Photo Simulations Overview

Surry-Skiffes Creek-Whealton Transmission Line Project, Surry, James City, and York Counties, Cities of Newport News and Hampton, Virginia

USACE Project: NAO-2012-00080 / 13-V0408
VDHR File: 2011-2071

April 7, 2016

Revised August 12, 2016

PHOTO SIMULATIONS OVERVIEW

INTRODUCTION and EXECUTIVE SUMMARY

This document provides an overview of the use of photo simulations ("simulations") to assess the potential visual impacts of projects on their surrounding areas. First, it provides a brief discussion of National Park Service ("NPS") guidance regarding the use of simulations to assess visual impacts related to energy projects, and how Truescape's work on behalf of Dominion Virginia Power ("Dominion") related to the Surry-Skiffes Creek-Whealton 500 kV project ("Project") is consistent with that guidance. Second, it summarizes how Truescape produces accurate and reliable simulations, and discusses Truescape's simulations to assess the potential visual impacts of the Project.

EVALUATING VISUAL IMPACT ASSESSMENTS – TRUESCAPE AND THE NPS GUIDE

Recently, the Argonne National Laboratory ("Argonne") was involved in an initiative to compile a best practice guide to assist a number of United States federal agencies, led by NPS, to understand how to assess the potential visual impacts of energy projects. The Argonne initiative ultimately resulted in a guidance document, adopted by NPS, titled *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects Natural Resource Report* NPS/ARD/NRR—2014/836 (Aug. 2014) ("NPS Guide"). Among other ways to assess these potential impacts, in the NPS Guide, Argonne considered the use of simulations as an important tool. Truescape, as an industry leader in simulation, was a contributing member of Argonne's review panel for this work. Indeed, as shown on the *Acknowledgments* of the NPS Guide, Edward Twiss, Truescape's North American Operations Manager, was a reviewer. NPS Guide at xv; *see also* Virginia State Corporation Commission (SCC), Rebuttal Testimony of E. Twiss at 1, 10-11 (Mar. 14, 2013) ("Twiss"). Mr. Twiss is the primary photographer who has captured the majority of field photographs for the Project since 2011. He also provided expert testimony regarding the Project before the SCC in 2013. *See* Twiss.

As Mr. Twiss explained before the SCC, the primary purpose of a simulation is to accurately portray, in as realistic manner and context as possible, a proposed activity, modification or change in the viewed landscape. *Id*. at 1. Simulations inform decision makers by providing transparent representations of the impacts of proposed project. Truescape has over 16 years of experience working in the 3 dimensional ("3D") photo and visual simulations industry. Among other things, it has completed simulations for transmission projects, including some spanning hundreds of miles, across the United States, Canada, New Zealand and Australia. *Id*. at 2.

As discussed in greater detail below, in preparing photos and simulations for the Project, Truescape followed the guidelines for accurate and reliable simulations set out in Chaper 5 of the NPS Guide. Specifically:

Truescape photo simulations follow the NPS guideline and provide traits of* accurate and reliable *simulations by

- Simulating the actual or expected appearance of the landscape and project as closely as possible, according to the data available at the time.
- Representing the important and typical range of views which would be experienced with the actual project, under a wide a range of viewing conditions.
- Being properly prepared and displayed such that project components and the surrounding landscape are depicted clearly.

Truescape also avoided common errors:

PHOTO SIMULATIONS OVERVIEW

Common sources of error and inaccuracy in simulations outlined in the NPS guidelines were avoided

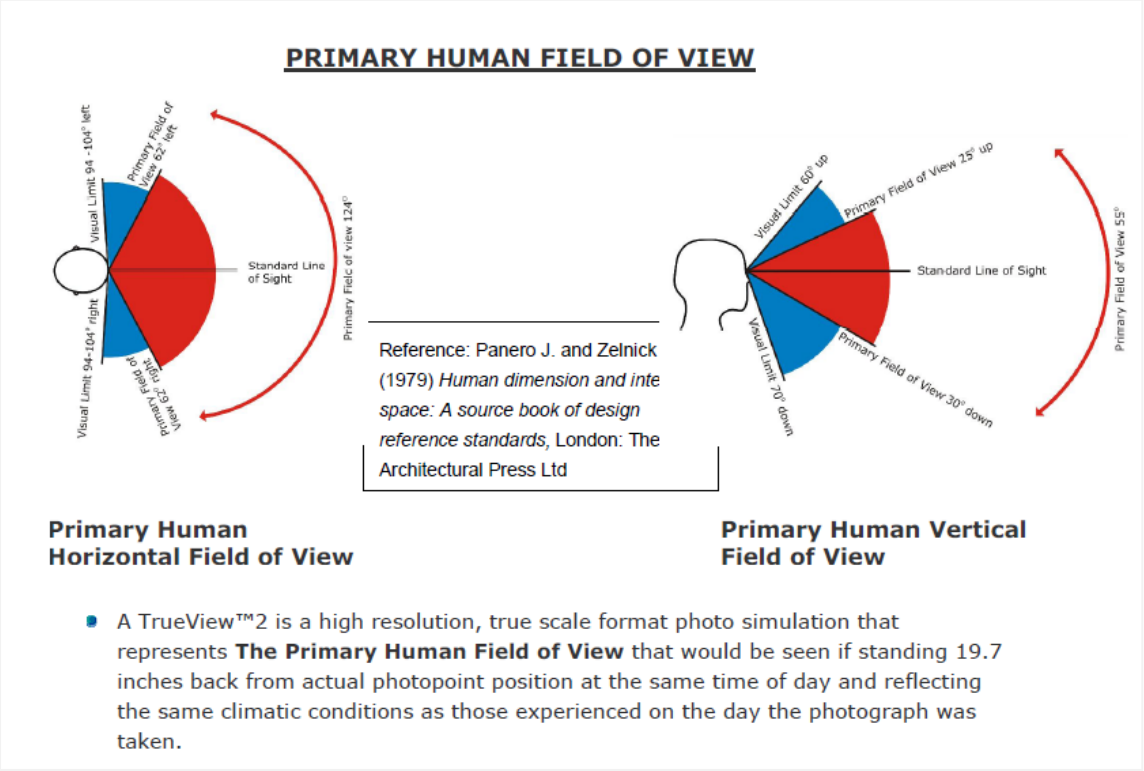
- **Selection of key observation points (KOPs)** – Dominion consulted with the Virginia State Historic Preservation Office (Virginia Department of Historic Resources) ("SHPO") to determine the KOPs for simulations by selecting optimal viewpoints from key, often-visited locations within view of the proposed project, as well as by viewpoints that likely represent the greatest potential for visual impacts, such as unobstructed shoreline areas. Truescape used these SHPO-approved KOPs.
- **Spatial accuracy** – Truescape did not omit elements that would be visible in the real landscape; nor show elements that would not be visible or objects in the wrong location or wrong sizes. Truescape simulations were created utilizing survey data and are accurate within one-inch of the locations supplied by Dominion's engineering team, as sworn under oath and entered into the legal record of the SCC evidentiary hearing.
- **Lack of realism** – Truescape simulations provide project elements that look the way they would in a real view of the project. Each Truescape simulation accurately depicts the appropriate metal color, medium-grey.
- **Improper display** – Truescape provides specific instructions for properly and accurately assessing impacts for stakeholder information purposes.
- **Improper documentation** – Truescape provides sound methodology and supporting documentation and produces defensible simulations.

Truescape's simulation work for the Project is consistent with the NPS Guide.

TRUESCAPE'S SIMULATION METHODOLOGY: GENERALLY AND REGARDING THE PROJECT

The following provides a brief summary of Truescape's simulation methodology generally, and as it pertains to the Project. For a full explanation, please reference Truescape's Statement of Methodology (June 2012) ("SOM"), a copy of which is attached hereto. As explained in the SOM, Truescape uses its TrueView™ simulation to provide a high resolution, true scale photo simulation that represents the "Primary Human Field of View" that would be seen if standing 19.7 inches back from actual photo point position at the same time of day and reflecting the same climatic conditions as those experienced on the day the photograph was taken. As the SOM also demonstrates, its TrueView™ simulation has been validated as accurate and realistic. As discussed further below, field visits by U.S. Army Corps of Engineers ("Corps") personnel related to their evaluation of the Project also confirm and validate Truescape's work for the Proejct as accurate and realistic.

A Truescape "TrueView" simulation represents the "Primary Human Field of View" which is depicted in the figure below.



- A TrueView™2 is a high resolution, true scale format photo simulation that represents **The Primary Human Field of View** that would be seen if standing 19.7 inches back from actual photopoint position at the same time of day and reflecting the same climatic conditions as those experienced on the day the photograph was taken.

To accurately create a TrueView photo simulation, Truescape begins with a site visit to take the necessary photographs, ground mark the photo point positions and identify additional reference points to enable the surveyor to survey-fix the exact location of the camera. Truescape representatives made several site visits for its work related to the Project. Truescape uses a digital SLR 1:1 21 mega pixel camera, which produces photographs for generating simulations at a resolution and clarity as high as current technology will allow. In addition to having the exact position of the camera survey-fixed by a surveyor, additional reference points are identified during the site visit so that 3D models of the proposed facilities (500 kV transmission line) can be accurately placed into the photograph. These reference points include objects within the field of view, such as the top of fence posts, road signs, houses and road markers. Where no suitable objects were available or accessible to be surveyed (such as in this case with regard to the James River Crossing) stakes were placed in the camera field of view, surveyed and then were removed in the final photo simulations. The surveyor is directed to each of these fixed points and because they were not on the surface of the water, they were not subject to the fluctuations due to tidal and other movement. For example, at viewpoint ("VP") 9 (Colonial Parkway), the photo was taken from a grassy area between the Parkway and the edge of the James River. Since there were no visible structural objects in the photo view that could be surveyed to fix the photograph, Truescape directed the surveyors to install vertical wooden survey stakes within the photo's field of view and to survey the top of each stake. These wooden stakes provided the needed reference points to be used in creating the simulation. In another example, at VP 11 (Kingsmill Resort and Golf Club from Overlook), a fence with multiple wooden posts in the field of view provided the vertical structures that were surveyed as reference points of the simulation. An example of collected reference points is provided on the last page of the SOM.

The next step is to construct the 3D computer model of the proposed transmission line. Using Autodesk® 3ds Max® 3D computer simulation software, tower color is matched to the client specification, which is then applied to the simulated structures themselves. The towers, insulators and other components are modeled in 3D from Dominion's engineering drawings to their exact specifications. They are then placed into the computer model accurately in coordinate space in accordance with the specific location data provided by Dominion's Electric Transmission Lines Engineering group. The survey-fixed photo and reference points are then imported into the 3D

model. A "computer camera" is created to simulate the camera that captured the original photographs, including matching the focal length. The simulated "computer camera" is then positioned at the same survey coordinates as the physical viewpoint positions. The photographs are then incorporated into the computer model. This is done by correctly aligning the "computer camera" to match the surveyed reference points to the reference objects, and to the terrain if required. The 3D terrain model of the site has been generated using digital land contour data provided by NRG. The proposed development (500 kV transmission line) has been modeled in 3D and is now imported and positioned accurately into the scene.

The simulation software allows the sun to be simulated at the precise time the original photography was captured. This ensures the lighting of the structures and the shadows they cast present an accurate depiction of how the project would appear in the photograph at the same time of day and reflecting the same climatic conditions as those experienced at the time the photograph was taken.

In order to correctly place existing objects that are in front of the 3D model, these foreground objects are overlaid, from the original photograph, onto the computer generated image using photo editing software. Truescape's extensive experience in researching how to accurately simulate the Primary Human Field of View has determined that the lens type is not determinative when generating such simulations. The key factors instead are the aligning of the raw photographs in 3D, the size at which the simulations are printed, and the viewing distance.

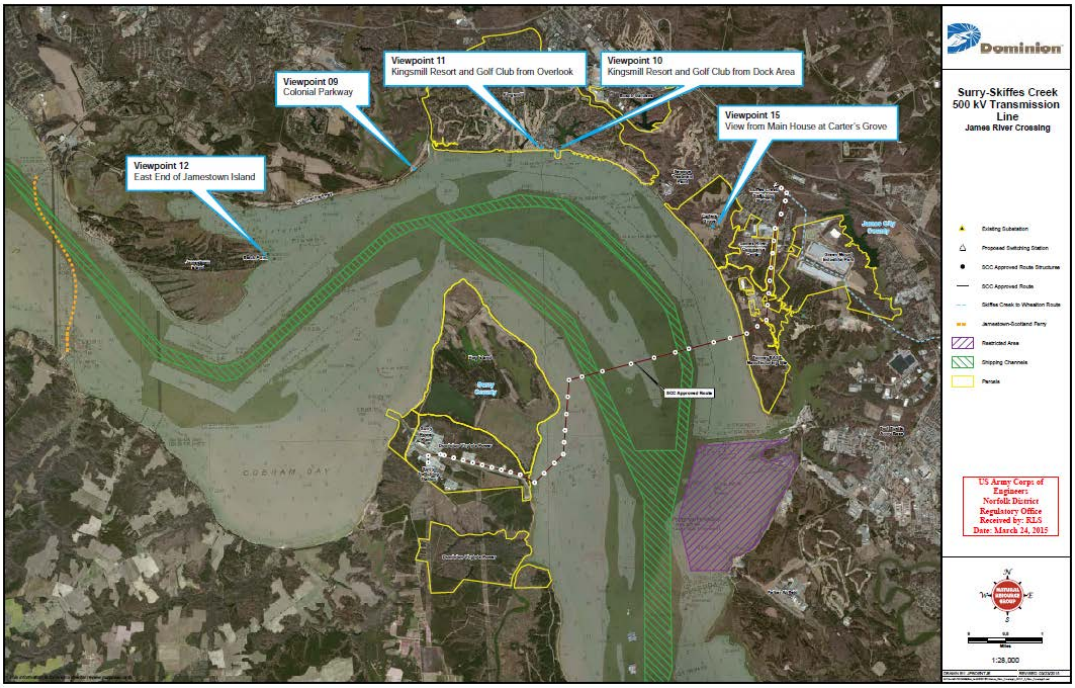
Once created, the full size TrueView simulations are approximately 21 inches x 59 inches and should be displayed level and at such a height as to allow the viewer's line of sight to be directly at the center of the image. The viewer should be looking forward at the center of the image at all times to ensure correct viewing. The TrueView simulations when viewed at the correct height and from a distance of 19.7 inches from the center of the image completely fill your field of view with the same view you would see at the photo point position in the field.

PHOTO SIMULATIONS OVERVIEW

Dominion submitted a compilation of Truescape simulations from five (5) KOPs for the Project to the Corps, titled Surry Interactive Simulations, which the Corps posted on its Project website under "View Shed Simulations." *See* Surry Interactive Simulations (Dominion) *at*: http://www.nao.usace.army.mil/Missions/Regulatory/SkiffesCreekPowerLine.aspx. In addition, for local validation purposes, Dominion also provided the Corps with Truescape Trueview photos and simulations of the James River Bridge depicting an existing project. The James River Bridge photos and simulations were compared to in the field views from the same vantage points, and those in the field views serve to confirm and validate that Truescape's work for the Project is accurate and realistic.

Set forth below is a brief summary of the Truescape work for the Project:

Page one of the 11-page Surry Interactive Simulations PDF shows where the proposed transmission line will cross the James River, and the five (5) KOPs used in the Surry Interactive Simulations.



As the map shows, in addition to the Surry Power Station and Joint Base Eustis (which includes Felker Airfield), development along the shoreline of the James River in this area also includes a sewage treatment plant, the Former BASF Manufacturing Site with its prominent water tower that shows above the tree line, Green Mount Industrial Park, and Busch Gardens.

In addition to producing the simulations, which are designed to be printed approximately 60" wide and viewed from approximately 20" away, Truescape also provided "enlargement area" views for the five (5) KOPs. These enlargement area views represent portions of the full-sized TrueView photo simulations that have been enlarged so that when an 11 x 17 inch printed copy is viewed from an approximately 20-inch distance, the viewer *has the same view as the photo point position in the field*. Understanding the enlargement and viewing instructions from the stated distance are crucial elements to ensuring correct viewing of the photo simulations.

Page 2 Viewpoint 09 - Colonial Parkway

Colonial Parkway Historic District (VDHR #047-0002)

Viewpoint 09 - Colonial Parkway – Looking Southeast - **Existing View**

Viewpoint 09 - Colonial Parkway – Looking Southeast - **James River Crossing Variation 1 - Proposed View**
White box indicates enlargement area (see next page)

Back to Map

The distance to the closest visible tower is 3.57 miles away from a short stretch of the Colonial Parkway where visitors have a view of the James River. From the vehicle turnout you also can see the Kingsmill Resort and the former BASF industrial property on the left. Also in view are the Surry power station and several existing transmission towers over the tree line on the right.

Page 3 Viewpoint 09 - Colonial Parkway Enlargement

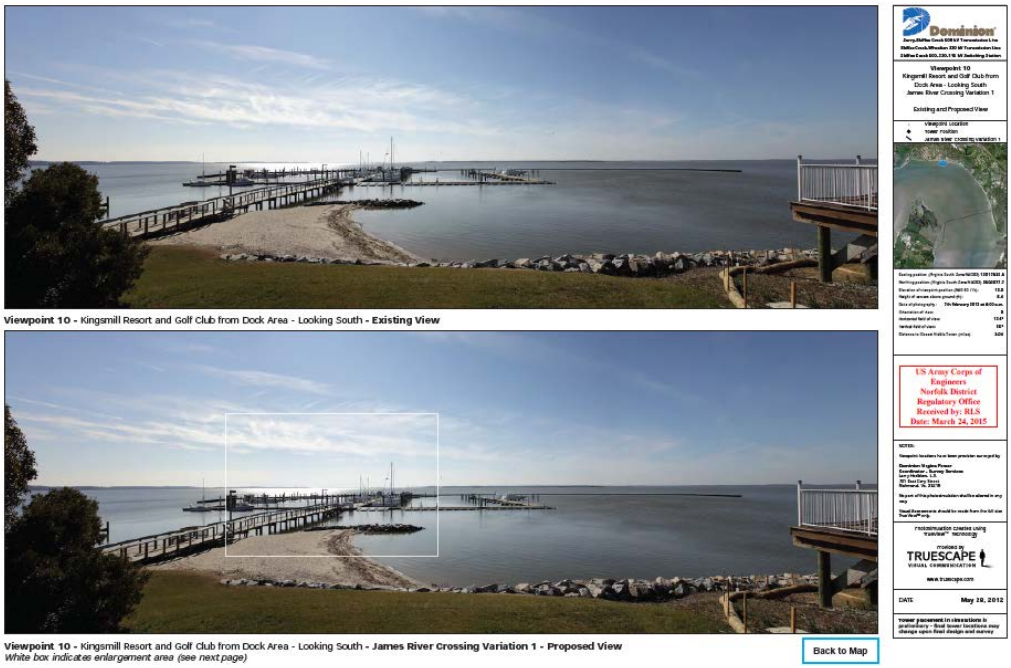
Colonial Parkway Historic District (VDHR #047-0002)

Viewpoint 09 - Colonial Parkway – Looking Southeast - **James River Crossing Variation 1 - Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Back to Map

Viewing the enlargement, you see the proposed project would place the closest towers 3.57miles away.

Page 4 Viewpoint 10 Kingsmill Resort and Golf Club from Dock Area

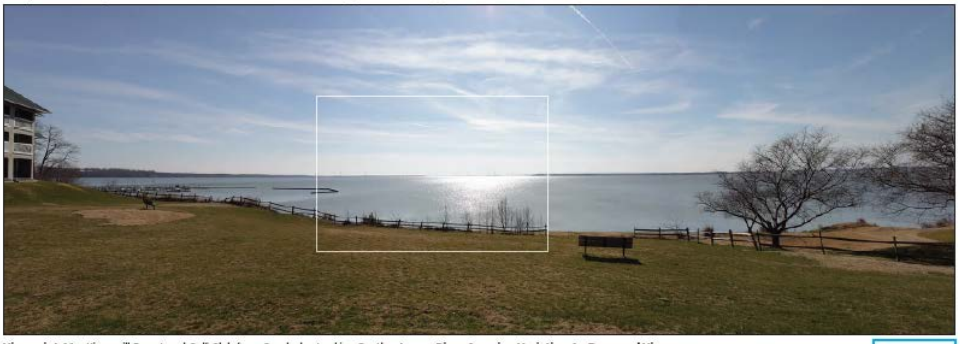


From the Kingsmill dock this simulation shows Felker Airfield at Fort Eustis on the left and Surry Power station on the right.

Page 5 Viewpoint 10 Kingsmill Resort and Golf Club from Dock Area Enlargement

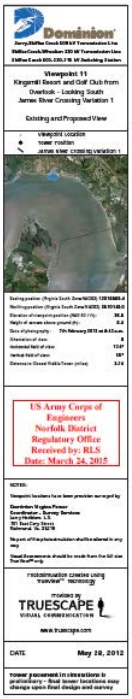
Page 6 Viewpoint 11 - Kingsmill Resort and Golf Club from Overlook

Viewpoint 11 - Kingsmill Resort and Golf Club from Overlook - Looking South - **Existing View**



Viewpoint 11 - Kingsmill Resort and Golf Club from Overlook - Looking South - **James River Crossing Variation 1 - Proposed View**
White box indicates enlargement area (see next page)

Back to Map



From the Kingsmill Resort this simulation shows the white sewage treatment buildings on the left, Surry power station on the right.

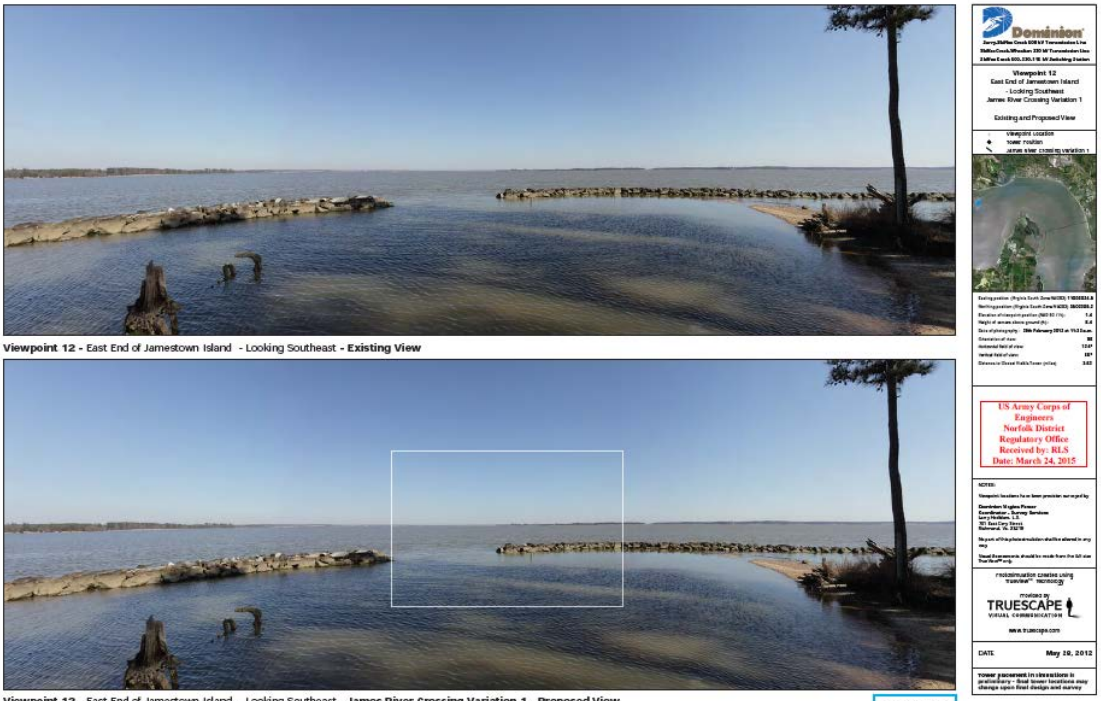
Page 7 Viewpoint 11 - Kingsmill Resort and Golf Club from Overlook Enlargement

Viewpoint 11 - Kingsmill Resort and Golf Club from Overlook - Looking South - **James River Crossing Variation 1 - Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Back to Map

Visitors can see the naval ghost fleet parked in the distance and the proposed towers across the river.

Page 8 Viewpoint 12 – East end of Jamestown Island

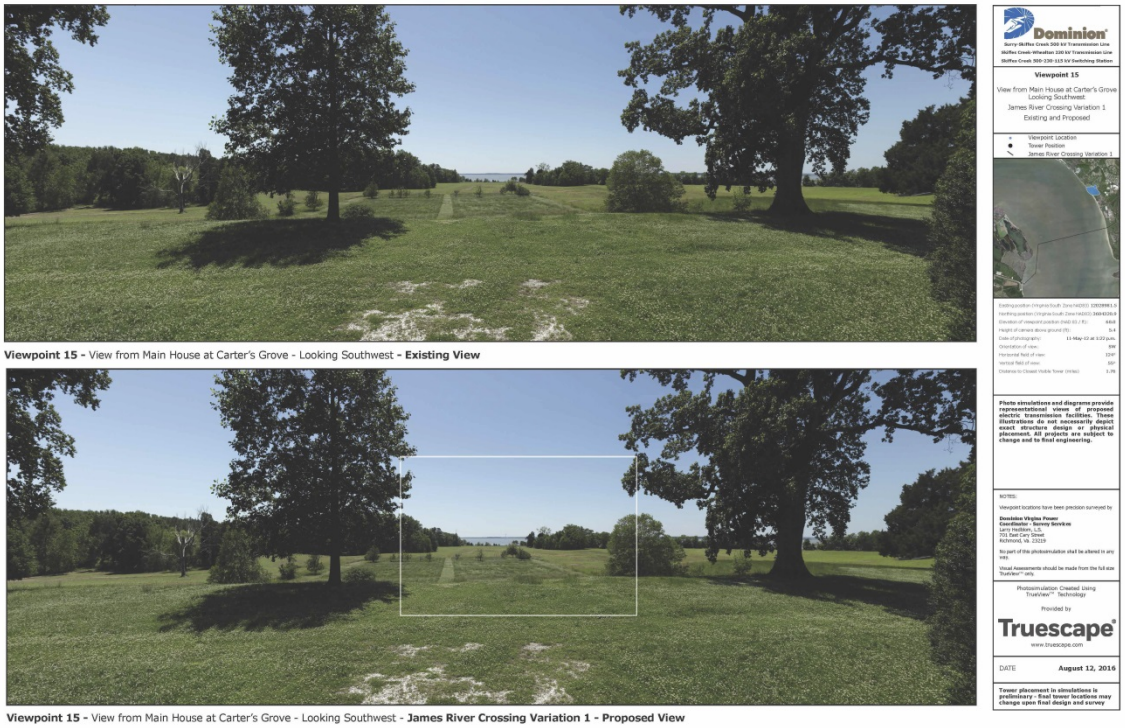


Jamestown National Historic Site/Jamestown Island Historic District (VDHR #047-0009)
As this simulation shows, a person standing at the eastern tip of Jamestown Island could -- on a clear day -- see the transmission line in the distance. It is 3.52 miles away at its closest point. Also in view from here is the "Griffon" roller coaster at Busch Gardens, Williamsburg, Surry Power Station, white tanks that are part of the sewage treatment plant, and the Kingsmill Resort.

Page 9 Viewpoint 12 – East end of Jamestown Island Enlargement

Jamestown National Historic Site/Jamestown Island Historic District (VDHR #047-0009)

Page 10 Viewpoint 15 – View from Main House at Carter's Grove



Viewpoint 15 - View from Main House at Carter's Grove - Looking Southwest - **Existing View**

Viewpoint 15 - View from Main House at Carter's Grove - Looking Southwest - **James River Crossing Variation 1 - Proposed View**

The view from the privately owned Carter's Grove is closer; however, the view from the main house is mitigated by the naturally occurring vegetation.

This viewpoint was updated August 2016 to include FAA navigational aids

Page 11 Viewpoint 15 – View from Main House at Carter's Grove Enlargement

Viewpoint 15 - View from Main House at Carter's Grove - Looking Southwest – **James River Crossing Variation 1 - Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

CONCLUSION

In response to comments from Consulting Parties Dominion engaged Truescape again to prepare photo simulations from specific locations on the James River as well as shoreline reference photography. To verify the accuracy of the Truescape simulations, Dominion also requested Truescape provide photographs of the existing transmission line crossing at the James River Bridge.

Based on the foregoing, the Truescape TrueView simulations for the Project are consistent with the NPS Guide, and its guidance and best practices for photo simulations. The TrueView simulations are accurate and realistic. They have been validated by other Truescape projects. The Corps should rely on the Truescape simulations when considering potential visual impacts from the Project.

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

TRUESCAPE

CONSULTING & VISUAL FACILITATION

Statement of Methodology of
Truescape Limited

On behalf of

Dominion Virginia Power & Natural Resource Group, LLC

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

June 2012

Truescape Credentials

Truescape has over 16 years of experience working in the 3D Photo and Video Simulations industry. Truescape has completed a wide range of different visualisation projects from photo-simulations for simple projects to full computer generated 3D video simulations for complex projects. Truescape's client base spans many energy industry sectors such as solar, wind, transmission and generation across New Zealand, Australia, and the US.

Truescape adopts a team approach for project completion as each type and phase of a project calls for a different mix of specialised skill sets. This expertise spans many disciplines including photography, engineering, architecture, surveying, landscape architecture, 3D computer modelling, evidence preparation and presenting evidence as expert witnesses. All members of our staff have either formal qualifications or have undergone professional training and have direct experience working in each these specialised areas.

Truescape simulations have been produced as evidence in forums such as the New Zealand Environment and High Courts, Australia's Victorian Civil and Administrative Tribunal, the AUS Supreme Court and the Connecticut Siting Council. Members of Truescape's staff have presented evidence as expert witnesses in these Courts, where our work has been subjected to cross-examination and accepted as evidence.

Truescape has assisted in providing survey controlled simulations for the following hearings:

- 2003 – Meridian Energy, Te Apiti Farm, Council Hearing;
- 2004 – Meridian Energy, White Hill Farm, Council Hearing;
- 2004 – Southern Hydro, Dollar Wind Farm South Australia, Panel Hearing;
- 2005 – Genesis Energy, Awhitu Wind Farm, Environment Court;
- 2005 – Unison Energy, Hawkes Bay Wind Farm, Environment Court;
- 2006 – Meridian Energy, Project West Wind, Environment Court;
- 2006 – Acciona Energy, Wind Farm South Australia, Panel Hearing;
- 2007 – Invenergy, Moresville Wind Energy Park, New York; USA Permitting Hearing;
- 2008 – Bluewater Wind, Offshore Wind Farm, Maryland, USA; Permitting Hearing;

- 2008 – Bluewater Wind, Offshore Wind Farm, New Jersey, USA; Permitting Hearing
- 2008 – BP Alternative Energy – White Pines Project, Michigan, USA; Permitting
- 2008 - Meridian Energy, Project Mill Creek, Council Hearing
- 2008 – Meridian Energy, Project Hayes, Environment Court;
- 2009 – Meridian Energy; Project Central Wind; Environment Court
- 2010 – WestWind Energy, Australia, Permit Application;
- 2010 - Meridian Energy Limited, Project Mill Creek, Environment Court Hearing;
- 2010 – Pacific Hydro; Australia, Panel Hearing;
- 2011 - AltaLink, Heartland Transmission Project; Alberta Utilities Commission (AUC) Hearing, Alberta Canada

In addition Truescape's survey controlled photo simulations were used to support permitting efforts on the following transmission projects:

- 2009 – Dominion - Hopewell-Prince George 230kV Line and Substation
- 2010 – Dominion - Loudoun-New Road 230kV Double-Circuit Line and Substation
- 2010 – CPS - Hot Wells Substation Project
- 2011 – CPS - Panther Springs Substation Project
- 2011 – CPS - Helotes-Grissom-Bandera Transmission Line Project
- 2011 – PG&E - Santa Cruz 115kV Reinforcement Project
- 2011 – Imperial Irrigation District – Imperial to Dixieland 230kV Interconnection Project
- 2011 – Oncor – Krum West - Anna 345kV Transmission Line Project
- 2011 – Dominion - Cloverhill-Liberty 230kV Line and Substation Project
- 2011 – Dominion - Cannon Branch 230kV Line and Substation Project

- 2011 – Dominion - Shawboro-Aydlett Tap 230kV Line
- 2011 – Dominion - Dahlgren 230kV Transmission Line Project

Validation of the Truescape Methodology

We have attached below some post construction analysis of the 'Project West Wind' wind farm that compared a simulation built using the construction layout plan against the completed project. This comparison of the photographs demonstrates the accuracy of the TrueView™ simulations.

In particular, it can be seen that the size and placement of the turbines in this simulation is identical to the wind farm that was constructed. It should be noted that the turbines in the simulation seem more obvious than the actual turbines in the photograph due to the atmospheric conditions experienced on the day the photograph was taken.

The simulation and photograph were produced 2 years and 7 days apart and both are taken at the same time of day so as to produce the same lighting and shadow conditions.

SIMULATION OF PROJECT WEST WIND PRE CONSTRUCTION (February 2008)

PHOTOGRAPH OF PROJECT WEST WIND POST CONSTRUCTION (February 2010)

Scope of work

Dominion Virginia Power and Natural Resource Group, LLC engaged Truescape in November 2011 to provide:

- Survey-controlled TrueView™ Photo Simulations from several pre-determined viewpoint locations. The simulations are a tool to assist with the visual assessment of the proposed Transmission routes and associated ROW modification.

Viewpoint locations

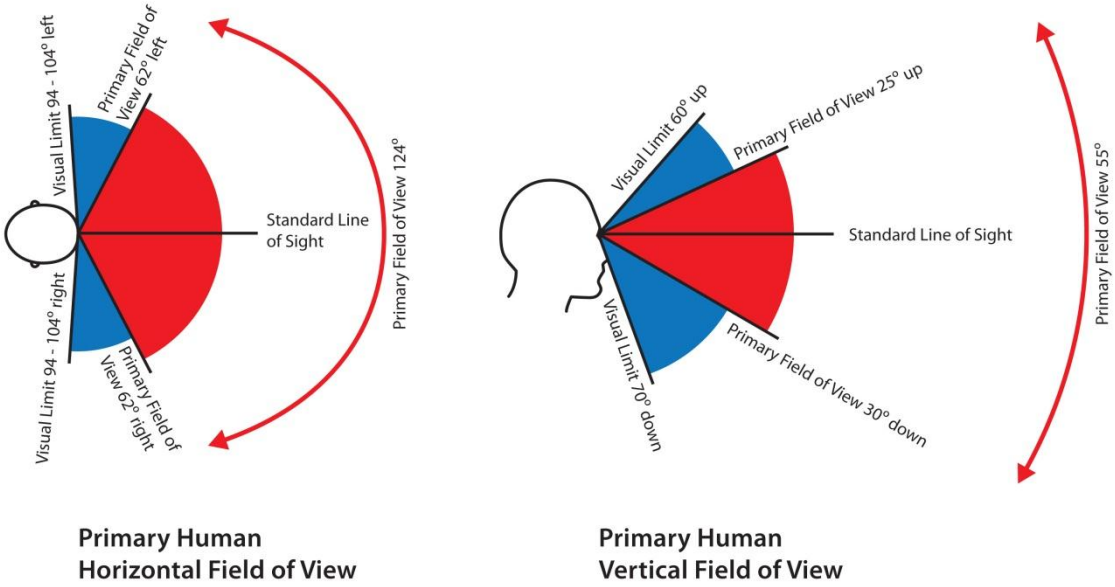
Location map depicting all viewpoints which TrueView™ Photo Simulations have been created for:

- VIEWPOINT 01 – State Route 603
- VIEWPOINT 02 – The Glebe Lane
- VIEWPOINT 03 – State Route 611
- VIEWPOINT 04 – Opportunity Way
- VIEWPOINT 05 - Richmond Road
- VIEWPOINT 06 - Tadich Drive
- VIEWPOINT 07 – Industrial Park Drive
- VIEWPOINT 08 – Devore Avenue
- VIEWPOINT 09 – Colonial Parkway
- VIEWPOINT 10 – Kingsmill Resort & Golf Club from Dock Area
- VIEWPOINT 11 – Kingsmill Resort & Golf Club from Overlook
- VIEWPOINT 12 – East End of Jamestown Island
- VIEWPOINT 13 – Chickahominy River
- VIEWPOINT 14 – State Route 60 (Pocahontas Trail)
- VIEWPOINT 15 – Main House at Carter's Grove

TrueView™ photo simulations

A TrueView™ Photo Simulation is a high resolution, true scale format photo simulation that represents the **Primary Human Field of View** that would be seen if standing 19.7 inches back from actual photo point position at the same time of day and reflecting the same climatic conditions as those experienced on the day the photograph was taken.

Primary Human Field of View



Primary Human Horizontal Field of View

Primary Human Vertical Field of View

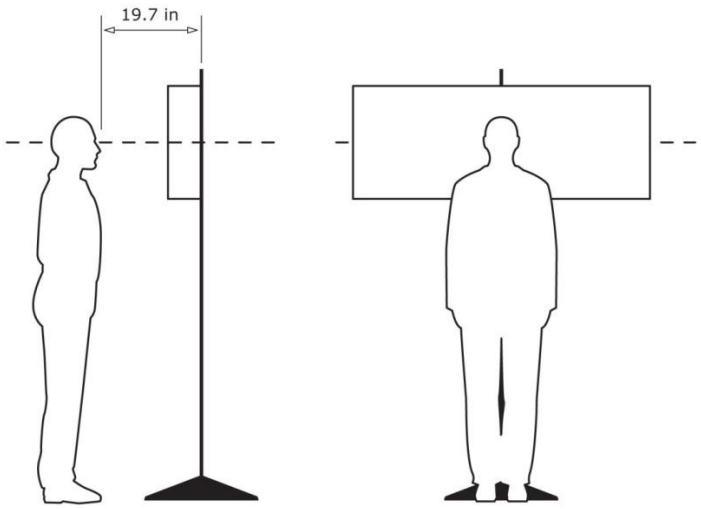
Reference: Panero J. and Zelnick M. (1979)
Human dimension and interior space: A source book of design reference standards, London: The Architectural Press Ltd

TrueView™ Photo Simulations

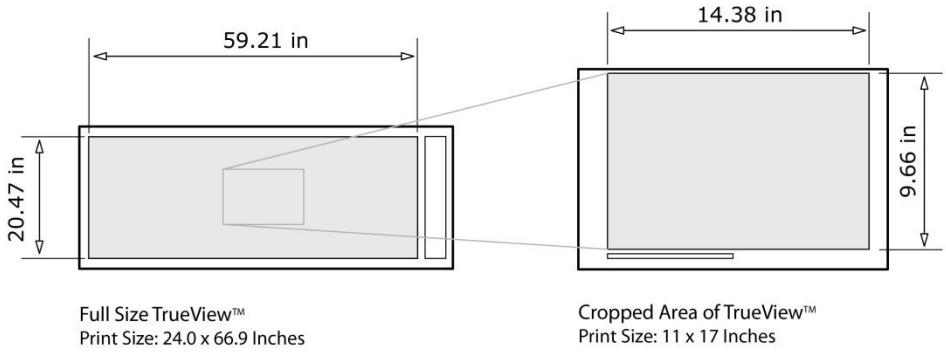
Correct Viewing of TrueView™ Photo Simulations

The TrueView™ simulations when viewed at the correct height and from a distance of 19.7 inches from the center of the image completely fill your field of view with the same view you would see at the photo point position.

The image should be displayed level at such a height to allow the viewer line of sight to be directly at the center of the image. The viewer should be looking forward at the center of the image at all times to ensure correct viewing as shown below.



An 11 x 17 inch booklet of existing views and proposed views has been provided for practicality and easy review. This booklet also contains cropped images of the proposed James River and Chickahominy River Simulations. The cropped images are portions of the full sized TrueViews™ as indicated in the diagram below. When printed at 11 x 17 inches the cropped images in the booklet depict a scaled image that represents what you would see at the photo point position in the field.



Methodology

The role of lenses

The sections below provide a concise overview of our methodology and the reasons behind the development of the TrueView™.

Camera lenses of different focal length create images of different fields of view. None of these fields of view are the same as the human field of view. A camera lens does not encompass the same horizontal and vertical "degree of arc" that is captured by human binocular vision. This is why a picture taken with a "non-human" lens does not represent what we actually see.

Look at the four photos below. The view captured with a 28mm lens looks further away than the view from the same spot taken with a 50mm lens. Standing at the same location, and using a 100mm lens, features in the picture look closer still, and with a 300mm lens, features that were far away now look much closer, and larger

28 mm image

50 mm image

100 mm image

300 mm image

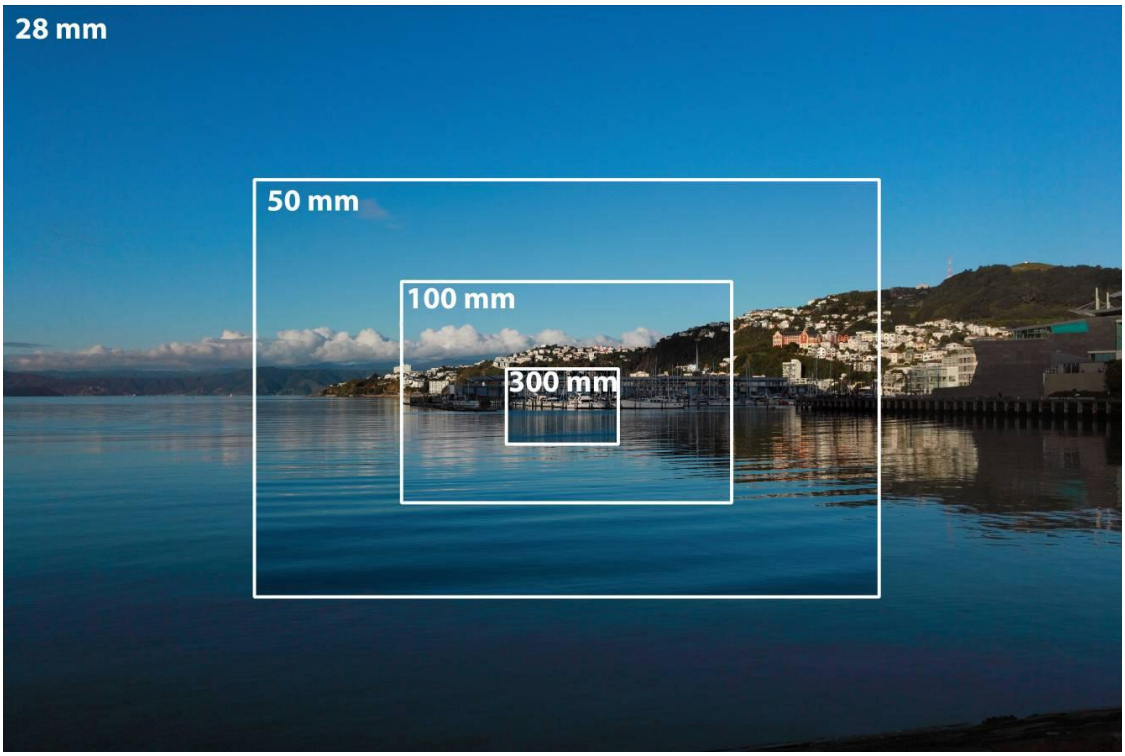
These different views are illusory, since all of the features in these photos are in reality a fixed size. Objects once built do not change in size. In reality, there is just one true view of what a person sees from any specified location

Methodology

The role of lenses

To understand how illusions are created by lens size, one must understand depth of field, and how "depth of field" and "field of view" are related. As you increase the millimetre specification (or focal length) of a lens, the less field of view it incorporates – some of the view to the left and right, and above and below, is cropped out. The view is not only less wide, it is also less deep.

As you decrease your field of view you are decreasing the amount of visible foreground in the image, but leaving the vanishing point or distant center unaltered. It is this truncation of depth of field, which causes far objects in images to appear nearer to other physically closer objects in the scene. The image below shows the combined view when comparing 28mm, 50mm, 100mm and 300mm lenses.



For example, the field of view of a 50mm lens is contained *within* the field of view of a 28mm lens because a 28mm lens has a greater field of view than a 50mm lens. The 28mm image has a correspondingly greater depth of field because it incorporates more foreground image.

Photographs only represent a part of our primary field of vision. However photographs taken using a 28mm lens represent a far greater portion of our primary field of vision.

Methodology

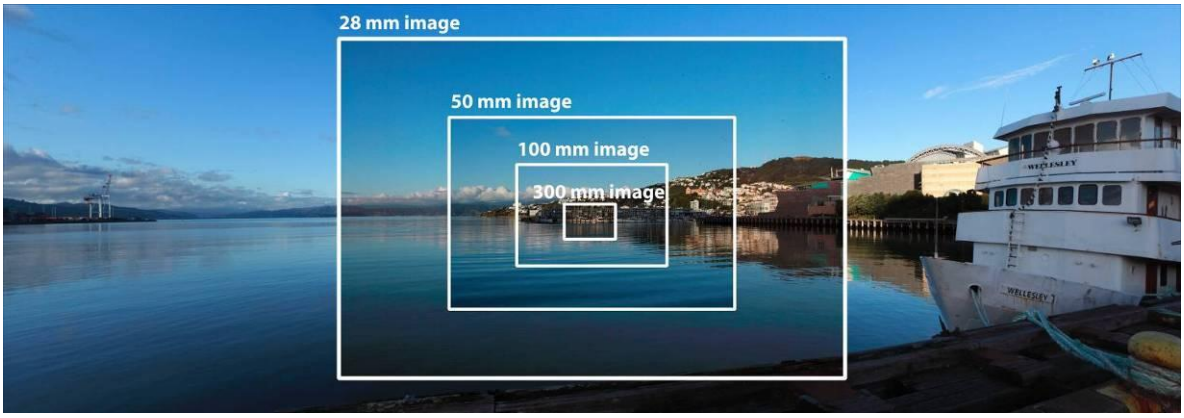
The role of lenses

No camera lens duplicates the primary field of human vision. In order to be able to match exactly the field of view of the **vertical** extent of primary vision, we would need to use a camera lens of 25.933mm. (Thus, a 28mm lens is a much better starting point than a 50mm lens)

In order to match exactly the field of view of the **horizontal** extent of primary vision, we would need to use a camera lens of 9.571mm. However it is not practical to use a lens with a focal length of 9.571mm, as it becomes too difficult to compensate for the effects of distortion. A TrueView™ image solves this problem.

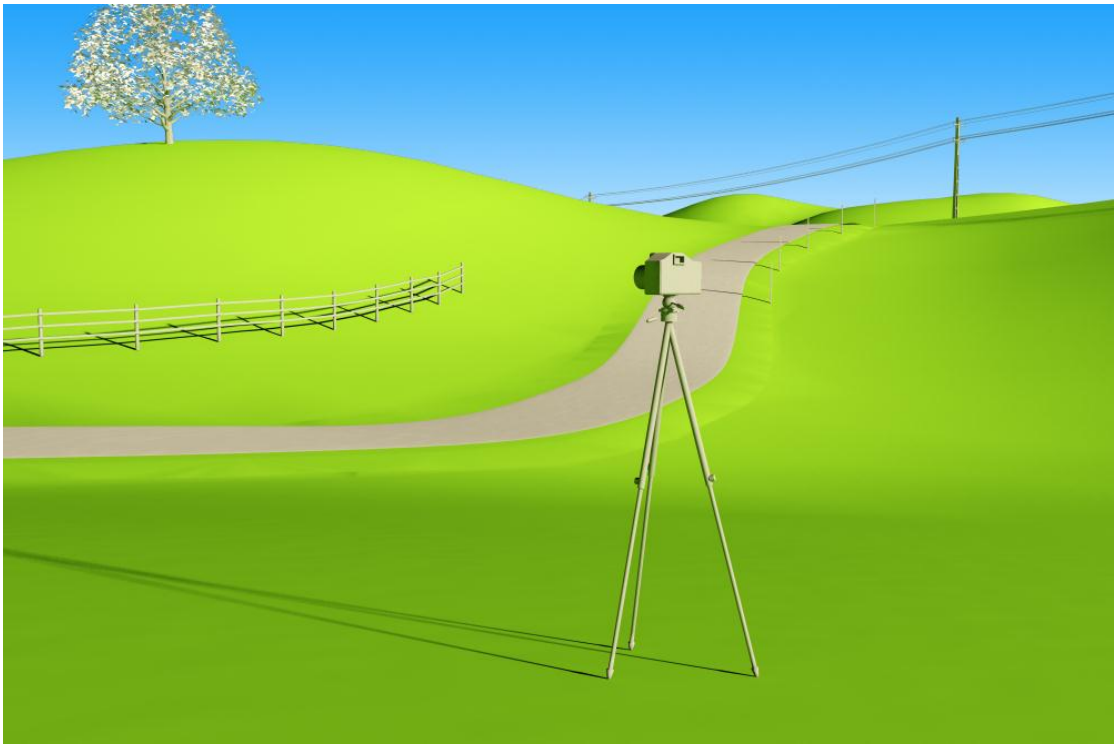
Since it is not possible to take a photograph with a 9.571 mm lens, and print out that image on a flat plane, the horizontal length of the image itself must be made up of multiple images.

Truescape has selected the lens size of 28 mm for best accuracy and optimum efficiency in production. While it is theoretically possible to produce a similar outcome by processing a series of 50 mm, or 100 mm images, the complexity of production and the number of images required would be far greater, simply to produce the same result.



Methodology

The site visit

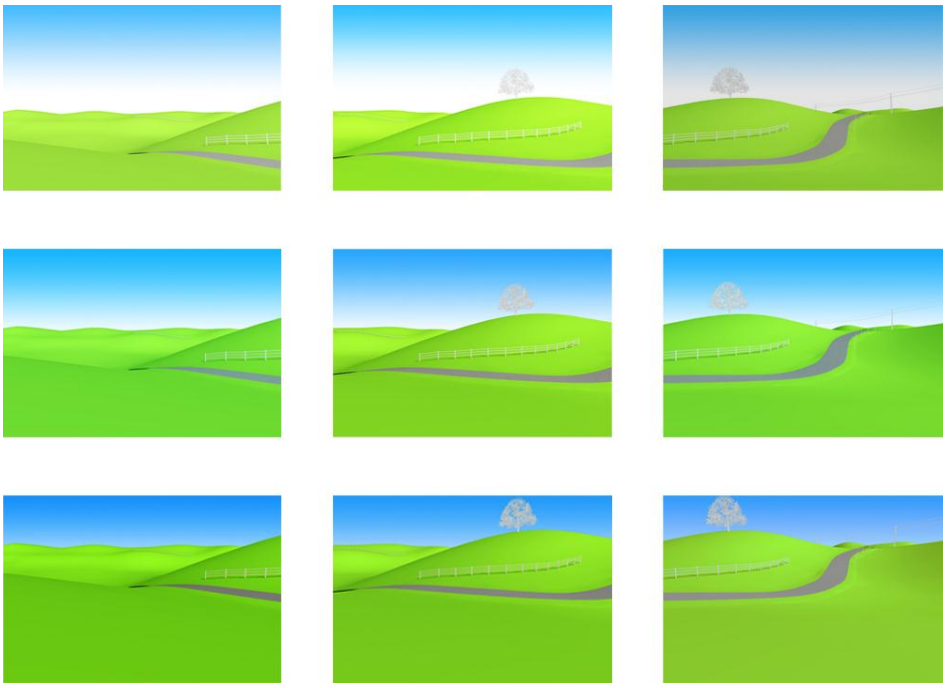


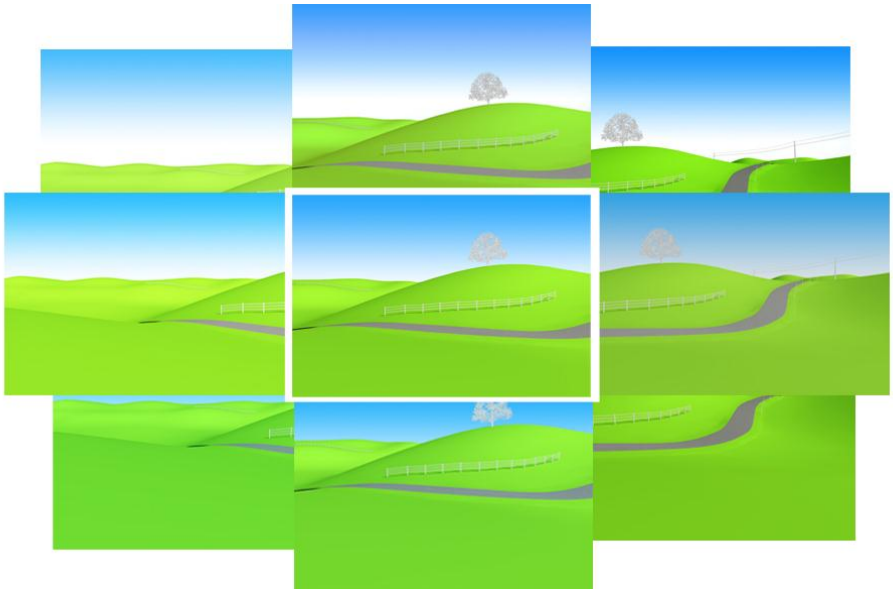
The site visit is undertaken to take the necessary photographs and ground mark the photo point position and identify additional reference points to enable the surveyor to survey fix the exact location of the camera.

A digital SLR 1:1 21 mega pixel camera is used to take the photography. This camera produces photographs at a resolution and clarity as good as current technology will allow when generating simulations.

Methodology

Creating the Primary Human Field of View image





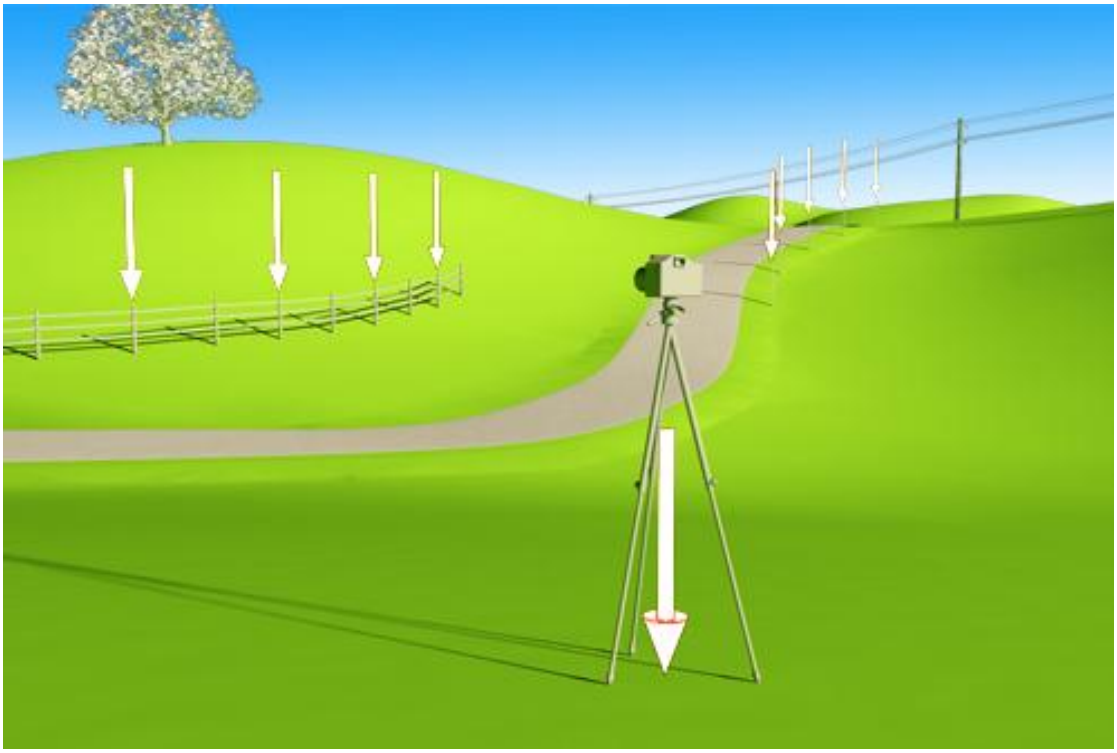
Methodology

The final colour adjusted TrueView™ photography

Using the middle photographs as the benchmark, each of the adjoining photographs is color adjusted to ensure consistency throughout the image. The TrueView™ photograph is now complete.

Methodology

Capturing the surveyed reference points

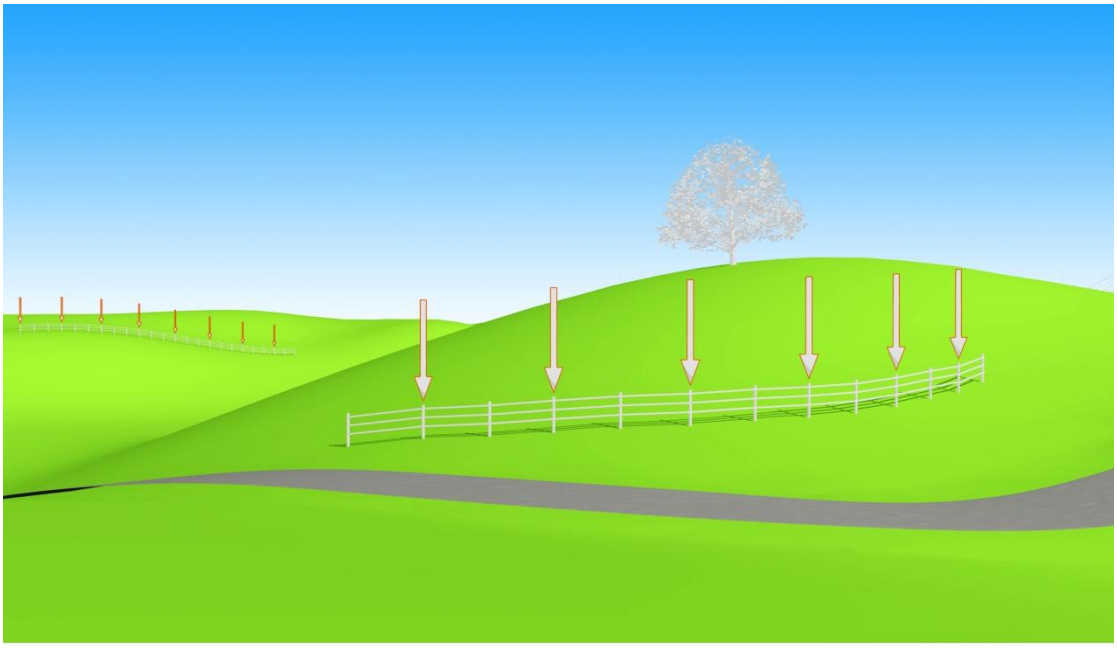


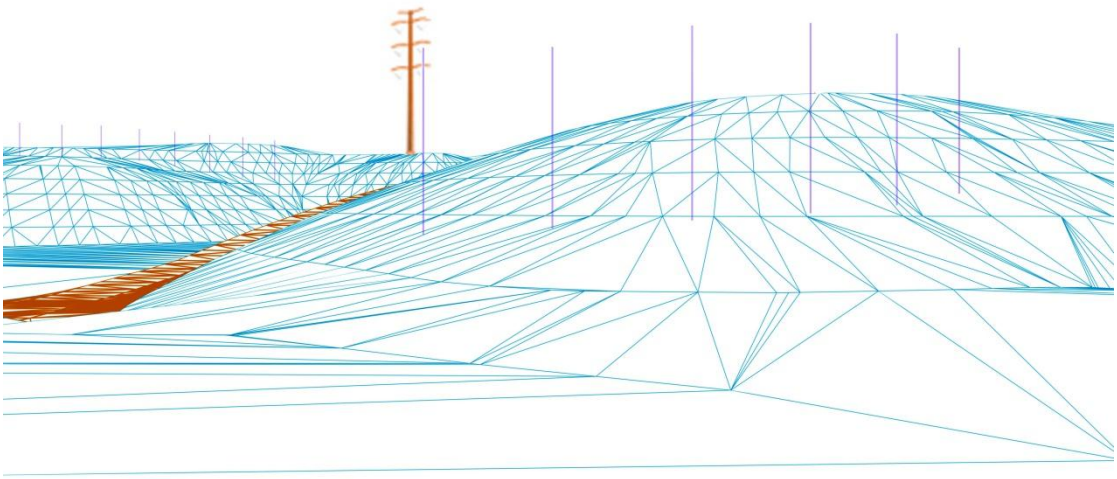
To accurately create a TrueView™ photo simulation the exact position of the camera is survey fixed by a surveyor.

Additional reference points are identified during the site visit so that the 3D model can be accurately placed into the photograph. These reference points include things like fences, vegetation, houses and roads. The surveyor is directed to each of these points.

Methodology

Aligning the surveyed reference points



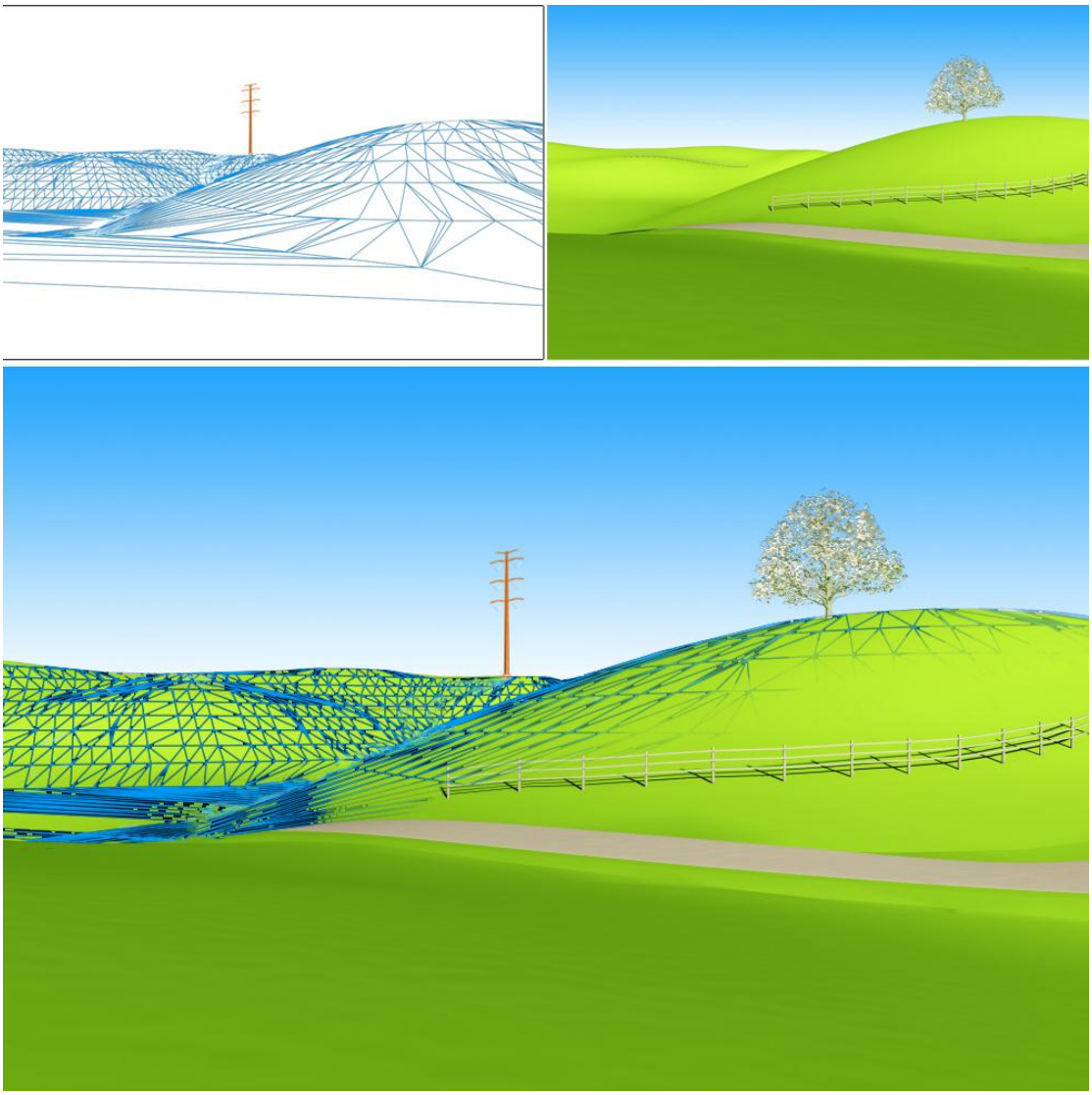


The next step is to construct the 3D computer model. Using Autodesk® 3ds Max® 3D computer simulation software the survey-fixed photo and reference points are imported into the 3D model. A "computer camera" is created to simulate the camera that captured the original photographs, including matching the focal length. The simulated "computer camera" is then positioned at the same survey coordinates as the physical viewpoint positions.

The photographs are then incorporated into the computer model. This is done by correctly aligning the "computer camera" to match the surveyed reference points to the reference objects, and to the terrain if required.

Methodology

Building the proposed project in 3D



The 3D terrain model of the site has been generated using the land contour data. The proposed development (500-230-115kV Transmission Line) has been modelled in 3D and are now imported and positioned accurately into the scene.

The simulation software allows the sun to be simulated at the precise time the original photography was captured. This ensures the lighting of the structures as well as the shadows they cast are an accurate depiction of how the project would appear in the photograph at the same time of day and reflecting the same climatic conditions as those experienced at the time the photograph was taken.

Methodology

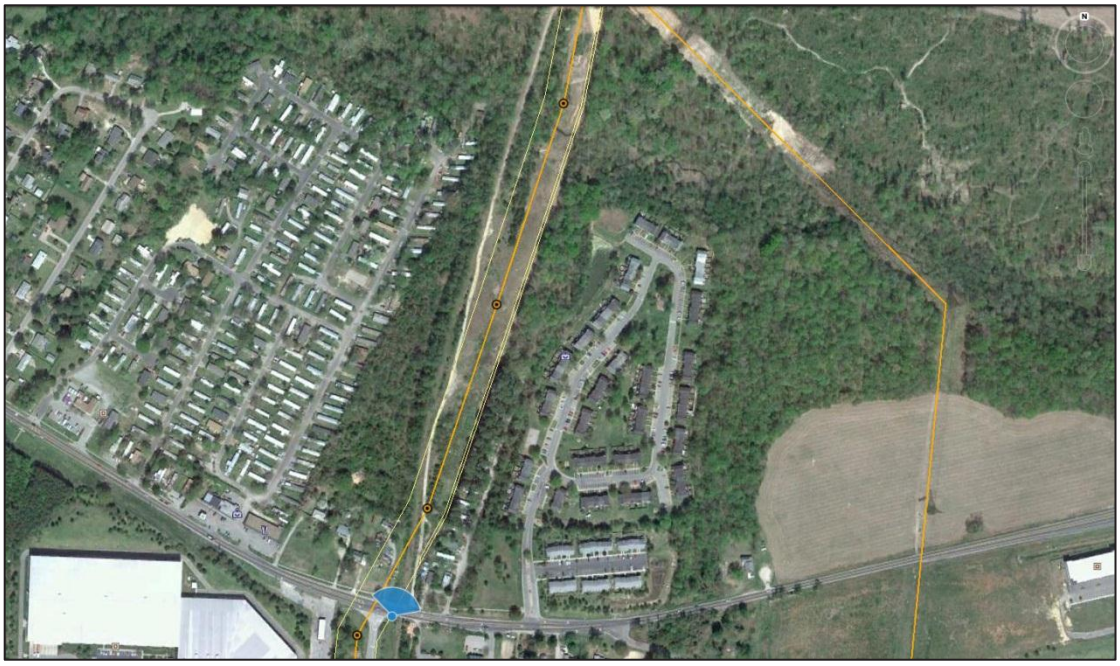
The final TrueView™ simulation

In order to correctly place existing objects that are in front of the 3D model of the development these foreground objects are overlaid, from the original photograph, onto the computer generated image using photo editing software.

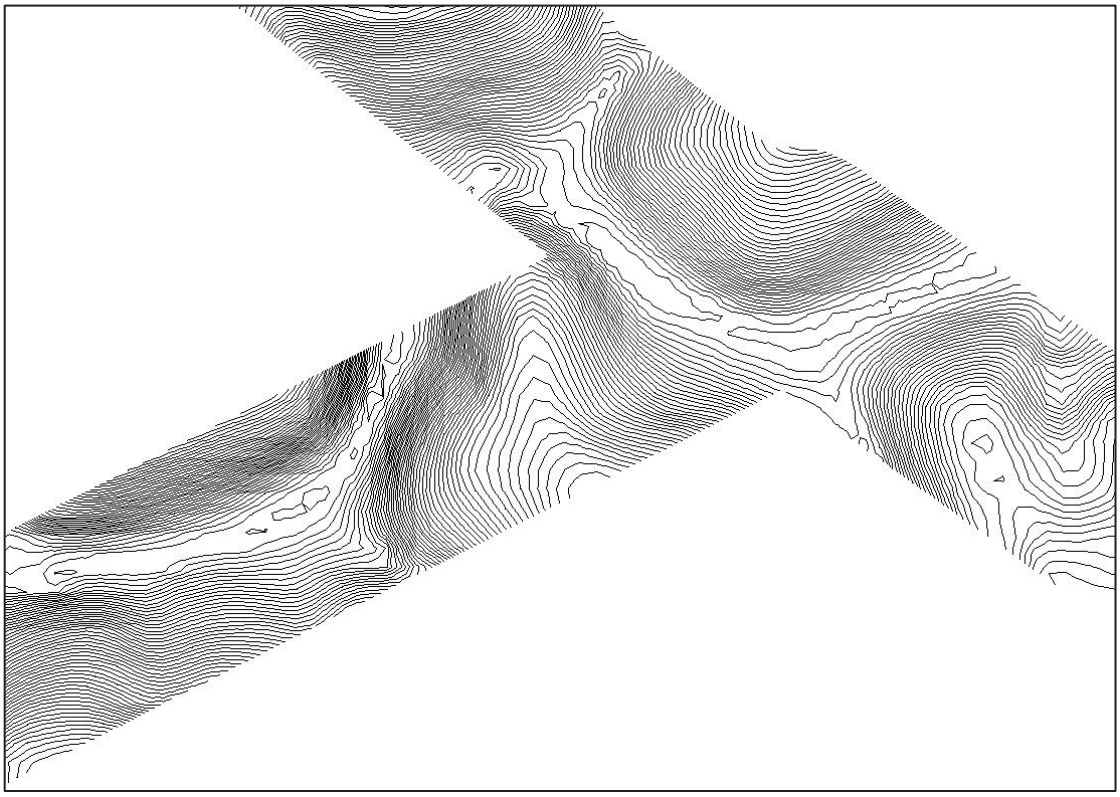
Our extensive experience in researching how to accurately simulate the "Primary Human Field of View" has determined that the lens type is not determinative when generating such simulations. The key factors are the aligning of the raw photographs in 3D, the size that the simulations are output at, and the viewing distance.

The full size TrueView™ simulations are printed at a size that represents the "Primary Human Field of View", being 124º horizontal field of view and 55º vertical field of view when standing 19.7 inches from the center of the image.

Model input data

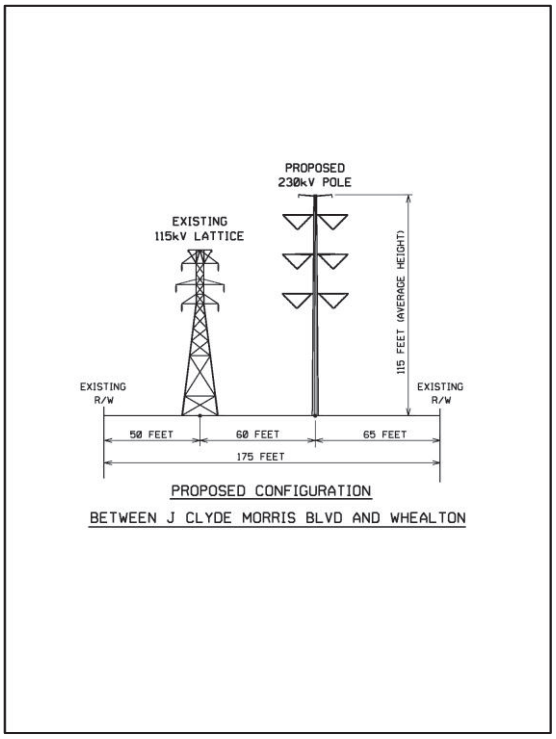


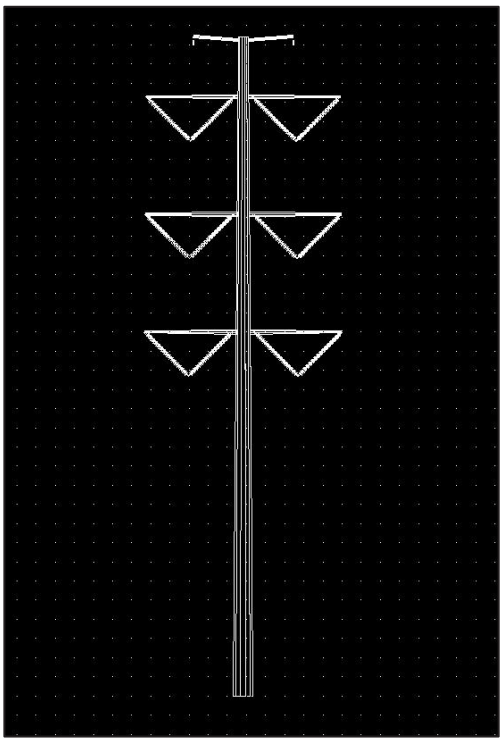
XYZ locations of transmission structures and ROW boundaries provided in .shp file and .kmz file format by Natural Resource Group LLC.

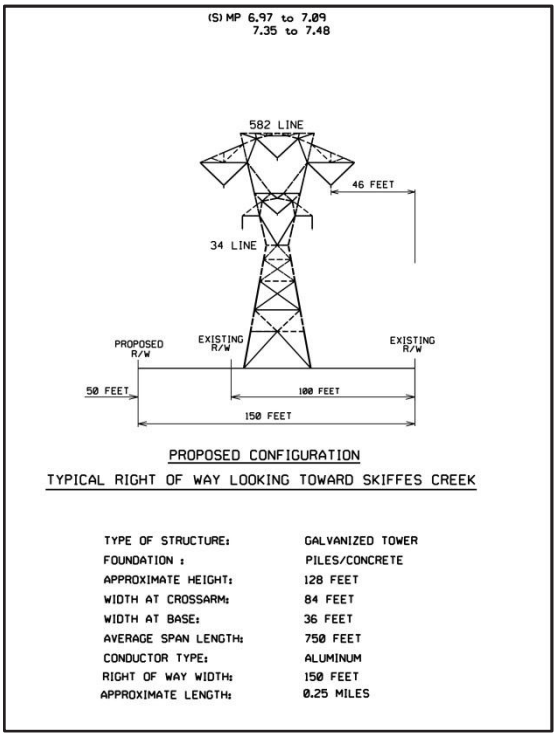


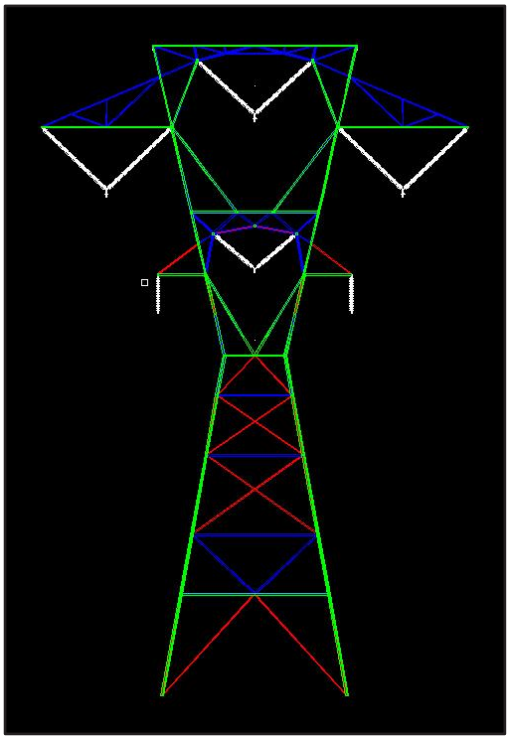
Contour Data for transmission route ROW area provided by Dominion Virginia Power.

Model input data









Drawings, dimensions and specifications for all structure types provided by Dominion Virginia Power.

Survey Control

Using Viewpoint 8 as an example the images below represent the survey accurate alignment of reference points. All surveying was carried out by Dominion Virginia Power – Survey Services.

Reference points requested for survey.

Reference points depicted by coloured lines have been survey fixed and used to accurately position the transmission structures into the photograph.

The final TrueView™ Photo Simulation.

Photo Simulations - Existing & Proposed Views - May 2016 (Updated August 12, 2016)
Shoreline Reference Photography - May 2016
James River Bridge - Existing Dominion Transmission Line - Reference Photography

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

Viewpoint Locations - Photo Simulations

VP 01 Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

VP 03 Approx. 9.5 miles WNW of crossing - (Inside western APE)

VP 04 Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

VP 05 Approx. 0.5 miles N of crossing - (South of Carter's Grove)

VP 06 Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

VP 09 Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Viewpoint 01 - Approx. 4.6 miles West-Northwest of crossing, near Jamestown Island, Looking Southeast **- Existing View**

Viewpoint 01 - Approx. 4.6 miles West-Northwest of crossing, near Jamestown Island, Looking Southeast **- Proposed View**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 01
Approx. 4.6 miles West-Northwest of crossing, near Jamestown Island

Looking Southeast

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**12001844.9**
Northing Position SPCS Virginia South:	**3603460.9**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 11:51 AM**
Orientation of View:	**SE**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

No part of this photosimulation shall be altered in any way.

Structure design and layout subject to final engineering.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created by

Truescape®

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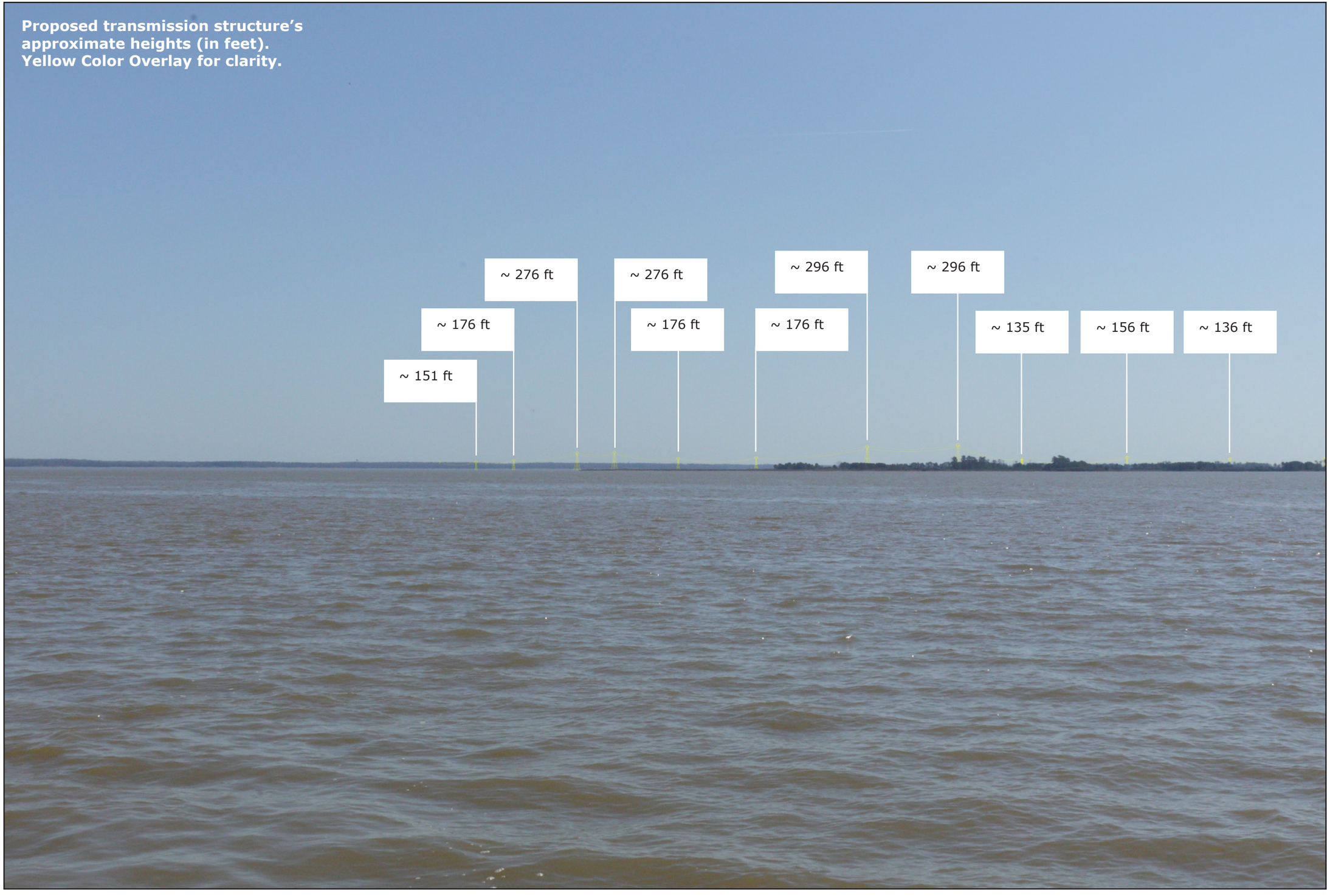
Viewpoint 01 - Approx. 4.6 miles West-Northwest of crossing, near Jamestown Island, Looking Southeast **- Proposed View**

Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.



Viewpoint 01 - Approx. 4.6 miles West-Northwest of crossing, near Jamestown Island, Looking Southeast **- Proposed View (with Yellow Color Overlay for clarity of structure height and location)**

Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 03 - Approx. 9.5 miles West-Northwest of crossing (Surry Plant West), Looking Southeast **- Existing View**

Viewpoint 03 - Approx. 9.5 miles West-Northwest of crossing (Surry Plant West), Looking Southeast **- Proposed View (Structures not visible due to being obscured by Jamestown/Fox Islands)**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 03
Approx. 9.5 miles West-Northwest of crossing (Surry Plant West)

Looking Southeast

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**11976707.6**
Northing Position SPCS Virginia South:	**3607067.5**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 12:30 PM**
Orientation of View:	**SE**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

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Structure design and layout subject to final engineering.

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Viewpoint 03 - Approx. 9.5 miles West-Northwest of crossing (Surry Plant West), Looking Southeast - **Proposed View (Structures will not be visible due to being obscured by Jamestown/Fox Islands)**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 03 - Approx. 9.5 miles West-Northwest of crossing (Surry Plant West), Looking Southeast - **Proposed View (with Yellow Color Overlay for clarity. Structures are obscured behind Jamestown/Fox Islands)**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 04 - Approx. 2.1 miles North of crossing (Off Waste Water Treatment), Looking Southeast **- Existing View**

Viewpoint 04 - Approx. 2.1 miles North of crossing (Off Waste Water Treatment), Looking Southeast **- Proposed View**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 04
Approx. 2.1 miles North of crossing
(Off Waste Water Treatment)

Looking Southeast

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**12021724.0**
Northing Position SPCS Virginia South:	**3605077.0**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 11:35 AM**
Orientation of View:	**SE**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

No part of this photosimulation shall be altered in any way.

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Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created by

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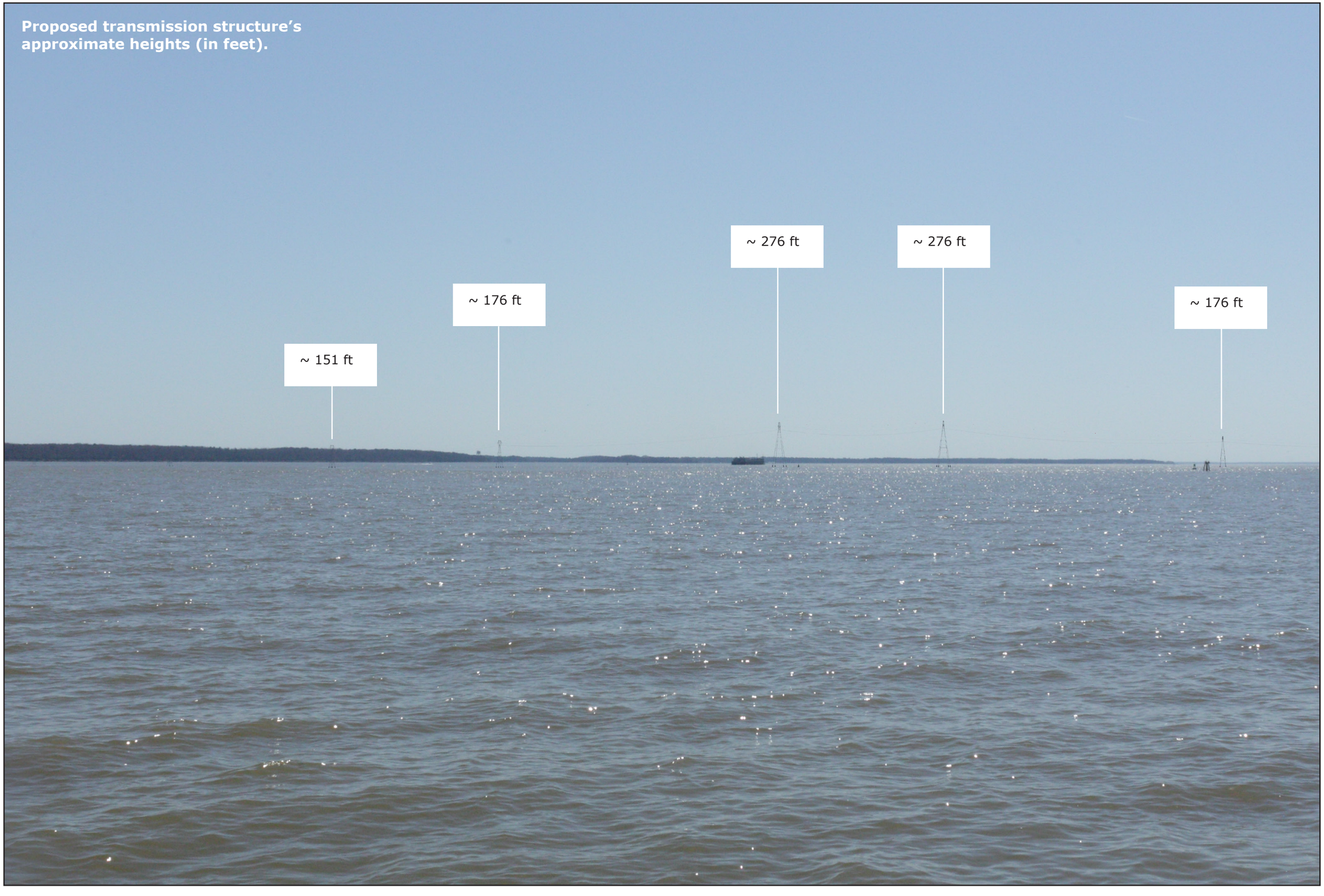
Viewpoint 04 - Approx. 2.1 miles North of crossing (Off Waste Water Treatment), Looking Southeast **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.



Viewpoint 04 - Approx. 2.1 miles North of crossing (Off Waste Water Treatment), Looking Southeast **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 05 - Approx. 0.5 miles North of crossing (South of Cater's Grove), Looking Southwest **- Existing View**

Viewpoint 05 - Approx. 0.5 miles North of crossing (South of Cater's Grove), Looking Southwest **- Proposed View**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 05
Approx. 0.5 miles North of crossing
(South of Carter's Grove)

Looking Southwest

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**12027263.1**
Northing Position SPCS Virginia South:	**3597461.8**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 11:18 AM**
Orientation of View:	**SW**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

No part of this photosimulation shall be altered in any way.

Structure design and layout subject to final engineering.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created by

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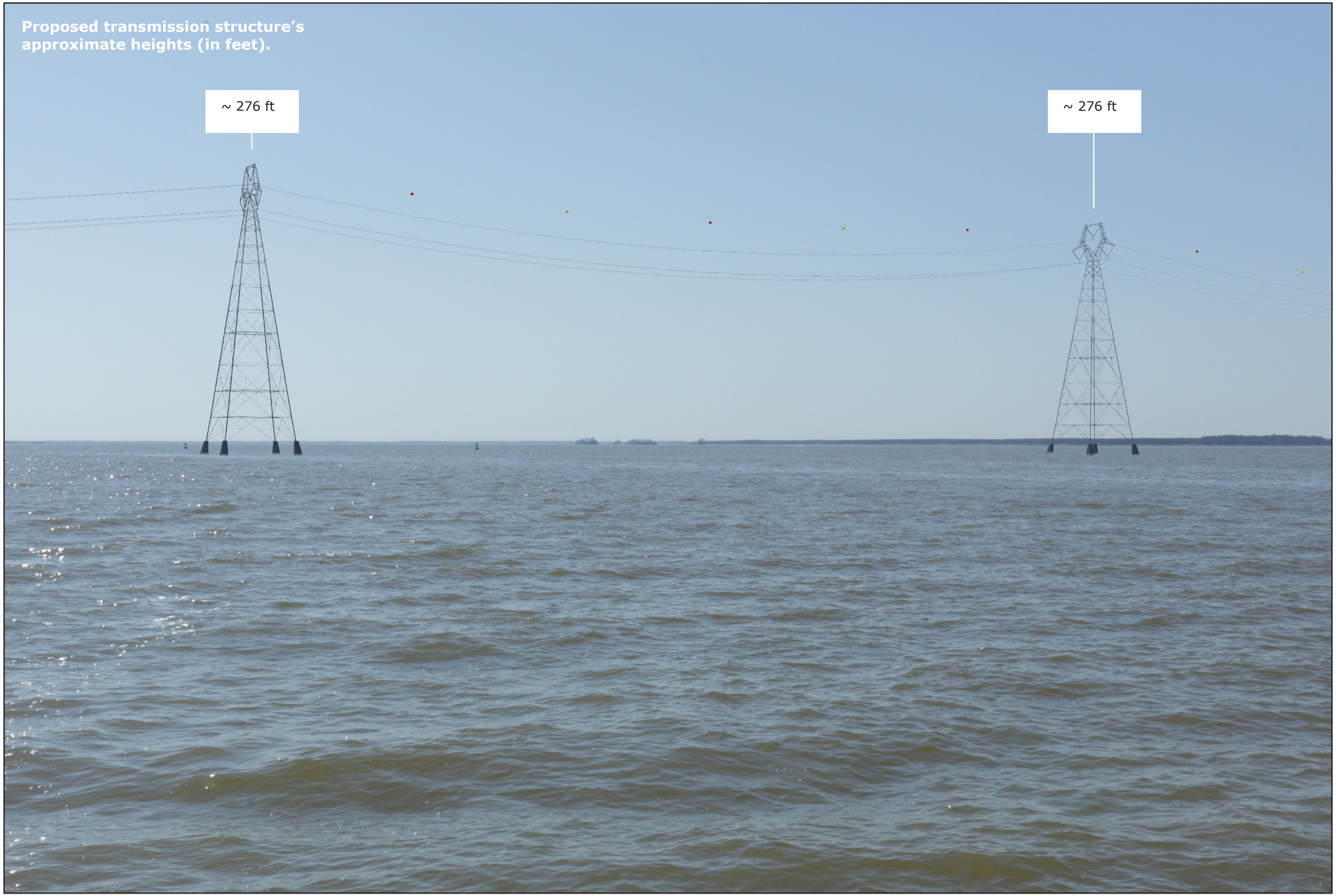
Viewpoint 05 - Approx. 0.5 miles North of crossing (South of Cater's Grove), Looking Southwest **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.



Viewpoint 05 - Approx. 0.5 miles North of crossing (South of Cater's Grove), Looking Southwest **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 06 - Approx. 5.4 miles South of crossing (south of Ghost Fleet), Looking North **- Existing View**

Viewpoint 06 - Approx. 5.4 miles South of crossing (south of Ghost Fleet), Looking North **- Proposed View**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 06
Approx. 5.4 miles South of crossing
(south of Ghost Fleet)

Looking North

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**12023378.0**
Northing Position SPCS Virginia South:	**3565993.4**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 10:24 AM**
Orientation of View:	**N**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

No part of this photosimulation shall be altered in any way.

Structure design and layout subject to final engineering.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created by

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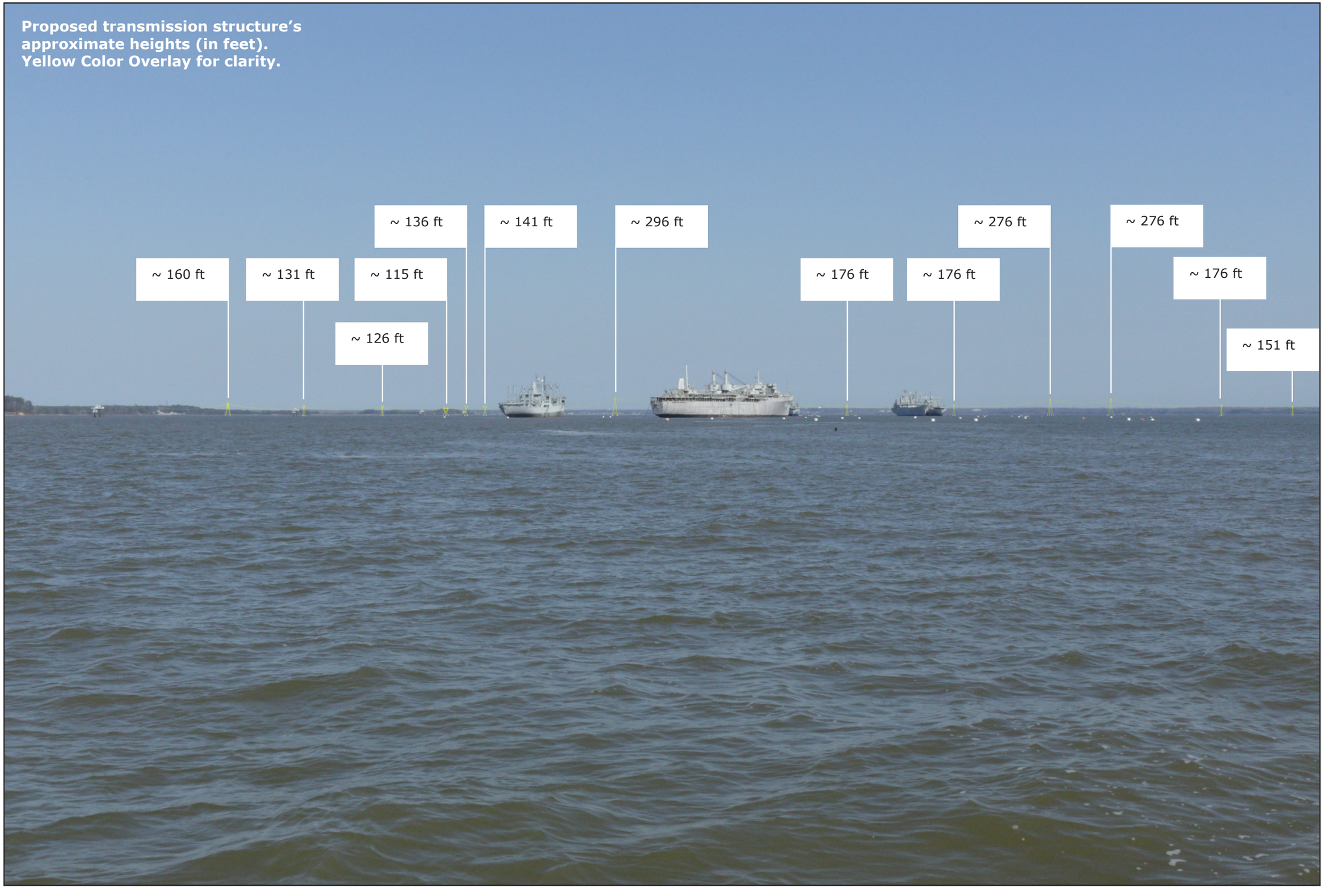
For proposed transmission structure's labeled approximate heights see next page.

Viewpoint 06 - Approx. 5.4 miles South of crossing (south of Ghost Fleet), Looking North **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.



Viewpoint 06 - Approx. 5.4 miles South of crossing (south of Ghost Fleet), Looking North **- Proposed View (with Yellow Color Overlay for clarity of structure height and location)**

Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Viewpoint 09 - Approx. 2.5 miles South of crossing (Near Fort Eustis), Looking North-Northwest **- Existing View**

Viewpoint 09 - Approx. 2.5 miles South of crossing (Near Fort Eustis), Looking North-Northwest **- Proposed View**

White box indicates enlargement area (see next page)

For on-screen display:
Scale bar to be 4 inches (101.6mm wide)
Viewing distance is 19.7 inches (50 cm)

Dominion®

Surry-Skiffes Creek 500 kV Transmission Line
Skiffes Creek-Whealton 230 kV Transmission Line
Skiffes Creek 500-230-115 kV Switching Station

Viewpoint 09
Approx. 2.5 miles South of crossing
(Near Fort Eustis)

Looking North-Northwest

Viewpoint Location — Transmission Line

Easting Position SPCS Virginia South:	**12026611.7**
Northing Position SPCS Virginia South:	**3581574.8**
Elevation of Viewpoint Position NAD83:	**2.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**16 March 2016 at 11:02 AM**
Orientation of View:	**NNW**

Photo simulations and diagrams provide representational views of proposed electric transmission facilities. These illustrations do not necessarily depict exact structure design or physical placement. All projects are subject to change and to final engineering.

NOTES:

Viewpoint locations have been precision surveyed by

Burgess & Niple
440 Monticello Ave Suite 1240
Norfolk, VA 23510

Heights are above mean sea level.

No part of this photosimulation shall be altered in any way.

Structure design and layout subject to final engineering.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created by

Truescape®

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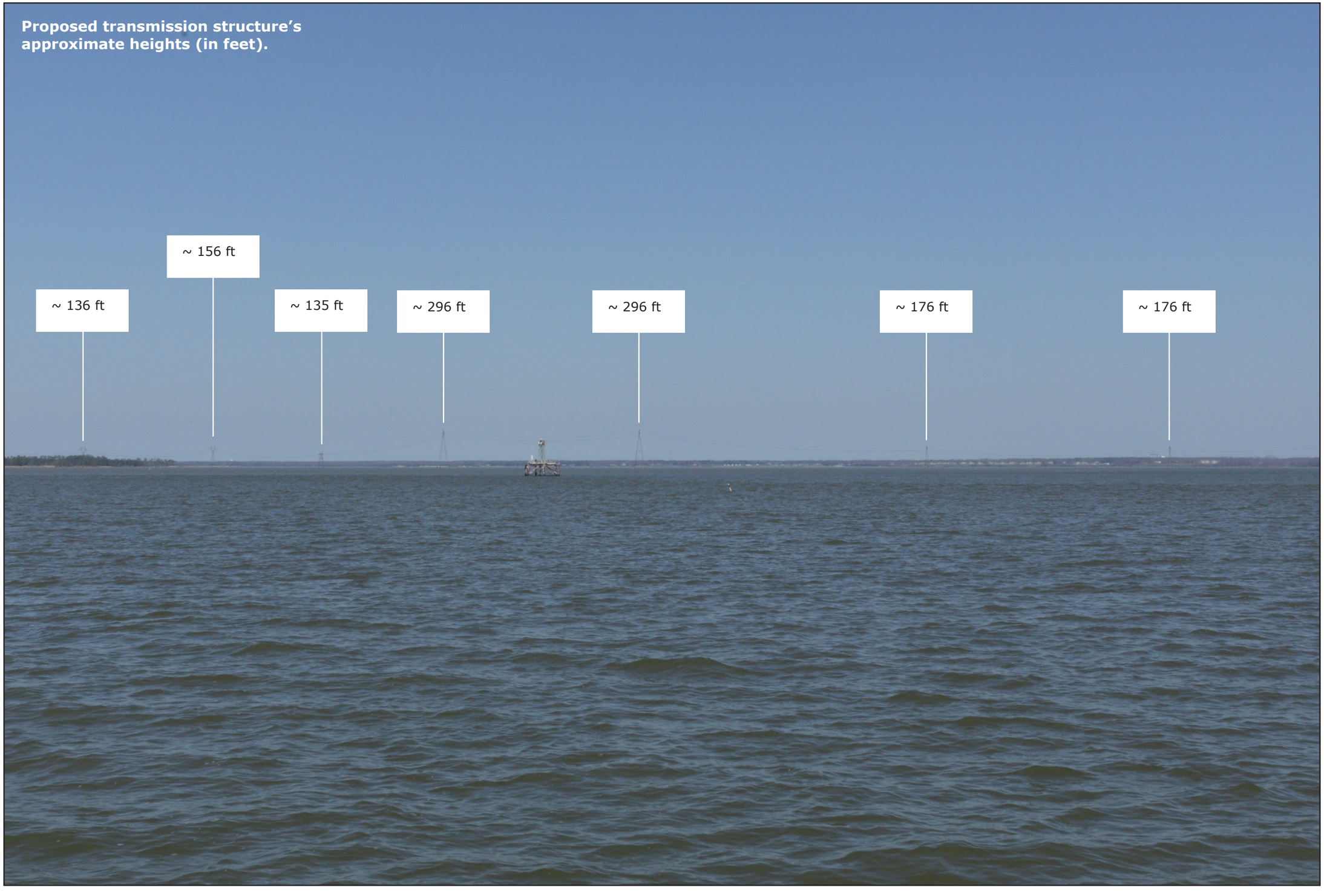
Viewpoint 09 - Approx. 2.5 miles South of crossing (Near Fort Eustis), Looking North-Northwest **- Proposed View**

Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.



Viewpoint 09 - Approx. 2.5 miles South of crossing (Near Fort Eustis), Looking North-Northwest **- Proposed View**
Enlargement Area of previous page - enlarged to a representative view when printed on a 11 x 17 " page and viewed from approx. 20" distance.

Shoreline Reference Photography - May 2016

Viewpoint Locations - Shoreline Reference Photography

VP 01 Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

VP 02 Approx. 4.2 miles W of crossing - (Surry Plant West)

VP 03 Approx. 9.5 miles WNW of crossing - (Inside western APE)

VP 04 Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

VP 05 Approx. 0.5 miles N of crossing - (South of Carter's Grove)

VP 06 Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

VP 07 Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

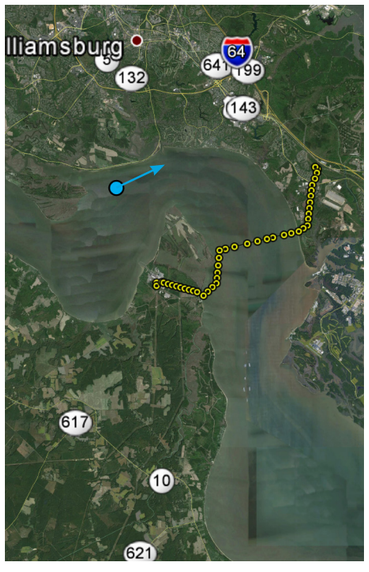
VP 09 Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

VP 10 Approx. 3.3 miles S of crossing - (North of Ghost Fleet)

Viewpoint 01 - Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

Shoreline Reference:
Busch Gardens
Rollercoaster &
The Mach Tower

Handheld GPS:
Latitude: 37.205769°
Longitude: -76.718164°



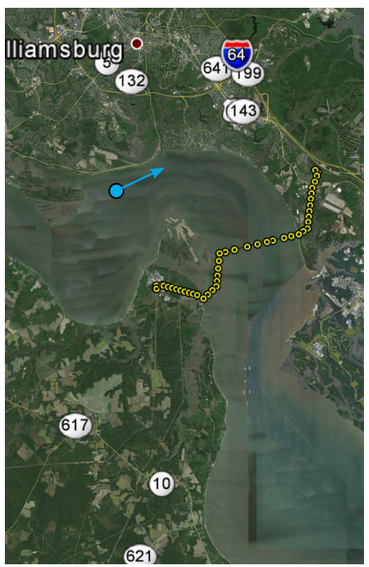
Distance to shore: Approximately 1.2mi

Viewpoint 01 - Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

Shoreline Reference:
Busch Gardens
Rollercoaster &
The Mach Tower

Handheld GPS:

Latitude:	37.205769°
Longitude:	-76.718164°



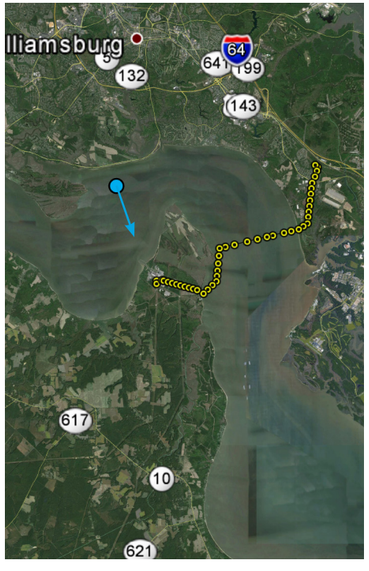
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 01 - Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

Shoreline Reference:
Hog Island existing transmission structures / Surry

Handheld GPS:

Latitude:	37.205769°
Longitude:	-76.718164°



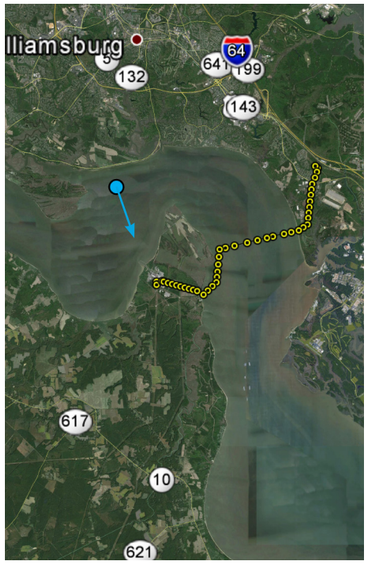
Distance to shore: Approximately 2.6mi

Viewpoint 01 - Approx. 4.6 miles WNW of crossing - (Near Jamestown Island)

Shoreline Reference:
Hog Island existing transmission structures / Surry

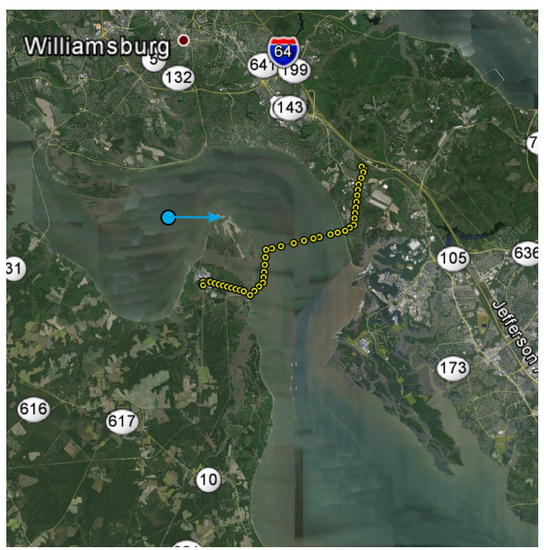
Handheld GPS:

Latitude:	37.205769°
Longitude:	-76.718164°



Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 02 - Approx. 4.2 miles W of crossing - (Surry Plant West)



Distance to shore: Approximately 1.3 mi

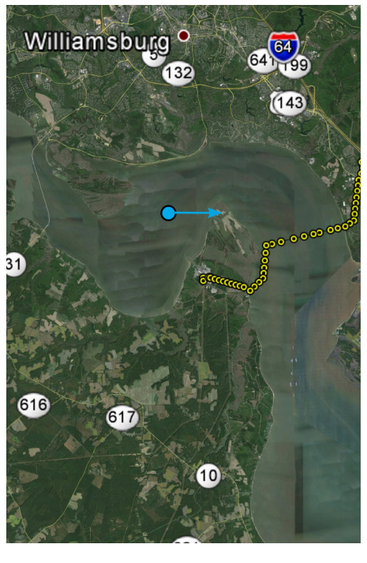
Handheld GPS:

Latitude: 37.192321°

Longitude: -76.715254°

Viewpoint 02 - Approx. 4.2 miles W of crossing - (Surry Plant West)

Handheld GPS:
Latitude: 37.192321°
Longitude: -76.715254°

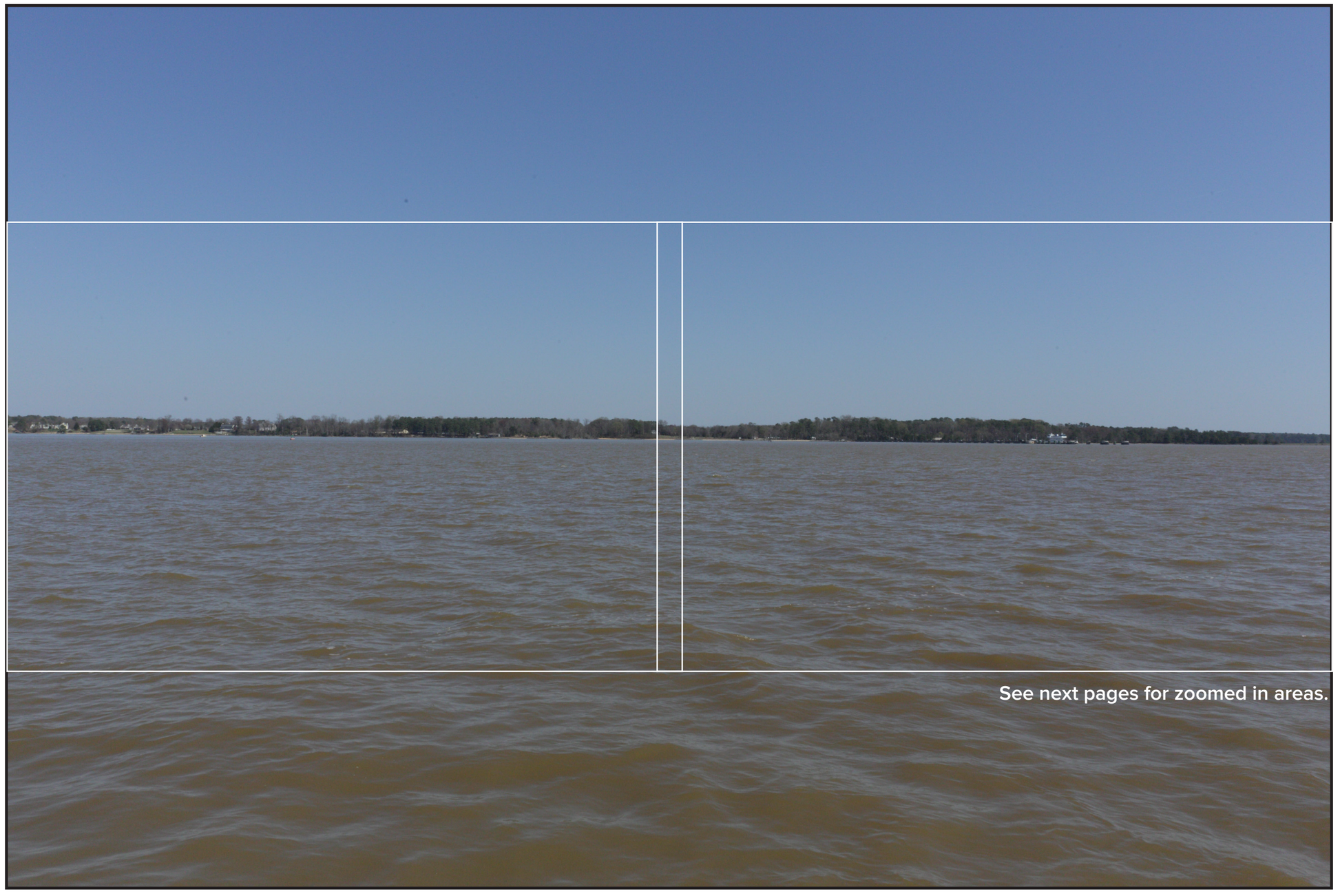


Approximately 340% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 03 - Approx. 9.5 miles WNW of crossing - (Inside western APE)

Shoreline Reference:
Scotland - Jamestown
Ferry Terminal

Handheld GPS:
Latitude: 37.218622°
Longitude: -76.806307°



Distance to shore: Approximately 1 mi

Viewpoint 03 - Approx. 9.5 miles WNW of crossing - (Inside western APE)

Shoreline Reference:
Jamestown
Houses on “Manion Drive”

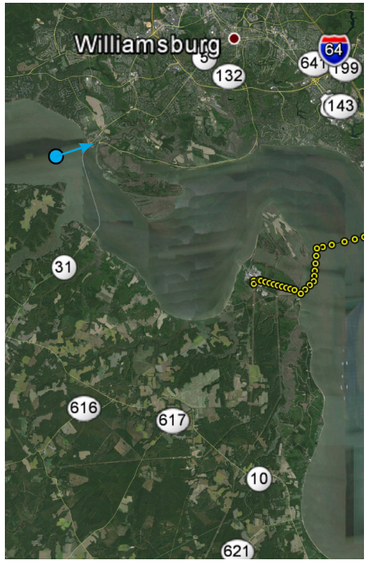
Handheld GPS:
Latitude: 37.218622°
Longitude: -76.806307°

Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 03 - Approx. 9.5 miles WNW of crossing - (Inside western APE)

Shoreline Reference:
Scotland-Jamestown
Ferry Terminal

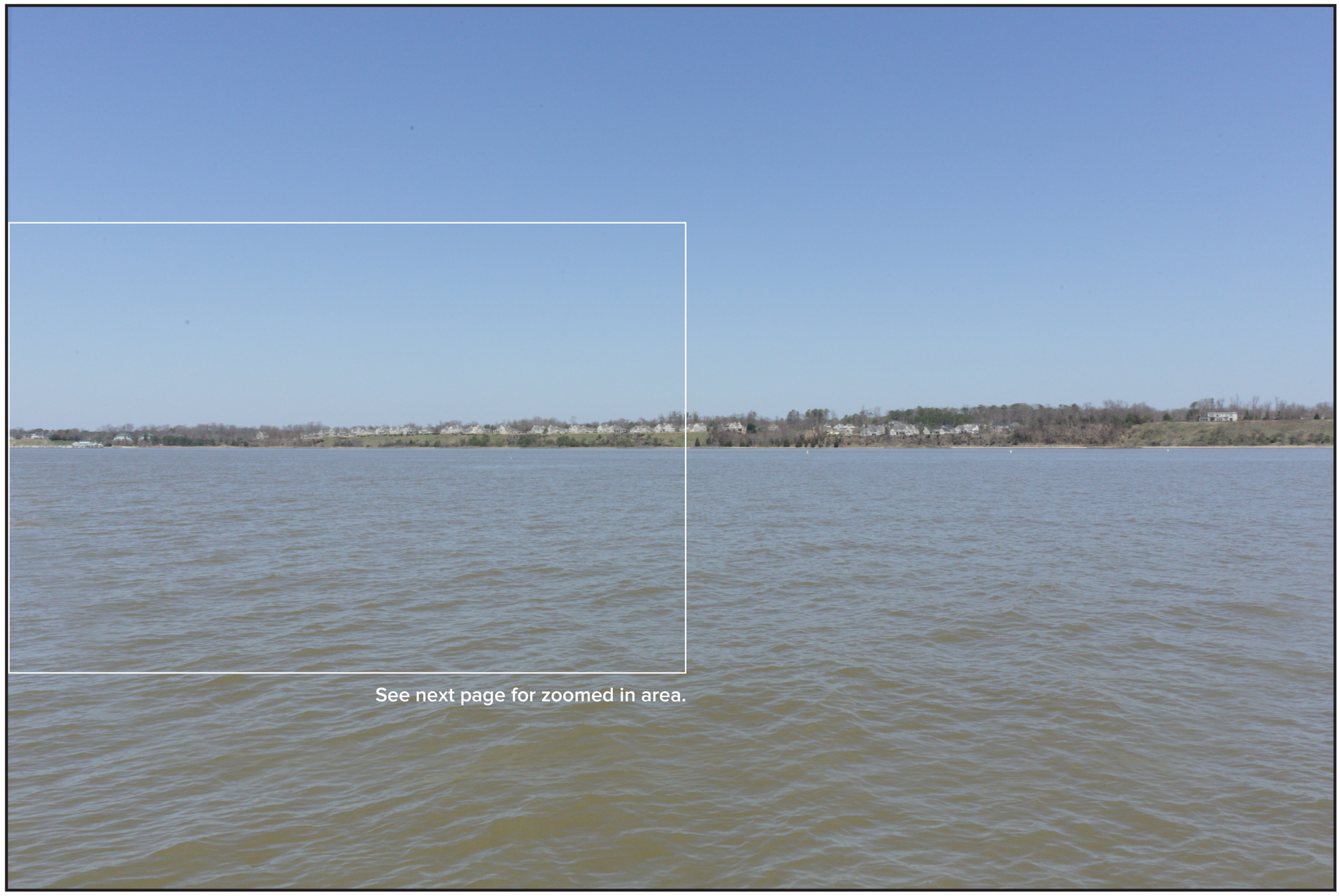
Handheld GPS:
Latitude: 37.218622°
Longitude: -76.806307°



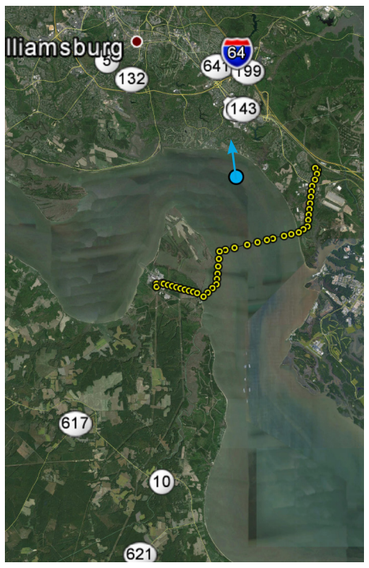
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 04 - Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

Shoreline Reference:
Kingsmill:
Houses on “River’s Edge”;
Kingsmill:
Marina (Left hand side)



Handheld GPS:
Latitude: 37.211102°
Longitude: -76.651258°



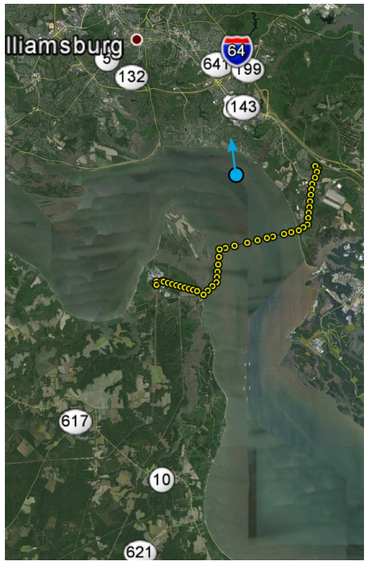
Distance to shore: Approximately 0.9mi

Viewpoint 04 - Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

Shoreline Reference:
Kingsmill:
Houses on “River’s Edge”;
Kingsmill:
Marina

Handheld GPS:

Latitude:	37.211102°
Longitude:	-76.651258°



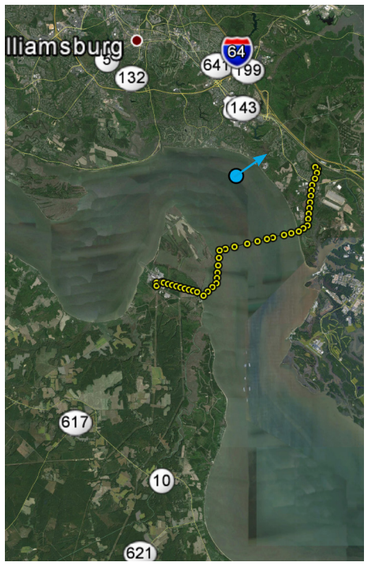
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 04 - Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

Shoreline Reference:
Grove and Waste Water Plant Tanks (right hand side).

Busch Gardens cannot be seen from here as view is too close to shore thus Busch Garden infrastructure is below treeline ...

Handheld GPS:
Latitude: 37.211102°
Longitude: -76.651258°



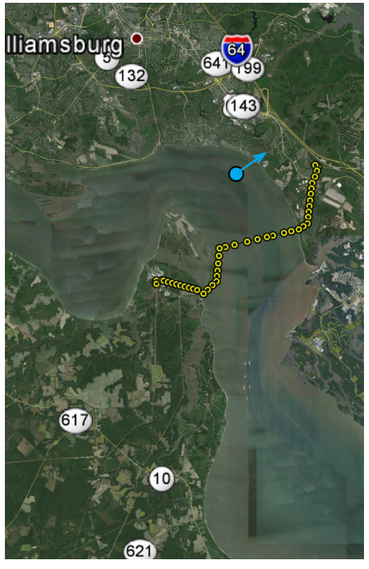
Distance to shore: Approximately 0.7mi

Viewpoint 04 - Approx. 2.1 miles N of crossing - (Off Waste Water Treatment)

Shoreline Reference:
Grove and Waste Water Plant Tanks (right hand side).

Busch Gardens cannot be seen from here as view is too close to shore thus Busch Garden infrastructure is below treeline ...

Handheld GPS:
Latitude: 37.211102°
Longitude: -76.651258°

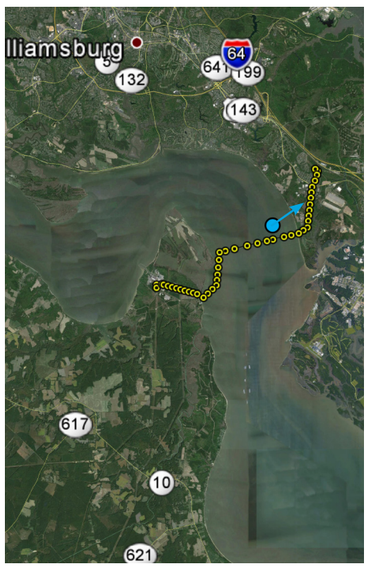


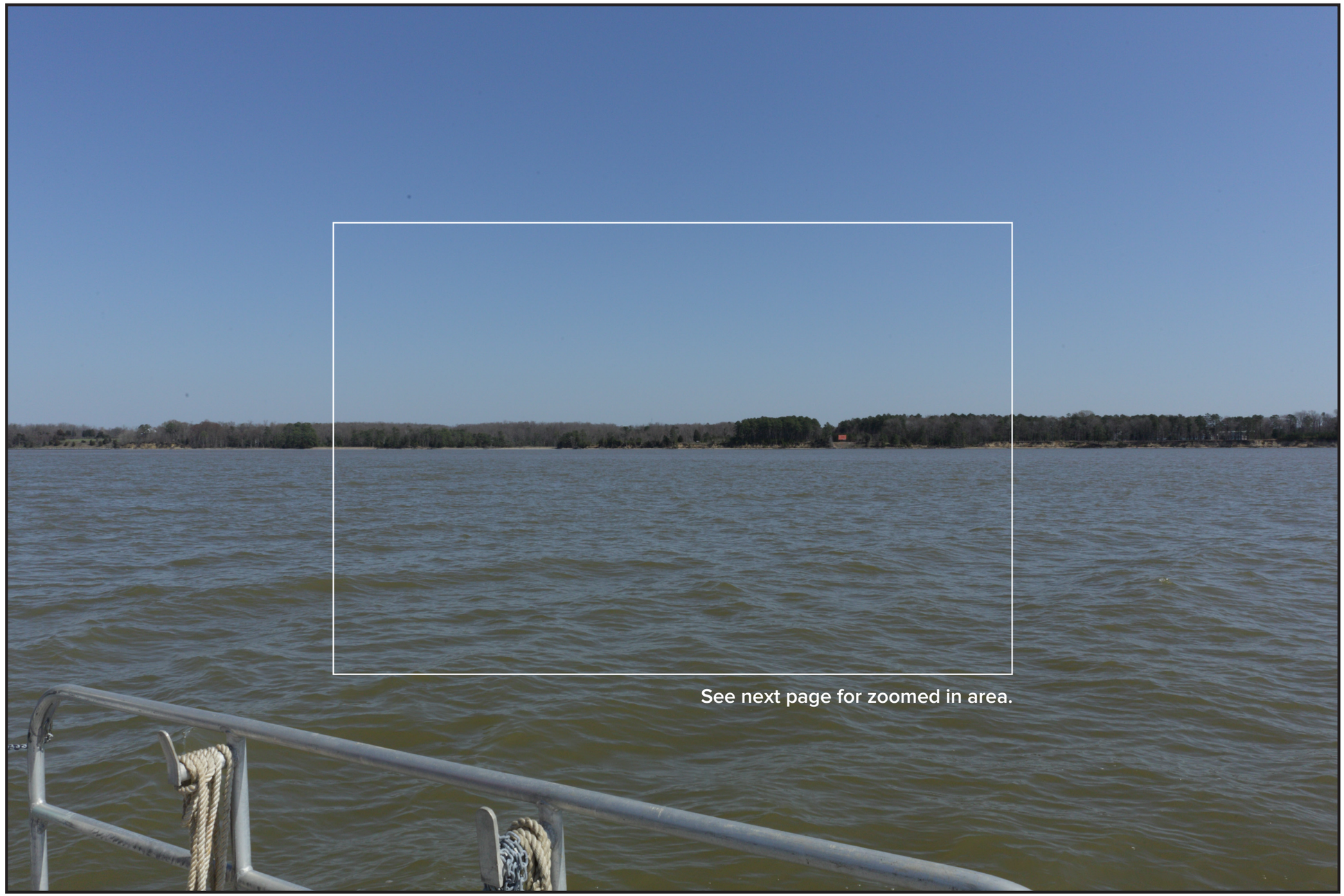
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
BASF Drive
Baseline Road
Carter's Grove (Left hand side)

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°



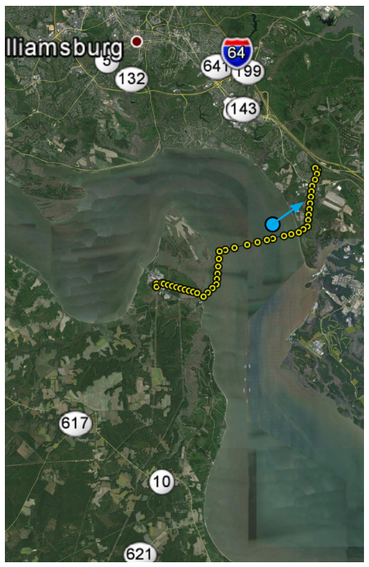


Distance to shore: Approximately 0.6mi

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
BASF Drive
Baseline Road

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°

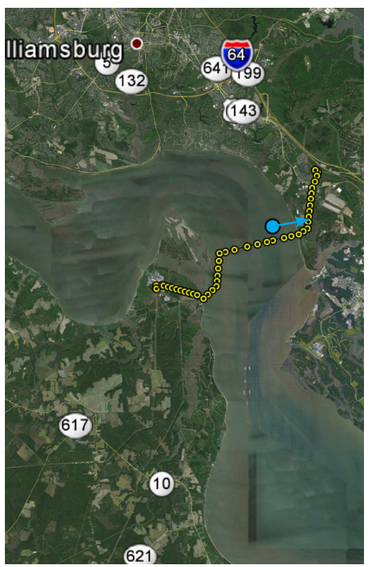


Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
BASF Drive and
Water Tower

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°



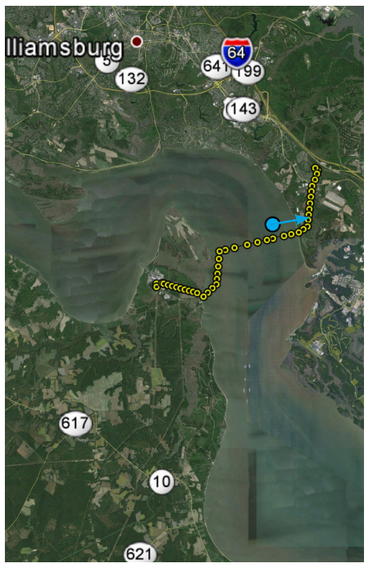
Distance to shore: Approximately 0.7mi

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
BASF Drive and
Water Tower

Handheld GPS:

Latitude:	37.189926°
Longitude:	-76.631094°

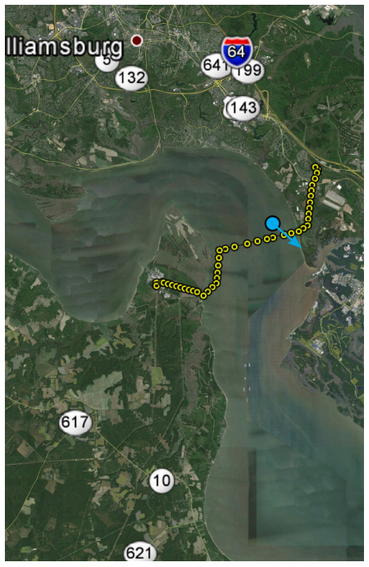


Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Goose Island
Ft. Eustis Water Tower

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°

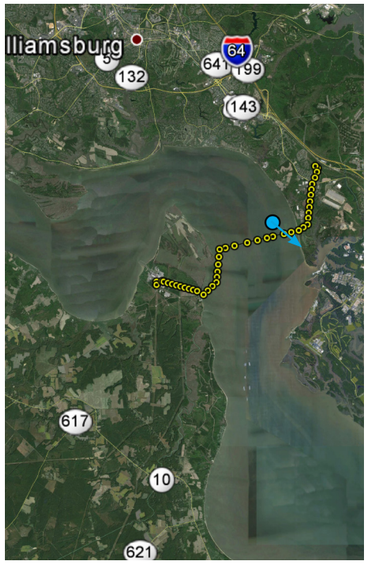


Distance to shore: Approximately 1 mi

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Goose Island
Ft. Eustis Water Tower

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°

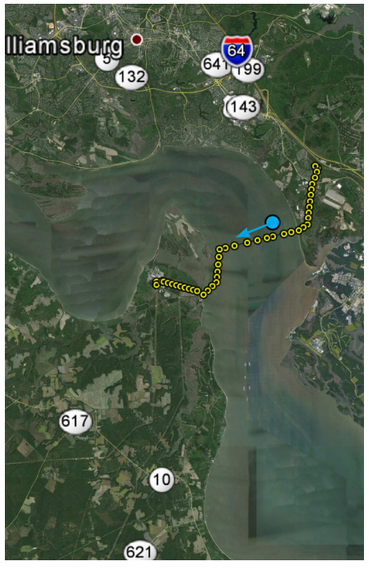


Approximately 200% enlargement area of previous page. Approximately 2.8mi to Water Tower.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Hog Island existing transmission structures and Surry

Handheld GPS:
Latitude: 37.189926°
Longitude: -76.631094°



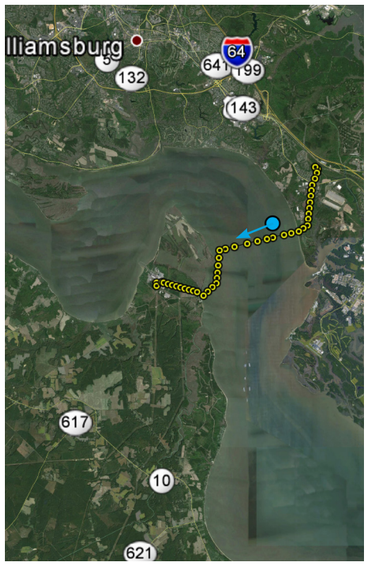
Distance to shore: Approximately 2.1mi

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Hog Island existing transmission structures and Surry

Handheld GPS:

Latitude:	37.189926°
Longitude:	-76.631094°



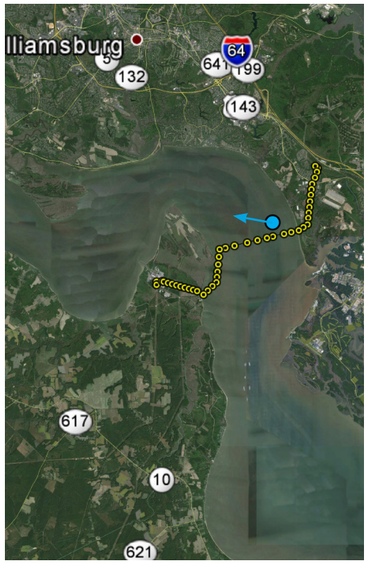
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Hog Island (Left hand side)
Jamestown Island (Middle)
Colonial National Historic Parkway (Right hand side)

Handheld GPS:

Latitude:	37.189926°
Longitude:	-76.631094°



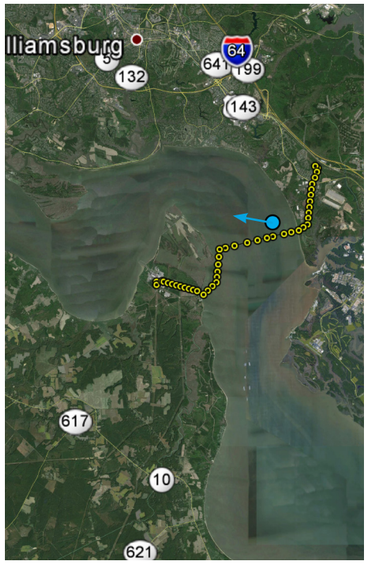
Distance to shore: Approximately 2.3mi to Hog Island; Approximately 4.7mi to Colonial National Historic Parkway

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Jamestown Island
Colonial National Historic
Parkway (Right hand side)

Handheld GPS:

Latitude:	37.189926°
Longitude:	-76.631094°



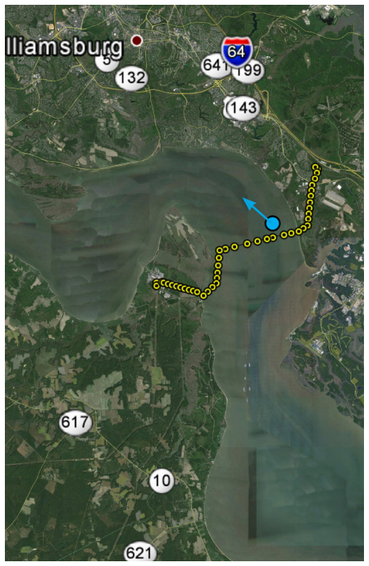
Approximately 200% enlargement area of previous page. Approximately 4.7mi to Colonial National Historic Parkway.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Jamestown Island
Colonial National Historic Parkway
Kingsmill Resort and Marina

Handheld GPS:

Latitude:	37.189926°
Longitude:	-76.631094°



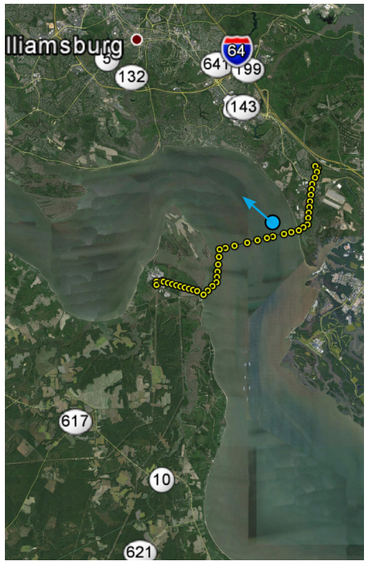
Distance to shore: Approximately 3.2mi

Viewpoint 05 - Approx. 0.5 miles N of crossing - (South of Carter's Grove)

Shoreline Reference:
Colonial National Historic Parkway
Kingsmill Resort and Marina

Handheld GPS:

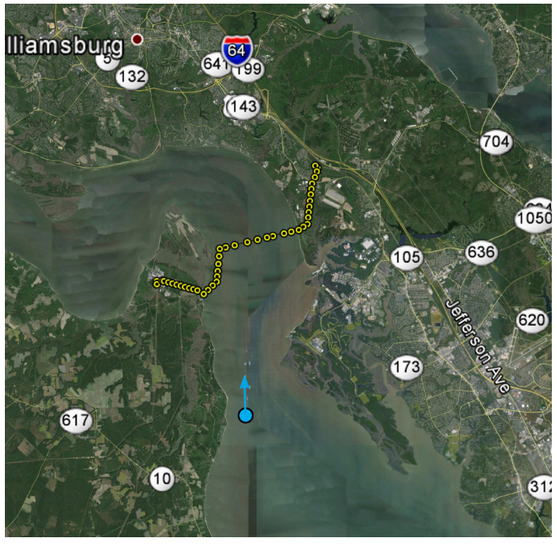
Latitude:	37.189926°
Longitude:	-76.631094°



Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17" page and viewed from approximately 20" distance.

Viewpoint 06 - Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

See next page for zoomed in area.



Distance to shore: Between approximately 0.8 to 8.5 miles

Handheld GPS:

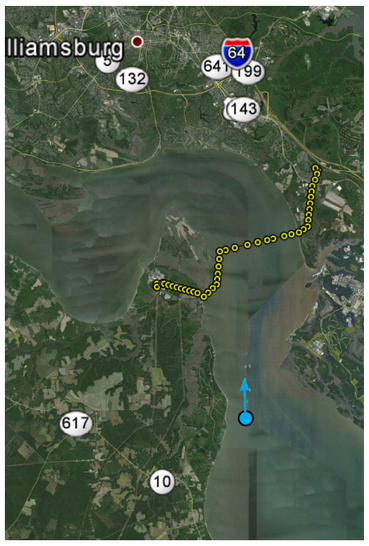
Latitude: 37.103734°

Longitude: -76.646044°

Viewpoint 06 - Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

Handheld GPS:

Latitude:	37.103734°
Longitude:	-76.646044°

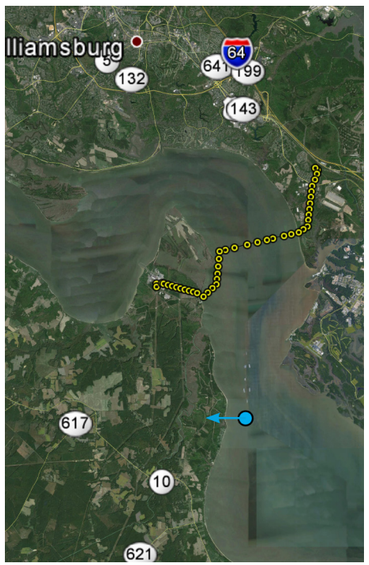


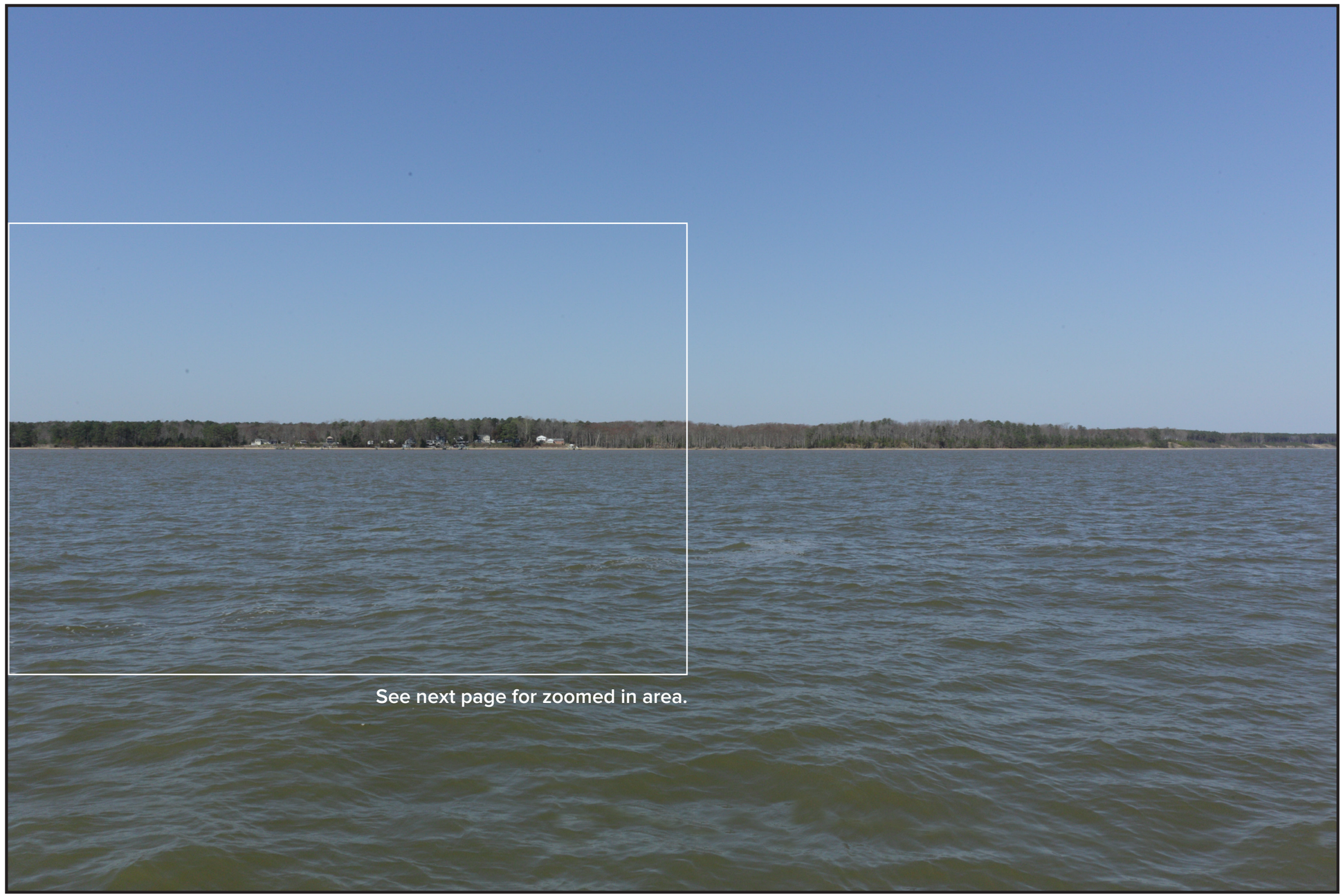
Approximately 340% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 06 - Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

Shoreline Reference:
Surry
N Shore Drive

Handheld GPS:
Latitude: 37.103734°
Longitude: -76.646044°





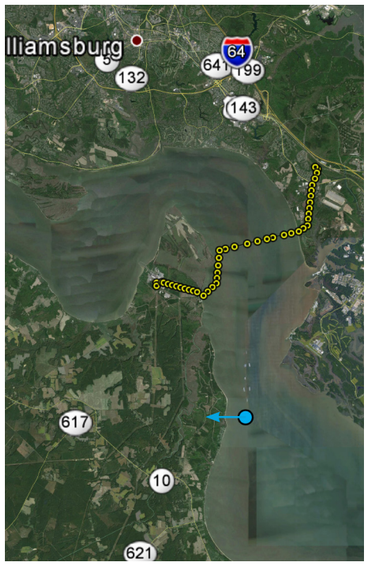
See next page for zoomed in area.

Distance to shore: Approximately 0.7mi

Viewpoint 06 - Approx. 5.4 miles S of crossing - (South of Ghost Fleet)

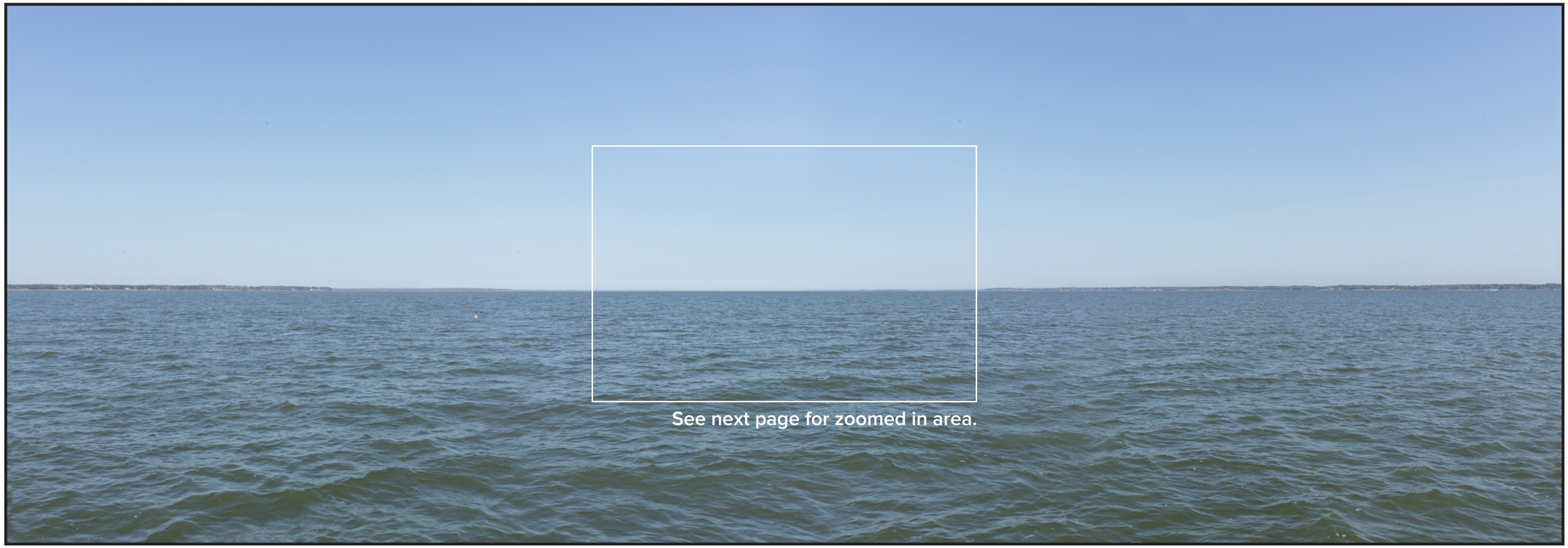
Shoreline Reference:
Surry
Houses on “N Shore Drive”

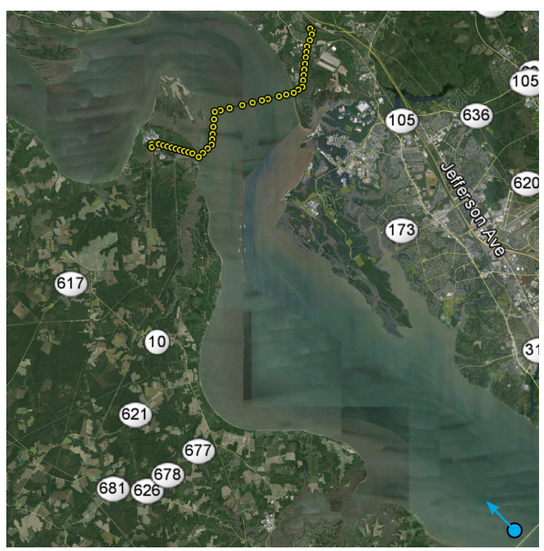
Handheld GPS:
Latitude: 37.103734°
Longitude: -76.646044°



Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)





Distance to shore: Between approximately 3 to 15 miles

Handheld GPS:

Latitude:	36.991253°
Longitude:	-76.492990°

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

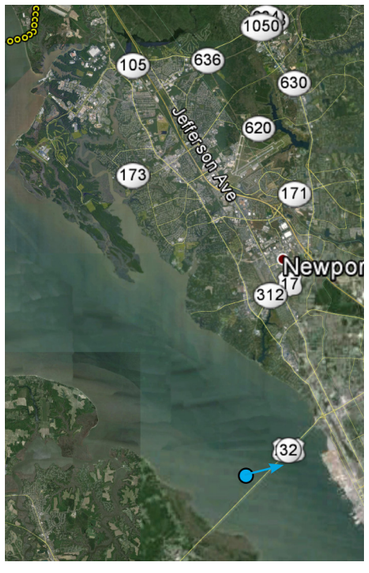
Handheld GPS:
Latitude: 36.991253°
Longitude: -76.492990°

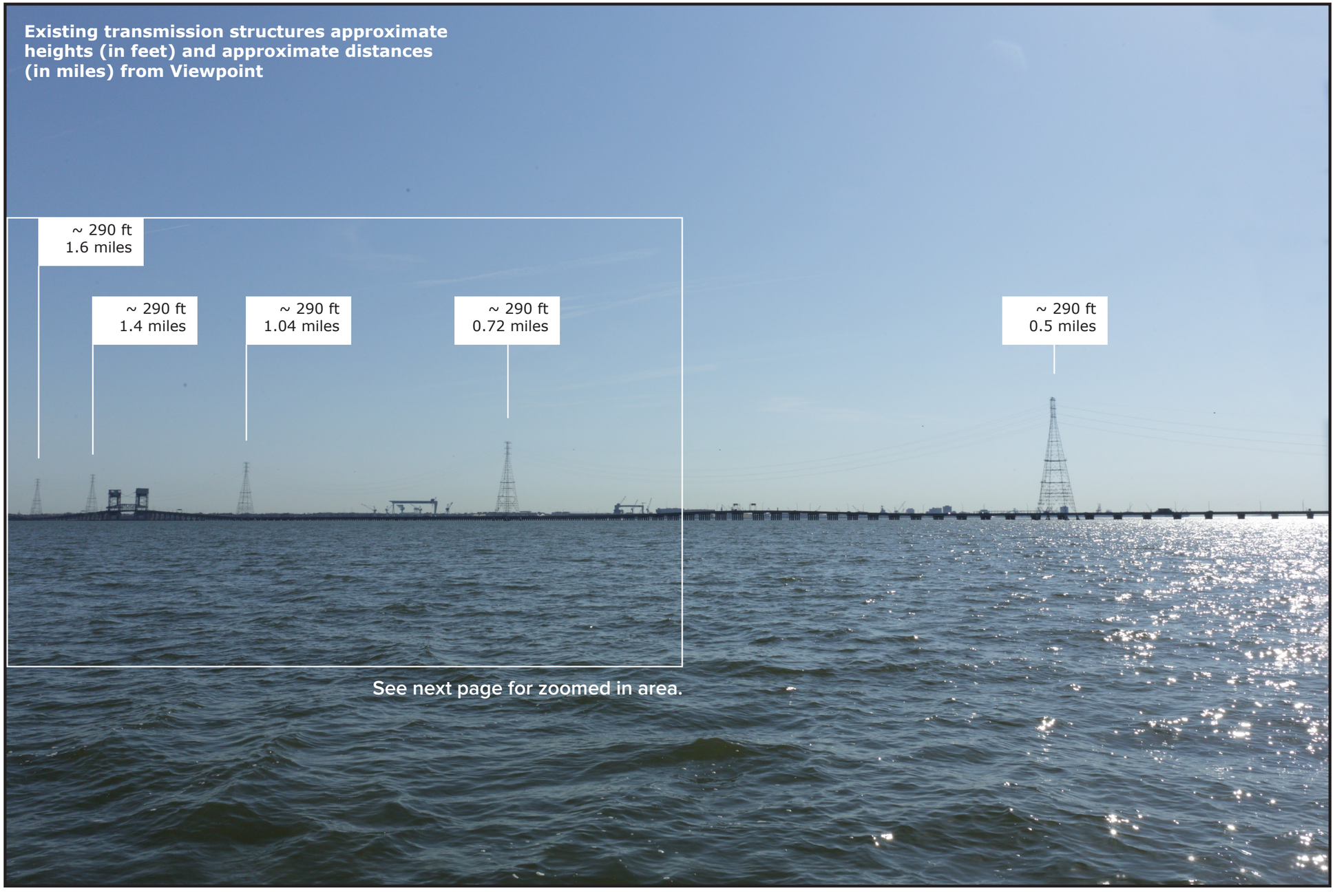
Approximately 340% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

Shoreline Reference:
Existing JRB transmission line (approx. 1.6 miles to farthest visible NE structure)

Handheld GPS:
Latitude: 36.991253°
Longitude: -76.492990°



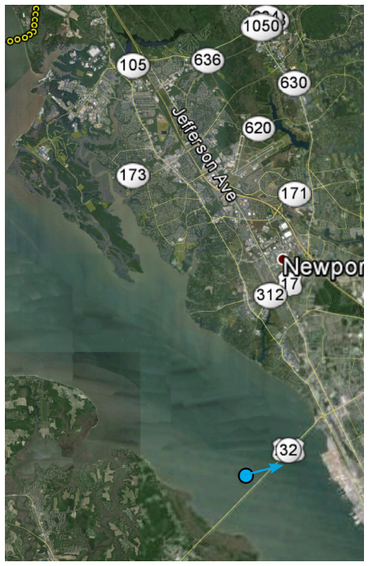


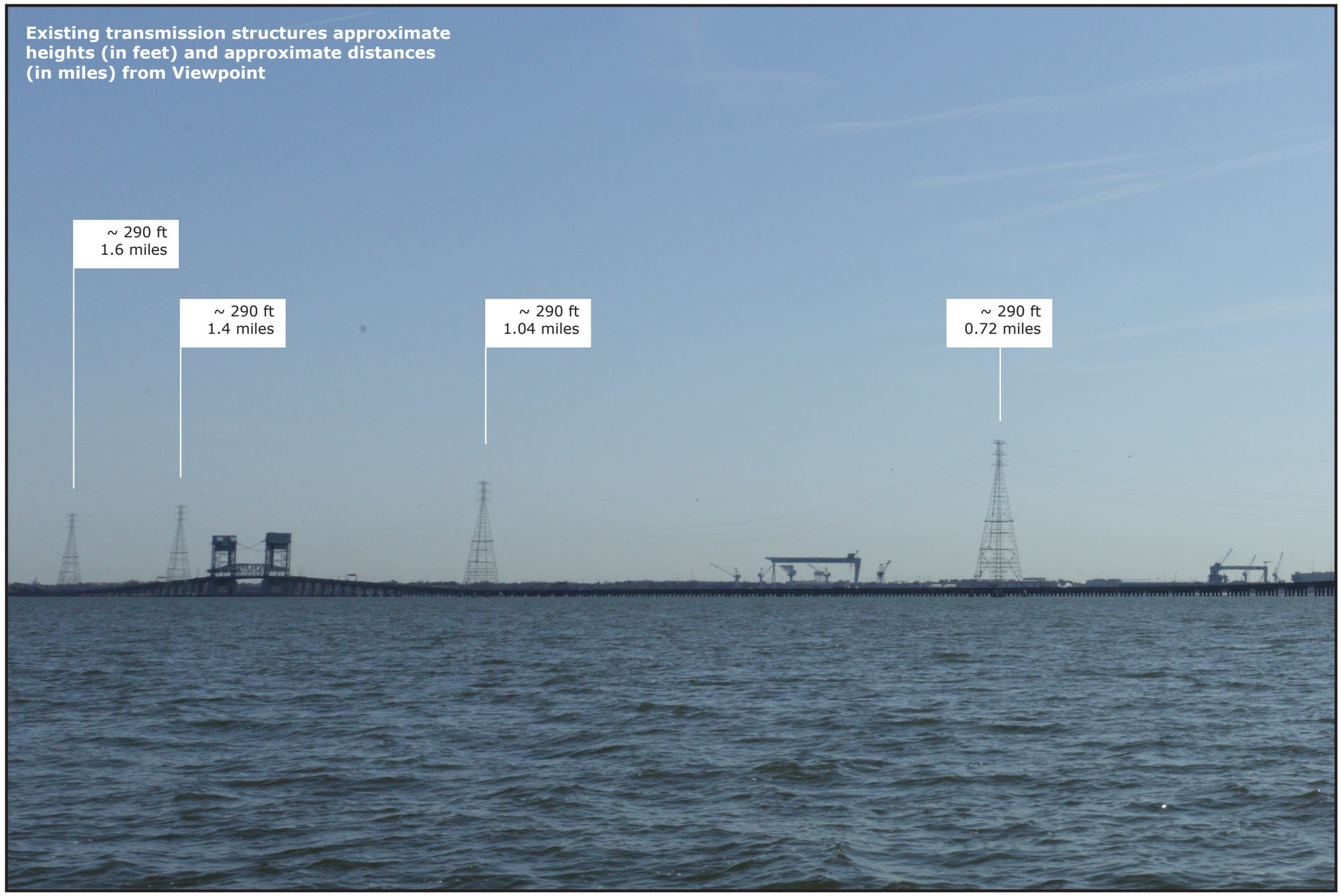
Distance to farthest visible NE structure: Approximately 1.6 miles; Distance to closest visible structure: Approximately 0.5 miles.

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

Shoreline Reference:
Existing JRB transmission line (approx. 1.6 miles to farthest visible NE structure)

Handheld GPS:
Latitude: 36.991253°
Longitude: -76.492990°



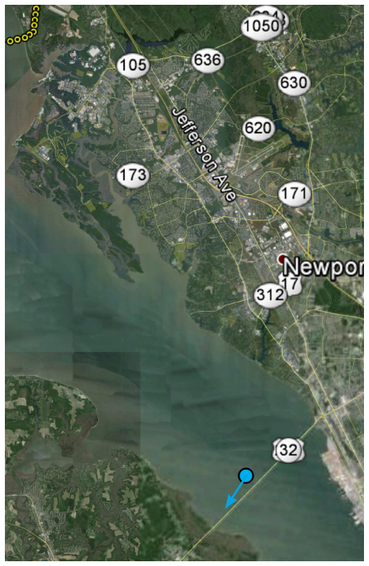


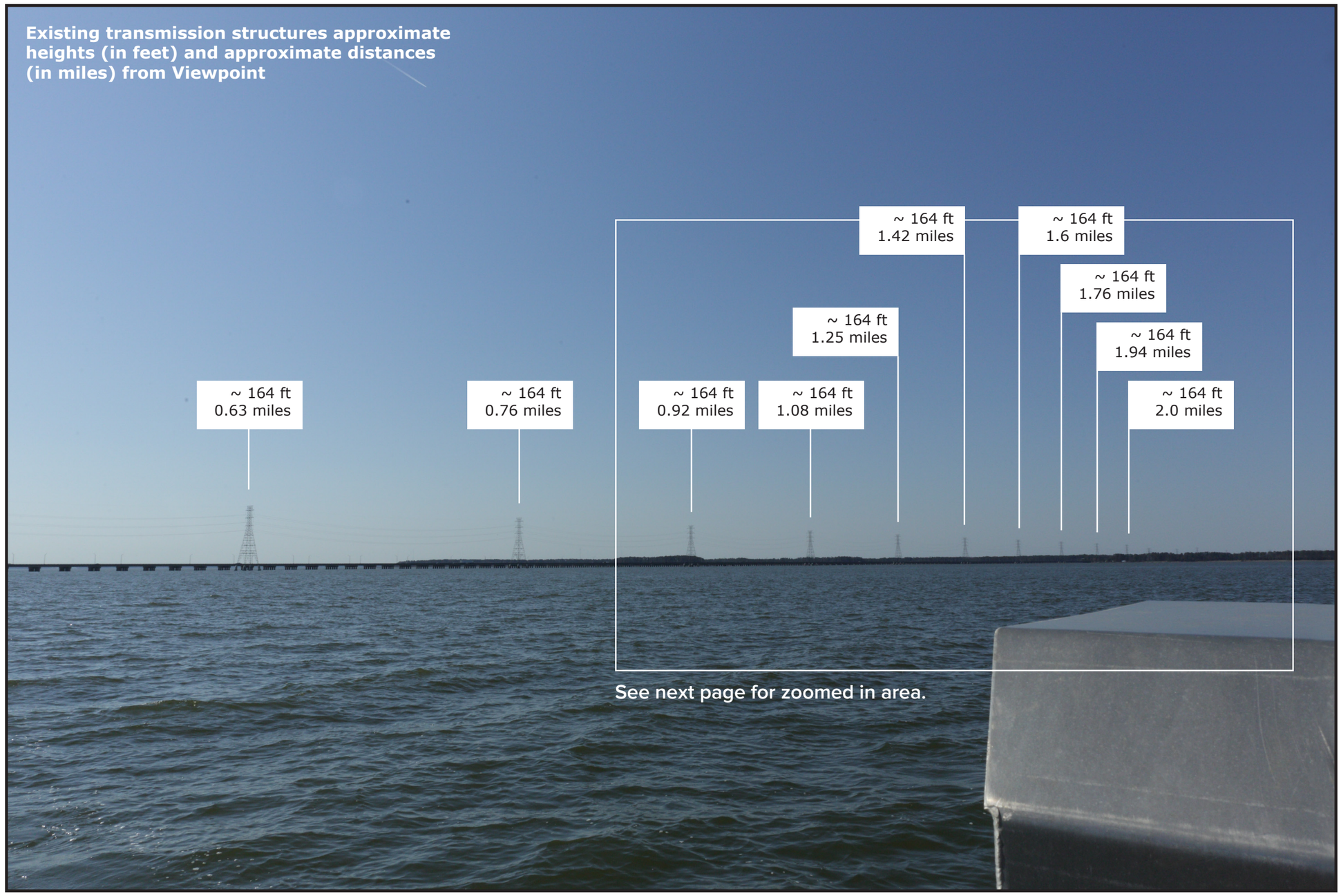
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

Shoreline Reference:
Existing JRB transmission line (approx. 2 miles to farthest SW river structure)

Handheld GPS:
Latitude: 36.991253°
Longitude: -76.492990°



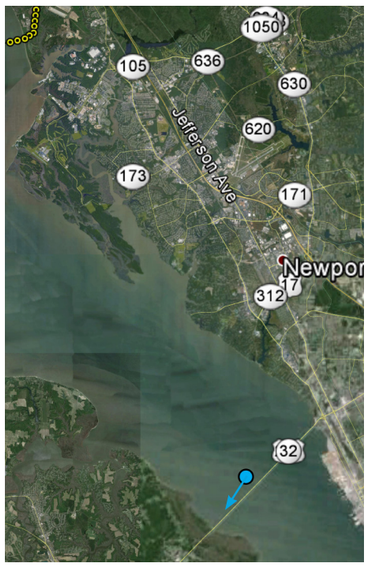


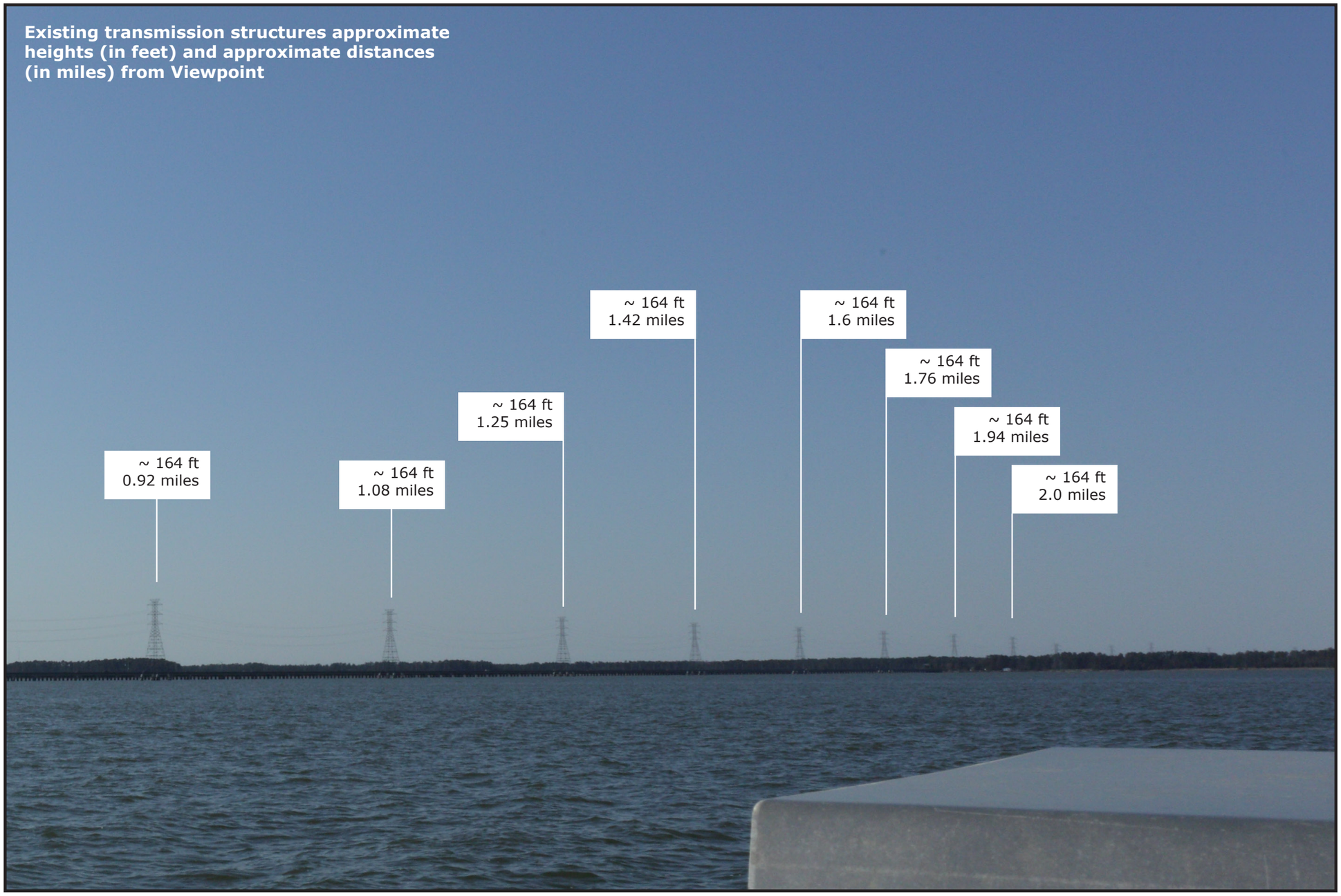
Distance to farthest SW river structure: Approximately 2 miles; Distance to closest visible structure: Approximately 0.63 miles.

Viewpoint 07 - Approx. 15.4 miles SSE of crossing - (Just NW of James River Bridge)

Shoreline Reference:
Existing JRB transmission line (approx. 2 miles to farthest SW river structure)

Handheld GPS:
Latitude: 36.991253°
Longitude: -76.492990°

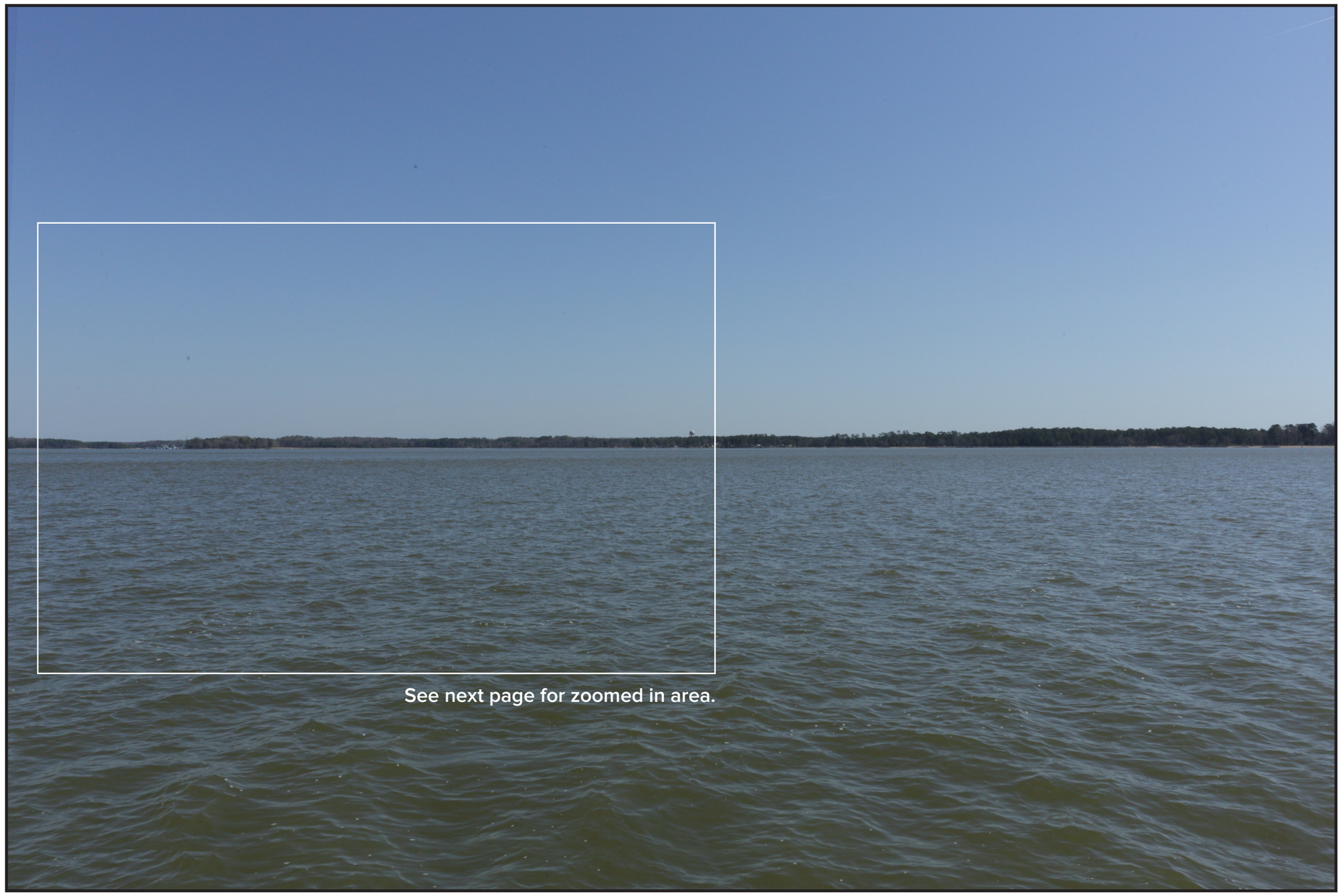




Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

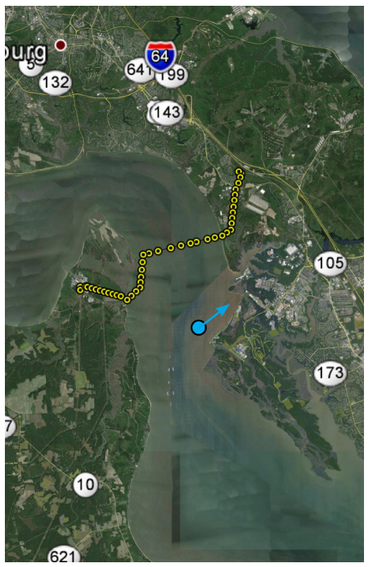
Viewpoint 09 - Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Shoreline Reference:
Goose Island and
Ft. Eustis Water Tower



Handheld GPS:

Latitude:	37.145388°
Longitude:	-76.629590°



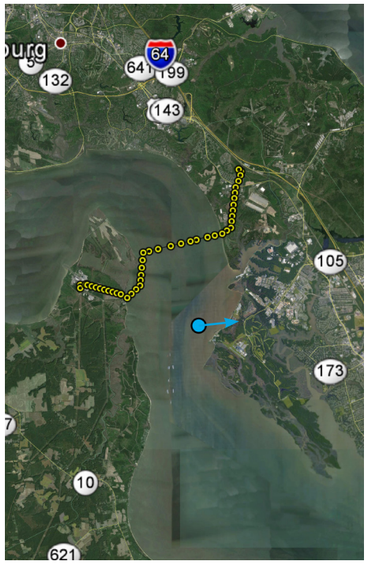
Distance to shore: Approximately 1.2mi; Approximately 2.2mi to Water Tower.

Viewpoint 09 - Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Shoreline Reference:
Goose Island;
Ft. Eustis Water Tower and
Felker US Army Northern
Pier

Handheld GPS:

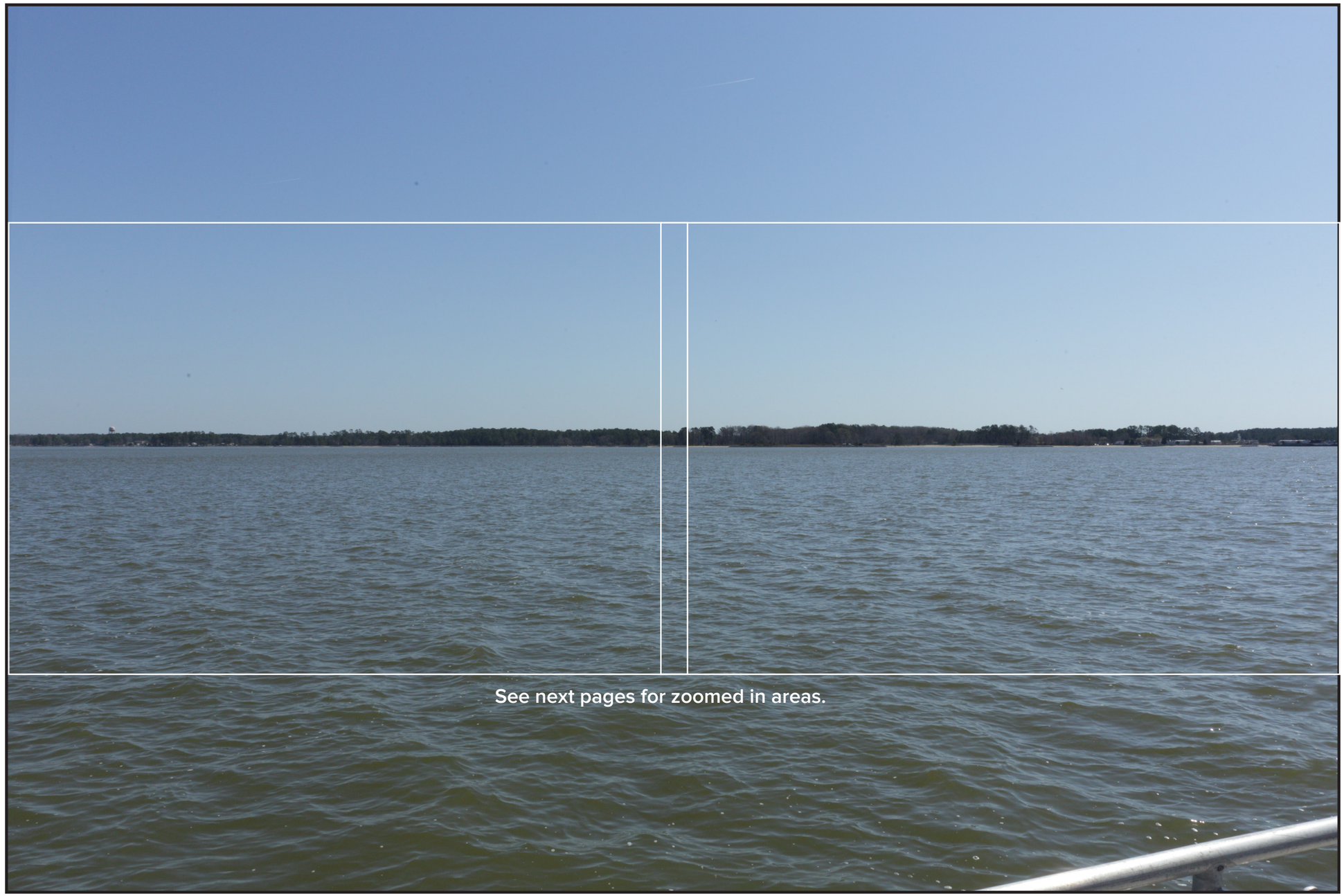
Latitude:	37.145388°
Longitude:	-76.629590°



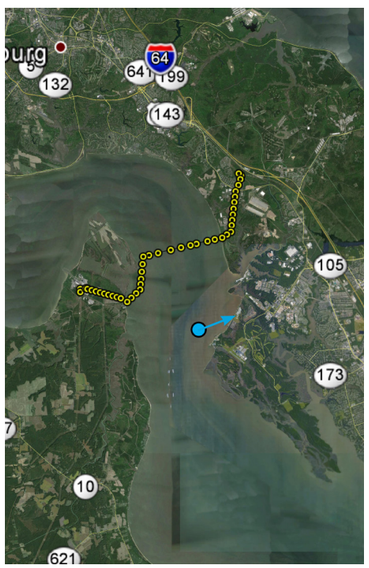
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 09 - Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Shoreline Reference:
Ft. Eustis, Water Tower and Felker US Army Southern Pier



Handheld GPS:
Latitude: 37.145388°
Longitude: -76.629590°



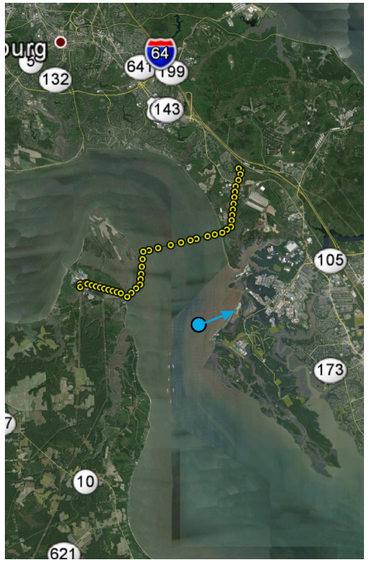
Distance to shore: Approximately 0.8mi

Viewpoint 09 - Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Shoreline Reference:
Ft. Eustis, Water Tower

Handheld GPS:

Latitude:	37.145388°
Longitude:	-76.629590°

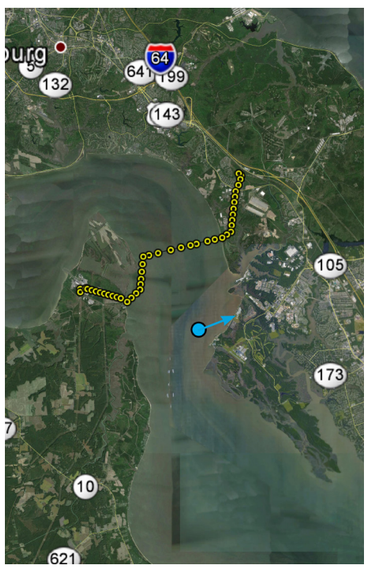


Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 09 - Approx. 2.5 miles S of crossing - (Near Ft. Eustis)

Shoreline Reference:
Ft. Eustis, Felker US Army
Southern Pier

Handheld GPS:
Latitude: 37.145388°
Longitude: -76.629590°

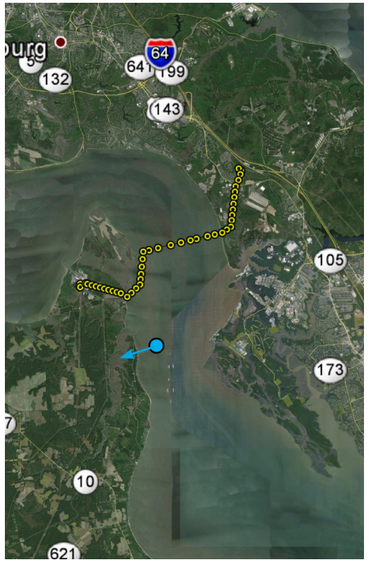


Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 10 - Approx. 3.3 miles S of crossing - (North of Ghost Fleet)

Shoreline Reference:
Surry,
Houses on “Sycamore Drive” (Northern End)

Handheld GPS:
Latitude: 37.135879°
Longitude: -76.653051°

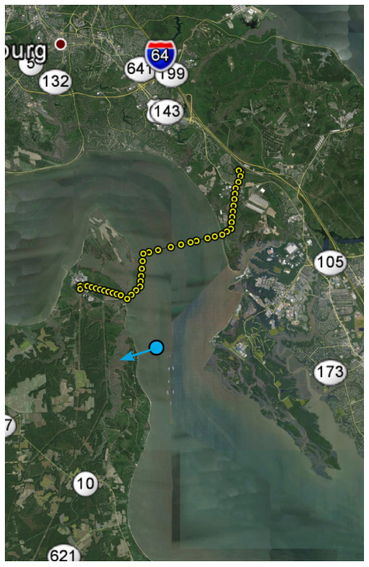


Distance to shore: Approximately 0.5mi

Viewpoint 10 - Approx. 3.3 miles S of crossing - (North of Ghost Fleet)

Shoreline Reference:
Surry,
Houses on “Sycamore Drive” (Northern End)

Handheld GPS:
Latitude: 37.135879°
Longitude: -76.653051°

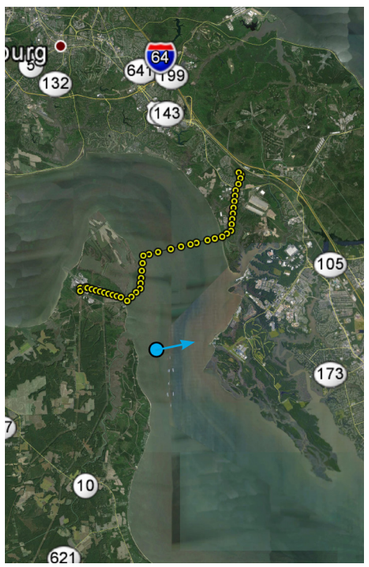


Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

Viewpoint 10 - Approx. 3.3 miles S of crossing - (North of Ghost Fleet)

Shoreline Reference:
Ft. Eustis Water Tower
Felker US Army Southern Pier
Northern End of Ghost Fleet

Handheld GPS:
Latitude: 37.135879°
Longitude: -76.653051°

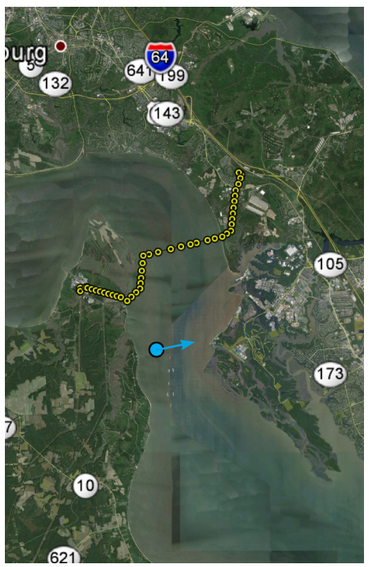


Distance to shore: Approximately 1.7mi

Viewpoint 10 - Approx. 3.3 miles S of crossing - (North of Ghost Fleet)

Shoreline Reference:
Ft. Eustis Water Tower
Felker US Army Southern Pier

Handheld GPS:
Latitude: 37.135879°
Longitude: -76.653051°



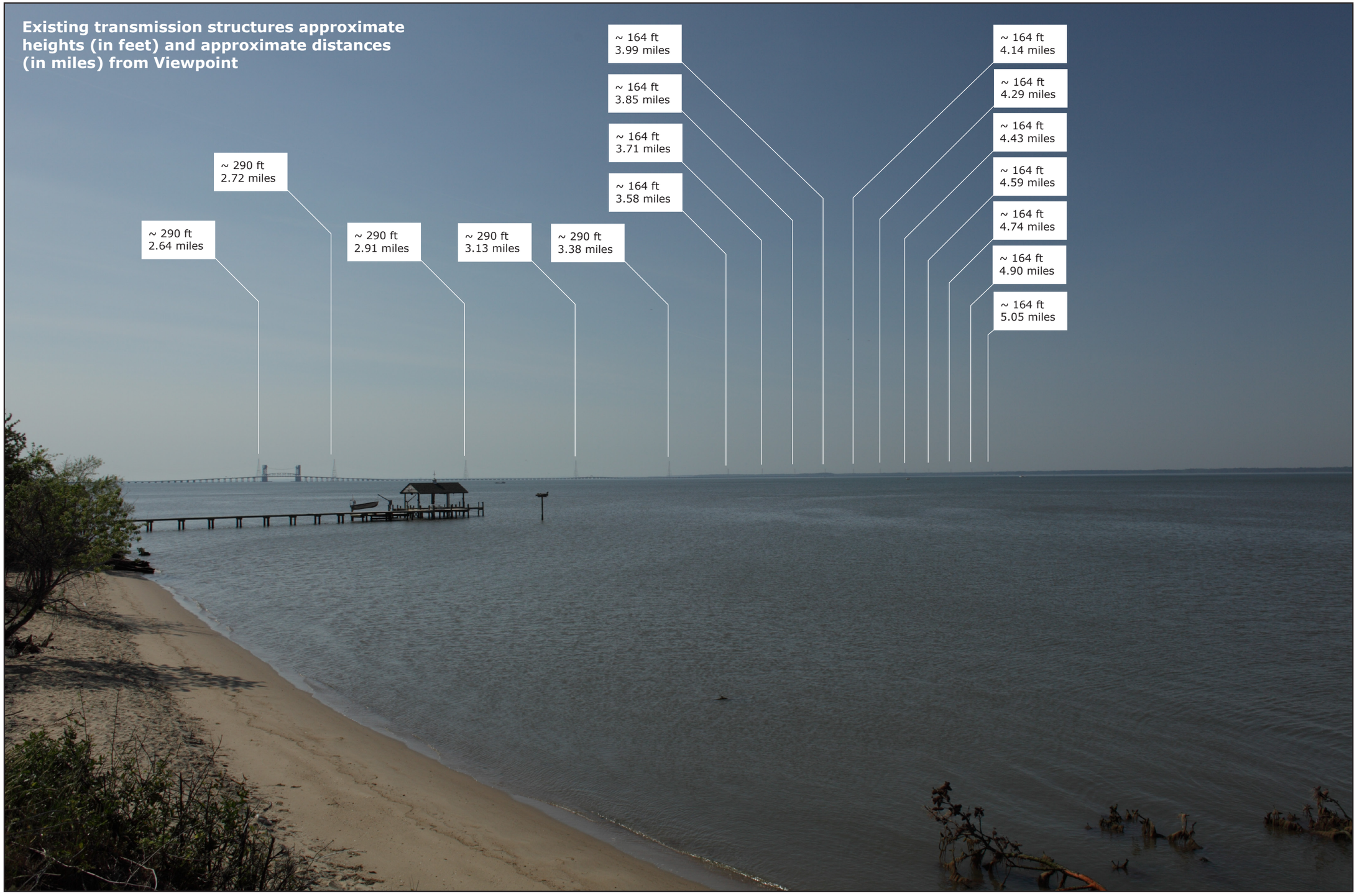
Approximately 200% enlargement area of previous page.
Representative view when printed on a 11 x 17” page and viewed from approximately 20” distance.

James River Bridge - Existing Dominion Transmission Line - Reference Photography

Camera Location:
Museum Drive - Looking South

Label highlights where photography of the existing James River electric transmission structures was captured from.

Individual approximate structure heights are in feet, approximate distances for each structure from that viewpoint are in miles.

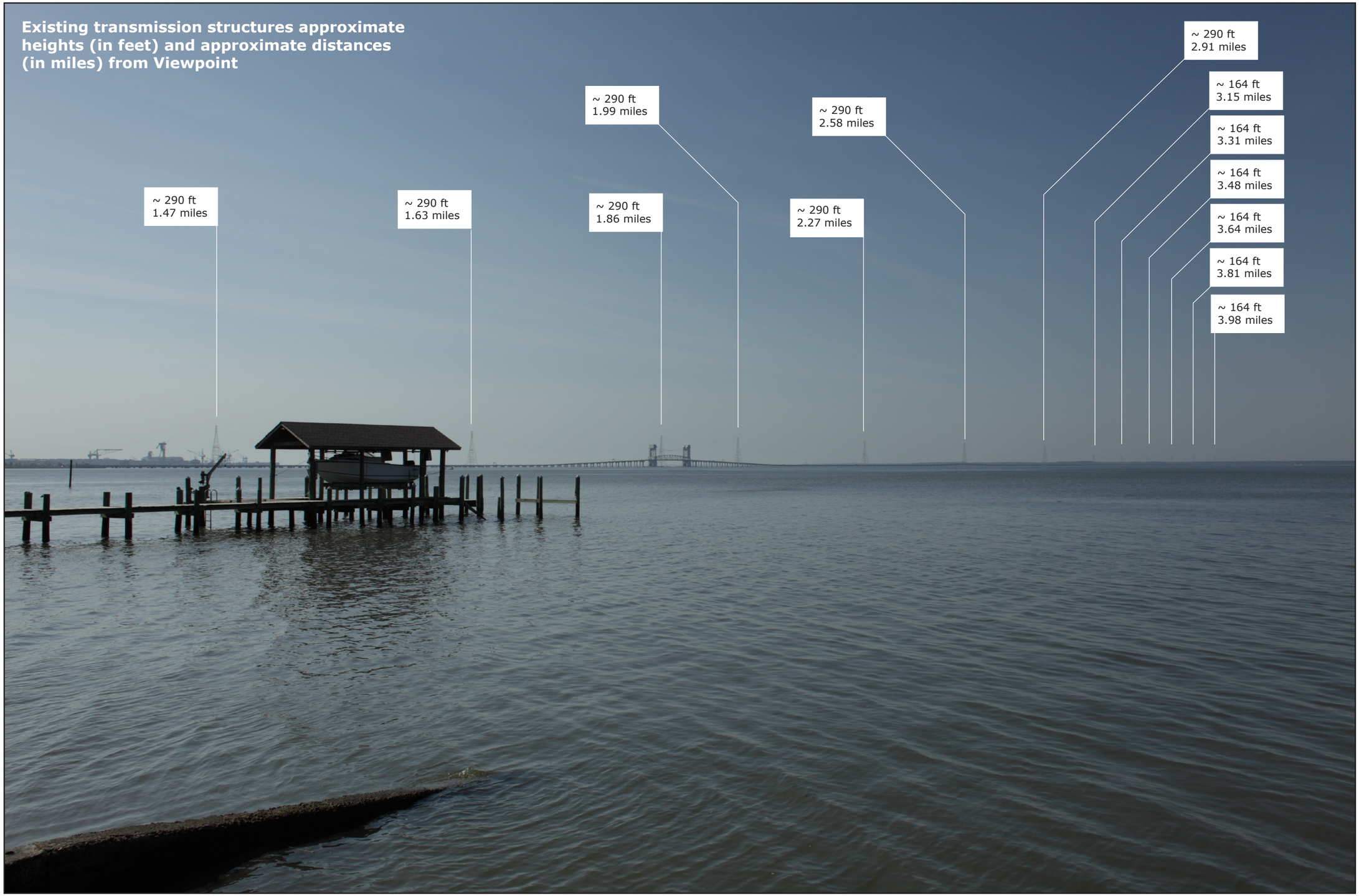


Existing James River electric transmission structures (**Actual photography, not a visual simulation**)
Museum Drive - Looking South

Camera Location:
River Road - Looking South East

Label highlights where photography of the existing James River electric transmission structures was captured from.

Individual approximate structure heights are in feet, approximate distances for each structure from that viewpoint are in miles.



Existing James River electric transmission structures (**Actual photography, not a visual simulation**)
River Road - Looking South East

Existing James River electric transmission structures (**Actual photography, not a visual simulation**)
River Road - Looking South East

Camera Location:
Carrollton Blvd - Looking North East

Label highlights where photography of the existing James River electric transmission structures was captured from.

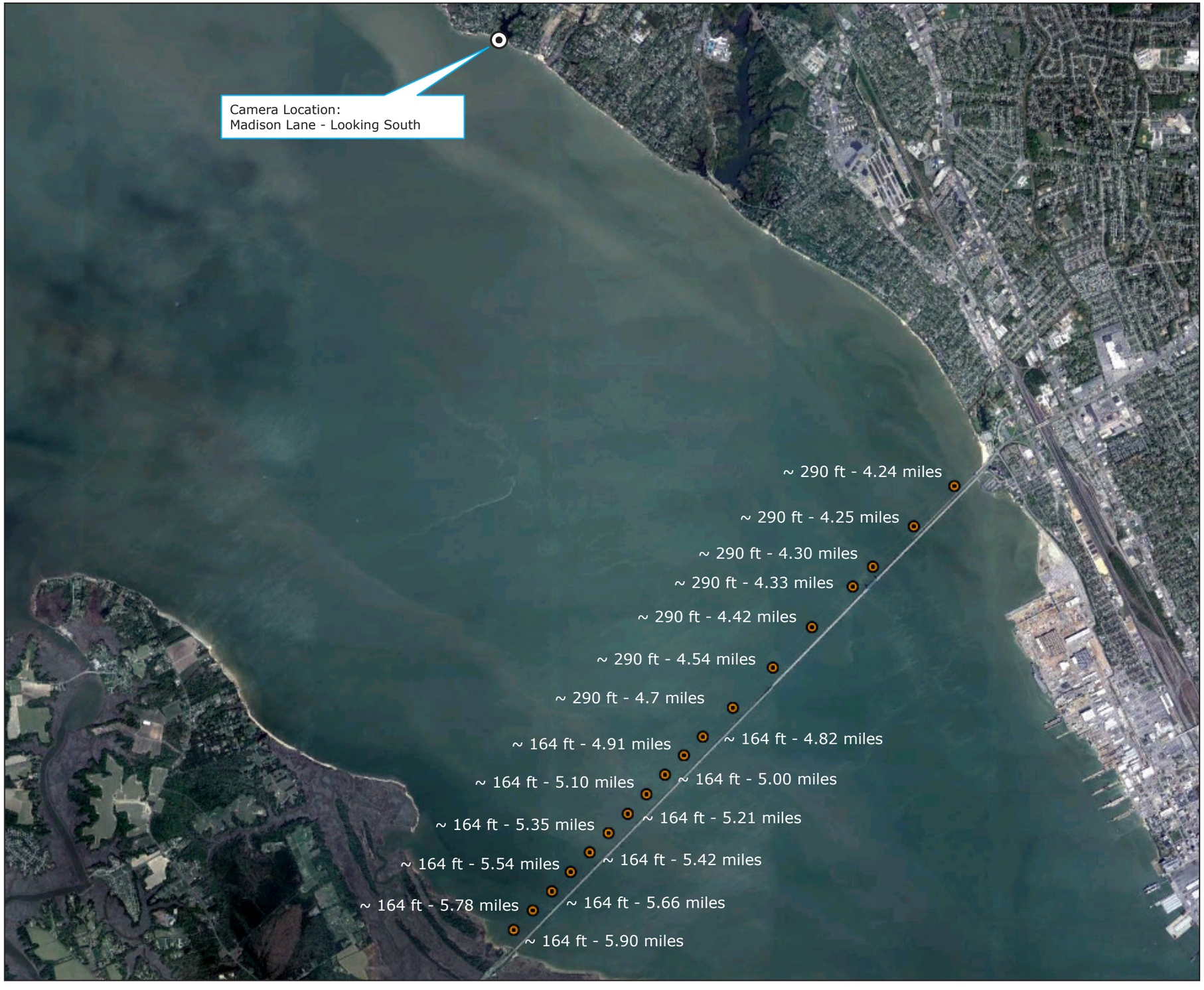
Individual approximate structure heights are in feet, approximate distances for each structure from that viewpoint are in miles.

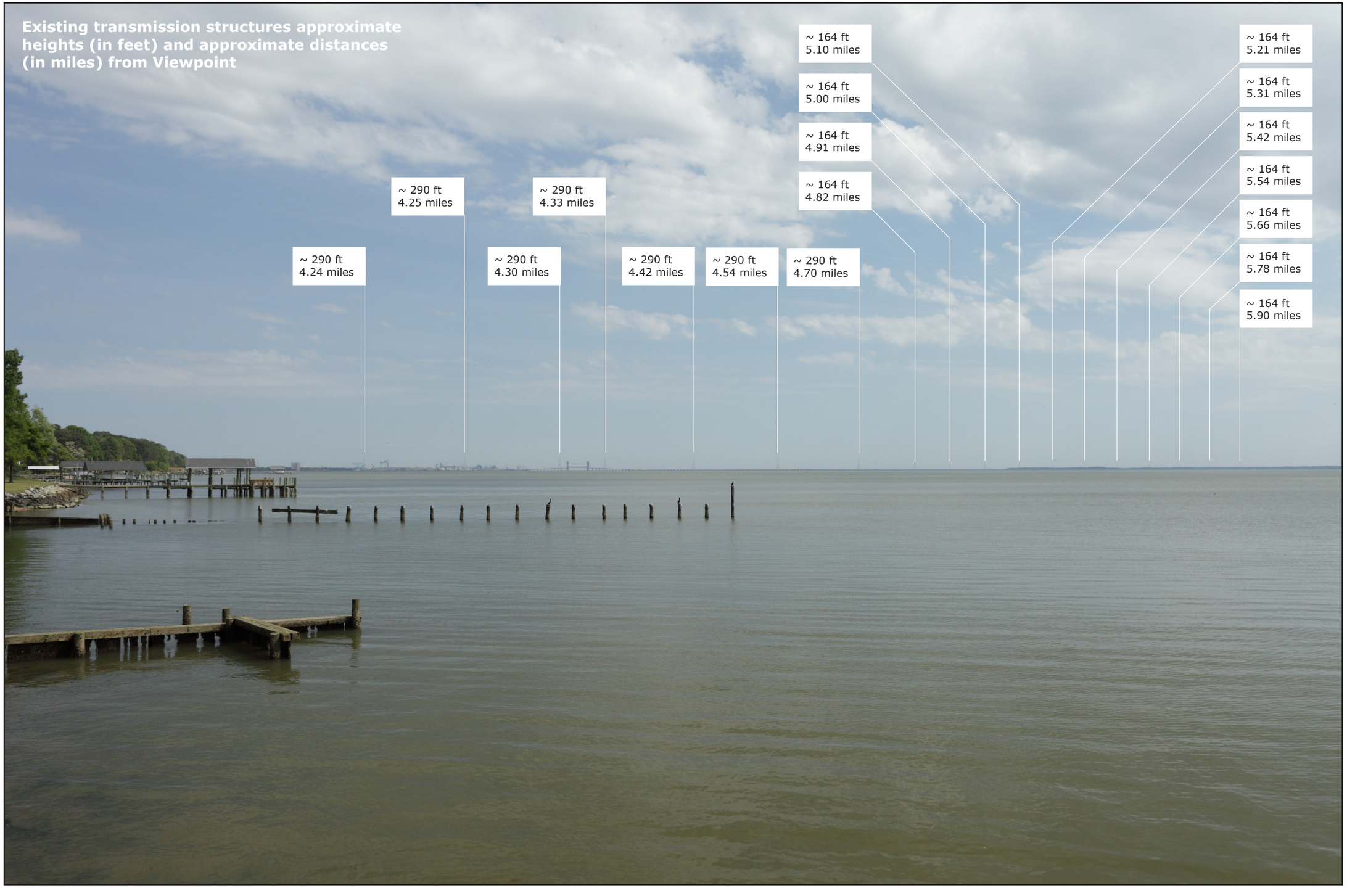
Existing James River electric transmission structures (**Actual photography, not a visual simulation**)
Carrollton Blvd (Southwest end of bridge) - Looking North East

Camera Location:
Madison Lane - Looking South
Latitude: 37.055262°
Longitude: -76.513673°

Label highlights where photography of the existing James River electric transmission structures was captured from.

Individual approximate structure heights are in feet, approximate distances for each structure from that viewpoint are in miles.





Existing James River electric transmission structures (**Actual photography, not a visual simulation**)
Madison Lane - Looking South