2.0 SITE CHARACTERIZATION

This section provides the Site topography, climatology, geology, hydrogeology, and land/water use that are required content for an AROWD. This section also provides investigation results and landfill characteristics (e.g., landfill cap construction and nature/extent of waste) that are required content for a Clean Closure Work Plan.

2.1 Topography

This section provides information on topography of the Site and surrounding region and the Site location relative to the floodplain.

2.1.1 Topographic Map

The topographic map for the Site and its surrounding region within a 1-mile radius is provided in Figure 2-1. The surrounding region is within the watershed of the American River and the regional drainage pattern is towards Lake Natoma. The Site is located on a terrace of the American River, adjacent to Lake Natoma. The elevation of the landfill cap ranges from approximately 153 to 156 feet above mean sea level (MSL). The topography rises to the east of the landfill to approximately 173 to 175 feet MSL and falls to the west to approximately 135 to 137 feet MSL. The primary Site drainage pattern is discussed in Section 2.2.3.

2.1.2 Floodplain

The floodplain map for the Site and its surrounding region within a 1-mile radius is provided in Figure 2-2. The Site is located in Zone C (areas of minimal flooding) and is not within the 100-year or 500-year flood zone according to the Federal Emergency Management Agency (FEMA).

2.2 Climatology

This section provides Site climatology information including precipitation, evapotranspiration, surface water drainage, and wind direction.

2.2.1 Precipitation and Evapotranspiration

An isohyetal contour map for the Site and surrounding region within a 10-mile radius is provided in Figure 2-3. The isohyetal map indicates the average annual precipitation for the Site is approximately 23 to 24 inches. The average precipitation and evapotranspiration near the Site is provided in the table below. The sources of the data and periods of record are noted in the table. The minimum monthly precipitation of 0.09 inches typically occurs in July and the maximum precipitation of 4.43 inches typically occurs in January. Average annual evapotranspiration near the Site is 57.06 inches. The minimum monthly evapotranspiration of 1.59 inches typically occurs in December and January and the maximum evapotranspiration of 8.67 inches typically occurs in July.

Average Precipitation and Evapotranspiration Near Site		
Month	**Precip.[(1)] (in)**	**Evap.[(2)] (in)**
January	4.43	1.59
February	3.82	2.20
March	3.92	3.66
April	1.91	5.08
May	0.63	6.83
June	0.24	7.80
July	0.09	8.67
August	0.11	7.81
September	0.46	5.67
October	1.47	4.03
November	3.36	2.13
December	3.48	1.59
Total	**23.92**	**57.06**

(1) National Weather Service (NWS) Cooperative Observer Program (COOP) Folsom Dam Station 043113 operated by the U.S. Bureau of Reclamation; period of record 10/26/55 to 4/30/93
(2) California Irrigation Management Information System (CIMIS) & California Department of Water Resources (DWR) Fair Oaks Station 131; period of record 4/97 to present

2.2.2 Design Storm
The landfill was originally designed to accommodate surface water drainage per regulations in 1996. The design storm (100-year/24-hour) precipitation for the region surrounding the Site is 3.91 inches (CIMIS & DWR Fair Oaks Station 131; period of record 4/97 to present).

2.2.3 Runoff Volume/Pattern
The surface water drainage for the landfill is provided in Figure 2-4. Surface water that does not infiltrate the vegetative soil layer of the landfill cap drains from the crest of the cap toward the margins. The surface water is then collected in earthen drainage ditches and directed along the perimeter to grouted riprap discharge structures. After waste in the landfill has been removed, the Site will be final-graded as necessary to ensure that drainage is adequate to prevent ponding or erosion. Calculation of the runoff volume for the landfill is not relevant for clean closure since the landfill will be removed.

2.2.4 Wind Rose
Wind direction in the region near the Site blows predominantly from the south/southeast based on Western Regional Climate Center (WRCC) hourly data from 1992 to 2002 from the Mather Station. The average annual wind speed in the region is 7.8 miles per hour based on National Climatic Data Center (NCDC) data from 1950 to 2001 at Sacramento, California.

In early March 2008, a meteorological station was installed in the southern portion of the Site along Young Wo Circle. The station records wind direction/speed, temperature/relative humidity, and barometric pressure at 15-minute intervals on a continuous basis. The station also features a digital

camera, data logger with flash memory, and solar powered battery. A Site wind rose is provided in Appendix E for wind measurements from March 7 to April 28, 2008. The preliminary wind data indicate that wind at the Site blows primarily from the north and the south. This wind pattern is common for areas near a water body (e.g., “up-canyon” and “down-canyon” winds on a river). Wind speeds at the Site are typically light to moderate.

2.3 Geology

Geology of the Site is provided in detail in Appendix C and summarized in this section. The Site is located where fluvial deposits of the ancestral and modern American River flood plain abut the foothills of the Sierra Nevada. A geologic map of the Site is provided in Figure 2-5 and geologic cross sections are provided in Figure 2-6 and Figure 2-7. Two surface units have been identified at the Site: the undisturbed Laguna Formation and dredged material (from historical gold mining operations) of the Laguna Formation (i.e., dredge tailings). Surface exposures of the Laguna Formation occur east and north of the landfill. The landfill was constructed within and is directly underlain by dredge tailings which overly the Mehrten Formation. More extensive dredge tailings can be observed to the west and south of the Site towards the American River. Off-site, the characteristic serrated shape of the dredge tailings can be observed. On-site, this material has been leveled for the landfill and Corporation Yard

2.3.1 Materials

The geologic formations at the Site consist primarily of the Laguna Formation (and dredged material of the Laguna Formation) and the Mehrten Formation as described below.

- <u>Laguna Formation</u>: This formation consists of poorly bedded layers of silt, clay, sand, and gravel deposited by meandering rivers and streams such as the American River. Historical gold mining operations in the area included extensive dredging of the Laguna Formation to reported depths of 40 to 90 feet below ground surface (bgs). At the Site, dredge tailings have been noted to a depth of approximately 30 feet bgs. Sediments are generally non-volcanic and predominantly arkosic (feldspar-rich) in contrast to the underlying formations. The underlying Mehrten Formation is distinguished from the Laguna Formation by the first occurrence of sediments composed predominantly of andesitic material. Unaltered dredge tailings consist predominantly of cobbles with interbedded fine-grained layers.

- <u>Mehrten Formation</u>: This formation consists of clays, conglomerates, and mudflows predominantly of andesitic detritus. The conglomerates are poorly sorted, well-rounded porphyritic andesitic cobbles with a matrix composed of ashy clay, silt, and sand. The mudflow, or lahar, consists of moderate to cobble size clasts cemented in an ash matrix. Both the Mehrten and Laguna Formations represent deposits of the paleo-

American River and, depending on the amount of andesitic material within the Mehrten, can be difficult to distinguish from each other in the subsurface.

2.3.2 Geologic Structure
There are no reported faults within a 1-mile radius of the Site as indicated on the Fault Activity Map (California Geologic Data Map Series Map No. 6) prepared by the California Department of Mines and Geology (CDMG) in 1994.

2.3.3 Engineering and Chemical Properties
During the 2000 Site investigation, information was collected on geotechnical properties of Site materials (Kleinfelder, 2000) as described below. Chemical properties of dredge tailings underlying the landfill were investigated during the February 2008 pre-design data collection field activities (Brown and Caldwell; 2008a, 2008d).

- Soil Parameters: One soil sample was collected at 3 feet below grade from test pit TP-13 outside the main landfill area and tested for geotechnical properties. The soil material description was brown sandy gravel with clay. The plasticity index was 16 while the liquid limit was 33. Based on plasticity charts for the classification of fine-grained soils, this soil had low plasticity.

- Faulting and Seismicity: Historically, seismicity in the Site vicinity has been relatively infrequent and consists of low to moderate size earthquake events. Based on the U.S. Geologic Survey probabilistic map for the region surrounding the Site, the estimated peak horizontal bedrock acceleration at the Site is approximately 0.2 to 0.3 g. As this value does not represent an unusually high ground motion, it is not likely that subsurface dredge tailings would liquefy.

2.4 Hydrogeology
Hydrogeology of the Site is provided in detail in Appendix C and summarized in this section. The regional aquifer in the vicinity of the Site consists of a series of discontinuous layers of permeable and low permeable sediments. Permeable units consist of sand and gravel that correspond to the channel deposits of the Mehrten and Laguna Formations. Low permeability units consist of interbedded clays and silts of the Mehrten and Laguna Formations and form local aquitards and confining units. Perched water has been observed in the area within the dredge tailings and groundwater flow within these zones is dependent upon the slope of the underlying low permeability unit.

2.4.1 Hydraulic Conductivity
The dredge tailings below the landfill generally consist of 60 to 95 percent well-rounded gravel and cobbles with clasts up to 14-inches in diameter. The gravel near the upper portions of the tailings is generally matrix supported with

interstices packed with fine-grained material. The hydraulic conductivity of this type of material (i.e., well-sorted sands and gravels) as reported by Fetter (1994) typically ranges from approximately 1×10^{-1} to 1×10^{-3} centimeters per second.

2.4.2 Flow Direction(s)

In the region surrounding the Site, groundwater generally flows toward the American River. The groundwater monitoring system for the landfill includes six upper zone wells (FCY-2, FCY-4, FCY-5, FCY-6, FCY-8, and FCY-9) and two lower zone wells (FCY-3 and FCY-7). An initial shallow well, FCY-1, was abandoned in 2002 because it was typically dry. Site groundwater within the dredge tailings appears to be perched above the low permeability silts and clays of the underlying Mehrten Formation. As such, the groundwater flow in this unit follows the topography of the top of the Mehrten Formation. As illustrated on Figure C-5 in Appendix C, both the slope of this material and groundwater surface appears to trend away from a mound in the Mehrten Formation near GAS-3 at the eastern edge of the landfill. Therefore, Site groundwater flows radially from the mounded area to the west, southwest and northwest. Due to the limited easterly extent of the shallow zone, attempts to install a shallow upgradient well to the east or northeast of the landfill have been unsuccessful. All of the shallow wells to the west, southwest, and northwest are downgradient. Although no specific data is available, it is expected that the groundwater encountered within the Mehrten Formation at FCY-3 and FCY-7 is not hydraulically connected to the perched groundwater within the dredge tailings.

During the annual groundwater monitoring event in December 2007 (Brown and Caldwell, 2008b), the elevation of groundwater (excluding FCY-3 and FCY-7 completed in the Mehrten Formation) perched within the dredge tailings ranged from approximately 128.00 to 129.34 feet MSL. The hydraulic gradient of the groundwater ranged from 0.004 to 0.006 foot per foot.

2.4.3 Capillary Rise

As described above, the landfill is constructed on dredge tailings, consisting primarily of gravels, cobbles, and boulders, with relatively minor amounts of sand, silt, and clay. The vadose zone occurs between the ground surface and the groundwater surface. Vadose water is held between soil particles by capillarity, which is an inverse function of the average grain size of the material in the vadose zone. Therefore, capillary rise is not as effective in coarse sediments, but can cause water to migrate upward 5 feet or more in fine, well-sorted sediments. Because the majority of sediments lying below the landfill are very coarse-grained and not well sorted, the potential for capillary rise from the vadose zone is low. A waiver from vadose zone sampling beneath the landfill was requested by the City and was granted by the RWQCB on January 17, 1989.

2.4.4 Springs

No springs were identified within a 1-mile radius of the Site (EDR, 2007).

2.4.5 Water Quality

The groundwater monitoring program for the Site was developed to monitor water quality parameters that may be affected as a result of the material present in the landfill. Groundwater monitoring at the Site has been conducted periodically since 1985. On a semi-annual basis, Site groundwater is monitored for the following parameters:

- Field parameters (temperature, turbidity, pH, and specific conductance);
- General minerals (chloride, nitrate, sulfate, total dissolved solids [TDS]);
- Metals (arsenic, chromium, iron, lead, mercury); and
- Volatile organic compounds (VOCs; list of 48 analytes).

A summary of analytical results detected at least once during the semi-annual groundwater program is provided in the following table.

Summary of Groundwater Quality								
Class	**Analyte(1)**	**Units**	**Count**	**Detects**	**Min.**	**Mean**	**Max.**	**Std. Dev.**
General Minerals	Chloride	mg/L	175	169	1.0	11.1	110	11.3
	Nitrate as NO_3	mg/L	168	134	0.1	10.0	43	10.0
	Sulfate as SO_4	mg/L	162	161	2.0	135	690	111
Metals	Arsenic	µg/L	108	53	1.0	4.9	31	5.8
	Chromium	µg/L	108	3	7.3	5.6	24	2.8
	Iron	µg/L	168	119	12	2,628	42,000	6,254
	Lead	µg/L	108	9	2.1	2.5	5.0	1.8
	Mercury	µg/L	108	6	0.025	0.10	0.33	0.03
VOCs	1,2,4-Trichlorobenzene	µg/L	64	1	1.8	---	1.8	---
	Chloroform	µg/L	64	1	0.51	---	0.51	---
	Ethylbenzene	µg/L	67	1	1.0	---	1.0	---
	MTBE	µg/L	66	16	0.54	1.2	20	3.2
	Toluene	µg/L	67	2	6.4	0.4	6.4	1.9
	Total Xylenes	µg/L	66	3	1.8	0.6	7.1	0.9

(1) Statistics shown only for analytes detected at least once during semi-annual monitoring program.

Site groundwater was most recently monitored in December 2007 for the semi-annual monitoring program and six water quality parameters were detected above their primary or secondary maximum contaminant level (MCL) in at least one monitoring well as described below. Historical groundwater monitoring at the Site shows spatial variability in various inorganic constituents indicative of impacts from former Site operations. Trend analysis presented in the 2007 annual report (Brown and Caldwell, 2008b) does not show any clear rising or falling trends since landfill capping in 1996, except for slightly increasing general minerals in off-site well FCY-4 and slightly decreasing general minerals in wells FCY-5 and FCY-6. Concentrations in the most impacted well, FCY-8, have remained constant since the well was installed in 1992. A summary of the data from the December 2007 monitoring event is presented below.

- Arsenic: detected in only one well above the primary MCL of 10 micrograms per liter (µg/L; FCY-8 at 21 µg/L).

- Iron: detected in three wells above the primary MCL of 300 µg/L (FCY-2 at 1,900 µg/L; FCY-4 at 410 µg/L; and FCY-8 at 18,000 µg/L).

- Nitrate: detected in two wells above the primary MCL of 10 milligrams per liter (mg/L; FCY-6 at 14.6 mg/L; and FCY-9 at 13.7 mg/L).

- Sulfate: detected in only one well above the secondary MCL of 250 mg/L (FCY-2 at 260 mg/L).

- Specific Conductance: detected in two wells above the secondary MCL of 900 microSiemens per centimeter (µS/cm; FCY-3 at 910 µS/cm; and FCY-8 at 930 µS/cm).

- Total Dissolved Solids: detected in three wells above the secondary MCL of 500 mg/L (FCY-2 at 520 mg/L; FCY-3 at 610 mg/L; and FCY-8 at 610 mg/L).

On a 5-year basis, Site groundwater is monitored for the following parameters:

- Field parameters (temperature, turbidity, pH, and specific conductance);
- General minerals (bicarbonate, bromide, carbonate, chloride, fluoride, magnesium, nitrate – nitrogen, phosphate, potassium, sodium, sulfate, TDS);
- Metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, chromium VI, cobalt, copper, cyanide, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, sulfide, thallium, tin, vanadium, zinc);
- VOCs (list of 66 analytes); and
- Semi-volatile organic compounds (SVOCs; list of 116 analytes).

Site groundwater was most recently monitored in December 2006 for the 5-year review monitoring program. General minerals and inorganic parameters were either within historical ranges or not detected. No VOCs or SVOCs were detected. The SVOC list includes polychlorinated byphenyls (PCBs), organochlorine pesticides, organophosphorous pesticides, and chlorophenoxy herbicides.

Groundwater impacts at the Site may be attributable to one or more of the following factors:

- Leachate infiltration due to the unlined landfill and reported disturbance of the pond liner;

- Reducing effects of the former sewage treatment plant pond sediments on groundwater chemistry (e.g., dissolution of natural iron and arsenic);
- Landfill gas effects (i.e., elevated bicarbonate); and
- Natural spatial variability.

Increasing concentrations to the north of the Site (i.e., from FCY-9 to FCY-8) may be attributable to one or more of the following factors:

- Thicker waste column and less groundwater separation in the former aeration pond;
- More leachate infiltration or landfill gas in the northern portion of the landfill; and
- Natural spatial variability.

2.4.6 Background

As discussed in Section 2.4.2, first groundwater beneath the landfill occurs within perched water developed within dredge tailings. Both FCY-3 and FCY-7 were installed in areas that have not been dredged and are completed within the Mehrten Formation. Assessment of depth to groundwater and the groundwater gradient strongly suggests that the groundwater at FCY-3 and FCY-7 is not hydraulically connected with the perched water system beneath the landfill. As such, these wells do not monitor background conditions for the landfill. However, it is important to note, that even if groundwater in the two systems are hydraulically connected, water elevations at FCY-3 and FCY-7 are significantly higher than beneath the landfill and therefore, potential impacts from the landfill would not migrate in this direction.

In June 2002, groundwater monitoring well FCY-8 was installed to provide an upgradient monitoring point; however, contact with the Mehrten Formation at FCY-8 was slightly lower than the contact at FCY-6. As such, groundwater in the northern portion of the Site trends away from the mound near FCY-6 and moves toward FCY-8. Based on this, there is no area near the landfill that would be in a location considered to be upgradient of the landfill.

Monitoring results of FCY-9 indicate former Site operations (i.e., as sewage treatment plant ponds and subsequently as a landfill) do not appear to affect groundwater in the southern portion of the Site. Therefore, concentration limits (CLs) presented in a separate document were based on groundwater results from alternative background monitoring point FCY-9.

2.5 Land and Water Use

Land and water use at the Site and within a 1-mile radius are provided below.

2.5.1 Water Use

There were no water wells, oil wells, or geothermal wells identified within one mile of the Site (EDR, 2007).

2.5.2 Land Use

Current land use within a 1-mile radius of the Site is provided in Figure 1-1. Land use includes recreational (e.g., Folsom Lake State Recreation Area), residential (e.g., Lake Natoma Shores development), commercial (e.g., Folsom Historic District), and industrial (e.g., Kikkoman soy sauce production facility). Currently, there is no agricultural or grazing activity within a 1-mile radius of the Site.

2.5.3 Groundwater Use

Based on a 2008 Department of Water Resources (DWR) survey, there are no water supply wells within a one-mile radius of the Site (Figure 2-8). The DWR survey did find a 1956 well log for an "industrial well" located 150 feet east of Main Avenue and 150 feet south of Greenback Lane in Orangevale. This well would be located approximately 1 mile west of the Site and 1/2 mile west of Lake Natoma (Figure 2-8). On the well log, the driller stated, "The well was dry from 68 feet to 107 feet." Reconnaissance conducted by Brown and Caldwell on February 27, 2008 of the area indicated that the area is developed and there is no trace of the well at the location stated on the well log.

There were also two wells of unknown use installed in 1948 on the south side of Bidwell Street near Reading Street, approximately 3/4 mile southeast of the Site. Reconnaissance conducted by Brown and Caldwell on February 27, 2008 indicated that the area is developed with an industrial complex, a storage facility, and small businesses. Mr. Scalzi, a long-time resident and owner of a 5-acre parcel where these wells would be located, was contacted and interviewed by Brown and Caldwell on February 29, 2008. He had no knowledge of any wells on his property or surrounding properties. He said he thought it was very likely that these wells were abandoned a long time ago.

All of the other wells provided by DWR within 1 mile of the Site are monitoring wells, remediation wells, and one cathodic protection well as shown on Figure 2-8. Properties with monitoring wells and remediation wells are represented on the figure as a single point even though all of those sites have multiple wells. There are no wells reported within 1,000 feet of the landfill, except the existing monitoring wells at the Corporation Yard Landfill. Residences and businesses in the landfill vicinity are connected to treated water supplied by the City of Folsom. The City gets its water from the Folsom Reservoir.

The City supplies treated water to the Corporation Yard, Veterans Hall, and Lake Natoma Shores development. There are no known restrictions on groundwater use at the Site and the adjacent properties.

2.6 Landfill Characteristics

Characteristics of the landfill cap, waste, and landfill gas are provided below and are based on investigation results and monitoring.

2.6.1 Summary of Investigation Results

Detailed investigation results are provided in Appendix A. From December 1985 through February 2008, the City of Folsom conducted the following investigation and monitoring activities:

- Drilled 12 exploratory borings;
- Installed 17 temporary landfill gas test probes;
- Installed nine groundwater wells for periodic monitoring;
- Installed six landfill gas wells for periodic monitoring;
- Excavated 43 exploratory test pits; and
- Collected over 180 groundwater samples, 150 landfill gas samples, and 20 soil samples for analysis.

2.6.2 Landfill Cap

In July 1996, the landfill cap was constructed that consists of three layers totaling approximately 4 feet:

- 12-inch vegetative soil layer;
- 12-inch clay layer; and
- 24-inch foundation layer.

The northern portion of the landfill cap features a 180-foot by 240-foot parking lot for City employee parking. The landfill cap in this area consists of four layers totaling approximately 4 feet:

- 2.5-inch asphalt concrete Type B;
- 10-inch aggregate base rock Class 2;
- 12-inch clay layer; and
- 24-inch foundation layer.

Details of the landfill cap and pavement are provided in Figure 2-4.

2.6.3 Nature and Extent of Waste

Based on the investigation results, the nature and extent of waste has been adequately characterized. Cross sections of the landfill are provided in Figures 2-9 and 2-10. The landfill can be divided into two basic areas: the main landfill area and the uncontrolled fill area.

- <u>Main Landfill Area</u>: the nature of the fill in this area generally consists mostly of soil with some concrete, asphalt, green waste, metal, and trash. The fill covers what appears to be a clay liner covering a plastic liner associated with the former sewage treatment plant ponds. The clay pond liner appears to have been disturbed and mixed with debris fill in some locations. The historical photograph in Figure 1-4 indicates a roadway

through the center of the former ponds; however, a distinct separation between the former ponds was not identified during the investigations.

The extent of fill is shown in Figure 1-2 and is estimated at 140,000 square feet (ft^2; 3.2 acres). The maximum depth of fill is approximately 12 to 16 feet below grade (i.e., the top of the cap). The cap is approximately 4 feet thick; therefore, the fill layer is approximately 8 to 12 feet thick. Assuming the fill layer has a uniform thickness of 8 feet throughout the fill area, the approximate *in situ* fill volume is 42,000 cubic yards (yds^3). The approximate *in situ* volume of the cap materials is 21,000 yds^3.

- Uncontrolled Fill Area: the nature of fill in this area generally consists mostly of soil with some household waste such as newspaper, carpet, plastic bags, clothing, and tires. The fill in this area is less dense and more variable than the fill in the main landfill area.

  The extent of fill is shown in Figure 1-2 and is estimated at 50,000 ft^2 (1.1 acres). The maximum depth of fill is approximately 4 to 8 feet below grade. Assuming the fill depth is uniform at an average of 6 feet throughout the fill area, the approximate *in situ* fill volume is 11,000 yds^3.

Based on the estimates above, the total *in situ* volume of material associated with the cap and waste in both the main landfill area and the uncontrolled fill area is approximately 74,000 yds^3. Assuming 30% expansion upon excavation, the total ex situ volume of all excavated materials is approximately 96,000 yds^3. The bid documents will include design drawings of the existing conditions of the landfill. Land Development AutoCAD software by AutoDesk will be used during the contracting phase of the project to refine the material volumes and provide an Engineer's Estimate of Probable Cost.

2.6.4 Landfill Gas Monitoring

The landfill gas monitoring program consists of measuring methane concentration in six gas wells (GAS-1 through GAS-6) on a periodic basis. Methane measurements from July 1995 through December 2007 are summarized in the following table. Methane is typically either detected at low concentrations (i.e., less than 1%) or not detected at all.

Summary of Methane Measurements in Gas Wells

Gas Well ID	General Location	Count	Detects	Min. (%)	Mean (%)	Max. (%)	Std. Dev. (%)
GAS-1	South of landfill	26	2	0.00	0.08	2.00	0.39
GAS-2	Main landfill area	27	17	0.00	1.36	6.10	1.85
GAS-3	Main landfill area	26	5	0.00	0.01	0.20	0.04
GAS-4	North of landfill	25	13	0.00	0.63	4.45	1.19
GAS-5	Main landfill area	27	5	0.00	0.01	0.05	0.02
GAS-6	West of landfill	26	1	0.00	0.0004	0.01	0.002

2.7 Target Parameters

Target parameters to evaluate during clean closure activities are presented in this section based on the Site characterization information.

2.7.1 Groundwater

Former use of the Site for sewage treatment plant ponds and subsequently for the Corporation Yard landfill appears to have impacted Site groundwater and several water quality parameters are currently above primary or secondary MCLs in one or more Site wells: arsenic, iron, nitrate, sulfate, specific conductance, and TDS. Groundwater concentration limits (CLs) for these parameters are proposed in a separate document.

The 2008 semi-annual groundwater monitoring event scheduled for June 2008 will be conducted per the current MRP prior to commencing construction. Following construction, limited semi-annual groundwater monitoring will be conducted to compare results to CLs. Statistical trend analysis will be performed on pre- and post-closure data. Upon evaluation of these post-closure monitoring results, the RWQCB will rescind the WDRs.

2.7.2 Soil/Solid Media

The landfill waste and former landfill sewage treatment plant pond liner will be removed during construction and there are no indications that underlying dredge tailings have been impacted by Site use. The target parameters in soil/solid media to evaluate during clean closure activities, therefore, are primarily based on elevated groundwater parameters:

- Metals;
- Soluble nitrate as NO_3; and
- Soluble sulfate as SO_4.

These target parameters will be incorporated into the confirmation sampling and analysis described in Section 4.1.

2.7.3 Ambient Air

The waste in the Corporation Yard landfill contains some decomposable green waste (e.g., tree stumps/branches, lumber) and methane is typically detected at low concentrations or not detected at all in semi-annual monitoring of the gas wells. Waste containing VOCs is not anticipated to be present in the landfill based on previous investigations. In addition, the waste is not expected to generate hydrogen sulfide. However, monitoring for landfill gases such as methane, total VOCs, and hydrogen sulfide at landfills is a standard health and safety precaution for on-site workers. General construction activities such as excavation and grading have the potential to temporarily increase airborne concentrations of dust. Target parameters in soil/solid media (i.e., metals) may

be disturbed during construction and temporarily become suspended in air. According to U.S. Geological Survey maps, no naturally occurring asbestos is present within a mile of the Site; however, old landfills have the potential to contain asbestos containing building materials (ACBM). The target parameters in ambient air to evaluate during clean closure activities are:

- Methane;
- Total VOCs;
- Hydrogen Sulfide;
- Dust;
- Metals; and
- Asbestos.

These target parameters will be incorporated into the air monitoring described in Section 3.3.1.

2.8 Cleanup Goals

Since clean closure involves the removal of all solid waste and impacted soil, cleanup goals are limited to soil/solid media. As part of the revised WDRs from the RWQCB, groundwater CLs will be developed and monitoring will continue following the completion of clean closure activities. Cleanup goals for in soil/solid media are proposed in a separate document. The cleanup goals will be developed in part from statistical analysis of the background soil sampling results from the pre-design field investigation conducted in February 2008 (Brown and Caldwell, 2008a).