DUGWAY PERMIT

MODULE VII

ATTACHMENT 26

SWMU 197
POST-CLOSURE PLAN

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Appendix A Certification of Closure

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

bgs	below ground surface
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation Plan
CPT	Cone Penetrometer Test
DPG	Dugway Proving Ground
DSHW	Divisions of Solid and Hazardous Waste
DWQ	Division of Water Quality
EPO	Environmental Program Office
ft	feet
GA	Tabun
GCL	Geosynthetic Clay Liner
GMA	Groundwater Management Area
HHRA	Human Health Risk Assessment
HWMU	Hazardous Waste Management Unit
kg	kilogram
µg/L	micrograms per liter
mg/L	milligrams per liter
msl	mean sea level
NFA	No Further Action
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
Shaw	Shaw Environmental, Inc.
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
USGS	U.S Geological Survey

1.0 INTRODUCTION

The two objectives of this Post-Closure Plan are: 1) ensure that Dugway Proving Ground (DPG or Dugway) complies with the Post-Closure Permit issued by the State of Utah in accordance with Title 40 Code of Federal Regulations (CFR) §264.117, with respect to post-closure inspection requirements; 2) outline the requirements needed to prevent exposure or contact with waste left in place at this landfill site. To meet these objectives, this Post-Closure Plan provides detailed information regarding the location, regulatory criteria, and post-closure inspections at Solid Waste Management Unit (SWMU) 197, herein referred to as DPG-197. Post-closure requirements will continue for a minimum of 30 years after closure of DPG-197. The post-closure care period may be extended or shortened, as deemed necessary (40 CFR §264.117(a)(2)).

In accordance with Title 40 CFR §270.28 and Utah Administrative Code (UAC) R315-3-2.19, the Post-Closure Plan is required to include specific information for a closed facility. As applicable to DPG-197, the information requirements include:

- General description of the facility,
- Description of security procedures,
- General inspection schedule,
- Preparedness and Prevention Plan,
- Facility location information (including seismic and flood plain considerations),
- Closure Plan or Closure Proposal,
- Certificate of Closure,
- Topographic map, with specific scale,
- Summary of groundwater monitoring data, and
- Identification of uppermost aquifer and interconnected aquifers.

Table 1 provides the regulatory citations for the general information requirements and the specific locations in this Post-Closure Plan where the specific information is presented.

Table 1: Summary of DPG-197 Post-Closure Information Requirements Under 40 CFR §270.14, and UAC R315-3-2.5

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(1) UAC R315-3-2.5(b)(1)	General Description of the Facility	Section 2.0
40 CFR §270.14(b)(4) UAC R315-3-2.5(b)(4)	Description of Security Procedures	Section 3.0
40 CFR §270.14(b)(5) UAC R315-3-2.5(b)(5)	General Inspection Schedule	Section 4.2 and Module VII Form B
40 CFR §270.14(b)(6) UAC R315-3-2.5(b)(6)	Preparedness and Prevention	Section 3.0

Table 1 (Continued): Summary of DPG-197 Post-Closure Information Requirements Under 40 CFR 270.14, UAC R315-3-2.19, and UAC R315-3-2.5

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(11)(i-ii, v) UAC R315-3-2.5(b)(11) (i-ii, v)	Facility Location Information Applicable seismic standard	Section 4.3.1
40 CFR §270.14(b)(11) (iii-v) UAC R315-3-2.5(b)(11) (iii-v)	Facility Location Information 100-year floodplain	Section 4.3.2
40CFR §270.14(b)(13) UAC R315-3-2.5(b)(13)	Copy of the Closure Proposal	Phase II RCRA Facility Investigation (RFI) was approved on April 12, 2006. No public comments were received.
40 CFR §270.14(b)(14) UAC R315-3-2.5(b)(14)	Closure Certification and Notification	Section 2.7 and Appendix A.
40 CFR §270.14(b)(16) UAC R315-3-2.5(b)(16)	Post-Closure Cost Estimate	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(18) UAC R315-3-2.5(b)(18)	Proof of Financial Coverage	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (i)	Topographic Map Map Scale and Date	Figure 2 (1 inch = 1000 feet (ft)).
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (ii)	Topographic Map 100-year floodplain area	Section 4.0; DPG-197 is not located within a verified 100-year floodplain area.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (iii)	Topographic Map Surface waters including intermittent streams	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (iv)	Topographic Map Surrounding land uses	DPG-197 is within a military base. There are no nearby operations in the vicinity of DPG-197.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (v)	Topographic Map A wind rose (i.e., prevailing windspeed and direction)	There are no residential populations abutting DPG-197. The closest residential area is English Village (approximately 26 miles away). A wind rose is not deemed necessary for DPG-197.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (vi)	Topographic Map Orientation of Map, North Arrow	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (vii)	Topographic Map Legal boundaries of the hazardous waste management facility	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (viii)	Topographic Map Access control, fence, gates	Figure 2. The site is not enclosed by a fence.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (ix)	Topographic Map Injection and withdrawal wells	Figure 2

Table 1 (Continued): Summary of DPG-197 Post-Closure Information Requirements Under 40 CFR 270.14, UAC R315-3-2.19, and UAC R315-3-2.5

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (xi)	Topographic Map Barriers for drainage or flood control	Figure 3. DPG-197 is graded to drain surface water away from the engineered covers. There are no barriers to drainage or flood control.
40 CFR §270.14(c) UAC R315-3-2.5(c)(1)	Groundwater Monitoring Information Summary of Groundwater Data	Final Phase II RFI Report, Section 2.2.4.2
40 CFR §270.14(c) UAC R315-3-2.5(c)(2)	Groundwater Monitoring Information Identification of uppermost aquifer	Final Phase II RFI Report, Section 2.2.1
40 CFR §270.14(c) UAC R315-3-2.5(c)(3)	Groundwater Monitoring Information Delineation of the Waste Management Area	Figure 2
40 CFR §270.14(c) UAC R315-3-2.5(c)(4)	Groundwater Monitoring Information Extent of Plume	Final Phase II RFI Report, Section 2.2.4.2, Figure 2.3 of the RFI.
40 CFR §270.14(c) UAC R315-3-2.5(c)(5)	Groundwater Monitoring Information Detailed Plans/Engineering Report for Proposed Groundwater Program	Post-closure groundwater monitoring at DPG-197 will be in accordance with the Downrange Groundwater Management Area (GMA) Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(i)	Groundwater Monitoring Information Proposed List of Parameters	Post-closure groundwater monitoring at DPG-197 will be in accordance with the Downrange GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(ii)	Groundwater Monitoring Information Proposed Groundwater Monitoring System	Post-closure groundwater monitoring at DPG-197 will be in accordance with the Downrange GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iii)	Groundwater Monitoring Information Background Values	Post-closure groundwater monitoring at DPG-197 will be in accordance with the Downrange GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iv)	Groundwater Monitoring Information A description of the Proposed Sampling	Post-closure groundwater monitoring at DPG-197 will be in accordance with the Downrange GMA Plan.

2.0 FACILITY DESCRIPTION

The following provides a general description of DPG-197, as required by UAC R315-3-2.5(b)(1).

2.1 DPG-197 LOCATION AND HISTORY

DPG-197 is located between November and Lima Roads in the center of Old South Ballistic Grid (Old Target S) in the Downwind Grid Area (Figure 1). This site occupies an area of approximately 0.37 acre and is relatively flat, with an average elevation of 4,308 feet (ft) above mean sea level.

DPG-197 consisted of a backfilled trench and the former location of a rectangular pad constructed of Marston matting laid directly on the ground. The backfilled trench was a northwest to southwest trending vegetated mound (50 ft wide by 100 ft long). The metal pad was approximately 100 ft long by 20 ft wide, and may have been used as a decontamination pad. Ordnance remnants were scattered throughout the area. Due to the distance between the trench and former area of Marston matting, the site was divided into two areas. Area 1 consisted of the trench located south of a dirt track and covered an affected area (portion of the SWMU where soil was potentially disturbed or otherwise affected by site activities) of approximately 0.22 acre. Area 2, located north of the dirt track, consisted of the former area of Marston matting and covered an affected area of approximately 0.15 acre.

2.2 PAST OPERATIONS

DPG-197 was not identified in the RCRA Facility Assessment (RFA; UDEQ, 1992); however, this site was included in the amended RFA in 1996 (UDEQ, 1996). Site history obtained from testing documents (U.S. Army, 1994) identified DPG-197 as the location for disposal testing of 250-kilogram (kg) German nerve agent-filled bombs captured during World War II. The objectives of these tests were three fold: 1) to tap agent-filled German bombs and transfer the agent into 1-ton containers for storage (occurred at the toxic gas yard); 2) to determine the agent dosage levels and the hazards incurred when quantities of agent-filled munitions were destroyed by open pit incineration (occurred at DPG-197); and 3) to develop and determine the feasibility and safety of two agent destruction chambers which could be quickly deployed by field personnel (occurred at White Sage Flat). Reportedly, these bombs were filled with a solution of 80-percent nerve agent and 20-percent chlorobenzene (DPG, 1957). After approximately 1000 of the 250-kg agent-filled bombs were demilitarized by open pit incineration at DPG-197, the remnants were transported to the Carr Area for disposal. Therefore, it was apparent that the demilitarized 250-kg bombs were not disposed of at this site, and the backfilled trench may have ultimately been used for disposal of other munitions or waste related to Target S operations. Documents also indicated that the South Ballistic Grid has been used for conventional ordnance and chemical agent testing since the mid-1940s (Baum, 1947). However, documentation regarding the presence or absence of buried waste at the site was unavailable. No investigations were conducted at the site prior to the Phase I activities.

A voluntary clean-up action was performed at DPG-197 during August 2003. The removal action involved removing the Marston matting from the ground surface and collecting miscellaneous debris from the area of the former pad. The metal was sent offsite to a metal recycler (Parsons, 2006).

2.3 PREVIOUS INVESTIGATIONS DOCUMENTATION

The detailed results of previous soil and groundwater sampling and closure information including the risk assessment are available for DPG-197 in the Division of Solid and Hazardous Waste (DSHW) public documents listed below in Table 2 (UAC R315-3-2.5(b)(13)).

Table 2: DSHW Library Documents Detailing DPG-197 Investigations

Document Title	Received Date	DSHW Library No.
Parsons, 1999. *Final Phase I RCRA Facility Investigation, Investigation Report, Revision 1*. September 1999	09/99	DPG00007
Parsons, 2006. *Final Phase II RCRA Facility Investigation Report, SWMU-197 Addendum*. January 2006	01/06	DPG00527
Shaw Environmental, 2007a. *Final Corrective Measures Study (CMS) Report, for Solid Waste Management Units (SWMUs) 180, 197, and 199 and RCRA Closure Plans for Hazardous Waste Management Units 55 and 58, Dugway Proving Ground, Utah*. April 2007	04/07	DPG00549
Shaw Environmental, 2007b. *Final Corrective Measures Implementation Plan, Firm Fixed-Price Remediation at DPG-197, Dugway Proving Ground, Utah*. May 2007	05/07	DPG00558
Shaw Environmental, Inc., 2008. *Final Corrective Measures Implementation Report For DPG-197* March 2008	03/08	DPG00587

2.4 CLOSURE ACTIVITIES

In accordance with UAC R315-7-21 and the Corrective Measures Implementation (CMI) Plan (Shaw, 2007b), closure at DPG-197 has been completed with the construction of an engineered cover system consisting of a geomembrane-supported geosynthetic clay liner (GCL) placed over the identified waste trench. The closure activities are described in the CMI Report (Shaw, 2008). Appendix A includes a copy of the DPG-197 Closure Certification signed and stamped by a Utah-licensed Professional Engineer.

The final cover system as designed and constructed satisfies the requirements of UAC R315-7-14 and R315-7-21 (by reference 40 CFR §264, Subpart N, 264.310) for the closure and post-closure of DPG-197, namely:

- Provide long-term minimization of migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the cover;
- Accommodate settling and subsidence so that the integrity of the cover is maintained; and
- Achieve a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.

In meeting the above performance standards, the major closure activities completed at DPG-197 included:

- Installation of the final engineered cover system; and
- Final grading of the site, including enhancement of drainage features, to help control erosion and minimize long-term maintenance requirements.

These measures will prevent human contact with the waste and provide for protection of groundwater. An inspection checklist for landfill sites (Form B) designed to ensure that these objectives are maintained is presented in Module VII.

2.5 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

In accordance with UAC R315-101, a risk assessment was conducted during the RFI (Parsons, 2006) to determine if the site-related chemicals detected in soil and groundwater at DPG-197 potentially posed unacceptable risks to human health and to define the boundary of remediation. In accordance with the risk assessment guidance presented in the DPG Risk Assumptions Document (Parsons, 2002), a quantitative human health risk assessment (HHRA) was conducted to determine if the site met requirements for risk-based closure under UAC R315-101. While useful in assessing potential risks during future use of the subject site, the risk assessment only addressed environmental media (e.g., soil and groundwater) and not buried waste or surface debris.

The results of the HHRA for DPG-197 performed per UAC R315-101 indicated that Area 1 characterized soil currently qualified for No Further Action (NFA) under UAC R315-101 based on hypothetical residential land use. Area 1 groundwater and Area 2 soil did not qualify for NFA; however, risk and hazard estimates under an industrial land-use scenario indicated that risks and hazards associated with potential exposures are below UAC R315-101 industrial screening levels. Soil-to-groundwater analysis also indicated that future impacts to groundwater from Chemicals of Potential Concern in soil are not expected.

An ecological risk assessment was also performed on the soil data from DPG-197. Lowest-observed-adverse-effect-level based hazard quotients calculated in the Tier 2 assessment showed that none of the contaminants of potential ecological concern had hazard quotients above 1.0. The evaluation of uncertainties associated with these hazard quotients provided additional support to this conclusion since the predicted exposures likely overestimated actual exposure due to conservative assumptions of factors such as bioavailability and exposure point concentrations. The potential for ecological risk at this site is therefore considered to be minimal.

Despite the absence of direct sampling results, risks to intrusive site workers and burrowing ecological receptors associated with uncharacterized buried wastes were assumed to be unacceptable based on the types of materials potentially present. Due to the risks associated with direct exposure to the waste, intrusive activities into the buried wastes must be avoided following site closure. The final RFI (Parsons, 2006 Appendix B) includes the full results of both the human health and ecological risk assessments for DPG-197.

2.6 SURFACE WATER AND GROUNDWATER

There are no defined surface water features within or near DPG-197. The general direction of surface water drainage in the area surrounding this unit is to the northwest, toward the main portion of the Great Salt Lake Desert.

The regional groundwater flow direction in the Downwind Grid area is to the northwest, and the local hydraulic gradient at DPG-197 is nearly flat. Average shallow groundwater quality at DPG-197 is Class IV (saline), per Utah Administrative Code (UAC) R317-6-3 Division of Water Quality ([DWQ], 2002), based on field measurements collected from DPG-197 temporary wells. Groundwater quality at nearby DPG-215, located 1.3 miles north of DPG-197, is also classified as Class IV (saline) per UAC R317-6-3 (DWQ, 2002) based on calculated values. The highly saline groundwater from the shallow water-bearing zone at DPG-197 is not used for drinking water, irrigation, or other purposes. Post-closure groundwater monitoring at DPG-197 will be managed in accordance with the Downrange GMA Plan.

2.7 CLOSURE NOTIFICATIONS

The Certification of Closure (Appendix A) was received and verified by the Executive Secretary of the Utah Solid and Hazardous Waste Control Board on April 7, 2008.

Federal facilities are exempt from submitting notifications to the local zoning authority as required by 40 CFR §§264.116 and 264.119, which are incorporated by reference in UAC R315-8-7.

3.0 SECURITY REQUIREMENTS

The following security conditions are applicable to DPG-197:

1. DPG-197 is located within a federal, military installation (DPG). As such, the installation is restricted for the common population.

2. At DPG-197, signs are present warning against unauthorized entry.

3. Security facilities are to be maintained and inspected throughout the post-closure care period. The security facilities (i.e., posted signs) will be inspected and the frequency of inspection is sated in Table 4. Dugway shall report to the DSHW any decrease of Dugway's Base Security, which could affect the security conditions as applicable to DPG-197.

4. Damaged or missing security facilities shall be noted in the inspection checklist. Repairs shall be completed as soon as practicable after the problem is discovered, in compliance with R3l5-8-2.6(c).

4.0 POST-CLOSURE OPERATIONS AND INSPECTIONS

4.1 INTRODUCTION

DPG-197 has been closed under the DPG RCRA part B Permit requirements and specifications of the CMI Plan for DPG-197 (Shaw, 2007b). Disturbance of the waste will not be allowed. To ensure that the area is not reused or developed, annual site inspections and a biennial post-closure report shall be

required. Removal and reuse of soil from this site will not be allowed unless under an excavation permit approved by the DPG Environmental Program Office (EPO). Soil excavation at this site must be coordinated through the DPG EPO.

4.2 ROUTINE SITE INSPECTIONS

During its Post-Closure period general inspections of the former DPG-197 site shall be conducted semi-annually to ensure that the integrity of the engineered cap is maintained and to verify the Dugway Dig Permit process as described in Module VII.I has been followed. The frequency of inspections can be scaled back to once every year after conditions of the landfill cap have stabilized over a minimum period of two years. Any modifications to the frequency of inspections will be in accordance with amendments submitted in the form of proposed permit modifications.

Site inspections will consist of a complete walkthrough and visual inspection of the covered areas as well as surface water drainage features. A general site inspection checklist for landfill sites is included in Module VII Form B. Completed inspection forms shall be filed with the Dugway EPO.

At a minimum the site shall be visually inspected to ensure the following conditions are maintained at the site:

- No noticeable sliding (slope failure)
- No noticeable damage to the soil covering from burrowing animals
- No noticeable depressions or ponding water are present
- No excessive soil erosion is evident on the cap surface or at the cap edges
- No weeds or trees (with deep tap roots) are present that may penetrate the cap
- Signs are in good condition
- Drainage patterns and roads are functioning as planned with no significant erosion or ponding
- Survey monument is undamaged and there is no significant subsidence of the landfill cap

Table 3 summarizes the Post-Closure Inspection Schedule for DPG-197, and lists the items to be inspected. Inspection personnel shall note any problems found and shall inform appropriate Dugway representatives.

Table 3: DPG-197 Post-Closure Inspection Schedule

Inspection/ Monitoring Item	Method of Documentation	Frequency of Inspection
Landfill Cap	Inspection Checklist (Module VII Form B)	Semi-Annual
Survey Monument	Inspection Checklist (Module VII Form B)	Annual / 5 year intervals
Signs	Inspection Checklist (Module VII Form B)	Semi-Annual
Drainage	Inspection Checklist (Module VII Form B)	Semi-Annual

4.2.1 Protective Soil Layer Inspections

Maintenance of the protective soil layer is an essential step in ensuring that the integrity of the final cover system is preserved. During each site visit, observations will be made to ensure that the protective soil layer is functioning as designed (i.e., protecting the underlying GCL). Repairs to the protective soil layer may include removal of vegetation species having tap roots greater than 12 inches, regrading through the

placement of fill in areas where a potential for ponding water on the cover exists due to settlement, or repair and stabilization of areas that have been eroded.

If signs of soil erosion are excessive (for example, cracks or rills greater than two-inches wide) or continual (recurring in the same area), corrective action may be necessary. Significant cracks or rills that have the potential to impact the functionality of the cover system will be documented on the inspection forms. Corrective action may include filling in the eroded or cracked area, regrading slopes, establishing vegetation (if soil salinity is favorable) or adding mulch to the soil surface.

For most routine repairs, corrective action should be initiated as soon as possible after identifying the problem or as directed by DPG. If the corrective action requires substantial effort and/or a technical plan, a brief plan will be prepared to summarize the problem, the potential impacts, and the time-frame in which corrective action will be implemented and the planning involved.

4.2.2 Survey Monument Inspections

During each visit, the survey monument installed during closure (Figure 4) will be inspected to determine if any damage has made its use questionable as a reference point. If missing or badly damaged, it will be replaced as soon as possible after discovery of the problem.

As part of the routine inspection, survey monument location and elevation will be surveyed at least once per year for the first two years after construction. Once a settlement of 0.1 ft or less has been measured for two consecutive years, surveys can be scaled back to once every five years. The baseline northing, easting, and elevation of the DPG-197 survey monument (SM-197) have been summarized in Table 4. In addition, the survey coordinates for locations around the perimeter of the cover system, shown on Figure 4, are presented for future reference.

Table 4: DPG-197 Survey Coordinates

Description / Pt. Location	Northing (ft)	Easting (ft)	Elevation[a] (ft above msl)
Survey Monument (SM197)	7,206,244.69	1,174,314.46	4311.0
6100	7,206,308.14	1,174,291.68	4308.7
6103	7,206,218.13	1,174,382.91	4309.4
6104	7,206,182.23	1,174,347.90	4309.8
6105	7,206,272.20	1,174,257.32	4309.5

[a] *The initial coordinates of prints 6100-6105 were obtained using a Global Positioning System. The survey monument (SM197) was surveyed in February, 2008 and results are provided in the 2008 biennial report.*

4.3 CONTINGENCY INSPECTIONS

This section provides information about emergency response inspection procedures to be implemented in the event of any natural disaster in the DPG area that may affect the final cover system at DPG-197. Module VII a general inspection checklist for landfill sites (Form B).

The Dugway Emergency Response and Contingency Plan (Part B Permit), where applicable to this site, shall be used to announce and respond to emergency conditions. At a minimum, the site inspector should have a radio or phone and a First Aid kit available during inspections.

4.3.1 Earthquakes

Dugway Proving Ground is located in Seismic Zone 2 with a maximum acceleration of 0.2 gravity force (Hunt, 1984). DPG-197 is not located within 200 ft of any active faults. Although Utah is tectonically active, most of the earthquake activity occurs about 65 miles to the east along the Wasatch Range Foothills.

A geologic map completed in a 1988 study by the U.S. Geological Survey (USGS) (Barnhard and Dodge, 1988), was used to determine the distribution, relative age, and amount and extent of surface rupture on Quaternary fault scarps, in the area of DPG-197.

The USGS study (Barnhard and Dodge, 1988) concluded that morphologic and geologic data collected along the fault scarps in the area indicate that all were formed during the later Pleistocene era and there is not any clear evidence of Holocene surface rupture. Several faults inferred on geophysical evidence are located at DPG; however, there is no evidence of displacement during Holocene time.

In the event of a 6.5 magnitude or higher earthquake centered within 50 miles of the site, qualified personnel will visually inspect the landfill cap for signs of damage as soon as it is safe and practical to do so. Any damage to the landfill cap will be repaired to ensure the integrity of the cap. If the landfill cap has sustained extensive damage, Dugway will implement corrective actions to ensure that contaminants are contained and human health is protected. Post-earthquake site inspection records will be submitted to the Dugway Environmental Department.

Following an earthquake, the landfill and landfill cap will also be inspected for lateral shifting of debris. Survey monuments will be resurveyed to determine any horizontal or vertical movement of the cap.

4.3.2 Floods or Major Storms

DPG-197 is not located within a 100-year verified floodplain. The National Flood Insurance Rate Map, identifying the boundary of the 100-year flood, does not include DPG. There are no permanent streams or other surface water bodies on DPG.

During the capping of DPG-197, the site was graded so that surface water from precipitation flows away from the capped area and to the northwest in the direction of the natural drainage flow. Most of the surface water evaporates and does not infiltrate into the ground. Like other arid regions, DPG is subject to flash flooding following high-precipitation events. Flash floods have occurred only four times in the history of the installation, in 1944, 1952, 1973, and 1983. The major area affected during flash floods has been the Government Creek drainage channel, which has overflowed and caused minor inundation of roads at the Ditto Technical Center.

In the event of a flood or major storm, Dugway will inspect the landfill cap to ensure its integrity within 72 hours of the event. A checklist is included in Module VII (Form B). A major storm is defined in this plan as a storm with one inch of precipitation or more over a 24-hour period. Any damage to the landfill cap will be repaired as soon as possible to ensure the integrity of the cap.

4.3.3 Fires

In the event of a surface fire near the landfill cap, the Dugway fire department will be notified and the Dugway integrated contingency plan will be implemented. In the event of a landfill fire, if the cap is observed to have been breached, firefighting methods such as foam or smothering with soil will be considered and used, as appropriate. Following the incident, Dugway will perform a thorough inspection of the landfill cap using the checklist included in Module VII (Form B), to ensure that the integrity of the cover has not been compromised and waste has not been exposed. If there is fire damage, DPG will implement corrective actions to ensure that contaminants are contained and human health is protected.

4.4 INSPECTION FOLLOW-UP

Copies of completed site inspection checklists (Form B, Module VII) shall be forwarded to the Dugway EPO. The Point-of-Contact for the Dugway EPO is as follows:

Environmental Programs Compliance Representative
Dugway Proving Ground Environmental Program Office
Dugway Proving Ground, UT 84022
Telephone: (435) 831-3560

The Dugway EPO shall notify the appropriate personnel to implement corrective action as needed.

Corrective action shall be initiated as soon as practical after identifying the problem, or as directed by Dugway. If the corrective action requires substantial effort, a technical plan shall be prepared to summarize the problem, the potential impacts, the proposed plan for action, and the time-frame in which corrective action will be implemented as required under this Permit. This plan shall be approved by the Executive Secretary prior to implementing corrective action.

5.0 SUBMITTALS/REPORTING

Based on the evaluation presented in the CMIR for DPG-197 (Shaw, 2007), post-closure inspection is required. Groundwater monitoring at DPG-197 will be managed under the Downrange GMA Plan.

5.1 NON-COMPLIANCE REPORTING

The conditions at DPG-197 are such that the impact to human health and the environment is very unlikely. Hazardous wastes are no longer managed at the site. Nonetheless, if there is any type of non-compliance with any condition of this Permit, notifications shall be submitted per permit condition VII.C.5.

5.2 BIENNIAL POST-CLOSURE REPORT

In accordance with UAC R315-3-3.1(l)(9), a Biennial Post-Closure Report shall be prepared for all Dugway closed Hazardous Waste Management Units (HWMUs) and SWMUs undergoing post-closure care by March 1, of the reporting year. The first Post-Closure report for DPG-197 shall be due no later than March 1, 2008. Specifically for DPG-197, the Biennial Post-Closure Report shall include, at a minimum, the following:

- General site description and conditions
- Areas of cap repair
- Inspection records

5.3 REQUIRED SUBMITTALS

Table 5 summarizes the requirements for the Biennial Post-Closure Report for DPG-197 and reporting for any non-compliance.

Table 5: Summary Table of Required Submittals

Required Submittals	Frequency and Submittal Date
Biennial Post-Closure Report	Post-Closure Reports shall be submitted to the Division of Solid and Hazardous Waste no later than March, of the year the report is due. Reporting years are even numbered years beginning with March 2008, for the duration of the Post-Closure Monitoring Period.
Non-Compliance Reporting	
Anticipated Non-Compliance	30 days advance notice of any change which may result in noncompliance
24-hour Notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment.	Orally within 24 hours of discovery
Five-day written notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment including evidence of groundwater contamination, significant data quality issues, or a request for reduced monitoring frequency. The Executive Secretary may waive the 5-day notice, in favor of a 15-day notice.	Within 5 days of discovery
Written notification for information concerning the non-compliance, which does not endanger human health or the environment.	Submitted when the Biennial Post-Closure Reports are submitted.

6.0 POST-CLOSURE CERTIFICATION

No later than 60 days after post-closure activities are completed and approved by the Executive Secretary, Dugway representatives shall submit a certification to the Board, signed by Dugway and an independent professional engineer registered in the State of Utah, stating why post-closure care is no longer needed.

7.0 REFERENCES

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FIGURES

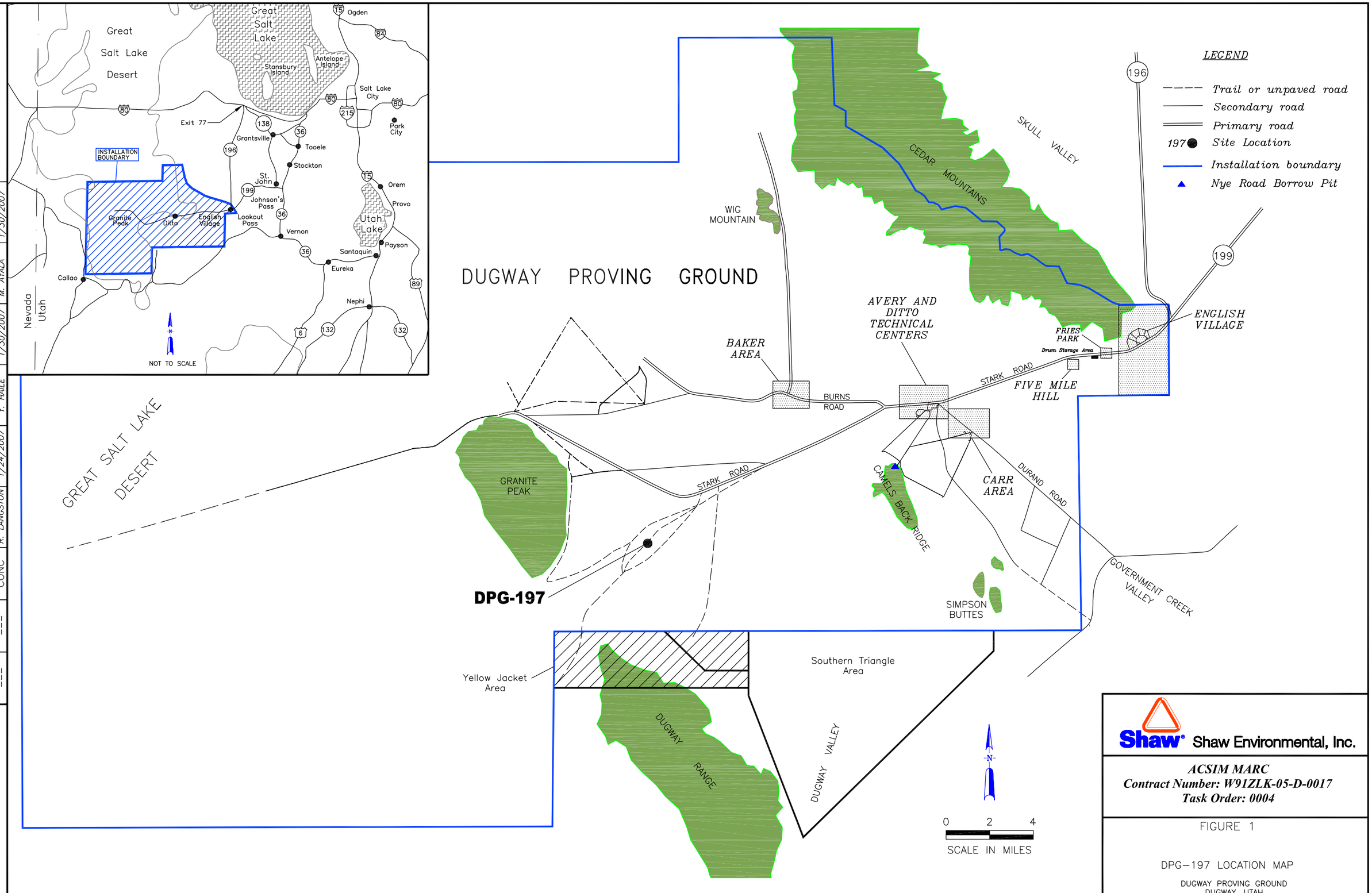
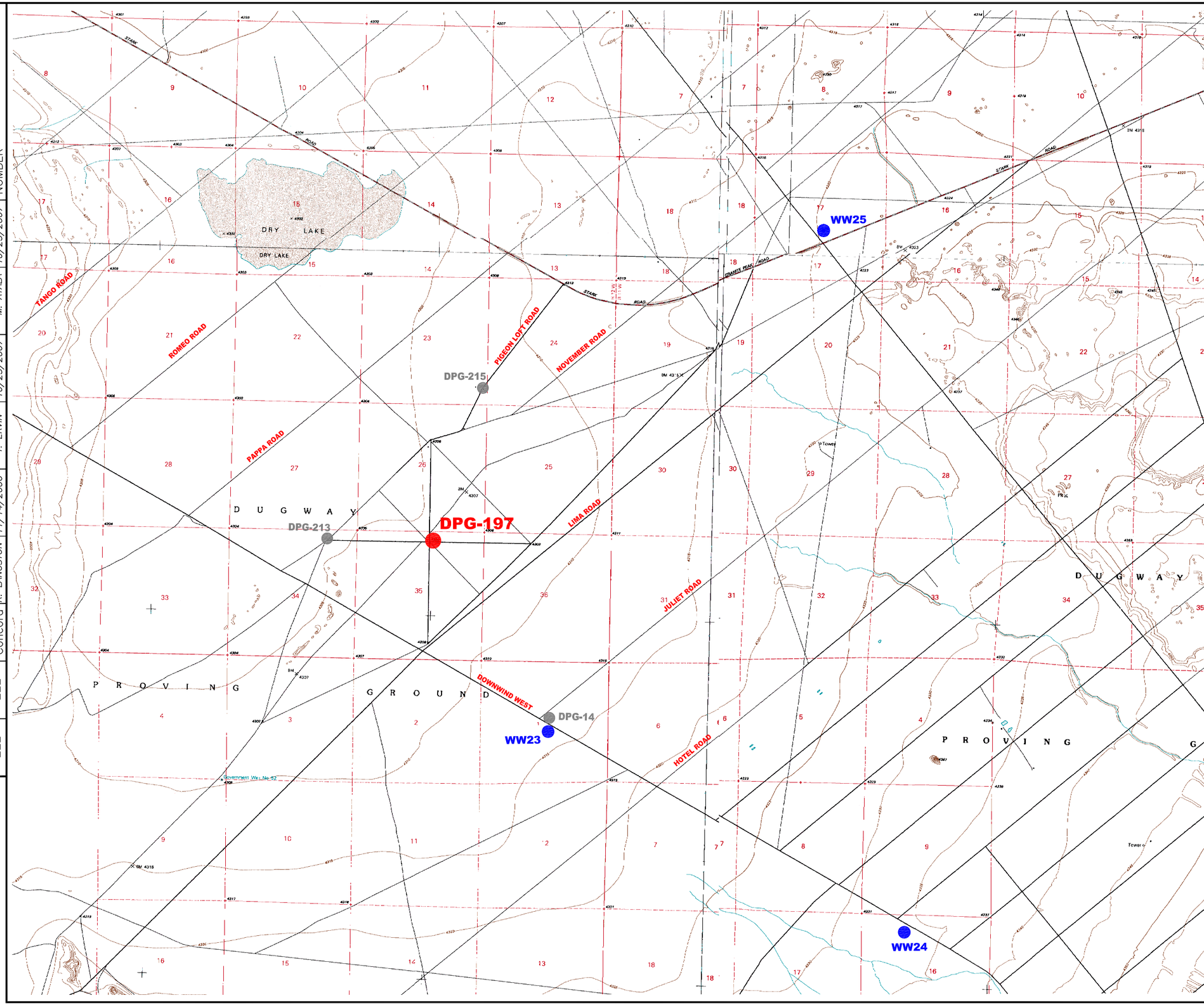

Great Salt Lake Desert
Great Salt Lake
Stansbury Island
Antelope Island
Ogden
Salt Lake City
Park City
Exit 77
Grantsville
Tooele
Stockton
St. John
Johnson's Pass
Lookout Pass
Vernon
Orem
Provo
Utah Lake
Payson
Santaquin
Eureka
Nephi
Callao
Granite Peak
Ditto
English Village
INSTALLATION BOUNDARY
Nevada
Utah
NOT TO SCALE
GREAT SALT LAKE DESERT
DUGWAY PROVING GROUND
WIG MOUNTAIN
CEDAR MOUNTAINS
SKULL VALLEY
LEGEND
Trail or unpaved road
Secondary road
Primary road
197 Site Location
Installation boundary
Nye Road Borrow Pit
BAKER AREA
AVERY AND DITTO TECHNICAL CENTERS
FRIES PARK
Drum Storage Area
ENGLISH VILLAGE
FIVE MILE HILL
STARK ROAD
BURNS ROAD
CARR AREA
DURAND ROAD
CAMELS BACK RIDGE
GRANITE PEAK
DPG-197
SIMPSON BUTTES
GOVERNMENT CREEK VALLEY
Yellow Jacket Area
Southern Triangle Area
DUGWAY RANGE
DUGWAY VALLEY
0 2 4
SCALE IN MILES
Shaw Environmental, Inc.
ACSIM MARC
Contract Number: W91ZLK-05-D-0017
Task Order: 0004
FIGURE 1
DPG-197 LOCATION MAP
DUGWAY PROVING GROUND
DUGWAY, UTAH
DRAWING 123354-B92
APPROVED BY M. AYALA 1/30/2007
CHECKED BY Y. HAILE 1/30/2007
DRAWN BY R. LANGSTON 1/24/2007
OFFICE CONC
X-REF ---
IMAGE ---

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	Concord	R. LANGSTON 11/14/2006	T. ERVIN 10/25/2007	M. AYALA 10/25/2007	123354-B93



LEGEND

- DPG Site Location
- Other DPG Site Location
- Water Well Location

N

SCALE IN FEET

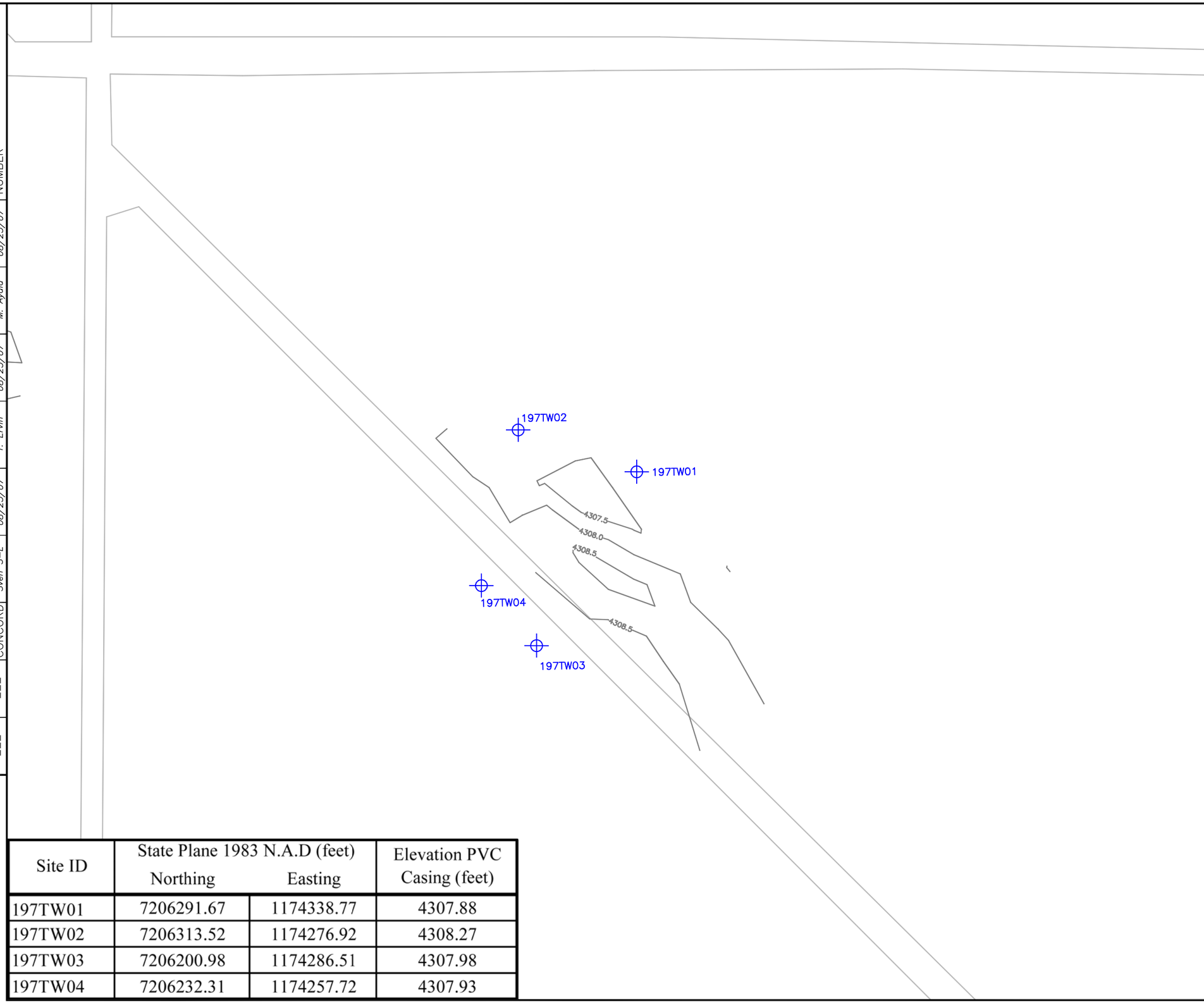
4000 0 4000

Shaw Environmental, Inc.

ACSIM MARC
Contract Number: W91ZLK-05-D-0017
Task Order: 0004

FIGURE 2

DPG-197
REGIONAL TOPOGRAPHY
DUGWAY PROVING GROUND
DUGWAY, UTAH



Site ID	State Plane 1983 N.A.D (feet)		Elevation PVC Casing (feet)
	Northing	Easting	
197TW01	7206291.67	1174338.77	4307.88
197TW02	7206313.52	1174276.92	4308.27
197TW03	7206200.98	1174286.51	4307.98
197TW04	7206232.31	1174257.72	4307.93

LEGEND

Temporary Well

Access Road

Pre–Construction Site Topography

Prepared for:
U.S. Army Dugway Proving Ground
Topography by: Shaw Environmental
Date of Survey: 04/24/2007

N

SCALE IN FEET

50 0 50

Shaw™ Shaw Environmental, Inc.

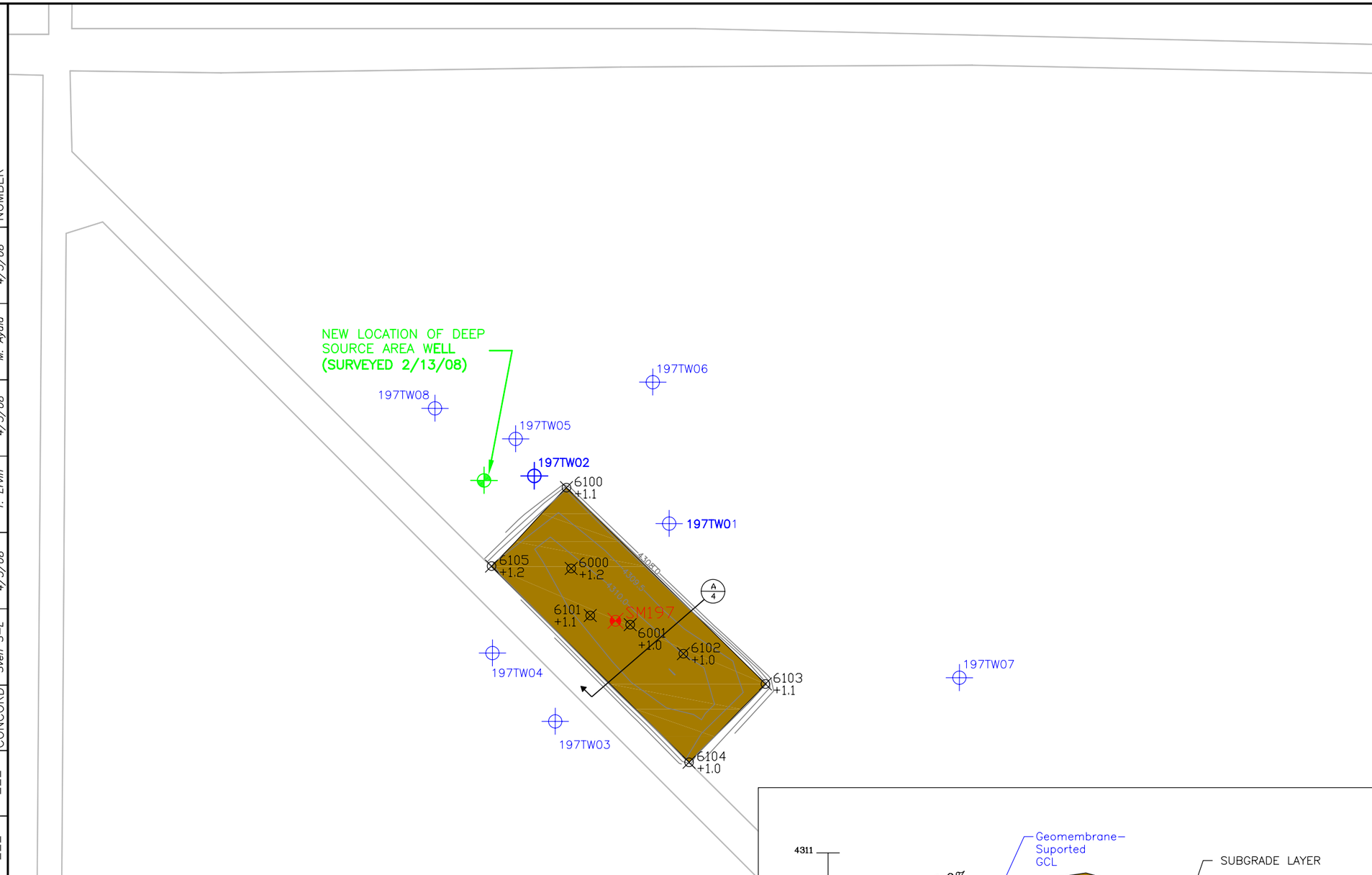
ACSIM MARC
Contract Number: W91ZLK-05-D-0017
Task Order: 0004

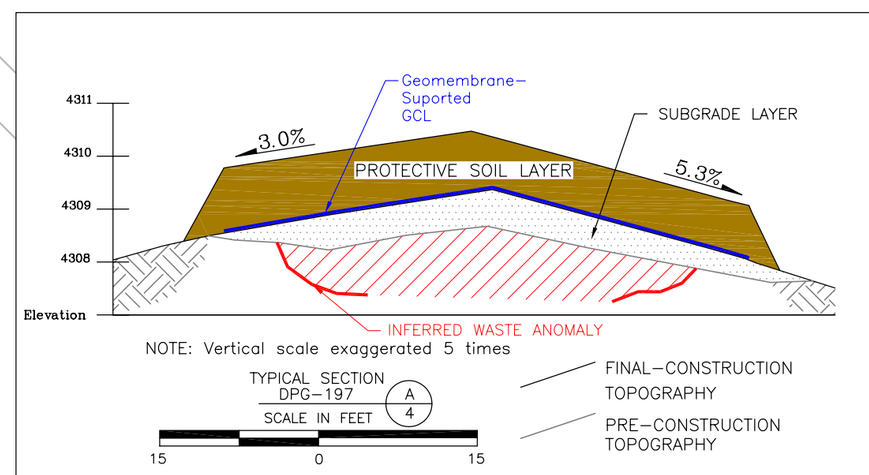
FIGURE 3

DPG–197 PRE–CONSTRUCTION TOPOGRAPHY

DUGWAY PROVING GROUND
DUGWAY, UTAH

IMAGE	X–REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	CONCORD	Sven S–L 08/23/07	T. Ervin 08/23/07	M. Ayala 08/23/07	123354–B77





LEGEND

- Temporary Well
- Survey Monument
- Access Road
- Topography of Protective Soil Layer
- Extent of Final Cover System
- 6000 +1.2 — Verification Shot Number Thickness of Soil Layer As Presented in Table 2-3 in the CMIR

NOTE
Topography contours within cap boudaries represent the top of prepared subgrade.

Contours at 0.5 foot interval

CMIR = Corrective measures implementation plan (Shaw, 2008)

Prepared For:
U.S. Army Dugway Proving Ground
Topography by: Shaw Environmental
Date of Survey: 07/27/2007

N

SCALE IN FEET
50 0 50

Shaw™ Shaw Environmental, Inc.

ACSIM MARC
Contract Number: W91ZLK-05-D-0017
Task Order: 0004

FIGURE 4
DPG-197
POST-CONSTRUCTION TOPOGRAPHY AND SITE CONDITIONS
DUGWAY PROVING GROUND
DUGWAY, UTAH

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1	2/15/08	MPA	--	--	ADDED ADDITIONAL WELL LOCATIONS

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	CONCORD	Sven S-L 4/3/08	T. Ervin 4/3/08	M. Ayala 4/3/08	123354-B59

APPENDIX A

COPY OF
CERTIFICATION OF CLOSURE

CERTIFICATION OF CLOSURE

The Corrective Measures Implementation Report for DPG-197 at Dugway Proving Ground, Utah has been prepared by Shaw Environmental in accordance with the closure requirements specified under the DPG Part B RCRA Permit and the CMI Plan. The requirements of UAC R315-101 form the basis for the risk-based criteria in the closure of DPG-197. The site has been managed in accordance with the specifications in the approved CMI Plan.

In accordance with the DPG Part B RCRA Permit, the signature and seal certify that a licensed professional has reviewed the Corrective Measures Implementation Report in accordance with the above referenced regulatory requirements.

Respectfully submitted,

Scott Reed
Directorate of Environmental Programs
Dugway Proving Ground

Sunil Kishnani, P.E.
Utah Registered Civil Engineer No. 6027103

REGISTERED PROFESSIONAL ENGINEER
No. 6027103
SUNIL S. KISHNANI
exp 3/31/09
STATE OF UTAH