1.0 INTRODUCTION

The City of Marysville (City) plans to decommission the Marysville Wastewater Treatment Plant (WWTP) ponds. The City's wastewater collection, treatment, and disposal system (CT&D) requires the City to comply with Waste Discharge Requirement (WDR) No. 5-01-071 and protocols from the Regional Water Quality Control Board (RWQCB). Once the City meets the CT&D, the City will commence the permitting and construction process to convey its wastewater to the Linda County Water District (LWD) Regional Wastewater Treatment Facility (WWTF) for treatment and subsequent discharge into the Feather River. Once the project is complete, the existing WWTP ponds will be decommissioned.

1.1 Purpose and Scope

The purpose of this Pond Decommissioning Evaluation is to provide WWTP facility information, convey the results of our evaluation, and provide conclusions relative to our findings.

To prepare this report, we performed the following scope of services:

- Reviewed the *Marysville Wastewater Treatment Compliance Pond Closure Workplan, Addendum No. 1* (Workplan) prepared by Kennedy/Jenks Consultants (November 10, 2016).
- Coordinated with City staff and performed a site reconnaissance to review project limits, determine exploration access and mark out sampling locations.
- Performed 76 hand auger borings to a depth of approximately 3 feet within 19 ponds.
- Performed 16 hand auger borings to a depth of approximately 3 feet from background locations around the ponds.
- Logged the borings in accordance with the Unified Soil Classification System (USCS).
- At each boring, obtained a sludge/surface sample, a soil sample immediately below the sludge/soil interface, and/or a soil sample at a depth of 2.5 to 3 feet.
- Upon completion, backfilled the borings with soil cuttings.
- Analyzed selected soil and sludge/surface samples by a California-certified analytical laboratory for the following:
  - ✓ CAM 17 metals by United States Environmental Protection Agency (USEPA) 6010B/7470
  - ✓ Gasoline, diesel- and oil-range organics (GRO, DRO, and ORO) by USEPA Method 8015
  - ✓ Volatile Organic Compounds (VOCs) by USEPA Method 8260
  - ✓ Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270
  - ✓ Organochlorine Pesticides (OCPs) by USEPA Method 8081
  - ✓ Paint Filter Test by USEPA Method 9095B
- Performed field quality assurance/quality control (QA/QC) procedures. QA/QC measures included the following:
  - ✓ Equipment Blanks
  - ✓ Field Duplicates

- Performed laboratory QA/QC procedures for each method of analysis with specificity for each analyte based on SW-846 requirements and USEPA. QA/QC measures included the following:
  - ✓ Method Blanks
  - ✓ Laboratory Control Samples and Duplicates
  - ✓ Matrix Spike and Matrix Spike Duplicates
  - ✓ Surrogate Standards
  - ✓ Calibration Checks
- Performed material property testing to support assessment of dewatering and/or material handling requirements. Material property testing included the following:
  - ✓ In-Place Dry Density and/or Moisture Content: ASTM D2216 and D2937
  - ✓ Grain Size Distribution/Percent Passing No. 200 Sieve: ASTM D422
  - ✓ Atterberg Limits: ASTM D4318
  - ✓ Specific Gravity: ASTM D854
- Prepared this report to transmit the field and laboratory data and data evaluation.

Details of our field exploration program including exploratory boring logs are presented in Appendix A. Approximate locations of our borings are shown on the Site Plans - Figures 2 and 3. Details of our material property testing program and test results are summarized in Appendix B.

2.0 SITE BACKGROUND

The Marysville WWTP is located at Biz Johnson Drive / 14th Street west of Highway 70 in Marysville, California (Figure 1). The WWTP includes thirteen ponds to the west of the Yuba River and six to the east of the Yuba River. The site is bounded to the north by Cotton Rosser Arena Pavilion, to the east by railroad tracks, to the west by the Feather River, and to the south by a walnut orchard (Figures 2 and 3). Land use in the surrounding area is generally light industrial and agricultural.

2.1 Topography

The Site and surrounding vicinity are relatively flat with minimal relief. Elevation of the Site is approximately 50 to 60 feet above mean sea level (MSL). The land surface of the surrounding region slopes gradually downward to the south.

2.2 Geology

The Site is located within the northern portion of the Great Valley Geomorphic Province, or what is more commonly referred to as the Sacramento Valley. The valley is a broad lowlands bounded by the Sierra Nevada to the east and the Coast Ranges to the west. The Sacramento Valley has been filled with a thick sequence of sedimentary deposits of Jurassic to recent age. The site vicinity, including most of the City of Marysville, is mapped as Quaternary (Holocene) Alluvium (Saucedo and Wagner, 1992). The Site is mapped as Qa – Natural levee and channel deposits.

2.3 Groundwater

Review of the Department of Water Resources *Sustainable Groundwater Management Act (SGMA) Data Viewer* (https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer) *Fall 2018 Contour* indicates that the average groundwater depth in the site vicinity ranges from approximately 20 to 30 feet below ground surface.

It should be noted that fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors. Depth to groundwater can also vary significantly due to the close proximity of the Feather and Yuba Rivers, localized pumping, irrigation practices, and seasonal fluctuations. Groundwater was not encountered during our field exploration which extended to a maximum depth of approximately 3 feet below the bottoms of the ponds.

3.0 POND EVALUATION

The purpose of the pond evaluation was to characterize the pond sludge and soils as outlined in the approved Workplan, to support regulatory closure of the wastewater ponds. This section presents the scope, methodology, and results of the evaluation.

3.1 Pond Sludge/Soil Sampling

We advanced 76 hand-auger borings at the approximate locations depicted on the Site Plans (Figures 2 and 3). At each boring location, we obtained a sludge/surface sample, a soil sample immediately below the sludge/soil interface, and a soil sample at a depth of 2.5 to 3 feet. The sludge thickness ranged from ½ inch to 6 inches. A summary of sludge thickness measurements at each boring location is presented in Table 1. The samples were collected from the hand-auger bucket, placed into glass jars, subsequently labeled, placed in chilled coolers containing ice and delivered to Advanced Technology Laboratories (ATL), a California-certified analytical laboratory, for analytical testing under chain-of-custody (COC) documentation. We collected additional samples at each depth which were placed into sealable plastic bags, subsequently labeled, and transported to the Geocon laboratory for material property testing. Selected soil and sludge/surface samples were composited in the field or in the laboratory prior to analysis.

3.2 Background Soil Sampling

We advanced 16 hand-auger borings (BK1 through BK16) at locations adjacent to and between the treatment ponds and collected background soil samples from each location. The approximate background soil sample locations are depicted on the Site Plans, Figures 2 and 3. For boring locations BK1 through BK8, we collected a soil sample from the surface and from a depth of 2.5 to 3 feet from each boring. For boring locations BK9 though BK16, we collected a soil sample from each boring at a depth of 2.5 to 3 feet.

The soil samples were collected from the hand-auger bucket and placed into glass jars, subsequently labeled, placed in a chilled cooler containing ice and delivered to ATL as previously described. QA/QC procedures performed during the soil sampling included cleansing/rinsing the equipment prior to and between borings. Cleansing/rinsing of the sampling equipment was performed by washing the equipment with an Alconox solution followed by subsequent tap water and deionized water rinses.

3.3 Laboratory Analyses

The sludge/soil samples were analyzed by ATL for the following:

- CAM 17 metals by USEPA 6010B/7470;
- GRO, DRO and ORO by USEPA Method 8015;
- VOCs by USEPA Method 8260;
- SVOCs by USEPA Method 8270;
- OCPs by USEPA Method 8081; and
- Paint Filter Test by USEPA Method 9095B.

Additionally, we performed material property testing on selected samples including the following tests:

- In-Place Dry Density and Moisture Content: ASTM D2216 and D2937;
- Grain Size Distribution/Percent Passing No. 200 Sieve: ASTM D422;
- Atterberg Limits: ASTM D4318; and
- Specific Gravity: ASTM D854.

3.4 Pond Evaluation Results

This section provides a summary of the pond evaluation results. Details of our field exploration program including exploratory boring logs are presented in Appendix A. Details of our material property testing program and test results are summarized in Appendix B. Approximate locations of our borings are shown on the Site Plans - Figures 2 and 3. Sludge thicknesses for each boring location are presented in Table 1, sludge and soil sample analytical test results are presented in Tables 2 through 4, and the laboratory reports and chain-of-custody documentation are presented in Appendix C.

3.4.1 Title 22 Metals

The Title 22 metals analytical results for the sludge/surface and soil samples are presented in Table 2. Results for the background samples collected from the site are also included in Table 2. For comparison, Table 2 includes the USEPA Regional Screening Levels (RSLs) and California Department of Toxic Substances Control Human Health Risk Assessment Note 3 Screening Levels (HHRA Note 3). Table 2 also includes key waste determination criteria values: Total Threshold Limit Concentration (TTLC) and ten times the Soluble Threshold Limit Concentration (STLC), and published background metals concentrations.

The range of Title 22 metal analytical results for the sludge and soil samples, along with the background soil sample results for comparison, are summarized hereinafter for each pond:

Analyte	Pond 1	Pond 1A	Pond 2	Pond 2A	Pond 3A	Background Soil Samples (2.5-3 feet)
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0-2.5	<2.0 to 7.2
Arsenic	1.1-14	1.5-5.1	<1.0-19	2.0-5.2	<1.0-4.4	2.2 to 11
Barium	34-250	54-110	31-440	54-110	53-240	23 to 550
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<1.0-1.6	<1.0-1.0	<1.0-1.7	<1.0	<1.0-1.6	<1.0 to 2.4
Chromium	16-50	26-44	22-44	19-37	18-57	12 to 58
Cobalt	2.7-6.0	5.4-12	3.0-4.1	3.6-10	2.7-49	2.2 to 10
Copper	14-460	21-140	14-760	26-150	33-280	14 to 420
Lead	3.3-60	3.8-74	4.8-50	6.0-30	41-320	2.6 to 220
Molybdenum	<1.0-25	<1.0-2.3	<1.0-38	<1.0-2.8	<1.0-1.1	<1.0 to 5.9
Nickel	11-30	23-23	14-23	13-28	9.6-25	9.2 to 33
Selenium	<1.0-1.9	<1.0	<1.0-4.7	<1.0	<1.0	<1.0 to 3.8
Silver	<1.0-15	<1.0-9.5	<1.0-8.9	<1.0-6.4	2.3-12	<1.0 to 65
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	27-73	39-51	29-85	25-50	24-49	21 to 53
Zinc	25-590	27-240	34-970	29-220	78-490	18 to 190
Mercury	0.13-1.6	0.27-1.3	0.15-1.1	0.22-0.61	0.22-1.1	<0.10 to 0.95

Results reported in milligrams per kilogram.

Analyte	Pond 3B	Pond 3C	Pond 4	Pond 5	Pond 5A	Background Soil Samples (2.5-3 feet)
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0 to 7.2
Arsenic	1.5-5.5	<1.0-1.5	2.1-10	<1.0-3.2	<1.0	2.2 to 11
Barium	45-150	34-61	52-240	8.5-93	19-54	23 to 550
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<1.0-2	<1.0	<1.0-1.2	<1.0	<1.0	<1.0 to 2.4
Chromium	24-37	18-23	27-52	10-45	11-36	12 to 58
Cobalt	4.9-7.0	2.9-4.7	7.5-8.5	<1.0-10	<1.0-2.7	2.2 to 10
Copper	20-230	13-49	24-430	4.1-55	4.1-28	14 to 420
Lead	6.9-220	3.5-17	5.5-52	3.3-31	4.4-28	2.6 to 220
Molybdenum	<1.0-1.9	<1.0	<1.0-11	<1.0	<1.0	<1.0 to 5.9
Nickel	18-26	9.1-11	25-33	3.9-57	4.4-18	9.2 to 33
Selenium	<1.0	<1.0	<1.0-1.3	<1.0	<1.0	<1.0 to 3.8
Silver	<1.0-6.1	<1.0-3.2	1.0-9.0	<1.0-3.4	1.1-8.3	<1.0 to 65
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	33-55	30-33	38-63	7.0-39	9.8-21	21 to 53
Zinc	38-460	20-73	33-430	11-140	11-67	18 to 190
Mercury	0.21-0.45	<0.1-0.18	0.28-1.2	<0.10-0.17	<0.10-0.37	<0.10 to 0.95

Results reported in milligrams per kilogram.

Analyte	Pond 6	Pond 7	Pond 8	Pond A	Pond B	Background Soil Samples (2.5-3 feet)
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0 to 7.2
Arsenic	1.2-1.5	1.2-2.1	<1.0-2.3	2.3-6.0	2.7-3.1	2.2 to 11
Barium	39-57	36-45	29-66	86-94	61-130	23 to 550
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 to 2.4
Chromium	23-36	19-31	21-34	24-27	18-28	12 to 58
Cobalt	6.6-6.8	5.2-8.1	3.5-6.7	6.8-7.8	4.3-5.5	2.2 to 10
Copper	20-46	12-27	16-93	20-30	23-66	14 to 420
Lead	5.9-18	2.9-8.1	5.3-21	7.3-14	13-23	2.6 to 220
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 to 5.9
Nickel	18-24	17-31	14-24	20-22	15-19	9.2 to 33
Selenium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 to 3.8
Silver	1.0-3.7	<1.0-2.2	<1.0-3.9	1.2-1.7	2.0-6.7	<1.0 to 65
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	34-44	28-42	28-46	34-41	27-41	21 to 53
Zinc	29-69	17-43	21-120	25-49	30-100	18 to 190
Mercury	0.11-0.34	0.19-0.28	0.15-0.39	0.27-0.38	0.31-0.40	<0.10 to 0.95

Results reported in milligrams per kilogram.

Analyte	Pond C	Pond D	Pond E	Pond F	Background Soil Samples (2.5-3 feet)
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0 to 7.2
Arsenic	1.5-5.7	1.9-4.2	1.7-4.1	2.3-4.8	2.2 to 11
Barium	77-110	59-110	45-100	110-140	23 to 550
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0 to 2.4
Chromium	22-30	25-30	22-28	29-31	12 to 58
Cobalt	5.8-10	5.9-7.7	6.2-8.5	6.2-9.2	2.2 to 10
Copper	21-48	20-39	16-32	26-29	14 to 420
Lead	5.5-14	6.8-10	6.2-8.8	9.3-11	2.6 to 220
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0 to 5.9
Nickel	18-34	21-24	18-25	22-28	9.2 to 33
Selenium	<1.0	<1.0	<1.0	<1.0	<1.0 to 3.8
Silver	1.0-2.1	1.1-2.8	1.0-2.3	1.5-2.0	<1.0 to 65
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	31-47	34-45	31-42	42-44	21 to 53
Zinc	24-52	23-56	23-48	34-52	18 to 190
Mercury	0.12-0.41	0.23-0.29	0.14-0.50	0.25-0.27	<0.10 to 0.95

Results reported in milligrams per kilogram.

3.4.2 GRO, DRO, ORO, VOCs, SVOCs and Paint Filter Test

The GRO, DRO, ORO, VOC, SVOC, and Paint Filter Test analytical results for the sludge/surface and soil samples are presented in Table 3. Results for the background samples are also included in Table 3. For comparison, Table 3 includes the RSLs and HHRA Note 3 Screening Levels, as well as the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs) for GRO, DRO and ORO.

GRO and free liquid (Paint Filter Test) were not reported at concentrations greater than the laboratory test method reporting limits for each of the sludge/surface and soil samples. The range of DRO, ORO, VOC and SVOC analytical results for the sludge and soil samples, along with the background soil sample results for comparison, are summarized hereinafter for each pond:

Analyte	Pond 1	Pond 1A	Pond 2	Pond 2A	Pond 3A	Background Soil Samples (2.5-3 feet)
DRO	5.4-3,400	4.9-370	6.2-10,000	1.7-610	110-450	1.6-2,400
ORO	6.5-8,400	6.6-920	8.2-28,000	2.7-1,500	270-1,100	2.8-4,600
Carbon disulfide	<5.0-10	<5.0-10	<5.0-20	<5.0-9.8	<5.0	<5.0
Methylene chloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tert-butanol	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<330-440	<330	<330	<330	<330	<330-3,700
Bis(2-ethylhexyl)phthalate	<330-1,300	<330	<330-11,000	<330	<330	<330
4-Chloroaniline	<660	<660	<660	<660	<660	<660

DRO/ORO results reported in milligrams per kilogram.
VOC and SVOC results reported in micrograms per kilogram

Analyte	Pond 3B	Pond 3C	Pond 4	Pond 5	Pond 5A	Background Soil Samples (2.5-3 feet)
DRO	4.9-390	9.0-290	3.3-7,600	6.5-620	5.3-87	1.6-2,400
ORO	8.7-1,100	18-780	4.0-16,000	11-1,400	10-210	2.8-4,600
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride	<5.0	<5.0	<5.0-34	<5.0	<5.0	<5.0
Tert-butanol	<100	<100	<100-340	<100	<100	<100
Benzo(g,h,i)perylene	<330	<330	<330	<330	<330	<330-3,700
Bis(2-ethylhexyl)phthalate	<330	<330	<330-4,300	<330	<330	<330
4-Chloroaniline	<660	<660	<660	<660	<660	<660

DRO/ORO results reported in milligrams per kilogram.
VOC and SVOC results reported in micrograms per kilogram

Analyte	Pond 6	Pond 7	Pond 8	Pond A	Pond B	Background Soil Samples (2.5-3 feet)
DRO	30-120	4.5-29	5.7-2,100	7.0-32	7.5-350	1.6-2,400
ORO	66-300	11-72	12-5,100	13-88	15-730	2.8-4,600
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride	<5.0	<5.0	<5.0-6.4	<5.0	<5.0	<5.0
Tert-butanol	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<330	<330	<330	<330	<330	<330-3,700
Bis(2-ethylhexyl)phthalate	<330	<330	<330	<330	<330	<330
4-Chloroaniline	<660	<660	<660	<660	<660-740	<660

DRO/ORO results reported in milligrams per kilogram.
VOC and SVOC results reported in micrograms per kilogram

Analyte	Pond C	Pond D	Pond E	Pond F	Background Soil Samples (2.5-3 feet)
DRO	3.9-21	4.4-50	4.3-29	2.4-18	1.6-2,400
ORO	7.5-60	7.3-110	7.2-93	4.8-85	2.8-4,600
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride	<5.0	<5.0	<5.0-7.0	<5.0	<5.0
Tert-butanol	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<330	<330	<330	<330	<330-3,700
Bis(2-ethylhexyl)phthalate	<330	<330	<330	<330	<330
4-Chloroaniline	<660	<660	<660	<660	<660

DRO/ORO results reported in milligrams per kilogram.
VOC and SVOC results reported in micrograms per kilogram

3.4.3 Organochlorine Pesticides

The OCP analytical results for the sludge/surface and soil samples are presented in Table 4. Results for the background samples are also included in Table 4. For comparison, Table 4 includes the RSLs and HHRA Note 3 Screening Levels.

Only 4,4-DDD and 4,4-DDE were reported at concentrations greater than the laboratory test method reporting limits for the sludge/surface and soil samples. Additional OCPs were detected in the background soil samples, however, they are not included in the following tables since they were not detected in the samples collected from the ponds. The range of OCP analytical results for the sludge and soil samples, along with the background soil sample results for comparison, are summarized hereinafter for each pond. Due to the variable laboratory test method reporting limits, ND (not detected) is listed for ponds where a detection was not reported.

Analyte	Pond 1	Pond 1A	Pond 2	Pond 2A	Pond 3A	Background Soil Samples (2.5-3 feet)
4,4-DDD	ND	ND-53	ND	ND	ND-7.3	ND-54
4,4-DDE	ND	ND-240	ND	ND-50	13-26	ND-150

Results reported in micrograms per kilogram.

Analyte	Pond 3B	Pond 3C	Pond 4	Pond 5	Pond 5A	Background Soil Samples (2.5-3 feet)
4,4-DDD	ND	ND-3.9	ND	ND-7.1	ND-48	ND-54
4,4-DDE	ND-67	ND-13	ND-8.1	ND-6.5	2.9-41	ND-150

Results reported in micrograms per kilogram.

Analyte	Pond 6	Pond 7	Pond 8	Pond A	Pond B	Background Soil Samples (2.5-3 feet)
4,4-DDD	ND-8.5	ND	ND-2.5	ND	ND	ND-54
4,4-DDE	13-21	ND-6.5	ND	ND	ND	ND-150

Results reported in micrograms per kilogram.

Analyte	Pond C	Pond D	Pond E	Pond F	Background Soil Samples (2.5-3 feet)
4,4-DDD	ND	ND	ND	ND	ND-54
4,4-DDE	ND	ND	ND	ND	ND-150

Results reported in micrograms per kilogram.

3.4.4 QA/QC

The field QA/QC implemented for the pond sampling included the collection of two duplicate samples and the submittal of an equipment blank sample. Composite sample B7-C-2 was duplicated and labeled as B7-C-2 dup. Composite sample BC-C1-4-0 was duplicated and labeled as BC-C1-4-0 dup. When comparing the results of the primary samples with their respective duplicate samples, CAM 17 metals and OCPs were reported at similar concentrations, thus showing good laboratory repeatability for these analyses. DRO and ORO were reported at similar concentrations for sample B7-C-2 and its duplicate, however, the results for the duplicate sample for DRO and ORO were nearly double the concentrations of the primary samples, reflecting the variability of the sludge/surface material. GRO, VOCs, SVOCs and Free Liquid (Paint Filter Test) were not reported at concentrations equal to or greater than their laboratory test method reporting limits for either the primary or duplicate samples.

CAM 17 metals, GRO and VOCs (with the exception of chloroform), were not reported at concentrations greater than their laboratory test method reporting limits for the equipment blank sample. DRO, ORO and chloroform were reported for the equipment blank sample at respective concentrations of 0.15 milligrams per liter (mg/l), 0.14 mg/l, and 6.5 micrograms per liter. Chloroform is a typical laboratory

contaminant and was not detected in any of the sludge or soil samples. Due to the variability of the DRO and ORO detections in the sludge and soil samples, the presence of low levels of DRO and ORO in the equipment blank does not appear to have affected the sample results.

We also reviewed the analytical laboratory QA/QC provided with the laboratory report. The analytical laboratory QA/QC data showed acceptable recoveries and relative percent differences for the matrix spikes and matrix spike duplicates, and/or acceptable laboratory control samples. Based on this limited data review, no qualification of the data is necessary, and the data herein are considered of sufficient quality for the purposes of this report.

3.4.5 Material Property Testing

The material property testing results for the sludge/surface and soil samples are presented in Appendix B. The range of material property testing results for the sludge and soil samples, including moisture content, percent passing No. 200 sieve (percent fines), Atterberg Limits (Liquid Limit and Plasticity Index), and specific gravity, are summarized hereinafter for each pond:

Test	Pond 1	Pond 1A	Pond 2	Pond 2A	Pond 3A
Moisture Content (%)	4.5-9.7	13.3-39.8	26.8	40.1-54.6	3.3-12.7
Percent Fines (%)	16.5-42.0	41.2-90.6	45.2	75.7-98.3	29.6-46.0
Liquid Limit	72	37-44	107	43-69	NP-30
Plasticity Index	4	8-9	8	13-26	NP
Specific Gravity	2.164-2.645	2.646-2.711	2.096	2.670	2.589-2.613

NP = non-plastic

Test	Pond 3B	Pond 3C	Pond 4	Pond 5	Pond 5A
Moisture Content (%)	5.4	4.1	16.8-41.2	29.6	1.8-4.4
Percent Fines (%)	21.5	37.3	7.2-94.4	2.6-20.0	18.1
Liquid Limit	NP-58	NP	25-51	NP	NP
Plasticity Index	NP	NP	NP-8	NP	NP
Specific Gravity	2.320	2.637	2.546	2.658-2.738	2.654

NP = non-plastic

Analyte	Pond 6	Pond 7	Pond 8	Pond A	Pond B
Moisture Content (%)	4.7	2.1-6.2	4.2-10.5	5.3	3.9-5.3
Percent Fines (%)	14.6-74.9	39.4	50.6-68.2	26.1-54.8	44.1
Liquid Limit	42	23	25-52	NP-26	NP
Plasticity Index	12	1	NP-12	NP	NP
Specific Gravity	2.651-2.694	2.650	2.607-2.683	2.640	2.557

NP = non-plastic

Analyte	Pond C	Pond D	Pond E	Pond F
Moisture Content (%)	3.9-5.2	4.4	2.2	3.4-4.5
Percent Fines (%)	47.2-53.5	62.1	30.9	36.4-37.8
Liquid Limit	24-29	NP	NP-29	NP-24
Plasticity Index	NP-1	NP	NP	NP
Specific Gravity	2.629	2.625	2.635-2.706	2.696

NP = non-plastic

3.5 Discussion of Findings

Title 22 Metals

The reported antimony, barium, beryllium, cadmium, chromium, silver, and thallium concentrations reported for the sludge and soil samples were all within the background range for these metals. Metals concentrations exceeded the background concentrations at the following locations:

Arsenic: Pond 1 (sludge), Pond 2 (sludge)

Cobalt: Pond 1A (2.5-3 feet soil)

Copper: Pond 1 (sludge), Pond 2 (sludge), Pond 4 (sludge)

Lead: Pond 3A (sludge)

Molybdenum: Pond 1 (sludge), Pond 2 (sludge), Pond 4 (sludge)

Nickel: Pond 1A (2 sludge and 2.5-3 feet soil), Pond 5 (1-1.5 inches soil), Pond C (2.5-3 feet soil)

Selenium: Pond 2 (sludge)

Vanadium: Pond 1 (sludge), Pond 2 (sludge), Pond 3B (sludge), Pond 4 (sludge)

Zinc: Pond 1 (sludge), Pond 1A (sludge), Pond 2 (sludge), Pond 2A (sludge), Pond 3A (sludge), Pond 3B (sludge), Pond 4 (sludge)

Mercury: Pond 1 (sludge), Pond 1A (2.5-3 feet soil), Pond 2 (sludge), Pond 3A (sludge), Pond 4 (sludge)

GRO, DRO, ORO, VOCs, SVOCs and Paint Filter Test

GRO and free liquid (Paint Filter Test) were not reported at concentrations greater than the laboratory test method reporting limits for each of the sludge/surface and soil samples. Reported DRO, ORO, VOC and SVOC concentrations exceeded the background concentrations at the following locations:

DRO: Pond 1 (sludge), Pond 2 (sludge), Pond 4 (sludge)

ORO: Pond 1 (sludge), Pond 2 (sludge), Pond 4 (sludge), Pond 8 (sludge)

Carbon disulfide: Pond 1 (sludge), Pond 1A (2 sludge), Pond 2 (sludge), Pond 2A (sludge)

Methylene chloride: Pond 4 (sludge and 2.5-3 inches soil), Pond 8 (2.5-3 inches soil)

Tert-butanol: Pond 4 (sludge)

Benxo(g,h,i)perylene: Pond 1 (3-4 inches soil)

Bis(2-ethylhexyl)phthalate: Pond 1 (3-4 inches soil), Pond 2 (sludge)

4-Choloroaniline: Pond B (2-2.5 inches soil)

Organochlorine Pesticides

The only OCP concentration exceeding background concentrations was the 4,4-DDE concentration reported for the soil sample collected from 1-2 inches in Pond 1A.

Conclusions

Concentrations of select Title 22 metals, DRO, ORO, select VOCs, and select SVOCs were detected at concentrations exceeding the background concentration range in sludge/surface samples collected from Ponds 1, 1A, 2, 2A, 3A, 3B, 4, and 8.

Concentrations of select Title 22 metals, select VOCs, select SVOCs, and select OCPs were detected at concentrations exceeding the background concentration range in soil samples collected immediately below the sludge/soil interface from Ponds 1, 1A, 4, 5, 8, and B.

Concentrations of select Title 22 metals were detected at concentrations exceeding the background concentration range in soil samples collected from a depth of 2.5-3 feet from Ponds 1A and C.

Reported concentrations of Title 22 metals, DRO, ORO, VOCs, and SVOCs did not exceed the background concentration range for each of the sludge/surface or soil samples collected from Ponds 3C, 5, 5A, 6, 7, A, D, E, and F.

Additional sampling and analysis is not necessary to further characterize the vertical or lateral extent of the chemicals of concern within the ponds. During sludge removal, the material should be handled and disposed of properly, in accordance with the receiving facility's requirements. Upon completion of the sludge removal, confirmation sampling is required to confirm that the chemicals of concern have been removed from the ponds.