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Title: CERRO GRANDE FIRE AFTERMATH:
ENVIRONMENTAL RESTORATION PROJECT
ACTIVITIES TO REDUCE THE MIGRATION OF
CONTAMINATION FROM POTENTIAL RELEASE SITES

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Submitted to: WATER QUALITY & HYDROLOGY GROUP (ESH-18)
ENVIRONMENTAL RESTORATION PROJECT

Los Alamos

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Form 836 (8/00)

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CERRO GRANDE FIRE: AFTERMATH

ER ACTIVITIES TO REDUCE THE POTENTIAL MOVEMENT OF CONTAMINATION AT POTENTIAL RELEASE SITES

Over the past decade, the Laboratory has identified approximately 2,100 historical sites with a potential for the release of contamination. The majority of the sites have been evaluated and a large number have been found to contain no contamination or insignificant quantities of chemical or radioactive contamination. The sites are called "potential release sites," or PRSs, because they may or may not contain contamination.

After the Cerro Grande Fire, a High Performing Team was established consisting of staff from the Environmental Restoration (ER) Project, New Mexico Environment Department (NMED) and the Department of Energy (DOE). The Team evaluated all PRSs located within the burned area to assess which ones had been touched by flame. It was determined that 315 PRSs had been impacted to some degree by the fire.

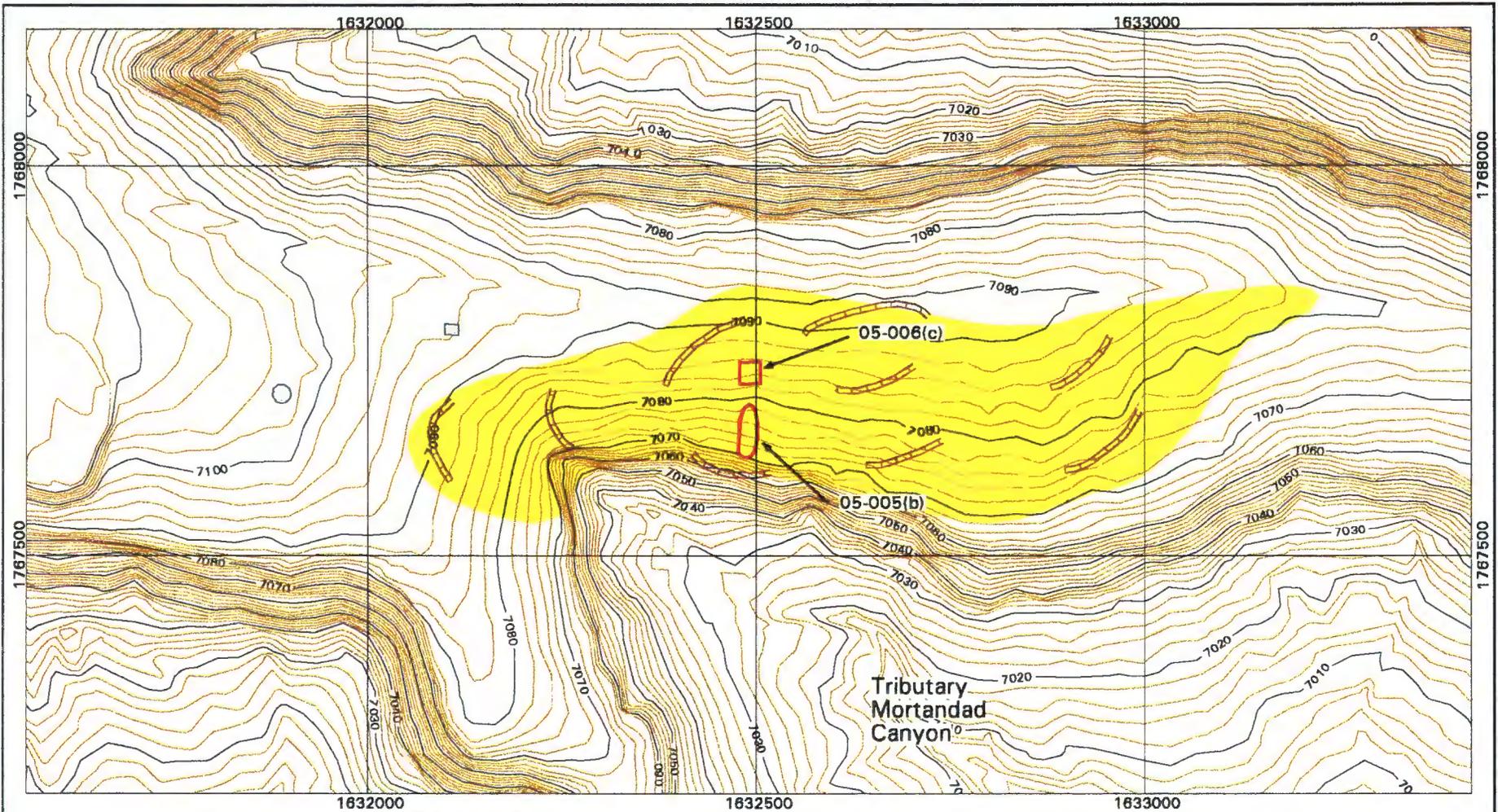
The 315 sites were individually field checked to determine which ones needed erosion control measures, called Best Management Practices, or BMPs. The results of Standard Operating Procedure 2.01 (Surface Water Site Assessments) were also referenced to verify which of the 315 sites had the highest "pre-fire" erosion potential to assure that no sites "fell through the cracks". Of the 315 PRSs, 91 were recommended for BMPs. The ER Project established a schedule (see below) for the placement of BMPs at the 91 PRSs. BMPs include the placing of protective jute matting, rock check dams, log-silt barriers and straw wattles, as well as other actions to control runoff and erosion.

Projected BMP Implementation Schedule

The following table shows the number of PRSs, their locations by technical area, start and completion dates for the implementation of BMPs:

# of PRSs	PRS locations	Start date	Completion Date
10	TA-11	5/21/00	5/24/00
29	TA-6, 14, 15, 22, 36, 40, 49	6/14/00	7/15/00
34	TA-16, 46, 15 (R-44)	5/29/00	7/15/00
18	TA-4, 5, 42, 48	6/27/00	7/15/00
Total: 91 PRSs			

The ER Project used three subcontractors to complete the work described above. The contractors were required to provide Site Specific Health & Safety Plans (SSHASP), HAZWOPER safety training and "L or Q Cleared" staff prior to entry into the field. The following pages show contour maps with PRSs plotted, photographs of the fire damage at several of the PRSs and the types of BMPs that were installed.



Best Management Practices at PRSs 05-005(b) and 05-006(c)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2400



EES-5 GIS Team
Los Alamos National Laboratory
Los Alamos, New Mexico

1983 North American Datum
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New Mexico State Plane Coordinate System,
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5-003 - Erosion Matrix Score 49.7. The calibration facility, (TA-5-20), was an 8' x 12' x 8' high building built over a shaft approximately 35 feet deep. The building was used to calibrate thermoluminescent dosimeters with a sealed radium source.

5-004 - Erosion Matrix Score 49.7. An inactive septic system (TA-5-13) that received industrial waste. The septic system was removed prior to 1985. As built drawings indicate a discharge line running from TA-5-1 near the TA-5-16 barricade to TA-5-13 and south toward the canyon.



CERRO GRANDE FIRE:

This site is located on the south rim of a tributary to Mortandad Canyon within the Upper Canada del Buey Watershed Aggregate. The fire damage was moderate to severe with nearly complete damage to the ground cover and canopy.

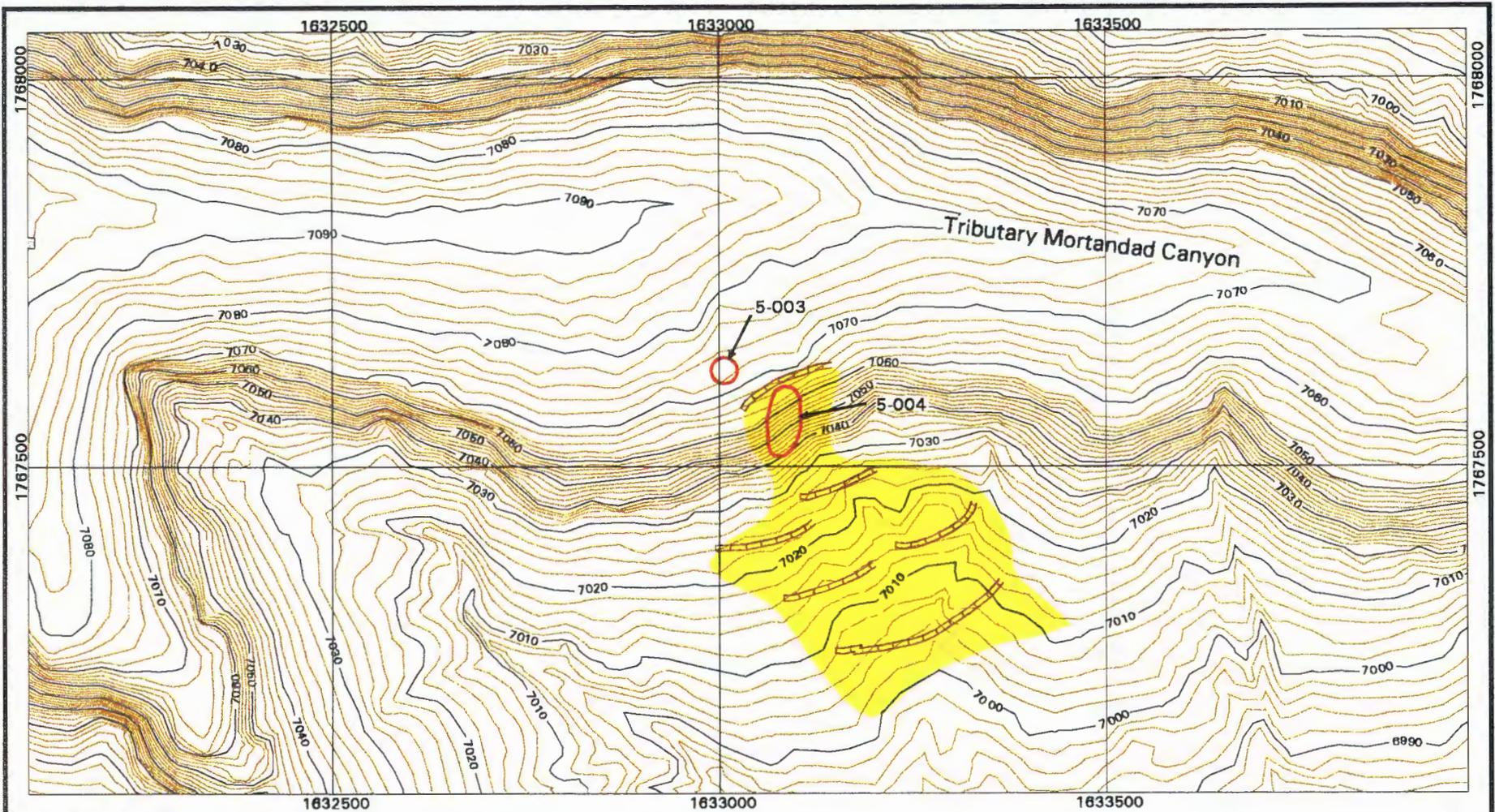


BMPs:

Contour tree felling was done to support erosion control on the south facing slope. Straw wattles were installed within the drainage channels and within the drainage basin for sediment retention. Raking was completed manually and native seed mix and straw mulch were applied.

ESTIMATED MATERIALS USED:

- 2 acres treated
- 40 straw wattles
- 40 straw bales
- 50 pounds seed



Best Management Practices at PRSs 5-003 and 5-004

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2400



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TECHNICAL AREA-6

6-007(g) – *Erosion Matrix Score 50.8*. Formerly Area Of Concern C-6-004, the site of building TA-6-12. Explosives, particularly PETN, were pressed in this building, which was removed from this site in 1949.



CERRO GRANDE FIRE:

This site is located on the south side of Pajarito Canyon within the Two Mile Canyon Watershed Aggregate. The drainage channel east of building TA-6-6 has minor evidence of fire damage. Miscellaneous debris was observed around the area including concrete, rebar and old building wood. A pre-existing erosional feature was observed.

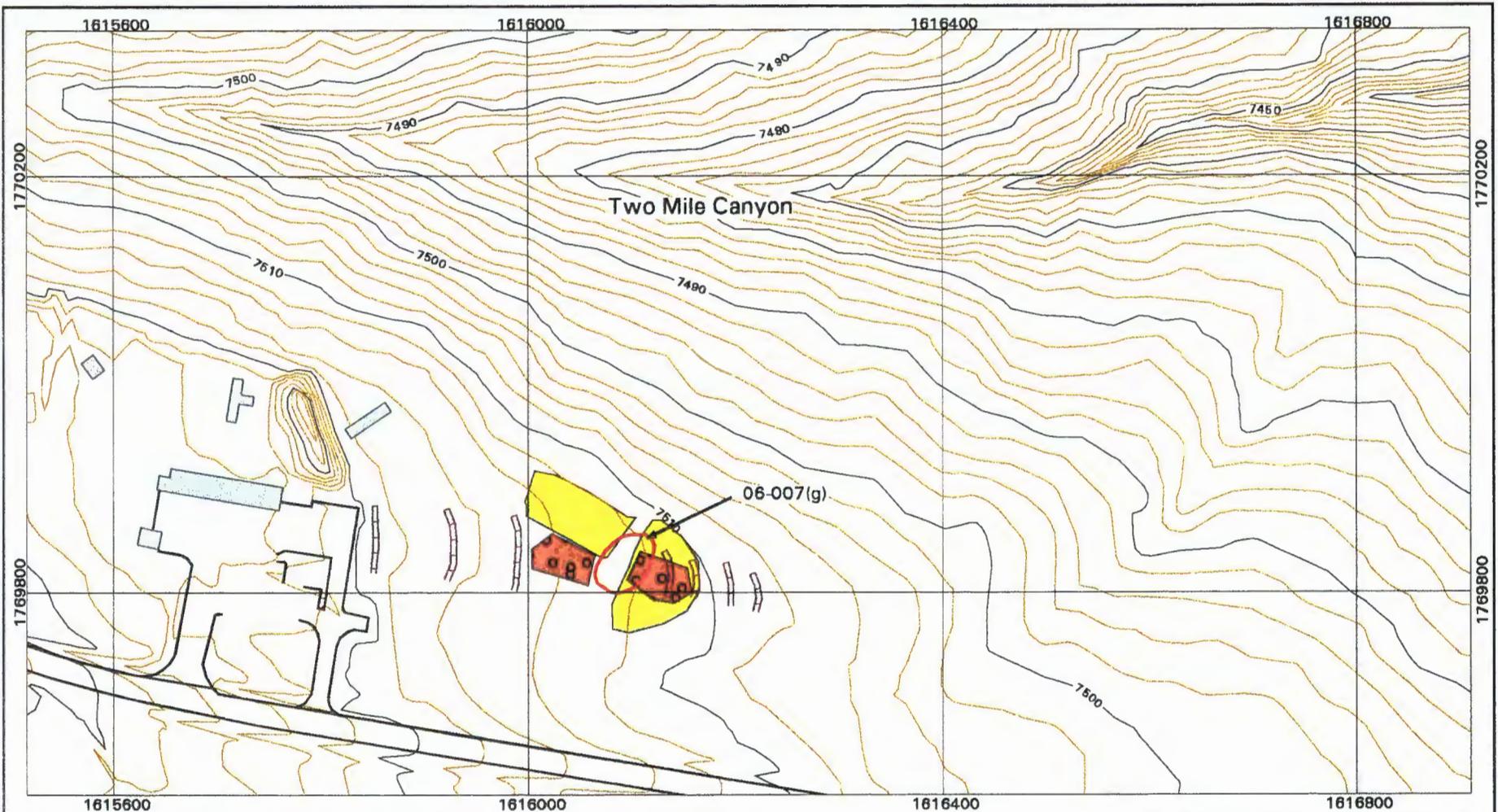


BMPs:

Wattles were installed both up and down slope within the drainage channel. Rock/log check dams were installed within the channel to dissipate surface runoff.

ESTIMATED MATERIALS USED:

.5 acre treated
15 straw wattles
10 straw bales
10 pounds seed



Best Management Practices at PRS 06-007(g)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



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TECHNICAL AREA-9

9-004(n) – *Erosion Matrix Score 3.6.* Reinforced concrete settling tank within building TA-9-48.

9-004(o) - *Erosion Matrix Score 43.8.* Inactive NPDES outfall associated with a sump and settling tank within building TA-9-48.



CERRO GRANDE FIRE:

This site is located south of Pajarito Canyon within the Starmer/Upper Pajarito Watershed Aggregate. The area received minor to moderate fire damage. The ground cover was completely burned but the canopy cover was only partially affected. The grasses have recovered quickly in most of the area.

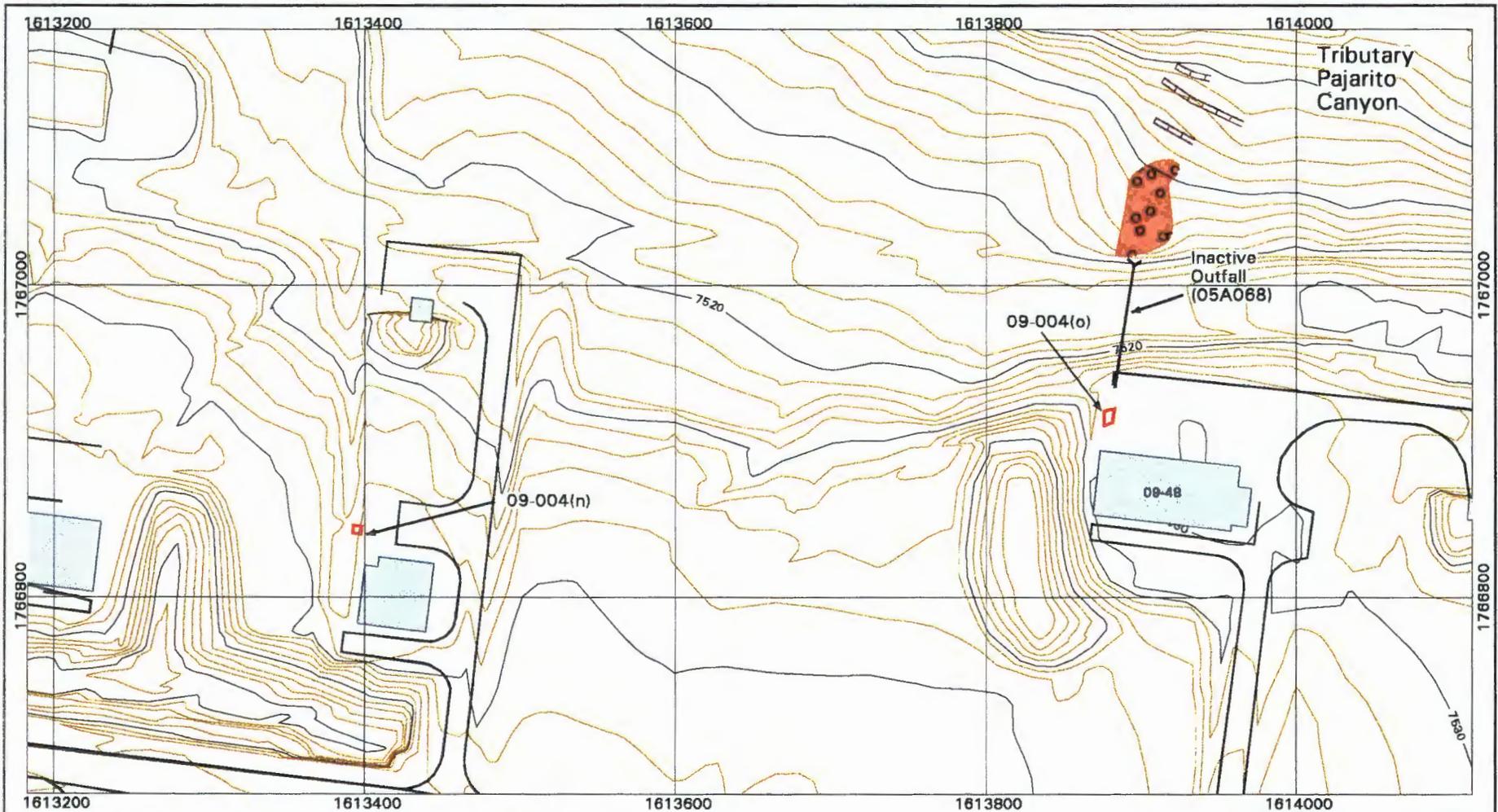


BMPs:

Straw wattles were installed within the drainage swales and rock check dams were placed within the channels to dissipate flow.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 15 straw wattles
- 10 straw bales
- 10 pounds seed



Best Management Practices at PRSs 09-004(n,o)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1200



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9-009 - Erosion Matrix Score 58.8. A lagoon and sand filters used to treat sanitary waste. After flowing through the sand filters, effluent discharged to a currently inactive NPDES outfall (555 02S).



CERRO GRANDE FIRE:

This site is located south of Pajarito Canyon within the Starmer/Upper Pajarito Watershed Aggregate. The PRS is the former Sanitary Wastewater Treatment Facility north of TA-9. Site has moderate fire damage with ground and canopy cover being impacted. The erosional feature below the site that previously existed is at the greatest risk.

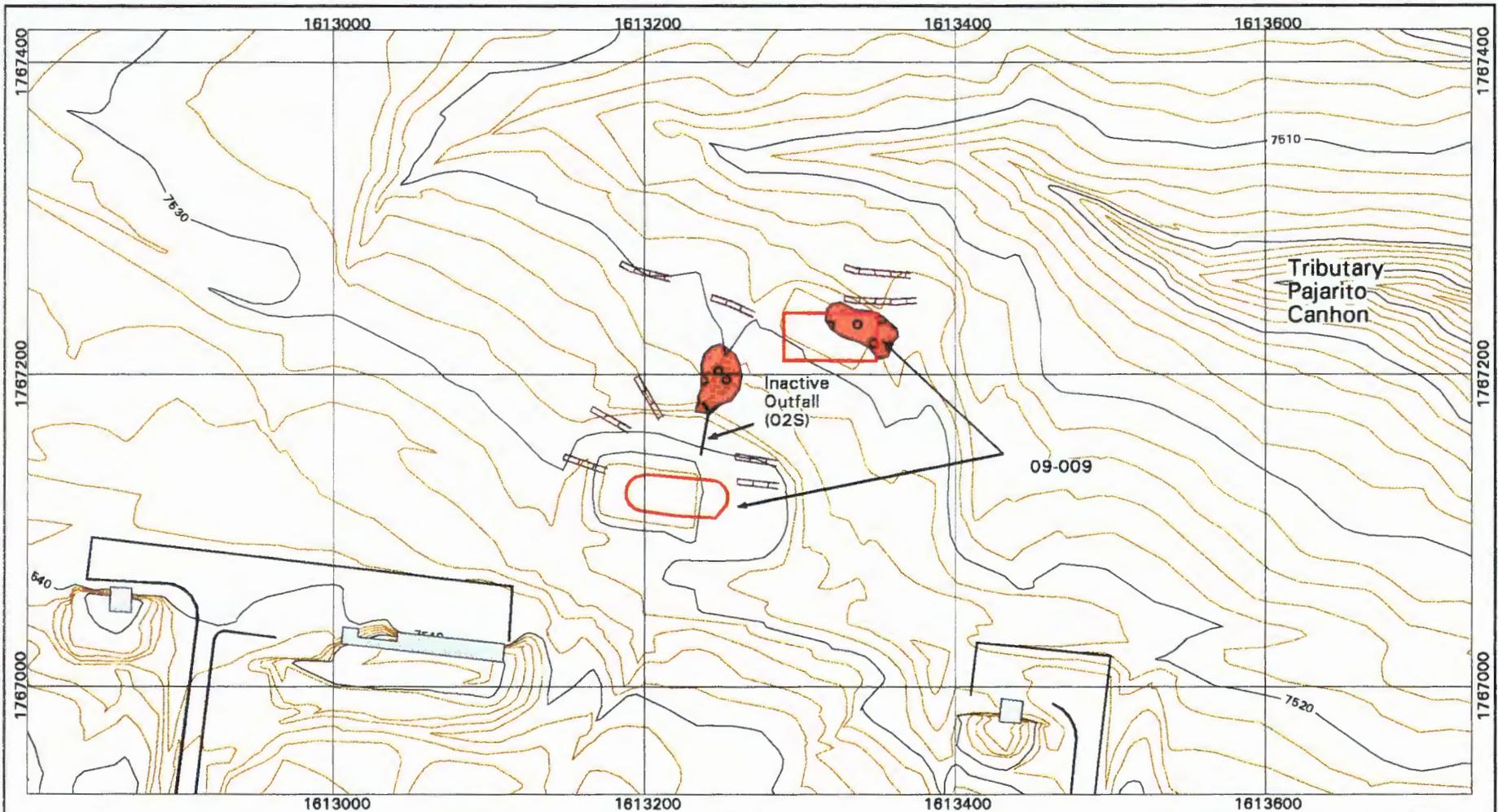


BMPs:

Straw wattles were installed in the drainage swales and rock check dams were placed in the channels to dissipate flow (using existing materials found on-site). Wattles were also provided upslope for run-on diversion.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 15 straw wattles
- 10 straw bales
- 10 pounds seed



Best Management Practices at PRS 09-009

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1200



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13 - Erosion Matrix Score 56.0. Material Disposal Area (MDA) M, was a surface disposal area located within TA-9. MDA-M occupied approximately 3.2 acres and was roughly circular in shape. Construction debris and solid wastes were posed there from 1948 to 1965



CERRO GRANDE FIRE:

This site is located south of Pajarito Canyon within the Starmer/Upper Pajarito Watershed Aggregate. The area surrounding MDA M was moderately to severely burned as was a majority of the upper Pajarito Watershed. All of the existing erosion controls at the site were destroyed.

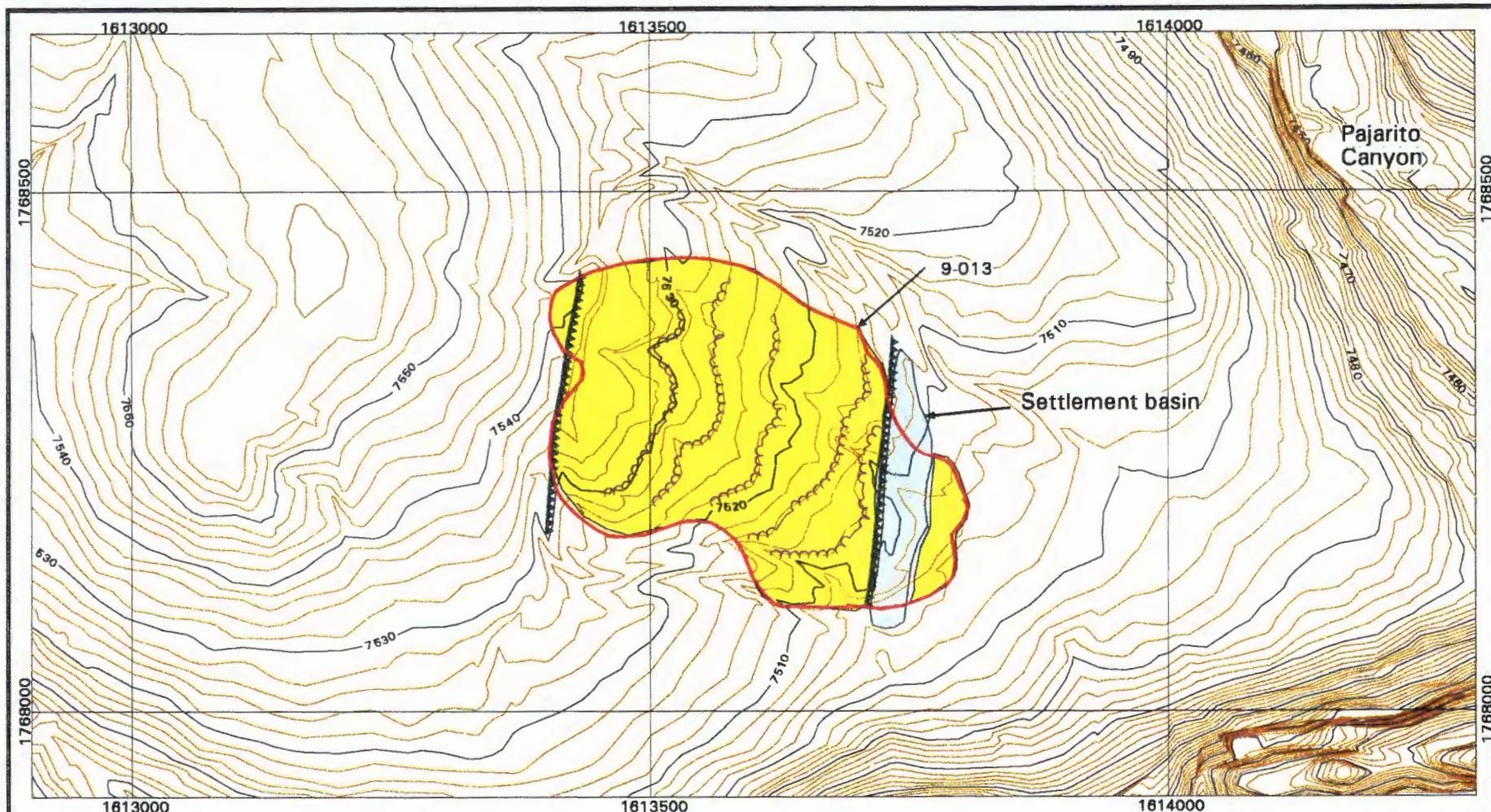
BMPs:

Run-on controls were replaced as shown below. The entire site was hand raked, reseeded and mulched. A retention basin was installed at the bottom of the slope to create a "zero discharge" area.

ESTIMATED MATERIALS USED:

- 5 acres treated
- 1200 linear feet of triangular silt dikes
- 75 straw bales
- 200 pounds seed
- 20 cubic yards of base coarse





Best Management Practices at PRS 09-013

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:1800



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HNICAL AREA-11

14(a-f) – *Erosion Matrix Score 56.0*. Active components of a drop tower (TA-11-25) complex located 180 feet east of 1-2 and TA-11-3.

16(a-d) – *Erosion Matrix Scores 10.6, 52.0, 68.8 and 74.0*. An HE sump (11-006(a)) that receives drainage from the ete pad (TA-11-26) that surrounds the drop tower (TA-11-25). The sump is located to the east of the drop tower lex. Three reinforced concrete surface water catch basins receive drainage from the sump (TA-11-39).



CERRO GRANDE FIRE:

This site is located north of Water Canyon within the S-Site Watershed Aggregate. The site has moderate to severe fire damage in the area surrounding the TA-11 Drop Tower. Log check dams within the major drainages received partial damage. All straw barriers installed around site were destroyed.

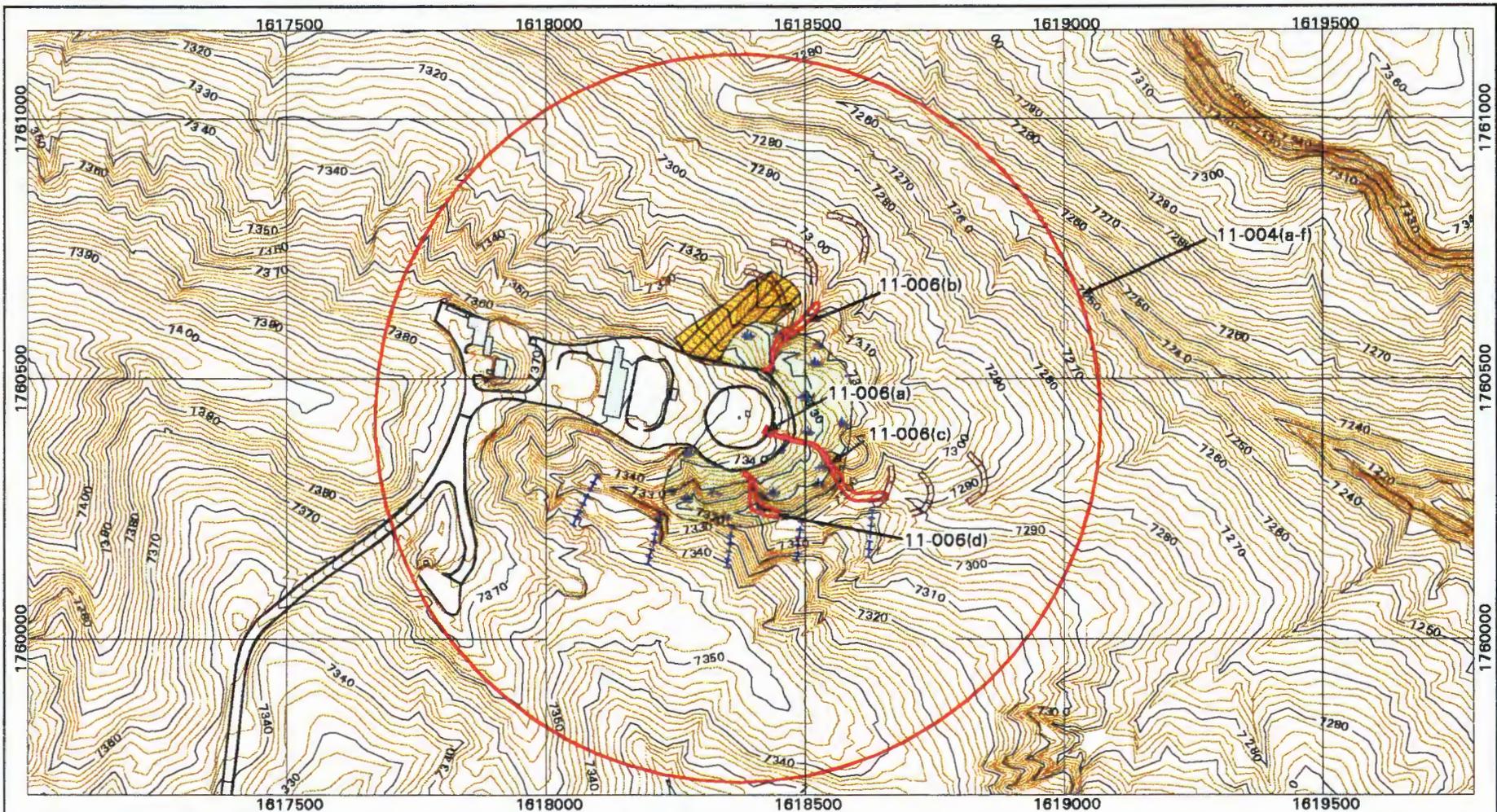
BMPs:

The log check dams (on-site materials used) were replaced with the adjacent drainages. Straw wattles were placed on the slope geotextile was installed in the areas with the most erosion potential. The area surrounding the Drop Tower was hydromulched to aid the revegetation process.

ESTIMATED MATERIALS USED:

10 acres treated
40 straw wattles
10 rolls of geotextile
110 pounds seed
720 pounds of tackifier
6,000 pounds of hydromulch
*only 3 acres were treated with hydromulch





Best Management Practices at PRS 11-004(a-f) and 11-006(a-d)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:3600



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TECHNICAL AREA-14

14-002(c) - Erosion Matrix Score 36.8. A control bunker built in 1944 converted to storage in 1961. In 1965 storage contents were destroyed. The 1990 SWMU report indicated that this site was contaminated with high explosives.

14-002(d) - Erosion Matrix Score 40.8. Firing pad in which small explosive tests (up to 15 lbs) were photographed, some of the shots contained uranium.

14-002(e) - Erosion Matrix Score 47.8. Firing pad on which explosive tests were photographed. Shots were small (up to 15 pounds) and some contained uranium.



CERRO GRANDE FIRE:

This site is located north of Canon de Valle within the Canon de Valle Watershed Aggregate. The eastern portion of TA-14 was moderately burned with substantial damage to the groundcover.



BMPs:

Straw wattles were installed within all drainage channels and swales. The areas were hand raked, reseeded and mulched.

ESTIMATED MATERIALS USED:

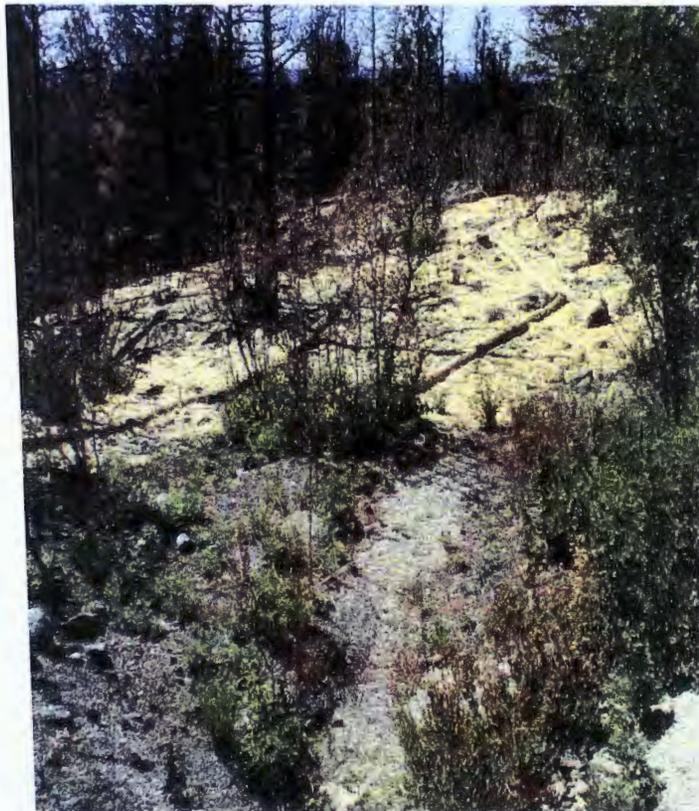
1 acre treated
25 straw wattles
20 straw bales
20 pounds seed
6 cubic yards of river rock

14-006 - *Erosion Matrix Score 47.1*. This PRS consists of a sump, drain line, and outfall. It was used to separate pieces of HE from liquid. The sump is now plugged and the only discharge to the outfall is rain water. HE and toxic chemicals may be present.



CERRO GRANDE FIRE:

This site is located north of Canon de Valle within the Canon de Valle Watershed Aggregate. The central portion of TA-14 was moderately burned with substantial damage to the groundcover.



BMPs:

Straw wattles were installed within all drainage channels and swales. The areas were hand raked, reseeded and mulched.

ESTIMATED MATERIALS USED:

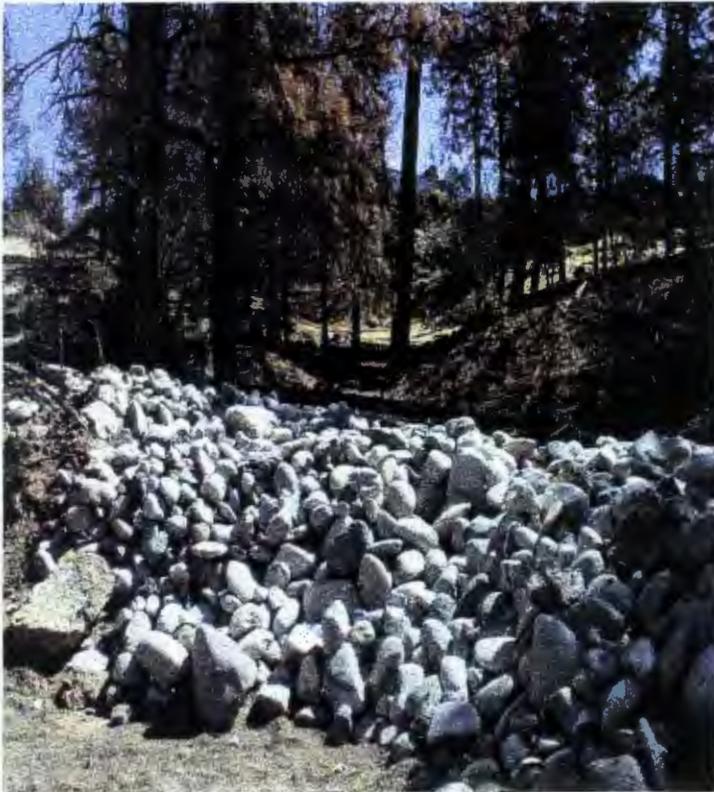
- 1 acre treated
- 25 straw wattles
- 20 straw bales
- 20 pounds seed

14-009 - Erosion Matrix Score 53.7. Surface disposal area consisting of ruptured sand bags which were used for containment during explosives testing activity. Sand could be contaminated with lead, uranium, HE and beryllium.



CERRO GRANDE FIRE:

This site is located north of Canon de Valle within the Canon de Valle Watershed Aggregate. The western portion of TA-14 was moderately to severely burned with substantial damage to the canopy and groundcover.



BMPs:

Straw wattles were installed within all drainage channels and swales. The areas were hand-raked, reseeded and mulched. A rock check dam was installed at the bottom of the drainage.

ESTIMATED MATERIALS USED:

- 2 acres treated
- 40 straw wattles
- 30 straw bales
- 40 pounds seed
- 6 cubic yards of river rock

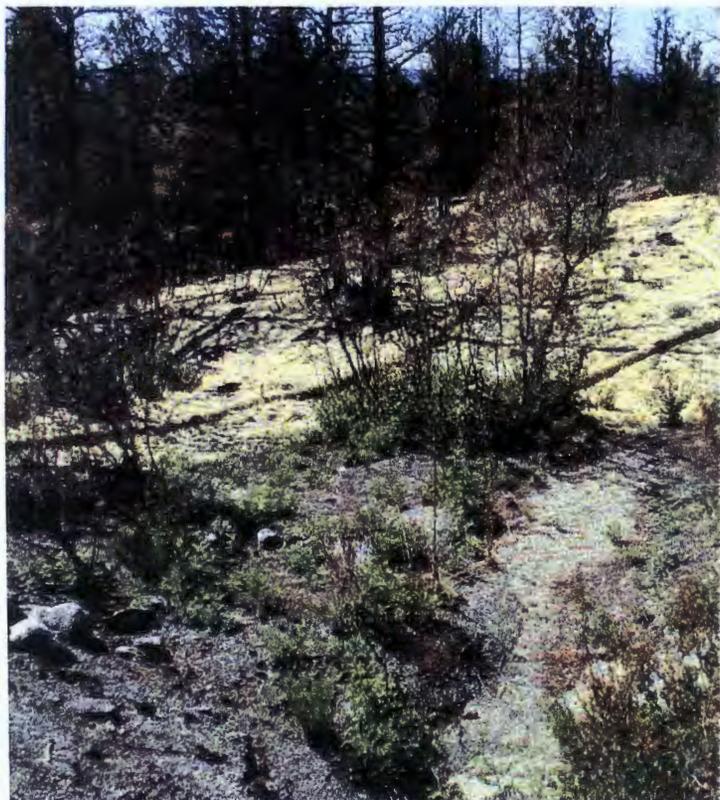
14-002(a) – *Erosion Matrix Score 51.5*. Decommissioned closed firing chamber. The chamber was dismantled and removed in 1973. It was used extensively for HE tests, many using uranium-238.

14-010 - *Erosion Matrix Score 51.5*. High explosive waste sump adjacent to TA-14-2. The site may have contained HE and other chemicals. The sump and drain-line were removed.



CERRO GRANDE FIRE:

This site is located north of Canon de Valle within the Canon de Valle Watershed Aggregate. The western portion of TA-14 was moderately to severely burned with substantial damage to the canopy and groundcover. Most of the existing BMPs at the site were destroyed. As a result, the erosion potential for the site is moderate to high.

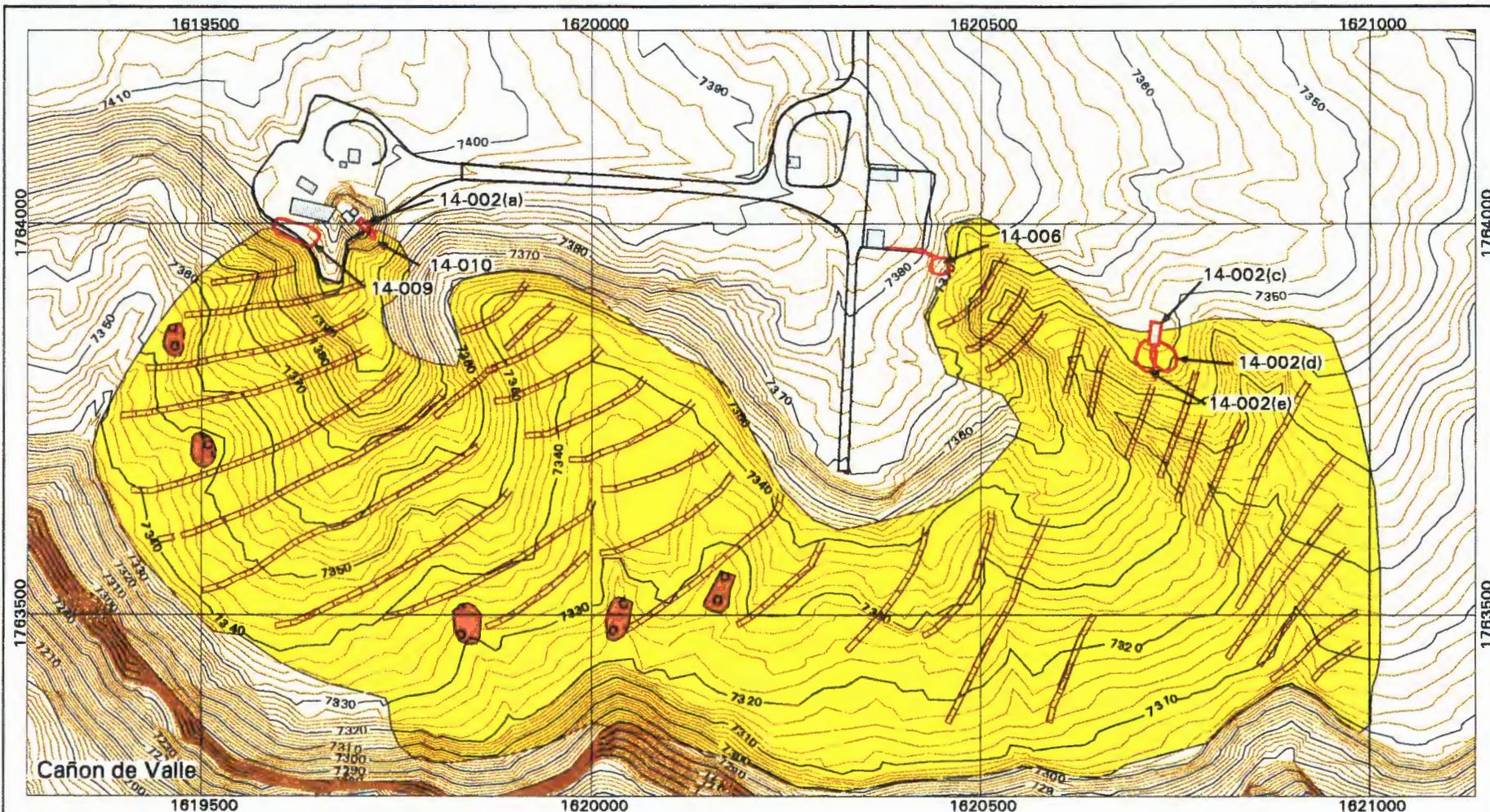


BMPs:

Straw wattles were installed within all drainage channels and swales. The areas were hand-raked, reseeded and mulched.

ESTIMATED MATERIALS USED:

- 6 acres treated
- 100 straw wattles
- 70 straw bales
- 120 pounds grass seed



Best Management Practices at PRSs 14-002(a,c-e), 14-006, 14-009, and 14-010



Scale: 1:2400



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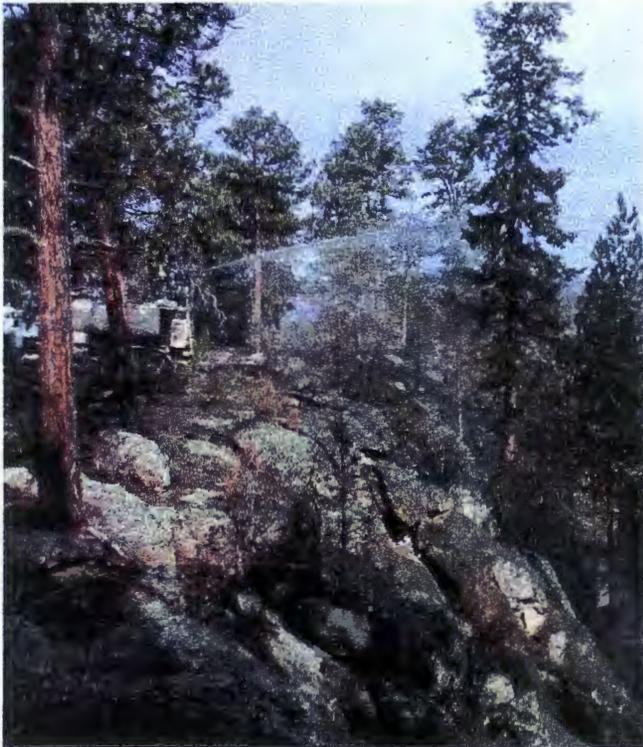
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TECHNICAL AREA-15 – R44

15-006(c) – Erosion Matrix Score 67.2. PRS 15-006(c) was the third most extensively used firing site at TA-15, used from the 1950s until 1992. Approximately 7,000 Kg of uranium and other materials, including lead and beryllium were expended.

15-008(b) - Erosion Matrix Score 67.2. Surface disposal area north of PRS 15-006(c), R-44 Firing Site. Remnants and debris from tests were pushed over the edge of the canyon.



CERRO GRANDE FIRE:

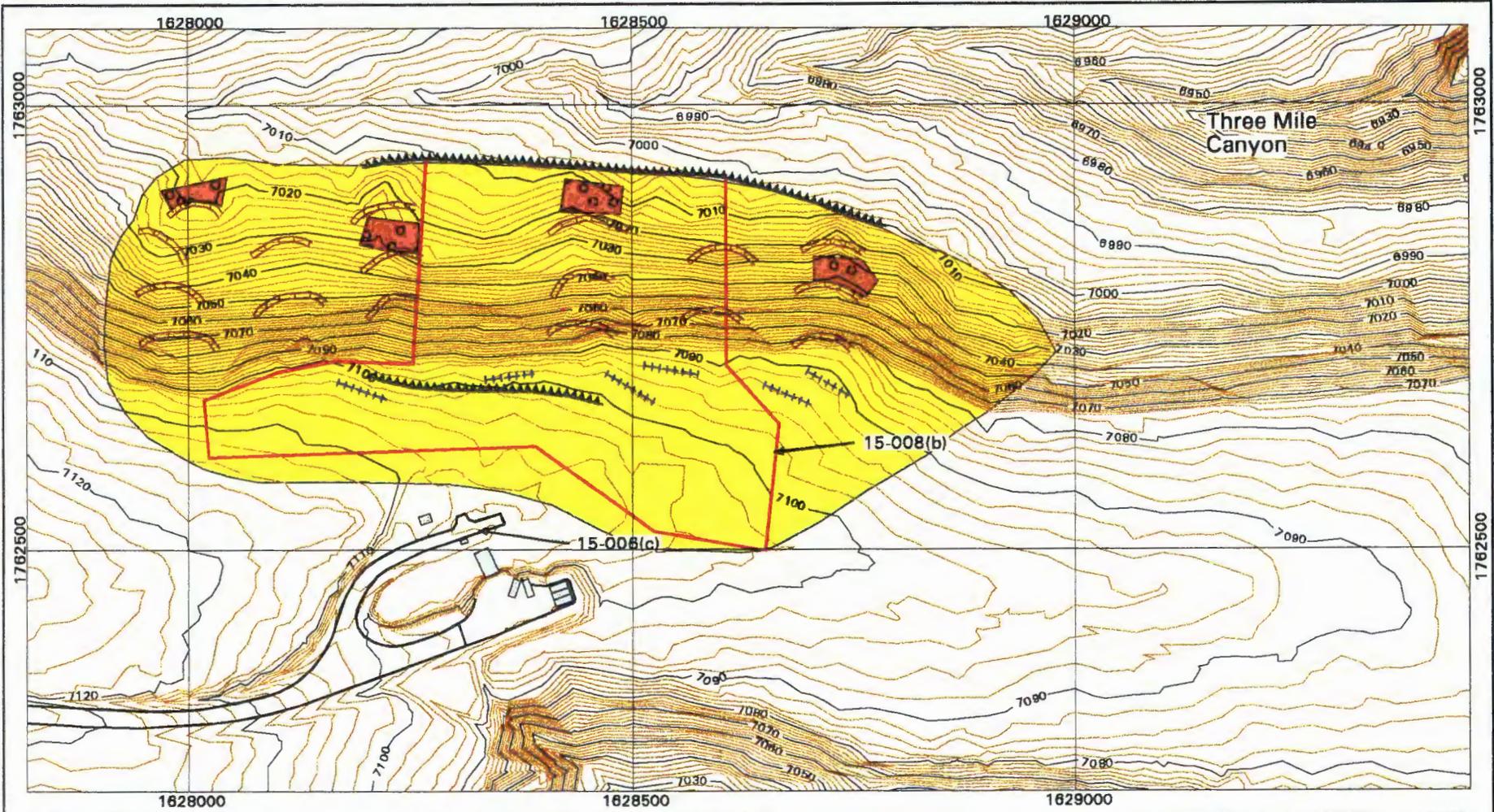
This site is located on the south rim of Three Mile Canyon within the Three Mile Watershed Aggregate. 15-006(c) has moderate to severe burn damage with most of the damage adjacent to the former R-44 Firing Pad. A large amount of firing site related debris has been exposed throughout the site (especially towards the east).

BMPs:

Straw wattles, rock check dams and silt fencing were installed throughout the burned areas. Over 20 cubic yards of firing site debris was removed from the surrounding area. The area was then hydromulched to enhance the revegetation process.

ESTIMATED MATERIALS USED:

12 acres treated
220 straw wattles
1200 linear feet silt fence
20,000 pounds of hydromulch
2,400 pounds of tacifier
360 pounds of seed



Best Management Practices at PRSs 15-006(c) and 15-008(b) (R-44)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:2100



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TECHNICAL AREA-15 – HOLLOW SITE

C-15-007 - *Erosion Matrix Score 51.5*. Stained soil noted during a 1988 ER site reconnaissance visit. A transportable building was placed over it. The area was sampled in 1997. **C-15-010** - *Erosion Matrix Score 8.8*. Removed inactive underground fuel storage tank. **15-014(k)** - *Erosion Matrix Score 3.6*. Concrete open trench drains. **15-011(a)** - *Erosion Matrix Score 3.6*. Concrete trench drains.

15-011(b) - *Erosion Matrix Score 87.0*. Dirt drainage ditch located southwest of Building R-194. Drainage may have received degreasers, solvents containing sulfuric acid, and/or hydrochloric acid.

15-011(c) - *Erosion Matrix Score 87.0*. Drainage, PRS 15-011(c), serves the outfalls from buildings within The Hollow that have had various uses as assembly building, laboratories, and shops.

15-014(j) - *Erosion Matrix Score 61.3*. PRS 15-014(j) consists of three outfalls from Building R-50 and a drainage channel that is partially asphalt just below the outfall leading towards the canyon.



CERRO GRANDE FIRE:

This site is located near the confluence of Canon de Valle and Water Canyon within the Canon de Valle Watershed Aggregate. The site was moderately to severely damaged including several burned structures. The ground cover and canopy surrounding the site was extensively damaged. Runoff from the entire Hollow site discharges into a small tributary (to Canon de Valle) west/southwest of the site near oil storage tank (15-011(b)).

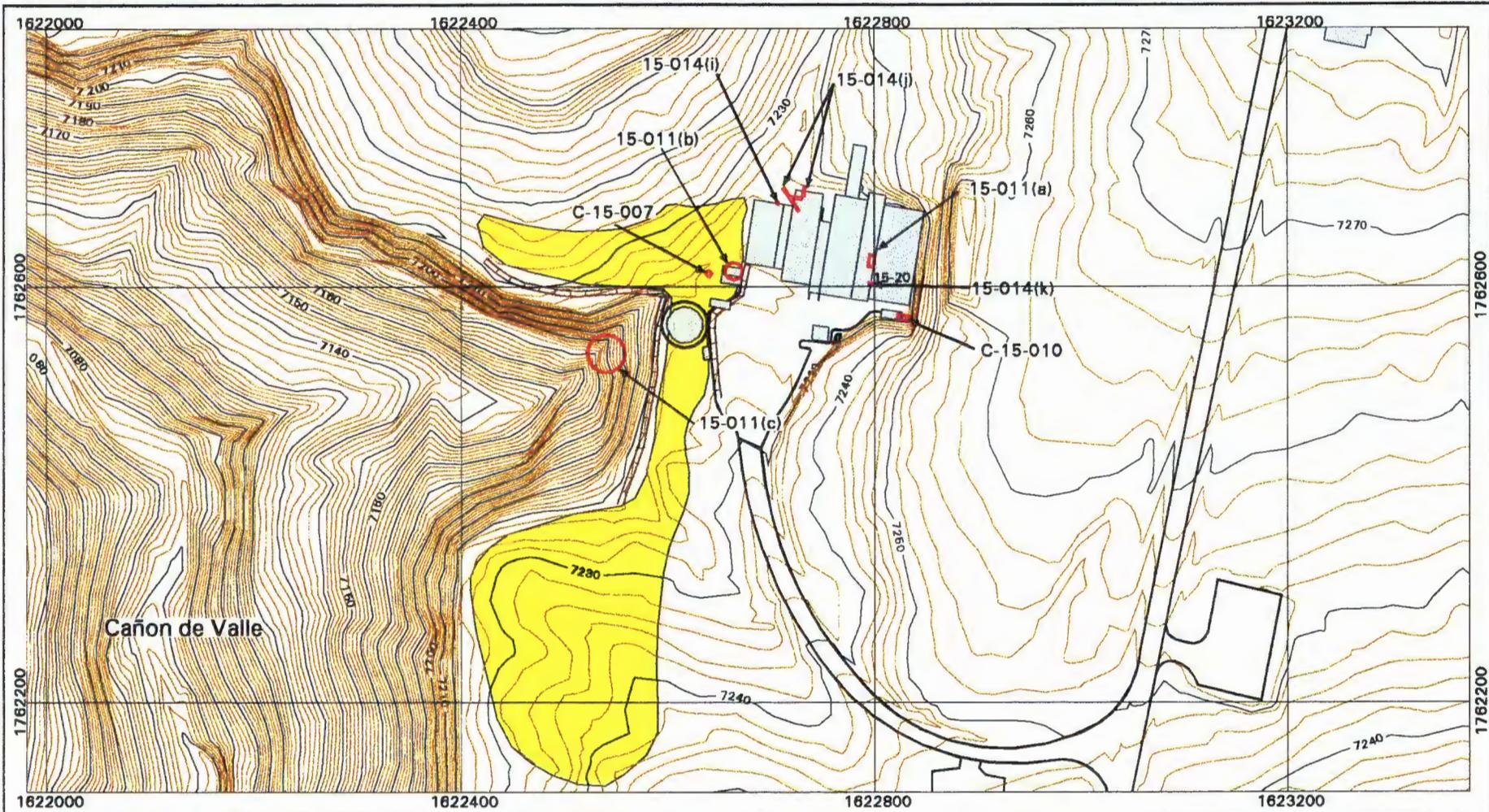


BMPs:

Straw wattles were installed along the western perimeter of the mesa. Several trees were contour felled for erosion control along the drainage channel. The site was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
20 straw bales
20 pounds seed



Best Management Practices at PRSs 15-011(a-c), 15-014(i-k), C-15-007, and C-15-010

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



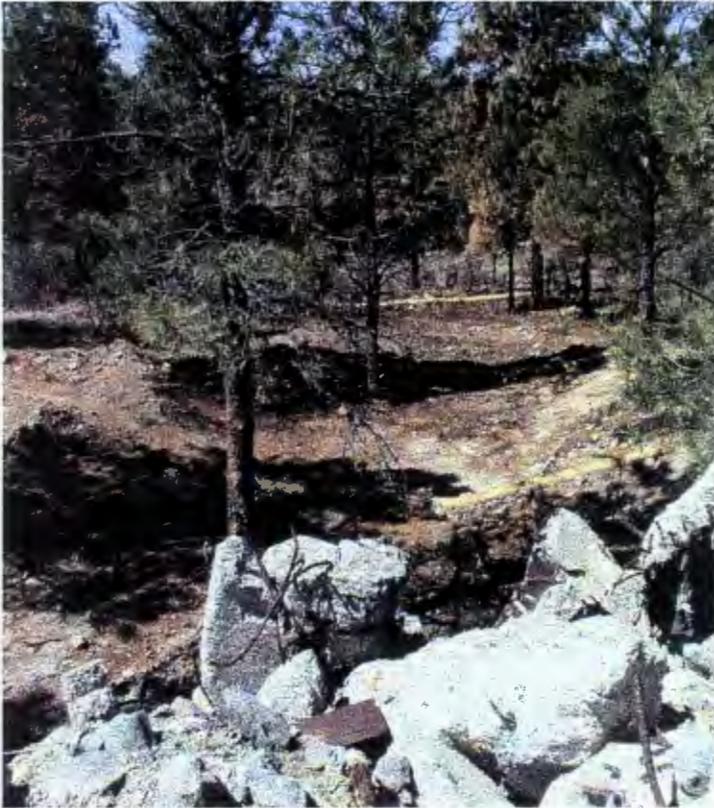
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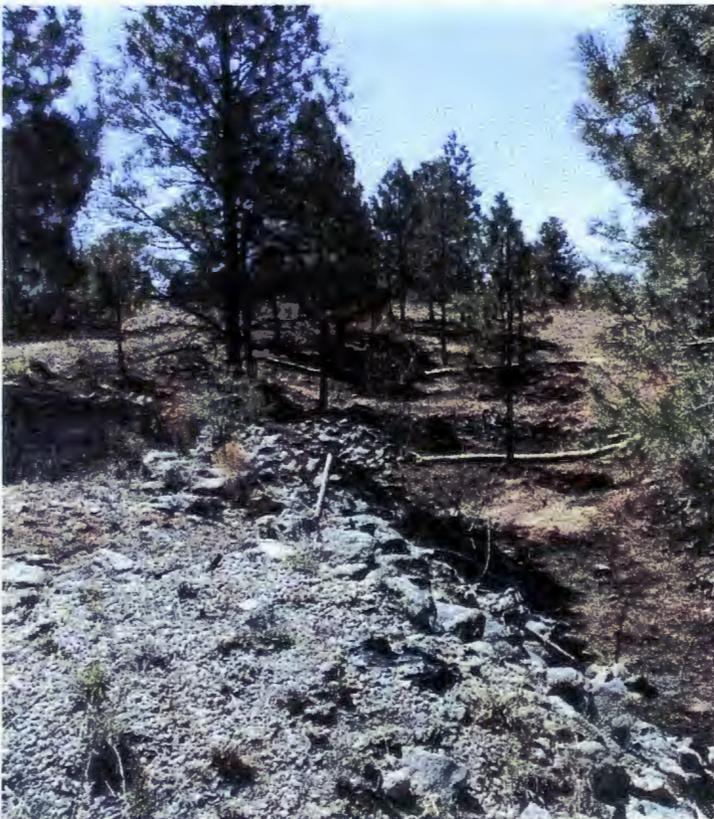
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15-007(b) – *Erosion Matrix Score 40.2*. MDA Z is an inactive disposal area that was used from 1965 to 1981 for construction debris, steel blast matting from PHERMEX, and other debris.



CERRO GRANDE FIRE:

This site is located near the confluence of Canon de Valle and Water Canyon within the Canon de Valle Watershed Aggregate. The area received minor burn damage primarily to the ground cover.

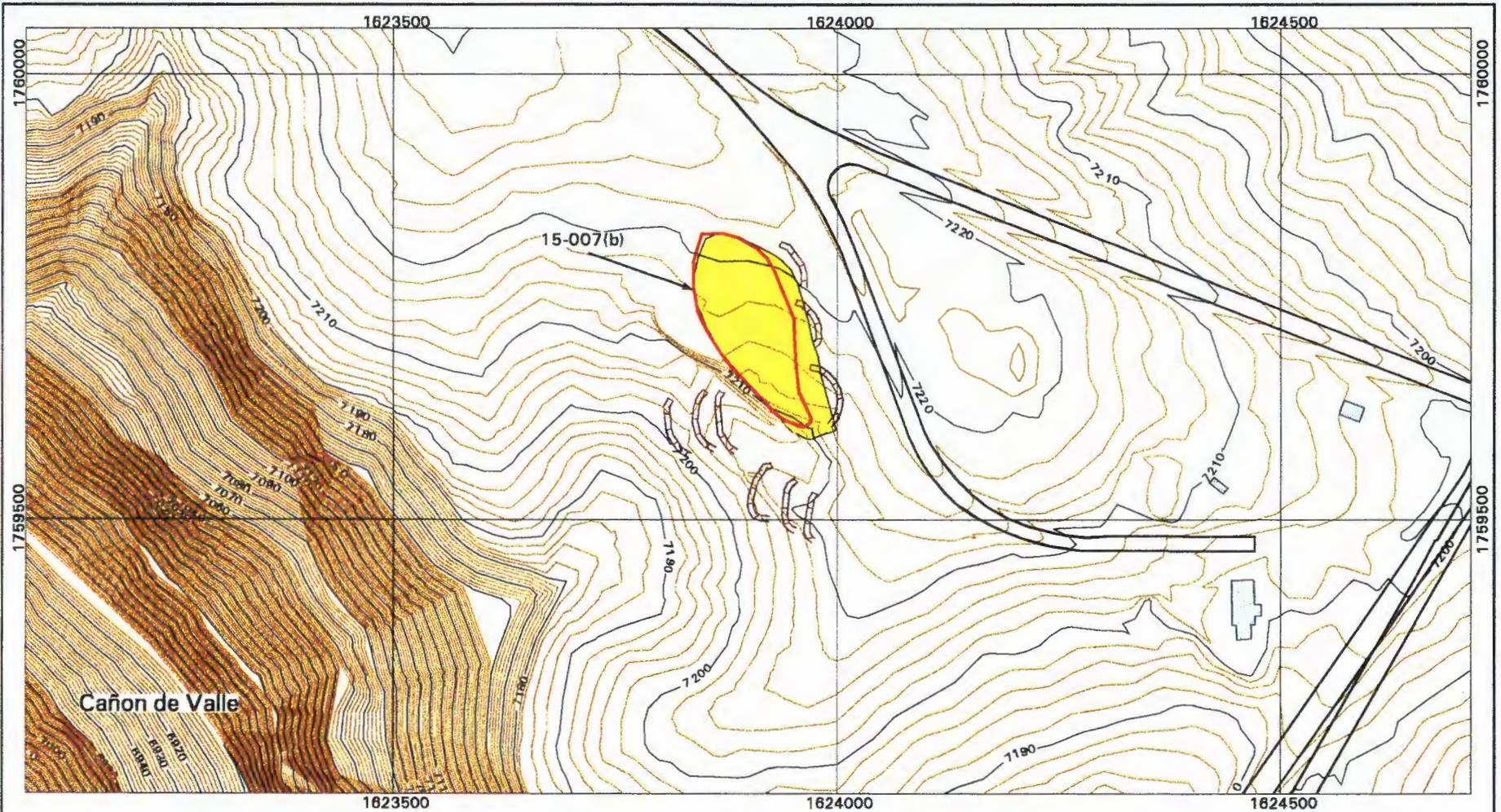


BMPs:

Straw wattles were installed above the site within the existing drainage channel and below the area with exposed debris.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
10 straw bales
10 pounds seed



Best Management Practices at PRSs 15-007(b)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2100

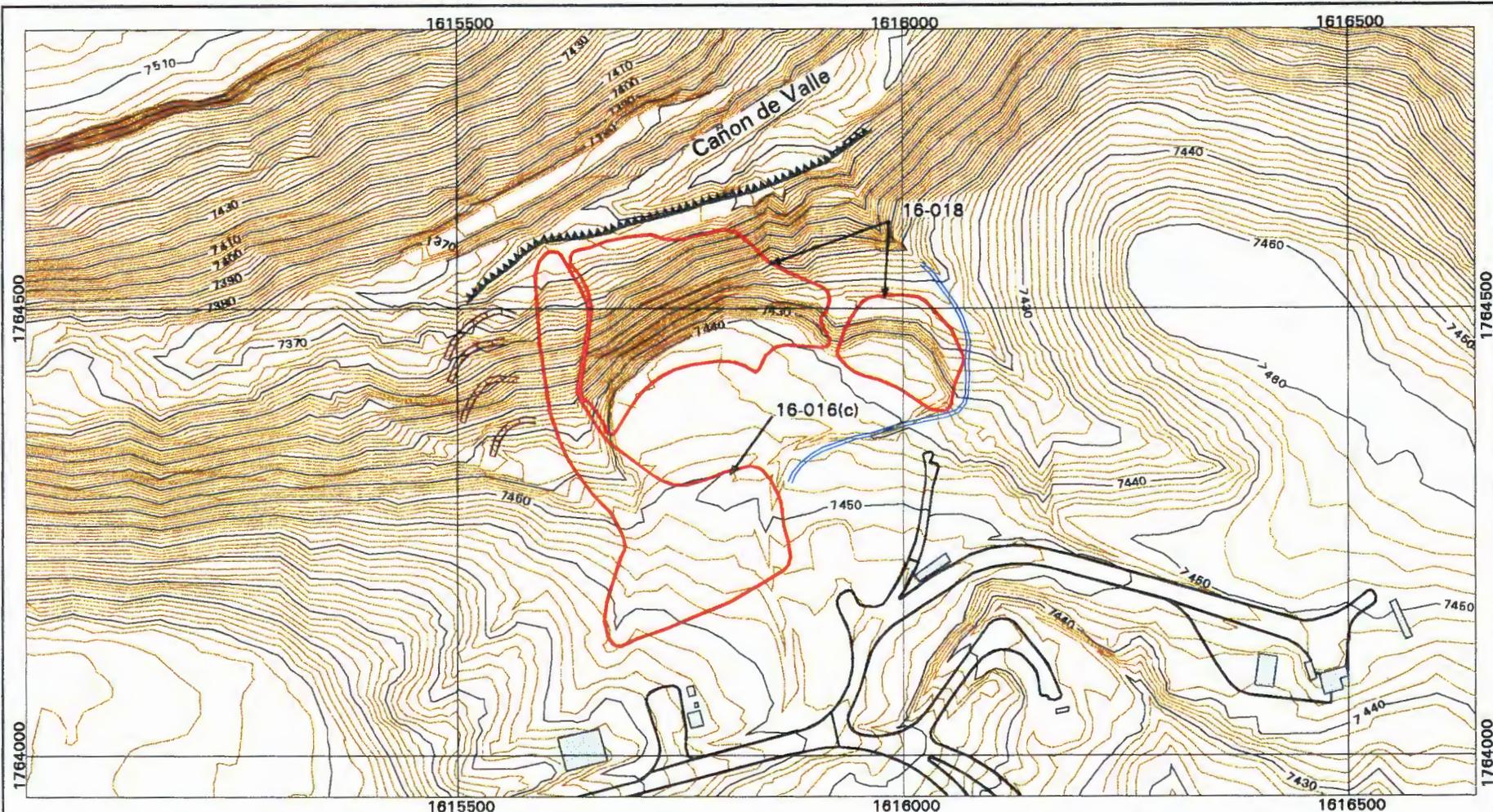


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Los Alamos National Laboratory
Los Alamos, New Mexico

1983 North American Datum
Projection and Grid Ticks:
New Mexico State Plane Coordinate System,
Central Zone (Transverse Mercator)

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Produced by Marcia Jones
FIMAD G108934 08 Aug 00



Best Management Practices at PRS 16-018 and 16-016(c)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:2100



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Produced by Marcia Jones
 FIMAD G108940 08 Aug 00

TECHNICAL AREA-16

16-018 – *Erosion Matrix Score 69.3*. A landfill that contains rubble and debris generated by the burning of HE, HE contaminated equipment and material, barium nitrate sands, building material, empty drums, bottles and trash. (MDA P). It is located in TA-16 near the south rim of Canon de Valle, just north of flash pad (TA-16-387).

16-016(c) - *Erosion Matrix Score 72.0*. A barium nitrate storage area that may have been located on or near the decommissioned burning pad (TA-16-386).

16-010(c) - *Erosion Matrix Score 47.2*. A former burn slab converted to a burn table (structure TA-16-388).



CERRO GRANDE FIRE:

This site is located on the edge of Canon de Valle within the Canon de Valle Watershed Aggregate. MDA-P received only peripheral fire damage on the lower portion of the site. The existing straw barriers and silt fencing were destroyed. No construction equipment and project infrastructure were damaged.



BMPs:

The straw barriers and silt fencing were replaced and fortified with an earthen berm below the site. Soil-Sement (polymer based emulsion) was applied to exposed slopes to reduce sediment transport potential.

ESTIMATED MATERIALS USED:

1 acre treated
50 straw bales
500 linear feet silt fence
500 gallons Soil-Sement

TECHNICAL AREA-16 GENERAL

16-028(a) – *Erosion Matrix Score 51.5*. An active outfall associated with TA-16-228 High Explosive Wastewater Treatment Facility. The discharge enters the canyon between TA-16-228 and the liquid impoundment SWMU (16-008(b)).



CERRO GRANDE FIRE:

This site is located near a tributary of Water Canyon within the Canon de Valle Watershed Aggregate. The site has minimal fire damage to the west and south. Some minor burning occurred within the SWMU boundary, but consisted mostly of destroyed grasses. The HEWTF remains operational.

BMPs:

Straw barriers and rock check dams (existing materials found on site) were placed within the drainage swale to reduce sediment transport potential.

ESTIMATED MATERIALS USED:

.5 acre treated
10 straw wattles
10 straw bales

16-003(f) – *Erosion Matrix Score 8.8*. An inactive HE sump associated with TA-16-304. No HE is currently used and the probability of HE in the sump is low.



CERRO GRANDE FIRE:

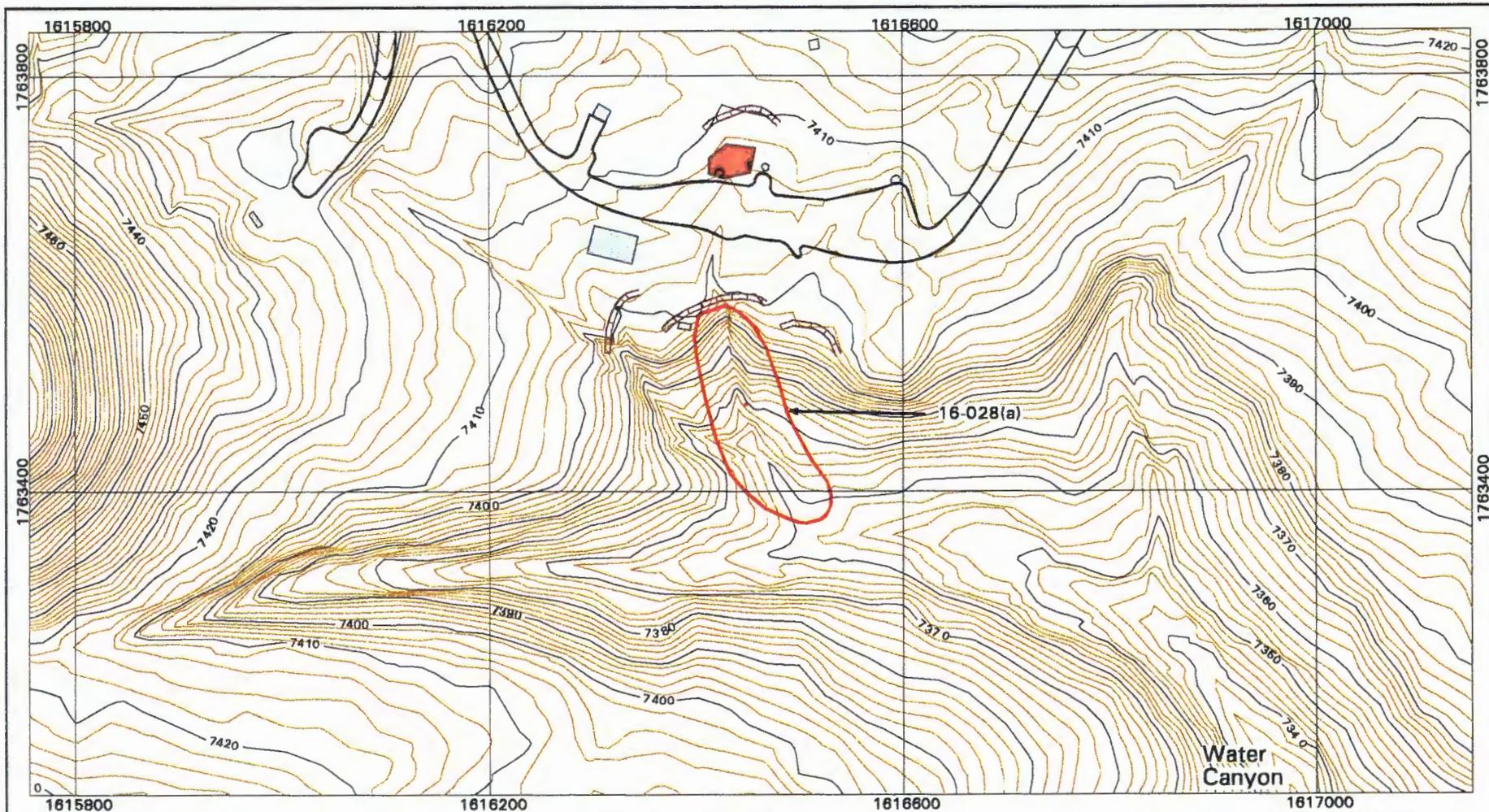
Site is located in a small tributary drainage to Water Canyon within the S-Site Watershed Aggregate. Site has minor to moderate fire damage within the outfall drainage. Ground cover has begun to re-establish itself.

BMPs:

Straw wattles were installed upslope from the drainage to divert and dissipate runoff. Straw barriers and rock check dams (using on-site material) were placed within the channel and the site was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

.5 acre treated
10 straw wattles
10 straw bales
10 pounds of seed



Best Management Practices at PRS 16-028(a)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:1800

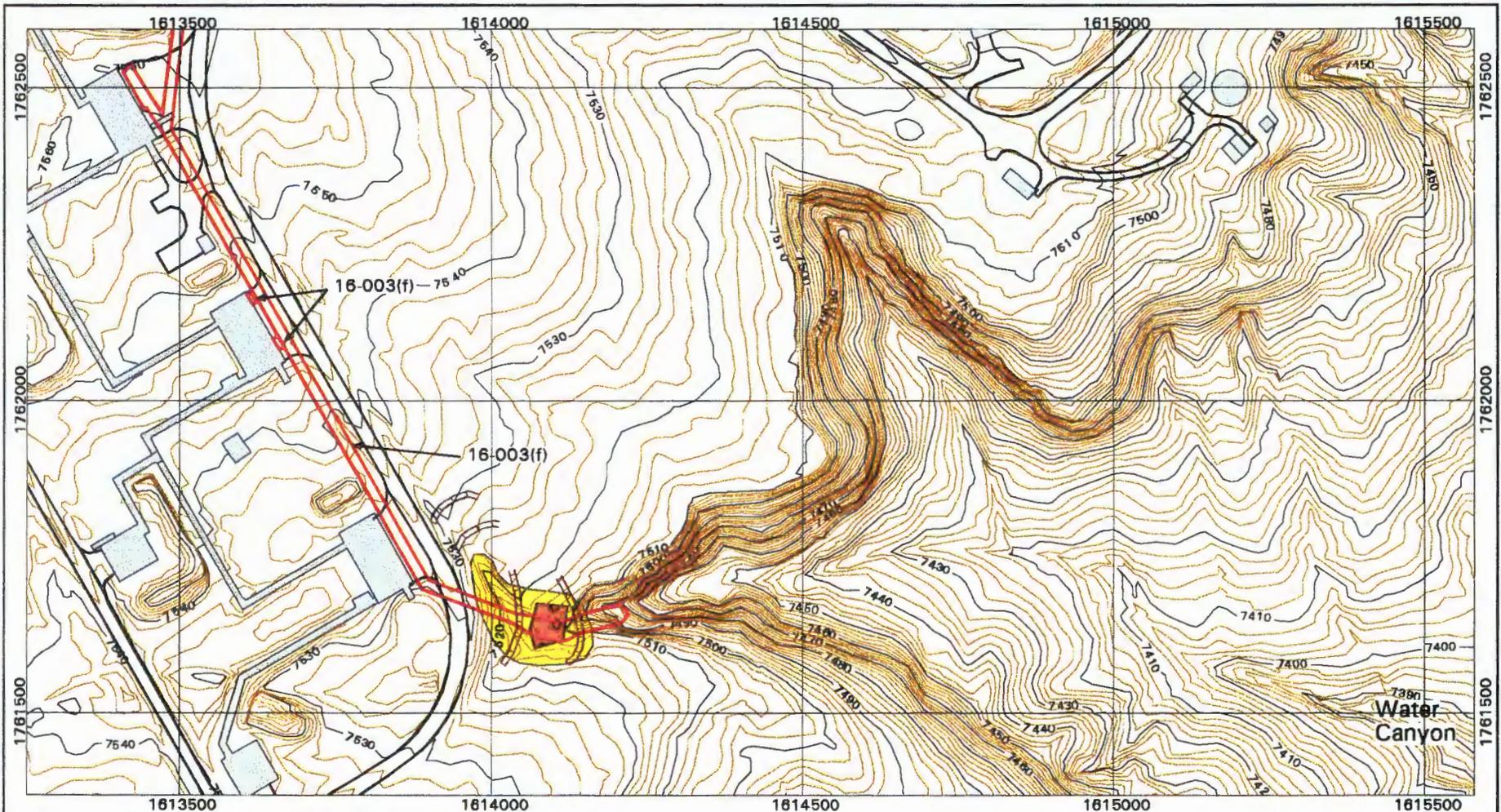


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Produced by Marcie Jones
 FIMAD G108945 08 Aug 00



Best Management Practices at PRS 16-003(f)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:3000



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Produced by Marcia Jones
FIMAD G108937 08 Aug 00

16-021(c) – *Erosion Matrix Score 73.3*. The outfall associated with the 13 HE sumps on the northeast side of TA-16-260. The drainage channel from the outfall flows about 600 feet to the bottom of Canon de Valle. A small pond, 55 feet long is formed by a rock dam located 93 feet from the outfall. The longitudinal axis of the pond is oriented east-west. The site is undergoing an Interim Measure at this time.



CERRO GRANDE FIRE:

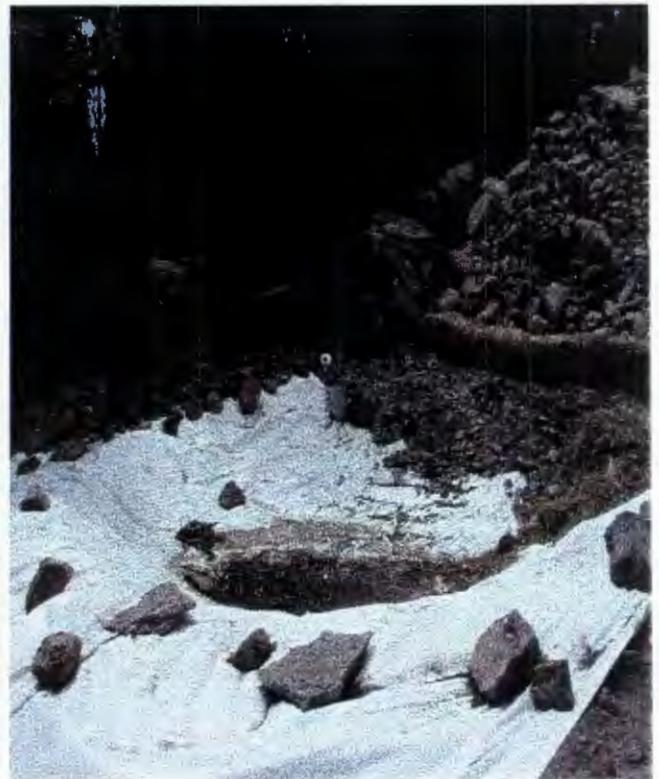
This site is located in a tributary drainage of Canon de Valle within the Canon de Valle Watershed Aggregate. Burn damage is minor to moderate within the SWMU boundary. All large equipment on-site was not affected by the fire; however, some hoses, drums and misc. equipment were damaged. The upper drainage pond was not burned. The lower drainage received minimal damage from the fire.

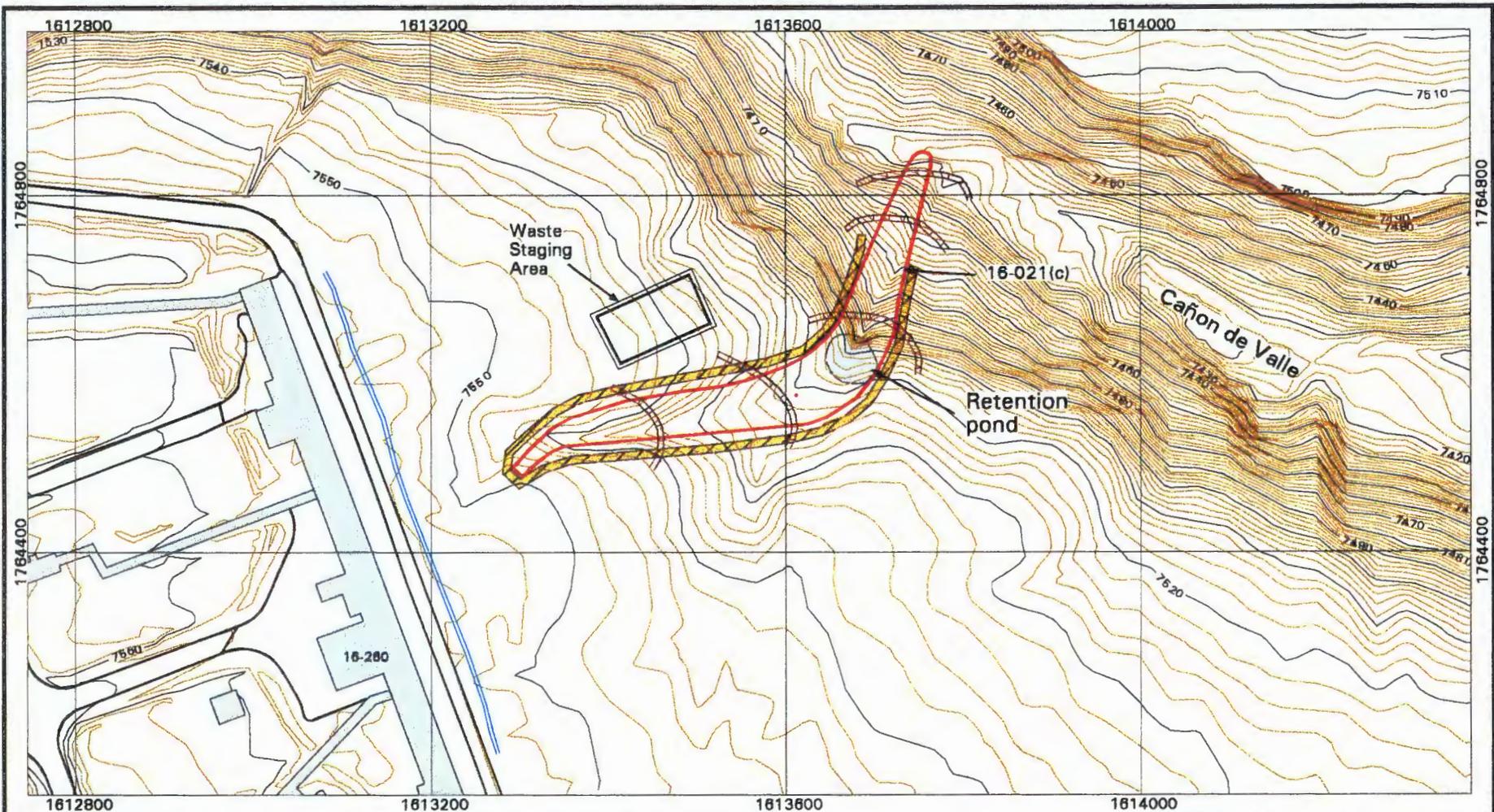
BMPs:

Straw barriers were replaced within the drainage channel and jute matting was installed to protect the exposed slopes. All excavated material remains covered with HDPE liners and is surrounded by an earthen berm. The storm water retention pond was unharmed and remains effective as a “zero discharge” BMP.

ESTIMATED MATERIALS USED:

- 1 acre treated
- 10 rolls of anti-wash jute matting
- 40 straw bales





Best Management Practices at PRS 16-021(c)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2100



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1983 North American Datum
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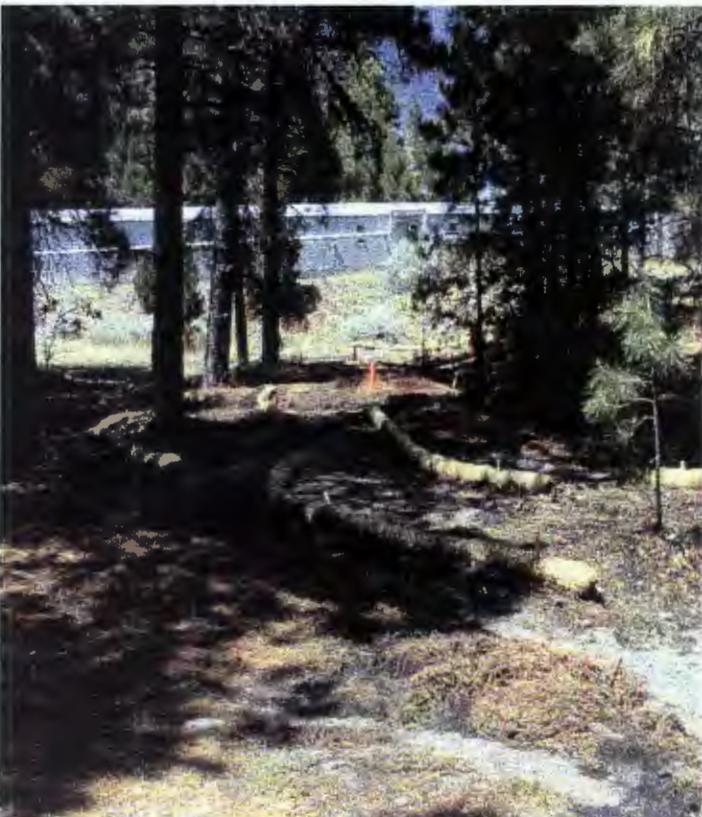
Produced by Marcia Jones
FIMAD G108943 08 Aug 00

16-020 – *Erosion Matrix Score 61.3*. A small outfall within a drainage channel on the south side of TA-16-222 that slopes gently for approximately 295 ft. to a confluence with the main channel of Canon de Valle.



CERRO GRANDE FIRE:

This site is located east of S-Site Road in the upper tributary of Canon de Valle within the Canon de Valle Watershed Aggregate. No damage was observed from the outfall to the first rock check dam. Below the second rock check dam, fire damaged much of the ground cover and several of the ponderosa pine trees. All straw were destroyed.

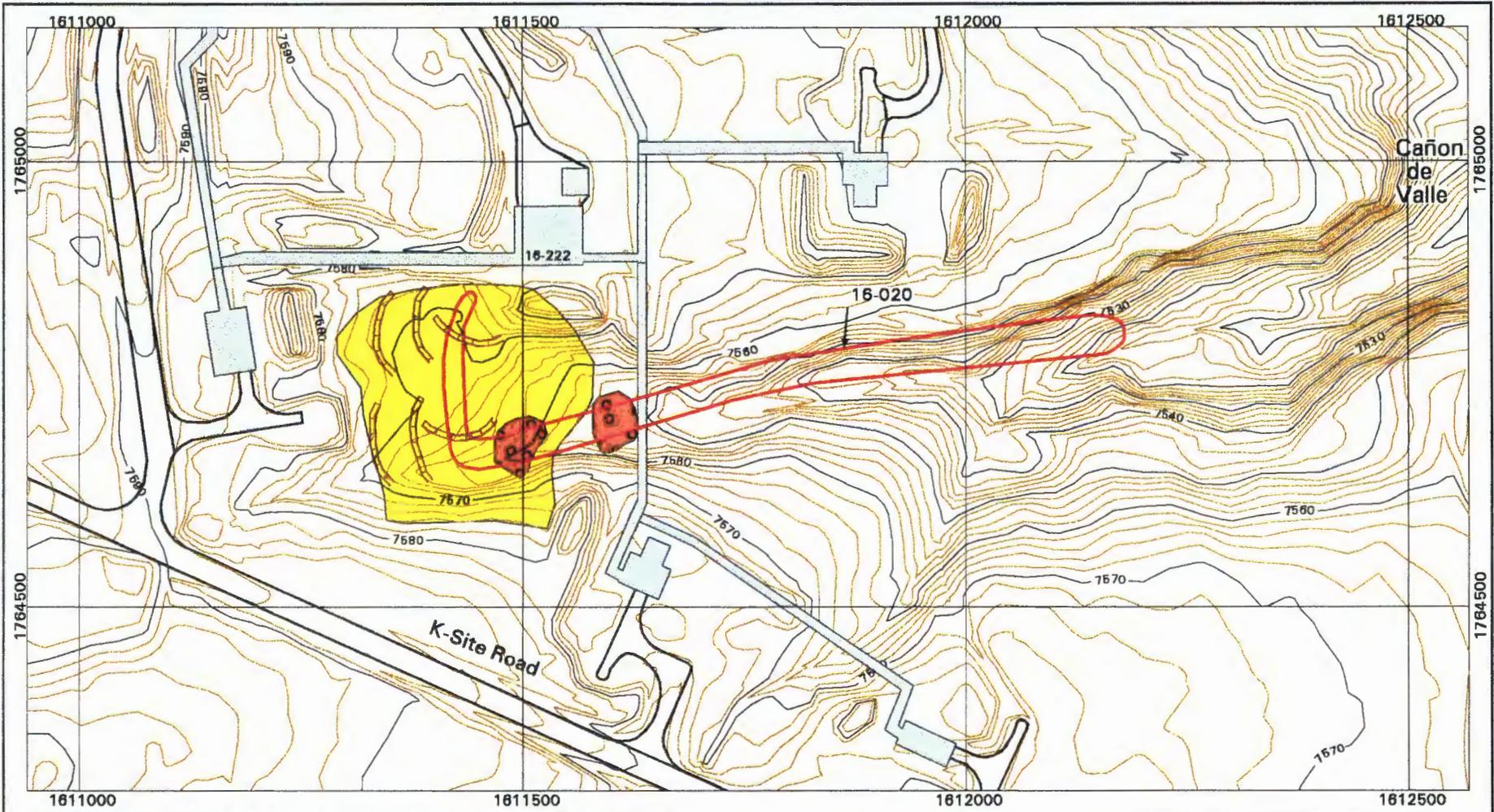


BMPs:

Straw wattles were installed throughout the outfall area to dissipate run-on. Ashflow from run-on events have been and will continue to be a problem in this area. This site is being considered for an accelerated cleanup.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 20 straw wattles
- 10 pounds of seed



Best Management Practices at PRS 16-020

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:2100



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Produced by Merois Jones
 FIMAD G108942 08 Aug 00

16-019 – Erosion Matrix Score 83.0. A material disposal area (MDA R) that consists of the WW II S-Site burning ground and its waste disposal site. This site was found smoldering on May 18th, 2000.



CERRO GRANDE FIRE:

This site is located near building TA-16-260 above Canon de Valle within the Canon de Valle Watershed Aggregate. The site has moderate to severe fire damage over a majority of the area. Miscellaneous debris was exposed on the mesa and slope above canyon channel. The dissipation controls installed within the eastern drainage were destroyed. The ground and canopy cover was completely destroyed. Ash is up to 12” deep in some areas at the toe of slope. Burning occurred in the Canon de Valle leaving severe erosion potential behind.



BMPs:

The fire smoldered for several weeks prior to being extinguished on June 4, 2000. The site was then excavated and 95% of the debris was staged in the area. Trees were contour felled at the toe of the slope to provide sediment retention. Straw wattles were installed across the entire slope at four locations. The entire slope was hydromulched to enhance the vegetation process.

ESTIMATED MATERIALS USED:

- 3 acres treated
- 200 straw wattles
- 6,000 pounds of hydromulch
- 720 pounds of tacifier
- 110 pounds seed



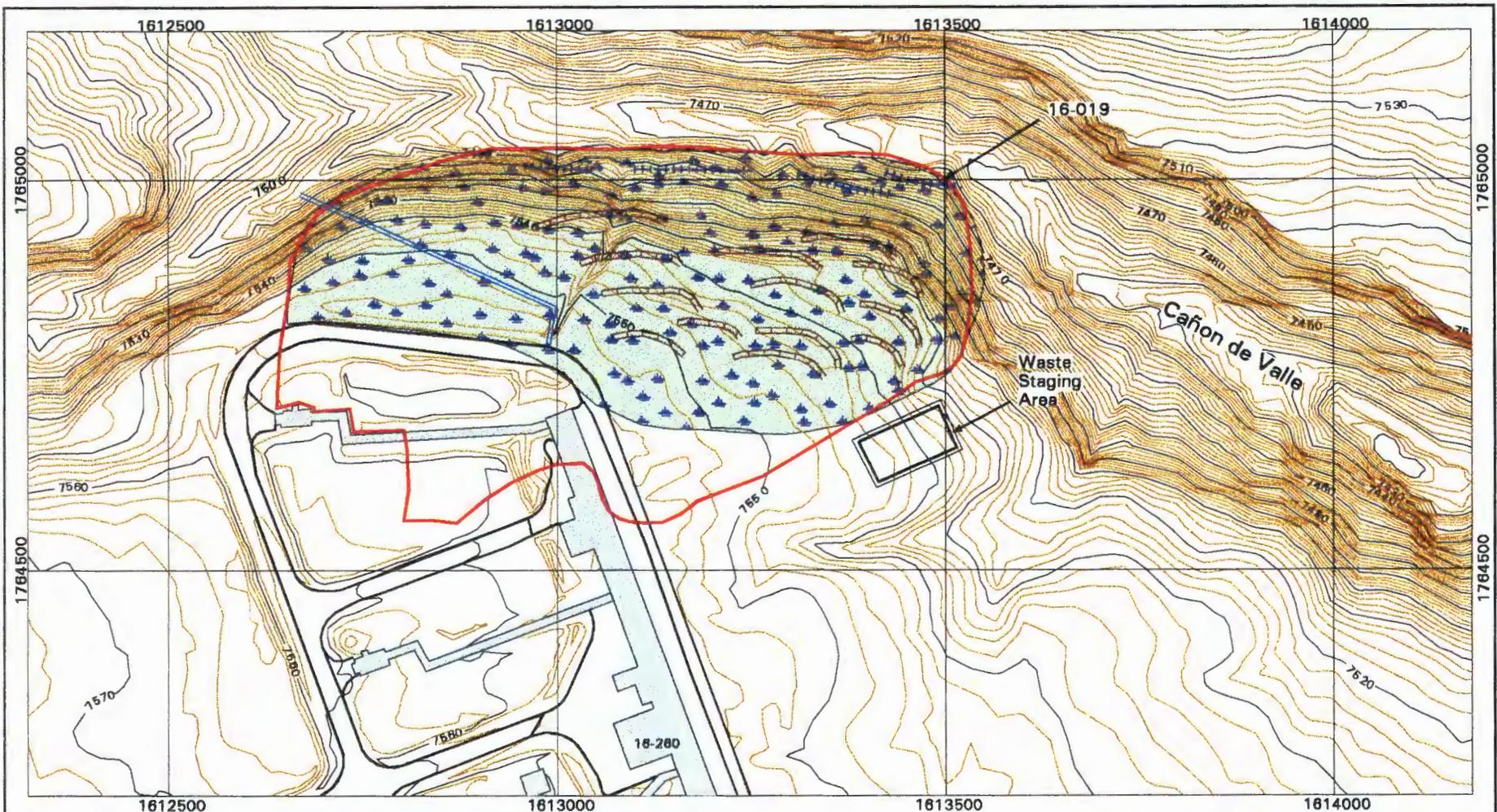
BMPs:

A storm water diversion trench was installed to prevent runoff from the area behind building TA-16-260. The trench was graded at 1% slope to the west of the excavated area of MDA R.



BMPs:

The excavated soils were staged on top of the mesa. Approximately 1500 cubic yards of soil and debris were removed from the hillside. A 3-foot high clean fill earthen berm was installed around the material. Straw wattles were also placed around the berm for added protection.



Best Management Practices at PRS 16-019

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2400



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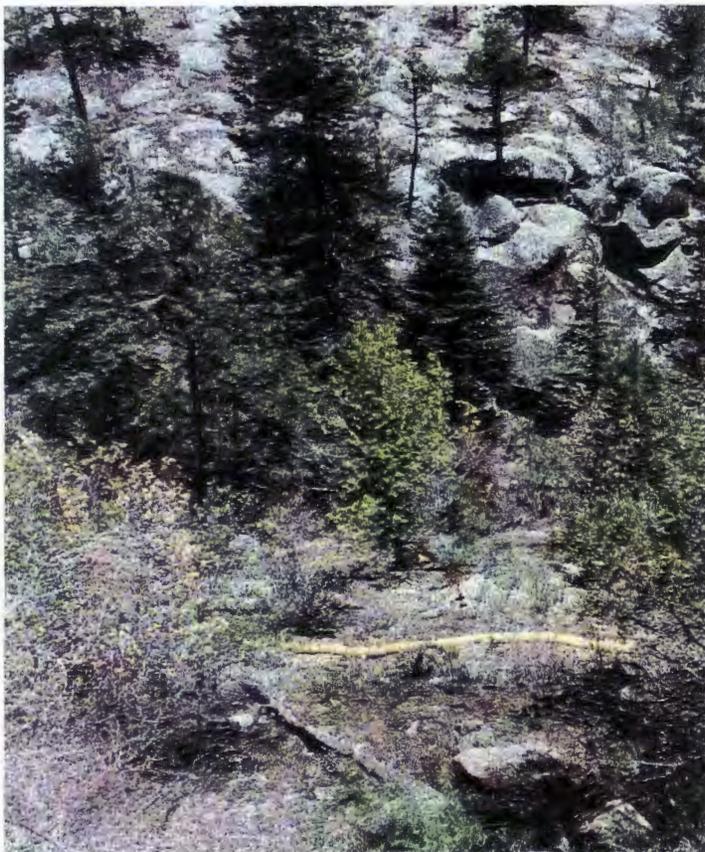
Produced by Marcie Jones
FIMAD G108941 08 Aug 00

16-003(a) – Erosion Matrix Score 55.5. A single inactive HE sump and an outfall associated with TA-16-410.



CERRO GRANDE FIRE:

Site is located near a tributary in upper Water Canyon within the Upper Water Canyon Watershed Aggregate. The site has minor to moderate fire damage within the outfall drainage.

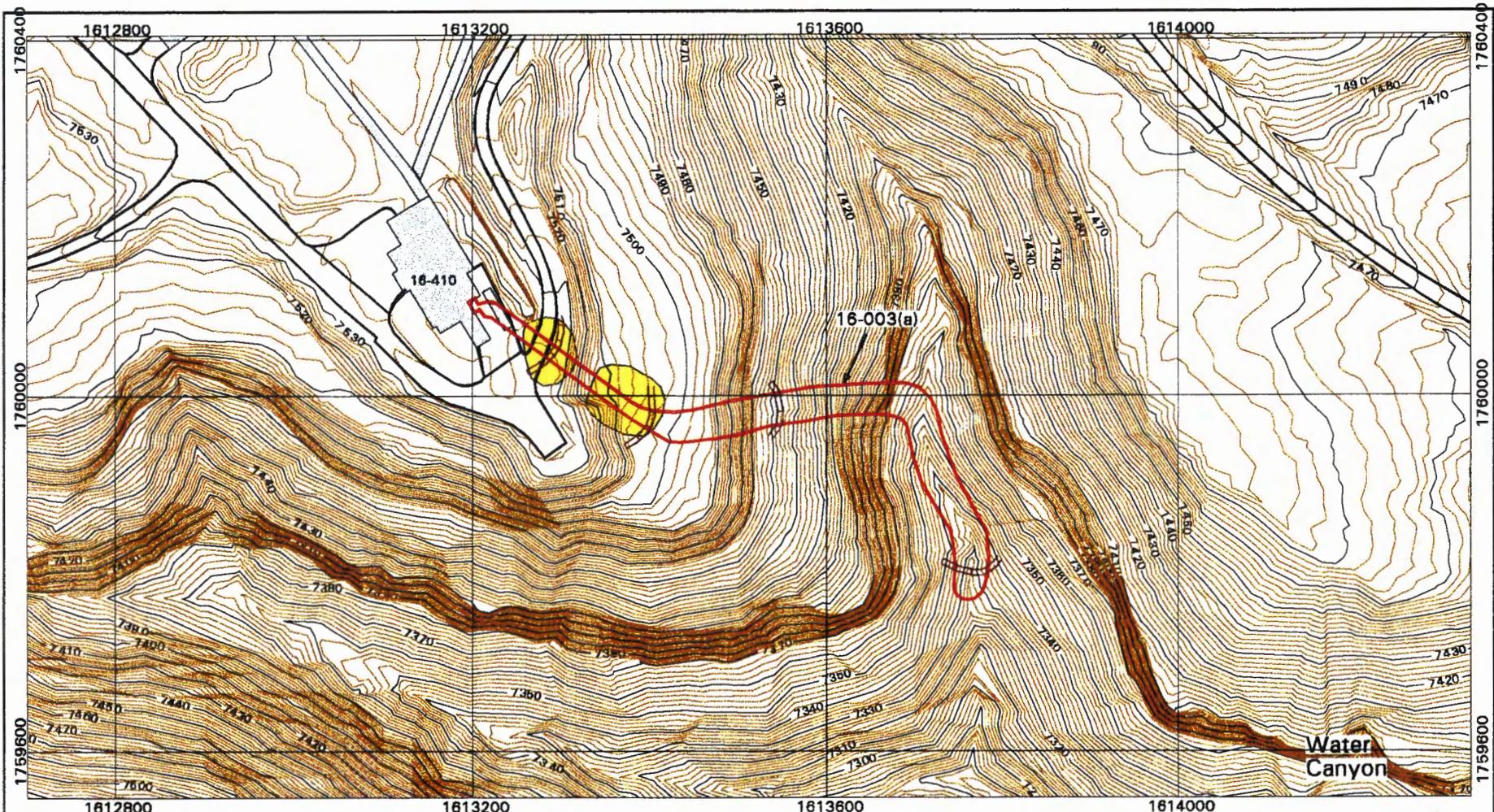


BMPs:

Straw wattles were installed near the outfall pipe and below the mesa's edge within the bottom of the tributary drainage. The area around the outfall was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 20 straw wattles
- 20 straw bales
- 10 pounds seed



Best Management Practices at PRS 16-003(a)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:2100



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Los Alamos, New Mexico

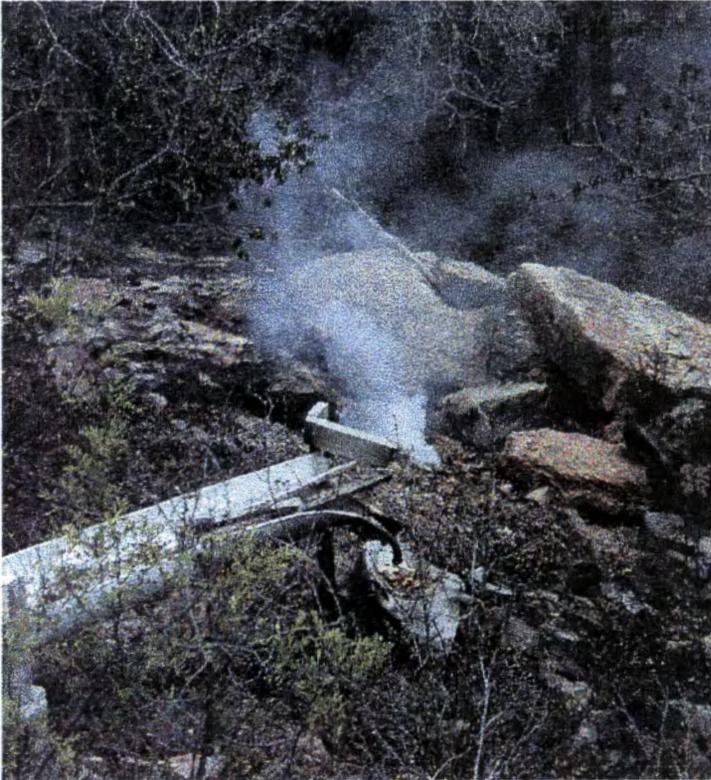
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Produced by Marcia Jones
FIMAD G108936 08 Aug 00

16-003(n) – *Erosion Matrix Score 25.0*. An active HE sump associated with TA-16-342. The outfall, EPA 05A062, receives effluent from a HE sump on the northeast corner of TA-16-342. The outfall discharges into a tributary of Canon de Valle.

16-003(o) – *Erosion Matrix Score 27.3*. Six active HE sumps associated with TA-16-340. The outfall, EPA 05A054, discharges effluent from the six HE sumps on the northeast side of TA-16-340. The effluent flows into a common drain line that discharges into a short tributary of Canon de Valle.



CERRO GRANDE FIRE:

The site is located in a tributary drainage of Water Canyon within the Canon de Valle Watershed Aggregate. The “fish ladder” was destroyed by the fire. The remainder of the site has minor to moderate fire damage within the drainage channel down to the existing wetlands located approximately ¼ mile downstream.

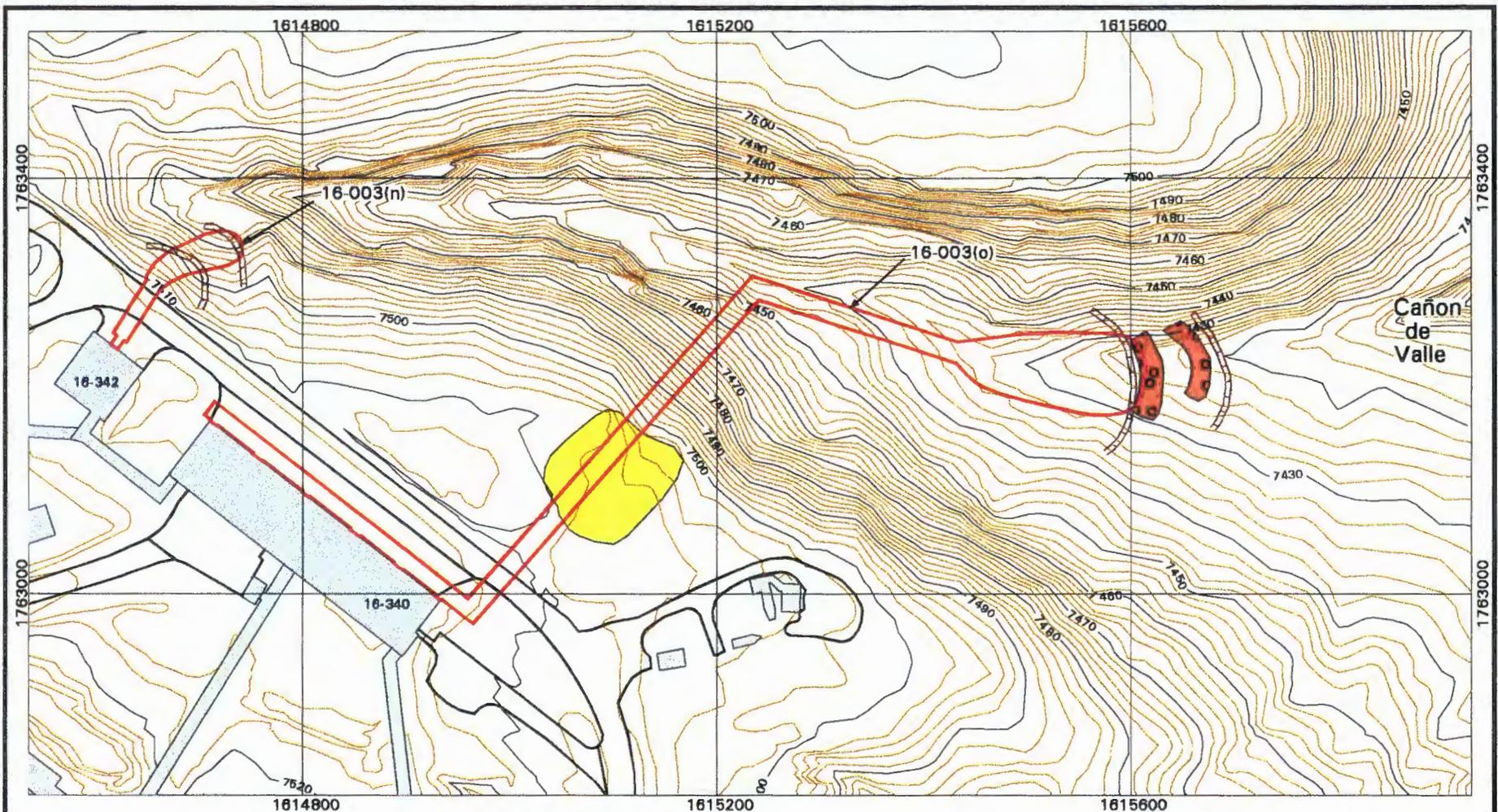


BMPs:

Straw wattles were installed above and below the wetland to help control sediment transport within the channel. Rock check dams (on-site materials used) were installed for flow dissipation. Wetland vegetation has begun to re-establish itself.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles



Best Management Practices at PRSs 16-003(n,o)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



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Produced by Marcie Jones
FIMAD G108938 09 Aug 00

16-026(h2) – Erosion Matrix Score 61.0. An outfall associated with the HE sump at TA-16-360.



CERRO GRANDE FIRE:

The site is located in a tributary drainage of Water Canyon within the Upper Water Canyon Watershed Aggregate. The site has minor to moderate fire damage within drainage channel.

BMPs:

Straw wattles and straw bale barriers were installed within the drainage channel to retain sediment and dissipate flow. Areas adjacent to the drainage were hand-raked, reseeded and covered with straw mulch.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
20 straw bales
10 pounds seed

16-004(f) – Erosion Matrix Score 31.0. Sludge drying bed and associated outfall near Sanitary Wasterwater Treatment Facility at 16-535.



CERRO GRANDE FIRE:

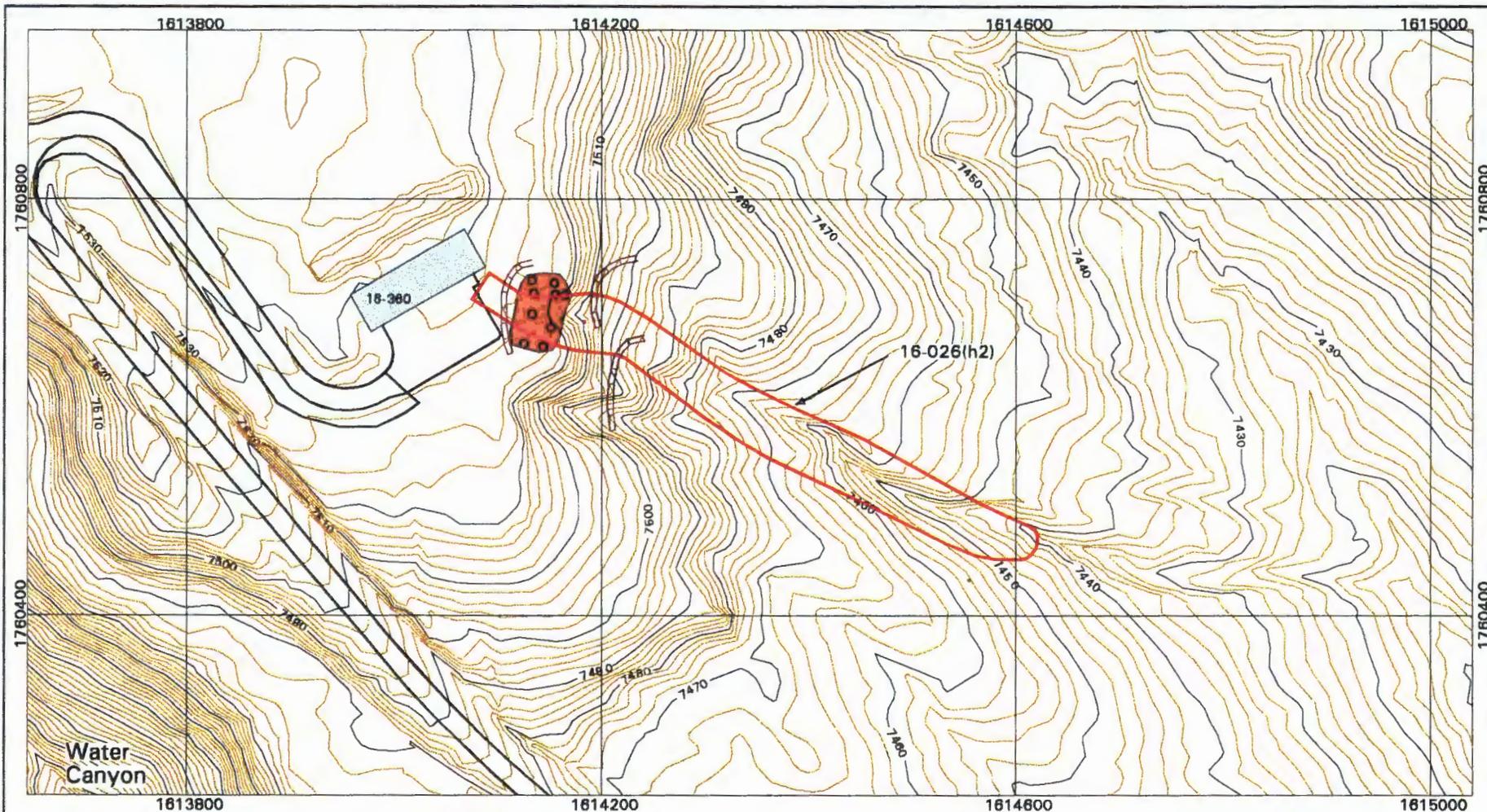
The site is located in a tributary drainage of Water Canyon within the S-Site Canyon Watershed Aggregate. The site has minor to moderate fire damage within drainage channel.

BMPs:

Straw wattles and straw bale barriers were installed within the drainage channel to retain sediment and dissipate flow. Areas adjacent to the drainage were hand-raked, reseeded and covered with straw mulch.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
20 straw bales
10 pounds seed



Best Management Practices at PRS 16-026(h2)

- | | | |
|--|---|---|
|  10-ft Contour |  Diversion Channel |  Rock Check Dams |
|  2-ft Contour |  Earthen Berm |  Secondary Containment |
|  Paved Road/Parking |  Geotextile/Jute Matting |  Silt Fence/Dike |
|  PRS |  Hydromulching |  Straw Mulch/Reseed |
|  Structure |  Log Check Dams |  Straw Wattles |



Scale: 1:1800

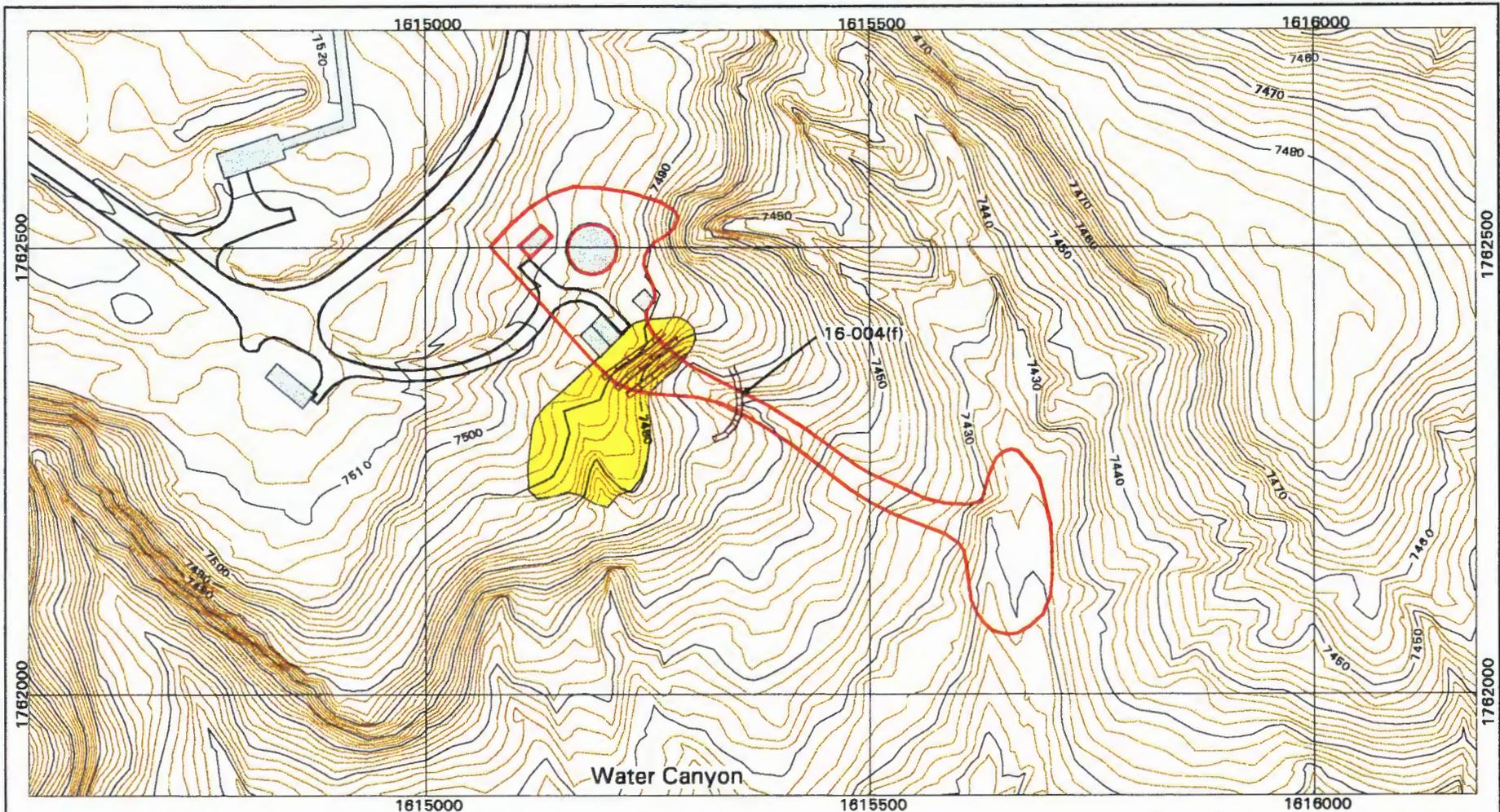


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Produced by Marcia Jones
FIMAD G108944 08 Aug 00



Best Management Practices at PRS 16-004(f)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:2100



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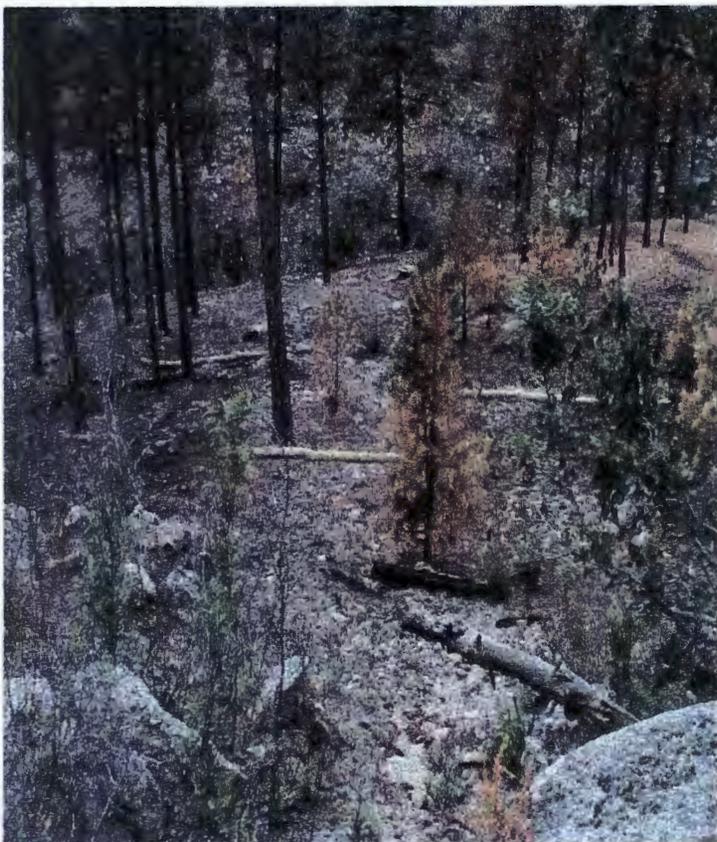
Produced by Marcia Jones
FIMAD G108939 08 Aug 00

16-028(b) – *Erosion Matrix Score 83.0*. Potentially contaminated soil from a permitted outfall at TA-16-370. The outfall drains from the west side of the building and daylights approximately 50 ft. south of the building in a steep, rocky area of Water Canyon.



CERRO GRANDE FIRE:

The site is located in a tributary drainage of Water Canyon within the Canon de Valle Watershed Aggregate. The site has minor to moderate fire damage within drainage channel. Debris was exposed within channel near the inactive outfall.

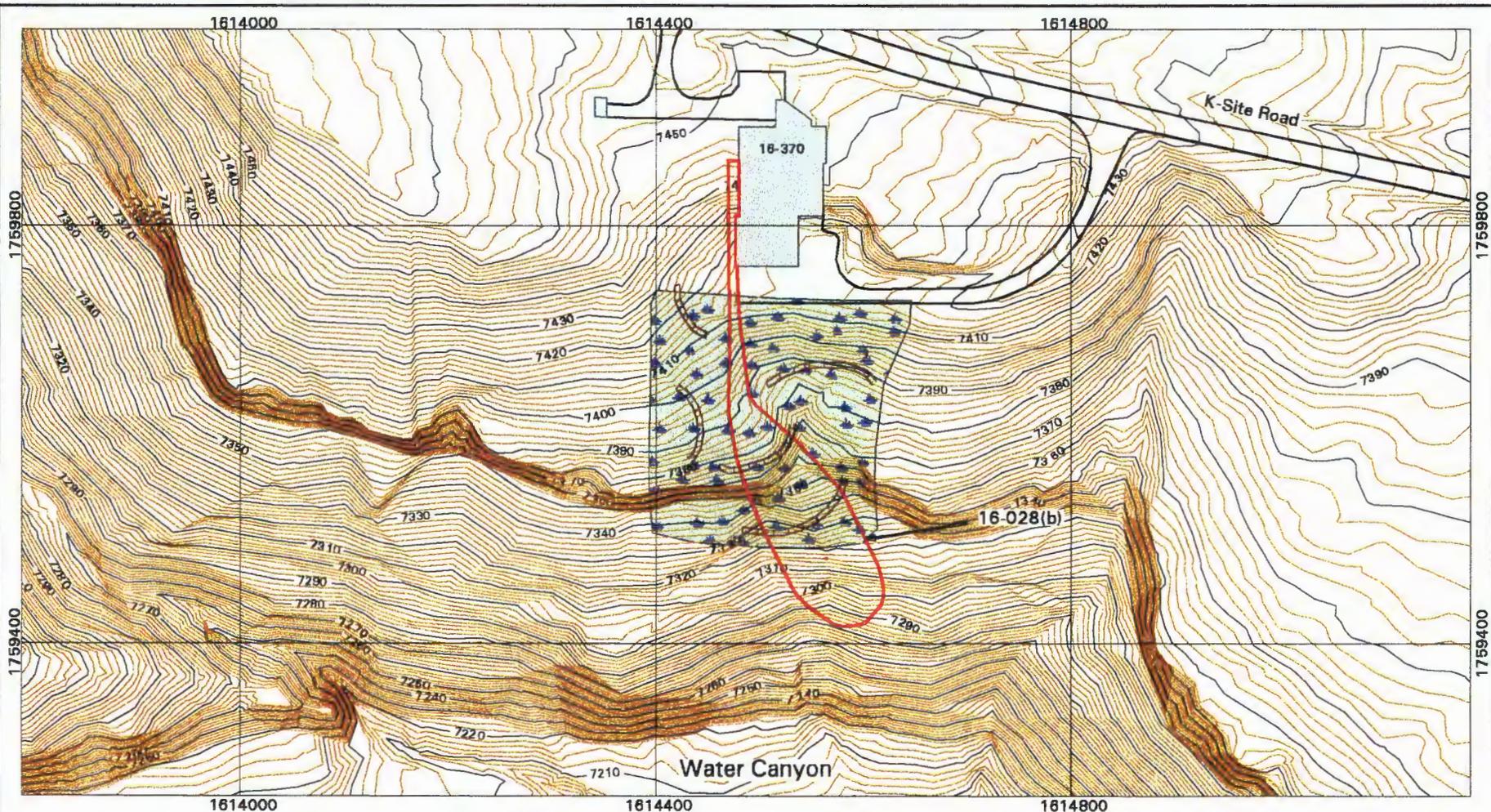


BMPs:

Straw wattles were installed upslope of and within the drainage channel to divert and dissipate storm flows. The debris was removed from the channel and the area was hydromulched to enhance the vegetation process.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 20 straw wattles
- 20 straw bales
- 10 pounds seed



Best Management Practices at PRS 16-028(b)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:1800



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Produced by Marcia Jones
FIMAD G108946 08 Aug 00

16-029(g) – *Erosion Matrix Score 21.5*. An active HE sump associated with TA-16-450. The outfall, EPA 04A091 located to the southeast of TA-16-450, receives effluent from the sump.



CERRO GRANDE FIRE:

The site is located in a tributary drainage of Water Canyon within the Upper Water Canyon Watershed Aggregate. The site has moderate fire damage of the ground cover with minor canopy damage.

BMPs:

Straw wattles were installed throughout the site for sediment retention. The area was then hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
20 straw bales
10 pounds seed

16-030(h) – *Erosion Matrix Score 29.1*. Building TA-16-430 functions as a high explosives pressing facility. Plastic-bonded explosives and mock HE powders are pressed to shape. The site consists of three outfalls associated with the three HE sumps at TA-16-430.



CERRO GRANDE FIRE:

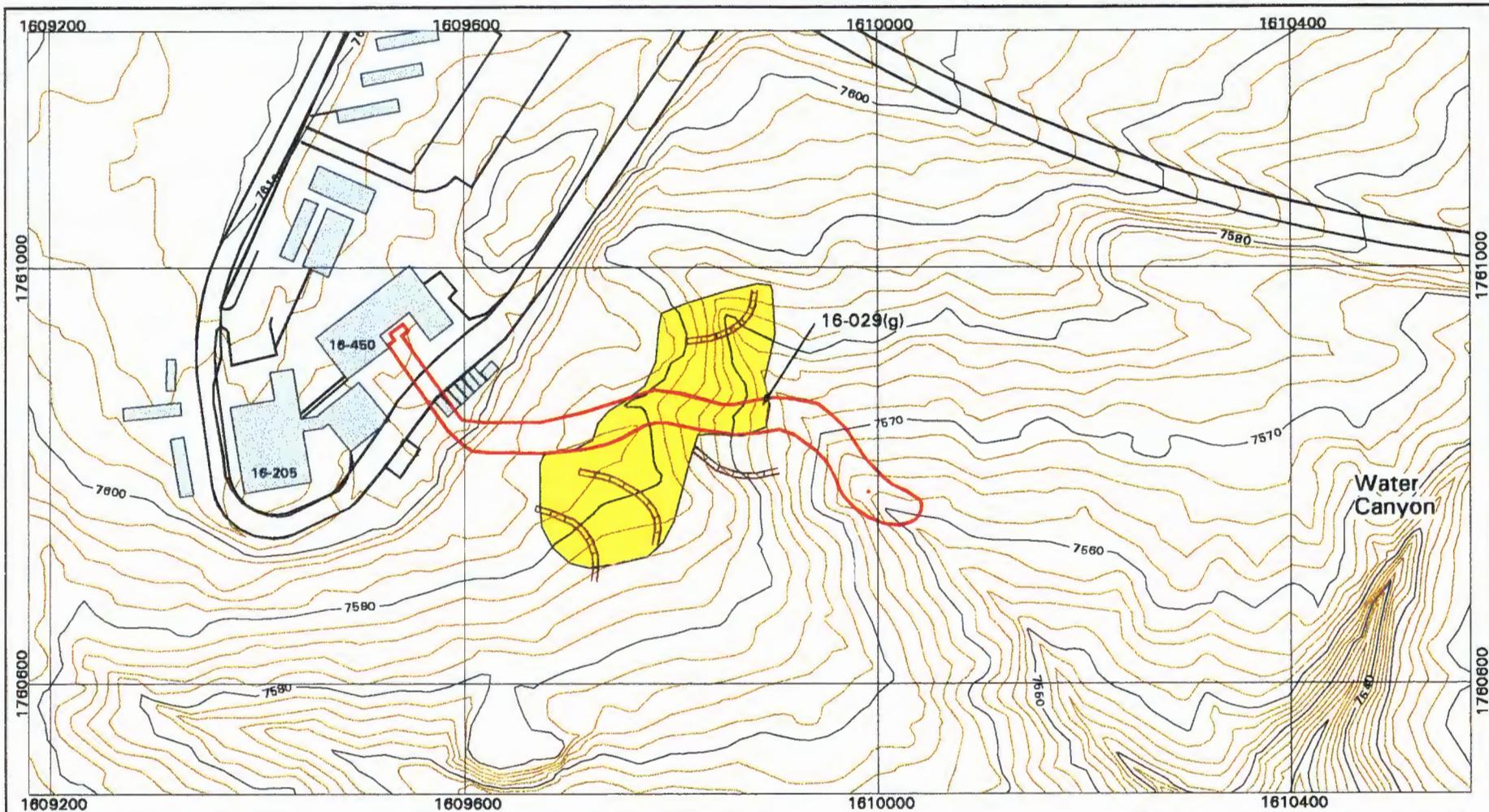
The site is located in a tributary drainage of Water Canyon within the Upper Water Canyon Watershed Aggregate. The site has moderate fire damage of the ground cover with minor canopy damage.

BMPs:

Straw barriers were installed within the drainage channel for sediment retention. The area was then hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

.5 acre treated
20 straw wattles
20 straw bales
10 pounds seed



Best Management Practices at PRS 16-029(g)

- | | | |
|--|---|---|
|  10-ft Contour |  Diversion Channel |  Rock Check Dams |
|  2-ft Contour |  Earthen Berm |  Secondary Containment |
|  Paved Road/Parking |  Geotextile/Jute Matting |  Silt Fence/Dike |
|  PRS |  Hydromulching |  Straw Mulch/Reseed |
|  Structure |  Log Check Dams |  Straw Wattles |



Scale: 1:1800

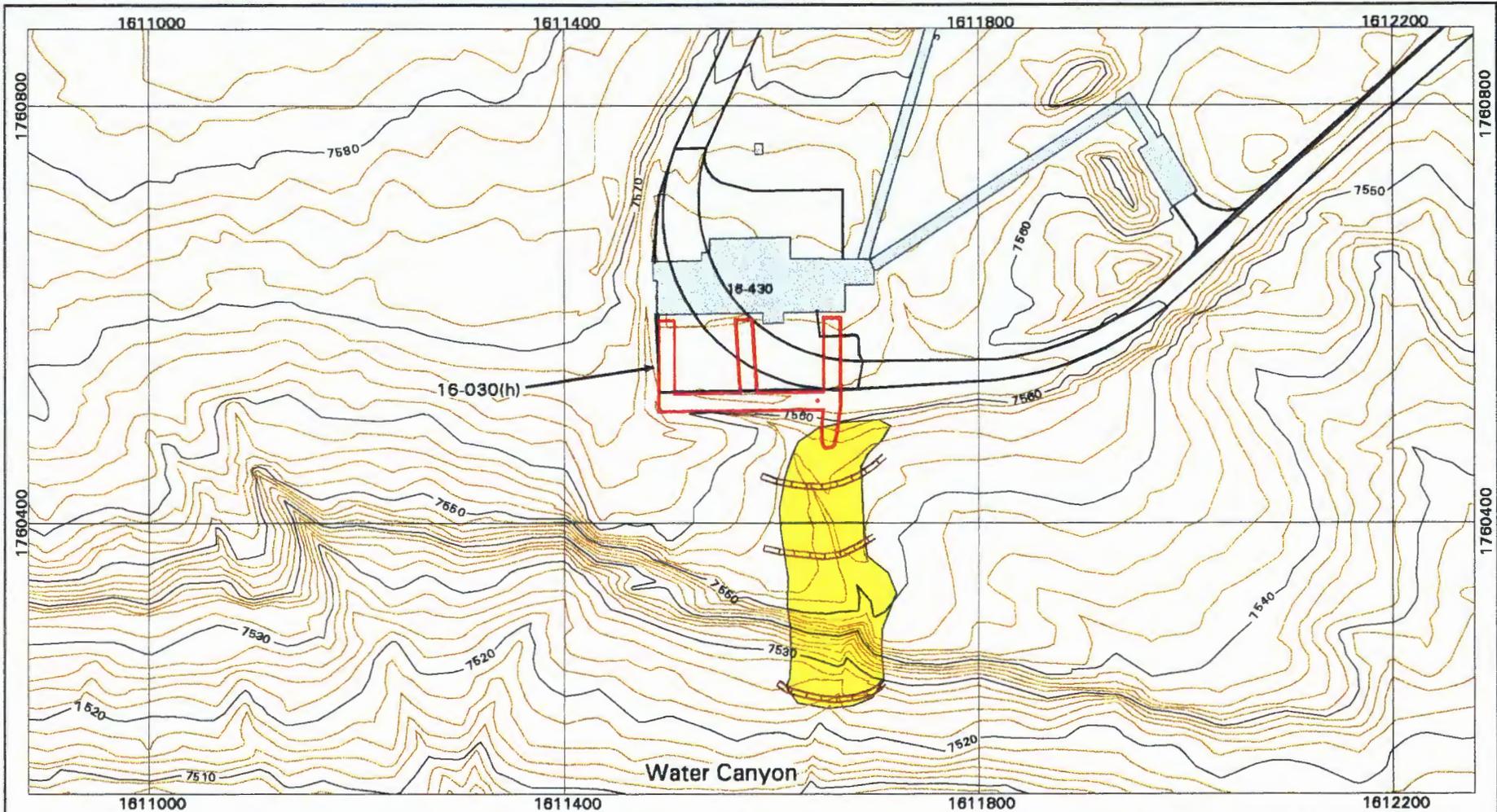


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Produced by Marcis Jones
FIMAD G108947 08 Aug 00



Best Management Practices at PRS 16-030(h)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



EES-5 GIS Team
Los Alamos National Laboratory
Los Alamos, New Mexico

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FIMAD G108948 08 Aug 00

TECHNICAL AREA-22

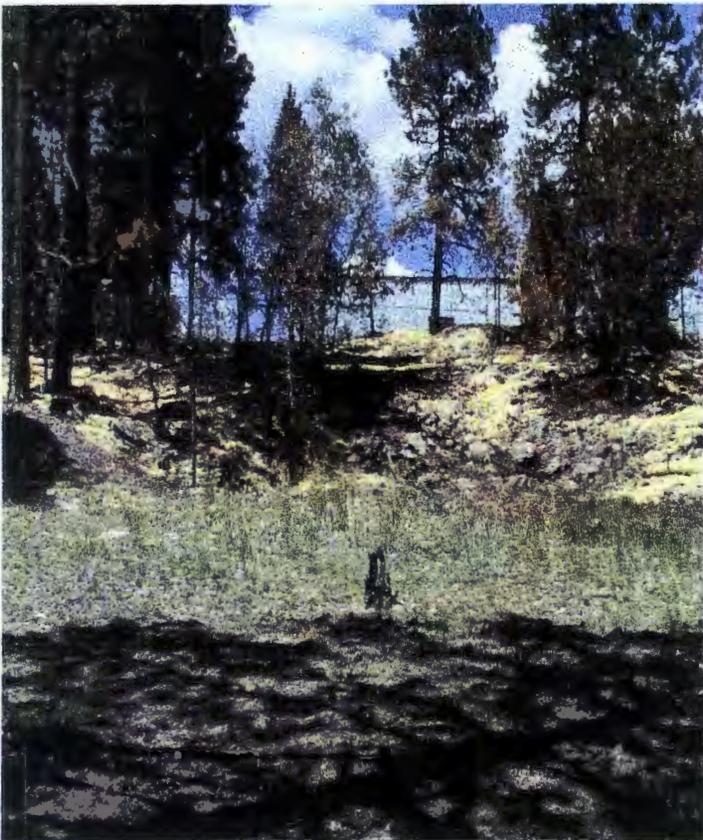
22-015(c) – *Erosion Matrix Score 51.5*. Former outfall from plating & etching operation.



CERRO GRANDE FIRE:

The site is located in a tributary drainage of Pajarito Canyon within the Starmer's/Pajarito Canyon Watershed Aggregate. Moderate fire damage was found at 22-015(c) including the drainage swale below the inactive outfall, the pond area and stained areas leading to the mesa edge. The ground cover was severely damaged leaving little or no protection.

*Photograph is mislabeled.

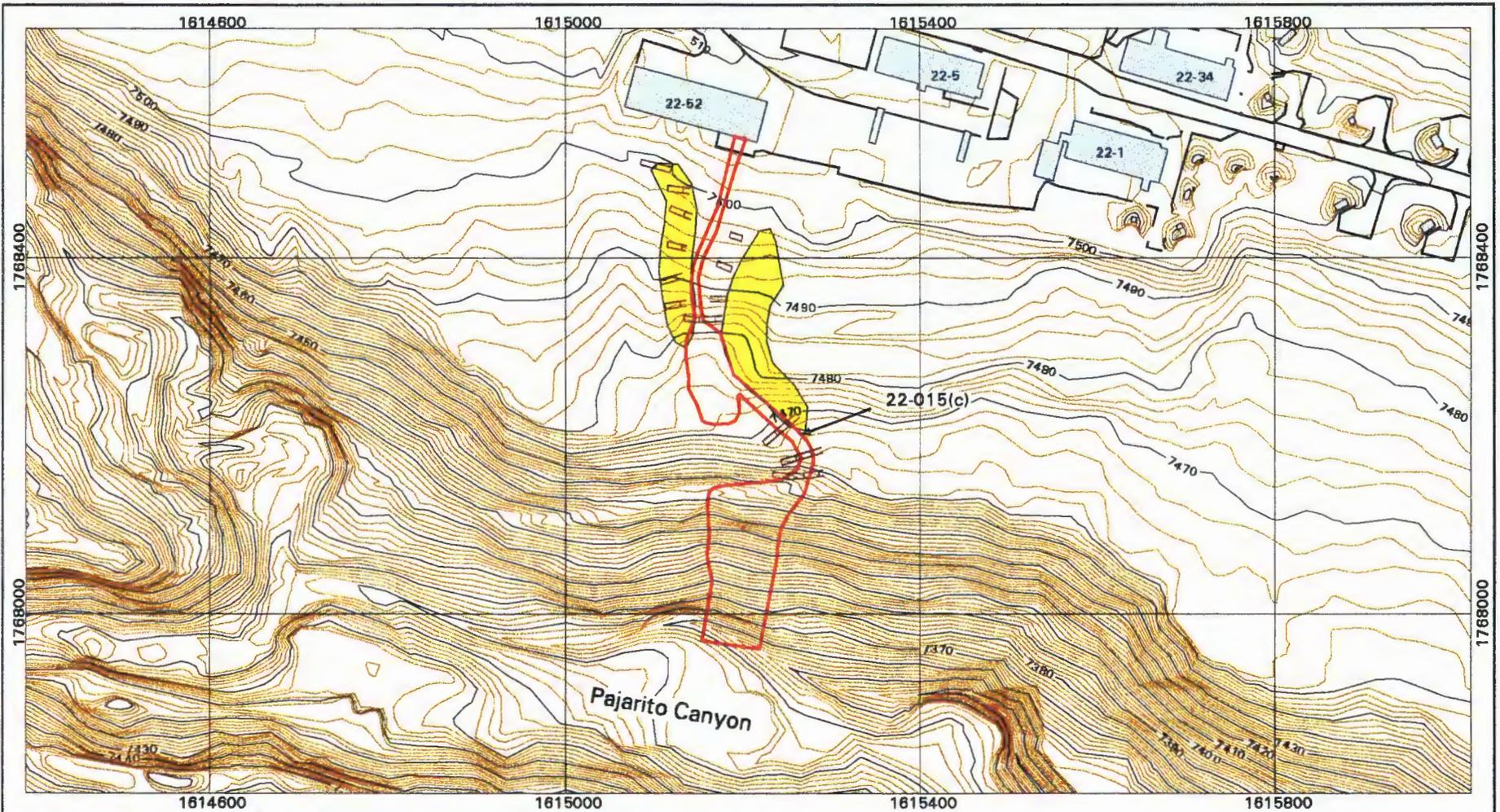


BMPs:

Straw wattles were installed upslope and within the drainage swale. The area was hand-raked, reseeded and mulched. The pond area has begun to revegetate itself.

□□□\$□□NORMALTERIALS USED:

- 1.5 acres treated
- 30 straw wattles
- 20 straw bales
- 30 pounds seed



Best Management Practices at PRS 22-015(c)



Scale: 1:2100



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Produced by Marcia Jones
FIMAD G10B949 08 Aug 00

TECHNICAL AREA-36

C-36-003 – *Erosion Matrix Score 52.0*. This is an inactive permitted (06A106) outfall that received chemicals from a photo lab within Building TA-36-1. It outfalls a few feet over the steep edge of Three Mile Canyon. It became operational in 1950.



CERRO GRANDE FIRE:

The site is located on the edge of Three Mile Canyon within the Three Mile Canyon Watershed Aggregate. A backfire was set near C-36-003 to help protect TA-18. This fire exposed miscellaneous debris on the slope behind building TA-36-1.

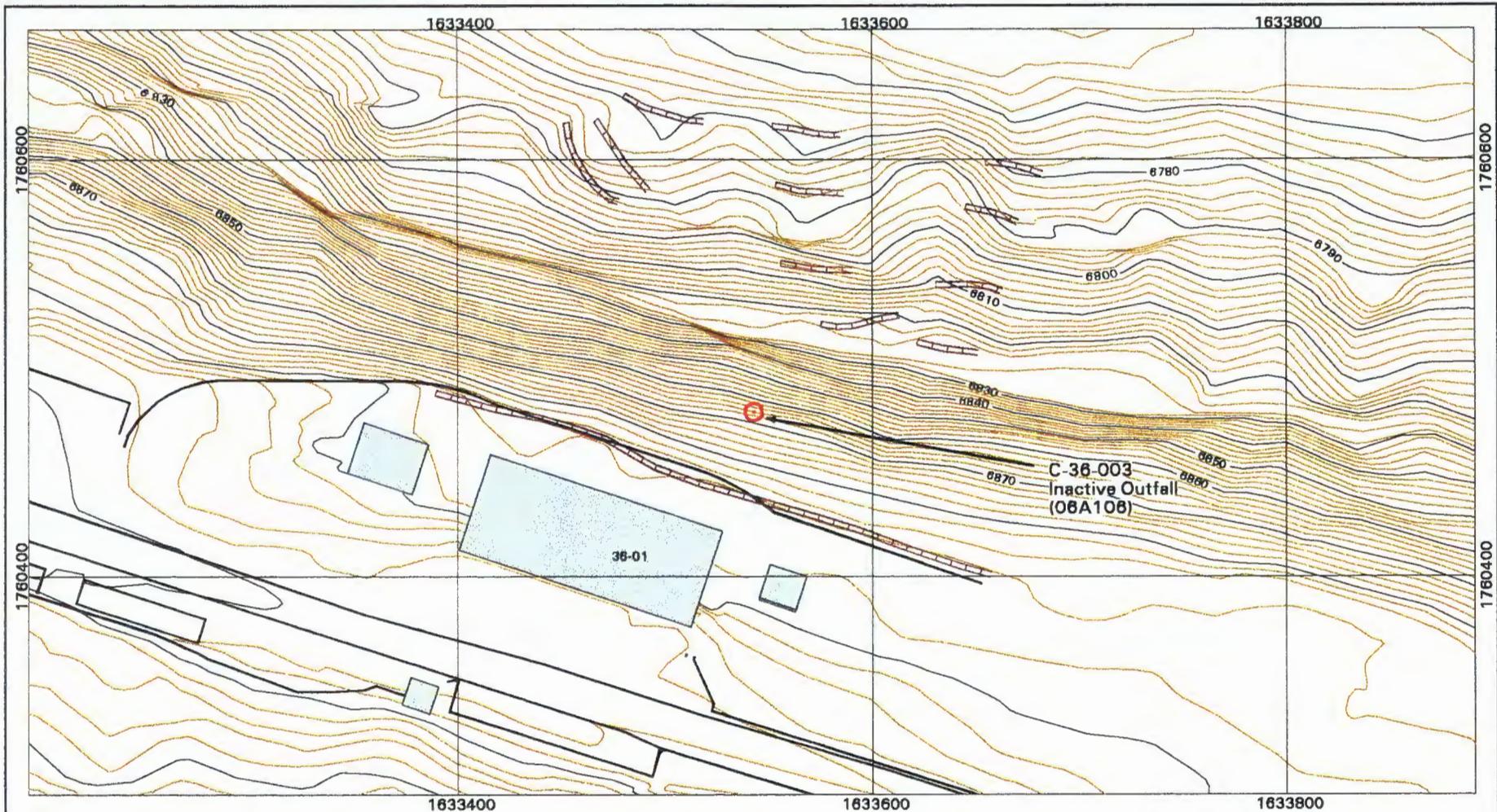


BMPs:

Straw wattles were installed on the mesa's edge to divert storm water run-on from the parking area, within the drainage channels on the slope and at the toe of the slope. The debris that was exposed has been removed, and the area was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

- 2 acres treated
- 50 straw wattles
- 20 straw bales
- 10 pounds seed



Best Management Practices at PRS C-36-003

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:900



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FMAD G108950 08 Aug 00

TECHNICAL AREA-40

40-006(b) – *Erosion Matrix Score 62.0*. Active firing site used only for testing and development of small explosive devices and not for waste disposal. An inactive NPDES outfall (06A081) is shown.



CERRO GRANDE FIRE:

The site is located on the edge of Pajarito Canyon within the Starmer's/Pajarito Canyon Watershed Aggregate. The fire damage was moderate to severe with several buildings destroyed near this site.



BMPs:

Straw wattles were installed on the steep portion of the slope to reduce the sediment migration potential. Wattles were also installed on the mesa's edge to divert run-on from slope.

ESTIMATED MATERIALS USED:

1 acre treated
20 straw wattles

40-006(c) - *Erosion Matrix Score 62.0*. Active firing site used only for testing and development of small explosive devices and not for waste disposal. An inactive NPDES outfall (06A080) is shown at the site.



CERRO GRANDE FIRE:

Site is located on the edge of Pajarito Canyon within the Starmer's/Pajarito Canyon Watershed Aggregate. The fire damage was moderate to severe with several buildings destroyed near this site.

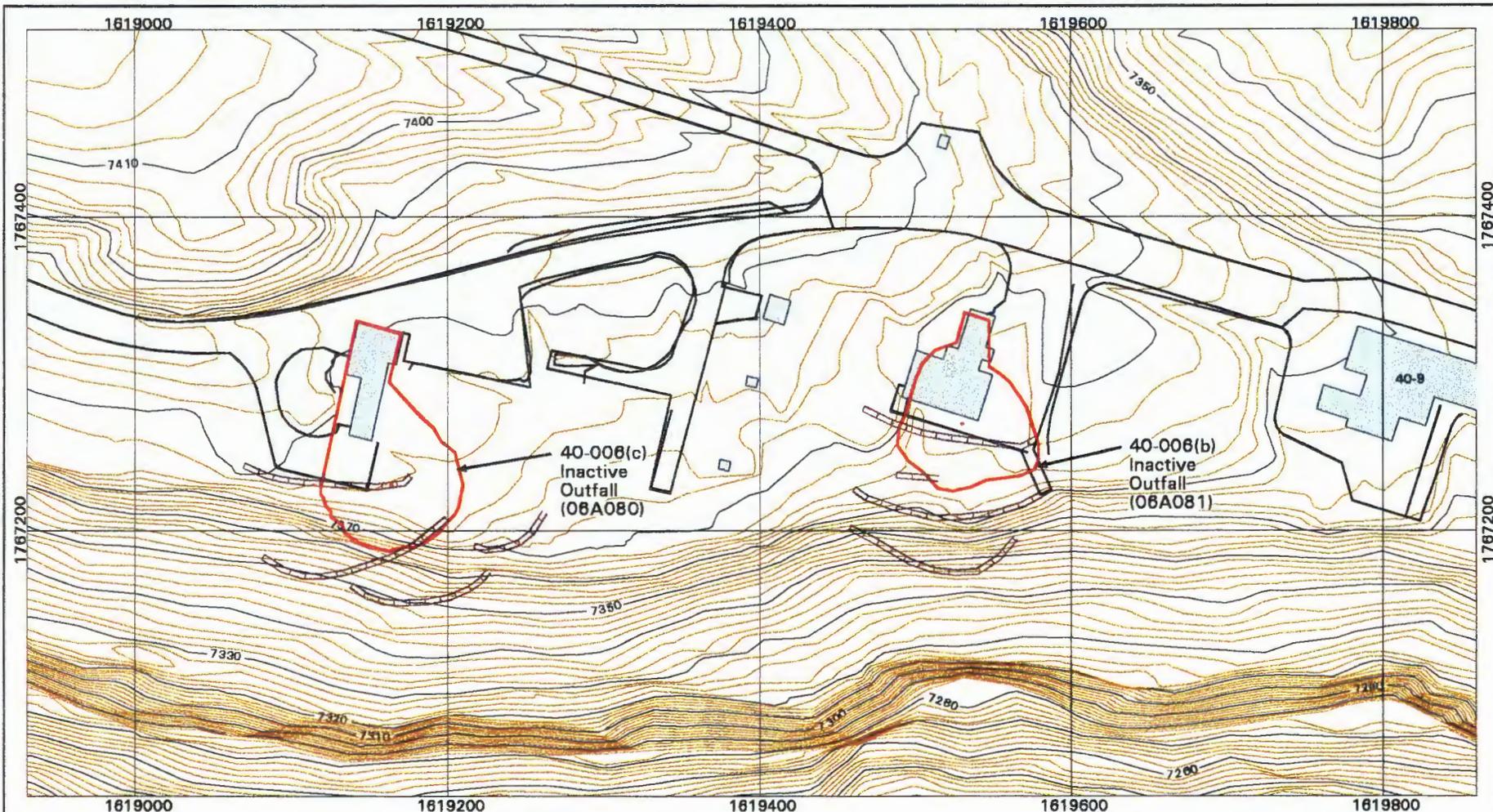


BMPs:

Straw wattles were installed on the steep portion of the slope to reduce the sediment migration potential. Wattles were also installed on the mesa's edge to divert run-on from the slope.

ESTIMATED MATERIALS USED:

1 acre treated
15 straw wattles



Best Management Practices at PRS 40-006(b,c)

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Scale: 1:1200



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Produced by Marcia Jones
FIMAD G108951 08 Aug 00

40-009 - Erosion Matrix Score 54.5. Landfill adjacent to firing site at TA-40-9. The landfill contains debris from decommissioning of buildings at TA-15. An inactive NPDES outfall (04A101) is located nearby.



CERRO GRANDE FIRE:

The site is located on the edge of Pajarito Canyon within the Starmer's/Pajarito Canyon Watershed Aggregate. The erosion potential on this slope increased due to lack of vegetative cover as a result of the fire.

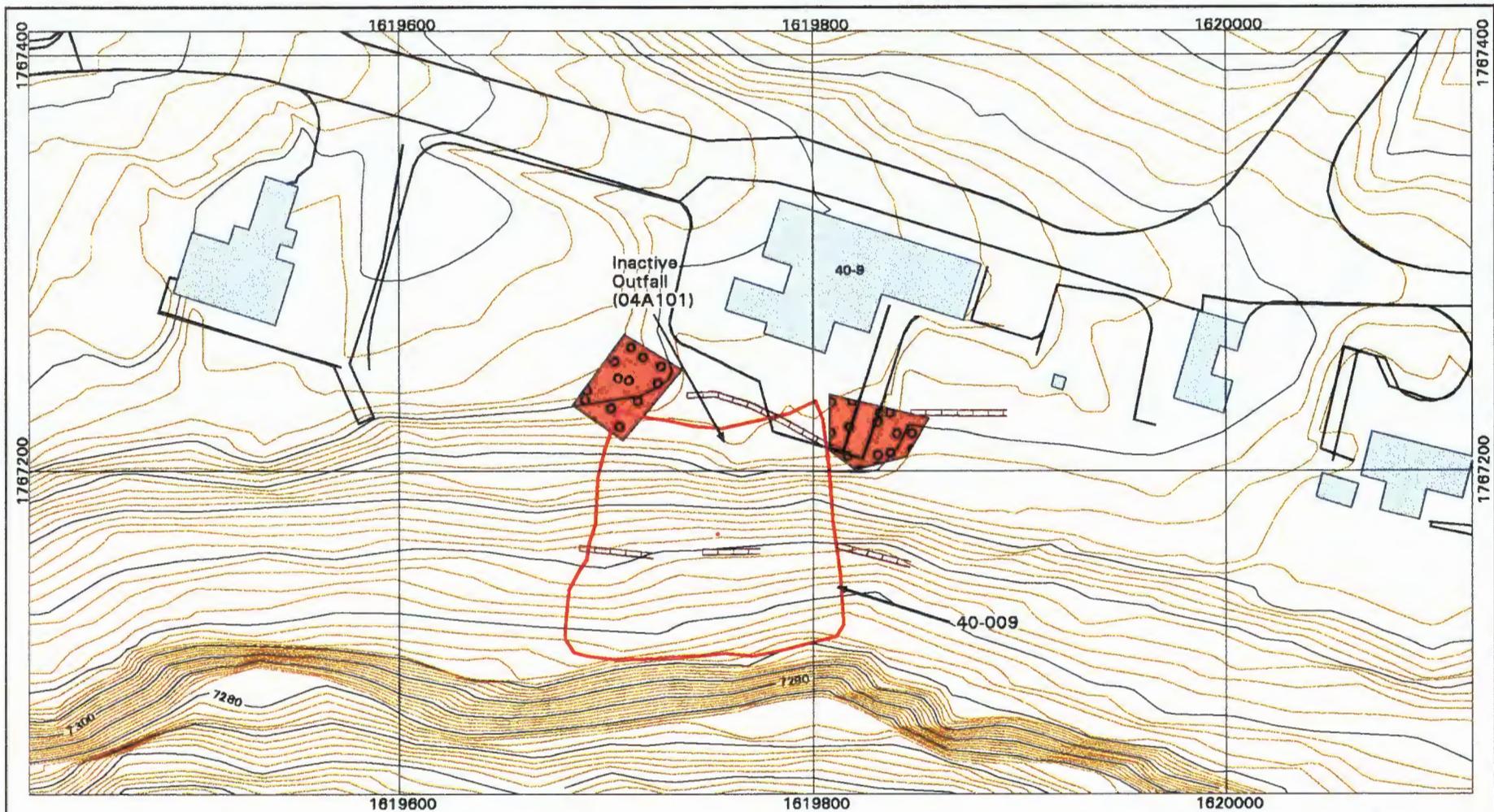


BMPs:

Straw wattles were installed along the mesa edge to divert run-on from the slope. Rock check dams (on-site materials used) were provided to dissipate flow within the drainage channels on both the east and west ends of the site.

ESTIMATED MATERIALS USED:

1 acre treated
20 straw wattles



Best Management Practices at PRS 40-009

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:900



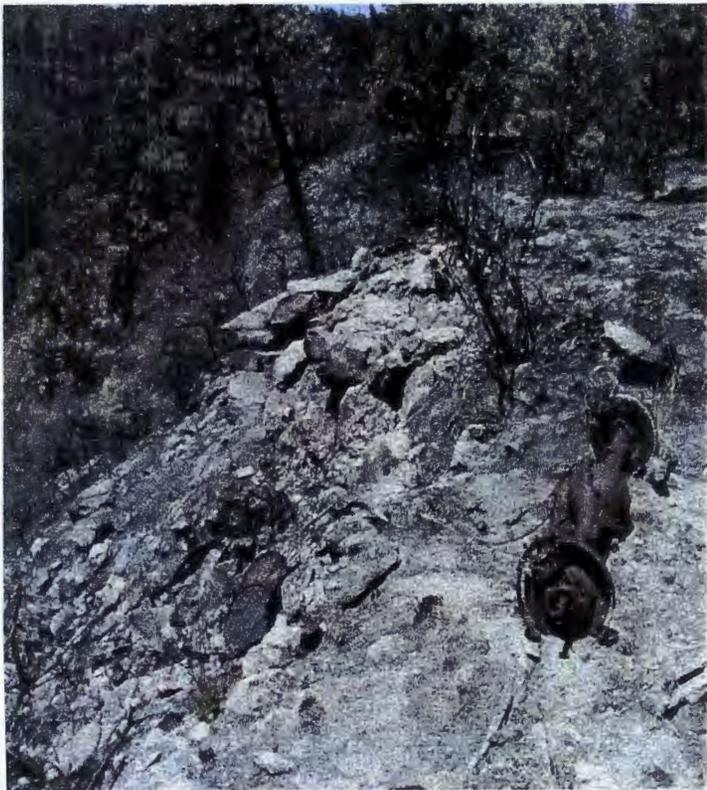
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Produced by Meroie Jones
FIMAD G108952 08 Aug 00

40-010 - Erosion Matrix Score 40.2. An area on the edge of Pajarito Canyon extending about 50-feet along the canyon edge and about 50 feet down the canyon. Debris in this area includes farm and home implements that probably predate the Manhattan Project.



CERRO GRANDE FIRE:

The site is located on the edge of Pajarito Canyon within the Starmer's/Pajarito Canyon Watershed Aggregate. Land disposal area 40-010 was exposed due to the fire, with debris consisting of industrial waste.

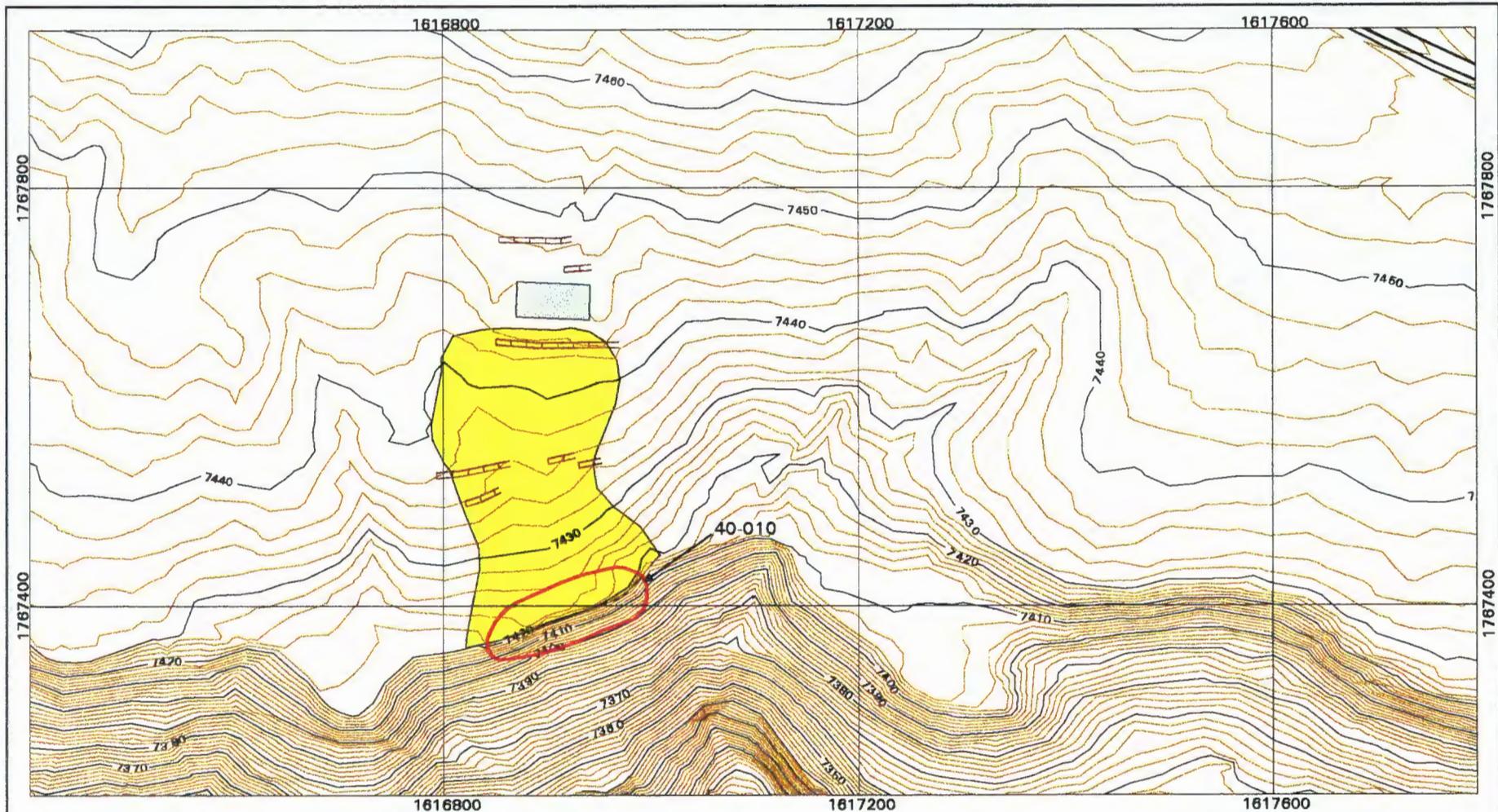


BMPs:

Straw wattles were installed upslope from the landfill to reduce run-on impact. Large trees were contour felled to provide run-on diversion. The area was hand-raked, reseeded and straw mulched. The debris near the mesa's edge was removed from the area and disposed of as solid waste.

ESTIMATED MATERIALS USED:

- 1.5 acres treated
- 40 straw wattles
- 20 straw bales
- 10 pounds seed



Best Management Practices at PRS 40-010

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



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TECHNICAL AREA-42

42-004 – Erosion Matrix Score 93.5. A canyon disposal area at former TA-42. Some building debris including pipes, were discarded over the canyon edge north of TA-42. The canyon disposal area is also designated as PRS No. C-42-001. Soil samples collected in 1991 as part of a survey found no contaminants of concern at the site.



CERRO GRANDE FIRE:

The site is located on a tributary drainage to Mortandad Canyon within the Upper Mortandad Canyon Watershed Aggregate. The entire north facing slope below former TA-42 was moderately burned. Debris on the slope was exposed as a result of the fire. Two distinct drainage channels bisect the area behind the new building constructed near TA-55. The run-on to the western most drainage has been diverted away from the area of concern. The other drainage receives only direct rainfall, with minimal upslope sources.

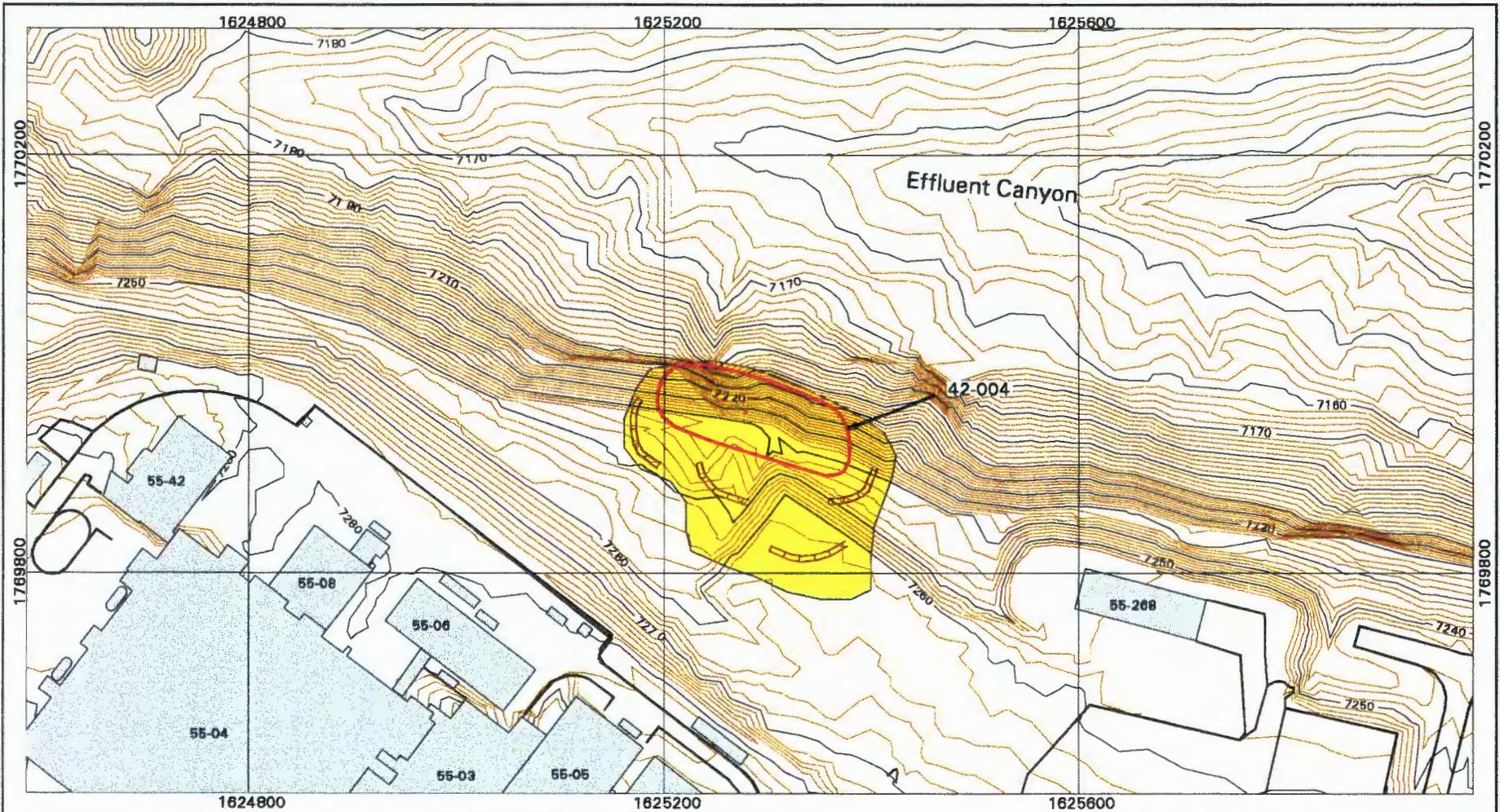


BMPs:

Straw wattles were installed around the area to divert run-on and to impede sediment transport potential. The area was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

- 1 acre treated
- 20 straw wattles
- 20 straw bales
- 10 pounds seed



Best Management Practices at PRS 42-004

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



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TECHNICAL AREA-46

46-004(g) - *Erosion Matrix Score 56.0.* (Outfall N) is the outfall associated with the industrial drain in building 46-1. The drain is a 12-inch vitreous clay pipe (VCP) that daylights into Canada del Buey northeast of TA-46-1. Roof drains and floor drains from the central part of the building are plumbed to the outfall.

46-004(h) - *Erosion Matrix Score 56.0.* (Outfall A) is the outfall from the industrial drain in TA-46-16. The outfall is a 6-inch cast iron pipe located north of the building. Floor drains and possibly roof drains are plumbed to this outfall.

46-004(m) - *Erosion Matrix Score 30.5.* (Outfall CC) is the outfall from a non-contact cooling water system in TA-46-30. The outfall, NPDES 04A013 located north of the building, protrudes from a 10-foot deep bank cut. The effluent had flowed through a ditch at the foot of the bank into a storm drain located east of TA-46-154.

46-004(q) - *Erosion Matrix Score 30.5.* (Outfall B) is a 6-inch cast iron pipe that discharges in Canada del Buey north of TA-46-58. The source of the outfall is unknown and is treated as an industrial drain.

46-004(s) - *Erosion Matrix Score 27.5.* (Outfall X) is the outfall of a 4-inch cast iron pipe located south of TA-46-1. Both floor drains and roof drains are connected to the outfall. The effluent had flowed through a ditch (SWMU 46-007), that is part of the storm drain network that discharges into Canada del Buey.

46-004(u) - *Erosion Matrix Score 30.5.* (Outfall F) is an outfall from an overflow pipe for the west concrete wet well in TA-46-87). The outfall, located north of TA-46-86, is an 8-inch cast iron pipe that discharges to Canada del Buey.

46-004(v) - *Erosion Matrix Score 30.5.* (Outfall G) is the outfall for the industrial drain from TA-46-87. The outfall is a 6-inch cast iron pipe located northwest of building and discharges to Canada del Buey. Both floor drains and roof drains are connected to the drain.

46-004(x) - *Erosion Matrix Score 30.5.* (Outfall J) may be the outfall from floor and/or roof drains in TA-46-31. The outfall is a 6-inch cast iron pipe, located northeast of building that discharges into Canada del Buey.

46-004(y) - *Erosion Matrix Score 30.5.* (Outfall K) is the blowdown outfall from the cooling tower that serves TA-46-31. The outfall is a 6-inch cast iron pipe labeled as (inactive- 03A043) located north of TA-46-31. Both floor drains, sink drains, fume hoods and roof drains are plumbed to this outfall.

46-004(z) - *Erosion Matrix Score 30.5.* (Outfall L) is the outfall from a second industrial drain servicing Rooms 160 through 172 in TA-46-31. The outfall is a 6-inch cast iron pipe, located northwest of building that discharges into Canada del Buey. Both floor drains and roof drains are connected to the outfall.

46-004(a2) - *Erosion Matrix Score 30.5.* (Outfall MM) is the outfall from the third industrial drain servicing Rooms 101, 103 and 105 in 46-31. The outfall is a 6-inch cast iron pipe, located southeast of TA-46-31 and northwest of TA-46-25, that discharged into a ditch located between the buildings. The ditch is part of the storm drain network that discharges into Canada del Buey.

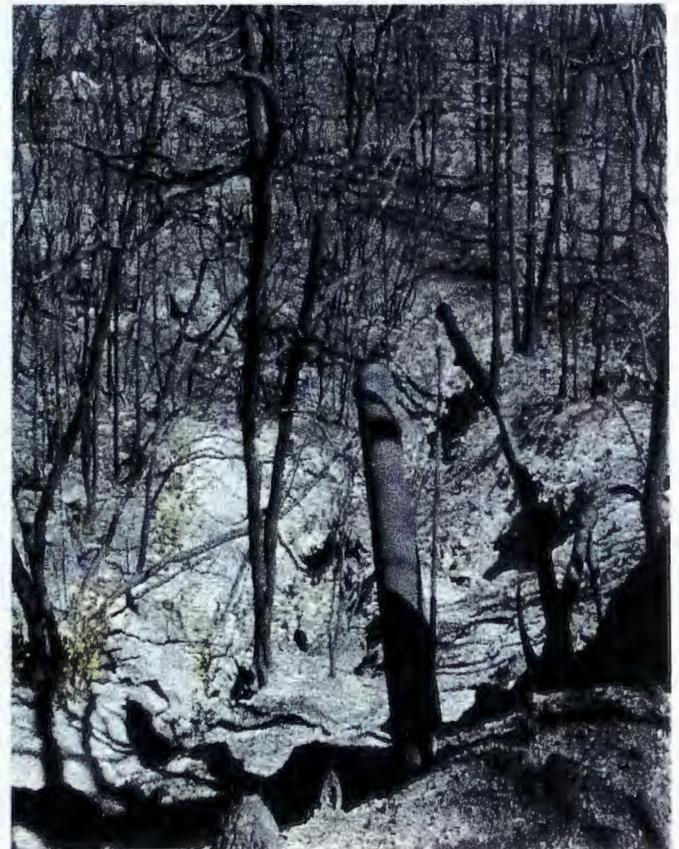
46-004(b2) - *Erosion Matrix Score 56.0.* (Outfall U) is the outfall for an additional industrial drain from TA-46-1. The outfall is a 4-inch VCP located east of building. Floor drains from the building discharged into a ditch (SWMU 46-007), that is part of the storm drain network discharging into Canada del Buey.

46-004(c2) - *Erosion Matrix Score 30.5.* (Outfall S) is the outfall from an industrial drain from building TA-46-1. The outfall is a 4-inch cast iron pipe, located northwest of the building that drains to Canada del Buey. Floor drains and equipment drains were plumbed to this outfall.



CERRO GRANDE FIRE:

The site is located on the northern edge of Canada del Buey within the Middle Mortandad/Canada del Buey Watershed Aggregate. The entire north-facing slope behind TA-46 was moderately to severely burned. Several buildings along the mesa edge were destroyed. The canopy and ground cover were mostly destroyed. The northern slope is extremely steep with several inactive outfalls, pipes and old infrastructure parts exposed.





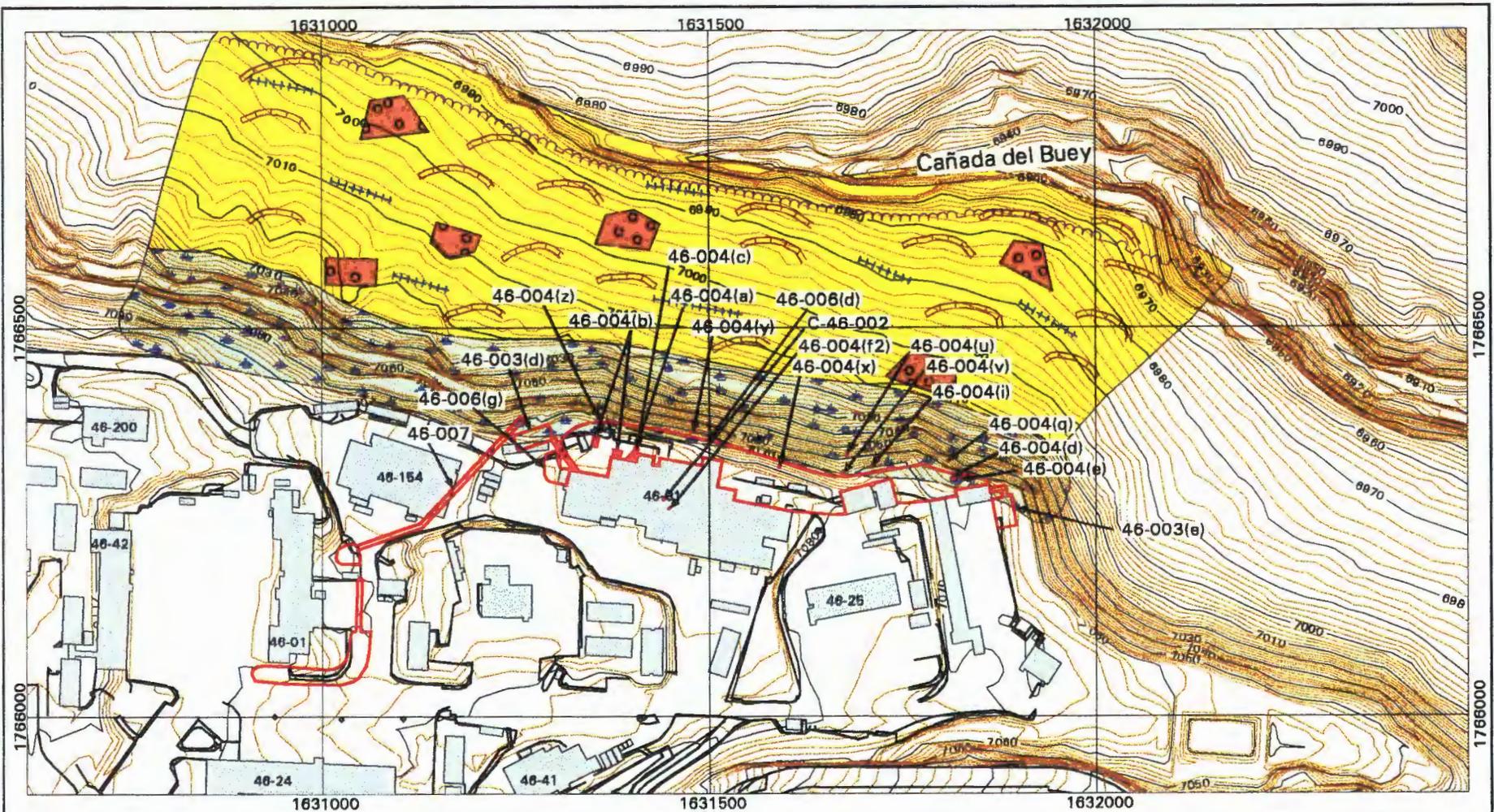
BMPs:

Nearly 15 acres were treated below the northern boundary of TA-46. Over 150 wattles were installed on slopes and within the drainages. Rock check dams were placed within the main drainages to dissipate storm runoff from above. Trees were contour felled across a majority of the site to provide erosion and sediment control. The lower portion of the site was hand raked, reseeded and straw mulched. The upper steep slopes were hydromulched from above. An earthen base coarse berm was installed along the access road at the toe of the slope to provide an extra "line of defense" against sediment migration

ESTIMATED MATERIALS USED:

- 15 acres treated
- 300 straw wattles
- 300 straw bales
- 360 pounds seed (hand applied)
- 12 cubic yards of river rock
- 8 cubic yards of base coarse
- 2,000 pounds of hydromulch
- 75 pounds of tacifier
- 75 pounds seed
- *only 3 acres were hydromulched





Best Management Practices at TA-46 North PRS

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2400



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Los Alamos, New Mexico

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Produced by Marcia Jones
FIMAD G108955 08 Aug 00

TECHNICAL AREA-48

48-003 – *Erosion Matrix Score 40.7*. Inactive septic system. The system served TA-48 from 1957 through January 1986 when it was removed from service. The septic tank and filter bed were decommissioned and removed in 1986.



CERRO GRANDE FIRE:

This site is located on the northern edge of Mortandad Canyon within the Upper Mortandad Watershed Aggregate. The northern part of TA-48 was moderately burned, with damage to ground cover and canopy.

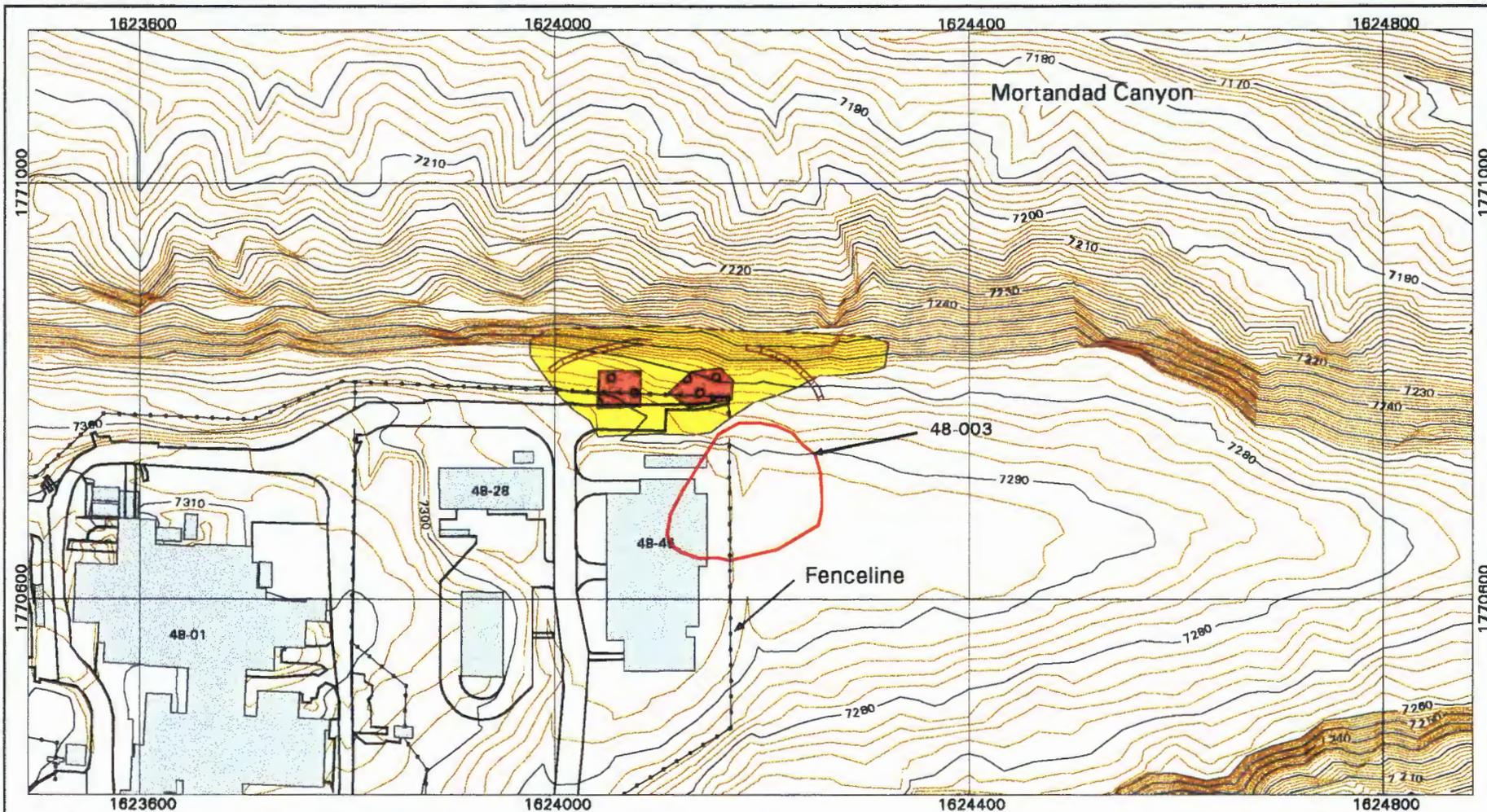


BMPs:

Rock check dams were installed at the northeastern corner of the Technical Area to provide for flow dissipation from runoff events. Straw wattles were installed at the mesa edge. The area was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 10 straw wattles
- 10 pounds seed
- 5 straw bales
- 3 cubic yards of river rock



Best Management Practices at PRSs 48-003

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1800



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FIMAD G108958 08 Aug 00

48-007(b) - *Erosion Matrix Score 49.3*. PRS No. 48-007(b) is an outfall that discharges non-contact cooling water from a magnet and a laser housed in TA-48-1; it discharges up to 4300 gallons per day into Mortandad Canyon and was grandfathered into the NPDES permit (LANL 1985, 853). It has NPDES Permit No. EPA 04A 016.



CERRO GRANDE FIRE:

This site is located on the northern edge of Mortandad Canyon within the Upper Mortandad Watershed Aggregate. The northern part of TA-48 was moderately burned, with damage to ground cover and canopy.



BMPs:

Straw wattles were installed at the mesa edge to impede sediment migration. The area was hand-raked, reseeded, and straw mulched to enhance the revegetation process.

ESTIMATED MATERIALS USED:

.5 acre treated
10 straw wattles
5 straw bales
10 pounds seed

48-007(c) - Erosion Matrix Score 69.5. Outfall that discharges non-contact cooling water that cools vacuum pumps housed in building TA-48-1; the outfall was submitted for inclusion under the NPDES permit in 1987 (LANL 1991, 21557). It has NPDES Permit No. EPA 04A131.



CERRO GRANDE FIRE:

This site is located on the northern edge of Mortandad Canyon within the Upper Mortandad Watershed Aggregate. The northern part of TA-48 was moderately burned, with damage to ground cover and canopy.

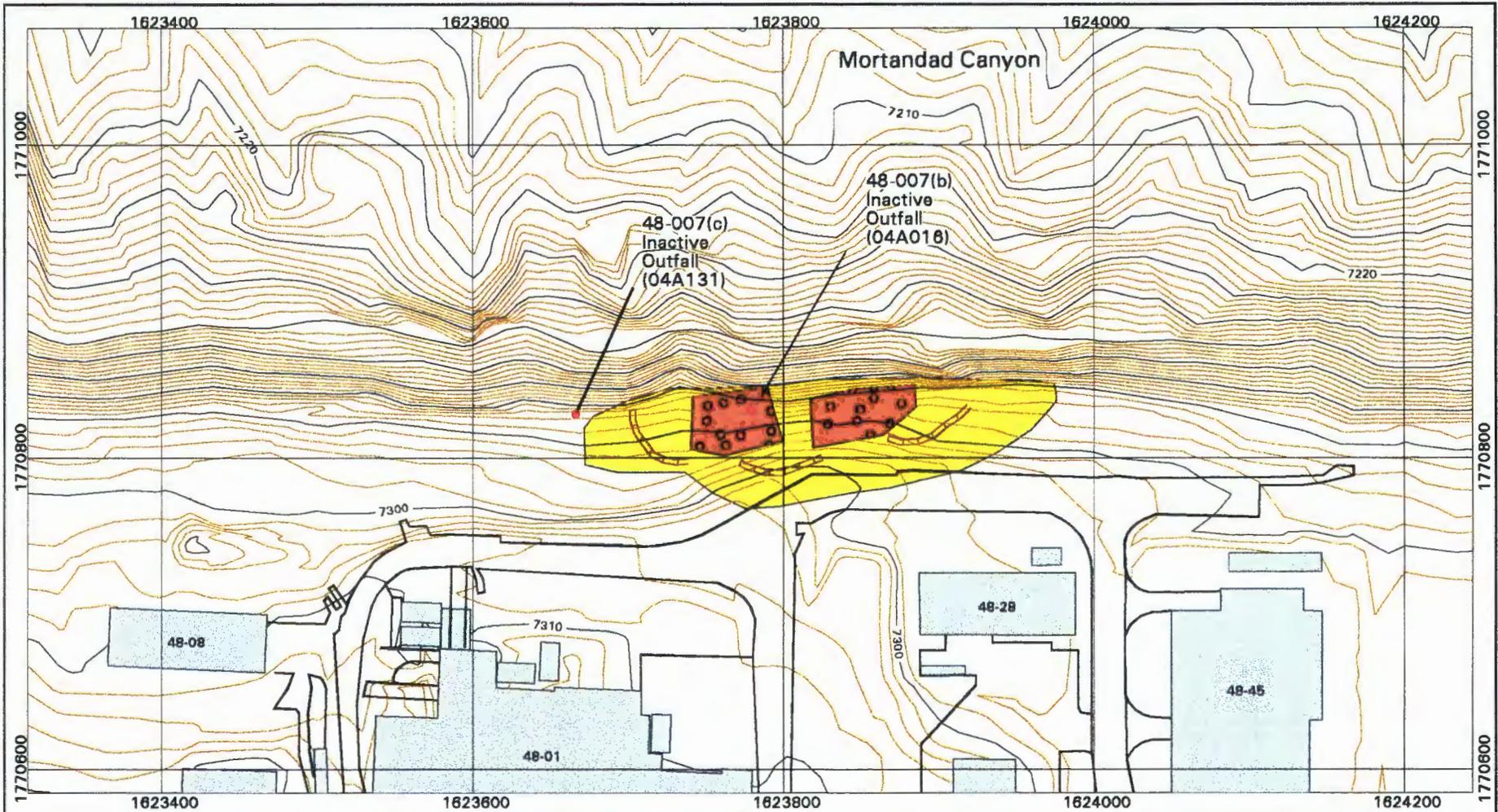


BMPs:

A rock check dam was installed to provide for flow dissipation from runoff events. Straw wattles were installed at the mesa edge. The area was hand-raked, reseeded and straw mulched.

ESTIMATED MATERIALS USED:

- .5 acre treated
- 5 straw wattles
- 3 cubic yards of river rock
- 10 pounds seed
- 5 straw bales



Best Management Practices at PRSs 48-007(b,c)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:1200



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Produced by Marcia Jones
FIMAD G108956 08 Aug 00

48-007(f) - *Erosion Matrix Score 76.5*. This outfall was submitted to the EPA in November 1987 for inclusion under the NPDES permit to discharge up to 100 gallons per day of non-contact cooling water from x-ray equipment located in building TA-48-46 (LANL 1990, 7511). It has Inactive NPDES 04A137.



CERRO GRANDE FIRE:

This site is located on the northern edge of Mortandad Canyon within the Upper Mortandad Watershed Aggregate. The northern part of TA-48 was moderately burned, with damage to ground cover and canopy.

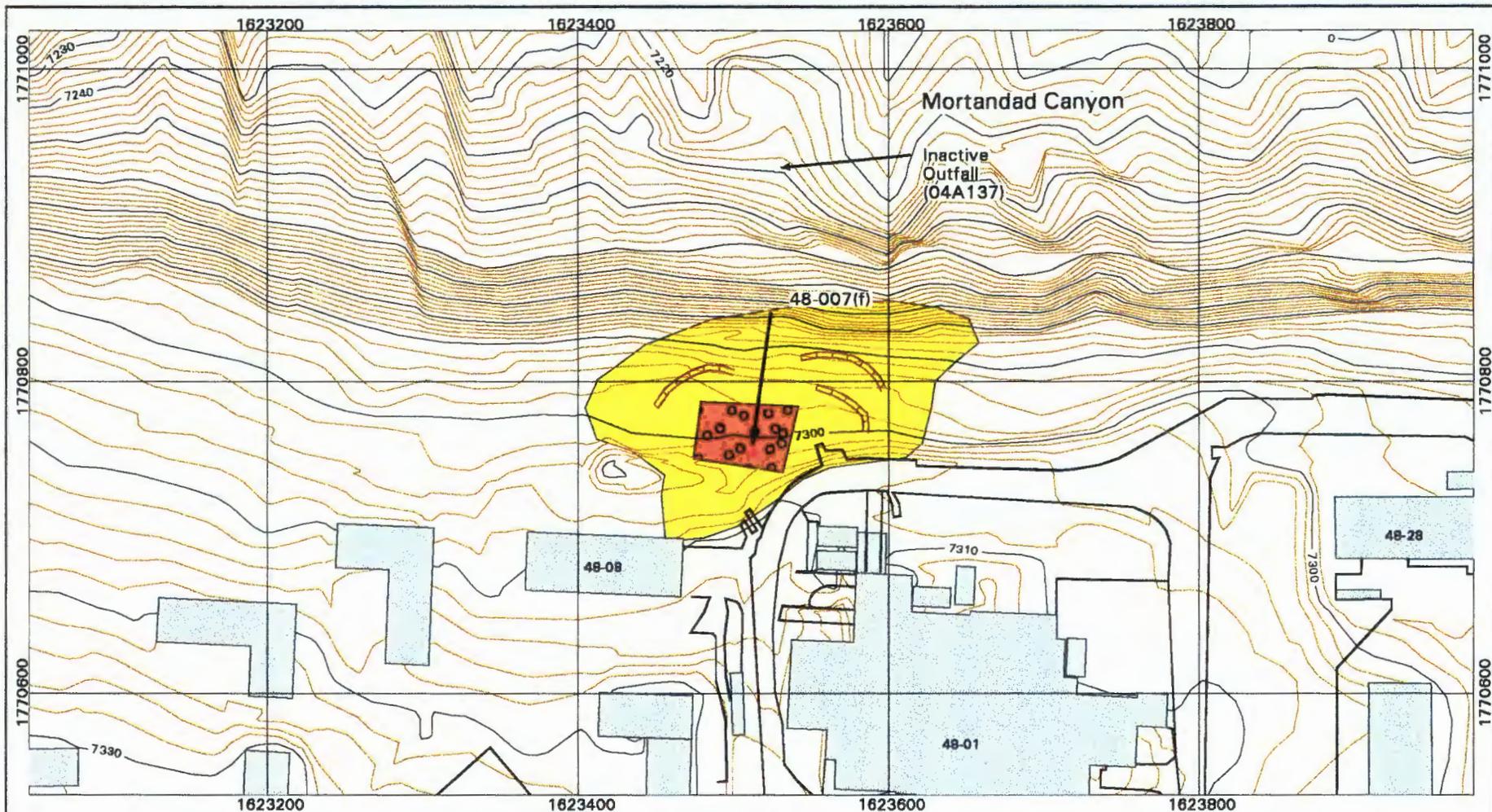


BMPs:

Rock check dams were installed upslope to provide for flow dissipation from runoff events. Straw wattles were installed at the mesa edge. The area was hand-raked, reseeded, and straw mulched.

ESTIMATED MATERIALS USED:

.5 acre treated
10 straw wattles
5 straw bales
10 pounds seed



Best Management Practices at PRSs 48-007(f)

- | | | | | | |
|---|--------------------|---|-------------------------|---|-----------------------|
|  | 10-ft Contour |  | Diversion Channel |  | Rock Check Dams |
|  | 2-ft Contour |  | Earthen Berm |  | Secondary Containment |
|  | Paved Road/Parking |  | Geotextile/Jute Matting |  | Silt Fence/Dike |
|  | PRS |  | Hydromulching |  | Straw Mulch/Reseed |
|  | Structure |  | Log Check Dams |  | Straw Wattles |



Scale: 1:1200



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Produced by Marcie Jones
FIMAD G10B957 08 Aug 00

TECHNICAL AREA-49

49-001(g) – *Erosion Matrix Score 59.2*. Surface contamination area from MDA AB activities.



CERRO GRANDE FIRE:

This site is located on a tributary to Water Canyon within the Lower Water/Indio Watershed Aggregate. The area was lightly to moderately burned from MDA AB towards the canyon edge. All existing BMPs were destroyed

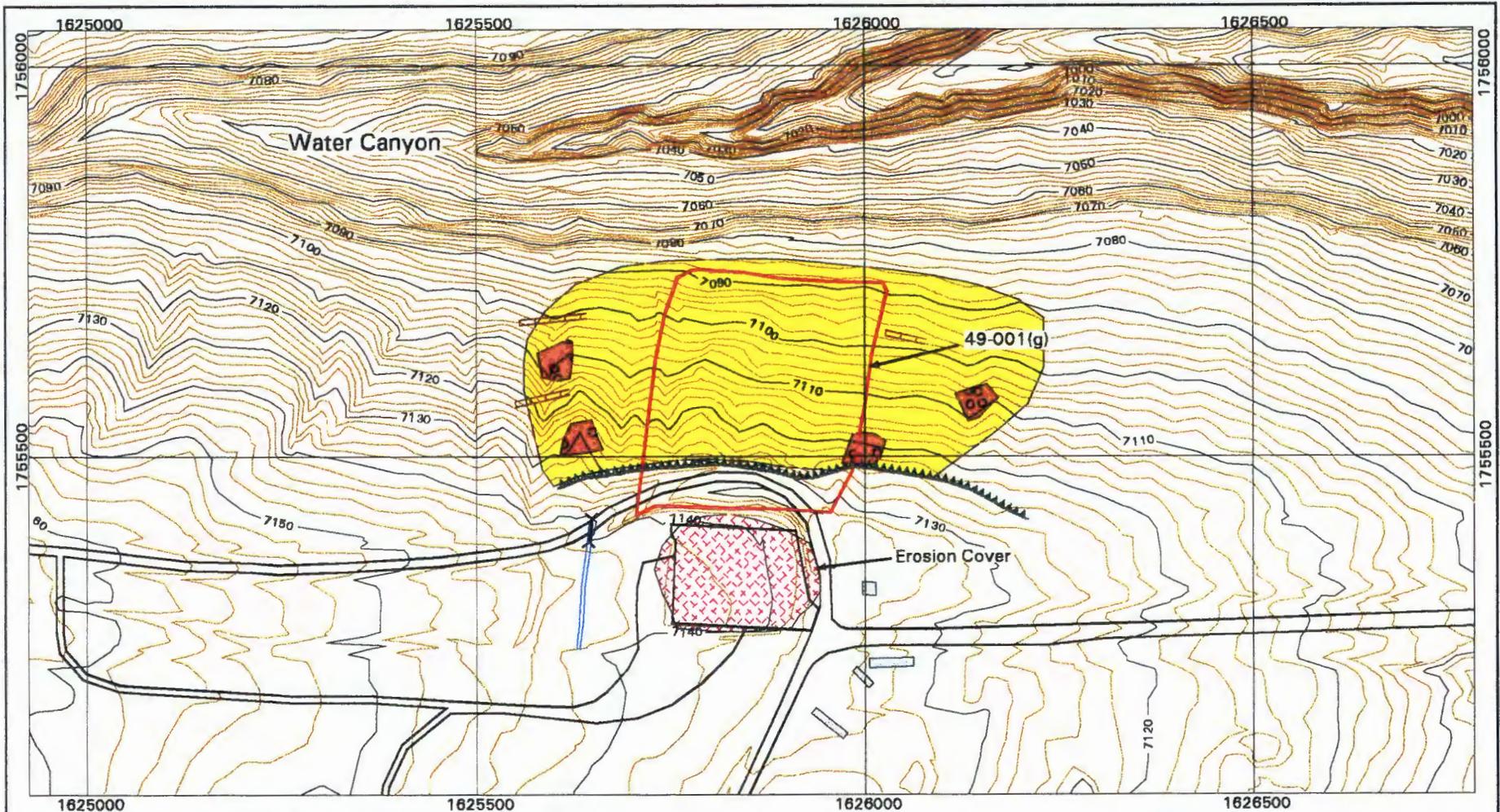


BMPs:

Trees were contour felled to provide erosion controls on the slopes. Rock check dams were installed within all main drainages for flow dissipation. Four hundred linear feet of silt fence was installed on the upper part of site below the access road. The area was spot hand-raked, reseeded and straw mulched to enhance the revegetation process.

ESTIMATED MATERIALS USED:

- 2 acres treated
- 50 straw wattles
- 16 cubic yards river rock
- 40 pounds seed
- 400 linear feet silt fence
- 30 straw bales



Best Management Practices at PRS 49-001(g)

	10-ft Contour		Diversion Channel		Rock Check Dams
	2-ft Contour		Earthen Berm		Secondary Containment
	Paved Road/Parking		Geotextile/Jute Matting		Silt Fence/Dike
	PRS		Hydromulching		Straw Mulch/Reseed
	Structure		Log Check Dams		Straw Wattles



Scale: 1:2400



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