Middle River Complex and Martin State Airport Newsletter

LOCKHEED MARTIN
We never forget who we're working for®

March 2016

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

Middle River Complex: Plans For Sediment Cleanup Move Forward In Dark Head Cove And Cow Pen Creek

Lockheed Martin's plans for cleaning up the sediment in Dark Head Cove and Cow Pen Creek are proceeding. Presuming that all required permits are approved in a timely fashion, the first of two seasons of work could begin late this fall in Dark Head Cove and the mouth of Cow Pen Creek when the in-water winter work window opens. The winter work window runs from mid-October to mid-February to avoid adversely affecting fish spawning and aquatic vegetation growth seasons.

The first step in the sediment project will be to repair the bulkhead on the north side of Dark Head Cove. Crews will drive new marine-grade sheet metal into place on the

- **The first in-water work season is October 16, 2016 to February 14, 2017.**
- **About 850 truckloads of sediment will be dredged from Dark Head Cove and the mouth of Cow Pen Creek in Season 1. Some or all of the sediment could be barged out and off-loaded to trucks. If a large barge were used, around 38 trips would be required.**
- **During dredging, Dark Head Cove will be closed to boat traffic.**
- **About 1200 truckloads of sediment and debris will be excavated from Cow Pen Creek in Season 2 (from June 16, 2017 to February 14, 2018).**
- **During excavation, Cow Pen Creek will be closed to boat traffic and access to the work area will be controlled.**

continued on page 3

Lockheed Martin Invites You to a Public Information Session on the Proposed Plans for Sediment Remediation and Associated Permitting at the Middle River Complex

Date: Monday, April 4, 2016
Location: Marshy Point Nature Center
7130 Marshy Point Road

5 to 7 p.m. - Informal poster session with the opportunity to talk one-on-one with the project team.

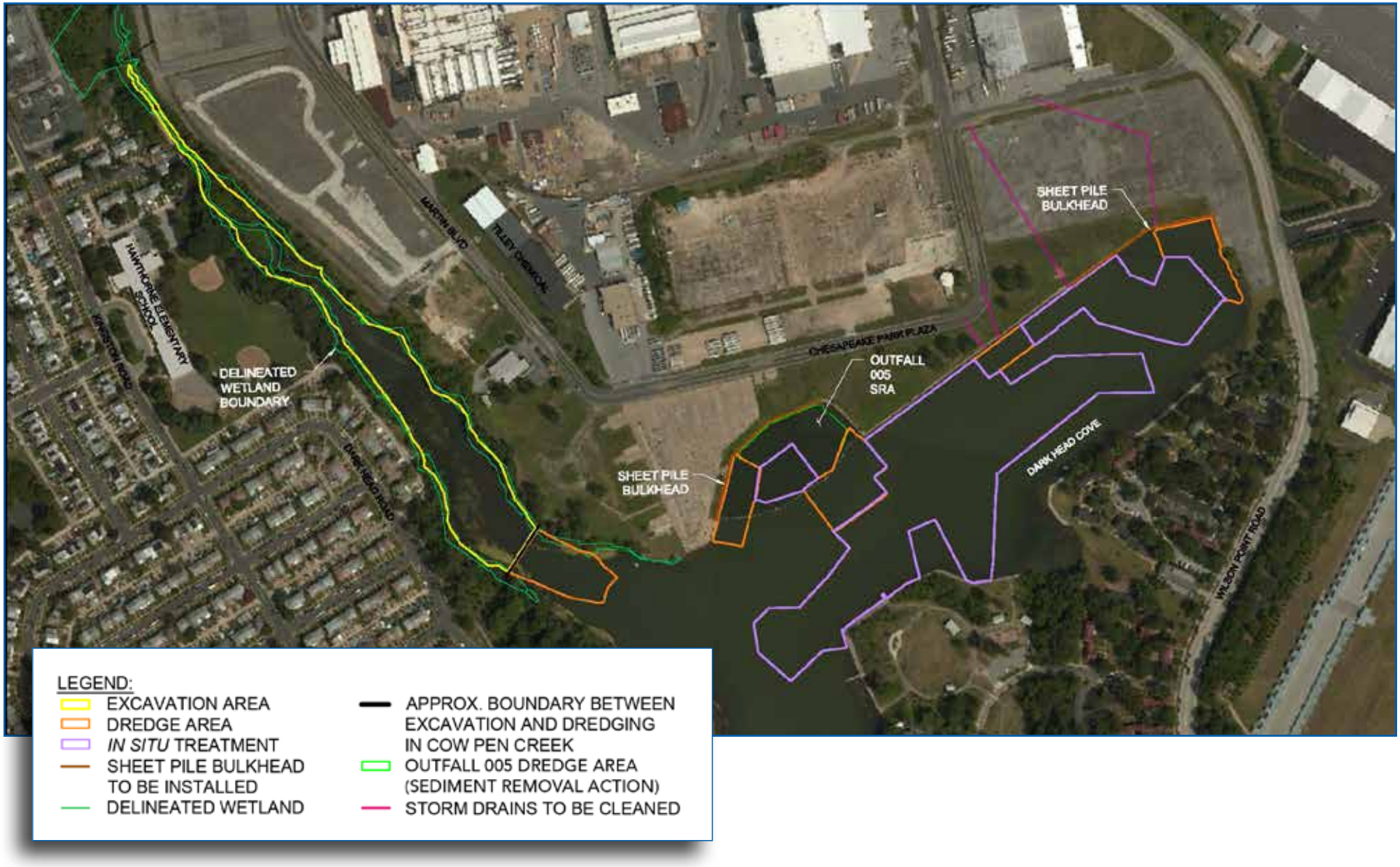
Updates on other remediation efforts and community topics of interest will be available between 5 and 7 p.m., at the informal poster session, and will include experts who can discuss and answer questions about groundwater and soil remediation at the Middle River Complex, and groundwater treatment construction activities at Martin State Airport. An aquatic ecologist will also be available to answer questions and provide information on the recent local algal bloom and fish die-off.

7 p.m. - Facilitated presentation and discussion on the **proposed plans and permitting requirements for sediment remediation at the Middle River Complex, and an update on construction of the groundwater treatment facility at Martin State Airport.**

A facilitated question and answer and comment session will follow the presentation.

Light refreshments will be served.

PLEASE NOTE: The Maryland Department of the Environment (MDE) will also hold a public meeting to present details of Lockheed Martin's Joint Permit Application for impacts to wetlands, waterways and floodplains associated with the proposed project, and to gain feedback from the public on the application. This public meeting will be held during the public comment period for the permit application, and is currently anticipated to be on April 21, also at Marshy Point Nature Center. The public can provide comments at that time. See MDE's upcoming public notice in The Avenue for confirmation of details. The notice will include a description of the proposed project, how to access Lockheed's Joint Permit Application from the MDE Wetlands and Waterways Website, and information about MDE's 30-day public review and comment period. Comments should be directed to Mr. Robert Rushlow with MDE Tidal Wetlands Division by email at Robert.Rushlow@maryland.gov, or by phone at 410-537-4023.



Sediment Remediation Areas

continued from page 1

water side of the old, corroded sections. They will fill the gap between the old and new sheet metal with stone and top with concrete. Four storm drains on the northeastern portion of the cove that drain Blocks E and D will also be cleaned and repaired and extended through the new bulkhead.

Existing Bulkhead

Dredging will begin as sections of the bulkhead are replaced. At least 17,000 cubic yards (or approximately 850 truckloads) of sediment will be removed during the dredging operation in Dark Head Cove and the mouth of Cow Pen Creek and will be transported for disposal at licensed facilities. The dredging crane will be located on a barge. Dredged sediment will be moved to the shore where it will be allowed to drain in specially constructed containment areas before transport. Additives may be mixed into the sediment to accelerate drying or provide the body required for disposal. This process was also used to help handle the sediments that were dredged near Outfall 005 during the winter of 2014-15. As in that earlier cleanup, a silt curtain will again be placed to isolate the entire work area.

The cloudiness of the water in the dredging area will be monitored continuously. If the water becomes measurably murky, crews will change their work practices, such as slowing the dredging operation or adding additional silt curtains. The cove will be closed to boat traffic during the dredging.

To make sure acceptable cleanup levels are achieved, samples will be taken of the cove bottom, and if needed, additional dredging will occur to achieve those levels. When dredging is finished, a six-inch-thick layer of sand will be placed over the dredged area to create a clean surface. This will isolate any small concentrations of contaminants that might possibly remain, further protecting fish and other aquatic animals. To protect fish spawning and aquatic vegetation, work crews will be out of the water by mid-February 2017.

Dredging in 2014-2015 at Outfall 005 used an environmental "clam-shell" bucket to seal sediments before removing them.

"We're making every effort possible to protect the environment as we clean it up," Tom Blackman, Lockheed Martin's project manager said. "First, the dredging of the creek and cove will be done during the winter. Then, adding a half-foot-thick layer of sand after we're done dredging will help us make sure we leave a clean environment."

The second work season runs from mid-June 2017 to mid-

continued on page 4

continued from page 3

An example of a coffer dam which separates a stream from a dry work area.

February 2018. Because all aquatic vegetation will be removed in work areas, it is better to do the work more quickly, so its recovery can begin faster; therefore the work will occur during the protection period for aquatic vegetation, allowing the entire project to complete in one work season. Over 23,000 cubic yards (or about 1200 truckloads) of sediment will be excavated from Cow Pen Creek. To do this, cofferdams, which are temporary watertight walls or water-filled bladders, will be placed on the streambed. The water behind these temporary dams will then be pumped out, exposing the creek bottom for excavation. Cofferdams will be built and removed in sequence as the work proceeds. The Lockheed Martin team will also remove any debris and waste materials it finds.

Also in season two, a layer of activated carbon, such as is found in household water filters or aquarium filters, will be spread over the remaining 14 acres of the cove. This treatment immobilizes contamination. After this work is complete, samples will be taken at regular intervals over the next five years to confirm that results are within limits acceptable to the U.S. Environmental Protection Agency and the Maryland Department of the Environment. The community will be kept informed of results.

Cow Pen Creek will be restored to a natural condition. Removing the sediments in the upper part of the creek will create a deeper channel, which will need to be refilled and shaped to return the creek bed to its previous form, so that water will meander the way it does now. Lower portions of the creek will be left at deeper depths. Wetlands will be restored. Where vegetation needs to be replanted, native species will be used. These will include trees, shrubs and plants that will provide habitat for wildlife. Large trees outside the excavation area will be left in place, except where required to access the creek.

Clean sand and gravel will be placed on the channel bottom to provide good conditions for fish spawning and other aquatic organisms. Placement of sand in the lower portion of the channel will encourage the growth of submerged aquatic vegetation, which provides fish with forage and cover.

The shoreline will be stabilized using natural material and vegetation. Where the shoreline needs to be strengthened, riprap will be used only when absolutely necessary.

“This will be one of our most challenging and also most rewarding projects,” Tom Blackman added. “We have an opportunity here to not only remove contamination, but also improve the habitat of Cow Pen Creek. We’ll be creating an aquatic environment that will promote spawning. We expect fishermen are going to find this area as good a place to fish as they ever did in the past.”

Tom also commented on the location of the work. “Cow Pen Creek and Dark Head Cove are in the middle of an active community. This work is like surgery, and it’s going to be going on in full view of the community, especially the residents of Wilson Point and Hawthorne. Hawthorne Elementary School overlooks this area and we are going to make sure the students know what’s going on and have a chance to learn about how you clean up the environment. People know how important this work is, and they’re going to be watching. We will be exercising the same level of care and attention that we did during the winter of 2014.”

Tom expanded further on the benefits of this work, “We’re also very excited about the restoration phase of this project. It will provide us a great opportunity to collect debris that’s been thrown into the creek over the years, including submerged tires and pieces of concrete, and to improve the environment of the creek and floodplain in a way that will enhance the natural beauty of this space for years to come.”

Lockheed Martin has submitted an application for approval of its plans to the tidal and non-tidal offices of the Maryland Department of the Environment and the U.S. Army Corps of Engineers. Lockheed Martin’s sediment cleanup plans will be presented to the community in a public information session scheduled for April 4, 2016 at Marshy Point Nature Center. The session will be in two parts—a poster session

Once restored, Cow Pen Creek will look very similar to how it looks now.

from 5 to 7 p.m., and a formal presentation that will begin at 7 p.m. The poster session will cover all aspects of Lockheed Martin's remediation projects at Middle River and Martin State Airport, and will include the latest available information on the algal bloom and subsequent fish die-off that occurred in November 2015 in the immediate area of the Middle River. An algae expert will be available during the poster session to answer any questions that come up. Attendees will be able to ask questions during both the poster session and the formal presentation. The formal presentation (at 7 p.m.) will focus on the sediment cleanup plans and on the on-going construction of the groundwater treatment facility at Martin State Airport.

Administrative Consent Order for the Middle River Complex is Finalized

- **Lockheed Martin voluntarily began investigation in early 2000s.**
- **From the outset Lockheed Martin has been committed to getting the cleanup done, and getting it done right.**
- **Administrative Consent Order is a written agreement memorializing Lockheed Martin's commitment to all work already underway.**

In December 2015 Lockheed Martin and the Maryland Department of the Environment (MDE) finalized the Administrative Consent Order (ACO) that covers the remediation project at the Middle River Complex. The ACO addresses what must be done to successfully clean up everything at the site—soil, groundwater, soil vapor and sediments. It includes work that Lockheed Martin has completed as well as what's left to do.

The remediation initiative at the Middle River Complex began originally as a voluntary effort in accordance with MDE regulations on Lockheed Martin's part after trash associated with historical operations at the Middle River Complex was found buried at Martin State Airport. The Corporation decided to sample the soil and groundwater at the Complex and the sediments in adjacent Dark Head Cove and Frog Mortar Creek. These investigations turned up contaminants also associated with historical operations at the Complex. The Corporation developed plans for cleaning up the soil and groundwater and then joined MDE's Voluntary Cleanup Program.

Over time, Lockheed Martin realized that because these bodies of water are owned by the State of Maryland, the cleanup could not be conducted under the Voluntary Cleanup Program (which is designed for land owners), and would be subject to the state's Controlled Hazardous Substances program.

"At that point," as Tom Blackman, Lockheed Martin's project manager for the Middle River Complex puts it, "to simplify our effort, it made more sense for us to place all our environmental work under one regulatory structure within MDE, which needed to be the Controlled Hazardous

continued on page 8

Martin State Airport:

Dump Road Area Groundwater Treatment System Construction Continued Through the Winter at Martin State Airport

Groundwater Treatment Facility Location

Construction of the Dump Road Area groundwater treatment system has been moving along. In spite of this past winter's cold and snow, Lockheed Martin's construction team has kept work on schedule by coming up with innovative solutions to Mother Nature's challenges. Some of the past few months' work is pictured here.

"Super Silt Fences" are part of the multiple erosion and sediment control measures that have been carefully placed around the site to protect the waterways from storm water and runoff from the construction site. ***The Super Silt Fences, constructed of woven synthetic fabric, are regularly inspected and maintained to prevent sediment being carried to Frog Mortar Creek, even during the heaviest rains.***

Site clearing began in late November, making way for the treatment building. ***The treatment system is situated central to the Dump Road Area to minimize the amount of tree clearing required.*** As part of the work, the existing Lynbrook Road extension to the Dump Road Area will be improved and paved.

For more information on the project, a Project Bulletin is available at: www.lockheedmartin.com/martinstate

The building site was graded in December and January. ***The treatment system building will measure 170 feet by 60 feet, by 36 feet high at the roof peak.*** The building and surrounding parking area will occupy roughly an acre (1.5 football fields per acre).

The treatment building foundation will rest on 250 concrete pilings. Installation of the foundation piles started in February and will continue into April. ***Each foundation pile extends about 40 feet into the ground and consists of a 14-inch diameter cement cylinder with steel reinforcement.***

Test borings were drilled in December for the groundwater extraction wells. These borings provided detailed information for construction of the groundwater extraction wells, through careful analysis of soil samples from as deep as 80 feet below the surface. ***Soil cores were carefully laid out in the order in which they were removed from the ground for photographing and sampling for analysis of the grain size.***

Based on the test boring results, the extraction well drilling started in early March. ***Sixteen total wells will be installed with 6-inch diameter well screens installed as deep as 80 feet below the surface.***

The ice on Frog Mortar Creek was thick in early February; the excavator aboard the barge moving the outfall pipe to the shallows of the creek doubled as an ice breaker.

On February 3rd work crews placed the outfall pipe and end piece in the shallows of Frog Mortar Creek. ***The end piece is mounted on a concrete slab that will be buried below the sediment in the creek, extending about 70 feet from the shoreline.*** Note the crew's survival suits and the winter fog.

continued from page 5

Substances program. This introduced the requirement for an Administrative Consent Order. None of this changed how we operate. We've always worked closely with all the government agencies that oversee our work. It's good to get the Administrative Consent Order completed. From the first day this project began, Lockheed Martin has been committed to getting the cleanup done and getting it done right. As I've said before, the Administrative Consent Order is a statement in black and white of what we've always intended to do."

Lockheed Martin first began reaching out to the Middle River community in 2005, attending community meetings and holding information sessions to let people know what was going on. As work on the remediation project has progressed, the Lockheed Martin team has distributed newsletters, emails, bulletins and announcements on every aspect of the work at the Middle River Complex and Martin State Airport, and has worked directly with the civic association leadership around the site to create and sustain a collaborative dialogue. Information has been shared through the Lockheed Martin website and Essex Public Library as well as at civic and community activities, informational and public meetings and throughout all the neighborhoods through newsletters and the media.

Rocky Jones, past president and current board member of the Essex-Middle River Civic Council and a member of the civic leaders group, recently offered his point of view about Lockheed Martin's commitment to strong community relations and doing things right: "These folks have been a pleasure to work with. They tell the community what the issues are and how they're going to solve them. They work to schedule and employ teams of good people who create plans that the permitting authorities find acceptable. By doing that they've kept the work moving forward, which has been great for all of us."

A timeline poster of all work progress and community outreach and information activities is available at the Lockheed Martin website:
www.lockheedmartin.com/middleriver

Lockheed Martin and its team of contractors were recognized in 2012 by the Chesapeake Gateway Chamber of Commerce with a "People's Choice Award" for its work to clean up the Middle River and Martin State sites and for the open and transparent communications they engage in with the community and its leadership. The Essex-Middle River Civic Council nominated the corporation for this distinctive honor.

Update on Soil Cleanup at Middle River

The removal of contaminated soil in Blocks F and H is finished. Work in Blocks D, D Panhandle and G is almost complete. A small amount of excavation in Block G will be done in the spring. Work included removing and disposing of seven underground storage tanks from Block F and one from Block G.

Based on interviews with former employees, the Lockheed Martin team will also investigate one more area in Block G for abandoned transformers. Restoration—final grading followed by planting of permanent grasses—will be completed in early spring. Soon after, all sediment and erosion controls will be removed from the site, pending Baltimore County inspection and approval.

Additional work unrelated to the remediation will continue in Blocks D and G in 2016. In Block D, a storm drain was replaced and will be sealed at the Dark Head Cove

A silt curtain is being placed in Cow Pen Creek and, along with super silt fencing, protects the creek from erosion and sediment during soil cleanup work.

A storm drain outfall required repair in the bulkhead at the corner of Blocks D and D Panhandle.

Seven underground storage tanks were removed in Block F.

bulkhead. Work in Block G will also include removing a pipe related to the underground storage tank that was removed in 2015.

For areas that were identified as needing remediation, contaminated soil was excavated down to two feet deep and a bit deeper in a few areas. A total of 527 truckloads of soil plus 55 truckloads of concrete and asphalt were removed. Soil was disposed of in licensed and approved landfills in Virginia and Maryland or at Lockheed Martin-approved recycling facilities. All but nine of the truckloads of concrete and asphalt, and most of the soil, were recycled at Lockheed Martin-approved facilities.

Soil in Block E contains polychlorinated biphenyls (PCBs) and will require additional investigations that will likely not be complete until 2018. Cleanup plans will require approvals from the Maryland Department of the Environment and the U.S. Environmental Protection Agency. Soil excavation is anticipated to begin in 2021.

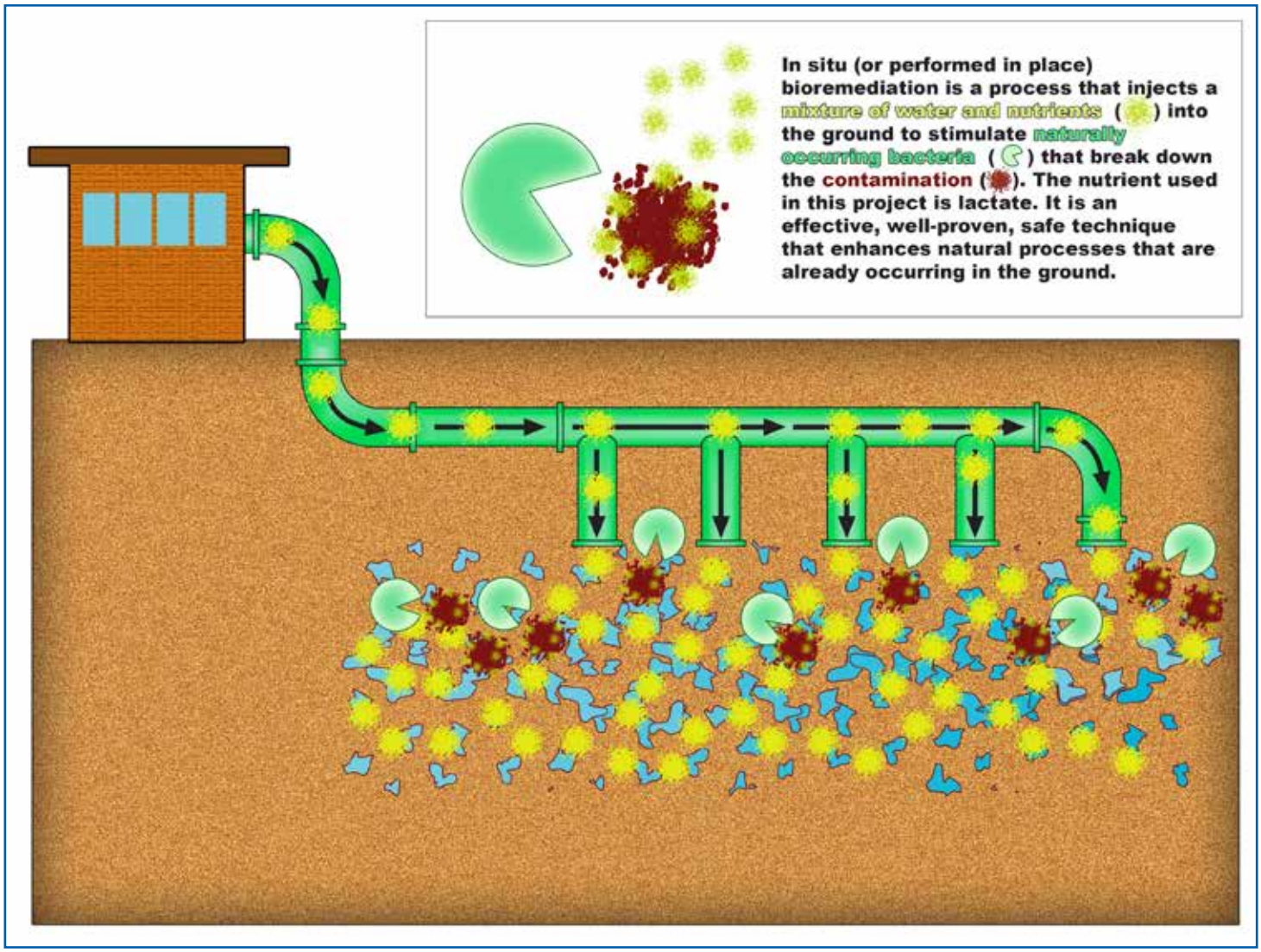
A Soil Photo Tour is available on the website at: www.lockheedmartin.com/middleriver

Groundwater Bioremediation to Begin Soon in Block E at Middle River

Lockheed Martin has resumed preparations for cleaning up groundwater using bioremediation in Block E at the Middle River Complex. Bioremediation has been underway in Blocks G and I since 2014. Installation of piping to do the same in Block E was underway when two abandoned underground storage tanks were discovered in 2013. Investigations of the area around the tanks discovered quantities of the solvent trichloroethene (TCE) that were too concentrated to be treated effectively by bioremediation alone in a reasonable time. Instead, Lockheed Martin installed a pumping and vacuum system that removed the bulk of the trichloroethene from the groundwater and soil via four extraction wells. Approximately 560 pounds of trichloroethene were removed and disposed of at a licensed waste facility. The system was shut down at the end of November 2015.

Bioremediation uses non-toxic food mixtures to feed bacteria that are already present in the soil to break trichloroethene down into non-toxic substances. Lockheed

continued on page 10



Martin relied on a food (sodium lactate) produced from the sugars of corn, beets, and other plants in Blocks G and I, and will also use it in Block E. In Block G, additional bacteria of the same type present in the groundwater has been added to make the process even more effective.

Preparations for installing the bioremediation system in Block E consist mainly of running pipes to wells, through which the food mixture will be injected into the ground. These connections were completed in February 2016. Next a neutral salt solution will be injected to determine operating settings and the ideal amount of the food to use in the soil, as well as to determine that the food mixture stays in the ground as intended and does not find its way to a storm

Trichloroethene (TCE) was used historically as a degreaser and solvent. When treated through bioremediation it breaks down into "daughter" byproducts, eventually becoming water and carbon dioxide.

Equipment inside the trailer distributes lactate (sugars) and water through a system of underground injection wells to activate bioremediation.

drain or other easy pathway. Lockheed Martin expects to begin full-scale bioremediation operations by mid-summer.

The November 2015 Fish Die-off in Middle River

A significant fish die-off occurred in the upper Middle River, Norman Creek, Hopkins Creek, Dark Head Cove, Cow Pen Creek and the upper reaches of Frog Mortar Creek in mid-November 2015. The number of fish that died was so high that the story was covered for several days in local media. Like members of the community, Lockheed Martin was concerned by this event, and went to extraordinary lengths to support the resulting investigations.

The Maryland Department of the Environment (MDE) investigated the incident and through its lab analyses determined a toxin released by dying algae caused the die-off. Unusually warm weather may have contributed to a large algal bloom. Excessive nutrients in the Chesapeake Bay are also known to encourage algae growth. The warm weather was followed by a cold snap that likely killed the algae, releasing the toxins. Salinity levels were also higher than usual.

As part of its investigations, the MDE collected samples at various points in the Middle River area, including several outfalls from the Lockheed Martin property. No chemicals were identified that could have killed the fish. Lockheed Martin also collected samples of shallow and deeper surface water just above the sediments in Dark Head Cove and Cow Pen Creek. No chemicals were identified in these samples that could kill fish. Lockheed Martin also repeated its annual routine sampling of surface water. While trace amounts of the solvent trichloroethene (TCE) were identified, as has been typical in the past, no chemicals were detected at concentrations high enough to kill fish.

In mid-December the MDE sampled four outfalls at the Middle River Complex. Samples from two of these outfalls showed the presence of chlorine, but at levels below that typically found in Baltimore City tap water. Even at the reduced level there was more chlorine than is typically found in water released from the Middle River Complex, and it turned out that the chlorine-reduction process used at the complex to remove chlorine from City water needed to be corrected. Lockheed Martin took action and the level of chlorine in the water released from the complex quickly returned to acceptable levels. Outfalls were sampled again later in December and they were in compliance. No impacts to the fish ecosystem were seen from any site activities, including this chlorine finding.

Dr. Jerry Diamond, a Tetra Tech aquatic ecologist and algal expert, will be available during the April 4 poster session (from 5 to 7 p.m.) to answer any questions you may have.

In a meeting with community and civic leaders on February 1, Dr. Jerry Diamond, a Tetra Tech algal expert, discussed worldwide concerns about the specific algae (Karlodinium veneficum) identified in the Middle River impact area (other algae are also present, and in fact are necessary for fish to survive). Dr. Diamond noted that fish die-offs in the Chesapeake Bay, while usually affecting smaller numbers of fish, are a reality throughout the Bay. He added, “A University of Maryland study published in 2015 tracked the increase of the particular algae that caused this fish kill. The kills caused by this algae seemed to be on the rise. Occurrences increased from approximately five kills per year up to 30 per year in the five-year period between 2003 and 2008. Oddly, after documenting the significant multi-year increase in fish die-offs in the Bay caused by this species, a reduction occurred over a subsequent five-year period. This was followed by the dramatic die-off this past November—all of which points to the unpredictable nature of algal blooms and fish die-offs.”

At last report, the number of fish returning to the areas of the algae bloom and fish die-off is increasing.

A Question/Answer on the Fish Die-Off is available at: www.lockheedmartin.com/middleriver

For More Information

Questions may be addressed to:
Bill Phelps, Lockheed Martin
Director, Communications
800.449.4486, william.phelps@lmco.com

All documents are available at the Essex Library, 410-887-0295, or on Lockheed Martin's Web site at www.lockheedmartin.com/middleriver or www.lockheedmartin.com/martinstate

Essex Library
1110 Eastern Boulevard
Essex, Maryland
410.887.0295

Hours: Sunday, 1 p.m. to 5 p.m.
Monday through Thursday, 9 a.m. to 9 p.m.
Friday and Saturday, 9 a.m. to 5:30 p.m.

Lockheed Martin Corp
455 Hillside Trail
Eddyville, Ky 42038

LOCKHEED MARTIN
We never forget who we're working for®