

Middle River Complex and Martin State Airport Newsletter

October 2015

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

Middle River

Soil Cleanup in Blocks H, G, F, D, and D Panhandle to Finish in November

Contractors cleaning up five of the six blocks of land on the western and southern portions of the Middle River Complex have been working since mid-spring 2015 and, barring any unforeseen circumstances, are on track to complete soil cleanup by Thanksgiving. Work in Blocks H, G and D is essentially finished. Work in the Block D Panhandle began in mid-September. Work to remove abandoned underground storage tanks in Block F should begin around the end of October.

“All in all, this part of the soil cleanup project has gone as planned,” said Tom Blackman, Lockheed Martin manager for the Middle River Complex. “Everything in the soil was pretty much as we anticipated. We came across metal debris in Block G that may have been from old transformers. We sampled the metal and the soil for PCBs; tests of the metal came back negative, and laboratory results on PCBs in the soil came back well below the level that would require any action.”



Soil cleanup work in Block F included excavations in grassy areas.

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Martin State Airport

Dump Road Area Groundwater Treatment System to Begin Construction Later This Year

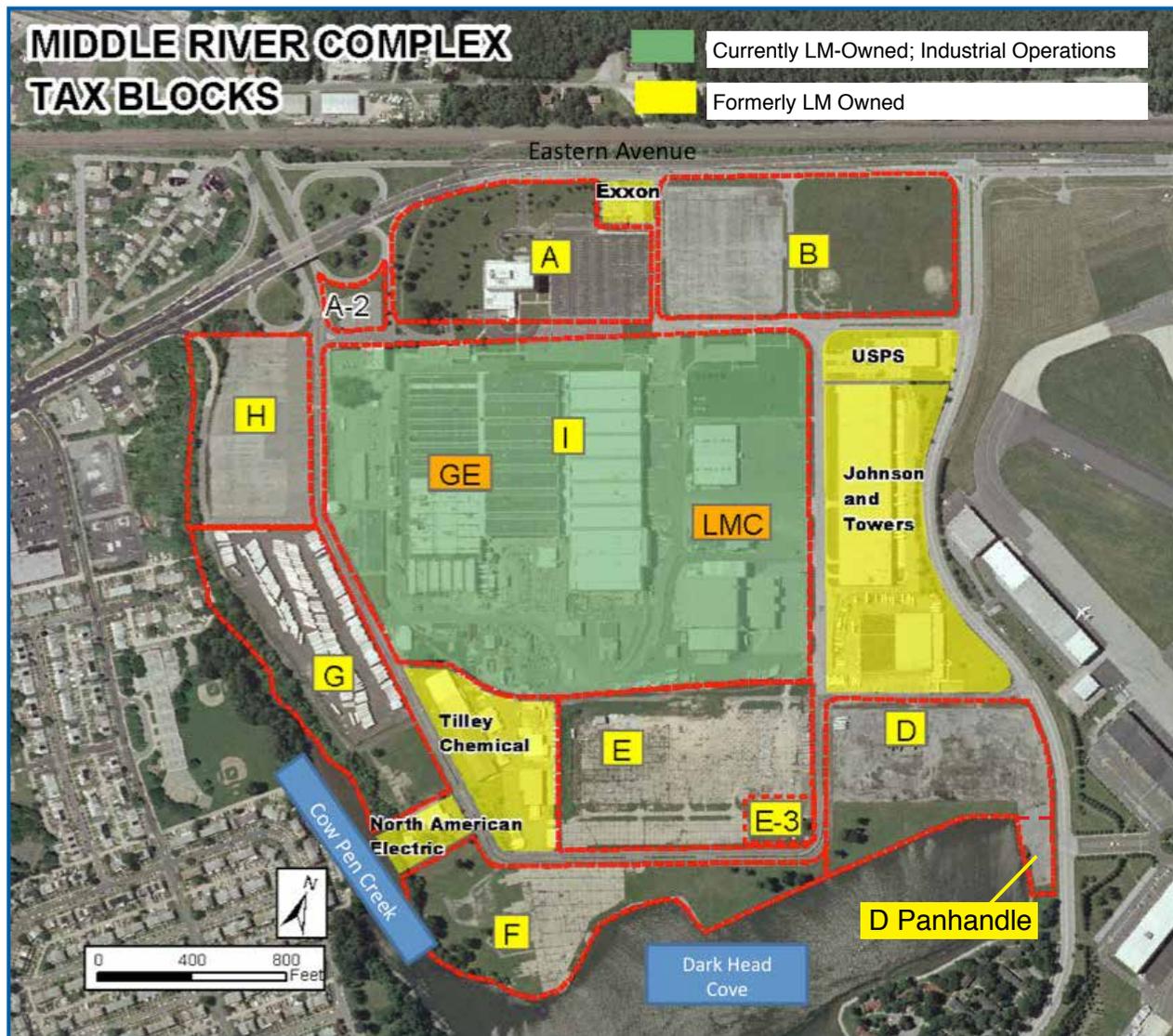
Lockheed Martin anticipates receiving the last major permits for construction of the Dump Road Area groundwater treatment system over the course of the next month. The tidal wetlands permit has been prepared by the Maryland Department of the Environment (MDE) and is in its final review by the Maryland Board of Public Works.

The Federal Aviation Administration has approved the final Environmental Assessment (EA) for the project and has issued a Finding of No Significant Impact (FONSI). A public notice of the availability of the Final EA and the FONSI was published on September 24. The draft National Pollutant Discharge Elimination System (NPDES) permit, controlling discharge of treated groundwater into Frog Mortar Creek, was released by MDE for a 30-day public review on September 17.

“After years of work we are now at a point where construction of the groundwater treatment system is imminent,” said Paul Calligan, Lockheed Martin’s manager for the Martin State Airport remediation project. “With the release of these permits, and the hiring of AECOM as our construction contractor, we will be ready to break ground. It’s been a long haul, beginning with our initial investigations to identify the source of contaminants. We are extraordinarily grateful for the community’s patience with and support for this project.”

The groundwater treatment system will be made up of a series of 16 extraction wells that will be installed within the Dump Road Area parallel to and near Frog Mortar Creek. The wells will be fitted with pumps that will extract groundwater and send it to the treatment plant for treatment. The treatment plant itself will be approximately

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Layout of Middle River Complex

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“Our preliminary investigations in Block F had indicated the possibility of abandoned underground storage tanks. We found six and there may be a seventh. The soil there is soft and we need to shore up the sides of the trench we dig to remove the tanks in order to ensure the trenches are a safe and secure work environment. We’ve provided the Maryland Department of the Environment a plan for how we’re going to do that. It’s likely that we’ll be able to begin that work the last week of October,” said Blackman.

Based on historical drawings, abandoned underground storage tanks were also anticipated in Block G. Lockheed Martin contractors searched for additional underground storage tanks, but found none.

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.

A standard cleanup process was followed in all the blocks. Contaminated soil was excavated down to two feet deep or more, at which point soil samples were taken to confirm that contaminant concentrations around the side walls of the excavation areas were less than concentrations allowable for site use (generally industrial). The soil was then loaded onto trucks and transported offsite for proper disposal or recycling. To ensure that no soil was tracked onto the roadways, before leaving the site, trucks were inspected and, if necessary, swept clean of debris or soil; then all of the trucks loaded with excavated soils were driven over rough stone as they exited the blocks to knock off any further dirt and debris from the tires. Once sample

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analysis confirmed that site use levels were met, the excavations were backfilled.

In Block H, the site of an active parking lot, asphalt had to be cut to gain access to the area of suspected contamination. The cut asphalt has been stockpiled on site and will be transported to an asphalt manufacturing plant where it will be recycled. Once confirmation was received that concentrations remaining in soils were acceptable for site use, new asphalt was laid. Cleanup in Block H is now complete.

Block G includes both a gravel parking lot and grass. The gravel was restored and the backfilled topsoil was reseeded. Block G was the site of most of the cleanup work and required a number of small excavations. One of the Block G excavations was near the bank of Cow Pen Creek where the soil proved to be somewhat unstable and contractors installed erosion and sediment control fences to protect the creek.



The transformer housing found in Block G was sampled to determine whether polychlorinated biphenyls (PCBs) contamination were present, so it could be disposed properly.

Block D is also a site of both a gravel parking lot and open grass, which were restored to their prior condition. In Block D contractors also had to dig around steel connecting rods (tie rods) that provide support for the bulkheads bordering Dark Head Cove, which they were able to do without incident.

The tie-back system supporting the bulkheads is connected to buried creosote-treated timbers. An organic sheen was observed on the water and it was determined that the sheen is most likely emanating from the creosote. This will be investigated when a catch basin is repaired in this area, and any contaminated soil will be removed. No significant

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80 feet wide, 180 feet long and 30 feet high. All the treatment system process equipment will be located within the building.

How the Treatment Plant will work

First the water will be pre-treated and filtered to remove metals and suspended solids; second, organic materials, primarily dissolved solvents and solvent by-products, will be removed using oxidation, air stripping and carbon filters. Most of the organic compounds will be completely destroyed by the oxidation process. The remainder will be captured by carbon filters which treat the air stripper emissions before release to the outside air, and additional carbon will be used as a final water treatment step. Sludge generated by the process will be disposed of at an MDE-approved facility. Cleaned water will be released through a pipe extending onto the bed of Frog Mortar Creek near the Dump Road Area shoreline. The water will be sampled monthly before it leaves the plant to make sure it meets Maryland's discharge permit requirements.



Access to the plant will be on existing roads beginning at Eastern Boulevard and extending south through the

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adverse effects are anticipated from the small amount of creosote-related sheen.

In addition to excavating contaminated soil, contractors are repairing eroded soil, damaged drainage and an outfall at the corner of Block D and the Block D Panhandle.

Cleanup of soil in Block E is more complex than in the other blocks. Polychlorinated biphenyls (PCBs) have been identified here, as have subsurface anomalies south of the foundation

of former Building D; the anomalies may be

A photo tour of the soil cleanup project can be viewed at lockheedmartin.com/middleriver

additional tanks requiring removal and other cleanup actions. Lockheed Martin is investigating the site further and is working with the Maryland Department of the Environment and the United States Environmental Protection Agency to design cleanup plans. Cleanup may not begin for several years.

Applications for Dredging Permits on Track for Submittal

Applications for permits to dredge Cow Pen Creek and Dark Head Creek and Cove are on track for submittal to the US Army Corps of Engineers (the Corps) and the Maryland Department of the Environment (MDE) in mid-November of this year. Besides detailing the proposed dredging operation, the applications will present Lockheed Martin's plans for controlling the impact of the dredging on the wetlands and water quality of the creeks and cove.

“Based on past experience, we believe it will take close to a year for the MDE and the Corps to process these applications, which will make it possible for us to begin work in October of 2016 or shortly thereafter, in time to take advantage of the 2016-2017 work window,” Tom Blackman, Lockheed Martin's project manager, said. “The winter work window avoids disturbing fish spawning and submerged aquatic vegetation. We were able to work within these restrictions this past year when we successfully completed our dredging in a portion of Dark Head Cove between December 10, 2014 and February 11 of this year.”

To obtain the necessary permits from the Corps and MDE, a joint application is submitted to both agencies. However, the applications are processed separately. The Corps of Engineers also requires an Environmental Assessment,

Maryland Air National Guard facility along Lynbrook Road to the Dump Road Area. The existing 1,500-foot long dirt and gravel access road through the Dump Road Area will be widened to 20 feet and paved with asphalt. All the road improvements will be on Maryland Aviation Administration property. The new building will have an asphalt-paved parking and delivery area. The existing security fencing preventing access to the Dump Road Area from Frog Mortar Creek will be maintained.

Paul Calligan added that, “It will likely take about a year to complete the construction of the treatment system. Several months will then be required to fine-tune the system. Once the system begins treating groundwater it could take as much as a year or more before there will be a noticeable difference in the levels of contaminants in the groundwater moving into the creek. We look forward to the day when MDE can remove their swimming advisory in Frog Mortar Creek.”

Contaminant Levels in Frog Mortar Creek Up Temporarily in July

Water samples taken in Frog Mortar Creek in July 2015 revealed higher concentrations of contaminants than have been typically found in past summers. The higher concentrations were detected along the shoreline near the former Dump Road Area where the highest concentrations are usually found. By early August, when samples were taken again, concentrations were back to what can be considered normal for the area. September results increased slightly above concentrations observed in past Septembers.

The contaminants—trichloroethene (TCE) (a solvent), cis-1,2-dichloroethene and vinyl chloride (breakdown products of TCE)—appear to come from the groundwater plume that originates in the Dump Road Area and is moving towards Frog Mortar Creek. Water in the creek is sampled six times a year: March, June, July, August, September and December in order for the Maryland Department of the Environment to provide advice regarding swimming in the creek. At the moment, signs advising that swimming should be limited are posted in an area along the shoreline of Martin State Airport.

Lockheed Martin takes samples from an area wider than the Maryland Department of the Environment's swimming advisory area to assure the affected area is identified.

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which goes through a separate review. Both the MDE and the Corps will be seeking public review of Lockheed Martin's application for a wetlands permit. The public meeting for that review will likely be held sometime in Spring 2016.

The MDE and the Corps are also required to get comments from sister agencies. For the MDE this includes the Maryland Department of Natural Resources, and for the Corps, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Lockheed Martin's application will include its plans for how it will protect the marine environment of the creeks and cove, as well as how it will restore wetlands and submerged aquatic vegetation that might be adversely impacted by the dredging.

"We've been talking with all these agencies," Blackman said, "and developing a mitigation plan to satisfy their concerns. Any approval will come with conditions that we will need to meet. In order to be proactive on the submerged aquatic vegetation issue, we've surveyed Cow Pen Creek and Dark Head Creek and Cove. We've mapped the extent of the water bottom that the submerged aquatic vegetation covers, as well as the kinds of vegetation and their density, and our estimate of what we think our impact will be. Our final plan will likely include replanting and re-establishing submerged aquatic vegetation, as well as how we will protect the vegetation while we're working."

Lockheed Martin's overall plans for cleaning up the sediments in Cow Pen Creek and Dark Head Cove were approved by the Maryland Department of the Environment (MDE) and the U.S. Environmental Protection Agency (EPA) in 2013 following extensive environmental investigations, development of cleanup objectives and goals and a screening of possible alternatives for cleaning up sediments in the waterways. A feasibility study was conducted to select the best alternative and submitted to the MDE and the EPA in December 2012. In early 2013 the proposed plans were presented to the public for review and comment.

Sampling of sediments in the creek and cove revealed elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals such as cadmium and chromium. This cleanup project includes the dredging as well as the excavation and restoration of wetlands along the upper portions of Cow Pen Creek. The dredging will remove about 47,000 cubic yards (2,400 truckloads) of contaminated sediments from more than 10.4 acres of water bottom (over 7 football fields). An additional 13.7 acres of water bottom (over 10 football fields) will be treated to reduce contaminant

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Samples are also taken offshore, out into the channel, and on the opposite shore. Because of the higher than normal concentrations found in July, Lockheed Martin tested the August and September samples rapidly to check whether July's higher concentrations extended into the following months. Starting in July, Lockheed Martin also collected additional samples from locations at the shoreline near where groundwater is thought to discharge to Frog Mortar Creek. The increased scrutiny in this area revealed August and September results improved over those from July. Had the contaminant levels remained high, the Maryland Department of the Environment may have considered additional measures to protect swimmers in the creek.

Lockheed Martin expects to start construction of the remediation system for treating the groundwater in the Dump Road Area before the end of the year. A contractor has been hired and a few permits are awaiting final approval. It will likely take about a year to complete the construction of the groundwater treatment system. Several months will then be required to fine-tune the system. During construction of the system and following the start of groundwater treatment, Lockheed Martin will continue to monitor contaminant levels in Frog Mortar Creek. Once the system begins treating groundwater the concentrations of contaminants in the creek will begin to decrease.

***For additional background information
go to lockheedmartin.com/martinstate***

mobility. Natural processes (ongoing sedimentation) will be relied upon to further return sediment to natural conditions in the remaining portions of the creeks and cove. Plans are for the dredging to be completed in the winter work window between October 2016 and February 2017. The Dark Head Cove remediation will be completed by placement of an *in situ* treatment layer later during 2017.

The wetland habitats that flank upper Cow Pen Creek will most likely be excavated in 2017. Work is planned to begin in June of 2017 when the annual fish-spawning restrictions are lifted. Lockheed Martin will replace wetland habitats that are removed, which is likely to total less than two acres (about two football fields). Forested wetlands, shrub wetlands and tidal marsh wetlands will be replaced in the same locations as what was removed. Because the work in upper Cow Pen Creek will require several months and replanting vegetation, Lockheed Martin is seeking a waiver

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from the MDE to allow it to complete the upper portion of Cow Pen Creek during the summer, when such work is typically restricted.

Permits will also be required from Baltimore County for grading, storm water management and sanitary sewer discharge. Because the creeks and cove are located within the 1,000-foot boundary of the Chesapeake Bay Critical Area, any damage to forest or other habitat will have to be moderated, which is often done by replanting. Also, because the project area is within the Martin State Airport zoning district, plantings cannot attract wildlife such as waterfowl that could interfere with the safe operation of the airport.

Underwater Vegetation Survey Moves Sediment Cleanup Forward

This summer the Lockheed Martin team was busy surveying the extent and nature of underwater plants (called submerged aquatic vegetation) in Cow Pen Creek and Dark Head Cove. This is a necessary step for obtaining permits to dredge the creek and cove. The survey will help make it possible to create a picture of the health of the underwater system; only by knowing how things are now will Lockheed Martin know what needs to be done to restore the creek and cove to an acceptable condition once dredging is complete.

To conduct the survey, a small boat crisscrossed the creek and cove tossing out a special sampling rake and dragging it for about five yards, pulling up samples to identify the kinds and density of underwater vegetation growing on the



Laura Burbage, from CDM Smith, a Lockheed Martin contractor, identifies the underwater vegetation raked up from the bottom of Cow Pen Creek.

creek bottom. The surveyors followed a grid connected to GPS (Global Positioning System), which made it possible to accurately locate each sample on a map. The sampling rakes were tossed out three times at each grid location and samples were collected from 231 locations. Surveyors also used a high-tech level to accurately determine the depth of the creek and cove at each location. The level readings are determined by using a laser and receiver connected to a measuring rod, which makes it possible to measure through vegetation all the way to the creek bottom.

The grid defining what parts of Cow Pen Creek and Dark Head Cove were to be sampled was approved by the Maryland Department of the Environment with input from the Maryland Department of Natural Resources and the U.S. Fish and Wildlife Service. Sampling was done mainly at creek bottom locations reached by sunlight, which is roughly up to six to seven feet deep. The Lockheed Martin team chose to sample deeper water as well, if vegetation was found at the 6 to 7 foot depth at any location, moving into deeper water until they couldn't find any vegetation. In general, aquatic vegetation is found at depths where the sun can reach the bottom. That depth depends on the general cloudiness of the water.

Laura Burbage, a Lockheed Martin contractor, led the survey team. "This was a large undertaking," Laura said. "Completing the survey took many days and several people. Recreational boaters created waves that rocked our

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In the first step in surveying the bottom of Cow Pen Creek, Tetra Tech employee John Roberts, part of the Lockheed Martin team, tosses the sampling rake overboard prior to dragging it along the creek bottom to gather underwater vegetation.



To establish the elevation of the bottom of Cow Pen Creek, a laser level transmits a signal from a spot on the shore of the Creek to a receiving rod on the boat out in the creek, from which the depth from the laser to the bottom of the creek can be measured. By comparing this measurement with that from a spot with a known elevation, the elevation of the creek bottom is calculated.

boats and made it challenging to pinpoint our sampling locations, and thunderstorms made us suspend work at times. But we collected a lot of quality data to help us understand the current conditions underwater. The result is a detailed map that shows the extent of submerged aquatic vegetation in Cow Pen Creek and Dark Head Cove, as well as the kinds of vegetation that were found, how thickly it grows and at what depths.”

The data that was collected is being discussed with permitting agencies to help determine an appropriate strategy to compensate for impacts to this natural resource. The agencies will consider what was found as well as its importance to the environment, and will incorporate requirements into their permits so that the ecosystem is adequately protected and restored.

Update On Groundwater Treatment

This spring Lockheed Martin successfully finished the first phase of its groundwater treatment remedy in Tax Blocks G and I, and is now beginning the second treatment phase.

As part of the second treatment, in September Lockheed Martin began adding naturally occurring organisms or “good” bacteria to the sodium lactate-water solution being injected into groundwater in Tax Block G at the Middle River Complex. These are helpful in improving the breakdown of contaminants into non-toxic substances (similar to adding bacteria to septic tanks to make them more effective). Beginning in the spring of 2015, only water and sodium lactate (a non-toxic food additive produced from the sugars of corn and beets) were being injected to stimulate the organisms already present in

the soil to consume and break down concentrations of trichloroethene (TCE). (TCE is the contaminant of concern found in the groundwater at the Middle River Complex.)

Testing of groundwater after the spring injections showed that, while initial results were very encouraging, simply stimulating existing bacteria in Tax Block G with the food additive was not producing desired results quickly enough. The food additive has also helped reduce levels of oxygen in the soil and groundwater, which helps the “good” bacteria grow and improves the rate of breakdown of the contaminants.

The injected organisms are the same as those already naturally occurring in the soil and groundwater at the Middle River Complex. Earlier this year in a meeting with community leaders and in its most recent newsletter, Lockheed Martin mentioned that it might be necessary to add these “good” bacteria into the groundwater to increase the speed of the cleanup process.

Prior to the injections this past spring, in December 2014 Lockheed Martin attempted to start the groundwater treatment at Block G using water and Lactoil (lactate and vegetable oil). During the cold winter, the vegetable oil clogged valves, pipes and injection wells. Consequently, the system was shut down, components were cleaned and restarted, and Lactoil was replaced with sodium lactate. However, as was reported in the spring newsletter, without the vegetable oil the water-lactate solution loses its potency more quickly, which led the project team to accelerate the start of follow-up injections and to add the additional “good” bacteria in Tax Block G. This second series of injections should be complete by year’s end. Sampling will take place one, three, and six months after the injections are finished to determine their success, and to provide information for future site activities.

In addition to the groundwater treatment in Tax Block G, groundwater in Tax Block I is being treated in a similar manner. However, the project team decided that at least for the time being, the water-lactate solution will be sufficient to break down contaminants in Tax Block I without any additions.

Administrative Consent Order Pending for the Middle River Complex

Lockheed Martin and the Maryland Department of the Environment (MDE) will be entering an administrative consent order for the Middle River Complex.

“This is an important step for everyone involved in this project—Lockheed Martin, the Maryland Department of the Environment and the community,” said Tom Blackman, Lockheed Martin’s project manager for the site. “The administrative consent order provides the legal framework by which Lockheed Martin will continue its cleanup of contamination at the Middle River Complex in soil, groundwater, and sediment.”

“It’s a little confusing because Lockheed Martin has been cleaning up the Middle River site without an order in hand, as is also the case for our work at Martin State Airport. Lockheed Martin is committed to doing the right thing, and in this case that meant getting started on cleanup at the earliest sensible opportunity. The administrative consent order puts in black and white much that we’ve already done, and what we intend to do in the future to finish the job of cleaning up this site,” said Blackman.

The administrative consent order was negotiated between Lockheed Martin and the Maryland Department of the Environment’s Controlled Hazardous Substance division. Lockheed Martin will be cleaning up the contaminated soil at most of the site to industrial standards. The Block D Panhandle will be cleaned to standards that allow that land to be used for recreation, which is one possible future

use of the Block D Panhandle. Lockheed Martin had been conducting remediation of soil and groundwater at the site under the MDE’s Voluntary Cleanup Program.

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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