

## INFORMATION SHEET

ORDER NO. R5-2015-XXXX  
SAN JOAQUIN COUNTY DEPARTMENT OF PUBLIC WORKS  
FOOTHILL SANITARY LANDFILL, INC.  
FOOTHILL LANDFILL  
SAN JOAQUIN COUNTY

### **Background**

The Foothill Landfill is an active, Class III, municipal solid waste (MSW) landfill on North Waverly Road approximately 1.7 miles south of North Shelton Road in San Joaquin County. The landfill has been in operation since 1965, accepting household, commercial, industrial, and agricultural wastes from the City of Stockton and surrounding areas. Approximately 600 tons per day (210,000 tons per year) of wastes were discharged to the landfill in 2014.

The landfill consists of two classified MSW landfill units under Title 27 regulations, including Landfill 1 (LF-1) and Landfill 2 (LF-2). LF-1 consists of a single, 80-acre, unlined module referred to as "Module 1" that no longer accepts wastes. LF-1 was partially closed in 2006 with an ET cover on its top deck. LF-2 is a Subtitle D compositely-lined, expansion landfill being constructed in phases around LF-1. At projected landfill closure in the year 2082, LF-2 will consist of 10 Subtitle D compositely-lined waste disposal modules encircling and partially overlapping LF-1. See WDR Attachment F: Conceptual Landfill Development Plan. The first LF-2 module, Module 1 (M-1), was constructed immediately south of LF-1. The first phase of the next LF-2 module, M-2, will be constructed in 2015.

Other onsite facilities include landfill-associated controls and monitoring systems (e.g., leachate, landfill gas, surface water, groundwater); an onsite borrow area; storm water retention basins/ponds; landfill access roads, maintenance buildings, a scale house; a landfill gas-to-energy plant; and various other landfill-related facilities.

### **Geology**

The site is underlain by Laguna alluvial deposits and cemented to partially-cemented Mehrten deposits. Laguna soils generally consist of silty sand, clayey silt, and silty clay to approximately 10 feet bgs. Underlying Mehrten deposits generally include clay/claystone, silt/siltstone, sand/sandstone, and conglomerates. In-place hydraulic conductivities generally range from  $1 \times 10^{-3}$  cm/sec (sand/sandstone) to  $1 \times 10^{-7}$  cm/sec (clay/claystone).

### **Groundwater**

First encountered groundwater at the site occurs at about 200 to 300 feet below ground surface (bgs) in Mehrten sands. The average groundwater elevation at the site is about 45 feet MSL. The uppermost aquifer occurs in Mehrten alluvium (e.g., sandy gravel) with an overall permeability of about  $9 \times 10^{-3}$  cm/sec. The groundwater gradient is typically about 0.0025 ft/ft toward the southeast. There are currently six groundwater monitoring wells at the site, including one background well (MW-4), two side gradient wells (MW-1A, and MW-3), and three down gradient wells (MW-2R, MW-5, and MW-6). MW-2R and MW-3 are Point of Compliance wells for LF-2 (Module 1) and LF-1, respectively, while MW-5 (installed in 2010) and MW-6 (installed in 2015) contiguously monitor both landfill units along the southern site

boundary. Each contiguous monitoring well (i.e., MW-5, MW-6) is a corrective action monitoring well for LF-1 and a detection monitoring well for LF-2.

Low to trace concentrations of volatile organic compounds (VOCs), primarily of Trichloroethene (TCE) and 1,1-Dichloroethene (DCE), have been intermittently detected in monitoring well MW-3 adjacent to unlined LF-1 since 1995, indicating a historical release from LF-1. TCE, for example, has been historically detected in MW-3 up to 4.0 µg/L (January 1999) and was recently detected in MW-3 at 4.0 µg/L (January 2014). No VOCs have been confirmed in any of the other groundwater monitoring wells at the site. No significant exceedances of inorganic parameters have been historically confirmed at the site.

## **Landfill Design and Construction**

### **Landfill 1**

Previous WDRs classified unlined unit LF-1 as a Class III landfill unit based on a finding that the natural geologic materials underlying the unit were sufficiently protective of underlying groundwater beneficial uses to meet Class III unit containment standards. See Title 27, sections 20240 and 20260. Monitoring data has since indicated that waste constituents from LF-1 have migrated into the unsaturated zone and groundwater indicating that the natural geologic materials underlying the site do not meet Class III containment standards. Instead of declassifying or reclassifying LF-1, these WDRs require that LF-1 be completely closed.

### **Landfill 2**

Previous WDRs Order R5-2003-0020 approved an engineered alternative design (EAD) to the Title 27/Subtitle D prescriptive liner design for an MSW landfill proposed by the Discharger for the containment systems of LF-2, Module 1 and future expansion modules at the site. LF-2, Module 1 was constructed consistent with this approved EAD and CAO R5-2004-0706, which required installation of an HDPE barrier layer between overlapping portions of Module 1 and Module I as a corrective action measure (i.e., to prevent landfill gas migration into Module I from Module 1). Module 2, Phase A (to be constructed immediately south of Module 1) and future modules/phases will also be constructed in accordance with the approved EAD. See WDR Finding 74.

In 2006, the Discharger implemented various corrective action measures (e.g., partial landfill closure, landfill gas extraction) to address the VOC release under Cleanup and Abatement Order (CAO) R5-2004-0706 issued by the Executive Officer (see WDR Finding 95).

## **ET Cover Demonstration Project**

The 2006 Site Improvement Program (see WDR Finding 96) included partial closure of Module I with an evapotranspirative (ET) final cover on its top deck as an EAD to Title 27 prescriptive closure requirements. The ET cover demonstration project included a 2,500 square foot test pad equipped with soil moisture monitoring equipment (e.g., time domain reflectometers coupled with heat dissipation units) placed at specified depths (i.e., 1, 2 and 3 feet below surface) within the 4.5-foot thick ET cover soil; an underlying percolation layer and a geomembrane to allow for recovery and measurement of percolation/seepage through the ET cover; plumbing for recovery and measurement of surface runoff; and a small weather

station equipped with telemetry for wireless transmission of monitoring data. Test pad monitoring results for a required 5-year demonstration period indicated that the test pad area was allowing significantly less seepage than that indicated by design modelling results. In a 11 July 2014 letter, Water Board acknowledged that the landfill had been partially closed as required under CAO R5-2004-0706.

### **Landfill Gas Controls**

The landfill gas (LFG) extraction system installed as part of the 2006 Site Improvement Project included the installation of 9 vertical extraction wells (GX-1 through GX-9) at LF-1; 5 horizontal extraction wells (HC-1 through HC-5) at LF-2, Module 1; and associated LFG collection and treatment facilities (i.e., lateral and header piping, condensate facilities, 2 blower motors, and a flare station). A gas-to-energy plant was subsequently installed in 2010 to generate electricity from the extracted landfill gas. In 2014, in response to a Water Board staff request, the Discharger submitted an amended Engineering Feasibility Study (EFS) proposing the installation of additional LFG controls and monitoring wells at the landfill as part of the corrective action program to address VOC impacts to groundwater at the site. The amended EFS has not yet been approved by Water Board staff. See WDR Finding 101.

### **Revised WDRs**

These revised WDRs classify the unlined landfill LF-1 and Subtitle D lined expansion landfill LF-2 as separate units under Title 27 and prescribe appropriate requirements for each (e.g., construction, operation, closure, postclosure maintenance, and corrective action, as applicable). Closure and Postclosure Maintenance Specification E.2, for example, requires that LF-1 be completely closed by **15 October 2018**, while Construction Specification D.5 specifies the Title 27 prescriptive standard and authorized engineered alternative designs for completing closure of LF-1, and Provision H.7 provides a schedule for submission of closure construction reports. Construction Specification D.1 similarly specifies the Title 27 prescriptive standards and authorized engineered alternative designs for the containment system components of new LF-2 expansion modules, including base liner, excavation side slopes, and areas of overlap between LF-1 and LF-2. Provision H.8 requires submission of an Operations and Maintenance (O&M) Plan for the LFG control system to ensure that LFG extracted from the landfill units is handled and disposed of in accordance with the requirements of the WDR requirements, including necessary modifications to discontinue discharges of LFG condensate from LF-1 to LF-2. The revised WDRs also include provisions requiring the Discharger to submit a revised Preliminary Closure and Postclosure Maintenance Plan (PC/PCMP) for LF-2 (Provision H.10) and a Water Quality Protection Standard Report describing the Water Quality Protection Standard for both units (Provision H.7) consistent with the requirements of this Order.

### **Monitoring**

The monitoring and reporting program (MRP) in the WDRs requires regular facility maintenance inspections and semiannual monitoring of the unsaturated zone, groundwater, and surface water for representative monitoring parameters. Leachate, landfill gas, and solid waste monitoring is also required. Monitoring every five years is required for all landfill constituents of concern. The MRP also requires that the Discharger maintain coverage under the General Industrial Storm Water Permit.

## **Drainage**

Surface drainage from the site flows into a network of streams and creeks that meander toward the southwest, ultimately emptying into Mormon Slough. Mormon Slough is partially tributary to the Stockton Diverting Canal, which drains into the Calaveras River, a tributary of the San Joaquin River. The remainder of Mormon Slough flows directly into the San Joaquin River in Stockton. The San Joaquin River discharges into the Sacramento-San Joaquin River Delta northwest of Stockton. (JDM)