November 17, 2008

Ms. Vanessa Steigerwald Dick, Ph.D.
Ohio Environmental Protection Agency
Northeast District Office
2110 East Aurora Road
Twinsburg, Ohio 44087

Re: Stormwater Sampling and Analysis Plan – Revision 1
Akron Airdock, Akron, Ohio
Voluntary Action Program (VAP)

Dear Ms. Steigerwald Dick:

On behalf of Lockheed Martin Corporation (Lockheed Martin) and Summit County Port Authority (SCPA), URS is submitting the enclosed *Stormwater Sampling and Analysis Plan- Revision 1* (SAP) for your files. The Revised Stormwater SAP addresses numbered comments received in a letter from Ohio Environmental Protection Agency (Ohio EPA) dated October 21, 2008 and a general comment letter dated November 4, 2008.

Ohio EPA Letter October 21, 2008 and November 4, 2008:

1) Sections 4.0 and 4.3, Sampling Locations and Purpose of Sampling: The Stormwater SAP proposes sampling for PCBs in storm water at five locations, but does not include the location where the water discharges to Haley's Ditch. The Haley's Ditch discharge point (i.e., the existing general NPDES permit outfall 001 located just beyond Triplett Boulevard) needs to be added to the Stormwater SAP as another sampling location.

A number of reasons support the need for outfall sampling data. The storm sewer cleaning outlined in the June 24, 2008 Storm Drain Debris Removal Plan includes the Airport East West Storm Drain to the outlet at Haley's Ditch. Outfall 001 sampling will provide data of detections, if any, in water down gradient of the cleaned sewers. The data will support evaluation of the property's compliance with storm water and surface water requirements, including assessment data for an Individual NPDES permit. The sampling data obtained from this location will also support the evaluation relative to the unrestricted TSCA decontamination standard for PCBs in water, as described in Section 3.0 of the SAP. Lastly, data obtained over time from sampling the outfall and other locations will support the evaluations necessary under Ohio Administrative Code (OAC) 3745-300-07 and 3745-300-15, to determine if the property achieves the applicable surface water quality standards for PCBs.

As discussed in your letter sent with the Stormwater SAP, incorporation of the Stormwater SAP as an element of the Operation & Maintenance (O&M) plan for the property's no further action (NFA) letter is appropriate. An NFA letter's reliance on an O&M plan allows additional time for the volunteer to perform needed monitoring and additional remedial activities, if needed, and provides

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the certified professional time to demonstrate that the voluntary action has resulted in the property complying with applicable standards.

Response: As we discussed during an October 29, 2008 conference call, Lockheed Martin is proposing to conduct off-property sampling for polychlorinated biphenyls (PCBs) at a temporary outfall point in the Triplett Boulevard median. The Storm Drain Debris Removal activity was completed this month (November) to a point in the storm sewer at the northern edge of Triplett Boulevard, which is approximately 175 feet from the culvert outfall at Haley's Ditch. Partial collapse in the final sewer segment combined with sediment buildup has partially submerged the downstream end of the pipe. Lockheed Martin plans to complete remediation of the final segment of the storm sewer in conjunction with the Haley's Ditch cleanup, which is being planned for summer 2009. In lieu of sampling from the submerged outfall at Haley's Ditch, Lockheed Martin proposes to sample from a temporary outfall 001 at the manhole in the median of Triplett Boulevard. As there are no lateral connections downstream prior to the outfall at Haley's Ditch, this sampling location is representative of all upstream stormwater flow. Based on Ohio EPA's letter dated November 4, 2008, this substitute outfall location is acceptable to both the VAP and Division of Surface Water (DSW).

Please note that the existing general National Pollution Discharge Elimination System (NPDES) permit held by Valley Association Corporation does not include an outfall 001 at Haley's Ditch; rather, the permitted outfall is 601, located on the City of Akron airport property.

With regard to the remaining debris in the last 175 feet of the storm sewer referenced above, Ohio EPA's November 4, 2008 letter states:

> "Until the contamination in the storm sewer has been removed, the pipe cleaned and surface water monitoring done, it will not be possible to demonstrate that VAP applicable standards have been met in accordance with OAC 3745-300-07(G)."

However, this section of the storm sewer is not part of the VAP property. In fact, this section of the storm sewer is approximately 4,000 feet from the VAP property. Thus, demonstrating compliance with the VAP applicable standards cannot be dependant upon the removal of the debris from this section of the storm sewer. In addition, as acknowledged by the Ohio EPA during the October 29, 2008 phone conference, it is possible to demonstrate that the VAP applicable standards have been met as to surface water and stormwater at points on the VAP property, such as Plant A West (PAW-7) and Plant A East (PAE-5), or much closer to the VAP property boundary, such as Outfall 601. While additional off-property data will be gathered as requested by the DSW, and under Toxic Substance Control Act (TSCA), these data will not necessarily be needed to demonstrate compliance with VAP applicable standards.

To summarize, revisions to the SAP include off-property monitoring points at Temporary Outfall 001 in the Triplett Boulevard median and at Outfall 601 on City of Akron's airport property. Five on-property locations remain in the SAP, bringing the total number of sampling points to seven. The specific programmatic objectives of VAP, TSCA, and DSW with respect to how the stormwater data will be used from the various sampling points is discussed in Section 3, Objectives.

2) <u>Section 4.2.2, Typo:</u> The last sentence of this section refers to sampling point CB1462 as one of the sampling points. However, Figure 2 shows sampling point CB1492. Please provide the correct numbering for this sampling point.

Response: CB1462 is the correct sampling point designation. Figure 2 has been corrected.

<u>3) Section 5.0, Sampling Events:</u> To follow DSW's standard storm water sampling requirements, a minimum of twelve (12) sampling events, each separated by approximately one month, are needed for representative sampling. Therefore, sampling should occur for at least one year. The four (4) proposed sampling events are not adequate to assess potential impacts from the property through storm water runoff to surface water, ensure the remedy is complete, and demonstrate applicable surface water standards have been met. For detections of PCBs above applicable standards, further sampling would be needed, in addition to other appropriate responses, depending on the detection. Section 9.0 of the SAP also acknowledges that recommended response actions will be developed as appropriate (e.g., which may involve collection of additional samples or an expanded program).

Response: Section 5 in the SAP has been modified to reflect 12 sampling events, conducted over approximately one year. As data are generated from the sampling program, modifications to the SAP may be proposed to further investigate conditions at the proposed or at additional monitoring points. In addition, Lockheed Martin may implement response actions to address detections as appropriate during the course of the monitoring program, prior to completion of 12 sampling events.

<u>4) Section 5.0, Sampling Procedure:</u> To follow DSW's standard storm water sampling requirements, the SAP's wording for collecting a grab sample should be revised as follows: "All samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches and at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where feasible, the variance in the duration of the event and the total rainfall of the event should not exceed 50 percent from the average or median rainfall event in that area. A grab sample shall be taken during the first 30 minutes of the discharge (or as soon thereafter as practicable)."

Response: Section 5 in the SAP has been modified to reflect DSW's standard stormwater sampling requirements.

<u>5) Sections 8.0 and 9.0, Sampling Analysis and Detection Limits:</u> The reporting limit (RL) by TestAmerica, when it analyzes for PCBs including Aroclor 1268, under EPA Method 8082 "low level" is 0.2 micrograms per liter (ug/L) or 200 ng/L. It is understood that TestAmerica is the only VAP certified lab with certification for Aroclor 1268 based upon Method 8082. The VAP agrees with your plan to obtain certified data through TestAmerica's analysis of the samples under its certification for PCBs by Method 8082.

In addition, please make sure that TestAmerica analyzes the samples down to the Method Detection Limit (MDL), which should be 0.1 ug/L or less. The analytical results need to be reported at the MDL because if PCBs are detected above the MDL, then there is a high probability that PCBs are present in the storm water. To report PCBs as present at or detected above the MDL is a more accurate representation of water quality than stating as not detected at the RL. Use of the MDL is needed

for DSW storm water permitting requirements and will support the data comparison to applicable standards under VAP. It is important to note here that the applicable standards for PCBs are the Lake Erie drainage basin surface water quality criterion as described in Section 3.0. However, the current VAP certified lab's RL is only 0.2 ug/L, with an MDL of about 0.1 ug/L. Because of this discrepancy, the remedy and monitoring data needs to address this situation to the maximum extent practicable.

Response: Samples submitted to TestAmerica, Inc. of North Canton (TestAmerica) will be requested for analysis of total PCBs by EPA Method 8082 "low level," with a reporting limit of 0.2 µg/L and a method detection limit of 0.1 µg/L. Lockheed Martin and SCPA acknowledge that Ohio EPA has approved using TestAmerica for certified analysis of stormwater samples.

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Implementation of the Stormwater SAP will occur as soon as weather conditions are suitable for sampling. In the meantime, please contact me if you have any questions or comments on the revised SAP.

Sincerely,

URS Corporation

Jennifer J. Krueger, PG, CP
Project Manager

Enclosure
14947614

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STORMWATER SAMPLING
AND ANALYSIS PLAN – REVISION 1

AKRON AIRDOCK, AKRON, OHIO

Prepared for:

LOCKHEED MARTIN CORPORATION
NOVEMBER 17, 2008

JOB NO: 14947614

URS CORPORATION

STORMWATER SAMPLING AND ANALYSIS PLAN – REVISION 1

Akron Airdock Facility
1210 Massillon Road
Akron, Ohio

November 17, 2008

PREPARED FOR:

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1.0 INTRODUCTION

This Stormwater Sampling and Analysis Plan (SAP) addresses post-remediation stormwater sampling activities at the Akron Airdock (Airdock) facility. The Airdock facility is a historic airship hangar located on the former Lockheed Martin Corporation (Lockheed Martin) property at 1210 Massillon Road, Akron, Ohio.

The activities discussed in this plan are specific to the approximately 19-acre parcel that includes the Airdock facility (also known as "Plant A"). A site aerial photograph illustrating the location of the Airdock parcel, surrounding properties, and other local drainage features is provided as Figure 1. The Airdock parcel, which is owned by Summit County Port Authority (SCPA) and leased by Lockheed Martin, is located in an industrial park south of the Akron Fulton International Airport and north of U.S. Highway 224. The industrial park is owned by LMA Commerce LTD (LMA) and managed by Ohio Realty Advisors, Inc.

Stormwater generated from the northern portion of the industrial park, which includes runoff from the Airdock parcel, is currently permitted under the Ohio Environmental Protection Agency (Ohio EPA) *General Permit Authorization to Discharge Stormwater Associated with Industrial Activities Under the National Pollutant Discharge Elimination System* (NPDES General Permit, Ohio EPA Facility Permit Number 3GR00733*DG). Valley Association Corporation (VAC), a corporation owned by LMA, Meggitt, and Lockheed Martin, holds the General Permit. At the request of Ohio EPA Division of Surface Water (DSW), Lockheed Martin is currently preparing an application for an individual NPDES permit for the 19-acre parcel to allow stormwater monitoring for polychlorinated biphenyls (PCBs).

2.0 BACKGROUND

The Airdock was constructed in 1929 using material coated with a fire-retardant substance now known to have contained PCBs, specifically Aroclor 1268. This unusual non-liquid PCB, Aroclor 1268, was discovered in the Airdock's original roof and siding in 2003. Since the initial PCB discovery and continuing to the present, Lockheed Martin has successfully implemented a multi-phased voluntary remediation program to manage the PCB-containing roofing and siding material. These remedial activities are being conducted under two regulatory programs: the federal Toxic Substances Control Act (TSCA) pursuant to 40 Code of Federal Regulations §761.61, and the Ohio EPA Voluntary Action Program (VAP) at Ohio Administrative Code (OAC) 3745-300. In conjunction with the appropriate regulatory notification and approval process, the overall remedial approach has centered on: (1) source control to prevent releases of Aroclor 1268 from the roof and siding material and to prevent further movement of PCBs on the grounds, and (2) cleanup of Aroclor 1268 from the stormwater conveyance and discharge systems (primarily through the removal of sediment and debris in the storm sewer system).

Samples of various media at and proximate to the Airdock indicated that weathering over the 75-year life of the building resulted in erosion of some of the siding material, with deposition on the surrounding grounds. Runoff apparently washed some of the material into the storm drainage system, and deposited it in soil and sediment in an area north of Triplett Boulevard known as Haley's Ditch. Although there is no known date for the release and migration of Aroclor 1268 to Haley's Ditch, the most plausible explanation is that it occurred historically, when precipitation was in direct contact with the roof and siding. Facility maintenance records document that almost 13,000 of the original sheet metal roof sections were replaced and the entire structure was coated in asphalt roof coating in 1976[1]. Beginning in 1987, the Airdock's owners have proceeded with execution of plans to prevent contact between precipitation and the original siding. That effort has been virtually completed, with a combination of rubber membrane over most the Airdock exterior, and replacement or covering of some of the original siding with aluminum siding. Beginning in 2003, interim measures to prevent further release and migration of the non-liquid Aroclor 1268 to the environment have been effected by removing debris from the gutters and catch basins, vacuuming the paved surfaces surrounding the Airdock, and installing filter fabric in the storm drainage system. These interim measures were taken while the necessary approvals were obtained under TSCA to clean up the interior and exterior under §761.61 (c).

Lockheed Martin has completed a number of source control and remedial actions at the Airdock and provided United States Environmental Protection (U.S. EPA) and Ohio EPA with reports and updates of these source management efforts. These activities have included:

- Installing a rubber membrane over the roof of the Airdock structure;
- Replacing rain gutters to control storm flow from the roof of the Airdock;
- Installing and maintaining filter fabric over all storm drain surface openings around the Airdock to capture solid particles until all Airdock remediation is complete;
- Replacing the vertical RPM siding with aluminum siding;
- Remediating the interior of the Airdock;
- Cleaning the contents and floor of the Airdock;
- Removing PCB-containing soil located adjacent to the Airdock;
- Removing debris from the pavement around the Airdock to remove residual RPM; and,
- Removing debris from the storm sewer system from the facility to Triplett Boulevard to remove residual RPM.

These remedial activities are detailed in various documents including: *Akron Airdock PCB Exterior Remediation Strategy* dated June 22, 2007[2], *Akron Airdock Application for Risk-Based Cleanup of Soil* dated August 27, 2007[2], *Akron Airdock Pavement PCB Characterization* dated November 20, 2007[2], *Soil Excavation Plan* dated April 18, 2008[3], and *Storm Drain Debris Removal Plan* dated June 24, 2008[3]. Together these remedial activities are expected to mitigate the future release of PCBs from the Airdock facility to the stormwater system and Haley's Ditch.

In accordance with the overall exterior remediation strategy, a post-remediation stormwater sampling program will be implemented to provide data to support the various programmatic requirements of VAP, TSCA, and DSW. Implementation of the stormwater sampling program is the subject of this SAP.

3.0 OBJECTIVE

The objective of this sampling program is to collect aqueous post-remediation sampling data that are representative of stormwater discharges from the 19-acre Airdock parcel. Stormwater sampling data will, depending upon the specific location and analytical results, be used to evaluate the following programmatic objectives of the VAP, TSCA, and DSW.

3.1 VAP OBJECTIVES

The VAP objectives for sampling stormwater are related to the requirement under OAC 3745-300-07 (D)(2) to evaluate existing and potentially complete exposure pathways for regulated media in excess of applicable standards, including those pathways and receptors that exist off-property. Cleanup of off-property areas is not required under VAP (although Lockheed Martin is addressing off-property impacts to the storm sewer and Haley's Ditch under TSCA) but rather, the VAP property cannot be causing off-property impacts, under current or reasonably anticipated future use. In the case of the Airdock, off-property soil and sediment samples at Haley's Ditch contain Aroclor 1268, indicating that there was a historical release via the stormwater system, presumably from the Airdock.

Therefore, because of the potentially complete exposure pathway from the 19-acre VAP property to Haley's Ditch via the stormwater system, the overall objective of the stormwater SAP program under the VAP is to demonstrate that the potentially affected medium, stormwater, is in compliance with applicable standards (OAC 3745-300-07(G)). VAP rules for meeting this general objective include the following specific requirements. Comments on how the SAP will be used to address the requirements are included where appropriate.

1. The data collected must be sufficient to determine whether applicable standards are met or to determine that remedial activities result in the property complying with applicable standards (OAC 3745-300-07(G)(1). Sampling will be conducted in accordance with 3745-300-07(D)(5).

2. The chemical of concern (COC) applicable to the release from the Airdock roofing and siding is Aroclor 1268, as determined in accordance with 3745-300-07(D)(1)(c).

3. The applicable standards for Aroclor 1268 in surface water are the same as those for total PCBs in surface water, which for Haley's Ditch are water quality standards for the Lake Erie drainage basin of 0.026 nanograms per liter (ng/L or part per trillion) outside mixing zone average for protection of human health and 0.12 ng/L outside mixing zone average for protection of wildlife (3745-300-08 (E) (2) (a) and 3745-1-33).

4. Analyses for the COC, Aroclor 1268, must be analyzed by a certified laboratory (CL) with reporting limits at or below the applicable standards (3745-300-09 (H)(2)). The only CL with certification for Aroclor 1268 is TestAmerica, Inc. (TestAmerica) of North Canton, Ohio (CL0024). Reporting limits for total PCBs by United States Environmental Protection Agency (EPA) Method 8082 "low level" are 0.2 micrograms per liter (µg/L or part per billion), with a method detection limit (MDL) of 0.055 µg/L for Aroclor 1268. Since the only VAP CL with certification for Aroclor 1268 is by a method that is orders of magnitude higher than the most stringent Lake Erie standard of 0.026 ng/L (0.000026 µg/L) (and few analytical methods exist to analyze reliably at part per trillion sensitivity), the results from the stormwater sampling will be used in combination with remedial activities (for example through an operations and maintenance plan and modeling to the point of exposure, if necessary and appropriate) to demonstrate that the remedy renders the pathway incomplete as to potential receptors and points of compliance (3745-300-07 (G)(4)(b) and Technical Decision Compendium VA30007.03.020).

5. The point of compliance for stormwater emanating from the 19-acre VAP property is defined as the northern property line of the Airdock parcel (3745-300-07(G)(1)(c) and 3745-300-09(3)(b)(iii)(*b*)(ii) for off-property transport-mediated pathways). The no further action letter and request for covenant not to sue will be based upon the voluntary action conducted on the 19-acre VAP property.

3.2 TSCA OBJECTIVES

Stormwater sampling will be conducted to evaluate the effectiveness of the exterior Airdock remedy on meeting the TSCA decontamination standard for removing PCBs from water, as cited in §761.79. For unrestricted use, the decontamination standard is less than or equal to 0.5 µg/L total PCBs (§761.79 (b)(1)(iii)). The stormwater samples will be considered confirmatory samples under §761.79(f) for Aroclor 1268 related to the Airdock parcel and the remediated storm sewer system to Triplett Boulevard.

3.3 DSW OBJECTIVES

The stormwater sampling conducted under this SAP will be used to support an individual NPDES permit application, focused on PCBs, for stormwater monitoring from the Airdock parcel. The specific objective of the individual permit is to monitor for the presence of PCBs in stormwater leaving the property. DSW requirements include representative sampling points on and off the property, including a

monitoring point where the storm sewer discharges to Haley's Ditch. The purpose of monitoring at the storm sewer outfall is to measure water quality at the point where stormwater discharges to waters of the State.

Permitted discharges by DSW require that samples analyzed for PCBs be below detection. The typical analytical detection limit recognized by DSW is 0.1 µg/L, which is above TestAmerica's MDL for PCBs by U.S. EPA Method 8082 "low level." DSW has indicated that standard stormwater sampling requirements include a minimum of 12 sampling events for representative sampling over approximately one year.

4.0 SAMPLING LOCATIONS

Sampling is proposed from seven locations, five on-property points and two off-property points as described below.

A map illustrating the Airdock facility layout, drainage system and proposed on-property sampling locations is provided as Figure 2. Three main sewers drain the Airdock parcel: (1) Plant A West (PAW) 48-inch, (2) Plant A West (PAW) 24-30-inch, and (3) Plant A East (PAE) 24-30-inch. PAW represents the storm sewers on the west side of the Airdock facility, and PAE represents those on the east side. As shown on Figure 2, both the PAE and PAW systems receive drainage from off-property buildings, Plant B and Plant E, respectively.

Each of the three sewers (PAW-48, PAW-24-30, and PAE-24-30) serving the Airdock facility parcel were subject to debris and sediment removal; however, only stormwater within the PAW-24-30 and PAE-24-30 sewers will be subject to sampling under this SAP. The PAW-24-30 sewer is representative of drainage for the entire western half of the symmetrical Airdock structure, while the PAE-24-30 sewer is representative of the drainage for the entire eastern half. The strategy of selecting these representative lines is consistent with the requirements for "Representative Discharge" contained in Part V.B.5. of the General Permit.

Stormwater from the Airdock facility and the surrounding areas drains through an underground storm sewer system to Haley's Ditch just beyond Triplett Boulevard, approximately 4,000 feet north of the Airdock facility. The main sewer that runs beneath the airport property receives flow from City of Akron storm sewers, as well as from other industrial and commercial properties upstream and downstream from the Airdock facility. As requested in the October 21, 2008 and November 4, 2008 letters from VAP, two additional off-property sampling points will be added to this plan. Outfall 601 is a manhole located in the City of Akron airport sewer downstream of the Airdock. Monthly sampling is currently conducted at Outfall 601 under VAC's general stormwater and non-contact cooling water permits. Sampling is proposed from an existing catch basin in the median of Triplett Boulevard (Temporary Outfall 001).

This temporary outfall represents the most downstream point in the storm sewer system that has been remediated in accordance with the *Storm Drain Debris Removal Plan.* Figure 3 shows the locations of these outfalls.

4.1 WESTERN SAMPLING (PAW) STRATEGY

Drainage from the western half of the Airdock facility is conveyed through PAW-24-30, which flows from south to north and includes several catch basins and manholes along the sewer. Available drawings indicate PAW-24-30 is isolated from Plant E drainage and therefore it may be suitable for representative monitoring purposes. However, a connection between PAW-24-30 and PAW-48 was found during the recent storm drain debris removal activity, which may introduce commingled flow from Plant E. The implications of the possible commingling in PAW will be evaluated once the sampling data are collected.

4.1.1 West Side Representative Sampling Point

As shown on Figure 2, Manhole PAW-7 will be the only western sewer sampling point for the stormwater sampling program. Manhole PAW-7 is located within the 19-acre parcel (immediately prior to leaving the parcel) and is downstream of the western Airdock facility drainage area.

4.2 EASTERN SAMPLING (PAE) STRATEGY

Sample points on and around the eastern storm sewer PAE were chosen to investigate several conditions. The conditions and requisite sample points are: (1) a sample point representative of the eastern storm sewer as a whole (PAE-5), (2) two sample points to quantify potential off-property sources (PAE-3 and CB-1462), and (3) a sample point to quantify conditions at the soil remediation site in the Southeast Area (PAE-2).

4.2.1 East Side Representative Sampling Point

The eastern storm sewer, PAE, runs parallel to the east side of the Airdock facility (see Figure 2). This storm sewer collects drainage from on-property and off-property sources, and flows from south to north. Downstream of the north end of the Airdock parcel, the storm sewer connects to the Airport's main storm drain, where stormwaters are conveyed beneath the Airport property.

Because of the layout and configuration of the east side drainage system, the most representative sample point for the eastern sewer is the northern-most accessible collection point along the sewer that remains within the bounds of the Airdock parcel. This point is the storm sewer manhole PAE-5 (also referenced as ST 5463, GPD survey, 2007). Manhole PAE-5 is located within the 19-acre parcel and is downstream of the eastern Airdock facility drainage area.

4.2.2 Off-Property Contribution Sampling Points

The Airdock parcel and the surrounding industrial facilities share common utilities, including the storm sewer system, and currently operate under an Ohio EPA General Permit (OHR000004) held by VAC. Consequently, several upstream, off-property storm sewers convey drainage through the Airdock eastern storm sewer resulting in commingled stormwater discharge. In order to monitor for representative stormwater in the eastern storm sewer that originates at the Airdock facility, the potential contribution from off-property sources must also be monitored.

Suitable sample locations to monitor potential off-property sources were chosen by identifying 1) off-property storm sewers that ultimately connect to the PAE, and 2) available monitoring locations within the boundary of the Airdock parcel.

Two sample points were identified based on the criteria. These points are (from south to north): CB 1462 and PAE-3 (see Figure 2).

4.2.3 Southeast Area Sampling Point

Soil excavation and remediation for PCBs was completed on the southeastern side of the Airdock facility in June 2008. In order to monitor for the influence upon stormwater drainage from residual PCBs in soil, a suitable sample point was identified from this area. This point was required to be proximate to the soil excavation area, in the path of the stormwater drainage, and at a location that ultimately discharges to the PAE sewer. The proposed point is storm sewer manhole PAE-2 (see Figure 2).

4.3 SAMPLING STRATEGY LOCATION SUMMARY

The following table summarizes the seven sampling points proposed for the stormwater sampling and analysis program.

Table 1

Proposed Stormwater Sampling Points

Sampling Area	Structure Name	Purpose	Invert (feet, msl)	Approximate Location
PAW	PAW-7	Representative – Main sewer, West Side	1035.1	From PAW-6: 350 feet north along PAW.
PAE	PAE-5	Representative – Main sewer, East Side	1036.0	From northeast corner Hydraulic Press Bldg: 90 feet north, 10 feet east.
PAE	CB-1462	Upstream, Off-property contribution	1038.4	From PAE-1: 240 feet south along PAE
PAE	PAE-3	Upstream, Off-property contribution	1037.3	From southeast corner Transformer Bldg: 75 feet south, 20 feet east.

Table 1

Proposed Stormwater Sampling Points

Sampling Area	Structure Name	Purpose	Invert (feet, msl)	Approximate Location
PAE	PAE-2	Southeast Soil Remediation Area	Not Available	From southeast corner Transformer Bldg: 225 feet south, 25 feet east.
Off-Property	Outfall 601	Downstream, combined point	1032.58	500 feet north of PAW-7
Off-Property	Temporary Outfall 001	Downstream, Discharge to Haley's Ditch	Not Available	Located in the median of Triplett Boulevard

PAE = Plant A East Storm Sewer
PAW = Plant A West Storm Sewer
MSL = Mean Sea Level

5.0 SAMPLE COLLECTION FREQUENCY AND STORMWATER EVENT REQUIREMENTS

Stormwater samples will be collected from the proposed PAW, PAE, and off-property sample locations during 12 discrete storm events. Consistent with NPDES guidance, one grab sample per sampling point for each of the 12 storm events will be collected under certain precipitation conditions. All samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inch and at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where feasible, the variance in the duration of the event and the total rainfall of the event should not exceed 50 percent from the average or median rainfall event in that area. A grab sample shall be taken during the first 30 minutes of the discharge (or as soon thereafter as practicable).

Ideally, the variance of the storm duration and total rainfall of a sampling event will not exceed 50 percent from the average or median storm event for the Akron area. Based upon this criterion, total rainfall must be between 0.25 and 0.75 inch and the total duration must be between 5.6 and 16.8 hours. Further, in order to provide data that are representative of 12 discrete sampling events, it is desired that each of the 12 sampling events be conducted approximately 1 month apart (subject to the availability of a "measurable" storm event). However, more frequent sampling may occur during the 'wet season' provided that the other criterion has been met.

It is anticipated that these 12 discrete samples can be collected within 1 year although weather patterns such as extended drought or frozen conditions could preclude meeting the 1 year target. As described below, the team responsible for sampling will be expected to monitor the weather forecasts and anticipate when an appropriate event may occur. In the event that it is not possible to collect and analyze these samples within a 1 year period, the sampling conditions may be modified in order to meet the objectives of the sampling program within a reasonable timeframe. Further, adverse climatic conditions may occur

that prohibit the collection of samples because they create dangerous conditions for personnel (such as local flooding, high winds, tornadoes, and electrical storms).

The intention of the sample collection frequency and stormwater event requirements described above is to collect samples that are representative of runoff conditions from each area.

6.0 SAMPLING METHODOLOGY

Grab samples during each "measurable" event will be collected from Manholes PAW-7, PAE-5 (T-5463), PAE-2, PAE-3, CB 1462, Outfall 601, and Temporary Outfall 001. A total of seven samples will be collected, five on-property locations and two off-property locations, as described in Section 4.0. Prior to sampling, the analytical schedule (Table 3) will be coordinated with the laboratory and a laboratory-supplied bottle order will be shipped to the sampling team.

Sampling personnel will track weather patterns in anticipation of a "measurable" storm. The goal is to target and collect samples from a "measurable" event (i.e., minimum 0.1-inch precipitation event) within the first 30 minutes of stormwater discharge. Precipitation patterns will be monitored using data from the Akron Fulton International Airport weather station. A rain gauge will be placed within the property to monitor the actual event precipitation at the time of sampling. Due to access limitations and geographical location, it may be impracticable to collect all seven samples within the first 30 minutes of stormwater discharge. Sampling will be conducted in the order described in Table 2 below and it is anticipated that the on-property samples can be collected within the first 30 minutes, with the off-property samples collected within approximately the first 60 minutes. The collection time will be noted by the sampling team.

The following sections describe the sampling methodology for collection of the stormwater samples.

6.1 STORMWATER SAMPLE COLLECTION

Grab samples will be collected from the PAW-24-30 sewer from surface access at Manhole PAW-7, from the PAE-24-30 sewer at PAE-5, PAE-2, PAE-3, and CB 1462 and from the off-property outfalls 601 and Temporary Outfall 001. No confined space entry will be permitted or required to collect the stormwater samples. The sampling procedure will involve observation of stormwater flow through the manhole followed by sample collection of grab samples. Sample collection activities will involve lowering the laboratory-prepared containers attached to a pole into the manhole. The sampling device will be turned into the incoming flow and a representative sample will be collected. The sampler will attempt to position the container in the center of the stormwater flow path so that it is representative of the flow through the manhole and to avoid sediment within the base of the manhole, if any.

Following representative sample collection, the containers will then be raised to the surface and capped. The jars will be labeled with sample designation, time, date, and samplers initials prior to placement into a pre-chilled cooler.

Flow will be estimated at points PAW-7 and PAE-5 by measuring depth of water in the pipes during storm events, and using the included discharge estimate worksheets (Appendices B and C).

The following table details the on-property sample collection order and pipe location, invert, diameter, and material information. At this time, it is anticipated that there will be one sampling team, comprised of two people. However, in the event that more than one sampling team is present, on-property samples and off-property samples will be collected in parallel.

Table 2

Target Sample Point Collection Order with Location Characteristics

Collection Order	Sewer	Location Name	Diameter (inches)	Material
1	PAE	PAE-5	30	Brick
2	PAE	PAE-3	24	VCP
3	PAE	PAE-2	24	VCP
4	PAE	CB 1462	12	VCP
5	PAW	PAW-7	30	Brick
6	Airport	Outfall 601	54	Brick
7	Off-property	Temporary Outfall 001	66	Brick

VCP = Vitrified Clay Pipe

6.2 MEASUREMENT OF FIELD PARAMETERS

Field parameters will be measured for each collected stormwater sample. At a minimum, these field parameters are anticipated to consist of pH, temperature, and specific conductivity. The parameters will be measured with a submersible instrument such as a Horiba U-10, or similar device. The instrument will be calibrated in accordance with the manufacturer's recommendations prior to each use and the information will be recorded in the field logbook.

7.0 SAMPLE PRESERVATION, SHIPPING, AND CHAIN-OF-CUSTODY

Samples will be placed in appropriate containers and preserved for shipment to the laboratory. A list of required parameters, test methods, and hold times for the stormwater monitoring program is provided in Table 3.

Table 3

Stormwater Sampling Analytical Schedule

Parameter	Test Method	Preservative	Maximum Hold Time
TSS	EPA 160.2	Cool 6ºC	7 days
Total PCBs	EPA 8082 low level	Cool 6ºC	1 year
Field Parameters (temperature, pH, specific conductivity, etc.)	Calibrated field instrument	None required	Analyze immediately in field

TSS = Total suspended solids
EPA = United States Environmental Protection Agency

All samples will be transported in a cooler with ice and delivered under chain-of-custody. Chain-of-custody records will be maintained to document the custody of all samples from the time of collection until analysis. Care will be taken in packing coolers. Bottles and ice will be packed in such a way as to minimize the chance of breakage. Each cooler shipped will be securely sealed to prevent opening in transit.

8.0 SAMPLE ANALYSIS AND DETECTION LIMITS

The samples will be analyzed by TestAmerica of North Canton, Ohio. TestAmerica is certified for PCB analysis including Aroclor 1268 by the VAP certification laboratory program (CL0024). Level 3 quality control (QC) data reporting will be required under a laboratory affidavit. Samples will be analyzed for total PCBs using EPA Method 8082. The analytical results will be summarized and reported by specific congener including Aroclor 1268. The VAP-certified laboratory reporting limit for the PCB analyses is 0.2 µg/L or 200 ng/L, which is consistent with VAP certified laboratory requirements.

9.0 EVALUATION OF RESULTS

Following receipt of the laboratory reports the data will go through a validation process to ensure that the reported results are of sufficient quality for the intended data use. Estimated concentrations reported by the lab that are below the VAP reporting limit of 0.2 µg/L, i.e. "J" flagged data, will be considered relative to the sampling program objectives.

After the validated results are available from each of the 12 discrete sampling events, the data will be reviewed and evaluated relative to sampling conditions and applicable standards. These evaluations will consider such factors as the:

- Consistency or variability of the analytical results over the sampling events, if applicable;
- Specific Aroclors detected at or above reporting limit, if any;
- Storm event characteristics (flow, duration, etc.);

- TSS levels; and
- Variability of sample results from the east and west sewer systems and off-property results, if any.

Based on these evaluations, recommended response actions may be developed and proposed as appropriate. Such response actions may involve collection of additional samples at the current sampling locations, an expanded sampling program to collect additional upstream data to identify potential contributing sources, additional remedial activities, and other such actions that could improve stormwater quality.

[1] Lockheed Martin Corporation, Fact Sheet, Haley's Ditch Voluntary Site Monitoring, February 2006.
[2] Lockheed Martin Corporation, 1210 Massillon Road, Akron, Ohio
[3] Arcadis, Project Reference B0038062.0000.

FIGURES

LEGEND

APPROXIMATE BOUNDARY OF 19-ACRE PARCEL

STORM SEWER LINE

Note: Other branch lines to sewer system may exist.

N

0 1,000 2,000 Feet

SOURCES: MODIFIED FROM SUMMIT COUNTY GIS, 2004, OSIP AERIAL PHOTOGRAPH, 2006, AND TETRA TECH, 2007

AKRON AIRDOCK FACILITY
AKRON, OHIO

FIGURE 1
SITE AERIAL PHOTOGRAPH

URS

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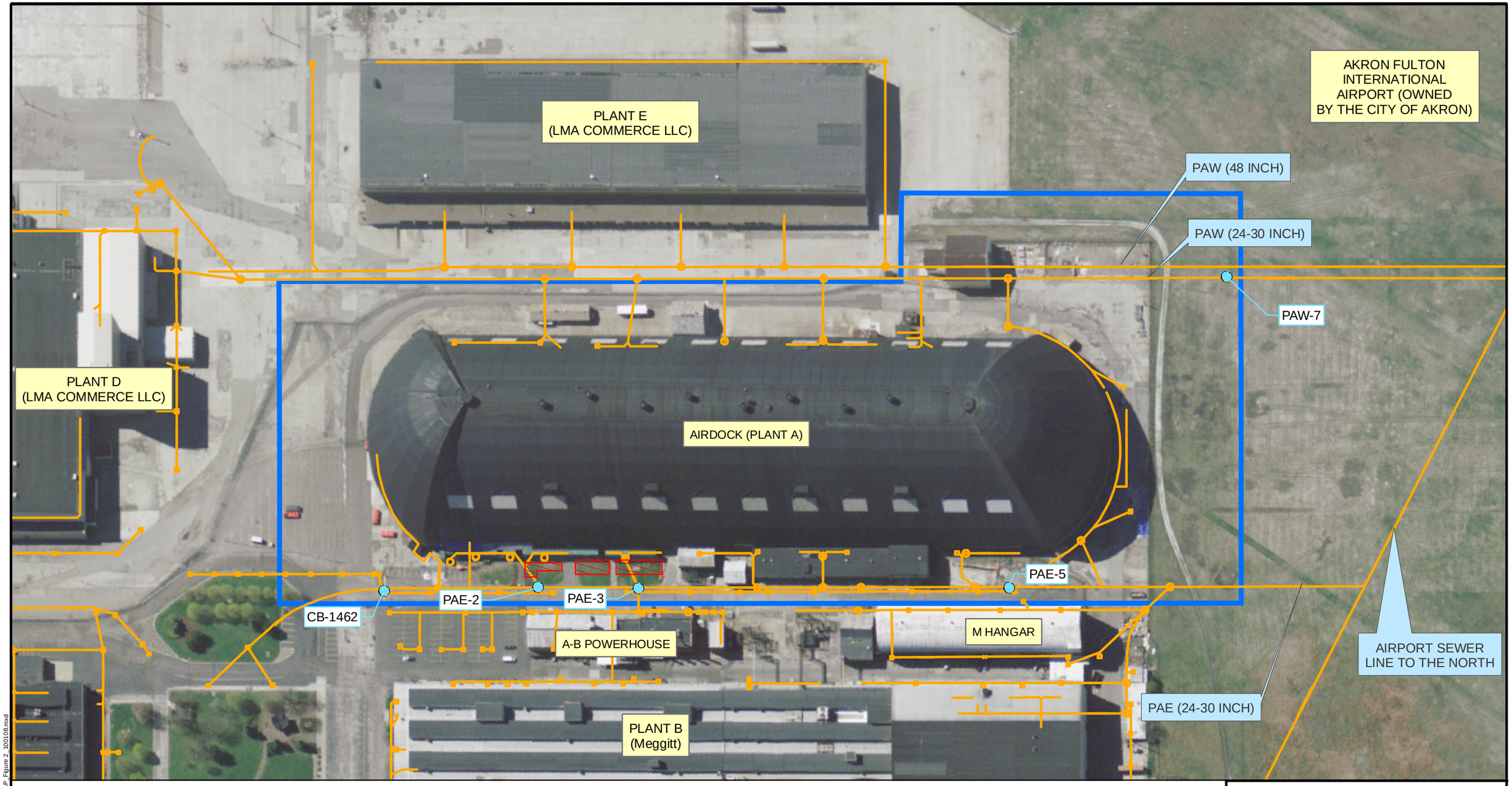

LEGEND

- Proposed Storm Sewer Sampling Location
- Approximate Airdock Boundary
- Location of Southeast Soil Remediation Area
- Storm Sewer
- Drainage Structure (Catch Basin or Manhole)

PAW = Plant A West Storm Sewer Line

PAE = Plant A East Storm Sewer Line

Note: Other branch lines to sewer system may exist.

N

0 75 150 Feet

SOURCES: MODIFIED FROM SUMMIT COUNTY GIS, 2004, OSIP AERIAL PHOTOGRAPH, 2006, AND TETRA TECH, 2007

AKRON AIRDOCK FACILITY
AKRON, OHIO

FIGURE 2
STORM SEWER SYSTEM WITH
FACILITY SAMPLING LOCATIONS

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HALEY'S DITCH

TRIPLETT BOULEVARD

Temporary Outfall 001

U.S. HIGHWAY 224

AIRDOCK

PAW-7

Outfall 601

PAE-5

LEGEND

- Outfall Location
- Voluntary Action Program Stormwater Point of Compliance (POC)
- Approximate Watershed Boundary
- Haley's Ditch
- Storm Sewer
- Approximate Airdock Boundary

Note: Other branch lines to sewer system may exist.

N

0 300 600 Feet

SOURCES: MODIFIED FROM SUMMIT COUNTY GIS, 2004, OSIP AERIAL PHOTOGRAPH, 2006, AND TETRA TECH, 2007

AKRON AIRDOCK FACILITY
AKRON, OHIO

FIGURE 3
STORM SEWER POINTS OF COMPLIANCE AND OUTFALL LOCATIONS

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APPENDICES

APPENDIX A

STORMWATER SAMPLING FORMS

Stormwater Sampling & Analysis Field Form
LOCKHEED MARTIN CORPORATION, AKRON AIRDOCK

DATE_____/_____/_____ START TIME:_____ SAMPLERS_____

WEATHER CONDITIONS:_____

OBSERVATIONS:_____

FIELD INSTRUMENT USED:_____LAST CALIBRATED_____/_____/_____

	PAE-5	CB 1462	PAE-2	PAE-3	PAW-7	OUTFALL 601	TEMP. OUTFALL 001
Time (Military)							
pH							
DO (mg/l)							
Temperature (°C)							
Conductivity (mS/cm)							
TDS (mg/l)							
ORP (mV)							
Turbidity							
Salinity							
TSS	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***
PCBs	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***	***LAB***
Flow Depth in Pipe (inches)							

Stormwater Sampling Field Form

Project: Akron Airdock	**Project Number**:
Client: Lockheed Martin	**Location:** 1210 Massillon Road, Akron, Ohio
Sample ID: _____ **Sample Location** _____: **Sample Medium:** Stormwater	**Personnel**: _____/ **Sample Date:** _____/_____/_____. **Sample Collection Time (ST):** _____

Storm Event and Sampling Point Information

Storm Event Start Time (ST):	**Precipitation at ST: inches/ source of data**
Weather Conditions at ST:	**Ambient Temperature at ST: ºF / source of data**
Storm Event Duration:	**Total Precipitation for Event (include source of data):**
Estimated Sampling Point Discharge Rate: cfs or gpm (circle one)	
Notes regarding flow character (turbulent, laminar, etc.):	

Water Quality Information

Instrument:		pH:		Color:	
Temperature(°F):		Oxidation-Reduction Potential (ORP) (mV):		Odor:	
Specific Conductance (mS/cm):		Total Dissolved Solids (mg/L):		Other:	

Sampling Information

Collection Method (describe):

Sample Container	Preservative	Analysis Required	Method Number	Laboratory
250 ml Plastic	Chilled to 6ºC	Total Suspended Solids	EPA160.2	TestAmerica
2 – 1 Liter Amber Glass	Chilled to 6ºC	Total PCBs (unfiltered)	EPA SW-846 8082 Low Level, VAP	TestAmerica

General Information

Sample Delivery or Shipment Method: _____

Date and Time Samples delivered to lab: _____

Laboratory Information:	TestAmerica Laboratories, Inc. 4101 Shuffle Drive NW North Canton, OH 44720 330-497-9396
Comments:	

URS CORPORATION

APPENDIX B

PAW FLOW ESTIMATE CALCULATION AND WORKSHEET

OBJECTIVE

The objective of these calculations is to provide an estimated full pipe flow value at manhole PAW-7 at the Akron Airdock site. This full flow value will be used by sampling personnel to estimate partial stormwater flow in the pipe at the PAW-7 test point using the attached worksheet.

METHODOLOGY

The calculation is performed by utilizing Manning's semi-empirical pipe flow formula. Partial flow is estimated by graphical method using a hydraulic characteristic graph for circular pipe flow (ratio of depth to diameter versus Q/Q_{full}), based on the theory of open channel flow. Units are BG standard.

ASSUMPTIONS

1. Manning's roughness coefficient "n" for brick ranges from 0.012 to 0.017 (Finnemore and Franzini, "Fluid Mechanics," McGraw-Hill 2002).
2. Manning's roughness coefficient "n" is taken as n=0.017 due to television pipe survey that determined the pipe in question was made of brick and mortar in semi-deteriorated condition.
3. Slope is estimated by dividing the change in vertical elevation between PAW-6 and PAW-7 inverts by the horizontal distance between the inverts.
4. Slope between PAW-6 and PAW-7 is assumed to be constant

CALCULATIONS

$$Q(cfs) = \frac{1.486}{n} A R_h^{2/3} S_0^{1/2}$$ (Manning's Equation)

where

- Q = *Flowrate (cfs)*
- n = *Manning's Roughness Coefficient*
- A = *Cross sectional area (ft^2)*
- R_h = *Hydraulic radius (cross section divided by wetted perimeter)(ft)*
- S_0 = *Pipe slope (ft/ft)*

$$D = 30\,inches = 2.5\ ft$$

$$A = \frac{\pi D^2}{4} = \frac{\pi (2.5)^2}{4} = 4.904\,ft^2$$

$$R_h = \frac{\pi r^2}{2\pi r} = \frac{r}{2} = \frac{D}{4} = \frac{2.5}{4} = 0.625\,ft$$

$$z_2 = 1035.60\,ft, z_1 = 1034.88\,ft, x_2 = 350\,ft, x_1 = 0\,ft$$

$$S_0 = \frac{\Delta z}{\Delta x} = \frac{1035.60 - 1034.88}{350} = \frac{0.72}{350} = 0.002\ ft/ft$$

Thus:

$$Q(cfs) = \frac{1.486}{n} A R_h^{2/3} S_0^{1/2}$$

$$Q(cfs) = \frac{1.486}{0.017}(4.904)(0.625)^{2/3}(0.002)^{1/2}$$

$$Q(cfs) = 14$$

CONCLUSIONS

The full pipe flow at PAW-7 is estimated at Q_{full} = 14 cfs. By using the ratio of measured depth to full diameter (y/D) and a provided hydraulic characteristic graph for circular pipe flow, the ratio of Q/ Q_{full} can be determined with the provided worksheet. Using this ratio, the partial flow in the pipe can subsequently be determined.

PAW Flow Calculation Worksheet

Required Equipment:

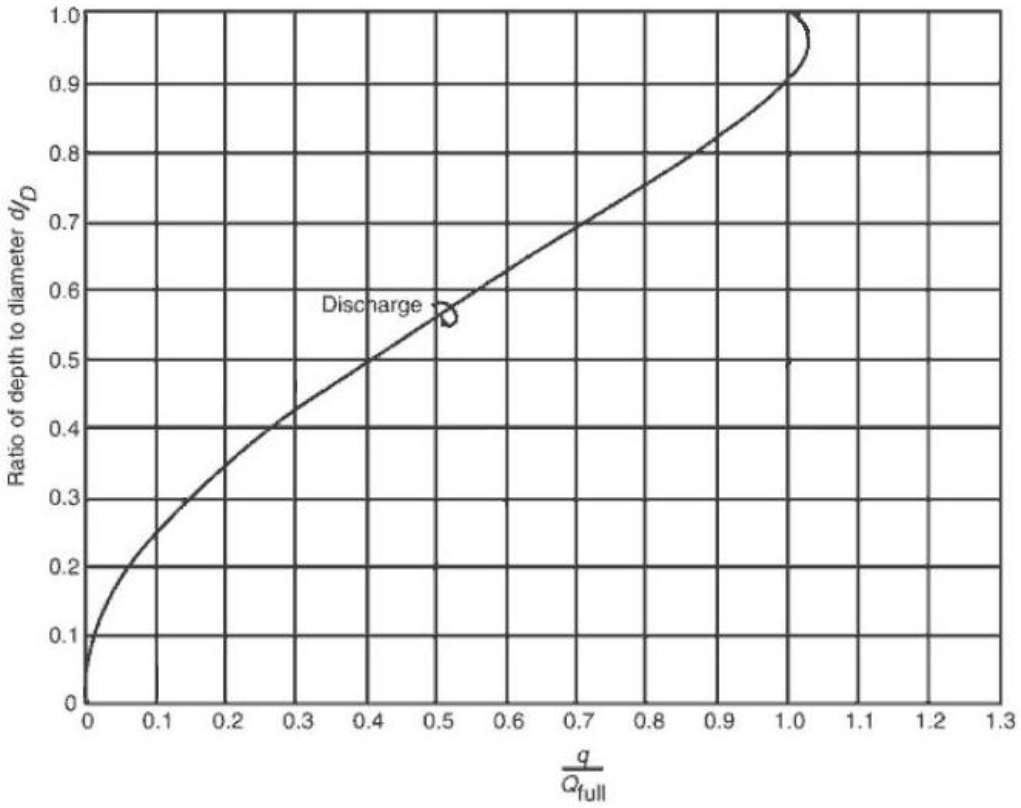
- **Staff Gauge / Water Depth Measurement Device**
- **Calculator**

Method:

(A) Record Water Depth Reading (in inches): ☐

(B) Divide Depth Reading **(A)** by 30 inches: ☐ ÷ 30 = ☐

(C) Use value found in **(B)** on the vertical axis of the chart below. Read horizontally across the chart from left to right until you reach the discharge line, then read vertically down to the proportion full flow value. Record that number here:



(D) Multiply value found in **(C)** by 14cfs: ☐ x 14 = ☐ Result is in cubic feet per second (cfs)

(E) Record discharge result **(D)** on Sampling Field Form

APPENDIX C

PAE FLOW ESTIMATE CALCULATION AND WORKSHEET

OBJECTIVE

The objective of these calculations is to provide an estimated full pipe flow value at manhole PAE-5 (ST 5463) at the Akron Airdock site. This full flow value will be used by sampling personnel to estimate partial stormwater flow in the pipe at the PAE-5 test point using the attached worksheet.

METHODOLOGY

The calculation is performed by utilizing Manning's semi-empirical pipe flow formula. Partial flow is estimated by graphical method using a hydraulic characteristic graph for circular pipe flow (ratio of depth to diameter versus Q/Q_{full}), based on the theory of open channel flow. Units are BG standard.

ASSUMPTIONS

1. Manning's roughness coefficient "n" for brick ranges from 0.012 to 0.017 (Finnemore and Franzini, "Fluid Mechanics", McGraw-Hill 2002).
2. Manning's roughness coefficient "n" is taken as n=0.017 due to television pipe survey that determined the pipe in question was made of brick and mortar in semi-deteriorated condition
3. Slope is estimated by dividing the change in vertical elevation between PAE-4 and PAE-5 inverts by the horizontal distance between the inverts.
4. Slope between PAE-4 and PAE-5 is assumed to be constant.

CALCULATIONS

$$Q(cfs) = \frac{1.486}{n} A R_h^{2/3} S_0^{1/2}$$ (Manning's Equation)

where Q = *Flowrate (cfs)*
n = *Manning's Roughness Coefficient*
A = *Cross sectional area (ft^2)*
R_h = *Hydraulic radius (cross section divided by wetted perimeter)(ft)*
S_0 = *Pipe slope (ft/ft)*

$D = 30\,inches = 2.5\ ft$

$$A = \frac{\pi D^2}{4} = \frac{\pi (2.5)^2}{4} = 4.904\ ft^2$$

$$R_h = \frac{\pi r^2}{2\pi r} = \frac{r}{2} = \frac{D}{4} = \frac{2.5}{4} = 0.625\ ft$$

$z_2 = 1036.1\ ft, z_1 = 1035.8\ ft, x_2 = 247\ ft, x_1 = 0\ ft$

$$S_0 = \frac{\Delta z}{\Delta x} = \frac{1036.1 - 1035.8}{247} = \frac{0.3}{247} = 0.001\ ft/ft$$

Thus:

$$Q(cfs) = \frac{1.486}{n} A R_h^{2/3} S_0^{1/2}$$

$$Q(cfs) = \frac{1.486}{0.017}(4.904)(0.625)^{2/3}(0.001)^{1/2}$$

$$Q(cfs) = 10$$

CONCLUSIONS

The full pipe flow at PAE-5 is estimated at Q_{full} = 10 cfs. By using the ratio of measured depth to full diameter (y/D) and a provided hydraulic characteristic graph for circular pipe flow, the ratio of Q/ Q_{full} can be determined with the provided worksheet. Using this ratio, the partial flow in the pipe can subsequently be determined.

PAE Flow Calculation Worksheet

Required Equipment:

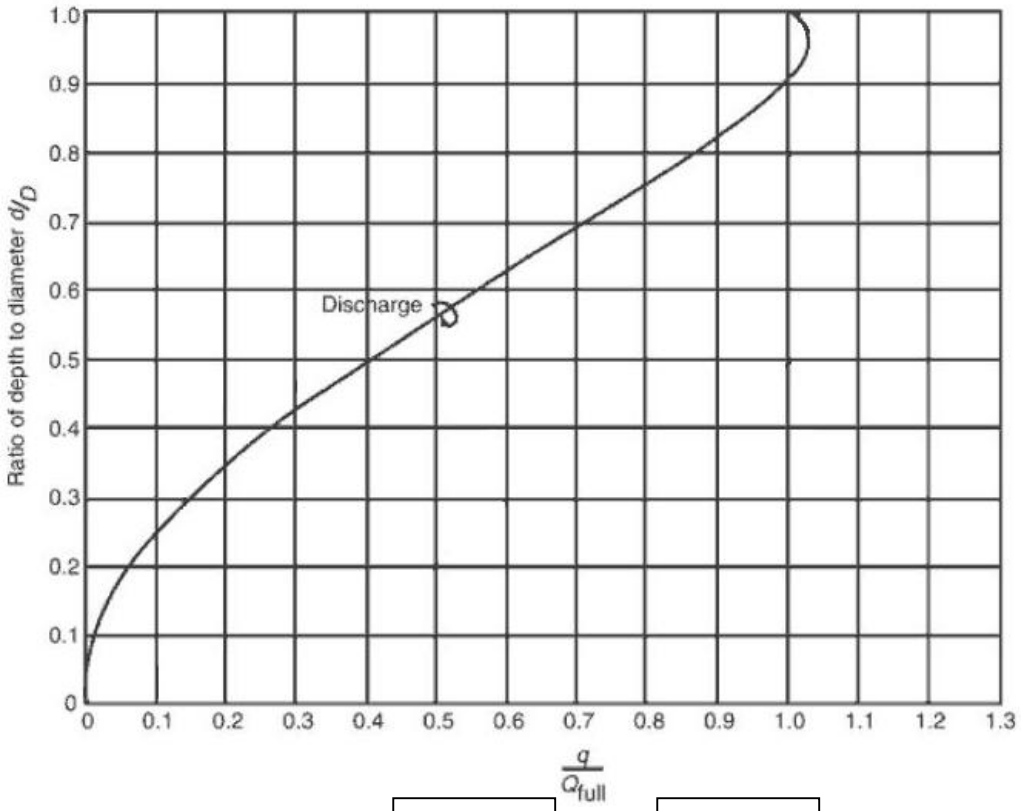
- **Staff Gauge / Water Depth Measurement Device**
- **Calculator**

Method:

(F) Record Water Depth Reading (in inches): ____

(G) Divide Depth Reading **(A)** by 30 inches: ____ ÷ 30 = ____

(H) Use value found in **(B)** on the vertical axis of the chart below. Read horizontally across the chart from left to right until you reach the discharge line, then read vertically down to the proportion full flow value. Record that number here:



(I) Multiply value found in **(C)** by 10cfs: ____ x 10 = ____ Result is in cubic feet per second (cfs)

(J) Record discharge result **(D)** on Sampling Field Form