STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

November 23, 2009

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-107-091028 -** Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 617 South Orange Center Road, Orange, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated October 28, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/CDM/laf

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange
Christopher B. Fisher, Esq., Cuddy & Fisher LLP

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Ten Franklin Square, New Britain, CT 06051
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November 6, 2009

The Honorable James M. Zeoli
First Selectman
Town of Orange
Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-VER-107-091028** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 617 South Orange Center Road, Orange, Connecticut.

Dear First Selectman Zeoli:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by November 20, 2009.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps

S. Derek Phelps
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange

G:\EM\BAM-VERIZON\ORANGE\zeoli2.DOC

CSC
CONNECTICUT SITING COUNCIL

ROBINSON & COLE LL

ENNETH C. BALDWIN

) Trumbull Street
:tford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

EM-VER-107-091028

ORIGINAL

October 28, 2009

Via Hand Delivery

RECEIVED
OCT 28 2009
CONNECTICUT
SITING COUNCIL

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
617 South Orange Center Road, Orange, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility consisting of twelve (12) antennas at the 117-foot level on the existing 180-foot tower and equipment located in a shelter near the base of the tower. The tower and underlying property are owned by the Town of Orange. The Council approved Cellco's shared use of the existing facility on May 21, 2002. Cellco now intends to modify its installation by replacing two of its existing "Beta Sector" cellular antennas with two (2) model LPA-80063/4CF cellular antennas. Cellco will also be installing three (3) new BXA-70063/4CF 700 MHz antennas, for a total of fifteen (15) antennas, at the same 117-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas and the new 700 MHz antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 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 James M. Zeoli, First Selectman of the Town of Orange.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in any increase in the overall height of the existing structures. Cellco's antennas will be located at the 117-foot level on the existing 180-foot tower.

Law Offices
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PROVIDENCE
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NEW LONDON
STAMFORD
WHITE PLAINS
NEW YORK CITY
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2. The proposed modifications will not involve any modifications to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also included is a Structural Analysis Report, prepared by GPD Associates, confirming that the tower can support the proposed modifications and a Structural Analysis Report, prepared by Natcomm Inc., confirming that the tower foundation can support Cellco's proposed antenna modifications. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
James M. Zeoli, Orange First Selectman
Sandy M. Carter

Vertically Polarized Log Periodic 63° / 13.0 dBd
806-960 MHz

Mechanical specifications

Length	1205	mm	47.4	in
Width	386	mm	15.2	in
Depth	335	mm	13.2	in
Depth with z-bracket	375	mm	14.8	in
Weight 4)	9.1	kg	20	lbs
Wind Area Fore/Aft	0.47	m^2	5.0	ft^2
Wind Area Side	0.40	m^2	4.4	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	665	N	150	lbf
Side	577	N	130	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a gray, UV safe fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

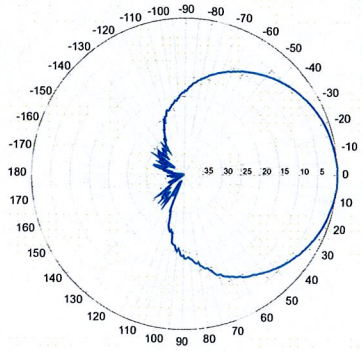
Mounting & Downtilt Bracket Kit 21699999

Electrical specifications

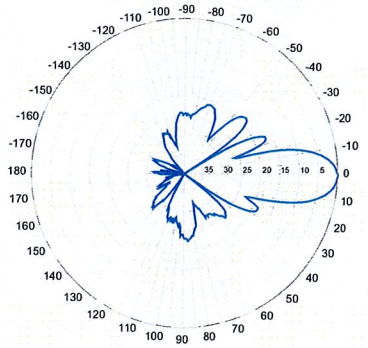
Frequency Range	806-960 MHz
Impedance	50Ω
Connector 3)	NE or E-DIN Female 1 port / Center
VSWR 1)	≤ 1.4:1
Polarization	Vertical
Gain 1)	13.0 dBd 15.0 dBi
Power Rating 2)	500 W
Half Power Angle 1)	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt 5)	0°
Null fill 1)	10%
Lightning protection	Direct ground

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Radiation-pattern 1)



Horizontal



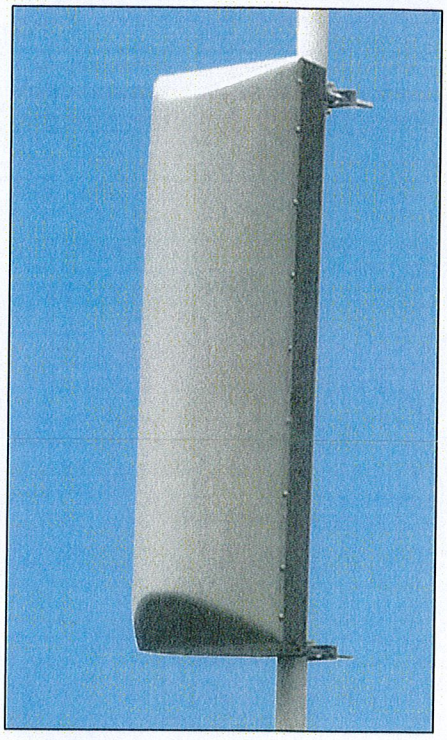
Vertical

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.

LPA-80063/4CF __

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date 12/26/08

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

806-960 MHz

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Slant ±45° Dual Polarized FET Panel 63° / 13 dBd
696-900 MHz

Mechanical specifications

Length	1205	mm	47.4	in
Width	285	mm	11.2	in
Depth	126	mm	5.0	in
Depth with z-bracket	166	mm	6.5	in
Weight 4)	4.5	kg	9.9	lbs
Wind Area Fore/Aft	0.36	m^2	3.9	ft^2
Wind Area Side	0.15	m^2	1.7	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	522	N	117	lbf
Side	244	N	55	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

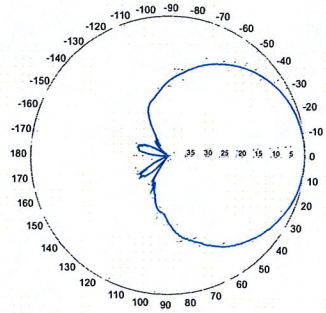
Frequency Range	696-900 MHz
Impedance	50Ω
Connector 3)	NE or E-DIN Female 2 ports / Center
VSWR 1)	≤ 1.4:1
Polarization	Slant ±45°
Isolation Between Ports 1)	< -30 dB
Gain 1)	13.0 dBd 15.0 dBi
Power Rating 2)	500 W
Half Power Angle 1)	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt 5)	0°
Null fill 1)	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

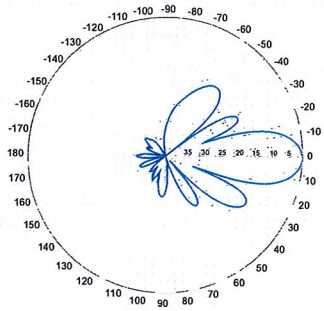
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern 1)
750 MHz

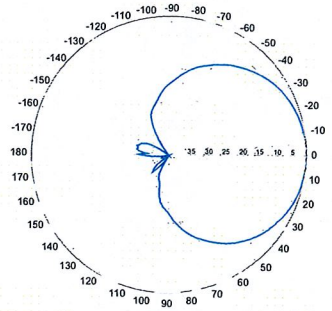


Horizontal

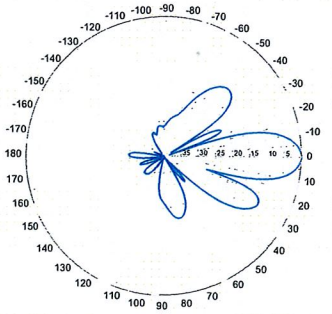


Vertical

850 MHz



Horizontal

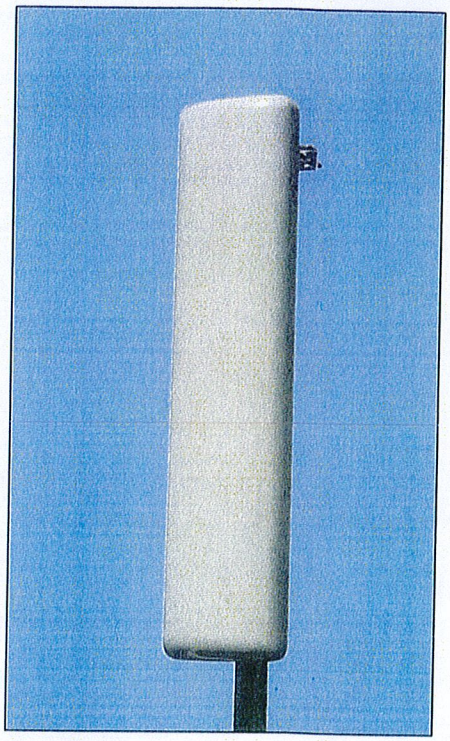


Vertical

696-900 MHz

BXA-70063/4CF __

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design 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.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date 10/27/08

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

	General	Power	Density					
Site Name: Orange 4								
Tower Height: Verizon @ 117'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint	11	122	127	0.0299	1962.5	1.0000	2.99%	
*Cingular UMTS	1	500	177	0.0057	1935	1.0000	0.57%	
*Cingular 800	6	296	177	0.0204	880	0.5867	3.47%	
*Cingular 1900	3	427	177	0.0147	1900	1.0000	1.47%	
*Nextel	12	100	137	0.0230	851	0.5673	4.05%	
*T-Mobile UMTS	2	645	150	0.0206	2100	1.0000	2.06%	
*T-Mobile GSM	8	154	150	0.0197	1945	1.0000	1.97%	
Verizon	**3**	**589**	**117**	**0.0464**	**1970**	**1.0000**	**4.64%**	
Verizon	**9**	**276**	**117**	**0.0653**	**869**	**0.5793**	**11.27%**	
Verizon	**1**	**574**	**117**	**0.0151**	**757**	**0.4973**	**3.04%**	
* Source: Siting Council								35.5%

at&t
Glynn Walker
AT&T Mobility
5405 Windward Pkwy.
Alpharetta, GA 30004
(770) 708-6122

GPD ASSOCIATES
Kevin Clements
520 South Main St., Suite 2531
Akron, Ohio 44311
(330) 572-2195
kclements@gpdgroup.com

GPD# 2009269.51
October 6, 2009

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	Site USID:	16326
	Site FA:	10071197
	Site Name:	ORANGE TRANSFER STATION
VERIZON DESIGNATION:	Site Name:	Orange 4
ANALYSIS CRITERIA:	Codes:	TIA/EIA-222-F & 2003 IBC 85-mph with 0" ice 74-mph with 1/2" ice
SITE DATA:		617 South Orange Center Road, Orange, CT, 06477 , New Haven County Latitude 41° 15' 19.979"N, Longitude 73° 0' 39.204"W 180' Rohn Monopole

Mr. Walker,

GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the addition of the following proposed loading configuration:

Elev. 117' (3) Antel BXA-70063/4CF Antennas on an existing 13' LP Platform w/ (3) 1-5/8" internal coax
(2) Antel LPA-80063/4CF Antennas on the same 13' LP Platform w/ (3) 1-5/8" internal coax

Based on our analysis we have determined the **tower is sufficient** for the proposed, existing, and reserved loadings as referenced in Appendix A. However, the foundation could not be verified based on the information provided.

We at GPD appreciate the opportunity of providing our continuing professional services to you and AT&T. If you have any questions please do not hesitate to call.

Respectfully submitted,

STATE OF CONNECTICUT
DAVID B. GRANGER, P.E.
NO. 17557
LICENSED
PROFESSIONAL ENGINEER

David B. Granger, P.E.
Connecticut#: 17557

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by Verizon to AT&T. This report was commissioned by Mr. Glynn Walker of AT&T.

No foundation or geotechnical information was available or provided for this report. Therefore, the in place capacity of the foundation could not be verified. A more thorough and accurate assessment of foundation capacity will require a site specific geotechnical report and foundation information.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	62.3%	Pass
Base Plate	38.3%	Pass
Anchor Bolts	62.8%	Pass
Foundation	Not Verified	N/A

ANALYSIS METHOD

RISA Tower (Version 5.3.1.0), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and being provided without the benefit of a site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Preliminary Tower Summary	Verizon Co-location document	Siterra
Site Lease Application	Verizon Application, dated 7/10/09	Siterra
Previous Structural Analysis	GPD Associates Job # 2008261.64, dated 3/26/08	Siterra

ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the monopole. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The monopole shaft sizes and shape are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations. If no data is available, the foundation system is not verified.
6. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
7. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
8. All existing loading was obtained from the most recent previous structural analysis by GPD Associates Job # 2008261.64, dated 3/26/08, site photos, and the provided preliminary tower summary and is assumed to be accurate.
9. All proposed coax is assumed to be internal to the monopole.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Associates should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD ASSOCIATES has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD ASSOCIATES in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD ASSOCIATES does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD ASSOCIATES provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD ASSOCIATES, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD ASSOCIATES makes no warranties, expressed and/or implied in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD ASSOCIATES will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD ASSOCIATES pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	ORANGE TRANSFER STATION
Site Number	16326
FA Number	10071197
Date of Analysis	10/6/2009
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	180'	
Tower Manufacturer	Rohn	
Tower Model	n/a	
Tower Design	n/a	
Foundation Design	n/a	
Geotech Report	n/a	
Tower Mapping	n/a	
Previous Structural Analysis	GPD Associates Job # 2008261.64	3/26/2008
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F
Location of Tower (County, State)	New Haven, CT
Basic Wind Speed (mph)	85-fastest
Ice Thickness (in)	0.5
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower	62.8%
Foundation	n/a
Guy Wire	n/a

Note: Foundations were note verified.

Steel Yield Strength (ksi)

Pole	65
Base Plate	60
Anchor Rods	75

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T Mobility	177	177	6	Panel	Powerwave	7770.00		1	Unknown	13' LP Platform	6	Unknown	1-5/8"	Internal
T-Mobile	148	148	9	Panel	RFS	APX16PV-16PVL		1	Unknown	13' LP Platform	24	Unknown	1-5/8"	Internal
T-Mobile	148	148	6	TMA	Powerwave	LGP 21401				behind antennas				
Nextel	137	137	12	Panel	Decibel	844G45VTZASX		1	Unknown	13' LP Platform	12	Unknown	1-5/8"	Internal
Sprint	127	127	6	Panel	Decibel	DB980H65T2E-M		1	Unknown	13' Platform	6	Unknown	1-5/8"	Internal
Verizon	117	117	6	Panel	Decibel	DB844G45ZAXY		1	Unknown	13' Platform	6	Unknown	1-5/8"	Internal
Verizon	117	117	6	Panel	Decibel	950F40T2E-M_2				on same mount	6	Unknown	1-5/8"	Internal
Sprint	50	50	1	GPS	Unknown	GPS Unit		1	Unknown	2' Standoff	1	Unknown	1/2"	Internal

Note: Two existing Decibel DB844G45ZAXY Antennas at the 117' level shall be removed prior to the installation of the proposed. All other antennas, mounts, and feedlines shall remain.

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
Verizon	117	117	3	Panel	Antel	BXA-70063/4CF				on existing mount	3	LDF7-50A	1-5/8"	Internal
Verizon	117	117	2	Panel	Antel	LPA-80063/4CF				on existing mount	3	LDF7-50A	1-5/8"	Internal

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External

Revision:3
Date: 2/18/09

APPENDIX B

RISA Tower Output File

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	177.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	148.00 - 8.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	137.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	127.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	117.00 - 8.00	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF4-50A (1/2 FOAM)	C	No	Inside Pole	50.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7770.00	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07
(2) 7770.00	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07
(2) 7770.00	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PiROD 13' Low Profile Platform	C	None		0.0000	177.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(3) APX16PV-16PVL	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(3) APX16PV-16PVL	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(3) APX16PV-16PVL	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(2) LGP21401	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
(2) LGP21401	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
(2) LGP21401	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
PiROD 13' Low Profile Platform	C	None		0.0000	148.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(4) 844G45VTZASX	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
(4) 844G45VTZASX	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
(4) 844G45VTZASX	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
PiROD 13' Low Profile Platform	C	None		0.0000	137.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(2) DB980H65T2E-M	A	From Centroid-Leg	4.00 0.00 0.00	30.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
(2) DB980H65T2E-M	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
(2) DB980H65T2E-M	C	From Centroid-Leg	4.00 0.00 0.00	-15.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
Valmont 13' Platform w/o Rails	C	None		0.0000	127.00	No Ice	35.00	35.00	1.50
						1/2" Ice	42.00	42.00	2.50
(2) DB844G45ZAXY	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
BXA-70063/4CF	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	5.16	2.44	0.01
						1/2" Ice	5.55	2.74	0.04
(2) DB950F40T2E-M	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	6.42	4.63	0.02
						1/2" Ice	6.88	5.01	0.06
(2) LPA-80063/4CF	B	From Centroid-Leg	4.00 0.00 0.00	-20.0000	117.00	No Ice	7.01	6.08	0.02
						1/2" Ice	7.42	6.48	0.07
BXA-70063/4CF	B	From	4.00	-20.0000	117.00	No Ice	5.16	2.44	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00 0.00			1/2" Ice	5.55	2.74	0.04
(2) DB950F40T2E-M	B	From Centroid-Leg	4.00 0.00 0.00	-20.0000	117.00	No Ice 1/2" Ice	6.42 6.88	4.63 5.01	0.02 0.06
(2) DB844G45ZAXY	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice	7.00 7.41	3.97 4.34	0.02 0.06
BXA-70063/4CF	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice	5.16 5.55	2.44 2.74	0.01 0.04
(2) DB950F40T2E-M	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice	6.42 6.88	4.63 5.01	0.02 0.06
Valmont 13' Platform w/o Rails	C	None		0.0000	117.00	No Ice 1/2" Ice	35.00 42.00	35.00 42.00	1.50 2.50
GPS	C	From Face	2.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice	0.17 0.24	0.17 0.24	0.00 0.00
2'-0" - STANDOFF	C	None		0.0000	50.00	No Ice 1/2" Ice	1.36 2.45	1.36 2.45	0.02 0.04

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	(2) 7770.00	35	25.753	1.1836	0.0005	123613
148.00	(3) APX16PV-16PVL	35	18.681	1.1282	0.0005	16046
137.00	(4) 844G45VTZASX	35	16.131	1.0808	0.0005	11808
127.00	(2) DB980H65T2E-M	35	13.919	1.0263	0.0005	9773
117.00	(2) DB844G45ZAXY	35	11.829	0.9615	0.0004	8657
50.00	GPS	35	2.104	0.3790	0.0001	5602

Section Capacity Table

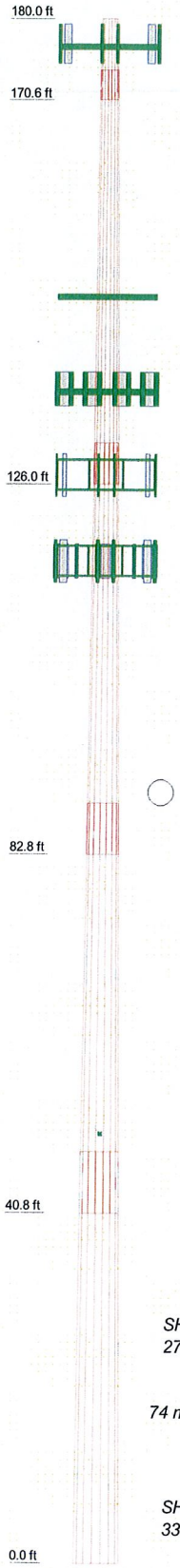
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	180 - 170.58	Pole	TP26.25x24x0.1875	1	-1.70	781.07	2.2	Pass
L2	170.58 - 126	Pole	TP36.525x25.0581x0.25	2	-8.82	1449.60	26.3	Pass
L3	126 - 82.75	Pole	TP46.357x34.8903x0.3125	3	-19.95	2300.36	55.3	Pass
L4	82.75 - 40.75	Pole	TP55.765x44.2987x0.375	4	-31.50	3320.24	62.3	Pass
L5	40.75 - 0	Pole	TP64.75x53.2831x0.4375	5	-49.09	4642.75	62.0	Pass
							Summary	
						Pole (L4)	62.3	Pass
						RATING =	**62.3**	**Pass**

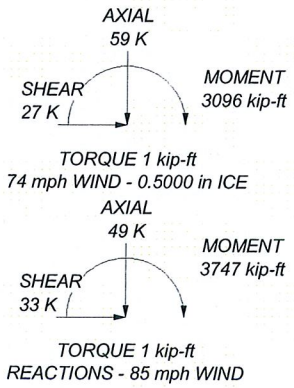
APPENDIX C

Tower Elevation Drawing

Section	1	2	3	4	5
Length (ft)	9.42	48.00	48.00	48.00	48.00
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.3750	0.4375
Lap Splice (ft)	3.42	4.75	6.00	7.25	
Top Dia (in)	24.0000	25.0581	34.8903	44.2987	53.2831
Bot Dia (in)	26.2500	36.5250	46.3570	55.7650	64.7500
Grade	A572-65				
Weight (K)	0.5	4.0	6.5	9.7	13.3

33.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00	177	(2) DB980H65T2E-M	127
(2) 7770.00	177	(2) DB980H65T2E-M	127
(2) 7770.00	177	Valmont 13' Platform w/o Rails	127
PiROD 13' Low Profile Platform	177	(2) DB844G45ZAXY	117
(3) APX16PV-16PVL	148	BXA-70063/4CF	117
(3) APX16PV-16PVL	148	(2) DB950F40T2E-M	117
(3) APX16PV-16PVL	148	(2) LPA-80063/4CF	117
(2) LGP21401	148	BXA-70063/4CF	117
(2) LGP21401	148	(2) DB950F40T2E-M	117
(2) LGP21401	148	(2) DB844G45ZAXY	117
PiROD 13' Low Profile Platform	148	BXA-70063/4CF	117
(4) 844G45VTZASX	137	(2) DB950F40T2E-M	117
(4) 844G45VTZASX	137	Valmont 13' Platform w/o Rails	117
(4) 844G45VTZASX	137	GPS	50
PiROD 13' Low Profile Platform	137	2'-0" - STANDOFF	50
(2) DB980H65T2E-M	127		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 62.3%

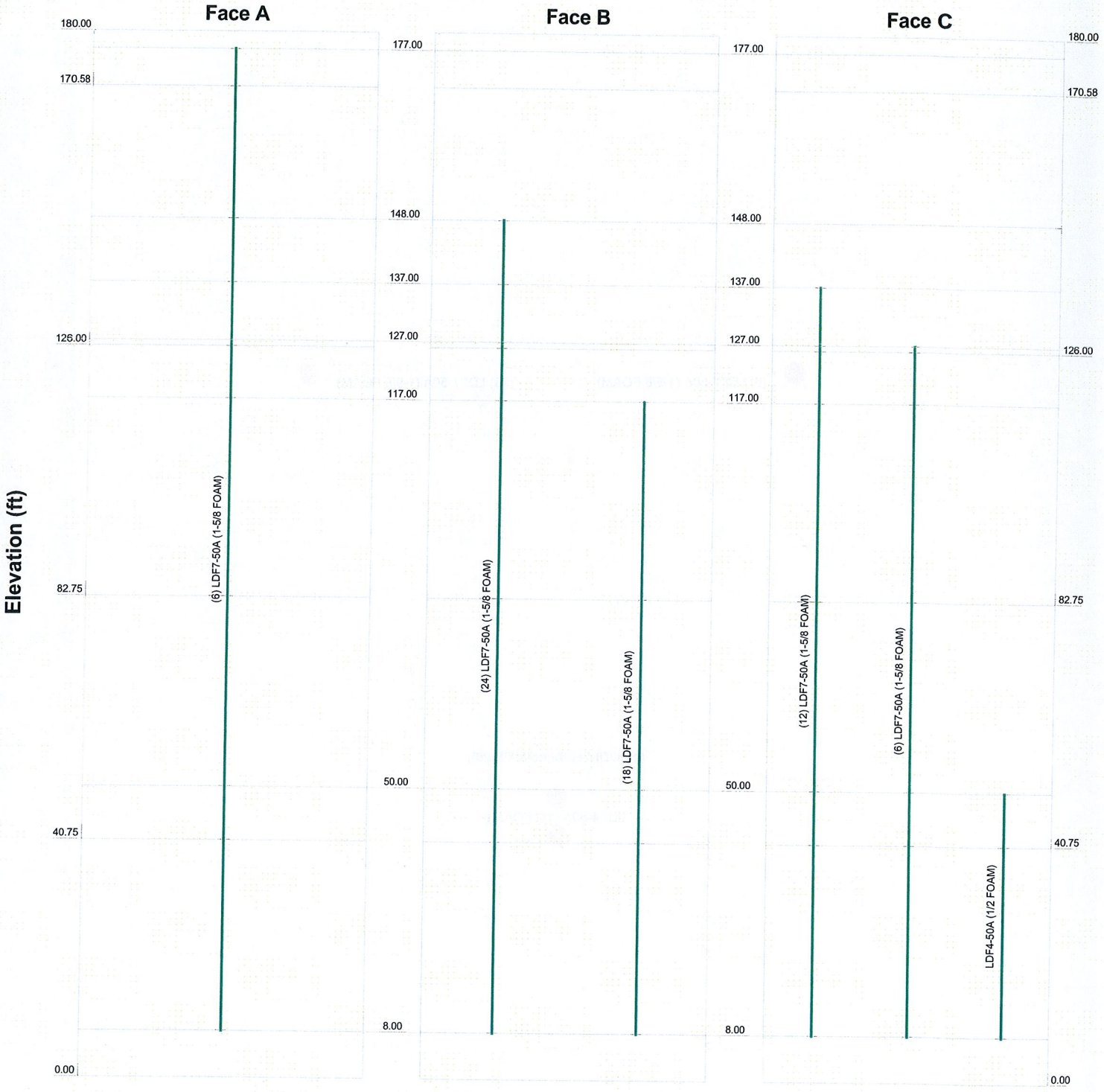
GPD GROUP
Consulting Engineers

GPD Group
520 South Main Street, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: **16326 Orange Transfer Station**			
Project: **2009269.51**			
Client: AT&T	Drawn by: bdaugherty	App'd:	
Code: TIA/EIA-222-F	Date: 10/06/09	Scale: NTS	
Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri		Dwg No. E-1	

Feedline Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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Code: TIA/EIA-222-F	Date: 10/06/09	Scale: NTS	
Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri		Dwg No. E-7	

Feedline Plan

Round _____ Flat _____ App In Face App Out Face

(6) LDF7-50A (1-5/8 FOAM)

(28) LDF7-50A (1-5/8 FOAM)

(12) LDF7-50A (1-5/8 FOAM)

LDF4-50A (1/2 FOAM)

GPD GROUP Consulting Engineers	**GPD Group** 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-2101	Job: ***16326 Orange Transfer Station***	
		Project: ***2009269.51***	
		Client: AT&T	Drawn by: bdaugherty / App'd:
		Code: TIA/EIA-222-F	Date: 10/06/09 / Scale: NTS
		Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri	Dwg No. E-7

APPENDIX D

Anchor Bolt and Base Plate Analysis

GPD ASSOCIATES

Anchor Rod and Base Plate Stresses
16326 Orange Transfer Station
2009269.51

Overturning Moment =	3747.19	k*ft
Axial Force =	49.09	k
Shear Force =	33.34	k

Anchor Rods		
Number of Rods =	20	
Type =	Upset Rod	
Rod Yield Strength (Fy) =	75	ksi
ASIF =	1.333	
Rod Circle =	72	in
Rod Diameter =	2.25	in
Net Tensile Area =	3.25	in^2
Max Tension on Rod =	122.39	kips
Max Compression on Rod =	127.30	kips
Allow. Rod Force =	195.00	kips
Anchor Rod Capacity =	62.8%	OK

Base Plate		
Location =	External	
Plate Strength (F_y) =	60	ksi
Outside Diameter =	77.25	in
Plate Thickness =	2.75	in
wcalc =	31.49	in
wmax =	49.75	in
w =	31.49	in
S =	39.69	in^3
fb =	23.01	ksi
Fb =	60	ksi
Base Plate Capacity =	38.3%	OK

Stiffeners		
Configuration =	None	

Pole		
Pole Diameter =	64.75	in
Number of Sides =	18	
Thickness =	0.4375	in
Pole Yield Strength =	65	ksi

NATCOMM INC.
CONSULTING ENGINEERS

Structural Analysis of an Existing Caisson Foundation

180-ft Existing ROHN Monopole

Proposed Verizon Wireless
Antenna Change-Out

Verizon Wireless Site Ref:
Orange 4

627 South Orange Center Road
Orange, CT

Natcomm Project No. 09009-CO-16

Date: October 21, 2009

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16994
LICENSED
PROFESSIONAL ENGINEER
10-22-09

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

Table of Contents

SECTION 1 - REPORT

- STRUCTURAL CERTIFICATION LETTER BY NATCOMM INC, dated 10.21.09

SECTION 2 – CALCULATIONS

- MathCAD CAISSON FOUNDATION ANALYSIS.
- L-PILE CAISSON ANALYSIS.
- L-PILE LATERAL DEFLECTION vs. DEPTH.
- L-PILE BENDING MOMENT vs. DEPTH.
- L-PILE SHEAR FORCE vs. DEPTH.

SECTION 3 – REFERENCE MATERIAL

- GPD ASSOCIATES STRUCTURAL MONOPOLE ANALYSIS, dated 10-06-09.
- CAISSON FOUNDATION DESIGN BY PAUL J. FORD & CO, originally dated 08-27-01.
- CLARENCE WELTI, P.E, P.C., GEOTECHCICAL REPORT – dated 06-07-01.
- VERIZON WIRELESS RF DATA SHEET.

NATCOMM INC.
CONSULTING ENGINEERS

October 21, 2009

Mr. Tom Nolan
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

Re: Structural Certification Letter ~ 180-ft Monopole Foundation
Verizon Wireless Site Ref ~ Orange 4
Orange Transfer Station
637 South Orange Center Road ~ Orange, CT

Natcomm Project No. 09000.CO16

Dear Mr. Nolan,

Natcomm Inc., has been retained by Verizon Wireless to review the structural adequacy of the existing monopole foundation for the proposed installation of five (5) panel antennas on an existing 13-ft low profile platform at the above referenced site.

A previous structural analysis was prepared by GPD Associates (GPD# 2009269.51), dated October 6, 2009 which determined that the tower structure above grade is sufficient for the existing and proposed loading. However, the foundation could not be verified based on the information provided.

Natcomm Inc., has established that the existing foundation was designed by Paul J. Ford & Company (PJF Job #20501-0701); dated August 27, 2001. The foundation construction consists of a 32-ft long x 8.0-ft ∅ reinforced drilled concrete caisson. Subsurface information was taken from the original geo-technical investigation report prepared by Clarence Welti & Associates, P.C., dated June 07, 2001.

The aforementioned supplemental information is available for reference in the Appendix of this review.

Refer to the Antenna and Appurtenance Summary below for a detailed description of the existing and proposed Verizon Wireless antenna/appurtenance configuration.

Existing antenna/appurtenance configuration:

- Verizon Wireless: (Existing)

  Antennas: Six (6) Andrew/Decibel DB844G45ZAXY panel antennas, six (6) Andrew/Decibel DB950F40T2E-M_2 panel antennas on an existing 13-ft platform with a RAD center elevation of 117-ft AGL.

  Coax Cables: Twelve (12) 1-1/4" Ø coax cables (interior).

Proposed antenna/appurtenance configuration:

- **VERIZON WIRELESS (Proposed):**

  Antennas: Three (3) Antel BXA 70063/4CF and two (2) Antel LPA 80063/4CF panel antennas on aforementioned existing 13-ft Low Profile Platform with a RAD center elevation of 117-ft above ground level.

  Coax Cable: Six (6) 1-5/8" ∅ coax cables (interior).

p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

Foundation

Review of the foundation design consisted of verification of applied loads obtained from the GPD Associates tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 of the aforementioned design calculations were used in the verification of the caisson foundation and are listed below:

Base Reactions	Vector	Proposed Load (kips/ft-kips)
Base	Shear	**33**
	Axial	**49**
	Moment	**3747**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	54.2%	**PASS**
	Lateral Deflection	1.03 in.(1)	**PASS**

(1) Lateral deflection typically limited to 1.0 in. for monopole tower structures. (Deflection deemed within acceptable limits).

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Natcomm, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Jason R. Mead
Structural Engineer

Caisson Foundation:

Input Data:

Shear Force =	$S := 33.00k$	USER INPUT-FROM RISATower
Overturning Moment =	$M := 3747.0ft \cdot k$	USER INPUT-FROM RISATower
Applied Axial Load =	$A1 := 49.0k$	USER INPUT-FROM RISATower
Bending Moment =	$Mu := 3885ft \cdot k$	USER INPUT--FROM LPILE
Moment Capacity =	$Mn := 9281ft \cdot k$	USER INPUT--FROM LPILE
Foundation Diameter =	$d := 8.0ft$	USER INPUT
Overall Length of Caisson =	$L_c := 32.0ft$	USER INPUT
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	USER INPUT
Number of Rebar =	$n := 28$	USER INPUT
Area of Rebar =	$Ar := 1.560in^2$	USER INPUT
Rebar Yield Strength =	$fy := 60ksi$	USER INPUT
Concrete Comp Strength =	$f'c := 4ksi$	USER INPUT

Check Foundation Depth:

Depth of Caisson Below Ground Level = $LD := L_c - L_{pag} = 31\,ft$ (TIA/EIA-222-F 7.2.5)

Depth Required = $$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft^{.5}\left(\frac{M \cdot ft}{3 \cdot kd} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 29.72\,ft$$

$DepthCheck := if(LD1 \le LD, "OK", "NO\ GOOD")$

$DepthCheck = "OK"$

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 2.4$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \ge FS_{reqd}, "OK", "NO\ GOOD")$

$FOSCheck = "OK"$

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 233.7 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 282.7 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 50.27ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 27082.3 \cdot kips$

$AxialCheck := if(AT \le Po, "OK", "NO\ GOOD")$

$AxialCheck = "OK"$

==========

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

(c) 1985-2007 by Ensoft, Inc.
All Rights Reserved

==========

This program is licensed to:

User
NATCOMM Inc

Path to file locations: J:\Jobs\0900900.WI\CO-16 - 627 South Orange Center Road, Orange, CT\Caisson Foundation\
Name of input data file: Orange 4 Caisson Analysis.lpd
Name of output file: Orange 4 Caisson Analysis.lpo
Name of plot output file: Orange 4 Caisson Analysis.lpp
Name of runtime file: Orange 4 Caisson Analysis.lpr

Time and Date of Analysis

Date: October 20, 2009 Time: 14:31:53

Problem Title

Foundation Stiffness of Concrete Pile with Nonlinear EI

Program Options

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

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 250
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 384.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	96.00000000	4169219.	7238.2000	3000000.
2	384.0000	96.00000000	4169219.	7238.2000	3000000.

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

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 84.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 84.000 in
Distance from top of pile to bottom of layer = 108.000 in
p-y subgrade modulus k for top of soil layer = 8.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 8.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 108.000 in
Distance from top of pile to bottom of layer = 138.000 in
p-y subgrade modulus k for top of soil layer = 8.000 lbs/in**3

p-y subgrade modulus k for bottom of layer = 8.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 138.000 in
Distance from top of pile to bottom of layer = 348.000 in
p-y subgrade modulus k for top of soil layer = 25.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 25.000 lbs/in**3

Layer 5 is weak rock, p-y criteria by Reese, 1997
Distance from top of pile to top of layer = 348.000 in
Distance from top of pile to bottom of layer = 432.000 in
Initial modulus of rock at top of layer = 5.0000E+05 lbs/in**2
Initial modulus of rock at bottom of layer = 5.0000E+05 lbs/in**2

(Depth of lowest layer extends 48.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 10 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	.05800
2	84.00	.05800
3	84.00	.07500
4	108.00	.07500
5	108.00	.07500
6	138.00	.07500
7	138.00	.04100
8	348.00	.04100
9	348.00	.05900
10	432.00	.05900

Shear Strength of Soils

Shear strength parameters with depth defined using 10 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	.00000	28.00	------	------
2	84.000	.00000	28.00	------	------
3	84.000	.00000	34.00	------	------
4	108.000	.00000	34.00	------	------
5	108.000	.00000	34.00	------	------
6	138.000	.00000	34.00	------	------
7	138.000	.00000	34.00	------	------
8	348.000	.00000	34.00	------	------
9	348.000	500.00000	.00	.00050	.0
10	432.000	500.00000	.00	.00050	.0

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.

(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 33000.000 lbs
Bending moment at pile head = 44964000.000 in-lbs
Axial load at pile head = 49000.000 lbs

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

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

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete	=	4.000	kip/in**2
Yield Stress of Reinforcement	=	60.	kip/in**2
Modulus of Elasticity of Reinforcement	=	29000.	kip/in**2
Number of Reinforcing Bars	=	28	
Area of Single Bar	=	1.56000	in**2
Number of Rows of Reinforcing Bars	=	15	
Area of Steel	=	43.680	in**2
Area of Shaft	=	7238.229	in**2
Percentage of Steel Reinforcement	=	.603	percent
Cover Thickness (edge to bar center)	=	4.000	in

Unfactored Axial Squash Load Capacity = 27082.27 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	44.000
2	3.120	42.897
3	3.120	39.643
4	3.120	34.401
5	3.120	27.434
6	3.120	19.091
7	3.120	9.791
8	3.120	0.000
9	3.120	-9.791
10	3.120	-19.091
11	3.120	-27.434
12	3.120	-34.401
13	3.120	-39.643
14	3.120	-42.897
15	1.560	-44.000

Axial Thrust Force = 49000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
10215514.	1.634482E+13	6.250000E-07	.00003191	51.05636930	113.26765	852.89669
20325430.	1.626034E+13	.00000125	.00006200	49.60122728	218.22078	1653.04449
30335187.	1.617877E+13	.00000188	.00009216	49.14968061	321.68826	2455.01388
40239527.	1.609581E+13	.00000250	.00012227	48.90700579	423.30172	3255.75792
40239527.	1.287665E+13	.00000313	.00007418	23.73703337	255.67033	6186.33135
40239527.	1.073054E+13	.00000375	.00008738	23.30075312	299.92672	7471.04310
40239527.	9.197606E+12	.00000438	.00010059	22.99257231	343.92145	8755.31739
40239527.	8.047905E+12	.00000500	.00011382	22.76447153	387.65372	10039.15163
40239527.	7.153694E+12	.00000563	.00012707	22.58977461	431.12272	11322.54302
40239527.	6.438324E+12	.00000625	.00014033	22.45247412	474.32760	12605.48907
40239527.	5.853022E+12	.00000688	.00015400	22.40000010	518.59378	13876.49998
40239527.	5.365270E+12	.00000750	.00016733	22.31103659	561.39531	15157.34954
40239527.	4.952557E+12	.00000813	.00018062	22.23060751	603.73850	16439.41311
40239527.	4.598803E+12	.00000875	.00019393	22.16361952	645.81939	17720.98155
40239527.	4.292216E+12	.00000938	.00020726	22.10740042	687.63717	19002.05051

40239527.	4.023953E+12	.00001000	.00022060	22.05994177	729.19092
20282.61689					
40239527.	3.787250E+12	.00001063	.00023396	22.01970720	770.47965
21562.67772					
40239527.	3.576847E+12	.00001125	.00024734	21.98550653	811.50255
22842.22849					
40239527.	3.388592E+12	.00001188	.00026073	21.95639563	852.25862
24121.26626					
40239527.	3.219162E+12	.00001250	.00027415	21.93162203	892.74696
25399.78701					
40239527.	3.065869E+12	.00001313	.00028758	21.91057634	932.96665
26677.78688					
40239527.	2.926511E+12	.00001375	.00030103	21.89275789	972.91664
27955.26279					
40239527.	2.799271E+12	.00001438	.00031449	21.87775755	1012.59610
29232.20982					
40674300.	2.711620E+12	.00001500	.00032798	21.86522913	1052.00392
30508.62533					
42292005.	2.706688E+12	.00001563	.00034148	21.85488653	1091.13920
31784.50454					
43908036.	2.702033E+12	.00001625	.00035501	21.84648657	1130.00098
33059.84320					
45522383.	2.697623E+12	.00001688	.00036855	21.83982038	1168.58819
34334.63790					
47135029.	2.693430E+12	.00001750	.00038211	21.83470774	1206.89968
35608.88582					
48745975.	2.689433E+12	.00001813	.00039569	21.83099985	1244.93464
36882.58070					
50355205.	2.685611E+12	.00001875	.00040929	21.82856226	1282.69194
38155.71927					
51962712.	2.681946E+12	.00001938	.00042290	21.82728052	1320.17059
39428.29676					
53568480.	2.678424E+12	.00002000	.00043654	21.82705164	1357.36939
40700.31005					
55172499.	2.675030E+12	.00002063	.00045020	21.82778692	1394.28728
41971.75495					
56774766.	2.671754E+12	.00002125	.00046388	21.82941198	1430.92336
43242.62487					
58375265.	2.668584E+12	.00002188	.00047757	21.83185530	1467.27641
44512.91680					
59973988.	2.665511E+12	.00002250	.00049129	21.83505678	1503.34538
45782.62545					
61570917.	2.662526E+12	.00002313	.00050503	21.83895922	1539.12898
47051.74798					
63166048.	2.659623E+12	.00002375	.00051878	21.84351683	1574.62627
48320.27779					
64759364.	2.656794E+12	.00002438	.00053256	21.84868383	1609.83594
49588.21161					
67940515.	2.651337E+12	.00002563	.00056018	21.86069727	1679.38808
52122.26934					
71114277.	2.646113E+12	.00002688	.00058788	21.87473059	1747.77594
54653.88185					
74280542.	2.641086E+12	.00002813	.00061567	21.89056063	1814.98961
57183.01149					
77439232.	2.636229E+12	.00002938	.00064355	21.90801287	1881.01963
59709.61154					
80059744.	2.614196E+12	.00003063	.00066991	21.87454462	1942.03735
60000.00000					
82185442.	2.578367E+12	.00003188	.00069482	21.79828405	1998.42614
60000.00000					
83963268.	2.534740E+12	.00003313	.00071869	21.69626284	2051.31280
60000.00000					
85613358.	2.490570E+12	.00003438	.00074218	21.59063387	2102.33086

60000.00000					
86916938.	2.439774E+12	.00003563	.00076451	21.46001959	2149.82140
60000.00000					
88217298.	2.392334E+12	.00003688	.00078689	21.33945036	2196.52160
60000.00000					
89514431.	2.347920E+12	.00003813	.00080932	21.22795343	2242.42722
60000.00000					
90435578.	2.296777E+12	.00003938	.00083030	21.08693361	2284.44010
60000.00000					
91341440.	2.248405E+12	.00004063	.00085127	20.95424223	2325.64737
60000.00000					
92244796.	2.202861E+12	.00004188	.00087227	20.83035707	2366.15344
60000.00000					
93202062.	2.161207E+12	.00004313	.00089700	20.79999876	2413.18994
60000.00000					
94094387.	2.120437E+12	.00004438	.00091764	20.67919207	2451.29168
60000.00000					
94727070.	2.076210E+12	.00004563	.00093696	20.53610945	2486.15942
60000.00000					
95313070.	2.033345E+12	.00004688	.00095608	20.39629984	2519.99644
60000.00000					
95897279.	1.992671E+12	.00004813	.00097522	20.26439524	2553.25124
60000.00000					
96479688.	1.954019E+12	.00004938	.00099440	20.13980055	2585.92099
60000.00000					
97060279.	1.917240E+12	.00005063	.00101361	20.02197790	2618.00272
60000.00000					
97639048.	1.882199E+12	.00005188	.00103285	19.91044378	2649.49362
60000.00000					
98215975.	1.848771E+12	.00005313	.00105213	19.80475760	2680.39063
60000.00000					
98783146.	1.816702E+12	.00005438	.00107138	19.70357180	2710.60626
60000.00000					
99145645.	1.782394E+12	.00005563	.00108934	19.58362055	2738.09471
60000.00000					
99506728.	1.749569E+12	.00005688	.00110732	19.46941710	2765.06640
60000.00000					
99866377.	1.718131E+12	.00005813	.00112533	19.36059237	2791.51881
60000.00000					
1.002246E+08	1.687993E+12	.00005938	.00114337	19.25681162	2817.44969
60000.00000					
1.008816E+08	1.664026E+12	.00006063	.00116400	19.20000029	2846.61950
60000.00000					
1.010277E+08	1.632771E+12	.00006188	.00118548	19.15933943	2876.26444
60000.00000					
1.013703E+08	1.605865E+12	.00006313	.00120292	19.05613375	2899.45846
60000.00000					
1.017116E+08	1.579985E+12	.00006438	.00122038	18.95735407	2922.16388
60000.00000					
1.020515E+08	1.555071E+12	.00006563	.00123787	18.86274576	2944.37798
60000.00000					
1.023902E+08	1.531068E+12	.00006688	.00125538	18.77208281	2966.09886
60000.00000					
1.027275E+08	1.507927E+12	.00006813	.00127293	18.68514490	2987.32362
60000.00000					
1.030635E+08	1.485600E+12	.00006938	.00129050	18.60174036	3008.05046
60000.00000					
1.033566E+08	1.463456E+12	.00007063	.00130768	18.51586962	3027.78298
60000.00000					
1.035538E+08	1.440748E+12	.00007188	.00132396	18.42034006	3045.94004
60000.00000					
1.037500E+08	1.418803E+12	.00007313	.00134026	18.32839251	3063.66954
60000.00000					

1.039451E+08	1.397581E+12	.00007438	.00135659	18.23984671	3080.96943
60000.00000					
1.043323E+08	1.357169E+12	.00007688	.00138931	18.07231665	3114.27377
60000.00000					
1.047154E+08	1.319249E+12	.00007938	.00142212	17.91652822	3145.83643
60000.00000					
1.050942E+08	1.283593E+12	.00008188	.00145504	17.77142859	3175.64219
60000.00000					
1.054688E+08	1.250000E+12	.00008438	.00148804	17.63607359	3203.67416
60000.00000					
1.057018E+08	1.216711E+12	.00008688	.00152900	17.59999895	3236.24110
60000.00000					
1.063047E+08	1.189423E+12	.00008938	.00156374	17.49644423	3261.33228
60000.00000					
1.066485E+08	1.160800E+12	.00009188	.00159556	17.36669111	3282.36809
60000.00000					
1.069884E+08	1.133652E+12	.00009438	.00162748	17.24484301	3301.73461
60000.00000					
1.073244E+08	1.107865E+12	.00009688	.00165950	17.13030481	3319.41579
60000.00000					
1.075684E+08	1.082450E+12	.00009938	.00169013	17.00754976	3334.64613
60000.00000					
1.077442E+08	1.057612E+12	.00010188	.00171974	16.88086939	3347.82702
60000.00000					
1.079169E+08	1.033934E+12	.00010438	.00174944	16.76106405	3359.55836
60000.00000					
1.080865E+08	1.011336E+12	.00010688	.00177922	16.64766169	3369.82694
60000.00000					
1.082530E+08	9.897415E+11	.00010938	.00180909	16.54022741	3378.61905
60000.00000					
1.084163E+08	9.690838E+11	.00011188	.00183904	16.43836927	3385.92096
60000.00000					
1.085763E+08	9.493014E+11	.00011438	.00186909	16.34173536	3391.71884
60000.00000					
1.087332E+08	9.303375E+11	.00011688	.00189922	16.24999666	3395.99832
60000.00000					
1.088868E+08	9.121405E+11	.00011938	.00192944	16.16285563	3398.74489
60000.00000					
1.090370E+08	8.946625E+11	.00012188	.00195975	16.08003473	3399.94372
60000.00000					
1.091772E+08	8.778063E+11	.00012438	.00199016	16.00128508	3394.50651
60000.00000					
1.100172E+08	8.671306E+11	.00012688	.00203000	16.00000048	3384.50796
60000.00000					
1.108481E+08	8.567966E+11	.00012938	.00207000	16.00000048	3388.15476
60000.00000					
1.108481E+08	8.405540E+11	.00013188	.00210011	15.92501020	3392.76484
60000.00000					
1.108481E+08	8.249158E+11	.00013438	.00212934	15.84621763	3396.13648
60000.00000					
1.108481E+08	8.098488E+11	.00013688	.00215866	15.77100992	3398.46657
60000.00000					
1.108481E+08	7.953224E+11	.00013938	.00218808	15.69921255	3399.74202
60000.00000					
1.108481E+08	7.813079E+11	.00014188	.00221765	15.63103437	3398.07543
60000.00000					
1.108481E+08	7.677788E+11	.00014438	.00224743	15.56664133	3391.79180
60000.00000					
1.108481E+08	7.547102E+11	.00014688	.00227729	15.50494337	3385.48865
60000.00000					
1.108481E+08	7.420791E+11	.00014938	.00230722	15.44581461	3379.16561
60000.00000					
1.108481E+08	7.298638E+11	.00015188	.00233722	15.38913202	3380.90127

60000.00000					
1.108481E+08	7.180441E+11	.00015438	.00236572	15.32449579	3385.60953
60000.00000					
1.108481E+08	7.066012E+11	.00015688	.00239335	15.25638342	3389.47759
60000.00000					
1.108481E+08	6.955172E+11	.00015938	.00242103	15.19079733	3392.75185
60000.00000					
1.108481E+08	6.847756E+11	.00016188	.00244878	15.12762308	3395.42595
60000.00000					
1.108510E+08	6.743785E+11	.00016438	.00247660	15.06675482	3397.49350
60000.00000					
1.108921E+08	6.645218E+11	.00016688	.00250448	15.00809240	3398.94797
60000.00000					
1.109327E+08	6.549531E+11	.00016938	.00253242	14.95154428	3399.78273
60000.00000					
1.109724E+08	6.456577E+11	.00017188	.00256046	14.89721632	3399.18360
60000.00000					
1.110100E+08	6.366163E+11	.00017438	.00258872	14.84568071	3394.35967
60000.00000					
1.110844E+08	6.192856E+11	.00017938	.00264535	14.74761629	3384.67875
60000.00000					
1.111577E+08	6.028895E+11	.00018438	.00270216	14.65578318	3374.95339
60000.00000					
1.112301E+08	5.873535E+11	.00018938	.00275914	14.56969786	3371.48815
60000.00000					
1.113013E+08	5.726114E+11	.00019438	.00281629	14.48893404	3380.36943
60000.00000					
1.113689E+08	5.585902E+11	.00019938	.00287385	14.41428423	3387.68830
60000.00000					
1.113689E+08	5.449244E+11	.00020438	.00294300	14.39999914	3395.04704
60000.00000					
1.113689E+08	5.319112E+11	.00020938	.00301500	14.39999914	3399.27170
60000.00000					
1.113689E+08	5.195052E+11	.00021438	.00308700	14.39999914	3395.60571
60000.00000					
1.115954E+08	5.086970E+11	.00021938	.00315900	14.39999914	3383.97956
60000.00000					
1.117052E+08	4.978505E+11	.00022438	.00321887	14.34595156	3375.55772
60000.00000					
1.117231E+08	4.870762E+11	.00022938	.00327973	14.29854441	3366.87622
60000.00000					
1.117402E+08	4.767584E+11	.00023438	.00334078	14.25401545	3358.14175
60000.00000					
1.117566E+08	4.668683E+11	.00023938	.00340205	14.21220732	3364.40550
60000.00000					
1.117722E+08	4.573797E+11	.00024438	.00346352	14.17298555	3373.25385
60000.00000					
1.117869E+08	4.482683E+11	.00024938	.00352522	14.13622427	3380.90031
60000.00000					
1.118008E+08	4.395117E+11	.00025438	.00358715	14.10180902	3387.31341
60000.00000					
1.118138E+08	4.310894E+11	.00025938	.00364931	14.06963968	3392.46007
60000.00000					
1.118259E+08	4.229821E+11	.00026438	.00371172	14.03961611	3396.30476
60000.00000					
1.118371E+08	4.151724E+11	.00026938	.00377439	14.01166391	3398.81046
60000.00000					
1.118472E+08	4.076437E+11	.00027438	.00383733	13.98570013	3399.93720
60000.00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 111368.91782 in-kip

---

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

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 33000.000 lbs
Specified moment at pile head = 44964000.000 in-lbs
Specified axial load at pile head = 49000.000 lbs

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

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	1.029	4.50E+07	33000.	-.005340	524.438	2.70E+12	0.000	0.000
12.288	.964223	4.54E+07	32995.	-.005135	529.143	2.70E+12	-6.942	11.059
24.576	.902400	4.58E+07	31171.	-.004927	533.758	2.70E+12	-283.715	482.918
36.864	.843141	4.61E+07	26172.	-.004718	537.883	2.70E+12	-524.096	954.778
49.152	.786464	4.64E+07	18431.	-.004507	541.101	2.70E+12	-730.468	1426.637
61.440	.732388	4.66E+07	8350.817	-.004295	543.052	2.69E+12	-905.231	1898.496
73.728	.680920	4.66E+07	-3695.229	-.004082	543.432	2.69E+12	-1050.796	2370.355
86.016	.632064	4.65E+07	-15398.	-.003870	542.011	2.70E+12	-310.961	755.676
98.304	.585812	4.63E+07	-19441.	-.003658	539.578	2.70E+12	-345.793	906.671
110.592	.542152	4.60E+07	-23831.	-.003448	536.544	2.70E+12	-358.195	1014.821
122.880	.501069	4.57E+07	-28375.	-.003239	532.878	2.70E+12	-380.308	1165.816
135.168	.462543	4.53E+07	-33153.	-.003032	528.549	2.70E+12	-396.538	1316.811
147.456	.426554	4.48E+07	-46391.	-.002826	523.060	2.70E+12	-1247.639	4492.690
159.744	.393072	4.42E+07	-61875.	-.002624	515.424	2.70E+12	-1270.459	4964.549
172.032	.362059	4.33E+07	-77565.	-.002425	505.579	2.70E+12	-1281.444	5436.408
184.320	.333464	4.23E+07	-93328.	-.002230	493.507	2.71E+12	-1282.679	5908.267
196.608	.307227	4.10E+07	-1.09E+05	-.002043	479.206	3.39E+12	-1276.138	6380.127
208.896	.282617	3.96E+07	-1.25E+05	-.001981	462.685	1.61E+13	-1260.736	6851.986
221.184	.258452	3.80E+07	-1.40E+05	-.001952	443.975	1.61E+13	-1232.334	7323.845
233.472	.234643	3.62E+07	-1.55E+05	-.001924	423.125	1.61E+13	-1190.890	7795.704

245.760	.211172	3.42E+07	-1.69E+05	-.001897	400.205	1.61E+13	-1136.641	8267.563
258.048	.188021	3.20E+07	-1.83E+05	-.001872	375.312	1.62E+13	-1069.788	8739.423
270.336	.165169	2.97E+07	-1.95E+05	-.001848	348.560	1.62E+13	-990.505	9211.282
282.624	.142593	2.72E+07	-2.07E+05	-.001827	320.088	1.62E+13	-898.927	9683.141
294.912	.120272	2.46E+07	-2.17E+05	-.001807	290.055	1.62E+13	-795.155	10155.
307.200	.098179	2.19E+07	-2.27E+05	-.001789	258.641	1.62E+13	-679.253	10627.
319.488	.076289	1.90E+07	-2.34E+05	-.001774	226.048	1.63E+13	-551.246	11099.
331.776	.054577	1.61E+07	-2.40E+05	-.001761	192.498	1.63E+13	-411.122	11571.
344.064	.033013	1.32E+07	-2.44E+05	-.001749	158.235	1.63E+13	-258.830	12042.
356.352	.011572	9.43E+06	-4.14E+05	-.001741	115.318	1.63E+13	-18864.	2.50E+06
368.640	-.009785	3.57E+06	-4.31E+05	-.001736	47.818	1.63E+13	20979.	3.29E+06
380.928	-.031106	1.58E+05	-1.01E+05	-.001735	8.592	1.63E+13	31871.	1.57E+06

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     1.02858410 in
Computed slope at pile head     =     -.00534042
Maximum bending moment          =      46619645. lbs-in
Maximum shear force             =  -513232.50721 lbs
Depth of maximum bending moment =    70.65600000 in
Depth of maximum shear force    =      362.49600 in
Number of iterations            =             68
Number of zero deflection points =             1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

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

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 33000.	M= 4.50E+07	49000.0000	1.0286	4.6620E+07	-513233.

Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00110447	3300.00005	661354.77798	2987869.	5.988004E+08
.00333874	9933.98986	1993996.	2975368.	5.972297E+08
.00576814	15745.00141	3268986.	2729652.	5.667317E+08
.00789808	19867.97971	4267537.	2515546.	5.403259E+08
.00969621	23066.01014	5075732.	2378869.	5.234759E+08
.01123242	25678.99126	5751518.	2286149.	5.120461E+08
.01257205	27888.23532	6332232.	2218273.	5.036753E+08
.01375469	29801.96957	6840382.	2166677.	4.973126E+08
.01481234	31490.00281	7291974.	2125930.	4.922904E+08
.01576976	33000.00002	7698475.	2092613.	4.881797E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00002789	16607.89737	4496400.	5.955592E+08	1.612409E+11
.00008990	45900.66068	13535513.	5.105947E+08	1.505678E+11
.00014700	69923.54890	21453280.	4.756816E+08	1.459441E+11
.00018814	86715.28098	27071025.	4.609072E+08	1.438873E+11
.00022031	99654.91080	31428487.	4.523479E+08	1.426584E+11
.00024675	110188.93922	34988793.	4.465550E+08	1.417966E+11
.00026922	119077.32813	37998988.	4.423087E+08	1.411459E+11
.00028886	126762.58247	40606538.	4.388357E+08	1.405746E+11
.00031278	133543.03139	42906560.	4.269558E+08	1.371783E+11
.00035291	139656.93210	44964000.	3.957293E+08	1.274092E+11

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

Pile-head Deflection vs. Pile Length

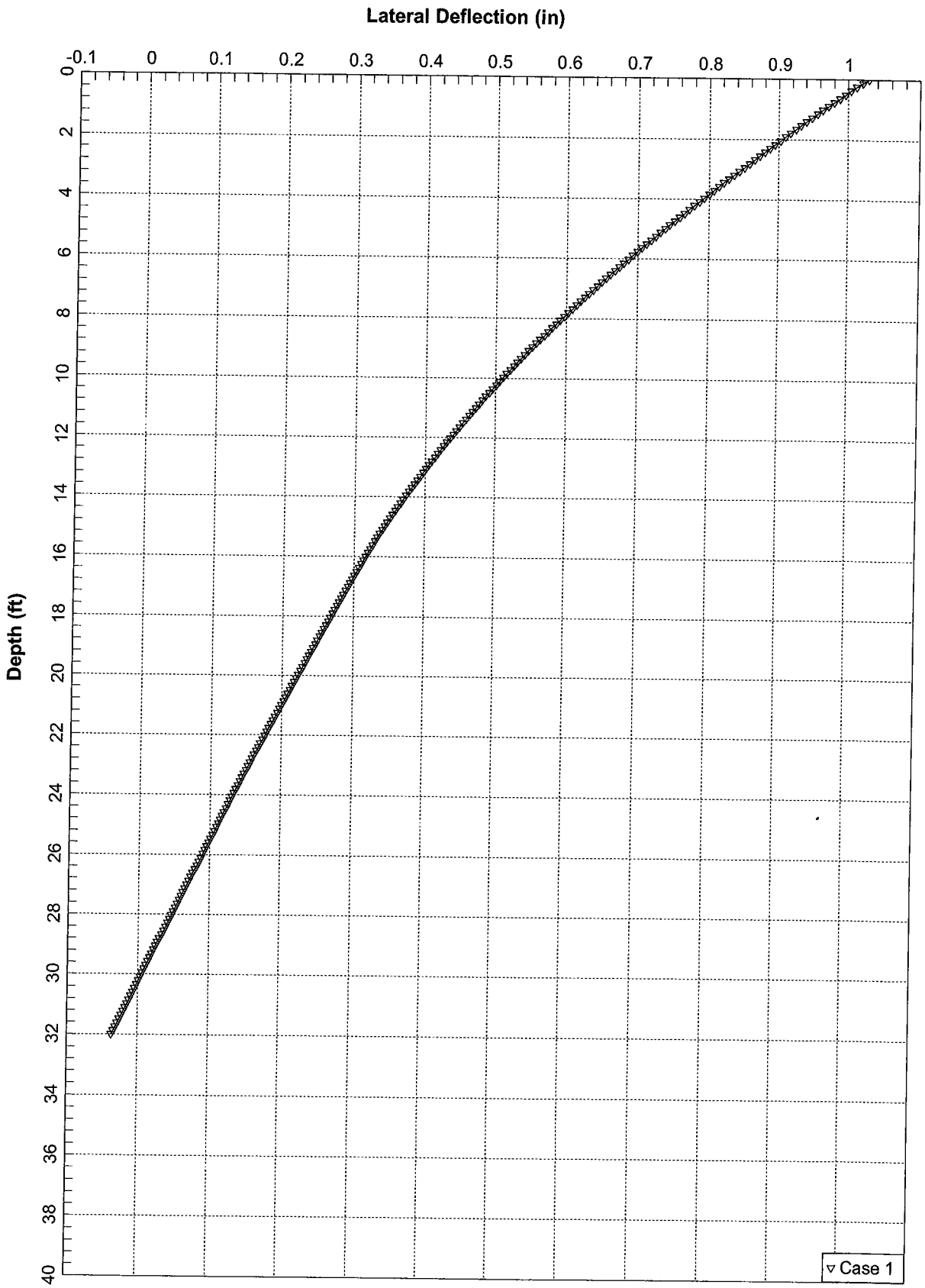
Boundary Condition Type 1, Shear and Moment

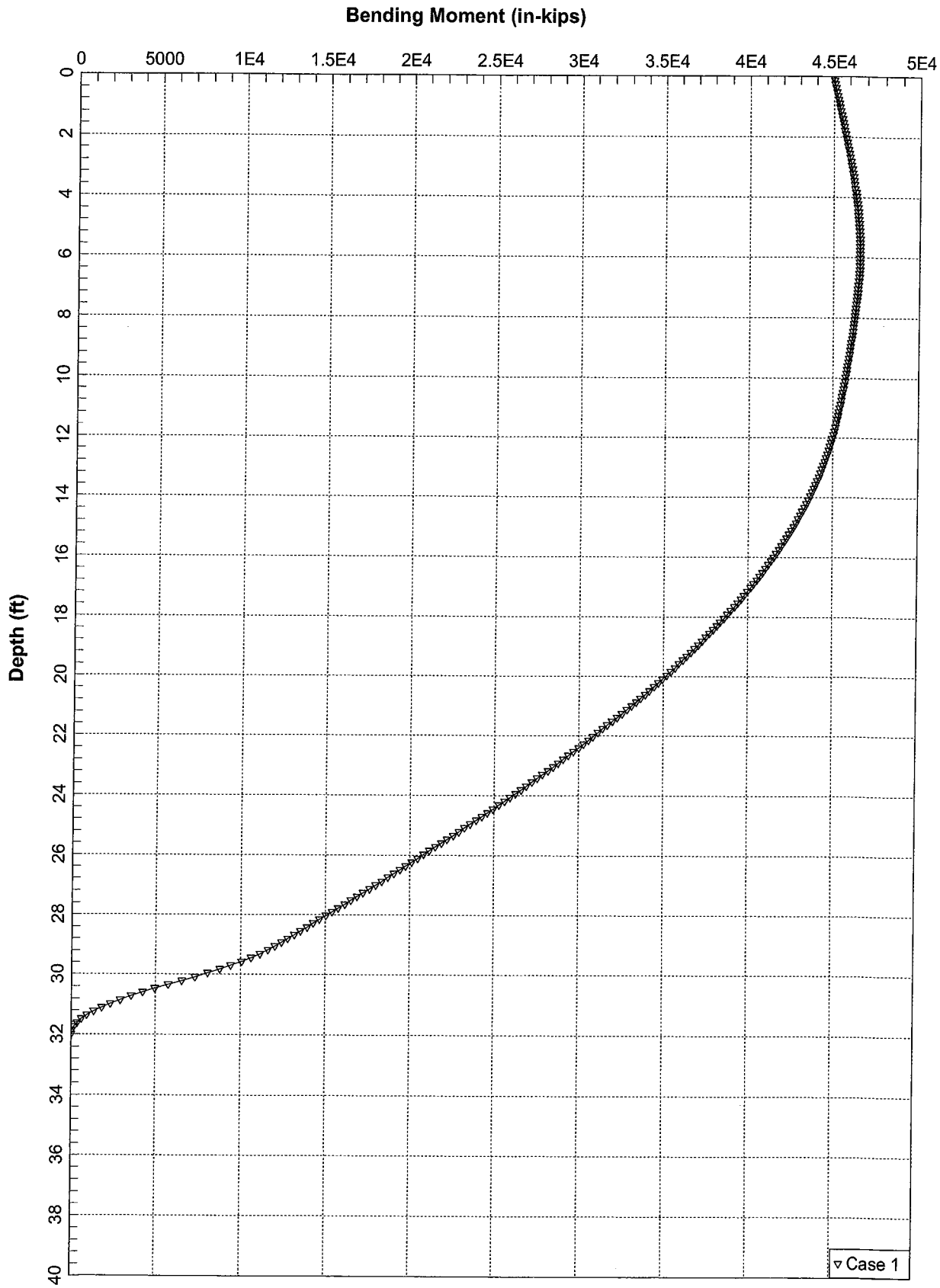
Shear = 33000. lbs
Moment = 44964000. in-lbs
Axial Load = 49000. lbs

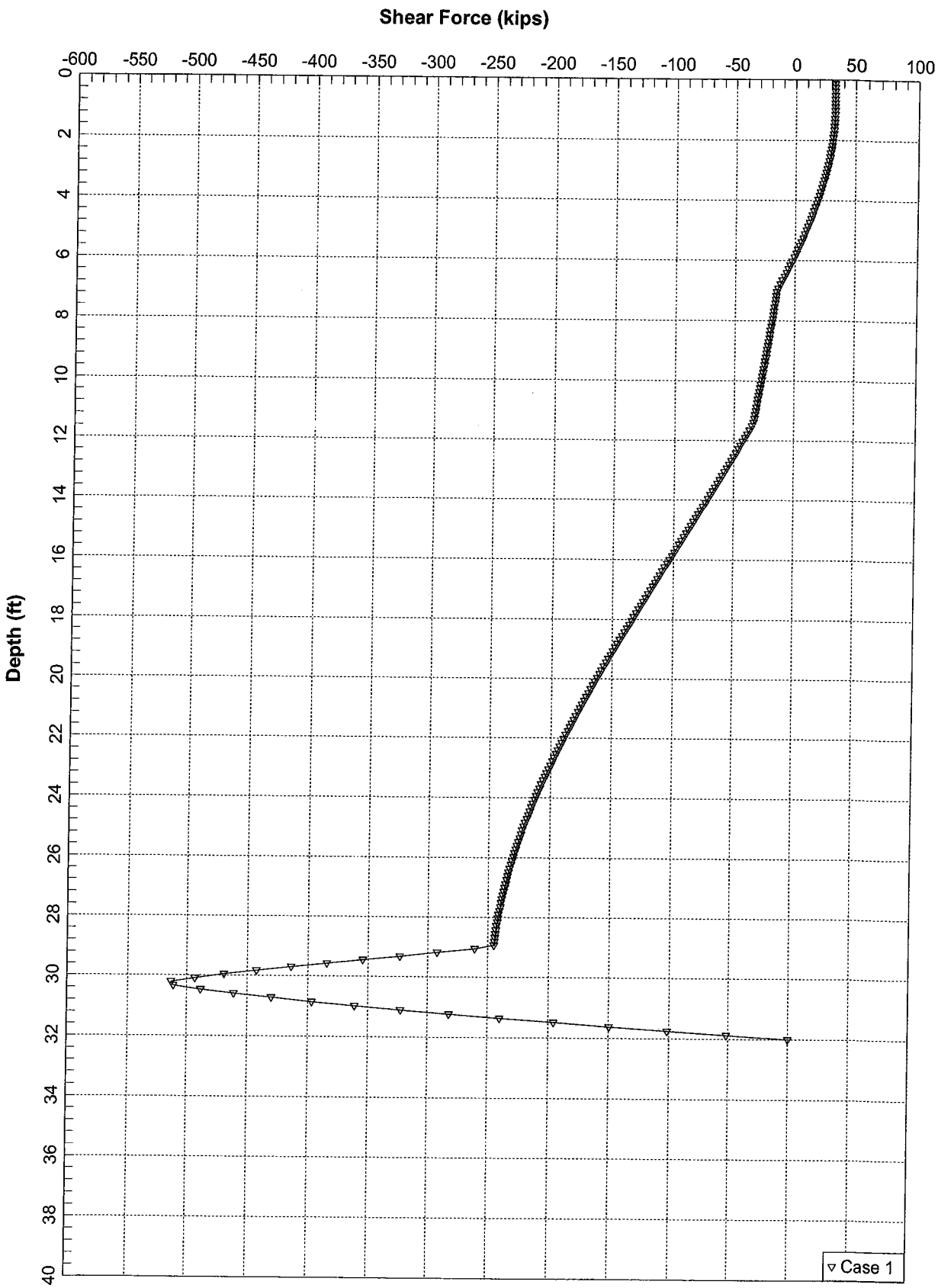
Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs

384.000	1.02858410	46619645.	-513232.50721
364.800	1.18409024	46520768.	-305213.63576
345.600	2.30172897	46380134.	-280267.81647
326.400	2.84569839	46353380.	-301419.16253
307.200	3.61945003	46320734.	-325820.31314
288.000	4.72052042	46302772.	-354206.93808
268.800	6.66950957	46331088.	-393979.57726
249.600	10.44248589	46388212.	-451880.56501
230.400	19.84723058	46543549.	-535309.75128

The analysis ended normally.


Lateral Deflection (in)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
Case 1


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
Case 1


Shear Force (kips)
-600
-550
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
Case 1

at&t
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GPD# 2009269.51
October 6, 2009

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	**Site USID:**	**16326**
	Site FA:	**10071197**
	Site Name:	**ORANGE TRANSFER STATION**
VERIZON DESIGNATION:	**Site Name:**	**Orange 4**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F & 2003 IBC** **85-mph with 0" ice** **74-mph with 1/2" ice**
SITE DATA:		**617 South Orange Center Road, Orange, CT, 06477 , New Haven County** **Latitude 41° 15' 19.979"N, Longitude 73° 0' 39.204"W** **180' Rohn Monopole**

Mr. Walker,

GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the addition of the following proposed loading configuration:

Elev. 117' (3) Antel BXA-70063/4CF Antennas on an existing 13' LP Platform w/ (3) 1-5/8" internal coax
(2) Antel LPA-80063/4CF Antennas on the same 13' LP Platform w/ (3) 1-5/8" internal coax

Based on our analysis we have determined the **tower is sufficient** for the proposed, existing, and reserved loadings as referenced in Appendix A. However, the foundation could not be verified based on the information provided.

We at GPD appreciate the opportunity of providing our continuing professional services to you and AT&T. If you have any questions please do not hesitate to call.

Respectfully submitted,

STATE OF CONNECTICUT
DAVID B. GRANGER, P.E.
NO. 17557
LICENSED
PROFESSIONAL ENGINEER

David B. Granger, P.E.
Connecticut#: 17557

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by Verizon to AT&T. This report was commissioned by Mr. Glynn Walker of AT&T.

No foundation or geotechnical information was available or provided for this report. Therefore, the in place capacity of the foundation could not be verified. A more thorough and accurate assessment of foundation capacity will require a site specific geotechnical report and foundation information.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	62.3%	Pass
Base Plate	38.3%	Pass
Anchor Bolts	62.8%	Pass
Foundation	Not Verified	N/A

ANALYSIS METHOD

RISA Tower (Version 5.3.1.0), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and being provided without the benefit of a site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Preliminary Tower Summary	Verizon Co-location document	Siterra
Site Lease Application	Verizon Application, dated 7/10/09	Siterra
Previous Structural Analysis	GPD Associates Job # 2008261.64, dated 3/26/08	Siterra

ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the monopole. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The monopole shaft sizes and shape are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations. If no data is available, the foundation system is not verified.
6. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
7. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
8. All existing loading was obtained from the most recent previous structural analysis by GPD Associates Job # 2008261.64, dated 3/26/08, site photos, and the provided preliminary tower summary and is assumed to be accurate.
9. All proposed coax is assumed to be internal to the monopole.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Associates should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD ASSOCIATES has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD ASSOCIATES in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD ASSOCIATES does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD ASSOCIATES provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD ASSOCIATES, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD ASSOCIATES makes no warranties, expressed and/or implied in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD ASSOCIATES will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD ASSOCIATES pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	ORANGE TRANSFER STATION
Site Number	16326
FA Number	10071197
Date of Analysis	10/6/2009
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	180'	
Tower Manufacturer	Rohn	
Tower Model	n/a	
Tower Design	n/a	
Foundation Design	n/a	
Geotech Report	n/a	
Tower Mapping	n/a	
Previous Structural Analysis	GPD Associates Job # 2008261.64	3/26/2008
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F
Location of Tower (County, State)	New Haven, CT
Basic Wind Speed (mph)	85-fastest
Ice Thickness (in)	0.5
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower	62.8%
Foundation	n/a
Guy Wire	n/a

Note: Foundations were note verified.

Steel Yield Strength (ksi)

Pole	65
Base Plate	60
Anchor Rods	75

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T Mobility	177	177	6	Panel	Powerwave	7770.00		1	Unknown	13' LP Platform	6	Unknown	1-5/8"	Internal
T-Mobile	148	148	9	Panel	RFS	APX16PV-16PVL		1	Unknown	13' LP Platform	24	Unknown	1-5/8"	Internal
T-Mobile	148	148	6	TMA	Powerwave	LGP 21401				behind antennas				
Nextel	137	137	12	Panel	Decibel	844G45VTZASX		1	Unknown	13' LP Platform	12	Unknown	1-5/8"	Internal
Sprint	127	127	6	Panel	Decibel	DB980H65T2E-M		1	Unknown	13' Platform	6	Unknown	1-5/8"	Internal
Verizon	117	117	6	Panel	Decibel	DB844G45ZAXY		1	Unknown	13' Platform	6	Unknown	1-5/8"	Internal
Verizon	117	117	6	Panel	Decibel	950F40T2E-M_2				on same mount	6	Unknown	1-5/8"	Internal
Sprint	50	50	1	GPS	Unknown	GPS Unit		1	Unknown	2' Standoff	1	Unknown	1/2"	Internal

Note: Two existing Decibel DB844G45ZAXY Antennas at the 117' level shall be removed prior to the installation of the proposed. All other antennas, mounts, and feedlines shall remain.

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
Verizon	117	117	3	Panel	Antel	BXA-70063/4CF				on existing mount	3	LDF7-50A	1-5/8"	Internal
Verizon	117	117	2	Panel	Antel	LPA-80063/4CF				on existing mount	3	LDF7-50A	1-5/8"	Internal

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External

Revision:3
Date: 2/18/09

APPENDIX B

RISA Tower Output File

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	177.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	148.00 - 8.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	137.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	127.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	117.00 - 8.00	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF4-50A (1/2 FOAM)	C	No	Inside Pole	50.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7770.00	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07
(2) 7770.00	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07
(2) 7770.00	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	5.88	2.93	0.04
						1/2" Ice	6.31	3.27	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PiROD 13' Low Profile Platform	C	None		0.0000	177.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(3) APX16PV-16PVL	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(3) APX16PV-16PVL	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(3) APX16PV-16PVL	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	6.65	1.98	0.04
						1/2" Ice	7.08	2.30	0.07
(2) LGP21401	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
(2) LGP21401	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
(2) LGP21401	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	148.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
PiROD 13' Low Profile Platform	C	None		0.0000	148.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(4) 844G45VTZASX	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
(4) 844G45VTZASX	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
(4) 844G45VTZASX	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	137.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
PiROD 13' Low Profile Platform	C	None		0.0000	137.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(2) DB980H65T2E-M	A	From Centroid-Leg	4.00 0.00 0.00	30.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
(2) DB980H65T2E-M	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
(2) DB980H65T2E-M	C	From Centroid-Leg	4.00 0.00 0.00	-15.0000	127.00	No Ice	3.80	2.19	0.01
						1/2" Ice	4.18	2.56	0.03
Valmont 13' Platform w/o Rails	C	None		0.0000	127.00	No Ice	35.00	35.00	1.50
						1/2" Ice	42.00	42.00	2.50
(2) DB844G45ZAXY	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
BXA-70063/4CF	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	5.16	2.44	0.01
						1/2" Ice	5.55	2.74	0.04
(2) DB950F40T2E-M	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	6.42	4.63	0.02
						1/2" Ice	6.88	5.01	0.06
(2) LPA-80063/4CF	B	From Centroid-Leg	4.00 0.00 0.00	-20.0000	117.00	No Ice	7.01	6.08	0.02
						1/2" Ice	7.42	6.48	0.07
BXA-70063/4CF	B	From	4.00	-20.0000	117.00	No Ice	5.16	2.44	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00 0.00			1/2" Ice	5.55	2.74	0.04
(2) DB950F40T2E-M	B	From Centroid-Leg	4.00 0.00 0.00	-20.0000	117.00	No Ice	6.42	4.63	0.02
						1/2" Ice	6.88	5.01	0.06
(2) DB844G45ZAXY	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	7.00	3.97	0.02
						1/2" Ice	7.41	4.34	0.06
BXA-70063/4CF	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	5.16	2.44	0.01
						1/2" Ice	5.55	2.74	0.04
(2) DB950F40T2E-M	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	117.00	No Ice	6.42	4.63	0.02
						1/2" Ice	6.88	5.01	0.06
Valmont 13' Platform w/o Rails	C	None		0.0000	117.00	No Ice	35.00	35.00	1.50
						1/2" Ice	42.00	42.00	2.50
GPS	C	From Face	2.00 0.00 0.00	0.0000	50.00	No Ice	0.17	0.17	0.00
						1/2" Ice	0.24	0.24	0.00
2'-0" - STANDOFF	C	None		0.0000	50.00	No Ice	1.36	1.36	0.02
						1/2" Ice	2.45	2.45	0.04

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	(2) 7770.00	35	25.753	1.1836	0.0005	123613
148.00	(3) APX16PV-16PVL	35	18.681	1.1282	0.0005	16046
137.00	(4) 844G45VTZASX	35	16.131	1.0808	0.0005	11808
127.00	(2) DB980H65T2E-M	35	13.919	1.0263	0.0005	9773
117.00	(2) DB844G45ZAXY	35	11.829	0.9615	0.0004	8657
50.00	GPS	35	2.104	0.3790	0.0001	5602

Section Capacity Table

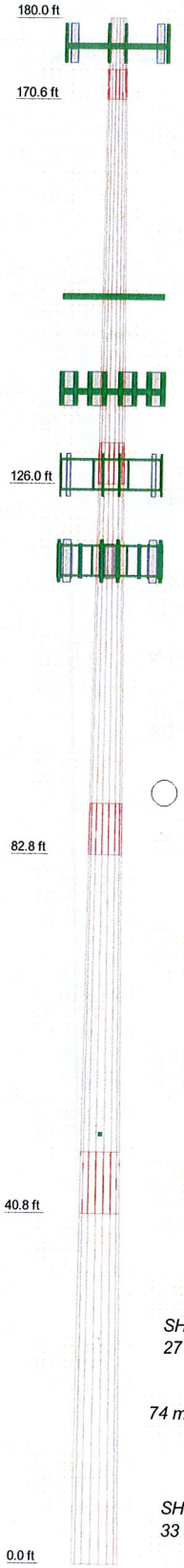
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	180 - 170.58	Pole	TP26.25x24x0.1875	1	-1.70	781.07	2.2	Pass
L2	170.58 - 126	Pole	TP36.525x25.0581x0.25	2	-8.82	1449.60	26.3	Pass
L3	126 - 82.75	Pole	TP46.357x34.8903x0.3125	3	-19.95	2300.36	55.3	Pass
L4	82.75 - 40.75	Pole	TP55.765x44.2987x0.375	4	-31.50	3320.24	62.3	Pass
L5	40.75 - 0	Pole	TP64.75x53.2831x0.4375	5	-49.09	4642.75	62.0	Pass
							Summary	
						Pole (L4)	62.3	Pass
						RATING =	**62.3**	**Pass**

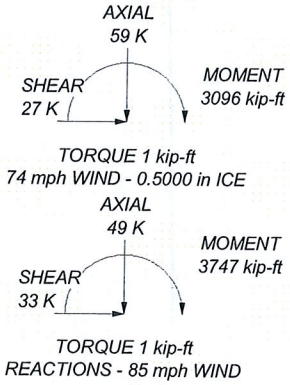
APPENDIX C

Tower Elevation Drawing

Section	1	2	3	4	5
Length (ft)	9.42	48.00	48.00	48.00	48.00
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.3750	0.4375
Lap Splice (ft)	3.42	4.75	6.00	7.25	
Top Dia (in)	24.0000	25.0581	34.8903	44.2987	53.2831
Bot Dia (in)	26.2500	36.5250	46.3570	55.7650	64.7500
Grade			A572-65		
Weight (K)	0.5	4.0	6.5	9.7	13.3

33.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00	177	(2) DB980H65T2E-M	127
(2) 7770.00	177	(2) DB980H65T2E-M	127
(2) 7770.00	177	Valmont 13' Platform w/o Rails	127
PiROD 13' Low Profile Platform	177	(2) DB844G45ZAXY	117
(3) APX16PV-16PVL	148	BXA-70063/4CF	117
(3) APX16PV-16PVL	148	(2) DB950F40T2E-M	117
(3) APX16PV-16PVL	148	(2) LPA-80063/4CF	117
(2) LGP21401	148	BXA-70063/4CF	117
(2) LGP21401	148	(2) DB950F40T2E-M	117
(2) LGP21401	148	(2) DB844G45ZAXY	117
PiROD 13' Low Profile Platform	148	BXA-70063/4CF	117
(4) 844G45VTZASX	137	(2) DB950F40T2E-M	117
(4) 844G45VTZASX	137	Valmont 13' Platform w/o Rails	117
(4) 844G45VTZASX	137	GPS	50
PiROD 13' Low Profile Platform	137	2'-0" - STANDOFF	50
(2) DB980H65T2E-M	127		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 62.3%

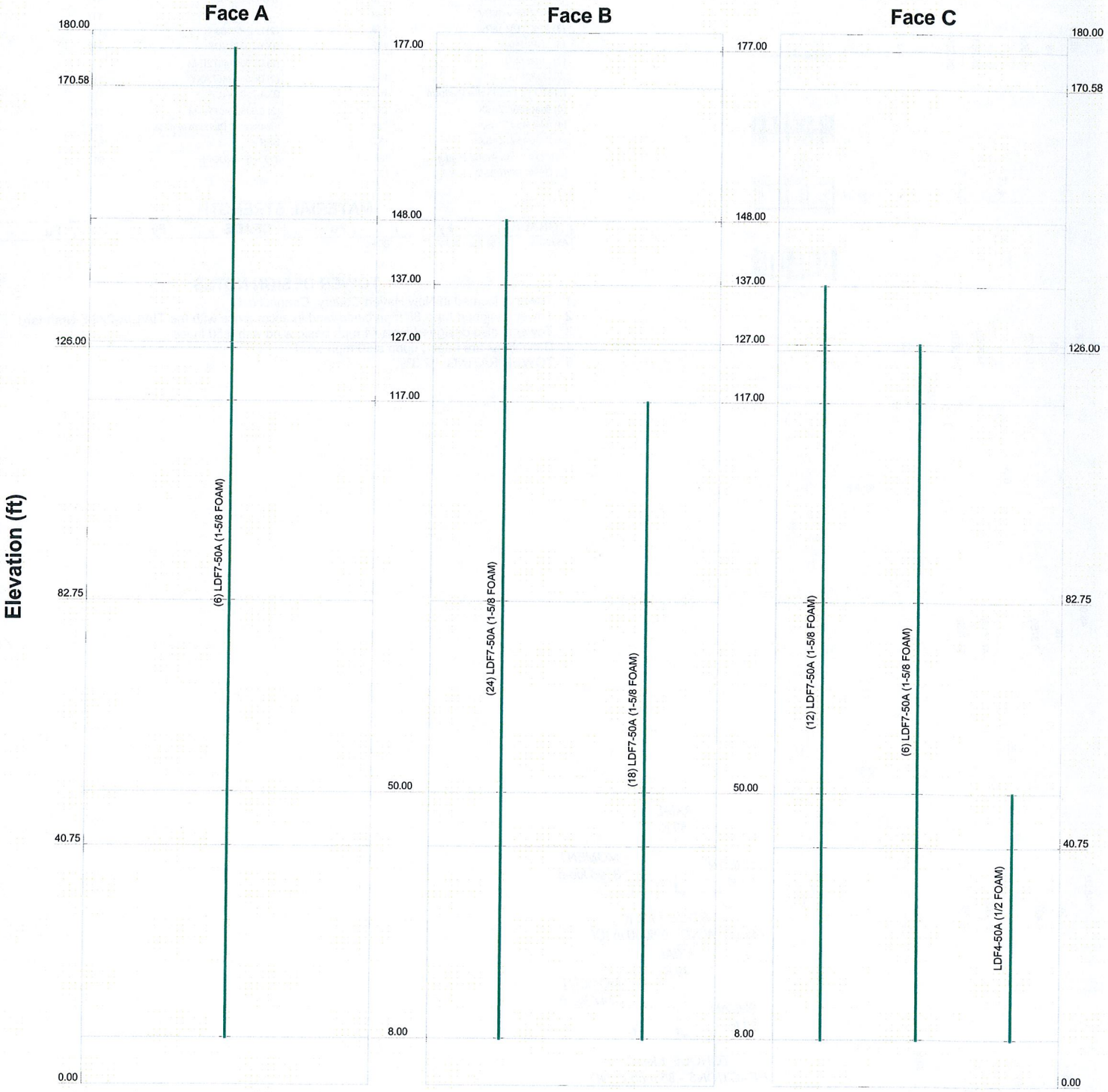
GPD GROUP
Consulting Engineers

GPD Group
520 South Main Street, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: **16326 Orange Transfer Station**			
Project: **2009269.51**			
Client: AT&T	Drawn by: bdaugherty	App'd:	
Code: TIA/EIA-222-F	Date: 10/06/09	Scale: NTS	
Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri		Dwg No. E-1	

Feedline Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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Code: TIA/EIA-222-F	Date: 10/06/09	Scale: NTS	
Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri		Dwg No. E-7	

Feedline Plan

_____ Round _____ Flat _____ App In Face App Out Face

(6) LDF7-50A (1-5/8 FOAM)

(28) LDF7-50A (1-5/8 FOAM)

(12) LDF7-50A (1-5/8 FOAM)

LDF4-50A (1/2 FOAM)

GPD GROUP Consulting Engineers	**GPD Group** 520 South Main Street, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-2101	Job: ***16326 Orange Transfer Station***	
		Project: ***2009269.51***	
		Client: AT&T	Drawn by: bdaugherty	App'd:
		Code: TIA/EIA-222-F	Date: 10/06/09	Scale: NTS
		Path: N:\2009\2009269\51\RISA\16326 Orange Transfer .eri		Dwg No. E-7

APPENDIX D

Anchor Bolt and Base Plate Analysis

GPD ASSOCIATES

Anchor Rod and Base Plate Stresses
16326 Orange Transfer Station
2009269.51

Overturning Moment =	3747.19	k*ft
Axial Force =	49.09	k
Shear Force =	33.34	k

Anchor Rods		
Number of Rods =	20	
Type =	Upset Rod	
Rod Yield Strength (Fy) =	75	ksi
ASIF =	1.333	
Rod Circle =	72	in
Rod Diameter =	2.25	in
Net Tensile Area =	3.25	in^2
Max Tension on Rod =	122.39	kips
Max Compression on Rod =	127.30	kips
Allow. Rod Force =	195.00	kips
Anchor Rod Capacity =	62.8%	OK

Base Plate		
Location =	External	
Plate Strength (F_y) =	60	ksi
Outside Diameter =	77.25	in
Plate Thickness =	2.75	in
wcalc =	31.49	in
wmax =	49.75	in
w =	31.49	in
S =	39.69	in^3
fb =	23.01	ksi
Fb =	60	ksi
Base Plate Capacity =	38.3%	OK

Stiffeners		
Configuration =	None	

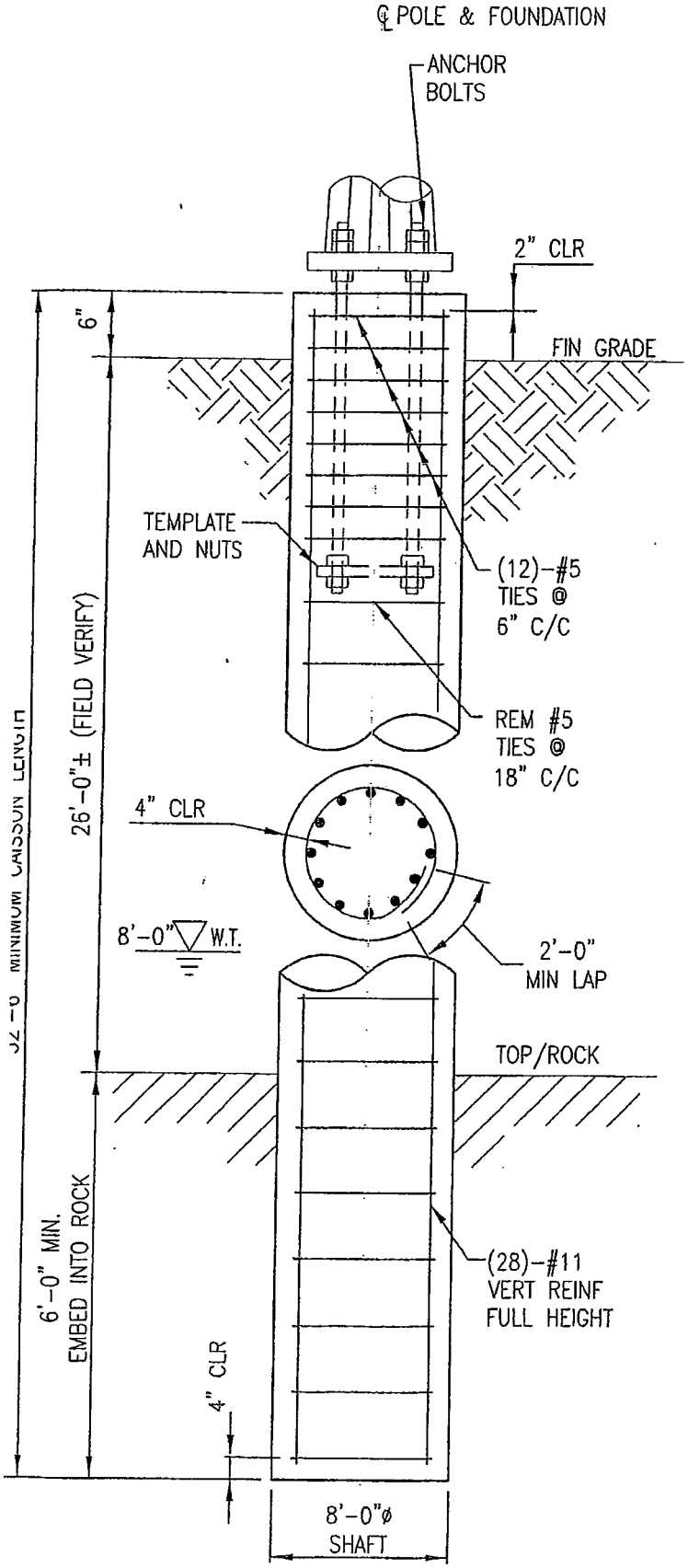
Pole		
Pole Diameter =	64.75	in
Number of Sides =	18	
Thickness =	0.4375	in
Pole Yield Strength =	65	ksi

GPD Round Base Plate Stress (Rev F) - V1.02

Omnipoint Communications, Inc.
100 Filley Street, Bloomfield, CT 06002

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street, Suite 1500, Columbus, Ohio 43215
(614) 221-6679 Fax: (614) 448-4105 www.PJFweb.com

JOB DATA			
Page 2 of 2	Job No.		31205-0019
By KJS	Design No.		ROHN #48820TT
Chk'd By KJS	Date		06-15-2005
	Rev. No. 1	Rev. Date	07-12-2005
Pole	180-FT MONOPOLE		
Site	CT-11-720A: ORANGE, CT		
Owner	AT&T		
Ref. No.	20501-0701		
Design	85 MPH / 74 MPH + 1/2" RADIAL ICE ACCORDING TO TIA/EIA-222-F 1996		



NOTES:

1. ALL CONCRETE ASSUMED TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED (6±1.5%).

2. REINFORCING STEEL ASSUMED TO CONFORM TO THE REQUIREMENTS OF ASTM A-615 (GRADE 60) EXCEPT THAT CAISSON TIES MAY BE ASTM A-615 (GRADE 40).

3. SEE PAGE 1 FOR ANCHOR BOLT QUANTITY, SIZE, LENGTH, AND BOLT CIRCLE.

4. FOUNDATION ANALYSIS IS BASED UPON GEOTECHNICAL EXPLORATION REPORT
PREPARED BY: CLARENCE WELTI ASSOC.
REPORT NO.: 2014895605
DATED: 06-07-2001

5. THE FOUNDATION WAS ANALYZED USING THE FOLLOWING SERVICE LOADS:
MOMENT: 3888 FT-KIPS
SHEAR: 33 KIPS
AXIAL: 51 KIPS
THE EXISTING FOUNDATION HAS SUFFICIENT CAPACITY TO SAFELY SUPPORT THE NEW LOADING.

6. ORIGINAL FOUNDATION DESIGN COMPLETED BY PAUL J. FORD & CO., PER PJF JOB #20501-0701 DATED 08-27-2001. ANALYSIS ASSUMES THE AS BUILT CONDITION OF THE FOUNDATION IS PER THE ORIGINAL DESIGN DRAWINGS. IF AS BUILT CONDITIONS ARE NOT AS SHOWN ON THIS SKETCH, PAUL J. FORD & CO. SHALL BE NOTIFIED SO THAT THE EXISTING CONDITION OF THE FOUNDATION MAY BE RE-EVALUATED.

EXISTING DRILLED PIER FOUNDATION

PJF_Pole (tm) - Monopole Design Program
Windows Version 3.04.0000 Tue Jul 12, 2005 - 10:08:04 am
(c) 1993 to 2000 PAUL J. FORD AND COMPANY, Columbus, Ohio

Job No.....: 31205-0019 Design No: ROHN #48820TT Engineer : KJS
Description : 180-Ft Monopole - CT-11-720A: ORANGE, CT
Design..... : 85 mph / 74 mph + 1/2" radial ice
Owner..... : AT&T Client: T-Mobile
Status..... : Final Design Revision: 1 Rev. Date : 7/12/2005

S U M M A R Y O F C U R R E N T C A I S S O N D E S I G N

Diameter (ft) .....:	8.00	Compression (kips):	51.02	Friction S.F .....:	2.00
Min. Depth (ft) ...:	24.50	Horizontal (kips) :	32.92	Lateral S.F .....:	2.00
Depth Used (ft) ...:	32.00	Uplift (kips) ....:	0.00	Concrete S.F .....:	1.30
Rebar Area (in^2) .:	43.68	Moment (Ft-kips) .:	3888.0	Concrete F'c (psi) :	3000.0
Rebar Used .....:	(28)#11	Full Cohesion (ft):	24.00	Steel Cover (in) ..:	4.00
Water at (ft) .....:	8.00	Rock at (ft) .....:	26.00		

SOIL PROFILE :

Soil Layer	Layer Thickness (ft)	Unit Weight (pcf)	Ult. Skin Friction (psf)	Allowable Bearing (psf)	Friction Angle- Phi (deg)	Passive Coeff.- KP	Cohesion (c) (psf)
1	6.00	100.00	0.00	0.00	0.00	1.000	0.00
2	2.00	130.00	0.00	0.00	34.00	3.537	0.00
3	16.00	70.00	0.00	0.00	34.00	3.537	0.00
4	10.00	70.00	0.00	20000.00	34.00	3.537	0.00

LATERAL / MOMENT CAPACITY (CHECK) :	Min Design	Actual Design
Caisson Diameter (ft) .....:	8.00	8.00
Height Above Grade (ft) .....:	0.50	0.50
Depth Below Grade (ft) .....:	24.50	32.00
Concrete Volume (CY) .....:	46.54	60.50
Applied Moment From Loads (Working), Mwork(Ft-kip):	4485.52	4650.12
Resisting Moment From Soil (Ult), Mult(Ft-kip) ...:	9086.06	18979.69
Moment S.F. (Mult / Mwork) .....:	2.03	4.08
Applied Horizontal Load (Working), Hwork (Kips) ..:	32.92	32.92
Horizontal Soil Resistance (Ultimate), Hult (Kips):	72.82	74.81
Horizontal S.F. (Hult / Hwork) .....:	2.21	2.27
Center of Rotation (from grade) (ft) .....:	17.65	22.65
Inflection Point (Max Design Moment Location (ft) :	7.30	7.30
Maximum Factored Design Moment for Reinf. (Ft-kip):	5522.36	5522.36
Area Steel Required From Loads (in^2) .....:	27.60	27.60
ACI Minimum Steel (0.5%) (in^2) .....:	36.19	36.19
Area Reinf. Steel Provided (in^2) .....:	43.68	43.68

UPLIFT CAPACITY CHECK :		
Actual Uplift on Caisson (Kips) .....:	0.00	0.00
Allowable Uplift Capacity (Kips) .....:	109.39	135.81

COMPRESSION CAPACITY CHECK :		
Actual Compression on Caisson (Kips) .....:	51.02	51.02
Total Compression (Includes Concrete Wt.) (Kips) .:	116.37	135.21
Allowable Compression Capacity (Kips) .....:	1005.31	1005.31

CAISSON DESIGN:
USE: 8.00 ft Diameter X 32.50 ft Long (Concrete Volume = 60.50 CY)
Reinf: (28)#11 Vert, w/Closed Ties: (12)#5 @6.0", remaining ties @18.0" (ASTM A615)

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street • P.O. Box 397
Glastonbury, CT 06033

(860) 633-4623 / FAX (860) 657-2514

June 7, 2001

Mr. Ignacio Artaiz, AIA
URS Corporation
795 Brook Street, Building 5
Rocky Hill, CT 06067-4002

Re: Geotechnical Study for Proposed AT&T Communications Tower Site CT-101 Orange Transfer Station, Orange, CT

Dear Mr. Artaiz:

1.0 Herewith are the data from the test boring and probes taken at the above referenced site. One boring was drilled at the tower center to 35 feet below the existing grade. The boring was cored five feet into bedrock. Three probes were drilled to 15 feet below grade. The boring and probe locations are shown on the attached plan. *The boring and probes were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The natural soils at the site appear to be of glacial fluvial or moraine origin. The soils consist generally of sand with little to some silt and gravel to the top of rock at about 28 feet below grade. The rock is a Greenstone and Schist. The rock core taken from 30 to 35 feet had an RQD value of 0%. There was 12 feet of existing fill plus buried subsoils with roots overlying the natural inorganic soils.

2.1 The Soils Cross Section from the boring and probes was as follows:

Wood Chips to about 2 feet

FILL; SILT and fine to medium SAND, little to some Gravel, Wood, Bricks, Glass, Rubber and Metal to about 8 feet below grade, loose to medium compact

Possible buried Subsoil, SILT and fine SAND, some Wood , loose

Fine to medium SAND, little to some Silt and Gravel to the top of rock at about 28 feet below grade, medium compact to dense

Bedrock, Greenstone and Schist, weathered to about 2 feet below top of rock and hard below that level

2.2 The **Ground Water Table** was at about 10 feet below grade at the completion of the boring.

3.0 The **Subject Project** includes a monopole tower, 180 feet in height, and several equipment buildings.

4.0 In general the criteria for tower support is that the foundation capacity would exceed the loads, which might collapse the tower. **Movements from strains in the soils should be limited to differential settlement (or lateral movements of less than ½").**

5.0 The pole foundation type could be one of the following:

1. **A large mat, placed sufficiently deep to prevent overturning by gravity resistance of the pad, combined with soil surcharge above the mat.**

2. **A large mat acting with it own mass to provide the required resistance to overturning and sliding.**

3. **A caisson foundation**

5.1 In **alternate (1)** the mat combined with soil surcharge, would provide the required resistance to over turning and sliding. The mat foundation would have to be placed below the existing fills and organic soils (about 12 feet below grade), or on a controlled fill placed after the removal of such materials. The controlled fill should conform to section 6.0 below and should extend laterally outside of the foundation for at least the depth of fill beneath the mat. Where below the water table the fill should be with 3/8" crushed stone. Where the foundation is on the natural soils in proximity to the water table there should a 12" layer of 3/8" stone beneath the foundation. The allowable loading on the crushed stone over the natural inorganic soils or on the controlled fill can be 2 Tons/sf.

5.2 Regarding **alternate (2)** the same criteria for loading will apply, but the surcharge weight above the concrete mat would be ignored.

5.3 In **summary** the following soil properties and design values would apply to alternates 1 & 2.

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	125 pcf
Soil Unit Weight (Natural)	130 pcf

Soil Unit Weight Submerged (Natural)	70 pcf
Angle of Internal Friction (ϕ)	34°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Frost Protection Depth (by code)	3.5 feet
Allowable Bearing Capacity	2 Tons/sf

5.4 Alternate 3 would be a caisson foundation. The caisson shall have a minimum embedment depth of 20 feet below the fill. The actual depth is to be determined by the designer to provide the required resistance to uplift and overturning forces as well as maintaining the allowable lateral deflection**. The following is summary of design parameters for the caisson foundation:

Parameter	Value
Allowable Bearing for Caisson at 20 + feet	10 Tons/sf
Allowable Side Resistance (friction) at 5 to 15 feet below grade	300 psf
Allowable Side Resistance (friction) at 15+ feet below grade	700 psf
Soil Unit Weight	130 pcf
Soil Unit Weight (submerged)	70 pcf
Angle of internal friction	34 °
Lateral Loading (at rest coefficient)	0.45
Lateral Loading (passive coefficient)	5.0
Coefficient of Lateral Subgrade Reaction (k_1) ***	from 6 to 12 feet 8 pci * from 12 feet 25 pci *

* This parameter should be used to evaluate lateral deflection at top of caisson.

** Typically this value would be about ½"

*** k_1 is horizontal subgrade reaction for a one foot wide caisson at one foot depth,
The value of $k = k_1 (Z/B)$ Z = Depth and B = Caisson Diameter

The lateral deflection can be analyzed from Lpile Program or from a empirical formulas in Drilled Pier Foundations; Woodward Gardener Greer;McGraw Hill 1972

6.0 Backfilling at the tower and building foundations should be with 3/8" stone or material which conforms to the following gradation:

Percent Passing	Sieve size
100	3.5"
50 - 100	3/4"
25 - 75	No.4

The fraction, passing the No.4 sieve, shall have less than 10%, passing the No. 200 sieve. All backfill and fill must be placed and compacted to at least 95% of modified optimum density (ASTM 1557-D).

The 3/8"stone could be placed in lifts up to 1 feet thick. It should be compacted with a minimum of 4 passes with a 750 lb compactor.

7.0 The **Criteria for the Building Structure** are generally as follows:

1. **The structural frame shall be subject to settlement less than a maximum of 3/4" and differentially less than ½ the maximum subsidence.**

2. **The foundation must address the seismic requirement of the building code.**

3. **The slab on grade (or supported slab) shall not subside more than ½" in excess of the structural frame.**

7.1 Regarding item 2 the soils at the subject site have sample blow counts which are above levels, below which soil liquefaction could occur. The site coefficient for can be S_1**= 1.0.**

7.2 The building foundation can be spread footings. The foundation recommendations and design

parameters from sections 5.1 and 5.3 above would apply. The slab on grade shall have at least 24" of the material described in section 6.0 above to minimize frost effects. A vapor barrier is required.

8.0 The soils at the subject site are generally in OSHA class C which would require excavations that are in excess of 5 feet to have slopes which are less than 34° i.e. 1.5H to1.0V.

9.0 This report has been prepared for specific a application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours

Clarence Welti Ph.D., P. E.
President, Dr. Clarence Welti P.E.; P.C.

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT: URS CORPORATION

PROJECT NAME: AT&T TOWER AT TRANSFER STATION

LOCATION: ORANGE, CT.

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	NX
SIZE I.D.	3.75"		1.5"	2"
HAMMER WT.			140lbs.	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.

HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT 10.5 FT. AFTER HOURS
AT FT. AFTER HOURS

START DATE 6/8/01
FINISH DATE 6/8/01

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0					WOOD CHIPS	
	1	4-6-5-4	2.00'-4.00'			
					GREY SILT AND FINE-MED. SAND, SOME FINE-MED. GRAVEL, WOOD & BRICK - FILL — 2.0	
	2	4-7-9-4	4.00'-6.00'			
	3	3-28-59-8	6.00'-8.00'			
6.5					GREY FINE-CRS. SAND, TRACE SILT - FILL — 6.0	
					GRAY SILT AND FINE-MED. SAND, SOME RUBBER, GLASS, WOOD & METAL - FILL — 6.5	
	4	3-3-2-5	8.00'-10.00'		BR. SILT. FINE SAND AND WOOD — 8.0	
	5	3-4-4-5	10.00'-12.00'			
	6	4-13-19-20	12.00'-14.00'			
13					GREY FINE-CRS. SAND AND FINE-CRS. GRAVEL, TRACE SILT — 12.5	
	7	15-9-7-7	15.00'-17.00'			
19.5	8	5-26-15-8	20.00'-22.00'			
					GREY FINE-CRS. SAND, SOME SILT & FINE-CRS. GRAVEL - TILL — 23.0	
26	9	20-20-20-13	25.00'-27.00'			
					GREY WEATHERED ROCK — 28.0	
					CORED ROCK — 30.0	
32.5					RUN #1 30.0' - 35.0' RECOVERED 36"	
					BOTTOM OF BORING @ 35.0' — 35.0	
39						
45.5						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: GRAVES
INSPECTOR:

SHEET 1 OF 1 HOLE NO. B-1

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT URS CORPORATION	PROJECT NAME AT&T TOWER AT TRANSFER STATION LOCATION ORANGE, CT.

	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO. PROBES
TYPE	SS				LINE & STA.	GROUND WATER OBSERVATIONS	START DATE 6/8/01
SIZE I.D.	4.0"				N. COORDINATE	AT FT. AFTER HOURS	
HAMMER WT.					E. COORDINATE	AT FT. AFTER HOURS	FINISH DATE 6/8/01
HAMMER FALL							

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0						
5						
10						
15						
20						
25						
30						
35						

#	BOTTOM OF PROBE	WATER DEPTH @ COMPLETION
P-1	15.0'	7.5'
P-2	15.0'	10.0'
P-3	15.0'	5.0'

LEGEND: COL. A:

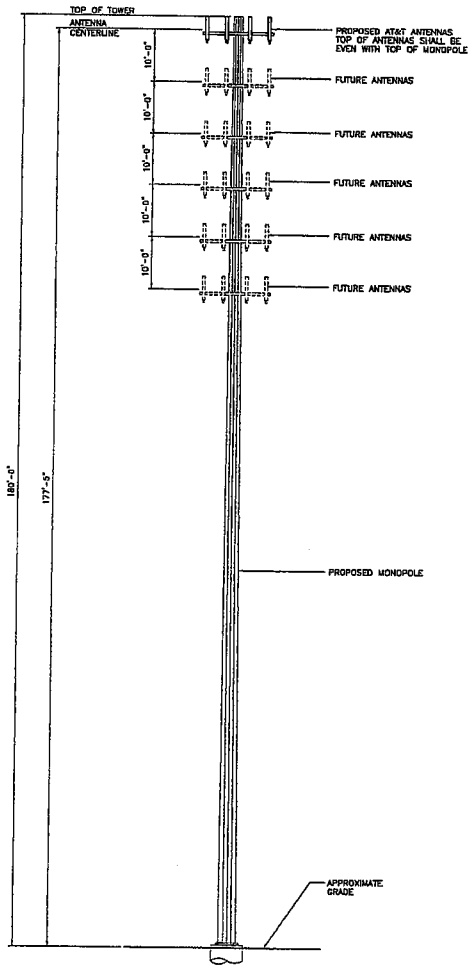
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

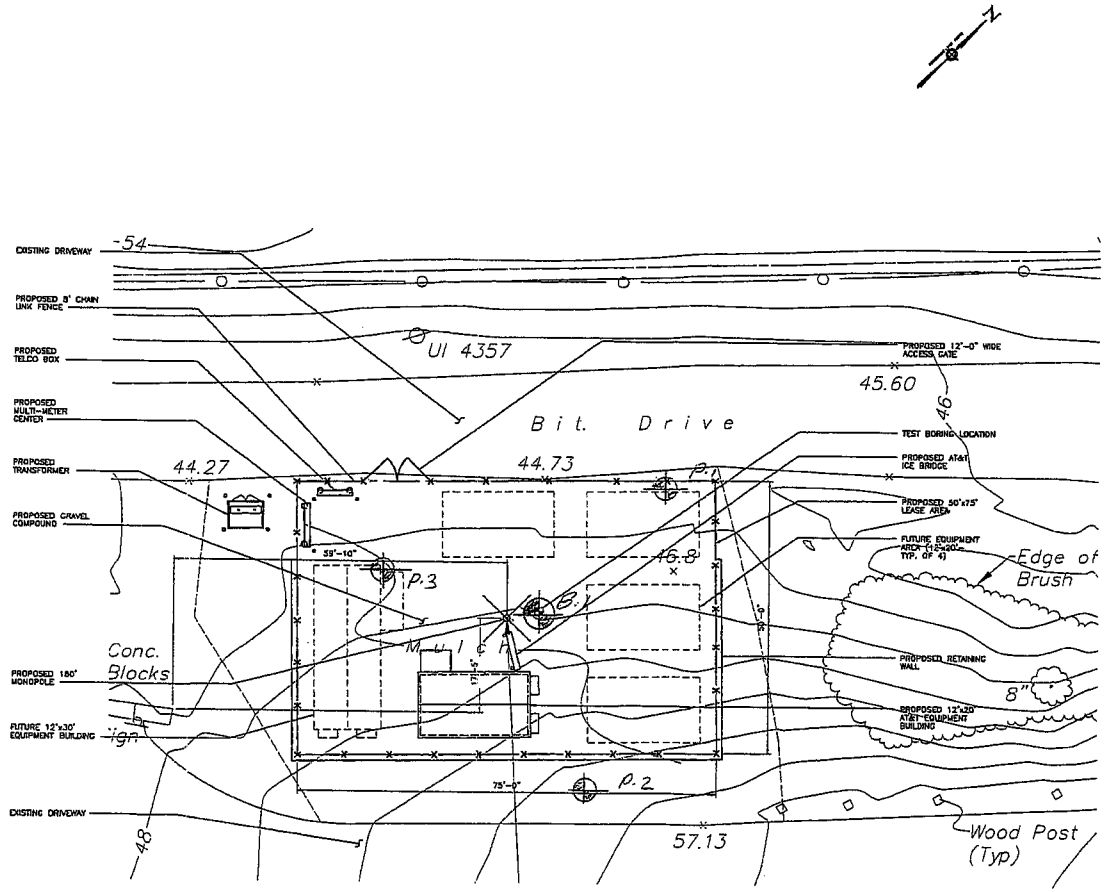
DRILLER: GRAVES

INSPECTOR:

SHEET 1 OF 1 HOLE NO. PROBES



2 / Z02 TOWER ELEVATION
SCALE: 3/32" = 1'-0"



1 / Z02 COMPOUND PLAN
SCALE: 1" = 10'-0"

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882
URS JOB NUMBER: F301924.07

ORANGE TRANSFER STATION
3C0-101B
SOUTH ORANGE CENTER ROAD
ORANGE, CONNECTICUT

AT&T
AT&T WIRELESS PCS LLC
12 OMEGA DRIVE
STAMFORD, CONNECTICUT 06902

NO.	DATE	REVISIONS	BY	CHK	APP'D
C	04-25-01	PLANNING & ZONING REVIEW	JCF		
B	02-07-01	BOARD OF SELECTMEN	JCF		
A	02-01-01	90% P & Z REVIEW	MCO		

SCALE: AS NOTED | DESIGNED: JCF | DRAWN: JCF

URS CORPORATION AES
RAW LAND SITE - MONOPOLE WITH SHELTER
COMPOUND PLAN AND TOWER ELEVATION

JOB NO.	SITE NO.	DRAWING NUMBER	REV
24445	3C0-101B	3C0-101B-00Z02	C

22 x 34 'D' SIZE
PSC-

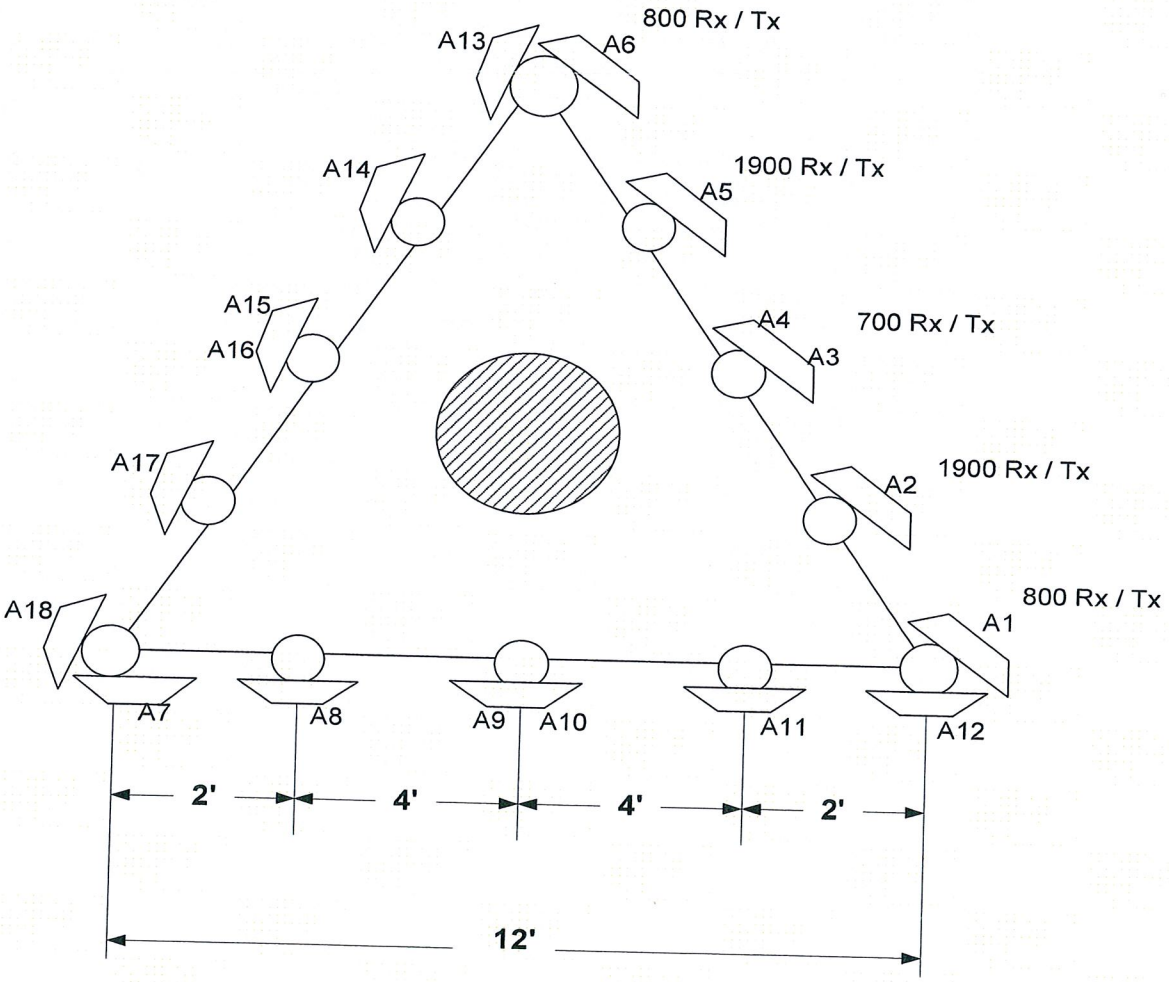
Site Name	ORANGE 4 CT	ECP AND CELL NUMBER	5	178
Latitude	41-15-20.00 N	Longitude	73-00-38.00 W	
RF Engineer		GEL (Feet)	49.2	
850 Cellular - Current Config	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	Cellular Modcell 4.0	Cellular Modcell 4.0	Cellular Modcell 4.0	
ANTENNA TYPE	DB844G45ZAXY	DB844G45ZAXY	DB844G45ZAXY	
QUANTITY PER FACE	2	2	2	
ORIENTATION	0	120	240	
DOWN TILT (DEG - MECH)	0	0	0	
RAD CTR (FT AGL)	117	117	117	
TOWER MOUNTED AMPS INSTALLED	No	No	No	
MCPA INSTALLED	No	No	No	
MCPA GAIN (dB)	0	0	0	
850 Cellular - Future Config	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	Cellular Modcell 4.0	Cellular Modcell 4.0	Cellular Modcell 4.0	
ANTENNA TYPE	DB844G45ZAXY	**LPA-80063/4CF**	DB844G45ZAXY	
QUANTITY PER FACE	2	2	2	
ORIENTATION	0	**100**	240	
DOWN TILT (DEG - MECH)	0	**2° Mech**	0	
RAD CTR (FT AGL)	117	117	117	
TOWER MOUNTED AMPS INSTALLED	No	No	No	
MCPA INSTALLED	No	No	No	
MCPA GAIN (DB)	0	0	0	
700 Cellular - Add	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	TBD	TBD	TBD	
ANTENNA TYPE	BXA-70063/4CF	BXA-70063/4CF	BXA-70063/4CF	
QUANTITY PER FACE	1	1	1	
ORIENTATION	0	100	240	
DOWN TILT (DEG - MECH)	**0**	**2° Mech**	**0**	
RAD CTR (FT AGL)	117	117	117	
1900 Cellular - Current Config	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	PCS Modcell 4.0	PCS Modcell 4.0	PCS Modcell 4.0	
ANTENNA TYPE	950F40T2E-M_2	950F40T2E-M_2	950F40T2E-M_2	
QUANTITY PER FACE	2	2	2	
ORIENTATION	0	120	240	
DOWN TILT (DEG - MECH)	0	0	0	
RAD CTR (FT AGL)	117	117	117	
TOWER MOUNTED AMPS INSTALLED	No	No	No	
MCPA INSTALLED	No	No	No	
MCPA GAIN (DB)	0	0	0	
1900 Cellular - Future Config	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	PCS Modcell 4.0	PCS Modcell 4.0	PCS Modcell 4.0	
ANTENNA TYPE	950F40T2E-M_2	950F40T2E-M_2	950F40T2E-M_2	
QUANTITY PER FACE	2	2	2	
ORIENTATION	0	**100**	240	
DOWN TILT (DEG - MECH)	0	0	0	
RAD CTR (FT AGL)	117	117	117	
TOWER MOUNTED AMPS INSTALLED	No	No	No	
MCPA INSTALLED	No	No	No	
MCPA GAIN (DB)	0	0	0	

CABLE INFORMATION

FEEDLINE SIZE	1 5/8	FEEDLINE SIZE	1 5/8	FEEDLINE SIZE	1 5/8
JUMPER SIZE	1/2"	JUMPER SIZE	1/2"	JUMPER SIZE	1/2"

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/WHITE	A8	1900	Tx2/Rx0	BLUE/WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ORANGE	A9	700	Tx2/Rx0	BLUE/ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE

A4	700	Tx4/Rx1	RED/RED/ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ORANGE
A5	1900	Tx4/Rx1	RED/RED/WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN

APPROVALS	INITIALS	DATE
Prepared By : Dany Bustamante > RF Engineer	DB	7/16/2009
Steve Weatherbee > RF Design Manager		

Site Configuration