

# Fact Sheet

## *Middle River, Maryland*

## *Middle River Complex and Martin State Airport*

### *Environmental Studies and Cleanup*



April 2022

## History

In 1929, the Glenn L. Martin Company, a predecessor to Lockheed Martin Corporation, bought land in Middle River, Maryland, to build and test aircraft. This land is now part of the Middle River Complex and Glenn L. Martin State Airport. In 1975, the airport was sold to the state of Maryland, through the Maryland Department of Transportation. The Maryland Aviation Administration, a unit of the Maryland Department of Transportation, operates the airport. Other land parcels sold around the same time include the land now occupied by Ashley Furniture, Johnson & Towers, Tilley Chemical, Total Industrial Group, the U.S. Postal Service, and a gas station-convenience store.

Martin Marietta Corporation merged with Lockheed Corporation in 1995 to form Lockheed Martin Corporation, which today conducts engineering and research at the Middle River Complex. The complex is owned by LMC Properties, Inc., which provides global real estate and asset management services to Lockheed Martin. Lockheed Martin's Rotary and Mission Systems business operates at the facility. MRA Systems, Inc also builds and tests aircraft components in A-, B-, and C-Buildings.

### ***Beginning Environmental Studies***

In the 1990s, excavations and a conceptual revitalization plan prompted questions about environmental conditions at Lockheed Martin's Middle River Complex and Martin State Airport. The Maryland Aviation Administration found china, papers, and other items associated with the former Glenn L. Martin Company while digging for utility work at Martin State Airport. Then, Baltimore County developed an economic revitalization plan for the Middle River community and asked about Lockheed Martin's plans for un-used waterfront parcels at the Middle River Complex.

Since that time, Lockheed Martin has completed thorough environmental studies at Martin State Airport in an area between Taxiway T or "Tango" and Frog Mortar Creek, the Dump Road Area. Lockheed Martin works with the Maryland Department of the Environment's Land and Material Management Program and the Maryland Aviation Administration. The team has also completed environmental investigations around the Main Terminal, Strawberry Point, and Greater Strawberry Point, and in Frog Mortar Creek and Stansbury Creek.

The team also conducted environmental studies at the Middle River Complex. Lockheed Martin entered the Maryland Department of the Environment's Voluntary Cleanup Program after starting soil and groundwater investigations at the Middle River Complex. Investigations grew to be in State of Maryland-owned surface water bodies. So, Lockheed Martin and the Maryland Department of the Environment agreed to move the Middle River Complex Remediation Project from the Voluntary Cleanup Program, which is for real-estate owned by the remediating entity, to the Land Restoration Program. This change combined all planned cleanup activities under one State of Maryland-administered program, addressed in an administrative consent order.

### ***Environmental Sampling***

Lockheed Martin has collected thousands of soil, surface water, sediment, groundwater, soil vapor, and indoor air samples at the Middle River Complex and Martin State Airport. We tested all samples for chemicals known to have been used during aircraft production and related industrial operations. The testing found chemicals used in the Middle River Complex beneath pavement and buildings, in fenced-off areas with limited access, and near storm water outfalls along Cow Pen Creek and Dark Head Cove. Sampling at Martin State Airport identified the Dump Road Area as the main area of concern, where a groundwater plume with contaminants moves towards Frog Mortar Creek. Some of these compounds were found in Frog Mortar Creek, which prompted the Maryland Department of the Environment to issue a water contact advisory along parts of the airport shoreline. Lockheed Martin, in response, constructed a groundwater treatment system on the airport property (see below). Sampling results helped assess potential risks to

***Newsletters and Project Bulletins updating the community on timely information and Citizen's Guides covering groundwater, soil, and sediment can be found at [lockheedmartin.com/middleriver](http://lockheedmartin.com/middleriver) or [lockheedmartin.com/martinstate](http://lockheedmartin.com/martinstate).***

human health and the environment and the appropriate level of cleanup, considering current and future property uses.

## Middle River Complex

The Middle River Complex has eight parcels of land, called tax blocks, identified separately by the letters A, B, and D through I. Teams have done site-wide investigations by tax block, or by medium (e.g., groundwater).

### Risk Assessments

Teams assessed soil, groundwater, soil vapor, indoor air, and sediments to evaluate potential risks to human health and the environment. The risk assessments determined which chemicals to target for cleanup, and proposed target cleanup amounts based on the current or future site use, such as industrial, residential, or recreational. The risk assessment information helped the team select and design appropriate cleanup remedies that could lower chemical amounts in soil, groundwater, indoor air, surface water, and sediments to health-protective levels in a timely manner.

### Soil Investigations and Cleanup

Soil around and underneath existing and former buildings, parking lots, and in secured, fenced-off areas along the waterfront included areas with high amounts of the following:

- Petroleum compounds
- Polycyclic aromatic hydrocarbons (PAHs)
- Heavy metals such as arsenic, mercury, and lead
- Polychlorinated biphenyls (PCBs)

Lockheed Martin cleaned up Block B (the parking lot and ball field area on Eastern Avenue) in 2010 by removing and disposing contaminated

soil at a licensed landfill and replacing it with clean soil. The Maryland Department of the Environment agrees that no further soil or groundwater cleanup is necessary on Block B. However, since contaminated groundwater is located under Block I, next to Block B, the Maryland Department of the Environment issued a land-use restriction banning groundwater use on Block B, recorded in the Baltimore County land records.

Block A includes a Lockheed Martin office building. The Maryland Department of the Environment agrees that the site history and characterization mean Block A does not need remediation. However, Block A groundwater also cannot be used, because like Block B, it is next to Block I.



Middle River Complex

Based on the risk assessment results, Blocks D, F, G, and H required soil remedial action plans. The Maryland Department of the Environment approved the resulting plans in 2013 and early 2014. In 2014 the public reviewed and commented on the plans, which proposed cleaning the soils to industrial standards, keeping with current and past property use. Lockheed Martin proposed cleaning the panhandle portion of Block D to recreational standards. The blocks were cleaned up in 2015 and 2016. In 2018, the Maryland Department of the Environment told Lockheed Martin that no further soil cleanup was needed on these Blocks. Land-use restrictions banning groundwater and prescribing soil management requirements are recorded in the Baltimore County land records. Additional remediation may be needed if residential, commercial, or recreational land use changes occur in the future within Blocks F, G, or H, or the non-panhandle portion of Block D.

Environmental monitoring continues at Block I, which has Middle River Aerostructure Systems (MRAS) production facilities and Lockheed Martin's Rotary and Mission Systems (RMS) operations. Block I environmental monitoring will continue after Lockheed Martin's RMS local business operations close in 2023.

***A Citizens' Guide and Addendum, Project Bulletin, and Website Virtual Photo Tour on Soil Cleanup are available at [lockheedmartin.com/middleriver](http://lockheedmartin.com/middleriver)***

Block E had high amounts of polychlorinated biphenyls (PCBs), prompting more investigations and remedial actions under a U.S. Environmental Protection Agency (EPA) program. The Maryland Department of the Environment approved the remedial action plan in 2020. EPA approved a risk-based disposal approval application in early 2021. Construction took place from April 2021 through April 2022. Monitoring activities will continue for several years. The construction removed the former D-Building foundation. The remedy also removed contaminated soil in Block E, down to a depth of 20 feet in certain areas, and replaced it with clean stone or soil. The remedy removed contaminated soil along part of the roadway and median. The contaminated soil was taken to licensed landfills, located out-of-state. Many of the original storm drains and inlet structures, which Lockheed Martin had been cleaning and rehabilitating since 2011, were removed and replaced. The remedy will restore the site to a fully vegetated field including a pollinator meadow. Verification monitoring of groundwater, storm drain sediment, and site revegetation will continue for two years.

Because radioactive materials were used in the former D-Building, the Nuclear Regulatory Commission conducted a closeout verification survey of that parcel in 1994. The survey found no detectable radiation above background levels. It

concluded the location was suitable for unrestricted use in its current condition, with the basement floor slab in place and the floor drains plugged with concrete. Lockheed Martin surveyed the area in 2004 and in 2012 and concluded that there was no radiation significantly above background levels at the ground's surface. Additional sampling for potential residual radioactive materials at the former location of D-Building continued during soil investigations. As expected, the sampling found small amounts of radioactive materials in some floor drains under the foundation slab, which were removed during the D-Building foundation demolition. Lockheed Martin developed and followed precautions for handling and disposing the radioactive material.

***A Citizens' Guide and Project Bulletin on Block E Soil Cleanup are available at [lockheedmartin.com/middleriver](http://lockheedmartin.com/middleriver)***

### ***Groundwater Investigations and Cleanup***

During investigations of groundwater at the Middle River Complex, Lockheed Martin found three shallow groundwater plumes with elevated levels of chlorinated solvents including trichloroethene (TCE). Two plumes came from the industrial facility in the center of the complex (Block I). The other came from an underground storage tank (UST) found in 2013 in the southeast corner of Block E. There were also several small, isolated areas with petroleum compounds, such as benzene, in shallow groundwater near former USTs beneath the Middle River Complex industrial buildings.

Site workers and visitors do not come into contact with these chemicals because groundwater at the site is not used. Mitigation systems are installed under parts of Block I buildings to protect indoor air quality. The systems remove the vapors of contaminants coming from contaminated soil and groundwater beneath the building. The Maryland Department of the Environment restricts any future use of shallow groundwater.

Shallow groundwater at the Middle River Complex goes into Dark Head Cove and Cow Pen Creek. The slow rate of discharge to these surface waters results in very small amounts of contaminants that rapidly disperse. This means the surface waters have low contaminant levels that consistently meet the site-specific swimming screening levels. A surface water monitoring program periodically samples the water to confirm levels meet Maryland Department of the Environment-approved swimming criteria.

***A Citizens' Guide, Project Bulletin, and Construction Photo Tour on groundwater are available at [lockheedmartin.com/middleriver](http://lockheedmartin.com/middleriver)***

Groundwater treatment systems began operating in 2014 to treat two of the three shallow groundwater plumes. These two systems relied on in situ (meaning “in place”) bioremediation to reduce trichloroethene in areas with the highest levels. In bioremediation, a mixture of water and lactate produced from sugars, like from corn or beets, is injected into the ground to stimulate naturally occurring bacteria that consume and break down the contaminants. Groundwater treatment in Blocks G and I met cleanup objectives by 2016 and 2017, respectively.

When preparing to install a third system in 2013, during excavation for the shallow groundwater plume in Block E, the team discovered two previously unknown USTs. One had trichloroethene (TCE), a solvent commonly used to clean industrial parts. The tanks were removed and disposed of following Maryland Department of the Environment regulations. Follow-up investigations revealed trichloroethene in the groundwater was at levels too high to be removed via the type of groundwater bioremediation treatment system recently installed for the other two groundwater plumes. In 2014, the team installed a high vacuum extraction system temporarily to remove the highest levels of trichloroethene from groundwater and soil. The extracted groundwater was treated before going into the Baltimore County sanitary sewer system. The vacuum system operated from 2014-2015 and removed about 550 pounds of TCE.

Lockheed Martin collected groundwater samples from Block E and next to Block F to better understand the TCE groundwater plume. The team completed a feasibility study proposing a new preferred remedy, which the Maryland Department of the Environment approved in 2019. The remedy was a multi-part approach to cleaning up the trichloroethene plume: groundwater treatment using bioremediation close to the original contamination source in Block E, with contaminated groundwater farther downgradient in Block F extracted by two extraction wells and pumped to a treatment system. The study also proposed a third component, a permeable reactive barrier, between these two systems, but a pilot test showed the additional treatment was not needed. The groundwater pump and treatment system construction began in mid-2020. Complications with COVID-19 and obtaining a building permit to house the treatment system slowed progress in late 2020. Lockheed Martin resumed constructing the treatment building in spring 2021, with startup occurring in October 2021. Groundwater treatment using bioremediation in Block E will begin near the end of 2022.

Meanwhile, Lockheed Martin has continued checking the groundwater plume for any movement of TCE toward Dark Head Cove, including sampling surface water in the cove. Groundwater investigations also confirm that the groundwater contamination does not move below the creek to the adjacent Hawthorne or Wilson Point neighborhoods.

While investigating groundwater in preparation for Block E soil remediation, Lockheed Martin defined the extent of 1,2,4-trichlorobenzene and other chlorinated benzene compounds in Block F groundwater. The team developed an addendum to its groundwater response action plan that presents alternatives for addressing these plumes. MDE approved the plan in April 2021. Shared with the public in the summer of 2021, the plan will take effect in the spring of 2022. The Block E soil cleanup removed the source areas and the next step is to monitor the plume to ensure it is naturally degrading.

***A July 2021 Newsletter describing the plan for reducing chlorobenzenes is available at [lockheedmartin.com/middleriver](https://lockheedmartin.com/middleriver)***

Lockheed Martin voluntarily sampled for eight compounds from a group of per- and polyfluoroalkyl substances (PFAS) at Middle River Complex and Martin State Airport. At Middle River Complex, 40 of 41 groundwater samples had low-level PFAS concentrations. None of the samples were above the EPA’s human health advisory levels of 70 parts per trillion (ppt) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), separate or combined. PFOS concentrations detected in two locations sampled were above the EPA groundwater screening level of 40 ppt, with levels of 42 and 47 ppt, respectively.

### ***Sediment Sampling and Proposed Sediments Cleanup***

Lockheed Martin has sampled the sediments of Dark Head Cove and Cow Pen Creek extensively. Sediments in Cow Pen Creek and along the bulkhead and airport discharge points in Dark Head Cove had elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals such as cadmium and chromium. These levels meant action needed to be taken to lower the potential risks associated with long-term direct contact, fish taking in the contaminants, and potential impact to organisms living in the sediment. Eating fish from these waters is guided by Maryland Department of the Environment and Maryland Department of Natural Resources fish advisories for the Chesapeake Bay and the Baltimore region, which include the Middle River area.

Lockheed Martin worked with the community to develop a preferred approach to remediating sediment in Cow Pen Creek and Dark Head Cove next to the Middle River Complex. The Maryland Department of the Environment and EPA approved the approach in 2013. The approach included removing contaminated sediments through dredging and excavation; in situ (“in place”) treatment to reduce contaminant mobility; and monitored natural recovery that relies on natural processes to return sediment to natural levels. The preferred approach included shoreline stabilization, habitat enhancement, and creek bed plantings

in Cow Pen Creek. Additional tests assessed benthic organisms (such as worms) and environmental conditions in the sediment to help find the level of activated carbon to use in in situ treatment. Test results submitted to regulators also helped design the remedy. Lockheed Martin cleaned up the site between 2014 and 2017, as described below.

### ***Sediment Dredging and Removal***

In 2013, sampling activities preparing for sediment remediation showed higher levels of polychlorinated biphenyls (PCBs) near Outfall 005 than had been found elsewhere in Dark Head Cove. PCBs were commonly used in electrical transformers and may have been released when D-Building was dismantled. Lockheed Martin, EPA, and the Maryland Department of the Environment agreed the best course of action was to clean up this location before implementing the full sediment remedy.

Lockheed Martin isolated the work area with a floating boom in the spring of 2014. The team removed sediments in the winter of 2014. Dredged sediments were moved to dump trucks at the nearby bulkhead. Then the trucks transported the sediments to a bermed and lined dewatering pad for draining. The team mixed additives with the sediments to reach necessary dryness and stability. The sediments were then moved to an approved and licensed disposal facility in New York State. The team completed in-water work in mid-February 2015, at the end of the allowable winter work window.

Similar practices were used for the full remedy dredging in Dark Head Cove and Cow Pen Creek during the winter of 2016-2017.

Excavation work in Cow Pen Creek started in July 2017 and finished in December 2017. The creek was piped around dammed-off segments, creating dry work areas. The team moved fish downstream to the creek section located below work areas. After contaminant removal, the creek was restored with native plants, including submerged aquatic vegetation.

In total, the combined dredging and excavation removed about 55,500 cubic yards (3,285 truckloads) of contaminated sediments from nearly 12 acres. For comparison, one football field is about 1.3 acres.

In winter 2017-2018, the team placed a layer of activated carbon on 13.7 more acres of sediments in un-dredged portions of Dark Head Cove, creating a protective layer to absorb any remaining PCBs. Three years of monitoring showed that PCBs were effectively removed from the food chain, meeting the project goal.

Lockheed Martin placed submerged aquatic vegetation seeds in April 2018 to help restore plants removed during dredging. Changing regional conditions in the Chesapeake Bay made it difficult for the submerged aquatic vegetation to return to the

density observed before the remedy construction. Monitoring the submerged aquatic vegetation will continue through 2023. The team harvested seeds this past fall in preparation for replanting submerged aquatic vegetation in the spring of 2022.

The team is checking on restored and replanted areas in Cow Pen Creek to make sure they recover properly. First and second year monitoring showed mostly good recovery in plantings in and upland to the creek, with a few areas needing to be replanted due to oversaturation. The team replanted in 2020 with small success in those saturated areas. An investigation in 2021 reevaluated the original amount of wetlands identified and, based on the findings, Lockheed Martin submitted a permit modification to the Maryland Department of the Environment in 2022.

Cow Pen Creek and Dark Head Cove are considered waters of the State of Maryland and of the United States, and are within the Chesapeake Bay Critical Area. So, the Maryland Department of the Environment made cleanup decisions in consultation with other governmental authorities, including EPA, the Maryland Department of Natural Resources, the U.S. Army Corps of Engineers, and the Maryland Critical Area Commission.

***A Citizens' Guide and Photo Tours on  
sediments are available at  
[lockheedmartin.com/middleriver](http://lockheedmartin.com/middleriver)***

### ***Lockheed Martin's Rotary and Mission Systems and MRA Systems, Inc. Facilities Vapor Mitigation***

Lockheed Martin sampled various Block I buildings to see if there is any potential risk to human health from soil, groundwater, and sub-slab vapor. Soil-gas sampling showed volatile organic compounds (VOCs) in several locations under and outside the buildings. Early sampling in 2006 showed contamination under A-, B-, and C-Buildings. Indoor air quality samples in the Vertical Launching System facility in 2006 and again in 2014 showed no need for additional sampling in that building. Sub-slab vapor in additional outlying buildings was sampled during 2017 and 2018, and the results verify there are no concerns for contaminant vapor mixing with indoor air.

In early 2008, Lockheed Martin took the precaution of installing sub-slab vapor-mitigation systems in the two areas of A- and C-Buildings where sub-slab vapor concentrations were above established screening levels. The systems are essentially vacuums that draw out the sub-slab vapor and direct it through a filter before releasing the vapor to the outside air. The systems have significantly reduced volatile organic compounds concentrations in vapors under the buildings. They have helped keep concentrations in indoor

air below the conservative screening levels calculated by EPA and the Maryland Department of the Environment.

Air samples collected while the A-Building system was shut down in March 2013 for maintenance showed that the amount of volatile organic compounds remains below risk levels even when the system is not operating. Still, the mitigation system continues to operate proactively. Samples from C-Building basement showed additional areas of volatile organic compounds in sub-slab vapor in the east-central part of the basement. Although indoor air samples do not show there are unacceptable risk levels, the C-Building sub-slab vapor-mitigation system was expanded proactively in 2012-13. Another additional expansion took place in A-Building in 2016. Lockheed Martin evaluates the systems to be sure they effectively control the potential for vapor intrusion.

Over the past year, study has focused on the former Drop Hammer Building located to the west of A-Building. Elevated levels of VOCs have been found under the building slab, but current data indicate the air quality inside the building does not put site workers at risk. More sampling is planned as the study continues. In an abundance of caution, Lockheed Martin installed a new vapor mitigation system in the Drop Hammer Building. The new system started operating in December 2021.

Indoor air monitoring in the basement of A-Building showed more persistent levels of volatile organic compounds, with several samples at levels above screening criteria. While this basement workspace is rarely occupied, it does require routine access for maintenance activities. Lockheed Martin installed an air filtration system in 2015 and expanded it in 2017. The filtration system cleans the air and then discharges the treated air back into the basement. Additional investigations in 2017 evaluated if trichloroethene vapors from the basement sumps and drains could be removed and treated using the existing A-Building sub-slab vapor-mitigation system. Based on positive results, one sump was covered and connected to the sub-slab vapor-mitigation system. Formerly used heating vents in the main workspace of A-Building were sealed off to prevent vapors travelling from beneath the building or the basement into work areas. In 2018, Lockheed Martin sampled and monitored the flow of water leaving the sumps and studied ways to permanently retire unused piping and sumps. Three sumps were permanently abandoned with concrete in 2019 and 2020 without any adverse effects. A fourth sump was connected to the vapor extraction system in 2021.

## Martin State Airport

Lockheed Martin conducts environmental investigations at Martin State Airport, including sampling the nearby Frog Mortar and Stansbury Creeks, in cooperation with the Maryland Department of the Environment. Lockheed Martin coordinates investigations, remediation, and permitting activities at Martin State Airport with the State of Maryland, represented by Maryland Aviation Administration (the property owner) and with the Maryland Air National Guard (a major tenant at the airport).

### *Dump Road Area*

Investigations in the Dump Road Area found contaminants. Chlorinated volatile organic compounds (CVOCs), including TCE, cis-1,2 dichloroethene, and vinyl chloride, at levels above federal and Maryland groundwater standards are in a groundwater plume coming from the Dump Road Area and moving towards Frog Mortar Creek. Lockheed Martin constructed a groundwater treatment plant to stop the contaminated groundwater from the Dump Road Area from going into Frog Mortar Creek. This interim remedial action consists of a series of extraction wells parallel to Frog Mortar Creek in the Dump Road Area. The wells extract groundwater and pump it to the groundwater treatment facility. Treated groundwater is discharged through a submerged outfall in Frog Mortar Creek. The treated water quality is regularly checked to ensure it meets permit requirements. The facility was completed in late 2017, and operation began in December 2017. The groundwater collection and treatment system operation has significantly improved the water quality in the creek, virtually eliminating any evidence of contaminants by 2019.

Lockheed Martin is in the process of designing an expansion to treatment of contaminated groundwater in the Dump Road Area by designing more extraction wells, to be installed in the areas of highest groundwater contamination between Taxiway Tango and Frog Mortar Creek. On the airfield, between Taxiway Tango and the runway, Lockheed Martin will employ an in situ (“in place”) bioremediation remedy to inject bacteria and nutrients into the contaminated groundwater to enhance natural contaminant breakdown. The groundwater extraction and treatment and the in situ bioremediation remedies will decrease the time needed to complete the overall groundwater treatment, currently expected to take decades. Lockheed Martin also coordinates with the Maryland Aviation Administration and the Maryland Air National Guard to control the risk of exposure to workers conducting airport maintenance or construction in the area. Lockheed Martin and the Maryland Aviation Administration are working together to determine what environmental conditions may need to be addressed to support airport operations and how to effectively close the landfill.

***An Indoor Air Quality Fact Sheet is available  
at [lockheedmartin.com/middleriver](https://lockheedmartin.com/middleriver)***

Since 2020, Lockheed Martin has voluntarily sampled for per- and polyfluoroalkyl substances (PFAS) at Martin State Airport, including three rounds of groundwater and surface water sampling in Greater Strawberry Point and the Dump Road Area. Sampling results have ranged widely. The Dump Road Area had the highest levels of PFOS and PFOA found in groundwater. PFOS was found in groundwater with the maximum level of 3,000 parts per trillion (ppt) in the north

Dump Road Area and 10,000 ppt in the south Dump Road Area. PFOA was found in groundwater at a maximum level of 680 ppt in the north Dump Road Area and 1,600 ppt in the south Dump Road Area. In Greater Strawberry Point, the groundwater had much lower levels of PFOS and PFOA. PFOS was found at a maximum level of 520 ppt in a ditch carrying overflow from stormwater retention basins near Strawberry Point Road. Lockheed Martin



*Martin State Airport*

regularly checks for PFAS in the treatment plant intake and treated water samples. Results show low levels of PFAS in groundwater entering the groundwater treatment plant. However, the treatment plant carbon filter vessels effectively remove the PFAS from the treated water before it goes into Frog Mortar Creek.

***A Citizens' Guide and Construction Photo Tour on groundwater are available at [lockheedmartin.com/martinstateairport](http://lockheedmartin.com/martinstateairport)***

### ***Frog Mortar Creek***

While earlier sampling found no issues of concern, sampling between 2012 and 2017 showed that some chlorinated volatile organic compounds (CVOCs), including TCE, cis-1,2-dichloroethene, and vinyl chloride, were going into Frog Mortar Creek. Thus, surface water levels of volatile organic compounds in part of Frog Mortar Creek were above the swimming criteria developed for this project. The highest levels were in a small area along the shoreline of Frog Mortar Creek in the Dump Road Area. After a public information meeting, in April 2012 the Maryland Department of the Environment issued a water contact advisory for a 2,000-foot-long stretch of shoreline next to the airport. The advisory stated that swimming within 200 feet of the shoreline should be limited to four hours per day and about 70 days per year. Lockheed Martin and the Maryland Department of the Environment established an ongoing surface water monitoring program for Frog Mortar Creek. Water samples have been collected six times a year, focusing on the summer swimming months. An annual report publishes the results. The average summer Frog Mortar Creek surface water conditions are on a poster, updated yearly, which is on the project website at: [www.lockheedmartin.com/martinstateairport](http://www.lockheedmartin.com/martinstateairport). Summer sampling results for the creek since the groundwater treatment facility began operating consistently show improved water quality,

***A Frog Mortar Creek Surface Water Conditions summary poster is available at [lockheedmartin.com/martinstateairport](http://lockheedmartin.com/martinstateairport)***

***Sampling results since the groundwater treatment facility began operating consistently show better water quality in the creek, virtually eliminating any evidence of the contaminants since 2019. Lockheed Martin will work with the Maryland Department of the Environment to change, and, in the future, remove the water contact advisory.***

with virtually no evidence of contaminants since 2019. Lockheed Martin will work with the Maryland Department of the Environment to change, and in the future, remove, the water contact advisory. As part of that process the number of annual monitoring rounds has been decreased from six to four, starting in 2022.

### ***Stansbury Creek***

Lockheed Martin collected sediment samples in Stansbury Creek in 2009 to identify and characterize the nature and extent of possible contamination from current and past airport activities. The samples showed levels of polycyclic aromatic hydrocarbons (PAHs) next to one outfall that drains paved surfaces associated with airport operations. These levels were consistent with regional findings, and have very low risks to human health and the environment. In 2010 the Maryland Department of the Environment told Lockheed Martin that based on the agency's review of the corporation's reports, no remediation was required for Stansbury Creek. In 2016, Lockheed Martin collected sediment and surface water samples near the northern end of Stansbury Creek and next to streams draining wetlands in Greater Strawberry Point and draining storm water from the airfield. Similar to the 2009 results, the sampling found PAHs levels and some elevated metals levels in the sediment by these outfalls in Stansbury Creek. No elevated VOC levels were detected in the creek surface water and sediment.

### ***Strawberry Point and Greater Strawberry Point***

Lockheed Martin has investigated the Greater Strawberry Point area of Martin State Airport since 2007 to determine the nature and extent of possible contamination in soil and groundwater in areas of former Glenn L. Martin Company operations. The investigations found limited instances of chemicals of concern in groundwater that were above conservative levels for use as drinking water set by Maryland Department of the Environment.

Soil and groundwater investigations in the southern part of Greater Strawberry Point, from the airport fuel storage area north to the airport maintenance facility, did not find contaminants at levels that present a risk to human health or the environment. Follow-up soil and groundwater investigations in the part of Greater Strawberry Point north of the airport maintenance facility show some areas of groundwater contamination. The area is largely woodlands and was the site of several former Glenn L. Martin facilities, most of them now demolished.

Based on the feasibility study approved in 2019, Lockheed Martin began monitoring the natural attenuation of groundwater contamination in Greater Strawberry Point in 2020. Chemical concentrations in groundwater in this area of Greater Strawberry Point are low enough that active cleanup does

not significantly improve upon natural processes to reduce the time needed to meet remediation goals. In addition to the monitored natural attenuation, Lockheed Martin will institute land-use controls and five-year reviews of the cleanup progress.

Although groundwater plumes in Greater Strawberry Point containing low levels of chemicals are moving towards Stansbury and Frog Mortar Creeks, the plumes largely remain close to their sources. However, groundwater samples between Strawberry Point Road and Frog Mortar Creek in 2020 and 2021 showed TCE at concentrations above the state and federal groundwater standards. Lockheed Martin will continue investigations to understand the source and extent of this contamination in 2022. The Greater Strawberry Point natural attenuation assessment collected surface water samples from Stansbury Creek, and did not find TCE or other volatile organic compounds. Lockheed Martin will continue surface water monitoring in Stansbury Creek in 2022.

### ***Main Terminal***

Investigations for the airport Main Terminal area surrounding Hangars 1 through 6, part of the original Glenn L. Martin Airport, began in 2011. They conducted geophysical and soil vapor surveys and soil and groundwater sampling in areas of former Glenn L. Martin Company operations near these hangars. Lockheed Martin completed the Main Terminal work report and did additional groundwater investigations in 2012. The investigations did not find any contaminants at levels that are a risk to human health or the environment. Biannual groundwater monitoring of two wells continues in the Main Terminal area due to the presence of low levels of fuel-related compounds. These contaminants are expected to degrade naturally without impacting nearby waterways..

## **Public Outreach and Citizen Participation**

Lockheed Martin is committed to ensuring that Middle River Complex employees, interested citizens, neighbors, the media, and local, state, and federal officials are informed of work progress at both sites. Lockheed Martin also shares all airport findings with the Maryland Aviation Administration and Maryland Air National Guard. Lockheed Martin has and will continue to conduct informational, educational, and working sessions, tours, briefings, and presentations with stakeholders. We provide poster and public availability sessions throughout the course of the investigations and cleanup. Lockheed Martin is keeping the public informed about the cleanup through newsletters, personal update letters, and its website.

Lockheed Martin has a long-standing tradition and a philosophy of involving community members and neighbors, encouraging them to provide their input and insight into the remedial investigations and proposed cleanup alternatives. As a part of the community outreach effort in the Middle River area, Lockheed Martin has conducted regular briefings and updates with civic association leaders, hosted community meetings, and actively participated in community events.

During many permitting activities, public comment periods are sponsored by state and federal governmental authorities. Lockheed Martin will share information about these opportunities through its ongoing community outreach program.

## Glossary and Acronym List

**Arsenic** — an odorless and tasteless semi-metal that enters bodies of water naturally from the earth and from industrial processes.

**Attenuation** — the decrease of a contaminant concentration in soil or groundwater over time due to processes such as microbial breakdown of the compound (biodegradation), sorption onto soil or sediment particles, dilution as contaminants move through an aquifer and mix with clean groundwater, evaporation of volatile organic compounds, and chemical reactions due to natural soil and groundwater conditions.

**Background radiation** — radiation that comes from natural sources and is always present in the environment. This includes solar and cosmic radiation, as well as radioactive elements in the ground, building materials, and the human body.

**Benzene** — a colorless, flammable, liquid aromatic hydrocarbon that comes from petroleum and is used to make a wide variety of chemical products.

**Cadmium** — an element found naturally in soil and rocks. Cadmium is also found in some foods and in man-made consumer products such as batteries, plastics, pigments, paints, and metal coatings. Cadmium does not break down in the environment and generally does not dissolve in water. In the ground, cadmium typically attaches to soil and sediment.

**Chlorinated solvents** — chemicals that include methylene chloride, perchloroethylene, trichloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and carbon tetrachloride. Chlorinated solvents are typically used as cleaning and degreasing agents.

**Chlorobenzene** — a common solvent and widely used to make other chemicals. 1,2,4-trichlorobenzene is also used in dielectric fluid along with polychlorinated biphenyls in electric transformers.

**Chromium** — an element found naturally in the earth's soil and water and all plants. Ore refining, chemical and refractory processing, cement plants, automobile and aircraft parts production, tanning and chrome pigments may also add chromium to the environment.

**EPA** — U.S. Environmental Protection Agency

**in situ** — in place

**Lead** — used in the manufacture of batteries, metal products, and ammunition, and occurs naturally.

**MAA** — Maryland Aviation Administration

**MDE** — Maryland Department of the Environment

**Mercury** — a metal used in manmade products such as batteries and thermometers, and occurs naturally.

**Middle River Complex** — the site that includes Lockheed Martin's Rotary and Mission Systems (RMS) facility; an MRA Systems, Inc. facility; and other businesses.

**Mitigation** — process that lessens the severity of an environmental risk or condition.

**MRA Systems, Inc.** — a company that leases space mainly inside A-, B-, and C-Buildings at the Middle River Complex to manufacture aircraft parts.

**PAHs** — polycyclic aromatic hydrocarbons — a group of chemicals formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 different polycyclic aromatic hydrocarbons. They are also commonly found in asphalt paving, roofing materials, and urban environments.

**PCBs** — polychlorinated biphenyls — a group of man-made organic chemicals. There are no known natural sources of polychlorinated biphenyls. Polychlorinated biphenyls can be oily liquids or solids and are colorless to light yellow. They were once used commonly as a component of dielectric fluids in electrical transformers, among many other things.

**PFAS** — per- and polyfluoroalkyl substances: a large group of man-made substances used in a variety of industries since the 1940s. They were used to make commercial products, including stain- and water-resistant fabrics, waxes, paints, and cleaning products, and are used in industry and firefighting.

**PFOA** — perfluorooctanoic acid

**PFOS** — perfluorooctane sulfonate

**ppt** — parts per trillion

**RMS** — Lockheed Martin's Rotary and Mission Systems business area.

**Sediment** — sand, silt, and clay washed from the land into water, usually after rain or snowmelt. Sediment is found under water in storm drains, ponds, lakes, creeks, streams, rivers, and oceans.

**Surface soils** — topsoil found usually within the first six inches to one foot of the land surface. People can come into contact with surface soils when doing normal activities around the home or workplace, such as shallow digging for fencing, gardening, landscaping, and mowing the lawn.

**Surface Water** — all water bodies naturally open to the atmosphere (rivers, creeks, storm drains, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

**TCE** — trichloroethene — a volatile organic compound (VOC) used to clean metals and in specialty adhesives. It was used commonly as a degreaser in industrial operations. Trichloroethylene is another, older name for the same chemical.

**UST** — underground storage tank

**VCP** — Voluntary Cleanup Program: a program administered by the Maryland Department of the Environment, participation by companies is voluntary. The program is used to clean up brownfield sites (abandoned or underused industrial and commercial facilities available for re-use).

**VOC** — volatile organic compound — A type of chemical that transforms from a liquid to a gas at room temperature.

## Further Information

Final environmental reports and other public information covering Lockheed Martin's environmental remediation activities at the Middle River Complex and Martin State Airport sites may be found at the Essex Public Library at 1110 Eastern Boulevard, Essex, Maryland, 21221. For more information about the library, call 410-887-0295.

Information also is available on the Lockheed Martin website: [www.lockheedmartin.com/middleriver](http://www.lockheedmartin.com/middleriver) and [www.lockheedmartin.com/martinstateairport](http://www.lockheedmartin.com/martinstateairport).

## Contact Information

Lockheed Martin welcomes your questions or requests for additional information!

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