

Fact Sheet

Middle River, Maryland

Middle River Complex and Martin State Airport

system on the airport property (see below). Sampling results were used to assess potential risks to human health and the environment and to assess the appropriate level of cleanup in consideration of current and anticipated future use of the properties.

Middle River Complex

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

Risk Assessments

Soil, groundwater, soil vapor,

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.

Based on results of the risk assessments, soil Remedial Action Plans (RAPs) were required for Blocks D, F, G, and H. The resulting Remedial Action Plans were approved by the Maryland Department of the Environment in 2013 and early 2014, and in 2016 the public reviewed and commented on the plans, which proposed cleaning the soils to industrial standards, consistent with current and historical 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 notified Lockheed Martin that no further soil cleanup is necessary on these Blocks. Land-use restrictions prohibiting the use of groundwater and prescribing soil management requirements have been recorded in the Baltimore County land records. Additional remediation would need to be completed should residential, commercial, or recreational land use within Blocks F, G, or H, or the non-panhandle portion of Block D, be planned in the future.

Environmental characterization and monitoring continues at Block I, which contains MRA Systems, Inc., production facilities and some operations of Lockheed Martin's Rotary and Mission Systems.

Polychlorinated biphenyls (PCBs) were found at elevated concentrations in Block E, prompting additional investigations and remedial actions for this area under a U.S. Environmental Protection Agency program. Lockheed Martin has now completed remedial investigations of Block E and is finishing the feasibility study (or Remedial Action Plan) evaluating potential remedial actions that may be effective in cleaning up Block E. The Remedial Action Plan, which includes the preferred cleanup alternative, is undergoing agency review and community review will likely be in late 2019. Construction design and permitting is projected to begin in late fall 2019, and construction could begin in 2021. The preferred alternative proposes removing the contaminated soil in Block E down to a depth of 20 feet, replacing it with clean soil. The contaminated soil would be taken to a licensed landfill. The foundation of the former D-Building would also be removed, and the site would be restored to a grass field. Many of the original storm drains and inlet structures, which Lockheed Martin has been cleaning and rehabilitating since 2011, would be removed and replaced.

Because radioactive materials were used in the former D-Building, the Nuclear Regulatory Commission conducted

a closeout verification survey of that parcel in 1994 and concluded that no detectable radiation levels above background were present and that 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. Radioactive materials are still present in some

The removed soil was sent to a licensed landfill, and certified clean soil and gravel replaced the contaminated soil. Groundwater treatment in Blocks G and I has met cleanup objectives.

During excavation for the third shallow groundwater plume in Block E, two previously unknown underground storage tanks were discovered, one of which contained 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 concentrations too high to be removed effectively by only the type of groundwater bioremediation treatment system that had been recently installed for the other two groundwater plumes. A high vacuum extraction system was temporarily installed in this area to remove the highest concentrations of trichloroethene from groundwater and soil. The extracted groundwater was treated prior to discharge to the Baltimore County sanitary sewer system. The system operated in 2014-2015 and removed approximately 550 pounds of trichloroethene.

A Citizens' Guide, Project Bulletin, and Construction Photo Tour on groundwater are available at lockheedmartin.com/middleriver

Lockheed Martin collected groundwater samples from Block E and adjacent Block F to develop a better understanding of the trichloroethene groundwater plume, and completed a feasibility study proposing a preferred remedy; the Maryland Department of the Environment has approved the remedy. Lockheed Martin has proposed a multi-part approach to cleaning up the trichloroethene plume. Groundwater will be treated using bioremediation close to the original contamination source in Block E. A permeable reactive barrier will be created downgradient in Block F across the width of the plume. The barrier, consisting of small iron particles, will break the trichloroethene down into non-toxic byproducts. Contaminated groundwater on the other side of the barrier will be extracted via two extraction wells and pumped to a treatment system. Construction of this multi-part system will likely begin in early 2020. Meanwhile, Lockheed Martin is monitoring the groundwater plume for any movement of trichloroethene toward Dark Head Cove, including sampling surface water in the cove. Groundwater investigations also confirm that the contamination does not move underneath the creek to the adjacent Hawthorne or Wilson Point neighborhoods.

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 contained elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals such as cadmium and chromium. These concentrations indicated need for appropriate action to 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.)

Lockheed Martin worked with the community to develop a preferred approach to remediating sediment in Cow Pen Creek and Dark Head Cove adjacent to the Middle River Complex. The approach was presented in a Feasibility Study and approved by the Maryland Department of the Environment and the U.S. Environmental Protection Agency 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 determine the level of activated carbon to be used in *in situ* treatment. Test results submitted to regulators were also incorporated into designing the remedy. Lockheed Martin conducted cleanup between 2014 and 2017. The stages are described below.

Sediment Dredging and Removal

In 2013, sampling activities in preparation for sediment remediation revealed higher concentrations of polychlorinated biphenyls (PCBs) near Outfall 005 than had previously been detected elsewhere in Dark Head Cove. (PCBs were commonly used in electrical transformers and may have been released when D-Building was dismantled.) Lockheed Martin, the U.S. Environmental Protection Agency, and the Maryland Department of the Environment agreed the best course of action was to clean up this location before the full sediment remedy was implemented.

Lockheed Martin sequestered the work area with a floating boom in the spring of 2014. Sediments were removed in the winter of 2014. Dredged sediments were moved to dump trucks at the nearby bulkhead, and the trucks transported the sediments to a bermed and lined dewatering pad for draining. Additives were mixed with the sediments to achieve necessary dryness and stability. The sediments were then transported to an approved and licensed disposal facility in New York State. In-water work was completed in mid-February 2015, which was 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, which occurred during the winter of 2016-2017.

Excavation work in Cow Pen Creek began in July 2017 and all work was completed by December 2017. The creek was piped around dammed-off segments, creating dry work areas. Fish were moved downstream to the creek below work areas. Following contaminant removal, the creek was restored with native plants, including submerged aquatic vegetation. Restored and replanted areas are being monitored to ensure they recover properly. First 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.

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

In winter 2017-2018 a layer of activated carbon was placed over an additional 13.7 acres of sediments in un-dredged portions of Dark Head Cove, creating a protective layer to absorb any remaining PCBs. This area is also being monitored and preliminary results are very positive, showing that remaining low levels of PCBs are being effectively sequestered from the food chain.

Because 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, the Maryland Department of the Environment made cleanup decisions in consultation with other governmental authorities, including the U.S. Environmental Protection Agency, the Maryland Department of Natural Resources, the U.S. Army Corps of Engineers, and the Maryland Critical Area Commission.

Lockheed Martin's Rotary and Mission Systems he IS.Bc ehwdInd (4) M S8ystemsiás

Martin State Airport

Lockheed Martin conducts environmental investigations at Martin State Airport, including sampling of the adjacent Frog Mortar and Stansbury Creeks, in cooperation with the Maryland Department of the Environment. Since it no longer owns any part of Martin State Airport, Lockheed Martin coordinates investigations, remediation, and permitting

activities at Martin State Airport with the State of Maryland, represented by the 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 revealed the presence of contaminants—concentrations of chlorinated volatile



Figure 2

organic compounds (CVOCs) including trichloroethene (TCE), cis-1,2 dichloroethene, and vinyl chloride at concentrations exceeding federal and Maryland groundwater standards—in a fume

Strawberry Point and Greater Strawberry Point

Lockheed Martin has been investigating 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. These investigations revealed limited instances of chemicals of concern in groundwater that exceed thresholds established by Maryland Department of the Environment. Although groundwater plumes containing low levels of chemicals are moving towards Stansbury and Frog Mortar Creek, the plumes remain close to their sources

