



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

December 5, 2001

Stephen J. Humes
LeBoeuf, Lamb, Greene & MacRae
Goodwin Square
225 Asylum Street
Hartford, CT 06103

RE: **EM-VOICESTREAM-035-011030** - VoiceStream Wireless Corporation notice of intent to modify an existing telecommunications facility located at 3 Mechanic Street, Darien, Connecticut.

Dear Attorney Humes:

At a public meeting held on November 29, 2001, the Connecticut Siting Council (Council) acknowledged 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 30, 2001. 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. 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,

Mortimer A. Gelston
Chairman

MAG/laf

- c: Honorable Robert F. Harrel, Jr., First Selectman, Town of Darien
David J. Keating, Zoning Enforcement Officer, Town of Darien
Peter Curry, Office Administrator, Town of Darien
Dorian Hill, Northeast Utilities Service Company

LEBOEUF, LAMB, GREENE & MACRAE
L.L.P.

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225 ASYLUM STREET
HARTFORD, CT 06103
(860) 293-3500
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(860) 293-3744

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October 30, 2001



Joel Rinebold, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Notice of Exempt Modification
3 Mechanic Street, Darien, Connecticut

Dear Mr. Rinebold:

Please be advised that LeBoeuf, Lamb, Greene & MacRae, L.L.P. represents Omnipoint Communications, Inc. ("VoiceStream"), a subsidiary of VoiceStream Wireless Corporation in the above-referenced matter. VoiceStream intends to update its existing equipment at the existing facility, a Connecticut Light and Power Company ("CL&P") electrical transmission facility described herein, located at 3 Mechanic Street in Darien. VoiceStream intends to modify its existing site by removing the existing pipe mast that now holds a total of three existing antennas and installing three new antenna sectors, with two antennas per sector on a new pipe mast, the top of which is approximately one hundred twenty-nine (129') feet above ground level ("AGL"). These modifications will create a total of six (6) panel antennas and related equipment at the existing facility in Darien. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of 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 the Town of Darien First Selectman, Robert F. Harrel, Jr.

Background

Effective as of the May 31, 2001 merger between Deutsche Telekom AG and VoiceStream Wireless Corp., the corporate structure of VoiceStream has changed.¹ VoiceStream holds the "A block" "Wideband PCS" license for the 2-GHz PCS frequencies for the greater New York City area, including the entire State of

¹The corporate structure of VoiceStream is as follows: Omnipoint Communications, Inc. ("Omnipoint") is a 95.4% subsidiary of Omnipoint Finance, LLC (hereinafter, "OF"). OF is a wholly owned subsidiary of Omnipoint Finance Holding, LLC (hereinafter, "OFH"). OFH is a subsidiary of Omnipoint Wireless Corporation (hereinafter "VS"), which owns all of the outstanding common shares of OFH. VS is a wholly owned subsidiary of T-Mobile International AG (hereinafter "T-Mobile"). T-Mobile is a wholly owned subsidiary of Deutsche Telekom AG (American Depositary Receipts traded in U.S. on the NYSE: DT).

Connecticut. VoiceStream is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation.

Discussion

The existing facility consists of an eight-sided, self supporting, double circuit monopole, with an overall height of one hundred fifteen feet (115'-0") and related equipment located at Mechanic Street in Darien. The tower is owned by Northeast Utilities and is part of the Stamford to Fairfield 115kV transmission line system. The pole is referred to as Connecticut Light and Power ("CL&P") pole number **1068**. The coordinates for the site are **41°-04'-38" N** and **73°-28'-01" W**. VoiceStream has received authorization from CL&P for this upgrade as evidenced by their authorization letter (attached as Exhibit A).

VoiceStream plans to update its existing antenna cluster with an updated cluster of three sectors with up to 2 antennas per sector, constituting a total of six (6) panel-type antennas on the existing tower. Currently, the tower holds three VoiceStream panel antennas on a pipe mast configuration, the top of which extend to the approximate one hundred twenty-five foot level (125'-0") AGL. VoiceStream's proposal calls for the removal of the existing pipe mast and antenna array. This configuration would be replaced by a new, slightly higher pipe mast with the antenna panels "stacked" three above three, comprising a total of six antennas. A detailed cross-section of the antenna mounting is shown in drawing S-7, part of the attached Exhibit B. The new pipe mast would extend 13.83 feet above the top of the pole to a height of 128.83 feet AGL. This represents a height of approximately 3.83 feet above the existing configuration. The model number for each antenna is Racal 8265T72-R0. A structural analysis of the tower has been completed and is attached as Exhibit D. As stated in the structural analysis, the existing tower and its foundation have sufficient capacity to support the proposed VoiceStream installation. It is also stated in the structural analysis, no structural problems for the pole or its foundation are anticipated, and no modifications are necessary. Two new Nortel S8000 equipment cabinets will be added to the existing cabinet. To accommodate the new cabinets a new nine foot by twelve foot (9'-0" x 12'-0") concrete pad will be added slightly to the southeast of the existing single cabinet's concrete pad, toward the existing Amtrack railroad tracks (see Design Drawings, attached as Exhibit B). To accommodate the new cabinets, the existing six foot chain link fence will be extended fifteen feet to the southeast at the same width as its present configuration. The antennas will be fed by 1-5/8" coaxial cables routed up the exterior of the pole to the antennas.

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

1. The proposed modification will not increase the height of the tower. While the proposed pipe mast configuration would extend higher than the tower, it would not increase the height of the actual CL&P structure and would not extend the boundaries of the existing compound area. In fact, the proposed modification would make the existing configuration only 3.83 feet higher. The enclosed tower drawing confirms that the planned changes will not increase the overall height of the tower.

2. The installation of VoiceStream equipment, as reflected on the attached site plan, will not require an extension of the site boundaries. VoiceStream's proposed equipment cabinets will be added to those already existing and located entirely within the existing compound.

3. The proposed modification to the facility will not increase the noise levels at the existing facility by six decibels or more. VoiceStream's equipment is self-contained and requires no additional heating, ventilation or cooling equipment.

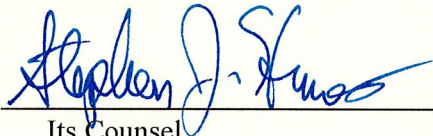
4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the applicable standard. The "worst-case" RF power density calculations, for a point at the site boundary, are attached hereto as Exhibit D.

For the foregoing reasons, VoiceStream respectfully submits that the proposed addition of antennas and equipment at the Norwalk facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Thank you for your consideration of this matter.

Respectfully submitted,

VOICESTREAM WIRELESS CORPORATION

By: 
Its Counsel
Stephen J. Humes
Diane W. Whitney

Attachments

cc: Robert F. Harrel, Jr., First Selectman, Town of Darien

Exhibit A

Letter of Authorization

3 Mechanic Street

Darien, Connecticut



**Northeast
Utilities System**

107 Selden Street, Berlin, CT
06037

Northeast Utilities Service
Company
P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

October 30, 2001

Voicestream Wireless Corporation
c/o Stephen J. Humes, Esq.
100 Philley Street
Bloomfield, CT 06002

Re: Site Permitting Authorization

Dear Mr. Humes:

Authorization is hereby given to Voicestream Wireless Corporation, its employees and its duly authorized agents and independent contractors (hereinafter collectively referred to as "Voicestream"), to apply for any and all local municipal, state and federal licenses, permits and approvals, including but not limited to Connecticut Siting Council, building permits, zoning variances, zoning special exceptions, site plan and subdivision approvals, driveway, wetlands and terrain alteration permits, which are or may be necessary or required for Voicestream to construct, operate and maintain a wireless communications system (PCS System), and/or antenna site on the following property over which The Connecticut Light & Power Company (CL&P) has easement rights:

Mechanics Street
Structure #1068
Darien, Connecticut

The foregoing authorization is given subject to the following conditions:

1. This authorization shall be nonexclusive. Nothing herein shall prevent or restrict CL&P from authorizing any other person or entity to apply for any similar licenses, permits or approvals to construct, operate and maintain any other communication system or facility of any type on the property at any time.
2. This authorization shall not obligate CL&P to pay for or reimburse any costs or expenses or to provide any assistance of any kind in connection with any applications, or bind or obligate CL&P to agree or be responsible for any on-site or off-site improvements, development restrictions, impact fees or assessments, capital improvement charges, bonds or other security, or any other fee, assessment, charge or expense imposed or required as a condition of any license, permit or approval. Voicestream shall be solely and fully responsible for all fees, charges costs and expenses of any kind in connection with any applications. CL&P agrees to reasonably cooperate with Voicestream in signing such applications or other similar documents as may be required in order for Voicestream to apply for any license, permit or approval.

3. This authorization shall not be deemed or construed to grant or transfer to Voicestream any interest in the property, whatsoever, and shall not in any respect obligate or require CL&P to sell, lease or license the Property to Voicestream or otherwise allow Voicestream to use or occupy the property for any purpose, regardless of whether any licenses, permits and approvals applied for by Voicestream for the property are granted. Voicestream understands and acknowledges that any and all applications filed by Voicestream for the property at Voicestream's sole risk and without any enforceable expectation that the property will be made available for Voicestream's use.
4. Voicestream shall be required to supply to CL&P, free of charge and contemporaneous with Voicestream's filing of same, a complete copy of any and all applications, plans, reports and other public filings made by Voicestream with any local, municipal, state or federal governmental or regulatory officer, agency board, bureau, commission or other person or body for any licenses, permits or approvals for the property, and to keep CL&P fully informed on a regular basis of the status of Voicestream's applications.
5. This authorization shall automatically expire six (6) months after the date of this letter, unless extended in writing by mutual agreement of CL&P and Voicestream.

Very truly yours,



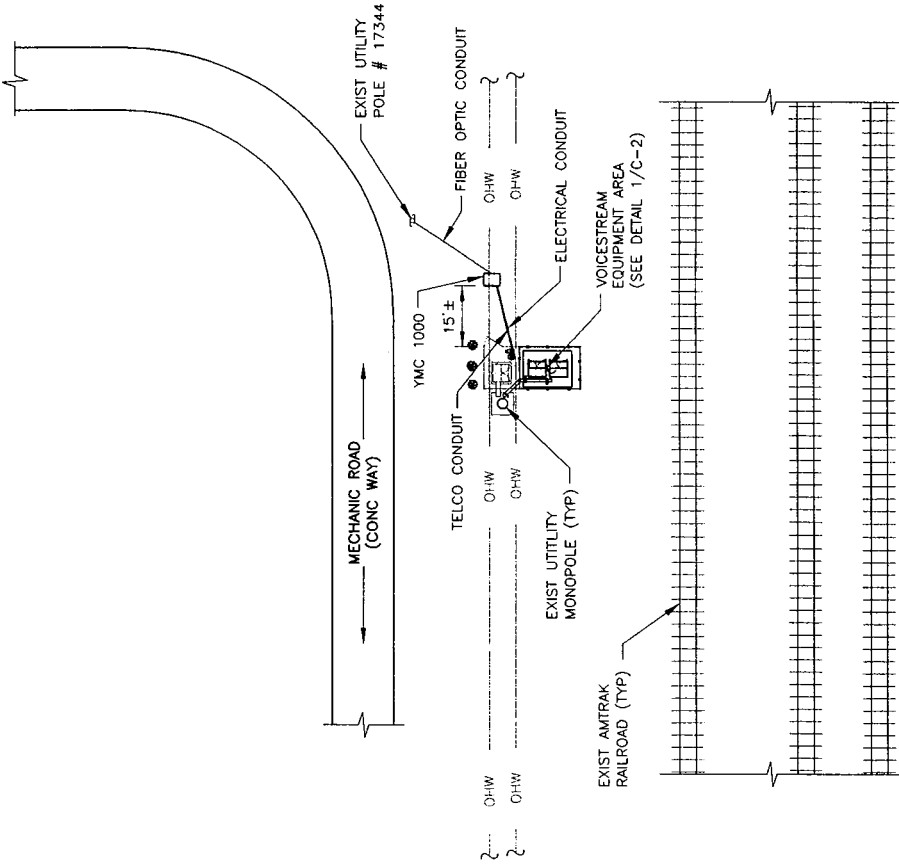
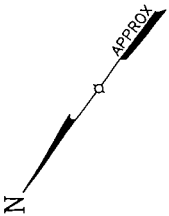
Salvatore Giuliano, Manager
Real Estate and Land Planning

RWO/

K:\Depend\Real_Est\Real Estate Operations\RWO\Situ Permits\
Voicestream - Permit file 190 op\lrc.doc

Exhibit B

Design Drawings **3 Mechanic Street** **Darien, Connecticut**



NOTE: SNET SHALL TRENCH FOR POWER AND FIBER

1
C-1
SITE PLAN
SCALE: 1" = 30'



ORIGINAL SIZE IN INCHES

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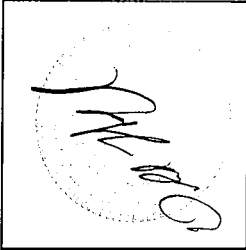
TECTONIC ENGINEERING CONSULTANTS P.C.
2320 ROUTE 111
DARREN, CT 06424
OFFICE: (860) 534-2400
FAX: (860) 534-2558

POINT
CONSULTANTS P.C.
A member of
VoiceStream
VOICESTREAM SERVICES
100 PACT STREET
DARREN, CT 06424
OFFICE: (860) 794-7100
FAX: (860) 892-7139

APPROVALS
OWNER: _____
LANDLORD: _____
RF: _____
CONSTRUCTION: _____

PROJECT NUMBER: 2306.11290
DESIGNED BY: CS
REV. DATE: _____
REVISION: _____
DRAWN BY: KSW
FOR COMMENT: 6/27/01
FOR CONSTRUCTION: 8/14/01

ISSUED BY: *John B...*
DATE: 8/14/01



SITE INFORMATION
CT-11-290-C
DARIEN/DTWN & RT.1
DARIEN, CT.
CL&P POLE #1068

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1

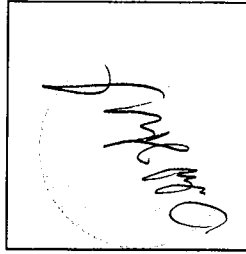
APPROVALS

OWNER: _____
 LANDLORD: _____
 CONSTRUCTION: _____

DESIGNED BY: _____
 OR: _____
 PROJECT NUMBER: 2394.11290

REV.	DATE	REVISION	DRAWN BY
1	6/27/01	FOR COMMENT	USW
2	9/14/01	FOR CONSTRUCTION	KSW

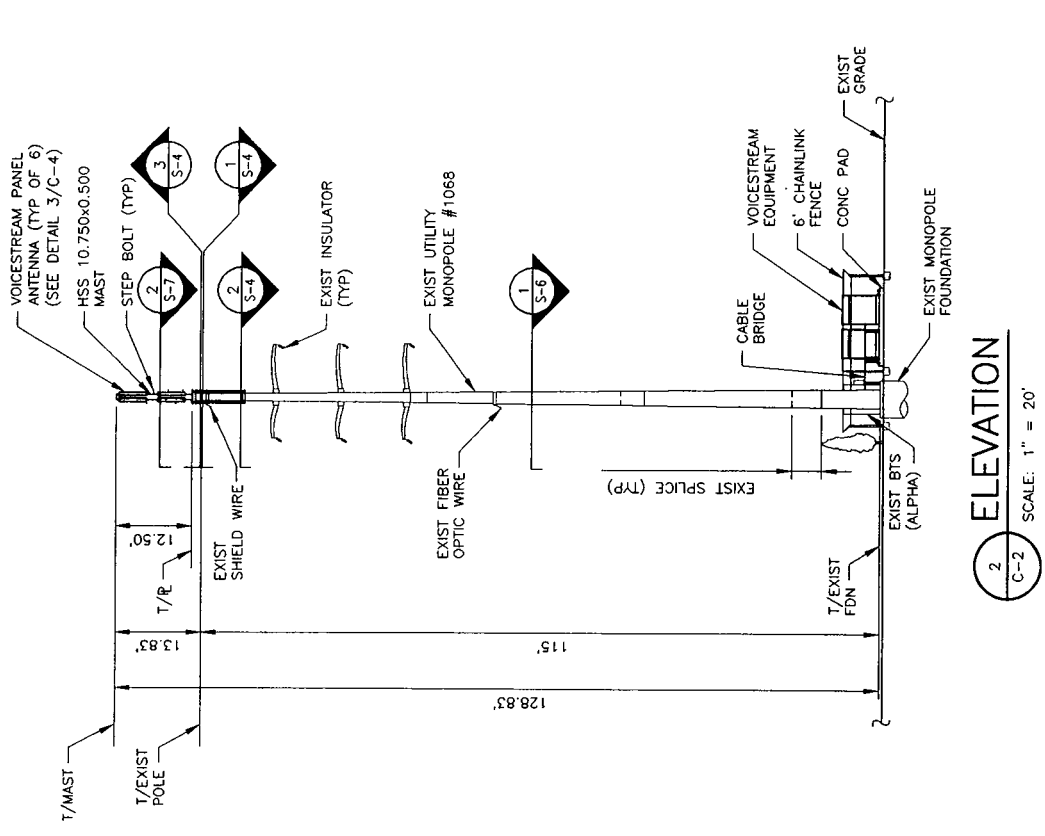
ISSUED BY: *Don Smith* DATE: 9/14/01



SITE INFORMATION
CT-11-290-C
DARIEN/DIWN & RT.1
DARIEN, CT.
CL&P POLE #1068

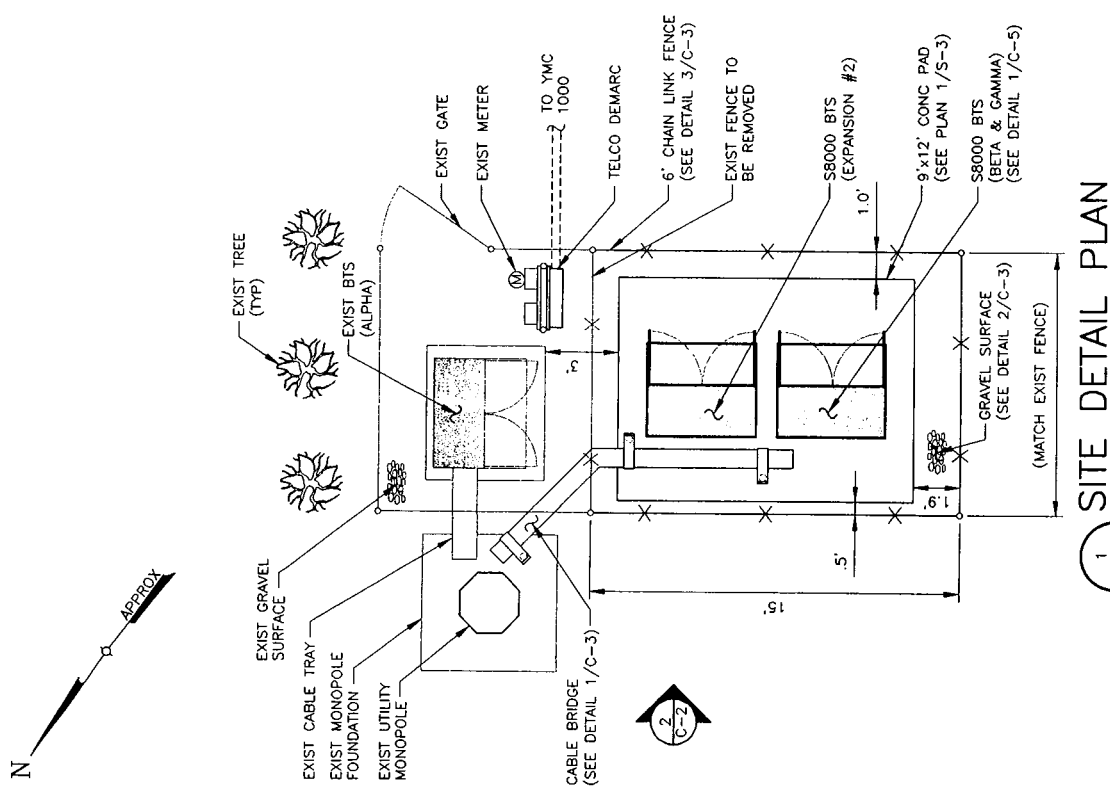
SHEET TITLE
SITE DETAIL PLAN & MONOPOLE ELEVATION

SHEET NUMBER
C-2



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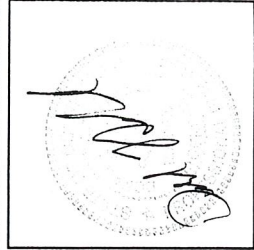
DESIGNED BY: _____

PROJECT NUMBER: 230A.11240

CONSTRUCTION: _____

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1	8/27/01				NSW	
2	8/14/01				NSW	

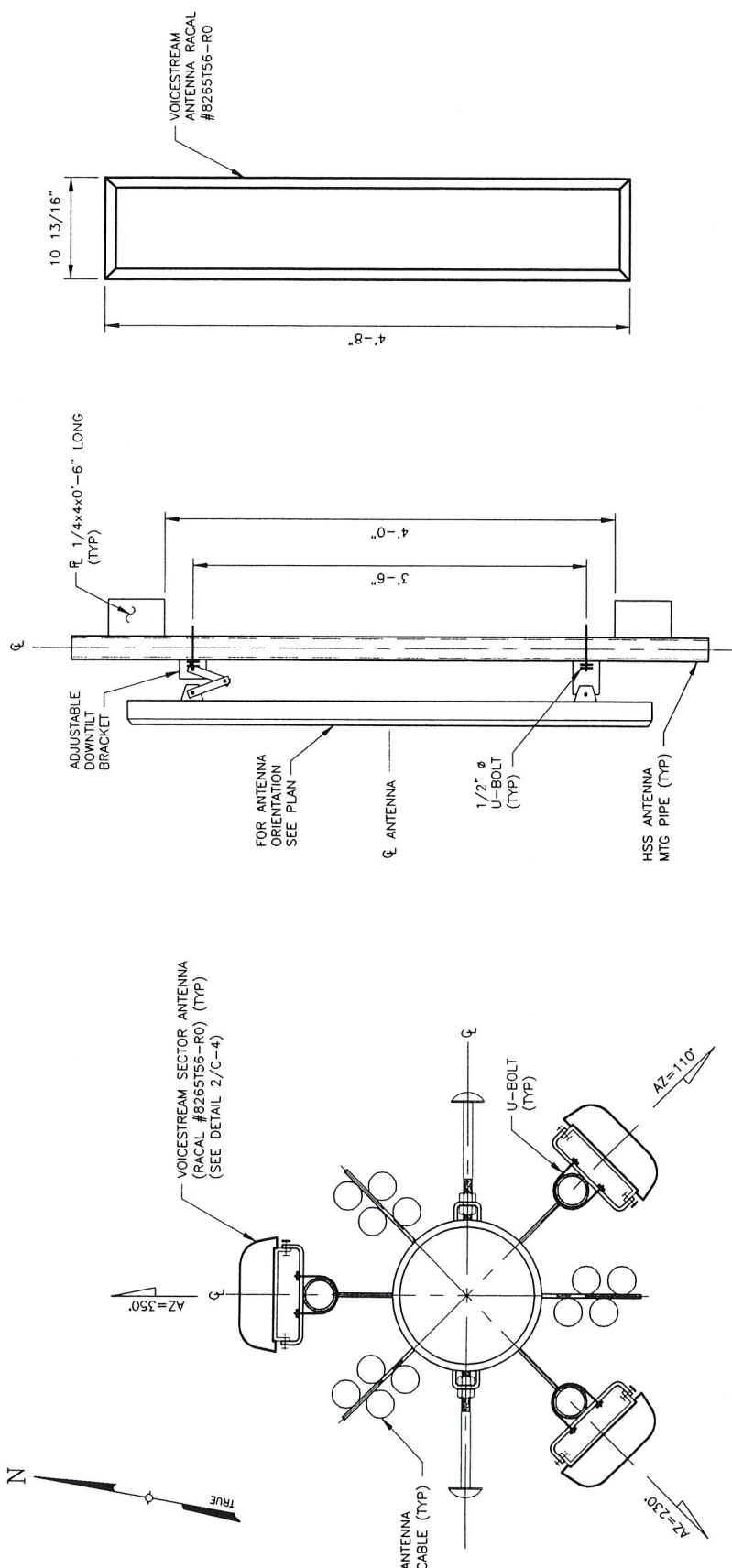
ISSUED BY: *Chris Brund* DATE: 8/14/01



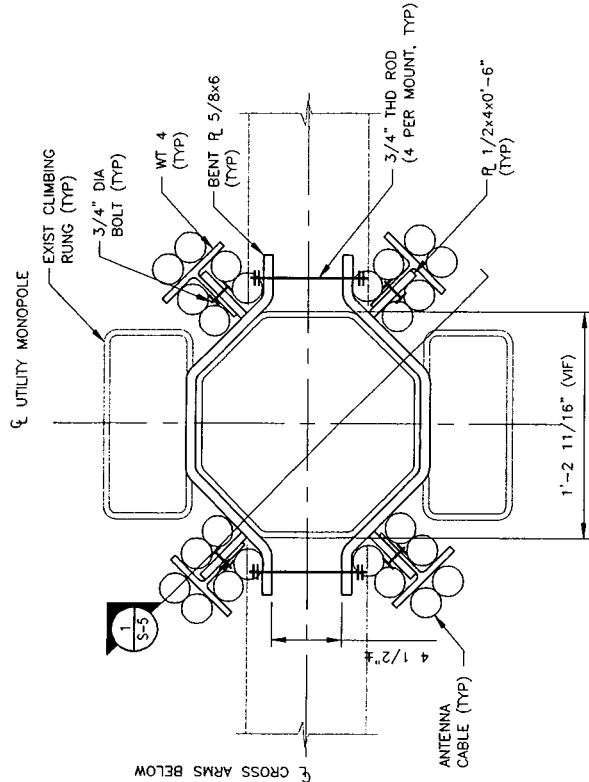
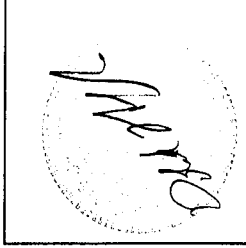
SITE INFORMATION
 CT-11-290-C
 DARIEN/DTWN & RT.1
 DARIEN, CT.
 CL&P POLE #1068

SHEET TITLE
 ANTENNA DETAIL

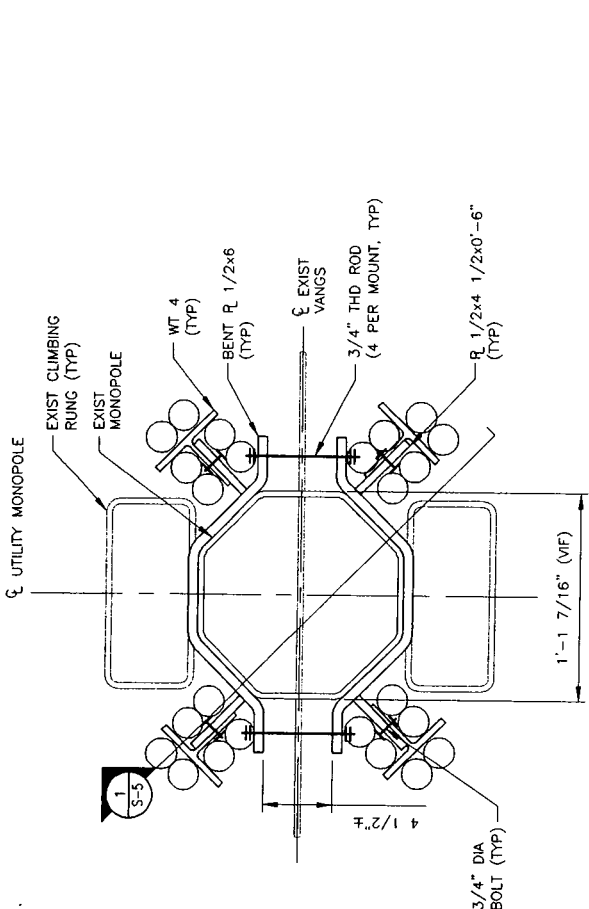
SHEET NUMBER
 C-4



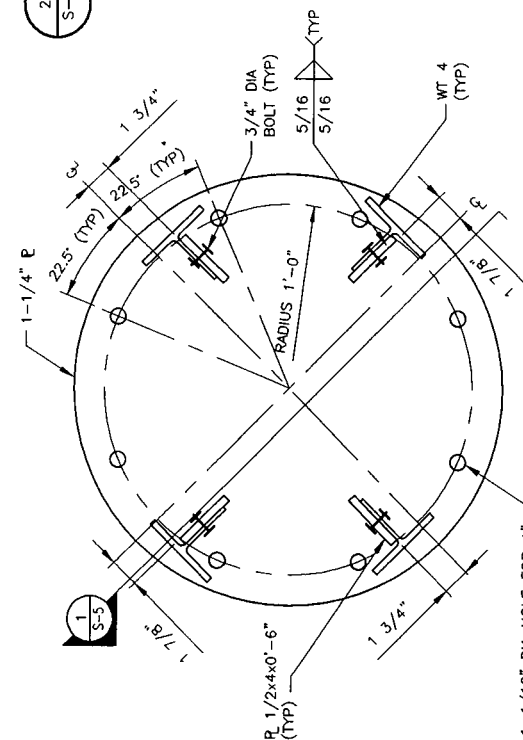
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SECTION 1
 SCALE: 1 1/2" = 1'-0"



SECTION 2
 SCALE: 1 1/2" = 1'-0"



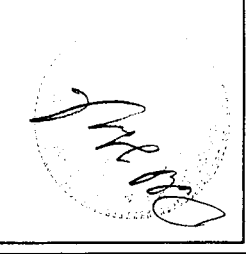
SECTION 3
 SCALE: 1 1/2" = 1'-0"



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PROJECT NUMBER	DESIGNED BY
2306.11290	CR
REV. DATE	REVISION
6/22/01	FOR COMMENT
8/14/01	FOR CONSTRUCTION
ASW	ASW

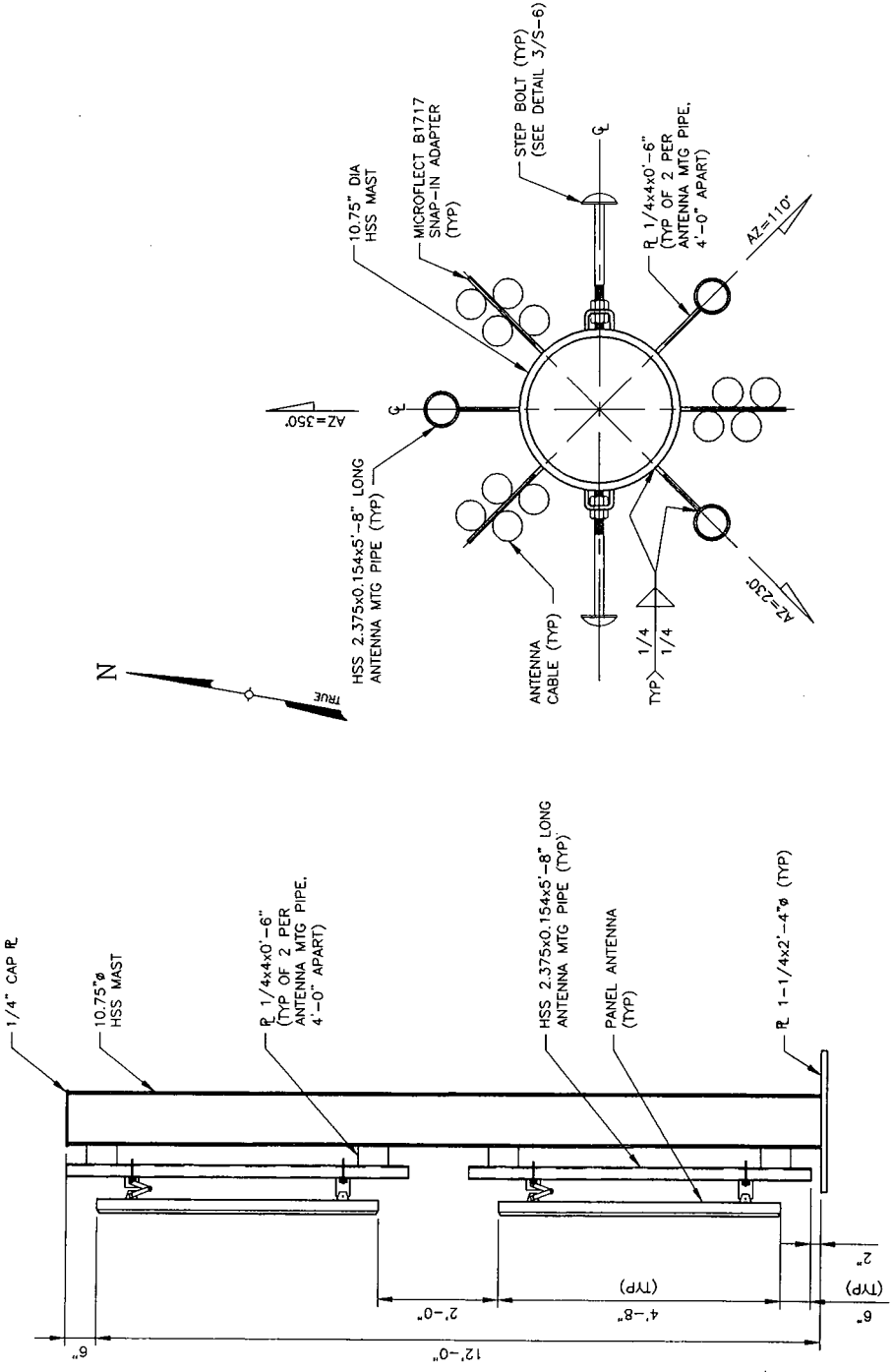
ISSUED BY: *[Signature]* DATE: 8/14/01



SITE INFORMATION
 CT-11-290-C
 DARIEN/DTWN & RT.1
 DARIEN, CT.
 CL&P POLE #1068

SHEET TITLE
SECTIONS

SHEET NUMBER
S-7



SECTION 2
 SCALE: 1 1/2" = 1'-0"

SECTION 1
 SCALE: 1/2" = 1'-0"



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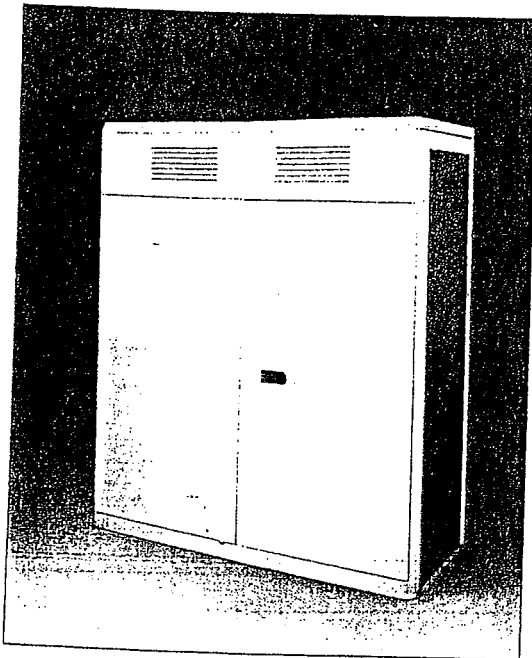
Exhibit C

Equipment Specifications

3 Mechanic Street

Darien, Connecticut

S8000 Outdoor Base Transceiver Station



Nortel's S8000 Outdoor Base Transceiver Station has been designed to meet the economic and performance requirements of network operators. Based on a highly integrated RF and digital design, the S8000 Outdoor Base Transceiver Station represents a major technology advancement and delivers all the benefits of a compact, modular, high quality and high performance product.

Nortel's S8000 Outdoor BTS: Radio Performance Leadership - Reduced Site Acquisition and Operating Costs

Installation

- The S8000 Outdoor Base Transceiver Station (BTS) offers compact packaging and requires minimal floor space, only .88 sq m (9.5 sq ft.). Front only access keeps total space required, including maintenance access, to only 1.8 sq m (19.4 sq ft.) per cabinet.

Transmission

- Integrated drop and insert connection to the Base Station Controller (BSC) and signaling concentration on the A-bis interface provide significant transmission cost reduction.
- Optional integrated digital microwave radio.

Maintenance

- Highly reliable technology, redundant architecture and integrated battery backup ensure high availability service.
- Front access and interconnections, as well as powerful fault detection, help reduce lifetime maintenance costs.

Industry leading performance

- New RF technology and advanced digital processing techniques provide very high receive sensitivity (-108 dBm guaranteed) and improved diversity gain (up to 6 dB). This provides higher resistance to interference, as well as, improved speech quality and cell coverage.
- Nortel's proven experience in frequency hopping, 1*3 frequency reuse, sophisticated microcellular handover algorithms and support of half-rate vocoders enables the operator to maximize use of available spectrum and deploy fewer cell sites.

Fast network deployment

- The S8000 BTS can be shipped fully equipped and tested, which provides fast network roll out to meet operator time to market requirements.

Modular and flexible configuration

- The S8000 supports eight transceivers (TRX) per cabinet in Omni and sectored configurations. The typical one cabinet S222 configuration may be expanded up to S332 or S422 without an additional cabinet.

Technical Data

• Frequency range		900 MHz GSM
		900 MHz GSM extended
		1800 MHz DCS
		1900 MHz PCS
• Receive sensitivity (guaranteed)		-108 dBm
• Dimensions	Height	1600 mm / 5 ft. 3 in.
	Width	1350 mm / 4 ft. 5 in.
	Depth	650 mm / 2 ft. 1 in.
• Weight	Fully equipped	600 kg / 1300 lbs.
• Capacity		8 TRX per cabinet
		up to 3 cabinets
• Configuration	Trisectorial	up to S888
	Omnidirectional	up to O16
• Amplifier output power		30 W (\pm 1.5 dB)
• Power control	Static	6 steps of 2 dB
	Dynamic	15 steps of 2 dB
• Frequency hopping		RF synthesized
		baseband
• Supported vocoders		Full rate
		Enhanced full rate
		Half rate
• Encryption algorithms		A5/1 A5/2
• Power supply		230V AC 50/60 Hz
• Power back-up		Integrated battery back-up plus optional battery cabinet allows provisioning up to 8 hours back-up time.
• Operating temperature range		-40°C to +50°C
		-40°F to +122°F

For more information,
please contact your local Nortel account representative.

In the USA:
Northern Telecom
2221 Lakeside Boulevard
Richardson TX 75082
USA
Telephone: 1-800-4 NORTEL
1-800-466-7838 or (214) 684-3935 --
<http://www.nortel.com/wireless>

In Canada:
Northern Telecom
2920 Matheson Boulevard East
Mississauga ON L4W 4M7
Canada
Telephone: 1-800-4 NORTEL

In the Caribbean and Latin America:
Northern Telecom (CALA) Corporation
1500 Concord Terrace
Sunrise FL 33323
USA
Telephone: (305) 851-8400

In Asia:
Northern Telecom (Asia) Limited
151 Lorong Chuan
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Singapore 1955
Telephone: (65) 287-2877

Nortel China Ltd.
34th Floor, Central Plaza
18 Harbour Road, Wanchai
Hong Kong
Telephone (852) 2585 2888

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Maidenhead
Berkshire SL6 1AY
England
Telephone: (44) (1628) 812000

Nortel Matra Cellular
BP 50
1 place des Frères Montgolfier
78042 Guyancourt Cedex
France
Telephone (33) (1) 34 52 52 52

Nortel Europe
12-12bis rue Jean Jaurès
92807 Puteaux
France
Telephone (33) (1) 46 96 15 15

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changes, without notice, in equipment
design as engineering or manufacturing
methods warrant.

NORTEL
NORTHERN TELECOM

3 CABINET DESCRIPTION

3.1 PHYSICAL CHARACTERISTICS

3.1.1 S8000 Outdoor BTS

3.1.1.1 BTS cabinet

Dimensions

The BTS S8000 Outdoor has the following dimensions:

- height: 160 cm (63 in.)
- width: 135 cm (52.8 in.)
- depth: 65 cm (25.6 in.)

Weight

The weight of the cabinet when empty, that is, without its battery, fan units or boards, is 164 kg (361 lb). Depending on the configuration, a fully equipped cabinet weighs approximately 480 kg (1056 lb) with ACU unit or 440 kg (968 lb) with DACS unit.

These weights do not include the plinth.

Operating temperature

To operate correctly, the BTS requires a temperature greater than -40°C (-40°F) and less than $+50^{\circ}\text{C}$ ($+122^{\circ}\text{F}$).

Consumption

BTS input voltage:

- GSM 900/1800
 - nominal voltage contained between 220V AC and 240V AC
 - minimum voltage: $220 - 10\% = 198\text{V AC}$
 - maximum voltage: $240 + 6\% = 254\text{V AC}$
- GSM 1900 (with DACS)
 - nominal voltage: 208V AC to 240V AC
 - minimum voltage: $208 - 10\% = 187\text{V AC}$
 - maximum voltage: $240 + 6\% = 254\text{V AC}$
- GSM 1900 (with ACU and/or the power system six-rectifier type)
 - nominal voltage: 240V AC
 - minimum voltage: $240 - 10\% = 187\text{V AC}$
 - maximum voltage: $240 + 6\% = 254\text{V AC}$

NON - PREMIUM
BTS ONLY

700

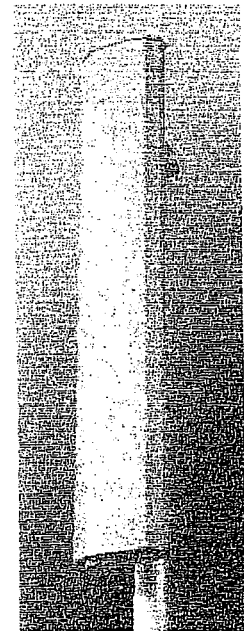
DUAL POL TWIN BEAM PANEL ANTENNA

TYPE 8265T-R0 XP/65/19 & XP/65/19

- Gain 19 dBi on 4 ports
- 65° Azimuth Twin Beam Coverage
- 5 Year Warranty
- Microstrip Design

ELECTRICAL PERFORMANCE

Frequency Range	:	1850-1990 MHz
Gain	:	18.8 dBi \pm 0.5 dBi
VSWR	:	1.4:1 maximum
Polarization	:	Dual Slant, +45° and -45°
Horizontal Beamwidth	:	65° \pm 5° Twin Beam
Vertical Beamwidth	:	5° \pm 0.25°
Downtilt	:	0°
Sidelobe Suppression	:	Elevation, better than 18dB
Front to Back Ratio	:	Better than 25 dB
Isolation between Ports	:	Better than 30 dB
Power Rating	:	250W
Intermodulation	:	-147 dBc
Impedance	:	50 Ω
Lightning Protection	:	DC Ground
Connector	:	7/16 DIN Female Bulkhead



Racal Antennas, Inc.

501 Tradeway

Mineral Wells, TX 76067

Tel: (940) 325-2341

Fax: (940) 325-4377

Website: www.racal-antennas.com

Email: sales@racalantennas.com

PCS
DUAL POL TWIN BEAM
PANEL ANTENNA

TYPE 8265T-R0 CONT'D

MECHANICAL PERFORMANCE

Length	:	72 in
Width	:	10.8 in
Depth	:	3.8 in
Weight	:	33 lbs excluding brackets
Mounting	:	Wall or pole (from 1.5 in to 5 in OD)
Downtilt	:	0° - 7° continually variable (tilt kit included)
Radome Material	:	U.V. stabilized high GRP
Wind Load	:	481N @ 100 mph

ENVIRONMENTAL SURVIVAL

Temperature	:	-40°F to +158°F (-40°C to +70°C)
Wind Survival	:	>150 mph
No Degradation During or After	:	Salt mist/driving rain and any moisture ingress

Specifications subject to change without notice

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Exhibit D

Structural Analysis **3 Mechanic Street** **Darien, Connecticut**

**VOICESTREAM WIRELESS: CL&P POLE #1068
SITE ID No. CT-11-290C
W.O. 2356.11290
EXISTING 115' TRANSMISSION POLE #1068
DARIEN, CT
STRUCTURAL ANALYSIS REPORT – REVISION 1
JUNE 21, 2001**



**ENGINEERING
CONSULTANTS P.C.**

**VOICESTREAM WIRELESS: CL&P POLE #1068
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EXISTING 115' TRANSMISSION POLE #1068
DARIEN, CT
STRUCTURAL ANALYSIS REPORT – REVISION 1
JUNE 21, 2001

1.0 INTRODUCTION

The existing Northeast Utilities transmission pole no. #1068 is located on Mechanic Street in Darien, CT. VoiceStream Wireless anticipates upgrading its existing antenna installation on this pole in the near future.

Tectonic Engineering Consultants, P.C. has performed a structural analysis of the pole. The analysis was to verify the adequacy of the pole for supporting the proposed installation in accordance with requirements provided by Northeast Utilities.

This report summarizes the results of our analysis and provides recommendations for the proposed installation.

This revision incorporates changes in the proposed antenna model and mounting height. It also incorporates a correction of the shape factor for antennas under the extreme wind loading condition.

1.1 Information Provided

For the purpose of the analysis, Tectonic was furnished with the following information:

1. CONNECTICUT LIGHT & POWER, 105'-0", 110'-0" & 115'-0" POLES, by Universal Pole Bracket Corp., shop order T-6291, drawing no. UDP-281, (sheets 1, 2 & 3 of 7), dated 10/16, 9/6, and 9/8/67.
2. FOUNDATIONS TYPE MFG TO MFN, STAMFORD TO FAIRFIELD 115 KV LINE, by The Connecticut Light & Power Company, drawing no. 16450-58, dated 8/28/69.
3. LE Tech Visit Summary Sign-Off, site I.D. #: CL&P CT-11-290C, site name: line 1867 pole 1068, by VoiceStream Wireless, dated 12/12/00.
4. LE Tech Visit Summary Sign-Off, site I.D. #: CT-11-290C, site name: CL&P site swap candidate, by VoiceStream Wireless, dated 1/30/01.
5. "Site Layout, CL&P Pole #1068", prepared by Arcnet Architects, Inc. for Omnipoint Communications, Arcnet project no. A99.506.833A, drawing no. LE-1, dated 3/22/99.

6. "West Elevation, CL&P Pole #1068", prepared by Arcnet Architects, Inc. for Omnipoint Communications, Arcnet project no. A99.506.833A, drawing no. LE-2, dated 3/22/99.
7. "Equipment Plan, CL&P Pole #1068", prepared by Arcnet Architects, Inc. for Omnipoint Communications, Arcnet project no. A99.506.833A, drawing no. A-2, rev. 1, dated 5/7/99.
8. Email from VoiceStream, Subject: A&E for CT11-290C, dated 3/20/01.
9. Comments from VoiceStream on the Tectonic Lease Exhibit regarding change of antenna model.
10. Email from VoiceStream, Subject: CT-11-290-C CL&P, dated 6/7/01.

In addition to the above, the following information was provided by Northeast Utilities:

1. Wire load calculations for CL&P STR. MECHANIC ST. DARIEN, CT, STRUCT 1068, dated 5/14/99, (9 pages).
2. Criteria for Design of PCS Facilities on or Extending above Metal Electric Transmission Towers and Analysis of Transmission Towers Supporting PCS Masts, dated 7/20/99.
3. Design Criteria Table Converting TIA/EIA Requirements to Equivalent Northeast Utility Design Requirements, dated 7/27/99.

2.0 ORIGINAL STRUCTURE DESIGN

2.1 Structure Description

The pole was originally designed by Universal Pole Bracket Corp. in 1967 for Connecticut Light & Power (CL&P) as a part of the Stamford to Fairfield 115 kV transmission line system, and is listed on their drawings as pole no. B466N.

The existing structure is an 8-sided, self-supporting, double circuit monopole, with an overall height of 115'. The pole consists of four (4) slip-jointed sections. Each section has a uniform taper of 0.23108 in/ft. The pole shaft is approximately 3'-1" wide at the base and approximately 1'-1" wide at the top.

We note that the Arcnet drawings provided incorrectly show the pole height to be 95'.

Mounted on the pole are six (6) conductor arms, three (3) 8'-3" long and three (3) 6'-3" long, in pairs at the 102'-4", 91'-4" and 80'-4" levels. A double static vang is attached at the 114'-9" level, and the pole has a 14" wide octagonal cap plate bolted to its top.

The pole drawing shows a 13" rake at the top, presumably to counteract the deflection caused by the conductor line angle.

A diagram of the structure is presented in Figure 1, attached.

2.2 Loading Criteria

No specific information regarding the original design loads or the original design criteria was made available.

2.3 Foundation

The foundation was designed by CL&P. According to the drawing provided, the pole is supported on a 6'-0" diameter reinforced concrete pier, bearing at a depth of 17'-0" below grade, and extending 1'-0" above grade. An alternate detail for a shorter embedment depth into rock is also shown on the foundation drawing.

The exposed portion of the existing foundation is 6'-0" square, and appears to be in fair to good condition. The pole is connected to its foundation with twelve (12) 2-1/4" diameter anchor bolts.

The original foundation design reactions are listed in the Universal Pole Bracket Corp. drawing furnished. However, no information on the site soil parameters used in the design was available.

3.0 EXISTING CONFIGURATION

According to the information listed in the wire load calculations provided, the existing pole is currently installed at a line angle of 3°, a wind span of 420' and a weight span of 434'. The maximum designed line angle, wind span and weight span were not provided.

The existing pole is supporting one (1) 336 MCM 26/7 ACSR shield wire at the top, one (1) 12-#8 FOCAS fiber optic cable (OPGW-12) at approximately the 65' level, and six (6) Bittern 1272 MCM 45/7 ACSR conductors.

The existing pole is also supporting the following items:

- 3 EMS RR90-17-00DP or similar panel antennas at approximately the 122'

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- level (centerline), mounted on a clamp-on pipe mast at the top of the existing pole
- 6 1-1/4" diameter coaxial cables routed up the exterior of the pole to the 122' level
- 1 1' diameter microwave antenna at the 118' level
- 1 7/8" diameter coaxial cable routed up the exterior of the pole to the 118' level

We note that the Arcnet drawings provided incorrectly show the top of antennas at 105' above grade.

4.0 PROPOSED INSTALLATION

It is our understanding that the existing antennas, mast, and coaxial cables will be removed, and the following items are proposed to be added to the pole by VoiceStream Wireless:

- 3 Racal 8265T56-R0 PCS Dual Pol Twin Beam panel antennas at the 126' level (centerline), mounted on a clamp-on mast at the top of the existing pole
- 3 Racal 8265T56-R0 PCS Dual Pol Twin Beam panel antennas at the 119'-4" level (centerline), mounted on the same mast
- 24 1-5/8" diameter coaxial cables routed up the exterior of the pole to the antennas

5.0 STRUCTURAL ANALYSIS

5.1 Current Loading Criteria

The design of electrical transmission line structures is governed by the National Electrical Safety Code (NESC), and the design of steel transmission pole structures is governed by ASCE Manual No. 72 (1990) "Design of Steel Transmission Pole Structures". Additional design constraints are imposed by the electrical utilities to account for special design considerations.

The design of antenna supports is governed by ANSI/TIA/EIA-222-F-1996 "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures". From this document, a basic wind speed of 85 mph applies to Fairfield County, CT where the pole is located. The 1999 Connecticut supplement to the BOCA National Building Code – 1996 requires a wind speed of 80 mph within the Town of Darien, which will not govern the design. Ice

loads have been established based on a 0.5" radial ice thickness in accordance with industry standard practice. A reduced wind speed of 74 mph is used in conjunction with this ice load.

The loading conditions considered in our analysis of the pole including all the applicable code requirements and the requirements stipulated by the utility, are summarized as follows:

Loading Condition	Wind Pressure (psf)	Radial Ice (in)	Overload Factors		
			Wind	Weight	Wire Tension
1. NESC Heavy	4.0	0.5	2.50	1.50	1.65
2. Heavy Ice	0	1.0	1.15	1.15	1.15
3. Extreme Wind	21.0	0	1.15	1.15	1.15

Loads acting on the conductors, shield wire and the fiber optic cable for each loading condition were provided by Northeast Utilities.

For the extreme wind case, a wind pressure of 22 psf is used on the proposed antennas and mast (height over 120') in accordance with the design criteria.

Details of total loads on the pole are summarized in the tables attached.

5.2 Procedure

The pole has been analyzed with STAAD/Pro 2000, a general purpose, three-dimensional structural analysis program. Nonlinear analysis was performed to account for the secondary bending moment caused by deflection of the pole.

The analysis included the pole with the existing conductors, shield wire and fiber optic cable along with the proposed installation described in Section 4.0, using the loading criteria summarized above.

5.3 Assumptions

Several assumptions were made in order to perform the analysis. Each of these is considered by Tectonic to be both reasonable and consistent with current standards of practice.

1. The pole is modeled as a cantilever beam, with a fixed connection at the top of the foundation.

2. Member sizes and material properties are as indicated on the Universal Pole Bracket Corp. drawings furnished.
3. The wind loads applied to the pole due to the antenna installation are conservatively based on the full projected area of all antennas.

5.4 Results

Member forces at various elevations have been calculated and the member capacities have been determined using current loading criteria. The stresses at various elevations are summarized as follows:

Pole Section	Elevation (ft)	Allowable Stress (ksi)	Maximum Combined Stress (ksi)	Percentage of Allowable
1 (Base)	0.00	60.43	57.70	95
	5.00	61.52	57.47	93
	10.00	62.60	57.19	91
2	15.08	62.82	53.81	86
	20.00	63.88	53.33	83
	25.00	65.00	52.77	81
	30.00	65.00	52.10	80
	35.00	65.00	51.32	79
	40.00	65.00	50.39	78
3	44.00	62.89	55.72	89
	50.00	64.45	53.79	83
	55.00	65.00	51.85	80
	60.00	65.00	49.54	76
	65.00	65.00	46.69	72
	70.00	65.00	43.63	67
	77.00	65.00	38.19	59
4	80.33	50.00	40.34	81
	85.00	50.00	36.04	72
	91.33	50.00	28.44	57
	95.00	50.00	25.23	50
	102.33	50.00	16.75	33
	105.00	50.00	15.04	30
	110.00	50.00	11.40	23
	114.75	50.00	8.88	18
5 (13'-4" Ext.)	115.00	50.00	6.76	14
	120.00	50.00	2.73	5
	125.00	50.00	0.53	1
	128.34	50.00	0.00	0

The maximum calculated stress occurs at the base, and is 95% of the capacity.

Loads on the cross arms members are not affected by the proposed installation, and therefore their capacities have not been evaluated.

The resulting foundation reactions are as follows:

	<u>Original Design</u>	<u>Current Analysis</u>	<u>Percentage</u>
Compression (kips)	25.2	25.2	100%
Total Shear (kips)	29.5	28.1	95%
Overturning Moment (kip-ft)	2289.6	2122.4	93%

The original design drawing indicates the tension capacity of the anchor bolts is 141 kips. The calculated maximum tension force in the anchor bolts is 75% of their capacity.

The detailed calculations and computer output are attached to this report.

The calculated vertical reactions for the NESC Heavy and Heavy Ice loading condition are larger than that listed in the original design drawing. However, the shear and overturning moment for NESC Heavy loading are only 65% and 70%, and for Heavy Ice loading are only 15% and 19% of those used in the original design, respectively. The vertical reaction is not critical for the existing foundation.

We note that the overturning moment at the base calculated using nonlinear analysis is approximately 2% - 5% larger than that calculated using linear analysis for the three (3) loading conditions considered.

6.0 CONCLUSIONS AND RECOMMENDATIONS

As a result of our analysis, we find that the existing pole and its foundation have sufficient capacity to support the proposed VoiceStream installation. No structural problems for the pole or its foundation are anticipated, and no modifications are necessary.


The proposed cables must be installed such that the total area exposed to wind acting within 25° of the transverse direction must not exceed a width equal to a total of eight (8) cable diameters.

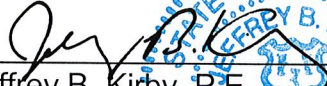
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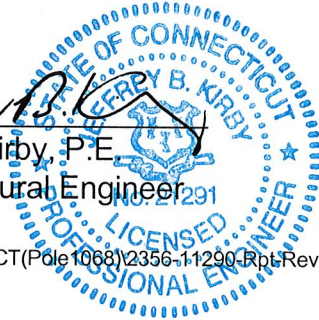
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June 21, 2001

Any further changes to the antenna configuration or other appurtenances should be reviewed with respect to their effect on structural loads prior to implementation.

Prepared by: 
Quan He Fan, P.E.
Staff Structural Engineer

Reviewed by: 
Jeffrey B. Kirby, P.E.
Chief Structural Engineer



Date: 6/21/01

Exhibit E

Power Density Calculations

**3 Mechanic Street
Darien, Connecticut**

Technical Memo

To: Karina Hansen
From: Solomon Berhe Radio Engineering Consultant
cc: Mike Fulton
Subject: Power Density Report for CT-11-290C
Date: 24-Sep-01

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the Voicestream Wireless Corporation PCS antenna installation on a Utility Pole at 3 Mechanic Street, Darien, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from several locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

- 1) The emissions from Voicestream Wireless transmitters are in the 1930-1950 MHz frequency band.
- 2) The antenna cluster consists of three sectors, with 2 antennas per sector. The model number for each antenna is Racal 8265T72-R0.
- 3) The antenna heights are 128.8 feet & 120.8 feet for top and bottom antennas respectively.
- 4) The maximum transmit power from each sector is 3157.01 Watts Effective Radiated Power (EiRP), assuming 8 channels per sector.
- 5) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
- 6) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) The average ground level of the studied area does not significantly change with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worse case assumptions, the power density calculations from the VoiceStream Wireless Corporation PCS antenna installation on a Utility Pole at 3 Mechanic Street, Darien, CT, is 0.044637 mw/cm². This value represents only 4.4639 % of the maximum Permissible Emission (MPE) standard of 1000 microwatts per square centimeter (uw/c²) set forth in the FCC/ANSI/IEEE C95.1-1991.

Furthermore, the proposed antenna location for VoiceStream Wireless will not interfere with existing public safety telecommunications, AM band and FM band radio broadcast, TV, Police Communication, HAM Radio communications and other signals in the area.

Worst Case Power Density

<p>Region 11 - Connecticut Power Density Calculation Site: CT-11-290C Site Address: 3 Mechanic Street Town: Darien Pole Height: 131.8FT Tower Style: a Utility Pole</p>	
Base Station TX output	14 W
Number of channels	4
Antenna Model	8265T72-R0
Cable Size	1 5/8 "
Cable Length	148.80 ft
Antenna Height	128.80 ft
Ground Reflection	1
Frequency	1930.00 MHz
Jumper & Connector loss	2.62 dB
Antenna Gain	18.8 dBi
Cable Loss per foot	0.0116 Loss per/ft
Total Cable Loss	1.72608 dB
Total Attenuation	4.34608 dB
Total EIRP per channel (In Watts)	55.92 dB 390.41 W
Total EIRP per sector (In Watts)	61.94 dB 1561.64 W
	nsg 14.45392
Power Density (S) =	0.020652 mW / cm²
% MPE =	2.0652%
Equation Used :	$S = \frac{(1000)(grf)^2 (Power)^{10} \text{ (nsg/10)}}{4\pi (R)^2}$
Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997	

Worst Case Power Density

Region 11 - Connecticut Power Density Calculation Site: CT-11-290C Site Address: 3 Mechanic Street Town: Darien Pole Height: 131.8FT Tower Style: a Utility Pole	
Base Station TX output	14 W
Number of channels	4
Antenna Model	8265T72-R0
Cable Size	1 5/8 "
Cable Length	140.80 ft
Antenna Height	120.80 ft
Ground Reflection	1
Frequency	1900.00 MHz
Jumper & Connector loss	2.62 dB
Antenna Gain	18.8 dBi
Cable Loss per foot	0.0116 Loss per/ft
Total Cable Loss	1.63328 dB
Total Attenuation	4.25328 dB
Total EIRP per channel (In Watts)	56.01 dB 398.84 W
Total EIRP per sector (In Watts)	62.03 dB 1595.36 W
	nsg 14.54672
Power Density (S) =	0.023985 mW / cm²
% MPE =	2.3985%
Equation Used :	$S = \frac{(1000)(grf)^2 (Power)^{10}}{4\pi (R)^2}$ <small>(nsg/10)</small>
Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997	