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November 10, 2011

Ms. Tara M. Blum, P.E.
NYSDEC Region 7
Division of Environmental Remediation
615 Erie Boulevard
West Syracuse, New York 13204-2400

Re: Carrier Corporation, Thompson Road Facility, Syracuse, New York
Corrective Action Order — Index CO 7-20051118-4
Transformer Yard Storm Line Investigation Work Plan (Rev 1), November 2011

Dear Ms. Blum:

In accordance with the above-referenced order, Carrier Corporation is providing one hard copy and one electronic copy of the referenced Work Plan. The electronic copy can be found in PDF format on the CD inside front cover of the attached report. Per email correspondence from your department on September 12, 2011, and follow-up e-mail on October 25, 2011, a hard copy and an electronic copy of this report will be submitted (via US Mail) to the New York State Department of Health contact, Mr. Steven Bates, with the Bureau of Environmental Exposure Investigation.

Please call me at (615) 255-9300 if you have any questions.

Sincerely,

EnSafe Inc.

By: May Heflin, PE

Encl. Transformer Yard Storm Line Investigation Work Plan (Rev 1), November 2011

cc: (hard copy and electronic copy):
Mr. Steven Bates — New York State Department of Health

cc: (electronic copy only):
Mr. William Penn — United Technologies Corporation
Mr. Nelson Wong — Carrier Corporation

TRANSFORMER YARD STORM LINE INVESTIGATION

UNITED TECHNOLOGIES/CARRIER
THOMPSON ROAD FACILITY
SYRACUSE, NEW YORK

EnSafe Project Number
0888809186

Revision No.: 1

Prepared for:

United Technologies Corporation
UTC Shared Remediation Services
United Technologies Building
Hartford, Connecticut 06010

Prepared by:

EnSafe Inc.
220 Athens Way, Suite 410
Nashville, Tennessee 37228
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November 2011

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November 2011

Prepared By:	**Reviewed By:**
May M. Heflin, PE	Tammy Keim, PG
November 10, 2011	November 10, 2011
Date	Date

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EXECUTIVE SUMMARY

Carrier Corporation, a wholly-owned subsidiary of United Technologies Corporation, is currently working through Corrective Action Order — Index CO 7-20051118-4 (order) dated February 13, 2006, with the New York State Department of Environmental Conservation Division of Solid and Hazardous Materials (NYSDEC-DSHM), to identify potential sources of polychlorinated biphenyls (PCBs) in storm water effluent at Outfall 002 at Carrier's Thompson Road, Syracuse, New York facility.

Carrier submitted a *Phase 2 PCB Source Investigation Work Plan* (work plan) to NYSDEC-DSHM on February 24, 2010, based on comments received on the *Potential PCB Sources Report* (Carrier, 2009). Dialogue with NYSDEC-DSHM since February 2010 regarding the proposed strategy for investigation, as described in the above-referenced work plan, has included the following:

- NYSDEC-DSHM, in correspondence dated April 30, 2010, commented on the work plan with requests for additional and more extensive investigations.

- Subsequent to the NYSDEC-DSHM April 30, 2010 correspondence, Carrier representatives met with NYSDEC Region 7 representatives on May 12, 2010, to discuss an overall approach for controlling storm water discharges at the Carrier facility. This approach included a combination of treatment, storage, and diversion to meet the 25-year, 24-hour storm event for the 002 outfall basin at the facility.

- Following the May 12 meeting with the NYSDEC, in which Carrier committed to compliance with the 25-year, 24-hour storm water event, Carrier met with NYSDEC representatives to discuss the April 30 comments, and how the work plan would be reevaluated in consideration of the storm water management commitment.

This work plan reflects the meetings and discussions that have occurred over the last year and describes Carrier's approach for continued PCB source investigations at the site, focusing on the areas with the greatest potential of being significant ongoing PCB sources.

Because the investigations will occur in several areas of the campus, a work plan has been prepared separately for each. The three work plans included are:

- ***PCB Investigation — Sub-Slab PCB Investigation in Building TR-1*** — this work plan has been implemented, the investigation completed, and an investigation report submitted to NYSDEC in October 2011. While PCBs were detected at limited locations in soil and/or groundwater under the sub-slab of Building TR-1, the findings support Carrier's conceptual site model that PCBs in sediments along the Thompson Road storm sewer originate from historical releases at the Transformer Yard.

- ***PCB Investigation — Thompson Road & TR-18 Storm Line Bedding Material Excavations*** — a work plan (Rev 0) was originally submitted to NYSDEC in October 2010, with verbal comments made by Mr. Larry Rosenmann in two telephone conversations in December 2010, and written comments sent via e-mail on December 15, 2010. A revised work plan (Rev 1) was submitted to NYSDEC in June 2011, and addressed Mr. Rosenmann's comments. On September 15, 2011, another telephone conference between NYSDEC, UTC, and EnSafe (UTC's consultant) representatives was held to discuss the departments' comments on the June 2011 work plan revision (Rev 1). Their comments will be addressed in a revised work plan (Rev 2) to be submitted to NYSDEC in November 2011.

- ***PCB Investigation — Transformer Yard Storm Line Excavation at Manhole 116 (sludge area)*** — the work plan that follows describes the proposed investigation activities at the Transformer Yard manhole and storm line. The work plan addresses comments made during a telephone conference between NYSDEC and UTC and EnSafe representatives on September 15, 2011, to discuss the departments' comments on the original submittal of the work plan in June 2011.

1.0 BACKGROUND

In the fall of 2009, Carrier developed a conceptual site model (CSM) for the transformer yard area that evaluated likely pathways for polychlorinated biphenyls (PCBs) to enter the storm sewer system. The CSM was presented in the *Potential PCB Source Work Plan (Carrier, 2009),* and the findings of the investigation were presented in *Potential PCB Source Investigation Report (Carrier, 2009).* Based on the findings of this investigation, Carrier believes that the source and transport of PCBs through the storm water system is primarily associated with historic PCB releases to it; sediments that have accumulated in the storm lines contain PCBs and erode and migrate during precipitation events.

- Carrier proposes to obtain a sample of the accumulated sediments (previously called "accumulated sludge" in the above-referenced report [Carrier, 2009]) observed in a section of the storm line during the October 2009 field investigations to determine further characterize the nature of this material.

New York State Department of Environmental Conservation (NYSDEC) hypothesizes that there is a PCB source external to the storm line that continually contributes PCBs (through deteriorated sections of the line [e.g., manhole MH-116A]) to storm line storm water and sediments. If such a source exists, the NYSDEC proposes that it also would be possible for PCB contaminated groundwater and sediments to migrate along the bedding material of the storm line before entering Sanders Creek.

- Carrier proposes to investigate the potential for a continuing PCB contribution to the storm line by excavating a 20-foot long by 1-foot wide trench beside (parallel to) the transformer yard area storm line from MH-116A east toward Building TR-11.

- Carrier will also replace Manhole 116A (MH-116A) in this area, which was observed to be deteriorating during the October 2009 investigation (*Potential PCB Source Investigation Report,* [Carrier, 2009]). This manhole will be replaced to minimize the lateral migration of contaminated sediments in and/or out of it.

1.1 Field Investigation Objectives

Figure 1-1 – Proposed Transformer Yard Storm Line Investigation, shows the section of storm line proposed for investigation. The investigation will focus on two areas along an approximately 20-foot section of storm line in the transformer yard area: inside the storm line (i.e., at the "accumulated sludge" area) and the other is outside the storm line (i.e., the 20 feet of bedding material underlying the storm line) between MH-116A and the "accumulated sludge" area.

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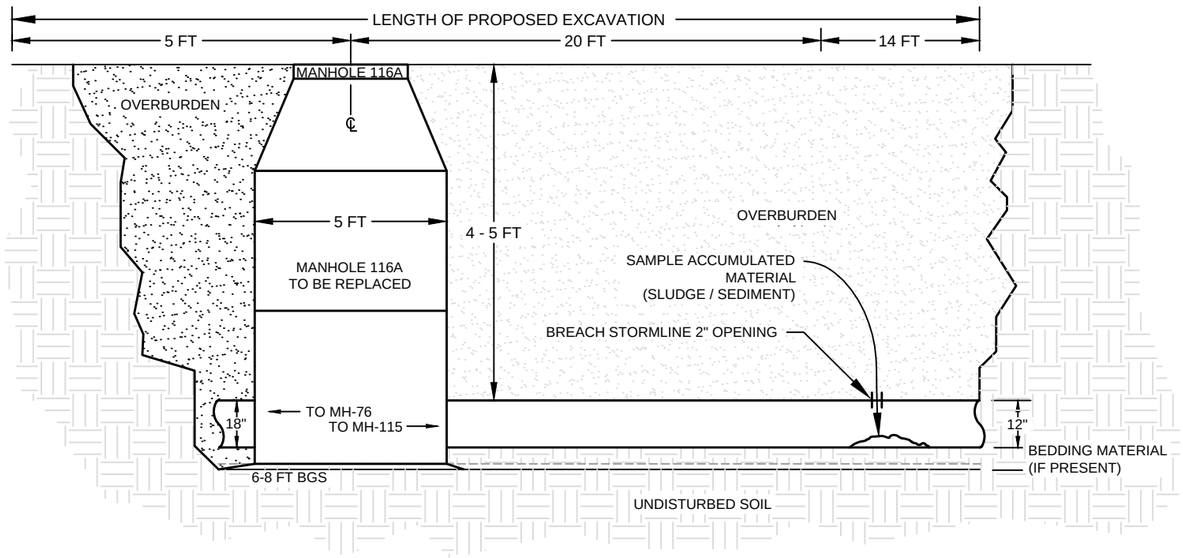
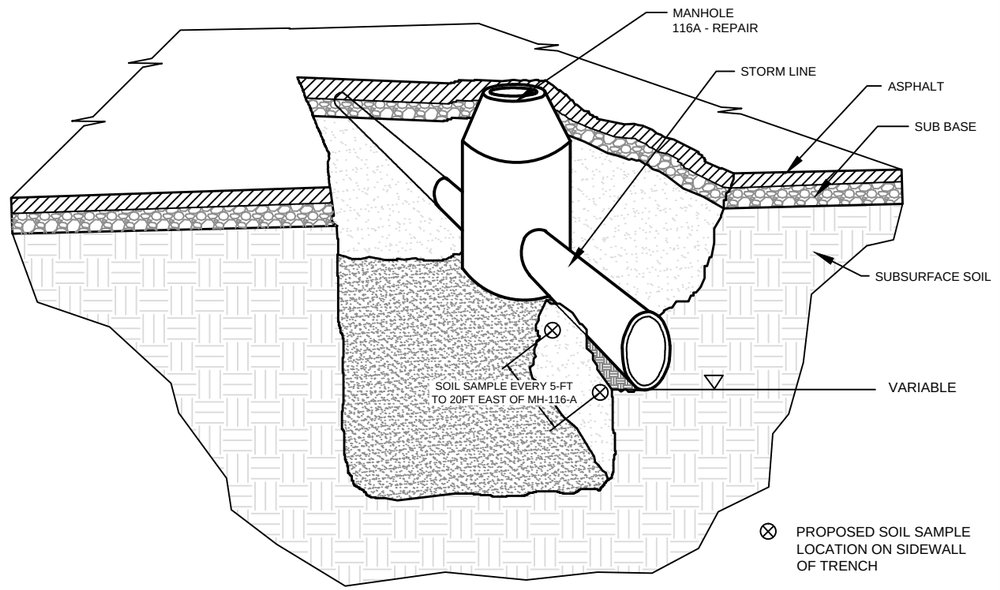
INSET A



CROSS SECTION (TYPICAL)

INSET B



TRENCH EXCAVATION (TYPICAL)

GRAPHIC SCALE
0 20 40 30
(IN FEET)
1 inch = 20 ft.

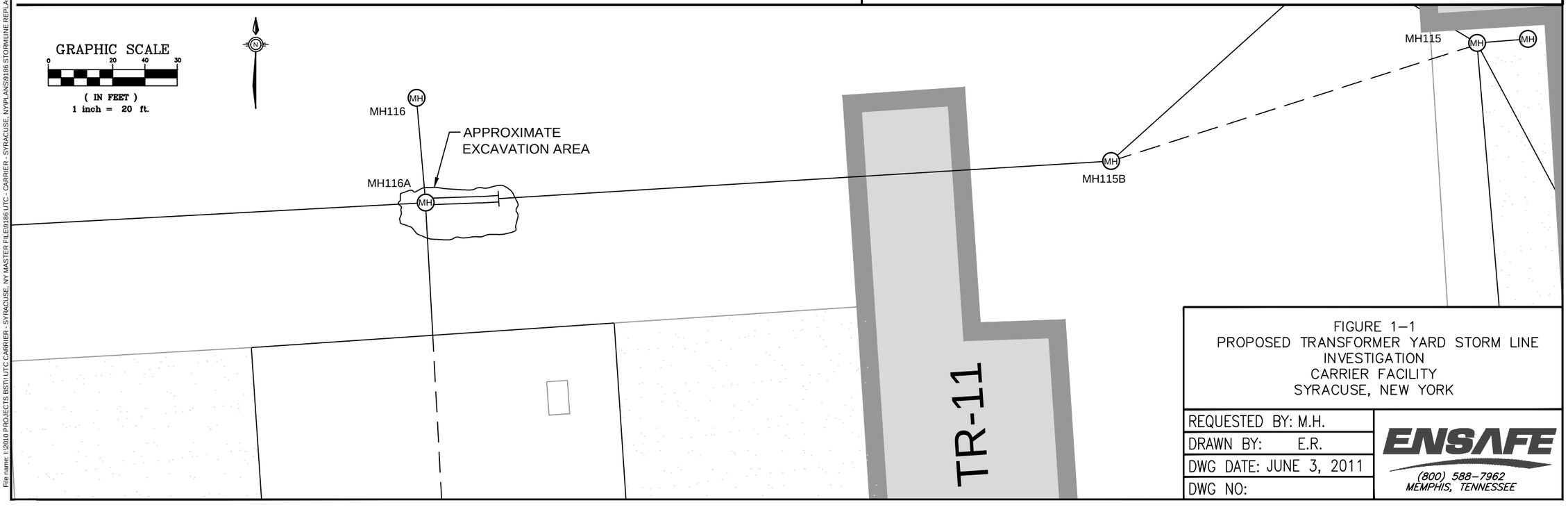


FIGURE 1–1
PROPOSED TRANSFORMER YARD STORM LINE
INVESTIGATION
CARRIER FACILITY
SYRACUSE, NEW YORK

REQUESTED BY: M.H.	
DRAWN BY: E.R.	
DWG DATE: JUNE 3, 2011	
DWG NO:	

ENSAFE
(800) 588-7962
MEMPHIS, TENNESSEE

File name: I:\2010 PROJECTS BST\UTC CARRIER - SYRACUSE, NY\ MASTER FILE\9186 UTC - CARRIER - SYRACUSE, NY\PLANS\9186 STORMLINE REPLACE AND REPAIR.DWG Plotted By: WADE MAREK Plot Date: 6/3/2011 11:47:04 AM

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The primary objectives of this work plan and subsequent field activities are to:

1. **Further characterize the nature of the accumulated "sludge" material identified during video inspection of the storm line.** As part of the October 2009 investigation/field activities, the storm lines in the transformer yard area were inspected using a video camera. Prior to video inspection, the lines were pressure washed to provide better visual inspection with the video camera. MH-116A, just north of the transformer yard, and other storm line sections to the east and west were difficult to assess due to a moderate amount of deterioration of the manhole and from buildup of sediment and debris in portions of the line that prevented the video camera from progressing further down the storm line. Inspection of the east-west storm line entering MH-116A was terminated approximately 14-feet east of the manhole due to the "accumulation of sludge" in this part of the line, as described by the subcontractor performing the video work — New York Leak Detection (NYLD). A review of the video footage of this section of the line shows there to be an accumulation of sediment, not sludge as described by NYLD, as it does not appear to be a viscous, flowable substance. Additionally, the storm line appears to be in good shape (not deteriorated), therefore it will not be replaced. The electronic video has been previously submitted to NYSDEC as part of the PCB Sources Report, Carrier 2009.

2. **Determine if there is an external (to storm line) PCB source [PCB-containing NAPL] that is migrating along the storm line and ultimately discharging to Sanders Creek.** NYSDEC hypothesizes that historic activities in the transformer yard area may have resulted in a significant release of NAPL to the surrounding soils and groundwater and that NAPL may be migrating along the bedding material of the storm line to Sanders Creek.

3. **Repair or replace manhole MH-116A.** A third objective proposed in the initial submittal of this work plan to NYSDEC and that was completed while the work plan was under review, was the replacement of MH-116A. This manhole was replaced as part of Pond #1 construction activities related to the campus-wide storm water management program at Carrier and as proposed in *Retention Pond #1, Engineering Plans and Technical Specifications, (*December 4, 2010), previously submitted to Ms. Sandy Lizlovs of NYSDEC. Historic video footage of the storm line between MH-116A and Building TR-11 showed the reinforced concrete pipe to be in good condition, but the manhole (MH-116A) was in poor condition. The manhole along with the storm line piping to west toward MH77 was replaced in order to capture storm water flow and divert it to Pond #1, where it is ultimately

routed to and treated at the PCB water treatment facility on the north end of the site. No indications of NAPL were noted in the bedding material underlying this section of storm line during construction activities, nor were there any visible or olfactory signs of contamination noted.

2.0 TECHNICAL APPROACH TO ACHIEVING OBJECTIVES

2.1 Objective 1 — Sample "Accumulated Sludge" Storm Line Section

Carrier will determine if the accumulated material as described in NYLDs 2009 video report is sludge or rather accumulated sediments, similar to those found in many areas of the storm lines throughout the site. Carrier will sample the sediments to further characterize the nature of the accumulated material. The first objective of the proposed field investigations will be accomplished by following the steps listed below:

1. Open newly replaced manhole MH-116A and evaluate the approximate direction of the piping using visual reference.

2. Mark the centerline of the pipe from manhole MH-116A approximately 20 feet to the east (about 5 feet beyond the expected location of the sludge build-up). Mark a secondary line on a 20-foot offset of original line to allow for the loss of the initial line during excavation activities.

3. For the area to be excavated, saw-cut the asphalt remove and load it for offsite disposal as construction-demolition debris.

4. Excavate an approximately 20-foot trench adjacent and parallel to the storm line piping east of manhole MH-116A — i.e., toward that section that appears to contain sludge build-up (Figure 1-1, Inset A). This excavation will provide access to the storm line in the area of the accumulated sediments.

5. Use a backhoe loader or tracked excavator to remove soils above and alongside of the 20-foot section of storm line. It may be necessary to bench (remove) overburden soils above the pipe to prevent excessive pressure on the manhole structure and potential bank failure.

6. Excavate a trench (test pit) the width of the backhoe bucket (approximately 1 to 2 feet) to a minimum depth of 1 foot below the storm line so that the bottom of the trench immediately adjacent to the storm line (this material should represent the bedding material) can be exposed. The width of the trench near the accumulated sediment location (approximately 14 feet east of MH-116A) may be widened in order to allow personnel to access piping to accomplish tasks listed below. Confined-spaced entry health and safety procedures will be implemented in accordance with Carrier and EnSafe health and safety procedures.

7. Create a 2-inch diameter opening in the top of the pipe using a concrete coring machine approximately 14 feet east of MH-116A.

8. Use a stainless steel spoon or other similar sampling device to obtain a sample of the accumulated material described by NYLD. Site personnel may have to enter the trench in order to obtain this sample. The sample will be submitted to Accutest Laboratories in Dayton, New Jersey (New York Certification 11791), for Total PCB analysis using U.S. Environmental Protection Agency (USEPA) Method 8082. The turn-around-time (TAT) on the sample sent to the lab will be expedited to minimize the length of time the trench and pipe are left open.

9. Place an overpatch on the hole using a standard 12-inch Fernco coupling specific for reinforced concrete pipe. Site personnel may have to enter the trench in order to place the overpatch on the cored hole.

Based on historic sediment sampling data from manholes along this section of storm line, it is expected that PCBs will be detected in the accumulated material proposed for sampling. Such detections will not warrant further investigative actions because the proposed 25-year, 24-hr storm event storage (specifically Pond #1), and subsequent treatment at the PCB Treatment Facility (currently operational), will effectively capture PCB-impacted storm water and sediments and prevent off-site migration. Carrier is sampling this material to further characterize the nature of sediments for further decision making regarding storm water management. Carrier will evaluate this collection, storage, and treatment system for managing the PCB-containing sediments as part of a comprehensive (focused) Corrective Measures Study (CMS).

2.2 Objective 2 — Storm Line Bedding Material Investigation

Once the accumulated sediments are sampled, Carrier will focus field activities on the second objective described above — the bedding material investigation. After the overpatch is placed on the pipe opening, the bedding material investigation will be implemented following the steps outlined below (essentially picking up with step (6) above):

1. Excavate a trench (test pit) the width of the backhoe bucket to a depth 1 foot below the storm line so that the bottom of the trench immediately adjacent to the storm line (this material should represent the bedding material) can be exposed and soil samples obtained. It is possible that groundwater will be encountered above the invert elevation of the pipe. In this case, the trench depth will extend 1 foot below the groundwater table.

The trench will be left open for 24 hours so that groundwater can equilibrate in the trench and observed for a visible sheen or accumulation of NAPL. The final depth of the trench, in this case, may not be below the invert elevation of the piping. Soil below the groundwater table will not be sampled. No soil samples are proposed above the invert elevation of the piping.

2. The excavation will be close enough to the storm line to expose the side of the line without undercutting it (i.e. the structural integrity of the line will not be compromised by removing the supporting underlying soils). The compressive overburden above the piping will be removed for the length of the excavation (Figure 1-1, Inset B).

3. Obtain soil samples on 5-foot centers between MH-116A and the end of trench excavation, with up to five soil samples proposed, initially. The samples will be collected from the storm line sidewall of the trench under the storm line (i.e. bedding material). Soil samples will be submitted to Accutest Laboratories in Dayton, New Jersey (New York Certification 11791), for Total PCB analysis using USEPA Method 8082. The TAT on samples sent to the lab will be expedited to minimize the length of time the trench is left open.

   Carrier will initially use a threshold of PCB detections in soil > 25 parts per million (ppm) as the basis for expanding field investigations beyond the location cited in this work plan. This concentration represents the industrial soil cleanup objective for PCBs listed in Table 375-6.8(b): Restricted Use Soil Cleanup Objectives of the New York State Department of Environmental Conservation (NYSDEC) Subpart 375-6: Remedial Program Soil Cleanup Objectives. Carrier will provide preliminary data from the investigation to NYSDEC as it is received so that the extent of further investigation, if required, can be determined while field crews are mobilized.

4. Once the soil samples have been obtained, continue excavation to a depth until the groundwater table is reached (expected at 6 to 8 feet bgs). The trench will be left open for 24 hours so that groundwater can equilibrate in the trench and observed for a visible sheen or accumulation of NAPL.

5. Stockpile overburden soils (those above the storm line) on the ground surface close to the excavation area. Soils at or below the top of storm line will be stockpiled on polyethylene sheeting (minimum thickness of 6 millimeters) adjacent to the excavation area. Overburden soils may be used to backfill the trench. Any open excavations will be stabilized to prevent sloughing and any remaining stockpiled soils will be covered with polyethylene sheeting.

6. Stockpile soils excavated at or below the storm line separately on the ground surface close to the excavation area. Soils will be stockpiled on polyethylene sheeting (minimum thickness of 6 millimeters) adjacent to the excavation area.

7. Backfill the excavation with excavated soils at or below the storm line if PCB concentrations in bedding material soil samples are < 25 ppm. Low compressive flowable fill may be used to replace any bedding material that sloughs into the excavation. If PCB concentrations in bedding material soil samples are > 25 ppm, the excavation will be backfilled with clean soils/stone. The overburden soils will be used to complete the backfill. PCB-containing soils not used for backfill will be disposed of in accordance with applicable regulations.

   In the event that groundwater is encountered above the invert elevation of the pipe and soil is not sampled from the bedding material or the trench, then the stockpiled soils will be sampled and analyzed for Total PCBs using Method 8082. Stockpiled soils will be sampled at a rate of one composite sample per 200 cubic yards. Three to five discrete samples from different locations in the stockpile will comprise a composite sample for analysis. As mentioned above, if the stockpiled soils contain PCBs > 25 ppm, then clean soils/stone will be used to fill the excavation. All soils containing PCBs > 25 ppm will be disposed of in accordance with applicable regulations.

8. Replace cut with 4-inch base material and 2-inch topcoat following completion of excavation and backfill activities.

Decision Framework

Tables 2-1 and 2-2 summarize some of the actions that may occur in the field for some of the primary possible outcomes. Not all potential findings and paths forward can be summarized in this work plan, and some work stoppage may be necessary to discuss findings with NYSDEC prior to continuing field investigations.

Table 2-1
Paths Forward Based on Soil Sampling Laboratory Analysis

1.	If PCBs are found in soils at concentrations <25 ppm, no further investigative actions are warranted. In this case, Carrier will propose a deed notice, environmental easement, or other mechanism to restrict future use of this area, as necessary.
2.	If PCBs in soils are found at concentrations >25 ppm, then Carrier will conduct further investigation as necessary to define extent of PCB impact. Trenching will not be used to expand the investigation. Instead, Carrier will use a direct push technology (DPT) rig to advance soil borings along the storm line at 10-foot intervals. The borings will be advanced to approximately 1-foot below the storm line invert elevation or just above the groundwater table, whichever is shallower. The direction of the investigation (i.e. up the storm line and/or down the storm line) will be determined by the soil samples obtained from the trench. Carrier will communicate with NYSDEC as analytical data is received so that changes in investigation approach, if necessary, can be discussed. Upon completion of these investigation activities, Carrier will evaluate remedial options and make a recommendation on managing the PCB-containing soils as part of a focused CMS.
3.	If groundwater is encountered above the piping invert elevation, the soil sampling protocol on either side of the manhole will not be implemented. Instead, sampling will focus immediately on groundwater. A groundwater sample will be obtained and submitted to the laboratory for Volatile Organic Compound (VOC) analysis using USEPA Method 8260b and Total PCB analysis using USEPA Method 8082.

Table 2-2
Paths Forward Based on Trench Water Sampling

1.	After groundwater has accumulated in the excavation, if the soil excavation sample results are <25 ppm for PCBs, a water sample will not be collected, unless upon visual inspection, a visible sheen or free-product are noted, in which case the water will be sampled and submitted to the laboratory for VOC and Total PCB analysis. If possible, a sample of free-product will be obtained for fingerprint analysis.
2.	After groundwater has accumulated in the excavation, if the soil excavation sample results are >25 ppm for PCBs, then a water sample will be collected and submitted to the laboratory for Total PCB and VOC analysis.
3.	If PCBs are detected in any water sample, the lab will be instructed to filter the sample through a 40-micron filter and re-analyze for dissolved PCBs.
4.	If laboratory analysis indicates PCBs or VOCs in groundwater, the excavation will be backfilled and no further actions will be taken as the facility currently operates an end-of-pipe air stripper that removes VOCs prior to discharge to Sanders Creek. Carrier also operates an end-of-pipe PCB treatment system that removes PCBs prior to discharge. Outfalls 001 and 002 also have a barrier wall and recovery well system that collects groundwater in the bedding material and discharges it back to the storm line system upgradient of both treatment systems. Further discussion on the potential migration of PCBs in bedding material groundwater (if found) and possible corrective actions will be presented in the report of findings.
5.	If laboratory analysis indicates VOC or PCB-related NAPL, then Carrier will conduct further investigation as necessary to define extent of impact. This investigation will not occur during this mobilization, but after existing data and historical information can be reviewed and an appropriate investigation plan can be developed. Upon completion of these investigation activities, Carrier will evaluate remedial options and make a recommendation on managing the PCB-containing soils as part of a focused CMS.

2.3 Objective 3 — Proposed Manhole Repair

Manhole MH-116A is approximately 5 feet deep with a 12-inch line entering the manhole from the east and a 12-inch line entering from the north (MH-116) and south (Transformer Yard). During the 2009 field activities mentioned above, it was observed to be in poor condition, with bricks used in the original construction of the manhole collapsed into the manhole sump and partially blocking flow in and out of the manhole. A composite sediment sample from manholes MH-116A, MH-116, MH-77, and MH-7A (obtained in October 2009) detected Aroclor 1260 at 67.8 milligrams per kilogram. PCB-containing sediments in this manhole may be migrating from the eastern section of line that flows into the manhole.

In the initial submittal of this work plan to NYSDEC in June 2011, Carrier proposed to replace MH-116A. The replacement of MH-116A was completed while the work plan was under review by NYSDEC as part of Pond #1 construction activities related to the campus-wide storm water management program at Carrier and as proposed in *Retention Pond #1, Engineering Plans and Technical Specifications, December 4, 2010*. The manhole along with the storm line piping to west toward MH77 was replaced in order to capture storm water flow and divert it to Pond #1, where it is ultimately routed to and treated at the PCB water treatment facility on the north end of the site. No signs of NAPL were noted in the bedding material underlying this section of storm line during construction activities, nor were any visible or olfactory signs of contamination noted. Appendix A — Pond #1 Engineering Plan View shows the location of the Pond #1 and the storm line section and manhole that were replaced. Pond construction was completed in August 2011.

3.0 SOIL SAMPLING TECHNIQUES

Grab Samples from Trench Excavation

A stainless steel hand auger with 5 to 8 feet of extension rod will be used to obtain soil samples from the bottom and/or sidewall of the excavation trench. This method will allow for safe sample collection from the ground surface. The hand auger will be extended to the target sample area and used to collect the sample of the bedding materials. Soil samples will be submitted to Accutest Laboratories for Total PCB analysis using USEPA Method 8082.

The hand auger will be decontaminated with a deionized water and Alconox mixture and rinsed with deionized water.

DPT Soil Sampling

If necessary, a DPT drilling rig will be employed to conduct the expanded subsurface investigation along the storm line. At each location along the storm line, the asphalt pavement will be cored using an asphalt-coring machine to provide an access point for the rig. Once coring is complete, the DPT drilling rig will advance steel rods containing acetate sleeves that will allow collection of the soil column encountered. The DPT rig is a hydraulically powered soil-probing machine that uses static force and percussion to advance small diameter sampling tools into the subsurface for collecting soil core and groundwater samples. A closed-piston sampling tool with plastic liner will be used for soil sample collection. From the ground surface, the sampler is advanced 48 or 60 inches (depending on the sampling tool length) and retrieved from the borehole with the first sample. The plastic sleeve and soil core are removed, a new sleeve is installed, and the sampler is inserted back down the same hole to collect a sample from the next interval.

Soil and Headspace Logging — DPT Sampling

The soil column will be evaluated at 2-foot intervals and split for description purposes and field screening using a photoionization detector. After the soil has been in the sealable plastic bag or glass jar for a sufficient amount of time, the volatile organic vapor concentration will be measured from the headspace of each bag or jar. The concentrations will be recorded in the field logbook or on soil boring logs for each boring. Descriptions of the soils encountered will also be placed on soil boring logs and/or recorded in the field logbook.

Only the bottom-most soil sample from the soil column (at approximately 0 to 1 foot below bedding material) will submitted to the laboratory for Total PCB analysis

Trench Groundwater Sampling

If soil sampling data and/or visual observation of accumulated groundwater indicate the need for grab sample from the trench (see Table 2-2 for explanation of sampling decision), a sample will be obtained using a polypropylene disposable bailer or peristaltic pump and transferred to a sample bottle. Otherwise, groundwater sampling via temporary or permanent groundwater monitoring wells is not proposed as part of this storm line bedding material investigation.

Samples will be submitted to Accutest Laboratories for Total PCBs and for VOCs using USEPA Method 8082 and 8260B, respectively.

4.0 HEALTH AND SAFETY PLAN

All field activities will be conducted in compliance with the site-specific health and safety plan, to be prepared prior to conducting activities outlined in this work plan. The health and safety plan will be prepared by EnSafe specifically for the activities described herein.

Investigation derived wastes generated during the field activities will be placed in Department of Transportation-approved drums, logged, properly labeled, and stored on the site. Analytical data from the investigation will be used for characterization, as practicable.

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5.0 IMPLEMENTATION SCHEDULE

Carrier will determine if the Transformer Yard storm line investigation activities outlined in this work plan can be safely performed this fall, otherwise filed work will be performed in spring, most likely mid-April.

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Appendix A
Pond #1 — Engineering Plan View

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

Retention Pond #1 — Basis for Design
The tributary drainage area is the portion of the 002 Drainage Basin upgradient of MH76A and encompasses 7.2 acres, composed of the following ground covers:

Ground Cover Type	Area	CN
Roofs and pavement	4.1 Acres	98
Grass (good condition)	2.8 Acres	74
Gravel	0.3 Acres	89

The weighted average curve number (CN) is 88.

The pond is designed to retain the runoff from the 25-year, 24-hour storm while releasing water through an outlet control device that will limit the peak discharge rate to approximately 110 gallons per minute.

In Syracuse, the 25-year, 24-hour storm event has a rainfall depth of 4.5 inches. With an average CN of 88, this subarea would have a runoff depth of 3.2 inches and a total runoff volume of approximately 625,000 gallons.

Allowing for the volume discharged through the outlet device during the storm, a working volume of approximately 545,000 gallons is needed to retain the runoff from the 25-year, 24-hour storm event.

The pond has been designed with a low water level at Elevation 36.0 (per site datum) and a high water level at Elevation 42.0. The geometry of the pond as designed provides approximately 560,000 gallons between these two elevations. Additional volume below Elevation 36.0 provides for silt accumulation.

Piping
Piping size is selected to match the existing piping downstream of MH76A, the manhole into which the pond's outlet pipe will be connected. Slope from the pond to MH76A is 1% downward from the pond to the manhole to drain the pond to the low water level after a storm event.

Outlet Flow Control
Discharge from the pond will be controlled by an orifice and weir constructed in a flow control junction box outside the footprint of the pond and just downstream of MH76A. This will protect the flow control devices from inclement weather.

The primary outlet will be a half-moon shaped orifice, the bottom flat edge of which will be at the invert of the junction box. For ease of cleaning without having to enter the junction box, this orifice will be cut into a 24-inch slide gate, which can be lifted periodically to allow debris to flow downstream. The junction box will have a lockable hatch-type door to limit access to authorized personnel only.

The orifice is sized to limit the discharge flow to 110 gpm when the pond is full based on the following calculation:

$$Q = CA\sqrt{2gh}$$
$$where:$$
$$Q = 110cm = 0.24cfs$$
$$C = 0.9$$
$$h = 6\,feet$$
$$A = \frac{1}{2}\pi r^2 \text{ for half circle}$$
$$\text{Find A} = 0.0138 \text{ sq. ft; r} = 1\frac{1}{8}\text{inch; d} = 2\frac{1}{4}\text{inch}$$

Flow exceeding the discharge of the orifice will create a backwater condition upstream, which will divert water into the pond for storm events up to the 25-year, 24-hour event. The internal wall containing the slide gate also serves as a weir, over which flow in excess of the 25-year, 24-hour volume will be discharged downstream. Review of hydrographs of the Pond #1 subbasin shows that the residual peak flow from a 100-year, 24-hour storm event occurring just after the pond becomes full would be approximately 480 gpm. Considering the top of the internal wall as a 5-foot long rectangular weir, the depth behind the weir at 480 gpm is calculated to be 0.16 feet.

MH78
8"ST
MH77
MH77A
30'
12"ST
FOURTH STREET
MH116
PP
OH
3-WIRE OVERHEAD 4160V ELECTRICAL SERVICE
FURNISH AND OPERATE BYPASS PUMP FOR SANITARY SEWER DURING CONSTRUCTION FROM THIS MANHOLE TO MANHOLE SOUTHWEST OF POND
116
MH116A
PROPOSED MH 76B
PROPOSED 21"ø HDPE
PROPOSED FLOW CONTROL JUNCTION BOX (SEE DETAIL)
BOLLARD (TYP)
18" STORM SEWER
20'
MH77B
18"ST
MH76
PLUG AND ABANDON SANITARY SEWER
A/C2.0
INSTALL IMPERMEABLE CHECK DAM IN BACKFILL. SEE SPECIFICATION SECTION 02222. (TYPICAL)
CHAIN LINK FENCE (SEE DETAIL)
16' WIDE GATE (SEE DETAIL)
TOP OF BERM
BOTTOM OF POND
POND 1
70'
35
36
42
44
B1
B2
B3
B4
B5
B6
B8
5'
40'
35'
TRANSFORMER YARD
TOP OF RERM
B/C2.0
25'
℄
50' EASEMENT
OVERHEAD 115 KV TRANSMISSION LINES
12" ST
SILT FENCE (SEE DETAIL)
TOR OF BERM
EL. 42 HIGH WATER LEVEL
41'
2:1
8" STEEL NAT. GAS
PLUG AND ABANDON SANITARY SEWER
MH92
8"ST
16' WIDE GATE (SEE DETAIL)
A
12" HP NAT. GAS

GRADING AND DRAINAGE NOTES:

1. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL VERIFY SITE CONDITIONS, DIMENSIONS, ELEVATIONS, AND LOCATION OF EXISTING FEATURES AFFECTED BY THE WORK. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY INTERFERENCES OR DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.
2. CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES PRIOR TO ANY LAND-DISTURBING ACTIVITY. EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs), AND OTHER SWPPP REQUIREMENTS SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION AND UNTIL PERMANENT GROUND COVER HAS BEEN ESTABLISHED ON ALL DISTURBED AREAS.
3. CONTRACTOR SHALL INSPECT SEDIMENT CONTROL STRUCTURES AT LEAST TWICE WEEKLY (72 HOURS APART).
4. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, CONTRACTOR SHALL PUMP WATER INTO FRAC TANKS AND ALLOW SETTLING FOR AT LEAST 4 HOURS BEFORE DECANTING SUPERNATANT TO DOWNSTREAM STORM SEWER.

CALL BEFORE YOU DIG

REV:

STATE OF NEW YORK · MARK M. HEFLIN · 085525 · LICENSED PROFESSIONAL ENGINEER

SCALE: 1" = 20'
DATE: AUGUST 03, 2010
REVISED:

DESIGNED: CIVIL
DRAWN BY: WJM
REVIEWED BY: TG
PROJECT #0888808989

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RETENTION POND #1 PLAN
002 STORMWATER MANAGEMENT SYSTEM
CARRIER CORPORATION
SYRACUSE, NEW YORK
AUGUST 2010

SHEET
C 2.0