

COPY

February 12, 2007

Michigan Electric Transmission Company, LLC  
C/O NSI Consulting & Development, Inc.  
26657 Woodward Ave., Suite 100  
Huntington Woods, MI 48070

Attention: Executive Vice President and Chief Operating Officer

SUBJECT: Proposed Single Phase, 4800 Volt Distribution line

Reference No: 06646956/Chippewa/Isabella/Klender

REFERENCE: Amended and Restated Easement Agreement (the "Agreement") dated April 29, 2002, between Consumers Energy Company ("Consumers") and Michigan Electric Transmission Company, now Michigan Electric Transmission Company, LLC ("METC")

Pursuant to Section 7.1 of the Agreement, Consumers hereby notifies METC that Consumers intends to construct a distribution line across certain land in which METC has an interest under the Agreement. The location of the land on which said line will be constructed, and a further description of the intended use, are set forth on "Annex A", attached to this letter.

Under said Section 7.1 of the Agreement, METC must within 30 days of this notice notify Consumers, as "Initiating User," of whether or not METC approves the proposed use as a Compatible Use. If you do not notify us either way within 30 days of this notice, then, as provided in said Section 7.1, METC will be deemed to have approved the proposed use as being a Compatible Use. We would appreciate, however, receiving METC's express approval of the proposed use as being a Compatible Use as soon as possible so that we can start work without delay.

February 12, 2007

Page Two

Reference No: 06646956/Chippewa/Isabella/Klender

This letter is being sent to you in duplicate. If METC agrees that the proposed use is a Compatible Use, please indicate that by signing and returning a copy of this letter to us as soon as possible, so that we can immediately proceed with construction. The other copy is for your records.

Very truly yours,



Stacie Lahr  
Consumers Energy  
One Energy Plaza  
Jackson, MI 49201

APPROVED:

MICHIGAN ELECTRIC TRANSMISSION  
COMPANY, LLC

By: 

Date: APPROVED MAR 20 2007

ANNEX A

Reference No: 06646956/Chippewa/Isabella/Klender

LAND TO BE IMPACTED:

Land located in the Township of Chippewa, County of Isabella, State of Michigan, described as follows:

The Northeast 1/4 of Section 27, Township 14 North Range 3 West.

PROPOSED USE:

**Building a new distribution line that crosses under a 138kV transmission line to service a new home. The distribution line will be crossing 25 feet East of pole #276 and will be 33 feet above ground. See attached 391 form, sketch, and plan and profile drawings.**

Prepared by:  
Stacie M Lahr 02/12/07  
Consumers Energy Company  
EP7-436  
One Energy Plaza  
Jackson, MI 49201

September 11, 2007

Michigan Electric Transmission Company  
Attention: Fernando Guevara  
39500 Orchard Hill Place, Suite 200  
Novi, MI 48375

**SUBJECT:** Proposed Installation or Modifications of Additional Antennas to Existing Telecom Lease Site  
Alltel Communications / Tower 970 / Section 7, City of Portage, Kalamazoo County

**REFERENCE:** Preliminary Review and Approval / Amended and Restated Easement Agreement (the "Agreement") dated April 29, 2002, between Consumers Energy Company ("Consumers") and Michigan Electric Transmission Company, now Michigan Electric Transmission Company, LLC ("METC")

Please find enclosed a copy of a completed "Application To Modify Existing Co-Location Site" from Alltel Communications. Alltel Communications currently has 3 antennas on this tower and are requesting to remove three and install six.

Enclosed you will find a copy of the previous structural analysis and loading information utilized in the analysis for the original installation.

We are asking that you review the attached information and respond as to the following:

Consumers may rely on existing drawings as the tower structure has not been modified.

**OR**

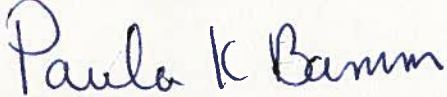
Enclosed are revised tower drawings.

We have reviewed the loading criteria provided, examined our planned future uses and have no objections to the proposed use, subject to the completion of a favorable structural analysis.

This request is being forwarded to you in duplicate. If METC has no objections, please sign, date and return this letter to us as soon as possible. The second copy may be retained by METC for its records.

Consumers Energy Company  
One Energy Plaza  
Jackson, MI 49201  
Attention: Paula Bamm

Very truly yours,



Paula K. Bamm  
Telecom & Facility Lease Manager  
Business Services Real Estate

APPROVED:

MICHIGAN ELECTRIC TRANSMISSION  
COMPANY, LLC

By: \_\_\_\_\_

Date: \_\_\_\_\_



Date: September 24, 2007

To: Fernando Guevara/ Barbara Mention  
Real Estate and Rights of Way  
ITC

From: David Doubley  
Engineering  
ITC

Subject: **ITC Project # USG071323/CU-290**  
Modification Alltell Communications Cell Site. Remove 3 antennas and add 6 antennas.  
Tower 008AB970, Drake Road-Milham  
Section 7, City of Portage, Kalamazoo County.

Note, Tower number not correct in your request letter, change from 907 to 970 and change project number from USG2071322 to USG2071323.

After reviewing the information, this request is approved. The tower design has not been modified. Analysis of tower required to allow this work.

Approved

by: David Doubley  
David Doubley  
Engineer



23  
Project No: USG071322

CU-290

Date: September 17, 2007

To: David Doubley  
Engineering

From: Fernando Guevara  
Real Estate

Subject: Proposed Installation or Modification of additional Antennas to Existing Telecom Lease Site 970  
Alltel Communications/Tower 907/Section 7, City of Portage,  
Kalamazoo County, Michigan.

The attached request was received from Consumers Energy. Alltel Communications intends to install and modify an existing telecom lease site. Alltel Communications currently has three antennas on this tower and are requesting to remove three and install six. Furthermore, pursuant to the Amended and Restated Easement Agreement, METC/ITC needs to submit a response letter to CE by **October 15, 2007**.

Please review and return to my attention with your recommendations/comments.

Attachments

CONSUMERS ENERGY  
NOTIFICATION OF PROPOSED LINE CONSTRUCTION  
REQUIRING COORDINATION WITH HVD AND/OR TRANSMISSION LINES

Send two (2) copies to:

Transmission Lines Design and Standards

Att: Justin Lancaster

Jackson, Michigan

TO BE FILLED IN BY SYSTEM OWNER / ENGINEER / CES

Headquarters Alma

Work Order No. 06646956

Date 1/31/07

**PROPOSED DISTRIBUTION CONSTRUCTION**

Sketch Attached  Yes  No

Primary:

Voltage 4800 Phase 1

No. of Wires 2 Crossarms Per Pole n/a

Wire Size 4 acsr Length of Crossarms n/a

Distance Below Transmission n/a

Skip-Span  Yes  No

Secondary:

No. of Wires n/a Wire Size n/a

Other Details: See included comments on print

**EXISTING DISTRIBUTION FACILITIES**

Description: See included print

**LOCATION**

Township Chippewa

County Isabella

Town 14 Range 03 Section 27

Transmission Line Involved Summerton Line

Transmission Pole No. not marked

**PROPOSED COMMUNICATION CONSTRUCTION  
TO BE FILLED IN BY FIELD TECHNICIAN**

Cable Dia. \_\_\_\_\_

Weight/ft. \_\_\_\_\_

Strand Size \_\_\_\_\_

Tension \_\_\_\_\_

Pole Attachment Height \_\_\_\_\_

Map # \_\_\_\_\_ Pole # \_\_\_\_\_

**TO BE FILLED IN BY TRANSMISSION LINES DESIGN  
AND STANDARDS OR METC**

Clearance/Attachment Approved

Clearance/Attachment NOT Approved

Clearance requires further verification  Yes  No  
with Power System Analysis

Structural Integrity - Engineering Required  Yes  No

Calculated assuming STE rating of \_\_\_\_\_ °F Cond Temp

Checked By \_\_\_\_\_ Date \_\_\_\_\_

GWO No. \_\_\_\_\_

**METC Line**

**REMARKS:**

Prepared By Rich Klender Date \_\_\_\_\_  
System Planning and Performance / Electric Service

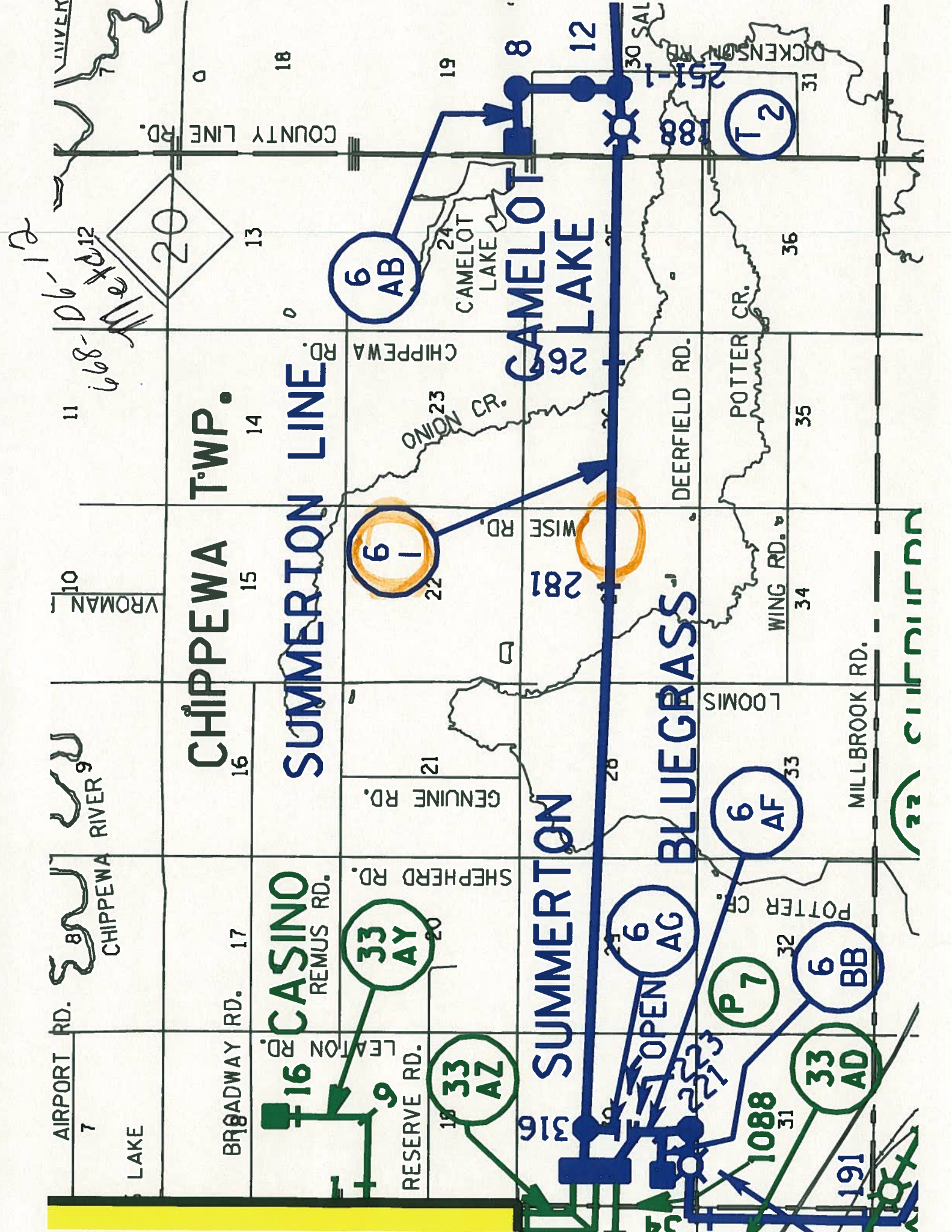
Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
Transmission Lines Design and Standards

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_  
METC

METC lines are subject to the easement rights of METC. Your request has been forwarded to Real Estate for processing and will require a 30-day period prior to approval.







668-D6-12  
Meth

CHIPPEWA TWP.

SUMMERTON LINE

SUMMERTON

BLUEGRASS

22 CHIPPEWA

6 AB

6 I

6 AF

6 AG

6 BB

33 AY

33 AZ

P7

33 AD

T2

191

1088

281

251

252

253

254

255

256

257

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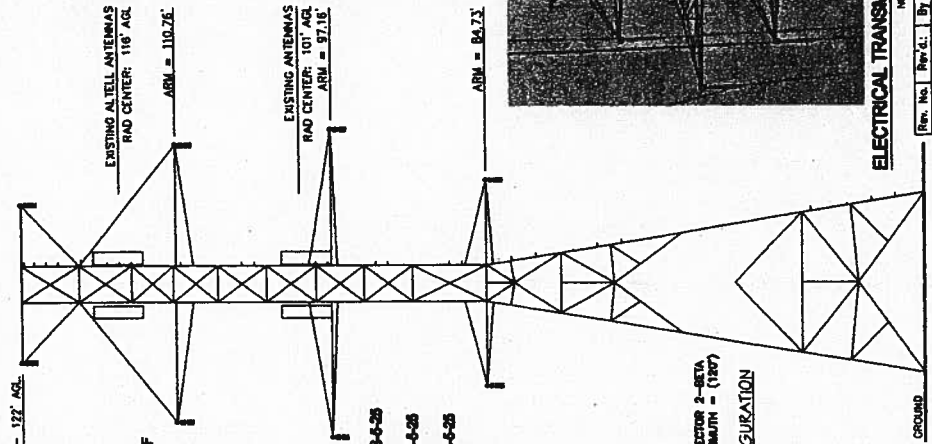
504



WOODLAND / New

# TOWER ELEVATION SKETCH

WOODLAND #622 / CONSUMERS ENERGY TOWER #970



**NOTES:**  
 EXISTING (0) 48' ANTENNAS TO BE REPLACED WITH (0) NEW 66' ANTENNAS OF SAME SIZE  
 EXISTING AND PROPOSED ANTENNA AZIMUTHS ARE 0°, 120° AND 240°.  
 COAX REMAINS UNCHANGED, (0) 1-66'.

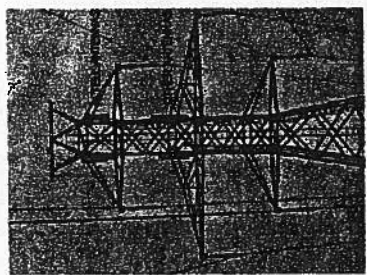
**ANTENNA SCHEDULE (continued)**  
 2 - Arval 66' antenna - model #RWA-00017LS-6-25 with 1-66' coax. Azimuth = 0 degrees.  
 2 - Arval 66' antenna - model #RWA-00017LS-6-25 with 1-66' coax. Azimuth = 120 degrees.  
 2 - Arval 66' antenna - model #RWA-00017LS-6-25 with 1-66' coax. Azimuth = 240 degrees.

SECTOR 1 - ALPHA  
 AZIMUTH = (0)

SECTOR 2 - BETA  
 AZIMUTH = (180)

SECTOR 3 - GAMMA  
 AZIMUTH = (240)

SECTORIZED ANTENNA CONFIGURATION  
 NOT TO SCALE



ELECTRICAL TRANSMISSION TOWER ELEVATION  
 NOT TO SCALE

Rev. No.	Rev. Lt.	By	Revision
0	03/28/07	PL	PRELIMINARY DRAWING

SITE #: TOWER 970  
 SITE ADDRESS:  
 6150 ANGLING ROAD  
 CITY OF PORTAGE, MI

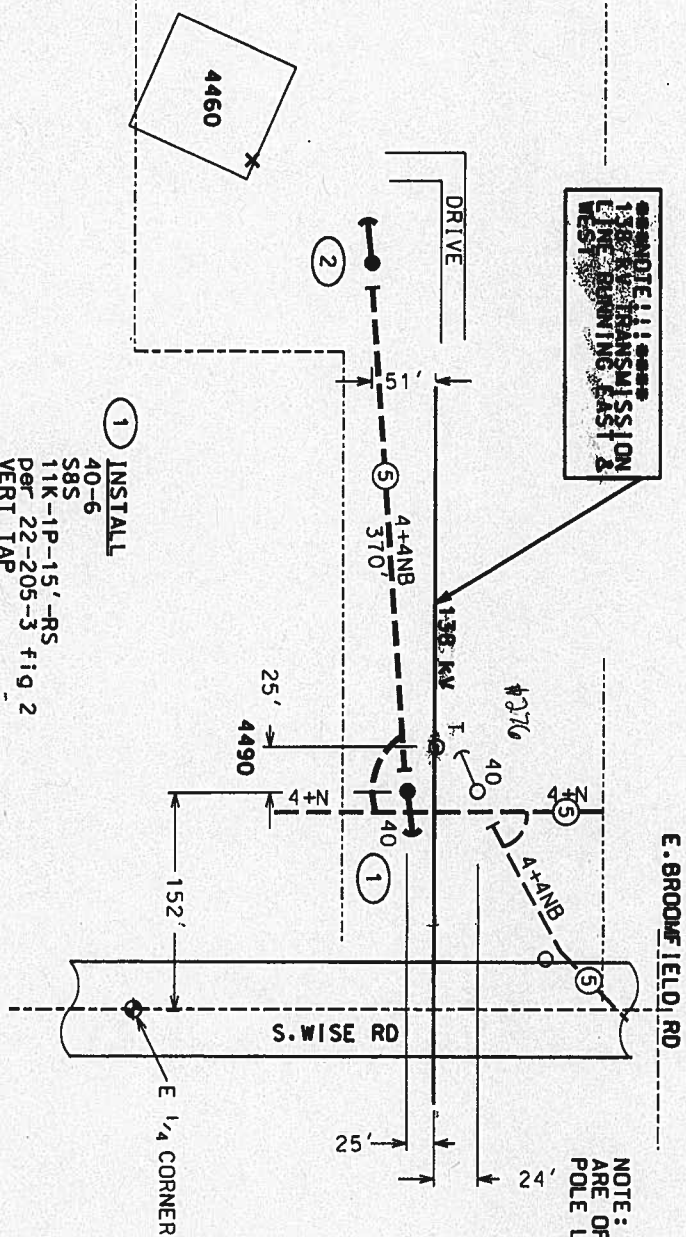
**LANDTECH**  
 PROFESSIONAL SURVEYING & ENGINEERING  
 231-643-8889 fax 231-643-8851 fax 877-428-1440 web www.landtech.com

Job: 0732005  
 Date: 03/28/07  
 Scale: NONE  
 Drawn: PL  
 Chk'd: M.T.M.

**elltel**  
 5715 STAMBUKY BOULEVARD  
 FRANKLIN HILLS, MI 48864  
 (248) 985-0200

Client: \_\_\_\_\_  
 Sheet 1 of 1

NOTE: ALL DIMENSIONS  
 ARE OFF CENTER OF TRANSMISSION  
 LINE RUNNING EAST &  
 WEST



NOTE: ALL DIMENSIONS GIVEN  
 ARE OFF CENTER OF TRANSMISSION  
 POLE LINE

DESCRIPTION OF WORK:  
 TAPPING OFF DISTRIBUTION LINE TO  
 SERVE NEW HOUSE. PROPOSED  
 POLE LOCATIONS FROM NEAREST  
 TRANSMISSION POLE.  
 NOTE: NO POLE NUMBERS ON POLES.  
 CHECKED 1 POLE EACH WAY. NO #'S

PLEASE CALL RICH KLENDER 989-466-4279  
 IF ANY QUESTIONS

- ① INSTALL  
 40-6  
 SBS  
 11K-1P-15'-RS  
 per 22-205-3 fig 2  
 VERT TAP  
 D=5  
 per 23-108 fig 2
- ② INSTALL  
 40-6  
 VERT DE'S  
 D=8  
 11K-1P-15'-RS  
 per 22-205-3 fig 2  
 10KVA LA/CO  
 per 26-101-1 fig 2

**-CONSTRUCTION CERTIFICATION-**  
 Work was constructed as Engineered or Changed as Indicated.  
 All Salvageable Material Was Returned to Stores.

Signed \_\_\_\_\_ in Direct Charge of Work

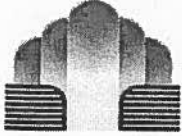
Dates: Started \_\_\_\_\_ Completed \_\_\_\_\_

MISS DIG NUMBER: \_\_\_\_\_ DATE: \_\_\_\_\_

STAKED	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
TREES	<input checked="" type="checkbox"/>	YES	<input type="checkbox"/>	NO
TLM NUMBER	1403274102	# OF ROADS		OHMS
A GOSSUMERS Energy Company ELECTRIC designed by R. Klender DATE 01/31/07 APPROVED BY DATE				
SHEET 1 OF 1		SCALE 1=100		
4460 WISE		CIRCUIT SHEPHERD		WD NO. 0006
For: JEREMY HUDECZ		SUBSTATION SHEPHERD		CKT NO. 02
4460 S WISE RD		FOREST HILL		LCP NO. 0534
CHIPPewa				
YEAR CODE 370429	REQUEST NO. 03041017	UTIL. TYPE CATEGORY	TYPE	WORK ORDER
EO	NBUS	OHLN		06646956
CAD FILE: 06646956.001				

ISABELLA CO  
 CHIPPewa TWP  
 T14 R03 SEC.27





Richard W  
Klender/AI/Consumers/CMS  
02/12/2007 09:35 AM

To Stacie M Lahr/Pr/Consumers/CMS@CMS

cc

bcc

Subject Crossing Height at 4460 Wise Rd, Mt. Pleasant

---

Stacie: The height of the distribution at the point it crosses the transmission line is 33 feet ground to top wire.

If you have any other questions, please call or email.

Thanks!  
Rich

LINE NAME: 61 -- #316 TO #47 (BULLOCK-SUMMERTON)

STRUCTURE #: 272

ORDER: 46

LINE NO/LTR:	61
STRUCT #:	272
OP VOLTAGE:	138
STNEQ:	228.10
BACK SPAN:	530.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	65
POLE CLASS:	3
CONST TYPE:	SA

**STRUCTURE**

DWG	SHT	LTR	FIG	REV	COMMENTS
SDM025134	1		B		

REMARKS:

GUYING:

**CONDUCTORS**

**LINE 61**

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS:	NUM	SHT	LTR	FIG	REV

SAG: SDM025531

SPACER RMKS:

**REMARKS**

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG	SHT	LTR	FIG	REV
MZ0000909			22	

**CONLIST**

DWG	SHT	LTR	FIG	REV
T13800610	7			

**GROUND WIRE**

**LINE 61**

TYPE:

DRAWINGS:	NUM	SHT	LTR	FIG	REV

SAG: SDM025537

**REMARKS**

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

**LOCATION**

PROP OWNER: B.GILMORE

PARCEL NO: 98

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 26

**REVISION**

LETTER: A

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR:	61
STR ORDER:	46
STRUCT #:	272

LINE NAME: 61 -- #316 TO #47 (BULLOCK-SUMMERTON)  
STRUCTURE #: 273 ORDER: 45

LINE NO/LTR:	61
STRUCT #:	273
OP VOLTAGE:	138
STNEQ:	222.80
BACK SPAN:	540.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	65
POLE CLASS:	3
CONST TYPE:	SA

**STRUCTURE**

DWG SHT LTR FIG REV COMMENTS  
SDM025134 1 B

REMARKS:

GUYING:

**CONDUCTORS**

**LINE 61**

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025531

SPACER RMKS:

**REMARKS**

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG	SHT	LTR	FIG	REV
MZ0000909			22	

**CON LIST**

DWG	SHT	LTR	FIG	REV
T13800610	7			

**GROUND WIRE**

**LINE 61**

TYPE:

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025537

**REMARKS**

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

**LOCATION**

PROP OWNER: B.GILMORE

PARCEL NO: 98

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 26

**REVISION**

LETTER: A

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR:	61
STR ORDER:	45
STRUCT #:	273



LINE NAME: 61 -- #316 TO #47 (BULLOCK-SUMMERTON)  
STRUCTURE #: 274 ORDER: 44

LINE NO/LTR:	61
STRUCT #:	274
OP VOLTAGE:	138
STNEQ:	217.40
BACK SPAN:	450.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	65
POLE CLASS:	3
CONST TYPE:	SA

**STRUCTURE**

DWG SHT LTR FIG REV COMMENTS  
SDM025134 1 B

REMARKS:

GUYING:

**CONDUCTORS**

**LINE 61**

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025531

SPACER RMKS:

**REMARKS**

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG SHT LTR FIG REV

MZ0000909 22

**CONLIST**

DWG SHT LTR FIG REV

T13800610 7

**GROUND WIRE**

**LINE 61**

TYPE:

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025537

**REMARKS**

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

**LOCATION**

PROP OWNER: B.GILMORE

PARCEL NO: 98

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 26

**REVISION**

LETTER: A

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR: 61

STR ORDER: 44

STRUCT #: 274

LINE NAME: 61 -- #316 TO #47 (BULLOCK-SUMMERTON)  
STRUCTURE #: 275 ORDER: 43

LINE NO/LTR:	61
STRUCT #:	275
OP VOLTAGE:	138
STNEQ:	212.90
BACK SPAN:	430.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	65
POLE CLASS:	2
CONST TYPE:	SA

**STRUCTURE**

DWG SHT LTR FIG REV COMMENTS  
SDM025134 1 B

REMARKS:

GUYING:

**CONDUCTORS**

**LINE 61**

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025531

SPACER RMKS:

**REMARKS**

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG SHT LTR FIG REV

MZ0000909 22

**CONLIST**

DWG SHT LTR FIG REV

T13800610 7

**GROUND WIRE**

**LINE 61**

TYPE:

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025537

**REMARKS**

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

208.74 - 2/W DIST, 2/W TELE UB, 210.45 - CL WISE  
ROAD, SECTION LINE, PROPERTY LINE, WARNING -  
BURIED TEL CABLE, 210.70 - FENCE

**LOCATION**

PROP OWNER: B.GILMORE

PARCEL NO: 98

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 26

**REVISION**

LETTER: A

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR: 61

STR ORDER: 43

STRUCT #: 275

LINE NAME: 61 -- #316 TO #47 (BULLOCK-SUMMERTON)  
STRUCTURE #: 276 ORDER: 42

LINE NO/LTR:	61
STRUCT #:	276
OP VOLTAGE:	138
STN/EQ:	208.60
BACK SPAN:	380.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	70
POLE CLASS:	2
CONST TYPE:	SA

**STRUCTURE**

DWG SHT LTR FIG REV COMMENTS  
SDM025134 1 B

REMARKS:

GUYING:

**CONDUCTORS**

**LINE 61**

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025531

SPACER RMKS:

REMARKS

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG	SHT	LTR	FIG	REV
MZ0000909			22	

**CON LIST**

DWG	SHT	LTR	FIG	REV
T13800610	6			

**GROUND WIRE**

**LINE 61**

TYPE:

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025537

REMARKS

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

**LOCATION**

PROP OWNER: E.SEELEY

PARCEL NO: 100

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 27

**REVISION**

LETTER: B

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR:	61
STR ORDER:	42
STRUCT #:	276

LINE NAME: 61 - #316 TO #47 (BULLOCK-SUMMERTON)  
STRUCTURE #: 277 ORDER: 41

LINE NO/LTR:	61
STRUCT #:	277
OP VOLTAGE:	138
STNEQ:	204.80
BACK SPAN:	530.00
DEFLECTION:	
TYPE:	WOOD POLE
POLE HT:	65
POLE CLASS:	3
CONST TYPE:	SA

**STRUCTURE**

DWG SHT LTR FIG REV COMMENTS  
SDM025134 1 B

REMARKS:

GUYING:

**CONDUCTORS**

LINE 61

TYPE: 336.4 KCMIL ACSR

DES VOLTAGE: 138

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025531

SPACER RMKS:

REMARKS

61: SAG 336.4 KCMIL ACSR FROM SUMMERTON SUB PER SDM025531 SH 4.

**ELEVATIONS**

GROUNDLINE:

SETTING:

CENTERLINE:

**FRAMING**

DWG	SHT	LTR	FIG	REV
MZ0000909			22	

**CONLIST**

DWG	SHT	LTR	FIG	REV
T13800610	6			

**GROUND WIRE**

LINE 61

TYPE:

DRAWINGS: NUM SHT LTR FIG REV

SAG: SDM025537

REMARKS

61: SAG 5/16" STEEL FROM SUMMERTON SUB PER SDM025537 SH 2.

**GENERAL REMARKS**

**LOCATION**

PROP OWNER: E.SEELEY

PARCEL NO: 100

REMARKS:

RIGHT-OF-WAY:

COUNTY: ISABELLA

TOWNSHIP: CHIPPEWA

TOWN/RANGE: T14N,R03W

SECTION: 27

**REVISION**

LETTER: B

GWO:

RS NO:

NOTES: CHG'D LINE LETTER FOR RECORD (JEO,HJE)

REV DESIGNER:

REV ENGINEER:

REVISION DATE: 7/13/1972

DESIGNER: RGH

ENGINEER: ACF,WAC,FFY

ENGINEER DATE: 7/30/1969

DIVISION HEAD: PAMULHEARN

DEPT HEAD:

LINE NO/LTR:	61
STR ORDER:	41
STRUCT #:	277

**Consumers Energy**  
**Application To Modify Existing Co-location Site**

WOODLAND  
 JTC

CLIENT INFORMATION	
Company Name:	ALTEL COMMUNICATIONS
Contact Person:	STEVE EARLS
Contact Address:	SEA WIRELESS, INC. 6312 W. MAIN ST. KALAMAZOO, MI 49009
Contact Telephone #'s:	269-372-7100 616-291-0711
Contact Fax #:	269-372-7112
Construction Coordinator Name:	TBD
Construction Coordinator Phone #:	TBD

SITE INFORMATION	
Consumers Energy Site Identification (Name/#):	* TOWER 970
Client Site Identification (Name/#):	WOODLAND
Site Address:	6150 ANGLING RD. KALAMAZOO, MI
Section, Town, Range:	
Township:	PORTAGE CITY
County:	KALAMAZOO
Latitude/Longitude:	42° 13' 36.8" -85° 37' 45.2

STRUCTURAL ANALYSIS/EQUIPMENT DATA	
Type of infrastructure: (Transmission tower, communications tower, distribution tower/pole, raw land, etc.)	TRANSMISSION TOWER #970
EXISTING EQUIPMENT:	
Antenna Type/Part Number(s):	RR70-12-00-A2
Antenna Mount Height:	116'
Antenna Quantity:	THREE
Microwave Dish Type/Part Number:	N/A
Microwave Dish Quantity:	N/A
Co-axial Cable Size & Quantity:	6 COAX LINES 1 5/8"
Transmit and Receive Frequencies:	
Shelter or Cabinet:	SHELTER

EQUIPMENT TO REMOVE:	
Antenna Type/Part Number(s):	RR70-12-00-A2
Antenna Mount Height:	116'
Antenna Quantity:	THREE
Microwave Dish Type/Part Number:	N/A
Microwave Dish Quantity:	N/A
Co-axial Cable Size & Quantity:	N/A
Transmit and Receive Frequencies:	T 836.52-88152 / R. 880-890
Shelter or Cabinet:	

EQUIPMENT TO ADD:	
Antenna Type/Part Number(s):	RWA-800176S-5-25
Antenna Mount Height:	116'
Antenna Quantity:	6
Microwave Dish Type/Part Number:	N/A
Microwave Dish Quantity:	N/A
Co-axial Cable Size & Quantity:	N/A
Transmit and Receive Frequencies:	
Shelter or Cabinet:	

WOODLAND

THE ANTENNA SPECIFICATION/CUT SHEETS INDICATING THE ANTENNA'S MECHANICAL AND ELECTRICAL SPECIFICATIONS MUST BE ATTACHED TO THIS APPLICATION.

<b>WORK DESCRIPTION</b>	
Brief description of deliverable: (Please be certain to provide enough detail to clearly describe what equipment will be installed on both the tower and the ground AFTER the modification has been completed).	REMOVING 3 EXISTING ANTENNAS AND ADDING 6 ANTENNAS USING SAME COAT.

\* Provided by Consumers Energy

DATE SUBMITTED: 3/30/07	PROPOSED BUILD MONTH: ASAP
-------------------------	----------------------------

**APPLICATION/ADMINISTRATIVE FEE:**  
 An application and/or administrative fee is required to process this application, depending on the terms of the applicant's general lease agreement with Consumers Energy. The Application Fee is \$500.00, and the Administrative Fee (if required) is \$500.00.

**INSTRUCTIONS:**

1. Read entire application and sign the application.
2. Return the following items to the address below: - Please do not send VIA Email
  - One (1) signed copy of this application,
  - Antenna specification/cut sheets,
  - Proposed site map (if exact address is unavailable), and
  - \$500 Administrative and/or \$500 Application Fee (make check(s) payable to Consumers Energy Company).
  - Send to:  
 Paula K Bamm  
 Consumers Energy Company  
 Telecom Leasing Project  
 One Energy Plaza  
 Jackson, MI 49201-2276

**GENERAL INFORMATION:**

An engineering and operating review of your request MUST be made. Questions regarding progress may be directed to the Telecom Leasing Project (Paula Bamm 517-788-1752).

- If proposed site is a transmission tower co-location, seven copies of the site plans and construction drawings will need to be submitted when available.
- If proposed site is a communications tower co-location, three copies of the site plans and construction drawings will need to be submitted when available.
- All other proposed co-location or raw land installations require seven copies of the site plans and construction drawings be submitted when available.

Applicant understands that it is not obtaining an option, right of first refusal, or any other interest in the property in question by virtue of this application or the enclosed payment. Applicant also understands that Consumers Energy Company may (1) Not be able to lease the property; (2) Refuse to lease the property; and/or (3) Lease the property subject to any conditions, restriction or reservations it deems necessary or desirable.

Applicant acknowledges reading this application and understands that the \$500.00 Administrative Fee is non-refundable. The \$500 Application Fee will be refunded ONLY if Consumers Energy Company is unable to rent the requested space due to factors within Consumers Energy Company's control.

Stephen M. Earls  
 Applicant's Signature

3/30/07  
 Date Signed

This application for Schedule A to Lease Site has been APPROVED/APPROVED SUBJECT TO: /DENIED (circle one).

Consumers Energy Company Representative

Date Signed

**TOWER SITE DETAIL**  
(Please do not invoice from this document)

Schedule A

Date: February 7, 2000

Regarding a Lease made the 13th day of February 1998 between CONSUMERS ENERGY COMPANY, a Michigan corporation, 212 West Michigan Avenue, Jackson, Michigan 49201, "Landlord," and CENTURYTEL PERSONAL ACCESS NETWORK, INC., a Louisiana corporation, P.O. Box 4065, Monroe, Louisiana 71211-4065, "Tenant."

**Site Name: Woodland #622 (Consumers Energy Tower #970)**  
**Site Coordinates: Lat: N 42°13'38" Long: 85°37'45"**  
**Site Address: 6150 Angling Road, City of Portage, Kalamazoo County, Michigan**

Landlord Contract Manager: Jack M Decker      Landlord Contract Manager Telephone: (517) 788-0055  
 Landlord Implementation Manager: Wendy C Allen      Landlord Implementation Manager Telephone: (517) 788-1089  
 Landlord Site Manager: Richard G. Cottrell      Landlord Site Manager Telephone: (517) 788-0817

Tenant Name: CenturyTel  
 Tenant Contact: Guy Link  
 Contact Address: 5025 28th Street SE, Grand Rapids, Michigan 49512  
 Tenant Telephone: (616) 285-7230  
 Tenant Fax: (616) 285-7396

First Year-Initial Term:	January 20, 2000 - January 19, 2001	First Year-Initial Term Rent:	\$15,000/year
Second Year-Initial Term:	January 20, 2001 - January 19, 2002	Second Year-Initial Term Rent:	\$15,600/year
Third Year-Initial Term:	January 20, 2002 - January 19, 2003	Third Year-Initial Term Rent:	\$16,224/year
Fourth Year-Initial Term:	January 20, 2003 - January 19, 2004	Fourth Year-Initial Term Rent:	\$16,873/year
Fifth Year-Initial Term:	January 20, 2004 - January 19, 2005	Fifth Year-Initial Term Rent:	\$17,548/year

Intended Site Use: Install antennas on tower and install equipment shelter or cabinets near tower.

Electric Energy charge of \$100.00 per month if metering is not obtained by tenant.

Tenant is authorized to install and maintain the following antenna and systems equipment:

<u>Antenna</u>	<u>Brand/Model</u>	<u>Mount Height</u>	<u>Azimuth</u>	<u>Mounting Leg</u>	<u>Line</u>	<u>Operating Transmission Frequencies</u>
3	RR90-17-00DP	114 feet	0-120-240		1/5/8"	<u>Transmit/Receive</u> Tx 1945-1950 MHZ Rx 1865-1870 MHZ

The above-mentioned antennas may be replaced with the below mentioned antennas at a future date, provided that a new structural analysis is performed and the results are favorable.

Installed Equipment Description:  
Rack   Qty.   Manufacturer   Description   Model  
 See Site Plan for approved tower and ground details.

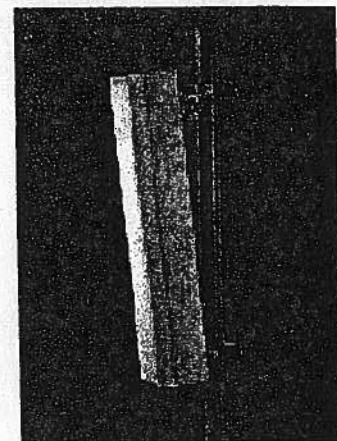
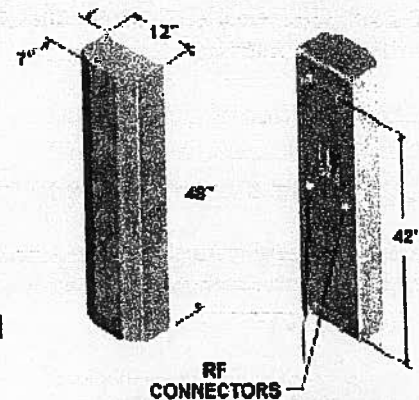
# RR70-12-XXXA2

DualPol® Polarization  
806 MHz - 896 MHz

OptiRange™

## Electrical Specifications

Azimuth Beamwidth	70°
Elevation Beamwidth	15°
Gain	11.2 dBd (13.1 dBi)
Polarization	Dual Linear, Slant ( $\pm 45^\circ$ )
Port-to-Port Isolation	$\geq 20$ dB
Front-to-Back Ratio	$\geq 26$ dB
Electrical Downtilt Options	0°, 5°
VSWR	1.35:1 Max
Connectors	2; Type N or 7-16 DIN (female)
Power Handling	500 Watts CW
Passive Intermodulation	$\leq -150$ dBc [2 x 20W (+ 43 dBm)]
Lightning Protection	Chassis Ground



## Mechanical Specifications

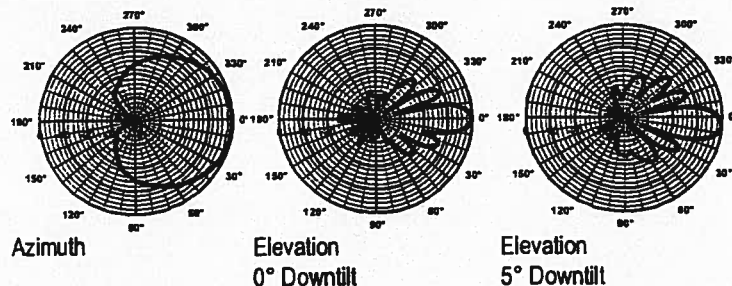
Dimensions (L x W x D)	48 in x 12 in x 7 in (121.9 cm x 30.5 cm x 17.8 cm)
Rated Wind Velocity	130 mph (209 kph)
Equivalent Flat Plate Area	4 ft <sup>2</sup> (.37 m <sup>2</sup> )
Front Wind Load @ 100 mph (161 kph)	118 lbs (525 N)
Side Wind Load @ 100 mph (161 kph)	69 lbs (308 N)
Weight (Without Mounting Kit)	18 lbs (8 kg)

## Mounting Options

MTG-P00-10, MTG-S02-10, MTG-DXX-20°, MTG-CXX-10°, MTG-C02-10, MTG-TXX-10°

Note: \*Model number shown represents a series of products. See Mounting Options section for specific model number.

## Patterns



EMS' antennas are protected by one or more of the following U.S. patents: 5,844,529; 6,067,053; 6,462,710; 6,392,600; 6,069,590; 5,966,102; 5,757,246. EMS' antenna designs may also be covered by pending U.S. patent applications and by pending & awarded international patents.

Revised 04/20/04



Vertically Polarized, Panel 62° / 16 dBd

# RWA-80017LS \_\_\_ 5° 25%

When ordering, replace "\_\_\_" with connector type.

## Mechanical specifications

Length	2450 mm	98.5 in
Width	285 mm	11.2 in
Depth	160 mm	6.3 in
<sup>1)</sup> Weight	14 kg	31.0 lbs
Wind Area	0.698 m <sup>2</sup>	7.51 ft <sup>2</sup>
Wind load at 50 m/s	1140 N	256 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome

## Mounting & Downtilting:

Mounting brackets attach to a pipe diameter of Ø50-160 mm (2.0-6.3 in)

Mounting bracket kit #36210002

Downtilt bracket kit #36114003

## Electrical specifications

Frequency Range	806-941 MHz*
Impedance	50Ω
<sup>2)</sup> Connector	NE, E-DIN
<sup>1)</sup> VSWR	≤1.4:1
Polarization	Vertical
<sup>1)</sup> Gain	16 dBd
<sup>2)</sup> Power Rating	500 W
<sup>1)</sup> Half Power Angle	
H-Plane	62°
E-Plane	7°
<sup>1)</sup> Electrical Downtilt	5°
<sup>1)</sup> Null Fill	25%
Lightning Protection	Direct Ground

\*Also available up to 960 MHz. Consult your sales director for more information.

<sup>2)</sup>Typical Values

<sup>2)</sup>Power Rating limited by connector only.

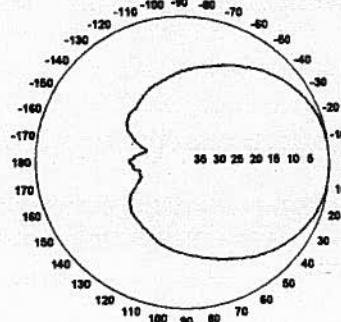
<sup>2)</sup>NE indicates an elongated N Connector.

<sup>2)</sup>E-DIN indicates an elongated DIN Connector.

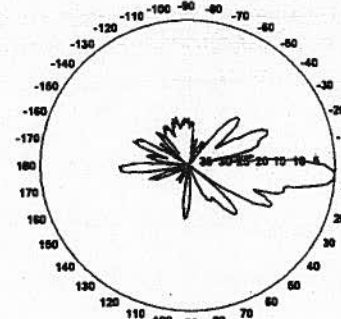
<sup>2)</sup>The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

## Radiation-pattern<sup>1)</sup>



Horizontal

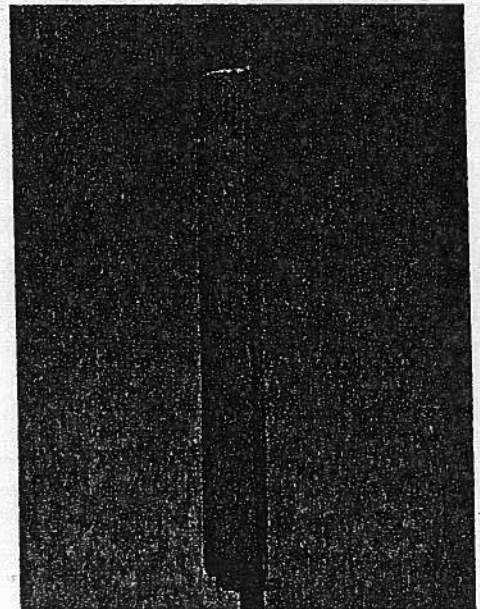


Vertical

Specially designed for enhanced upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back Ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- A 1½" four-channel extrusion running the entire length of the antenna for unmatched strength and rigidity.
- Durable brass feedline design that eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band width and superior performance.
- Air as insulation for virtually no internal signal loss.

Every Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with bottom-fed connector only.

## 806-941 MHz

**Amphenol Antel, Inc.**  
The Antenna Technology Company

Revision Date: 6/3/04

1300 Capital Drive Rockford, IL 61109 Toll-Free (888) 417-9562 Tel. (815) 399-0001  
Fax. (815) 399-0156 Email: antel@antelinc.com www.antelinc.com

## **Tower Loading Calculations**

**TOWER #970 TOWER LOADS**

**Variable Assignment:**

800	=	Wind Span (feet)	
1040	=	Weight Span (feet)	
0.273	=	Shield Wire Weight (pound/foot)	Shield Wire: 3/8" HS Steel (7 Str)
0.808	=	Shield Wire Weight (+ 1/2" radial ice) (pound/foot)	
1.613	=	Conductor Weight (pound/foot)	Conductor: 1431 Kcmil 45/7 Str. ACSR (Bobolink)
2.182	=	Conductor Weight (+ 1/2" radial ice) (pound/foot)	
0.36	=	Shield Wire Diameter (inches)	
1.38	=	Shield Wire Diameter (+ 1/2" radial ice) (inches)	
1.427	=	Conductor Diameter (inches)	
2.427	=	Conductor Diameter (+ 1/2" radial ice) (inches)	
0.83	=	Line Angle (degrees)	
4500	=	Shield Wire Tension (Nesc Heavy) (pounds)	
12830	=	Conductor Tension (Nesc Heavy) (pounds)	
3299	=	Shield Wire Tension (Nesc Extreme Wind) (pounds)	
10725	=	Conductor Tension (Nesc Extreme Wind) (pounds)	

**Load Case #1 NESC Heavy (1997 OLF)**

<b>SW</b>	V =	1.5 * Weight Span * Shield Wire Weight	
		= 1260	
	T =	2.5 * Wind Span * Shield Wire Diameter * 1 FT/ 12 IN * 4 PSF	
		+ 1.65 * 2 * SIN (Line Angle/2) * Shield Wire Tension	
		= 1015	
<b>COND</b>	V =	1.5 * Weight Span * Conductor Weight	
		= 3404	
	T =	2.5 * Wind Span * Conductor Diameter * 1 FT/ 12 IN * 4 PSF	
		+ 1.65 * 2 * SIN (Line Angle/2) * Conductor Tension	
		= 1926	
<b>TOWER</b>	WIND	4 * (2.5 * 2 Faces * 1.6)/2	
		= 16 PSF/FACE	DRAG FACTOR = 1.0
	DEAD LOAD	= DL * 1.5	

**CABLE BELOW JOINT 4**

V = 3.00 #/ft

T = 4.38 #/ft

**CABLE BELOW JOINT 10**

V = 6.00 #/ft

T = 8.76 #/ft

**JOINT LOAD DUE TO WIND ON CABLES ON LEGS**

Joint	Cable Lengths	Vertical	Transverse
4S	5.20	16	23
5S	4.50	14	20
6S	4.50	14	20
7S	4.30	13	19
8S	4.00	12	18
9S	4.30	13	19
10P	5.40	32	47
11S	6.50	39	57
12S	6.90	41	60
13S	7.10	43	62
14S	17.00	102	149
15S	29.00	174	254

**TOTAL JOINT LOADS**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	85	66
41	69	43
42	41	26
43	41	26
5S	14	20
6S	58	45
61	45	25
62	45	25
7S	57	44
71	45	25
72	45	25
8S	12	18
9S	13	19
10P	32	47
11S	39	57
12S	41	60
13S	43	62
14S	102	149
15S	174	254

**JOINT LOAD DUE TO ANTENNA**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	69	43
41	69	43
42	41	26
43	41	26
6S	45	25
61	45	25
62	45	25
7S	45	25
71	45	25
72	45	25

**Load Case #2 NESC Extreme Wind**

**SW**             $V = \text{Weight Span} * \text{Shield Wire Weight}$   
                        $= 284$   
                        $T = \text{Wind Span} * \text{Shield Wire Diameter} * 1 \text{ FT/ 12 IN} * 24 \text{ PSF}$   
                                $+ 2 * \text{SIN} (\text{Line Angle}/2) * \text{Shield Wire Tension}$   
                                $= 624$

**COND**             $V = \text{Weight Span} * \text{Conductor Weight}$   
                                $= 1678$   
                        $T = \text{Wind Span} * \text{Conductor Diameter} * 1 \text{ FT/ 12 IN} * 24 \text{ PSF}$   
                                $+ 2 * \text{SIN} (\text{Line Angle}/2) * \text{Conductor Tension}$   
                                $= 2439$

**TOWER**            **WIND**     $36.0 * 1.00$   
                                $= 36.00 \text{ PSF/FACE}$   
   **DRAG FACTOR = 1.0**  
                       **DEAD LOAD**     $= \text{DL} * 1.0$

**CABLE BELOW JOINT 4**  
                        $V = 2.00 \text{ \#/ft}$   
                        $T = 9.84 \text{ \#/ft}$

**CABLE BELOW JOINT 10**  
                        $V = 4.00 \text{ \#/ft}$   
                        $T = 19.68 \text{ \#/ft}$

**JOINT LOAD DUE TO WIND ON CABLES ON LEGS**

Joint	Cable Lengths	Vertical	Transverse
4S	5.20	10	51
5S	4.50	9	44
6S	4.50	9	44
7S	4.30	9	42
8S	4.00	8	39
9S	4.30	9	42
10P	5.40	22	106
11S	6.50	26	128
12S	6.90	28	136
13S	7.10	28	140
14S	17.00	68	335
15S	29.00	116	571

**TOTAL JOINT LOADS**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	79	94
41	69	43
42	41	26
43	41	26
5S	9	44
6S	54	69
61	45	25
62	45	25
7S	53	67
71	45	25
72	45	25
8S	8	39
9S	9	42
10P	22	106
11S	26	128
12S	28	136
13S	28	140
14S	68	335
15S	116	571

**JOINT LOAD DUE TO ANTENNA**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	69	43
41	69	43
42	41	26
43	41	26
6S	45	25
61	45	25
62	45	25
7S	45	25
71	45	25
72	45	25

**Load Case #3 NESC Extreme Wind (45 Degrees)**

$(24 \text{ PSF} \times \cos^2 45^\circ \times 1.2 = 14.4 \text{ PSF})$

**SW**  
 $V = \text{Weight Span} \times \text{Shield Wire Weight}$   
 $= 284$   
 $T = \text{Wind Span} \times \text{Shield Wire Diameter} \times 1 \text{ FT} / 12 \text{ IN} \times 14.4 \text{ PSF}$   
 $+ 2 \times \text{SIN} (\text{Line Angle} / 2) \times \text{Shield Wire Tension}$   
 $= 394$

**COND**  
 $V = \text{Weight Span} \times \text{Conductor Weight}$   
 $= 1678$   
 $T = \text{Wind Span} \times \text{Conductor Diameter} \times 1 \text{ FT} / 12 \text{ IN} \times 14.4 \text{ PSF}$   
 $+ 2 \times \text{SIN} (\text{Line Angle} / 2) \times \text{Conductor Tension}$   
 $= 1526$

**TOWER**  
**WIND**  $43.2 \times 1.00$   
 $= 43.20 \text{ PSF/FACE}$   $\frac{x \cos 45^\circ}{30.5}$   
**DRAG FACTOR** = 1.0  
**DEAD LOAD** =  $DL \times 1.0$

**CABLE BELOW JOINT 4**  
 $V = 2.00 \text{ \#/ft}$   
 $T = 9.84 \text{ \#/ft}$

**CABLE BELOW JOINT 10**  
 $V = 4.00 \text{ \#/ft}$   
 $T = 19.68 \text{ \#/ft}$

**JOINT LOAD DUE TO WIND ON CABLES ON LEGS**

Joint	Cable Lengths	Vertical	Transverse
4S	5.20	10	51
5S	4.50	9	44
6S	4.50	9	44
7S	4.30	9	42
8S	4.00	8	39
9S	4.30	9	42
10P	5.40	22	106
11S	6.50	26	128
12S	6.90	28	136
13S	7.10	28	140
14S	17.00	68	335
15S	29.00	116	571

**TOTAL JOINT LOADS**

Joint	Vertical	Transverse	x cos 45°
3P	69	43	30
31	69	43	30
32	41	26	18
33	41	26	18
4S	79	94	67
41	69	43	30
42	41	26	18
43	41	26	18
5S	9	44	31
6S	54	69	49
61	45	25	18
62	45	25	18
7S	53	67	48
71	45	25	18
72	45	25	18
8S	8	39	28
9S	9	42	30
10P	22	106	75
11S	26	128	90
12S	28	136	96
13S	28	140	99
14S	68	335	237
15S	116	571	404

**JOINT LOAD DUE TO ANTENNA**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	69	43
41	69	43
42	41	26
43	41	26
6S	45	25
61	45	25
62	45	25
7S	45	25
71	45	25
72	45	25

**Load Case #5 Extreme Wind Tower Only (45 degrees)**

TOWER WIND 73.2 \* 1.00 = 73.20 PSF/FACE  
 = 73.20 PSF/FACE DRAG FACTOR = 1.0  
 $\frac{x \cos 45^\circ}{51.8}$   
 DEAD LOAD = DL \* 1.0

**CABLE BELOW JOINT 4**  
 V = 2.00 #/ft  
 T = 16.70 #/ft

**CABLE BELOW JOINT 10**  
 V = 4.00 #/ft  
 T = 33.40 #/ft

**JOINT LOAD DUE TO WIND ON CABLES ON LEGS**

Joint	Cable Lengths	Vertical	Transverse
4S	5.20	10	87
5S	4.50	9	75
6S	4.50	9	75
7S	4.30	9	72
8S	4.00	8	67
9S	4.30	9	72
10P	5.40	22	180
11S	6.50	26	217
12S	6.90	28	230
13S	7.10	28	237
14S	17.00	68	568
15S	29.00	116	969

**TOTAL JOINT LOADS**

Joint	Vertical	Transverse	x cos 45°
3P	69	43	30
31	69	43	30
32	41	26	18
33	41	26	18
4S	79	130	92
41	69	43	30
42	41	26	18
43	41	26	18
5S	9	75	53
6S	54	100	71
61	45	25	18
62	45	25	18
7S	53	97	68
71	45	25	18
72	45	25	18
8S	8	67	47
9S	9	72	51
10P	22	180	128
11S	26	217	154
12S	28	230	163
13S	28	237	168
14S	68	568	401
15S	116	969	685

**JOINT LOAD DUE TO ANTENNA**

Joint	Vertical	Transverse
3P	69	43
31	69	43
32	41	26
33	41	26
4S	69	43
41	69	43
42	41	26
43	41	26
6S	45	25
61	45	25
62	45	25
7S	45	25
71	45	25
72	45	25





CALCULATION SHEET

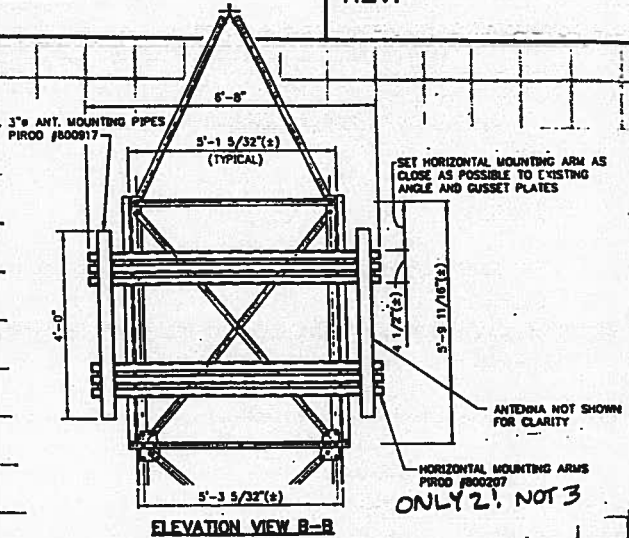
CLIENT <b>CENTURY TEL</b>	SHEET <b>1</b> OF <b>1</b>
SUBJECT <b>CE TOWER NO. 970</b>	JOB NUMBER <b>210002</b>
CALC. BY/DATE <b>WAS 9/20/99</b>	CHECKED BY/DATE <b>REV.</b>

CENTURYTEL ANTENNA

ANT. AREA = 3.11<sup>sq ft</sup>  
 ANT. WT = 18<sup>#</sup>  
 (assumed) PIPE WT = 10.25<sup>#/ft</sup>  
 (assumed L=2x2x1/4) ANGLE ARMS AREA = 2<sup>sq in</sup>  
 WT = 2.44<sup>#/ft</sup>

XSIDE WITH 2 ANTENNAS

LOAD CASE - NESC HEAVY



$$V = 1.5 \times (2 \times 18^{\#} + 2 \times 4' \times 10.25^{\#/ft} + 4 \times (6.67' \times 2.44^{\#/ft})) = 275^{\#}$$

$$T = 4^{\#/ft} \times (3.11^{\text{sq ft}} \times 2 \times 1.6 + 4 \times (6.67' \times 2^{\text{sq in}} \times (\frac{1}{2}')) \times 1.6) \times 2.5 = 171^{\#}$$

LOAD - EXT. WIND

$$V = 275^{\#} / 1.5 = 183^{\#}$$

$$T = 36^{\#/ft} \times (2 \times 3.11^{\text{sq ft}} + 4 \times (6.67' \times 2^{\text{sq in}} \times \frac{1}{2}')) = 384^{\#}$$

LOAD - EXT WIND - TOWER ONLY

$$V = 183^{\#}$$

$$T = 61^{\#/ft} \times (2 \times 3.11^{\text{sq ft}} + 4 \times (6.67' \times 2^{\text{sq in}} \times \frac{1}{2}')) = 651^{\#}$$

XSIDE WITH 1 ANTENNA



LOAD CASE - NESC HEAVY

$$V = 1.5 (18^{\#} + 4 \times 10.25^{\#/ft} + 4 \times 5.1' \times 2.44^{\#/ft}) = 163^{\#}$$

$$T = 4^{\#/ft} \times (3.11^{\text{sq ft}} + 4 \times 5.1' \times 2^{\text{sq in}} \times \frac{1}{2}')) \times 1.6 \times 2.5 = 104^{\#}$$

LOAD CASE - EXT WIND / TOWER ONLY

DIVIDE LOADS BY FOUR AND APPLY AT JOINTS

$$V = 163 / 1.5 = 109^{\#}$$

$$T = 36^{\#/ft} \times 6.5^{\text{sq ft}} / 61^{\#/ft} \times 6.5^{\text{sq ft}} = 397^{\#}$$

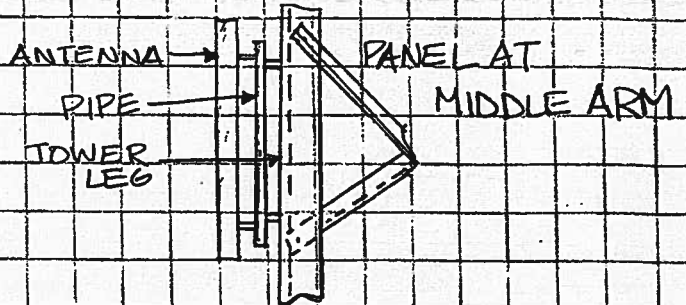


CALCULATION SHEET

CLIENT <b>OMNIPONT</b>	SHEET	OF
SUBJECT <b>CE TOWER NO. 970</b>	JOB NUMBER	
CALC. BY/DATE <b>WAS 9/20/99</b>	CHECKED BY/DATE	REV.

OMNIPONT ANTENNA

ANT. AREA = 3.11 sq'  
 ANT. WT = 18#  
 (assumed) PIPE WT = 10.25 #/l'



LOAD CASE NESC HEAVY

$$V = 1.5 \times (18\# + 4' \times 10.25\#/l') = 89\#$$

$$T = 4\#/l' \times (3.11\text{sq}' \times 1.6) \times 2.5 = 50\#$$

LOAD CASE EXTREME WIND

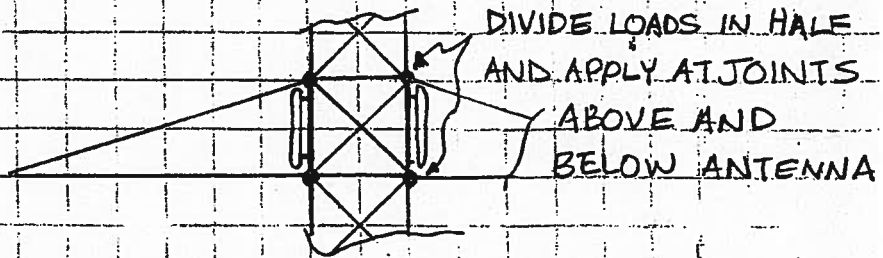
$$V = (18\# + 4' \times 10.25\#/l') = 59\#$$

$$T = 36\#/l' \times (3.11\text{sq}') = 112\#$$

LOAD CASE EXT. WIND, TOWER ONLY

$$V = (18\# + 4' \times 10.25\#/l') = 59\#$$

$$T = 60\#/l' \times 3.11\text{sq}' = 190\#$$



CALCULATION SHEET

CLIENT	SHEET 1 OF 1	
SUBJECT	JOB NUMBER	
CALC. BY/DATE	CHECKED BY/DATE	REV.
WAS 9/20/99		

CENTURYTEL 6 @ 7/8" COAX  $\phi = 1.09"$   $w = .33 \#/\text{ft}$

NESC HEAVY

$$N = 1.5 \times 33 \#/\text{ft} \times 6 = 3.0 \#/\text{ft}$$

$$T = 4 \#/\text{ft} \times 7/8" \times 1/2" \times 2.5 \times 6 = 4.38 \#/\text{ft}$$

EXTREME WIND

$$V = 6 \times 33 \#/\text{ft} = 2.0 \#/\text{ft}$$

$$T = 72 \#/\text{ft} / 2 / 1.6 \times 7/8" \times 1/2" \times 6 = 9.84 \#/\text{ft}$$

EXTREME WIND (TOWER ONLY)

$$V = 6 \times 33 \#/\text{ft} = 2.0 \#/\text{ft}$$

$$T = 122 \#/\text{ft} / 2 / 1.6 \times 7/8" \times 1/2" \times 6 = 16.7 \#/\text{ft}$$

OMNIPONT 6 @ 7/8" COAX  $\phi = 1.09"$   $w = .33 \#/\text{ft}$

BELOW THIS LEVEL ON THE TOWER (OMNI ANTENNA ATTACH.) DOUBLE THE ABOVE CABLE LOADS.

ALUMINUM COMPANY OF AMERICA SAG AND TENSION DATA

COND FOR 970 TOWER

Conductor BOBOLINK 1431.0 Kcmil 45/ 7 Stranding ACSR  
 M:\PLS\TOWER\CLIENTS\CONSUMER\970\_CON.PRF Time:09:01AM Date:09/20/1999  
 Area= 1.2010 Sq. In Dia= 1.427 In Wt= 1.613 Lb/F RTS= 38300 Lb  
 Data from Chart No. 1-957  
 English Units

Span= 800.0 Feet NESC Heavy Load Zone  
 Creep IS a Factor  
 Design Points

Temp F	Ice In	Wind Psf	K Lb/F	Weight Lb/F	Final		Initial	
					Sag Ft	Tension Lb	Sag Ft	Tension Lb
0.	.50	4.00	.30	3.226	21.54	12024.	20.18	12830.*
0.	.50	2.80	.00	2.868	21.01	10961.	19.40	11864.
32.	.50	.00	.00	2.812	22.59	10001.	20.76	10873.
60.	.00	24.00	.00	3.278	24.58	10725.	22.91	11496.
60.	.00	14.40	.00	2.352	23.39	8082.	21.17	8925.
60.	.00	10.20	.00	2.018	22.93	7073.	20.47	7917.
-20.	.00	.00	.00	1.613	17.56	7366.	14.96	8641.
0.	.00	.00	.00	1.613	18.81	6880.	16.11	8026.
30.	.00	.00	.00	1.613	20.61	6283.	17.84	7250.
60.	.00	.00	.00	1.613	22.32	5804.	19.55	6622.
90.	.00	.00	.00	1.613	23.95	5413.	21.20	6109.
120.	.00	.00	.00	1.613	25.51	5086.	22.80	5685.
167.	.00	.00	.00	1.613	27.81	4671.	25.17	5153.
212.	.00	.00	.00	1.613	29.87	4352.	27.32	4753.

\* Design Condition

ALUMINUM COMPANY OF AMERICA SAG AND TENSION DATA

SHIELD WIRE FOR CONSUMERS TOWER NO. 970

Conductor Nominal Diameter 3/ 8 7 Strand Steel HS  
 M:\PLS\TOWER\CLIENTS\CONSUMER\970\_SW.PRF Time:09:02AM Date:09/20/1999  
 Area= .0792 Sq. In Dia= .360 In Wt= .273 Lb/F RTS= 10800 Lb  
 Data from Chart No. 1-1245  
 English Units

Span= 800.0 Feet NESC Heavy Load Zone

Creep is NOT a Factor

Design Points				Final			Initial	
Temp	Ice	Wind	K	Weight	Sag	Tension	Sag	Tension
F	In	Psf	Lb/F	Lb/F	Ft	Lb	Ft	Lb
0.	.50	4.00	.30	1.226	21.89	4500.	21.89	4500.*
0.	.50	2.80	.00	.868	19.32	3605.	19.11	3645.
32.	.50	.00	.00	.808	19.66	3299.	19.38	3346.
60.	.00	24.00	.00	.770	20.08	3078.	19.76	3128.
60.	.00	14.40	.00	.511	17.70	2316.	17.17	2387.
60.	.00	10.20	.00	.410	16.56	1985.	15.91	2066.
-20.	.00	.00	.00	.273	11.71	1867.	10.98	1992.
0.	.00	.00	.00	.273	12.45	1757.	11.66	1875.
30.	.00	.00	.00	.273	13.57	1612.	12.72	1720.
60.	.00	.00	.00	.273	14.69	1490.	13.79	1586.
90.	.00	.00	.00	.273	15.80	1385.	14.87	1472.
120.	.00	.00	.00	.273	16.89	1296.	15.94	1373.
167.	.00	.00	.00	.273	18.54	1181.	17.58	1246.
212.	.00	.00	.00	.273	20.07	1092.	19.10	1147.

\* Design Condition

- CENTURY TEL SITE # 622 (WOODLAND)
- OMNIPOINT SITE # KZ 06311

CE Tower # 970

138W LINES 8V/N

TOWER TYPE 2IA+30

0°50'

A

TABLE I  
NEW  
2I SERIES TOWER  
DESIGN LOAD BASIS

Tower #	Design Conditions	Initial Tensions (lbs)		Design Span (Ft)	Wire Loading (Initial)			Wind on Tower (PSF)	Wire Safety Factors						
		Subconductor Intact	Subconductor Broken		Ground Wire Intact	Ground Wire Broken	Temp		Wind	Ice	Vert	Trans	Long		
2A (2°)	TOWER TYPE	1431 (45) ACSK	3/8 ST (7 ST)	800	1040	800	800	32	1.5	2.5/1.65	1.65				
I.	NESC Gr B, Intact	12,830	-	4,500	-	4,500	4,500	0°	4psf	1/2"	1.0	1.0	1.0	1.0	
II.	Broken GW	12,830	-	4,500	4,500	4,500	4,500	0°	8psf	1/2"	1.0	1.0	1.0	1.0	
III.	Broken Cond	12,830	7,550	4,500	-	4,500	4,500	0°	8psf	1/2"	1.0	1.0	1.0	1.0	
IV.	NESC Extreme Wind	11,273	-	3,269	-	3,269	3,269	60°	24psf	-	1.0	1.0	1.0	1.0	
V.	NESC Extreme Wind, Right Wt Spca	11,273	-	3,269	-	3,269	3,269	60°	24psf	-	1.0	1.0	1.0	1.0	
	NESC Extreme Wind, Tower Only	-	-	-	-	-	-	-	-	-	1.0	1.0	1.0	1.0	
VI.	Heavy Ice	17,506	-	7,026	-	7,026	7,026	30°	-	1-1/4"	1.0	1.0	1.0	1.0	
VII.	Constr Vert, GW														
VIII.	Constr Vert, Conductor														

3,040 lbs  
(See Note 1)

7,600 lbs  
(See Note 1)

III = NOT REQUIRED

JLarkey  
1/12/79

SL  
8/26/79