Golder Associates

May 15, 2003

033-7324

California Regional Water Quality Control Board
3443 Routier Road, Suite A
Sacramento, California 95827

ATTN: Ms. Stephanie Young

RE: DM-4.1 BASE LINER DESIGN REPORT AND CONSTRUCTION DOCUMENTS NORCAL WASTE SYSTEMS HAY ROAD LANDFILL SOLANO COUNTY, CALIFORNIA

Dear Ms. Young:

Golder Associates Inc. (Golder) is pleased to submit this design report and attached construction documents for the construction of the Disposal Module (DM) 4.1 base liner system at the Norcal Waste Systems Hay Road Sanitary Landfill (NWSHRL) in Solano County, California. Norcal Waste Systems Hay Road Landfill, Inc. (NWSHRLI) owns and operates the NWSHRL as a Class II solid waste disposal facility.

This report presents the grading plan and base liner design for DM-4.1, which has been designed as a Class II disposal unit in compliance with the design requirements specified in the site's Waste Discharge Requirements (WDR's) Order No. 5-01-101. Construction of DM-4.1 will begin the week of June 2nd, 2003 with the placement of general fill. The liner components are scheduled to be constructed in July and August 2003. Drawing 2 of the Construction Plans (Appendix A) shows the site development plan and the limits of the DM-4.1 base liner.

1. FINAL BASE GRADING

The grading plan for DM 4.1 conforms to the minimum ground water separation requirements developed by Geosyntec (1995) and stipulated in WDR Order No. 5-01-101.

Grading for DM 4.1 will involve minor excavation in the sump area and placement of approximately 80,000 cubic yards of general fill to establish the lower limits of the liner system as shown in Drawing 3 of the construction plans (Appendix A). The final base grades maintain a minimum 2 percent grade on the floor and 1 percent grade along the Leachate Collection and Removal System (LCRS) drainage pipes, which are consistent with the construction of previous Class II landfill disposal units at the site (DM-2.2a, DM-2.2b, DM-11.1, DM-11.2, and DM-5.1). The base grading and construction requirements are designed to provide positive drainage to the collection sump and to provide a firm, stable foundation for the containment system (Geosyntec, 1995).

The interior slopes of the perimeter levee will be graded to 2H:1V (horizontal to vertical) with a crest elevation of 40 feet mean sea level (msl). The minimum elevation of the containment system is based on the maximum anticipated groundwater elevation. This maximum elevation is interpolated to be 19.3 feet msl at the sump location based on the historical groundwater elevations developed by Geosyntec (1995).

2. CONTAINMENT SYSTEM CONFIGURATION

The DM-4.1 containment system conforms to the containment system described in Golder's Liner Performance Demonstration Report (April 15, 2003) and the associated May 6, 2003 addendum. As described in these documents, the containment system for the 2H:1V side-slope consists of the following components from top to bottom:

- 18-inch thick operations layer
- LCRS geocomposite drainage layer
- 60-mil textured HDPE geomembrane
- Geosynthetic clay liner (Gundseal with 30-mil HDPE geomembrane backing or equivalent)
- Subgrade (compacted general fill)

The proposed floor liner system consists of the following components from top to bottom:

- 12-inch thick operations layer
- 8-oz/sy geotextile filter layer
- 6-inch thick LCRS gravel (3/8-inch minus)
- 60-mil textured HDPE geomembrane
- 24-inch thick low-permeability soil ($k \leq 1x10^{-7}$ cm/s)
- 6-inch thick foundation soil
- Leak detection geocomposite drainage layer
- 60-mil textured HDPE geomembrane
- Subgrade (fine-grained soils)

The DM-4.1 base liner project includes the following additional design and/or enchanced CQA features:

- An electrical leak location survey will be conducted following the placement of the operations soil layer.

- The construction specifications require that LCRS gravel grading equipment contain laser or global positioning surveying equipment that provides the operator with real-time measurements of the dozer blade relative to the liner.

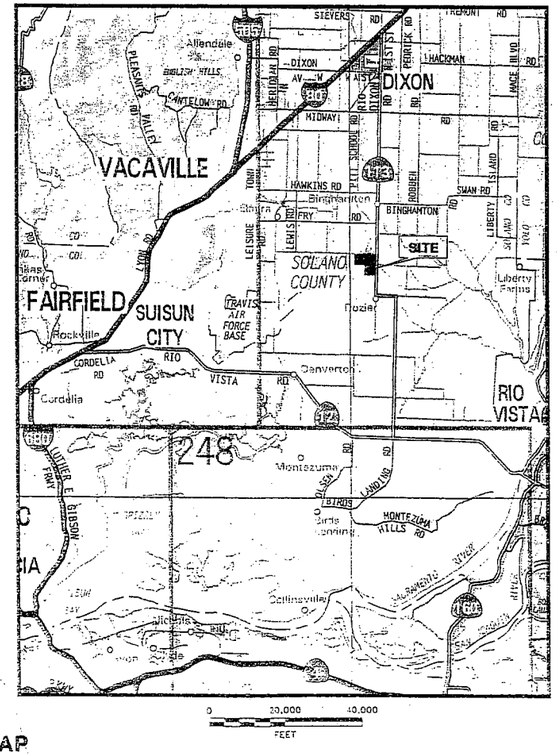
- Additional perforated pipes have been included in the LCRS gravel layer offset 130 to 150 feet horizontally from the center LCRS pipe (Drawing 3, Appendix A). These pipes are available to extract landfill gas from the LCRS layer if future engineering evaluations determine that this is necessary to provide adequate landfill gas control.

- A 2-inch diameter injection pipe has been included to allow annual testing of the LCRS by injection a know quantity and rate of water.

CONSTRUCTION DRAWINGS

NWS HAY ROAD LANDFILL BASE LINER SYSTEM DISPOSAL MODULE 4.1

SOLANO COUNTY, CALIFORNIA



LOCATION MAP

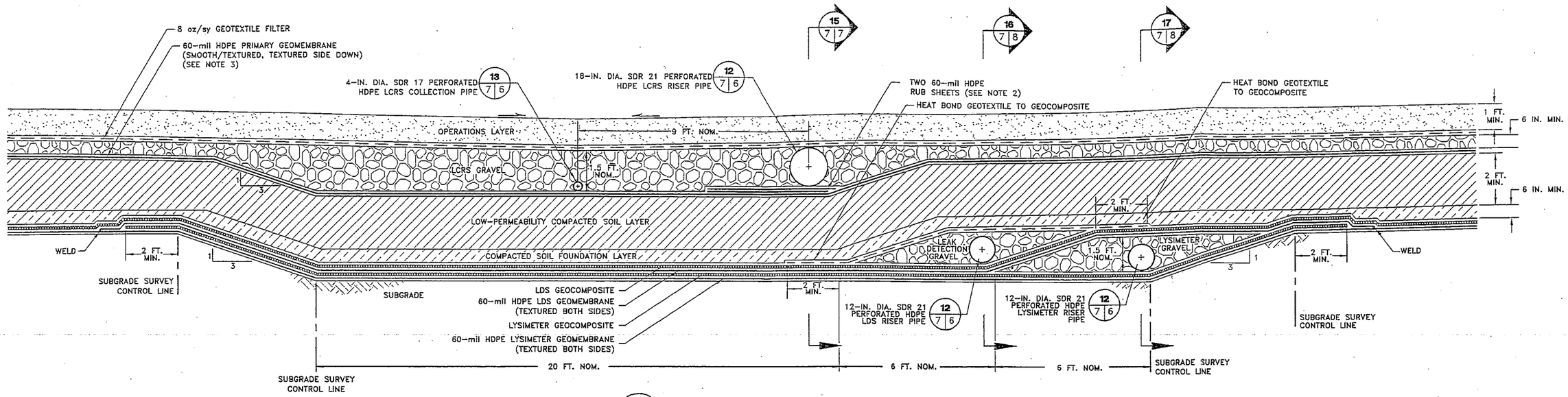
DRAWING NO.	TITLE
1	COVER SHEET
2	SITE PLAN
3	SUBGRADE PLAN
4	CROSS-SECTIONS
5	CONTAINMENT SYSTEM DETAILS
6	CONTAINMENT SYSTEM DETAILS
7	SUMP DETAILS
8	SUMP DETAILS
9	SOIL BORROW EXCAVATION PLAN
10	SUBGRADE SURVEY GRID PLAN

NOTES:
1) BASE MAP FROM THE THOMAS GUIDE, CALFORNIA ROAD ATLAS AND DRIVER'S GUIDE, 2000.

PREPARED BY:

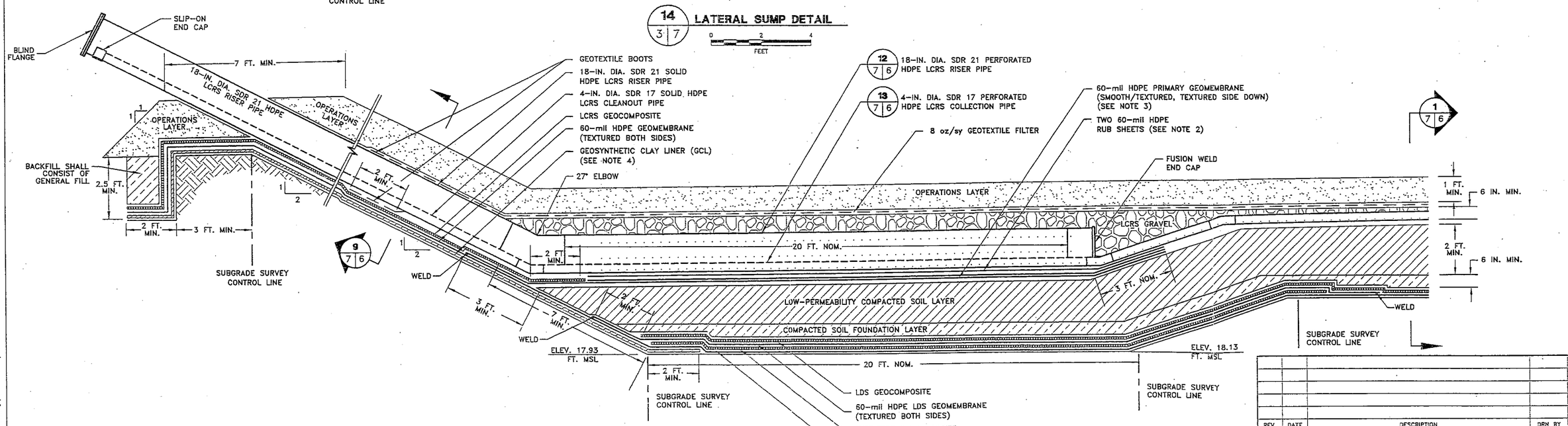
Golder Associates
Roseville, California

PROJECT NO.: 033-7324
PREPARED: MAY 2003



14 LATERAL SUMP DETAIL

0 2 4 FEET



15 SUMP DETAIL AT LCRS RISER PIPE

0 2 4 FEET

LEGEND:

- 2H:1V — SLOPE INDICATOR
- 1/2 — SLOPE INDICATOR
- 2% — GRADE INDICATOR
- A / 0 2 — DETAIL/SECTION DESIGNATION; DRAWING WHERE SECTION/DETAIL IS LOCATED; DRAWING WHERE SECTION/DETAIL IS REFERENCED

NOTES:

1) GEOSYNTHETICS THICKNESS EXAGGERATED FOR CLARITY.
2) TWO 5 FT WIDE 60-mil HDPE RUB SHEETS OR ONE 5 FT WIDE GEOCOMPOSITE RUB SHEET SHALL BE PLACED UNDER THE 18 IN. DIAMETER LCRS PIPE WHERE IT LAYS OVER THE FLOOR GEOMEMBRANE. OVERLAP RUB SHEETS WITH LCRS GEOCOMPOSITE
3) AS AN ALTERNATIVE TO SINGLE-SIDED TEXTURE, THE PRIMARY GEOMEMBRANE MAY BE TEXTURED ON BOTH SIDES.
4) GCL SHALL INCLUDE A 30-MIL HDPE GEOMEMBRANE BACKING. HDPE GEOMEMBRANE BACKING SHALL BE PLACED FACING DOWN.

REV.	DATE	DESCRIPTION	DRN BY	RVW BY

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DES BY
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PROJECT NO.: 033-7324
TASK NO.: 2
PROJECT: NWS HAY ROAD LANDFILL DISPOSAL MODULE 4.1
SHEET TITLE: SUMP DETAILS

REGISTERED PROFESSIONAL ENGINEER KENNETH G. HANSEN EXP. 12/31/2013 NO. 053290 CIVIL STATE OF CALIFORNIA

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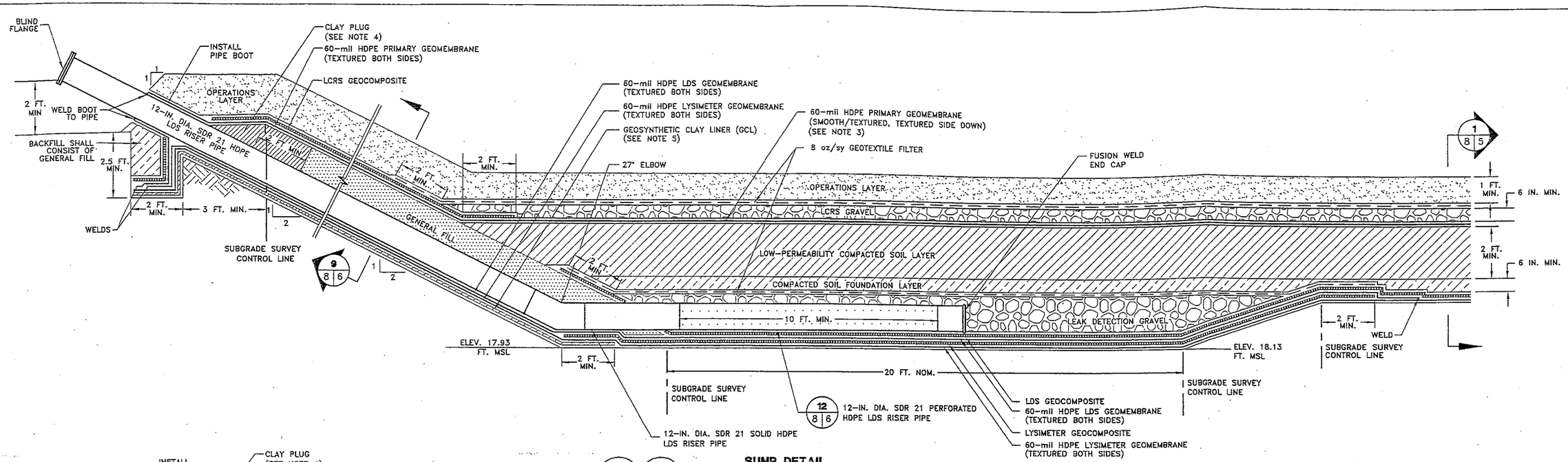
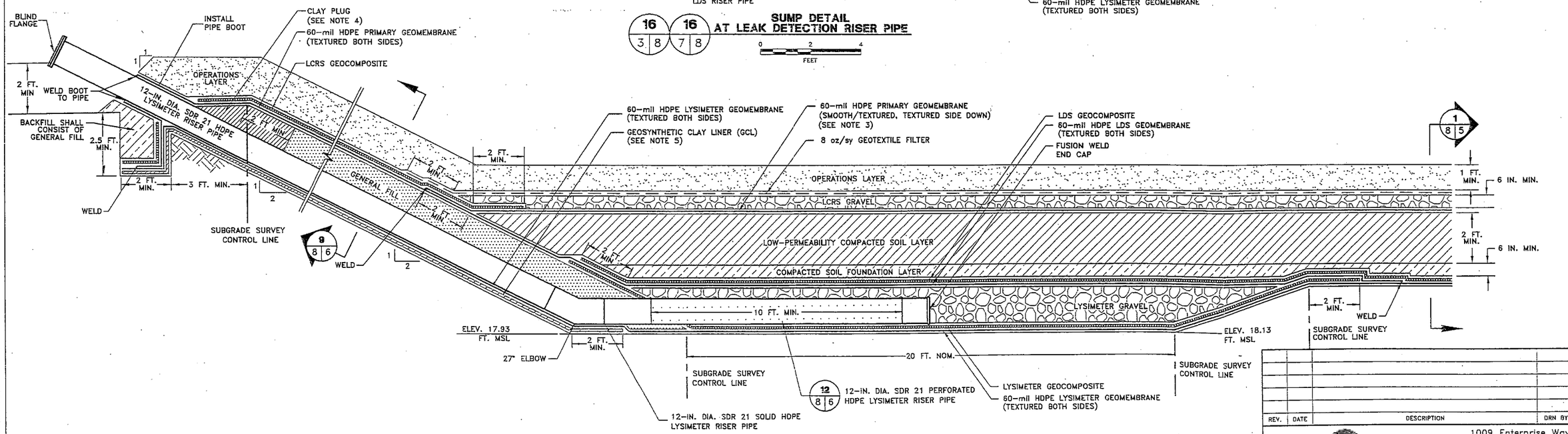
SHEET: 7 OF 10
DRAWING NO. 7
REV. 0



16 3|8 16 7|8 **SUMP DETAIL AT LEAK DETECTION RISER PIPE**

0 2 4 FEET



17 3|8 17 7|8 **SUMP DETAIL AT LYSIMETER RISER PIPE**

0 2 4 FEET

LEGEND:

- 2H:1V — SLOPE INDICATOR
- 1 / 2 — SLOPE INDICATOR
- 2% — GRADE INDICATOR
- A / 0|2 — DETAIL/SECTION DESIGNATION; DRAWING WHERE SECTION/DETAIL IS LOCATED; DRAWING WHERE SECTION/DETAIL IS REFERENCED

NOTES:

1) GEOSYNTHETICS THICKNESS EXAGGERATED FOR CLARITY.
2) TWO 5 FT WIDE 60-mil HDPE RUB SHEETS OR ONE 5 FT WIDE GEOCOMPOSITE RUB SHEET SHALL BE PLACED UNDER THE 18 IN. DIAMETER LCRS PIPE WHERE IT LAYS OVER THE FLOOR GEOMEMBRANE. EXTEND RUB SHEET 2-FEET UP SLOPE.
3) AS AN ALTERNATIVE TO SINGLE-SIDED TEXTURE, THE PRIMARY GEOMEMBRANE MAY BE TEXTURED ON BOTH SIDES.
4) CLAY PLUG SHALL CONSIST OF ONSITE CLAY ADMIXED WITH 10% BENTONITE BY DRY WEIGHT. CLAY PLUG SHALL BE COMPACTED TO 90% MODIFIED PROCTOR (ASTM D1557) AT +/- 2% OF OPTIMUM MOISTURE CONTENT.
5) GCL SHALL INCLUDE A 30-MIL HDPE GEOMEMBRANE BACKING. HDPE GEOMEMBRANE BACKING SHALL BE PLACED FACING DOWN.

REV.	DATE	DESCRIPTION	DRN BY	RVW BY

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RVW BY

PROJECT NO.: 033-7324 TASK NO.: 2

PROJECT: NWS HAY ROAD LANDFILL DISPOSAL MODULE 4.1

SHEET TITLE: SUMP DETAILS

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SHEET: 8 OF 10

DRAWING NO. 3 REV. 0

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