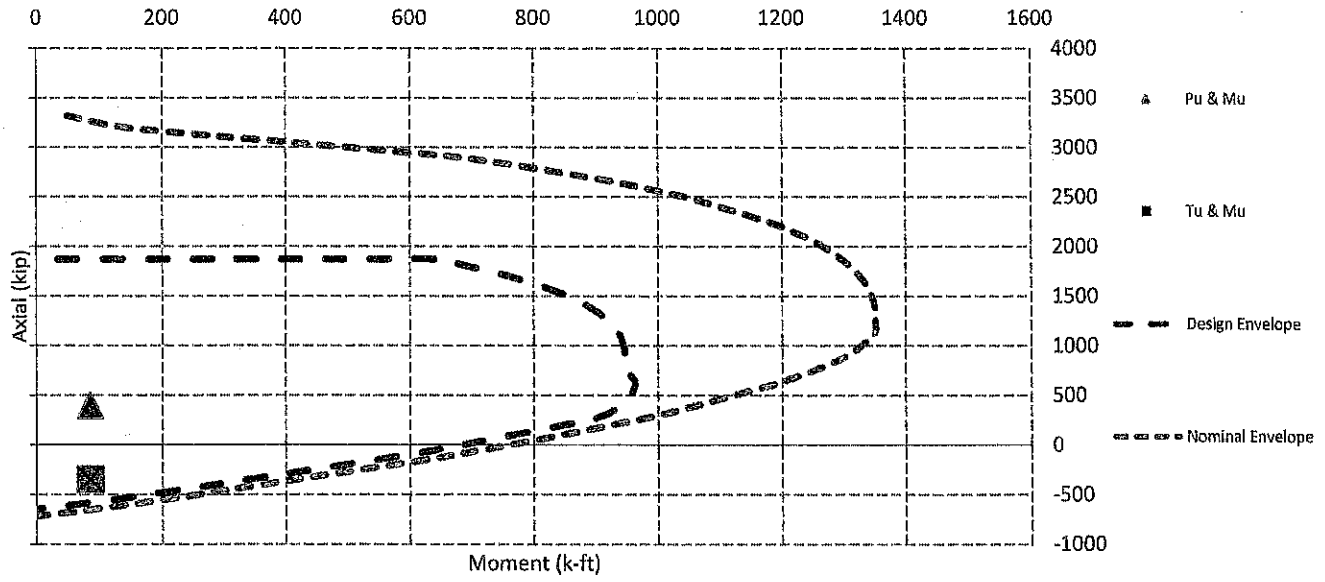
Sliding Factor of Safety

Total Factored Sliding Resistance:	207.3	k
Sliding Design / Sliding Resistance:	0.28	Result: OK

One Way Shear, Flexual Capacity, and Punching Shear

Factored One Way Shear (V_u):	215.3	k
One Way Shear Capacity (ϕV_c):	719.8	k - ACI11.3.1.1
$V_u / \phi V_c$:	0.30	Result: OK
Load Direction Controling Shear Capacity:	Diagonal to Pad Edge	
Lower Steel Pad Factored Moment (M_u):	1622.7	k-ft
Lower Steel Pad Moment Capacity (ϕM_n):	8474.9	k-ft - ACI10.3
$M_u / \phi M_n$:	0.19	Result: OK
Load Direction Controling Flexural Capacity:	Diagonal to Pad Edge	
Upper Steel Pad Factored Moment (M_u):	530.7	k-ft
Upper Steel Pad Moment Capacity (ϕM_n):	8730.4	k-ft
$M_u / \phi M_n$:	0.06	Result: OK
Lower Pad Flexural Reinforcement Ratio:	0.0045	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0045	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Reinforcement Spacing:	6	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Reinforcement Spacing:	6	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Factored Punching Shear (V_u):	347.3	k
Nominal Punching Shear Capacity ($\phi_c V_n$):	1451.6	k - ACI11.12.2.1
$V_u / \phi V_c$:	0.24	Result: OK
Factored Moment in Pier (M_u):	86.4	k-ft
Pier Moment Capacity (ϕM_n):	637.5	k-ft
$M_u / \phi M_n$:	0.14	Result: OK
Factored Shear in Pier (V_u):	38.4	k
Pier Shear Capacity (ϕV_n):	69.4	k
$V_u / \phi V_c$:	0.55	Result: OK
Pier Shear Reinforcement Ratio:	0.0020	OK - Reinforcement Ratio Met - ACI11.5.6.3
Factored Tension in Pier (T_u):	347.3	k
Pier Tension Capacity (ϕT_n):	639.9	k
$T_u / \phi T_n$:	0.54	Result: OK
Factored Compression in Pier (P_u):	394.5	k
Pier Compression Capacity (ϕP_n):	1334.0	k - ACI10.3.6.2
$P_u / \phi P_n$:	0.30	Result: OK
Pier Compression Reinforcement Ratio:	0.012	OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.68	Result: OK

Nominal and Design Moment Capacity and Factored Design Loads

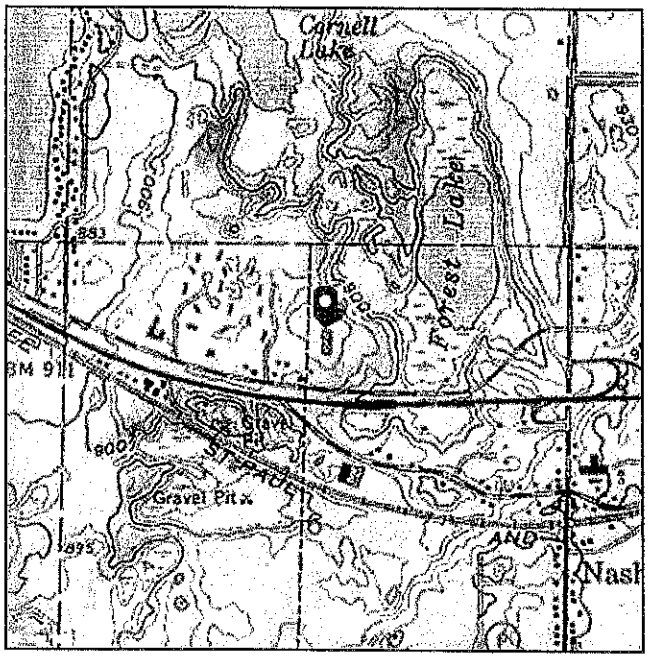


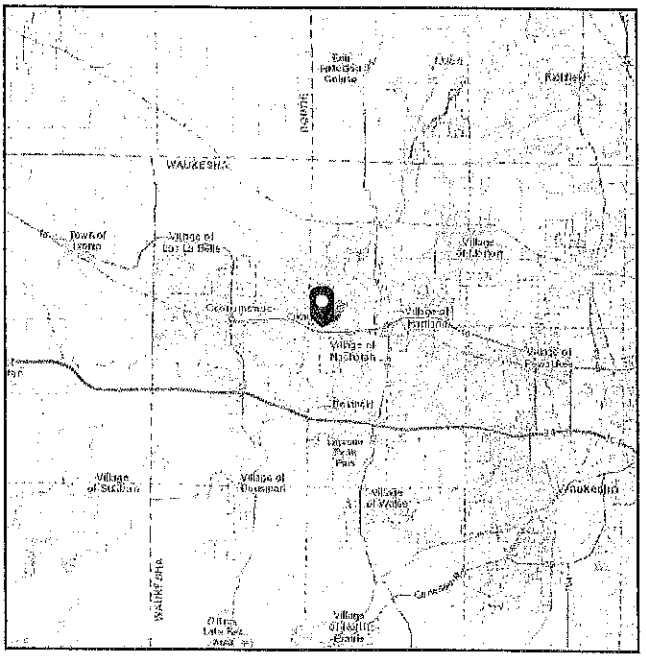
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 934.45 ft (NAVD 88)
Latitude: 43.1037
Longitude: -88.412





Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri Nov 13 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 127

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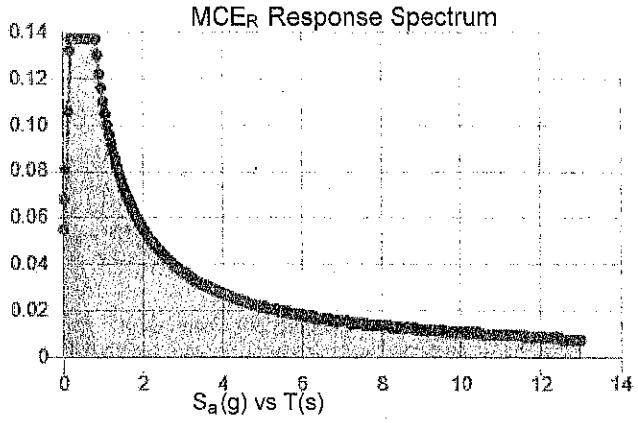
Seismic

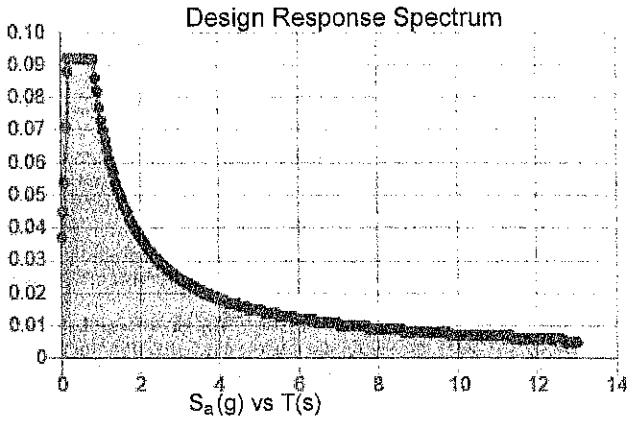
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.086	S_{DS} :	0.092
S_1 :	0.046	S_{D1} :	0.073
F_a :	1.6	T_L :	12
F_v :	2.4	PGA :	0.041
S_{MS} :	0.137	PGA_M :	0.066
S_{M1} :	0.11	F_{PGA} :	1.6
		I_e :	1.25

Seismic Design Category B





Data Accessed: Fri Nov 13 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	-5 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Nov 13 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Referred on: 06/03/21 File Number: 176-O-032 Referred to: JU 129

MODIFY THE WAUKESHA COUNTY SHERIFF'S DEPARTMENT 2021 BUDGET TO ACCEPT THE CORONAVIRUS EMERGENCY SUPPLEMENTAL FUNDING PROGRAM GRANT FROM THE STATE OF WISCONSIN DEPARTMENT OF JUSTICE AND TO AUTHORIZE GRANT EXPENDITURES

WHEREAS, the United States Department of Justice identified a need to provide financial resources to reimburse local law enforcement agencies for expenditures associated with COVID-19; and

WHEREAS, the Waukesha County Sheriff's Department was awarded $273,250 for the time period of June 1, 2021 through December 31, 2021, from the Wisconsin Department of Justice to fund expenses associated with COVID-19; and

WHEREAS, the Waukesha County Sheriff's Department is proposing to amend the 2021 adopted budget by increasing the operating expenditure appropriation unit by $61,250 and the fixed asset appropriation unit by $212,000 to fund COVID-19 related expenses.

THE COUNTY BOARD OF SUPERVISORS OF WAUKESHA COUNTY ORDAINS that the Waukesha County Sheriff's Department be authorized to accept the grant award from the Wisconsin Department of Justice.

BE IT FURTHER ORDAINED that the Waukesha County Sheriff's Department 2021 budget be modified by increasing general government revenues by an additional $273,250, increasing the Department's operations expenditure appropriation unit by $61,250, and the fixed asset appropriation unit by $212,000 to fund expenditures associated with COVID-19.

Referred on: 06/03/21	File Number: 176-O-033	Referred to: JU – FI

FISCAL NOTE

ACCEPT THE CORONAVIRUS EMERGENCY SUPPLEMENTAL FUNDING PROGRAM GRANT FROM THE STATE OF WISCONSIN DEPARTMENT OF JUSTICE AND MODIFY THE WAUKESHA COUNTY SHERIFF'S DEPARTMENT 2021 BUDGET TO AUTHORIZE GRANT EXPENDITURES

This ordinance authorizes the Waukesha County Sheriff's Department to accept general government revenue from the Wisconsin Department of Justice, and modifies the 2021 budget, increasing general government revenues and expenditures by $273,250. The funds are for the items listed below and all relate to reducing the spread of the COVID-19 virus.

Appropriation Unit	**Unit**	**Item**	**Amount**
Operating	Jail	Conference Room Remote Meeting Equipment	$6,000
Operating	Metro	Keycard Door Access	$10,000
Operating	Metro	Motion Sensor Lighting	$4,500
Operating	Metro	Touchless Technology for Restrooms	$1,500
Operating	Patrol	Industrial Dryer	$4,000
Operating	Patrol	Steri-Lamps (4)	$2,500
Operating	Patrol	Ozone Sanitation System for Vehicles	$4,000
Operating	Patrol	Tactical Equipment Bags with Disinfecting Attachment (65)	$9,750
Operating	Patrol	Cleanable Training Flooring and Wall Pads	$19,000
Fixed Asset	Jail	Electrostatic Cleaners (3)	$21,000
Fixed Asset	Jail	Body Scanner	$180,000
Fixed Asset	Patrol	Industrial Washer	$11,000
Total			**$273,250**

This ordinance results in no direct additional tax levy impact. The department may choose to prioritize some of these items within future-year replacement plans.

William Duckwitz

William Duckwitz
Budget Manager
5/27/2021
SMK
JE #2021-00003648

Referred on: 06/03/21	File Number: 176-O-033	Referred to: JU – FI

MODIFY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES 2021 BUDGET TO ACCEPT THE URBAN BLACK AND HISPANIC GRANT FUNDING AND APPROPRIATE ADDITIONAL EXPENDITURES

WHEREAS, the State of Wisconsin Department of Health Services has made available Urban Black and Hispanic grant funds of $100,000 to the Waukesha County Department of Health and Human Services; and

WHEREAS, these revenues were not anticipated nor included in the 2021 budget; and

WHEREAS, the Urban Black and Hispanic grant seeks to work with community providers to educate minority populations in Waukesha County about the substance use services and recovery support available in Waukesha County; and

WHEREAS, the Department of Health and Human Services will utilize funding to provide substance use treatment to uninsured or underinsured minority residents using trauma informed care principles, provide interpreters when needed, provide training for department staff members, provide outreach brochures in multiple languages and allocate 0.33 FTE limited-term employee (LTE) Clinical Therapist for outreach activities and community events.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the Waukesha County Department of Health and Human Services is authorized to accept the Urban Black and Hispanic grant of $100,000 from the State of Wisconsin, Department of Health Services.

BE IT FURTHER ORDAINED that the 2021 Health and Human Services Budget be modified to appropriate expenditures of $100,000 by increasing personnel expenses by $26,250, increasing operating expenses by $70,750, increasing interdepartmental charges by $3,000, and increasing general government Revenues by $100,000.

Referred on: 06/03/21	File Number: 176-O-034	Referred to: HS – FI

FISCAL NOTE

MODIFY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES 2021 BUDGET TO ACCEPT THE URBAN BLACK AND HISPANIC GRANT FUNDING AND APPROPRIATE ADDITIONAL EXPENDITURES

This ordinance authorizes the Department of Health and Human Services to accept $100,000 of Urban Black and Hispanic grant funding from the State of Wisconsin Department of Health Services, which seeks to educate minority populations in Waukesha County about substance use services by contracting with community providers. The department indicates that it intends to use the grant funding to provide substance use treatment to uninsured or underinsured minority residents. The grant period is through December 31, 2021.

This ordinance also modifies the 2021 Health and Human Services budget by increasing personnel expenses by $26,250, increasing operating expenses by $70,750, increasing interdepartmental charges by $3,000, and increasing general government revenues by $100,000. Personnel costs of $26,250 are meant to fund 0.33 FTE limited-term employee (LTE) Clinical Therapist position. Operating expenses include $48,334 for contracted services for substance abuse treatment services, $19,000 for prescription medication, $2,059 for travel and training, and $1,357 of other operating expenses (e.g. printing brochures). Interdepartmental charges include $3,000 of indirect cost recovery.

This ordinance results in no direct levy impact.

William Duckwitz

William Duckwitz
Budget Manager
5/27/2021
AJK JE# 2021-00003093

Referred on: 06/03/21	File Number: 176-O-034	Referred to: HS – FI

CREATE 2.00 REGULAR FULL TIME PRINCIPAL INFORMATION TECHNOLOGY PROFESSIONAL POSITIONS AND ABOLISH 2.00 REGULAR FULL TIME SENIOR INFORMATION TECHNOLOGY PROFESSIONAL POSITIONS IN THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

WHEREAS, the Waukesha County Department of Health and Human Services (HHS) budget includes three funded Regular Full Time Senior Information Technology Professional positions for its Administrative Services Division, two of which are affected by this ordinance; and

WHEREAS, the Business Application Support unit is undergoing a reorganization that will result in two supervisors instead of three, and will align the compensation of Human Services Information Technology professionals with Department of Administration Information Technology professionals who perform the same or similar duties; and

WHEREAS, one of the positions is currently vacant due to retirement in May 2021 and one of the positions will be vacant in June or July 2021 due to transfer to another department within Waukesha County; and

WHEREAS, HHS management estimates that the Principal Information Technology Professional positions will cost $6,300 less than the Senior Information Technology Professional positions in 2021 due to one of the previous staff members being a long-serving employee that was near the top of the salary range, and no budget modification is needed in this ordinance.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that, effective upon final approval of this ordinance, in the Department of Health and Human Services, that one regular full-time Senior Information Technology Professional position, Open Range 15 ($35.40/hour minimum, $41.11/hour mid-point, $46.81/hour maximum) is abolished, and one regular full-time Principal Information Technology Professional position, Open Range 18 ($40.97/hour minimum, $49.98/hour mid-point, $58.99/hour maximum) is created.

BE IT FURTHER ORDAINED that upon vacancy, one additional Senior Information Technology Professional position will be abolished, and one Principal Information Technology Professional position will be created.

FISCAL NOTE

CREATE 2.00 REGULAR FULL TIME PRINCIPAL INFORMATION TECHNOLOGY PROFESSIONAL POSITIONS AND ABOLISH 2.00 REGULAR FULL TIME SENIOR INFORMATION TECHNOLOGY PROFESSIONAL POSITIONS IN THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

The Department of Health and Human Services – Administrative Services budget currently includes three regular, full-time Senior Information Technology Professional positions, Open Range 15 ($35.40/hour minimum, $41.11/hour mid-point, $46.81/hour maximum). This ordinance requests the abolishment of two of the three Senior Information Technology Professional positions: One position that is vacant and another upon vacancy during the summer of 2021. (Department management intends to maintain the third Senior Information Technology Professional position at its current classification.) The ordinance also replaces these abolished positions by authorizing the creation of two regular, full-time Principal Information Technology Professional positions, Open Range 18 ($40.97/hour minimum, $49.98/hour mid-point, $58.99/hour maximum).

The partial-year impact of this change is expected to result in $6,300 of lower costs (not including potential changes in employee benefit plan selection) due to one of the previous employees having been near the top of their salary range, and no modification to the 2021 budget is being requested. This position change will eventually result in higher overall position costs because the Principal Information Technology Professional positions have a higher salary range than the Senior Information Technology Professional positions. The department plans to cover this ongoing tax levy impact within its future tax levy allocations.

William P. Duckwitz
Budget Manager
6/1/2021
CLD

Referred on: 06/03/21	File Number: 176-O-035	Referred to: HS – HR – FI