SIMULATIONS

011 Great Island Camps
Late Afternoon
Simulation
011 Great Island Camps
Late Afternoon
Siemens SWT-3.6-107
10 nm

GENERAL INFORMATION

Base Photograph
Photo Name: GIA_0245-Polarized2 levels
Date: April 18, 2012
Time: 6:04 PM
GPS Coordinates: lat 34.761186°, long -76.409638°
Viewpoint Elevation: 3'

Sun and Weather
Sun Angle/Azimuth: 279°
Sun Elevation: 7°
Lighting Angle: Overhead
Weather Conditions: Partly cloudy
Visibility: 10 mi
Wave Height: 2 - 4'
Period: 4 sec.

Camera
Camera Make/Model: Nikon D7000
Sensor Dimensions: 23.6 mm X 15.6 mm
Lens Make/Model: Nikkor DX AF-S 35 mm
Lens Focal Length: 35 mm
35mm Equivalent Focal Length: 52.5 mm
Horizontal and Vertical Angles of View:
37.3° wide and 25.3° high
Camera Height: 1.5 m (5')
Camera Azimuth: 130°

Wind Turbine Information
Number: 200
Make and Model: Siemens SWT-3.6-107
Height/Dimensions:
Support Structure/Monopile Ht.: 13 m (43')
Hub Ht. (above Monopile): 80 m (262')
Rotor Diameter: 107 m (351')
Total Height to Tip of Blade: 147 m (481')
Service Platform: A bldg. 50’H X 100’W X 200’ L
   elevated 50’ above the water

VIEWING INSTRUCTIONS

The simulation is properly printed on an 11” X 17” sheet at actual size.
If viewed on a computer monitor, use the highest screen resolution. The
simulated image is at the proper perspective when viewed at 23.5° from the
eye, or at a distance of approximately twice the image height.

NOTES

- A fully white specular color was used for "sun light" to increase the contrast
  of turbines against the skyline.
- Turbine heights were adjusted to the image's horizon line, which was
  slightly curved due to camera lens distortion.
- The image was taken with a polarized filter.
- Image RGB levels were adjusted in Photoshop.
- Refraction Coefficient (k) = .075

PANORAMA

Simulation location within the panorama view (170° X 45°)
from the Great Island Camps site
SIMULATION

011 Great Island Camps
Late Afternoon
Siemens SWT-3.6-107
15 nm
Simulation
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Late Afternoon
Siemens SWT-3.6-107
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Simulation location within the panorama view (170° X 45°)
from the Great Island Camps site

T. J. Boyle Associates
landscape architects • planning consultants
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Sun Elevation: 7°
Lighting Angle: Overhead
Weather Conditions: Partly cloudy
Visibility²: 10 mi
Wave Height: 2 - 4’
Period: 4 sec.

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Lens Make/Model: Nikkor DX AF-S 35 mm
Lens Focal Length: 35 mm
35mm Equivalent Focal Length: 52.5 mm
Horizontal and Vertical Angles of View:

37.3° wide and 25.3° high
Camera Height: 5’ 6”
Camera Azimuth³: 130°

Wind Turbine Information
Number: 200
Make and Model: Siemens SWT-3.6-107
Height/Dimensions:
Support Structure/Monopile Ht.: 13 m (43’)
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PANORAMA

Simulation location within the panorama view (170° X 45°)
from the Great Island Camps site

T. J. Boyle Associates
landscape architects • planning consultants
SIMULATION

011 Great Island Camps
Late Afternoon
Vestas V164-7.0 MW
10 nm
**Simulation**

**011 Great Island Camps**

**Late Afternoon**

**Vestas V164-7.0 MW**

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**Sun and Weather**

Sun Angle/Azimuth: 279°

Sun Elevation: 7°

Lighting Angle: Overhead

Weather/Conditions: Partly cloudy

Visibility²: 10 mi

Wave Height: 2 - 4'

Period: 4 sec.

**Camera**

Camera Make/Model: Nikon D7000

Sensor Dimensions: 23.6 mm X 15.6 mm

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Horizontal and Vertical Angles of View:

37.3° wide and 25.3° high

Camera Height: 5’6”

Camera Azimuth³: 130°

**Wind Turbine Information**

Number: 200

Make and Model: Vestas V164-7.0 MW

Height/Dimensions:

Support Structure/Monopile Ht.: 13 m (43’)

Hub Ht. (above Monopile): 105 m (345’)

Rotor Diameter: 164 m (538’)

Total Height to Tip of Blade: 200 m (656’)

Service Platform: A bldg. 50’H X 100’W X 200’L elevated 50’ above the water

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from the Great Island Camps site
1^GPS Coordinates
Location coordinates as used in WindPRO to register the wireframe diagram to the photograph. Due to slight errors and lens distortion, these values may differ at the fourth significant digit as obtained from a handheld GPS device at the time the photographs were taken and as shown on the Project Location Map.

2^Visibility
Visibility is obtained from the closest airport weather station (see chart at right). The chart shows which weather station was used for each site. Visibility is measured up to ten statute miles.

3^Camera Azimuth
Camera azimuth was obtained using a magnetic compass at the time of photography. However magnetic anomalies in the study area make some of these measurements unreliable. The camera azimuth reported here is for true north and reflects the bearing used to register the wind turbines to the photograph in WindPRO.

4^Refraction Coefficient
The correction for refraction comes from Technical Appendix F Earth Curvature and Refraction of Light, in the report Visual Representation of Windfarms Good Practice Guidance, prepared for Scottish Natural Heritage (h+m 2006). The coefficient of refraction k is commonly defined as the ratio between the radius of the earth and the radius of the light in the line of sight between an object and the observer (Hirt 2010). The value reported here is half this value, but it is multiplied by two in the Technical Appendix’s equation.

Closest Airport Weather Station to Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Weather Station Location NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>001 Corolla Lighthouse</td>
<td>Kill Devil Hills</td>
</tr>
<tr>
<td>002 Beach at Duck</td>
<td>Kill Devil Hills</td>
</tr>
<tr>
<td>003 Kitty Hawk</td>
<td>Kill Devil Hills</td>
</tr>
<tr>
<td>004 Coquina Beach</td>
<td>Kill Devil Hills</td>
</tr>
<tr>
<td>005 Bodie Island Lighthouse</td>
<td>Hatteras</td>
</tr>
<tr>
<td>006 Cape Hatteras Lighthouse</td>
<td>Hatteras</td>
</tr>
<tr>
<td>007 Lighthouse Beach</td>
<td>Hatteras</td>
</tr>
<tr>
<td>008 Ocracoke Beach</td>
<td>Hatteras</td>
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<tr>
<td>009 Portsmouth Life Saving Station Tower</td>
<td>Hatteras</td>
</tr>
<tr>
<td>010 Long Point Camps</td>
<td>Beaufort</td>
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<tr>
<td>011 Great Island Camps</td>
<td>Beaufort</td>
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<tr>
<td>012 Cape Lookout Lighthouse</td>
<td>Beaufort</td>
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<tr>
<td>017 Holden Beach</td>
<td>Southport</td>
</tr>
<tr>
<td>018 Sunset Beach</td>
<td>Southport</td>
</tr>
</tbody>
</table>

ABBREVIATIONS

nm  nautical miles
mi  statute miles
mm  millimeters
m   meters
sec. seconds
`  feet
"  inches
°   degrees
lat  latitude
long longitude

REFERENCES
