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Inspection Report for Technical Area 73, Los Alamos County Airport Landfill, Solid Waste Management Units 73-001(a) and 73-001(d)

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

This report summarizes activities and findings of the landfill cover inspection conducted for the Los Alamos County Airport Technical Area 73 landfill, third and fourth quarters calendar year 2010, as part of the postclosure care and monitoring requirements. Inspection activities were suspended during the first two quarters while construction was being performed to address restoration of the landfill cover to original design and constructed conditions, to implement features to minimize future erosion damage to the cover system, and to enhance the quality and reduce the peak discharge rate of stormwater runoff from the landfill cover. These enhancements were recommended in the "Inspection Report for Technical Area 73 Los Alamos County Airport Landfill, Solid Waste Management Units 73-001(a) and 73-001(d)," dated August 2009. The implementation of these enhancements is described in the "Final Construction Report for Los Alamos Airport Landfill TA-73, SWMU 73-001(a) Cover Improvements, Los Alamos, New Mexico," dated June 2010. This final construction report is included as an appendix to this inspection report.

Inspection activities performed in 2010 indicate the landfill cover is functioning adequately. However, some observations were made during the inspection surveys that indicate additional work may be needed to meet the original design criteria. These observations include (1) three gas vent locations that were found to be capped; (2) rilling along the northern perimeter of the vegetated slope; and (3) subsidence and cracking of the MatCon pavement, hangar pads, and trench drains.

Based on the findings of the inspection activities, it is recommended that measures be taken to install gas-vent risers and spinners at the capped vent locations and to restore the rilling area to meet the original design configuration. A detailed engineering evaluation is currently being conducted by the Army Corps of Engineers to assess the rate of subsidence of the MatCon pavement and associated concrete hangar pads.

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1.0 INTRODUCTION

This landfill cover inspection report, prepared by Los Alamos National Laboratory (the Laboratory), summarizes the findings of inspection activities conducted at the Los Alamos County (LAC) Airport at the Technical Area 73 (TA-73) Solid Waste Management Unit (SWMU) 73-001(a), a landfill, and SWMU 73-001(d), a debris disposal area (DDA), for the third and fourth quarters of calendar year 2010.

Postclosure care and monitoring inspection and reporting requirements are described in the "Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico" (CE2 Corporation 2009, 111600) and the "Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill" (North Wind Inc. 2006, 111707). The final implementation strategy was developed to update the 2006 postclosure plan to include minor changes reflected in the 2007 final remedy and to include specific operations and maintenance activities necessary for a comprehensive approach to maintaining and monitoring the landfill for 30 yr following construction.

2.0 BACKGROUND

Two inactive solid waste disposal sites [the airport landfill, SWMU 73-001(a), and the DDA, SWMU 73-001(d)] are located at the LAC Airport (Figure 1). The airport landfill operated from 1943 to 1973 for the disposal of solid waste consisting of household trash from the Los Alamos townsite and office trash from Los Alamos Scientific Laboratory. Before 1965, some of the waste was incinerated and subsequently buried in the airport landfill. Approximately 489,500 yd^3 of waste was disposed of in the landfill.

From 1984 to 1986, approximately 126,000 yd^3 of burned debris was excavated from the western end of the airport landfill and reburied in a pair of parallel trenches at the DDA.

In late 2006 and early 2007, the final remedy landfill cover system was installed at the airport landfill. The final remedy design and completion activities for the landfill and the DDA are provided in the "Remedy Completion Report, DOE LASO TA-73 Airport Landfill, SWMUs 73-001(a) and 73-001(d)" (North Wind Inc. 2007, 096333). Approximately 50,000 yd^3 of waste was relocated within the SWMU boundary during the 2006 final remedy construction activities. With the exception of a single container of Freon-113 uncovered and subsequently managed off-site, no other hazardous or radioactive materials were discovered.

After waste relocation, compaction, and regrading were conducted, the following features were installed for the airport landfill cover (Figure 2):

- Approximately 6 acres of MatCon (Modified Asphalt Technology for Waste Containment) asphalt pavement
- Five concrete hangar pads within the MatCon pavement area
- A landfill-gas collection system
- Two rock retaining walls
- A concrete retaining wall
- Turf reinforcement matting (TRM)

- Revegetation of approximately 4 acres with native grasses
- A stormwater collection system consisting of five trench drains, seven drain inlets, approximately 1950 ft of associated buried concrete storm-sewer lines, an 18-in.-diameter high-density polyethylene outfall pipe approximately 110 ft in length, and three riprap drainage channels

In 2009 and 2010, erosion features (rills and small gullies) and subsidence associated with stormwater runoff from the paved areas above the vegetated slopes were repaired. In addition, the curb along the taxiway was repaired and extended to redirect stormwater away from the main vegetated slope. These repairs and enhancements are detailed in the "Final Construction Report for Los Alamos Airport Landfill TA-73, SWMU 73-001(a) Cover Improvements, Los Alamos, New Mexico," which is included as Appendix A to this inspection report.

The New Mexico Environment Department's (NMED's) approval with modifications for the remedy completion report requires monitoring of the stormwater runoff from the site (NMED 2007, 098285). This monitoring is being performed under the Laboratory's individual permit for stormwater discharges from SWMUs and areas of concern.

3.0 INSPECTION ACTIVITIES

Inspection activities were conducted during the third and fourth quarters of 2010 in accordance with the "Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico" (CE2 Corporation 2009, 111600), and the "Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill" (North Wind, Inc. 2006, 111707).

Inspection activities focused on the individual features of the landfill cover, evaluating the condition and overall integrity of each element. In addition, landfill-gas monitoring was conducted throughout the landfill cover to evaluate the presence of potentially combustible gases. The DDA, located at the eastern end of the airport runway (Figure 1) was inspected for evidence of erosion or diminished vegetation. The completed inspection checklists are included in Appendix B.

Per section 7 of the implementation strategy (CE2 Corporation 2009, 111600), the following field inspections, surveys, and gas monitoring were completed during the third and fourth quarters of 2010.

August 20, 2010

- Annual inspection of the gas-collection system, TRM, vegetated areas, wattle area, concrete and rock retaining walls, stormwater-collection system, and the outfall pipe
- Monthly inspection of MatCon pavement, concrete hangar pads, and survey benchmarks

September 23, 2010

- Significant rainfall (1.22 in. on September 22, 2010) inspection of the MatCon pavement, hangar pads, vegetated areas, wattle area, retaining walls, and the stormwater-collection system

September 28, 2010

- Third quarter landfill-gas monitoring

October 20, 2010

- Monthly inspection of MatCon pavement, concrete hangar pads, and survey benchmarks. Additional activities included visual inspection of the gas-collection system, TRM, vegetated areas, wattle area, concrete and rock retaining walls, and stormwater-collection system.

November 19, 2010

- Monthly inspection of MatCon pavement, concrete hangar pads, and survey benchmarks. Additional activities included visual inspection of the gas-collection system, TRM, vegetated areas, wattle area, concrete and rock retaining walls, and stormwater-collection system.

December 15, 2010

- Monthly inspection of MatCon pavement, concrete hangar pads, and survey benchmarks. Additional activities included visual inspection of the gas-collection system, TRM, vegetated areas, wattle area, concrete and rock retaining walls, and stormwater-collection system.

December 23, 2010

- Fourth quarter landfill-gas monitoring. The survey could not be completed because of gusting winds and snow and was rescheduled for the first week of January 2011, after the Laboratory winter closure.

January 4, 2010

- Completed fourth quarter landfill-gas monitoring

Inspection activities and findings are described below.

3.1 MatCon Pavement and Concrete Hangar Pads

An inspection survey of the MatCon asphalt pavement was conducted by walking transects along the western, eastern, and southern areas of the pavement and between each hangar pad shown in Figures 3 and 4. The survey looked for evidence of cracking, subsidence, or separation of the pavement.

Visible cracking or separation was noted in various locations of the MatCon pavement. The cracks occurred mainly along the contact seam between paving lanes as shown in Figure 5. Cracks ranged from a few feet to over 100 ft in length, up to 0.5 in. wide and approximately 3 in. deep. Weeds were observed growing through the cracks in several locations, as shown in Figures 6 and 7.

Visible subsidence of the MatCon pavement was noted near the northern half of hangar pads 2 and 3 and, to a lesser degree, along the northern quarter of pad 4. It was noted during the September 23 inspection, after the significant rainfall event, that the MatCon surface was not draining and puddles had formed. It was also noted that various locations have been patched with asphalt pavement, as shown in Figure 8.

An inspection of the five concrete hangar pads was conducted by walking along the perimeter of each hangar pad and along a transect down the center of each pad. The inspection looked for evidence of cracking, subsidence, or separation between expansion joints and separation/subsidence between the concrete pads and the MatCon pavement.

Visible subsidence was noted on the northern half of hangar pads 2 and 3. Subsidence was also found on the northwest quarter of hangar pads 1 and 4, but to a lesser degree than on pads 2 and 3. An elevation survey of the pads, commissioned by the LAC Airport, determined that the northern half of pads 2 and 3 were approximately 1 ft lower than the southern half of the pads. All the pads have risen and fallen to some degree, as indicated in the LAC survey notes.

Cracking associated with the subsidence of the pads was also noted throughout the central portion of each pad. Typical cracking observed at pad 3 is shown in Figure 9. Cracks in pads 2 and 3 had been treated in 2009 using polyurethane sealants (Appendix A). Some of the treated cracks have expanded and grown in length and width. Separation of the expansion joints was noted at all the pads, with the exception of pad 5.

Separation or subsidence of joints between the pads and the MatCon pavement was noted at various locations, with weeds growing between the pad and the MatCon pavement in some locations, as shown in Figure 10.

A survey of the MatCon and hangar pads was conducted by the Army Corps of Engineers in January 2011 to obtain more accurate measurements. Additional measurements will be made over time to evaluate the rate of subsidence of the MatCon and hangar pads. This evaluation will be included in the 2011 inspection report.

3.2 Vegetated (Seeded) Areas

Inspection of the vegetated areas focused on evidence of erosion, subsidence, sparse vegetation, and animal burrows. Two parallel transects were walked along the northern vegetated area between the MatCon pavement and the chainlink perimeter fence, three parallel transects were walked along the upper reaches of the eastern sloped area, and three parallel transects were walked along the lower reaches of the eastern sloped area.

Erosion rills identified in the 2009 inspection report (North Wind Inc. 2009, 111706) were repaired in early 2010 by removing the TRM, excavating the area of rilling to subgrade material, adding infiltration material (silty sandy clay) in 6-in. lifts, and compacting. The final lift consisted of a sandy clay loam topsoil with organic compost material. The area was then seeded and the TRM replaced as needed. For rills less than 4 in. deep, topsoil was placed over the existing TRM. In addition, approximately 375 linear ft of curb and gutter was constructed along the southern perimeter of the vegetated slope to prevent run-on and future erosion. These activities are described in the final construction report (Appendix A).

The vegetated areas are well populated with various grasses, some shrubs, and seasonal weeds, as shown in Figure 11. A few areas have sparse vegetation but are covered with TRM. No animal burrows were noted. Erosion caused by stormwater runoff was noted in one area during the inspection. Rills are forming along the northeast margin of the vegetated slope and the straw wattle area, as shown in Figure 12. Minor sediment accumulation is evident behind the wattles shown in Figure 13. In general, the vegetated cap is functioning as designed.

3.3 Stormwater-Collection System

The visible components of the stormwater-collection system consist of 6 grated trench drains (5 of which run next to each of the five hangar pads), 13 drain inlets, a manhole, and the outfall pipe (Figure 2). The length of each trench drain was walked and inspected for standing water, cracking, excessive sedimentation, and displacement of grates. The integrity of the drain inlet grates and concrete structures

was inspected for cracking or displacement. The outfall pipe was inspected for damage and/or displacement.

General cracking was noted along the concrete channels of the five trench drains next to the hangar pads. Larger cracks (approximately 0.25 to 0.5 in. in width), as shown in Figures 14 and 15, and displacement of the concrete channels associated with hangar pad subsidence were noted in the trench drains next to hangar pads 1, 2, 3, and 4, as shown in Figure 16. Cracks in the trench drains next to pads 2 and 3 appear to have been previously repaired with grout. Drain inlets associated with pads 1, 2, and 3 are cracking or flaking and contain standing water. The remaining 10 drain inlets, manhole, and outfall appear to be in good working order. Underground piping runs were not inspected.

3.4 Riprap Drainage Channels

Two riprap gravel drainage channels are located along the eastern and southeastern edges of the MatCon cover; a third riprap gravel channel is located mid-slope on the sloped portion of the landfill cover (Figures 1 and 2).

During 2010, repairs were made to correct subsidence of the riprap by compacting the subgrade material and adding infiltration material, followed by repair of the geomembrane and replacement of riprap material (Appendix A).

The length of each drainage channel was inspected for evidence of subsidence, erosion, vegetation, or excessive sedimentation. Areas below each end of the mid-slope drainage channel that receive flow from the channels were also inspected for signs of subsidence, erosion, and sedimentation.

All drainage channels are in good working order with no evidence of subsidence, erosion, sedimentation, or excessive vegetation.

3.5 Retaining Walls

The concrete retaining wall and two rock retaining (rock basket/gabion) walls are located at the toe of the sloped portion of the landfill cover (Figure 2). The top and face of each wall were inspected for areas of cracking, separation, rotation, erosion/sedimentation, or slumping.

In 2010, three porous detention areas were constructed on the lower slope to the east of the concrete retaining wall to enhance sediment removal from stormwater prior to being discharged from the site and to reduce the velocity of the stormwater discharge (Appendix A).

All retaining walls are in good working order with no evidence of cracking, separation, rotation, erosion/sedimentation, or slumping. The detention areas are also in good working order.

3.6 Temporary Erosion-Control Features

Temporary erosion-control features installed during the designed remedy implementation included straw wattles, hay bales, and erosion fencing. These features served their intended purpose of protecting unvegetated runoff areas until vegetation could be established. During the 2010 inspections, it was noted that vegetation had been established and the existing temporary erosion-control measures were no longer needed.

3.7 Landfill-Gas Monitoring

Landfill-gas monitoring entailed measuring methane, oxygen, and carbon dioxide at 54 locations, including the landfill-gas collection system riser vents, along the hangar pads, trench drains, drain inlets, and within the northern and eastern vegetated areas. Gas-monitoring locations are shown in Figure 2 and completed gas-measurement forms are provided in Appendix C. Figure 17 shows a photograph of gas-monitoring activities. Per the implementation plan (CE2 Corporation 2009, 111600), no landfill-gas monitoring was conducted at the DDA.

Concentrations of combustible gases, oxygen, and carbon dioxide were measured in percent values using a factory-calibrated MSA Altair 4 multigas detector. This instrument is designed to detect the minimum concentration of a combustible gas in air that can ignite, or the lower explosive limit (LEL). The upper alarm level of the multigas detector was set at 20% of the LEL. Because of the potential for variable combustible gases and vapors that could rise from the landfill, the gas detector was calibrated using pentane rather than methane. Calibration to pentane results in the detector readings being more conservative (i.e., biased high) with respect to methane and minimizes the loss of sensitivity because of "poisoning" of the detector with elevated levels of methane.

Gas monitoring was completed 2 in. above expansion joints for the hangar pad (HP) locations, 4 in. below the trench grate for trench drain (TD) locations, 4 in. below the grate for drainage culvert (DC) locations, 2 in. above ground surface for perimeter ground (PG) locations, and at the spinner for perimeter spinner (PS) vent pipe locations. Vent risers had not been installed at locations PS-02, PS-03, and PS-05 (Figure 2), but were completed with blind flange cap fittings, as shown in Figures 18 and 19. If the vent was capped, monitoring was completed at the cap.

During third quarter monitoring, elevated combustible gases were detected at TD-08 at a concentration of 3%, at DC-05 at a concentration of 3%, and at PS-06 at a concentration of 15% of the LEL. Third quarter gas-monitoring results are presented in Table 1.

During the fourth quarter monitoring, elevated combustible gases were detected at DC-03 at a concentration of 4%, at DC-04 at a concentration of 5%, at DC-05 at a concentration of 5%, at DC-06 at a concentration of 6%, at PS-04 at a concentration of 5%, and at PS-06 at a concentration of 32% of the LEL. Fourth quarter gas-monitoring results are presented in Table 2.

Landfill-gas monitoring results are below action levels, as specified in the postclosure care and monitoring plan (North Wind Inc. 2006, 111707), indicating the system is currently meeting the design criteria. However, gas concentrations appear to be increasing based on two quarters of monitoring data. The action levels are 25% of the LEL for methane in any enclosed structure (currently there are no enclosed structures within the cap area) and 100% of the LEL at the north edge of the cap.

3.8 Debris Disposal Area

Inspection of the DDA did not identify any areas of erosion, and the area is well vegetated, as shown in Figure 20.

4.0 RECOMMENDATIONS

Inspection activities indicate features of the landfill cover are functioning adequately. However, a number of recommendations have been identified as a result of the 2010 inspections. These recommendations are detailed in the following sections.

4.1 MatCon Pavement and Concrete Hangar Pads

The MatCon pavement was observed to be in relatively good condition over the majority of the paved areas. Exceptions occur along paving seams, with visible cracking and separation in the areas of hangar pads 1, 2, 3, and 4, where the MatCon pavement appears to have subsided along with the hangar pads, and in areas that have been patched with regular asphalt.

Remedies for the permanent correction of the cracking, separation, and subsidence of the MatCon are being evaluated by the Army Corps of Engineers, but no recommendations have resulted from this evaluation to date. Recommendations, if any, will be presented in the 2011 inspection report.

The rate of subsidence of the concrete hanger pads is also being evaluated by the Army Corps of Engineers. Based on the findings of their study, it will be determined whether hangars can be constructed on the pads in their current condition or if some type of pad stabilization or repair will be necessary before hangars can be built.

4.2 Vegetated (Seeded) Areas

The vegetated areas are meeting the design criteria and consist of an engineered landfill cap designed to limit the volume of ground surface runoff that reaches the underlying landfill debris. Beginning at the ground surface and continuing to the landfill debris, the cross-sectional material includes 6 in. of topsoil with TRM, 12 in. of infiltration layer material, double-sided synthetic drainage composite, an additional 6 in. of infiltration layer material, and the existing interim cover material.

The erosion area shown in Figure 12 will require backfilling of the rills, seeding, and installation of additional erosion-control blankets. The accumulated sediment in the wattles can be raked out and seeded. The area with sparse to no vegetation and exposed soil can be raked, seeded, and covered with erosion-control blankets. Additional temporary wattles may be required to limit run-on from the asphalt cap until vegetation is established.

4.3 Stormwater-Collection System

The stormwater-collection system was determined to be functioning properly, with the exception of the trench drains next to hangar pads 1, 2, 3, 4, and possibly 5. The subsidence of the northern portions of these structures is causing the invert elevations on the northern portions of the trench drains to drop, resulting in insufficient drainage within the trench drains and standing water.

Remedies for the permanent correction of the cracking, separation, and subsidence of the stormwater-collection system are being evaluated by the Army Corps of Engineers, but no recommendations have resulted from this evaluation to date. Recommendations, if any, will be presented in the 2011 inspection report.

4.4 Riprap Drainage Channels

The riprap drainage channels appear to be functioning as designed as part of the engineered landfill cap; therefore, there are no recommendations for the riprap drainage channels.

4.5 Retaining Walls

The retaining walls appear to be in good condition and functioning according to the original design; therefore, there are no recommendations for the retaining walls.

The detention areas constructed east of the concrete retaining wall are functioning according to design (Appendix A); therefore, there are no recommendations for the detention areas.

4.6 Temporary Erosion-Control Features

Additional temporary wattles may be required to limit run-on from the asphalt cap until vegetation is established, as described in section 4.2.

4.7 Landfill-Gas Monitoring

Landfill-gas monitoring results do not exceed action levels, indicating the system currently meets design criteria. However, based on two quarters of data, the levels of combustible gas within the drainage culverts and vent risers appear to be increasing. Completion of the vent risers and spinners at locations PS-02, PS-03, and PS-05 (Figure 2) is recommended and may prevent future increases in levels of combustible gas. In addition, permanent location markers should be installed at PG gas-monitoring locations to ensure comparability of PG monitoring results.

4.8 Debris Disposal Area

The vegetative cover is functioning properly at the DDA; therefore, there are no recommendations for the DDA.

5.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the New Mexico Environment Department Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

CE2 Corporation, July 2009. "Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico," report prepared for U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Site Office, Los Alamos, New Mexico. (CE2 Corporation 2009, 111600)

NMED (New Mexico Environment Department), August 8, 2007. "Notice of Approval, Remedy Completion Report SWMUs 73-001(a) and 73-001(d)," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2007, 098285)

North Wind Inc., April 2006. "Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill, Revision 2," report prepared for the U.S. Department of Energy, Los Alamos Site Office, North Wind report no. NW-ID-2004-027, Los Alamos, New Mexico. (North Wind, Inc., 2006, 111707)

North Wind Inc., April 2007. "Remedy Completion Report, DOE-LASO TA-73 Airport Landfill, SWMUs 73-001(a) and 73-001(d)," report prepared for U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Site Office, North Wind report no. NWI-4212-001, Los Alamos, New Mexico. (North Wind, Inc., 2007, 096333)

North Wind Inc., August 5, 2009. "Inspection Report for Technical Area 73 Los Alamos County Airport Landfill, Solid Waste Management Units 73-001(a) and 73-001(d)," report prepared for the U.S. Department of Energy, Los Alamos Site Office, Los Alamos, New Mexico. (North Wind, Inc., 2009, 111706)

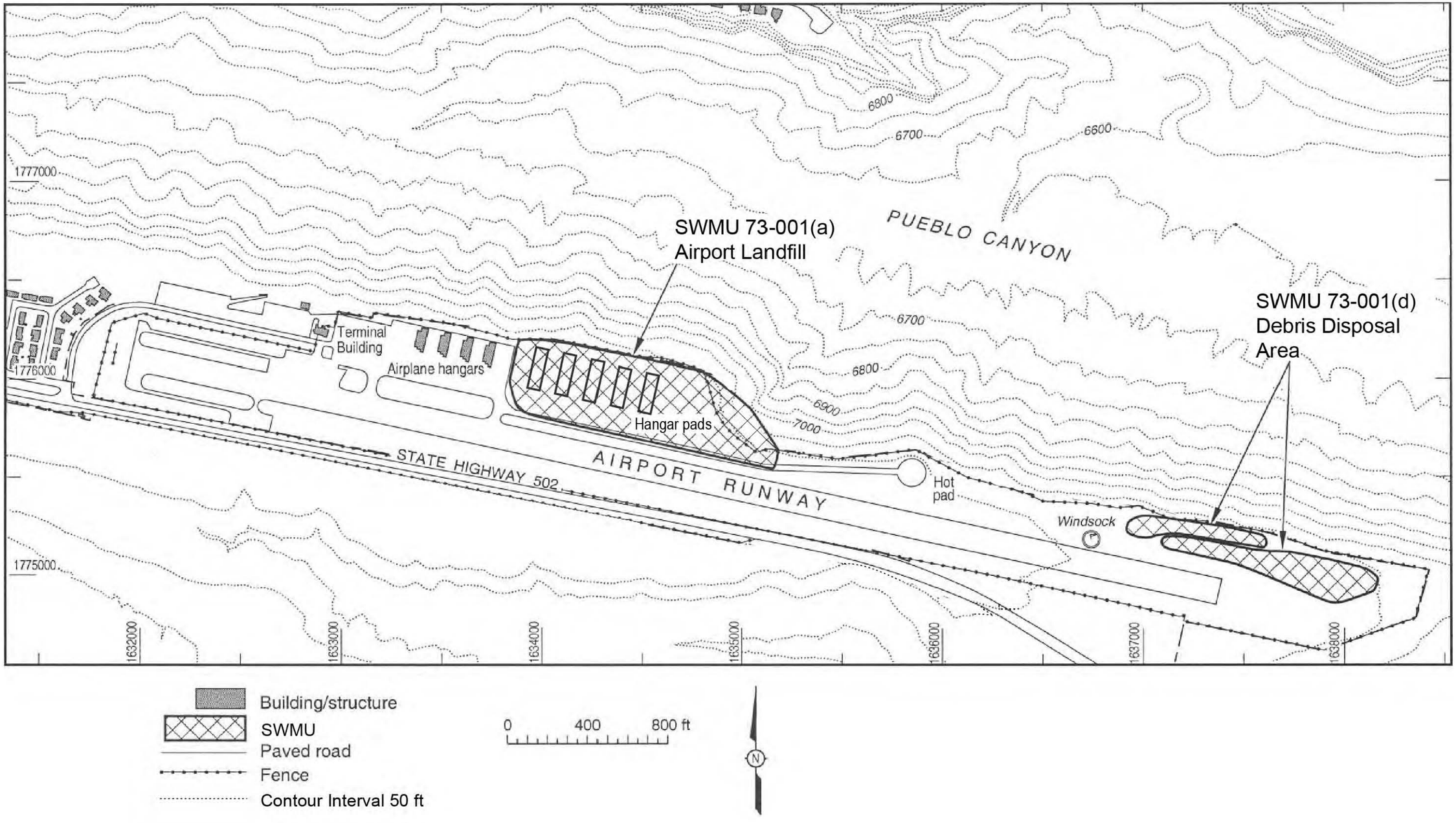

Figure 1 Locations of the airport landfill and DDA

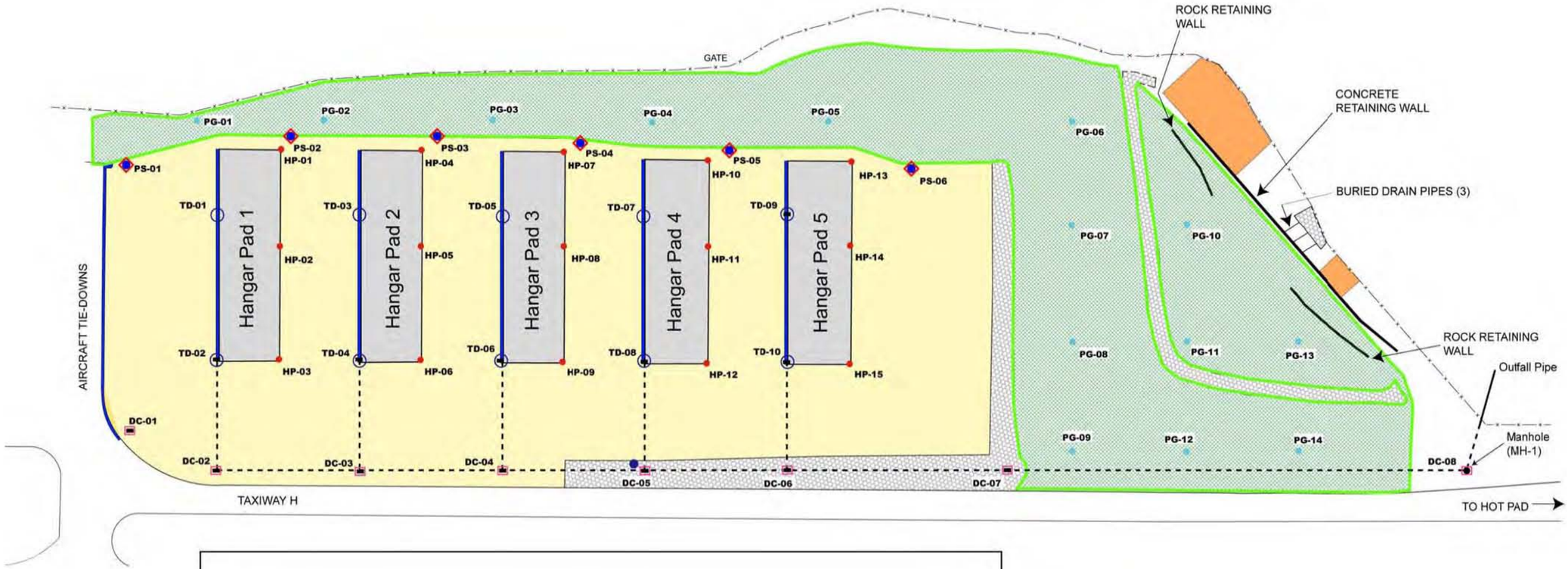

Figure 2 **Airport landfill features**

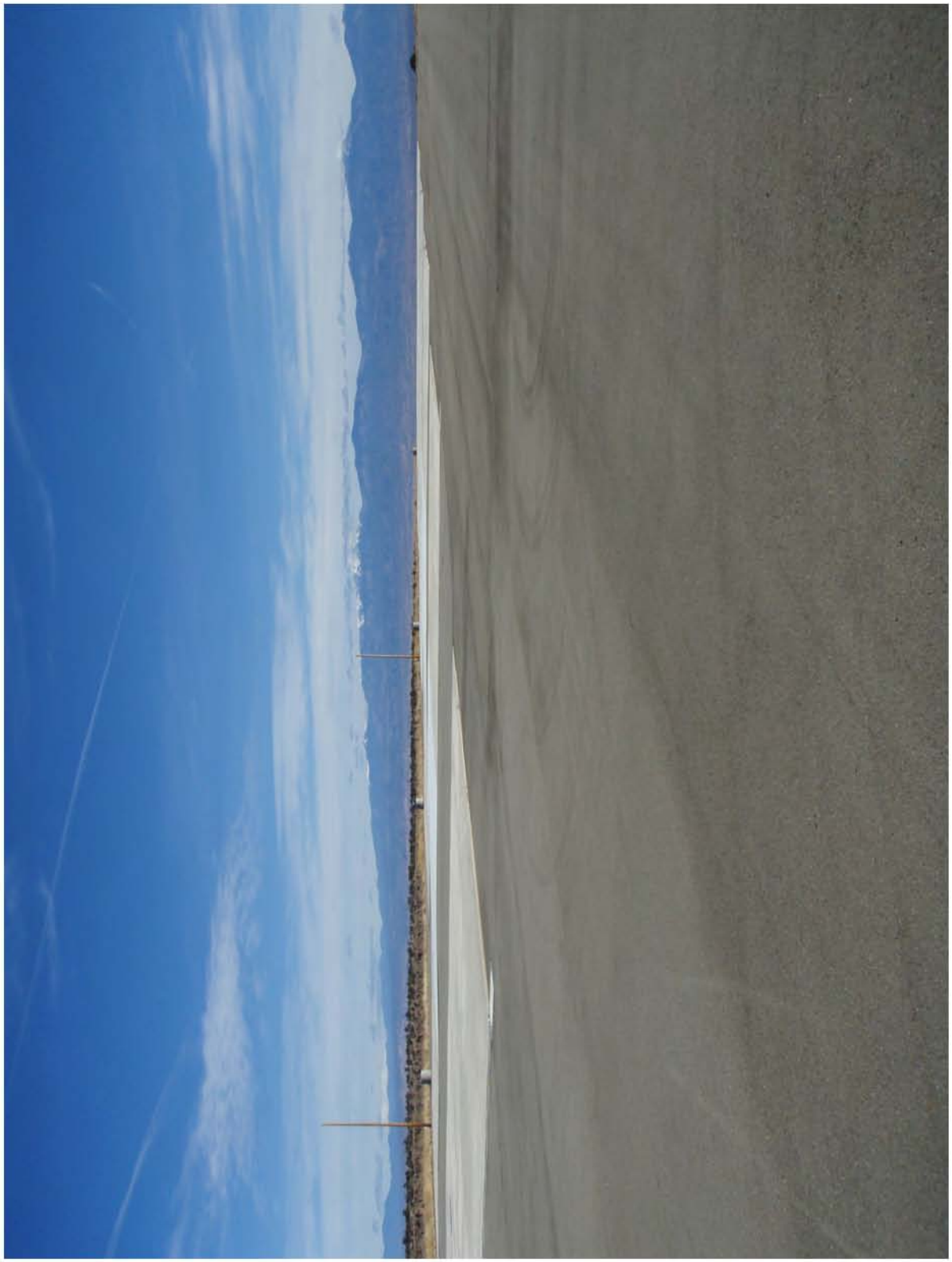

Figure 3 **Looking northeast across the MatCon pavement and concrete hangar pads**

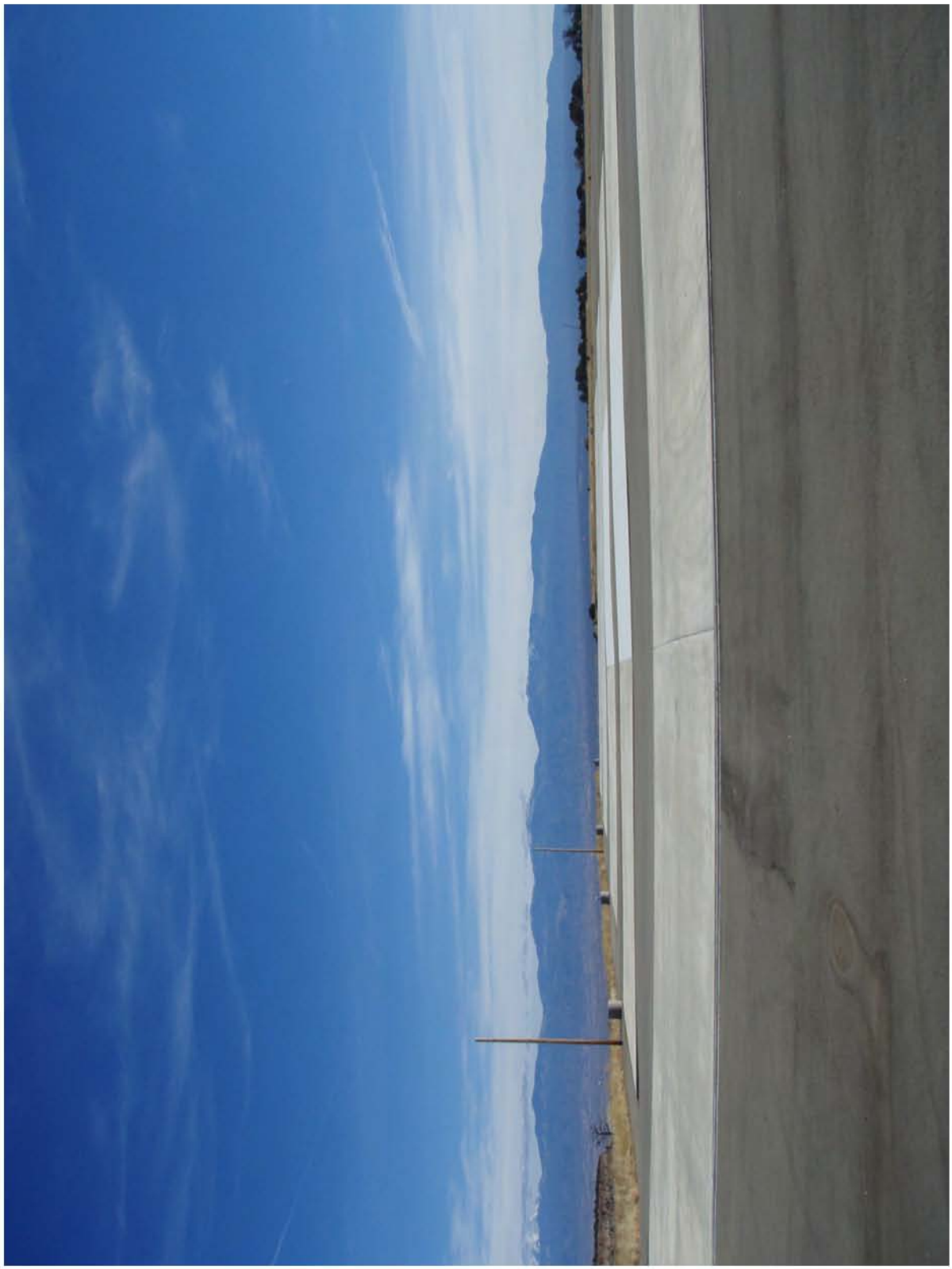

Figure 4 **View to the east, note uneven appearance of pads and MatCon pavement**

Figure 5 Typical crack in MatCon pavement, view to the west

Figure 6 **Vegetation growing within cracks of the MatCon pavement near the gravel drainage channel**

Figure 7 **Vegetation growing in crack in MatCon pavement south of hangar pad 1**

Figure 8 **Ponding of water at northwest corner of hangar pad 3, note asphalt patches**

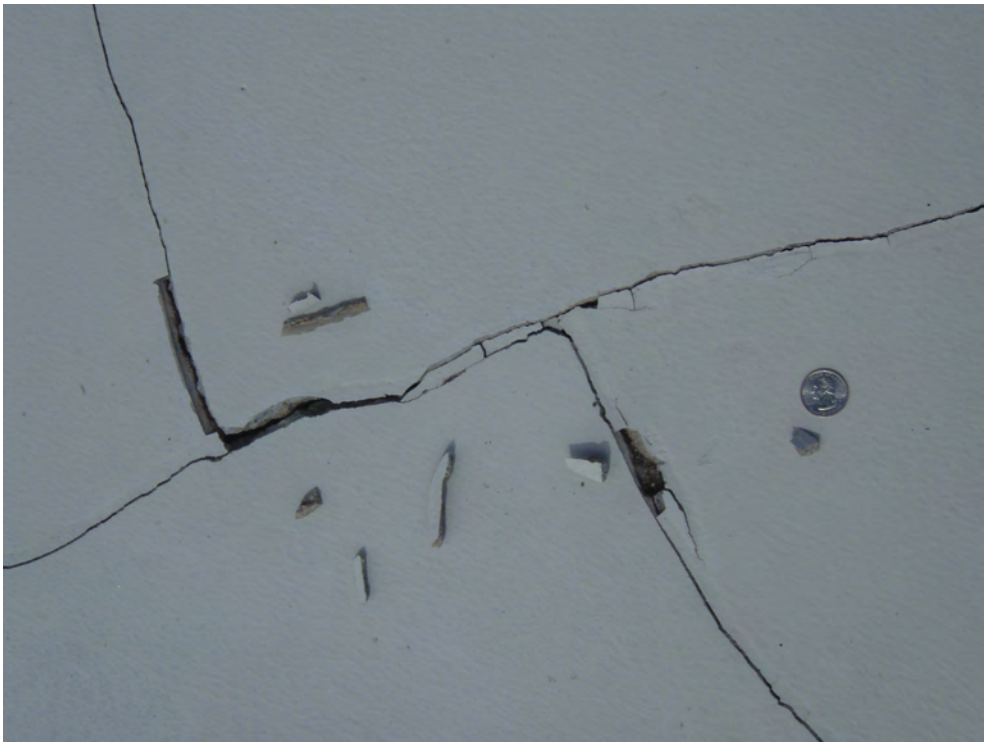

Figure 9 **Typical cracking observed in hangar pads 1, 2, 3, and 4**

Figure 10 Vegetation growing between MatCon and hangar pad 4

Figure 11 Curb installed in 2009 to control run-on to vegetative cap

Figure 12 Rilling in wattle area

Figure 13 Sediment accumulation behind wattles in the wattle area

Figure 14 Crack across trench drain at hangar pad 1

Figure 15 Crack across bottom and side of trench drain at hangar pad 1

Figure 16 **Separation between hangar pad and trench drain, note subsidence of MatCon pavement**

Figure 17 **Gas survey at vent riser with spinner**

Figure 18 Gas vent with capping flange

Figure 19 Gas vent locations, note missing risers and spinners

Figure 20 Vegetated DDA

Table 1
Third Quarter Landfill-Gas Monitoring Results

Sample Location	Height (ft)	Time	CH_4* % LEL	O_2 %	CO_2 %
Hangar Pads (samples collected on the east side of the pad along the expansion joint)					
HP-01	2 in. above expansion joint	0853	0	20.7	0
HP-02	2 in. above expansion joint	0859	0	20.8	0
HP-03	2 in. above expansion joint	0901	0	20.7	0
HP-04	2 in. above expansion joint	0906	0	20.8	0
HP-05	2 in. above expansion joint	0908	0	20.7	0
HP-06	2 in. above expansion joint	0909	0	20.7	0
HP-07	2 in. above expansion joint	0922	0	20.6	0
HP-08	2 in. above expansion joint	0918	0	20.8	0
HP-09	2 in. above expansion joint	0915	0	20.7	0
HP-10	2 in. above expansion joint	0927	0	20.5	0
HP-11	2 in. above expansion joint	0930	0	20.5	0
HP-12	2 in. above expansion joint	0931	0	20.5	0
HP-13	2 in. above expansion joint	0944	0	20.5	0
HP-14	2 in. above expansion joint	0941	0	20.4	0
HP-15	2 in. above expansion joint	0939	0	20.4	0
Trench Drains (west side of each hangar pad)					
TD-01	4 in. below trench grate	0847	0	20.7	0
TD-02	4 in. below trench grate	0844	0	20.7	0
TD-03	4 in. below trench grate	0905	0	20.7	0
TD-04	4 in. below trench grate	0904	0	20.7	0
TD-05	4 in. below trench grate	0920	0	20.7	0
TD-06	4 in. below trench grate	0917	0	20.6	0
TD-07	4 in. below trench grate	0925	0	20.5	0
TD-08	4 in. below trench grate	1031	3%	20.5	0
TD-09	4 in. below trench grate	1029	0	20.5	0
TD-10	4 in. below trench grate	0937	0	20.4	0
Drainage Culverts (drainage inlets on the buried storm sewer lines)					
DC-01	4 in. below grate	0838	2%	20.8	0
DC-02	4 in. below grate	0843	0	20.7	0
DC-03	4 in. below grate	0903	0	20.8	0
DC-04	4 in. below grate	0912	0	20.7	0
DC-05	4 in. below grate	0913	3%	20.7	0
DC-06	4 in. below grate	0935	0	20.5	0
DC-07	4 in. below grate	0953	0	20.5	0
DC-08	4 in. below manhole lid	1000	0	20.5	0

Table 1 (continued)

Sample Location	Height (ft)	Time	CH_4* % LEL	O_2 %	CO_2 %
Northern Perimeter (ground and spinner [wind turbine] locations)					
PG-01	2 in. above ground surface	0848	0	20.7	0
PG-02	2 in. above ground surface	0852	0	20.7	0
PG-03	2 in. above ground surface	0921	0	20.7	0
PG-04	2 in. above ground surface	0924	0	20.6	0
PG-05	2 in. above ground surface	0927	0	20.6	0
PG-06	2 in. above ground surface	1023	0	20.5	0
PG-07	2 in. above ground surface	1025	0	20.5	0
PG-08	2 in. above ground surface	1026	0	20.6	0
PG-09	2 in. above ground surface	0954	0	20.6	0
PG-10	2 in. above ground surface	1015	0	20.5	0
PG-11	2 in. above ground surface	1009	0	20.5	0
PG-12	2 in. above ground surface	0956	0	20.5	0
PG-13	2 in. above ground surface	1008	0	20.5	0
PG-14	2 in. above ground surface	0957	0	20.5	0
PS-01	At spinner (4 ft above pavement)	0835	0	20.8	0
PS-02	At spinner (4 ft above pavement)	0851	0	20.6	0
PS-03	At spinner (4 ft above pavement)	0906	0	20.8	0
PS-04	At spinner (4 ft above pavement)	0923	0	20.5	0
PS-05	At spinner (4 ft above pavement)	0929	0	20.5	0
PS-06	At spinner (4 ft above pavement)	0949	15%	20.3	0

Notes: Combustible gas concentrations measured in percent of the LEL. Other gases measured in percent.
*CH_4 = Methane.

Table 2
Fourth Quarter Landfill-Gas Monitoring Results

Sample Location	Height (ft)	Time	CH_4* % LEL	O_2 %	CO_2 %
Hangar Pads (samples collected on the east side of the pad along the expansion joint)					
HP-01	2 in. above expansion joint	0916	0	20.8	0
HP-02	2 in. above expansion joint	0917	0	20.8	0
HP-03	2 in. above expansion joint	0918	0	20.8	0
HP-04	2 in. above expansion joint	0921	0	20.8	0
HP-05	2 in. above expansion joint	0920	0	20.8	0
HP-06	2 in. above expansion joint	0919	0	20.8	0
HP-07	2 in. above expansion joint	0922	0	20.8	0
HP-08	2 in. above expansion joint	0923	0	20.7	0
HP-09	2 in. above expansion joint	0924	0	20.7	0
HP-10	2 in. above expansion joint	0927	0	20.6	0
HP-11	2 in. above expansion joint	0926	0	20.5	0
HP-12	2 in. above expansion joint	0925	0	20.6	0
HP-13	2 in. above expansion joint	0929	0	20.6	0
HP-14	2 in. above expansion joint	0930	0	20.6	0
HP-15	2 in. above expansion joint	0931	0	20.7	0
Trench Drains (west side of each hangar pad)					
TD-01	4 in. below trench grate	0941	0	20.8	0
TD-02	4 in. below trench grate	0943	0	20.8	0
TD-03	4 in. below trench grate	0944	0	20.7	0
TD-04	4 in. below trench grate	0945	0	20.8	0
TD-05	4 in. below trench grate	0946	0	20.7	0
TD-06	4 in. below trench grate	0947	0	20.6	0
TD-07	4 in. below trench grate	0949	0	20.8	0
TD-08	4 in. below trench grate	0950	0	20.8	0
TD-09	4 in. below trench grate	0952	0	20.8	0
TD-10	4 in. below trench grate	0953	0	20.8	0
Drainage Culverts (drainage inlets on the buried storm sewer lines)					
DC-01	4 in. below grate	0940	0	20.8	0
DC-02	4 in. below grate	0938	0	20.7	0
DC-03	4 in. below grate	0937	4%	20.8	0
DC-04	4 in. below grate	0935	5%	20.7	0
DC-05	4 in. below grate	0934	5%	20.7	0
DC-06	4 in. below grate	0933	6%	20.8	0
DC-07	4 in. below grate	0931	0	20.8	0
DC-08	4 in. below manhole lid	1020	0	20.8	0

Table 2 (continued)

Sample Location	Height (ft)	Time	CH_4* % LEL	O_2 %	CO_2 %
Northern Perimeter (ground and spinner [wind turbine] locations)					
PG-01	2 in. above ground surface	1005	0	20.8	0
PG-02	2 in. above ground surface	1006	0	20.8	0
PG-03	2 in. above ground surface	1007	0	20.8	0
PG-04	2 in. above ground surface	1008	0	20.8	0
PG-05	2 in. above ground surface	1009	0	20.8	0
PG-06	2 in. above ground surface	1010	0	20.8	0
PG-07	2 in. above ground surface	1011	0	20.8	0
PG-08	2 in. above ground surface	1012	0	20.8	0
PG-09	2 in. above ground surface	1013	0	20.8	0
PG-10	2 in. above ground surface	1014	0	20.8	0
PG-11	2 in. above ground surface	1015	0	20.8	0
PG-12	2 in. above ground surface	1017	0	20.8	0
PG-13	2 in. above ground surface	1018	0	20.8	0
PG-14	2 in. above ground surface	1019	0	20.8	0
PS-01	at spinner (4 ft above pavement)	1003	0	20.8	0
PS-02	at spinner (4 ft above pavement)	1002	0	20.6	0
PS-03	at spinner (4 ft above pavement)	1001	0	20.8	0
PS-04	at spinner (4 ft above pavement)	1000	5%	20.8	0
PS-05	at spinner (4 ft above pavement)	0957	0	20.8	0
PS-06	at spinner (4 ft above pavement)	0954	32%	20.4	0

Notes: Methane concentrations measured in percent of the LEL. Other gases measured in percent.

*CH_4 = Methane.

Appendix A

Final Construction Report

Final Construction Report for Los Alamos Airport Landfill TA-73 SWMU 73-001(a) Cover Improvements Los Alamos, New Mexico

Prepared for:
U.S. Department of Energy
National Nuclear Security Administration

Prepared by:
One Stop Environmental, LLC and North Wind, Inc.

June 2010

NWI-10246-015
Project No. 10246

Final
Construction Report
for Los Alamos Airport Landfill TA-73
SWMU 73-001(a) Cover Improvements

June 2010

Prepared for:

U.S. Department of Energy, National Nuclear Security Administration
Los Alamos Site Office
3747 West Jemez Road
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Prepared by:

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Idaho Falls, Idaho 83402

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Final
Construction Report
for Los Alamos Airport Landfill TA-73
SWMU 73-001(a) Cover Improvements

NWI-10246-015

Approved by

David Parks, OSE Project Manager	6-30-10 Date
Terry Jennings, NWI Project Manager	6/30/10 Date
Philip Meehan, Engineer of Record	6/30/10 Date

CONTENTS

TABLES

APPENDICES

ACRONYMS

DDA	Debris Disposal Area
DOE	U.S. Department of Energy
FGM	Flexible Growth Medium
HASP	Health and Safety Plan
HDPE	high-density polyethylene
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
Mat Con™	Modified Asphalt Technology for Waste Containment
NMDOT	New Mexico Department of Transportation
NWI	North Wind, Inc.
OSE	One Stop Environmental, LLC
PVC	polyvinyl chloride
QCSM	Quality Control Systems Manager
SWMU	Solid Waste Management Unit
TRM	turf reinforcement mat
yd^3	cubic yards

Final
Construction Report
DOE-LASO TA-73 Airport Landfill
SWMU 73-001(a) Landfill Cover Improvements

1. INTRODUCTION

The construction activities summarized in this Construction Report were performed under the U.S. Department of Energy (DOE) Los Alamos Site Office (LASO) TA-73 Landfill Cover Improvements Plans (North Wind 2009a) and Specifications (North Wind 2009b) prepared by North Wind, Inc. and dated September 2009. The Airport Landfill is a DOE Solid Waste Management Unit (SWMU) whose complete designation is U.S. DOE-LASO SWMU 73-001(a). The construction activities were completed by a team consisting of One Stop Environmental, LLC (OSE) as the Prime Contractor and North Wind, Inc. (NWI) as a Subcontractor to OSE. The intent of the construction design focused on three main goals:

1. Restore the landfill cover to the originally designed and constructed condition,

2. Implement features that would minimize future erosional damage to the cover system, and

3. Enhance the quality and reduce the peak discharge rate of stormwater runoff originating on the landfill cover system.

These design goals were effectively accomplished by construction methods, as indicated in Section 2.

The project was separated into two separate phases due to available resources and inclement weather during the 2009-2010 winter season, which brought unusually high snowfall to the Los Alamos area. The first phase (Phase I) of the project started in October of 2009 and ran through to November of 2009; the second phase (Phase II) of the project started in April of 2010 and was completed in May of 2010 (see Appendix G for a Construction Schedule of each phase). This Construction Report combines the Phase I and II construction activities into one comprehensive document.

1.1 Background

1.1.1 History

Two inactive solid waste disposal sites (the airport landfill [SWMU 73-001(a)] and the Debris Disposal Area [DDA; SWMU 73-001(d)]) are located at the Los Alamos County Airport. The airport landfill was operated from 1943 to 1973 for the disposal of solid waste consisting of household trash from the Los Alamos townsite and office trash from Los Alamos National Laboratory (LANL). Prior to 1965, some of the waste was incinerated and subsequently buried in the airport landfill. Approximately 489,500 cubic yards (yd^3) of waste, which consisted primarily of municipal solid waste, was disposed of in the landfill. However, the presence of non-municipal solid waste could not be ruled out. Approximately 50,000 yd^3 of waste was relocated within the SWMU boundary during the 2006 Final Remedy construction activities (North Wind, 2006a). With the exception of a single container of Freon-113, uncovered and subsequently disposed off site, no other hazardous or radioactive materials were discovered.

From 1984 to 1986, approximately 126,000 yd^3 of burned debris was excavated from the western end of the airport landfill and reburied in a pair of parallel trenches at the DDA.

1.1.2 Final Remedy Landfill Cover System

In late 2006 and early 2007, the Final Remedy landfill cover system was installed at the airport landfill. The Final Remedy design and completion activities for the airport landfill and the DDA are provided in the *Remedy Completion Report DOE LASO TA-73 Airport Landfill SWMUs 73-001(a) and 73-001(d)* (North Wind, 2007). The main tasks that were implemented during the construction of the landfill cover system are listed below:

- Relocation of existing landfill waste;
- Import, placement, and compaction of cover system material;
- Approximately 6 acres of MatCon™ (Modified Asphalt Technology for Waste Containment) asphalt pavement;
- Five concrete hangar pads within the MatCon™ pavement area;
- A landfill-gas collection system;
- Two rock retaining walls;
- A concrete retaining wall;
- Turf reinforcement mats;
- Revegetation of approximately 4 acres with native grasses; and
- A stormwater collection system consisting of five trench drains, seven drain inlets, approximately 1,950 feet of associated buried concrete storm-sewer lines, an 18-inch diameter high-density polyethylene (HDPE) outfall pipe approximately 110 feet in length, and three rip rap drainage channels.

1.1.3 Post Closure Inspection and Maintenance Activities

Inspection activities were conducted from July 7 through July 10, 2009, by a New Mexico-licensed professional engineer and in accordance with the *Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico* (CE2 Corporation, 2009), and the *Post-Closure Care and Monitoring Plan for the Los Alamos Site Office TA-73 Airport Landfill* (North Wind, 2006b).

Inspection activities were focused on the individual elements of the landfill cover described above, including the MatCon pavement area and hangar pads, the vegetative cover system, the rip rap drainage channels, the concrete and rock retaining walls, the stormwater collection system, and all temporary and permanent erosion control features. Inspection activities evaluated the condition and overall integrity of each element. In addition, landfill-gas monitoring was conducted throughout the landfill cover to evaluate the presence of potentially combustible gases (i.e., methane).

Information derived from the *Inspection Report for Technical Area 73 Los Alamos County Airport Landfill, Solid Waste Management Units 73-001(a) and 73-001(d)* (North Wind, 2009c) was used to prepare the DOE LASO TA-73 Landfill Cover Improvements Plans and Specifications, as referenced above.

1.2 Report Organization

This report documents the construction activities associated with the DOE LASO TA-73 Landfill Cover Improvements Plans and Specifications, referred to hereafter as the Plans and Specifications. The report focuses on the summary of work that was completed and the quality control documentation used to ensure that all tasks were completed per the approved Plans and Specifications. Specifically, the report includes the following:

- Body of Report: Summary of Work Completed,
- Appendix A: As-built Drawings,
- Appendix B: Materials Testing-Laboratory,
- Appendix C: Materials Testing-Field,
- Appendix D: Field Change Notices,
- Appendix E: Construction Photos,
- Appendix F: Landfill Cover Improvements Acceptance Letter, and
- Appendix G: Phase I & II Construction Schedules.

2. SUMMARY OF WORK COMPLETED

As indicated in the Introduction of this document, the goals of the project can be separated into the following three subcategories: (1) restoring the landfill cover to the originally designed and constructed condition; (2) implementing features that would minimize future erosional damage to the cover system; and (3) enhancing the quality and reduce the peak discharge rate of stormwater runoff originating on the landfill cover system. Although there is some overlap in the results of the tasks listed below (and not all subtasks are referenced), in general terms, Tasks 1 through 4, as listed below, were performed to restore the landfill cover to the originally designed and constructed condition. Task 5 was performed to minimize future erosional damage to the cover system. Task 6 was performed to enhance the quality and reduce the peak discharge rate of the stormwater runoff.

1. Repair of Erosional Rills with Approved Materials,
2. Repair of Subsidence at the Rip Rap Bench,
3. Replacement of Seed and Turf Reinforcement Mat (TRM),
4. Filling of Cracks within Hangar Pads,
5. Construction of a Curb and Gutter and Earthen Berm Barrier, and
6. Construction of Porous Detention Areas.

Each of these tasks, along with the Quality Control methods implemented for each task, are discussed in detail below.

2.1 Repair of Erosional Rills

The existing TRM was carefully cut and removed to expose any rills that were over approximately 4 inches in depth. If a rill was less than 4 inches, topsoil was replaced with the existing TRM remaining in place. Excavation along the edges of the existing rills was required to create an area wide enough to use the material compaction equipment. Once the rill was adequately excavated, the remaining subgrade material was compacted and scarified to prepare the subgrade for the placement of the infiltration material.

The infiltration material, which was imported from DTT Sand and Gravel, had been previously tested during the preconstruction phase to determine the adequacy of the material as well as to determine the field compaction requirements (see Appendix B). Geo-Test, the geotechnical engineering laboratory that performed all of the materials testing for the project, conducted the hydraulic conductivity tests for the infiltration material. Through laboratory testing, it was determined that the chosen infiltration material would result in an adequate hydraulic conductivity of 1.05×10^{-6} cm/sec when compacted to 93% of the standard proctor with a moisture content of 21.5%. The specifications indicated that the material would need to have a hydraulic conductivity of less than or equal to 1.0×10^{-5} cm/sec. It should be noted that per the Remedy Completion Report for the Landfill Closure (North Wind, 2007), the infiltration layer material was previously compacted to 100% of the Standard Proctor to fulfill this hydraulic conductivity requirement. Because the chosen material presumably had a higher clay content, the required compactive effort could be reduced.

The infiltration material was placed in 6-inch lifts and compacted. One compaction test per lift per rill was performed to ensure adequate compaction and moisture content. Under the direction of the Site Superintendent, field personnel compacted and moisture treated the material as required to yield acceptable results for each 6-inch lift (see Appendix C). Once the lift passed the field testing, the surface was scarified to prepare the area for the next lift of infiltration material or the placement of topsoil.

Topsoil material was imported from Payne's Nursery and stockpiled onsite until use. The final topsoil product consisted of a sandy, clay loam textured material that had been amended with a mixture of 13% organic compost material and 27% sand. Horse manure with chipped green and wood waste product produced by Soilutions was used for the compost material. The compost and sand were mixed into the topsoil by the topsoil supplier by continually turning the mixture until a homogenous product was produced. Topsoil was placed over the top 6 inches of all disturbed areas. No fertilizer was amended with the topsoil per the direction of the topsoil provider and NWI's Natural Soil Scientist.

Quality assurance during the repairing of the rills focused primarily on the compactive effort used on the infiltration material. All testing was observed by the Quality Control Systems Manager (QCSM) and recorded in the field log book. Field tests were compared with the required results, as determined in the laboratory. Any failing tests were noted and the areas were reworked until passing results were obtained.

2.2 Repair of Subsidence at the Rip Rap Bench

During the landfill investigation activities, subsidence at the rip rap bench was identified; however, the extent of the erosional damage could not be determined due to the subsurface location of the damage. The Plans and Specifications, therefore, indicated that the extent of the damage be determined during the construction process and reported to the Engineer so that the required construction method could be determined and documented. To determine the extent of the required repair, all of the overlying material was uncovered to expose the underlying subsided subgrade. The overlying material consisted of rip rap, geomembrane with geotextile on the top and bottom, and infiltration material. During this process, the

existing geomembrane was cut and pulled back to expose the underlying material. It is assumed that runoff from the rills above the subsided areas caused undermining of the subgrade material and subsequent subsidence of the rip rap bench. The subsidence extended approximately 18 inches below the adjacent ground surface over the area, as indicated in the Landfill Investigation Report (North Wind, 2009c). The subsidence was relatively abrupt with the edges of the subsided areas sloping back up to adjacent areas at an approximate 1:1 slope. The geomembrane had remained intact during the subsidence; however, and no rips or tears were observed.

To repair the subsided area, the exposed top surface of the subgrade was compacted and scarified. Scarification of the top surface was performed to promote better bonding between the two independently compacted layers. Approved infiltration material was placed on the prepared subgrade in 6-inch lifts until the top surface of infiltration material was even with the top of the infiltration layer of the adjacent areas. Each lift of infiltration material was tested prior to placement of the following lift.

Southwest Lining, a subcontractor regularly engaged in the geomembrane placement and seaming process, was hired to appropriately seam the previously cut geomembrane. The sandwiching geotextile material was also repaired at that time. The overlying rip rap material was then hand placed to create positive drainage of the bench per the original design. All repair procedures were in accordance with the approved design and no field changes were required.

Quality assurance during the reparation of the rip rap subsidence focused both on the compactive effort used on the infiltration material as well as the seaming of the existing geomembrane. All testing was observed by the QCSM and recorded in the field log book. Compaction and moisture testing were performed on the infiltration material and vacuum testing was performed on the geomembrane seam. Any failing tests were noted and the areas were reworked until passing results were obtained. No rework of the geomembrane sealing was required.

2.3 Replacement of Seed and Turf Reinforcement Mat

Areas of repaired erosional rilling and all other areas that were disturbed during construction activities were repaired per the approved construction Plans and Specifications. The surface of the topsoil material was raked to provide a roughened area in which the seeds could germinate. The seed mix was a preapproved mix that was also used on the original Landfill Closure Project. Seed was placed, at a rate of approximately 35 lbs/acre, using placement equipment that was calibrated using visual observation of the discharge rates and ground coverages. Additionally, a winter crop consisting of a Quickguard and Common Oat was added to the seed mix during Phase I as a means of quick vegetation and temporary erosion control during the winter months. Neither of these two winter crops is expected to survive the summer months. The seed mix used is indicated in Table 1.

Once the seed was spread per the Specifications, all of the seeded area was covered with either the TRM or straw mulch depending on the preconstruction condition. Any areas that were previously covered with TRM received the new TRM covering and all other areas were covered with a weed free straw mulch. The TRM was placed and fastened to the ground surface per the manufacturer's recommendations and the straw mulch was crimped in with multiple passes of the track mounted skid steer.

Greenfix America CFG2000 TRM was used to replace all removed or damaged TRM. The Specifications (North Wind, 2009b) indicated that any removed TRM should be replaced with an equal to or superior product than that which was removed. This TRM type was used on the Landfill Closure Project in areas where the slope was more steep than 4:1 and a lesser product was used on slopes less steep than 4:1. Because the CFG2000 TRM was the superior product of the two that were used and to avoid confusion in the field, the CFG2000 was used throughout the project, except as listed below where the Green Armor System was implemented.

Table 1. Seed mix used for the TA-73 Landfill.

Species	Scientific Name	% of Mix
Blue grama	*Bouteloua gracilis*	10%
Sideoats grama	*Bouteloua curtipendla*	15%
Indian ricegrass	*Oryzopsis hymenoides*	15%
Mountain brome	*Bromus marginatus*	15%
Thickspike wheatgrass	*Agropyron dasystachyum*	20%
Sheep fescue	*Festuca ovina*	15%
Firewheel	*Gaillardia pulchella*	2%
Fringed sage	*Artemisia frigida*	1%
Blue flax	*Linum perenne lewisii*	4%
Palmer penstemon	*Penstemon palmeri*	2%
Prairie coneflower	*Ratibida columnifera*	1%

The QCSM observed the placement of both the seed and the TRM. Periodic observations were made to ensure that the fastening was at the frequency recommended by the TRM manufacturer. Visual observations were also made of the seed coverages.

2.3.1 Placement of Green Armor System

The Green Armor System is a two part, highly erosion resistant system consisting of Enkamat TRM and the application of a Flexible Growth Medium (FGM). This system was implemented in Areas S, T, U, and V to reduce the excessive erosion identified in the Inspection Report (North Wind, 2009c). Per manufacturer recommendations, seed was placed in two separate applications. The first application occurred before the placement of the TRM and the second application occurred after the TRM was applied. The Enkamat TRM arrived in a roll that was brought to the required locations and was unrolled and staked per manufacturer's recommendations. After placement of the Enkamat TRM, the second application of seed was placed and the FGM was sprayed at the application rate required by the manufacturer.

The QCSM inspected the prepared area grade and observed the placement of the entire Green Armor System. Also, a representative from the Green Armor System distributor was on-site during the installation of the system to provide technical assistance.

2.4 Filling of Cracks within Hangar Pads

Construction joints on the hangar pads had become separated and were creating a flow path for stormwater runoff to the underlying landfill debris. The Landfill Inspection Report identified the construction joints on hangar pads 2, 3, and 4 as requiring repair. It was decided during construction that cracks on these three hangar pads would be addressed as well as any separated joints on hangar pad 5.

The joints were first cleared of any existing joint material then filled with one of two polyurethane sealant products, depending on the width of the joint separation. Joints widths less than 1 inch were filled with an elastomeric polyurethane, and joints widths greater than 1 inch were filled with a self-leveling polyurethane. Due to the large separation in some of the joints, an insulating foam was also used below the joint sealant to act as a space filler. The use of the foam eliminated the need to fill in entire cavity with the more costly joint sealant. In all repaired joints (at a minimum), the top ¾-inch was filled with joint sealant.

The QCSM observed and documented the clearing of the existing joints and the placement of the joint filler into those joints.

2.5 Construction of Curb and Gutter and Earthen Berm Barrier

Approximately 375 linear feet of New Mexico Department of Transportation (NMDOT) Type B Barrier Concrete Curb and Gutter was constructed along the northern taxiway perimeter per the Plans and Specifications. The excavation for the curb and gutter included the sawcut and removal of an approximate 18-inch width of asphalt taxiway. The asphalt taxiway consisted of a 4-inch plant mix pavement layer over a 6-inch aggregate base course layer. The plant mix pavement was removed over the entire width and 2 inches of base course material was excavated and stockpiled for use on areas outside of the existing taxiway. The remaining 4 inches of base course material remained in place to be used as base course for the new curb and gutter. A sample of the previously stockpiled existing base course material was then taken and the compaction requirements were obtained.

Areas outside of the existing taxiway were excavated to a depth of approximately 10 inches below the ground surface and the subgrade material, which consisted of a tuff material, was compacted with multiple passes of the plate tamper. The in-place base course material and the newly placed base course material were then compacted to at least 98% of the standard proctor. Once the base course material was placed and compacted, the forms were set and the curb and gutter construction began.

In addition to the concrete curb and gutter, the Plans and Specifications required that an asphalt curb be placed to the northwest of Hangar Pad #1 to redirect stormwater runoff from Area C to an existing storm inlet. The existing storm inlet is located at the northern edge of the pavement to the west of the proposed curb location.

As a temporary stormwater diversion measure implemented during Phase I of this project, a 1-foot high earthen berm was constructed directly north of the proposed curb location. During the Phase II site walk down, it was determined that the earthen berm was an effective means of redirecting stormwater runoff away from Area C to the existing storm inlet, and therefore met the intent of the original design. The earthen berm was compacted, as required, and received 6 inches of topsoil and was seeded.

The QCSM observed the compaction of the subgrade material and base course material and noted the testing results for the concrete curb and gutter. After material placement and prior to construction, the forms were checked to ensure that the forms were straight and clean. During the construction of the curb and gutter, Geo-Test performed slump tests and temperature tests on the poured concrete. Visual observations were made to ensure that positive drainage would be maintained to the east within the flowline of the gutter.

2.6 Construction of Porous Detention Areas

Three porous detention areas were constructed on the lower slope to the east of the concrete retaining wall. It should be noted that the location of the porous detention areas is outside of the limits of the

landfill perimeter per drawing 2002 of the original "Los Alamos Site Office TA-73 Airport Landfills," engineering plans dated June 22, 2005. The main purpose of the porous detention areas is to remove sediment within stormwater runoff prior to the runoff being discharged from the site. A secondary purpose of the porous detention areas is to reduce the velocity of the stormwater discharge, which will, in turn, reduce the peak discharge rate from the site.

The porous detention areas were constructed with a sand-topsoil mix (2/3 sand to 1/3 topsoil) and a permeable drain rock below the sand-topsoil mix. A perforated HDPE pipe was constructed within the drain rock layer of the porous detention area to capture and convey infiltrated runoff to the existing sedimentation basin. A 40-mil polyvinyl chloride (PVC) liner was constructed beneath the drain rock to reduce any runoff from infiltrating below the porous detention area. To act as a cushion to the 40-mil PVC, a non-woven geotextile fabric was placed over the liner prior to the placement of the drain rock. A woven geotextile fabric was then placed over the drainrock and beneath the sand-topsoil layer to keep the two layers separated.

As stated above, the philosophy behind the detention areas is such that stormwater runoff from the smaller storm events will be subjected to a filtering process prior to its discharge off-site. Because the grading of the detention area creates a localized low point, the runoff will pond within the detention area and a portion of the stormwater volume will infiltrate into the sand-topsoil mix layer (runoff from larger storm events will continue draining through the detention areas with relatively little impediment). The sandy-topsoil mix layer will function as a filter for runoff passing through the media. Sediment will remain in the sand topsoil layer, which will require that the porous detention areas be maintenanced periodically. Infiltrated runoff will continue downward to the drain rock layer, where it will pass relatively freely through the media. The perforated pipe will capture the majority of the infiltrated runoff and convey it downstream to the existing sedimentation basin, which is also the outfall location for runoff discharging from the site. The 40-mil PVC liner acts as barrier for runoff from infiltrating any further into the soil and is mainly a safety measure for preventing any runoff from undermining the existing concrete retaining wall.

2.7 Final Walk-through and Acceptance

On May 14, 2010, a final walk-through was performed by the DOE LASO Representative and members of the OSE/NWI Team. A brief introduction of the design and construction requirements was reviewed and all of the above elements were inspected for deficiencies or incomplete construction. No items were identified that required any rework or attention. Per the LASO Representative, "…all work was validated as completed to specifications." A copy of the acceptance letter provided by the DOE LASO Representative is included in Appendix F.

3. REFERENCES

CE2 Corporation, 2009, *Final Implementation Strategy for Post Closure Inspection and Maintenance of the DOE/NNSA LASO Airport Landfill SWMU 73-001(a) and Debris Disposal Area SWMU 73-001(d), Los Alamos County Airport, New Mexico*, Pleasanton, California, July 2009.

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APPENDIX A-AS-BUILT DRAWINGS

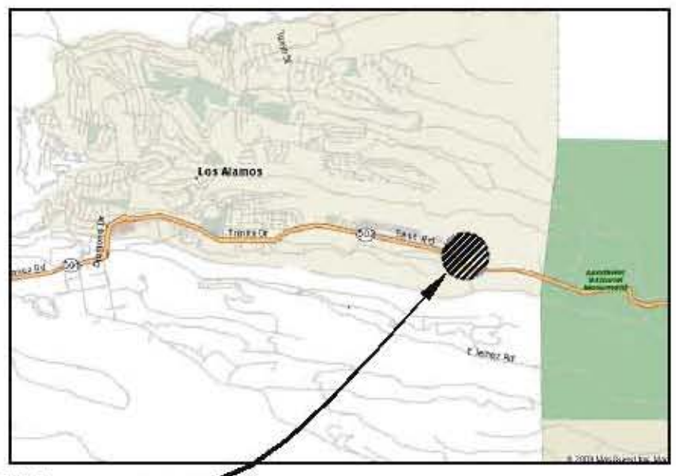
U.S. DEPARTMENT OF ENERGY

LOS ALAMOS SITE OFFICE

TA-73 AIRPORT LANDFILL COVER IMPROVEMENTS

INDEX OF DRAWINGS

1	NW09-170	T-1	AB	TITLE SHEET
2	NW09-171	C-1	AB	GENERAL PLAN
3	NW09-172	C-1	AB	LANDFILL REPAIR AREA-EAST
4	NW09-173	C-2	AB	LANDFILL REPAIR AREA-WEST
5	NW09-174	C-3	AB	BLOWUP AREA DETAILS
6	NW09-175	C-4	AB	SECTION AND PROFILES
7	NW09-176	C-5	AB	SECTION AND PROFILES
8	NW09-177	C-6	AB	CONSTRUCTION DETAILS
9	NW09-178	C-7	AB	CONSTRUCTION DETAILS



PROJECT AREA

SITE MAP
SCALE: NONE

PROJECT AREA

VICINITY MAP
SCALE: NONE

N

REV NUM	DESCRIPTION	CHKD BY	APPV BY	DATE

DWG SIZE: D
SCALE: NTS
DESIGN PHASE: AS-BUILT
DATE: 6/15/10
JOB NUMBER: 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: JH
APPROVED BY: CM
CHECK FILE:

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WEB: www.northwind.com

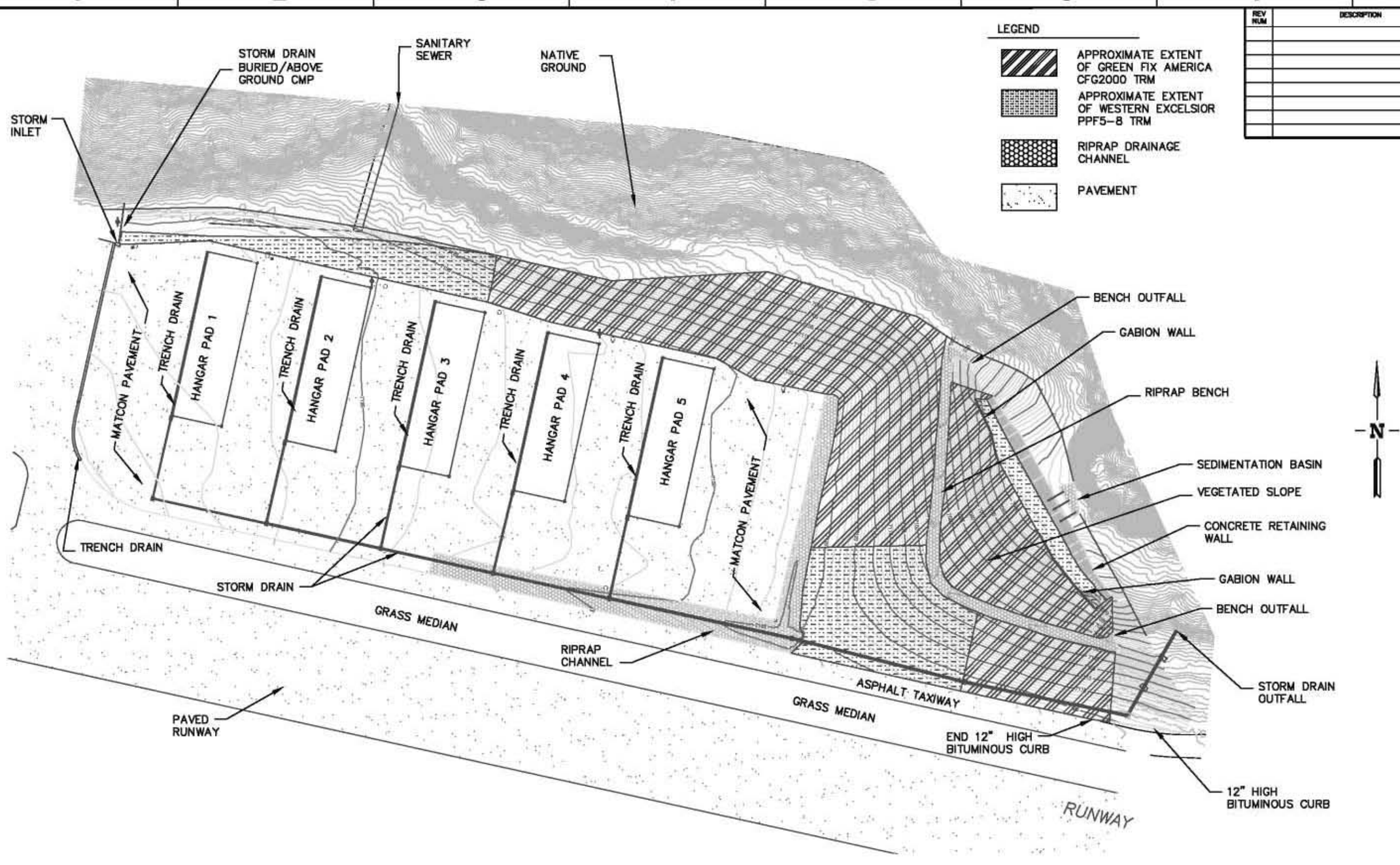
DOE LASO
TA-73 LANDFILL

COVER IMPROVEMENTS
TITLE SHEET

NORTH WIND DRAWING NO.
NWI_09-170

SHEET NO.
T-1

REV. AB



REV NUM	DESCRIPTION	CHK'D BY	APP'V BY	DATE

HORIZONTAL DATUM: STATE PLANE COORDINATE SYSTEM NAD83 (CENTRAL ZONE) US SURVEY UNITS
VERTICAL DATUM: NAVD 88 US SURVEY FOOT UNITS

NOTE: ALL FEATURES IDENTIFIED ON THIS DRAWING ARE EXISTING.

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS-BUILT
DATE: 6/15/10
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: BH
APPROVED BY: GM
CADD FILE:

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DOE LASO
TA-73 LANDFILL

LANDFILL COVER REPAIR
GENERAL MAP

NORTH WIND DRAWING NO.
NWI_09-171

SHEET NO.
G-1

REV. AB

KEYED NOTES:

1. FILL RILLS TO RETURN THE DAMAGED AREA TO THE CROSS SECTION REQUIRED IN THE ORIGINAL DESIGN. APPROPRIATE FILL MATERIAL SHALL BE USED BASED ON THE EXTENT OF THE DAMAGE. SEE DETAIL (1/C-6)

2. FILL SUBSIDENCE TO RETURN THE AREA TO THE ORIGINAL REQUIRED SECTION. TOPSOIL FILL MATERIAL SHALL BE USED TO FILL SUBSIDENCE. SEE DETAIL (2/C-6)

3. REVEGETATE AREA WITH SEED AND TRM PER SPECIFICATIONS. REPLACE ANY REMOVED TRM WITH TRM PER THE ORIGINAL DESIGN–SEE SHT. G-1.

4. RECOMPACT AREA ADJACENT TO GABION WALL. REVEGETATE AREA WITH SEED AND TRM PER SPECIFICATIONS. REPLACE ANY REMOVED TRM WITH TRM PER THE ORIGINAL DESIGN–SEE SHT. G-1.

5. REGRADE AREA AND PROVIDE POROUS DETENTION PER DETAIL. USE TRM AND FGM GREEN ANCHOR SYSTEM (SEE www.profileproducts.com) OR APPROVED EQUAL FOR EROSION CONTROL AND REVEGETATION. (6/C-3) (7/C-3)

6. REMOVE SEDIMENTATION AND VEGETATION FROM EXISTING SEDIMENTATION BASIN.

7. REPAIR EROSIONAL SUBSIDENCE TO THE EXISTING RIPRAP BENCH PER DETAIL. (3/C-6)

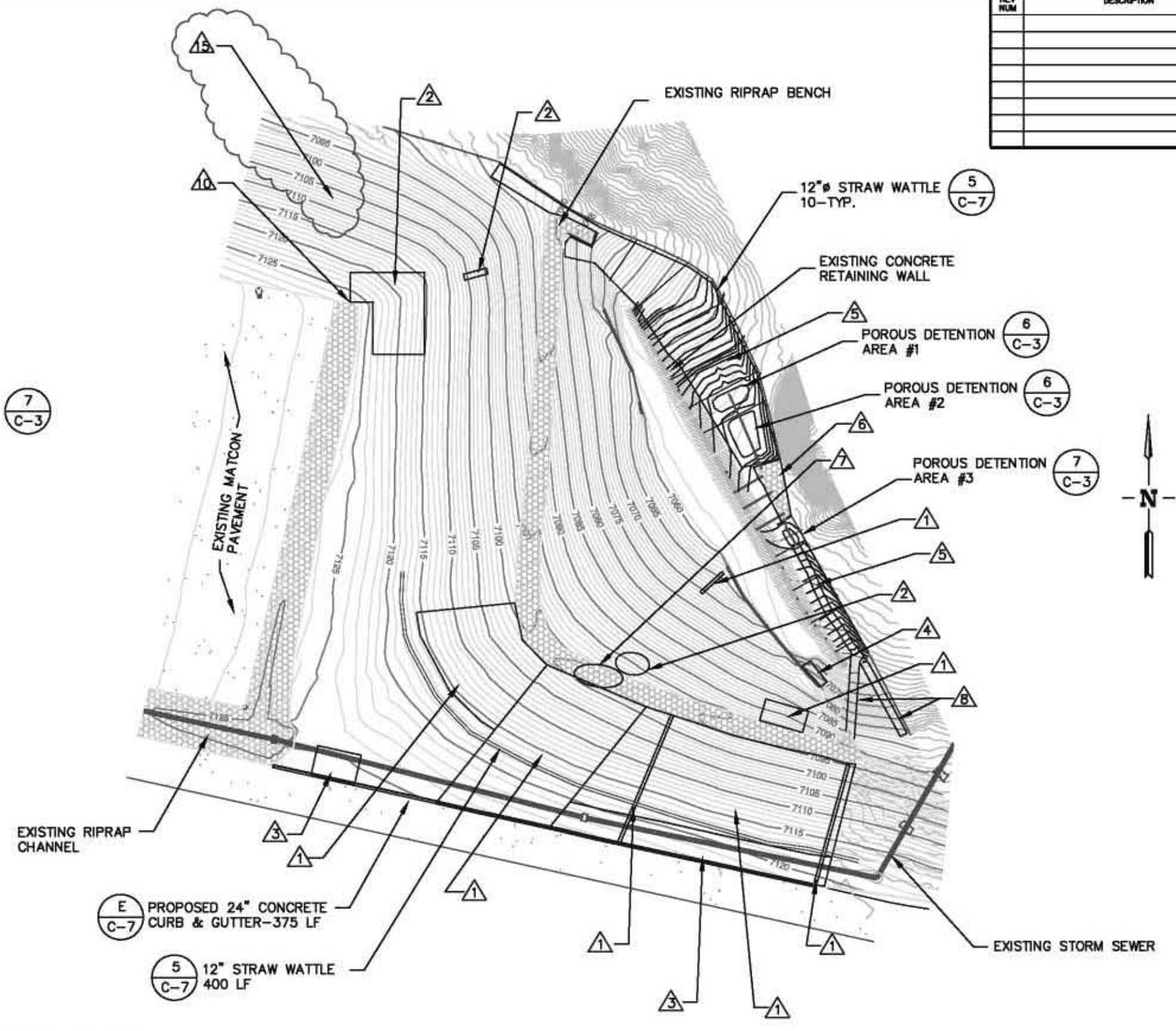
8. FILL RILLS TO RETURN THE DAMAGED AREA TO THE CROSS SECTION REQUIRED IN THE ORIGINAL DESIGN. APPROPRIATE FILL MATERIAL SHALL BE USED BASED ON THE EXTENT OF THE DAMAGE. THE AREA SHALL BE REVEGETATED WITH TRM AND FGM GREEN ANCHOR SYSTEM (SEE www.profileproducts.com) OR APPROVED EQUAL.

9. PROVIDE 6" ASPHALT CURB TO DIRECT RUNOFF TO EXISTING STORM DRAIN. SEE SHT. C-2 AND DETAIL (4/C-6)

10. RAISE THE HEIGHT OF RIPRAP BERM IN THIS AREA BY ONE FOOT TO ELIMINATE OR REDUCE THE STORMWATER RUNOFF FROM DISCHARGING THE CHANNEL TO THE EAST. THE SOUTHERLY FLOW PATTERN WITHIN THE CHANNEL SHOULD BE RESTORED.

11. FILL CONCRETE HANGAR PAD RANDOM CRACKING AND GAPS WITH KWIKSEAL 35 FLEXIBLE, SELF-LEVELING, MODIFIED POLYUREA ELASTOMER OR APPROVED EQUAL. SEE SHT. C-2.

15. PER FCN 003, FILLED EROSIONAL RILLING WITH TOPSOIL AND REPLACED TRM AND SEED.



HORIZONTAL DATUM: STATE PLANE COORDINATE SYSTEM NAD83 (CENTRAL ZONE) US SURVEY UNITS
VERTICAL DATUM: NAVD 88 US SURVEY FOOT UNITS

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS-BUILT
DATE: 6/15/10
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: BH
APPROVED BY: GM
CADD FILE: FILENAME.DWG

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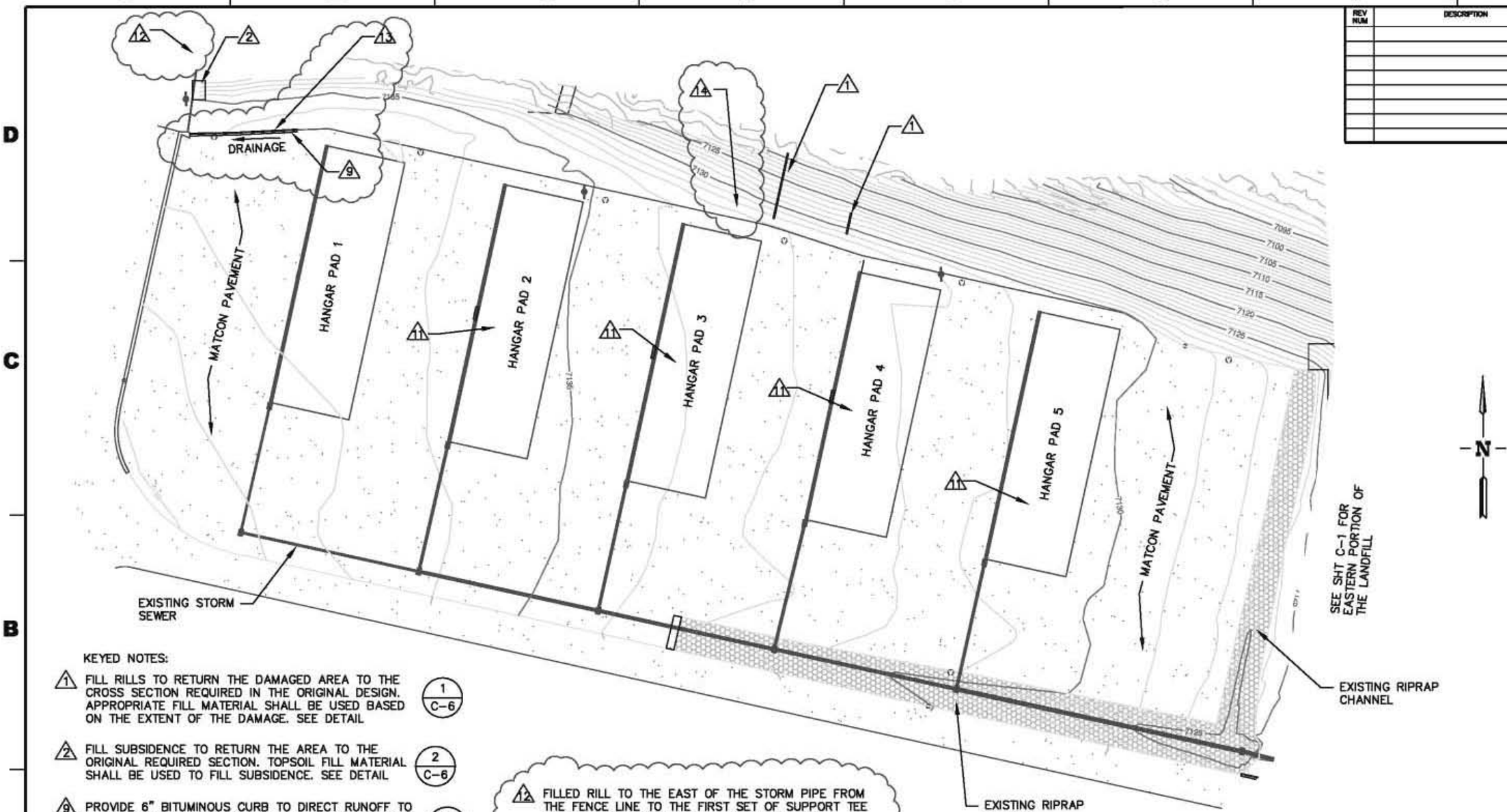
DOE LASO TA-73 LANDFILL
COVER IMPROVEMENTS AREA-EAST

NORTH WIND DRAWING NO.
NWI_09-172

SHEET NO.
C-1

REV. AB



KEYED NOTES:

1. FILL RILLS TO RETURN THE DAMAGED AREA TO THE CROSS SECTION REQUIRED IN THE ORIGINAL DESIGN. APPROPRIATE FILL MATERIAL SHALL BE USED BASED ON THE EXTENT OF THE DAMAGE. SEE DETAIL 1/C-6
2. FILL SUBSIDENCE TO RETURN THE AREA TO THE ORIGINAL REQUIRED SECTION. TOPSOIL FILL MATERIAL SHALL BE USED TO FILL SUBSIDENCE. SEE DETAIL 2/C-6
9. PROVIDE 6" BITUMINOUS CURB TO DIRECT RUNOFF TO EXISTING STORM INLET. EXTEND CURB ONTO FLAT TOP INLET TO THE EXTENT NECESSARY TO ENSURE THAT ANY STORM WATER RUNOFF WILL BE CAPTURED BY THE INLET–APPROX–90 LF. SEE DETAIL 4/C-6
11. FILL CONCRETE HANGAR PAD RANDOM CRACKING AND GAPS WITH KWIKSEAL 35 FLEXIBLE, SELF–LEVELING, MODIFIED POLYUREA ELASTOMER OR APPROVED EQUAL. CLEAN CRACKS AND GAPS AND PREPARE AREA PER MANUFACTURE RECOMMENDATIONS.

SEE DRAWING C–1 FOR ADDITIONAL KEYED NOTES. NOTE THAT KEYED NOTES NOT SHOWN HERE INDICATES THAT THAT PARTICULAR DRAINAGE IMPROVEMENT IS NOT REQUIRED IN AREA–WEST

12. FILLED RILL TO THE EAST OF THE STORM PIPE FROM THE FENCE LINE TO THE FIRST SET OF SUPPORT TEE POSTS. FILL MATERIAL CONSISTED OF RIP RAP, CLAY, AND TOPSOIL. THE AREA WAS THEN SEEDED.
13. CONSTRUCTED A 12" HIGH EARTHEN BERM IN PLACE OF BITUMINOUS CURB PER FCN 003. SIX INCHES OF TOPSOIL WAS PLACED ON THE FINAL 6" LIFT AND THE AREA WAS THEN SEEDED.
14. SEEDED AREA AND TREATED WITH STRAW MULCH PER FCN 003.

HORIZONTAL DATUM: STATE PLANE COORDINATE SYSTEM NAD83 (CENTRAL ZONE) US SURVEY UNITS
VERTICAL DATUM: NAVD 88 US SURVEY FOOT UNITS

0 40' 80'

REV NUM	DESCRIPTION	CHK'D BY	APP'V BY	DATE

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS–BUILT
DATE: 6/15/10
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: BH
APPROVED BY: GM
CADD FILE:

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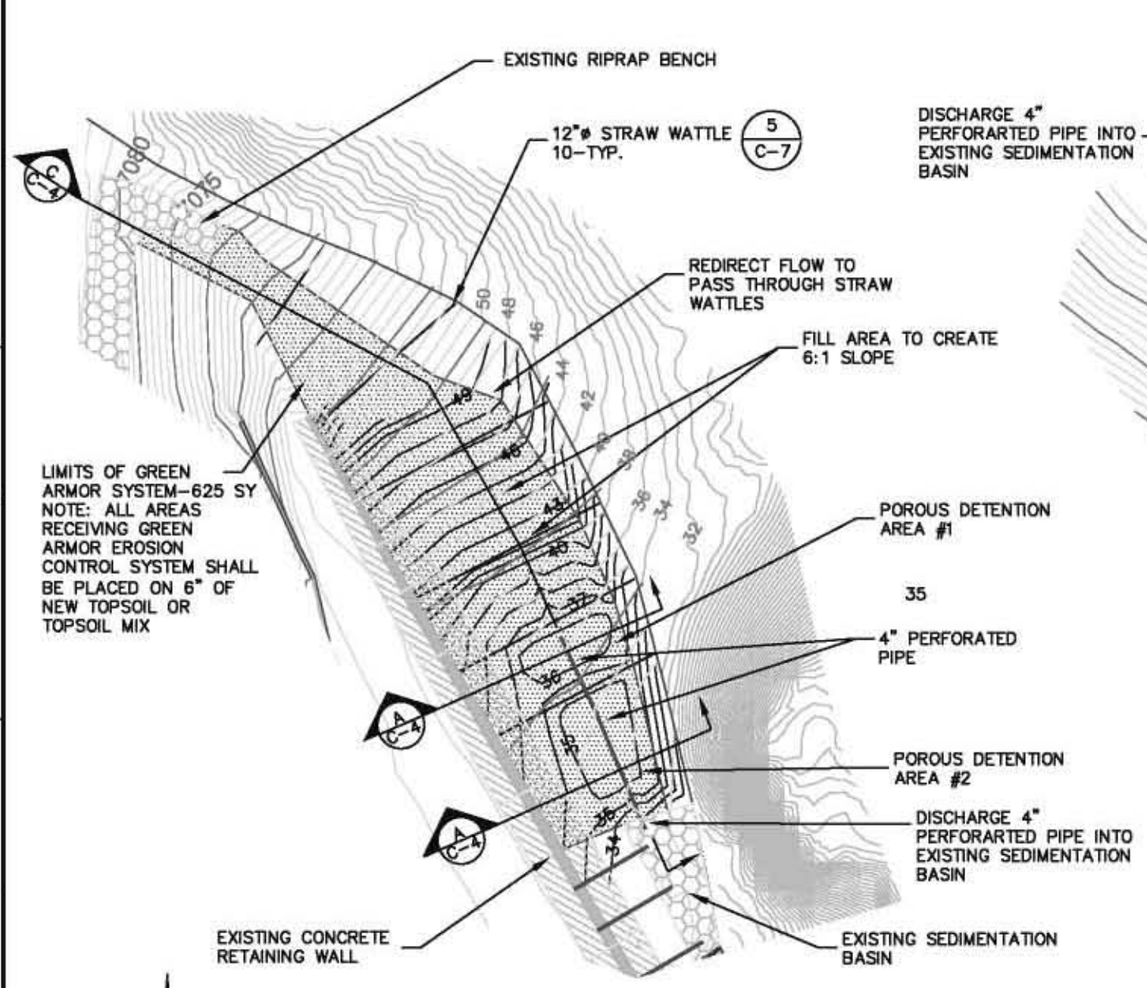
DOE LASO TA–73 LANDFILL
COVER IMPROVEMENTS AREA–WEST

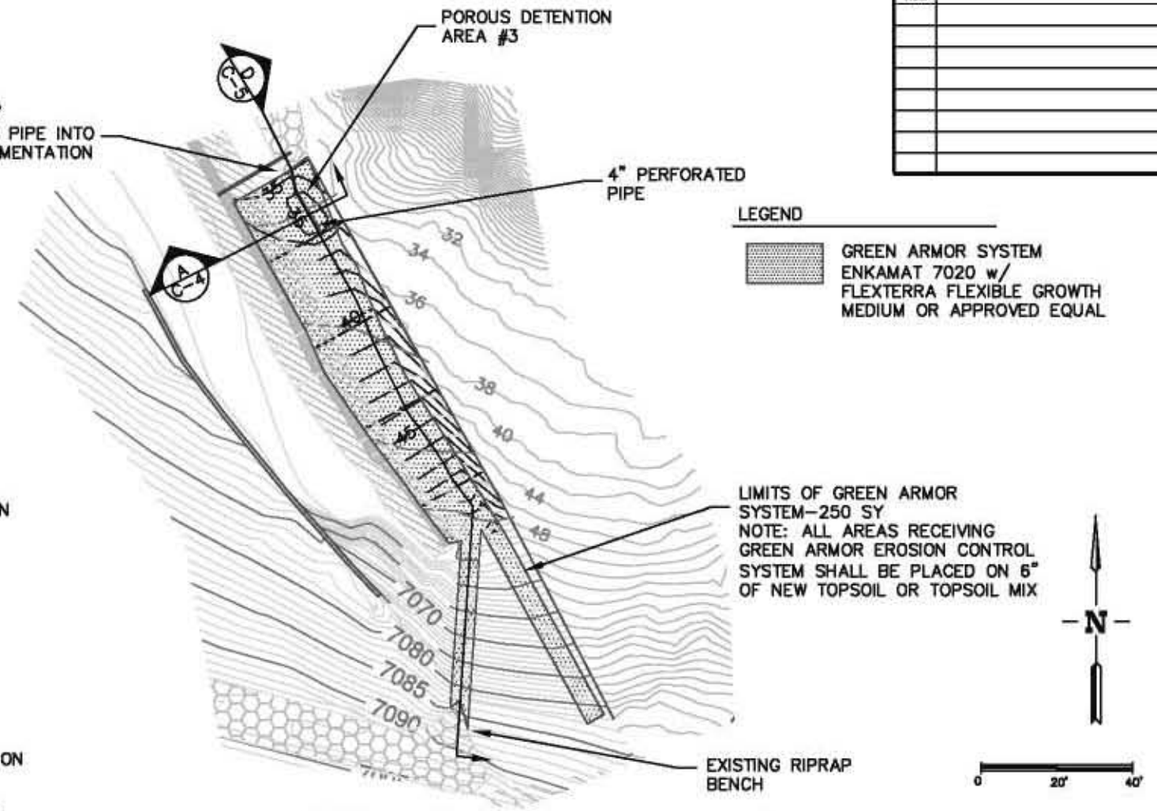
NORTH WIND DRAWING NO.
NWI_09–173

SHEET NO.
C–2

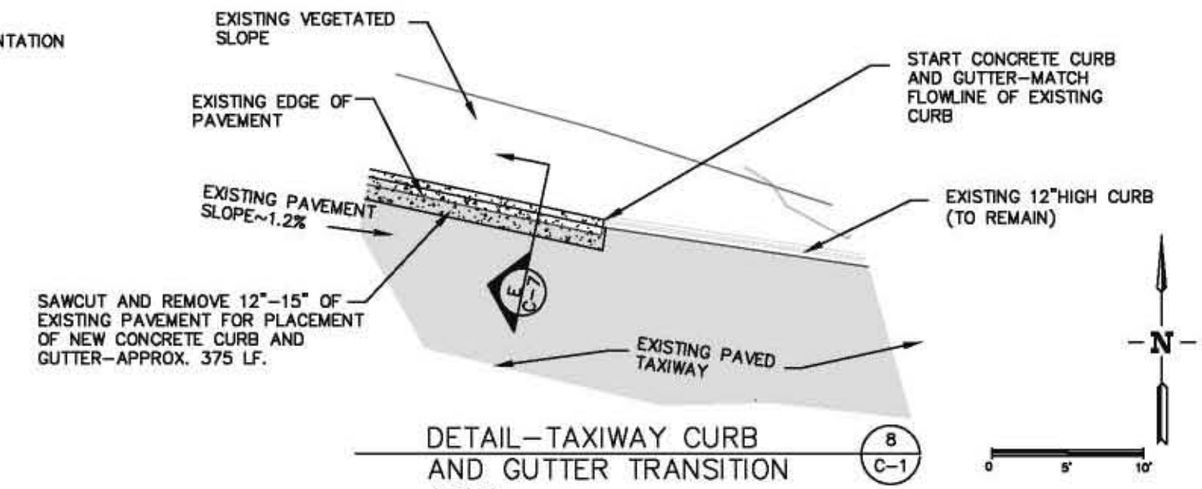
REV. AB



DETAIL-POROUS DETENTION AREAS 1 & 2 — 6 / C-1



DETAIL-POROUS DETENTION AREA 3 — 7 / C-1



DETAIL-TAXIWAY CURB AND GUTTER TRANSITION AREA — 8 / C-1

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS-BUILT
DATE: 6/15/10
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: BH
APPROVED BY: GM
CADD FILE:

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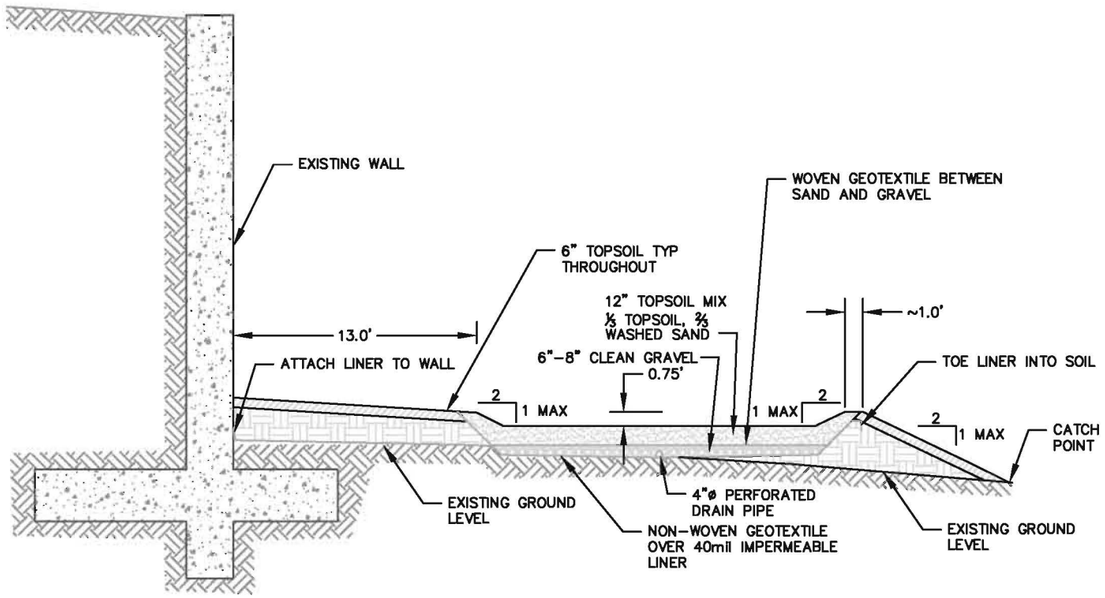
DOE LASO TA-73 LANDFILL

COVER IMPROVEMENTS AREA DETAILS

NORTH WIND DRAWING NO. NWI_09-174

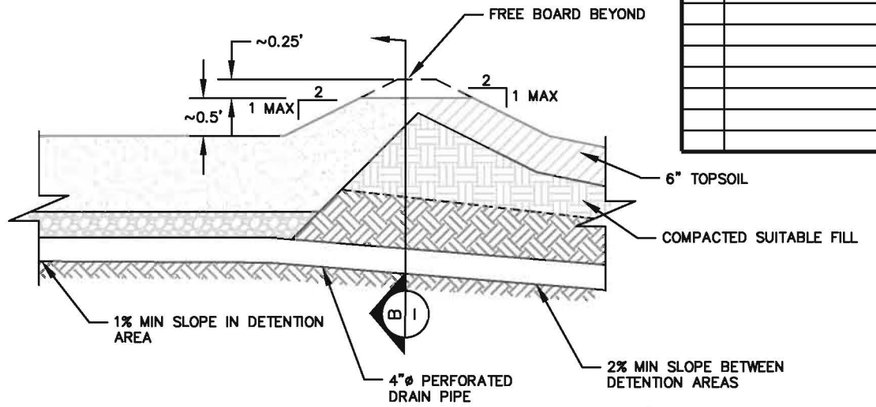
SHEET NO. C-3

REV. AB



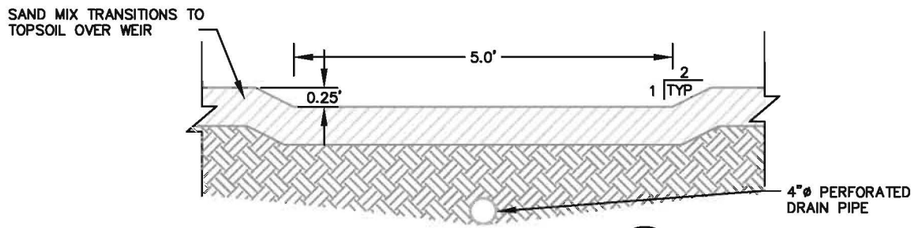
SECTION – POROUS DETENTION AREA TYP (A / C-3)

SCALE: ¼"=1'



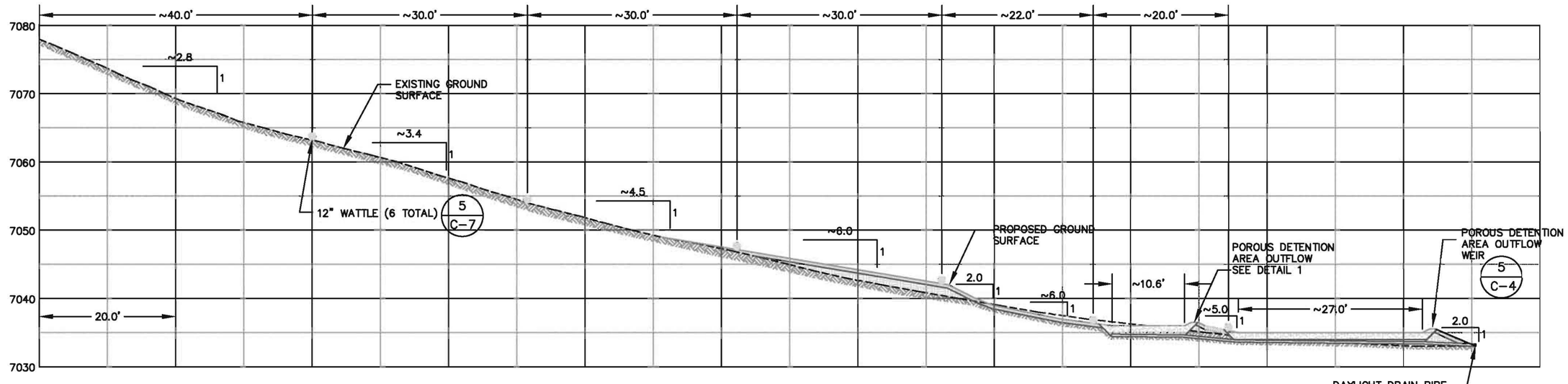
DETAIL – POROUS DETENTION AREA OUTFALL (5 / –)

SCALE: 1"=1'



SECTION–OVERFLOW WEIR (B / –)

SCALE: 1"=1'



SECTION – LOWER SLOPE NORTH (C / C-3)

SCALE: ⅛"=1'

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE

DWG SIZE: D

SCALE: AS SHOWN

DESIGN PHASE: AS-BUILT

DATE: 6/15/10

JOB NUMBER 10136

DESIGNED BY: PM

DRAWN BY: PM

CHECKED BY: BH

APPROVED BY: GM

CADD FILE:

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1425 HIGHAM ST.
IDAHO FALLS, ID 83402
WEB: www.nwidaho.com
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DOE LASO TA–73 LANDFILL

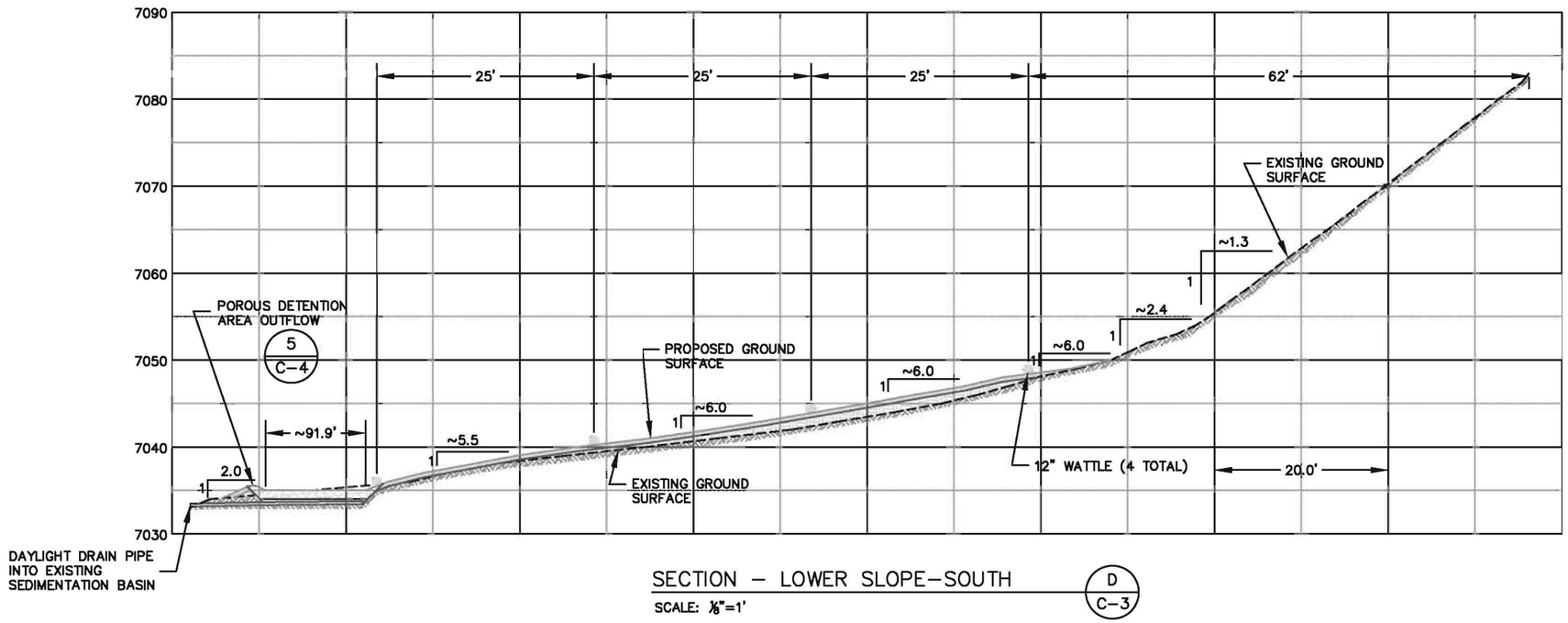
COVER IMPROVEMENTS SECTION AND DETAILS

NORTH WIND DRAWING NO.
NWI_09–175

SHEET NO.
C–4

REV. AB

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE



SECTION – LOWER SLOPE–SOUTH (D / C-3)

SCALE: 1/8"=1'

DWG SIZE: D

SCALE: AS SHOWN

DESIGN PHASE: AS-BUILT

DATE: 6/15/10

JOB NUMBER 10136

DESIGNED BY:	PM
DRAWN BY:	PM
CHECKED BY:	BH
APPROVED BY:	GM
CADD FILE:	

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DOE LASO
TA-73 LANDFILL

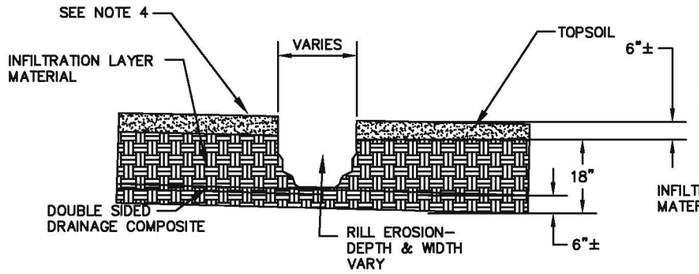
COVER IMPROVEMENTS
SECTION AND DETAILS

NORTH WIND DRAWING NO.
NWI_09-176

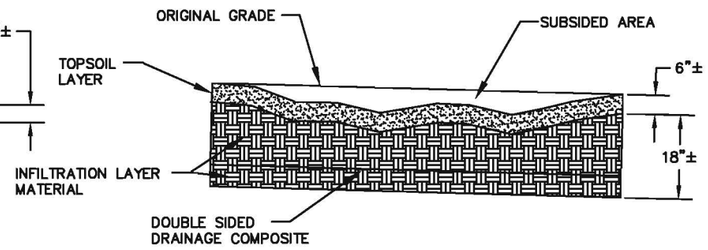
SHEET NO.
C-5

REV. AB

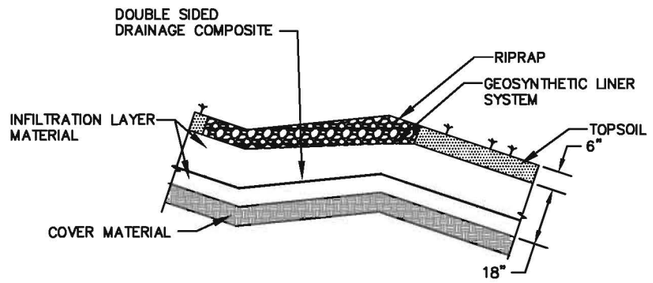
REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE



RILL EROSION REPAIR DETAIL
BEFORE



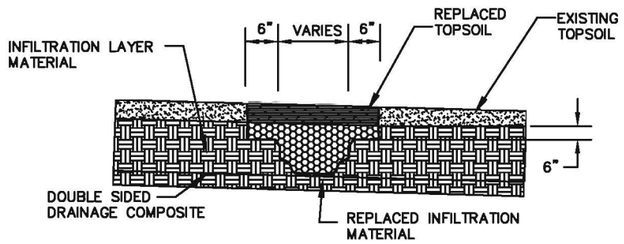
AREA SUBSIDENCE REPAIR DETAIL
BEFORE



TYPICAL BENCH SECTION DETAIL (3 / C–1)

NOTES:

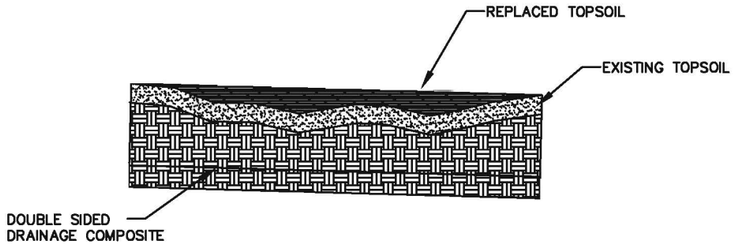
1. REMOVE RIPRAP, GEOSYNTHETIC LINER, AND INFILTRATION MATERIAL AS REQUIRED TO ACCESS THE LOWEST MATERIAL THAT HAS SUBSIDED. PLACE AND COMPACT MATERIAL PER APPLICABLE SPECIFICATIONS. IF GEOSYNTHETIC LINER IS DAMAGED A QUALIFIED SUBCONTRACTOR SHALL BE EMPLOYED TO MAKE REPAIRS. THE QUALIFICATIONS AND REPAIR TECHNIQUES SHALL BE PER THE SPECIFICATIONS.
2. RIPRAP SHALL BE PLACED TO PROMOTE POSITIVE DRAINAGE PER THE ORIGINAL DESIGN.
3. NOTIFY ENGINEER IF ANY DAMAGE IS OBSERVED TO THE DOUBLE SIDED DRAINAGE COMPOSITE.



RILL EROSION REPAIR DETAIL
AFTER (1 / C–1,C–2)

NOTES:

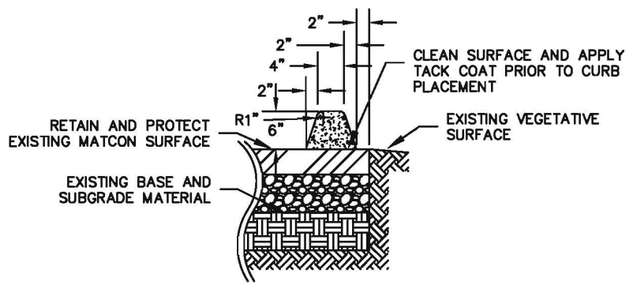
1. FILL MATERIAL EXTENTS SHALL BE BASED ON THE DEPTH OF THE RILL EROSION. IF RILL IS LESS THAN 6", THE RILL MAY BE FILLED WITH TOPSOIL MATERIAL. IF THE RILL EXTENDS TO A DEPTH DEEPER THAN 6", THE CONTRACTOR SHALL FILL RILL WITH APPROPRIATE MATERIAL BASED ON THE ORIGINAL CROSS SECTION. THE MATERIAL SHALL BE PLACED AND COMPACTED PER THE SPECIFICATIONS.
2. REVEGETATION SHALL BE PER THE SPECIFICATIONS.
3. NOTIFY ENGINEER IF ANY DAMAGE IS OBSERVED TO THE DRAINAGE COMPOSITE.
4. REPAIR OF RILL EROSION PROCEDURE FOR RILLS EXTENDING INTO INFILTRATION LAYER MATERIAL–REMOVE TRM (PER MANUFACTURER RECOMMENDATION), TOPSOIL AND THE TOP 6" OF EXISTING INFILTRATION MATERIAL FOR A DISTANCE OF 6" BEYOND EDGE OF RILL. SCARIFY REMAINING SURFACE OF INFILTRATION MATERIAL. FILL RILL EROSION AND ADDITIONAL VOID WITH APPROVED INFILTRATION MATERIAL AND COMPACT. SCARIFY SURFACE LAYER OF REPLACED INFILTRATION MATERIAL PRIOR TO PLACEMENT TOPSOIL. PLACE NEW TRM AND SEED PER MANUFACTURER/SUPPLIER RECOMMENDATION. REPLACE TRM WITH THE TYPE OF TRM SPECIFIED IN THE ORIGINAL DESIGN–SEE SHT. G–1.
5. REPAIR OF RILL EROSION PROCEDURE FOR RILLS EXTENDING ONLY INTO TOPSOIL–REMOVE TRM (PER MANUFACTURER RECOMMENDATION) AND TOPSOIL. SCARIFY EXISTING TOPSOIL SURFACE AND FILL RILL VOID WITH APPROPRIATE VOLUME OF TOPSOIL TO MATCH ORIGINAL DESIGN. PLACE NEW TRM AND SEED PER MANUFACTURER/SUPPLIER RECOMMENDATION.



AREA SUBSIDENCE REPAIR DETAIL
AFTER (2 / C–1,C–2)

NOTES:

1. REMOVE EXISTING TRM AS REQUIRED TO ACCESS SUBSIDED AREA. THE TRM REMOVAL PROCEDURE SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.
2. SCARIFY REMAINING TOPSOIL SURFACE AND FILL SUBSIDED AREAS WITH AN APPROPRIATE VOLUME OF TOPSOIL TO MATCH ORIGINAL DESIGN.
3. REPLACE TRM AND SEED PER THE SPECIFICATIONS AND MANUFACTURER/SUPPLIER RECOMMENDATIONS. REPLACE TRM WITH THE TYPE OF TRM SPECIFIED IN THE ORIGINAL DESIGN–SEE SHT. G–1.
4. NOTIFY THE ENGINEER IF ANY DAMAGE IS OBSERVED TO THE DOUBLE SIDED DRAINAGE COMPOSITE.



DETAIL – BITUMINOUS CURB (4 / C–2)

NOTES:

1. BITUMINOUS CURB DIMENSION MAY VARY DEPENDING ON AVAILABLE CURBING MACHINES.
2. BITUMINOUS CURB SHALL BE PLACED IN ACCORDANCE WITH SECTION 609 OF THE NMDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION–LATEST EDITION

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS–BUILT
DATE: 6/15/10

JOB NUMBER 10136

DESIGNED BY:	PM	
DRAWN BY:	PM	
CHECKED BY:	BH	
APPROVED BY:	GM	
CADD FILE:		

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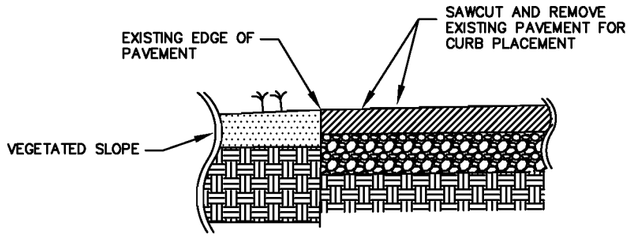
DOE LASO
TA–73 LANDFILL

COVER IMPROVEMENTS
CONSTRUCTION DETAILS

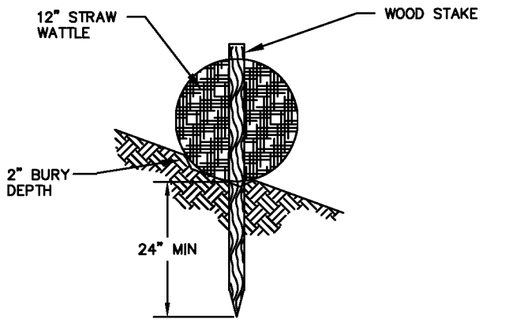
NORTH WIND DRAWING NO.
NWI_09–177

SHEET NO.
C–6

REV. AB



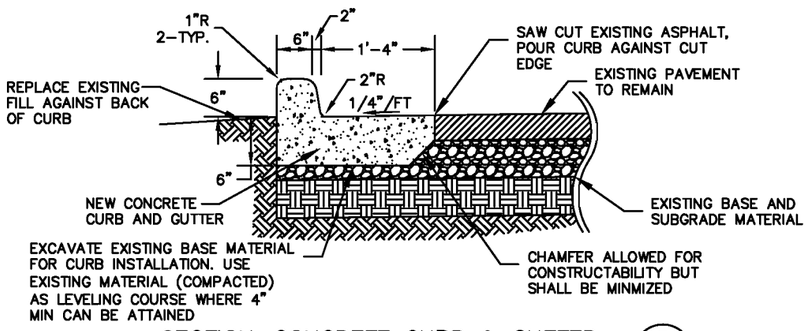
SECTION–CONCRETE CURB & GUTTER
BEFORE



DETAIL–STRAW WATTLE (5, C-1)

NOTES:

1. STRAW WATTLES SHALL BE EARTH SAVER STRAW WATTLES (100% FREE OF NOXIOUS WEEDS) OR APPROVED EQUAL.
2. TRENCH, PLACE, AND ANCHOR STRAW WATTLES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.



SECTION–CONCRETE CURB & GUTTER
AFTER (E, C-1, C-3)

NOTES:

1. SAWCUT AND REMOVE EXISTING PAVEMENT TO CONSTRUCT THE CONCRETE CURB AND GUTTER PER DETAIL.
2. MATCH PROPOSED CONCRETE GUTTER FLOW LINE WITH EXISTING PAVEMENT FLOW LINE (THERE IS NO NEED TO MATCH TOP OF CURB ELEVATIONS).
3. CONSTRUCT IN ACCORDANCE WITH NMDOT CONCRETE BARRIER CURB AND GUTTER TYPE "B". ALL JOINTS SHALL BE SEALED IN ACCORDANCE WITH NMDOT STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGE CONSTRCUTION–LATEST ADDITION.
4. PATCH PAVEMENT AS NECESSARY TO MAINTAIN STRAIGHT EDGE ABUTTING THE NEWLY PLACED CONCRETE CURB AND GUTTER PER NMDOT STANDARDS.

REV NUM	DESCRIPTION	CHK'D BY	APPV BY	DATE

DWG SIZE: D
SCALE: AS SHOWN
DESIGN PHASE: AS–BUILT
DATE: 6/15/10
JOB NUMBER 10136
DESIGNED BY: PM
DRAWN BY: PM
CHECKED BY: BH
APPROVED BY: GM
CADD FILE:

North Wind, Inc.
1425 HIGHAM ST.
IDAHO FALLS, ID 83402
WEB: www.nwindenv.com
Phone: (208) 528-8718 Fax: (208) 528-8714

DOE LASO
TA–73 LANDFILL

COVER IMPROVEMENTS
CONSTRUCTION DETAILS

NORTH WIND DRAWING NO.
NWI_09–178

SHEET NO.
C–7

REV. AB

APPENDIX B- INFILTRATION MATERIAL LABORATORY TESTING RESULTS

GEO-TEST

October 27, 2009

DTT Sand and Gravel
Attn Dave Tanter
Rt 4 Box 20 E
Hernandez, NM 87537

Job No.:2-70206
Lab No.:5499

PROJECT: **Miscellaneous Testing**

LOCATION OF SAMPLE: Clay for TA-73

DATE SAMPLED: October 20, 2009

SAMPLE: Silty Sand Clay, Brown (CL)

MOISTURE-DENSITY RELATIONSHIP ASTM-D-698

Maximum Density	99.2	pcf
Optimum Moisture	21.5	percent

SIEVE ANALYSIS

Sieve Size	Percent Passing
3/4"	100
1/2"	99
3/8"	99
No. 4	99
No. 10	98
No. 40	96
No. 100	80
No. 200	66.7

ATTERBERG LIMITS

Plasticity Index	10
Liquid Limit	26

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Addressee

TB/cb

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GEO-TEST

October 29, 2009

Job No.: 2-70206
Lab No. 5499

DTT Sand and Gravel
Rt. 4, Box 20E
Hernandez, NM 87537

PROJECT : Miscellanios Testing

LOCATION: Delivered by Client on 10/19/09
Clay Cover TA-73

HYDRAULIC CONDUCTIVITY OF SATURATED SOILS

Sample Type:	Remolded to 93% of ASTM D698
Maximum Dry Density (ASTM D698)	99.2 pcf
Optimum Moisture Content	21.5 %
Wet Unit Weight of Sample:	113.4 pcf
Dry Unit Weight of Sample:	92.6 pcf
Initial Moisture Content:	22.4 %

Hydraulic Conductivity: 1.05E-06 cm/sec

Respectfully Submitted:

GEO-TEST, INC.

Tim Byres, SET

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APPENDIX C- INFILTRATION MATERIAL FIELD TESTING RESULTS

Appendix B-1
Los Alamos TA-73 Airport Landfill-Cover Improvements
Infiltration Material Field Test Results

Date	Test Number	Laboratory Proctor Number	Dry Density	Moisture Content	Max Dry Density	Optimum Moisture	Moisture +/-	Percent Compaction*	Pass/Fail	Notes
11/2/2009	1	5499	94.0	9.1%	99.2	21.5%	-12.4%	94.8%	FAIL	
11/2/2009	2	5499	93.2	18.2%	99.2	21.5%	-3.3%	94.0%	PASS	RETEST #1-Engineer determined to be aceptable
11/3/2009	3	5499	97.2	19.5%	99.2	21.5%	-2.0%	98.0%	PASS	
11/3/2009	4	5499	98.7	21.4%	99.2	21.5%	-0.1%	99.5%	PASS	
11/3/2009	5	5499	95.9	22.1%	99.2	21.5%	0.6%	96.7%	PASS	
11/3/2009	6	5499	99.9	19.9%	99.2	21.5%	-1.6%	100.7%	PASS	
11/3/2009	7	5499	99.2	19.2%	99.2	21.5%	-2.3%	100.0%	PASS	
11/3/2009	8	5499	97.3	20.1%	99.2	21.5%	-1.4%	98.1%	PASS	
11/3/2009	9	5499	96.4	22.3%	99.2	21.5%	0.8%	97.2%	PASS	
11/3/2009	10	5499	98.4	18.9%	99.2	21.5%	-2.6%	99.2%	PASS	
11/3/2009	11	5499	95.5	20.5%	99.2	21.5%	-1.0%	96.3%	PASS	
11/4/2009	12	5499	97.4	20.0%	99.2	21.5%	-1.5%	98.2%	PASS	
11/4/2009	13	5499	98.5	21.3%	99.2	21.5%	-0.2%	99.3%	PASS	
11/5/2010	14	5499	98.6	20.7%	99.2	21.5%	-0.8%	99.4%	PASS	
11/5/2010	15	5499	95.0	21.2%	99.2	21.5%	-0.3%	95.8%	PASS	
11/5/2010	16	5499	94.7	19.0%	99.2	21.5%	-2.5%	95.5%	PASS	
11/5/2010	17	5499	99.3	18.8%	99.2	21.5%	-2.7%	100.1%	PASS	
11/5/2010	18	5499	97.8	20.9%	99.2	21.5%	-0.6%	98.6%	PASS	
11/5/2010	19	5499	99.0	23.1%	99.2	21.5%	1.6%	99.8%	PASS	
11/5/2010	20	5499	99.2	22.2%	99.2	21.5%	0.7%	100.0%	PASS	
11/5/2010	21	5499	97.3	21.5%	99.2	21.5%	0.0%	98.1%	PASS	
11/5/2010	22	5499	99.5	20.0%	99.2	21.5%	-1.5%	100.3%	PASS	
11/5/2010	23	5499	99.4	20.2%	99.2	21.5%	-1.3%	100.2%	PASS	
11/5/2010	24	5499	95.4	21.6%	99.2	21.5%	0.1%	96.2%	PASS	
11/5/2010	25	5499	95.7	24.2%	99.2	21.5%	2.7%	96.5%	PASS	
11/6/2010	26	5499	97.7	24.5%	99.2	21.5%	3.0%	98.5%	PASS	
11/6/2010	27	5499	98.8	21.5%	99.2	21.5%	0.0%	99.6%	PASS	

* A minimum compaction of 93% is required to meet the specified hydraulic conductivity.

GEO-TEST

November 9, 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-02-09

Results of Field Density tests performed at the above referenced project:

Test No.	Location	Dry Density (PCF)	% Moisture	Maximum Density (PCF)	Optimum Moisture	% Compaction	% Required
1	Subsistence channel patch 1st lift	94.0	9.1	99.2	21.5	95	93
2	Subsistence channel patch 1st lift (RETEST)	93.2	18.2	99.2	21.5	94	93

Respectfully submitted:
GEO-TEST, INC.

Manuel Pena
Engineering Technician

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November 9, 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-03-09

Results of Field Density tests performed at the above referenced project:

TEST NO.	LOCATION	DRY DENSITY (PCF)	% MOISTURE	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE	% COMPAC-TION	% REQUIRED
3	Subsistence channel patch East side 2nd lift	97.2	19.5	99.2	21.5	98	93
4	Subsistence channel patch West side 2nd lift	98.7	21.4	99.2	21.5	99	93
5	Subsistence channel patch West side 3rd lift	95.9	22.1	99.2	21.5	97	93
6	Subsistence channel patch East side 3rd lift	99.9	19.9	99.2	21.5	100	93

Respectfully submitted:
GEO-TEST, INC.

Manuel Pena
Engineering Technician

cc: Addressee

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November 9, 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-03-09

Results of Field Density tests performed at the above referenced project:

Test No.	Location	Dry Density (PCF)	% Moisture	Maximum Density (PCF)	Optimum Moisture	% Compac-tion	% Required
7	Subsistence channel patch West side 4th lift	99.2	19.2	99.2	21.5	100	95
8	Subsistence channel patch East side 4th lift	97.3	20.1	99.2	21.5	98	95
9	Subsistence channel patch East side 5th lift	96.4	22.3	99.2	21.5	97	95
10	Subsistence channel patch West side 5th lift	98.4	18.9	99.2	21.5	99	95
11	Subsistence channel patch East side 6th lift	95.5	20.5	99.2	21.5	96	95

Respectfully submitted:
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Manuel Pena
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November 9, 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-04-09

Results of Field Density tests performed at the above referenced project:

TEST NO.	LOCATION	DRY DENSITY (PCF)	% MOISTURE	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE	% COMPAC-TION	% REQUIRED
12	Subsistence channel patch West side 7th lift	97.4	20.0	99.2	21.5	98	95
13	Subsistence channel patch East side 7th lift	98.5	21.3	99.2	21.5	99	95

Respectfully submitted:
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November 9, 2009 RECEIVED NOV 16 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-05-09

Results of Field Density tests performed at the above referenced project:

TEST NO.	LOCATION	DRY DENSITY (PCF)	% MOISTURE	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE	% COMPAC-TION	% REQUIRED
14	Trench No. 9 -6" FSG	98.6	20.7	99.2	21.5	99	95
15	Trench No. 8 -6" FSG	95.0	21.2	99.2	21.5	96	95
16	Trench No. 7 -6" FSG	94.7	19.0	99.2	21.5	95	95
17	Trench No. 6 -6" FSG	99.3	18.8	99.2	21.5	100	95
18	Trench No. 5 -6" FSG	97.8	20.9	99.2	21.5	99	95
19	Trench No. 4 -6" FSG	99.0	23.1	99.2	21.5	100	95
20	Trench No. 3 -6" FSG	99.2	22.2	99.2	21.5	100	95
21	Trench No. 2 -6" FSG	97.3	21.5	99.2	21.5	98	95
22	Trench No. 1 -6" FSG	99.5	20.0	99.2	21.5	100	95
23	Trench No. 6 -6" FSG (RETEST)	99.4	20.2	99.2	21.5	100	95
24	Trench No. 7 -6" FSG (RETEST)	95.4	21.6	99.2	21.5	96	95

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GEO-TEST

Project: Los Alamos County Landfill Cover
Job No: 2-91101
November 9, 2009
Page 2

TEST No.	LOCATION	DRY DENSITY (PCF)	% MOISTURE	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE	% COMPAC-TION	% REQUIRED
25	Trench No. 10 -6" FSG	95.7	24.2	99.2	21.5	96	95

Respectfully submitted:
GEO-TEST, INC.

Manuel Pena
Engineering Technician

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November 9, 2009

One Step Environmental, LLC.
4924 1st Avenue North
Birmingham, Alabama 35244

Job No.:2-91101

PROJECT: Los Alamos County Landfill Cover

DATE TESTED: 11-06-09

Results of Field Density tests performed at the above referenced project:

Test No.	Location	Dry Density (PCF)	% Moisture	Maximum Density (PCF)	Optimum Moisture	% Compac-tion	% Required
26	Trench No. 12 -6" FSG	97.7	24.5	99.2	21.5	99	95
27	Trench No. 11 FSG	98.8	21.5	99.2	21.5	100	95

Respectfully submitted:
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Manuel Pena
Engineering Technician

cc: Addressee

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APPENDIX D- FIELD CHANGE NOTICES

North Wind

PWIF-10246-005 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill Cover Improvements (North Wind Inc. Project #10246)

FCN No: 10246-001

Affected Document: Revisions to Spec 02200 Table 02200-1 and Minimum Testing Acceptance for infiltration Material

Date Prepared: 10/29/09

Prepared by: P. Meehan

Description of Field Change (Cite section in document and description of change): The Specifications indicate that the minimum construction parameters for the infiltration material will be identified once the laboratory testing is completed. The laboratory testing for this material was completed on 10/29/09. This FCN documents the required design parameters.

Reason for Field Change:

- Minimum required dry density of the infiltration material shall be 93% (standard proctor) of the maximum dry density which is 99.2 pcf. This dry density will achieve the maximum hydraulic conductivity of 1.0 x 10-5 cm/sec.
- The moisture content shall be between +/-3% of the optimum moisture which is 21.5%.

This field change will impact project schedule by 0 Months; 0 cost

Approval

Philip S. Meehan — Engineer of Record Signature — Date 10/29/09

Project Manager Signature — Date 10/29/09

North Wind

PWIF-10246-005 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill Cover Improvements (North Wind Inc. Project #10246)

FCN No: 10246-002

Affected Document: Revisions to Spec 02200 Table 02200-1 and Minimum Testing Acceptance for Topsoil

Date Prepared: 11/04/09

Prepared by: P. Meehan and S. Flynn

Description of Field Change (Cite section in document and description of change):
Revised the topsoil material requirements listed in Table 02200-1 and the minimum Testing Acceptance requirements as indicated below.

Reason for Field Change:

- Organic Content: Clarification/Confirmation of the Specifications. The topsoil provider will incorporate at least 1% organic matter into the topsoil. For each 100 cy of topsoil, at least 1 cy of organic matter will be added. The organic matter used will be a low sodium compost to be determined as recommended by the topsoil provider.

- pH: Revision to the Specifications. The soils in the desert southwest are above the upper range of the specification; typically, a pH of 8.0 is not uncommon. In addition, any water used on the soil is also alkaline (i.e., over pH 7.0). The specification should be revised to test and document the pH of the topsoil material but not have the pH included in the Minimum Testing Requirements.

- USDA Classification: Clarification/Confirmation of the Specifications. The site superintendent (L. Barker of One Stop Environmental, LLC.) & the NWI soil & environmental scientist (S. Flynn) will determine that the final soil texture falls within the following ranges: 20 – 65% sand; 10 – 65% silt; and, 10 – 25 % clay to meet the sandy loam/loam/silt loam/sandy clay loam specification. Based on the small volume of required topsoil, a particle size hydrometer test will not be performed to determine the texture of the material. The above listed project personnel will rely on their experience and engineering judgment to determine the acceptability of the soil texture.

- Nitrogen (TKN): Revision to the Specifications. This analysis will not be completed because no fertilizers will be used. Native plants do not require any fertilizers. Based on revegetation experience of the project personnel, fertilizers tend to encourage undesirable growth of both

- invasive & noxious weeds, which cause decreased native plant growth.

- Phosphorus, Orthophosphate (as P): Revision to the Specifications. This analysis will not be completed because no fertilizers will be used. Native plants do not require any fertilizers. Based on revegetation experience of the project personnel, fertilizers tend to encourage undesirable growth of both invasive & noxious weeds, which cause decreased native plant growth.

This field change will impact project schedule by 0 Months; 0 cost

Approval Philip S. Meehan 11/04/09

Engineer of Record Signature Date

11/4/09

Project Manager Signature Date

North Wind

FIELD CHANGE NOTICE

Project: Los Alamos Site Office TA-73 Airport Landfill Cover Improvements (North Wind Project # 10246)

FCN No.: 003 **Affected Document:** Drawing C-2 NWI 09-173

Date Prepared: April 29, 2010 **Prepared By:** Phil Meehan

Description of Field Change (Cite section in document and description of change):

Replace the proposed asphalt curb specified on drawing C-2 of the Final Engineering Plans with a one foot high earthen berm. The earthen berm should be improved in accordance with the Final Engineering Plan details. Additional cover improvements should also be implemented to off set the cost savings associated with eliminating the curb.

Reason for Field Change:

Drawing C-2 requires that an asphalt curb be placed to the northwest of hangar pad #1 to redirect storm water runoff from Area C to an existing storm inlet. The existing storm inlet is located at the northern edge of the pavement to the west of the proposed curb location.

As a temporary storm water diversion measure implemented during Phase I of this project, a one foot high earthen berm was constructed directly north of the proposed curb location. During the Phase II site walk down, it was determined that the earthen berm was an effective means of redirecting storm water runoff away from Area C to the existing storm inlet and therefore met the intent of the original design. To be in compliance with the Final Engineering Plan details, the earthen berm should receive at least six inches of topsoil, appropriate trm, and seed.

In addition to constructing the earthen berm, a previously unidentified erosional rilling area to the northeast of hangar pad 5 should be repaired in accordance with the Final Engineering Plan details. Also, an area of sparse vegetation to the north of hangar pad 3 should be seeded and treated with a straw mulch.

The cost associated with not constructing the asphalt curb is approximately $1,000. The additional improvements identified can be performed for approximately 4 hours of superintendent time, 8 hours of laborer time, and $200 worth of materials which corresponds to approximately $1,000.

This field change will impact project schedule by 0 months; 0 cost

Approval

Philip S. Meehan 4/29/10
Engineer of Record

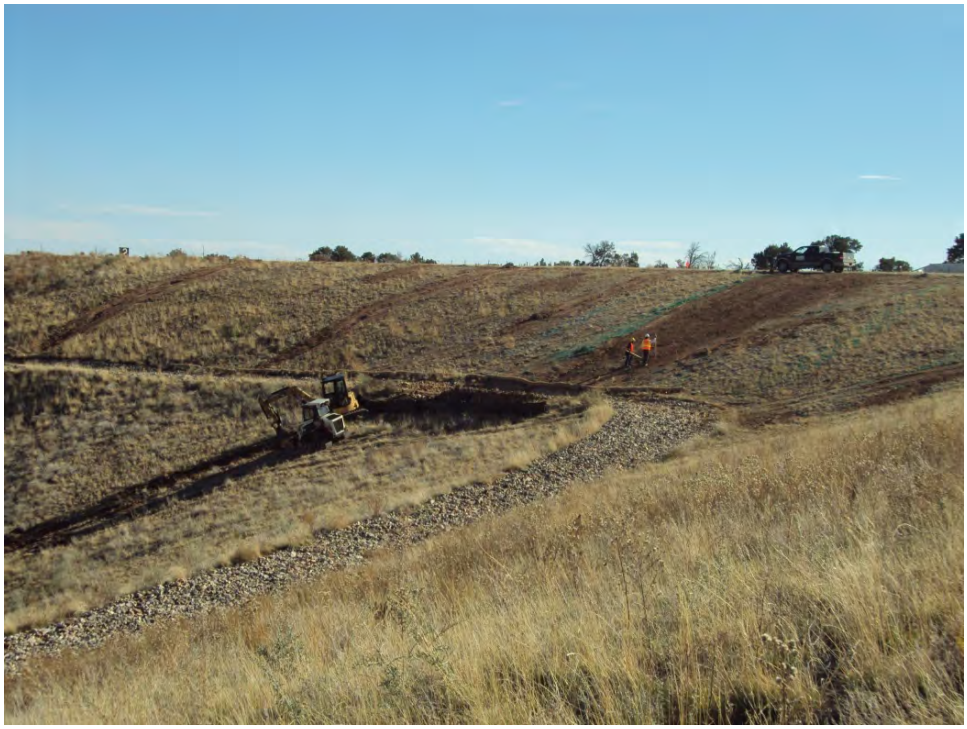
4/29/10
Project Manager

APPENDIX E-CONSTRUCTION PHOTOS

AREA L-SUBGRADE PRIOR TO SCARIFICATION AND PLACEMENT OF INFILTRATION MATERIAL

AREA I-TRM CUT AND REMOVED AND RILL PARTIALLY EXCAVATED

AREA L-COMPACTION OF INFILTRATION MATERIAL



LOOKING SOUTH-NORTH FACING VEGETATED LANDFILL COVER

AREA T-FILLING RILL WITH FILL MATERIAL

CONCRETE CURB AND GUTTER-PRIOR TO BITUMINOUS PATCH

HANGAR PADS-FILLING CRACKS

AREA C-FILLING RILL WITH RIP RAP AND TOPSOIL FILL MATERIAL

AREAS S, R, AND V-IMPORTING FILL MATERIAL TO BRING SURFACE TO REQUIRED GRADE

AREAS S –CONSTRUCTING POROUS DETENTION AREAS

AREA S –USING CONSTRUCTION STAKING TO DETERMINE REQUIRED GRADE

GEOMEMBRANE –SEAMING GEOMEMBRANE FOR USE UNDER POROUS DETENTION AREAS

AREA S –GREEN ARMOR SYSTEM INSTALLED

APPENDIX F- LANDFILL COVER IMPROVEMENTS ACCEPTANCE LETTER

Philip Meehan

From: Schulman, Suzanne [SSchulman@doeal.gov]
Sent: Monday, May 17, 2010 6:48 AM
To: James Kling; Luke Barker
Cc: Philip Meehan; Terry L. Jennings; Davidson, Robert; Robinson-Freeman, Yolanda F.
Subject: Airport Landfill Phase II Inspection

Hello All:

A final inspection was conducted on Friday, May 14, 2010, and all work was validated as completed to specifications. The One Stop/NWI Team did an exceptional job. I anticipate receiving the draft final report a week or two before the June 30 deadline. It should not take me more than a few days to return comments in an effort to get a final report by June 30th. Thanks again for a great job. --Suzy

Suzy Schulman, PMP
Federal Project Director
LASO Environmental Projects Office
National Nuclear Security Administration
3747 West Jemez Road (MS A316)
Los Alamos, NM 87544
Office: (505) 606-1962
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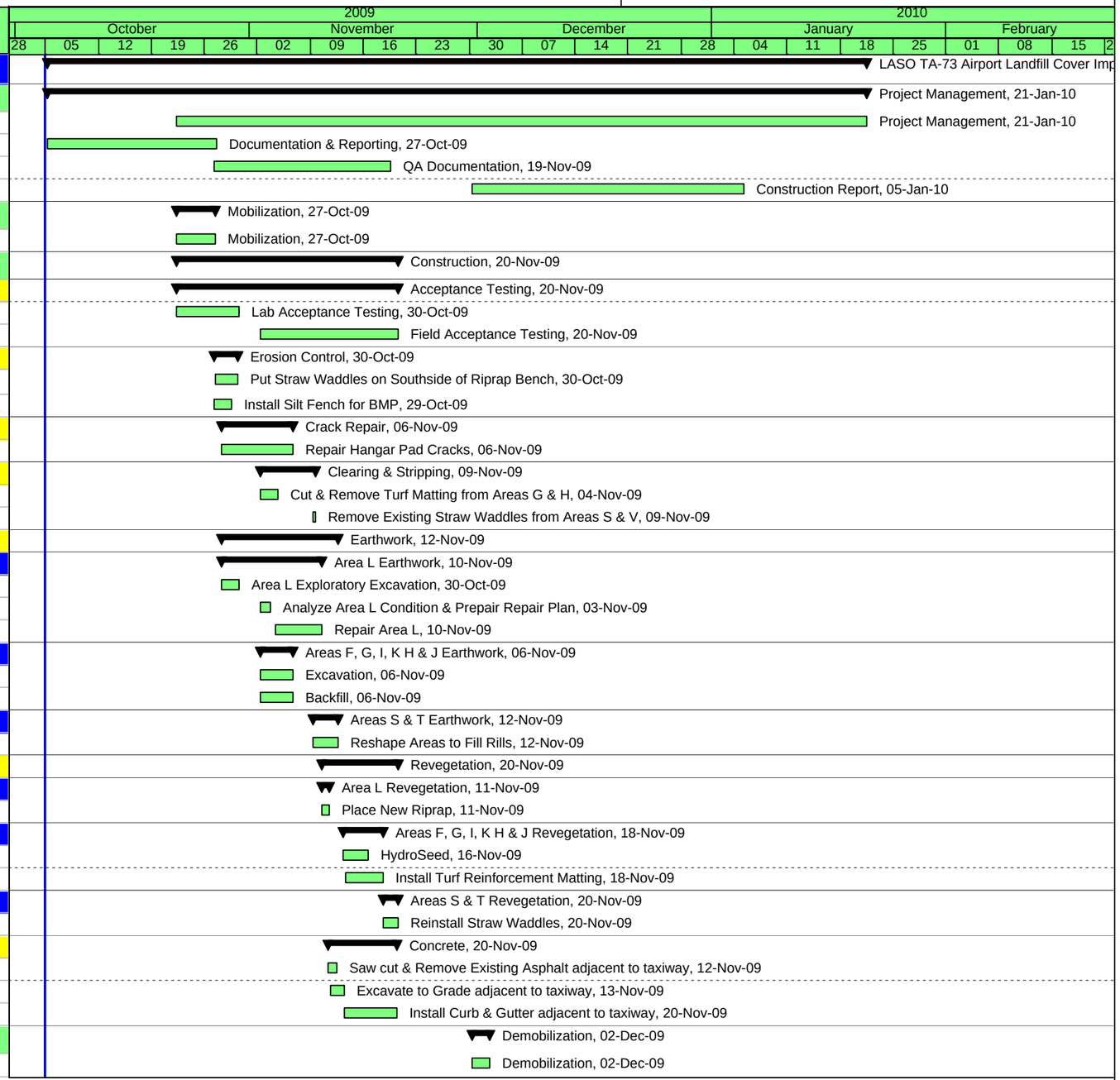
APPENDIX G- CONSTRUCTION SCHEDULES

LASO TA-73 Airport Landfill Cover Improvements Summary

PHASE I

Remaining Level of Effort ◆ Milestone
Actual Level of Effort Summary
Actual Work
Remaining Work
Critical Remaining Work

Activity ID	Activity Name	Original Duration	Start	Finish
LASO TA-73 Airport Landfill Cover Improvements Summ...		75	05-Oct-09	21-Jan-10
Project Management		75	05-Oct-09	21-Jan-10
A1100	Project Management	61	22-Oct-09*	21-Jan-10
A1110	Documentation & Reporting	16	05-Oct-09	27-Oct-09
A1120	QA Documentation	19	27-Oct-09*	19-Nov-09
A1130	Construction Report	26	30-Nov-09*	05-Jan-10
Mobilization		3	22-Oct-09	27-Oct-09
A1000	Mobilization	3	22-Oct-09*	27-Oct-09
Construction		22	22-Oct-09	20-Nov-09
Acceptance Testing		22	22-Oct-09	20-Nov-09
A1080	Lab Acceptance Testing	7	22-Oct-09	30-Oct-09
A1270	Field Acceptance Testing	16	02-Nov-09	20-Nov-09
Erosion Control		3	27-Oct-09	30-Oct-09
A1020	Put Straw Waddles on Southside of Riprap Bench	3	27-Oct-09	30-Oct-09
A1140	Install Silt Fench for BMP	3	27-Oct-09*	29-Oct-09
Crack Repair		8	28-Oct-09	06-Nov-09
A1150	Repair Hangar Pad Cracks	8	28-Oct-09*	06-Nov-09
Clearing & Stripping		6	02-Nov-09	09-Nov-09
A1030	Cut & Remove Turf Matting from Areas G & H	3	02-Nov-09*	04-Nov-09
A1050	Remove Existing Straw Waddles from Areas S & V	1	09-Nov-09*	09-Nov-09
Earthwork		12	28-Oct-09	12-Nov-09
Area L Earthwork		10	28-Oct-09	10-Nov-09
A1040	Area L Exploratory Excavation	3	28-Oct-09*	30-Oct-09
A1070	Analyze Area L Condition & Prepair Repair Plan	2	02-Nov-09	03-Nov-09
A1160	Repair Area L	5	04-Nov-09	10-Nov-09
Areas F, G, I, K H & J Earthwork		5	02-Nov-09	06-Nov-09
A1170	Excavation	5	02-Nov-09*	06-Nov-09
A1180	Backfill	5	02-Nov-09	06-Nov-09
Areas S & T Earthwork		4	09-Nov-09	12-Nov-09
A1190	Reshape Areas to Fill Rills	5	09-Nov-09*	12-Nov-09
Revegetation		8	10-Nov-09	20-Nov-09
Area L Revegetation		1	10-Nov-09	11-Nov-09
A1210	Place New Riprap	1	10-Nov-09*	11-Nov-09
Areas F, G, I, K H & J Revegetation		4	13-Nov-09	18-Nov-09
A1220	HydroSeed	2	13-Nov-09	16-Nov-09
A1230	Install Turf Reinforcement Matting	3	13-Nov-09	18-Nov-09
Areas S & T Revegetation		2	18-Nov-09	20-Nov-09
A1250	Reinstall Straw Waddles	2	18-Nov-09	20-Nov-09
Concrete		7	11-Nov-09	20-Nov-09
A1095	Saw cut & Remove Existing Asphalt adjacent to taxiway	2	11-Nov-09*	12-Nov-09
A1105	Excavate to Grade adjacent to taxiway	2	11-Nov-09	13-Nov-09
A1260	Install Curb & Gutter adjacent to taxiway	5	13-Nov-09	20-Nov-09
Demobilization		3	30-Nov-09	02-Dec-09
A1090	Demobilization	3	30-Nov-09	02-Dec-09

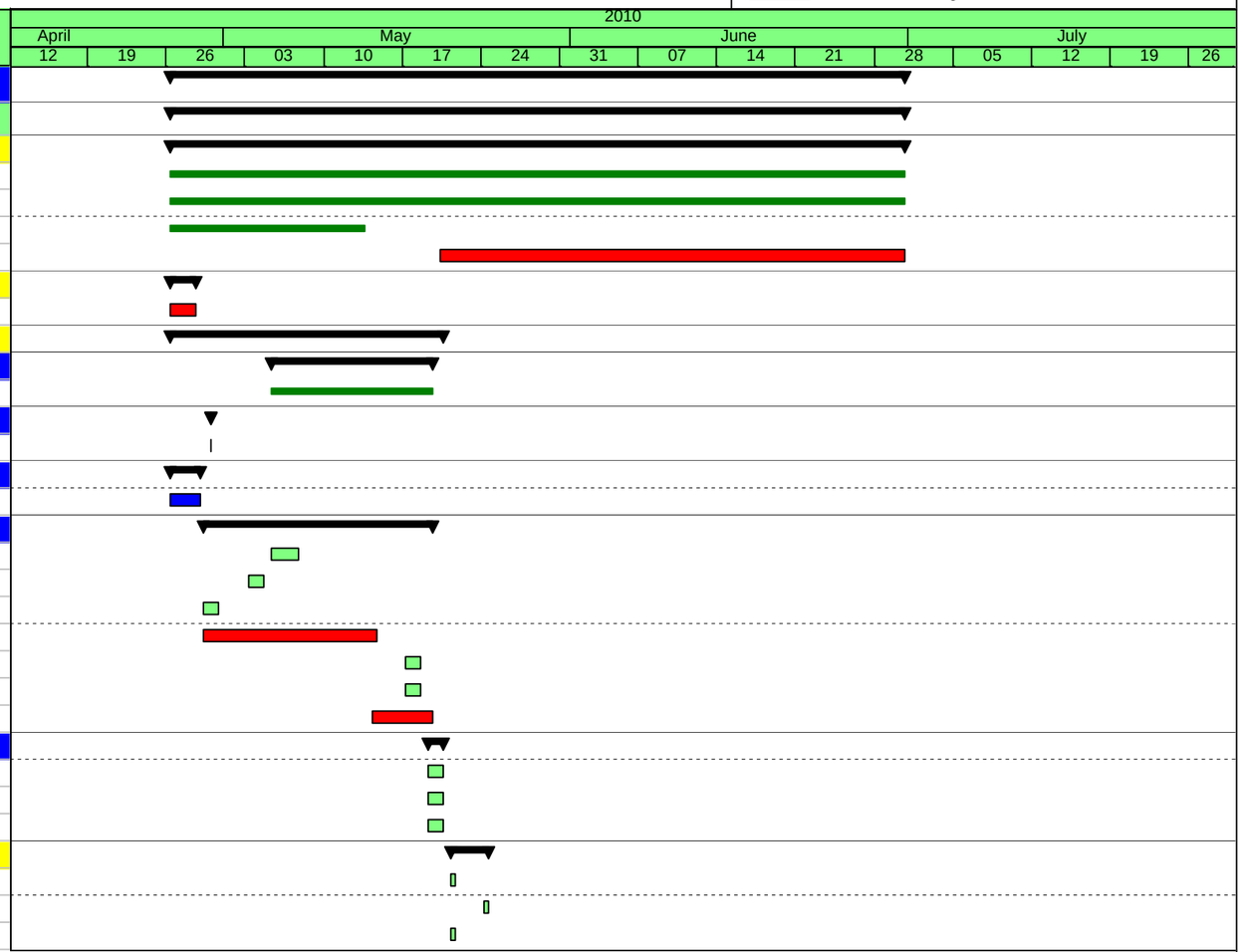


LASO TA-73 Airport Landfill Cover Improvements

PHASE II

Remaining Level of Effort ◆ Milestone
Actual Level of Effort Summary
Actual Work
Remaining Work
Critical Remaining Work

Activity ID	Activity Name	Original Duration	Start	Finish
LASO TA-73 Airport Landfill Cover Improvements		47	26-Apr-10 A	30-Jun-10
Phase 2		47	26-Apr-10 A	30-Jun-10
Project Management		47	26-Apr-10	30-Jun-10
A1350	Project Management	47	26-Apr-10	30-Jun-10
A1360	Documentation & Reporting	47	26-Apr-10	30-Jun-10
A1370	QA Documentation	14	26-Apr-10	13-May-10
A1380	Construction Report	29	20-May-10	30-Jun-10
Mobilization		3	26-Apr-10	28-Apr-10
A1280	Mobilization	3	26-Apr-10*	28-Apr-10
Construction		20	26-Apr-10 A	20-May-10
Acceptance Testing		11	05-May-10	19-May-10
A1530	Field Acceptance Testing	11	05-May-10	19-May-10
Clearing & Stripping		1	30-Apr-10 A	30-Apr-10 A
A1290	Clear Existing Debris from Sedimentation Basin Area R	1	30-Apr-10 A	30-Apr-10 A
Material Procurement		5	26-Apr-10 A	29-Apr-10 A
A1560	Import Earthwork Materials	5	26-Apr-10 A	29-Apr-10 A
Earthwork		15	29-Apr-10	19-May-10
A1310	Repair Rill Erosion at Areas A & B	3	05-May-10*	07-May-10
A1410	Repair Subsidence in Areas D & E	2	03-May-10*	04-May-10
A1540	Repair Overland Flow Erosion Area C	2	29-Apr-10*	30-Apr-10
A1600	Repair Erosion Areas S-V	12	29-Apr-10	14-May-10
A1610	Repair Erosion from Bench Outfall to Fence Line Area T	2	17-May-10*	18-May-10
A1620	Repair Erosion along Fence Line Area U	2	17-May-10*	18-May-10
A1630	Distribute Topsoil For all Disturbed Areas	4	14-May-10	19-May-10
Revegetation Areas A-E & Q-V		2	19-May-10	20-May-10
A1550	Spread Seed	2	19-May-10	20-May-10
A1580	Install Turf Reinforcement Mat	2	19-May-10	20-May-10
A1590	Distribute Flexible Growth Medium	2	19-May-10	20-May-10
Demobilization		2	21-May-10	24-May-10
A1340	Site Walk Down & Cleanup	1	21-May-10	21-May-10
A1390	Demobilize	1	24-May-10	24-May-10
A1640	Punchlist & Final Approval of Fieldwork	1	21-May-10	21-May-10



Appendix B

Completed Inspection Checklists

Inspection Checklist for the Airport Landfill, SWMU 73-001(a) and Debris Disposal Area, SWMU 73-001(d)

Date: August 20, 2010 Time: 1100 Printed Name: Jeff Walterscheid Signature: _____ Logbook: NA Figure(s) _____
Weather: temperature 75 wind Calm days since last rain ___, on unknown Weather Data Source: Los Alamos Airport

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Airport Landfill				
MatCon Asphalt Pavement: cracks, gaps, spalling, subsidence	M ***Annual Inspection***	Yes	Visible cracking or separation was noted at various locations. Cracks mainly occur along paving lanes contact seam and range from a few feet to 100 ft in length and up to 3 inches deep. Vegetation (weeds and grasses) were noted in several locations along the joints between the pavement and concrete hanger pads. Subsidence and lifting seem to be related to the hanger pads with minimal subsidence noted away from pads. Various locations have been patched. Some of the patches look like regular asphalt.	No
Concrete Hangar Pads (5) and expansion joints: cracks, gaps, spalling, pop-outs, separation of pad from asphalt, subsidence	M ***Annual Inspection***	Yes	Numerous cracks, spalling, and separation associated with subsidence and possible lifting were noted in pads 1-3. Pad 4 was observed to have some minor cracking and subsidence. Pad 5 is in good condition.	No
Survey Benchmark on each hangar pad: accessible, attached to concrete pad	M ***Annual Inspection***	Yes	Pad 1,2 and 4 have bronze (?) benchmarks located at the SE and NE corners of the pad. Pad 3 is missing the bronze benchmark in the NE corner of the pad. Pad 5 does not have any benchmarks.	No
Gas Collection System: Turbines (6) along northern edge of asphalt pavement and 1 stub-out on southern edge of asphalt pavement: debris, functional, accessible	A ***Annual Inspection***	Yes	Of the six turbine locations noted on the north side of the hanger pads three have not had riser vents and spinners installed, stub-outs are capped. The three that are installed are functional, accessible and clear of debris. The stub out along the southern edge of the asphalt is clear of debris and accessible, a riser/spinner has not been installed.	No

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Measure landfill-gas concentrations using Landfill Gas Monitoring Form: any values greater than 25% of the methane LEL (lower explosive limit)?	Q or B		*Not completed during annual inspection*	
Turf Reinforcement Mats: tears, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Gravel drainage channels (3): subsidence, erosion, clear of trash, soil, other blockages	A, ASR ***Annual Inspection***	No	All are in working order	
Seeded (hydromulched) Areas: barren areas >1,000 square feet, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Concrete Retaining Wall: cracks, bulges, separation, rotation, nearby erosion, spalling, pop-outs, drain pipes (3) open at gravel drainage channel	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Rock Retaining Walls (2): movement, separation, bulges, rotation, nearby erosion	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Grated Trenches (6): cracks; clear of trash, soil, other blockages, draining properly, standing water, subsidence	A, ASR ***Annual Inspection***	Yes	Multiple cracks were noted in the trench drain associated with Pad 1. Some of the cracks had been previously repaired with crack/joint filler but are pulling apart while others have not been repaired and are assumed to be new from the 2009 inspection. Multiple repaired cracks were noted in trench drains associated with pads 2, 3, 4, and 5. Buckling of the trench drain was noted near the middle of pad 4. Standing water was noted in drains associated with pads 1-5. Improper drainage was noted with pads 1-4, subsidence at north end.	No

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Drainage inlets (8): functional, grates not blocked by trash, soil, other material	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Evidence that pollutants (spills) have entered the storm-water system?	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Sediment washing off the site? If so, map the location[s] in logbook	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Outfall Pipe: secure, blockage, significant erosion, soil staining, manhole in place	A, ASR ***Annual Inspection***	No	No deficiencies noted	
Straw-wattle areas between retaining walls and fence: wattles in place, erosion, rills	A, ASR ***Annual Inspection***	Yes	Rilling was noted along the margin of the turf matting. Minor surface erosion occurring in the exposed soil with accumulation behind wattles.	No
Debris Disposal Area				
Seeded (hydromulched) Areas: animals burrows >4 inches deep, barren areas >1,000 square feet, subsidence >1 ft deep, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR ***Annual Inspection***	No	No deficiencies noted	

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Comments: Annual inspection completed for all components of the landfill with the exception of gas monitoring. Marked up figures attached. <u>Recommendations</u> • MatCon representative familiar with installation at the Los Alamos airport complete a site review of the cracking and subsidence • Structural Engineering review be completed for the concrete pads • It is recommended that the MatCon asphalt and Concrete Hanger Pads be reviewed under a separate engineering report.				

Component locations are shown on Figure 2. Copies of this figure can be marked up to show concerns, findings, and corrective actions. These copies should be listed above in the comments section and stapled to this checklist.
*Inspection Frequency: A= annual, ASR = After Significant Rainfall, B = biannual (twice a year), M = Monthly, Q = quarterly.
Note: If an additional component(s) is installed for the Airport Landfill, the component(s) can be added in the blank row.

Inspection Checklist for the Airport Landfill, SWMU 73-001(a) and Debris Disposal Area, SWMU 73-001(d)

Date: September 23, 2010 Time: 1230 Printed Name: Jeff Walterscheid Signature: _____ Logbook: NA Figure(s) __none__
Weather: temperature _65___ wind _calm_____ days since last rain _1__, on _Sept. 22_____. Weather Data Source: Los Alamos Airport

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Airport Landfill				
MatCon Asphalt Pavement: cracks, gaps, spalling, subsidence	M			
Concrete Hangar Pads (5) and expansion joints: cracks, gaps, spalling, pop-outs, separation of pad from asphalt, subsidence	M			
Survey Benchmark on each hangar pad: accessible, attached to concrete pad	M			
Gas Collection System: Turbines (6) along northern edge of asphalt pavement and 1 stub-out on southern edge of asphalt pavement: debris, functional, accessible	A			
Measure landfill-gas concentrations using Landfill Gas Monitoring Form: any values greater than 25% of the methane LEL (lower explosive limit)?	Q or B			
Turf Reinforcement Mats: tears, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Gravel drainage channels (3): subsidence, erosion, clear of trash, soil, other blockages	A, ASR **Significant Rainfall Inspection**	No	All are in working order	

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Seeded (hydromulched) Areas: barren areas >1,000 square feet, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Concrete Retaining Wall: cracks, bulges, separation, rotation, nearby erosion, spalling, pop-outs, drain pipes (3) open at gravel drainage channel	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Rock Retaining Walls (2): movement, separation, bulges, rotation, nearby erosion	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Grated Trenches (6): cracks; clear of trash, soil, other blockages, draining properly, standing water, subsidence	A, ASR **Significant Rainfall Inspection**	Yes	Multiple cracks were noted in the trench drain associated with Pad 1. Some of the cracks had been previously repaired with crack/joint filler but are pulling apart while others have not been repaired and are assumed to be new from the 2009 inspection. Multiple repaired cracks were noted in trench drains associated with pads 2, 3, 4, and 5. Buckling of the trench drain was noted near the middle of pad 4. Standing water was noted in drains associated with pads 1-5. Improper drainage was noted with pads 1-4, subsidence at north end and puddles above the grate had formed.	No

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Drainage inlets (8): functional, grates not blocked by trash, soil, other material	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Evidence that pollutants (spills) have entered the storm-water system?	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Sediment washing off the site? If so, map the location[s] in logbook	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Outfall Pipe: secure, blockage, significant erosion, soil staining, manhole in place	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	
Straw-wattle areas between retaining walls and fence: wattles in place, erosion, rills	A, ASR **Significant Rainfall Inspection**	Yes	Rilling was noted along the margin of the turf matting. Minor surface erosion occurring in the exposed soil with accumulation behind wattles during the August annual inspection. No additional rills, erosion or sediment accumulation was noted.	No
Debris Disposal Area				

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Seeded (hydromulched) Areas: animals burrows >4 inches deep, barren areas >1,000 square feet, subsidence >1 ft deep, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR **Significant Rainfall Inspection**	No	No deficiencies noted	

Comments:

Significant rainfall inspection (1.22 inches on September 22, 2010) completed for the listed areas.

In addition, completed inspection for all other components of the landfill with the exception of gas monitoring. Findings were same as identified in August 20, 2010 Annual Inspection.

Component locations are shown on Figure 2. Copies of this figure can be marked up to show concerns, findings, and corrective actions. These copies should be listed above in the comments section and stapled to this checklist.

*Inspection Frequency: A= annual, ASR = After Significant Rainfall, B = biannual (twice a year), M = Monthly, Q = quarterly.

Note: If an additional component(s) is installed for the Airport Landfill, the component(s) can be added in the blank row.

Inspection Checklist for the Airport Landfill, SWMU 73-001(a) and Debris Disposal Area, SWMU 73-001(d)

Date: October 20, 2010 Time: 1330 Printed Name: Jeff Walterscheid Signature: Logbook: NA Figure(s) None
Weather: temperature 47 degrees wind calm days since last rain 4, on Oct. 16. Weather Data Source: Los Alamos Airport

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Airport Landfill				
MatCon Asphalt Pavement: cracks, gaps, spalling, subsidence	M ***Monthly Inspection***	Yes	Visible cracking or separation was noted at various locations. Cracks mainly occur along paving lanes contact seam and range from a few feet to 100 ft in length and up to 3 inches deep. Vegetation (weeds and grasses) were noted in several locations along the joints between the pavement and concrete hanger pads. Subsidence and lifting seem to be related to the hanger pads with minimal subsidence noted away from pads. Various locations have been patched. Some of the patches look like regular asphalt.	No
Concrete Hangar Pads (5) and expansion joints: cracks, gaps, spalling, pop-outs, separation of pad from asphalt, subsidence	M ***Monthly Inspection***	Yes	Numerous cracks, spalling, and separation associated with subsidence and possible lifting were noted in pads 1-3. Pad 4 was observed to have some minor cracking and subsidence. Pad 5 is in good condition.	No
Survey Benchmark on each hangar pad: accessible, attached to concrete pad	M ***Monthly Inspection***	Yes	Pads 1, 2 and 4 have bronze (?) benchmarks located at the SE and NE corners of the pad. Pad 3 is missing the bronze benchmark in the NE corner of the pad. Pad 5 does not have any benchmarks.	No
Gas Collection System: Turbines (6) along northern edge of asphalt pavement and 1 stub-out on southern edge of asphalt pavement: debris, functional, accessible	A			

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Measure landfill-gas concentrations using Landfill Gas Monitoring Form: any values greater than 25% of the methane LEL (lower explosive limit)?	Q or B			
Turf Reinforcement Mats: tears, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Gravel drainage channels (3): subsidence, erosion, clear of trash, soil, other blockages	A, ASR			
Seeded (hydromulched) Areas: barren areas >1,000 square feet, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Concrete Retaining Wall: cracks, bulges, separation, rotation, nearby erosion, spalling, pop-outs, drain pipes (3) open at gravel drainage channel	A, ASR			
Rock Retaining Walls (2): movement, separation, bulges, rotation, nearby erosion	A, ASR			
Grated Trenches (6): cracks; clear of trash, soil, other blockages, draining properly, standing water, subsidence	A, ASR			
Drainage inlets (8): functional, grates not blocked by trash, soil, other material	A, ASR			
Evidence that pollutants (spills) have entered the storm-water system?	A, ASR			
Sediment washing off the site? If so, map the location[s] in logbook	A, ASR			

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Outfall Pipe: secure, blockage, significant erosion, soil staining, manhole in place	A, ASR			
Straw-wattle areas between retaining walls and fence: wattles in place, erosion, rills	A, ASR			
Debris Disposal Area				
Seeded (hydromulched) Areas: animals burrows >4 inches deep, barren areas >1,000 square feet, subsidence >1 ft deep, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			

Comments:

Monthly inspection completed for the MatCon pavement, hanger pads and benchmarks.

In addition, completed inspection for all other components of the landfill with the exception of gas monitoring. Findings were same as identified in August 20, 2010 Annual Inspection.

For marked up figure see August 20 annual inspection.

Component locations are shown on Figure 2. Copies of this figure can be marked up to show concerns, findings, and corrective actions. These copies should be listed above in the comments section and stapled to this checklist.
*Inspection Frequency: A= annual, ASR = After Significant Rainfall, B = biannual (twice a year), M = Monthly, Q = quarterly.
Note: If an additional component(s) is installed for the Airport Landfill, the component(s) can be added in the blank row.

Inspection Checklist for the Airport Landfill, SWMU 73-001(a) and Debris Disposal Area, SWMU 73-001(d)

Date: November 19, 2010 Time: 1330 Printed Name: Jeff Walterscheid Signature: Logbook: NA Figure(s) _attached__
Weather: temperature __38 degrees__ wind __calm__ days since last rain _35__, on __Oct. 16____. Weather Data Source: Los Alamos Airport

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Airport Landfill				
MatCon Asphalt Pavement: cracks, gaps, spalling, subsidence	M ***Monthly Inspection***	Yes	Visible cracking or separation was noted at various locations. Cracks mainly occur along paving lanes contact seam and range from a few feet to 100 ft in length and up to 3 inches deep. Vegetation (weeds and grasses) were noted in several locations along the joints between the pavement and concrete hanger pads. Subsidence and lifting seem to be related to the hanger pads with minimal subsidence noted away from pads. Various locations have been patched. Some of the patches look like regular asphalt.	No
Concrete Hangar Pads (5) and expansion joints: cracks, gaps, spalling, pop-outs, separation of pad from asphalt, subsidence	M ***Monthly Inspection***	Yes	Numerous cracks, spalling, and separation associated with subsidence and possible lifting were noted in pads 1-3. Pad 4 was observed to have some minor cracking and subsidence. Pad 5 is in good condition.	No
Survey Benchmark on each hangar pad: accessible, attached to concrete pad	M ***Monthly Inspection***	Yes	Pads 1, 2 and 4 have bronze (?) benchmarks located at the SE and NE corners of the pad. Pad 3 is missing the bronze benchmark in the NE corner of the pad. Pad 5 does not have any benchmarks.	No
Gas Collection System: Turbines (6) along northern edge of asphalt pavement and 1 stub-out on southern edge of asphalt pavement: debris, functional, accessible	A			

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Measure landfill-gas concentrations using Landfill Gas Monitoring Form: any values greater than 25% of the methane LEL (lower explosive limit)?	Q or B			
Turf Reinforcement Mats: tears, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Gravel drainage channels (3): subsidence, erosion, clear of trash, soil, other blockages	A, ASR			
Seeded (hydromulched) Areas: barren areas >1,000 square feet, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Concrete Retaining Wall: cracks, bulges, separation, rotation, nearby erosion, spalling, pop-outs, drain pipes (3) open at gravel drainage channel	A, ASR			
Rock Retaining Walls (2): movement, separation, bulges, rotation, nearby erosion	A, ASR			
Grated Trenches (6): cracks; clear of trash, soil, other blockages, draining properly, standing water, subsidence	A, ASR			
Drainage inlets (8): functional, grates not blocked by trash, soil, other material	A, ASR			
Evidence that pollutants (spills) have entered the storm-water system?	A, ASR			
Sediment washing off the site? If so, map the location[s] in logbook	A, ASR			

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Outfall Pipe: secure, blockage, significant erosion, soil staining, manhole in place	A, ASR			
Straw-wattle areas between retaining walls and fence: wattles in place, erosion, rills	A, ASR			
Debris Disposal Area				
Seeded (hydromulched) Areas: animals burrows >4 inches deep, barren areas >1,000 square feet, subsidence >1 ft deep, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			

Comments:

Monthly inspection completed for the MatCon pavement, hanger pads and benchmarks.

In addition, completed inspection for all other components of the landfill with the exception of gas monitoring. Findings were same as identified in August 20, 2010 Annual Inspection.

Marked up figures attached.

Component locations are shown on Figure 2. Copies of this figure can be marked up to show concerns, findings, and corrective actions. These copies should be listed above in the comments section and stapled to this checklist.
*Inspection Frequency: A= annual, ASR = After Significant Rainfall, B = biannual (twice a year), M = Monthly, Q = quarterly.
Note: If an additional component(s) is installed for the Airport Landfill, the component(s) can be added in the blank row.

Inspection Checklist for the Airport Landfill, SWMU 73-001(a) and Debris Disposal Area, SWMU 73-001(d)

Date: December 15, 2010 Time: 1330 Printed Name: Jeff Walterscheid Signature: _____ Logbook: NA
Figure(s) __none__
Weather: temperature _28 degrees___ wind __calm_ days since last rain (snow) _3__, on _December 12__. Weather Data Source: Los Alamos Airport

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Airport Landfill				
MatCon Asphalt Pavement: cracks, gaps, spalling, subsidence	M ***Monthly Inspection***	Yes	Visible cracking or separation was noted at various locations. Cracks mainly occur along paving lanes contact seam and range from a few feet to 100 ft in length and up to 3 inches deep. Additional cracking was noticed along the SE corner of Pad 3. Vegetation (weeds and grasses) were noted in several locations along the joints between the pavement and concrete hanger pads. Subsidence and lifting seem to be related to the hanger pads with minimal subsidence noted away from pads. Various locations have been patched. Some of the patches look like regular asphalt. Remedies for the permanent corrective action of the cracking and subsidence are beyond the scope of the inspection. It is recommended that the MatCon asphalt and Concrete Hanger Pads be reviewed under a separate engineering report.	No
Concrete Hangar Pads (5) and expansion joints: cracks, gaps, spalling, pop-outs, separation of pad from asphalt, subsidence	M ***Monthly Inspection***	Yes	Numerous cracks, spalling, and separation associated with subsidence and possible lifting were noted in pads 1-3. Pad 4 was observed to have some minor cracking and subsidence. Pad 5 seem s to be in good condition.	No
Survey Benchmark on each hangar pad: accessible, attached to concrete pad	M ***Monthly Inspection***	Yes	Pads 1, 2 and 4 have bronze (?) benchmarks located at the SE and NE corners of the pad. Pad 3 is missing the bronze benchmark in the NE corner of the pad. Pad 5 does not have any benchmarks.	No

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Gas Collection System: Turbines (6) along northern edge of asphalt pavement and 1 stub-out on southern edge of asphalt pavement: debris, functional, accessible	A			
Measure landfill-gas concentrations using Landfill Gas Monitoring Form: any values greater than 25% of the methane LEL (lower explosive limit)?	Q or B			
Turf Reinforcement Mats: tears, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Gravel drainage channels (3): subsidence, erosion, clear of trash, soil, other blockages	A, ASR			
Seeded (hydromulched) Areas: barren areas >1,000 square feet, animals burrows >4 inches deep, subsidence >1 ft, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			
Concrete Retaining Wall: cracks, bulges, separation, rotation, nearby erosion, spalling, pop-outs, drain pipes (3) open at gravel drainage channel	A, ASR			
Rock Retaining Walls (2): movement, separation, bulges, rotation, nearby erosion	A, ASR			
Grated Trenches (6): cracks; clear of trash, soil, other blockages, draining properly, standing water, subsidence	A, ASR			
Drainage inlets (8): functional, grates not blocked by trash, soil, other material	A, ASR			
Evidence that pollutants (spills) have entered the storm-water system?	A, ASR			

Component: Concern(s)	Inspection Frequency*	Corrective Action Needed Yes/No?	Description of Corrective Action	Corrective Action Completed Yes/No? & Date
Sediment washing off the site? If so, map the location[s] in logbook	A, ASR			
Outfall Pipe: secure, blockage, significant erosion, soil staining, manhole in place	A, ASR			
Straw-wattle areas between retaining walls and fence: wattles in place, erosion, rills	A, ASR			
Debris Disposal Area				
Seeded (hydromulched) Areas: animals burrows >4 inches deep, barren areas >1,000 square feet, subsidence >1 ft deep, rills/cracks >4 inches deep, large vegetation (trees, shrubs, bushes, deep-rooting weeds)	A, ASR			

Comments:

Monthly inspection completed for the MatCon pavement, hanger pads and benchmarks.

In addition, completed inspection for all other components of the landfill with the exception of gas monitoring. Findings were same as identified in August 20, 2010 Annual Inspection.

See November 19, 2010 monthly inspection for marked up figure (has not changed).

Component locations are shown on Figure 2. Copies of this figure can be marked up to show concerns, findings, and corrective actions. These copies should be listed above in the comments section and stapled to this checklist.
*Inspection Frequency: A= annual, ASR = After Significant Rainfall, B = biannual (twice a year), M = Monthly, Q = quarterly.
Note: If an additional component(s) is installed for the Airport Landfill, the component(s) can be added in the blank row.

Appendix C

Completed Landfill-Gas Checklists

LANDFILL GAS MONITORING FORM

Landfill Name: Airport Landfill, SWMU 73-001(a) at the Los Alamos County Airport

Inspector Printed Name: _Jeff Walterscheid_____ Inspector Signature: 

Date: 9/28/10___ Barometric Pressure: __30.37_____ Temperature: __67 degrees____

Weather conditions: __sunny____ Wind Direction: _west____ Wind Speed: __calm 0-3 mph

Date and amount of last precipitation (within last 48 hours): ___NA_____

Instrument: _MSA Fivestar_#902___Calibration method and date: _Factory calibrated 9/23/10, Pentane gas_

Sample Location	Height (ft)	Time	CH_4 % LEL	O_2 %	CO_2 %
Hangar Pads: Samples will be collected on the east side of the pad along the expansion joint.* After a hangar is built, samples will be collected along the interior walls at 4 inches to 4 ft above pad.					
HP-01	2 inches above expansion joint*	0853	0	20.7	0
HP-02	2 inches above expansion joint*	0859	0	20.8	0
HP-03	2 inches above expansion joint*	0901	0	20.7	0
HP-04	2 inches above expansion joint*	0906	0	20.8	0
HP-05	2 inches above expansion joint*	0908	0	20.7	0
HP-06	2 inches above expansion joint*	0909	0	20.7	0
HP-07	2 inches above expansion joint*	0922	0	20.6	0
HP-08	2 inches above expansion joint*	0918	0	20.8	0
HP-09	2 inches above expansion joint*	0915	0	20.7	0
HP-10	2 inches above expansion joint*	0927	0	20.5	0
HP-11	2 inches above expansion joint*	0930	0	20.5	0
HP-12	2 inches above expansion joint*	0931	0	20.5	0
HP-13	2 inches above expansion joint*	0944	0	20.5	0
HP-14	2 inches above expansion joint*	0941	0	20.4	0
HP-15	2 inches above expansion joint*	0939	0	20.4	0

Trench drains (west side of each hangar pad)					
TD-01	4 inches below trench grate	0847	0	20.7	0
TD-02	4 inches below trench grate	0844	0	20.7	0
TD-03	4 inches below trench grate	0905	0	20.7	0
TD-04	4 inches below trench grate	0904	0	20.7	0
TD-05	4 inches below trench grate	0920	0	20.7	0
TD-06	4 inches below trench grate	0917	0	20.6	0
TD-07	4 inches below trench grate	0925	0	20.5	0
TD-08	4 inches below trench grate	1031	**3%**	20.5	0
TD-09	4 inches below trench grate	1029	0	20.5	0
TD-10	4 inches below trench grate	0937	0	20.4	0
Drainage culverts (drainage inlets on the buried storm sewer lines)					
DC-01	4 inches below grate	0838	**2%**	20.8	0
DC-02	4 inches below grate	0843	0	20.7	0
DC-03	4 inches below grate	0903	0	20.8	0
DC-04	4 inches below grate	0912	0	20.7	0
DC-05	4 inches below grate	0913	**3%**	20.7	0
DC-06	4 inches below grate	0935	0	20.5	0
DC-07	4 inches below grate	0953	0	20.5	0
DC-08	4 inches below manhole lid	1000	0	20.5	0
Northern perimeter (ground and spinner [wind turbine] locations)					
PG-01	2 inches above ground surface	0848	0	20.7	0
PG-02	2 inches above ground surface	0852	0	20.7	0
PG-03	2 inches above ground surface	0921	0	20.7	0
PG-04	2 inches above ground surface	0924	0	20.6	0
PG-05	2 inches above ground surface	0927	0	20.6	0
PG-06	2 inches above ground surface	1023	0	20.5	0
PG-07	2 inches above ground surface	1025	0	20.5	0
PG-08	2 inches above ground surface	1026	0	20.6	0

PG-09	2 inches above ground surface	0954	0	20.6	0
PG-10	2 inches above ground surface	1015	0	20.5	0
PG-11	2 inches above ground surface	1009	0	20.5	0
PG-12	2 inches above ground surface	0956	0	20.5	0
PG-13	2 inches above ground surface	1008	0	20.5	0
PG-14	2 inches above ground surface	0957	0	20.5	0
PS-01	at spinner (4 ft above pavement)	0835	0	20.8	0
PS-02	at spinner (4 ft above pavement)	0851	0	20.6	0
PS-03	at spinner (4 ft above pavement)	0906	0	20.8	0
PS-04	at spinner (4 ft above pavement)	0923	0	20.5	0
PS-05	at spinner (4 ft above pavement)	0929	0	20.5	0
PS-06	at spinner (4 ft above pavement)	0949	15%	20.3	0

Note:
Methane concentrations shall be measured in percent of the LEL. Other gases measured in %.
DC = Drainage Culvert (inlet)
HP = Hangar Pad
LEL = lower explosive limit
PG = Perimeter Ground
PS = Perimeter Spinner (wind turbine)
TD = Trench Drain
Methane = CH_4
Oxygen = O_2
Carbon dioxide = CO_2

Comments: _____
_____
_____

Form modified from http://www.nmenv.state.nm.us/swb/documents/ExampleMethaneFORM10-10-08.doc.

LANDFILL GAS MONITORING FORM

Landfill Name: Airport Landfill, SWMU 73-001(a) at the Los Alamos County Airport

Inspector Printed Name: _Jeff Walterscheid_____ Inspector Signature:

Date: 1/4/11___ Barometric Pressure: __772_____ Temperature: __25 degrees____

Weather conditions: __clear____ Wind Direction: _easterly____ Wind Speed: __calm 0-3 mph

Date and amount of last precipitation (within last 48 hours): ___NA__(snow on ground)____

Instrument: _MSA Fivestar__ Calibration method and date: _Factory calibrated , Pentane gas_

Sample Location	Height (ft)	Time	CH_4 % LEL	O_2 %	CO_2 %
Hangar Pads: Samples will be collected on the east side of the pad along the expansion joint.* After a hangar is built, samples will be collected along the interior walls at 4 inches to 4 ft above pad.					
HP-01	2 inches above expansion joint*	0916	0	20.8	0
HP-02	2 inches above expansion joint*	0917	0	20.8	0
HP-03	2 inches above expansion joint*	0918	0	20.8	0
HP-04	2 inches above expansion joint*	0921	0	20.8	0
HP-05	2 inches above expansion joint*	0920	0	20.8	0
HP-06	2 inches above expansion joint*	0919	0	20.8	0
HP-07	2 inches above expansion joint*	0922	0	20.8	0
HP-08	2 inches above expansion joint*	0923	0	20.7	0
HP-09	2 inches above expansion joint*	0924	0	20.7	0
HP-10	2 inches above expansion joint*	0927	0	20.6	0
HP-11	2 inches above expansion joint*	0926	0	20.5	0
HP-12	2 inches above expansion joint*	0925	0	20.6	0
HP-13	2 inches above expansion joint*	0929	0	20.6	0
HP-14	2 inches above expansion joint*	0930	0	20.6	0
HP-15	2 inches above expansion joint*	0931	0	20.7	0

Trench drains (west side of each hangar pad)					
TD-01	4 inches below trench grate	0941	0	20.8	0
TD-02	4 inches below trench grate	0943	0	20.8	0
TD-03	4 inches below trench grate	0944	0	20.7	0
TD-04	4 inches below trench grate	0945	0	20.8	0
TD-05	4 inches below trench grate	0946	0	20.7	0
TD-06	4 inches below trench grate	0947	0	20.6	0
TD-07	4 inches below trench grate	0949	0	20.8	0
TD-08	4 inches below trench grate	0950	0	20.8	0
TD-09	4 inches below trench grate	0952	0	20.8	0
TD-10	4 inches below trench grate	0953	0	20.8	0
Drainage culverts (drainage inlets on the buried storm sewer lines)					
DC-01	4 inches below grate	0940	0	20.8	0
DC-02	4 inches below grate	0938	0	20.7	0
DC-03	4 inches below grate	0937	**4%**	20.8	0
DC-04	4 inches below grate	0935	**5%**	20.7	0
DC-05	4 inches below grate	0934	**5%**	20.7	0
DC-06	4 inches below grate	0933	**6%**	20.8	0
DC-07	4 inches below grate	0931	0	20.8	0
DC-08	4 inches below manhole lid	1020	0	20.8	0
Northern perimeter (ground and spinner [wind turbine] locations)					
PG-01	2 inches above ground surface	1005	0	20.8	0
PG-02	2 inches above ground surface	1006	0	20.8	0
PG-03	2 inches above ground surface	1007	0	20.8	0
PG-04	2 inches above ground surface	1008	0	20.8	0
PG-05	2 inches above ground surface	1009	0	20.8	0
PG-06	2 inches above ground surface	1010	0	20.8	0
PG-07	2 inches above ground surface	1011	0	20.8	0
PG-08	2 inches above ground surface	1012	0	20.8	0

PG-09	2 inches above ground surface	1013	0	20.8	0
PG-10	2 inches above ground surface	1014	0	20.8	0
PG-11	2 inches above ground surface	1015	0	20.8	0
PG-12	2 inches above ground surface	1017	0	20.8	0
PG-13	2 inches above ground surface	1018	0	20.8	0
PG-14	2 inches above ground surface	1019	0	20.8	0
PS-01	at spinner (4 ft above pavement)	1003	0	20.8	0
PS-02	at spinner (4 ft above pavement)	1002	0	20.6	0
PS-03	at spinner (4 ft above pavement)	1001	0	20.8	0
PS-04	at spinner (4 ft above pavement)	1000	**5%**	20.8	0
PS-05	at spinner (4 ft above pavement)	0957	0	20.8	0
PS-06	at spinner (4 ft above pavement)	0954	**32%**	20.4	0

Note:
Methane concentrations shall be measured in percent of the LEL. Other gases measured in %.
DC = Drainage Culvert (inlet)
HP = Hangar Pad
LEL = lower explosive limit
PG = Perimeter Ground
PS = Perimeter Spinner (wind turbine)
TD = Trench Drain
Methane = CH_4
Oxygen = O_2
Carbon dioxide = CO_2

Comments: PS-04 and PS-06 registered 100% of the LEL approximately 6-8 inches down the vent pipe.

Form modified from http://www.nmenv.state.nm.us/swb/documents/ExampleMethaneFORM10-10-08.doc.