Appendix F

Federal Aviation Administration Data and Documentation
NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§77.13 Construction or alteration requiring notice.
(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:

(1) Any construction or alteration of more than 200 feet in height above the ground level at its site.

(2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:

(i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with at least one runway more than 3,200 feet in actual length, excluding heliports.

(ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.

(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a) (5) of this section.

(3) Any highway, railroad, or other traverse way for mobile objects, of a height above the ground, if adjusted upward 7 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where crossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally travel the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally travel it, would exceed a standard of paragraph (a) (1) or (2) of this section.

(4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.

(5) Any construction or alteration on any of the following airports (including heliports):

(i) An airport that is listed in the FAA Directory of the current Airman’s Information Manual or in either the Alaska or Pacific Airman’s Guide and Chart Supplement.

(ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and except for military airports, it is clearly indicated that that airport will be available for public use.

(iii) An airport that is operated by an armed force of the United States.

(b) Each sponsor who proposes construction or alteration that is subject to a licensing requirement of the Federal Communications Act may be required to notify the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part will proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height, shall contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply, and the notice may be sent by telephone, telegram, or other expedient means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.13, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

§77.15 Construction or alteration not requiring notice.
No person is required to notify the Administrator for any of the following construction or alteration:

(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.

(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.

(d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.
(a) Each person who is required to notify the Administrator under §77.13 (a) shall send one executed form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.

(b) The notice required under §77.13 (a) (1) through (4) must be submitted at least 30 days before the earlier of the following dates —

(1) The date the proposed construction or alteration is to begin.

(2) The date an application for a construction permit is to be filed.

However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part will proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height, shall contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply, and the notice may be sent by telephone, telegram, or other expedient means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.13, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

Announcement

Please send all future FAA form 7460-1 notices to the FAA's new...

EXPRESSION PROCESSING CENTER
Federal Aviation Administration
Southwest Regional Office
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-4298
Phone: (817) 838-1990

Visit the FAA's new Obstruction Evaluation web site at http://oeea.aaa.gov
INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1

PLEASE TYPE or PRINT

ITEM #1. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #2. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #3. New Construction would be a structure that has not yet been built.
Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration shall be included in ITEM #21 "Complete Description of Proposal". Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has been studied by the FAA. The reason for the notice shall be included in ITEM #21 "Complete Description of Proposal".

ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enter the estimated length of time the temporary structure will be up.

ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.

ITEM #6. Please indicate the type of structure. DO NOT LEAVE BLANK.

ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other" and indicate "no preference". DO NOT LEAVE BLANK. NOTE: High intensity lighting shall be used only for structures over 500' AGL. In the absence of high intensity lighting for structures over 500' AGL, marking is also required.

ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.

ITEM #9. and #10. Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from a hand-held GPS instrument is acceptable. This data, when plotted, should match the site depiction submitted under ITEM #20.

ITEM #11. NAD 83 is preferred; however, latitude/longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datums may be used. It is important to know which datum is used. DO NOT LEAVE BLANK.

ITEM #12. Enter the name of the nearest city/state to the site. If the structure is or will be in a city, enter the name of that city/state.

ITEM #13. Enter the full name of the nearest public-use (not private-use) airport (or heliport) or military airport (or heliport) to the site.

ITEM #14. Enter the distance from the airport or heliport listed in #13 to the structure.

ITEM #15. Enter the direction from the airport or heliport listed in #13 to the structure.

ITEM #16. Enter the site elevation above mean sea level and expressed in whole feet rounded to the nearest foot (e.g. 17 3/4 rounds to 17', 176.6 rounds to 18'). This data should match the ground contour elevations for site depiction submitted under ITEM #20.

ITEM #17. Enter the total structure height above ground level in whole feet rounded to the next highest foot (e.g. 173.3 rounds to 18'). The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.

ITEM #18. Enter the overall height above mean sea level and expressed in whole feet. This will be the total of ITEM #16 + ITEM #17.

ITEM #19. If an FAA aeronautical study was previously conducted, enter the previous study number.

ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" X 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, Contact USGS at 1-888-275-8747 or via Internet at http://store.usgs.gov/. If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet.

ITEM #21. For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.

For antennas, include the type of antenna and center of radiation (Attach the antenna pattern, if available).

For microwave, include azimuth relative to true north.

For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction).

For each pole/support, include coordinates, site elevation, and structure height above ground level or water.

For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials.

For alterations, explain the alteration thoroughly.

For existing structures, thoroughly explain the reason for notifying the FAA (e.g. corrections, no record of previous study, etc.).

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation and zoning authorities.
**Paperwork Reduction Act Statement:** This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Providing this information is mandatory for anyone proposing construction or alteration that meets or exceeds the criteria contained in 14 CFR, part 77. We estimate that the burden of this collection is an average 19 minutes per response. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection is 2120-0001.

**FAA Form 7460-1 (2-99) Supersedes Previous Edition**
## Notice of Proposed Construction or Alteration

1. **Sponsor** (person, company, etc. proposing this action):
   - **Attn. of:** Rick Thomas
   - **Name:** Timmons Group
   - **Address:** 1001 Boulders Parkway Suite 300
   - **City:** Richmond
   - **State:** VA
   - **Zip:** 23225
   - **Telephone:** 804-200-6500
   - **Fax:** 804-560-1438
   - **E-mail Address:** rick.thomas@timmonsgroup.com

2. **Sponsor’s Representative** (if other than #1):
   - **Attn. of:**
   - **Name:**
   - **Address:**
   - **City:**
   - **State:**
   - **Zip:**
   - **Telephone:**
   - **Fax:**
   - **E-mail Address:**

3. **Notice of:**
   - [ ] New Construction
   - [ ] Alteration
   - [ ] Existing

4. **Duration:**
   - [ ] Permanent
   - [ ] Temporary (months, days)

5. **Work Schedule:**
   - Beginning ________
   - End ________

6. **Type:**
   - [ ] Antenna Tower
   - [ ] Crane
   - [ ] Building
   - [ ] Power Line
   - [ ] Landfill
   - [ ] Water Tank
   - [ ] Other: Wind Turbine

7. **Marking/Painting and/or Lighting Preferred:**
   - [ ] Red Lights and Paint
   - [ ] Dual - Red and Medium Intensity White
   - [ ] White - Medium Intensity
   - [ ] Dual - Red and High Intensity White
   - [ ] White - High Intensity
   - [ ] Other

8. **FCC Antenna Structure Registration Number (if applicable):**

9. **Latitude:** N36° 57' 32". 94"
10. **Longitude:** W76° 24' 10". 74"

11. **Datum:**
   - [ ] NAD 83
   - [ ] NAD 27
   - [ ] Other

12. **Nearest:**
   - **City:** Newport News
   - **State:** VA

13. **Nearest Public-use (not private-use) or Military Airport or Heliport:**
   - Norfolk Naval Air Station

14. **Distance from #13. to Structure:** 5.5 miles
15. **Direction from #13. to Structure:** WNW

16. **Site Elevation (AMSL):** 0 ft.
17. **Total Structure Height (AGL):** 499 ft.
18. **Overall height (#16. + #17.) (AMSL):** 499 ft.
19. **Previous FAA Aeronautical Study Number (if applicable):** OE

20. **Description of Location:** (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey.)

21. **Complete Description of Proposal:**
   - The applicant proposes to construct one (1) utility scale wind turbine at this location. The Department of Defense Siting Clearinghouse (DODSC) has already indicated that this site does not interfere with DOD operations. The maximum capacity of the turbine proposed at this location is 3MW.

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I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking and lighting standards as necessary.

**Date**
**Typed or Printed name and Title of Person Filing Notice**
**Signature**

**Frequency/Power (kW)**

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**NSN:** 0052-00-012-0008
NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§77.13 Construction or alteration requiring notice.
(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:
   (1) Any construction or alteration of more than 200 feet in height above the ground level at its site.
   (2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:
      (i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with at least one runway more than 3,200 feet in actual length, excluding heliports.
      (ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.
      (iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a) (5) of this section.
   (3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an interstate highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a watertway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) (1) or (2) of this section.
   (4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.
   (5) Any construction or alteration on any of the following airports (including heliports):
      (i) An airport that is available for public use and is listed in the Airport Directory of the current Airman’s Information Manual or in either the Alaska or Pacific Airman’s Guide and Chart Supplement.
      (ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and except for military airports, it is clearly indicated that that airport will be available for public use.
      (iii) An airport that is operated by an armed force of the United States.
   (b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) (5) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit a copy of the notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of construction or alteration.
   (c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) (6) of this section shall, within 5 days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the region involved, if —
      (1) The construction or alteration is more than 200 feet above the surface level of its site; or
      (2) An FAA regional office advises him that submission of the form is required.

§77.15 Construction or alteration not requiring notice.
(a) No person is required to notify the Administrator for any of the following construction or alteration:
   (a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond any reasonable doubt that the structure so shielded would not adversely affect safety in air navigation.
   (b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.
   (c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.
   (d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.
(a) Each person who is required to notify the Administrator under §77.13 (a) shall send one executed form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.
   (b) The notice required under §77.13 (a) must be submitted at least 30 days before the earlier of the following dates —
      (1) The date the proposed construction or alteration is to begin.
      (2) The date an application for a construction permit is to be filed.
   However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.
   (c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height, must contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.
   (d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expeditious means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.
   (e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.15, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

Announcement

Please send all future FAA form 7460-1 notices to the FAA's new...

EXPRESS PROCESSING CENTER
Federal Aviation Administration
Southwest Regional Office
Air Traffic Airspace Branch, ASW-520
2601 Meachan Blvd.
Fort Worth, TX 76137-4298
Phone: (817) 838-1900

Visit the FAA's new Obstruction Evaluation website at http://oeea.aov.gov
INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1

PLEASE TYPE or PRINT

ITEM #1. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #2. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #3. New Construction would be a structure that has not yet been built. Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration shall be included in ITEM #21 "Complete Description of Proposal". Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has never been studied by the FAA. The reason for the notice shall be included in ITEM #21 "Complete Description of Proposal".

ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enter the estimated length of time the temporary structure will be up.

ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.

ITEM #6. Please indicate the type of structure. DO NOT LEAVE BLANK.

ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other" and indicate "no preference". DO NOT LEAVE BLANK. NOTE: High intensity lighting shall be used only for structures over 5000 AGL. In the absence of high intensity lighting for structures over 500' AGL, marking is also required.

ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.

ITEM #9. and #10. Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from a hand-held GPS instrument is acceptable. This data, when plotted, should match the site depiction submitted under ITEM #20.

ITEM #11. NAD 83 is preferred; however, latitude/longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datums may be used. It is important to know which datum is used. DO NOT LEAVE BLANK.

ITEM #12. Enter the name of the nearest city/state to the site. If the structure is or will be in a city, enter the name of that city/state.

ITEM #13. Enter the full name of the nearest public-use (not private-use) airport (or heliport) or military airport (or heliport) to the site.

ITEM #14. Enter the distance from the airport or heliport listed in #13 to the structure.

ITEM #15. Enter the direction from the airport or heliport listed in #13 to the structure.

ITEM #16. Enter the site elevation above mean sea level and expressed in whole feet rounded to the nearest foot (e.g. 17 3/8' rounds to 17', 176 2/3' rounds to 18'). This data should match the ground contour elevations for site depiction submitted under ITEM #20.

ITEM #17. Enter the total structure height above ground level in whole feet rounded to the next highest foot (e.g. 173' rounds to 18'). The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.

ITEM #18. Enter the overall height above mean sea level and expressed in whole feet. This will be the total of ITEM #16 + ITEM #17.

ITEM #19. If an FAA aeronautical study was previously conducted, enter the previous study number.

ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" X 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, Contact USGS at 1-888-885-8747 or via Internet at http://store.usgs.gov/. If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet.

ITEM #21. • For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.
• For antennas, include the type of antenna and center of radiation (Attach the antenna pattern, if available).
• For microwave, include azimuth relative to true north.
• For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction).
• For each pole/support, include coordinates, site elevation, and structure height above ground level or water.
• For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials,
• For alterations, explain the alteration thoroughly,
• For existing structures, thoroughly explain the reason for notifying the FAA (e.g. corrections, no record of previous study, etc.).

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation and zoning authorities.
Paperwork Reduction Act Statement: This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Providing this information is mandatory for anyone proposing construction or alteration that meets or exceeds the criteria contained in 14 CFR, part 77. We estimate that the burden of this collection is an average 19 minutes per response. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless the agency displays a currently valid OMB control number. The OMB control number for this collection is 2120-0001.

FAA Form 7460-1 (2-99) Supersedes Previous Edition

0008

NSN: 0052-00-012-
# Notice of Proposed Construction or Alteration

## 1. Sponsor (person, company, etc. proposing this action):

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Rick Thomas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Timmons Group</td>
</tr>
<tr>
<td>Address</td>
<td>1001 Boulders Parkway Suite 300</td>
</tr>
<tr>
<td>City</td>
<td>Richmond</td>
</tr>
<tr>
<td>State</td>
<td>VA</td>
</tr>
<tr>
<td>Zip</td>
<td>23225</td>
</tr>
<tr>
<td>Phone</td>
<td>804-200-6500</td>
</tr>
<tr>
<td>Fax</td>
<td>804-560-1438</td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:rick.thomas@timmons.com">rick.thomas@timmons.com</a></td>
</tr>
</tbody>
</table>

## 2. Sponsor’s Representative (if other than #1):

<table>
<thead>
<tr>
<th>Sponsor Representative</th>
<th>Rick Thomas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
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<tr>
<td>Zip</td>
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<tr>
<td>Phone</td>
<td></td>
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<tr>
<td>Fax</td>
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<tr>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>

## 3. Notice of:

| Notice | New Construction |

## 4. Duration:

| Duration | Permanent |

## 5. Work Schedule:

| Work Schedule | Beginning | End |

## 6. Type:

| Type          | Antenna Tower |

## 7. Marking/Painting and/or Lighting Preferred:

<table>
<thead>
<tr>
<th>Lighting</th>
<th>Red Lights and Paint</th>
<th>Dual - Red and Medium Intensity White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White - Medium Intensity</td>
<td>Dual - Red and High Intensity White</td>
</tr>
<tr>
<td></td>
<td>White - High Intensity</td>
<td>Other Wind Turbine</td>
</tr>
</tbody>
</table>

## 8. FCC Antenna Structure Registration Number (if applicable):

| Number |             |

## 9. Latitude:

| Latitude | N36° 55' 03" 04" |

## 10. Longitude:

| Longitude | W76° 24' 29" 93" |

## 11. Datum:

| Datum | NAD 83 |

## 12. Nearest:

<table>
<thead>
<tr>
<th>Nearest</th>
<th>Suffolk</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>VA</td>
</tr>
</tbody>
</table>

## 13. Nearest Public-use (not private-use) or Military Airport or Heliport:

| Location | Norfolk Naval Air Station |

## 14. Distance from #13. to Structure:

| Distance | 7.25 miles |

## 15. Direction from #13. to Structure:

| Direction | WSW |

## 16. Site Elevation (AMSL):

| Elevation | 0 ft |

## 17. Total Structure Height (AGL):

| Height | 499 ft |

## 18. Overall height (#16. + #17.) (AMSL):

| Height | 499 ft |

## 19. Previous FAA Aeronautical Study Number (if applicable):

| Number | 0E |

## 20. Description of Location:

| Location | Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey. |

## 21. Complete Description of Proposal:

The applicant proposes to construct one (1) utility scale wind turbine at this location. The Department of Defense Siting Clearinghouse (DODSC) has already indicated that this site does not interfere with DOD operations. The maximum capacity of the turbine proposed at this location is 3MW.
NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§77.13 Construction or alteration requiring notice.
(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:
   (1) Any construction or alteration of more than 200 feet in height above the ground level at its site.
   (2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:
      (i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section
          with at least one runway more than 3,200 feet in actual length, excluding heliports.
      (ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section
          with its longest runway no more than 3,200 feet in actual length, excluding heliports.
      (iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a)(5) of this section.
   (3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a)(1) or (2) of this section.
   (4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.
   (5) Any construction or alteration on any of the following airports (including heliports):
      (i) An airport that is available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement.
      (ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and except for military airports, it is clearly indicated that that airport will be available for public use.
      (iii) An airport that is operated by an armed force of the United States.
(b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit that notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of construction or alteration.
(c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) of this section shall, within 5 days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the region involved, if —
   (1) The construction or alteration is more than 200 feet above the surface level of its site; or
   (2) An FAA regional office advises him that submission of the form is required.

§77.15 Construction or alteration not requiring notice.
No person is required to notify the Administrator for any of the following construction or alteration:
(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.
(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.
(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.
(d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.
(a) Each person who is required to notify the Administrator under §77.13(a) shall send one execution form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.
   (b) The notice required under §77.13(a) (1) through (4) must be submitted at least 30 days before the earlier of the following dates —
      (1) The date the proposed construction or alteration is to begin.
      (2) The date an application for a construction permit is to be filed.
However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.
(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height, must contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.
(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expedient means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.
(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.15, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

Announcement

Please send all future FAA form 7460-1 notices to the FAA’s new...

EXPRESS PROCESSING CENTER
Federal Aviation Administration
Southwest Regional Office
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-4298
Phone: (817) 835-1990

Visit the FAA’s new Obstruction Evaluation web site at http://oeaaa.faa.gov
INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1

PLEASE TYPE or PRINT

ITEM #1. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #2. Please include the name, address, and phone number of a personal contact point as well as the company name.

ITEM #3. New Construction would be a structure that has not yet been built.
Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration shall be included in ITEM #21 "Complete Description of Proposal". Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has never been studied by the FAA. The reason for the notice shall be included in ITEM #21 "Complete Description of Proposal".

ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enter the estimated length of time the temporary structure will be up.

ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.

ITEM #6. Please indicate the type of structure. DO NOT LEAVE BLANK.

ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other" and indicate "no preference". DO NOT LEAVE BLANK. NOTE: High intensity lighting shall be used only for structures over 500' AGL. In the absence of high intensity lighting for structures over 500' AGL, marking is also required.

ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.

ITEM #9. and #10. Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from a hand-held GPS instrument is acceptable. This data, when plotted, should match the site depiction submitted under ITEM #20.

ITEM #11. NAD 83 is preferred; however, latitude/longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datums may be used. It is important to know which datum is used. DO NOT LEAVE BLANK.

ITEM #12. Enter the name of the nearest city/state to the site. If the structure is or will be in a city, enter the name of that city/state.

ITEM #13. Enter the full name of the nearest public-use (not private-use) airport (or heliport) or military airport (or heliport) to the site.

ITEM #14. Enter the distance from the airport or heliport listed in #13 to the structure.

ITEM #15. Enter the direction from the airport or heliport listed in #13 to the structure.

ITEM #16. Enter the site elevation above mean sea level and expressed in whole feet rounded to the nearest foot (e.g. 173' rounds to 17', 176' rounds to 18'). This data should match the ground contour elevations for site depiction submitted under ITEM #20.

ITEM #17. Enter the total structure height above ground level in whole feet rounded to the next highest foot (e.g. 173' rounds to 18'). The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.

ITEM #18. Enter the overall height above mean sea level and expressed in whole feet. This will be the total of ITEM #16 + ITEM #17.

ITEM #19. If a FAA aeronautical study was previously conducted, enter the previous study number.

ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" X 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, Contact USGS at 1-888-275-8747 or via Internet at http://store.usgs.gov/. If available, attach a copy of a documented site survey with the surveyor’s certification stating the amount of vertical and horizontal accuracy in feet.

ITEM #21.
• For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.
• For antennas, include the type of antenna and center of radiation (Attach the antenna pattern, if available).
• For microwave, include azimuth relative to true north.
• For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction).
• For each pole/support, include coordinates, site elevation, and structure height above ground level or water.
• For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials.
• For alterations, explain the alteration thoroughly.
• For existing structures, thoroughly explain the reason for notifying the FAA (e.g. corrections, no record of previous study, etc.).

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation and zoning authorities.
Paperwork Reduction Act Statement: This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Providing this information is mandatory for anyone proposing construction or alteration that meets or exceeds the criteria contained in 14 CFR, part 77. We estimate that the burden of this collection is an average 19 minutes per response. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection is 2120-0001.

FAA Form 7460-1 (2-99) Supersedes Previous Edition
0008

NSN: 0052-00-012-
Notice of Proposed Construction or Alteration

1. Sponsor (person, company, etc. proposing this action):
   - Attn. of: Rick Thomas
   - Name: Timmons Group
   - Address: 1001 Boulders Parkway Suite 300
   - City: Richmond State: VA Zip: 23225
   - Telephone: 804-200-6500 Fax: 804-560-1438
   - E-mail Address: rick.thomas@timmons.com

2. Sponsor's Representative (if other than #1):
   - Attn. of: 
   - Name: 
   - Address: 
   - City: State: Zip: 
   - Telephone: Fax: 

3. Notice of: New Construction Alteration Existing
4. Duration: Permanent Temporary ( months, days)
5. Work Schedule: Beginning End
6. Type: Antenna Tower Crane Building Power Line Landfill Water Tank Other Wind Turbine
7. Marking/Painting and/or Lighting Preferred:
   - Red Lights and Paint
   - White - Medium Intensity White - High Intensity
   - Dual - Red and Medium Intensity White - High Intensity
8. FCC Antenna Structure Registration Number (if applicable): 
9. Latitude: N37° 03' 11.64"
10. Longitude: W76° 01' 16.12"
11. Datum: NAD 83 NAD 27 Other
12. Nearest: City: Virginia Beach State: VA
13. Nearest Public-use (not private-use) or Military Airport or Heliport: Norfolk International Airport
14. Distance from #13. to Structure: 12 miles
15. Direction from #13. to Structure: SSW
16. Site Elevation (AMSL): 0 ft.
17. Total Structure Height (AGL): 540 ft.
19. Previous FAA Aeronautical Study Number (if applicable): - OE
20. Description of Location: (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey.)
21. Complete Description of Proposal:
   The applicant proposes to construct one (1) utility scale wind turbine at this location. The Department of Defense Siting Clearinghouse (DODSC) has already indicated that this site does not interfere with DOD operations. The maximum capacity of the turbine proposed at this location is 6MW.

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of part 77 are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to 49 U.S.C., section 46301 (a).

I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking and lighting standards as necessary.

Date Typed or Printed name and Title of Person Filing Notice Signature
Rick Thomas, Principal

FAA Form 7460-1 (5-07) Supersedes Previous Edition
NSN: 0052-00-012-0008
March 14, 2012

Mr. Don Giecek  
Project Manager  
Timmons Group  
1001 Boulders Parkway, Suite 300  
Richmond, Virginia 23225  
Via Electronic Mail  
don.giecek@timmons.com

Re: Potential Wind Turbine Generator Site  
Chesapeake Bay Bridge Tunnel Site

Dear Mr. Giecek:

QED is pleased to submit this report addressing potential airspace impacts associated with the proposed wind turbine generator site. We evaluated the following airspace in accordance with our agreement. The wind turbine generator is located at latitude 37º03’11.64”N, longitude 76º01’16.12”W (NAD83) with a blade tip height of 540’ above mean sea level (AMSL.)

**Federal Aviation Regulations Part 77**

Federal Aviation Regulations (FAR) Part 77, "Safe, Efficient Use and Preservation of the Navigable Airspace" sets guidance on providing notice to the Federal Aviation Administration (FAA) of certain proposed new construction or alteration to existing structures. This affords the FAA with an opportunity to assess whether the construction or alteration is an obstruction to the navigable airspace and, if so, would be determined to be a hazard to such use.

By definition in FAR Part 77, any structure exceeding a height greater than 499’ above the ground level is determined to be an obstruction to air navigation. Therefore, the proposed wind turbine generator would carry that determination. The FAA would then conduct an aeronautical study of the obstruction to evaluate if it should be determined to constitute a hazard to air navigation. A hazard determination signifies that the obstruction has a significant adverse impact on air navigation. The aeronautical study considers the en route airspace and that airspace protected for terminal operations such as instrument approach and departure procedures. Not all obstructions are determined to be hazards and often the FAA will require that the structure be marked and lighted so as to make its location and elevation conspicuous to aircraft as a mitigation measure.

The sections that follow provide an overview of the potential impacts on the navigable airspace that the wind turbine generator may impose as an obstruction.
Airspace Setting

The proposed wind turbine generator is located in Chesapeake Bay, slightly east of the Chesapeake Bay Bridge Tunnel. Figure 1 on the following page illustrates the location of the proposed wind turbine generator and primary aviation facilities and flight routes.

Additionally, airport facilities in the vicinity of the proposed wind turbine generator are depicted in Figure 1. Notable among these are the Norfolk International Airport, Oceana Naval Air Station, and Norfolk Naval Air Station. These airports are served with published instrument approach and departure procedures that allow aircraft to operate under instrument flight rules and that provide navigational guidance at low altitudes in the terminal airspace.

En Route Airspace

The en route airspace is divided into low and high segments. The term 'low' designates airspace from the surface to 18,000' AMSL. All other airspace is then classified as 'high.’ Airspace is also classified for purposes of air traffic management, which is not relevant in this situation. For the purposes of this evaluation, only the low altitude airspace requires evaluation.

Figure 1 identifies a visual flight rule route that traverses an area near the proposed wind turbine generator. The route is named V1-139 and links the Cape Charles and Norfolk VORTAC’s. This Victor Airway passes more than two statute miles west of the proposed wind turbine generator. At this lateral separation, it is not considered an obstruction to visual flight rule aircraft operations along the route. Although not depicted as a designated flight route, the Chesapeake Bay Bridge Tunnel serves as an effective visual flight rule route that can attract use by light aircraft. The proposed wind turbine generator is positioned about 1 statute mile east of the bridge/tunnel and therefore is subject to an aeronautical study. Visual flight rules require that aircraft operating in areas that are not congested maintain an elevation of at least 500' above the surface of the roadway plus the height of a vehicle. Thus, at an elevation of 540' AMSL, the proposed wind turbine could be determined to be a hazard to visual flight rule aircraft operations.

The impact on minimum en route, minimum safe and minimum obstacle clearance altitudes as a result of the proposed wind turbine generator was evaluated and found not to be a factor. Other obstructions in the en route airspace set these altitudes, which would otherwise be lower if the wind turbine generator by itself was the controlling obstruction. Consequently, the FAA would likely not make a hazard determination for this airspace management.
Terminal Airspace

Terminal airspace is defined to provide specific routes that aircraft fly to and from airports under visual and instrument flight rules. Visual flight rule airspace typically involves air traffic patterns that are generally rectangular in space and have a perimeter of about one to two miles centered on the runway(s.) Airspace for instrument flight rules is a much larger volume to provide for the arrival and departure of aircraft under low ceiling or visibility conditions. Obstructions to the imaginary surfaces that define these volumes of airspace substantiate the need for further evaluation as part of an aeronautical study.
Instrument Approach and Departure Procedures

We identified several instrument approach procedures to certain airports in the vicinity of the proposed wind turbine generator that necessitated an assessment of the possible impact on their use. Of primary concern was the need to increase altitudes associated with any of the approach segments (initial, intermediate and final) or modifications to the missed approach segment that are presently published for these procedures. These analyses were only required for Norfolk International Airport, Oceana Naval Air Station and Norfolk Air Station. The proposed wind turbine generator was not located within the obstacle evaluation areas associated with the instrument approach procedures at the remaining airports depicted in Figure 1 (Newport News/Williamsburg International Airport, Langely Air Force Base and Hampton Roads Executive Airport.) Tables 1 through 3 on the following pages present a summary of the findings of these evaluations.

Table 1 addresses the 12 instrument approach procedures published for Norfolk International Airport. Depending on the direction of the flight, the proposed wind turbine generator is located within the obstacle evaluation area of the initial segment of the instrument approach procedure or the missed approach segment. The initial approach segment is the first to be engaged when the aircraft transitions from the en route airspace to the terminal area. The altitudes assigned to the initial approach fix are the highest of all segments and the aircraft descends from that point to a lower altitude intermediate fix and then down to the final approach fix along a well defined flight path and within an allowable rate of descent between the fixes. The missed approach segment is larger in area to account for the potential to initiate a 'go-around' at any point during the approach.

The data in Table 1 indicates that in each of the initial approach segments, the altitude currently assigned is higher than that which would be required based solely on the location and elevation of the proposed wind turbine generator. The higher initial approach segment altitude is due to one of two factors. First, there is an existing antenna tower (identifier number 51-001347) located at latitude 37°15'45"N, longitude 76°00'44"W at an elevation of 757' AMSL. Secondly, for those approaches where the initial approach course is based on a radial within the 137° to 322° sector from the Cape Charles VORTAC, the minimum reception altitude is 2000' AMSL. By itself and absent any other obstructions, the proposed wind turbine generator would necessitate the assignment of an altitude of 1600’ AMSL in the initial approach segment. The proposed wind turbine generator is located in the missed approach segments of some of these instrument approach procedures; however, it is not an obstruction and presents no conflict or adverse impact. Instrument departure procedures from Norfolk International Airport are similarly not impacted. Thus, the proposed wind turbine generator does not impose an additional impact on the instrument approach and departure procedures at Norfolk International Airport and the FAA would likely make a determination of no hazard to air navigation.
<table>
<thead>
<tr>
<th>Instrument Approach Procedure</th>
<th>Associated IAP Segment</th>
<th>From / To NAVAIDS, Fixes and Waypoints</th>
<th>Currently Published Altitude (AMSL)</th>
<th>WTG Required Altitude (AMSL)</th>
<th>Likely FAA Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS or LOC 5</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>ILS or LOC 23</td>
<td>Initial</td>
<td>HCM to KLINK</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td></td>
<td>Initial</td>
<td>CCV to KLINK</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (RNP) Y 5</td>
<td>Missed</td>
<td>TECHI to CCV</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (RNP) Y 23</td>
<td>Initial</td>
<td>OMRIE to KLINK</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 14</td>
<td>Missed</td>
<td>WARIV to JIMMY</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 32</td>
<td>Initial</td>
<td>CCV to JEBAT</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) Z 5</td>
<td>Missed</td>
<td>TECHI to CCV</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) Z 23</td>
<td>Initial</td>
<td>OMRIE to KLINK</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>VOR/DME 5</td>
<td>Missed</td>
<td>ORF to JIMMY</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>VOR/DME 14</td>
<td>Missed</td>
<td>ORF to JIMMY</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>VOR/DME 32</td>
<td>Missed</td>
<td>ORF to JIMMY</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>VOR 23</td>
<td>Initial</td>
<td>CCV to JIMMY</td>
<td>2000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
</tbody>
</table>
The data in Table 2 identifies the instrument approach procedures to the Oceana Naval Air Station. With respect to this facility, the proposed wind turbine generator is located within the initial approach segment obstacle evaluation area of 2 of the 11 procedures. Otherwise, it is located beyond the limits of the associated obstacle evaluation area and not a factor. The initial approach segments are assigned altitudes of 3000' AMSL, primarily as a means to separate the arrival streams to Runways 23L and Runway 23R from that of Runway 23 at Norfolk International Airport some 9 miles to the southeast. The proposed wind turbine does not serve to increase this altitude and, thus, the FAA would not likely determine it to be a hazard. Additionally, the proposed wind turbine generator does not impact the existing published instrument departure procedures from Oceana Naval Air Station.

<table>
<thead>
<tr>
<th>Instrument Approach Procedure</th>
<th>Associated IAP Segment</th>
<th>From / To NAVAIDS, Fixes and Waypoints</th>
<th>Currently Published Altitude (AMSL)</th>
<th>WTG Required Altitude (AMSL)</th>
<th>Likely FAA Determination</th>
</tr>
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<tbody>
<tr>
<td>RNAV (GPS) 5L</td>
<td>None</td>
<td>NA</td>
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<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 5R</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
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<td>Initial</td>
<td>CCV to JAGNI</td>
<td>3000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 23R</td>
<td>Initial</td>
<td>CCV to HENIP</td>
<td>3000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 5L</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 5R</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 23L/R</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 32L/R</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 5L</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 5R</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 23L/R</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
</tbody>
</table>
As indicated in Table 3, there are seven instrument approach procedures published for the Norfolk Air Station and for those where the proposed wind turbine generator lies within an obstacle evaluation area, the required altitude is less than that currently designated. There is no impact on the instrument departure procedures published for the Airport. Therefore, a determination of no hazard can be expected.

<table>
<thead>
<tr>
<th>Instrument Approach Procedure</th>
<th>Associated IAP Segment</th>
<th>From / To NAVIDS, Fixes and Waypoints</th>
<th>Currently Published Altitude (AMSL)</th>
<th>WTG Required Altitude (AMSL)</th>
<th>Likely FAA Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS or LOC/DME 10</td>
<td>Missed</td>
<td>NGU to RUVNE</td>
<td>2100</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 10</td>
<td>Missed</td>
<td>RW 10 to NELBe</td>
<td>3000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) 28</td>
<td>Feeder</td>
<td>SCHOL to MURAE</td>
<td>3000</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 10</td>
<td>Missed</td>
<td>NGU as Directed</td>
<td>2300</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 28</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 10</td>
<td>Missed</td>
<td>NGU as Directed</td>
<td>2300</td>
<td>1600</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 28</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
</tbody>
</table>

**Summary**

In conclusion, the proposed wind turbine generator would be considered an obstruction to the navigable airspace because of its altitude at more than 499’ above the surface. Its location proximate to the Chesapeake Bay Bridge Tunnel as a visual flight route reference could reinforce this determination. Nonetheless, the airspace impact can be mitigated by lighting the wind turbine generator so that it may be seen by pilots transiting the airspace or en route to one of the nearby airports. High intensity white strobe lights and red obstruction lights similar to that installed on the 757’ AMSL antenna tower described previously should be strongly considered as a mitigation measure and are likely to be required by the FAA as a consequence of its aeronautical study.
Disclaimer

The analyses conducted reflect an initial assessment of the potential impact of a single proposed wind turbine generator on navigable airspace based on readily available data. The analysis should not be extended to address other wind turbine generators that may complement this installation. The results presented are subject to review by the FAA, which may have access to other information related to use of the airspace and the location of existing obstacles in the en route and terminal areas.

Respectfully submitted,

Ronald F. Price, P.E.
Principal

RFP/pss
April 30, 2012

Mr. Don Giecek  
Project Manager  
Timmons Group  
1001 Boulders Parkway, Suite 300  
Richmond, Virginia 23225  

Re: Potential Wind Turbine Generator Site  
Newport News, Virginia

Dear Mr. Giecek:

QED is pleased to submit this report addressing potential airspace impacts associated with the proposed wind turbine generator site. We evaluated the following airspace in accordance with our agreement. The wind turbine generator is located at latitude 36°57′32.94"N, longitude 76°24′10.74"W (NAD83) with a blade tip height of 499′ above mean sea level (AMSL.)

Federal Aviation Regulations Part 77

Federal Aviation Regulations (FAR) Part 77, "Safe, Efficient Use and Preservation of the Navigable Airspace" sets guidance on providing notice to the Federal Aviation Administration (FAA) of certain proposed new construction or alteration to existing structures. This affords the FAA with an opportunity to assess whether the construction or alteration is an obstruction to the navigable airspace and, if so, would be determined to be a hazard to such use.

By definition in FAR Part 77, any structure exceeding a height greater than 499′ above the ground level is determined to be an obstruction to air navigation. Therefore, the proposed wind turbine generator would not carry that determination. The proposed wind turbine generator is not located within any FAR Part 77 imaginary surfaces associated with civilian airports. However, it is located within but does not penetrate the outer horizontal surface established in FAR Part 77 for Department of Defense air bases – Norfolk Naval Station/Chambers Field and Langley Air Force Base. Nonetheless, because the proposed wind turbine generator exceeds a height of 200′ above ground elevation, the FAA must be notified so that the agency can conduct a study of the object to determine if it is an obstruction or a hazard to air navigation, other than under the provisions of FAR Part 77. A hazard determination signifies that the obstruction has a significant adverse impact on air navigation. The aeronautical study considers the en route airspace and that airspace protected for terminal operations such as instrument approach and departure procedures. Not all obstructions are determined to be hazards and often the FAA will require that the structure be marked and lighted so as to make its location and elevation conspicuous to aircraft as a mitigation measure.

The sections that follow provide an overview of the potential impacts on the navigable airspace that the wind turbine generator may impose as an obstacle.
Airspace Setting

The proposed wind turbine generator is located in Hampton Roads Bay, slightly east of Interstate Highway 664 as it crosses the Bay at the northern end. Figure 1 on the following page illustrates the location of the proposed wind turbine generator, and primary aviation facilities, visual flight routes, and tall obstacles in the general area. The base map is the visual flight rule (VFR) sectional map.

Notable among the airport facilities in the area is the Norfolk Air Station/Chambers Field with its single east-west runway designated Runway 10-28. This airport is served with published instrument approach and departure procedures to each runway end that allow aircraft to operate under instrument flight rules and that provide navigational guidance at low altitudes in the terminal airspace.

En Route Airspace

The en route airspace is divided into low and high segments. The term 'low' designates airspace from the surface to 18,000’ AMSL. All other airspace is then classified as 'high.' Airspace is also classified for purposes of air traffic management, which may have some relevance in this situation. For the purposes of this evaluation, only the low altitude airspace requires evaluation.

Figure 1 does not illustrate the existence of defined visual or low level instrument flight rule routes in the vicinity of the proposed wind turbine generator. Nonetheless, aircraft do operate in the airspace area and Interstate Highway 664 can be considered to serve as an effective reference as a visual flight rule route that can attract use by light aircraft. The proposed wind turbine generator is positioned nearly 2,000' east of the Interstate Highway, which traverses land and open water. Visual flight rules require that aircraft operating in areas that are not congested or over open water maintain an elevation of at least 500’ above the surface of the roadway plus the height of a vehicle. Thus, at an elevation of 499’ AMSL, the proposed wind turbine could be determined to be a hazard to VFR aircraft operations because the difference in flight altitude and obstacle elevations is slight. Aircraft overflying congested areas are to remain at least 1000' above the highest obstacle within 2000' of the aircraft. There is the potential that aircraft operating VFR and transiting the area will maintain an altitude of at least 1200’AMSL or higher than 4000’ AMSL as depicted on the VFR sectional map in order to ensure that they are outside of the Class C airspace assigned to Norfolk International Airport and Norfolk Naval Station/Chambers Field. The proposed wind turbine generator is located immediately to the west of this airspace boundary and, depending on the flight accuracy of the pilot, the aircraft could enter this airspace. Such action would trigger a requirement to communicate with air traffic controllers and the aircraft must also be equipped with a Mode C (altitude reporting) radar transponder. However, when clear of the Class C airspace, VFR aircraft can be flown at slightly above 500’ AMSL when in the vicinity of the proposed wind turbine generator.

The impact on minimum en route, minimum safe and minimum obstacle clearance altitudes as a result of the proposed wind turbine generator was evaluated and found not to be a factor. Other obstructions in the en route airspace set these altitudes, which would otherwise be lower if the wind turbine generator by itself was the controlling obstacle. Consequently, the FAA would likely not make a hazard determination for this airspace management.
Terminal Airspace

Terminal airspace is defined to provide specific routes that aircraft fly to and from airports under visual and instrument flight rules. Visual flight rule airspace typically involves air traffic patterns that are generally rectangular in space and have a perimeter of about one to two miles centered on the runway(s.) Airspace for instrument flight rule operations is a much larger volume to provide for the arrival and departure of aircraft under low ceiling or visibility conditions. Obstructions to the imaginary surfaces that define these volumes of airspace substantiate the need for further evaluation as part of an aeronautical study to determine their potential as hazards to the navigable airspace.
Instrument Approach and Departure Procedures

We reviewed several instrument approach procedures to airports in the vicinity of the proposed wind turbine generator that necessitated an assessment of the possible impact on their use. Of primary concern was the possible need to increase approach minimums or altitudes associated with any of the approach segments (initial, intermediate and final), or modifications to the missed approach segment that are presently published for these procedures. Instrument departure procedures were also considered. This review indicated that analyses were only required for Norfolk Naval Station/Chambers Field. Table 1 on the following page presents a summary of the findings of these evaluations.

Table 1 addresses the six instrument approach procedures (approach and missed approach segments), associated circling procedures (a visual procedure utilizing the instrument approach procedure), and the single instrument departure procedure published for Norfolk Naval Station/Chambers Field. Depending on the direction of the flight, the proposed wind turbine generator is located within the obstacle evaluation area of the intermediate or missed approach segment of the instrument approach procedure, or the diverse departure area associated with instrument departure procedures. The intermediate approach segment is the second to be engaged when the aircraft transitions from the en route airspace to the terminal area and the initial approach segment. The final approach segment follows the intermediate approach segment, and the missed approach segment concludes the procedure.

The altitude assigned to the final approach fix is based on the highest obstacle in the intermediate approach segment with allowances for the required obstacle clearance and other adjustment values. The aircraft descends through the fixes along a well defined flight path and within allowable rates of descent between each. The more precise the instrument approach in terms of the navigation system utilized, the smaller the obstacle evaluation area required. At Norfolk Naval Station, the ILS is the most precise instrument approach procedure, followed by the RNAV (GPS) LNAV/VNAV, LOC/DME, RNAV (GPS) LNAV and the HI-TACAN and TACAN procedures. Military aircraft may utilize any of these procedures; civil aircraft are restricted to the use of the ILS, LOC/DME and RNAV (GPS) procedures. The missed approach segment is larger in area than those for the initial, intermediate and final approach segments to account for the potential to initiate a 'go-around' at any point during the approach. When obstacles penetrate any of the various obstacle clearance surfaces defined for a particular approach procedure, the FAA is likely to issue a hazard to air navigation determination. Mitigation measures can potentially be identified to overcome such determinations and, preferably, these should be investigated prior to informing the FAA of the intended development action.

An initial climb area and a diverse departure area are also assigned to each runway end for aircraft conducting instrument departures. Obstacles that penetrate the obstacle clearance surface (OCS) associated with these areas and that cannot be lowered in height or removed cause an increase to the departure climb gradient (within allowable limits) and/or the issuance of specified headings (consistent with uses of adjoining airspace) to be flown if in the initial climb area, or the assignment of prohibited sectors of airspace when within the diverse departure area OCS. Absent mitigation, such impacts would cause the FAA to issue a hazard to air navigation determination.
Table 1
INSTRUMENT APPROACH AND DEPARTURE PROCEDURE IMPACT
NORFOLK NAVAL STATION / CHAMBERS FIELD

<table>
<thead>
<tr>
<th>Instrument Approach / Departure Procedure</th>
<th>Associated IAP Segment</th>
<th>From / To NAVAIDS, Fixes and Waypoints</th>
<th>Currently Published Altitude (AMSL) or OCS Elevation</th>
<th>WTG Required Altitude (AMSL) or OCS Elevation</th>
<th>Likely FAA Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS 10</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>LOC/DME 10</td>
<td>Intermediate</td>
<td>NONNU to HISAM</td>
<td>1600</td>
<td>1000</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV/VNAV 10</td>
<td>Intermediate</td>
<td>JUPOL to JUMEM</td>
<td>1000</td>
<td>1000</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV 10</td>
<td>Intermediate</td>
<td>JUPOL to JUMEM</td>
<td>1000</td>
<td>1000</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 10</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 10</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV/VNAV 28</td>
<td>Missed</td>
<td>R/W 28 to JUPOL</td>
<td>OCS 790 at WTG 2000 at JUPOL</td>
<td>OCS 499 at WTG 1500 at JUPOL</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV 28</td>
<td>Missed</td>
<td>R/W 28 to JUPOL</td>
<td>OCS 714 at WTG 2000 at JUPOL</td>
<td>OCS 499 at WTG 1500 at JUPOL</td>
<td>No Hazard</td>
</tr>
<tr>
<td>All Circling Approaches</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 28</td>
<td>Missed</td>
<td>R/W 28 outbound on CHAMBERS TACAN R-277º</td>
<td>OCS 870 at WTG 2300 at Hold</td>
<td>OCS 499 at WTG 2300 at Hold</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 28</td>
<td>Missed</td>
<td>R/W 28 outbound on CHAMBERS TACAN R-277º</td>
<td>OCS 870 at WTG 2300 at Hold</td>
<td>OCS 499 at WTG 2300 at Hold</td>
<td>No Hazard</td>
</tr>
<tr>
<td>R/W 28 Departure</td>
<td>Diverse Departure</td>
<td>R/W 28 outbound as directed</td>
<td>OCS 756 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
</tbody>
</table>
The data in Table 1 indicates that in each of the intermediate approach segments, the altitude currently assigned to the final approach fix is higher than or equivalent to that which would be required based solely on the location and elevation of the proposed wind turbine generator (1000’ AMSL.) The cause for these existing final approach fix altitudes was not investigated due to a lack of readily available existing obstacle data. However, the currently required altitude is generally due to one or more factors. These include existing obstacles that are higher or nearly equivalent in elevation in the vicinity of Norfolk Naval Station/Chambers Field and/or the need to establish the fix altitudes to achieve acceptable aircraft descent gradients between the initial approach and intermediate approach fixes or the intermediate approach fix and the final approach fix. The key finding in this case is that none of the final approach fix altitudes for any of the procedures will require an upward adjustment due to the installation of the proposed wind turbine generator.

The proposed wind turbine generator is located in the missed approach segment of some of the instrument approach procedures; however, it is does not penetrate the obstacle clearance surface (OCS) and thus presents no conflict or adverse impact. Instrument departure procedures from Norfolk Naval Station/Chambers Field are similarly not impacted.

Thus, the proposed wind turbine generator does not impose an additional impact on the instrument approach and departure procedures at Norfolk Naval Station/Chambers Field and the FAA would likely make a determination of no hazard to air navigation.

Summary

In conclusion, the proposed wind turbine generator could be considered a hazard to the navigable airspace because its elevation of 499’ AMSL is nearly equivalent to the minimum altitude required for aircraft operating under visual flight rules over uncongested areas or open water. It could be debated whether the area surrounding the proposed wind turbine generator is uncongested or in open water should the FAA make a hazard to air navigation determination. The proposed wind turbine location proximate to Interstate Highway 664 as it crosses Hampton Roads Bay as a visual flight route reference could reinforce this determination. Nonetheless, the airspace impact can be mitigated by lighting the wind turbine generator so that it may be seen by pilots transiting the airspace or en route to or from one of the nearby airports. High intensity white strobe lights and red obstruction lights similar to those installed on existing antenna towers in the general area should be strongly considered as a mitigation measure and are likely to be required by the FAA as a consequence of its aeronautical study.
Disclaimer

The analyses conducted reflect an initial assessment of the potential impact of a single proposed wind turbine generator on navigable airspace based on readily available data. The analysis should not be extended to address other wind turbine generators that may complement this installation. The results presented are subject to review by the FAA, which may have access to other information related to use of the airspace and the location of existing obstacles in the en route and terminal areas.

Respectfully submitted,

Ronald F. Price, P.E.
Principal

RFP/pss
April 30, 2012

Mr. Don Giecek  
Project Manager  
Timmons Group  
1001 Boulders Parkway, Suite 300  
Richmond, Virginia 23225  
Via Electronic Mail  
don.giecek@timmons.com

Re: Potential Wind Turbine Generator Site  
Suffolk, Virginia

Dear Mr. Giecek:

QED is pleased to submit this report addressing potential airspace impacts associated with the proposed wind turbine generator site. We evaluated the following airspace in accordance with our agreement. The wind turbine generator is located at latitude 36°54'04.50"N, longitude 76°25'03.04"W (NAD83) with a blade tip height of 499' above mean sea level (AMSL.)

Federal Aviation Regulations Part 77

Federal Aviation Regulations (FAR) Part 77, "Safe, Efficient Use and Preservation of the Navigable Airspace" sets guidance on providing notice to the Federal Aviation Administration (FAA) of certain proposed new construction or alteration to existing structures. This affords the FAA with an opportunity to assess whether the construction or alteration is an obstruction to the navigable airspace and, if so, would be determined to be a hazard to such use.

By definition in FAR Part 77, any structure exceeding a height greater than 499’ above the ground level is determined to be an obstruction to air navigation. Therefore, the proposed wind turbine generator would not carry that determination. The proposed wind turbine generator is not located within any FAR Part 77 imaginary surfaces associated with civilian airports. However, it is located within but does not penetrate the outer horizontal surface established in FAR Part 77 for Department of Defense air bases – Norfolk Naval Station/Chambers Field. Nonetheless, because the proposed wind turbine generator exceeds a height of 200’ above ground elevation, the FAA must be notified so that the agency can conduct a study of the object to determine if it is an obstruction or a hazard to air navigation, other than under the provisions of FAR Part 77. A hazard determination signifies that the obstruction has a significant adverse impact on air navigation. The aeronautical study considers the en route airspace and that airspace protected for terminal operations such as instrument approach and departure procedures. Not all obstructions are determined to be hazards and often the FAA will require that the structure be marked and lighted so as to make its location and elevation conspicuous to aircraft as a mitigation measure.

The sections that follow provide an overview of the potential impacts on the navigable airspace that the wind turbine generator may impose as an obstacle.
Airspace Setting

The proposed wind turbine generator is located in Hampton Roads Bay, slightly east of Interstate Highway 664 as it crosses the Bay at the southern end. Figure 1 on the following page illustrates the location of the proposed wind turbine generator, and primary aviation facilities, visual flight routes, and tall obstacles in the general area. The base map is the visual flight rule (VFR) sectional map.

Notable among the airport facilities in the area is the Norfolk Air Station/Chambers Field with its single east-west runway designated Runway 10-28. This airport is served with published instrument approach and departure procedures to each runway end that allow aircraft to operate under instrument flight rules and that provide navigational guidance at low altitudes in the terminal airspace.

En Route Airspace

The en route airspace is divided into low and high segments. The term 'low' designates airspace from the surface to 18,000' AMSL. All other airspace is then classified as 'high.' Airspace is also classified for purposes of air traffic management, which may have some relevance in this situation. For the purposes of this evaluation, only the low altitude airspace requires evaluation.

Figure 1 does not illustrate the existence of a defined visual or low level instrument flight rule routes in the vicinity of the proposed wind turbine generator. Nonetheless, aircraft do operate in the area and Interstate Highway 664 can be considered to serve as an effective reference as a visual flight rule route that can attract use by light aircraft. The proposed wind turbine generator is positioned about 1,600' east of the Interstate Highway, which traverses land and open water. Visual flight rules require that aircraft operating in areas that are not congested or over open water maintain an elevation of at least 500' above the surface of the roadway plus the height of a vehicle. Thus, at an elevation of 499' AMSL, the proposed wind turbine could be determined to be a hazard to VFR aircraft operations because the difference in flight altitude and obstacle elevations is slight. Aircraft overflying congested areas are to remain at least 1000' above the highest obstacle within 2000' of the aircraft. There is the potential that aircraft operating VFR and transiting the area will maintain an altitude of at least 1200' AMSL or higher than 4000' AMSL as depicted on the VFR sectional map in order to ensure that they are outside of the Class C airspace assigned to Norfolk International Airport and Norfolk Naval Station/Chambers Field. The proposed wind turbine generator is located immediately to the west of this airspace boundary and, depending on the flight accuracy of the pilot, the aircraft could enter this airspace. Such action would trigger a requirement to communicate with air traffic controllers and the aircraft must also be equipped with a Mode C (altitude reporting) radar transponder. However, when clear of the Class C airspace, VFR aircraft can be flown at slightly above 500’ AMSL when in the vicinity of the proposed wind turbine generator.

The impact on minimum en route, minimum safe and minimum obstacle clearance altitudes as a result of the proposed wind turbine generator was evaluated and found not to be a factor. Other obstructions in the en route airspace set these altitudes, which would otherwise be lower if the wind turbine generator by itself was the controlling obstacle. Consequently, the FAA would likely not make a hazard determination for this airspace management.
Terminal Airspace

Terminal airspace is defined to provide specific routes that aircraft fly to and from airports under visual and instrument flight rules. Visual flight rule airspace typically involves air traffic patterns that are generally rectangular in space and have a perimeter of about one to two miles centered on the runway(s.) Airspace for instrument flight rules is a much larger volume to provide for the arrival and departure of aircraft under low ceiling or visibility conditions. Obstructions to the imaginary surfaces that define these volumes of airspace substantiate the need for further evaluation as part of an aeronautical study to determine their potential as hazards to the navigable airspace.
Instrument Approach and Departure Procedures

We reviewed several instrument approach procedures to airports in the vicinity of the proposed wind turbine generator that necessitated an assessment of the possible impact on their use. Of primary concern was the possible need to increase approach minimums or altitudes associated with any of the approach segments (initial, intermediate and final), or modifications to the missed approach segment that are presently published for these procedures. Instrument departure procedures were also considered. This review indicated that analyses were only required for Norfolk Naval Station/Chambers Field. Table 1 on the following page presents a summary of the findings of these evaluations.

Table 1 addresses the six instrument approach procedures (approach and missed approach segments), associated circling procedures (a visual procedure utilizing the instrument approach procedure), and the single instrument departure procedure published for Norfolk Naval Station. Depending on the direction of the flight, the proposed wind turbine generator is located within the obstacle evaluation area of the intermediate or missed approach segment of the instrument approach procedure, or the diverse departure area associated with instrument departure procedures. The intermediate approach segment is the second to be engaged when the aircraft transitions from the en route airspace to the terminal area and the initial approach segment. The final approach segment follows the intermediate approach segment, and the missed approach segment concludes the procedure.

The altitude assigned to the final approach fix is based on the highest obstacle in the intermediate approach segment with allowances for the required obstacle clearance and other adjustment values. The aircraft descends through the fixes along a well defined flight path and within allowable rates of descent between each. The more precise the instrument approach in terms of the navigation system utilized, the smaller the obstacle evaluation area required. At Norfolk Naval Station, the ILS is the most precise instrument approach procedure, followed by the RNAV (GPS) LNAV/VNAV, LOC/DME, RNAV (GPS) LNAV and the HI-TACAN and TACAN procedures. Military aircraft may utilize any of these procedures; civil aircraft are restricted to the use of the ILS, LOC/DME and RNAV (GPS) procedures. The missed approach segment is larger in area than those for the initial, intermediate and final approach segments to account for the potential to initiate a 'go-around' at any point during the approach. When obstacles penetrate any of the various obstacle clearance surfaces defined for a particular approach procedure, the FAA is likely to issue a hazard to air navigation determination. Mitigation measures can potentially be identified to overcome such determinations and, preferably, these should be investigated prior to informing the FAA of the intended development action.

An initial climb area and a diverse departure area are also assigned to each runway end for aircraft conducting instrument departures. Obstacles that penetrate the obstacle clearance surface (OCS) associated with these areas and that cannot be lowered in height or removed cause an increase to the departure climb gradient (within allowable limits) and/or the issuance of specified headings (consistent with uses of adjoining airspace) to be flown if in the initial climb area, or the assignment of prohibited sectors of airspace when within the diverse departure area OCS. Absent mitigation, such impacts would cause the FAA to issue a hazard to air navigation determination.
<table>
<thead>
<tr>
<th>Instrument Approach / Departure Procedure</th>
<th>Associated IAP Segment</th>
<th>From / To NAVAIDS, Fixes and Waypoints</th>
<th>Currently Published Altitude (AMSL) or OCS Elevation</th>
<th>WTG Required Altitude (AMSL) or OCS Elevation</th>
<th>Likely FAA Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS 10</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>LOC/DME 10</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV/VNAV 10</td>
<td>Intermediate</td>
<td>JUPO to JUMEM</td>
<td>1000</td>
<td>1000</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV 10</td>
<td>Intermediate</td>
<td>JUPO to JUMEM</td>
<td>1000</td>
<td>1000</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 10</td>
<td>Intermediate with Stepdown Fix</td>
<td>KRANY to EVWEL (REGEE is stepdown fix)</td>
<td>900 with use of REGEE stedown fix at 1000</td>
<td>1000</td>
<td>Hazard</td>
</tr>
<tr>
<td>TACAN 10</td>
<td>Intermediate with Stepdown Fix</td>
<td>KRANY to EVWEL (REGEE is stepdown fix)</td>
<td>900 with use of REGEE stedown fix at 1000</td>
<td>1000</td>
<td>Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV/VNAV 28</td>
<td>Missed</td>
<td>R/W 28 to JUPO</td>
<td>OCS 790 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
<tr>
<td>RNAV (GPS) LNAV 28</td>
<td>Missed</td>
<td>R/W 28 to JUPO</td>
<td>OCS 714 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
<tr>
<td>All Circling Approaches</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>No Hazard</td>
</tr>
<tr>
<td>HI-TACAN 28</td>
<td>Missed</td>
<td>R/W 28 outbound on CHAMBERS TACAN R-277º</td>
<td>OCS 1074 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
<tr>
<td>TACAN 28</td>
<td>Missed</td>
<td>R/W 28 outbound on CHAMBERS TACAN R-277º</td>
<td>OCS 1074 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
<tr>
<td>R/W 28 Departure</td>
<td>Diverse Departure</td>
<td>R/W 10 outbound as directed</td>
<td>OCS 900 at WTG</td>
<td>OCS 499 at WTG</td>
<td>No Hazard</td>
</tr>
</tbody>
</table>
The data in Table 1 indicates that in each of the intermediate approach segments for those procedures that are aligned with the extended runway centerline, the altitude currently assigned to the final approach fix is higher than or equivalent to that which would be required based solely on the location and elevation of the proposed wind turbine generator (1000' AMSL.) The cause for these existing final approach fix altitudes was not investigated due to a lack of readily available existing obstacle data. However, the currently required altitude is generally due to one or more factors. These include existing obstacles that are higher or nearly equivalent in elevation in the vicinity of Norfolk Naval Station/Chambers Field and/or the need to establish fix altitudes to achieve acceptable aircraft descent gradients between the initial approach and intermediate approach fixes or the intermediate approach fix and the final approach fix. The key finding in this case is that none of the final approach fix altitudes for the ILS, LOC/DME and RNAV (GPS) procedures will require an upward adjustment due to the installation of the proposed wind turbine generator.

At this juncture it is important to note that the initial through the final approach segments published for the HI-TACAN and TACAN procedures to Runway 10 are not aligned with the extended runway centerline. The course alignment is based on the location of the TACAN facility, which is positioned slightly north and west of the Runway 28 threshold and extends outbound to the west on a magnetic heading of 277°. Aircraft utilizing the HI-TACAN and TACAN approach procedures to the opposite Runway 28 end fly a missed approach course that is similarly aligned on a 277° magnetic heading. This 277° course alignment is 3°46'31.6" offset to the south of the runway centerline extended to the west. Thus, the proposed wind turbine generator is located closer to the approach and missed approach courses when the HI-TACAN and TACAN procedures are in use than those associated with the ILS, LOC/DME and RNAV (GPS) procedures that are aligned with the extended Runway 10-28 centerline when landing on Runway 10 and flying the RNAV (GPS) missed approach to Runway 28. Because the obstacle evaluation areas and obstacle clearance surfaces associated with these procedures are aligned with these courses, the impact of the proposed wind turbine generator on navigable airspace can be more pronounced. This outcome is highlighted in Table 1 where the proposed wind turbine generator is likely to be determined to be a hazard to air navigation because it raises the final approach fix altitudes for the HI-TACAN and TACAN procedures to Runway 10 from 900' AMSL to 1000' AMSL.

The proposed wind turbine generator is located in the missed approach segment of some of the instrument approach procedures; however, it does not penetrate the obstacle clearance surface (OCS) and thus presents no conflict or adverse impact. Instrument departure procedures from Norfolk Naval Station/Chambers Field are similarly not impacted.

Thus, the FAA is expected to determine that the proposed wind turbine generator is a hazard to air navigation because it causes an upward adjustment to the final approach fix for the HI-TACAN and TACAN procedures to Runway 10 at Norfolk Naval Station/Chambers Field. No hazard determinations are anticipated for the remaining instrument approach and departure procedures.
Mitigation

We reviewed possible means to mitigate a hazard determination associated with the HI-TACAN and TACAN approach procedures to Runway 10. An effective mitigation that can yield a no hazard determination is to allow for the increase in the final approach fix altitude to 1000’ AMSL for each procedure as required to accommodate the proposed wind turbine generator. This will eliminate the need for the REGEE stepdown fix, which is positioned just 1 nm to the west of the final approach fix (EVWEL.) The higher final approach fix altitude increases the descent gradient between it and the Runway 10 threshold crossing height of 35’ from the current 324'/nm to 361'/nm, which is within an acceptable range for the final approach segment. Elimination of the REGEE stepdown fix in the intermediate approach segment results in a descent gradient of 217'/nm for this segment, which is also an acceptable outcome. The approach minimums (minimum descent altitude) for each procedure are unchanged.

Summary

In conclusion, the proposed wind turbine generator could be considered a hazard to the navigable airspace because it adversely impacts visual flight rule aircraft operations and causes an increase to the final approach fix altitude for the HI-TACAN and TACAN approaches to Runway 10. With respect to the visual flight rule impact, the proposed wind turbine generator elevation of 499’ AMSL is nearly equivalent to the minimum altitude required for aircraft operating under visual flight rules over uncongested areas or open water. It could be debated whether the area surrounding the proposed wind turbine generator is uncongested or in open water should the FAA make a hazard to air navigation determination. The proposed wind turbine location proximate to Interstate Highway 664 as it crosses Hampton Roads Bay as a visual flight route reference could reinforce this determination. Nonetheless, the airspace impact can be mitigated by lighting the wind turbine generator so that it may be seen by pilots transiting the airspace or en route to or from one of the nearby airports. High intensity white strobe lights and red obstruction lights similar to those installed on existing antenna towers in the general area should be strongly considered as a mitigation measure and are likely to be required by the FAA as a consequence of its aeronautical study.

Mitigation of the impacts associated with the HI-TACAN and TACAN instrument approaches can be effected through the use of the required final approach fix altitude of 1000’ AMSL and elimination of the REGEE stepdown fix in the intermediate approach segment of these procedures. The resultant modified approach procedures do not change the current achievable approach minimums and offers acceptable descent gradients in the intermediate and final approach segments. This mitigation measure should be communicated to the FAA at such time as notice of the proposed wind turbine generator is filed with the agency. Such proactive action can avoid the issuance of a presumed or final hazard to air navigation determination by the FAA.
Disclaimer

The analyses conducted reflect an initial assessment of the potential impact of a single proposed wind turbine generator on navigable airspace based on readily available data. The analysis should not be extended to address other wind turbine generators that may complement this installation. The results presented are subject to review by the FAA, which may have access to other information related to use of the airspace and the location of existing obstacles in the en route and terminal areas.

Respectfully submitted,

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Principal

RFP/pss