

# Citizens' Guide To Understanding The Remedial Action Work Plan For West Branch of Bloody Brook

*Summer 2013*

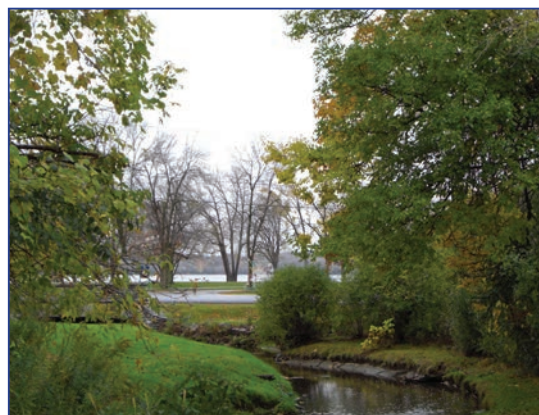


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## Public Meeting Scheduled

*The New York State Department of Environmental Conservation has developed a Proposed Decision Document, which incorporates Lockheed Martin's cleanup plan for the West Branch of Bloody Brook. This document is available for public review at the repositories listed on Page 15 of this Citizens' Guide through October 25th. A public meeting will be held on Tuesday, October 8th, at 6:00 p.m. at the Holiday Inn, 441 Electronics Parkway, Liverpool, N.Y. Lockheed Martin representatives will be present before the meeting, from 4-6:00 p.m., to answer any questions you may have.*





## Introduction

This Citizens' Guide is designed to provide information about Lockheed Martin's proposed cleanup of the West Branch of Bloody Brook, which runs through the town of Salina and a portion of the village of Liverpool in Onondaga County, N.Y. Lockheed Martin has voluntarily assumed responsibility for the cleanup.

This guide describes the history of the project, provides facts about cadmium, and explains Lockheed Martin's proposed plan to clean up and restore areas in and near the West Branch of Bloody Brook.

### *Voluntary Cleanup*

***Lockheed Martin has voluntarily assumed responsibility for the cleanup. We are taking a proactive approach to minimize potential future human and environmental exposure to cadmium.***

Lockheed Martin proposed the cleanup after environmental sampling indicated that elevated levels of cadmium above applicable Standards, Criteria, and Guidance are present in the West Branch of Bloody Brook. Environmental studies also were conducted in the Middle Branch of Bloody Brook, and no environmental impacts were identified. Therefore, there will be no sediment or soil removal activities in the Middle Branch.

Potential contact with cadmium in the West Branch of Bloody Brook is unlikely, because the cadmium is located in areas that are not easily accessed or are covered by vegetation or clean soil. Lockheed Martin is taking a proactive approach to the cleanup in order to remove or minimize the chance that residents or wildlife could be exposed in the future.



Lockheed Martin's Remedial Action Work Plan proposes digging up and removing about 38,000 tons (21,800 cubic yards) of soil and sediment from the brook channel, side banks and properties adjacent to the West Branch of Bloody Brook. Over the expected three-year cleanup period, about 3,300 round-trip truck loads — about seven truck loads per day — will be required to haul soil and sediment to a permitted landfill off-site and to bring in clean backfill material. Lockheed Martin submitted the plan to the New York State Department of Environmental Conservation in February 2013 and must receive approval from the department before work can begin. The proposed plan is available for public comment. (See Page 15 for details on where the plan is available.)



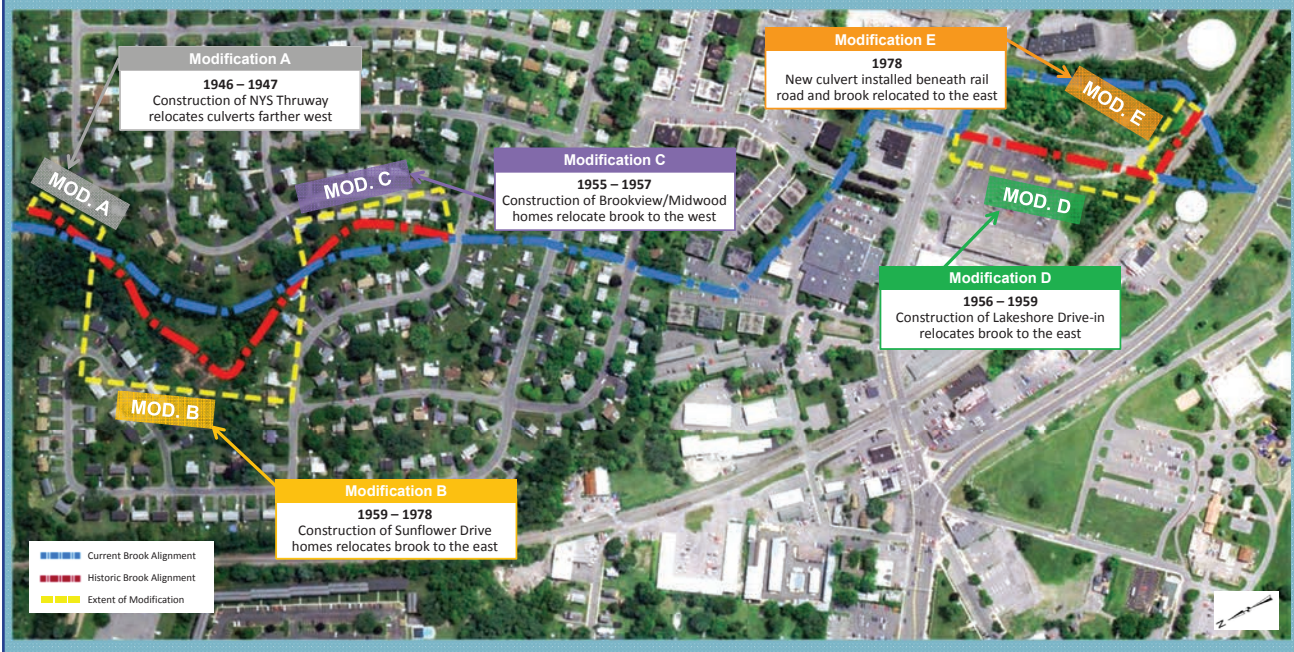
### *Cadmium*

***Cadmium is a metal found naturally in soil, plants and animals. It also is found in small amounts in food and is used in consumer products such as batteries, paint, metal coatings and plastics.***

# Brook Realignment

LOCKHEED MARTIN

*Five major modifications were made to realign the brook during development of the surrounding areas.*



## Project History

### *Electronics Business Park*

Today, Lockheed Martin is a major tenant in Electronics Business Park in Liverpool, N.Y. General Electric began construction of what was known as Electronics Park in 1944 and began operations there three years later. Through an acquisition and a corporate merger in the 1990s, Lockheed Martin ultimately acquired the business located at the Electronics Business Park from General Electric. In 1996, Lockheed Martin transferred ownership of Electronics Business Park to Empire State Development Corporation.

### *Middle Branch of Bloody Brook*

The Middle Branch of Bloody Brook flows from upstream of the New York State Thruway and joins the West

Branch of Bloody Brook near the Old Liverpool Road culvert. Studies were conducted in the Middle Branch, with no environmental impacts identified, thus no further activities are required.

### *West Branch of Bloody Brook*

The West Branch of Bloody Brook flows from upstream of Electronics Business Park and discharges into Onondaga Lake. The West Branch is within a drainage district maintained by Onondaga County and runs through wooded, residential, commercial, light industrial and municipal properties. Onondaga County uses Bloody Brook to control storm water. The area of the brook where the cleanup will take place is about 5,000-feet long and 4-feet to 6-feet wide.

Since 1946, Bloody Brook has gone through several modifications due to construction of the New York State Thruway, the former Lakeshore Drive-in and new residences. These modifications have resulted in rerouting and filling portions of Bloody Brook.

The distribution of cadmium in soil generally follows the historic brook alignment. Higher cadmium concentrations

***Middle Branch Not Impacted***  
***Environmental testing of the Middle Branch of Bloody Brook has been completed, and no environmental impacts were identified.***



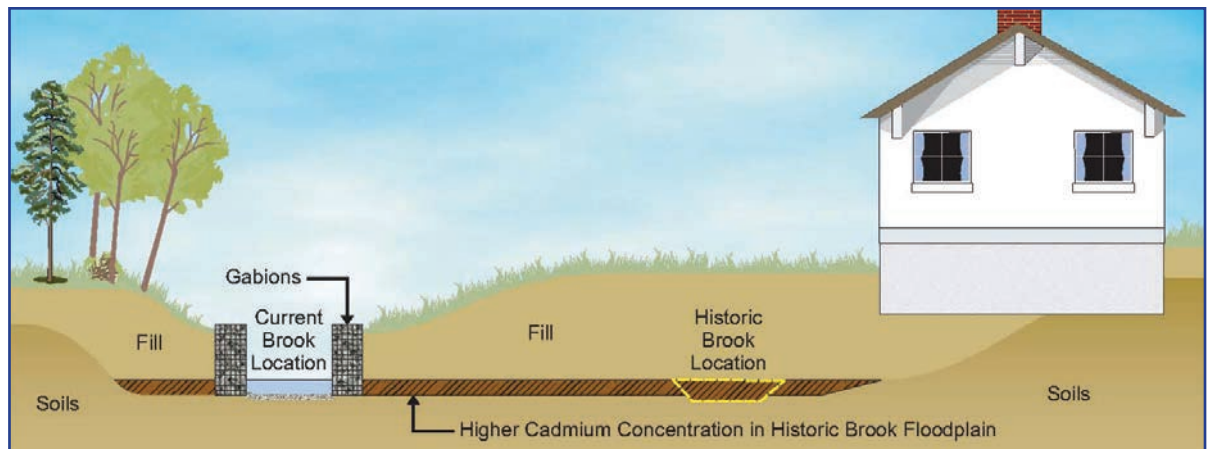
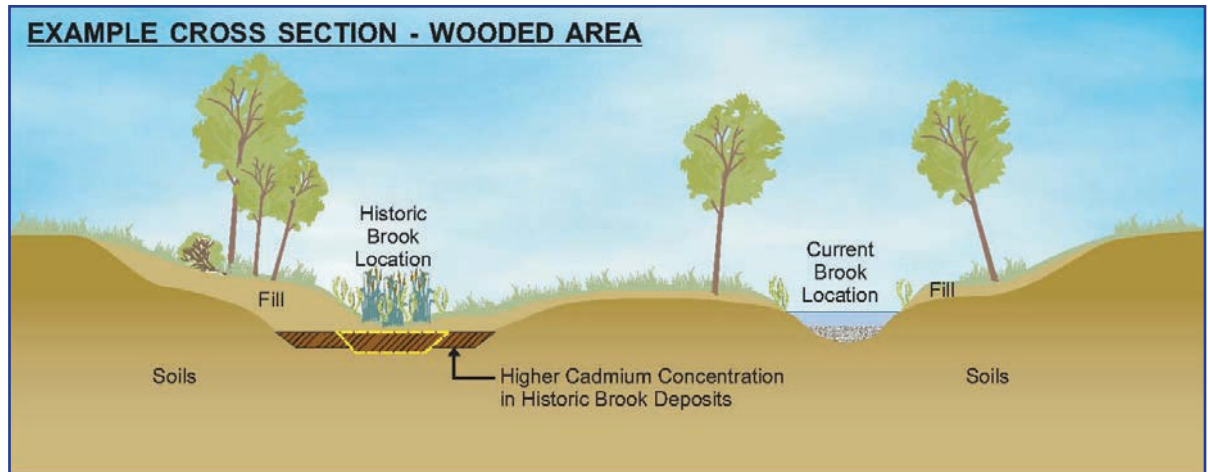
are associated with historic brook deposits and the floodplain. During area development, fill was brought to the site to raise the grade. In some locations, historic brook deposits and the floodplain were buried under this fill as deep as 15 feet, which is why cadmium is now found deep under clean soil.

### ***Environmental Testing and Sediment Removal***

In the mid-1990s, the New York State Department of Environmental Conservation investigated tributaries that flow into Onondaga Lake for a number of chemicals, and found elevated levels of cadmium in sediment and crayfish in the West Branch of Bloody Brook. Cadmium was not present in the surface water.

Lockheed Martin conducted extensive sampling of sediment, water and soil beginning in 1996. As a result of the initial sampling, high levels of cadmium were identified in a 750-foot stretch of the West Branch, just south of the New York State Thruway. In 1997, Lockheed Martin removed 325 tons (about 35 truckloads) of sediment from that area.

Between 2001 and 2011, Lockheed Martin collected more than 1,700 additional soil samples and found elevated levels of cadmium in soil at a number of locations, ranging



from the ground surface to 15 feet below the surface. Cadmium distribution in the soil indicates it is associated with a historic release, and has been there for a long time.

### ***Assisting Onondaga County***

In 2008, Lockheed Martin assisted Onondaga County by completing a voluntary culvert sediment removal project to improve stream flow. In 2009, Lockheed Martin sampled and removed soil from areas adjacent to Bloody Brook to facilitate Onondaga County's storm sewer improvement project.

### ***Cadmium Distribution***

***The distribution of cadmium in soil generally follows the historic brook alignment.***

## Facts About Cadmium

### *General facts*

Cadmium is a metal found naturally in soil, plants and animals. It also is found in small amounts in food. Cadmium has many uses in industry and is found in consumer products, such as batteries, paint, metal coatings and plastics.

Low levels of cadmium exist in most environments. In New York State, the rural soil background level is 2.5 parts per million (ppm) (New York Codes, Rules, and Regulations, 2006, Title 6 Part 375, effective December 14), but the natural level of cadmium found in soil is as high as 9.2 parts per million (ppm) (New York State Brownfield Cleanup Program, Development of Soil Cleanup Objectives, Technical Support Document. Albany, NY, September 2006). Plants, crops, fish and wildlife absorb cadmium from the ground. People and animals can get cadmium into their bodies by eating plants and animals that contain cadmium.

### *Exposure Potential*

***Potential contact with cadmium in the West Branch of Bloody Brook is unlikely because the:***

- ***concentrations in the surface layer are very low, are not easily accessed, and are covered by vegetation such as grass or soil***
- ***higher concentrations are buried deep below the surface where people would not be exposed to the cadmium***
- ***human health evaluation found no significant health hazard at the site.***

Exposure to high levels of cadmium can affect people's health, causing gastric distress and vomiting. Repeated ingestion of cadmium can cause kidney and liver damage. Studies have shown that cadmium can cause cancer when it is inhaled by workers in industrial settings over long periods of time.

### *'PPM' Means 'Parts Per Million'*

***PPM is used to define the concentration of a substance in water, land or air.***

***One ppm equals one in a million and would be equivalent to:***

- ***1 inch in 16 miles***
- ***1 second in 11.5 days***
- ***1 car in bumper-to-bumper traffic from Syracuse to Las Vegas.***

Extensive testing at the West Branch of Bloody Brook site has shown that potential contact with cadmium in the soil and sediment is unlikely because it is not located in easily accessible areas or is covered by vegetation or clean soil. A human health exposure assessment was completed to consider exposure to cadmium at the West Branch of Bloody Brook. That evaluation found no significant health hazards at the site. Given the conditions at the West Branch of Bloody Brook, people and animals do not come in contact with the cadmium as workers may at certain industrial facilities.

### ***Cadmium in the West Branch of Bloody Brook***

Based on the extensive environmental testing that was done, it was determined that:

- Surface concentrations are generally low in accessible areas.
- The highest cadmium concentrations are found at a depth of 3 to 4 feet in the wooded area.
- Portions of the brook's former channel are now buried as deep as 15 feet below the ground surface.
- 77 percent of the West Branch of Bloody Brook soil samples contained cadmium at levels less than 10 ppm, which is close to the range for natural levels of cadmium in New York State soils.
- 93 percent of site soil samples contained cadmium at levels less than 100 ppm, which is the highest cleanup objective for the site.

The New York State Departments of Environmental Conservation and Health, and the Onondaga County Health Department have reviewed the data for the site. As a precaution, the Onondaga County Health Department issued an advisory for the site stating that any potential health risk is unlikely but recommended that residents avoid contact with the banks of the brook.

## Developing The Remedial Action Work Plan

Lockheed Martin developed its proposed Remedial Action Work Plan in a step-by-step process that included establishing over-arching cleanup goals (also called Remedial Action Objectives), setting preliminary remediation goals, evaluating various technologies and cleanup options, and selecting the most effective solution using evaluation criteria established by the state departments.

### *Cleanup Goals*

Lockheed Martin's cleanup goals are, to the extent practicable:

- Prevent future exposure to soil and sediment containing cadmium,
- Maintain human and ecological protection, and minimize disruption to the community, and
- Ensure Onondaga County staff can continue routine maintenance of the Drainage District by minimizing exposure to soil and sediment containing cadmium.

### *Evaluating Options*

***Lockheed Martin and the New York State Department of Environmental Conservation worked together to evaluate numerous cleanup options.***



New York State has developed soil cleanup objectives for cadmium (New York Codes, Rules, and Regulations, 2006, Title 6 Part 375, effective December 14). These soil cleanup objectives vary depending on the land use and/or property type. Lockheed Martin has worked with the New York State Department of Environmental Conservation to incorporate these soil cleanup objectives into our remedial plan.

## The Proposed Cleanup Plan

Lockheed Martin's proposed cleanup will eliminate, to the extent practicable, potential exposure to cadmium by removing shallower cadmium-contaminated soil and replacing it with clean soil. Any cadmium remaining will be covered by clean soil and will be at depths where people and animals would not normally come into contact with the cadmium.

The proposed cleanup plan has been divided into different work areas based on land use and property type to determine the appropriate cleanup objectives. These areas are:

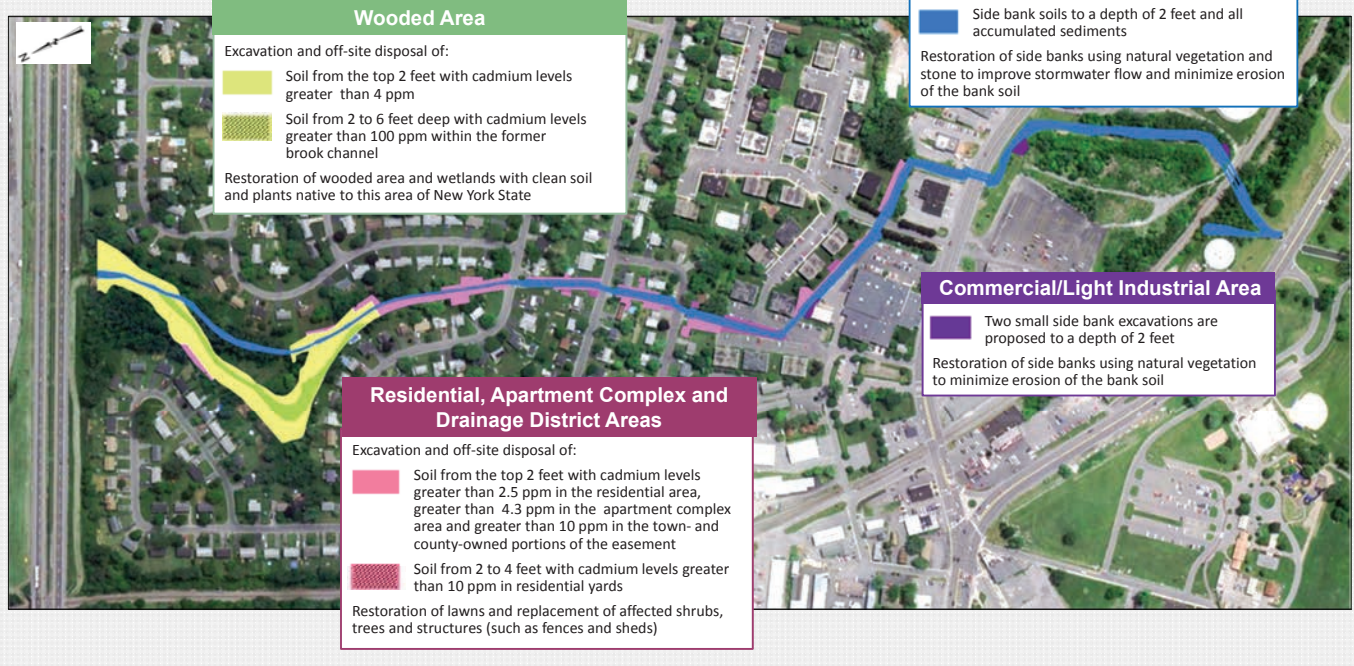
- Brook channel and side banks,
- Wooded/Wetland Area,
- Residential Area,



# Proposed Cleanup Plan

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**The proposed plan involves the excavation and off-site disposal of soil and sediment. This cleanup plan is available for public review.**



- Apartment Complex Area,
- Drainage District Easement, and
- Commercial/Light Industrial Area.

removing and replacing the top 2 feet of side bank material. This will improve how storm water moves through the brook, minimize future side bank erosion, and ensure minimal maintenance in the future.

## Wooded/Wetland Area

Lockheed Martin will remove and replace soil located in the top 2 feet containing cadmium in excess of 4 ppm. Soil from 2 feet to 6 feet with cadmium levels greater than 100 ppm within the former brook channel also will be removed and replaced. This additional removal will effectively remove a high percentage of cadmium-impacted material greater than 100 ppm from the site. Because the wooded area is undeveloped and was not covered with clean fill, the cadmium is more easily accessible and can be removed with minimal disturbance to the surrounding residents.

***Cadmium is found naturally in soil, plants and animals.***

## Residential Area

Lockheed Martin will remove and replace soil containing cadmium in excess of 2.5 ppm located in the top 2 feet, and

Under the proposed cleanup plan, Lockheed Martin will dig up about 38,000 tons (21,800 cubic yards) of soil and sediment over the expected three-year cleanup period. About 3,300 round-trip truckloads will be required to haul soil and sediment to a permitted landfill off-site and to bring in clean backfill material. Over the course of the three work seasons, each of which will run spring through fall, there will be about seven truck trips per day.

## Brook Channel and Side Banks

Lockheed Martin is proposing to remove sediment and restore the side banks along the entire length of the West Branch of Bloody Brook within the site, regardless of the presence of cadmium. Side bank restoration will involve

in excess of 10 ppm from 2 feet to 4 feet. This soil removal will be protective and allow the residential user to conduct routine improvement activities that involve disturbing the soil, such as planting trees and installing fences.

### ***Apartment Complex Area***

Lockheed Martin will remove and replace soil containing cadmium in excess of 4.3 ppm located in the top 2 feet and in excess of 10 ppm located from 2 feet to 4 feet within apartment complex properties. This soil removal will reduce the concentration of cadmium in shallow soil, which is the soil most accessible to the public, to levels below New York State residential soil cleanup objective values.

### ***Drainage District Easement***

For the portions of the Drainage District easement located adjacent to and within residential properties, Lockheed Martin will remove and replace soil located in the top 2 feet containing cadmium in excess of 10 ppm.

### ***Commercial/Light Industrial Area***

The former drive-in theater makes up a large portion of the non-residential commercial/light industrial area. The soils in this area are comprised of various components. There are native soils as well as areas where surface disposal of brook sediments occurred. In addition, construction and demolition debris and other non-site related fill material were used to establish the grade for the former drive-in theater. Cleanup activities will not take place in portions of this area containing fill material. Lockheed Martin is proposing to remove soils containing cadmium in excess of 9.3 ppm in the top 2 feet where surface disposal of brook sediments occurred.

## **Restoration And Monitoring**

Lockheed Martin's proposed plan includes site restoration and monitoring after the digging is completed. Regarding restoration:

- Side banks of the brook will be restored using natural vegetation and stone to improve storm water flow and minimize the need for maintenance by the county.



***Slumped flagstone – before restoration***



***Armored bank – rendering after restoration***



***Grass-lined bank – before restoration***



***Grass-lined bank – rendering after restoration***

- On residential properties, Lockheed Martin will restore disturbed vegetation, such as grass, shrubs and trees, and structures (for example, fences and sheds).
- In the wooded area, Lockheed Martin will restore disturbed vegetation, including replanting the wetlands with native species.

Since cadmium will be remaining at deeper depths in portions of some of the properties, Lockheed Martin will give property owners documentation of post-cleanup conditions on their property. In the future, if a property owner would need to disturb cadmium-containing soil for an activity, such as installing an in-ground swimming pool, Lockheed Martin will manage the removal and disposal of

### ***Cadmium Management***

***For properties where cadmium remains in deeper soils, if the property owner conducts an activity that would disturb the residual cadmium, Lockheed Martin will manage the removal and disposal of the residual cadmium at its expense.***



the soil containing residual cadmium above soil cleanup goals at the Corporation's expense. There will not be deed restrictions on any properties, and Lockheed Martin will send an annual notice to property owners reminding them of the residual cadmium on the property and its ongoing commitment to assist in soil removal and disposal, as needed.

Lockheed Martin will establish and implement a plan for site monitoring and maintenance that confirms the cleanup is protective of human health and the environment. The monitoring and maintenance plan is mentioned in the Remedial Action Work Plan. Maintenance and monitoring details will be fully developed after the cleanup is complete.

## What To Expect

### *What Happens Next*

Lockheed Martin has submitted the proposed Remedial Action Work Plan to the New York State Department of Environmental Conservation, whose approval is required before Lockheed Martin can begin work. The New York State Department of Environmental Conservation has developed a proposed cleanup plan based on the Remedial Action Work Plan. **The proposed plan is currently available for public comment (through October 25th). (See Page 15 for details on where the plan is available.)** A public meeting will be held on **Tuesday, October 8th at 6:00 p.m. at the Holiday Inn, 441 Electronics Parkway, Liverpool, N.Y.** Lockheed Martin's representatives will be present before the meeting, from **4-6:00 p.m., to answer any questions you may have.**

Additional sampling is being performed during 2013 to further define removal limits in the residential area, as well as to characterize soils for waste disposal.





Excavation currently is scheduled to start in 2014 and to be completed by the end of 2016, although the exact timing is dependent upon New York State Department of Environmental Conservation's approval and public comments, as well as the weather. Work will begin in the upstream portion of the brook in the wooded area and may take up to two construction seasons to complete. Work on residential properties downstream is planned to begin in 2015.



Digging on residential properties will be conducted Monday through Friday, from approximately 8 a.m. to 5 p.m. Work will not be conducted on national holidays. Lockheed Martin will take steps to minimize the impact on the community by using the quietest pumps possible to divert the brook while the brook channel is being worked on. It also will use the smallest and quietest equipment practical to excavate the soil and sediment. Trucks will carry the removed soil and sediment to a permitted landfill and bring in clean material to replace it.



### ***What You Will See***

The proposed cleanup will use conventional sampling and construction equipment. The sampling equipment will include small drilling rigs, hand augers and shovels. Construction and control equipment will include:

- Excavators, loaders and backhoes to dig up the soil and sediment,
- Trucks to haul it to licensed landfills,
- Silt fencing, hay bales and other sediment control measures, and
- Temporary dams, bypass pumps and piping.

Between 10-20 people will be working at the site. Trucks will be staged at Electronics Business Park and dispatched to the site, as needed.



### **Lockheed Martin Contact Information**

***Residents with questions, concerns or suggestions about the cleanup activities are encouraged to call the project information line at 315-456-2150.***



## Ensuring Health and Safety

Lockheed Martin wants to do everything it can to protect the community and site workers. During the cleanup, Lockheed Martin will ensure:

- Community air monitoring
  - o Dust control through use of tarps and water sprayers
  - o Trucks cleaned, lined and covered for transport
- Noise monitoring
  - o Pumps equipped with silencers
  - o Use of the quietest and smallest equipment practicable
- Worker training programs
  - o Daily safety meetings for on-site workers
  - o Personal protective equipment for workers (such as hard hats and vests)
  - o Secured work areas with temporary barriers and signs
  - o Traffic control signs, cones and flag persons
- Dedicated on-site Lockheed Martin representative
- Contingency planning (such as for floods, accidents and emergencies).

## Frequently Asked Questions

### **Q. Why is Lockheed Martin voluntarily doing this cleanup?**

A. Lockheed Martin is taking a proactive approach to the cleanup to minimize potential future human and environmental exposure.

### **Q. What is the purpose of the cleanup?**

A. The purpose of the cleanup is to prevent potential future human and environmental exposure to cadmium, to the extent practicable.

### **Q. Is this the first cleanup work to be done?**

A. No, it is not. In 1997, after elevated levels of cadmium were identified in a 750-foot stretch of the West Branch of Bloody Brook just south of the New York State Thruway, Lockheed Martin removed 325 tons (about 35 truckloads) of sediment from the area and worked with Onondaga County in 2008 to remove sediments from the culverts.

### **Q. Is the Middle Branch of Bloody Brook affected?**

A. No. Environmental studies were conducted in the Middle Branch with no environmental impacts identified, and no further activities required.

### **Q. What is cadmium?**

A. Cadmium is a metal found naturally in soil, plants and animals. It also is found in small amounts in food. Cadmium has many uses in industry and consumer products, such as batteries, paint, metal coatings and plastics.

### **Q. How does cadmium behave in the environment?**

A. Cadmium does not break down or degrade in the environment. It strongly binds to soil and sediment. This property limits the ability for cadmium to move with ground water or evaporate into air.

### **Q. Can cadmium get into food?**

A. Small amounts of cadmium are commonly present in foods from naturally occurring sources. Plants, fish and livestock can absorb limited quantities of cadmium, and if people or pets eat the plants, fish or livestock, they also are exposed to the small quantities of naturally occurring cadmium.

**Q: Can cadmium get into the air of my basement or home?**

A: Cadmium cannot get into the air of a home or basement because cadmium cannot evaporate into air. Although cadmium can become airborne in particulate form, this requires that cadmium bound to soil be eroded by wind from an exposed surface, such as bare, non-vegetated soil, which is not present at this site.

**Q: Is cadmium toxic?**

A: All chemicals, including cadmium, are toxic if a person is exposed to high amounts. Frequent ingestion of high levels of cadmium (throughout the year) can cause kidney and liver damage. However, accessible surface soil in and near Bloody Brook does not contain enough cadmium to make someone sick. Direct skin contact with cadmium does not cause illness, because cadmium cannot be absorbed through the skin.

**Q: Is it safe for animals on my property?**

A: Lockheed Martin evaluated whether cadmium on the West Branch of the Bloody Brook posed a risk to animals and determined there is little risk to animals because the levels of accessible cadmium are low.

**Q: How did you decide on the right cleanup method?**

A: Lockheed Martin evaluated a number of potentially viable alternatives and conducted comparative analyses to determine which alternatives would most effectively achieve the cleanup goals. Lockheed Martin chose the alternative that best met criteria recommended by the New York State Department of Environmental Conservation.

**Q: Can you summarize the cleanup and restoration plan?**

A: Lockheed Martin's Remedial Action Work Plan proposes digging up and removing about 38,000 tons (21,800 cubic yards) of soil and sediment from the brook channel, side banks and properties adjacent to the West Branch of Bloody Brook. Over the expected cleanup period (three construction seasons), about 3,300 round-trip truckloads — about seven truckloads per day — will be required to haul soil and sediment to a permitted landfill off-site and to bring in clean backfill material. Lockheed Martin submitted the plan

to the New York State Department of Environmental Conservation and must receive approval from the Department before work can begin.

**Q: Why does Lockheed Martin need to do more sampling before remediation?**

A: The additional sampling is being conducted to define the removal limits in the residential area and to gather data about the soil and sediment, as required by the landfill.

**Q: What happens if you leave cadmium in deep soil on my property, but I do work that requires digging at a later date?**

A: On an annual basis, Lockheed Martin will provide you documentation that cadmium remains in deep soil on your property. If at a later date you, or the future property owner wanted to conduct an activity that would disturb the residual cadmium, Lockheed Martin would manage the removal and disposal of the residual cadmium at Lockheed Martin's expense.

**Q: What is the schedule for the cleanup?**

A: Work cannot begin until the New York State Department of Environmental Conservation approves Lockheed Martin's proposed plan. Digging is scheduled to begin in 2014 and to be completed by the end of 2016, but that will depend on the Department's approval and public comments. The schedule also is dependent on the weather. At the moment, work in the wooded area is slated to begin in 2014 and work in the residential area is set to begin in 2015.

**Expected Truckloads**

***Over the expected cleanup period of three construction seasons, about 3,300 round-trip truckloads — about seven truckloads per day — will be required to haul soil and sediment to a permitted landfill off-site and to bring in clean backfill material.***



**Q. How will my residential neighborhood be impacted by the work?**

- A. Based on the proposed plan, soil excavation on residential properties and removal of brook sediment will be conducted Monday through Friday, from approximately 8 a.m. to 5 p.m. Work will not be conducted on national holidays. Lockheed Martin will use the quietest equipment and least-intrusive cleanup methods practicable to minimize the impact on the community.

**Q. Why is Lockheed Martin digging deeper in the wooded area than in the residential area?**

- A. Lockheed Martin is digging deeper in the wooded area than in the residential area because the wooded area is undeveloped and was not covered with clean fill. The cadmium in this area is more easily accessible and can be removed with minimal disturbance to the surrounding residents.

**Q. How will dust be controlled during cleanup?**

- A. Dust emissions will be monitored during work. Actions will be taken whenever dust monitoring shows an impact due to the cleanup activities. Dust will be controlled at the cleanup site by wetting dry soils, by minimizing work performed during extremely windy conditions, and by covering soil piles with tarps or plastic sheeting during non-working hours. All trucks exiting the site will be covered with tarps and their wheels will be cleaned to minimize dust and dirt carried onto the streets. Additionally, streets will be routinely cleaned using a wet sweeper when work is in progress.

**Q. How will animals living within the wooded area be controlled during cleanup?**

- A. An attempt will be made to relocate animals that may become a nuisance to neighboring residents during work. These animals will be humanely relocated to an approved area.

**Q. How will truck traffic be managed through the community?**

- A. Truck traffic will be managed through the community using an approved traffic control plan. The traffic control plan will address the use of additional traffic

**Cleanup Schedule**

***Digging is scheduled to begin in 2014 and to be completed by 2016, but that will depend on the state's approval and public comments. The schedule also is dependent on the weather.***

controls, such as signage and flagmen and detouring of traffic within the community.

**Q: Is it likely that the material found in Bloody Brook got into Onondaga Lake?**

- A: Residues of cadmium in Bloody Brook and adjacent areas show that the extent of downstream impacts ends before Bloody Brook enters Onondaga Lake. This pattern is consistent with the tendency of cadmium to adhere onto and become incorporated into sediment deposits. As such, we see no indication or reason to believe that impacts extend into Onondaga Lake.

**Q: Was there any actual sampling done at the lake that verifies this?**

- A: Yes, there has been extensive sampling within the lake. The results show no concentrations of cadmium consistent with a discharge from Bloody Brook.



## Environmental Glossary

*This glossary defines some of the environmental terms that are found in this Citizens' Guide or are used in the Remedial Action Work Plan.*

**Aquatic Organisms** — Aquatic organisms are those that live in water.

**Bioavailability** — Bioavailability defines how a substance will interact with its environment, including how it will be absorbed and how it will impact living organisms.

**Brook Hydraulics** — Brook hydraulics refers to how the water rests or flows through the brook.

**Cadmium** — Cadmium is an element found naturally in soil and rocks throughout New York State, typically at a concentration of less than 9 ppm. 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, it typically clings to soil and sediment.

**Ecological Exposure** — Ecological exposure describes the conditions that would be required for plants and animals to be impacted by contaminants.

**Exposure Pathway** — An exposure pathway describes the way a contaminant moves from the source of the pollution to people, animals or plants. The exposure pathway defines how people come in contact with the contaminant. That information, combined with other factors, is used to evaluate potential risks to animals and humans and to determine the best ways to clean up the contamination. Pathways for soil contamination include accidentally eating contaminated soil, eating food grown in the soil, or touching the soil.

**Human Exposure Evaluation** — A human exposure evaluation describes how exposure to contamination has impacted a specific population. Human exposure evaluations consider how people were exposed and the level and severity of their exposure. The evaluation uses all of the information to determine the level to which humans have been exposed.

**Human Health Risk** — A human health risk describes the potential that exposure to a contaminant may damage someone's health.

**'PPM,' or 'Parts Per Million'** — PPM is used to express the concentration of a substance in water, land or air. One





PPM equals one in a million. As a comparison, 1 ppm would be the equivalent of 1 inch in 16 miles, one second in 11.5 days, or one car in bumper-to-bumper traffic from Syracuse to Las Vegas.

**Permeable** — The word “permeable” describes a substance such as soil that allows the passage of water.

**Receptor** — A receptor is a living organism that may have been impacted by environmental factors.

**Remedial Action Objectives** — Lockheed Martin developed the Remedial Action Objectives (also referred to as cleanup goals) to be met during and following completion of remediation. The objectives are, to the extent practicable:

- Prevent future exposure to soil and sediment containing cadmium,
- Maintain human and ecological protection and minimize disruption to the community, and
- Ensure Onondaga County staff can continue routine maintenance of the Drainage District by minimizing exposure to soil and sediment containing cadmium.

**Residual** — The word “residual” defines the amount of a contaminant that remains at the site after remediation is complete.

**Sediment** — Sediment is soil, sand and minerals that have washed from the land into water, usually after rain or a snow melt. Sediment is found on brook, creek and lake bottoms.



**Solidification and stabilization** — Solidification and stabilization are processes commonly used to prepare wet soil for transportation on public roadways. The process binds the water within the soil with an additive such as concrete.

**Surficial** — Surficial refers to something that is near the surface.

**Topography** — Topography refers to the physical features of the land surface.

**Toxicity** — Toxicity defines how harmful a substance or mixture of substances is to humans or animals.

## For More Information

- Residents with questions, concerns or suggestions about the cleanup activities are encouraged to call 315-456-2150.
- Information also is available on the Lockheed Martin external Web site at [www.lockheedmartin.com/liverpool](http://www.lockheedmartin.com/liverpool).
- The New York State Department of Environmental Conservation maintains repositories for documents and sample results at the locations listed below. The proposed cleanup plan for Bloody Brook is currently available here:

**Liverpool Public Library**  
**310 Tulip St.**  
**Liverpool, N.Y. 13088**  
**315-457-0310**

**New York State Department of Environmental  
Conservation, Region 7**  
**615 Erie Blvd.**  
**West Syracuse, N.Y. 13204**  
**315-426-7403**

**New York State Department of  
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