



Crown Castle  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065

September 12, 2023

Melanie A. Bachman  
Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

RE: **Notice of Exempt Modification for Verizon  
Crown #845455\_Crown\_VZW  
85 Quaker Farms Road, Oxford, CT 06478  
Latitude: 41.383989 / Longitude: -73.137372**

Dear Ms. Bachman:

Verizon Wireless is requesting to file an exempt modification for an existing tower located at 85 Quaker Farms Road, Oxford, CT 06478. The property is owned by William & Elaine Schiavi and the tower is owned by Crown Castle. Verizon now intends to add two (2) interference mitigation filters to be installed at the 120-foot level of the tower of the 149-foot monopole. This modification may include B2, B5, B17, B14, B29, B30, B66 & n77 hardware that is 4G(LTE) and/or 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

**Panned Modification:**

**Tower:**

Installed New:

(2) Kaelus BSF0020F3V1-1 Twin Bandstop 900MHZ Interference Mitigation Filters

The proposed work in this application only pertains to the installation of interference mitigation filter(s) and does not involve any additional equipment that may be called out in the Mount Analysis and/or in Table 1 of the Structural Analysis Reports.

The facility was approved by the Connecticut Siting Council on December 22, 2003, Docket #261. The approval has conditions which this exempt modification complies with. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to First Selectman George R. Temple and Steven Macary, Zoning Enforcement Official for the municipality. A copy is also being sent to William & Elaine Schiavi as the property owners and Crown Castle is the tower owner. The proposed modifications will not result in an increase in the height of the existing tower.

1. The proposed modifications will not require the extension of the site boundary.
2. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

The Foundation for a Wireless World.  
CrownCastle.com

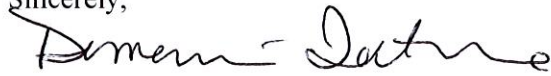
Melanie A. Bachman

Page 2

3. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
4. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
5. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Verizon respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Domenica Tatasciore.

Sincerely,



Domenica Tatasciore  
Site Acquisition Specialist  
1800 W. Park Drive  
Westborough, MA 01581  
(508) 621-9161/ Domenica.Tatasciore@crowncastle.com

#### Attachments

cc:

First Selectman George R. Temple  
Town of Oxford  
486 Oxford Road  
Oxford, CT 06478  
203-888-2543

Steven Macary, Zoning Enforcement Official  
Town of Oxford  
486 Oxford Road  
Oxford, CT 06478  
203-828-6503

William & Elaine Schiavi, Property Owners  
85 Quaker Farms Road  
Oxford, CT 06478  
203-463-0361

Crown Castle, Tower Owner

**CROWN CASTLE USA INC.**  
2000 CORPORATE DRIVE  
CANONSBURG PA 15317  
724-416-2000

**JPMorgan Chase Bank, N.A.**  
DALLAS TX  
32-61/1110

**2892716**

SIX HUNDRED TWENTY FIVE AND 00/100\*\*\*\*\*

DATE 09/06/23

\$\*\*\*\*\*625.00

Pay To Connecticut Siting Council  
The Ten Franklin Square  
Order Of New Britain CT 06051

2695915

*Robert A. Cole* VP and Controller  
*[Signature]* April 2023

VOID AFTER 180 DAYS

⑈ 2892716⑈ ⑆ 111000614⑆ 103410453⑈

Check No 2892716

Check Date 09/06/23

Stub 1 of 1

CKRQ 845455 654621 ZAP	09/05/23	Invoice Summ	625.00	625.00
			625.00	625.00

**From:** [TrackingUpdates@fedex.com](mailto:TrackingUpdates@fedex.com)  
**To:** [Tatasciore, Domenica](#)  
**Subject:** FedEx Shipment 773323045639: Your package has been delivered  
**Date:** Tuesday, September 12, 2023 10:14:02 AM

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Hi. Your package was  
delivered Tue, 09/12/2023 at  
10:07am.



Delivered to 486 OXFORD RD, OXFORD, CT 06478  
Received by L.CAPRIO

**OBTAIN PROOF OF DELIVERY**

How was your delivery ?



<b>TRACKING NUMBER</b>	<a href="#">773323045639</a>
<b>FROM</b>	Crown Castle 1800 West Park Drive Suite 200 WESTBOROUGH, MA, US, 01581
<b>TO</b>	Town of Oxford First Selectman George R. Temple 486 Oxford Road OXFORD, CT, US, 06478
<b>REFERENCE</b>	799001.7680
<b>SHIPPER REFERENCE</b>	799001.7680
<b>SHIP DATE</b>	Mon 9/11/2023 05:18 PM
<b>DELIVERED TO</b>	Receptionist/Front Desk
<b>PACKAGING TYPE</b>	FedEx Envelope
<b>ORIGIN</b>	WESTBOROUGH, MA, US, 01581
<b>DESTINATION</b>	OXFORD, CT, US, 06478
<b>NUMBER OF PIECES</b>	1
<b>TOTAL SHIPMENT WEIGHT</b>	0.50 LB
<b>SERVICE TYPE</b>	FedEx Priority Overnight

## Wondering when a package will arrive?

Enter your tracking number to see your estimated delivery time within a 4-hour window.

[TRACK A PACKAGE](#)

**From:** [TrackingUpdates@fedex.com](mailto:TrackingUpdates@fedex.com)  
**To:** [Tatasciore, Domenica](#)  
**Subject:** FedEx Shipment 773323092049: Your package has been delivered  
**Date:** Tuesday, September 12, 2023 10:13:45 AM

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FedEx



Hi. Your package was  
delivered Tue, 09/12/2023 at  
10:07am.



Delivered to 486 OXFORD RD, OXFORD, CT 06478  
Received by L.CAPRIO

**OBTAIN PROOF OF DELIVERY**

How was your delivery ?



<b>TRACKING NUMBER</b>	<a href="#">773323092049</a>
<b>FROM</b>	Crown Castle 1800 West Park Drive Suite 200 WESTBOROUGH, MA, US, 01581
<b>TO</b>	Town of Oxford Steven Macary, ZEO 486 Oxford Road OXFORD, CT, US, 06478
<b>REFERENCE</b>	799001.7680
<b>SHIPPER REFERENCE</b>	799001.7680
<b>SHIP DATE</b>	Mon 9/11/2023 05:18 PM
<b>DELIVERED TO</b>	Receptionist/Front Desk
<b>PACKAGING TYPE</b>	FedEx Envelope
<b>ORIGIN</b>	WESTBOROUGH, MA, US, 01581
<b>DESTINATION</b>	OXFORD, CT, US, 06478
<b>NUMBER OF PIECES</b>	1
<b>TOTAL SHIPMENT WEIGHT</b>	0.50 LB
<b>SERVICE TYPE</b>	FedEx Priority Overnight

## Wondering when a package will arrive?

Enter your tracking number to see your estimated delivery time within a 4-hour window.

[TRACK A PACKAGE](#)

**From:** [TrackingUpdates@fedex.com](mailto:TrackingUpdates@fedex.com)  
**To:** [Tatasciore, Domenica](#)  
**Subject:** FedEx Shipment 773323131360: Your package has been delivered  
**Date:** Tuesday, September 12, 2023 11:12:06 AM

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**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Hi. Your package was  
delivered Tue, 09/12/2023 at  
11:05am.



Delivered to 85 QUAKER FARMS RD, OXFORD, CT 06478  
Received by W.WILLIAM

**OBTAIN PROOF OF DELIVERY**

How was your delivery ?





**TRACKING NUMBER** [773323131360](#)

**FROM** Crown Castle  
1800 West Park Drive  
Suite 200  
WESTBOROUGH, MA, US, 01581

**TO** William & Elaine Schiavi  
85 Quaker Farms Road  
OXFORD, CT, US, 06478

**REFERENCE** 799001.7680

**SHIPPER REFERENCE** 799001.7680

**SHIP DATE** Mon 9/11/2023 05:18 PM

**DELIVERED TO** Residence

**PACKAGING TYPE** FedEx Envelope

**ORIGIN** WESTBOROUGH, MA, US, 01581

**DESTINATION** OXFORD, CT, US, 06478

**SPECIAL HANDLING** Residential Delivery

**NUMBER OF PIECES** 1

**TOTAL SHIPMENT WEIGHT** 0.50 LB

**SERVICE TYPE** FedEx Priority Overnight

## Wondering when a package will arrive?

Enter your tracking number to see your [estimated delivery time](#) within a 4-hour window.

<b>DOCKET NO. 261</b> - AT&T Wireless PCS, LLC d/b/a AT&T } Wireless application for a Certificate of Environmental } Compatibility and Public Need for the construction, maintenance } and operation of a wireless telecommunications facility at one of } two sites at 85 Quaker Farms Road, Oxford, Connecticut. }	Connecticut  Siting  Council  December 22, 2003
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**Decision and Order**

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS d/b/a AT&T Wireless for the construction, maintenance and operation of a wireless telecommunications facility at Site B, located at 85 Quaker Farms Road, Oxford, Connecticut. The Council denies certification of Site A, also located at 85 Quaker Farms Road, Oxford, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council’s record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of AT&T and other entities, both public and private, but such tower shall not exceed a height of 153 feet above ground level, including appurtenances. Antennas installed on the monopole shall be flush mounted.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
  - a) color options for painting the tower, including the color option preferred by the Town of Oxford;
  - b) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and
  - c) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities’ antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. The Certificate Holder shall provide space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.
6. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
7. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.
8. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Waterbury Republican-American.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The party to this proceeding is:

**Applicant**

AT&T Wireless PCS, LLC d/b/a AT&T Wireless (AT&T)

**Its Representative**

Christopher B. Fisher, Esq.

Cuddy & Feder LLP

90 Maple Avenue

White Plains, New York 10601

**PLANNING & ZONING COMMISSION**  
**TOWN OF OXFORD**  
 486 Oxford Road  
 Oxford, CT 06478  
 (203) 888-2543

Z#: 2-05-116  
 Date Rec'd: 4-28-05  
 Date on Agenda: \_\_\_\_\_  
 65-Day Expiration: \_\_\_\_\_

**ZONING PERMIT APPLICATION**

(This permit is hereby applied for in accordance with the requirements of the Oxford Zoning Regulations)

**Property Identification**

Street Address: 85 QUAKER FARMS RD  
 Subdivision Name: \_\_\_\_\_ Date Approved: \_\_\_\_\_  
 Map: 23 Block: 7 Lot: 8 Zoning district: R-A

**Owner/Applicant**

Owner Name: SCHIARI  
 Owner Address: 85 QUAKER FARMS RD  
 Owner Telephone: \_\_\_\_\_

Applicant Name: NEW CINGULAR WIRELESS PCS, LLC  
 Applicant Address: 500 ENTERPRISE DR., ROCKY HILL  
 Applicant Telephone: 860-513-7636 CT 06007

**Miscellaneous Information**

\* CT SITING COUNCIL CERTIFICATE  
 Special Exception: Article \_\_\_\_\_ Section \_\_\_\_\_ Yes No  
 Site Plan Approval: Article \_\_\_\_\_ Section \_\_\_\_\_ Yes No  
 Estimated Cost of Construction: \$150,000-  
 Variance Granted: \_\_\_\_\_ Date Granted: \_\_\_\_\_

**Signatures/Authorization**

Application for Zoning Permit approval as described herein is hereby made. The Oxford Planning & Zoning Commission and its technical staff are authorized to enter the property for the purpose of evaluating this application.

**Permit Void If:** a) Work or activity not commenced within 1 year of the date of issuance or b) Authorized construction not completed within 2 years of the date of issuance.

This permit, if issued, is based upon the plot plan submitted. Falsification, by misrepresentation or omission, or failure to comply with the conditions of approval of this permit constitute a violation of the Oxford Zoning Regulations.

St. Chris for Cingular Wireless 4-28-05  
 Property Owner or Agent \_\_\_\_\_ Date \_\_\_\_\_

**Purpose**

- New Home
- Addition
- Garage
- Cottage Business
- Swimming Pool IG AG
- Sign
- Shed
- Barn
- Change of Use
- Excavating/Filling
- Trailer
- Other CELL SITE

**Use**

- Single-Family Residence
- Multi-Family Residence
- Commercial
- Industrial
- Residential/POD
- Other CELL SITE

**Required Approvals and Dates**

- Inland Wetlands \_\_\_\_\_
- P.D.D.H. \_\_\_\_\_
- Fire Marshal \_\_\_\_\_
- Z.B.A. \_\_\_\_\_
- W.P.C.A. \_\_\_\_\_
- Floodplain \_\_\_\_\_
- Copy of Deed \_\_\_\_\_
- Driveway Existing
- Erosion Control Plan \_\_\_\_\_
- Plot Plan \* 4-28-05
- Other \_\_\_\_\_

106.00 Town Fee  
70.00 State Fee  
176.00 Total Fee

\*Draw plot plan of proposed construction and attach. Plan must show property boundaries and dimensions; location of proposed buildings on property with respect to boundaries; location of existing buildings on property; outside dimensions of all buildings proposed or now existing; location of water supply; location of sewage system. All copies must have a complete sketch. Construction and use must be exactly as described in this application. If later changes from this plan are desired prior approval of an amended application is necessary.

Denied Approved By: Debra Valt Date: 4-28-05  
 Title: ZCC

Reason for Denial \_\_\_\_\_

ZPA-1  
 (Adopted 5/15/97)



### Property Information

Owner	SCHIAVI WILLIAM & ELAINE W
Address	85 QUAKER FARMS RD
Mailing Address	85 QUAKER FARMS RD OXFORD , CT 06478
Land Use	- Res Dwelling
Land Class	R

Census Tract	L 6
Neighborhood	090
Zoning	RESA
Acreage	12.5
Utilities	
Lot Setting/ Desc	/ Clear

### Photo



### PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	230200	161100
Outbuildings	43600	30500
Improvements	273800	191600
Extras	0	0
Land	348300	192800
Total	622100	384400
Previous		

### Construction Details

Year Built	
Stories	2
Building Style	Colonial
Building Use	Residential
Building Condition	B-
Total Rooms	
Bedrooms	4 Bedrooms
Full Bathrooms	0
Half Bathrooms	
Bath Style	Average
Kitchen Style	Average
Roof Style	Gable
Roof Cover	Arch Shingles

#### EXTERIOR WALLS:

Primary	Clapboard
Secondary	Wood Shingle

#### INTERIOR WALLS:

Primary	Drywall
Secondary	

#### FLOORS:

Primary	Hardwood
Secondary	

#### HEATING/AC:

Heating Type	Hot Water
Heating Fuel	Oil
AC Type	None

#### BUILDING AREA:

Effective Building Area	
Gross Building Area	
Total Living Area	

#### SALES HISTORY:

Sale Date	4/1/1996
Sale Price	0
Book/ Page	187/ 390



**Property Information**

Owner	AT&T
Address	85 QUAKER FARMS RD
Mailing Address	754 PEACHTREE STREET ATLANTA , GA 30308
Land Use	- Cell Tower
Land Class	I

Census Tract	
Neighborhood	090
Zoning	
Acreage	0
Utilities	
Lot Setting/ Desc	/

**Photo**

No Photo Available

**PARCEL VALUATIONS** (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	0	0
Outbuildings	638800	447100
Improvements	638800	447100
Extras	0	0
Land	0	0
Total	638800	447100
Previous		

**Construction Details**

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	
Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

**EXTERIOR WALLS:**

Primary	
Secondary	

**INTERIOR WALLS:**

Primary	
Secondary	

**FLOORS:**

Primary	
Secondary	

**HEATING/AC:**

Heating Type	
Heating Fuel	
AC Type	

**BUILDING AREA:**

Effective Building Area	
Gross Building Area	
Total Living Area	

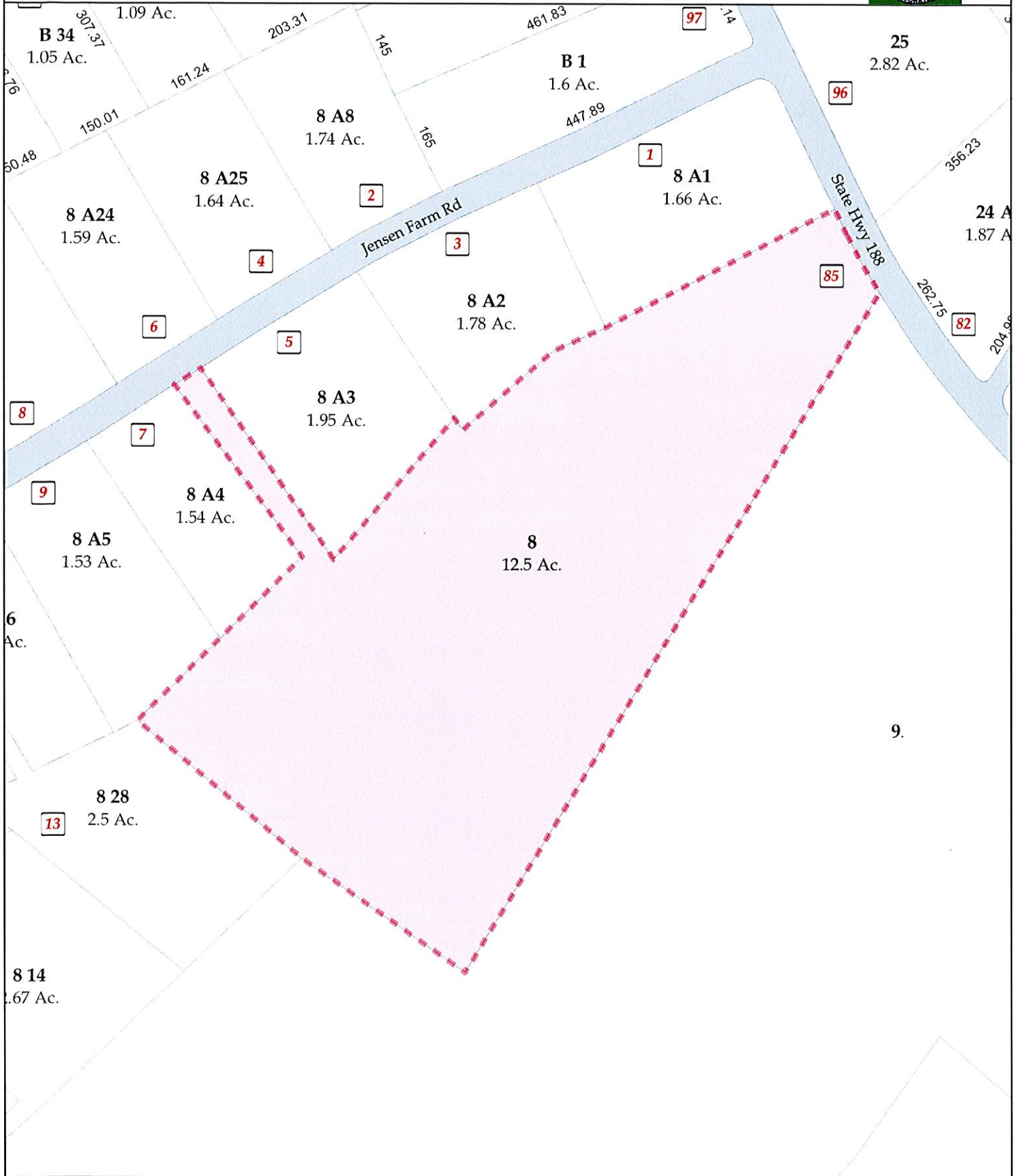
**SALES HISTORY:**

Sale Date	10/1/2010
Sale Price	0
Book/ Page	000/ 000

# Town of Oxford, Connecticut - Assessment Parcel Map

Parcel: 23-57-8

Location: 85 QUAKER FARMS RD



Approximate Scale: 1 inch = 200 feet



Map Produced: March 2023

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Oxford and its mapping contractors assume no legal responsibility for the information contained herein.

154 FT. 5 IN. TIP OF EQUIPMENT

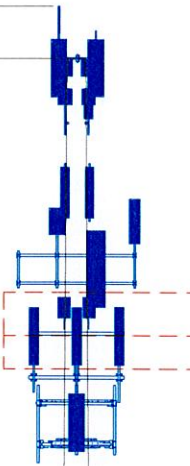
154'-11" (ACL)

149'-0"

6" (END)

5'-6"

5'-6"



- 149 FT LEVEL  
REF. DWG. 845455\_A\_149\_I AT&T MOBILITY AREA TO 154 FT SEYMOUR CT, TOWN OF AT&T MOBILITY AT&T MOBILITY AREA TO 144 FT
- 144 FT LEVEL  
REF. DWG. 845455\_A\_144\_I AT&T MOBILITY
- 135 FT LEVEL  
REF. DWG. 845455\_A\_135\_I AT&T MOBILITY AREA TO 139 FT AT&T MOBILITY
- 127 FT LEVEL  
REF. DWG. 845455\_A\_127\_I T-MOBILE
- 122 FT LEVEL (PROPOSED)  
REF. DWG. 845455\_A\_122\_I& \_P VERIZON WIRELESS
- 118 FT LEVEL (PROPOSED)  
REF. DWG. 845455\_A\_118\_I& \_P VERIZON WIRELESS
- 111 FT LEVEL  
REF. DWG. 845455\_A\_111\_I DISH NETWORK
- 81 FT LEVEL  
REF. DWG. 845455\_A\_81\_I SEYMOUR CT, TOWN OF

BOTTOM OF TOWER STEEL  
BASE PLATE ELEV 0'-0"



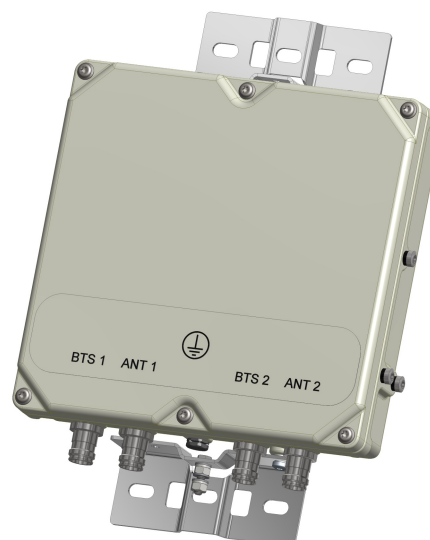
# BSF0020F3V1-1

## TWIN BANDSTOP 900MHZ INTERFERENCE MITIGATION FILTER

The BSF0020 is ideal for co-located 700, 850 and 900 networks. Utilising a 2.6MHz guardband the BSF0020 provides rejection of the 900 UL band while passing 700/850 UL and DL bands. Capable of being used in an outdoor environment the BSF0020 contains two identical bandstop filters, suitable for 2x2 MIMO configuration, offering excellent insertion loss, group delay and rejection.

### FEATURES

- Passes full 700 and 850 bands
- Low insertion loss
- Rejection of 900MHz uplink
- DC/AISG pass
- Twin unit
- Dual twin mounting available



### TECHNICAL SPECIFICATIONS

BAND NAME	700 PATH / 850 UPLINK PATH	850 DOWNLINK PATH
Passband	698 - 849MHz	869 - 891.5MHz
Insertion loss	0.1dB typical / 0.3dB maximum	0.5dB typical, 1.45dB maximum
Return loss	24dB typical, 18dB minimum	
Maximum input power (Per Port)	100W average	200W average and 66W per 5MHz
Rejection	53dB minimum @ 894.1 - 896.5MHz	
<b>ELECTRICAL</b>		
Impedance	50Ohms	
Intermodulation products	-160dBc maximum in UL Band (assuming 20MHz Signal), with 2 x 43dBm carriers -153dBc maximum with 2 x 43dBm	
<b>DC / AISG</b>		
Passband	0 - 13MHz	
Insertion loss	0.3dB maximum	
Return loss	15dB minimum	
Input voltage range	± 33V	
DC current rating	2A continuous, 4A peak	
Compliance	3GPP TS 25.461	
<b>ENVIRONMENTAL</b>		
For further details of environmental compliance, please contact Kaelus.		
Temperature range	-20°C to +60°C   -4°F to +140°F	
Ingress protection	IP67	
Altitude	2600m   8530ft	
Lightning protection	RF port: ±5kA maximum (8/20us), IEC 61000-4-5 – Unit must be terminated with some lightning protection circuits.	
MTBF	>1,000,000 hours	
Compliance	ETSI EN 300 019 class 4.1H, RoHS, NEBS GR-487-CORE	
<b>MECHANICAL</b>		
Dimensions H x D x W	269 x 277 x 80mm   10.60 x 10.90 x 3.15in (Excluding brackets and connectors)	
Weight	8.0 kg   17.6 lbs (no bracket)	
Finish	Powder coated, light grey (RAL7035)	
Connectors	RF: 4.3-10 (F) x 4	
Mounting	Optional pole/wall bracket supplied with two metal clamps 45-178mm diameter poles or custom bracket. See ordering information.	

## ORDERING INFORMATION

PART NUMBER	CONFIGURATION	OPTIONAL FEATURES	CONNECTORS
BSF0020F3V1	TWIN, 2 in / 2 out	DC/AISG PASS NO BRACKET	4.3-10 (F)
BSF0020F3V1-1	TWIN, 2 in / 2 out	DC/AISG PASS	4.3-10 (F)
BSF0020F3V1-2	QUAD, 4 in / 4 out	DC/AISG PASS	4.3-10 (F)

ELECTRICAL BLOCK DIAGRAM

ANT1



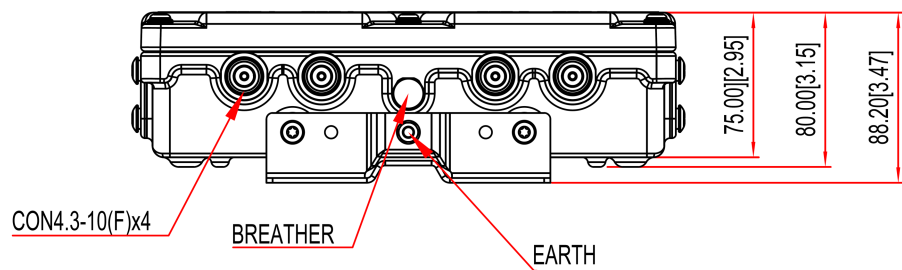
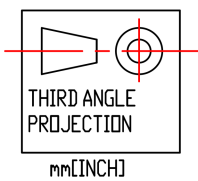
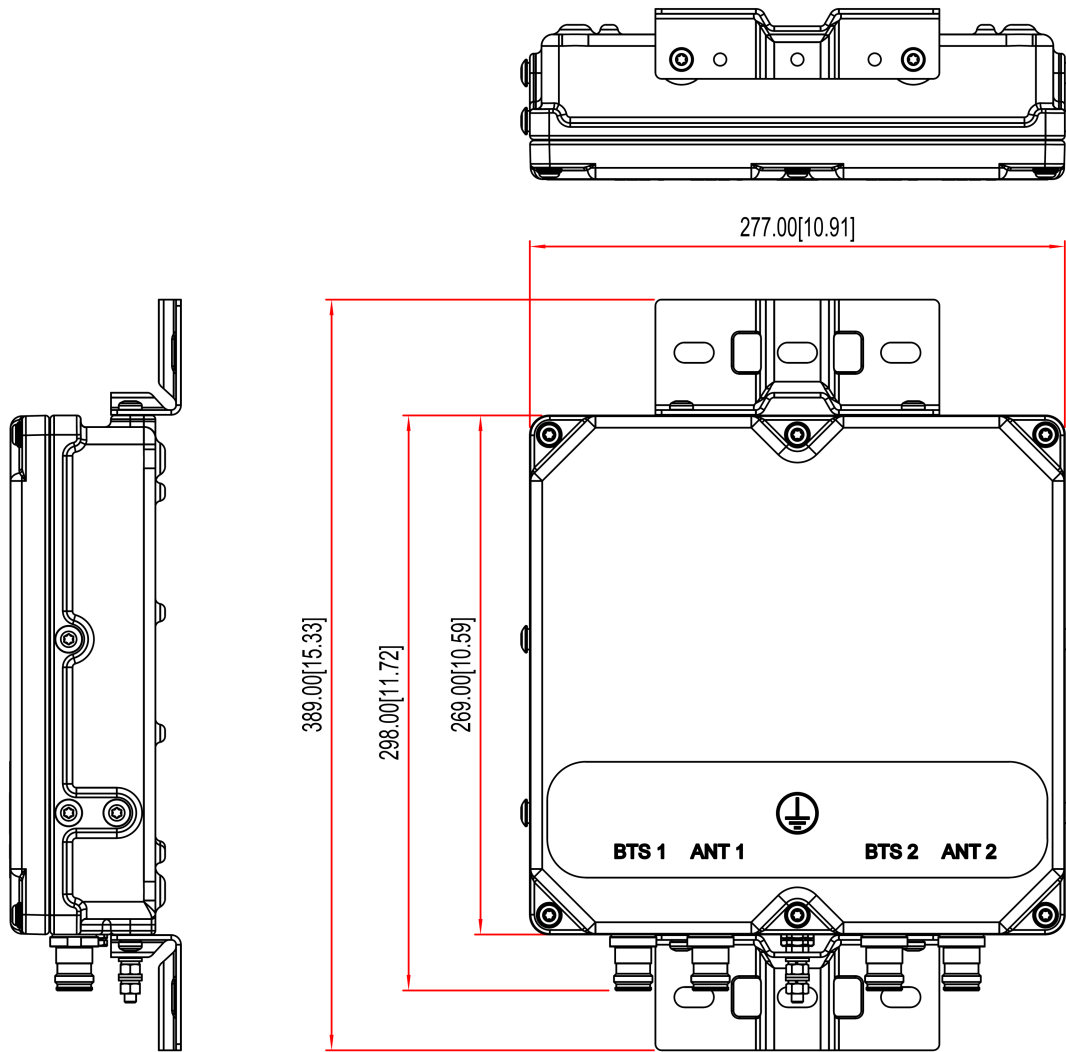
BTS1

ANT2



BTS2

**MECHANICAL BLOCK DIAGRAM**





Colliers Engineering & Design, CT, P. C.  
1055 Washington Boulevard  
Stamford, CT 06901  
203.324.0800  
peter.albano@collierseng.com

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## Antenna Mount Analysis Report and PMI Requirements

Mount ReAnalysis

SMART Tool Project #: 10206427  
Colliers Engineering & Design, CT, P. C. Project #: 23777074

June 30, 2023

### Site Information

Site ID: 5000385883-VZW / SEYMOUR WEST CT  
Site Name: SEYMOUR WEST CT  
Carrier Name: Verizon Wireless  
Address: 85 Quaker Farms Rd  
Oxford, Connecticut 06478  
New Haven County  
Latitude: 41.384000°  
Longitude: -73.137361°

### Structure Information

Tower Type: 147-Ft Monopole  
Mount Type: 5.33-Ft Integrated T-Frame

FUZE ID # 17123814

### Analysis Results

Integrated T-Frame: 80.8% Pass\*

**\*Antennas and equipment to be installed in compliance with PMI Requirements of this mount analysis.**

### \*\*\*Contractor PMI Requirements:

**Included at the end of this MA report**

**Available & Submitted via portal at <https://pmi.vzwsmart.com>**

**For additional questions and support, please reach out to:**

**[pmisupport@colliersengineering.com](mailto:pmisupport@colliersengineering.com)**

Report Prepared By: Gianna Argentina

**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
<i>Radio Frequency Data Sheet (RFDS)</i>	<i>Verizon RFDS, Site ID: 324827, dated May 17, 2022</i>
<i>Mount Mapping Report</i>	<i>Onsight Services, Site ID: 469065, dated April 8, 2022</i>
<i>Filter Add Scope</i>	<i>Guidance Provided by Verizon</i>
<i>Final Loading Configuration</i>	<i>Email correspondence with Robert Moore, dated March 1, 2023</i>

**Analysis Criteria:**

Codes and Standards:	ANSI/TIA-222-H Connecticut State Building Code, Effective October 1, 2022	
Wind Parameters:	Basic Wind Speed (Ultimate 3-sec. Gust), $V_{ULT}$ : Ice Wind Speed (3-sec. Gust): Design Ice Thickness: Risk Category: Exposure Category: Topographic Category: Topographic Feature Considered: Topographic Method: Ground Elevation Factor, $K_e$ :	118 mph 50 mph 1.00 in II C 1 N/A N/A 0.978
Seismic Parameters:	$S_s$ : $S_1$ :	0.202 g 0.054 g
Maintenance Parameters:	Wind Speed (3-sec. Gust): Maintenance Load, $L_v$ : Maintenance Load, $L_m$ :	30 mph 250 lbs. 500 lbs.
Analysis Software:	RISA-3D (V17)	

**Final Loading Configuration:**

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

Mount Elevation (ft)	Equipment Elevation (ft)	Quantity	Manufacturer	Model	Status
118.70	120.00	6	JMA Wireless	MX06FRO860-03	Added
		3	Samsung	MT6407-77A	
		3	Samsung	RF4439d-25A	
		3	Samsung	RF4440d-13A	
		1	Raycap	RVZDC-6627-PF-48	
		2	KAelus	BSF0020F3V1-1	

The recent mount mapping reported existing OVP units. It is acceptable to install up to any three (3) of the OVP model numbers listed below as required at any location other than the mount face without affecting the structural capacity of the mount. If OVP units are installed on the mount face, a mount re-analysis may be required unless replacing an existing OVP.

Model Number	Ports	AKA
DB-B1-6C-12AB-0Z	6	OVP-6
RVZDC-6627-PF-48	12	OVP-12

**Standard Conditions:**

1. All engineering services are performed on the basis that the information provided to Colliers Engineering & Design, CT, P. C. 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 Colliers Engineering & Design, CT, P. C. 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 in accordance with the NSTD-446 Standard, 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. Colliers Engineering & Design, CT, P. C. 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:
  - o Channel, Solid Round, Angle, Plate      ASTM A36 (Gr. 36)
  - o HSS (Rectangular)                              ASTM 500 (Gr. B-46)
  - o Pipe    ASTM A53 (Gr. B-35)
  - o Threaded Rod                                      F1554 (Gr. 36)
  - o Bolts     ASTM A325

**Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Colliers Engineering & Design, CT, P. C.**

**Analysis Results:**

Component	Utilization %	Pass/Fail
Standoff Horizontal	19.9 %	Pass
Standoff Plate	60.8 %	Pass
Face Horizontal	41.4 %	Pass
Mount Pipe	80.8 %	Pass
Mount Connection	21.9 %	Pass

<b>Structure Rating – (Controlling Utilization of all Components)</b>	<b>80.8%</b>
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**Mount Steel (EPA)a per ANSI/TIA-222-H Section 2.6.11.2:**

Ice Thickness (In)	Mount Pipes Excluded		Mount Pipes Included	
	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)
0	15.1	15.1	28.0	28.0
0.5	21.0	21.0	38.8	38.8
1	26.7	26.7	49.6	49.6

Notes:

- (EPA)a values listed above may be used in the absence of more precise information
- (EPA)a values in the table above include 3 sectors.
- Ka factors included in (EPA)a calculations

**Requirements:**

The existing mount is **SUFFICIENT** for the final loading configuration shown in attachment 2 and do not require modifications. Additional requirements are noted below.

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



**Attachments:**

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

# Mount Desktop – Post Modification Inspection (PMI) Report Requirements

## Documents & Photos Required from Contractor – **Passing Mount Analysis**

Passing Mount Analysis requires a PMI due to a modification in loading.

Electronic pdf version of this can be downloaded at <https://pmi.vzwsmart.com>.

For additional questions and support, please reach out to [pmisupport@colliersengineering.com](mailto:pmisupport@colliersengineering.com)

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MDG #: 5000385883

SMART Project #: 10206427

Fuze Project ID:

**Purpose** – to provide SMART Tool structural vendor 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:**

- If installation will cause damage to the structure, the climbing facility, or safety climb if present or any installed system, SMART Tool vendor to be notified prior to install. Any special photos outside of the standard requirements will be indicated on the drawings.
- Provide “as built mount drawings” showing contractor’s name, contact information, preparer’s signature, and date. Any deviations from the drawings (Proposed modification) shall be shown. NOTE: If loading is different than what is conveyed in the passing mount analysis (MA) contact the SMART Tool vendor immediately.
- Each photo should be time and date stamped
- Photos should be high resolution.
- 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. If there is conflict, contact the SMART Tool engineer for recommendations.
- The PMI can be accessed at the following portal: <https://pmi.vzwsmart.com>

### **Photo Requirements:**

- Photos taken at ground level
  - Photo of Gate Signs showing the tower owner, site name, and number.
  - Overall tower structure after installation.
  - Photos of the mount after installation; if the mounts are at different rad elevations, pictures must be provided for all elevations that equipment was installed.
- Photos taken at Mount Elevation
  - Photos showing the safety climb wire rope above and below the mount prior to installation.
  - Photos showing the climbing facility and safety climb if present.
  - Photos showing each individual sector after installation. Each entire sector shall be in one photo to show the interconnection of members.

- These photos shall also certify that the placement and geometry of the equipment on the mount is as depicted in the antenna placement diagram in this form.
- Photos that show the model number of each antenna and piece of equipment installed per sector.

**Antenna & equipment placement and Geometry Confirmation:**

- The contractor shall certify that the antenna & equipment placement and geometry is in accordance with the sketch and table as included in the mount analysis and noted below.
  - The contractor certifies that the photos support and the equipment on the mount is as depicted on the sketch and table included in this form and with the mount analysis provided.

OR

- The contractor notes that the equipment on the mount is not in accordance with the sketch and has noted the differences below and provided photo documentation of any alterations.

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

**Issue:**

**Response:**

**Special Instruction Confirmation:**

- The contractor has read and acknowledges the above special instructions.
- All hardware listed in the Special Instructions above (if applicable) has been properly installed, and the existing hardware was inspected.
- The material utilized was as specified in the SMART Tool engineering vendor Special Instructions above (if applicable) and included in the material certification folder is a packing list or invoice for these materials.

OR

- The material utilized was approved by a SMART Tool engineering vendor as an “equivalent” and this approval is included as part of the contractor submission.

**Comments:**

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**Contractor certifies that the climbing facility / safety climb was not damaged prior to starting work:**

Yes       No

**Contractor certifies no new damage created during the current installation:**

Yes       No

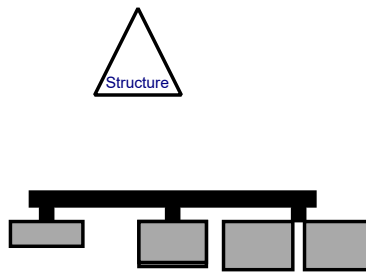
**Contractor to certify the condition of the safety climb and verify no damage when leaving the site:**

Safety Climb in Good Condition                       Safety Climb Damaged

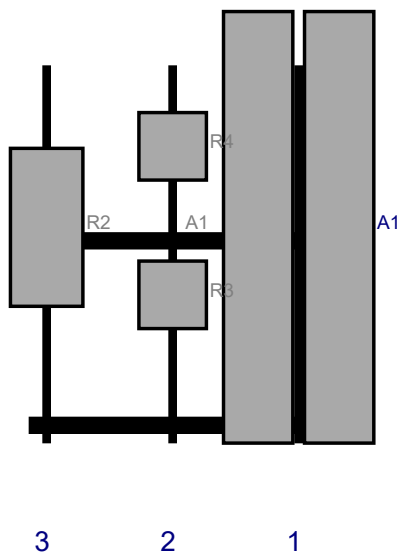
**Certifying Individual:**

Company:	
Employee Name:	
Contact Phone:	
Email:	
Date:	

Plan View

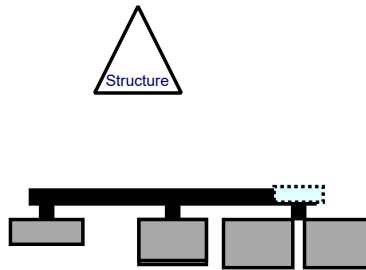


Front View - Looking at Structure

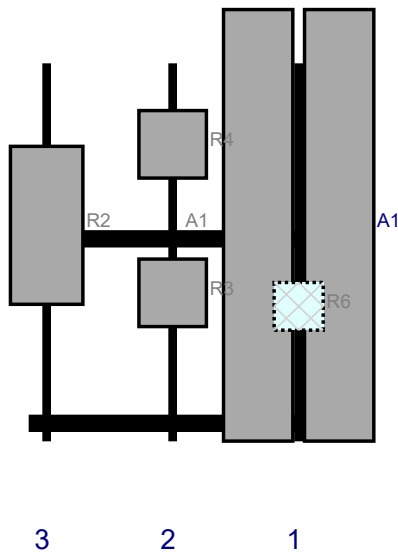


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A1	MX06FRO860-03	95.9	15.4	60	1	a	Front	36	9	Added	
A1	MX06FRO860-03	95.9	15.4	60	1	b	Front	36	-9	Added	
R3	RF4439d-25A	15	15	32	2	a	Front	51	0	Added	
R4	RF4440d-13A	15	15	32	2	a	Front	18	0	Added	
R2	MT6407-77A	35.1	16.1	4	3	a	Front	36	0	Added	
OVP	RVZDC-6627-PF-48	29.5	16.5			Member				Added	

Plan View

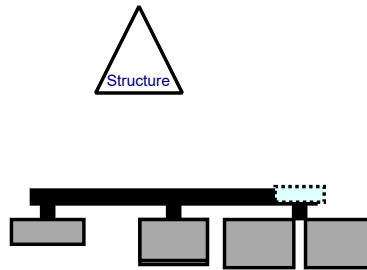


Front View - Looking at Structure

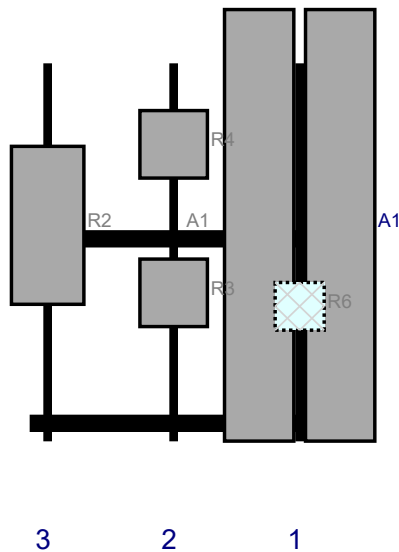


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A1	MX06FRO860-03	95.9	15.4	60	1	a	Front	36	9	Added	
A1	MX06FRO860-03	95.9	15.4	60	1	b	Front	36	-9	Added	
R6	BSF0020F3V1-1	10.6	10.9	60	1	a	Behind	54	0	Added	
R3	RF4439d-25A	15	15	32	2	a	Front	51	0	Added	
R4	RF4440d-13A	15	15	32	2	a	Front	18	0	Added	
R2	MT6407-77A	35.1	16.1	4	3	a	Front	36	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
A1	MX06FRO860-03	95.9	15.4	60	1	a	Front	36	9	Added	
A1	MX06FRO860-03	95.9	15.4	60	1	b	Front	36	-9	Added	
R6	BSF0020F3V1-1	10.6	10.9	60	1	a	Behind	54	0	Added	
R3	RF4439d-25A	15	15	32	2	a	Front	51	0	Added	
R4	RF4440d-13A	15	15	32	2	a	Front	18	0	Added	
R2	MT6407-77A	35.1	16.1	4	3	a	Front	36	0	Added	









**Observed Safety and Structural Issues During the Mount Mapping**

Issue #	Description of Issue	Photo #
1		
2		
3		
4		
5		
6		
7		
8		

**Mapping Notes**

1. Please report any visible structural or safety issues observed on the antenna mounts (Damaged members, loose connections, tilting mounts, safety climb issues, etc.)
2. If the thickness of the existing pipes or tubing can't be obtained from a general tool (such as Caliper), please use an ultrasonic measurement tool (thickness gauge) to measure the thickness.
3. Please create all required detail sketches of the mounts and insert them into the "Sketches" tab.
4. Please measure and enter the bolt sizes and types under the Members Box in the spreadsheet of the mount type.
5. Take and label the photos of the tower, mounts, connections, antennas and all measurements. Minimum 50 photos are required.
6. Please measure and report the size and length of all existing antenna mounting pipes.
7. Please measure and report the antenna information for all sectors.
8. Don't delete or rearrange any sheet or contents of any sheet from this mapping form.

**Standard Conditions**

1. Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping are to be reported in this mapping. However, this mount mapping is not a condition assessment of the mount.

<b>SMART Tool<sup>®</sup></b> <b>Vendor</b>	<b>Antenna Mount Mapping Form (PATENT PENDING)</b>			FCC #
	Tower Owner:	CROWN CASTLE	Mapping Date:	4/8/2022
	Site Name:	SEYMOUR WEST CT	Tower Type:	MONOPOLE
	Site Number or ID:	469065	Tower Height (Ft.):	147
	Mapping Contractor:	ONSIGHT SERVICES	Mount Elevation (Ft.):	120

This antenna mapping form is the property of TES and under **PATENT PENDING**. The formation contained herein is considered confidential in nature and is to be used only for the specific customer it was intended for. Reproduction, transmission, publication, modification or disclosure by any method is prohibited except by express written permission of TES. All means and methods are the responsibility of the contractor and the work shall be compliant with ANSI/ASSE A 10.48, OSHA, FCC, FAA and other safety requirements that may apply. TES is not warranting the usability of the safety climb as it must be assessed prior to each use in compliance with OSHA requirements.

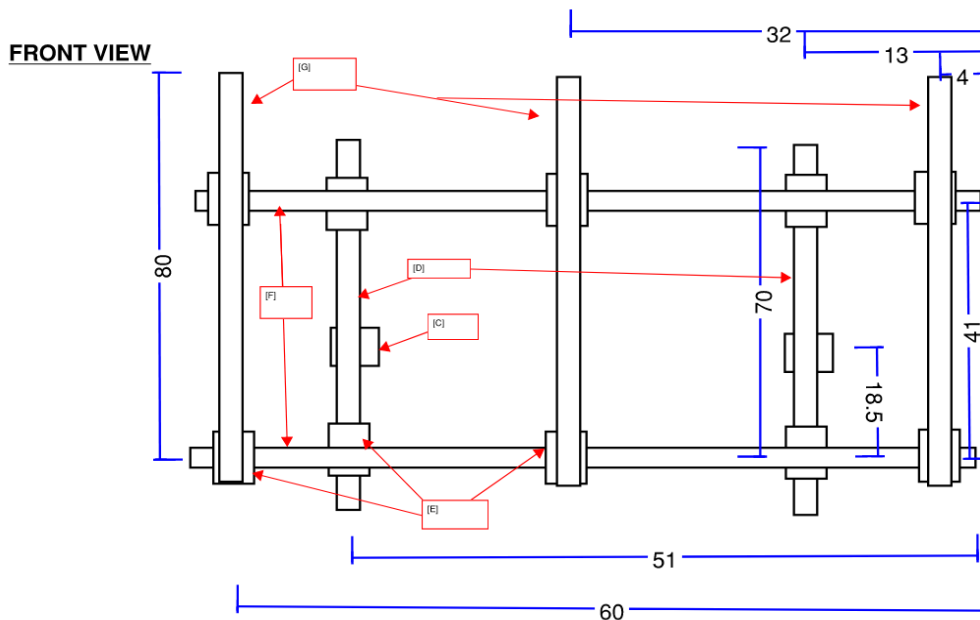
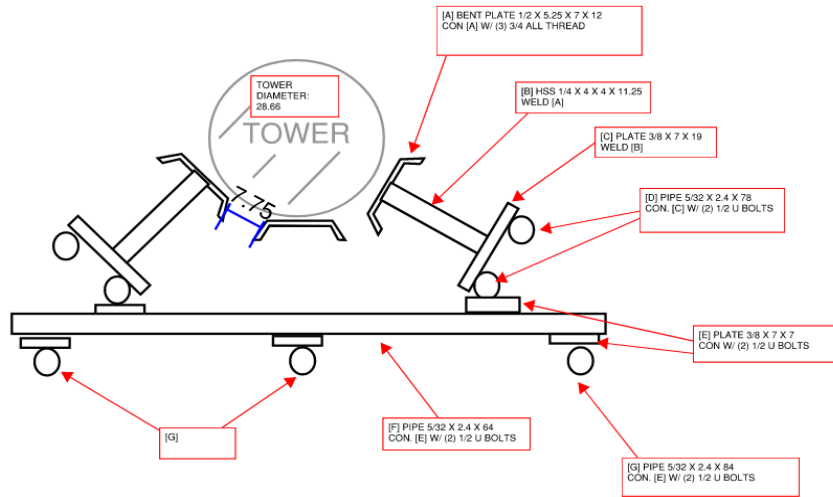
**Please Insert Sketches of the Antenna Mount**

Site Number: 469065

\*All measurements / offsets given in inches\*



**TOP VIEW**



**AZIMUTH**

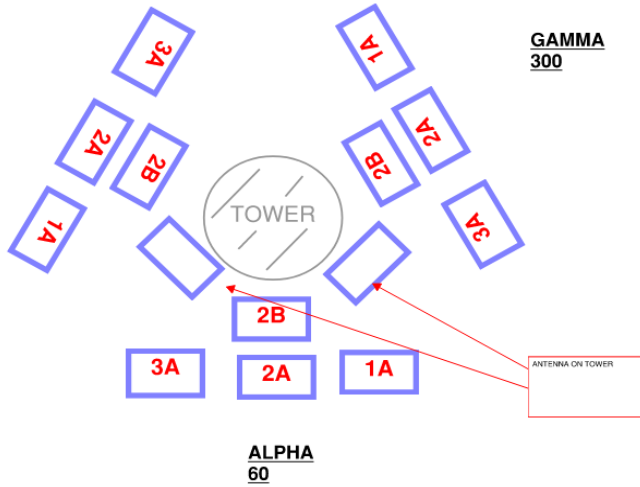
(18) 1-5/8" COAX  
(2) 1.55" OD HYBRID

MCL: 120 FT  
TOT: 147 FT

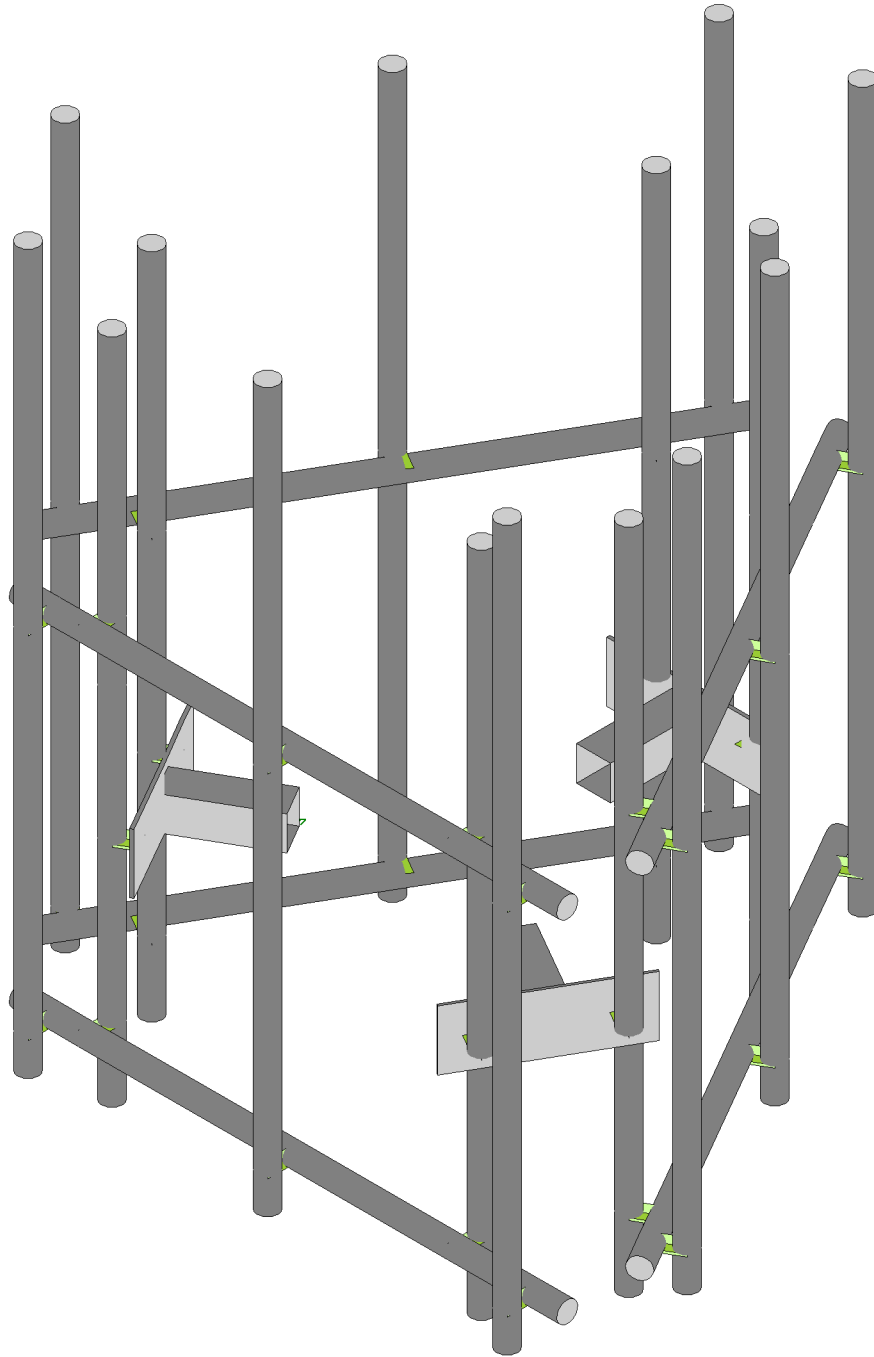
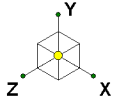


**BETA**  
**280**

**GAMMA**  
**300**



**ALPHA**  
**60**



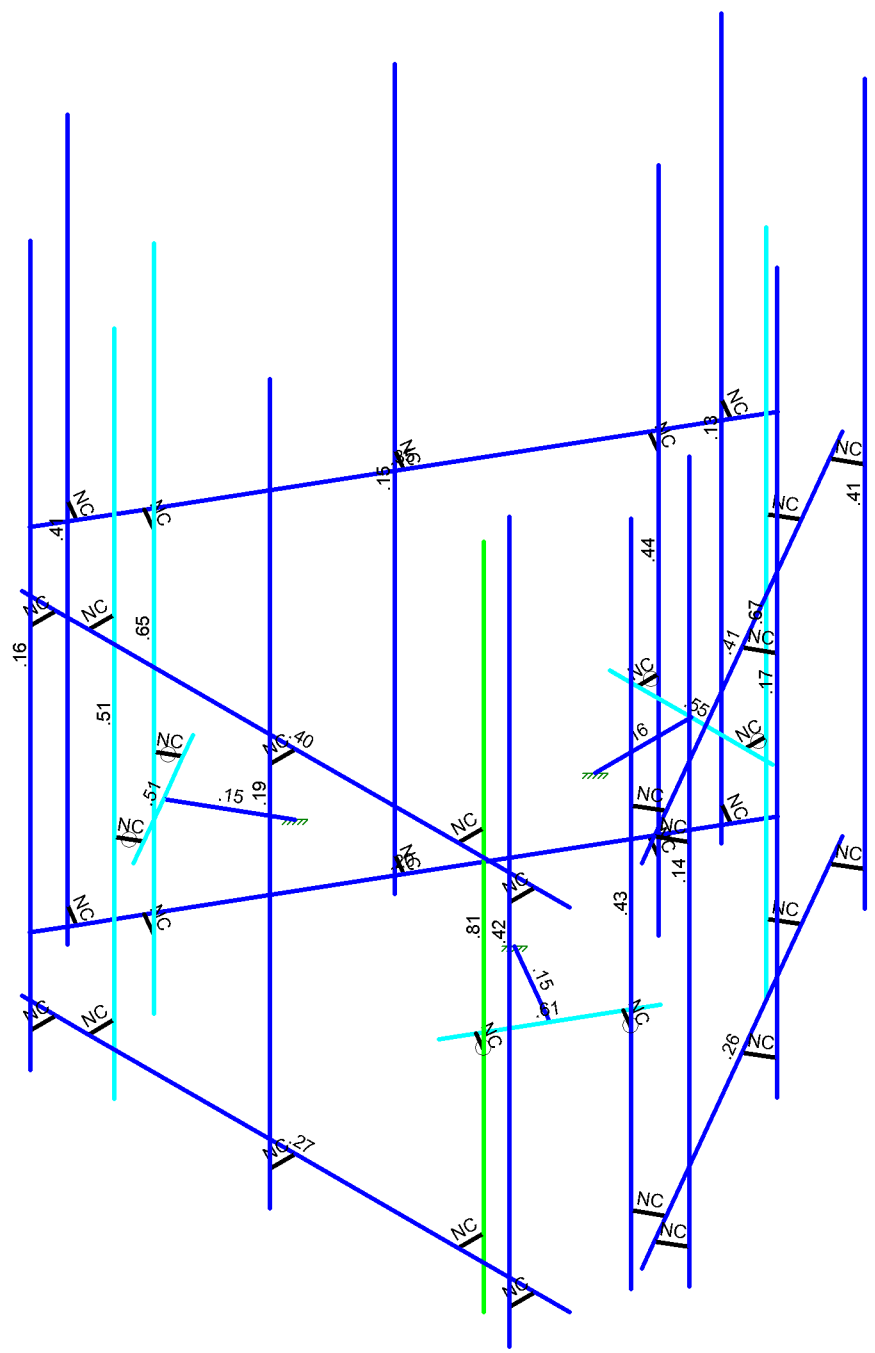
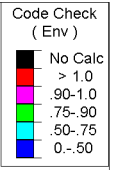
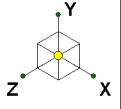
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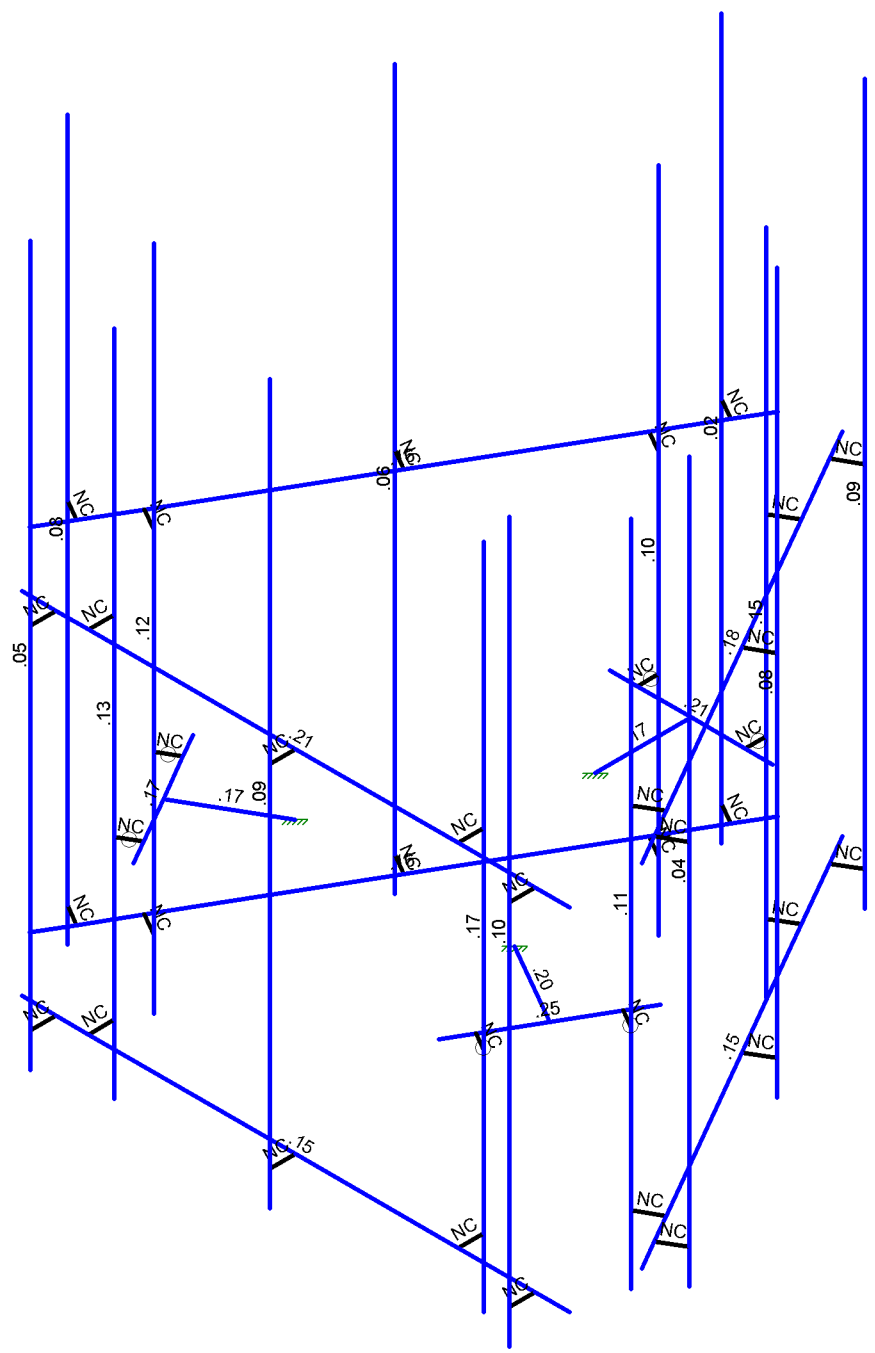
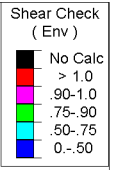
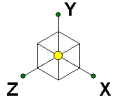
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J	T ÚFÓ	T:	ÈëH	È
F€	T ÚFÓ	ÿ	È í È	í È
FF	T ÚFÓ	T^	ÈëF	í È
FG	T ÚFÓ	T:	ÈëH	í È
FH	T ÚFÔ	ÿ	È í È	È
FI	T ÚFÔ	T^	ÈEH F	È
FÍ	T ÚFÔ	T:	ÈëCH	È
FĪ	T ÚFÔ	ÿ	È í È	í È
Fİ	T ÚFÔ	T^	ÈEH F	í È
FĪ	T ÚFÔ	T:	ÈëCH	í È
FJ	T ÚFÖE	ÿ	È í È	È
G€	T ÚFÖE	T^	ÈëCH	È
GF	T ÚFÖE	T:	ÈëH	È
GG	T ÚFÖE	ÿ	È í È	í È
GH	T ÚFÖE	T^	ÈëCH	í È
G	T ÚFÖE	T:	ÈëH	í È
Ğ	T ÚFÓ	ÿ	È í È	È
Ĝ	T ÚFÓ	T^	ÈEH F	È
Ğ	T ÚFÓ	T:	ÈëCH	È
G	T ÚFÓ	ÿ	È í È	í È
GJ	T ÚFÓ	T^	ÈEH F	í È
H€	T ÚFÓ	T:	ÈëCH	í È
HF	T ÚFÔ	ÿ	È í È	È
HG	T ÚFÔ	T^	ÈëF	È
HH	T ÚFÔ	T:	ÈEH	È
HI	T ÚFÔ	ÿ	È í È	í È
HÍ	T ÚFÔ	T^	ÈëF	í È
HĪ	T ÚFÔ	T:	ÈEH	í È
Hİ	T ÚHÖE	ÿ	È H È í	G
HĪ	T ÚHÖE	T^	ÈëCG	G
HJ	T ÚHÖE	T:	€	G
I€	T ÚHÖE	ÿ	È H È í	I
IF	T ÚHÖE	T^	ÈëCG	I
IG	T ÚHÖE	T:	€	I
IH	T ÚHÓ	ÿ	È H È í	G
II	T ÚHÓ	T^	ÈëFF	G
IÍ	T ÚHÓ	T:	ÈëFJ	G
IĪ	T ÚHÓ	ÿ	È H È í	I
Iİ	T ÚHÓ	T^	ÈëFF	I
IĪ	T ÚHÓ	T:	ÈëFJ	I
IJ	T ÚHÓ	ÿ	È H È í	G
I€	T ÚHÓ	T^	ÈëFF	G
IF	T ÚHÓ	T:	ÈëFJ	G
IG	T ÚHÓ	ÿ	È H È í	I
IH	T ÚHÓ	T^	ÈëFF	I
Iİ	T ÚHÓ	T:	ÈëFJ	I



**A Ya Vyf'Dc]bh@UXg'f6 @ '&: '5 bhYbbU8 jk'f7 c'bh'pi YXL**

	T^{ à^\Áæ^ }	Óá^&cá }	T æ } á ^ à^\Áæ Ééá	Š éæá } ŽéÁ á
GG	T ÚFOE	ÿ	É-É É-É	í éé
GH	T ÚFOE	T ^	ÉÉ H	í éé
G	T ÚFOE	T :	ÉÉ	í éé
Q	T ÚFÓ	ÿ	É-É É-É	éé
Q	T ÚFÓ	T ^	ÉÉÍ	éé
Q	T ÚFÓ	T :	ÉÉÉ	éé
Q	T ÚFÓ	ÿ	É-É É-É	í éé
U	T ÚFÓ	T ^	ÉÉÍ	í éé
H€	T ÚFÓ	T :	ÉÉÉ	í éé
HF	T ÚFÓ	ÿ	É-É É-É	éé
HG	T ÚFÓ	T ^	ÉÉ H	éé
HH	T ÚFÓ	T :	ÉÉ Í	éé
HI	T ÚFÓ	ÿ	É-É É-É	í éé
HÍ	T ÚFÓ	T ^	ÉÉ H	í éé
Hí	T ÚFÓ	T :	ÉÉ Í	í éé
Hï	T ÚHœ	ÿ	ÉÍ ÉÍ Í	G
Hì	T ÚHœ	T ^	ÉÉÍ	G
HJ	T ÚHœ	T :	€	G
I€	T ÚHœ	ÿ	ÉÍ ÉÍ Í	I
IF	T ÚHœ	T ^	ÉÉÍ	I
IG	T ÚHœ	T :	€	I
IH	T ÚHó	ÿ	ÉÍ ÉÍ Í	G
II	T ÚHó	T ^	ÉÉÉ	G
IÍ	T ÚHó	T :	ÉÉÍ	G
Iï	T ÚHó	ÿ	ÉÍ ÉÍ Í	I
Iì	T ÚHó	T ^	ÉÉÉ	I
Iì	T ÚHó	T :	ÉÉÍ	I
I J	T ÚHó	ÿ	ÉÍ ÉÍ Í	G
I€	T ÚHó	T ^	ÉÉÉ	G
IF	T ÚHó	T :	ÉÉÍ	G
IG	T ÚHó	ÿ	ÉÍ ÉÍ Í	I
IH	T ÚHó	T ^	ÉÉÉ	I
Iì	T ÚHó	T :	ÉÉÍ	I
Iî	T ÚGœ	ÿ	É Í ÉÍ J	I ÉÉ
Iî	T ÚGœ	T ^	ÉÉG	I ÉÉ
Iî	T ÚGœ	T :	€	I ÉÉ
Iì	T ÚGó	ÿ	É Í ÉÍ J	I ÉÉ
I J	T ÚGó	T ^	ÉÉFF	I ÉÉ
I€	T ÚGó	T :	ÉÉFJ	I ÉÉ
IF	T ÚGó	ÿ	É Í ÉÍ J	I ÉÉ
IG	T ÚGó	T ^	ÉÉFF	I ÉÉ
IH	T ÚGó	T :	ÉÉFJ	I ÉÉ
Iì	T ÚGœ	ÿ	É ÉÉ J	FÉÉ
Ií	T ÚGœ	T ^	ÉÉGF	FÉÉ
Ií	T ÚGœ	T :	€	FÉÉ
Iï	T ÚGó	ÿ	É ÉÉ J	FÉÉ
Iì	T ÚGó	T ^	ÉÉFF	FÉÉ
I J	T ÚGó	T :	ÉÉÍ	FÉÉ
I€	T ÚGó	ÿ	É ÉÉ J	FÉÉ
IF	T ÚGó	T ^	ÉÉFF	FÉÉ
IG	T ÚGó	T :	ÉÉÍ	FÉÉ
I H	UXU	ÿ	É Í ÉÍ H	FÉÉ

















**A Ya Vyf Dc ]bhi @ UXg f6 @ '+: '5 bhYbbUK c fP&\$ '8 Yt tL'f c bhbi YXL**

	T ^ ( à^/Aæ^ )	Öa^&a )	T æ ) æ à^ Za È Eéa	Š &a ) Že Á á
FH	T ÚFÔ	Ý	í î €	ë
FI	T ÚFÔ	Z	í ë ì F	ë
FÍ	T ÚFÔ	T ç	ë ì G	ë
FÎ	T ÚFÔ	Ý	í î €	í ë
FÌ	T ÚFÔ	Z	í ë ì F	í ë
FÌ	T ÚFÔ	T ç	ë ì G	í ë
FJ	T ÚFœ	Ý	í î €	ë
œ	T ÚFœ	Z	í ë ì F	ë
Gf	T ÚFœ	T ç	ë ì G	ë
GG	T ÚFœ	Ý	í î €	í ë
GH	T ÚFœ	Z	í ë ì F	í ë
G	T ÚFœ	T ç	ë ì G	í ë
Ğ	T ÚFÓ	Ý	Fë Òì H	ë
Ğ	T ÚFÓ	Z	ì ĞH I	ë
Ğ	T ÚFÓ	T ç	ë ì J	ë
Ğ	T ÚFÓ	Ý	Fë Òì H	í ë
GJ	T ÚFÓ	Z	ì ĞH I	í ë
H€	T ÚFÓ	T ç	ë ì J	í ë
HF	T ÚFÓ	Ý	í î €	ë
HG	T ÚFÓ	Z	í ë ì F	ë
HH	T ÚFÓ	T ç	ë ì	ë
H	T ÚFÓ	Ý	í î €	í ë
HÌ	T ÚFÓ	Z	í ë ì F	í ë
HÌ	T ÚFÓ	T ç	ë ì	í ë
HÍ	T ÚHœ	Ý	HH H	G
HÌ	T ÚHœ	Z	FJH HG	G
HJ	T ÚHœ	T ç	ë ì	G
I €	T ÚHœ	Ý	HH H	I
IF	T ÚHœ	Z	FJH HG	I
IG	T ÚHœ	T ç	ë ì	I
I H	T ÚHÓ	Ý	í î ï	G
I I	T ÚHÓ	Z	H Ë Ğ	G
I Í	T ÚHÓ	T ç	€	G
I Î	T ÚHÓ	Ý	í î ï	I
I Ì	T ÚHÓ	Z	H Ë Ğ	I
I Ì	T ÚHÓ	T ç	€	I
I J	T ÚHÓ	Ý	HH H	G
I €	T ÚHÓ	Z	FJH HG	G
I F	T ÚHÓ	T ç	ë ì	G
I G	T ÚHÓ	Ý	HH H	I
I H	T ÚHÓ	Z	FJH HG	I
I I	T ÚHÓ	T ç	ë ì	I
I Í	T ÚGœ	Ý	HJH Í	I Ğ
I Î	T ÚGœ	Z	ĞĜ I J	I Ğ
I Ì	T ÚGœ	T ç	ë Ğ	I Ğ
I Î	T ÚGÓ	Ý	ì ĞH H	I Ğ
I J	T ÚGÓ	Z	HĜH I	I Ğ
I €	T ÚGÓ	T ç	€	I Ğ
I F	T ÚGÓ	Ý	HJH Í	I Ğ
I G	T ÚGÓ	Z	ĞĜ I J	I Ğ
I H	T ÚGÓ	T ç	ë Ğ	I Ğ
I I	T ÚGœ	Ý	H Ë Ğ	F Ğ



**A Ya Vyf Dc ]bhi @ UXg f6 @ ; : ' 5 bhYbbUK c fP\$ 8 Yf tL'f c bhbi YXL**

	T ^{ à^/Aæ ^	Öã^&çã }	T æ } æ à^ ŽãÊ Èeá	Š } &çã } ŽeÁ á
HG	T ÚFÔ	Z	í Ë Fì	È
HH	T ÚFÔ	T ç	È Ì	È
H	T ÚFÔ	Ý	ì Ì È Ì	ì È
Hí	T ÚFÔ	Z	í Ë Fì	ì È
Hì	T ÚFÔ	T ç	È Ì	ì È
Hï	T ÚHÇE	Ý	HÇFG	G
Hî	T ÚHÇE	Z	ì Ì È Ì	G
HJ	T ÚHÇE	T ç	È È Fì	G
í €	T ÚHÇE	Ý	HÇFG	ì
í F	T ÚHÇE	Z	ì Ì È Ì	ì
í G	T ÚHÇE	T ç	È È Fì	ì
í H	T ÚHÓ	Ý	HÇFG	G
í I	T ÚHÓ	Z	ì Ì È Ì	G
í Í	T ÚHÓ	T ç	È È Fì	G
í Î	T ÚHÓ	Ý	HÇFG	ì
í Ï	T ÚHÓ	Z	ì Ì È Ì	ì
í Ñ	T ÚHÓ	T ç	È È Fì	ì
í J	T ÚHÓ	Ý	FHÇH	G
í €	T ÚHÓ	Z	GÇGF	G
í F	T ÚHÓ	T ç	È FH	G
í G	T ÚHÓ	Ý	FHÇH	ì
í H	T ÚHÓ	Z	GÇGF	ì
í I	T ÚHÓ	T ç	È FH	ì
í Í	T ÚÇE	Ý	G È Ì Ì	ì È
í Î	T ÚÇE	Z	ì È È	ì È
í Ï	T ÚÇE	T ç	È È Fì	ì È
í Ñ	T ÚGÓ	Ý	G È Ì Ì	ì È
í J	T ÚGÓ	Z	ì È È	ì È
í €	T ÚGÓ	T ç	È È Fì	ì È
í F	T ÚGÓ	Ý	GÈH J	ì È
í G	T ÚGÓ	Z	H È Fì	ì È
í H	T ÚGÓ	T ç	È G	ì È
í I	T ÚÇE	Ý	G È H Ì	FÈ
í Î	T ÚÇE	Z	ì Ì È Ì	FÈ
í Ï	T ÚÇE	T ç	È È Fì	FÈ
í Ñ	T ÚGÓ	Ý	G È H Ì	FÈ
í R	T ÚGÓ	Z	ì Ì È Ì	FÈ
í S	T ÚGÓ	T ç	È È Fì	FÈ
í T	T ÚGÓ	Ý	F Ì È G	FÈ
í U	T ÚGÓ	Z	H È G	FÈ
í V	T ÚGÓ	T ç	È Fì	FÈ
í W	UXÚ	Ý	í Ë Jì H	FÈ
í X	UXÚ	Z	ì Ì È Ì	FÈ
í Y	UXÚ	T ç	È	FÈ
í Z	T ÚFÔ	Ý	F Ì È J	ì È
í A	T ÚFÔ	Z	G È È Fì	ì È
í B	T ÚFÔ	T ç	È È	ì È
í C	T ÚFÔ	Ý	ì È H	ì È
í D	T ÚFÔ	Z	F È G	ì È
í E	T ÚFÔ	T ç	È È	ì È







**A Ya Vyf Dc]bh@UXg f6 @ '%\$. '5 bhMbbUK c fB?.\$ '8 Y[ tL'f c bh]bi YXL**

	T^{\ à^!Àë^}\	Öä^&ç)}	T æ } æ à^ ža È Eéá	Š } &ç} ŽéÁ á
GE	T ÚFÖE	Z	F F F E J G	È
GF	T ÚFÖE	T ç	È È I	È
GG	T ÚFÖE	Y	È I È G H	Í È
GH	T ÚFÖE	Z	F F F E J G	Í È
GI	T ÚFÖE	T ç	È È I	Í È
GJ	T ÚFÓ	Y	È I È I	È
GK	T ÚFÓ	Z	I È F I	È
GL	T ÚFÓ	T ç	È È I	È
GM	T ÚFÓ	Y	È I È I	Í È
GN	T ÚFÓ	Z	I È F I	Í È
GO	T ÚFÓ	T ç	È È I	Í È
GP	T ÚFÓ	Y	È I È I	Í È
GQ	T ÚFÓ	Z	I È F I	Í È
GR	T ÚFÓ	T ç	È È I	Í È
GS	T ÚFÓ	Y	È I È I	Í È
GT	T ÚFÓ	Z	I È F I	Í È
HU	T ÚHÖE	Y	È G F G	G
IV	T ÚHÖE	Z	I I È I I	G
IU	T ÚHÖE	T ç	È È I	G
IY	T ÚHÖE	Y	È G F G	I
IF	T ÚHÖE	Z	I I È I I	I
IG	T ÚHÖE	T ç	È È I	I
IH	T ÚHÓ	Y	È È G H H	G
II	T ÚHÓ	Z	G È J G F	G
IÍ	T ÚHÓ	T ç	È È F H	G
IÏ	T ÚHÓ	Y	È È G H H	I
IË	T ÚHÓ	Z	G È J G F	I
IÌ	T ÚHÓ	T ç	È È F H	I
IJ	T ÚHÓ	Y	È G F G	G
Í€	T ÚHÓ	Z	I I È I I	G
ÍF	T ÚHÓ	T ç	È È I	G
ÍG	T ÚHÓ	Y	È G F G	I
ÍH	T ÚHÓ	Z	I I È I I	I
ÍI	T ÚHÓ	T ç	È È I	I
ÍÍ	T ÚGÖE	Y	È G È I I	I È
ÍÏ	T ÚGÖE	Z	I I È È I	I È
ÍÌ	T ÚGÖE	T ç	È È I	I È
ÍË	T ÚGÓ	Y	È G È I J	I È
ÍJ	T ÚGÓ	Z	H I È F I	I È
Í€	T ÚGÓ	T ç	È È G	I È
ÍF	T ÚGÓ	Y	È G È I I	I È
ÍG	T ÚGÓ	Z	I I È È I	I È
ÍH	T ÚGÓ	T ç	È È I	I È
ÍI	T ÚGÖE	Y	È G È J I	F È
ÍÍ	T ÚGÖE	Z	I I È I I	F È
ÍÏ	T ÚGÖE	T ç	È È I	F È
ÍË	T ÚGÓ	Y	È I È G J	F È
ÍJ	T ÚGÓ	Z	H F È J G	F È
Í€	T ÚGÓ	Y	È È I	F È
ÍF	T ÚGÓ	Z	I I È I I	F È



















**A Ya Vyf'Dc]bhi@UXg'f6 @ '% : '5 bhMbU'K ]f\$ '8 Yf £f7 cb]bi YXL**

	T ^ ( à^!Áëá^)	Öá^&ç)	T æ ) æ à^ ŽaÈ Èeá	Š ( &ç ) ŽeÁ á
î H	T ÚGÓ	T ç	ÈÈÈÍ	I ÈÈ
ï I	T ÚGÈ	Ý	€	F ÈÈ
î Ì	T ÚGÈ	Z	ÈÍ ÈÈ FI	F ÈÈ
ï Î	T ÚGÈ	T ç	€	F ÈÈ
ï Ï	T ÚGÓ	Ý	€	F ÈÈ
ï Ì	T ÚGÓ	Z	ÈÈÈÍ Í	F ÈÈ
î J	T ÚGÓ	T ç	ÈÈÈÍ	F ÈÈ
ï €	T ÚGÓ	Ý	€	F ÈÈ
ï F	T ÚGÓ	Z	ÈÈÈÈ Í	F ÈÈ
ï G	T ÚGÓ	T ç	ÈÈÈÈÍ	F ÈÈ
ï H	UXÚ	Ý	€	F ÈÈ
ï I	UXÚ	Z	ÈÈÈÈÈ G	F ÈÈ
ï Ì	UXÚ	T ç	€	F ÈÈ
ï Î	T ÚFÓ	Ý	€	I ÈÈ
ï Ï	T ÚFÓ	Z	ÈÈÈÈ F	I ÈÈ
ï Ì	T ÚFÓ	T ç	ÈÈÈÈG	I ÈÈ
ï J	T ÚFÓ	Ý	€	I ÈÈ
ï €	T ÚFÓ	Z	ÈÈÈÈ F	I ÈÈ
ï F	T ÚFÓ	T ç	ÈÈÈÈG	I ÈÈ

**A Ya Vyf'Dc]bhi@UXg'f6 @ '% : '5 bhMbU'K ]f\$ '8 Yf £**

	T ^ ( à^!Áëá^)	Öá^&ç)	T æ ) æ à^ ŽaÈ Èeá	Š ( &ç ) ŽeÁ á
F	T ÚFÈ	Ý	G ÈÍ Í	ÈÈ
G	T ÚFÈ	Z	ÈÈÈÈ H	ÈÈ
H	T ÚFÈ	T ç	ÈÈÈÈÍ	ÈÈ
I	T ÚFÈ	Ý	G ÈÍ Í	Í ÈÈ
Í	T ÚFÈ	Z	ÈÈÈÈÈ H	Í ÈÈ
Î	T ÚFÈ	T ç	ÈÈÈÈÍ	Í ÈÈ
Ï	T ÚFÓ	Ý	GÈÈÈÈ Í	ÈÈ
Ì	T ÚFÓ	Z	ÈÈÈÈÈÈ I	ÈÈ
J	T ÚFÓ	T ç	ÈÈÈÈÈ	ÈÈ
F€	T ÚFÓ	Ý	GÈÈÈÈÈ Í	Í ÈÈ
FF	T ÚFÓ	Z	ÈÈÈÈÈÈÈ I	Í ÈÈ
FG	T ÚFÓ	T ç	ÈÈÈÈÈÈÈ	Í ÈÈ
FH	T ÚFÓ	Ý	G ÈÍ Í	ÈÈ
FI	T ÚFÓ	Z	ÈÈÈÈÈÈÈ H	ÈÈ
FÍ	T ÚFÓ	T ç	ÈÈÈÈÈÈÈ	ÈÈ
FÎ	T ÚFÓ	Ý	G ÈÍ Í	Í ÈÈ
FÏ	T ÚFÓ	Z	ÈÈÈÈÈÈÈÈ H	Í ÈÈ
FÌ	T ÚFÓ	T ç	ÈÈÈÈÈÈÈÈ	Í ÈÈ
FJ	T ÚFÈ	Ý	G ÈÍ Í	ÈÈ
G€	T ÚFÈ	Z	ÈÈÈÈÈÈÈÈ H	ÈÈ
GF	T ÚFÈ	T ç	ÈÈÈÈÈÈÈÈ	ÈÈ
GG	T ÚFÈ	Ý	G ÈÍ Í	Í ÈÈ
GH	T ÚFÈ	Z	ÈÈÈÈÈÈÈÈÈ H	Í ÈÈ
G	T ÚFÈ	T ç	ÈÈÈÈÈÈÈÈÈ	Í ÈÈ
Ĝ	T ÚFÓ	Ý	GÈÈÈÈÈÈÈÈ Í	ÈÈ
Ĝ	T ÚFÓ	Z	ÈÈÈÈÈÈÈÈÈÈ I	ÈÈ
Ĝ	T ÚFÓ	T ç	ÈÈÈÈÈÈÈÈÈÈ	ÈÈ
Ĝ	T ÚFÓ	Ý	GÈÈÈÈÈÈÈÈÈÈ Í	Í ÈÈ
GJ	T ÚFÓ	Z	ÈÈÈÈÈÈÈÈÈÈÈ I	Í ÈÈ





**A Ya Vyf'Dc]bhi@UXg'f6 @ '%: '5 bhMbUK]ft \$'8 Yl H'f7 cb]bi YXL**

	T ^{ à\Aæ ^}	Öã^&ç)	T æ) æ à^ ŽaÈ Eeá	Š &ç) ŽeÁ á
í H	T ÚHÓ	Z	È ÈGJ	I
í I	T ÚHÓ	T ç	€	I
í Í	T ÚGÖ	Y	F È JÌ	I È
í Î	T ÚGÖ	Z	È È F	I È
í Ï	T ÚGÖ	T ç	È È Í	I È
í J	T ÚGÓ	Y	F È JÌ	I È
í K	T ÚGÓ	Z	È È F	I È
í L	T ÚGÓ	T ç	È È	I È
í M	T ÚGÓ	Y	F H È	I È
í N	T ÚGÓ	Z	È È Ì	I È
í O	T ÚGÖ	T ç	€	I È
í P	T ÚGÖ	Y	J È H	F È
í Q	T ÚGÖ	Z	È È H	F È
í R	T ÚGÖ	T ç	È È Í	F È
í S	T ÚGÓ	Y	J È H	F È
í T	T ÚGÓ	Z	È È H	F È
í U	T ÚGÓ	T ç	È È	F È
í V	T ÚGÓ	Y	F H È	F È
í W	T ÚGÓ	Z	È È Ì	F È
í X	T ÚGÓ	T ç	€	F È
í Y	UXÚ	Y	G È Í J	F È
í Z	UXÚ	Z	È È Í	F È
í AA	UXÚ	T ç	€	F È
í AB	T ÚFÓ	Y	I È JÌ	I È
í AC	T ÚFÓ	Z	È È Í	I È
í AD	T ÚFÓ	T ç	È È G	I È
í AE	T ÚFÓ	Y	I È JÌ	I È
í AF	T ÚFÓ	Z	È È FÌ	I È
í AG	T ÚFÓ	T ç	€	I È

**A Ya Vyf'Dc]bhi@UXg'f6 @ '%: '5 bhMbUK]ft \$'8 Yl H**

	T ^{ à\Aæ ^}	Öã^&ç)	T æ) æ à^ ŽaÈ Eeá	Š &ç) ŽeÁ á
F	T ÚFÖ	Y	I È FF	È
G	T ÚFÖ	Z	€	È
H	T ÚFÖ	T ç	È È G	È
I	T ÚFÖ	Y	I È FF	Í È
J	T ÚFÖ	Z	€	Í È
K	T ÚFÖ	T ç	È È G	Í È
L	T ÚFÓ	Y	I J È H	È
M	T ÚFÓ	Z	€	È
N	T ÚFÓ	T ç	È È G	È
O	T ÚFÓ	Y	I J È H	Í È
P	T ÚFÓ	Z	€	Í È
Q	T ÚFÓ	T ç	È È G	Í È
R	T ÚFÓ	Y	I J È H	È
S	T ÚFÓ	Z	€	È
T	T ÚFÓ	T ç	È È Í	È
U	T ÚFÓ	Y	I J È H	Í È
V	T ÚFÓ	Z	€	Í È
W	T ÚFÓ	T ç	È È Í	Í È
X	T ÚFÖ	Y	I È FF	È





**A Ya Vyf'Dc]bh@UXg f6 @ '% : '5 bhYbbUK ]fP&\$ '8 Yl Ł'f' cbh]bi YXL**

	T ^ ( à\!Çëã^)	Öã^&çã }	T æ ) æ ^ à^ ŽãÈ Èëá	Š ğëã } ŽëÄ á
HJ	T ÚHÖE	T ç	ÈëÉ	G
I €	T ÚHÖE	Ý	JÈJÍ	I
I F	T ÚHÖE	Z	Í ÈKJ	I
I G	T ÚHÖE	T ç	ÈëÉ	I
I H	T ÚHÓ	Ý	FÍ ÈÍ J	G
I I	T ÚHÓ	Z	JÈGJ	G
I Í	T ÚHÓ	T ç	€	G
I Î	T ÚHÓ	Ý	FÍ ÈÍ J	I
I Ï	T ÚHÓ	Z	JÈGJ	I
I Ì	T ÚHÓ	T ç	€	I
I J	T ÚHÔ	Ý	JÈJÍ	G
I €	T ÚHÔ	Z	Í ÈKJ	G
I F	T ÚHÔ	T ç	ÈëÉ	G
I G	T ÚHÔ	Ý	JÈJÍ	I
I H	T ÚHÔ	Z	Í ÈKJ	I
I I	T ÚHÔ	T ç	ÈëÉ	I
I Í	T ÚGË	Ý	FÈJÌ	I È
I Î	T ÚGË	Z	Í ÈJ F	I È
I Ï	T ÚGË	T ç	ÈëÉ	I È
I Ì	T ÚGÓ	Ý	FHÈ €	I È
I J	T ÚGÓ	Z	Í ÈÍÍ	I È
I €	T ÚGÓ	T ç	€	I È
I F	T ÚGÓ	Ý	FÈJÌ	I È
I G	T ÚGÓ	Z	Í ÈJ F	I È
I H	T ÚGÓ	T ç	ÈëÉ	I È
I I	T ÚGË	Ý	JÈH	FÈ
I Í	T ÚGË	Z	Í ÈH	FÈ
I Î	T ÚGË	T ç	ÈëÉ	FÈ
I Ï	T ÚGÓ	Ý	FHÈ €	FÈ
I Ì	T ÚGÓ	Z	Í ÈÍÍ	FÈ
I J	T ÚGÓ	T ç	€	FÈ
I €	T ÚGÓ	Ý	JÈH	FÈ
I F	T ÚGÓ	Z	Í ÈH	FÈ
I G	T ÚGÓ	T ç	ÈëÉ	FÈ
I H	UXÚ	Ý	G ÈÍ J	FÈ
I I	UXÚ	Z	FÍ ÈÍ Í	FÈ
I Í	UXÚ	T ç	€	FÈ
I Î	T ÚFÓ	Ý	Í ÈÍÍ	I È
I Ï	T ÚFÓ	Z	Í ÈFÍ	I È
I Ì	T ÚFÓ	T ç	€	I È
I J	T ÚFÓ	Ý	Í ÈJÍ	I È
I €	T ÚFÓ	Z	G ÈÍ Í	I È
I F	T ÚFÔ	T ç	ÈëG	I È

**A Ya Vyf'Dc]bh@UXg f6 @ '&\$' : '5 bhYbbUK ]fP\$ '8 Yl Ł**

	T ^ ( à\!Çëã^)	Öã^&çã }	T æ ) æ ^ à^ ŽãÈ Èëá	Š ğëã } ŽëÄ á
F	T ÚFÖE	Ý	G ÈÍ Í	È
G	T ÚFÖE	Z	I ÈG H	È
H	T ÚFÖE	T ç	ÈëG	È
I	T ÚFÖE	Ý	G ÈÍ Í	Í È
Í	T ÚFÖE	Z	I ÈG H	Í È



**A Ya Vyf Dc ]bh @ UXg f6 @ ' & \$ : ' 5 bh Mb b U K ] f l ) \$ ' 8 Y l k' f l' cb ] bi Y X L**

	T ^ { à ^ ! A c a ^ }	Ö a ^ & c a }	T æ } æ à ^ Ž a B È e á	Š } & c a } Ž e A á
Ā	T ÚFCE	T ĉ	ĚG	Ī Ě
Ä	T ÚFÓ	Ý	G ĚĪ Ī	Ě
Å	T ÚFÓ	Z	I HĚG H	Ě
Ĵ	T ÚFÓ	T ĉ	ĚĪ Ī	Ě
F€	T ÚFÓ	Ý	G ĚĪ Ī	Ī Ě
FF	T ÚFÓ	Z	I HĚG H	Ī Ě
FG	T ÚFÓ	T ĉ	ĚĪ Ī	Ī Ě
FH	T ÚFÓ	Ý	G ĚĪ Ī	Ě
FI	T ÚFÓ	Z	H ĚĪ Ī	Ě
FÍ	T ÚFÓ	T ĉ	ĚG	Ě
FĪ	T ÚFÓ	Ý	G ĚĪ Ī	Ī Ě
FĬ	T ÚFÓ	Z	H ĚĪ Ī	Ī Ě
FÌ	T ÚFÓ	T ĉ	ĚG	Ī Ě
FĴ	T ÚFCE	Ý	G ĚĪ Ī	Ě
G€	T ÚFCE	Z	I HĚG H	Ě
GF	T ÚFCE	T ĉ	ĚĪ Ī	Ě
GG	T ÚFCE	Ý	G ĚĪ Ī	Ī Ě
GH	T ÚFCE	Z	I HĚG H	Ī Ě
GĴ	T ÚFCE	T ĉ	ĚĪ Ī	Ī Ě
Ĝ	T ÚFÓ	Ý	G ĚĪ Ī	Ě
Ġ	T ÚFÓ	Z	I HĚG H	Ě
ĜĪ	T ÚFÓ	T ĉ	ĚG	Ě
ĜĬ	T ÚFÓ	Ý	G ĚĪ Ī	Ī Ě
ĜÌ	T ÚFÓ	Z	I HĚG H	Ī Ě
H€	T ÚFÓ	T ĉ	ĚG	Ī Ě
HF	T ÚFÓ	Ý	G ĚĪ Ī	Ě
HG	T ÚFÓ	Z	H ĚĪ Ī	Ě
HH	T ÚFÓ	T ĉ	ĚG	Ě
HÍ	T ÚFÓ	Ý	G ĚĪ Ī	Ī Ě
HĪ	T ÚFÓ	Z	H ĚĪ Ī	Ī Ě
HÌ	T ÚFÓ	T ĉ	ĚG	Ī Ě
HĴ	T ÚHCE	Ý	Ī Ī Ĵ	G
HĬ	T ÚHCE	Z	F H Ī Ī	G
HÌ	T ÚHCE	T ĉ	ĚĪ Ī	G
I€	T ÚHCE	Ý	Ī Ī Ĵ	I
IF	T ÚHCE	Z	F H Ī Ī	I
IG	T ÚHCE	T ĉ	ĚĪ Ī	I
IĴ	T ÚHÓ	Ý	Ī Ī Ĵ	G
IĬ	T ÚHÓ	Z	F H Ī Ī	G
IÌ	T ÚHÓ	T ĉ	ĚĪ Ī	G
IĴĪ	T ÚHÓ	Ý	Ī Ī Ĵ	I
IĴĬ	T ÚHÓ	Z	F H Ī Ī	I
IĴÌ	T ÚHÓ	T ĉ	ĚĪ Ī	I
IĴĴ	T ÚHÓ	Ý	H Ī Ĵ	G
I€Ī	T ÚHÓ	Z	Ī Ě Ī Ī	G
I€Ĭ	T ÚHÓ	T ĉ	ĚĪ Ī	G
I€Ì	T ÚHÓ	Ý	H Ī Ĵ	I
I€Ĵ	T ÚHÓ	Z	Ī Ě Ī Ī	I
I€ĴĪ	T ÚHÓ	T ĉ	ĚĪ Ī	I
I€ĴĬ	T ÚGCE	Ý	Ī Ī Ĵ	I Ī Ĵ
I€ĴÌ	T ÚGCE	Z	F Ĵ Ī Ĵ	I Ī Ĵ
I€ĴĴ	T ÚGCE	T ĉ	ĚĪ Ī	I Ī Ĵ



**A Ya Vyf'Dc]bhi@UXg'f6 @ '&% '5 bhMbbUK ]f% \$ '8 Y[ k'f' cb]bi YXL**

	T ^{ à\Aþæ ^	Öa^&cã }	T æ } æ à^ ŽaB Èeá	Šj &eai } ŽeA á
Q	T ÚFÓ	Ý	€	È
Q	T ÚFÓ	Z	I HĚ Í G	È
Q	T ÚFÓ	T ç	ÈëëH	È
Q	T ÚFÓ	Ý	€	Í È
Q	T ÚFÓ	Z	I HĚ Í G	Í È
H€	T ÚFÓ	T ç	ÈëëH	Í È
HF	T ÚFÓ	Ý	€	È
HG	T ÚFÓ	Z	I HĚ Í G	È
HH	T ÚFÓ	T ç	ÈĚ Í	È
HI	T ÚFÓ	Ý	€	Í È
HÍ	T ÚFÓ	Z	I HĚ Í G	Í È
HĚ	T ÚFÓ	T ç	ÈĚ Í	Í È
Hš	T ÚHœ	Ý	€	G
Hì	T ÚHœ	Z	FÌ È Í J	G
HJ	T ÚHœ	T ç	€	G
I €	T ÚHœ	Ý	€	I
IF	T ÚHœ	Z	FÌ È Í J	I
IG	T ÚHœ	T ç	€	I
I H	T ÚHó	Ý	€	G
I I	T ÚHó	Z	FÈ Ě FJ	G
I Í	T ÚHó	T ç	ÈĚ Í	G
I Ě	T ÚHó	Ý	€	I
I Ì	T ÚHó	Z	FÈ Ě FJ	I
I Ï	T ÚHó	T ç	ÈĚ Í	I
I J	T ÚHó	Ý	€	G
I €	T ÚHó	Z	FÈ Ě FJ	G
I F	T ÚHó	T ç	ÈĚ Í	G
I G	T ÚHó	Ý	€	I
I H	T ÚHó	Z	FÈ Ě FJ	I
I I	T ÚHó	T ç	ÈĚ Í	I
I Í	T ÚGœ	Ý	€	I È
I Ě	T ÚGœ	Z	FÌ È FÌ	I È
I Ï	T ÚGœ	T ç	€	I È
I Ì	T ÚGó	Ý	€	I È
I J	T ÚGó	Z	FĞ FĞ G	I È
I €	T ÚGó	T ç	ÈĚ Í	I È
I F	T ÚGó	Ý	€	I È
I G	T ÚGó	Z	FĞ FĞ G	I È
I H	T ÚGó	T ç	ÈĚ Í	I È
I I	T ÚGœ	Ý	€	FÈ
I Í	T ÚGœ	Z	FÌ È FÌ	FÈ
I Ě	T ÚGœ	T ç	€	FÈ
I Ï	T ÚGó	Ý	€	FÈ
I Ì	T ÚGó	Z	FÈ Ě Í	FÈ
I J	T ÚGó	T ç	ÈĚ Í	FÈ
I €	T ÚGó	Ý	€	FÈ
I F	T ÚGó	Z	FÈ Ě Í	FÈ
I G	T ÚGó	T ç	ÈĚ Í	FÈ
I H	UXÚ	Ý	€	FÈ
I I	UXÚ	Z	G È G	FÈ
I Í	UXÚ	T ç	€	FÈ
I Ě	T ÚFÓ	Ý	€	I È

**A Ya Vyf'Dc]bh@UXg'f6 @' &% '5 bhYbbUK ]f7% \$'8 Yl'É'f7 cbh]bi YXL**

	T\{ à¹/Àæ ^	Öä^&ç¹	T æ) æ à¹ ZaÈ Èeá	Š } &ç¹) ŽeÄ á
İ	T ÚFÓ	Z	I È HF	I È
ı	T ÚFÓ	T ç	ÈÈG	I È
İ J	T ÚFÔ	Y	€	I È
İ €	T ÚFÔ	Z	I È HF	I È
İ F	T ÚFÔ	T ç	ÈÈG	I È

**A Ya Vyf'Dc]bh@UXg'f6 @' &&. '5 bhYbbUK ]f8% \$'8 Yl'É**

	T\{ à¹/Àæ ^	Öä^&ç¹	T æ) æ à¹ ZaÈ Èeá	Š } &ç¹) ŽeÄ á
F	T ÚFœ	Y	ÈG ÈJ Í	È
G	T ÚFœ	Z	I ÈG H	È
H	T ÚFœ	T ç	È È Í	È
I	T ÚFœ	Y	ÈG ÈJ Í	Í È
Í	T ÚFœ	Z	I ÈG H	Í È
Î	T ÚFœ	T ç	È È Í	Í È
İ	T ÚFÓ	Y	ÈÈG Í	È
ì	T ÚFÓ	Z	H È È I	È
J	T ÚFÓ	T ç	ÈÈG	È
F€	T ÚFÓ	Y	ÈÈG Í	Í È
FF	T ÚFÓ	Z	H È È I	Í È
FG	T ÚFÓ	T ç	ÈÈG	Í È
FH	T ÚFÔ	Y	ÈG ÈJ Í	È
FI	T ÚFÔ	Z	I ÈG H	È
FÍ	T ÚFÔ	T ç	ÈÈG	È
FÌ	T ÚFÔ	Y	ÈG ÈJ Í	Í È
Fİ	T ÚFÔ	Z	I ÈG H	Í È
Fİ	T ÚFÔ	T ç	ÈÈG	Í È
FJ	T ÚFœ	Y	ÈG ÈJ Í	È
G€	T ÚFœ	Z	I ÈG H	È
GF	T ÚFœ	T ç	ÈÈG	È
GG	T ÚFœ	Y	ÈG ÈJ Í	Í È
GH	T ÚFœ	Z	I ÈG H	Í È
G	T ÚFœ	T ç	ÈÈG	Í È
Ĝ	T ÚFÓ	Y	ÈÈG Í	È
ğ	T ÚFÓ	Z	H È È I	È
Ğ	T ÚFÓ	T ç	ÈÈG	È
Ĝ	T ÚFÓ	Y	ÈÈG Í	Í È
GJ	T ÚFÓ	Z	H È È I	Í È
H€	T ÚFÓ	T ç	ÈÈG	Í È
HF	T ÚFÔ	Y	ÈG ÈJ Í	È
HG	T ÚFÔ	Z	I ÈG H	È
HH	T ÚFÔ	T ç	È È Í	È
H	T ÚFÔ	Y	ÈG ÈJ Í	Í È
HÍ	T ÚFÔ	Z	I ÈG H	Í È
HÌ	T ÚFÔ	T ç	È È Í	Í È
HĬ	T ÚHœ	Y	È È J	G
Hİ	T ÚHœ	Z	FH È H	G
HJ	T ÚHœ	T ç	ÈÈ	G
I €	T ÚHœ	Y	È È J	I
I F	T ÚHœ	Z	FH È H	I
I G	T ÚHœ	T ç	ÈÈ	I
I H	T ÚHÓ	Y	ÈÈ J	G

**A Ya Vyf'Dc]bh@UXg f6 @ ' & . ' 5 bhYbbUK ]fB%\$ '8 Yl Łł'f' cbh]bi YXL**

	Tˆ{ àˆ!ã ˆ!	Ôãˆ&ç! }	T æ ) æ àˆ žaë Èëá	Š ëëá ) Žëã á
ll	T ÚHÓ	Z	î È í í	G
ll	T ÚHÓ	T ç	ëëë	G
ll	T ÚHÓ	Ý	ëëë í J	I
ll	T ÚHÓ	Z	î È í í	I
ll	T ÚHÓ	T ç	ëëë	I
lJ	T ÚHÔ	Ý	ëëë í J	G
l€	T ÚHÔ	Z	FHë H	G
lF	T ÚHÔ	T ç	ëëë	G
lG	T ÚHÔ	Ý	ëëë í J	I
lH	T ÚHÔ	Z	FHë H	I
ll	T ÚHÔ	T ç	ëëë	I
ll	T ÚGË	Ý	ëëë í	I È
ll	T ÚGË	Z	Fëë í F	I È
ll	T ÚGË	T ç	ëëë	I È
ll	T ÚGÓ	Ý	ëëë í G	I È
lJ	T ÚGÓ	Z	Jëë í F	I È
l€	T ÚGÓ	T ç	ëëë	I È
lF	T ÚGÓ	Ý	ëëë í	I È
lG	T ÚGÓ	Z	Fëë í F	I È
lH	T ÚGÓ	T ç	ëëë	I È
ll	T ÚGË	Ý	ëëë í	FÈ
ll	T ÚGË	Z	Fëë í	FÈ
ll	T ÚGË	T ç	ëëë	FÈ
ll	T ÚGÓ	Ý	ëëë í F	FÈ
ll	T ÚGÓ	Z	î È í	FÈ
lJ	T ÚGÓ	T ç	ëëë	FÈ
l€	T ÚGÔ	Ý	ëëë í	FÈ
lF	T ÚGÔ	Z	Fëë í	FÈ
lG	T ÚGÔ	T ç	ëëë	FÈ
lH	UXÚ	Ý	ëëë FH	FÈ
ll	UXÚ	Z	Gëë é	FÈ
ll	UXÚ	T ç	€	FÈ
ll	T ÚFÓ	Ý	ëëë í	I È
ll	T ÚFÓ	Z	Gëë í F	I È
ll	T ÚFÓ	T ç	ëëë G	I È
lJ	T ÚFÔ	Ý	ëëë í í	I È
l€	T ÚFÔ	Z	î È í	I È
lF	T ÚFÔ	T ç	ëëë G	I È

**A Ya Vyf'Dc]bh@UXg f6 @ ' & . ' 5 bhYbbUK ]fB(\$ '8 Yl Łł**

	Tˆ{ àˆ!ã ˆ!	Ôãˆ&ç! }	T æ ) æ àˆ žaë Èëá	Š ëëá ) Žëã á
F	T ÚFCE	Ý	ëëë È ëH	È
G	T ÚFCE	Z	Gëë G	È
H	T ÚFCE	T ç	ëëë	È
I	T ÚFCE	Ý	ëëë È ëH	í È
l	T ÚFCE	Z	Gëë G	í È
l	T ÚFCE	T ç	ëëë	í È
l	T ÚFÓ	Ý	ëëë È ëH	È
l	T ÚFÓ	Z	Gëë G	È
J	T ÚFÓ	T ç	ëëë	È
F€	T ÚFÓ	Ý	ëëë È ëH	í È

**A Ya Vyf'Dc]bh@UXg'f6 @ ' & ' . ' 5 bhMbU'K ]fB(\$'8 Y[ L'f'7 cbh]bi YXL**

	T^ { à^! / Ææ^ }	Öä^ & ç^ }	T æ } æ à^ / çæ È Eeá	Š } & çæ } ŽeÁ á
FF	T ÚFÓ	Z	GFÈ Ğ	Í È
FG	T ÚFÓ	T ç	ËëëH	Í È
FH	T ÚFÔ	Ý	Ë Í ÈÍ H	È
FI	T ÚFÔ	Z	Ğ È Ĥ	È
FÍ	T ÚFÔ	T ç	Ë	È
FÎ	T ÚFÔ	Ý	Ë Í ÈÍ H	Í È
FÏ	T ÚFÔ	Z	Ğ È Ĥ	Í È
FÌ	T ÚFÔ	T ç	Ë	Í È
FJ	T ÚFœ	Ý	ËÍ È ÈH	È
G€	T ÚFœ	Z	GFÈ Ğ	È
GF	T ÚFœ	T ç	ËëëH	È
GG	T ÚFœ	Ý	ËÍ È ÈH	Í È
GH	T ÚFœ	Z	GFÈ Ğ	Í È
G	T ÚFœ	T ç	ËëëH	Í È
Ğ	T ÚFÓ	Ý	ËÍ È ÈH	È
Ğ	T ÚFÓ	Z	GFÈ Ğ	È
Ğ	T ÚFÓ	T ç	ËËÍ	È
Ğ	T ÚFÓ	Ý	ËÍ È ÈH	Í È
GJ	T ÚFÓ	Z	GFÈ Ğ	Í È
H€	T ÚFÓ	T ç	ËËÍ	Í È
HF	T ÚFÔ	Ý	Ë Í ÈÍ H	È
HG	T ÚFÔ	Z	Ğ È Ĥ	È
HH	T ÚFÔ	T ç	Ë	È
HÍ	T ÚFÔ	Ý	Ë Í ÈÍ H	Í È
HÏ	T ÚFÔ	Z	Ğ È Ĥ	Í È
HÌ	T ÚFÔ	T ç	Ë	Í È
HĬ	T ÚHœ	Ý	Ë È È Ĵ	G
HĪ	T ÚHœ	Z	Í È Ĵ	G
HJ	T ÚHœ	T ç	ËËÍ	G
I€	T ÚHœ	Ý	Ë È È Ĵ	I
IF	T ÚHœ	Z	Í È Ĵ	I
IG	T ÚHœ	T ç	ËËÍ	I
IH	T ÚHó	Ý	Ë È È Ĵ	G
IĬ	T ÚHó	Z	Í È Ĵ	G
IĪ	T ÚHó	T ç	ËËÍ	G
IĴ	T ÚHó	Ý	Ë È È Ĵ	I
IÏ	T ÚHó	Z	Í È Ĵ	I
IÌ	T ÚHó	T ç	ËËÍ	I
IJ	T ÚHô	Ý	Ë Í È Í J	G
Í€	T ÚHô	Z	J È Ĵ	G
ÍF	T ÚHô	T ç	€	G
ÍG	T ÚHô	Ý	Ë Í È Í J	I
ÍH	T ÚHô	Z	J È Ĵ	I
ÍĬ	T ÚGœ	T ç	€	I
ÍĪ	T ÚGœ	Ý	Ë È È Ĵ	I È
ÍĴ	T ÚGœ	Z	Í È F	I È
ÍĶ	T ÚGœ	T ç	ËËÍ	I È
ÍĴ	T ÚGó	Ý	Ë È È Ĵ	I È
ÍJ	T ÚGó	Z	Í È F	I È
Í€	T ÚGó	T ç	ËËÍ	I È
ÍF	T ÚGó	Ý	Ë È È Ĵ	I È
ÍG	T ÚGó	Z	Í È Í	I È



**A Ya Vyf Dc ]bh @ UXg f6 @ ' & ( . ' 5 bhMb bUK ]fB+\$ ' 8 Y[ k'f'7 cbh]bi YXL**

	T^ { à^! /Aæ^ ^ }	Ôã^ & çã }	T æ } æ à^ /Aæ^ ^ Êëá	Š } & çã } ŽëÁ á
H€	T ÚFÓ	T ç	Êëí	í Êë
HF	T ÚFÔ	Ý	Êë JÊHH	Êë
HG	T ÚFÔ	Z	€	Êë
HH	T ÚFÔ	T ç	ÊëG	Êë
H	T ÚFÔ	Ý	Êë JÊHH	í Êë
Hí	T ÚFÔ	Z	€	í Êë
Hî	T ÚFÔ	T ç	ÊëG	í Êë
Hï	T ÚHœ	Ý	Êë ÊH	G
Hì	T ÚHœ	Z	€	G
Hj	T ÚHœ	T ç	Êë	G
I€	T ÚHœ	Ý	Êë ÊH	I
IF	T ÚHœ	Z	€	I
IG	T ÚHœ	T ç	Êë	I
IH	T ÚHó	Ý	Êëí Êí J	G
Ií	T ÚHó	Z	€	G
Iî	T ÚHó	T ç	Êë	G
Iï	T ÚHó	Ý	Êëí Êí J	I
Iì	T ÚHó	Z	€	I
Ij	T ÚHó	T ç	Êë	I
Ij€	T ÚHó	Ý	Êëí Êí J	G
IjF	T ÚHó	Z	€	G
IjG	T ÚHó	T ç	Êë	G
IjH	T ÚHó	Ý	Êëí Êí J	I
Ijí	T ÚHó	Z	€	I
Ijî	T ÚGœ	Ý	Êë Êí G	I Êë
Ijï	T ÚGœ	Z	€	I Êë
Ijï	T ÚGœ	T ç	Êë	I Êë
Ijì	T ÚGó	Ý	Êëí Êë Fí	I Êë
IjJ	T ÚGó	Z	€	I Êë
Ij€	T ÚGó	T ç	Êë	I Êë
IjF	T ÚGó	Ý	Êëí Êë Fí	I Êë
IjG	T ÚGó	Z	€	I Êë
IjH	T ÚGó	T ç	Êë	I Êë
IjI	T ÚGœ	Ý	Êë Êë G	FÊë
IjÍ	T ÚGœ	Z	€	FÊë
IjÎ	T ÚGœ	T ç	Êë	FÊë
IjÏ	T ÚGó	Ý	Êëí Êë Fí	FÊë
IjÌ	T ÚGó	Z	€	FÊë
IjJ	T ÚGó	T ç	Êë	FÊë
Ij€	T ÚGó	Ý	Êëí Êë Fí	FÊë
IjF	T ÚGó	Z	€	FÊë
IjG	T ÚGó	T ç	Êë	FÊë
IjH	UXÚ	Ý	Êë Êë Fí	FÊë
IjI	UXÚ	Z	€	FÊë
IjÍ	UXÚ	T ç	€	FÊë
IjÎ	T ÚFÓ	Ý	Êë Êë H	I Êë
IjÏ	T ÚFÓ	Z	€	I Êë
IjJ	T ÚFÓ	T ç	ÊëG	I Êë
Ij€	T ÚFÓ	Ý	Êë Êë H	I Êë
IjF	T ÚFÓ	Z	€	I Êë
IjG	T ÚFÓ	T ç	ÊëG	I Êë







**A Ya Vyf Dc ]bh @ UXg f6 @ ' & \* : ' 5 bh Mb b UK ] fl ' \$ ' 8 Yl k f l' cbh ] bi YXL**

	T ^{ à^!Aæ ^}	Öá ^ & ç }	T æ } æ à ^ Ža È Eeá	Š } & ç } Že Ā á
GE	T ÚFOE	Z	È HEG H	È
GF	T ÚFOE	T ç	È Í	È
GG	T ÚFOE	Y	ÈG ÈÍ Î	Í È
GH	T ÚFOE	Z	È HEG H	Í È
GI	T ÚFOE	T ç	È Í	Í È
GJ	T ÚFO	Y	ÈG ÈÍ Î	È
GK	T ÚFO	Z	È HEG H	È
GL	T ÚFO	T ç	ÈG	È
GM	T ÚFO	Y	ÈG ÈÍ Î	Í È
GN	T ÚFO	Z	È HEG H	Í È
GO	T ÚFO	T ç	ÈG	Í È
GP	T ÚFO	Y	ÈG ÈÍ Î	È
GQ	T ÚFO	Z	È HEG H	È
GR	T ÚFO	T ç	ÈG	È
GS	T ÚFO	Y	ÈG ÈÍ Î	Í È
GT	T ÚFO	Z	È HEG H	Í È
HU	T ÚHOE	Y	È ÈÍ J	G
HV	T ÚHOE	Z	È ÈÈ H	G
HW	T ÚHOE	T ç	ÈÈ	G
HX	T ÚHOE	Y	È ÈÍ J	I
HY	T ÚHOE	Z	È ÈÈ H	I
HZ	T ÚHOE	T ç	ÈÈ	I
IA	T ÚHÓ	Y	È ÈÍ J	G
IB	T ÚHÓ	Z	È ÈÈ H	G
IC	T ÚHÓ	T ç	ÈÈ	G
ID	T ÚHÓ	Y	È ÈÍ J	I
IE	T ÚHÓ	Z	È ÈÈ H	I
IF	T ÚHÓ	T ç	ÈÈ	I
IG	T ÚHÓ	Y	È ÈÍ J	I È
IH	T ÚHÓ	Z	È ÈÈ H	I È
II	T ÚHÓ	T ç	ÈÈ	I È
IJ	T ÚHÓ	Y	È ÈÍ J	I È
IK	T ÚHÓ	Z	È ÈÈ H	I È
IL	T ÚHÓ	T ç	ÈÈ	I È
IM	T ÚGÖ	Y	È ÈÍ	I È
IN	T ÚGÖ	Z	È ÈÍ F	I È
IO	T ÚGÖ	T ç	ÈÈ	I È
IP	T ÚGÖ	Y	È ÈÍ	I È
IQ	T ÚGÖ	Z	È ÈÍ F	I È
IR	T ÚGÖ	T ç	ÈÈ	I È
IS	T ÚGÖ	Y	È ÈÍ G	I È
IT	T ÚGÖ	Z	È ÈÍ F	I È
IU	T ÚGÖ	T ç	ÈÈ	I È
IV	T ÚGÖ	Y	È ÈÍ	F È
IY	T ÚGÖ	Z	È ÈÍ	F È
IZ	T ÚGÖ	T ç	ÈÈ	F È
JA	T ÚGÓ	Y	È ÈÍ	F È
JB	T ÚGÓ	Z	È ÈÍ	F È
JC	T ÚGÓ	T ç	ÈÈ	F È
JD	T ÚGÓ	Y	È ÈÍ	F È
JE	T ÚGÓ	Z	È ÈÍ	F È
JF	T ÚGÓ	T ç	ÈÈ	F È
JG	T ÚGÓ	Y	È ÈÍ F	F È
JH	T ÚGÓ	Z	È ÈÍ F	F È
JI	T ÚGÓ	T ç	ÈÈ	F È
JK	T ÚGÓ	Y	È ÈÍ	F È
JL	T ÚGÓ	Z	È ÈÍ	F È
JM	T ÚGÓ	T ç	ÈÈ	F È
JN	T ÚGÓ	Y	È ÈÍ	F È
JO	T ÚGÓ	Z	È ÈÍ	F È
JP	T ÚGÓ	T ç	ÈÈ	F È
JQ	T ÚGÓ	Y	È ÈÍ	F È
JR	T ÚGÓ	Z	È ÈÍ	F È
JS	T ÚGÓ	T ç	ÈÈ	F È
JT	T ÚGÓ	Y	È ÈÍ	F È
JU	T ÚGÓ	Z	È ÈÍ	F È
JV	T ÚGÓ	T ç	ÈÈ	F È
JW	T ÚGÓ	Y	È ÈÍ	F È
JX	T ÚGÓ	Z	È ÈÍ	F È
JY	T ÚGÓ	T ç	ÈÈ	F È
JZ	T ÚGÓ	Y	È ÈÍ	F È















**A Ya Vyf'Dc]bh@UXg f6 @ ' '\$: '5 bhYbbUK a 'ft\$'8 Yl t'f' cbh]bi YXL**

	T^{\ à^!Aæ^}	Öa^&ç)}	T æ) æ à^ ŽaÈ Èeá	Š } &ç)} ŽeĀ á
ll	T ÚHÓ	Z	€	G
ll	T ÚHÓ	Tç	ÈÈF	G
ll	T ÚHÓ	Y	I ÈÍ H	I
ll	T ÚHÓ	Z	€	I
ll	T ÚHÓ	Tç	ÈÈF	I
lJ	T ÚHÓ	Y	I ÈÍ H	G
l€	T ÚHÓ	Z	€	G
lF	T ÚHÓ	Tç	ÈÈF	G
lG	T ÚHÓ	Y	I ÈÍ H	I
lH	T ÚHÓ	Z	€	I
ll	T ÚHÓ	Tç	ÈÈF	I
ll	T ÚGÈ	Y	GÈ H	I È
ll	T ÚGÈ	Z	€	I È
ll	T ÚGÈ	Tç	ÈÈF	I È
ll	T ÚGÓ	Y	HÈ È	I È
lJ	T ÚGÓ	Z	€	I È
l€	T ÚGÓ	Tç	ÈÈÈÈF	I È
lF	T ÚGÓ	Y	HÈ È	I È
lG	T ÚGÓ	Z	€	I È
lH	T ÚGÓ	Tç	ÈÈÈÈF	I È
ll	T ÚGÈ	Y	GÈ H G	FÈ
ll	T ÚGÈ	Z	€	FÈ
ll	T ÚGÈ	Tç	ÈÈÈF	FÈ
ll	T ÚGÓ	Y	HÈ I G	FÈ
ll	T ÚGÓ	Z	€	FÈ
lJ	T ÚGÓ	Tç	ÈÈÈÈ Ì Ì	FÈ
l€	T ÚGÓ	Y	HÈ I G	FÈ
lF	T ÚGÓ	Z	€	FÈ
lG	T ÚGÓ	Tç	ÈÈÈÈ Ì Ì	FÈ
lH	UXÚ	Y	I ÈH	FÈ
ll	UXÚ	Z	€	FÈ
ll	UXÚ	Tç	€	FÈ
ll	T ÚFÓ	Y	GÈGH	I ÈÈ
ll	T ÚFÓ	Z	€	I ÈÈ
ll	T ÚFÓ	Tç	ÈÈÈÈ È	I ÈÈ
lJ	T ÚFÓ	Y	GÈGH	I ÈÈ
l€	T ÚFÓ	Z	€	I ÈÈ
lF	T ÚFÓ	Tç	ÈÈÈÈ È	I ÈÈ

**A Ya Vyf'Dc]bh@UXg f6 @ ' '\$: '5 bhYbbUK a 'fp&\$'8 Yl t**

	T^{\ à^!Aæ^}	Öa^&ç)}	T æ) æ à^ ŽaÈ Èeá	Š } &ç)} ŽeĀ á
F	T ÚFÈ	Y	I ÈÍ H	ÈÈ
G	T ÚFÈ	Z	HÈ J	ÈÈ
H	T ÚFÈ	Tç	ÈÈÈÈ	ÈÈ
I	T ÚFÈ	Y	I ÈÍ H	I ÈÈ
l	T ÚFÈ	Z	HÈ J	I ÈÈ
l	T ÚFÈ	Tç	ÈÈÈÈ	I ÈÈ
l	T ÚFÓ	Y	I ÈI	ÈÈ
l	T ÚFÓ	Z	I ÈH	ÈÈ
J	T ÚFÓ	Tç	ÈÈÈÈ	ÈÈ
F€	T ÚFÓ	Y	I ÈI	I ÈÈ







**A Ya Vyf Dc]bh@UXg f6 @ ' ' ' . 5 bhMbUK a fl% \$ 8 YJ tL**

	T ^{ à^!Aëë^	Öá^&ç }	T æ) æ à^ ŽaB Èëá	Š ěëë  ŽëÁ á
F	T ÚFÖE	Ý	€	È
G	T ÚFÖE	Z	ì ëí J	È
H	T ÚFÖE	T ç	ëëí	È
I	T ÚFÖE	Ý	€	í È
Í	T ÚFÖE	Z	ì ëí J	í È
Ī	T ÚFÖE	T ç	ëëí	í È
İ	T ÚFÓ	Ý	€	È
Ì	T ÚFÓ	Z	î È HU	È
J	T ÚFÓ	T ç	ëëí	È
F€	T ÚFÓ	Ý	€	í È
FF	T ÚFÓ	Z	î È HU	í È
FG	T ÚFÓ	T ç	ëëí	í È
FH	T ÚFÔ	Ý	€	È
FI	T ÚFÔ	Z	î È HU	È
FÍ	T ÚFÔ	T ç	ëëëhí J	È
FĪ	T ÚFÔ	Ý	€	í È
FÌ	T ÚFÔ	Z	î È HU	í È
Fİ	T ÚFÔ	T ç	ëëëhí J	í È
FJ	T ÚFÖE	Ý	€	È
G€	T ÚFÖE	Z	ì ëí J	È
GF	T ÚFÖE	T ç	ëëí	È
GG	T ÚFÖE	Ý	€	í È
GH	T ÚFÖE	Z	ì ëí J	í È
G	T ÚFÖE	T ç	ëëí	í È
Ĝ	T ÚFÓ	Ý	€	È
Ğ	T ÚFÓ	Z	î È HU	È
Ĝ	T ÚFÓ	T ç	ëëëhí J	È
Ĝ	T ÚFÓ	Ý	€	í È
GJ	T ÚFÓ	Z	î È HU	í È
H€	T ÚFÓ	T ç	ëëëhí J	í È
HF	T ÚFÔ	Ý	€	È
HG	T ÚFÔ	Z	î È HU	È
HH	T ÚFÔ	T ç	ëëí	È
H	T ÚFÔ	Ý	€	í È
HÍ	T ÚFÔ	Z	î È HU	í È
HĪ	T ÚFÔ	T ç	ëëí	í È
HÌ	T ÚHÖE	Ý	€	G
Hİ	T ÚHÖE	Z	ì ëí Ī	G
HJ	T ÚHÖE	T ç	€	G
I€	T ÚHÖE	Ý	€	I
IF	T ÚHÖE	Z	ì ëí Ī	I
IG	T ÚHÖE	T ç	€	I
IH	T ÚHÓ	Ý	€	G
II	T ÚHÓ	Z	Ğ Ĝ	G
Í	T ÚHÓ	T ç	ëëëF	G
Ī	T ÚHÓ	Ý	€	I
Ì	T ÚHÓ	Z	Ğ Ĝ	I
İ	T ÚHÓ	T ç	ëëëF	I
IJ	T ÚHÓ	Ý	€	G
Í€	T ÚHÓ	Z	Ğ Ĝ	G
ÍF	T ÚHÓ	T ç	ëëëF	G
ÍG	T ÚHÓ	Ý	€	I











**A Ya Vyf'Dc]bh@UXg'f6 @' '\*.'5bhYbbUK a 'fB+\$'8 YJ H'f' c]h]bi YXL**

	T^({ à\A@a^)	Öá^&ç})	T æ } æ à^ ŽaÉ Eeá	Š } &çá ) ŽeÁ á
Í	T ÚFOE	T ç	É€€H	Í É
Ï	T ÚFÓ	Ý	É É Í H	É
Ì	T ÚFÓ	Z	€	É
J	T ÚFÓ	T ç	É€€H	É
F€	T ÚFÓ	Ý	É É Í H	Í É
FF	T ÚFÓ	Z	€	Í É
FG	T ÚFÓ	T ç	É€€H	Í É
FH	T ÚFÒ	Ý	É É Í H	É
FI	T ÚFÒ	Z	€	É
FÍ	T ÚFÒ	T ç	É€€Í	É
FÎ	T ÚFÒ	Ý	É É Í H	Í É
FÏ	T ÚFÒ	Z	€	Í É
FÌ	T ÚFÒ	T ç	É€€Í	Í É
FJ	T ÚFOE	Ý	É É H G	É
G€	T ÚFOE	Z	€	É
GF	T ÚFOE	T ç	É€€H	É
GG	T ÚFOE	Ý	É É H G	Í É
GH	T ÚFOE	Z	€	Í É
G	T ÚFOE	T ç	É€€H	Í É
Q	T ÚFÓ	Ý	É É Í H	É
Q	T ÚFÓ	Z	€	É
Q	T ÚFÓ	T ç	É€€Í	É
Q	T ÚFÓ	Ý	É É Í H	Í É
Q	T ÚFÓ	Z	€	Í É
H€	T ÚFÓ	T ç	É€€Í	Í É
HF	T ÚFÒ	Ý	É É Í H	É
HG	T ÚFÒ	Z	€	É
HH	T ÚFÒ	T ç	É€€H	É
HI	T ÚFÒ	Ý	É É Í H	Í É
HÍ	T ÚFÒ	Z	€	Í É
HÎ	T ÚFÒ	T ç	É€€H	Í É
HÏ	T ÚHOE	Ý	É É F F	G
HÌ	T ÚHOE	Z	€	G
HJ	T ÚHOE	T ç	É€€ Í Í	G
I€	T ÚHOE	Ý	É É F F	I
IF	T ÚHOE	Z	€	I
IG	T ÚHOE	T ç	É€€ Í Í	I
IH	T ÚHÓ	Ý	É É Í H	G
II	T ÚHÓ	Z	€	G
IÍ	T ÚHÓ	T ç	É€€F	G
IÏ	T ÚHÓ	Ý	É É Í H	I
IÌ	T ÚHÓ	Z	€	I
I	T ÚHÓ	T ç	É€€F	I
IJ	T ÚHÒ	Ý	É É Í H	G
I€	T ÚHÒ	Z	€	G
IF	T ÚHÒ	T ç	É€€F	G
IG	T ÚHÒ	Ý	É É Í H	I
IH	T ÚHÒ	Z	€	I
II	T ÚHÒ	T ç	É€€F	I
IÍ	T ÚG€E	Ý	É G É H	I É
IÏ	T ÚG€E	Z	€	I É
IÌ	T ÚG€E	T ç	É€€F	I É



Ó[ { ]æ^ K  
 Ô•ã}^! K  
 Rã^~{ à^! K  
 T[ à^/Aæ^ ^ K íëëëhíííHÉZY 'TV' ŠU' P

R' } ^AGI ÉGEGH  
 FREGÁUT  
 Ô@&^àÁÓK''''

**A Ya Vyf'Dc]bhi@UXg f6 @ ' \* : ' 5 bhYbbUK a 'fB+\$'8 YJ tL'f' cbi]bi YXL**

	T^ ( à^/Aæ^ ^)	Öä^&çä}	T æ } æ à^ ŽaÉ Eeá	Š &çä } ŽeÁ á
íí	T ÚGÓ	Ý	ÈÈÈ È	I È
íJ	T ÚGÓ	Z	È	I È
í€	T ÚGÓ	T ç	ÈÈÈÈ ÈF	I È
íF	T ÚGÓ	Ý	ÈÈÈ È	I È
íG	T ÚGÓ	Z	È	I È
íH	T ÚGÓ	T ç	ÈÈÈÈ ÈF	I È
íI	T ÚGÈ	Ý	ÈÈH I G	F È
íÍ	T ÚGÈ	Z	È	F È
íÎ	T ÚGÈ	T ç	ÈÈÈÈ ÈF	F È
íï	T ÚGÓ	Ý	ÈÈÈ I G	F È
íì	T ÚGÓ	Z	È	F È
íJ	T ÚGÓ	T ç	ÈÈÈÈ I Î	F È
í€	T ÚGÓ	Ý	ÈÈÈ I G	F È
íF	T ÚGÓ	Z	È	F È
íG	T ÚGÓ	T ç	ÈÈÈÈ I Î	F È
íH	UXÚ	Ý	È ÈH	F È
íI	UXÚ	Z	È	F È
íÍ	UXÚ	T ç	È	F È
íÎ	T ÚFÓ	Ý	ÈÈÈGH	I È
íì	T ÚFÓ	Z	È	I È
íï	T ÚFÓ	T ç	ÈÈÈÈ ÈI	I È
íJ	T ÚFÓ	Ý	ÈÈÈGH	I È
í€	T ÚFÓ	Z	È	I È
íF	T ÚFÓ	T ç	ÈÈÈÈ ÈI	I È

**A Ya Vyf'Dc]bhi@UXg f6 @ ' + : ' 5 bhYbbUK a 'fI \$\$'8 YJ tL**

	T^ ( à^/Aæ^ ^)	Öä^&çä}	T æ } æ à^ ŽaÉ Eeá	Š &çä } ŽeÁ á
F	T ÚFÈ	Ý	È È È H	È
G	T ÚFÈ	Z	ÈÈÈ J	È
H	T ÚFÈ	T ç	ÈÈÈH	È
I	T ÚFÈ	Ý	È È È H	I È
Í	T ÚFÈ	Z	ÈÈÈ J	I È
Î	T ÚFÈ	T ç	ÈÈÈH	I È
ï	T ÚFÓ	Ý	È È I	È
ì	T ÚFÓ	Z	È ÈH	È
J	T ÚFÓ	T ç	ÈÈ	È
F€	T ÚFÓ	Ý	È È I	I È
FF	T ÚFÓ	Z	È ÈH	I È
FG	T ÚFÓ	T ç	ÈÈ	I È
FH	T ÚFÓ	Ý	È È È H	È
FI	T ÚFÓ	Z	ÈÈÈ J	È
FÍ	T ÚFÓ	T ç	ÈÈÈ	È
FÎ	T ÚFÓ	Ý	È È È H	I È
Fï	T ÚFÓ	Z	ÈÈÈ J	I È
Fì	T ÚFÓ	T ç	ÈÈÈ	I È
FJ	T ÚFÈ	Ý	È È È H	È
G€	T ÚFÈ	Z	ÈÈÈ J	È
GF	T ÚFÈ	T ç	ÈÈ	È
GG	T ÚFÈ	Ý	È È È H	I È
GH	T ÚFÈ	Z	ÈÈÈ J	I È
G	T ÚFÈ	T ç	ÈÈ	I È



**A Ya Vyf'Dc]bh@UXgf6 @ " +: '5 bhYbbUK a 'fl '\$\$ '8 Yf t't' c b]bi YXL**

	T\{ à^!Åëá\}	Öá^&ç}	T æ ) æ à^ žaÈ Èeá	Š } &ëá } ŽeĀ á
İİ	T ÚFÓ	Z	ÈÈÈFİ	I È
İi	T ÚFÓ	T ç	€	I È
İJ	T ÚFÔ	Y	ÈÈÈIG	I È
İ€	T ÚFÔ	Z	ÈÈ€F	I È
İF	T ÚFÔ	T ç	ÈÈÈGF	I È

**A Ya Vyf'Dc]bh@UXgf6 @ " , : '5 bhYbbUK a 'fl ' \$ '8 Yf t**

	T\{ à^!Åëá\}	Öá^&ç}	T æ ) æ à^ žaÈ Èeá	Š } &ëá } ŽeĀ á
F	T ÚFÇE	Y	ÈÈÈİİ	È
G	T ÚFÇE	Z	ÈÈÈIF	È
H	T ÚFÇE	T ç	ÈÈÈH	È
I	T ÚFÇE	Y	ÈÈÈİİ	İ È
Í	T ÚFÇE	Z	ÈÈÈIF	İ È
Î	T ÚFÇE	T ç	ÈÈÈH	İ È
ï	T ÚFÓ	Y	ÈÈÈİİ	È
ì	T ÚFÓ	Z	ÈÈÈIF	È
J	T ÚFÓ	T ç	ÈÈÈ	È
F€	T ÚFÓ	Y	ÈÈÈİİ	İ È
FF	T ÚFÓ	Z	ÈÈÈIF	İ È
FG	T ÚFÓ	T ç	ÈÈÈ	İ È
FH	T ÚFÔ	Y	ÈÈÈFİ	È
Fİ	T ÚFÔ	Z	ÈÈÈGG	È
FÍ	T ÚFÔ	T ç	ÈÈÈH	È
FĪ	T ÚFÔ	Y	ÈÈÈFİ	İ È
Fì	T ÚFÔ	Z	ÈÈÈGG	İ È
Fì	T ÚFÔ	T ç	ÈÈÈH	İ È
FJ	T ÚFÇE	Y	ÈÈÈİİ	È
G€	T ÚFÇE	Z	ÈÈÈIF	È
GF	T ÚFÇE	T ç	ÈÈÈ	È
GG	T ÚFÇE	Y	ÈÈÈİİ	İ È
GH	T ÚFÇE	Z	ÈÈÈIF	İ È
G	T ÚFÇE	T ç	ÈÈÈ	İ È
Ĝ	T ÚFÓ	Y	ÈÈÈİİ	È
ğ	T ÚFÓ	Z	ÈÈÈIF	È
Ĝ	T ÚFÓ	T ç	ÈÈÈH	È
Ĝ	T ÚFÓ	Y	ÈÈÈİİ	İ È
GJ	T ÚFÓ	Z	ÈÈÈIF	İ È
H€	T ÚFÓ	T ç	ÈÈÈH	İ È
HF	T ÚFÔ	Y	ÈÈÈFİ	È
HG	T ÚFÔ	Z	ÈÈÈGG	È
HH	T ÚFÔ	T ç	ÈÈÈH	È
Hİ	T ÚFÔ	Y	ÈÈÈFİ	İ È
HÍ	T ÚFÔ	Z	ÈÈÈGG	İ È
HĪ	T ÚFÔ	T ç	ÈÈÈH	İ È
Hì	T ÚHÇE	Y	ÈÈÈİİ	G
Hì	T ÚHÇE	Z	ÈÈÈJİ	G
HJ	T ÚHÇE	T ç	ÈÈÈF	G
I€	T ÚHÇE	Y	ÈÈÈİİ	I
IF	T ÚHÇE	Z	ÈÈÈJİ	I
IG	T ÚHÇE	T ç	ÈÈÈF	I
IH	T ÚHÓ	Y	ÈÈÈİİ	G



**A Ya Vyf'Dc]bhi@UXg'f6 @ ; \$ : ' @ & L**

	T ^ { à\Aæ ^ }	Öä^&ç } }	T æ } æ à ^ žã È é á	Š &ç } žã á
F	ŠX	Ÿ	€	€

**A Ya Vyf'Dc]bhi@UXg'f6 @ ; % ' 5 bHbU'j l**

	T ^ { à\Aæ ^ }	Öä^&ç } }	T æ } æ à ^ žã È é á	Š &ç } žã á
F	T ÚFœ	Ÿ	ÈÈÍ F	È
G	T ÚFœ	T ^	ÈÈÈJ	È
H	T ÚFœ	T :	ÈÈF	È
I	T ÚFœ	Ÿ	ÈÈÍ F	Í È
Í	T ÚFœ	T ^	ÈÈÈJ	Í È
Î	T ÚFœ	T :	ÈÈF	Í È
Ï	T ÚFó	Ÿ	ÈÈÍ F	È
Ì	T ÚFó	T ^	ÈÈÈ Í H	È
J	T ÚFó	T :	ÈÈG	È
F€	T ÚFó	Ÿ	ÈÈÍ F	Í È
FF	T ÚFó	T ^	ÈÈÈ Í H	Í È
FG	T ÚFó	T :	ÈÈG	Í È
FH	T ÚFó	Ÿ	ÈÈÍ F	È
FI	T ÚFó	T ^	ÈÈG	È
FÍ	T ÚFó	T :	ÈÈÈFI	È
FÎ	T ÚFó	Ÿ	ÈÈÍ F	Í È
FÏ	T ÚFó	T ^	ÈÈG	Í È
FÌ	T ÚFó	T :	ÈÈÈFI	Í È
FJ	T ÚFœ	Ÿ	ÈÈÍ F	È
G€	T ÚFœ	T ^	ÈÈÈJ	È
GF	T ÚFœ	T :	ÈÈF	È
GG	T ÚFœ	Ÿ	ÈÈÍ F	Í È
GH	T ÚFœ	T ^	ÈÈÈJ	Í È
GI	T ÚFœ	T :	ÈÈF	Í È
GÍ	T ÚFó	Ÿ	ÈÈÍ F	È
GÎ	T ÚFó	T ^	ÈÈG	È
GÏ	T ÚFó	T :	ÈÈÈFI	È
GÌ	T ÚFó	Ÿ	ÈÈÍ F	Í È
GJ	T ÚFó	T ^	ÈÈG	Í È
H€	T ÚFó	T :	ÈÈÈFI	Í È
HF	T ÚFó	Ÿ	ÈÈÍ F	È
HG	T ÚFó	T ^	ÈÈÈ Í H	È
HH	T ÚFó	T :	ÈÈG	È
HI	T ÚFó	Ÿ	ÈÈÍ F	Í È
HÍ	T ÚFó	T ^	ÈÈÈ Í H	Í È
HÎ	T ÚFó	T :	ÈÈG	Í È
HÏ	T ÚHœ	Ÿ	ÈÈÈ Í	G
HÌ	T ÚHœ	T ^	ÈÈÈHÍ	G
HJ	T ÚHœ	T :	€	G
I€	T ÚHœ	Ÿ	ÈÈÈ Í	I
IF	T ÚHœ	T ^	ÈÈÈHÍ	I
IG	T ÚHœ	T :	€	I
IH	T ÚHó	Ÿ	ÈÈÈ Í	G
II	T ÚHó	T ^	ÈÈÈ Í J	G
IÍ	T ÚHó	T :	ÈÈÈ FH	G
IÎ	T ÚHó	Ÿ	ÈÈÈ Í	I
IÌ	T ÚHó	T ^	ÈÈÈ Í J	I





**A Ya Vyf'Dc]bh@UXg f6 @' ; & . '5 bhYbbU9\ 'f\$ '8 Yl ŁŁf7 cb]bi YXL**

	T^{\ à^!Aæ^}	Öa^&cá}	T æ) æ à^ ŽaÉ Èeá	Š ëeá) ŽeÁ á
Fí	T ÚFOE	Z	È È EG	Í È
Fî	T ÚFOE	T ç	È È	Í È
Fï	T ÚFÓ	Z	È È EG	È
Fì	T ÚFÓ	T ç	È È EG I	È
FJ	T ÚFÓ	Z	È È EG	Í È
G€	T ÚFÓ	T ç	È È EG I	Í È
Gf	T ÚFÓ	Z	È È EG	È
Gg	T ÚFÓ	T ç	È È	È
Gh	T ÚFÓ	Z	È È EG	Í È
Gi	T ÚFÓ	T ç	È È	Í È
Gĭ	T ÚHCE	Z	È È JG	G
Gî	T ÚHCE	T ç	€	G
Gï	T ÚHCE	Z	È È JG	I
Gì	T ÚHCE	T ç	€	I
GJ	T ÚHÓ	Z	È È JG	G
H€	T ÚHÓ	T ç	È È EG	G
Hf	T ÚHÓ	Z	È È JG	I
Hg	T ÚHÓ	T ç	È È EG	I
Hh	T ÚHÓ	Z	È È JG	G
Hi	T ÚHÓ	T ç	È È EG	G
Hĭ	T ÚHÓ	Z	È È JG	I
Hî	T ÚHÓ	T ç	È È EG	I
Hï	T ÚGCE	Z	È È I	I È
Hì	T ÚGCE	T ç	€	I È
HJ	T ÚGÓ	Z	È È I	I È
I€	T ÚGÓ	T ç	È È H	I È
If	T ÚGÓ	Z	È È I	I È
Ig	T ÚGÓ	T ç	È È H	I È
Ih	T ÚGCE	Z	È È I	F È
Ii	T ÚGCE	T ç	€	F È
Iĭ	T ÚGÓ	Z	È È I	F È
Iî	T ÚGÓ	T ç	È È H	F È
Iï	T ÚGÓ	Z	È È I	F È
Iì	T ÚGÓ	T ç	È È H	F È
Ij	UXÚ	Z	È È I	F È
I€	UXÚ	T ç	€	F È
ÍF	T ÚFÓ	Z	È È JÍ	I È
ÍG	T ÚFÓ	T ç	È È EG GF	I È
ÍH	T ÚFÓ	Z	È È JÍ	I È
ÍI	T ÚFÓ	T ç	È È EG GF	I È

**A Ya Vyf'Dc]bh@UXg f6 @' ; ' . '5 bhYbbU9\ 'f\$ '8 Yl ŁŁ**

	T^{\ à^!Aæ^}	Öa^&cá}	T æ) æ à^ ŽaÉ Èeá	Š ëeá) ŽeÁ á
F	T ÚFOE	Y	I È EG	È
G	T ÚFOE	T ç	È È EG	È
H	T ÚFOE	Y	I È EG	Í È
I	T ÚFOE	T ç	È È EG	Í È
Í	T ÚFÓ	Y	I È EG	È
Ī	T ÚFÓ	T ç	È È EG	È
İ	T ÚFÓ	Y	I È EG	Í È
Ì	T ÚFÓ	T ç	È È EG	Í È





**A Ya Vyf'8 ]gfh]Vi hYX' @ UXg'f6 @ (%. 'Gfi Wh fY'K c 'f6'8 Y] H'f' c b]h]bi YXL**

	T^{ à^!Àæ^}	Öã^&ç}	ÚçæÁ æ} æ à^ ŽaD€€€D) áÁ æ} æ à^ ŽaD€€€E ÚçæÁ Š &ç} ŽdÁ á	Ò) áÁ Š &ç} ŽdÁ á
GH	TH	Y	€	€
G	TH	Z	€€€G	€€€G
Q	TH	Y	€	€
Q	TH	Z	€€€G	€€€G
Q	TUHÔ	Y	€	€
Q	TUHÔ	Z	€€€FG	€€€FG
GJ	TUFÔ	Y	€	€
H€	TUFÔ	Z	€€€FG	€€€FG
HF	TUGÔ	Y	€	€
HG	TUGÔ	Z	€€€FH	€€€FH
HH	TÍH	Y	€	€
HI	TÍH	Z	€€€G	€€€G
HÍ	TÍI	Y	€	€
HÍ	TÍI	Z	€€€G	€€€G
Hİ	TUHÓ	Y	€	€
Hİ	TUHÓ	Z	€€€FG	€€€FG
HJ	TUFÓ	Y	€	€
I€	TUFÓ	Z	€€€FG	€€€FG
IF	TUGÓ	Y	€	€
IG	TUGÓ	Z	€€€FH	€€€FH
IH	TÍI	Y	€	€
II	TÍI	Z	€€€FG	€€€FG
ÍI	TÍIÖE	Y	€	€
ÍI	TÍIÖE	Z	€€€FG	€€€FG
Iİ	UXÚ	Y	€	€
Iİ	UXÚ	Z	€€€FG	€€€FG
IJ	TÍJ	Y	€	€
Í€	TÍJ	Z	€€€FG	€€€FG
ÍF	TÍÍÔ	Y	€	€
ÍG	TÍÍÔ	Z	€€€FG	€€€FG
ÍH	TÍJÖE	Y	€	€
ÍI	TÍJÖE	Z	€€€FG	€€€FG

**A Ya Vyf'8 ]gfh]Vi hYX' @ UXg'f6 @ (&. 'Gfi Wh fY'K c 'f1' \$'8 Y] H**

	T^{ à^!Àæ^}	Öã^&ç}	ÚçæÁ æ} æ à^ ŽaD€€€D) áÁ æ} æ à^ ŽaD€€€E ÚçæÁ Š &ç} ŽdÁ á	Ò) áÁ Š &ç} ŽdÁ á
F	TF	Y	Í€€Í	Í€€Í
G	TF	Z	€€€Í	€€€Í
H	TG	Y	€	€
I	TG	Z	€	€
Í	Tİ	Y	F€€U	F€€U
Î	Tİ	Z	€€€F	€€€F
İ	TÌ	Y	F€€I	F€€I
Ì	TÌ	Z	€€€ÍJ	€€€ÍJ
J	TFH	Y	F€€U	F€€U
F€	TFH	Z	€€€F	€€€F
FF	TFI	Y	F€€I	F€€I
FG	TFI	Z	€€€ÍJ	€€€ÍJ
FH	TGH	Y	H€€JG	H€€JG
FI	TGH	Z	€€€J	€€€J
FÍ	SX	Y	H€€JG	H€€JG
Fİ	SX	Z	€€€J	€€€J











Ô({ ]æˆ K  
 Ô•ā}^ K  
 Rā{ à! K  
 T[ à\Aæ ^ KíëëHííiHÉZYˆTVˆŠUˆP

Rˆ^ÅI ÉœœH  
 FÉGAÚT  
 Ó@&ˆaÁOˆKˆˆˆˆ

**A Ya Vyf'8 jghjvi hyx'@ Uxg'f6 @' ( ) : Gfi Wh fy'K c'fv&\$ 8 Y tL**

T^ ( à!\Aæ^)		Öä^&çj)	ÙcœA æ) æ à^ZaD(È) áA æ) æ à^ZaD(È) ÙcœA(Ç &œ) ZœA á	ÙcœA(Ç &œ) ZœA á	ÙcœA(Ç &œ) ZœA á	ÙcœA(Ç &œ) ZœA á
F	TF	Ý	€	€	€	Å FEE
G	TF	Z	€	€	€	Å FEE
H	TG	Ý	GÉÍ J	GÉÍ J	€	Å FEE
I	TG	Z	FÈHG	FÈHG	€	Å FEE
Í	TÍ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
Î	TÍ	Z	IÈH	IÈH	€	Å FEE
Ï	TÌ	Ý	ÍËJ	ÍËJ	€	Å FEE
Ì	TÌ	Z	HÉÍ	HÉÍ	€	Å FEE
J	TFH	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
F€	TFH	Z	IÈH	IÈH	€	Å FEE
FF	TFI	Ý	ÍËJ	ÍËJ	€	Å FEE
FG	TFI	Z	HÉÍ	HÉÍ	€	Å FEE
FH	TGH	Ý	GÉF	GÉF	€	Å FEE
FI	TGH	Z	FÉÍ	FÉÍ	€	Å FEE
FÍ	SX	Ý	GÉF	GÉF	€	Å FEE
FÌ	SX	Z	FÉÍ	FÉÍ	€	Å FEE
FÏ	TÚHœ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
FÎ	TÚHœ	Z	IÈÍ	IÈÍ	€	Å FEE
FJ	TÚFœ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
œ	TÚFœ	Z	IÈÍ	IÈÍ	€	Å FEE
GF	TÚGœ	Ý	JÉÍH	JÉÍH	€	Å FEE
GG	TÚGœ	Z	IÈH	IÈH	€	Å FEE
GH	THÍ	Ý	GÉF	GÉF	€	Å FEE
G	THÍ	Z	FÉÍ	FÉÍ	€	Å FEE
GÍ	THU	Ý	GÉF	GÉF	€	Å FEE
GÌ	THU	Z	FÉÍ	FÉÍ	€	Å FEE
GÏ	TÚHÔ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
GÎ	TÚHÔ	Z	IÈÍ	IÈÍ	€	Å FEE
GJ	TÚFÔ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
Hœ	TÚFÔ	Z	IÈÍ	IÈÍ	€	Å FEE
HF	TÚGÔ	Ý	JÉÍH	JÉÍH	€	Å FEE
HG	TÚGÔ	Z	IÈH	IÈH	€	Å FEE
HH	TÍH	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
H	TÍH	Z	IÈÍ	IÈÍ	€	Å FEE
HÍ	TÍI	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
HÌ	TÍI	Z	IÈÍ	IÈÍ	€	Å FEE
HÏ	TÚHÔ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
HÎ	TÚHÔ	Z	IÈÍ	IÈÍ	€	Å FEE
HJ	TÚFÔ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
I€	TÚFÔ	Z	IÈÍ	IÈÍ	€	Å FEE
IF	TÚGÔ	Ý	JÉÍH	JÉÍH	€	Å FEE
IG	TÚGÔ	Z	IÈH	IÈH	€	Å FEE
IH	TÍI	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
II	TÍI	Z	IÈÍ	IÈÍ	€	Å FEE
Í	TÍÍœ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
Î	TÍÍœ	Z	IÈÍ	IÈÍ	€	Å FEE
Ï	UXÚ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
Ì	UXÚ	Z	IÈÍ	IÈÍ	€	Å FEE
IJ	TÍJ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
Í€	TÍJ	Z	IÈÍ	IÈÍ	€	Å FEE
ÍF	TÍÍœ	Ý	ÍÉÍ	ÍÉÍ	€	Å FEE
ÍG	TÍÍœ	Z	IÈÍ	IÈÍ	€	Å FEE







**A Ya Vyf'8 jglfjVi hYX'@ UXg'f6 @ '(, : 'Gfi Wf fY'K c'fB'\$ 8 Yj HfV cbjbi YXL**

T^{ á^/Áá^}	Öá^&á}	ÚcáoÁ á} á^ á^ŽáDfííí) áÁ á} á^ á^ŽáDfííí ÚcáoÁ} &á}	ŽáÁ á	Ó) áÁ} &á}	ŽáÁ á	
HÍ	TÍÍ	Y	€	€	€	Ā FEE
HÍ	TÍÍ	Z	€	€	€	Ā FEE
HĪ	T ÚHÓ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
HĪ	T ÚHÓ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
HJ	T ÚFÓ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
I €	T ÚFÓ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
IF	T ÚGÓ	Y	Ě Ě H	Ě Ě H	€	Ā FEE
IG	T ÚGÓ	Z	J Ě H	J Ě H	€	Ā FEE
IH	T ÍÍ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
II	T ÍÍ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
IÍ	T ÍÍŒ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
IÍ	T ÍÍŒ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
IĪ	UXÚ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
IĪ	UXÚ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
IJ	T ÍJ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
Í €	T ÍJ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
ÍF	T ÍÍŒ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
ÍG	T ÍÍŒ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
ÍH	T ÍJŒ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
ÍI	T ÍJŒ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE

**A Ya Vyf'8 jglfjVi hYX'@ UXg'f6 @ '(- : 'Gfi Wf fY'K c'fB'(\$ 8 Yj Hf**

T^{ á^/Áá^}	Öá^&á}	ÚcáoÁ á} á^ á^ŽáDfííí) áÁ á} á^ á^ŽáDfííí ÚcáoÁ} &á}	ŽáÁ á	Ó) áÁ} &á}	ŽáÁ á	
F	TF	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
G	TF	Z	Ì Ě H	Ì Ě H	€	Ā FEE
H	TG	Y	Ě Ě J	Ě Ě J	€	Ā FEE
I	TG	Z	H Ě Í	H Ě Í	€	Ā FEE
Í	TĪ	Y	€	€	€	Ā FEE
Î	TĪ	Z	€	€	€	Ā FEE
Ī	TÌ	Y	Ě Ě J	Ě Ě J	€	Ā FEE
Ī	TÌ	Z	F Ě H	F Ě H	€	Ā FEE
J	TFH	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
F €	TFH	Z	Ì Ě H	Ì Ě H	€	Ā FEE
FF	TFI	Y	Ě Ě J	Ě Ě J	€	Ā FEE
FG	TFI	Z	H Ě Í	H Ě Í	€	Ā FEE
FH	TGH	Y	Ě Ě F	Ě Ě F	€	Ā FEE
FI	TGH	Z	F Ě Í	F Ě Í	€	Ā FEE
FÍ	ŠX	Y	Ě Ě F	Ě Ě F	€	Ā FEE
FĪ	ŠX	Z	F Ě Í	F Ě Í	€	Ā FEE
FĪ	T ÚHOE	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
FĪ	T ÚHOE	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
FJ	T ÚFOE	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
G €	T ÚFOE	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
GF	T ÚGOE	Y	Ě Ě H	Ě Ě H	€	Ā FEE
GG	T ÚGOE	Z	Ì Ě H	Ì Ě H	€	Ā FEE
GH	TH	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
G	TH	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
GĪ	THJ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
GĪ	THJ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE
GĪ	T ÚHÓ	Y	Ě Ě Í	Ě Ě Í	€	Ā FEE
GĪ	T ÚHÓ	Z	Ì Ě Í	Ì Ě Í	€	Ā FEE



**A Ya Vyf'8 ]g]f]Vi hYX' @ UXg'f6 @ ) \$ : 'Gfi Wñ fy'K c 'f6+\$ 8 Y] H'fV' cb]h]bi YXL**

	T^{ à^!Áæ^}	Öá^&ç}	ÚcæÁ æ } á à^ ŽaD(É) áÁ æ } á à^ ŽaD(É) ÚcæÁ &ç } ŽdÁ á	Ò) áÁ &ç } ŽdÁ á		
GH	TH	Y	Ě Ě I I	Ě Ě I I	€	Ä FEE
G	TH	Z	€	€	€	Ä FEE
Q	THU	Y	Ě Ě I I	Ě Ě I I	€	Ä FEE
Q	THU	Z	€	€	€	Ä FEE
Q	T ÚHÔ	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
Q	T ÚHÔ	Z	€	€	€	Ä FEE
Q	T ÚFÔ	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
H€	T ÚFÔ	Z	€	€	€	Ä FEE
HF	T ÚGÔ	Y	Ě Ě Ě H	Ě Ě Ě H	€	Ä FEE
HG	T ÚGÔ	Z	€	€	€	Ä FEE
HH	T Í H	Y	Ě Ě I I	Ě Ě I I	€	Ä FEE
H	T Í H	Z	€	€	€	Ä FEE
H	T Í I	Y	Ě Ě I I	Ě Ě I I	€	Ä FEE
H	T Í I	Z	€	€	€	Ä FEE
H	T ÚHÓ	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
H	T ÚHÓ	Z	€	€	€	Ä FEE
HJ	T ÚFÓ	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I €	T ÚFÓ	Z	€	€	€	Ä FEE
IF	T ÚGÓ	Y	Ě Ě Ě H	Ě Ě Ě H	€	Ä FEE
IG	T ÚGÓ	Z	€	€	€	Ä FEE
I H	T Í I	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I I	T Í I	Z	€	€	€	Ä FEE
I I	T Í I ÖE	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I I	T Í I ÖE	Z	€	€	€	Ä FEE
I I	UXÚ	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I I	UXÚ	Z	€	€	€	Ä FEE
I J	T Í J	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I €	T Í J	Z	€	€	€	Ä FEE
I F	T Í I Ó	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I G	T Í I Ó	Z	€	€	€	Ä FEE
I H	T Í J ÖE	Y	Ě Ě FG	Ě Ě FG	€	Ä FEE
I I	T Í J ÖE	Z	€	€	€	Ä FEE

**A Ya Vyf'8 ]g]f]Vi hYX' @ UXg'f6 @ ) % : 'Gfi Wñ fy'K c 'f1 \$\$ 8 Y] H**

	T^{ à^!Áæ^}	Öá^&ç}	ÚcæÁ æ } á à^ ŽaD(É) áÁ æ } á à^ ŽaD(É) ÚcæÁ &ç } ŽdÁ á	Ò) áÁ &ç } ŽdÁ á		
F	TF	Y	€	€	€	Ä FEE
G	TF	Z	€	€	€	Ä FEE
H	TG	Y	Ě Ě I J	Ě Ě I J	€	Ä FEE
I	TG	Z	Ě Ě H G	Ě Ě H G	€	Ä FEE
I	T I	Y	Ě Ě I	Ě Ě I	€	Ä FEE
I	T I	Z	Ě Ě I H	Ě Ě I H	€	Ä FEE
I	T I	Y	Ě Ě J	Ě Ě J	€	Ä FEE
I	T I	Z	Ě Ě I I	Ě Ě I I	€	Ä FEE
J	T FH	Y	Ě Ě I	Ě Ě I	€	Ä FEE
F€	T FH	Z	Ě Ě I H	Ě Ě I H	€	Ä FEE
FF	T FI	Y	Ě Ě J	Ě Ě J	€	Ä FEE
FG	T FI	Z	Ě Ě I I	Ě Ě I I	€	Ä FEE
FH	T GH	Y	Ě Ě F I	Ě Ě F I	€	Ä FEE
FI	T GH	Z	Ě Ě I I	Ě Ě I I	€	Ä FEE
F I	SX	Y	Ě Ě F I	Ě Ě F I	€	Ä FEE
F I	SX	Z	Ě Ě I I	Ě Ě I I	€	Ä FEE





**A Ya Vyf'8 ]g]f ]Vi hYX' @ UXg'f6 @ )' &: 'Gfi Wh fy'K c'f1 ' \$ 8 Y] Hf'V' cb]bi YXL**

T ^ { à^! /Šca^ \}	Öá^&á)	ÚcáoA' æ } á' à^ ŽaD'fíE) áA' æ } á' à^ ŽaD'fíE' ÚcáoŠ' &ca) Žd'Á á	Ó) á'Š' &ca) Žd'Á á					
FF	T FI	Y	€	€	€	€	€	€
FG	T FI	Z	€	€	€	€	€	€
FH	T GH	Y	€	€	€	€	€	€
FI	T GH	Z	€	€	€	€	€	€
FÍ	ŠX	Y	€	€	€	€	€	€
FÌ	ŠX	Z	€	€	€	€	€	€
FĪ	T ÚHOE	Y	€	€	€	€	€	€
Fİ	T ÚHOE	Z	€	€	€	€	€	€
FJ	T ÚFOE	Y	€	€	€	€	€	€
G€	T ÚFOE	Z	€	€	€	€	€	€
GF	T ÚGOE	Y	€	€	€	€	€	€
GG	T ÚGOE	Z	€	€	€	€	€	€
GH	T H̄	Y	€	€	€	€	€	€
G	T H̄	Z	€	€	€	€	€	€
Ḡ	T HU	Y	€	€	€	€	€	€
Ḡ	T HU	Z	€	€	€	€	€	€
G̃	T ÚHÔ	Y	€	€	€	€	€	€
Ḡ	T ÚHÔ	Z	€	€	€	€	€	€
GJ	T ÚFÔ	Y	€	€	€	€	€	€
H€	T ÚFÔ	Z	€	€	€	€	€	€
HF	T ÚGÔ	Y	€	€	€	€	€	€
HG	T ÚGÔ	Z	€	€	€	€	€	€
HH	T ÍH	Y	€	€	€	€	€	€
HI	T ÍH	Z	€	€	€	€	€	€
HÍ	T ÍI	Y	€	€	€	€	€	€
HÌ	T ÍI	Z	€	€	€	€	€	€
HĪ	T ÚHÓ	Y	€	€	€	€	€	€
Hİ	T ÚHÓ	Z	€	€	€	€	€	€
HJ	T ÚFÓ	Y	€	€	€	€	€	€
I€	T ÚFÓ	Z	€	€	€	€	€	€
IF	T ÚGÓ	Y	€	€	€	€	€	€
IG	T ÚGÓ	Z	€	€	€	€	€	€
IH	T ÍI	Y	€	€	€	€	€	€
II	T ÍI	Z	€	€	€	€	€	€
IÍ	T ÍIOE	Y	€	€	€	€	€	€
IĪ	T ÍIOE	Z	€	€	€	€	€	€
IĴ	UXÚ	Y	€	€	€	€	€	€
Iİ	UXÚ	Z	€	€	€	€	€	€
IJ	T ÍJ	Y	€	€	€	€	€	€
I€	T ÍJ	Z	€	€	€	€	€	€
ÍF	T ÍIO	Y	€	€	€	€	€	€
ÍG	T ÍIO	Z	€	€	€	€	€	€
ÍH	T ÍJOE	Y	€	€	€	€	€	€
ÍI	T ÍJOE	Z	€	€	€	€	€	€

**A Ya Vyf'8 ]g]f ]Vi hYX' @ UXg'f6 @ )' ' : 'Gfi Wh fy'K ]'f6'8 Y] H**

T ^ { à^! /Šca^ \}	Öá^&á)	ÚcáoA' æ } á' à^ ŽaD'fíE) áA' æ } á' à^ ŽaD'fíE' ÚcáoŠ' &ca) Žd'Á á	Ó) á'Š' &ca) Žd'Á á					
F	TF	Y	€	€	€	€	€	€
G	TF	Z	€	€	€	€	€	€
H	TG	Y	€	€	€	€	€	€
I	TG	Z	€	€	€	€	€	€



**A Ya Vyf'8 ]gfh]Vi hYX' @ Uxg'f6 @' ) ( : 'Gfi Wñ fy'K ]'fi \$'8 Y] tL**

	T^ { }á^/Áëá^	Öá^&á}	ÚcëóÁ æ } á^ á^ZáD(íí) áÁ æ } á^ á^ZáD(íí) ÚcëóÁ } &á}	ZáÁ á	Ó) áÁ } &á}	ZáÁ á
F	TF	Y	FÉ É	FÉ É	€	Á FEE
G	TF	Z	ÉÉ É	ÉÉ É	€	Á FEE
H	TG	Y	€	€	€	Á FEE
I	TG	Z	€	€	€	Á FEE
Í	TÍ	Y	ÉÍ Í	ÉÍ Í	€	Á FEE
Ī	TĪ	Z	ÉĪ Ī	ÉĪ Ī	€	Á FEE
İ	Tİ	Y	GG İ	GG İ	€	Á FEE
Ĭ	TĬ	Z	ÉĬ Ĭ	ÉĬ Ĭ	€	Á FEE
J	TFH	Y	ÉÍ Í	ÉÍ Í	€	Á FEE
F€	TFH	Z	ÉĪ Ī	ÉĪ Ī	€	Á FEE
FF	TFI	Y	GG İ	GG İ	€	Á FEE
FG	TFI	Z	ÉĬ Ĭ	ÉĬ Ĭ	€	Á FEE
FH	TGH	Y	FEG	FEG	€	Á FEE
FI	TGH	Z	ÉFG	ÉFG	€	Á FEE
FÍ	SX	Y	FEG	FEG	€	Á FEE
FĪ	SX	Z	ÉFG	ÉFG	€	Á FEE
Fİ	T ÚHOE	Y	FÉ H	FÉ H	€	Á FEE
FĬ	T ÚHOE	Z	ÉÉ H	ÉÉ H	€	Á FEE
FJ	T ÚFOE	Y	FÉ H	FÉ H	€	Á FEE
G€	T ÚFOE	Z	ÉÉ H	ÉÉ H	€	Á FEE
GF	T ÚGOE	Y	FÉ FH	FÉ FH	€	Á FEE
GG	T ÚGOE	Z	ÉÉ F	ÉÉ F	€	Á FEE
GH	TH	Y	FEG	FEG	€	Á FEE
G	TH	Z	ÉFG	ÉFG	€	Á FEE
GÍ	THU	Y	FEG	FEG	€	Á FEE
GĪ	THU	Z	ÉFG	ÉFG	€	Á FEE
Gİ	T ÚHÔ	Y	FÉ H	FÉ H	€	Á FEE
GĬ	T ÚHÔ	Z	ÉÉ H	ÉÉ H	€	Á FEE
GJ	T ÚFÔ	Y	FÉ H	FÉ H	€	Á FEE
H€	T ÚFÔ	Z	ÉÉ H	ÉÉ H	€	Á FEE
HF	T ÚGÔ	Y	FÉ FH	FÉ FH	€	Á FEE
HG	T ÚGÔ	Z	ÉÉ F	ÉÉ F	€	Á FEE
HH	TÍH	Y	€	€	€	Á FEE
H	TÍH	Z	€	€	€	Á FEE
HÍ	TÍI	Y	€	€	€	Á FEE
HĪ	TÍI	Z	€	€	€	Á FEE
Hİ	T ÚHÔ	Y	FÉ H	FÉ H	€	Á FEE
HĬ	T ÚHÔ	Z	ÉÉ H	ÉÉ H	€	Á FEE
HJ	T ÚFÔ	Y	FÉ H	FÉ H	€	Á FEE
I€	T ÚFÔ	Z	ÉÉ H	ÉÉ H	€	Á FEE
IF	T ÚGÔ	Y	FÉ FH	FÉ FH	€	Á FEE
IG	T ÚGÔ	Z	ÉÉ F	ÉÉ F	€	Á FEE
IH	TÍI	Y	FÉ H	FÉ H	€	Á FEE
II	TÍI	Z	ÉÉ H	ÉÉ H	€	Á FEE
IÍ	TÍÍOE	Y	FÉ H	FÉ H	€	Á FEE
IĪ	TÍÍOE	Z	ÉÉ H	ÉÉ H	€	Á FEE
Iİ	UXÚ	Y	FÉ H	FÉ H	€	Á FEE
IĬ	UXÚ	Z	ÉÉ H	ÉÉ H	€	Á FEE
IJ	TÍJ	Y	FÉ H	FÉ H	€	Á FEE
I€	TÍJ	Z	ÉÉ H	ÉÉ H	€	Á FEE
ÍF	TÍÍÔ	Y	FÉ H	FÉ H	€	Á FEE
ÍG	TÍÍÔ	Z	ÉÉ H	ÉÉ H	€	Á FEE





**A Ya Vyf 8 ]g]f ]Vi hyX' @ UXg' f6 @ ' ) \* . : ' Ghf i Wñ fy'K ]'fl \$'8 Yl tL'f7 cb]h]bi YXL**

	T { à^!^áæ^}	Ôá^&á}	ÚcëóÁ æ} á à^!^áæ^	áÁ æ} á à^!^áæ^	ÚcëóÁ &æ} ŽdÁ á	Ò) áÁ &æ} ŽdÁ á
IF	T ÚGÓ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
IG	T ÚGÓ	Z	€	€	€	Ă FEE
IH	T ÍÍ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
II	T ÍÍ	Z	€	€	€	Ă FEE
ÍÍ	T ÍÍŒ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
ÎÎ	T ÍÍŒ	Z	€	€	€	Ă FEE
IÏ	T UXÚ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
IÌ	T UXÚ	Z	€	€	€	Ă FEE
IJ	T ÍJ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
Í€	T ÍJ	Z	€	€	€	Ă FEE
ÍF	T ÍÍŒ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
ÍG	T ÍÍŒ	Z	€	€	€	Ă FEE
ÍH	T ÍJŒ	Ý	HĚ Ě	HĚ Ě	€	Ă FEE
ÍI	T ÍJŒ	Z	€	€	€	Ă FEE

**A Ya Vyf 8 ]g]f ]Vi hyX' @ UXg' f6 @ ' ) + . : ' Ghf i Wñ fy'K ]'fl &\$'8 Yl tL**

	T { à^!^áæ^}	Ôá^&á}	ÚcëóÁ æ} á à^!^áæ^	áÁ æ} á à^!^áæ^	ÚcëóÁ &æ} ŽdÁ á	Ò) áÁ &æ} ŽdÁ á
F	TF	Ý	€	€	€	Ă FEE
G	TF	Z	€	€	€	Ă FEE
H	TG	Ý	Í Ě F	Í Ě F	€	Ă FEE
I	TG	Z	HĚ Ě	HĚ Ě	€	Ă FEE
Í	TÍ	Ý	FĚ Í	FĚ Í	€	Ă FEE
Î	TÍ	Z	FĚ Ě	FĚ Ě	€	Ă FEE
Ï	TÌ	Ý	FĚ Í	FĚ Í	€	Ă FEE
Ì	TÌ	Z	Ě Í J	Ě Í J	€	Ă FEE
J	T FH	Ý	FĚ Í	FĚ Í	€	Ă FEE
F€	T FH	Z	FĚ Ě	FĚ Ě	€	Ă FEE
FF	T FI	Ý	FĚ Í	FĚ Í	€	Ă FEE
FG	T FI	Z	Ě Í J	Ě Í J	€	Ă FEE
FH	T GH	Ý	Ě Ě	Ě Ě	€	Ă FEE
FI	T GH	Z	Ě Ě	Ě Ě	€	Ă FEE
FÍ	ŠX	Ý	Ě Ě	Ě Ě	€	Ă FEE
FÌ	ŠX	Z	Ě Ě	Ě Ě	€	Ă FEE
FÏ	T ÚHOE	Ý	GĚ Í	GĚ Í	€	Ă FEE
FÌ	T ÚHOE	Z	FĚ Ě	FĚ Ě	€	Ă FEE
FJ	T ÚFOE	Ý	GĚ Í	GĚ Í	€	Ă FEE
G€	T ÚFOE	Z	FĚ Ě	FĚ Ě	€	Ă FEE
GF	T ÚGOE	Ý	HĚ Í	HĚ Í	€	Ă FEE
GG	T ÚGOE	Z	FĚ FH	FĚ FH	€	Ă FEE
GH	T HĚ	Ý	Ě Ě	Ě Ě	€	Ă FEE
G	T HĚ	Z	Ě Ě	Ě Ě	€	Ă FEE
GÍ	T HU	Ý	Ě Ě	Ě Ě	€	Ă FEE
GÌ	T HU	Z	Ě Ě	Ě Ě	€	Ă FEE
GÏ	T ÚHÔ	Ý	GĚ Í	GĚ Í	€	Ă FEE
GÌ	T ÚHÔ	Z	FĚ Ě	FĚ Ě	€	Ă FEE
GJ	T ÚFÔ	Ý	GĚ Í	GĚ Í	€	Ă FEE
H€	T ÚFÔ	Z	FĚ Ě	FĚ Ě	€	Ă FEE
HF	T ÚGÔ	Ý	HĚ Í	HĚ Í	€	Ă FEE
HG	T ÚGÔ	Z	FĚ FH	FĚ FH	€	Ă FEE
HH	T ÍH	Ý	GĚ Í	GĚ Í	€	Ă FEE
HI	T ÍH	Z	FĚ Ě	FĚ Ě	€	Ă FEE















**A Ya Vyf'8 ]gfh]Vi hYX' @ UXg'f6 @ ' \* ' : 'Gfi Wñ fy'K ]'fi \$\$'8 YL**

	T^ { á^!Áæ^ }	Öá^&ç }	ÚçæÁ æ } á^!Áæ^ }	á^!Áæ^ }	ÚçæÁ æ } á^!Áæ^ }	ÚçæÁ æ } á^!Áæ^ }	ÚçæÁ æ } á^!Áæ^ }
F	TF	Y	€	€	€	€	€
G	TF	Z	€	€	€	€	€
H	TG	Y	€	€	€	€	€
I	TG	Z	€	€	€	€	€
Í	TÍ	Y	€	€	€	€	€
Ì	TÌ	Z	€	€	€	€	€
Î	TÌ	Y	€	€	€	€	€
Ï	TÌ	Z	€	€	€	€	€
J	TFH	Y	€	€	€	€	€
F€	TFH	Z	€	€	€	€	€
FF	TFI	Y	€	€	€	€	€
FG	TFI	Z	€	€	€	€	€
FH	TGH	Y	€	€	€	€	€
FI	TGH	Z	€	€	€	€	€
FÍ	SX	Y	€	€	€	€	€
FÌ	SX	Z	€	€	€	€	€
FÌ	T ÚHCE	Y	€	€	€	€	€
FÌ	T ÚHCE	Z	€	€	€	€	€
FJ	T ÚFOE	Y	€	€	€	€	€
GE	T ÚFOE	Z	€	€	€	€	€
GF	T ÚGOE	Y	€	€	€	€	€
GG	T ÚGOE	Z	€	€	€	€	€
GH	TH	Y	€	€	€	€	€
G	TH	Z	€	€	€	€	€
G	THU	Y	€	€	€	€	€
G	THU	Z	€	€	€	€	€
G	T ÚHÔ	Y	€	€	€	€	€
G	T ÚHÔ	Z	€	€	€	€	€
GJ	T ÚFÔ	Y	€	€	€	€	€
H€	T ÚFÔ	Z	€	€	€	€	€
HF	T ÚGÔ	Y	€	€	€	€	€
HG	T ÚGÔ	Z	€	€	€	€	€
HH	T ÍH	Y	€	€	€	€	€
H	T ÍH	Z	€	€	€	€	€
H	T ÍI	Y	€	€	€	€	€
H	T ÍI	Z	€	€	€	€	€
H	T ÚHÔ	Y	€	€	€	€	€
H	T ÚHÔ	Z	€	€	€	€	€
HJ	T ÚFÔ	Y	€	€	€	€	€
I€	T ÚFÔ	Z	€	€	€	€	€
IF	T ÚGÔ	Y	€	€	€	€	€
IG	T ÚGÔ	Z	€	€	€	€	€
IH	T ÍI	Y	€	€	€	€	€
II	T ÍI	Z	€	€	€	€	€
IÍ	T ÍIÖE	Y	€	€	€	€	€
IÌ	T ÍIÖE	Z	€	€	€	€	€
IÏ	UXÚ	Y	€	€	€	€	€
IÏ	UXÚ	Z	€	€	€	€	€
IJ	T ÍJ	Y	€	€	€	€	€
I€	T ÍJ	Z	€	€	€	€	€
ÍF	T ÍIÖ	Y	€	€	€	€	€
ÍG	T ÍIÖ	Z	€	€	€	€	€















**A Ya Vyf'8]g]f]Vi hYX'@ UXg'f6 @ \*- :.Gfi Wi fy'Ka ''fV&\$'8 Y] Lf'f' cbi]bi YXL**

	T^{ à^!Àæ^ ^}	Öã^&çj}	ÚcëóÁ æ} æ à^ ŽaDë(É) áÁ æ} æ à^ ŽaDë(É) ÚcëóÁ &çj} ŽdĀ á	Ò) áÁ &çj} ŽdĀ á		
Fİ	T ÚHÖE	Ý	Ë GF	Ë GF	€	Ä FEE
FÌ	T ÚHÖE	Z	Ë HF	Ë HF	€	Ä FEE
FJ	T ÚFOE	Ý	Ë GF	Ë GF	€	Ä FEE
G€	T ÚFOE	Z	Ë HF	Ë HF	€	Ä FEE
GF	T ÚGOE	Ý	Ë HF	Ë HF	€	Ä FEE
GG	T ÚGOE	Z	Ë Í	Ë Í	€	Ä FEE
GH	T HÌ	Ý	Ë H	Ë H	€	Ä FEE
GÌ	T HÌ	Z	Ë Í	Ë Í	€	Ä FEE
GÍ	T HJ	Ý	Ë H	Ë H	€	Ä FEE
GÌ	T HJ	Z	Ë Í	Ë Í	€	Ä FEE
GÛ	T ÚHÔ	Ý	Ë GF	Ë GF	€	Ä FEE
GÜ	T ÚHÔ	Z	Ë HF	Ë HF	€	Ä FEE
GJ	T ÚFÔ	Ý	Ë GF	Ë GF	€	Ä FEE
H€	T ÚFÔ	Z	Ë HF	Ë HF	€	Ä FEE
HF	T ÚGÔ	Ý	Ë HF	Ë HF	€	Ä FEE
HG	T ÚGÔ	Z	Ë Í	Ë Í	€	Ä FEE
HH	T ÍH	Ý	Ë GF	Ë GF	€	Ä FEE
HÌ	T ÍH	Z	Ë HF	Ë HF	€	Ä FEE
HÍ	T ÍI	Ý	Ë GF	Ë GF	€	Ä FEE
HÌ	T ÍI	Z	Ë HF	Ë HF	€	Ä FEE
HÛ	T ÚHÓ	Ý	Ë GF	Ë GF	€	Ä FEE
HÜ	T ÚHÓ	Z	Ë HF	Ë HF	€	Ä FEE
HJ	T ÚFÓ	Ý	Ë GF	Ë GF	€	Ä FEE
I€	T ÚFÓ	Z	Ë HF	Ë HF	€	Ä FEE
IF	T ÚGÓ	Ý	Ë HF	Ë HF	€	Ä FEE
IG	T ÚGÓ	Z	Ë Í	Ë Í	€	Ä FEE
IH	T ÍÍ	Ý	Ë GF	Ë GF	€	Ä FEE
IÌ	T ÍÍ	Z	Ë HF	Ë HF	€	Ä FEE
IÍ	T ÍÍÖE	Ý	Ë GF	Ë GF	€	Ä FEE
IÛ	T ÍÍÖE	Z	Ë HF	Ë HF	€	Ä FEE
IÛ	UXÚ	Ý	Ë GF	Ë GF	€	Ä FEE
IÜ	UXÚ	Z	Ë HF	Ë HF	€	Ä FEE
IJ	T ÍJ	Ý	Ë GF	Ë GF	€	Ä FEE
I€	T ÍJ	Z	Ë HF	Ë HF	€	Ä FEE
IF	T ÍÍÖ	Ý	Ë GF	Ë GF	€	Ä FEE
IG	T ÍÍÖ	Z	Ë HF	Ë HF	€	Ä FEE
IH	T ÍJÖE	Ý	Ë GF	Ë GF	€	Ä FEE
IÌ	T ÍJÖE	Z	Ë HF	Ë HF	€	Ä FEE

**A Ya Vyf'8]g]f]Vi hYX'@ UXg'f6 @ +\$.Gfi Wi fy'Ka ''fV&\$'8 Y] Lf'**

	T^{ à^!Àæ^ ^}	Öã^&çj}	ÚcëóÁ æ} æ à^ ŽaDë(É) áÁ æ} æ à^ ŽaDë(É) ÚcëóÁ &çj} ŽdĀ á	Ò) áÁ &çj} ŽdĀ á		
F	TF	Ý	Ë J	Ë J	€	Ä FEE
G	TF	Z	Ë Í	Ë Í	€	Ä FEE
H	TG	Ý	Ë Í F	Ë Í F	€	Ä FEE
I	TG	Z	FË Í F	FË Í F	€	Ä FEE
Í	TÍ	Ý	Ë Í F	Ë Í F	€	Ä FEE
Û	TÍ	Z	Ë G	Ë G	€	Ä FEE
Ü	TÌ	Ý	€	€	€	Ä FEE
Ì	TÌ	Z	€	€	€	Ä FEE
J	TFH	Ý	Ë J	Ë J	€	Ä FEE
F€	TFH	Z	Ë Í	Ë Í	€	Ä FEE

**A Ya Vyf'8 ]g]f]Vi hYX' @ UXg'f6 @ '+\$ : Gfi Wi fy'Ka ''f% \$'8 Y] ŁŁfV cbl]bi YXL**

	T^{\ à^/Áæ^}	Öá^&á}	ÚcáoÁ æ) á á^ŽaDíííD) áÁ æ) á á^ŽaDíííE ÚcáoÁ} &æá} ŽdÁ á	Ò) áÁ} &æá} ŽdÁ á		
FF	TFI	Ý	ĚÍF	ĚÍF	€	Ă FEE
FG	TFI	Z	FĚÍF	FĚÍF	€	Ă FEE
FH	TGH	Ý	ĚGĚ	ĚGĚ	€	Ă FEE
FI	TGH	Z	ĚUF	ĚUF	€	Ă FEE
FÍ	ŠX	Ý	ĚGĚ	ĚGĚ	€	Ă FEE
FĪ	ŠX	Z	ĚUF	ĚUF	€	Ă FEE
FĪ	T ÚHOE	Ý	ĚHF	ĚHF	€	Ă FEE
FÌ	T ÚHOE	Z	ĚGF	ĚGF	€	Ă FEE
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GG	T ÚGOE	Z	ĚHF	ĚHF	€	Ă FEE
GH	THÌ	Ý	€	€	€	Ă FEE
G	THÌ	Z	€	€	€	Ă FEE
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**I. Mount-to-Tower Connection Check**

<u>Custom Orientation Required</u>	No
<u>Tower Connection Bolt Checks</u>	No
<u>Tower Connection Baseplate Checks</u>	No

<u>Tower Connection Weld Checks</u>	Yes
-------------------------------------	-----

Weld Shape:	Rectangle
Weld Stiffener Configuration:	None
Stiffner Notch Length, n (in):	
Weld Size (1/16 in):	4
W1 (in):	4
W2 (in):	4
Weld Total Length (in):	16.00
Z <sub>x</sub> (in <sup>3</sup> /in):	21.33
Z <sub>y</sub> (in <sup>3</sup> /in):	21.33
J <sub>p</sub> (in <sup>4</sup> /in):	85.33
c <sub>x</sub> (in)	2
c <sub>y</sub> (in)	2
Required combined strength (kip/in):	1.22
Weld Capacity (kip/in):	5.57
Weld Utilization:	<b>21.9%</b>

Date: **July 31, 2023**



Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Site Number:** 5000385883  
**Site Name:** SEYMOUR WEST CT

**Crown Castle Designation:** **BU Number:** 845455  
**Site Name:** OXFORD-QUAKER FARMS  
**JDE Job Number:** 751353  
**Work Order Number:** 2248095  
**Order Number:** 654621 Rev. 0

**Engineering Firm Designation:** **Crown Castle Project Number:** 2248095

**Site Data:** **85 QUAKER FARMS ROAD, OXFORD, NEW HAVEN County, CT**  
**Latitude 41° 23' 2.36", Longitude -73° 8' 14.54"**  
**149 Foot - Monopole Tower**

Crown Castle is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration

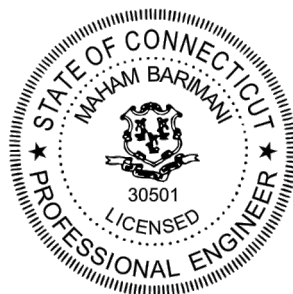
**Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Kenneth Sukitch

Respectfully submitted by:

Maham Barimani, P.E.  
Senior Project Engineer



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Table 2 - Other Considered Equipment

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Table 3 - Documents Provided

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3.2) Assumptions

### 4) ANALYSIS RESULTS

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Table 5 - Tower Component Stresses vs. Capacity - LC5

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations



## 1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by PAUL J FORD.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	118 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
122.0	123.0	2	raycap	RRFDC-3315-PF-48	2	1-1/4
118.0	120.0	3	antel	BXA-80080/6CF w/ Mount Pipe	18	1-5/8
		6	jma wireless	MX06FRO660-03 w/ Mount Pipe		
		2	kaelus	BSF0020F3V1		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RF4439D-25A		
	3	samsung telecommunications	RF4440D-13A			
	118.0	1	-	5.33' integrated mount w/modifications		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
149.0	153.0	1	telewave	ANT150D	6	3/8 1/2 3/4 1 5/8
	150.0	3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		6	powerwave technologies	LGP21401		
		1	raycap	DC9-48-60-24-PC16-EV		
	149.0	1	tower mounts	Pipe Mount [PM 501-3]		
		1	tower mounts	T-Arm Mount [TA 702-3]		
	148.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe		
		3	commscope	NNH4-65B-R6 w/ Mount Pipe		
144.0	148.0	3	ericsson	RRUS 12 B2	1	3/8
	145.0	3	ericsson	RRUS 11 B12	2	3/4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
	144.0	1	raycap	DC6-48-60-18-8F	1	RC
		1	tower mounts	Pipe Mount [PM 601-3]		
135.0	140.0	6	powerwave technologies	LGP13519	6	1-5/8
	135.0	3	powerwave technologies	RA21.7770.00 w/ Mount Pipe		
		1	tower mounts	Side Arm Mount [SO 104-3]		
127.0	132.0	3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe	1 8	1-1/4 1-5/8
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
	127.0	3	rfs celwave	APXVAALL24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 301-1]		
111.0	111.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		
81.0	86.0	1	telewave	ANT150D	3	1/2
	81.0	1		PCTEL MPRC2449		
		2	tower mounts	Pipe Mount [PM 601-1]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4546778	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5113091	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5110795	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.1.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

### 3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	149 - 111.5	Pole	TP29.487x23x0.1875	1	-11.21	1047.35	43.2	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-19.83	1466.49	94.7	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-27.58	2187.66	96.4	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-41.30	3438.05	82.9	Pass
							Summary	
						Pole (L3)	96.4	Pass
						Rating =	96.4	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	90.7	Pass
1	Base Plate		68.3	Pass
1	Base Foundation (Structure)		41.8	Pass
1	Base Foundation (Soil Interaction)		78.3	Pass

<b>Structure Rating (max from all components) =</b>	<b>96.4%</b>
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Notes:

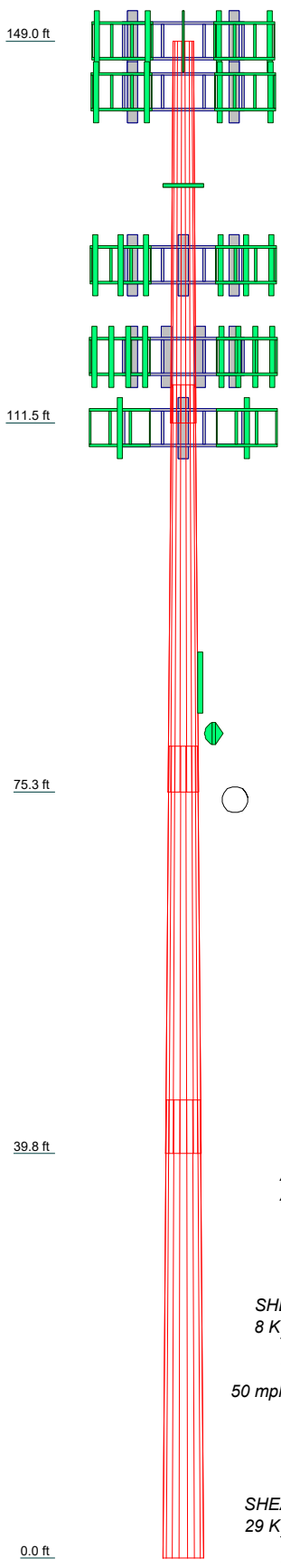
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

### 4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	17.4
Length (ft)	37.50	40.00	40.00	45.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.2188	0.2813	0.3750	
Socket Length (ft)	3.75	4.50	5.25		
Top Dia (in)	23.0000	28.4633	34.1670	39.6154	
Bot Dia (in)	29.4870	35.3830	41.0860	47.4000	
Grade	A607-65				
Weight (K)	2.0	3.0	4.5	7.9	



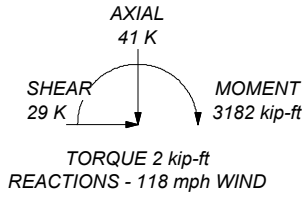
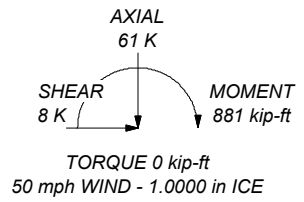
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 96.4%

ALL REACTIONS  
ARE FACTORED



<p><b>Crown Castle</b> 2000 Corporate Drive Canonsburg, PA 15317 The Pathway to Possible Phone: (724) 416-2000 FAX:</p>		Job: <b>BU# 845455</b>	
		Project:	
Client: Crown Castle	Drawn by: KSukitch	App'd:	
Code: TIA-222-H	Date: 07/31/23	Scale: NTS	
Path:		Dwg No. E-1	
C:\Work Area\845455\WO 2248095 - SAIProd\845455.eri			

## Tower Input Data

The tower is a monopole.  
 This tower is designed using the TIA-222-H standard.  
 The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Tower base elevation above sea level: 607.00 ft.
- Basic wind speed of 118 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs  
 Consider Moments - Horizontals

Distribute Leg Loads As Uniform  
 Assume Legs Pinned

Use ASCE 10 X-Brace Ly Rules  
 Calculate Forces in Supporting Bracing Members

Consider Moments - Diagonals  
 Use Moment Magnification  
 ✓ Use Code Stress Ratios  
 ✓ Use Code Safety Factors - Guys  
 Escalate Ice  
 Always Use Max Kz  
 Use Special Wind Profile  
 Include Bolts In Member Capacity  
 Leg Bolts Are At Top Of Section  
 Secondary Horizontal Braces Leg  
 Use Diamond Inner Bracing (4 Sided)  
 SR Members Have Cut Ends  
 SR Members Are Concentric

✓ Assume Rigid Index Plate  
 ✓ Use Clear Spans For Wind Area  
 Use Clear Spans For KL/r  
 Retension Guys To Initial Tension  
 ✓ Bypass Mast Stability Checks  
 ✓ Use Azimuth Dish Coefficients  
 ✓ Project Wind Area of Appurt.  
 Autocalc Torque Arm Areas  
 Add IBC .6D+W Combination  
 ✓ Sort Capacity Reports By Component  
 Triangulate Diamond Inner Bracing  
 Treat Feed Line Bundles As Cylinder  
 Ignore KL/ry For 60 Deg. Angle Legs

Ignore Redundant Members in FEA  
 SR Leg Bolts Resist Compression  
 All Leg Panels Have Same Allowable  
 Offset Girt At Foundation  
 ✓ Consider Feed Line Torque  
 Include Angle Block Shear Check  
 Use TIA-222-H Bracing Resist. Exemption  
 Use TIA-222-H Tension Splice Exemption  
**Poles**  
 ✓ Include Shear-Torsion Interaction  
 Always Use Sub-Critical Flow  
 Use Top Mounted Sockets  
 Pole Without Linear Attachments  
 Pole With Shroud Or No Appurtenances  
 Outside and Inside Corner Radii Are Known

## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149.00-111.50	37.50	3.75	18	23.0000	29.4870	0.1875	0.7500	A607-65 (65 ksi)
L2	111.50-75.25	40.00	4.50	18	28.4633	35.3830	0.2188	0.8750	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	75.25-39.75	40.00	5.25	18	34.1670	41.0860	0.2813	1.1250	(65 ksi) A607-65
L4	39.75-0.00	45.00		18	39.6154	47.4000	0.3750	1.5000	(65 ksi) A607-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	23.3259	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	29.9130	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L2	29.5274	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	35.8951	24.4150	3814.1390	12.4833	17.9746	212.1965	7633.2967	12.2098	5.8424	26.708
L3	35.4411	30.2494	4388.2314	12.0295	17.3569	252.8241	8782.2369	15.1276	5.5184	19.621
	41.6764	36.4259	7662.4750	14.4857	20.8717	367.1229	15335.032	18.2164	6.7361	23.951
L4	41.0909	46.7059	9086.0569	13.9303	20.1246	451.4897	18184.069	23.3574	6.3123	16.833
	48.0734	55.9715	15637.310	16.6939	24.0792	649.4115	31295.196	27.9911	7.6824	20.486

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor Ar	Adjust. Factor Ar	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 149.00- 111.50				1	1	1			
L2 111.50- 75.25				1	1	1			
L3 75.25- 39.75				1	1	1			
L4 39.75-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	Number Per Row	Start/En d Position	Width or Diamete r in	Perimete r in	Weight plf
** 122 + 118 ** HB158-1-08U8- S8J18(1-5/8)	C	No	Surface Ar (CaAa)	118.00 - 0.00	8	6	-0.300 0.000	1.9800		1.30
HB158-1-08U8- S8J18(1-5/8) ** 127 ft **	C	No	Surface Ar (CaAa)	122.00 - 118.00	2	2	-0.100 0.000	1.9800		1.30
AVA7-50(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 0.00	2	2	0.500 0.500	2.0100		0.70
HB114-U6S12-XXX- LI(1-1/4)	B	No	Surface Ar (CaAa)	127.00 - 0.00	1	1	0.400 0.410	1.5400		1.70
*****										

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
<b>** 80 ft **</b>									
LDF4-50A(1/2)	A	No	No	Inside Pole	80.00 - 0.00	3	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	118.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
LDF7-50A(1-5/8)	B	No	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
<b>** 135 **</b>									
AVA7-50(1-5/8)	C	No	No	Inside Pole	135.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
<b>** 149 **</b>									
LDF4-50A(1/2)	C	No	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	149.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	149.00 - 0.00	3	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
<b>** 144 **</b>									
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
2" Flex Conduit	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.36
							1/2" Ice	0.00	0.36
							1" Ice	0.00	0.36
<b>** 111 **</b>									
CU12PSM9P6XXX(1-1/2)	A	No	No	Inside Pole	111.00 - 0.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35
*****									
*****									

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	149.00-111.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	8.618	0.000	0.12
		C	0.000	0.000	9.306	0.000	0.55
L2	111.50-75.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	20.155	0.000	0.29
		C	0.000	0.000	43.065	0.000	1.19
L3	75.25-39.75	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	19.738	0.000	0.28
		C	0.000	0.000	42.174	0.000	1.17
L4	39.75-0.00	A	0.000	0.000	0.000	0.000	0.11
		B	0.000	0.000	22.101	0.000	0.32
		C	0.000	0.000	47.223	0.000	1.31



### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> <sub>In Face</sub>	C <sub>AA</sub> <sub>Out Face</sub>	Weight
n	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	149.00-111.50	A	0.975	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	16.974	0.000	0.25
		C		0.000	0.000	14.191	0.000	0.67
L2	111.50-75.25	A	0.943	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	39.697	0.000	0.60
		C		0.000	0.000	62.664	0.000	1.72
L3	75.25-39.75	A	0.898	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	38.366	0.000	0.57
		C		0.000	0.000	61.085	0.000	1.67
L4	39.75-0.00	A	0.809	0.000	0.000	0.000	0.000	0.11
		B		0.000	0.000	42.163	0.000	0.62
		C		0.000	0.000	67.955	0.000	1.84

### Feed Line Center of Pressure

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub>	CP <sub>z</sub>
	ft	in	in	Ice	Ice
				in	in
L1	149.00-111.50	1.9919	2.5767	1.9112	2.2007
L2	111.50-75.25	4.0373	6.6223	3.6214	5.2320
L3	75.25-39.75	4.2935	7.0195	3.8907	5.6223
L4	39.75-0.00	4.5150	7.3630	4.1167	5.9648

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	4	HB158-1-08U8-S8J18(1-5/8)	111.50 - 118.00	1.0000	1.0000
L1	5	HB158-1-08U8-S8J18(1-5/8)	118.00 - 122.00	1.0000	1.0000
L1	8	AVA7-50(1-5/8)	111.50 - 127.00	1.0000	1.0000
L1	10	HB114-U6S12-XXX-LI(1-1/4)	111.50 - 127.00	1.0000	1.0000
L2	4	HB158-1-08U8-S8J18(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	8	AVA7-50(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	10	HB114-U6S12-XXX-LI(1-1/4)	75.25 - 111.50	1.0000	1.0000
L3	4	HB158-1-08U8-S8J18(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	8	AVA7-50(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	10	HB114-U6S12-XXX-LI(1-1/4)	39.75 - 75.25	1.0000	1.0000
L4	4	HB158-1-08U8-S8J18(1-5/8)	0.00 - 39.75	1.0000	1.0000
L4	8	AVA7-50(1-5/8)	0.00 - 39.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L4	10	HB114-U6S12-XXX-LI(1-1/4)	0.00 - 39.75	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
** 149 **					
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00 0.00 -1.00	0.0000	149.00
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00 0.00 -1.00	0.0000	149.00
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00 0.00 -1.00	0.0000	149.00
NNH4-65B-R6 w/ Mount Pipe	A	From Leg	4.00 0.00 -1.00	0.0000	149.00
NNH4-65B-R6 w/ Mount Pipe	B	From Leg	4.00 0.00 -1.00	0.0000	149.00
NNH4-65B-R6 w/ Mount Pipe	C	From Leg	4.00 0.00 -1.00	0.0000	149.00
ANT150D	B	From Leg	4.00 0.00 4.00	0.0000	149.00
(2) LGP21401	A	From Leg	4.00 0.00 1.00	0.0000	149.00
(2) LGP21401	B	From Leg	4.00 0.00 1.00	0.0000	149.00
(2) LGP21401	C	From Leg	4.00 0.00 1.00	0.0000	149.00
RADIO 4415 B30	A	From Leg	4.00 0.00 1.00	0.0000	149.00
RADIO 4415 B30	B	From Leg	4.00 0.00 1.00	0.0000	149.00
RADIO 4415 B30	C	From Leg	4.00 0.00 1.00	0.0000	149.00
RRUS 8843 B2/B66A	A	From Leg	4.00 0.00 1.00	0.0000	149.00
RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 1.00	0.0000	149.00
RRUS 8843 B2/B66A	C	From Leg	4.00 0.00 1.00	0.0000	149.00
RRUS 4449 B5/B12	A	From Leg	4.00 0.00	0.0000	149.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RRUS 4449 B5/B12	B	From Leg	1.00 4.00 0.00	0.0000	149.00
RRUS 4449 B5/B12	C	From Leg	1.00 4.00 0.00	0.0000	149.00
DC9-48-60-24-PC16-EV	A	From Leg	1.00 4.00 0.00	0.0000	149.00
T-Arm Mount [TA 702-3]	C	None		0.0000	149.00
Pipe Mount [PM 501-3] ** 144 **	C	None		0.0000	149.00
DC6-48-60-18-8F	A	From Leg	1.00 0.00 0.00	0.0000	144.00
RRUS 11 B12	A	From Leg	1.00 0.00 1.00	0.0000	144.00
RRUS 11 B12	B	From Leg	1.00 0.00 1.00	0.0000	144.00
RRUS 11 B12	C	From Leg	1.00 0.00 1.00	0.0000	144.00
RRUS 12 B2	A	From Leg	1.00 0.00 4.00	0.0000	144.00
RRUS 12 B2	B	From Leg	1.00 0.00 4.00	0.0000	144.00
RRUS 12 B2	C	From Leg	1.00 0.00 4.00	0.0000	144.00
Pipe Mount [PM 601-3] ** 135 **	C	None		0.0000	144.00
RA21.7770.00 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	135.00
RA21.7770.00 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	135.00
RA21.7770.00 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	135.00
(2) LGP13519	A	From Leg	1.00 0.00 5.00	0.0000	135.00
(2) LGP13519	B	From Leg	1.00 0.00 5.00	0.0000	135.00
(2) LGP13519	C	From Leg	1.00 0.00 5.00	0.0000	135.00
Side Arm Mount [SO 104-3]	C	None		0.0000	135.00
4.5' x 2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	135.00
4.5' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	135.00
4.5' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	135.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 5.00	0.0000	127.00
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 5.00	0.0000	127.00
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 5.00	0.0000	127.00
APXVAALL24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	127.00
APXVAALL24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	127.00
APXVAALL24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	127.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.00 5.00	0.0000	127.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 0.00 5.00	0.0000	127.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4415 B66A_CCIV3	A	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4415 B66A_CCIV3	B	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4415 B66A_CCIV3	C	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4424 B25_TMO	A	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4424 B25_TMO	B	From Leg	4.00 0.00 5.00	0.0000	127.00
RADIO 4424 B25_TMO	C	From Leg	4.00 0.00 5.00	0.0000	127.00
Platform Mount [LP 301-1] ** 122 **	C	None		0.0000	127.00
(2) RRFDC-3315-PF-48	A	From Leg	4.00 0.00 1.00	0.0000	122.00
** 118 **					
BXA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	118.00
BXA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00	0.0000	118.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
BXA-80080/6CF w/ Mount Pipe	C	From Leg	2.00 4.00 0.00	0.0000	118.00
(2) MX06FRO660-03 w/ Mount Pipe	A	From Leg	2.00 4.00 0.00	0.0000	118.00
(2) MX06FRO660-03 w/ Mount Pipe	B	From Leg	2.00 4.00 0.00	0.0000	118.00
(2) MX06FRO660-03 w/ Mount Pipe	C	From Leg	2.00 4.00 0.00	0.0000	118.00
MT6407-77A w/ Mount Pipe	A	From Leg	2.00 4.00 0.00	0.0000	118.00
MT6407-77A w/ Mount Pipe	B	From Leg	2.00 4.00 0.00	0.0000	118.00
MT6407-77A w/ Mount Pipe	C	From Leg	2.00 4.00 0.00	0.0000	118.00
BSF0020F3V1	A	From Leg	2.00 4.00 0.00	0.0000	118.00
BSF0020F3V1	B	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4439D-25A	A	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4439D-25A	B	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4439D-25A	C	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4440D-13A	A	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4440D-13A	B	From Leg	2.00 4.00 0.00	0.0000	118.00
RF4440D-13A	C	From Leg	2.00 4.00 0.00	0.0000	118.00
5.33' integrated mount w/modifications	C	None	2.00	0.0000	118.00
(2) 7' x 2" Mount Pipe	A	From Leg	3.00 0.00	0.0000	118.00
(2) 7' x 2" Mount Pipe	B	From Leg	3.00 0.00	0.0000	118.00
(2) 7' x 2" Mount Pipe	C	From Leg	3.00 0.00	0.0000	118.00
** 111 **			0.00		
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00	0.0000	111.00
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00	0.0000	111.00
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	111.00

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft
			Horz Lateral ft	Vert ft		
TA08025-B604	A	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
TA08025-B604	B	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
TA08025-B604	C	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
TA08025-B605	A	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
TA08025-B605	B	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
TA08025-B605	C	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
RDIDC-9181-PF-48	A	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
Commscope MC-PK8-DSH (2) 8' x 2" Mount Pipe	A	None			0.0000	111.00
	A	From Leg	4.00	0.00	0.0000	111.00
			0.00	0.00		
(2) 8' x 2" Mount Pipe	B	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
(2) 8' x 2" Mount Pipe	C	From Leg	0.00	4.00	0.0000	111.00
			0.00	0.00		
** 81 ** ANT150D	B	From Leg	0.50	0.00	0.0000	81.00
			0.00	5.00		
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.00	0.0000	81.00
			0.00	0.00		
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.00	0.0000	81.00
			0.00	0.00		
6' x 2" Mount Pipe	A	From Leg	0.50	0.00	0.0000	81.00
			0.00	0.00		
6' x 2" Mount Pipe	A	From Leg	0.50	0.00	0.0000	81.00
			0.00	0.00		
****						

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft
				Horz Lateral ft	Vert ft				
**80**									

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft
PCTEL MPRC2449	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		81.00	2.17
***								

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

## Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22.86	-0.44	1.48
			Max. Mx	8	-11.24	-277.41	0.40
			Max. My	2	-11.21	-0.12	280.67
			Max. Vy	8	16.46	-277.41	0.40
			Max. Vx	2	-16.64	-0.12	280.67
L2	111.5 - 75.25	Pole	Max. Torque	8			1.30
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.53	-1.20	1.29
			Max. Mx	8	-19.91	-1022.24	-0.04
			Max. My	2	-19.90	0.04	1029.92
			Max. Vy	20	-23.28	1021.38	0.91
L3	75.25 - 39.75	Pole	Max. Vx	2	-23.28	0.04	1029.92
			Max. Torque	20			-1.79
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.91	-1.78	0.04
			Max. Mx	20	-27.64	1878.61	0.84
			Max. My	2	-27.63	0.85	1885.66
L4	39.75 - 0	Pole	Max. Vy	20	-25.94	1878.61	0.84
			Max. Vx	2	-25.90	0.85	1885.66
			Max. Torque	20			-1.79
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.67	-2.61	-1.78
			Max. Mx	20	-41.30	3112.03	0.56
			Max. My	2	-41.30	1.85	3116.10
			Max. Vy	20	-28.63	3112.03	0.56
			Max. Vx	2	-28.58	1.85	3116.10
			Max. Torque	20			-1.78

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	60.67	-0.00	-7.97
	Max. H <sub>x</sub>	20	41.33	28.59	0.01
	Max. H <sub>z</sub>	3	31.00	0.03	28.54
	Max. M <sub>x</sub>	2	3116.10	0.03	28.54
	Max. M <sub>z</sub>	8	3110.35	-28.55	-0.01
	Max. Torsion	8	1.78	-28.55	-0.01
	Min. Vert	11	31.00	-24.55	-14.28
	Min. H <sub>x</sub>	8	41.33	-28.55	-0.01
	Min. H <sub>z</sub>	14	41.33	-0.01	-28.50
	Min. M <sub>x</sub>	14	-3114.94	-0.01	-28.50
	Min. M <sub>z</sub>	20	-3112.03	28.59	0.01
	Min. Torsion	20	-1.78	28.59	0.01

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	34.44	0.00	0.00	0.91	-0.76	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	41.33	-0.03	-28.54	-3116.10	1.85	0.44
0.9 Dead+1.0 Wind 0 deg - No Ice	31.00	-0.03	-28.54	-3066.98	2.07	0.45



Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 30 deg - No Ice	41.33	14.64	-25.59	-2761.81	-1579.41	-0.53
0.9 Dead+1.0 Wind 30 deg - No Ice	31.00	14.64	-25.59	-2718.61	-1554.32	-0.53
1.2 Dead+1.0 Wind 60 deg - No Ice	41.33	24.69	-14.35	-1565.36	-2690.57	-1.34
0.9 Dead+1.0 Wind 60 deg - No Ice	31.00	24.69	-14.35	-1540.85	-2647.77	-1.34
1.2 Dead+1.0 Wind 90 deg - No Ice	41.33	28.55	0.01	2.80	-3110.35	-1.78
0.9 Dead+1.0 Wind 90 deg - No Ice	31.00	28.55	0.01	2.48	-3060.92	-1.78
1.2 Dead+1.0 Wind 120 deg - No Ice	41.33	24.55	14.28	1561.30	-2677.71	-1.77
0.9 Dead+1.0 Wind 120 deg - No Ice	31.00	24.55	14.28	1536.29	-2635.07	-1.77
1.2 Dead+1.0 Wind 150 deg - No Ice	41.33	14.17	24.71	2700.64	-1546.69	-1.28
0.9 Dead+1.0 Wind 150 deg - No Ice	31.00	14.17	24.71	2657.58	-1521.97	-1.28
1.2 Dead+1.0 Wind 180 deg - No Ice	41.33	0.01	28.50	3114.94	-1.91	-0.44
0.9 Dead+1.0 Wind 180 deg - No Ice	31.00	0.01	28.50	3065.31	-1.64	-0.44
1.2 Dead+1.0 Wind 210 deg - No Ice	41.33	-14.68	25.57	2762.30	1580.45	0.52
0.9 Dead+1.0 Wind 210 deg - No Ice	31.00	-14.68	25.57	2718.56	1555.85	0.52
1.2 Dead+1.0 Wind 240 deg - No Ice	41.33	-24.73	14.36	1567.68	2692.47	1.32
0.9 Dead+1.0 Wind 240 deg - No Ice	31.00	-24.73	14.36	1542.60	2650.14	1.32
1.2 Dead+1.0 Wind 270 deg - No Ice	41.33	-28.59	-0.01	-0.56	3112.03	1.78
0.9 Dead+1.0 Wind 270 deg - No Ice	31.00	-28.59	-0.01	-0.82	3063.08	1.78
1.2 Dead+1.0 Wind 300 deg - No Ice	41.33	-24.57	-14.29	-1560.16	2677.74	1.78
0.9 Dead+1.0 Wind 300 deg - No Ice	31.00	-24.57	-14.29	-1535.71	2635.58	1.78
1.2 Dead+1.0 Wind 330 deg - No Ice	41.33	-14.20	-24.75	-2701.53	1546.63	1.29
0.9 Dead+1.0 Wind 330 deg - No Ice	31.00	-14.20	-24.75	-2658.99	1522.38	1.29
1.2 Dead+1.0 Ice+1.0 Temp	60.67	0.00	-0.00	1.78	-2.61	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	60.67	-0.01	-7.97	-877.74	-2.20	0.15
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	60.67	3.96	-6.90	-759.39	-438.88	-0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	60.67	6.86	-3.98	-437.44	-758.85	-0.27
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	60.67	7.93	0.00	2.17	-876.57	-0.40
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	60.67	6.87	3.99	441.92	-759.92	-0.42
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	60.67	3.97	6.91	763.53	-440.00	-0.33
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	60.67	0.00	7.97	880.65	-3.00	-0.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	60.67	-3.97	6.90	762.65	433.92	0.07
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	60.67	-6.87	3.98	441.08	754.07	0.27
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	60.67	-7.94	-0.00	1.46	871.75	0.40
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	60.67	-6.88	-3.99	-438.53	754.74	0.42
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	60.67	-3.97	-6.91	-760.56	434.80	0.33

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - Service	34.44	-0.01	-6.95	-752.23	-0.12	0.11
Dead+Wind 30 deg - Service	34.44	3.57	-6.23	-666.71	-382.21	-0.13
Dead+Wind 60 deg - Service	34.44	6.01	-3.50	-377.56	-650.64	-0.33
Dead+Wind 90 deg - Service	34.44	6.95	0.00	1.32	-752.05	-0.44
Dead+Wind 120 deg - Service	34.44	5.98	3.48	377.86	-647.52	-0.44
Dead+Wind 150 deg - Service	34.44	3.45	6.02	653.15	-374.27	-0.32
Dead+Wind 180 deg - Service	34.44	0.00	6.94	753.25	-1.03	-0.11
Dead+Wind 210 deg - Service	34.44	-3.57	6.23	668.12	381.33	0.13
Dead+Wind 240 deg - Service	34.44	-6.02	3.50	379.41	649.96	0.33
Dead+Wind 270 deg - Service	34.44	-6.96	-0.00	0.51	751.32	0.44
Dead+Wind 300 deg - Service	34.44	-5.98	-3.48	-376.29	646.38	0.44
Dead+Wind 330 deg - Service	34.44	-3.46	-6.03	-652.07	373.11	0.32

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-34.44	0.00	0.00	34.44	0.00	0.000%
2	-0.03	-41.33	-28.54	0.03	41.33	28.54	0.000%
3	-0.03	-31.00	-28.54	0.03	31.00	28.54	0.000%
4	14.64	-41.33	-25.59	-14.64	41.33	25.59	0.000%
5	14.64	-31.00	-25.59	-14.64	31.00	25.59	0.000%
6	24.69	-41.33	-14.35	-24.69	41.33	14.35	0.000%
7	24.69	-31.00	-14.35	-24.69	31.00	14.35	0.000%
8	28.55	-41.33	0.01	-28.55	41.33	-0.01	0.000%
9	28.55	-31.00	0.01	-28.55	31.00	-0.01	0.000%
10	24.55	-41.33	14.28	-24.55	41.33	-14.28	0.000%
11	24.55	-31.00	14.28	-24.55	31.00	-14.28	0.000%
12	14.17	-41.33	24.71	-14.17	41.33	-24.71	0.000%
13	14.17	-31.00	24.71	-14.17	31.00	-24.71	0.000%
14	0.01	-41.33	28.50	-0.01	41.33	-28.50	0.000%
15	0.01	-31.00	28.50	-0.01	31.00	-28.50	0.000%
16	-14.68	-41.33	25.57	14.68	41.33	-25.57	0.000%
17	-14.68	-31.00	25.57	14.68	31.00	-25.57	0.000%
18	-24.73	-41.33	14.36	24.73	41.33	-14.36	0.000%
19	-24.73	-31.00	14.36	24.73	31.00	-14.36	0.000%
20	-28.59	-41.33	-0.01	28.59	41.33	0.01	0.000%
21	-28.59	-31.00	-0.01	28.59	31.00	0.01	0.000%
22	-24.57	-41.33	-14.29	24.57	41.33	14.29	0.000%
23	-24.57	-31.00	-14.29	24.57	31.00	14.29	0.000%
24	-14.20	-41.33	-24.75	14.20	41.33	24.75	0.000%
25	-14.20	-31.00	-24.75	14.20	31.00	24.75	0.000%
26	0.00	-60.67	0.00	-0.00	60.67	0.00	0.000%
27	-0.01	-60.67	-7.97	0.01	60.67	7.97	0.000%
28	3.96	-60.67	-6.90	-3.96	60.67	6.90	0.000%
29	6.86	-60.67	-3.98	-6.86	60.67	3.98	0.000%
30	7.93	-60.67	0.00	-7.93	60.67	-0.00	0.000%
31	6.87	-60.67	3.99	-6.87	60.67	-3.99	0.000%
32	3.97	-60.67	6.91	-3.97	60.67	-6.91	0.000%
33	0.00	-60.67	7.97	-0.00	60.67	-7.97	0.000%
34	-3.97	-60.67	6.90	3.97	60.67	-6.90	0.000%
35	-6.87	-60.67	3.98	6.87	60.67	-3.98	0.000%
36	-7.94	-60.67	-0.00	7.94	60.67	0.00	0.000%
37	-6.88	-60.67	-3.99	6.88	60.67	3.99	0.000%
38	-3.97	-60.67	-6.91	3.97	60.67	6.91	0.000%
39	-0.01	-34.44	-6.95	0.01	34.44	6.95	0.000%
40	3.57	-34.44	-6.23	-3.57	34.44	6.23	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
41	6.01	-34.44	-3.50	-6.01	34.44	3.50	0.000%
42	6.95	-34.44	0.00	-6.95	34.44	-0.00	0.000%
43	5.98	-34.44	3.48	-5.98	34.44	-3.48	0.000%
44	3.45	-34.44	6.02	-3.45	34.44	-6.02	0.000%
45	0.00	-34.44	6.94	-0.00	34.44	-6.94	0.000%
46	-3.57	-34.44	6.23	3.57	34.44	-6.23	0.000%
47	-6.02	-34.44	3.50	6.02	34.44	-3.50	0.000%
48	-6.96	-34.44	-0.00	6.96	34.44	0.00	0.000%
49	-5.98	-34.44	-3.48	5.98	34.44	3.48	0.000%
50	-3.46	-34.44	-6.03	3.46	34.44	6.03	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006996
3	Yes	4	0.00000001	0.00094914
4	Yes	6	0.00000001	0.00053520
5	Yes	6	0.00000001	0.00015914
6	Yes	6	0.00000001	0.00054197
7	Yes	6	0.00000001	0.00016307
8	Yes	5	0.00000001	0.00029438
9	Yes	5	0.00000001	0.00013492
10	Yes	6	0.00000001	0.00051738
11	Yes	6	0.00000001	0.00015467
12	Yes	6	0.00000001	0.00053964
13	Yes	6	0.00000001	0.00016248
14	Yes	5	0.00000001	0.00008911
15	Yes	5	0.00000001	0.00003834
16	Yes	6	0.00000001	0.00054351
17	Yes	6	0.00000001	0.00016219
18	Yes	6	0.00000001	0.00052195
19	Yes	6	0.00000001	0.00015595
20	Yes	5	0.00000001	0.00031507
21	Yes	5	0.00000001	0.00014404
22	Yes	6	0.00000001	0.00054247
23	Yes	6	0.00000001	0.00016368
24	Yes	6	0.00000001	0.00052122
25	Yes	6	0.00000001	0.00015590
26	Yes	4	0.00000001	0.00002673
27	Yes	5	0.00000001	0.00093166
28	Yes	6	0.00000001	0.00021775
29	Yes	6	0.00000001	0.00021956
30	Yes	5	0.00000001	0.00093006
31	Yes	6	0.00000001	0.00021463
32	Yes	6	0.00000001	0.00022021
33	Yes	5	0.00000001	0.00092881
34	Yes	6	0.00000001	0.00021538
35	Yes	6	0.00000001	0.00021310
36	Yes	5	0.00000001	0.00092396
37	Yes	6	0.00000001	0.00021926
38	Yes	6	0.00000001	0.00021430
39	Yes	4	0.00000001	0.00021215
40	Yes	5	0.00000001	0.00014834
41	Yes	5	0.00000001	0.00015479
42	Yes	4	0.00000001	0.00036691
43	Yes	5	0.00000001	0.00013677
44	Yes	5	0.00000001	0.00015332
45	Yes	4	0.00000001	0.00021357
46	Yes	5	0.00000001	0.00015390
47	Yes	5	0.00000001	0.00013906
48	Yes	4	0.00000001	0.00037047
49	Yes	5	0.00000001	0.00015540
50	Yes	5	0.00000001	0.00013892

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	33.822	40	1.8906	0.0041
L2	115.25 - 75.25	20.830	40	1.7277	0.0032
L3	79.75 - 39.75	9.704	40	1.1886	0.0015
L4	45 - 0	3.007	46	0.6118	0.0006

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DMP65R-BU6D w/ Mount Pipe	40	33.822	1.8906	0.0041	37270
144.00	DC6-48-60-18-8F	40	31.838	1.8790	0.0040	37270
135.00	RA21.7770.00 w/ Mount Pipe	40	28.291	1.8528	0.0038	13310
127.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	40	25.199	1.8169	0.0036	8469
122.00	(2) RRFDC-3315-PF-48	40	23.310	1.7853	0.0034	6901
118.00	BXA-80080/6CF w/ Mount Pipe	40	21.830	1.7534	0.0033	6015
111.00	MX08FRO665-21 w/ Mount Pipe	40	19.318	1.6815	0.0030	5116
81.00	PCTEL MPRC2449	40	10.029	1.2105	0.0016	3371

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	139.689	4	7.8285	0.0166
L2	115.25 - 75.25	86.135	4	7.1585	0.0129
L3	79.75 - 39.75	40.178	4	4.9267	0.0061
L4	45 - 0	12.449	16	2.5350	0.0023

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DMP65R-BU6D w/ Mount Pipe	4	139.689	7.8285	0.0166	9343
144.00	DC6-48-60-18-8F	4	131.512	7.7813	0.0162	9343
135.00	RA21.7770.00 w/ Mount Pipe	4	116.898	7.6740	0.0154	3334
127.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	4	104.151	7.5265	0.0145	2119
122.00	(2) RRFDC-3315-PF-48	4	96.363	7.3960	0.0139	1725
118.00	BXA-80080/6CF w/ Mount Pipe	4	90.258	7.2647	0.0133	1502
111.00	MX08FRO665-21 w/ Mount Pipe	4	79.896	6.9673	0.0121	1273
81.00	PCTEL MPRC2449	4	41.521	5.0177	0.0063	828

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	A in <sup>2</sup>	$P_u$ K	$\phi P_n$ K	Ratio $\frac{P_u}{\phi P_n}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	37.50	0.00	0.0	17.050 8	-11.21	997.47	0.011
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	40.00	0.00	0.0	23.874 5	-19.83	1396.66	0.014
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	40.00	0.00	0.0	35.615 2	-27.58	2083.49	0.013
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	45.00	0.00	0.0	55.971 5	-41.30	3274.33	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	$M_{ux}$ kip-ft	$\phi M_{nx}$ kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	$M_{uy}$ kip-ft	$\phi M_{ny}$ kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	280.67	639.10	0.439	0.00	639.10	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	1035.48	1060.37	0.977	0.00	1060.37	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	1911.86	1917.64	0.997	0.00	1917.64	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	3182.47	3714.79	0.857	0.00	3714.79	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	16.64	296.03	0.056	0.21	750.83	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	23.68	419.00	0.057	0.58	1261.74	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	26.65	625.05	0.043	0.53	2183.88	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	29.53	982.30	0.030	0.52	4045.32	0.000

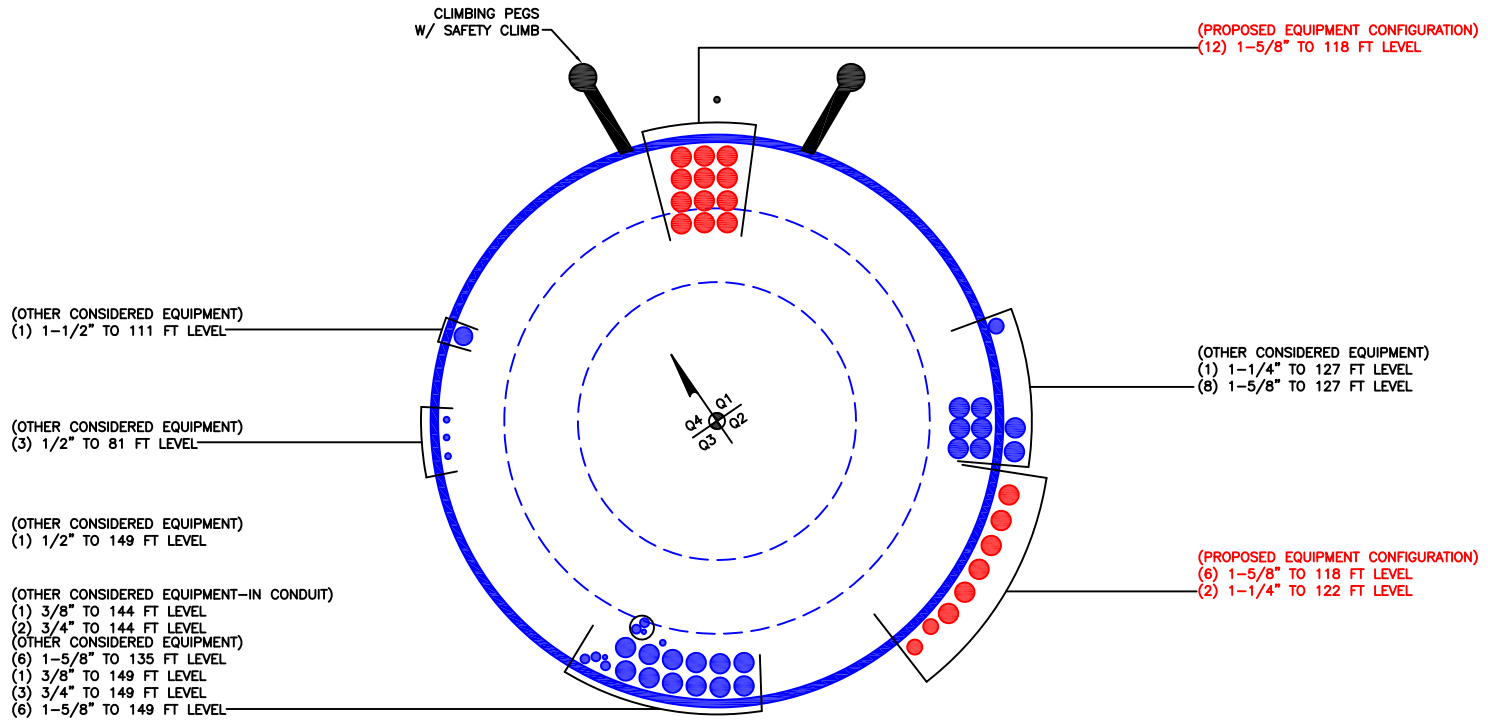
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 111.5 (1)	0.011	0.439	0.000	0.056	0.000	0.454	1.050	4.8.2
L2	111.5 - 75.25 (2)	0.014	0.977	0.000	0.057	0.000	0.994	1.050	4.8.2
L3	75.25 - 39.75 (3)	0.013	0.997	0.000	0.043	0.000	1.012	1.050	4.8.2
L4	39.75 - 0 (4)	0.013	0.857	0.000	0.030	0.000	0.870	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	149 - 111.5	Pole	TP29.487x23x0.1875	1	-11.21	1047.35	43.2	Pass	
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-19.83	1466.49	94.7	Pass	
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-27.58	2187.66	96.4	Pass	
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-41.30	3438.05	82.9	Pass	
							Summary		
							Pole (L3)	96.4	Pass
							<b>RATING =</b>	<b>96.4</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**





**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Monopole Base Plate Connection

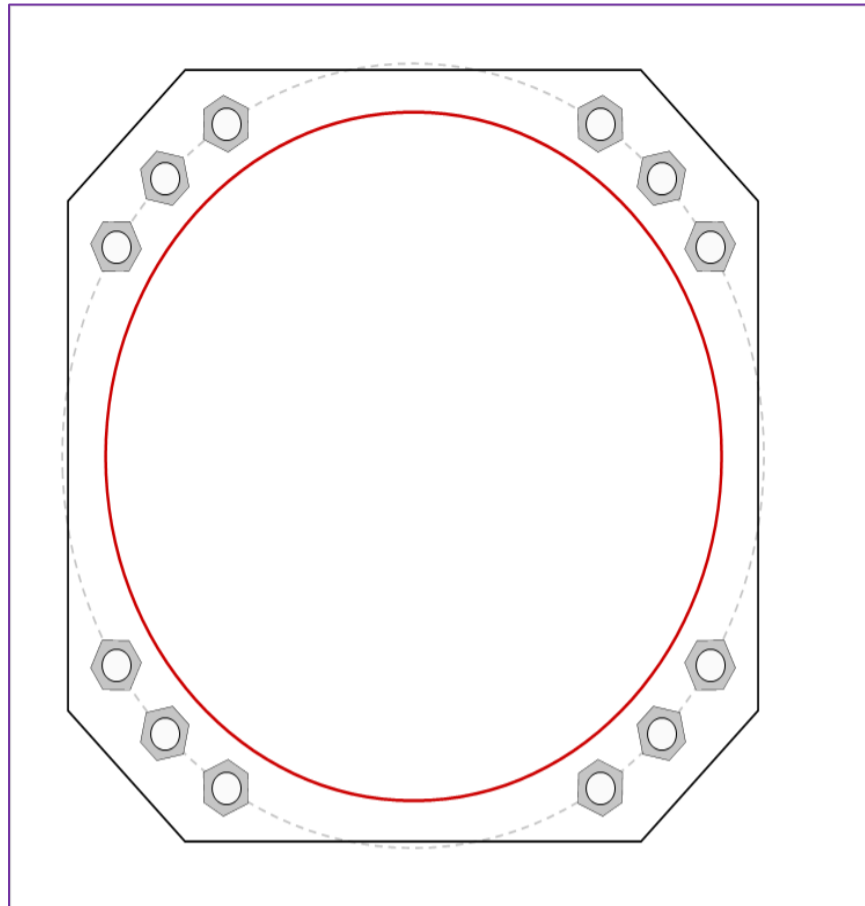


Site Info	
BU #	845455
Site Name	XFORD-QUAKER FARM
Order #	654621 - Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	1

Applied Loads	
Moment (kip-ft)	3182.47
Axial Force (kips)	41.30
Shear Force (kips)	29.53

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(12) 2-1/4" $\phi$ bolts (A615-75 X; $F_y=75$ ksi, $F_u=100$ ksi) on 54" BC <i>Anchor Spacing: 6 in</i>
Base Plate Data
53" W x 2.75" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi); Clip: 9 in
Stiffener Data
N/A
Pole Data
47.4" x 0.375" 18-sided pole (A607-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary <span style="float: right;"><i>(units of kips, kip-in)</i></span>		
$P_{u,t} = 232.13$	$\phi P_{n,t} = 243.75$	<b>Stress Rating</b>
$V_u = 2.46$	$\phi V_n = 149.1$	<b>90.7%</b>
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>
Base Plate Summary		
Max Stress (ksi):	38.72	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	<b>68.3%</b>	<b>Pass</b>

# Pier and Pad Foundation



**BU #:** 845455  
**Site Name:** Oxford-Quaker Farm  
**App. Number:** 654621 - Rev. 0

**TIA-222 Revision:** H  
**Tower Type:** Monopole

**Top & Bot. Pad Rein. Different?:**   
**Block Foundation?:**   
**Rectangular Pad?:**

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	41.33	kips
Base Shear, $V_{u\_comp}$ :	29.48	kips
Moment, $M_u$ :	3182.47	ft-kips
Tower Height, $H$ :	149	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	286.23	29.48	9.8%	Pass
<i>Bearing Pressure (ksf)</i>	22.50	4.75	21.1%	Pass
<i>Overturning (kip*ft)</i>	4376.56	3425.68	78.3%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	7555.51	3315.13	41.8%	Pass
<i>Pier Compression (kip)</i>	23390.64	81.02	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	4295.05	1608.92	35.7%	Pass
<i>Pad Shear - 1-way (kips)</i>	731.44	310.80	40.5%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.000	0.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	7386.86	1989.08	25.6%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	7	ft
Ext. Above Grade, $E$ :	0.5	ft
Pier Rebar Size, $Sc$ :	11	
Pier Rebar Quantity, $mc$ :	32	
Pier Tie/Spiral Size, $St$ :	5	
Pier Tie/Spiral Quantity, $mt$ :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	41.8%
Soil Rating*:	78.3%

Pad Properties		
Depth, $D$ :	7.5	ft
Pad Width, $W_1$ :	20	ft
Pad Thickness, $T$ :	3.5	ft
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	10	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	21	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $F_y$ :	60	ksi
Concrete Compressive Strength, $F'_c$ :	3	ksi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	125	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	30.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	36	degrees
SPT Blow Count, $N_{blows}$ :	41	
Base Friction, $\mu$ :		
Neglected Depth, $N$ :	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	none	ft

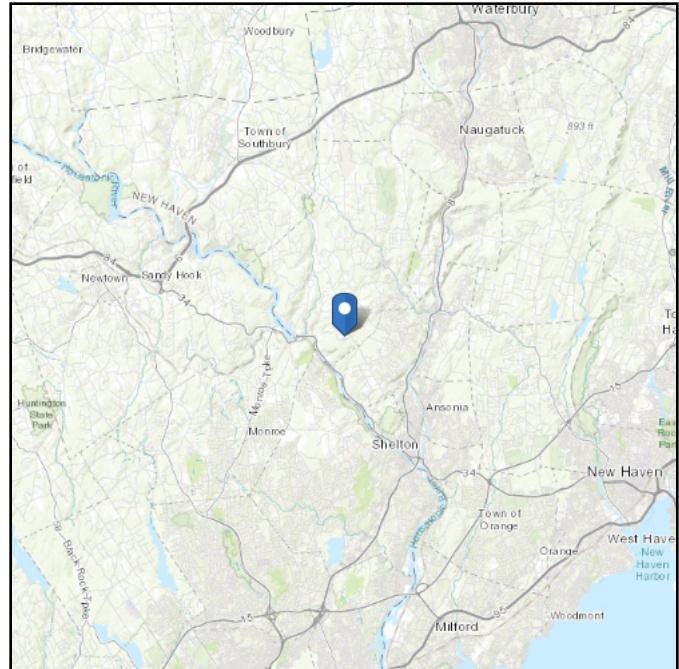
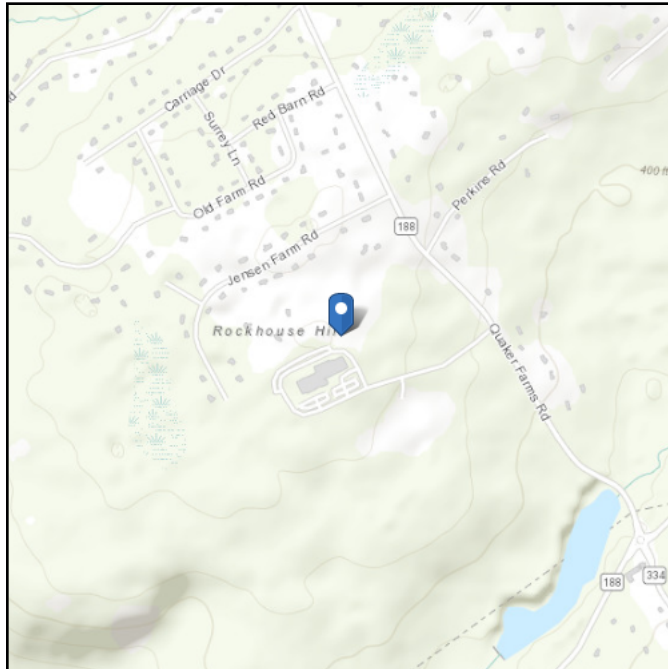
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# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 607.1 ft (NAVD 88)  
**Latitude:** 41.383989  
**Longitude:** -73.137372



## Wind

### Results:

Wind Speed	118 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2  
Date Accessed: Thu Jun 30 2022

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 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

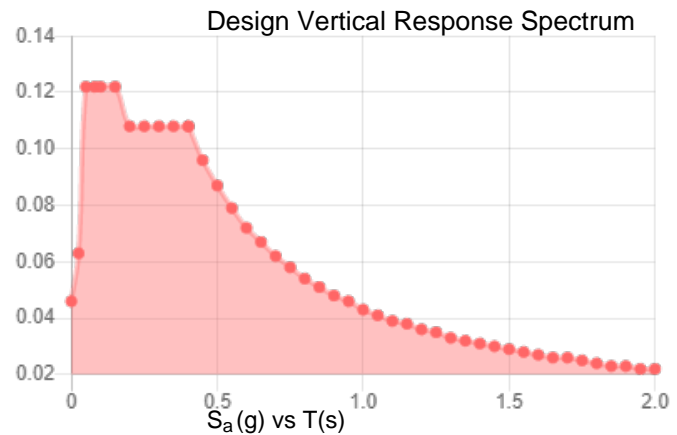
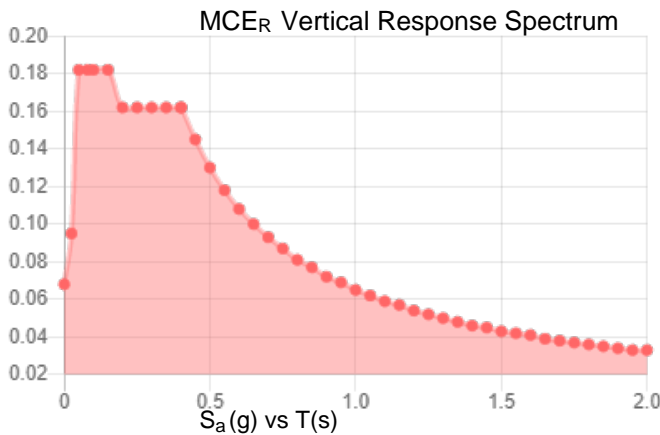
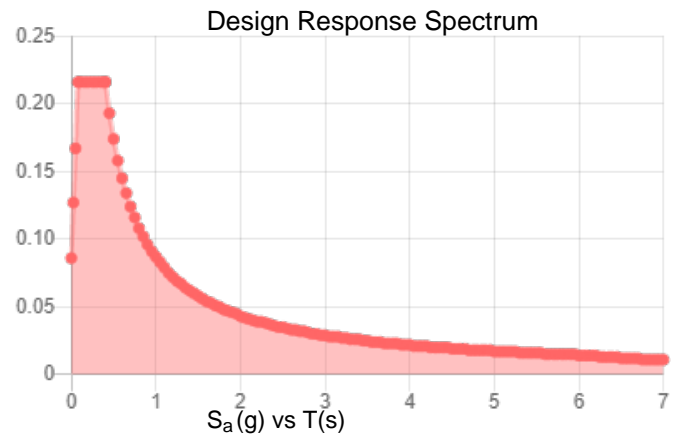
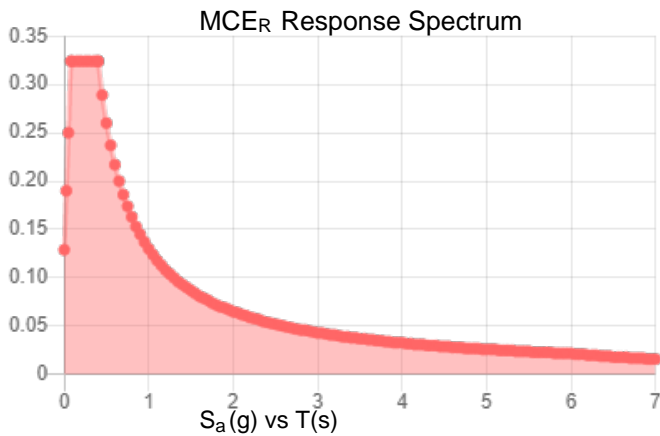
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:**

$S_s$ :	0.202	$S_{D1}$ :	0.087
$S_1$ :	0.054	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.113
$F_v$ :	2.4	PGA <sub>M</sub> :	0.179
$S_{MS}$ :	0.324	$F_{PGA}$ :	1.573
$S_{M1}$ :	0.13	$I_e$ :	1
$S_{DS}$ :	0.216	$C_v$ :	0.705

**Seismic Design Category** B



**Data Accessed:** Thu Jun 30 2022

**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.**

## Ice

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**Results:**

Ice Thickness: 1.00 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Thu Jun 30 2022

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.

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