
U.S. Army Corps of Engineers Fort Worth District

Final Lake Belton and Lake Waco Delta Areas
Field Sampling Plan

Bosque and Leon River Watersheds Study

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MWH
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ACRONYMS

BRA	Brazos River Authority
°C	degrees Celsius
CQC	contractor quality control
CSM	conceptual site model
DOT	Department of Transportation
DQCR	Daily Quality Control Report
DQOs	data quality objectives
FSP	field sampling plan
GIS	graphical information systems
GPS	global positioning system
IDW	investigation-derived waste
MS/MSD	matrix spike/matrix spike duplicate
MWH	MWH Americas, Inc.
NWIRP	Naval Weapons Industrial Reserve Plant
PPE	personal protective equipment
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SSHP	site safety and health plan
TIEHH	The Institute of Environmental and Human Health at Texas Tech University
USACE	U.S. Army Corps of Engineers Fort Worth District
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

This *Lake Belton and Lake Waco Delta Areas Field Sampling Plan* (FSP) is a component of the *Sampling and Analysis Plan - Bosque and Leon River Watersheds Study* (SAP; MWH Americas, Inc. 2002a). The SAP includes a quality assurance project plan (QAPP), a site safety and health plan (SSHP), and task-specific FSPs. This and other task-specific FSPs are prepared as addenda to the overall SAP to describe the project requirements for the field investigations associated with the Bosque and Leon River Watersheds Study.

This FSP was prepared for the U.S. Army Corps of Engineers Fort Worth District (USACE) by its environmental contractor, MWH Americas, Inc. (MWH), through authorization provided in contract DACW57-97-D-004, Task Order DY01, Modification No. 003. This FSP has been prepared in accordance with the USACE Statement of Work dated May 7, 2002, and the *Requirements for the Preparation of Sampling and Analysis Plans* (EM 200-1-3; USACE, 2001).

1.1 PROJECT DESCRIPTION AND BACKGROUND

The purpose of the USACE Bosque and Leon River Watersheds Study is to assess the impact of perchlorate releases associated with the former Naval Weapons Industrial Reserve Plant at McGregor, Texas (NWIRP McGregor). Specifically, the USACE study is assessing the impact of perchlorate releases on Lake Belton and Lake Waco water quality, and the potential human and environmental exposure to perchlorate in the Lake Belton and Lake Waco study area. NWIRP McGregor is located approximately 20 miles southwest of Waco, Texas, as shown on Figure 1-1.

A conceptual site model (CSM) was prepared to provide a preliminary conceptual understanding of potential human and environmental exposures to perchlorate in the Lake Belton and Lake Waco study area (MWH, 2002b). The CSM identified data gaps in the current understanding of perchlorate migration and exposure within the study area, and identified additional investigation activities aimed at filling such data gaps. Sampling the Lake Belton and Lake Waco delta areas is one component of the field investigation activities proposed to fill certain data gaps identified in the CSM.

Please refer to the SAP for a historical summary of NWIRP McGregor, a description of the integrated multi-disciplinary project team, a description of the USACE perchlorate study area, the environmental setting, and a brief summary of previous environmental investigations in the study area. Details regarding the historical use, and investigation history at former NWIRP McGregor also are included in the *Final Conceptual Site Model Bosque and Leon River Watersheds Study* (MWH, 2002b).

1.2 FIELD SAMPLING PLAN SCOPE AND OBJECTIVES

This FSP describes the field activities to be performed and defines the procedures and methods to be used to collect field measurements and samples during the Lake Belton and Lake Waco Delta Areas field program. The elements of the field program include:

- Establishing a 20-point sampling grid on both the Lake Belton and Lake Waco delta areas using global positioning system (GPS).
- Collecting surface water and sediment pore water samples at each grid location on Lake Belton and Lake Waco.
- Collecting algae samples at 10 of the grid locations within the Lake Belton delta area.
- Collecting surface water samples at the Heather Run and Ridgewood Golf Course intakes from Lake Waco.

Please note that during the course of the Bosque and Leon River Watersheds Study, the project team may determine that additional surface water, sediment pore water, and algae samples are required to supplement the data collected during this Delta Area field program. As a result, the procedures and protocols described in this FSP may be referenced in the event the project team determines additional sampling is necessary to supplement the data obtained from this and other Bosque and Leon River Watersheds Study field programs. In addition, please note that sediment samples will not be collected as part of the Delta Areas field program. However, sediment sampling procedures are included in Section 2.0 of this FSP for future reference in the event the project team determines sediment sampling is necessary to supplement the data obtained from other Bosque and Leon River Watersheds Study field programs.

1.3 DOCUMENT ORGANIZATION

The remainder of this FSP consists of:

- Section 2.0 Field Program. Includes the rationale and data quality objectives (DQOs), sampling equipment and procedures, and all other operations associated with the field sampling program.
- Section 3.0 Health and Safety Program. References the site-specific SSHP component of the SAP. It includes all personal protective equipment (PPE) and safety precautions applicable to the field activities described in this FSP.

- Section 4.0 Quality Control. Includes the quality control that is specific to this field program including field quality assurance/quality control (QA/QC) samples and data validation requirements.

Please note that as described above, the SAP includes the project-specific QAPP and SSHP that should be referenced for quality assurance and health and safety procedures as they relate to the overall study.

2.0 FIELD PROGRAM

This section describes the rationale and DQOs; field documentation procedures; and sampling locations, rationale, equipment, and procedures for the Lake Belton and Lake Waco Delta Areas field program.

2.1 QUALITY ASSURANCE PROJECT PLAN

All data for this project will be collected in accordance with the QAPP, which along with the SSHP and this FSP, is a component of the SAP (MWH, 2002a). The QAPP presents the QA/QC protocols that will be used to meet the DQOs of this field program. The QAPP will be referenced throughout this document to support the sampling techniques and data collection procedures presented herein. The types of data to be collected during this field program and their intended uses are presented in Table 2-1.

2.2 DATA QUALITY OBJECTIVES

DQOs have been developed for each field task in this field program using the seven-step process as outlined in the *Guidance for the Data Quality Objectives Process, EPA QA/G-4* (USEPA, 1994a) and additional guidance as provided in *Data Quality Objectives for Hazardous Waste Site Investigations, EPA QA/G-4HW* (USEPA, 2000). The steps in this process are:

- State the Problem
- Identify the Decision
- Identify the Inputs to the Decision
- Define the Boundaries of the Study
- Develop Decision Rules
- Specify Tolerable Limits on Decision Errors
- Optimize the Design for Obtaining Data.

The DQOs developed for the Lake Belton and Lake Waco Delta Areas field program (including Lake Belton and Lake Waco Delta Areas surface water and sediment pore water sampling, Lake Belton algae sampling, and surface water sampling at the Heather Run and Ridgewood Golf Course intakes from Lake Waco) are presented in Table 2-2.

2.3 FIELD DOCUMENTATION

All information pertinent to the field activities described herein will be entered directly into a field logbook and on project-specific field forms. The field logbook will be maintained throughout all field activities and will consist of a weatherproof, bound, survey-type book, with non-removable, numbered pages.

All data generated during the investigation and any deviations from this work plan will be recorded in detail in the field logbook. At a minimum, the date, weather conditions, personnel on site, type of activities being performed, samples collected, and any unusual conditions encountered during the investigation will be recorded in the logbook. Corrections to erroneous data will be made by crossing a single line through the entry and entering the correct information. Unused portions of the logbook pages will be crossed out, signed, and dated at the end of each work day. Language used will be objective, factual, and free of personal opinions. Hypotheses for observed phenomena may be recorded; however, they must be clearly indicated as such and only relate to the subject observation. The field forms that are applicable to this project include Daily Quality Control Reports, Tailgate Safety Meeting Forms, and Chain-of-Custody Records. Field forms will become part of the project record. Sample field forms are provided in Appendix A of this work plan.

In addition to written records, photographs also will be taken as necessary to supplement written descriptions of field activities entered in the field logbook and on field forms. Photographs will be included in project reports when appropriate, and will be stored with the permanent project files.

2.4 SURFACE WATER SAMPLING

Surface water samples will be collected from grid locations located in the delta areas of both Lake Belton and Lake Waco (refer to Figures 2-1 and 2-2), and from the Heather Run and Ridgewood Golf Course intake structures in Lake Waco. This section describes the locations and rationale, equipment and procedures, and sample frequency, designation, and analysis for the surface water samples collected during this field program.

2.4.1 Locations and Rationale

Delta Area Grid Sampling. Surface water samples will be collected to evaluate the presence and distribution of perchlorate in the Lake Belton and Lake Waco delta areas. The samples will be collected from the delta areas because they receive direct discharge from the Bosque and Leon River watersheds. As described in Section 2.0 of the SAP, NWIRP McGregor straddles the boundary of these two watersheds. As a result, potentially contaminated stormwater, surface water, and groundwater flow from the NWIRP McGregor site ultimately discharges into the delta areas of Lake Belton and Lake Waco.

A sampling grid was selected to minimize sample bias and to provide adequate coverage of the relatively large delta areas. A 20-point sample grid will be established at each delta area as shown on Figures 2-1 and 2-2 using a boat and a GPS instrument. Because the delta areas shown on Figure 2-1 and 2-2 are based on geographic information systems (GIS) information provided by the USACE, and because the actual shorelines of the delta

areas will vary according to when the field activities are conducted, the actual grid locations will be established by the field team during the field activities. The sampling grid will be established such that it provides uniform coverage of the delta areas. The field team will document the actual GPS coordinates of the sampling locations as described in Section 2.11.

Heather Run and Ridgewood Golf Course Intakes Sampling. Surface water samples will be collected to determine the presence of perchlorate in the Lake Waco water that is used at the Heather Run and Ridgewood Golf Courses. The Brazos River Authority (BRA) will identify the location of the surface water intakes and appropriate sampling locations prior to initiating the sampling activities.

2.4.2 Equipment and Procedures

At the golf course intakes, surface water samples will be collected from near the location of the intake port. At the delta area grid locations, sample depths will depend on whether the lake is thermally stratified at the sample location. Although it is not anticipated that the lakes will be thermally stratified at the sample locations due to the relatively shallow water depths in the delta areas (approximately 5 to 30 feet), temperature profiles will be established prior to collecting the surface water samples. At each grid location, a multi-parameter instrument (e.g., Hydrolab, Horiba, YSI) will be lowered through the water column in order to develop a vertical temperature profile. The multi-parameter instrument will have a minimum of 30 feet of cable to reach the deepest anticipated lake bottom in the delta areas. The temperature data will be collected at 5 foot increments from the lake surface to the lake bottom and will be recorded directly onto a copy of the Thermal Profile Graph provided in Appendix A. The completed graph will be compared with Figure 2-3, which shows a thermal profile typical of a thermally stratified lake. If the thermal profile indicates the lake is thermally stratified (i.e., clear evidence of an epilimnion, thermocline, and hypolimnion as shown on Figure 2-3), then surface water samples will be collected from mid-depth in the epilimnion (upper layer) and from mid-depth of the hypolimnion (lower layer). If the thermal profile indicates the lake is not stratified, one surface water sample will be collected midway between the lake surface and the lake bottom.

Each surface water sample (whether from an intake structure or from a grid location) will be a discrete “grab” type sample collected with a thief sampler (e.g., Kemmerer, Van Dorn, Alpha, or a double check-valve bailer) as shown on Figure 2-4. Thief samplers consist of a cylinder with stoppers or check valves on each end. The samplers allow water to pass through the sample cylinder as it is lowered to the desired sampling depth. The samplers are then activated to close the stoppers and retain the sample prior to retrieval. The Kemmerer, Van Dorn, and Alpha samplers are activated by sending a “messenger” down the retrieval line to close the stoppers. The double check-valve bailer is activated by raising the bailer, which forces the check valves at each end of the cylinder to close.

Upon retrieval of the sampler, the sample will be transferred to the appropriate sample containers. If a Kemmerer, Van Dorn, or Alpha sampler is used, one of the stoppers will be opened and the sample carefully poured into the sample container. If a bailer is used, the sample will be transferred to the sample container using the discharge port. Sample containers and preservation requirements for the surface water samples are presented in Table 2-3. The samples will be labeled, handled, and shipped according to the procedures described in Section 2.8.

The following field observations and water quality measurements also will be collected at each sampling location.

Field Observations:

- Cloud cover
- Wind velocity
- Secchi Disk transparency
- Water color
- Aquatic vegetation in percent cover (qualitative)

Water Quality Measurements (at each sampled location and depth):

- Temperature
- Dissolved oxygen
- Specific conductance
- pH
- Salinity
- Dissolved oxygen percent saturation.

The water quality measurements will be obtained by lowering the probe of the multi-parameter instrument to the sampled depth after the surface water samples are collected.

Quality Assurance/Quality Control Sample Collection. The quality assurance/quality control (QA/QC) samples that will be collected during the Delta Areas field program include blind duplicate samples, matrix spike/matrix spike duplicate (MD/MSD) samples, and equipment blank samples. A discussion of the QA/QC sample types and frequencies is presented in Section 4.2. The procedures for collecting the required QA/QC samples are discussed below.

The surface water blind duplicate samples (i.e., duplicate samples submitted to the laboratory with fictional sample identifications) will be collected by alternately filling two sets of sample containers; one for the environmental sample and one for the blind duplicate sample. Similarly, when surface water MS/MSD samples are required, the samples will be collected by alternately filling three sets of sample containers; one for the environmental sample, one for the MS, and one for the MSD. The equipment blanks will

consist of samples of the final decontamination rinse water. After the thief sampler is decontaminated as described in Section 2.9, the final decontamination rinse water will be collected into a sample container and labeled as an equipment blank.

2.4.3 Sample Frequency, Designation, and Analysis

Sample Frequency. Surface water samples will be collected from each of the grid points established on Lake Belton and Lake Waco during a single sampling event. The number of surface water samples to be collected at each grid location will depend on whether the lake is thermally stratified at that location (refer to Section 2.4.1). If the lake is stratified, two surface water samples will be collected at that location; one from mid-depth in the epilimnion (upper layer) and one from mid-depth in the hypolimnion (lower layer). If the lake is not stratified, one surface water sample will be collected midway between the lake surface and the lake bottom at that location.

Surface water samples also will be collected from the Heather Run and Ridgewood Golf Course intake structures. One surface water sample will be collected from each golf course intake structure on a monthly basis for a period of 12 months. Please note that the golf course intake samples will be collected from near the intake structure; therefore the sampling locations are not dependant on lake stratification.

At all sampling locations, blind duplicate and equipment blank samples will be collected at a frequency to represent 10 percent of the environmental samples collected, and MS/MSD samples will be collected at a frequency to represent 5 percent of the environmental samples collected. Table 2-4 lists all samples that will be collected during the Delta Area field program.

Sample Designation. Each surface water sample will be designated with an alphanumeric character string set apart by hyphens. For the samples collected from the delta area grid points, the designation will begin with the lake name abbreviation and grid number (e.g., “LB1” for Lake Belton grid point number 1, “LW1” for Lake Waco grid point number 1, etc.), followed by “SW” to indicate a surface water sample, and finally by the depth the sample was collected. For example, the surface water sample collected from Lake Belton grid point number 1 from 15 feet deep would be designated “LB1-SW-15’ ”.

At the golf course intake structures, the sample designations will be similar except the lake name abbreviation and grid point number will be replaced with the golf course intake number (e.g., “HR” for the Heather Run intake structure and “RW” for the Ridgewood intake structure) and the sample depth will be replaced with the date the sample was collected. For example, the surface water sample collected from the Heather Run Golf Course intake structure on July 3, 2003 would be designated “HR-SW-7-3-03”.

Blind duplicate surface water samples will be designated with a fictitious number beginning with 1001 so the laboratory is unaware the sample is a duplicate. For example,

the first blind duplicate sample would be designated "SW-1001". The field crew will keep careful records of the designations given to the blind duplicate samples and their corresponding environmental sample so that the analytical results can be correlated when they are received. Each MS/MSD sample will have the same designation as its associated environmental sample except that "MS" or "MSD" will follow the sample designation (e.g., "LB1-SW-15' MS" and "LB1-SW-15' MSD"). Each equipment blank sample will have the same designation as its associated sampling location except that "EB" will follow the sample designation (e.g., "LB1-SW-15'-EB").

Sample Analysis. All surface water samples will be analyzed for perchlorate by USEPA Method 314.0. The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska will perform all sample analyses. The USACE laboratory will conform to the analytical method requirements, analytical quality control requirements, instrument calibration frequency, and the laboratory quality control requirements presented in the QAPP. A discussion of sample labeling, chain-of-custody, handling and shipping is presented in Section 2.8.

2.5 SEDIMENT PORE WATER SAMPLING

2.5.1 Locations and Rationale

Sediment pore water samples will be collected to evaluate the presence and distribution of perchlorate in the Lake Belton and Lake Waco delta areas. The sediment pore water samples will be collected from the grid locations established on the delta areas as discussed in Section 2.4.1. Sediment pore water samples will not be collected from the Heather Run and Ridgewood Golf Course intake structures.

2.5.2 Equipment and Procedures

Sediment pore water samples will be collected using diffusion samplers (also known as peepers) as depicted on Figure 2-5. The Institute of Environmental and Human Health at Texas Tech University (TIEHH) will construct the peepers that will be used for this project prior to mobilizing to the field. The peepers will consist of a stainless steel or Teflon drive stake with three columns and three rows of diffusion chambers or sample ports bored into the stake. The diffusion chambers will be filled with de-ionized water and covered with two Teflon membranes (one 8 micrometers [μm] and the other 0.2 μm) to allow the sediment pore water to diffuse into the chambers while keeping the sediments out. The Teflon membranes are held in place with a perforated plate that screws into the drive stake.

The sediment pore water samples are obtained by pushing the peepers into the lake bottom sediments and allowing the de-ionized water in the diffusion chambers to equilibrate with the adjacent sediment pore water for a period of two weeks. The peepers are then retrieved and the water in the diffusion chambers is extracted with a syringe and transferred to the appropriate sample container. For the purposes of this project, the diffusion chambers will be spaced along the drive stake such that samples are obtained just below the lake water/

sediment interface, 1 foot below the lake water/sediment interface, and 2 feet below the lake water/sediment interface. Each diffusion chamber will be capable of holding a minimum of 20 milliliters of de-ionized water, which will provide an adequate volume of water for the laboratory to perform the perchlorate analyses.

The peepers will be installed by attaching a rope to the top of the peeper and threading the rope through hollow extension pipes that have a diameter slightly smaller than the drive stake of the peeper. Tension will be maintained on the rope to keep the peeper in contact with the lead extension pipe. The extension pipes will be approximately 5 feet in length and will either have threaded ends or quick-connects to allow additional lengths of pipe to be attached as the sampler is lowered through the water column. Once resistance is felt as a result of the peeper contacting the lake bottom, the peeper will be pushed or driven with a slide hammer until the bottom diffusion chamber reaches the desired sampling depth (i.e., 2 feet below the sediment/lake water interface). It is anticipated that the top of the sediments is likely to be very soft or even colloidal in nature. However, if the bottom diffusion chamber is set 2 feet below when resistance is first observed, it is likely to result in the proper placement of the upper diffusion chamber (i.e., just below the colloidal sediment zone). It may be necessary for the field team to test the depth to sediment at each sample location with the extension pipes or a weighted probe prior to actually setting the peeper to assure that the samplers can be properly installed.

After the peepers are pushed or driven to the desired depth, the extension pipes will be retracted leaving the peeper in place. The rope extending from the top of the drive stake will be attached to a buoy to allow for locating and retrieving the peeper after the two-week equilibration time has elapsed. After the peepers are retrieved, the samples will be extracted from the diffusion chambers with a clean syringe. Sample containers and preservation requirements for the surface water samples are presented in Table 2-3. The samples will be labeled, handled, and shipped according to the procedures described in Section 2.8.

Quality Assurance/Quality Control Sample Collection. As discussed above, the peepers will be constructed with three columns of diffusion chambers to allow blind duplicate and MS/MSD samples to be collected when scheduled (refer to Figure 2-5). When only an environmental sample is required, the sample will be obtained from one of the three adjacent chambers and the other two chambers will be available as backup. The sediment pore water blind duplicate samples will be collected by filling the environmental sample container and the blind duplicate sample container from the pore water obtained from two adjacent diffusion chambers with the third chamber available as backup. When an MS/MSD samples are required, the samples will be collected by filling the environmental sample container, the MS sample container, and the MSD sample container from three adjacent diffusion chambers.

Because the peepers will be constructed for this project using new materials, they will not require decontamination prior to their first use. Equipment blank samples only will be required if the peepers are reused. Following routine decontamination of the peeper as

described in Section 2.9, the equipment blank sample will be obtained by collecting the final rinse water into a sample container and labeling the sample as an equipment blank.

2.5.3 Sample Frequency, Designation, and Analysis

Sample Frequency. At each Lake Belton and Lake Waco delta area grid location, a total of three sediment pore water samples will be collected; one from just below the lake water/sediment interface, one from 1 foot below the lake water/sediment interface, and one from 2 feet below the lake water/sediment interface.

Blind duplicate and equipment blank samples will be collected at a frequency to represent 10 percent of the environmental samples collected, and MS/MSD samples will be collected at a frequency to represent 5 percent of the environmental samples collected. Table 2-4 list all samples that will be collected during the Delta Area field program.

Sample Designation. The sediment pore water samples will be designated similarly to the surface water samples collected at the grid locations except that the lake name abbreviation and grid point number will be followed by SPW to indicate a sediment pore water sample, and finally the depth from which the sample was obtained. For example the sediment pore water sample collected from just below the lake water/sediment interface at Lake Waco grid point number 1 would be designated “LW1-SPW-0’ ”.

Blind duplicate sediment pore water samples will be designated with a fictitious number beginning with 1001 so the laboratory is unaware the sample is a duplicate. For example, the first sediment pore water blind duplicate sample would be designated “SPW-1001”. The field crew will keep careful records of the designations given to the blind duplicate samples and their corresponding environmental sample so that the analytical results can be correlated when they are received. Each MS/MSD sample will have the same designation as its associated environmental sample except that “MS” or “MSD” will follow the sample designation (e.g., “LW1-SPW-0’ MS” and “LW1-SPW-0’ MSD”). Each equipment blank sample will have the same designation as its associated sampling location except that “EB” will follow the sample designation (e.g., “LW1-SPW-0’-EB”).

Sample Analysis. All sediment pore water samples will be analyzed for perchlorate by USEPA Method 314.0. The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska will perform all sample analyses. The USACE laboratory will conform to the analytical method requirements, analytical quality control requirements, instrument calibration frequency, and the laboratory quality control requirements presented in the QAPP. A discussion of sample labeling, chain-of-custody, handling and shipping is presented in Section 2.8.

2.6 ALGAE SAMPLING

2.6.1 Locations and Rationale

Algae sampling will be performed in the Lake Belton delta area to assess if algae are uptaking perchlorate, and if so, is there potential for algal blooms to be a mechanism to spread contamination through the lake. The algae sampling will be limited to Lake Belton (i.e., algae sampling will not be conducted in Lake Waco at this time) because it is assumed that Lake Belton is thermally stratified whereas Lake Waco is assumed to be well mixed.

Algae samples will be collected from 10 of the grid points established in the Lake Belton delta area for the surface water and sediment pore water sampling activities described in Section 2.4 and Section 2.5. The actual grid locations will be selected by the field crew and will be based on field conditions at the time of sampling. The field crew will select 10 grid points that provide a relatively even distribution across the delta area and locations that have an adequate water column to collect a sufficient volume of algae as described below. The field team will document the actual GPS coordinates of the sampling locations as described in Section 2.11.

2.6.2 Equipment and Procedures

Bulk algae samples will be collected using a plankton net (e.g., Student or Wisconsin Net) as shown on Figure 2-6. At each selected grid location, the plankton net will be lowered to approximately 3 feet above the lake bottom and raised to the surface to capture algae in the sampler. Upon retrieval, the net will be rinsed from the outside with distilled water to wash any algae that may be adhering to the net into the cup at the bottom of the sampler. The water will be allowed to drain from the cup and the algae will be transferred to the appropriate sample container. It may be necessary to repeat the sampling procedure in order to obtain a sufficient volume of algae for the laboratory to perform the perchlorate analysis (i.e., 100 milliliters). Sample containers and preservation requirements for the algae samples are presented in Table 2-3. The samples will be labeled, handled, and shipped according to the procedures described in Section 2.8.

Quality Assurance/Quality Control Sample Collection. The algae blind duplicate samples will be collected by alternately filling two sets of sample containers; one for the environmental sample and one for the blind duplicate sample. Similarly, when algae MS/MSD samples are required, the samples will be collected by alternately filling three sets of sample containers; one for the environmental sample, one for the MS, and one for the MSD. The equipment blanks will consist of samples of the final decontamination rinse water. After the plankton net sampler is decontaminated as described in Section 2.9, the final decontamination rinse water will be collected into a sample container and labeled as an equipment blank.

2.6.3 Sample Frequency, Designation, and Analysis

Sample Frequency. The algae samples will be collected when an algal bloom is expected (i.e., during the summer). One algae sample will be collected at each of the 10 selected Lake Belton grid locations as described in Section 2.6.1. Blind duplicate and equipment blank samples will be collected at a frequency to represent 10 percent of the environmental samples collected and MS/MSD samples will be collected at a frequency to represent 5 percent of the environmental samples collected. Table 2-4 list all samples that will be collected during the Delta Area field program.

Sample Designation. The algae samples will be designated similarly to the surface water samples collected at the grid locations except that the lake name abbreviation and grid point number will be followed by AGE to indicate an algae sample. For example, the algae sample collected at Lake Belton grid point number 1 would be designated “LB1-AGE”. Please note that the actual grid locations where the algae samples are collected will be determined in the field as described in Section 2.6.1.

Blind duplicate algae samples will be designated with a fictitious number beginning with 1001 so the laboratory is unaware the sample is a duplicate. For example, the first blind duplicate sample would be designated “AGE-1001”. The field crew will keep careful records of the designations given to the blind duplicate samples and their corresponding environmental sample so that the analytical results can be correlated when they are received. Each MS/MSD sample will have the same designation as its associated environmental sample except that “MS” or “MSD” will follow the sample designation (e.g., “LB1-AGE-MS” and “LB1-AGE-MSD”). Each equipment blank sample will have the same designation as its associated sampling location except that “EB” will follow the sample designation (e.g., “LB1-AGE-EB”).

Sample Analysis. All algae samples will be analyzed for perchlorate by USEPA Method 314.0 modified for tissue analysis. The Institute of Environmental and Human Health at Texas Tech University (TIEHH) will perform all algae sample analyses. The TIEHH laboratory will follow their standard operating procedures for the analytical method requirements, analytical quality control requirements, instrument calibration frequency, and the laboratory quality control requirements (refer to Appendix A of the QAPP). A discussion of sample labeling, chain-of-custody, handling and shipping is presented in Section 2.8.

2.7 SEDIMENT SAMPLING

As discussed in Section 1.2, sediment samples will not be collected during the Delta Areas field program. The following sediment sampling procedures are presented in the event the project team determines sediment sampling is necessary to supplement the data obtained from other Bosque and Leon River Watersheds Study field programs. Additional sediment sampling procedural information is included in MWH SOP-9 Surface Water and Sediment Sampling (located in Appendix B).

2.7.1 Equipment and Procedures

The following equipment may be used to collect sediment samplers:

- Scoop sampler
- Core sampler
- Gravity Core Sampler
- Dredge sampler

The equipment used to collect sediment samples will depend on the depth of water in the stream or lake above the sediment and the type of sample to be collected (e.g., bulk sample or vertical column). A description of the different types of sediment samplers is presented below. Additional information regarding the sediment samplers is contained in MWH SOP-9 Surface Water and Sediment Sampling (located in Appendix B).

Scoop Sampler. A clean stainless steel or plastic scoop may be used to collect bulk sediment samples from shallow water bodies (e.g., the water body can be safely waded or if samples can be collected from shore). If necessary, the scoop sampler can be attached to an extension rod to reach the sediments. The sediments will be transferred from the scoop to the appropriate sample containers and labeled, handled, and shipped according to the procedures described in Section 2.8.

Core Samplers. Core samplers may be used to collect relatively undisturbed vertical columns of sediment. Core samplers are generally constructed of an outer rigid metal tube (core barrel) into which a plastic, brass, stainless-steel or Teflon liner fits with minimal clearance. In shallow wadeable waters, the direct use of the liner without the core barrel is recommended. The use of the liner by itself eliminates the need to decontaminate core barrels, cutting heads, and retainers between samples. In deeper waters, the liner is placed in a core barrel and attached to an extension rod. If necessary the core tip will be equipped with a butterfly valve or a core catcher to retain the sample in the liner when the sampler is retrieved. The core sampler (or liner by itself) is pushed in the sediment to the desired depth and slowly extracted to obtain the sample. Upon retrieval, the liner is removed and capped with a sheet of Teflon held in place by a plastic cap. The caps are secured with tape on the outside of the liner. The liner is then labeled, handled and shipped to the laboratory as described in Section 2.8.

Gravity Core Samplers. Gravity core samplers operate in a manner similar to the core samplers described above (i.e., a plastic, brass, stainless-steel or Teflon liner fits within a metal core barrel). However, gravity corer samplers may be used in water bodies that are too deep to effectively use extension rods.

Samples are obtained by allowing the sampler, which is attached to sufficient length of stainless-steel cable or nylon rope, to drop to the bottom. An opening exists above the liner to allow free flow of water through the corer as it moves vertically through the water

and into the sediment. The weight of the sampler drives the core barrel into the sediment to varying depths depending on the characteristics of the sediments. The sampler has a messenger-activated valve assembly that seals the opening above the liner following sediment penetration, which creates a partial vacuum to assist in sample retention during retrieval. Upon retrieval, the liner is removed and capped with a sheet of Teflon held in place by a plastic cap. The caps are secured with tape on the outside of the liner. The liner is then labeled, handled and shipped to the laboratory as described in Section 2.8.

Dredges. Dredges (e.g., Peterson, Eckman, and Ponar) are generally used to sample sediments that cannot easily be obtained using scoops or coring devices (i.e., coarse-grained or semi-consolidated materials) or when large quantities of materials are required. Dredges generally consist of a clam shell arrangement of two buckets. The buckets either may close upon impact or be activated by use of a messenger. The sediments are transferred from the dredge to the appropriate sample container and labeled, handled, and shipped according to the procedures described in Section 2.8.

Quality Assurance/Quality Control Sample Collection. If sediment samples are collected, QA/QC samples will be collected as described in Section 4.2. The sediment blind duplicate samples (i.e., duplicate samples submitted to the laboratory with fictional sample identifications) will be collected by alternately filling two sets of sample containers; one for the environmental sample and one for the blind duplicate sample. Similarly, when sediment MS/MSD samples are required, the samples will be collected by alternately filling three sets of sample containers; one for the environmental sample, one for the MS, and one for the MSD. The equipment blanks will consist of samples of the final decontamination rinse water. After the sediment sampler is decontaminated as described in Section 2.9, the final decontamination rinse water will be collected into a sample container and labeled as an equipment blank.

2.7.2 Sample Frequency, Designation, and Analysis

Sample Frequency. If the project team determines that sediment samples are required, the sampling frequency will be determined at that time.

Sample Designation. Each sediment sample will be designated with an alphanumeric character string set apart by hyphens. The designation will begin with a sample location abbreviation, followed by “SED” to indicate a sediment sample. For example, a sediment sample collected from Lake Belton grid location 1 would be designated “LB1-SED”

Blind duplicate sediment samples will be designated with a fictitious number beginning with 1001 so the laboratory is unaware the sample is a duplicate. For example, the first blind duplicate sediment sample would be designated “SED-1001”. The field crew will keep careful records of the designations given to the blind duplicate samples and their corresponding environmental sample so that the analytical results can be correlated when they are received. Each MS/MSD sample will have the same designation as its

associated environmental sample except that “MS” or “MSD” will follow the sample designation (e.g., “LB1-SED-MS” and “LB1-SED-MSD”). Each equipment blank sample will have the same designation as its associated sampling location except that “EB” will follow the sample designation (e.g., “LB1-SED -EB”).

Sample Analysis. All sediment samples will be analyzed for perchlorate by USEPA Method 314.0. The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska laboratory will perform all sample analyses. The USACE laboratory will conform to the analytical method requirements, analytical quality control requirements, instrument calibration frequency, and the laboratory quality control requirements presented in the QAPP. A discussion of sample labeling, chain-of-custody, handling and shipping is presented in Section 2.8.

2.8 SAMPLE LABELING, CHAIN-OF-CUSTODY, HANDLING, AND SHIPPING

The following procedures for sample labeling, chain-of-custody, handling and shipping are intended for the samples scheduled for collection during the Delta Areas field program (refer to Table 2-4). However, these procedures are applicable to any environmental sample collected during the Bosque and Leon River Watersheds Study.

2.8.1 Sample Labeling

A label will be placed on each sample container submitted for analysis and will include the following information:

- Project name and location
- Sample designation
- Date and time of sample collection
- Preservative (if applicable)
- Sampler’s initials
- Requested analyses.

2.8.2 Chain-of-Custody

A chain-of-custody form will be completed and will accompany each sample cooler submitted to the laboratory. This form includes project identification, project location, sample designation, and analysis type. In addition, there are spaces for entry of the sample collection date and time, signatures of the persons relinquishing and receiving samples, and the conditions of the samples upon receipt by the laboratory. An example chain-of-custody form is included in Appendix A.

2.8.3 Sample Handling and Shipping

After sample collection, each sample container will be placed in a cooler that contains sufficient ice to maintain the samples at a temperature of 4 ± 2 °C. Plastic “blue” ice shall not be used to chill the samples. Each sample will be wrapped separately in bubble-wrap or other protective material. Ice will be double-bagged in zip-lock bags such that the water will not fill the cooler as the ice melts. The chain-of-custody record will be placed inside a plastic bag, sealed, and placed inside the cooler. The cooler will be taped shut with strapping tape and custody seals shall be affixed to the outside of the cooler. All samples will be shipped to the laboratory within 24 hours of sample collection via Federal Express priority service (or equivalent) to ensure that the samples arrive at the laboratory in time to meet both analytical holding times and the project schedule.

2.9 EQUIPMENT DECONTAMINATION PROCEDURES

To prevent cross-contamination between sampling locations, all reusable sampling equipment will be thoroughly decontaminated between uses. New nylon rope will be used to raise and lower the sampling equipment and will be replaced any time the sampling equipment is reused (i.e., the nylon rope will not be reused at different sampling locations).

The thief samplers and plankton nets will be decontaminated before each use. It is anticipated that the peepers used to collect the sediment pore water samples will be new and will not require decontamination prior to their first use. However, the peepers will be decontaminated after the samples have been collected (i.e., the samplers will be decontaminated prior to storage or reuse).

Decontamination of non-dedicated equipment will include:

- Wash with laboratory-grade detergent (Alconox)
- Rinse with tap water
- Triple rinse with distilled water
- Air dry.

All decontamination fluids will be contained in 5-gallon buckets. If a sufficient quantity of decontamination fluids is generated, the fluids will be transferred to DOT-approved 55 gallon drums for temporary storage pending characterization and disposal. Due to the small volume of decontamination fluids that are expected to be generated during this field program, all decontamination fluids will be combined in a single set of containers (i.e., the decontamination fluids will not be segregated based on source). All decontamination fluids will be handled, characterized, and disposed of as described in Section 2.9.

2.10 INVESTIGATION DERIVED WASTE HANDLING

2.10.1 Introduction

The types of IDW expected to be generated during this field program include personal protective equipment (PPE), disposable field equipment, and decontamination fluids. All field activities are expected to be conducted in Level D PPE (see Section 1.4 of the SSHP); therefore, the only PPE that will be discarded will be disposable work gloves. The PPE and disposable sampling equipment (e.g., paper towels, empty 5-gallon buckets, nylon rope, etc.) will be discarded as non-hazardous municipal waste.

All decontamination fluids will be contained in 5-gallon buckets or DOT-approved 55-gallon drums for temporary storage pending characterization and disposal. Each IDW container will be clearly labeled to indicate its contents, date generated, and the name and telephone number of the contact person for this project.

2.10.2 IDW Disposal Profiling Sample Locations and Rationale

One disposal-profiling sample will be collected and analyzed for perchlorate to determine the appropriate disposal options for the decontamination fluids. The disposal-profiling sample will be designated “DAFP-IDW” for Delta Areas field program - Investigation-Derived Waste. Please note that QA/QC samples will not be collected in conjunction with the IDW disposal-profiling sampling because the results will not be used for site characterization. The procedures for collecting the IDW disposal-profiling sample are presented below.

2.10.3 Disposal-Profiling Sampling Equipment and Procedures

One disposal-profiling sample will be collected from the decontamination fluids generated during the Delta Area field program and analyzed for perchlorate. If more than one IDW container is generated, the sample will be a composite of aliquots collected from each container. The sample will be collected with a clean glass, stainless steel, or Nalgene flask and poured directly into the appropriate sample containers. If a composite sample is required, two flasks will be used. One flask will be used to collect the sample aliquots, which will be transferred to the second flask for homogenization prior to filling the appropriate sample container (refer to Table 2-3). All IDW disposal-profiling samples will be handled and shipped according to the procedures discussed in Section 2.7.

2.10.4 IDW Characterization and Disposal Criteria

In order to determine the appropriate disposal options for the IDW, it will be necessary to determine if the wastes are hazardous or nonhazardous as defined by RCRA. A waste is classified as hazardous if it is listed in 40 CFR 261, Subpart D (i.e., it is a *listed hazardous waste*) or it exhibits any of the four criteria of hazardous waste as identified in

40 CFR 261, Subpart C (i.e., it is a *characteristic* hazardous waste exhibiting the characteristic of ignitability, corrosivity, reactivity, or toxicity).

Based on the information presented in the CSM, the following assumptions apply to characterizing the IDW generated during the Delta Areas field program:

- The perchlorate in the study area is not from a source listed in 40 CFR 261, Subpart D (i.e., it is not a *listed* hazardous waste).
- The anticipated concentrations of perchlorate in the study area (and therefore in the IDW) are likely to be in the low part-per-billion range. As a result, it is unlikely that the IDW will exhibit the characteristic of ignitability, corrosivity, or reactivity.
- There are no established toxicity criteria for perchlorate in 40 CFR Part 261.24.

Therefore, the IDW will not be considered hazardous waste regardless if perchlorate is detected in the disposal-profiling samples because it is not from a listed source, it will not exhibit the characteristic of ignitability, corrosivity, or reactivity, and because RCRA has not established toxicity criteria for perchlorate.

If there are detectable concentrations of perchlorate in a disposal-profiling sample, the IDW represented by that sample will be disposed of a RCRA Subtitle D or Subtitle C landfill as non-hazardous waste containing perchlorate. If perchlorate is not detected in the disposal-profiling sample, the non-contaminated water IDW will be poured into a publicly owned treatment works drainage system.

2.11 GLOBAL POSITIONING SYSTEM SURVEY

As discussed in Section 2.4.1, the locations of the sampling grid points will be documented using a Garmin GPS 76 instrument. The accuracy of this instrument ranges from less than 3 meters to less than 15 meters depending on the sky cover and the number of satellites available at the time a reading is taken. The GPS information to be recorded at each grid point includes latitude (degrees and minutes), longitude (degrees and minutes), and the instrument accuracy information at the time each reading is recorded. The GPS information will be used for relocating the sample locations (e.g., when retrieving the peepers) and for reporting purposes. It also may be necessary to return to the general vicinity of the sampled locations at a later date to perform verification sampling activities.

2.12 CONTRACTOR QUALITY CONTROL

The three-phase Contractor Quality Control (CQC) program described in Section 6.0 of the SAP will be implemented for each definable feature of work. The definable features of work for the Delta Area field program include:

- Establishing the sampling grids
- Collecting surface water samples
- Collecting sediment pore water samples
- Collecting algae samples
- Laboratory analyses
- Data management (including data reduction, validation, and reporting).

The CQC program will be implemented prior to initiating each definable feature of work and will remain in effect throughout its duration.

TABLE 2-1
SUMMARY OF DATA TYPES AND USES FOR THE LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM

Field Program	Summary of Proposed Activities	Data	Data Type	Data Uses
Field Observations	Observations by an on-site professional during all field activities.	Date Weather conditions On-site personnel Field activity type Samples collected/Details Unusual conditions encountered	Field Field Field Field Field Field	Project documentation
Establish Sampling Grids on Lake Belton and Lake Waco	Establish 20-point sampling grid on both Lake Belton and Lake Waco delta areas using global positioning system (GPS).	Establish sampling locations	Definitive Definitive Definitive	Evaluation of the sample data and generation of maps for the final report.
Collect Surface Water and Sediment Pore Water Samples	Collect samples at each grid location in the Lake Belton and Lake Waco delta areas. Submit samples for perchlorate analysis.	Perchlorate	Definitive	Assess perchlorate concentrations in surface water and sediment pore water. Evaluate impacts to Lake Belton and Lake Waco water quality, assess risks to human health and the environment.
Collect Algae Samples from Lake Belton	Collect samples from selected grid locations within the Lake Belton delta area. Submit samples for perchlorate analysis.	Perchlorate	Definitive	Assess perchlorate concentrations in Lake Belton algae. Evaluate risks to human health and the environment.
Collect Surface Water Samples at the Heather Run and Ridgewood Golf Course Intakes	Collect surface water samples over a period of 12 months at the golf course intakes in Lake Waco.	Perchlorate	Definitive	Assess perchlorate concentrations over time in surface water that is used at the golf courses. Evaluate impacts to human health and the environment.
Investigation Derived Waste (IDW) Sampling	Collect sample of decontamination fluid IDW.	Perchlorate	Definitive	Characterize IDW for disposal purposes

TABLE 2-2

DATA QUALITY OBJECTIVES FOR THE LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 1 of 4)

USEPA DATA QUALITY OBJECTIVE STEP	FIELD ACTIVITY Lake Belton and Lake Waco Delta Areas Surface Water and Sediment Pore Water Sampling	FIELD ACTIVITY Lake Belton Algae Sampling	FIELD ACTIVITY Surface Water Sampling at the Heather Run and Ridgewood Golf Course intakes from Lake Waco
STEP 1: State the Problem	<p><i>Problem Statements</i> Presence or absence of perchlorate in Lake Belton and Lake Waco delta areas needs to be established to evaluate potential risks to human health and the environment.</p>	<p>Presence or absence of perchlorate in Lake Belton algae needs to be established in order to evaluate ecological exposures through food chain transfer. Potential for algae to spread contamination also needs to be addressed.</p>	<p>Presence or absence of perchlorate in Lake Waco water that is used at the Heather Run and Ridgewood Golf Courses needs to be established.</p>
<i>Planning Team Members</i>	<p>Brian Condike – USACE Project Manager David Ebersold – MWH Project Manager Kyle Headley – BRA Project Manger Dr. Todd Anderson – TIEHH</p>	<p>Planning team as indicated previously.</p>	<p>Planning team as indicated previously.</p>
<i>Primary Decision Maker</i>	<p>Brian Condike – USACE Project Manager David Ebersold – MWH Project Manager Kyle Headley – BRA Project Manger</p>	<p>Primary decision makers as indicated previously.</p>	<p>Primary decision makers as indicated previously.</p>
<i>Relevant Deadlines</i>	<p>One-time sampling will be performed to establish presence or absence of perchlorate.</p>	<p>One-time sampling will be performed to establish presence or absence of perchlorate.</p>	<p>Sampling will occur monthly for a period of 12 months.</p>
STEP 2: Identify the Decision	<p><i>Principle Study Questions</i> Is perchlorate present in the surface water or sediment pore water in the Lake Belton and Lake Waco delta areas?</p>	<p>Is perchlorate present in the algae in the Lake Belton delta area and is there potential for the algae to spread contamination?</p>	<p>Is perchlorate present in the Lake Waco water that is used at the Heather Run and Ridgewood Golf Courses?</p>
<i>Alternate Actions</i>	<p>Data will be used in conjunction with other Bosque and Leon River Watersheds Study data to evaluate potential risks to human health and the environment.</p>	<p>Data will be used in conjunction with other studies being performed by TIEHH to evaluate ecological exposures through food chain transfer as well as the potential for algae to spread contamination through the lake.</p>	<p>Data will be used in conjunction with other Bosque and Leon River Watersheds Study data to evaluate potential risks to human health and the environment.</p>
STEP 3: Identify the Inputs to the Decision	<p><i>Environmental Measurements</i> Samples will be collected at a 20-point sampling grid in both the Lake Belton and Lake Waco delta areas. At each grid location surface water and sediment pore water samples will be collected and submitted for perchlorate analysis. Sampling equipment is readily available (e.g., boat, sample tools) and a USEPA promulgated method exists for perchlorate analysis (Method 314.0).</p>	<p>Samples will be collected from 10 of the sample grid locations established in the Lake Belton delta area. Samples will be collected during the algae blooming season (i.e., summer). Bulk algae samples will be obtained with a plankton net and submitted for perchlorate analysis. Sampling equipment is readily available (e.g., boat, buoys, and plankton net samplers) and a USEPA promulgated method exists for perchlorate analysis (Method 314.0).</p>	<p>Surface water samples will be collected at the intake locations and analyzed for perchlorate. Sampling equipment is readily available and a USEPA promulgated method exists for perchlorate analysis (Method 314.0).</p>

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MDL Method Detection Limit
MRL Method Reporting Limit

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TABLE 2-2

DATA QUALITY OBJECTIVES FOR THE LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 2 of 4)

USEPA DATA QUALITY OBJECTIVE STEP	FIELD ACTIVITY Lake Belton and Lake Waco Delta Areas Surface Water and Sediment Pore Water Sampling	FIELD ACTIVITY Lake Belton Algae Sampling	FIELD ACTIVITY Surface Water Sampling at the Heather Run and Ridgewood Golf Course intakes from Lake Waco
<p>STEP 3: Identify the Inputs to the Decision (continued)</p> <p><i>Basis for Action Level^a</i></p>	<p>Because the purpose of this field program is to determine the presence or absence of perchlorate in the delta areas, the action level for perchlorate is any valid detectable concentration.</p>	<p>Because the purpose of this field investigation is to collect data that will be used to evaluate impacts and risks from perchlorate, the action level for perchlorate is any valid detectable concentration.</p>	<p>Because the purpose of this field investigation is to collect data that will be used to evaluate impacts and risks from perchlorate, the action level for perchlorate is any valid detectable concentration.</p>
<p>STEP 4: Define Study Boundaries</p> <p><i>Population of Interest</i></p> <p><i>Spatial Boundaries</i></p> <p><i>Temporal Boundaries</i></p> <p><i>Scale of Decision Making</i></p> <p><i>Practical Constraints on Data Collection</i></p>	<p>Perchlorate concentrations in surface water and sediment pore water.</p> <p>The immediate spatial boundaries for this field program are the boundaries of sampling grids. However, this field program is a component of the Bosque and Leon River Watersheds Study. As a result, the data will be used in conjunction with other field programs conducted within the Bosque and Leon River Watersheds Study Area. A description of the study area is included in Section 2.0 of the SAP. The boundary of the study area is shown on Figure 2-1 of this FSP.</p> <p>Each sample will be considered representative of a specific location at a given point and time.</p> <p>A data summary report will be included with the overall Bosque and Leon River Watersheds Study quarterly technical memorandums. The data summary report will present the data, discuss the results, and make recommendations additional sampling, if necessary.</p> <p>Practical constraints include the difficulty associated with sampling from a boat. The constraints may include weather, weight of the sampling equipment, and depth of water at a sampling location. These constraints will be minimized as follows: Sampling will not be performed during inclement weather (e.g., windy conditions). The depth of water in the delta areas is not expected to exceed 30 feet, which is within the range of the sampling equipment. The proposed sampling equipment is light enough to be safely operated over the edge of a boat; if necessary, a winch may be used to raise and lower samplers.</p>	<p>Perchlorate concentrations in the algae samples.</p> <p>The spatial boundaries for this field program are the boundaries of sampling grid.</p> <p>Each sample will be considered representative of a specific location at a given point and time.</p> <p>A data summary report will be included with the overall Bosque and Leon River Watersheds Study quarterly technical memorandums. The data summary report will present the data, discuss the results, and make recommendations additional sampling, if necessary.</p> <p>Practical constraints include the difficulty associated with sampling from a boat as discussed previously. Other practical constraints include not being able to obtain a sufficient amount of algae as required by the laboratory to perform the perchlorate analysis. However, the sampling will occur when an algal bloom is expected (i.e., during the summer) and the plankton nets can be raised and lowered multiple times to obtain more sample volume.</p>	<p>Perchlorate concentrations in the surface water.</p> <p>The spatial boundaries for this field program are the Lake Waco intakes to the Heather Run and Ridgewood Golf Courses.</p> <p>Each sample will be considered representative of a specific location at a given point and time.</p> <p>Quarterly technical memorandums will be prepared that present the data, discuss the results, and make recommendations for modifying the sampling requirements, if necessary.</p> <p>Practical constraints include the difficulty associated with sampling from a boat as discussed previously.</p>

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TABLE 2-2

DATA QUALITY OBJECTIVES FOR THE LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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USEPA DATA QUALITY OBJECTIVE STEP	FIELD ACTIVITY Lake Belton and Lake Waco Delta Areas Surface Water and Sediment Pore Water Sampling	FIELD ACTIVITY Lake Belton Algae Sampling	FIELD ACTIVITY Surface Water Sampling at the Heather Run and Ridgewood Golf Course intakes from Lake Waco
<p>STEP 5: Development of Decision Rules</p> <p><i>Statistical Parameter of Interest</i> Total perchlorate concentrations.</p> <p><i>Scale of Decision Making</i> Data will be considered representative of the sampling location. Extrapolation of the data may be possible between sampling locations or when assessed in conjunction with other field investigations (e.g., Lake Belton Fate and Transport Study).</p> <p><i>Action Level</i> The action level for perchlorate is any valid detectable concentration. The applicable analytical method for perchlorate is USEPA Method 314.0, which has a method detection limit of 0.9 µg/l and a method reporting limit of 4 µg/l.</p> <p><i>Alternative Actions</i> See previously defined alternate action in Step 2.</p> <p><i>Decision Rules</i> Data will be assessed to resolve the decision statements presented above.</p>	<p>Total perchlorate concentrations.</p> <p>Data will be considered representative of the sampling location. Extrapolation of the data may be possible between sampling locations.</p> <p>The action level for perchlorate is any valid detectable concentration. The applicable analytical method for perchlorate is USEPA Method 314.0, which has a method detection limit of 0.9 µg/l and a method reporting limit of 4 µg/l.</p> <p>See previously defined alternate action in Step 2.</p> <p>Data will be assessed to resolve the decision statements presented above.</p>	<p>Total perchlorate concentrations.</p> <p>Data will be considered representative of the sampling location. The data may be extrapolated to the disposition areas of the water (e.g., golf course ponds, irrigated areas).</p> <p>The action level for perchlorate is any valid detectable concentration. The applicable analytical method for perchlorate is USEPA Method 314.0, which has a method detection limit of 0.9 µg/l and a method reporting limit of 4 µg/l.</p> <p>See previously defined alternate action in Step 2.</p> <p>Data will be assessed to resolve the decision statements presented above.</p>	
<p>STEP 6 Specify Tolerable Limits on Decision Errors</p> <p><i>Null Hypothesis</i> Sampled media contains detectable concentrations of perchlorate.</p> <p><i>Alternate Hypothesis</i> Sampled media does not contain detectable concentrations of perchlorate.</p> <p><i>Gray Region</i> Detected perchlorate concentration is between the MDL and the MRL.</p> <p><i>Tolerable Probability of Making an Incorrect Decision</i> Perchlorate concentrations in samples collected according to this FSP and analyzed and verified according to the QAPP will be considered valid. Results that are in the gray region will be considered detections (i.e., perchlorate is present) unless otherwise qualified.</p>	<p>Algae contains detectable concentrations of perchlorate.</p> <p>Algae does not contain detectable concentrations of perchlorate.</p> <p>Detected perchlorate concentration is between the MDL and the MRL.</p> <p>Perchlorate concentrations in samples collected according to this FSP and analyzed and verified according to the QAPP will be considered valid. Results that are in the gray region will be considered detections (i.e., perchlorate is present) unless otherwise qualified.</p>	<p>Surface water contains detectable concentrations of perchlorate.</p> <p>Surface water does not contain detectable concentrations of perchlorate.</p> <p>Detected perchlorate concentration is between the MDL and the MRL.</p> <p>Perchlorate concentrations in samples collected according to this FSP and analyzed and verified according to the QAPP will be considered valid. Results that are in the gray region will be considered detections (i.e., perchlorate is present) unless otherwise qualified.</p>	

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TABLE 2-2

DATA QUALITY OBJECTIVES FOR THE LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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USEPA DATA QUALITY OBJECTIVE STEP	FIELD ACTIVITY Lake Belton and Lake Waco Delta Areas Surface Water and Sediment Pore Water Sampling	FIELD ACTIVITY Lake Belton Algae Sampling	FIELD ACTIVITY Surface Water Sampling at the Heather Run and Ridgewood Golf Course intakes from Lake Waco
STEP 7: Optimize the Design for Obtaining Data	A grid sampling pattern will be used to minimize bias and to provide representative coverage of the relatively large delta areas. The data collection design is described in this field sampling plan.	A grid sampling pattern will be used to minimize bias and to provide representative coverage of the relatively large delta area. The data collection design is described in this field sampling plan.	Grab samples will be collected at each intake structure over a period of 12 months. The data collection design is described in this field sampling plan.

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^a Please note that the term “action level” refers to the value chosen in the USEPA DQO Process that provides the criterion for resolving the decision statements.

TABLE 2-3

SAMPLE CONTAINERS AND PRESERVATION REQUIREMENTS

Analysis	Container Type	Container Size (Number)	Closure	Preservative	Holding Time
Water Samples^(a)					
Perchlorate USEPA Method 314.0	Glass or plastic	20- milliliter minimum (one per sample)	Teflon-lined cap	None	28 days from sample collection to analysis.
Algae Samples					
Perchlorate USEPA Method 314.0 (modified for tissue analysis)	Glass or plastic	100- milliliter minimum (one per sample)	Teflon-lined cap	4±2°C	28 days from sample collection to analysis.
Sediment Samples					
Perchlorate USEPA Method 314.0	Glass or plastic	4-ounce	Teflon-lined cap	None	28 days from sample collection to analysis.

(a) Surface water samples, sediment pore water samples, and liquid investigation-derived waste samples.

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 1 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SURFACE WATER SAMPLES				
LB1-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1001	LB1-SW-depth duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB2-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-SW-depth-EB	Sample of final decontamination rinse water following routine decontamination of sampler used to collect LB3-SW-depth sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LB4-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-SW-depth-MS	LB5-SW-depth duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LB5-SW-depth-MSD	LB5-SW-depth duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 2 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SURFACE WATER SAMPLES (continued)				
LB6-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB7-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB8-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB9-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB10-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB11-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1002	LB11-SW-depth duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB12-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 3 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SURFACE WATER SAMPLES (continued)				
LB13-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB14-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB14-SW-depth-EB	Sample of final decontamination rinse water following routine decontamination of sampler used to collect LB14-SW-depth sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LB15-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB16-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB17-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB18-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 4 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SURFACE WATER SAMPLES (continued)				
LB19-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB20-SW-depth	Surface water sample collected at Lake Belton delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
<i>Note: Additional surface water samples will be collected if the lake is thermally stratified (refer to Section 2.4.3)</i>				
LAKE WACO DELTA AREA - SURFACE WATER SAMPLES				
LW1-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1003	LW1-SW-depth duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW2-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW3-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 5 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW3-SW-depth-EB	Sample of final decontamination rinse water following routine decontamination of sampler used to collect LW3-SW-depth sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SURFACE WATER SAMPLES (continued)				
LW4-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW5-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW5-SW-depth-MS	LW5-SW-depth duplicate sample.	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LW5-SW-depth-MSD	LW5-SW-depth duplicate sample.	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LW6-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW7-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 6 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW8-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SURFACE WATER SAMPLES (continued)				
LW9-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW10-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1004	LW10-SW-depth duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW11-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW12-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW13-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW14-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 7 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW14-SW-depth-EB	Sample of final decontamination rinse water following routine decontamination of sampler used to collect LW14-SW-depth sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SURFACE WATER SAMPLES (continued)				
LW15-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW16-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW17-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW18-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW19-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW20-SW-depth	Surface water sample collected at Lake Waco delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Note: Additional surface water samples will be collected if the lake is thermally stratified (refer to Section 2.4.3)

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 8 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE WACO - HEATHER RUN GOLF COURSE INTAKE - SURFACE WATER SAMPLES				
HR-SW-date (1 st month)	Surface water sample collected from the Heather Run Golf Course intake during 1 st month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO - HEATHER RUN GOLF COURSE INTAKE - SURFACE WATER SAMPLES (continued)				
SW-1005	HR-SW-date (1 st month) duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
HR-SW-date (2 nd month)	Surface water sample collected from the Heather Run Golf Course intake during 2 nd month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (3rd month)	Surface water sample collected from the Heather Run Golf Course intake during 3 rd month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date-EB (3rd month)	Sample of final decontamination rinse water following routine decontamination of sampler used to collect HR-SW-date (3rd month) sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
HR-SW-date (4th month)	Surface water sample collected from the Heather Run Golf Course intake during 4 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (5th month)	Surface water sample collected from the Heather Run Golf Course intake during 5 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - Intermediate-Derived Water MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 9 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
HR-SW-date-MS (5 th month)	HR-SW-date (5 th month) duplicate sample.	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LAKE WACO - HEATHER RUN GOLF COURSE INTAKE - SURFACE WATER SAMPLES (continued)				
HR-SW-date-MSD (5 th month)	HR-SW-date (5 th month) duplicate sample.	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
HR-SW-date (6 th month)	Surface water sample collected from the Heather Run Golf Course intake during 6 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (7 th month)	Surface water sample collected from the Heather Run Golf Course intake during 7 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (8 th month)	Surface water sample collected from the Heather Run Golf Course intake during 8 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (9 th month)	Surface water sample collected from the Heather Run Golf Course intake during 9 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (10 th month)	Surface water sample collected from the Heather Run Golf Course intake during 10 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date (11 th month)	Surface water sample collected from the Heather Run Golf Course intake during 11 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 10 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
SW-1006	HR-SW-date (11 st month) duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE WACO - HEATHER RUN GOLF COURSE INTAKE - SURFACE WATER SAMPLES (continued)				
HR-SW-date (12 th month)	Surface water sample collected from the Heather Run Golf Course intake during 12 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
HR-SW-date-EB (12 th month)	Sample of final decontamination rinse water following routine decontamination of sampler used to collect HR-SW-date (12 th month) sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LAKE WACO - RIDGEWOOD GOLF COURSE INTAKE - SURFACE WATER SAMPLES				
RW-SW-date (1 st month)	Surface water sample collected from the Ridgewood Golf Course intake during 1 st month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1007	RW-SW-date (1 st month) duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
RW-SW-date (2 nd month)	Surface water sample collected from the Ridgewood Golf Course intake during 2 nd month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date (3 rd month)	Surface water sample collected from the Ridgewood Golf Course intake during 3 rd month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 11 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
RW-SW-date-EB (3rd month)	Sample of final decontamination rinse water following routine decontamination of sampler used to collect RW-SW-date (3rd month) sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0
LAKE WACO - RIDGEWOOD GOLF COURSE INTAKE - SURFACE WATER SAMPLES (continued)				
RW-SW-date (4th month)	Surface water sample collected from the Ridgewood Golf Course intake during 4 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date (5th month)	Surface water sample collected from the Ridgewood Golf Course intake during 5 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date-MS (5 th month)	RW-SW-date (5 th month) duplicate sample.	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
RW-SW-date-MSD (5 th month)	RW-SW-date (5 th month) duplicate sample.	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
RW-SW-date (6th month)	Surface water sample collected from the Ridgewood Golf Course intake during 6 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date (7th month)	Surface water sample collected from the Ridgewood Golf Course intake during 7 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - Intermediate-Derived Water MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 12 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
RW-SW-date (8th month)	Surface water sample collected from the Ridgewood Golf Course intake during 8 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO - RIDGEWOOD GOLF COURSE INTAKE - SURFACE WATER SAMPLES (continued)				
RW-SW-date (9th month)	Surface water sample collected from the Ridgewood Golf Course intake during 9 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date (10th month)	Surface water sample collected from the Ridgewood Golf Course intake during 10 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date (11th month)	Surface water sample collected from the Ridgewood Golf Course intake during 11 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SW-1008	HR-SW-date (11 st month) duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
RW-SW-date (12th month)	Surface water sample collected from the Ridgewood Golf Course intake during 12 th month. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
RW-SW-date-EB (12 th month)	Sample of final decontamination rinse water following routine decontamination of sampler used to collect RW-SW-date (12 th month) sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - Intermediate-Derived Waste MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 13 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES				
LB1-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SPW-1001	LB1-SPW-0' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB1-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB1-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB1-SPW-2'-MS	LB1-SPW-2' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LB1-SPW-2'-MSD	LB1-SPW-2' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – InvIgation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB2-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB2-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB2-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB4-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB4-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1002	LB4-SPW-1' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB4-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 16 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB5-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB6-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB6-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB6-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB7-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB7-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 17 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB7-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SPW-1003	LB7-SPW-2' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB8-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB8-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB8-SPW-1'-MS	LB8-SPW-1' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LB8-SPW-1'-MSD	LB8-SPW-1' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LB8-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB9-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB9-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB9-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB10-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB10-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB10-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 19 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB11-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1004	LB11-SPW-0' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB11-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB11-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB12-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB12-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 20 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LB12-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB13-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB13-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB13-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB14-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB14-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 21 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
SPW-1005	LB14-SPW-1' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB14-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB15-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB15-SPW-0'-MS	LB15-SPW-0' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LB15-SPW-0'-MSD	LB15-SPW-0' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LB15-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB15-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 22 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB16-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB16-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB16-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB17-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB17-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB17-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 23 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1006	LB17-SPW-2' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB18-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB18-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB18-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB19-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB19-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - Intermediate-Derived Waste MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 24 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LB19-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB20-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Belton delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB20-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Belton delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB20-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Belton delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Note: Equipment blank samples will be collected to represent 10 percent of the total number of sediment pore water samples collected if the samplers are reused.

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 25 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES				
LW1-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1007	LW1-SPW-0' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW1-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW1-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW1-SPW-2'-MS	LW1-SPW-2' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LW1-SPW-2'-MSD	LW1-SPW-2' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

**SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes^(b)	Method
LW2-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW2-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW2-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW3-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW3-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW3-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW4-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW4-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1008	LW4-SPW-1' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW4-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW5-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW5-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW5-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW6-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW6-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW6-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW7-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW7-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Intermediate-Derived Water MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW7-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
SPW-1009	LW7-SPW-2' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW8-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW8-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW8-SPW-1'-MS	LW8-SPW-1' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LW8-SPW-1'-MSD	LW8-SPW-1' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LW8-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW9-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW9-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW9-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW10-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW10-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW10-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes^(b)	Method
LW11-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-1010	LW11-SPW-0' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW11-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW11-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 11. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW12-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW12-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
 IDW - Intermediate-Derived Water MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LW12-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 12. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW13-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW13-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW13-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 13. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW14-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW14-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
SPW-1011	LW14-SPW-1' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW14-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 14. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW15-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW15-SPW-0'-MS	LW15-SPW-0' duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LW15-SPW-0'-MSD	LW15-SPW-0' duplicate sample duplicate	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LW15-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW15-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 15. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 34 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW16-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW16-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW16-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 16. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW17-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW17-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW17-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 17. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
SPW-10012	LW17-SPW-2' duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LW18-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW18-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW18-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 18. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW19-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW19-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - Intermediate-Derived Waste MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4
SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 36 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE WACO DELTA AREA - SEDIMENT PORE WATER SAMPLES (continued)				
LW19-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 19. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW20-SPW-0'	Sediment pore water sample collected from just below the sediment surface at Lake Waco delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW20-SPW-1'	Sediment pore water sample collected from 1-foot below the sediment surface at Lake Waco delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LW20-SPW-2'	Sediment pore water sample collected from 2 feet below the sediment surface at Lake Waco delta area grid location number 20. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
<i>Note: Equipment blank samples will be collected to represent 10 percent of the total number of sediment pore water samples collected if the samplers are reused.</i>				
LAKE BELTON DELTA AREA - ALGAE SAMPLES				
LB1-AGE	Algae sample collected at Lake Belton delta area grid location number 1. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
 IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
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Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - ALGAE SAMPLES (continued)				
AGE-1001	LB1-AGE duplicate sample.	QA/QC (Blind Duplicate)	Perchlorate	USEPA Method 314.0
LB2-AGE	Algae sample collected at Lake Belton delta area grid location number 2. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-AGE	Algae sample collected at Lake Belton delta area grid location number 3. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB3-AGE-MS	LB3-AGE duplicate sample	QA/QC (Matrix Spike)	Perchlorate	USEPA Method 314.0
LB3-AGE-MSD	LB3-AGE duplicate sample	QA/QC (Matrix Spike Duplicate)	Perchlorate	USEPA Method 314.0
LB4-AGE	Algae sample collected at Lake Belton delta area grid location number 4. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-AGE	Algae sample collected at Lake Belton delta area grid location number 5. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB5-AGE-EB	Sample of final decontamination rinse water following routine decontamination of sampler used to collect LB5-AGE sample.	QA/QC (Equipment Blank)	Perchlorate	USEPA Method 314.0

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB – Lake Belton LW – Lake Waco HR – Heather Run RW – Ridgewood SW – Surface Water SPW – Sediment Pore Water AGE – Algae
IDW – Investigation-Derived Waste MS/MSD – Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

TABLE 2-4

SUMMARY OF SAMPLES TO BE COLLECTED DURING THE
LAKE BELTON AND LAKE WACO DELTA AREAS FIELD PROGRAM
(Page 38 of 38)

Sample Designation ^(a)	Sample Location/Rationale	Sample Type	Analytes ^(b)	Method
LAKE BELTON DELTA AREA - ALGAE SAMPLES (continued)				
LB6-AGE	Algae sample collected at Lake Belton delta area grid location number 6. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB7-AGE	Algae sample collected at Lake Belton delta area grid location number 7. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB8-AGE	Algae sample collected at Lake Belton delta area grid location number 8. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB9-AGE	Algae sample collected at Lake Belton delta area grid location number 9. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
LB10-AGE	Algae sample collected at Lake Belton delta area grid location number 10. Assess perchlorate concentrations.	Environmental	Perchlorate	USEPA Method 314.0
<i>Note: As described in Section 2.6.1, algae samples will be collected from 10 selected locations on the sampling grid established to collect surface water and sediment pore water samples on Lake Belton. The selected grid numbers (which will be determined in the field) will be used in the algae sample identification (refer also to Section 2.6.3).</i>				
INVESTIGATION DERIVED WASTE SAMPLES				
DAFP-IDW	Sample collected from fluids generated during decontamination of non-dedicated sampling equipment. Characterize IDW for disposal.	Disposal-profiling	Perchlorate	USEPA Method 314.0

Note: One disposal profiling sample will be collected to represent all liquid IDW generated during the Delta Area field program (refer to Section 2.9)

Shading indicates where quality assurance/quality control (QA/QC) samples will be collected.

(a) Sample Designation:

LB- Lake Belton LW - Lake Waco HR - Heather Run RW - Ridgewood SW - Surface Water SPW - Sediment Pore Water AGE - Algae
IDW - InvIgIstigation-Derived Waste MS/MSD - Matrix Spike/Matrix Spike Duplicate

(b) All surface water, sediment pore water, and IDW samples will be sent to: The USACE Engineer Research and Development Center Environmental Laboratory at the Environmental Chemistry Branch in Omaha, Nebraska. All algae samples will be sent to The Institute of Environmental and Human Health at Texas Tech University (TIEHH).

3.0 HEALTH AND SAFETY PROGRAM

All personnel involved with the field activities described in this FSP shall follow the *Site Safety and Health Plan – Bosque and Leon River Watersheds Study* (SSHP; MWH, 2002a). The SSHP was prepared specifically for the field investigations that will support the USACE Bosque and Leon River Watersheds Study, and includes the health and safety procedures and protocols for the Delta Areas field program. The Activity Hazard Analysis that is specific to Delta Areas field program is summarized in Table 1-1b of the SSHP.

4.0 QUALITY CONTROL

This section is a summary of quality control procedures that will be followed during the Delta Areas field program, including daily quality control reports, field and laboratory quality control samples, data validation, and final reporting requirements. The overall quality program for all field investigations that will be implemented to support the USACE Bosque and Leon River Watersheds Study is presented in the *Quality Assurance Project Plan – Bosque and Leon River Watersheds Study* (QAPP; MWH, 2002a).

4.1 DAILY QUALITY CONTROL REPORTS

Daily Quality Control Reports (DQCRs) will be prepared for every day field work is performed. DQCRs are field reports that summarize daily activities and help project personnel track quality control activities. These reports will include location(s) of work, weather conditions and temperatures, work performed, results of any inspections/tests performed, the individuals performing the inspections/tests, equipment calibration procedures, problems identified and associated corrective actions taken, any instructions received from the USACE Project Manager, and any general comments. A DQCR form is included in Appendix A.

4.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality assurance/quality control samples will be collected and submitted for laboratory analysis during sampling activities to ensure the quality of the data generated. The QA/QC sample types and frequencies are listed below. QA/QC sample locations, collection procedures, and designations are presented in Section 2.0.

QC Sample Type	Frequency
Blind Duplicate	Ten percent of the total number of surface water, sediment pore water, and algae samples will be collected as a duplicate set: one submitted to the laboratory labeled as the environmental sample and the other submitted “blind” to assess laboratory consistency and precision.
Matrix Spike/Matrix Spike Duplicate	Five percent of the total number of surface water, sediment pore water, and algae samples will be collected as a triplicate set: one submitted to the laboratory labeled as the environmental sample, one as the MS, and one as the MSD. The MS/MSD results will be used to measure the efficiency of the analytical method in recovering target analytes from an environmental sample matrix and the laboratory precision and accuracy.
Equipment Blank	Ten percent of the total number of samples, of any media, in which non-dedicated sampling equipment was used will be tested to assess cross-contamination from the sampling equipment by collecting an equipment blank sample.

4.3 LABORATORY QUALITY CONTROL

The environmental, QA/QC, and IDW samples will be analyzed for perchlorate using USEPA Method 314.0 as outlined in Section 2.0 of this work plan. All analytical procedures performed during this project will conform to the most recently promulgated version of *Method 314.0 - Determination of Perchlorate in Drinking Water Using Ion Chromatography* (USEPA, 1999). Additional information regarding the analytical method requirements is included in Section 7.0 of the QAPP.

The analytical quality control requirements (laboratory method detection limits; practical quantitation limits; summary of internal quality control procedures; control limits for matrix spikes, matrix spike duplicates, and surrogate spikes; control limits for laboratory control samples; and calibration procedures) are presented in Appendix A of the QAPP. Data management, including the format of the data packages and data archive, will follow the guidance set forth in Section 9.0 of the QAPP.

4.4 DATA VALIDATION AND VERIFICATION

All data received from the laboratory will be reviewed by the MWH Project Chemist to ensure that the data meets the project data quality objectives (refer to Section 9.5 of the QAPP, Reconciliation with Data Quality Objectives). Specifically, the Project Chemist

will review the holding times, MS/MSD recoveries, relative percent differences (RPDs), and blank analyses. In addition, Level IV data validation on 10 percent of the analyzed data for the surface water samples also will be performed in accordance with *USEPA Contact Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* (USEPA, 1994b), the Department of Defense “*Quality Systems Manual for Environmental Laboratories*” (Version 1.0, October 2000), and the USACE EM 200-1-3, Appendix I “*Shell for Analytical Chemistry Requirements*” (February 2001). All data will be presented with explanations of nonconforming data. Resampling or reanalysis may be requested in the case of unsatisfactory performance on the part of the laboratory.

4.5 REPORTING REQUIREMENTS

Project activities will be documented in the quarterly updates regarding the data that were collected during the field sampling activities. A technical memorandum will be prepared each quarter that discusses the results and makes recommendations for refining the sampling/measurement criteria. The text will also include a discussion of field methods and procedures that deviated from those proposed in this document (if any). All laboratory analytical data will be presented with a data validation narrative that will summarize the quality and usefulness of the data.

5.0 REFERENCES

- Department of Defense, 2002. *Quality Systems Manual for Environmental Laboratories*. Prepared By DoD Environmental Data Quality Workgroup - Department of Navy, Lead Service. Version 1, October 2000.
- MWH Americas, Inc., 2002a. *Sampling and Analysis Plan – Bosque and Leon River Watersheds Study*; comprises the sampling and analysis plan (SAP), quality assurance project plan (QAPP), site safety and health plan (SSHP), and the task-specific field sampling plans (FSPs). Prepared for the U.S. Army Corps of Engineers, Fort Worth District. July 2002.
- MWH Americas, Inc., 2002b. *Final Conceptual Site Model – Bosque and Leon River Watersheds Study*. Prepared for the U.S. Army Corps of Engineers, Fort Worth District. April 2002.
- U.S. Army Corps of Engineers, 2001. *Requirements for the Preparation of Sampling and Analysis Plans*. EM 200-1-3.
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- U.S. Environmental Protection Agency (EPA), 1994b. USEPA Contact Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review, Office of Emergency and Remedial Response, Washington D.C., 1994.
- U.S. Environmental Protection Agency, 1996. *EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*, (U.S. EPA Third edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996).
- U.S. Environmental Protection Agency, 1999. *Method 314.0 - Determination of Perchlorate in Drinking Water Using Ion Chromatography*. Revision 1.0, November 1999.
- U.S. Environmental Protection Agency, 2000. *Data Quality Objectives for Hazardous Waste Site Investigations*, EPA QA/G-4HW. EPA/600/R-00/007.