

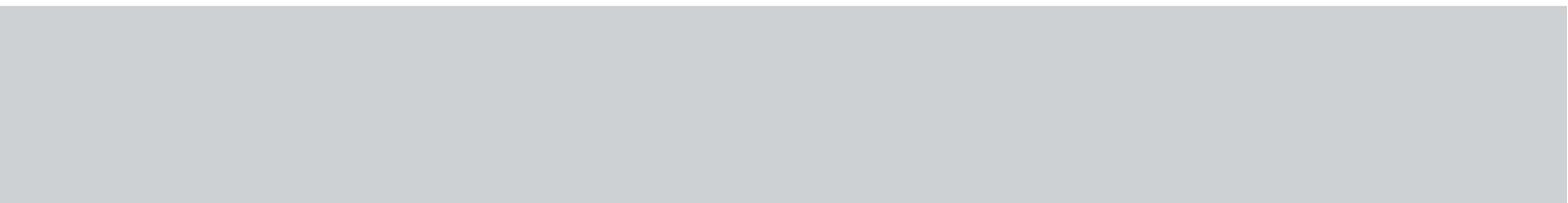


MARYLAND

Military Assets and Considerations for Renewable Energy Development



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The Maryland Compatible Energy Siting project was developed collaboratively with representatives from a variety of stakeholders. The Steering Committee, which included representatives from key stakeholder groups, provided direction, project oversight, and recommendations. The following table identifies those individuals who formally participated in the development of the Maryland Compatible Energy Siting project.

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Matrix Design Group, Inc. was the project consultant team hired to conduct tasks through coordination with and assistance from the Maryland Department of Commerce, the Steering Committee, and other stakeholders.



Glossary

Accidental Potential Zones	An area at military airfields which is beyond the Clear Zone. The standards for the Accident Potential Zones are set out in Department of Defense Instruction (DODI) 4165.57.
Aeronautical Studies	A review or analysis of the effect of the proposed construction or alteration of a structure upon the operation of air navigation facilities and the safe and efficient utilization of the navigable airspace at an airport.
AGL	Above ground level.
Azimuth	Horizontal direction is expressed as the angular distance between the direction of a fixed point (such as the observer's heading) and the direction of the object.
Clear Zone	An area of land which is just beyond the runway and poses the highest accidental potential. The standards for Clear Zones are set out in DODI 4165.57.
Comprehensive Plan	A document designed to guide a planning process, addressing the broad spectrum of issues and resources for a jurisdiction, installation, or other large planning areas.
Conceptual Site Plan	A forecast of development potential for a property.
CPCN Application	A Certificate of Public Convenience and Necessity (CPCN) under Public Utilities Article, §§7-207 and 7-208, Annotated Code of Maryland, for the construction of an electric generating station including its associated transmission line, if applicable, a qualified generator lead line, or a transmission line.
Curtailement Agreements	Agreements whereby the project operators agree to temporarily suspend (or "curtail") spinning turbines and electric generation during certain military testing, training, and operations events.
Due Diligence	Reasonable steps were taken by a person to satisfy a legal requirement.
EJScreen	An environmental justice mapping and screening tool that provides the U.S. Environmental Protection Agency with a nationally consistent dataset and approach for combining environmental and demographic indicators.
Fixed-Wing Aircraft	An aircraft capable of flight using wings that generate lift caused by the vehicle's forward airspeed and the shape of the wings.
Flight Corridors	A designated region of airspace that an aircraft must remain in during its transit through a given region.
Flight Level (FL)	The altitude at the standard air pressure, expressed in hundreds of feet; FL200 = 20,000 feet above mean sea level.
Glint	A momentary flash of light from a surface.
Glare	A more continuous source of excessive brightness relative to the ambient lighting.
Hub Height	The distance from the ground to the middle of the turbine's rotor.
Imaginary Surfaces	Multiple three-dimensional surfaces that build upon one another and are designed to eliminate vertical obstructions to air navigation and operations.
Installation Coordination Areas	The land surrounding military installations and facilities in which certain types of development and activities have the potential to adversely affect military testing, training, and other operations, such that coordination is recommended.
Instrument Flight Rules	Rules governing the procedures for conducting instrument flight. Generally, IFR applies when meteorological conditions with a ceiling below 1,000 feet and visibility less than 3 miles prevail.
Instrument Route	Aircraft operations conducted in accordance with Instrument Flight Rules at a maximum ceiling (altitude) of 1,000 feet Above Ground Level (AGL), and/or with visibility less than 3 miles.
Interconnection Agreement	A legal contract between the electric utility and customer establishing all terms and conditions associated with operating distributed generation in parallel with the utility's electric power system.
Line-of-Sight	A characteristic of radars, meaning electromagnetic waves traveling in a direct path from the source to the receiver.
Low-Level Flight	Flight training conducted at altitudes below 10,000 feet above mean sea level, and sometimes even below 200 feet AGL.
Meteorological Tower/Meteorological Buoys	On land, a tower which is erected primarily to measure wind speed and directions plus other data relevant to siting a Wind Energy Conversion System. Buoys conduct similar testing over open water.
Military Aviation and Installation Assurance Clearinghouse	The Department of Defense entity that reviews the compatibility of proposed wind, solar, transmission, and other projects with military activities.
Military Operational Areas	Areas significant to sustaining the military mission and represent the only approved areas to conduct these operations.
Military Training Routes	A designated corridor of airspace with defined vertical and lateral dimensions used for military flight training.

Mitigation Response Team	A team comprised of representatives from affected DoD components that evaluates mitigation options for projects that were deemed to have an impact on military operations. The intent is to negotiate implementation with industry and other stakeholders.
MSL	Mean sea level. Typically, in reference to aircraft altitude.
Navigational/Communications Facilities	Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight.
Ocular Analysis	An FAA analysis on potential glint/glare impacts from solar energy system projects.
Offshore Military Operational Areas	Military operations taking place over water.
Operating Floor	The lowest altitude allowable for aircraft operations within an established flight corridor.
Outer Continental Shelf (OCS)	Includes the area between state jurisdiction to 200 nautical miles (nm) from shore. State jurisdiction over the seafloor extends from the shoreline out to 3 nm.
Prohibited Area	Airspace of defined dimensions identified by an area on the surface of the earth within which the flight of aircraft is prohibited. Such areas are established for security or other reasons associated with the national welfare.
Public Service Commission (PSC)	Regulator of public utilities and certain passenger transportation companies conducting business in the state of Maryland.
PSC Evidentiary Hearings	A procedure in which witnesses are called and each party and the presiding officer can cross-examine the witnesses, i.e., closed hearing.
PSC Final Order	The decision precipitating from an evidentiary hearing; does not become a final order until 30 days after the preliminary order is issued to allow for an appeal.
Radar Clutter	Any reflected energy from the environment that can be mistaken for the detection of a true target in the radar system.
Radar Consultation Area	An area extending from radars at elevations at or below 200 meters AGL where significant operational impacts are possible, depending on the height and number of structures, and distance from the radar. Consultation is conducted through NOAA or the DoD to discuss details and perform analysis.
Radar Mitigation Area	An area extending from radars at elevations at or below 200 meters AGL where significant operational impacts are likely and adjustments to the project or other mitigation efforts would be requested by NOAA or the DoD. Coordination is conducted through NOAA or the DoD to mitigate impacts after a detailed analysis has been performed.
Radar Notification Area	An area extending from radars at elevations at or below 200 meters AGL where structures would occasionally be visible in the radar data but where significant impacts are not likely. NOAA and the DoD would like to be notified by developers about a project so that radar users are aware of any radar impacts.
Radar Viewshed	The field of view that is within range of a radar's electromagnetic waves.
Restricted Area	Airspace where aircraft flight is subject to restriction, but not solely prohibited.
Rotary-Wing Aircraft	A heavier-than-air flying machine that uses lift generated by wings, called rotor blades, that revolve around a mast.
Scattering Effect	Radar signal interference due to multiple moving objects, such as wind turbine blades.
Site Assessment Plan	A detailed proposal for the construction of a meteorological tower and/or the installation of meteorological buoys.
Slow Route	Operations conducted at speeds less than 250 knots and altitudes as low as 250 feet AGL.
Special Use Airspace	Airspace where activities need to be confined due to their nature, where limitations are imposed upon aircraft operations that are not included in those activities, or both.
Supersonic Test Track	Airspace designated for the performance of specific flight tests, including those that require supersonic speeds.
Utility-Scale	Electrical facilities in the state of Maryland with generating capacity of more than two megawatts.
Vertical Obstructions	Buildings, trees, structures, and other features that encroach into the navigable airspace or a radar's line-of-sight used by the military.
Visual Flight Rules (VFR)	Aircraft Operations occurring in visual conditions, i.e., nice and clear weather so that a pilot can see where they are flying.
Visual Route (VR)	Aircraft operations conducted in accordance with VFR where visibility must be ≥ 5 statute miles and with flight occurring above 3,000 feet AGL.



Executive Summary

Maryland has installed over 719 megawatts (MW) of power generated by renewable energy resources, representing approximately 3 percent of power distributed throughout the state's power grid. Maryland has an ambitious goal for renewable energy development established in the 2019 Maryland Clean Energy Jobs Act, requiring electricity suppliers to source 50 percent of electricity in the state from renewable sources, generated in the PJM region or surrounding states, by 2030 and 100 percent by 2040.

As renewable energy development opportunities continue to expand, the potential for incompatible development within military operational areas will require enhanced coordination efforts. Within the state, there are 20 military facilities, which provide high value to the economy, contributing more than \$55 billion in Fiscal Year 2016 as most recently reported by the State of Maryland. The state also ranks first in federal obligations for research and development.

Early coordination between military, industry, and community stakeholders has proven to be the most effective approach to ensuring renewable energy development is compatible with military operations, which also minimizes delays in project siting and ultimately reduces the financial bottom line for energy developers. Per state requirements, all utility-scale energy projects (2 MW or higher generating capacity) must go through the Certificate of Public Convenience and Necessity (CPCN) process, which requires an applicant to provide a copy of project information to the Federal Aviation Administration (FAA) and Department of Defense (DoD). However, small-scale renewable energy projects do not have this state requirement, nor is there legislation requiring applications to be provided to local military installation subject matter experts. While the DoD's Military Aviation and Installation Assurance Siting Clearinghouse have and continue to work with developers on siting renewable energy projects, early information sharing and coordination with local military installations continue to be an important element to protect military missions and maintain military readiness.

Sponsored by the Maryland Department of Commerce and funded by a grant from the Department of Defense (DoD) Office of Local Defense Community Cooperation (OLDCC), this project:

- Identified considerations for compatible renewable energy development with military operations,
- Provided recommendations to enhance existing coordination efforts, and
- Developed military and compatibility layers to facilitate information sharing and early coordination as part of the online Smart DG+ tool – an existing statewide screening tool for renewable energy projects.

The analysis and products for the project were developed in consultation with a project Steering Committee, though not all elements were unanimously endorsed by all Committee members.

Supplementary to the military and compatibility layers added to Smart DG+, this report includes information intended to be used as a reference and process guide on enhancing coordination efforts. The report highlights the following:

- Areas where military operations occur within the state,
- How military operations relate to renewable energy development,
- Current coordination efforts,
- Potential mitigation strategies, and
- Best practice recommendations.

Additionally, case studies of Caroline and St. Mary's counties are provided to inform how local and state processes may be refined to promote compatibility between the military and renewable energy industry. The best practice recommendations are provided for consideration to authorities with control over policies and processes where recommendations apply. Feedback was solicited from the Steering Committee, and the comments on these recommendations are included to provide the full spectrum of viewpoints. Model renewable energy ordinances were developed for small-scale wind energy systems and utility-scale and small-scale solar energy systems for jurisdictions to consider adopting, as appropriate.

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Introduction

The ability for the military to train beyond the limits of the installation fenceline is critical to the military's mission and national security. Military operations require vast areas of land, air, and sea space to test and train in real-world situations. However, conducting military operations beyond the installation fenceline leaves the military more susceptible to incompatible development in training locations where protections such as aviation (or airspace) easements on private property do not exist. Conversely, the potential for private development, particularly renewable energy, can be impacted by the presence of military operations.

As renewable energy development opportunities increase, issues of compatibility with military research, testing, training, and operations require greater levels of coordination. Coordination of renewable energy siting in Maryland, which already generally occurs through existing local, state, and/or federal processes described in this report, is necessary to ensure both military missions and renewable energy development continue to thrive

in the state. Maryland's military installations provide high value to the economy, representing \$55.5 billion, or nearly one-fifth, of the total state output according to Department of Commerce data¹. Passed in 2019, Maryland's Clean Energy Jobs Act establishes a requirement to produce 50% of energy from renewable resources by the year 2030 with a path to 100% renewable energy by 2040. The goal established for 2030 includes a carve-out requirement of 14.5% specifically for solar resources and an additional 1,200 megawatts (MW) of offshore wind generation. This requirement will increase the current state output of approximately \$10.2 billion from the renewable energy and sustainability industry². The state law requiring expanded renewable energy deployment; the economic, environmental, and national security benefits of renewable energy; and the importance of military installations to Maryland's economy and national security all point to the need for early and robust engagement between renewable energy developers and military stakeholders.

¹ <https://commerce.maryland.gov/Documents/ResearchDocument/economic-impact-analysis-of-marylands-military-installations-fy-2016.pdf>

² https://cleanpower.org/wp-content/uploads/2021/10/Maryland_clean_energy_factsheet.pdf

The Department of Defense (DoD) also recognizes the value of renewable energy. *DoD Directive 4715.21, Climate Change Adaptation and Resilience*³ recognizes the need to incorporate climate considerations into infrastructure and operations planning to manage risks associated with the impacts of the changing climate. Renewable energy development directly aids in achieving this goal by reducing overall carbon emissions, emphasizing the importance of collaboration and communication through the development processes. The DoD views climate change as a national security risk and the impacts of climate change may affect military facilities or operations in Maryland.

This report presents an overview of Maryland’s military installations and operational areas that are essential to the military missions conducted in Maryland (**Section 1.0**). Additionally, the report identifies areas of renewable energy potential relative to these military operational areas (**Section 2.0**), and where the presence of military operations can impact renewable energy development (**Section 3.0**), underscoring the pivotal need for coordination. Because military operations are prevalent throughout Maryland, the locations of these operational areas do not represent areas of automatic exclusion for siting renewable energy

development, but rather emphasize the need for continued and improved information sharing and coordination efforts.

Section 4.0 summarizes the existing state and federal review processes for renewable energy facilities, including how military compatibility issues are already considered. Illustrative examples of mitigation options that may be relevant to addressing certain DoD concerns, along with links to additional information may be found in **Section 5.0**. Whether a specific mitigation option is relevant or feasible in a particular situation is discussed between the DoD and project proponent. As the report will identify, there are opportunities to enhance current coordination efforts on renewable energy sitings in the state, particularly at the local level, as identified in *Appendix A, Best Practice Recommendations*.

To support compatible renewable energy development, Best Practice Recommendations were developed to enhance coordination for renewable energy siting between the military, state agencies, local governments, and renewable energy developers. Recommendations focus on small-scale and utility-scale renewable energy projects and include options for administrative, regulatory, or legislative changes to the current renewable energy siting process in the state.

3 <https://dod.defense.gov/Portals/1/Documents/pubs/471521p.pdf>





Each recommendation was then reviewed by the project Steering Committee through a series of stakeholder interviews, review and analysis of existing state processes, and discussion at committee meetings. The recommendations comprise 18 different strategies focused on enhancing existing coordination and review processes for military coordination on renewable energy projects, including efforts aimed at implementing the use of the **enhanced Smart DG+ tool**. As described in more detail in Appendix A, not all steering committee members endorse each recommendation in the report.

In addition to this report, a military operations interface was added to the existing Smart DG+ tool run by the state's Department of Natural Resources office. This interface contains geographic data for all military operational areas and relevant points of contact for developers to use for coordination when identifying sites for potential renewable energy projects. The goal of this enhancement is to promote early coordination efforts and compatibility between military operations and energy development. Examples of how the tool may be utilized at the local level are presented in **Appendix B, Case Studies**.

The Case Studies are an assessment of Caroline and St. Mary's County's renewable energy

development and siting process. This assessment is intended to identify methods of integrating the Smart DG+ tool as part of the renewable energy siting process at the local level, to enhance coordination and promote military compatibility. The intended audience of this report and the enhanced Smart DG+ tool includes developers, any state or local government involved in the siting review and permitting process for renewable energy projects, and military partners. The goal of this report is to provide information relevant to assuring compatibility between military operational areas and renewable energy siting by identifying early communication efforts and tools to assure the achievement of this goal in the state of Maryland.

Appendix C, Model Ordinances includes suggested language and explanatory guidance for localities to consider in framing an ordinance for small-scale wind energy projects, as well as utility-scale and small-scale solar energy projects. The ordinances are guidance for developing or enhancing already existing renewable energy regulations and intended to be tailored appropriately for a community's unique needs and conditions. The model ordinances are provided as a resource for localities as part of this project and are not expressly endorsed by any particular project stakeholder.





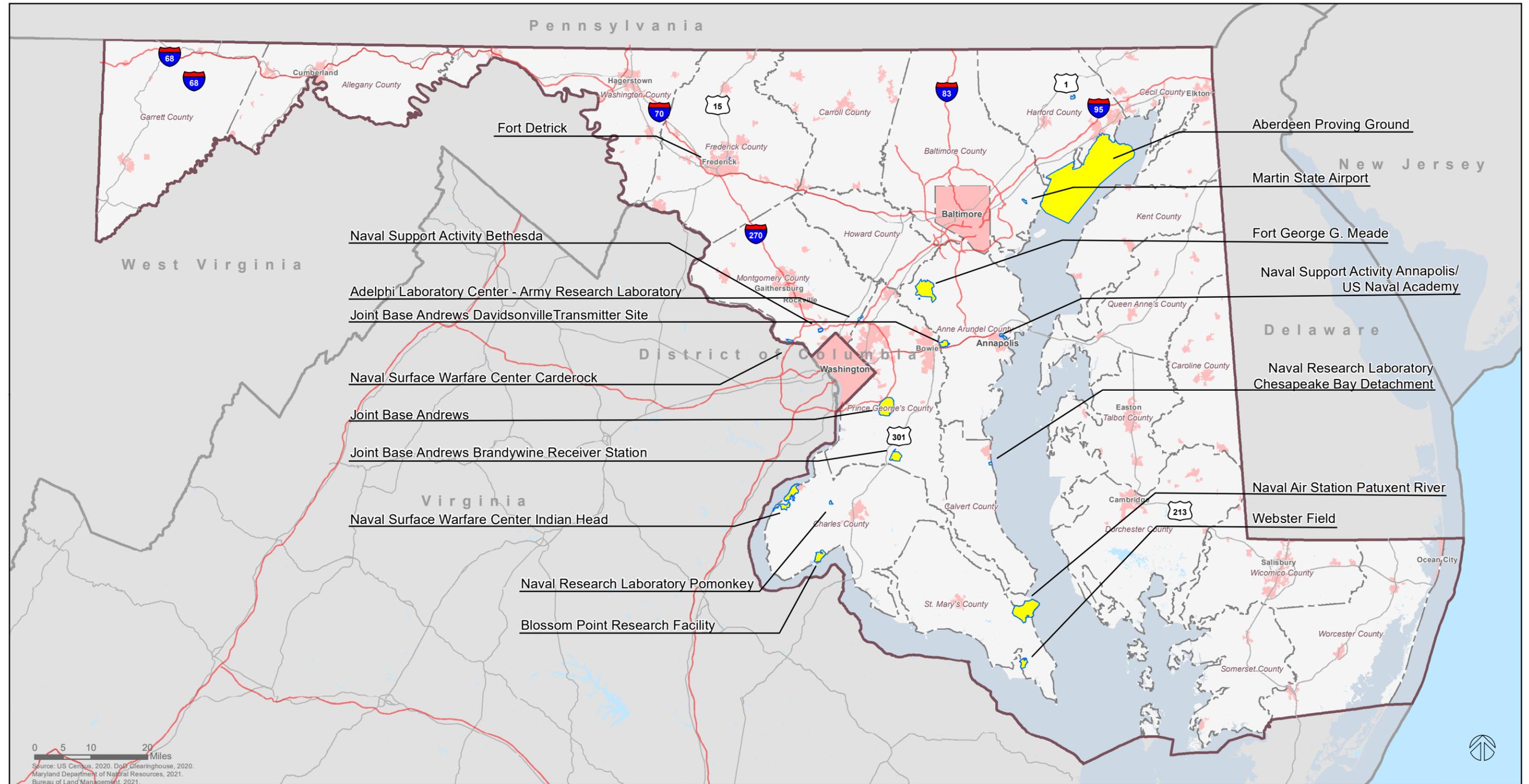
1.0 Military Operational Areas in Maryland

Each military installation, depicted in **Figure 1**, conducts training, testing, and other related activities within specified geographic areas, on and off the installation, to meet the operational requirements necessary to accomplish its mission in support of national security objectives. The general term for these areas is military operational areas and includes the land within installation boundaries, as well as the airspace above and beyond the installation, such as Military Training Routes (MTRs), Special Use Airspace (SUA), and radar viewsheds. These areas are significant to sustaining the military mission and represent the only approved areas to conduct these operations.

There are various levels of concern for the siting of renewable energy within and near military operational areas. If not properly sited, the construction and operation of renewable energy facilities have the potential to impact military missions. These military operational areas do not represent areas of automatic exclusion for siting renewable energy development, but rather emphasize the need for continued and improved information sharing and coordination efforts, which are identified in **Section 4.0** of this report. As described in **Section 5.0**, prior experience indicates that DoD concerns can often be addressed in mitigation discussions with project developers. To the extent the concerns cannot be addressed, developers typically cancel the proposed projects. An example of a project cancellation due to military objection may be found in **Appendix B, Case Studies**.

The military operational areas in Maryland discussed in this report include:

- Military Training Routes
- Special Use Airspace
- Low-Level Flight Areas
- Offshore Military Operational Areas
- Testing Areas
- Imaginary Surfaces
- Radar Viewsheds
- Installation Coordination Areas



0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021.



- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Military Installations
Figure 1

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1.1 Military Training Routes

An MTR is a designated corridor of airspace with defined vertical and lateral dimensions used for military flight training. MTRs can be characterized as a complex network of interrelated and interdependent highways in the sky to conduct low-altitude navigation and tactical training. As such, these highways have associated rules for conducting operations.

- **Instrument Flight Rules (IFR)** refer to flying, using instruments on an aircraft where navigation is accomplished by electronic signals, regardless of the weather.
- **Visual Flight Rules (VFR)** mean the aircraft is intended to operate in visual conditions, i.e., nice, and clear weather so that a pilot can see where they are flying. Clouds, heavy precipitation, low visibility, and otherwise adverse weather conditions are not conducive to flying under VFR.

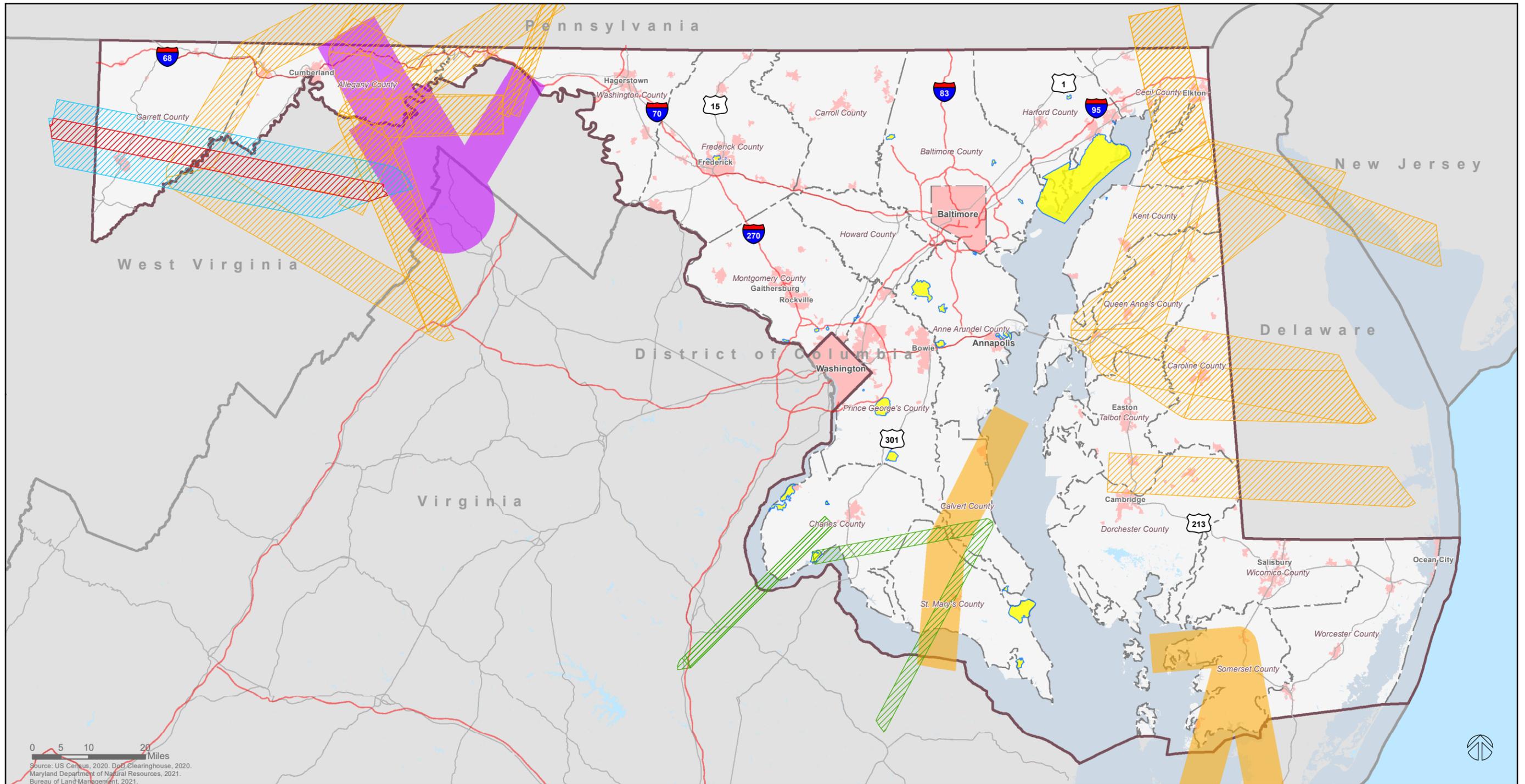
MTRs are comprised of segments that can have different minimum and maximum flight altitudes. MTRs also are characterized by type, described as follows:

- **Instrument Route (IR):** Aircraft operations conducted in accordance with Instrument Flight Rules at a maximum ceiling (altitude) of 1,000 feet Above Ground Level (AGL), and/or with visibility less than 3 miles.
- **Visual Route (VR):** Aircraft operations conducted in accordance with VFR where visibility must be ≥ 5 statute miles and with flight occurring above 3,000 feet AGL.
- **Slow Route (SR):** Operations conducted at speeds less than 250 knots and altitudes as low as 250 feet AGL.

The MTRs that traverse Maryland are identified in **Table 1** and **Figure 2**. The MTRs are organized by the minimum flight altitude (or how low an aircraft can fly) AGL, with “Surface” being at the ground. The MTRs are classified by their type, i.e., IR, VR, and SR and controlling authority. It should be noted that some MTRs controlled by military installations in Maryland extend outside of the state and some MTRs within Maryland are controlled by military installations outside the state. MTRs may be used by any branch of the U.S. Armed Forces, provided they coordinate flight operations with the controller of that MTR.

Table 1. Military Training Routes in Maryland

MTR	Minimum Altitude (ft)	Controlling Installation or Agency
VR1756	Surface	Naval Air Station (NAS) Oceana
VR708	100 AGL	Maryland Air National Guard
SR820	300 AGL	Delaware Air National Guard
SR821	300 AGL	Delaware Air National Guard
SR805	Variable by segment – 300 to 500 AGL	Delaware Air National Guard
SR835	Variable by segment – 300 to 500 AGL	Delaware Air National Guard
VR1709	500 AGL	North American Aerospace Defense Command
VR1711	500 AGL	Joint Base Andrews
VR1712	500 AGL	Joint Base Andrews
VR1713	500 AGL	Joint Base Andrews
VR1757	500 AGL	NAS Oceana
SR800	500 AGL	Delaware Air National Guard
SR801	500 AGL	Delaware Air National Guard
SR803	500 AGL	West Virginia Air National Guard
SR804	500 AGL	West Virginia Air National Guard
SR806	500 AGL	West Virginia Air National Guard
SR807	500 AGL	West Virginia Air National Guard
SR808	500 AGL	West Virginia Air National Guard
SR845	500 AGL	Delaware Air National Guard
IR762	6,000 above mean sea level (MSL)	NAS Oceana



0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021.



Military Training Route

Maryland Operated

- Min. altitude of 100 ft. AGL
- Min. altitude of 500 ft. AGL

Out-of-State Operated

- Min. altitude of Surface
- Min. altitude of 300 ft. AGL
- Min. altitude of 500 ft. AGL
- Min. altitude of 6,000 ft. MSL

- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Military Training Routes
Figure 2

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1.2 Special Use Airspace

Special Use Airspace (SUA) is where activities need to be confined due to their nature, where limitations are imposed upon aircraft operations that are not included in those activities, or both. The SUA designation serves to alert nonparticipating aircraft (civilian or military) to the possible presence of these activities. Entering SUA without authorization from the controlling agency can be extremely hazardous to aircraft. There are two types of SUAs within Maryland – Prohibited Areas and Restricted Areas, which are identified in **Figure 3**.

Prohibited Area

A Prohibited Area is airspace in which aircraft are not allowed, typically due to security reasons. There are two Prohibited Areas in Maryland – P40 Thurmont, MD (over Camp David in Frederick County) and P73 Mount Vernon, VA, which extends over the Potomac River in Prince George’s County and Charles County, MD.

Restricted Area

A Restricted Area is airspace where aircraft flight, while not solely prohibited, is subject to restriction. Within a Restricted Area, activities must be confined, limitations must be set on all aircraft that are not participating in such activities, or both. A Restricted Area denotes the existence of unusual hazards to aircraft, either on the ground or in the air, such as live fire or weapons discharge, or flight operations. Each Restricted Area within Maryland and the owner or controlling agency is identified in **Table 2**, organized by minimum altitude shown as AGL, above mean sea level (MSL), or flight level (FL), with “Surface” being on the ground, MSL referring to altitude relative to the average sea level regardless of the elevation of the ground, and FL referring to the altitude at the standard air pressure, expressed in hundreds of feet.

Table 2. Special Use Airspace in Maryland

SUA	Minimum Altitude	Controlling Installation or Agency
R4001A(A)	Surface	Aberdeen Proving Ground
R4007	Surface	Naval Air Station Patuxent River
R4001B	Surface	Aberdeen Proving Ground
R4001C	Surface	Aberdeen Proving Ground
R4002	Surface	Naval Air Station Patuxent River
R4005 (A)	Surface	Naval Air Station Patuxent River
R4005 (B)	Surface	Naval Air Station Patuxent River
R4005 (C)	Surface	Naval Air Station Patuxent River
R4005 (D)	Surface	Naval Air Station Patuxent River
R6611A	Surface	Naval Support Facility Dahlgren
R6612	Surface	Naval Support Facility Dahlgren
R6613A	Surface	Naval Support Facility Dahlgren
R6604D	100 ft AGL	Wallops Flight Facility
R4008	Flight Level (FL) 250	Naval Air Station Patuxent River
R6611B	FL 400	Naval Support Facility Dahlgren
R6613B	FL 400	Naval Support Facility Dahlgren
R4006	3,500 ft MSL	Naval Air Station Patuxent River
R4009	5,000 ft MSL	Federal Aviation Administration, Washington, DC, Air Route Traffic Control Center
R4001A(B)	10,001 ft MSL	Aberdeen Proving Ground

1.3 Low-Level Flight Areas

Some military flight training is conducted at altitudes below 10,000 feet MSL, and sometimes even below 200 feet AGL. Due to the low altitudes and speeds of the aircraft, these training missions are conducted within designed low-level flight areas to avoid collisions with civilian aircraft. However, the development of tall structures can interfere with and create hazards for aircraft conducting low-level flight training. There are two low-level flight areas in Maryland associated with low-level helicopter flight – NAS Patuxent River Helicopter Operating Area and Joint Base Andrews Helicopter Flight Area – which are depicted in **Figure 4**. It should be noted that the NAS Patuxent River Helicopter Operating Area extends into the Northern Neck of Virginia and Joint Base Andrews Helicopter Flight Area extends into Virginia and West Virginia.

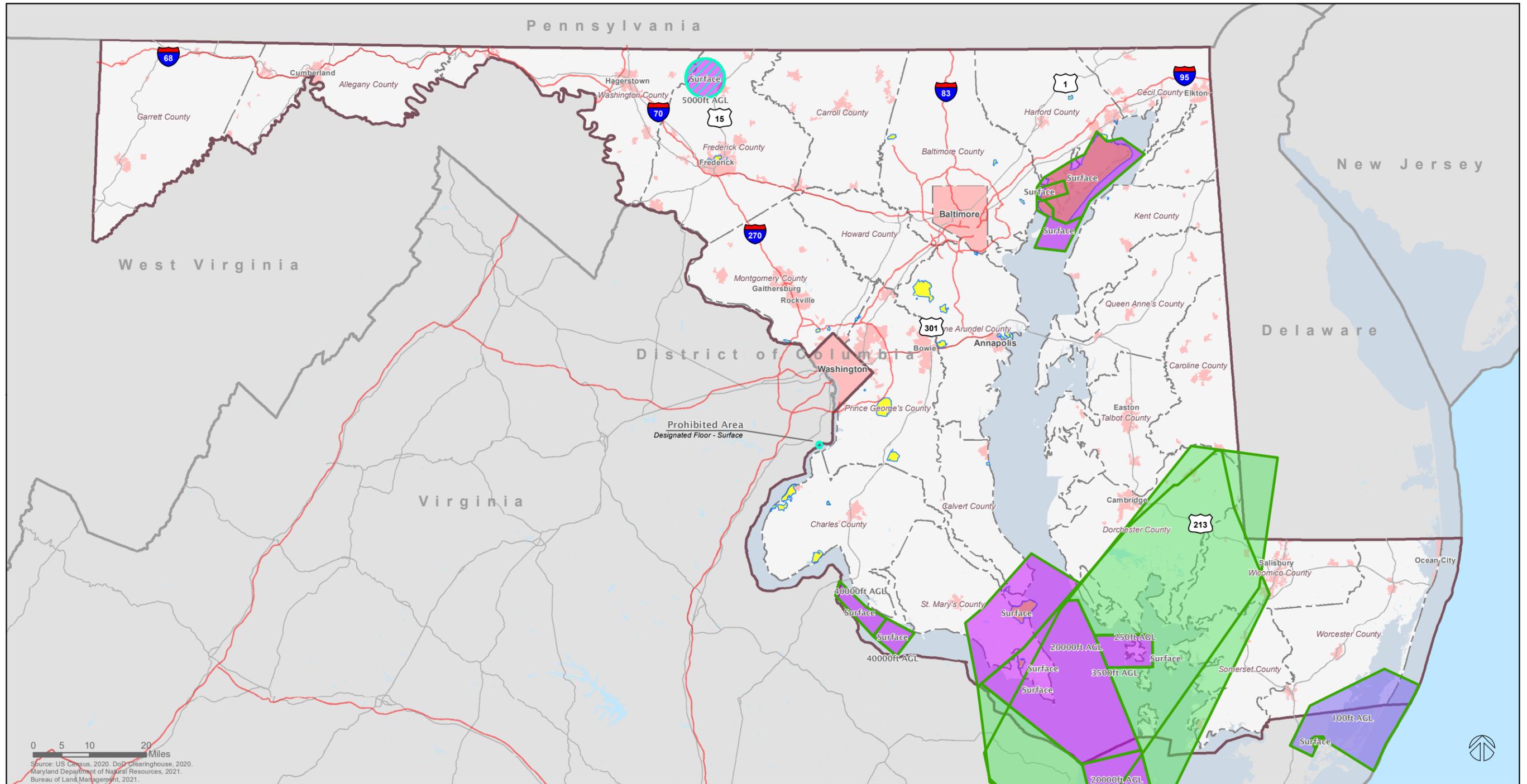
NAS Patuxent River Low-Level Helicopter Operations

There are three separate low-level flight areas associated with training at NAS Patuxent River, two of which are in Maryland – East Helicopter Operating Area and West Helicopter Operating Area. Both low-level flight areas cover a broad area of land across Calvert County, Dorchester County, St. Mary’s County, and Wicomico County in which NAS Patuxent River conducts low-level flight training operations with rotary-wing and some fixed-wing aircraft.

Joint Base Andrews Low-Level Helicopter Operations

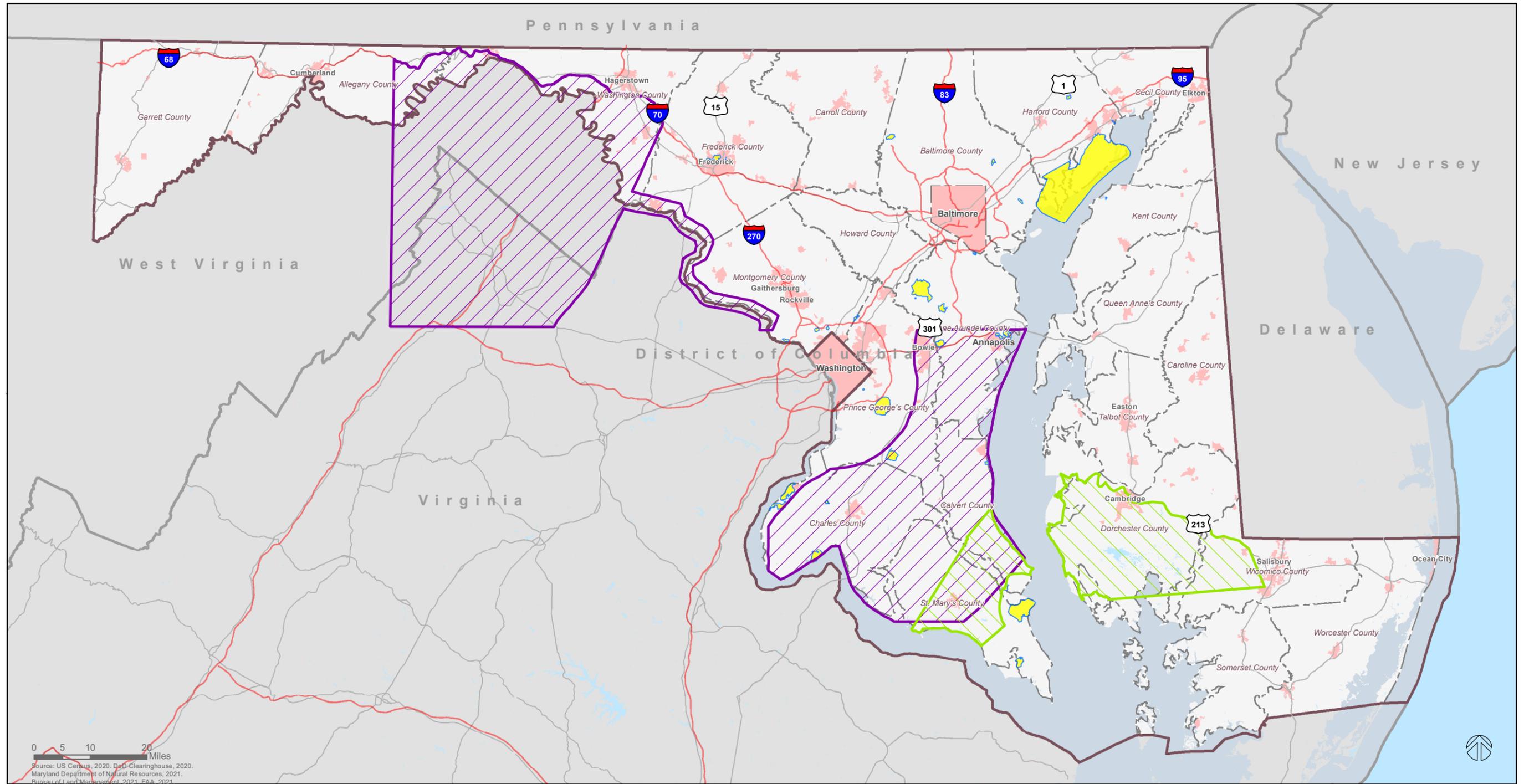
Joint Base Andrews conducts low-level helicopter training operations across areas in southern Maryland and northern Maryland including along the Potomac River.





- Restricted Area
- Prohibited Area
- Designated Floor*
- Minimum altitude at surface
- Minimum altitude of 100' AGL
- Minimum altitude of 3,500' AGL
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Special Use Airspace
Figure 3



0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021. FAA, 2021.

- Joint Base Andrews Helicopter Operations
- NAS Patuxent River Helicopter Operations
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route



Low-Level Flight Areas
 Figure 4



1.4 Offshore Military Operational Areas

The DoD manages offshore areas to conduct research, development, testing, and evaluation operations over vast areas of air and sea space. The vast area of the Atlantic Ocean provides uninhibited space to conduct military operations. There are two offshore military operational areas off the Maryland coast – the Supersonic Test Track and the Atlantic Warning Area, both depicted in **Figure 5**. Although most of these offshore military operational areas lie within federally controlled waters, which begins three miles off the coast, and are subject to federal regulations and permitting processes under the authority of the Bureau of Ocean Energy Management (BOEM), a small portion of these offshore military operational areas extends approximately one mile into Maryland territorial waters. For proposed offshore renewable energy projects submitted through the BOEM siting process, further described in **Section 4.3**, the DoD participates both in establishing lease areas for renewable energy, as well as project development reviews.

Supersonic Test Track

The Supersonic Test Track is used by various DoD installations to test and evaluate aircraft that travel at the speed of sound, or “supersonic.” This military operational area is located offshore over the Atlantic Ocean to avoid populated areas.

Atlantic Warning Area

The Atlantic Warning Area covers over 35,000 square miles across the Atlantic Ocean, including both the air and sea space. This vast area supports a wide variety of DoD training requirements, as well as other research, development, testing, and evaluation, including munitions deployment and flight-testing.

1.5 Testing Areas

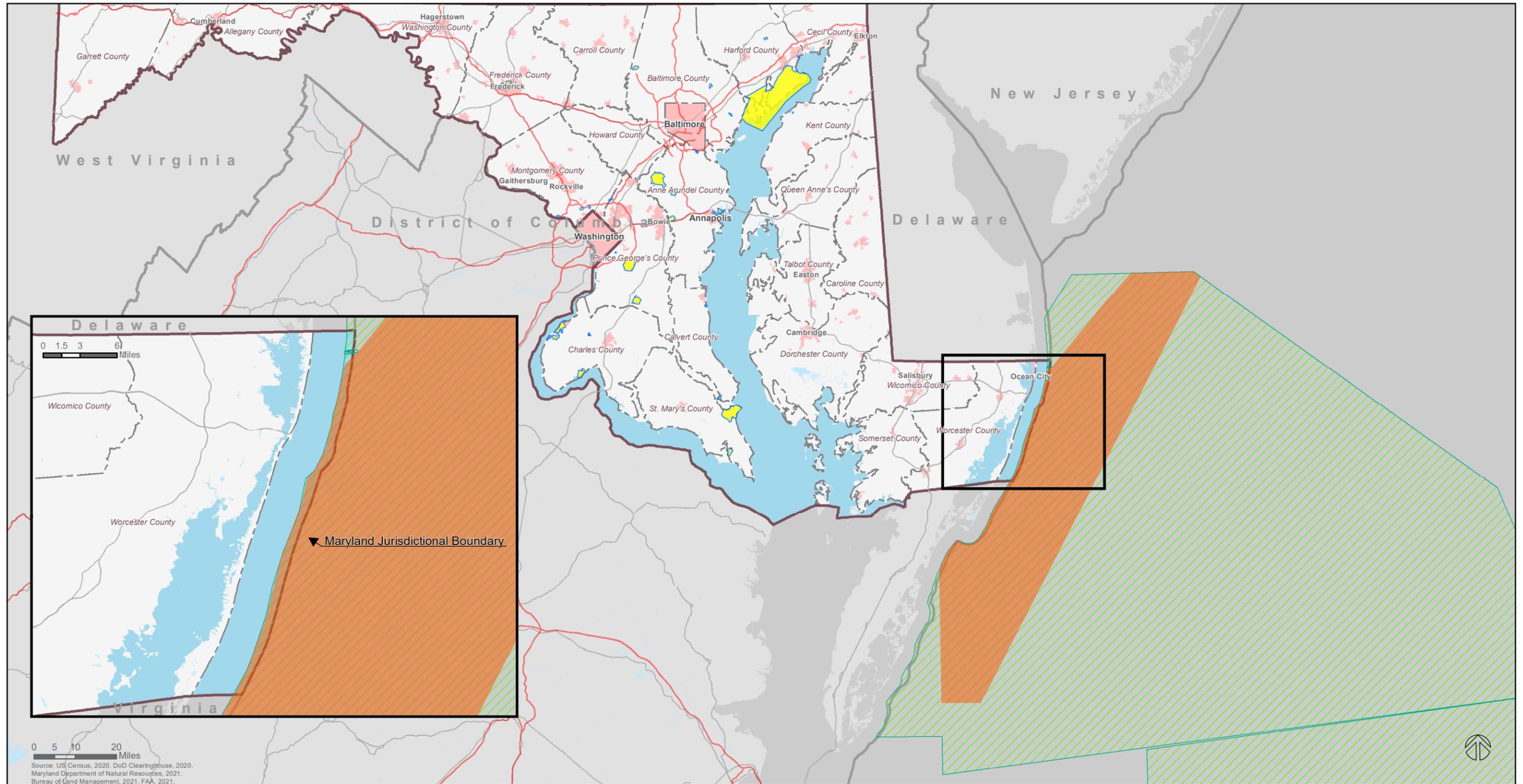
Military testing areas include firing and bombing ranges where the DoD tests weapons systems and equipment, which include releasing ordnance and other projectiles from aircraft, watercraft, as well as from land-based artillery. These areas can be particularly hazardous for development as some weapons systems and ordnance being tested can contain live ammunition and explosives.

Most military testing areas in Maryland (Atlantic Test Range – Inner Range including the Bloodsworth Island Range, and the Potomac River Test Range) correlate directly with Restricted Areas, and their minimum altitudes are addressed under the previous Special Use Airspace section. The one testing area with a unique boundary is the NAS Patuxent River Aerial Firing/Weapons Separation Testing Area identified in **Figure 6**.

Aerial Firing/Weapons Separation Testing Area

The Aerial Firing/Weapons Separation Testing Area is within the Atlantic Test Range – Inner Range and over the Chesapeake Bay in which the DoD evaluates the characteristics and effects of aerial-delivered weapons and ordnance.

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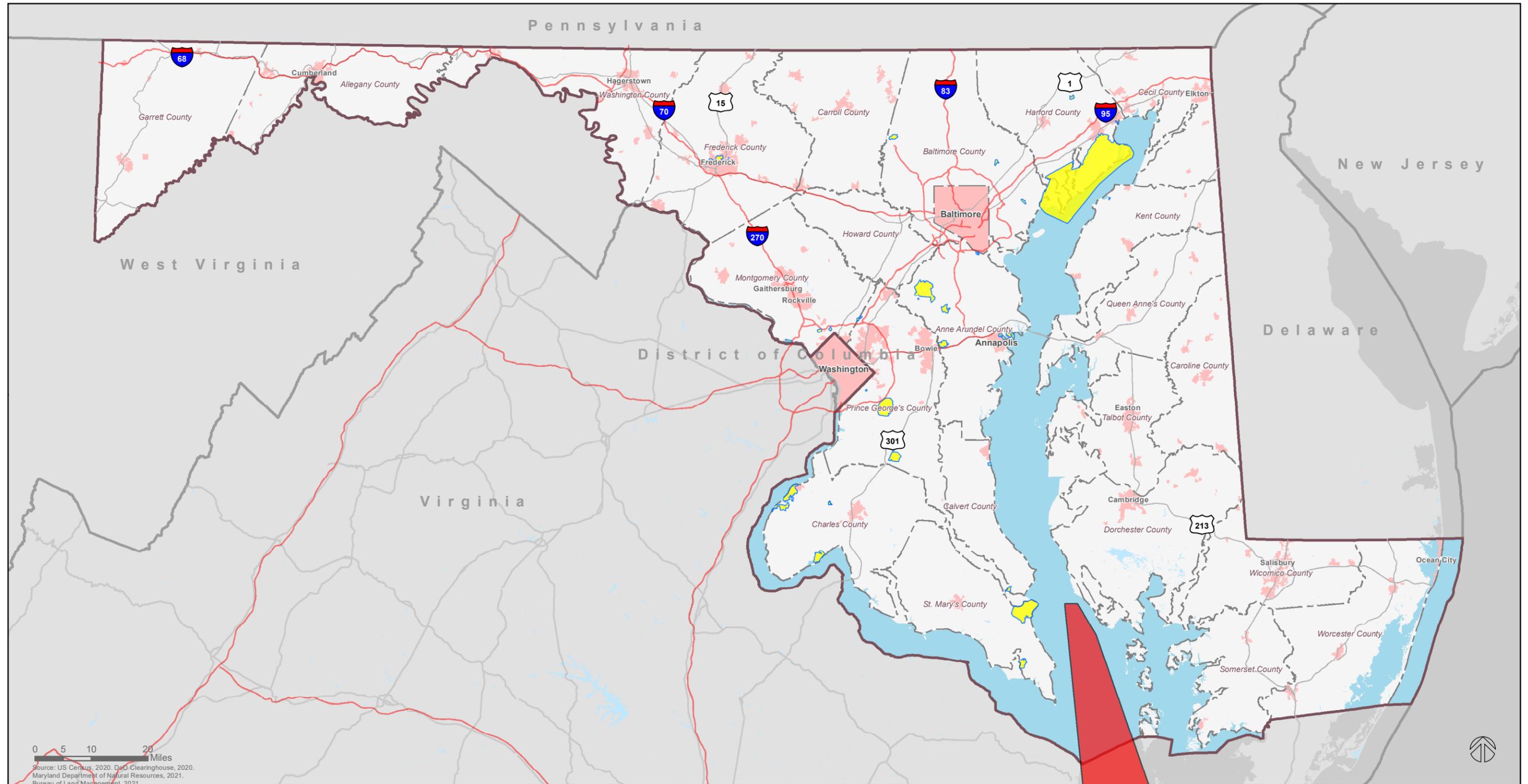


Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021. FAA, 2021.



- Navy Supersonic Test Range
- Atlantic Warning Area
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Offshore Military Operational Areas
Figure 5



0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021.



- Aerial Firing Weapons Separation Testing Area (Min. Altitude 0')
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Testing Areas
Figure 6



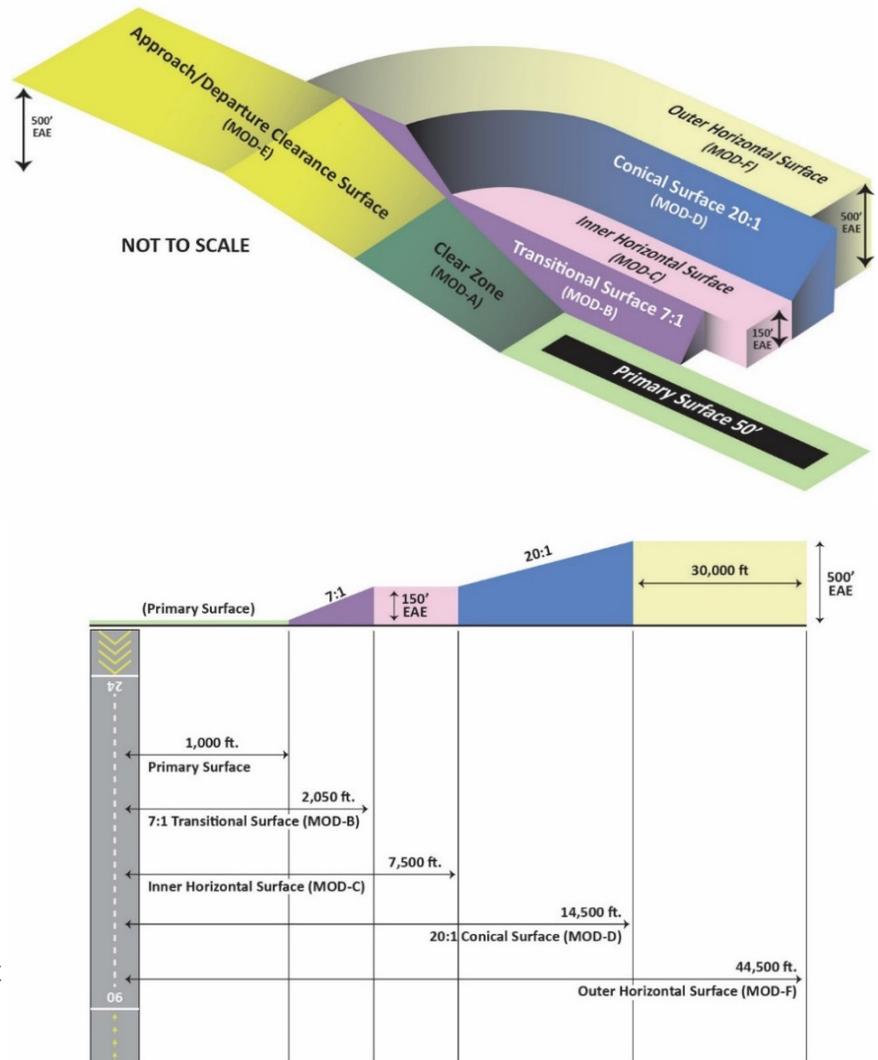
1.6 Imaginary Surfaces

Title 14 CFR § 77.21⁴ establishes imaginary surfaces surrounding military heliports or airfields and Section 77.19 for civilian airfields, such as Martin State Airport where the Maryland Air National Guard operates. These imaginary surfaces must be kept clear of objects that might pose a safety threat to aviation activities. Man-made or natural objects that project above an imaginary surface are considered a flight obstruction and safety hazard. Imaginary surfaces consist of multiple surfaces that build upon one another and are designed to eliminate vertical obstructions to air navigation and operations, as indicated in the graphic below. The dimension or size of an imaginary surface depends on the runway classification. The Federal Aviation Administration (FAA) Obstruction Evaluation process detailed in **Section 4.0** of this report requires that proposed structures that may impact these imaginary surfaces be evaluated for compatibility with air safety and navigation.

There are 10 airfields within and in proximity to the State of Maryland supporting military activities which have associated imaginary surfaces pursuant to Title 14 CFR § 77.21 or § 77.19. These airfields are listed below and are illustrated in **Figure 7**:

- Aberdeen Proving Ground Philips Army Airfield
- Aberdeen Proving Ground Weide Army Heliport
- Fort Belvoir Davison Army Airfield (Virginia)
- Joint Base Andrews
- Martin State Airport
- NAS Patuxent River Main Base
- NAS Patuxent River Webster Field
- Naval Support Facility Dahlgren (Virginia)
- Quantico Marine Corps Base (Virginia)
- Wallops Flight Facility (Virginia)

Figure 7. Imaginary Surfaces



⁴ <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-E/part-77>

1.7 Radars Viewsheds

Radars locate an object's position by emitting electromagnetic waves that reflect off objects, such as planes, birds, and mountains, and are returned to the radar. The electromagnetic waves that are returned to the radar provide the information needed to calculate an estimated size, location, speed, and direction of an object.

The radar viewshed, or field of view, is the area that is within range of a radar's electromagnetic waves. The range of the viewshed is influenced by multiple factors, including the radar's look angle, terrain, weather, as well as natural and manmade objects.

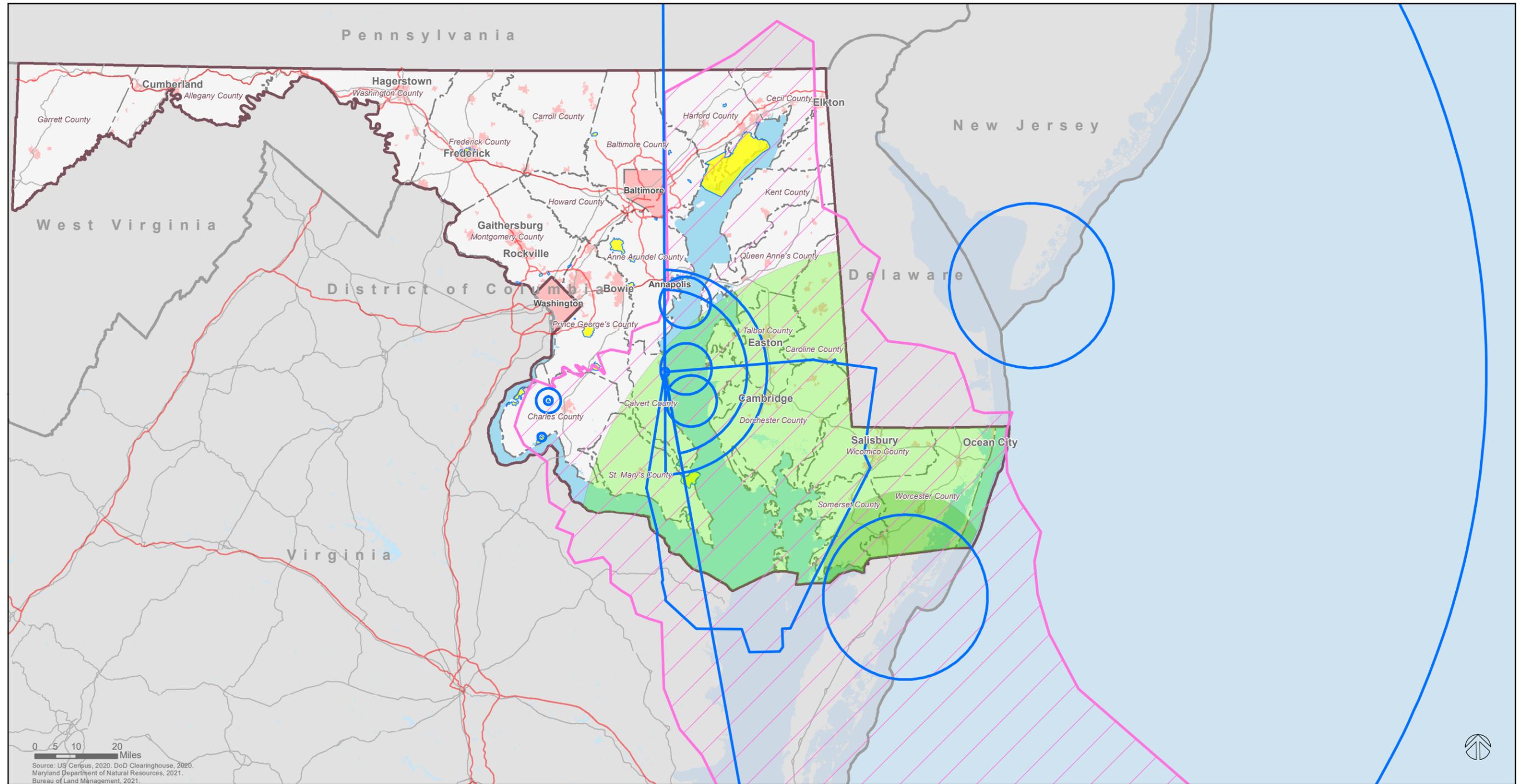
Natural and man-made structures within a radar's viewshed, that is, line-of-sight, can impact the integrity and usefulness of radar in identifying and locating aircraft, watercraft, weather, or other objects such as missiles. Additionally, other electromagnetic activity, such as radio waves or microwaves, can interfere with the electromagnetic waves emitted by the radar.

Three radar viewsheds in Maryland are of particular importance and concern to the military and are depicted in **Figure 8**. These three viewsheds stem from the Advanced Dynamic Aircraft Measurement System (ADAMS) Radar at NAS Patuxent River, the radar operated by the Naval Research Laboratory (NRL) at Wallops Flight Facility in Virginia, and the radar operated by NRL at Chesapeake Bay Detachment.

1.8 Installation Coordination Areas

Installation coordination areas include the land surrounding military installations and facilities in which certain types of development and activities have the potential to adversely affect military testing, training, and other operations. Some development of concern includes vertical development which may penetrate airspace directly around the installation and development that may generate electromagnetic interference. These areas

were established in consultation with each military installation to address their compatibility concerns based on specific missions and operations. Since these areas are not excluded from development, it is important to coordinate future development with the military to ensure compatibility with military operations and to address any necessary mitigation measures. The installation coordination areas are shown in **Figure 9**.

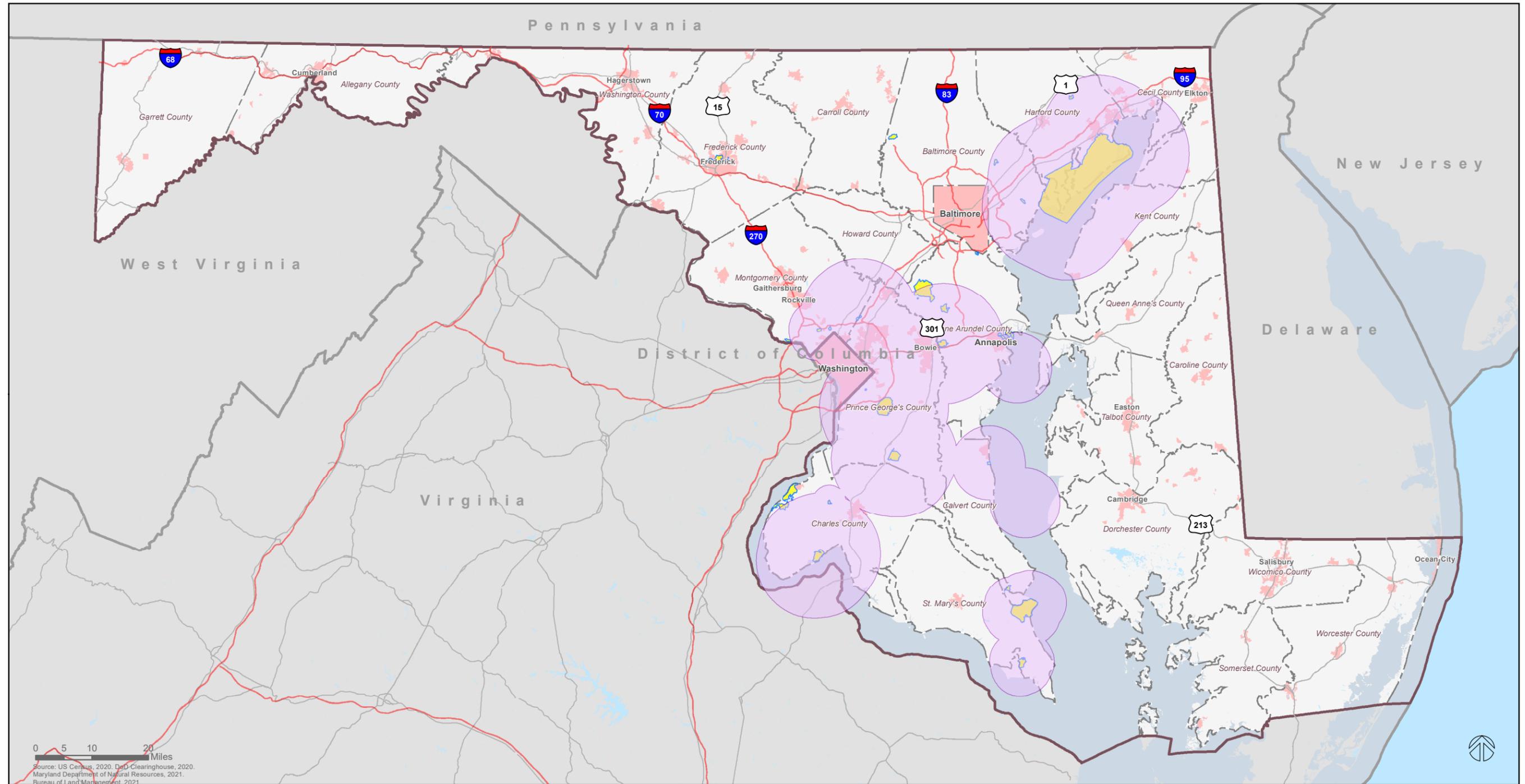


Source: US Census, 2020, DoD Clearinghouse, 2020, Maryland Department of Natural Resources, 2021, Bureau of Land Management, 2021.



- Naval Research Laboratory Radar
- Naval Air Station Patuxent River Geographic Area of Concern
- Wallops Flight Facility 20-mile Area of Concern
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route
- Wallops 80-mile Area of Concern

Radar Notification Areas
 Figure 8



- Installation Coordination Area
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Installation Coordination Area
 Figure 9



2.0 Renewable Energy Considerations for Military Operations

The siting of renewable energy generation facilities and transmission lines, depending on their location, may be a concern due to their potential to interfere with and degrade the military's ability to test, train, and operate. Renewable energy development can cause a variety of issues for military operations depending on the location and design, such as glint and glare, frequency interference, and vertical obstructions. In addition to these concerns, energy generating facilities (not exclusive to renewable energy) require transmission lines to transport power to the energy grid. The extension of transmission lines can also be a concern for military operations if they generate frequency interference or create vertical obstructions in low-level flight paths.

While there is an established federal and state process in place for siting, as explained in **Section 4.0**, local installation personnel with expertise on certain concerns are not always included in those processes. Following some of the mitigation options identified in Section 5.0 or adoption of the recommendations identified in Appendix A may help limit or eliminate gaps in communication to assure Maryland military operations are protected. Potential issues that arise from siting renewable energy generating facilities and transmission lines, and how they may affect military operations, are further elaborated on below.

2.1 Glint and Glare

In certain circumstances, solar energy facilities on or near an airfield can pose impacts on military operations for Air Traffic Control Tower (ATCT) personnel. Photovoltaic (PV) panels used to collect solar energy are made of reflective materials with the potential to create a glint – a quick reflection, or glare – a longer reflection.

The Federal Aviation Administration (FAA) policy ***Review of Solar Energy System Projects on Federally Obligated Airports***⁵ identifies a concern for ATCT personnel visibility along the viewing angle. As such, glint and glare are most often a concern when solar energy facilities are sited in proximity to or on airports, particularly when ATCT personnel are crucial to military operations. In the case of facilities on or near airports with an ATCT, the FAA recommendations conducting an ocular analysis of potential impacts on ATCTs before submitting ***FAA Form 7460-1, Notice of Proposed Construction or Alteration***.



Additional research and analysis on glint and glare may be found on the National Renewable Energy Laboratory website.

2.2 Frequency Interference

The frequency spectrum is the entire range of electromagnetic frequencies used for communications and other transmissions, which includes communication channels for radio, cellular phones, and television. The military relies on frequencies for communications and radar systems, which are essential for effectively testing, training, and evaluating DoD aircraft and weapons systems, as well as for national security purposes. However, both solar energy and wind energy facilities can cause frequency interference for DoD radars, and communication when siting does not take these needs into account.

The spinning blades of large wind turbines within a radar's viewshed can block or reflect radar signals, creating an anomaly on the radar known as clutter which causes the system to be less accurate. Radar blockages or reflections associated with wind turbines can weaken signal strength and cause blind spots or false readings, which are referred to as radar clutter. To mitigate the effects of the radar clutter, some radar operators will screen the field of view, or block out those portions of the radar that are impacted rendering a blind spot to detect any aircraft in the screened area.

⁵ <https://www.govinfo.gov/content/pkg/FR-2021-05-11/pdf/2021-09862.pdf>

Wind turbines can also impact aeronautical navigation systems, particularly VOR (very high frequency (VHF) omnidirectional radio) which enables aircraft to determine their position to stay on course and for surveillance and Instrument Landing System (ILS) used to guide aircraft to a specific airport runway for landing. VOR is very sensitive to the scattering effect from large structures such as wind turbines which can shift the azimuth of onboard aircraft receivers. Flight calibration results for ILS systems from wind turbines may be impacted depending on proximity.

Shielding, noise cancellation, filtering using capacitors or inductors, or suppression methods, such as ferrites, are mitigation measures for these potential impacts.

Equipment used in solar energy facilities, including switching power supplies, charge controllers, DC light ballasts, and inverters emit electromagnetic noise. Equipment built within 150 feet of radar may pose impacts to the frequency-reliant systems, according to a report from the National Renewable Energy Laboratory⁶. Additional mitigation measures, specific to offshore radars may be found in the *Offshore Wind Turbine Radar Interference Mitigation (WTRIM) Series* presentation from the US Department of Energy.⁷

2.3 Vertical Obstructions

Vertical obstructions are created by buildings, trees, structures, and other features that encroach into the navigable airspace or a radar's line-of-sight used by the military. These obstructions can also pose safety hazards to both the public and military personnel and potentially impact military readiness depending on their proximity to low-level flying routes, accident potential zones (APZs), or imaginary surfaces.

Vertical obstructions can compromise the value of low-level flight training by limiting the areas where such training occurs. Vertical obstructions may also interfere with radar transmissions, compromising the integrity of data transmission between the transmitter and receiver. Though most critical near the transmitter, the geographic area impacting the transmissions, or radar viewshed, can be broad depending on the distance between the transmitter and receivers.

⁶ <https://www.nrel.gov/docs/fy17osti/67440.pdf>

⁷ <https://www.energy.gov/sites/prod/files/2020/11/f80/offshore-wind-turbine-radar-interference-mitigation-webinar-10-26-2020.pdf>



Large wind turbines are getting taller to reach greater wind potential at higher altitudes – some extending more than 500 feet AGL. These tall structures can create vertical obstructions for military flight training, as well as commercial flight operations if sited beneath low-level training routes or imaginary surfaces. The aggregate of wind turbines within a single MTR can degrade the utility of the route.

2.4 Transmission Lines

The height of transmission lines and towers may pose hazards to aircraft if within low-level flight areas and imaginary surfaces. Although the heights of transmission lines are typically below the minimum flight altitudes of MTRs and SUA, safety regulations specify that aircraft operate at least 500 feet away from transmission lines. As such, transmission lines located near lower altitude MTRs and SUAs could create areas requiring alterations to military operations and training.

High voltage transmission lines (500 kV or greater) can also generate electromagnetic interference that impacts radar and communication frequencies. Technical research papers have been published that indicate several factors including the power levels of lines and tower incident angles, types, and numbers that can influence radar signal loss. A recent study on the distance between intelligence radar stations and high voltage transmission lines recommended a horizontal separation of 2,200 meters (1.36 miles) between high voltage transmission lines and radar facilities to ensure any electromagnetic interference does not exceed an acceptable threshold⁸.



⁸ T. Bo, Y. Jiawei, H. Li and H. Bin, "Determination of Permissible Distance Between Air Defense Surveillance Radar and UHVAC Power Transmission Lines," in IEEE Transactions on Applied Superconductivity, vol. 29, no. 2, pp. 1-5, March 2019, Art no. 0500105, doi: 10.1109/TASC.2018.2890589.

3.0 Military Operations Considerations for Renewable Energy Development

While renewable energy can conflict with military training, the presence of military operational areas may also impact the development potential of renewable energy. Military operational areas traverse a large portion of the State of Maryland, each with various requirements and vulnerabilities. Ensuring renewable energy development can be sited and operated with minimal impacts on military operations, requires coordination with military personnel to develop mitigation strategies, as necessary.

Further explained in **Section 4.0**, there are existing federal and state processes to assure renewable energy applicants work with the DoD to develop these mitigations. Maryland’s Smart DG+ tool, which was enhanced to display military operational areas, should be used in concert with the siting process by developers to reduce impacts on military operations. While military operational areas are not exclusionary to development, the tool can facilitate early coordination between developers and the military by providing developers with points of contact for those operational areas. Recommendations aimed at incorporating the Smart DG+ tool are included in **Appendix A, Best Practices**. Examples how incorporating the tool at the local level may be found in **Appendix B, Case Studies**. The following sections discuss impacts on renewable energy development for both onshore and offshore wind potential, solar energy development, and transmission lines.

3.1 Onshore Wind

The siting of wind energy development can be impacted by the presence of low-level flight corridors including MTRs and SUA below 500 feet AGL, as well as low-level flight areas. There are six wind energy developments in Maryland – four projects (Fourmile Ridge, Criterion, Fair Wind, and Roth Rock) in Garrett County (northwest Maryland) where the highest elevations have the greatest potential for wind energy, one project in Somerset County, and one in Talbot County, both located on the Eastern Shore. These developments are shown

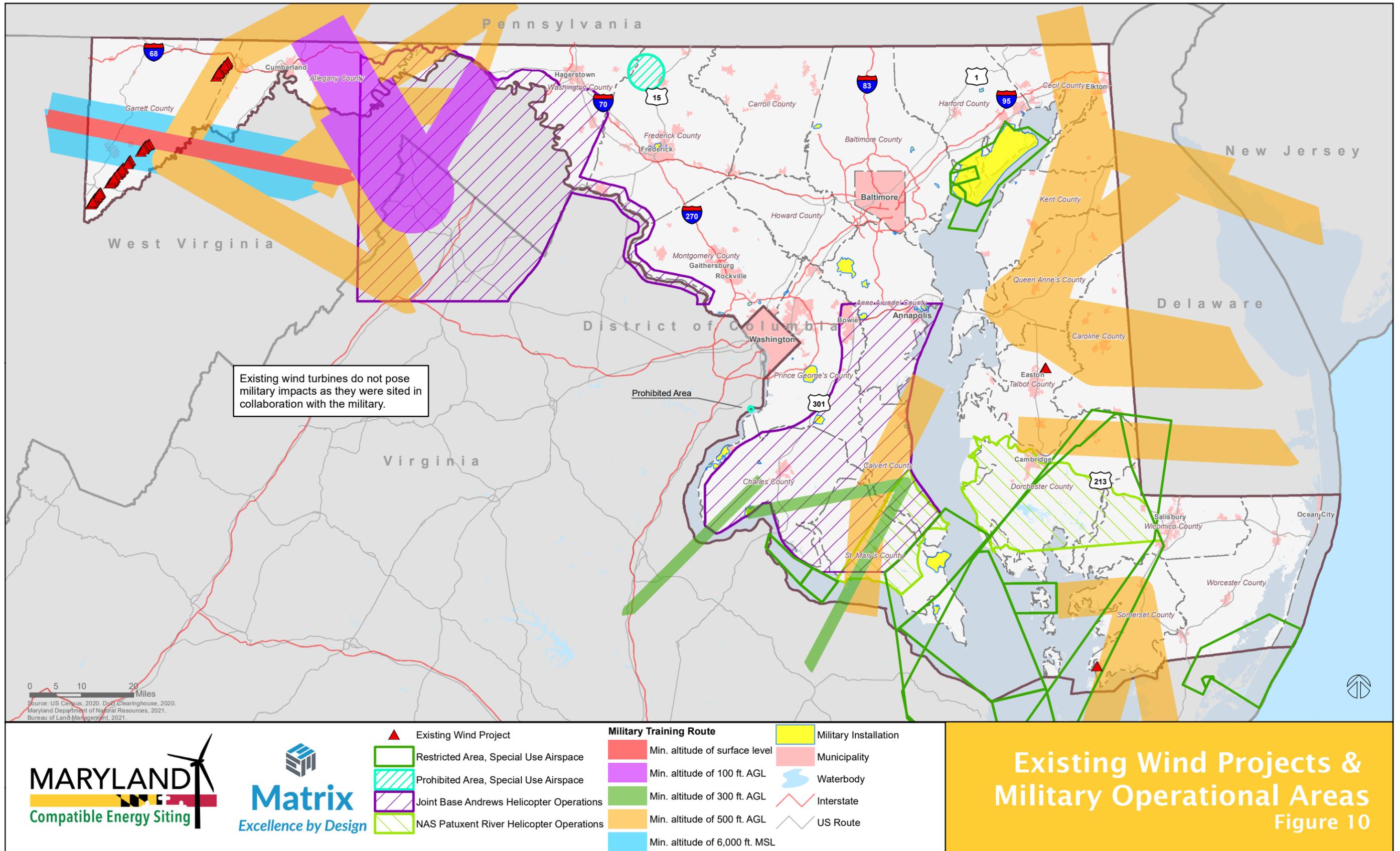
in **Figure 10**. Two of the wind development projects in Garrett County are located under MTRs with an operating floor of Surface and 500 ft AGL. These wind turbines do not pose impacts as they were sited in collaboration with the military. All other wind energy developments are located outside of low-level military operational areas. **Figures 11, 12, and 13** also identify the onshore wind potential at 80 meters (262 ft), 110 meters (360 ft), and 140 meters (459 ft) AGL, respectively, measured at the hub height of a wind turbine, along with low-level flight area (at or below 500 ft). All six wind energy developments in Maryland were sited in collaboration with the military, per local and federal guidelines. Recommendations for enhanced coordination efforts on future projects, as they relate to wind energy, are included in **Appendix A, Best Practice Recommendations**.

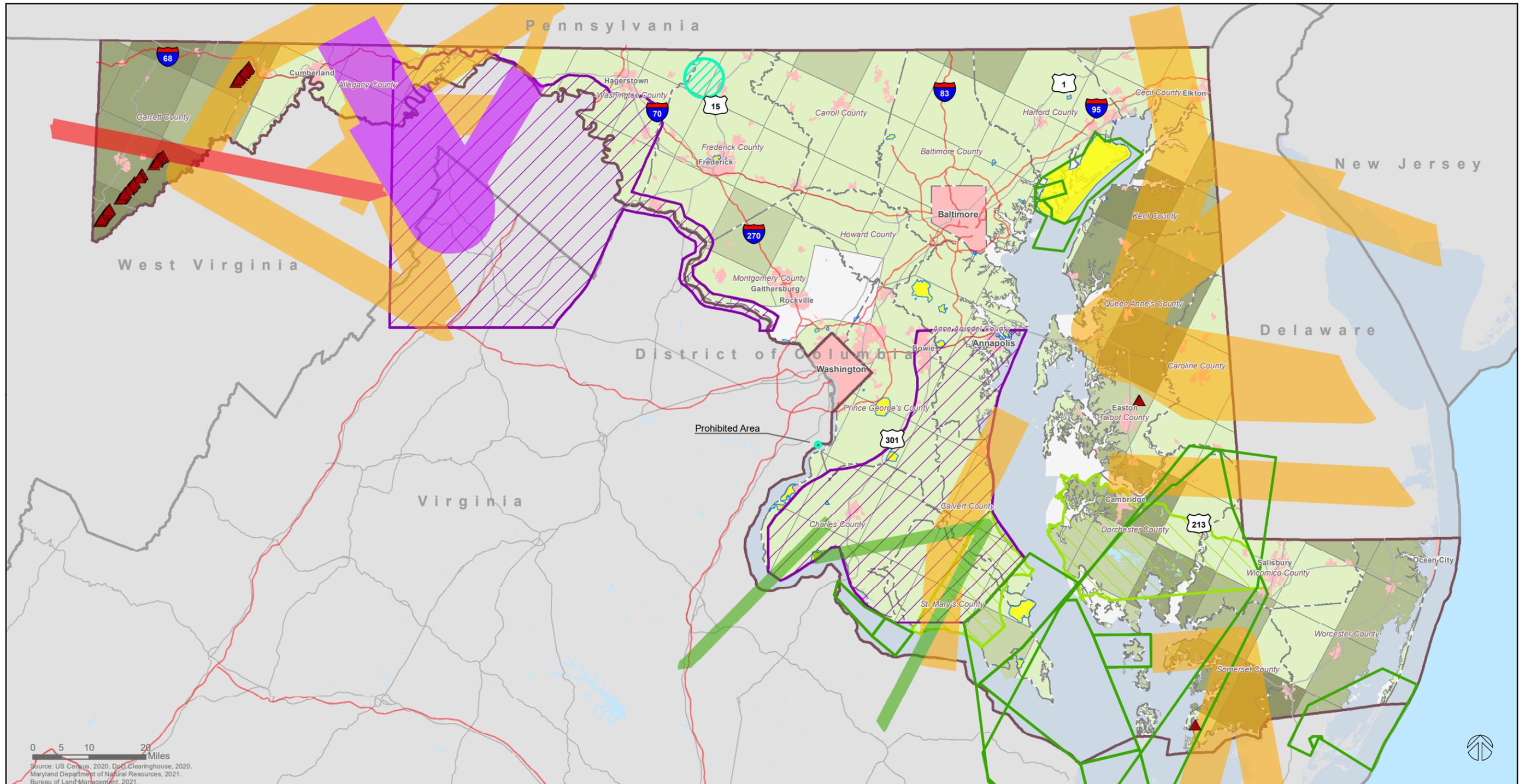
The wind potential data is provided by the National Renewable Energy Laboratory (NREL) and is expressed in grid tiles as a developable area at 30% capacity output. At 80 meters AGL, the highest potential for wind energy development is generally concentrated in the northwestern portion of the state (where existing wind turbines are located) and the northern Eastern Shore. Low-level flight operations are present but not extensive in northwest Maryland, however, MTRs with a minimum altitude of 500 ft AGL are found in these areas of high wind energy potential on the Eastern Shore. The potential for wind energy development increases at higher altitudes, which can be harnessed by newer wind turbine technologies. At 140 meters AGL, there is greater potential for wind energy development throughout the Eastern Shore where there are numerous low-level MTRs, as well as some areas in southern Maryland where Joint Base Andrews conducts low-level helicopter flight training among other low-level MTRs.

Wind energy development can also be impacted by the presence of radar viewsheds, due to the potential for frequency interference. **Figures 14, 15, and 16** identify the onshore wind potential at 80 meters, 110 meters, and 140 meters AGL, respectively, along with various radar viewsheds and areas of concern where siting coordination is crucial for NRL, Wallops Flight Facility, and the ADAMS Radar at NAS Patuxent River. These radar viewsheds are characterized as geographic areas where coordination with the military is important to identify, assess and mitigate any potential adverse impacts on a case-by-case basis. Because these radars have very specific operational requirements, impacts on wind turbine development are more complex than distance alone from the radars. The importance of coordination is underscored as the wind energy potential increases across these radar viewshed areas at higher altitudes.



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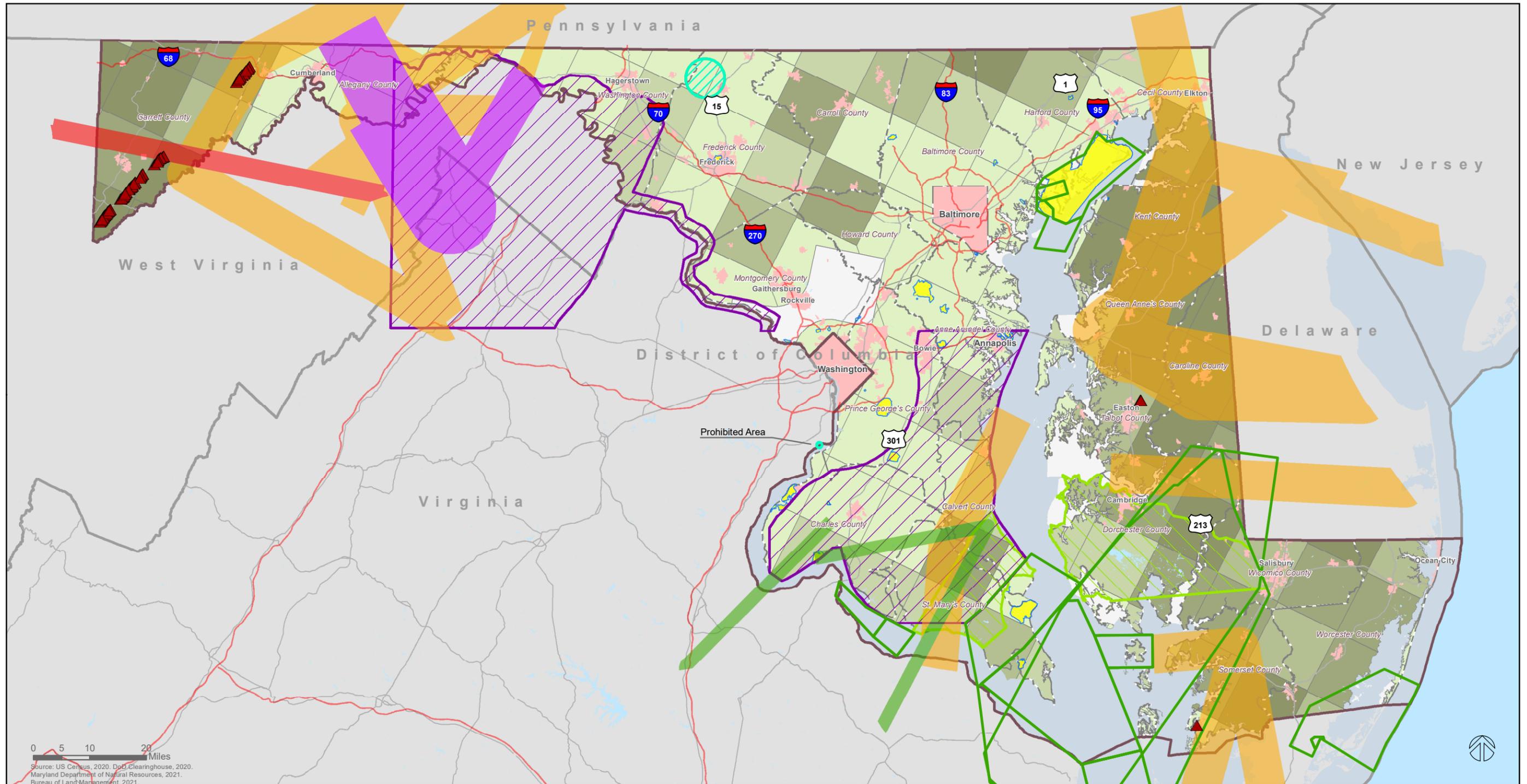


0 5 10 20 Miles
 Source: US Census, 2020, DoD Clearinghouse, 2020, Maryland Department of Natural Resources, 2021, Bureau of Land Management, 2021.



<ul style="list-style-type: none"> Existing Wind Project Restricted Area, Special Use Airspace Prohibited Area, Special Use Airspace Joint Base Andrews Helicopter Operations NAS Patuxent River Helicopter Operations 	<p>Military Training Route</p> <ul style="list-style-type: none"> Min. altitude of ground level Min. altitude of 100' Min. altitude of 300' Min. altitude of 500' 	<p>Developable Area at 30% Capacity</p> <ul style="list-style-type: none"> 0 - 50 acres 50 - 100 acres 100 - 150 acres 150 - 200 acres Above 200 acres 	<ul style="list-style-type: none"> Military Installation Municipality Waterbody Interstate US Route
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Onshore Wind Potential - 80m AGL & Military Operational Areas
 Figure 11



0 5 10 20 Miles

Source: US Census, 2020; DoD Clearinghouse, 2020; Maryland Department of Natural Resources, 2021; Bureau of Land Management, 2021.



- Existing Wind Project
- Restricted Area, Special Use Airspace
- Prohibited Area, Special Use Airspace
- Joint Base Andrews Helicopter Operations
- NAS Patuxent River Helicopter Operations

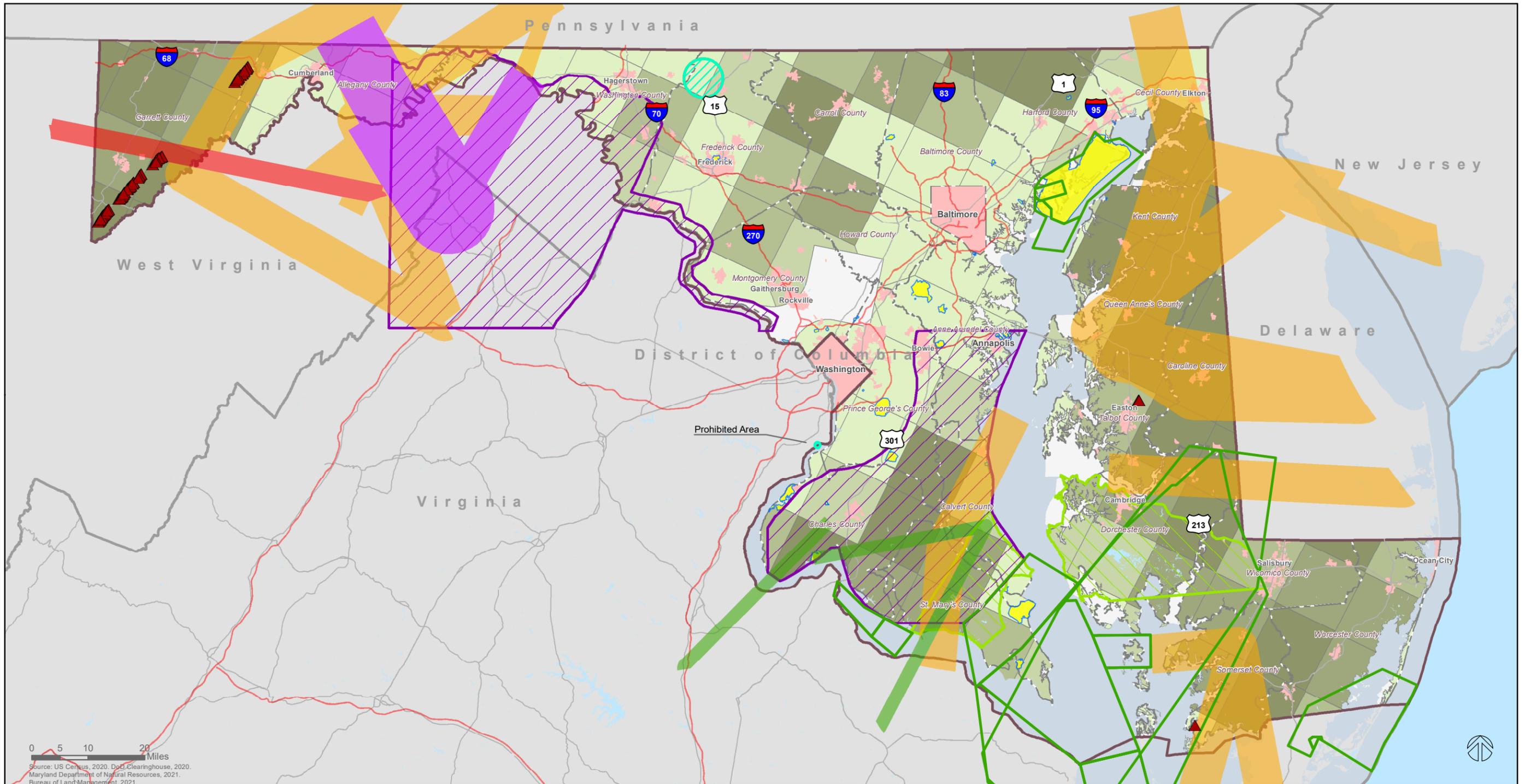
- Military Training Route**
- Min. altitude of ground level
 - Min. altitude of 100' AGL
 - Min. altitude of 300' AGL
 - Min. altitude of 500' AGL

- Developable Area at 30% Capacity**
- 0 - 50 acres
 - 50 - 100 acres
 - 100 - 150 acres
 - 150 - 200 acres
 - Above 200 acres

- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Onshore Wind Potential - 110m AGL & Military Operational Areas

Figure 12

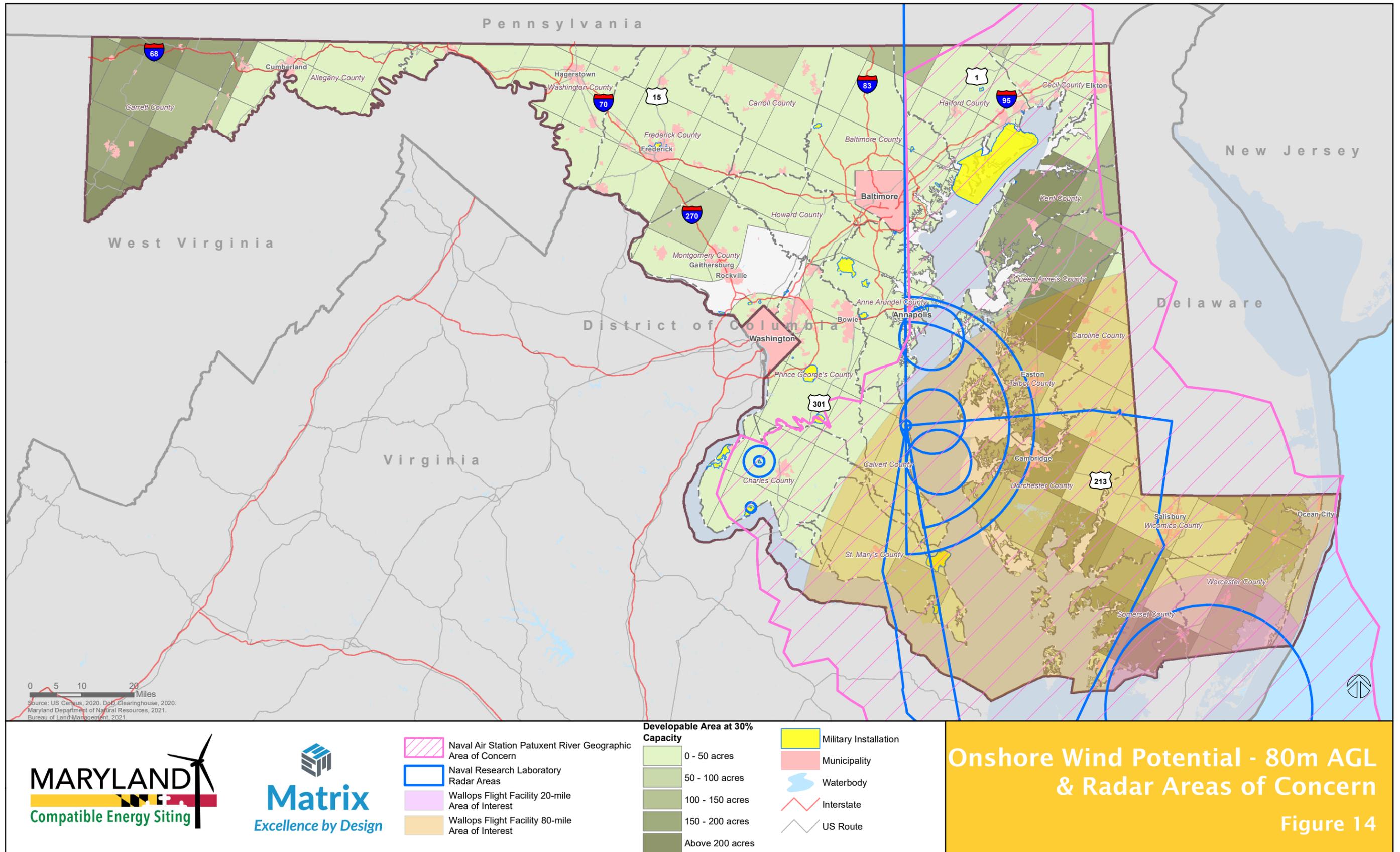


0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020.
 Maryland Department of Natural Resources, 2021.
 Bureau of Land Management, 2021.



▲ Existing Wind Project	Military Training Route	Developable Area at 30% Capacity	■ Military Installation
□ Restricted Area, Special Use Airspace	■ Min. altitude of ground level	■ 0 - 50 acres	■ Municipality
▨ Prohibited Area, Special Use Airspace	■ Min. altitude of 100' AGL	■ 50 - 100 acres	■ Waterbody
▨ Joint Base Andrews Helicopter Operations	■ Min. altitude of 300' AGL	■ 100 - 150 acres	— Interstate
▨ NAS Patuxent River Helicopter Operations	■ Min. altitude of 500' AGL	■ 150 - 200 acres	— US Route
		■ Above 200 acres	

Onshore Wind Potential - 140m AGL & Military Operational Areas
 Figure 13



Onshore Wind Potential - 80m AGL & Radar Areas of Concern
Figure 14

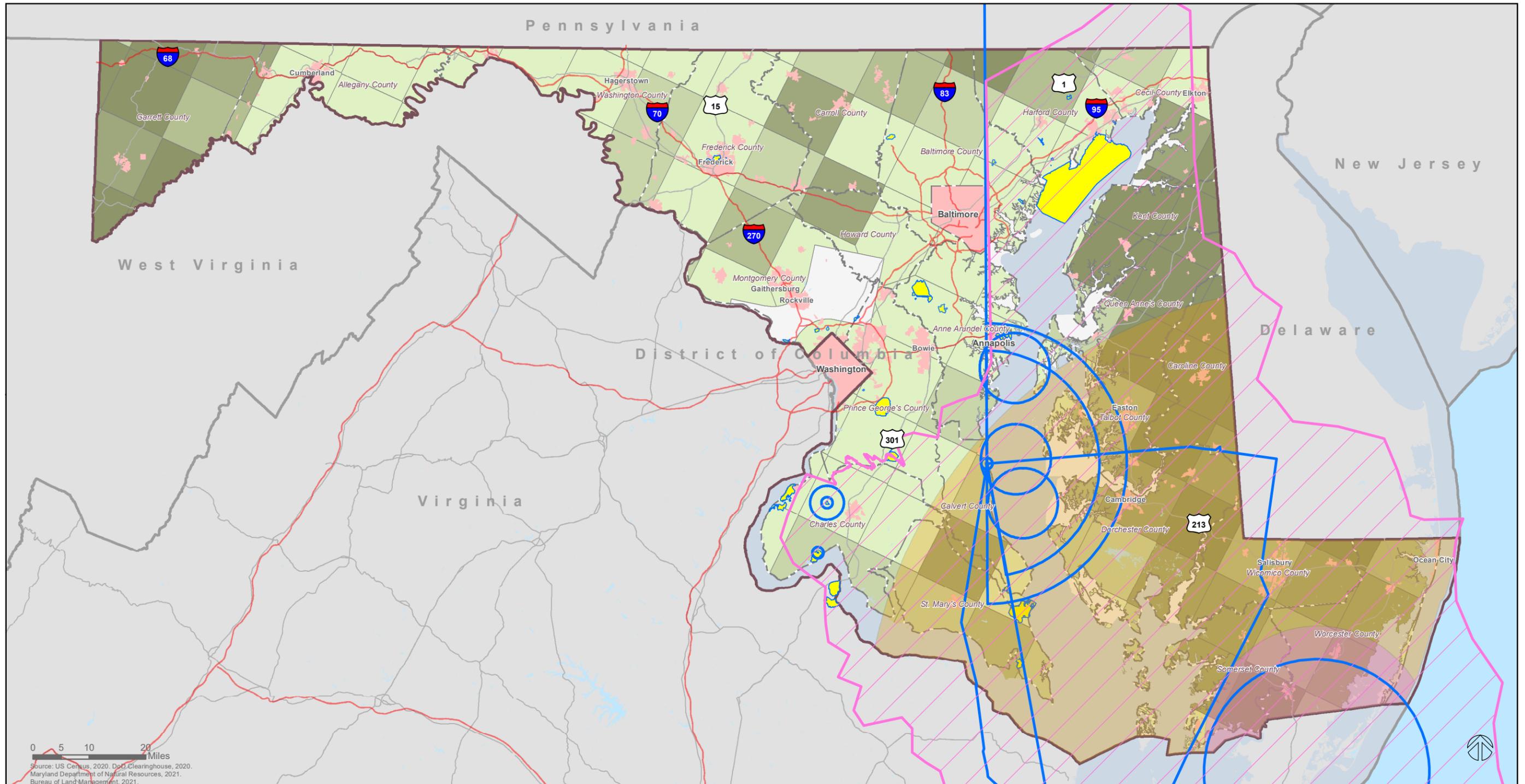


[Pink Hatched Box] Naval Air Station Patuxent River Geographic Area of Concern
 [Blue Circle] Naval Research Laboratory Radar Areas
 [Purple Circle] Wallops Flight Facility 20-mile Area of Interest
 [Orange Circle] Wallops Flight Facility 80-mile Area of Interest

Developable Area at 30% Capacity

- 0 - 50 acres
- 50 - 100 acres
- 100 - 150 acres
- 150 - 200 acres
- Above 200 acres

[Yellow Box] Military Installation
 [Pink Box] Municipality
 [Blue Wavy Line] Waterbody
 [Red Line] Interstate
 [Grey Line] US Route



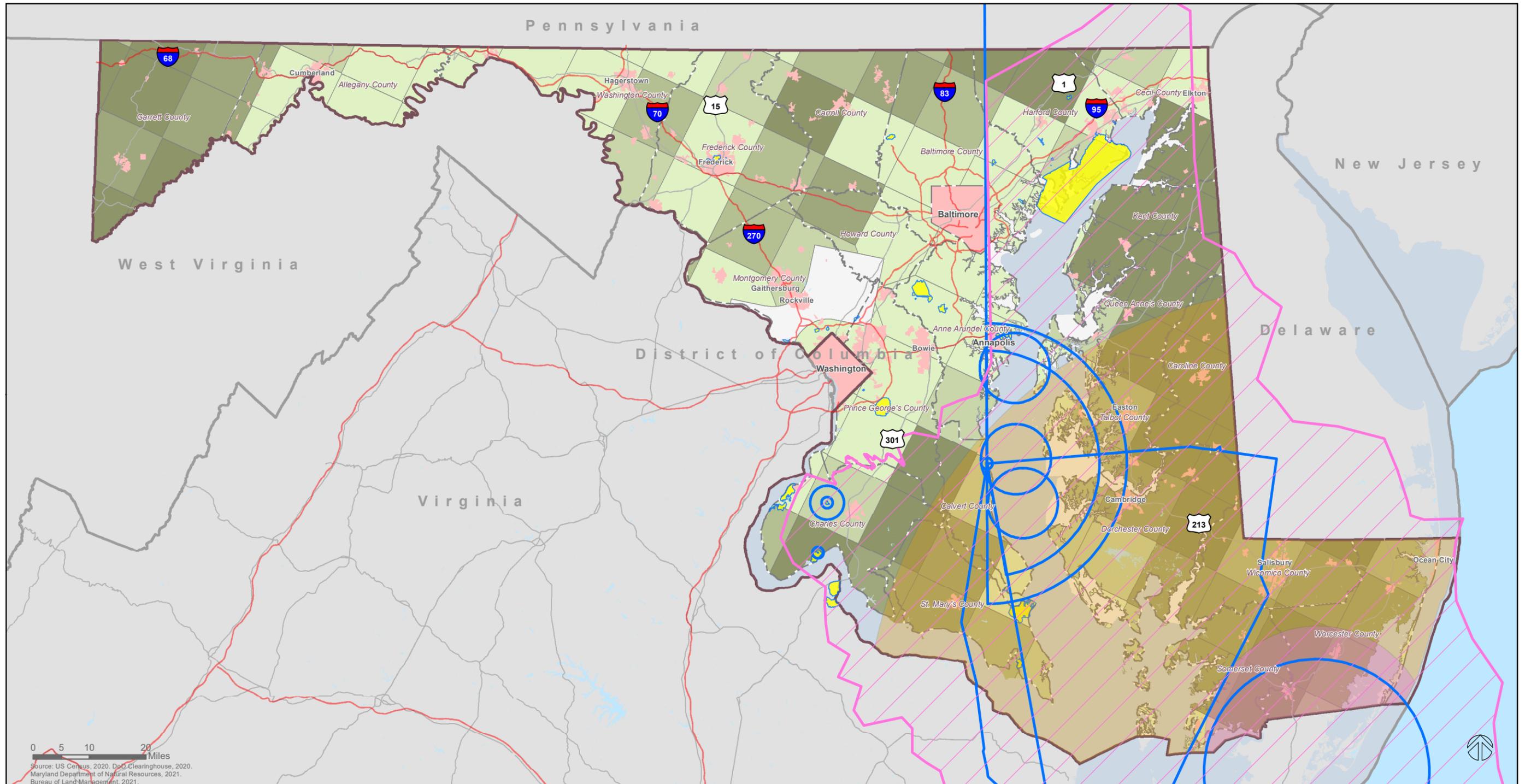
0 5 10 20 Miles
 Source: US Census, 2020, DoD Clearinghouse, 2020, Maryland Department of Natural Resources, 2021, Bureau of Land Management, 2021.



- Naval Air Station Patuxent Geographic Area of Concern
 - Naval Research Lab Radar Area
 - Wallops Flight Facility 20 mile Area of Interest
 - Wallops Flight Facility 80 mile Area of Interest
- | | |
|---|---|
| <p>Developable Area at 30% Capacity</p> <ul style="list-style-type: none"> 0 - 50 acres 50 - 100 acres 100 - 150 acres 150 - 200 acres Above 200 acres | <ul style="list-style-type: none"> Military Installation Municipality Waterbody Interstate US Route |
|---|---|

**Onshore Wind Potential - 110m AGL
 & Radar Areas of Concern**

Figure 15



0 5 10 20 Miles
 Source: US Census, 2020, DoD Clearinghouse, 2020, Maryland Department of Natural Resources, 2021, Bureau of Land Management, 2021.



- Naval Air Station Patuxent Geographic Area of Concern
 - Naval Research Lab Radar Area
 - Wallops Flight Facility 20 mile Area of Interest
 - Wallops Flight Facility 80 mile Area of Interest
- | | |
|--|---|
| <p>Developable Area at 30% Capacity</p> <ul style="list-style-type: none"> 0 - 50 acres 50 - 100 acres 100 - 150 acres 150 - 200 acres Above 200 acres | <ul style="list-style-type: none"> Military Installation Municipality Waterbody Interstate US Route |
|--|---|

Onshore Wind Potential - 140m AGL & Radar Areas of Concern

Figure 16

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3.2 Offshore Wind

Offshore areas in Maryland include the Chesapeake Bay and the territorial waters three miles off the Maryland coast. These areas are used for military operations including various low-level flight corridors and airspace, radar viewsheds, and other testing areas. NREL calculates wind speed for offshore areas as an indicator of wind energy potential at 90 meters (295 ft) height. Low to moderate wind energy potential exists at wind speeds between 4.5-7 meters per second while moderate to high potential exists between 7-9.5 meters per second. As shown in **Figure 17**, the Chesapeake Bay has a relatively low potential for wind energy development at 90 meters, making this a lower probability for military operations to impact renewable energy development. Within the Maryland territorial 3-mile waters off the Atlantic coast, wind energy potential is moderate at 90 meters, with higher wind speeds further out into the Atlantic Ocean. The greatest potential for offshore wind energy development is in the Outer Continental Shelf (OCS), within federal territorial waters.

The Maryland Public Service Commission (PSC) approved two projects within federal offshore areas to Skipjack Offshore Energy, LLC and US Wind, Inc. This last year, both companies received approvals from the PSC to further expand wind energy in offshore federal waters. The approval of these projects does not leave room for additional projects under the Clean Energy Jobs Act currently. As explained in **Section 4.0**, the BOEM will incorporate DoD inputs into the final evaluation of this proposed site expansion as part of the required process outlined in DoD Instruction (DoDI) 4180.2. The likelihood of military operations impacting offshore renewable energy development in the Maryland territorial waters is very low since the only renewable energy infrastructure likely within this area would be buried transmission cables connecting the offshore wind turbines to onshore stations, which have neither a vertical component nor potential to produce frequency interference.

3.3 Solar

The most recent existing and proposed solar energy projects in Maryland were provided by PPRP and are depicted in **Figure 18**. As shown in the figure, solar energy developments are widely dispersed across Maryland, including several operational facilities within proximity to military use airports and the Brandywine Receiver Site for Joint Base Andrews. Since impacts of solar energy projects on military operational areas are very localized, future siting of solar energy projects is not significantly impacted by military operational areas. However, coordination with the military is critical to ensure no adverse impacts from frequency interference or glint and glare for ATCT personnel, as discussed in **Section 2.1** of this report. Recommendations for enhanced coordination efforts, as they relate to solar projects, are included in **Appendix A, Best Practice Recommendations**.

Figure 19 shows the solar energy development potential expressed as diffuse horizontal irradiance (DHI) by NREL, which is the terrestrial irradiance received by a horizontal surface that has been scattered or diffused by the atmosphere⁹. High solar energy potential is dispersed throughout the state, generally east of Washington County with strong solar potential outside areas of concern. Two solar consultation areas were added to the Smart DG+ tool to identify where solar projects may be of concern. The first consultation area relates to areas of concern for communication frequencies,

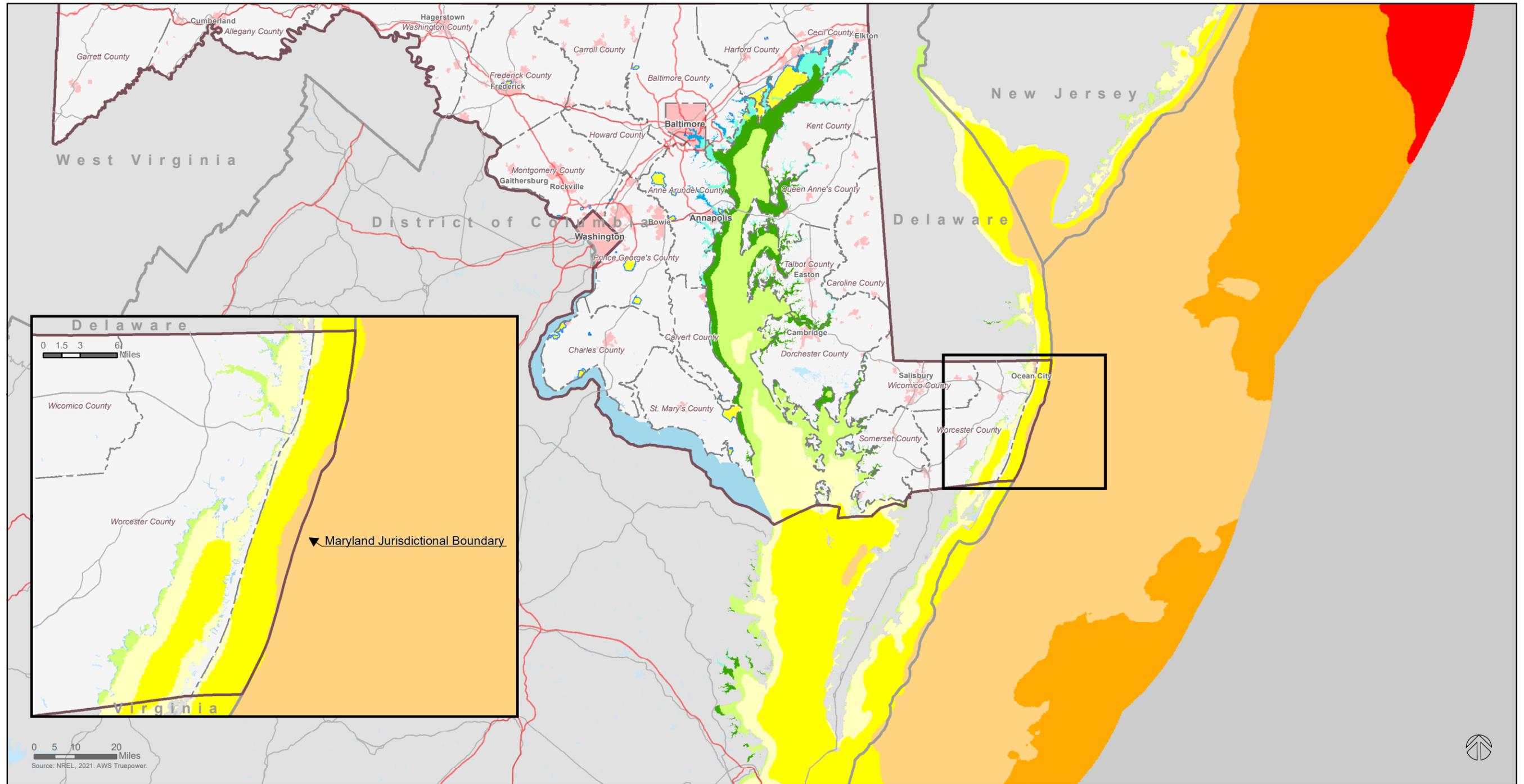
which is a 10-mile area surrounding the Joint Base Andrews Brandywine transmission site. The second consultation area is the outer extent of imaginary surfaces where solar projects could have the potential to impact air traffic controller visibility of low-level aircraft from towers at airfields.

3.4 Transmission Lines

Transmission lines in Maryland traverse all corners of the state. Although transmission lines are critical infrastructure to transport electricity from all types of electric generating facilities, the siting of these lines potentially creates vertical obstructions and causes radio frequency issues for flight operations. These issues are most relevant within imaginary surface Approach and Departure Clearance Surfaces (**Figure 20**), as well as low-level MTRs and operational areas (**Figure 21**). These military operational areas are not exclusionary for transmission line development, but rather highlight the importance of early coordination.

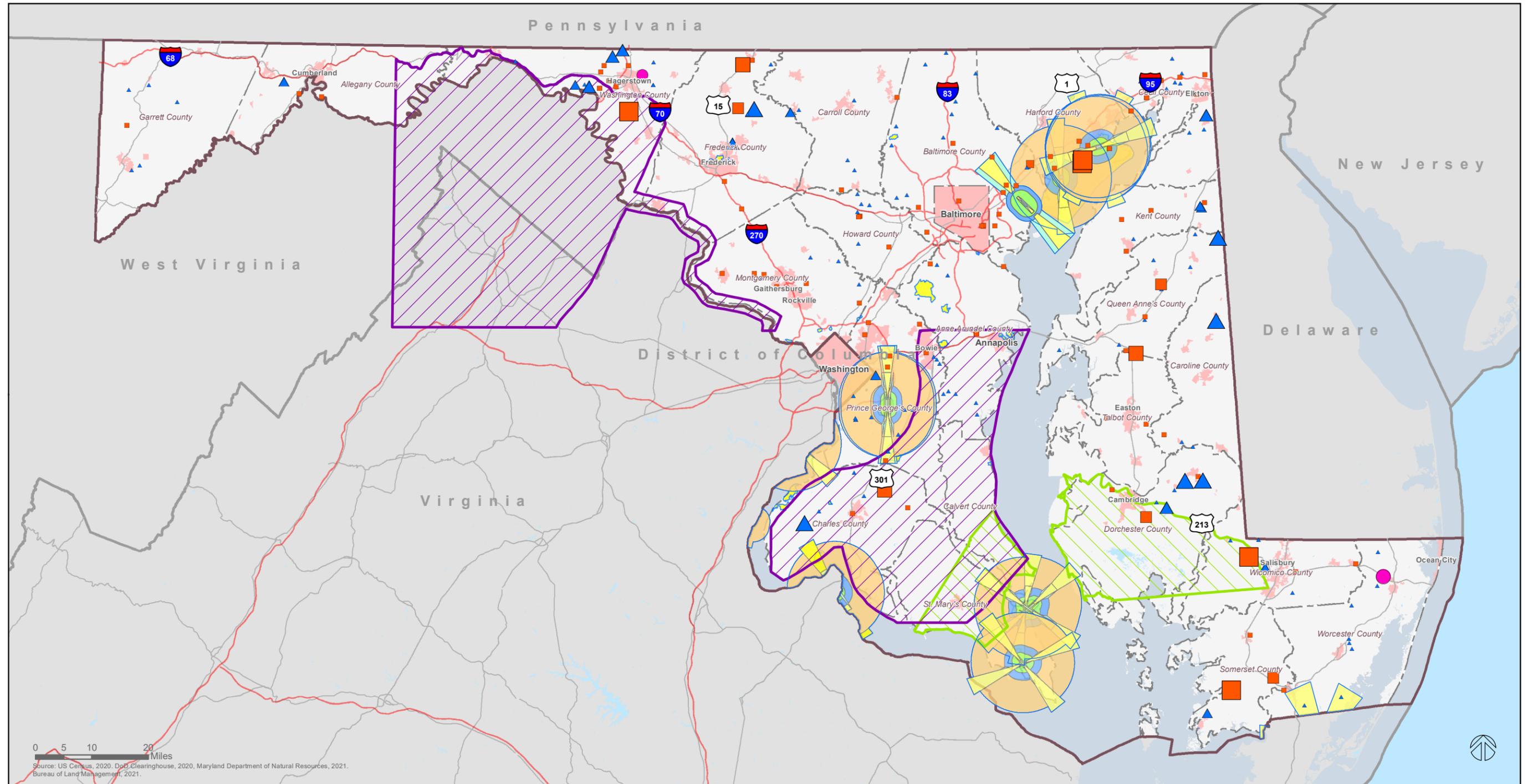


⁹ [https://pvpmc.sandia.gov/modeling-steps/1-weather-design-inputs/irradiance-and-insolation-2/diffuse-horizontal-irradiance/#:~:text=Diffuse%20horizontal%20irradiance%20\(DHI\)%20is,view%20concentric%20around%20the%20sun](https://pvpmc.sandia.gov/modeling-steps/1-weather-design-inputs/irradiance-and-insolation-2/diffuse-horizontal-irradiance/#:~:text=Diffuse%20horizontal%20irradiance%20(DHI)%20is,view%20concentric%20around%20the%20sun)



Offshore Wind Speed 90m (meters/second)	6.5 - 7	Military Installation
4.5 - 5	7 - 7.5	Municipality
5 - 5.5	7.5 - 8	Waterbody
5.5 - 6	8 - 8.5	Interstate
6 - 6.5	8.5 - 9	US Route
	9 - 9.5	

Offshore Wind Potential at 90 Meters Height
Figure 17



0 5 10 20 Miles
 Source: US Census, 2020. DoD Clearinghouse, 2020. Maryland Department of Natural Resources, 2021. Bureau of Land Management, 2021.

Solar Project Status
 (Valid as of Aug 2019)

- Operational
- Under Construction
- Proposed

Solar Project Size
 Energy Output

- Data Unavailable
- <2 MW
- 2-10 MW
- 10-20 MW
- >20 MW

Airfield Imaginary Surfaces

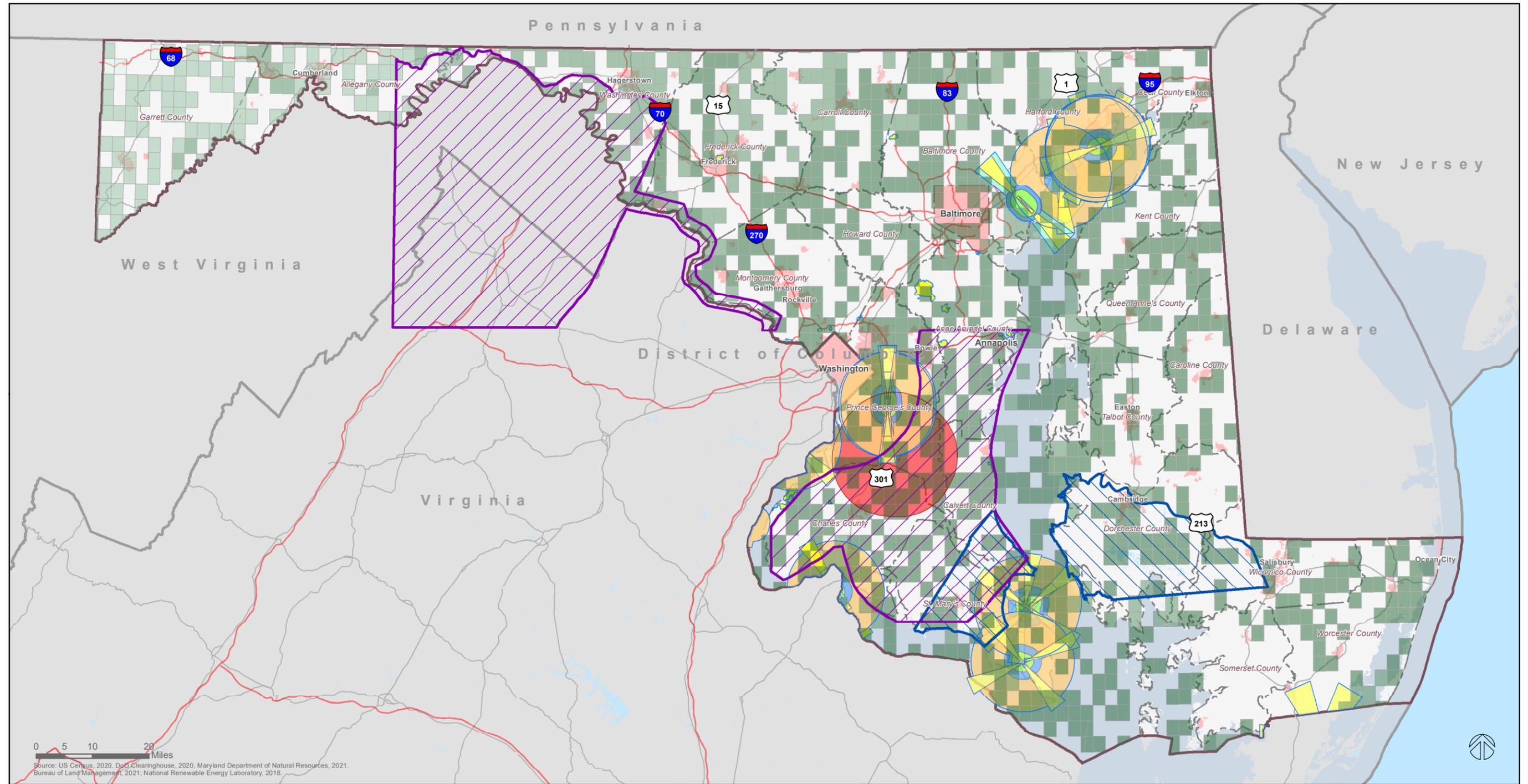
- Primary Surface (0 ft)
- Approach/Departure Clearance Surface (50:1/Up to 500')
- Inner Horizontal Surface (150 ft)
- Conical Surface (20:1)
- Outer Horizontal Surface (500 ft)
- Transitional Surface (7:1)

Joint Base Andrews Helicopter Operations

- NAS Patuxent River Helicopter Operations
- Military Installation
- Municipality
- Waterbody
- Interstate
- US Route

Solar Projects, Imaginary Surfaces, & Low-Level Helicopter Operations
 Figure 18



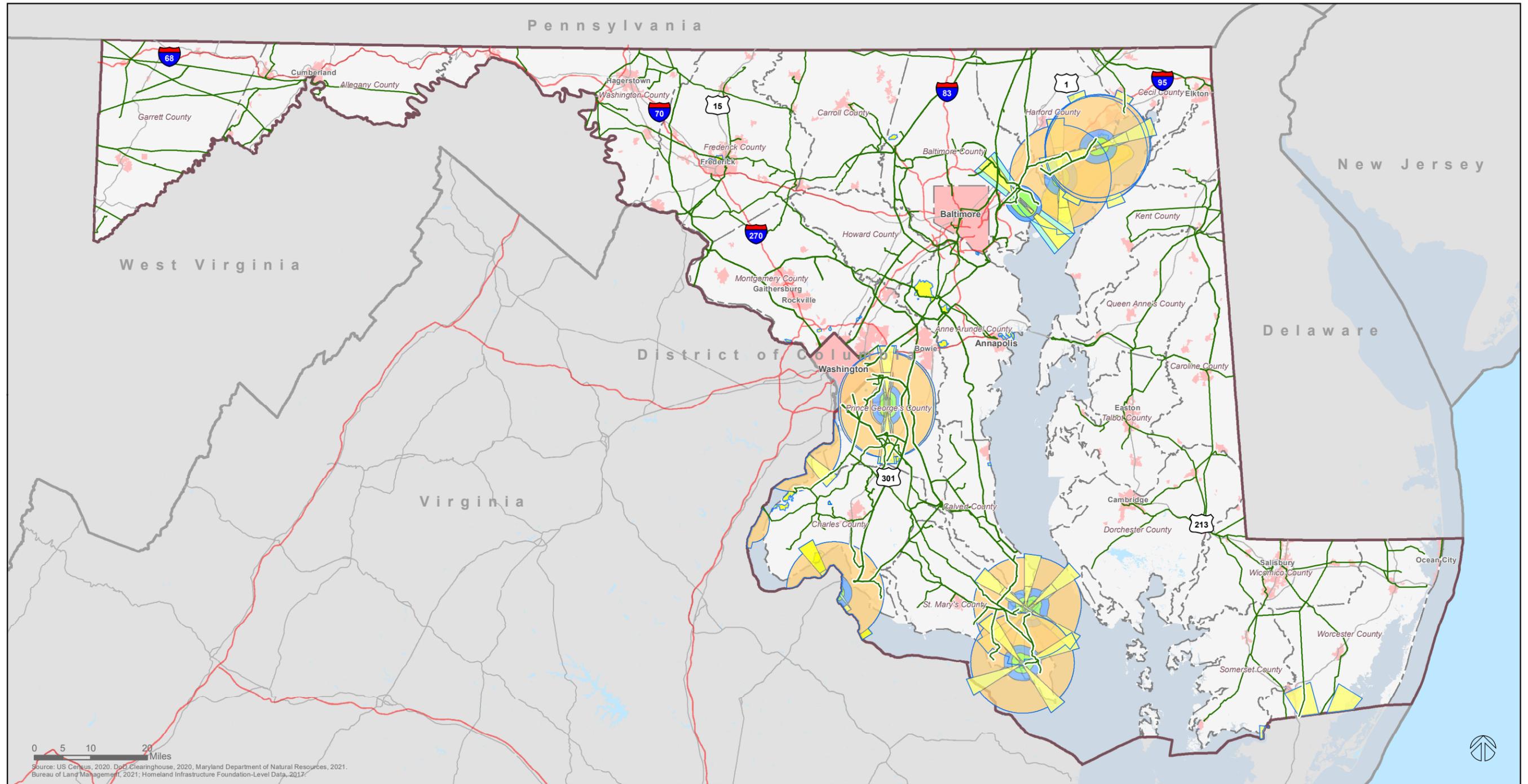


0 5 10 20 Miles
 Source: US Census, 2020; DoD Clearinghouse, 2020; Maryland Department of Natural Resources, 2021; Bureau of Land Management, 2021; National Renewable Energy Laboratory, 2018.



<p>Direct Normal Irradiance kWh/sq m/day</p> <ul style="list-style-type: none"> Up to 4.0 4.0 to 4.25 4.25 to 4.5 4.5 to 4.92 	<p>Airfield Imaginary Surfaces</p> <ul style="list-style-type: none"> Primary Surface (0 ft) Approach/Departure Clearance Surface (50:1/Up to 500') Inner Horizontal Surface (150 ft) Conical Surface (20:1) Outer Horizontal Surface (500 ft) Transitional Surface (7:1) Aviation Solar Buffer (outer extent of Imaginary Surfaces) 	<ul style="list-style-type: none"> Joint Base Andrews Helicopter NAS Patuxent River Helicopter Operations Military Installation Municipality Waterbody Interstate US Route
<p> Solar Frequency Buffer</p>		

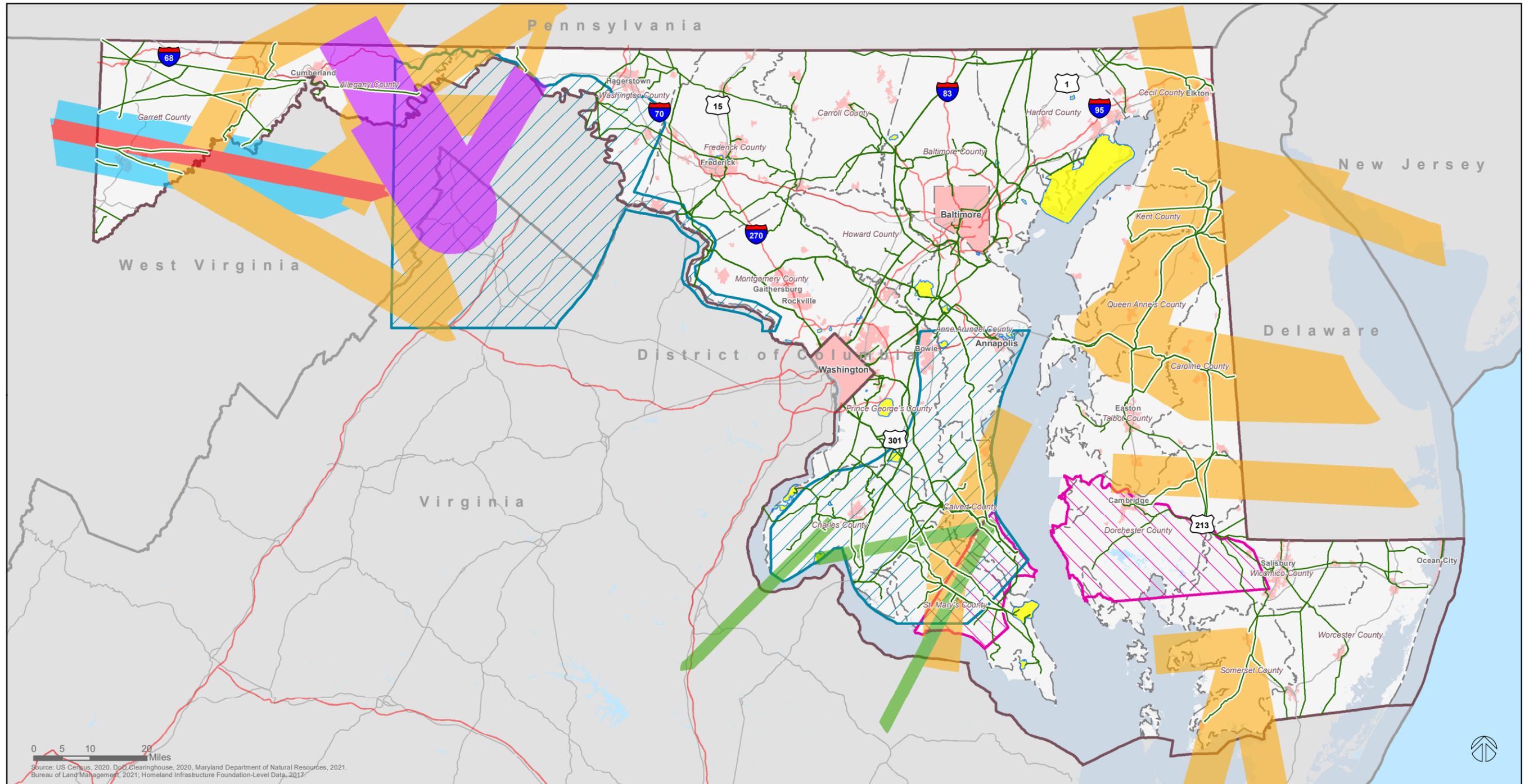
Solar Potential, Imaginary Surfaces, & Low-Level Helicopter Operations
 Figure 19



- | | |
|--|-----------------------|
| Airfield Imaginary Surface | Transmission Line |
| Primary Surface (0 ft) | Military Installation |
| Approach/Departure Clearance Surface (50:1/Up to 500') | Municipality |
| Inner Horizontal Surface (150 ft) | Waterbody |
| Conical Surface (20:1) | Interstate |
| Outer Horizontal Surface (500 ft) | US Route |
| Transitional Surface (7:1) | |

Transmission Lines and Imaginary Surfaces
Figure 20





0 5 10 20 Miles
 Source: US Census, 2020; DoD Clearinghouse, 2020; Maryland Department of Natural Resources, 2021; Bureau of Land Management, 2021; Homeland Infrastructure Foundation-Level Data, 2017



- | | | |
|--------------------------------|--|--------------|
| Military Training Route | Joint Base Andrews Helicopter Operations | Municipality |
| Min. altitude of ground level | NAS Patuxent River Helicopter Operations | Waterbody |
| Min. altitude of 100' AGL | Transmission Line | Interstate |
| Min. altitude of 300' AGL | Military Installation | US Route |
| Min. altitude of 500' AGL | | |
| Min. altitude of 6,000' MSL | | |

Transmission Lines, Military Training Routes, & Low-Level Helicopter Operations
 Figure 21

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4.0 Renewable Energy Siting Process

Siting and permitting renewable energy development are complex, multi-step processes that may take several years to complete. This chapter reviews and highlights the key steps in siting and permitting a renewable energy project, such as wind and solar, for development in the State of Maryland. The renewable energy siting process in Maryland consists of three key phases, which are listed below and described further in this report:

- Due Diligence
- Permitting
- Interconnection Agreement

Since time is money, developer costs increase as a project moves from one phase to the next, which makes informed decisions and proactive planning critical in minimizing development costs and time. In general, local counties and municipalities have zoning codes, height regulations, or setback requirements impacting the type of development allowed. In addition, local jurisdictions may have the authority to approve small-scale renewable energy siting.

Other proactive measures for onshore siting reviews include the federal energy siting review processes. There are three components to these reviews which may take place in a concert, or separately, depending on the type of energy development, location, and timing of the request. Onshore federal siting reviews include:

- FAA Obstruction Evaluation / Airport Airspace Analysis (OE/AAA)¹⁰
- Military Aviation and Installation Assurance Clearinghouse Formal Review¹¹
- Military Aviation and Installation Assurance Clearinghouse Informal Review

In addition to the onshore federal renewable energy siting processes, this report reviews the Bureau of Ocean Energy Management (BOEM) siting process for offshore projects in Federal waters. Although the purview of this project is limited to the State of Maryland, military installations in Maryland rely on offshore air and sea space to conduct a broad range

of research, development, testing, and evaluation operations. The review of the BOEM renewable energy siting and permitting process provides an awareness measure for military leaders, decision-makers, and the renewable energy industry.

Though the processes in the state of Maryland are thorough and include the DoD in siting efforts for renewable energy, local installations may not always be aware of mitigation agreements made at the higher level. For this reason, best practice recommendations were developed to aid in closing communication gaps, assuring military operations and the renewable energy industry continue to thrive in the state. Furthermore, utilizing tools like the Smart DG+, which provides key points of contact for military layers, will aid in closing communications gaps. Recommendations to incorporate the Smart DG+ tool into state and local processes are also in **Appendix A**, while examples how the tool may be used at the local level may be found in **Appendix B**.

4.1 State Siting and Permitting Process

Due Diligence

Although not a statutory requirement, due diligence is a critical first step in the renewable energy siting process. Due diligence includes the technical site evaluation that assesses the site conditions, constraints, assets, opportunities, and potential concerns. This initial assessment considers the potential of renewable energy development before investing additional time and money. Site considerations generally include the renewable resources available, distance from transmission lines, and environmental concerns, as well as land ownership, costs, uses, radar and airspace overlap, and regulations.

According to the University of Maryland College of Agriculture & Natural Resources, producing one megawatt of electricity from solar requires approximately seven acres of land.

¹⁰ <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>

¹¹ <https://www.acq.osd.mil/dodsc/contact/dod-review-process.html>

As part of this site evaluation, developers should consider holding a pre-consultation meeting with local governments to help better understand local regulations, policies, and other relevant information that may create potential obstacles to renewable energy development, such as the community's perception of renewable energy.

The Maryland Department of Natural Resources (DNR) Power Plant Research Program (PPRP) maintains an interactive online mapping tool – Smart DG+ – a data repository and screening tool for utility-scale renewable energy projects in the state. This tool contains an array of data that supports the preliminary due diligence necessary for renewable energy siting. The tool includes locations of transmission lines, wind speeds at 100 meters, airport buffers, protected lands, and areas with prime farmland soil, as well as desired land use for the site or area, and any potential impacts to uses such as agriculture or open space. This data intends to provide potential renewable energy developers with baseline information on site conditions which may aid in making investment decisions. The State of Maryland's Compatible Energy Siting Project, the scope of which includes the development of this report, has added military data to the Smart DG+ tool to help energy developers coordinate with the military during the due diligence phase.

The due diligence performed in the first phase of the siting process should inform the viability and feasibility of developing a renewable energy project in a specified location. The information acquired and evaluated should also initiate discussions with willing landowners and influence preliminary project designs necessary for permitting.

Permitting

The permitting process for renewable energy facilities in Maryland is dependent on the size or capacity of the proposed project. Small-scale solar energy projects under two MW and wind energy projects under 70 MW are permitted and approved at the local level in the county or municipality in which the project is located. Generally, local zoning ordinances and other land development controls unique to each community provide the

required renewable energy siting processes in their respective jurisdiction. These local development controls can specify permitted uses and conditional uses, as well as development restrictions on such uses, for example, height limitations, setbacks, and other requirements. As detailed further later in this report, the local land use controls also play a key role in the state siting and permitting process.

Renewable energy projects over two MW are permitted by the Maryland Public Service Commission (PSC) via a Certificate of Public Convenience and Necessity (CPCN) with a few exceptions. The CPCN process is outlined in the following subsections.

Certificate of Public Convenience and Necessity

The CPCN process for permitting utility-scale renewable energy facilities is governed by Maryland Code, Public Utilities § 7-207-209 and codified in the Code of Maryland Regulations (COMAR) Title 20 Subtitle 79 (§20.79)¹². Utility-scale energy generating facilities, or facilities with generating capacity of more than two MW, are required to submit a CPCN application to the PSC for approval before constructing any facilities. Renewable energy developers may alternatively seek a CPCN exemption with PSC approval if the proposed facility meets any of the following conditions:

- On-site generation capacity of up to 25 MW and at least 10% of generated electricity is consumed on-site
- On-site generation capacity up to 70 MW and at least 80% is consumed on-site
- Land-based wind generation capacity not exceeding 70 MW

The CPCN process can be generally described in five phases, which are detailed further in the following sections:

1. Application
2. Proceeding
3. Public Hearing
4. Evidentiary Hearing
5. Final Order

¹² http://mdrules.elaws.us/comar/20_79



Land-based wind energy projects less than 70 MW may request an exemption from the CPCN process but must still obtain approval from the PSC pursuant to the Maryland Public Utility Code §7-207.1. Land-based wind energy is restricted within 46 miles of NAS Patuxent River and requires notification and a public hearing in affected local communities.

Application

The CPCN application filing requirements are outlined in COMAR §20.79.01.03¹³. Additionally, applicants are encouraged to use the EJSreen mapping tool, which allows applicants to capture environmental justice concerns and community relevant scales which create a score of different census tracts in the state. A formal CPCN application may be submitted to the PSC upon fulfilling the application tasks, including:

- Specific information about the proposed energy generating facility, including the location, design features, and implementation schedule
- Whether the applicant has received approval from the local, state, or federal agencies that have authority to approve or disapprove the construction or operation of the project, or a statement of why approval has not yet been obtained at the time of the application
- Compliance with environmental restrictions, including environmental studies prepared by the applicant
- A copy of the applicant’s EJSreen Standard Report¹⁴ or comparable report
- In addition to the PSC, CPCN applicants must provide copies of the CPCN application to 11 state agencies and five federal agencies, as well as any county or local municipality within one mile of the proposed project location according to COMAR §20.79.02.02¹⁵. The 11 state agencies and five federal agencies that CPCN applicants must provide copies of the application to are identified in **Table 3**.

Table 3. State and Federal Agency Coordination with CPCN Applications

State Agencies	
Department of Agriculture	Maryland Aviation Administration
Department of Commerce	Maryland Energy Administration
Department of the Environment	Maryland Department of Health
Department of Planning	Office of People’s Counsel
Department of Natural Resources	State Highway Administration
Department of Transportation	
Federal Agencies	
Federal Aviation Administration	U.S. Department of Interior
Federal Energy Regulatory Commission	U.S. Fish and Wildlife Service
Department of Defense	

Proceeding

The CPCN application submittal initiates the formal PSC CPCN proceeding. The Maryland DNR PPRP is tasked with coordinating the first phase of the CPCN application review process with seven state agencies:

- Maryland Department of Agriculture
- Maryland Department of Commerce
- Maryland Energy Administration
- Maryland Department of the Environment
- Maryland Department of Natural Resources
- Maryland Department of Planning
- Maryland Department of Transportation

¹³ <http://mdrules.elaws.us/comar/20.79.03.03>

¹⁴ <https://www.epa.gov/ejscreen>

¹⁵ <http://mdrules.elaws.us/comar/20.79.02.02>

Each agency reviews the information provided in the application and evaluates the potential adverse and beneficial impacts of the proposed project (e.g., land use impacts, biological impacts, economic impacts, or transportation impacts). Following the review and evaluation of the CPCN application, each state agency provides a notice of approval or disapproval to the PPRP, as well as recommended licensing conditions. The PPRP presents the evaluation and recommendations provided by each state agency as testimony in the PSC evidentiary hearings. The PSC considers each request to

Any individual, county, advocate, or organization may petition as an intervening party during the proceeding, pursuant to Public Utilities Article §3-106.

intervene and determines whether the interests of the petitioner are adequately represented by another party to the proceeding. If necessary, the PSC will also consider informing the petitioning party whether the issues they raise are irrelevant or immaterial.

Public Hearing

A CPCN application requires at least one public hearing at a location near the proposed project location and before the PSC evidentiary hearing. Notifications of this public hearing are required to



Photo Credit: chesapeakeclimate, Flickr

be sent to local governing bodies (i.e., counties or incorporated municipalities), as well as posted in local newspapers and the PSC website and social media accounts.

Evidentiary Hearing

Before the evidentiary hearing, formal parties to the proceeding (both statutory parties and intervening parties) are allowed to submit pre-filed written testimony, which may be entered into the evidentiary record during the evidentiary hearing. The evidentiary hearing may last one day to multiple days at which the parties may present evidence and cross-examine witnesses, like a court trial. Following the evidentiary hearing, the hearing examiner or Commission may allow the parties to file post-hearing briefs.

PSC Final Order

The PSC issues a final order, or determination, on the CPCN application following both the public and evidentiary hearings. Under Public Utilities Article §7-207¹⁶, the PSC’s final order on a CPCN application must consider the recommendation provided by the local governing bodies where the project is proposed, the proposed project’s consistency with local comprehensive plans, and zoning regulations, as well as the PPRP’s testimony.

Although recommendations from the local governing bodies and state agencies are considered in the final order, the PSC ultimately has the final decision on CPCN applications. The PSC is required to consider the evidence in the record, including the parties’ testimonial evidence, concerning the project’s effect on the stability and reliability of the electric system, economics, esthetics, historic sites, aviation safety; where applicable, air quality, and water pollution, and the availability of means for the required timely disposal of wastes produced by any generating station. Any party may appeal the PSC’s final order in circuit court.

PSC Rulemaking 72 (Enhanced Local Jurisdiction Participation)

The Maryland PSC approved Rulemaking 72¹⁷ amending COMAR §20.79 on August 10, 2021. Rulemaking 72 includes amendments to COMAR §20.79 related to the CPCN process including a

¹⁶ <https://law.justia.com/codes/maryland/2005/gpu/7-207.html>

¹⁷ <https://www.psc.state.md.us/wp-content/uploads/RM72-Notice-Initiating-CPCN-Rulemaking.pdf>



requirement for developers to hold a pre-application meeting with staff from affected counties and local municipalities at least 90 days before submitting a formal CPCN application and submit a draft environmental review, conceptual site plan, as well as information describing the CPCN process. Following the pre-application meeting, county and/or municipal staff are encouraged to provide a report citing whether the proposed energy generating facility is consistent with their respective comprehensive plan and zoning ordinance.

Further, if development approval by affected counties and/or local municipalities is not obtained before submitting a CPCN application, the applicant must include a description of their efforts to consult and resolve issues with the affected respective jurisdiction.

Interconnection Agreement

The Federal Energy Regulatory Commission (FERC) requires all energy-generating facilities, including renewable energy facilities, that connect to an electric distribution system or grid to receive an interconnection agreement from the transmission operator or provider. Interconnection standards for small generator facilities, or facilities with a generating capacity of 10 MW or less, are codified in COMAR §20.50.09. A renewable energy developer of a small generator facility, after receiving CPCN approval, must submit an interconnection request to the electric utility owner of the electric distribution system their project will connect to. Large generator facilities, or facilities with a generating capacity of over 10 MW, must apply to PJM Interconnection, LLC (PJM), under the authority of FERC. PJM is a FERC accepted Regional Transmission Organization and is responsible for assuring the transmission of safe and reliable electricity within its territory, covering the entire State of Maryland.

The PJM interconnection request is a critical component of renewable energy development. The process requires that applicants conduct feasibility, impact, and facility studies, all of which take up to three years to complete. Additionally, applicants are required to finalize agreements for interconnection service, construction service or upgrade construction service, and wholesale market participation. All interconnection requests

submitted to PJM are entered into the PJM Interconnection Queue. PJM conducts a series of studies for each project in the Queue to determine if a project can safely connect to the grid. PJM grants an Interconnection Service Agreement once their review and studies are complete. Further information may be found in the interconnection process overview prepared by PJM¹⁸.

4.2 Federal Onshore Siting Review Process

The FAA Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) review process is codified by **49 United States Code (USC) Sections 44718, Structures Interfering with Air Commerce or National Security and 47101, Policies**. Title 14 CFR Part 77 authorizes the FAA to collect the information required for analysis. The OE/AAA review is required for certain proposed construction or alterations to existing structures to determine if the structures:

- Are obstructions to air navigation and navigational/communication facilities
- Require aeronautical studies

Reviews are initiated via **FAA Form 7460-1, Notice of Proposed Construction or Alteration**, which developers are required to file under certain criteria. The OE/AAA review process will trigger a military review as well under 49 U.S. Code § 44718, depending on the location of the obstruction. To promote air safety and the efficient use of navigable airspace, aeronautical studies are conducted based on information provided by an applicant via FAA Form 7460-1. Requirements for filing a Form 7460-1 on proposed structures are based on several factors including height, proximity to an airport, location, and frequencies emitted from the development. Per the OE/AAA process, the FAA requests filing of Form 7460-1 90-120 days before planned construction if:

- Height exceeds 200 feet AGL
- Location is near or within an airport/heliport, approach/departure area, or navigation facility that may impact assurance of navigation and signal reception
- Emitted frequencies do not meet FAA co-location policy
- Filing is requested directly by the FAA

¹⁸ <https://www.pjm.com/-/media/committees-groups/task-forces/iprtf/postings/interconnection-process-overview.ashx>

FAA OE/AAA Process Triggering Military Review

Title 32 CFR Part 211, Mission Compatibility Evaluation Process¹⁹, outlines the structured process for developers to request a mission compatibility evaluation of proposed energy projects from the Military Aviation and Installation Assurance Clearinghouse (Clearinghouse), which was established in 2011 by Congress to review proposed wind, solar, transmission, and other projects which may affect military operations. Though the Clearinghouse review assists in mitigating adverse impacts on operations and readiness, the review intends to:

- Determine if projects pose an unacceptable risk to the national security of the United States
- Protect the DoD's mission capabilities from incompatible energy development
- Increase the resiliency of the commercial electrical grid in the United States

Title 49 U.S. Code § 44718 states the administrator of the FAA is obligated to develop procedures allowing the DoD to review and comment on an aeronautical study before the study completion. The FAA makes final determinations based on the aeronautical study findings and will issue either a Determination of Hazard or No Hazard to Air Navigation. FAA Determination of No Hazard to Air Navigation may still include conditional provisions of the determination, limitations as needed to minimize potential impacts, supplemental notice requirements, or marking and lighting recommendations as identified in **14 CFR § 77.31, Determinations**.

As part of the aeronautical study and per **10 U.S. Code § 183a, Military Aviation and Installation Assurance Clearinghouse for Review of Mission Obstructions**²⁰, the Secretary of Defense will make a finding on whether the construction or alteration of a structure results in unacceptable risk to the national security. These findings are transmitted to the Secretary of Transportation for inclusion in the final report.

Under 10 U.S. Code § 183a (c)(6), if an energy project proposal is located within a Military Training Route (MTR) or in a radar viewshed that the DoD owns or operates in, the applicant must file a request for the Clearinghouse to review the project at least one year before construction. Additionally, this law allows for the DoD to designate geographic areas of concern where adverse impacts on military operations and readiness may exist solely to inform preliminary evaluations of proposed projects. Geographic areas of concern are not exclusion zones.

Military Aviation and Installation Assurance Clearinghouse Formal Review

The Clearinghouse formal review process, described in **Title 10 USC § 183a, Military Aviation and Installation Assurance Clearinghouse for Review of Mission Obstructions**²¹ applies to projects filed with the Secretary of Transportation's Federal Aviation Administration (FAA). This process addresses all impacts on military operations from energy projects filed with the FAA. The Clearinghouse then provides information about proposed projects to all stakeholders in the Military Departments and DoD components. This coordination generally includes potentially affected military installations for input on local impacts. Once technical and operational studies are complete, the Clearinghouse submits a unified DoD position of findings to the FAA as part of the OE/AAA review.

If DoD findings state that a project may pose unacceptable impacts to national security, the Clearinghouse will seek to mitigate those impacts before submitting a negative recommendation to the FAA. The applicant is then asked to participate with the DoD in a partnership called a Mitigation Response Team (MRT) to explore potential mitigation opportunities while ensuring the continuation of DoD operations, testing, and training, as well as energy development. Local military facilities are key participants in the MRT discussions. Mitigation opportunities may include site modifications, upgrades to military systems, curtailment agreements, or other feasible impact reduction strategies.

¹⁹ <https://www.law.cornell.edu/cfr/text/32/211.7>

²⁰ [https://uscode.house.gov/view.xhtml?req=\(title:10%20section:183a%20edition:prelim\)%20OR%20\(granuleid:USC-prelim-title10-section183a\)&f=treesort&edition=prelim&num=0&jumpTo=true](https://uscode.house.gov/view.xhtml?req=(title:10%20section:183a%20edition:prelim)%20OR%20(granuleid:USC-prelim-title10-section183a)&f=treesort&edition=prelim&num=0&jumpTo=true)

²¹ <https://www.govinfo.gov/app/details/USCODE-2017-title10/USCODE-2017-title10-subtitleA-part1-chap7-sec183a>



Military Aviation and Installation Assurance Clearinghouse Informal Review

The Clearinghouse encourages all developers to take advantage of the informal military review as early as possible in the siting process. **Title 32 CFR § 211.7** establishes the informal review process. These reviews are typically initiated by the developer and recommended in the early stages of the siting process for energy facilities. Though there may be no definitive plans, early engagement is key to this review process. The goal is to identify areas of potential impact and once identified, refer the applicant to the appropriate DoD stakeholder for further discussion within five days of receiving the request. The Clearinghouse will work with the Military Departments to identify any potential impacts on military operations from any renewable energy project or transmission line. If the review identifies potentially significant impacts on operations, the response will include military points of contact for further discussion. Developers may initiate the review through the Clearinghouse website and should receive an answer within 75 days.

The Clearinghouse responds to the applicant with one of three findings:

- The determination that the project will have no adverse impact on military operations and readiness
- The determination that the project will have an adverse impact on military operations and readiness but that the adverse impact involved is sufficiently attenuated that it does not require mitigation
- The determination that the project will have an adverse impact on military operations and readiness

While the DoD determination during informal review does not replace the formal review, if the project does pose a concern, the DoD will identify any feasible and affordable actions that could be taken by the Department, the developer of such energy project, or others to mitigate the adverse impact. Case studies on the variety of mitigation opportunities are detailed in an American Wind Energy Association report published in May of 2018.

As the report also notes, if mitigation cannot be identified or agreed to, developers cancel proposed projects even before DoD formally objects. No energy facility has been built over a DoD objection. Most cases in the state of Maryland do reach a mitigation agreement to protect military interests while promoting renewable energy growth in the state.

4.3 Federal Offshore Siting Process

The Energy Policy Act of 2005 authorized BOEM to manage the siting and permitting of offshore renewable energy development in federal waters, or what is considered the OCS beginning three nautical miles off the coast of Maryland²². BOEM's renewable energy permitting process in the OCS is codified in Title 30 CFR §585²³. BOEM groups the regulations in Title 30 CFR §585 into four phases:

1. Planning and Analysis
2. Lease Issuance
3. Site Assessment
4. Construction and Operations

To help guide the planning and siting of renewable energy in the OCS, BOEM establishes Intergovernmental Renewable Energy Task Forces. These task forces are established in 14 coastal states, including the State of Maryland, and are comprised of federal, state, and local officials, as well as federally recognized tribes. The agencies represented in the Maryland Renewable Energy Task Force include those identified in **Table 4**. The DoD participates in the BOEM siting process as outlined in DoDI 4180.2 in each of the phases listed below and will engage with the project developer once a lease is awarded.

²² <https://www.boem.gov/sites/default/files/documents/about-boem/Wind-Energy-Comm-Leasing-Process-FS-01242017Text-052121Branding.pdf>

²³ <https://www.ecfr.gov/current/title-30/chapter-V/subchapter-B/part-585?toc=1>

Table 4. Maryland Renewable Energy Task Force Member Agencies

Federal		
<ul style="list-style-type: none"> ■ Bureau of Indian Affairs ■ Bureau of Safety and Environmental Enforcement ■ Department of Defense ■ Department of Energy ■ Department of Homeland Security ■ Department of Transportation 	<ul style="list-style-type: none"> ■ Environmental Protection Agency ■ Federal Aviation Administration ■ Federal Energy Regulatory Commission ■ Federal Emergency Management Agency ■ NASA ■ National Oceanic and Atmospheric Administration 	<ul style="list-style-type: none"> ■ National Park Service ■ U.S. Army Corps of Engineers ■ U.S. Coast Guard ■ U.S. Navy ■ U.S. Fish and Wildlife Service
State		
<ul style="list-style-type: none"> ■ Maryland Department of Natural Resources ■ Maryland Department of Commerce ■ Maryland Department of the Environment 	<ul style="list-style-type: none"> ■ Maryland Department of Planning ■ Maryland Department of Transportation ■ Maryland Energy Administration 	<ul style="list-style-type: none"> ■ Maryland Public Service Commission ■ State of Maryland Executive Department
Local		
<ul style="list-style-type: none"> ■ Town of Berlin 	<ul style="list-style-type: none"> ■ Town of Ocean City 	<ul style="list-style-type: none"> ■ Worcester County
Tribal		
<ul style="list-style-type: none"> ■ Shinnecock 		

Planning and Analysis

BOEM’s initial planning and analysis phase seeks to identify suitable areas for wind energy leasing in the OCS via a Call for Information and Nominations. Potential lease areas are identified through a collaborative review process, which engages with state and federal agencies, Tribes, and other stakeholders. At this point, BOEM also conducts environmental compliance reviews and consultations with natural resource agencies, States, and Tribes.

Lease Issuance

Once lease areas are identified in the planning and analysis phase, BOEM initiates a competitive or non-competitive leasing process to attract bidders. The issuance of a lease provides the lessee with rights to conduct further site analysis in the lease area. The issuance of a lease does not permit the lessee the right to develop and construct facilities.

Site Assessment

Lessees are required to submit a Site Assessment Plan (SAP) upon obtaining a lease from BOEM and before conducting site analysis activities, such as installing a meteorological tower and/or meteorological buoys. The SAP outlines the type of testing that will be conducted and how it will be conducted.

Construction and Operations

A Construction and Operations Plan (COP) must be submitted and approved by BOEM before initiating development. The COP identifies all planned facilities, including both onshore and offshore support facilities and easements.

The BOEM renewable energy lease process may be initiated by any party, public or private.



5.0 Illustrative Mitigation Options

There are various methods for mitigating the adverse impacts of renewable energy on military operations. The following are examples of opportunities for mitigation between the military and renewable energy developers. Whether a specific mitigation option is relevant or feasible in a particular situation will be discussed between DoD and the project proponent. To the extent they cannot be addressed, developers cancel the proposed projects. **Appendix A, Best Practice Recommendations**, provides specific opportunities where coordination efforts may be enhanced to mitigate concerns earlier in the project planning process.

5.1 Adjustments to Proposed Construction

The relocation of proposed vertical obstructions, to include renewable energy, transmission lines, and communications towers could mitigate impacts on military operations if coordinated early in the development process. These obstructions may be relocated outside military airspace or radar viewsheds to a location that is less critical airspace to military operations, based on local inputs from installations. Early engagement in the planning process has proven successful in the past. As further described earlier in this report, prior experience indicates that DoD concerns can often be addressed in mitigation discussions with project developers.

5.2 Coordinated Suspension of Renewable Energy Operations

In partnership with wind energy operators, the military has developed agreements whereby the project operators agree to temporarily suspend (or “curtail”) spinning turbines and electric generation during certain military testing, training, and operations events. These types of partnerships or agreements should include coordination protocols, including points of contact and the number of hours per year in which the military can request the suspension of energy-generating activities.

5.3 Adding or Reprogramming Radars

Adding radars requires financial investment but will increase the overall radar viewsheds impeded by renewable energy projects. Title 10 USC 183a(f) authorizes DoD to “request and accept” a voluntary contribution of funds from an energy project proponent to offset the cost to the DoD of mitigating adverse impacts from energy development. Additionally, radars can be reprogrammed to ignore doppler interference at a specific location if properly identified. Radar interference working groups including military and renewable energy development partners may help establish the best way forward to mitigate radar interference.

5.4 Military Installation Buffer Zones

As observed in Prince George County, counties or cities can recognize military buffer zones in local zoning regulations. While Maryland’s state and federal coordination requirements are robust, creating buffer zones around military installations can protect those immediate areas around the installation in local zoning regulations. These buffer zones add an extra layer of protection by identifying areas where further land-use protections are required to protect the safety of the public and reduce potential encroachment impacts on military missions. These buffer zones typically add a step to coordinate directly with the local installation before new or redevelopment within an identified radius around installations.

5.5 MTR Realignment

Though the process may take time, realignment of some MTRs may be possible to avoid key areas for renewable energy development as identified earlier in this report. This option is however limited due to the cost and lengthy processes/regulatory requirements to complete such actions.



For examples of more than 40 agreements signed between DoD and project developers, visit the **Military Aviation and Installation Assurance Siting Clearinghouse website**.

Conclusion

As outlined in this report, military operational areas in Maryland are vital assets to each installation's ability to accomplish missions in support of national security objectives. These military operational areas provide the only air and sea space in the nation where the military can effectively conduct research, testing, training, development, and evaluation activities. Conversely, the presence of these military operational areas has the potential to impact renewable energy development, particularly when the military operational areas intersect with the more viable areas for renewable energy development such as wind and solar.

The potential for wind energy development at lower hub heights is greatest in the western portion of the state, where there are fewer military operational areas. Because military operations in these areas are minimal, they are more conducive to unfettered renewable energy development due to fewer impacts on the military. Continuance of the existing federal review processes summarized in this report and DoD's participation in the state process, as outlined in COMAR §20.79.01.06, is key to keeping open lines of communication between all stakeholders to meet the state's renewable energy goals.

Areas on the Eastern Shore where there is greater potential for wind energy development can have a greater impact on military operations and potential to be impacted by military operations, due to the presence of military operational areas, including MTRs, low-level helicopter operations, and radar viewsheds. The potential for offshore wind energy development in Maryland territorial waters (shore out to 3 nm) is minimal, but there is significant wind energy potential in federal waters (beyond 3 nm). The existing lease areas off the Maryland coast present some of the same concerns as with onshore development due to the unique testing and training missions that occur within this area and the radar viewshed that extends over the Atlantic Ocean. These areas are where early coordination with DoD and other stakeholders is

most important through the BOEM siting process explained in **Section 4.3**. Recommendations aimed at addressing compatibility between wind energy project sitings and military operations are included in **Appendix A, Best Practice Recommendations**.

The potential for solar energy development is dispersed throughout the state, with strong solar resources both within and outside of military operational areas. As described in **Section 2.1**, although impacts to the military are minimal, they should still be addressed in any solar siting closer to installations and radar sites. Recommendations aimed at addressing compatibility between solar project sitings and military operations are included in **Appendix A**, separate from recommendations related to wind energy project sitings due to the smaller geographic areas of concern. These areas are also identified in the Smart DG+ military interface as the solar frequency and aviation solar consultation areas.

Although critical infrastructure, transmission lines that connect and distribute renewable energy to the power grid have the potential to adversely impact localized military operational areas. As such, transmission lines must be also properly coordinated with the military to ensure compatible development. The current state and federal siting processes as explained in **Section 4.0** of this document are important components to assuring potential impacts from renewable energy development do not pose hazards to national security objectives.

While **Section 5.0** provides illustrative examples of mitigation options for renewable energy developers and the military, the Best Practice Recommendations identified in **Appendix A** provide specific opportunities where enhancements can be made to existing coordination efforts in the state of Maryland. Recommendations focus on community and utility-scale renewable energy projects and include options for administrative, regulatory, or legislative changes to the current renewable energy



siting process in the state. They are intended to enhance existing coordination procedures, identify areas for improvement at the local level, as it pertains to community-scale projects.

In addition to the report, a military operations interface was added to the existing Smart DG+ tool which contains geographic data for all military operational areas and relevant points of contact for developers to use for coordination when identifying potential sites for renewable energy projects. The goal of this enhancement is to promote early coordination efforts and compatibility between military operations and renewable energy development. **Appendix B, Case Studies**, provides an examination of two real-world scenarios – Caroline and St. Mary’s counties, explaining their existing coordination processes with the military and how SmartDG+ can be integrated to facilitate early coordination. **Appendix C, Model Ordinances**, provides regulatory language and guidance for small-scale wind energy development and utility-

scale and small-scale solar energy development, including military coordination.

This report, along with the Smart DG+ tool military interface, and the best practice recommendations were created to identify opportunities where early communication and coordination efforts may be enhanced to continue the support of national security efforts and promotion of renewable energy goals in the state of Maryland.

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APPENDIX

A

Best Practice Recommendations Overview

As part of the Maryland Compatible Energy Siting Project and with the goal to support compatible renewable energy development, Best Practice Recommendations were developed to enhance coordination for renewable energy siting between the military, state agencies, local governments, and renewable energy developers.

To develop the recommendations, renewable energy policies and legislation at the state level were reviewed from across the United States. The policies and legislation were evaluated for their comprehensiveness, capacity to address coordination with the military, and their overall effectiveness in achieving coordination. An evaluation of current Maryland siting processes for renewable energy relative to other state legislation, and opportunities to integrate military coordination within existing state and local government processes in Maryland, were identified, including the state CPCN process. A shortlist of “best practice” recommended process and legislative enhancements were developed, presented, and reviewed by the project Steering Committee through a questionnaire and discussion at Steering Committee meetings and input via email.

The Best Practice Recommendations comprise 18 strategies focusing on enhancing review processes for military coordination of wind and solar energy projects. Strategies primarily focus on:

- Requiring early notification for renewable energy siting projects
- Requesting informal review from local military installations on siting of projects
- Ensuring any potential conflicts are resolved during the planning phase
- Enacting siting guidelines implementing the use of the Smart DG+ tool

The Steering Committee reviewed 13 of the 18 recommendations from December 2021 to February 2022 in the form of a questionnaire worksheet. Comments received from Steering Committee members and county stakeholders reflect the various positions of the committee and are depicted in **Table A-1**. The remaining five recommendations were reviewed by the Steering Committee during the final draft report review period in March and April 2022.

The recommendations and responses do not express the views or opinions of all Steering Committee members and do not comprise actions for the Steering Committee to take. This report does not take a position on the recommendations based on the Steering Committee feedback, but rather *impartially presents the feedback for consideration of the owner who controls the process subject to each recommendation for their evaluation and implementation and determination as to whether recommendations become guidance or mandates.*

Of the 28 Steering Committee members, comments were received by 11 members and 3 counties who provided feedback through the Association of Counties Steering Committee member. The following organizations provided comment:

- Maryland Department of Commerce, Office of Military and Federal Affairs (comments incorporated prior to Steering Committee distribution)
- Maryland Department of Planning
- Maryland Energy Administration
- Maryland Public Service Commission
- Power Plant Research Project / Department of Natural Resources
- Joint Base Andrews
- National Research Laboratory
- Naval Air Warfare Center Aircraft Division
- American Clean Power Association
- Utility-Scale Solar Energy Coalition of Maryland
- Mid-Atlantic Renewable Energy Coalition
- Saint Mary's County – Department of Land Use and Growth Management
- Howard County – Office of Community Sustainability and Department of Planning and Zoning
- Queen Anne's County – Planning and Zoning

Steering Committee members who did not provide comments are not assumed to imply support or objection to the recommendations. Table A-1 presents the list of recommendations and all responses as they were submitted regardless of support or opposition. In cases where comments were received as questions, additional responses from the project team are provided. The table displays the recommended organizations responsible for implementation, committee member group, support for the recommendation (Yes, No, Unsure, or No Opinion), and comments from the Steering Committee members, as applicable.



Table A-1. Best Practice Recommendation Responses

Recommendation 1: Administratively require developers of community and small-scale wind energy projects to demonstrate coordination with the military at the time of development application to the county or municipality.

Proof of coordination may include:

- Checkbox on the development application that coordination has occurred
- Coordination Report for the subject property from SmartDG+ tool
- Signed letter from affected military partners
- Mitigation letter from the DoD Clearinghouse (as applicable)

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Energy Administration	Yes	Due to the low effort it will take for the community/municipality to provide proof of coordination with the military and the benefits of ensuring engagement with military stakeholders at the beginnings of the application, this is supported with the contingency that this does not apply to residential systems as providing this proof of coordination would be too large of a burden on small scale developers for residential systems.
	Maryland Public Service Commission	Yes	This falls outside the purview of the PSC. Overall, it's a good idea to have developers put military operations on notice of forthcoming/planned projects and coordinate efforts ahead of time. For community solar and solar generation under 2 MW in capacity, these are largely outside the PSC CPCN requirement. This Recommendation does not specifically call out generation under 2 MW, so if "small-scale" contemplates units slightly larger than 2 MW, there may be a need to seek CPCN exemption from PSC. Having proof of coordination would be helpful, although it is presently not a requirement for seeking an exemption.
	National Research Laboratory	Yes	No Comment
	Joint Base Andrews	Yes	If the checkbox is legally sufficient (i.e., can stand up in court as required "demonstrated coordination with the military"), then keep it as an example of proof. If not, then remove this as an example of proof. - I don't believe a signed letter from affected military partners will be legally sufficient since the OSD Siting Clearinghouse, using the OE/AAA process, should be the primary entity for mitigating energy development impacts on DoD missions. Suggest removing this from the list of examples of proof.
	Saint Mary's County, Department of Land Use and Growth Management	Yes	Mary's County Zoning Ordinance for Small Wind Energy: Approval of the building permit shall be subject to a determination by appropriate personnel affiliated with Patuxent River Naval Air Station as to noninterference with military activities. The Commissioners this morning passed a Solar Ordinance. All plans for solar will be sent to PAX River for review.
	Utility Scale Solar Energy Coalition of Maryland	No	We categorically reject the premise that you combine all renewable energy development projects into one bucket. Case in point, both examples cited in support of this recommendation are wind projects near military bases. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Community wind projects are just one or two turbines and have similar height and airspace concerns as large-scale wind farms and both should have similar requirements to coordinate with the military. The military should similarly be required to take measures to mitigate or avoid conflicts with proposed projects.
	Maryland Dept of Planning	Unsure	To reduce the level of effort for developers and military personnel and potentially local planning staff, while also maximizing the coordination impact, maybe in lieu of signed letters the same impact could be accomplished with email or some web-based application that allows developers to communicate virtually with military staff and then email or otherwise electronically submit to the local planning staff. The recommendation says local governments are responsible parties, but the example includes an Oklahoma statewide requirement. Or is this a suggested legislative requirement that is only implemented by local governments? Project Development Team Response: The background information was provided as a baseline of how other states have addressed this coordination and though a legislative example was provided, this recommendation could be implemented through legislation (as a requirement) for counties and municipalities to adopt and administer or as a voluntary action for counties and municipalities to adopt and administer.
	Naval Air Warfare Center Aircraft Division	Unsure	Need a definition of small scale and what type of renewable. Some small-scale renewable energy projects like residential rooftop PV solar or PV solar projects serving a single building wouldn't need any coordination. However, single wind turbines, even residential could pose a risk to military missions depending on location. Potentially a copy of an e-mail from a dot-mil address would be sufficient proof
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
	American Clean Power Association	No Opinion	No comment
Mid-Atlantic Renewable Energy Coalition	No Opinion	No comment	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 2: Administratively require developers of utility-scale wind energy projects, if applicable, to demonstrate coordination with the military at the time of application to the county or municipality.

Proof of coordination may include:

- Checkbox on the development application that the application has gone through the CPCN process
- Coordination Report for the subject property from the SmartDG+ tool
- Documentation of PSC approval

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Energy Administration	Yes	Utility scale renewable energy projects are larger than community and small-scale projects and will therefore hold the potential to pose a significant impact on military operations. As such, coordination with military stakeholders at the time of application should be done to ensure mitigation efforts are included in the renewable energy project planning.
	Maryland Department of Planning	Yes	To reduce the level of effort for developers and military personnel and potentially local planning staff, while also maximizing the coordination impact, maybe in lieu of signed letters the same impact could be accomplished with email or some web-based application that allows developers to communicate virtually with military staff and then email or otherwise electronically submit to the local planning staff. The recommendation says local governments are responsible party, but example includes an Oklahoma statewide requirement. Or is this a suggested legislative requirement that is only implemented by local governments? Project Development Team Response: The background information was provided as a baseline of how other states have addressed this coordination and though a legislative example was provided, this recommendation could be implemented through legislation (as a requirement) for counties and municipalities to adopt and administer or as a voluntary action for counties and municipalities to adopt and administer.
	Maryland Public Service Commission	Yes	Utility scale projects will likely require a CPCN review or CPCN exemption from the PSC. To the extent this requirement is unrelated to the CPCN review process--i.e., that it is applicable after the Developer has received a CPCN from the PSC--the PSC does not oppose such a requirement. Generally, it's a good idea to have developers put military operations on notice of forthcoming/planned projects and coordinate efforts ahead of time. If this is required as part of CPCN application--for PSC consideration as part of the CPCN approval process--it will likely require a rulemaking, and the PSC would adopt a No Opinion position.
	Joint Base Andrews	Yes	If the checkbox is legally sufficient (i.e., can stand up in court as required "demonstrated coordination with the military"), then keep as an example of proof. If not, then remove this as an example of proof. - Suggest adding "Mitigation letter from the DoD Siting Clearinghouse (as applicable)" to the list of examples of proof.
	Naval Air Warfare Center Aircraft Division	Yes	Would anticipate needing a letter from the Military Aviation and Installation Assurance Siting Clearinghouse for large renewable energy projects. Possibly an OE/AAA form that showed a determination of no hazard. I don't believe that the PSC or CPCN process would meet this requirement as I don't believe the PSC requires the developer to do any military coordination
	National Research Laboratory	Yes	No Comment
	Saint Mary's County-- Department of Land Use and Growth Management	Yes	St. Mary's County will not have utility-scale wind because of PAX River. Utility-scale solar will be sent to PAX River for review
	American Clean Power Association	No	ACP does not support the state imposing this requirement on local jurisdictions. If local jurisdictions want to establish this requirement, they should do so through a normal public process that allows for comment.
	Utility Scale Solar Energy Coalition of Maryland	No	We categorically reject the premise that you combine all renewable energy development projects into one bucket. Case in point, both examples cited in support of this recommendation are wind projects near military bases. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Wind projects have unique height and airspace concerns that merit coordination with the military. In our experience, even when mitigation is available to address military concerns, the military declines to engage and simply kills the wind project. Therefore, we would support limitations on the military and an obligation to take measures to mitigate or avoid conflicts with proposed projects where feasible.
	Mid-Atlantic Renewable Energy Coalition	No	Given that projects already coordinate with the DoD and require PSC approval, requiring local governments to formulate duplicative rules adds unnecessary complexity for developers as well as local government
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	The CPCN process is very rigorous and already includes this type of coordination with the military. Requiring similar local effort is not necessary.
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	



Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 3: Include military installation participation on technical review committees for wind energy and for solar energy projects within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+, that require conditional or special use approval.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Energy Administration	Yes	Having local military personnel participate in siting discussions via a technical review committee engages military stakeholders in project planning discussions and has the potential to mitigate any negative impacts of renewable energy project planning and development on military operations. This initiative is low effort to implement and including military stakeholders in technical review committees will benefit the project planning and development process.
	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	Military would have an opportunity to review simultaneously with other local government agencies. Timelines would be established by the local government to ensure military comments are received in a timely fashion. Would not preclude developers from contacting military before application to get an informal review
	Joint Base Andrews	Yes	This already occurs, or should already occur, if the project has been inputted into the OE/AAA process. - If the Level of Impact box is indeed High, change the color of the box to red.
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	The Community Planning Liaison Officer at PAX River is sent all plans that go to TEC.
	American Clean Power Association	No	ACP opposes this recommendation. It is duplicative of the existing federal review process, in which individual military installations play a central role in the evaluation of potential impacts and discussion of potential mitigation with project developers. The rationale for this recommendation is that it brings installations to the table early in the development process. However, this recommendation is not necessary to do that. Under federal law (10 USC 183a(c)(7)), developers are already expected to engage with DoD at least one year before expected construction. In practice, developers often file projects informally with DoD or formally through the FAA, which then triggers DoD's formal review, well before then given the time it can take to get through the review process and to try to identify potential fatal flaws for the project as early as possible.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. As with other examples where the proposal is to impose coordination requirements on solar projects, your examples of where this approach has been implemented in other states reference only wind project impacts near military bases. This fact supports our contention that this effort should not apply to solar projects of any kind and that by looping in renewable energy projects together in your questions, the methodology used in seeking this group's feedback is going to produce meaningless/skewed feedback. Solar should not be part of this process unless it's within or adjacent to a military airfield (same with housing developments, shopping centers, poultry houses, greenhouses, etc.)
	Mid-Atlantic Renewable Energy Coalition	No	The DoD Clearinghouse process exists to ensure that energy projects are compatible with the military. Again, this proposed local requirement would be duplicative of the existing federal review process, which considers individual military installations/operations. More generally, is there any reason why renewable energy is singled out for any of these requirements? There are potential impacts from other sources of energy generation on the military.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Maryland Dept of Planning	Unsure	The recommendation says local governments are responsible parties, but the example includes a North Carolina statewide requirement. Or is this a suggested legislative requirement that is only implemented by local governments? Project Development Team Response: The background information was provided as a baseline of how other states have addressed this coordination and though a legislative example was provided, this recommendation could be implemented through legislation (as a requirement) for counties and municipalities to adopt and administer or as a voluntary action for counties and municipalities to adopt and administer.
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	
Maryland Public Service Commission	No Opinion	Presumably, this would happen before the CPCN application is filed for utility-scale projects.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 4: Jurisdictional planning agencies notify military installations, utilizing the SmartDG+ tool for points of contact, of the adoption or substantial amendment to regulations for wind energy projects. This can be accomplished via e-mail, mailed letter, or other best method of contact for the installation/jurisdiction.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Joint Base Andrews	Yes	No Comment
	National Research Laboratory	Yes	No Comment
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	St. Mary's County hired Chesapeake Conservancy for a Solar Siting Report for the county. Ordinances and amendments are sent to PAX River for review.
	Maryland Energy Administration	No	The level of effort to administer this task far outweighs the potential impact it has on military operations. Military stakeholders are already engaged in the project planning and development process and even more when projects are utility-scale in size. Additionally, the SmartDG+ tool should not be the primary method for locating the correct point of contact for a specific military installation, and it should not be a requirement for developers to use.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Solar farms should be no more exposed to this kind of policy than other forms of development that are higher profile such as housing developments, commercial centers, poultry houses, greenhouses, etc.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Maryland Dept of Planning	Unsure	The recommendation says local governments are the responsible party, but the example includes a California statewide requirement. Or is this a suggested legislative requirement that is only implemented by local governments? Project Development Team Response: The background information was provided as a baseline of how other states have addressed this coordination and though a legislative example was provided, this recommendation could be implemented through legislation (as a requirement) for counties and municipalities to adopt and administer or as a voluntary action for counties and municipalities to adopt and administer.
	Naval Air Warfare Center Aircraft Division	Unsure	This seems to shift a lot of coordination burden on local governments. Local governments typically advertise public hearings when they have major revisions to local ordinances. The military could monitor government websites and news outlets to be informed of these events.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
	American Clean Power Association	No Opinion	No comment
	Mid-Atlantic Renewable Energy Coalition	No Opinion	No comment
Maryland Public Service Commission	No Opinion	PSC rulemakings are available to the public, and public notice is always given. Military community may not be actively monitoring PSC activities. The Developer could, in its coordination efforts, provide military operations with a listing of applicable regulations for renewable energy projects. Alternatively, a military operations POC could monitor PSC activities regularly for new regulatory developments	



Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 5: Model Renewable Energy Siting Ordinance (where they do not exist) for localities defining military coordination for utility, community, and small-scale wind energy facilities.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	If properly written into ordinance the burden could be managed.
	Joint Base Andrews	Yes	No Comment
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	St. Mary's County hired Chesapeake Conservancy for a Solar Siting Report for the county. Ordinances and amendments are sent to PAX River for review.
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	The solar ordinance passed today might be a model ordinance - the commissioners appointed a solar task force, a solar siting analysis and report was done, the solar task force recommended what should be included in an ordinance. When the ordinance went to public hearing agriculture interested groups wanted a prohibition on prime ag soils, farmland of statewide importance, and Rural Legacy Areas. The CSMC voted to exclude the areas as recommended by the ag interest. Per the Chesapeake Conservancy solar siting report, St. Mary's County can easily meet the renewable energy goal using only solar with including productive farmland.
	American Clean Power Association	No	ACP opposes this recommendation, at least concerning utility-scale (2 MW and above) facilities. First, utility-scale facilities are generally permitted by the MD PSC. In that context, this draft recommendation does not make sense since it is proposing a model ordinance for authorities that don't generally permit utility-scale facilities. Second, this recommendation presumes there is a gap in industry coordination with the military when, in fact, there is none given the existing federal review process (both FAA and DoD). There is also a risk that the more layers of regulation (local, state, federal) a proposed project faces, the higher the probability of getting different answers on the same military compatibility questions, which creates unnecessary uncertainty.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. The examples you use for this proposed element include a draft ordinance for Los Angeles County from 2015 that was not adopted. The list of considerations proposed would presumably impact a wide range of uses, including any use that releases "steam, dust, or smoke"...these features may apply to a broad range of uses including the over 1 million acres of active farmland across Maryland. This emphasizes why including solar developments under a "renewable energy" umbrella is not a reasonable approach and is going to skew results in this group's responses.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Maryland Energy Administration	Unsure	While this only impacts localities where renewable energy ordinance is not already modeled, modeling renewable energy siting ordinances is a lengthy and in-depth process. It would be beneficial for all counties to have renewable energy ordinances modeled, but the amount of time and effort it would take to do this may make it too difficult to implement.
Maryland Dept of Planning	Unsure	Although the initial level of effort is high for the administrator on this one, the longer-term benefits toward standardizing coordination with the military for these projects seem worthwhile. Model ordinances are typically created by an organization or entity separate from a county or municipal government, and then used by such a government for developing their own. This says the responsible party would be a local government, but that seems incorrect based on this assumption. The level of effort could be reduced, and this could only work well (be adopted by most of the 24 counties and affected of the 157 municipalities) if there were buy-in for the concept of a model ordinance (or set of COMAR regulations) and a role in drafting/review of any proposal by county and municipal governments. This may be possible with a workgroup that included representation of the Saint Mary's County-- Department of Land Use and Growth Management and the Maryland Municipal League and led by Planning and/or Commerce. Who would create the model ordinance? Project Development Team Response: Matrix Design Group has developed model ordinance language that is included as Appendix C.	
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	
Maryland Public Service Commission	No Opinion	Local renewable energy siting ordinances fashioned after a model ordinance could aid with project planning in advance of any local approvals. Presumably, these ordinances would not supersede the PSC's final siting authority for CPCN-eligible projects.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 6: Amend existing regulations for localities defining military coordination. Can be used to coordinate for community and small-scale wind energy facilities and utility-scale wind energy projects subject to the CPCN process. Proof of coordination may be in the form of a letter to affected military partners. Needs to specify whether the planning department vice applicant is responsible for demonstrating military coordination.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Department of Planning	Yes	I think "vice" should say "versus" in the recommendation. For larger projects, the CCPN process could potentially be amended by the Public Service Commission to require the report of the multi-agency Power Plant Research Project to include a section that requires a report of the consultation with potentially affected military installations. This could be carried out by MDP and include consultation with the affected installations and any potentially affected municipalities since the county is automatically part of the process from the beginning. This could be added to the COMAR and include a catch-all provision like 20.62.01.04 "Waiver. The Commission may waive a regulation in this subtitle for good cause shown." Such a provision should be considered for any attempts by the State to regulate local land use.
	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	If local regulations exist, incorporating military coordination requirements sounds reasonable
	Joint Base Andrews	Yes	No Comment
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	Already answered above
	American Clean Power Association	No	ACP opposes this recommendation, at least concerning utility-scale (2 MW and above) facilities. First, utility-scale facilities are generally permitted by the MD PSC. In that context, this draft recommendation does not make sense since it is proposing a model ordinance for authorities that don't generally permit utility-scale facilities. Second, this recommendation presumes there is a gap in industry coordination with the military when, in fact, there is none given the existing federal review process (both FAA and DoD). There is also a risk that the more layers of regulation (local, state, federal) a proposed project faces, the higher the probability of getting different answers on the same military compatibility questions, which creates unnecessary uncertainty.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Case in point, both of your examples are wind projects near military bases. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Wind projects have unique height and airspace concerns that merit coordination with the military. In our experience, even when mitigation is available to address military concerns, the military declines to engage and simply kills the wind project. Therefore, we would support limitations on the military and an obligation to take measures to mitigate or avoid conflicts with proposed projects where feasible.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Maryland Energy Administration	Unsure	As with #5, while it may be beneficial to amend existing regulations defining military coordination the amount of effort and time it would take to do so may make this unable to be implemented.
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	
Maryland Public Service Commission	No Opinion	Local regulations fall outside PSC jurisdiction. Presumably, these regulations would not supersede the PSC's final siting authority for CPCN-eligible projects. Furthermore, proof of military coordination is not a prerequisite or condition for CPCN approval. Generally, it would be good to facilitate coordination between the Developer and the military as early in the planning process as possible.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 7: Incorporate in wind and solar energy ordinances the use of the enhanced SmartDG+ tool by developers and the public to determine whether community and small-scale wind energy or solar energy projects within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+, meet the criteria to notify military personnel about the project via a letter.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Department of Planning	Yes	Would require the development of state-level education and training resources to help jurisdictions implement this.
	PPRP/DNR	Yes	We support this recommendation but agree that it would take a lot of work within the local jurisdictions to make it work properly and compliance would be difficult to monitor
	National Research Laboratory	Yes	No Comment
	Joint Base Andrews	Yes	I recommend including Utility-scale renewable energy projects in the red-highlighted phrase as well
	Maryland Energy Administration	No	The SmartDG+ tool is valuable to determine potential impacts of renewable energy projects and military installations, but the use of the tool should not be a requirement to determine if a community-scale energy project meets the requirements to notify military personnel. The concern is that this requirement would be too large a burden for small-scale residential system installers. It also requires knowledge of how to navigate the SmartDG+ tool and does not allow for the opportunity to use other software's that a developer may already be familiar with.
	Naval Air Warfare Center Aircraft Division	No	I'm not convinced SmartDG+ should be required. I believe it is more appropriate for evaluating where an installation should go in the planning stages. If an applicant goes to the military directly and receives a no impact statement from the facility, that should also be able to satisfy the requirement. Also, you wouldn't need to use the tool if ordinances had specific coordination requirements without the use of SmartDG+.
	Utility-Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Case in point, the example you cite for this recommendation is for a wind energy ordinance near military bases in sparsely populated New Mexico. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Also, where is the discussion of limiting military impacts on renewable siting? Project Development Team Response: A discussion of limiting military impacts is not an action that can be considered by the state of Maryland since the military operates under the Department of Defense. This type of action is discussed in the report as part of the DOD review process in Chapter 4 and in the Illustrative Mitigation Options in Chapter 5.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	Would require the use of the Smart DG+ tool by developers. Rather than through the local zoning process, we suggest the state create educational information for developers about how to use the tool. This would allow local governments to share a statewide resource about the solar permitting process with interested developers.
	Saint Mary's County-- Dept of Land Use & Growth Management	Unsure	St. Mary's County did not use DG+
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
	American Clean Power Association	No Opinion	No comment
	Mid-Atlantic Renewable Energy Coalition	No Opinion	No comment
Maryland Public Service Commission	No Opinion	To the extent the SmartDG+ tool can serve as a comprehensive, all-in-one planning tool, then such incorporation could assist with the Developer's overall user experience. Generally, it would be good to facilitate coordination between the Developer and the military as early in the planning process as possible.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 8: Designate a state agency representative to serve as a liaison with the military in the CPCN process to facilitate and coordinate the inclusion of the military installation concerns with reviews and approvals for wind energy projects or solar energy projects within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+.

Organizations with Responsibility	Committee Member	Support	Comment
State of Maryland to Administer (Agency TBD) If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Department of Planning	Yes	The state assisting local government planning staff in this effort seems critical for success and to ensure local governments feel supported and have a central state-level staff person to address questions and potentially act as a liaison DNR's PPRP performs the coordinating review role for larger wind and solar projects. MDP could perform this function and it may not need a statute, but merely a regulation.
	Maryland Energy Administration	Yes	This will make coordination between military personnel and renewable energy developers clearer as there will be one point of contact to reach out to. It is recommended that an individual from the PPRP serve as the liaison.
	Maryland Public Service Commission	Yes	To ensure that the military is provided an opportunity to provide input, having a state agency liaison would help. Agree that PPRP should provide this role as the lead coordinator for the seven reviewing state agencies in the CPCN process.
	PPRP/DNR	Yes	No Comment
	Joint Base Andrews	Yes	At some level (e.g., PPRP contacts military installation POCs with projects that may impact them), this already happens but may not necessarily be a formalized process. However, the state does not have cognizance of overall renewable energy projects (e.g., solar less than 2 MW) that are controlled by the local municipalities. I recommend expanding this recommendation to include "Local municipalities are encouraged to designate a rep to serve as a liaison with the local military installation."
	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	Could the PPRP fill this role? Project Development Team Response: That would be at the discretion of the PPRP.
	American Clean Power Association	No	ACP opposes this recommendation. It duplicates the existing federal review process, in which local installations are central to the impact analysis, mitigation discussions, and DoD position recommendations. ACP is not aware of situations in which the local base concerns were rejected by the chain of command. Having a separate state review process with potentially different participants risks developers getting different answers from the state and federal processes on the same issue(s).
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Also, where is the discussion of limiting military impacts on renewable siting? Project Development Team Response: A discussion of limiting military impacts is not an action that can be considered by the state of Maryland since the military operates under the Department of Defense. This type of action is discussed in the report as part of the DOD review process in Chapter 4 and in the Illustrative Mitigation Options in Chapter 5.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
Saint Mary's County-- Dept of Land Use & Growth Management	No	Commissioners of St Mary's County meet with the PAX River base commander twice per year; a state liaison is not needed	
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 9: Amend COMAR 20.79.05 Pre-Application Consultation Requirement for Generating Stations to include the military in the pre-application consultation process to determine if a wind energy project or solar energy project within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+, poses a risk to military operations.

Organizations with Responsibility	Committee Member	Support	Comment
Amendment by PSC If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Department of Planning	Yes	Defer to DNR PPRP. The cite is 20.79.01.05 and could add a section (A) 3 for military installations that mirrors what is required in the way of consulting with a municipal corporation in (A) (2).
	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	This would be helpful
	Joint Base Andrews	Yes	No Comment
	Maryland Energy Administration	No	A pre-application site evaluation by military personnel for each renewable energy siting application would increase the time it takes for project approval and development. It would make the application process more difficult to streamline and amending COMAR would require the approval of PSC staff. Rather than amending COMAR, it would be easier to incorporate military stakeholders in the pre-application conversations for utility-scale renewable energy projects.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Also, where is the discussion of limiting military impacts on renewable siting? Project Development Team Response: A discussion of limiting military impacts is not an action that can be considered by the state of Maryland since the military operates under the Department of Defense. This type of action is discussed in the report as part of the DOD review process in Chapter 4 and in the Illustrative Mitigation Options in Chapter 5.
	Saint Mary's County-- Dept of Land Use & Growth Management	No	St. Mary's County will consult as described above if there were to be one of these proposed.
	American Clean Power Association	Unsure	ACP could be okay with this recommendation if it was clarified to say that the requirement to consult is satisfied by participating in the federal Clearinghouse review process (formal or informal).
	Mid-Atlantic Renewable Energy Coalition	Unsure	No Comment
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
Maryland Public Service Commission	No Opinion	This rulemaking would necessarily involve PSC Staff resources. While it is generally a good idea to facilitate coordination between the Developer and the military as early as possible in the project planning process, there is no statutory requirement that PSC relies on this coordination or give due consideration to military-related impacts as part of granting (or denying) a CPCN. It is unclear whether the goal of this requirement is to enable the PSC to grant/deny a CPCN based on the project's risk to military operations. One important benefit of this requirement is to provide the military with advance notice of the project to assist the military in deciding whether to intervene in the CPCN proceeding.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 10: Amend COMAR Title 20, Subtitle 79 to require applicants of wind energy projects and solar energy projects within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+, subject to the CPCN process, to file an informal review request per DoD Clearinghouse guidance prior to filing an application through the CPCN process.

Organizations with Responsibility	Committee Member	Support	Comment
Amendment by PSC If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the Maryland Department of Planning	Maryland Department of Planning	Yes	Defer to DNR PPRP. It is not so much a new process for the PSC to administer as the regulation places the burden on the applicant to file the report with the PSC demonstrating that they have complied and updated if anything changes.
	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	This leverages an already existing process. Although sometimes the DOD clearinghouse reviews are very high level, it would at least show DOD had been informed.
	Joint Base Andrews	Yes	This will help the developer understand the potential impacts of the chosen location on military missions, which could reduce the number of pre-construction costs, improve investor relations based on better due diligence, and help with identifying other areas that may provide a better location for the developer's project.
	Maryland Energy Administration	No	As with #9, a pre-application process will increase the amount of time needed to approve a renewable energy project. While amending COMAR to include this could initiate communication with DoD early in project planning, it would not be the most streamlined approach in engaging military stakeholders in renewable energy project planning.
	American Clean Power Association	No	ACP opposes this recommendation. It is essentially duplicative of the immediately preceding recommendation. If a developer is working with DoD before the CPCN process, it should not matter to the State whether that is being done through the DoD's formal or informal review proc
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Also, where is the discussion of limiting military impacts on renewable siting? Project Development Team Response: A discussion of limiting military impacts is not an action that can be considered by the state of Maryland since the military operates under the Department of Defense. This type of action is discussed in the report as part of the DOD review process in Chapter 4 and in the Illustrative Mitigation Options in Chapter 5.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Saint Mary's County-- Dept of Land Use & Growth Management	No	Require is a strong word. This county has a small staff, and every outside requirement is a burden to us.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
Maryland Public Service Commission	No Opinion	As with #9, the rulemaking would necessarily involve PSC Staff resources. While it is generally a good idea to facilitate coordination between the Developer and the military as early as possible in the project planning process, there is no statutory requirement that PSC gives due consideration to military-related impacts as part of granting (or denying) a CPCN. It is unclear whether the goal of this requirement is to enable the PSC to grant/deny a CPCN based on the project's risk to military operations. One important benefit of this requirement is to provide the military with advance notice of the project to assist the military in deciding whether to intervene in the CPCN proceeding.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 11: Establish Renewable Energy Opportunity Areas, located in portions of a community so that the construction and operation of wind energy facilities would be compatible with other uses of property in the area including with commercial and military air space requirements.

Organizations with Responsibility	Committee Member	Support	Comment
Maryland Department of Commerce / Maryland Department of Planning	National Research Laboratory	Yes	No Comment
	Joint Base Andrews	Yes	Appears to help developers with selecting locations for their projects despite the possibility of not having access to more desirable sites.
	Saint Mary's County-- Dept of Land Use & Growth Management	Yes	Today's solar ordinance effectively does this.
	American Clean Power Association	No	ACP opposes this recommendation. Given changing military requirements and missions, and given changing renewable energy technologies, ACP does not believe it is a good use of limited resources to try to, in essence, pre-clear areas for development. Proposed projects should always go through site-specific, project-specific, technology-specific, mission-specific, etc. reviews. In addition, as the draft recommendation acknowledges, identified areas may be of limited or no interest to industry for various reasons (proximity to households, wildlife issues, limited acreage, no transmission tic.). There is no value to the industry, and there is a risk to DoD, to identify supposed areas of no/limited conflict via regulations.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. Virtually all similar efforts to create target zones for renewable development have predictably failed nationwide because siting of renewables is significantly limited by available transmission capacity which cannot be mapped. Most transmission lines do not have the capacity, and the location of capacity is geographically fixed and mappable, but changes with grid/transmission additions. Also, where is the discussion of limiting military impacts on renewable siting? Project Development Team Response: A discussion of limiting military impacts is not an action that can be considered by the state of Maryland since the military operates under the Department of Defense. This type of action is discussed in the report as part of the DOD review process in Chapter 4 and in the Illustrative Mitigation Options in Chapter 5.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Maryland Energy Administration	Unsure	Establishing pre-planned areas for renewable energy projects could help cut down the time between the application and approval process while outlining which areas may be most compatible with different renewable energies. It would also be useful for this to consider ease of grid connection and areas of agriculture and farmland. However, this holds the potential to greatly restrict the rights of landowners and developers. Needs additional information to determine how this could impact landowners and developers.
	Naval Air Warfare Center Aircraft Division	Unsure	Could reduce conflict with the military. Seems that it would be difficult to find conflict-free areas.
	PPRP/DNR	Unsure	Although there are positive aspects to this recommendation, we're concerned that it could / would discourage development in areas that weren't opportunity areas, and then, as mentioned in the cons list, the opportunity areas might not always be ideal (grid might be overloaded there, or would be too far from transmission line for cost-effective interconnection)
	Maryland Department of Planning	Unsure	Would this include financial incentives that could potentially cover the loss of developing in a less desirable area? Project Development Team Response: That would be up to the state and local entities that establish such areas to decide. Not clear about whether this would limit renewable energy projects to these opportunity areas, or if projects located in those opportunity areas would just be incentivized but development would still be allowable in other areas. Also, if it is an incentive-type program, what are the incentives? Would this include financial incentives that could potentially cover the loss of developing in a less desirable area? Would require legislation. Does the state have any targeted areas where they would prefer these renewable energy facilities to be located? Not sure how you could recreate an "opportunity area" without identifying preferred locations. Also, I assume the preferred locations would likely cross county boundaries or at a minimum be coordinated in some manner. The history of trying to get counties to identify preferred areas for solar has been somewhat tortuous. Since Maryland's highest Court has ruled that the PSC has preempted the area (muting the effectiveness of some county regulations and making the juice not worth the squeeze for some elected officials) it may be a better strategy to work with the PSC and then lessons learned could be adopted for smaller systems that do not require PSC approval.
Maryland Public Service Commission	Unsure	The establishment of such areas would be outside the purview of the PSC. However, to the extent a renewable energy project can ONLY be sited in one of these Renewable Energy Opportunity Areas, then PSC would likely oppose as being prescriptive.	

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 12: Require county and municipal governments to adopt coordination procedures with the military as part of a Maryland Military Protection Act for wind energy projects and solar energy projects within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+. Should be silent on how it is implemented (administratively vice codified and planning staff vice applicant responsibility) at the discretion of the affected government.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer Requirement implemented by statute	National Research Laboratory	Yes	No Comment
	Joint Base Andrews	Yes	Some military installations have this type of cooperation with the local municipality, but it requires constant updating especially after people change or leave their jobs.
	American Clean Power Association	No	ACP opposes this recommendation, at least concerning utility-scale (2 MW and above) facilities. First, utility-scale facilities are generally permitted by the MD PSC. In that context, this draft recommendation does not make sense. Second, this recommendation presumes there is a gap in industry coordination with the military when, in fact, there is none given the existing federal review process (both FAA and DoD). Further, as noted above, local installations are central to the impact analysis, mitigation discussions, and DoD position recommendations in the federal review process. ACP is not aware of situations in which the local base concerns were rejected by the chain of command. There is also a risk that the more layers of regulation (local, state, federal) a proposed project faces, the higher the probability of getting different answers on the same military compatibility questions, which creates unnecessary uncertainty.
	Maryland Energy Administration	No	Creating a standardized process for how the state and military coordinate over renewable energy projects will create a more streamlined process for energy siting; however, this states that a Maryland Military Protection Act would be silent on how it is implemented, removing the potential for standardization with military coordination. Leaving the implementation of military coordination up to the county or municipal governments creates inconsistency within how governments and the military should coordinate.
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation. For example, The Indiana example cited is limited to an area within 3 miles of a military base. We'd argue that proximity should be much smaller for any solar photovoltaic project
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Saint Mary's County-- Dept of Land Use & Growth Management	No	Require is a strong word. St. Mary's County and PAX River coordinate without a requirement.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Naval Air Warfare Center Aircraft Division	Unsure	Would this be redundant if military reps were included on technical review committees/local planning approval boards? Might be viewed as state overreach. Project Development Team Response: This recommendation is an option for including local military representatives in project development phase for those key areas identified above. At the discretion of local governments to decide on how that inclusion occurs.
	Maryland Department of Planning	Unsure	Would require state legislation. Appreciate the value in local governments adopting military coordination procedures for renewable energy development projects. However, the department also respects local planning and zoning authority and suggests this state mandate be converted into a measure by which jurisdictions would be encouraged or incentivized to create such procedures. Best Practices description - should be "versus" not "vice". While I see the benefit of having a state mandate for military facilities and nearby local government to coordinate, adding a required coordination provision to the Land Use Article would be precedent-setting in specifying a particular local land use implementation action, rather than simply enabling legislation. One alternative would be to mandate a comprehensive plan element for local governments within a certain distance of defined military facilities and require within that element strategies to address coordination for compatible use and renewable energy siting. This does not get us to what we want, but it is better. Additionally, please be aware there are no enforcement mechanisms that Planning can use to ensure compliance with a state mandate. Legislative mandates for specific action (such as establishing a septic tiers designation that caused great and lingering consternation) should be a last resort strategy. Including a Compatibility with Military Installations component in the Land Use Plan section that merely required a county to consider (think through) their current and proposed land uses proximate to the installations, and demonstrate that they have communicated with the installations, and include this in their comprehensive plan, maybe a good first start. Requiring consideration and consultation every 10 years is not very much to ask, however, it will be viewed as an unfunded mandate if not developed without their input. MDP could offer to provide the technical assistance to pull this off and it could be so stated in the statute. This could also be done by regulation.
Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.	
Maryland Public Service Commission	No Opinion	This is outside the purview of the PSC. To the extent this coordination later dictates what position the host jurisdiction will take on the CPCN application, this could lead to conflict, where the PSC grants a CPCN granted for a Project that could conflict with the local plan or zoning rules.	



Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 13: Require all county/municipal governments with military installations to adopt Airport/Military Installation Overlay Zoning Districts.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer Requirement implemented by statute	National Research Laboratory	Yes	No Comment
	Naval Air Warfare Center Aircraft Division	Yes	Seems like the DOD AICUZ program
	Joint Base Andrews	Yes	Some military installations have this already and can be used as best practices for bases with airfields. However, this can be morphed into overlay zones for installations that do NOT have an airfield as well.
	American Clean Power Association	No	ACP does not support the State imposing this requirement on local jurisdictions. First, it potentially conflicts with the MD PSC CPCN process for utility scale projects in which potential military concerns are considered. Second, it potentially conflicts with the federal Clearinghouse review process. As ACP has commented before, just because a project is proposed within certain airspace does not mean it is going to have a problematic impact. Identifying areas as in or out for development with no site-specific, project-specific, mission-specific technical review and consideration of mitigation options is inappropriate in ACP's view.
	Maryland Energy Administration	No	This is a high-level effort to both implement and administer and it holds the potential to impact the ability for renewable energy projects to be approved as overlay zoning districts may create more stringent restrictions on the types of renewable energy projects allowed in the zone.
	Maryland Public Service Commission	No	This is outside the purview of the PSC. However, to the extent a renewable energy project can ONLY be sited within an Airport/Military Installation Overlay Zoning District, then PSC would likely oppose as being proscriptive
	Utility Scale Solar Energy Coalition of Maryland	No	Again, we categorically reject the premise that you combine all renewable energy development projects into one bucket. Coordination for solar projects of any size should not be a requirement unless such projects are within or directly adjacent to a military installation.
	Mid-Atlantic Renewable Energy Coalition	No	No Comment
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value.
	Saint Mary's County-- Dept of Land Use & Growth Management	Unsure	St. Mary's County has had the AICUZ overlay zone for decades.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.
	Maryland Department of Planning	Unsure	Need more clarity about how prohibitive overlay zoning districts can be to renewable energy projects. Would require state legislation. The Maryland Department of Planning appreciates the value in local governments adopting military overlay zoning districts. However, the department also respects local planning and zoning authority and suggests this state mandate be converted into a measure by which jurisdictions would be encouraged or incentivized to develop such zoning districts. See comp planning element comments above. Military Installation Overlay Districts could be included as best practices by MDP and potentially be incentivized by connection to increased scoring for eligibility for other forms of state assistance that come from other agencies (like MALPF and DHCD) since MDP does not make funding available to local governments.

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 14: Administratively require developers of community and small-scale solar energy development projects within Solar Frequency Consultation Area or Aviation Solar Consultation Area as depicted in SmartDG+, to demonstrate coordination with the military at the time of development application to the county or municipality.

Proof of coordination may include:

- Checkbox on the development application that coordination has occurred
- Coordination Report for the subject property from SmartDG+ tool
- Signed letter from affected military partners
- Mitigation letter from the DoD Clearinghouse (as applicable)

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute /If voluntary, implemented by notice from the appropriate state agency	Maryland Dept of Planning	Yes	Support recommendation as long as it is not a requirement implemented by statute. To reduce the level of effort for developers and military personnel and potentially local planning staff, while also maximizing the coordination impact, maybe in lieu of signed letters the same impact could be accomplished with email or some web-based application that allows developers to communicate virtually with military staff and then email or otherwise electronically submit to the local planning staff.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	Suggest additional review of this recommendation by the Steering Committee and other experts before they proceed further. Project Development Team Response: This recommendation was submitted to the Steering Committee for review in March/April 2022.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.



Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 15: Administratively require developers of utility-scale solar energy development projects within Solar Frequency Consultation Area or Aviation Solar Consultation Area as depicted in SmartDG+, to demonstrate coordination with the military at the time of development application to the county or municipality.

Proof of coordination may include:

- Checkbox on the development application that coordination has occurred
- Coordination Report for the subject property from SmartDG+ tool
- Signed letter from affected military partners
- Mitigation letter from the DoD Clearinghouse (as applicable)

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the appropriate state agency	Maryland Dept of Planning	Yes	Support recommendation as long as it is not a requirement implemented by statute. This appears to be a requirement that would be implemented by the Power Plant Research Program (PPRP) or the Public Service Commission (PSC). MDP serves on the PPRP as a support agency and provides comments and coordinates with local governments but does not have other roles regarding solar energy project proposals. The PSC is required to consider a utility-scale energy facility development proposal for consistency with the local comprehensive plan. This recommendation could be reworded as a local best practice for jurisdictions to include a comprehensive plan requirement that utility scale developers coordinate with military installations within or adjacent to their jurisdiction prior to submission to the PSC. If the developers do not do that, then they are not acting with consistency to the comprehensive plan. There is some benefit requiring communication and coordination between the utility-scale developer and the local government. The onus should be on the developer as part of the CPCN process. This recommendation might not be redundant with other review components. Based on comments provided by ACP and Howard County, this recommended process seems redundant.
	American Clean Power Association	No	ACP objects to Recommendation 15 because: (1) technical explanation/justification for proposed "Consultation Areas," or consultation areas, is not provided (2) even if technical justification was available, a layer of additional paperwork at the state or local level is unnecessary because if a proposed solar project could impact the safety of air navigation (including via impacts to air navigation aids like radar) then they would fall under the FAA obstruction evaluation process (44 USC 44718 and 14 CFR Part 77), which would also trigger review under the Military Aviation and Installation Assurance Siting Clearinghouse process. ACP does not believe there is a need to add another layer of reporting and paperwork given the existing federal review processes. Source: https://uscode.house.gov/view.xhtml?req=(title:49%20section:44718%20edition:prelim)%20OR%20(granuleid:USC-prelim-title49-section44718)&f=treesort&num=0&edition=prelim and https://www.ecfr.gov/current/title-14/chapter-I/subchapter-E/part-77 .
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	The CPCN process is very rigorous and already includes this type of coordination with the military. Requiring similar local effort is not necessary. Suggest additional review of this recommendation by the Steering Committee and other experts before they proceed further. Project Development Team Response: This recommendation was submitted to the Steering Committee for review in March/April 2022.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.

Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 16: Jurisdictional planning agencies notify military installations, utilizing the SmartDG+ tool for points of contact, of the adoption or substantial amendment to regulations for solar energy projects within Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+. This can be accomplished via e-mail, mailed letter, or other best method of contact for the installation/jurisdiction.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the appropriate state agency	Maryland Dept of Planning	Yes	Support recommendation as long as it is not a requirement implemented by statute. MDP could develop guidance in this area, but jurisdictions are not required to inform the department of ordinance amendments. Requiring them to do so, or to notify military installations, would necessitate legislation. Recommend converting this to a local best practice that is decided locally. Considering concerns from Howard County regarding the level of effort for local governments if mandated to implement this, MDP recommends this should be a voluntary best practice for local governments.
	American Clean Power Association	No	ACP recommends clarification that the recommendation is focused solely on notifying DoD stakeholders of any changes in planning regulations related to solar energy and not a recommendation that planning jurisdictions should change their regulations related to solar energy.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value. Suggest additional review of this recommendation by the Steering Committee and other experts before they proceed further. Project Development Team Response: This recommendation was submitted to the Steering Committee for review in March/April 2022.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.

Recommendation 17: Amend existing regulations for localities defining military coordination. Can be used to coordinate community and small-scale solar energy projects, and utility-scale solar energy projects subject to the CPCN process. Proof of coordination may be in the form of a letter to affected military partners. Needs to specify whether the planning department vice applicant is responsible for demonstrating military coordination.

Organizations with Responsibility	Committee Member	Support	Comment
Local jurisdictions administer If mandatory, requirement implemented by statute / If voluntary, implemented by notice from the appropriate state agency	Maryland Dept of Planning	No	This recommendation is not clear. To which entity (state government, military installation) do jurisdictions need to certify their coordination with military installations? How does this recommendation work in concert with recommendation 15's requirement that developers certify coordination with military installations? The two requirements have the potential to overlap and cause confusion and miscommunication. This would likely require legislation. Which regulations are to be amended? Local or state? Project Development Team Response: This will be up to the state to decide. Based on comments provided by ACP, this recommended process seems redundant. And based on comments provided by Howard County, this could place a high burden on local governments if they are mandated to implement it. This recommendation also seems vague regarding how local regulations would be amended and how the proposed regulation would fit in with recommendations 14-16.
	American Clean Power Association	No	ACP objects to Recommendation 17 because if a proposed solar project could impact the safety of air navigation (including via impacts to air navigation aids like radar) then they would fall under the FAA obstruction evaluation process (44 USC 44718 and 14 CFR Part 77), which would also trigger review under the Military Aviation and Installation Assurance Siting Clearinghouse process. ACP does not believe there is a need to add another layer of reporting and paperwork given the existing federal review processes. Source: https://uscode.house.gov/view.xhtml?req=(title:49%20section:44718%20edition:prelim)%20OR%20(granuleid:USC-prelim-title49-section44718)&f=treesort&num=0&edition=prelim and https://www.ecfr.gov/current/title-14/chapter-I/subchapter-E/part-77..
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value. Suggest additional review of this recommendation by the Steering Committee and other experts before they proceed further. Project Development Team Response: This recommendation was submitted to the Steering Committee for review in March/April 2022.
	Queen Anne's County, Planning and Zoning	Unsure	The County would need to review any specific proposals that would require/likely create the need for code amendments or those that would create more work/responsibility for County staff.



Table A-1. Best Practice Recommendation Responses (continued)

Recommendation 18: Model Solar Energy Siting Ordinance (where they do not exist) within the Solar Frequency Consultation Area or Aviation Solar Consultation Area, as depicted in SmartDG+ for localities defining military coordination for utility, community, and small-scale solar energy projects.

Organizations with Responsibility	Committee Member	Support	Comment
Appropriate state agency responsible for making available	Maryland Dept of Planning	Yes	Support is contingent upon revising this recommendation to focus on providing local governments with ordinance development guidance that includes a menu of options and variations, rather than a model/one-size-fits-all ordinance. MDP could help create/craft ordinance development guidance that includes a menu of options and variations, if so directed. We note that PSC has pre-emptive authority regarding utility-scale projects, although that does not necessarily mean it will always override local action. Based on comments provided by Howard County, this could place a high burden on local governments if they are mandated to implement it. The ordinance development guidance should include some direction from state agencies about which installations, or which types of installation missions, would benefit from the different variations. Essentially, create an ordinance "menu," but the menu points users toward the options that would best meet their specific requirements.
	American Clean Power Association	No	ACP objects to Recommendation 18 on the "Model Solar Energy Siting Ordinance." ACP opposes this recommendation, at least with respect to utility scale (2 MW and above) facilities. First, utility scale facilities are generally permitted by the MD PSC. In that context, this draft recommendation does not make sense since it is proposing a model ordinance for authorities that don't generally permit utility scale facilities. Second, this recommendation presumes there is a gap in industry coordination with the military when, in fact, there is none given the existing federal review process (both FAA and DoD). There is also a risk that the more layers of regulation (local, state, federal) a proposed project faces, the higher the probability of getting different answers on the same military compatibility questions, which creates unnecessary uncertainty. ACP also cannot support this recommendation because the draft model ordinance has not even been made available to steering committee members, so ACP cannot weigh in on the details of the proposal.
	Howard County, Office of Community Sustainability and Department of Planning & Zoning	No	If adopted as mandates, could place a high burden on local governments to implement. These new processes could add considerable time and effort to local review with limited added value. Suggest additional review of this recommendation by the Steering Committee and other experts before they proceed further. Project Development Team Response: This recommendation was submitted to the Steering Committee for review in March/April 2022.

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APPENDIX

B

Case Studies

The use of web-based technology can greatly support military compatibility by enhancing awareness of military operational areas. The Maryland Department of Natural Resources (DNR) Power Plant Research Program (PPRP) maintains a web-based mapping application for the State of Maryland – Smart DG+ – which contains various geographic information related to renewable energy siting and is intended as an initial screening tool for developers. The Smart DG+ tool includes site limitations, such as forested lands, prime farmland, and protected lands, as well as renewable energy potentials, such as proximity to transmission lines and wind speeds at 100 meters. As a part of the Maryland Compatible Energy Siting project, in addition to this report, a military operations interface was added to the Smart DG+ tool containing geographic data for all military operational areas and relevant points of contact for developers to use for coordination when identifying sites for potential renewable energy projects. The goal of this enhancement was to promote early coordination efforts and compatibility between military operations and energy development.

This appendix provides an assessment of two Maryland counties' renewable energy development regulations and siting processes – Caroline County and St. Mary's County. To conduct a thorough case study, these counties were chosen due to the high potential for renewable energy development. Additionally, St. Mary's County was chosen due to its proximity to military installations (both Naval Air

Station (NAS) Patuxent River and the associated Webster Field Annex), while Caroline County was studied due to its intersection with military airspace. This assessment will help identify methods of integrating the Maryland DNR PPRP Smart DG+ tool as part of the renewable energy siting and development process to support military compatibility.

These case studies address the following:

- Existing county policies, standards, and regulations relating to renewable energy development
- Methods of integrating the Smart DG+ tool as part of the development application and siting process
- Proposed military coordination procedures

Caroline County

Caroline County is located on the eastern edge of Maryland, abutting the State of Delaware, and has a population of 33,293 as of the 2020 U.S. Census. The closest military installation to Caroline County is Dover AFB in Dover, DE approximately 15 miles east. Although there is no military presence on the ground in Caroline County, there are several areas of concern for military compatibility. Caroline County is within three radar viewsheds – the ADAMS Radar at NAS Patuxent River, the Naval Research Laboratory Chesapeake Bay Detachment Radar, and the NASA Radar at Wallops Flight Facility. Two

Military Training Routes traverse the County – SR 801 and SR 845 – both of which have a minimum operating altitude of 500 feet AGL. Due to the presence of these critical military operational areas, it is important renewable energy development is coordinated with the respective military installations to avoid adverse impacts to these operational areas, despite the lack of the presence of a military installation in the County.

Current Renewable Energy Developments in Caroline County

Caroline County contains one small existing solar array at 4439 Bethlehem Road near Preston, MD developed by Tangent Energy. This solar array is less than 2 MW in size, and as such, was

not required to submit a CPCN application for PSC approval. A second solar energy project, Cherrywood Solar I, was proposed near Greensboro, MD. Cherrywood Solar I is currently in the PJM Queue for interconnection with a status of suspended and is projected to generate 202 MW of electricity across 1,085 acres. A third solar energy project, Waypost Solar Project, is proposed in the vicinity of Templeville and Marydel townships. The project is expected to produce 92 MW of solar capacity across 495 acres. The project owner filed a CPCN application in January 2022 and is in the middle of the approval process. Additionally, the project is in the PJM Queue for interconnection. These renewable energy facilities in Caroline County are reflected in **Table B-1**.

Table B-1. Existing and Proposed Renewable Energy Facilities in Caroline County

Name	Type	Acreage	Capacity	Status
Tangent Energy Solar Power Plant	Solar	5	< 2 MW	Active
Cherrywood Solar I	Solar	1,085	202 MW	In PJM queue, Status: Suspended
Waypost Solar Project	Solar	495	92 MW	In CPCN review process; In PJM queue

Existing Development Regulations

Solar

Solar energy systems are defined in Caroline County’s Zoning Ordinance as either accessory or commercial. Accessory solar energy systems include any roof-mounted or freestanding solar array that is accessory to and incorporated into the development of an authorized use on a property and is intended to generate on-site energy needs. Accessory solar energy systems are permitted in all zoning districts within the County. Commercial solar energy systems are freestanding, ground-mounted shared community facilities that convert sunlight into electricity for the primary purpose of wholesale or retail sale of electricity. There are two scales of commercial solar energy systems – small-scale and utility-scale. Small-scale solar energy systems include facilities with a generating capacity of up to 2 MW of power. Utility-scale solar energy systems include facilities with a generating capacity of more than 2 MW of power. Both small-scale and utility-scale solar energy systems are permitted as a special exception in the Rural (R),

General Commercial (C-2), and Light Industrial (I-2) zoning districts.

Uses allowed by special exception require a public hearing and an application to the Caroline County Board of Zoning Appeals pursuant to Article 16 of Caroline County’s Zoning Ordinance. The Board of Zoning Appeals, in the review of the application, must consider the following:

- Effects on public health, safety, or general welfare
- Effects on surrounding properties
- Effects on public facilities and services
- Effects on the environment
- Compliance with other sections of the Zoning Ordinance

Consistent with and in addition to these considerations, the Board of Zoning Appeals may impose further conditions for approval of a special-use exception.

The minimum requirements for solar energy systems are prescribed in §175-46. These minimum requirements limit the total aggregate acreage of



commercial solar energy systems within Caroline County to a total of 2,000 acres. The minimum requirements also address design standards for solar energy systems, including screening and setbacks from abutting properties, glare prevention, fencing, and a height limit of 15 feet, as well as compliance with Federal Aviation Administration (FAA) regulations for air navigation hazards.

Wind

Small wind-energy systems are defined in Caroline County’s Zoning Ordinance as a wind-energy system that is used to generate electricity, generates 100 kilowatts of power or less, and has a total height of fewer than 200 feet. Small wind-energy systems are permitted in all zoning districts, except the Mobile Home (MH) Zoning District.

Caroline County regulations for small wind-energy systems are codified in §175-84 of the Zoning Ordinance, which limits lots or parcels to only one small wind-energy system, or up to two systems for agricultural and business operations. These regulations also address setbacks, lighting as required by the FAA, appearance, noise, and abandonment. Caroline County’s Zoning Ordinance does not contain regulations for utility-scale wind-energy systems.

Coordination with Military Installations

Currently, Caroline County does not involve military partners in development review processes by ordinance. Additional recommendations for how Caroline County can protect key airspace assets over the county are discussed under the Smart DG+ Integration section below.

St. Mary’s County

St. Mary’s County has a population of 113,777 as of the 2020 census and is in southern Maryland, bordered by the Potomac River, Patuxent River, and the Chesapeake Bay. Both Naval Air Station (NAS) Patuxent River and the associated Webster Field Annex are in St. Mary’s County. NAS Patuxent River is located at the confluence of the Patuxent River and the Chesapeake Bay, and the Webster Field Annex is located approximately nine miles south at the confluence of the Potomac River and St. Mary’s River. The presence of NAS Patuxent River and Webster Field Annex results in broader renewable energy development areas of concern for military operations. These include buffer coordination areas surrounding NAS Patuxent River and Webster Field Annex and imaginary surfaces radiating from the respective runways; MTRs traversing the County with minimum operational altitudes 500 feet AGL and below; radar viewsheds from the ADAMS Radar at NAS Patuxent River, the Naval Research Laboratory Chesapeake Bay Detachment Radar, and the NASA Radar at Wallops Flight Facility; Special Use Airspace from the Atlantic Test Range; as well as low-level flight areas for helicopter training at NAS Patuxent River and Joint Base Andrews.

Current Renewable Energy Developments in St. Mary’s County

There are no existing utility-scale renewable energy developments in St. Mary’s County. Lightsource Renewable Energy Development submitted a Certificate of Public Convenience and Necessity application to the Maryland Public Service Commission in August 2019, but the project owner has since withdrawn the application due to concerns raised by NAS Patuxent River which were unable to be addressed. The project, Whitetail VI Solar, was anticipated to produce 20 MW of electricity across 80 acres of land. The Whitetail VI Solar Project is detailed in **Table B-2**.

Table B-2. Existing and Proposed Renewable Energy Facilities in St. Mary’s County

Name	Type	Acreage	Capacity	Status
Whitetail VI Solar Project	Solar	81	20 MW	Withdrawn July 2021

Existing Development Regulations

Solar

St. Mary's County adopted solar energy development standards on March 1, 2022, through Ordinance 2022-06. The standards apply to "major" (utility-scale projects generating greater than 2 MW) and "minor" (projects generating less than 2 MW) solar energy developments and regulate processes including requirements for site plan approval (major projects) or permit approval (minor projects), buffer standards to minimize visual impacts, and restrictions for major projects on prime agricultural soils, farmland of statewide importance soils, and Maryland Rural Legacy Areas.

Wind

Small wind energy systems, which include wind-power generating systems with a capacity of up to 100 kilowatts, are allowed as an accessory use in all zoning districts. Under the St. Mary's County Comprehensive Zoning Ordinance Article 5 §51.3.95, small wind energy systems are intended primarily to generate electricity for on-site consumption. The development of a small wind energy system requires a building permit subject to a determination by appropriate personnel at NAS Patuxent River.

Coordination with Military Installations

St. Mary's County actively coordinates with NAS Patuxent River due to the military air operations and high volume of helicopter traffic in the area. Per the county's Comprehensive Zoning Ordinance, NAS Patuxent River is included in Technical Evaluation Committee (TEC) distributions of applications and meetings for proposed small wind energy projects and solar projects in the county. NAS Patuxent River can evaluate applications for renewable energy development and object to proposals that may adversely affect the safety and viability of military operations.

Smart DG+ Integration

Integrating the Smart DG+ into the development process

The best use of the updated Smart DG+ tool is early in the development process. As indicated in

the St. Mary's County case study, involving military installations early is key to ensuring any project considerations are discussed in a timeframe that reduces impacts for the developer. The Smart DG+ tool includes a feature to create, download, and/or print a Coordination Report with key points of contact for military operational areas which may exist in the vicinity of a project. This Coordination Report may be utilized to initiate coordination on small-scale wind energy development projects and utility-scale and small-scale solar energy projects. Proof of coordination with local military partners is key to ensuring compatibility between military operational areas and future energy development. The following measures are recommended for each county in this case study. ***Ultimately, it will be at the discretion of each county to implement the recommendations which should involve a dialog with the community, Planning Commission, and County Commissioners.***

Caroline County

- **For small scale commercial wind energy projects that fall within a military operational area stipulate where/when coordination would be needed**, by either of the following methods:
 - Applicant demonstrates coordination, as applicable, by selecting a checkbox on a development application and provides all comments from consultation with the appropriate military contact as part of the development application submittal. The Applicant may use the SmartDG+ tool to determine parties with whom to coordinate to fulfill this requirement.
 - or
 - Applicant demonstrates coordination, as applicable, by providing a Coordination Report from SmartDG+ and provides all comments from consultation with the appropriate military contact as part of the development application submittal.
- **There are no recommendations to modify the zoning ordinance for solar energy systems since Caroline County is outside both the Solar Frequency Consultation Area and Aviation Solar Consultation Areas.**



St. Mary's County

- **For small-scale wind energy projects,** administratively require or codify applicant coordination with military installations by either of the following methods:
 - Applicant demonstrates coordination, as applicable, by selecting a checkbox on a development application and provides all comments from consultation with NAS Patuxent River, Joint Base Andrews and 166th AW, Delaware ANG as part of the development application submittal. The Applicant may use the SmartDG+ tool to determine parties with whom to coordinate to fulfill this requirement.

or

- Applicant demonstrates coordination, as applicable, by providing a Coordination Report from SmartDG+ and provides all comments from consultation with the NAS Patuxent River, Joint Base Andrews and 166th AW, Delaware ANG as part of the development application submittal.
- **For utility-scale and small-scale solar projects,** administratively require or codify applicant coordination with NAS Patuxent River for projects within the Aviation Solar Consultation Area by either of the following methods:
 - Applicant demonstrates coordination by selecting a checkbox on a development application that the project is or is not within the Aviation Solar Consultation Area. If the project is within the Aviation Solar Consultation Area, applicant provides all comments from consultation with NAS Patuxent River as part of the development application submittal. The Applicant may use the SmartDG+ tool to determine whether the project is within the Aviation Solar Consultation Area.

or

- Applicant demonstrates coordination by providing a Coordination Report from SmartDG+ showing whether the project is or is not within the Aviation Solar Consultation Area. If the project is within the Aviation Solar Consultation Area, applicant provides all comments from consultation with NAS Patuxent River as part of the development application submittal.

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APPENDIX

C

Model Renewable Energy Ordinances for Local Jurisdictions

Background Information

The following model ordinances for renewable energy projects, developed by the project consultant, provide suggested language for consideration by localities in framing a local wind ordinance for small-scale wind energy projects, as well as utility-scale and small-scale solar energy projects. The ordinances are intended to be a guide for developing or enhancing already existing renewable energy regulations.

The model ordinances are provided as a resource for localities as part of this project and are not expressly endorsed by any particular project stakeholder. Any jurisdiction contemplating adopting the model ordinances should review the language in detail and tailor it appropriately for their unique needs and conditions. The ordinances are not intended to provide a one-size-fits-all approach, since various nuances need to be considered.

While the Steering Committee had the opportunity to review and provide comments on the model ordinances, not all committee members support the approach of a model ordinance without ongoing dialog between communities that are host to military facilities and the renewable energy industry, applicable state agencies, and other stakeholders.

According to the Maryland Energy Administration, 16 counties within the state have wind-energy related ordinances:

- Allegany County
- Anne Arundel County
- Calvert County
- Caroline County
- Carroll County
- Dorchester County
- Frederick County
- Harford County
- Howard County
- Kent County
- St. Mary's County
- Somerset County
- Talbot County
- Washington County
- Wicomico County
- Worcester County

Primary sources for the model wind energy development ordinance included adopted ordinances from Calvert, Carroll, Kent, and St. Mary's counties in Maryland, the Virginia Association of Counties (VACO) Model wind ordinance, and the model wind energy ordinance developed by the State of Oregon.

Within the state of Maryland only those jurisdictions within the boundary of the Solar Frequency Consultation Area and Aviation Solar Consultation Area as described in this report are relevant to solar energy development and military compatibility. These jurisdictions are identified below. With the exception of St. Mary's County, none of the jurisdictions require coordination with the military in their solar energy development regulations.

Jurisdictions within the Solar Frequency Consultation Area

- Anne Arundel County
- Charles County
- Calvert County
- Prince George's County

Jurisdictions within the Aviation Solar Consultation Area

- Anne Arundel County
- Baltimore County
- Calvert County
- Cecil County
- Charles County
- Harford County
- Kent County
- Prince George's County
- St. Mary's County
- Somerset County
- Worcester County
- City of Aberdeen
- City of Bowie
- City of District Heights
- City of Havre de Grace
- City of Mt. Rainier
- City of New Carrollton
- Pocomoke City
- City of Seat Pleasant
- Town of Bel Air
- Town of Betterton
- Town of Bladensburg
- Town of Cheverly
- Town of Forest Heights
- Town of Glenarden
- Town of Indianhead
- Town of Perryville
- Town of Upper Marlboro

Primary sources for the model solar energy development ordinance included adopted regulations from Calvert, Carroll, and Kent counties in Maryland. The solar energy development ordinance from St. Mary's County was adopted in March 2022. The St. Mary's County solar ordinance was important since it was developed in conjunction with recommendations of a solar task force appointed by the county commissioners, based on a rigorous analysis commissioned by the county.

To the extent practicable, explanatory comments and guidance are noted. The use of **[brackets]** around specific provisions indicates when a local government should supply jurisdiction-specific information or signals a decision point at which a local government may consider the suggested provision or give special consideration to local circumstances and preferences in framing the provision.

When utilizing these model ordinances, please also refer to the Maryland Military Operations and Considerations for Renewable Energy Development report details.



Model Ordinance

Model Ordinance – Small-scale Wind Energy Systems

1. Title

[Chapter XX] Regulations and Standards –
Small-scale Wind Energy Systems

2. Purpose

The purpose of these regulations is to ensure the timely and orderly development of Small-scale Wind Energy Systems to meet energy and economic needs while protecting the environment. These regulations and standards allow [insert jurisdiction] to protect its citizens' public health, safety, and general welfare. These standards comply with the comprehensive land use plan and with the Statewide Planning requirements.

3. Applicability

This ordinance applies to all wind energy projects with a total generating capacity of 70 megawatts (MW) or less proposed to be constructed after the effective date of this ordinance. Small-scale wind energy projects built prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance.

4. Definitions

"Applicant" means the owner or operator who submits an application to the jurisdiction for a permit to install a wind energy project under this ordinance.

"Landowner" means the person who owns all or a portion of the real property on which a wind energy project is constructed.

"Military Operational Areas" means areas significant to sustaining the military mission and represent the only approved areas to conduct these operations.

"Non-participating landowner" means a person who owns real property that may be affected by a wind energy project and is not under lease or other property agreement with the owner or operator of the wind energy project.

Commentary

2. Purpose. This ordinance section describes the need for standards relating to the siting of small-scale wind energy systems. It may refer to compliance with the local comprehensive plan and the statewide planning goals.

3. Applicability. The Maryland PSC has authority over utility-scale projects, which are defined as systems with a rated capacity of 70 megawatts or more in the state of Maryland.

As noted above, 16 counties have existing wind energy ordinances—it is recommended that military compatibility language be added to existing ordinances for counties within military operational areas.

4. Definitions are necessary to provide context to the ordinance provisions and should be incorporated in any proposed wind-energy ordinance.

Model Ordinance

“Operator” means the person responsible for the overall operation and management of a wind energy project.

“Owner” means the person who owns all or a portion of a wind energy project.

“Participating landowner” means a person who owns the real property under a lease or other property agreement with the owner or operator of a wind energy project.

“Rated capacity” means the maximum capacity of a wind energy project based on the total sum of each turbine’s nameplate capacity. The nameplate capacity is typically specified by the manufacturer with a label on the turbine equipment.

“Smart DG+ tool” is a free, online, map-based screening tool sponsored by the Maryland Energy Administration and the Power Plant Research Program at the Maryland Department of Natural Resources. The tool’s Military & Compatibility Layers, and associated Coordination Report were developed to facilitate information sharing and early coordination of proposed renewable energy projects with the military.

“Small-Scale Wind Energy System” is a wind energy conversion system that is used to generate electricity; has a total rated capacity of 70 MW or less; consists of a wind turbine, a single tower, and a base with associated control or conversion electronics

“Shadow flicker” is the moving shadow created by the sun shining on the rotating blades of the wind turbine.

“Tower” means the structure on which a wind turbine is mounted.

“Wind turbine” means a wind energy conversion system that converts wind energy into electricity using a wind turbine generator that typically consists of a tower, nacelle, rotor, blades, controller, and associated mechanical and electrical conversion components.

“Wind turbine height” means the vertical height of a wind turbine as measured from the existing grade to the highest vertical point of the turbine rotor or tip of the turbine blade when it reaches its highest elevation.

Commentary



Model Ordinance

5. Applications and Procedures

A **[zoning or building]** permit application shall be obtained prior to installing a small-scale wind energy system. The **[zoning or building]** permit application shall be accompanied by a site plan of the property, including all boundaries, drawn to scale. In addition to the requirements of **[local site plan citation]** and **[local special use permit citation]**, applications for a small-scale wind energy project shall include the following information:

A. Project Description

A narrative identifying the applicant and describing the proposed wind project, including an overview of the project and its location; approximate rated capacity of the wind energy project; the approximate number, representative types, and height or range of heights of wind turbines to be constructed; and a description of ancillary facilities, if applicable.

B. Site Plan

The site plan shall conform to the preparation and submittal requirements of **[local site plan citation]**, including supplemental plans and submissions, and shall include the following information:

1. A location map with total site area and applicable land boundaries indicating the location of the proposed project in relation to municipal boundaries, perimeter roads, and traffic facilities.
2. A copy of the web-based map displaying the Military and Compatibility Layers of the Smart DG+ tool with the applicant's proposed project site location.
3. Operational features, including the expected capacity factor.
4. Existing and proposed access roads, drives, turnout locations, and parking.
5. The location of the proposed small wind energy system and the locations of all existing buildings, structures, overhead utility lines, and environmental features including woodland and other vegetation shall be shown on the site plan.

Commentary

5. Applications and Procedures. All cities and counties have ordinances that describe the land use permitting procedures. It is not suggested that local governments need to modify their current procedures to accommodate wind energy project permitting. The local government could address permitting process requirements by including a cross-reference to the applicable section of the local government development code.

Section 5 addresses the content of a land use application for a small-scale wind energy project. It suggests the level of detail regarding a proposed project that an applicant should provide to the local planning authority. This level of detail could be included in the development code, if appropriate, or could serve as guidance to the planning authority to use in designing an application form.

Because of the size and complexity of wind energy projects, the local government should require sufficient maps, documentation of other permits and licenses needed, development plans, and other information the city or county will need to review the request.

It is recommended that planning departments have an informal procedure for meeting with a potential applicant before the applicant submits a development application. Such advanced communication helps the planning department understand the scope of the project and provides an opportunity to answer any applicant questions regarding standards and application requirements. This will also help ensure that the applicant submits adequate information in the application.

Model Ordinance

6. The distance between the small-scale wind energy system tower and structures on adjoining properties and property lines shall be shown on the site plan.
7. All existing and proposed structures, existing and proposed parking areas with setbacks and buffers, and areas of impervious surfaces or lot coverage; including preliminary location(s) and elevation(s) of the proposed wind turbine(s).
8. Location of substations, electrical cabling from the wind turbine(s) to the substations, ancillary equipment, buildings, and structures (including those within any applicable setbacks), if any.
9. Additional information may be required, as determined by the **[local official]**, such as a scaled elevation view and other supporting drawings, photographs of the proposed site, photos or other realistic simulations or modeling of the proposed wind project from potentially sensitive locations as deemed necessary by the **[local official]** to assess the visual impact of the project, landscaping, and screening plan, coverage map, and additional information that may be necessary for a technical review of the proposal.

C. Liability Insurance

The applicant shall provide proof of adequate liability insurance for a small-scale wind energy project prior to the issuance of a zoning or building permit **[or prior to beginning construction]**.

6. Location, Appearance, and Operation of a Project Site

The following state, federal, and local regulations/requirements shall be followed when planning a small-scale wind energy system project:

A. Compliance with Uniform Statewide Building Code

[Zoning or Building] permit applications for small-scale wind energy systems shall be accompanied by standard drawings of the wind turbine structure, including the tower, base, and footings.

Commentary

C. Liability Insurance. Localities will need to decide what “adequate liability insurance” means in the context of local land use requirements. Typically, insurance requirements will be subject to the amount of investment, including installation costs, in the facility. Rather than providing a specific dollar amount, localities might want to develop a sliding scale based upon investment amount or some other indicator used by the jurisdiction in other contexts. Some localities prefer to address the issue of liability insurance as part of the building permit process. Additional note: If the project will utilize net metering, insurance, and certain other requirements will apply.



Model Ordinance

An engineering analysis of the tower showing compliance with the Uniform Statewide Building Code shall also be submitted. This analysis may be supplied in the form of documentation from the manufacturer or supplier. Submit the footing specifications developed by the tower supplier or manufacturer.

B. Compliance with the National Electric Code

Building permit applications for Small-Scale Wind Energy Systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code. This information may be supplied by the manufacturer.

C. Military Coordination

Version A (Less Prescriptive)

A Small-Scale Wind Energy System must comply with regulations of the Federal Aviation Administration (FAA), if applicable, including any necessary approvals for wind energy installations close to airports.

If the project is sited in a military operational area, applicants shall demonstrate they have coordinated with affected local military partners by selecting a check box indicating such on the development application. Applicants may use the SmartDG+ tool to determine parties with whom to coordinate to fulfill this requirement, if applicable.

Version B (More Prescriptive)

A Small-Scale Wind Energy System must comply with regulations of the Federal Aviation Administration (FAA), if applicable, including any necessary approvals for wind energy installations close to airports. If the proposed project location is within a military operational area, the applicant shall utilize the Military and Compatibility Layers of the Smart DG+ tool to determine military compatibility as follows:

1. The applicant shall use the Military and Compatibility Layers Smart DG+ tool to map the project location and determine whether the proposed project is within military operational

Commentary

C. Military Coordination. Local military installations should be consulted in the review of small-scale wind energy development projects. The provisions are intended to enhance early coordination efforts with military installations and identify potential areas of concern, and NOT substitute official analysis or render decisions on proposed developments.

Early coordination efforts may also include the DoD Informal Review process, discussed in the Maryland Military Operations and Considerations for Renewable Energy Development report. Additional early coordination efforts are described in the Best Practice Recommendations section of the report. Localities should choose the most appropriate method when considering the early coordination efforts to promote wind energy development and protect military operational areas.

Model Ordinance

areas. A copy of this map from SmartDG+ shall be included with the site plan per Section B.2.

2. The applicant shall utilize the SmartDG+ Compatibility Report tool to identify military installation Points of Contact within military operational areas and conduct consultations with them.
3. A copy of the Compatibility Report from SmartDG+ and proof of consultation including all comments from the military consultations shall be provided to **[local planning jurisdiction]** as part of the development application.

D. Visual Appearance

1. The color of the wind energy project shall be a non-reflective, unobtrusive color that blends with the surrounding environment and prevents glare. A photo or other simulation may be required.
2. Electrical controls and control wiring and power lines shall be wireless or underground.

E. Visual Impacts

1. The applicant shall demonstrate through project siting and proposed mitigation, if necessary, that the wind project minimizes impacts on the visual character of a scenic landscape.
2. The wind project shall be constructed to minimize interference with the view of or from any public park, Historic District, or **[other areas identified by jurisdiction]**

F. Lighting

A Small-scale Wind Energy System shall not be artificially lighted unless required by the Federal Aviation Administration (FAA) or other applicable authority.

G. Signage

A Small-scale Wind Energy system shall not be used for displaying any advertising. Appropriate warning signage shall be placed on wind turbines, electrical equipment, and wind energy project entrances. Wind turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the wind energy

Commentary

D. Visual Appearance. Larger wind energy projects have a visual presence in the landscape. Some communities may be concerned about the visual impact of these facilities; the language provided is designed to enable localities to explicitly address visual impacts without restricting access to wind resources.



Model Ordinance

project. All signs, flags, streamers, or similar items, both temporary and permanent, are prohibited on turbines except as follows:

- a. Manufacturers or installers identification of the wind turbine.
- b. Appropriate warning signs and placards.
- c. Signs that may be required by a federal agency.
- d. Signs that provide a 24-hour emergency contact phone number and warn of any danger. Educational signs providing information about the project and the benefits of renewable energy may be allowed as provided in the sign ordinance.

H. Noise

A Small-scale Wind Energy System shall not exceed the ambient noise levels as established by **[local noise ordinance]**.

I. Shadow Flicker

1. The applicant shall certify, by a professional engineer, that any wind turbine that is sited within one-half mile of any occupied building on a non-participating landowner's property either avoids shadow flicker on any occupied building or that reasonable effort to minimize shadow flicker to any occupied building on a non-participating landowner's property shall be made. Any occupied building situated to the south of the line of latitude that crosses the southern-most wind turbine associated with a wind project is excluded from any flicker study requirement.
2. The applicant does not have to meet these requirements if adjoining property owners sign a waiver of their rights regarding shadow flicker impacts, as follows:
 - a. The written waiver shall notify the property owner(s) of shadow flicker limits in this ordinance, describe the impact on the property owner(s), and state that the consent is granted for the wind energy project to not comply with the flicker limit in this ordinance.

Commentary

H. Noise is a complex technical issue on which research is ongoing. Local government leaders may want to consult reliable noise research studies. These issues typically include whether to measure noise at the property line or at non-participating residences, the necessity of subtracting out (controlling for) background noise when setting/measuring the standard, whether a qualified professional should be required to conduct the measurements, at what intervals the measurements should be taken, and the appropriate dBA over background noise. The subject of (inaudible) low-frequency noise is often raised by citizens.

I. Shadow Flicker. Shadow flicker issues may be relevant for small-scale wind energy projects which may be located within or near residential areas.

Model Ordinance

- b. Any such waiver shall be recorded in the office of the clerk of courts of the jurisdiction where the property is located. In addition to the above, the waiver shall describe the properties benefited and burdened, and advise subsequent purchasers of the burdened property that the waiver of shadow flicker limits runs with the land and may forever burden the subject property.

J. Height

Version A (Less Prescriptive)

1. The blade tip of any wind turbine shall, at its lowest point, have ground clearance of no less than fifteen (15) feet, as measured at the lowest point of the arc of the blades.
2. Small wind energy systems constructed over 200' must comply with all regulations of the Federal Aviation Administration (FAA), if applicable, including any necessary approvals for installation within airport overlay zones and military operational areas as identified in Smart DG+ and required by federal law.

Version B (More Prescriptive)

1. If located on a lot or parcel containing less than one acre, the height of the wind turbine and support structure, as measured from the ground level to the tip of a blade when the blade is at its highest point, shall not exceed 85 feet.
2. If located on a lot or parcel containing one acre or more, the height of the wind turbine and support structure, as measured from the ground level to the tip of a blade when the blade is at its highest point, shall not exceed 160 feet.
3. The blade tip of any wind turbine shall, at its lowest point, have ground clearance of no less than 15 feet.

Commentary



Model Ordinance

K. Setbacks

Version A (Less prescriptive)

Wind turbines shall be set back from buildings, property lines, and public or private rights-of-way for the **[Zoning District] [site local zoning ordinance, as applicable]**. The minimum setback from all adjoining parcels shall be equal to the height of the tower measured from its base to the adjoining property line. The **[local planning authority]** may reduce this requirement if the planning goals of **[jurisdiction/ planning document]** would be better served.

Version B (More Prescriptive)

1. The tower of a Small Wind Energy System shall be set back a distance equal to its total height, which is a one-to-one (1:1) ratio between height and setback, from all property lines and any overhead utility lines. A variance or an agreement in a recordable form signed by the adjoining property owner(s) must be obtained to reduce this required setback from property lines. Total height means the vertical distance from ground level to the tip of a wind generator blade when the tip is at its highest point.
2. The wind turbine and support structure shall be set back from all property lines and all above-ground utility lines at a distance equal to its height. These setbacks may not be reduced.
3. Guy wires and accessory structures shall comply with the minimum setback requirements for the **[Zoning District]** within which the wind energy system is located **[site local zoning ordinance, as applicable]**.

Waiver of Requirements **[jurisdiction to decide on the inclusion of the following language]**

Any participating or adjoining landowner may waive applicable setback requirements for occupied buildings of adjacent property or property lines by **[following the designated procedures and signing and filing the appropriate documentation with the jurisdiction in which the wind energy project is located]**; however, all occupied buildings shall be subject to the minimum setback requirements for occupied buildings of the subject property. Setback requirements for occupied buildings of the subject property and public and private rights-of-way may not be waived.

Commentary

Model Ordinance

L. Use of roads

1. The applicant shall identify all state and local public roads to be used within the **[jurisdiction]** to transport equipment and parts for construction, operation, or maintenance of the wind project.
 - a. The applicant shall submit written documentation that the applicant or designated assignee has accepted full financial responsibility for repairs to damage to private roads used during the construction or operation of the proposed project unless documentation is provided of other agreements with the owner(s) of the private roads. Private roads used to access the proposed project, including roads that serve non-participating landowners, shall be restored and maintained to pre-construction conditions during the operation of the project unless otherwise agreed by the parties.

7. Safety and Construction

A. Climb Prevention / Locks

1. The tower of a Small-scale Wind Energy System shall be designed to prohibit step bolts or a ladder readily accessible to the public for a minimum height of 10 feet above the ground.
2. All access doors to wind turbines and electrical equipment shall be locked or fenced, as appropriate, to prevent entry by unauthorized persons.
3. The **[jurisdiction]** may waive these requirements, if and as it deems appropriate.

B. Ground Clearance

The minimum distance between the ground and any protruding blades utilized on a community-scale wind energy project shall be 15 feet on a horizontal axis system and ten feet on a vertical axis system, as measured at the lowest point of the arc of the blades. The lowest point of the arc of the blade shall also be ten feet above the height of any structure within 150 feet of the base of the tower.

Commentary

L. Note, this section may not apply to all projects



Model Ordinance

C. Frequency Interference

The applicant shall make reasonable efforts to avoid disruption or loss of radio, telephone, television, or similar signals, and shall mitigate for significant interference caused by the project.

The project shall comply with the provisions of Title 47 of the Code of Federal Regulations, Section 15, and subsequent revisions governing said emissions. The owner or operator of a wind energy project may be required to discontinue use until the specified interference has been corrected.

D. Emergency response plan

1. Upon request, the applicant shall cooperate with emergency services to develop and coordinate the implementation of an emergency response plan for the wind energy project.
2. Any wind energy project found to be unsafe **[by the local enforcement officer]** shall be repaired by the project's owner or operator to meet applicable federal, state, and local safety standards or removed within six months.

8. Abandonment

Any small-scale wind energy system found to be abandoned or unsafe by the Building Code Official shall be repaired or removed by the landowner. A small wind energy system that fails to operate or is out of service for a continuous 12-month period shall be deemed to be abandoned. A wind turbine tower shall be removed within ninety (90) days of abandonment. Failure to comply within the period specified above will result in the complete removal of the abandoned wind turbine tower by **[jurisdiction]**. As provided by Code, all costs associated with this action incurred by **[jurisdiction]** will be forwarded to the property owner for payment. Should the property owner fail to make payment to **[jurisdiction]** within thirty (30) days of the turbine tower removal, the costs shall be charged to the owner of such property on the next regular real estate tax bill forwarded to such owner by the **[jurisdiction]** and said charges shall become a lien on the property and be due and payable by said owner at the time of payment of such bill

Commentary

C. The Maryland Military Operations and Considerations for Renewable Energy Development report explains in further detail frequency interference, which may occur depending on components of a small-scale wind project. This will not apply to all projects of this size.

Model Ordinance

Model Ordinance – Utility-Scale & Small-Scale Solar Energy Systems

1. Title

[Chapter XX] Regulations and Standards – Utility-Scale and Small-Scale Solar Energy Systems.

2. Purpose

The purpose of these regulations is to ensure the timely and orderly development of Utility-Scale and Small-Scale Solar Energy Systems to meet energy and economic needs while protecting the environment. These regulations and standards allow **[insert jurisdiction]** to protect public health, safety, and general welfare. These standards comply with the comprehensive land use plan and with the Statewide Planning requirements.

3. Applicability

This ordinance applies to all solar energy systems, proposed to be constructed after the effective date of this ordinance. Utility-Scale and Small-Scale Solar Energy systems constructed prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance.

4. Definitions

“Applicant” means the owner or operator who submits an application to the jurisdiction for a permit to install a solar energy project under this ordinance.

“Aviation Solar Consultation Area” means the outer extent of imaginary surfaces surrounding military airfields where the visual range of low-level aircraft is critical for Air Traffic Control Tower personnel.

“Military Operational Areas” means areas significant to sustaining the military mission and represent the only approved areas to conduct these operations.

“Prime agricultural soils” are soils defined by the U.S. Department of Agriculture, as having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these

Commentary

The model ordinance for Utility-Scale and Small-Scale Solar Energy Systems applies to the following jurisdictions:

For Solar Frequency Consultation Area:

- Anne Arundel County
- Prince George’s County
- Charles County
- Calvert County

For Solar Aviation Consultation Area:

- Calvert County
- Charles County
 - Town of Indian Head
- St. Mary’s County
- Prince George’s County
 - City of Bowie
 - Town of Upper Marlboro
 - Town of Forest Heights
 - City of District Heights
 - City of Seat Pleasant
 - Town of Bladensburg
 - Town of Cheverly
 - Town of Glenarden
 - City of New Carrollton
 - City of Mt Rainier
- Anne Arundel County
- Baltimore County
- Somerset County
- Worcester County
 - Pocomoke City
- Harford County
 - Town of Bel Air
 - City of Aberdeen
 - City of Havre de Grace
- Cecil County
 - Town of Perryville
- Kent County
 - Town of Betterton

2. Purpose. This ordinance section describes the need for standards relating to the siting of utility-scale and small-scale solar energy systems. It may refer to compliance with the local comprehensive plan and the statewide planning goals.

4. Definitions are necessary to provide context to the ordinance provisions and should be incorporated in any proposed solar energy ordinance.



Model Ordinance

uses. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied.

“Small-scale” is defined as a community solar energy generating system which has the meaning stated in Public Utilities Article, §7-306.2, Annotated Code of Maryland

“Smart DG+ tool” is a free, online, map-based screening tool sponsored by the Maryland Energy Administration and the Power Plant Research Program at the Maryland Department of Natural Resources. The tool’s Military & Compatibility layers, and associated coordination report were developed to promote military compatibility with proposed renewable energy projects.

“Solar Frequency Consultation Area” means a 10-mile area surrounding the Joint Base Andrews Brandywine Receiver Site.

“Solar, Commercial, Industrial, or Institutional Accessory” means a small-scale solar energy system that:

1. uses energy from the sun to produce electricity for on-site use as an accessory to the principal commercial, industrial, or institutional use.
2. may provide excess energy that is not immediately utilized on-site or temporarily stored for future use on-site to a utility company that provides electrical service to the property where the commercial, industrial, or institutional accessory solar energy generating facility is located in.

“Solar, Residential, or Agricultural Accessory” means a small-scale solar energy system that

1. derives energy from the sun to produce electricity to support a residential use or accessory structure, building, or use. Residential is a detached residential structure, a duplex, or a townhouse not more than three stories above grade plane in height with a separate means of egress. A small-scale solar facility may provide electricity to residential

Commentary

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accessory structures or buildings that comply with the following:

- a. constructed or located on the same zoning lot as the principal residential building; and
 - b. clearly incidental to, subordinate in purpose to, and serving the residential use.
2. derives energy from the sun to produce electricity to support an agricultural operation located on the same property as the agricultural operation; and
 3. includes an energy-generating system that delivers electricity to a power grid and complies with the laws of the State of Maryland.

“Utility-Scale” means a facility that

1. uses energy from the sun to generate electricity primarily for use off-site; and
2. sells the electricity to the regional wholesale electricity market; and
3. has a generating capacity of more than 70 MW; and
4. requires a Certificate of Public Convenience and Necessity from the Maryland Public Service Commission.

5. Provisions for Utility-Scale Solar Energy Systems

[Insert Land Use Table for utility-scale solar projects by local zoning districts]

A. General Standards:

1. Site plan approval is required.
2. Buffer yards required by **[Local Buffer Yard Standards]**. Buffer yards are not required for Solar, Residential, or Agricultural Accessory facilities.
3. Development in the Critical Area shall comply with Code of Maryland Regulations, Title 27, Subtitle 01 Criteria for Local Critical Area Program Development and Code of Maryland Regulations, Title 27, Subtitle 02 Development in the Critical Area Resulting from State and Local Agency Programs.

Commentary

5. The land use table will guide where utility-scale solar energy systems are allowed as a permitted use by-right or conditional use depending on the location relative to the jurisdictional zoning districts.

2. Buffer yards are a way of minimizing the potential visual impacts of solar energy systems. This can be done by planting canopy trees, understory trees, and shrubs subject to the buffer yard requirements for the local jurisdiction.



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4. The developer shall provide proof they have complied with decommissioning requirements, including proof of a bond or other financial security, set forth by the Maryland Public Service Commission.

B. Limited Standards:

1. The solar panels and any other structures of a utility-scale solar project may not be constructed on prime agricultural soils.
2. The solar panels and any other structures of a utility-scale solar project may not be constructed on farmland of statewide importance soils.
3. A private road conforming to the specifications in the **[insert state soil conservation for local jurisdiction, if applicable]** Private Road Standards may be built on prime agricultural soils or farmland of statewide importance soils if needed to access the location of the solar.
4. Panels or other structures and no feasible location of the road other than on prime agricultural soils or farmland of statewide importance soils is possible.
5. Utility-scale solar projects are not allowed on land designated as a Rural Legacy Area by the Maryland Rural Legacy Board.

C. Military Coordination

Version A (Less Prescriptive)

A Utility-Scale Solar Energy System must comply with regulations of the Federal Aviation Administration (FAA) and, if applicable, include any necessary approvals for solar energy installations close to airports.

If the project is sited in a military operational area, applicants shall demonstrate they have coordinated with affected local military installations by selecting a check box indicating such on the development application. Applicants may use the SmartDG+ tool to determine parties with whom to coordinate to fulfill this requirement.

Commentary

B. While these limitations are not specific to military operations, they support agricultural conservation and land preservation at the local level.

Maryland courts have decided the state can overrule local restrictions on which zoning designations or types of land solar facilities may be located¹.

1. Prime agricultural soils are defined by the USDA and are identified for each county in Maryland at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1338623.html

C. Military Coordination. COMAR 20.79.01-03 sets forth requirements for utility-scale solar energy systems and assures the inclusion of the Military Installation and Aviation Assurance Siting Clearinghouse in the review of projects which may affect military operational areas.

Local military installations should be consulted in the review of utility-scale solar energy development projects. The provisions are intended to enhance early coordination efforts with military installations and identify potential areas of concern within the Solar Frequency Consultation Area and Aviation Solar Consultation Area, as defined in Section 4, Definitions. The coordination does NOT substitute official analysis or render decisions on proposed developments.

¹ <https://planning.maryland.gov/Pages/OurWork/envr-planning/solar-siting/solar-siting-judicial-adminstrative-decisions.aspx>

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Version B (More Prescriptive)

A Utility-Scale Solar Energy System must comply with regulations of the Federal Aviation Administration (FAA) and, if applicable, include any necessary approvals for solar energy installations close to airports. If the project is sited in a military operational area, applicants shall use the Military and Compatibility Layers of the Smart DG+ tool to determine military compatibility as follows:

1. The applicant shall use the Military and Compatibility Layers Smart DG+ tool to map the project location and determine whether the proposed project is within a Solar Frequency Consultation Area or Aviation Solar Consultation Area. A copy of this map shall be included with the site plan.
2. The applicant shall use the SmartDG+ Compatibility Report tool to identify military installation Points of Contact within the Solar Frequency Consultation Area or Aviation Solar Consultation Area and conduct consultations with them.
3. A copy of the Compatibility Report from SmartDG+ and proof of consultation including all comments from the military consultations shall be provided to the **[local planning authority]** as part of the development application.

6. Provisions for Small-Scale Solar Energy Systems

[Insert Land Use Table for utility-scale solar projects by local zoning districts]

A. General Standards

1. Permit approval is required.
2. Buffer yards required by **[Local Buffer Yard Standards]**. Buffer yards are not required for Solar, Residential, or Agricultural Accessory facilities.
3. Development in the Critical Area shall comply with Code of Maryland Regulations, Title 27, Subtitle 01 Criteria for Local Critical Area Program Development and Code of Maryland Regulations, Title 27, Subtitle 02 Development in the Critical Area resulting from State and Local Agency Programs.

Commentary

Early coordination efforts may include the DoD Informal Review process, explained further in the Maryland Military Operations and Considerations for Renewable Energy Development report. Additional early coordination efforts are described in the Best Practice Recommendations section of the report. Localities should choose the most appropriate way forward when considering the best early coordination efforts to promote renewable energy development and protect military operational areas.

6. The land use table will guide where small-scale solar energy systems are allowed as a permitted use by-right or conditional use depending on the location relative to the jurisdictional zoning districts.

2. Buffer yards are a way of minimizing the potential visual impacts of solar energy systems. This can be done by planting canopy trees, understory trees, and shrubs subject to the buffer yard requirements for the local jurisdiction.



Model Ordinance

B. Military Coordination

Version A (Less Prescriptive)

A Small-Scale Solar Energy System must comply with regulations of the Federal Aviation Administration (FAA) and, if applicable, include any necessary approvals for solar energy installations close to airports.

If the project is sited in a military operational area, applicants shall demonstrate they have coordinated with affected local military installations by selecting a check box indicating such on the development application. Applicants may use the SmartDG+ tool to determine parties with whom to coordinate to fulfill this requirement.

Version B (More Prescriptive)

A Small-Scale Solar Energy System must comply with regulations of the Federal Aviation Administration (FAA), if applicable, including any necessary approvals for solar installations close to airports. Applicants shall use the Military and Compatibility Layers of the Smart DG+ tool to determine military compatibility as follows:

1. The applicant shall use the Military and Compatibility Layers Smart DG+ tool to map the project location and determine whether the proposed project is within a Solar Frequency Consultation Area or Aviation Solar Consultation Area. A copy of this map shall be included with the site plan.
2. The applicant shall use the SmartDG+ Compatibility Report tool to identify military installation Points of Contact within the Solar Frequency Consultation Area or Aviation Solar Consultation Area and conduct consultations with them.
3. A copy of the Compatibility Report from SmartDG+ and proof of consultation including all comments from the military consultations shall be provided to the **[local planning authority]** as part of the development application.

Commentary

B. Military Coordination. Local military installations should be consulted in the review of small-scale solar energy development projects. The provisions are intended to enhance early coordination efforts with military installations and identify potential areas of concern within the Solar Frequency Consultation Area and Aviation Solar Consultation Area, as defined in Section 4. The coordination does NOT substitute official analysis or render decisions on proposed developments.

Early coordination efforts may include the DoD Informal Review process, explained further in the Maryland Military Operations and Considerations for Renewable Energy Development report. Additional early coordination efforts are described in the Best Practice Recommendations section of the report. Localities should choose the most appropriate way forward when considering the best early coordination efforts to promote renewable energy development and protect military operational areas.

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