Form # P 04

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING INSPECTION

PERMIT

PERMIT ISSUED

Please Read Application And Notes, If Any, Attached

Permit Number: 091279

MAR 2 - 2010

This is to certify that DIMILLO ARLENE ETALS TRUSTEES /Nelson & Small

has permission to Install a Windspire vertical axis wind turbine City of Portland

AT 144 COMMERCIAL ST CBL 030 H001001

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and written permission procured before this building or part thereof is lathed or otherwise closed-in. 24 HOUR NOTICE IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. CAPT. R. Gautreau

Health Dept. _____

Appeal Board _____

Other _____

Department Name

Director - Building & Inspection Services

3/2/10

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
09-1279		030 H001001

Location of Construction:	Owner Name:	Owner Address:	Phone:
144 COMMERCIAL ST	DIMILLO ARLENE ETALS TRUS	LONG WHARF	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Nelson & Small	P.O. Box 1420 Portland	2077755666
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		Additions - Commercial	WC2

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Commercial Restaurant & Marina - "DiMillo's"	Commercial Restaurant & Marina - "DiMillo's" - Install a Windspire vertical axis wind turbine	$90.00	$6,500.00	1

Proposed Project Description:
Install a Windspire vertical axis wind turbine

FIRE DEPT: ☑ Approved ☐ Denied
Signature: KG

INSPECTION:
Use Group: A-2/M Type: N/A
IBC-2003
Signature: JMB 3/2/10

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)
Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied
Signature: Date:

Permit Taken By:	Date Applied For:
Ldobson	11/12/2009

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..

PERMIT ISSUED

MAR 2 - 2010

City of Portland

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☑ Shoreland no setback in WC2.	☐ Variance	☑ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☑ Flood Zone A2 panel 14 - Zone [illegible]	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☑ Site Plan Exemption 109 - 699 00044	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐ ok w/ condition	☐ Denied	☐ Denied ABM
Date: 11/20/09 ABM	Date:	Date:

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 provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT | ADDRESS | DATE | PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE | DATE | PHONE

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
09-1279	11/12/2009	030 H001001

Location of Construction:	Owner Name:	Owner Address:	Phone:
144 COMMERCIAL ST	DIMILLO ARLENE ETALS TRUS	LONG WHARF	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Nelson & Small	P.O. Box 1420 Portland	(207) 775-5666
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Additions - Commercial	

Proposed Use:	Proposed Project Description:
Commercial Restaurant & Marina - "DiMillo's" - Install a Windspire vertical axis wind turbine	Install a Windspire vertical axis wind turbine

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Ann Machado **Approval Date:** 11/20/2009

Note: **Ok to Issue:** ☑

1) Minor development in the A2 flood hazard zone requires that the structure be built with flood damage resistant material and be adequately anchored.

2) The Windspire vertical axis wind turbine is being approved as an accessory use - supplemental energy supply for DiMillo's Marina Office. If this use changes then a new permit will have to be applied for.

3) This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.

Dept: Building **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 03/02/2010

Note: **Ok to Issue:** ☑

1) Separate permits are required for any electrical installations.

2) Application approval based upon information provided by applicant. Any deviation from approved plans requires separate review and approrval prior to work.

Dept: Fire **Status:** Approved **Reviewer:** Capt Keith Gautreau **Approval Date:** 11/24/2009

Note: **Ok to Issue:** ☑

Dept: Planning **Status:** Approved with Conditions **Reviewer:** Jean Fraser **Approval Date:** 01/29/2010

Note: Planning Div has requested this be 5 feet higher (to inc. Clearance for moving parts) and is requiring railings around base- see HTE 09 69900044. **Ok to Issue:** ☑

1) All required building permits shall be obtained prior to installation.

2) The railing specifications shall be submitted for review and approval prior to the issuance of a building permit.

Comments:

1/27/2010-jmb: Received stamped plan of anchoring, spoke to Jean F. Who needed the copies and provided. She is still working on the site plan exemption and will send the draft of the new ordinance for wind turbines.

2/2/2010-gg: received partial granted site exemption on 02/02/2010. Filed with permit (Jeanie) /gg
Cannot issue due to criteria for site plan exemption, emailed Jean F. For notification on condition compliance. Left vcmsg for Mark H. For details on maintenance of turbine for fastenings and proper functioning, grounding of the tower and ice build up and dislodging information.

Location of Construction:	Owner Name:	Owner Address:	Phone:
144 COMMERCIAL ST	DIMILLO ARLENE ETALS TRUS	LONG WHARF	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Nelson & Small	P.O. Box 1420 Portland	(207) 775-5666
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Additions - Commercial	

3/2/2010-jmb: Mark H. Came into the office with the plans circumfrence protection around the windspire. I spoke with Jean F. As she had a copy of this and will approve the design. I verified the pole will be grounded and maintenance will be as needed or every 5 years or so. The fins do stop rotating at 35 mph, there is no report of problems with ice build up in tests in Colorado. Ok to issue

11/17/2009-amachado: Spoke to Mark Hellen. He needs to fill out a Flood Hazard Development Application and flood Hazard Development Permit. He said that he would pick it up tomorrow.

11/17/2009-amachado: Gave application for exemption from site plan to planning.

11/20/2009-amachado: Received Flood Hazard Development Application.

12/1/2009-jmb: Left vcmsg with Mark H. For details on the structural design of the foundation as this appears to be anormal to the typical design. Also need to discuss specs per towers, Sec. 3108 for wind, ice, dead loads. Mark called and will submit a stamped plan for the proposed foundation and anchoring. This was designed to meet the specs of the turbine per wind and loads. It can withstand 104 mph wind and if a hurricane is forecast the turbine will be lowered as it has a hinge plate.

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@protlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the City of Portland Inspection Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months, if the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue with construction.**

__X__ **Final inspection required at completion of work.**

__X__ **Prior to the final inspection a sealed letter from the professional engineer shall be submitted to verify the installation is in substantial compliance with the approved plans.**

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OR CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

Jeanie Bourke - Re: Planning Site Plan Sign off re Windspire railings

From: Jeanie Bourke
To: Jean Fraser
Date: 3/3/2010 8:42 AM
Subject: Re: Planning Site Plan Sign off re Windspire railings
CC: markh@nelsonsmall.com

It is on the SPE....I have cc'd
Correction, the poles are 9" O.C. for an actual space of 8", this is still adequate.
Thanks

Jeanie Bourke
Code Enforcement Officer/Plan Reviewer

City of Portland
Planning & Urban Development Dept./ Inspections Division
389 Congress St. Rm 315
Portland, ME 04101
jmb@portlandmaine.gov
(207)874-8715

>>> Jean Fraser 3/2/2010 4:01 PM >>>
Jeanie,

Forgot to give this a "proper" subject name.

Also I do not have an direct e-mail for Mr Hellen so if you have an e-mail address I would appreciate it if you could forward to him to make sure he gets it.

thanks
Jean

>>> Jean Fraser 3/2/2010 3:48 PM >>>
Fao Mark Hellen

Re (Planning Division) Site Plan Exemption #69900044 for 23 Long Wharf
Re (Inspections Division) Building Permit #09-1279 (144 Commercial St)

I refer to the proposed *Windspire* installation at diMillos Restaurant and the Site Plan Exemption dated Jan 29, 2010.

The proposed "railings" as outlined in this scan is understood to create a round circle of poles around the base of the *Windspire* support pole - my understanding is that it creates a railing but instead of forming a square it forms a circle, 5 ft in diameter (the *Windspire* rotor is 4 ft in diameter). Although the poles are at 8 inch centers, this is reduced by the width of the pole.

I have consulted with my colleagues and confirm that this approach is approved for the purpose of issuing the Building Permit. Our review suggests that this should satisfy our concerns about safety of the public and minimizing the potential of the *Windspire* to be an "attractive nuisance".

If for any reason this approach does not succeed in meeting the concerns we have discussed, I would hope this could be reconsidered/upgraded if necessary to ensure a "positive" project.

Jean

Jean Fraser, Planning Division
City of Portland
874 8728

>>> <info@nelsonsmall.com> 2/18/2010 12:16 PM >>>

PROPOSED POLE TYPE PROTECTOR FOR DIMILLO'S WINDSPIRE BASE

5 FOOT IN DIAMETER

21 1" GALVINIZED IRON PIPES THREADED ON BOTH ENDS 9" ON CENTER, ACTUAL SPACE BETWEEN PIPES WILL BE 8". PIPES WILL BE 5' HIGH THREADED INTO FLOOR FLANGES THAT WILL BE SECURED INTO PIER. TOP OF PIPE WILL BE CAPPED WITH A GALVINIZED PIPE CAP. PIPES WILL BE PAINTED THE SAME COLOR AS THE BASE POLE.

THIS CONCEPT WILL TAKE UP LESS ROOM WHILE PROVIDEING PROTECTION THAT THE CITY IS LOOKING FOR AND REMAINING PLEASEING TO THE EYE. IT IS BASED ON THE CONCEPT OF TREE PROTECTORS.

Application for Exemption from Site Plan Review

Portland, Maine

Department of Planning and Urban Development, Planning Division and Planning Board

149 Commercial St.

PROJECT NAME: DiMillo's Floating Restaurant & Marina

PROJECT ADDRESS: 25 Long Wharf Portland, Maine 04101

PROJECT DESCRIPTION: (Please Attach Sketch/Plan of Proposal/Development)

To install an Auxiliary Generator @ DiMillo's to supplement the energy supply to the Marina

RECEIVED

NOV 17 2009

City of Portland Planning Division

CHART/BLOCK/LOT: 30-H-001

CONTACT INFORMATION:

OWNER/APPLICANT		CONSULTANT/AGENT	
Name:	Steve DiMillo	Name:	Mark J. Hellen
Address:	25 Long Wharf Portland, Me	Address:	212 Canco Road Portland, Me
Zip Code:	04101	Zip Code:	04103
Work #:	772-2216	Work #:	775-5461 Ext. 237
Cell #:		Cell #:	831-6051
Fax #:	772-1081	Fax #:	775-4303
Home #:		Home #:	879-0006
E-mail:	steve@dimillos.com	E-mail:	markh@nelsonsmall.com

Criteria for Exemptions:
(See Section 14-523 (4) on page 2 of this application)

		Applicant's Assessment Y(yes), N(no), N/A	Planning Division Use Only
a)	Is the proposal within existing structures?	No	No
b)	Are there any new buildings, additions, or demolitions?	No	No
c)	Is the footprint increase less than 500 sq ft.?	Yes	Yes
d)	Are there any new curb cuts, driveways or parking areas?	No	No
e)	Are the curbs and sidewalks in sound condition?	Yes NA	Yes N/A
f)	Do the curbs and sidewalks comply with ADA?	NA	N/A
g)	Is there any additional parking?	No	No
h)	Is there an increase in traffic?	No	No
i)	Are there any known stormwater problems?	No	No
j)	Does sufficient property screening exist?	NA	N/A amidst boat masts
k)	Are there adequate utilities?	Yes	Yes.

RECEIVED
FEB 2 2010
Dept. of Building Inspections
City of Portland Maine

Planning Division Use Only Exemption Granted ___ Partial Exemption ✓ Exemption Denied ___

Exemption granted subject to 2 conditions:
1. That the roofing specifications shall be submitted for review and approval prior to the issuance of a Building Permit, and
2. That all required Building Permits shall be obtained prior to installation.

Planner's Signature Jan Hill Date 01-29-2010

[This cross refers to Building Permit # 09-1279 Nov 2009 149 Commercial St]

~ Original - Planning Division ~ ~ Copy - Inspections Division and Applicant ~

PROVISION OF PORTLAND CITY CODE
14-523 (SITE PLAN ORDINANCE)
RE: EXEMPTIONS FROM SITE PLAN REVIEW

Sec. 14-523. Approval required.

No person shall undertake any development without obtaining approval therefore under this article.

(4) The Planning authority shall exempt from review under all standards in this article developments that meet all of t following requirements:

a The proposed development will be located within existing structures, and there will be no new buildings, demolitio or building additions other than those permitted by subsection b of this section,

b Any building addition shall have a new building footprint expansion of less than five hundred (500) square feet;

c The proposed site plan does not add any new curb cuts, driveways, or parking areas; the existing site has no more th one (1) curb cut and will not disrupt the circulation flows and parking on-site; and there will be no drive-throu services provided;

d The curbs and sidewalks adjacent to the lot are complete and in sound condition, as determined by the public wo authority, with granite curb with at least four (4) inch reveal, and sidewalks are in good repair with uniform mate and level surface and meet accessibility requirements of the Americans with Disabilities Act;

e. The use does not require additional or reduce existing parking, either on or off the site, and the project does r significantly increase traffic generation;

f There are no known stormwater impacts from the proposed use or any existing deficient conditions of stormwa management on the site;

g. There are no evident deficiencies in existing screening from adjoining properties; and

h Existing utility connections are adequate to serve the proposed development and there will be no disturbance to improvements within the public right-of-way

A developer claiming exemption under this subsection shall submit a written request for exemption stating that the proposed meets of the provisions in standards a-h of this subsection, including an itemized statement by a qualified professional. Upon receipt of s a request, the planning authority will visit the site to verify that the exemption is applicable due to compliance with the standards. T planning authority, after consultation with the public works authority, shall render a written decision within twenty (20) working d after receipt of a written request for exemption that contains all the information required by this subsection. If a full exemptio granted, the application shall be approved without further review under this article, and no performance guarantee shall be requir The planning authority may require full site plan review of a project that meets the criteria of this subsection if it determined that th is a substantial public interest in the project.

In the event that the planning authority determines that standards a and b of this subsection and at least four (4) of the remain standards have been met, the planning authority shall review the site plan under the review standards in section 14-526 that are affec by the standards in this subsection that have not been met. An application that receives review by the planning board shall receiv complete review under the standards of section 14-526. The planning authority shall notify an applicant in writing that full or par site plan review is required, the reasons for the decision, and the information that will be required for site plan review.

IMPORTANT NOTICE TO APPLICANT

An Exemption from site plan review <u>does not exempt</u> this proposal from other approvals or permits, nor is it authorization for construction. You should first check with the Building Inspections Office, Room 315, City Hall (874-8703), to determine what other City permits, such as a building permit, will be required.

Planning Barbara Barhydt

[Note; This is tied in with the Building Permit #09-1279 144 Commercial Street]

Jean Fraser has reviewed this project to ensure that the review reflects the developing Wind Ordinance.

12.10.2009: JF spoke to the applicant's agent Mark Hellen of Nelson and Small (Technical Consultant) 775-5661 Ext 237 and he confirmed:

a. The site already has fencing on the 2 water sides (high chain link for one segment and a lower tubular steel for the other – visible in photos) and they would fence the other 2 sides with 6 ft high black vinyl-coated chain link fence if we would like it to be fenced. This would not be within 5 ft of the water as its on the inland side.

b. Instead/in addition he can add a 5 ft extender to the pole so that the height before reaching the moving spinner is increased from 9'1" to 14'.

c. He confirmed that if someone put their hands into the vertical spinning mechanism that they would probably break their hand.

d. Also he confirmed that for the City's Building Inspector they are getting a PE to review and stamp the plans etc.

e. Re shadow flicker/ice shedding, he doesn't think these are issues but will check (and get back to me) with the company as they have piloted these in Colorado (where is snow/ice).

f. They will do whatever we feel is appropriate as they want this installation to give a positive "message" about wind energy; they are likely to wait until Spring to install so to allow all the necessary discussions to take place with us as they want everyone "happy".

g. He is confident of the wind resource at DiMillo's (he knows Steve DiMillo and had suggested this); thinks the *Windspire* will work well as only needs 4mph; he anticipates that these will initially be most popular with small commercial uses and be located in parking lots (a 3kW version is soon to be available).

12.15.2009: After discussing with senior colleagues, the following e-mail sent:

Mark,
Further to our conversation last week, I write to confirm that we would like some additional/revised plans submitted that include the additional items that we discussed.

Our main concern is public safety since the location of the Windspire is immediately adjacent the main entrance to DiMillos and also easily accessible by pedestrians via the parking area on Commercial Street. Virtually all other wind energy ordinances I have reviewed (and the one I am drafting for Portland) include requirements for non-climbable poles, clearances for moving parts, and security and we consider that following would be appropriate at this location to address safety issues:

1. 5-6 ft high tubular railings (similar to the blue painted ones that are there but higher) around the generator base and securely attached to the existing railing and chain link fencing on the waterside to prevent unauthorized access to the generator base;

2. Add a 5 foot extender to the pole so that the moving parts of the wind generator are at least 12 ft above the "ground" (eg existing asphalt level).

Please send me more detailed plans (this can be by pdf in an e-mail) showing the actual proposed location of the base/pole, the fencing (clarifying the spec) and the revised elevation showing the revised pole and height.

Once we receive these details we can quickly continue processing the Exemption Request.

1.28.2010 Final Planner Comments on further information received 1.27.2010:

I have reviewed the further information and although somewhat "rough" (particularly regarding the design of the railings) I suggest the revised proposals should be granted an exemption for the following reasons:

- Our requirements (linked to information obtained during research on the Wind Ordinance) included raising the height of the support pole by 5 ft, which brings the overall height to 35 feet (still well within the zoning height limit of 45 ft), and results in the moving parts of the generator being 14+ feet from the surrounding grade. The support is an unclimbable steel pole.
- Setbacks: it does meet the zoning requirement of 5 ft from the edge of the pier. There are no current standards for a wind generator.
- Noise: the noise tests I have looked at seem to indicate that the source noise is around 45dBA for this *Windspire*. The Waterfront Zone has 75dBA as the maximum so this is acceptable.
- The proposal has been located as close as possible to the existing building so that is distant from public ways. The fact it impinges on an adopted view corridor was agreed with Associate Corporation Counsel as irrelevant as this proposal does not meet the definition of a minor site plan and therefore site plan standards per se do not apply.
- The revised sketch plan includes "5-6 ft high tubular railings similar to existing" and indicates where they will be located around the base. While no details of the fencing or its connections to existing fencing are included (I had asked for clarification of the spec), I suggest that we grant the exemption subject to a condition that requires submission of the railing specifications for review and approval
- I have discussed the proposal with both Jeanie Bourke and Bill Needleman and both agree it's a good site for a "test" case of the *Windspire*, since it's a well-proven system (the manufacturing company have just installed their 400th) which is likely to be the subject of future site plan/ZBA/building permit applications in Portland. Bill confirms that the waterfront is a noisy and visually chaotic area in any case and as it offers "good" wind it's a good location for a wind system (he supports ones that are even higher).
- As the wind generator raise some particular potential engineering issues (such as vibration, ice throw, lightning strikes) I have drawn these to the attention of Inspections so that the Building Code reviewer can investigate and review accordingly. Barbara Barhydt suggests that a condition should be included that they obtain the required building permits.

01.29.2010: Final Planning Division Decision (agreed with Barbara Barhydt):

Grant the exemption subject to:

- **a condition that requires submission of the railing specifications for review and approval (?prior to issuance of building permit? JF checking re this);**
- **a condition that they obtain the required building permits prior to installation.**

NOTE FOR FILE 12.10.09

Re: DiMillo's Exemption Application for *WINDSPIRE* Wind Generator

I had a telephone conversation today with **Mark Hellen** of Nelson and Small (Technical Consultant) 775-5661 Ext 237 [He apologized for not getting back to us but has had a difficult couple of weeks; I called him after leaving message yesterday].

1. **Proposals for security:**

   a. The site already has fencing on the 2 water sides (high chain link for one segment and a lower tubular steel for the other – visible in photos) and they would fence the other 2 sides with 6 ft high black vinyl-coated chain link fence if we would like it to be fenced. This would not be within 5 ft of the water as its on the inland side.

   b. Instead/in addition he can add a 5 ft extender to the pole so that the height before reaching the moving spinner is increased from 9'1" to 14'.

   c. He confirmed that if someone put their hands into the vertical spinning mechanism that they would probably break their hand.

   d. Also he confirmed that for the City's Building Inspector they are getting a PE to review and stamp the plans etc.

   e. Re shadow flicker/ice shedding, he doesn't think these are issues but will check (and get back to me) with the company as they have piloted these in Colorado (where is snow/ice).

   f. They will do whatever we feel is appropriate as they want this installation to give a positive "message" about wind energy; they are likely to wait until Spring to install so to allow all the necessary discussions to take place with us as they want everyone "happy".

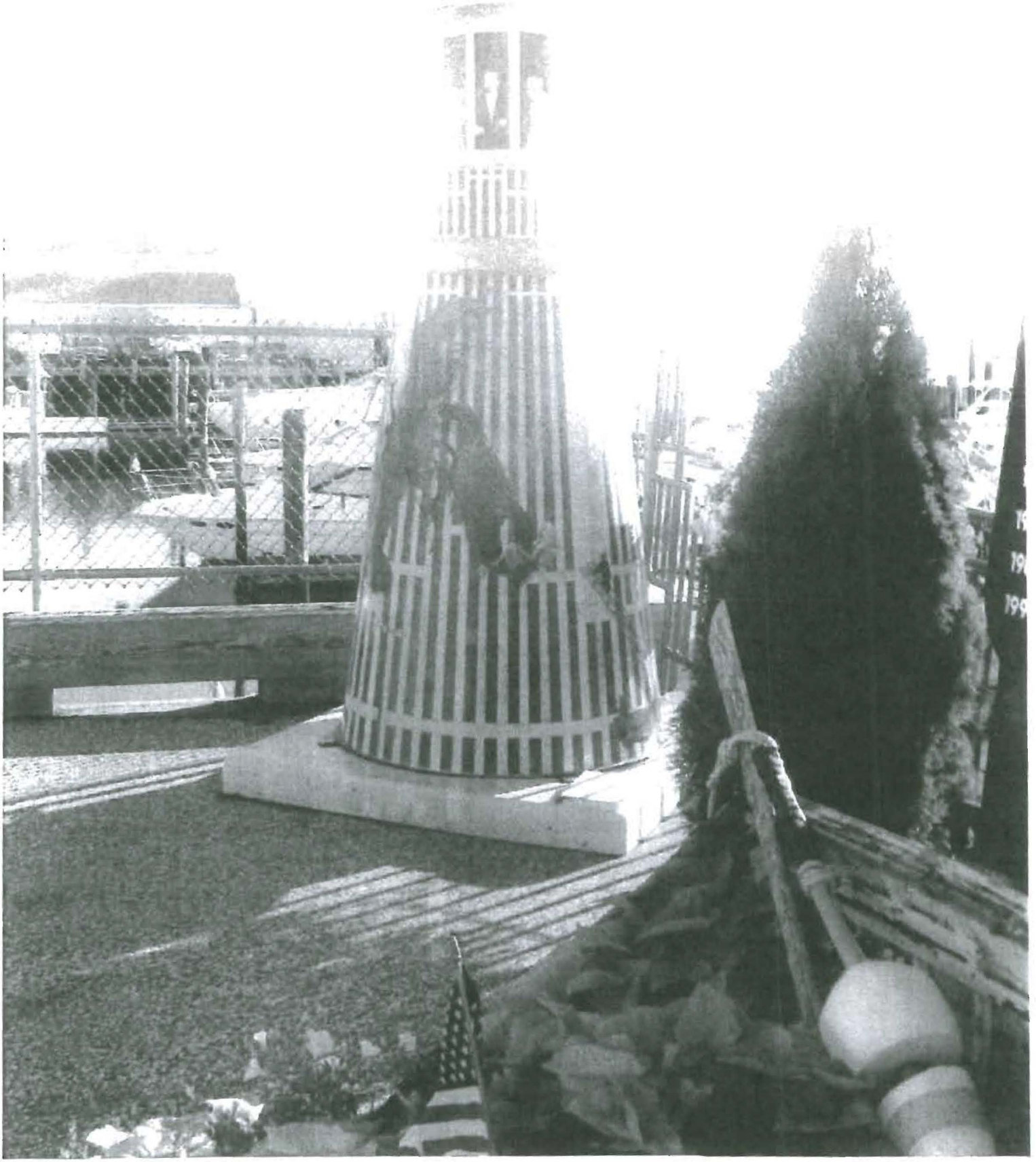
2. **Context information:**

   a. He was unaware of any other *Windspire* being installed in the Portland area and this one at DiMillos is the first one that Nelson & Small have been involved with (they have an approx 50 ft high *Skystream* (horizontal axis) in their front yard). He is going to check whether there is one installed nearby by others and get back to me.

   b. He is confident of the wind resource at DiMillo's (he knows Steve DiMillo and had suggested this); thinks the *Windspire* will work well as only needs 4mph; he anticipates that these will initially be most popular with small commercial uses and be located in parking lots (a 3kW version is soon to be available; currently the *Skystream* is 2.4kW and *Windspire* is 1.2-1.5kW). Householders probably won't be interested (now) as cost too high compared to savings given current cost of oil.

   c. He is supportive of the Ordinance development and willing to participate in any discussions I arrange etc.

Jean Fraser, Planner Ext 8728 12.10.09



Nelson & Small, Inc.

Import · Export · Manufacturing · Distribution of World Class Products

PROPOSAL

November 5, 2009

Nelson & Small Inc., distributors of the WINDSPIRE vertical axis wind turbine, will supply all materials and install a WINDSPIRE vertical axis wind turbine for DiMillo's Restaurant & Marina at 25 Long Wharf Portland, Maine 04101.

This proposed auxiliary generator will supplement the energy supply for DiMillo's Marina office. The Marian Office is an out building located on 25 Long Wharf just in front of the entrance (gangway) into the restaurant.

The WINDSPIRE generates grid quality 120 Volt 60 Cycle electricity and will be tied directly into the circuit breaker box. We will have a disconnect switch and meter in close proximity of the Turbine to show how much power is generated by the WINDSPIRE vertical axis turbine.

Mark J. Hellen, Energy Service Manager, is the contact person at Nelson & Small Inc., he can be reached at:

Office: **775-5661 Ext. 237**
Email : markh@nelsonsmall.com
Cell: **831-6051**

BERNSTEIN SHUR

COUNSELORS AT LAW

207 774-1200 main
207 774-1127 facsimile
bernsteinshur.com

100 Middle Street
PO Box 9729
Portland, ME 04104-5029

Christopher L. Vaniotis
207 228-7205 direct
cvaniotis@bernsteinshur.com

November 6, 2009

Mark Hellen
Energy Service Manager
Nelson & Small, Inc.
212 Canco Road
Portland, Maine 04103

Re: Proposed Auxiliary Generator at DiMillo's Marina

Dear Mark:

I am writing to follow up on our meeting Wednesday afternoon during which we discussed the proposal to install a wind-powered auxiliary generator at DiMillo's Marina. The goal is to supplement the energy supply to the marina with a vertical-axis wind turbine. Nelson & Small, Inc. would undertake the installation for DiMillo's.

You asked me to review the City of Portland Land Use Ordinance to determine if the installation would be permissible. In my view, the ordinance allows it as an accessory use under Section 14-308(e)(1)(b) – a permitted use in the Waterfront Central Zone. The wind turbine functions as a generator, supplying supplemental power to a permitted marine use. All along the Portland waterfront and throughout the City there are gas, diesel or gasoline-powered generators auxiliary to permitted uses. While those are typically standby generators to deal with power outages, I do not see any reason why an auxiliary generator which regularly supplements grid power would be treated any differently. And I do not see why the source of the power – wind versus fossil fuels – would make a difference. In fact, public policy at the state, local and national levels encourages the use of electricity generation using non-fossil fuels.

On the DiMillo's Marina site there are already accessory structures involved in the distribution of power – utility poles, wires and related equipment. They are all there as accessory structures. The proposed wind turbine would also be an accessory structure. The fact that this particular auxiliary generator is tall, with a small footprint, does not take it out of the category of an accessory structure. It would comply with the height requirement of the Waterfront Central Zone and would be located in compliance with all required setback regulations. In terms of visual compatibility, the design and height of the vertical axis wind turbine are completely harmonious with the sailing masts which populate the marina.

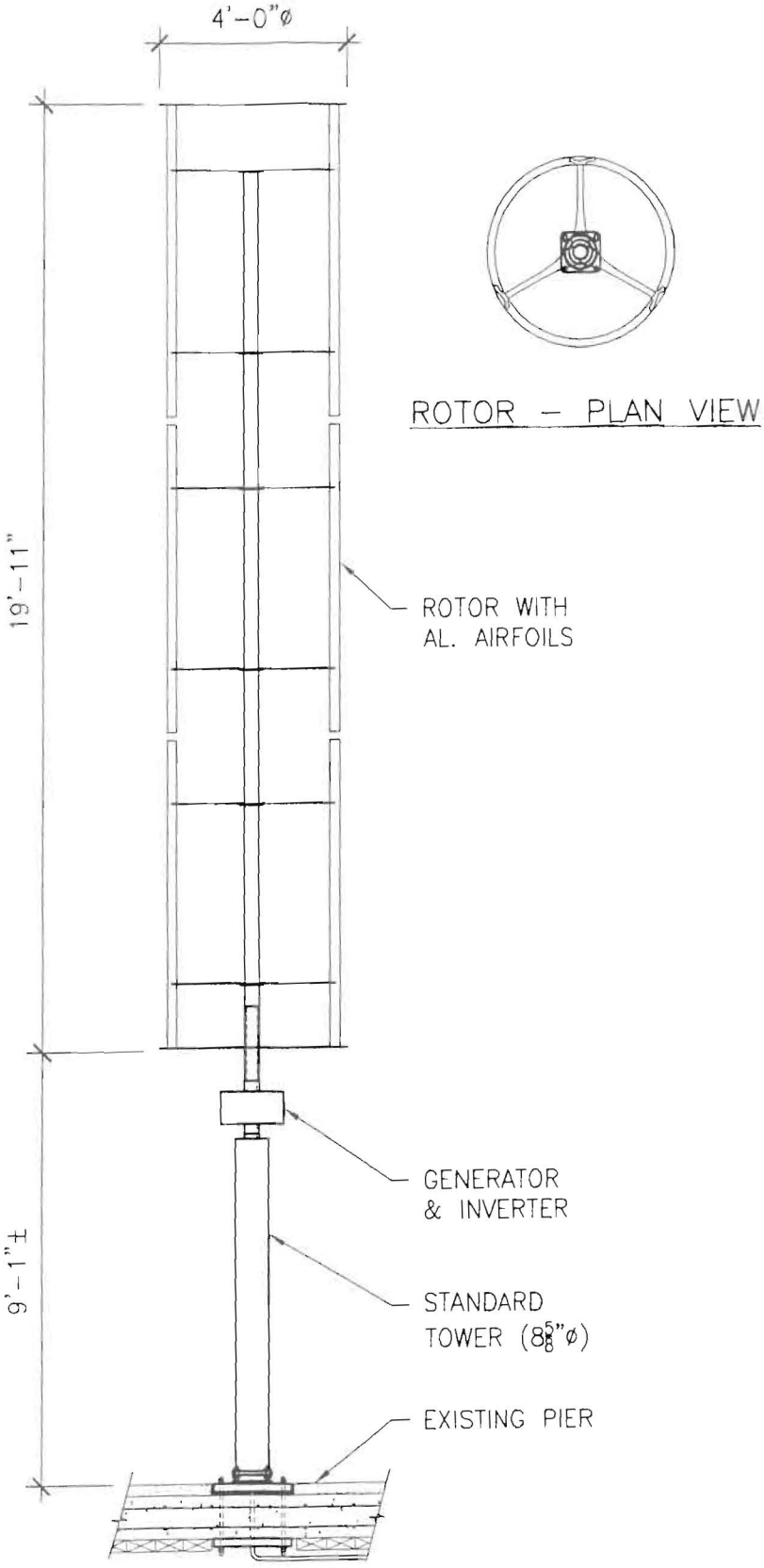
I also looked at Section 14-313(e), which lists as a prohibited use "ground mounted telecommunications towers, antennas, and/or disks." Clearly that language refers only to telecommunications facilities, such as cell phone towers. It does not prohibit the kind of vertical access wind generator proposed for the DiMillo's site.

In summary, I would categorize the use of the structure as an auxiliary generator accessory to the marina, and I believe that use is permitted by the Portland Land Use Ordinance.

Sincerely,

Christopher L. Vaniotis

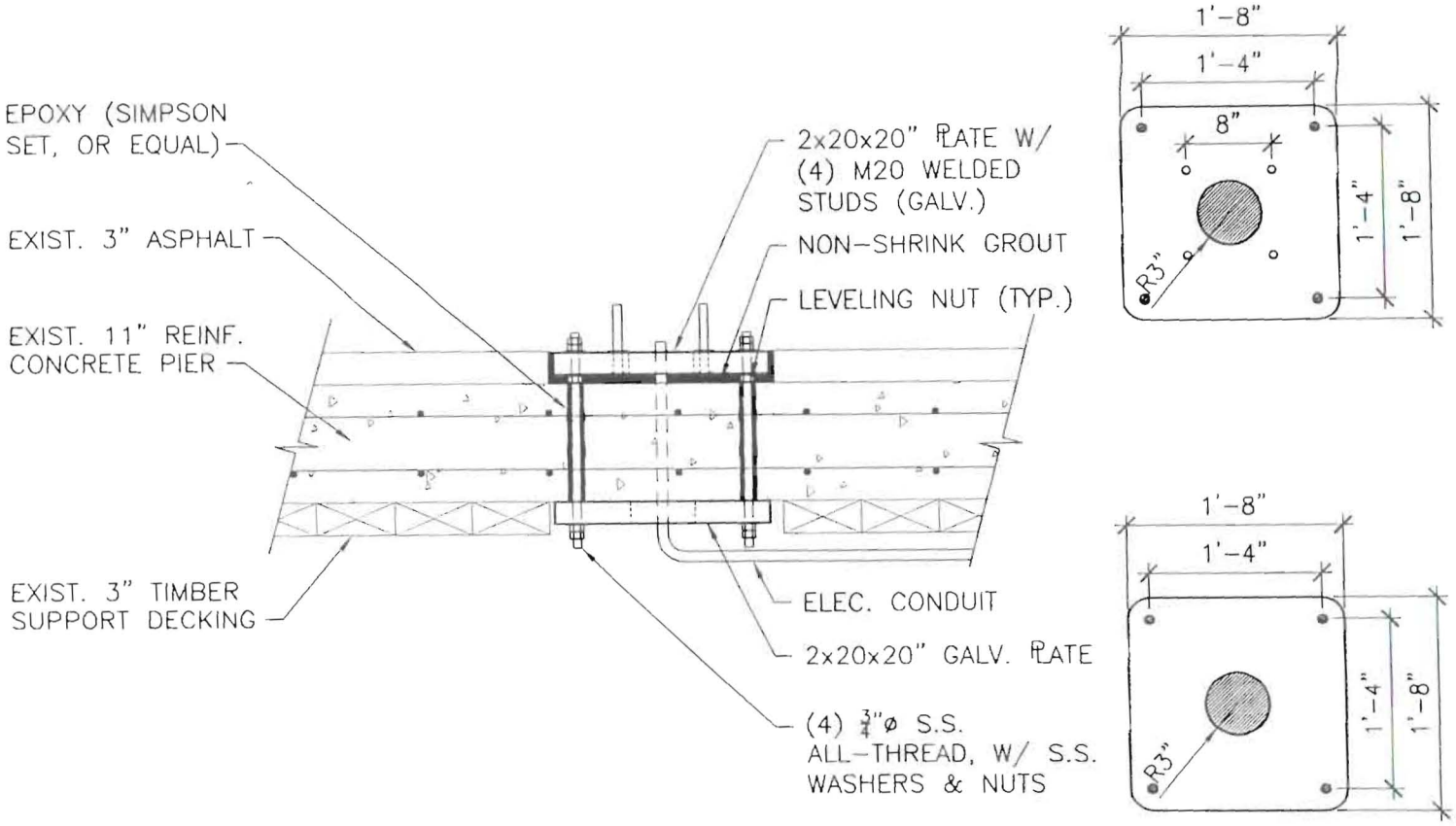
CLV/lc



ROTOR – PLAN VIEW

1.2kW WINDSPIRE – ELEVATION

Proposed Entrance
DiMillos



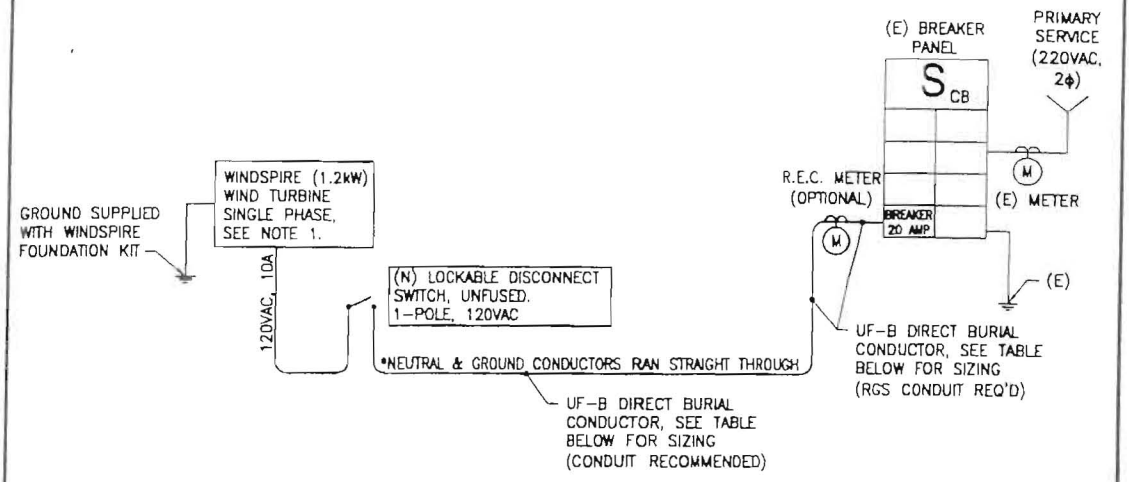
1.2kW WINDSPIRE – BASE CONNECTION

Figure 2-78: Wiring Diagram—Single Connection, Single Phase

WIRING DIAGRAM

1.2kW WINDSPIRE

SINGLE CONNECTION, SINGLE PHASE



ELECTRICAL NOTES:

1. SELF-CONTAINED INVERTER, UL 1741 LISTING REPORT #3125756CRT-001a, MANUFACTURED BY TECHNOLOGY DRIVEN PRODUCTS.
2. ALL EQUIPMENT IS NEW UNLESS OTHERWISE NOTED.
3. CONDUIT ENTRY/CONNECTION TO ELECTRICAL ENCLOSURES SHALL BE SUITABLE FOR GROUNDING PER NEC 250.97 AND SHALL BE SEALED AGAINST ENVIRONMENT.
4. ALL EXPOSED CONDUIT SHALL BE UV RESISTANT PVC OR RIGID GALV. STEEL (RGS).
5. INSTALLATION TO COMPLY WITH NEC, INCLUDING BUT NOT LIMITED TO SECTIONS 690.64(B)(2) AND 705.12.
6. DEDICATED CIRCUIT BREAKER FOR WIND TURBINE SHALL BE INSTALLED AT EITHER (L) OR (R) BOTTOM CORNER OF CIRCUIT BREAKER PANEL PER NEC REQUIREMENTS.
7. THE SUMMATION OF ALL CUIRCUIT BREAKERS (AMPERAGE) WITHIN THE PANEL, SHALL NOT EXCEED 120% OF THE BREAKER PANEL AMPERAGE RATING.
8. VERIFY WITH LOCAL UTILITY COMPANY REGARDING ANY ADDITIONAL WIRING OR DISCONNECT REQUIREMENTS.
9. ELECTRICAL INSTALLATION SHALL BE COMPLETED BY A LICENSED ELECTRICIAN.
10. DO NOT CONNECT TO AN AC LOAD CENTER (CIRCUIT BREAKER PANEL) THAT IS EQUIPPED WITH MULTIWIRE BRANCH CIRCUITS AND/OR GFCI PROTECTED CIRCUIT.

CONDUCTOR MAX. RUN TABLE [1,2]

# OF WINDSPIRE UNITS	CONDUCTOR DESIGN (A)	(V)	CONDUCTOR SIZE (AWG)	MAXIMUM CONDUCTOR RUN (FEET)
1	10	120	10	190
1	10	120	8	290
1	10	120	6	470
1	10	120	4	740
1	10	120	3	920

1. CONDUCTOR (COPPER) RUNS SHALL BE VERIFIED BY ELECTRICIAN OR QUALIFIED DESIGNER FOR SITE SPECIFIC CONDITIONS.
2. CONNECTION OF MULTIPLE WINDSPIRES TO A SINGLE CONDUCTOR RUN, WILL MULTIPLY THE CONDUCTOR CURRENT (A) BY THE NUMBER OF WINDSPIRES AND THUS REDUCE THE MAXIMUM RUN TO BE THE SINGLE UNIT RUN DISTANCE DIVIDED BY THE NUMBER OF UNITS (EXAMPLE: 4 UNITS = 40A; FOR #10 MAX. RUN = 190'/4 = 47.5').

DATE: APRIL 30, 2009	SINGLE WINDSPIRE V.A.W.T. 1.2kW WIRING DIAGRAM	Mariah Power 5450 LOUIE LANE RENO, NV 89511 (775) 857-4888 WWW.MARIAHPOWER.COM
DRAWN: DLM DWG. NO. 100006_P		
REV. A SHEET: 1 OF 1		

ELECTRICAL TO BE PROVIDED BY LICENSED ELECTRICIAN, WHO WILL BE RESPONSIBLE FOR THAT PERMIT

Memorandum
Department of Planning and Urban Development
Planning Division

TO: Barbara Barhydt

FROM: Jean Fraser

DATE: January 28, 2010

RE: **PROPOSED *WINDSPIRE* WIND TURBINE AT DIMILLOS – SITE PLAN REVIEW EXEMPTION**

REVIEW BACKGROUND:

- The Site Plan Exemption application was submitted 11.17.2009 (I think you have the original application)
- After both you and me left unreturned messages for Mark Hellan at Nelson & Small (agent), I finally spoke to him in early December and got more information regarding the proposed installation (note attached).
- Based on Penny Littell comments (early November) regarding the "attractive nuisance" issues associated with wind systems and my research regarding other Ordinances and their requirement for clearances beneath moving parts, we agreed that for now we should adhere to the general view that a 12 foot clearance between the ground and the moving parts of the generator is appropriate to require, particularly as the proposed location is very "public". We also determined that some railings should also be required (and the draft Wind Ordinance reinforces the need for lockable railings where the turbine is publicly accessible).
- Based on further discussions with you, I sent the agent an e-mail on Dec 15, 2009 outlining what we considered necessary to meet site plan concerns and approve the exemption request (applicant included this in his revised submission).
- On January 27, 2010 I received further information (**attached**) via the Inspections Division.

REVIEW COMMENTS:

- I have reviewed the further information and although somewhat "rough" (particularly regarding the design of the railings) I suggest that the information is adequate and the revised proposals should be granted an exemption for the following reasons (I have underlined aspects where potential conditions could be crafted):
    - Our requirements (linked to information obtained during research on the Wind Ordinance) included raising the height of the support pole by 5 ft, which brings the overall height to 35 feet (still well within the zoning height limit of 45 ft), and results in the moving parts of the generator being 14+ feet from the surrounding grade. The support is an unclimbable steel pole.
    - The other three key requirements as currently included in the internal draft Wind Energy Generation Draft are setbacks, noise, location on the site. Taking each in turn:

- Setbacks: the draft specifies 1.1 times height from property lines and 1.5 times height from inhabited buildings (eg residential). The proposal technically does not meet the (draft) standard re the setback from property lines as the applicant does not own the water, but it does meet the zoning requirement of 5 ft from the edge of the pier.

- Noise: the noise tests I have looked at (although partly in French) seem to indicate that the source noise is around 45dBA for this *Windspire*. The Waterfront Zone has 75dBA as the maximum (the draft Wind Ordinance requirement is to meet the zoning requirement)

- Location: the proposal generally meets the draft standard for location which specifies it be least visible from right of ways (Commercial Street), as it has been located as close as possible to the existing building. The fact it impinges on an adopted view corridor was agreed with Danielle as irrelevant as this proposal does not meet the definition of a minor site plan and therefore site plan standards per se do not apply.

- The discussion draft Wind Energy Generation Ordinance also refers to shadow flicker and ice shedding. I could not find any information in the technical info available on the *Windspire* web regarding these 2 issues but given the distance from residential uses (over 200 ft) and its location nestled next to a building, and the fact our Ordinance is not yet adopted, I think these are lesser issues (which this installation would provide info on).

- Ice throw is the most likley possibility, so a condition re that could be included- much of the testing of this particular wind system has been in places where snow and ice do not happen. Jeanie Bourke is looking closely at the engineering issues re its performance in high winds.

- The revised sketch plan includes "5-6 ft high tubular railings similar to existing" and indicates where they will be located around the base. While no details of the fencing or its connections to existing fencing are included (I had asked for clarification of the spec), I think we could grant the exemption with a condition that relates to the railings (or I could ask for the spec now).

- I have discussed the proposal with both Jeanie Bourke and Bill Needleman and both agree it's a good site for a "test" case of the *Windspire*, since it's a well-proven system (the manufacturing company have just installed their 400th) which is likely to be the subject of future site plan/ZBA/building permit applications in Portland. Bill confirms that the waterfront is a noisy and visually chaotic area in any case and as it offers "good" wind it's a good location for a wind system (he supports ones that are even higher).

- Having said that, the *Windspire* has had a number of technical problems during development and I have advised Jeanie Bourke (Code Reviewer) of these. I don't think those problems relate to planning issues but more to the robustness of the various components.

30-H-1

Mariah Power

Technical Data Sheet

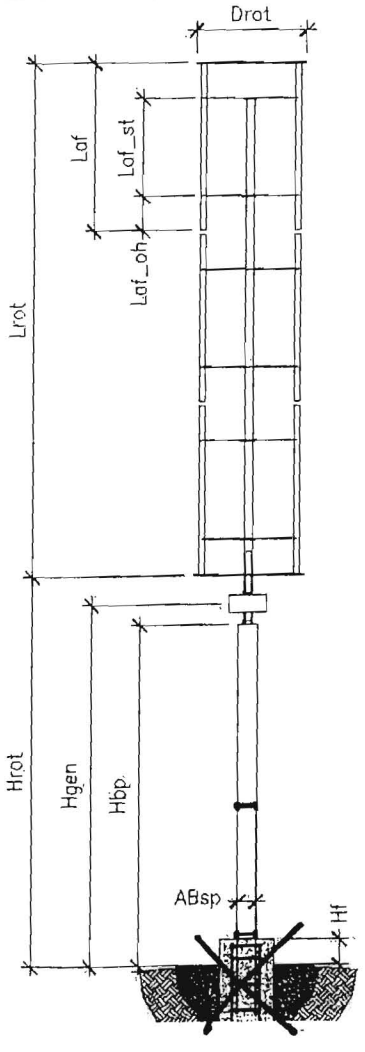
Windspire™ 7

1.2kW - Standard (35 ft.)

Aug. 2009

Material Specifications:

Mechanical Item	*Size*	*Grade*
Top Shaft:	3.5" OD x 0.120" Wall x 230" Lg.	Steel, ASTM A513 Type 5
Bottom Shaft:	3.5" OD x 0.500" Wall x 114" Lg.	Steel, ASTM A513 Type 5
Tower:	8.625" OD x 0.188" Wall x 84" Lg. & 8.625" OD x 0.322" Wall x 60" Lg.	Steel, ASTM A500 Grade B
Base Plate:	~~10" sq. x 1" Thick~~ SEE DETAIL	Steel, ASTM A36
Anchor Bolts:	(4) M20 x 1m Length (4.5" projection)	Steel, ISO 898.1 - Class 8.8
Airfoils:	5" Chord x 78" Length	Aluminum, 6063-T6
Airfoil Struts:	1.5" Width x 0.25" Thick	Aluminum, 6061-T6
Elastomer Dampers:	2" OD x 0.75" ID x 0.125" Thick	Fabreeka Washer - (5) at each anchor bolt (4 below, 1 above base plate)



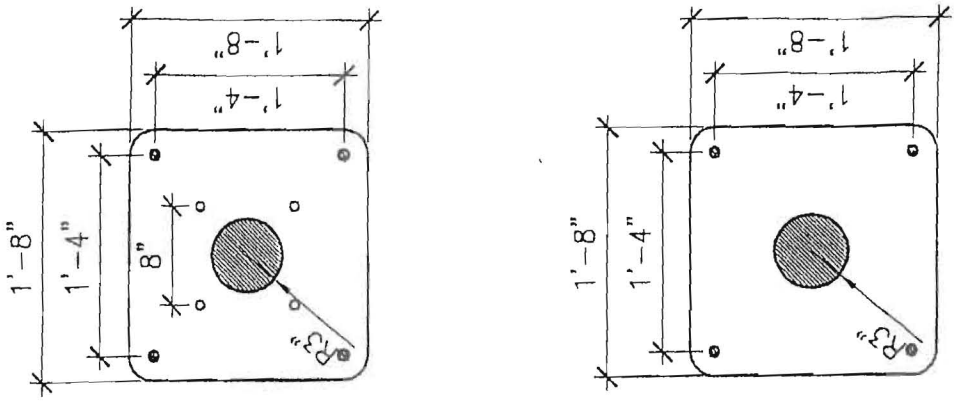
SEE DETAIL SSK-1

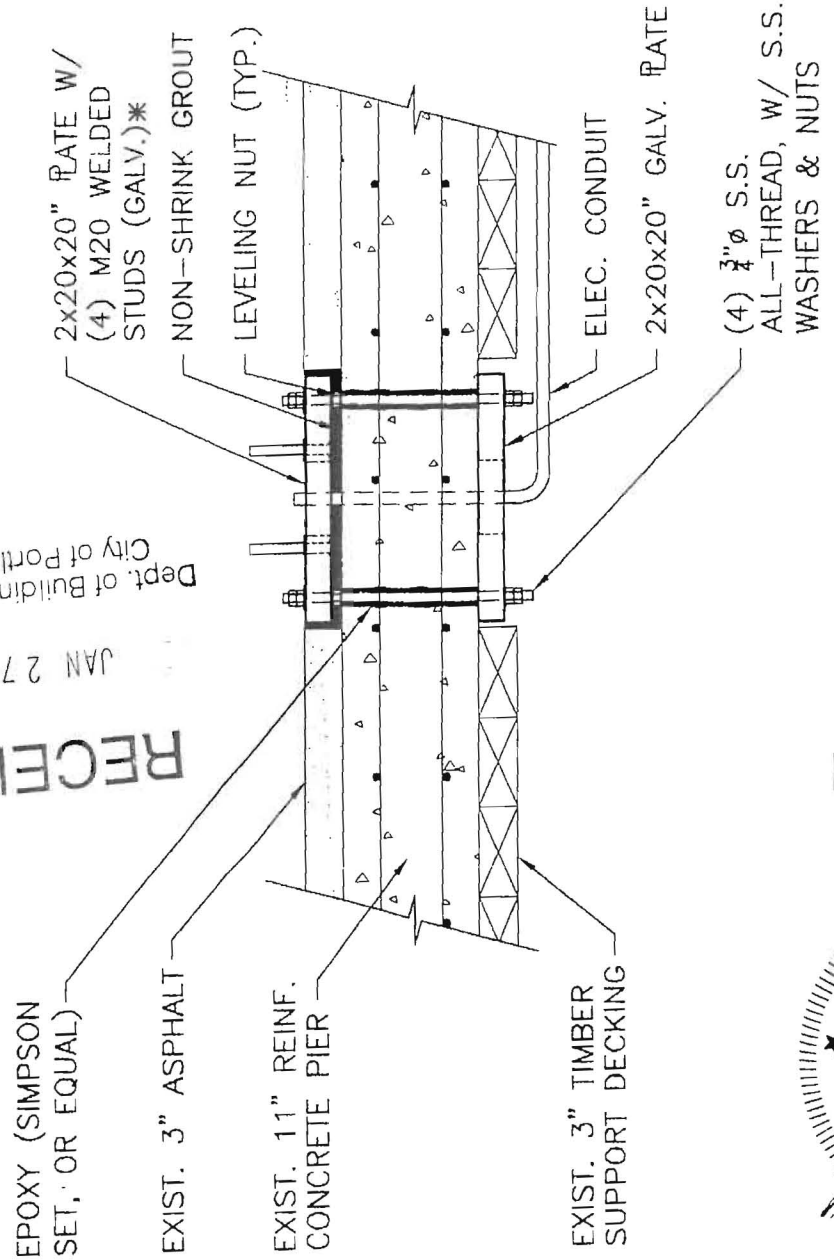
Cut-In Wind Speed =	9 mph (200 rpm)
Cut-Out Wind Speed =	34 mph (420 rpm)
Design Peak Gust =	**105 mph**
Peak Lateral Force (105mph) =	814 lbs.
Peak Overturing Moment (105mph) =	17,244 lbs*ft
Approx. Weight =	750 lbs
Rated Power (RP) =	1,200 Watts
Wind Speed @ RP =	25 mph
1st Resonance Mode =	55 rpm
2nd Resonance Mode =	275 rpm

D_{rot} =	48 in
L_{rot} =	240 in
L_{af} =	78 in
L_{af_st} =	46 in
L_{af_oh} =	16 in
H_{rot} =	180 in
H_{gen} =	168 in
H_{bp} =	156 in
H_f =	12 in (adjustable with engineering)
ABsp =	8 in

Note: Product variations, revised base connections or additional connections, and/or removal of Fabreeka dampening washers will drastically effect the rotordynamics and may result in overstressed conditions. Prior to any revisions or modifications, consult with engineering department.

30-H.1





1.2kW WINDSPIRE – BASE CONNECTION

* M20 STUDS ARE CLASS 8.8

TIMOTHY S. DEAN
No. 7545
LICENSED PROFESSIONAL ENGINEER

01/19/10

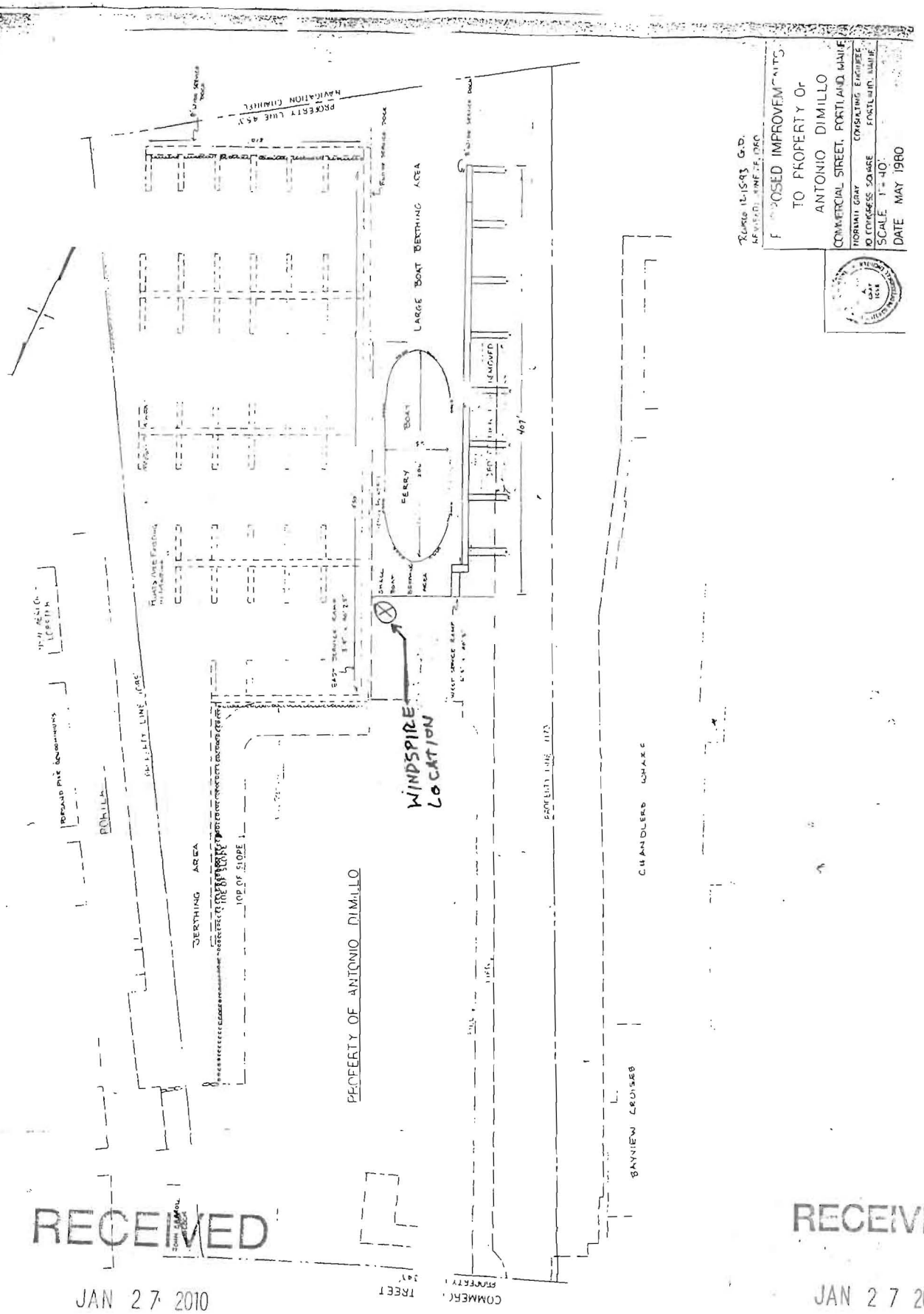
NELSON & SMALL
DIMILLO'S WINDSPIRE
PORTLAND, MAINE

SCALE: N.T.S.
DATE: JANUARY 19, 2010
DESG BY: TSD
PROJECT: 10303

SSK-1

PINKHAM & GREER CONSULTING ENGINEERS 380 US ROUTE ONE, FALMOUTH, MAINE TELEPHONE: (207) 781-5242

30-H-1



RECEIVED
JAN 27 2010
Dept. of Building Inspections
City of Portland Maine

RECEIVED
JAN 27 2010
City of Portland
Planning Division

30-H-1

DiMillo's Windspire
Jean Fraser to: markh

12/15/2009 12:12 PM

Mark,

Further to our conversation last week, I write to confirm that we would like some additional/revised plans submitted that include the additional items that we discussed.

Our main concern is public safety since the location of the Windspire is immediately adjacent the main entrance to DiMillos and also easily accessible by pedestrians via the parking area on Commercial Street. Virtually all other wind energy ordinances I have reviewed (and the one I am drafting for Portland) include requirements for non-climbable poles, clearances for moving parts, and security and we consider that following would be appropriate at this location to address safety issues:

1. 5-6 ft high tubular railings (similar to the blue painted ones that are there but higher) around the generator base and securely attached to the existing railing and chain link fencing on the waterside to prevent unauthorized access to the generator base;

2. Add a 5 foot extender to the pole so that the moving parts of the wind geneator are at least 12 ft above the "ground" (eg existing asphalt level).

Please send me more detailed plans (this can be by pdf in an e-mail) showing the actual proposed location of the base/pole, the fencing (clarifying the spec) and the revised elevation showing the revised pole and height.

Once we receive these details we can quickly continue processing the Exemption Request.

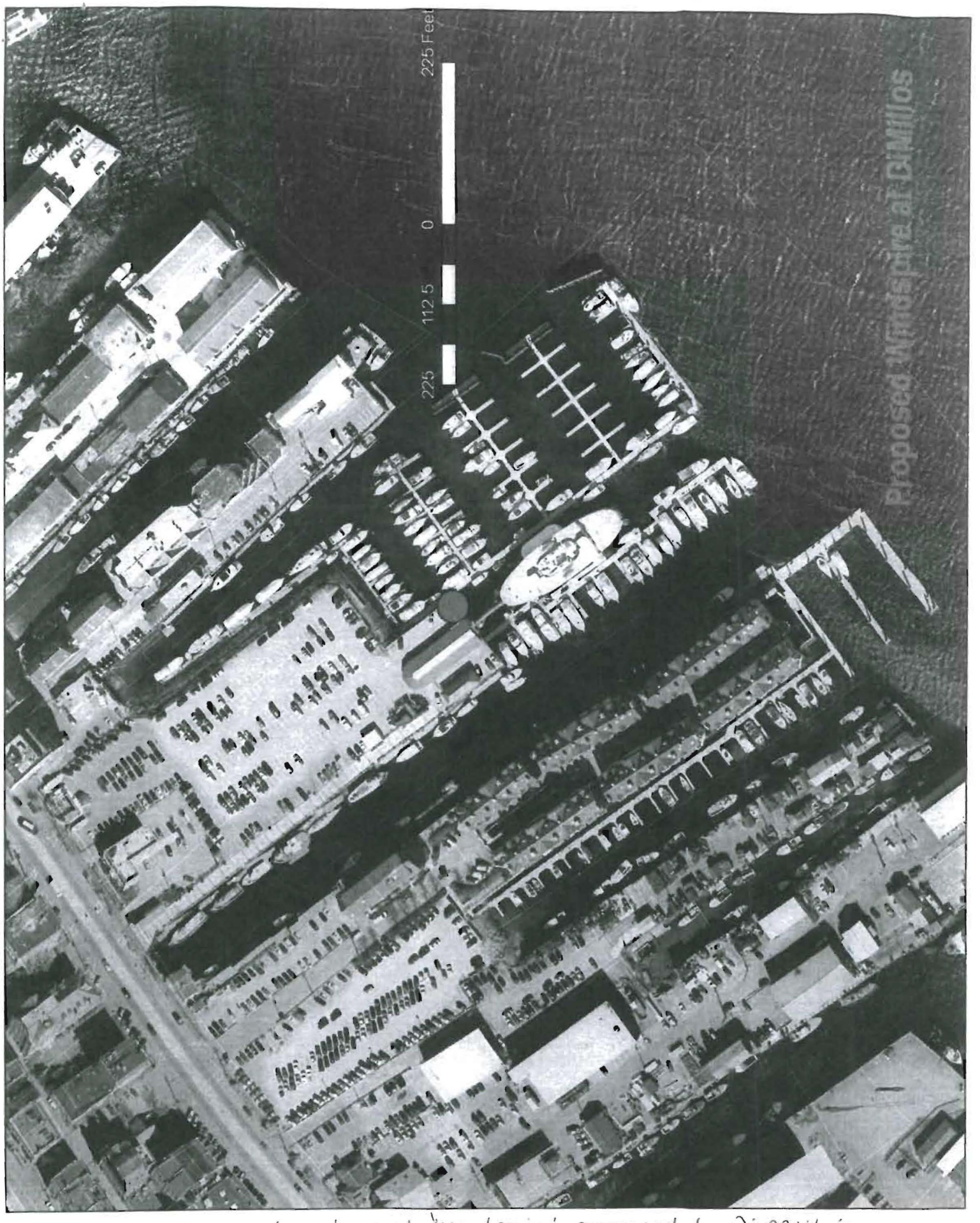
Please do not hesitate to telephone me if you have any questions- I will be in the office today until about 1pm (my daughter is unwell) and I will be in the office tomorrow.

Thank you

Jean

Jean Fraser, Planner
City of Portland
874 8728

Planning Staff aerial



Location of 'Windspire' proposed for Di Millo's

NOTE FOR FILE 12.10.09

Re: DiMillo's Exemption Application for *WINDSPIRE* Wind Generator

I had a telephone conversation today with **Mark Hellen** of Nelson and Small (Technical Consultant) 775-5661 Ext 237 [He apologized for not getting back to us but has had a difficult couple of weeks; I called him after leaving message yesterday].

1. **Proposals for security:**

   a. The site already has fencing on the 2 water sides (high chain link for one segment and a lower tubular steel for the other – visible in photos) and they would fence the other 2 sides with 6 ft high black vinyl-coated chain link fence if we would like it to be fenced. This would not be within 5 ft of the water as its on the inland side.

   b. Instead/in addition he can add a 5 ft extender to the pole so that the height before reaching the moving spinner is increased from 9'1" to 14'.

   c. He confirmed that if someone put their hands into the vertical spinning mechanism that they would probably break their hand.

   d. Also he confirmed that for the City's Building Inspector they are getting a PE to review and stamp the plans etc.

   e. Re shadow flicker/ice shedding, he doesn't think these are issues but will check (and get back to me) with the company as they have piloted these in Colorado (where is snow/ice).

   f. They will do whatever we feel is appropriate as they want this installation to give a positive "message" about wind energy; they are likely to wait until Spring to install so to allow all the necessary discussions to take place with us as they want everyone "happy".

2. **Context information:**

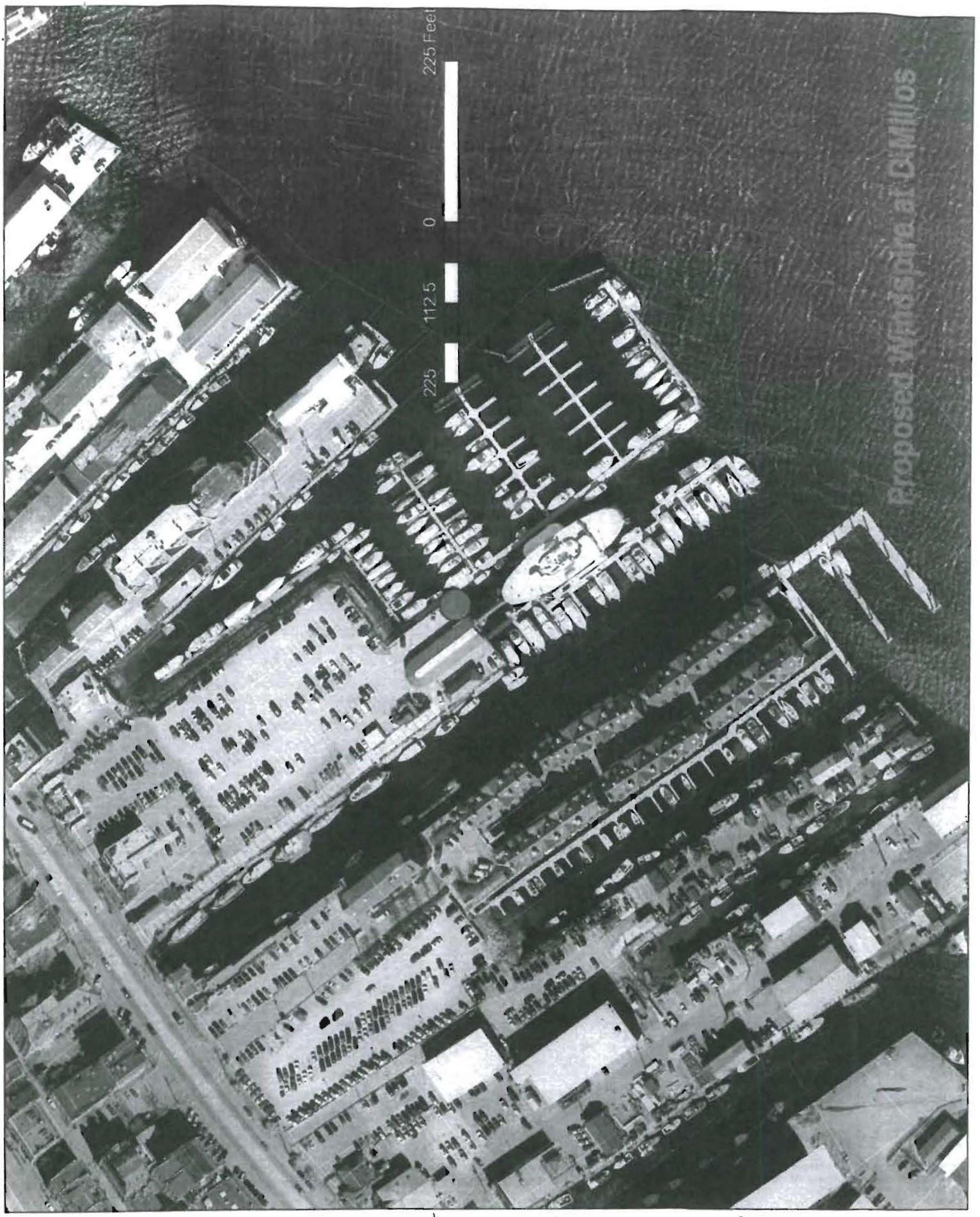
   a. He was unaware of any other *Windspire* being installed in the Portland area and this one at DiMillos is the first one that Nelson & Small have been involved with (they have an approx 50 ft high *Skystream* (horizontal axis) in their front yard). He is going to check whether there is one installed nearby by others and get back to me.

   b. He is confident of the wind resource at DiMillo's (he knows Steve DiMillo and had suggested this); thinks the *Windspire* will work well as only needs 4mph; he anticipates that these will initially be most popular with small commercial uses and be located in parking lots (a 3kW version is soon to be available; currently the *Skystream* is 2.4kW and *Windspire* is 1.2-1.5kW). Householders probably won't be interested (now) as cost too high compared to savings given current cost of oil.

   c. He is supportive of the Ordinance development and willing to participate in any discussions I arrange etc.

Jean Fraser, Planner Ext 8728 12.10.09

Planning Staff aerial



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Jean Fraser, Planner Ext 8728 12.10.09

DiMillo's Exemption Application for a "Windspire" Wind Generator

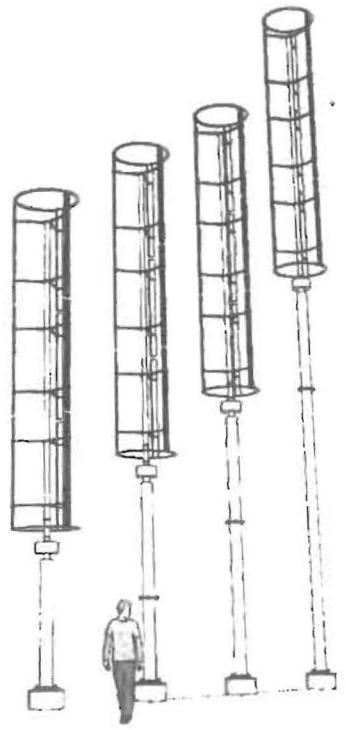
Comments from Planning Division

1. In principle this project should be treated as an exemption as it meets the exemption requirements.

2. However, in looking at other USA Wind Energy Ordinances (adopted local ordinances and State models) it is generally required elsewhere that there be a 12 foot non-climbable distance between the ground and the lowest moving part of the generator (whether horizontal or vertical axis).

3. **Potential condition**: Therefore we (recommend/require) that this project achieve a 12 foot clearance (between the horizontal grade at the base and the lowest moving part) either by raising the base (in a manner that does not make it more climbable) or by adding the manufacturer's (see Moriah Power catalog) available base pole 5 foot extension.

(on Jean's Desktop)



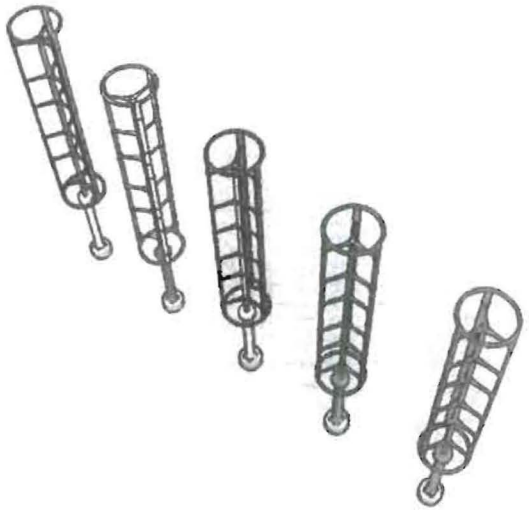
30' 35' 40' 50'

HEIGHTS

Windspire® can be installed at several heights depending on site conditions. Available base pole extensions can add 5', 10' and 20' to the original 30' Windspire height.

COLORS

Custom order in any color.



SYSTEM COMPONENTS

A complete Windspire wind turbine includes four basic system components: rotor, generator, inverter, and an integrated structure.

ROTOR

The lift-based rotor converts the energy of moving air into rotational mechanical energy. Spinning only 2-3 times the speed of the wind (compared to about 7 times for propeller-based turbines), makes Windspire virtually silent. The vertical design allows it to capture wind shifts instantaneously and continue to produce energy in turbulent conditions.

GENERATOR

The generator converts the mechanical energy into electricity by rotating a magnetic field over coils to produce an electric current. Designed for 98% efficiency at low RPM.

INVERTER

The built-in inverter converts electricity to grid-ready 120 v. AC form. UL rating indicates that no additional electronics are needed for inter-connection with utility. The inverter also controls generator and rotor speeds to optimize power output.

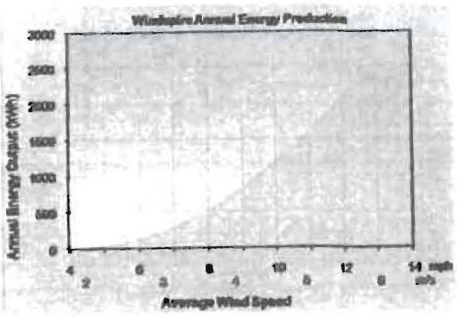
STRUCTURE

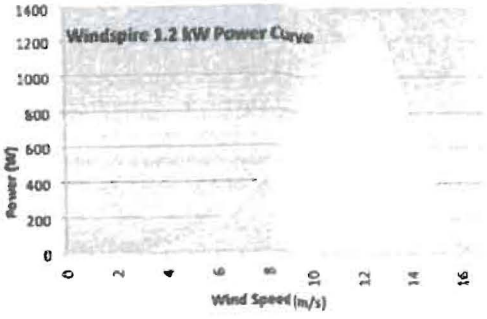
Complete integration translates to smaller parts and easier installation/maintenance through a hinged, monopole system. Sealed bearings require no greasing. Pole made of recycled steel.

1.2 kW Standard Windspire®

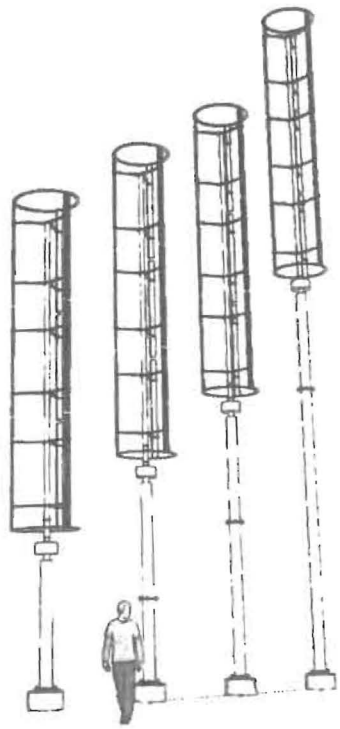
Specifications

Annual Energy Production (AEP) @ 12 mph	2000 kWh*
Instantaneous Power Rating (IPR)	1.2 kW (1200 watts)*
Maximum Power at 30 mph (13.4 m/s)	1.6 kW (1600 watts)*
Standard Unit Height	30 ft | 9.1 m
Sound Measurement	6 dB above ambient (15 mph @ 6ft from base)
Total Weight	624 lb | 283 kg
Rotor Type	Vertical-Axis Low Speed Giromill
Rotor Material	Aircraft Grade Aluminum
Rotor Height/Diameter	20ft/4ft (6.1m/1.2m)
Swept Area	80 sf / 7.42 sq. m.
Max Rotor Speed	400 RPM
Tip Speed Ratio	2.3
Speed Control	Redundant Electronic
Wind Tracking	Instantaneous
Generator	High Efficiency Brushless Permanent Magnet
Inverter	Inverter Custom Integrated Grid Tie 120 VAC 60 Hz
Inverter Certification	Meets IEEE 1547; UL 1741
Performance Monitor	Integrated Wireless Zigbee Modem
Cut-in Wind Speed	8 mph | 3.6 m/s
AEP Avg. Winds Speed	12 mph | 5.4 m/s
IPR Rated Winds Speed	25 mph | 11.2 m/s
Survival Wind Speed	105 mph | 47 m/s
Monopole/Structure Material	Recycled High Grade Steel
Paint	2 Coats, Corrosion -Resistant Industrial Grade Paint
Coatings	Rust Veto & Zinc Olive Drab
Warranty	5 year limited warranty





Proposed Entrance - DiMillos



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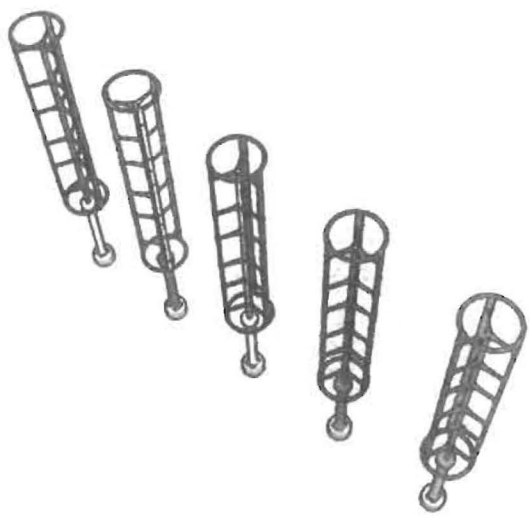

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Complete integration translates to smaller parts and easier installation/maintenance through a hinged, monopole system. Sealed bearings require no greasing. Pole made of recycled steel.

Standard 1.2 kW

The Windspire® wind turbine is an aesthetically designed vertical axis wind turbine that operates quietly while generating electricity for immediate use in your home or business.

The Windspire is also the lowest priced alternative energy appliance within the one kilowatt range on the market. And it's made in the USA.

Windspire invites everyone to explore the potential of clean energy from the natural power of the wind.

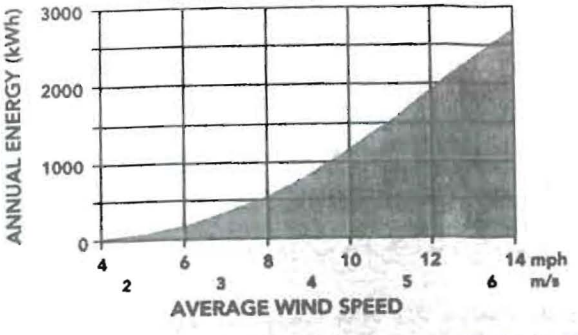
WINDSPIRE® SPECIFICATIONS - STANDARD 1.2 KW UNIT

Annual Energy Production (AEP)	2000 kWh [1]
Instantaneous Power Rating (IPR)	1.2 kW (1200 watts) [2]
Standard Unit Height	30 ft | 9.1 m (pole extension options available)
Total Weight	624 lb | 283 kg
Unit color	Soft Silver
Sound output	6 dBA above ambient (15 mph wind, 6 ft from base)
Warranty	5 Year Limited
Rotor Type	Vertical Axis - Low Speed Giromill
Rotor Height / Diameter	20 ft | 6.1 m / 4 ft | 1.2 m
Swept Area	80 sq ft | 7.43 sq m
Max Rotor Speed	400 RPM [3]
Tip Speed Ratio	2.3
Speed Control	Redundant Electronic
Wind Tracking	Instantaneous
Generator	High Efficiency Brushless Permanent Magnet
Inverter	Inverter Custom Integrated Grid Tie 120 VAC 60 Hz
Inverter Certification	Meets IEEE 1547.1; UL 1741
Performance Monitor	Integrated Wireless Zigbee Modem
Cut-in Wind Speed	8 mph | 3.6 m/s
AEP Average Wind Speed	12 mph | 5.4 m/s
IPR Rated Wind Speed	25 mph | 11.2 m/s
Survival Wind Speed	105 mph | 47 m/s
Foundation	Poured Concrete
Foundation Size	2 ft diameter by 6 ft base [4]
Rotor Material	Recycled Aircraft Grade Extruded Aluminum
Monopole/Structure Material	Recycled High Grade Steel
Paint	2 Coats, Corrosion-Resistant Industrial Grade Paint
Coatings	Rust Veto & Zinc Olive Drab

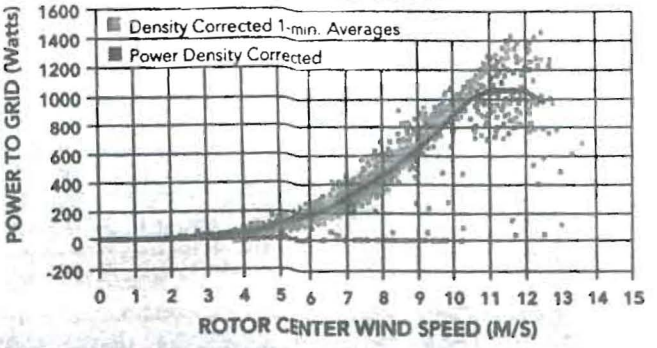
General | Rotor | Electronics | Ratings | Construction

Notes: 1: AEP is based on the power curve and standard assumptions including a Rayleigh wind distribution and sea level air density. 2, 3: Performance is based on initial field test data. Final testing is currently underway. 4. Foundation size may vary for non-standard soil conditions or non-standard heights.

Annual Energy Production



Power Curve



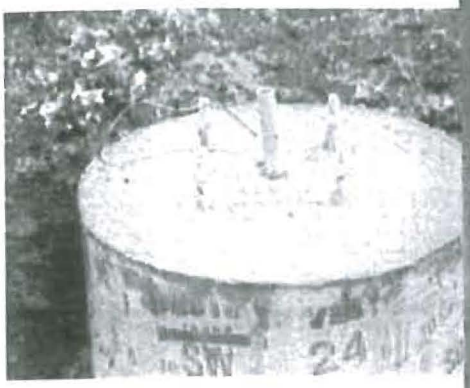
MADE IN USA

Mariah Power

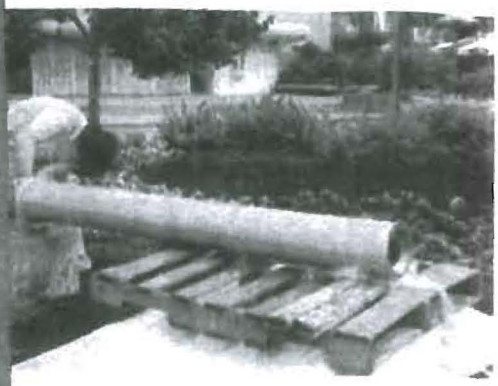
Windspire

www.windspire.info

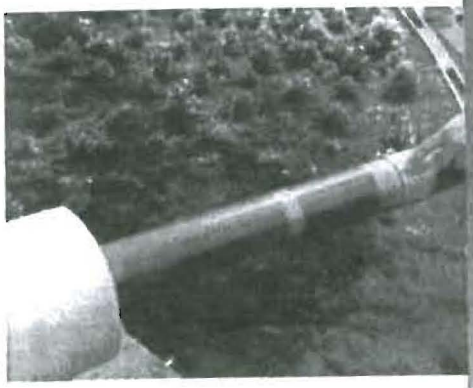
Installation is Simple and Fast!



1. Set Concrete



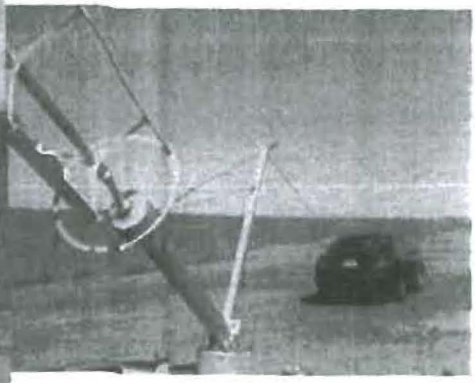
2. Install Base Pole



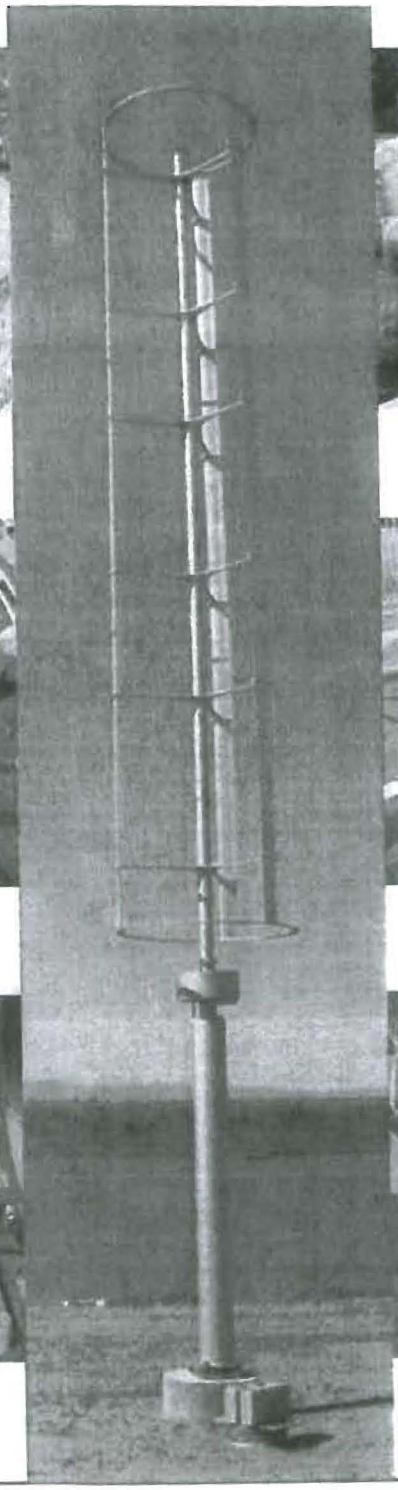
3. Install Top Pole

4. Assemble Rotor

5. Connect Electronics



6. Erect Windspire



Key Features:

- Clean Renewable Energy
- Complete Wind Power System
- Sleek, Attractive Design
- Cost Effective
- Silent Operation
- Made in the USA
- Made from Recycled Materials
- Low Profile, only 30 Feet Tall
- Annual Energy ~ 2000+ kWh/yr
- Grid-Ready, Plug 'n Produce™
- Integrated Inverter
- High Efficiency Generator
- Hinged Monopole Makes Installation Simple
- Wireless Performance Monitor
- Maintenance-Free
- Independently Tested
- IEEE & UL Certified
- Popular Science "Best of What's New 2008" Award

Mariah Power

www.mariahpower.com
5450 Louie Lane,
Reno, NV 89511

775-857-4888

Printed on 100% Recycled Paper

Power to Inspire™

Clean. Simple. Smart.

Clean Energy for You

Affordable, attractive and ultra quiet, the Windspire® wind turbine gives you the power to create clean energy from the natural wind just outside your door. At only 30 feet tall and 4 feet wide, the Windspire wind turbine is distinguished by its sleek propeller-free design and ultra-quiet operation. Designed for use where you live or work, the Windspire is currently powering homes, small businesses, schools, museums, parks, and much more.

Power from Wind

The Windspire® wind turbine generates power when the wind blows against its vertical airfoils causing them to spin. This power is then converted into AC electricity and is immediately available to power your home grid and all the appliances that draw electricity from it, such as lights, refrigerators, and air conditioners. While the technology behind the Windspire is complex, the basic premise is simple: the stronger the wind the more power it generates.

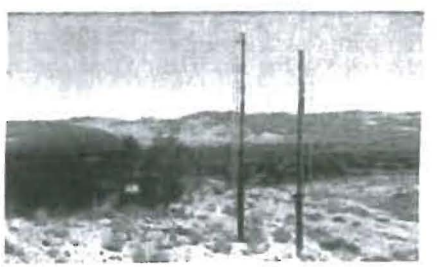
Wind & Site Requirements

The Windspire® wind turbine was designed to operate in areas with minimum average wind speeds of at least 10 mph (4.5 m/s) though it works best where average winds exceed 12 mph (5.4 m/s). Wind speeds vary by location, even within a property, and generally preferred sites are clear of any nearby obstructions such as tall trees or buildings. Your Windspire Dealer can discuss siting guidelines with you in more detail.

Installation is Quick & Easy

Simple to install and use, the Windspire® wind turbine comes as a complete system with a high-efficiency generator, integrated inverter, hinged monopole, and wireless performance monitor. Once your foundation is properly laid, your Windspire Dealer can install your new Windspire in as few as three hours without the use of heavy machinery.

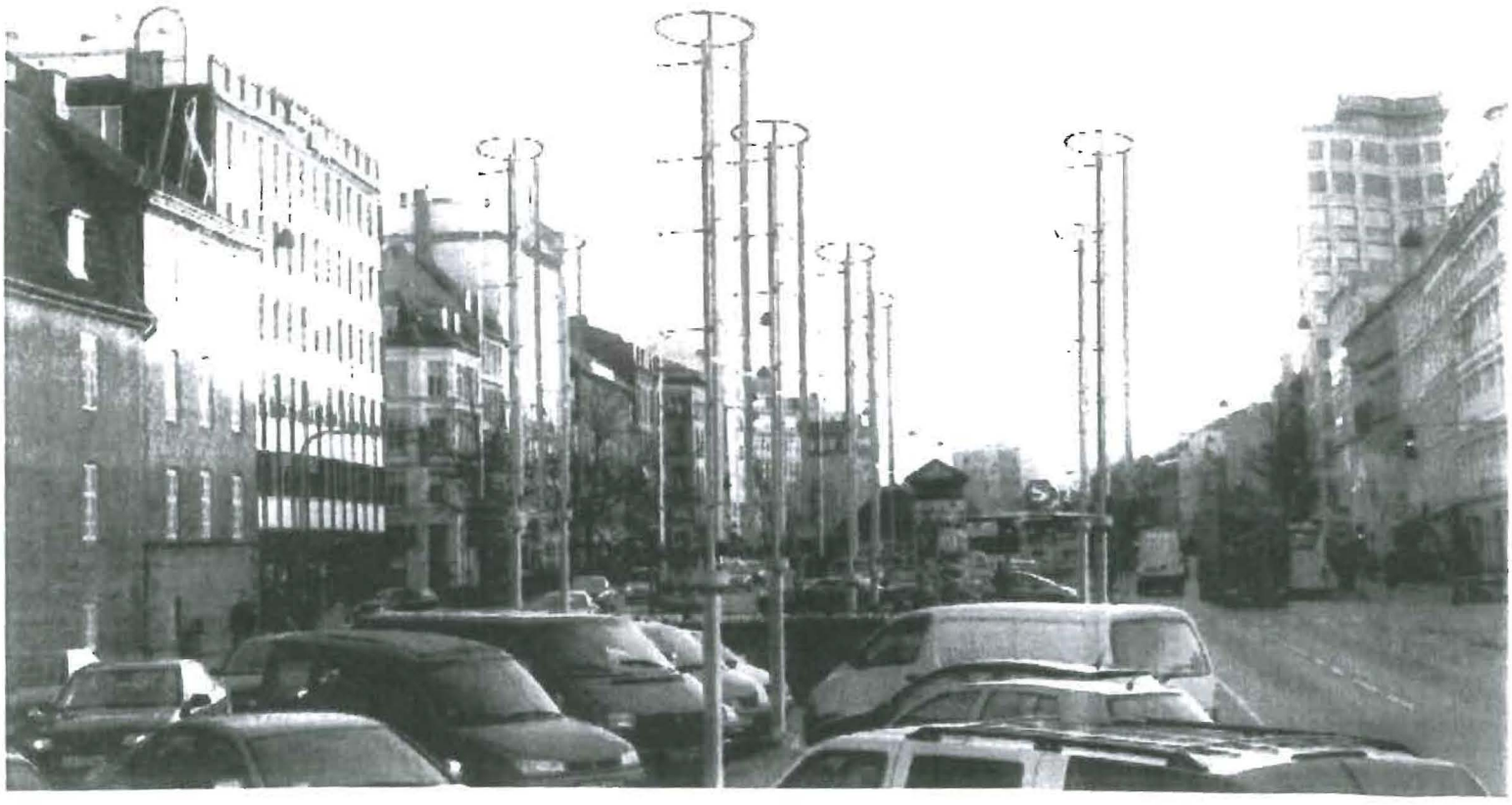
Credit: Dawon Bank



Be Smart & Save Money

Starting at $6,500 for the complete system (before installation) the Windspire® is priced much lower than comparable wind turbines and other alternative energy options. Independent tests confirm the Windspire will produce approximately 2,000 kilowatt hours per year in 12-mile per hour average winds. This equates to around a quarter of the average energy needs of a residential home.

Depending on wind conditions, electricity rates, and local incentives, the Windspire can pay for itself in as little as five years. The U.S. Federal Government provides a 30% tax credit off the total cost of the Windspire including installation fees. Other local incentives may be available in your area.



Windspire

FORM MEETS FUNCTION IN WIND ENERGY

Windspire® is a welcome solution for architects, planners and developers involved in sustainable design. Offering wind power systems with flexible siting options and impressive power production, the Windspire vertical wind turbine is reshaping renewable energy projects with a new look and a cost competitive advantage.

The Windspire is designed and manufactured by small wind technology company Mariah Power. The company is based in Reno, Nevada and has a volume manufacturing facility in Manistee, Michigan.

DESIGN WITH WINDSPIRE

Work in series. Create through variations in height, rotor size and color. Design through building integration to capture more energy.

PROVIDE SCALABLE POWER

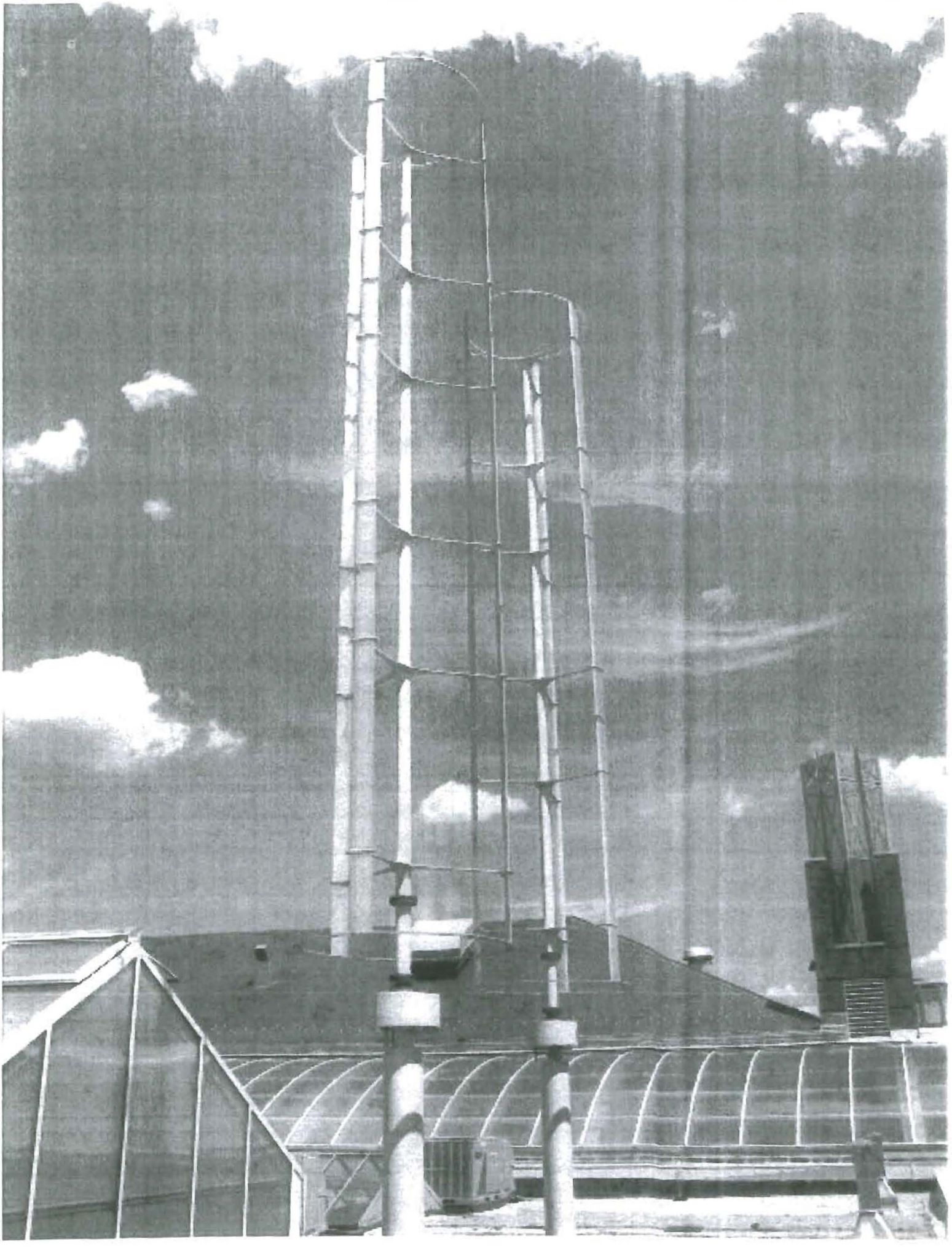
Increase power with an array of units. Site a micro-wind plant within zoning guidelines.

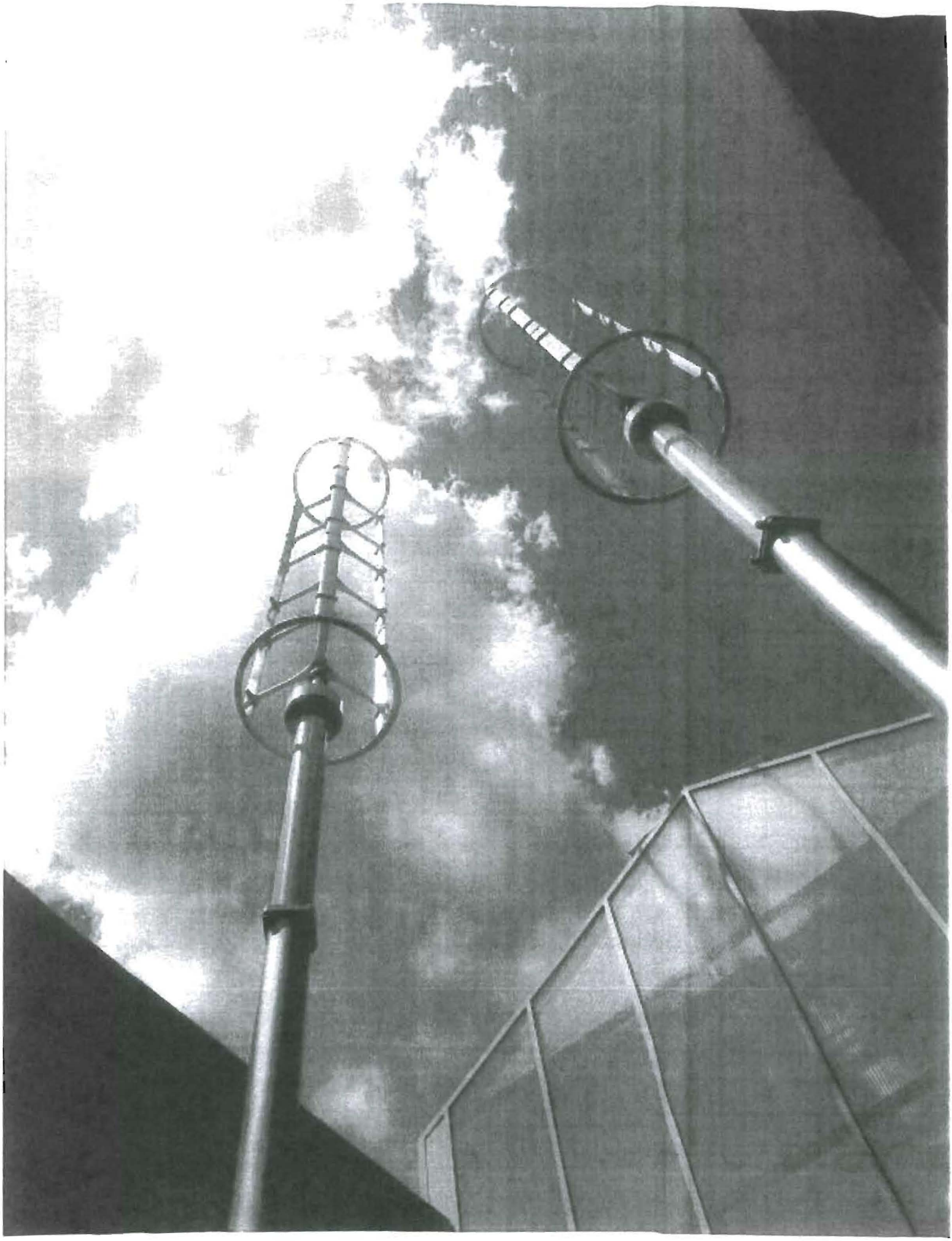
PLACE IN MORE HUMAN ENVIRONMENTS

Silent. Sculptural. Bring wind power close to areas where people live and work.

CREATE A VISUAL STATEMENT FOR SUSTAINABLE DESIGN

Value-added impact to express a variety of motivations and project goals.





WIND AND AIRFLOW BASICS

To site a Windspire® for best power production, it is important to understand the conditions at a site, including:

1. Available wind resource
2. Direction of the prevailing winds
3. Locations of obstructions, both existing and predicted

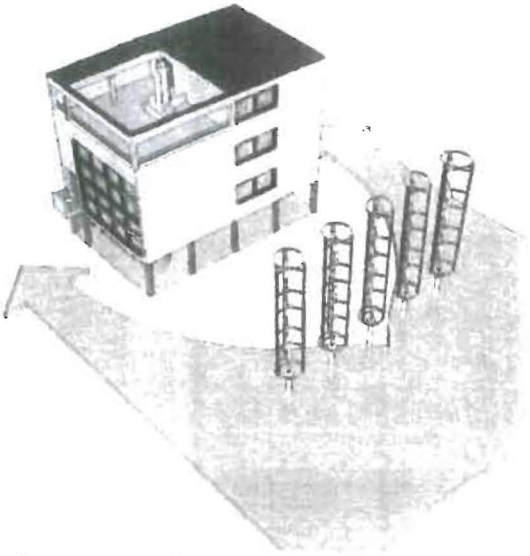
Estimating a range for annual average wind speeds is possible by several sources, including wind maps, area weather stations, visual reference scales and local knowledge. These tools should serve as general guides, remembering that specific conditions at the proposed site could vary greatly. A year-long anemometer study is most accurate, but costs ranging from $2,000 - $5,000 can be prohibitive and time-consuming.

Knowing the direction of local prevailing winds is important to help find the best orientation and avoid turbulence from obstacles. Turbulence slows down airflow and reduces power production.

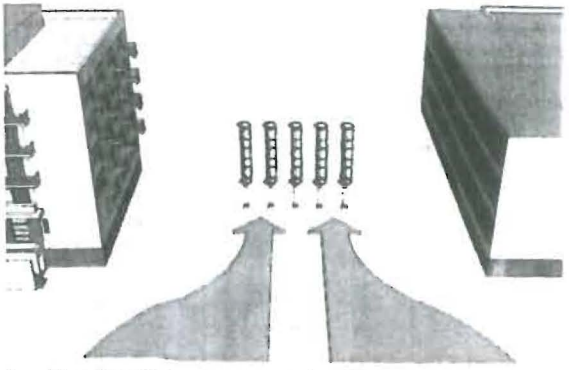
The wind has the most potential power where it is least obstructed, which is often the highest point on the site. Wind speed increases with height, and gaining even a small increase in velocity will result in exponentially better power production. A minor 10% increase in wind speed will create 33% more available power.

Where obstacles block clear access to the wind, Windspire wind turbines can be installed higher on base pole extensions or even on top of a building. This should be coordinated with local zoning height restrictions.

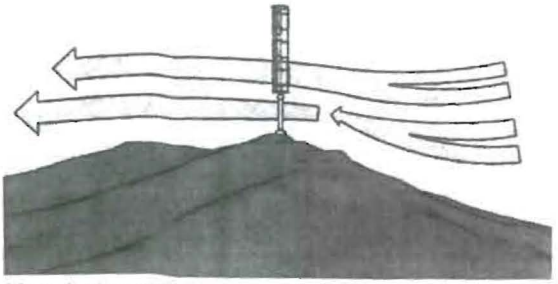
Complex terrain requires more careful consideration. Siting on the windy side of a hill will allow more access to prevailing winds than in a gully or on the leeward (sheltered) side of the same hill.



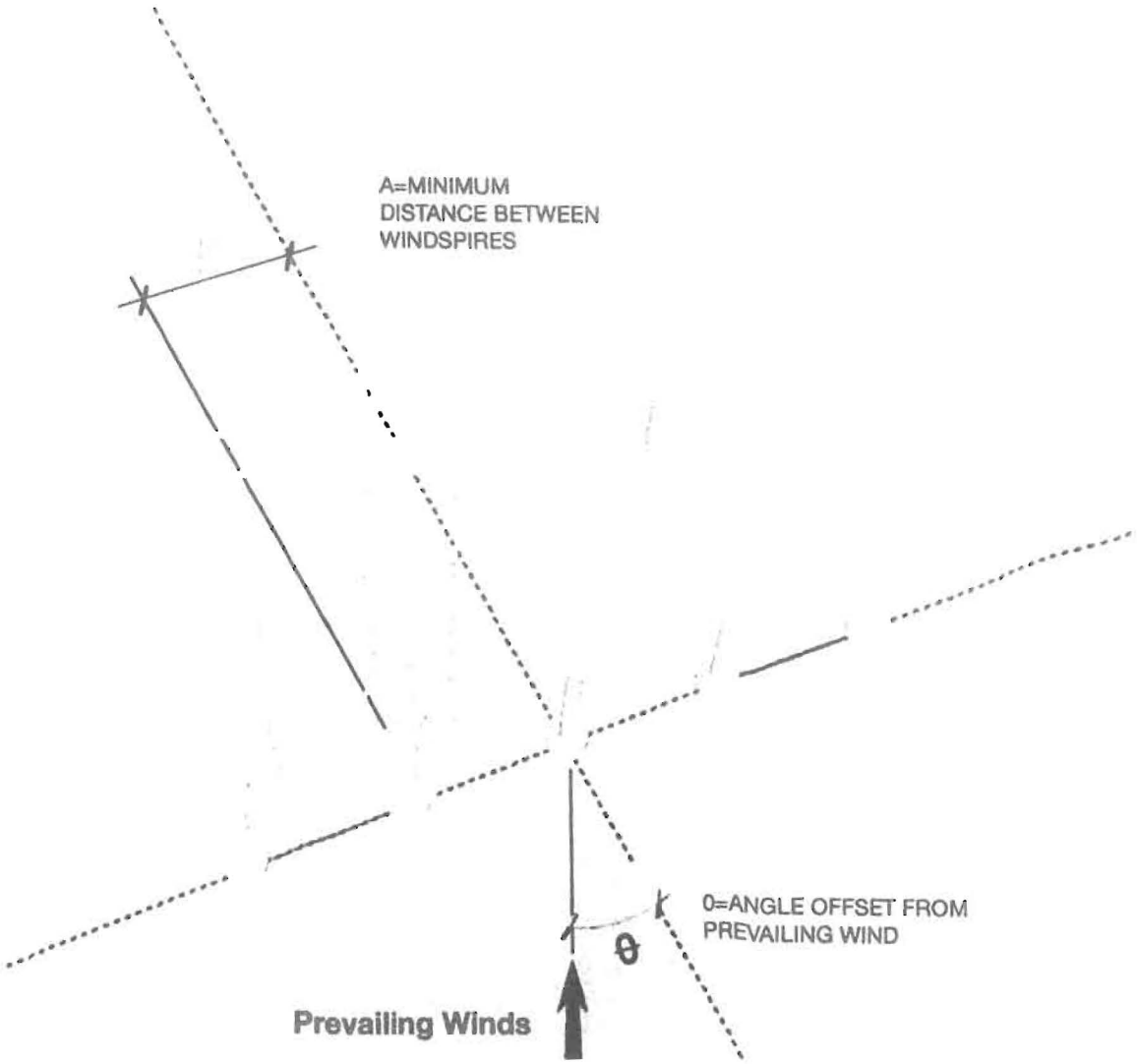
Wind splits long before reaching an obstacle, creating pockets of dead air upwind of the obstacle and a turbulent vacuum on the downwind side of the obstacle.



Looking for or creating areas with accelerated airflow can increase the power output of a Windspire installation.



More factors are considered for complex terrains.



SITING WINDSPIRES

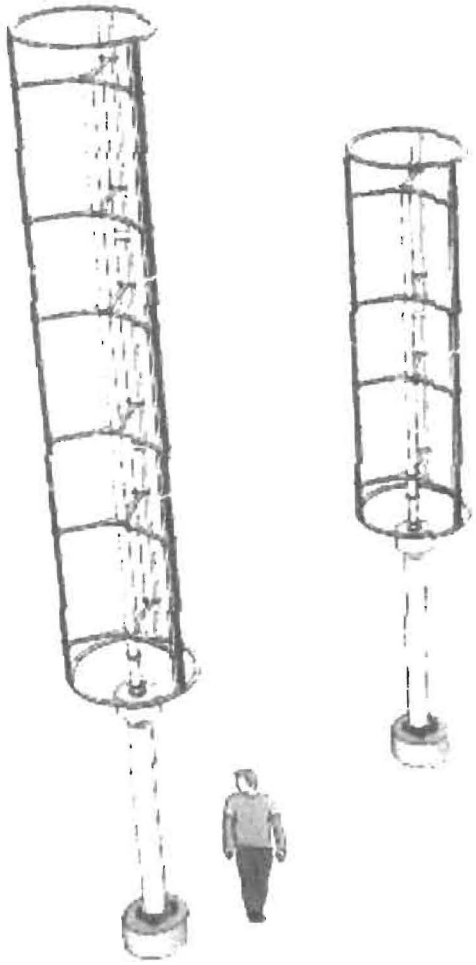
In order to successfully site a Windspire® installation, designers should be aware of the prevailing wind and relationships to obstacles at and around the site. Siting multiple Windspire wind turbines requires additional consideration regarding the drag (reduced airflow) that one unit may have upon another.

CLEARANCES BETWEEN WINDSPIRES

Windspires should be placed in series according to their orientation to the prevailing winds.

Angle offset from wind	Distance required (feet)
0°	8'
15°	8.3'
30°	9.2'
45°	11.2'
60°	15.4'
75°	26.5'
90°	50'

WINDSPIRE MODEL RANGE



COMING SOON

	STANDARD WINDSPIRE	EXTREME-WINDS WINDSPIRE	DEC 2009 LOW-WIND WINDSPIRE	EARLY 2010 COASTAL WINDSPIRE
DIMENSIONS	30' Tall x 4' Dia.	23' Tall x 4' Dia.	30' Tall x 6' Dia.	23' Tall x 6' Dia.
COLLECTED AREA	80 SF	52.7 SF	120 SF	79 SF
AEP	2000 kWh@ 12 mph	2050 kWh@ 15 mph	In testing	n/a
IPR	1.2 kW	1.1 kW	In testing	n/a
SURVIVAL SPEED	105 mph	168 mph	90 mph	n/a

POWER OUTPUT

Windspire® provides power at 120v AC. New inverters to be released over the coming months will enable a variety of other applications.

INVERTERS

120v AC

12v/24v/48v DC

230v AC

3-Phase

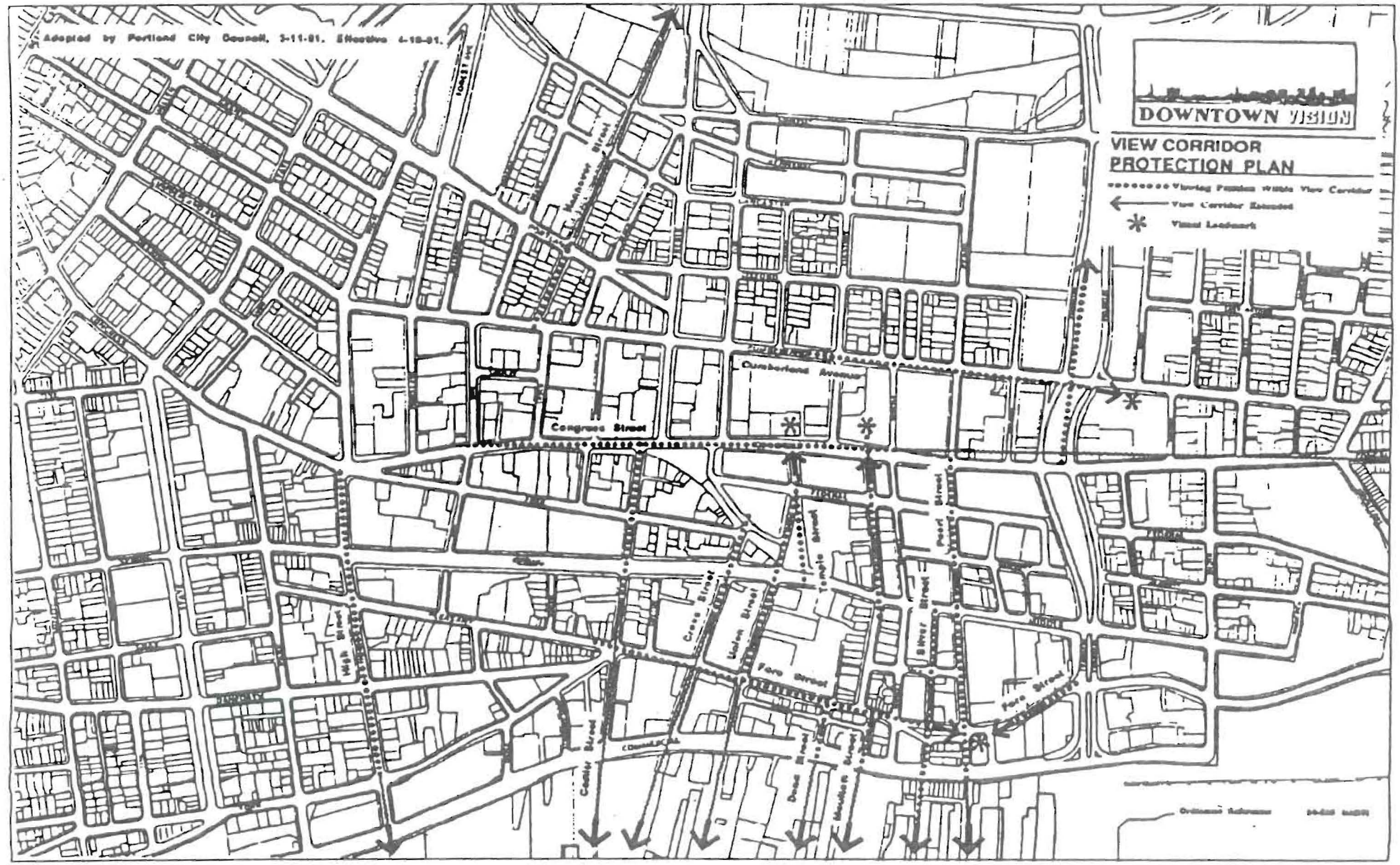


Figure ___: View Corridor Protection Map

Planning Barbara Barhydt

[Note; This is tied in with the Building Ppermit #09-1279 144 Commercial Street]

Jean Fraser has reviewed this project to ensure that the review reflects the developing Wind Ordinance.

12.10.2009: JF spoke to the applicant's agent Mark Hellen of Nelson and Small (Technical Consultant) 775-5661 Ext 237 and he confirmed:

a. The site already has fencing on the 2 water sides (high chain link for one segment and a lower tubular steel for the other – visible in photos) and they would fence the other 2 sides with 6 ft high black vinyl-coated chain link fence if we would like it to be fenced. This would not be within 5 ft of the water as its on the inland side.

b. Instead/in addition he can add a 5 ft extender to the pole so that the height before reaching the moving spinner is increased from 9'1" to 14'.

c. He confirmed that if someone put their hands into the vertical spinning mechanism that they would probably break their hand.

d. Also he confirmed that for the City's Building Inspector they are getting a PE to review and stamp the plans etc.

e. Re shadow flicker/ice shedding, he doesn't think these are issues but will check (and get back to me) with the company as they have piloted these in Colorado (where is snow/ice).

f. They will do whatever we feel is appropriate as they want this installation to give a positive "message" about wind energy; they are likely to wait until Spring to install so to allow all the necessary discussions to take place with us as they want everyone "happy".

g. He is confident of the wind resource at DiMillo's (he knows Steve DiMillo and had suggested this); thinks the *Windspire* will work well as only needs 4mph; he anticipates that these will initially be most popular with small commercial uses and be located in parking lots (a 3kW version is soon to be available).

12.15.2009: After discussing with senior colleagues, the following e-mail sent:

Mark,
Further to our conversation last week, I write to confirm that we would like some additional/revised plans submitted that include the additional items that we discussed.

Our main concern is public safety since the location of the Windspire is immediately adjacent the main entrance to DiMillos and also easily accessible by pedestrians via the parking area on Commercial Street. Virtually all other wind energy ordinances I have reviewed (and the one I am drafting for Portland) include requirements for non-climbable poles, clearances for moving parts, and security and we consider that following would be appropriate at this location to address safety issues:

1. 5-6 ft high tubular railings (similar to the blue painted ones that are there but higher) around the generator base and securely attached to the existing railing and chain link fencing on the waterside to prevent unauthorized access to the generator base;

2. Add a 5 foot extender to the pole so that the moving parts of the wind generator are at least 12 ft above the "ground" (eg existing asphalt level).

Please send me more detailed plans (this can be by pdf in an e-mail) showing the actual proposed location of the base/pole, the fencing (clarifying the spec) and the revised elevation showing the revised pole and height.

Once we receive these details we can quickly continue processing the Exemption Request.

1.28.2010 Final Planner Comments on further information received 1.27.2010:

I have reviewed the further information and although somewhat "rough" (particularly regarding the design of the railings) I suggest the revised proposals should be granted an exemption for the following reasons:

- Our requirements (linked to information obtained during research on the Wind Ordinance) included raising the height of the support pole by 5 ft, which brings the overall height to 35 feet (still well within the zoning height limit of 45 ft), and results in the moving parts of the generator being 14+ feet from the surrounding grade. The support is an unclimbable steel pole.

- Setbacks: it does meet the zoning requirement of 5 ft from the edge of the pier. There are no current standards for a wind generator.

- Noise: the noise tests I have looked at seem to indicate that the source noise is around 45dBA for this *Windspire*. The Waterfront Zone has 75dBA as the maximum so this is acceptable.

- The proposal has been located as close as possible to the existing building so that is distant from public ways. The fact it impinges on an adopted view corridor was agreed with Associate Corporation Counsel as irrelevant as this proposal does not meet the definition of a minor site plan and therefore site plan standards per se do not apply.

- The revised sketch plan includes "5-6 ft high tubular railings similar to existing" and indicates where they will be located around the base. While no details of the fencing or its connections to existing fencing are included (I had asked for clarification of the spec), I suggest that we grant the exemption subject to a condition that requires submission of the railing specifications for review and approval.

- I have discussed the proposal with both Jeanie Bourke and Bill Needleman and both agree it's a good site for a "test" case of the *Windspire*, since it's a well-proven system (the manufacturing company have just installed their 400th) which is likely to be the subject of future site plan/ZBA/building permit applications in Portland. Bill confirms that the waterfront is a noisy and visually chaotic area in any case and as it offers "good" wind it's a good location for a wind system (he supports ones that are even higher).

- As the wind generator raise some particular potential engineering issues (such as vibration, ice throw, lightning strikes) I have drawn these to the attention of Inspections so that the Buidling Code reviewer can investigate and review accordingly. Barbara Barhydt suggests that a condition should be included that they obtain the required building permits.

01.29.2010: Final Planning Division Decision (agreed with Barbara Barhydt):

Grant the exemption subject to:

- **a condition that requires submission of the railing specifications for review and approval (?prior to issuance of building permit? JF checking re this);**
- **a condition that they obtain the required building permits.**

General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: DiMillo's Floating Restaurant & Marina

Total Square Footage of Proposed Structure/Area	Square Footage of Lot	Number of Stories
± 81 ft	Plot Plan Submitted	

Tax Assessor's Chart, Block & Lot	Applicant *must be owner, Lessee or Buyer*	Telephone:
Chart# 30 Block# 4 Lot# 1	Name DiMillo's Floating Restaurant & Marina Address 25 Long Wharf City, State & Zip Portland, Me 04101	207-772-2216

Lessee/DBA (If Applicable)	Owner (if different from Applicant)	Cost Of Work: $ 6500.00
	Name Address City, State & Zip	C of O Fee: $ Total Fee: $

Current legal use (i.e. single family) Restaurant & Marina Number of Residential Units N/A
If vacant, what was the previous use? _____
Proposed Specific use: Auxilliary wind powered generator accessary to Marina
Is property part of a subdivision? No If yes, please name _____
Project description: See Attached

Contractor's name: Nelson & Small Inc.
Address: 212 Canco Road
City, State & Zip Portland, Maine 04103 Telephone: 775-5461 ext 237
Who should we contact when the permit is ready: Mark J. Hellen Telephone: 831-6051
Mailing address: 212 Canco Road Portland, Me 04103

Please submit all of the information outlined on the applicable Checklist. Failure to do so will result in the automatic denial of your permit.

RECEIVED
NOV 12 2009
Dept. of Building Inspections
City of Portland Maine

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at www.portlandmaine.gov, or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

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

Signature: [signature] Date: 11-5-09

This is not a permit; you may not commence ANY work until the permit is issue

Revised 07-11-08

Letter from Mariah Power
4/29/09

Mariah Power Response to NREL Small Wind Testing, Chronology of Events

Mariah Power thanks NREL and the staff at the Wind Technology Center for providing the opportunity to test the Windspire, and for sharing feedback in order to help us improve our product. That said, we were disappointed with the turbine component failures during the field testing at the National Renewable Energy Laboratory's Wind Technology Center (WTC) site, and the subsequent discontinuation of testing. The Windspire was a brand new product at the time testing began, and the unit provided for the test was one of our earliest production units.

In addition to testing at the WTC, Mariah Power deployed 100 units to the field as part of our 100 Unit Field Program and continued independent testing. By selecting these diverse sites, some in extreme conditions, we tried to simulate the variety of conditions in which the Windspire was designed to operate. As a result of the WTC and these other programs, we were able to identify and rectify several product design issues early in our production phase.

The problems identified at the WTC and in the field have been closely analyzed and put through a rigorous engineering change order process to remedy. Consequently, the following changes in our design and manufacturing processes have been instituted:

- New air foils replace welded end plates. These end plates are now secured with stainless steel M8 fasteners.
- The safety rings are now segmented and attached with mechanical fasteners. These replaced the butt welded rings.
- The airfoil clamping system was redesigned which provides for a more concentric gripping force. These new opposing clamps secure the airfoils from slippage.
- We have engineered stiffer and straighter shafts, and added ¼ inch thickness to the base plate. These help improve longevity and address early modal/resonance disturbances.
- The loose nuts encountered on this test unit were not encountered on any of the other field units. We believe this issue arose on the test unit due to undue stress from poor shaft straightness (see above).
- A new clamping method was developed to secure the top shaft and generator in order to eliminate fretting.

In addition, Mariah Power has introduced other product upgrades since the first units were shipped. The benefit of a complete field test program and other independent test sites is that we can identify and address potential issues quickly, and also make improvements to the existing technology.

We were disappointed that our inverter had so many issues on the electrical side. Several factors have been changed in our inverter since UL approval, to improve reliability, power output and safety. We are working closely with ETL to incorporate these changes in our UL certification:

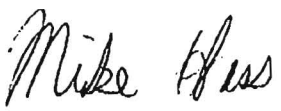
- Revised boost transformer to lower the internal temperature of the transformer
- Added thermal sensing to maximize wattage output while maintaining electrical integrity by shutting down when thermal limits are reached.
- Improved firmware control to better manage the power output and system control in high wind.

Finally, Mariah Power has implemented more quality control measures for its current production units. We have partnered with a top US manufacturing company, MasTech Manufacturing based in Manistee, Michigan. MasTech has manufactured for many top US and foreign car companies and is well known for its expertise in meeting stringent quality controls. We have put in place critical components to our new manufacturing processes:

- Hired AWS certified welders.
- Hired an ASQ certified quality engineer to manage the quality process at Mastech Manufacturing.
- Combined wrought multi-piece components into steel and aluminum castings.
- Put holding fixtures for component fabrication in place to provide consistent machining of the parts.
- Use plug and ring gauges for functional inspection of critical dimensions to ensure consistency of systems.

We are continuing and expanding our own third party testing programs to ensure we integrate testing methodologies and results into our own programs. We look forward to the upcoming AWEA standards for small wind turbines and testing against these requirements once ratified.

Respectfully Yours,



Mike Hess, on behalf of the entire Mariah Power team
(Signed for Mike Hess with his permission)

Nelson & Small, Inc.

Import · Export · Manufacturing · Distribution of World Class Products

PROPOSAL

November 5, 2009

Nelson & Small Inc., distributors of the WINDSPIRE vertical axis wind turbine, will supply all materials and install a WINDSPIRE vertical axis wind turbine for DiMillo's Restaurant & Marina at 25 Long Wharf Portland, Maine 04101.

This proposed auxiliary generator will supplement the energy supply for DiMillo's Marina office. The Marian Office is an out building located on 25 Long Wharf just in front of the entrance (gangway) into the restaurant.

The WINDSPIRE generates grid quality 120 Volt 60 Cycle electricity and will be tied directly into the circuit breaker box. We will have a disconnect switch and meter in close proximity of the Turbine to show how much power is generated by the WINDSPIRE vertical axis turbine.

Mark J. Hellen, Energy Service Manager, is the contact person at Nelson & Small Inc., he can be reached at:

Office: **775-5661 Ext. 237**
Email : markh@nelsonsmall.com
Cell: **831-6051**

BERNSTEIN SHUR

COUNSELORS AT LAW

207 774-1200 main
207 774-1127 facsimile
bernsteinshur.com

100 Middle Street
PO Box 9729
Portland, ME 04104-5029

Christopher L. Vaniotis
207 228-7205 direct
cvaniotis@bernsteinshur.com

November 6, 2009

Mark Hellen
Energy Service Manager
Nelson & Small, Inc.
212 Canco Road
Portland, Maine 04103

Re: Proposed Auxiliary Generator at DiMillo's Marina

Dear Mark:

I am writing to follow up on our meeting Wednesday afternoon during which we discussed the proposal to install a wind-powered auxiliary generator at DiMillo's Marina. The goal is to supplement the energy supply to the marina with a vertical-axis wind turbine. Nelson & Small, Inc. would undertake the installation for DiMillo's.

You asked me to review the City of Portland Land Use Ordinance to determine if the installation would be permissible. In my view, the ordinance allows it as an accessory use under Section 14-308(e)(1)(b) – a permitted use in the Waterfront Central Zone. The wind turbine functions as a generator, supplying supplemental power to a permitted marine use. All along the Portland waterfront and throughout the City there are gas, diesel or gasoline-powered generators auxiliary to permitted uses. While those are typically standby generators to deal with power outages, I do not see any reason why an auxiliary generator which regularly supplements grid power would be treated any differently. And I do not see why the source of the power – wind versus fossil fuels – would make a difference. In fact, public policy at the state, local and national levels encourages the use of electricity generation using non-fossil fuels.

On the DiMillo's Marina site there are already accessory structures involved in the distribution of power – utility poles, wires and related equipment. They are all there as accessory structures. The proposed wind turbine would also be an accessory structure. The fact that this particular auxiliary generator is tall, with a small footprint, does not take it out of the category of an accessory structure. It would comply with the height requirement of the Waterfront Central Zone and would be located in compliance with all required setback regulations. In terms of visual compatibility, the design and height of the vertical axis wind turbine are completely harmonious with the sailing masts which populate the marina.

I also looked at Section 14-313(e), which lists as a prohibited use "ground mounted telecommunications towers, antennas, and/or disks." Clearly that language refers only to telecommunications facilities, such as cell phone towers. It does not prohibit the kind of vertical access wind generator proposed for the DiMillo's site.

In summary, I would categorize the use of the structure as an auxiliary generator accessory to the marina, and I believe that use is permitted by the Portland Land Use Ordinance.

Sincerely,

Christopher L. Vaniotis

CLV/lc

DiMillo's

LONGWHARF

DOCKAGE & MONTHLY PARKING

To: City of Portland Maine

From: Steve DiMillo

Date: November2, 2009

Re: Wind Power

To whom it may concern,

We give permission to Nelson & Small to install a Windspire wind turbine on our property. It will be installed in a specific area near our restaurant entrance, meeting all necessary regulations. The wind turbine will feature a display that will show the power being generated and other information about wind power for the public to view. Please contact me if you have any questions regarding this exciting initiative.

Steve DiMillo
Long Wharf

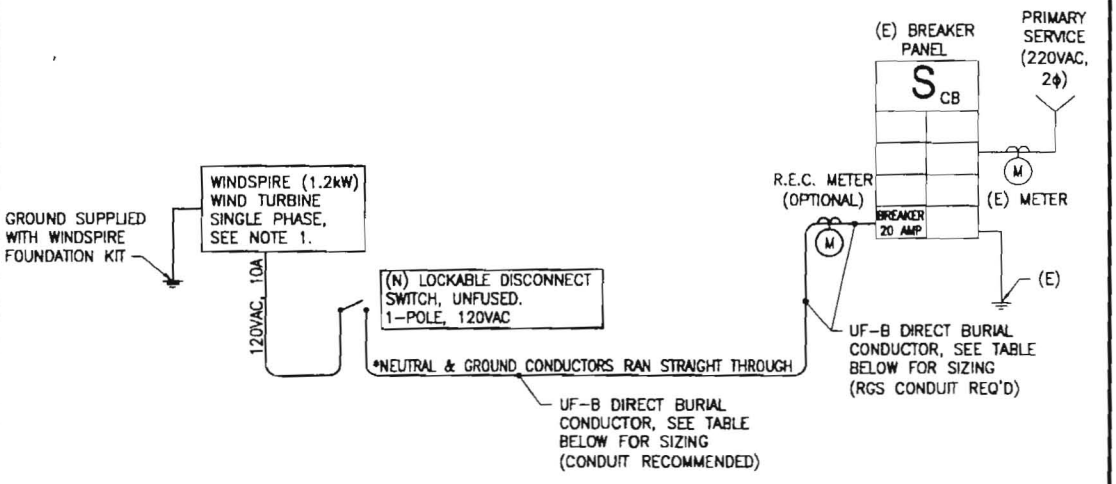
25 Long Wharf, Portland, Maine 04101
(207) 772-2216 • FAX (207) 772-1081

Figure 2–78: Wiring Diagram—Single Connection, Single Phase

WIRING DIAGRAM

1.2kW WINDSPIRE

SINGLE CONNECTION, SINGLE PHASE



ELECTRICAL NOTES:

1. SELF–CONTAINED INVERTER, UL 1741 LISTING REPORT #3125756CRT–001a, MANUFACTURED BY TECHNOLOGY DRIVEN PRODUCTS.
2. ALL EQUIPMENT IS NEW UNLESS OTHERWISE NOTED.
3. CONDUIT ENTRY/CONNECTION TO ELECTRICAL ENCLOSURES SHALL BE SUITABLE FOR GROUNDING PER NEC 250.97 AND SHALL BE SEALED AGAINST ENVIRONMENT.
4. ALL EXPOSED CONDUIT SHALL BE UV RESISTANT PVC OR RIGID GALV. STEEL (RGS).
5. INSTALLATION TO COMPLY WITH NEC, INCLUDING BUT NOT LIMITED TO SECTIONS 690.64(B)(2) AND 705.12.
6. DEDICATED CIRCUIT BREAKER FOR WIND TURBINE SHALL BE INSTALLED AT EITHER (L) OR (R) BOTTOM CORNER OF CIRCUIT BREAKER PANEL PER NEC REQUIREMENTS.
7. THE SUMMATION OF ALL CUIRCUIT BREAKERS (AMPERAGE) WITHIN THE PANEL, SHALL NOT EXCEED 120% OF THE BREAKER PANEL AMPERAGE RATING.
8. VERIFY WITH LOCAL UTILITY COMPANY REGARDING ANY ADDITIONAL WIRING OR DISCONNECT REQUIREMENTS.
9. ELECTRICAL INSTALLATION SHALL BE COMPLETED BY A LICENSED ELECTRICIAN.
10. DO NOT CONNECT TO AN AC LOAD CENTER (CIRCUIT BREAKER PANEL) THAT IS EQUIPPED WITH MULTIWIRE BRANCH CIRCUITS AND/OR GFCI PROTECTED CIRCUIT.

CONDUCTOR MAX. RUN TABLE [1,2]

# OF WINDSPIRE UNITS	CONDUCTOR DESIGN (A)	(V)	CONDUCTOR SIZE (AWG)	MAXIMUM CONDUCTOR RUN (FEET)
1	10	120	10	190
1	10	120	8	290
1	10	120	6	470
1	10	120	4	740
1	10	120	3	920

1. CONDUCTOR (COPPER) RUNS SHALL BE VERIFIED BY ELECTRICIAN OR QUALIFIED DESIGNER FOR SITE SPECIFIC CONDITIONS.
2. CONNECTION OF MULTIPLE WINDSPIRES TO A SINGLE CONDUCTOR RUN, WILL MULTIPLY THE CONDUCTOR CURRENT (A) BY THE NUMBER OF WINDSPIRES AND THUS REDUCE THE MAXIMUM RUN TO BE THE SINGLE UNIT RUN DISTANCE DIVIDED BY THE NUMBER OF UNITS (EXAMPLE: 4 UNITS = 40A; FOR #10 MAX. RUN = 190'/4 = 47.5').

DATE: APRIL 30, 2009	SINGLE WINDSPIRE V.A.W.T. 1.2kW WIRING DIAGRAM	Mariah Power 5450 LOUIE LANE RENO, NV 89511 (775) 857–4888 WWW.MARIAHPOWER.COM
DRAWN: DLM — DWG. NO. 100006_P		
REV. A — SHEET: 1 OF 1		

ELECTRICAL TO BE PROVIDED BY LICENSED ELECTRICIAN, WHO WILL BE RESPONSIBLE FOR THAT PERMIT

Windspire

Windspire® Specifications

The Windspire® wind turbine is an aesthetically designed vertical axis wind turbine that operates quietly while generating electricity for immediate use in your home or business.

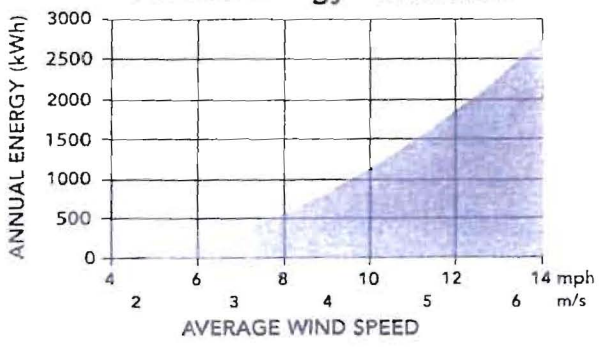
The Windspire® is also the lowest priced alternative energy appliance within the one kilowatt range on the market. And it's made in the USA.

Windspire® invites everyone to explore the potential of clean energy from the natural power of the wind.

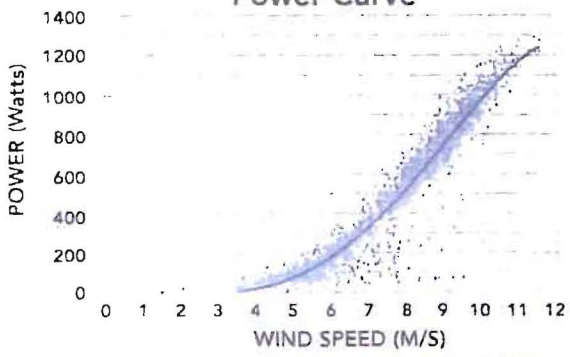
Annual Energy Production (AEP)	2000 kWh [1]	General
Instantaneous Power Rating (IPR)	1.2 kW (1200 watts) [2]	
Standard Unit Height	30 ft | 9.1 m (pole extension options available)	
Total Weight	624 lb | 283 kg	
Unit color	Soft Silver	
Sound output	6 dBA above ambient (15 mph wind, 6 ft from base)	
Warranty	5 Year Limited	
Rotor Type	Vertical Axis - Low Speed Giromill	Rotor
Rotor Height / Diameter	20 ft | 6.1 m / 4 ft | 1.2 m	
Swept Area	80 sq ft | 7.43 sq m	
Max Rotor Speed	400 RPM [3]	
Tip Speed Ratio	2.3	
Speed Control	Redundant Electronic	
Wind Tracking	Instantaneous	
Generator	High Efficiency Brushless Permanent Magnet	Electronics
Inverter	Inverter Custom Integrated Grid Tie 120 VAC 60 Hz	
Inverter Certification	Meets IEEE 1547.1; UL 1741	
Performance Monitor	Integrated Wireless Zigbee Modem	
Cut-in Wind Speed	8 mph | 3.6 m/s	Wind Ratings
AEP Average Wind Speed	12 mph | 5.4 m/s	
IPR Rated Wind Speed	25 mph | 11.2 m/s	
Survival Wind Speed	105 mph | 47 m/s	
Foundation	Poured Concrete	Construction
Foundation Size	2 ft diameter by 6 ft base [4]	
Rotor Material	Recycled Aircraft Grade Extruded Aluminum	
Monopole/Structure Material	Recycled High Grade Steel	
Paint	2 Coats, Corrosion-Resistant Industrial Grade Paint	
Coatings	Rust Veto & Zinc Olive Drab	

Notes: 1: AEP is based on the power curve and standard assumptions including a Rayleigh wind distribution and sea level air density. 2, 3: Performance is based on initial field test data. Final testing is currently underway. 4: Foundation size may vary for non-standard soil conditions or non-standard heights

Annual Energy Production



Power Curve



Data from Windward Test Site, Spanish Fork, Utah

MADE IN USA

Mariah Power 5450 Louie Lane, Reno NV 89511 · 775.857.4888 · www.windspire.info

FLOOD HAZARD DEVELOPMENT APPLICATION

PORTLAND, Maine

(All applicants must complete entire application)
[60.3(e)]

Application is hereby made for a Flood Hazard Development Permit as required under Article II of the Floodplain Management Ordinance of PORTLAND, Maine, for development as defined in said ordinance. This permit application does not preclude the need for other municipal permit applications.

Owner: DiMillo's Floating Restaurant Address: 25 Long Wharf (144 Commercial

Phone No.: 207-772-2216

Applicant: Nelson & Small, Inc Address: 212 Canco Road

Phone No.: 207-775-5666 Contact Mark Hellen 831-6051

Contractor: SAME Address:

Phone No.:

RECEIVED
NOV 20 2009
Dept. of Building Inspections
City of Portland Maine

LEGAL DESCRIPTION

Is this part of a subdivision? ☐ Yes ☒ No If yes, give the name of the subdivision and lot number:

Subdivision: Lot #:

Tax Map: Chart 30 Block H Lot #: 001

Address: 25 Long Wharf (144 Commercial Street)
Street/Road Name

Zip Code: 04101
Town/Zip Code

General explanation of proposed development: Install an Auxiliary Generator @ DiMillo's to supplement the energy supply to the Marina Office

Estimated Value of Proposed Development: $ 6500 ±

Proposed Lowest Floor elevation [for new or substantially improved structure]:

OTHER PERMITS

Are other permits required from State or Federal jurisdictions? ☐ Yes ☒ No
If yes, are these other permits attached? ☐ Yes ☐ No ☐ Not Applicable

Federal and State Permits may include but are not limited to: ME/DEP/Natural Resource Protection Act, Site Location of Development Act, Metallic Mineral Exploration, Advanced Exploration and Mining; USACE/Section 9 &10 of the Rivers and Harbors Act/ Section 404 of the Clean Water Act; Federal Energy Regulation Commission.

SEWER AND WATER

Sewage Disposal:	☒ Public	☐ Private	
	☒ Existing	☐ Proposed	☐ Not Applicable Type
Water Supply:	☒ Public	☐ Private	

(This section to be completed by Municipal Official)

LOCATION

Flooding Source (name of river, pond, ocean, etc.): Fore River

☐ V1-30 Zone ☐ VE Zone ☐ AE Zone ☑ A1-30 Zone ☐ A Zone ☐ AO Zone ☐ AH Zone
☐ FRINGE ☐ FLOODWAY (1/2 width of floodplain in A Zone)

Base Flood Elevation (bfe) at the site _____ NGVD [Required for New Construction or Substantial Improvement]

Lowest floor elevation of proposed or existing structure _____ NGVD [Required for New Construction or Substantial Improvement]

If proposed development is in an AE or A1-30 Zone and cross section data is available in the Flood Insurance Study, please note the nearest cross section reference letter and elevation of base flood at nearest cross section above and below the site.

Cross Section Letter	Base Flood Elevation
Above Site _____	Above Site _____
Below Site _____	Below Site _____

Basis of unnumbered A Zone bfe determination:

☐ From a Federal Agency: ☐ USGS ☐ USDA/NRCS ☐ USACE ☐ Other _____
☐ From a State Agency: ☐ MDOT ☐ Other _____
☐ Established by Professional Land Surveyor
☐ Established by Professional Engineer ☐ HEC/RAS ☐ HEC II ☐ HY 7 ☐ TR20 ☐ TR55 ☐ Quick-2
☐ Other _____
☐ Highest Known Water Level
☐ Other (Explain) _____

VALUE

If the development involves work on an existing structure, enter the **Market Value** of existing structure before improvements:
$2,434,900

☐ New Construction or Substantial Improvement ☑ Minor improvement or minor addition to existing development

TYPE OF DEVELOPMENT

Check the appropriate box to the left of the type(s) of development requested and complete information for each applicable line:

	Dimensions
☐ 1. Residential Structure	
☐ 1a. New Structure	_____
☐ 1b. Add to Structure	_____
☐ 1c. Renovations/repairs/maintenance	
☐ 2. Non-Residential Structure	
☐ 2a. New Structure	_____
☐ 2b. Add to Structure	_____
☐ 2c. Renovations/repairs/maintenance	
☐ 2d. Floodproofing	
☒ 3. Accessory Structure	4' diameter, 24' high
☐ 4. Functionally Dependent Use:	
☐ 4a. Dock	_____
☐ 4b. Pier	_____
☐ 4c. Boat Ramp	_____
☐ 4d. Other	_____
☐ 5. Paving	_____
☐ 6. Conditional Use (Lobster/Fish Shed seaward of mean high tide)	

Note: Conditional Use requires add'l. information due to specific standards, public hearing, and Planning Board review.

	Cubic Yards
☐ 7. Filling[3]	_____
☐ 8. Dredging	_____
☐ 9. Excavation	_____
☐ 10. Levee	_____
☐ 11. Drilling	

	Number of Acres
☐ 12. Mining	_____
☐ 13. Dam: Water surface to be created	_____
☐ 14. Water Course Alteration	_____

Note: Detailed description must be attached with copies of all applicable notifications, state and federal permits.

☐ 15. Storage of equipment or materials
☐ 16. Sewage Disposal System
☐ 17. Water Supply System
☐ 18. Other: Explain _____

[1] Certain prohibitions apply in Velocity Zone

Attach a Site Plan – Drawn to scale with north arrow.

- Show property boundaries, floodway, and floodplain lines.
- Show dimensions of the lot.
- Show dimensions and location of existing and/or proposed development on the site.
- Show areas to be cut and filled.

Attach Statement – describing in detail how each applicable development standard in Article VI will be met.

For New Construction or Substantial Improvement also show:

- Existing and proposed grade elevations adjacent to the walls of the structure done by a Professional land Surveyor, Architect, or Engineer.
- Location and elevation of temporary elevation reference marks on the site.

Special Note:
Substantial Improvement is defined as any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. Please refer to the floodplain management ordinance, Article XIV, for more complete definitions of New Construction and Substantial Improvement.

Structures in Velocity Zones are not permitted on fill or excavations. Structures must be built on open foundation systems, i.e., columns, piles, posts. Certification of structural design, specifications, plans and construction methods completed by a Professional Engineer or Architect shall accompany the application as required in Article VI.L.3. of the floodplain management ordinance.

The applicant understands and agrees that:

- The permit applied for, if granted, is issued on the representations made herein;
- Any permit issued may be revoked because of any breach of representation;
- Once a permit is revoked all work shall cease until the permit is reissued or a new permit is issued;
- Any permit issued on this application will not grant any right or privilege to erect any structure or sue any premises described for any purposes or in any manner prohibited by the ordinances, codes, or regulations of the municipality;
- The applicant hereby gives consent to the Code Enforcement Officer to enter and inspect activity covered under the provisions of the Floodplain management Ordinance;
- If issued, the permit form will be posted in a conspicuous place on the premises in plain view; and,
- If issued, the permit will expire if no work is commenced within 180 days of issuance.

I hereby certify that all the statements in, and in the attachments to this application are a true description of the existing property and the proposed development project.

Owner: _____ Date: _____
Signature

or

Authorized Agent: Mark Hall Date: 11-20-09
Signature

(This section to be completed by Municipal Official)

Date: Submitted 11/20/09, Fee Paid $90; Reviewed by CEO MM; Reviewed by Planning Board N/A

Permit # 09-173 Issued by Ann Machado Date 11/20/09

FLOOD HAZARD DEVELOPMENT PERMIT
For Minor Development
PORTLAND, Maine
(For Development not considered a Substantial Improvement)

This Flood Hazard Development Permit allows minor development as provided in Article V.F.3. of the Floodplain Management Ordinance of PORTLAND, Maine, for development in a Special Flood Hazard Area as defined in said ordinance. Development authorized by this permit must be adequately anchored to prevent flotation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, be constructed with materials resistant to flood damage and be constructed by methods and practices that minimize flood damage. This permit is issued based on documentation that the information provided in the Flood Hazard Development Permit Application is in compliance with the Floodplain Management Ordinance.

Tax Map: Chart 30 Block H Lot #: 001

Project Description: INSTALL AN AUXILIARY GENERATOR @ DIMILLO'S RESTAURANT

The permittee understands and agrees that:

- The permit is issued on the representations made herein and on the application for permit;
- The permit may be revoked because of any breach of representation;
- Once a permit is revoked all work shall cease until the permit is reissued or a new permit is issued;
- The permit will not grant any right or privilege to erect any structure or use any premises described for any purposes or in any manner prohibited by the ordinances, codes, or regulations of the municipality;
- The permittee hereby gives consent to the Code Enforcement Officer to enter and inspect activity covered under the provisions of the Floodplain Management Ordinance;
- The permit form will be posted in a conspicuous place on the premises in plain view; and,
- The permit will expire if no work is commenced within 180 days of issuance.

I hereby certify that all the statements in, and in the attachments to this permit are a true description of the existing property and the proposed development project.

Owner: _____ Date: _____
Signature

or

Authorized Agent: _____ Date: 11-20-09
Signature

Issued by: _____ Date: 11/20/09

Permit #: 09-1279

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

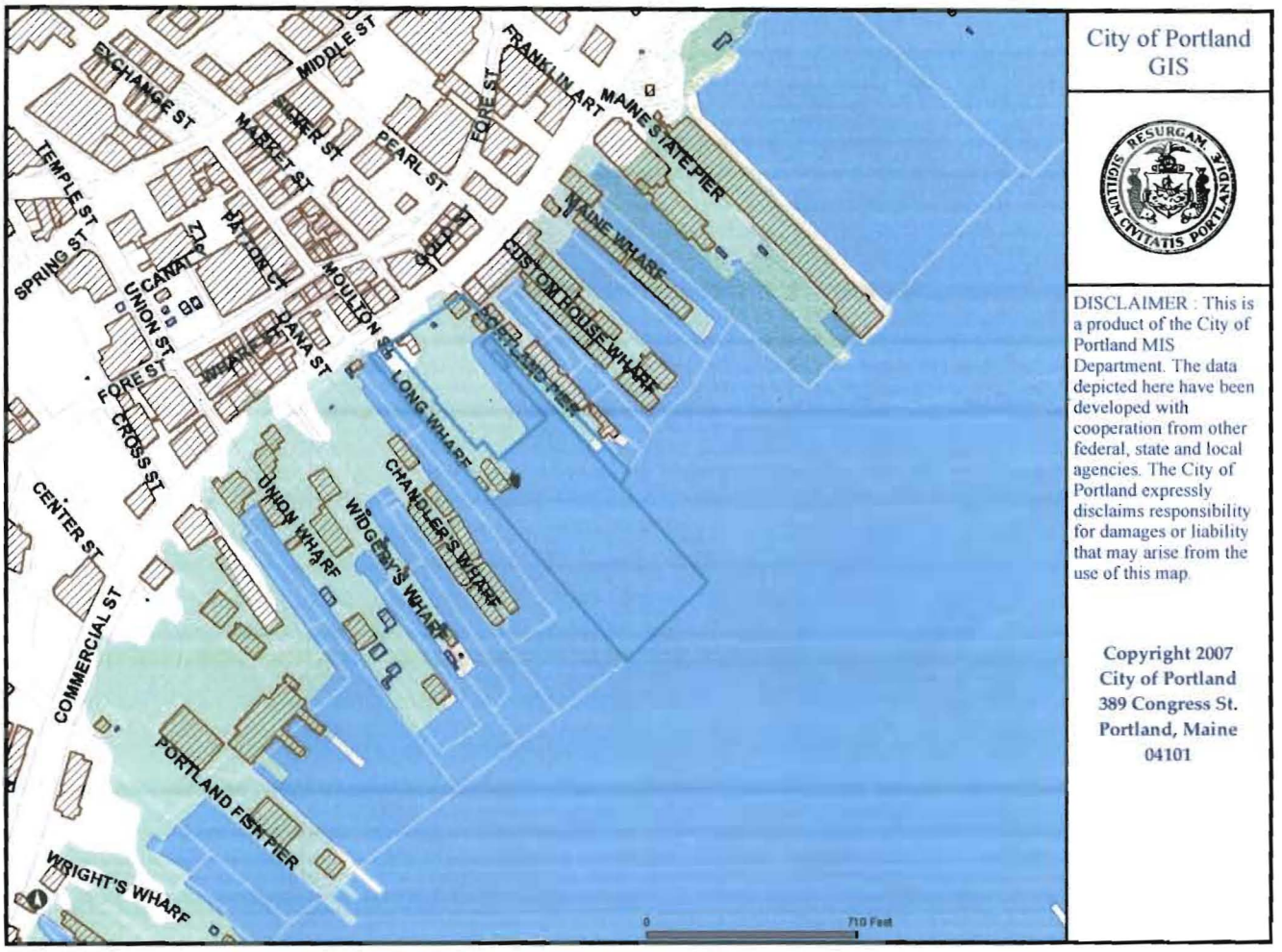
CITY OF
PORTLAND, MAINE
CUMBERLAND COUNTY

PANEL 14 OF 17
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230051 0014 B

EFFECTIVE DATE:
JULY 17, 1986

Federal Emergency Management Agency



City of Portland GIS

DISCLAIMER : This is a product of the City of Portland MIS Department. The data depicted here have been developed with cooperation from other federal, state and local agencies. The City of Portland expressly disclaims responsibility for damages or liability that may arise from the use of this map.

30-H-1

Mariah Power

Technical Data Sheet

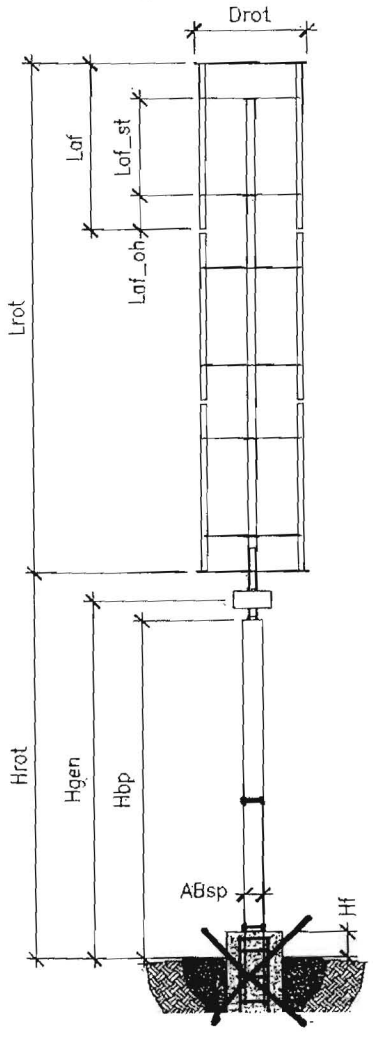
Windspire™ 7

1.2kW - Standard (35 ft.)

Aug. 2009

Material Specifications:

Mechanical Item	*Size*	*Grade*
Top Shaft:	3.5" OD x 0.120" Wall x 230" Lg.	Steel, ASTM A513 Type 5
Bottom Shaft:	3.5" OD x 0.500" Wall x 114" Lg.	Steel, ASTM A513 Type 5
Tower:	8.625" OD x 0.188" Wall x 84" Lg. & 8.625" OD x 0.322" Wall x 60" Lg.	Steel, ASTM A500 Grade B
Base Plate:	~~10" sq. x 1" Thick~~ SEE DETAIL	Steel, ASTM A36
Anchor Bolts:	(4) M20 x 1m Length (4.5" projection)	Steel, ISO 898.1 - Class 8.8
Airfoils:	5" Chord x 78" Length	Aluminum, 6063-T6
Airfoil Struts:	1.5" Width x 0.25" Thick	Aluminum, 6061-T6
Elastomer Dampers:	2" OD x 0.75" ID x 0.125" Thick	Fabreeka Washer - (5) at each anchor bolt (4 below, 1 above base plate)



Cut-In Wind Speed =	9	mph (200 rpm)
Cut-Out Wind Speed =	34	mph (420 rpm)
Design Peak Gust =	**105**	**mph**
Peak Lateral Force (105mph) =	814	lbs.
Peak Overturing Moment (105mph) =	17,244	lbs*ft
Approx. Weight =	750	lbs
Rated Power (RP) =	1,200	Watts
Wind Speed @ RP =	25	mph
1st Resonance Mode =	55	rpm
2nd Resonance Mode =	275	rpm

D_{rot} =	48	in
L_{rot} =	240	in
L_{af} =	78	in
L_{af_st} =	46	in
L_{af_oh} =	16	in
H_{rot} =	180	in
H_{gen} =	168	in
H_{bp} =	156	in
H_f =	12	in (adjustable with engineering)
ABsp =	8	in

Note: Product variations, revised base connections or additional connections, and/or removal of Fabreeka dampening washers will drastically effect the rotordynamics and may result in overstressed conditions. Prior to any revisions or modifications, consult with engineering department.

1.2kW WINDSPIRE – BASE CONNECTION

* M20 STUDS ARE CLASS 8.8

01/19/10

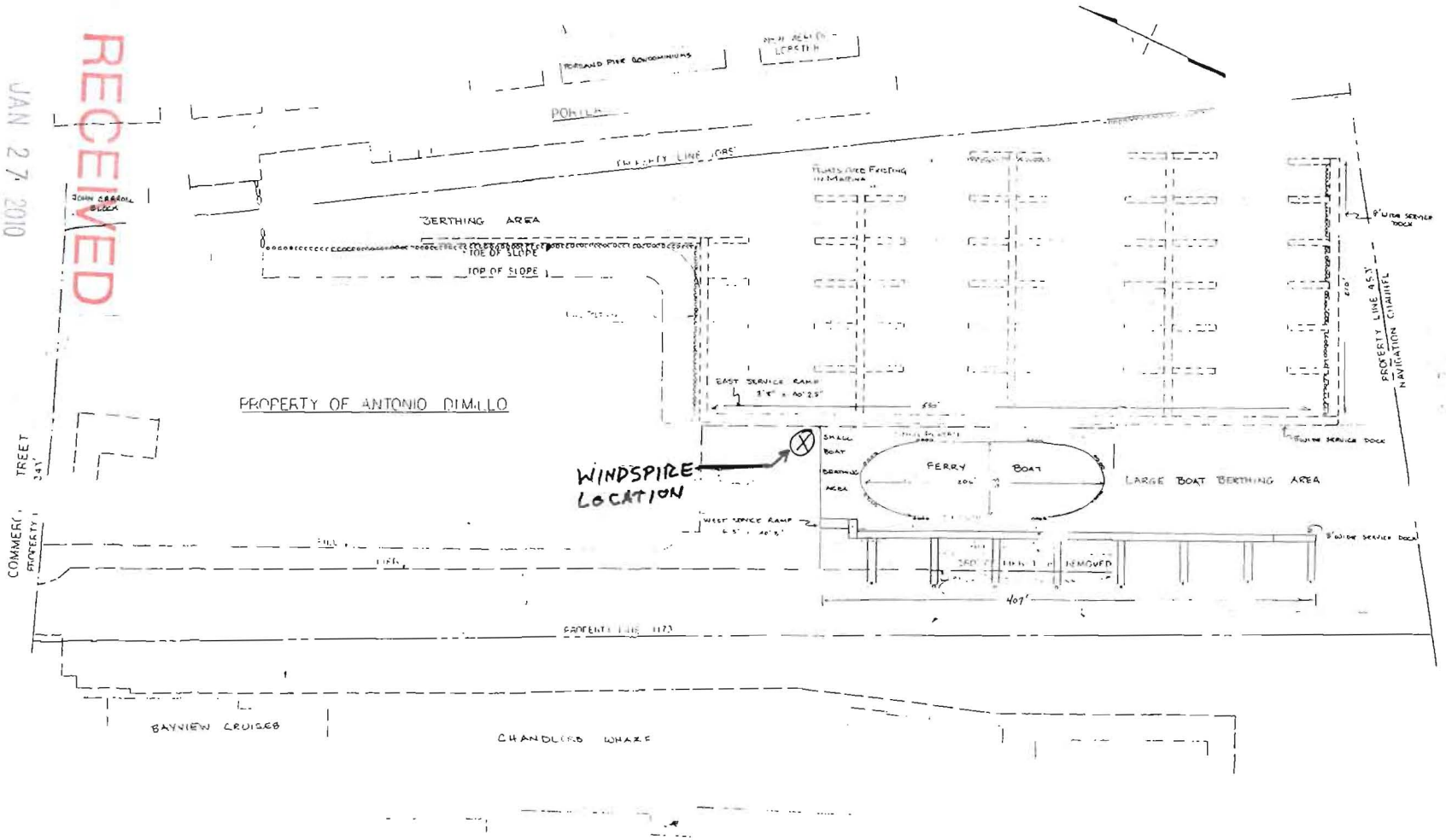
30-111

NELSON & SMALL
DIMILLO'S WINDSPIRE
PORTLAND, MAINE

SCALE: N.T.S.
DATE: JANUARY 19, 2010
DESG BY: TSD
PROJECT: 10303

SSK-1

PINKHAM & GREER CONSULTING ENGINEERS 380 US ROUTE ONE, FALMOUTH, MAINE TELEPHONE: (207) 781-5242



REVISED 12-15-93 G.D.
REVISED JUNE 26, 1980

PROPOSED IMPROVEMENTS
TO PROPERTY Of
ANTONIO DIMILLO
COMMERCIAL STREET, PORTLAND MAINE

NORMAN GRAY — CONSULTING ENGINEER
10 CONGRESS SQUARE — PORTLAND, MAINE

SCALE 1" = 40'
DATE MAY 1980

30-H-1

30-H-1

DiMillo's Windspire
Jean Fraser to: markh 12/15/2009 12:12 PM

Mark,

Further to our conversation last week, I write to confirm that we would like some additional/revised plans submitted that include the additional items that we discussed.

Our main concern is public safety since the location of the Windspire is immediately adjacent the main entrance to DiMillos and also easily accessible by pedestrians via the parking area on Commercial Street. Virtually all other wind energy ordinances I have reviewed (and the one I am drafting for Portland) include requirements for non-climbable poles, clearances for moving parts, and security and we consider that following would be appropriate at this location to address safety issues:

1. 5-6 ft high tubular railings (similar to the blue painted ones that are there but higher) around the generator base and securely attached to the existing railing and chain link fencing on the waterside to prevent unauthorized access to the generator base;

2. Add a 5 foot extender to the pole so that the moving parts of the wind geneator are at least 12 ft above the "ground" (eg existing asphalt level).

Please send me more detailed plans (this can be by pdf in an e-mail) showing the actual proposed location of the base/pole, the fencing (clarifying the spec) and the revised elevation showing the revised pole and height.

Once we receive these details we can quickly continue processing the Exemption Request.

Please do not hesitate to telephone me if you have any questions- I will be in the office today until about 1pm (my daughter is unwell) and I will be in the office tomorrow.

Thank you

Jean

Jean Fraser, Planner
City of Portland
874 8728

30-H-1

X - 5'-6" HIGH TUBULAR RAILINGS SIMILAR TO EXISTING

5' EXTENSION TO BE ADDED TO BASE

AS PER REQUEST of JEAN FRASER

MARINA SIDE

Windspire

Frequently Asked Questions

What is the difference between Energy and Power?

At wind speeds greater than 8 mph, the Windspire® will begin producing power, which is measured in Watts (W) or kilowatts (kW). Power output jumps up and down as quickly as the wind changes speed, so the industry measures output over time in kilowatt-hours (kWh) which is how many watts of power are consumed over a full hour. Your electric company charges you for energy usage based on a rate/kWh. Over the course of a year, the 1.2kW Windspire will produce approximately 2000 kWh in 12 mph average winds to help offset the energy you require from the electric company. This is approximately one-third to one-fifth of the energy usage of an average US home.

Are There Tax Credits Available?

The Federal Government provides a 30 percent tax credit for the total cost of the unit, including installation. Many state and local municipalities also offer rebates, as do local power companies.

Is it Safe for Birds?

The Windspire® rotates at a lower speed than most wind turbines and is more visible to flying birds. So far, we have had no reports of collisions – and we have had one report of a nest built under an active unit.

Are There Specific Requirements for Potential Customers?

A Windspire® site requires land with unobstructed wind and adequate space for installation. The Windspire also needs at least class two winds – ideally class three (an average of 12 mph) – and a tie to the power grid.

Is the Windspire® a Grid-Tie or Off-Grid Product?

The currently available Windspire is grid-tie, which requires the unit to be tied into the local utility grid. An off-grid version of the Windspire® is in development and will be available soon.

Can I sell electricity back to the grid?

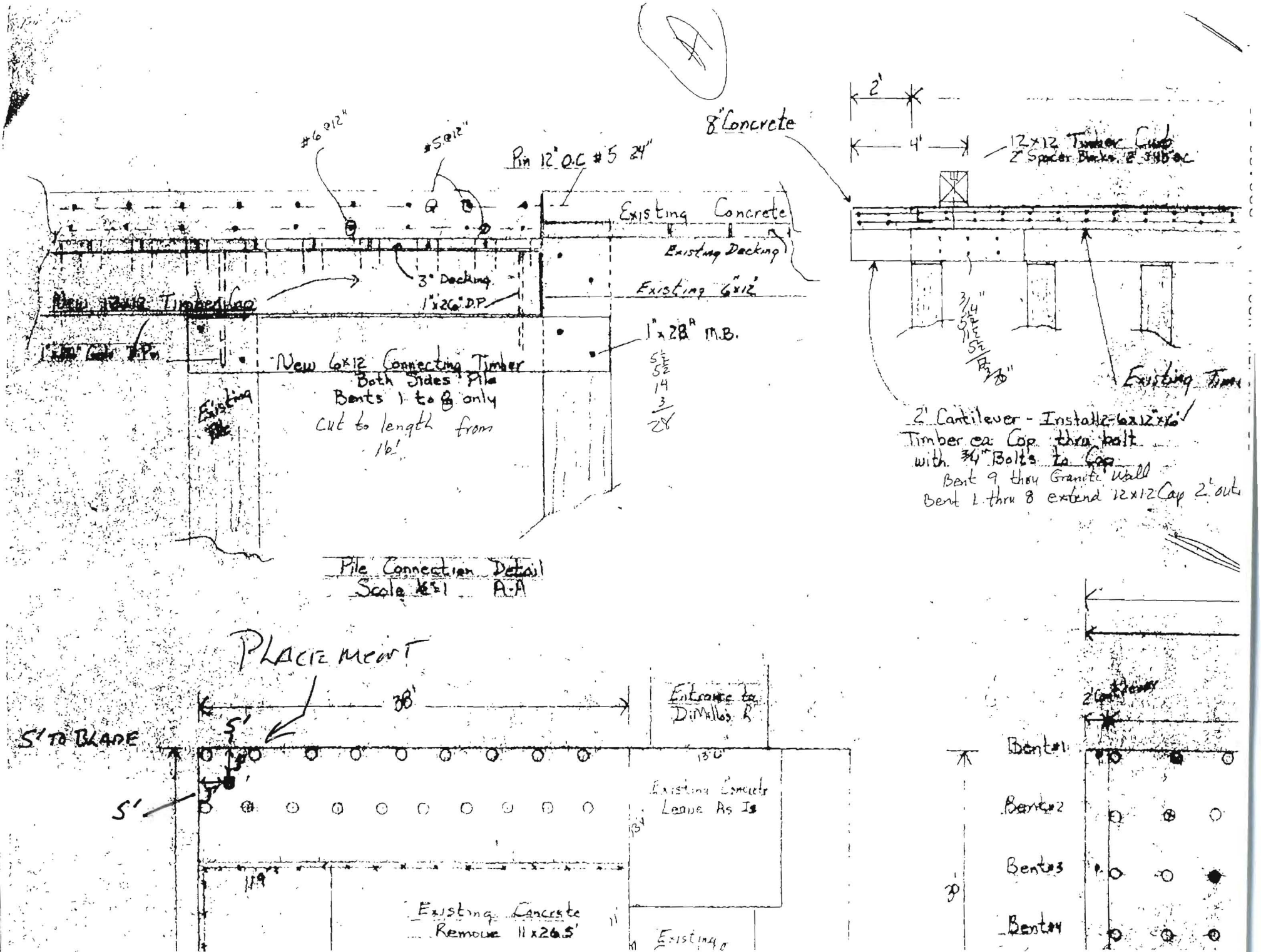
Some utilities offer net metering agreements that allow the sale of excess power back to the grid.

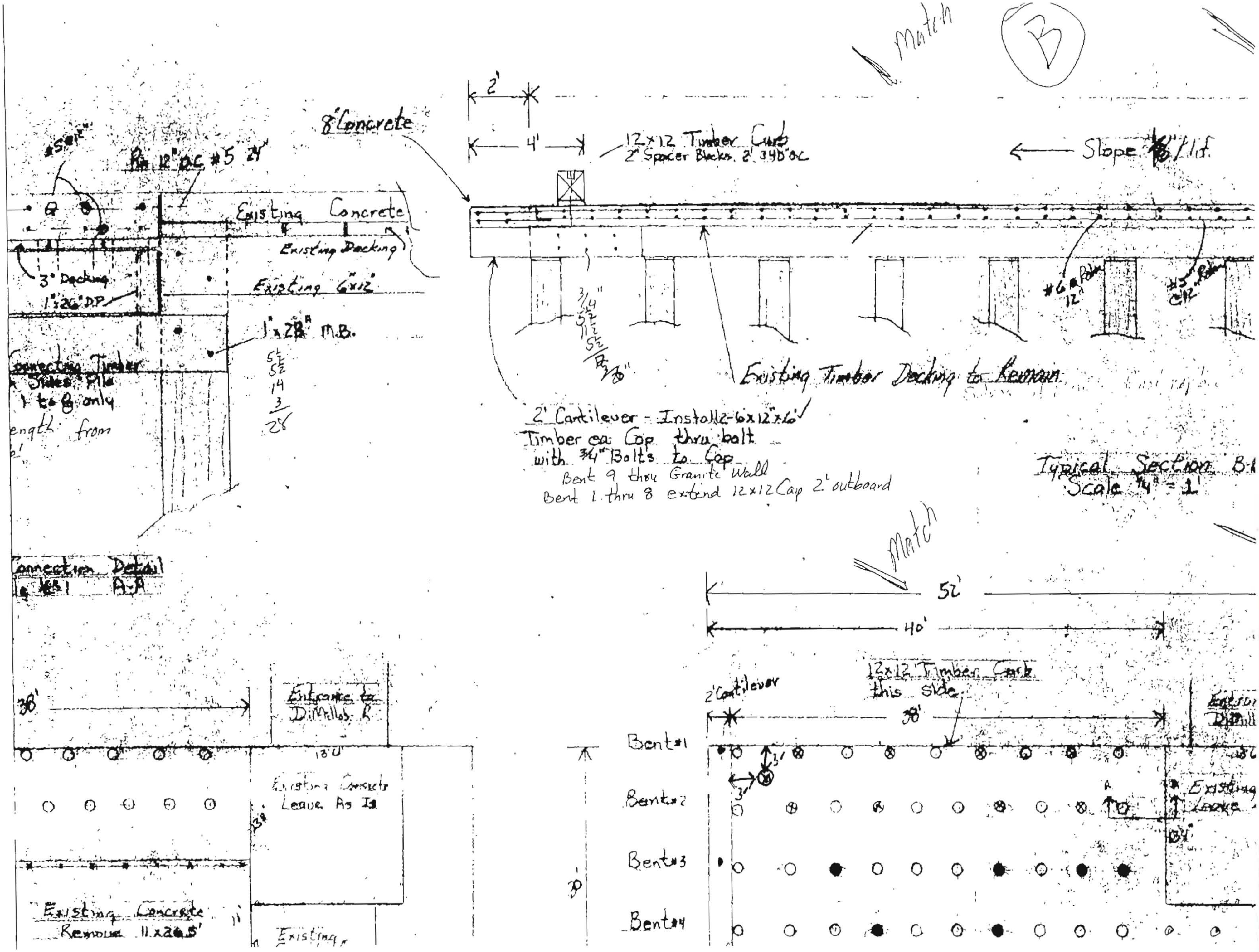
Is the Windspire® Independently Tested and Certified?

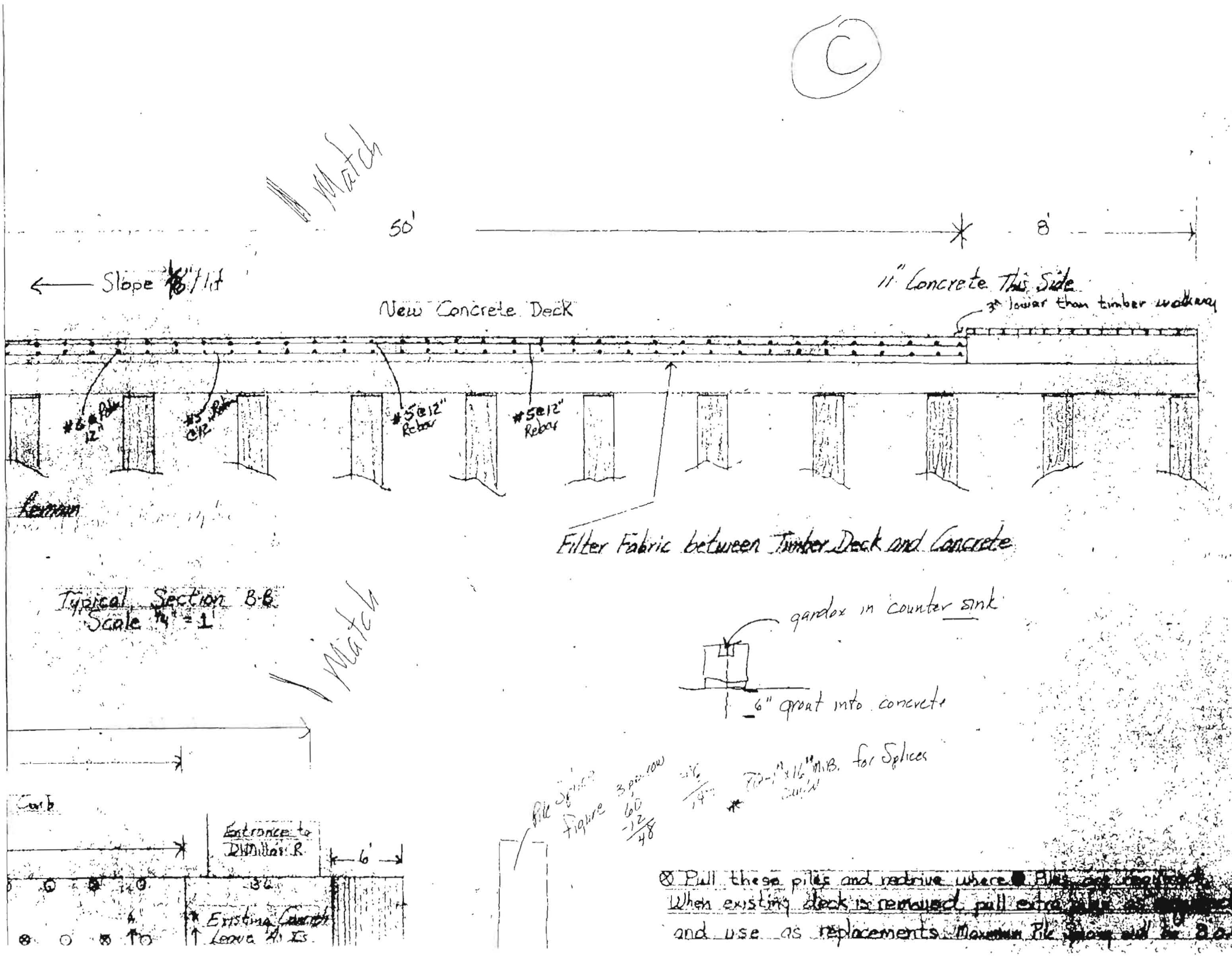
The Windspire is independently tested at Windward Engineering in Spanish Fork, Utah. This testing allows customers to know what level of power production to expect from specific wind ranges. The Windspire received ETL certification as of March 2008 for the U.S. and Canada, which includes UL and IEEE testing.

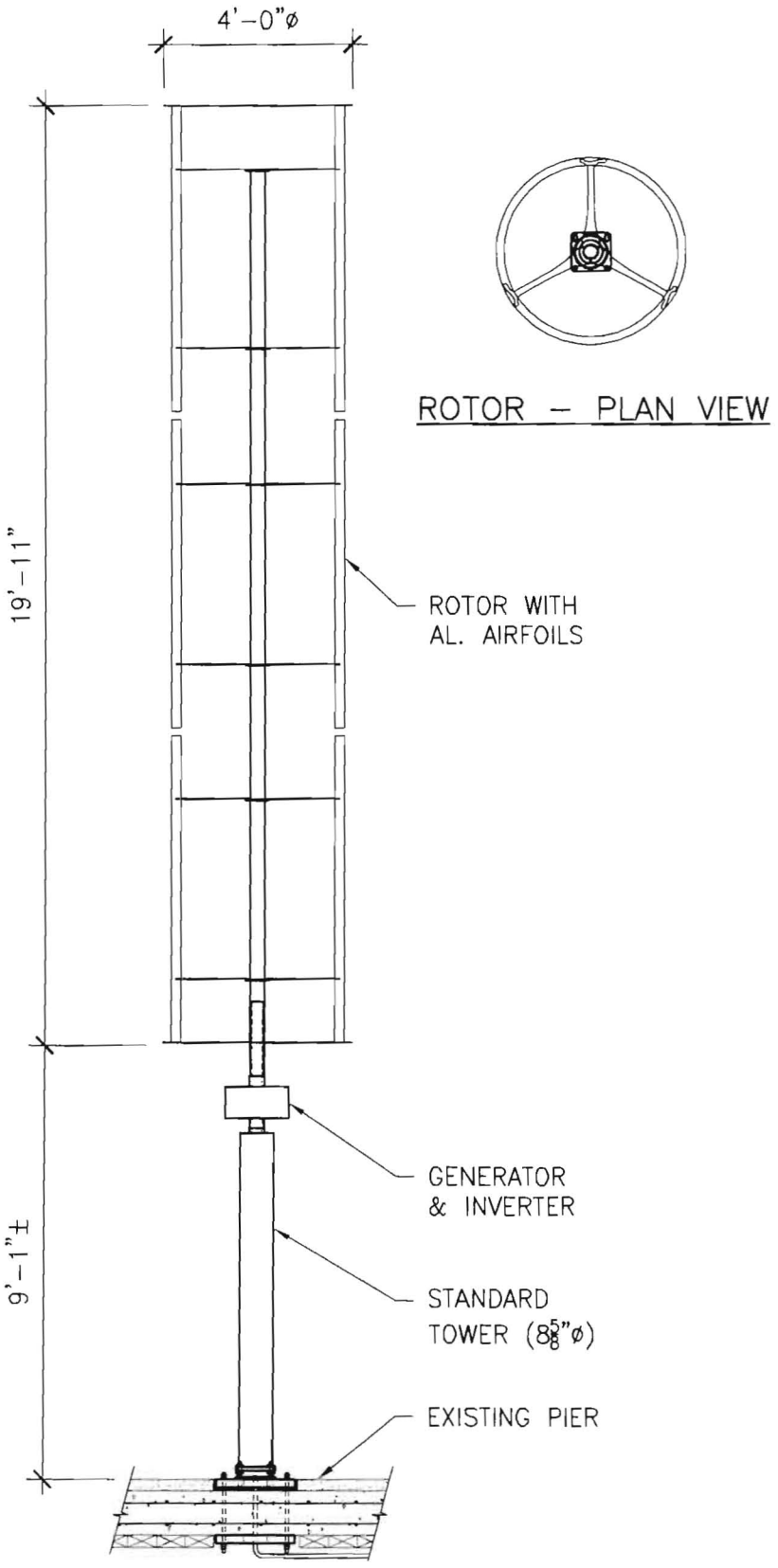
What Is the Maintenance?

The Windspire® requires zero maintenance as its ball bearings are greased for life. Durable construction enables it to produce power for 20+ years. A dual-layer paint coat, rust proof spray, and zinc plating are applied for weather protection.


#6 @12"
#5@12"
Pin 12" O.C #5 24"
8" Concrete
Existing Concrete
Existing Decking
3" Decking
1"x26" D.P.
Existing 6"x12"
New 12x12 Timber Cap
1"x28" M.B.
New 6x12 Connecting Timber
Both Sides Pile
Bents 1 to 8 only
cut to length from
16'
Existing
5½
5½
14
3/28
Pile Connection Detail
Scale 1"=1' A-A
2'
4'
12x12 Timber Cap
2" Spacer Blocks @ 3'-6" o.c.
3/4"
5½
11½
5½
3/8"
Existing Timber
2' Cantilever - Install 6x12"x6'
Timber ea Cap thru bolt
with 3/4" Bolts to Cap
Bent 9 thru Granite Wall
Bent 1 thru 8 extend 12x12 Cap 2' out
PLACEMENT
38'
5'
5' TO BLADE
5'
Entrance to
DiMillo's
13'-0"
Existing Concrete
Leave As Is
13'-4"
11'-9"
Existing Concrete
Remove 11'x26.5'
Existing
2' Cantilever
Bent #1
Bent #2
Bent #3
Bent #4
39'

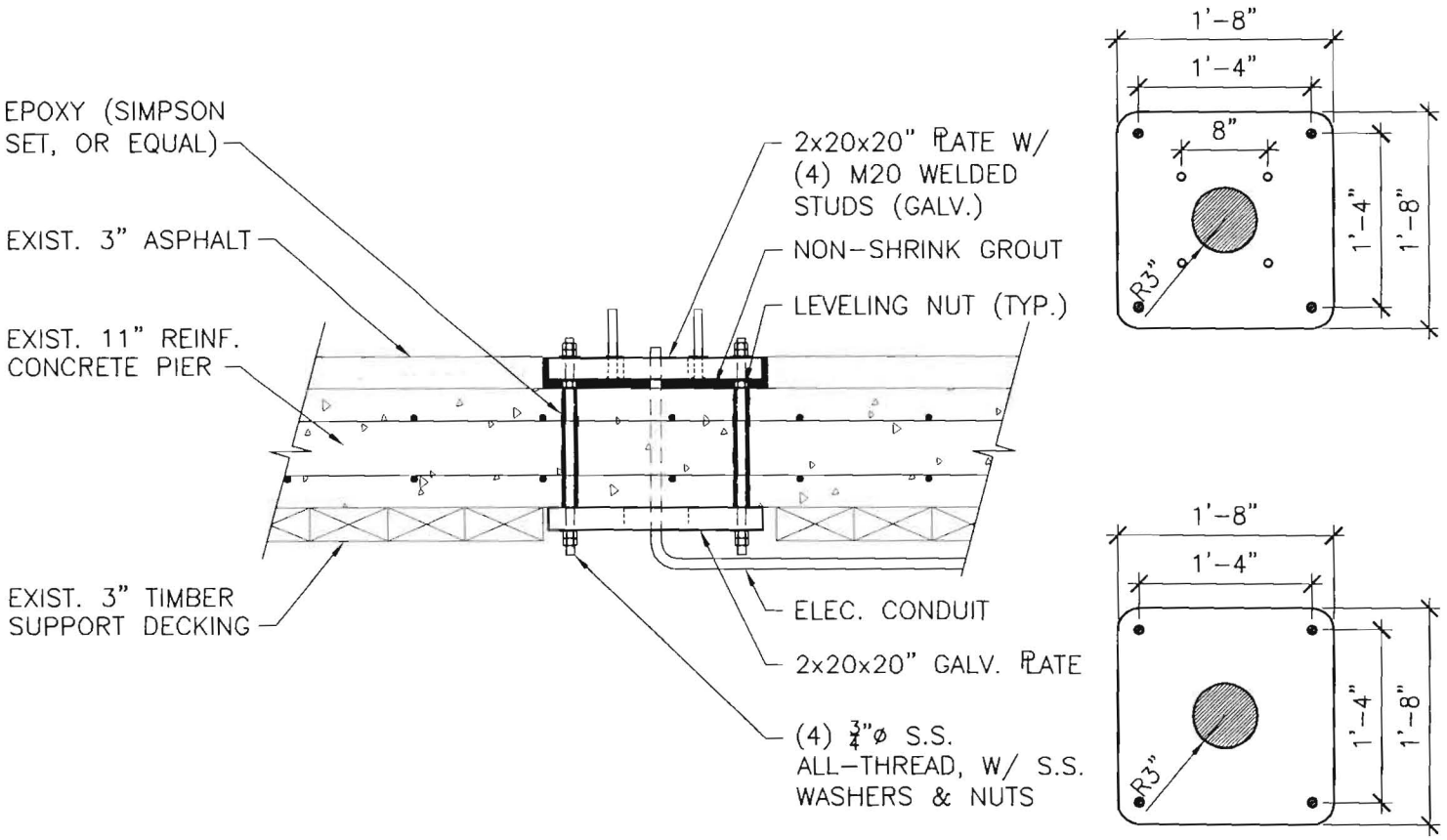

Match
B
8" Concrete
12x12 Timber Curb
2" Spacer Blocks 2' 3 1/2" O.C.
Slope 1/8"/l.f.
Existing Concrete
Existing Decking
3" Decking
1"x26" D.P.
Existing 6"x12"
1"x28" M.B.
Connecting Timber
Existing Timber Decking to Remain
2' Cantilever - Install 2-6"x12"x16' Timber ea Cap thru bolt with 3/4" Bolts to Cap
Bent 9 thru Granite Wall
Bent 1 thru 8 extend 12x12 Cap 2' outboard
Typical Section
Scale 1/4" = 1'
Connection Detail
A-A
52'
40'
38'
12x12 Timber Curb this side
2' Cantilever
Entrance to DiMillo's
Existing Concrete Leave As Is
Existing Concrete Remove 11x26.5'
Existing
Bent #1
Bent #2
Bent #3
Bent #4
18'0"


C
Match
50'
8'
← Slope /ft
11" Concrete This Side
3" lower than timber walkway
New Concrete Deck
#6 @ Rebar 12"
#5 Rebar C12
#5@12" Rebar
#5@12" Rebar
Remain
Filter Fabric between Timber Deck and Concrete
Typical Section B-B
Scale 1/4" = 1'
Match
gardox in counter sink
6" grout into concrete
for Splices
Pile Splice Figure
Curb
Entrance to DWMiller R
6'
36
Existing Concrete
Leave As Is
⊗ Pull these piles and redrive where
When existing deck is removed pull extra
and use as replacements.

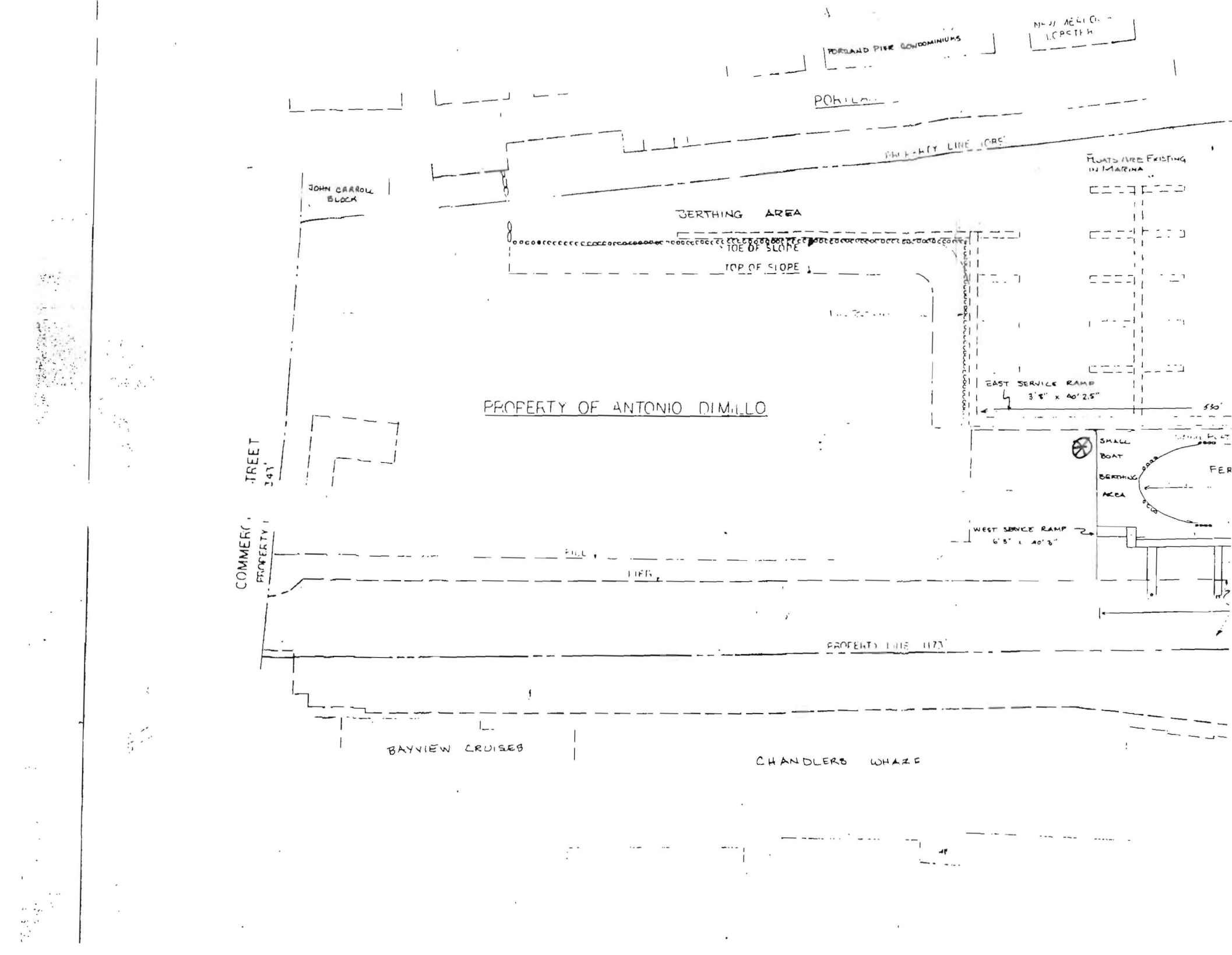


ROTOR – PLAN VIEW

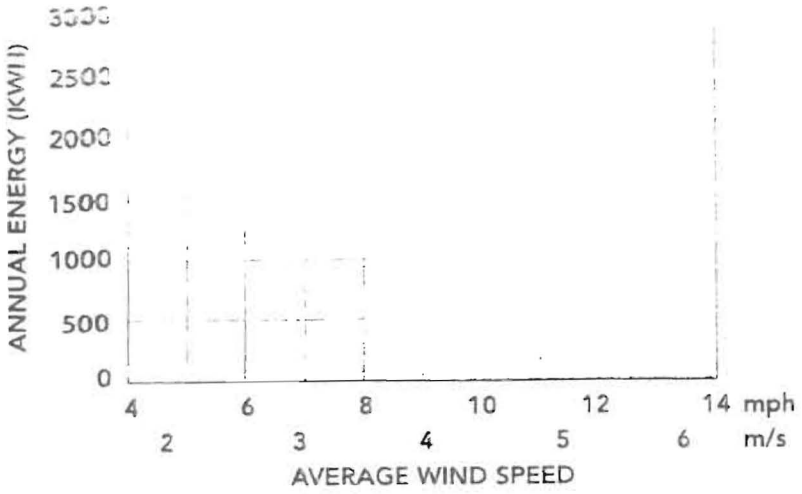
1.2kW WINDSPIRE – ELEVATION



1.2kW WINDSPIRE – BASE CONNECTION


PORTLAND PIER CONDOMINIUMS
PORTLAND
HIGH WATER LINE 108'
FLOATS ARE EXISTING IN MARINA
JOHN CARROLL BLOCK
BERTHING AREA
TOE OF SLOPE
TOP OF SLOPE
EAST SERVICE RAMP
3'8" x 40' 2.5"
530'
PROPERTY OF ANTONIO DIMILLO
SMALL BOAT BERTHING AREA
WEST SERVICE RAMP
6'5" x 40' 8"
COMMERCIAL PROPERTY
FILL
HIGH WATER
PROPERTY LINE 1173'
BAYVIEW CRUISES
CHANDLERS WHARF

Windspire® Annual Energy Production



Specifications

Annual Energy Production (AEP) with 12 mph | 5.4m/s average wind speed	2000 kWh*
Instantaneous Power Rating (IPR) at 25 mph	1.2 kW
Standard Unit Height	30 ft | 9.1 m (pole extension options)
Sound Measurement	6 dB above ambient (15 mph wind, 6 ft from base)
Total Weight	624 lb | 283 kg
Min Wind Required for Power	8 mph | 3.6 m/s
Survival Wind Speed	105 mph | 47 m/s
Rotor Material	Recycled Aircraft Grade Extruded Aluminum
Monopole/Structure Material	Recycled High-Grade Steel

The wind blows...

3 **The rotor turns a generator which produces electricity.**

The heart of the Windspire® is its ultra-efficient generator. All components are designed to work together for maximum efficiency – a benefit of a truly integrated design.

5 **The Windspire® supplies power to your home, shop or business.**

Plug 'n Produce™: You can get power from your Windspire® as soon as it is installed.

CORPORATE LIMITS
RIVER
FORK
ZONE V3
(EL 12)

Power to Inspire™

energy from the natural wind just outside your door. At only 30 feet tall and 4 feet wide, the Windspire wind turbine is distinguished by its sleek propeller-free design and ultra-quiet operation. Designed for use where you live or work, the Windspire is currently powering homes, small businesses, schools, museums, parks, and much more.

Power from Wind

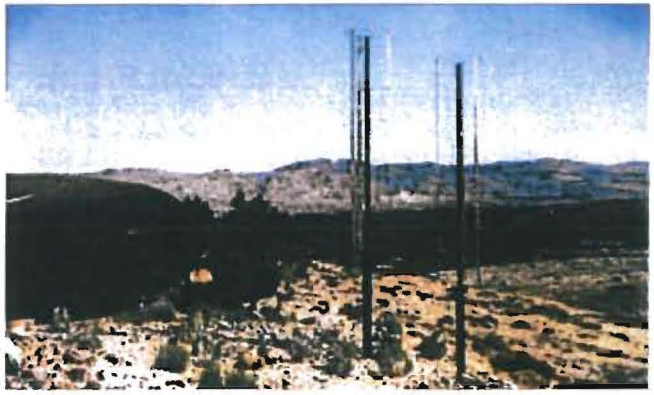
The Windspire® wind turbine generates power when the wind blows against its vertical airfoils causing them to spin. This power is then converted into AC electricity and is immediately available to power your home grid and all the appliances that draw electricity from it, such as lights, refrigerators, and air conditioners. While the technology behind the Windspire is complex, the basic premise is simple: the stronger the wind the more power it generates.

Wind & Site Requirements

The Windspire® wind turbine was designed to operate in areas with minimum average wind speeds of at least 10 mph (4.5 m/s) though it works best where average winds exceed 12 mph (5.4 m/s). Wind speeds vary by location, even within a property, and generally preferred sites are clear of any nearby obstructions such as tall trees or buildings. Your Windspire Dealer can discuss siting guidelines with you in more detail.

generator, integrated inverter, hinged monopole, and wireless performance monitor. Once your foundation is properly laid, your Windspire Dealer can install your new Windspire in as few as three hours without the use of heavy machinery.

Credit: Devon Bank



Be Smart & Save Money

the Windspire® is priced much lower than comparable wind turbines and other alternative energy options. Independent tests confirm the Windspire will produce approximately 2,000 kilowatt hours per year in 12-mile per hour average winds. This equates to around a quarter of the average energy needs of a residential home.

Depending on wind conditions, electricity rates, and local incentives, the Windspire can pay for itself in as little as five years. The U.S. Federal Government provides a 30% tax credit off the total cost of the Windspire including installation fees. Other local

1 | The wind blows...

2 | The wind is caught by the Windspire® airfoils which spin the rotor around.

Like airplane wings, the airfoils use lift to propel the rotor faster.

3 | The rotor turns a generator which produces electricity.

The heart of the Windspire® is its ultra-efficient generator. All components are designed to work together for maximum efficiency – a benefit of a truly integrated design.

4 | The inverter converts power output by the Windspire® into smooth alternating current (AC), for use with the electric grid.

The Windspire® is sold as a complete system. The package includes all the electronics, the performance transmitter, and the pole and structure.

5 | The Windspire® supplies power to your home, shop or business.

Plug 'n Produce™:
You can get power from your Windspire® as soon as it is installed.

When the wind isn't blowing, you still get electricity from your local utility.

Safety controls prevent power surges, and provide automatic shut-off if the grid fails.

You can monitor electricity from your own computer using WindSync™ software.