

Final

# Construction Completion Report for Toyon Canyon Sanitary Landfill

Volume 1

Main Text, Tables, and Figures

Project Number 776595

May 2009

Prepared For:

The City of Los Angeles

Department of Public Works

Bureau of Sanitation

Solid Resources Program

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Shaw Environmental & Infrastructure,

FINAL

CONSTRUCTION COMPLETION REPORT  
FOR  
TOYON CANYON SANITARY LANDFILL



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Revision 0

May 2009

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CONSTRUCTION COMPLETION REPORT  
FOR  
TOYON CANYON SANITARY LANDFILL

Revision 0

May 2009



Approved by: \_\_\_\_\_

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*5.15.09*

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## ***Volume 1***

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# FINAL

## Table of Contents

---

List of Tables .....	ii
List of Figures .....	ii
List of Appendices .....	ii
Acronyms and Abbreviations .....	iv
1.0 Introduction .....	1-1
1.1 General Project Background .....	1-1
1.2 QA/QC Management Organization .....	1-2
1.2.1 QA/QC Administrator .....	1-2
1.2.2 QA/QC Inspector .....	1-3
1.2.3 City Construction Services Laboratories .....	1-3
1.2.4 City Site Engineer .....	1-3
2.0 Construction Verification .....	2-1
2.1 Closure Construction Items .....	2-1
2.2 Existing Cover Preparation for Areas Requiring GDB Placement .....	2-1
2.2.1 Monitoring .....	2-1
2.2.2 Field Tests .....	2-2
2.2.3 Deficiencies .....	2-2
2.2.3.1 General .....	2-2
2.2.3.2 Notification .....	2-2
2.2.3.3 Corrective Action .....	2-2
2.2.3.4 Repairs and Retesting .....	2-2
2.3 GDB Placement .....	2-3
2.4 Monolithic Cover Testing .....	2-3
2.4.1 General .....	2-3
2.4.2 Monitoring .....	2-3
2.4.3 Laboratory Tests .....	2-4
2.4.4 Survey .....	2-4
2.4.5 Deficiencies .....	2-4
2.4.5.1 General .....	2-4
2.4.5.2 Notification .....	2-4
2.4.5.3 Corrective Action .....	2-5
2.4.5.4 Repairs and Retesting .....	2-5
2.4.5.5 Moisture Monitoring for Compliance with Conditional Approval .....	2-5
2.5 Added Soil Layer Testing .....	2-6
2.5.1 Monitoring .....	2-6
2.5.2 QA/QC Tests .....	2-7
2.5.3 Survey .....	2-7
2.5.4 Deficiencies .....	2-7
2.5.4.1 General .....	2-7
2.5.4.2 Notification .....	2-7
2.5.4.3 Corrective Action .....	2-7
2.5.4.4 Repairs and Retesting .....	2-7

# FINAL

## ***Table of Contents (continued)***

---

3.0	Drainage System.....	3-1
4.0	Erosion Control.....	4-1
5.0	Final Documentation.....	5-1
5.1	Final Report .....	5-1
5.2	Appendices .....	5-1
5.2.1	Volume 2.....	5-1
5.2.2	Volume 3.....	5-1
5.2.3	Volume 4.....	5-1
6.0	Statement of Certification .....	6-1
7.0	References .....	7-1

## ***List of Tables***

---

Table E-8	Existing Cover Preparation Testing for the Areas Requiring GBD Placement
Table E-9	Geocomposite Drainage Blanket Specifications
Table E-10	Monolithic Cover Testing
Table E-11	QA/QC Testing of Added Soil Layers

## ***List of Figures***

---

Figure 1	Site Location
Figure 2	QA/QC Organization and Responsibility Chart

# FINAL

## *List of Appendices*

---

Appendix A	Daily Reports
Appendix B	Field Photographs
Appendix C	Field Test Data Sheets for Existing Cover
Appendix D	Field Test Data Sheets for Monolithic Cover
Appendix E	Field Test Data Sheets for Added Soil Layer
Appendix F	Laboratory Test Data Sheets for Existing Cover
Appendix G	Laboratory Test Data Sheets for Monolithic Cover
Appendix H	Laboratory Test Data Sheets for Added Soil Layer
Appendix J	Record Drawings
Appendix K	Meeting Notes
Appendix L	Design Changes
Appendix M	Material Data Sheets

# FINAL

## *Acronyms and Abbreviations*

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ASTM	American Society for Testing and Materials
CCR	California Code of Regulations
City	City of Los Angeles Bureau of Sanitation
cm/s	centimeters per second
FCPCMP	Final Closure and Post-Closure Maintenance Plan
GCL	geosynthetic clay liner
GDB	geocomposite drainage blanket
LARWQCB	Los Angeles Regional Water Quality Control Board
LCRS	leachate collection and recovery system
QA/QC	quality assurance/quality control
QA/QC Plan	Quality Assurance/Quality Control Plan
SEMR	Soils Evaluation and Modeling Report

# FINAL

## 1.0 Introduction

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Shaw Environmental, Inc. (Shaw) was retained by the City of Los Angeles, Bureau of Sanitation (City) to draft and administer the construction quality assurance/quality control (QA/QC) program for final closure of the Toyon Canyon Sanitary Landfill in accordance with the Final Closure and Post-Closure Maintenance Plan (FCPCMP) (City, 2001a). This Construction Completion Report provides a format to document that closure construction was constructed in accordance with the FCPCMP and the Construction Quality Assurance (CQA) Plan in Appendix E of the FCPCMP (City, 2001b). Such a program is required by "Discharges of Waste to Land" contained in Title 23, Chapter 15, of the California Code of Regulations, Section 2590(6) (23 CCR 2590[6]).

### 1.1 General Project Background

The Toyon Canyon Landfill is located near the intersection of Interstate 5 and the 134 Freeways, in Griffith Park. Griffith Park is near the boundary of the cities of Los Angeles, Glendale, and Burbank (Figure 1). The site address is 5050 Mount Hollywood Drive, Los Angeles, California. The landfill encompasses about 90 acres of canyon terrain. The site was operated as a Class III sanitary landfill between 1957 and November 1985, receiving about 16 million tons of municipal waste during its operational life.

During the last years of operation, on site borrow soils for daily cover was depleted and soil was imported from other City projects (City, 2001c). Thus when disposal ended abruptly in 1985, the imported daily cover stockpiled on the topdeck was leveled, leaving the topdeck soils unusually thick, from a minimum of 3 feet to a maximum of 16 feet.

The City has submitted to the Los Angeles Regional Water Quality Control Board (LARWQCB) an original, two revisions, and one amendment of the FCPCMP. The FCPCMP covered by this Construction Completion Report is the approved Amendment to the FCPCMP (City, 2001a).

The original FCPCMP, prepared in accordance to Title 23 of the California Code of Regulations (23 CCR), was submitted to the LARWQCB on October 3, 1994. The final cover proposed in this FCPCMP consisted of a geosynthetic clay liner (GCL) as an engineered alternative to the prescriptive 1-foot thick clay because clay was not readily available at the time. The proposed cover was to be underlain with geocomposite drainage blanket (GDB) to convey leachate seepage from the front slopes. However, as closure construction began, a clay borrow source was identified during the development of the City's Lopez Canyon Landfill.

The first revision of the FCPCMP was July 8, 1996. This revision proposed to substitute clay for the GCL on the front slopes while retaining the GCL system for the topdeck areas. Clay cover

# FINAL

test pads were constructed in October 1996 and the associated geotechnical study indicated that clay could provide the engineering characteristic required to meet the closure performance criteria (City, 2001c).

The second revision of the FCPCMP was January 1997. This revision proposed to eliminate the GDB on higher front slope areas where leachate seepage did not appear and other areas that did not historically have a problem with leachate seepages. Because of the difference in construction methods, the Toyon Landfill Closure Construction Quality Assurance/Quality Control Plan (QA/QC Plan) was also modified to reflect both a GCL and a prescriptive clay cover system. By this time, the City had officially closed approximately 18 acres of sloped areas by the prescriptive clay cover system. This area is shown as Area 2 in Figure 1 of the Soils Evaluation and Modeling Report (SEMR) (City, 2001c).

The final FCPCMP is the Amendment to the FCPCMP (City, 2001a), which proposed an alternative cover. In lieu of the previously proposed systems of GCL for the top deck areas and prescriptive clay cover for the front slope areas, the City proposed the monolithic or alternative cover system approved in the SEMR (City, 2001c). According to the 27 CCR 20080(a), an alternative cover is accepted if it “affords equivalent protection against water quality impairment” and costs substantially less than the prescribed design. The SEMR, which was prepared in November 1998 and accepted by RWQCB on January 10, 2000, addressed the equivalent protection criterion, subject to two years of moisture monitoring. The SEMR is incorporated into the Amended FCPCMP as Appendix H (City, 2001c). Correspondence and the LARWQCB approval of the alternative cover are incorporated in the Amended FCPCMP as Appendix J (City, 2001e).

The remaining areas of the landfill were closed with a monolithic cover system. This Construction Completion Report covers the recent activities involved with the closure activities involving the monolithic cover system closed in accordance with the Amendment to the FCPCMP (City, 2001a)

## **1.2 QA/QC Management Organization**

The QA/QC program was administered by Shaw. Shaw personnel and subcontractor Ninyo and Moore, Inc., consisted of a QA/QC Administrator and QA/QC Inspectors. The overall organization chart for this QA/QC management organization is shown in Figure 2. The qualifications and duties of the field positions are described below:

### **1.2.1 QA/QC Administrator**

The QA/QC Administrator is a Registered Civil Engineer or Certified Engineering Geologist who had overall responsibility for documenting the quality and completeness of closure

# FINAL

construction. At completion, the QA/QC Administrator prepared a Construction Quality Assurance Report to verify that the work meet the closure plan requirements.

## **1.2.2 QA/QC Inspector**

A qualified QA/QC Inspector observed field testing and periodic construction progress inspections. The QA/QC Inspector was on the job site during important phases of construction.

The QA/QC Inspector had sufficient field experience to discuss daily activities (Appendix A), problems, and proposed solutions to problems with the City Site Engineer. The QA/QC Inspector kept written and photographic records, problem resolution, and daily work progress. The QA/QC Inspector understood, monitored, and validated the various field and lab tests listed in this plan. Tests, including failed tests, were recorded in the daily record by unique number. Test locations and numbers were mapped and included in Appendix B. Where tests fail, the affected area was re-worked and re-tested. Re-test numbers contain an "R" designation and were clearly cross-referenced to the failed test. The QA/QC Inspector noted reasons for failed tests, along with corrective actions taken.

The QA/QC Inspector reviewed specifications and factory certification (if applicable) of incoming materials ordered by the City. Recommendations for acceptance or rejection of materials were presented to the City Site Engineer.

## **1.2.3 City Construction Services Laboratories**

The various types of samples listed in the QA/QC Plan were delivered to City Construction Services laboratories qualified to perform testing in accordance with standardized methods.

## **1.2.4 City Site Engineer**

The City Site Engineer is the authorized representative of the City at the construction site responsible for managing the project for the City. The City Site Engineer was the point of contact between the City Operations Supervisor and the QA/QC Inspector. Information and questions went through the City Site Engineer for dissemination or resolution, respectively.

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## 2.0 Construction Verification

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This Construction Completion Report covers the recent activities involved with the closure activities involving the monolithic cover system. The construction verification element of the QA/QC program provided a format to document that closure construction is conducted in accordance with the standards approved in the FCPCMP.

Areas reflected in the SEMR were found to be acceptable for meeting the equivalent protection criterion and that no additional work was necessary, subject to the two years of moisture monitoring verification. Only cover areas disturbed to install the leachate collection and recovery system (LCRS) and drainage improvements required additional QA/QC verification.

### 2.1 Closure Construction Items

The closure construction items requiring QA/QC verification follow the order in the Toyon Canyon FCPCMP, Appendix E:

- Existing Cover preparation testing for areas requiring GDB placement
- GDB Placement
- Monolithic Cover Testing
- Added Soil Layer testing

### 2.2 Existing Cover Preparation for Areas Requiring GDB Placement

Soils QA were performed for areas of the front slope that will have the Leachate Collection and Recovery System (LCRS) installed. Front slope areas that do require LCRS installation had compaction tests performed in accordance with Table E-8. No additional monitoring was proposed on the top deck and front slope areas that did not require LCRS installation.

#### 2.2.1 Monitoring

The QA/QC Inspector monitored and documented the preparation of cover surface below the GDB. Monitoring the earthwork for the existing cover preparation specifically included the following:

- Monitor clearing, grubbing, and stripping of the existing cover;
- Monitor the re-compaction of the existing cover;
- Reviewing documentation of quality control test results;
- Visually monitoring the physical condition of the material during placement; and
- Visually monitoring the soil stability under the action of the compaction equipment.

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## **2.2.2 Field Tests**

The field test methods, testing frequencies, and criteria used to determine acceptability are presented in Table E-8. A special testing frequency was used at the discretion of the City Site Engineer or the QA/QC Inspector when visual observations of construction performance indicated a potential of recurring deficiency.

## **2.2.3 Deficiencies**

### **2.2.3.1 General**

If a defect was discovered in the earthwork product, the QA/QC Inspector informed the QA/QC Administrator or his designated representative. The QA/QC Inspector, in consultation with the QA/QC Administrator, determined the extent and nature of the defect. If the defect was indicated by an unsatisfactory test result, the extent of the deficient area was determined by additional tests, observations, a review of records, or other means that the QA/QC Administrator deemed appropriate.

If the defect was related to adverse site conditions, such as overly wet soils or surface desiccation, the QA/QC Inspector, in consultation with the QA/QC Administrator defined the limits and nature of the defect.

### **2.2.3.2 Notification**

After determining the extent and nature of a defect, the QA/QC Administrator notified the City Project Manager and the City Site Engineer and scheduled appropriate re-tests when the work deficiency was to be corrected.

### **2.2.3.3 Corrective Action**

At locations where the field testing of the soil indicated that the field density did not meet the requirements presented in Table E-8, the failing area was reworked as indicated below:

- If the results of in-situ dry density value failed to meet the specified criteria presented in Table E-8, two additional tests of the same type were performed in the vicinity of the failed test. If either of the additional tests resulted in a failure, then this area of the existing cover was considered in nonconformance and was reworked and recompacted to meet the requirements specified in Table E-8.

### **2.2.3.4 Repairs and Retesting**

The City's work force corrected the deficiency to the satisfaction of the QA/QC Inspector. If a project specification criterion could not be met, or unusual weather conditions hindered work, then the QA/QC Administrator developed and presented to the City Site Engineer suggested solutions for approval.

# FINAL

Re-tests recommended by the QA/QC Inspector verified that the defect was corrected before additional work was performed by the City's work force in the area of the deficiency. The QA/QC Inspector also verified that installation requirements were met.

Penetrations into the compacted cover resulting from sampling or other activities were properly backfilled with hand-tamped material. QA personnel repaired nuclear density hole perforations. The City's work force repaired perforations and excavations resulting from QA sampling and testing. Repairs were inspected by the QA/QC Inspector for compliance.

## **2.3 GDB Placement**

The FCPCMP designated part of Areas below Bench 7 and south of the north drainage pipe alignment received a single layer of Geocomposite Drainage Blanket (GDB). However, during construction, the GDB was extended to include Bench 8. These areas corresponded to where previous leachate seepages had occurred. The QA/QC Inspector ensured that incoming rolls of GDB were accompanied by factory certifications verifying that each roll meets specifications in Table E-9. In addition, the QA Inspector verified that GDB was properly protected from damage during unloading and storage.

Rolls was designated as panels and placed in a controlled manner over the finished grade. Handling equipment did not create ruts in supporting soils. Panels were unrolled from center tubes in a way to avoid wrinkles. Adjacent panels were overlapped and fastened in accordance with manufacturer's specification.

## **2.4 Monolithic Cover Testing**

### **2.4.1 General**

Soils QA was performed on soil components used during construction of the monolithic soil final cover. The criteria used for the determination of acceptability of the construction work were as identified in Table E-10 for permeability acceptance criteria and Table E-11 for QA/QC test types, acceptance criteria and testing frequency.

### **2.4.2 Monitoring**

The QA/QC Inspector monitored and documented the construction of monolithic cover soil. Monitoring of the construction work included the following:

- Monitoring the quality of the material stockpiles, obtaining borrow soil samples for conformance testing;
- Recording test results and locations;
- Noting deficiencies;

# FINAL

- Monitoring the thickness of lifts as loosely placed and as compacted;
- Monitoring that the thickness of the monolithic soil cover over the GDB areas was two feet minimum;
- Monitoring the action of the compaction and heavy hauling equipment on the construction surface (i.e., penetration, pumping, and cracking);
- Monitoring the repair of nonconforming areas and testing perforations;
- Reviewing documentation of the quality control test results;
- Monitoring soil for deleterious material; and
- Monitoring the thickness of lifts during placement of the materials;

## **2.4.3 Laboratory Tests**

The laboratory test method, laboratory testing frequency, and criteria used to determine acceptability are for permeability is presented in Table E-10. Table E-11 presents the approved QA/QC test types, acceptance criteria and testing frequency for the soil cover.

## **2.4.4 Survey**

The City Survey Support surveyed the top of the monolithic soil layer, following the end of installation. The thickness of the monolithic soil layer was determined by comparing the survey of the GDB layer and the top of the monolithic soil layer.

## **2.4.5 Deficiencies**

### **2.4.5.1 General**

If a defect was discovered in the earthwork product, the QA/QC Inspector immediately informed the QA/QC Administrator or his designated representative. The QA/QC Inspector in consultation with the QA/QC Administrator determined the extent and nature of the defect. If the defect was indicated by an unsatisfactory test result, the extent of the deficient area was determined by additional tests, observations, a review of records, or other means that the QA/QC Administrator deemed appropriate.

If the defect was related to adverse site conditions, such as overly wet soils or surface desiccation, the QA/QC Inspector, in consultation with the QA/QC Administrator defined the limits and nature of the defect.

### **2.4.5.2 Notification**

After determining the extent and nature of a defect, the QA/QC Administrator notified the City Site Engineer and scheduled appropriate retests when the work deficiency was corrected.

# FINAL

## **2.4.5.3 Corrective Action**

At locations where the field testing of the soil indicated that the laboratory hydraulic conductivities did not meet the requirements presented in Table E-10, the failing area was reworked as indicated below:

- If the results of lab hydraulic conductivity value failed to meet the specified criteria presented in Table E-10, two (2) additional tests were performed in the vicinity of the failed test. If either of the additional tests resulted in a failure, then this area was considered in nonconformance and was reworked and recompact to meet the requirements specified in Tables E-10 and E-11.
- Obtained samples of soil material from nonconforming area for potential laboratory testing to evaluate differences in soil properties that contributed to the nonconforming test results.

## **2.4.5.4 Repairs and Retesting**

The City's work force corrected the deficiency to the satisfaction of the QA/QC Inspector. If a project specification criterion was not met or unusual weather conditions hindered work, then the QA/QC Administrator developed and presented to the City Site Engineer suggested solutions for approval.

Retests recommended by the QA/QC Inspector were verified that the defect was corrected before additional work was performed by the City's work force in the area of the deficiency. The QA/QC Inspector also verified that installation requirements were met.

Penetrations into the compacted monolithic soil cover resulting from sampling or other activities were properly backfilled with hand-tamped select low-permeability material. The City's work force repaired perforations and excavations resulting from QA sampling and testing. Repairs were inspected by the QA/QC Inspector.

## **2.4.5.5 Moisture Monitoring for Compliance with Conditional Approval**

As part of the SEMR, moisture movement modeling included the 1997-1998 El Nino rain and an artificial 100-yr 24 hr storm event in the comparison of equivalent protection of the monolithic cover versus the prescriptive cover system described in Title 27. The LARWQCB conditionally approved the SEMR as part of the approval for the FCPCMP subject to 2 years of monitoring to verify or validate the equivalent protection discussed in the SEMR modeling (City, 2001e).

Accordingly, two moisture monitoring stations were constructed in November and December 2008. One was located on the top deck and the other on lower sideslope immediately above Bench 4.

# FINAL

These stations will be checked periodically over the two year monitoring period to make sure they are recording and that the data collected is suitable for use in a water balance computer model.

The results of the site values will be compared to the SEMR model to see if these site values mimic or provide less moisture movement than the model. If so, then the moisture monitoring will validate the model and likely provide the LARWQCB with the assurance that alternative cover provides the equivalent protection as the prescriptive cover.

At the end of the two years, an additional installation, performance, and water balance model validation report will be provided to LARWQCB as part of the conditional approval of the FCPCMP.

## **2.5 Added Soil Layer Testing**

Soil outside the areas requiring GDB and soil required to bring the monolithic cover to design subgrade elevations was called the Added Soil Layer. These subgrade elevations were to ensure that the final slope on the benches met minimum design grades to minimize ponding after settlement. QA was performed on soil components is a similar method to the monolithic soil final cover in accordance with Table E-11 for QA/QC test types, acceptance criteria and testing frequency. There were no criteria used for the determination for permeability.

### **2.5.1 Monitoring**

The QA/QC Inspector monitored and documented the construction of added soil layer. Monitoring of the construction work included the following:

- Monitoring the quality of the material stockpiles, obtaining borrow soil samples for conformance testing;
- Recording test results and locations;
- Noting deficiencies;
- Monitoring the thickness of lifts as loosely placed and as compacted;
- Monitoring the action of the compaction and heavy hauling equipment on the construction surface (i.e., penetration, pumping, and cracking);
- Monitoring the repair of nonconforming areas and testing perforations;
- Reviewing documentation of the quality control test results;
- Monitoring soil for deleterious material; and
- Monitoring the thickness of lifts during placement of the materials;

# FINAL

## **2.5.2 QA/QC Tests**

Table E-11 presents the approved QA/QC test types, acceptance criteria and testing frequency for the soil cover.

## **2.5.3 Survey**

The City Survey Support surveyed the top of the added soil layer, following the end of installation. The thickness of the monolithic soil layer was determined by comparing the survey of the added soil layer and the top of the monolithic soil layer.

## **2.5.4 Deficiencies**

### **2.5.4.1 General**

If a defect was discovered in the earthwork product, the QA/QC Inspector immediately informed the QA/QC Administrator or his designated representative. The QA/QC Inspector in consultation with the QA/QC Administrator determined the extent and nature of the defect. If the defect was indicated by an unsatisfactory test result, the extent of the deficient area was determined by additional tests, observations, a review of records, or other means that the QA/QC Administrator deemed appropriate.

If the defect was related to adverse site conditions, such as overly wet soils or surface desiccation, the QA/QC Inspector, in consultation with the QA/QC Administrator defined the limits and nature of the defect.

### **2.5.4.2 Notification**

After determining the extent and nature of a defect, the QA/QC Administrator notified the City Site Engineer and scheduled appropriate retests when the work deficiency was corrected.

### **2.5.4.3 Corrective Action**

At locations where the field testing of the soil did not meet the requirements presented in Table E-11, the failing area was reworked as indicated below:

- If the results of tests failed to meet the specified criteria presented in Table E-11, the area was reworked and recompact to meet these requirements.

### **2.5.4.4 Repairs and Retesting**

The City's work force corrected the deficiency to the satisfaction of the QA/QC Inspector. If a project specification criterion was not met or unusual weather conditions hindered work, then the QA/QC Administrator developed and presented to the City Site Engineer suggested solutions for approval.

# FINAL

Retests recommended by the QA/QC Inspector were verified that the defect was corrected before additional work was performed by the City's work force in the area of the deficiency. The QA/QC Inspector also verified that installation requirements were met.

Penetrations into the compacted added soil layer resulting from sampling or other activities were properly backfilled and compacted. Repairs were inspected by the QA/QC Inspector.

# FINAL

## 3.0 *Drainage System*

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The existing drainage system on the Front Slope was removed and replaced with a new system along the existing alignment. The system involved installing piping in various materials, sizes, and configurations. Other welded fabrications include trash racks and anchor assemblies. The supplier prepared shop drawings of fabrications prior to manufacture. The QA/QC Inspector reviewed the shop drawings for conformance to specifications. Dimensions were checked against actual site conditions.

During the construction, the QA/QC Inspector ensured that pipe and anchors were placed as required by the plans. Premixed concrete contained not less than 500 pounds of Portland cement per cubic yard. Concrete batching was performed by weight and delivered in transit-mix trucks pursuant to ASTM C 94-90. The QA/QC Inspector retained copies of delivery tickets bearing the time batching began, the weight of Portland cement in the mix, and the water added to the mix after batching. The QA/QC Inspector ensured that excess water was not added during placement.

## 4.0 Erosion Control

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This work consisted of hydroseeding with an erosion control admixture areas with slopes steeper than 3 horizontal to 1 vertical (3H:1V).

The QA/QC Inspector ensured that hydroseeding materials conformed to project specifications. Commercial fertilizer conformed to the requirements of the California Food and Agricultural Code. Seed was properly sealed with a certification tag according to the California Seed Law. Evidence was furnished that mulch was manufactured with materials conforming to specification.

Fertilizer, seed, mulch, and erosion-control admixture were distributed uniformly across completed surfaces with equipment of sufficient operating capacity to produce homogeneous mixtures and uniformly broadcast over the distances required. The QA/QC Inspector ensured that application rates for materials conformed to the specification.

# FINAL

## 5.0 *Final Documentation*

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Daily reports and testing results accumulated during closure construction were assembled and submitted to the City Project Manager as update on closure construction progress. The Final Construction Quality Assurance Report provides evidence that construction proceeded in accordance with the Closure Plan. The Final Report was certified by the QA/QC Administrator.

### 5.1 *Final Report*

At the completion of the work, the QA/QC Administrator submitted to the City Project Manager this Construction Completion Report, Volumes 1 through 4, which includes a summary statement, signed and sealed by a Registered Civil Engineer or Certified Engineering Geologist in the State of California. This report acknowledged:

- That the work had been performed in compliance with the plans and specifications;
- Physical sampling and testing had been conducted at the appropriate frequencies; and
- That the summary document provided the necessary supporting information.

Volume 1 is the body of the final report. CQA activities from Shaw's subcontractor Ninyo and Moore, Inc., are included as Appendices A through E (Volume 2) and Appendices F through H (Volume 3). The final report also includes Shaw's Appendices J through M (Volume 4).

### 5.2 *Appendices – Volumes 2 through 4*

#### 5.2.1 *Volume 2*

- |   |            |
|---|------------|
| • Daily Reports                               | Appendix A |
| • Field Photographs                           | Appendix B |
| • Field Test Data Sheets for Existing Cover   | Appendix C |
| • Field Test Data Sheets for Monolithic Cover | Appendix D |
| • Field Test Data Sheets for Added Soil Layer | Appendix E |

#### 5.2.2 *Volume 3*

- |  |            |
|--|------------|
| • Laboratory Test Data Sheets for Existing Cover   | Appendix F |
| • Laboratory Test Data Sheets for Monolithic Cover | Appendix G |
| • Laboratory Test Data Sheets for Added Soil Layer | Appendix H |

#### 5.2.3 *Volume 4*

- |                        |            |
|------------------------|------------|
| • Record drawings      | Appendix J |
| • Meeting Notes        | Appendix K |
| • Design Changes       | Appendix L |
| • Material Data Sheets | Appendix M |

# FINAL

## 6.0 Statement of Certification

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This section constitutes certification of this Construction Completion Report for Toyon Canyon Sanitary Landfill in accordance with CCR 27 258.60.

*I certify that this Construction Completion Report for the Toyon Canyon Sanitary Landfill Closure has been completed in accordance with the Construction Quality Assurance Plan included in the approved Amendment to the Final Closure and Post Closure Maintenance Plan and the applicable regulations. I also certify that, to the best of my knowledge, the data and information presented in this report are true, accurate, and complete.*



Michael L. Williams, P.E., C 40010  
Registered Professional Engineer  
Engineer of Record



# FINAL

## 7.0 References

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American Standards of Testing Materials (ASTM), 1991, *ASTM D698: Laboratory Compaction Characteristics of Soil Using Standard Effort*.

ASTM, 1991, *ASTM D1557: Laboratory Compaction Characteristics of Soil Using Modified Effort*.

City of Los Angeles (City), Bureau of Sanitation, Department of Public Works, 2001a, *Amendment to the Final Closure and Post-Closure Maintenance Plan for Toyon Canyon Sanitary Landfill*, August.

City of Los Angeles (City), Bureau of Sanitation, Department of Public Works, 2001b, *Amendment to the Final Closure and Post-Closure Maintenance Plan for Toyon Canyon Sanitary Landfill, Appendix E, Construction Quality Assurance Plan*, August.

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City of Los Angeles (City), Bureau of Sanitation, Department of Public Works, 2001d, *Amendment to the Final Closure and Post-Closure Maintenance Plan for Toyon Canyon Sanitary Landfill*, August, *Appendix E, Construction Quality Assurance Plan, Attachment A, Clay Test Pad Demonstration Report*, IT Corporation, 1997, February.

City of Los Angeles (City), Bureau of Sanitation, Department of Public Works, 2001e, *Amendment to the Final Closure and Post-Closure Maintenance Plan for Toyon Canyon Sanitary Landfill*, August, *Appendix J, Correspondence, RWQCB, Work Plan to Revise the Closure and Post-Closure Maintenance Plan – Toyon Canyon Landfill, Los Angeles (File No. 57-061)*, letter to Mr. Steve Fortune, Division Manager, Bureau of Sanitation, Department of Public Works, City of Los Angeles, January 10, 2000.

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## ***Tables***

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**Table E-8**  
**Existing Cover Preparation Testing**  
**For Areas Requiring GDB Placement**

<b>Parameter</b>	<b>Test Method</b>	<b>Placed Material per Test</b>	<b>Equivalent Test Area</b>	<b>Acceptance Criteria</b>
Density and Moisture	Nuclear Gage ASTM D 2922	1,000 cy	1 test per 270,000 ft <sup>2</sup> , minimum two tests per bench slope	85% of maximum dry density at optimum moisture

**Table E-9**  
**Geocomposite Drainage Blanket Specifications**

Compound	Property	Test Method	Minimum Acceptance Criteria
Nonwoven Geotextile	Apparent Opening Size	ASTM D 4751	50 (US Sieve Size) 0.210 mm
	Permittivity	ASTM D 4491	5 gpm/ft <sup>2</sup>
	Grab Strength	ASTM D 4632	110 lb
	Fabric Weight	ASTM D 5261	7 oz/yd <sup>2</sup>
	Puncture Resistance	ASTM D 4833	35 lb.
Geonet	Polymer Density	ASTM D 1505	0.940 g/cm <sup>3</sup>
	Polymer Melt Index (Max)	ASTM D 1238	0.5 g/10 minutes
	Carbon Black Content	ASTM D 4218	2.0 %
	Tensile Strength	ASTM D 5035	40 lbs/in
	Thickness	ASTM D5199	0.200 inches
	Mass Per Unit Area	ASTM D 5261	0.150 lbs/ft <sup>2</sup>
Geocomposite	Transmissivity (@ Gradient = 1.0 and Pressure = 4,000 psf)	ASTM D 4716	$>1 \times 10^{-5} \text{ m}^2/\text{sec}$
	Ply Adhesion	ASTMD D 413	2 lbs/in
	Tensile Strength (MD)	ASTM D 4632	500 lbs

**Table E-10**  
**Monolithic Cover Testing**

Minimum Test Frequency	Test Method	Acceptance Criteria
1 per 15,000 SF of monolithic cover placed	Laboratory Permeability ASTM D-5084	$< 1 \times 10^{-5}$ cm/sec

**Table E-11**  
**QA/QC Testing of Added Soil Layers**

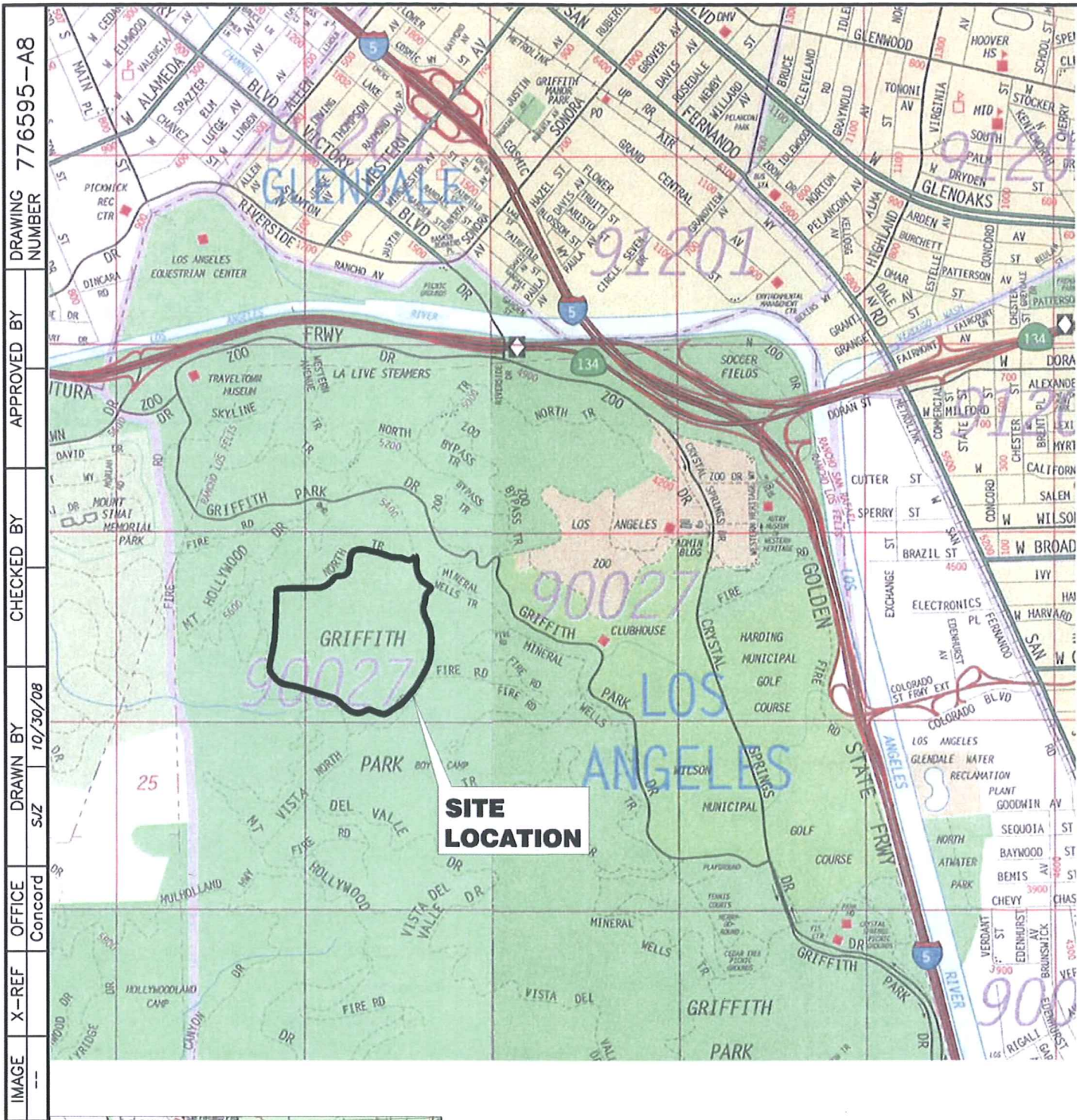
<b>Parameter</b>	<b>Test Method</b>	<b>Acceptance Criteria</b>	<b>Frequency of Tests</b>
Density and Moisture	Nuclear Gage ASTM D 2992	85% of maximum dry density	1 per 250 yd <sup>3</sup>
Confirming Density and Moisture	Sand Cone/"Speedy" ASTM D 1556, AASHTO <sup>1</sup> T-217	85% of maximum dry density	1 per 5 nuclear rests
Atterberg Limits	ASTM D 4318	-	1 per 250 yd <sup>3</sup>
Grain-Size Distribution	ASTM D 422 w/ hydrometer	Between 6 and 20 percent clay fraction	1 per 250 yd <sup>3</sup>
Confirming Moisture-Relations	ASTM D 3152	Within calculated tolerances	1 per 10 grain-size tests
Soil Permeability	ASTM D 5084	-	1 per moisture-relations test

Note: <sup>1</sup> - American Association of State Highway and Transportation Officials

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## ***Figures***

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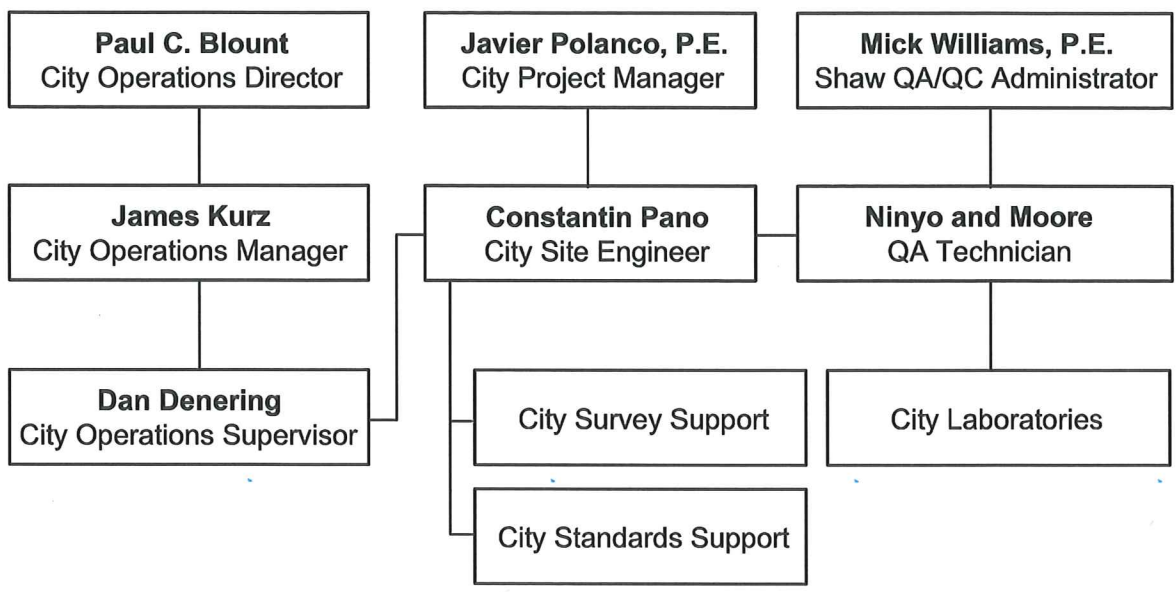
**Shaw** Shaw Environmental, Inc.

CITY OF LOS ANGELES  
TOYON CANYON LANDFILL CLOSURE

FIGURE 1  
SITE LOCATION MAP

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
SAN DIEGO	MPortacio 6/2009	MW 6/09		BT-128606-A4

## QA Organization and Responsibility Chart



CITY OF LOS ANGELES  
TOYON CANYON LANDFILL CLOSURE

FIGURE 2

QA ORGANIZATION AND  
RESPONSIBILITY CHART