

**City of Portland, Maine – Building or Use Permit Application** 389 Congress Street, 04101, Tel: (207) 874-8703, FAX: 874-8716

970238

Location of Construction: 1340 Riverside St		Owner: Labrecque, Paul & Alice		Phone:		Permit No. 970238
Owner Address:		Lessee/Buyer Name: Atlantic Cellular Telephone Corp		Phone:		
Contractor Name: Shaw Brothers		Address:		Phone:		Permit Issued: MAR 24 1997 CITY OF PORTLAND
Past Use: Comm		Proposed Use: Same		COST OF WORK: \$ 121,000.00 PERMIT FEE: \$ 625.00		
Proposed Project Description: Erect Monopole Tower		FIRE DEPT. <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied		INSPECTION: Use Group: Type:		Zone: CBL 357-C-005 Zoning Approval: 3/21/97 Special Zone or Reviews: <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan
		Signature: <i>[Signature]</i> PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.) Action: Approved <input type="checkbox"/> Approved with Conditions: <input type="checkbox"/> Denied <input type="checkbox"/>		Signature: <i>[Signature]</i> Date:		
Permit Taken By: Mary Gresik		Date Applied For: 20 March 1997				Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Call Mark at sebage Tech 856-0277

**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provisions of the code(s) applicable to such permit

SIGNATURE OF APPLICANT *Mark LaGross*      ADDRESS:      DATE: 20 March 1997      PHONE:      AGENT

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE      PHONE:

White-Permit Desk   Green-Assessor's   Canary-D.P.W.   Pink-Public File   Ivory Card-Inspector

Action:  
 Approved  
 Approved with Conditions  
 Denied  
 Date: 3/21/97  
*[Signature]*  
 CEO DISTRICT 7  
 K. Carroll

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				Signature: _____ Date: _____		Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied	

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RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE \_\_\_\_\_ PHONE: \_\_\_\_\_

White-Permit Desk Green-Assessor's Canary-D.P.W. Pink-Public File Ivory Card-Inspector

**CITY OF PORTLAND**

Zone: CBL: 357-C-005

Signature: *[Signature]*

Date: 3/21/97

**CEO DISTRICT** 7

COMMENTS

3-11-98 Done

Inspection Record

Type	Date
Foundation: _____	_____
Framing: _____	_____
Plumbing: _____	_____
Final: _____	_____
Other: _____	_____

# ELECTRICAL PERMIT

## City of Portland, Me.

# 2355



To the Chief Electrical Inspector, Portland Maine:  
 The undersigned hereby applies for a permit to make electrical installations  
 in accordance with the laws of Maine, the City of Portland Electrical Ordinance,  
 National Electrical Code and the following specifications:

Date 4/23/97  
 Permit # \_\_\_\_\_

LOCATION: 1340 Riverside St

OWNER Atlantic Cellular Telph Co ADDRESS \_\_\_\_\_

							TOTAL EACH FEE	
OUTLETS		Telephone		Data		CATV		.20
		Receptacles		Switches		Smoke Detector		.20
FIBER OPTICS								15.00
FIXTURES		incandescent		fluorescent				.20
		fluorescent strip						.20
SERVICES		Overhead				TTL AMPS TO	800	15.00
	x	Underground					800 200	15.00 15
Temporary Service		Overhead				AMPS OVER	800	25.00
		Underground					800	25.00
METERS	1	(number of)					1	1.00 1
MOTORS		(number of)						2.00
RESID/COM		Electric units						1.00
HEATING		oil/gas units		Interior		Exterior		5.00
APPLIANCES		Ranges		Cook Tops		Wall Ovens		2.00
Insta-Hot		Water heaters		Fans		Dryers		2.00
Disposals		Dishwasher		Compactors		Others (denote)		2.00
MISC. (number of)		Air Cond/win						3.00
		Air Cond/cent				Pools		10.00
		HVAC		EMS		Thermostat		5.00
		Signs						10.00
		Alarms/res						5.00
		Alarms/com						15.00
		Heavy Duty(CRKT)						2.00
		Circus/Carnv						25.00
		Alterations						5.00
		Fire Repairs						15.00
		E Lights						1.00
	1	E Generators					1	20.00 20
PANELS		Service	1	Remote		Main	1	4.00 4
TRANSFORMER		0-25 Kva						5.00
		25-200 Kva						8.00
		Over 200 Kva						10.00
							TOTAL AMOUNT DUE	
							40	
							MINIMUM FEE	
							25.00	
							MINIMUM FEE/COMMERCIAL 35.00	

INSPECTION: Will be ready \_\_\_\_\_ or will call  \_\_\_\_\_

Benjamin Douglass

CONTRACTORS NAME Douglass Elect MASTER LIC. # X2432  
 ADDRESS Box 158 - Standish ME LIMITED LIC. # \_\_\_\_\_  
 TELEPHONE 642-3118

SIGNATURE OF CONTRACTOR Benjamin R Douglass

**ELECTRICAL INSTALLATIONS**

INSPECTION: Service 5/6/07 by [Signature]  
 Service called in 5/7/07  
 Closing-in \_\_\_\_\_ by \_\_\_\_\_

Permit Number \_\_\_\_\_  
 Location \_\_\_\_\_  
 Owner \_\_\_\_\_  
 Date of Permit \_\_\_\_\_  
 Final Inspection 5/6/07  
 By Inspector [Signature]

PROGRESS INSPECTIONS:

<u>5/6/07</u>	<u>(SERIAL)</u>	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

DATE:	REMARKS:
<u>5/6/07</u>	<u>no grounding conductor from disconnect to panel</u>
<u>5/7/07</u>	<u>All OK</u>

SIGNATURE OF CONTRACTOR



**CITY OF PORTLAND, MAINE  
DEVELOPMENT REVIEW APPLICATION  
PLANNING DEPARTMENT PROCESSING FORM**

970122

I. D. Number

Applicant Atlantic Cellular Telephone Corp  
2002 Pisgah Church rd  
Greensboro, NC  
 Applicant's Mailing Address

22 January 1997  
 Application Date  
Cellular Telephon  
 Project Name/Description

Consultant/Agent Sebago Tech Charlie Brown  
 Applicant or Agent Daytime Telephone, Fax 856-0277

1340 Riverside St  
 Address of Proposed Site  
357-C-005  
 Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply):  New Building  Building Addition  Change of Use  Residential  
 Office  Retail  Manufacturing  Warehouse/Distribution  Other (specify) Monopole Tower  
86,582 Sq Ft  
 Proposed Building Square Feet or # of Units      Acreage of Site      Zoning I-M

**Check Review Required:**

- |   |  |  |  |
|---|--|--|--|
| <input checked="" type="checkbox"/> Site Plan (major/minor) | <input type="checkbox"/> Subdivision # of lots _____ | <input type="checkbox"/> PAD Review            | <input type="checkbox"/> 14-03 Streets Review    |
| <input type="checkbox"/> Flood Hazard                       | <input type="checkbox"/> Shoreland                   | <input type="checkbox"/> Historic Preservation | <input type="checkbox"/> DEP Local Certification |
| <input type="checkbox"/> Zoning Conditional Use (ZBA/PB)    | <input type="checkbox"/> Zoning Variance             | <input type="checkbox"/> Single-Family Minor   | <input type="checkbox"/> Other _____             |

Fees paid: site plan 300.00      subdivision \_\_\_\_\_

**Approval Status:**

Reviewer M. Lynn Schmitt

- Approved       Approved w/Conditions listed below       Denied

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Approval Date 3/21/97      Approval Expiration \_\_\_\_\_ date      Extension to \_\_\_\_\_ date       Additional Sheets Attached

Condition Compliance \_\_\_\_\_ signature \_\_\_\_\_ date

Performance Guarantee  Required\*       Not Required

\* No building permit may be issued until a performance guarantee has been submitted as indicated below

- |   |                      |                         |                       |
|---|----------------------|-------------------------|-----------------------|
| <input type="checkbox"/> Performance Guarantee Accepted | _____ date           | _____ amount            | _____ expiration date |
| <input type="checkbox"/> Inspection Fee Paid            | _____ date           | _____ amount            |                       |
| Performance Guarantee Reduced                           | _____ date           | _____ remaining balance | _____ signature       |
| Performance Guarantee Released                          | _____ date           | _____ signature         |                       |
| Defect Guarantee Submitted                              | _____ submitted date | _____ amount            | _____ expiration date |
| Defect Guarantee Released                               | _____ date           | _____ signature         |                       |

Address: 1340 Riverside St



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 Office  Retail  Manufacturing  Warehouse/Distribution  Other (specify) Monopole Tower  
86,582 Sq Ft I-M  
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**Approval Status:**

Reviewer [Signature]

- Approved       Approved w/Conditions listed below       Denied

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Approval Date 3/12/97 Approval Expiration \_\_\_\_\_ date      Extension to \_\_\_\_\_ date       Additional Sheets Attached

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**CITY OF PORTLAND, MAINE  
DEVELOPMENT REVIEW APPLICATION  
PLANNING DEPARTMENT PROCESSING FORM**

970122

I. D. Number

Atlantic Cellular Telephone Corp

22 January 1997

Applicant 2001 Flagah Church rd

Application Date Cellular Telephone

Applicant's Mailing Address Greensboro, NC

Project Name/Description

Consultant/Agent Sebago Tech Charlie Brown

Address of Proposed Site 1340 Riverside St 357-6-005

Applicant or Agent Daytime Telephone, Fax 834-0277

Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply):  New Building  Building Addition  Change of Use  Residential  
 Office  Retail  Manufacturing  Warehouse/Distribution  Other (specify) Monopole Tower

Proposed Building Square Feet or # of Units \_\_\_\_\_ Acreage of Site \_\_\_\_\_ Zoning \_\_\_\_\_

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Fees paid: site plan 300.00 subdivision \_\_\_\_\_

**Approval Status:**

Reviewer Kandis Taubert

- Approved  Approved w/Conditions listed below  Denied

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Approval Date 3/19/97 Approval Expiration 3/19/98 Extension to \_\_\_\_\_ date \_\_\_\_\_ date  Additional Sheets Attached

Condition Compliance \_\_\_\_\_ signature \_\_\_\_\_ date \_\_\_\_\_

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**Approval Status:**

Reviewer STEVE BUSHEY - DRC

- Approved       Approved w/Conditions listed below       Denied
1. per revised plans submitted on March 6, 1997
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Approval Date 3/14/97      Approval Expiration \_\_\_\_\_ date      Extension to \_\_\_\_\_ date       Additional Sheets Attached

Condition Compliance \_\_\_\_\_ signature \_\_\_\_\_ date

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Address: 1340 Riverside St

**DESIGN OF SPREAD FOOTING**

Tower Type & Height : 180 Ft. PIROD Monopole, Vanguard / Jerren Corp

Site : N. Portland, ME

MEI Job # : 97-113

**Defined Units and Constants**  
 $psf \equiv \frac{lb}{ft^2}$      $kip \equiv 1000 \cdot lb$      $kips \equiv 1000 \cdot lb$      $plf \equiv \frac{lb}{ft}$      $ft\_lb \equiv ft \cdot lb$      $ksi \equiv \frac{kip}{in^2}$   
 $ksf \equiv \frac{kip}{ft^2}$      $kcf \equiv \frac{kip}{ft^3}$      $ft\_K \equiv 1000 \cdot ft \cdot lb$      $cy \equiv ft^3 \cdot 27$      $psi \equiv \frac{lb}{in^2}$

REACTIONS ON THE FOUNDATION

Shear;                     $S := 30.2 \cdot kips$

Moment;                  $M := 3708.7 \cdot ft\_K$

Down load;              $P_v := 49.3 \cdot kips$

Uplift load;             $P_{up} := 0.0 \cdot kips$

SOIL PARAMETERS

Per soil report by HALEY & ALDRICH, INC. dated 02/28/97, #80593-001

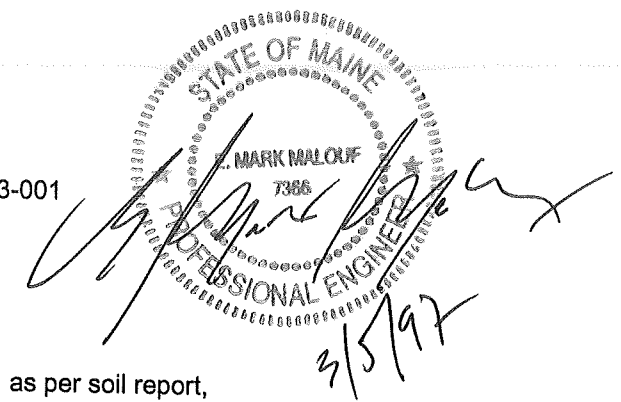
Allowable Bearing Capacity,             $Brg_{allw} := 3 \cdot ksf$

Passive Pressure,                         see below

Unit wt. of soil,                              $\gamma_s := 0.060 \cdot kcf$

Internal angle of friction for soil,       $\phi := 30 \cdot deg$     Str. backfill

Cohesion of soil,                            $c_u := 0.0 \cdot ksf$



as per soil report,

$$K_p := \tan\left(45 \cdot deg + \frac{\phi}{2}\right)^2$$

$$K_p = 3$$

MATERIAL PARAMETERS

Conforming to the design requirements as in ACI 318-89, 1992

Unit wt. of concrete,                      $\gamma_c := .150 \cdot kcf - 0.0624 \cdot kcf$

Concrete compressive strength,         $f_c := 3500 \cdot psi$

Rebar yield strength,                      $f_y := 60000 \cdot psi$

PRELIMINARY DIMENSIONS

Type of column, col.t=0 for circular,=1 for rectangular/square     $col_t := 0$     Anchor bolt vertical length             $L_{bolt} = 80 \cdot in$

Depth of footing,                          $D_f := 12 \cdot ft$                              Projected length of anchor bolt,  $L_{proj} := 8.5 \cdot in$

Extension above the grade,              $E_g := 0.5 \cdot ft$                              Anchor bolt dia.                          $d_{ac} = 1.25 \cdot in$

Ped diameter/size                          $Ped_s := 7 \cdot ft$                              No. of anchor bolts=                     $n = 52$

Thickness of footing,                      $T_f := 3 \cdot ft$                                   $B = L$                                           $L_{neg} = 3 \cdot ft$     Depth of soil neglected

Footing Dimensions, LxB                  $L := 24 \cdot ft$                                  Pier  $d_2 = 6.667 \cdot ft < Ped_s = 7 \cdot ft$                              **OK!**

Pole Anchor Bolt Template Dia.,         $TW1 := 67 \cdot in$                               $L_{bolt1} := L_{bolt} - L_{proj}$

Pier  $d_2 = TW1 + 6 \cdot in + 6 \cdot in + 1 \cdot in$                              length available                          $H_{ped} := (D_f + E_g - T_f)$                               $H_{ped} = 114 \cdot in > L_{bolt1} = 71.5 \cdot in$                              **OK!**

Template + 3"ea. side+ conc. clear+bar dia. ave

**CALCULATIONS**

**Design of footing size**

$$P_{ave} = \frac{(D_f - T_f - L_{neg}) \cdot K_p \cdot \gamma_s + (D_f - L_{neg}) \cdot K_p \cdot \gamma_s}{2} \quad P_{ave} = 1.35 \text{ ksf} \quad \text{average passive pressure on footing.}$$

Calculate safety against overturning and location of resultant on the base

**Resisting Moments**  $Area_{ped} := \text{if} \left( \cot \phi = 1, Ped_s^2, \frac{\pi}{4} \cdot Ped_s^2 \right) \quad Area_{ped} = 38.485 \cdot ft^2$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L \cdot B \cdot T_f \gamma_c + Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f)$ $C_w = 183.4 \cdot kips$	$L_c := \frac{L}{2}$ $L_c = 12 \cdot ft$	$R_c := C_w \cdot L_c$ $R_c = 2200.795 \cdot ft\_K$
2) Soil wt.	$S_w := [L \cdot B \cdot (D_f - T_f) - Area_{ped} \cdot (D_f - T_f)] \cdot \gamma_s$ $S_w = 290.258 \cdot kips$	$L_s := \frac{L}{2}$ $L_s = 12 \cdot ft$	$R_s := S_w \cdot L_s$ $R_s = 3483.1 \cdot ft\_K$
3) Wt. of soil wedge	$W_w := D_f \frac{1}{2} \cdot (D_f \tan(\phi)) \cdot B \cdot \gamma_s$ $W_w = 59.86 \cdot kips$	$L_w := \left( L + D_f \frac{\tan(\phi)}{3} \right)$ $L_w = 26.309 \cdot ft$	$R_w := W_w \cdot L_w$ $R_w = 1574.872 \cdot ft\_K$
4) Passive earth pressure	$Pe_p := T_f \cdot B \cdot P_{ave}$ $Pe_p = 97.2 \cdot kips$	$L_p := \frac{T_f}{3}$ $L_p = 1 \cdot ft$	$R_p := Pe_p \cdot L_p$ $R_p = 97.2 \cdot ft\_K$
5) Vertical load	$P_v = 49.3 \cdot kips$	$L_v := \frac{L}{2}$ $L_v = 12 \cdot ft$	$R_v := P_v \cdot L_v$ $R_v = 591.6 \cdot ft\_K$
	$S_{w1} := L \cdot B \cdot D_f \gamma_s$ $S_{w1} = 414.72 \cdot kips$ <--- for net calcs		

Total weight=  $T_w := C_w + P_v + S_w + W_w \quad T_w = 582.818 \cdot kips$

Total resisting Moment=  $M_r := R_c + R_s + R_w + R_p + R_v \quad M_r = 7947.568 \cdot ft\_K$

**Overturning Moments**

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation	-	-	$M = 3708.7 \cdot ft\_K$
2) Moment due to horizontal shear	$S = 30.2 \cdot kips$	$L_{hs} := D_f + E_g$ $L_{hs} = 12.5 \cdot ft$	$O_{hs} = L_{hs} \cdot S$ $O_{hs} = 377.5 \cdot ft\_K$
Total Overturning Moment=	$M_o := M + O_{hs}$	$M_o = 4086.2 \cdot ft\_K$	

Check Safety Factor against Overturning

$$SF = \frac{M_r}{M_o} \quad SF = 1.945 > 1.5 \quad \text{O.K!} \quad \text{Calculate eccentricity, } e = \frac{M_o}{T_w} \quad e = 7.011 \cdot \text{ft}$$

Check location of eccentricity and determine pressure distribution under the footing

$$L_{loc} = \frac{L}{6} \quad L_{loc} = 4 \cdot \text{ft} \quad \text{For net bearing calcs } T_{w1} := S_{w1} + W_w \quad T_{w1} = 474.58 \cdot \text{kips}$$

$$P_{max1} = \text{if} \left[ e \leq L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[ 1 + \left( 6 \cdot \frac{e}{L} \right) \right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)} \right] \quad P_{max1} = 3.245 \cdot \text{ksf} \quad \text{Gross soil pressure}$$

$$P_{max2} = \left( \frac{T_{w1}}{L \cdot B} \right) \quad P_{max2} = 0.824 \cdot \text{ksf} \quad \text{In-situ soil pressure} \quad P_{net} := P_{max1} - P_{max2} \quad P_{max} = P_{net}$$

$$\text{Net soil pressure, } P_{net} = 2.421 \cdot \text{ksf} < Brg_{allw} = 3 \cdot \text{ksf} \quad \text{O.K!}$$

$$P_{min} = \text{if} \left[ e \leq L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[ 1 - \left( 6 \cdot \frac{e}{L} \right) \right], 0 \cdot \text{ksf} \right] \quad P_{min} = 0 \cdot \text{ksf}$$

Check for horizontal shear

$$P_e p = 97.2 \cdot \text{kips} \quad S = 30.2 \cdot \text{kips}$$

Since  $P_e p > S$  it is safe!

Concrete Design Calculations

General Input parameters

$$\text{Concrete Cover, } cc = 3.0 \cdot \text{in}$$

Reduction factors as per respective ACI sections

$$\phi_{shear} = 0.85 \quad \text{as per ACI 9.3.2.3} \quad \text{Reinforced concrete load } RC_{fac} := 1.3$$

$$\phi_{compr} = 0.75 \quad \text{as per ACI 9.3.2.2} \quad \text{factor as per EIA 3.1.13}$$

$$\phi_{axten} = 0.9 \quad \text{as per ACI 9.3.2.2 a}$$

Check for wide beam or single shear in footing

Allowable shear stress in concrete for wide beam shear criteria=

$$v_{wide} = 2 \cdot \phi_{shear} \cdot \sqrt{f_c} \cdot \text{psi} \quad v_{wide} = 100.573 \cdot \text{psi}$$

$$\text{Effective depth of steel= } d := T_f - cc \quad d = 33 \cdot \text{in}$$

$$L_{eff} = \text{if} (e \leq L_{loc}, L, L - 2 \cdot e) \quad L_{eff} = 9.978 \cdot \text{ft}$$

Factor load by RCfac

$$P_{maxf} := P_{max} \cdot RC_{fac} \quad P_{minf} := P_{min} \cdot RC_{fac}$$

shear on the face of concrete=

$$\text{Shear}_{wide} := \left( \frac{L - Ped_s}{2} - d \right) \cdot B \cdot \left[ \frac{P_{maxf} + \left[ P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot \left( \frac{L - Ped_s}{2} - d \right) \right]}{2} \right] \quad \text{Shear}_{wide} = 309.201 \cdot \text{kips}$$

Area of concrete in shear=  $A_{shear} := B \cdot d$        $A_{shear} = 9504 \cdot \text{in}^2$

Shear stress acting on concrete face=  $v_{act} := \frac{\text{Shear wide}}{A_{shear}}$        $v_{act} = 32.534 \cdot \text{psi}$        $<$        $v_{wide} = 100.573 \cdot \text{psi}$       **O.K!**

Check for punching or two way shear in footing

Calculate allowable shear stress in concrete for punching/two way shear

$\beta := \frac{L}{B}$        $\beta = 1$        $v_{punch} := \text{if} \left[ \left( 2 + \frac{4}{\beta} \right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot \text{psi}} \leq 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot \text{psi}}, \left( 2 + \frac{4}{\beta} \right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot \text{psi}}, 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot \text{psi}} \right]$

$v_{punch} = 201.147 \cdot \text{psi}$

$\text{Area}_{col} := \text{if} \left[ \text{col}_t = 0, \frac{\pi}{4} \cdot (\text{Ped}_s + d)^2, (\text{Ped}_s + d)^2 \right]$

$P_{avg} := \frac{P_{maxf} + P_{minf}}{2}$

$\text{Peri}_{col} := \text{if} \left[ \text{col}_t = 0, 2 \cdot \pi \cdot \frac{\text{Ped}_s + d}{2}, 4 \cdot (\text{Ped}_s + d) \right]$

Factor vertical load

$P_{vf} := RC_{fac} \cdot P_v$

Shear stress acting on the concrete face=  $v_{act} := \frac{P_{vf} - \text{Area}_{col} \cdot P_{avg}}{\text{Peri}_{col} \cdot d}$        $v_{act} = -4.403 \cdot \text{psi}$        $<$        $v_{punch} = 201.147 \cdot \text{psi}$       **O.K!**

**Design of Pedestal Column**

Design pedestal steel

Effective diameter/size=  $D_{eff} := \text{Ped}_s - cc \cdot 2$        $D_{eff} = 78 \cdot \text{in}$        $h := \text{Ped}_s$        $h = 84 \cdot \text{in}$

$M_{col} := S \cdot (D_f - T_f + E_g) + M$        $M_{col} = 3995.6 \cdot \text{ft}_K$

Eccentricity for column=  $e_{col} := \frac{M_{col}}{P_v}$        $e_{col} = 972.56 \cdot \text{in}$

Factored vertical compression load for column=  $P_n = P_v \cdot \frac{RC_{fac}}{\phi_{compr}}$        $P_n = 85.453 \cdot \text{kips}$

$x = 0.212 \cdot h + 0.576 \cdot \left[ 0.393 \cdot h - \left( \frac{P_n}{0.85 \cdot f_c \cdot h} \right) \right]$        $x = 36.626 \cdot \text{in}$

Area of steel required is given by

$A_{st_{col}} = \frac{P_n \cdot (e_{col} - x)}{0.4 \cdot f_y \cdot 0.75 \cdot D_{eff}}$        $A_{st_{col}} = 56.965 \cdot \text{in}^2$       **Moment and Compression requirement**

Minimum area of steel required as per ACI 10.8.4 & 10.9.1

$A_{st_{mincol}} = 0.005 \cdot \frac{\pi}{4} \cdot h^2$        $A_{st_{mincol}} = 27.709 \cdot \text{in}^2$

$A_{st_{coluse}} := \text{if}(A_{st_{col}} > A_{st_{mincol}}, A_{st_{col}}, A_{st_{mincol}})$        $A_{st_{coluse}} = 56.965 \cdot \text{in}^2$

$No = (0 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \ 11 \ 12 \ 13 \ 14 \ 15 \ 16 \ 17 \ 18)^T$

$d_b = (0 \ 0 \ 0 \ 0.375 \ 0.5 \ 0.625 \ 0.75 \ 0.875 \ 1.00 \ 1.128 \ 1.27 \ 1.41 \ 0 \ 0 \ 1.693 \ 0 \ 0 \ 0 \ 2.257)^T \cdot \text{in}$

$A_b = (0 \ 0 \ 0 \ 0.11 \ 0.20 \ 0.31 \ 0.44 \ 0.60 \ 0.79 \ 1.00 \ 1.27 \ 1.56 \ 0 \ 0 \ 2.25 \ 0 \ 0 \ 0 \ 4.00)^T \cdot \text{in}^2$

Use bar size,  $k = 11$        $k = 11$        $Lg_{bar} := No_k$        $d_{b_k} = 1.41 \cdot \text{in}$        $d_{bardia} := d_{b_k}$

Bar area=  $Lg_{abbar} := A_{b_k}$        $Lg_{abbar} = 1.56 \cdot \text{in}^2$        $Lg_{dia} := d_{b_k}$

Number of bars required=  $NLg_{bars} := \frac{A_{st_{coluse}}}{Lg_{abbar}}$        $NLg_{bars} = 36.516$        $NLg_{bars} = 38$

Use 38 # 11 vertical bars

Check pedestal in compression

Allowable compressive load on column ACI 10.15=  $P_{comp} := \phi_{compr} \cdot 0.85 \cdot f_c \cdot Area_{ped}$   
 $P_{comp} = 12365.073 \cdot kips$   
 $P_{comp} = 12365.073 \cdot kips > P_v = 49.3 \cdot kips \quad \mathbf{O.K!}$

Design of lateral ties for the pedestal

Tie bar size to be used=  $Tie_{bar} := 5$

Tie bar diameter=  $Tie_{dia} := \frac{Tie_{bar} \cdot in}{8} \quad Tie_{dia} = 0.625 \cdot in$

For seismic zones 0 and 1

$Tie_{spac1} := if(16 \cdot Lg_{dia} > 48 \cdot Tie_{dia}, 48 \cdot Tie_{dia}, 16 \cdot Lg_{dia})$

$Tie_{spac1} := if(Tie_{spac1} > Ped_s \cdot 12, Ped_s \cdot 12, Tie_{spac1})$

$Tie_{spac1} = 22.56 \cdot in$

For seismic zones 2, 3 and 4

$Tie_{spac2} := if(8 \cdot Lg_{dia} > 24 \cdot Tie_{dia}, 24 \cdot Tie_{dia}, 8 \cdot Lg_{dia})$

$Tie_{spac2} := if(Tie_{spac2} > 0.5 \cdot Ped_s, 0.5 \cdot Ped_s, Tie_{spac2})$

$Tie_{spac2} = 11.28 \cdot in \quad Tie_{spuse} = 12 \cdot in$

Use #4 ties @ 3" O.C at top and bot. and 12" O.C. over complete pedestal length.

Check for development length for longitudinal pedestal reinforcement

Development length requirement in tension ACI 12.2

$L_{dt} := .04 \cdot Lg_{abar} \cdot \frac{f_y}{\sqrt{f_c \cdot psi}} \cdot \frac{1}{in} \quad L_{dt} = 63.285 \cdot in$

Bar spacing in pedestal=  $B_{sp} := D_{eff} \frac{\pi}{NLg_{bars}} - Lg_{dia} \quad B_{sp} = 5.039 \cdot in$

Factor for concrete cover and clear space ACI 12.2.3.1

$2 \cdot Lg_{dia} = 2.82 \cdot in, 3 \cdot Lg_{dia} = 4.23 \cdot in$

$L_{dt} := if(cc \geq 2 \cdot Lg_{dia}, (B_{sp} \geq 3 \cdot Lg_{dia}), L_{dt}, 2 \cdot L_{dt}) \quad L_{dt} = 63.285 \cdot in$

Reduction for concrete cover and clear space ACI 12.2.3.4

$2.5 \cdot Lg_{dia} = 3.525 \cdot in, 5 \cdot Lg_{dia} = 7.05 \cdot in$

$L_{dt} := if(cc \geq 2.5 \cdot Lg_{dia}, (B_{sp} \geq 5 \cdot Lg_{dia}), 0.8 \cdot L_{dt}, 1.0 \cdot L_{dt}) \quad L_{dt} = 63.285 \cdot in$

Minimum development length in tension

$L_{dmint} = 0.03 \cdot Lg_{dia} \cdot \frac{f_y}{\sqrt{f_c \cdot psi}} \quad L_{dmint} = 42.9 \cdot in$

$L_{dt} := if(L_{dt} \leq L_{dmint}, L_{dmint}, L_{dt}) \quad L_{dt} = 63.285 \cdot in$

$L_{dt} := if(L_{dt} < 12 \cdot in, 12 \cdot in, L_{dt}) \quad L_{dt} = 63.285 \cdot in$

**Development Length requirement in compression ACI 12.3**

$$L_{dc} = 0.02 \cdot L_g \cdot dia \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \quad L_{dc} = 28.6 \cdot \text{in}$$

Minimum develop length in compression

$$L_{dminc} = 0.0003 \cdot L_g \cdot dia \cdot f_y \cdot \frac{1}{\text{psi}} \quad L_{dminc} = 25.38 \cdot \text{in}$$

$$L_{dc} = \text{if}(L_{dc} \leq L_{dminc}, L_{dminc}, L_{dc}) \quad L_{dc} = 28.6 \cdot \text{in}$$

$$L_{dc} = \text{if}(L_{dc} \leq 8 \cdot \text{in}, 8 \cdot \text{in}, L_{dc}) \quad L_{dc} = 28.6 \cdot \text{in}$$

Development length available in pedestal

$$L_{ped} = D_f + E_g - T_{f-cc}$$

$$L_{ped} = 111 \cdot \text{in} > L_{dt} = 63.285 \cdot \text{in} \quad \text{Tension O.K!}$$

$$L_{ped} = 111 \cdot \text{in} > L_{dc} = 28.6 \cdot \text{in} \quad \text{Compression O.K!}$$

Development Length available in footing

$$L_{foot} = T_{f-cc}$$

$$L_{foot} = 33 \cdot \text{in} < L_{dt} = 63.285 \cdot \text{in} \quad \text{Tension N.G!} \quad \text{bend bars at end}$$

$$L_{foot} = 33 \cdot \text{in} > L_{dc} = 28.6 \cdot \text{in} \quad \text{Compression OK!}$$

Basic Development length required for a hooked bar ACI 12.5.2

$$L_{hb} = 1200 \cdot \frac{L_g \cdot dia}{\sqrt{f_c \cdot \text{psi}}} \cdot (\text{psi}) \quad L_{hb} = 28.6 \cdot \text{in}$$

Applicable reduction factor as per ACI 12.5.3

$$L_{hb} = L_{hb} \cdot 0.7 \quad L_{hb} = 20.02 \cdot \text{in}$$

Check for minimum hook length as per ACI 12.5.1

$$L_{hb} = 20.02 \cdot \text{in} > 8 \cdot L_g \cdot dia = 11.28 \cdot \text{in} \quad \text{in.} \quad \text{O.K!}$$

$$L_{hb} = 20.02 \cdot \text{in} > 6 \quad \text{in.} \quad \text{O.K!}$$

**Design of footing**

$$\phi_{bend} = 0.9 \quad \text{ACI 9.3.2.2}$$

$$\beta_1 = \text{if} \left[ f_c \leq 4000 \cdot \text{psi}, 0.85, \text{if} \left[ f_c \geq 8000 \cdot \text{psi}, 0.65, 0.85 - \left( \frac{f_c}{\text{psi}} - 4000 \right) \cdot 0.05 \right] \right] \quad \text{ACI 10.2.7.3}$$

$$B_{mo} = \frac{(L - Ped_s)^2}{8} \cdot B \cdot \left[ \frac{P_{maxf} + \left[ P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot \left( \frac{L - Ped_s}{2} \right) \right]}{2} \right] \cdot RC_{fac}$$

$$B_{mo} = 2036.491 \cdot \text{ft}_K \quad B_{mo1} = M_o \cdot RC_{fac} \quad B_{mo1} = 5312.06 \cdot \text{ft}_K$$

$$B_{mo} = \text{if}(B_{mo} > B_{mo1}, B_{mo}, B_{mo1}) \quad B_{mo} = 5312.06 \cdot \text{ft}_K$$

required  $R_u$

$$R_u = \frac{B_{mo}}{\phi_{bend} \cdot B \cdot d^2} \quad R_u = 225.83 \cdot \text{psi} \quad m = \frac{f_y}{\beta_1 \cdot f_c} \quad m = 20.168$$

required  $\rho = \frac{1}{m} \left( 1 - \sqrt{1 - \frac{2 \cdot m \cdot R_u}{f_y}} \right) \quad \rho = 0.004$

required area of steel for footing=

$A_{st_f} = \rho \cdot B \cdot d \quad A_{st_f} = 37.243 \cdot \text{in}^2 \quad A_{st_{minf}} = .0018 \cdot B \cdot T_f \quad A_{st_{minf}} = 18.662 \cdot \text{in}^2 \quad \text{per ACI 10.5.3 \& 7.12}$

$A_{st_{fuse}} = \text{if}(A_{st_f} > A_{st_{minf}}, A_{st_f}, A_{st_{minf}}) \quad A_{st_{fuse}} = 37.243 \cdot \text{in}^2$

$N_o = (0 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \ 11 \ 12 \ 13 \ 14 \ 15 \ 16 \ 17 \ 18)^T$

$d_b = (0 \ 0 \ 0 \ 0.375 \ 0.5 \ 0.625 \ 0.75 \ 0.875 \ 1.00 \ 1.128 \ 1.27 \ 1.41 \ 0 \ 0 \ 1.693 \ 0 \ 0 \ 0 \ 2.257)^T \cdot \text{in}$

$A_b = (0 \ 0 \ 0 \ 0.11 \ 0.20 \ 0.31 \ 0.44 \ 0.60 \ 0.79 \ 1.00 \ 1.27 \ 1.56 \ 0 \ 0 \ 2.25 \ 0 \ 0 \ 0 \ 4.00)^T \cdot \text{in}^2$

Use bar size,  $m_k = 10 \quad m_k = 10 \quad f_{bar} = N_{o_{m_k}} \quad d_{b_{m_k}} = 1.27 \cdot \text{in} \quad d_{bar_{dia}} = d_{b_{m_k}}$

Bar area=  $f_{abar} = A_{b_{m_k}} \quad f_{abar} = 1.27 \cdot \text{in}^2 \quad f_{dia} = d_{b_{m_k}}$

Number of bars required=  $Nf_{bars} = \frac{A_{st_{fuse}}}{f_{abar}} \quad Nf_{bars} = 29.325 \quad Nf_{bars} = 31$

Provide 31 #10 bars each way at the top and bottom of the footing

Check for development length for footing reinforcement

Development length requirement in tension ACI 12.2

$L_{dt} = .04 \cdot f_{abar} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{1}{\text{in}} \quad L_{dt} = 51.521 \cdot \text{in}$

Bar spacing in footing=  $B_{sp} = \frac{B - 2 \cdot cc}{Nf_{bars} - 1} \cdot f_{dia} \quad B_{sp} = 8.13 \cdot \text{in}$

Factor for concrete cover and clear space ACI 12.2.3.1

$2 \cdot f_{dia} = 2.54 \cdot \text{in} \quad 3 \cdot f_{dia} = 3.81 \cdot \text{in}$

$L_{dt} = \text{if}[(cc \geq 2 \cdot f_{dia}) \cdot (B_{sp} \geq 3 \cdot f_{dia}), L_{dt}, 2 \cdot L_{dt}] \quad L_{dt} = 51.521 \cdot \text{in}$

Reduction for concrete cover and clear space ACI 12.2.3.4

$2.5 \cdot f_{dia} = 3.175 \cdot \text{in} \quad 5 \cdot f_{dia} = 6.35 \cdot \text{in}$

$L_{dt} = \text{if}[(cc \geq 2.5 \cdot f_{dia}) \cdot (B_{sp} \geq 5 \cdot f_{dia}), 0.8 \cdot L_{dt}, 1.0 \cdot L_{dt}] \quad L_{dt} = 51.521 \cdot \text{in}$

Minimum development length in tension

$L_{dmint} = 0.03 \cdot f_{dia} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \quad L_{dmint} = 38.64 \cdot \text{in}$

$L_{dt} = \text{if}(L_{dt} \leq L_{dmint}, L_{dmint}, L_{dt}) \quad L_{dt} = 51.521 \cdot \text{in}$

$L_{dt} = \text{if}(L_{dt} < 12 \cdot \text{in}, 12 \cdot \text{in}, L_{dt}) \quad L_{dt} = 51.521 \cdot \text{in}$

Length available in footing=  $L_{pad} = \frac{(L - Ped_s)}{2} - cc \quad L_{pad} = 99 \cdot \text{in}$

$L_{pad} = 99 \cdot \text{in} \quad > \quad L_{dt} = 51.521 \cdot \text{in} \quad \text{O.K!}$



**Summary**

**Pedestal:**

Size : Ped<sub>s</sub> = 7•ft diameter  
 Height of pedestal:  $H_{ped} := (D_f + E_g - T_f)$       $H_{ped} = 9.5 \cdot ft$   
 Anchor bolt dia./size,      $d_{ac} = 1.25 \cdot in$      Anchor bolt length,      $L_{bolt} = 80 \cdot in$   
 Anchor bolt circle dia.     TW1 = 67•in     Anchor bolt projection,      $L_{proj} = 8.5 \cdot in$

**Reinforcement:**

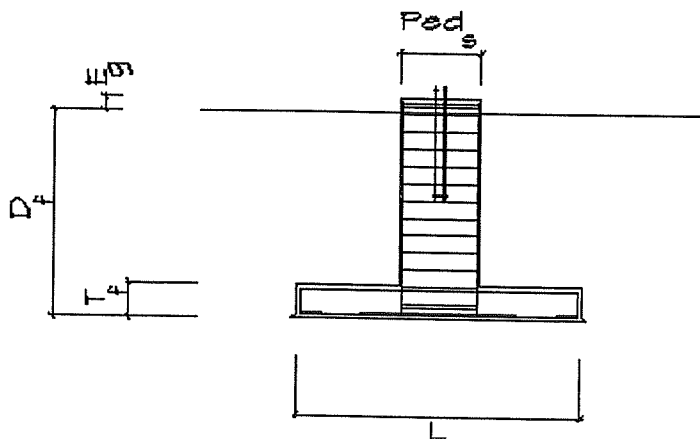
Size of vertical bar=      $L_{g\ bar} = 11$      Number of vertical bars=      $N_{Lg\ bars} = 38$   
 Vertical bar length,      $L_v := D_f + E_g - 2 \cdot cc - 1.0 \cdot in$       $L_v = 11.917 \cdot ft$       $L_v = 143 \cdot in$   
 Horizontal bar length,      $15 \cdot L_{g\ dia} = 21.15 \cdot in$      Provide 22"  
 Tie bar size=      $Tie_{bar} = 5$      Spacing of tie bars at top and bot, 2 spaces      $Tie_{sptb} = 3 \cdot in$      Spacing of tie bars for remaining portion of pedestal      $Tie_{spuse} = 12 \cdot in$   
 Total no of tie bars,      $Tie_{to} := \left( \text{ceil} \left( \frac{L_v - 4 \cdot Tie_{sptb}}{Tie_{spuse}} \right) + 1 \right) + 2 \cdot 2$       $Tie_{to} = 16$

**Footing/pad:**

Size LxB=      $L = 24 \cdot ft$       $X$       $B = 24 \cdot ft$      Thickness of footing/pad:  $T_f = 3 \cdot ft$      Depth of footing/pad:  $D_f = 12 \cdot ft$

**Reinforcement:**

Bars at top of footing each way  
 Size of bar:      $f_{bar1} := 9$      Number of bars:  $N_{f\ bars} = 31$   
 Bars at bot. of footing each way  
 Size of bar:      $f_{bar} = 10$      Number of bars:  $N_{f\ bars} = 31$   
 Volume of concrete:  
 $V_{conc} := \text{Area}_{ped} \cdot (D_f + E_g - T_f) + L \cdot B \cdot T_f$       $V_{conc} = 77.541 \cdot cy$   
 Total no. of bars at top of pad,      $N_{f\ total} := N_{f\ bars} \cdot 2$       $N_{f\ total} = 62$   
 Total no. of bars at bot. of pad,      $N_{f\ total} := N_{f\ bars} \cdot 2$       $N_{f\ total} = 62$



TYPICAL SPREAD FOOTING

NORTH PORTLAND SWITCH: 96369

PROJECT COSTS FOR BUILD-OUT:

FOUNDATIONS = \$ 25,000.00

BUILDING = \$ 28,000.00

TOWER = \$ 68,000.00

TOTAL = \$ 121,000.00

**SEBAGO TECHNICS, INC.**

12 Westbrook Common  
P.O. Box 1339  
WESTBROOK, ME 04098-1339

**LETTER OF TRANSMITTAL**

Phone (207) 856-0277 FAX (207) 856-2206

TO CITY OF PORTLAND

DATE	3/20/97	JOB NO.	96369
ATTENTION	CODE ENFORCEMENT		
RE:	NORTH PORTLAND CELLULAR TELEPHONE SWITCHING FACILITY PORTLAND, MAINE		

WE ARE SENDING YOU  Attached  Under separate cover via \_\_\_\_\_ the following items:

- Shop drawings     Prints     Plans     Samples     Specifications  
 Copy of letter     Change order     \_\_\_\_\_

COPIES	DATE	NO.	DESCRIPTION
2			MONOPOLE FOUNDATION DESIGN
2			SWITCHING BLDG FOUNDATION DESIGN
2			MONOPOLE DESIGN
2			SWITCHING BLDG. DESIGN
1			APPLICATION FEE

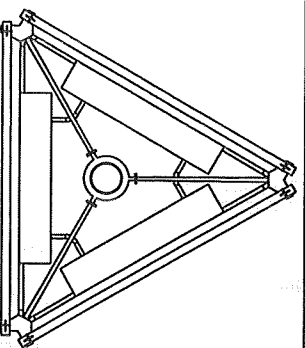
THESE ARE TRANSMITTED as checked below:

- For approval     Approved as submitted     Resubmit \_\_\_\_\_ copies for approval  
 For your use     Approved as noted     Submit \_\_\_\_\_ copies for distribution  
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 FOR BIDS DUE \_\_\_\_\_ 19 \_\_\_\_\_     PRINTS RETURNED AFTER LOAN TO US

REMARKS HAND DELIVERED

COPY TO \_\_\_\_\_

SIGNED: Mark L. Blaise



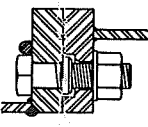
ROTATABLE TOP - TOP VIEW

MONOPOLE SECTION DATA				(ALL BOLTS ARE FOR BOTTOM OF SECTION)					
SECTION			CONNECT BOLT		PILOT BOLT				
LENGTH	PART#	SIZE WALL	WT. *	DIAM	LENGTH	#	DIAM	LENGTH	#
2'-6"	121999	18"	N/A	2203#	1"	4-1/2"	8		
17'-6"	126252	24"	.375"	1949#	1"	4-1/2"	17	1"	5"
20'	126057	30"	.375"	2747#	1"	4-1/2"	21	1"	5"
20'	126058	36"	.375"	3290#	1"	5"	25	1"	6"
20'	126059	42"	.375"	3833#	1"	5"	29	1"	6"
20'	126060	48"	.375"	4376#	1"	5"	33	1"	6"
20'	126061	54"	.375"	4918#	1"	5"	45	1"	6"
20'	126310	60"	.375"	5701#	1-1/4"	4-1/2"	64		
20'	126313	60"	.500"	7779#	1-1/4"	4-1/2"	64		
20'	126309	60"	.500"	7779#					

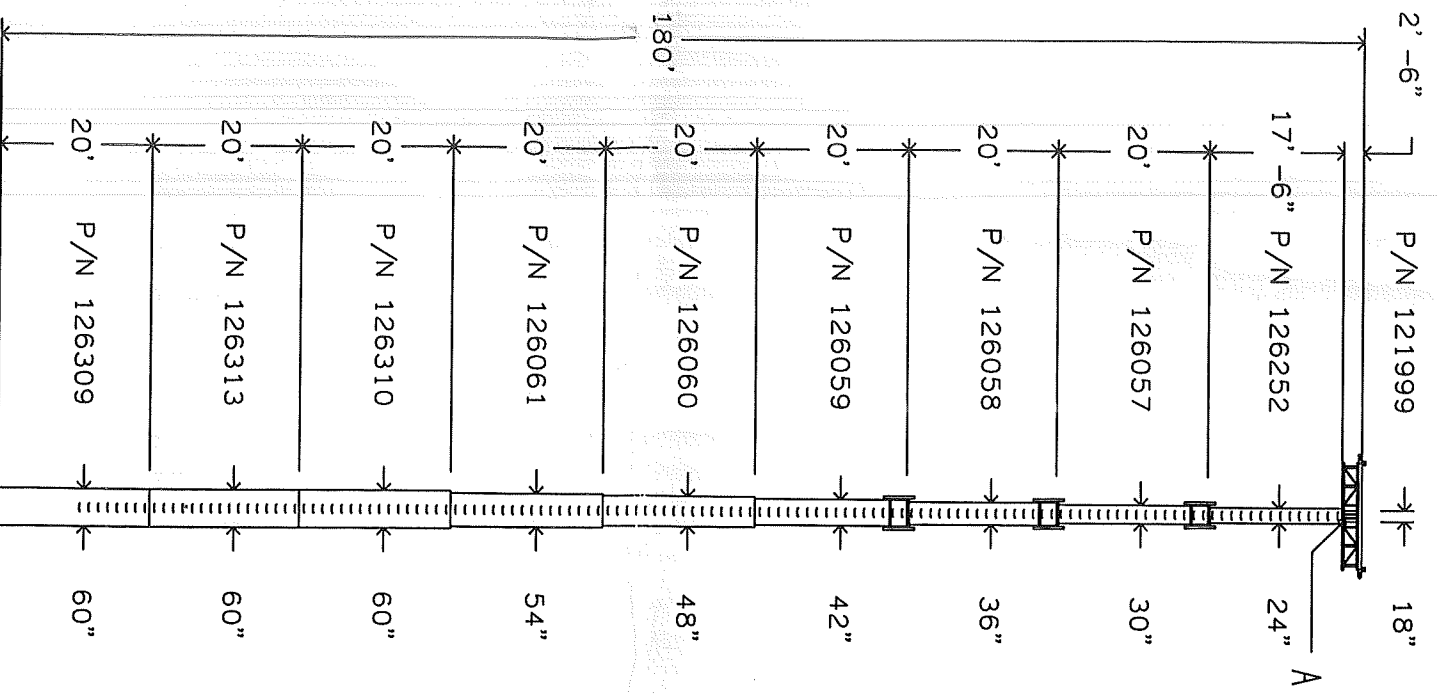
\*THE WEIGHTS LISTED ARE THEORETICAL. THE ACTUAL WEIGHTS WILL VARY. ALL WEIGHTS SHOULD BE CONFIRMED IN THE FIELD PRIOR TO ERECTION.

TOP 2'-6" CONSISTS OF ROTATABLE TOP ASSEMBLY. SEE DWG # 122761-B FOR INSTALLATION DETAILS.

ALL CONNECTIONS ARE A-325 BOLTS SEE TABLE ABOVE FOR SIZE & QTY.



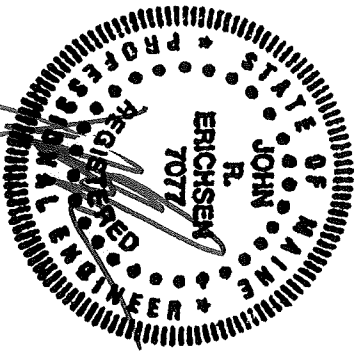
TYPICAL FLUSH FLANGE CONNECTION  
VIEW A



SEE PAGE 2 OF THIS DRAWING FOR OPENING INFORMATION.

SEE PAGE 4 OF THIS DRAWING FOR CONNECTION BOLT TIGHTENING SPECIFICATIONS.

REMOVABLE CLIMBING RUNGS.



VANGUARD CELLULAR SYSTEMS  
N. PORTLAND, MAINE  
MP60 X 180' ASSEMBLY DRAWING

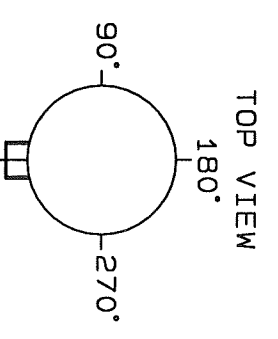
APPROVED/ENG. KMD 03/05/1997  
APPROVED/FOUND. N/A  
DRAWN BY RCH  
1545 Pidco Dr.  
Plymouth, IN 46563-0128  
219-936-4221

A	REVISED EIA/TIA-222-E TO EIA/TIA-222-F	RCH	03/05/1997
REV	DESCRIPTION OF REVISIONS	INI	DATE

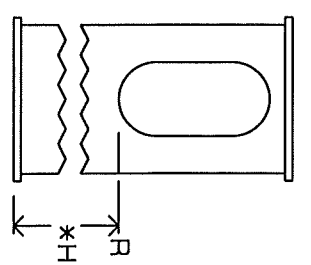
ENG. FILE NO. A-113355-ARCHIVE  
DRAWING NO. 202340-B  
PAGE 1 OF 6

OPENINGS & BRACKETS WELDED TO POLE

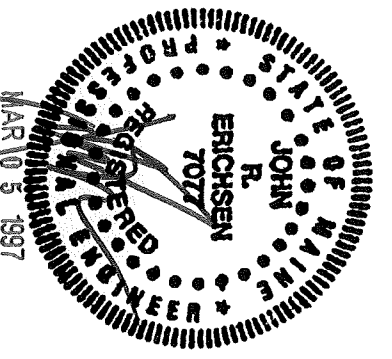
HEIGHT *H	TYP	DESCRIPTION	ANGL	ASSEMBLY DRAWING#
176'-5"	13	SAFETY CLIMB BRACKET	0°	
154'-9"	9	4" X 6" PORTHOLE EXITTING UP	90°	
154'-9"	9	4" X 6" PORTHOLE EXITTING UP	270°	
134'-9"	9	4" X 6" PORTHOLE EXITTING UP	90°	
134'-9"	9	4" X 6" PORTHOLE EXITTING UP	270°	
114'-9"	9	4" X 6" PORTHOLE EXITTING UP	90°	
114'-9"	9	4" X 6" PORTHOLE EXITTING UP	270°	
9'-8"	8	TRANS. LINE BRIDGE ATTACH BRACKET	270°	
9'-6"	13	SAFETY CLIMB BRACKET	0°	
7'-4"	2	10" X 25" OVAL PORTHOLE	270°	
6'-9"	7	GROUNDING PLATE	270°	
1'-6"	2	10" X 25" OVAL PORTHOLE	180°	



CLIMBING RUNGS  
 THE ANGLE TO THE OPENING IS  
 MEASURED CLOCKWISE FROM THE  
 CENTER-LINE OF THE CLIMBING  
 RUNGS WHEN LOOKING DOWN



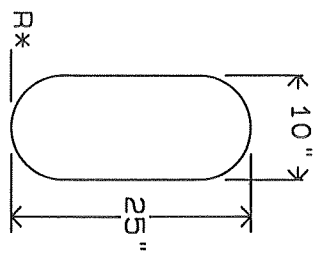
\* THE HEIGHT IN THE TABLE IS  
 THE DISTANCE FROM THE BASE OF  
 THE BOTTOM SECTION OF THE MONO  
 POLE TO THE OPENING REFERENCE  
 POINT "R" AS SPECIFIED ON PAGE  
 3 FOR THAT OPENING TYPE.



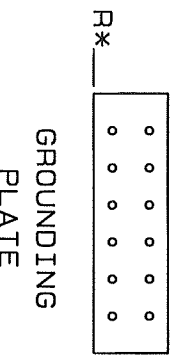
VANGUARD CELLULAR SYSTEMS  
 N. PORTLAND, MAINE  
 MP60 X 180' OPENINGS

APPROVED/ENG.	KMD	03/05/1997
APPROVED/FOUND.	N/A	
DRAWN BY	RCH	

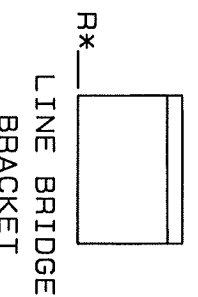
**PRUD'OM**  
 1545 Pidco Dr.  
 Plymouth, IN 46563-0128  
 219-936-4221



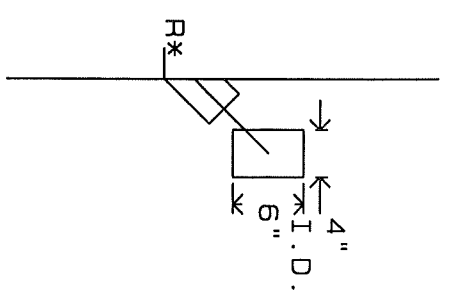
TYPE 2  
OPENING



GROUNDING  
PLATE

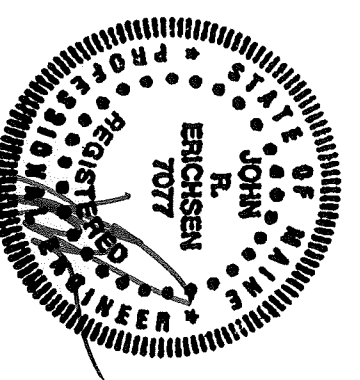


LINE BRIDGE  
BRACKET



TYPE 9  
OPENING

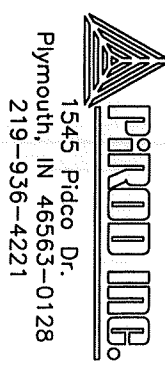
SAFETY CLIMB BRACKET



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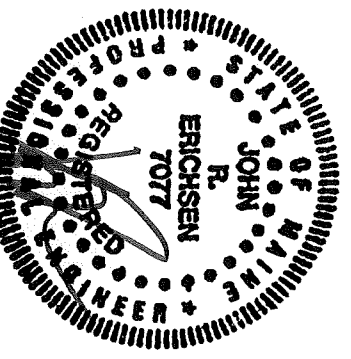
VANGUARD CELLULAR SYSTEMS  
N. PORTLAND, MAINE  
MP60 X 180' OPENINGS

APPROVED/ENG.	KMD	03/05/1997
APPROVED/FOUND.	N/A	
DRAWN BY	RCH	



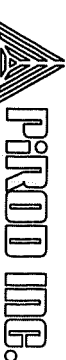
GENERAL NOTES

1. TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH NO ICE. TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH .50" RADIAL ICE WITH LOAD DUE TO WIND REDUCED BY 25% WHEN CONSIDERED SIMULTANEOUSLY WITH ICE.
2. MATERIAL: (A) SOLID RODS CONFORM TO ASTM A-572 GRADE 50 REQUIREMENTS.  
 (B) ANGLES CONFORM TO ASTM A-36 REQUIREMENTS.  
 (C) PIPE CONFORMS TO ASTM A-53 TYPE E, GRADE B REQUIREMENTS. (MIN YIELD STRENGTH=42 KSI)  
 (D) ALL STEEL PLATES CONFORM TO ASTM A-36 REQUIREMENTS.
3. BASE REACTIONS PER EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH NO ICE.  
 TOTAL WEIGHT= 49.3 KIPS.  
 MOMENT= 3708.7 KIP-FT.  
 MAXIMUM SHEAR= 30.2 KIPS TOTAL.
4. BASE REACTIONS PER EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH .50" RADIAL ICE WITH LOAD DUE TO WIND REDUCED BY 25% WHEN CONSIDERED SIMULTANEOUSLY WITH ICE:  
 TOTAL WEIGHT= 56.6 KIPS.  
 MOMENT= 2923.4 KIP-FT.  
 MAXIMUM SHEAR= 23.4 KIPS TOTAL.
5. FINISH: HOT DIPPED GALVANIZED AFTER FABRICATION.
6. ANTENNAS: TOP (12) ALP9212 WITH 7/8" LINES MOUNTED ON A ROTATABLE PLATFORM. (FUTURE)  
 TOP (6) PD10017 WITH 7/8" LINES MOUNTED ON A ROTATABLE PLATFORM. (FUTURE)  
 160' (2) 6' HIGH PERFORMANCE DISHES (6 GHz) WITH EW52 LINES.  
 140' (2) 6' HIGH PERFORMANCE DISHES (6 GHz) WITH EW52 LINES.  
 120' (2) 6' HIGH PERFORMANCE DISHES (6 GHz) WITH EW52 LINES.
7. INSTALL BASE SECTION WITH MINIMUM OF 2" CLEARANCE ABOVE CONCRETE.
8. MIN. WELDS 5/16" UNLESS OTHERWISE SPECIFIED. ALL WELDING TO CONFORM TO AWS SPECIFICATIONS.
9. ALL BOLTS MUST BE IN PLACE WITH JAM NUTS PRIOR TO ERECTION OF THE STRUCTURE. ALL BOLTS AND NUTS MUST BE IN PLACE AND TIGHTENED BEFORE THE ADJOINING SECTION(S) ARE PLACED.
10. ALL A-325 BOLTS SHALL BE PRE-TENSIONED PER AISC SPECIFICATIONS. REFER TO DRAWING # 123107-B ("BOLT PRE-TENSIONING GUIDELINES".)
11. EIA GROUNDING FOR TOWER.
12. OUTSIDE CLIMB RUNGS WITH SAFETY CLIMB.



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VANGUARD CELLULAR SYSTEMS  
 N. PORTLAND, MAINE  
 MP60 X 180' NOTES



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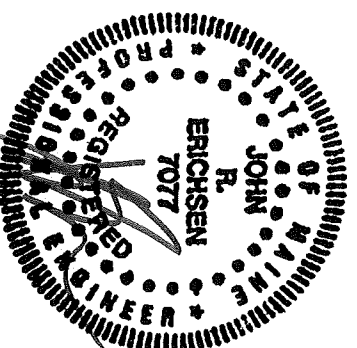
APPROVED/ENG.		KWD	03/05/1997
APPROVED/FOUND.		N/A	
DRAWN BY		RCH	
ENG. FILE NO.		A-113355-ARCHIVE	
DRAWING NO.		202340-B	
PAGE		4 OF 6	

A	REVISED EIA/TIA-222-E TO EIA/TIA-222-F	RCH	03/05/1997
REV	DESCRIPTION OF REVISIONS	INI	DATE

From: 63996.DFT - 02/28/97 14:27 > 2023404A.DWG \* 03/05/97 13:35  
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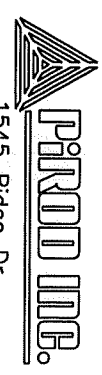
1. FOUNDATION DESIGN BY OTHERS.

FOUNDATION NOTES



MAR 05 1997

VANGUARD CELLULAR SYSTEMS  
N. PORTLAND, MAINE  
MP60 X 180' NOTES



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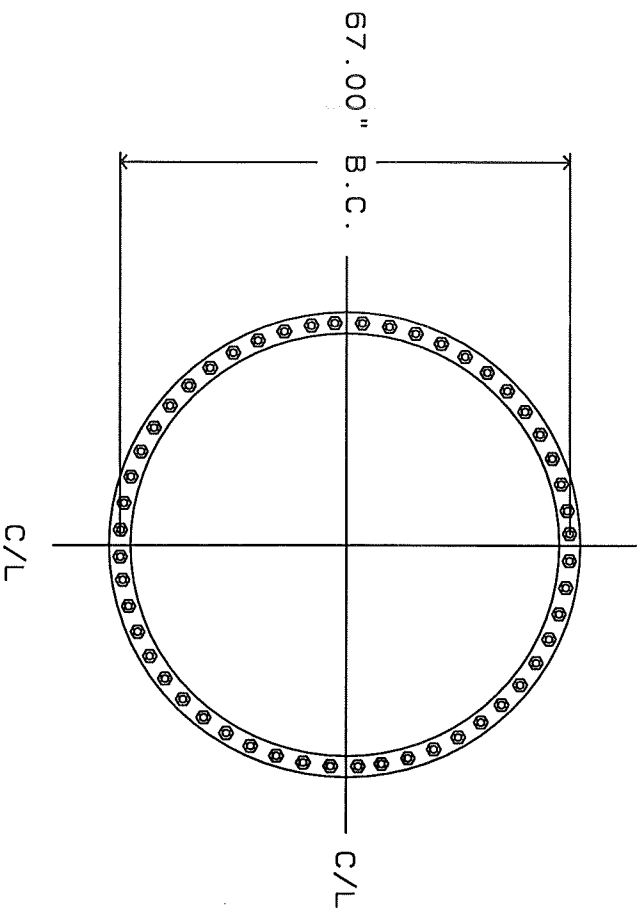
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ARCHIVE Q-63996

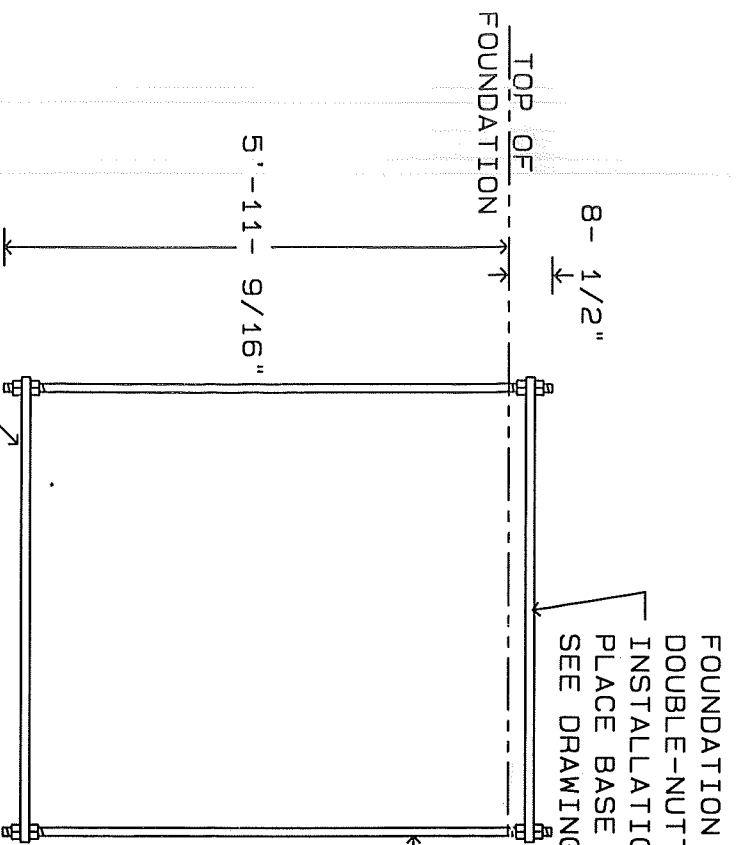
DRAWING NO. 202340-B  
PAGE 5 OF 6



BASE FLANGE MUST BE CENTERED IN PIER WITHIN +/- 10% OF PIER DIAMETER.



GROUTING OF MONOPOLE BASE IS OPTIONAL. IF GROUT IS USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF POLE.

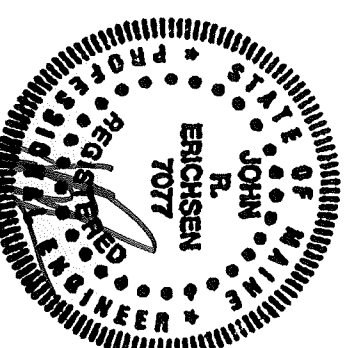


FOUNDATION PLATE P/N 125220 MUST BE SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS DURING CONCRETE INSTALLATION AND MUST BE LEVEL +/- 1/8". PLACE BASE FLANGE AS DEPICTED ABOVE. SEE DRAWING #118492-B.

ANCHOR BOLT P/N 109881 - 52 REQUIRED  
 ← DIAMETER= 1.25" COLOR CODE= PINK/WHITE  
 INSTALL WITH 8.5" OF THREADS EXPOSED.

PLATE P/N 125220 SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS USED AS EMBEDMENT PLATE IN CONCRETE.

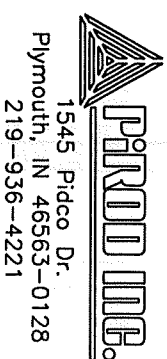
TOWER ANCHOR STEEL PLACEMENT

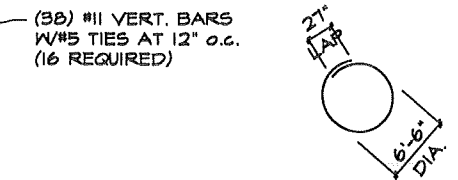
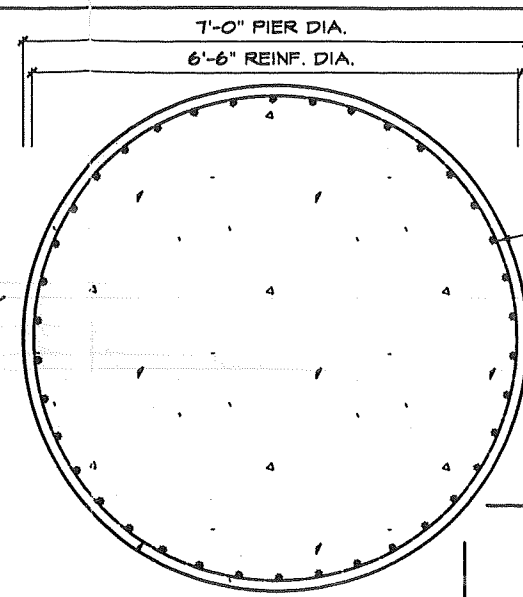
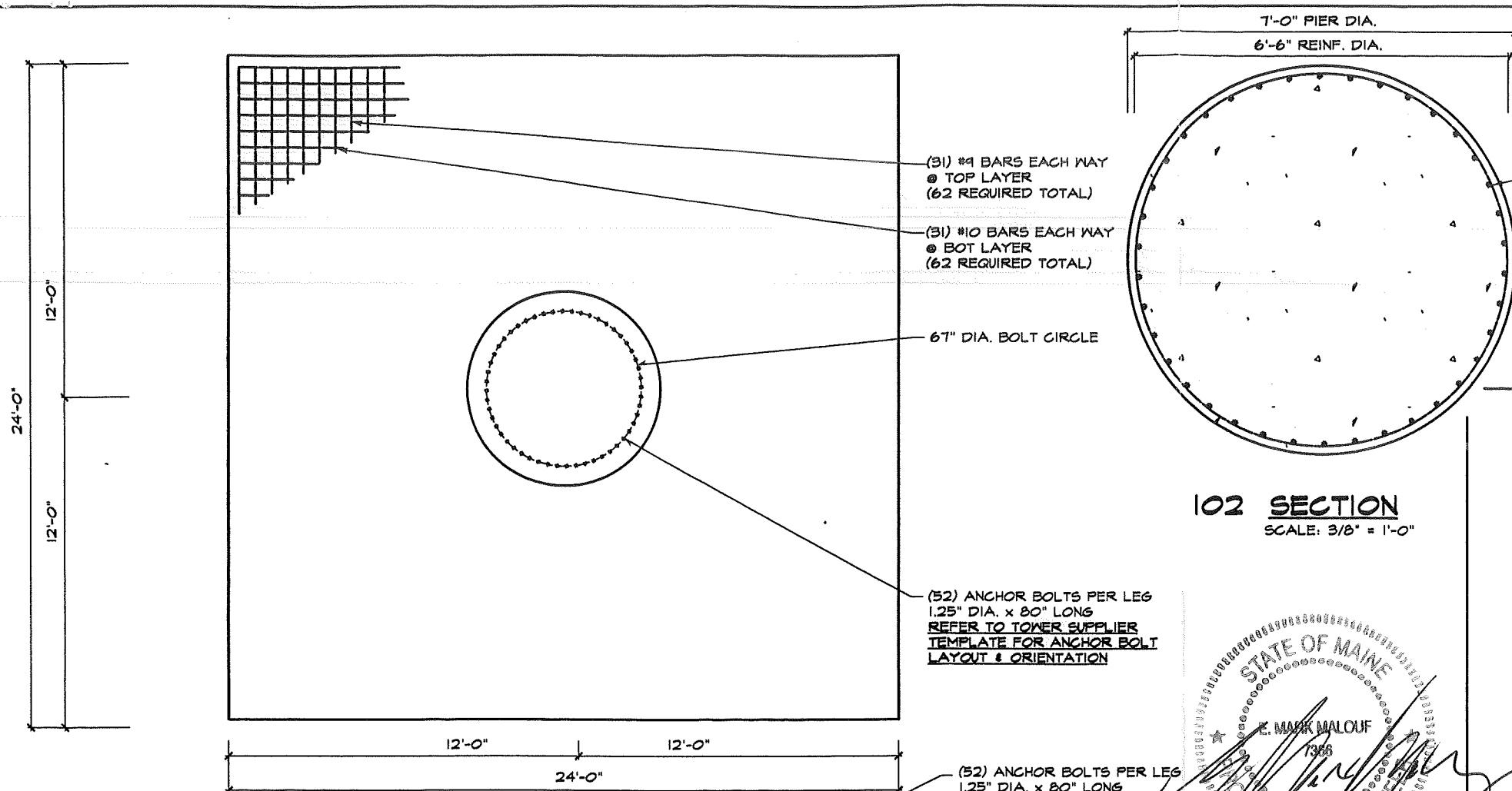


MAR 05 1997

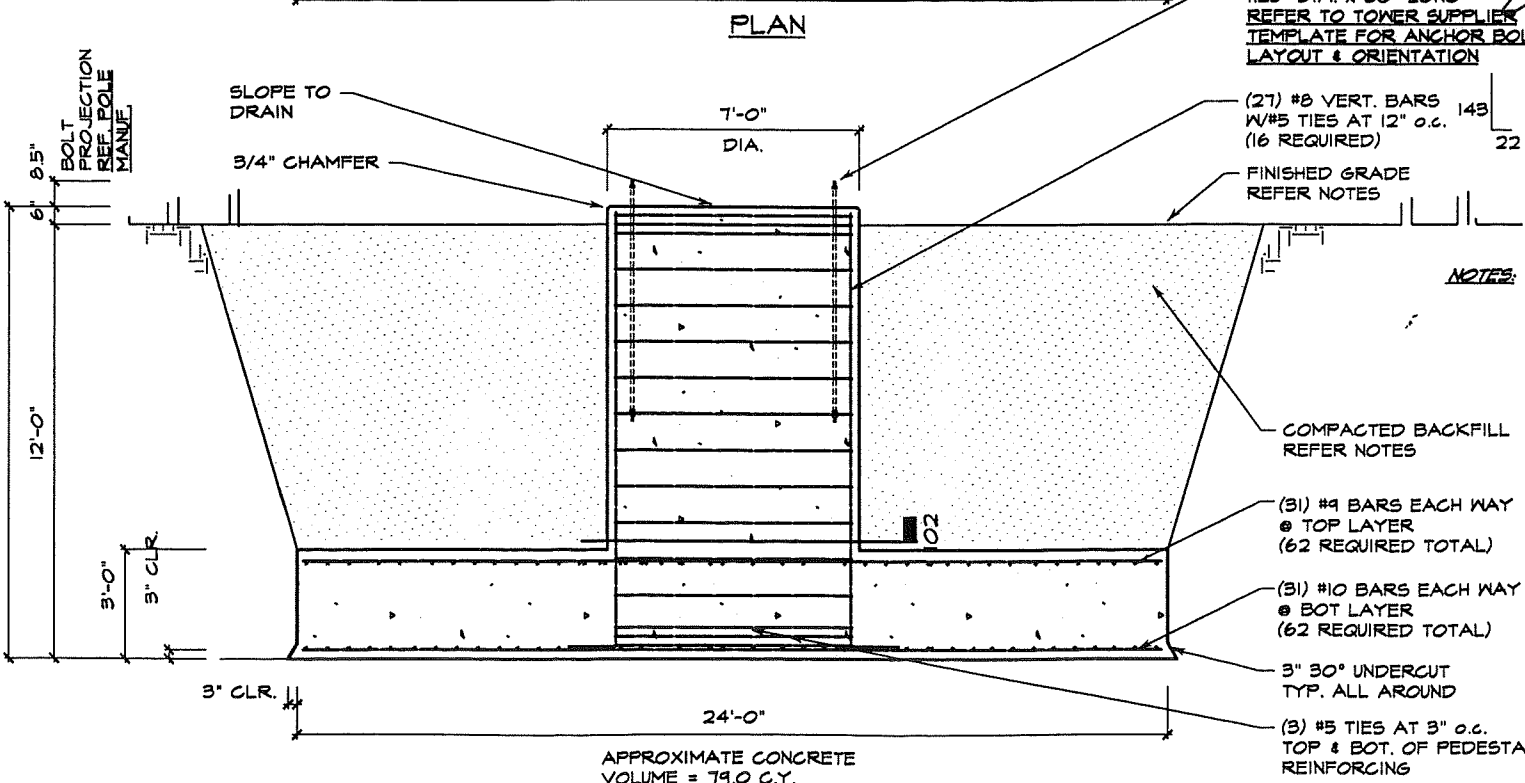
VANGUARD CELLULAR SYSTEMS  
 N. PORTLAND, MAINE  
 MP60 X 180' ANCHOR STEEL

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**102 SECTION**  
SCALE: 3/8" = 1'-0"



**101 TOWER FOUNDATION**  
SCALE: 3/16" = 1'-0"

**180' MONOPOLE FOUNDATION**  
**N. PORTLAND SITE**  
PORTLAND, MAINE

STATE OF MAINE  
E. MARK MALOUF  
7366  
PROFESSIONAL ENGINEER  
3/5/97

**FOUNDATION NOTES**

**GENERAL:**

1. THIS FOUNDATION HAS BEEN DESIGNED FOR 180' MONOPOLE TOWER BASE REACTIONS AS FURNISHED BY PIROD INC., PLYMOUTH, INDIANA, REFERENCE DWG #202340-B & ENG FILE #A-113355 DATED 03/03/97.

DOWN LOAD =	44.3	KIPS
OT MOMENT =	3708.7	FT-KIPS
HORIZONTAL =	30.2	KIPS

2. FOUNDATION HAS BEEN DESIGNED BASED ON DATA TAKEN FROM A SUBSURFACE EXPLORATION REPORT #80543-001 PREPARED BY HALEY & ALDRICH, INC. SOUTH PORTLAND MAINE, DATED 02/28/97.

3. CONTACT THE ENGINEER CONCERNING ANY CHANGES IN THE INSTALLATION DUE TO ANY DIFFERENCE OF THE ON SITE EXISTING CONDITIONS.

4. CHECK AREA FOR LOCATION OF UNDERGROUND PIPES, CABLES CONDUIT, ETC. PRIOR TO STARTING EXCAVATION.

5. ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS REQUIREMENTS. PROCEDURES FOR PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO START OF FOUNDATION WORK.

6. DEMATERING THE EXCAVATION WILL BE REQUIRED DUE TO PRESENCE OF GROUNDWATER. CONTROL WATER LEVELS TO AT LEAST 1 FT BELOW SUBRADE ELEVATION. REFER TO SOIL REPORT FOR DETAILS.

**FOUNDATION:**

7. ALL CONCRETE WORK SHALL CONFORM TO ACI 318 BUILDING CODE REQUIREMENTS (Latest Edition) FOR REINFORCED CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 4,000 PSI.

8. ALL REINFORCING STEEL BARS SHALL BE DOMESTIC, NEW BILLET STEEL, ASTM A615, GRADE 60. REINFORCING SHALL BE DETAILED AND FABRICATED IN ACCORDANCE WITH "MANUAL OF STANDARD FOR DETAILING REINFORCED CONCRETE". (ACI 318-Latest Edition)

9. WELDING OF REINFORCING STEEL AND EMBEDMENTS IS PROHIBITED UNLESS OTHERWISE APPROVED BY ENGINEER.

10. CONCRETE COVERAGE OVER ALL STEEL SHALL CONFORM TO ACI 318 BUILDING CODE MINIMUM REQUIREMENTS AND AS SHOWN ON STRUCTURAL DETAILS.

11. INSPECT BOTTOM OF EXCAVATION PRIOR TO PLACING STEEL CAGE AND CONCRETE TO INSURE NO LARGE AMOUNTS OF LOOSE DIRT OR FOREIGN MATERIAL REMAINS.

12. SPACING DEVICES SHALL BE USED AS REQUIRED TO MAINTAIN THE SIDE CLEARANCE BETWEEN THE STEEL REINFORCEMENT AND EXCAVATION WALL.

13. ALL ANCHOR BOLTS SHALL BE FURNISHED BY THE TOWER MANUFACTURER. ANCHOR BOLTS SHALL BE SET WITH TEMPLATES FURNISHED BY THE TOWER MANUFACTURER. TEMPLATE MUST BE SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS DURING CONCRETE INSTALLATION AND MUST BE LEVEL +/- 1/2". INSTALL TEMPLATE WITH SUFFICIENT SPACE BENEATH TO PERMIT FINISHING OF CONCRETE AND TO FACILITATE TEMPLATE REMOVAL PRIOR TO TOWER ERECTION.

14. CONCRETE SHALL BE PLACED INTO EXCAVATION WITHIN 6-8 HOURS OF EXCAVATION WITH THE USE OF A CHUTE OR HOPPER DEVICE TO DIRECT THE CONCRETE TO FALL WITHIN THE CENTER OF THE STEEL CAGE. CONCRETE SLUMP SHALL NOT BE LESS THAN 4" NOR MORE THAN 6". CONCRETE SHALL NOT BE ALLOWED TO HIT THE STEEL CAGE WHICH WOULD CAUSE SEGREGATION OF THE MATERIAL.

15. VIBRATE THE TOP 5 FT. OF CONCRETE IN ORDER TO ACHIEVE PROPER COMPACTION. SLOPE TOP OF CONCRETE AS REQUIRED FOR PROPER DRAINAGE AWAY FROM TOWER.

16. BACKFILL SHALL BE PLACED IN 4"-12" HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM TEST DESIGNATION D-698 (STANDARD PROCTOR). THE FILL MATERIALS SHALL BE FREE FROM LARGE ROCKS, WASTE, DEBRIS AND SHALL BE PLACED AT OR NEAR THE OPTIMUM MOISTURE CONTENT.

**NOTES:**  
1. REFER TO TOWER MANUFACTURER FOR BOLT CIRCLE AND ANCHOR BOLT LAYOUT  
2. REFER TO SITE PLAN FOR TOWER ORIENTATION

MALOUF ENGINEERING INTL., INC.  
1702 N. COLLINS BLVD., SUITE 203  
RICHARDSON, TEXAS 75080-3622  
Tel: 972 / 763-2578 Fax: 972 / 763-2583  
STRUCTURAL CONSULTANTS

FOUNDATION DETAILS & TECH. SPECS. NOTES  
180' MONOPOLE FOUNDATION - N. PORTLAND SITE  
VANGUARD CELLULAR SYSTEMS / JERREN CORP  
MYRTLE BEACH, SC  
GREENSBORO, NC

DRAWN BY: RS  
ENG'D. BY: RS  
APP'D. BY: MM

REVISIONS

JOB NO 97-113  
DATE 03/05/97

SHEET NO 1  
OF 1