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CONSTRUCTION CERTIFICATION REPORT
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING

SPRING 018 INTERIM MEASURE

GM CETC BEDFORD FACILITY
105 GM DRIVE
BEDFORD, INDIANA

Prepared for: General Motors LLC

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List of Acronyms and Terms

AMSL	above mean sea level
AOC	Administrative Order on Consent
Bailey's Branch Creek	Bailey's Branch Creek located at the upstream end of Pleasant Run Watershed
CA	Corrective Action
Report	Construction Certification Report for Bailey's Branch and Tributary 3 Concrete Sealing – Spring 018 Interim Measure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CETC	Castings Engines Transmissions and Components
CRA	Conestoga-Rovers & Associates Inc.
Facility	GM CETC Bedford Facility
ft	feet
GCL	geosynthetic clay liner
GM	General Motors LLC
HDPE	high-density polyethylene
IM	Interim Measure
IMI	Irving Materials, Inc.
lb	pound
MLC	Motors Liquidation Company
PCBs	polychlorinated biphenyls
PSI	Professional Service Industries, Inc.
psi	pounds per square inch
RA	Removal Action
RACER Trust	Revitalizing Auto Communities Environmental Response Trust
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SSC	Site Source Control
Site	Swallets and springs formerly within the Spring 018 area on Parcels 15 and 216
Spring 018 area	a sub-section of the Pleasant Run Creek Watershed that is a hydrologically linked system of springs, swallets, sinkholes, groundwater, and adjacent uplands areas

List of Acronyms and Terms
(continued)

Spring 018A, B, and C	physical Spring 018 sampling locations representing different states of soil (Spring 018A) and bedrock removal (Spring 018B and C) but understood to represent the same water; Spring 018C is the current location
Tributary 3	unnamed tributary to Baileys Branch Creek originating in the area north of Area of Interest 4 within the Upstream Parcels at the upstream end of Pleasant Run Watershed
µg/L	micrograms per liter
U.S. EPA	United States Environmental Protection Agency
Willowstick	Willowstick Technologies, LLC

Section 1.0 Introduction

1.1 General

This document presents the Construction Certification Report (Report) for concrete sealing activities within the Pleasant Run Creek Watershed (Bailey's Branch Creek and Tributary 3) Lawrence County, Indiana, associated with the implementation of the United States Environmental Protection Agency (U.S. EPA) approved Spring 018 Interim Measure (IM) Proposal, originally dated June 26, 2012 (final approved revision dated June 19, 2013), and the design drawings submitted November 14, 2012 (and subsequent responses to comments emailed November 20, 2012). The IM activities described herein were conducted from August 16, 2012 to April 1, 2013.

Bailey's Branch Creek and areas downstream were affected by historical releases of polychlorinated biphenyls (PCBs) from the General Motors LLC (GM) Castings, Engines, Transmissions and Components (CETC) Bedford Facility (Facility), formerly owned and operated by General Motors Corporation Powertrain. The Spring 018 area discussed in this Report forms part of the Facility Removal Action (RA) Site as defined in the Administrative Order on Consent (AOC) (effective July 31, 2003).

Conestoga-Rovers & Associates, Inc. (CRA) has prepared this Report on behalf of GM in accordance with the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) work conducted under the Performance Based Agreement (effective March 20, 2001, as amended October 1, 2002, March 29, 2007, May 9, 2008) with U.S. EPA for the Facility, and consistent with the AOC, under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The Spring 018 area (Site) refers to a sub-section of the Pleasant Run Creek Watershed that is a hydrologically linked system of springs, swallets, sinkholes, groundwater and adjacent uplands areas. The Site location is presented on Figure 1.1. The Site Plan, including existing spring locations of the Spring 018 area, is presented on Figure 1.2. Swallets and springs formerly within the Spring 018 area on Parcels 15 and 216 were located within and adjacent to the creek channel, which is typically coincident with the property boundaries in this immediate area.

The work described in this Report was preceded by work conducted under the Downstream Parcels RA Work Plan (CRA, May 25, 2004) and investigations completed under the Site Source Control (SSC) Work Plan (CRA, November 11, 2003). The Downstream RA Work Plan consisted of soil and sediment excavation and proper disposal, verification sampling to document attainment of the cleanup objectives, and restoration of the creek, including filling and covering select swallets with concrete upon such verification. The SSC Work Plan and addenda included: identification of swallets and springs through visual inspections; thermal imaging; sampling of spring water to identify potential PCB impacted areas; installation and sampling of boreholes and rock corings; geophysical surveys conducted with ground penetrating radar and electromagnetic groundwater mapping; and dye tracer studies. Additionally, temperature studies were performed in the Spring 018 area in 2012 and 2013 to assist in the

identification of potential flow pathways contributing to the Spring 018 discharge. Based on the information collected during the SSC Work Plan implementation, water from the Spring 018 area was identified as impacted with low level PCB concentrations and GM instituted collection and treatment of the impacted water emanating from Spring 018.

This Report documents the completion of the IM concrete sealing activities performed in accordance with the Spring 018 IM Work Plan, which was formally approved by U.S. EPA on June 19, 2013, although the implementation of the work preceded the formal approval and U.S. EPA was kept informed of progress throughout the implementation of the work and provided comments to the design. Creek sealing activities began in December 2012 and were completed in March 2013. A photographic log of historical Spring 018 Site conditions and construction activities related to the concrete sealing is presented in Appendix A.

1.2 Report Organization

The Report is organized in the following sections:

i) Section 1.0 presents the Site location, a brief introduction to the history of the work performed in the Spring 018 area, and organization of the Report

ii) Section 2.0 summarizes activities completed in the Spring 018 area during the initial Downstream RA and presents a summary of Spring 018 monitoring results to date

iii) Section 3.0 provides the rationale for implementation of the concrete sealing activities to meet the IM objectives and the basis of the design

iv) Section 4.0 presents a summary of the IM activities

v) Section 5.0 presents references cited in this Report

vi) Section 6.0 provides certification of the Spring 018 IM construction completion

Section 2.0 Spring 018 Background and Monitoring Results

2.1 Spring 018 Investigations and Background Summary

The water produced at the current Spring 018 location initially consisted of several springs, including Spring 018, Spring 021-002, Spring 021-003, Spring 021-004, and Spring 021-005. The locations of the seeps and springs within the Spring 018 area are presented on Figure 2.1[1]. Historical sampling of these

[1] Removal of sediment, soil and rock from the mouth of Spring 018 was completed under the Downstream Parcels RA activities. As the RA excavation extended into the limestone bedrock and hillside, the physical location of where the Spring 018 water discharged to the creek changed, resulting in the consolidation of the down-gradient springs to a single source, renamed as interim sampling locations Spring 018A, Spring 018B, and the current location, Spring 018C. Although the current and interim locations represent different physical settings, they are understood to represent the water originally observed at Spring 018.

springs indicated the presence of PCBs at various levels exceeding the 0.3 micrograms per liter (µg/L) action level, with the majority of spring flow observed emanating from Spring 018.

Two dye trace studies were completed in 2004 at the suspected sources for water which feed the springs, including several swallets located upstream of Spring 018 within Bailey's Branch Creek and sinkholes located within a farm field to the east on Parcel 14. Dye trace studies conducted on July 8 and July 21, 2004 on the upstream swallets and sinkholes to the east concluded that the water entering the swallets and sinkholes exited the underground conduit system and discharged to the creek at Spring 018. The dye exited the conduit system fairly rapidly and moved through the system without significant dispersion (i.e., as a slug), indicating a relatively direct flow path and limited underground storage. The results of these tests were provided in the RCRA Facility Investigation (RFI) Technical Memorandum for Swallet Testing (CRA, September 27, 2004).

The water discharging from Spring 018 was found to originate from:

1. Surface water seeping through the fractured rock of the creek bed (swallets) just upstream of the Spring 018 area
2. Groundwater flowing in overburden and the fractured bedrock along the western bank of the creek, west of Spring 018
3. Groundwater flowing from the east of Spring 018, including water introduced through a series of sinkholes located on Parcels 14 and 15

Soil, sediment and bedrock removal and concrete filling of select excavated swallets within Bailey's Branch Creek upstream of the Spring 018 area began in 2004. Removal Action work was completed in 2005. Bedrock removal in the creek channel upstream of Spring 018 extended to depths exceeding 10 feet (ft) below the original creek bed in select areas in order to remove PCB impacted media within bedrock fractures at the major swallet areas (Swallets 1A, 1B, 2, 3, 4, 5, 6, and 8). Rock removal at Spring 018 began on July 18, 2005, moving upstream/upgradient approximately 10 ft into the rock face, resulted in the consolidation of the springs in the study area with the exception of the main discharge at Spring 018 (the downgradient seeps and springs dried up). Excavation around Spring 018 was completed on August 17, 2005. The final and current discharge point, following soil, sediment and bedrock removal, is identified as Spring 018C for sampling identification purposes.

As part of the initial interim restoration work in the Spring 018 area, the bedrock excavations in the major swallet areas were backfilled with rock and Standard Type II Portland Cement with nylon fiber reinforcement (fiber-reinforced concrete) designed to yield 4,000 pounds per square inch (psi) compressive strength. Exposed bedrock walls were covered with shotcrete mixed with nylon fiber reinforcement designed to yield 4,000 psi compressive strength. Filling and shotcrete work was completed by August 2005. The filling of the former swallet areas with rock and concrete significantly

reduced the observed flow from Spring 018. Although the cleanup work lowered the concentrations in the spring water, it did not lower it sufficiently to allow the spring to discharge water directly to the creek and temporary treatment of the water before discharge was initiated.

At that time, the area surrounding and downstream of Spring 018 was bermed with a clay dam in order to collect the PCB-impacted water emanating from Spring 018. The collected water was pumped to a temporary water treatment plant constructed on top of the hill southeast of Spring 018 on Parcel 216. The spring water was treated using a combination of settling/flow equalization in two one-million gallon Modular Tanks, followed by sand and carbon filtering prior to discharge back to the creek, downstream of the Spring 018 containment berm. This water was periodically tested to ensure the treated water met the U.S.EPA requirements for discharge of the water.

Upon completion of the interim restoration work, three separate qualitative dye trace investigations were conducted in the Spring 018 area, starting July 2007, as part of the SSC Addendum No. 5 (CRA, November 9, 2006). The purposes of the dye trace investigations were to:

- Evaluate the effectiveness of the concrete filling of the swallets and surrounding creek bed and to see if additional areas of the creek were contributing to the flow at Spring 018
- Monitor and evaluate various potential groundwater flow paths between the area of former Swallet 1A and Spring 018
- Monitor and evaluate potential groundwater flow paths from the east (upgradient) sinkholes and associated bedrock on Parcel 14

In addition to the dye trace investigations, two geophysical studies were conducted by Willowstick Technologies, LLC (Willowstick) and CRA, to identify apparent groundwater flow pathways within the bedrock and to further delineate the area of the Spring 018 groundwater drainage basin. The flow pathways identified by the geophysical studies are shown on Figure 2.1.

Results of the geophysical studies and dye trace investigations supported results from previous dye trace studies showing flowpaths connecting Spring 018 to the upstream swallets. The studies were submitted to U.S. EPA on April 12, 2006. The results indicated that the pathways had not been completely sealed off during the RA excavation and concrete filling activities. A connection between the upgradient sinkholes to the east was also shown to exist with similar low storage capacity based on the fairly quick response time observed during the dye tracer studies.

A bedrock drilling/coring investigation was completed in March and April 2007, targeting the pathways identified by the geophysical investigations. The investigation did not definitively locate any conduits that had been previously identified by the geophysical studies, but did confirm water is likely transported through fractured bedrock zones in the general vicinity of those pathways. The results were

summarized in the SSC Investigation Summary and Proposed RA Approach – Spring 018C, dated November 14, 2008. Figure 2.1 shows the location of the coreholes.

A new work plan proposing additional visual dye trace observations was submitted to U.S. EPA on September 7, 2012. The Work Plan was designed to divide up Bailey's Branch Creek and Tributary 3 into discrete, isolated sections so as to provide direct and conclusive evidence of the location of any existing swallet areas losing surface water and contributing to the overall volume being discharged at Spring 018. The dye trace tests confirmed that a portion of the water emanating from Spring 018 continued to be a result of isolated recharge from the creek. Results were provided to U.S. EPA in CRA's memo dated November 26, 2012.

2.2 Pre-Interim Measure Monitoring Summary

Monitoring of Spring 018 discharge rates, PCB concentrations, water temperature, and conductivity has been conducted prior to, during, and post IM concrete sealing activities implementation. The following sections present a summary of monitoring conducted prior to the completion of the IM.

2.2.1 Spring 018 Discharge Volumes

Water discharge volumes from Spring 018 have been attenuated through the various phases of work, including the temporary by-pass of significant portions of the surface water flow during the RA activities and the initial filling of excavated swallets. Prior to installation of flow meters on the Spring 018 pumps in 2012, discharge volumes were estimated based on visual observations of Spring 018. Prior to any remediation work being conducted in the area, Spring 018 had an estimated base flow discharge of 500 to 800 gallons per minute (gpm) and peak discharge during storm events estimated to be 3,000 to 5,000 gpm. Following the initial swallet filling activities completed in 2005, Spring 018 discharge was reduced to approximately 200 to 400 gpm during base flow conditions and approximately 500 to 1,000 gpm during storm events. It is noted that following the interim swallet filling and creek bed restoration work, creek flow over the area immediately upstream of Spring 018 was predominantly carried through by-pass piping that was temporarily installed to facilitate cleanup of the creek and made it difficult to evaluate flow into the Spring 018 regime. Following removal of the temporary by-pass piping (after further IM sealing efforts), the creek was allowed to return to natural flow paths.

2.2.2 PCB Sampling Results

Sampling of Spring 018 was initially performed as part of the initial spring and seep sampling event conducted in May 2002 under the RFI Stream investigation. Additional sampling of Spring 018 has generally been completed on at least a quarterly basis since the second quarter of 2004, with more frequent sampling generally ranging from daily to monthly during the RA and creek sealing activities. Samples are currently collected on a monthly basis with additional opportunistic samples collected once per quarter if a precipitation event of at least 1-inch of rain occurs within a 24-hour time frame.

Figure 2.2 shows the Spring 018 (including interim and final spring locations) monitoring results of PCB concentrations over time, through January 2014. Table 2.1 presents a summary of the monitoring analytical results. In general, a reduction in PCB concentrations has been observed through the course of RA activities, with the exception of periods of invasive work disturbances (i.e., excavation, pressure washing, rock breaking) which occasionally resulted in a small spike of PCB concentrations followed by further PCB concentration decreases. In addition to the overall downward trend since completion of the RA activities, a cyclical trend was noted prior to the IM concrete sealing activities with concentrations generally peaking during the warmer months and decreasing through the winter when concentrations were in recent years at or below the levels allowed for discharge.

2.2.3 Spring 018 Temperature Monitoring

Temperature monitoring was conducted in the Spring 018 area, commencing in July 2012, in order to identify potential relationships between the surface water temperature, groundwater temperature, and Spring 018 discharge temperature. If the temperature of water emanating from Spring 018 were to be consistently similar to the surface water temperature and dissimilar to upgradient groundwater, for example, it would suggest that Spring 018 is recharged primarily from that surface water.

Figure 2.3 plots the temperature versus time for upgradient groundwater monitoring locations (green lines), groundwater monitoring locations near the creek channel (purple lines), surface water in Bailey Scales Branch and Tributary 3 (blue lines), and Spring 018 water (red line). The initial readings were taken prior to the commencement of the additional concrete creek sealing work in late 2012. Figure 2.3 illustrates that in the summer of 2012, prior to conducting the creek sealing work and re-establishing the creek flow, the temperature of spring water and groundwater in proximity to the creek channel correlated more closely with the temperature of surface water in the creek than upgradient groundwater from wells located a further distance from the creek. This correlation is most particularly evident during the warmer summer months, when there is the maximum contrast in temperature between upgradient groundwater and surface water. This infers that the surface water flow within the creek channel (not otherwise conveyed in by-pass pipes) prior to creek sealing was still a source of recharge to spring water and is consistent with the findings of the 2012 dye-trace studies performed in the Spring 018 area.

Table 2.2 presents the summary of temperature field measurements.

2.3 Conclusions

The following summarizes the conclusions of the monitoring at Spring 018 performed prior to implementing the IM:

- Dye trace studies conducted in Bailey's Branch Creek and Tributary 3 in 2012 confirmed that pathways connecting surface water to the groundwater and Spring 018 in the areas surrounding the former swallets remained despite the swallet sealing efforts conducted in 2005.
- The discharge rate in Spring 018 remained weather dependent. Prior to the final concrete creek sealing work, the discharge rate was estimated to be generally 200 to 400 gpm in dry weather and 500 to 1,000 gpm or more in wet weather.
- Since completion of the RA sediment and rock removal and prior to the final concrete sealing, the PCB concentrations at Spring 018 had appeared to be cyclical, peaking during warmer summer months, with an overall trend of decreasing amplitude in the maximum (peak) concentration over time.
- Prior to implementing the IM, the peak PCB concentrations in Spring 018 water, generally above the action level of 0.3 µg/L, have typically occurred during the summer months and had a typical duration of about two to four months. These peak PCB concentrations were separated by periods of time when the PCB concentrations were at or below 0.3 µg/L, often during seasonally cooler weather.
- The spring water temperature at Spring 018 was influenced by the surface water temperature in the creek, suggesting the spring was being, at least in part, recharged by surface water via the swallets and fractures in the creek bed.

Section 3.0 Creek Sealing Objectives and Design Basis

Based on the completed investigations and monitoring results, a conceptual site model was developed for the Spring 018 area and presented in the aforementioned Proposed RA Approach (CRA, November 14, 2008). The final conceptual site model has been refined since this initial model by incorporating new data and information obtained over the past several years.

The source of the PCB impacts detected in water emanating from Spring 018 are believed to originate from the entrained PCB-contaminated sediment/clay material residing within the hydrogeologically active bedrock fractures between the various swallet locations and Spring 018. During the summer and early fall months, relatively warm surface water infiltrates through the swallets, recharging the groundwater system near Spring 018 through historical pathways, which had previously left PCB impacted sediments. This fast flowing warm surface water recharges groundwater and dislodges clay particles as it flows through the fractured bedrock hydrogeologic system towards Spring 018. It is

hypothesized that reducing surface water recharge to groundwater flow (by changing the flow pathway) through these original fractures minimizes the water in contact with the entrained sediment, thereby lowering the PCB levels in the discharging spring water.

GM evaluated several remedial alternatives to determine the most appropriate IM for Spring 018. In order to minimize the amount of surface water entering the groundwater system near Spring 018 from the fractures within the creek bed, GM determined the most efficient and effective IM would be to perform additional concrete sealing of the creek bed, both upstream of and directly adjacent to the Spring 018 area. If successful, this IM would limit the recharge of warmer surface water in the summer and early fall months, which resulted in the exceedance of the action level at Spring 018, as well as hopefully reduce the discharge from the spring.

In addition to the creek bed sealing, a permanent containment berm would be constructed to contain water discharging from Spring 018. By-pass piping would extend through the berm in order to allow Spring 018 to flow directly into the creek, if the water was not required by U.S. EPA to be collected for treatment. Valves on the piping would allow for cutoff of the flow and containment for collection and treatment, if needed. U.S. EPA and GM agreed to a contingency plan by which routine sampling results would be used to determine if Spring 018 water requires capture and treatment prior to being introduced in the creek system. This plan was provided to U.S. EPA in CRA's memo dated September 9, 2013.

The design basis for the concrete sealing of Bailey's Branch Creek and Tributary 3 was to provide a low permeability concrete seal over the creek bottom and form a base to support the restoration of the creek channel and banks in this area. The purpose of the sealing was to further minimize infiltration of surface water in the location of the former swallet areas. Creek base flow would be channeled near the center of the creek cross-section to reduce surface water from entering groundwater. The design assumes a v-channel such that the final concrete surface is shaped from the creek banks down towards the center of the creek, with slopes between 4 and 17 percent, as required, to convey flow for a 1 in 10-year storm event within the v-channel. The Spring 018 containment berm elevation was set to prevent the expected 1 in 100-year storm from flooding (or damaging) the Spring 018 berm.

The general cross-section of the concrete sealing cover consists of:

- Stone and concrete mix base fill layer over the bedrock, where necessary, of varying thicknesses, to bring the creek base to a generally uniform level with decreasing elevation from upstream to downstream. Base fill concrete near the walls was generally thicker to give the overall channel a 'V'' form.
- In areas where swallets have been identified as contributing to the discharge at Spring 018, the concrete seal consists of a geosynthetic clay liner (GCL) placed within 8 inches of concrete (2-inches below and a minimum 6-inches above).

- In areas with no identified swallets or where existing swallets have been shown to not have a direct connection to Spring 018, the concrete seal consisted of a 4-inch layer of concrete over top of the base fill concrete or bedrock.

As-built drawings from the IM are presented in Appendix B. Drawing C-01 presents the limits of GCL placement in addition to the overall concrete placement limits. Drawing C-07 presents general cross-sections of the construction.

Section 4.0 Concrete Sealing Interim Measure Activities

This section presents activities implemented as part of the Spring 018 and Bailey's Branch Creek/Tributary 3 concrete sealing IM.

4.1 Site Preparation

Site preparation activities were completed prior to initiating concrete sealing activities. Where possible, resources already in place for the East Plant IM and the CERCLA RA were used in conjunction with the creek sealing activities. The following is a list of activities previously completed in conjunction with other Site investigative and cleanup efforts:

- Mobilized construction facilities, material, equipment, and personnel necessary to perform the work
- Provided and maintained construction facilities
- Assembled construction support facilities (Site trailers, first aid facilities, break facilities, tool and material storage areas).

The following is a list of Site preparation activities for the Spring 018 IM not already completed in conjunction with other Site investigative and cleanup efforts:

- Performed surveys of private and public utilities
- Established erosion/sediment transport controls
- Removed sediment and vegetation accumulation from bedrock surfaces
- Removed select creek bypass controls (piping, earthen dams, temporary culverts) used during creek cleanup activities, but not needed for the concrete capping activities.

4.2 Erosion/Sediment Transport Controls

Erosion/sediment controls were put in place prior to initiating creek bed cleaning and concrete sealing activities to control the potential migration of sediment from the work areas. Select creek by-pass

controls used during the creek cleanup activities were left in place and relocated as needed throughout the bedrock cleanup and the various concrete pours. These erosion/sediment controls were removed as part of the final restoration of the work area.

4.3 Bedrock Cleaning

During the previous RA, the creek bed in the Spring 018 area had been excavated to bedrock and in most cases, had several feet of surficial bedrock removed. However, natural stream and erosion processes in this area over the past few years had resulted in sediment deposits and vegetative growth over the previously cleaned bedrock surface. In preparation for the concrete placement, the general contractor removed the vegetation and loose debris from the creek bed and re-cleaned the bedrock surface by pressure washing the creek floor. In a few areas, small rock outcrops were removed from the planned channel area to accommodate a continuous creek bottom slope as part of the final concrete sealing channel design.

4.4 Spring 018 Containment Berm Improvements

Prior to beginning the Spring 018 containment berm reinforcement activities, sediment that had accumulated within the containment berm area since its original construction in 2005 was removed, characterized, and properly disposed. The bedrock surface within the containment berm area was power washed and the bedrock surface was sealed with a layer of fiber-reinforced concrete to form a smooth base floor to the spring.

The existing clay containment berm around Spring 018 was refurbished with additional clay to bring the top of the berm to the design final grade and to adjust its overall base footprint in preparation for the resumption of normal flow through the creek channel alongside the berm, upon completion of the overall concrete sealing. A 4 to 6-inch layer of stone was placed on top of the clay to provide a surface for the concrete to adhere to.

An approximate 12-inch thick layer of fiber-reinforced concrete was placed over the entire berm (top and sides) once the top of the berm elevation and base footprint were achieved. To maintain the slopes of the berm's clay core, concrete was placed on the top of the berm with workers pushing the concrete down the side slopes to the extent practical, resulting in horizontal-to-vertical slopes ranging from 0.6:1.0 to 0.8:1.0 (i.e., concrete thickness at base of slopes likely thicker than at the top of slopes). The surface of the concrete was left rough to minimize slippage for samplers/workers in this area.

The second 12-inch fiber-reinforced concrete layer over the berm was placed as a single pour at the same time as the pour for the 4-inch layer of fiber-reinforced concrete placed on the creek floor within the containment area and the creek floor exterior to the berm. Steps were cast into the concrete surface at the upstream end of the berm to facilitate access to Spring 018 by sampling and maintenance personnel and to allow exit from the containment area. The final top elevation of the concrete covered

berm is approximately 562 ft above mean sea level (AMSL). Berm improvements were completed on December 13, 2012, in conjunction with the creek sealing activities.

Prior to refurbishing the clay berm, two 8-inch diameter high-density polyethylene (HDPE) pipes were placed through the downstream end of the Spring 018 containment berm. Each pipe was fitted with a gate valve, located on the exterior wall of the containment berm. The pipes were then sealed into the berm system as the concrete berm layers were placed. Hydra Stop 300, a hydrophobic urethane foam grout, was formed around the pipe where the pipes protruded through the berm (following concrete placement and curing) to prevent seepage. These pipes were installed to facilitate direct discharge of contained water to the creek if spring water collection and treatment is not required. The gate valves remained closed during the periods when Spring 018 water was collected for treatment.

4.5 Concrete Base Layer

A base layer consisting of a mixture of fiber-reinforced concrete and stone (where required) was placed along the length of the creek bed to adjust the channel floor elevations to a generally more consistent slope, and across the width of the creek bed to create and maintain a stable flow regime (upstream to downstream) with base flow events contained to the center line of the creek through an obtuse 'V' shaped channel.

The concrete mixture, comprised of standard Type II Portland Cement with fibrillated microsynthetic fibers (also known as fiber-reinforced concrete), which was designed to yield 4,000- (psi) compressive strength, consisted of 564 pounds (lbs) of cement, 1,280 lbs of sand, 1,750 lbs of #8 limestone, 1 lb of fiber, 33 ounces of water reducer, 12 lbs of a water proofer, 236 lbs of water, and frost guard depending on the day's temperature (specification provided in Appendix C.1). Fiber-reinforced concrete was selected as opposed to regular Type II Portland Cement for the design to provide additional strength and help to reduce the permeability of the overall concrete mixture. Additives to reduce shrinkage and cracking and chemical treatment additives for waterproofing were also included in the mixture to achieve the lowest permeability and optimum flexibility. The concrete was supplied by Irving Materials, Inc. (IMI). Each batch of concrete delivered to the Site was accompanied by a load ticket verifying the mixture.

The base layer concrete mix was generally placed in depressions in the creek bed to create the consistent slope and along the squared edges of the creek bed to form the basic 'V' design of the channel. Stone was placed in deeper areas of the creek to act as filler and reduce the amount of concrete required, as well as provide workability for thicker concrete placement (i.e., allow workers to walk over a surface of stone and not sink too far into wet concrete during placement). The contractor surveyed the final elevation of the base layer to confirm design elevations were met and to ensure there were no bedrock outcroppings that might protrude through the final (surface) concrete layer. The base

layer concrete surface was given a textured finish for the subsequent application of the GCL (where applicable) and the final concrete sealing layer.

Concrete cylinder samples were collected daily by Professional Service Industries, Inc. (PSI) for compressive strength testing according to ASTM C-39 [standard test method for compressive strength of cylindrical concrete specimens]. Each sample exceeded the target compressive strength of 4,000 psi (Appendix C.2).

Base-layer concrete generally began with the stretch of concrete upstream of the Bailey's Branch and Tributary 3 confluence, followed by the stretch of creek downstream of the confluence. This work was performed between November 9, 2012 and January 9, 2013. The base-layer concrete at the confluence was poured once the creek sealing activities upstream and downstream of the creek were complete. This was done to prevent damage by construction equipment traversing the area while completing the restoration in the adjacent areas. The base layer concrete was poured between February 12 and 14, 2013.

4.6 Permanent Spring 018 Conveyance Pipe Lines

As a contingency measure, two 10-inch diameter HDPE pipes were embedded in the bottom portion of the concrete base layer across the bottom of the creek, such that they were placed beneath the final concrete sealing layer. The pipes extend from within the reinforced Spring 018 berm to a point approximately 137 ft to the southwest (Drawing C-02, and cross section B on Drawing C-08 in Appendix B shows the detail for these pipes). These two pipes would facilitate future pumping of water from within the Spring 018 containment berm (if required) to a future water treatment facility located west of the creek, without restricting creek flow with overland piping. Currently, the pipe ends have been capped.

4.7 Geosynthetic Clay Liner

GCL was placed, according to the manufacturer's specifications, with a minimum overlap of six inches between panels (Appendix C.3), over select areas of the concrete base layer. GCL was placed over areas identified in the 2012 dye trace study as having a water-loss downward, through the creek bed, to Spring 018, primarily the Swallet 2/3 area, Swallet 9, and the fractured area just upstream of Spring 018C (Drawing C-02 in Appendix B). Water was applied to the GCL along the seams to ensure adequate hydration/sealing of the bentonite powder at the overlaps.

4.8 Concrete Sealing Layer

The final upper concrete sealing layer was placed over the concrete base and GCL layers. The same 4,000 psi compressive strength fiber-reinforced concrete mix used for the base layer was specified for the concrete sealing layer (Appendix C.1). The final concrete pour in the creek was generally completed

as a continuous pour (on a daily basis) to the extent possible, from downstream to upstream, with any overlapping pours resulting in a downstream facing seam. The continuous pours were completed as 4-inch or 8-inch thick lifts (per the design specifications) using a boom-arm concrete pumper truck, keeping heavy equipment off of the base concrete and GCL layers (it should be noted that where 8-inch thick concrete lifts were required, the bottom 2 inches were installed as part of the base concrete layer prior to placement of the GCL such that the final placed concrete surface layer was 6 inches thick). Where the concrete sealing layer was placed over the GCL covered areas, a small amount of water was applied to the GCL to pre-saturate the liner and prevent the bentonite clay in the GCL from drawing water out of the concrete mixture prior to the concrete hardening.

As part of the restoration of this portion of the creek, nodules, or bumps of concrete, generally 6 inches to 36 inches across and approximately 3 to 6 inches high were hand-formed in the concrete surface outside of the creek centerline. These nodules were formed into the sealing surface to provide a more natural looking creek surface and to collect sediment during base flow in order to encourage potential future vegetative growth within the channel.

A large depression in the bedrock near the Swallet 7, just upstream of Spring 018, was left as a pool formation (pond) within the creek profile. The 2012 dye trace test showed this area to be relatively sealed off from Spring 018 (i.e., not hydraulically connected), so it was left as a small waterfall and pool habitat feature within the creek. The 4-inch concrete sealing layer was applied to the base and sides of the pool with a target pool base flow elevation of 564.75 ft AMSL.

Concrete for the final layers were poured between January 15 and February 15, 2013. Concrete cylinder samples were collected daily by PSI to test the compressive strength of the concrete. Tests were performed in accordance with ASTM C-39 [standard test method for compressive strength of cylindrical concrete specimens]. Each sample exceeded the target compressive strength of 4,000 psi (Appendix C.2).

4.9 Cable Concrete Low-Flow Crossing and Maintenance Road

A low-flow crossing and access road was constructed across the creek at the confluence of Tributary 3 and Bailey's Branch Creek, as well as an access road along the east bank of Bailey's Branch Creek, downstream of the confluence, to maintain service access to the Spring 018 berm area. Concrete under the crossing and access road was reinforced with #6 steel reinforcing rods on 12-inch centers in a crossing pattern. Cable concrete type CC45 mats (4-foot by 8-foot mats comprised of interlocking concrete blocks, each roughly 12 inches square and 6 inches high, held together by steel cables) were placed over the reinforced sealing layer of concrete. The cable concrete mats define the driving surface of the access road in areas where the road was constructed over concrete and allow for stream flow through/across the road (i.e., between cable concrete blocks).

4.10 Concrete Surface Inspection and Crack Repair

Due to the large surficial area of the concrete pours completed, some minor shrinkage cracking of the concrete was expected and did occur. The final concrete surface was inspected and identified cracks were sealed. Repairs were completed using liquid concrete crack sealant (Quikrete Brand Gray Concrete Crack Sealant) for smaller hairline cracks and a combination of the liquid concrete crack sealant covered with polyurethane enhanced concrete crack sealant (Quikrete Brand Polyurethane Concrete Crack Sealant) for larger cracks, as recommended by the concrete supplier (IMI). A flexible scraper was used to push sealant into the cracks and smooth the surface over the repair.

4.11 Resumption of Creek Flow and Monitoring

Following receipt of the concrete test results and completion of the concrete patching (crack repairs), the temporary creek by-pass piping and check dams were removed and the creek water was allowed to return to its natural flow path within the concrete-lined creek bed on April 1, 2013.

Figure 2.2 and Table 2.1 present the PCBs analytical results for Spring 018, including monitoring conducted subsequent to the resumption of flow to the main creek channel on April 1, 2013. Figure 2.2 depicts relatively steady concentrations (less than 0.3 µg/L) following the resumption of flow through Bailey's Branch Creek and Tributary 3. PCB concentrations from Spring 018 samples collected in the summer of 2013 showed no change when compared to samples collected during seasonally cooler portions of the year, as had been typically observed in the past.

Figure 2.3 presents the results of temperature monitoring conducted from July 2012 through October2013 (May 2013 creek readings were taken shortly after a cold snap which explains the sharp drop in surface water temperature). Prior to sealing the creek, spring water temperature at Spring 018 more closely followed the temperature of surface water in the creek. Following completion of the restoration work and re-establishing the entire creek flow, the temperature of the spring water and that of the surface water diverges. Additionally, groundwater temperature near the creek channel after completion of the sealing correlates more closely with upgradient groundwater temperature. These metrics indicate that the surface water recharge to Spring 018 via swallets in the creek bed has been largely eliminated as a result of the concrete sealing activities.

4.12 Interim Measure Summary

The completed as-recorded topographic plan views for the final concrete sealing, cross-sections along the length of the creek centerline, sections across the width of the channel, and construction details are presented in Appendix B on Drawings C-01 through C-09.

4.13 Post-Interim Measure Summary

The following summarizes significant observations of the monitoring performed at Spring 018 after construction of the IM:

- Discharge from Spring 018 continues to be weather dependent, estimated since April 2013 to be 200 to 400 gpm during base flow conditions, and 400 to 800 gpm following storm events. This represents an estimated decrease of approximately 50 to 60-percent during base flow and approximately 85-percent during wet weather peak discharge when compared to pre-RA implementation (original flow conditions).
- PCB concentrations from Spring 018 samples in prior years exhibited a cyclic increase during the summer and decrease during the cooler months. Sample results from the summer of 2013, after completion of the concrete sealing activities, showed no significant increase in PCB concentrations when compared to results for samples collected during the balance of the year, despite air temperatures ranging from 90° to low 100°s Fahrenheit. Since the initiation of the additional creek concrete sealing activities in December 2012, PCB concentrations (samples are collected monthly) have remained below the action level (0.3 µg/L) . At the time of writing, the twelve month rolling PCB average (March 2013 through February 2014) is 0.14 µg/L (February 2014 sample results not yet validated).
- Water temperature at Spring 018 generally more closely reflects upgradient groundwater temperatures than upstream surface water temperatures, indicating Spring 018 is currently being recharged primarily by upgradient groundwater rather than surface water.

The monitoring results collected to date support the assertion that the concrete sealing activities have further isolated Spring 018 from swallets and creek bed fractures located within Bailey's Branch Creek. The concrete sealing activities have decreased the discharge at Spring 018, and sampling has indicated a continued and sustained overall decrease in PCB concentrations due to decreased flow through the fractured hydrogeologic system, formerly supplied by surface water in-flows at the swallets.

Section 5.0 References

CRA, Site Source Control Work Plan, November 11, 2003.

CRA, Downstream Parcels RA Work Plan, May 25, 2004.

CRA, RCRA Facility Investigation Technical Memorandum for Swallet Testing Bailey's Branch to Pleasant Run Creek, September 27, 2004.

CRA, Ground Penetrating Radar (GPR) Results for Bailey's Branch (Spring 018 Area), April 12, 2006.

CRA, Site Source Control Work Plan: Addendum No. 5, November 9, 2006.

CRA, Site Source Control Investigation Summary and Proposed Removal Action Approach – Spring 018C, November 14, 2008.

CRA, Spring 018 Interim Measures Work Plan, June 26, 2012.

CRA, Spring 018 Creek Sealing Design, emailed November 14, 2012.

CRA, Spring 018 Dye Tracer Testing Results, November 26, 2012.

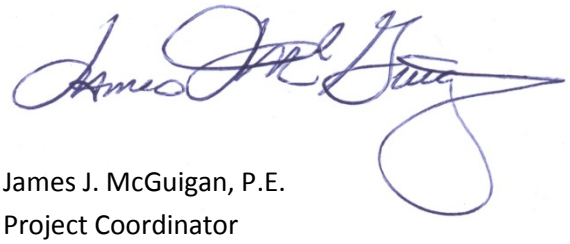
CRA, Memo from Jim McGuigan to Peter Ramanauskas, et.al., Re: Spring 18 Interim Measure, September 9, 2013

Willowstick, Delineation of Groundwater Flow Pathways Near Spring 018C, March 17, 2006.

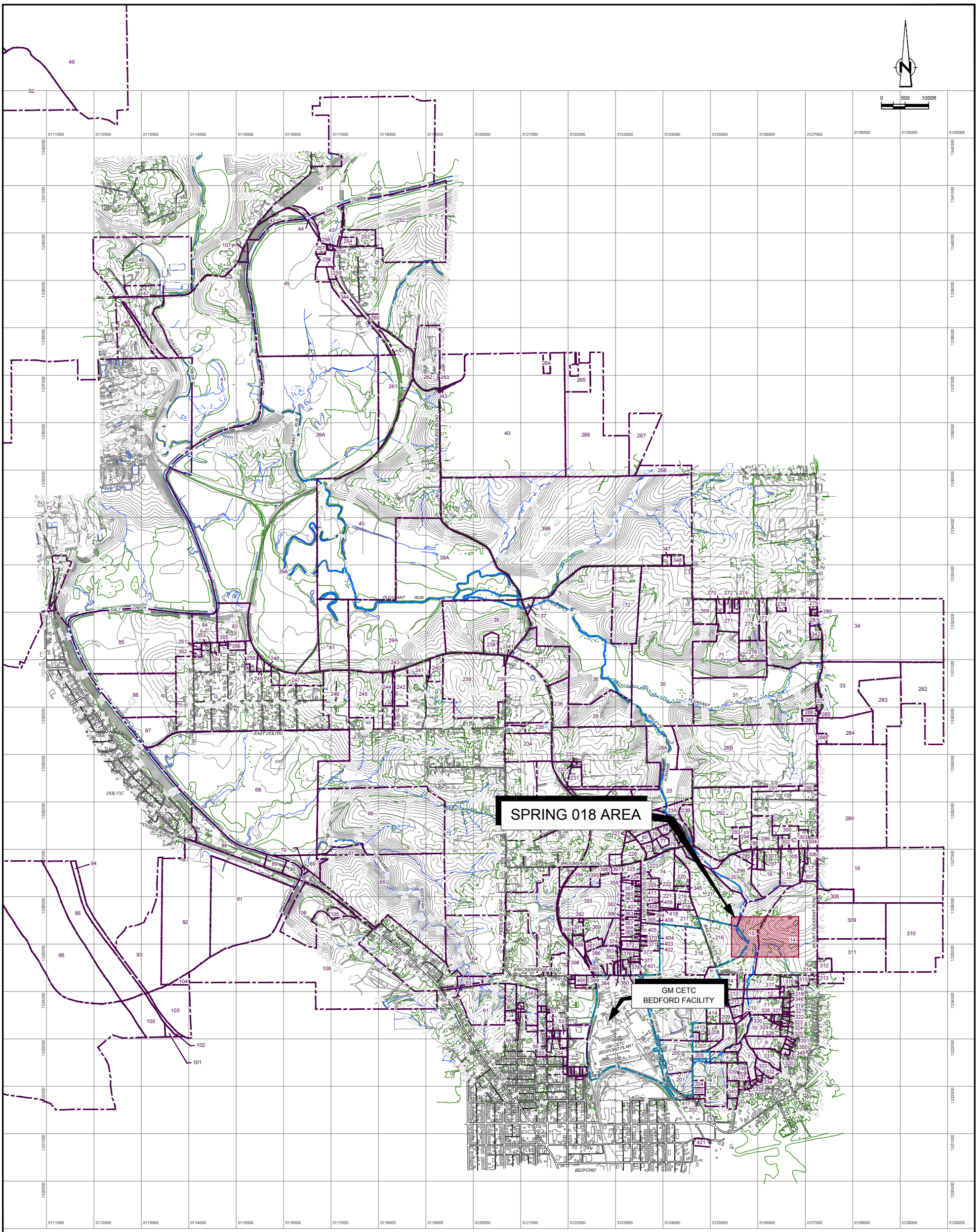
Section 6.0 Construction Certification

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Respectfully Submitted,



James J. McGuigan, P.E.
Project Coordinator



LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- EXISTING VEGETATION
- EXISTING BUILDINGS
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE GM PROPERTY BOUNDARY
- APPROXIMATE STUDY AREA

NOTE: GM PROPERTY BOUNDARY SURVEY BY BLEDSOE RIGGERT GUERRETTAZ RECEIVED OCTOBER 2007. ADJACENT PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. ADJOINING PROPERTY LINES MAY NOT ACCURATELY REPRESENT THE TRUE PROPERTY BOUNDARIES

Nº	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION

SITE LOCATION

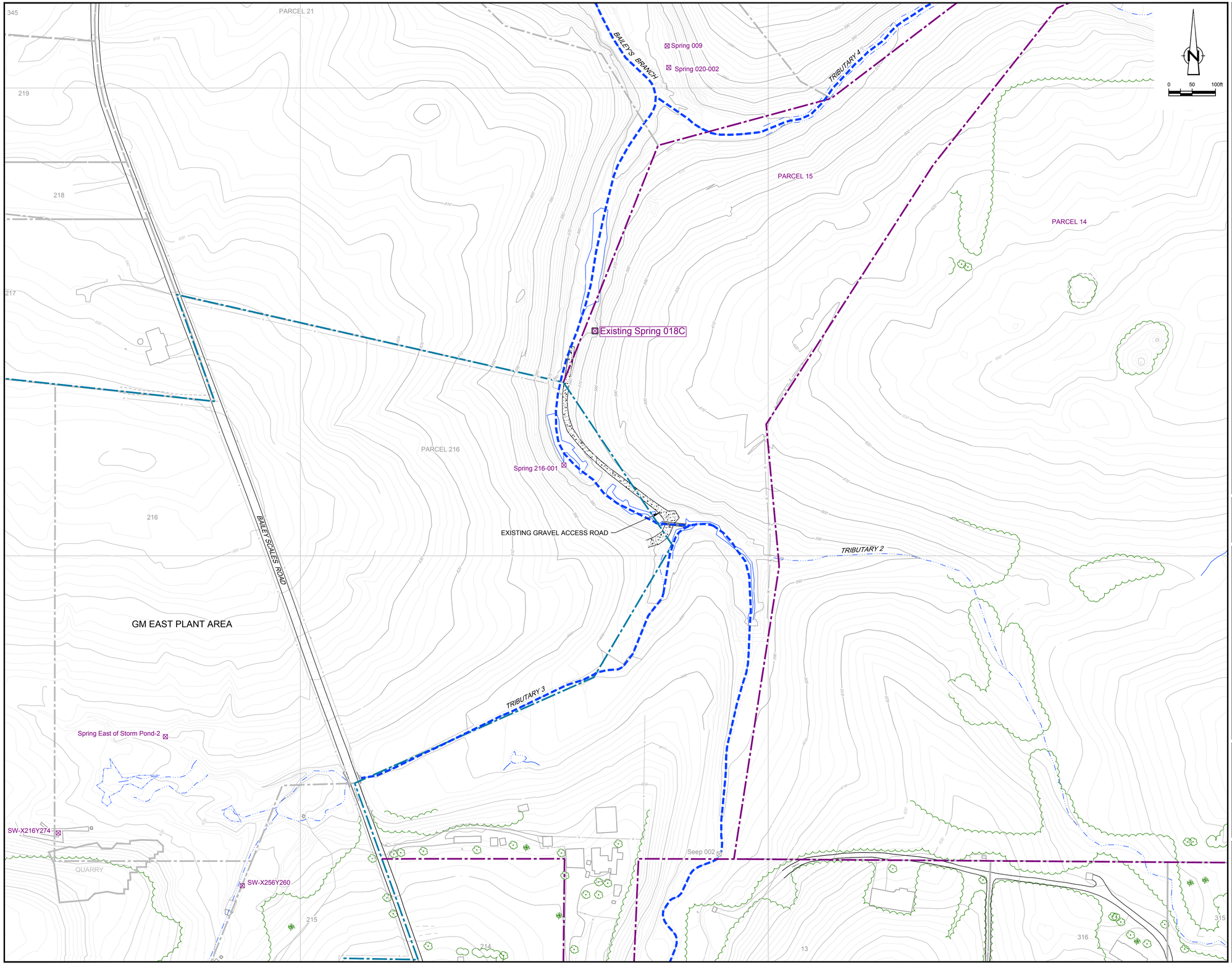
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001 AND CRA SURVEYS 2002 TO 2005

Project Manager:	Reviewed By:	Date:	
J.D.	L.L.	APRIL 2008	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: figure 1.1

13968-00(368)GN-WA002 FEB 19/2014



No	Revision	Date	Initial

LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- EXISTING FENCE
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE PARCELS 14 AND 15 BOUNDARIES
- APPROXIMATE GM PROPERTY BOUNDARY
- SPRING LOCATION

NOTE:

1) BOUNDARY BETWEEN PARCELS 14 AND 15 SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (APRIL 2011). ADJACENT PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. ADJOINING PROPERTY LINES MAY NOT ACCURATELY REPRESENT THE TRUE PROPERTY BOUNDARIES

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION

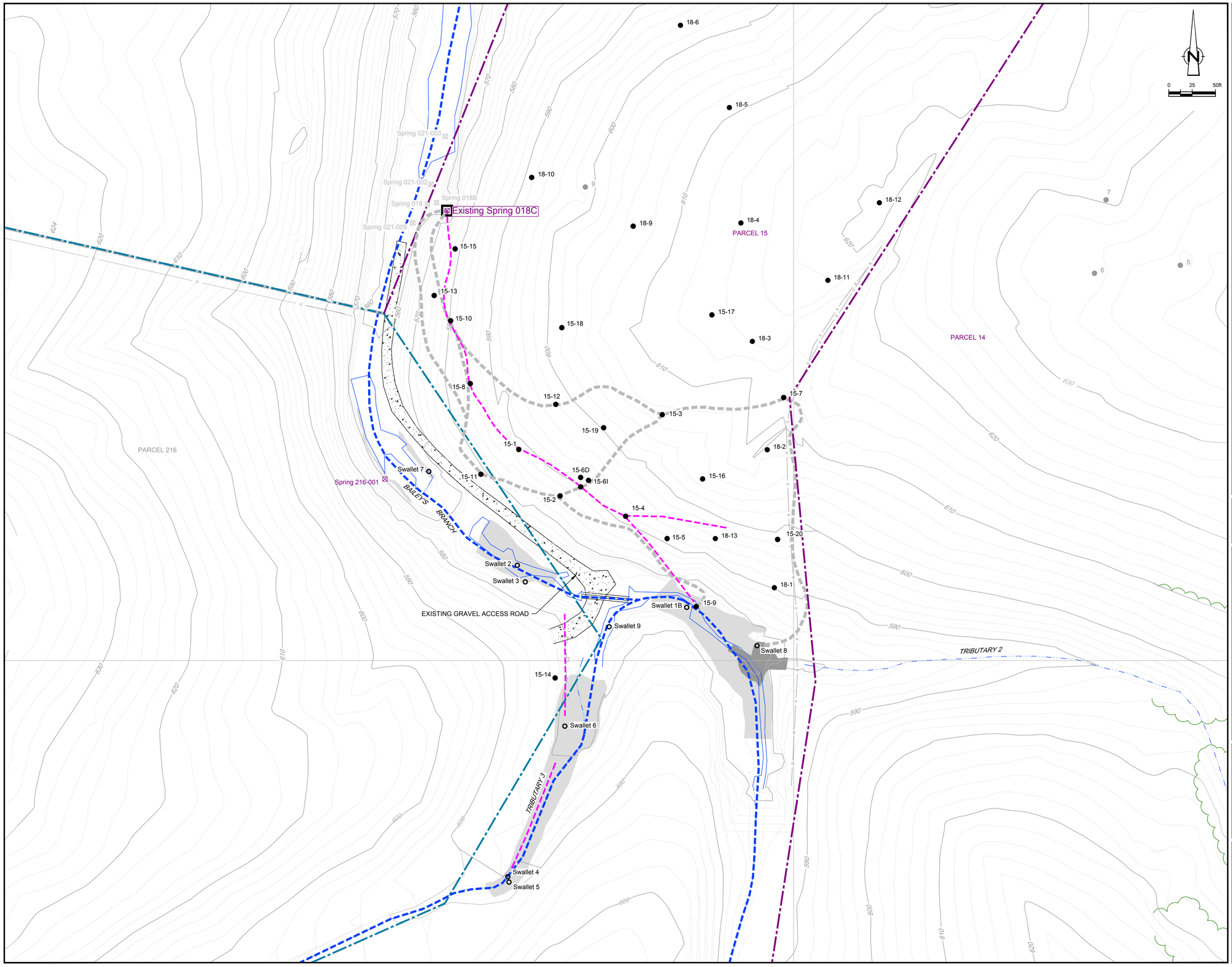
SITE PLAN

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001, AND BLEDSOE RIGGERT GUERRETTAZ SURVEY MARCH 14, 2011

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	APRIL 2011	
Scale: 1:100	Project No: 13968-00	Report No: 368	Drawing No: figure 1.2



NO	Revision	Date	Initial

LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- EXISTING FENCE
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE PARCELS 14 AND 15 BOUNDARIES
- APPROXIMATE GM PROPERTY BOUNDARY
- WILLOWSTICK PROBABLE GROUNDWATER FLOW PATH
- GPR PROBABLE GROUNDWATER FLOW PATH
- EXISTING CONCRETE CAP (2005 SURVEY)
- CONCRETE SEALING AREA (2005)
- SWALLET LOCATION
- FORMER SPRING LOCATION
- SPRING LOCATION
- SINKHOLE LOCATION
- 15-5 COREHOLE LOCATION

NOTE:

1) BOUNDARY BETWEEN PARCELS 14 AND 15 SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (APRIL 2011). ADJACENT PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. ADJOINING PROPERTY LINES MAY NOT ACCURATELY REPRESENT THE TRUE PROPERTY BOUNDARIES

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION

GEOPHYSICAL FLOW PATHWAY, SINKHOLE, AND COREHOLE LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001, AND BLEDSOE RIGGERT GUERRETTAZ SURVEY MARCH 14, 2011

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	APRIL 2011	
Scale: 1:50	Project NO: 13968-00	Report NO: 368	Drawing NO: figure 2.1

13968-00(368)GN-WA008 FEB 19/2014

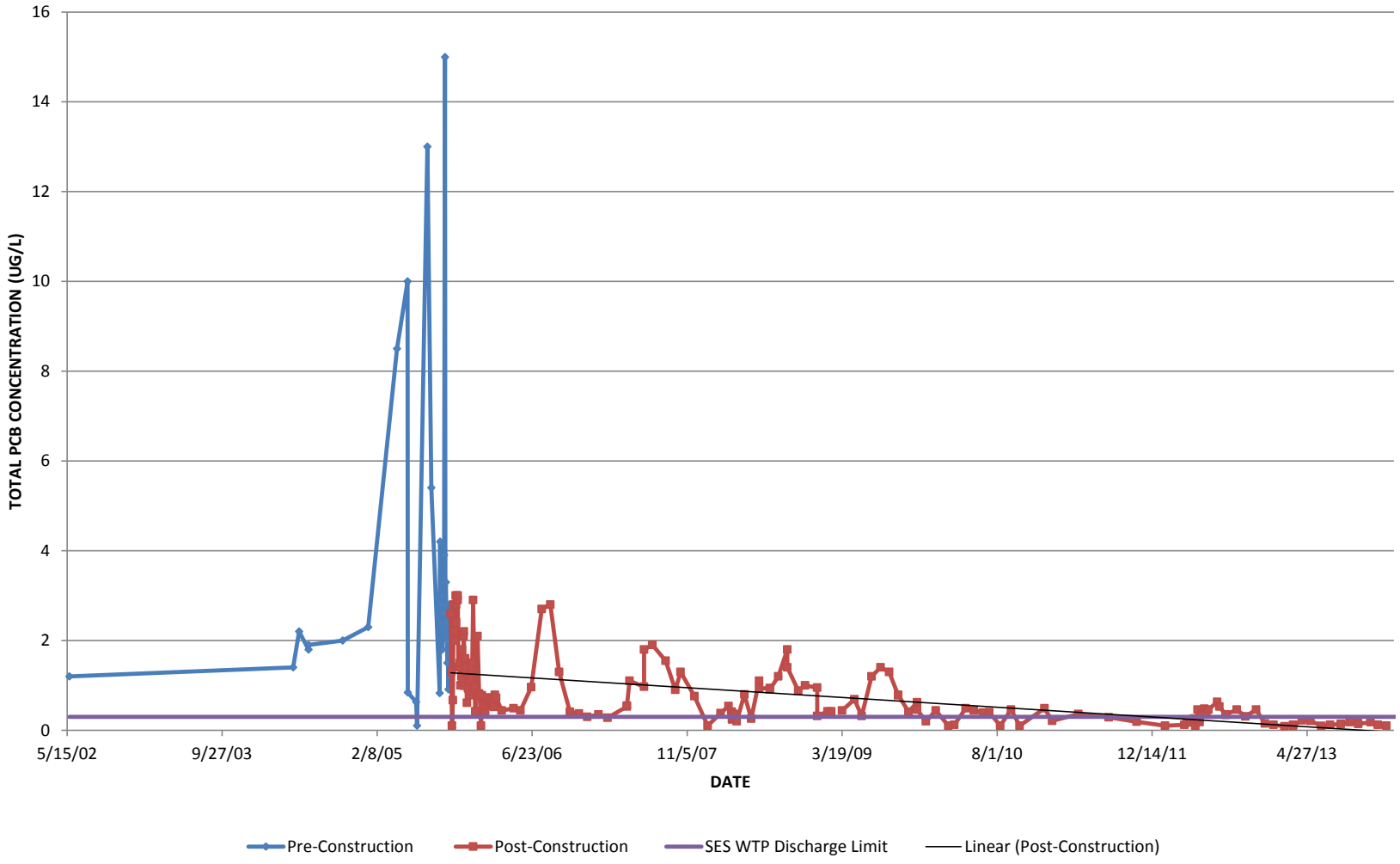


figure 2.2
SPRING 018 MONITORING RESULTS
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING
GM CETC BEDFORD FACILITY
Bedford, Indiana

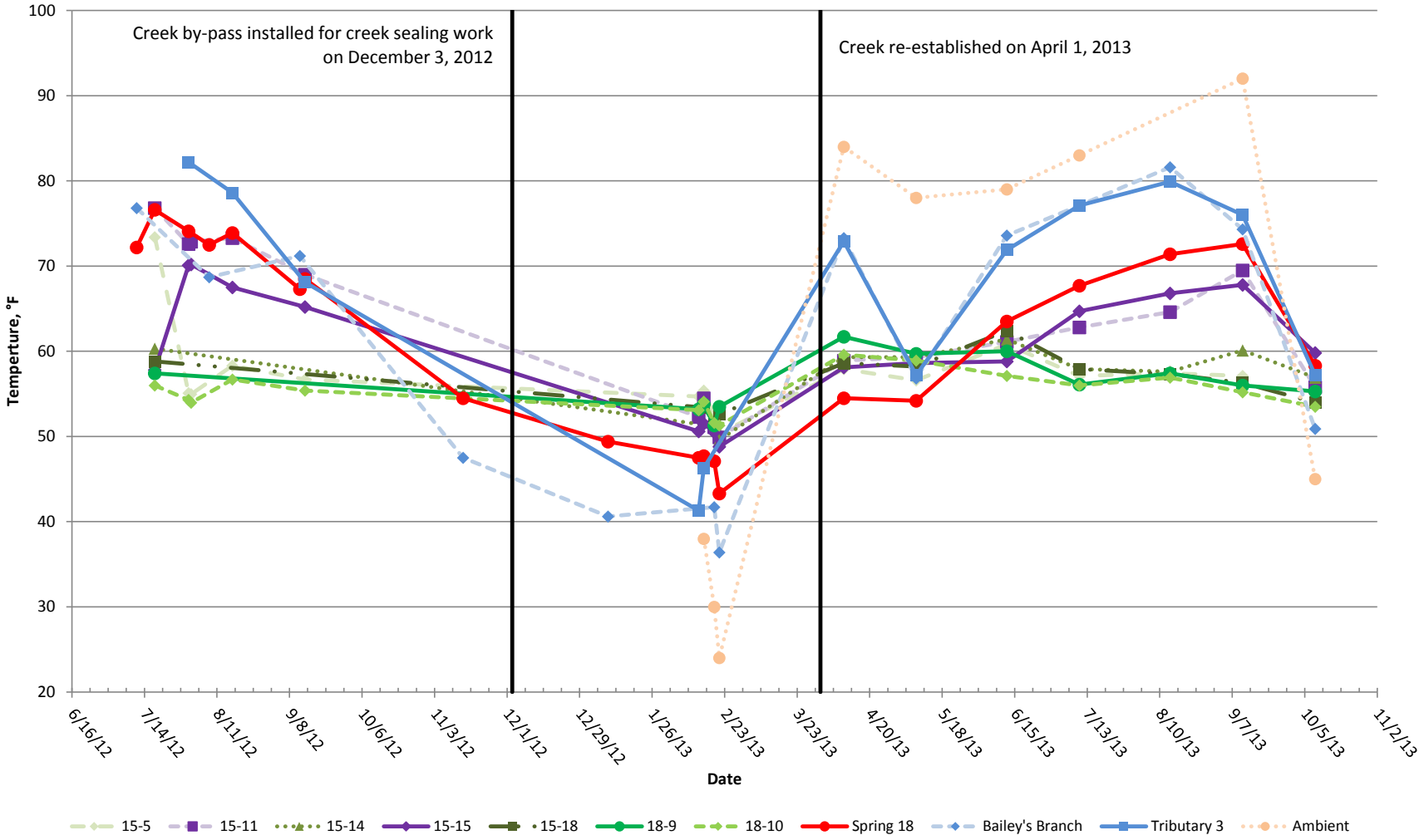


figure 2.3
SPRING 018 AREA WATER TEMPERATURE PROFILE MONITORING
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING
GM CETC BEDFORD FACILITY
Bedford, Indiana

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 015-007*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*
Sample Identification:		*SW-015-010111-GS-39539*	*SW-052202-JW-5047*	*SW-051304-JN-5204*	*SW-060104-KMV-5220*	*SW-070204-KMV-5228*	*SW-070204-KMV-5229*	*SW-102004-JN-5280*	*SW-011005-JN-5312*
Sample Date:		*1/1/2011*	*5/22/2002*	*5/13/2004*	*6/1/2004*	*7/2/2004*	*7/2/2004*	*10/20/2004*	*1/10/2005*
Sample Type:							*Duplicate*		
	Units								
PCBs									
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.2 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.2 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.4 U	0.40 UJ	0.40 UJ	0.40 UJ	0.40 UJ	0.40 U	0.40 U
Aroclor-1242 (PCB-1242)	ug/L	0.49	1.2	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	2.0	2.3
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.2 U	1.4 J	2.2 J	1.8 J	1.9 J	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.2 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.2 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Total PCBs	ug/L	0.49	1.2	1.4 J	2.2 J	1.8 J	1.9 J	2	2.3
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.4 U	0.40 U	0.40 UJ	0.40 UJ	0.40 UJ	0.40 U	0.40 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.2 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND
General Chemistry									
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--	--
Field Parameters									
Conductivity, field	mS/cm	--	0.510	0.650	0.642	0.629	0.629	0.687	0.509
Dissolved oxygen (DO), field	ug/L	--	910	4610	6270	1400	1400	8090	9600
Flow rate	gpm/ft	--	--	1	2.5	5	5	11	15
Oxidation reduction potential (ORP), field	millivolts	--	168.2	81.6	164.9	72.4	72.4	201.2	198.8
pH, field	s.u.	--	7.70	6.89	7.25	7.17	7.17	7.54	7.65
Temperature, sample	Deg C	--	15.10	18.09	17.68	23.16	23.16	14.97	10.27
Turbidity, field	NTU	--	1.48	3.19	14.40	2.51	2.51	12.50	8

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 018*	*Spring 021-002A*	*Spring 018B*	*Spring 018C*
Sample Identification:		*SW-216-041305-CL-7542*	*SW-015-051705-CL-7754*	*SW-051805-JN-5398*	*SW-015-061305-CL-7849*	*SW-061705-JN-5431*	*SW-021-072005-CL-7912*	*SW-080205-CH-7945*	*SW-015-082905-DM-7985*
Sample Date:		*4/13/2005*	*5/17/2005*	*5/18/2005*	*6/13/2005*	*6/17/2005*	*7/20/2005*	*8/2/2005*	*8/29/2005*
Sample Type:									
	Units								
PCBs									
Aroclor-1016 (PCB-1016)	ug/L	1.0 U	1.0 U	0.20 U	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	1.0 U	1.0 U	0.20 U	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	2.0 U	1.0 U	0.20 U	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	8.5	10	0.20 U	0.63	0.20 UJ	13	5.4	0.83
Aroclor-1248 (PCB-1248)	ug/L	1.0 U	1.0 U	0.84	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	1.0 U	1.0 U	0.20 U	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	1.0 U	1.0 U	0.20 U	0.20 U	0.20 UJ	1.0 U	1.0 U	0.20 U
Total PCBs	ug/L	8.5	10	0.84	0.63	ND	13	5.4	0.83
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.79	--	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	0.20 UJ	--	0.20 UJ	0.20 U	--	0.20 U
Total PCBs (dissolved)	ug/L	--	--	ND	--	ND	0.79	--	ND
General Chemistry									
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--	--
Field Parameters									
Conductivity, field	mS/cm	--	--	0.598	--	0.703	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	5980	--	7540	--	--	--
Flow rate	gpm/ft	--	--	10	--	20	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	478.2	--	465.2	--	--	--
pH, field	s.u.	--	--	7.43	--	6.99	--	--	--
Temperature, sample	Deg C	--	--	16.72	--	19.56	--	--	--
Turbidity, field	NTU	--	--	24.9	--	5.37	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-083005-DM-7992*	*SW-015-083005-DM-7993*	*SW-021-090105-DM-7994*	*SW-021-090605-DM-7997*	*SW-021-090605-DM-7998*	*SW-015-090805-DM-11004*	*SW-015-091005-KH-11024*
Sample Date:		*8/30/2005*	*8/30/2005*	*9/1/2005*	*9/6/2005*	*9/6/2005*	*9/8/2005*	*9/10/2005*
Sample Type:						*Duplicate*		
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1221 (PCB-1221)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1232 (PCB-1232)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1242 (PCB-1242)	ug/L	4.2	2.4	2.8	3.0	0.20 UJ	3.3 J	2.6 J
Aroclor-1248 (PCB-1248)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	1.8 J	0.20 UJ	0.20 UJ
Aroclor-1254 (PCB-1254)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260)	ug/L	0.40 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ
Total PCBs	ug/L	4.2	2.4	2.8	3	1.8 J	3.3 J	2.6 J
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.75	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	0.75	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
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R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***
Sample Identification:		***SW-015-091205-DM-11035***	***SW-015-091405-DM-11035***	***SW-015-091605-DM-11045***	***SW-015-091705-DM-11046***	***SW-015-091905-JS-11062***	***SW-015-092005-DM-11074***	***SW-015-092205-DM-11104***
Sample Date:		***9/12/2005***	***9/14/2005***	***9/16/2005***	***9/17/2005***	***9/19/2005***	***9/20/2005***	***9/22/2005***
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 UJ	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 UJ	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 UJ	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	3.9 J	15	2.8	0.20 U	2.4	2.0	1.5
Aroclor-1248 (PCB-1248)	ug/L	0.20 UJ	1.0 U	0.20 U	3.3	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.065 J	0.20 U
Total PCBs	ug/L	3.9 J	15	2.8	3.3	2.4	2.065 J	1.5
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.82	0.20 U	0.20 U	0.20 U	0.12 J	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.061 J	0.20 U
Total PCBs (dissolved)	ug/L	ND	0.82	ND	ND	ND	0.181 J	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-092405-CH-11110*	*SW-015-092605-JS-11111*	*SW-015-092805-DM-11130*	*SW-015-093005-DM-11154*	*SW-015-100305-DM-11163*	*SW-015-100505-DM-11173*	*SW-015-100705-DM-11191*
Sample Date:		*9/24/2005*	*9/26/2005*	*9/28/2005*	*9/30/2005*	*10/3/2005*	*10/5/2005*	*10/7/2005*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.91	0.20 UJ	0.20 U	0.20 U	1.3	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	2.0	0.20 U	0.20 UJ	2.5	2.6	0.20 U	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	2.8 J	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	2	0.91	2.8 J	2.5	2.6	1.3	ND
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.38	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	0.38	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-101005-DG-11192*	*SW-015-101205-DM-11211*	*SW-015-101405-DM-11237*	*SW-015-101705-DM-11265*	*SW-015-101905-DM-11278*	*SW-015-102105-DM-11294*	*SW-015-102105-DM-11295*
Sample Date:		*10/10/2005*	*10/12/2005*	*10/14/2005*	*10/17/2005*	*10/19/2005*	*10/21/2005*	*10/21/2005*
Sample Type:								*Duplicate*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	1.0 U	2.8	2.2	2.0	3.0	2.4	2.8
Aroclor-1248 (PCB-1248)	ug/L	0.67 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.67 J	2.8	2.2	2	3	2.4	2.8
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.31	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	0.31	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-102405-KH-11303*	*SW-015-102605-DM-11315*	*SW-015-102605-DM-11316*	*SW-015-102805-DM-11342*	*SW-015-103105-DM-11347*	*SW-015-103105-DM-11348*	*SW-015-110205-DM-11362*
Sample Date:		*10/24/2005*	*10/26/2005*	*10/26/2005*	*10/28/2005*	*10/31/2005*	*10/31/2005*	*11/2/2005*
Sample Type:				*Duplicate*			*Duplicate*	
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	3.0	2.9	3.0	1.4	1.4	1.4	1.5
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	3	2.9	3	1.4	1.4	1.4	1.5
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.34 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

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BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***
Sample Identification:		***SW-015-110405-AH-11375***	***SW-015-110705-AH-11386***	***SW-015-110905-AH-11402***	***SW-015-111105-KH-11405***	***SW-015-111405-AH-11406***	***SW-015-111505-AH-11412***	***SW-015-111705-AH-11416***
Sample Date:		***11/4/2005***	***11/7/2005***	***11/9/2005***	***11/11/2005***	***11/14/2005***	***11/15/2005***	***11/17/2005***
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	1.0 J	1.2 J	1.8 J	1.1 J	2.1	2.2	0.99
Aroclor-1248 (PCB-1248)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	R	0.20 UJ	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	1 J	1.2 J	1.8 J	1.1 J	2.1	2.2	0.99
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	2.0 J	0.20 UJ	0.20 U	0.64	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.078 J	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	R	0.20 UJ	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	2 J	ND	ND	0.718 J	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-111905-AH-11419*	*SW-015-111905-AH-11420*	*SW-015-112105-AH-11427*	*SW-015-112305-AH-11428*	*SW-015-112505-CH-11429*	*SW-015-112805-AH-11433*	*SW-015-113005-AH-11434*
Sample Date:		*11/19/2005*	*11/19/2005*	*11/21/2005*	*11/23/2005*	*11/25/2005*	*11/28/2005*	*11/30/2005*
Sample Type:			*Duplicate*					
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	1.5	1.6	1.3	1.4	0.20 U	0.93	1.2
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.61	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	1.5	1.6	1.3	1.4	0.61	0.93	1.2
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.11 J	0.20 U	0.080 J	0.13 J	0.20 U	0.11 J	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.11 J	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	0.11 J	ND	0.08 J	0.13 J	0.11 J	0.11 J	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-120205-AH-11441*	*SW-015-120505-AH-11442*	*SW-015-120805-JF-11459*	*SW-015-121205-KH-11464*	*SW-015-121205-KH-11465*	*SW-015-121505-AH-11477*	*SW-015-121905-AH-11478*
Sample Date:		*12/2/2005*	*12/5/2005*	*12/8/2005*	*12/12/2005*	*12/12/2005*	*12/15/2005*	*12/19/2005*
Sample Type:						*Duplicate*		
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.78	1.1	1.3	1.4	1.5	2.9	0.98
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.78	1.1	1.3	1.4	1.5	2.9	0.98
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.33	0.26	0.16 J	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.13 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	0.13 J	ND	0.33	0.26	0.16 J	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-122205-AH-11482*	*SW-015-122905-AH-11496*	*SW-015-010306-KH-11503*	*SW-015-010506-AH-11510*	*SW-015-010906-AH-11515*	*SW-015-011206-AH-11524*	*SW-015-011906-KH-11531*
Sample Date:		*12/22/2005*	*12/29/2005*	*1/3/2006*	*1/5/2006*	*1/9/2006*	*1/12/2006*	*1/19/2006*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.42 J	2.1	0.20 U	0.77	0.20 U	0.78	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.20 UJ	0.20 U	0.82	0.20 U	0.20 U	0.20 U	0.56
Aroclor-1254 (PCB-1254)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.42 J	2.1	0.82	0.77	ND	0.78	0.56
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
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* - Laboratory split/duplicate reanalyzed by laboratory
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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-012306-AH-11545*	*SW-015-012606-AH-11549*	*SW-015-013006-CL-11550*	*SW-015-020206-KH-11568*	*SW-015-020606-KH-11569*	*SW-015-020906-AH-11589*	*SW-015-021306-KH-11597*
Sample Date:		*1/23/2006*	*1/26/2006*	*1/30/2006*	*2/2/2006*	*2/6/2006*	*2/9/2006*	*2/13/2006*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.37	0.54	0.73	0.60	0.20 UJ	0.20 U	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.58 J	0.69	0.60
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U
Total PCBs	ug/L	0.37	0.54	0.73	0.6	0.58 J	0.69	0.6
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.093 J
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	0.093 J
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-021606-AH-11599*	*SW-015-022006-AH-11604*	*SW-015-022306-AH-11612*	*SW-015-022706-AH-11618*	*SW-015-031706-KH-11632*	*SW-015-042406-AH-11673*	*SW-015-051606-DL-11773*
Sample Date:		*2/16/2006*	*2/20/2006*	*2/23/2006*	*2/27/2006*	*3/17/2006*	*4/24/2006*	*5/16/2006*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	0.52	0.79	0.72	0.44	0.49	0.44
Aroclor-1248 (PCB-1248)	ug/L	0.66	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.66	0.52	0.79	0.72	0.44	0.49	0.44
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***
Sample Identification:		***SW-015-062006-AH-11846***	***SW-015-072406-KH-11919***	***SW-015-082106-AH-11939***	***SW-091806-JN-5833***	***SW-102306-JN-5884***	***SW-015-112106-AH-27146***	***SW-015-121806-AH-27168***
Sample Date:		***6/20/2006***	***7/24/2006***	***8/21/2006***	***9/18/2006***	***10/23/2006***	***11/21/2006***	***12/18/2006***
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	2.7	2.8	0.20 U	0.41	0.20 U	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.96	0.20 U	0.20 U	1.3	0.20 U	0.37	0.30
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.96	2.7	2.8	1.3	0.41	0.37	0.3
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	0.645	0.672	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	5430	3530	--	--
Flow rate	gpm/ft	--	--	--	20	50	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	277.2	201.7	--	--
pH, field	s.u.	--	--	--	7.18	7.53	--	--
Temperature, sample	Deg C	--	--	--	17.25	13.82	--	--
Turbidity, field	NTU	--	--	--	25	43	--	--

Notes:

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R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-012307-AH-27194*	*SW-015-022107-AH-27218*	*SW-042507-JN-5985*	*SW-042507-JN-5986*	*SW-015-053007-AH-27296*	*SW-015-061907-AH-27322*	*SW-015-061907-AH-27323*
Sample Date:		*1/23/2007*	*2/21/2007*	*4/25/2007*	*4/25/2007*	*5/30/2007*	*6/19/2007*	*6/19/2007*
Sample Type:					*Duplicate*			*Duplicate*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	0.28	0.53	0.55	1.1	0.20 U	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.35	0.20 U	0.20 U	0.20 U	0.20 U	0.97 J	1.8 J
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Total PCBs	ug/L	0.35	0.28	0.53	0.55	1.1	0.97 J	1.8 J
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.077 J
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	0.077 J
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	0.505	0.501	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	10210	9970	--	--	--
Flow rate	gpm/ft	--	--	55	55	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	100.1	103.8	--	--	--
pH, field	s.u.	--	--	7.71	7.69	--	--	--
Temperature, sample	Deg C	--	--	13.62	13.11	--	--	--
Turbidity, field	NTU	--	--	267	49.1	--	--	--

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[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***
Sample Identification:		***SW-015-071607-AH-27344***	***SW-082707-JN-6006***	***SW-015-091807-AH-27388***	***SW-015-101507-AH-27405***	***SW-015-112907-AH-27470***	***SW-011008-JN-6047***	***SW-015-022008-AH-27530***
Sample Date:		***7/16/2007***	***8/27/2007***	***9/18/2007***	***10/15/2007***	***11/29/2007***	***1/10/2008***	***2/20/2008***
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	1.9	1.5	0.90	0.20 U	0.76	0.20 U	0.38
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	1.3	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.050 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	1.9	1.55 J	0.9	1.3	0.76	ND	0.38
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.2
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	1.2
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	0.713	--	--	--	0.488	--
Dissolved oxygen (DO), field	ug/L	--	5960	--	--	--	8540	--
Flow rate	gpm/ft	--	7.5	--	--	--	55	--
Oxidation reduction potential (ORP), field	millivolts	--	177.9	--	--	--	94.5	--
pH, field	s.u.	--	7.94	--	--	--	8.44	--
Temperature, sample	Deg C	--	22.51	--	--	--	10.09	--
Turbidity, field	NTU	--	10.53	--	--	--	23.8	--

Notes:

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[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-031808-MB-27551*	*SW-015-032708-CH-27557*	*SW-015-032708-CH-27558*	*SW-015-032808-CH-27559*	*SW-015-032908-MB-27560*	*SW-015-033108-CH-27561*	*SW-015-040108-CH-27562*
Sample Date:		*3/18/2008*	*3/27/2008*	*3/27/2008*	*3/28/2008*	*3/29/2008*	*3/31/2008*	*4/1/2008*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	0.36	0.41	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.54	0.20 U	0.20 U	0.41	0.24	0.26	0.31
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.54	0.36	0.41	0.41	0.24	0.26	0.31
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
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[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-040308-CH-27571*	*SW-015-040408-CH-27572*	*SW-015-041308-YM-27577*	*SW-015-050808-MB-27631*	*SW-015-053008-MB-27696*	*SW-015-062408-MB-27731*	*SW-015-062408-MB-27732*
Sample Date:		*4/3/2008*	*4/4/2008*	*4/13/2008*	*5/8/2008*	*5/30/2008*	*6/24/2008*	*6/24/2008*
Sample Type:								*Duplicate*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.1	0.93
Aroclor-1248 (PCB-1248)	ug/L	0.31	0.36	0.20	0.80	0.26	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.31	0.36	0.2	0.8	0.26	1.1	0.93
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-072908-MB-27765*	*SW-015-072908-MB-27766*	*SW-015-082508-MB-27807*	*SW-092308-JN-6084*	*SW-092308-JN-6085*	*SW-015-102908-MB-27858*	*SW-015-112008-MB-27893*
Sample Date:		*7/29/2008*	*7/29/2008*	*8/25/2008*	*9/23/2008*	*9/23/2008*	*10/29/2008*	*11/20/2008*
Sample Type:			*Duplicate*			*Duplicate*		
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.94	0.91	1.2	1.8 J	1.4 J	0.88	1.0
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.94	0.91	1.2	1.8 J	1.4 J	0.88	1
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.82 J	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	0.82 J	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	0.729	0.727	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	3410	3950	--	--
Flow rate	gpm/ft	--	--	--	--	7.5	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	52.7	55.5	--	--
pH, field	s.u.	--	--	--	7.37	7.18	--	--
Temperature, sample	Deg C	--	--	--	20.81	20.47	--	--
Turbidity, field	NTU	--	--	--	6.75	6.74	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-122908-JN-6097*	*SW-122908-JN-6098*	*SW-012109-JN-6108*	*SW-015-021209-JN-27980*	*SW-015-021209-JN-27980*	*SW-015-031909-JN-39008*	*SW-015-042809-JN-39051*	*SW-015-052109-JN-39075*
Sample Date:		*12/29/2008*	*12/29/2008*	*1/21/2009*	*2/12/2009*	*2/12/2009*	*3/19/2009*	*4/28/2009*	*5/21/2009*
Sample Type:			*Duplicate*			*Split Duplicate*			
	Units								
PCBs									
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.20 U	0.20 U	0.42	13	0.42	0.44	0.69	0.32
Aroclor-1248 (PCB-1248)	ug/L	0.95 J	0.32 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.33	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	0.95 J	0.32 J	0.42	13.33 *	0.42	0.44	0.69	0.32
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	--	ND	ND	ND
General Chemistry									
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--	--
Field Parameters									
Conductivity, field	mS/cm	0.498	0.496	0.548	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	11390	10810	18380	--	--	--	--	--
Flow rate	gpm/ft	0 NM	0 NM	12.5	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	77.6	79.1	140.9	--	--	--	--	--
pH, field	s.u.	7.69	7.67	8.48	--	--	--	--	--
Temperature, sample	Deg C	8.99	9.01	7.71	--	--	--	--	--
Turbidity, field	NTU	139	131	6.48	--	--	--	--	--

Notes:

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J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-062209-JN-39096*	*SW-015-072109-JN-39117*	*SW-015-081809-JN-39149*	*SW-015-091609-JN-39170*	*SW-015-091609-JN-39171*	*SW-015-101909-JN-39196*	*SW-015-111609-JN-39220*
Sample Date:		*6/22/2009*	*7/21/2009*	*8/18/2009*	*9/16/2009*	*9/16/2009*	*10/19/2009*	*11/16/2009*
Sample Type:						*Duplicate*		
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	1.2	1.4	1.3	0.78	0.79	0.41	0.62
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs	ug/L	1.2	1.4	1.3	0.78	0.79	0.41	0.62
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 U	0.21	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 U	1.5 U	0.20 U	0.20 U	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	0.21	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-111609-JN-39221*	*SW-015-121409-JN-39252*	*SW-015-011510-GS-39277*	*SW-015-022510-GS-39278*	*SW-015-031610-GS-39335*	*SW-015-042210-GS-39366*	*SW-015-051810-GS-39385*
Sample Date:		*11/16/2009*	*12/14/2009*	*1/15/2010*	*2/25/2010*	*3/16/2010*	*4/22/2010*	*5/18/2010*
Sample Type:		*Duplicate*						
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1242 (PCB-1242)	ug/L	0.46	0.20	0.44	0.20 U	0.12 J	0.49 J	0.44 J
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Total PCBs	ug/L	0.46	0.2	0.44	ND	0.12 J	0.49 J	0.44 J
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
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R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-061610-GS-39402*	*SW-015-070710-SM-39429*	*SW-015-081110-AS-39445*	*SW-015-091510-GS-39474*	*SW-015-101310-SM-39494*	*SW-015-012611-GS-39557*	*SW-015-042011-GS-39607*
Sample Date:		*6/16/2010*	*7/7/2010*	*8/11/2010*	*9/15/2010*	*10/13/2010*	*1/26/2011*	*4/20/2011*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.39	0.40 J	0.20 UJ	0.46 J	0.20 UJ	0.21	0.20 U
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.36
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Total PCBs	ug/L	0.39	0.4 J	ND	0.46 J	ND	0.21	0.36
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	ND	ND	ND
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	--	--	--	--
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-072711-SM-39675*	*SW-015-102511-GS-39735*	*SW-015-012512-GS-39798*	*SW-015-032712-GS-39834*	*SW-015-040212-GS-39837*	*SW-015-041712-GS-39838*	*SW-015-042712-GS-39847*
Sample Date:		*7/27/2011*	*10/25/2011*	*1/25/2012*	*3/27/2012*	*4/2/2012*	*4/17/2012*	*4/27/2012*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U	0.21 U	0.19 U
Aroclor-1221 (PCB-1221)	ug/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U	0.21 U	0.19 U
Aroclor-1232 (PCB-1232)	ug/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U	0.21 U	0.19 U
Aroclor-1242 (PCB-1242)	ug/L	0.19 U	0.19	0.20 U	0.19 U	0.21	0.17 J	0.19 U
Aroclor-1248 (PCB-1248)	ug/L	0.29	0.19 U	0.20 U	0.12 J	0.19 U	0.21 U	0.26
Aroclor-1254 (PCB-1254)	ug/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U	0.21 U	0.19 U
Aroclor-1260 (PCB-1260)	ug/L	0.19 U	0.19 U	0.20 U	0.19 U	0.19 U	0.21 U	0.19 U
Total PCBs	ug/L	0.29	0.19	ND	0.12 J	0.21	0.17 J	0.26
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	0.20 U	0.19 U	0.20 U	0.19 U	--	--	--
Total PCBs (dissolved)	ug/L	ND	ND	ND	ND	--	--	--
General Chemistry								
Total suspended solids (TSS)	ug/L	--	--	--	4000 U	3000 J	4000 U	4000 U
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-050212-GS-39848*	*SW-015-050812-GS-39849*	*SW-015-050912-GS-39850*	*SW-015-051512-GS-39851*	*SW-015-051512-GS-39852*	*SW-015-052312-GS-39855*	*SW-015-053012-GS-39856*
Sample Date:		*5/2/2012*	*5/8/2012*	*5/9/2012*	*5/15/2012*	*5/15/2012*	*5/23/2012*	*5/30/2012*
Sample Type:						*Duplicate*		
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U
Aroclor-1221 (PCB-1221)	ug/L	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U
Aroclor-1232 (PCB-1232)	ug/L	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U
Aroclor-1242 (PCB-1242)	ug/L	0.10 J	0.20 U	0.46	0.18 J	0.25	0.36	0.19 U
Aroclor-1248 (PCB-1248)	ug/L	0.19 U	0.21	0.20 U	0.19 U	0.19 U	0.19 U	0.48
Aroclor-1254 (PCB-1254)	ug/L	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U
Aroclor-1260 (PCB-1260)	ug/L	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U
Total PCBs	ug/L	0.1 J	0.21	0.46	0.18 J	0.25	0.36	0.48
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	--	--	--	--	--
Total PCBs (dissolved)	ug/L	--	--	--	--	--	--	--
General Chemistry								
Total suspended solids (TSS)	ug/L	2000 J	25000	11000	4000 U	4000 U	2000 J	4000 U
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
* - Laboratory split/duplicate reanalyzed by laboratory
[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-060612-GS-39857*	*SW-015-061312-GS-39862*	*SW-015-071112-GS-39868*	*SW-015-071812-KMV-39869*	*SW-015-080812-GS-39870*	*SW-015-080812-GS-39871*	*SW-015-091212-GS-39881*
Sample Date:		*6/6/2012*	*6/13/2012*	*7/11/2012*	*7/18/2012*	*8/8/2012*	*8/8/2012*	*9/12/2012*
Sample Type:							*Duplicate*	
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.19 U	0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.19 U	0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.19 U	0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.19 U	0.46	0.63	0.20 U	0.34 J	0.35 J	0.46
Aroclor-1248 (PCB-1248)	ug/L	0.37	0.19 U	0.19 U	0.53	0.19 U	0.20 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.19 U	0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.19 U	0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.20 U
Total PCBs	ug/L	0.37	0.46	0.63	0.53	0.34 J	0.35 J	0.46
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	--	--	--	--	--
Total PCBs (dissolved)	ug/L	--	--	--	--	--	--	--
General Chemistry								
Total suspended solids (TSS)	ug/L	4000 U	3000 J	3000 J	4000	4000 U	4000 U	16000
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.
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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-101012-GS-39907*	*SW-015-111412-GS-39912*	*SW-015-121212-GS-39924*	*SW-015-010913-GS-39925*	*SW-015-021313-GS-39928*	*SW-015-031313-GS-39940*	*SW-015-031313-GS-39941*
Sample Date:		*10/10/2012*	*11/14/2012*	*12/12/2012*	*1/9/2013*	*2/13/2013*	*3/13/2013*	*3/13/2013*
Sample Type:								*Duplicate*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.19 U	0.19 U	0.20 U	0.21 U	0.20 U	0.19 U	0.19 UJ
Aroclor-1221 (PCB-1221)	ug/L	0.19 U	0.19 U	0.20 U	0.21 U	0.20 U	0.19 U	0.19 UJ
Aroclor-1232 (PCB-1232)	ug/L	0.19 U	0.19 U	0.20 U	0.21 U	0.20 U	0.19 U	0.19 UJ
Aroclor-1242 (PCB-1242)	ug/L	0.19 U	0.46	0.15 J	0.21 U	0.088 J	0.19 U	0.19 UJ
Aroclor-1248 (PCB-1248)	ug/L	0.31	0.19 U	0.20 U	0.12 J	0.20 U	0.12 J	0.19 UJ
Aroclor-1254 (PCB-1254)	ug/L	0.19 U	0.19 U	0.20 U	0.21 U	0.20 U	0.19 U	0.19 U
Aroclor-1260 (PCB-1260)	ug/L	0.19 U	0.19 U	0.20 U	0.21 U	0.20 U	0.19 U	0.19 U
Total PCBs	ug/L	0.31	0.46	0.15 J	0.12 J	0.088 J	0.12	ND
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	--	--	--	--	--
Total PCBs (dissolved)	ug/L	--	--	--	--	--	--	--
General Chemistry								
Total suspended solids (TSS)	ug/L	4000	43000	4000 U	5000	4000 U	5000	3000 J
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
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TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*	*Spring 018C*
Sample Identification:		*SW-015-041013-GS-39942*	*SW-015-050813-GS-39953*	*SW-015-061213-SA-39956*	*SW-015-071013-GS-39966*	*SW-015-081413-GS-39969*	*SW-015-091113-SM-39973*	*SW-015-100713-GS-39976*
Sample Date:		*4/10/2013*	*5/8/2013*	*6/12/2013*	*7/10/2013*	*8/14/2013*	*9/11/2013*	*10/7/2013*
Sample Type:								
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.19 U	0.21 U	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Aroclor-1221 (PCB-1221)	ug/L	0.19 U	0.21 U	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Aroclor-1232 (PCB-1232)	ug/L	0.19 U	0.21 U	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Aroclor-1242 (PCB-1242)	ug/L	0.19 U	0.21 U	0.19 U	0.12 J	0.14 J	0.18 J	0.20 J
Aroclor-1248 (PCB-1248)	ug/L	0.22	0.21	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Aroclor-1254 (PCB-1254)	ug/L	0.19 U	0.21 U	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Aroclor-1260 (PCB-1260)	ug/L	0.19 U	0.21 U	0.19 U	0.19 U	0.19 U	0.19 U	0.20 U
Total PCBs	ug/L	0.22	0.21	ND	0.12 J	0.14 J	0.18 J	0.2 J
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	--	--	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	--	--	--	--	--
Total PCBs (dissolved)	ug/L	--	--	--	--	--	--	--
General Chemistry								
Total suspended solids (TSS)	ug/L	4000 U	5000	2000 J	4000 U	3000 J	4000	2000 J
Field Parameters								
Conductivity, field	mS/cm	--	--	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--	--	--

Notes:

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J - Estimated concentration.
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[1] - February 11, 2014 sample result is unvalidated.

TABLE 2.1

SPRING 018 PCBs ANALYTICAL RESULTS SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCITON CERTIFICATION
GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location:		***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***	***Spring 018C***
Sample Identification:		***SW-015-100913-GS-39977***	***SW-015-111813-GS-39982***	***SW-015-121113-GS-39985***	***SW-015-010814-GS-39988***	***SW-015-021114-GS-39994 [1]***
Sample Date:		***10/9/2013***	***11/18/2013***	***12/11/2013***	***1/8/2014***	***2/11/2014***
Sample Type:						
	Units					
PCBs						
Aroclor-1016 (PCB-1016)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Aroclor-1221 (PCB-1221)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Aroclor-1232 (PCB-1232)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Aroclor-1242 (PCB-1242)	ug/L	0.14 J	0.18 J	0.12 J	0.20 U	0.059 J
Aroclor-1248 (PCB-1248)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Aroclor-1254 (PCB-1254)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Aroclor-1260 (PCB-1260)	ug/L	0.20 U	0.22 U	0.19 U	0.20 U	0.19 U
Total PCBs	ug/L	0.14 J	0.18 J	0.12 J	ND	0.059 J
Aroclor-1016 (PCB-1016) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1221 (PCB-1221) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1232 (PCB-1232) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1242 (PCB-1242) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1248 (PCB-1248) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1254 (PCB-1254) (dissolved)	ug/L	--	--	--	--	--
Aroclor-1260 (PCB-1260) (dissolved)	ug/L	--	--	--	--	--
Total PCBs (dissolved)	ug/L	--	--	--	--	--
General Chemistry						
Total suspended solids (TSS)	ug/L	3000 J	5000	4000 U	8000	19000
Field Parameters						
Conductivity, field	mS/cm	--	--	--	--	--
Dissolved oxygen (DO), field	ug/L	--	--	--	--	--
Flow rate	gpm/ft	--	--	--	--	--
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--
pH, field	s.u.	--	--	--	--	--
Temperature, sample	Deg C	--	--	--	--	--
Turbidity, field	NTU	--	--	--	--	--

Notes:

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TABLE 2.2

SPRING 018 AREA TEMPERATURE AND CONDUCTIVITY MONITORING SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION
GM BEDFORD REMEDIATION PROJECT
BEDFORD, INDIANA

	7/18/2012	7/31/2012		7/31-12 - 8/1/12		8/17/2012				9/14/2012				2/13/2013		2/15/2013		2/19/2013	
Corehole				Upper	Lower	Upper		Lower		Upper		Lower							
	°F	°F	Conductivity	°F	°F	°F	Conductivity	°F	Conductivity	°F	Conductivity	°F	Conductivity	°F	Conductivity	°F	Conductivity	°F	Conductivity
15-1	--	61.6	514	60.85	61.63	64.7	467	66.2	548	64.5	326	65.3	354	--	--	--	--	--	S
15-2	--	66.7	811	68.13	66.79	66.7	495	67.3	662	62.5	448	62.9	454	--	--	--	--	--	--
15-3	58.3	54.7	523	54.43	54.74	56.9	347	58.3	368	55.5	343	55.3	351	--	--	--	--	--	--
15-4	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-5	73.4	55.1	505	54.97	55.13	58.3	378	59.5	422	56.7	350	57.7	364	54.7	808	55.4	756	52.3	621
15-6	58.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-6 D	57.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-6 I	58.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-7	58.8	55.1	531	54.83	58.28	57.3	354	58.7	367	55.9	357	57.6	370	--	--	--	--	--	--
15-8	--	55.6	463	55.44	55.72	58.5	330	61.2	344	56.7	394	57.7	411	--	--	--	--	--	--
15-9	68.2	67.7	729	68.57	68.32	59.3	432	66.4	463	57.5	387	61.3	398	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted
15-9 (creek)	78.8	76.6	920	--	76.72	--	784	72.9	--	--	426	70.8	--	--	--	--	--	--	--
15-10	76.1	72.9	880	73.04	73.1	70.5	412	71.7	426	67.5	447	60.1	442	--	--	--	--	--	--
15-11	76.8	72.6	764	72.86	72.69	73.3	347	73.1	350	69	356	68.2	321	52.3	535	54.5	521	51.1	597
15-12	58.6	55.4	470	55.22	55.42	58.4	326	60.8	344	56	328	55.8	339	--	--	--	--	--	--
15-13	Dry	Dry	Dry	--	--	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	--	--	--	--	--	--
15-14	60.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	51.2	523
15-15	57.8	70.1	828	70.19	70.26	67.5	392	68.5	470	65.2	417	65.2	417	50.6	583	51.5	614	50.5	655
15-16	57.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-17	57.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-18	58.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53.4	753	51.7	631
15-19	58.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-20	58.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-1	56.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-2	58.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-3	57.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-4	57.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-5	57.9	54.3	476	53.78	54.34	58.8	320	59.7	338	54.8	327	55.8	337	--	--	--	--	--	--
18-6	56.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-7	55.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-8	60.8	57.3	500	56.65	57.17	61.6	320	62.8	326	60	326	59.9	348	--	--	--	--	--	--
18-9	57.4	--	--	--	--	--	--	--	--	--	--	--	--	53.2	511	53.8	702	51.3	715
18-10	56	54.3	504	53.96	54.34	56.7	329	58.7	326	55.4	343	55.4	361	53.1	710	54.1	689	51.6	683
18-11	57.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-12	56.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-13	58.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Spring 18	76.6	74.1	801	--	74.12	73.9	428	--	--	68.5	443	--	--	47.5	665	47.7	698	47.1	640
Tributary 2	--	Dry	Dry	--	--	76.3	328	--	--	71.6	439	--	--	--	--	--	--	Dry	Dry
Tributary 3	--	82.2	575	--	82.23	78.6	262	--	--	68.1	315	--	--	41.3	997	46.3	1117		
Swallet 7	--	74.4	631	--	74.27	77.5	263	--	--	66.2	296	--	--	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
Pond Area	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	44.5	667	47.9	683	42.7	602
Air Temp.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	38	NA	30	NA
Trib 3 - Ponded at Dam near Confluence																		41.8	754
SES By-Pass Pump Discharge (downstream of Spring 018)																		42.5	739
Baileys Branch (upstream of concrete sealing areas)																		41.7	744
Trib 3 - at Bailey Scales Road Culvert																		37.3	341

TABLE 2.2

SPRING 018 AREA TEMPERATURE AND CONDUCTIVITY MONITORING SUMMARY
BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION
GM BEDFORD REMEDIATION PROJECT
BEDFORD, INDIANA

	2/21/2013		4/10/2013		5/8/2013		6/12/2013		7/10/2013		8/14/2013		9/11/2013		10/9/2013	
Corehole	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**	**°F**	**Conductivity**
15-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-5	50.3	523	57.9	637	56.6	663	60.8	759	57.1	350	57.4	350	57.1	358	54.9	716
15-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-6 D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-6 I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-9	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted	Grouted
15-9 (creek)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-11	49.9	501	58.9	558	59.3	602	61.1	565	62.8	576	64.6	328	69.5	288	55.8	682
15-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-14	49.6	536	59.3	793	59.3	783	61.4	660	57.9	368	57.6	421	60.1	379	56.9	938
15-15	48.8	642	58.1	801	58.6	799	58.8	715	64.7	434	66.8	662	67.8	653	59.8	1317
15-16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-18	52.6	628	58.6	766	58.2	801	62.4	246	57.9	333	57.3	319	56.3	333	54	601
15-19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-9	53.5	640	61.7	711	59.7	736	60	695	56.1	338	57.4	369	56	365	55.3	870
18-10	51.3	663	59.6	737	58.9	821	57.1	680	56	354	56.9	365	55.2	356	53.5	738
18-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Spring 18	43.3	756	54.5	337	54.2	629	63.5	801	67.7	1043	71.4	777	72.6	762	58.3	1016
Tributary 2	Dry	Dry	Dry	Dry	56.8	722	75.8	549	dry	dry	dry	dry	dry	dry	dry	dry
Tributary 3			72.9	1211	57.2	773	71.9	999	77.1	315	79.9	784	76	251	57.2	708
Swallet 7	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
Pond Area	38.6	421	71.1	1213	56.9	728	74.2	608	77.9	580	79.1	768	76.5	251	59.2	716
Air Temp.	24	NA	84	NA	78	NA	79	NA	83	NA	NA	NA	92	NA	45	NA
Trib 3 - Ponded at Dam near Confluence	37.7	1135														
SES By-Pass Pump Discharge (downstream of Spring 018)	39.1	1005														
Baileys Branch (upstream of concrete sealing areas)	36.4	1308	73.3	1251	56.8	811	73.6	584	77.1	630	81.6	783	74.3	808	50.9	1323
Trib 3 - at Bailey Scales Road Culvert	34.7	453	72.3	1161	57.3	821	72.3	708	74.1	366	82.4	193	69.4	549	50.1	757

Appendix A

Photographic Log

PHOTO No. 1: DYE INJECTION FOR A TRACER TEST COMPLETED TO SHOW CONNECTIVITY BETWEEN SWALLET 1 AND SPRING 018. SEP. 2004

PHOTO No. 2: BAILEY'S BRANCH FACING DOWNSTREAM. SWALLET 3 MARKED BY ORANGE FLAG. SEP. 2004

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PHOTO No. 3: SPRING 018 PRE-EXCAVATION. OCT. 2004

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PHOTO No. 4: SPRING 018 EXPOSED, AFTER INITIAL REMOVAL ACTION EXCAVATION. NOV. 2004

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PHOTO No. 5: SPRING 018 FOLLOWING HIGH-FLOW EVENT. DEC. 2004

PHOTO No. 6: BROKEN OUT BEDROCK NEAR SWALLET 5. JAN. 2005

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PHOTO No. 7: BEDROCK FRACTURES BEING BROKEN-OUT IMMEDIATELY DOWNSTREAM OF SWALLETS 1A AND 1B. APR. 2005

PHOTO No. 8: ROCK FACE OF EXCAVATION ALONG BROKEN OUT FRACTURE NEAR SWALLETS 1A AND 1B. APR. 2005

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PHOTO No. 9: BROKEN OUT ROCK NEAR SWALLETS 2 AND 3 TO BE HAULED OUT. APR. 2005

PHOTO No. 10: CONCRETE FILLING OF SWALLETS 1A AND 1B BEDROCK TRENCH. MAY. 2005

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PHOTO No. 11: CONCRETE FILLED IN SWALLET 4. MAY. 2005

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PHOTO No. 12: SIMULTANEOUS WATER PUMPING AND CONCRETE FILLING AT SWALLETS 2 AND 3. MAY. 2005

PHOTO No. 13: TYPICAL EXPOSED CREEK SIDEWALL FOLLOWING EXCAVATION ALONG TRIBUTARY 3 AND BAILEY'S BRANCH CREEK ON PARCEL 216, PRIOR TO SHOTCRETE APPLICATION. JULY. 2005

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PHOTO No. 14: COMPLETED CONCRETE NEAR SWALLETS 2 AND 3. AUG. 2005

PHOTO No. 15: COLLECTION OF GRAB SOIL AND SURFACE WATER SAMPLES IN SPRING 018B FOLLOWING FIRST SIGNIFICANT ROCK REMOVAL. AUG. 2005

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PHOTO No. 16: CRA SURVEYOR LOCATING THE CONCRETE POURED NEAR SWALLET 7, ADJACENT TO THE CREEK BY-PASS PIPING. AUG. 2005

PHOTO No. 17: SPRING 018C FOLLOWING THE SECOND SIGNIFICANT ROUND OF ROCK REMOVAL. AUG. 2005

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PHOTO No. 18: PUMP TRUCK POURING BASEFILL CONCRETE OF SEALING LAYER UPSTREAM OF TRIBUTARY 3. DEC. 2012

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PHOTO No. 19: BEGINNING OF CONCRETE POUR WHERE TRIBUTARY 2 DISCHARGES INTO BAILEY'S BRANCH. DEC. 2012

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PHOTO No. 20: TRIBUTARY 3 CONCRETE SEALING WORK LOOKING DOWNSTREAM. DEC. 2012

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PHOTO No. 21: MAN-MADE "ROCKS" IN TRIBUTARY 3. DEC. 2012

PHOTO No. 22: CONCRETE WORK LOOKING FROM SWALLET 7 AREA UPSTREAM TOWARD TRIBUTARY 3 CONFLUENCE. DEC. 2012

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PHOTO No. 23: CONCRETE WORK LOOKING FROM CONFLUENCE TOWARD SWALLET 7 ALONG CENTERLINE DEC. 2012

PHOTO No. 24: PLACING CONCRETE ON THE SPRING 018 CONTAINMENT BERM. DEC. 2012

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PHOTO No. 25: FINAL CONCRETE ON THE SPRING 018 CONTAINMENT BERM. DEC. 2012

PHOTO No. 26: POURING CONCRETE FOR THE POND CONSTRUCTION NEAR FORMER SWALLET 7. DEC. 2012

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PHOTO No. 27: POURING CONCRETE ALONG THE CREEK SIDEWALL OVER PREVIOUSLY SHOTCRETE WITHIN POND NEAR FORMER SWALLET 7. DEC. 2012

PHOTO No. 28: COMPLETED BASEFILL CONCRETE FOR THE POND CONSTRUCTION NEAR FORMER SWALLET 7, LOOKING UPSTREAM. DEC. 2012

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PHOTO No. 29: PLACING GEOSYNTHETIC CLAY LINER (GCL). FEB. 2012

PHOTO No. 30: PLACING GEOSYNTHETIC CLAY LINER (GCL). FEB. 2012

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PHOTO No. 31: REBAR MATTING COVERING GLC LAYER FOR CONCRETE POUR FEB. 2012

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PHOTO No. 32: LAYING OF REBAR MATTING OVER GLC FEB. 2012

PHOTO No. 33: LAYING OF REBAR MATTING OVER GLC FEB. 2012

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PHOTO No. 34: REBAR MATTING FOR CONCRETE ACCESS ROAD. FEB. 2012

PHOTO No. 35: COMPLETED CONCRETE LOOKING UPSTREAM ALONG SEALED TRIBUTARY 3. MAY 2013

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PHOTO No. 36: FACING DOWNSTREAM ON BAILEY'S BRANCH UPSTREAM OF SPRING 018. MAY 2013

PHOTO No. 37: LOW FLOW CREEK CROSSING IMMEDIATELY DOWNSTREAM OF CONFLUENCE. MAY 2013

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PHOTO No. 38: POND CONSTRUCTED WITHIN CREEK UPSTREAM OF SPRING 018. MAY 2013

PHOTO No. 39: FACING DOWNSTREAM AT SPRING 018 CONTAINMENT BERM AND PUMPS. MAY 2013

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PHOTO No. 40: TYPICAL CRACK PRIOR TO REPAIR. MAR. 2013

PHOTO No. 41: TYPICAL CRACK REPAIR USING QUIKRETE BRAND CRACK SEALANTS. APR. 2013

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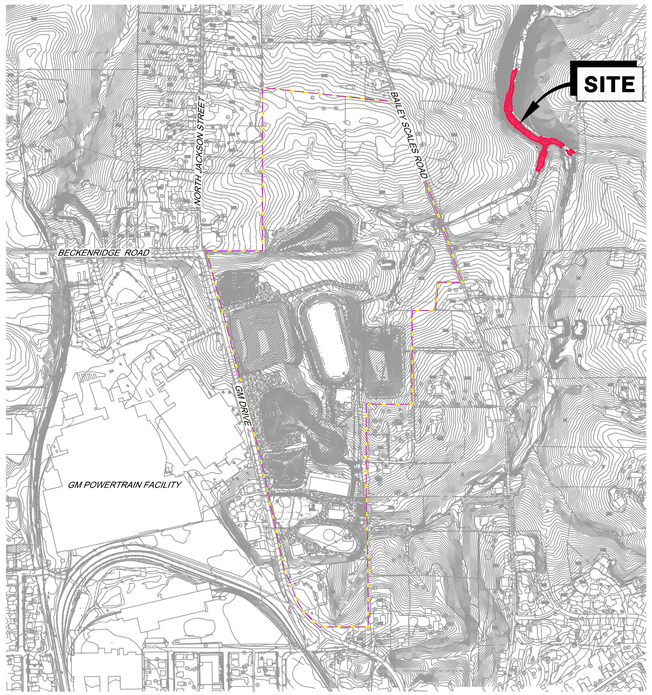
Bedford, Indiana

Appendix B

As-Recorded Drawings



KEY MAP

DRAWING INDEX

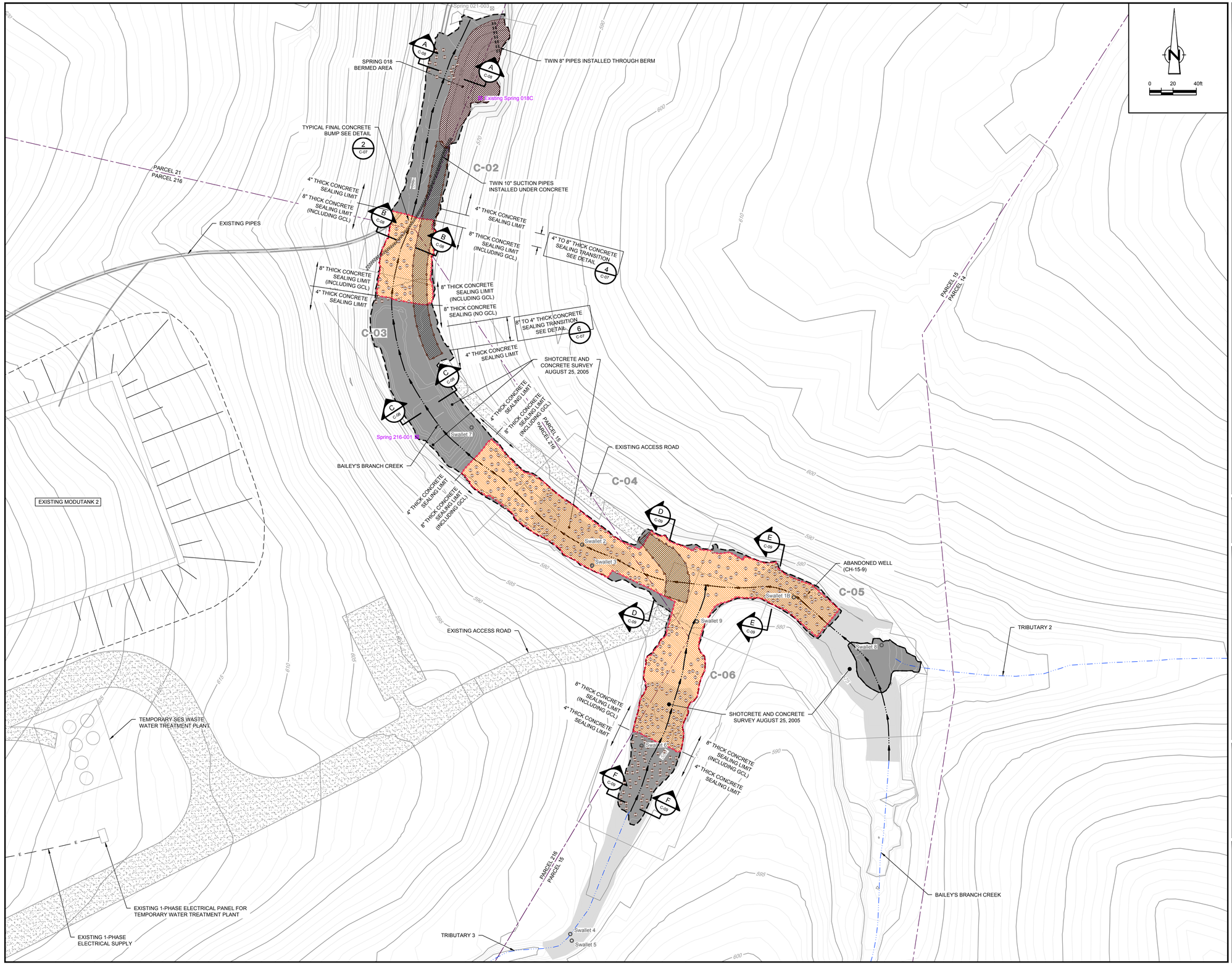
DWG. No.	REV. No.	DATE	TITLE
C-01	0	MAY 2013	OVERALL SITE PLAN
C-02	0	MAY 2013	FINAL CONCRETE ELEVATIONS PLAN AND PROFILE STA. 0+00 TO 2+30
C-03	0	MAY 2013	FINAL CONCRETE ELEVATIONS PLAN AND PROFILE STA. 2+30 TO 4+55
C-04	0	MAY 2013	FINAL CONCRETE ELEVATIONS PLAN AND PROFILE STA. 4+55 TO 6+30
C-05	0	MAY 2013	FINAL CONCRETE ELEVATIONS PLAN AND PROFILE STA. 6+30 TO 8+70
C-06	0	MAY 2013	FINAL CONCRETE ELEVATIONS PLAN AND PROFILE STA. 10+00 TO 12+05
C-07	0	MAY 2013	DETAILS
C-08	0	MAY 2013	CROSS SECTIONS SHEET 1 OF 2
C-09	0	MAY 2013	CROSS SECTIONS SHEET 2 OF 2

BAILEY'S BRANCH CREEK AND TRIBUTARY 3 CONCRETE SEALING CONSTRUCTION CERTIFICATION AS-BUILTS

GM CETC BEDFORD FACILITY BEDFORD, INDIANA

CONESTOGA-ROVERS & ASSOCIATES

13968-00(368)GN-WA001 JAN 14/2014



NΩ	Revision	Date	Initial

LEGEND

- AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- APPROXIMATE PROPERTY BOUNDARY
- V-CHANNEL ALIGNMENT
- EXISTING CONCRETE CAP (2005 SURVEY)
- AS-BUILT CONCRETE SEALING LIMIT
- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
- AS-BUILT 8" THICK CONCRETE SEALING AREA WITH GCL
- AS-BUILT CABLE CONCRETE TYPE CC45 AREA
- AS-BUILT SPRING 18 BERM RECONSTRUCTION
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS (VARIOUS SIZES 6" TO 36")
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION

NOTES:

1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.
2. BOUNDARY BETWEEN PARCELS 14 AND 15 SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (APRIL 2011). ADJACENT PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. ADJOINING PROPERTY LINES MAY NOT ACCURATELY REPRESENT THE TRUE PROPERTY BOUNDARIES

RECORD DRAWINGS

THIS RECORD DRAWING HAS BEEN PREPARED, IN PART, BASED ON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, CRA CAN NOT AND DOES NOT WARRANT ITS ACCURACY AND/OR COMPLETENESS, AND THUS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED HEREIN AS A RESULT. THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN VERIFICATION OF ITS ACCURACY AND/OR COMPLETENESS BEFORE USING IT FOR ANY PURPOSE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD, INDIANA

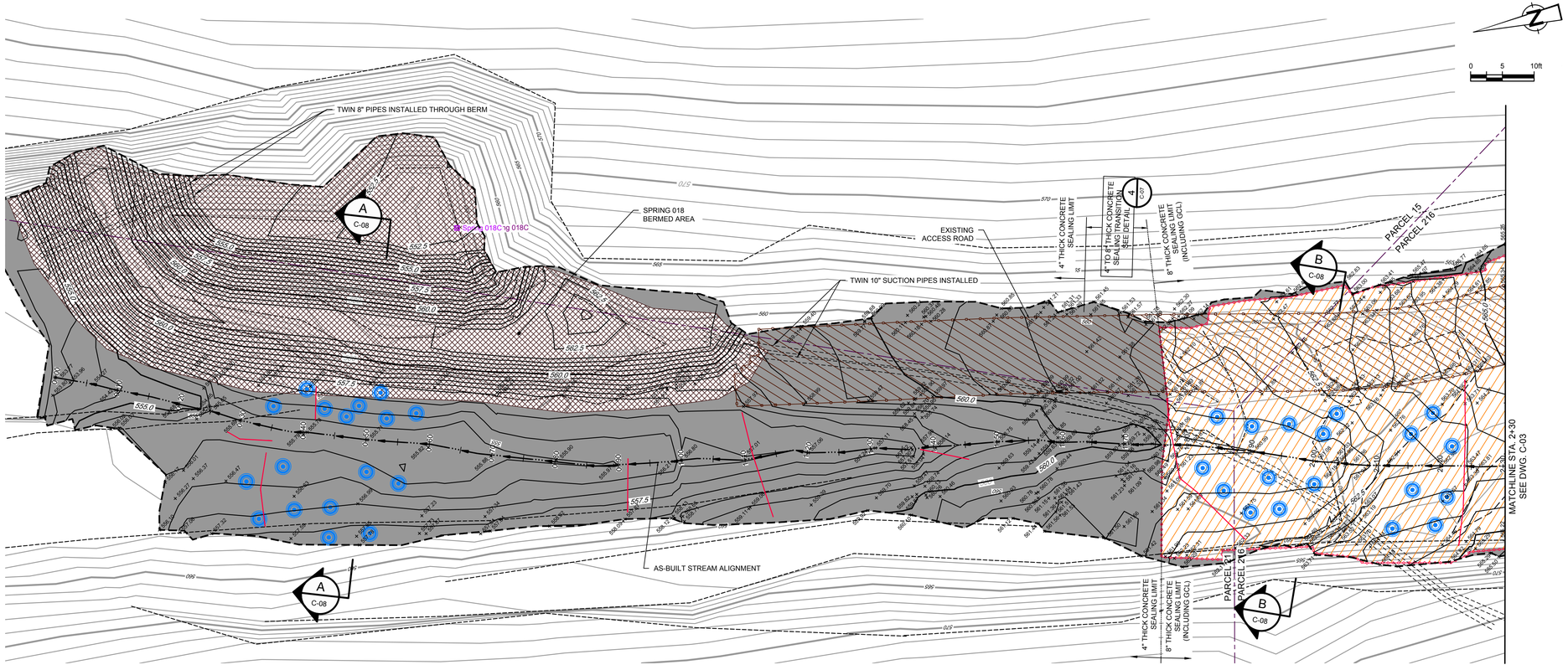
BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

OVERALL SITE PLAN
DELINEATION OF COVER AREAS

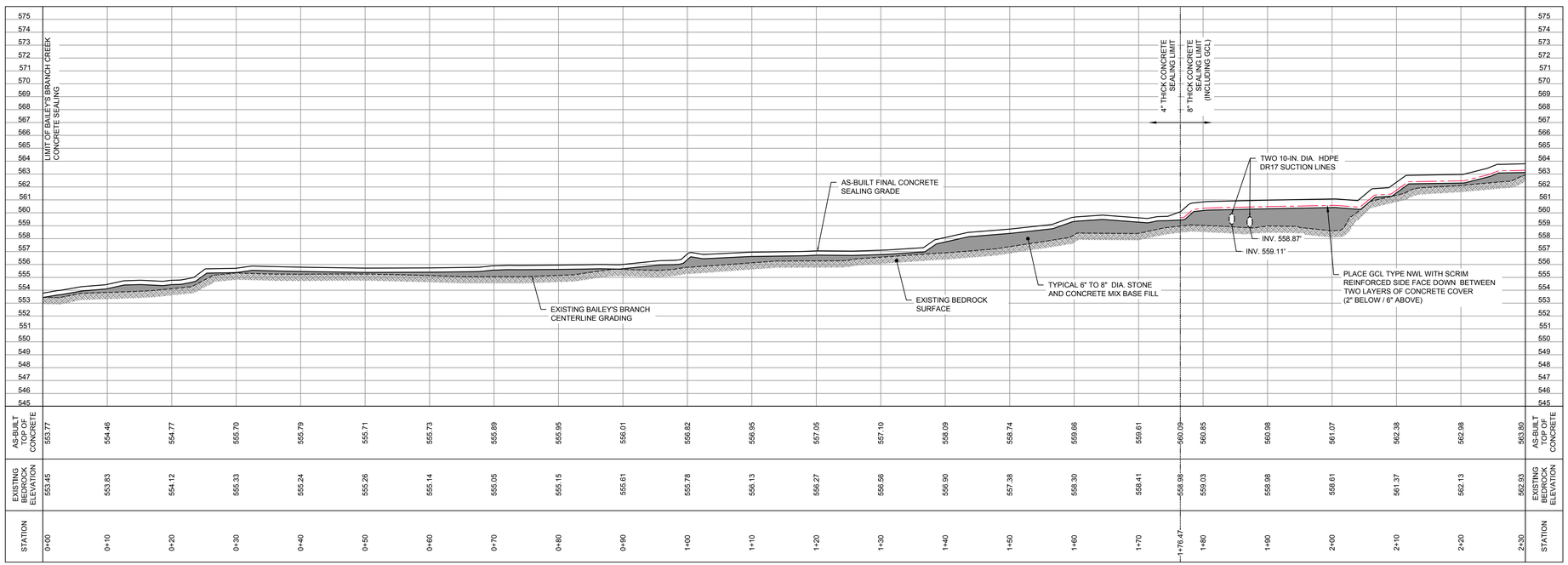
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001, AND AREA WITHIN LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: 1" = 40'	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-01



PLAN
SCALE:
1" = 10'



STATION	AS-BUILT TOP OF CONCRETE	EXISTING BEDROCK ELEVATION
0+00	553.77	553.45
0+10	554.46	553.83
0+20	554.77	554.12
0+30	555.70	555.33
0+40	555.79	555.24
0+50	555.71	555.26
0+60	555.73	555.14
0+70	555.89	555.05
0+80	555.95	555.15
0+90	556.01	555.61
1+00	556.82	555.78
1+10	556.95	556.13
1+20	557.05	556.27
1+30	557.10	556.56
1+40	558.09	556.90
1+50	558.74	557.38
1+60	559.66	558.30
1+70	559.61	558.41
1+76.47	560.09	558.98
1+80	560.85	559.03
1+90	560.98	558.98
2+00	561.07	558.61
2+10	562.38	561.37
2+20	562.98	562.13
2+30	563.80	562.93

Nº	Revision	Date	Initial

LEGEND

- AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
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- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
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- AS-BUILT CABLE CONCRETE TYPE CC45 AREA
- AS-BUILT SPRING 18 BERM RECONSTRUCTION
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS VARIOUS SIZES
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION
- FINAL CONCRETE ELEVATION

NOTES:
1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

RECORD DRAWINGS

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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

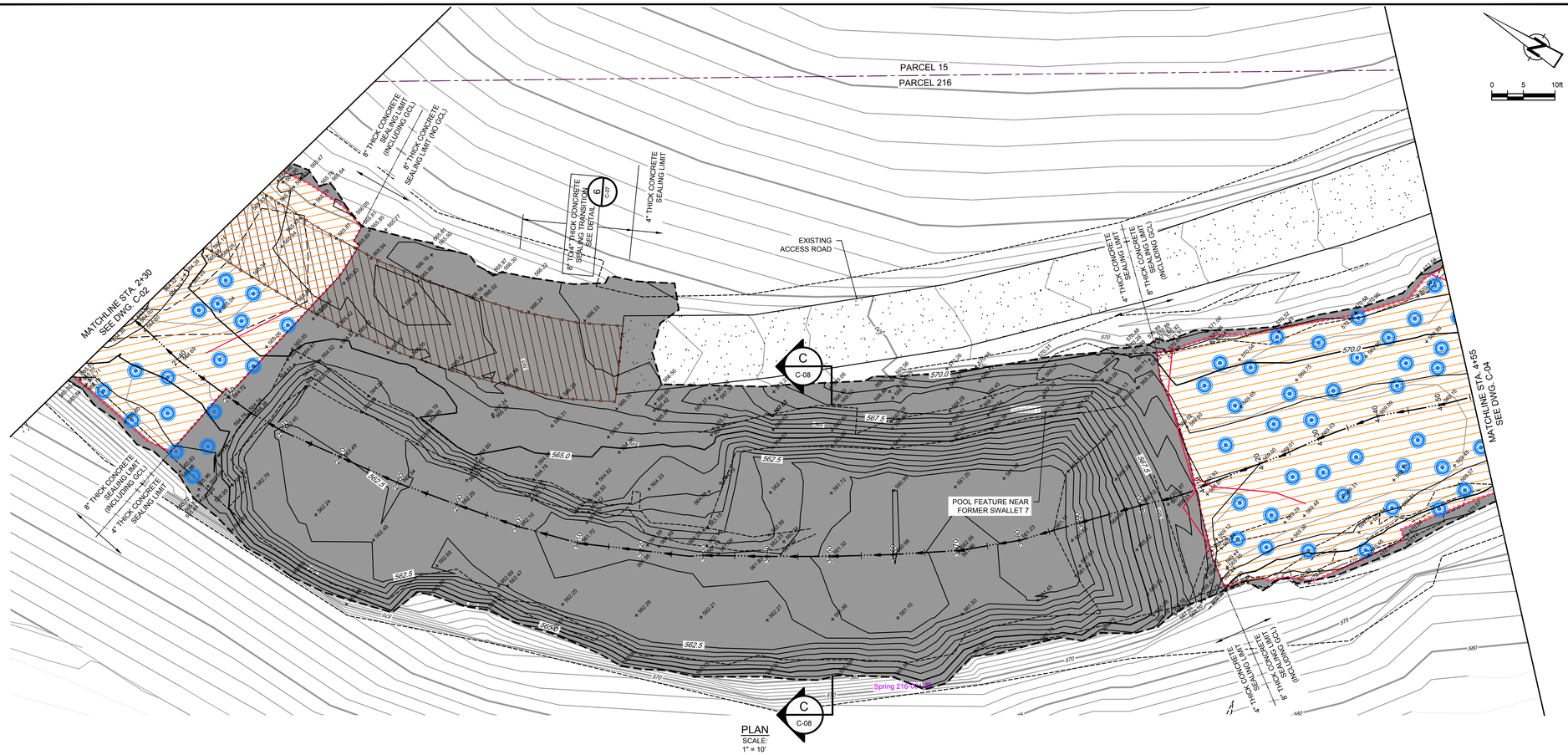
EXISTING BAILEY'S BRANCH PLAN AND PROFILE STA. 0+00 TO 2+30

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001
LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: HORZ. 1" = 10' VERT. 1" = 5'	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-02

13968-00(368)CI-WA002 FEB 18/2014



STATION	EXISTING BEDROCK ELEVATION	AS-BUILT TOP OF CONCRETE
2+30	562.93	563.80
2+40	563.87	564.69
2+48.90	563.95	564.72
2+50	563.93	564.72
2+60	562.10	562.47
2+70	562.14	562.49
2+80	561.85	562.54
2+90	561.47	562.31
3+00	561.69	562.11
3+10	561.33	561.74
3+20	561.60	561.94
3+30	561.45	561.80
3+40	561.35	561.83
3+50	560.88	561.34
3+60	560.47	560.99
3+70	561.62	562.01
3+80	560.86	561.25
3+90	561.69	562.20
4+00	564.16	566.04
4+09.13	567.21	568.83
4+10	567.22	568.80
4+20	567.54	569.00
4+30	567.93	569.04
4+40	567.84	569.09
4+50	567.41	569.16
4+55	567.24	569.19

NΩ	Revision	Date	Initial

LEGEND

- AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- APPROXIMATE PROPERTY BOUNDARY
- V-CHANNEL ALIGNMENT
- EXISTING CONCRETE CAP (2005 SURVEY)
- SEALED CONCRETE CRACKS (MAY 3, 2013 SURVEY)
- AS-BUILT CONCRETE SEALING LIMIT
- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
- AS-BUILT 8" THICK CONCRETE SEALING AREA WITH GCL
- AS-BUILT CABLE CONCRETE TYPE CC45 AREA
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS VARIOUS SIZES
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION
- FINAL CONCRETE ELEVATION

NOTES:
1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

RECORD DRAWINGS

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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

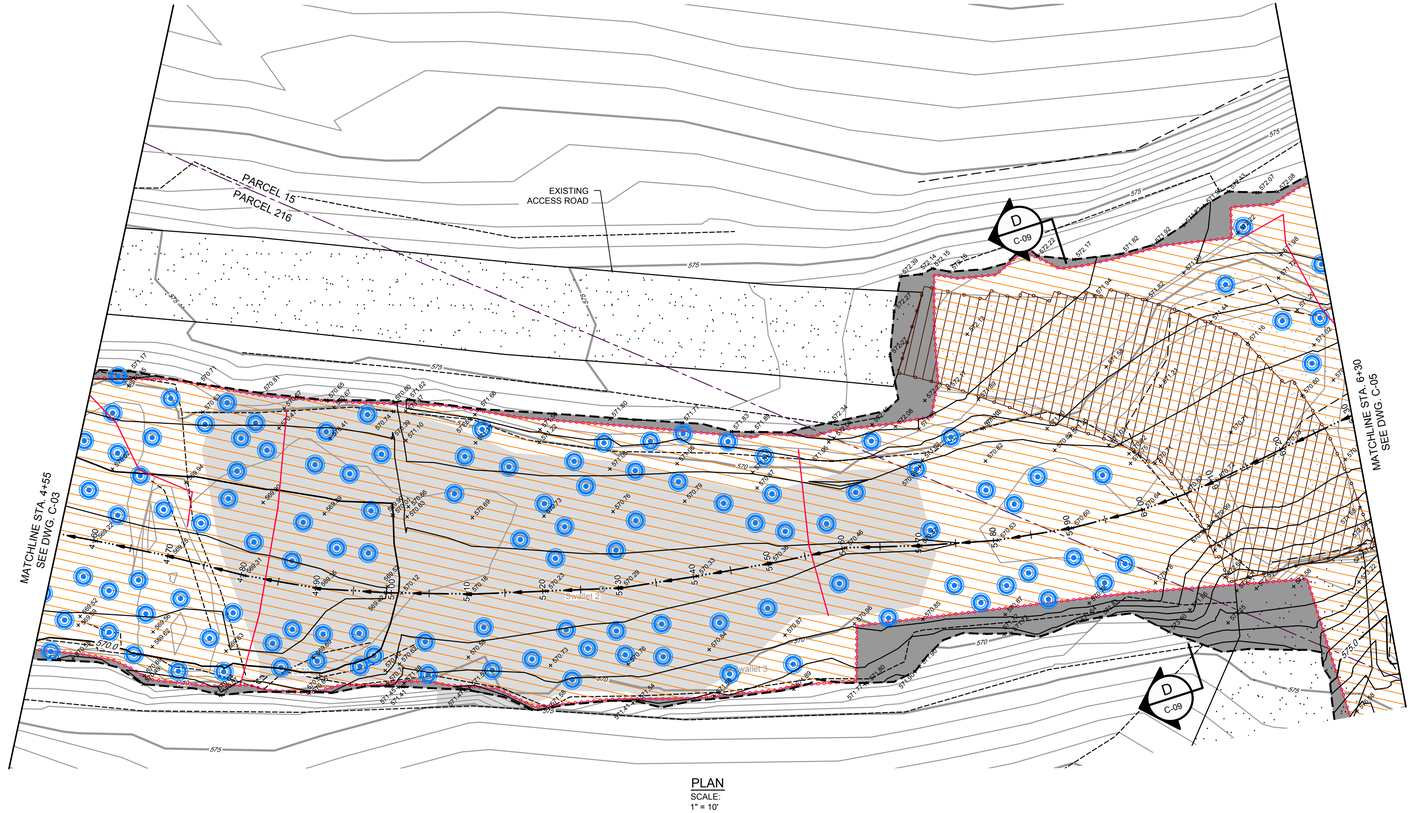
EXISTING BAILEY'S BRANCH PLAN AND PROFILE STA. 2+30 TO 4+55

CONESTOGA-ROVERS & ASSOCIATES

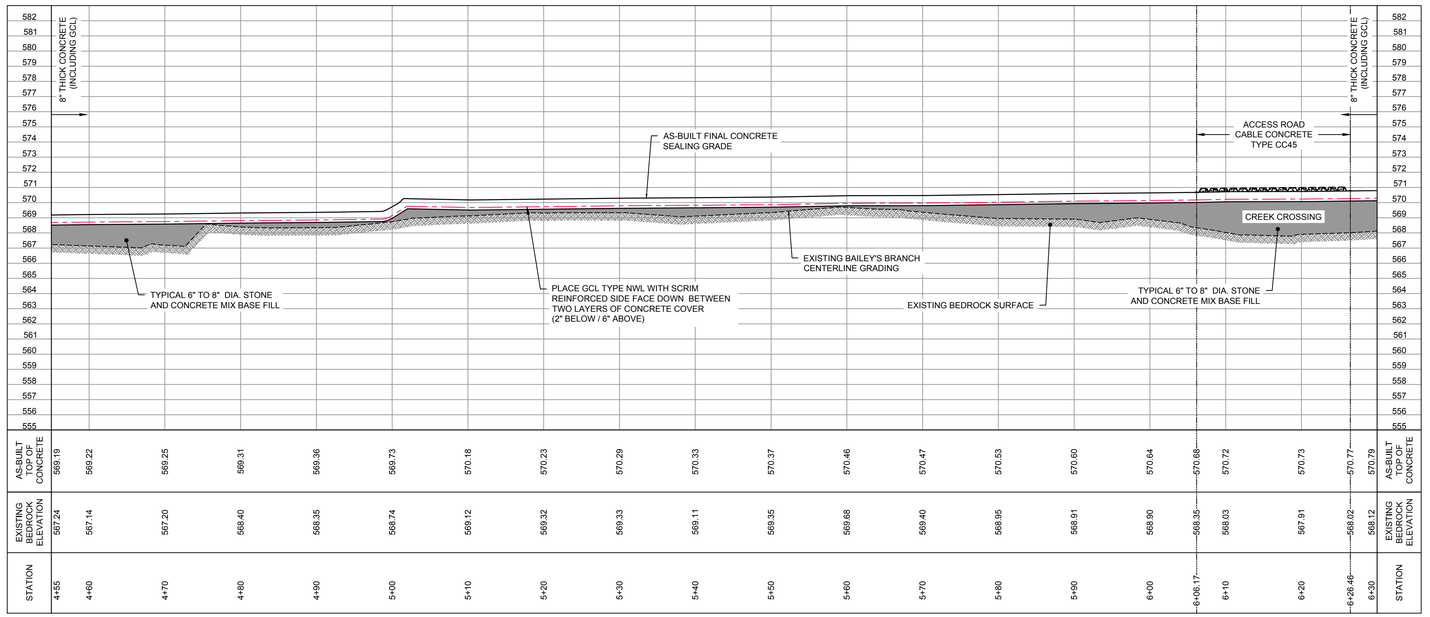
Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001
LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: HORZ. 1" = 10' VERT. 1" = 5'	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-03

13968-00(368)CI-WA002 FEB 18/2014



PLAN
SCALE:
1" = 10'



STATION	EXISTING BEDROCK ELEVATION	AS-BUILT TOP OF CONCRETE
4+55	567.24	569.19
4+60	567.14	569.22
4+70	567.20	569.25
4+80	568.40	569.31
4+90	568.35	569.36
5+00	568.74	569.73
5+10	569.12	570.18
5+20	569.32	570.23
5+30	569.33	570.29
5+40	569.11	570.33
5+50	569.35	570.37
5+60	568.88	570.46
5+70	569.40	570.47
5+80	568.95	570.53
5+90	568.91	570.60
6+00	568.80	570.64
6+06.17	568.35	570.68
6+10	568.03	570.72
6+20	567.91	570.73
6+26.46	568.02	570.77
6+30	568.12	570.79

NΩ	Revision	Date	Initial

LEGEND

- AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- APPROXIMATE PROPERTY BOUNDARY
- V-CHANNEL ALIGNMENT
- EXISTING CONCRETE CAP (2005 SURVEY)
- SEALED CONCRETE CRACKS (MAY 3, 2013 SURVEY)
- AS-BUILT CONCRETE SEALING LIMIT
- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
- AS-BUILT 8" THICK CONCRETE SEALING AREA WITH GCL
- AS-BUILT CABLE CONCRETE TYPE CC45 AREA
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS VARIOUS SIZES
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION
- FINAL CONCRETE ELEVATION

NOTES:
1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

RECORD DRAWINGS

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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

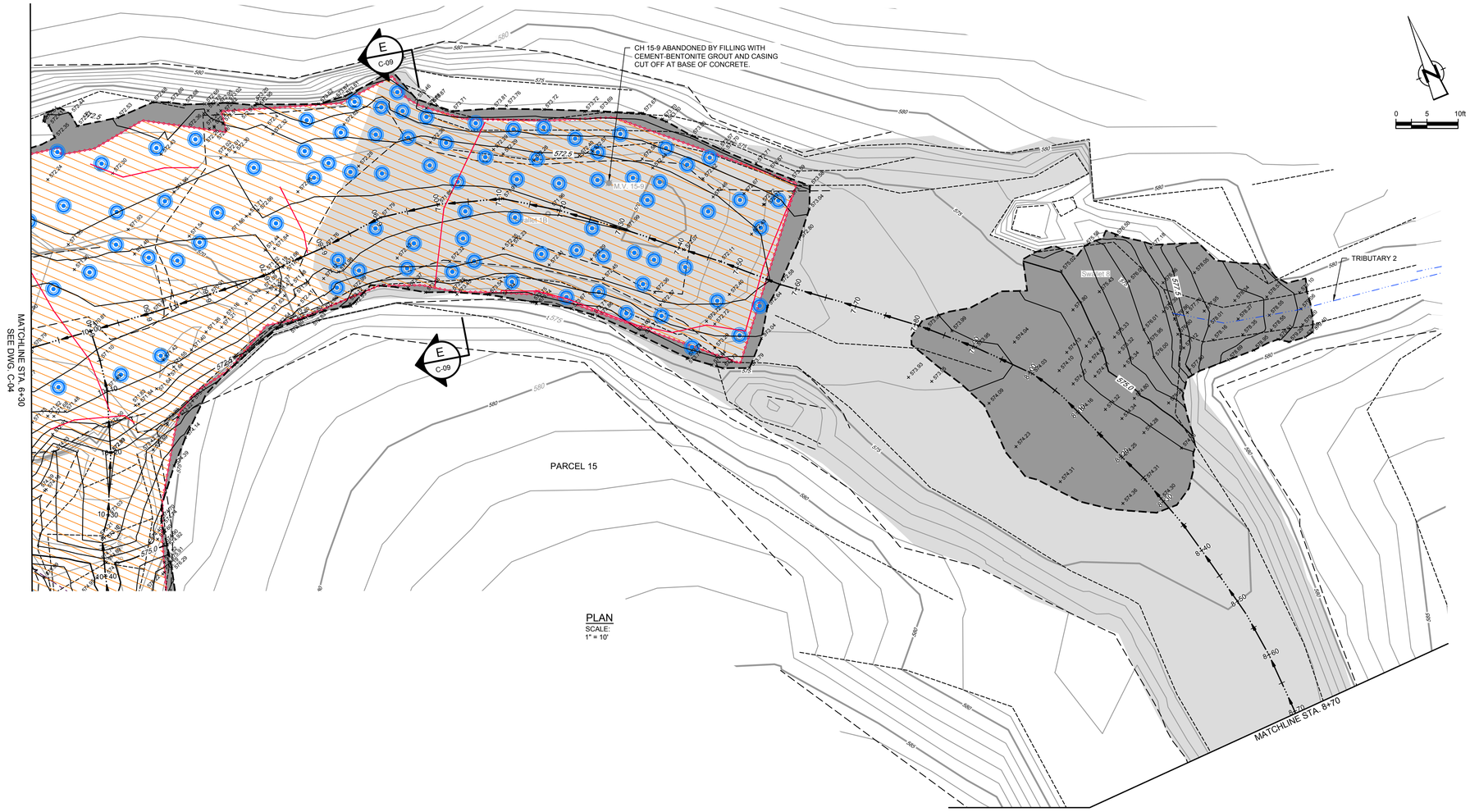
BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

EXISTING BAILEY'S BRANCH
PLAN AND PROFILE STA. 4+55 TO 6+30

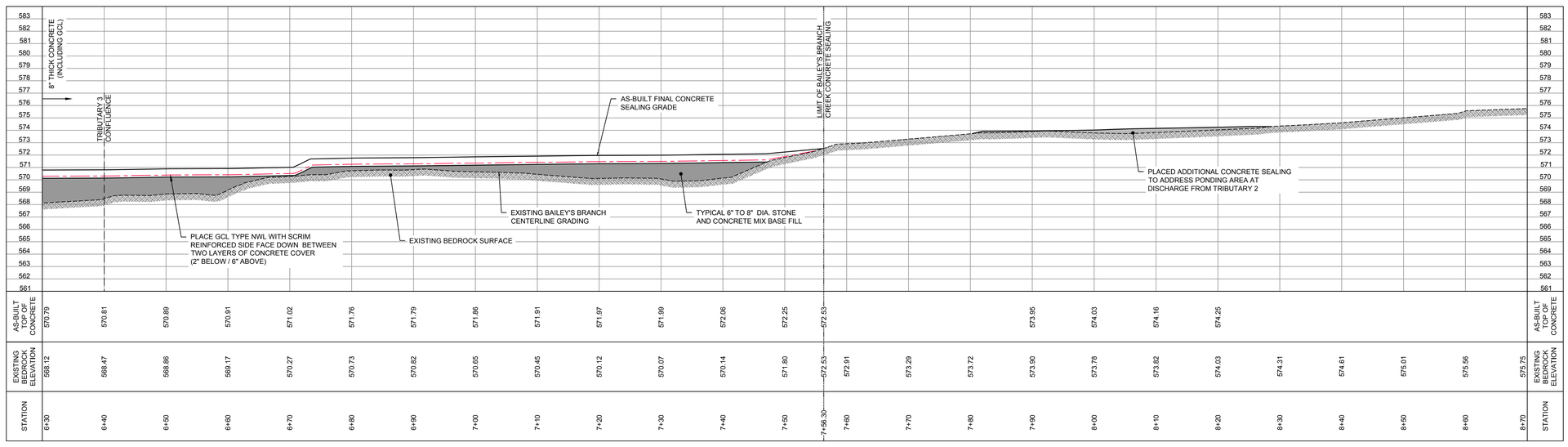
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001
LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: HORZ. 1" = 10' VERT. 1" = 5'	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-04



PLAN
SCALE:
1" = 10'



NO	Revision	Date	Initial

LEGEND

- 580.0 — AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- APPROXIMATE PROPERTY BOUNDARY
- V-CHANNEL ALIGNMENT
- EXISTING CONCRETE CAP (2005 SURVEY)
- SEALED CONCRETE CRACKS (MAY 3, 2013 SURVEY)
- AS-BUILT CONCRETE SEALING LIMIT
- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
- AS-BUILT 8" THICK CONCRETE SEALING AREA WITH GCL
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS VARIOUS SIZES
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION
- 580.70 FINAL CONCRETE ELEVATION

NOTES:
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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

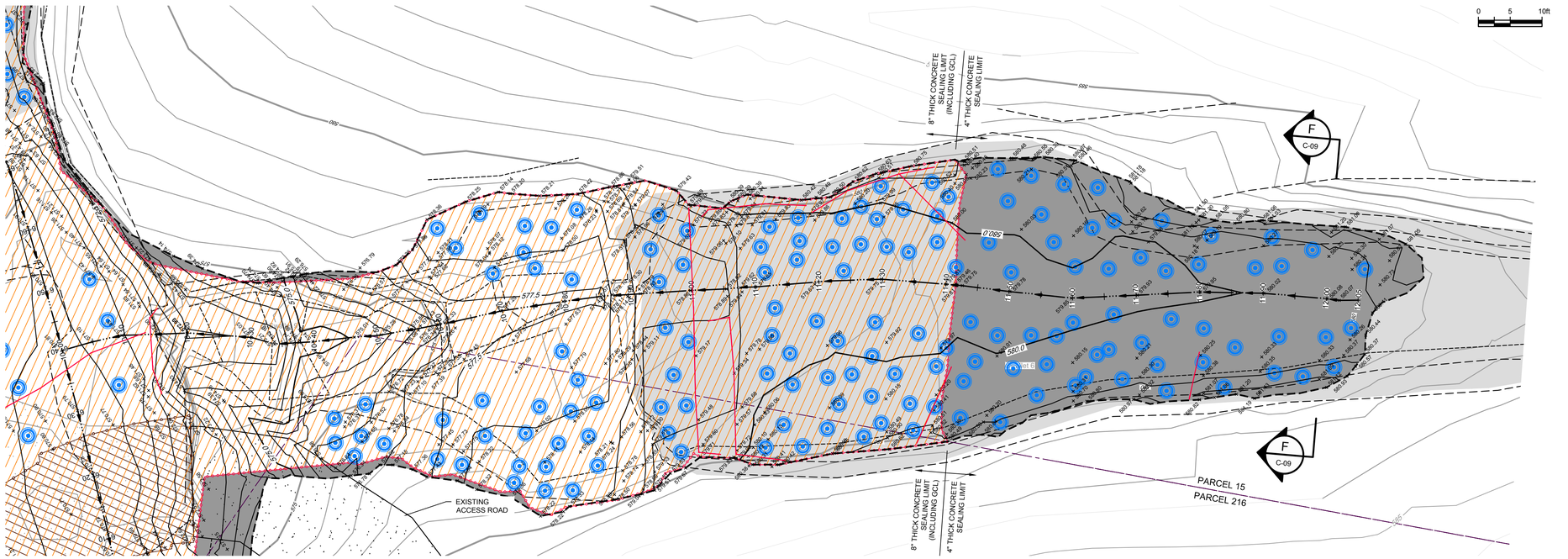
EXISTING BAILEY'S BRANCH PLAN AND PROFILE STA. 6+30 TO 8+70

CONESTOGA-ROVERS & ASSOCIATES

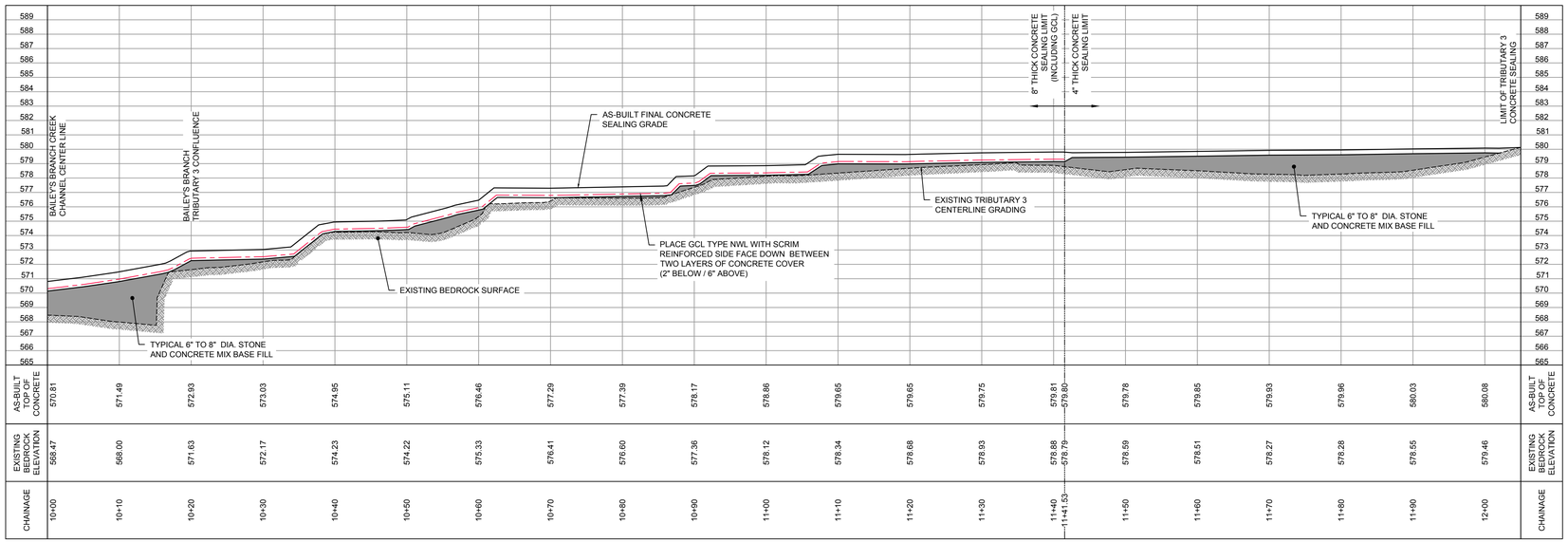
Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001
LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: HORZ. 1" = 10' VERT. 1" = 5'	Project No: 13968-00	Report No: 368	Drawing No: C-05

13968-00(368)CI-WA002 FEB 18/2014



PLAN
SCALE:
1" = 10'



CHAINAGE	AS-BUILT TOP OF CONCRETE	EXISTING BEDROCK ELEVATION
10+00	570.81	568.47
10+10	571.49	568.00
10+20	572.83	571.63
10+30	573.03	572.17
10+40	574.95	574.23
10+50	575.11	574.22
10+60	576.46	575.33
10+70	577.29	576.41
10+80	577.39	576.60
10+90	578.17	577.36
11+00	578.86	578.12
11+10	579.65	578.34
11+20	579.65	578.68
11+30	579.75	578.93
11+40	579.81	578.88
11+41.53	578.80	578.79
11+50	579.78	578.59
11+60	579.85	578.51
11+70	579.93	578.27
11+80	579.96	578.28
11+90	580.03	578.55
12+00	580.08	579.46

Nº	Revision	Date	Initial

LEGEND

- AS-BUILT GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- APPROXIMATE PROPERTY BOUNDARY
- V-CHANNEL ALIGNMENT
- EXISTING CONCRETE CAP (2005 SURVEY)
- SEALED CONCRETE CRACKS (MAY 3, 2013 SURVEY)
- AS-BUILT CONCRETE SEALING LIMIT
- AS-BUILT CONCRETE SEALING AREA (TYPICALLY 4" THICK)
- AS-BUILT 8" THICK CONCRETE SEALING AREA WITH GCL
- AS-BUILT CABLE CONCRETE TYPE CC45 AREA
- AS-BUILT CONCRETE BUMPS AT RANDOM LOCATIONS VARIOUS SIZES
- FORMER SPRING LOCATION
- FORMER SWALLET LOCATION
- SPRING LOCATION
- FINAL CONCRETE ELEVATION

NOTES:
1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

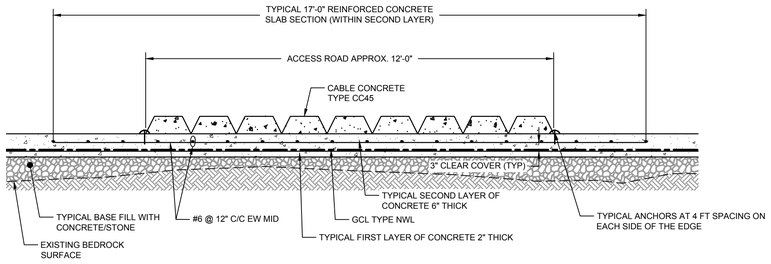
BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

EXISTING TRIBUTARY 3
PLAN AND PROFILE STA. 10+00 TO 12+05

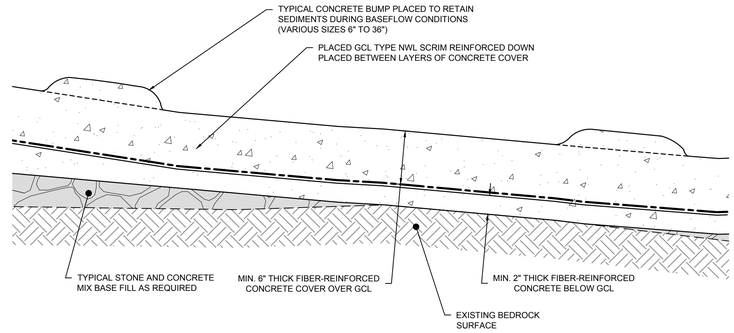
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI. APRIL 2001
LIMIT OF CONCRETE SURVEYED BY BLEDSOE RIGGERT GUERRETTAZ (FEBRUARY 28, 2013).

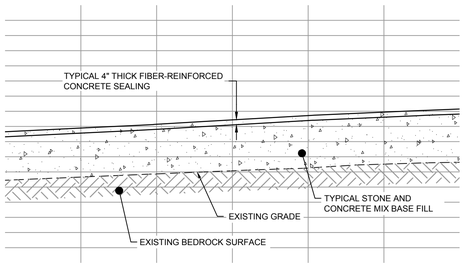
Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	MAY 2013	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-06



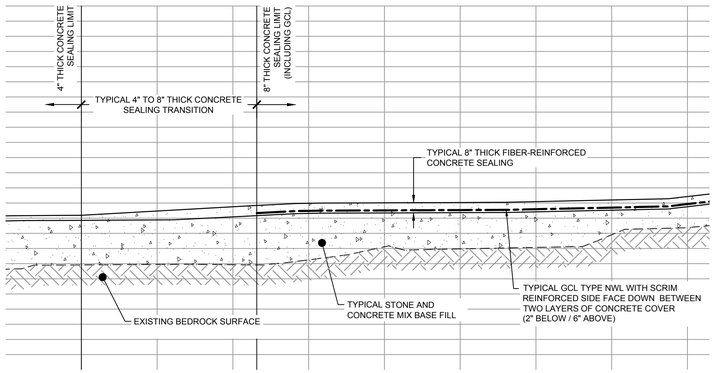
DETAIL 1 C-08 CABLE CONCRETE ACCESS ROAD
N.T.S.



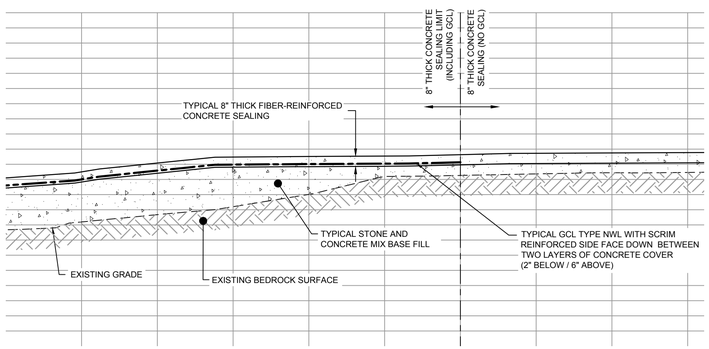
DETAIL 2 C-08 TYPICAL CONCRETE BUMPS
N.T.S.



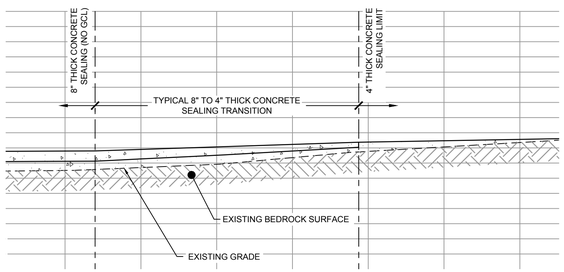
DETAIL 3 C-08 TYPICAL 4" CONCRETE CAP
N.T.S.



DETAIL 4 C-08 TYPICAL 4" TO 8" CONCRETE CAP TRANSITION
N.T.S.



DETAIL 5 C-08 TYPICAL 8" CONCRETE CAP
N.T.S.



DETAIL 6 C-08 TYPICAL 8" TO 4" CONCRETE CAP TRANSITION
N.T.S.

NΩ	Revision	Date	Initial

NOTES:
1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

RECORD DRAWINGS

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SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

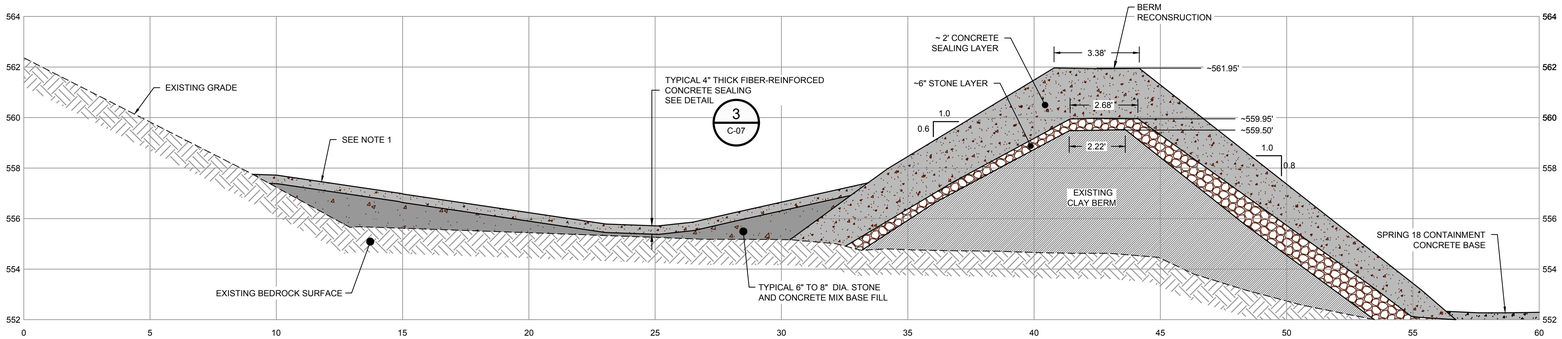
DETAILS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS FLINT, MI, APRIL 2001

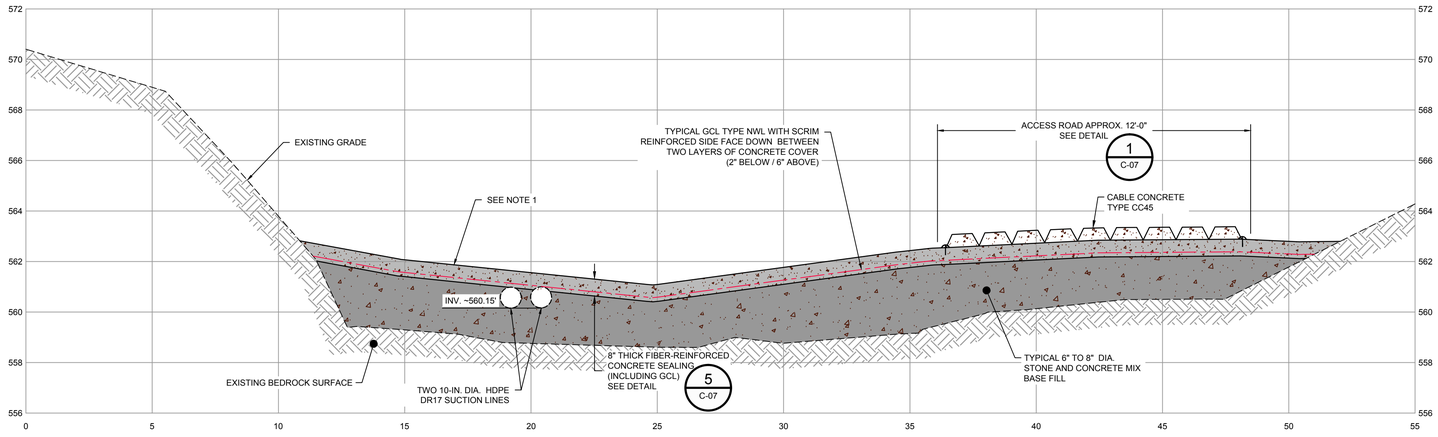
Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	NOVEMBER 2012	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-07

13968-00(368)CI-WA003 OCT 29/2013



SECTION AT STA. 0+50 (A / C-02)

1" = 3'



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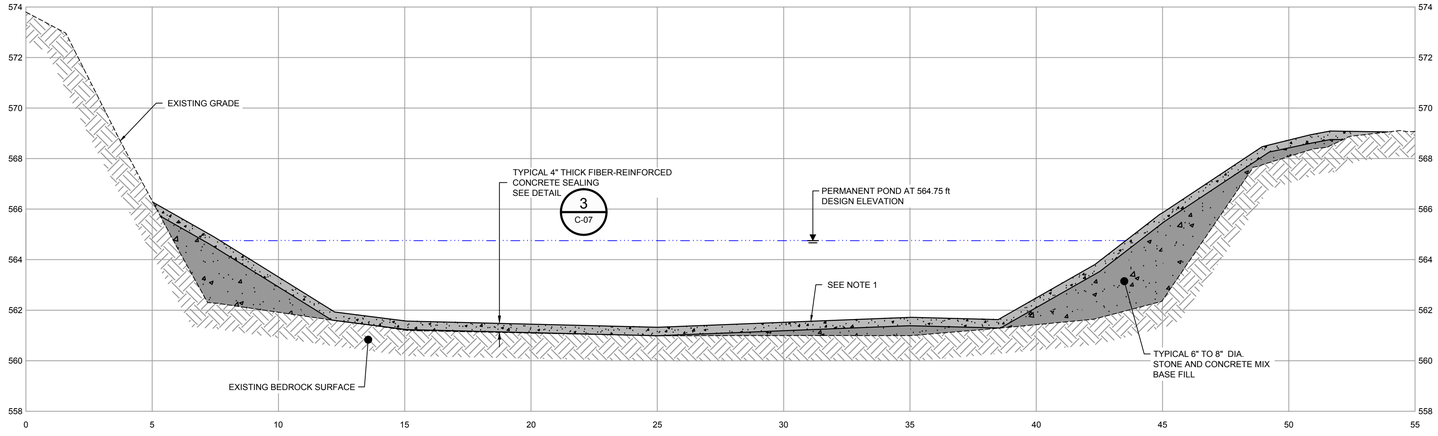


SECTION AT STA. 3+50 (C / C-08)

1" = 3'

NΩ	Revision	Date	Initial

NOTES:

1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

RECORD DRAWINGS

THIS RECORD DRAWING HAS BEEN PREPARED, IN PART, BASED ON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, CRA CAN NOT AND DOES NOT WARRANT ITS ACCURACY AND/OR COMPLETENESS, AND THUS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED HEREIN AS A RESULT. THOSE RELYING ON THIS RECORD DRAWING ARE ADVISED TO OBTAIN VERIFICATION OF ITS ACCURACY AND/OR COMPLETENESS BEFORE USING IT FOR ANY PURPOSE.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS		
Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

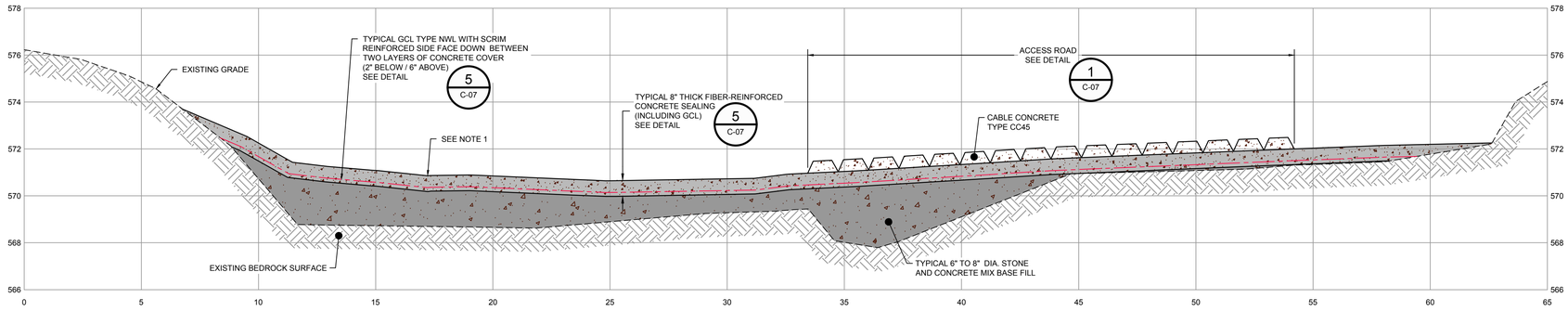
BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

CROSS SECTIONS
A - A', B - B', C - C'

CONESTOGA-ROVERS & ASSOCIATES

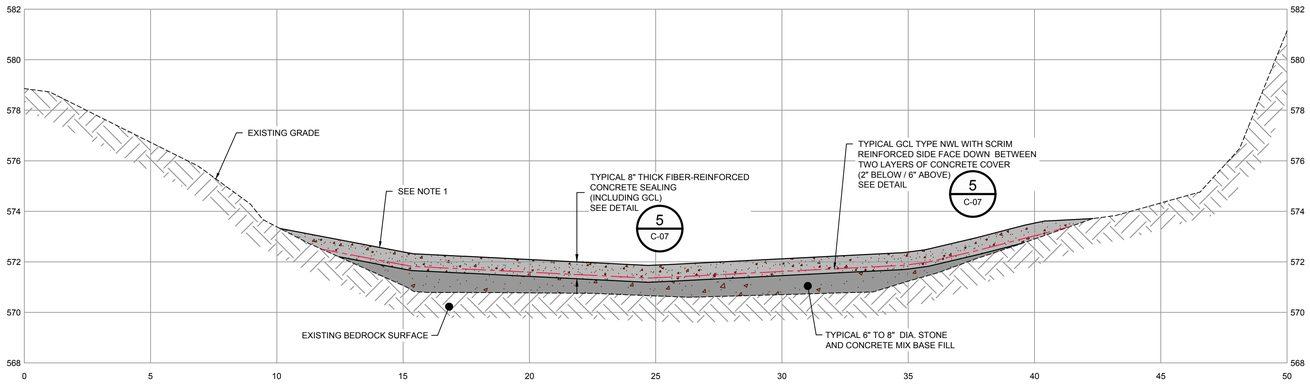
Source Reference:

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	NOVEMBER 2012	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-08



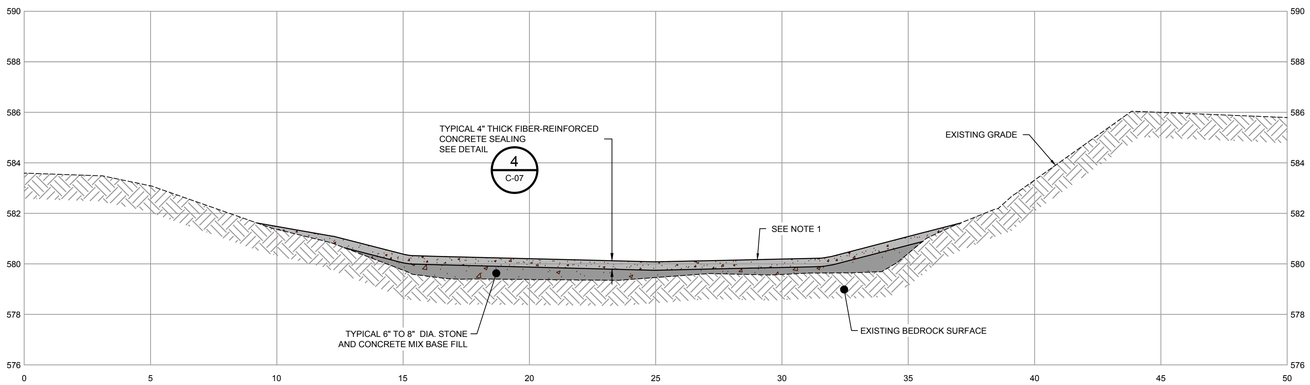
SECTION AT STA. 6+00 — D / C-09

1" = 3'



SECTION AT STA. 7+00 — E / C-10

1" = 3'



SECTION AT STA. 12+00 — F / C-11

1" = 3'

NΩ	Revision	Date	Initial

NOTES:

1. TOP OF CONCRETE CONSTRUCTED WITH A ROUGHENED AND UNDULATING SURFACE THAT PROVIDE COLLECTION AREAS FOR MIGRATING SOIL AND ROCK AND MIGHT ENHANCE THE POTENTIAL FOR NATURALLY OCCURRING VEGETATION OVER SEVERAL YEARS. THE MINIMUM REQUIRED THICKNESS OF 4" OR 8" (AS APPROPRIATE) MAINTAINED OVER THE CONCRETE BASE FILL GRADES, WITH ADDITIONAL CONCRETE PLACED AT RANDOM LOCATIONS THROUGHOUT THE CONCRETE SEALING AREA TO CREATE A MORE NATURAL APPEARANCE (I.E., NOT STRICTLY SMOOTH CONCRETE CHANNEL) BUT STILL MAINTAIN THE GENERAL FLOW PATTERN TOWARDS THE CENTER OF THE CONCRETE CHANNEL. THESE UNDULATIONS DO NOT OCCUR WITHIN THE APPROXIMATE 5-FOOT CENTER SECTION AT STA. OF THE CONCRETE CHANNEL SO AS NOT TO INTERRUPT BASE LOW FLOW CONDITIONS.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GM CETC BEDFORD FACILITY
BEDFORD INDIANA

BAILEY'S BRANCH CREEK & TRIBUTARY 3 CONCRETE SEALING

CROSS SECTIONS
D - D', E - E', F - F'

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date:	
J.M.	R.H.	NOVEMBER 2012	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 368	Drawing Nº: C-09

Appendix C

Materials Information

Appendix C.1

Concrete Mix Specifications

Sevenson Environmental Services, Inc.

LETTER OF TRANSMITTAL

2749 Lockport Road
Niagara Falls, New York 14305
(716) 284-0431

TO: CRA	DATE: November 30, 2012
ADDRESS:	JOB NO.: E801
CITY: Waterloo, Canada	RE: Sevenson Submittal#29
ATTENTION: Rick Hoekstra	

PLEASE BE ADVISED:

WE ARE SENDING YOU: ☒ **Attached** ☐ **Under Separate Cover Via The Following:**

☐ PRINTS ☐ PLANS ☐ SHOP DRAWINGS ☐ SAMPLES ☒ SPECIFICATIONS
☐ ARTWORK ☐ PROOFS ☐ PHOTOGRAPHS ☐ COPY OF LETTER ☐ CHANGE ORDER
☐

	No. of Copies	Drawing No.	Date	Description
1	3	SES Submittal #29	11/30/12	Concrete Mix Manufacturer Literature and Data for the Bailey's Branch and Tributary #3 Capping Project at Spring 18
2				
3				
4				
5				
6				
7				

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

☒ AS REQUESTED ☐ APPROVED AS IS ☐ SUBMIT COPIES FOR DISTRIBUTION
☒ FOR APPROVAL ☐ APPROVED WITH CORRECTIONS ☐ RETURN CORRECTED
☐ FOR YOUR USE ☐ RETURNED WITH CORRECTIONS ☐ RETURNED AFTER LOAN TO US
☒ FOR YOUR COMMENTS ☐ RESUBMIT COPIES FOR APPROVAL ☐

COMMENTS:

Please reiew and return one appoved copy of the submittal for our records

Please return all documents if corrections are required

COPIES TO:

-
-
-
-
-

SEVENSON ENVIRONMENTAL SERVICES, INC.

Signed _____

Daniel Sekanovich

SUBMITTAL FORM

Project: Bailey's Branch and Tributary #3 Capping Project at Spring 18

Contractor:
Sevenson Environmental Services
2749 Lockport Road
Niagara Falls, N.Y. 14305

Engineer: Conestoga-Rovers & Associates
320 GM Drive
Bedford, Indiana 47421

SUBMITTAL NUMBER:	#29
SECTION:	Cast in place concrete notes
PAGE NUMBER	CRA Drawing C-07
ITEM:	4000 psi concrete mix
SUBMITTAL TYPE:	A - Test Results and/or Certificates **B - Manufacturer's Literature or Data** C - Shop Drawings D - Operation and Maintenance Instructions E - Samples F - Alternative Product Supporting Data G - Administrative such as schedules, etc.
DEFICIENCIES:	
SUBMITTAL DATE:	11/30/12
RESPONSE REQUIRED:	A.S.A.P

SHOP DRAWING REVIEW
Submission No. #29
Contract No. 13968
ENGINEER's approval is for the sole purpose of ascertaining conformance with general design concepts expressed in the Contract Documents and in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Approval does not authorize changes to Contract Documents.
☒ Approved with resubmitted site-specific core mix
☐ Approved as Noted
☐ Not Subject to Review
☐ Revise and Resubmit
By:
Date: 12/5/12 File: 13968
CRA

Certification Statement:: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Signature

11/30/12
Date

December 5, 2012

Mr. Shane Reynolds
Sevenson
2749 Lockport Road
Niagara Falls, NY 14305

Re: **G.M. Project — Bedford, Indiana**

We are pleased to resubmit the following mix designs for the above referenced project. Per ACI 318 and ASTM C-94, imi kindly requests that we receive copies of all concrete test reports for this project. They can be sent to technicalservices@irvmat.com

Description	**6 Bag Air Limestone**
imi Mix Number	**060**
Cement	564 lbs.
Sand	1280
#8 Limestone	1750
Fiber	1 lb.
Water Reducer	33 oz.
Waterproof	12 lbs.
W/C	0.42
Water	236 lbs.
Air	5-8 %
Slump	8" max.

HIGH RANGE WATER REDUCER (Superplasticizer): This admixture will be ordered in any of the above mix design by specifying ***SUP*** after the imi mix design number. The dosage rate of this admixture is 5-7 oz/cwt of cement. This will increase the maximum allowable slump to 8".

FIBER SECONDARY REINFORCING: This product will be added to the above mix design by specifying *CF* after the imi mix design number. A 1 lb. dosage of NYTECH will be added when requested per yard.

MATERIAL SUPPLIERS & SPECIFICATIONS:

Cement:	ASTM C-150: Type I-II or Type III, Lehigh (Mitchell, IN)
Admixtures:	ASTM C-494: Superplasticizer, Type F, Glenium 7500. BASF Optional: Non-chloride Accelerator, Polarset, Grace Construction Products ASTM C-260: Air entrainment, Micro Air, BASF Water-proofing admixture, Xypex C-1000, Xypex Corporation.
Aggregates:	ASTM C-33 & INDOT Specifications: #23 Sand, from Rogers Group (Morgan County); #8,¾" Limestone from Rogers Group (Springville, IN).
Fiber:	ASTM C-1116, Nytech CG, NMW, Inc.

Respectfully Submitted,

Rodney Haag
Irving Materials, Inc.

8032 N. State Road 9 • Greenfield, IN 46140
317.326.3101 • Fax: 317.326.3105
www.irvmat.com

imi
Irving Materials, Inc.

Technical Services

November 30, 2012

Mr. Shane Reynolds
Sevenson
2749 Lockport Road
Niagara Falls, NY 14305

Re: **G.M. Project — Bedford, Indiana**

We are pleased to submit the following mix designs for the above referenced project. Per ACI 318 and ASTM C-94, imi kindly requests that we receive copies of all concrete test reports for this project. They can be sent to technicalservices@irvmat.com

Description	**6 Bag Air Limestone**
imi Mix Number	**060**
Cement	564 lbs.
Sand	1280
#8 Limestone	1750
Fiber	1 lb.
Water Reducer	33 oz.
Waterproof	2-3% of cement
W/C	0.42
Water	236 lbs.
Air	5-8 %
Slump	8" max.

OBSOLETE CRA 12/24/12

HIGH RANGE WATER REDUCER (Superplasticizer): This **optional** admixture can be ordered in any of the above mix designs by specifying ***SUP*** after the imi mix design number. The dosage rate of this admixture is 5-7 oz/cwt of cement. This will increase the maximum allowable slump to 8".

MID RANGE WATER REDUCER: This **optional** product may be ordered by specifying ***MID*** after the imi mix design number. The dosage rate of this admixture is 4 oz/cwt of cement. This will increase the maximum allowable slump to 6".

FIBER SECONDARY REINFORCING: This **optional** product may be added to any of the above mix designs by specifying *CF* after the imi mix design number. A 1 lb. dosage of NYTECH will be added when requested per yard.

MATERIAL SUPPLIERS & SPECIFICATIONS:

Cement:	ASTM C-150: Type I-II or Type III, Lehigh (Mitchell, IN)
Admixtures:	ASTM C-494: Water Reducer, Type A, Glenium 7500, BASF
	Optional: Mid-Range Water Reducer, Glenium 7500, BASF
	ASTM C-494: Superplasticizer, Type F, Glenium 7500. BASF
	Optional: Non-chloride Accelerator, Polarset, Grace Construction Products
	ASTM C-260: Air entrainment, Micro Air, BASF
	Water-proofing admixture, Xypex C-1000, Xypex Corporation.
Aggregates:	ASTM C-33 & INDOT Specifications: #23 Sand, from Rogers Group (Morgan County); #8,¾" Limestone from Rogers Group (Springville, IN).
Fiber:	ASTM C-1116, Nytech CG, NMW, Inc.

Respectfully Submitted,

Rodney Haag
Irving Materials, Inc.

8032 N. State Road 9 • Greenfield, IN 46140
317.326.3101 • Fax: 317.326.3105
www.irvmat.com

Material Safety Data Sheet

Revised: October 27, 2011
Replaces: August 6, 2004

Irving Materials, Inc.
Corporate Office: 8032 N State Road 9, Greenfield, IN 46140

1 -- IDENTIFICATION

Freshly Mixed Unhardened Concrete also called **Ready-Mixed Concrete**, **Portland Cement Concrete**, &/or **Flowable Fill**

2 -- PRODUCT AND COMPONENT DATA

Concrete is a mixture of Portland and other cements, gravel and/or crushed limestone, sand, and water. It may also contain fly ash, silica fume, fibers and/or chemical admixtures.

Ingredients	%	OSHA-PEL	NIOSH-REL	CAS No.
Portland Cement*	10 - 25	5.0 mg/m^3 respirable dust 15.0 mg/m^3 total dust	5.0 mg/m^3 respirable dust 10.0 mg/m^3 total dust	65997-15-1
Aggregates*	35 - 90	5.0 mg/m^3 respirable dust 15.0 mg/m^3 total dust	5.0 mg/ M^3 respirable dust 10.0 mg/m^3 total dust	Limestone 1317-65-3 Sand & Gravel None
Fly Ash*	0 - 15	5.0 mg/m^3 respirable dust 15.0 mg/m^3 total dust	5.0 mg/m^3 respirable dust 10.0 mg/m^3 total dust	68131-74-8
Slag Cement*	0 - 15	5.0 mg/m^3 respirable dust 15.0 mg/m^3 total dust	5.0 mg/m^3 respirable dust 10.0 mg/m^3 total dust	**
Water	5 - 25	None	None	77321-85
Crystalline Silica SiO_2	> 1	See note below*	See note below*	14808-60-7

**Each of these ingredients may have quartz [silica (SiO_2)] as a component. The percent of silica varies greatly from product to product and also within the same product. Silica exposure may occur when respirable dust is present. Dust is not present in Freshly Mixed Unhardened Concrete. The OSHA-PEL for respirable crystalline silica = 10 mg/m^3 ÷ (%SiO_2 + 2) and the ACGIH TLV for respirable silica = 0.05 mg/m^3.*

***Slag Cement may contain any or all of the following: Calcium Oxide, Fused Silca Oxide, Mangesium Oxide, Aluminum Oxide, Sulfur, Manganese Oxide, Postassium Oxide, Sodium Oxide, Titanium Oxide, and Ferric Oxide, CAS Nos.; 1305-78-8, 60676-86-0, 1309-48-4, 1344-28-1, 7704-34-9, 7439-96-5, 12136-45-7, 12401-86-4, 13463-67-7, 1309-37-1. Since Blast Furnace Slag Cement is manufactured from materials mined from the earth, and process heat is provided by burning fuels derived form the earth, trace but detectable amounts of naturally occurring metals, and possibly harmful elements may be found during chemical analysis. Ingredients are expressed as oxides for quantitative purposes. Actual oxides do not generally occur in "free form" but rather as complex silica-based glasses or crystals. May contain more than 0.1% of free crystalline silica.*

The chemical admixtures are present in quantities comprising less than 1%. These chemical admixtures can be both dry and/or liquid. Admixtures contained in Freshly Mixed Unhardened Concrete at the time of delivery would have no effect on the hazards associated with the use of Fresh Mixed Unhardened Concrete.

The hazardous ingredients associated with dust from concrete cannot become airborne in plastic (wet) concrete. When water is added to the dry ingredients a reaction occurs with the calcium oxide that is present to form calcium hydroxide, a high alkalinity chemical which can irritate the eyes and skin upon contact. The product is delivered as a ready mixed unhardened concrete. There is no dust hazard present from the wet product. An OSHA-PEL or a NIOSH-REL would not apply at the time of delivery.

Component product Material Safety Data Sheets are available upon request.

3-- PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	NA	**Specific Gravity** (H_2O = 1)	1.5 – 3.0
Vapor Pressure	NA	**Melting Point**	NA
Vapor Density (Air = 1)	NA	**Evaporation Rate** (Butyl Acetate = 1)	NA
Solubility in Water	Slight (0.01 to 1%)	pH (in water) (ASTM D 1293-95)	12 to 13
Appearance and Color	Odorless gray, plastic, flowable, granular mud		

4 -- FIRE AND EXPLOSION HAZARD

Flash point	NA	**Flammable Limits**	NA
LEL	NA	**UEL**	NA
Extinguishing Media	NA	**Special Fire Fighting Procedures**	NA
Unusual fire and Explosion Hazards	None		

5 -- REACTIVITY DATA

Stability	Stable
Conditions to Avoid	None known
Incompatibility (Materials to avoid)	Strong Acids
Hazardous Decomposition Products	None known
Hazardous Polymerization	Will not occur

6 -- HEALTH HAZARDS

Emergency Overview: Short term exposure to wet concrete is not likely to cause an immediate hazard. However, freshly mixed unhardened (plastic) concrete has a high alkalinity level which can cause skin and eye irritation. Exposure of sufficient duration to wet concrete can cause serious, potentially irreversible tissue (skin or eye) damage in the form of chemical (caustic) burns. Take appropriate precautions to minimize direct contact with the product. See **Personal Protective Equipment** precautions in Section 7 below.

Routes of Entry: Skin Contact, Eye Contact, Ingestion

Effects of Acute Exposure: Plastic concrete can dry the skin and cause alkali burns (cement dermatitis). Prolonged exposure may irritate the skin and cause a burning sensation, particularly in areas of prior abrasion or irritation. Contact with plastic concrete can cause irritation of the eye. Ingestion may cause throat irritation.

Effects of Chronic Exposure: Hypersensitive individuals may develop an allergic dermatitis. This product may contain crystalline silica. Since freshly mixed unhardened concrete is a wet product, the risk of silica inhalation is negligible and should not present a significant health hazard.

Emergency and First Aid Procedures: Irrigate eyes with copious amounts of water. Wash exposed areas of the body with soap and water. Saturated or contaminated clothing should be removed and washed before re-use. If irritation persists, obtain medical attention.

Carcinogenic Potential: Freshly Mixed Unhardened Concrete is not listed as a carcinogen by NTP, OSHA, or IARC. Concrete frequently contains crystalline silica in concentrations greater than 0.1%,. Respirable crystalline silica is classified by IARC (International Agency for Research on Cancer) as a known human carcinogen and by NTP (National Toxicology Program) as "reasonably anticipated to be a carcinogen." Crystalline silica in wet concrete is not respirable and does not pose a health hazard. See **Additional Precautions** in Section 7 below.

7 -- PRECAUTIONS FOR SAFE HANDLING AND USE

Personal Protective Equipment: Use barrier creams, gloves, boots, and clothing to protect skin from prolonged contact with plastic concrete. Particularly protect abrasions of the skin from contact with plastic concrete. Wear safety glasses or goggles when placing methods cause splashing of the plastic concrete.

Waste Disposal Methods: Spills of plastic concrete should be allowed to harden, when it can be disposed of as common waste. All disposals should be accordance with local regulations.

Additional Precautions: Any cutting, grinding, or scarifying of dry hardened concrete can cause dusting of the concrete. Dust created in this fashion may contain crystalline silica. Repeated and prolonged inhalation of respirable crystalline silica in excess of appropriate exposure limits can cause scarring of the lungs or a progressive lung disease called silicosis. Silicosis may aggravate other chronic lung related conditions. Smoking is strongly suspected of aggravating the effects of silica exposure and may increase the risk of lung cancer. When cutting, grinding, or scarifying dry hardened concrete, appropriate precautions must be taken to prevent inhalation of the dust. Engineering controls such as dust suppression or capture should be employed. When this is not possible a NIOSH - MSHA approved respirator should be used when the TLV is exceeded.

Ready-Mixed Concrete is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA). In October 1996, an IARC Working Group re-assessing crystalline silica, a component of this product, designated respirable crystalline silica as carcinogenic (Group 1). The NTP's Report on Carcinogens, 9th Edition, lists respirable crystalline silica as a "known human carcinogen". In year 2000, the American Conference of Governmental Industrial Hygienists (ACGIH) listed respirable crystalline silica (quartz) as a suspected human carcinogen (A-2). These classifications are base on sufficient evidence of carcinogenicity in certain experimental animals and on selected epidemiological studies of workers exposed to crystalline silica.

8 -- PREPARATION OF THIS DOCUMENT

Prepared by: **Irving Materials, Inc.**
8032 North SR 9
Greenfield, Indiana 46140
(317) 326-3101

Effective Date: October 27, 2011
Replaces: August 6, 2004

PRODUCT DATA SHEET

XYPEX ADMIX C-1000

DESCRIPTION

Xypex is a unique chemical treatment for the waterproofing, protection and improvement of concrete. XYPEX ADMIX C-1000 is added to the concrete mix at the time of batching. Xypex Admix C-1000 consists of portland cement, very fine treated silica sand and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

XYPEX ADMIX C-SERIES

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. Xypex Admix C-500 is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. Xypex Admix C-1000 is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. Xypex Admix C-2000 is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. See Setting Time and Strength for more details. Consult with a Xypex Technical Representative for the most appropriate Xypex Admix for your project.

RECOMMENDED FOR:

- Reservoirs
- Sewage and Water Treatment Plants
- Secondary Containment Structures
- Tunnels and Subway Systems
- Underground Vaults
- Foundations
- Parking Structures
- Swimming Pools
- Pre-Cast Components

ADVANTAGES

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Added to the concrete at time of batching and therefore is not subject to climatic restraints
- Increases flexibility in construction scheduling

PACKAGING

Xypex Admix C-1000 is packaged in 20 lb. (9.1 kg) pails, 60 lb. (27.2 kg) pails and 50 lb. (22.7 kg) bags. Admix C-1000 is also available in cartons containing 10 lb. (4.5 kg), 12 lb. (5.5 kg), and 15 lb. (6.8 kg) soluble bags. For specific projects, contact the manufacturer for availability of custom sized packaging.

STORAGE

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

DOSAGE RATES

Xypex Admix C-1000: 2% - 3% by weight of cement
Xypex Admix C-1000 NF (No Fines Grade): 1% - 1.5% by weight of cement

Note: Under certain conditions, the dosage rate for No Fines Grade may be as low as 0.8% depending on the quantity and type of total cementitious materials.

Consult with Xypex's Technical Department for assistance in determining the appropriate dosage rate and for further information regarding enhanced chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

TEST DATA

PERMEABILITY

U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete" Aviles Engineering Corp., Houston, USA

Two concrete samples containing Xypex Admix at 3% and 5% respectively, and an untreated control sample were tested for water permeability. Both the treated and untreated samples were subjected to a pressure of 150 psi (350 ft. waterhead). Results showed moisture and permeated water throughout the untreated sample after 24 hours. However, the Xypex Admix samples showed no leakage, and water penetration of only 1.5 mm after 120 hours (5 days).

U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete" Setsco Services, Pte Ltd, Singapore

Six Xypex Admix-treated and six untreated concrete samples were tested for water permeability. Pressure was gradually increased over five days and then maintained at 7 bars (224 ft. waterhead) for 10 days. While the six reference samples showed water leakage beginning on the fifth day and increasing throughout the test period, the Xypex Admix samples showed no water leakage at any time during the test.

DIN 1048 "Water Impermeability of Concrete" DICTU S.A. Dept. Of Engineering and Construction Mgt., Santiago, Chile

Concrete samples 120 mm thick containing Xypex Admix were tested with the same size reference samples for water impermeability. Samples were subjected to hydrostatic pressure for 28 days. Water totally permeated the untreated samples but no water penetration was detected in any of the Xypex Admix-treated samples.

COMPRESSIVE STRENGTH

ASTM C 39 "Compressive Strength of Cylindrical Concrete Specimens" HBT Agra, Vancouver, Canada

Concrete samples containing Xypex Admix at various dosage rates (1%, 2% and 5%) were tested against an untreated concrete control sample. Compressive strength test results after 28 days indicated a significant strength increase in the samples incorporating Xypex Admix. The compressive strength increase varied between 5% and 20% (depending on the Xypex Admix dosage rate) over that of the reference sample.

ASTM C 39 "Compressive Strength of Cylindrical Concrete Specimens" Kleinfelder Laboratories, San Francisco, USA

At 28 days, the compressive strength test of the concrete containing Xypex Admix measured 7160 psi as compared to the reference sample at 6460 psi (a 10% increase).

CHEMICAL RESISTANCE

JIS "Chemical Durability Test" Japanese Utility Company, In-house Test Report, Tokyo, Japan

Concrete samples containing Xypex Admix were tested against five samples containing other admixtures and against a control sample, to determine resistance to corrosion and deterioration caused by contact with aggressive chemicals. All samples were soaked in a 5% sulfuric acid solution at 20°C for six months. Various evaluations and measurements were assessed every month during the test period, including: photographic comparisons, relative dynamic modulus of elasticity, percentage change in length, weight and flexural rigidity. Although the Xypex Admix sample was subjected to acid conditions well outside its published range, the results confirmed Xypex with the best performance among the seven samples tested.

"Sulfuric Acid Resistance Test" Aviles Engineering Corporation, Houston, USA

Concrete samples containing Xypex Admix at different dosage rates (3%, 5% and 7%) were tested against untreated control samples for Sulfuric acid resistance. After immersion in the Sulfuric acid, each sample was tested for weight loss on a daily basis until a weight loss of 50% or a definite response trend was obtained. The percentage weight loss of the samples containing Xypex Admix tested significantly lower than the control samples.

"Sulphate Resistance Test" Taywood Engineering Ltd., Perth, Australia

Xypex Admix-treated concrete samples were immersed in an ammonium-sulphate solution and tested for "resistance in a harsh environment". The performance of the Xypex-Crystalline-Technology was compared with five other concretes, including one containing a sulphate-resistant cement. Each of the test samples was cured for seven days and then placed in an ammonium-sulphate solution (132 g/l) for 180 days. The rate of corrosion was determined by measuring weight loss, and length change was noted on a weekly basis. The Xypex-Crystalline-Technology substantially improved concrete performance as compared to the reference concrete and tested very similar to the sulphate-resistant concrete. The Xypex Admix-treated samples also provided the highest level of protection as measured by change in length.

FREEZE/THAW DURABILITY

ASTM C 666 "Freeze/Thaw Durability" Independent Laboratory, Cleveland, USA

After 300 freeze/thaw cycles, the Xypex Admix-treated samples indicated 94% relative durability.

POTABLE WATER EXPOSURE

NSF 61 "Drinking Water System Component-Health Effects" NSF International, Ann Arbor, USA

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

DIRECTIONS FOR USE

Xypex Admix C-1000 must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

1. READY MIX PLANT - DRY BATCH OPERATION Add Xypex Admix in powder form to the drum of the ready-mix truck. Drive the ready-mix truck under the batch plant and add the balance of the materials in accordance with standard concrete batching practices. Mix materials for a minimum of 5 minutes to ensure that the Xypex Admix has been thoroughly dispersed throughout the concrete.

2. READY MIX PLANT - CENTRAL MIX OPERATION Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb./6.75 - 9 kg of powder mixed with 3 gallons/13.6 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the concrete into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

3. PRECAST BATCH PLANT Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

Notes:

1. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Therefore, do not add dry Admix powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur.

2. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing and measures for repairing defects in concrete (i.e. honeycombing, tie holes, cracks beyond specified limits).

For further information regarding the proper use of Xypex Admix for a specific project, consult with a Xypex Technical Representative.

SETTING TIME AND STRENGTH

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Xypex Admix C-1000 is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. Concrete containing the Xypex Admix C-1000 may develop higher ultimate strengths than plain concrete. Trial mixes should be carried out under project conditions to determine the setting time and strength of the concrete dosed with Xypex Admix C-1000. Consult with a Xypex Technical Representative for the most appropriate Xypex Admix for your project.

LIMITATIONS

When incorporating Xypex Admix, the temperature of the concrete mix should be above 40°F (4°C).

TECHNICAL SERVICES

For more instructions, alternative installation methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex Representative.

SAFE HANDLING INFORMATION

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

WARRANTY

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

Commercial Grade
Division 3

NYTECH® CG

Performance Concrete Fibers

Nytech® CG (Commercial Grade) Nylon monofilament fibers reduce early plastic shrinkage cracking and provides multi-dimensional secondary reinforcement that cannot be achieved with WWF.

Nytech® CG fibers improve long term durability as well as quantifiable engineering properties. **Nytech® CG** fibers will always be positioned correctly with millions of fibers dispersed evenly throughout the concrete.

Nytech® CG fibers conform to ASTM C 1116, ICC-ES AC32, and numerous Federal, State and Local Codes.

Benefits:

- CG Fibers provide 3-Dimensional reinforcement
- Provides plastic shrinkage crack reduction
- Provides secondary/temperature - shrinkage crack reduction
- Easily finished with non-hairy concrete
- Significant time and labor cost savings over WWF
- Improves overall durability of the concrete
- Easier to pump without equipment clogs
- Greater fatigue strength and Impact resistance than WWF
- Reduces Permeability

Applications:

- Commercial, Industrial, Warehouse and Residential Slabs-on-ground
- Decorative Concrete
- Shotcrete
- Precast Concrete
- Composite Elevated Decks

General Specification:

Nytech® CG is a monofilament nylon that meets the requirements of ASTM C - 1116, Section 4.1.3 and Note 3. Additionally **Nytech® CG** meets ICC ES AC32 Section 3.1.1 (Plastic Shrinkage Reinforcement) and Section 3.1.2 (Secondary/Temperature – Shrinkage Reinforcement). The standard dosage rate to meet this specification is 1.0 lbs / yd^3 (0.6 kg / m^3). **Nytech® CG** is marketed by NMW, Inc., 6553 West 400 North, Greenfield, IN 46140. Phone: (800)253-4237, Fax: (317)891-1019.

Nytech® CG

Installation:

Nytech® CG fibers are packaged in pre-weighed paper/degradable bags that are added to the mix at the batch plant. To ensure even fiber disbursement, do not add concurrently with cement. If added after all the standard ingredients, then continue to mix for an additional 3 – 5 minutes.

Normal Dosage rate for **Nytech® CG** fibers is 1 pound / yd^3 of concrete.

Packaging:

Standard Packaging for **Nytech® CG** fibers is:

1lb bags	30 bags / box, 36 boxes/skid
5lb bags	6 bags / box, 36 boxes/skid

Optional Packaging:

9lb bags*	3 bags / box, 36 boxes/skid
10lb bags*	3 bags / box, 36 boxes/skid

*Additional Charges Apply

Physical Properties:

Specific Gravity	1.16
Denier Range	2 – 7
Melting Point	490° - 510° F
Alkali & Chemical Resistance	Excellent
Water Absorption	4 – 5%
Color	Natural

Shipping Policy:

NMW, Inc. utilizes multiple shipping points around the country and can have products virtually anywhere in the US in 1 - 2 days.

All LTL shipments/deliveries are fob plant.*

*Some exceptions apply

Limitations:
Nytech® CG fibers are intended to reduce plastic shrinkage cracking and provide secondary/temperature-shrinkage reinforcement. **Nytech® CG** should not be used as structural reinforcement. NMW, Inc. warrants that the product sold hereunder is of merchantable quality and conforms to seller's standards and specifications. Seller's sole liability for claim shall be limited to replacement of defective or non-conforming product. In no event shall seller be liable for any special, incidental, consequential, or exemplary damages. NMW, Inc. recommends that each user determine the suitability of the product(s) for their own particular application.

NMW, inc
Concrete Solutions

6553 West 400 North • Greenfield IN • 46140

Ph: (317)891-1010 • Fax: (317)891-1019 • Toll Free: (800)253-4237

On the web: www.nmwinc.com

BASF

The Chemical Company

September 30, 2010

Project: Airport renovation
Project location: Bedford Indiana

Certificate of Conformance
GLENIUM® 7500
BASF Construction Chemicals, LLC* Admixture for Concrete

(*Previously doing business as BASF Admixtures, Inc. and prior to that as Degussa Admixtures, Inc. and Master Builders, Inc.)

I, Richard Hubbard, Sr. Technical Marketing Specialist for BASF Construction Chemicals, LLC , Cleveland, Ohio,certify:

That GLENIUM 7500 is a high-range water-reducing admixture manufactured by BASF Construction Chemicals, LLC; and

That no calcium chloride or chloride based ingredient is used in the manufacture of GLENIUM 7500; and

That GLENIUM 7500, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00017 percent (1.7 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That GLENIUM 7500 meets the requirements for a Type A, Water-Reducing and Type F, Water-Reducing, High Range Admixture specified in ASTM C 494, Corps of Engineers' CRD-C 87 and AASHTO M194, the Standard Specifications for Chemical Admixtures for Concrete.

Richard Hubbard III

Richard Hubbard
Sr. Technical Marketing Specialist BASF Construction Chemicals, LLC

BASF Construction Chemicals, LLC
23700 Chagrin Boulvard
Cleveland, OH 44122
216 839-7500 ph
www.masterbuilders.com

Master Builders
Admixture Solutions

BASF

The Chemical Company

May 28, 2009

Irving Materials, Inc.
5024 S. State Road 67
Anderson, Indiana 46013

Attention: Svetlana Latashiline
Project: Annual Certification
Project location: various locations

Certificate of Conformance
Micro-Air®
BASF Construction Chemicals, LLC* Air-Entraining Admixture for Concrete

(*Previously doing business as BASF Admixtures, Inc. and prior to that as Degussa Admixtures, Inc. and Master Builders, Inc.)

I, Richard Hubbard, Sr. Technical Marketing Specialist for BASF Construction Chemicals, LLC , Cleveland, Ohio,certify:

That Micro-Air is a BASF Construction Chemicals, LLC Air-Entraining Admixture for concrete; and

That no calcium chloride or chloride based ingredient is used in the manufacture of Micro-Air; and

That Micro-Air, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.0001 percent (1.0 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That Micro-Air meets the requirements of ASTM C 260, Corps of Engineers CRD-C 13 and AASHTO M154, the Standard Specifications for Air-Entraining Admixtures for Concrete.

Richard Hubbard III

Richard Hubbard
Sr. Technical Marketing Specialist BASF Construction Chemicals, LLC

BASF Construction Chemicals, LLC
23700 Chagrin Boulvard
Cleveland, OH 44122
216 839-7500 ph
www.masterbuilders.com

Master Builders
Admixture Solutions

Grace Construction Products

W.R. Grace & Co. - Conn.
6060 W. 51st Street
Chicago, IL 60638

T 800-232-6411

www.graceconstruction.com

5/22/2009

Svetlana Latashiline
Irving Materials, Inc.
5024 S. State Road 67
Anderson, Indiana 46013

Project Name: Annual Certification
Product Selected: Polarset®

This is to certify that the Polarset, a Accelerator, as manufactured and supplied by Grace Construction Products, W.R. Grace & Co. – Conn., is formulated to comply with the Specifications for Chemical Admixtures for Concrete, ASTM: C494, Type C, AASHTO: M194, Type C.

Polarset does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in manufacturing.

The foregoing is in addition to and not in substitution for our standard Conditions of Sale attached.

James A. Kolakowski
Central Region Technical Services Manager

Lehigh Cement Company
Mill Test Certificate Report

Type: I-II ASTM, I-II AASHTO

Test Period: August 2012

Certification

This certifies that the described cement, at the time of shipment, meets chemical and physical requirements of the current applicable specification for ASTM C-150, for type I and type II as well as AASHTO M-85 for type I and type II. We are not responsible for improper use or workmanship.

General Information

Supplier: Lehigh Cement Company
Address: 180 N. Meridian Road
Mitchell, IN 47446
Telephone: (812)-849-2191

Source Location: Lehigh Cement Company
Mitchell, Indiana

Contact: Joe Cieslik
Quality Control Manager

Tests Data on ASTM "Standard" Requirements

Chemical				Physical			
Item	ASTM	Limit	Result	Item	ASTM	Limit	Result
SiO_2 (%)	C 114	20 min	20.1	Fineness:	C 204		
Al_2O_3 (%)	C 114	6.0 max	4.8	% Passing 45 µm (No. 325) Sieve (%)	C430	-	95.7
Fe_2O_3 (%)	C 114	6.0 max	3.0	Blaine Fineness (m^2/kg) *	C204	280-430	400
CaO (%)	C 114	-	62.7	Autoclave Expansion (%)	C151	0.8 max	0.007
MgO (%)	C 114	6.0 max	2.1	Vicat Setting Time:	C191		
SO_3 (%)	C 114	-	3.4	Intial Vicat (minutes)	C191	45 min	122
Loss on Ignition (%)	C 114	3.0 max	2.5	Final Vicat (minutes)	C191	375 max	216
Na_2O (%)	C114	-	0.16	Air Content (%)	C185	12 max	8.3
K_2O (%)	C114	-	0.76	Heat of Hydration (KJ/kg)			
Insoluble Residue (%)	C 114	0.75 max	0.34	7 Days **	C186	-	346
CO_2 (%)	C 114	-	1.4	C1038 Mortar Bar Expansion (%) ***	C1038	-	0.01
Limestone (%)	C 114	5 max	3.3				
$CaCO_3$ in Limestone (%)	C114	70 min	96.5	Compressive Strength MPa:	C 109/C 109M		
Inorganic Processing Addition (%)	C114	5 max	-	1 Day	C 109/C 109M	-	12.9
(Type I-II)				3 Day	C 109/C 109M	12.0 min	24.5
Potential Compounds:	C114			7 Day	C 109/C 109M	19.0 min	30.8
C_3S (%)	C114	-	52	28 Day	C 109/C 109M	-	
C_2S (%)	C114	-	18				
C_3A (%)	C114	8 max	7.4	Compressive Strength PSI:	C 109/C 109M		
C_4AF (%)	C114	-	9	1 Day	C 109/C 109M	-	1865
$C_4AF + 2(C_3A)$	C114	-	24	3 Day	C 109/C 109M	1740 min	3550
$C_3S+4.75*C_3A$	C114	100 Max	87	7 Day	C 109/C 109M	2760 min	4472
Na Eqv (%)	C114	-	0.67	28 Day	C 109/C 109M	-	

Notes

* Maximum fineness limits do not apply if the sum of C3S + 4.75C3A is less than or equal to 90.
**Test result represents most recent value and is provided for information only.
***Test result for this production period not available. Most recent test result provided.

09/18/12
Date

J. Cieslik

Joe Cieslik
Quality Control Manager

Lehigh Cement Company
Mill Test Certificate Report

Type: I-II ASTM, I-II AASHTO

Test Period: August 2012

Certification

This certifies that the described cement, at the time of shipment, meets chemical and physical requirements of the current applicable specification for ASTM C-150, for type I and type II as well as AASHTO M-85 for type I and type II. We are not responsible for improper use or workmanship.

General Information

Supplier: Lehigh Cement Company
Address: 180 N. Meridian Road
Mitchell, IN 47446
Telephone: (812)-849-2191

Source Location: Lehigh Cement Company
Mitchell, Indiana

Contact: Joe Cieslik
Quality Control Manager

Additional Data

Inorganic Processing Addition Data	
Type	
Amount (%)	-
SiO_2 (%)	-
Al_2O_3 (%)	-
Fe_2O_3 (%)	-
CaO (%)	-
SO_3 (%)	-

Base Cement Phase Composition	
C_3S (%)	53
C_2S (%)	19
C_3A (%)	7.7
C_4AF (%)	10

Notes

We certify that the above described data represents the materials used in the cement manufacturing during the production period indicated

J. Cieslik

September 18, 2012
Date

Joe Cieslik
Quality Control Manager

Lehigh Cement Company

Mill Test Certificate Report

Type: III ASTM

Test Period: January 2012

Certification

This certifies that the described cement, at the time of shipment, meets chemical and physical requirements of the current applicable specification for ASTM C-150, for type III as well as AASHTO M-85 for type III. We are not responsible for improper use or workmanship.

General Information

Supplier: Lehigh Cement Company
Address: 180 North Meridian road
Mitchell, IN 47445 - 1144
Telephone: (812)-849-2191

Source Location: Lehigh Cement Company
Mitchell, Indiana

Contact: Joe Cieslik
Quality Control Supervisor

Tests Data on ASTM "Standard" Requirements

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
SiO_2	-	20.1	Fineness:		
Al_2O_3	-	4.8	% Passing 45 µm (No. 325) Sieve (%)	-	99.6
Fe_2O_3	-	3.1	Blaine Fineness (m^2/kg)	-	614
CaO	-	62.6	Autoclave Expansion (%)	-	-0.01
MgO	6.0 max	1.8	Vicat Setting Time:		
SO_3	3.5 max	3.3	Intial Vicat (minutes)	45 min	107
Na Eqv	-	0.64	Final Vicat (minutes)	375 max	211
Loss on Ignition	3.0 max	2.1	Air Content (%)	12 max	9
Insoluble Residue	0.75 max	0.44			
Potential Compounds:			Compressive Strength MPa		
C_3S	-	56	1 Day	12 min	28.7
C_2S	-	16	3 Day	24.0 min	39.9
C_3A	15 max	7	7 Day	-	46.4
C_4AF	-	9	28 Day	-	-

Notes

02/13/12
Date

Joe Cieslik
Quality Control Supervisor

imi Technical Services

ACI 214/318 Strength Test Evaluation

Project Name: Mackey Arena #D6, NW Athletics Complex - Phase I, PID #08-9658
Contractor: JR Kelly, Shiel Sexton
Mix Design #: 060: 6 Bag, Air, Stone, WR
Spec'd Str. (f'c): 4000 psi

West Lafayette Concrete Plant

Test No.	Date	Slump, in	Air, %	Additive	Air Temp., °F	Concrete Temp., °F	7-Day Str., psi	28-Day Compressive Strength, psi				Moving Avg of Three
								Cyl.#1, psi	Cyl.#2, psi	Cyl.#3, psi	Avg Strength, psi	
1	03/30/12	6.00	5.6		48	66	3520	4460	4070		4265	
2	04/02/12	4.25	5.4		65	72	4350	4970	5050		5010	
3	04/06/12	6.00	5.8		50	71	3300	4590	4510		4550	4608
4	04/10/12	5.00	6.4		36	67	4240	4800	4580		4690	4750
5	04/11/12	5.25	6.4		28	66	4100	5040	4820		4930	4723
6	04/12/12	5.00	6.0	RF IMIXC FTE	53	58	3760	4380	4120		4250	4623
7	04/13/12	4.75	5.7		41	68	3950	4600	4400		4500	4560
8	05/10/12	4.50	5.1	RF	47	63	3570	4260	4400		4330	4360
9	05/10/12	5.00	5.9	CF	55	64	3430	4210	4030		4120	4317
10	05/11/12	3.50	4.0		44	64	4460	5020	4980		5000	4483
11	05/14/12	5.00	5.4	CF	57	68	3520	3990	4260		4125	4415
12	05/14/12	3.25	4.6		70	76	4780	5390	5310		5350	4825
13	05/15/12	7.00	5.2	CF	55	69	3790	4330	4590		4460	4645
14	05/16/12	4.50	4.9		66	73	4595	5270	5370		5320	5043
15	06/04/12	4.50	5.6	CF	60	68	3960	5110	5060		5085	4955
16	06/05/12	5.00	5.5	CF	55	69	3500	4090	3970		4030	4812
17	06/06/12	5.00	5.3	CF	54	67	4175	4800	4830	4640	4757	4624
18	06/07/12	5.00	5.0	CF	54	68	4465	4930	5540	4930	5133	4640
19	06/08/12	5.00	4.8	CF	60	71	4775	5530	5480	5250	5420	5103
20	06/09/12	5.25	5.3	CF	63	70	3795	4290	4500	4370	4387	4980
21	06/11/12	4.75	5.0	CF FT8	71	73	4335	4810	4760	5290	4953	4920
22	06/12/12	5.00	6.0	CF	66	70	3660	4330	4430		4380	4573
23	06/13/12	4.25	5.3	CF	58	68	4240	5030	4780		4905	4746
24	06/14/12	5.25	6.5	CF	56	70	3855	4360	4320		4340	4542
25	06/15/12	4.75	4.4	CF	63	70	4145	4740	4810	5000	4850	4698
26	06/18/12	5.50	6.0	CF	87	74	3570	4240	4230	3880	4117	4436
27	06/19/12	3.25	4.7	CF	70	78	4620	4950	5110	5250	5103	4690
28	06/20/12	4.50	4.2	CF	86	85	4235	4860	4980	4740	4860	4693
29	06/20/12	3.75	4.2		77	83	4435	5020	5060		5040	5001
30	05/21/12	5.00	4.6	CF	73	88	3560	4140	4060		4100	4667
31	06/22/12	4.75	4.3	CF	62	80	4215	5120	5070	5050	5080	4740
32	06/25/12	3.50	4.5		72	77	4130	4860	4720	4820	4800	4660
33	06/25/12	4.25	4.4	CF	70	73	4600	5670	5050	5400	5373	5084
34	07/11/12	5.50	5.7	CF	69	72	4150	4580	4340	4520	4480	4884
35	07/16/12	4.50	6.3	RF	85	76	3500	4000	3930	4160	4030	4628
36	07/20/12	5.00	6.4	RF	80	75	3530	4090	4690	4500	4427	4312
37	07/25/12	4.50	5.5	RF	78	82	3700	4220	4300	4310	4277	4244
38	07/26/12	2.75	3.0		83	83	4700	5510	5270		5390	4698
39	07/28/12	7.00	2.0		87	80	4430	4960	4940		4950	4872
40	07/31/12	4.00	4.0		78	80	4690	5440	5340		5390	5243
41	08/02/12	4.50	1.9		82	78	3490	4150	4000	3920	4023	4788
42	08/02/12	5.00	4.5		86	75	3700	4070	4100		4085	4499
43	08/03/12	5.00	4.5		73	80	4030	4700	4520		4610	4239
44	08/07/12	3.50	5.5	RF	87	85	4090	5210	4680	4770	4887	4527
45	08/10/12	4.50	5.0		70	80	4480	4960	4830	5030	4940	4812
Average		4.73	5.0		65	73	4047				4691	

imi Technical Services

ACI 214 Strength Analysis

Average Strength, $\bar{X}$	4691 psi	Min Strength, psi	4023
No. of Tests, n	45	Avg Strength, psi	4691
		Max Strength, psi	5420
		Min Slump, in.	2.75
		Avg Slump, in.	4.73
Standard Deviation, s	438 psi	Max Slump, in.	7.00
Coefficient of Variation, V	9.3 %		
		Min Air Content, %	1.9
		Avg Air Content, %	5.0
		Max Air Content, %	6.5
		Min Conc. Temp., °F	58
		Avg Conc. Temp., °F	73
		Max Conc. Temp., °F	88
		Min Air Temp., °F	28
		Avg Air Temp., °F	65
		Max Air Temp., °F	87

imi Technical Services

ACI 318 Performance Approval VALID, >15 TESTS

Modification factor for sample standard deviation:	1.000	
Sample standard deviation, Ss:	438 psi	Ss = sample standard deviation x modification factor
Required average compressieve strength, f'cr:	4587 psi	f'cr = f 'c + 1.34Ss
Required average compressieve strength, f'cr:	4520 psi	f'cr = f 'c + 2.33Ss - 500
		Notation:
		f 'c = specified compressive strength of concrete, psi

CONCLUSION: MIX APPROVED

Quality Test Report

Plant 072-Sieboldt Quarry
Product 5019-#8 AP INDOT
Specification #8 IMI Spec

1876076249

Sample Information

Sample No 1876076249
Date Sampled 08/24/2012 09:20
Sampled By Laresa Ingram
Type Production
Method Bin
Location
Process
Ledge 4-9 (short /full face)
Other
Weather Sunny
Temp 92

Split Sample ☐
Resample ☐
Lot / Sublot
Quad / Quantity

Sequence
Code

Test Note

Gradation Results

Date Completed 08/24/2012 10:22
Tested By Laresa Ingram

Unit	Moist Mass	Dry Mass	Wash Mass	Moisture %	Wash Loss %	Procedure
g	7903.80	7860.70		0.5		

Sieve	Mass Retained	Cum Mass Retained	Ind % Retained	% Retained	% Passing	Target	Specification	Comment
1" (25mm)	0.0	0.0	0.0	0.0	100.0		100-100	
3/4" (19mm)	744.2	744.2	9.5	9.5	90.5		75-95	
1/2" (12.5mm)	2926.3	3670.5	37.2	46.7	53.3	39.9-58.5\49.9	40-70	
3/8" (9.5mm)	1459.3	5129.8	18.6	65.3	34.7		20-50	
#4 (4.75mm)	2081.0	7210.8	26.5	91.7	8.3		0-15	
#8 (2.36mm)	549.6	7760.4	7.0	98.7	1.3		0-10	
#16 (1.18mm)								
#30 (0.6mm)								
#50 (0.3mm)								
#100 (0.15mm)								
#200 (75um)	59.6	7820.0	0.8	99.5	0.5		0-2.5	
Pan	40.1	7860.1	0.5	100.0	0.0			

Other Test Results

Test Name	Date / Procedure	Result / Lab	Unit	Target	Specification / Tested By	Comment
Grad Loss	08/24/2012 10:22	0.008 Sieboldt Quarry	%		-0.3-0.3 Laresa Ingram	
Total Moisture	08/24/2012 10:22	0.55 Sieboldt Quarry	%		 Laresa Ingram	

Quality Test Report

Plant 0424-Morgan County Sand & Gravel
Product 2001-#23 Natural Sand/#4 Structural Backfill/De-Ice
Specification #23 Natural Sand/#4 Structural Backfill/De-Ice

1517843815

Sample Information

Sample No 1517843815
Date Sampled 11/19/2012 09:40
Sampled By Laresa Ingram
Type Production
Method Stockpile
Location Paddle #5
Process
Ledge 2:30
Other
Weather
Temp

Split Sample ☐
Resample ☐
Lot / Sublot
Quad / Quantity

Sequence Code

Test Note

Gradation Results

Date Completed 11/19/2012 09:40
Tested By Laresa Ingram

Unit	Moist Mass	Dry Mass	Wash Mass	Moisture %	Wash Loss %	Procedure
g	574.70	546.30		5.2		

Sieve	Mass Retained	Cum Mass Retained	Ind % Retained	% Retained	% Passing	Target	Specification	Comment
1/2" (12.5mm)	0.0	0.0	0.0	0.0	100.0		>100	
3/8" (9.5mm)	0.0	0.0	0.0	0.0	100.0		>100	
#4 (4.75mm)	5.2	5.2	1.0	1.0	99.0		95-100	
#8 (2.36mm)	90.5	95.7	16.6	17.5	82.5		80-100	
#16 (1.18mm)	105.9	201.6	19.4	36.9	63.1		50-85	
#30 (0.6mm)	124.6	326.2	22.8	59.7	40.3		25-60	
#50 (0.3mm)	162.0	488.2	29.7	89.4	10.6		5-30	
#100 (0.15mm)	48.0	536.2	8.8	98.2	1.8		0-10	
#200 (75um)	4.5	540.7	0.8	99.0	1.0	0-2.9\1.5	0-3	
Pan	4.1	544.8	0.8	100.0	0.0			

Other Test Results

Test Name	Date	Result	Unit	Target	Specification	Comment
	Procedure	Lab			Tested By	
FM	11/19/2012 09:40	3.03				
		Morgan County Sand & Gravel			Laresa Ingram	
Grad Loss	11/19/2012 09:40	0.275	%			
		Morgan County Sand & Gravel			Laresa Ingram	
Total Moisture	11/19/2012 09:40	5.20	%			
		Morgan County Sand & Gravel			Laresa Ingram	

Appendix C.2

Concrete Compression Test Results

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-4
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 11/28/2012

General Field Data

Technician: John Staples
Test Date: 11/9/2012
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-4-C1	2	3118749	09:55	10:55	36.0	2.25	2.25	5.80	44	65

Location & Remarks

General Location: Spring 18 berm

Set No.	Location	Remarks
0014921-4-C1	North side of spring 18 berm, elevation = 560.50	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-4-C1	Irving Materials, Inc.	060	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-6
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 11/28/2012

General Field Data

Technician: John Staples
Test Date: 11/14/2012
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-6-C1	2	3118774	08:35	09:30	9.0	4.00	5.90	31	65

Location & Remarks

General Location: 4" wear surface spring 18

Set No.	Location	Remarks
0014921-6-C1	North side of 4" wear surface	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-6-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-9
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/11/2012

General Field Data

Technician: Melissa Vandenberg
Test Date: 12/6/2012
Weather: Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-9-C1	2	3118958	08:45	09:45	27.0	4.75	7.90	76	31

Location & Remarks

General Location:

Set No.	Location	Remarks
0014921-9-C1	Station 6+50-7+65	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-9-C1	Irving Materials, Inc.	060	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-11
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/12/2012

General Field Data

Technician: David Noggle
Test Date: 12/10/2012
Weather: Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-11-C1	2	3118982	08:29	09:40	9.0	3.00	5.00	35	76

Location & Remarks

General Location: Tributary #3

Set No.	Location	Remarks
0014921-11-C1	Tributary #3 station 11+40-11+98	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-11-C1	Irving Materials, Inc.	060	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-12
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/20/2012

General Field Data

Technician: David Noggle
Test Date: 12/11/2012
Weather: Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-12-C1	2	3119004	09:08	10:00	9.0	4.25	5.10	28	65

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-12-C1	Tributary 2	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-12-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-13
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/20/2012

General Field Data

Technician: David Noggle
Test Date: 12/12/2012
Weather: Clear

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-13-C1	2	3119019	08:16	09:40	18.0	4.25	5.20	27	67

Location & Remarks

General Location: Bailey Branch station 4+20 to 5+70

Set No.	Location	Remarks
0014921-13-C1	4+50	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-13-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-14
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/20/2012

General Field Data

Technician: David Noggle
Test Date: 12/13/2012
Weather: Clear

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-14-C1	2	3119044	08:25	09:20	9.0	4.50	5.10	23	64

Location & Remarks

General Location: Spring 18 berm final layer

Set No.	Location	Remarks
0014921-14-C1	10' south of the north end of the berm	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-14-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-16
Issue No: 1

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/4/2013

General Field Data

Technician: John Staples
Test Date: 12/18/2012
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-16-C1	2	3119101	08:55	09:38	36.0		6.00	5.70	38	67

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-16-C1	Station 2+54 to 4+00	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-16-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-19
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/9/2013

General Field Data

Technician: David Lahr
Test Date: 1/8/2013
Weather: Clear

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-19-C1	2	3119134	09:15	11:30	5.0		7.00	3.90	40	71

Location & Remarks

General Location: Tributary #3

Set No.	Location	Remarks
0014921-19-C1	Trib #3 station 11+40 to 10+25	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-19-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-20
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/11/2013

General Field Data

Technician: David Lahr
Test Date: 1/9/2013
Weather: Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-20-C1	2	3119145	08:53	09:40	5.0	7.00	7.00	4.00	40	65

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-20-C1	Station 4+50 to 3+88	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-20-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-23
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/24/2013

General Field Data

Technician: Chris Bernier
Test Date: 1/15/2013
Weather: Partly Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-23-C1	2	3119177	09:23	10:27	9.0		2.00	2.50	31	61

Location & Remarks

General Location: Trib 3, station 11+00, top layer

Set No.	Location	Remarks
0014921-23-C1	upstream quarter of pour	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-23-C1	Irving Materials, Inc.	907	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-24
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/24/2013

General Field Data

Technician: John Staples
Test Date: 1/16/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-24-C1	2	3119183	10:30	11:10	27.0		3.00	5.80	34	65

Location & Remarks

General Location: Trib #3 capping

Set No.	Location	Remarks
0014921-24-C1	10+95 thru 10+55	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-24-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-25
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/24/2013

General Field Data

Technician: John Staples
Test Date: 1/17/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-25-C1	2	3119196	10:30	11:00	36.0		3.00	5.80	34	70

Location & Remarks

General Location: Bailey's Branch Area

Set No.	Location	Remarks
0014921-25-C1	Station 7+48 thru 6+45	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-25-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-26
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/29/2013

General Field Data

Technician: John Staples
Test Date: 1/18/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-26-C1	2	3119209	09:37	10:19	36.0		4.00	5.50	27	67

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-26-C1	Baileys Branch 4+05 to 4+65	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-26-C1	Irving Materials, Inc.	908	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-27
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/29/2013

General Field Data

Technician: John Staples
Test Date: 1/19/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-27-C1	2	3119217	09:00	09:52	18.0		3.00	5.70	41	70

Location & Remarks

General Location: Bailey's Branch Area

Set No.	Location	Remarks
0014921-27-C1	Station 4+83 thru Station 5+55	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-27-C1	Irving Materials, Inc.	PSI	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Field Report

Report No: FC:0014921-29
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/29/2013

General Field Data

Technician: John Staples
Test Date: 1/23/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-29-C1	2	3119226	10:45	11:35	27.0		4.00	5.80	19	67

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-29-C1	Station 0+00 thru station 0+60	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-29-C1	Irving Materials, Inc.	PSI	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Field Report

Report No: FC:0014921-30
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/30/2013

General Field Data

Technician: John Staples
Test Date: 1/24/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-30-C1	2	3119234	10:35	11:30	27.0		4.00	5.20	20	68

Location & Remarks

General Location: Bailey's Branch

Set No.	Location	Remarks
0014921-30-C1	0+60 thru 0+98	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-30-C1	Irving Materials, Inc.	917	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Concrete Field Report

Report No: FC:0014921-32
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/30/2013

General Field Data

Technician: John Staples
Test Date: 1/29/2013
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-32-C1	2	3119245	09:40	10:30	36.0		3.00	5.00	61	74

Location & Remarks

General Location: Bailey's Branch

Set No.	Location	Remarks
0014921-32-C1	Station 0+98 thru 1.75	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-32-C1	Irving Materials, Inc.	060 4000 PSI	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Field Report

Report No: FC:0014921-37
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/13/2013

General Field Data

Technician: John Staples
Test Date: 2/5/2013
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-37-C1	2	3119261	09:20	10:10	10.0		5.00	5.80	32	65

Location & Remarks

General Location: Spring 18, access road

Set No.	Location	Remarks
0014921-37-C1	Station 20+00 thru station 20+65	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-37-C1	Irving Materials, Inc.	917	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Field Report

Report No: FC:0014921-38
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/6/2013
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-38-C1	2	3119278	09:45	10:24	36.0		3.50	6.00	35	65

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-38-C1	Station 2+45 thru station 2+95	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-38-C1	Irving Materials, Inc.	917	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

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Indianapolis, IN 46268

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Concrete Field Report

Report No: FC:0014921-39
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/7/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-39-C1	2	3119294	09:45	10:40	36.0		3.00	6.00	41	65

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-39-C1	Station 1+75 thru station 2+55	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-39-C1	Irving Materials, Inc.	918	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Concrete Field Report

Report No: FC:0014921-40
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/8/2013
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-40-C1	2	3119314	09:00	09:48	18.0		3.00	4.70	35	65

Location & Remarks

General Location: Spring 18 Acess Road

Set No.	Location	Remarks
0014921-40-C1	Station 21+40 thru station 21+98	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-40-C1	Irving Materials, Inc.	917	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-41
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/13/2013
Weather: Overcast

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-41-C1	2	3119348	09:50	10:27	45.0		3.50	5.30	32	67

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-41-C1	Station 5+40 thru station 6+70	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-41-C1	Irving Materials, Inc.	918	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Field Report

Report No: FC:0014921-42
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/14/2013
Weather: Partly Cloudy

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-42-C1	2	3119368	10:05	10:52	54.0		3.50	5.80	36	70

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-42-C1	Station 5+40 thru Station 6+70	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-42-C1	Irving Materials, Inc.	918	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

Professional Service Industries, Inc.
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Indianapolis, IN 46268

Phone: (317) 876-7723
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Concrete Field Report

Report No: FC:0014921-43
Issue No: 1

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

General Field Data

Technician: John Staples
Test Date: 2/15/2013
Weather: Sunny

Test Results

Set No.	Specimens Made	Ticket	Time Batched	Time Unloaded	Cubic Yards Placed	Slump (in)	Slump w/ Plasticizer (in)	Air Content (%)	Air Temp. (°F)	Concrete Temp. (°F)
0014921-43-C1	2	3119396	11:00	11:34	45.0		3.50	5.70	40	70

Location & Remarks

General Location: Baileys Branch

Set No.	Location	Remarks
0014921-43-C1	Station 5+40 thru station 6+70	

Mix Data

Set No.	Supplier	Mix	Design Strength (psi)
0014921-43-C1	Irving Materials, Inc.	918	4000

Notes

Sampled from Revolving Drum Truck Mixer (ASTM C 172, 5.2.3)

Remarks

Applicable ASTM standards unless otherwise indicated: Making Samples: C31 (except sec. 10.1.2); Slump: C143; Air Content: C231 (except sec. 6); Temperature: C1064; Sampling: C17; Grout: C1019; Slump-Flow: C1611; Mortar: C109; Flow: C1437.

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Concrete Test Report

Report No: CON:0014921-4-C1
Issue No: 3

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/11/2012

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)		564	N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	060	Coarse Agg (lb)		1800	
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)		1340	
Design Unit Weight (pcf)		Admix Agg (lb)		12.0	N/A
Cement Factor (Sacks/yd³)		Water (gal)		226.0	N/A

Details of Sample

						Measured	Specified
Date Sampled	11/9/2012	Date Received	11/12/2012	Slump (in)	ASTM C 143	2.25	
General Location	Spring 18 berm			Slump w/ plasticizer (in)		2.25	
Sample Location	North side of spring 18 berm, elevation = 560.50			Air Temp (°F)		44	
Curing Method	Three day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	476	Ticket No.	3118749	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:55	
Weather	Sunny			Time Sampled		10:57	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		10:55	
Est. Rh (%)				Time In Truck (mins)		60	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-4-C1\1	12/07/12	28	4.00	8.00	12.57		96030	2	7640	4000

Average 28 Day Compressive Strength (psi) 7640

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-6-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 12/13/2012

Mix Data

Mix Data Submitted By	Irving Materials, Inc.			Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.			Cement (lb)			N/A
Plant				Fly Ash (lb)			N/A
Mix Identification	908			Coarse Agg (lb)			
Specified Design Strength (psi)	4000	at age 28	days	Fine Agg (lb)			
Design Unit Weight (pcf)				Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)				Water (gal)			N/A

Details of Sample

						Measured	Specified
Date Sampled	11/14/2012	Date Received	11/15/2012	Slump (in)	ASTM C 143	4.00	
General Location	4" wear surface spring 18			Slump w/ plasticizer (in)		N/A	
Sample Location	North side of 4" wear surface			Air Temp (°F)		31	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.90	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1702	Ticket No.	3118774	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		08:35	
Weather	Sunny			Time Sampled		09:35	
Est. Wind (mph)		Yd³ Placed	9.0	Time Placed		09:30	
Est. Rh (%)				Time In Truck (mins)		55	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-6-C1\1	12/12/12	28	4.00	8.00	12.57		76600	1	6100	4000
0014921-6-C1\2		Hold								4000

Average 28 Day Compressive Strength (psi) 6100

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 1 = C39: Cones on both ends; C1314: Conical Break,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-9-C1
Issue No: 3

Client: SEVENSON ENVIRONMENTAL
320 GM DRIVE, CONSTRUCTION TRAILER
BEDFORD, IN 47421

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/3/2013

Mix Data

			Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.					
Supplier	Irving Materials, Inc.		Cement (lb)		564	N/A
Plant			Fly Ash (lb)			N/A
Mix Identification	060		Coarse Agg (lb)		1800	
Specified Design Strength (psi)	4000	at age 28 days	Fine Agg (lb)		1340	
Design Unit Weight (pcf)			Admix Agg (lb)		12.0	N/A
Cement Factor (Sacks/yd³)			Water (gal)		226.0	N/A

Details of Sample

						Measured	Specified
Date Sampled	12/6/2012	Date Received	12/10/2012	Slump (in)	ASTM C 143	4.75	
Sample Location	Station 6+50-7+65			Slump w/ plasticizer (in)		N/A	
				Air Temp (°F)		76	
Curing Method	Four day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	31	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	7.90	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1746	Ticket No.	3118958	Water Added (gal)	Before		
Sampled By	Melissa Vandenberg				After		
Submitted By	Melissa Vandenberg			Time Batched		08:45	
Weather	Cloudy			Time Sampled		09:30	
Est. Wind (mph)		Yd³ Placed	27.0	Time Placed		09:45	
Est. Rh (%)				Time In Truck (mins)		60	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-9-C1\1	01/03/13	28	3.99	8.00	12.50		67740	2	5420	4000
0014921-9-C1\2	01/03/13	28	3.99	8.00	12.50		65720	3	5260	4000
					Average 28 Day Compressive Strength (psi)				5340	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear, 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

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Concrete Test Report

Report No: CON:0014921-11-C1
Issue No: 3

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/8/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)		564	N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	060	Coarse Agg (lb)		1800	
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)		1340	
Design Unit Weight (pcf)		Admix Agg (lb)		12.0	N/A
Cement Factor (Sacks/yd³)		Water (gal)		226.0	N/A

Details of Sample

						Measured	Specified
Date Sampled	12/10/2012	Date Received	12/11/2012	Slump (in)	ASTM C 143	3.00	
General Location	Tributary #3			Slump w/ plasticizer (in)		N/A	
Sample Location	Tributary #3 station 11+40-11+98			Air Temp (°F)		35	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	76	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.00	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1616	Ticket No.	3118982	Water Added (gal)	Before		
Sampled By	David Noggle				After		
Submitted By	Melissa Vandenberg			Time Batched		08:29	
Weather	Cloudy			Time Sampled		09:10	
Est. Wind (mph)		Yd³ Placed	9.0	Time Placed		09:40	
Est. Rh (%)				Time In Truck (mins)		71	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-11-C1\1	01/07/13	28	4.01	8.00	12.60		93400	1	7410	4000
0014921-11-C1\2	01/07/13	28	4.00	8.00	12.57	U	92660	2	7370	4000
					Average 28 Day Compressive Strength (psi)				7390	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 1 = C39: Cones on both ends; C1314: Conical Break, 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Concrete Test Report

Report No: CON:0014921-12-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/8/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	12/11/2012	Date Received	12/12/2012			Measured	Specified
				Slump (in)	ASTM C 143	4.25	
General Location	Baileys Branch			Slump w/ plasticizer (in)		N/A	
Sample Location	Tributary 2			Air Temp (°F)		28	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.10	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	531	Ticket No.	3119004	Water Added (gal)	Before		
Sampled By	David Noggle				After		
Submitted By	Melissa Vandenberg			Time Batched		09:08	
Weather	Cloudy			Time Sampled		09:45	
Est. Wind (mph)		Yd³ Placed	9.0	Time Placed		10:00	
Est. Rh (%)				Time In Truck (mins)		52	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-12-C1\1	01/08/13	28	4.01	8.00	12.60	U	84130	2	6680	4000
0014921-12-C1\2	01/08/13	28	4.01	8.00	12.60	U	84090	2	6670	4000
					Average 28 Day Compressive Strength (psi)				6680	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Concrete Test Report

Report No: CON:0014921-13-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/9/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	12/12/2012	Date Received	12/13/2012			Measured	Specified
				Slump (in)	ASTM C 143	4.25	
General Location	Bailey Branch station 4+20 to 5+70			Slump w/ plasticizer (in)		N/A	
Sample Location	4+50			Air Temp (°F)		27	
Curing Method	Field Cure			Concrete Temp (°F)	ASTM C 1064	67	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.20	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1692	Ticket No.	3119019	Water Added (gal)	Before		
Sampled By	David Noggle				After		
Submitted By	Melissa Vandenberg			Time Batched		08:16	
Weather	Clear			Time Sampled		09:30	
Est. Wind (mph)		Yd³ Placed	18.0	Time Placed		09:40	
Est. Rh (%)				Time In Truck (mins)		84	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-13-C1\1	01/09/13	28	4.01	8.00	12.60	U	81050	3	6430	4000
0014921-13-C1\2	01/09/13	28	4.00	8.00	12.57	U	81020	3	6450	4000
					Average 28 Day Compressive Strength (psi)				6440	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

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Concrete Test Report

Report No: CON:0014921-14-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/11/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	12/13/2012	Date Received	12/14/2012			Measured	Specified
				Slump (in)	ASTM C 143	4.50	
General Location	Spring 18 berm final layer			Slump w/ plasticizer (in)		N/A	
Sample Location	10' south of the north end of the berm			Air Temp (°F)		23	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	64	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.10	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1616	Ticket No.	3119044	Water Added (gal)	Before		
Sampled By	David Noggle				After		
Submitted By	Melissa Vandenberg			Time Batched		08:25	
Weather	Clear			Time Sampled		09:20	
Est. Wind (mph)		Yd³ Placed	9.0	Time Placed		09:20	
Est. Rh (%)				Time In Truck (mins)		55	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-14-C1\1	01/10/13	28	4.00	8.00	12.57	U	90670	5	7220	4000
0014921-14-C1\2	01/10/13	28	4.01	8.00	12.60	U	81560	4	6470	4000
					Average 28 Day Compressive Strength (psi)				6850	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 4 = C39: Diagonal fracture; C1314: Tension Break, 5 = C39: Side fracture-opposite ends; C1314: Semi-Conical Break,

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Concrete Test Report

Report No: CON:0014921-16-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/21/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	12/18/2012	Date Received	12/19/2012			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		6.00	
Sample Location	Station 2+54 to 4+00			Air Temp (°F)		38	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	67	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.70	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1604	Ticket No.	3119101	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		08:55	
Weather	Overcast			Time Sampled		09:45	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		09:38	
Est. Rh (%)				Time In Truck (mins)		43	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-16-C1\1	01/15/13	28	4.00	8.00	12.53	U	85570	5	6830	4000
0014921-16-C1\2	01/15/13	28	4.01	8.00	12.60	U	91950	5	7300	4000
					Average 28 Day Compressive Strength (psi)				7070	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 5 = C39: Side fracture-opposite ends; C1314: Semi-Conical Break,

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Concrete Test Report

Report No: CON:0014921-17-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Christopher Carson (Project Manager)
Date of Issue: 1/21/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	12/19/2012	Date Received	12/20/2012			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 3+40 to 3+85			Air Temp (°F)		40	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	70	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1617	Ticket No.	3119115	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:10	
Weather	Partly Cloudy			Time Sampled		10:10	
Est. Wind (mph)		Yd³ Placed	27.0	Time Placed		09:59	
Est. Rh (%)				Time In Truck (mins)		49	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-17-C1\1	01/16/13	28	4.00	8.00	12.53	U	104750	5	8360	4000
0014921-17-C1\2	01/16/13	28	4.00	8.00	12.57	U	94680	2	7530	4000
					Average 28 Day Compressive Strength (psi)				7950	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear, 5 = C39: Side fracture-opposite ends; C1314: Semi-Conical Break,

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Concrete Test Report

Report No: CON:0014921-19-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/14/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/8/2013	Date Received	1/9/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Tributary #3			Slump w/ plasticizer (in)		7.00	
Sample Location	Trib #3 station 11+40 to 10+25			Air Temp (°F)		40	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	71	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	3.90	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1702	Ticket No.	3119134	Water Added (gal)	Before		
Sampled By	David Lahr				After		
Submitted By	Melissa Vandenberg			Time Batched		09:15	
Weather	Clear			Time Sampled		11:26	
Est. Wind (mph)	0	Yd³ Placed	5.0	Time Placed		11:30	
Est. Rh (%)	60			Time In Truck (mins)		135	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-19-C1\1	02/05/13	28	3.99	8.00	12.50	U	77110	2	6170	4000
0014921-19-C1\2	02/05/13	28	4.00	8.00	12.57	U	78130	1	6220	4000
					Average 28 Day Compressive Strength (psi)				6200	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 1 = C39: Cones on both ends; C1314: Conical Break, 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Concrete Test Report

Report No: CON:0014921-20-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/14/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/9/2013	Date Received	1/10/2013			Measured	Specified
				Slump (in)	ASTM C 143	7.00	
General Location	Baileys Branch			Slump w/ plasticizer (in)		7.00	
Sample Location	Station 4+50 to 3+88			Air Temp (°F)		40	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	4.00	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1594	Ticket No.	3119145	Water Added (gal)	Before		
Sampled By	David Lahr				After		
Submitted By	Melissa Vandenberg			Time Batched		08:53	
Weather	Cloudy			Time Sampled		09:35	
Est. Wind (mph)	13	Yd³ Placed	5.0	Time Placed		09:40	
Est. Rh (%)	75			Time In Truck (mins)		47	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-20-C1\1	02/06/13	28	4.00	8.00	12.57	U	81650	2	6500	4000
0014921-20-C1\2	02/06/13	28	4.00	8.00	12.57	U	76160	2	6060	4000
					Average 28 Day Compressive Strength (psi)				6280	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-23-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/13/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	907	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/15/2013	Date Received	1/16/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Trib 3, station 11+00, top layer			Slump w/ plasticizer (in)		2.00	
Sample Location	upstream quarter of pour			Air Temp (°F)		31	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	61	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	2.50	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1746	Ticket No.	3119177	Water Added (gal)	Before		
Sampled By	Chris Bernier				After		
Submitted By	Melissa Vandenberg			Time Batched		09:23	
Weather	Partly Cloudy			Time Sampled		10:40	
Est. Wind (mph)	1-2	Yd³ Placed	9.0	Time Placed		10:27	
Est. Rh (%)				Time In Truck (mins)		64	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-23-C1\1	02/12/13	28	4.00	8.00	12.53	U	95740	2	7640	4000
0014921-23-C1\2	02/12/13	28	4.00	8.00	12.53	U	95260	2	7600	4000
					Average 28 Day Compressive Strength (psi)				7620	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-24-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/14/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

						Measured	Specified
Date Sampled	1/16/2013	Date Received	1/17/2013	Slump (in)	ASTM C 143		
General Location	Trib #3 capping			Slump w/ plasticizer (in)		3.00	
Sample Location	10+95 thru 10+55			Air Temp (°F)		34	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1604	Ticket No.	3119183	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		10:30	
Weather	Sunny			Time Sampled		11:15	
Est. Wind (mph)		Yd³ Placed	27.0	Time Placed		11:10	
Est. Rh (%)				Time In Truck (mins)		40	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-24-C1\1	02/13/13	28	4.01	8.00	12.60	U	89060	2	7070	4000
0014921-24-C1\2	02/13/13	28	4.01	8.00	12.60	U	90390	2	7180	4000
					Average 28 Day Compressive Strength (psi)				7130	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-25-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/17/2013	Date Received	1/18/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Bailey's Branch Area			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 7+48 thru 6+45			Air Temp (°F)		34	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	70	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1616	Ticket No.	3119196	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		10:30	
Weather	Sunny			Time Sampled		11:05	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		11:00	
Est. Rh (%)				Time In Truck (mins)		30	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-25-C1\1	02/14/13	28	4.00	8.00	12.57	U	90630	2	7210	4000
0014921-25-C1\2	02/14/13	28	4.00	8.00	12.57	U	99070	2	7880	4000
					Average 28 Day Compressive Strength (psi)				7550	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-26-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	908	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/18/2013	Date Received	1/19/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		4.00	
Sample Location	Baileys Branch 4+05 to 4+65			Air Temp (°F)		27	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	67	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.50	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	531	Ticket No.	3119209	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		09:37	
Weather	Sunny			Time Sampled		10:24	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		10:19	
Est. Rh (%)				Time In Truck (mins)		42	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-26-C1\1	02/15/13	28	4.00	8.00	12.57	U	87260	1	6940	4000
0014921-26-C1\2	02/15/13	28	4.00	8.00	12.57	U	87300	2	6950	4000
					Average 28 Day Compressive Strength (psi)				6950	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 1 = C39: Cones on both ends; C1314: Conical Break, 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
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Concrete Test Report

Report No: CON:0014921-27-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	PSI	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/19/2013	Date Received	1/21/2013			Measured	Specified
				Slump (in)			
General Location	Bailey's Branch Area			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 4+83 thru Station 5+55			Air Temp (°F)		41	
Curing Method	Two day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	70	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.70	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1692	Ticket No.	3119217	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		09:00	
Weather	Sunny			Time Sampled		09:58	
Est. Wind (mph)		Yd³ Placed	18.0	Time Placed		09:52	
Est. Rh (%)				Time In Truck (mins)		52	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-27-C1\1	02/16/13	28	4.00	8.00	12.57	U	89440	2	7120	4000
0014921-27-C1\2	02/16/13	28	4.00	8.00	12.53	U	93020	2	7420	4000
					Average 28 Day Compressive Strength (psi)				7270	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-29-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 2/20/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	PSI	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	1/23/2013	Date Received	1/24/2013			Measured	Specified
				Slump (in)			
General Location	Baileys Branch			Slump w/ plasticizer (in)		4.00	
Sample Location	Station 0+00 thru station 0+60			Air Temp (°F)		19	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	67	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1604	Ticket No.	3119226	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		10:45	
Weather	Sunny			Time Sampled		11:40	
Est. Wind (mph)		Yd³ Placed	27.0	Time Placed		11:35	
Est. Rh (%)				Time In Truck (mins)		50	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-29-C1\1	02/20/13	28	3.99	8.00	12.50	U	80930	3	6470	4000
0014921-29-C1\2	02/20/13	28	3.99	8.00	12.50	U	74850	2	5990	4000
					Average 28 Day Compressive Strength (psi)				6230	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear, 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-30-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/1/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	917	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

						Measured	Specified
Date Sampled	1/24/2013	Date Received	1/25/2013	Slump (in)	ASTM C 143		
General Location	Bailey's Branch			Slump w/ plasticizer (in)		4.00	
Sample Location	0+60 thru 0+98			Air Temp (°F)		20	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	68	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.20	0
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1708	Ticket No.	3119234	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		10:35	
Weather	Sunny			Time Sampled		11:35	
Est. Wind (mph)		Yd³ Placed	27.0	Time Placed		11:30	
Est. Rh (%)				Time In Truck (mins)		55	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-30-C1\1	02/21/13	28	3.99	8.00	12.50	U	83270	2	6660	4000
0014921-30-C1\2	02/21/13	28	3.99	8.00	12.50	U	83890	2	6710	4000
					Average 28 Day Compressive Strength (psi)				6690	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

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Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-32-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/1/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.	Cement (lb)			N/A
Supplier	Irving Materials, Inc.	Fly Ash (lb)			N/A
Plant		Coarse Agg (lb)			
Mix Identification	060 4000 PSI	Fine Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Admix Agg (lb)			N/A
Design Unit Weight (pcf)		Water (gal)			N/A
Cement Factor (Sacks/yd³)					

Details of Sample

						Measured	Specified
Date Sampled	1/29/2013	Date Received		Slump (in)	ASTM C 143		
General Location	Bailey's Branch			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 0+98 thru 1.75			Air Temp (°F)		61	
Curing Method				Concrete Temp (°F)	ASTM C 1064	74	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.00	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1702	Ticket No.	3119245	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		09:40	
Weather	Overcast			Time Sampled		10:40	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		10:30	
Est. Rh (%)				Time In Truck (mins)		50	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-32-C1\1	02/26/13	28	4.00	8.00	12.57	U	90160	2	7170	4000
0014921-32-C1\2	02/26/13	28	4.00	8.00	12.57	U	86580	2	6890	4000
					Average 28 Day Compressive Strength (psi)				7030	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
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Indianapolis, IN 46268

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Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-37-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	917	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	2/5/2013	Date Received	2/6/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Spring 18, access road			Slump w/ plasticizer (in)		5.00	
Sample Location	Station 20+00 thru station 20+65			Air Temp (°F)		32	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1798	Ticket No.	3119261	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By				Time Batched		09:20	
Weather	Overcast			Time Sampled		10:20	
Est. Wind (mph)		Yd³ Placed	10.0	Time Placed		10:10	
Est. Rh (%)				Time In Truck (mins)		50	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-37-C1\1	03/05/13	28	3.99	8.00	12.50	U	73730	2	5900	4000
0014921-37-C1\2	03/05/13	28	3.99	8.00	12.50	U	70240	2	5620	4000
					Average 28 Day Compressive Strength (psi)				5760	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-38-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	917	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

						Measured	Specified
Date Sampled	2/6/2013	Date Received	2/7/2013	Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.50	
Sample Location	Station 2+45 thru station 2+95			Air Temp (°F)		35	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	6.00	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1616	Ticket No.	3119278	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:45	
Weather	Overcast			Time Sampled		10:30	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		10:24	
Est. Rh (%)				Time In Truck (mins)		39	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-38-C1\1	03/06/13	28	4.01	8.00	12.60	U	79200	3	6290	4000
0014921-38-C1\2	03/06/13	28	4.00	8.00	12.57	U	79060	3	6290	4000
					Average 28 Day Compressive Strength (psi)				6290	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-39-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

		Material	Source	Amount	Moisture (%)
Mix Data Submitted By	Irving Materials, Inc.				
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	918	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

						Measured	Specified
Date Sampled	2/7/2013	Date Received	2/8/2013	Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 1+75 thru station 2+55			Air Temp (°F)		41	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	6.00	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	517	Ticket No.	3119294	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:45	
Weather	Sunny			Time Sampled		10:45	
Est. Wind (mph)		Yd³ Placed	36.0	Time Placed		10:40	
Est. Rh (%)				Time In Truck (mins)		55	

Compressive Strength of Concrete Cylinders — ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-39-C1\1	03/07/13	28	4.01	8.00	12.60	U	89110	3	7070	4000
0014921-39-C1\2	03/07/13	28	4.00	8.00	12.57	U	87300	3	6950	4000
					Average 28 Day Compressive Strength (psi)				7010	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-40-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	917	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	2/8/2013	Date Received	2/13/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Spring 18 Acess Road			Slump w/ plasticizer (in)		3.00	
Sample Location	Station 21+40 thru station 21+98			Air Temp (°F)		35	
Curing Method	Five day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	65	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	4.70	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1802	Ticket No.	3119314	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:00	
Weather	Overcast			Time Sampled		09:53	
Est. Wind (mph)		Yd³ Placed	18.0	Time Placed		09:48	
Est. Rh (%)				Time In Truck (mins)		48	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-40-C1\1	03/08/13	28	4.00	8.00	12.57	U	87390	2	6950	4000
0014921-40-C1\2	03/08/13	28	4.00	8.00	12.57	U	84650	2	6740	4000
					Average 28 Day Compressive Strength (psi)				6850	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-41-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	918	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	2/13/2013	Date Received	2/14/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.50	
Sample Location	Station 5+40 thru station 6+70			Air Temp (°F)		32	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	67	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.30	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1604	Ticket No.	3119348	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		09:50	
Weather	Overcast			Time Sampled		10:34	
Est. Wind (mph)		Yd³ Placed	45.0	Time Placed		10:27	
Est. Rh (%)				Time In Truck (mins)		37	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-41-C1\1	03/11/13	26	3.99	8.00	12.50	U	87250	2	6980	
0014921-41-C1\2	03/11/13	26	4.00	8.00	12.53	U	93490	2	7460	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 2 = C39: Vert crack/ cone opposite end; C1314: Cone & Shear,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

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Concrete Test Report

Report No: CON:0014921-42-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	918	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	2/14/2013	Date Received	2/15/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.50	
Sample Location	Station 5+40 thru Station 6+70			Air Temp (°F)		36	
Curing Method	One day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	70	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.80	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1708	Ticket No.	3119368	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		10:05	
Weather	Partly Cloudy			Time Sampled		10:56	
Est. Wind (mph)		Yd³ Placed	54.0	Time Placed		10:52	
Est. Rh (%)				Time In Truck (mins)		47	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-42-C1\1	03/15/13	29	4.00	8.00	12.57	U	95120	3	7570	4000
0014921-42-C1\2	03/15/13	29	4.01	8.00	12.60	U	90700	3	7200	4000

Average 28 Day Compressive Strength (psi)

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: 3 = C39: Vert cracking/no cones; C1314: Cone & Split,

Professional Service Industries, Inc.
5362 West 78th Street
Indianapolis, IN 46268

Phone: (317) 876-7723
Fax: (317) 876-8155

Concrete Test Report

Report No: CON:0014921-43-C1
Issue No: 2

Client: SEVENSON ENVIRONMENTAL SERVICE
2749 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

CC: DAN SEKANOVICH
SHANE REYNOLDS

Project: GM BEDFORD SPRING 18
BEDFORD, IN

Approved Signatory: Alex Stanley (Department Manager)
Date of Issue: 3/26/2013

Mix Data

Mix Data Submitted By	Irving Materials, Inc.	Material	Source	Amount	Moisture (%)
Supplier	Irving Materials, Inc.	Cement (lb)			N/A
Plant		Fly Ash (lb)			N/A
Mix Identification	918	Coarse Agg (lb)			
Specified Design Strength (psi)	4000 at age 28 days	Fine Agg (lb)			
Design Unit Weight (pcf)		Admix Agg (lb)			N/A
Cement Factor (Sacks/yd³)		Water (gal)			N/A

Details of Sample

Date Sampled	2/15/2013	Date Received	2/18/2013			Measured	Specified
				Slump (in)	ASTM C 143		
General Location	Baileys Branch			Slump w/ plasticizer (in)		3.50	
Sample Location	Station 5+40 thru station 6+70			Air Temp (°F)		40	
Curing Method	Three day Field/Laboratory Cure			Concrete Temp (°F)	ASTM C 1064	70	
Field Sample No		Field Cure Temp (°F)	High	Air Content (%)	ASTM C 231	5.70	
			Low	Unit Weight (pcf)	ASTM C 138		
Contractor	Sevenson Environmental			Batch Size (yd³)		9	
Truck No.	1714	Ticket No.	3119396	Water Added (gal)	Before		
Sampled By	John Staples				After		
Submitted By	Melissa Vandenberg			Time Batched		11:00	
Weather	Sunny			Time Sampled		11:39	
Est. Wind (mph)		Yd³ Placed	45.0	Time Placed		11:34	
Est. Rh (%)				Time In Truck (mins)		34	

Compressive Strength of Concrete Cylinders

ASTM C 39

Specimen ID	Date Tested	Age (Days)	Dimensions (in) Diameter	Height	Area (in²)	Type of Cap	Ultimate Load (lbf)	Fracture Type/Remark	Compressive Strength (psi)	Required Strength (psi)
0014921-43-C1\1	03/15/13	28	4.00	8.00	12.53	U	89090	-	7110	4000
0014921-43-C1\2	03/15/13	28	4.00	8.00	12.57	U	92780	-	7380	4000
					Average 28 Day Compressive Strength (psi)				7250	

Notes

1.Sampling to ASTM C 172
2.Specimen(s) Prepared to ASTM C 31
3.Capping B=Bonded ASTM C 617, U=Unbonded ASTM C 1231, C = Combined

Remarks

Fracture Type / Remarks: - = Not Defined,

Appendix C.3

Geosynthetic Clay Liner

Sevenson Environmental Services, Inc.

2749 Lockport Road
Niagara Falls, New York 14305
(716) 284-0431

LETTER OF TRANSMITTAL

TO: CRA	DATE: November 27, 2012
ADDRESS:	JOB NO.: E801
CITY: Waterloo, Canada	RE: Sevenson Submittal#28
ATTENTION: Rick Hoekstra	

PLEASE BE ADVISED:

WE ARE SENDING YOU:	☒ **Attached**	☐ **Under Separate Cover Via The Following:**
☐ PRINTS ☐ PLANS	☐ SHOP DRAWINGS	☐ SAMPLES ☒ SPECIFICATIONS
☐ ARTWORK ☐ PROOFS	☐ PHOTOGRAPHS	☐ COPY OF LETTER ☐ CHANGE ORDER
☐		

	No. of Copies	Drawing No.	Date	Description
1	3	SES Submittal #28	11/27/12	GSEBentoliner NWL-35 Geosynthetic Clay Liner Manufacturer Literature and Data for the Bailey's Branch and Tributary #3 Capping Project at Spring 18
2				
3				
4				
5				
6				
7				

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

☒ AS REQUESTED	☐ APPROVED AS IS	☐ SUBMIT COPIES FOR DISTRIBUTION
☒ FOR APPROVAL	☐ APPROVED WITH CORRECTIONS	☐ RETURN CORRECTED
☐ FOR YOUR USE	☐ RETURNED WITH CORRECTIONS	☐ RETURNED AFTER LOAN TO US
☒ FOR YOUR COMMENTS	☐ RESUBMIT COPIES FOR APPROVAL	☐

COMMENTS:

Please reiew and return one appoved copy of the submittal for our records

Please return all documents if corrections are required

COPIES TO:
▪
▪
▪
▪
▪

SEVENSON ENVIRONMENTAL SERVICES, INC.

Signed _____

Daniel Sekanovich

M:\Submittals\Submittal #27 Gate 31 Turnstile Access Stairs\Submittal 27 Transmittal 20120625.doc

SUBMITTAL FORM

Project: Bailey's Branch and Tributary #3 Capping Project at Spring 18

Contractor:
Sevenson Environmental Services
2749 Lockport Road
Niagara Falls, N.Y. 14305

Engineer: Conestoga-Rovers & Associates
320 GM Drive
Bedford, Indiana 47421

SUBMITTAL NUMBER:	#28
SECTION:	Detail B (C-08)
PAGE NUMBER	CRA Drawing C-08
ITEM:	GSE Bentoliner NWL-35 Geosynthetic Clay Liner
SUBMITTAL TYPE:	A - Test Results and/or Certificates **B - Manufacturer's Literature or Data** C - Shop Drawings D - Operation and Maintenance Instructions E - Samples F - Alternative Product Supporting Data G - Administrative such as schedules, etc.
DEFICIENCIES:	
SUBMITTAL DATE:	11/2712
RESPONSE REQUIRED:	A.S.A.P

SHOP DRAWING REVIEW
Submission No. 28
Contract No. 13968
ENGINEER's approval is for the sole purpose of ascertaining conformance with general design concepts expressed in the Contract Documents and is in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Approval does not authorize changes to Contract Documents.
X Approved
☐ Approved as Noted
☐ Not Subject to Review
☐ Revise and Resubmit
By: 11/29/12 13968
CRA

Certification Statement:: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Signature

11/27/12
Date

PRODUCT DATA SHEET

GSE BentoLiner NWL-35 Geosynthetic Clay Liner

GSE BentoLiner "NWL-35" is a needlepunched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a nonwoven and a scrim-nonwoven geotextile for dimensional stability. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

[*]

AT THE CORE:
This composite clay liner is composed of a uniform layer of granular sodium bentonite between a nonwoven and scrim-nonwoven textile for dimensional stability.

Product Specifications

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV(1)
Carrier Scrim Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area(2)	ASTM D 5993	1/40,000 ft²	0.75 lb/ft² MARV
Tensile Strength(3)	ASTM D 6768	1/40,000 ft²	45 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632(4)	1/40,000 ft²	5.3 lb/in MARV 35 lb MARV
Hydraulic Conductivity(5)	ASTM D 5887	1/Week	5 x 10^{-9} cm/sec max
Index Flux(5)	ASTM D 5887	1/Week	1 x 10^{-8} m³/m²/sec max
Internal Shear Strength(6)	ASTM D 6243	Periodically	500 psf Typical
TYPICAL ROLL DIMENSIONS			
Width x Length(7)	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft²
Packaged Weight	Typical	Every Roll	2,600 lb

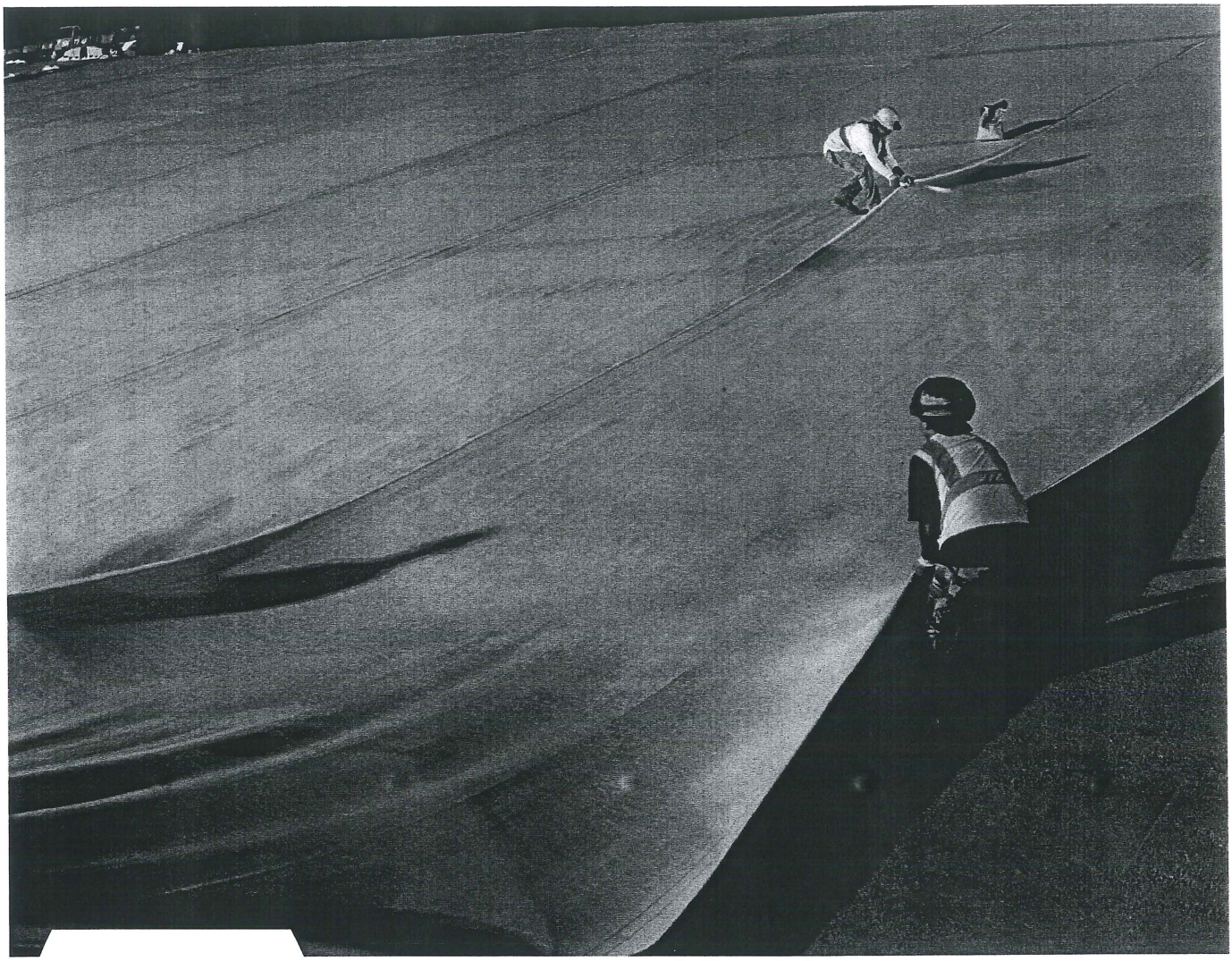
NOTES:
- (1)Minimum Average Roll Value.
- (2)At 0% moisture content.
- (3)Tested in machine direction.
- (4)Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- (5)Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
- (6)Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- (7)Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

[DURABILITY RUNS DEEP] For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.



GSE
ENVIRONMENTAL™

BENTOLINER GCL PRODUCTS
INSTALLATION QUALITY ASSURANCE MANUAL

Contents

1.0 INTRODUCTION

This manual provides an overview of the GSE Installation Quality Assurance procedures consistent with industry accepted practices to ensure that the GSE BentoLiner GCL products installed will best perform for its intended purpose. In addition, all installation work will be performed in strict accordance per the customer's specifications. Please read the procedures below completely before you begin. If you need further clarification, contact the GSE Engineering Support Staff for assistance or please refer to ASTM D 6102, Standard Guide for Installation of Geosynthetic Clay Liners and ASTM D 5888, Standard Guide for Storage and Handling of Geosynthetic Clay Liners. Remember safety first and use safe practices always on every project.

2.0 UNLOADING PROCEDURES

As with all lifting or unloading operations, appropriate equipment and experienced personnel should be employed along with proper safe handling methods. The party responsible for unloading the GSE BentoLiner should contact GSE prior to shipment to determine the correct unloading methods and equipment if different from the pre-approved and specified methods as described below.

Lifting GCL rolls can typically be accomplished with by using a 2.5 in - 3.0 in (63 mm - 75 mm) outside diameter (O.D.) steel pipe (preferably solid), with a wall thickness capable of providing sufficient beam strength to support the weight of the roll, which average less than 3,000 lb (1,364 kg) and the length is approximately 18 ft (5.5 m). This core pipe is inserted through the hollow center of the GCL cardboard core. Heavy-duty slings or chains, which are approximately 10 ft (3.1 m) long, each are attached to each end of the pipe, which are then fastened to a I-beam spreader bar or a GSE approved alternative. Care should be taken to ensure that lifting chains or straps do not rub, chafe, or otherwise damage the GCL. A crane, backhoe, front-end loader or another suitable piece of construction equipment can then lift the entire assembly.

An all-terrain, extendable boom forklift, such as a Lull or Caterpillar Telehandler, can be fitted with a special, solid steel "carpet pole" or stinger, typically 14.0 ft (4.3 m) in length having an outside diameter of no more then 3.38 in (8.6 mm). The carpet pole can be inserted into the hollow cardboard core of the GCL roll.

The roll should not be fully suspended until the pole extends through the entire length of the core tube or you run the risk that the core may break creating additional handling and unloading difficulties

A properly structured and supported pole can be used to unload GCL rolls onsite. As an alternative, straps that are appropriately rated can be used as a GSE approved lifting method to unload GCL rolls. Lifting straps are supplied on every roll. Each GCL roll label contains roll weight information that should be consulted in determining appropriate lifting equipment and factors of safety.

The CQA inspector or owner's representative should verify that only appropriate handling equipment is utilized, i.e. equipment that does not pose any danger to personnel or undue risk of damage or deformation to the liner material.

3.0 STORAGE

While stored GCL needs to be kept dry and away from potential flooding or high storm runoff. On the job site storage methods include; storing the rolls tarped on pallets; storing the rolls under roof in a clean, dry protected area; and storing the rolls on a flat, dry, stable surface suitably covered with protective waterproof tarps. Rolls can be stacked as long as it is done in a manner that prevents them from rolling, shifting, or spontaneously moving. Maximum roll height should be determined by CQA personnel, but never more than can be safely managed considering site conditions, equipment and personnel.

Stored rolls should be tarped and remain in their original, unopened plastic shipping sleeves to prevent damage and undue prehydration prior to installation. Any rolls that come in contact with water should be examined by CQA or an owner's representative prior to installation. Prehydrated or physically damaged rolls should be set aside for further examination to determine the plausibility of repair or need to replace.

4.0 SUBGRADE PREPARATION

The surface upon which the GSE BentoLiner is installed should be smooth and free of wheel ruts, debris, roots, sticks, and rocks larger than 1.0 in (25 mm). Site specific compaction requirements should be followed in accordance with the project plans and specifications. At a minimum, the site should be smooth rolled the level of compaction such that installation equipment and other construction vehicles traffic does not cause rutting greater than 1.0 in (25 mm) deep. Furthermore, all protrusions extending more than 0.5 in (12 mm) from the subgrade shall be removed, crushed, or pushed into the subgrade.

In applications where the product is the sole barrier, subgrade surfaces consisting of gravel or granular soils may not be acceptable due to their large void content. For these applications, the subgrade shall be greater than 80% fines and contain no particles larger than 1 in (25 mm). In all high head, water containment applications, i.e. maximum water depth greater than 1 ft (30.5 cm), GSE recommends the use of a coated or laminated GCL such as GSE BentoLiner CNSL.

Immediately prior to deployment of the GCL, the subgrade shall be final compacted to fill in any remaining voids or desiccation cracks and to ensure that no sharp irregularities or abrupt elevation changes exist greater than 1.0 in (25 mm). The surfaces to be lined shall be maintained in this condition and free of standing water. GCL can be deployed on a frozen subgrade, if the subgrade would meet all the conditions as previously outlined if unfrozen.

The subgrade surface and preparation should be inspected and certified by the CQA inspector prior to GSE BentoLiner placement. Upon approval by the CQA inspector, it is the geosynthetic installer's responsibility to communicate to the engineer of any changes in the condition of the subgrade that might render it out of compliance, with any of the requirements of the project specification or ASTM Standard D 6102.

5.0 DEPLOYMENT

As rolls are selected for deployment, the labels should be removed and recorded by the installer, along with any other pertinent information. The rolls should only be transported from the storage area using approved lifting equipment as described in section 2.0. The roll is supported during deployment, so that the fabric designated as the upper surface faces out, away from the installation vehicle. The free end of the roll can then be secured, while the vehicle supporting the roll slowly backs away, deploying the GCL as it moves. Alternatively, the free end can be manually pulled across an area to be lined by the installation crew while the equipment simply suspends the roll. Equipment traveling directly on GCL for deployment of overlying geosynthetics should be limited to lightweight ATVs maximum bearing capacity of 8.0 psi (34.5 kPa) or equivalent.

Successive panels are overlapped according to project specifications and/or within the overlap lines stenciled on the upper surface of each panel. Wherever possible, installation of GSE BentoLiner should begin at high elevation and proceed to low elevation. This allows any precipitation to accumulate and drain quickly without adversely affecting the GCL. The edges of exposed GCL should be weighted down with sandbags or equivalent ballast to prevent uplift in the event of substantially strong winds.

Only as much GSE BentoLiner as can be fully covered by the end of the day should be deployed or such amount that can be covered in a reasonably short time in the event of heavy precipitation. When GCL is being installed under a geomembrane, the leading edge should be folded back under the membrane at the end of the construction day. Temporary ballasting, such as sandbags, to prevent uplift and the infiltration of runoff water should secure the leading edge of the membrane.

GSE BentoLiner panels should be installed in a relaxed condition, free of wrinkles and folds. When fitting the product into small areas or around construction details, use a sharp utility or hook blade knife to cut the liner to the appropriate dimensions. Adjacent panels should overlap at the edges as described in section 6.0 below.

6.0 OVERLAPS & SEAMS

Unless specified differently adjacent lengthwise (longitudinal) seams should be overlapped a minimum of 6.0 in (150 mm). Granular bentonite should be used to augment all overlapped seams. Loose granular bentonite is placed between ajoining panels into the overlap area at a rate of 0.25 lb per linear foot (350 g per linear meter) of seam. Widthwise overlaps at the butt ends of rolls should be a minimum 12.0 in (300 mm). Seams should be shingled in a down slope direction, so that water flows across the seam from upslope sheet to the down slope sheet.

When the liner is cut to fit in small areas, i.e. into corners or around structures, adjacent panels should overlap a minimum of 1.0 ft (300 mm), adding abundant loose granular bentonite into the overlapped areas.

7.0 ATTACHMENT DETAILS

he product should be installed around penetrations, structures, pipes, structures and other appurtenances according to the contract drawings. GSE BentoLiner may be secured to appurtenances by use of a stainless steel batten or clamps, mechanical fasteners, or other appropriate device if necessary to minimizing movement. The use of additional granular bentonite or bentonite paste is recommended to maximize the seal around structures or protuberances.

8.0 ANCHORING

GSE BentoLiner is typically anchored in a trench around the perimeter of the lined area, which provides the required pullout resistance. In most cases, GCL can be anchored in the same trench as any adjacent geosynthetic liner components (if used). Dimensions and locations of the trench should be provided in the project drawings. Alternately, the material may be anchored by deploying additional run out of material, a minimum of 3.0 ft (1.0 m), past the slope crest and toe. Typically GCL should not be deployed in tension. The force holding the GCL in place should be provided by friction between the GCL and adjacent materials

Steps should be taken to ensure that precipitation does not accumulate in the trench prior to backfilling. The GCL should only cover the front face and bottom of the anchor trench. The trench should be back filled and properly compacted prior to placing cover soil on the slopes.

9.0 REPAIRS

In the event an area of GSE BentoLiner becomes damaged, torn, or punctured during installation, the affected area should be repaired. On relatively level surfaces, the damaged area should be covered with a separate piece of GSE BentoLiner extending at least 12.0 in (300 mm) beyond the damaged area in every dirRection. Granular bentonite should be used to augment the patch overlays as is required for all other seams. Patches on side slopes can be temporarily secured with construction adhesive such as Liquid Nails or tape.

Areas that are exposed to standing water or excess precipitation with resulting bentonite hydration, typically as defined as greater than 30% moisture, prior to soil covering, should be examined for bentonite displacement and damage by subsequent activities. If it is determined that the GCL has been hydrated and damaged, the GCL should be covered with new material over the affected area or removed and replaced. All GSE BentoLiner material exposed to hydrocarbon fuels, chemicals, pesticides, non-compatible leachates, or other harmful liquids during the installation should be removed and replaced with non-affected material.

10.0 INSPECTION

Prior to soil covering the panels, penetrations and any other details should be visually inspected to ensure full coverage and proper orientation. Once the installed GSE BentoLiner material has been approved the next layer of geosynthetics or soil covering may be applied.

11.0 COVER MATERIAL

Only the amount of GSE BentoLiner GCL that can be anchored, inspected, and covered the same day should be installed. In cases where the GSE BentoLiner GCL is the sole hydraulic barrier, the GCL should be covered with the specified thickness of cover soil (a minimum 1.0 ft (300 mm)) immediately following deployment. Where GSE BentoLiner GCL is used in conjunction with other membrane components, it should be covered with the geomembrane after placement, as soon as possible to protect it from the climatic elements.

When a geomembrane is being installed over the GCL, the leading edge of the GSE BentoLiner should be folded back under the geomembrane so that the geomembrane extends beyond the GCL a minimum of 2.0 ft (600 mm). The leading edge of the membrane should subsequently be weighted with sand bags or suitable ballast to safeguard against wind uplift and to prevent runoff water from undermining the liner.

When GSE BentoLiner is used with no overlying geomembrane, the soil cover should be placed within 2.5 ft (800 mm) of the leading edge of the GCL. The leading edge can then be covered with plastic sheeting that is folded under the exposed edge approximately 12.0 in (300 mm). Sand bags or suitable ballast should be placed on the liner to hold the plastic in place and to partially confine the GCL. The next morning the ballast and the plastic can be removed and subsequent rolls of GCL placed as described in section 5.0.

Cover soil placed directly on GCL should have a gradation to not damage or puncture the GCL. Cover soil should be free of all rocks greater than 0.75 in (18 mm) diameter, sharp or angular objects, sticks, roots or debris. Appropriate placement methods should be used at all times to protect the GCL. Compatibility of GSE BentoLiner GCL with the soil should be verified. Cover material should be pushed across the seams from top to bottom to prevent the cover material from lodging between the overlapped panel seams.

12.0 HYDRATION & ACTIVATION

In applications where the product is used as the sole hydraulic barrier, such as secondary containment, the GCL must first be hydrated with fresh water. Non-aqueous chemicals will not activate the bentonite. Therefore, bentonite hydration via rainwater or sprinkler and irrigation is necessary. When hydrated, the GSE BentoLiner is an excellent barrier to hydrocarbon fuels, fertilizers, and other such chemicals.

Only after the cover material has been placed should the GSE BentoLiner be allowed to hydrate. Once hydration has occurred no vehicles should be allowed to traffic the area directly above the GCL, unless minimum 1.0 ft (300 mm) separation exists between the GCL and the vehicle to adequately distribute the vehicle load. This should be increased to a minimum of 2.0 ft (600 mm) in high traffic areas such as roadways.

Periodic inspection of the liner to ensure proper coverage and adequate moisture content is recommended when GSE BentoLiner is used alone under a minimum 1.0 ft (300 mm) depth of cover soil. In arid regions, it may be necessary to irrigate the containment area, at a predetermined interval and/or a laminated or coated GCL used and deployed with the plastic component up in order to minimize dessication and wet - dry cycling.