Attachment 1
Viewshed Analysis

Kitty Hawk North Wind
Visual Impact Assessment

14 October 2021 (MAP 04 Revised 30 September 2022)

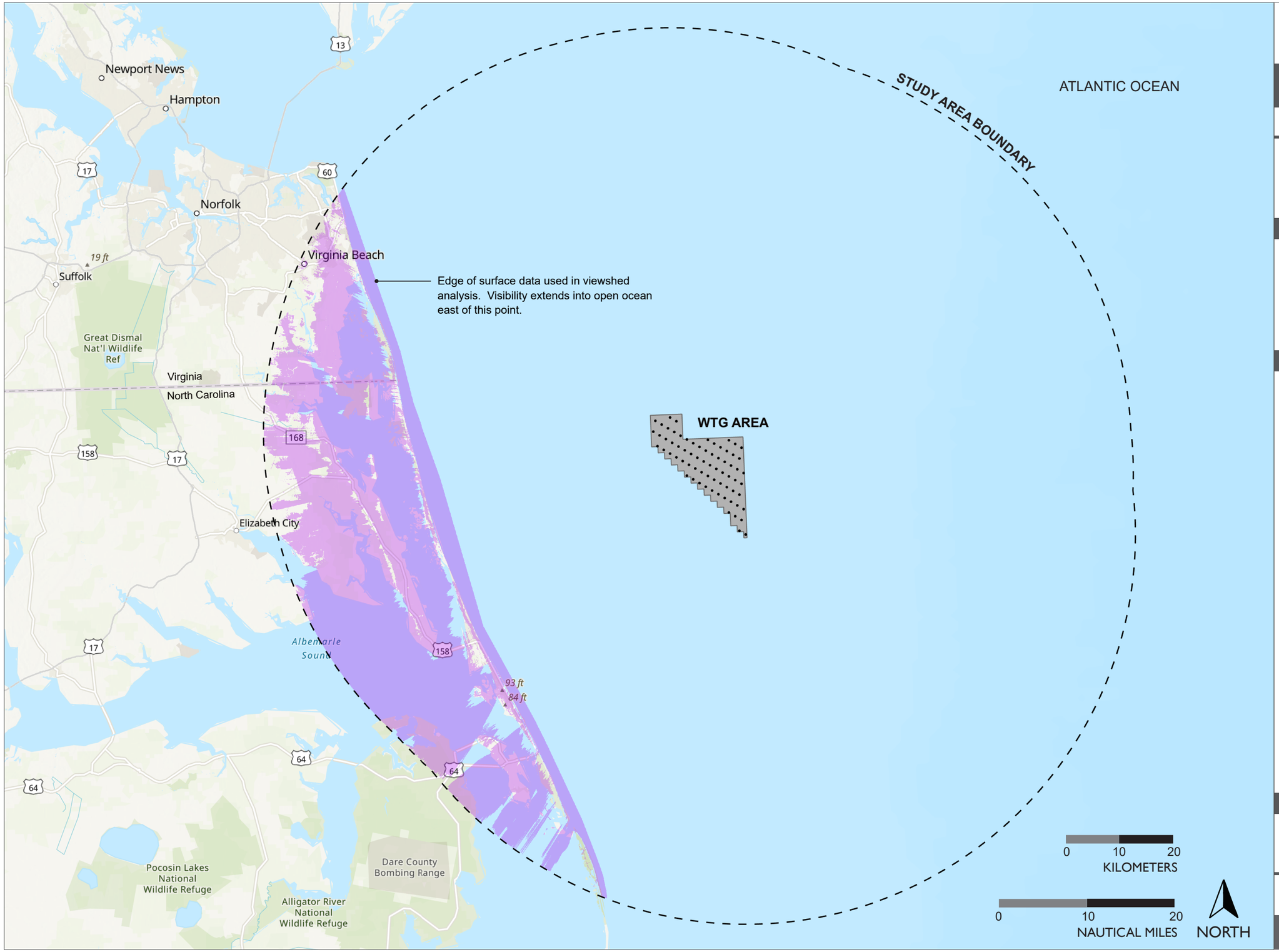
tjd&a

Kitty Hawk Wind
AVANGRID

COMPUTER-BASED VIEWSHED ANALYSIS

MAP 01

Potential Visibility of
Blade Tips
based on
Topographic Data



LEGEND

- Proposed WTG Location
- Lease Area
- Study Area Boundary (74 km / 40 nm)
- Area of Theoretical Blade Tip Visibility Based only on DTM

ANALYSIS NOTES

Map shows theoretical areas of visibility for offshore WTG blade tips, relying on the screening effects of topography alone (without accounting for vegetation and structures such as buildings).

The analysis is based on a Digital Terrain Model (DTM) processed at 10-foot resolution from first return LiDAR point cloud data acquired from the USGS National Map. The viewer height is set at 1.8 m (5.9 ft) above ground level elevation.

The purple areas represent where a viewer may theoretically see at least one WTG blade tip without intervening surface data.

The analysis does not determine the degree of visibility based on distance or the number of visible WTGs. It does not take into account visual acuity or atmospheric conditions. Potential visibility needs to be confirmed with field investigations and other visualization techniques.

KITTY HAWK
NORTH WIND

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14 October 2021

Attachment 1. Viewshed Analysis

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 02

Potential Visibility of
Blade Tips
based on
Topographic + Surface Data

LEGEND

- Proposed WTG Location
- Lease Area
- Study Area Boundary (74 km / 40 nm)
- Area of Potential Blade Tip Visibility Based on DTM + DSM

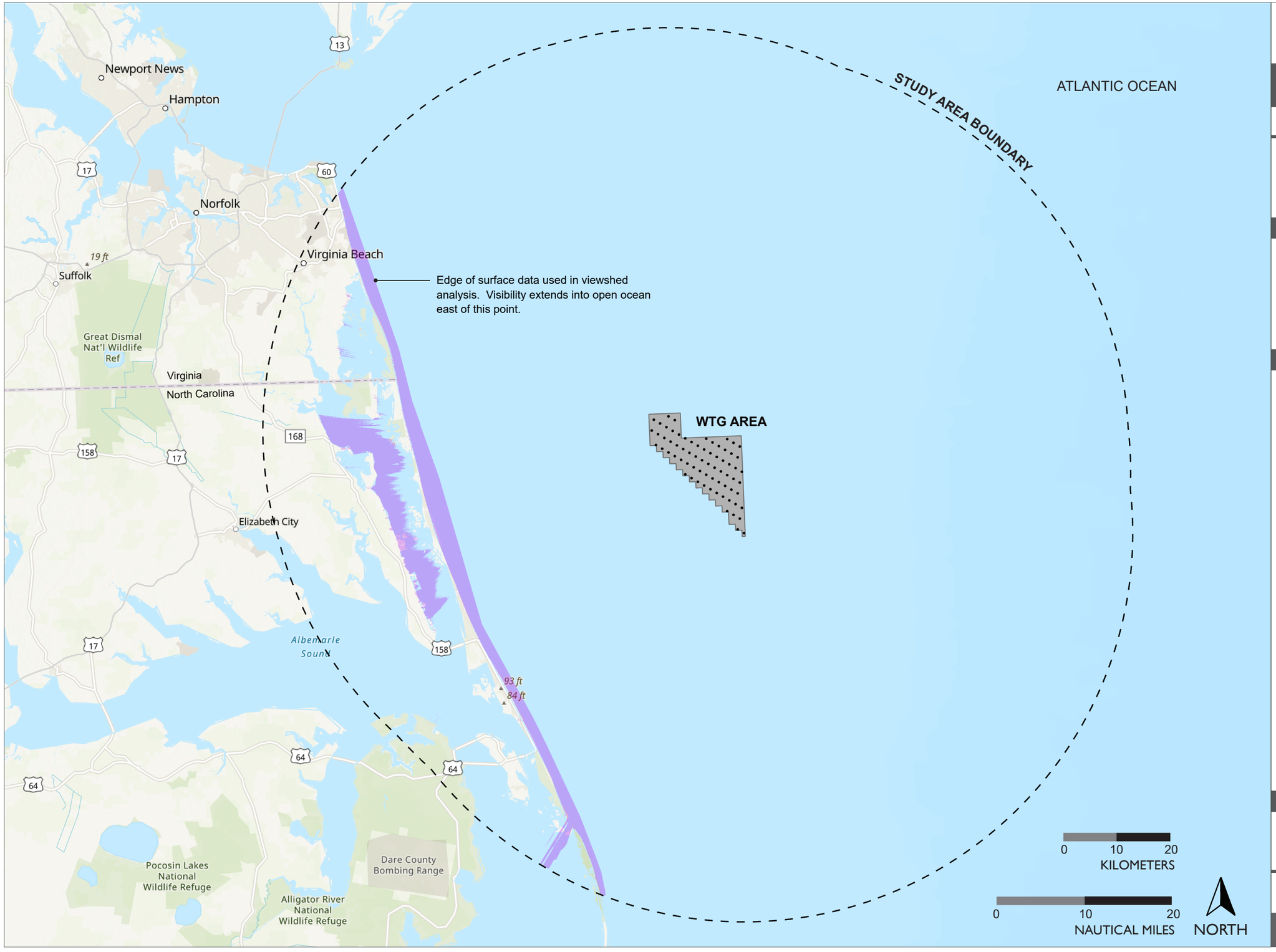
ANALYSIS NOTES

Map shows potential areas of visibility for offshore WTG blade tips, relying on the screening effects of both topography and surface data (accounting for vegetation and structures such as buildings).

The analysis is based on a Digital Terrain Model (DTM) processed at 10-foot resolution from first return LiDAR point cloud data acquired from the USGS National Map. The viewer height is set at 1.8 m (5.9 ft) above ground level elevation.

The purple areas represent where a viewer may potentially see at least one WTG blade tip, accounting for intervening surface data.

The analysis does not determine the degree of visibility based on distance or the number of visible WTGs. It does not take into account visual acuity or atmospheric conditions. Potential WTG visibility needs to be confirmed with field investigations and other visualization techniques.



KITTY HAWK NORTH WIND

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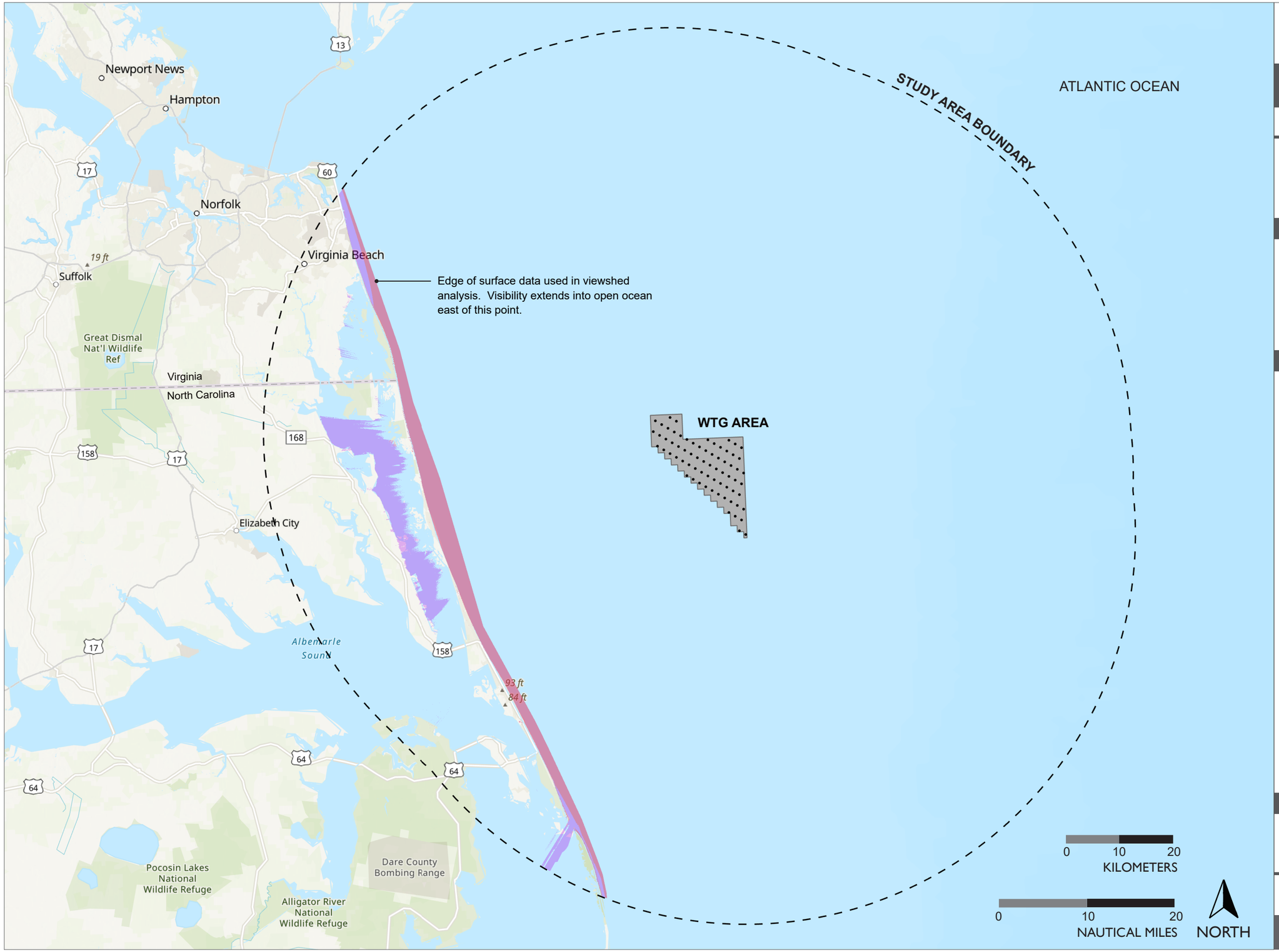
Attachment 1. Viewshed Analysis



Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03

Potential Visibility of
Blade Tips / Hubs
based on
Topographic + Surface Data

LEGEND

- Proposed WTG Location
- Lease Area
- Study Area Boundary (74 km / 40 nm)
- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible in this area)

ANALYSIS NOTES

Map shows potential areas of visibility for both offshore WTG hubs and blade tips. The analysis relies on the screening effects of both topography and surface data (accounting for vegetation and structures such as buildings).

The analysis is based on a Digital Terrain Model (DTM) processed at 10-foot resolution from first return LiDAR point cloud data acquired from the USGS National Map. The viewer height is set at 1.8 m (5.9 ft) above ground level elevation.

The areas of potential hub visibility (pink) are presumed to also have visibility of blade tips. The areas of potential visibility of blade tips alone (purple) do not have visibility of the WTG hubs.

The analysis does not determine the degree of visibility based on distance or the number of visible WTGs. It does not take into account visual acuity or atmospheric conditions. Potential WTG visibility needs to be confirmed with field investigations and other visualization techniques.

KITTY HAWK NORTH WIND

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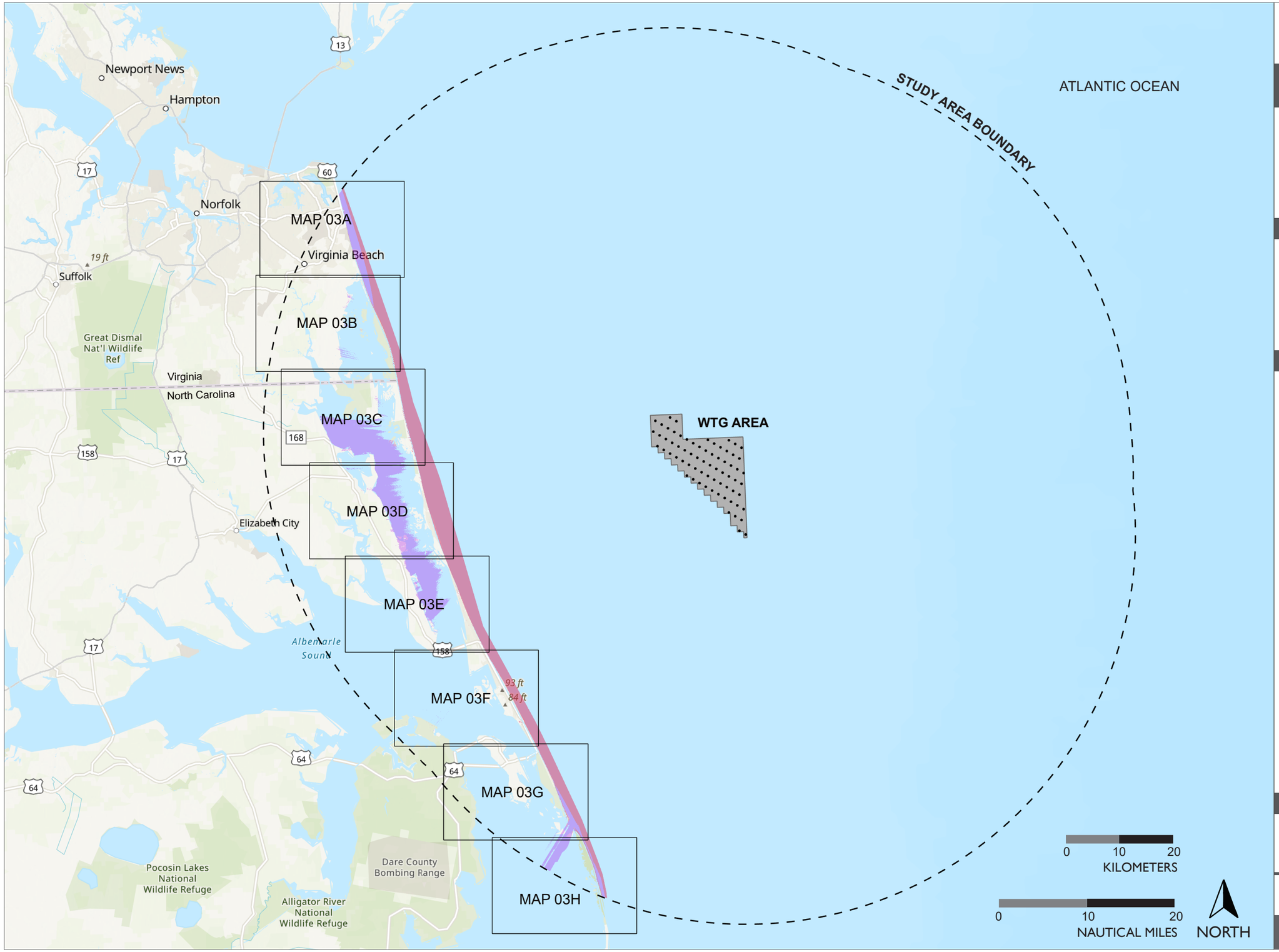
Attachment 1. Viewshed Analysis



Kitty Hawk Wind
AVANGRID

COMPUTER-BASED VIEWSHED ANALYSIS

KEY MAP

LEGEND

- Proposed WTG Location
- Lease Area
- Study Area Boundary (74 km / 40 nm)
- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible in this area)

ANALYSIS NOTES

Map shows potential areas of visibility for both offshore WTG hubs and blade tips. The analysis relies on the screening effects of both topography and surface data (accounting for vegetation and structures such as buildings).

The analysis is based on a Digital Terrain Model (DTM) processed at 10-foot resolution from first return LiDAR point cloud data acquired from the USGS National Map. The viewer height is set at 1.8 m (5.9 ft) above ground level elevation.

The areas of potential hub visibility (pink) are presumed to also have visibility of blade tips. The areas of potential visibility of blade tips alone (purple) do not have visibility of the WTG hubs.

The analysis does not determine the degree of visibility based on distance or the number of visible WTGs. It does not take into account visual acuity or atmospheric conditions. Potential WTG visibility needs to be confirmed with field investigations and other visualization techniques.

KITTY HAWK NORTH WIND

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Attachment 1. Viewshed Analysis

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03A

Potential Visibility of
Blade Tips / Hubs
based on
Topographic + Surface Data

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

STUDY AREA BOUNDARY

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis
- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas
- Public Conserved Lands
- Private Conserved Lands

Historic Resources
- Historic Buildings
- Historic District

Water Resources
- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails
- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

0 2 KILOMETERS
0 1 MILES
NORTH

KITTY HAWK NORTH WIND

tjd&a

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03B

Potential Visibility of Blade Tips / Hubs based on Topographic + Surface Data

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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Attachment 1. Viewshed Analysis

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03C

Potential Visibility of Blade Tips / Hubs based on Topographic + Surface Data

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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Attachment 1. Viewshed Analysis

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03D

Potential Visibility of Blade Tips / Hubs based on Topographic + Surface Data

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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Attachment 1. Viewshed Analysis

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03E

Potential Visibility of Blade Tips / Hubs based on Topographic + Surface Data

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

0 2 KILOMETERS
0 1 MILES
NORTH

KITTY HAWK NORTH WIND

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Kitty Hawk Wind
AVANGRID

COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03F

Potential Visibility of
Blade Tips / Hubs
based on
Topographic + Surface Data

Edge of surface data used in viewshed analysis. Visibility extends into open ocean east of this point.

V7 V8 V9

Kitty Hawk Life-Saving Station DR0258
Avalon Beach Boat Launch W-24
Wright Brothers National Memorial DR0014
Wright Brothers Nat'l Memorial Visitor Center DR0273
Sam's Diner DR0024
Jockeys Ridge State Park
Midgett Store and House DR0574
Nags Head Beach Cottages Historic District DR0011
Fort Raleigh National Historic Site DR0008
Fort Raleigh Maritime Forest Registered Heritage Area
Waterside Theatre
Island Farm State Historic Site
Roanoke Island Festival Park
First Colony Inn
Kitty Hawk Wood Preserve
Run Hill State Natural Area
Nags Head Woods Unique Wetland
Nags Head Woods Registered Heritage Area
Nags Head Woods Ecological Preserve
Mashoes Boat Launch W-26
SE Coast Paddling Trail
Mountains-to-Sea Trail

Point Harbor · Bodie Island · Kitty Hawk Bay · Colington · Run Hill · Nags Head · Mashoes · Roanoke Sound · Dare County Regional · Nags Head Golf Links

0 2 KILOMETERS
0 1 MILES
NORTH

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis
- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas
- Public Conserved Lands
- Private Conserved Lands

Historic Resources
- Historic Buildings
- Historic District

Water Resources
- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails
- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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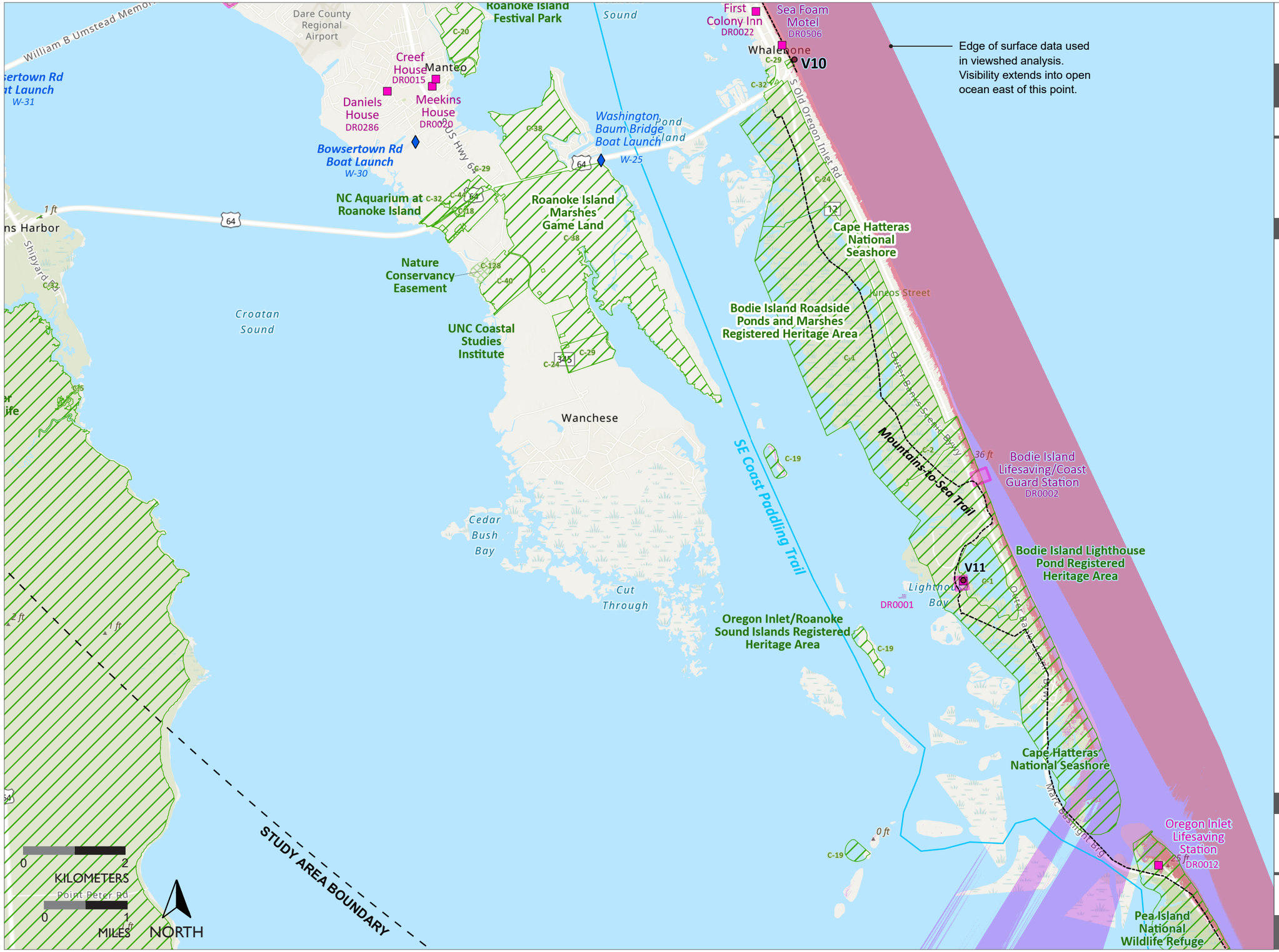

Kitty Hawk Wind
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COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03G

Potential Visibility of Blade Tips / Hubs based on Topographic + Surface Data

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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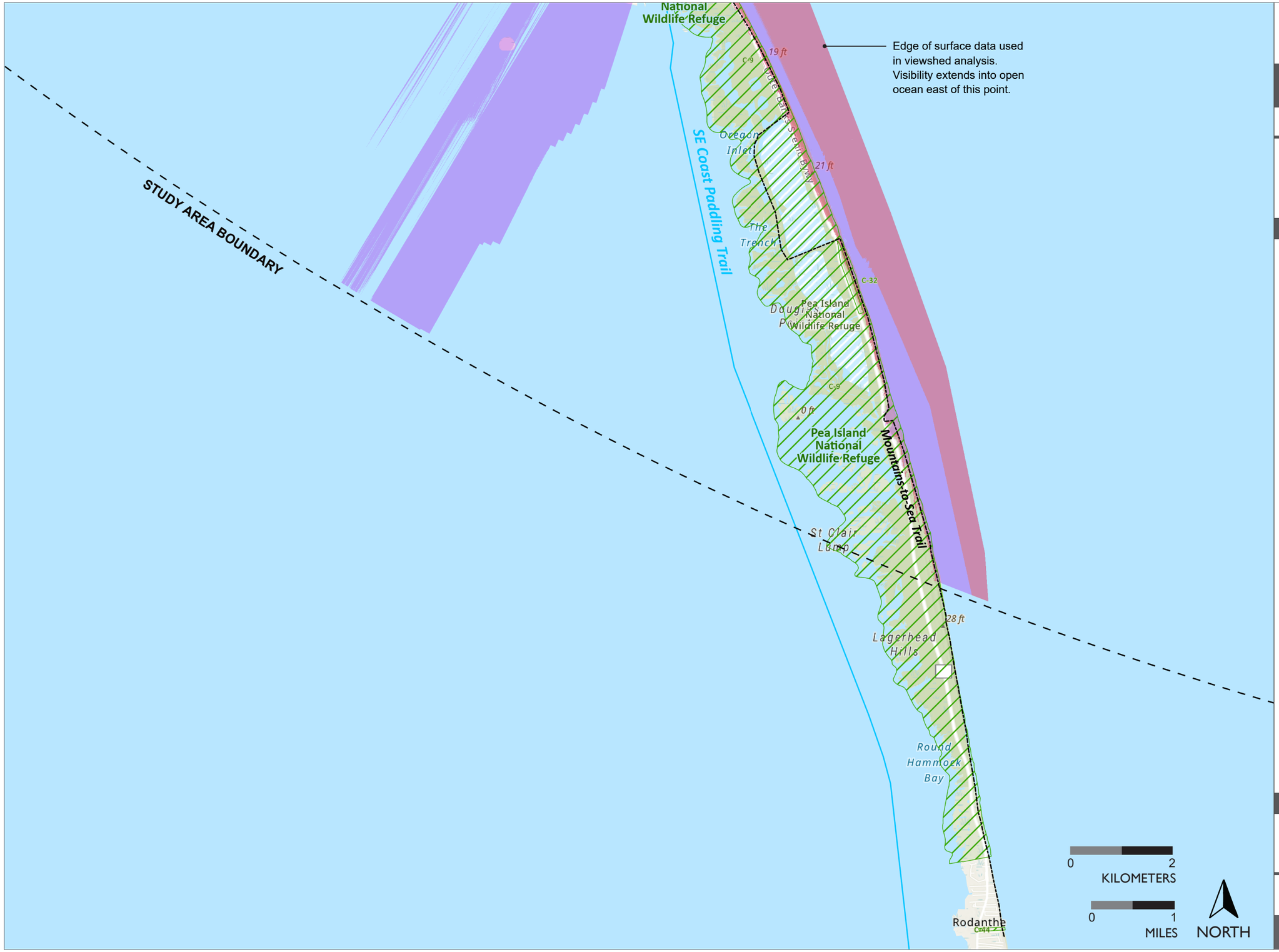
Attachment 1. Viewshed Analysis



Kitty Hawk Wind
AVANGRID

COMPUTER-BASED VIEWSHED ANALYSIS

MAP 03H

Potential Visibility of
Blade Tips / Hubs
based on
Topographic + Surface Data

LEGEND

- Study Area Boundary (74 km / 40 nm)
- C-65 Resource ID (see Scenic Resource Table)
- KOP Visualization Locations

Visibility Analysis

- Area of Potential Blade Tip Visibility Based on DTM + DSM
- Area of Potential Hub Visibility Based on DTM + DSM (blades also visible)

Conservation Areas

- Public Conserved Lands
- Private Conserved Lands

Historic Resources

- Historic Buildings
- Historic District

Water Resources

- Scenic Rivers
- Water Trails
- SE Coast Paddling Trail
- Water Access Areas
- Boating Access Sites

Trails

- Onshore Trails
- Birding Wildlife Trail Sites

NOTE: See Map 3 or Key Map for Viewshed Analysis notes.

KITTY HAWK NORTH WIND

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Kitty Hawk Wind
AVANGRID

COMPUTER-BASED VIEWSHED ANALYSIS

MAP 04

Potential Visibility of
Onshore Substation Site
based on
Topographic + Surface Data

LEGEND

- Substation Site Study Area
- Potential Infrastructure Visibility

ONSHORE INFRASTRUCTURE

- Infrastructure Points in Analysis
- Substation Site Parcel Boundary
- Substation Fence Line
- Sandbridge Route
- Western Route

SCENIC RESOURCES

- Public Conserved Lands
- Private Conserved Lands
- Trails

ANALYSIS NOTES

Map shows potential areas of visibility for the proposed above ground infrastructure associated with onshore substation site. The visibility analysis relies on the screening effects of both topography and surface data (accounting for vegetation and structures such as buildings). The analysis is based on a Digital Terrain Model (DTM) processed at 10-foot resolution from first return LiDAR point cloud data acquired from the USGS National Map. The viewer height is set at 1.8 m (5.9 ft) above ground level elevation.

The purple areas represent where a viewer may see the very top of substation site infrastructure when accounting for intervening surface data. See additional notes on Maps 01 – 03.

KITTY HAWK NORTH WIND

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Oceana Naval Air Station
STUDY AREA BOUNDARY
Red Wing on the Park
Redwing Park
General Booth Trail
Dam Neck Rd Trail
Dunwoody Park
Upton Estates Park
Pine Meadow Park
Box Elder Park
Substation Infrastructure
Tranmission Structures
Switching Station Infrastructure
Middle Oaks Plantation Park
Strawbridge Park System
Ocean Lakes North
Pine Ridge Park
Hunt Club Park
Ocean Lakes East Park
Sawyer Lakes Estates Park
Hunters Run Park
Princess Anne Rec-Center
0 0.25 0.5 KILOMETERS
0 0.25 0.5 MILES
NORTH

Attachment 1. Viewshed Analysis