Anniston PCB Site (OU1/OU2)

Calhoun County, Alabama
EPA ID# ALD000400123

March 2017

Superfund Proposed Plan

U.S. Environmental Protection Agency, Region 4

EPA Announces Proposed Plan

The United States Environmental Protection Agency (the EPA) invites comments on the Proposed Plan for the Anniston PCB Site (the Site) Operable Unit 1 (OU1, residential properties) and Operable Unit 2 (OU2, non-residential properties). The Anniston PCB Site consists of residential, commercial/industrial, and public properties located in and around Anniston, Oxford, Hobson City, Calhoun County, and Talladega County, Alabama, which contain hazardous substances, including but not limited to polychlorinated biphenyls (PCBs). The primary source of contamination at the Site is a former PCB production facility located in the north-central part of Alabama. The facility and areas where PCBs and other contaminants have been distributed off the facility and downstream from the facility collectively make up the Site.

This Proposed Plan describes the remedial alternatives evaluated to address Site contamination, and provides the rationale for the EPA's Preferred Alternative. The EPA in consultation with the Alabama Department of Environmental Management (ADEM) will select the final remedy to address contamination in OU1/OU2 after reviewing and considering the comments received during the public comment period.

This Proposed Plan is consistent with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.430(f)(2) and the Comprehensive

We want your input!

Public comment period:
March 13 to May 12, 2016

During the comment period, the EPA is accepting comments on this Proposed Plan, as well as the supporting documents, including the Remedial Investigation, the Feasibility Study and human health and ecological risk assessments. Mail or email comments to:

Pam Scully
U.S.EPA Region 4
61 Forsyth Street, SW
Atlanta. Georgia 30303
scully.pam@epa.gov

Mark your calendars!

The EPA is hosting two public meetings to present this Proposed Plan and accept public comment:

6-8 p.m. Thursday, March 23,
Anniston Meeting Center
1615 Noble St. Anniston, AL

6-8 p.m. Friday, March 24,
Oxford Civic Center, 401 McCullars Lane, Oxford, AL

The EPA will also host a public availability session to help the community understand the Proposed Plan:

10a.m.-2 p.m. Saturday, March 25,
Carver Community Center,
720 W 14th St.
Anniston, AL

Environmental Response, Compensation and Liability Act (CERCLA), Section 117(a). This Proposed Plan summarizes background information about the Site, the nature and extent of contamination found in OU1/OU2, the assessment of human health and environmental risks posed by contaminants, and the identification and evaluation of remedial action alternatives for OU1/OU2.

Supporting documents including the Remedial Investigation/Feasibility Study (RI/FS) are included in the Site Administrative Record. These documents can be found at the Information Repositories for the Site, which are located at the Anniston Calhoun Public Library, Carver Branch, 722 West 14th Street, Anniston, AL, and Main Branch, 108 East 10th Street, Anniston, AL. Select documents are also on the EPA website.

At this Site, the EPA is the lead agency, and ADEM is the support agency. The EPA and ADEM encourage the public to review these documents to gain a more comprehensive understanding of the Site and Superfund activities that have been conducted at the Site. The EPA and ADEM want to hear your views about this Proposed Plan and all the alternatives presented. You can provide comments on the Proposed Plan at the public meeting on March 23, 2017, at 6:00 pm at the Anniston Meeting Center located at 1615 Noble Street in Anniston, Alabama, or at the public meeting on March 24, 2017, at 6:00 pm at the Oxford Civic Center located at 401 McCullars Lane in Oxford, Alabama. Comments can also be submitted through the mail to Pam Scully, U.S.EPA Region 4, 61 Forsyth Street, SW, Atlanta. Georgia 30303 or through email to scully.pam@epa.gov. An extended 60-day comment period has been approved at the request of the Site's Community Advisory Group (CAG). The comment period begins on March 13, 2017 and ends on May 12, 2017.

The Site is considered to be a Superfund Alternative Approach (SAA) site. An SAA site is a site that needs a remedial action, and where site contaminants are significant enough that the site is eligible for, but not listed on, the National Priorities List (NPL) (see Superfund process in Figure 1). SAA sites must also have cooperative financially viable and technically capable potentially responsible parties (PRPs) that are willing to perform the cleanup work under a settlement agreement with the EPA. The EPA anticipates entering into a Consent Decree (CD) with the PRPs, Pharmacia Corporation and Solutia Inc. (P/S), and other industrial companies as necessary for performance of the selected remedy.

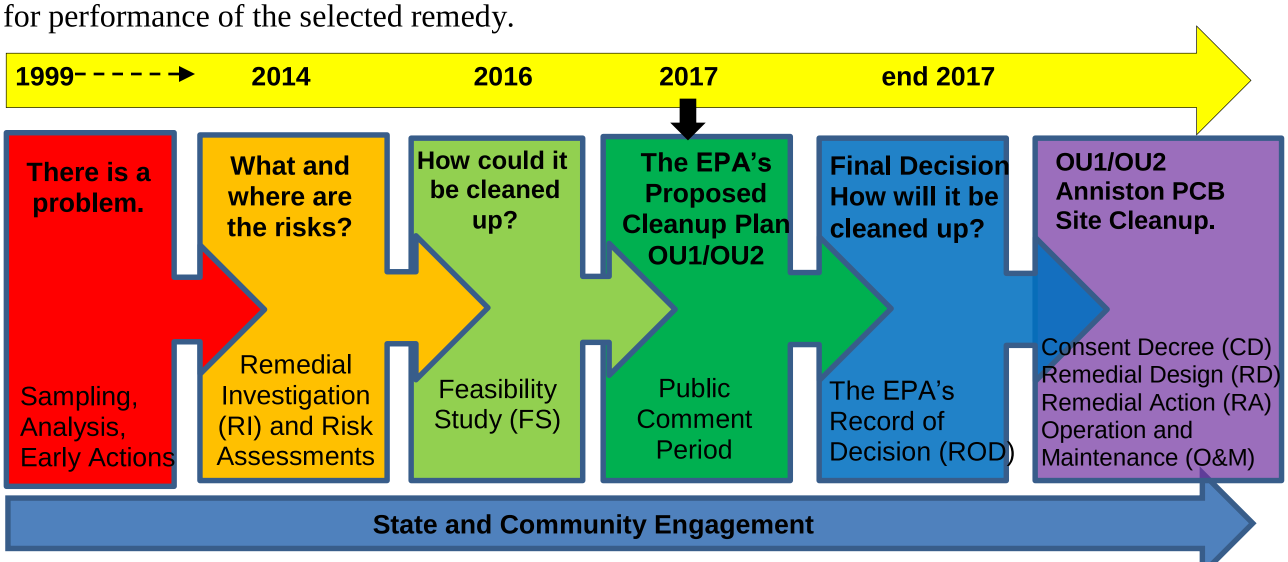


Figure 1. The Superfund Remedial Process

The Site has been divided into several OUs, which were selected based on geographic location and complexity (Figure 2). OU1/OU2 is a combination of two OUs representing residential properties (OU1) and non-residential properties (OU2) located around the facility currently owned by Solutia, and downstream along Snow Creek to Highway 78. OU3 is Solutia's Anniston facility (Facility) and its adjacent closed landfills, the South Landfill and the West End Landfill. OU4 includes Snow Creek and its floodplain downstream of Highway 78 to the confluence of Snow and Choccolocco Creeks, and Choccolocco Creek from the backwater area upstream of Snow Creek to the embayment of Lake Logan Martin on the Coosa River. All operable units are being investigated concurrently. When the RI for OU4 is complete, the EPA will consider whether an additional downstream investigation of the Coosa River System is warranted.

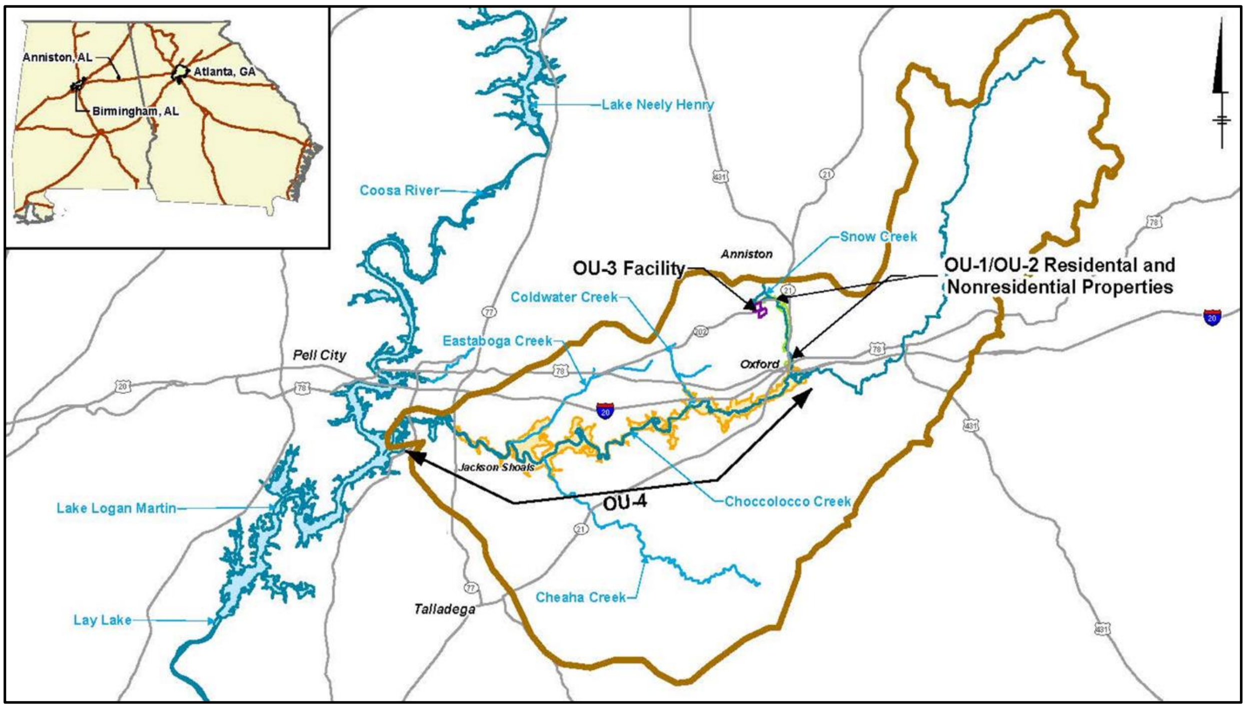


Figure 2. Anniston PCB Site Location Map

The subject of this Proposed Plan is OU1/OU2 (Figure 3). The purpose of the Preferred Alternative in this Proposed Plan is to reduce current and future risks from contaminants in soil, sediments, surface water, groundwater, and air. This is the second action proposed for the Anniston PCB Site. An Interim Record of Decision (IROD) was signed for OU3 in September 2011, and additional proposed plans and decision documents are expected to be issued that finalize remedies at OU3 and address risks at OU4 and impacted areas further downstream.

The Preferred Alternative includes: excavation with onsite and offsite disposal of contaminated soil on residential and Special Use Properties (i.e., schools, churches, day-care centers, community centers, playgrounds, and parks); excavation and offsite disposal of contaminated soil around interim measures, in dredge spoil piles, and on other non-residential properties; containment of contamination in unapproved waste disposal areas and an isolated groundwater contamination area; extraction and treatment of contaminated groundwater; excavation and offsite disposal of contaminated sediment in Snow Creek; and creek bank stabilization.

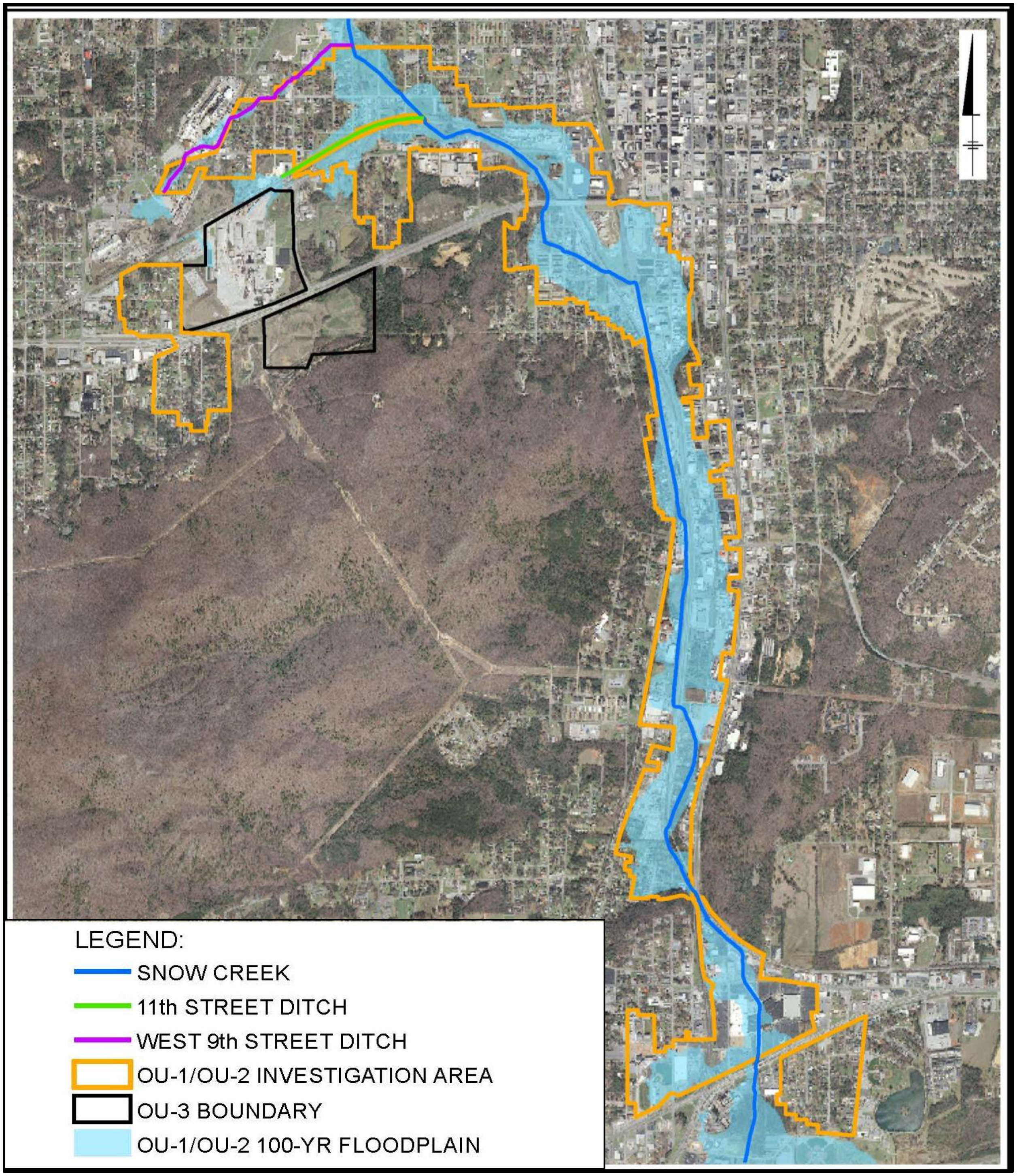


Figure 3. OU1/OU2 Areas of Investigation

Community Role in the Remedy Selection Process

This Proposed Plan is being issued to inform the public of the EPA's Preferred Alternative and to solicit public comments pertaining to the remedial alternatives evaluated, including the Preferred Alternative. The EPA may modify the Preferred Alternative, or select a different alternative presented in this Proposed Plan based on new information and/or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

The EPA will select a final remedy after reviewing and considering all information submitted during the public comment period. The public comment period for this Proposed Plan concludes on May 12, 2017. The EPA will hold public meetings during the comment period to present information regarding the investigations conducted, the remedial alternatives considered, and the Preferred Alternative. The EPA will answer questions from the public, as well as receive public comments. Additional information on the public meetings and process for submitting written comments can be found on page one (1) of this Proposed Plan. Comments received at the public meetings, as well as written comments received during the public comment period, will be documented in the Responsiveness Summary in the Record of Decision (ROD). The ROD is the document that selects the final remedy and provides the EPA's basis for the selection of that remedy.

Site Background

The primary source of contamination under investigation is a chemical manufacturing facility (the Facility). The Facility is currently active. Manufacturing operations began at the Facility in 1917 with the production of ferro-manganese, ferro-silicon, and ferro-phosphorus compounds, and later phosphoric acid by the Southern Manganese Corporation. In 1927, the production of organic chemicals began with the introduction of biphenyl, which remains a major product of the Facility. PCB production began in 1929. In 1930, Southern Manganese Corporation became Swann Chemical Company. Monsanto Company purchased Swan Chemical Company in 1935. Monsanto Company created Solutia as a separate company in 1997. In 2012, Solutia was merged into Eastman Chemical Company. Solutia is a wholly owned subsidiary of Eastman Chemical Company.

A variety of organic and inorganic chemicals have been produced at the Facility during its history, including PCBs, parathion, phosphorus pentasulfide, and 4-nitrophenol [also known as para-nitrophenol (PNP)]. The Facility currently manufactures polyphenyl compounds (utilized in a variety of heat transfer fluid, plasticizer, and lubricant applications). These compounds have been produced for many years using the same raw materials and intermediates, even though there have been several expansions and process modifications. In addition, the manufacture of phosphate ester-based non-flammable hydraulic fluids commenced at the Facility in 2006.

The Facility is currently operated in accordance with a variety of permits issued under provisions of the Clean Air Act (CAA), Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA), and their state counterparts. There have been a number of investigations and corrective measures taken over the years to reduce environmental impacts from the Facility. PCBs were identified as a contaminant that was onsite and offsite in drainage ditches that flow toward the

11th Street Ditch. PCB contamination from the 11th Street ditch was detected further downstream in Snow Creek, Choccolocco Creek, and the Coosa River System.

Investigation and removal work were also conducted in the vicinity of the Facility under CERCLA. The EPA notified P/S of their potential CERCLA liability in a General Notice letter dated August 31, 2000. P/S agreed to enter into negotiations for an Administrative Order on Consent (Removal Order) on September 12, 2000, for cleanup of certain residential properties. The Removal Order became effective October 27, 2000, but was rescinded and replaced by a new order on October 5, 2001. The EPA negotiated a Partial Consent Decree (PCD) with the with P/S to perform an early Non-Time-Critical (NTC) Removal Action on contaminated residential properties and an RI/FS for the entire Site. The PCD was entered by the U.S. District Court of Northern Alabama on August 4, 2003. When the PCD was entered by the court, the Site, including the Facility, became subject to both RCRA and CERCLA authority.

On July 6, 2006, the United States and P/S entered into a Stipulation and Agreement Clarifying the Partial Consent Decree (Stipulation), whereby P/S agreed to work zones in areas shared by another site, the Anniston Lead Site. In September 2011, the EPA signed an IROD for OU3 (the Facility). P/S agreed to implement the requirements of the IROD in a CD that was approved by the Court on April 17, 2013.

Previous RCRA / CERCLA Response Actions on Non-Residential Properties

A significant number of actions for OU1/OU2 have also been implemented as Interim Measures (IMs) for the Site and were designed to further reduce the potential for migration of PCBs to areas downstream of this OU. These IMs were implemented on former residential and non-residential properties under the jurisdiction of the RCRA Program. Figure 4 shows the locations where IMs have been implemented in OU1/OU2, and the locations are listed below:

- Northside Area
- Eastside Area
- Eastside Drainageway (through the former Miller Property)
- Alabama Power Company (APCO) Drainage Ditch
- Quintard Mall

There have been a number of other removal activities in OU1/OU2 on non-residential properties that were performed as CERCLA removal actions. Figure 4 shows the locations where some of the non-residential removal actions have been implemented in OU1/OU2 and where residual PCBs are present in soil. The locations are listed below:

- 11th Street Ditch
- Hall Street Properties
- Snow Creek Sediment and Dredge Spoil Pile Removal (not shown on Figure 4)

Detailed information about the sampling and actions taken previously to reduce exposure to PCBs in these eight locations is provided in more detail in the FS.

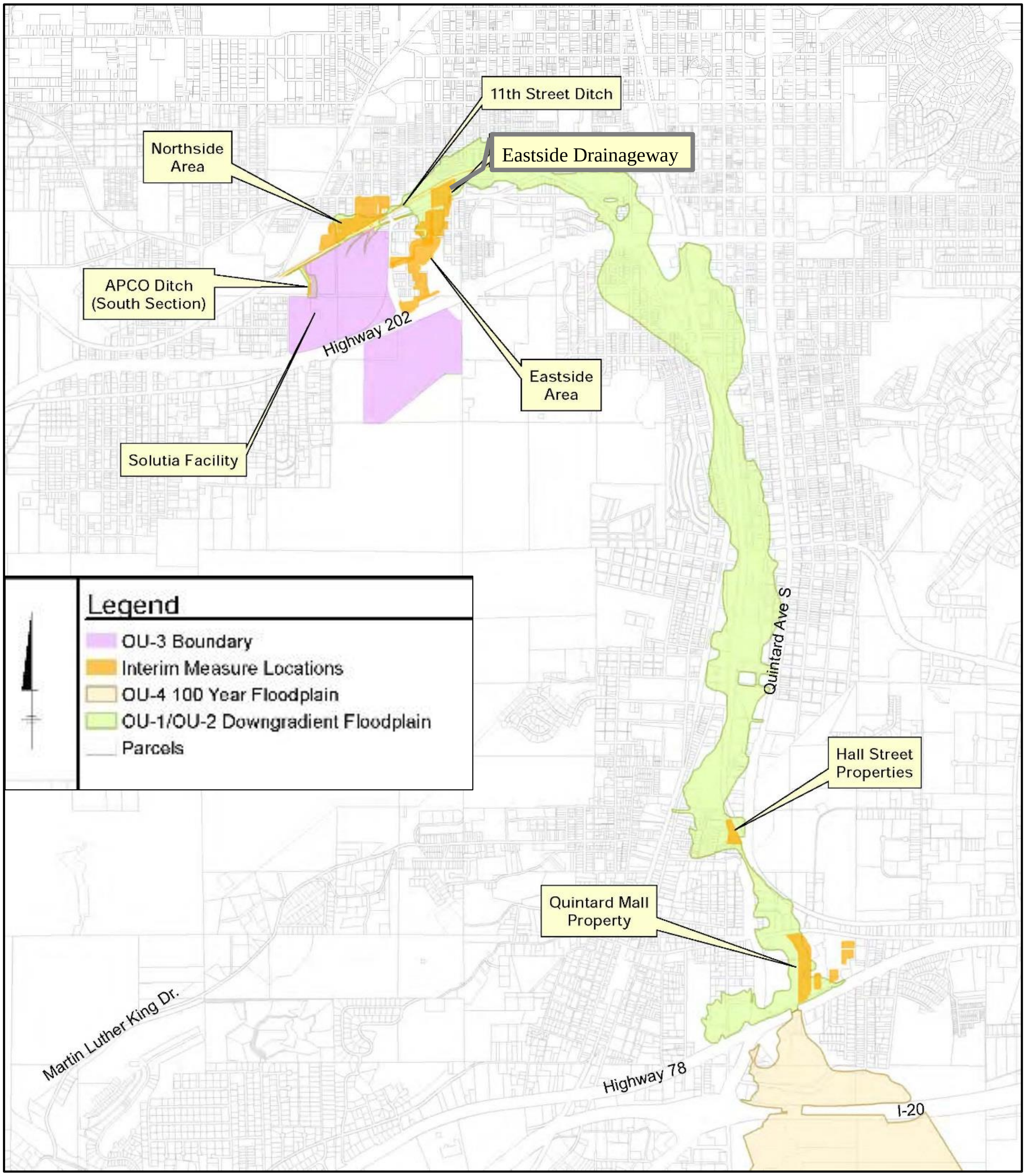


Figure 4. OU1/OU2 Interim Measures

Previous CERCLA Response Actions on Residential Properties

The EPA became aware of residential soil contamination during a removal action investigation of the Anniston PCB Site in 1999 and 2000. Both PCBs and lead were detected at levels of concern in residential soil. A wider list of contaminants was tested, but no other contaminants were determined to be of concern on residential properties. The EPA determined that there were 22 industrial operations in the area that could have contributed PCB and lead contamination to residential soil.

The former Monsanto production facility was determined to be the primary source of PCBs in the environment, while 21 other nearby industries were determined to be “de minimis” PCB contributors. PCBs were assumed to be distributed to residential properties by three main pathways: air dispersion, the physical transport of contaminated fill material, and surface water transport. The air and contaminated fill pathways were investigated by sampling properties outside of the flood plain. The surface water pathway was investigated by sampling properties located within the downstream flood plain. All residential samples collected were analyzed for lead and PCBs.

All 22 industrial facilities in the Anniston area, including the former Monsanto production facility, were determined to be partially responsible for lead contamination present in the environment. Lead was assumed to be distributed to residential properties by two main pathways: air dispersion and the transport of contaminated fill material. Modeling indicated that air transport of lead would not have extended beyond 500 meters from the point of discharge. For that reason, all residential properties located within 500 meters of the center of the 22 industrial operations identified as contributors were required to be sampled for lead. It was also determined that lead contaminated fill would only have freely been transported to locations less than the distance to a land disposal facility or dump. Therefore, the extent of the Lead Site investigation did have a geographic boundary.

Based on all of the above determinations, a map illustrating the boundaries of different sampling areas in Anniston was developed as part of the settlement of the Anniston Lead Site. The map was used in the negotiation of the 2006 Stipulation to the PCD to resolve sampling and cleanup responsibilities between the two sites. The overall area was divided into zones labeled A, B, C, and D (see Figure 5). Zone A was the 500 meter (m) area around 21 of the industrial operations. Zone B was the area in which fill may have been transported outside of the other zones. Zone C was the area adjacent to the former Monsanto production facility and landfills, and the downstream floodplain to Highway 78. Zone D was the Facility (OU3) and a 500 m area around the Facility.

In the Stipulation and Agreement to the PCD, the responsible parties for the Anniston PCB Site agreed to clean up all yards (e.g., front, back, side) within Residential Properties in Zones A and B that contained a surface soil (top 12 inches of soil) PCB concentration greater than or equal to 1 milligram per kilogram (mg/kg) and no surface soil lead concentration greater than or equal to 400 mg/kg. The parties further agreed to clean up all portions of yards (e.g., front, back, side) within Residential Properties in Zones C and D that contain surface soil PCB concentrations greater than or equal to 1 mg/kg, regardless of the levels of lead found in that portion of the yard.

Though the EPA determined that P/S should clean up the remaining properties with soil lead greater than 400 mg/kg in Zone D, as part of their contribution to lead contamination on residential properties, no settlement has been reached, and the EPA is conducting the remaining lead only cleanups in Zone D.

An NTC Removal Agreement was used to address residential properties with surface soil PCB levels at or above 1 mg/kg. The NTC Removal Agreement was based on an engineering evaluation and cost analysis (EECA), which compared alternatives for addressing PCB-containing soil in residential areas of the Site with PCB concentrations greater than or equal to 1 mg/kg in the upper 12 inches of soil and greater than or equal to 10 mg/kg below 12 inches.

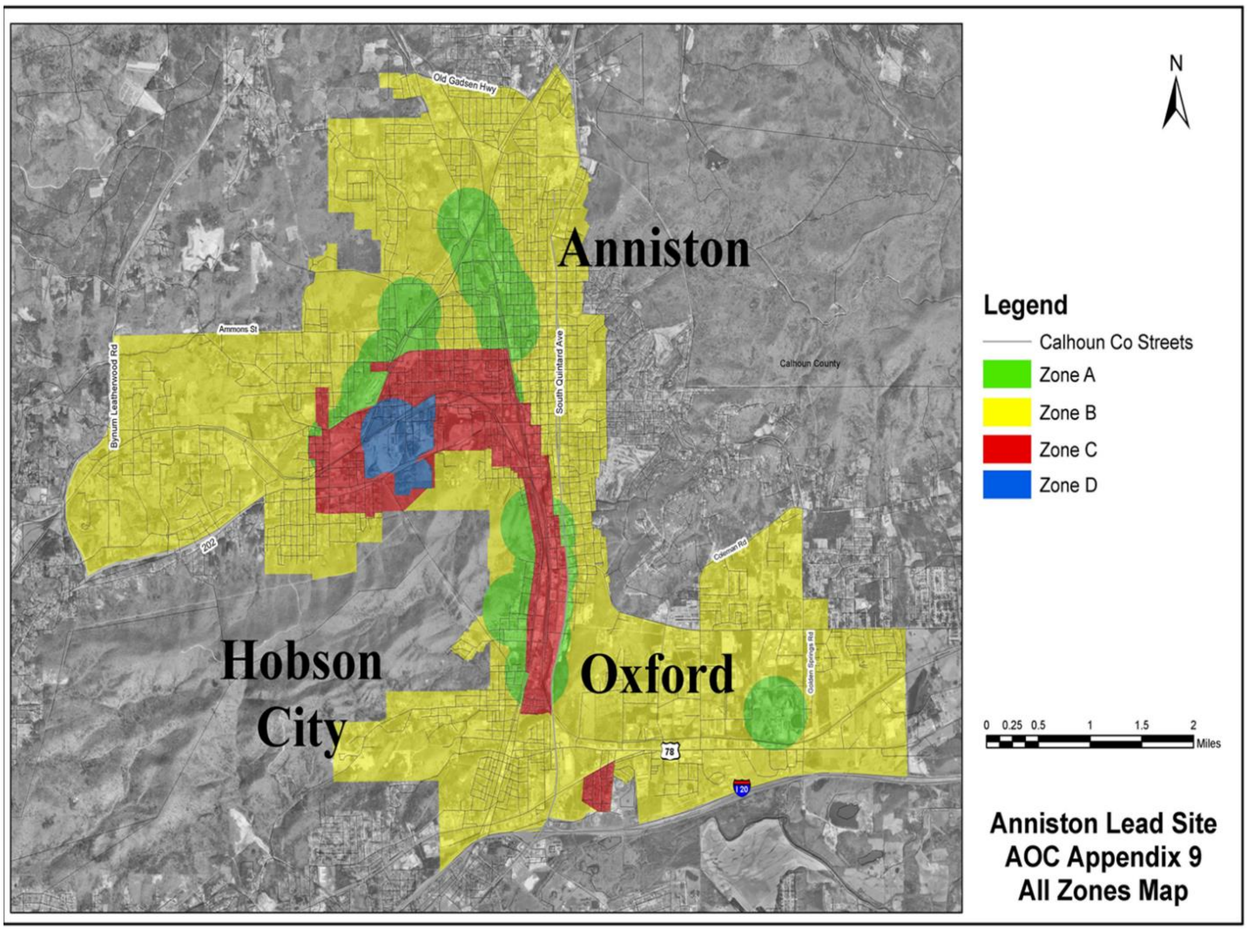


Figure 5. Zone Map

The EECA Report proposed excavation, with onsite and offsite disposal of PCB contaminated soil and onsite soil management for soil with PCB concentrations less than 10 mg/kg. After a public comment period, the EPA selected the proposed remedy. The NTC Removal Agreement was clarified by the issuance of the Stipulation mentioned previously.

P/S then developed a residential soil removal work plan as required by the NTC Removal Agreement to define the approach for performing a removal action response at any property for which composite sampling results indicates the presence of PCBs in surface soil at or above 1 mg/kg. During the transition period from the Removal Order to the NTC Removal Agreement, P/S continued to sample and complete removal actions under the Removal Order. As part of the Site Sampling and Analysis Plan (SSAP) and associated addenda, P/S organized the OU1/OU2 portion of the Site into 35 evaluation areas (EAs) to streamline sampling and removal activities.

Table 1 provides a summary of the number of residential parcels sampled and/or cleaned up for PCBs by different groups under the EPA actions and oversight at the Anniston Lead and PCB Sites. It should be noted that some parcels were sampled and even required cleanup by both sites based on the agreed division of work in the Stipulation to the PCD. The lower half of the table is an accounting of where residual PCBs may be present in subsurface soil at concentrations greater than 1 mg/kg.

Table 1. Number of Parcels Where Activities Were Performed at the Anniston Sites.

Activity\Responsibility	EPA	Anniston Lead Site	Anniston PCB Site
Parcels Sampled for PCBs	1978	4893	1850
Parcels with Residential Soil Removal Complete for PCBs	16	71	632
Parcels with Residential Soil Requiring Cleanup for PCBs		2 access issues	43 wooded 19 access issues
Parcels with Potential PCBs beneath structures	16	49	297
PCBs < 10 mg/kg in subsurface		5	28
PCBs < 10 mg/kg in subsurface and potentially beneath structures		4	67

SITE CHARACTERISTICS

OU1/OU2 is wholly located in Calhoun County, Alabama. Approximately 90% of Calhoun County lies within the Valley and Ridge physiographic province. The geology of this area is characterized by folding and thrust faulting. Thrust faults are the dominant structural features in this province. The upward folding of rocks and cutting to streams has formed a series of sharp ridges and valleys. The remaining area of Calhoun County, which is located in the extreme southeastern part of the county, lies within the Piedmont physiographic province consisting of well-dissected uplands developed on metamorphic rocks. Upstream of its confluence with Snow Creek, Choccolocco Creek runs along the Talladega-Cartersville fault, which separates these two physiographic provinces. Various tributaries in the eastern and southern portions of the basin originate in the Piedmont province.

Snow Creek and its floodplain are defining features for OU1/OU2. Snow Creek, which generally runs down the center line of its 100-year floodplain, has a wide range of bed materials. The native materials in the Snow Creek basin include solids ranging from clays to gravels and bedrock contact areas, each of which play a role in determining sediment transport of hydrophobic organic compounds such as PCBs.

Snow Creek flows through recently deposited alluvium belonging to the Philo series (upper two-thirds of the basin) or Pope series (lower one-third of the basin). Both alluvial soil series are similar in their classification as fine sandy loam, their origin from sandstone and shale with possible limestone parent material, and their frequency of flooding. The dominant soil types outside the immediate channel area are identified as an undifferentiated mixture of Anniston and Allen soil. In the area of Snow Creek, sandstone and quartzite gravel, and cobbles up to eight inches in diameter are common in these soil types, comprising 10% to 20%. With increasing elevation, the soil grades to the Muskingum series, a coarse, stony residuum of sandstone and shale 1 to 2 feet thick over bedrock. In the upper Snow Creek basin, extensive rough mountainous areas with many outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material are present. Slopes are generally greater than 25%, and runoff is rapid.

The stratigraphic and structural relationships of the rocks throughout most of Calhoun County are typical of the Valley and Ridge physiographic province of the southern Appalachian Highlands. Rocks that range in age from the Cambrian Period to the Pennsylvanian Period have been sharply folded into northeast trending anticlines and synclines that are complicated by thrust faults. The thrust faults are the dominant structural features of the Valley and Ridge province and cause the repetition of the geologic units on the surface. Secondary stresses caused numerous high-angle faults of more limited extent. This faulting, folding, and crushing of rock units has caused the sometimes chaotic surficial distribution of formations in the county, including portions underlying OU1/OU2.

Nine consolidated units (bedrock units, including the Shady Dolomite) and the overlying residuum are considered significant water-bearing units in Calhoun County. Although the vertical conductivity in these units varies, there is no readily identifiable regional confining layer or layers to isolate the units into separate systems. Groundwater occurs in a variety of hydrogeologic environments in the consolidated (bedrock) units in Calhoun County. The majority of the water-bearing units in the area are carbonate rocks, which typically yield only enough water for individual domestic use.

The Shady Dolomite Formation is present along the lower slopes of Coldwater Mountain and Choccolocco Mountain. This formation is approximately 500 feet thick and consists of bluish-gray or pale-yellowish gray, thick-bedded dolomite with chert. The Shady Dolomite Formation is considered a good aquifer in Calhoun County, and wells developed in this aquifer can supply enough water for municipal or industrial uses.

Regional groundwater flow is controlled by topography and the transmissivity and geologic structure of the underlying formations. As groundwater flow is controlled by topography, local flow direction is generally to the north in the vicinity of the Facility. However, as groundwater approaches the 11th Street Ditch, flow becomes northeast, following the slope of the 11th Street Ditch. Ground surface elevations of the monitoring wells installed along Snow Creek indicate over 100 feet of elevation drop from the Facility to the area where OU1/OU2 crosses into OU4 along Snow Creek. Depths to the surficial water table along the 11th Street Ditch and Snow Creek are shallow, generally ranging from approximately 6 to 13 feet below ground surface (bgs). A generalized cross-section depicting approximate ground surface, depth to groundwater, and general geology is included on Figure 6.

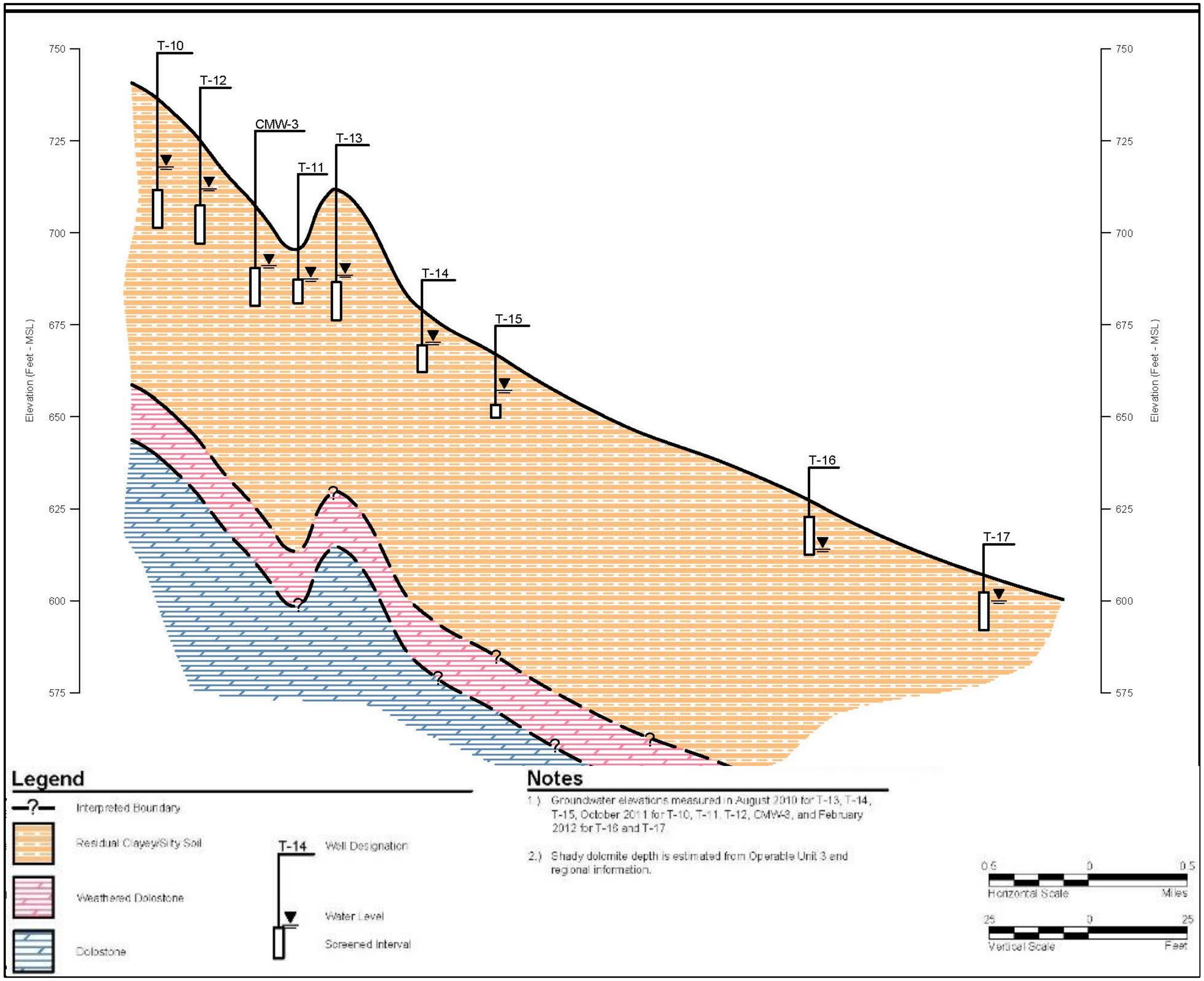


Figure 6. Geologic Cross Section OU1/OU2 / Snow Creek

Lesser quantities of groundwater are obtained from sandstone, shale, mudstone, and quartzite units present in the county. These groundwater sources can be sufficient for domestic uses; however, it is difficult to obtain sufficient groundwater from these sources for municipal or industrial uses. The groundwater yield from these rocks is controlled by fracture orientation, grain size, grain distribution, and secondary permeability.

Approximately 150 springs have been identified and located in the county, and the discharge of these springs is variable, ranging from less than 1 gallon per minute (gpm) to over 17,000 gpm. Many of these springs are found along the trace of thrust faults and produce enough water for domestic uses and, in some instances, for municipal supply. It is estimated that 80% of these springs are used for domestic, farm, stock, municipal, industrial, or recreational water supplies. The two most significant springs located nearest to the Facility are Collateral Spring and Coldwater Spring. Both springs are located approximately five miles from the Facility. Collateral Spring is to the south of the Facility near Interstate 20. Coldwater Spring is approximately five miles southwest of the Facility.

Coldwater Spring is the primary water source for Anniston, Fort McClellan, Anniston Ordinance Depot, and other municipalities and communities within Calhoun County. During an observation period from 1957 to 1983, the average discharge of Coldwater Spring was approximately 31 million gallons per day (mgd), and the minimum discharge was 23.5 mgd. The City of Oxford currently relies on groundwater as its primary source of water. The city operates five production wells (each approximately 300 feet deep) that draw water from the Knox Group, Shady Dolomite Aquifer. The water from each well is tested regularly and meets all drinking water regulations without any treatment required.

As part of the investigations for OU3, P/S contacted the local water utility who confirmed that they provided service to the area surrounding the Solutia Facility. Additionally, during the RI program for OU3, a door-to-door survey of private wells within a one-mile radius around the Solutia Facility was conducted. The field team surveyed 2,545 properties. Four commercial properties (11 parcels) were identified during the survey as having active wells. One of the wells on these properties was permitted for drinking water use, but was currently used only for process water.

A location map showing the identified springs, the survey area, and the groundwater well locations, including the Oxford municipal wells and the OU1/OU2 investigation wells, has been included as Figure 7.

There are many natural and man-made features in OU1/OU2 that govern surface water drainage. During precipitation events, significant quantities of surface water flow across the Facility, and into various man-made ditches. This flow generally discharges into the 11th Street Ditch north of the Facility. The 11th Street Ditch discharges in an easterly direction to Snow Creek. Snow Creek in turn flows to the south and eventually drains into Choccolocco Creek, which in turn flows to the west into Lake Logan Martin on the Coosa River. When surface water comes into contact with contaminated soil, constituents can become entrained in the water and subsequently transported downstream. The Facility storm water detention basin, 11th Street Ditch, and Snow Creek are part of OU1/OU2. The quality of surface water in these bodies is considered in the investigation of OU1/OU2.

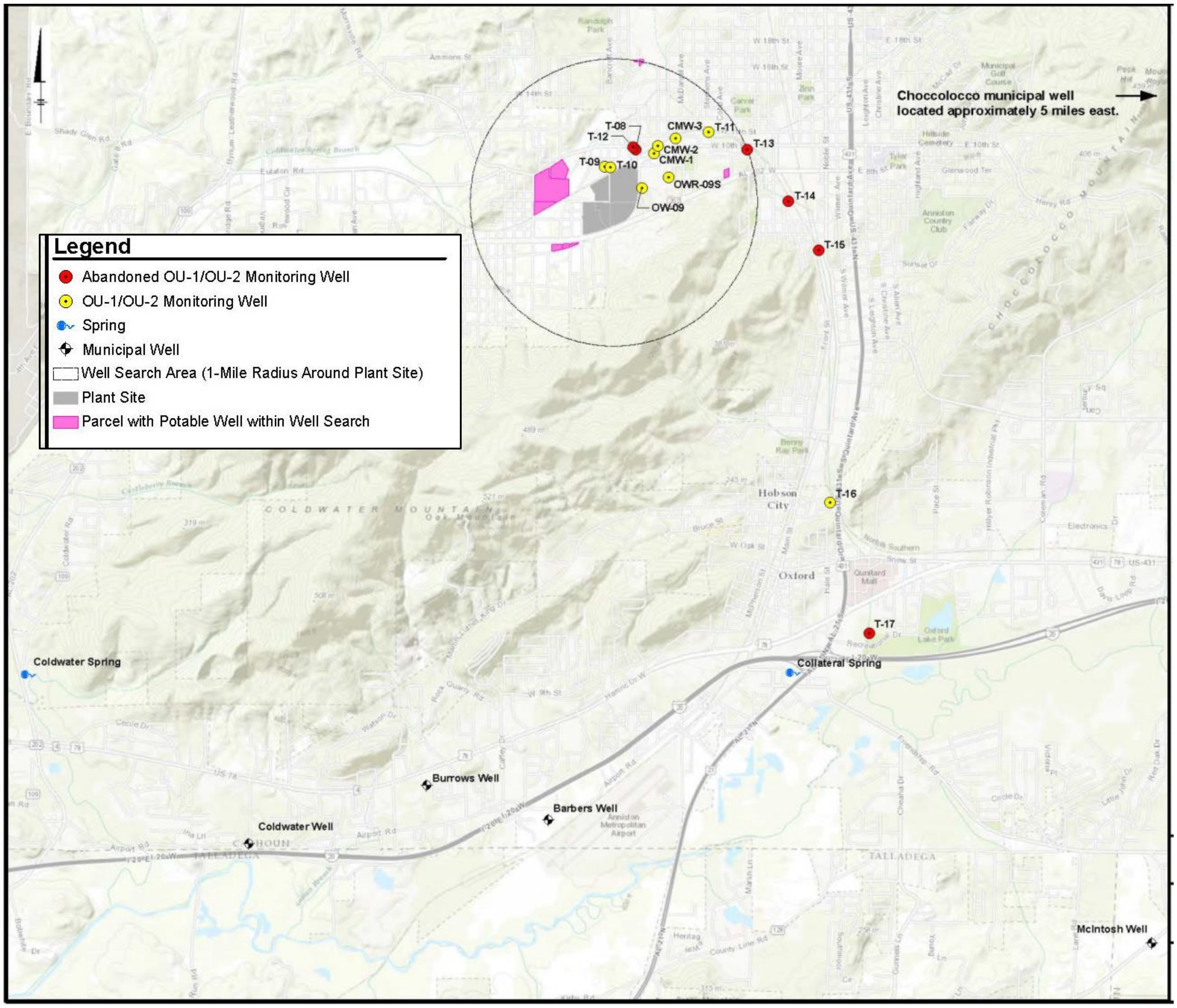


Figure 7. Well Survey Radius, Municipal Well, and Spring Locations.

Snow Creek is a small urban drainageway that flows through Anniston into Oxford, before its confluence with Choccolocco Creek just south of Interstate 20 near the Choccolocco Creek Publicly Owned Treatment Works (POTW). Aquatic habitat in the OU1/OU2 portion of Snow Creek (north of U.S. Highway 78) upstream to the confluence with the 11th Street Ditch is limited. There are drainage ditches along local roads that flow into the creek, and the creek is channelized in some locations through dense areas of residential, commercial, and industrial land use. In areas where concrete sluiceways channelize the creek, substrate, aquatic vegetation, and bank features are lacking or are insufficient as habitat for aquatic organisms or wildlife. While other areas of the creek have not been altered to the same degree, specifically the portion of Snow Creek between Noble Street and U.S. Highway 78, much of the creek is adjacent to roadways with limited vegetated buffer zones. Some areas of the creek have more expansive banks with riparian vegetation, a sandy-silt mix of substrate and depositional bars, and occasional riffle-run-pools.

At the southern limit of Snow Creek in OU1/OU2, surface waters flow into a long underground culvert beneath the Quintard Mall. The portion of Snow Creek downstream of Highway 78 is part of OU4 and not OU1/OU2. The terrestrial areas that surround the creek support a wide range of land uses including industrial, manufacturing, scrap yards, recycling facilities, roadways, railroad lines, and residential properties. The fragmented and changing nature of land use in the surrounding floodplain areas serves to limit the habitat value of these areas.

Nature and Extent of Contamination

Investigations of soil, groundwater, sediment, creek banks, surface water, and air were conducted in OU1/OU2 under both RCRA and CERCLA agreements. All of the data from both programs was considered in this Proposed Plan. Many of the investigations, specifically the investigations of air and groundwater, focused only on PCBs. The reasoning for the sampling locations and contaminants of interest in each media are described in the following sections.

Soil

Substances detected in soil in OU1/OU2 were identified under several investigation programs including residential and non-residential sampling programs. The EPA removal assessments conducted from 2000 through 2002 determined that PCB and lead concentrations in soil should be the primary focus of the investigations on residential yards. Two Superfund sites, the Anniston PCB Site and the Anniston Lead Site, were designated to cleanup PCBs and lead, respectively, in soil on residential properties. The sites overlap geographically in some areas. This document only addresses the PCBs that remain in residential soil where access for removal has not been granted and where PCBs greater than 1 mg/kg are still present in subsurface soil or under structures after the removal actions.

The non-residential properties were sampled through separate investigations of special use properties (i.e., schools, churches, day-care centers, community centers, playgrounds, and parks), interim measures areas, dredge spoil piles, and all other non-residential soil. A special category called unapproved waste disposal areas (UWDAs) was established in the FS to address two properties where auto fluff dumping was contributing to the extent of contamination on those properties, recognizing that the remedy on these properties requires a different approach.

Residential Soil

Sampling of residential properties was conducted both inside and outside of the 100-year floodplain. Residential soil was sampled for lead and PCBs. Lead and a portion of the PCB impacted properties were cleaned up by other parties in a separate removal agreement under the Anniston Lead Site. All residential properties with PCB contamination are considered part of the Anniston PCB Site. For the most part, surface soil PCB concentrations on the affected properties have been remediated to below 1 mg/kg and subsurface soil PCB concentrations have been remediated to below 10 mg/kg. Long-term management of residual PCBs remediation waste on residential properties (soil with PCB concentrations greater than or equal to 1 mg/kg) within and outside the floodplain are addressed by this Proposed Plan, including any residuals on properties cleaned up as part of the de minimis settlement on the Anniston Lead Site.

The residual PCB contamination remaining in soil on residential properties (as of December 31, 2014) is summarized in the RI and the files added to the Administrative Record from the Anniston Lead Site, and can be characterized as follows:

- Five-point composite samples were collected from 0-3 inches below land surface (bls) and 0-6 inches bls on approximately 7600 residential properties.
- PCB concentrations were detected in surface soil on 4322 residential properties.
- PCB concentrations were detected in surface soil at concentrations greater than 1.0 mg/kg on 783 residential properties.
- PCB concentrations greater than 1.0 mg/kg were removed from the top one foot of soil on 719 residential properties (632 by the Anniston PCB Site PRPs and 71 by the Anniston Lead Site PRPs and 16 by the EPA).
- 64 residential properties with PCB concentrations greater than 1 mg/kg in surface soil have not been cleaned up: 43 are wooded lots were no exposure is currently occurring with PCB detections in soil ranging from 1 mg/kg to 441.5 mg/kg; and 21 are properties where access has been denied with PCB detections in soil ranging from 1 mg/kg to 24.7 mg/kg.
- Residual contamination between 1 mg/kg and 10 mg/kg remains in some portions of 104 properties below the 1-foot thick layer of clean backfill installed during the NTC Removal Action.
- 433 properties have the potential to have PCBs greater than 1mg/kg under structures.

Attempts to gain access to residential properties for sampling and cleanup have been performed by the PRPs, the EPA, and members of the community. Court ordered access was granted for sampling on a number of properties.

Non-residential Soil

Non-residential soil was sampled for PCBs and other constituents by multiple parties through multiple sampling programs. OU1/OU2 non-residential soil can be grouped and evaluated in five soil/property categories:

- *Special Use Properties* (i.e., soil at schools, churches, day-care centers, community centers, playgrounds, and parks) – sampled like both residential properties, for PCBs and lead, and like non-residential properties (below).
- *Interim Measure Properties* (i.e., soil beneath and around interim measures) – sampled for PCBs only.
- *Dredge Spoil Piles* (i.e., former Snow Creek sediments left along banks) – sampled for PCBs and mercury only.
- *Unapproved Waste Disposal Areas* (i.e., apparent Auto Fluff dump areas) – one sampled in residential property investigation and one sampled in non-residential (commercial/ industrial) property investigation.
- *Non-Residential Properties* – sampled for PCBs with a subset sampled for a wide list of constituents.

Special Use Properties

Special Use Properties are a subset of non-residential properties where children may congregate. The high activity areas of schools, churches, day-care centers, community centers, playgrounds, and parks were sampled and cleaned up in accordance with residential standards under the NTC Removal Action. Low activity areas on these properties have not yet been cleaned up. These properties are primarily located adjacent to residential areas and are spread throughout the zones shown in Figure 5. The residual PCB contamination remaining in soil on Special Use Properties is summarized in the RI and can be characterized as follows:

- Both five-point composite and grab samples were collected from 0-3 inches bls and 0-6 inches bls in high and low activity areas on 41 Special Use Properties.
- PCB concentrations were detected in soil at concentrations greater than 1.0 mg/kg in surface soil on 23 Special Use Properties.
- PCB concentrations greater than 1.0 mg/kg were removed from surface soil in high activity areas on 15 Special Use Properties as part of the NTC Removal Action.
- PCB concentrations greater than 1.0 mg/kg are present in surface soil of low activity areas on 19 properties. PCB concentrations range from 1 mg/kg to 45.2 mg/kg.
- Residual contamination between 1 mg/kg and 10 mg/kg remains on 3 Special Use Properties in high activity areas below the 1-foot thick layer of clean backfill installed during the NTC Removal Action.
- 14 properties have the potential to have PCBs greater than 1 mg/kg under structures.

Interim Measure Properties

As discussed previously, multiple IMs and removal action projects have been conducted over the past 20 years where PCBs in surface water directly impacted both residential and non-residential properties adjacent to the Facility and in downstream drainageways. After some residential and non-residential property buyouts, the interim measures were implemented in the locations shown on Figure 4. There are PCBs in surface soil not under permeable and impermeable caps in the IMs that might pose a threat. The PCBs in IMs soil beneath caps and outside of caps are identified on Figures 8 through 14 at the end of the Proposed Plan. No new samples were collected in the RI. Groundwater monitoring wells have been located near most of the interim measures, and provide additional information about the effectiveness of the measures. Groundwater results will be discussed later in this document.

Dredge Spoil Piles

Dredging activities previously performed in Snow Creek by the City of Anniston resulted in eight dredge spoil piles being placed along the nearby banks of the creek. Dredge spoil piles from the dredging of Snow Creek, labeled SC-1 through SC-8, were located and mapped in the late 1990s. The dredge spoil piles on Snow Creek are shown on Figure 15. Seven of the dredge spoil piles were sampled for PCBs and mercury in 1999. PCB were detected in 29 of 29 samples, and concentrations ranged from 0.75 mg/kg to 88 mg/kg. Mercury was detected in four of four samples, and concentrations ranged from 0.19 mg/kg to 0.27 mg/kg. No new samples were collected in the RI.

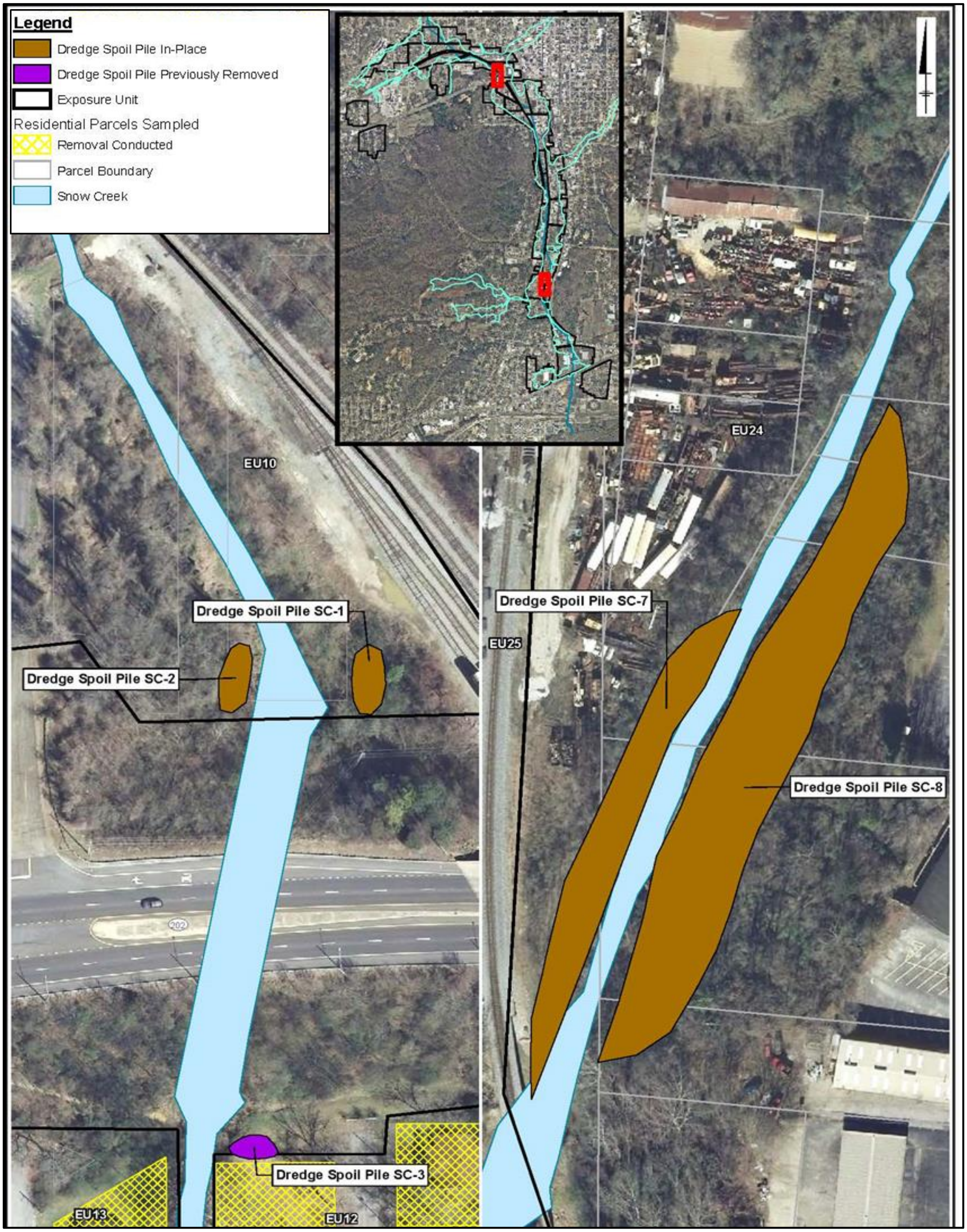


Figure 15. Dredge Spoil Piles

During a residential removal action at 710 Pine Street in June 2009, SC-3 was removed from the bank and disposed of along with the residential soil. In November 2009, three dredge spoil areas (SC-4, SC-5 and SC-6) were removed from the banks along Snow Creek and disposed of offsite as part of the Snow Creek sediment removal action with the City of Anniston. The dredge spoil areas remaining adjacent to Snow Creek include SC-1, SC-2, SC-7 and SC-8. PCB concentrations in the remaining piles range from 0.75 mg/kg to 46 mg/kg. Mercury concentrations ranged from 0.19 mg/kg to 0.27 mg/kg.

In 2012, the condition of the remaining dredge spoil piles was evaluated. The piles range in height from 3 to 7 feet and in areal extent from 225 square feet to 44,000 square feet. The piles had a well-established vegetative cover comprised of trees, ivy, vines, weeds, brush, brier, or kudzu. A non-woven geotextile was also observed at SC-1. Evidence of creek bank erosion was observed along the four remaining Snow Creek dredge spoil piles, and some minor slumping was observed at SC-2 on the west bank. The widths of dredge spoil SC-7 and SC-8 were smaller than the initial investigation which occurred in September 1998. Field measurements indicated that SC-7 had an initial width of 40 feet in 1998 and in 2012 had a width of 30 feet. SC-8 had an initial width of 80 feet in 1998 and in 2012 had a width of 70 feet.

Unapproved Waste Disposal Areas

In conducting the investigation for OU1/OU2, two areas were identified that were used for the unapproved disposal of waste materials. The two identified unapproved waste disposal areas (UWDAs) and their approximate lateral extents are shown on Figure 16. Investigations conducted in these areas have shown that the UWDAs contain or may contain auto fluff that was deposited over time. The two specific locations include:

- The Ashley Street and Legrande area. This area includes parcels identified as 510 Legrande Street, 0 Ashley Street, and 505 Ashley Street. This UWDA is located approximately 0.25 miles west of the Solutia facility outside of the 100-year floodplain of Snow Creek. The waste is estimated to cover an area of approximately 1.7 acres and the depth of waste material averages about 4 feet over this footprint and 5 to 6 feet in depth over large portions of this UWDA. PCBs detected in this surface soil ranged from 0.23 mg/kg to 70 mg/kg, and PCBs detected in subsurface soil ranged from 0.40 mg/kg to 64.9 mg/kg. Groundwater was not sampled on this property because waste did not reach the groundwater table.

- The Wilborn Property area. This area includes 830 W 10th Street and 0 9th & Mulberry Avenue. This non-residential property is located approximately one mile east of the Solutia facility with a portion of the property located inside the lateral limits of the historical 100-year floodplain. Although a portion of the property is located inside of this historical floodplain boundary, significant filling of the property has elevated the ground surface approximately 20 feet above Snow Creek. A limited investigation was conducted at this property, including the installation of monitoring well T-13. The estimated waste limits are approximately 3.2 acres. The depth of waste material was estimated to be an average of 18 feet thick, based on the boring log and analytical data collected for well T-13. PCBs detected in surface soil ranged from 0.58 mg/kg to 190 mg/kg, and PCBs in subsurface soil ranged from 0.72 mg/kg to 562 mg/kg. No PCBs were detected in groundwater on this property. Groundwater results will be discussed later in this document.

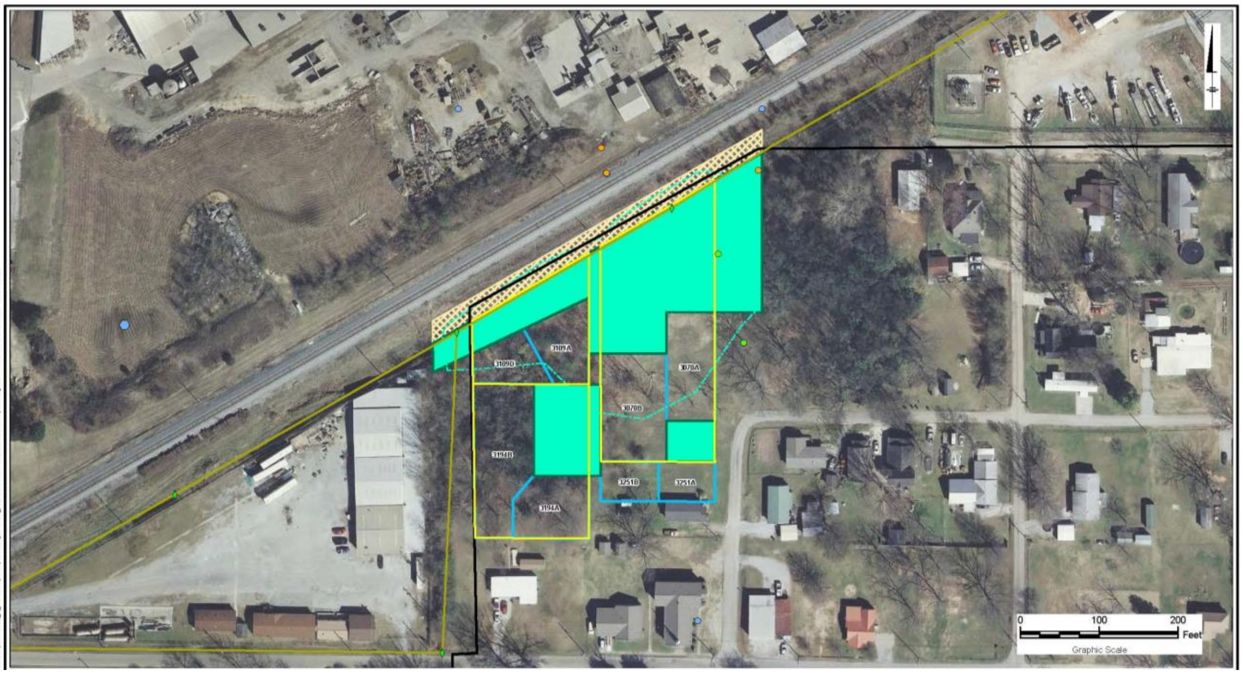


Figure 16(a). Ashley and Legrande Unapproved Waste Disposal Area

Figure 16(b). Wilborn Unapproved Waste Disposal Area

Non-Residential (Commercial/Industrial) Properties

The study area for the non-residential portions of OU1/OU2 was subdivided into 30 sampling areas called characterization areas (CAs) to assist in characterizing the overall floodplain. The CAs are shown in Figure 17. The boundaries of each CA were established based on the following:

- The limits of the drainage areas and 100-year floodplain for Snow Creek.
- Natural and man-made physical features that could impact transport patterns (ridges, valleys, elevated highways, bridges, culverts, railroad beds).
- Land use.
- Continuity (e.g., if a park is divided by a road or railroad, the entire park would still be grouped into one CA).
- Similarity of location with respect to suspected transport and deposition characteristics (i.e., PCBs transported via surface water are contained in the 100-year floodplain).

The data collected in the CAs for the non-residential properties were used to evaluate the nature and extent of contamination and to evaluate the baseline risk to human receptors in a human health risk assessment (HHRA). In the OU1/OU2 HHRA, the non-residential exposure units (EUs) were for the most part, determined to reflect the CAs, with the adjustments shown in Figure 17. The adjustments were made so that higher contaminant concentrations in portions of an EU were not "diluted" by lower concentrations in another portion of the EU when calculating exposure point concentrations (EPCs). The adjustments are described as follows: CA 14 was divided into EU14S and EU14N; CA 19 was divided into EU 19N and EU 19S; and CA 15 and CA 16 were combined into EU 15/16.

Within each of the EUs, the properties evaluated under the residential program and areas covered by improvements (i.e., parking lots, buildings, roads, interim measures, dredge spoil piles) were excluded from the non-residential soil investigation. Sampling conducted within the unimproved areas provided data sufficient for characterization and risk assessment.

Specific sample locations within each EU were identified using the Visual Sample Plan (VSP) approach. All surface soil samples were analyzed for PCB Aroclors and total organic carbon (TOC). Approximately 20% of the samples were analyzed for grain size, and 10% of the samples were analyzed for the wider list of constituents. The subsurface soil sampling component of the non-residential program was targeted to the 10% of locations with the highest PCB concentrations in non-residential surface soil.

The distribution of PCBs in non-residential floodplain surface soil and subsurface soil are shown on figures in the RI and FS. Samples were collected from all EUs except for EU28. EU28 is completely covered by a shopping mall and parking lots. Sufficient PCB data were collected to allow estimation of EPCs for all EUs, including instances where CAs where divided into two EUs for purposes of the risk assessment.

Soil samples analyzed for a wider constituent list, which included volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), other semi-volatile organic compounds (SVOCs), pesticides, metals, cyanide, and chlorinated dibenzodioxins and furans (PCDD/DF).

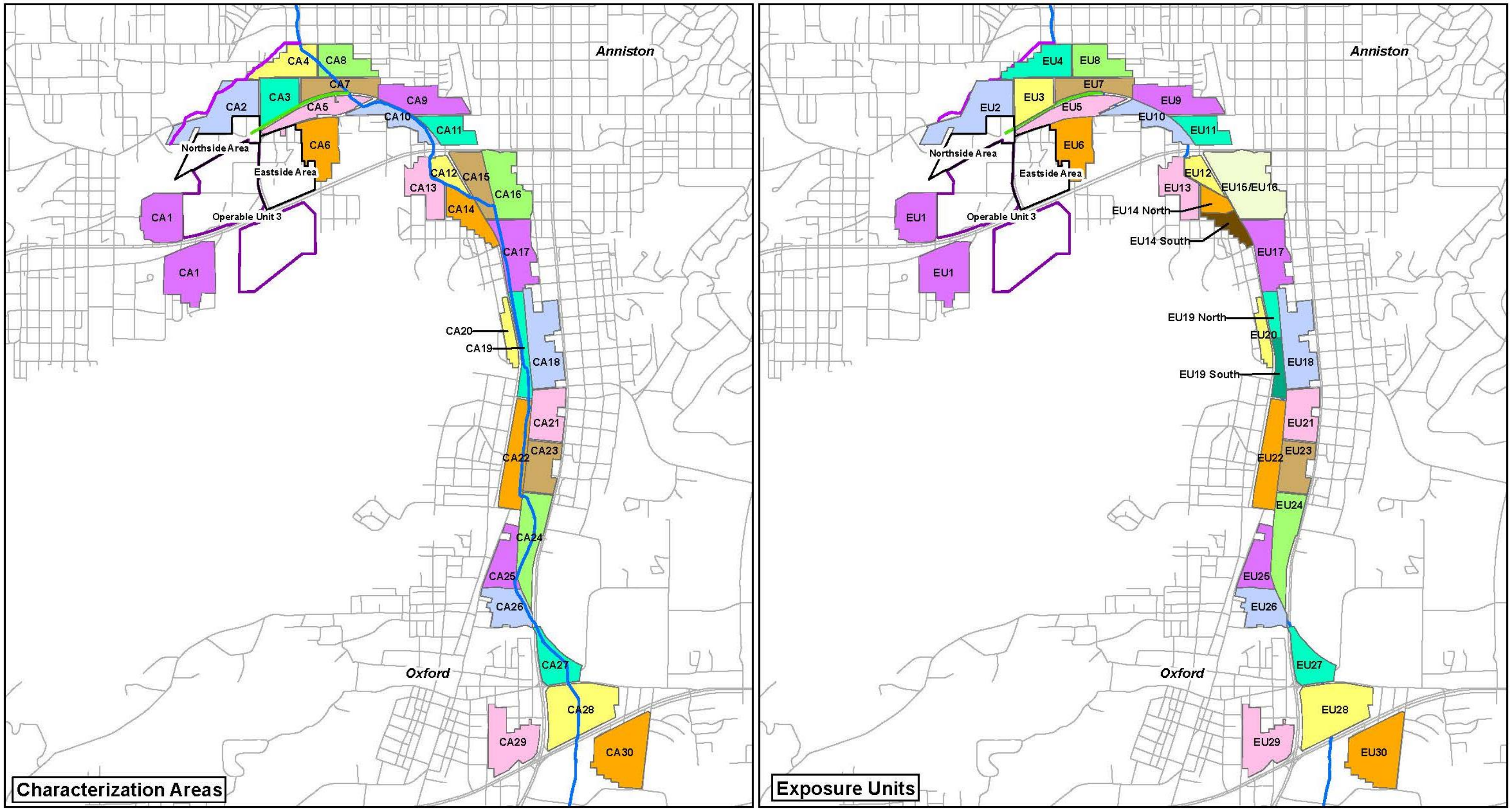


Figure 17. Characterization Areas (CA) and Exposure Units (EU)

While the surface soil sampling efforts were designed to achieve comprehensive overall spatial coverage of the OU, the subsurface soil sampling locations were targeted for areas within the OU with elevated surface soil PCB concentrations. The intent was to determine if the areas of high surface concentrations created significant subsurface contamination, leaching to deeper soil and possibly to groundwater contamination. This methodology was justified based on the results of the residential sampling and removal efforts which confirmed that for the most part OU1/OU2 PCB contamination is a surface soil concern.[1]

Sampling results for non-residential surface and subsurface soil are provided in the RI and the results for the more significant detections relative to occurrence and risk are summarized below:

- **Arsenic**: OU1/OU2 arsenic concentrations were detected in 98 percent of the soil samples tested at concentrations ranging from 1.2 mg/kg to 120 mg/kg across the EUs. The background arsenic concentration from the Fort McClellan study was 8 mg/kg, and the mean arsenic concentration for the OU1/OU2 EUs is 11 mg/kg.

- **PAHs**: OU1/OU2 PAH concentrations were detected in 85 percent of the soil samples tested at BaP equivalent concentrations ranging from 0.091 mg/kg to 640 mg/kg, with a mean concentration of 9 mg/kg. The elevated concentrations of PAHs are randomly distributed and interspersed with lower concentrations. The higher PAH concentrations were found to the north and outside of the OUs. PAHs are present throughout the Anniston area at typical urban background levels.

- **Chromium**: OU1/OU2 chromium concentrations were detected in 99.7 percent of soil samples tested at concentrations ranging from 3.2 mg/kg to 14,000 mg/kg. The average chromium concentration of 90 mg/kg is driven by two elevated sample results of 14,000 and 850 mg/kg from samples collected in EU22 and EU24, respectively. Both of these samples were collected in former industrial areas including near railroad tracks in EU22 and a junkyard in EU24. Both of these EUs also have relatively low PCB concentrations with a mean PCB concentration of 1.5 mg/kg in EU22 and a mean PCB concentration of 6.8 mg/kg in EU24.

- **PCDD/DFs**: OU1/OU2 PCDD/DF data were detected in 100 percent of soil samples tested at TEQ concentrations ranging from 0.00036 micrograms per kilogram (μg/kg) to 0.25 μg/kg, with the exception of a single isolated result for a sample that was collected in EU25. This sample was collected in a former industrial area (US Pipe) and has a PCDD/DF TEQ concentration of 2.2 μg/kg. The sample was also tested for PCBs and had a concentration of 0.062 mg/kg. The mean PCB concentration for EU25 as a whole is also low (0.27 mg/kg). The distribution pattern of PCDD/DF concentrations suggests that their presence is the result of local anthropogenic background sources. When combined with dioxin-like PCBs (DL-PCBs) the total dioxin value (PCDD/DF/DL-PCB) TEQ

[1] Approximately 15 percent of the residential properties that required cleanup have subsurface soil PCB concentrations greater than or equal to 1 mg/kg. Of those properties, 50 percent had subsurface soil PCB concentrations less than 2 mg/kg, 35 percent had subsurface soil PCB concentrations less than 5 mg/kg, and 15 percent had subsurface soil PCB concentrations between 5 mg/kg and 10 mg/kg.

ranges from 0.00036 to 2.23 µg/kg. This includes two outlier concentrations: one at 2.01 µg/kg in EU15 and the other 2.23 ng/kg in EU25 as described previously.

Sediment

There are three discrete sampling programs that provide data to evaluate sediment conditions in the OU1/OU2 portion of Snow Creek (Figure 18). These three sampling programs include: 73 sediment samples collected from 34 sampling locations during the RCRA Facility Investigation (RFI) program; four samples including a field duplicate collected under the RI to evaluate the wider list of constituents over the range of PCB concentrations present in Snow Creek and to confirm the general distribution of PCBs in the OU-1/OU-2 portion of Snow Creek; and 7 sample results from the EPA sediment assessments.

The sediment data for Snow Creek are presented on a series of figures and in multiple tables in the RI and FS. The sediment total PCB concentrations for the OU1/OU2 Snow Creek range from not detected to 60 mg/kg. The highest PCB concentrations are generally located in the upstream portions of Snow Creek between the 11th Street Ditch and Highway 202, inclusive of the culverts that go under the highway. The portion of Snow Creek between the railroad bridge and Highway 78 is generally characterized by low PCB concentrations. The average sediment PCB concentration for this reach of the creek is approximately 1.9 mg/kg. Most of the sample results for this reach of the creek were less than 6 mg/kg. A single elevated concentration (approximately 11 mg/kg) was measured in this downstream portion of Snow Creek. This sediment sample was collected adjacent to EU25 and is located next to a railroad crossing. The total PCB concentrations in sediment for the portion of Snow Creek upstream of the 11th Street Ditch range from not detected to a high of 18 mg/kg. The average PCB concentration for this portion of Snow Creek located upstream of its confluence with the 11th Street Ditch is approximately 0.96 mg/kg. The sediment PCB concentrations for the West 9th Street Creek range from not detected to a high of 15 mg/kg. The average PCB concentration for the West 9th Street Creek is approximately 1.9 mg/kg.

Metals were also found in sediment data for OU1/OU2. Results for some of the more significant detections relative to occurrence and risk are summarized below:

- **Barium:** Barium concentrations in Snow Creek sediment samples collected downstream of the 11th Street Ditch range from approximately 40 mg/kg to 580 mg/kg.

- **Chromium:** Chromium concentrations in Snow Creek sediment samples collected downstream of the 11th Street Ditch range from approximately 30 mg/kg to 670 mg/kg.

- **Cobalt:** Cobalt concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from not detected to 110 mg/kg.

- **Lead:** Lead concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from approximately 20 mg/kg to approximately 510 mg/kg.

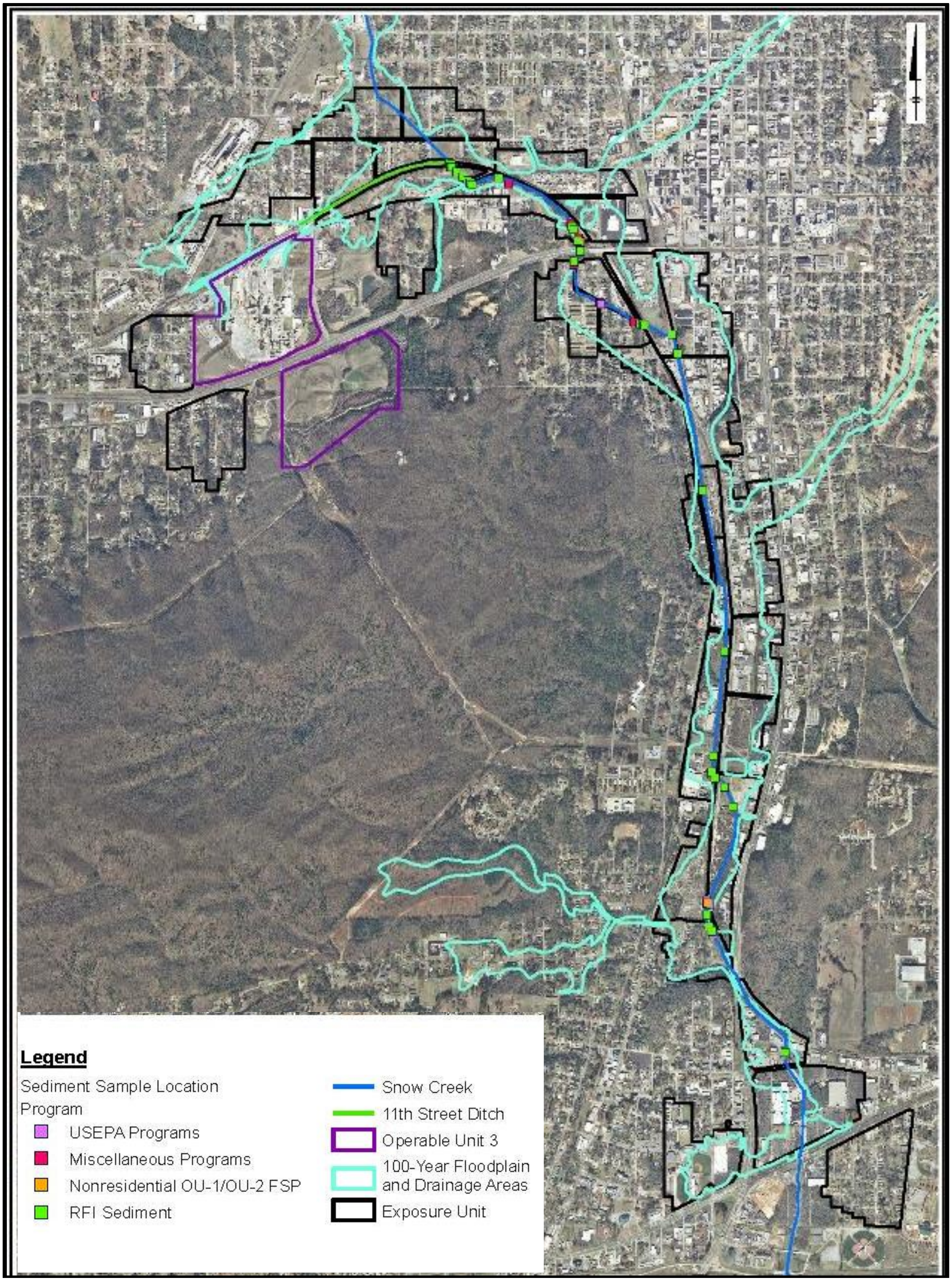


Figure 18. Overview of Snow Creek Sediment Sampling Locations

- **Manganese:** Manganese concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from approximately 100 mg/kg to approximately 5,200 mg/kg.

- **Mercury:** Mercury concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from approximately not detected to approximately 9 mg/kg.

- **Nickel:** Nickel concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from approximately 12 mg/kg to approximately 110 mg/kg.

- **Vanadium:** Vanadium concentrations in sediment samples collected from Snow Creek downstream of the 11th Street Ditch range from approximately 6 mg/kg to 64 mg/kg.

In addition to the metals listed above, PCDD/DFs as TEQ were evaluated. TEQs were calculated for PCDD/DFs alone and with PCB congeners for use in the ecological risk assessment. Detailed information about sample locations and corresponding results for all contaminants are available for review in the RI/FS.

Creek Banks

There are 14 EUs that directly border Snow Creek: EU5, EU10, EU12, EU13, EU14N, EU15/16, EU17, EU19N, EU19S, EU22, EU 24, EU25, EU26 and EU27. The list of EUs to evaluate for potential bank stability concerns was further narrowed to 11 EUs by eliminating the 3 EUs with average PCB OU-1/OU-2 Feasibility Study Report Anniston PCB Site concentrations below 1 mg/kg. This screening step eliminated EU15/16, EU25, and EU27. The conditions at the remaining 11 EUs were reviewed in detail and creek bank areas with stability-related concerns were identified based on the potential for contributing PCBs to Snow Creek and OU-4.

- **EU5:** Both the east and west banks of EU5 include a range from relatively stable to severe erosion conditions. Based on PCB concentrations along EU5, creek bank stability is a concern. This includes the high-energy setting in the area of the confluence of Snow Creek with the 11th Street Ditch and at the 90-degree transition in creek flow that occurs at the border between EU5 and EU10. There may be portions along the lower section of EU5, before the transition to EU10, where natural forms of bank stabilization may be effective due to the wider creek cross section and the lower surface water velocities.

- **EU10:** Conditions are unique in EU10. After the transition from EU5, the floodplain is approximately 20 to 25 feet higher in elevation than the creek. This difference in elevation is due to filling of the area. The average PCB concentration for floodplain soils in EU10 is 8.5 mg/kg, and the concentration is driven by several samples collected in a former auto fluff dump site. The difference in elevation between the creek and floodplain is also important in that the floodplain soil PCB data do not reflect creek bank conditions. The creek banks are steep, but are covered with a heavy vegetation layer that limits erosion. At creek level, the erosion classifications range from minor erosion to relatively stable with one exception. The single exception is the severe erosion at the 10th Street Bridge. Erosion at this bridge does not contribute PCBs to the creek as the materials are base type fill materials associated with the initial construction of the bridge. The primary bank stability concern for EU10 is the transition from EU5 that is discussed above.

- **EU12 and EU13 and EU14N:** Bank conditions for EU12, EU13, and EU14N are discussed together as they border opposite sides of the same reach of the creek. This portion of the creek begins at the outlet of the Highway 202 culvert structure and continues downstream to the railroad tracks. EU12 is on the east to northern side of Snow Creek; EU13 is on the west to southern side of the creek; and EU14N is on the south side of the creek. Bank conditions in the initial portion of EU12 and EU13 are relatively stable and reflect prior bank stabilization work conducted as part of removal projects. The bank conditions then transition to minor erosion including a turn in creek flow to the east. Soils in the adjoining floodplain of EU14N and EU12 have average PCB concentration of 12 mg/kg and 4.3 mg/kg, respectively. The average PCB concentrations in EU13 are 3 mg/kg. The vegetation on the banks in EU12 and EU13 appears to be cut on a regular basis. If the vegetation on the banks continues to be regularly trimmed, there is some possibility that bank erosion of PCB-containing materials could occur.

- **EU17:** There are no bank stability concerns along EU17 as a large portion of the area is characterized by a lined channel, including the vertical concrete walls. The creek bank conditions along the unlined portion of the creek are also stable. The average soil PCB concentration in the adjoining floodplain is 2.4 mg/kg, with the highest concentration samples collected well away from the creek banks.

- **EU19N:** There are no bank stability concerns in EU19N. While the PCB concentrations in some portion of the adjoining floodplain are elevated (average of 77 mg/kg), the east bank of the creek is a concrete wall that is stable.

- **EU19S:** There is one location in EU19S with significant bank erosion. This area has been field inspected on multiple occasions. The significant erosion area is located on the western portion of the creek bank where Snow Creek turns quickly to the east and then back to the south. While the average surface soil PCB concentration for EU19S is 13 mg/kg, this average is driven by two sample results with PCB concentrations greater than 50 mg/kg that were collected in the eastern portion of the EU. One sample was collected in a heavily wooded area, and the second sample was collected near the railroad tracks. There were eight surface soil samples collected from the western side of Snow Creek for this EU, and all the PCB results were below 1 mg/kg. There are no bank stability concerns for this portion of EU19S. This finding is based on the PCB results for the samples collected near the creek banks areas.

- **EU22:** There are no bank stability concerns along EU22. The creek banks are relatively stable and the average PCB for the EU is 1.5 mg/kg.

- **EU24 –** There are no bank stability concerns for EU24. The creek banks were classified as stable and relatively stable, and based on the floodplain soil data, there are no soils with elevated PCB concentrations near the creek bank.

- **EU26:** Most of the creek banks in EU 26 are stable and transition to relatively stable at the southern end of the EU where the Highway 21 Bridge crosses over Snow Creek. The average PCB concentration in this EU is 12 mg/kg and is driven by high concentration samples that were collected in the upland portion of the EU.

The results of a systematic review of bank stability conditions along the OU-1/OU-2 portion of Snow Creek indicate two reach locations where unstable creek banks could be potential sources of PCBs to Snow Creek and OU-4. These areas include the creek banks along EU5 including the area around the 11th Street Ditch confluence and downstream near the transition to EU10 where the creek turns sharply to the east. The second reach of creek with potential bank stability concerns is located where EU12 and EU13 border the creek. These areas may not present a bank stability concern if the vegetation along the creek banks is maintained and a vegetated buffer strip is allowed to form.

Groundwater

Groundwater was not expected to be a medium of concern in the OU1/OU2 portion of the Site. Groundwater migrating from the Facility (OU3) with Site-related contaminants above regulatory action levels is being remediated through remedial actions selected for OU3. However, sampling of surface water and sediment pathways has shown that significant concentrations of PCBs have been released from the Facility to Snow Creek and its floodplain. At subsurface soil locations where the deepest sampling interval (four feet below ground surface or refusal) indicated the presence of PCBs at concentrations above 10 mg/kg, a groundwater pathway investigation was performed. Additionally, since high concentrations of PCBs remain in soil of former drainage features that are under caps and covers installed as Interims Measures, monitoring wells were to help evaluate the effectiveness of the IMs.

Ten wells, T-8 through T-17, are shown in Figure 7. They were installed and sampled in three sampling phases as part of the OU1/OU2 RI. Soil data was collected at each well location. Groundwater sampling data from the 10 wells and another 6 wells located outside of OU3 near IMs were used to evaluate the effectiveness of the IMs. All of the wells were analyzed for PCBs Aroclors. Additionally, the 10 new wells were analyzed for PCB homologues. Filtered and unfiltered results were evaluated for each sample.

In the first phase of the groundwater investigation, temporary monitoring wells T-08, T-09, T-I0, T-11, and T-12 were installed and sampled in April 2008. The first phase sampling results appeared to indicate an association between low concentration PCB detections in groundwater with shallow floodplain soil containing lower chlorinated PCBs (based on the results from the T-11 location). To determine whether these groundwater impacts were associated with the particular Aroclor distribution of PCBs in soil, a second phase of the investigation was implemented. In August 2010, groundwater samples were collected for laboratory analysis from temporary monitoring wells T-13, T-14, and T-15. PCBs concentrations were below the MCL for PCBs at each of these new well locations in samples analyzed by Aroclor and Homolog methods.

Though the first two groundwater investigation phases described above provided insight into PCB patterns that might be expected to result in groundwater contamination, that information was not the only criteria used because no groundwater data were available for downstream properties along Snow Creek and for properties near the confluence of Snow Creek and Choccolocco Creek, where previous interim measures and removal actions had been taken to address exposure concerns. The Hall Street property in EU26 was selected for investigation because a previous removal action resulted in the placement of a soil cover (i.e., a geotextile marker layer and a 12-inch thick soil and vegetative cover) on the parcel, followed by deed restrictions limiting future use of the property. Monitoring well T-16 was installed in a location with total PCB concentrations of 116 mg/kg (36 to 48-inch depth) and 84 mg/kg (48 to 60-inch depth). PCBs were not detected in groundwater at T-16. Similarly, monitoring well T-17 was installed at a central location in Oxford Lake Park. The T-17 well was installed in a location with total PCB concentrations of 163 mg/kg (24 to 36-inch depth) and 28.1 mg/kg (36 to 48-inch depth). PCBs were not detected in groundwater at T-17.

Surface Water

Surface water data collected under the RCRA program was the primary source of information in the RI Figure 19. These data were collected during base- and high-flow conditions to assess the downstream transport of PCBs and suspended solids but were also used to calculate estimated whole-water PCB concentrations. These data indicate that for base-flow conditions at the downstream end of OU1/OU2, the chronic Ambient Water Quality Criteria (AWQC) of 0.014 micrograms per liter (µg/L) was exceeded in three of six sampling events. This is relevant in assessing surface water conditions for Snow Creek because base-flow conditions are typically present 90% of the time. Also of note was the presence of PCBs in the surface waters of Snow Creek at sampling stations located 2,000 feet and 3,000 feet upstream of where the 11th Street Ditch enters Snow Creek.

The highest calculated whole-water PCB concentration was also for an upstream sampling location (0.772 µg/L at 14th Street) and was a factor of approximately five higher than the highest calculated downstream whole-water concentration for base-flow conditions (0.168 at Snow Street). The AWQC for PCBs was exceeded during all high-flow events using the calculated whole-water PCB concentrations. This is not unexpected as during periods of high-flow, elevated TSS concentrations that are present in the surface water can drive the calculated whole-water PCB concentrations.

The data collected under the RI were collected in OU4 just downstream of OU1/OU2 and were collected for three separate high-flow events. PCB Aroclors were not detected (at a reporting limit of approximately 0.5 µg/L) in any of the whole-water samples. Total PCBs as the sum of homolog groups were also determined using a more sensitive method than the 8082 Aroclor method with the concentrations ranging from 0.2 µg/L to 0.6 µg/L. While PCBs were present at concentrations above the AWQC during these high-flow conditions, this was not unexpected as the samples were analyzed as whole-water samples and included suspended sediment. While the data indicate that during periods of high flow, the chronic AWQC for PCBs was exceeded, an acute AWQC value for comparison with high-flow conditions is not available. In terms of the metals, lead exceeded the chronic AWQC in one event and both chromium and lead exceeded acute and chronic AWQC in one event.

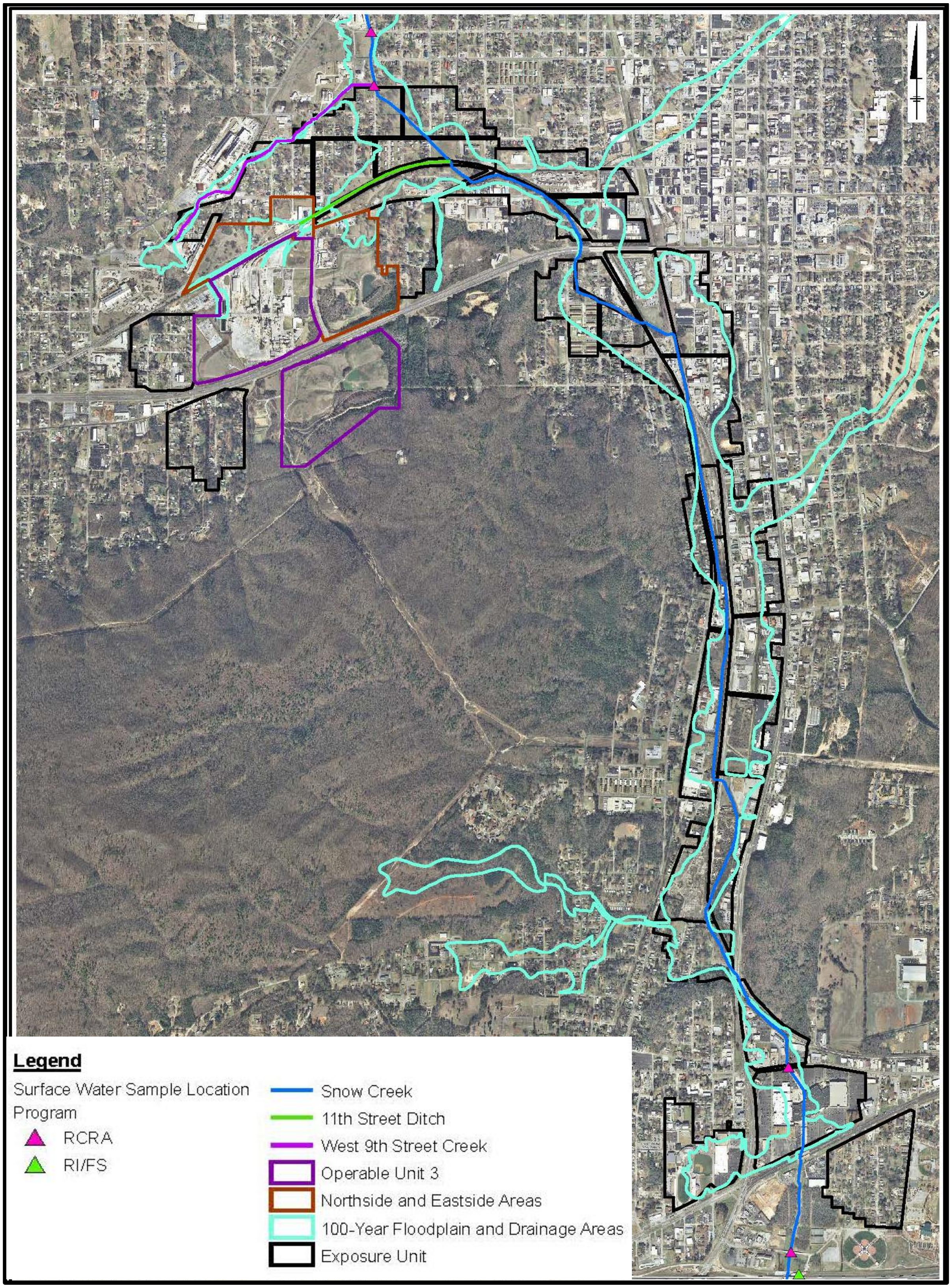


Figure 19. Snow Creek Surface Water Sampling Locations

The surface water data for Snow Creek indicate that during base-flow conditions the downstream PCB contributions from Snow Creek to OU4 are small and that TSS and PCB transport in Snow Creek are extremely responsive to high-flow events. The majority of annual sediment transport occurs infrequently and over short periods of time. Given the low concentration of solids generally present in the creek during the period of low flow, the surface water PCB concentrations are expected to be quite low.

Air

Ambient air data for the Site have been collected under separate sampling programs spanning a 14-year period. All of the results show low [nanograms per cubic meter (ng/m^3)] PCB concentrations in air above the screening level; the regional screening level is used by the EPA to help determine when collecting additional data is warranted. The sampling locations used in a few of the air studies discussed below are Shown in Figure 20. More information is available in the study reports that are part of administrative record.

Solutia collected ambient air samples in and around the Facility from February 19, 1998 to December 23, 1999. Over this period, 36 sampling events were conducted to assess PCB concentrations in ambient air with samples collected from four to eight locations near the perimeter of the Facility and one background location. The results of the air sampling determined that the PCB concentrations in air typically ranged of 0.1 to 50 ng/m^3. The highest value reported during sampling by Solutia was 80 ng/m^3 near Mars Hill Missionary Baptist Church on April 9, 1998.

The EPA collected ambient air samples for three days in and around the Facility from June 28 to July 1, 1999. The results of the air sampling determined that the PCB concentrations in air typically ranged of 2.4 to 78 ng/m^3. The highest value reported during sampling by the EPA was 78 ng/m^3 at the sampler located between the railroad tracks and 10th Street near Crawford Avenue.

Solutia collected 24-hour air samples two days per month at five locations on the facility property boundaries from January 2000 through January 2001. The results of the air sampling conducted by Solutia determined that the PCB concentrations in air ranged of non-detect to 116 ng/m^3. The highest value reported during sampling by Solutia was 116 ng/m^3 near The Northside Properties Interim Measure Area on June 28-29, 2000.

The EPA collected 24-hour samples for two days in June 2000 at eight locations (Solutia Inc. sampling occurred on the same two days in June). Six of the EPA sample stations were located approximately 0.25 to 0.5 miles away from the facility property borders; the remaining two sample stations were located approximately 1 mile away. Total PCB concentrations for the air samples collected by the EPA in 2000 ranged from not detected to 45 ng/m^3.

Solutia conducted the most comprehensive of all the PCB ambient air study in Anniston in 2003 and 2004. The study involved monthly monitoring of ambient PCBs and continuous collection of meteorological monitoring data over the course of a one-year period from April 2003 through March 2004. PCB concentrations in air ranging from non-detect to 145.4 ng/m^3, while the average total PCB concentration at each sampling location ranged from 2.9 ng/m^3 to 24.4 ng/m^3.

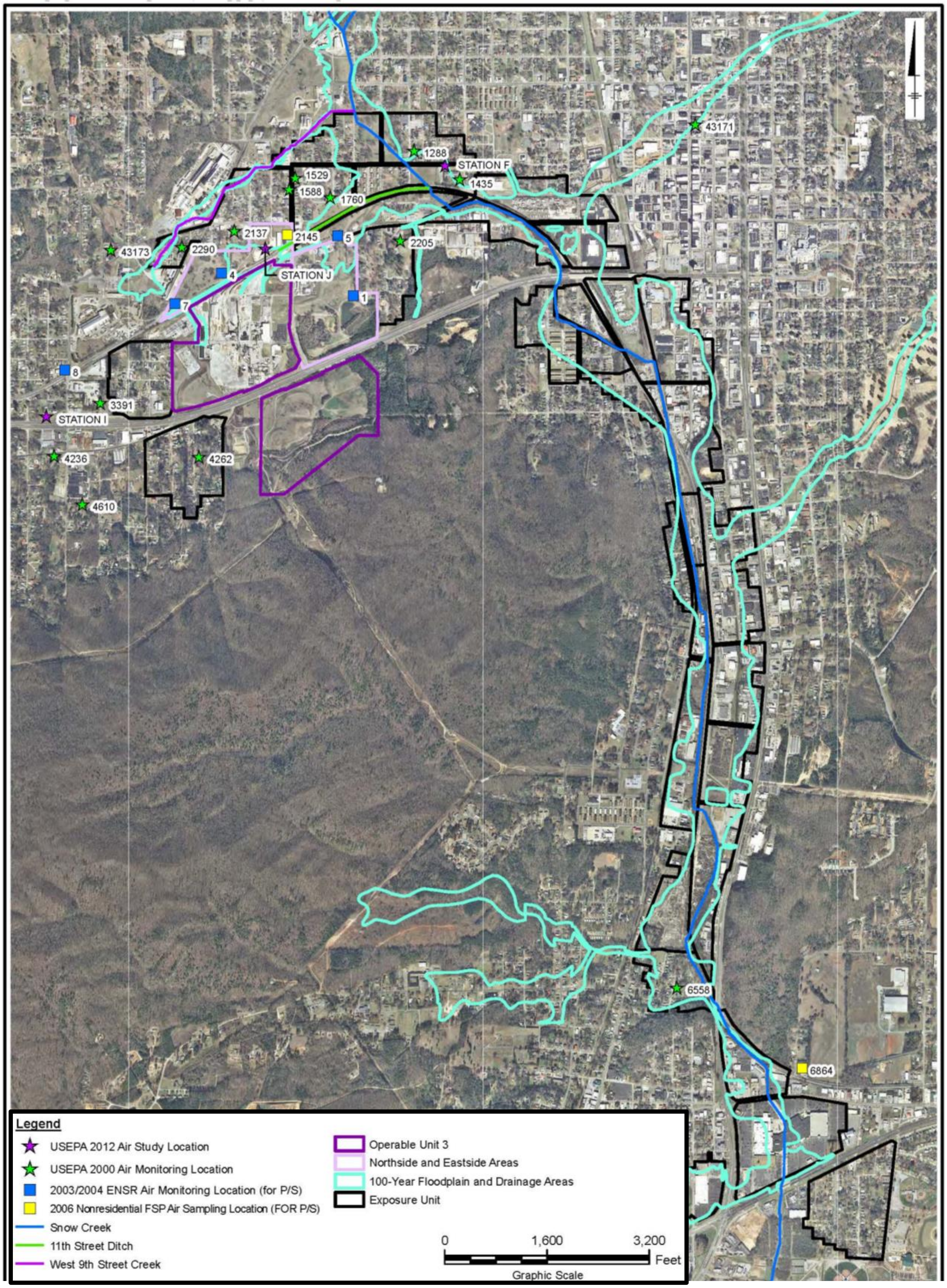


Figure 20. Air Study Sampling Locations

Additional air samples were collected by Solutia during the summer of 2006 as part of the OU1/OU2 RI. The two locations were selected and were located at the north end and the south end of the OU1/OU2 study area. A total of four air samples and one duplicate were collected at two locations (two samples per location). During the RI/FS air study, PCB concentrations in air ranging from 1.4 ng/m^3 to 14.5 ng/m^3. Air samples collected in 2006 were also analyzed for PCDD/DFs and 12 dioxin-like PCB congeners. The data was used to calculate total TEQs for each sample. Total TEQs ranged from 0.001 picograms per cubic meter (pg/m^3) to 0.028 pg/m^3.

At the Request of the community, the EPA conducted air sampling in residential areas in 2012 and 2013. The PCB air data collected by the EPA in 2012 are consistent with previously collected data for OU1/OU2, and the concentrations ranged from 1.7 ng/m^3 to 26 ng/m^3, with an average of 9 ng/m^3. The PCB air data collected by the EPA in 2013 are consistent with previously collected data for OU1/OU2, and the concentrations ranged from 1.3 ng/m^3 to 19 ng/m^3, with an average of 8.2 ng/m^3.

Air samples collected in OU1/OU2 are consistent with a report prepared by the Agency for Toxic Substances and Disease Registry (ATSDR) titled Health Consultation: Anniston PCB Air Sampling that concluded mean concentrations from the EPA air sampling stations located 0.25 to 1.0 miles from the Facility were generally below 10 ng/m^3. These data are consistent with the atmospheric concentrations reported by ATSDR for more densely populated areas in the US.

Depending on the alternatives selected and whether these will disturb soil with elevated PCB concentrations, leading to both volatile and particulate releases of PCBs to air, the need to collect air samples for the protection of Site workers or the local community needs to be considered during remedy implementation and monitoring.

Principal Threat Waste

CERCLA 121, the NCP and the EPA guidance specify requirements related to addressing principal threat wastes (PTW) through a CERCLA response action. A general rule of thumb is to consider PTW as source materials with toxicity and mobility characteristics that combine to pose a potential risk several orders of magnitude greater than the risk level that is acceptable for the current or reasonably anticipated future land use, given realistic exposure scenarios. Based upon those CERCLA and NCP requirements, the EPA guidance states that any PTW should be identified in the OU1/OU2 FS in order to develop and properly evaluate remedial alternatives to address such wastes. Additionally, PTW should be identified in order to select a remedy that satisfies CERCLA's preference to treat wastes to the maximum extent practicable (or publish an explanation why it is not practicable).[2] The identification in the FS of certain PCB wastes, located in residential areas at concentrations greater than 100 ppm and in non-residential areas at concentrations greater than 500 ppm, which constitute PTW, is necessary to select remedies consistent with the statutory and regulatory requirements of CERCLA.

[2] See CERCLA Section 121(d)(1), 40 C.F.R. Section 300.430(a)(1)(iii)(A), 40 C.F.R. Section 300.430 (f)(1)(2)(E), A Guide to Principal Threat and Low Level Threat Wastes (OSWER Directive No. 9380.3-06FS, November 1991), A Guidance on Remedial Actions at Superfund Sites with PCB Contamination (OSWER Directive No. 9355.4-01FS, August 1990).

As noted above, CERCLA 121(b)(1) contains a preference or expectation for selecting remedial actions that utilize treatment technologies and permanent solutions to the maximum extent practicable. If the selected remedy does not comply with this preference, the EPA must publish an explanation as to why a treatment remedy was not selected. The basis for this statutory provision is that EPA believes that treatment is the best way to address certain hazardous source materials given the technical limitations with the long-term reliability of containment technologies and the seriousness of the human health and environmental consequences of exposure should a release occur.[3] These PTWs are those source materials that contain highly toxic or highly mobile wastes and liquids for which treatment is preferred.[4]

No threshold of toxicity or risk has been established to equate to a "principle threat".[5] For PCB contamination or PCB waste at Superfund sites, principal threats will generally include material contaminated at concentrations exceeding 100 ppm for sites in residential areas and concentrations exceeding 500 ppm for sites in industrial areas.[6]

When PTWs are not practicable to treat or remove, reliable and effective long-term containment options can be considered in the FS. In demonstrating impracticability, EPA considers such factors as the media involved, the volume and concentration of contamination, the size and depth of the area impacted, whether containment is even possible, whether groundwater is or is likely to be impacted, the accessibility to the waste material, the on-site containment costs, the availability of effective ICs and engineering controls and the likely threat of exposure over time. Applying these considerations to the portions of OU1/OU2 that contain contamination > 500 ppm, the EPA believes it can effectively prevent exposure over the long-term through the proposed alternatives that involve both excavation and containment.

Groundwater protection directly downgradient of former high PCB concentration areas on the Eastside Properties IM needs to be verified during remedial design. However, the results of groundwater investigations at high PCB concentration areas at other IMs provide strong support for the assumption that groundwater is not affected. If groundwater impacts are found during design, excavation of PTW may be required.

Scope and Role of Operable Unit or Response Action

As with many Superfund sites, the problems encountered at the Anniston PCB Site are complex. As a result, the work has been organized into several OUs, which were identified based on geographic location and complexity. OU1 and OU2 generally consists of both residential and non-residential properties around the Facility and downstream, following Snow Creek to Highway 78. The EPA has already selected a Time-Critical Removal Action and an NTC

[3] A Guide to Principal Threat and Low Level Threat Wastes (OSWER Directive No. 9380.3-06FS, November 1991).
[4] Id., Page 2.
[5] Id., Page2.
[6] Guidance on Remedial Actions for Superfund Sites with PCB Contamination, U.S. EPA, August 1990, (EPA/540/G-90/007), at Page iv.

Removal Action to clean up residential properties. The removal decisions were documented in Removal Action Memoranda dated October 2001 and February 2004.

The Proposed Plan presents a Preferred Alternative to reduce current and future risks from contaminants in soil, sediments, surface water, groundwater, and air at OU1 and OU2. This is the second CERCLA remedial action proposed for the Anniston PCB Site. An Interim ROD was signed for OU3 in September 2011, and additional Proposed Plans and decision documents are expected to be issued to select a final remedy for OU3 and address risks at OU4 and impacted areas further downstream.

Summary of Site Risks

The assessment of risk prepared for this portion of the Site estimates what risks the chemicals found in OU1/OU2 pose to human health and the environment if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The Site risk assessment consists of a Human Health Risk Assessment (HHRA) and a Streamlined Ecological Risk Assessment (SERA).

The risk assessment was developed with data gathered in previous RCRA investigations and during the RI, and includes analyses of samples of soil, sediment, groundwater, surface water and air at OU1/OU2. Estimates of current risks are based on the absence of any site-specific remediation; estimates of future risk are based on the assumption that current soil and groundwater chemical concentrations will persist in the future, and groundwater will be utilized. More information and details of the risk assessments and their findings are provided in the RI and in the HHRA and SERA reports.

Human Health Risk Assessment

The HHRA was prepared by the EPA using the data provided by P/S. Though initially finalized in 2010, the HHRA was revised in 2012 to evaluate the impact of the dioxin reassessment, and again in 2014 to adjust exposure assumptions used in the OU1/OU2 HHRA so they were the same as the assumptions used in the OU4 HHRA. The results presented in this section reflect all of the changes made to the original HHRA.

The HHRA for OU1/OU2 evaluated and quantified potential risks to human health from exposure to chemical constituents in OU1/OU2. The Conceptual Site Model used for sampling and risk assessment is shown in Figure 21. The HHRA included the following steps:

- Evaluated potential ways people may come into contact with contaminants of potential concern (COPCs)
- Identified COPCs.
- Calculated exposure point concentrations (EPCs) for the COPCs in the various media.
- Identified toxicity criteria to quantify potential risks.
- Characterized potential cancer risks and non-cancer health hazards associated with possible current and future exposure to COPCs.

The process also identified uncertainties in the data evaluated and in the risk assessment process and culminated with the development of site-specific risk-based Preliminary Remedial Goals (PRGs).

The HHRA evaluated the potential health risks associated with exposure to the Site contaminants for residents and workers. The HHRA evaluated both cancer and noncancer risks related to identified COPCs for the Site. The benchmark risk levels used for comparison were the EPA's target cancer risk range of $1x10^{-6}$ (one in a million) to $1x10^{-4}$ (one in 10,000) and a noncancer hazard index (HI) of one.

The HHRA found that the most prevalent and widespread risks to human health for OU1/OU2 are associated with the presence of PCBs in surface soil. The HHRA also identified constituents other than PCBs as COPCs that exceed the screening risk thresholds (i.e., one in a million cancer risk or hazard index of one (1) in soil). Those constituents are arsenic, chromium, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated dibenzo-p-dioxin and dibenzofurans (PCDD/DFs).

The risk exceedances are limited to surface soil; COPCs in other Site media (subsurface soil, surface water, sediment, and air) result in low levels of risk. Risks associated with PCBs in groundwater were estimated as part of OU3 HHRA; PCBs in groundwater are also elevated in the T-11 portion of EU5 where PCB concentrations in groundwater exceeded the maximum contaminant level (MCL) value of 5 micrograms per liter (µg/L).

The HHRA found that risks associated with PCBs in soil were negligible to low in 25 of the 31 EUs. Of the six EUs that pose potential risks, the two EUs with some of the highest levels of risk are EU5 and EU19N. EU5 is located in the northern portion of OU1/OU2 near the confluence of the 11th Street Ditch and Snow Creek, and EU19N is located next to Snow Creek midway between the 11th Street Ditch-Snow Creek confluence and Highway 78. The cancer risk and noncancer effects are summarized in Tables 2 and 3.

Uncertainties are introduced in each step of the data collection and risk assessment processes. Because of these uncertainties and the nature of the risk assessment methodology and assumptions, the risk assessment provides a conservative (upper-end) measure of the potential risks and hazards from COPCs in the OU. The use of conservative assumptions throughout the risk assessment process is intended to result in overestimating rather than underestimating human health risk. Therefore, actual risk may be lower than estimated, but is unlikely to be greater.

Dioxins v. PCBs

Dioxins (i.e., PCDD/DFs and dioxin like PCBs (DL-PCB)) were sampled in a subset of soil. Samples collected for OU3 were used to provide information about total dioxins (PCDD/DF/DL-PCB) in industrial settings, and samples collected for OU1/OU2 were used to provide information about total dioxins (PCDD/DF/DL-PCB) in lower concentrations of PCBs, like what might be present in a residential setting. The human health risk assessments for these OUs were performed before the release of the February 17, 2012, oral non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the EPA's Integrated Risk Information System (IRIS). PCDD/DFs were not determined to be significant risk drivers in either risk assessment. As a result of the release of new toxicity information and the EPA's new guidance on addressing dioxins, it has been demonstrated that preliminary and final PCB remedial goals are protective of the risk expected from dioxin TEQs

OU1/OU2 has both industrial/commercial areas and residential areas. The highest PCB value evaluated for non-residential surface soil is 21 mg/kg. The PCB remedial goals for residential surface soil is 1 mg/kg. Two sets of data comparing PCBs and dioxins were used to predict if a cleanup based on PCB concentrations would be sufficient to protect for dioxin exposure.

A remedial design study was conducted at the Facility (OU3) to demonstrate that in industrial areas such as those found in OU2, PCB industrial cleanup levels were also protective of PCDD/DFs/DL-PCBs TEQs. The results of the study provided a relationship between total dioxin (i.e., PCDD/DF and DL-PCB TEQ) and total PCBs. The data predicts that the PCB remedial goals in OU3 (i.e., 25 mg/kg in surface soil and 40 mg/kg in subsurface soil) are expected to be protective for total dioxin less than 0.73 µg/kg, the concentration protective for industrial worker exposure (cancer and noncancer).

OU1/OU2, the PCDD/DF/DL-PCB TEQ concentrations range from 0.00036 to 0.793 µg/kg, excluding two outlying concentrations: one at 2.01 µg/kg in EU15 which is driven by DL-PCBs concentration, and the other 2.23 ng/kg in EU25 which is driven by PCDD/DF concentration. Both appear to be hot spots that are nor representative of the data as a whole.

The results from OU1/OU2 were used to verify that PCB concentrations remaining in residential soil after cleanup (i.e., PCBs less than 1 mg/kg) are protective of total dioxin concentrations. The results of the total dioxin calculations for samples collected in OU1/OU2 shows that a PCB remedial goals of 1 mg/kg for residential properties is expected to be protective for total dioxin less than 0.051 µg/kg, the concentration protective for a residential receptor (cancer and noncancer).

Ecological Risk Assessment

Ecological risk assessments for the OU1/OU2 portion of the Site were developed in two reports. Potential ecological risks for OU1/OU2 were initially evaluated in the Screening-Level Ecological Risk Assessment (SLERA). In the 2005 SLERA, it was determined that the terrestrial exposure pathways in OU1/OU2 are fragmented, habitat is disturbed (dominated by mowed and maintained lands with little habitat-quality plant cover, impervious surfaces, and transportation infrastructure), and development pressure is strong, which will likely lead to additional fragmented and disturbed ecological habitat over time. Due to the habitat constraints, the EPA decided that soil cleanup to protect human health would provide acceptable protection of terrestrial ecological receptors exposed to OU1/OU2 soil. One third of the OU1/OU2 area is residential, where PCBs have been cleaned up to a concentration of less than 1 mg/kg. Future cleanup of non-residential soil will also increase the protection of terrestrial ecological receptors. If after the Baseline Ecological Risk Assessment for OU4 is complete, it is determined that additional terrestrial cleanup should be conducted in certain areas to address ecological risk, an amendment to the decision document will be considered.

The OU1/OU2 portion of Snow Creek required a more quantitative evaluation because of the ecological receptors associated with the aquatic environment. The aquatic conceptual site model is provided in Figure 22. The results of SLERA supported PCBs as the primary risk driver for

OU1/OU2. In further evaluation conducted by the EPA, (which considered background concentrations, bioaccumulation and the EPA Region 4 sediment screening values), eight other constituents, in addition to PCBs, were identified as possibly indicating risk, and these constituents were carried forward for evaluation in the SERA. The COPCs evaluated in the SERA were PCBs, barium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, and PCDDs/PCDFs and DL-PCBs. The SERA for the OU1/OU2 portion of Snow Creek found that there are risks to benthic invertebrates, avian, and mammalian receptors from exposure to PCBs and some metals (barium, chromium, cobalt, lead, manganese, mercury, nickel, and vanadium) in sediment in localized areas. Tables 4 and 5 present the summary of risks.

Remedial Action Objectives

The Remedial Action Objectives (RAOs) provide the overall goals that an alternative is to achieve, and are used to guide the development of the remedial alternatives. RAOs were developed for four environmental media: soil, sediment, groundwater, and surface water as follows.

The EPA has identified the following RAOs for Site soil:

1. Reduce risks to residents from direct contact with, inhalation of, or incidental ingestion of PCBs in surface soil to levels that are protective of residential use.

2. Reduce risks to industrial and commercial workers, commercial visitors, trespassers, school children, and recreational users associated with direct contact with, inhalation of, or incidental ingestion of COCs in surface soil to levels that are protective of industrial use.

3. Reduce risks to construction and utility workers from direct contact with, inhalation of, or incidental ingestion of COCs in surface and subsurface soil to levels that are protective.

4. Prevent migration of COCs from surface soil to surface water and sediment to levels that are protective.

5. Prevent migration and leaching of PCBs in surface and subsurface soil to groundwater above levels that are protective of beneficial use (i.e., drinking water standards).

The following are the RAOs for Snow Creek sediments:

6. Reduce risks to ecological receptors from exposures to sediments in Snow Creek to levels that are protective of receptors.

7. Prevent migration of PCBs from creek bank soil to levels that are protective of Snow Creek and OU4.

The following is the RAO for surface water:

8. Reduce COC concentrations in surface water to meet AWQC.

The following are the RAOs for groundwater:

9. Prevent exposure to groundwater from direct contact with, inhalation of, or ingestion of PCBs in groundwater above acceptable levels that are protective of beneficial use (i.e., attain drinking water standards).

10. Restore PCBs in contaminated groundwater to levels that are protective of beneficial use (i.e., attain drinking water standards).

Preliminary Remedial Goals

In general, preliminary remedial goals (PRGs) are used to develop the long-term contaminant concentrations needed to be achieved to meet the RAOs by the remedial alternatives. These goals must comply with Applicable or Relevant and Appropriate Requirements (ARARs) (or the basis for a waiver must be provided) and result in residual risk levels that fully satisfy the CERCLA requirement for the protection of human health and the environment. PRGs are based on ARARs, risk-based concentrations if standards are not available or not sufficiently protective, or background concentrations. Site-specific PRGs were developed for each RAO for the following media: soil, sediment, groundwater, and surface water. The PRGs are summarized in Table 6, at the end of this section. A summary of the risk based goals developed in the HHRA and SERA are provided in Table 7 and 8 at the end of the Proposed Plan. Final cleanup levels will be documented in the ROD.

PRGs for Soil

The range of PRGs for the Site-specific COCs in surface and subsurface soil are based on the HHRA. PRGs for residential soil were established in the EECA and are required to satisfy RAOs 1, 4, and 5 above. The removal action level (RAL) for PCBs in residential soil was established at 1.0 mg/kg in surface soil and 10.0 mg/kg in subsurface soil. These concentrations have been achieved for most residential properties at the Site through the NTCRA. The long-term protectiveness of those values was confirmed in the OU1/OU2 HHRA. However, any soil with PCB concentrations greater than 1 mg/kg that remain on the property are considered PCB remediation waste and P/S still has TSCA obligations, largely related to future soil disturbance activities that could create an unacceptable risk by bringing to the surface subsurface soil with PCB concentrations greater than 1.0 mg/kg. The alternatives considered for residential exposures need to address the few properties that have not been cleaned up and the residual PCBs greater than 1 mg/kg in subsurface soil and potentially beneath structures on residential properties.

PRGs for non-residential soil are established to satisfy RAOs 2, 3, 4, and 5 above. Non-residential exposures include industrial and commercial workers, commercial visitors, trespassers, school and daycare workers and children, and recreational area users. COCs include PCBs, arsenic, chromium, PAHs and DCDD/DFs.

School/daycare workers and children, and recreational exposures are of primary concern on Special Use Properties. The PRG for PCBs in soil in the high activity areas of Special Use Properties was established at 1.0 mg/kg in surface soil and 10.0 mg/kg in subsurface soil (i.e., the same as the residential PRGs) in the Stipulation to the CD, because it was determined that children may experience the same exposures in these areas as on residential properties. The high activity areas have already been cleaned up. However, as noted above, any soil with PCB concentrations greater than 1 ppm that remain in the high activity areas are considered PCB remediation waste and P/S would still have TSCA obligations for those remaining soil.

The PRG for low activity areas of Special Use Properties has not been addressed. A non-residential PRG is appropriate for the low activity portions of Special Use Properties provided adequate controls can be established to prevent the low activity areas from being converted to high activity areas. If controls cannot be established to prevent certain uses in low activity areas, the most stringent non-residential exposure scenario should be assumed for the low activity areas (i.e. PCB PRGs of 1.0 mg/kg in surface soil and 10.0 mg/kg in subsurface soil). However, as noted above, any soil with PCB concentrations greater than 1 ppm that remain on the property are considered PCB remediation waste and P/S would still have TSCA obligations for those remaining soil. The alternatives considered for Special Use Properties will address this range of options and the residual PCBs on the properties.

The PRG for PCBs on properties where interim measures have been implemented, dredge spoil piles exist adjacent to Snow Creek, UWDAs are present, and all other non-residential areas should be sufficient to protect industrial and commercial workers, commercial visitors, and trespassers. The PCB PRGs that are protective of commercial/industrial workers exposed to and that are within the carcinogenic risk range and have noncancer HIs less than or equal to 1 range from 2 mg/kg to 29 mg/kg. Within this range, commercial visitors are adequately protected at PCB concentrations from 9 mg/kg to 29 mg/kg, and trespassers are adequately protected at PCB concentrations from 8 mg/kg to 29 mg/kg. Given these ranges for expected exposures, two non-residential RGs were evaluated for non-residential surface soil cleanup: 21 mg/kg, which represents the $1x10^{-5}$ carcinogenic risk to commercial/industrial workers and a $2x10^{-6}$ carcinogenic risk to commercial visitors and trespassers; and 9 mg/kg which represents the $4.5x10^{-6}$ carcinogenic risk to commercial/industrial workers and an approximately $1x10^{-6}$ carcinogenic risk to commercial visitors and trespassers.

Construction workers and utility workers are exposed to surface and subsurface soil. The PRG for subsurface soil is typically tied to the acceptable construction worker exposure, which is the more critical of the two exposure scenarios. The PCB PRGs that are protective of construction workers that are within the carcinogenic risk range and have noncancer HIs less than or equal to 1 range from 56 mg/kg to 97 mg/kg. One subsurface PCB PRG was evaluated for construction and utility worker exposure: 97 mg/kg, which represents an HI of 1 and the $2x10^{-6}$ carcinogenic risk to construction workers and an HI of 0.1 and $2x10^{-7}$ carcinogenic risk to utility workers. Again, any soil with PCB concentrations greater than 1 ppm that remain on non-residential properties are considered PCB remediation waste and there are still TSCA obligations associated with those remaining soil. The alternatives considered for interim measures, dredge spoil piles, UWDAs, and other non-residential soil will address a range of options and the residual PCBs.

In addition to PCBs, COCs in soil include arsenic, chromium, PAHs, and PCDD/DF/DL-PCBs. There is substantial data to link these contaminants to multiple industrial operations in the area, even some still operating in the floodplain. Appendix G in the FS includes an exhaustive review of data compared to background concentrations and geographic distribution. The end result is a determination that the Facility is not likely the only or even primary contributor to the concentrations detected in OU1/OU2. Remediation of the OU1/OU2 area to the lowest (i.e., $1x10^{-6}$ carcinogenic risk) concentrations is not sustainable. For that reason, the highest acceptable cleanup concentration (i.e., $1x10^{-4}$ carcinogenic risk or an HI of 1) was used to identify hot spots for remediation of these non-PCB contaminants. Additional investigations may be needed during remedial design to ensure that these concentrations are protective of groundwater.

The OU1/OU2 mean arsenic concentrations are the same as the local background mean at Fort McClellan. The OU1/OU2 maximum arsenic concentration (120 mg/kg near railroad and the 11th Street ditch) is higher than the Fort McClellan maximum suggesting anthropogenic source(s) of arsenic inside or outside of OU1/OU2. The range of PRGs for Arsenic that are protective of all exposures except young children in a school/daycare or recreational setting are within the carcinogenic risk range and have noncancer HIs less than or equal to 1 range from 4 mg/kg to 382 mg/kg. Since the high concentrations are associated with industrial areas and not schools and recreation areas, the PRG for arsenic was set at 382 mg/kg, and no areas of exceedance have been identified.

The OU1/OU2 mean chromium concentrations are much higher than the local background mean at Fort McClellan. The OU1/OU2 average chromium concentration is driven by two elevated points of 14,000 mg/kg in EU22 and 850 mg/kg in EU24. If these two high points are removed, the average would be 39 mg/kg and the maximum would be 550 mg/kg, which is higher than Fort McClellan, but consistent with OU1/OU2 background. The range of PRGs for chromium that are protective of all exposures except young children in a school/daycare setting are within the carcinogenic risk range and have noncancer HIs less than or equal to 1 range from 6 mg/kg to 568 mg/kg. Since the high concentrations are associated with industrial areas and not schools and daycares, the PRG for chromium was set at 568 mg/kg, and two areas of exceedance not associated with PCBs have been identified.

PAH concentrations in soil appear to be attributable to urban background. OU1/OU2 maximum concentrations are higher than OU3 maximum concentrations. PAHs are likely present from multiple urban and industrial uses in the area. The range of PRGs for PAHs that are protective of for all exposures except young children in a school or daycare setting are within the carcinogenic risk range and have noncancer HIs less than or equal to 1 range from 0.2 mg/kg to 21 mg/kg. Since the high concentrations in OU1/OU2 are associated with industrial areas and not schools and recreation areas, the PRG for PAHs was set at 21 mg/kg, and one area of exceedance not associated with PCBs has been identified.

The distribution of concentrations of PCDD/DFs is random with no evident pattern to the sporadic higher concentrations in the Snow Creek floodplain. The highest PCDD/DF TEQ is 2.2 µg/kg [i.e., 2,200 nanograms per kilogram (ng/kg) in EU25]. When combined with dioxin-like PCBs, only two locations (2,200 ng/kg in EU25 and 2000 ng/kg in EU10) do not fit the data demonstrating that PCB cleanup goals are protective of PCDD/DF/DL-PCB concentrations. The sample in EU25 is not associated with significant PCBs and the sample in EU10 is not associated with significant PCDD/DFs. RGs for PCDD/DF/DL-PCB was set at 0.73 µg/kg to address these data outliers, ensuring that the OU1/OU2 area as protected as possible.

For subsurface soil, arsenic concentrations less than 596 mg/kg are protective, chromium concentrations less than 6,936 mg/kg are protective, PAHs (as BaPE) concentrations less than 534 mg/kg and PCDD/PCDFs (TEQ) less than 0.73 µg/kg are protective. Confirmation samples will be needed to demonstrate whether subsurface soil need to be remediated.

Groundwater

The PRG for PCBs in groundwater, the only contaminant investigated in groundwater outside of OU3, is established by a chemical specific ARAR which establishes that the MCL of 0.5 µg/L is a relevant and appropriate requirement. Chemical-, Action-, and Location-specific ARARs are presented in more detail later in this Proposed Plan. The PRG in groundwater is required to satisfy RAOs 9 and 10 above.

Sediment

A range of PRGs for sediment were established by the SERA for ecological receptors for OU1/OU2. Receptors evaluated included benthic invertebrates, mallards, tree swallows, spotted sandpipers, pied-billed grebe, muskrat, little brown bats, and raccoons. COC concentrations levels that induce no-effects and low-effects are presented in the SERA.

The PRGs for total PCBs in sediment range from 0.1 mg/kg to 5 mg/kg for receptors that spend 100% of their time in Snow Creek. Two total PCB PRGs in sediment were evaluated for the protection of ecological receptors: 3 mg/kg which represents the LOAEL for benthic invertebrates; and 1 mg/kg, which represents the NOAEL for benthic invertebrates. Both goals are protective of mallards, pied-billed grebe, muskrat, and raccoons. The 1 mg/kg goal is more protective of tree swallows, spotted sandpipers, and little brown bats that spend 50% of their time in Snow Creek.

The PRGs for barium in sediment range from 160 mg/kg to 4,249 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for barium in sediment was set at 322 mg/kg, which represents the lowest LOAEL for the receptors in OU1/OU2 (i.e., the mallard) and is expected to be protective for three of eight receptors at a NOAEL and all receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for barium in Snow Creek is 255 mg/kg.

The PRGs for chromium range from 20mg/kg to 269 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for chromium in sediment is 111 mg/kg, which represents the LOAEL for benthic invertebrates in Snow Creek and is expected to be protective for 3 of 8 receptors at a NOAEL and four of seven receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for chromium in Snow Creek is 364 mg/kg.

The PRGs for cobalt in sediment range from 50 to 504 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for cobalt in sediment is 59 mg/kg, which represents lowest LOAEL for the receptors in OU1/OU2 (i.e., the spotted sandpiper) and is expected to be protective for six of eight receptors at a NOAEL and all receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for cobalt in Snow Creek is 33.2 mg/kg.

The PRGs for lead in sediment range from 22 to 1,000 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for lead in sediment is 128 mg/kg, which represents LOAEL for benthic invertebrates in Snow Creek and is expected to be protective for four of eight receptors at a NOAEL and five of seven receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for lead in Snow Creek is 126 mg/kg.

The PRGs for manganese in sediment range from 169 to 9,063 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for manganese in sediment is 1,100 mg/kg, which represents mean upgradient concentration for manganese. It is higher than both the minimum LOAEL (214 mg/kg) and two times the mean of sediment background concentration at Fort McClellan (713 mg/kg). The 95% UCL for manganese in Snow Creek is 2,643 mg/kg.

The PRGs for mercury in sediment range from 0.2 to 13 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for mercury in sediment is 1 mg/kg, which represents the LOAEL for benthic invertebrates in Snow Creek and is expected to be protective for three of eight receptors at a NOAEL and five of seven receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for mercury in Snow Creek is 2 mg/kg.

The PRGs for nickel in sediment range from 10.9 to 295 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for nickel in sediment is 49 mg/kg, which represents the LOAEL for benthic invertebrates in Snow Creek and is expected to be protective for four of eight receptors at a NOAEL and six of seven receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for nickel in Snow Creek is 50 mg/kg.

The PRGs for vanadium in sediment range from 6 mg/kg to 988 mg/kg for receptors that spend 100% of their time in Snow Creek. The goal for vanadium in sediment is 41 mg/kg, which represents two times the mean of sediment background concentration at Fort McClellan (41 mg/kg). This values are also similar to the minimum value in NOAA SQuiRT Screening Table (50 mg/kg) and the upgradient mean (31 mg/kg). The goal for vanadium is expected to be protective for three of seven receptors at a NOAEL and four of seven receptors at a NOAEL that spend 50% of their time outside of Snow Creek. The 95% UCL for vanadium in Snow Creek is 40 mg/kg.

The PRGs in sediment are required to satisfy RAO 6 and 7 above.

Surface Water

The PRGs for contaminants in surface water are established by chemical specific ARARs. Chemical-, Action-, and Location-specific ARARs are presented in more detail in Section 9 of this Proposed Plan. Nationally recommended water quality criteria for aquatic life are ARARs for the highest concentration of specific pollutants or parameters in water that are not expected to pose a significant risk to the majority of species in a given environment. Surface water exceeded total PCB (by total homologues), lead, and chromium ambient water quality criteria in samples collected during the RI. The Chronic AWQC for total PCBs is 0.014 µg/L. The Chronic AWQC for lead is 2.5 µg/L. The Chronic AWQC for chromium is 11 µg/L (chromium VI) and 74 µg/L (chromium III).

The PRGs in surface water are required to satisfy RAO 8 above.

Table 6. Summary of Preliminary Remedial Goals OU1/OU2 Media

MEDIA	CONTAINANT	PRELIMINARY REMEDIAL GOAL	BASIS
Soil - residential			
surface	PCBs	1 mg/kg	HHRA
subsurface	PCBs	10 mg/kg	PCB Guidance
Soil - nonresidential			
surface	PCBs	21 mg/kg or 9 mg/kg	HHRA
	Arsenic	382 mg/kg	HHRA
	Chromium VI	568 mg/kg	HHRA
	PAHs	21 mg/kg	HHRA
	Dioxins TEQ	730 ng/kg	RSL
Subsurface[1]	PCBs	97 mg/kg	HHRA
	Arsenic	596 mg/kg	HHRA
	Chromium VI	6936 mg/kg	HHRA
	PAHs	534 mg/kg	HHRA
	Dioxins TEQ	730 ng/kg	RSL
Sediment	PCBs	3 mg/kg or 1 mg/kg	SERA
	Barium	322 mg/kg	SERA
	Chromium VI	111 mg/kg	SERA
	Cobalt	59 mg/kg	SERA
	lead	128 mg/kg	SERA
	manganese	1,100 mg/kg	SERA
	mercury	1 mg/kg	SERA
	nickel	46 mg/kg	SERA
	vanadium	41 mg/kg	SERA
Groundwater	PCBs	0.5 µg/L	ARAR
Surface Water	PCBs	0.014 µg/L	ARAR
	Chromium VI	11 µg/L	ARAR
	Chromium III	74 µg/L	ARAR
	Lead	2.5 µg/L	ARAR

Description of Alternatives

General response actions and remedial technologies for reducing unacceptable risks to contamination in soil, sediment, and groundwater at OU1/OU2 were developed and screened. The potential technologies were first screened based on technical implementability only. Surviving technologies were then screened based on effectiveness, implementability, and cost. The technologies that were not feasible or had limitations that might prevent achievement of RAOs were eliminated in the screening process, with the remaining technologies considered to be better suited for further consideration in developing remedial alternatives.

The retained technologies are used to develop eight categories of alternatives needed to address a wide range of different issues in the OU1/OU2 study area. Six of the categories address human exposure to contamination in surface and subsurface soil at residential properties, Special Use Properties, within and around previously implemented interim measure, in dredge spoil piles, in UWDAs, and in other non-residential areas (i.e., commercial/industrial properties, etc.). A seventh category addresses human exposure and leaching to groundwater and surface water from surface and subsurface soil near T-11, as well as restoration of groundwater contamination in the area. An eighth category addresses alternatives for ecological exposure to sediments and surface water in Snow Creek and the stability of creek bank soil to reduce ongoing contamination. These eight categories of alternatives represent the range of remedial activities considered appropriate for OU1/OU2. As required by CERCLA, no further action alternatives were evaluated in each category, to serve as a basis for comparison with the other active cleanup methods. The following sections present a summary of the remedial alternatives evaluated.

Remedial Alternatives for Residential Soil

The remedial alternatives developed for soil on residential properties are inclusive of the removal actions already completed under the Removal Order, the NTC Removal Action Agreement, and the Stipulation to the CD. All residential removal properties that have been cleaned up meet the requirements of the selected remedy in the NTC Removal Action, which was based on an evaluation of alternatives in an EECA. The selected remedy implemented in the NTC Removal Action included:

- Excavation of surface soil with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10.0 mg/kg.
- Cleaning interior surfaces of homes with PCB dust concentrations above 1.0 mg/kg.
- Excavation or installation of barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.
- Disposal of soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Disposal of soil with PCB concentrations more than 10.0 mg/kg, at an appropriate offsite solid waste landfill.
- Backfilling excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetation of the property as close to original conditions as possible.

Residential cleanup alternatives are needed to manage residual PCBs that may remain on residential properties. Residual PCBs may be present: in surface soil on 64 properties where access to cleanup has not been granted and/or overgrown vegetation currently prevents human exposure; in subsurface soil on 104 properties at concentrations greater than 1 mg/kg and less than 10 mg/kg; and beneath existing structures (e.g., homes, garages, paved areas, etc.) on 433 properties. Although wooded/overgrown residential lots were not prioritized for cleanup as part of the NTC Removal Action because no current exposure was occurring, the PRPs should clear the properties as needed to remediate PCBs in soil, if access is provided.

Key ARARs for the Residential Soil alternatives include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

The Residential Soil (RS) remedial alternatives developed for detailed analysis are summarized below and in Table 9:

- Alternative RS-1 – No Further Action
- Alternative RS-2 – Complete Non-Time-Critical Removal and Manage PCB Residuals Soil and Under Structures
- Alternative RS-3 – Excavate PCBs ≥ 1 mg/kg at all depths and Manage PCB Residuals

ALTERNATIVE RS-1
No Further Action
Estimated Capital Cost: $0
Estimated Annual Operation &Maintenance (O&M) Cost: $0
Estimated Present Worth Cost: $0

No additional remedial actions would be undertaken as part of this alternative to contain, remove, or monitor impacted soil. Although most residential properties have been remediated to a currently protective level, the health of current residents of properties where access was denied and future residents where overgrown vegetation and structures are removed may be at risk. There would be no safeguards to ensure cover soil over subsurface soil PCBs remain in place. The No Action alternative is intended to serve as a baseline for comparison with the other alternatives.

ALTERNATIVE RS-2
Complete Non-Time-Critical Removal and Manage PCB Residuals Soil and Under Structures
Estimated Capital Cost: $3,726,000
Estimated Annual O&M Cost: $113,000
Estimated Present Worth Cost: $7,342,000

Alternative RS-2 requires completion of the removal of PCB contaminated soil from the residential properties that have not already been addressed under the NTC Removal Action, provided access is granted and/or wooded areas with overgrown vegetation have been cleared. Surface soil with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10 mg/kg would be excavated and backfilled with clean soil. Soil generated during the additional residential removal activities would be disposed of onsite in the designated Facility soil management area known as the South Staging and Soil Management Area (SSSMA) provided that the PCB concentrations from the five-point composite samples collected for the property are less than 10 mg/kg. Otherwise, the excavated soil would be disposed of at an approved TSCA offsite disposal facilities.

A soil management program would be implemented as part of this remedial alternative. The management plan would track residential properties with residual PCB concentrations (between 1 mg/kg and 10 mg/kg) that remain in subsurface soil underlying areas that were previously remediated, and possibly structures (i.e., buildings, sheds, or paved areas that limits exposure) near remediated areas. Soil management activities would include interactive outreach with local landowners or local municipalities regarding any plans to remove the current access constraints such as granting permission to access the property, clearing of heavily vegetated land or demolition of buildings/structures, etc. There are currently no institutional controls (ICs) that can be identified to aid the soil management plan to protection the remedy and prevent future exposures. Deed notices to inform prospective purchasers of potential residual contamination on properties would be voluntary. The EPA and the community are working with local officials to develop more formal institutional controls can be enforced to prevent future exposures.

The following components are part of alternative RS-2:

- Follow an approved soil management plan which requires:
  - periodic attempts to gain access to properties identified with PCBs in surface and/or subsurface soil;
  - PCB cleanup of soil on properties where wooded areas have been cleared and soil are now accessible; and
  - PCB sampling and cleanup, if needed, of soil below demolished structures (i.e., building, shed, or paved area that limits exposure) on properties where previous cleanups have occurred.
- Excavate surface soil with PCB concentrations greater than or equal to 1.0 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10.0 mg/kg.
- Clean interior surfaces of homes with dust concentrations above 1.0 mg/kg.
- Excavate or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.

- Dispose of soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Dispose of soil with PCB concentrations greater than 10.0 mg/kg PCBs at an approved TSCA offsite disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate the property as close to original conditions as possible.

ALTERNATIVE RS-3
Excavate PCBs ≥ 1 mg/kg at all depths and Manage PCB Residuals
Estimated Capital Cost: $9,918,000
Estimated Annual O&M Cost: $54,000
Estimated Present Worth Cost: $15,715,000

Alternative RS-3 is the same as Alternative RS-2 except that subsurface soil with PCB concentrations greater than or equal to 1 mg/kg will also be removed. This alternative will include returning to those previously remediated residential properties where subsurface soil PCB concentrations are between 1 mg/kg and 10 mg/kg and removing this material. Removal of these soil would reduce the opportunity of future recontamination of residential yards if the soil management plan fails. Soil management would be reduced to only tracking demolition of structures on previously remediated properties.

Soil on the residential properties that have not already been addressed under the NTC Removal Action will be remediated after access is granted and/or wooded areas with overgrown vegetation have been cleared. Surface soil with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 1 mg/kg would be excavated and backfilled with clean soil. Soil generated during the additional residential removal activities would be disposed of onsite in the SSSMA provided that the PCB concentrations from the five-point composite samples collected for the property are less than 10 mg/kg. Otherwise, the excavated soil would be disposed of at an approved TSCA offsite disposal facility.

A soil management program would be implemented as part of this remedial alternative. The management plan would track properties with residual PCBs that may remain under structures (i.e., buildings, sheds, or paved areas that limits exposure) near remediated areas. Soil management activities would include interactive outreach with local landowners or local municipalities regarding any plans to clear heavily vegetated land and/or demolish buildings/structures, etc. There are currently no ICs that can be identified to aid the soil management plan in protection of the remedy and preventing exposure in the future. Deed notices to inform prospective purchasers of potential residual contamination on properties would be voluntary. The EPA and the community are working with local officials to develop more formal institutional controls can be enforced to prevent future exposures.

The following components are part of alternative RS-3:

- Follow an approved soil management plan which requires:

    - periodic attempts to gain access to properties identified with PCBs in surface and/or subsurface soil;
    - PCB cleanup on properties where wooded areas have been cleared and are now accessible; and
    - PCB sampling and cleanup, if needed, of soil below demolished structures (i.e., building, shed, or paved area that limits exposure) on properties where previous cleanups have occurred.
- Excavate surface soil with PCB concentrations greater than or equal to 1.0 mg/kg and subsurface soil with PCB concentrations greater than or equal to 1.0 mg/kg.
- Clean interior surfaces of homes with dust concentrations above 1.0 mg/kg.
- Excavate or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.
- Dispose of soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Dispose of soil with PCB concentrations greater than 10.0 mg/kg PCBs, at an approved TSCA offsite disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate the property as close to original conditions as possible.

Remedial Alternatives for Special Use Property Soil

In accordance with the Stipulation to the PCD, Special Use Properties (i.e., schools, churches, day-care centers, community centers, playgrounds, and parks) were partially cleaned up by the NTC Removal Action using the same surface and subsurface removal action criteria for soil as required for residential properties. The playground area of a public park, the outdoor play or recess areas of a school, community center, or day-care center, and similar areas of any church property, generally comprised of areas less than one quarter acre in size, were designated as high activity areas subject to a residential cleanup. Surface soil with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10 mg/kg were excavated and backfilled with clean soil. Three of the high activity areas remediated contain residual PCB concentrations (between 1 mg/kg and 10 mg/kg) in subsurface soil. Fourteen properties contain structures (i.e., buildings, sheds, or paved areas) that may be preventing exposure to PCBs in soil.

Other areas of the same types of property, such as athletic fields and large open fields larger than one quarter acre in size, paved areas, and other portions of these properties where people, primarily children, are likely to spend less time, were designated as low activity areas and were not subject to a residential cleanup. The low activity portion of 19 Special Use Properties have PCB concentrations in surface soil that range from non-detect to 45.2 mg/kg (a sampled collected in a wooded area at a depth of 6-12 inch below ground surface) and have not been remediated.

Remedial alternatives were developed to represent a range of options to address PCBs in soil in low activity areas, residual PCB concentrations (between 1 mg/kg and 10 mg/kg) that remain in subsurface soil underlying areas that were previously remediated, and possibly residual PCBs in soil beneath structures (i.e., buildings, sheds, or paved areas) near remediated areas.

Key ARARs for the Special Use Property alternatives:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

The Special Use Property Soil (SU) remedial alternatives developed for detailed analysis are summarized below and in Table 10:

- Alternative SU-1 – No Action
- Alternative SU-2 – Excavate Low Activity Areas to Non-Residential Goal and Manage PCB Residuals
- Alternative SU-3 – Excavate Low Activity Areas to Residential Goal and Manage PCB Residuals
- Alternative SU-4 – Excavate PCBs ≥ 1 mg/kg in High and Low Activity Areas and Manage PCB Residuals

ALTERNATIVE SU-1
No Further Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

Under this alternative, no additional remedial actions would be undertaken as part of this alternative to contain, remove, or monitor impacted soil. Although the high activity areas on Special Use Properties have been remediated to a currently protective level, the health of current visitors and workers at low activity areas on Special Use Properties may be at risk. There would be no safeguards to ensure that low activity areas do not become high activity areas, that cover soil over subsurface PCBs remains in place or that soil beneath structures is protective after demolition. The No Action alternative is intended to serve as a baseline for comparison with the other alternatives.

ALTERNATIVE SU-2
Excavate Low Activity Areas to Non-Residential Goal and Manage PCB Residuals
Estimated Capital Cost: $181,000
Estimated Annual O&M Cost: $22,000
Estimated Present Worth Cost: $517,000

Alternative SU-2 is focused on PCBs in soil in low activity areas and soil management of residual PCBs in subsurface soil or beneath structures. This alternative assumes that low activity soil is the same as all other non-residential soil and is sufficiently protective if cleaned up to the

PCB RG of 21 mg/kg, representing a $1x10^{-5}$ carcinogenic risk to industrial/commercial workers. This value is protective of all other exposures at $1x10^{-5}$ carcinogenic risk level, except young children in a school or daycare setting. PCB concentrations in low activity areas currently range from non-detect to 21.4 mg/kg, except for one concentration at 45.2 mg/kg at 6 to 12 inches bls in a heavily wooded area. At the 21 mg/kg cleanup level, no additional work in low-activity areas is required to make soil on Special Use Properties protective unless the wooded area is cleared.

The soil management plan would be designed to ensure that: low activity areas with PCB concentrations ≥ 1 mg/kg do not become high activity areas without further cleanup; subsurface soil with PCB concentrations ≥ 1 mg/kg remain in the subsurface or are appropriately managed; and soil below structures near PCB impacted areas are sampled and cleaned up, as needed, following demolition. Any soil generated during soil management activities would be disposed of in the SSSMA provided that the PCB concentration from the five-point composite samples collected for the property are less than 10 mg/kg. Otherwise, the excavated soil would be disposed of at approved offsite disposal facilities.

Deed notices to inform prospective purchasers of potential residual contamination on properties would be voluntary. The EPA and the community are working with local officials to develop more formal institutional controls can be enforced to prevent future exposures.

The following components are part of alternative SU-2:

- Follow an approved soil management plan which requires:
  - Monitoring low-activity areas with PCB concentrations ≥ 1 mg/kg to ensure they do not become high activity areas without further cleanup;
  - Monitoring to ensure subsurface soil with PCB concentrations ≥ 1 mg/kg remain in the subsurface or are appropriately managed; and
  - Monitoring to ensure soil below structures near PCB impacted areas are sampled and cleaned up, as needed, following demolition.
- Excavate surface soil in High-Activity areas with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10 mg/kg.
- Excavate surface soil in Low-Activity areas with PCB concentrations greater than or equal to 21 mg/kg and subsurface soil with PCB concentrations greater than or equal to 97 mg/kg.
- Clean interior surfaces of occupied structures with dust concentrations above 1.0 mg/kg.
- Excavate or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.
- Dispose of excavated soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Dispose of soil with PCB concentrations more than 10.0 mg/kg PCBs, at an approved TSCA offsite disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate the property as close to original conditions as possible.

ALTERNATIVE SU-3
Excavate Low Activity Areas to Residential Goal and Manage PCB Residuals
Estimated Capital Cost: $1,890,000
Estimated Annual O&M Cost: $25,000
Estimated Present Worth Cost: $3,128,000

Like Alternative SU-2, Alternative SU-3 is focused on PCBs in soil in low activity areas and soil management of residual PCBs in subsurface soil or beneath structures. This alternative assumes that the low activity soil is not the same as all other non-residential soil and should be provide more protection to young children. Additionally, this alternative assumes that the soil management plan will not effectively prevent Special Use Properties from using low-activity areas as high activity areas in the future. For those reasons, this alternative requires that the PCB RG of 1 mg/kg, representing a $1x10^{-6}$ carcinogenic risk to young children in a school/daycare setting be used for low-activity areas. This essentially means that the low activity areas would be cleaned up the same as the high activity areas, eliminating the need to track changes in use on the property. This value is protective of all other exposures. PCB-impacted soil in low-activity areas of 19 Special Use Properties would require remediation under this alternative.

The soil management plan would be designed to ensure that: subsurface soil with PCB concentrations ≥ 1 mg/kg remain in the subsurface or are appropriately managed; and soil below structures near PCB impacted areas are sampled and cleaned up, as needed, following demolition. Any soil generated during remediation and soil management activities would be disposed of in the SSSMA provided that the PCB concentration from the five-point composite samples collected for the property are less than 10 mg/kg. Otherwise, the excavated soil would be disposed of at approved offsite disposal facilities.

Deed notices to inform prospective purchasers of potential residual contamination on properties would be voluntary. The EPA and the community are working with local officials to develop more formal institutional controls can be enforced to prevent future exposures.

The following components are part of alternative SU-3:

- Follow an approved soil management plan which requires:
  - Monitoring to ensure subsurface soil with PCB concentrations ≥ 1 mg/kg remain in the subsurface or are appropriately managed; and
  - Monitoring to ensure soil below structures near PCB impacted areas are sampled and cleaned up, as needed, following demolition.
- Excavate surface soil in High- and Low-Activity areas with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10 mg/kg.
- Clean interior surfaces of occupied structures with dust concentrations above 1.0 mg/kg.
- Excavate or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.

- Dispose of excavated soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Dispose of soil with PCB concentrations more than 10.0 mg/kg at an approved TSCA offsite disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate the property as close to original conditions as possible.

ALTERNATIVE SU-4
Excavate PCBs ≥ 1 mg/kg in High and Low Activity Areas and Manage PCB Residuals
Estimated Capital Cost: $2,532,000
Estimated Annual O&M Cost: $14,000
Estimated Present Worth Cost: $3,922,000

Like Alternative SU-2 and SU-3, Alternative SU-4 is focused on PCBs in soil in low activity areas and soil management of residual PCBs beneath structures. This alternative assumes that the low activity soil is not the same as all other non-residential soil and should be provide more protection to young children. Additionally, this alternative assumes that the soil management plan will not effectively prevent Special Use Properties from using low-activity areas as high activity areas in the future or at preventing subsurface soil with PCB concentrations ≥ 1 mg/kg from impacting surface soil in the future. For those reasons, this alternative requires that the PCB RG of 1 mg/kg, representing a $1x10^{-6}$ carcinogenic risk to young children in a school/daycare setting be used for low-activity areas, and that subsurface soil in high and low activity areas also meet the PCB RG of 1 mg/kg. This value is protective of all other exposures. PCB-impacted surface soil in low-activity areas of 19 Special Use Properties and PCB impacted subsurface soil in three high activity areas previously remediated would require remediation under this alternative.

The soil management plan would be designed to ensure that the soil below structures near PCB impacted areas are sampled and cleaned up as needed following demolition. Any soil generated during remediation and soil management activities would be disposed of in the SSSMA provided that the PCB concentration from the five-point composite samples collected for the property are less than 10 mg/kg. Otherwise, the excavated soil would be disposed of at approved offsite disposal facilities.

Deed notices to inform prospective purchasers of potential residual contamination on properties would be voluntary. The EPA and the community are working with local officials to develop more formal institutional controls can be enforced to prevent future exposures.

The following components are part of alternative SU-4:

- Follow an approved soil management plan which requires monitoring to ensure soil below structures near PCB impacted areas are sampled and cleaned up, as needed, following demolition.

- Excavate surface soil in High- and Low-Activity areas with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 1 mg/kg.
- Clean interior surfaces of occupied structures with dust concentrations above 1.0 mg/kg.
- Excavate or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1.0 mg/kg.
- Dispose of soil with PCB concentrations less than 10.0 mg/kg at an onsite soil management area located near the Facility, provided the material passes leachability testing.
- Dispose of excavated soil with PCB concentrations more than 10.0 mg/kg PCBs, at an approved TSCA offsite disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate the property as close to original conditions as possible.

Remedial Alternatives for Interim Measure Area Soil

Multiple interim measures and removal action projects have been conducted over the past 20 years. The complete list of previously implemented interim measures, interim caps, and removals actions, other than those completed under the Removal Order, the NTC Removal Action Agreement, and the Stipulation include:

- Northside Area properties
- Eastside Area properties
- Eastside Drainageway
- APCO Drainage Ditch
- Hall Street properties
- Quintard Mall
- 11th Street Ditch Removal
- Snow Creek Sediment and Dredge Spoil Pile Removal

An effectiveness evaluation was completed for all of the previous interim measures, interim caps, and removal projects. The results of the effectiveness evaluation indicated that additional efforts were necessary to enhance three of the previously implemented interim measures: Northside Area, Eastside Area, and the Eastside Drainageway (attached Figure 23, 24a-d, and 25).

Key ARARs for the IMs alternatives include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

The Interim Measure (IM) soil remedial alternatives developed for detailed analysis are summarized below and in Table 11:

- Alternative IM-1 – No Action
- Alternative IM-2 – Expand Existing Measures, Address PTW if Present and Institutional Controls (ICs)
- Alternative IM-3 – Expand Existing Measures, Address PTW if Present, Excavate and Offsite Disposal of Soil at PB-RR-37, and ICs
- Alternative IM-4 – Excavate Soil to Non-residential PRGs where not Covered by Existing Measures and Dispose of Offsite, Address PTW if Present, and ICs

ALTERNATIVE IM-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

The No Action alternative is intended to serve as a baseline for comparison with the other alternatives. This alternative would leave the impacted soil around the previously implemented interim measures in place with no controls to prevent human or ecological exposure or transport to Snow Creek. Under this alternative, no remedial actions would be undertaken as part of this alternative to contain, remove, monitor, or treat impacted soil.

ALTERNATIVE IM-2
Expand Existing Interim Measures to Meet Non-Residential Goal; Excavate any Principal Threat Waste found within IMs if Leaching to Groundwater
Estimated Capital Cost: $702,000
Estimated Annual O&M Cost: $100,000
Estimated Present Worth Cost: $2,604,000

Alternative IM-2 includes maintaining the existing IMs and expanding the existing IMs in the Northside Area, Eastside Area, and the Eastside Drainageway (including the drainage ditch to the north and PB-RR-37 area) to meet the non-residential RG for PCBs in surface soil of 21 mg/kg. This alternative would include placing an engineered cap over the additional areas using the original cover designs developed when the existing IM covers were installed. For locations with PCBs in drainageways, the engineering cap would include a low permeability geomembrane liner covered with at least 12 inches of clean soil and vegetation. For locations not considered drainageways, a cover consisting of a geotextile marker layer covered with at least 12 inches of clean soil and vegetation would be installed.

Further evaluation of potential PCB discharges to groundwater at the Eastside Area and PB-RR-37 area are required during the remedial design to confirm that the high subsurface PCB concentrations are not leaching to groundwater. If leaching to groundwater is found to be present, subsurface soil excavation will be required as determined during design.

Deed restrictions and environmental easements/covenants will be used to restrict the potential future uses of the IM areas, including the expanded areas. Operation, monitoring, and maintenance of the existing and proposed additional remedial components are included in IM-2.

The following components are part of Alternative IM-2:

- Expand the engineered caps of the IMs such that the EPC for the area is less than 21 mg/kg, with a not to exceed concentration of 50 mg/kg:
  - in drainageways, a low permeability geomembrane liner covered with at least 12 inches of clean soil and vegetation will be used to cap PCB impacted soil;
  - in non-drainageways, a geotextile marker layer covered with at least 12 inches of clean soil and vegetation will be used to cap PCB impacted soil; and
  - any soil excavated to implement these caps and covers will be disposed of offsite at an appropriate facility.
- Ensure deed restrictions or easements/covenants are in place to restrict the potential future uses of the new and old IM areas.
- Conduct operations, monitoring, and maintenance of the existing and proposed additional remedial components.
- Further investigate potential groundwater impacts from high subsurface PCB concentrations located within the Eastside Area IM and at sample PB-RR-37. If PCB impacts to groundwater are greater than the MCL, excavation of the PCB impacted subsurface soil within the IM or at PB-RR-37 will be required as determined in design.

ALTERNATIVE IM-3

Expand Existing Interim Measures to meet Non-Residential Goal; Excavate Potential PTW at Railroad and McDaniel; and Excavate any PTW found within IMs if Leaching to Groundwater

Estimated Capital Cost: $721,000
Estimated Annual O&M Cost: $100,000
Estimated Present Worth Cost: $2,632,000

Alternative IM-3 includes maintaining the existing IMs, expanding the existing IMs in the Northside Area, Eastside Area, and the Eastside Drainageway (including the drainage ditch to the north) to meet the non-residential preliminary remedial goal (PRG) for PCBs in surface soil of 21 mg/kg, and excavating and offsite disposal of soil near PB-RR-37 to meet the non-residential PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg. This alternative would include placing an engineered cap over the additional areas using the original cover designs developed when the existing IM covers were installed. For locations with PCBs in drainageways, the engineering cap would include a low permeability geomembrane liner covered with at least 12 inches of clean soil and vegetation. For locations not considered drainageways, the installed cover would consist of a geotextile marker layer covered with at least 12 inches of clean soil and vegetation.

Further evaluation of potential PCB discharges to groundwater at the Eastside Area and PB-RR-37 area are required during the remedial design to confirm that the high subsurface PCB concentrations are not leaching to groundwater. If leaching to groundwater is found to be present, subsurface soil excavation will be required as determined during design.

Deed restrictions or environmental easements/covenants will be used to restrict the potential future uses of the IM areas, including the expanded areas. Operation, monitoring, and maintenance of the existing and proposed additional remedial components are included in IM-3.

The following components are part of Alternative IM-3:

- Expand the engineered caps of the IMs such that the EPC for the area is less than 21 mg/kg, with a not to exceed concentration of 50 mg/kg:
  - in drainageways, a low permeability geomembrane liner covered with at least 12 inches of clean soil and vegetation will be used to cap PCB impacted soil;
  - in non-drainageways, a geotextile marker layer covered with at least 12 inches of clean soil and vegetation will be used to cap PCB impacted soil; and
  - any PCB impacted soil excavated to implement these caps and covers will be disposed of offsite at an appropriate disposal facility.
- Excavate soil near PB-RR-37 to meet the non-residential PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate backfilled area.
- Dispose of excavated soil at an approved offsite disposal facility based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Ensure deed restrictions or environmental easements/covenants are in place to restrict the potential future uses of the new and old IM areas.
- Soil management of residual PCBs in the subsurface may be needed in the excavation area.
- Conduct operations, monitoring, and maintenance of the existing and proposed additional remedial components.
- Further investigate potential groundwater impacts from high subsurface PCB concentrations located within the Eastside Properties IM and at sample PB-RR-37. If PCB impacts to groundwater are greater than the MCL, excavation of PCB impacted subsurface soil within the IM or at PB-RR-37 will be required as determined in design.

ALTERNATIVE IM-4
Excavate around Existing Interim Measures to Meet Non-Residential Goals; Excavate any Principal Threat Waste found within IMs if Leaching to Groundwater
Estimated Capital Cost: $1,842,000
Estimated Annual O&M Cost: $100,000
Estimated Present Worth Cost: $4,315,000

Alternative IM-4 includes maintaining the existing IMs and excavating soil around the Northside Area, Eastside Area, and the Eastside Drainageway (including the drainage ditch to the north and PB-RR-37 area) IMs to meet the non-residential PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg.

Further evaluation of potential PCB discharges to groundwater at the Eastside Area and PB-RR-37 area are required during the remedial design to confirm that the high subsurface PCB concentrations are not leaching to groundwater. If leaching to groundwater is found to be present, subsurface soil excavation will be required as determined during design.

Deed restrictions or environmental easements/covenants will be used to restrict the potential future uses of the IM areas. Operation, monitoring, and maintenance of the existing and proposed additional remedial components are included in IM-4.

The following components are part of Alternative IM-4:

- Excavate soil around the Northside Area, Eastside Area, and the Eastside Drainageway (including the drainage ditch to the north and PB-RR-37 area) IMs to meet the to meet the non-residential PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Re-vegetate backfilled area.
- Dispose of excavated soil at an approved offsite disposal facility based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Ensure deed restrictions or environmental easements/covenants are in place to restrict the potential future uses of the IM areas.
- Soil management of residual PCBs in the subsurface may be needed in the excavation areas.
- Conduct operations, monitoring, and maintenance of the existing and proposed additional remedial components.
- Further investigate potential groundwater impacts from high subsurface PCB concentrations located within the Eastside Area IM and at sample PB-RR-37. If PCB impacts to groundwater are greater than the MCL, excavation of PCB impacted subsurface soil within the IM or at PB-RR-37 will be required as determined in design.

Remedial Alternatives for Dredge Spoil Piles

There were eight dredge spoil piles (SC-1 through SC-8) located along Snow Creek in OU1/OU2. Four of the eight dredge spoil piles were removed (SC-3, SC-4, SC-5, and SC-6) during previous removal actions. The current locations of the remaining dredge spoil piles are shown on Figure 7. Dredge spoil pile SC-8 has been identified as a target remedial area based on its PCB EPC (29 mg/kg). Even though dredge spoil piles SC-1 and SC-7 were characterized as having EPCs below the non-residential soil PRG of 21 mg/kg and SC-2 is assumed to be similar in concentration to SC-1 (because they are located on the same stretch of the creek), two of the alternatives require total excavation of the four remaining piles to prevent future erosion back into the creek or residential use of the soil in the piles as fill. The alternatives for dredge spoil piles involve different combinations of removal and stabilization and onsite and offsite disposal.

Key ARARs for the Dredge Spoil Piles include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.

- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

The Dredge Spoil Piles (DSP) remedial alternatives developed for detailed analysis are summarized below and in Table 12:

- Remedial Alternative DSP-1 – No Action
- Remedial Alternative DSP-2 – Excavate to Non-Residential Goal and Offsite Disposal
- Remedial Alternative DSP-3 – Excavate to Non-Residential Goal and Onsite Disposal
- Remedial Alternative DSP-4 – Excavate All Dredge Spoil Piles and Offsite Disposal
- Remedial Alternative DSP-5 – Excavate All Dredge Spoil Piles and Onsite Disposal

ALTERNATIVE DSP-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

The No Action alternative is intended to serve as a baseline for comparison with the other alternatives. This alternative would leave the impacted soil in place with no controls to prevent human or ecological exposure. Under this alternative, no remedial actions would be undertaken as part of this alternative to contain, remove, monitor, or treat impacted soil/sediments.

ALTERNATIVE DSP-2
Excavate to Non-Residential Goal and Offsite Disposal
Estimated Capital Cost: $631,000
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $947,000

Alternative DSP-2 includes excavation and offsite disposal of dredge spoil pile soil with an exposure point concentration that exceeds the non-residential PRG for PCBs in surface soil of 21 mg/kg. Only SC-8 would be removed under this remedial alternative. This alternative will also include collecting PCB data for dredge spoil pile SC-2 during a preliminary design investigation to confirm that the exposure point concentration for the pile is less than the non-residential PRG for PCBs in surface soil of 21 mg/kg.

The process to remove dredge spoil pile SC-8 includes clearing trees and constructing a temporary construction roadway to the dredge spoil pile. The excavated soil will be loaded onto on-road dump trucks. The trucks will be decontaminated and covered with a tarp prior to transport to the offsite disposal facility. A 12-inch layer of soil beneath the dredge spoil pile will also be removed and disposed of offsite as part of this alternative. The area will be backfilled with clean soil and vegetated. Dispose of all excavated soil at an approved offsite disposal facility

The remaining dredge soil piles with concentrations below the PRG of 21 mg/kg [SC-1, SC-7, and possibly SC-2, depending on the predesign investigation (PDI) results] will be evaluated for perennial vegetation and the effectiveness of that vegetation in ensuring stability. If additional stabilization is needed, planting or seeding will be conducted to ensure stability.

Following construction, soil management will be conducted for residual PCBs that remain in the dredge spoil areas.

The following components are part of Alternative DSP-2:

- Collect PCB sample(s) for dredge spoil pile SC-2 during a preliminary design investigation to confirm that the exposure point concentration for total PCBs is less than the PCB PRG of 21 mg/kg.
- Excavate dredge spoil pile soil with an exposure point concentration for total PCBs greater than or equal to the PCB PRG of 21 mg/kg.
- Excavate soil beneath the dredge spoil pile footprint as needed to meet the non-residential soil PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to the dredge spoil piles.
- Re-vegetate backfilled area or provide other erosion protection.
- Dispose of excavated soil at an approved offsite disposal facility.
- All PCB remediation waste disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Evaluated vegetation and stability of remaining dredge spoil piles and re-vegetate as needed to ensure stability.
- Manage residual PCBs in dredge spoil areas and in soil beneath the footprint of the dredge spoil piles along with other non-residential soil, as needed.

ALTERNATIVE DSP-3
Excavate to Non-Residential Goal and Onsite Disposal
Estimated Capital Cost: $324,000
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $485,000

Remedial alternative DSP-3 is the same as DSP-2 with the exception that an onsite soil management area is proposed for the disposal of soil with PCB concentrations less than 50 mg/kg.

Alternative DSP-3 includes excavation of dredge spoil pile soil with an exposure point concentration that exceeds the non-residential PRG for PCBs in surface soil of 21 mg/kg. Only SC-8 would be removed under this remedial alternative. This alternative also includes collecting PCB data for dredge spoil pile SC-2 during a preliminary design investigation to confirm that the exposure point concentration for the pile is less than the non-residential PRG for PCBs in surface soil of 21 mg/kg.

The process to remove dredge spoil pile SC-8 includes clearing trees and constructing a temporary construction roadway to the dredge spoil pile. The excavated soil will be loaded onto on-road dump trucks. The trucks will be decontaminated and covered with a tarp prior to transport to the offsite disposal facility. A 12-inch layer of soil beneath the dredge spoil pile will also be removed and disposed of offsite as part of this alternative. The area will be backfilled with clean soil and vegetated.

The remaining dredge soil piles with concentrations below the PRG of 21 mg/kg (SC-1, SC-7, and possibly SC-2, depending on the PDI results) will be evaluated for perennial vegetation and the effectiveness of that vegetation in ensuring stability. If additional stabilization is needed, planting or seeding will be conducted to ensure stability.

Following construction, soil management will be conducted for residual PCBs that remain in the dredge spoil areas.

The following components are part of Alternative DSP-3:

- Collect PCB sample(s) for dredge spoil pile SC-2 during a preliminary design investigation to confirm that the exposure point concentration for total PCBs is less that the PCB PRG of 21 mg/kg.
- Excavate dredge spoil pile soil with an exposure point concentration for total PCBs greater than or equal to the PCB PRG of 21 mg/kg (this currently impacts only SC-8).
- Excavate soil beneath the dredge spoil pile footprint as needed to meet the non-residential soil PRG for PCBs in surface soil of 21 mg/kg and the subsurface soil PRG for PCBs of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to the dredge spoil piles.
- Re-vegetate backfilled area or provide other erosion protection.
- Disposal of soil with total PCB concentrations less than 50 mg/kg in an onsite soil management area. (If new samples reveal soil with total PCB concentrations greater than or equal to 50 mg/kg it must be disposed of in an approved TSCA offsite disposal facility.)
- All PCB remediation waste disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Evaluate vegetation and stability of remaining dredge spoil piles and re-vegetate as needed to ensure stability.
- Manage residual PCBs in dredge spoil areas and in soil beneath the footprint of the dredge spoil piles along with other non-residential soil, as needed.

ALTERNATIVE DSP-4
Excavate All Dredge Spoil Piles and Offsite Disposal
Estimated Capital Cost: $932,000
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $1,399,000

Alternative DSP-4 requires the removal of the four remaining dredge spoil piles (SC-2, SC-2, SC-7, and SC-8) and disposal of the excavated soil in an offsite landfill. This alternative will eliminate the need to stabilize the remaining dredge spoil piles and ensure that the soil does not get re-deposited in the creek or transported for use as fill.

The process to remove the dredge spoil piles includes clearing trees and constructing temporary construction roadways to the dredge spoil piles. The excavated soil will be loaded onto on-road dump trucks. The trucks will be decontaminated and covered with a tarp prior to transport to the offsite disposal facility. A 12-inch layer of soil beneath the dredge spoil piles will also be removed and disposed of offsite as part of this alternative. The area will be backfilled with clean soil and vegetated. All excavated soil will be sent to an approved offsite disposal facility.

Any soil management required will be conducted for residual PCBs that remain below the dredge spoil pile footprint along with other non-residential soil.

The following components are part of Alternative DSP-4:

- Excavate all dredge spoil pile soil.
- Excavate soil beneath the dredge spoil pile footprints as needed to meet the non-residential soil PRG for PCBs in surface soil of 21 mg/kg and subsurface PRG for PCBs of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to the dredge spoil piles.
- Re-vegetate backfilled area or provide other erosion protection.
- Dispose of excavated soil at an approved offsite disposal facility.
- All disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Manage residual PCBs in dredge spoil areas and in soil beneath the footprint of the dredge spoil piles along with other non-residential soil, as needed.

ALTERNATIVE DSP-5
Excavate All Dredge Spoil Piles and Onsite Disposal
Estimated Capital Cost: $475,000
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $714,000

Remedial alternative DSP-5 is the same as DSP-4 with the exception that an onsite soil management area is proposed for the disposal of materials with PCB concentrations less than 50 mg/kg. Alternative DSP-5 requires the removal of the four remaining dredge spoil piles (SC-2, SC-2, SC-7, and SC-8) and disposal of soil with total PCB concentrations less than 50 mg/kg in an onsite soil management area and soil with total PCB concentrations greater than or equal to 50 mg/kg in an approved TSCA offsite disposal facility. Disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.

The process to remove the dredge spoil piles includes clearing trees and constructing temporary construction roadways to the dredge spoil piles. The excavated soil will be loaded onto on-road dump trucks. The trucks will be decontaminated and covered with a tarp prior to transport to the offsite disposal facility. A 12-inch layer of soil beneath the dredge spoil piles will also be removed and disposed of offsite as part of this alternative. After confirmation that non-residential RGs are met, the area will be backfilled with a 12-inch layer of clean soil and vegetated. Any soil management required will be conducted for residual PCBs that remain below the dredge spoil pile footprint along with other non-residential soil alternative areas.

The following components are part of Alternative DSP-5:

- Excavate all dredge spoil pile soil.
- Excavate soil beneath the dredge spoil pile footprints as needed to meet the non-residential soil PRG for PCBs in surface soil of 21 mg/kg and the soil PRG for PCBs in subsurface soil of 97 mg/kg.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to the dredge spoil piles.
- Re-vegetate backfilled area or provide other erosion protection.
- Disposal of soil with total PCB concentrations less than 50 mg/kg in an onsite soil management area. (If new samples reveal soil with total PCB concentrations greater than or equal to 50 mg/kg it must be disposed of in an approved TSCA offsite disposal facility.)
- Disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Manage residual PCBs in dredge spoil areas and in soil beneath the footprint of the dredge spoil piles along with other non-residential soil, as needed.

Remedial Alternatives for Unapproved Waste Disposal Areas

In conducting the investigation for OU1/OU2, two areas were identified that were used for the unapproved disposal of waste materials (Figure 8). Investigations conducted in these areas have shown that in addition to PCBs, the UWDAs contain or may contain auto fluff and/or other waste materials that have been deposited over time. The two specific locations include the Ashley Street and Legrande site and the Wilborn site located in the southeastern portion of EU10.

Key ARARs for the UWDAs include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.
- Regulations at ADEM Admin. Code r. 335-13-4-.17, 19 and 20.

The remedial alternatives for the UWDAs are summarized below and in Table 13:

- Alternative UWDA-1 – No Action

- Alternative UWDA-2 –Soil Cover and Marker Layer

- Alternative UWDA-3 – RCRA Subtitle D Cap

- Alternative UWDA-4 – Excavation and Offsite Disposal

ALTERNATIVE UWDA-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

Alternative UWDA-1 is the no action alternative, which means that no remedial actions would be conducted at the two unapproved UWDA areas. Concentrations of PCBs in surface soil at the Ashley Street and Legrande area will exceed the residential RG of 1 mg/kg and concentrations of PCBs in surface soil at the Wilborn area will exceed the non-residential RG of 21 mg/kg. Under this alternative, no remedial actions would be undertaken as part of this alternative to contain, remove, monitor, or treat impacted soil. This alternative is presented and analyzed as required by the NCP.

ALTERNATIVE UWDA-2
Soil Cap with Marker Layer
Estimated Capital Cost: $570,000
Estimated Annual O&M Cost: $50,000
Estimated Present Worth Cost: $1,630,000

Alternative UWDA-2 includes constructing a protective soil cover system over the two UWDAs at the Site to eliminate the direct contract threat. Figure 26 shows what a typical soil cover cross section looks like. This alternative includes placing a soil cover over these areas consisting of a geotextile fabric and a 12-inch-thick layer of clean soil. Clean imported fill would be used to construct the caps. (Note that a wells installed at Wilborn property and Carter Street auto fluff disposal areas were used to determined that PCBs were not leaching to groundwater from these disposal areas.)

ICs including environmental covenants will be adopted to restrict future use of these areas to further restrict contact with impacted soil. O&M and monitoring of the proposed remedial components are included as part of UWDA-2.

The following components are part of Alternative UWDA-2:

- Clear and prepare surface for cover.
- Install soil cover consisting of:
  - Geotextile marker layer; and
  - 12-inch-thick layer of clean soil
- Execute environmental covenants to restrict future use of these areas and to protect the cap.
- Conduct O&M and monitoring of the soil cover.

ALTERNATIVE UWDA-3
RCRA Subtitle D Cap
Estimated Capital Cost: $1,317,000
Estimated Annual O&M Cost: $50,000
Estimated Present Worth Cost: $2,715,000

Alternative UWDA-3 is the same as UWDA-2 except that the cap constructed over the two UWDAs will be equivalent to a RCRA Subtitle D multi-layer cap consisting of a 40-mil geomembrane liner, a geocomposite drainage layer, and protective soil cover. Figure 26 shows what a RCRA Subtitile-D cap (low-permeability cap cross section) looks like. Though groundwater contamination is not a concern in these areas, a more stringent RCRA Subtitle D cap is appropriate for waste disposal areas. Clean imported fill would be used to construct the caps.

ICs including environmental covenants will be adopted to restrict future use of these areas to further restrict contact with impacted soil. O&M and monitoring of the proposed remedial components are included as part of UWDA-3.

The following components are part of Alternative UWDA-3:

- Clear and prepare surface for cap.
- Install a RCRA Subtitle D multi-layer cap consisting of:
    - 40-mil geomembrane liner,
    - Geocomposite drainage layer, and
    - 18-inch-thick protective soil cover.
- Re-vegetate the surface or provide other erosion protection for the cap.
- Execute environmental covenants to restrict future use of these areas and to protect the cap.
- Conduct O&M and monitoring of the cover.

ALTERNATIVE UWDA-4
Excavate Waste and Offsite Disposal
Estimated Capital Cost: $27,486,000
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $41,229,000

Alternative UWDA-4 includes the excavation and offsite disposal of all waste materials contained on the affected properties. This alternative consists of removing both surface and subsurface soil, replacing the removed soil as needed to control erosion with clean fill material. The upper portion of fill should be capable of supporting vegetative growth, and reestablishing vegetation in disturbed areas. Soil generated during the removal activities would be disposed of at an approved offsite landfill(s). Approximately 101,700 cubic yards of waste material would be excavated and disposed of at an offsite landfill under this alternative.

No O&M or ICs would be required for this alternative as the waste materials identified at these locations would be removed and transported to an approved landfill(s).

The following components are part of Alternative UWDA-4:

- Excavate all contaminated soil/waste in the waste disposal areas.
- Dispose of excavated soil/waste offsite at an approved disposal facility(ies).
- All PCB disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Backfill as needed to re-establish natural grades and prevent erosion.

- Re-vegetate surface or provide other erosion protection.

Remedial Alternatives for Non-residential Soil

Candidate remedial areas for the non-residential soil were developed to address PCBs, PAHs as BaPE, chromium, and PCDD/DF/DL-PCBs in surface soil. Each of the remedial alternatives developed for the non-residential soil would address the same geographic footprint (see Table 14 and attached Figure 27a-l for a PRG of 21 mg/kg and Figures 28 for a PRG of 9 mg/kg). Seven remedial approaches were screened for the non-residential soil including the no action alternative. Six of these approaches were carried through the screening process. The first active approach of placing cover soil over the target remedial areas was screened out due to concerns with increasing localized flooding in EU5, EU14N, and EU19S. To address this concern, the second alternative combines removing soil with placing clean backfill materials in the three EUs where flooding is of concern and directly covering target remedial area soil in the remaining EUs and areas where flooding is less of a concern. The four other remedial approaches include removing the upper 12 inches of soil with different forms of disposal, including offsite disposal, a combination of onsite and offsite disposal, offsite treatment using incineration, and a combination of onsite treatment using thermal desorption combined with offsite incineration of the high-concentration PCB oil from the thermal treatment process. With the exception of the no action alternative, each of the remedial alternatives includes implementing a soil management plan and the possibility if ICs including environmental covenants. The soil management plan would include monitoring for potential changes in property use from non-residential to residential as part of long-term O&M activities.

The remedial alternatives for non-residential soil are focused on surface soil in EUs where PCBs, chromium, PAH (as BaPE), and PCDD/DF exceed PRGs:

- The PCB EPC for each EU was compared to the PCB surface soil PRG of 21 mg/kg and the not-to-exceed PCB concentration of 50 mg/kg. Based on this evaluation, 11 general locations in OU1/OU2 were identified as either not meeting the non-residential surface soil criteria PRG for PCBs or having PCB concentrations greater than or equal to 50 mg/kg. These general areas are EU5, EU7, EU10, EU14N, EU19N, EU19S, EU24, EU26, west of EU1, north of APCO, and Highway 202.

- The surface soil PRGs for the non-PCB constituents are 382 mg/kg for arsenic, 568 mg/kg for chromium, 21 mg/kg for PAHs as BaPE, and 0.73 μg/kg for PCDD/DF/DL-PCB. There was only enough data to calculate a site-wide EPC for the non-PCB constituents. In order to ensure that hot spots of the non-PCB constituents were not disregarded, a point-by-point analysis was compared to the PRGs and a limited number of small isolated areas where concentrations of non-PCB constituents exceed their respective PRGs were found in surface soil. This includes two locations where three sample results exceed the PAH (as BaPE) PRG of 21 mg/kg (north of APCO, EU14N); two locations where one sample result in each of these areas exceeds the chromium PRG of 568 mg/kg (EU22, EU24); and one location where one sample result exceeds the PCDD/DF PRG of 0.6 μg/kg (EU25).

The overall remedial approach is to reduce the EPC values in these areas to less than the PRGs by remediating the higher-concentration areas until the EPC for the area as a whole is reduced to a value that is less than the PRG and also address all locations with PCB concentrations greater than or equal to 50 mg/kg. Preliminary design investigations will be used to fully delineate the areas.

The range of remedial alternatives for non-residential surface soil includes no action to removal with a range of disposal options and treatment. The options for disposal include offsite disposal and a combination of onsite and offsite disposal.

Key ARARs for Non-Residential Soil Alternatives include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.

The Non-residential Soil (NRS) remedial alternatives developed for detailed analysis are summarized below and in Table 15:

- Remedial Alternative NRS-1 – No Action
- Alternative NRS-2 – Combination Capping and Excavation, Onsite and Offsite Disposal, and Management of PCB Residuals
- Alternative NRS-3 – Excavate Soil, Onsite and Offsite Disposal, and Manage PCB Residuals
- Alternative NRS-4 – Excavate, Offsite Disposal, and Manage PCB Residuals
- Alternative NRS-5 – Excavation of Surface Soil, Offsite Treatment, and Soil Management
- Alternative NRS-6 – Excavation of Surface Soil, Onsite Treatment, and Soil Management

ALTERNATIVE NRS-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

Under NRS-1, no actions would be taken to address PCBs, Chromium, PAHs, or PCDD/DF/DL-PCB in non-residential surface soil. Under this alternative, no remedial actions would be undertaken as part of this alternative to contain, remove, monitor, or treat impacted soil. This alternative is presented and analyzed as required by the NCP.

ALTERNATIVE NRS-2
Combination Capping and Excavation, Onsite and Offsite Disposal, and Management of PCB Residuals

(a) For PRG 21 mg/kg	***Estimated Capital Cost: $1,004,000***
	Estimated Annual O&M Cost: $413,000
	Estimated Present Worth Cost: $7,911,000
(b) For PRG 9 mg/kg	***Estimated Capital Cost: $2,467,000***
	Estimated Annual O&M Cost: $413,000
	Estimated Present Worth Cost: $10,106,000

Alternative NRS-2 includes a nonintrusive approach for covering non-residential surface soil in three EUs (EU7, EU19N, and EU26) and removing and replacing non-residential surface soil in the remaining remedial areas to achieve the PCB PRG of 21/mg/kg in surface soil. No subsurface excavation is anticipated to meet the PCB PRG of 97 mg/kg in subsurface soil. No non-PCB PRGs are known to be exceeded in these areas. Excavation would only be conducted in those areas where placement of cover alone would likely increase the potential for flooding. The excavated soil would be disposed of, and the removal areas would be backfilled with clean fill materials.

NRS-2 would involve clearing trees and surface vegetation from the target remedial areas. The amount of vegetation removed varies between target removal areas.

For the areas where soil removal is needed to facilitate cover placement, Best Management Practices (BMPs) such as a silt sock or waddle would be placed between the excavation area and Snow Creek to prevent the erosion of loose soil into the creek. Bank soil would be excavated or stabilized as needed to meet the selected remedy for sediments and banks (the alternatives under consideration are presented further in the document).

Specific soil management activities would include active outreach with property owners, local City building departments, area utility companies, and county/state-wide transportation agencies regarding any plans to disturb soil in non-residential areas where construction and demolition activities could impact the non-residential or adjacent residential remedies.

Institutional controls such as deed notices or environmental easements/ covenants are needed to ensure that owners are aware of residual PCBs present on properties and that they handle them properly. The EPA and the community are working with local officials to determine if more formal institutional controls can be established to prevent future exposures.

The following components are part of Alternative NRS-2:

- Install a soil cover over PCB impacted surface and subsurface soil in areas in EU7, EU19N, EU26:
    - Clear surface vegetation and prepare surface;
    - Install geotextile marker layer;
    - Place a 12-inch layer of clean fill; and
    - Re-vegetate the area or install an alternative surface to prevent erosion of cover.

- Excavate and dispose of PCB and Non-PCB impacted surface and subsurface soil in areas EU5, EU10, EU14N, EU19S, EU22, EU24, EU25, west of EU1, north of APCO, and Highway 202:
  - Excavate surface soil and subsurface soil, if needed to meet PRGs;
  - Dispose of excavated soil with total PCB concentrations less than 50 mg/kg in an onsite soil management area and soil with total PCB concentrations greater than or equal to 50 mg/kg in an approved TSCA offsite disposal facility.
  - All PCB disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
  - Dispose of non-PCB contaminated soil offsite.
  - Backfill and re-vegetate as needed to re-establish natural grades and prevent erosion.
- Manage residual PCBs in non-residential soil.

ALTERNATIVE NRS-3
Excavate Soil, Onsite and Offsite Disposal, and Manage PCB Residuals

(a) For PRG 21 mg/kg ***Estimated Capital Cost: $2,391,000***
Estimated Annual O&M Cost: $413,000
Estimated Present Worth Cost: $9,992,000

(b) For PRG 9 mg/kg ***Estimated Capital Cost: $4,190,000***
Estimated Annual O&M Cost: $413,000
Estimated Present Worth Cost: $12,691,000

NRS-3 addresses the same remedial areas as NRS-2 but only includes excavation and disposal (no covers). Excavated soil with PCB concentrations less than 50 mg/kg would be disposed of in an onsite management area (the SSSMA), and soil with PCB concentrations greater than or equal to 50 mg/kg would be disposed of in a permitted offsite landfill.

NRS-3 would involve clearing trees and surface vegetation from the target remedial areas. The amount of vegetation removed varies between target removal areas.

BMPs such as a silt sock or waddle would be placed between the excavation area and Snow Creek to prevent the erosion of loose soil into the creek. Bank soil would be excavated or stabilized as needed to meet the selected remedy for sediments and banks (the alternatives under consideration are presented further in the document).

Specific soil management activities would include active outreach with property owners, local City building departments, area utility companies, and county/state-wide transportation agencies regarding any plans to disturb soil in non-residential areas where construction and demolition activities could impact the non-residential or adjacent residential remedies.

Institutional controls such as deed notices or environmental easements/ covenants are needed to ensure that owners are aware of residual PCBs present on properties and that they handle them properly. The EPA and the community are working with local officials to determine if more formal institutional controls can be established to prevent future exposures.

The following components are part of Alternative NRS-3:

- Excavate non-residential soil to meet PCB and non-PCB PRGs (9700 CY).
- Dispose of excavated soil with total PCB concentrations less than 50 mg/kg in an onsite soil management area and soil with total PCB concentrations greater than or equal to 50 mg/kg in an approved TSCA offsite disposal facility.
- All PCB disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Dispose of non-PCB contaminated soil offsite.
- Backfill and re-vegetate as needed to re-establish natural grades and prevent erosion.
- Manage residual PCBs in non-residential soil.

ALTERNATIVE NRS-4
Excavate, Offsite Disposal, and Manage PCB Residuals

(a) For PRG 21 mg/kg	***Estimated Capital Cost: $2,679,000*** ***Estimated Annual O&M Cost: $413,000*** ***Estimated Present Worth Cost: $10,425,000***
(b) For PRG 9mg/kg	***Estimated Capital Cost: $5,462,000*** ***Estimated Annual O&M Cost: $413,000*** ***Estimated Present Worth Cost: $14,600,000***

NRS-4 would remove non-residential surface soil consistent with the approach used for NRS-3. The only difference is the exclusive use of offsite disposal.

NRS-4 would involve clearing trees and surface vegetation from the target remedial areas. The amount of vegetation removed varies between target removal areas.

BMPs such as a silt sock or waddle would be placed between the excavation area and Snow Creek to prevent the erosion of loose soil into the creek. Bank soil would be excavated or stabilized as needed to meet the selected remedy for sediments and banks (the alternatives under consideration are presented further in the document).

Specific soil management activities would include active outreach with property owners, local City building departments, area utility companies, and county/state-wide transportation agencies regarding any plans to disturb soil in non-residential areas where construction and demolition activities could impact the non-residential or adjacent residential remedies.

Institutional controls such as deed notices or environmental easements/ covenants are needed to ensure that owners are aware of residual PCBs present on properties and that they handle them properly. The EPA and the community are working with local officials to determine if more formal institutional controls can be established to prevent future exposures.

The following components are part of Alternative NRS-4:

- Excavate non-residential soil to meet PCB and non-PCB PRGs (9700 CY).
- Dispose of excavated soil in an approved offsite disposal facility.

- All PCB disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Backfill and re-vegetate as needed to re-establish natural grades and prevent erosion.
- Manage residual PCBs in non-residential soil.

ALTERNATIVE NRS-5
Excavate, Offsite Treatment of Soils and Manage of PCB Residuals

(a) For PRG 21 mg/kg ***Estimated Capital Cost: $9,729,000***
Estimated Annual O&M Cost: $413,000
Estimated Present Worth Cost: $21,000,000

(b) For PRG 9mg/kg ***Estimated Capital Cost: $26,558,000***
Estimated Annual O&M Cost: $413,000
Estimated Present Worth Cost: $46,242,000

Alternative NRS-5 is the same as alternative NRS-4 with the exception that PCB contaminated soil would be incinerated at a permitted offsite facility rather than disposed of in a permitted landfill. NRS-5 would involve transporting excavated material offsite for treatment. For PCB containing materials, treatment options are limited and offsite incineration is the most likely treatment alternative. Materials would be transported to one of the three TSCA-permitted facilities in Texas or Kansas, incinerated, and the resulting ash would be disposed of by the incineration facility.

NRS-5 would involve clearing trees and surface vegetation from the target remedial areas. The amount of vegetation removed varies between target removal areas.

BMPs such as a silt sock or waddle would be placed between the excavation area and Snow Creek to prevent the erosion of loose soil into the creek. Bank soil would be excavated or stabilized as needed to meet the selected remedy for sediments and banks (the alternatives under consideration are presented further in the document).

Specific soil management activities would include active outreach with property owners, local City building departments, area utility companies, and county/state-wide transportation agencies regarding any plans to disturb soil in non-residential areas where construction and demolition activities could impact the non-residential or adjacent residential remedies.

Institutional controls such as deed notices or environmental easements/ covenants are needed to ensure that owners are aware of residual PCBs present on properties and that they handle them properly. The EPA and the community are working with local officials to determine if more formal institutional controls can be established to prevent future exposures.

The following components are part of Alternative NRS-5:

- Excavate non-residential soil to meet PCB and non-PCB PRGs (9700 CY).
- All PCB disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.

- Transport PCB contaminated soil for offsite incineration. Materials would be transported to one of the three TSCA-permitted facilities in Texas or Kansas, incinerated, and the resulting ash would be disposed of by the incineration facility.
- Dispose of non-PCB contaminated soil offsite.
- Backfill and re-vegetate as needed to re-establish natural grades and prevent erosion.
- Manage residual PCBs in non-residential soil.

ALTERNATIVE NRS-6
Excavate, Onsite Thermal Desorption of Soils and Manage PCB Residuals

(a) For PRG 21 mg/kg	***Estimated Capital Cost: $8,464,000*** ***Estimated Annual O&M Cost: $413,000*** ***Estimated Present Worth Cost: $19,102,000***
(b) For PRG 9mg/kg	***Estimated Capital Cost: $20,104,000*** ***Estimated Annual O&M Cost: $413,000*** ***Estimated Present Worth Cost: $36,561,000***

Alternative NRS-6 is the same as alternative NRS-5 with the difference that soil would be treated onsite as opposed to treatment at an offsite facility. It is likely that the preferred onsite treatment would be thermal desorption, as it is expected that the only other viable onsite option (incineration) would not be practical for the relatively small amount of soil requiring treatment. Thermal desorption would be conducted onsite, creating a high-concentration PCB waste oil that would be transported offsite for incineration and lower concentration treated soil with PCB concentrations below 50 mg/kg that could be disposed of onsite in the onsite soil management area.

NRS-6 would involve clearing trees and surface vegetation from the target remedial areas. The amount of vegetation removed varies between target removal areas.

BMPs such as a silt sock or waddle would be placed between the excavation area and Snow Creek to prevent the erosion of loose soil into the creek. Bank soil would be excavated or stabilized as needed to meet the selected remedy for sediments and banks (the alternatives under consideration are presented further in the document).

Specific soil management activities would include active outreach with property owners, local City building departments, area utility companies, and county/state-wide transportation agencies regarding any plans to disturb soil in non-residential areas where construction and demolition activities could impact the non-residential or adjacent residential remedies.

Institutional controls such as deed notices or environmental easements/ covenants are needed to ensure that owners are aware of residual PCBs present on properties and that they handle them properly. The EPA and the community are working with local officials to determine if more formal institutional controls can be established to prevent future exposures.

The following components are part of Alternative NRS-6:

- Excavate non-residential soil to meet PCB and non-PCB PRGs (9700 CY).

- Treat PCB contaminated soil with thermal desorption.
- Dispose of non-PCB contaminated soil offsite.
- Transport high-concentration PCB waste oil from thermal desorption process offsite for incineration.
- Dispose of lower concentration treated soil with PCB concentrations less than 50 mg/kg onsite in the soil management area.
- Backfill and re-vegetate as needed to re-establish natural grades and prevent erosion.
- Manage residual PCBs in non-residential soil.

Remedial Alternatives for Groundwater and Principal Threat Waste at T-11

One area was identified during the RI where PCB contaminated soil was leaching PCBs to groundwater. The contaminated area is adjacent to Snow Creek, creating a high potential for discharge of PCB contaminated groundwater to surface water.

Well T-11 was installed in the area because there were relatively high PCB concentrations in surface and subsurface soil. Groundwater tests from T-11 consistently detected PCBs in groundwater at concentrations greater than the MCLs (i.e., 0.5 µg/L). PCB concentrations were identified as principal threat wastes (PTW) for both toxicity and mobility in this area. Because this was the only area away from the facility where PCB groundwater impacts were found, a separate set of alternatives were considered for this area.

Six remedial approaches were screened to address groundwater and soil contamination at the relatively isolated T-11 area. The T-11 area is located in the eastern most portion of EU5 and is bounded by Snow Creek to the west and south, and railroad tracks to the north and east. The range of remedial approaches carried through the screening process includes excavating the materials with high PCB concentrations immediately surrounding the T-11 groundwater well and using different cover and cap materials to limit infiltration. The one remedial approach eliminated during the screening process was placing cover soil directly over the overall T-11 area. This remedial approach was eliminated due to concerns for increasing local flooding. Placing the cover material directly on the ground surface would raise the elevation and reduce the cross-sectional flow area in this portion of the floodway. One of the remedial approaches includes groundwater extraction and treatment.

Key ARARs for Groundwater and PTW alternatives include:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.
- State and Federal Safe Drinking Water Act MCLs
- Regulations at ADEM Admin. Code r. 335-6-6-.04 and ADEM Admin. Code r. 335-6-6-.14 for discharge of treated groundwater to surface water
- Regulations at ADEM Admin. Code r. 335-9-1-.05 and ADEM Admin. Code r. 335-9-1 -.06 for construction of new extraction wells

The Groundwater (GW) remedial alternatives developed for detailed analysis are summarized below and in Table 16:

- Alternative GW-1 – No Action
- Alternative GW-2 – Excavate Area
- Alternative GW-3 – Excavate Area and Install Low-Permeability Cap
- Alternative GW-4 – Excavate Area, Install Low Permeability Cap, and Extract and Treat Contaminated Groundwater

ALTERNATIVE GW-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

Alternative GW-1 is the no action alternative, which means that no remedial actions would be conducted in the T-11 area of EU5. Groundwater impacts would continue to be present and discharges of PCBs to surface water remain possible. This alternative is presented and analyzed as required by the NCP.

ALTERNATIVE GW-2
Excavate High Concentrations and Surface Soils, Offsite Disposal, Soil Cap and Monitor Groundwater
Estimated Capital Cost: $1,316,000
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $2,206,000

Alternative GW-2 includes excavating material immediately surrounding well T-11 and removing a 12-inch layer of soil over the broader T-11 area. The extent of the excavation should ensure that the non-residential PCB surface soil PRG of 21 mg/kg and the PCB subsurface soil PRG of 97 mg/kg are met outside and around the covered area. The soil immediately surrounding T-11 would be excavated and transported to an approved offsite facility for disposal. The planned depth of excavation in the area immediately surrounding the well is approximately 4 feet based on existing data that show this to be the vertical limits of impacted materials. The samples (CA-05-8583-14), collected at depths of 2–3 feet and 3–4 feet near well T-11, indicate the presence of Aroclor-1232, which may have contributed to the groundwater impacts in the area. Aroclor-1232 and other lower chlorinated Aroclors were not detected in soil samples collected from approximately 10 feet in each direction from T-11. In order to remove these impacted soil, the excavation would extend 20 feet in each direction from T-11. The deeper excavation immediately surrounding groundwater well T-11 would encompass these sample locations. The materials excavated from this area (approximately 200 cubic yards of soil) would be loaded into trucks and taken to an approved offsite disposal facility. The excavation area would be backfilled with clean fill materials once the excavation is complete.

The 12-inches of soil removed over the broader T-11 area would be backfilled with soil and vegetated as shown on Figure 29. The final surfaces of the covered area would be gently graded into the surrounding terrain, and no significant or noticeable changes from the existing topography are anticipated. Prior to disturbing surface soil, appropriate temporary erosion and sedimentation control measures and surface water management structures would be put in place to prevent migration of soil and particulates during excavation. Air monitoring would be conducted at the location of soil disturbances.

ICs, such as a deed restrictions or environmental easements/covenants, would be included to restrict access to groundwater and to restrict future uses of the property. Monitoring and O&M of the proposed remedial components, including further groundwater monitoring, are included in this alternative.

The following components are part of Alternative GW-2:

- Excavate PCB impacted soil acting as PTW (approximately 200 cubic yards) and 12-inches of soil over the broader impacted area (approximately 2800 cubic yards).
- Dispose of excavated soil at an approved offsite disposal facility.
- All PCB contaminated soil disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Backfill excavated areas with clean fill materials.
- Cover the area:
    - Geotextile marker layer
    - Minimum 12-inches of clean backfill and topsoil protective soil cover
    - Vegetative cover
- Restrict deed or process environmental easement/covenant to prevent access to groundwater and use of the property.
- Monitor and conduct O&M, including groundwater monitoring.

ALTERNATIVE GW-3
Excavate of High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, Monitor Groundwater and Operations and Maintenance
Estimated Capital Cost: $2,023,000
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $3,266,000

Alternative GW-3 is similar to GW-2 with the exception of installing a cap equivalent to a RCRA Subtitle D cap around well T-11 area (attached Figure 30). In order to accommodate the thickness of the cap without changing surface water drainage, the excavation of the broader area around T-11 would be slightly deeper (18 inches) than the 12 inches included under GW-2. The capping system would consist of the a 40-mil geomembrane liner, a geocomposite drainage layer, and protective soil cover (see Figure 26). The final surfaces of the capped areas would be gently graded into the surrounding terrain, and no significant or noticeable changes from the existing topography are anticipated. The extent of the excavation should ensure that the non-residential PCB surface soil PRG of 21 mg/kg and the PCB subsurface soil PRG of 97 mg/kg are met outside and around the covered area.

ICs, such as a deed restriction or environmental easements/covenants, would be included to restrict access to groundwater and to restrict future uses of the property. Monitoring and O&M of the proposed remedial components, including further groundwater monitoring, are included in this alternative.

The following components are part of Alternative GW-3:

- Excavate PCB impacted soil acting as PTW (approximately 200 cubic yards) and 18-inches of soil over the broader impacted area (approximately 4200 cubic yards).
- Dispose of excavated soil at an approved offsite disposal facility.
- All PCB contaminated soil disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Backfill excavated areas with clean fill materials and preparing surface for the cap.
- Install a low-permeability cap over the area:
  - 40-mil geomembrane liner
  - Geocomposite drainage layer
  - Minimum 18-inches clean backfill and topsoil protective soil cover
  - Vegetative cover
- Restrict deed or process environmental easement/covenant to prevent access to groundwater and use of the property.
- Monitor and conduct O&M of the cap, including groundwater monitoring.

ALTERNATIVE GW-4

Excavate High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, Pump and Treat Groundwater, Monitor Groundwater and Operation and Maintenance

Estimated Capital Cost: $2,366,000
Estimated Annual O&M Cost: $40,000
Estimated Present Worth Cost: $4,169,000

The soil removal and capping components of GW-4 are identical to GW-3. GW-4 adds installation of a groundwater pump-and-treat system to address groundwater concentrations measured in the T-11 area (attached Figure 31). The system would include two extraction wells with pumps that operate using solar power, a temporary carbon filter, and an NPDES discharge to Snow Creek. During the remedial design phase, alternate methods for groundwater extraction, treatment, and disposal may be considered.

The operation of the groundwater extraction and treatment system will be evaluated during remedial design using the Adaptive Site Management (ASM) approach. Initially, at least two pore volumes of groundwater from the impacted area will be removed and groundwater conditions will be monitored to evaluate rebound. More groundwater will be extracted if PCB MCLs are not reached. Once the PCB MCL is achieved a period of monitoring will be necessary to demonstrate that rebound is not likely to reoccur. Extraction of two pore volumes is estimated to take approximately one year. Solar powered equipment will be used at this isolated location. An NPDES permit will be required to discharge treated surface water to Snow Creek.

The following components are part of Alternative GW-4:

- Excavate PCB impacted soil acting as PTW (approximately 200 cubic yards) and 18-inches of soil over the broader impacted area (approximately 4300 cubic yards).
- Dispose of excavated soil at an approved offsite disposal facility.
- All PCB contaminated soil disposal decisions will be based on in-place total PCB concentrations from grab samples that include Aroclor-1268 as an analyte.
- Backfill excavated areas with clean fill materials and preparing the surface for the cap.
- Install a low-permeability cap over the area:
  - 40-mil geomembrane liner
  - Geocomposite drainage layer
  - Minimum 18-inches clean backfill and topsoil protective soil cover
  - Vegetative cover
- Install a pump-and-treat system:
  - two extraction wells
  - two pumps that operate using solar power,
  - a temporary carbon filter system
- Restrict deed or process environmental easement/covenant to prevent access to groundwater and use of the property.
- Monitor and conduct O&M of the cap, including groundwater monitoring.

Remedial Alternatives for Sediment and Creek Banks

The alternatives developed for sediment and creek banks involve a similar geographical footprint. Some sediment concentrations were estimated based on nearby deposits. A preliminary design investigation will be needed for the sediment deposits that have yet to be characterized. Six remedial approaches (including the no action alternative) for sediment and creek banks were considered during the screening process. Two of the approaches were screened out, including monitored natural recovery (MNR) and directly capping the in-creek sediment deposits. MNR was screened out as a remedial approach due to concerns regarding effectiveness as a standalone remedy. In place capping was screened out based on concerns regarding localized flooding as a result of raising the elevation of the creek bed with the cap profile. The elevated cap profile would be associated with the relatively thick layer of riprap armor stone that would be placed over the sediment deposits to protect the underlying capping material (sand or a reactive cap material) from erosion during high flow conditions. One of the retained alternatives has a slightly smaller remedial footprint as it targets sediment deposits with average PCB concentrations greater than or equal to 10 mg/kg.

Two PCB PRGs were considered in the FS to protect ecological receptors and limit the continuing downstream migration of contaminants: 3 mg/kg (attached Figures 32a-j) and 1 mg/kg (attached Figures 33a-j). Sediment PRGs for chromium, cobalt, manganese, mercury, nickel, and vanadium were also considered in the alternatives. All of the alternatives include removing of an estimated 1600 cubic yards of sediment accumulated in the Highway 202 culverts. Table 17 lists the snow creek sediment deposits and their significant characteristics.

The remedial alternatives for sediment are focused on the sediment deposits from the OU1/OU2 portion of Snow Creek with PCBs and metals exceeding their respective PRGs. In addition, several creek bank areas are targeted for stabilization. The creek bank areas are included with the sediment alternatives to address materials with PCB concentrations above the PRG that could enter the aquatic system. These areas include EU5 and EU10, especially at the upstream end of EU5 near the confluence of the 11th Street Ditch and the downstream end of EU5 where it merges with EU10. Hardened or engineered approaches for bank stabilization such as riprap, gabion rock baskets, or articulated concrete mats are included with the alternatives and were estimated for creek banks that have sharp changes in flow direction to decrease the potential for stream bank erosion. A more natural approach for stabilizing the creek banks along the remainder of EU5 and along the banks of the creek between EU12 and EU13 has also been included. These natural measures could include allowing the vegetation to reestablish itself along the creek bank instead of having it regularly cut to ground surface as part of routine maintenance activities and/or augmenting the creek banks with natural features such as large tree stumps or logs. Of the 1,400 feet of bank area identified for stabilization (shown on Figures 32a-j and Figures 33a-j), approximately 350 feet are targeted for engineered approaches and approximately 1,050 feet are targeted for a naturalized bank stabilization using the range of potential techniques identified above. All of these assumptions will be evaluated further in the remedial design.

The following are key ARARs:

- Regulations at 40 Code of Federal Regulations (C.F.R.) Part 262.11(a)-(d) for the management and disposal of remediation wastes.
- Regulations at 40 C.F.R. Part 761 for the management, storage and disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes.
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC as part of the ASM process under this alternative
- Regulations at 40 C.F.R. § 230 regarding dredging and filling in the creek
- Regulations at U.S.C 4001 et seq. and 4101 regarding alternation of the creek
- Section 404(b)(1) of the CWA for mitigation of wetlands.

The sediment and creek bank (SED) remedial alternatives developed for detailed analysis are summarized below and in Table 25:

- Alternative SED-1 – No Action
- Alternative SED-2 – Excavation, Onsite/Offsite Disposal, and MNR
- Alternative SED-3 – Excavation and Onsite/Offsite Disposal
- Alternative SED-4 – Excavation and Offsite Disposal

ALTERNATIVE SED-1
No Action
Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0

Alternative SED-1 is the no action alternative required by the NCP. SED-1 would not be protective of the environment. Sediment and creek bank soil would remain in place with concentrations above the PRGs developed for ecological receptors. Also, this alternative will not reduce the contaminant sources available to downstream receptors.

ALTERNATIVE SED-2

Combination Excavate, Onsite and Offsite Disposal, and Monitored Natural Attenuation

For PRG = 3 mg/kg ***Estimated Capital Cost: $1,619,000***
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $2,661,000

Remedial alternative SED-2 uses an average target PCB concentration of 10 mg/kg for the sediment deposits to define whether sediment deposits will be removed, and MNR is used to achieve the long term goal of 3 mg/kg. The excavated materials would be disposed of offsite if total PCB concentrations are greater than or equal to 50 mg/kg; onsite disposal would be used for materials with PCB concentrations less than 50 mg/kg.[7] The majority of sediments to be excavated under this alternative are located upstream of the Highway 202 culverts. Only one sediment deposit, located downstream of the Highway 202 culvert, would be excavated based on having an average PCB concentration above 10 mg/kg. The average PCB concentrations for the sediment deposits remaining following implementation under this remedial alternative would be 1.9 mg/kg.

SED-2 also addresses three small sediment deposits where the average PCB concentration does not exceed 10 mg/kg, but the PRGs for one or more metals are exceeded. The total resulting removal volume is estimated to be 2,300 cubic yards. Prior to implementing this remedial alternative, a PDI would be implemented for the Snow Creek sediment deposits that had not been sampled.

A combination of onsite and offsite disposal of the excavated materials would be used. Onsite disposal in a soil management area (the SSSMA) would be used for materials with PCB concentrations less than 50 mg/kg and offsite disposal would be used for materials with PCB concentrations greater than or equal to 50 mg/kg.

There are 1.5 acres of tree clearing associated with SED-2. Most of this clearing is located directly along the edge of the creek in the riparian buffer zone. Removing sediment is likely to cause a short-term increase in suspended sediment in the surface water column and an associated increase in concentrations of COCs in surface water. Stabilizing the creek banks would require hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. This alternative assumes that approximately 75% of the creek bank stabilization (1,050 linear feet of 1,400 linear feet of bank stabilization areas) can be stabilized using natural techniques. There are significant, but manageable, logistical issues associated with accessing and removing sediment from the Highway 202 culverts.

[7] PCB concentrations considered for remediation and disposal should be based on in-place total PCB concentrations from grab samples not more than 6 inches in depth, that includes Aroclor-1268 as an analyte or total PCBs based another method that will represent all homologues and congeners.

The duration to implement the field construction components of SED-2 is 6 to 12 months, recognizing that the time to achieve the PRGs may be longer as the alternative relies on a combination of source control and MNR, and the elimination of upstream sources. Energy use for SED-2 is approximately 1,400 million British Thermal Units (MMBtu), and the greenhouse gas emissions are approximately 110 tons of carbon dioxide equivalents (CO2e).

The following components are part of Alternative SED-2:

- Excavate sediment with an average target PCB concentration greater than or equal to 10 mg/kg (approximately 2,700 cubic yards).
- Dispose of sediment with total PCB concentrations greater than or equal to 50 mg/kg offsite and dispose of sediments with total PCB concentrations less than 50 mg/kg onsite.
- Disposal will be based on in-place total PCB concentrations from grab samples not more than 6 inches in depth, that include Aroclor-1268 as an analyte or total PCBs based on another method that will represent all homologues and congeners.
- Monitored natural attenuation of sediments until they achieve the long term goal of 3 mg/kg.
- Monitor bank stability and sediment concentrations to ensure the sediments remedy is maintained.

ALTERNATIVE SED-3
Excavate and Onsite and Offsite Disposal

(a) For PRG = 3 mg/kg ***Estimated Capital Cost: $1,751,000***
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $2,859,000

(b) For PRG = 1 mg/kg ***Estimated Capital Cost: $2,608,000***
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $4,142,000

Remedial alternative SED-3 is similar to SED-2 with the exception that the alternative targets the remediation of sediment deposits with average PCB concentrations greater than or equal to a PRG of 3 mg/kg. SED-3 also includes the removal of sediment deposits with average concentrations exceeding the non-PCB PRG values. This includes two of the three deposits targeted in SED-2 for non-PCB constituents. The approach for sediment disposal under alternatives SED-2 and SED-3 are identical where a combination of onsite and offsite disposal is used for the excavated materials.

There are 1.9 acres of tree clearing associated with implementing SED-4. Most of this clearing is located directly along the edge of the creek in the riparian buffer zone. Removing sediment is likely to cause a short-term increase in suspended sediments in the surface water column and an associated increase in concentrations of COCs in surface water. Stabilizing the creek banks would require hard engineering (such as riprap or concrete) in places, permanently affecting the aesthetics of the creek banks. Approximately 75% of the creek bank stabilization (1,050 linear feet of 1,400 linear feet of bank stabilization areas) would be stabilized using natural techniques.

There are significant, but manageable logistical issues associated with accessing and removing sediments from the Highway 202 culverts.

The anticipated duration to construct SED-3 is 6 to 12 months. The PRGs for sediment would be achieved following implementation, but, the surface water PRG may take some time to achieve as upstream sources are controlled over time. Energy use for SED-3 is approximately 1,530 MMBtu, and the greenhouse gas emissions are approximately 120 CO2e.

The following components are part of Alternative SED-3:

- Excavate sediment with an average target PCB concentration greater than or equal to 3 mg/kg.
- Dispose of sediments with total PCB concentrations greater than or equal to 50 mg/kg offsite and dispose of sediments with total PCB concentrations less than 50 mg/kg onsite.
- Disposal will be based on in-place total PCB concentrations from grab samples not more than 6 inches in depth, that includes Aroclor-1268 as an analyte or total PCBs based on another method that will represent all homologues and congeners.
- Monitor bank stability and sediment concentrations to ensure the sediments remedy is maintained.

ALTERNATIVE SED-4
Excavate and Offsite Disposal

(a) For PRG = 3 mg/kg
Estimated Capital Cost: $1,897,000
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $3,078,000

(b) For PRG = 1 mg/kg
Estimated Capital Cost: $2,837,000
Estimated Annual O&M Cost: $15,000
Estimated Present Worth Cost: $4,487,000

SED-4 is similar to SED-3 with the exception of the approach used for sediment disposal. SED-4 targets the removal of sediment deposits with average PCB concentrations exceeding the PCB PRG of 3 mg/kg and the two small sediment deposits where the PCB PRG is not exceeded but the PRG for one or more metals is exceeded. Once removed, the sediments would be transported to and disposed of in a permitted offsite facility.

There are 1.9 acres of tree clearing associated with implementing SED-4. Most of this clearing is located directly along the edge of the creek in the riparian buffer zone. Removing sediment is likely to cause a short-term increase in suspended sediment in the surface water column and an associated increase in concentrations of COCs in surface water. Stabilizing the creek banks would require hard engineering (such as riprap or concrete) in places, permanently affecting the aesthetics of the creek banks. Approximately 75% of the creek bank stabilization (1,050 linear feet of 1,400 linear feet of bank stabilization areas) would be stabilized using natural techniques. There are significant, but manageable logistical issues associated with accessing and removing sediments from the Highway 202 culverts.

The anticipated construction duration of SED-4 is 6 to 12 months. The PRGs for sediments would be achieved following implementation, but the surface water PRG may take some time to achieve as upstream sources are controlled over time. Energy use for SED-4 is approximately 1,720 MMBtu, and the greenhouse gas emissions are approximately 140 CO2e.

The following components are part of Alternative SED-4:

- Excavate sediments with an average target PCB concentration greater than or equal to 3 mg/kg.
- Dispose of sediments offsite based on in-place total PCB concentrations from grab samples not more than 6 inches in depth, that includes Aroclor-1268 as an analyte or total PCBs based on another method that will represent all homologues and congeners.
- Monitor bank stability and sediment concentrations to ensure the sediments remedy is maintained.

Comparative Evaluation of Alternatives

Each alternative was evaluated using the nine evaluation criteria in the NCP, 40 C.F.R. Section 300.430(e)(9)(iii). Two of the nine criteria, overall protection of human health and the environment, and compliance with ARARs, are threshold criteria. If an alternative does not meet these two criteria, it cannot be considered as a remedy for the category being compared in OU1/OU2.

- **Overall protection of human health and the environment** addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

- **ARARs** - Section 121(d) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (i.e., ARARs) to the hazardous substances or particular circumstances at a site or obtain a waiver. See also 40 C.F.R. § 300.430(f)(1)(ii)(B). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. Compliance with OSHA standards is required by 40 C.F.R. § 300.150 and, therefore, the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

  Under CERCLA Section 121(e)(1), federal, state or local permits are not required for the portion of any removal or remedial action conducted entirely onsite as defined in 40 C.F.R. § 300.5. See also 40 C.F.R. §§ 300.400(e)(1) & (2). Also, CERCLA actions must only comply with the "substantive requirements," not the administrative requirements of a regulation. Administrative requirements include permit applications, reporting, record keeping and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements such as those typically identified as Location-Specific ARARs.

Applicable requirements, as defined in 40 C.F.R. § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements, as defined in 40 C.F.R. § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.

Per 40 C.F.R. § 300.400(g)(5), only those state standards that are promulgated, are identified in a timely manner, and that are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of general applicability and are legally enforceable. State ARARs are considered more stringent where there is no corresponding federal ARAR, where the State ARAR provides a more stringent concentration of a contaminant, or the where a State ARAR is broader in scope than a federal requirement.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The "to-be-considered" (TBC) category consists of advisories, criteria or guidance that were developed by the EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. See 40 C.F.R. § 300.400(g)(3). TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site but are evaluated along with ARARs as part of the risk assessment to set protective cleanup goals. TBCs can be used in the absence of ARARs, when ARARs are insufficient to develop cleanup goals, or when multiple contaminants may be posing a cumulative risk. See the EPA, OSWER Directive No. 9234.0-05, Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements (July 9, 1987).

For purposes of ease of identification, the EPA has created three categories of ARARs: Chemical-, Location- and Action-Specific. Under 40 C.F.R. § 300.400(g)(5), the lead and support agencies shall identify their specific ARARs for a particular site and notify each other in a timely manner as described in 40 C.F.R. § 300.515(d). Chemical- and Location-Specific ARARs should be identified as early as the scoping phase of the RI, while Action-Specific ARARs are identified as part of the FS for each remedial alternative. See 40 C.F.R. §§ 300.430(b)(9) & 300.430(d)(3).

In accordance with 40 C.F.R. § 300.400(g), the EPA and the State of Alabama have identified the potential ARARs and TBCs for the evaluated alternatives. The Chemical-, Location-, and Action-Specific ARARs/TBCs being considered are presented in the FS and will be finalized in the ROD.

Five of the criteria are balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contaminants through treatment; short-term effectiveness, implementability, and cost. The EPA can make tradeoffs between the alternatives with respect to the balancing criteria.

- **Long-term effectiveness and permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

- **Reduction of toxicity, mobility or volume through treatment** refers to the anticipated performance of the treatment technologies that may be included as part of the remedy. This criterion evaluates an alternative's use of treatment to reduce harmful effects of contaminants, their ability to move in the environment, and the amount of contamination present.

- **Short-term effectiveness** addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

- **Implementability** addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility and coordination with other governmental entities are also considered.

- **Cost** - This criterion evaluates the estimated capital and O&M costs as well as present worth costs of each alternative based on a 7% discount rate. Present worth costs are the total cost of an alternative over time in terms of today's dollars (i.e., present worth costs correct for expected inflation). The cost estimates are order-of-magnitude estimates, which are expected to be accurate within the range of +50 to -30 percent.

Two of the criteria are modifying criteria, state/support agency acceptance and community acceptance. These modifying criteria are formally taken into account after public comment is received on the Proposed Plan and RI/FS, and may be used by the EPA to modify the proposed remedy.

- **State/Support Agency Acceptance** is important to the EPA. ADEM received draft documents and engaged in discussions about draft plans, data, and alternatives. ADEM is a valued partner in protecting the environment. The EPA would like to receive ADEM's concurrence on the selected remedy.

- **Community Acceptance** has been considered to some degree during the RI/FS development. The Community Advisory Group and community Technical Advisor have received draft documents and engaged in discussions about draft plans, data, and alternatives. Community acceptance will be gauged based on input received during the comment period.

This section summarizes the comparison of each category of alternative to the nine CERCLA evaluation criteria and to each other.

Residential Soil

Residential cleanups of PCBs in surface soil have been implemented at most yards/properties except where access has not been granted or where wooded/overgrown conditions are preventing current exposure. In addition to the previously completed removal actions under the Removal Order and the NTC Removal Action Agreement, RS-2 would use a soil management approach (i.e., operations and maintenance) to address the PCB residuals at depth beneath previously remediated yard areas. Soil management would also be used to monitor locations where structures may be removed over time and additional evaluations and/or removal actions may be needed at these locations. The only difference between RS-3 and RS-2 is the approach to address the PCB residuals at depth. Under RS-3, subsurface soil with PCB concentrations between 1 mg/kg and 10 mg/kg would be removed and disposed of onsite. The onsite soil management area would be used for the disposal of materials with PCB concentrations less than 10 mg/kg that have been characterized with five-point composite samples.

Alternatives RS-2 and RS-3 would meet the overall protection of human health and the environment threshold criterion. RS-1 would meet this criterion for the areas/ properties where removals have been conducted, but would not meet this criterion for the few remaining residential properties with surface soil concentrations above 1 mg/kg and where removals have not been conducted because the property is wooded and overgrown. RS-1 would not provide for future management of residual PCBs in the subsurface of some properties or under structures.

Both RS-2 and RS-3 would both require proper handling and disposal of PCB remediation waste.

Short-term impacts are higher for alternative RS-3 than under RS-2. These impacts are associated with returning to properties where surface soil were previously removed and repeating the process to remove subsurface soil with PCB concentration between 1 mg/kg and 10 mg/kg. RS-3 will have a larger environmental impact in terms of energy use and greenhouse gas emissions than RS-2. RS-3 will also take two to three years longer to implement than RS-2.

RS-2 and RS-3 alternatives provide long-term effectiveness and permanence where removals/backfill have been or will be completed. RS-2 and RS-3 would both provide protection by completing the necessary removal actions as required and conducting long-term residuals management with RS-3 providing a higher level of permanence through the removal of subsurface soil.

The RS alternatives are not treatment alternatives and thus do not reduce the toxicity, mobility or volume of the materials. Because access to properties for excavation is sporadic and spread out over time, only small quantities of low level PCB contaminated soil are typically handled at any time, making it impractical to treat the contamination.

Both RS-2 and RS-3 alternatives are implementable. RS-2 has been or will be implemented in the same manner as previously conducted for the residential properties. RS-3 would be conducted in the same manner, but it would require excavating to greater depths around structures and other obstructions.

There is no cost associated with RS-1. RS-2 is estimated to cost $7.3M, and RS-3 is estimated to cost $15.7M.

RS-1 was eliminated because it does not provide overall protection where cleanups have not yet been performed and does not provide for management of residual PCBs on residential properties. RS-2 and RS-3 are similar in that surface soil on most of the affected residential properties have already been effectively addressed. Alternatives RS-2 provides more short-term effectiveness but lower long-term effectiveness, while RS-3 provides more long-term effectiveness but lower short-term effectiveness. The primary differences between RS-2 and RS-3 are the increased level of community impact and implementability challenges under RS-3, and the increase in permanence that RS-3 provides. There is also a substantial difference in cost between the two approaches ($7.3M for RS-2 and $15.7M for RS-3). Table 19 provides a summary level of the comparative analysis for the RS alternatives.

Special Use Property Soil

Surface soil in high activity areas of Special Use Properties (i.e., schools, churches, day-care centers, community centers, playgrounds, and parks) have been addressed similar to residential soil; PCBs greater than or equal to 1 mg/kg in surface soil and PCBs greater than or equal to 10 mg/kg in subsurface soil have been excavated, disposed of onsite and offsite, backfilled with clean soil, and re-vegetated. The special use property alternatives were developed to address residual PCBs concentrations in low activity surface and subsurface soil, PCBs in subsurface soil in high activity areas, and the future discovery of PCBs beneath structures. SU-1 is the no further action alternative. SU-2 focuses on soil management for the PCB residuals at depth within high activity areas with concentrations between 1 and 10 mg/kg, monitoring locations where structures may be removed over time and the potential need for additional evaluations and/or removal actions at these locations, and treating the low activity areas of these properties as non-residential soil with a PCB cleanup goal of 21 mg/kg. Under SU-3, the low activity areas on Special Use Properties would be cleaned up to 1.16 mg/kg, the most stringent non-residential cleanup goal (i.e., 1 x 10-6 cancer risk to young children in a future school or daycare setting), which essentially the same as conducting a residential cleanup. For SU-4, the removals would be further expanded to include removing both surface and subsurface soil above 1 mg/kg in high and low activity portions of the special use areas. Consistent with the alternatives for residential soil, the onsite soil management area would be used for the disposal of materials with PCB concentrations less than 10 mg/kg that have been characterized with five-point composite samples.

Alternatives SU-2, SU-3, and SU-4 would meet the overall protection of human health and the environment threshold criterion. Alternative SU-1 (no further action) does not include a mechanism for addressing low activity areas, residuals at the high activity areas, or for monitoring potential changes in land use or the removal of structures, and thus, SU-1 does not fully meet this threshold criterion.

SU-2 through SU-4 require proper handling and disposal of PCB remediation waste.

Since the high activity areas removals have already been implemented and no low activity areas need to be addressed in SU-2, the comparative short-term impacts are higher for SU-3 and much higher for alternative SU-4. The short term impacts of SU-3 would include remediation in low-activity areas. The impacts in SU-4 are associated with addressing low activity areas as well as returning to areas where surface soil were previously removed and repeating the process to remove subsurface soil with PCB concentrations between 1 mg/kg and 10 mg/kg. SU-4 will have a larger environmental impact in terms of energy use and greenhouse gas emissions than SU-2 and SU-3. SU-4 will also take longer to implement.

SU-2, SU-3, and SU-4 alternatives would provide some long-term effectiveness and permanence where removals/backfill have been or will be completed. SU-3 would provide a slightly higher level of permanence through the removal of surface soil from low activity areas to concentrations less than 1.16 mg/kg. SU-4 would provide even a higher level of permanence by removing all soil (surface and subsurface) above 1 mg/kg from all the high activity and low activity areas.

The SU alternatives are not treatment alternatives and thus do not reduce the toxicity, mobility or volume of the materials. Like the residential category, access to Special Use Properties for remediation has historically been sporadic and spread out over time, only small quantities of low level PCB contaminated soil are typically handled at any time, making it impractical to treat the contamination.

All of the SU alternatives are implementable. The work remaining under SU-2 is just soil management and thus the easiest to implement. SU-3 is more difficult to implement given the work that would be conducted in the low activity areas. SU-4 would be conducted in the same manner as SU-3, but is even more difficult to implement given the surface and subsurface removals in the low activity areas and the need to return to high activity areas where the surface soil has already been remediated to address residuals at depth.

No cost is associated with SU-1. The estimated cost for SU-2 is approximately $0.5M, assuming that no non-residential cleanup is required in low activity areas to reach the non-residential goal. The cost for SU-3 is approximately $3.1M. SU-4 is estimated to cost approximately $3.9M.

Because the high activity areas of the Special Use Properties have already been addressed, SU-2 would provide the additional long-term effectiveness through soil management to address PCB residuals at depth or potential residuals beneath structures. O&M would be conducted to monitor potential changes of areas from low activity to high activity. SU-3 would provide an additional level of long-term protectiveness by addressing low activity portions of special use areas using the most stringent non-residential RGO (i.e., 1 x 10-6 cancer risk to young children in a school or daycare setting). SU-4 would be similar to SU-3 except that it would include conducting removals at depth at the low activity and high activity portions of the special use areas. There is a difference in cost between SU-2, SU-3 and SU-4 ($0.5M for SU-2, $3.1M for SU-3, and $3.9M for SU 4). Table 20 provides a summary level of the comparative analysis for the SU alternatives.

Interim Measures Soil

Four alternatives were evaluated to address interim measures, IM-1 through IM-4. IM-1 is no further action. IM-2 includes expansion of soil and liner caps over portions of the IMs that are currently lacking in spatial coverage to meet the non-residential PRG of 21 mg/kg. IM-3 expands the spatial extent of the caps in the same manner as IM-2 with the exception that soil in the vicinity of PB-RR-37 would be removed rather than capped. IM-4 relies upon soil excavation and offsite disposal to address the proposed IM enhancement areas. IM-2 through IM-4 would all include long-term O&M and IC requirements.

IM-1 would leave some areas without adequate cover or controls and, therefore, would not be protective. IM-2 and IM-3 would provide protection of human health and the environment. IM-4 would provide an additional level of protection over IM-2 and IM-3 by excavating and disposing of impacted soil that need to be addressed.

IM-2, IM-3, and IM-4 would comply with ARARs and PCB impacted soil would be disposed of in accordance with ARARs.

IM-2, IM-3, and IM-4 would be effective as soon as they are implemented. Because of the location of the IM areas, the short-term negative impacts to the public would be minimal. Potential impacts to workers would be addressed in the same manner as other construction work conducted for the Site. IM-2 would be easier to implement and would disturb less high-concentration soil in the vicinity of PB-RR-37 than IM-3. IM-3 would also require water diversion and water control procedures during excavation to minimize the potential for erosion and surface water runoff during the excavation of high-concentration soil. IM-4 would be the most difficult to implement as it would require the excavation and removal of a larger quantity of impacted soil prior to placing a minimum 12-inch clean soil cover over the removal areas.

The environmental footprints of the three active IM alternatives are similar with a slightly larger footprint for IM-4. The energy use for IM-2 and IM-3 are very close—IM-2 at 690 MMBtu and IM-3 at approximately 750 MMBtu. IM-3 has a slightly higher quantity of greenhouse gas emissions (60 CO_2e) versus IM-2 (55 CO_2e). This difference is associated with the transportation of excavated soil to an offsite TSCA disposal facility for soil excavated from the PB-RR-37 portion of the Eastside Area. IM-4 has a higher quantity of greenhouse gas emissions (300 CO_2e) versus each of the other alternatives. This difference is associated with the transportation of excavated soil to an offsite TSCA disposal facility for soil excavated from the IM areas.

Both IM-2 and IM-3 would provide long-term effectiveness and permanence through isolation, O&M, and ICs. The cap will also protect these soil from direct contact or erosion from surface water flow. To maintain the current surface water flow conditions in the local area, a culvert would be placed in the area prior to capping. IM-4 would provide the highest degree of long-term effectiveness and permanence with the removal of impacted soil in areas previously not covered by existing IMs.

The IM alternatives are not treatment alternatives and would not reduce the toxicity, mobility or volume of the materials. The volume of material is relatively low and can be effecting contained or excavated and disposed of offsite.

The IM alternatives could be implemented in a manner similar to IM-related work that has been implemented previously on the Site. IM-3 would be more difficult to implement than IM-2, as it would involve surface water controls and diversion and the removal, transport, and disposal of the materials near PB-RR-37. IM-4 would be more difficult to implement than IM-3, as it would involve more excavation and offsite transport and disposal than the other alternatives.

The costs for IM alternatives IM-2 and IM-3 are comparable, with both IM-2 and IM-3 estimated at approximately $2.6M. The cost for implementing IM-4 is significantly higher than the other alternatives at approximately $4.3M.

The three active IM alternatives (IM-2, IM-3, and IM-4) would effectively address the current gaps in spatial coverage for the previously implemented IMs. These actions, in combination with O&M and ICs would provide long-term effectiveness and permanence for each alternative. IM-2 would be easier to implement; while IM-4 would provide higher long-term effectiveness and permanence through soil removal. Soil in the area of PB-RR-37 would be removed under IM-3 and IM-4, and this would include additional controls to manage surface water runoff during construction and additional truck traffic associated with offsite disposal operations. Truck traffic would be further increased with the implementation of IM-4. The costs for IM-2 and IM-3 are similar ($2.6M), while the cost for IM-4 is higher ($4.3M). Table 21 provides a summary of the comparative analysis.

Dredge Spoil Piles

In addition to no action (DSP-1), there are four active alternatives to address the dredge spoil piles (DSP-2 through DSP-5). DSP-2 and DSP-3 are the same with the exception of how materials are disposed. Both DSP-2 and DSP-3 are assumed to include removal and disposal of dredge spoil pile SC-8 to meet the non-residential PCB surface soil PRG of 21 kg/mg. A PDI for dredge spoil pile SC-2 would be conducted under DSP-2 and DSP-3. A stabilization cover system would be used for the dredge spoil piles characterized as having PCB concentrations below the PRG of 21 mg/kg to the extent needed. Alternatives DSP-2 and DSP-3 would remove the dredge spoil piles with EPCs calculated as greater than 21 mg/kg and would remove and backfill 12-inches of underlying soil. The excavated materials would be transported to an offsite disposal facility under alternative DSP-2. For alternative DSP-3, the excavated materials would be transported to an onsite soil management area for disposal, provided that the materials have PCB concentrations less than 50 mg/kg. Alternatives DSP-4 and DSP-5 would involve excavation of each of the four dredge spoil piles and 12 inches of underlying soil. DSP-4 would involve offsite disposal at a nonhazardous landfill. DSP-5 would dispose of material onsite if the concentrations are confirmed to be less than 50 mg/kg. For each of the active alternatives, the remaining backfilled areas would be managed using the same approach as selected for non-residential soil.

The no action alternative (DSP-1) would not be protective of human health and the environment. Each of the remaining 4 DSP alternatives would provide protection. The non-residential PRG of 21 mg/kg is applied in DSP-2 and DSP-3, resulting in the removal of SC-8 which has a PCB EPC of 29 mg/kg. DSP-4 and DSP-5 require removal and offsite disposal of all dredge spoil piles which is also protective.

Each of the active DSP alternatives will meet ARARs and appropriately dispose of PCB remediation waste.

Each of the active DSP alternatives would be similar in short-term effectiveness and short-term negative impacts. Each active alternative would achieve the PRG of 21 mg/kg immediately upon completion and would have short-term negative impacts associated with clearing, truck traffic, the potential for fugitive emissions, noise, and dust. There is slightly less truck traffic with DSP-3 and DSP-5 (i.e., onsite disposal alternatives) than with DSP-2 or DSP-4, as under the offsite disposal option, the trucks are on the local roadways for a longer period of time due to the increased distance between the excavation area and the offsite disposal facilities.

The differences in energy consumption between DSP-2 (1,200 MMBtu) and DSP-3 (750 MMBtu) is associated with use of an onsite soil management area under DSP-3 as opposed to the offsite facility used under DSP-2. The same rationale applies to greenhouse gas emissions—100 CO_2e for DSP-2 and 60 CO_2e for DSP-3. DSP-4 has the largest environmental footprint as all four dredge spoil piles are excavated and transported to an offsite landfill for disposal.

Each of the active alternatives would effectively and permanently remove dredge spoil pile(s) with concentrations above the PRG of 21 mg/kg (i.e., SC-8). DSP-2 and DSP-3 would further reduce the exposure to concentrations below 21 mg/kg and would stabilize the materials if needed. DSP-4 and DSP-5 would effectively and permanently remove all of the remaining dredge spoil piles, regardless of concentration. DSP-4 and DSP-5 would provide better long-term permanence over DSP-2 and DSP-3 because the dredge spoil piles would no longer be available to re-contaminate Snow Creek if stabilization of the piles deteriorates over time.

The DSP alternatives are not treatment alternatives and do not change the toxicity, mobility, or volume of the PCBs in soil. The volume of material associated with the piles is relatively low and can be effectively contained or excavated and disposed of onsite or offsite. Current data indicates that PCB concentrations are below 50 mg/kg and do not require disposal in a TSCA approved chemical waste landfill.

All of the DSP alternatives are implementable and have similar levels of implementability. DSP-4 and DSP-5 would require more property access and shoreline clearing to implement and would include the excavation and disposal of more materials (4,900 cubic yards for DSP-2 and DSP-3, and 7,300 cubic yards for DSP-4 and DSP-5).

The costs for the DSP alternatives are highly dependent on the disposal costs. The PCB concentrations of dredge spoil pile SC-8 and the 12-inch layer of soil beneath SC-8 are less than 50 mg/kg. Based on this, these materials could be disposed of in the onsite disposal area and would significantly reduce the cost for DSP-3 and DSP-5 as compared to DSP-2 and DSP-4. The cost for DSP-2 (with offsite disposal) is approximately $0.9M, and the cost with onsite and offsite disposal (DSP-3) is significantly less ($0.5M). The cost for DSP-4 is $1.4M and the cost for DSP-5 is $0.7M.

The four active dredge spoil alternatives are expected to have similar levels of effectiveness; however, more contaminated soil would be removed under DSP-4 and DSP-5. DSP-2 and DSP-3 would have less short-term impacts during implementation because the smaller volume of soil being removed would cause less disruption. There are more impacts under the offsite disposal options (DSP-2 and DSP-4) as the trucks would be on the local roadways for a longer period of time than if the materials were disposed of in the SSSMA. The costs for the alternatives are $0.5M (DSP-3), $0.7M (DSP-5), $0.9M (DSP-2), and $1.4M (DSP-4). Table 22 provides a summary of the comparative analysis.

Unapproved Waste Disposal Areas

The four alternatives—UWDA-1 through UWDA-4—include no action and three different approaches to address the UWDAs. UWDA-2 and UWDA-3 would each involve a cover system, with UWDA-2 being a simple soil cap. UWDA-3 includes a RCRA-type cap over each of the UWDA areas. UWDA-4 includes significantly more intrusive work and would include excavating all of the waste and transporting these materials to an offsite facility.

Each of the UWDA alternatives, with the exception of UWDA-1 (no further action), would meet this threshold criterion. Relevant waste disposal and capping ARARs would be met.

Each of the active UWDA alternatives would comply with potential ARARs.

The two capping alternatives (UWDA-2 and UWDA-3) would have similar short-term effectiveness. They would each take about the same amount of time to implement and would have similar issues with truck traffic, dust, and noise. Each capping alternative would achieve surface soil PRGs immediately upon completion. UWDA-4 (waste removal and disposal) would be a much larger construction project and would involve the excavation, handling, and transport of PCB-containing materials; include a range of unknown waste materials; and have more dust and emissions and proportionally more truck traffic to transport waste and backfill materials. These unknown waste materials may include constituents such as lead or other metals that may require pretreatment through stabilization prior to disposal at the landfill. UWDA-4 also presents significant challenges and the potential to impact the local community and surrounding creeks/drainageway areas. Implementing a large open excavation project in the floodplain where unknown waste material is to be excavated has the potential for significant short-term impacts. To address these uncertainties, significant efforts would be required to characterize materials prior to excavating, monitor and control emissions during implementation, and protect the creeks and drainageway areas that border the UWDAs. The construction duration for UWDA-4 is difficult to estimate, but the time to complete the process of excavating, offsite transport and disposal, backfilling, and restoring the areas is approximately one to two years. PDI efforts would also be needed to ensure that the excavation areas were stable during implementation. This includes portions of the UWDAs where deep excavations—up to 18 feet below the current grade—would be necessary.

These PDI efforts would focus on preventing damage to adjoining properties and structures during project implementation. Instead of capping approximately 4.5 acres, UWDA-4 would require excavation and offsite disposal of approximately 100,000 cubic yards of material from the same 4.5-acre area. The environmental footprints of UWDA-2 and UWDA-3 are similar with a significant increase for UWDA-4 that is approximately 50 times larger than UWDA-2 and UWDA-3.

Each of the active UWDA alternatives would provide some long-term effectiveness and permanence. The soil and marker layer cap (UWDA-2) has been shown to be effective throughout the Site. RCRA capping has been used effectively on many sites. However, excavation and removal of the waste is the most effective and permanent solution.

Two of the UWDA alternatives (UWDA-2 and UWDA-3) do not include treatment and thus do not reduce the toxicity, mobility, or volume of waste materials. There is a possibility that a portion of the materials excavated under UWDA-4 would require pretreatment with stabilization for leachable metals. This pretreatment would reduce the mobility of the metals (and the PCB), and would increase the volume of the waste material requiring disposal.

The active capping alternatives (UWDA-2 and UWDA-3) are equally implementable as demonstrated on this and other sites. UWDA-4 would be an enormous excavation and backfilling effort. Although excavation and backfilling are also known and reliable technologies, the magnitude of the effort, the duration of construction, and the possible implications of large open excavations of unknown materials would make UWDA-4 a very complex alternative to implement.

The costs for the active UWDA alternatives vary widely, with UWDA-2 estimated at $1.6M, UWDA-3 estimated to be $2.8M, and UWDA-4 estimated to be $41.2M.

Both UWDA-2 and UWDA-3 are proven technologies and have been implemented at other areas both on and off site. UWDA-4 would require a much higher effort to construct and would take one or more years longer to implement compared to the capping alternatives. In addition, the associated short-term impacts for UWDA-4 would be higher than the capping alternatives due to increased construction activities. The costs for the alternatives are $1.6M (UWDA-2), $2.8M (UWDA-3) and $41.2M (UWDA-4). Table 23 provides a summary of the comparative analysis.

Non-residential Soil

Six non-residential soil alternatives were evaluated—NRS-1 through NRS-6. As with all the categories, the first alternative (NRS-1) would be no action. NRS-2 involves placing clean cover (soil) over the area and in areas where impacts to flooding are expected to be minimal, and excavating the 12-inch surface soil layer in areas where placing a soil cover directly over the current grade could cause unacceptable flooding. The excavated areas would be backfilled with a 12-inch layer of clean soil to return the areas to grade. Alternatives NRS-3 through NRS-6 each involves excavating 12 inches of surface soil and replacing the areas with clean backfill materials. NRS-3 would allow excavated materials with a concentration less than 50 mg/kg to be disposed of onsite in the SSSMA. NRS-4 involves disposing of all excavated materials offsite. NRS-5 would include offsite treatment of excavated soil, instead of disposing the soil. NRS-6 would treat soil onsite using thermal desorption. The PCB concentration of the treated solids would be less than 50 mg/kg and would be disposed of onsite. The high-concentration PCB oil from the thermal treatment process would be shipped offsite for destruction using incineration.

Each alternative, with the exception of NRS-1, would include soil management for the alternatives to be effective over the long term. ICs including the potential use of environmental covenants may also be included.

Each of the NRS alternatives, with the exception of NRS-1 (no further action), would meet this criterion. Relevant waste disposal ARARs would be met.

NRS-2 through NRS-5 would have similar short-term impacts on a local level. NRS-6 would involve more local impacts, as the treatment system and support operations would be more visible, take more space, have the potential for air-borne emissions, and require offsite long-distance truck transport for the extracted PCB-containing oils. Each alternative addresses the same geographical footprint and would require the same access and truck traffic. NRS-5 and NRS-6 would involve trucks transporting the excavated materials or PCB oil to the offsite incineration facility. These trucks could be traveling on highways for several hundred miles and have a higher risk for transportation-related mishaps.

NRS-2 would take slightly less time to implement than the other alternatives. This is because NRS-2 only includes excavating and backfilling in three of the candidate remedial areas, and the other alternatives include excavating soil and backfilling in all of the remedial areas. All five of the active alternatives involve some level of truck traffic to and from the Site to remove materials and bring in clean cover.

There is a wide range in energy requirements and greenhouse gas emissions for the NRS alternatives. NRS-5 has the largest energy consumption at 502,600 MMBtu and the highest quantity of greenhouse gas emissions (35,750 CO_2e). The energy usage between the remaining active alternatives ranges from 2,300 MMBtu to 31,600 MMBtu. This difference is driven by the limited quantity of excavation, backfill and disposal under NRS-2 as opposed to alternatives NRS-3 and NRS-4. There is also a slight difference between NRS-3 and NRS-4 where the use of an onsite soil management area under NRS-3 has a reduced impact (5,500 MMBtu for NRS-3 versus 5,870 for NRS-4). The CO_2e values for NRS-2 through NRS-4 range from 185 to 470, and the reasons for the differences are identical to the energy use as described above.

The lower cleanup goal will approximately double the volume of soil and increase the short-term impacts on the community.

Each of the active NRS alternatives would offer long-term effectiveness and permanence, resulting in surface soil concentrations less than the PRGs. NRS-3 through NRS-6 would provide slightly improved permanence over NRS-2. NRS-2 would create some areas where the final elevation is 12 inches above current grade.

The lower cleanup goal will approximately double the volume of soil and increase the long-term effectiveness.

NRS-2, NRS-3, and NRS-4 do not include treatment that reduces the toxicity, mobility or volume of waste materials. NRS-5 and NRS-6 are the only two remedial alternatives that would reduce the toxicity, mobility, and volume of PCB-containing materials through treatment. NRS-5 will destroy PCBs in soil through incineration. NRS-6 will concentrate PCBs to a much smaller, more concentrated waste stream.

NRS-2 through NRS-5 have similar implementability challenges; capping and excavating soil can be implemented while offsite disposal is more work that onsite disposal. NRS-6 would involve procurement and permitting-type approvals for the onsite treatment of PCB- and metal-containing soil. The implementability challenges for transporting 9,100 cubic yards of soil 644 miles to an offsite incinerator (NRS-5) are significant when compared to the shipment of soil to landfills located in Alabama. Setting up and operating an onsite thermal treatment unit would involve air modeling and extensive stack testing of emissions prior to and during operations. NRS-6 would also involve the offsite transport of high-concentration oil for incinerator destruction. Although this would be significantly less volume than NRS-5, NRS-6 would involve both the local traffic involved with transporting solid materials to and from the treatment facility to the onsite soil management area and offsite long distance transport to an approved incinerator facility.

The lower cleanup goal will approximately double the volume of soil and increase the implementability challenges.

Costs for the active NRS alternatives are estimated to range from $7.9M to $21.0M. NRS-2 does not include as much excavation as the other alternatives and has the lowest cost ($7.9M). The costs for offsite disposal (NRS-4) and onsite/offsite disposal (NRS-3) are similar and are estimated to be $10.4M and $10.0M, respectively. This is because a majority of the soil (approximately 68%) for both of these alternatives is expected to have PCB concentrations greater than or equal to 50 mg/kg, and thus, the unit cost for offsite disposal drive the overall cost for both alternatives to be similar. The cost for offsite treatment is the significant influence for the overall cost under NRS-5 ($21.0M). NRS-6 would cost $19.1M.

The lower cleanup goal will approximately double the volume of soil and increase the costs.

The five NRS alternatives considered effective are similar with respect to most of the evaluation criteria. NRS-2 may have slightly reduced long-term permanence, as less of the materials are removed from the Site, and could be susceptible to erosion. NRS-3, NRS-4, and NRS-5 would be similar in the onsite implementation and the resulting effectiveness. NRS-3 would be slightly less costly to implement, as it would be less costly to dispose of even the small proportion of acceptable material onsite. NRS-5 and NRS-6 are the only treatment alternatives that would reduce the toxicity, mobility, and volume of the material through treatment. NRS-6 would have more short-term negative impacts and require more design work, coordination, advanced planning, and permitting-type activities, as well as monitoring prior to and during implementation to protect against potential airborne emissions. NRS-6 would also involve an offsite incineration component. The small advantages to either offsite (NRS-5) or onsite (NRS-6) treatment are disproportionate to the implementability challenges and higher costs for the treatment of PCBs. Table 24 provides a summary of the comparative analysis.

Groundwater and PTW at T-11 Summary

Four alternatives were evaluated to address the one area identified with PTW and demonstrated groundwater impacts. GW-1 is the no action alternative, and the other three alternatives sequentially increase in complexity to address PCBs in soil and the associated concentrations in groundwater at the T-11 area. GW-2 would excavate soil immediately around well T-11 to a depth of 4 feet (the vertical extent of high concentrations in soil in this area) and would excavate

12 inches of material across the broader area around T-11. All of the excavation areas under GW-2 would be backfilled with clean materials. GW-3 would include a similar excavation with the exception that 18 inches of soil would be removed as opposed to the 12-inch layer of soil that would be removed under GW-2. The primary difference between GW-2 and GW-3 is the placement of a low permeability cap (rather than backfill only) over the broader T-11 area. GW-4 is almost identical to GW-3 (excavation and capping) with the addition of extracting and treating groundwater from extraction wells that would be installed at the current location of groundwater well T-11. The extracted groundwater would be treated with activated carbon and discharged to Snow Creek.

Each of the GW alternatives, with the exception of GW-1 (no action), would meet this criterion.

GW-1 (no action) is not expected to achieve MCLs in groundwater. The three active GW alternatives are expected to reduce groundwater concentrations over time with the expectation that MCLs would be met in the future. Discharge of treated water to Snow Creek would require an NPDES permit. All of the active alternatives can be designed to meet ARARs.

Each of the active alternatives would have similar manageable short-term impacts associated with excavation and truck traffic. This includes the construction of a temporary or permanent bridge across the creek to access the area. There would be more impacts associated with GW-4 than with GW-2 and GW-3. This is due to the need to provide continued access to the area throughout the extraction period which is expected to take approximately one year. O&M personnel and equipment would be routinely accessing the area to service the treatment plant under GW-4. Removal of two pore volume of groundwater under GW-4 should also reduce the timeframe to achieve the MCL.

The energy uses and greenhouse gas emissions are similar between the alternatives; GW-2 has the lowest values due to a smaller quantity of soil being excavated and transported to an offsite disposal facility (2,250 MMBtu and 180 CO2e). The other two alternatives are equivalent with a slightly higher footprint for GW-4 (3,370 MMBtu and 260 CO2e for GW-4 and 3,220 MMBtu and 260 CO2e for GW-3). The environmental footprint of these two alternatives is considered to be equivalent through a combination of the similar values and the use of solar power as part of GW-4.

Each of the active alternatives would provide long-term effectiveness and permanence. Each of the active alternatives would remove the highest concentration soil immediately around the groundwater well (T-11). The surrounding surface soil layer (upper 12 inches) would also be removed from the broader T-11 area bounded by Snow Creek and the railroad tracks. These actions are expected to result in an effective remedy over the long term. While GW-3 and GW-4 also include a low permeability cap that limits infiltration over the broader T-11 area, the cap is not expected to significantly increase the effectiveness and permanence of GW-3 and GW-4. This is based on the CSM for the Site and the associated soil and groundwater data that support impacts to groundwater being linked to lower chlorinated PCB mixtures in close proximity to groundwater.

GW-4 is the only treatment alternative; it reduces the mobility, toxicity, and volume through the groundwater extraction and treatment processes. It does not provide for the treatment of contamination in soil.

Each of the GW alternatives is implementable using proven technologies. GW-4 has the greatest implementability challenges at the T-11 area, which is an island bounded by Snow Creek and an active railway line. In order to operate the extraction well and groundwater treatment plant, continued access to the work area would be required. Prior to implementing GW-4, a PDI would be needed to support the remedial design process. This would include obtaining a NPDES discharge permit. The PDI and permit would not be required for GW-2 or GW-3.

As each of the GW alternatives are more complex, the costs increase with complexity. GW-2 is estimated as $2.2M. GW-3 is estimated as $3.3M, and GW-4 is estimated as $4.2M.

The active alternatives for groundwater and PTW near T-11 (GW-2, GW-3, and GW-4) progressively increase in complexity, short-term effectiveness, and implementability challenges. However, the effectiveness of GW-4 is higher than GW-2 and GW-3, because it reduces the expected time to achieve the MCL between these active alternatives. Alternative GW-4 is the only alternative to include a treatment component. The costs for the alternatives are $2.2M (GW-2), $3.3M (GW-3) and $4.2M (GW-3). Table 25 provides a summary of the comparative analysis for the groundwater alternatives.

Sediment and Creek Bank

Four alternatives are evaluated to address sediment in Snow Creek and the creek banks. SED-1 is the no action alternative and SED-3 and SED-4 would both excavate the same footprint to achieve PRGs. SED-3 and SED-4 differ only in that SED-4 would dispose of all material offsite and SED-3 would use a combination of onsite and offsite disposal. SED-2 would excavate a smaller footprint based on the source control target PCB concentration of 10 mg/kg and is combined with MNR to achieve sediment PRGs over the long term. SED-2 also includes an ASM process for systematically adjusting the remedy, if needed, to meet the PRGs including the chronic AWQC for surface water. The stabilization of 1,400 linear feet of creek bank areas is included for all three active alternatives using a combination of engineered and natural approaches is the same under all three active alternatives.

Each of the sediment alternatives, with the exception of SED-1 (no action), provide for protection of human health and the environment. SED-2, SED-3, and SED-4 could be designed and constructed in compliance with ARARs. A number of federal, state, and local ARARs would be involved for work in this waterway.

SED-3 and SED-4 would have similar short-term effectiveness and associated short-term negative impacts and include the same footprint for excavation and shoreline impacts associated with tree removal, temporary access roads and staging areas, truck traffic, noise, and air issues. SED-2, SED-3, and SED-4 would each excavate the Highway 202 culverts and involve the same logistical issues with accessing and working safely in this area. SED-2 would excavate less material from fewer deposits and would only include one deposit downstream of Highway 202. With a smaller remediation footprint, SED-2 would be less intrusive, especially in the downstream portion of the creek. This alternative would require less tree cutting and fewer access roads and would have less surface water impacts during remediation. Because SED-2 has less tree removal, restoration, tree replacement and growing time are not as significant as for SED-3 and SED-4. SED-2 relies on MNR to achieve the PCB PRG of 3 mg/kg in the downstream deposits. SED-2 also provides an ASM process to guide achievement of the PRG and the chronic AWQC over a reasonable period.

The estimated time for the field construction period for SED-2, SED-3 and SED-4 is 6 to 12 months. It is expected that SED-2 would take less time than SED-3 and SED-4 as there are fewer sediment deposits to address and less shoreline areas to clear and grub. The estimated difference in time to implement SED-2 as compared to the other two active alternatives (approximately one to two months) is shorter than the expected viability in the overall field construction schedule. This schedule will likely be driven by sediment removal productivity constraints associated with the potential for confined space work inside the Highway 202 culverts and surface water flow conditions in Snow Creek that fluctuate throughout the year.

The three active alternatives have similar environmental footprints; where there are differences, they are associated with the use of an onsite management area and in the case of SED-2, the removal of a smaller volume of sediment. The energy consumption ranges from 1,720 MMBtu for SED-4 to 1,400 MMBtu for SED-2. The greenhouse gas emissions have the same distribution with 140 CO2e for SED-4 and 110 CO2e for SED-2. All of the active alternatives include natural stabilization techniques for 75% of the creek bank areas. This includes 1,050 linear feet of natural bank stability measures over 1,400 feet of creek bank that were identified as needing stabilization measures. The remaining 350 linear feet of creek bank would be stabilized with engineered measures that are considered to be less sustainable.

The lower cleanup goal will approximately double the volume of sediments and increase the short-term impacts on the community.

SED-2, SED-3, and SED-4 would effectively and permanently remove sediments with elevated concentrations of PCB and metals. It is expected that the sediment removal will also achieve a long-term reduction in surface water concentrations, even under high-flow conditions. Long-term effectiveness and permanence will also be determined by the contribution of multiple historical and ongoing sources to Snow Creek. The Anniston area is industrial with multiple possible sources for discharges and runoff into the creek. Although environmental awareness and enforcement has reduced the number and magnitude of the many possible direct sources of discharge to Snow Creek, discharges and surface runoff will probably continue to contribute concentrations of organic chemicals and metals to the sediment and surface water of Snow Creek. With the remediation measures already taken and those anticipated to be taken in OU3 and in the soil areas in OU1/OU2, the concentration of PCBs entering the creek from discharge and runoff is expected to continue to decrease over time.

The lower cleanup goal will approximately double the volume of sediments and increase long-term effectiveness of the remedy.

None of the sediment alternatives include treatment and thus would not reduce the mobility, toxicity, or volume of that material. Each of the active sediment alternatives has a similar level of implementability with SED-2 being more implementable than the two other active alternatives (SED-3 and SED-4). SED-2 requires less access and clearing (approximately 1.4 acres) than SED-3 and SED-4 which require the clearing and grubbing of 1.9 acres of land and access from eight landowners. For Snow Creek, the adjoining landowners in many cases own the rights to the creek and formal access is required. This is in contrast to other larger creeks where the creek bed is typically owned by the State. The lower cleanup goal will approximately double the volume of sediments and make the remedy more difficult to implement.

The costs for the three active SED alternatives are comparable ranging from $2.7M to $3.1M. The cost for offsite disposal only (SED-4) is slightly higher ($3.1M) than the combination of onsite and offsite disposal (SED-3; $2.9M). SED-2 would remove and dispose of less material and is, therefore, the lowest cost alternative at $2.7M.

The lower cleanup goal will approximately double the volume of sediments and increase the cost of the remedy. The costs for the alternatives with a cleanup goal of 1 mg/kg are $4.1M (SED-3) and $4.5M (SED-3). Sediments in Snow Creek upstream of the 11 Street Ditch and in the 9th Street Ditch would need to be remediated to 1 mg/kg to protect the remedy downstream, further increasing the cost of the remedy.

The three active sediment alternatives are comparable for most of the evaluation criteria. SED-3 and SED-4 are essentially the same, with SED-3 offering a slightly lower cost by disposing of some materials onsite rather than transporting everything offsite. SED-2 would be less effective than SED-3 and SED-4 because a smaller amount of contaminated sediment would be removed and MNR would be used to achieve the PRG of 3 mg/kg over time. SED-2 would have fewer short-term negative impacts than SED-3 and SED-4, especially downstream of Highway 202. The costs for the alternatives with a cleanup goal of 3 mg/kg are $2.7M (SED-2), $2.9M (SED-3) and $3.1M (SED-3). The costs for the alternatives with a cleanup goal of 1 mg/kg are $4.1M (SED-3) and $4.5M (SED-3). Table 26 provides a summary of the comparative analysis for the sediment alternatives.

Preferred Alternative

The Preferred Alternative includes one alternative from each of the eight categories of alternatives as follows:

- Residential Soil: RS-2 Complete Non-Time-Critical Removal and Manage PCB Residuals.
- Special Use Properties: SU-3 Excavate of Low Activity Areas to Residential Goal and Manage PCB Residuals.
- Interim Measures Areas: IM-4 Excavate around Existing Interim Measures to Meet Non-Residential Goals; Excavate any Principal Threat Waste found within Interim Measures if Leaching to Groundwater.
- Dredge Spoil Piles: DSP-4 Excavate All Dredge Spoil Piles and Offsite Disposal.
- Unapproved Waste Disposal Areas: UWDA-3 RCRA Subtitle D Cap.
- Non-Residential Soil: NRS-4 a) Excavate Soils (PRG 21 mg/kg), Offsite Disposal, and Manage PCB Residuals.
- Groundwater at T-11: GW-4 Excavate High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, and Pump and Treat Groundwater.

- Snow Creek Sediment and Creek Bank Soils: SED-4 a) Excavate (PRG 3 mg/kg) and Offsite Disposal.

Based on information currently available, the EPA believes the Proposed Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Proposed Remedy to satisfy the following statutory requirements of CERCLA 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element.

These remedial alternatives include removal of contaminated soil/sediments exceeding the cleanup goals and offsite disposal of excavated material for the Residential, Special Use, Interim Measures, Non-residential, and Snow Creek areas. All of the Dredge Spoil Piles will be removed and disposed of offsite. The Unapproved Waste Disposal Areas will be capped with a RCRA Subtitle D equivalent low-permeability cap. The contaminated groundwater and PTW soil at T-11 will be remediated through removal of contaminated soil exceeding the cleanup goals, extracting contaminated groundwater, and constructing a low-permeability cap over the area.

These remedial actions were selected for a number of reasons:

- Onsite treatment of non-residential soils was not recommended because this is already a heavily impacted community.

- Offsite treatment was not selected because the cost is twice the offsite disposal cost, and it is an expense that would not provide additional protection to the community, but might threaten other communities during extended transit.

- Offsite disposal of excavated soils (from IM, DSP, NRS, GW, and SED alternatives) was selected because the community has expressed concern about additional waste streams being allowed to be disposed of in the community (at the Facility); only low level PCB contaminated soils (i.e., [tPCB] < 10 mg/kg) from the residential and special use properties are currently managed onsite.

- Removal of all dredge spoil piles and impacted sediment provides the most protection for the downstream waterways.

- Groundwater extraction in addition to soil excavation and capping will result in attainment of PCB drinking water standards in groundwater much more quickly.

A soil management program would be implemented by the PRP, as part of the remedial alternative for Residential Soil and Special Use Properties where PCB concentrations between 1 mg/kg and 10 mg/kg will remain in subsurface soil underlying areas that were previously remediated or structures. The soil management program would extent to dealing with property owners, local government agencies, and utilities on nonresidential properties, transportation corridors, and waterways where PCBs concentrations exceed 1 mg/kg in surface and subsurface soils. Soil management activities would include interactive outreach with local landowners or local municipalities regarding any plans to remove the current access constraints such as granting permission to access the property, clearing of land, demolition of buildings/structures, new construction etc.

Institutional controls are required as part of the Preferred Alternatives. A Final Institutional Controls Implementation Plan will be developed during the remedial design and will identify the institutional controls available to help protect the remedies. Current institutional controls are limited to, the following:

- Formalizing deed restrictions or environmental easements/covenants to prohibit excavation within the capped areas at the Interim Measure Areas, UWDAs, and the area surrounding T-11.
- Requesting property owners with residual PCB remediation waste concentrations greater than 1 mg/kg in surface or subsurface soils to voluntarily place a notice on their deed for prospective purchasers.

Five-year reviews would be conducted to evaluate the implementation and performance of the Preferred Alternatives and to determine if the remedies continues to be protective of human health and the environment. Five year reviews will be conducted as required under CERCLA and the NCP.

The estimated total present worth cost for the proposed remedy is $36.6 million. For cost estimation purposes it was assumed that $756,000 for annual O&M and $16.7 million for capital costs is needed to implement the Proposed Remedy. Five-year reviews will be performed at the site because PCBs remediation waste is being left in the area. Total costs are based on a 7% discount rate applied to all costs incurred after the first year to find the present worth cost of the Selected Remedy.

These alternatives:

- Provide the maximum protection to children at home and on Special Use Properties.
- Provide acceptable protection to industrial and commercial workers, commercial visitors, trespassers, construction and utility workers at businesses in the floodplain.
- Provide for stabilization of creek banks, removal of sediments from culverts and the creek itself, and removal of dredge spoil piles near the creek.
- Provides for offsite disposal of soil (except residential and special use soil with PCB concentrations < 10 mg/kg).
- Community concerns about PCBs in air is not increased by selection of onsite treatment.

Community Participation

Since 2000, the EPA and Solutia have been working to keep the community, natural resource trustees, other governmental entities, the Community Advisory Group, the Technical Advisor, the United States District Court for the Northern District of Alabama, and all other interested parties informed about Site activities. Information has been disseminated through websites, fact sheets, open houses, availability meetings, and public meetings.

The OU1/OU2 RI Report, FS Report, Baseline Risk Assessment Reports, and Proposed Plan for OU1/OU2 of the Anniston PCB Site are scheduled for release to the public on March 13, 2017. These documents are incorporated in the Administrative Record for the Site. A copy of the Administrative Record, upon which the Preferred Alternative is based, is located at the Information Repositories. In addition, the Administrative Record and the Site (project) files are available for review at the EPA Region 4 offices in Atlanta, Georgia. Notices about the availability of these documents will be published in the Anniston Star and announced on Anniston radio stations.

An extended 60-day comment period has been approved at the request of the Site's Community Advisory Group (CAG). The comment period begins on March 13, 2017 and ends on May 12, 2017. On March 23, 2017, the EPA will present its preferred remedy for OU1/OU2 of the Anniston PCB Site during a public meeting at the Anniston Meeting Center, Noble Street, Anniston, Alabama. A similar meeting will be held at the Oxford Civic Center on March 24, 2017. At these meetings, representatives of the EPA and Solutia will answer questions about sampling at OU1/OU2 and the remedial alternatives under consideration. A transcript of the meetings will be prepared and will be available with the ROD at the Information Repositories.

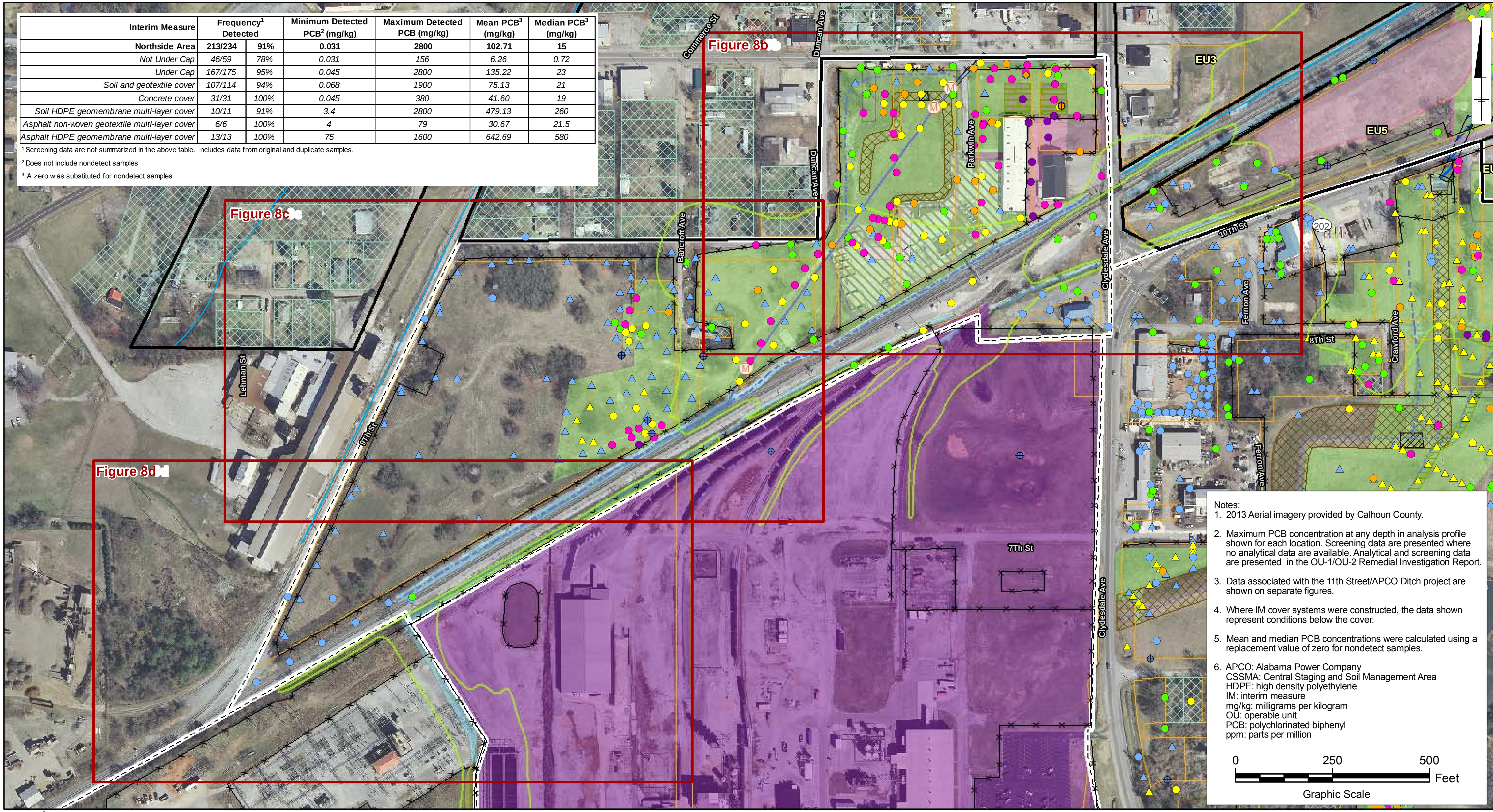
The EPA will also host a public availability session to help the community understand the Proposed Plan on Saturday, March 25, 2017 at the Carver Community Center located at 720 W 14th St., Anniston, AL. The EPA will also present various portions of the Proposed Plan at community meetings sponsored by the Community Advisory Group, the Technical Advisor, and other local groups, as needed during the comment period.

Site Contacts for the Anniston PCB Site

Organization	Name	Mailing Address	Phone	Email
U.S. Environmental Protection Agency	Pam Scully, Project Manager	U.S.EPA, Region 4 61 Forsyth St, S.W. Atlanta, GA 30303	(404)562-8935	scully.pam@epa.gov
	Stephanie Brown, Community Involvement Coordinator		(404)562-8450	brown.stephaniey@epa.gov
	EPA website	http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0400123		
Alabama Department of Environmental Management	Metz Duites, Project Manager	1400 Coliseum Blvd. Montgomery, AL 36110	(334) 270-5679	MPD@adem.alabama.gov
Technical Advisory Group	Bertrand Thomas, WAF Technical Advisor	2138 Harmony Lakes Cir. Lithonia, Ga. 30058	Office (256)238-9900 Cell (678) 772-1146	bertrandthomas10@att.net
Community Advisory Group	Cindy Calix, Administrator	1812 Wilmer Ave. Suite B Anniston, AL 36201	(256) 741-1429	ccalix@annistoncag.org
PRP Group	Gayle Macolly, Project Manager	702 Clydesdale Ave. Anniston, AL 36201	(256) 831-8404	egmaco@eastman.com
Northern District Court	Tom Dahl, Technical Special Master			todahl@comcast.net

Figures

Tables



Interim Measure	Frequency[1] Detected		Minimum Detected PCB[2] (mg/kg)	Maximum Detected PCB (mg/kg)	Mean PCB[3] (mg/kg)	Median PCB[3] (mg/kg)
Northside Area	**213/234**	**91%**	**0.031**	**2800**	**102.71**	**15**
Not Under Cap	*46/59*	*78%*	*0.031*	*156*	*6.26*	*0.72*
Under Cap	*167/175*	*95%*	*0.045*	*2800*	*135.22*	*23*
Soil and geotextile cover	*107/114*	*94%*	*0.068*	*1900*	*75.13*	*21*
Concrete cover	*31/31*	*100%*	*0.045*	*380*	*41.60*	*19*
Soil HDPE geomembrane multi-layer cover	*10/11*	*91%*	*3.4*	*2800*	*479.13*	*260*
Asphalt non-woven geotextile multi-layer cover	*6/6*	*100%*	*4*	*79*	*30.67*	*21.5*
Asphalt HDPE geomembrane multi-layer cover	*13/13*	*100%*	*75*	*1600*	*642.69*	*580*

[1] Screening data are not summarized in the above table. Includes data from original and duplicate samples.

[2] Does not include nondetect samples

[3] A zero w as substituted for nondetect samples

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. Data associated with the 11th Street/APCO Ditch project are shown on separate figures.
4. Where IM cover systems were constructed, the data shown represent conditions below the cover.
5. Mean and median PCB concentrations were calculated using a replacement value of zero for nondetect samples.
6. APCO: Alabama Power Company
   CSSMA: Central Staging and Soil Management Area
   HDPE: high density polyethylene
   IM: interim measure
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   ppm: parts per million

0 250 500 Feet
Graphic Scale

Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Abandoned Groundwater Monitoring Well
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- > 1; > 5
- > 10; > 25
- <50
- >50
- Outlet/Manhole Cover
- Fence
- Creek

- DrainageDitch
- 42" Diameter HDPE Pipe
- Storm Water Piping
- Box Culvert
- Berm
- Concrete Cover
- Emergency Spillway
- Soil-HDPE Geomembrane Liner
- Soil-HDPE Geomembrane Multilayer Cover

- 11th Street/APCO Ditch Cover
- 1997 IM Cover Limits
- Asphalt and HDPE Geomembrane Multilayer Cover
- Asphalt and Nonwoven Geotextile Multilayer Cover; Asphalt Cover Repair Area
- Closed CSSMA Cells
- Concrete Lined APCO Ditch
- Outfall
- Soil-Geotextile Cover

- Solutia-Owned Parcels
- OU-1/OU-2 Residential Property
- Northside/Eastside Area Boundary
- OU-3 Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

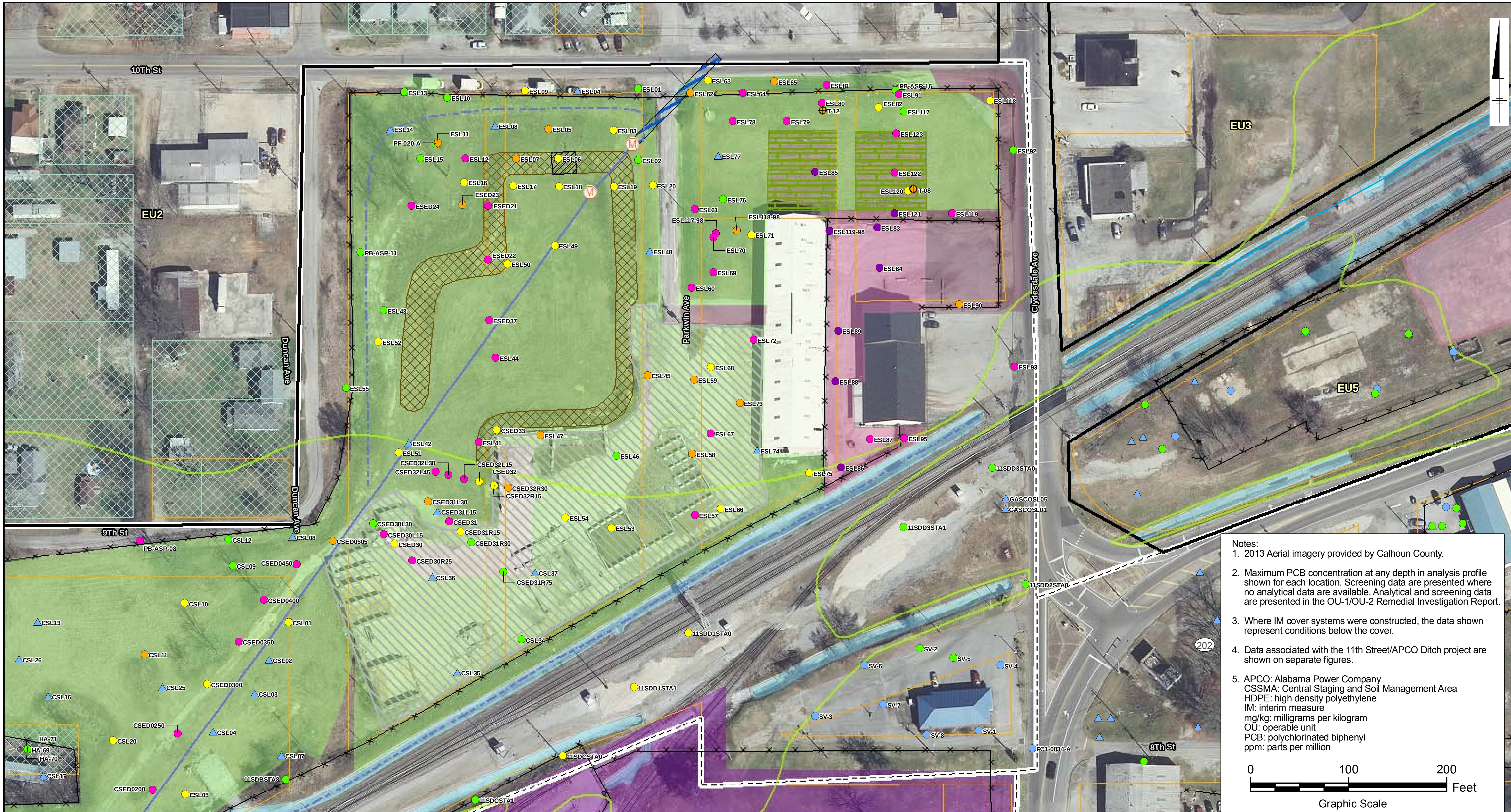
OU-1/OU-2 Proposed Plan

Northside Area (Overall Area) Interim Measures

Solutia

Figure **8a**

City: SVR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-3A_InterimMeasures_PCB_NorthsideKeyMap.mxd 3/25/2016 1:22:00 PM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. Where IM cover systems were constructed, the data shown represent conditions below the cover.
4. Data associated with the 11th Street/APCO Ditch project are shown on separate figures.
5. APCO: Alabama Power Company
CSSMA: Central Staging and Soil Management Area
HDPE: high density polyethylene
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

0 100 200 Feet
Graphic Scale

Legend

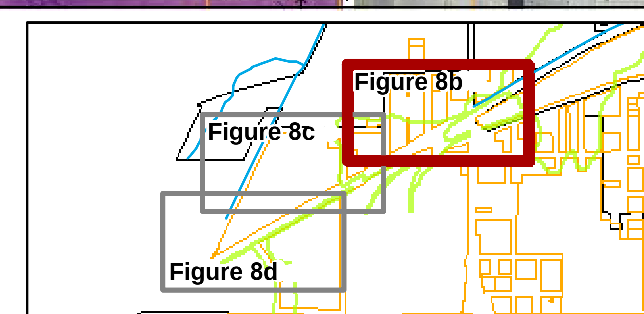
Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Abandoned Groundwater Monitoring Well
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- Outlet/Manhole Cover
- Fence
- Creek

- DrainageDitch
- 42" Diameter HDPE Pipe
- Exposure Unit
- Solutia-Owned Parcels
- Box Culvert
- Berm
- Concrete Cover
- Emergency Spillway
- Soil-HDPE Geomembrane Multilayer Cover

- 11th Street/APCO Ditch Cover
- Asphalt and HDPE Geomembrane Multilayer Cover
- Asphalt and Nonwoven Geotextile Multilayer Cover; Asphalt Cover Repair Area
- Closed CSSMA Cells
- Soil-Geotextile Cover
- Northside Area Boundary
- OU-3 Boundary

- OU-1/OU-2 Residential Property
- OU-1 and OU-2 Downgradient Floodplain



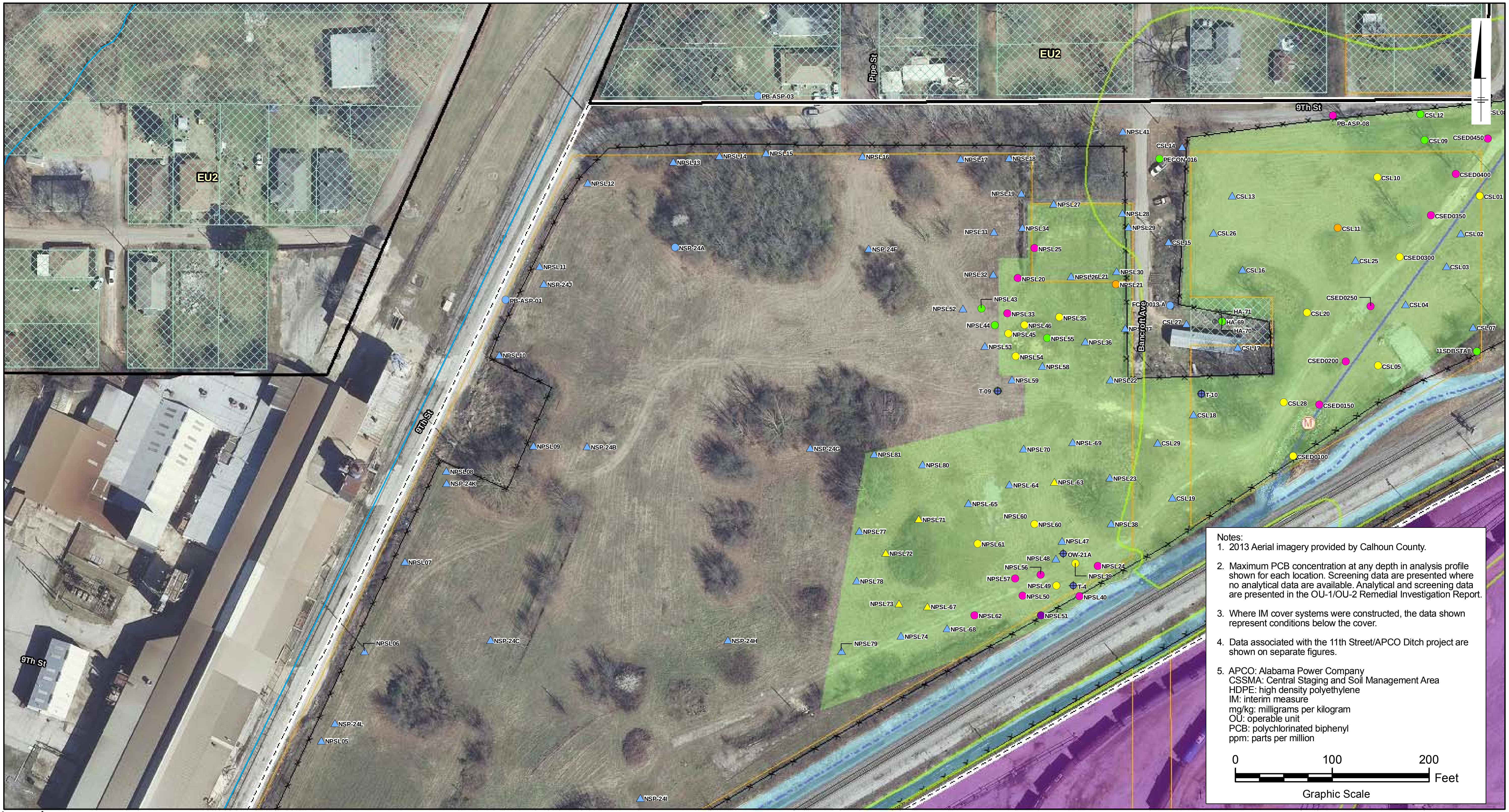
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Northside Area Interim Measures

Solutia

Figure
8b



Notes:

1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. Where IM cover systems were constructed, the data shown represent conditions below the cover.
4. Data associated with the 11th Street/APCO Ditch project are shown on separate figures.
5. APCO: Alabama Power Company
   CSSMA: Central Staging and Soil Management Area
   HDPE: high density polyethylene
   IM: interim measure
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   ppm: parts per million

0 100 200
Feet
Graphic Scale

Legend

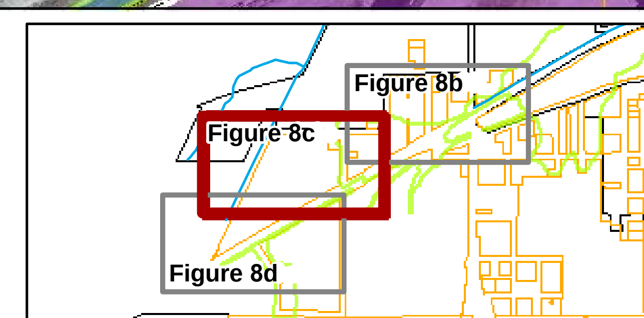
Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- > 10; > 25
- Outlet/Manhole Cover
- Fence
- Creek

- DrainageDitch
- 42" Diameter HDPE Pipe
- Exposure Unit
- Solutia-Owned Parcels

- 11th Street/APCO Ditch Cover
- Soil-Geotextile Cover
- Northside Area Boundary
- OU-3 Boundary

- OU-1/OU-2 Residential Property
- OU-1 and OU-2 Downgradient Floodplain



Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Northside Area
Interim Measures

Solutia

Figure
8c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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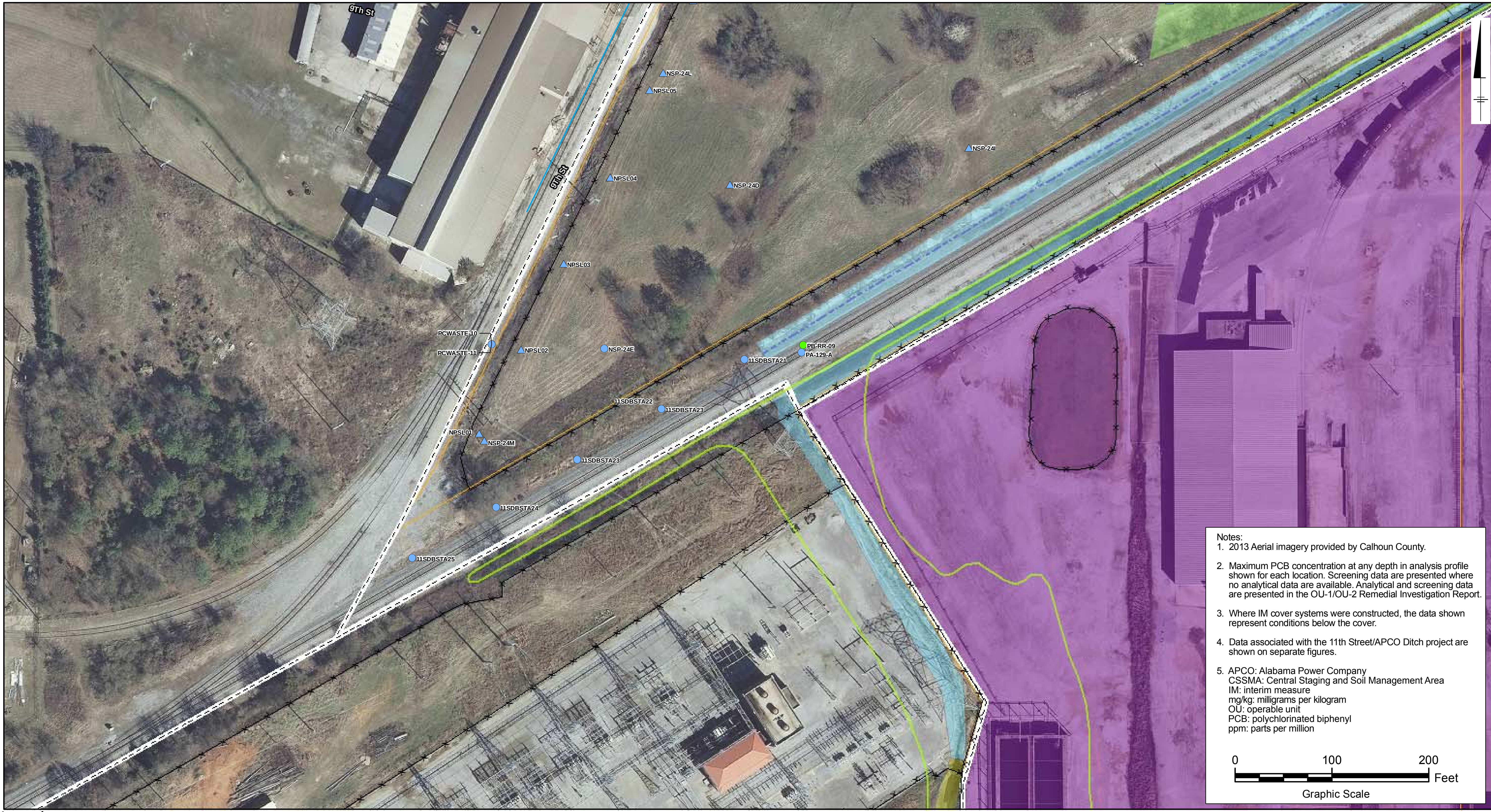


Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. Where IM cover systems were constructed, the data shown represent conditions below the cover.
4. Data associated with the 11th Street/APCO Ditch project are shown on separate figures.
5. APCO: Alabama Power Company
CSSMA: Central Staging and Soil Management Area
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

0 100 200 Feet
Graphic Scale

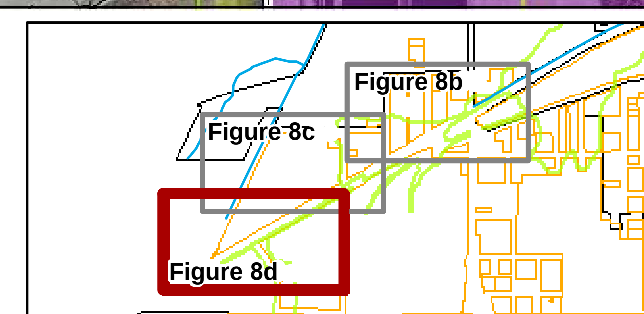
Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- Fence
- Creek

- DrainageDitch
- Exposure Unit
- Solutia-Owned Parcels

- 11th Street/APCO Ditch Cover
- Concrete Lined APCO Ditch
- Soil-Geotextile Cover
- Northside Area Boundary
- OU-3 Boundary
- OU-1 and OU-2 Downgradient Floodplain



Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Northside Area Interim Measures

Solutia

Figure
8d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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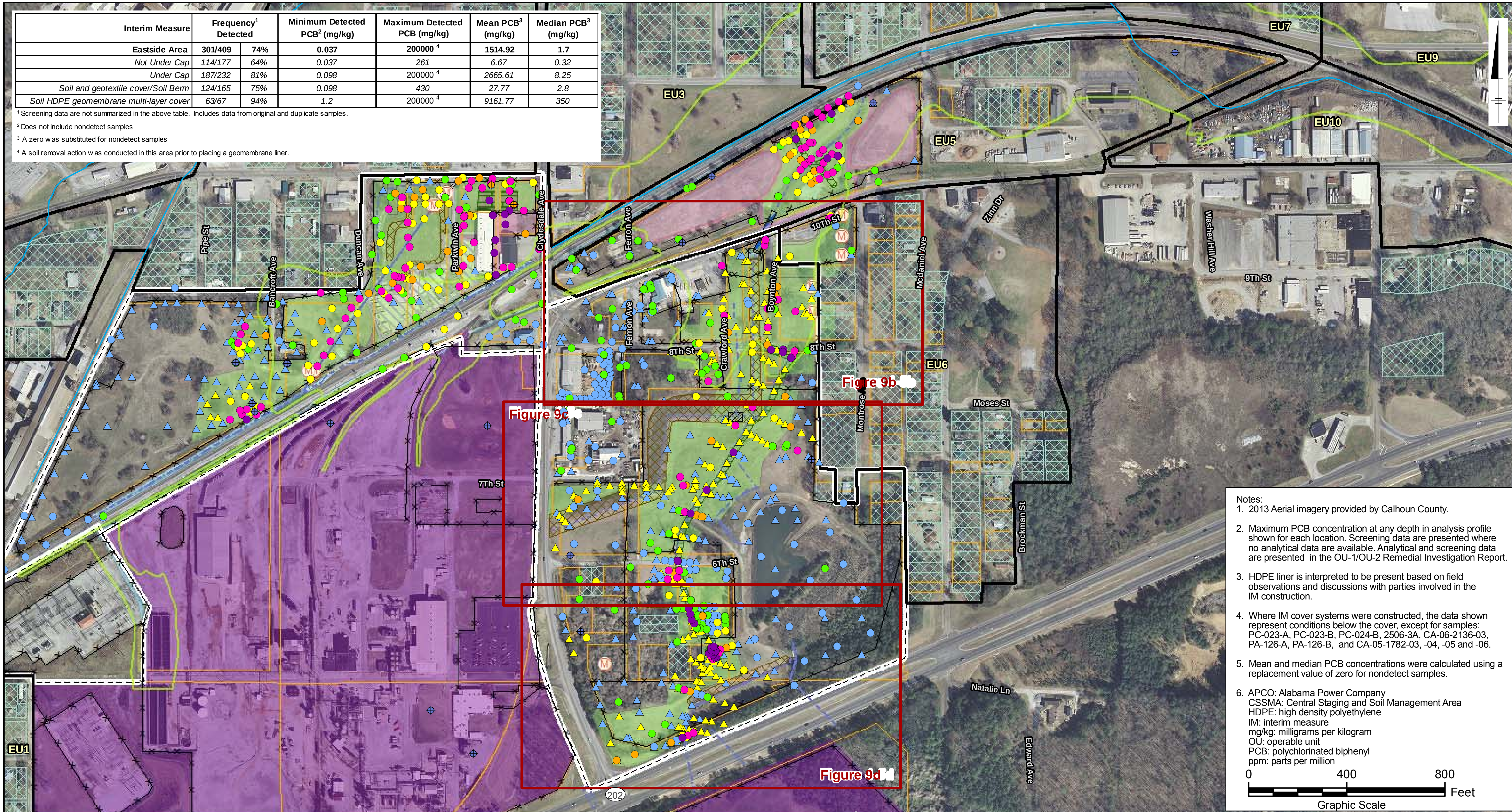
Interim Measure	Frequency[1] Detected		Minimum Detected PCB[2] (mg/kg)	Maximum Detected PCB (mg/kg)	Mean PCB[3] (mg/kg)	Median PCB[3] (mg/kg)
Eastside Area	**301/409**	**74%**	**0.037**	**200000 [4]**	**1514.92**	**1.7**
Not Under Cap	*114/177*	*64%*	*0.037*	*261*	*6.67*	*0.32*
Under Cap	*187/232*	*81%*	*0.098*	200000 [4]	*2665.61*	*8.25*
Soil and geotextile cover/Soil Berm	*124/165*	*75%*	*0.098*	*430*	*27.77*	*2.8*
Soil HDPE geomembrane multi-layer cover	*63/67*	*94%*	*1.2*	200000 [4]	*9161.77*	*350*

[1] Screening data are not summarized in the above table. Includes data from original and duplicate samples.

[2] Does not include nondetect samples

[3] A zero was substituted for nondetect samples

[4] A soil removal action was conducted in this area prior to placing a geomembrane liner.



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. HDPE liner is interpreted to be present based on field observations and discussions with parties involved in the IM construction.
4. Where IM cover systems were constructed, the data shown represent conditions below the cover, except for samples: PC-023-A, PC-023-B, PC-024-B, 2506-3A, CA-06-2136-03, PA-126-A, PA-126-B, and CA-05-1782-03, -04, -05 and -06.
5. Mean and median PCB concentrations were calculated using a replacement value of zero for nondetect samples.
6. APCO: Alabama Power Company
CSSMA: Central Staging and Soil Management Area
HDPE: high density polyethylene
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

0 400 800 Feet

Graphic Scale

Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Abandoned Groundwater Monitoring Well
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- > 1; > 5
- > 10; > 25
- <50
- >50
- Outlet/Manhole Cover
- Fence
- Creek

- DrainageDitch
- 42" Diameter HDPE Pipe
- Storm Water Piping
- Box Culvert
- Berm
- Concrete Cover
- Emergency Spillway
- Soil-HDPE Geomembrane Liner
- Soil-HDPE Geomembrane Multilayer Cover

- 11th Street/APCO Ditch Cover
- 1997 IM Cover Limits
- Asphalt and HDPE Geomembrane Multilayer Cover
- Asphalt and Nonwoven Geotextile Multilayer Cover; Asphalt Cover Repair Area
- Closed CSSMA Cells
- Concrete Lined APCO Ditch
- Outfall
- Soil-Geotextile Cover

- Solutia-Owned Parcels
- Northside/Eastside Area Boundary
- OU-3 Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

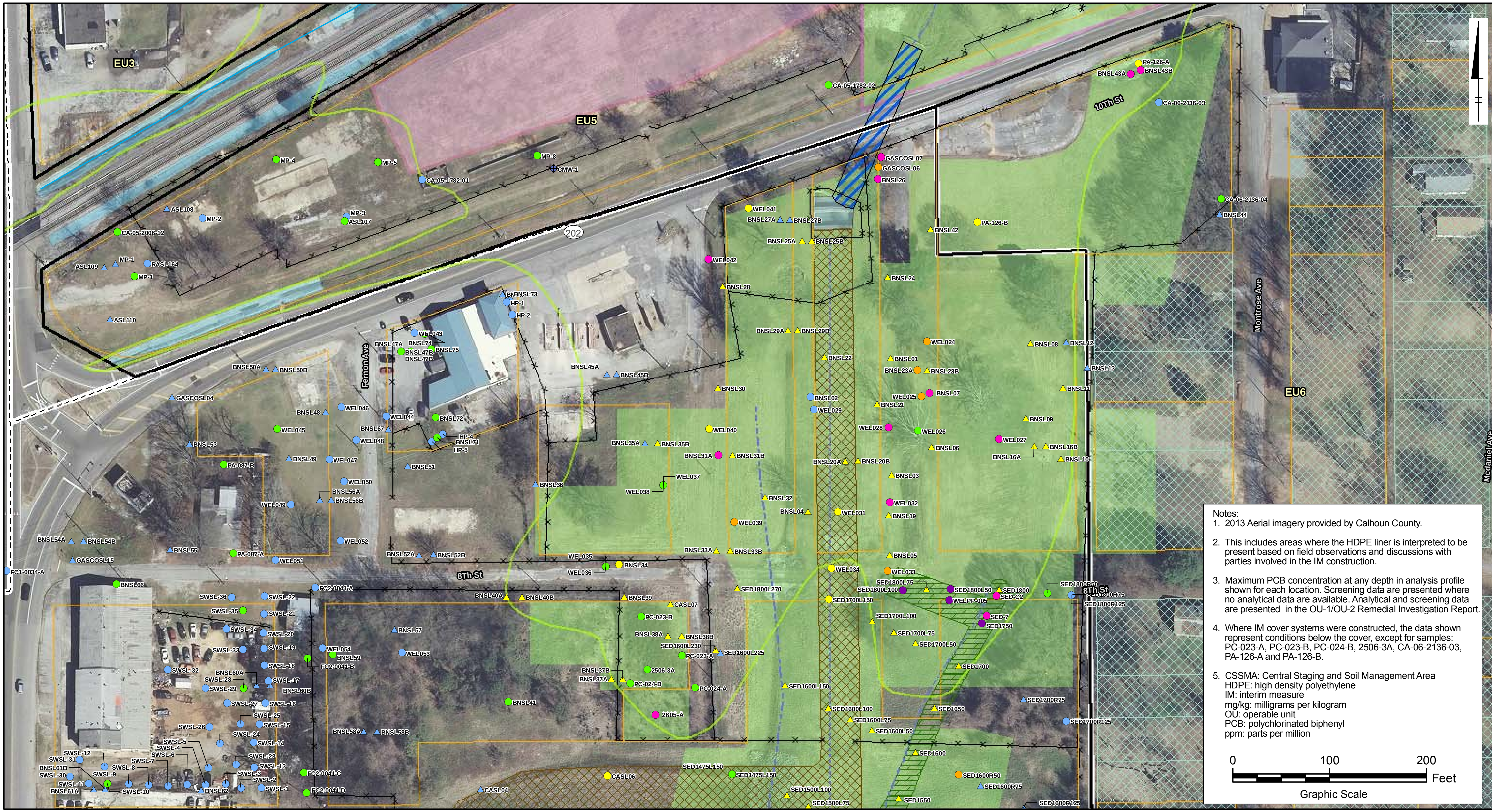
OU-1/OU-2 Proposed Plan

Eastside Area (Overall Area): Interim Measures

Solutia

Figure
9a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-5A_InterimMeasures_PCB_EastsideKeyMap_v2.mxd 3/25/2016 1:25:25 PM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. This includes areas where the HDPE liner is interpreted to be present based on field observations and discussions with parties involved in the IM construction.
3. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
4. Where IM cover systems were constructed, the data shown represent conditions below the cover, except for samples: PC-023-A, PC-023-B, PC-024-B, 2506-3A, CA-06-2136-03, PA-126-A and PA-126-B.
5. CSSMA: Central Staging and Soil Management Area
HDPE: high density polyethylene
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

0 100 200 Feet

Graphic Scale

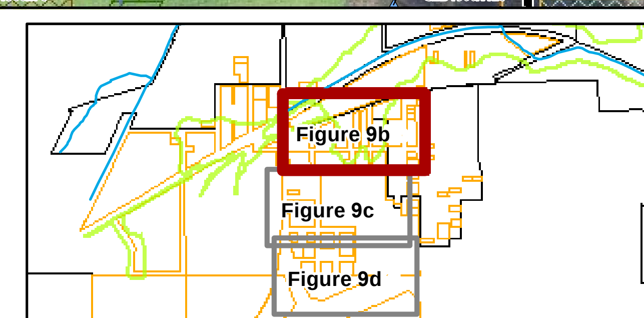
Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 3)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 3)
- < 1; < 5; < 10
- > 10; > 25
- Fence
- Creek

- DrainageDitch
- Storm Water Piping
- Exposure Unit
- Solutia-Owned Parcels Box
- Culvert
- Berm
- Soil-HDPE Geomembrane Liner (See Note 2)

- 11th Street/APCO Ditch Cover
- 1997 IM Cover Limits
- Closed CSSMA Cells
- Outfall
- Soil-Geotextile Cover
- Northside Area Boundary
- OU-1 and OU-2 Downgradient Floodplain



Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

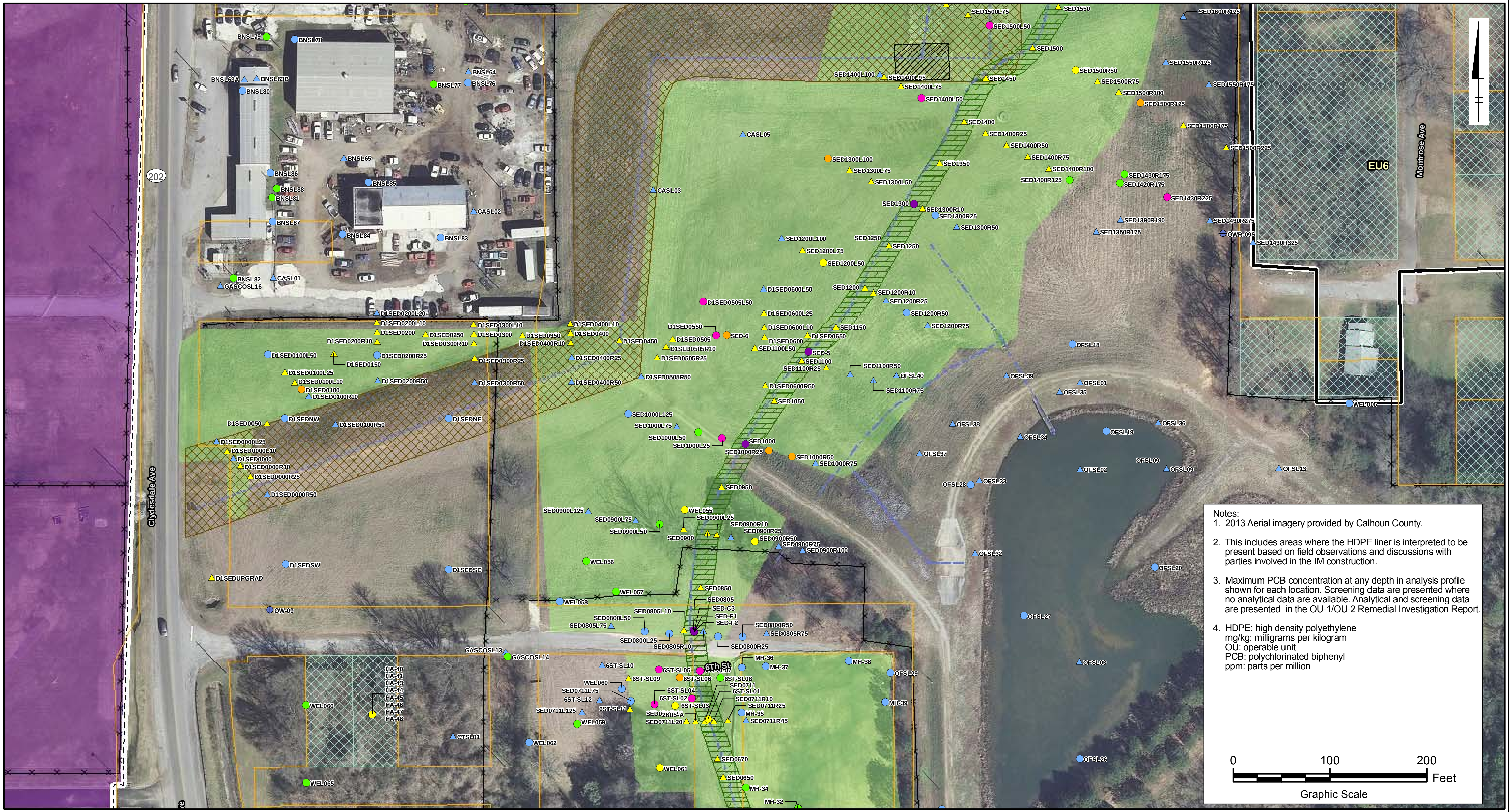
OU-1/OU-2 Proposed Plan

Eastside Area: Interim Measures

Solutia

Figure 9b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-5BtoD_InterimMeasures_PCB_Eastside_MapBook_v2.mxd 3/24/2016 8:55:14 AM



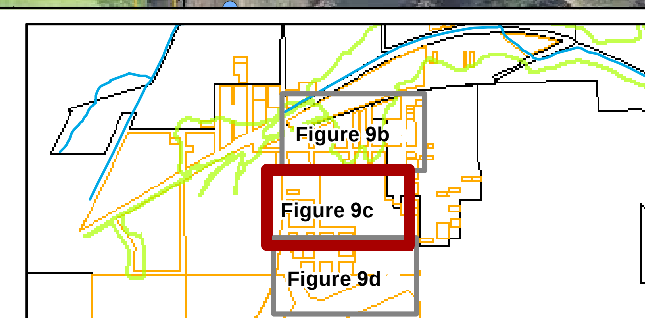
Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. This includes areas where the HDPE liner is interpreted to be present based on field observations and discussions with parties involved in the IM construction.
3. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
4. HDPE: high density polyethylene
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 3)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 3)
- < 1; < 5; < 10
- > 10; > 25
- Fence

- DrainageDitch
- Storm Water Piping
- Exposure Unit
- Solutia-Owned Parcels
- Berm
- Emergency Spillway Soil-HDPE Geomembrane Liner (See Note 2)
- OU-3 Boundary
- Soil-Geotextile Cover
- Northside Area Boundary



Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Eastside Area: Interim Measures

Solutia

Figure
9c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. This includes areas where the HDPE liner is interpreted to be present based on field observations and discussions with parties involved in the IM construction.
3. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
4. HDPE: high density polyethylene
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

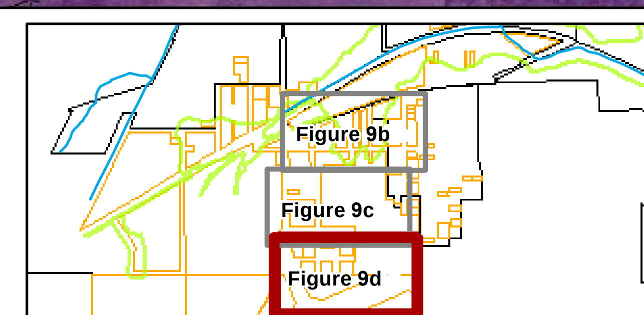
0 100 200 Feet
Graphic Scale

Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 3)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 3)
- < 1; < 5; < 10
- > 10; > 25
- Fence

- DrainageDitch
- Exposure Unit
- Solutia-Owned Parcels
- Berm
- Soil-HDPE Geomembrane Liner (See Note 2)
- OU-3 Boundary
- Soil-Geotextile Cover
- Northside Area Boundary



Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Eastside Area: Interim Measures

Solutia

Figure
9d

City: SVR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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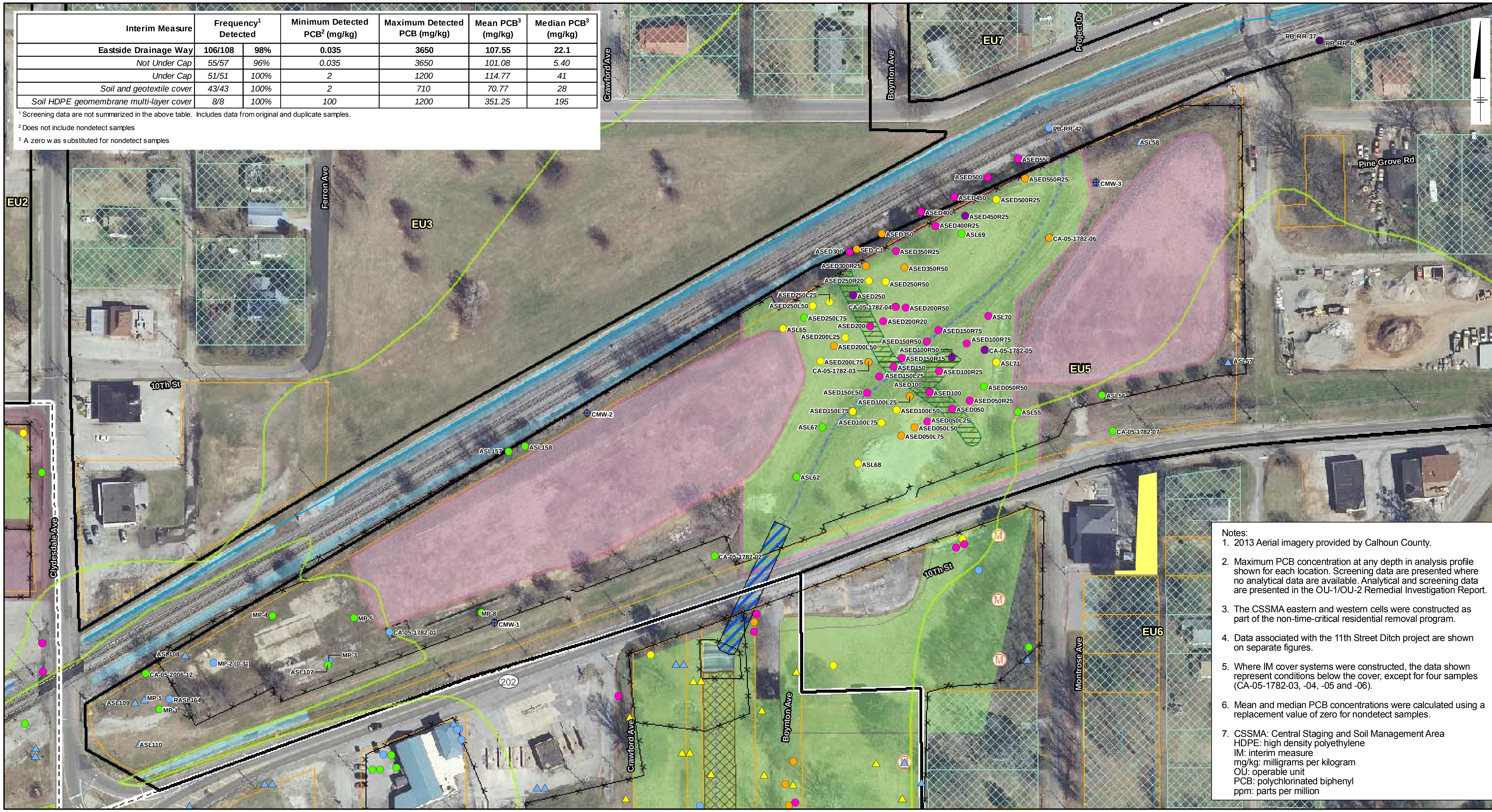
Interim Measure	Frequency[1] Detected		Minimum Detected PCB[2] (mg/kg)	Maximum Detected PCB (mg/kg)	Mean PCB[3] (mg/kg)	Median PCB[3] (mg/kg)
Eastside Drainage Way	**106/108**	**98%**	**0.035**	**3650**	**107.55**	**22.1**
Not Under Cap	*55/57*	*96%*	*0.035*	*3650*	*101.08*	*5.40*
Under Cap	*51/51*	*100%*	*2*	*1200*	*114.77*	*41*
Soil and geotextile cover	*43/43*	*100%*	*2*	*710*	*70.77*	*28*
Soil HDPE geomembrane multi-layer cover	*8/8*	*100%*	*100*	*1200*	*351.25*	*195*

[1] Screening data are not summarized in the above table. Includes data from original and duplicate samples.

[2] Does not include nondetect samples

[3] A zero was substituted for nondetect samples



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available. Analytical and screening data are presented in the OU-1/OU-2 Remedial Investigation Report.
3. The CSSMA eastern and western cells were constructed as part of the non-time-critical residential removal program.
4. Data associated with the 11th Street Ditch project are shown on separate figures.
5. Where IM cover systems were constructed, the data shown represent conditions below the cover, except for four samples (CA-05-1782-03, -04, -05 and -06).
6. Mean and median PCB concentrations were calculated using a replacement value of zero for nondetect samples.
7. CSSMA: Central Staging and Soil Management Area
HDPE: high density polyethylene
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million

Legend

Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 2)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 2)
- < 1; < 5; < 10
- > 10; > 25
- Outlet/Manhole Cover
- Fence
- Creek
- DrainageDitch
- Storm Water Piping

- Solutia-Owned Parcels
- Box Culvert
- Berm
- Soil-HDPE Geomembrane Liner

- 11th Street Ditch Cover
- 1997 IM Cover Limits
- Asphalt and Nonwoven Geotextile Multilayer Cover; Asphalt Cover Repair Area
- Closed CSSMA Cells
- Outfall
- Soil-Geotextile Cover
- Special Use: Low Activity Area ≥ 1 mg/kg

- OU-1/OU-2 Residential Property
- Northside/Eastside Area Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

0 125 250 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Eastside Drainage Way: Interim Measures

Solutia

Figure
10

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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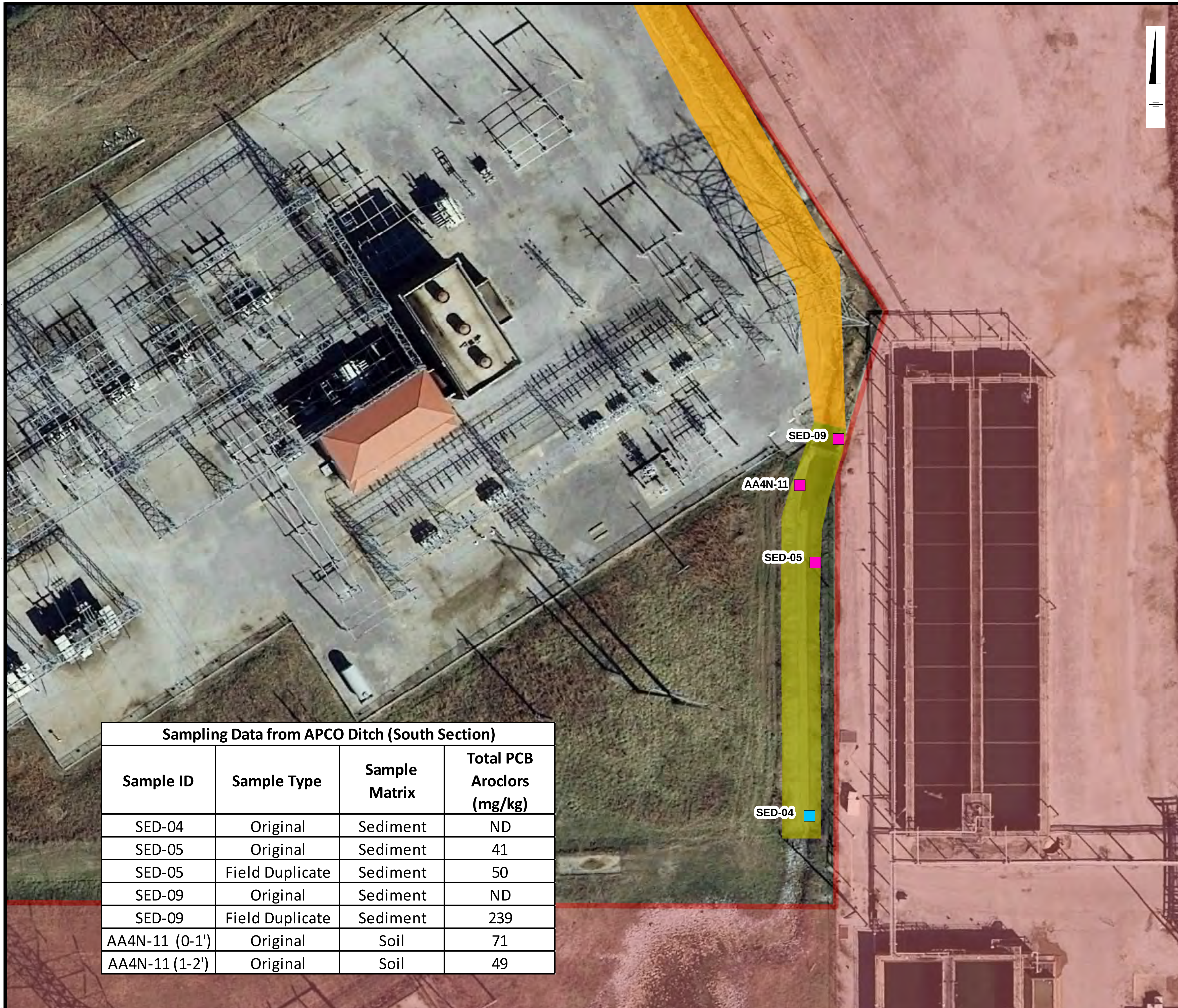


Sampling Data from APCO Ditch (South Section)

Sample ID	Sample Type	Sample Matrix	Total PCB Aroclors (mg/kg)
SED-04	Original	Sediment	ND
SED-05	Original	Sediment	41
SED-05	Field Duplicate	Sediment	50
SED-09	Original	Sediment	ND
SED-09	Field Duplicate	Sediment	239
AA4N-11 (0-1')	Original	Soil	71
AA4N-11 (1-2')	Original	Soil	49

Legend

Total PCB Aroclor Concentration in Soil
(mg/kg) (See Note 1)

- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Concrete Lined APCO Ditch, See Note 3
- 11th Street Ditch IM (See Figure Series 3-8)
- OU-3 Boundary

Notes

1. Figure presents available analytical PCB data in the IM area. Maximum PCB concentration at any depth in analysis profile shown for each location.

2. Where IM cover systems were constructed, the data shown represent conditions below the cover. Data associated with soil samples collected outside of the APCO Ditch (south section) IM cover, including the 11th Street Ditch project are shown on separate figures.

3. APCO Ditch (south section) IM cover was constructed during the adjacent West End Landfill closure construction in 1996.

4. The OU-3 boundary shown has been modified since issuance of the OU-3 IROD. P/S are currently working with USEPA to formally revise the boundary.

APCO: Alabama Power Company
IM: interim measure
IROD: Interim Record of Decision
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
P/S: Pharmacia LLC and Solutia Inc.
USEPA: United States Environmental Protection Agency

References

1. Aerial provided by Calhoun County, date of aerial 2011.

2. Geraghty & Miller, Inc., Anniston West End Landfill Site Investigation, August 1994.

3. Golder Associates Inc., Detailed Design – West End Landfill – Cover Revisions, Anniston, Alabama Facility, May 1995.

0 50 100
Feet

Anniston PCB Site
Anniston, Alabama
OU-1/OU-2 Remedial Investigation Report

APCO Ditch (South Section)
Interim Measure and
Total PCB Concentrations in Soil

Solutia

Figure 11

Quintard Mall Soil Sampling Data

Sample ID	Minimum Depth (inches)	Maximum Depth (inches)	Total PCB Aroclors (mg/kg)
QMBS-1	0	6	2.0
QMBS-2	0	6	1.4
QMBS-3	0	6	1.2
QMBS-4	0	6	0.61
QMBS-5	0	6	0.67

Test method for total PCB Aroclors: USEPA Method 8082

Legend:

- Interim Measure Isolation Covers
- <1 / ≥1 - <10 — Total PCB Aroclor concentrations in soil (mg/kg) (see Note 1)
- Asphalt
- Concrete
- Crushed Stone
- Geotextile
- Excavated Soil Consolidated Under Covers - <50 mg/kg PCBs
- Clean Fill
- Native Material

Notes:

1. The soils under isolation covers were consolidated from various excavations at the property and contain <50 mg/kg (or ppm) PCBs based on laboratory analytical data and/or field screening.
2. Temporary channel was backfilled with stockpiled soils originally excavated from Snow Creek and temporary channel, then covered with either the foundation for the mall expansion or with asphalt as part of the parking lot.
3. Soil samples shown were prior to installation of the isolation covers.
4. Cap details are drawn not to scale.

OU: operable unit
PCB: polychlorinated biphenyl
ppm: parts per million
mg/kg: milligrams per kilogram

References:

1. Base drawing and sample locations provided by Genesis Project, Inc., June 23, 2003.
2. Roux Associates, Inc., (June 14, 2013), Interim Measures Report.
3. Aerial imagery provided by Calhoun County, 2011.

0 100 200 300 400
Scale Feet

Anniston PCB Site
Anniston, Alabama
OU1/OU2 Proposed Plan

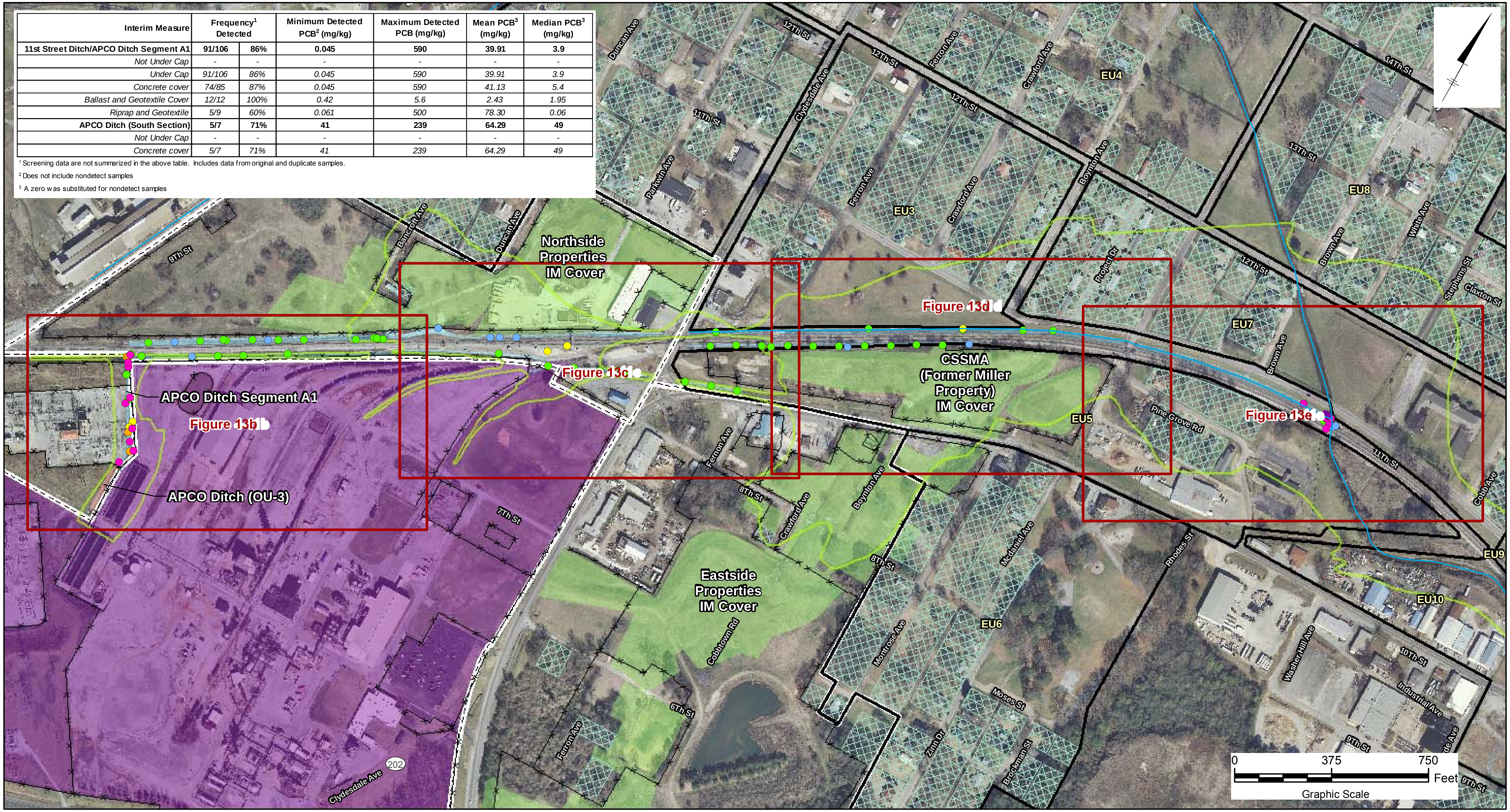
Quintard Mall Interim Measures
Total PCB Concentrations in Soil under Cover

Solutia

Figure 12

Interim Measure	Frequency[1] Detected		Minimum Detected PCB[2] (mg/kg)	Maximum Detected PCB (mg/kg)	Mean PCB[3] (mg/kg)	Median PCB[3] (mg/kg)
11st Street Ditch/APCO Ditch Segment A1	**91/106**	**86%**	**0.045**	**590**	**39.91**	**3.9**
Not Under Cap	-	-	-	-	-	-
Under Cap	*91/106*	*86%*	*0.045*	*590*	*39.91*	*3.9*
Concrete cover	*74/85*	*87%*	*0.045*	*590*	*41.13*	*5.4*
Ballast and Geotextile Cover	*12/12*	*100%*	*0.42*	*5.6*	*2.43*	*1.95*
Riprap and Geotextile	*5/9*	*60%*	*0.061*	*500*	*78.30*	*0.06*
APCO Ditch (South Section)	**5/7**	**71%**	**41**	**239**	**64.29**	**49**
Not Under Cap	-	-	-	-	-	-
Concrete cover	*5/7*	*71%*	*41*	*239*	*64.29*	*49*

[1] Screening data are not summarized in the above table. Includes data from original and duplicate samples.
[2] Does not include nondetect samples
[3] A zero was substituted for nondetect samples



Legend

Total PCB Aroclor
Concentration in Soil (mg/kg)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500

- Creek
- OU-1 / OU-2 Interim Measures Isolation Covers
- APCO Ditch Concrete Cover (OU-3)
- 11th Street/APCO Ditch Cover
- OU-1/OU-2 Residential Property
- Northside/Eastside Area Boundary

- OU-3 Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location.
3. Data represent conditions below the cover limits, where constructed.
4. PCB data associated with soil excavated as part of the 11th Street Ditch are not shown on this figure.
5. The APCO Ditch Segment A1 cover system was constructed as part of the 11th Street Ditch Project.
6. The APCO Ditch South Section cover system was constructed as part of the OU-3 West End Landfill construction work in 1996.
7. APCO: Alabama Power Company
CSSMA: Central Staging and Soil Management Area
IM: interim measure
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

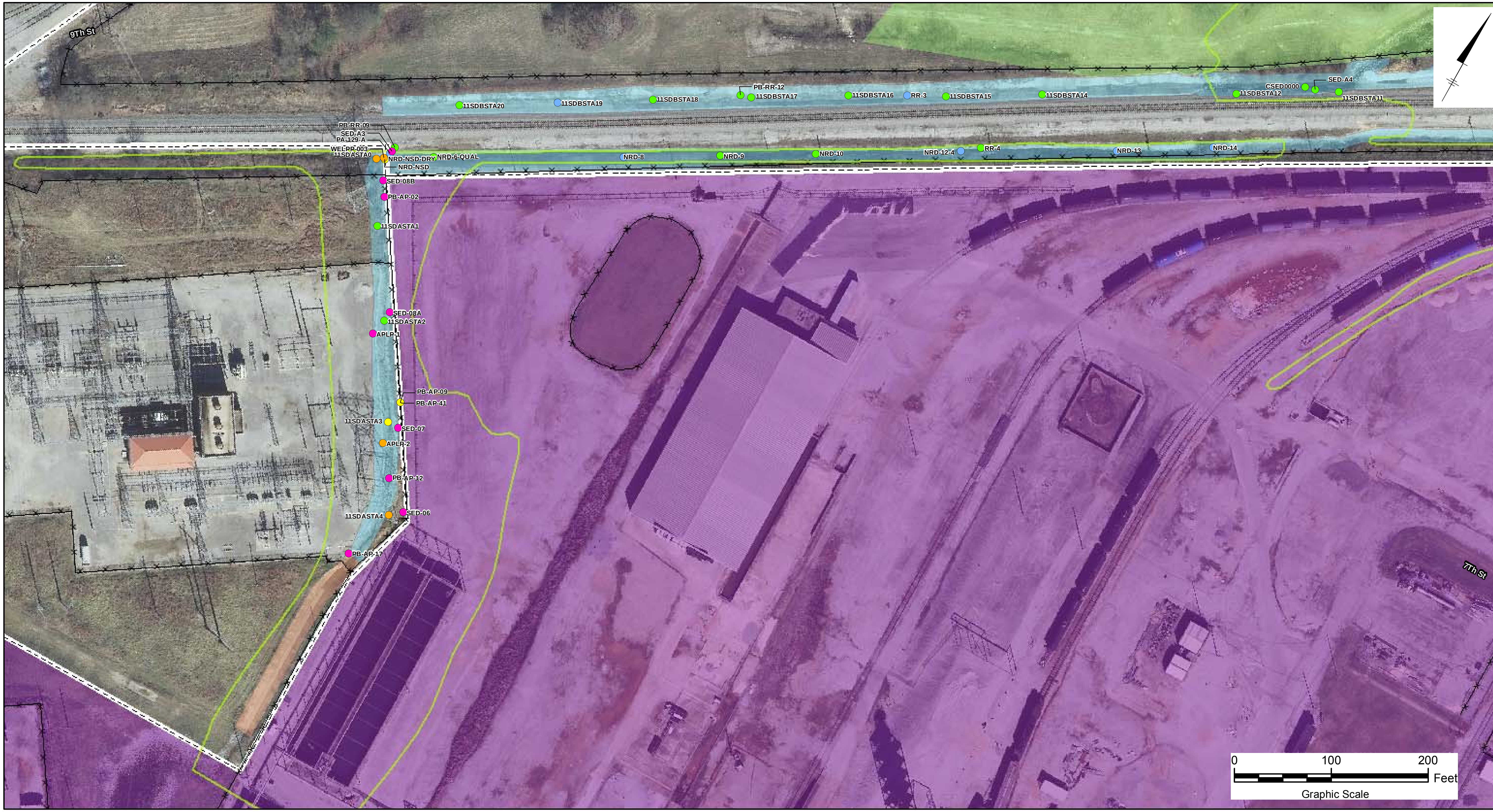
OU-1/OU-2 Proposed Plan

11th Street Ditch Removal Action

Solutia

Figure
13a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-11A_InterimMeasures_PCB_11thSt_KeyMap.mxd 3/25/2016 2:44:17 PM



Legend

Total PCB Aroclor Concentration in Soil (mg/kg)

- <1
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500

- Creek
- OU-1 / OU-2 Interim Measures Isolation Covers
- APCO Ditch Concrete Cover (OU-3)
- 11th Street/APCO Ditch Cover
- Northside/Eastside Area Boundary
- OU-3 Boundary
- OU-1 and OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available.
3. Data represent conditions below the cover limits, where constructed.
4. PCB data associated with soil excavated as part of the 11th Street Ditch are not shown on this figure.
5. The APCO Ditch Segment A1 cover system was constructed as part of the 11th Street Ditch Project.
6. The APCO Ditch South Section cover system was constructed as part of the OU-3 West End Landfill construction work in 1996.
7. APCO: Alabama Power Company
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

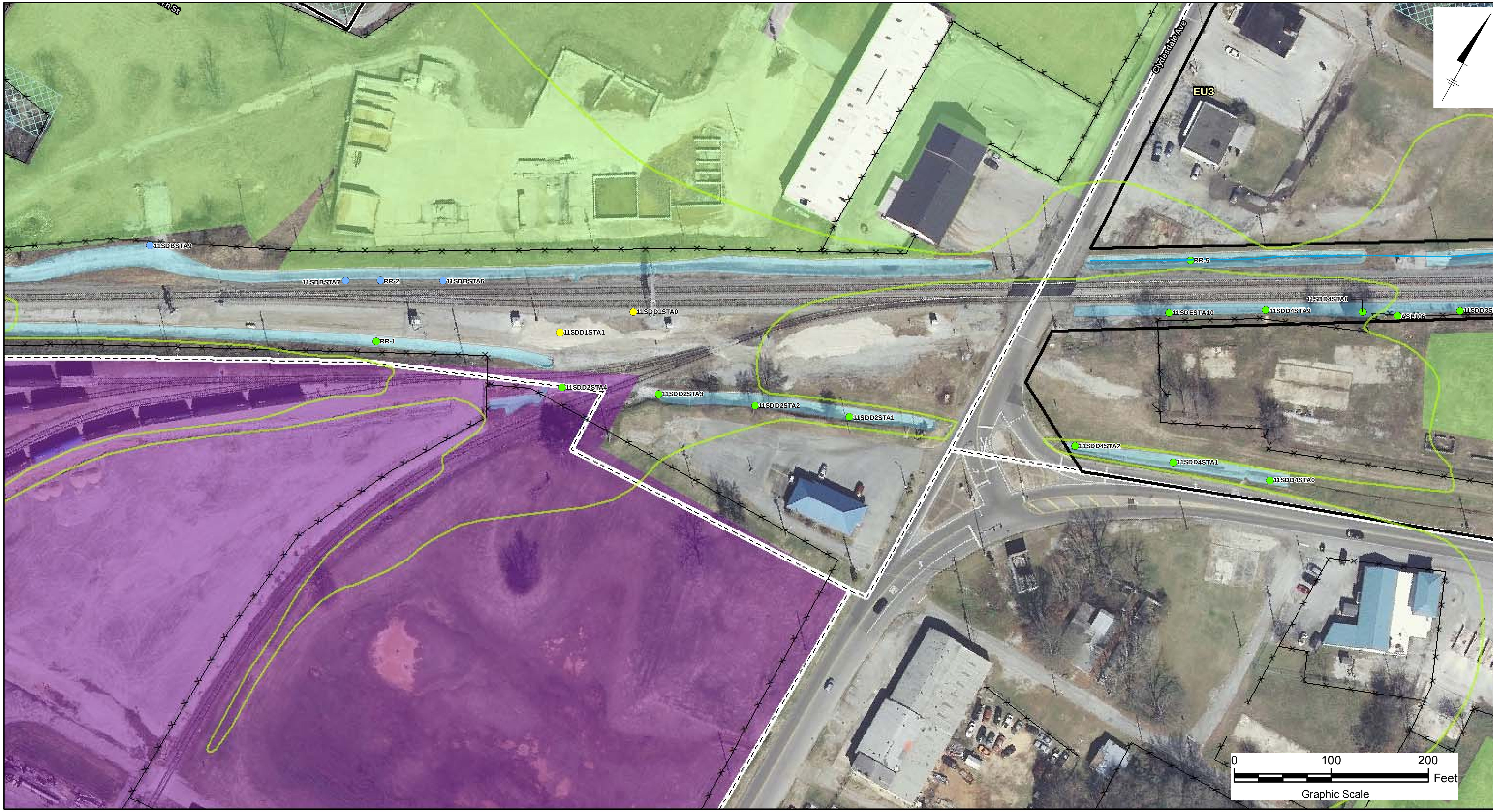
OU-1/OU-2 Proposed Plan

11th Street Ditch Removal Action

Solutia

Figure **13b**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-11BtoE_InterimMeasures_PCB_11thSt_MapBook1.mxd 3/25/2016 2:45:48 PM



Legend

Total PCB Aroclor Concentration in Soil (mg/kg)

- <1
- ≥1 to <10
- ≥10 to <25

- Creek
- OU-1 / OU-2 Interim Measures Isolation Covers
- 11th Street/APCO Ditch Cover
- OU-1/OU-2 Residential Property
- Northside/Eastside Area Boundary
- OU-3 Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Notes:

1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available.
3. Data represent conditions below the cover limits, where constructed.
4. PCB data associated with soil excavated as part of the 11th Street Ditch are not shown on this figure.
5. The APCO Ditch Segment A1 cover system was constructed as part of the 11th Street Ditch Project.
6. The APCO Ditch South Section cover system was constructed as part of the OU-3 West End Landfill construction work in 1996.
7. APCO: Alabama Power Company
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

11th Street Ditch Removal Action

Solutia

Figure
13c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-11BtoE_InterimMeasures_PCB_11thSt_MapBook1.mxd 3/25/2016 2:45:48 PM

Legend

Total PCB Aroclor

Concentration in Soil (mg/kg)

- <1
- ≥1 to <10
- ≥10 to <25

- Creek
- OU-1 / OU-2 Interim Measures Isolation Covers
- 11th Street/APCO Ditch Cover
- OU-1/OU-2 Residential Property
- Northside/Eastside Area Boundary
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Notes:

1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available.
3. Data represent conditions below the cover limits, where constructed.
4. PCB data associated with soil excavated as part of the 11th Street Ditch are not shown on this figure.
5. The APCO Ditch Segment A1 cover system was constructed as part of the 11th Street Ditch Project.
6. The APCO Ditch South Section cover system was constructed as part of the OU-3 West End Landfill construction work in 1996.
7. APCO: Alabama Power Company
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

11th Street Ditch Removal Action

Solutia

Figure **13d**

Legend

Total PCB Aroclor Concentration in Soil (mg/kg)

- <1
- ≥1 to <10
- ≥10 to <25
- ≥50 to <500
- ≥500

- Creek
- OU-1 / OU-2 Interim Measures Isolation Covers
- 11th Street/APCO Ditch Cover
- OU-1/OU-2 Residential Property
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Maximum PCB concentration at any depth in analysis profile shown for each location. Screening data are presented where no analytical data are available.
3. Data represent conditions below the cover limits, where constructed.
4. PCB data associated with soil excavated as part of the 11th Street Ditch are not shown on this figure.
5. The APCO Ditch Segment A1 cover system was constructed as part of the 11th Street Ditch Project.
6. The APCO Ditch South Section cover system was constructed as part of the OU-3 West End Landfill construction work in 1996.
7. APCO: Alabama Power Company
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

11th Street Ditch Removal Action

Solutia

Figure
13e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-11BtoE_InterimMeasures_PCB_11thSt_MapBook1.mxd 3/25/2016 2:45:48 PM

Interim Measure	Frequency[1] Detected		Minimum Detected PCB[2] (mg/kg)	Maximum Detected PCB (mg/kg)	Mean PCB[3] (mg/kg)	Median PCB[3] (mg/kg)
Hall Street Properties	**30/31**	**97%**	**0.056**	**84**	**16.33**	**11.7**
Not Under Cap	-	-	-	-	-	-
Under Cap - Soil and geotextile cover	*30/31*	*97%*	*0.056*	*84*	*16.33*	*11.7*

[1] Screening data are not summarized in the above table. Includes data from original and duplicate samples.

[2] Does not include nondetect samples

[3] A zero was substituted for nondetect samples

Legend

Total PCB Aroclor Concentration in Soil (mg/kg)
- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500

- Creek
- Drainage Outlet
- Gravel Road
- Cover Limits
- Parcel Boundary
- OU-1/OU-2 Residential Property
- Exposure Unit
- OU-1 and OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery and parcels provided by Calhoun County.
2. IM cover construction occurred between 2004 and 2006. The cover consists of a nominal 12-inch vegetated soil cover that comprises approximately 1.34 acres.
3. Figure presents analytical PCB data for the Hall Street properties. Maximum PCB concentration at any depth in analysis profile shown for each location. Analytical data are presented in the OU-1/OU-2 Remedial Investigation Report.
4. Mean and median PCB concentrations were calculated using a replacement value of zero for nondetect samples.
5. Where IM cover systems were constructed, the data shown represent conditions below the cover.
6. IM: interim measure
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

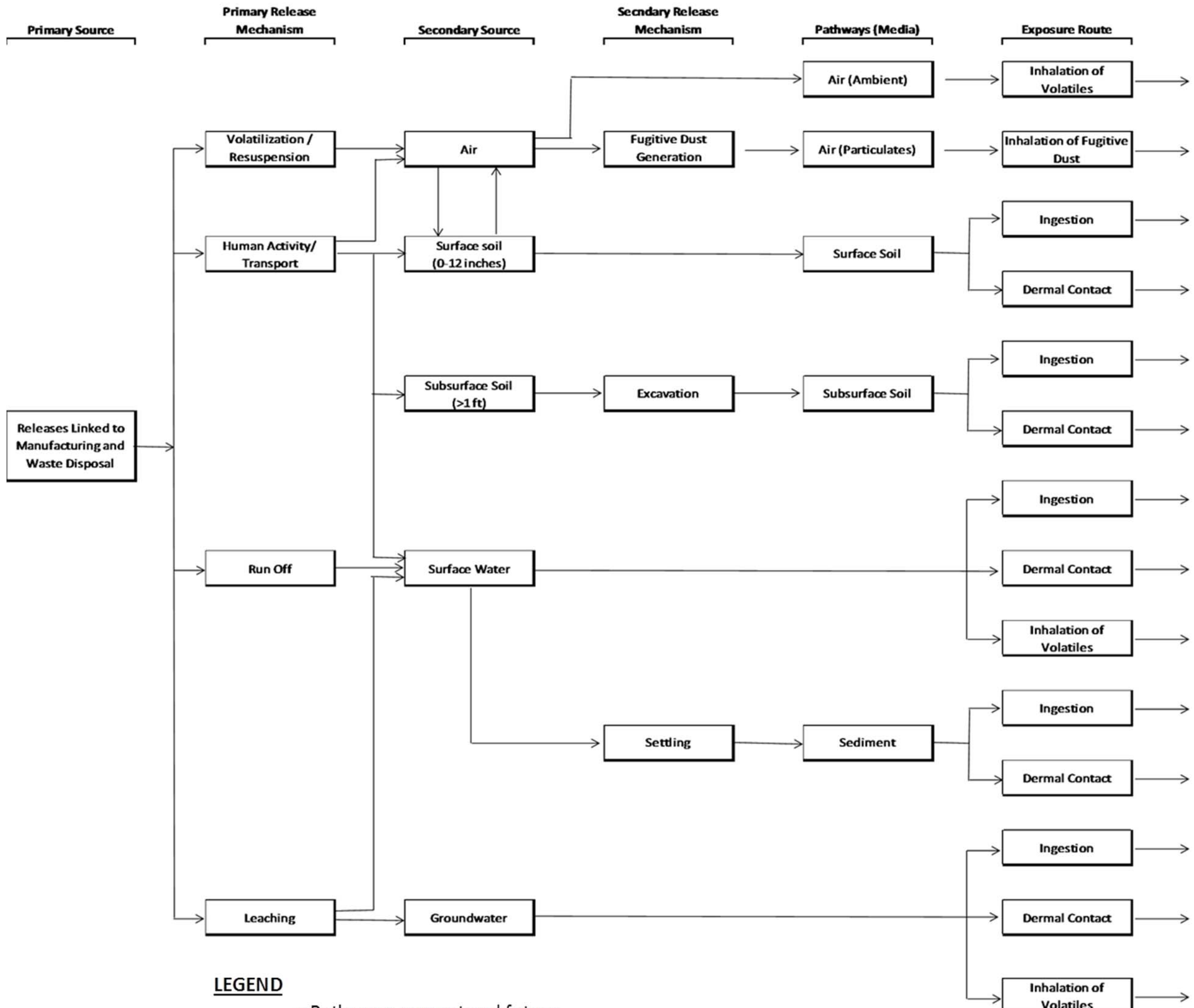
OU-1/OU-2 Proposed Plan

Hall Street: Interim Measures

Solutia

Figure **14**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-9_InterimMeasures_PCB_HallSt.mxd 3/25/2016 2:40:38 PM



Potential Receptors

Pathways (Media)	Exposure Route	Industrial/ Commercial Worker (Non-Residential Area)	Commercial Visitor (Non-Residential Area)	School/ Daycare Adult and Child (Non-Residential Area)	Intrusive Workers* (Non-Residential Area)	Recreational User (Non-Residential Area)	Trespasser (Non-Residential Area)	Resident (Residential Area)
Air (Ambient)	Inhalation of Volatiles	○	○	○	○	○	○	○
Air (Particulates)	Inhalation of Fugitive Dust	●	●	●	●	●	●	●
Surface Soil	Ingestion	●	●	●	●	●	●	●
Surface Soil	Dermal Contact	●	●	●	●	●	●	●
Subsurface Soil	Ingestion	----	----	----	●	----	----	●
Subsurface Soil	Dermal Contact	----	----	----	●	----	----	●
Surface Water	Ingestion	----	----	----	----	●	●	----
Surface Water	Dermal Contact	----	----	----	----	●	●	----
Surface Water	Inhalation of Volatiles	----	----	----	----	●	●	----
Sediment	Ingestion	----	----	----	----	○	○	----
Sediment	Dermal Contact	----	----	----	----	○	○	----
Groundwater	Ingestion	----	----	----	----	----	----	----
Groundwater	Dermal Contact	----	----	----	----	----	----	----
Groundwater	Inhalation of Volatiles	----	----	----	----	----	----	----

LEGEND

→ = Pathways, current and future
● = Pathways for quantitative evaluation
○ = Pathways for qualitative evaluation
----- = Incomplete pathway or insufficient data available
* = Includes construction and utility workers

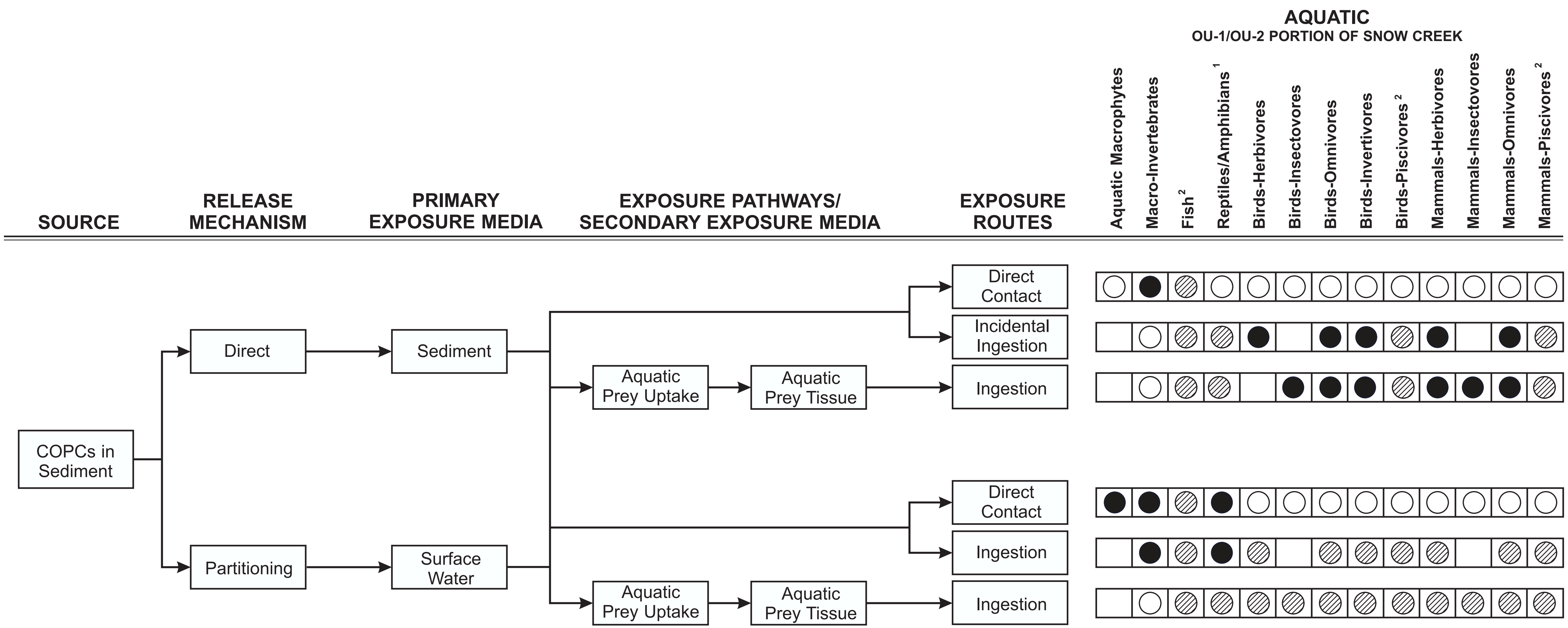
Reproduced from HHRA Figure 4-1 (CDM 2010a)

ANNISTON PCB SITE ANNISTON ALABAMA
OU-1/OU-2 REMEDIAL INVESTIGATION

CONCEPTUAL SITE MODEL FOR HUMAN HEALTH RISK ASSESSMENT

Solutia

Figure 21



High potential for complete exposure pathway. Primary Pathway quantitatively evaluated.

Exposure pathway considered de minimus. Not quantitatively evaluated.

Secondary pathway complete but expected to be minimal relative to the identified Primary complete pathways. Not quantitatively evaluated.

incomplete exposure pathway.

1 = Pathway may be complete but insufficient toxicity data available. Not quantitatively evaluated.

2 = Pathways are considered secondary because minimal fish community present.

COPCs : constituents of potential concern

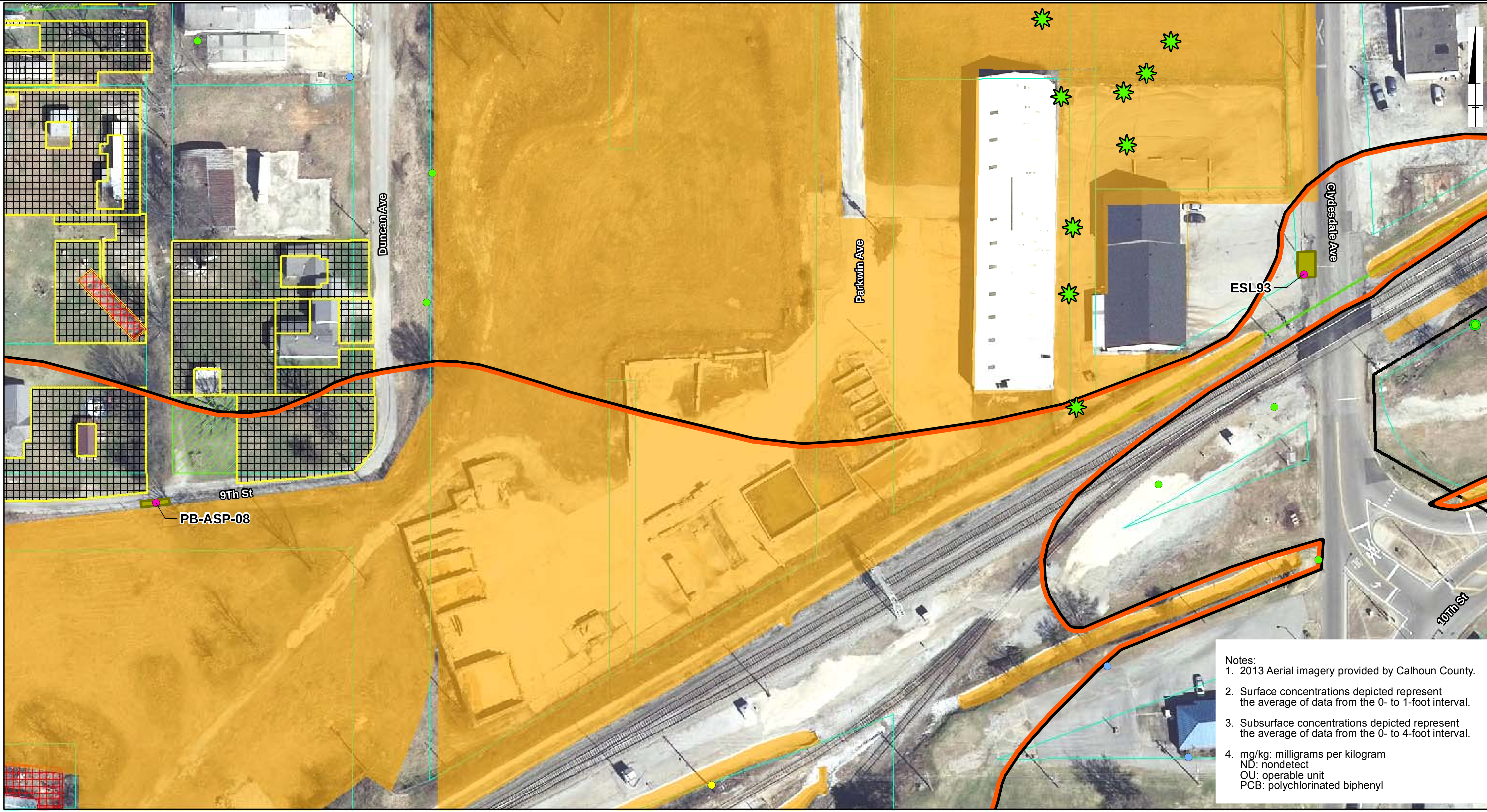
OU : operable unit

Anniston PCB Site: OU1/OU2
Anniston, Alabama
OU1/OU2 Proposed Plan

Ecological Conceptual Site Model

Solutia

FIGURE
22



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50

- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg
- 11th Street Ditch
- Residential >1 (mg/kg) - Not removed
- Completed Removal Area
- Residential < 1 (mg/kg)
- OU-1/OU-2 Downgradient Floodplain
- Exposure Unit
- Parcel Boundaries
- Interim Measure and Other Early Actions
- Remedial Alternatives IM-2 and IM-3

0 75 150 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

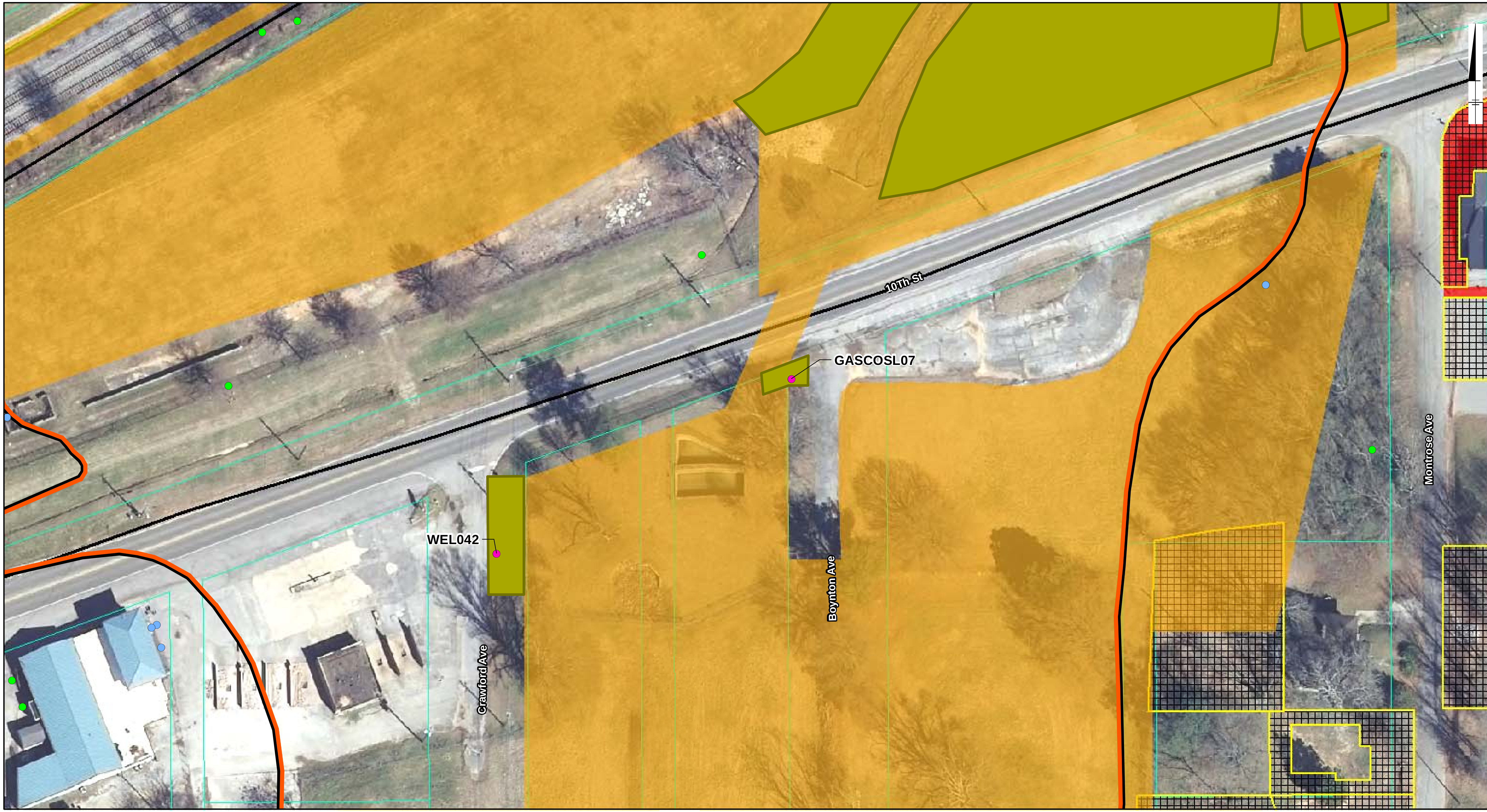
OU-1/OU-2 Proposed Plan

Northside Area: Candidate Remedial Areas

Solutia

Figure
23

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-4_RemedialAlternativesIM2and3.mxd 3/30/2016 9:12:42 AM



Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

- 11th Street Ditch
- Completed Removal Area
- Residential < 1 (mg/kg)
- Exposure Unit
- Parcel Boundaries
- OU-1/OU-2 Downgradient Floodplain

- Special Use: High Activity Area Removed
- Interim Measure and Other Early Actions
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4

0 100 200 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

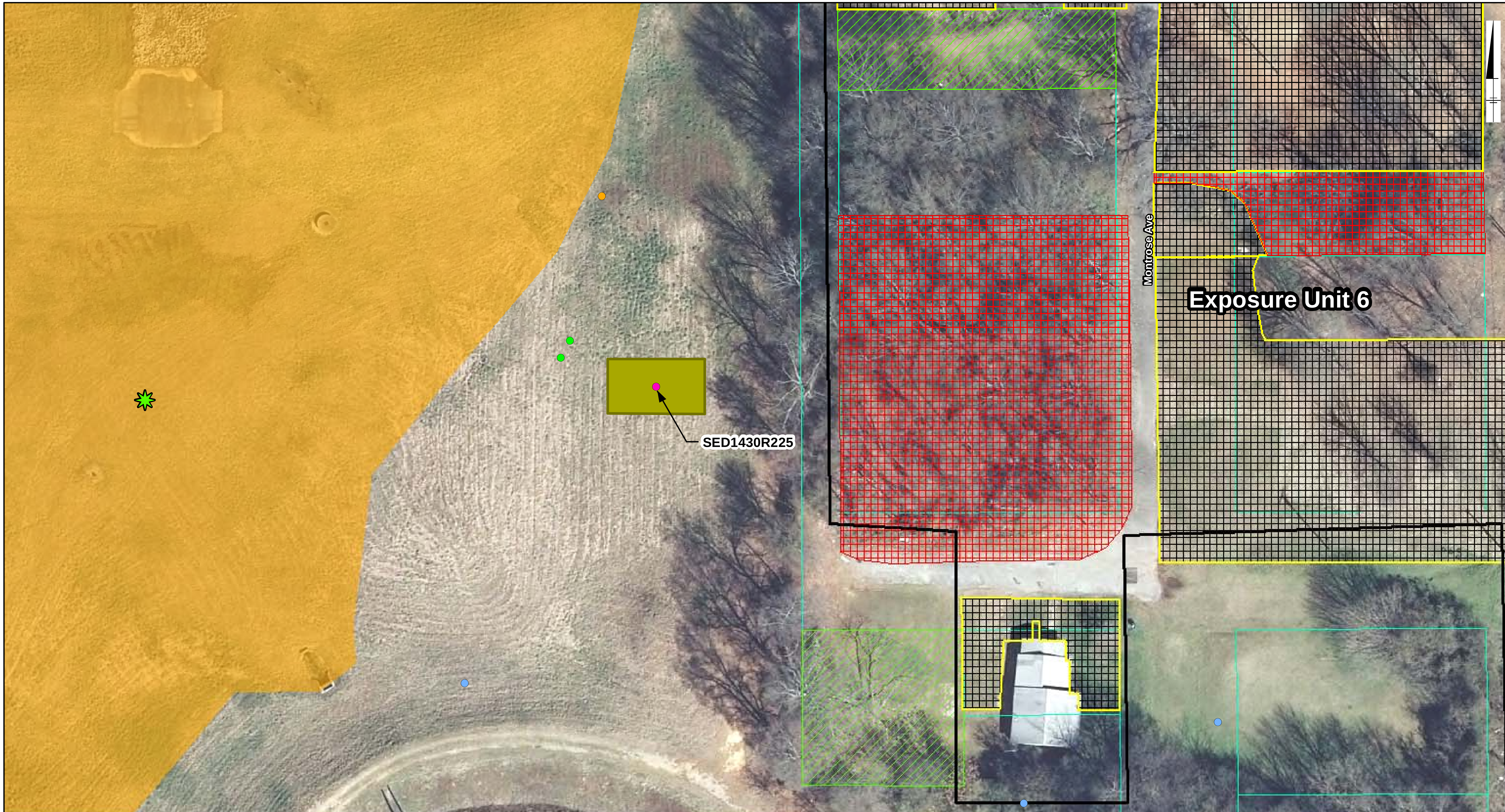
OU-1/OU-2 Proposed Plan

Eastside Area: Candidate Remedial Areas

Solutia

Figure **24a**

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-6a_EastsideArea_CandidateRemedialAreas.mxd 3/25/2016 1:44:46 PM



Legend

Soil Sample Location

Surface PCB (mg/kg)

- ND to < 1
- ≥ 1 to <10
- ≥ 25 to < 50
- ≥ 50 to < 500
- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

- Residential >1 (mg/kg) - Not removed
- Completed Removal Area
- Residential < 1 (mg/kg)
- Exposure Unit
- Parcel Boundaries
- Interim Measure and Other Early Actions
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 100 200 Feet

Graphic Scale

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

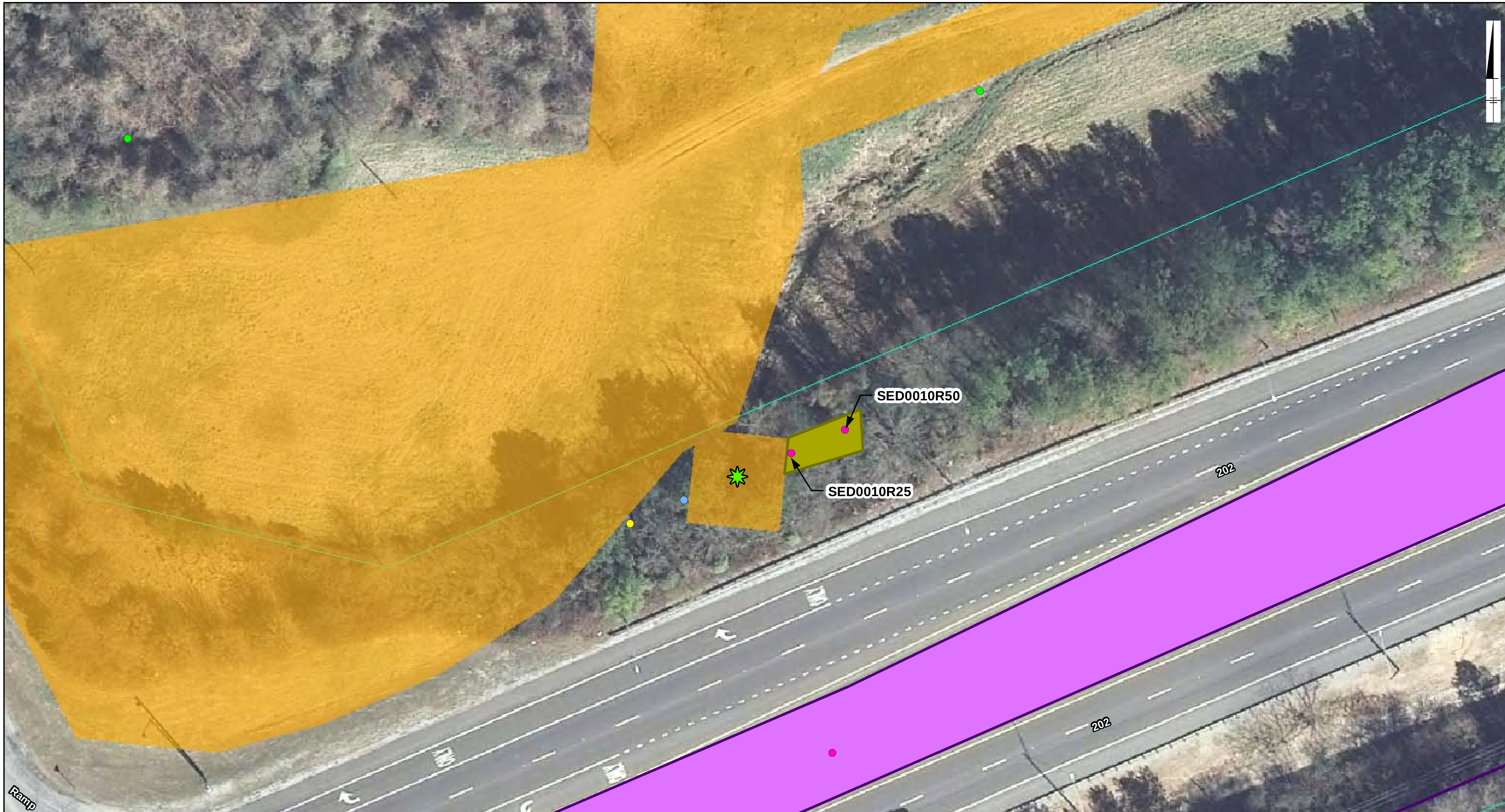
OU-1/OU-2 Proposed Plan

Eastside Area: Candidate Remedial Areas

Solutia

Figure **24b**

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-6b_EastsideArea_CandidateRemedialAreas.mxd 3/25/2016 1:59:02 PM



Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 50 to < 500

- Operable Unit 3
- Parcel Boundaries
- Interim Measure and Other Early Actions
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
- Target Remedial Area - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 100 200 Feet
Graphic Scale

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

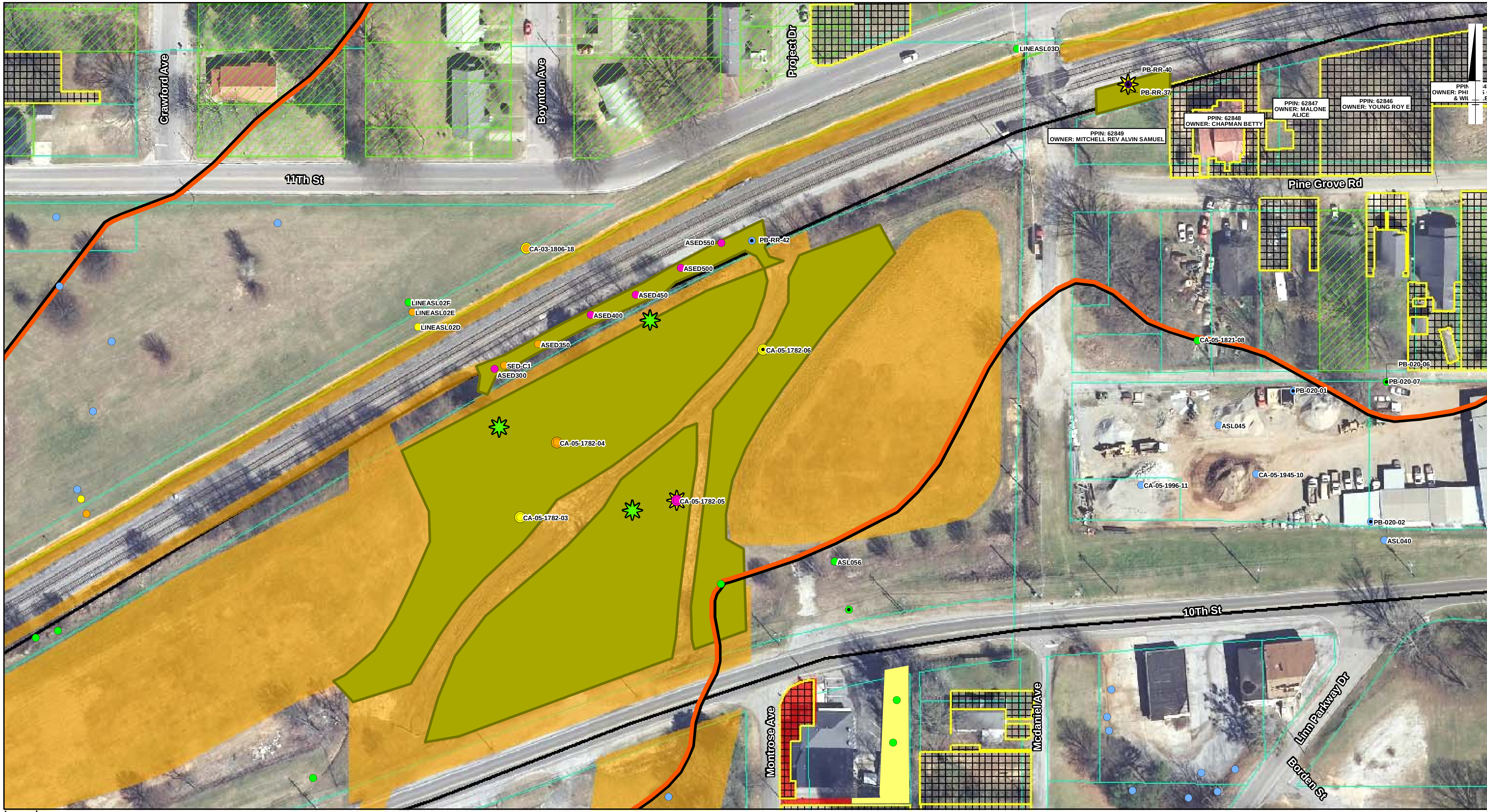
OU-1/OU-2 Proposed Plan

Eastside Area: Candidate Remedial Areas

Solutia

Figure
24c

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-6c_EastsideArea_CandidateRemedialAreas.mxd 3/25/2016 2:03:52 PM



Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

- Analytes other than PCB and Lead Analyzed
- 11th Street Ditch
- Exposure Unit
- Parcel Boundaries
- Completed Removal Area
- Residential < 1 (mg/kg)
- OU-1/OU-2 Downgradient Floodplain
- Interim Measure and Other Early Actions

- Special Use: High Activity Area
- Special Use: Low Activity Area ≥ 1 mg/kg
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
- Locations with Maximum PCB Results ≥ 500 mg/kg
- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

0 100 200 Feet
Graphic Scale

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU1/OU2
Anniston, Alabama
OU1/OU2 Proposed Plan

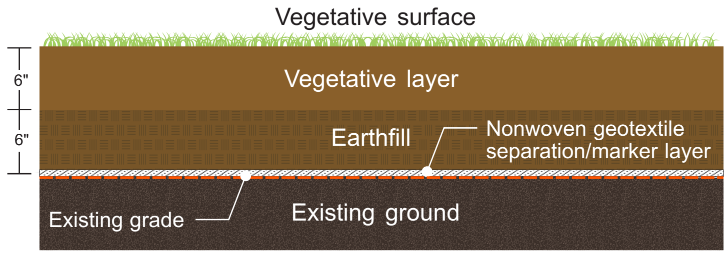
Eastside Drainage Way: Candidate Remedial Areas

Solutia

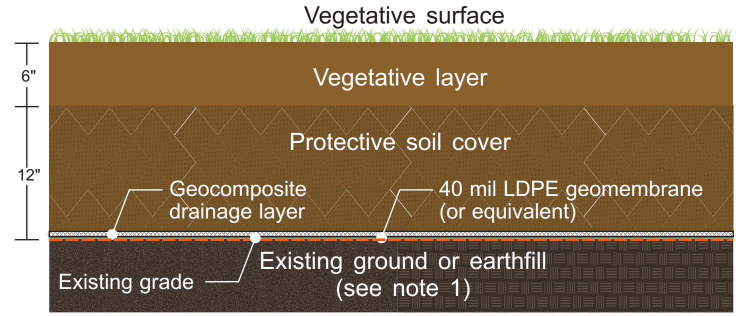
Figure
25

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-8_EastsideDrainageWay_CandidateRemedialAreas.mxd 3/25/2016 3:10:01 PM

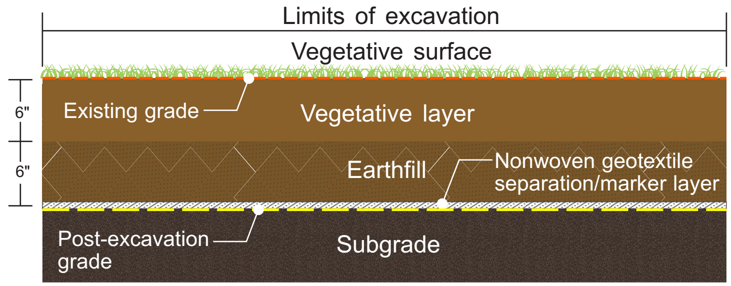
03/25/2016 SYRACUSE, NY-ENV/CAD-DJHOWES
B0010294/3014/00007/CDR/FSR/10294S02.CDR



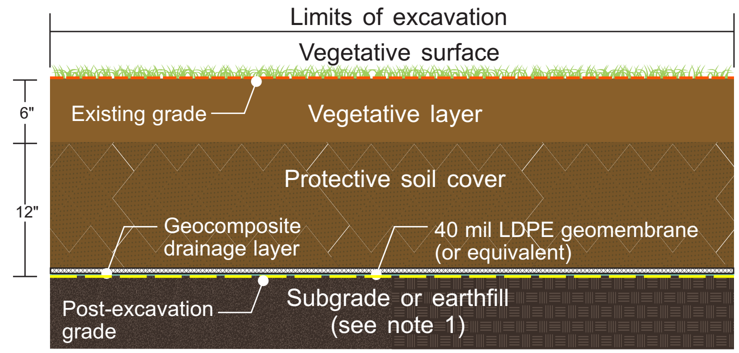
Typical Soil Cover Cross Section - No Soil Excavation



Typical Low-Permeability Cap Cross Section - No Soil Excavation



Typical Soil Cover Cross Section - Soil Excavation (Where Cover Placement Cannot Be Implemented Due to the Potential for Local Flooding)



Typical Low-Permeability Cap Cross Section - Soil Excavation (where Cover Placement Cannot Be Implemented Due to the Potential for Local Flooding)

Not to scale

Note:

1. Earthfill material to be provided as necessary to provide the proper drainage for the cap system.

LDPE: low density polyethylene
OU: operable unit
PCB: polychlorinated biphenyl

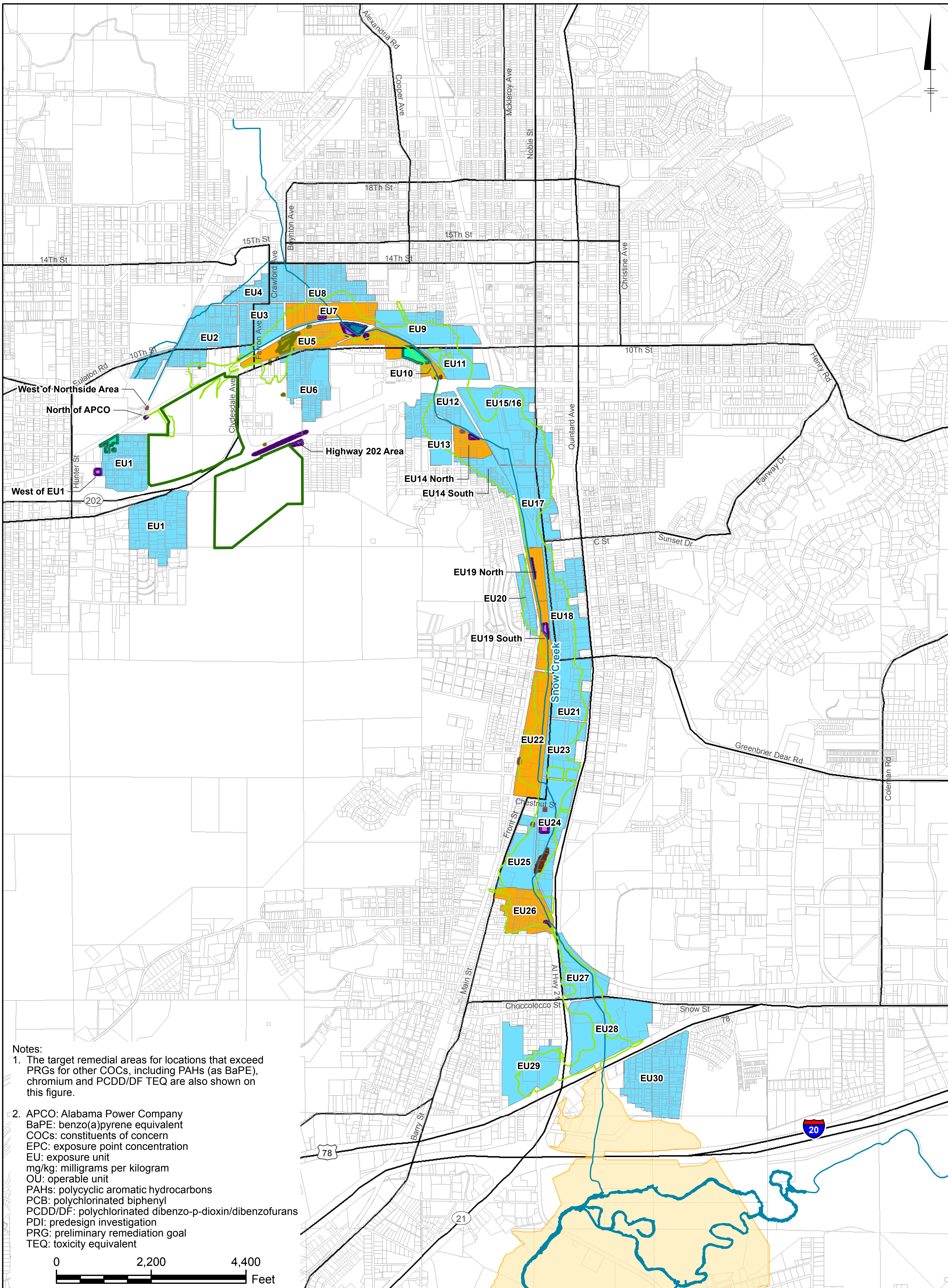
Anniston PCB Site: OU1/OU2
Anniston, Alabama
OU1/OU2 Proposed Plan

Typical Soil Cover and Low-Permeability Cap Cross Sections

Solutia

Figure 26

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17a_TargetRemedialAreasforOUwidePRG21_v3.mxd 3/30/2016 4:22:16 PM



Notes:

1. The target remedial areas for locations that exceed PRGs for other COCs, including PAHs (as BaPE), chromium and PCDD/DF TEQ are also shown on this figure.
2. APCO: Alabama Power Company
   BaPE: benzo(a)pyrene equivalent
   COCs: constituents of concern
   EPC: exposure point concentration
   EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PAHs: polycyclic aromatic hydrocarbons
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofurans
   PDI: predesign investigation
   PRG: preliminary remediation goal
   TEQ: toxicity equivalent

0 2,200 4,400 Feet

Graphic Scale

Legend

- Creek
- Major Roads
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Downgradient Floodplain
- Parcels
- Exposure Unit with PCB EPC < 21 mg/kg or a maximum PCB concentration < 50 mg/kg
- EU with PCB EPC ≥ 21 mg/kg or a maximum PCB concentration ≥ 50 mg/kg
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
- Target Remedial Area – Alternatives GW-2, GW-3, and GW-4
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Unapproved Waste Disposal Area – Alternatives UWDA-2, UWDA-3, and UWDA-4
- Dredge Spoil Pile In-Place Subject to PDI Sampling - Alternative DSP-2 and DSP-3
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

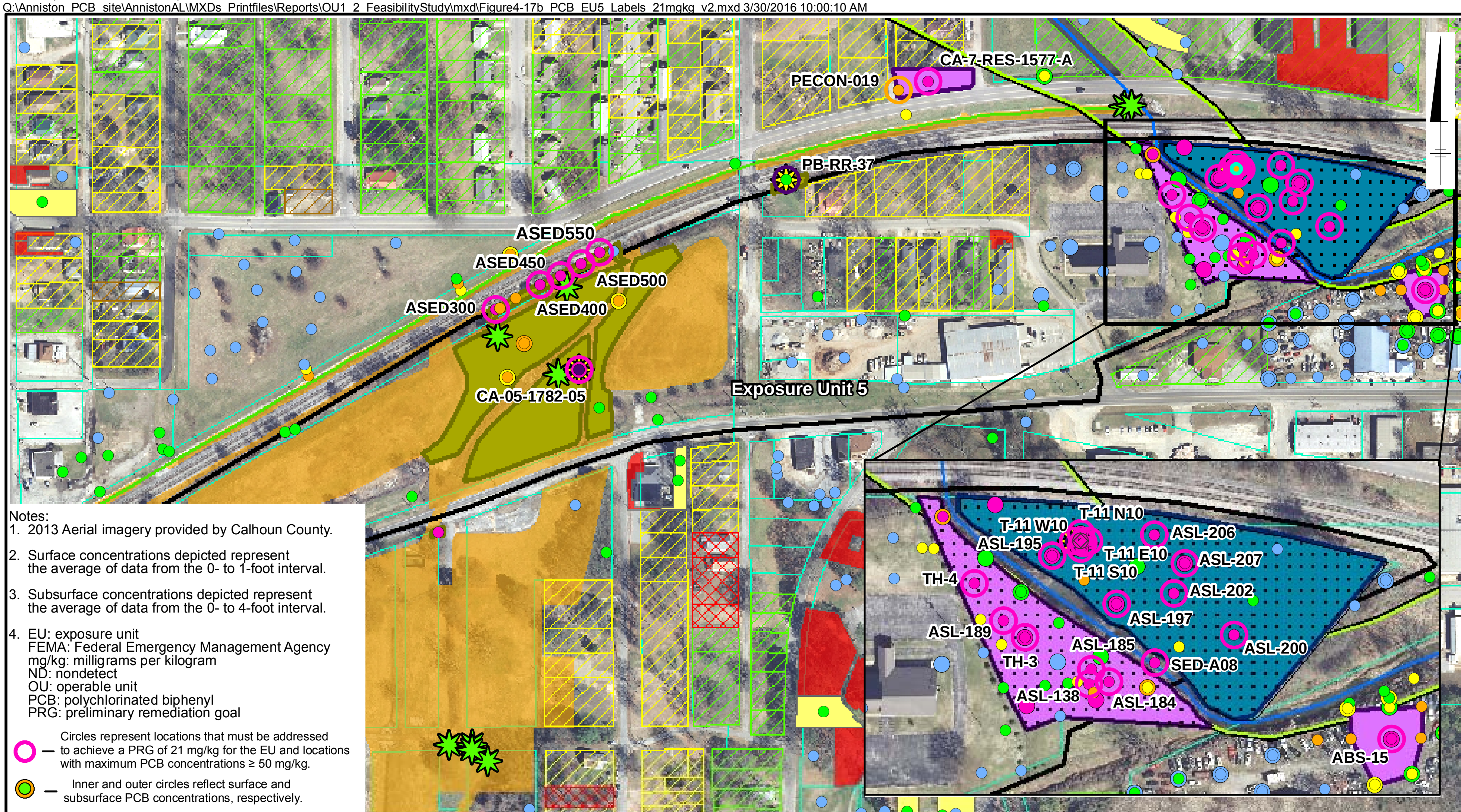
Anniston PCB Site: OU1/OU2
Anniston, Alabama
OU1/OU2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg

Solutia

Figure
27a

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17b_PCB_EU5_Labels_21mgkg_v2.mxd 3/30/2016 10:00:10 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500
- Snow Creek
- 11th Street Ditch
- Exposure Unit

- Interim Measure and Other Early Actions
- FEMA Floodway
- All Parcels

Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential Appendix 6
- Residential > 1 (mg/kg) (Removal Pending)
- Special Use: High Activity Area
- Principal Threat Waste Area

- Special Use: Low Activity Area ≥ 1 mg/kg
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
- Target Remedial Area – Alternatives GW-2, GW-3, and GW-4
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

- Locations with Maximum PCB Results ≥ 500 mg/kg
- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

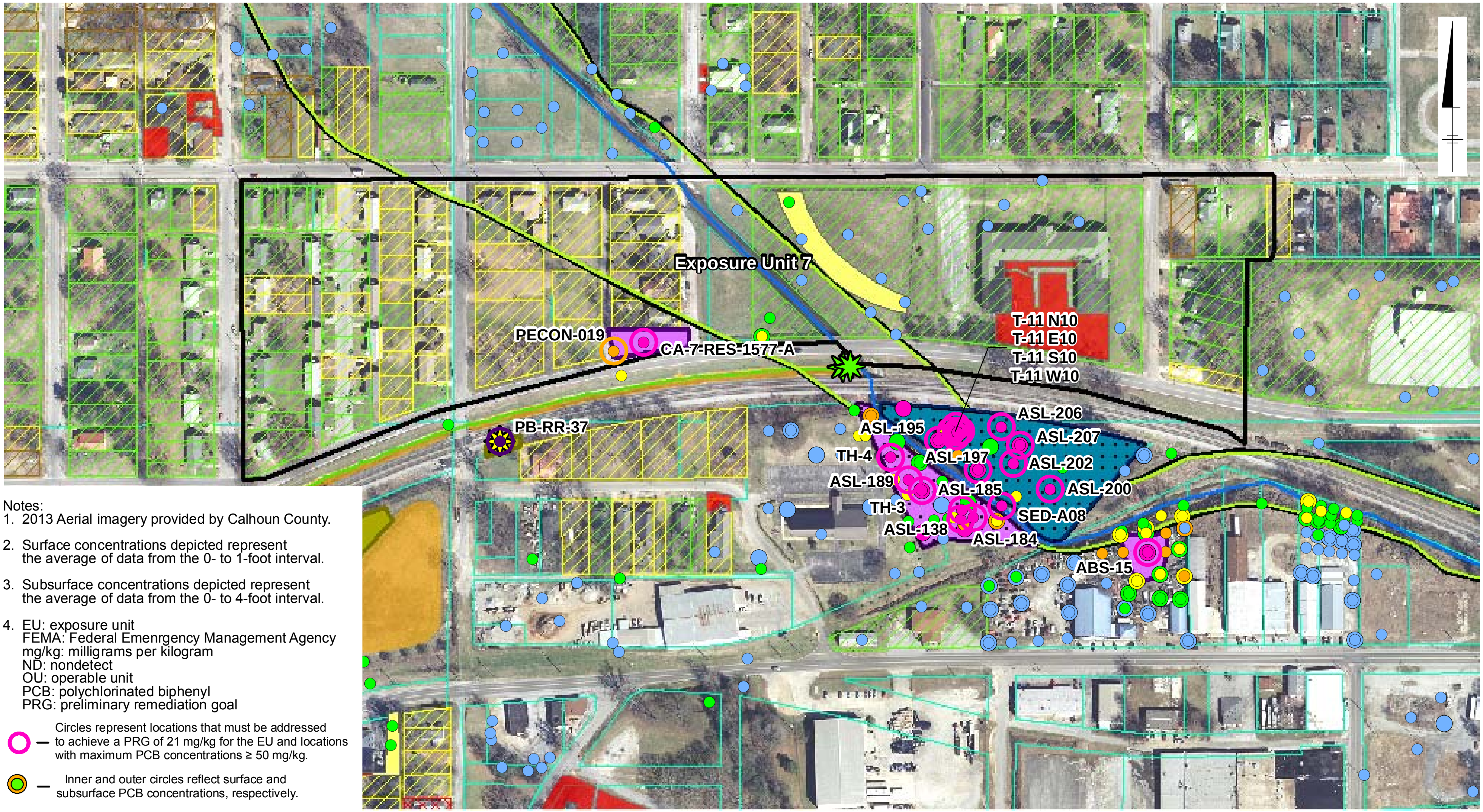
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 5

Solutia
Ingenuity Productivity Performance

Figure
27b

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17c_PCB_EU7_Labels_21mgkg_v2.mxd 3/30/2016 10:01:43 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emenrgency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

Snow Creek
11th Street Ditch
Exposure Unit

Interim Measure and Other Early Actions
FEMA Floodway
All Parcels
Residential Parcels Sampled
Residential < 1 (mg/kg)
Removal Complete
Residential Appendix 6
Residential > 1 (mg/kg) (Removal Pending)
Special Use: High Activity Area

Special Use: Low Activity Area ≥ 1 mg/kg
Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
Target Remedial Area – Alternatives GW-2, GW-3, and GW-4
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

Locations with Maximum PCB Results ≥ 500 mg/kg
Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

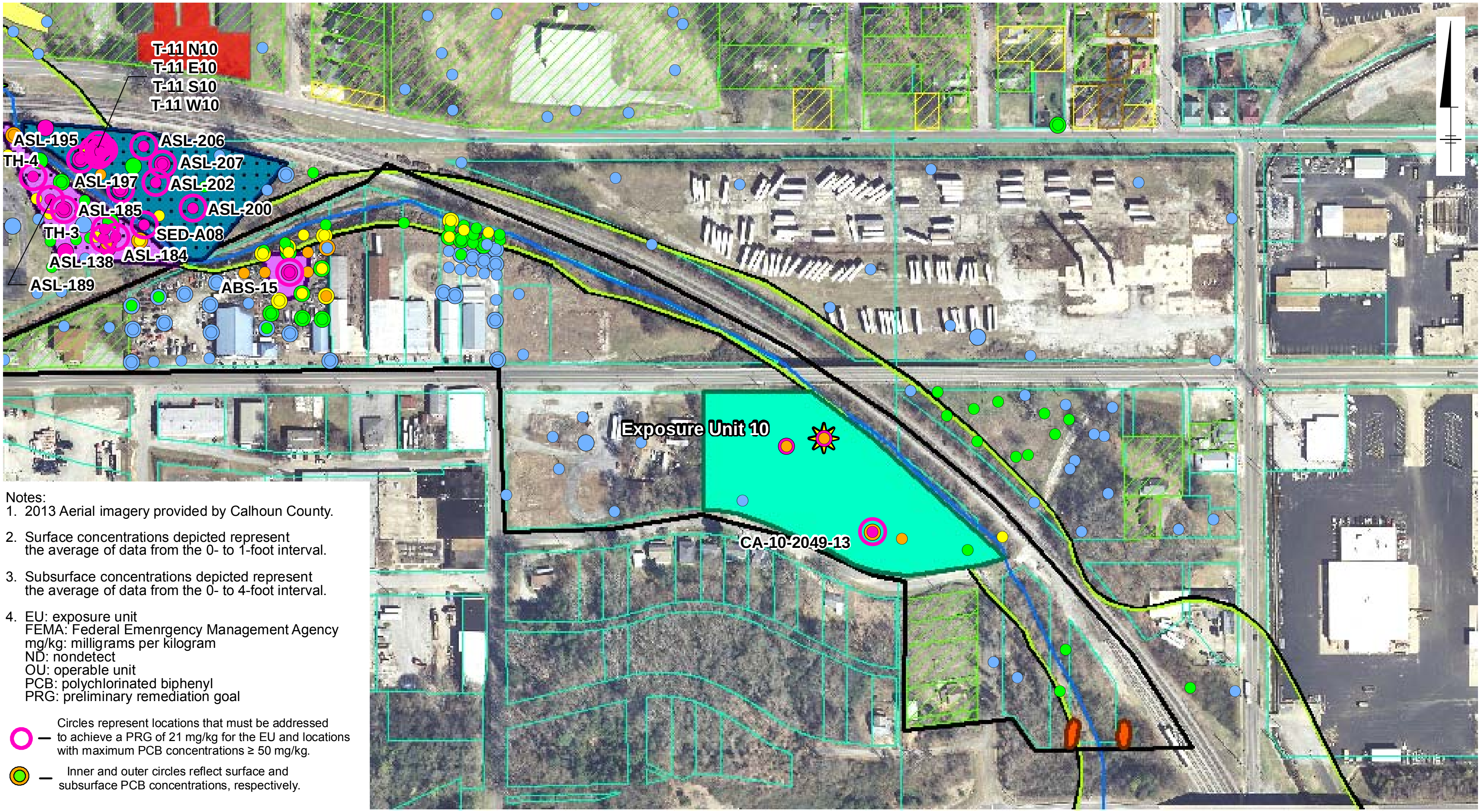
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 7

Solutia
Ingenuity Productivity Performance

Figure
27c

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17d_PCB_EU10_Labels_21mgkg_v2.mxd 3/30/2016 10:03:00 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emenrgency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

Snow Creek
Exposure Unit
Interim Measure and Other Early Actions

FEMA Floodway
All Parcels
Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential Appendix 6

Special Use: High Activity Area
Special Use: Low Activity Area ≥ 1 mg/kg
Target Remedial Area – Alternatives GW-2, GW-3, and GW-4
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Unapproved Waste Disposal Area – Alternatives UWDA-2, UWDA-3, and UWDA-4
Dredge Spoil Pile In-Place

Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts
Locations with Maximum PCB Results ≥ 500 mg/kg
Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

0 300 600 Feet
Graphic Scale

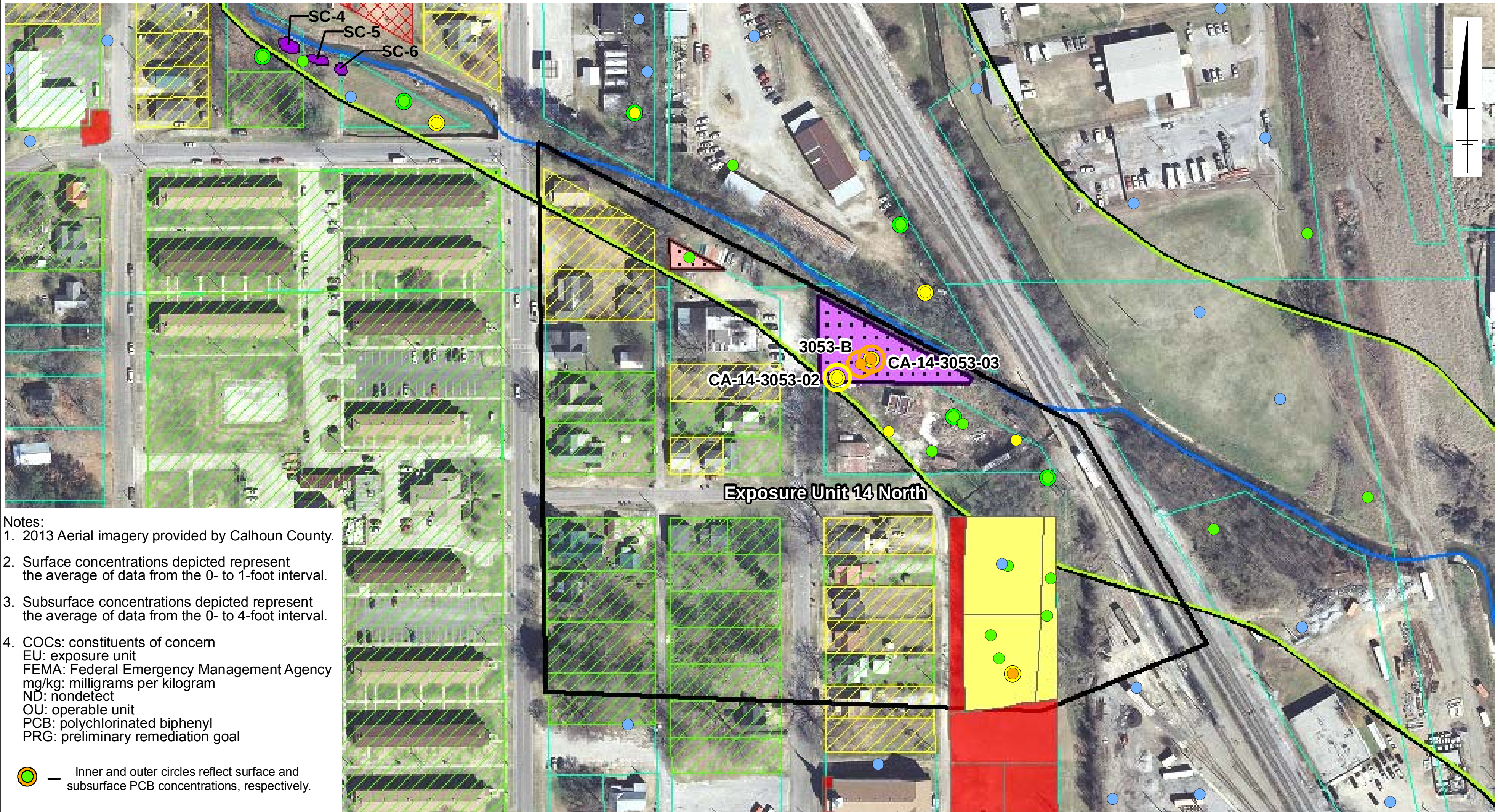
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 10

Solutia

Figure
27d



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. COCs: constituents of concern
EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50

Snow Creek
Exposure Unit
FEMA Floodway
Dredge Spoil Pile Removed

All Parcels
Residential Parcels Sampled
Residential < 1 (mg/kg)
Removal Complete
Residential > 1 (mg/kg) (Removal Pending)

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

Special Use: High Activity Area
Special Use: Low Activity Area ≥ 1 mg/kg
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

0 200 400 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

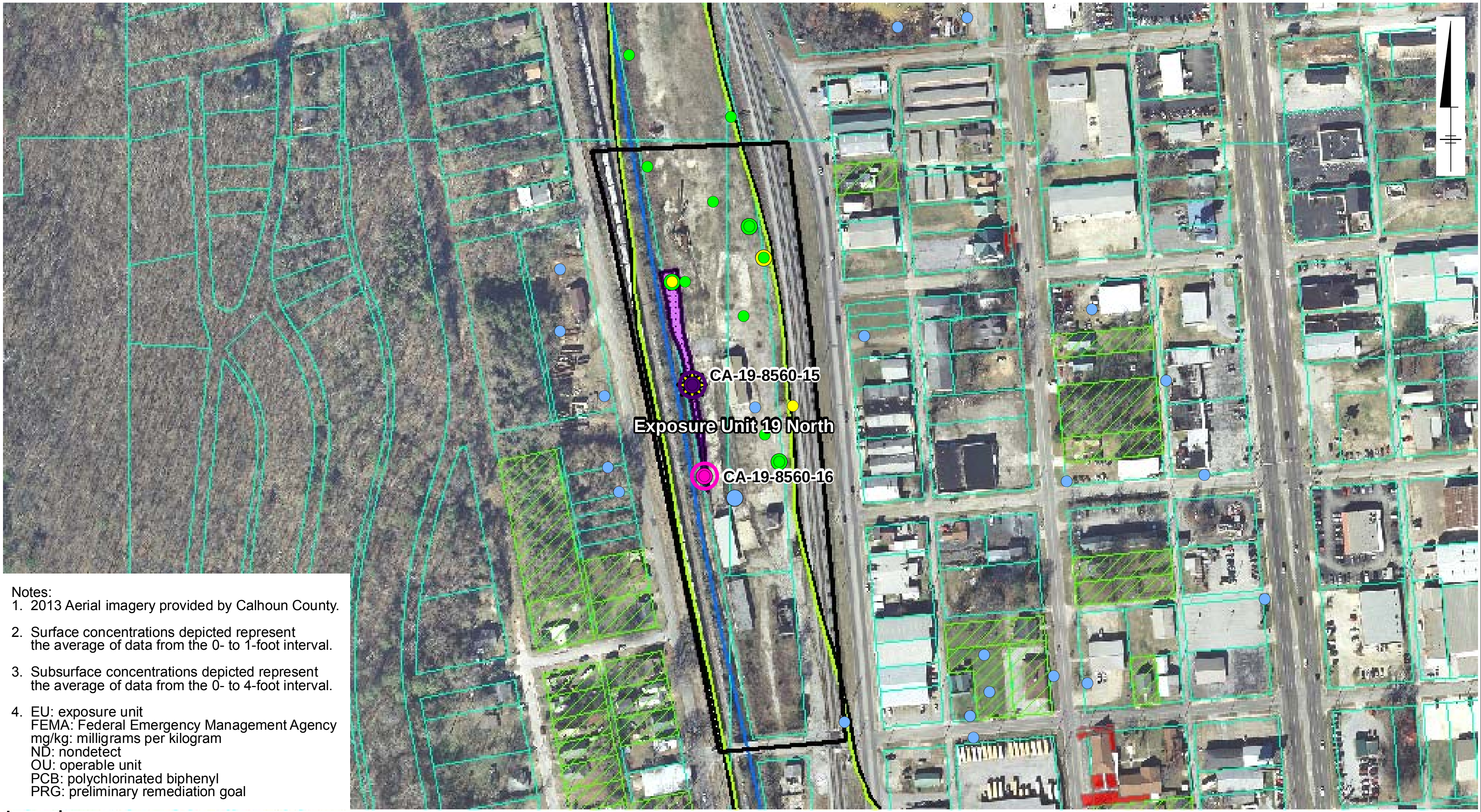
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 14 North

Solutia
Ingenuity Productivity Performance

Figure
27e

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17f_PCB_EU19N_Labels_21mgkg_v2.mxd 3/30/2016 10:06:05 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500
- Snow Creek

- Exposure Unit
- FEMA Floodway
- All Parcels

Residential Parcels Sampled
- Residential < 1 (mg/kg)

- Special Use: High Activity Area
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts
- Locations with Maximum PCB Results ≥ 500 mg/kg

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

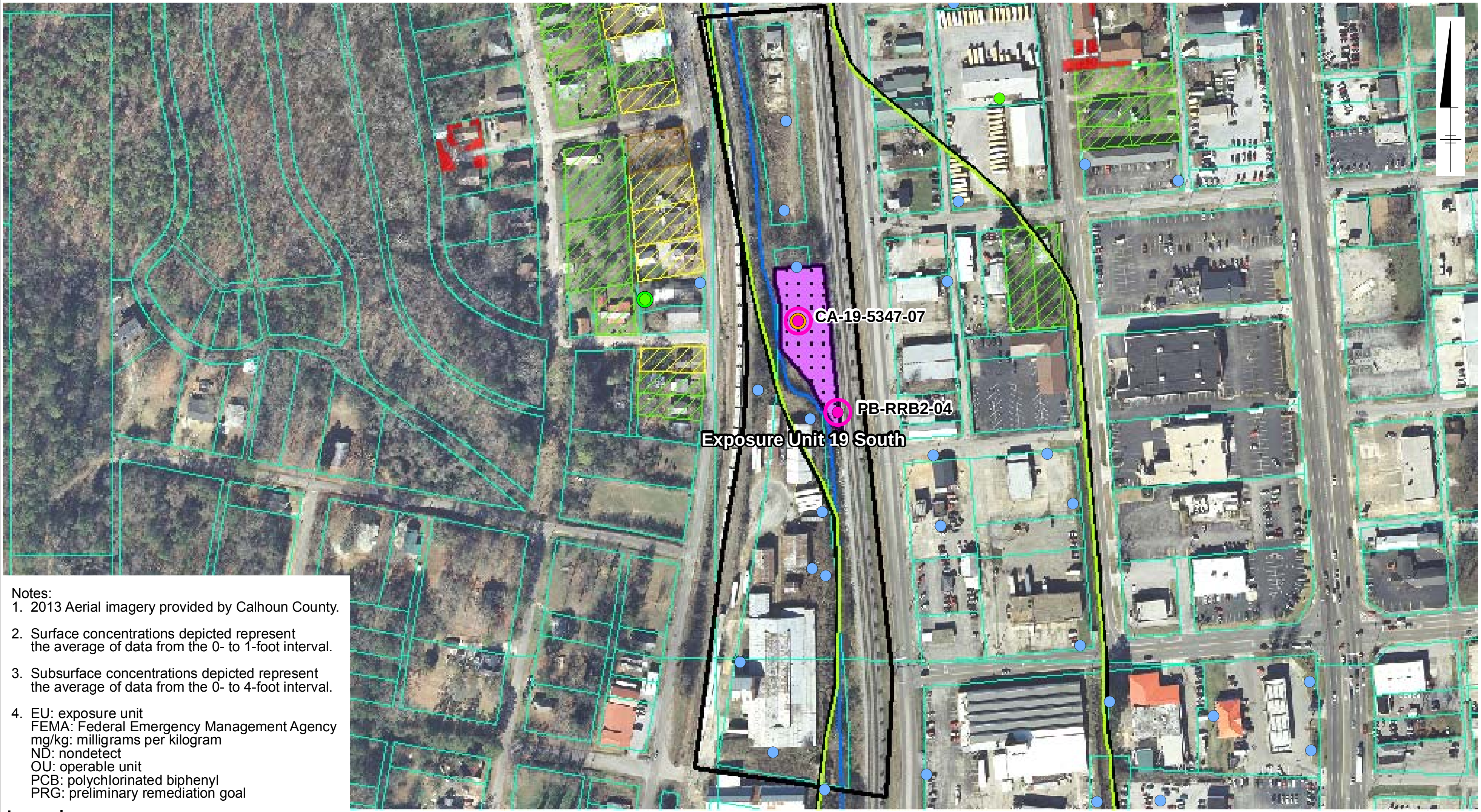
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 19 North

Solutia
Ingenuity Productivity Performance

Figure
27f

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17g_PCB_EU19S_Labels_21mgkg_v2.mxd 3/30/2016 10:07:26 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Snow Creek
- Exposure Unit
- FEMA Floodway

- All Parcels

Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential Appendix 6
- Special Use: High Activity Area

- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 300 600 Feet
Graphic Scale

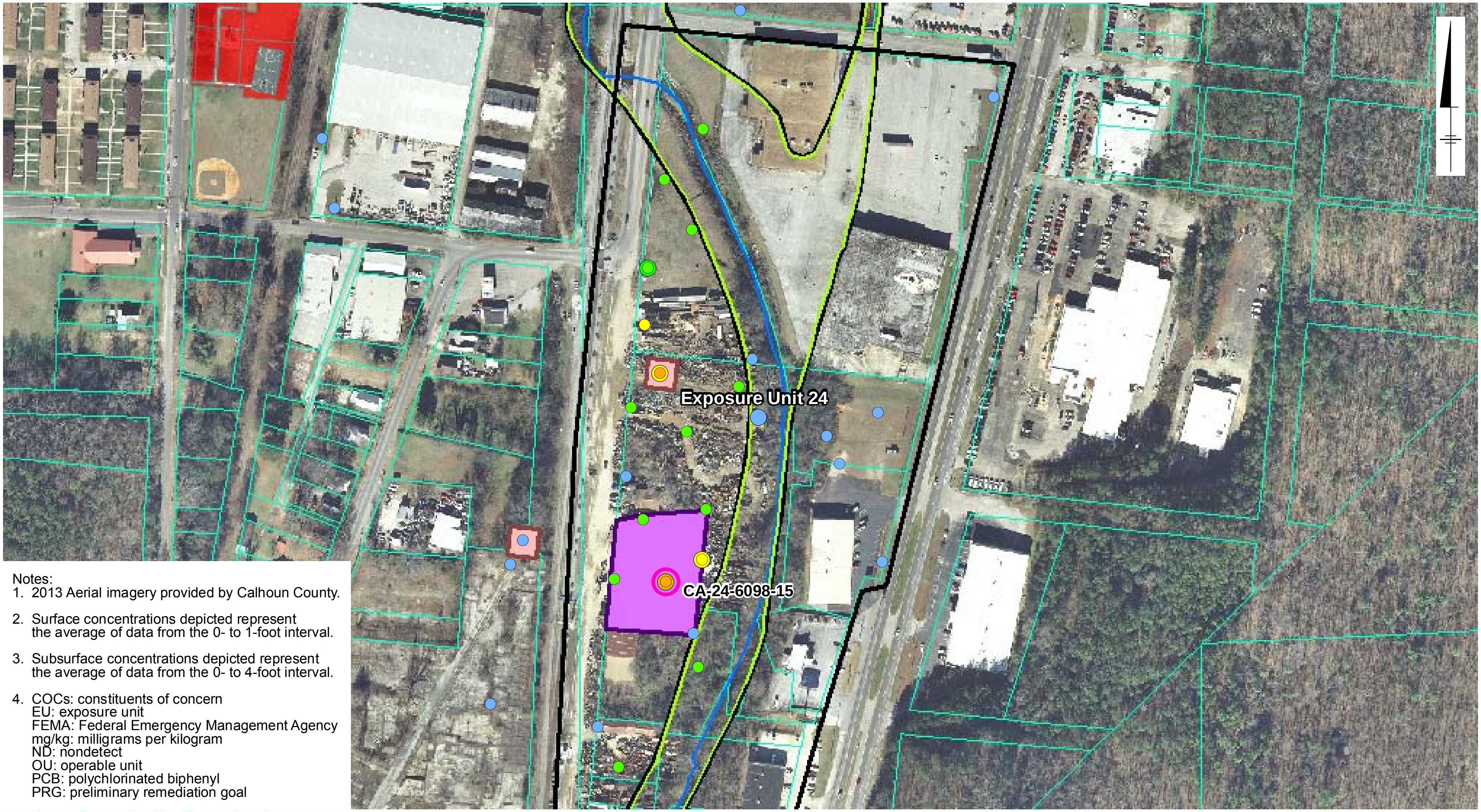
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 19 South

Solutia
Ingenuity Productivity Performance

Figure
27g



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. COCs: constituents of concern
   EU: exposure unit
   FEMA: Federal Emergency Management Agency
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Snow Creek
Exposure Unit
FEMA Floodway

All Parcels
Special Use: High Activity Area
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Dredge Spoil Pile In-Place
Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

– Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

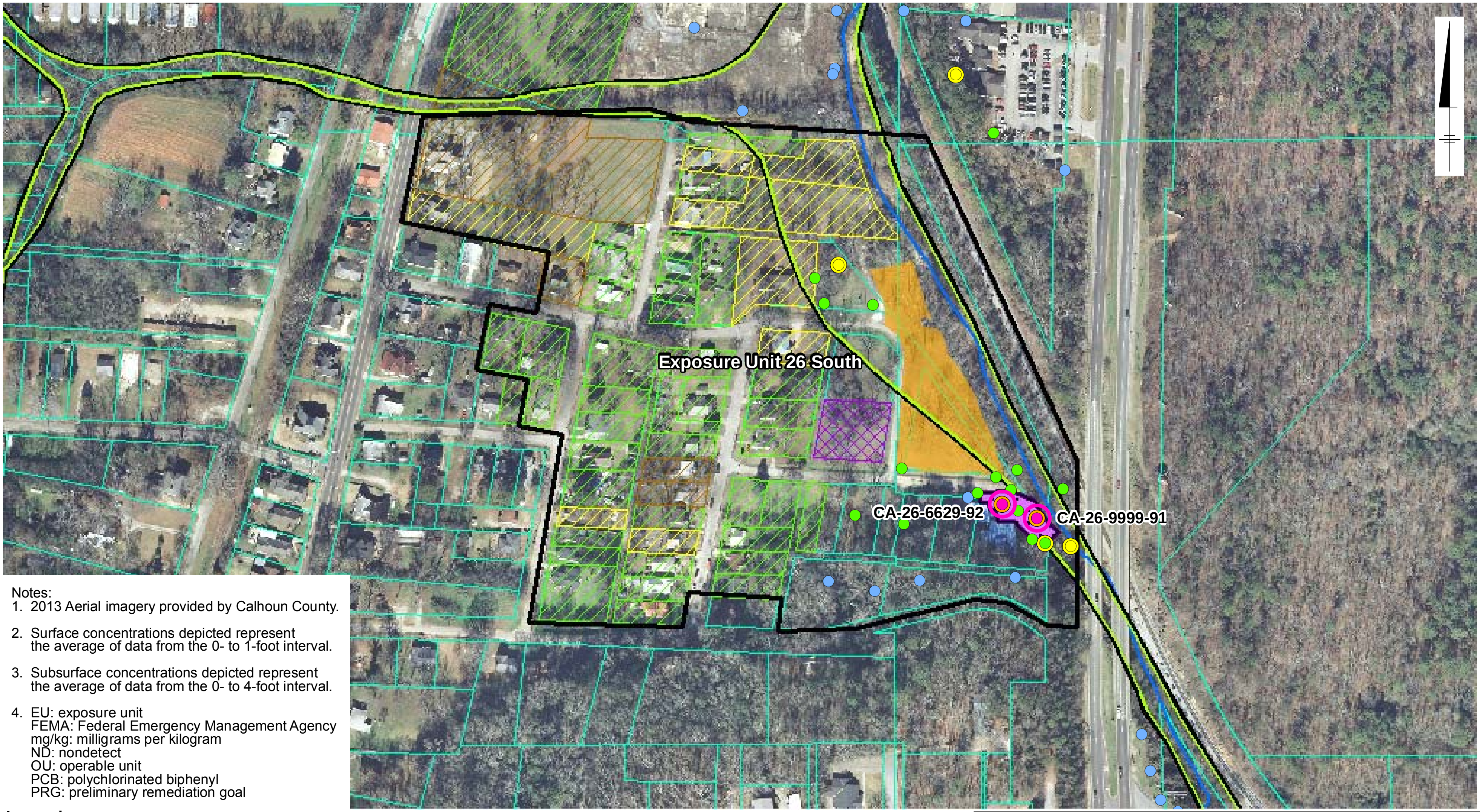
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 24

Solutia
Ingenuity Productivity Performance

Figure
27h

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17i_PCB_EU26_Labels_21mgkg_v2.mxd 3/30/2016 10:09:51 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Snow Creek
Exposure Unit
Interim Measure and Other Early Actions
FEMA Floodway
All Parcels
Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential Appendix 6
- Residential > 1 (mg/kg)

Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Area Not Suitable for Cover Placement without Excavation Due to Potential Local Flooding Impacts

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the EU and locations with maximum PCB concentrations ≥ 50 mg/kg.

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

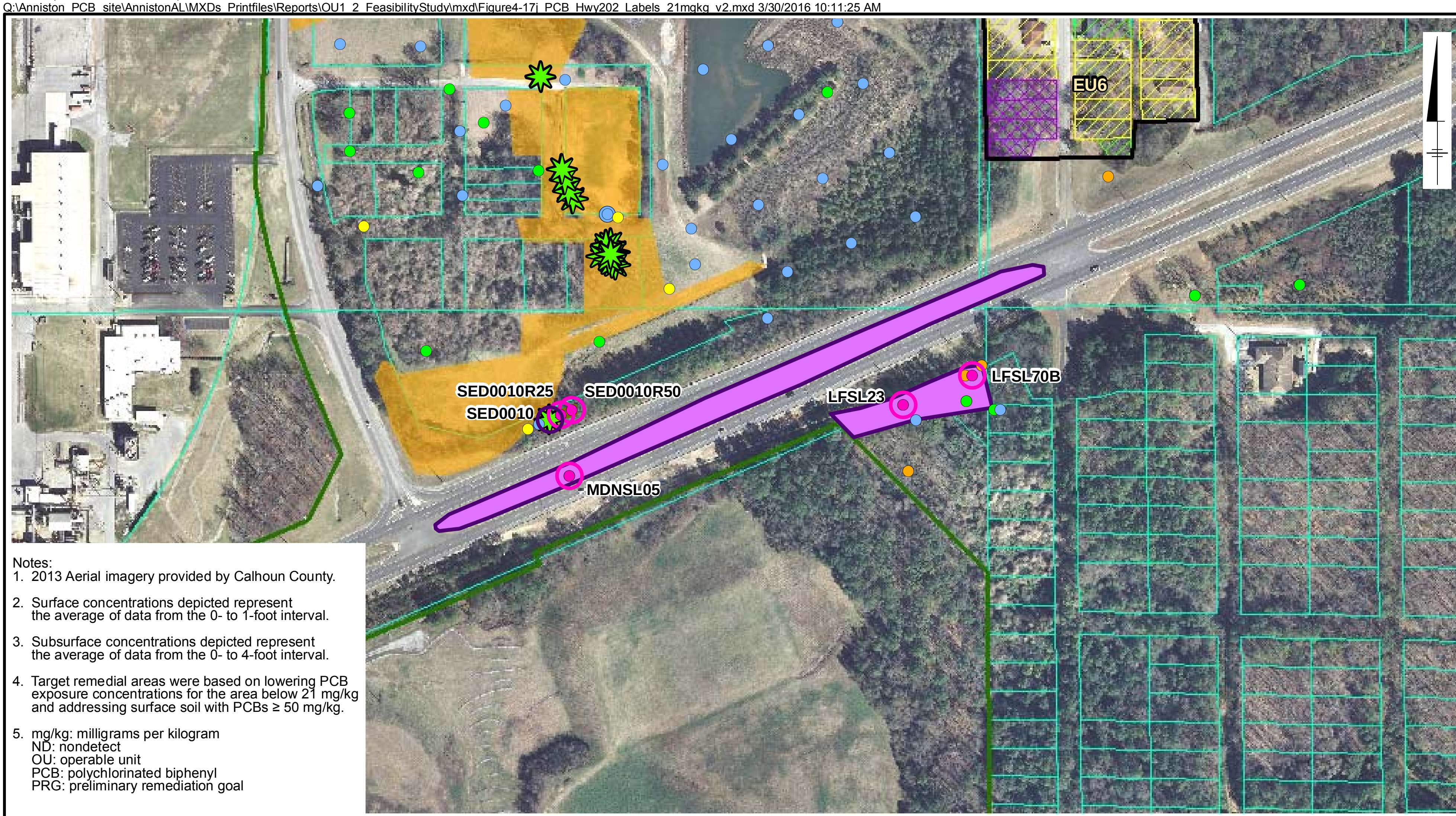
0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Exposure Unit 26

Figure
27i



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Target remedial areas were based on lowering PCB exposure concentrations for the area below 21 mg/kg and addressing surface soil with PCBs ≥ 50 mg/kg.
5. mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Exposure Unit
Operable Unit 3

Interim Measure and Other Early Actions
All Parcels
Residential Parcels Sampled
Residential < 1 (mg/kg)
Removal Complete
Residential > 1 (mg/kg) (Unsuitable for Removal)

Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

— Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

— Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the area and locations with maximum PCB concentrations ≥ 50 mg/kg.

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg Highway 202 Area

Solutia
Ingenuity Productivity Performance

Figure
27j

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
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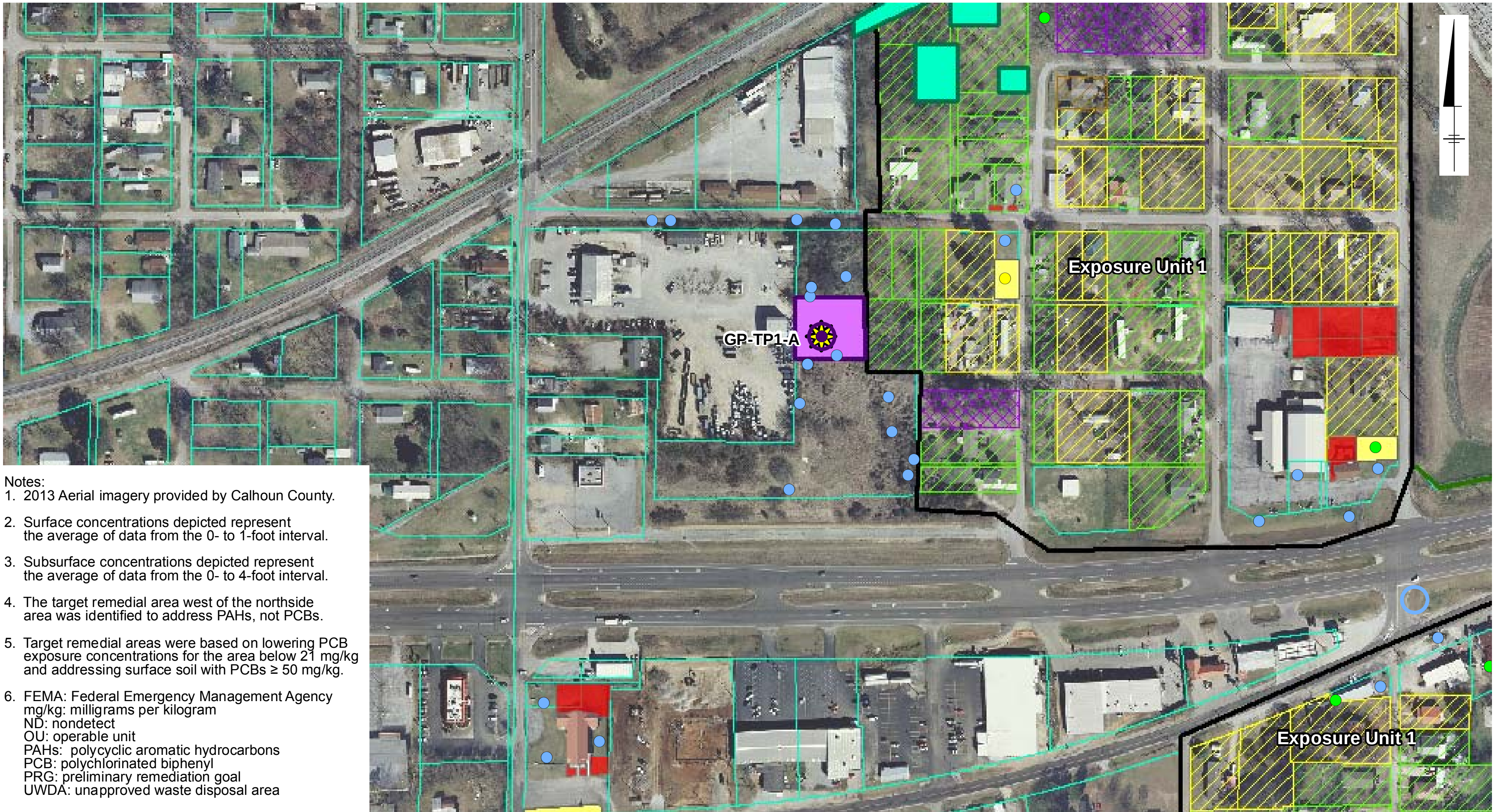


Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. The target remedial area west of the northside area was identified to address PAHs, not PCBs.
5. Target remedial areas were based on lowering PCB exposure concentrations for the area below 21 mg/kg and addressing surface soil with PCBs ≥ 50 mg/kg.
6. FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PAHs: polycyclic aromatic hydrocarbons
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
UWDA: unapproved waste disposal area

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to < 10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

Exposure Unit
Operable Unit 3

All Parcels
Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential Appendix 6
- Residential > 1 (mg/kg) (Removal Pending)
- Residential > 1 (mg/kg) (Unsuitable for Removal)

Special Use: High Activity Area
Special Use: Low Activity Area ≥ 1 mg/k
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Unapproved Waste Disposal Area – Alternatives UWDA-2, UWDA-3, and UWDA-4
Locations with Maximum PCB Results ≥ 500 mg/kg

– Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the area and locations with maximum PCB concentrations ≥ 50 mg/kg.
– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 300 600 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

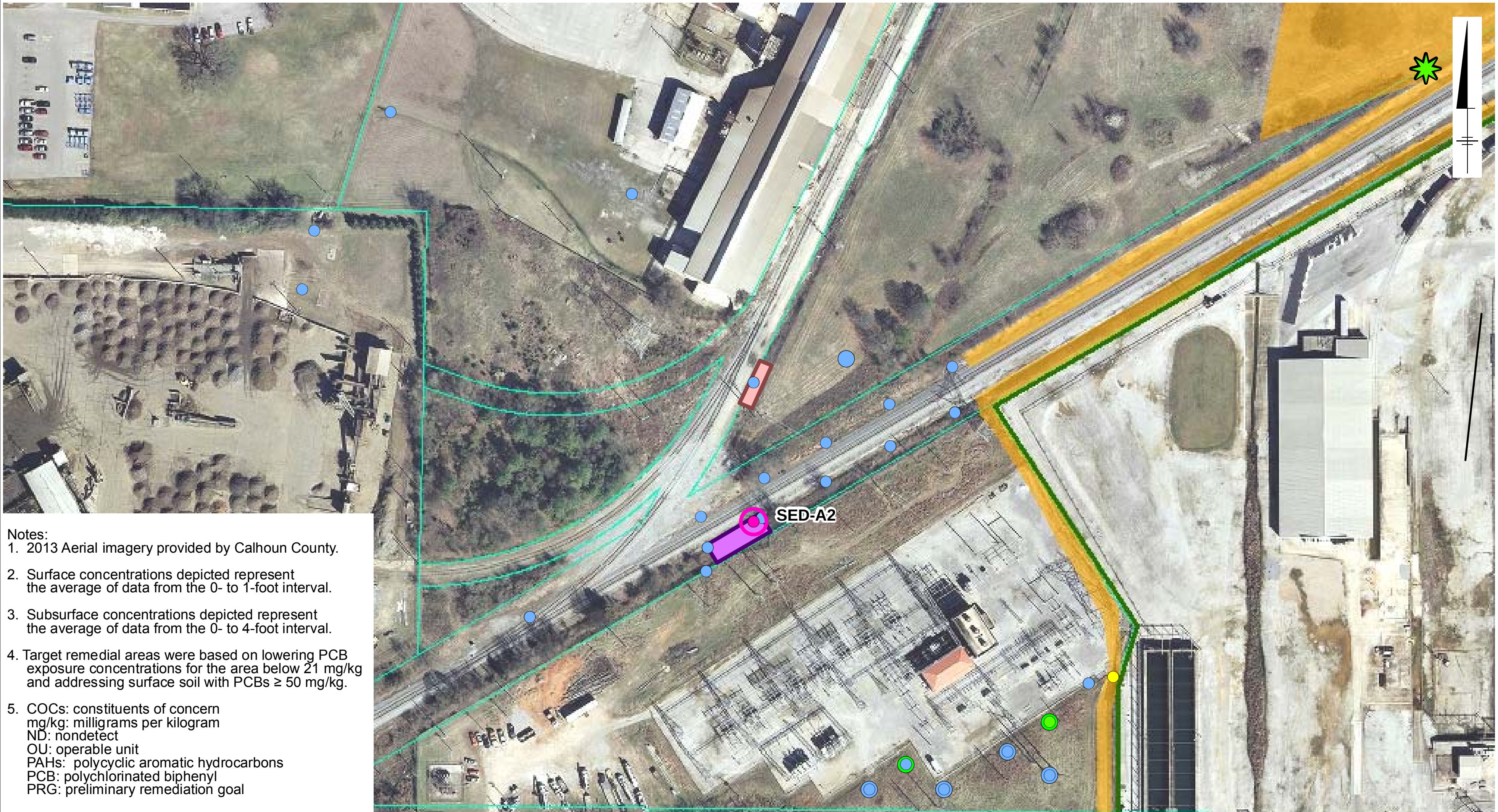
OU1/OU2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg West of Exposure Unit 1

Solutia

Figure
27k

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17l_PCB_APCO_Labels_21mgkg.mxd 3/30/2016 10:20:47 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Target remedial areas were based on lowering PCB exposure concentrations for the area below 21 mg/kg and addressing surface soil with PCBs ≥ 50 mg/kg.
5. COCs: constituents of concern
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PAHs: polycyclic aromatic hydrocarbons
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Exposure Unit
Interim Measure and Other Early Actions
Operable Unit 3
All Parcels
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

– Circles represent locations that must be addressed to achieve a PRG of 21 mg/kg for the area and locations with maximum PCB concentrations ≥ 50 mg/kg.
– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 200 400 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

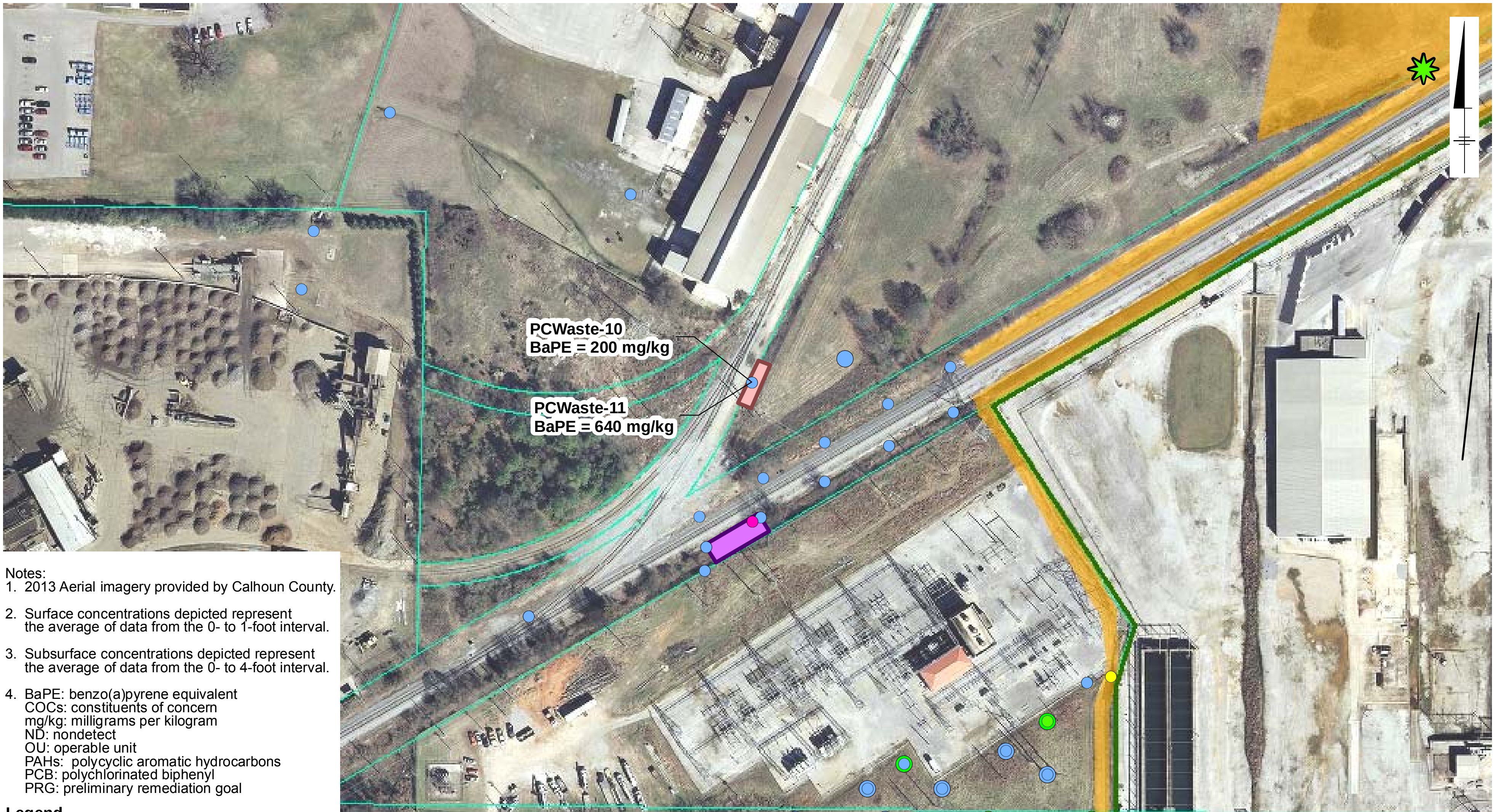
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 21 mg/kg North of APCO

Solutia
Ingenuity Productivity Performance

Figure
27l

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-18a_Northside_PAH_Area.mxd 3/30/2016 10:37:28 AM



Notes:

1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. BaPE: benzo(a)pyrene equivalent
   COCs: constituents of concern
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PAHs: polycyclic aromatic hydrocarbons
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)

- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Exposure Unit
- Interim Measure and Other Early Actions
- Operable Unit 3
- All Parcels
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 200 400 Feet
Graphic Scale

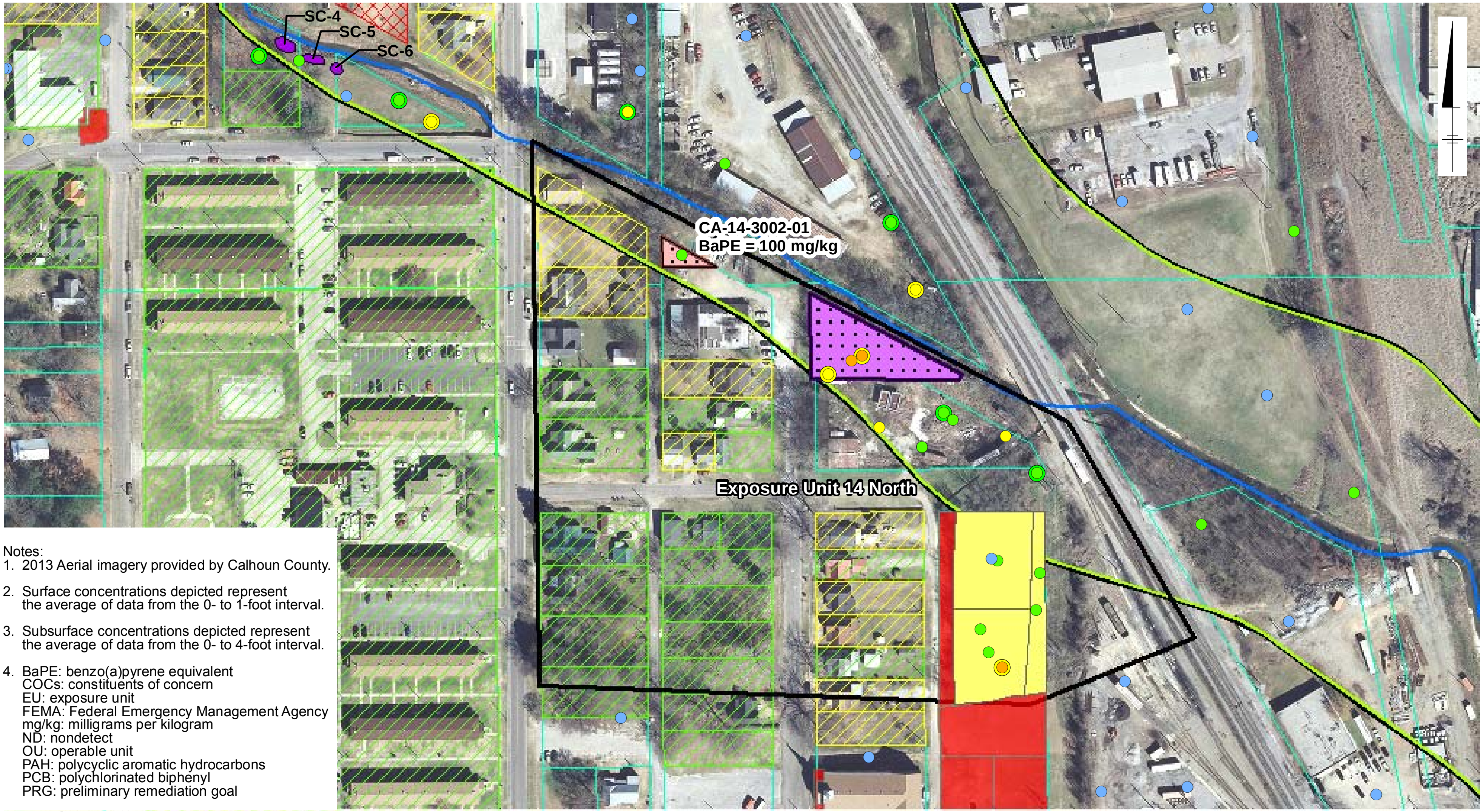
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Area for Nonresidential Surface Soil Exceeding PAH (as BaPE) PRG of 21 mg/kg West of Northside Area

Solutia
Ingenuity Productivity Performance

Figure
28a



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. BaPE: benzo(a)pyrene equivalent
COCs: constituents of concern
EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PAH: polycyclic aromatic hydrocarbons
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- Snow Creek
- Dredge Spoil Pile Removed
- Exposure Unit
- FEMA Floodway
- All Parcels

Residential Parcels Sampled
- Residential < 1 (mg/kg)
- Removal Complete
- Residential > 1 (mg/kg) (Removal Pending)
- Special Use: High Activity Area
- Special Use: Low Activity Area ≥ 1 mg/kg
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 200 400 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

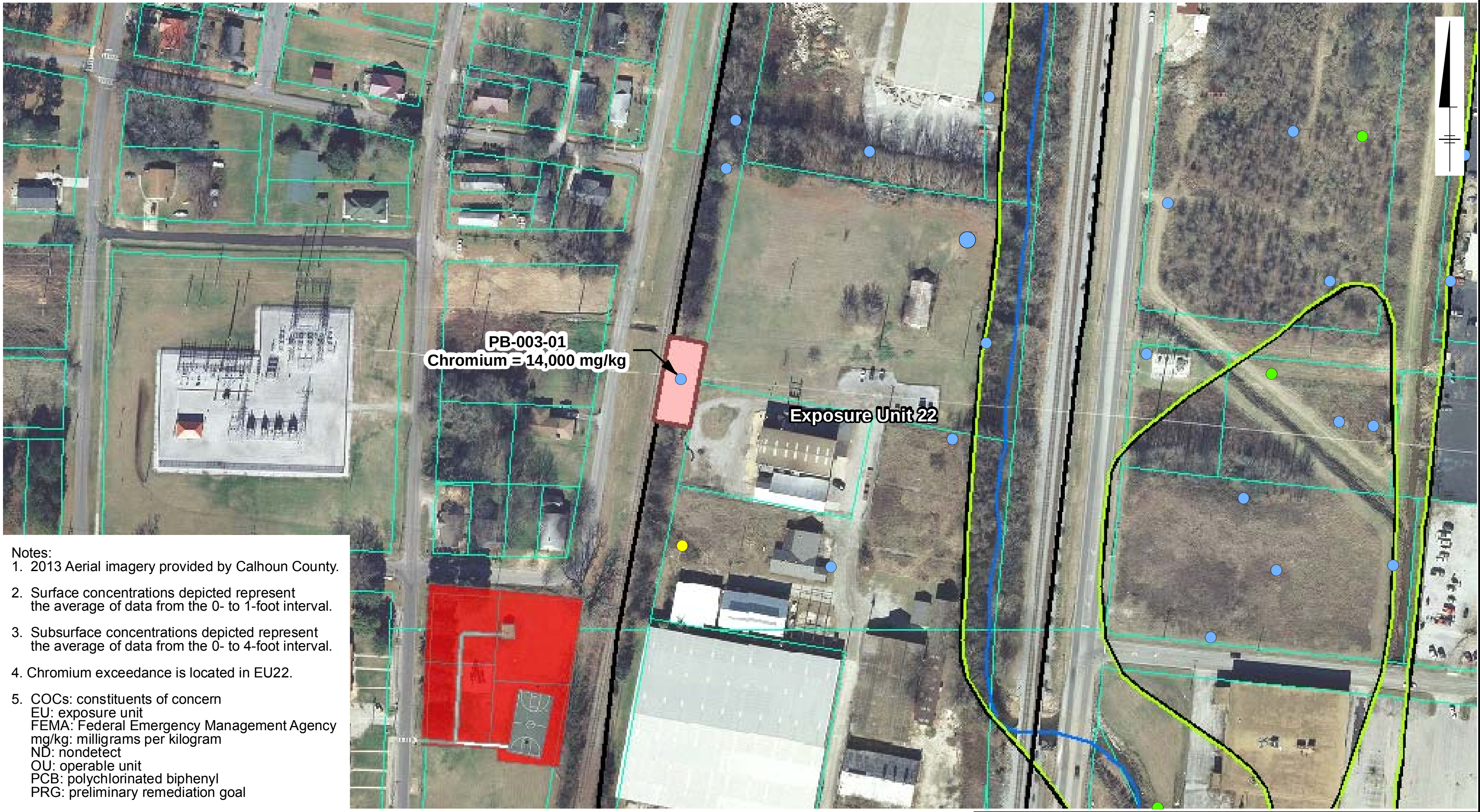
OU-1/OU-2 Proposed Plan

Candidate Remedial Area for Nonresidential Surface Soil Exceeding PAH (as BaPE) PRG of 21 mg/kg EU14 North

Solutia
Ingenuity Productivity Performance

Figure
28b

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-19a_EU22_Chromium_Area.mxd 3/28/2016 8:19:08 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Chromium exceedance is located in EU22.
5. COCs: constituents of concern
EU: exposure unit
FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- Snow Creek

- Exposure Unit
- Special Use: High Activity Area
- FEMA Floodway
- All Parcels
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

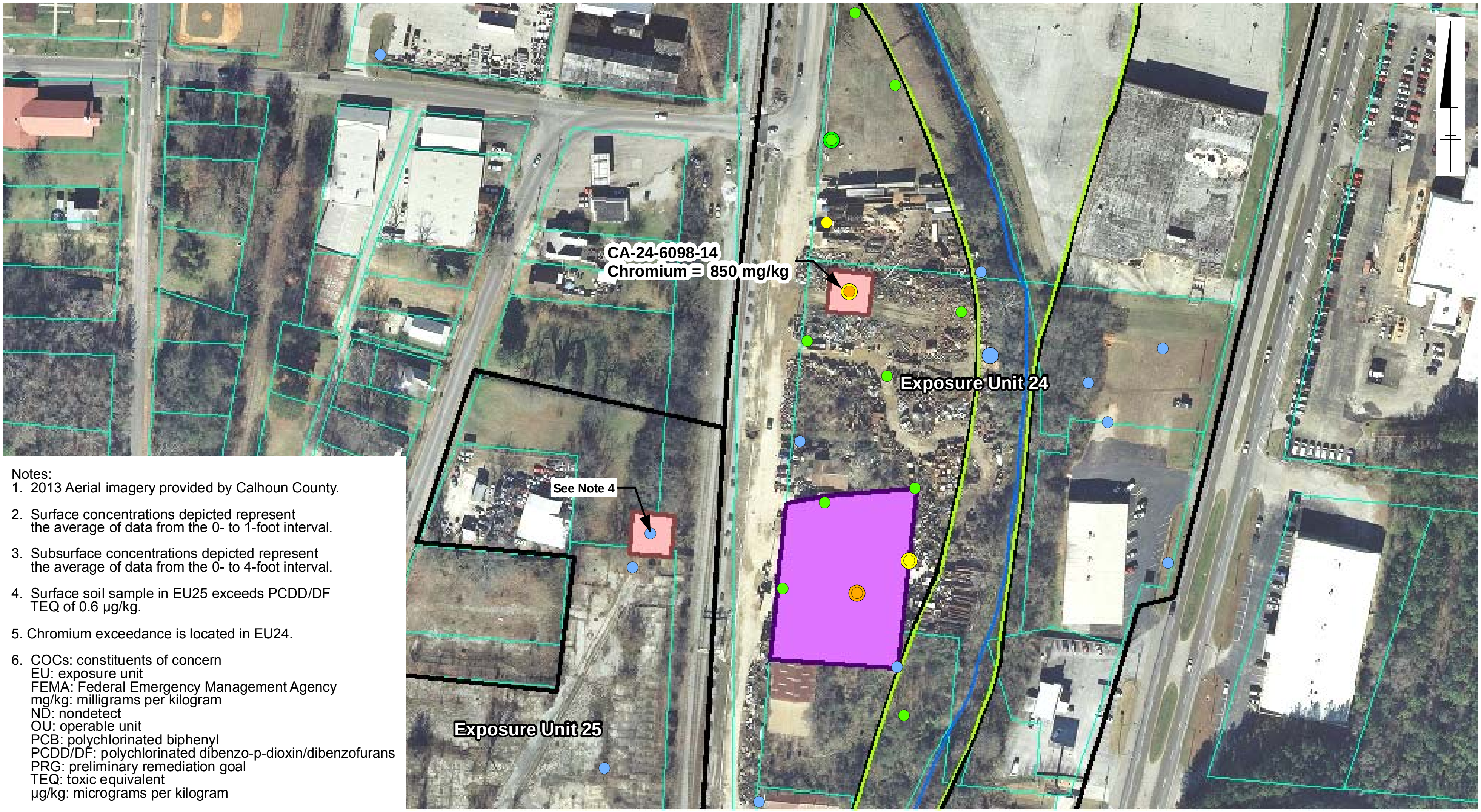
OU-1/OU-2 Proposed Plan

Candidate Remedial Area for Nonresidential Surface Soil Exceeding Chromium PRG of 568 mg/kg EU22

Solutia
Ingenuity Productivity Performance

Figure
29a

CITY: SYR DIV/GROUP: 40 DB: KES EAL LD: PIC: PM: TM: TR:
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-19b_EU24_Chromium_Area.mxd 3/30/2016 10:25:47 AM



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Surface soil sample in EU25 exceeds PCDD/DF TEQ of 0.6 µg/kg.
5. Chromium exceedance is located in EU24.
6. COCs: constituents of concern
   EU: exposure unit
   FEMA: Federal Emergency Management Agency
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofurans
   PRG: preliminary remediation goal
   TEQ: toxic equivalent
   µg/kg: micrograms per kilogram

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- Snow Creek

- Exposure Unit
- FEMA Floodway
- All Parcels
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 150 300 Feet
Graphic Scale

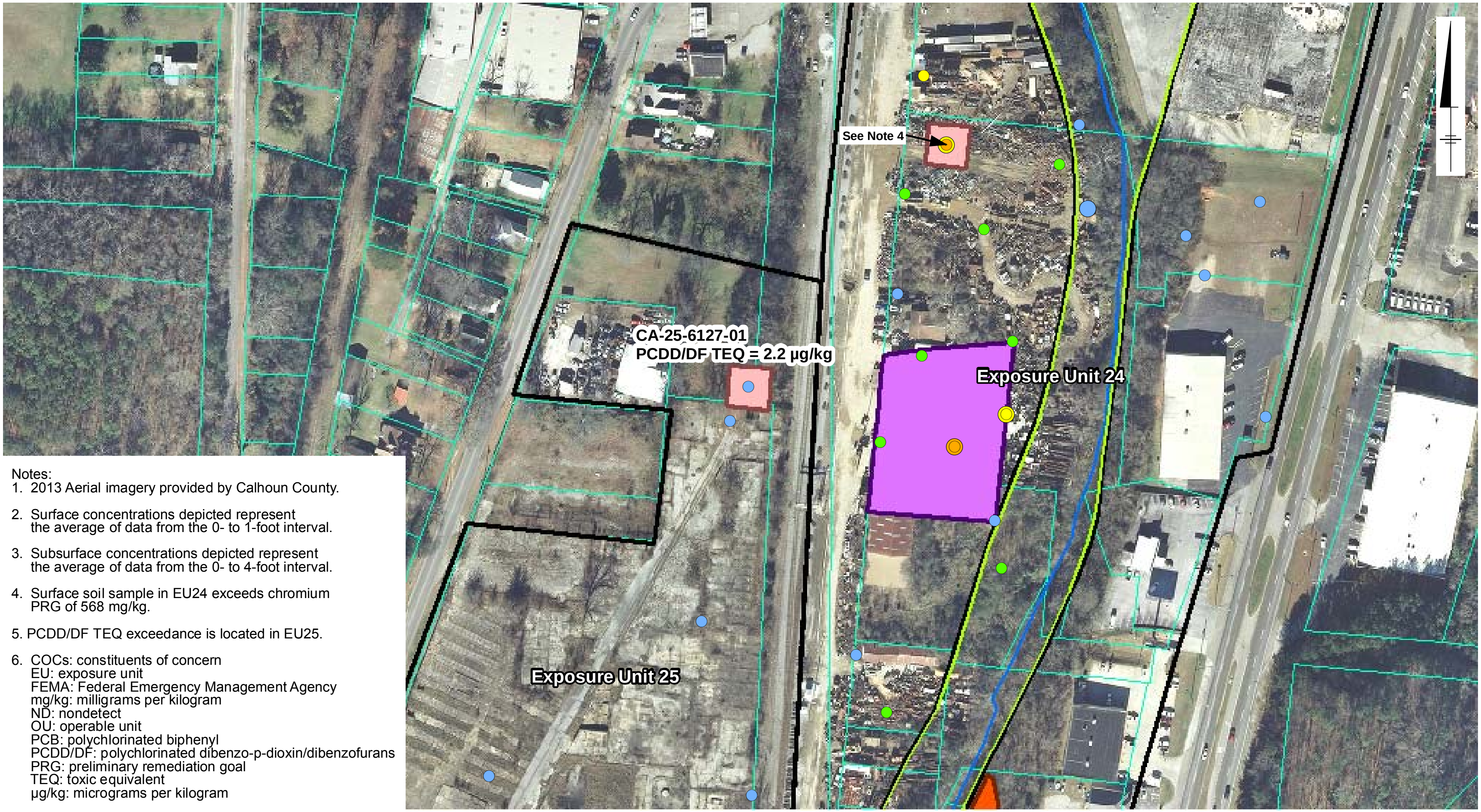
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Area for Nonresidential Surface Soil Exceeding Chromium PRG of 568 mg/kg EU24

Solutia
Ingenuity Productivity Performance

Figure
29b



Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Surface soil sample in EU24 exceeds chromium PRG of 568 mg/kg.
5. PCDD/DF TEQ exceedance is located in EU25.
6. COCs: constituents of concern
   EU: exposure unit
   FEMA: Federal Emergency Management Agency
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofurans
   PRG: preliminary remediation goal
   TEQ: toxic equivalent
   µg/kg: micrograms per kilogram

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Snow Creek

Exposure Unit
FEMA Floodway
All Parcels
Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
Dredge Spoil Pile In-Place
Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

– Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

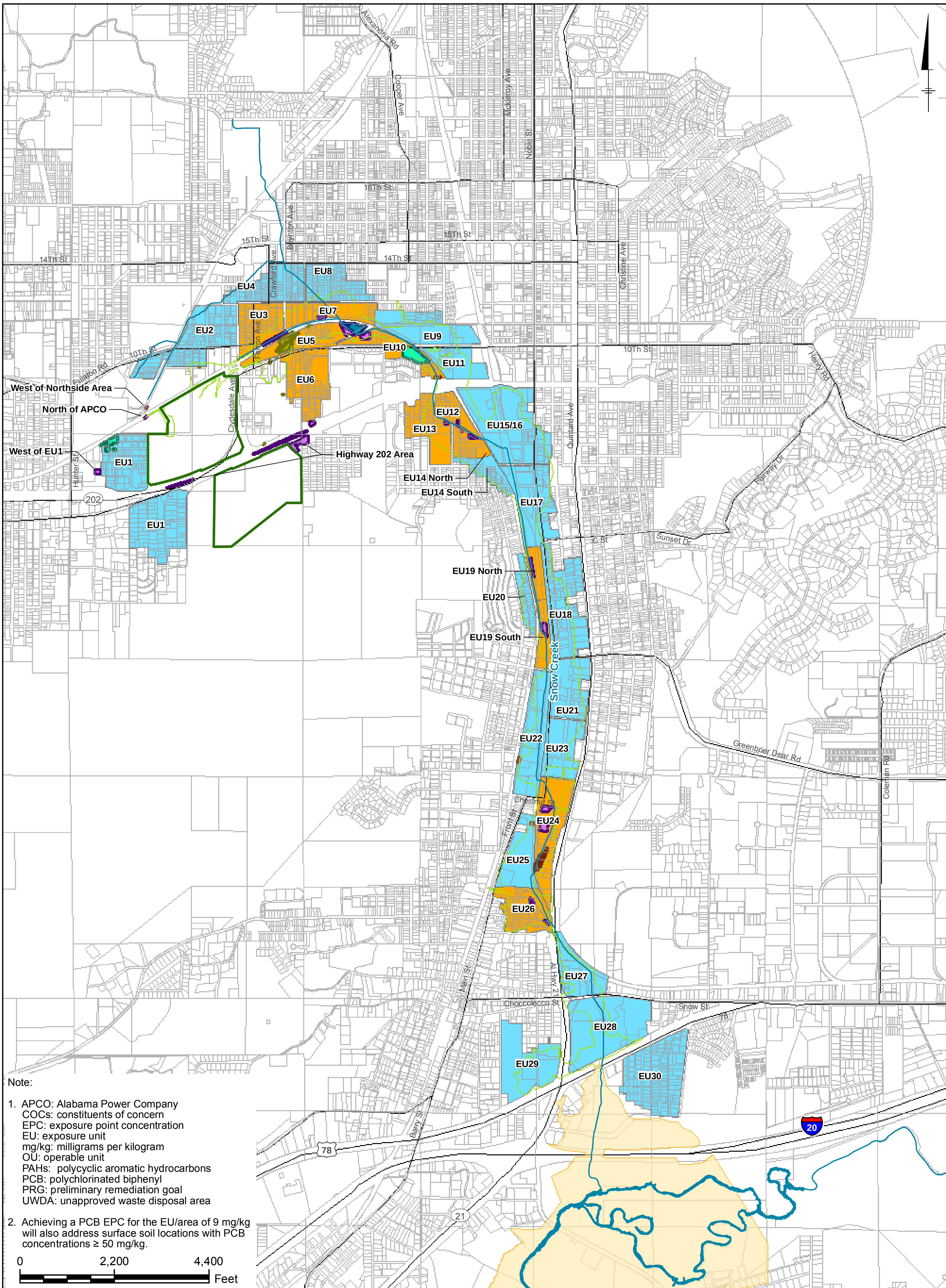
OU-1/OU-2 Proposed Plan

Candidate Remedial Area for Nonresidential Surface Soil Exceeding PCDD/DF TEQ PRG of 0.73 µg/kg EU25

Solutia
Ingenuity Productivity Performance

Figure
30

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Appendix B Figures\FigB-1_TargetRemedialAreasforOUwidePRG9_v2.mxd 3/30/2016 9:03:01 AM



Note:

1. APCO: Alabama Power Company
   COCs: constituents of concern
   EPC: exposure point concentration
   EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PAHs: polycyclic aromatic hydrocarbons
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal
   UWDA: unapproved waste disposal area
2. Achieving a PCB EPC for the EU/area of 9 mg/kg will also address surface soil locations with PCB concentrations ≥ 50 mg/kg.

Legend

- Creek
- Major Roads
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Downgradient Floodplain
- Parcels
- Exposure Unit with PCB EPC < 9 mg/kg
- Exposure Unit with PCB EPC ≥ 9 mg/kg
- Interim Measures Expansion Area – Alternatives IM-2, IM-3, and IM-4
- Target Remedial Area – Alternatives GW-2, GW-3, and GW-4
- Target Remedial Area for PCBs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6
- Unapproved Waste Disposal Area – Alternatives UWDA-2, UWDA-3, and UWDA-4
- Dredge Spoil Pile In-Place
- Target Remedial Areas for Other COCs - Alternatives NRS-2, NRS-3, NRS-4, NRS-5, and NRS-6

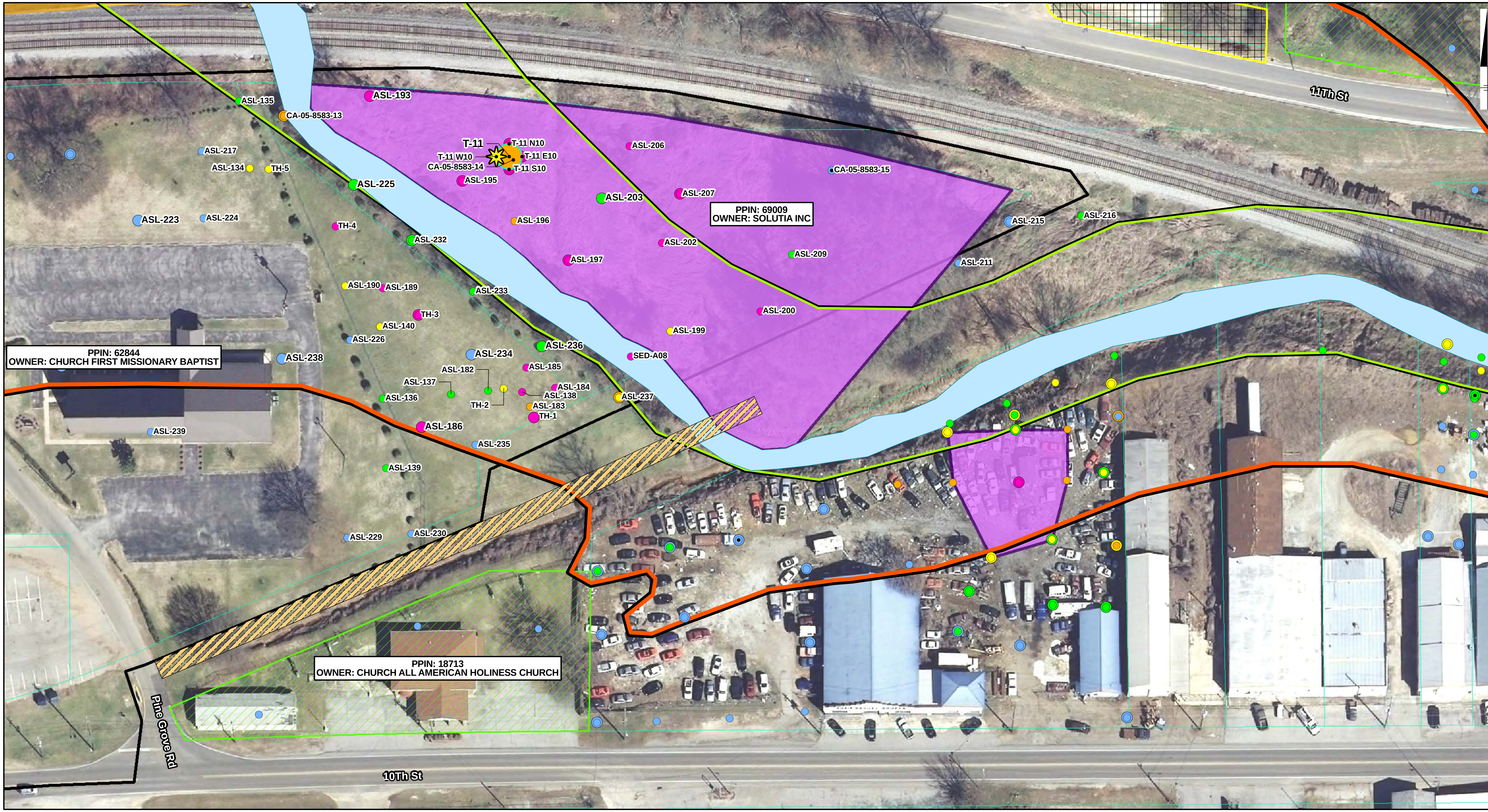
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Nonresidential Surface Soil with a PCB PRG of 9 mg/kg

Solutia

Figure
31



Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Analytes other than PCB and Lead Analyzed
- Locations with Maximum PCB Results ≥ 500 mg/kg
- Completed Removal Area
- Residential < 1 (mg/kg)
- FEMA Floodway
- OU-1/OU-2 Downgradient Floodplain
- Exposure Unit

- Snow Creek
- Parcel Boundaries
- Interim Measure and Other Early Actions
- Potential Access Road
- Target Remedial Area - 1-Foot Soil Excavation
- Principle Threat Waste Area

0 75 150 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Locations of the access road and bridge across Snow Creek would be determined during the design phase.
5. FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PPIN: property parcel identification number

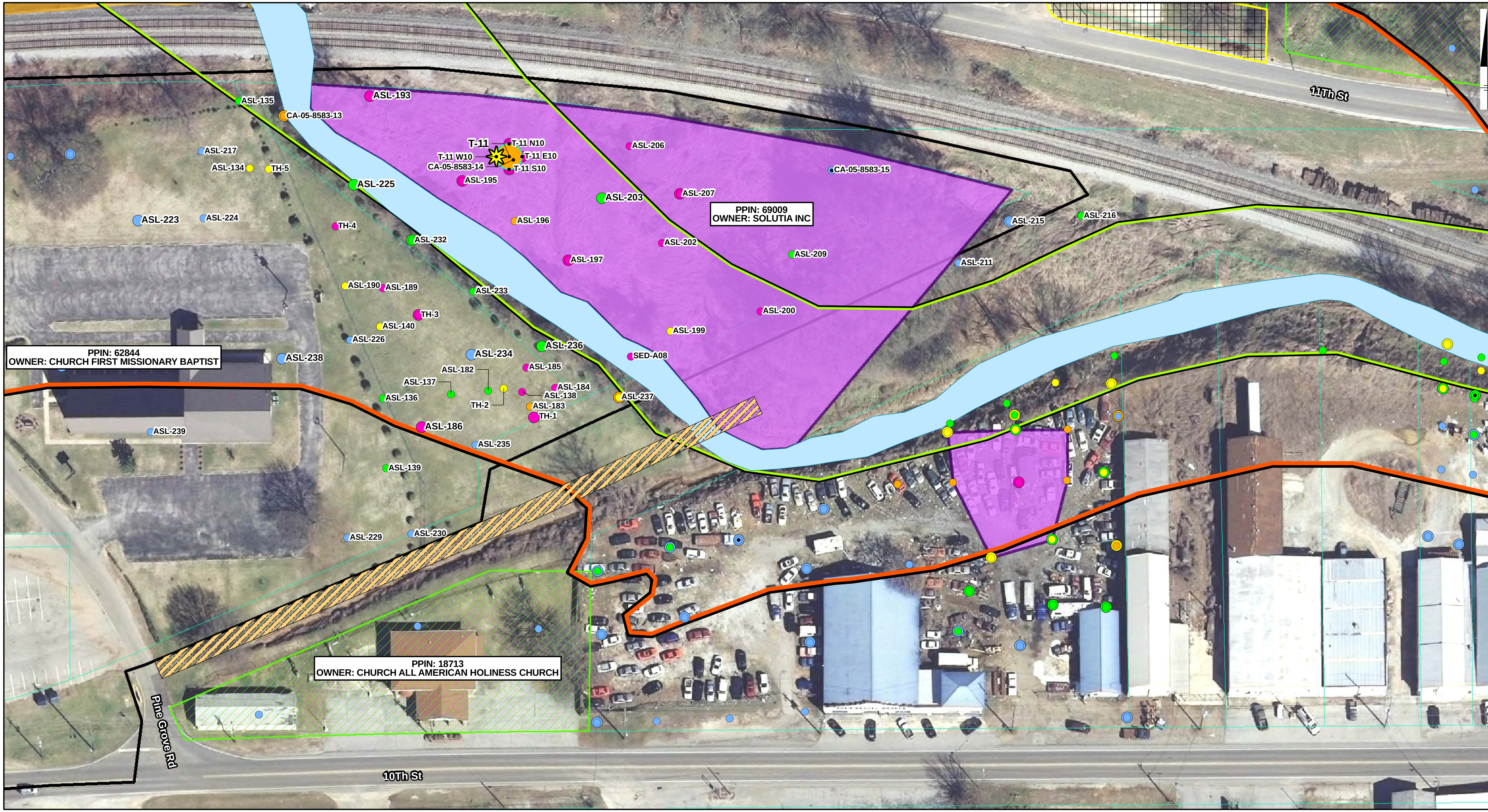
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Remedial Alternative GW-2

Solutia

Figure
32



Legend

Soil Sample Location

Surface PCB (mg/kg)

- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Analytes other than PCB and Lead Analyzed
- Locations with Maximum PCB Results ≥ 500 mg/kg
- Completed Removal Area
- Residential < 1 (mg/kg)
- FEMA Floodway
- OU-1/OU-2 Downgradient Floodplain
- Exposure Unit

- Snow Creek
- Parcel Boundaries
- Interim Measure and Other Early Actions
- Potential Access Road
- Target Remedial Area - 1.5-Foot Soil Excavation and Low-Permeability Cap
- Principle Threat Waste Area

0 75 150 Feet

Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Locations of the access road and bridge across Snow Creek would be determined during the design phase.
5. FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PPIN: property parcel identification number

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

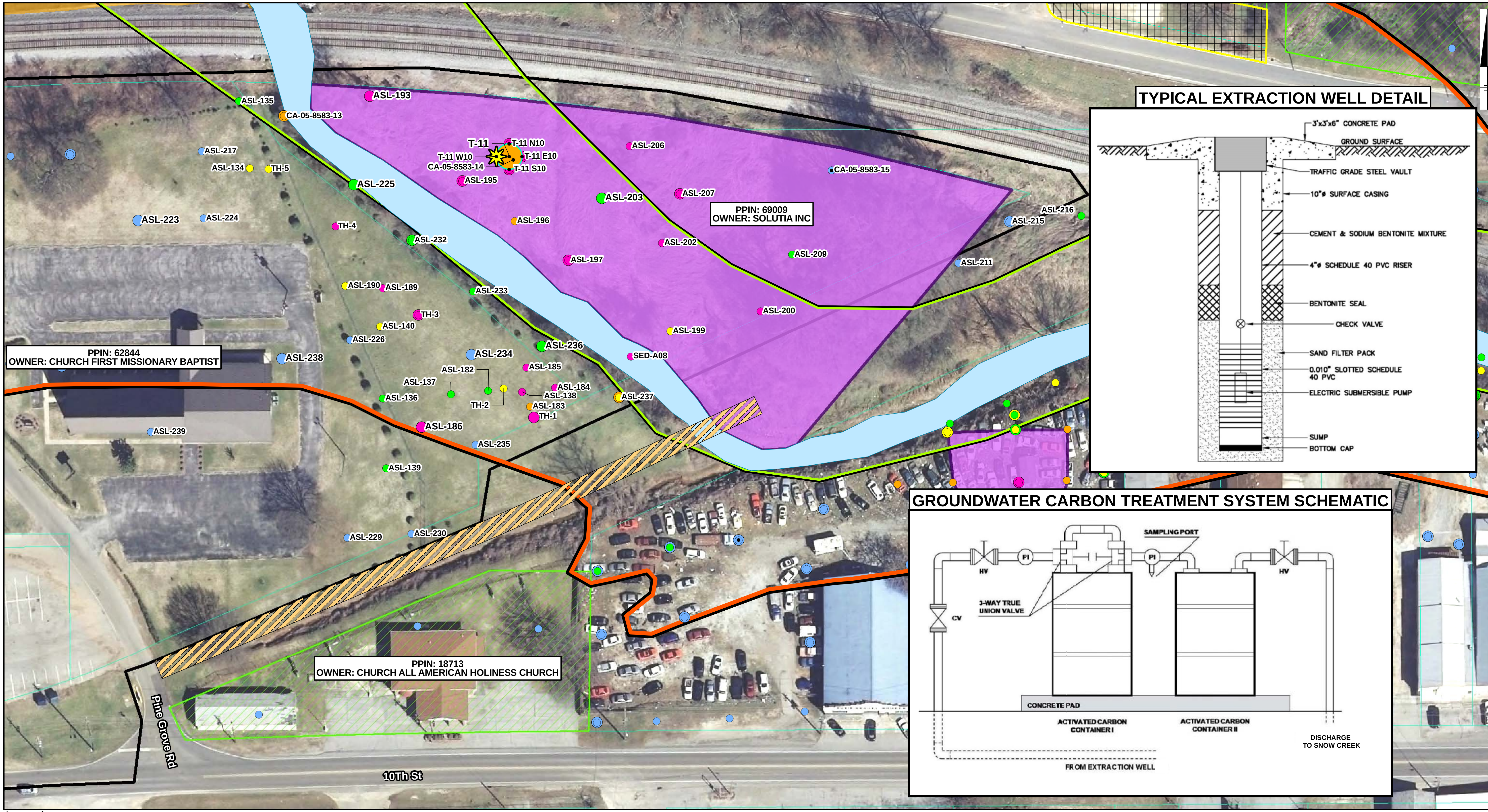
OU-1/OU-2 Proposed Plan

Remedial Alternative GW-3

Solutia

Figure
33

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: kives
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Fig7-3_RemedialAlternativeGW_3.mxd 3/28/2016 1:30:55 PM



City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: kives
Anniston
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Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Analytes other than PCB and Lead Analyzed
- Locations with Maximum PCB Results ≥ 500 mg/kg
- Completed Removal Area
- Residential < 1 (mg/kg)
- FEMA Floodway
- OU-1/OU-2 Downgradient Floodplain
- Exposure Unit
- Snow Creek

- Parcel Boundaries
- Interim Measure and Other Early Actions
- Potential Access Road
- Target Remedial Area - 1.5-Foot Soil Excavation and Low-Permeability Cap
- Principle Threat Waste Area
- PI Pressure Gauge

0 75 150 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Locations of the access road and bridge across Snow Creek would be determined during the design phase.
5. Groundwater extraction well location would be determined during the design phase
6. CV: check valve
FEMA: Federal Emergency Management Agency
HV: hand-operated gauge
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PVC: polyvinyl chloride
PPIN: property parcel identification number

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Remedial Alternative GW-4

Solutia

Figure 34

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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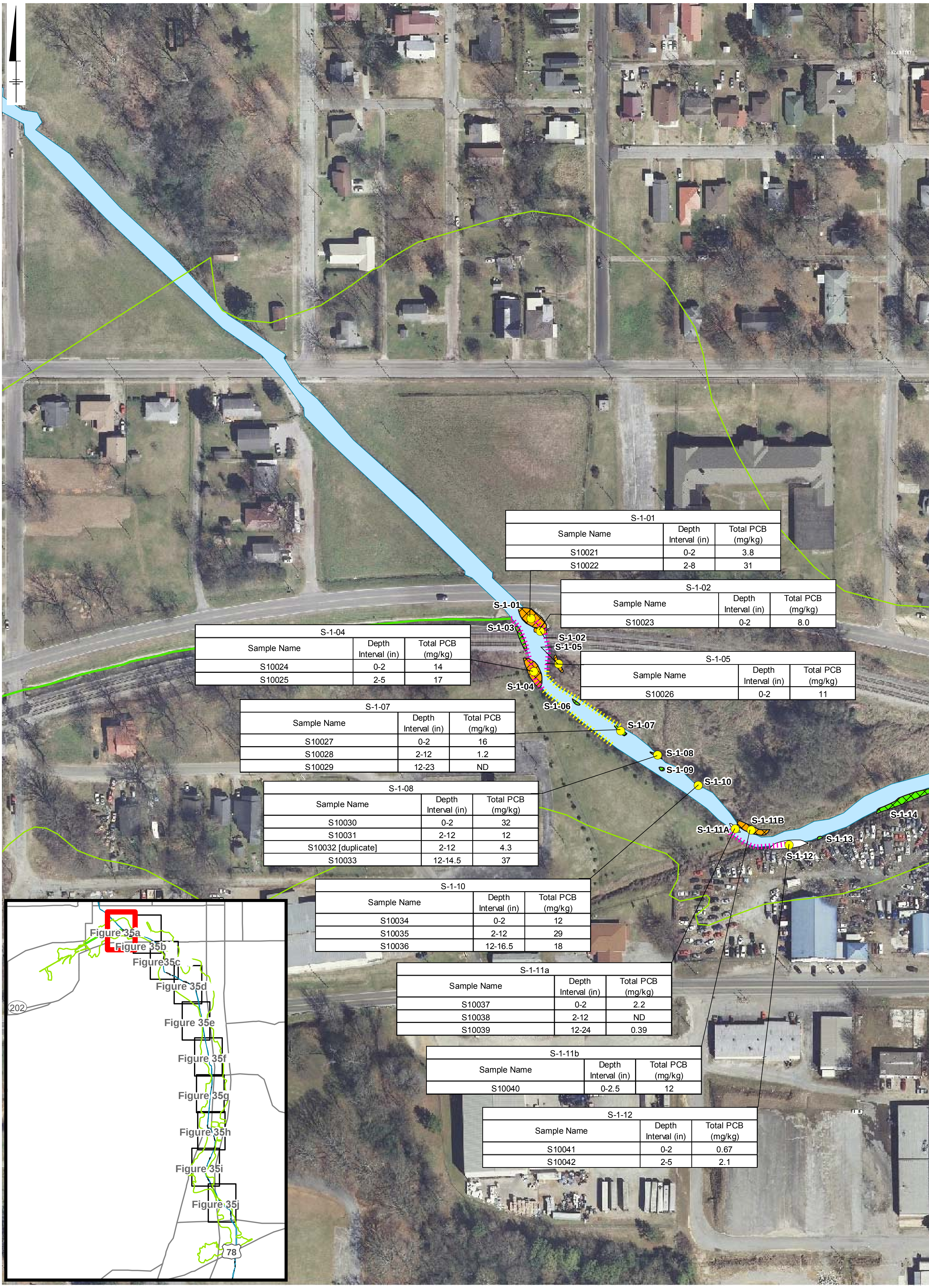


S-1-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10021	0-2	3.8
S10022	2-8	31

S-1-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10023	0-2	8.0

S-1-04		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10024	0-2	14
S10025	2-5	17

S-1-05		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10026	0-2	11

S-1-07		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10027	0-2	16
S10028	2-12	1.2
S10029	12-23	ND

S-1-08		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10030	0-2	32
S10031	2-12	12
S10032 [duplicate]	2-12	4.3
S10033	12-14.5	37

S-1-10		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10034	0-2	12
S10035	2-12	29
S10036	12-16.5	18

S-1-11a		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10037	0-2	2.2
S10038	2-12	ND
S10039	12-24	0.39

S-1-11b		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10040	0-2.5	12

S-1-12		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10041	0-2	0.67
S10042	2-5	2.1

Legend

- Sediment Sample Location
- Engineered Bank Stability Measures
- Natural Bank Stability Measures
- 11th Street Ditch
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- ≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
35a

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:39:36 AM

S-1-16		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10043	0-2	28
S10044	2-5	32

SED-A09		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A9	0-3	7.8

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

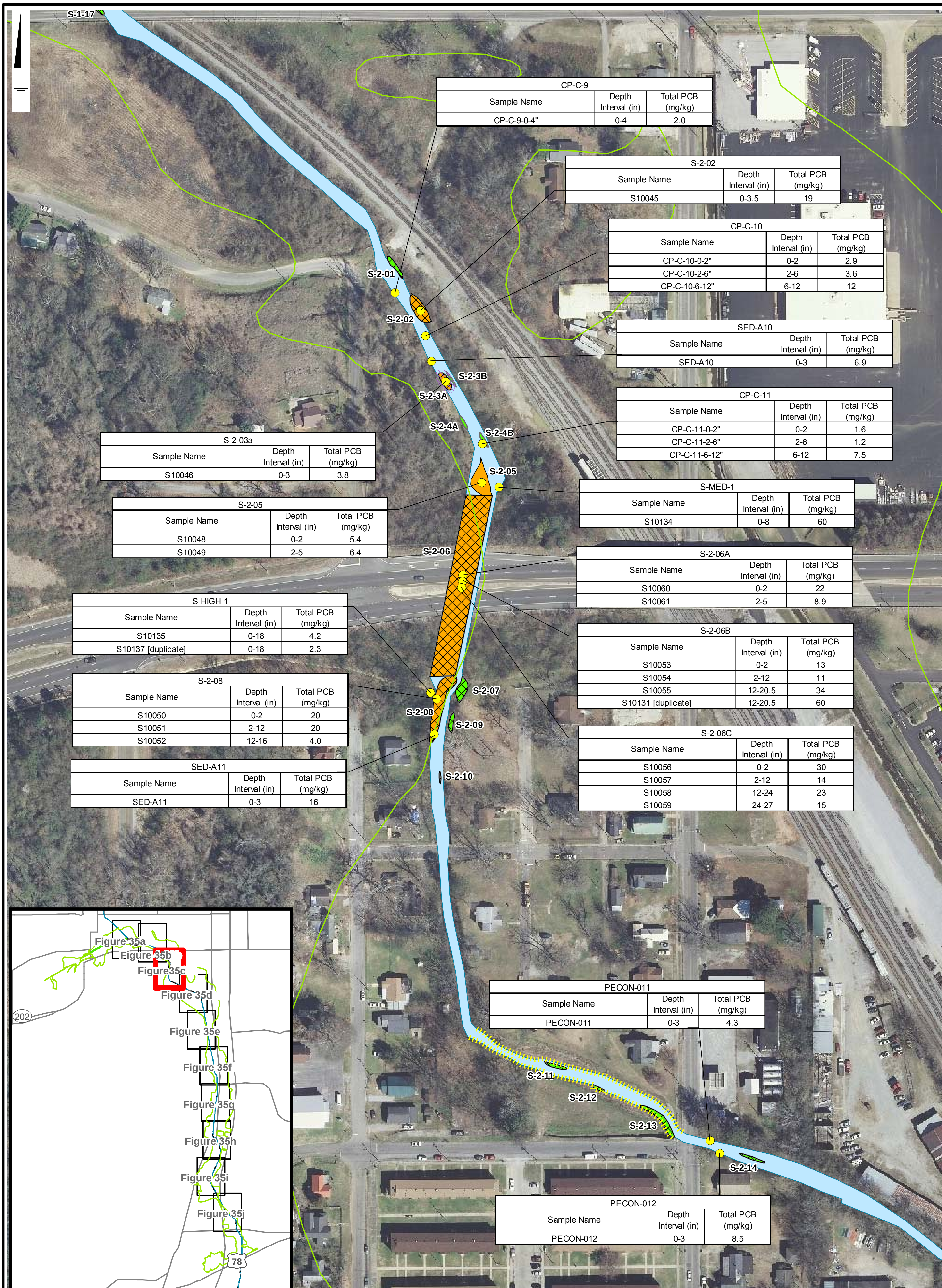
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
35b

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM



CP-C-9

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-9-0-4"	0-4	2.0

S-2-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10045	0-3.5	19

CP-C-10

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-10-0-2"	0-2	2.9
CP-C-10-2-6"	2-6	3.6
CP-C-10-6-12"	6-12	12

SED-A10

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A10	0-3	6.9

CP-C-11

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-11-0-2"	0-2	1.6
CP-C-11-2-6"	2-6	1.2
CP-C-11-6-12"	6-12	7.5

S-2-03a

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10046	0-3	3.8

S-MED-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10134	0-8	60

S-2-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10048	0-2	5.4
S10049	2-5	6.4

S-2-06A

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10060	0-2	22
S10061	2-5	8.9

S-HIGH-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10135	0-18	4.2
S10137 [duplicate]	0-18	2.3

S-2-06B

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10053	0-2	13
S10054	2-12	11
S10055	12-20.5	34
S10131 [duplicate]	12-20.5	60

S-2-08

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10050	0-2	20
S10051	2-12	20
S10052	12-16	4.0

S-2-06C

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10056	0-2	30
S10057	2-12	14
S10058	12-24	23
S10059	24-27	15

SED-A11

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A11	0-3	16

PECON-011

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-011	0-3	4.3

PECON-012

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-012	0-3	8.5

Legend

- Sediment Sample Location
- Natural Bank Stability Measures
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 10 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- ≥ 3 and < 10
- ≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia

Figure
35c

S-3-01

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10064	0-2	3.3
S10065	2-8	4.8

SED-A12

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A12	0-3	3.9

S-3-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10069	0-2	1.4
S10070	2-10.5	2.1

S-2-16

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10062	0-2	4.0
S10063	2-4	3.3

S-3-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10066	0-2	8.1
S10067	2-12	11
S10068	12-15.5	17

S-3-07

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10071	0-2	0.66
S10072	2-8	0.76

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)

- < 3
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)

- < 3
- ≥ 3 and < 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia

Figure
35d

S-4-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10073	0-2	1.1
S10074	2-4	0.58

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
35e

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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Legend

Snow Creek

OU-1/OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
3. No remedial areas shown on this figure. Figure included to provide complete view of Snow Creek.

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia

Figure
35f

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-5-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10075	0-3.5	0.65
S10076 [duplicate]	0-3.5	0.76

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
35g

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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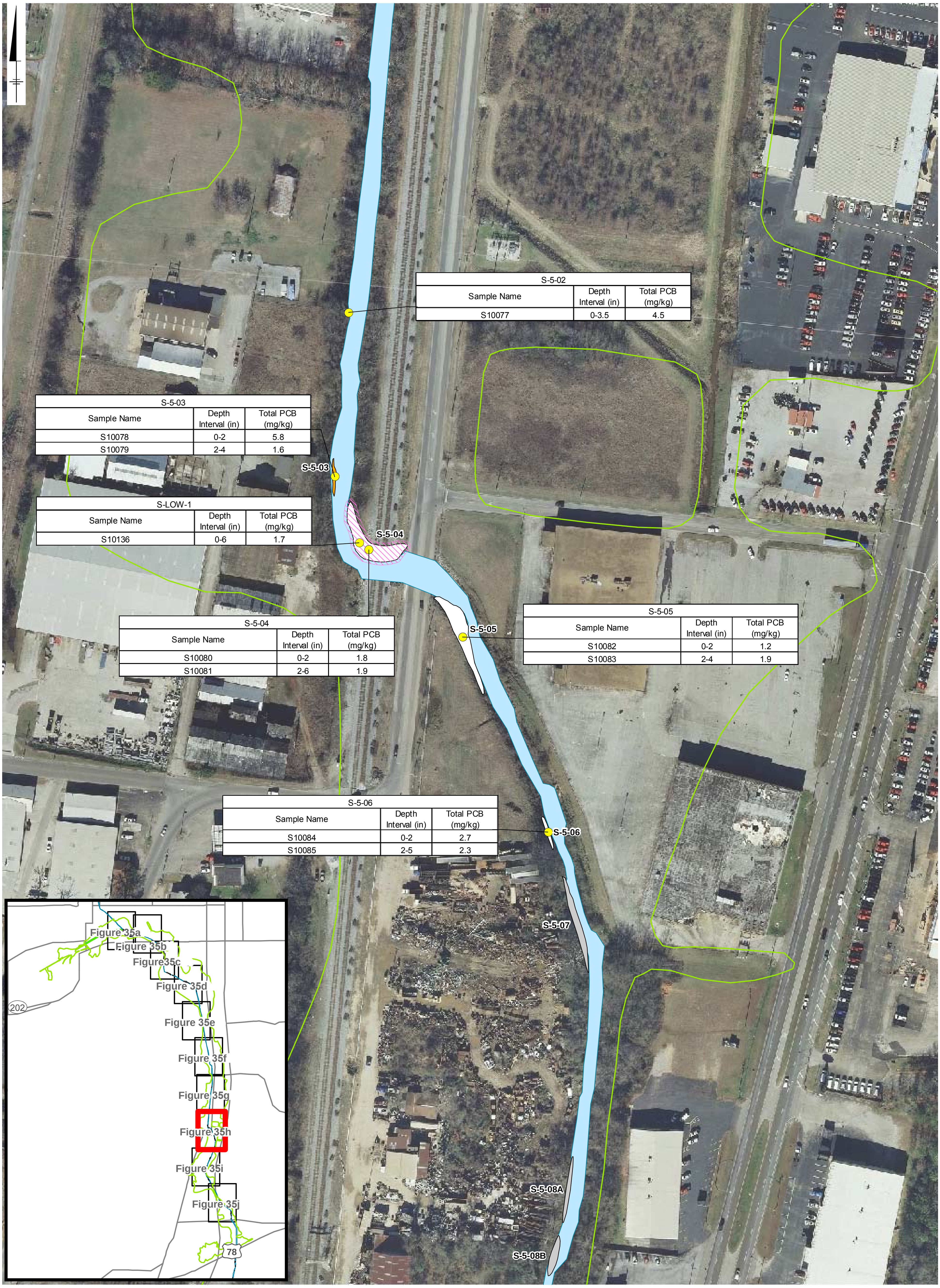


S-5-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10077	0-3.5	4.5

S-5-03

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10078	0-2	5.8
S10079	2-4	1.6

S-LOW-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10136	0-6	1.7

S-5-04

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10080	0-2	1.8
S10081	2-6	1.9

S-5-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10082	0-2	1.2
S10083	2-4	1.9

S-5-06

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10084	0-2	2.7
S10085	2-5	2.3

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3
- ≥ 3 and < 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

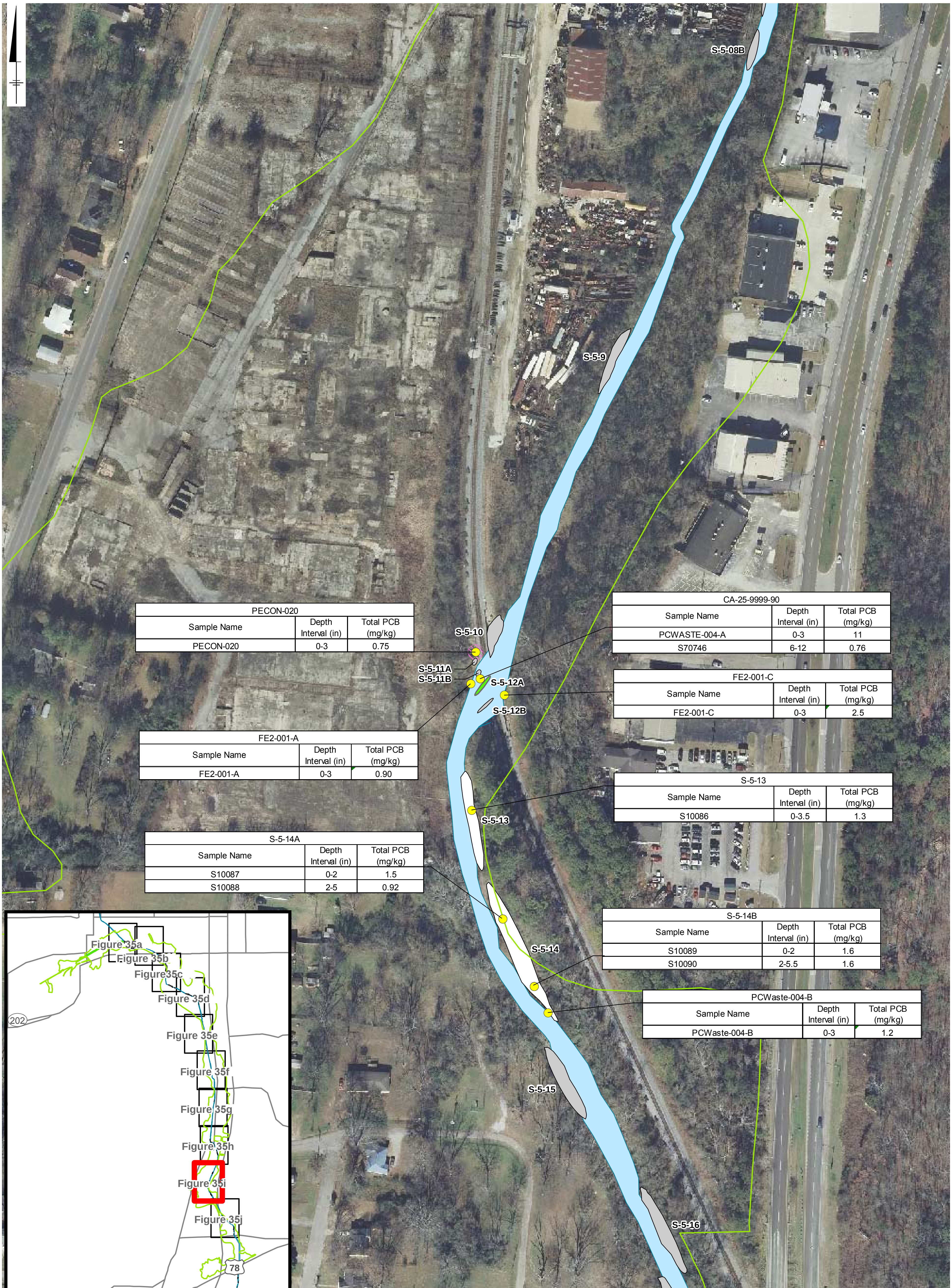
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
35h

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM



PECON-020		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-020	0-3	0.75

CA-25-9999-90		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWASTE-004-A	0-3	11
S70746	6-12	0.76

FE2-001-C		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-C	0-3	2.5

FE2-001-A		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-A	0-3	0.90

S-5-13		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10086	0-3.5	1.3

S-5-14A		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10087	0-2	1.5
S10088	2-5	0.92

S-5-14B		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10089	0-2	1.6
S10090	2-5.5	1.6

PCWaste-004-B		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWaste-004-B	0-3	1.2

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3
- ≥ 3 and < 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia

Figure
35i

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM

S-5-24		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10091	0-2	1.2
S10092	2-12	1.2

Legend

Sediment Sample Location
Snow Creek
OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
< 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
mg/kg: milligram per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

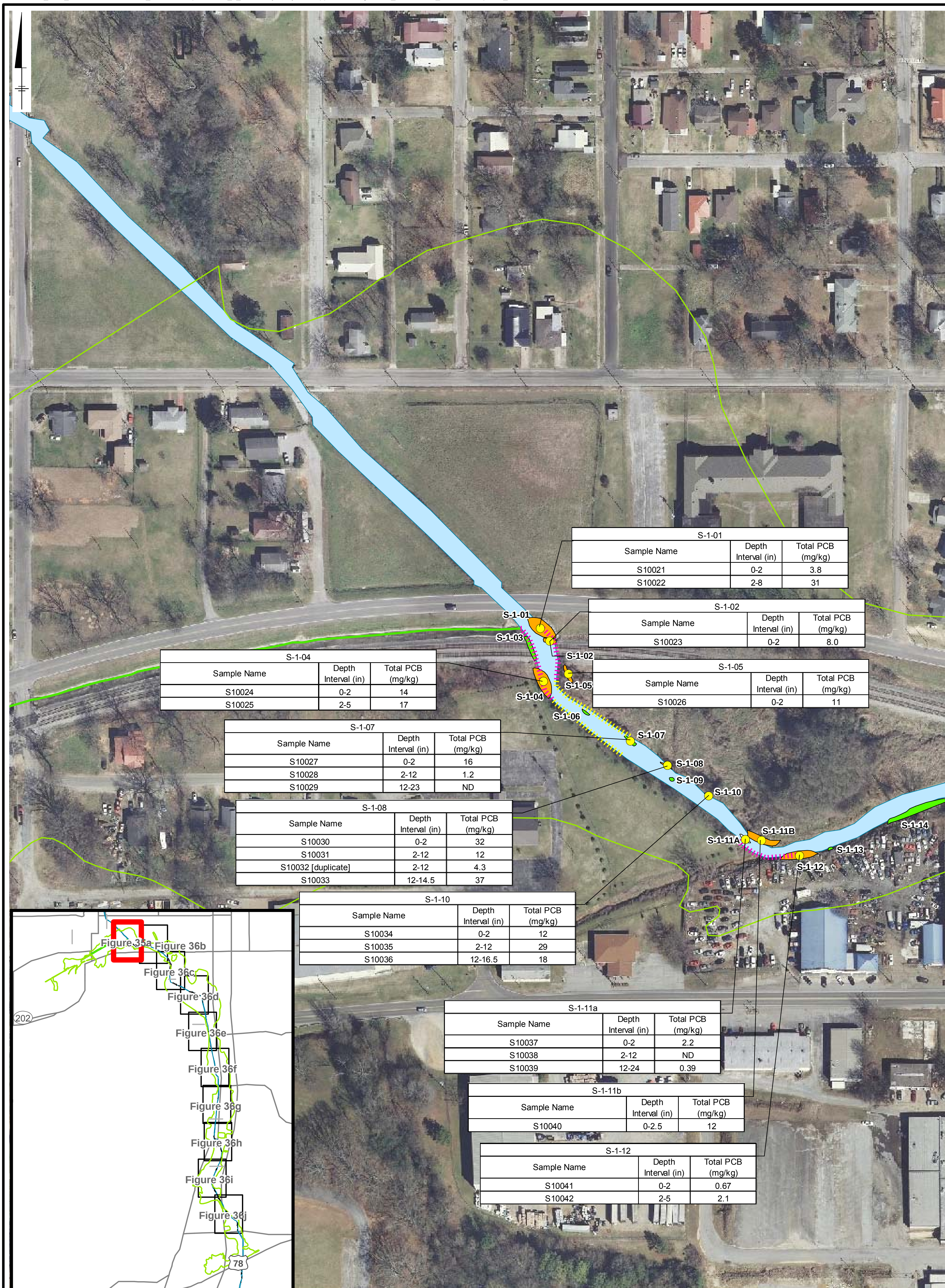
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 3 mg/kg

Solutia

Figure
35j



S-1-01

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10021	0-2	3.8
S10022	2-8	31

S-1-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10023	0-2	8.0

S-1-04

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10024	0-2	14
S10025	2-5	17

S-1-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10026	0-2	11

S-1-07

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10027	0-2	16
S10028	2-12	1.2
S10029	12-23	ND

S-1-08

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10030	0-2	32
S10031	2-12	12
S10032 [duplicate]	2-12	4.3
S10033	12-14.5	37

S-1-10

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10034	0-2	12
S10035	2-12	29
S10036	12-16.5	18

S-1-11a

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10037	0-2	2.2
S10038	2-12	ND
S10039	12-24	0.39

S-1-11b

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10040	0-2.5	12

S-1-12

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10041	0-2	0.67
S10042	2-5	2.1

Legend

- Sediment Sample Location
- Engineered Bank Stability Measures
- Natural Bank Stability Measures
- 11th Street Ditch
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 1
- ≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
- ≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36a

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-1-16		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10043	0-2	28
S10044	2-5	32

SED-A09		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A9	0-3	7.8

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- ≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
- ≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

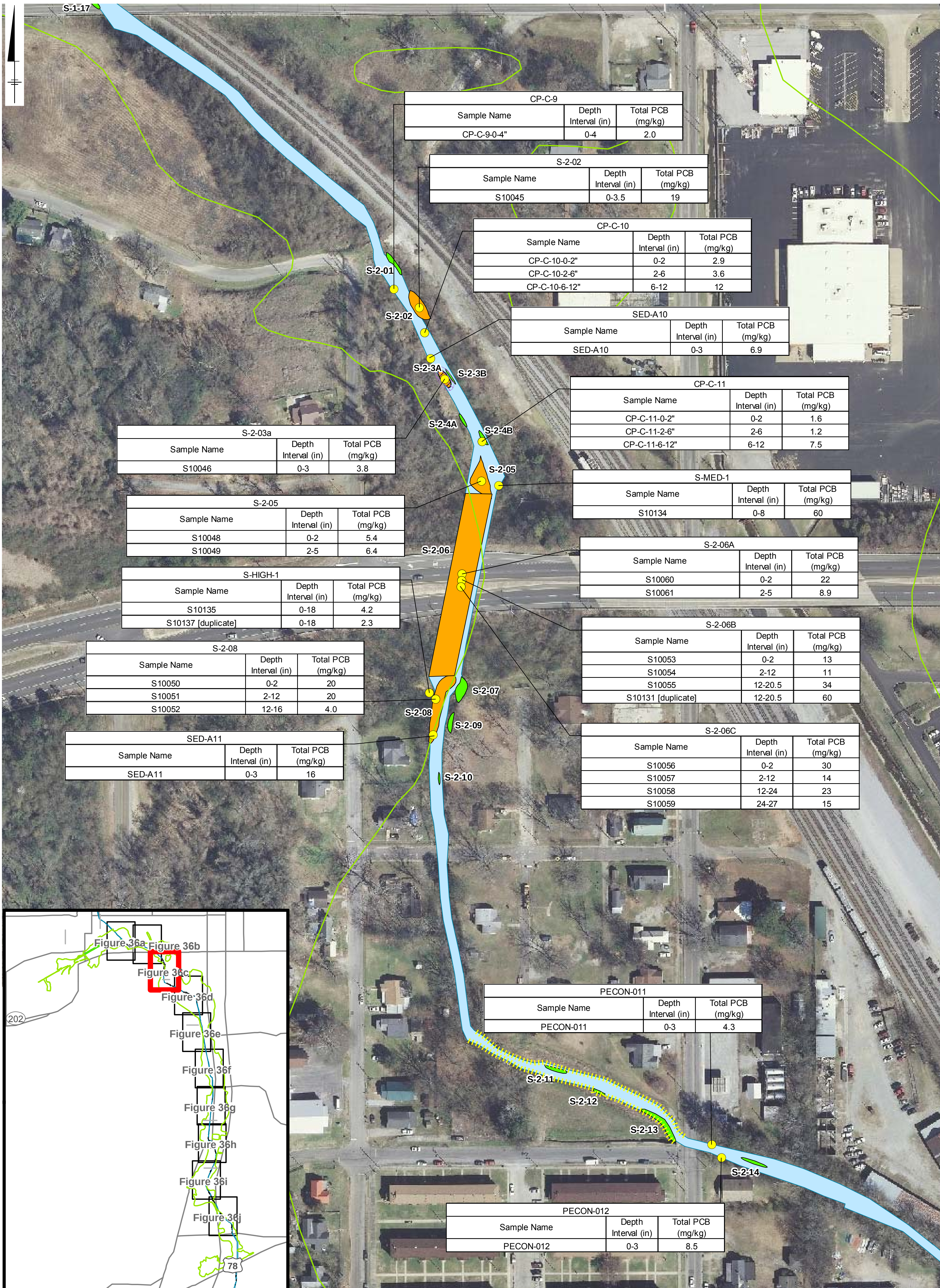
OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
36b

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Appendix C\FigC-AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/3/2016 1:59:07 PM



CP-C-9

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-9-0-4"	0-4	2.0

S-2-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10045	0-3.5	19

CP-C-10

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-10-0-2"	0-2	2.9
CP-C-10-2-6"	2-6	3.6
CP-C-10-6-12"	6-12	12

SED-A10

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A10	0-3	6.9

CP-C-11

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-11-0-2"	0-2	1.6
CP-C-11-2-6"	2-6	1.2
CP-C-11-6-12"	6-12	7.5

S-2-03a

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10046	0-3	3.8

S-MED-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10134	0-8	60

S-2-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10048	0-2	5.4
S10049	2-5	6.4

S-2-06A

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10060	0-2	22
S10061	2-5	8.9

S-HIGH-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10135	0-18	4.2
S10137 [duplicate]	0-18	2.3

S-2-06B

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10053	0-2	13
S10054	2-12	11
S10055	12-20.5	34
S10131 [duplicate]	12-20.5	60

S-2-08

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10050	0-2	20
S10051	2-12	20
S10052	12-16	4.0

SED-A11

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A11	0-3	16

S-2-06C

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10056	0-2	30
S10057	2-12	14
S10058	12-24	23
S10059	24-27	15

PECON-011

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-011	0-3	4.3

PECON-012

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-012	0-3	8.5

Legend

- Sediment Sample Location
- Natural Bank Stability Measures
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 10 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300
Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36c

S-3-01

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10064	0-2	3.3
S10065	2-8	4.8

SED-A12

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A12	0-3	3.9

S-3-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10069	0-2	1.4
S10070	2-10.5	2.1

S-2-16

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10062	0-2	4.0
S10063	2-4	3.3

S-3-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10066	0-2	8.1
S10067	2-12	11
S10068	12-15.5	17

S-3-07

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10071	0-2	0.66
S10072	2-8	0.76

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 1
- ≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
- ≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36d

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Appendix C\FigC-AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/3/2016 1:59:07 PM

S-4-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10073	0-2	1.1
S10074	2-4	0.58

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36e

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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Legend

Snow Creek

OU-1/OU-2 Downgradient Floodplain

Notes:

1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal
6. No remedial areas shown on this figure.
   Figure included to providecomplete view of Snow Creek.

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36f

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANSTON
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S-5-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10075	0-3.5	0.65
S10076 [duplicate]	0-3.5	0.76

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal
6. No remedial areas shown on this figure. Figure included to providecomplete view of Snow Creek.

0 150 300 Feet
Graphic Scale

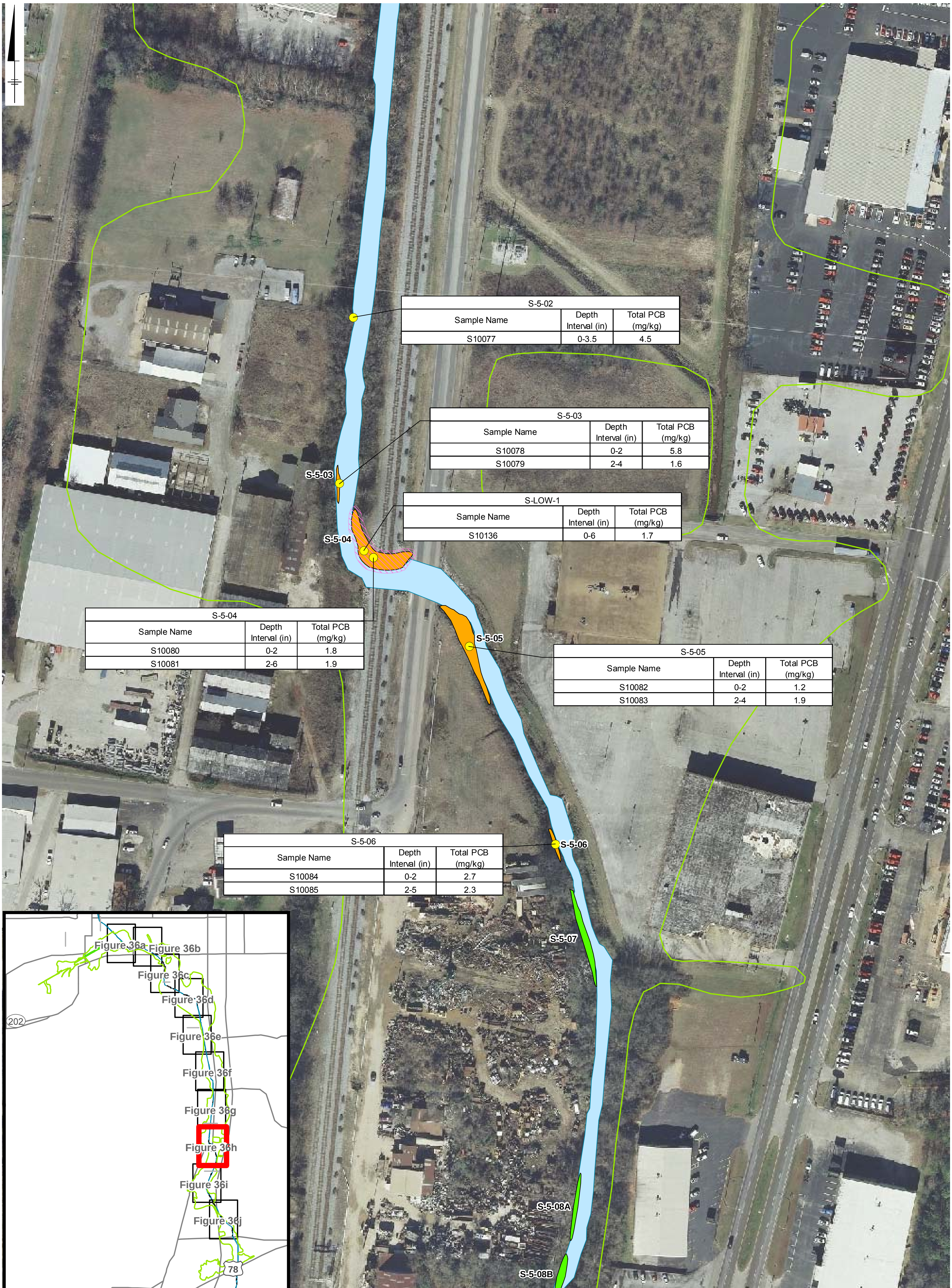
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
36g



S-5-02

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10077	0-3.5	4.5

S-5-03

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10078	0-2	5.8
S10079	2-4	1.6

S-LOW-1

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10136	0-6	1.7

S-5-04

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10080	0-2	1.8
S10081	2-6	1.9

S-5-05

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10082	0-2	1.2
S10083	2-4	1.9

S-5-06

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10084	0-2	2.7
S10085	2-5	2.3

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300
Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36h

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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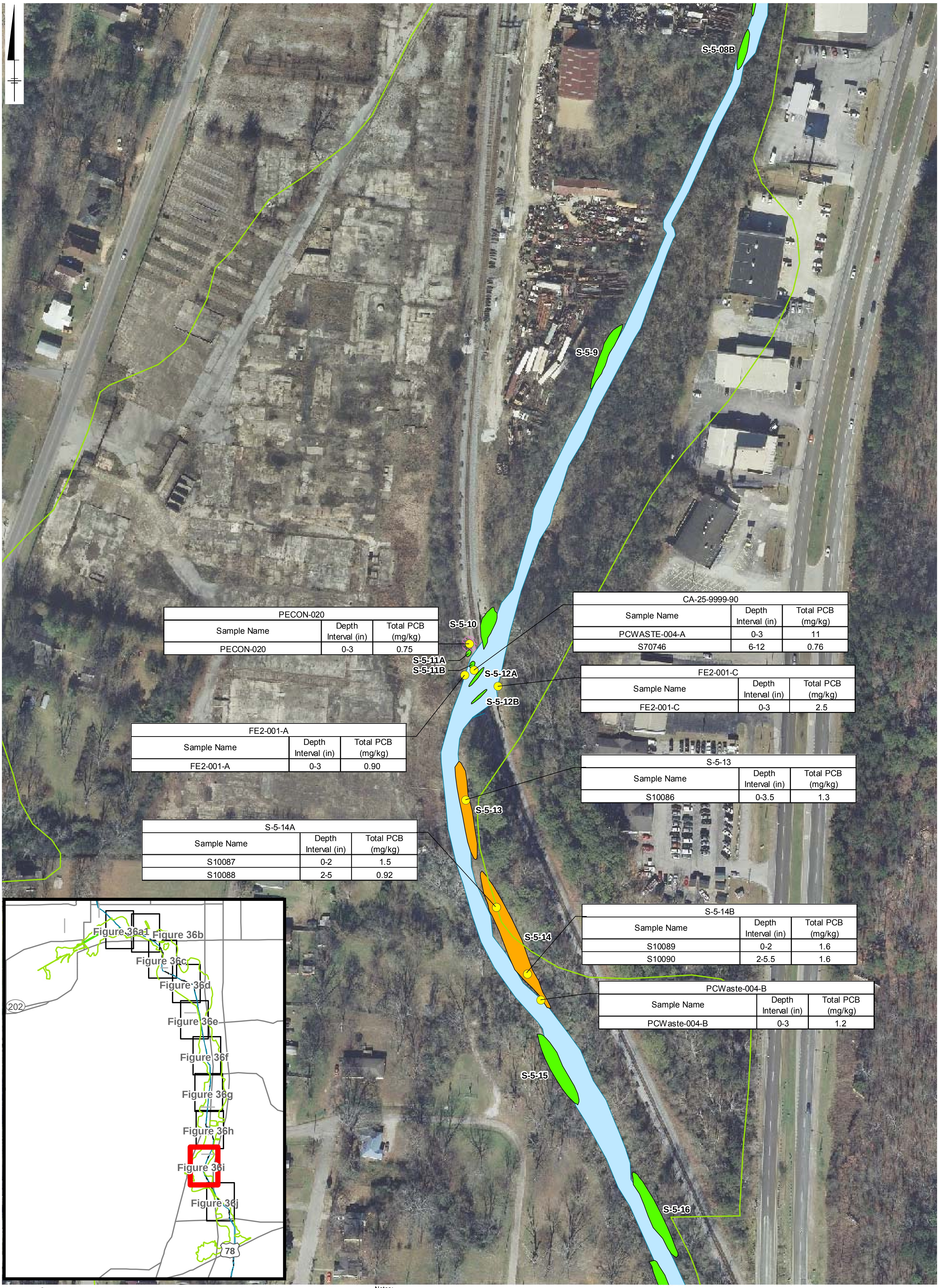

PECON-020

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-020	0-3	0.75

CA-25-9999-90

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWASTE-004-A	0-3	11
S70746	6-12	0.76

FE2-001-C

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-C	0-3	2.5

FE2-001-A

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-A	0-3	0.90

S-5-13

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10086	0-3.5	1.3

S-5-14A

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10087	0-2	1.5
S10088	2-5	0.92

S-5-14B

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10089	0-2	1.6
S10090	2-5.5	1.6

PCWaste-004-B

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWaste-004-B	0-3	1.2

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- ≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
- ≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia

Figure
36i

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Appendix C\FigC-AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/3/2016 1:59:07 PM

S-5-24

Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10091	0-2	1.2
S10092	2-12	1.2

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- ≥ 1

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 2)
- ≥ 1

Notes:
1. Aerial imagery provided by Calhoun County.
2. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
3. Sediment sample locations are approximate.
4. Snow Creek deposits are based on field probing conducted in 1999.
5. in: inches
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Proposed Plan

Candidate Remedial Areas for Sediment/ Creek Banks with a PCB PRG of 1 mg/kg

Solutia
Ingenuity Productivity Performance

Figure
36j

Tables

Table 2. Cancer Risk Summary - RME Nonresidential Surface Soil

Anniston PCB Site, OU-1/OU-2, Anniston, Alabama

PCB-Based Risk Calculations

Exposure Unit	Industrial	Commercial Visitor		Schools & Day Care		Recreational		Trespasser
	Adult	Adult	Young Child	Adult	Young Child	Young Child	Adolescent	Adolescent
EU1	4.E-06	9.E-07	5.E-07	NA	NA	NA	NA	1.E-06
EU2	3.E-05	6.E-06	4.E-06	NA	NA	2.E-05	2.E-05	7.E-06
EU3	NA	1.E-06	8.E-07	NA	NA	4.E-06	3.E-06	1.E-06
EU5	1.E-04	3.E-05	2.E-05	NA	NA	NA	NA	3.E-05
EU6	NA	8.E-07	5.E-07	NA	NA	3.E-06	2.E-06	9.E-07
EU7	NA	NA	NA	5.E-05	1.E-04	6.E-05	5.E-05	2.E-05
EU8	NA	1.E-07	9.E-08	NA	NA	4.E-07	4.E-07	2.E-07
EU9	5.E-07	1.E-07	7.E-08	NA	NA	NA	NA	1.E-07
EU10	2.E-05	5.E-06	3.E-06	NA	NA	2.E-05	1.E-05	5.E-06
EU11	9.E-07	2.E-07	1.E-07	NA	NA	NA	NA	2.E-07
EU12	5.E-06	1.E-06	7.E-07	NA	NA	4.E-06	3.E-06	1.E-06
EU13	NA	1.E-06	8.E-07	NA	NA	NA	NA	1.E-06
EU14N	1.E-05	3.E-06	2.E-06	NA	NA	9.E-06	7.E-06	3.E-06
EU14S	9.E-07	2.E-07	1.E-07	NA	NA	7.E-07	5.E-07	2.E-07
EU15/16	7.E-07	2.E-07	1.E-07	NA	NA	5.E-07	4.E-07	2.E-07
EU17	2.E-06	5.E-07	3.E-07	NA	NA	NA	NA	6.E-07
EU19N	3.E-04	NA	NA	NA	NA	NA	NA	7.E-05
EU19S	3.E-05	NA	NA	NA	NA	NA	NA	7.E-06
EU20	NA	3.E-07	2.E-07	NA	NA	NA	NA	3.E-07
EU22	4.E-06	8.E-07	5.E-07	NA	NA	NA	NA	9.E-07
EU24	6.E-06	1.E-06	9.E-07	NA	NA	NA	NA	2.E-06
EU25	NA	3.E-07	2.E-07	NA	NA	NA	NA	4.E-07
EU26	5.E-05	NA	NA	NA	NA	4.E-05	3.E-05	1.E-05
Snow Creek-SW	NA	NA	NA	NA	NA	2.E-08	2.E-08	9.E-09

Non-PCB-Based Risk Calculations

Exposure	Industrial	Commercial Visitor		Schools & Day Care		Recreational		Trespasser
	Adult	Adult	Young Child	Adult	Young Child	Young Child	Adolescent	Adolescent
Sitewide	3.E-04	6.E-05	6.E-05	2.E-04	6.E-04	2.E-04	8.E-05	2.E-05

Notes:

Highlighted values exceed USEPA's risk threshold.

EU: exposure unit

NA: not available

PCB: polychlorinated biphenyl

RME: reasonable maximum exposure

USEPA: United States Environmental Protection Agency

Table 3. Noncancer Risk Summary - RME Nonresidential Surface Soil

Anniston PCB Site, OU-1/OU-2, Anniston, Alabama

PCB-Based Risk Calculations

Exposure Unit	Industrial	Commercial Visitor		Schools & Day Care		Recreational		Trespasser
	Adult	Adult	Young Child	Adult	Young Child	Young Child	Adolescent	Adolescent
EU1	0.3	0.06	0.05	NA	NA	NA	NA	0.2
EU2	2	0.4	0.4	NA	NA	2	3	1
EU3	NA	0.08	0.08	NA	NA	0.4	0.5	0.2
EU5	8	2	2	NA	NA	NA	NA	5
EU6	NA	0.06	0.05	NA	NA	0.3	0.4	0.2
EU7	NA	NA	NA	3	14	6	8	4
EU8	NA	0.01	0.008	NA	NA	0.04	0.06	0.03
EU9	0.03	0.007	0.006	NA	NA	NA	NA	0.02
EU10	1	0.3	0.3	NA	NA	2	2	0.9
EU11	0.06	0.01	0.01	NA	NA	NA	NA	0.04
EU12	0.3	0.07	0.07	NA	NA	0.2	0.5	0.2
EU13	NA	0.08	0.08	NA	NA	NA	NA	0.2
EU14N	0.8	0.2	0.2	NA	NA	0.8	1	0.5
EU14S	0.06	0.01	0.01	NA	NA	0.06	0.09	0.04
EU15/16	0.05	0.01	0.01	NA	NA	0.05	0.07	0.03
EU17	0.2	0.04	0.03	NA	NA	NA	NA	0.1
EU19N	18	NA	NA	NA	NA	NA	NA	12
EU19S	2	NA	NA	NA	NA	NA	NA	1
EU20	NA	0.02	0.02	NA	NA	NA	NA	0.06
EU22	0.3	0.06	0.05	NA	NA	NA	NA	0.2
EU24	0.4	0.09	0.08	NA	NA	NA	NA	0.3
EU25	NA	0.02	0.02	NA	NA	NA	NA	0.07
EU26	4	NA	NA	NA	NA	4	5	2
Snow Creek SW	NA	NA	NA	NA	NA	0.001	0.003	0.002

Non-PCB-Based Risk Calculations

Exposure	Industrial	Commercial Visitor		Schools & Day Care		Recreational		Trespasser
	Adult	Adult	Young Child	Adult	Young Child	Young Child	Adolescent	Adolescent
Sitewide	0.7	0.2	0.4	0.7	4	2	0.5	0.1

Notes:

Highlighted values are HIs above 1.
EU: exposure unit
HI: hazard index
NA: not available
PCB: polychlorinated biphenyl
RME: reasonable maximum exposure

Table 4. PCB Site-specific Risk-based Concentrations Exceedances for Benthic Invertebrates

Species	Endpoint	Percent of Samples Exceeding SSRBC			
		EC0	EC0*	EC10*	EC20*
C. dilutus	13-d survival	100	18	0	0
	13-d ash-free dry weight	100	39	14	2
	13-d biomass per replicate chamber	100	29	14	6
	Emergence percentage	100	65	39	18
	Adult survival time	88	0	0	0
	No. of egg cases	100	10	4	2
	Total young	100	0	0	0
	Young/egg case	14	0	0	0
H. azteca	28-d survival	100	0	0	0
	28-d biomass per replicate chamber	100	71	8	2
	42-d survival	100	4	0	0
	42-d biomass per replicate chamber	100	14	2	0
	42-d total young	100	29	20	14
	42-d young/female	100	76	57	41
	42-d young/female (normalized to 42-d survival)	100	76	61	45

Notes:
Same Table as B-11.
95% UCL concentration exceeds SSRBC.
C0, EC10*, and EC20* are the regression-predicted PCB_A concentrations that would cause an additional 0%, 10%, or 20% effect beyond the lowest response measured in the reference sediments (i.e., 1×, 0.9×, and 0.8× the response at the “bottom” of the reference envelope).

%: percent
d: day
EC0: the tPCB concentration at which the average reference-sediment response would be predicted to occur, when projected onto the concentration-response curve generated for that endpoint with OU-4 sediments.
PCB: polychlorinated biphenyl
SSRBC: site-specific risk-based concentration

Table 5. Site-specific Risk-based Concentrations Exceedances for All Constituents of Potential Concern

COPC	Benthic Invertebrate	Mallard	Tree Swallow	Spotted Sandpiper	Pied-billed Grebe	Muskrat	Little Brown Bat	Raccoon
NOAEL SSRBC Comparisons (percent of samples exceeding SSRBC)								
Organics								
tPCB (mid-range sensitivity)	See Table 6-3	43 (67)	100	88 (100)	43 (100)	47 (67)	100	59 (88)
tPCB (high sensitivity)	100	100 (100)	100	100 (100)	100 (100)	NA	NA	NA
Total TEQ	NA	0	0	0	0	0	0	0
Metals								
Barium	NC	33	8	33	17	8	0	0
Chromium	58	33	100	100	33	33	100	17
Cobalt	8	0	8	8	0	0	0	0
Lead	53	53	7	93	33	7	0	7
Manganese	NC	92	0	100	83	100	33	83
Mercury	67	8	25	42	17	0	8	0
Nickel	33	0	25	25	0	17	100	0
Vanadium	NC	83	50	92	67	0	0	0
LOAEL SSRBC Comparisons (percent of samples exceeding SSRBC)								
Organics								
tPCB (mid-range sensitivity)	See Table 6-3	18 (43)	75	57 (94)	18 (67)	22 (43)	88	31 (57)
tPCB (high sensitivity)	96	80 (100)	100	100 (100)	80 (100)	NA	NA	NA
Total TEQ	NC	NC	NC	NC	NC	NC	NC	NC
Metals								
Barium	NC	8	0	8	8	0	0	0
Chromium	33	33	100	100	33	33	100	17
Cobalt	NC	0	8	8	0	0	0	0
Lead	7	13	7	53	13	7	0	0
Manganese	NC	50	0	83	50	100	17	75
Mercury	8	0	8	17	0	0	0	0
Nickel	25	0	25	17	0	0	42	0
Vanadium	NC	25	25	83	25	0	0	0

Notes:

95% UCL concentration exceeds SSRBC.

Parenthetical values are those derived using BAFs from the laboratory bioaccumulation study as opposed to field data.

%: percent

COPC: constituent of potential concern

LOAEL: lowest observed adverse effect level

NOAEL: no observed adverse effect level

NA: not applicable

NA: no criteria available

SSRBC: site-specific risk-based concentration

tPCB: total polychlorinated biphenyl

TEQ: 2,3,7,8-TCDD toxic equivalents

Table 7. Summary of Human Health PRGs

		BaP Equivalent RGO (mg/kg)					
		Cancer			Noncancer		
	Target Risk Limit =	1.00E-06	1.00E-05	1.00E-04	0.1	1	3
Scenario	Age						
Ind/Comm. Worker	Adult	0.2	2	21	NA	NA	NA
Comm. Visitor	Adult	0.9	9	93	NA	NA	NA
	Young Child	1	13	128	NA	NA	NA
Schools/Daycare	Adult	0.3	3	31	NA	NA	NA
	Young Child	0.1	1	11	NA	NA	NA
Trespasser	Adolescent	1	10	97	NA	NA	NA
Recreational user	Young Child	0.3	3	27	NA	NA	NA
	Adolescent	0.4	4	40	NA	NA	NA
Construction Worker	Adult	5	53	534	NA	NA	NA
Utility Worker	Adult	53	534	5,341	NA	NA	NA
	Background (2) =	NA			NA		

		Total PCB RGO (mg/kg)					
		Cancer			Noncancer		
	Target Risk Limit =	1.00E-06	1.00E-05	1.00E-04	0.1	1	3
Scenario	Age						
Ind/Comm. Worker	Adult	2	21	206	3	29	88
Comm. Visitor	Adult	9	91	910	13	130	390
	Young Child	14	142	1,423	15	146	439
Schools/Daycare	Adult	3	34	342	5	49	146
	Young Child	1	12	116	1	12	36
Trespasser	Adolescent	8	81	809	5	46	139
Recreational user	Young Child	3	28	278	3	29	86
	Adolescent	4	35	352	2	20	60
Construction Worker	Adult	56	565	5,645	10	97	290
Utility Worker	Adult	565	5,645	56,454	97	968	2,903
	Background (2) =	NA			NA		

		Arsenic RGO (mg/kg)					
		Cancer			Noncancer		
	Target Risk Limit =	1.00E-06	1.00E-05	1.00E-04	0.1	1	3
Scenario	Age						
Ind/Comm. Worker	Adult	4	38	382	61	608	1,824
Comm. Visitor	Adult	17	169	1,692	269	2,687	8,062
	Young Child	22	217	2,169	84	837	2,510
Schools/Daycare	Adult	5	53	530	85	845	2,535
	Young Child	2	20	200	8	77	231
Trespasser	Adolescent	20	195	1,950	125	1,252	3,757
Recreational user	Young Child	5	48	481	19	185	556
	Adolescent	8	79	787	51	506	1,517
Construction Worker	Adult	93	925	9,254	60	595	1,785
Utility Worker	Adult	925	9,254	92,538	595	5,951	17,853

	Background (2) =	32			32		

		Chromium RGO (mg/kg)					
		Cancer			Noncancer		
	Target Risk Limit =	1.00E-06	1.00E-05	1.00E-04	0.1	1	3
Scenario	Age						
Ind/Comm. Worker	Adult	6	57	568	304	3,038	9,114
Comm. Visitor	Adult	25	251	2,512	1,343	13,429	40,286
	Young Child	23	228	2,277	878	8,776	26,329
Schools/Daycare	Adult	6	57	570	305	3,050	9,151
	Young Child	3	26	255	98	984	2,953
Trespasser	Adolescent	92	918	9,175	1,965	19,649	58,948
Recreational user	Young Child	6	61	614	237	2,367	7,102
	Adolescent	22	221	2,208	473	4,731	14,192
Construction Worker	Adult	108	1,080	10,799	694	6,936	20,807
Utility Worker	Adult	1,080	10,799	107,990	6,936	69,357	208,072
	Background (2) =	41			41		

Notes:

(1): PRGs were not calculated for dioxin. TEQ for dioxins are compared to RSLs.

(2): Fort McClellan surface/subsurface background UPL.

Table 8. Summary of SERA PRGS - a) 100% Site Use

Anniston PCB Site, Anniston, Alabama

Constituent	Benthic Invertebrates	Mallard	Tree Swallow	Spotted Sandpiper	Pied-Billed Grebe	Muskrat	Little Brown Bat	Raccoon
	NOAEL-Based or NOAEL Equivalent RGOs							
tPCB (mid-range sensitivity)	see Table C-14	5	0.5	1	5	4	0.3	3
tPCB (high sensitivity)	NA	0.4	0.05	0.1	0.4	NA	NA	NA
Barium	NC	160	542	169	214	474	1818.8	1235
Chromium	43	97	19	26	131	109	23.7	229
Cobalt	50	120	72	57	149	142	93.6	370
Lead	36	41	136	22	58	140	528.1	403
Manganese	NC	473	4661	287	563	169	1808.3	549
Mercury	0.2	1	0.3	0.3	0.7	5	1.7	7
Nickel	23	243	32	46	164	77	10.9	110
Vanadium	NC	13	20	6	19	178	333.9	495
	LOAEL-Based or LOAEL Equivalent RGOs							
tPCB (mid-range sensitivity)	see Table C-14	14	2	3	14	12	1	8
tPCB (high sensitivity)	NA	1	0.1	0.3	1	NA	NA	NA
Barium	NC	322	1086	340	429	1106	4249	2884
Chromium	111	102	20	27	138	128	28	269
Cobalt	NC	123	74	59	153	193	128	504
Lead	128	82	272	43	117	265	1000	763
Manganese	NC	919	9063	559	1095	214	2282	693
Mercury	1	3	1	0.8	2	9	3	13
Nickel	49	295	39	56	199	154	22	220
Vanadium	NC	26	42	12	38	355	667	988

Notes:

All values are mg/kg sediment dry weight.
%: percent
LOAEL: lowest observed adverse effect level
mg/kg: milligram per kilogram
NA: not applicable
NC: no toxicity criteria available - RGO value could not be developed
NOAEL: no observed adverse effect level
OU: Operable Unit
PRG: Preliminary Remedial Goal
tPCB: total polychlorinated biphenyl
SERA - Streamlined Ecological Risk Assessment

Table 8. Summary of SERA PRGS - b) 50% Site Use

Anniston PCB Site, Anniston, Alabama

Constituent	Mallard	Tree Swallow	Spotted Sandpiper	Pied-Billed Grebe	Muskrat	Little Brown Bat	Raccoon
	NOAEL-Based RGOs						
tPCB (mid-range sensitivity)	9	1	2	9	8	0.7	6
tPCB (high sensitivity)	0.9	0.1	0.2	0.9	NA	NA	NA
Barium	321	1,083	339	428	947	3,638	2,469
Chromium	194	39	52	262	219	47	458
Cobalt	240	144	115	299	283	187	739
Lead	82	272	43	117	280	1,056	806
Manganese	945	9,323	575	1,127	339	3,617	1,099
Mercury	2	0.5	0.5	1	9	3	13
Nickel	485	64	93	328	154	22	220
Vanadium	26	41	12	38	356	668	990
	LOAEL-Based RGOs						
tPCB (mid-range sensitivity)	28	3	6	28	24	2	17
tPCB (high sensitivity)	3	0.3	0.6	3	NA	NA	NA
Barium	643	2,172	679	858	2,212	8,497	5,768
Chromium	204	41	54	276	257	56	538
Cobalt	246	148	118	306	387	255	1,008
Lead	163	543	86	234	530	2,000	1,526
Manganese	1,838	18,125	1,117	2,190	428	4,565	1,387
Mercury	7	2	2	4	19	7	26
Nickel	590	77	112	399	309	43	440
Vanadium	52	83	24	77	710	1,334	1,977

Notes:

[1]All values are mg/kg sediment dry weight and are based on an assumption of 50% Site use by receptors.

%: percent

LOAEL: lowest observed adverse effect level

mg/kg: milligram per kilogram

NA: not applicable

NC: no toxicity criteria available - RGO value could not be developed

NOAEL: no observed adverse effect level

OU: Operable Unit

RGO: remedial goal options

tPCB: total polychlorinated biphenyl

Table 9. Remedial Alternatives for Residential Soil

Considerations:	RS-1 No Action	RS-2 Complete Non-Time-Critical Removal and Manage PCB Residuals	RS-3 Excavate PCBs ≥ 1 mg/kg at all depths and Manage PCB Residuals
Excavation	None.	Excavate soil with PCBs ≥ 1 mg/kg in top foot and PCBs ≥ 10 mg/kg below top foot - 18,400 Cubic Yards (CY).	Excavate all accessible soils[1] ≥ 1 mg/kg at all depths - 56,000 CY.
Covers	None.	Structures and clean backfill.	Structures.
Exceptions	None.	Where structures or tree roots prevent complete removal at depth.	
Relocation	None.	Residents offered temporary relocation during excavation.	
Disposal	None.	Soils with PCBs concentrations < 10 mg/kg can be disposed onsite; soils with PCBs concentrations ≥ 10 mg/kg must be disposed offsite at approved landfills.	
Treatment	None.	None; volume and sporadic implementation rate of remaining work and concentrations too low to justify.	
Re-vegetation	None.	Re-vegetated or otherwise restored to pre-remediation condition if possible.	
Institutional Controls (ICs)	None.	Use ICs if available to protect the remedy, manage contaminated soil when it becomes accessible, and provide awareness of risks from exposure.	
Monitoring and Maintenance	None.	Contact residents about residual PCBs present in subsurface and work with local governments about demolitions and excavation on impacted properties. Voluntary deed notices should be implemented.	
Cost Estimate[2]	$ 0	$ 7,300,000	$ 15,700,000
Timeframe	None.	64 properties remain.[3] Access and development issues control construction timeframe. Management of residuals at 433 properties until no longer a concern.[4] Costs reflect 30 years to manage PCB residuals.	168 properties impacted.[5] Access and development issues control construction timeframe. Management of residuals at 429 properties until no longer a concern.[6] Costs reflect 30 years to manage PCB residuals.

[1] Accessible soils are soils not under structures (i.e., houses, driveways, sidewalks, garages, sheds).
[2] Cost estimates do not include the cost to manage PCB residuals at properties cleaned up by the Anniston Lead Site (5 with structures and PCBs > 1 mg/kg at depth, 4 with only PCBs > 1 mg/kg at depth, and 48 with structures and no PCBs at depth).
[3] Properties remaining for cleanup in RS-2 include 21 with access issues and 43 that are wooded/overgrown with little accessibility.
[4] Properties with structures that require longterm controls or soil management in RS-2 to ensure no unacceptable exposure occurs total 433 (380 from the Anniston PCB Site and 53 from the Anniston Lead Site).
[5] Properties remaining for cleanup in RS-3 include 21 with access issues, 43 that are wooded/overgrown with little accessibility and 104 with PCBs > 1 mg/kg at depth.(95 left by the Anniston PCB Site PRPs and 9 left by the Anniston Lead Site PRPs).
[6] Properties with structures that require longterm controls or soil management to ensure no unacceptable exposure occurs total 429 (380 from the Anniston PCB Site and 49 from the Anniston Lead Site).

Table 10. Remedial Alternatives for Special Use Properties

Considerations:	SU-1 No Action	SU-2 Excavate Low Activity Areas to Non-Residential Goal and Manage PCB Residuals	SU-3 Excavate Low Activity Areas to Residential Goal and Manage PCB Residuals	SU-4 Excavate PCBs ≥ 1 mg/kg in High and Low Activity Areas and Manage PCB Residuals
Excavation	None.	Excavate 1,000 CY from Low Activity Areas when property use changes.[1]	Excavate 10,600 CY from Low Activity Areas if PCBs in soils ≥ 1 mg/kg in surface soil.	Excavate 14,400 CY (in High and Low Activity Areas if PCBs in soils ≥ 1 mg/kg at all depths).
Covers	None.	Structures and clean backfill.	Structures and clean backfill.	Structures.
Exceptions	None.	Where structures prevent complete removal.		
Relocation	None.	No temporary or permanent relocation required.		
Disposal?	None.	Soils with PCBs concentrations < 10 mg/kg disposed onsite; soils with PCBs concentrations ≥ 10 mg/kg disposed offsite at approved landfills.		
Treatment	None.	None. Volume and sporadic implementation rate of remaining work and concentrations too low to justify treatment.		
Re-vegetation	None.	Re-vegetated or otherwise restored to pre-remediation condition if possible.		
Institutional Controls (ICs)	None.	Use ICs if available to protect the remedy, manage contaminated soil when it becomes accessible, and provide awareness of risks from exposure. Voluntary deed notices should be implemented.		
Monitoring and Maintenance	None.	Contact owners about residual PCBs present in surface and/or subsurface soils and work with local governments about high activity area changes, demolitions and excavations on impacted properties.		
Cost Estimate	$ 0	$ 500,000	$ 3,100,000	$ 3,900,000
Timeframe	None.	No low-activity areas require removal to meet non-residential goal. Management of residuals at surface, subsurface and under structures is required. Costs reflect 30 years to manage PCB residuals in soils.	19 properties impacted. Access issues control construction timeframe. Management of residuals at subsurface and under structures is required. Costs reflect 30 years to manage PCB residuals in soils.	22 properties impacted. Access issues control construction timeframe. Management of residuals under structures is required. Costs reflect 30 years to manage PCB residuals in soils.

Table 11. Remedial Alternatives for Interim Measures

Considerations	IM-1 No Action	IM-2 Expand Existing Interim Measures (IMs) to Meet Non-Residential Goal; Excavate any Principal Threat Waste (PTW) found within IMs if Leaching to Groundwater	IM-3 Expand Existing IMs to meet Non-Residential Goal; Excavate Potential PTW at Railroad (RR) and McDaniel; and Excavate any PTW found within IMs if Leaching to Groundwater	IM-4 Excavate around Existing IMs to Meet Non-Residential Goals; Excavate any PTW found within IMs if Leaching to Groundwater
Excavation	None.	None. Assume no additional PTW within IMs (confirm with design).	Excavate 67 CY at RR and McDaniel. Assume no additional PTW within IMs (confirm with design).	Excavate 4,200 CY soils outside measures to meet non-residential goals. Assume no additional PTW within IMs (confirm with design).
Covers	None.	Expand IM caps using 1-ft of soil over a 12,100 Square Yard (SY) area and geomembrane over a 300 SY area.	Expand IM caps using 1-ft of soil over a 12,100 SY area.	No new caps.
Exceptions	None.	Allowance for modifications in or near railroad easement.		
Relocation	None.	Purchase inaccessible private property within eastside area when available and incorporate into IM cap.		
Disposal	None.	None.	Dispose of excavated soils offsite (100% > 50 mg/kg).	Dispose of excavated soils offsite (20% > 50 mg/kg).
Treatment	None.	None. PWT considered effectively contained unless design sampling indicates otherwise.		
Re-vegetation	None.	Re-vegetate or otherwise restored to pre-remediation condition if possible.		
Institutional Controls (ICs)	None.	Environmental easements/covenants following state requirements should be put in place.		
Monitoring and Maintenance	None.	Contact owners about covers present; maintain caps as necessary to protect remedy.		
Cost Estimate	$ 0	$ 2,600,000	$ 2,600,000	$ 4,300,000
Timeframe	None.	3 months to implement. Management of residuals required. Costs reflect 30 years of management.		

Table 12. Remedial Alternatives for Dredge Spoil Piles

Considerations:	DSP-1 No Action	DSP-2 Excavate to Non-Residential Goal and Offsite Disposal	DSP-3 Excavate to Non-Residential Goal and Onsite Disposal	DSP-4 Excavate All Dredge Spoil Piles and Offsite Disposal	DSP-5 Excavate All Dredge Spoil Piles and Onsite Disposal
Excavation	None.	Excavate pile labeled SC-8 (4,900 CY).	Excavate pile labeled SC-8 (4,900 CY).	Excavate piles labeled SC-1, SC-2, SC-7, and SC-8 (7,300 CY).	Excavate piles labeled SC-1, SC-2, SC-7, and SC-8 (7,300 CY).
Covers	None.	None.	None.	None.	None.
Exceptions	None.	Allowance for modifications in or near railroad easement.			
Relocation	None.	No temporary or permanent relocation required.			
Disposal	None.	Offsite disposal.	Onsite disposal (Offsite disposal only if PCBs $\geq$ 50 mg/kg detected).	Offsite disposal.	Onsite disposal (Offsite disposal only if PCBs $\geq$ 50 mg/kg detected).
Treatment	None.	None; concentrations too low to justify.			
Re-vegetation	None.	Re-vegetate as needed to prevent erosion and match existing land use.			
Institutional Controls	None.	Remaining spoil piles will be treated as part of the non-residential property where they are located.		None.	
Monitoring and Maintenance	None.	Remaining spoil piles will be treated as part of the non-residential property where they are located.		None.	
Cost Estimate	$ 0	$ 900,000	$ 500,000	$ 1,400,000	$ 700,000
Timeframe	None.	One month to implement.			

Table 13. Remedial Alternatives for Unapproved Waste Disposal Areas

Considerations	UWDA-1 No Action	UWDA-2 Soil Cap with Marker Layer	UWDA-3 RCRA Subtitle-D Cap	UWDA-4 Excavate Waste and Offsite Disposal
Excavation	None.	None.	None.	Excavate 101,700 CY of waste.
Covers	None.	4.5 acres covered with marker layer, 1 foot of soil and vegetation.	4.5 acres covered with geo-membrane and geocomposite drainage layers, 18-inches of soil backfill and vegetation.	None.
Exceptions	None.	Owners are individual landowners who should be onboard with remedy, able to maintain and agree to use restrictions that might be relevant.		
Relocation	None.	No temporary or permanent relocation required.		
Disposal	None.	None.		Dispose offsite. Assume 50% of PCBs ≥ 50 mg/kg.
Treatment	None.	None.		Stabilization required if leaching of metals detected.
Re-vegetation	None.	Re-vegetate as needed to prevent erosion.		
Institutional Controls	None.	Environmental easements/covenants following state requirements should be put in place.		None.
Monitoring and Maintenance	None.	Maintain caps as necessary to protect remedy.		None.
Cost Estimate	$0	$ 1,600,000	$ 2,800,000	$ 41,200,000
Timeframe	None.	Construction 2 months. O&M of caps required. Costs reflect 30 years of O&M.	Construction 3 months. O&M of caps required. Costs reflect 30 years of O&M.	Implementation 9 months.

Table 14. Target Remedial Area Summary for Nonresidential Surface Soil

EU	PPIN	COC	Owner Name	Potential Remediation Area ID	Estimated Area (ac)	Removal Depth (ft) [1]	Estimated Removal Volume (cy)	Pre Remediation EPC (mg/kg)	Post Remediation EPC (mg/kg)[2]
West of EU1	32695	PCB	Wilborn, Walden J and Gary	Wilborn 2 PPIN 32695	0.41	1	667	NA	NA
5	62844	PCB	First Missionary Baptist Church	FMBC	0.78	1	1,261	350	18 [3]
7	19312	PCB	Lynch, Lonzo and Lizzie	1577 Lynch EU7	0.18	1	297	160	4.1
10	18705	PCB	McDonal, David	ABS-15	0.24	1	388	19	10 [3]
14N	18125	PCB	Colyer-Lloyd Development Company. Inc.	3053 Colyer 14N	0.30	1	484	21	8.8 [3]
19N	66676	PCB	Shorty's Truck and Railroad Car Parts	8560 Shorty's 19N	0.17	1	274	660	7.8
19S	66392	PCB	Sandy M Lumber Sales Company, Inc.	5374 Sandy Lumber 19S	0.61	1	983	68	0.22
24	64446	PCB	Williams Scrap Metal, Inc.	Williams CA-24-6098-15	0.60	1	975	12	9.2
26	67788	PCB	Tull Chemical Company	6629 Tull 26	0.20	1	318	34	9.5
202	ROW	PCB	ROW	202 Median	1.42	1	2,292	NA	NA
202	32746 32763 ROW	PCB	Solutia Worsham ROW	202 South	0.50	1	809	99	17
APCO	32363	PCB	APCO	APCO	0.04	1	65	18	11
14N	63444	PAH	David & Ronald Hall	PAH (CA-14-3002-01)	0.04	1	60	38 PAH For Entire OU	2.6 PAH For Entire OU
22	67095 67096 ROW	Chromium	Wear Kote Inc Alacote Inc ROW (Front St)	Chromium (PB-003-01)	0.15	1	235	290 Chromium For Entire OU	43 Chromium For Entire OU

Table 14. Target Remedial Area Summary for Nonresidential Surface Soil

EU	PPIN	COC	Owner Name	Potential Remediation Area ID	Estimated Area (ac)	Removal Depth (ft) [1]	Estimated Removal Volume (cy)	Pre Remediation EPC (mg/kg)	Post Remediation EPC (mg/kg)[2]
24	64446	Chromium	Williams Scrap Metal, Inc.	Chromium (CA-24-6098-14)	0.08	1	133	290 Chromium For Entire OU	43 Chromium For Entire OU
25	64534 68720	Dioxin TEQ	Mueller Property Holdings LLC	Dioxin(CA-25-6127-01)	0.08	1	133	0.29 (ug/kg) Dioxin TEQ For Entire OU	0.062 (ug/kg) Dioxin TEQ For Entire OU
NS	32593	PAH	Solutia	PAH (PCWaste-10/11)	0.03	1	43	38 PAH For Entire OU	2.6 PAH For Entire OU

Notes:

1. Potential removal depths are only included to illustrate the volume of soil associated with a 1-foot removal, should it be part of the selected remedial alternative.
2. Post-remediation EPC includes actions conducted from other categories of alternatives such as groundwater, unapproved waste disposal areas, and interim measures.

ac: acres
COC: constituent of concern
cy: cubic yards
EPC: exposure point concentration
EU: exposure unit
FMBC: First Missionary Baptist Church
ft: foot/feet
MCL: maximum contaminant level
µg/L: micrograms per liter
mg/kg: milligrams per kilogram
NA: not applicable - insufficient data to estimate EPC
OU: operable unit
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
PPIN: parcel pin identification number
PTW: principal threat waste
RGO: remedial goal option
ROW: right of way
TEQ: toxicity equivelent

Table 15. Remedial Alternatives for Non-Residential Soil

Considerations: a) goal 21 mg/kg b) goal 9 mg/kg	NRS-1 No Action	NRS-2 a) and b) Combination Capping and Excavation; Onsite and Offsite Disposal; and Management of PCB Residuals	NRS-3 a) and b) Excavate Soil; Onsite and Offsite Disposal; and Manage PCB Residuals	NRS-4 a) and b) Excavate; Offsite Disposal; and Manage PCB Residuals	NRS-5 a) and b) Excavate, Offsite Treatment of Soils and Manage of PCB Residuals	NRS-6 a) and b) Excavate, Onsite Thermal Desorption of Soils and Manage PCB Residuals
Excavation[1]	None.	Excavate a) 3,500 CY for goal of 21 mg/kg or b) 8,600 CY for goal of 9 mg/kg).	Excavate a) 9,700 CY for non-residential goal of 21 mg/kg or b) 26,700 CY for non-residential goal of 9 mg/kg.			
Covers	None.	Install 12-inch (or more if required) clean soil backfill in excavated areas. Structures may also cover contamination in floodplain.				
		Area is a) 7,100 SY for goal 21 mg/kg or b) 22,600 SY for goal 9 mg/kg.	Area is a) 9,700 SY for non-residential goal of 21 mg/kg or b) 15,800 SY for non-residential goal of 9 mg/kg.			
Exceptions	None.	Exception may be made where structures prevent complete removal. Owners are individual landowners who should be onboard with remedy, able to maintain the remedy, and agree to use restrictions that might be relevant.				
Relocation	None.	No temporary or permanent relocation anticipated.				
Disposal	None.	Onsite disposal if PCBs < 50 mg/kg (assume 38%), offsite if PCBs ≥ 50 mg/kg (assume 62%).	Onsite disposal if PCBs < 50 mg/kg (assume 37%), offsite if PCBs ≥ 50 mg/kg (assume 63%).	100% disposal to offsite to landfills.	100% disposal to offsite treatment facility.	PCB concentrate from treatment disposed offsite. Treated soils disposed onsite.
Treatment	None.	None.	None.	None.	Ship soils offsite for treatment of PCBs.	Treat onsite with Thermal Desorption.
Re-vegetation	None.	Re-vegetate as needed to prevent erosion.				
Institutional Controls (ICs)	None.	Use ICs if available to protect the remedy, manage contaminated soil when it becomes accessible, and provide awareness of risks from exposure. Voluntary deed notices should be implemented.				
Monitoring and Maintenance	None.	Contact owners about residual PCBs present in subsurface soils or under structures. Owners should maintain				
Cost Estimate	$0	a)$7,900,000(21mg/kg) b)$10,100,000(9mg/kg)	a)$10,000,000(21mg/kg) b) $12,700,000(9mg/kg)	a)$10,400,000(21mg/kg) b) $14,600,000(9mg/kg)	a)$21,000,000(21mg/kg) b)$36,600,000(9mg/kg)	a)$19,100,000(21mg/kg) b)$46,200,000(9mg/kg)
Timeframe	None.	Construction 5 months. Management of PCB residuals required. Costs reflect 30 years of management.	Construction 5 months. Management of PCB residuals required. Costs reflect 30 years of management.	Construction 5 months. Management of PCB residuals required. Costs reflect 30 years of management.	Construction 5 months.	Construction 5 months.

[1] Non-PCB contaminants included in total excavation volume. PAHs (as BaPE) in surface soil exceed the PRG in three locations with an estimated volume of 103 CY. Chromium in surface soil exceeds the PRG in two locations with an estimated volume of 368 CY. The Dioxin Toxic Equivalency Quotient (TEQ) in surface soil exceeded the PRG in two locations at an estimated volume of 133 CY. Total non-PCBs included in the excavation totals is 604 CY.

Table 16. Remedial Alternatives for Groundwater at T-11

Considerations:	GW-1 No Action	GW-2 Excavate High Concentrations and Surface Soils, Offsite Disposal, Soil Cap and Monitor Groundwater	GW-3 Excavate of High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, Monitor Groundwater and Operations and Maintenance (O&M)	GW-4 Excavate High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, Pump and Treat Groundwater, Monitor Groundwater and O&M
Excavation	None.	Excavate 3,000 CY.	Excavate 4,400 CY.	Excavate 4,500 CY.
Covers	None.	1.7 acres covered with geotextile marker and 12-inches soil backfill.	1.7 acres covered with geomembrane and geocomposite drainage layers, and 18-inches of soil backfill.	
Exceptions	None.	Allowance for modifications in or near railroad easement.		
Relocation	None.	No temporary or permanent relocation required.		
Disposal	None.	Offsite Disposal. Assume 76% of soil have PCBs concentrations ≥ 50 mg/kg.		
Treatment	None.	None.	None.	Treat GW with skid mounted carbon unit.
Re-vegetation	None.	Low maintenance vegetative cover that supports pollinators.		
Institutional Controls	None.	Environmental easements/covenants following state requirements should be put in place. Groundwater use would be restricted.		
Monitoring and Maintenance	None.	Maintain caps as necessary to protect remedy. Monitor groundwater and surface water.		Maintain caps, and pump and treat equipment as necessary to protect remedy.
Cost Estimate	$ 0	$ 2,200,000	$ 3,300,000	$ 4,200,000
Timeframe	None.	Construction 3 months. O&M of caps required. Costs reflect 30 years of O&M.	Construction 6 months. O&M of caps required. Costs reflect 30 years of O&M.	Construction 6 months. Pump and treat assumed for 5 years. O&M of caps required. Costs reflect 30 years of O&M.

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
S-1-01	dark brown silt and fine to medium sand, trace coarse sand over gravel, rock/silt along edge of channel, slight oil sheen	terrace deposit	1000	1.3	48	1	2	17	31
S-1-02	sand, silt, and railroad bedding gravels washed down by the steep bank	low terrace deposit	162	0.3	2	1	1	8.0	8.0
S-1-03	fine to very coarse sands, gravels, rocks	low terrace/ aggrading bar	280	0.8	8			15	>10
S-1-04	mixture fine to very coarse sand, silts, gravels, rocks; silt and fine sand along edge of channel/terrace	low terrace deposit	900	0.8	27	1	2	15	17
S-1-05	silt, fine sand, aquatic plant roots over rock, gravel	low terrace	180	0.3	2	1	1	11	11
S-1-06	brown fine sand, little silt, oil sheen	channel deposit	48	1.5	3			15	>10
S-1-07	soft silt over silt and fine sand, heavy oil sheen, strong organic odor behind RR tie in creek	channel deposit	144	1.5	8	1	3	5.9	16
S-1-08	soft brown silt over fine sand and clay, grey with black staining	drainage ditch outlet/ 2nd channel during high flow	75	1.0	3	1	3	27	37
S-1-09	fine sand to very coarse sand, gravel, trace silt, oil sheen, organic odor	aggrading bar	36	0.5	1			15	>10
S-1-10	soft dark brown silt over tan fine sandy clay, oil sheen	low terrace	45	1.5	3	1	3	19	29
S-1-11A	brown silt and fine sand over dark brown silt, fine to medium sand, small gravel	low terrace deposit with secondary channel	120	0.5	2	1	3	0.94	2.2

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
S-1-11B	brown silt and fine sand over dark brown silt, fine to medium sand, small gravel with some medium size gravel	low terrace deposit with secondary channel	600	0.5	11	1	1	12	12
S-1-12	fine to medium sand, trace coarse sand, orange brown upper part, bottom part fine sand and silt	low terrace/ channel deposit	675	0.5	13	1	2	1.4	2.1
S-1-13	fine sand to very coarse sand, gravel	sand bar deposit	20	1.2	1			15	>10
S-1-14	fine sand to very coarse sand, gravel, rocks	bank deposit/ high terrace	1000	0.3	9			15	>10
S-1-15	fine sand to very coarse sand, gravels, small to medium rock	channel deposit/ aggrading bar	225	0.6	5			15	>10
S-1-16	mostly fine sand, some medium to coarse sand, gravels, rock	bank deposit/ high terrace	750	0.9	25	1	2	30	32
SED-A09	Standalone sample location		50	1.0	2	1	1	7.8	7.8
S-1-17	medium sand to very coarse sand, gravels, small/medium rock	aggrading bar	192	1.0	7			15	>10
S-2-01	brown medium to very coarse sand, some gravels	channel deposit	270	1.0	10			15	>10
CP-C-9	Standalone sample location		50	1.0	2	1	1	2.0	2.0
S-2-02	dark brown to black silt with fine to medium sand, some coarse sand, gravels	exposed channel deposit/ aggrading bar	1000	0.5	19	1	1	19	19
CP-C-10	Standalone sample location		50	1.0	2	1	3	6.2	12

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
SED-A10	Standalone sample location		50	1.0	2	1	1	6.9	6.9
S-2-03A	silt, fine to very coarse sand, gravel over rock	channel deposit/ aggrading bars	100	0.3	1	1	1	3.8	3.8
S-2-03B	fine sand to coarse sand	channel deposit/ aggrading bar	150	0.5	3			5	=>3 and <10
S-2-04A	fine sand to medium sand, trace silt	aggrading bar	125	0.5	2			5	=>3 and <10
S-2-04B	fine sand to coarse sand, trace silt over rock	aggrading bar	150	0.5	3			5	=>3 and <10
CP-C-11	Standalone sample location		50	1.0	2	1	3	3.4	7.5
S-2-05	fine sand to very coarse sand, gravel, small to large rocks 1"-4"	aggrading bar above culvert pipes	2600	2.5	241	1	2	5.9	6.4
S-2-06	fine sand to very coarse sand, gravels	exposed sediment built up in culvert pipes	14400	3.0	1600	3	9	22	60
S-2-07	fine sand, some silt, medium to coarse sand, gravel	channel deposit/ aggrading bar	756	0.4	10			15	>10
S-2-08	fine sand to very coarse sand, gravels, small rock	channel deposit/ aggrading bar	4800	1.0	178	1	3	15	20
S-2-09	fine sand to coarse sand	bank deposit/ channel deposit	120	0.4	2			15	>10
SED-A11	Standalone sample location		50	1.0	2	1	1	16	16
S-2-10	fine sand to very coarse sand, gravels	low terrace/ bank deposit	60	0.3	1			15	>10
S-2-11	fine sand to very coarse sand	channel deposit	216	0.6	5			15	>10
S-2-12	fine sand to very coarse sand, gravels	channel deposit/ low terrace	100	0.5	2			15	>10
S-2-13	fine sand to medium sand, gravels, rock, some silt	channel deposit/ aggrading bar	640	0.5	12			15	>10

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
PECON-011	Standalone sample location		50	1.0	2	1	1	4.3	4.3
PECON-012	Standalone sample location		50	1.0	2	1	1	8.5	8.5
S-2-14	fine sand to very coarse sand, gravels, rock	aggrading bar	225	0.5	4			15	>10
SED-A12	Standalone sample location		50	1.0	2	1	1	3.9	3.9
S-2-15	fine sand to very coarse sand, trace silt, organics	aggrading bar/ channel deposit	84	0.6	2			5	=>3 and <10
S-2-16	mostly fine to medium sand, debris, some coarse sand, gravels	channel deposit	750	2.5	69	1	2	3.7	4.0
S-3-01	fine sand to coarse sand, some silt, some gravels, little medium size rocks	channel deposit	480	0.5	9	1	2	4.1	4.8
S-3-02	fine sand, some medium to coarse sand, some silt	low terrace deposit	800	1.0	30	1	3	12	17
S-3-03	fine sand to medium sand, trace coarse sand, gravels	terrace/channel deposit	225	0.5	4			5	=>3 and <10
S-3-04	fine to coarse sand, some silt, vegetated along right bank, appears to have been dumped from side of channel	channel deposit	270	0.3	3			5	=>3 and <10
S-3-05	fine sand and silt, trace medium to coarse sand	channel deposit/ low terrace	100	1.0	4	1	2	1.8	2.1
S-3-06	mostly fine sand, trace medium to coarse sand	channel deposit	100	0.5	2			2	<3
S-3-07	mostly fine sand to coarse sand, little silt, some very coarse sand, gravels, small to large stone	aggrading bar	2000	0.8	56	1	2	0.71	0.76

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
S-4-01	medium sand to very coarse sand, gravels, rock, cobble, debris	aggrading bar	75	0.4	1			2	<3
S-4-02	fine sand with silt over medium sand to very coarse sand, gravels, rock	high terrace	192	0.5	3	1	2	0.83	1.1
S-5-01	fine sand, some medium sand, some very coarse sand, gravels, rock	high terrace/ bank deposit	960	0.7	25	1	1	0.76	0.76
S-5-02	fine sand, silt along left bank over rock, gravels	low terrace	30	0.4	0	1	1	4.5	4.5
S-5-03	silt and fine sand over fine sand, trace medium sand	high terrace/ bank deposit	315	0.8	9	1	2	3.7	5.8
S-5-04	fine sand to coarse sand up high, medium to very coarse sand, gravels, rock, stone	low to high terrace/ channel deposit	2250	3.0	250	2	3	1.8	1.9
S-5-05	medium sand to very coarse sand, gravels, rock	aggrading bar	2600	1.5	144	1	2	1.5	1.9
S-5-06	fine sand to very coarse sand, gravels, some silt, organic matter, leaves	aggrading bar/ channel deposit	330	0.5	6	1	2	2.5	2.7
S-5-07	mostly gravel, rock over some coarse sand to very coarse sand	aggrading bar/ channel deposit	1920	0.2	14			2	<3
S-5-08A	medium to very coarse sand, gravels, rock	aggrading bar	735	0.6	16			2	<3
S-5-08B	medium sand to very coarse sand, gravels, rock		900	0.4	13			2	<3
S-5-09	medium to very coarse sand, gravels, rock 1"-6"	aggrading bar	1350	0.5	25			2	<3

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
S-5-10	medium sand to very coarse sand, gravels, rock, cobble	aggrading bar/ low terrace	500	0.7	13			2	<3
PECON-020	Standalone sample location		50	1.0	2	1	1	0.75	0.75
S-5-11A	fine sand over coarse sand to very coarse sand, gravels	sand mound	96	4.0	14			2	<3
S-5-11B	fine sand over coarse sand to very coarse sand, gravels	sand mound	96	4.0	14			2	<3
FE2-001-A	Standalone sample location		50	1.0	2	1	1	0.90	0.90
CA-25-9999-90	Standalone sample location		50	1.0	2	1	2	5.9	11
S-5-12A	medium sand to very coarse sand, gravel	aggrading bar	240	1.0	9			5	=>3 and <10
FE2-001-C	Standalone sample location		50	1.0	2	1	1	2.5	2.5
S-5-12B	medium sand to very coarse sand, gravel	aggrading bar	175	1.0	6			2	<3
S-5-13	fine sand to very coarse sand, gravels, rock, few cobbles	aggrading bar/ low terrace	3300	0.9	110	1	1	1.3	1.3
S-5-14	coarse sand to very coarse sand, gravel; fine sand some medium sand on terrace; medium to very coarse sand, gravels/ rock on aggrading bar	aggrading bar/ low terrace	7800	1.5	433	2	4	1.4	1.6
PCWaste-004-B	Standalone sample location		50	1.0	2	1	1	1.2	1.2

Table 17. Summary of Snow Creek Deposits

Location	Predominant Sediment Type(s)	Depostional Environment	Area (sf)	Depth to Refusal (ft)	Volume (cy)	Cores Analyzed (n)	Samples (n)	Mean PCB (mg/kg)	Maximum PCB (mg/kg)
S-5-15	coarse to very coarse sand, gravels, rock, small cobble; low terrace has fine sand over small cobble	aggrading bar/ low terrace	3120	0.5	58			2	<3
S-5-16	fine sand to very coarse sand, gravel, rock	aggrading bar	3750	0.5	69			2	<3
S-5-17	coarse sand to very coarse sand, gravel, rock	aggrading bar	3000	0.5	56			2	<3
S-5-18	coarse sand to very coarse sand, gravel, rock	aggrading bar	3000	0.5	56			2	<3
S-5-19	medium sand to very coarse sand, gravel, rock	aggrading bar	3000	0.8	89			2	<3
S-5-20	coarse sand to very coarse sand, gravel, rock	aggrading bar	1000	0.6	22			2	<3
S-5-21	fine sand to very coarse sand, gravel	aggrading bar	175	0.9	6			2	<3
S-5-22	fine sand to very coarse sand, gravel	aggrading bar	1200	0.8	36			2	<3
S-5-23	coarse sand to very coarse sand, gravel, rock	aggrading bar	150	1.2	7			2	<3
S-5-24	medium to very coarse sand, gravel	channel deposit	240	2.0	18	1	2	1.2	1.2
S-5-25	fine sand to coarse sand, little gravel	aggrading bar/ sand bar	150	0.9	5			2	<3

Notes:

Shading (yellow)	Indicates an estimated concentration based on spatial location.
Shading (green)	Indicates sample was not collected as part of the deposit characterization program and areas, depths, and volumes are an estimate.

cy: cubic yards
ft: feet
mg/kg: milligram(s) per kilogram
n: sample size
PCB: polychlorinated biphenyl
sf: square feet

Table 18. Remedial Alternatives for Snow Creek Sediment and Creek Banks

Considerations: **a) goal 3 mg/kg** **b) goal 1 mg/kg**	**SED-1 No Action**	**SED-2 a) Combination Excavate, Onsite and Offsite Disposal, and Monitored Natural Attenuation (MNA)**	**SED-3 a) and b) Excavate and Onsite and Offsite Disposal**	**SED-4 a) and b) Excavate and Offsite Disposal**
Excavation[1, 2]	None.	Excavate 2300 CY of sediment with PCBs > 10 mg/kg.	Excavate a) 2500 CY sediment with PCBs > 3 mg/kg or b) excavate 4000 CY with PCBs > 1 mg/kg.	Excavate a) 2500 CY sediment with PCBs > 3 mg/kg or b) excavate 4000 CY with PCBs > 1 mg/kg.
Covers	None.	Cover from natural attenuation of sediment in Snow Creek System.	None.	None.
Exceptions	None.	Where structural stability prevents complete removal.		
Relocation	None.	No temporary or permanent relocation anticipated.		
Disposal	None.	Dispose sediment with PCBs < 50 mg/kg onsite (84%) and dispose sediment with PCBs ≥ 50 mg/kg offsite (16%).	Dispose sediment with PCBs < 50 mg/kg onsite (85%) and dispose sediment with PCBs ≥ 50 mg/kg offsite (15%).	All sediment disposed offsite.
Treatment	None.	As needed to dewater and stabilize sediment for transport.		
Re-vegetation	None.	Re-vegetate banks as needed to prevent erosion / stabilize 13,800 square feet of banks.		
Institutional Controls	None.	Work with county and Cities of Anniston and Oxford to protect the sediment and bank remedy.		
Monitoring and Maintenance	None.	Monitor and maintain banks where needed; monitor natural sedimentation until 3 mg/kg maintained; and monitor sediment to ensure recontamination not occurring.	Monitor and maintain banks where needed; monitor sediment to ensure recontamination not occurring	Monitor and maintain banks where needed; monitor sediment to ensure recontamination not occurring
Cost Estimate	$0	a) $2,700,000 (3 mg/kg)	a) $2,900,000 (3 mg/kg) b) $4,100,000 (1 mg/kg)	a) $3,100,000 (3 mg/kg) b) $4,500,000 (1 mg/kg)
Timeframe	None.	Construction 5 months; Monitoring of natural attenuation and effectiveness evaluated every 5 years.	Construction 5 months. Effectiveness evaluated every 5 years.	Construction 5 months. Effectiveness evaluated every 5 years.

[1] The volume of sediment in the Highway 202 culverts dominates the overall removal volume (1,600 cubic yards).
[2] There were only two sediment deposits identified as candidate remedial areas based on the exceedance of non-PCB PRGs. Sediment deposit S-5-04 is a candidate remedial area as the PRG for manganese is exceeded (estimated at 250 CY). The sediment deposit associated with sample PECON-020 is also a candidate remedial area for sediment as the PRGs for chromium, lead, manganese, and nickel are exceeded (estimated at 2 CY).

Table 19. Comparative Analysis of Remedial Alternatives for Residential Soil

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume by Treatment	Short-Term Effectiveness	Implementability	Cost in millions ($M)
RS-1	No Action	Does not provide protection of human health and the environment where removals have not been conducted	Not Evaluated Further					0
RS-2	Complete Non-Time-Critical Removal and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term provided subsurface residuals are not exposed through erosion and structures remain in place	Does not include treatment, would not reduce toxicity, mobility, or volume	Short-term impacts similar to previous removals and manageable	Implementable	7.3
RS-3	Excavate PCBs ≥ 1 mg/kg at All Depths and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term provided structures remain in place	Does not include treatment, would not reduce toxicity, mobility, or volume	Additional short-term impacts as compared to the other alternatives including impacts to properties where surface soil removals previously occurred	Implementable	15.7

ARAR: applicable or relevant and appropriate requirement
PCB: polychlorinated biphenyl
RS: Residential Soil

Table 20. Comparative Analysis of Remedial Alternatives for Special Use Properties

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume by Treatment	Short-Term Effectiveness	Implementability	Cost in millions ($M)
SU-1	No Action	Does not provide protection where removals have not been conducted	Not Evaluated Further					0
SU-2	Excavate Low Activity Areas to Non-Residential Goal and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over longterm provided activity areas don't change, erosion does not expose PCB waste, and structures remain in place	Does not include treatment, would not reduce toxicity, mobility, or volume	Minimal additional impacts	Implementable	0.5
SU-3	Excavate Low Activity Areas to Residential Goal and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over longterm provided erosion does not expose PCB waste and structures remain in place	Does not include treatment, would not reduce toxicity, mobility, or volume	Short-term impacts similar to previous removals and manageable	Implementable	3.1
SU-4	Excavate PCBs ≥ 1 mg/kg in High and Low Activity Areas and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term provided structures remain in place	Does not include treatment, would not reduce toxicity, mobility, or volume	Additional short-term impacts as compared to the other alternative including impacts where surface soil removals previously occurred	Implementable	3.9

ARAR: applicable or relevant and appropriate requirement

Table 21. Comparative Analysis of Remedial Alternatives for Interim Measures

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume	Short-Term Effectiveness	Implementability	Cost in millions ($M)
IM-1	No Action	Not Evaluated Further	-	-	-	-	-	0
IM-2	Expand Existing IMs to Meet Non-Residential Goals; Excavate any PTW found within IMs if Leaching to Groundwater	Provides protection of human health and the environment	Compliant with ARARs	Effective and permanent as long as caps and covers remain in place	Does not include treatment to reduce toxicity, mobility, or volume	Short-term impacts similar to other construction conducted for the Site	Implementable	2.6
IM-3	Expand Existing IMs to Meet Non-Residential Goals; Excavate Potential PTW at Railroad (RR) and McDaniel; and Excavate any PTW found within IMs if Leaching to Groundwater	Provides protection of human health and the environment	Compliant with ARARs	Effective and permanent as long as caps and covers remain in place; provide permanent fix for contaminated soil at RR and McDaniel	Does not include treatment to reduce toxicity, mobility, or volume	Short-term concerns with excavation of high-concentration materials in a drainage way	Implementable	2.6
IM-4	Excavate around Existing IMs to Meet Non-Residential Goals; Excavate any PTW found within IMs if Leaching to Groundwater	Provides protection of human health and the environment	Compliant with ARARs	Effective and permanent as long as caps and covers remain in place; provide permanent fix for PCBs outside current IMs	Does not include treatment to reduce toxicity, mobility, or volume	Short-term concerns with excavation of high-concentration materials in a drainage way	Implementable; May be difficult to excavate adjacent to an active railroad line	4.3

ARAR: applicable or relevant and appropriate requirement
IM: Interim Measure
PTW: principal threat waste

Table 22. Comparative Analysis of Remedial Alternatives for Soil in Dredge Spoil Piles

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume by Treatment	Short-Term Effectiveness	Implementability	Cost in millions ($M)
DSP-1	No Action	Does not protect human health or Snow Creek Sediment.	Not Evaluated Further					0
DSP-2	Excavate to Non-Residential Goal and Offsite Disposal	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment to reduce toxicity, mobility, or volume.	Manageable. Truck traffic more disruptive than DSP-3.	Implementable	0.9
DSP-3	Excavate to Non-Residential Goal and Onsite Disposal	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment to reduce toxicity, mobility, or volume.	Manageable. Least long distance truck traffic.	Implementable	0.5
DSP-4	Excavate All Dredge Spoil Piles and Offsite Disposal	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment to reduce toxicity, mobility, or volume.	Manageable. More area disrupted than DSP-2 and DSP-3. Higher level of truck traffic for long distance.	Implementable	1.4
DSP-5	Excavate All Dredge Spoil Piles and Onsite Disposal	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment, to reduce toxicity, mobility, or volume.	Manageable. More area disrupted than DSP-2 and DSP-3. Highest level of truck traffic for long distance.	Implementable More access needed than DSP-2 and DSP-3	0.7

ARAR: Applicable or Relevant and Appropriate Requirement
DSP: Dredge Spoil Piles

Table 23. Comparative Analysis of Remedial Alternatives for Unapproved Waste Disposal Areas

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume by Treatment	Short-Term Effectiveness	Implementability	Cost in millions ($M)
UWDA-1	No Action	Not protective of human health or the environment	Not Evaluated Further					0
UWDA-2	Soil Cap and Marker Layer	Provides protection of human health and the environment if cap maintained	Complies with ARARs	Effective but not as permanent over the long term as other alternatives	Does not include treatment to reduce toxicity, mobility or volume	Short-term impacts from construction similar to other construction activities conducted for the Site	Implementable	1.6
UWDA-3	RCRA Subtitle- D Cap	Provides protection of human health and the environment if cap maintained	Complies with ARARs	Effective and permanent over the long term if cap remains in place	Does not include treatment to reduce toxicity, mobility or volume	Short-term impacts from construction similar to other construction activities conducted for the Site	Implementable	2.8
UWDA-4	Excavate Waste and Off-Site Disposal	Provides protection of human health and the environment	Complies with ARARs	Effective and most permanent over the long term	Does not include treatment to reduce toxicity, mobility or volume with the possible exception of treatment of metals prior to disposal	Significant short-term impacts; the size and duration would be significantly larger and deeper than other removals conducted elsewhere on the Site	Implementable, but would need significant predesign work, engineering planning, and controls to conduct in a manner that would be safe for the Site, the workers, and the public	41.2

ARAR: applicable or relevant and appropriate requirement
IC: institutional control
O&M: operation and maintenance
RCRA: Resource Conservation and Recovery Act
UWDA: unapproved waste disposal area

Table 24. Comparative Analysis of Remedial Alternatives for Non-Residential Soil

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume by Treatment	Short-Term Effectiveness	Implement-ability	Cost in millions ($M)	
								a) 21 mg/kg	b) 9 mg/kg
NRS-1	No Action	Is not protective of human health or the environment	Not Evaluated Further					0	0
NRS-2	Combination Capping and Excavation; Onsite and Offsite Disposal; and Management of PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent but slightly less so than NRS-3, NRS-4, and NRS-5	No treatment to reduce toxicity, mobility, or volume	Manageable over similar time period as other alternatives	Implement with existing technology	7.9	10.1
NRS-3	Excavate Soil; Onsite and Offsite Disposal; and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term	No treatment to reduce toxicity, mobility, or volume	Manageable over similar time period as other alternatives	Implement with existing technology	10.0	12.7
NRS-4	Excavate; Offsite Disposal; and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term	No treatment to reduce toxicity, mobility, or volume	Manageable over similar time period as other alternatives	Implement with existing technology	10.4	14.6
NRS-5	Excavate, Offsite Treatment of Soil and Manage of PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term	Includes treatment to reduce the toxicity, mobility, and volume of PCBs	Manageable over similar time period as other alternatives, with the exception of long-distance trucking under this alternative	Implement with existing technology but off-site treatment facilities remote and limited	21.0	36.6
NRS-6	Excavate, Onsite Thermal Desorption of Soil and Manage PCB Residuals	Provides protection of human health and the environment	Complies with ARARs	Effective and permanent over the long term	Includes treatment to reduce the toxicity, mobility, and volume of PCBs	Manageable over similar time period as other alternatives; more community outreach and approvals due to the potential for emissions	Implement with existing technology, assuming that a thermal treatment vendor can meet operating requirements	19.1	46.2

ARAR: applicable or relevant and appropriate requirement

Table 25. Comparative Analysis of Remedial Alternatives for Groundwater at T-11

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity Mobility and Volume by Treatment	Short-Term Effectiveness	Implement-ability	Cost in millions ($M)
GW-1	No Action	Is not protective	Not Evaluated Further	-	-	-	-	0
GW-2	Excavate High Concentrations and Surface Soil, Offsite Disposal, Soil Cap and Monitor Groundwater	Provides protection of human health and the environment	Will comply with ARARs in time	Effective over the long term and permanent if cap is not disturbed and leaching no longer occurs	Does not include treatment to reduce toxicity, mobility, or volume	Impacts associated with construction are manageable	Can be implemented with available resources recognizing the challenges in working in this isolated area	2.2
GW-3	Excavate of High Conc. and Surface Soil, Offsite Disposal, Low-permeability Cap, Monitor Groundwater and Operations and Maintenance (O&M)	Provides protection of human health and the environment	Will comply with ARARs in time	Effective over the long term and permanent if cap is not disturbed	Does not include treatment to reduce toxicity, mobility, or volume	Impacts associated with construction are manageable	Can be implemented with available resources recognizing the challenges in working in this isolated area	3.3
GW-4	Excavate High Concentrations and Surface Soil, Offsite Disposal, Low-permeability Cap, Pump and Treat Groundwater, Monitor Groundwater and O&M	Provides protection of human health and the environment	Will comply with ARARs in time	Effective over the long term and permanent	Reduces volume and toxicity through the treatment of groundwater but not principal threat waste in soil	Impacts associated with construction are manageable	Can be implemented with available resources recognizing the challenges in working in this isolated area	4.2

Table 26. Comparative Analysis of Remedial Alternatives for Snow Creek Sediment and Creek Banks

Alternative ID	Description	Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and/or Volume	Short-Term Effectiveness	Implementability	Cost in millions ($M)	
								a) 3mg/kg	b) 1mg/kg
SED-1	No Action	Is not protective	Not Evaluated Further	-	-	-	-	0	
SED-2	Combination Excavate, Onsite and Offsite Disposal, and Monitored Natural Attenuation	Provides protection of human health and the environment	Complies with ARARs including the AWQC	Effective over the long term and permanent; will take longer to reach sediment and surface water goals	Does not include treatment to reduce toxicity, mobility, or volume	Fewer impacts than SED-3 or SED-4 based on less expansive sediment removal	Some implementability challenges exist, especially for sediment in the Highway 202 culverts	2.7	-
SED-3	Excavate and Onsite and Offsite Disposal	Provides protection of human health and the environment	Complies with ARARs including the AWQC	Effective over the long term and permanent	Does not include treatment to reduce toxicity, mobility, or volume	Potential impacts during construction can be managed	Some implementability challenges exist, especially for sediment in the Highway 202 culverts	2.9	4.1
SED-4	Excavation and Off-Site Disposal	Provides protection of human health and the environment	Complies with ARARs including the AWQC	Effective over the long term and permanent	Does not include treatment to reduce toxicity, mobility, or volume	Potential impacts during construction can be managed	Some implementability challenges exist, especially for sediment in the Highway 202 culverts	3.1	4.5

ARAR: applicable or relevant and appropriate requirement
MNR: monitored natural recovery