# APPENDIX E

# REMAINING AIRSPACE AND SITE LIFE ESTIMATES

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# MEMORANDUM

TO: Lochlin Caffey, Republic / Keller Canyon Landfill Company, Inc.
Susan Klassen, Sonoma County

FROM: Joseph Miller, SCS Engineers
Ambrose McCready, P.E., SCS Engineers

SUBJECT: **Updated Airspace Capacity and Site Life Estimates, Sonoma Central Disposal Site, Sonoma County, California**

SCS Engineers (SCS) has prepared updated estimates of airspace capacity and site life for the proposed re-permitting and future development of the Sonoma County Central Disposal Site (CDS). These estimates are intended for inclusion in the landfill Joint Technical Document (JTD) and CDS Preliminary Closure/Post-Closure Maintenance Plan. This update is based on information obtained from the May, 2012 aerial/topographic survey for the CDS.

## AIRSPACE CAPACITY

Airspace capacity was originally estimated by SCS in support of the March, 2011 JTD submittal. Those estimates were made using AutoDesk Civil 3D software. In particular, volumetric take-off comparisons were made using the following digital files prepared by SCS as part of facility design:

- Then-assumed existing grades (2007 aerial topographic survey), provided by Sonoma County. Until recently (see below), this was the most current topographic survey for the entire site. Note that MSW disposal operations were temporarily suspended at the CDS over the period 2005 through late September 2010. We therefore assumed that grades had not changed appreciably between the date of the 2007 topographic survey and resumption of filling at CDS.

- Fill sequencing and final grading plans for the landfill for future development of LF-2, Phases III – V, the Rock Extraction Area (REA) and filling over existing LF-1.

- Landfill cell excavation and preliminary design plans for LF-2, Phases III and IV and the REA.

Gross remaining airspace capacity was assumed to be the difference between existing grades and final grades for a given cell, plus the volume available in excavation areas.

Taking into account airspace to be consumed by landfill base liners and the final cover system, it was estimated that approximately 9,257,000 cubic yards useable airspace capacity would be available at the Central Disposal Site as of September, 2010. This volume reflects filling over approximately 158.4 acres within the footprint area in LF-1 and LF-2 (the 172.8-acre area permitted in the existing Solid Waste Facilities Permit, less the 14.4 acres proposed for partial final closure).

### 2012 Update

Estimates of remaining airspace were adjusted as follows to take into account airspace consumed by filling over the period September 2010 through mid-May 2012:

- Remaining useable airspace Sept-2010: 9,257,000 cu yd
- Airspace consumed, Sept-2010 through May 15, 2012: 261,000 cu yd
- Remaining useable airspace, May 16, , 2012: 8,996,000 cu yd
- Remaining disposal capacity, May 16, 2012: 5,397,600 tons

Airspace consumption for the period September 2010 through May, 2012 was determined via volumetric take-off comparisons of the following:

- LF-2, Phase I-II topography prior to resumption of refuse filling in 2010 (aerial topographic survey dated March 2, 2010). Filling operations since September 2010 have been in this area only.
- CDS site topography (aerial survey dated May 15, 2012).

A worksheet with details on the estimated capacity estimates is attached. Useable airspace includes volume occupied by both waste materials and daily cover. The airspace consumed for base liner and final cover systems is not expected to vary significantly from previous estimates (SCS, March 2011 JTD). (A double-composite base liner and additional soil layer placement to meet the agency interpretation for groundwater separation is currently proposed. However, the base elevations for waste placement in LF-2 and the REA will not change appreciably from previous the previous design.)

## CELL AND SITE LIFE ESTIMATES

SCS estimates approximately 5.4 million tons disposal capacity would be available via development of the CDS as presented in the above-referenced plans. This estimate is based on the above calculations of remaining airspace volume, and a conservative landfill industry airspace utilization factor of 1,200 pounds per cubic yard for in-place waste density (refuse plus daily cover). The in-place density reflects total weight of MSW disposed that is placed in a surveyed volume of landfill airspace. This is typically verified using comparisons of annual aerial topographic surveys, and tonnage data from truck scales.

Note: Keller Canyon Landfill Inc., the site operator, reports that its current operational practices result in an in-place waste density of 1,500 pounds per cubic yard. Over the long-term this continued practice would increase site life. Thus we consider our use of the 1,200 pounds per cubic yard in-place density to be conservative for planning purposes.

For the purpose of estimating site life, we assumed MSW disposal rates would range between 700 tons per day (tpd) and 1,400 tpd. The CDS is permitted to operate 360 days per year. These disposal rates are equivalent to approximately 250,000 and 495,000 tons per year (tpy), respectively. The lower rate reflects anticipated disposal rates when the CDS resumes operations in year 2012 following re-permitting and new cell construction. The higher rate is closer to historic annual average for the period 2000 – 2004, before disposal operations at the CDS were temporarily suspended in 2005.

The attached worksheet provides estimate of cell life for the various stages of development, and overall site life. As shown, site life is expected to range between 11 to 22 years, depending on MSW disposal rates.

## LIMITATIONS

Projecting landfill cell and site life is affected by many factors including population and demographic changes, local and regional economics affecting waste generation and disposal, jurisdictional waste flow commitments, advances in waste handling and disposal technology, recycling efforts, landfill compaction efforts, settlement, and daily soil cover use. We consider the airspace capacity and site life estimates herein to be reasonable for planning purposes.

SCS ENGINEERS

**AIRSPACE CAPACITY AND SITE LIFE ESTIMATES**
**SONOMA CENTRAL LANDFILL**

Jun-29-2012

| Specification | Phase 3 | Phase 4 | Phase 5 | REA | LF-1 | Totals |
|---|---|---|---|---|---|---|
| Area AC | 10 | 8 | 33 | 11 | 96 | 158 |
| Excavation CY | 457,000 | 328,000 | N/A | 15,000 | N/A | 800,000 |
| Disposal Volume CY | 1,876,500 | 1,369,500 | 1,800,000 | 750,000 | 3,200,000 | 8,996,000 |
| Disposal Capacity Tons | 1,125,900 | 821,700 | 1,080,000 | 450,000 | 1,920,000 | 5,397,600 |
| Cell Life at 500,000 TPY | 2.3 | 1.6 | 2.2 | 0.9 | 3.8 | 11 |
| Cell Life at 400,000 TPY | 2.8 | 2.1 | 2.7 | 1.1 | 4.8 | 13 |
| Cell Life at 250,000 TPY | 4.5 | 3.3 | 4.3 | 1.8 | 7.7 | 22 |

Notes:

Projections exclude filling on approximate 14.4-acre "South Face" of LF-1.

Effective Density is 1,200 LBS/CY

Remaining volume for LF-2, Phase 3 and 4 reflect deduction for filling over period September 2010 through May 2012, as determined via AutoCAD volume take-off.