

Fact Sheet

Middle River, Maryland

Middle River Complex and Martin State Airport



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Lockheed Martin Middle River Complex
2323 Eastern Boulevard
Middle River, Maryland

History

In 1928, the Glenn L. Martin Company, a predecessor to Lockheed Martin Corporation, purchased land in Middle River, Maryland, to build and test aircraft. This land is now part of the Middle River Complex, known locally as Plant 1, and the Glenn L. Martin State Airport, known locally as Martin State Airport. In 1975, the airport was sold to the Maryland Aviation Administration (MAA), a Maryland Department of Transportation agency, which currently owns and operates the airport. Other land parcels also were sold during the same time, including the properties now occupied by Johnson & Towers, Tilley Chemical, North American Electric, the U.S. Post Office and Exxon.

In 1995, Martin Marietta Corporation merged with Lockheed Corporation 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 business units. Lockheed Martin Mission Systems and Training currently operates at the facility, as does Lockheed Martin Applied NanoStructured Solutions. Aircraft components are assembled and tested in Buildings A, B and C by MRA Systems, Inc. (MRAS), a subsidiary of General Electric Company.

Background

In the early 1990s, two developments occurred that prompted environmentally related inquiries at Lockheed Martin's Middle River Complex and Martin State Airport. First, china, papers and other items apparently associated with the former Glenn L. Martin Company were found

by the Maryland Aviation Administration in excavations for utility work on the Martin State Airport site. Second, Baltimore County developed an economic revitalization plan for the Middle River community and inquired about Lockheed Martin's plans for vacant waterfront parcels at the Middle River Complex.

Since that time, Lockheed Martin has conducted extensive environmental studies at Martin State Airport in an area between the taxiway and Frog Mortar Creek (the Dump Road Area) in cooperation with the Maryland Department of the Environment's (MDE) Controlled Hazardous Substance Enforcement Division (formerly the State Superfund Program). Additional environmental investigations have been performed around the Main Terminal, Strawberry Point, in Frog Mortar Creek and in Stansbury Creek. Environmental studies also have been conducted at the Middle River Complex to determine what contamination exists around the plant. Lockheed Martin entered the MDE's Voluntary Cleanup Program at the time investigations began at the Middle River Complex. At the present time, Lockheed Martin is moving the Middle River Remediation Project from the Voluntary Cleanup Program to the Controlled Hazardous Substance Enforcement Division.

Environmental Sampling

Lockheed Martin has now collected thousands of soil, sediment, groundwater, soil vapor and indoor air samples at the Middle River Complex and Martin State Airport. All samples were tested for chemicals known to have been used during aircraft manufacturing and assembly and related industrial operations. Chemicals used in the Middle River Complex were found 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 primary area of concern and revealed a groundwater plume containing contaminants moving towards Frog Mortar Creek. Sampling results were used to assess potential risks to human health and the environment and to assess the appropriate level of cleanup.

Newsletters updating the community on timely information and Citizen's Guides covering groundwater and sediment can be found at lockheedmartin.com/middleriver or lockheedmartin.com/martinstate

Middle River Complex

The property consists of eight parcels of land, called tax blocks, identified separately by the letters A through I. Investigations have been conducted primarily by tax block or site-wide by medium (e.g., groundwater).

Risk Assessments

Soil, groundwater, soil vapor, indoor air and sediments were assessed to evaluate potential risks to human health and the environment. While the assessments indicate that the chemical concentrations at the Middle River Complex do not pose significant risks to the health of the general population of workers, visitors or residents in the community, based on current use of the complex, fencing was installed around areas where contaminants were found to prevent any risk of exposure. Vacant land surrounding the industrial facility will require some level of cleanup before or in coordination with any future development.

Soil Investigations and Cleanup

Soil around and underneath buildings and parking lots and in fenced off areas along the waterfront had areas containing elevated concentrations of petroleum compounds such as polycyclic aromatic hydrocarbons (PAHs); metals such as arsenic, mercury and lead; and polychlorinated biphenyls (PCBs). Block B, (the parking lot and ball field area on Eastern Avenue), was remediated in 2010 by removing contaminated soil to a

licensed landfill and replacing the contaminated soil with clean soil. The Maryland Department of the Environment has notified Lockheed Martin that no further soil or groundwater cleanup is necessary on Block B. However, since contaminated groundwater is located on adjacent Tax Block I, a land-use restriction prohibiting the use of groundwater on Block B has been recorded in the land records of Baltimore County.

Environmental characterization and monitoring continues at Block I, which contains MRA Systems, Inc. (MRAS)



Figure 1

production facilities, some operations of Lockheed Martin Mission Systems and Training, and Lockheed Martin Applied NanoStructured Solutions.

Block A contains Lockheed Martin offices. The Maryland Department of the Environment agrees that Block A does not require remediation. However, Block A is subject to the same land-use restriction regarding use of groundwater as Block B because it is also adjacent to Block I.

Blocks D, E, F, G and H required Soil Remedial Action Plans (RAPs), which are being developed in consultation with the Maryland Department of the Environment. The public will have the opportunity to review and comment on the plans, which propose cleaning this soil to industrial standards, consistent with historical property use. Additional remediation would be conducted as necessary in the future should residential, commercial or recreational use be planned. If the RAPs are approved, design of soil cleanup remedies will begin in 2014; the majority of the remediation will begin in 2015 or 2016.

Additional remedial actions for Block E will be developed under the U.S. Environmental Protection Agency program addressing polychlorinated biphenyls (PCBs) remediation, because PCBs were found at elevated concentrations in this Block. The PCBs were found in a relatively confined area, mostly between concrete slabs, in the soil under the western area and in the grass channels south of a former building. PCBs were also found around storm drain inlets and within storm drains. In 2011 Lockheed Martin cleaned out and rehabilitated the storm drain and inlet structures to the extent possible; remaining contamination will be addressed in future soil and sediment remediation activities.

Because radioactive materials were used in former Building D (Tax Block E), the Nuclear Regulatory Commission conducted a closeout verification survey of that site in 1994 and concluded that no detectable radiation levels above background were present and that the location remained suitable for unrestricted use in its current condition, with the basement floor slab in place and the floor drains plugged with concrete. Lockheed Martin also surveyed the area in 2004 and in 2012 and concluded that there was no radiation significantly above background. Additional sampling for potential residual radioactive materials at the former location of Building D will continue during soil remedy activities.

Groundwater Investigations and Cleanup

Investigations of groundwater at the Middle River Complex identified two shallow groundwater plumes containing elevated concentrations of chlorinated solvents such as trichloroethene (TCE) that originated from the industrial

facility in the center of the complex (Block I). There also were several small, isolated areas containing petroleum compounds such as benzene in shallow groundwater near former underground storage tanks (USTs) underneath the Middle River Complex industrial buildings. Site workers and visitors do not come into contact with these chemicals because the groundwater at the site is not used for any purposes. Any future use of shallow groundwater is likely to be restricted by the Maryland Department of the Environment.

Shallow groundwater at the Middle River Complex discharges to Dark Head Cove and Cow Pen Creek. The slow rate of discharge to these surface waters results in very small discharge of contaminant, which rapidly disperses, resulting in low levels that meet the Maryland criteria for open bodies of water such as rivers and creeks, as well as drinking water standards, and is not a concern for human health or the environment. This is assessed by a periodic surface water monitoring program. Groundwater investigations also confirm that the contamination does not move across the creek and cove to the adjacent Hawthorne or Wilson Point neighborhoods.

A groundwater treatment system is being installed during 2013 to treat the two shallow groundwater plumes; it is expected to be operating in 2014. The system will rely on in situ (meaning “in place”) bioremediation to reduce trichloroethene (TCE) in areas of the highest concentration. In bioremediation, a mixture of water, food-grade vegetable oil, and lactate produced from sugars of corn or beets will be injected into the ground to stimulate naturally occurring bacteria that will consume and break down the contaminants. Additionally, more than 2,000 cubic yards (about 200 truckloads) of contaminated soil are being excavated where treatment wells and piping are being installed. The removed soil is being moved to a licensed landfill, and certified clean soil will replace the contaminated soil.

A Citizens' Guide on groundwater is available at lockheedmartin.com/middleriver

Sediment Sampling and Proposed Sediments Cleanup

The sediments of Dark Head Cove and Cow Pen Creek have been sampled extensively. Sediments in Cow Pen Creek and along the bulkhead and airport discharge points in Dark Head Cove have elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals such as cadmium and chromium. These concentrations indicate that some action is necessary to

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reduce potential risks associated with long-term direct contact, uptake of contaminants by fish, and potential impact to organisms residing in the sediment. (Consumption of fish taken in 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.) The potential health risks to people swimming and wading in Dark Head Cove and Cow Pen Creek are within the U.S. Environmental Protection Agency's acceptable risk range and just above Maryland's target, noting that the most impacted sediments are submerged at all times.

Lockheed Martin is currently developing its preferred approach to remediating sediment in Cow Pen Creek, Dark Head Cove and Dark Head Creek adjacent to the Middle River Complex. The approach includes removing about 48,800 cubic yards (3,300 truckloads) of contaminated sediments from more than 12.5 acres; in situ ("in place") treatment to reduce contaminant mobility over an additional 8.5 acres; and monitored natural recovery, relying on natural processes to return sediment to natural levels (for comparison, one football field is approximately equal to 1-1/3 acre). The preferred approach includes shoreline stabilization, habitat enhancement and creek bed plantings. Lockheed Martin presented this approach to the public, the Maryland Department of the Environment and the U.S. Environmental Protection Agency and received only minor comment. Moving forward, additional tests will assess benthic organisms (such as worms) and environmental conditions in the sediment, which will help determine the level of activated carbon to be used in in situ treatment. Test results will be submitted to regulators for approval and subsequent incorporation into design of the remedy. Lockheed Martin anticipates conducting cleanup from 2016 to 2017.

Because the Cow Pen Creek and Dark Head Cove waters are owned by the State of Maryland and are considered waters of the United States, the Maryland Department of the Environment will make cleanup decisions in consultation with other agencies, including the U.S. Environmental Protection Agency, the Maryland Department of Natural Resources, the U.S. Army Corps of Engineers and the Maryland Critical Areas Commission. The sediment remediation will require additional permits and will include additional opportunities for public review.

Mission Systems and Training and MRA Systems, Inc. Facilities

Lockheed Martin continues to conduct environmental tests in and outside Buildings A, B and C (Tax Block I) to evaluate the extent of contamination in soil, groundwater

A Citizens' Guide on sediments is available at lockheedmartin.com/middleriver

and sub-slab vapor and assess if there is a potential risk to human health. Soil-gas sampling indicates the presence of volatile organic compounds (VOCs) in several locations under and outside of the buildings. In early 2008, as a precaution, Lockheed Martin installed sub-slab vapor-mitigation systems in the two areas of Buildings A and C where sub-slab vapor concentrations exceed established screening concentrations. The systems have significantly reduced VOC concentrations in vapors under the buildings and have helped maintain concentrations in indoor air below the conservative screening levels of the U.S. Environmental Protection Agency and the Maryland Department of the Environment.

Recent air samples collected while the Building A system was shut down for maintenance revealed that concentrations of volatile organic compounds (VOCs) remain below risk levels even when the system is not operating. Nonetheless, the mitigation system will continue to be operated proactively. Monitoring in the Building C basement identified additional areas of VOCs in sub-slab vapor in the east-central part of the basement. Although indoor air samples do not indicate unacceptable levels, the Building C sub-slab vapor-mitigation system was expanded proactively in 2012-13 to address this area. The mitigation systems may be modified to increase the capture of sub-slab vapors where necessary and shut down when data indicate they are no longer necessary.

Sampling of indoor air quality in the Lockheed Martin Mission System and Training's Vertical Launching System (VLS) facility in 2006 indicated no need for additional sampling.

Martin State Airport

Lockheed Martin conducts environmental investigations at Martin State Airport, including sampling of the adjacent Frog Mortar and Stansbury Creeks, under the regulatory authority of Maryland's Controlled Hazardous Substance Enforcement Division. As it no longer owns any part of Martin State Airport, Lockheed Martin coordinates all investigations, remediation and permitting activities at Martin State Airport in monthly meetings with the Maryland Aviation Administration (the property owner) and the Maryland Air National Guard (a major tenant at the airport).

Dump Road Area

Investigations in the Dump Road Area revealed the presence of contaminants—concentrations of chlorinated volatile

organic compounds (VOCs) such as trichloroethene, as well as cis-1,2 dichloroethene and vinyl chloride in levels exceeding federal and Maryland groundwater standards—in a plume originating from the Dump Road Area and moving towards Frog Mortar Creek. Lockheed Martin is proceeding with the design of an Interim Remedial Action

A Citizens' Guide on groundwater is available at www.lockheedmartin.com/martinstate

(IRA) to contain flow of the contaminated groundwater from the Dump Road Area towards Frog Mortar Creek. The IRA will contain the groundwater through a series

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Figure 2

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of extraction wells located parallel to Frog Mortar Creek near the southeast portion of the Dump Road Area that will feed to a water treatment facility. The IRA design and permitting activities are reviewed regularly by the Maryland Aviation Administration and the Maryland Air National Guard; construction and operation of the treatment system requires coordination with multiple agencies at the county, state and federal level. Public review and comment related to the proposed plan for the IRA occurred in early 2012. Construction of the IRA is expected to begin in late 2015, with operation anticipated to begin in 2016.

Lockheed Martin is also evaluating supplementing groundwater treatment with in situ remedies to reduce the potential for human and environmental exposure to the contaminants remaining in the soil of the Dump Road Area, and potentially to decrease the time needed to treat groundwater. Soil remedies could include stabilization, covering or other treatment of soils, which would reduce the risk of exposure without significant disruption to airport operations and limit negative impact to the Chesapeake Bay Critical Area bordering Frog Mortar Creek. Lockheed Martin is coordinating its plans with the Maryland Aviation Administration to lessen the risk of exposure to workers conducting airport maintenance in the area.

Lockheed Martin continues to investigate potential sources of groundwater contamination in the Dump Road Area and close to the airport's Taxiway Tango. These investigations will help determine where additional cleanup actions could further reduce groundwater contamination. Lockheed Martin and the Maryland Aviation Administration also will work together to determine what environmental conditions may need to be addressed in conjunction with a planned renovation of Taxiway Tango.

Frog Mortar Creek

While earlier sampling indicted no issues of concern, sampling in the last four years indicate the discharge of some concentrations of the volatile organic compounds (VOCs) trichloroethene (TCE) and vinyl chloride above Ambient Water Quality Criteria in an area adjacent to the shoreline of Frog Mortar Creek in the Dump Road Area. Consequently, following 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, recommending that swimming within 200 feet of the shoreline be limited to less than 4 hours per day for 20 days of the year. Lockheed Martin and the Maryland Department of the Environment have established an on-going surface water monitoring program for Frog Mortar Creek where 40 water samples are collected 6 times a year, focusing on the summer swimming months. Results are published for

individual sampling events (monthly in the summer) and in an annual report.

Stansbury Creek

Lockheed Martin collected sediment samples in Stansbury Creek in 2009 to identify and characterize the nature and extent of possible contamination resulting from current and past airport activities. Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were found next to one outfall that drains paved surfaces associated with airport operations. These concentrations were consistent with regional findings, and risks to human health and the environment appear negligible. In 2010, the Maryland Department of the Environment notified Lockheed Martin that based on the agency's review of the Corporation's reports, no remediation was required for Stansbury Creek at that time.

Strawberry Point

Investigation of Strawberry Point began with records research, followed by investigations in areas where materials may have been buried. Soil and groundwater were sampled in the wooded area of Strawberry Point and no evidence of any waste disposal was found.

The Greater Strawberry Point area of Martin State Airport has been investigated since 2010 to determine the nature and extent of any environmental contamination in soil and groundwater in areas of former Lockheed Martin operations. Soil and groundwater investigations in the southern area of Greater Strawberry Point, from the airport fuel storage area north to the airport maintenance facility, did not encounter contaminants at levels that present a risk to human health or the environment. Follow-up soil and groundwater investigations in the area of Greater Strawberry Point north of the Martin State Airport maintenance facility showed some areas of groundwater and soil contamination; further soil, soil vapor and groundwater investigations are planned for 2013 and 2014. The area is largely woodlands and was the site of several Lockheed Martin facilities that have been demolished.

The airport Main Terminal area, surrounding Hangars 1 through 6, was investigated starting in 2011. Geophysical and soil vapor surveys and soil and groundwater sampling were conducted in areas of former Lockheed Martin operations near these hangars, which were part of the original Glenn L. Martin Airport. The report for the Main Terminal work was completed in 2012. Additional groundwater investigations were also conducted in summer 2012. No contaminants were encountered at levels that present a risk to human health or the environment. Annual groundwater monitoring continues in the Main Terminal area due to the presence of low levels of fuel-related compounds. These are expected to degrade without impacting nearby waterways.

Public Outreach and Citizen Participation

Lockheed Martin is committed to ensuring that its employees, interested citizens, neighbors to the site, the media, and local, state and federal officials are kept informed of the progress of this work. Lockheed Martin has conducted and will continue to conduct informational, educational and working sessions, tours, briefings and presentations with stakeholders, and to provide poster and public availability sessions and open houses 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 tradition and a philosophy of involving community members and neighbors and encouraging them to provide their input and insight into the remedial investigations and proposed cleanup alternatives. As a part of this community outreach effort in the Middle River area, Lockheed Martin has conducted regular briefings and updates with civic association leaders, held community meetings and been active with community events.

During the upcoming permitting process for both sites, public comment periods will also be sponsored by state and federal agencies. Lockheed Martin will share information about these opportunities through its ongoing community outreach program.

Glossary and Acronym List

of terms used in this Fact Sheet or other site-related documents.

Applied NanoStructured Solutions, LLC — a subsidiary of Lockheed Martin located in the Middle River Complex.

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

AWQC — Ambient Water Quality Criteria; numeric values limiting the amount of chemicals present in our nation's waters to help protect human health and the environment.

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 derived from petroleum and used in or to manufacture 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 clings to soil and sediment.

Chlorinated solvents — chemicals that include methylene chloride, perchloroethylene, trichloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane and carbon tetrachloride.

Chromium — a mineral 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 add chromium to the environment.

EPA — U.S. Environmental Protection Agency

In situ — in place

IRA — Interim Remedial Action

Lead — used in the manufacture of batteries, metal products and ammunition. Exposure can occur from breathing contaminated air in or near workplaces that process lead, as well as chips from lead-based paint. Lead can cause effects on the blood, nervous, immune, renal, and cardiovascular systems.

MAA — Maryland Aviation Administration

MDANG — Maryland Air National Guard

MDE — Maryland Department of the Environment

MDNR — Maryland Department of Natural Resources

Mercury — a metal used in manmade products such as batteries and thermometers.

Middle River Complex — the site that includes a Lockheed Martin Mission Systems and Training (MST) facility; Applied NanoStructured Solutions, LLC; General Electric's MRA Systems, Inc. (MRAS); and other businesses.

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

MRAS — MRA Systems, Inc., a/k/a Middle River Aircraft Systems, a subsidiary of General Electric Company, which leases space mainly inside Buildings A, B and C at the Middle River Complex to manufacture aircraft parts.

MST — Mission Systems and Training (MST) business area of the Lockheed Martin Corporation.

PAHs — polycyclic aromatic hydrocarbons — a group of chemicals that are 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 PAHs. Also commonly found in asphalt paving and roofing materials and urban environments.

PCBs — polychlorinated biphenyls — a group of synthetic organic chemicals. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow. They were once used commonly in electrical transformers.

RAP — Remedial Action Plan

Sediment — sand, silts and clays 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 beneath the land surface. It is assumed that people can come into contact with surface soils when doing normal activities around the home or work place, 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.).

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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. Operated by 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).

VLS — Vertical Launching System

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 studies 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, call 410-887-0295. Information also is available on the Lockheed Martin website: www.lockheedmartin.com/middleriver or www.lockheedmartin.com/martinstate

Contact Information

Interested members of the public, or the media, are invited to contact Lockheed Martin at any time with questions or requests for additional information.

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